CICS Transaction Server for z/OS
5.5

C++ OO Class Libraries

IBM
Note
Before using this information and the product it supports, read the information in “Notices” on page 263.
# Contents

**About this PDF**................................................................................................................................. ix

**Chapter 1. Installation and setup**........................................................................................................ 1
Getting ready for object oriented CICS........................................................................................................ 1
Installed contents............................................................................................................................................. 1
Header files.................................................................................................................................................... 1
Dynamic link library...................................................................................................................................... 2
Sample source code....................................................................................................................................... 2
Other data sets for CICS Transaction Server for z/OS.................................................................................. 3

**Chapter 2. Using the CICS foundation classes** ...................................................................................... 5
C++ Objects.................................................................................................................................................. 5
Creating an object........................................................................................................................................ 5
Using an object............................................................................................................................................. 6
Deleting an object....................................................................................................................................... 6
Overview of the foundation classes.............................................................................................................. 6
Base classes.................................................................................................................................................. 6
Resource identification classes..................................................................................................................... 7
Resource classes......................................................................................................................................... 8
Support Classes........................................................................................................................................... 10
Using CICS resources.................................................................................................................................. 11
Buffer objects.......................................................................................................................................... 12
IccBuf class.............................................................................................................................................. 12
Using CICS Services................................................................................................................................... 15
File control.................................................................................................................................................. 15
Program control......................................................................................................................................... 19
Starting transactions asynchronously........................................................................................................ 20
Transient Data............................................................................................................................................ 23
Temporary storage....................................................................................................................................... 25
Terminal control......................................................................................................................................... 27
Time and date services............................................................................................................................... 28
Compiling, executing, and debugging........................................................................................................ 30
Compiling a CICS Foundation Class program.......................................................................................... 30
Executing Programs................................................................................................................................... 31
Program debugging...................................................................................................................................... 31
Conditions, errors, and exceptions................................................................................................................ 32
Foundation Class Abend codes................................................................................................................... 32
C++ Exceptions and the Foundation Classes............................................................................................. 32
CICS conditions........................................................................................................................................ 34
Platform differences.................................................................................................................................. 36
Polymorphic Behavior................................................................................................................................. 38
Example of polymorphic behavior.............................................................................................................. 41
Storage management................................................................................................................................... 42
Parameter passing conventions................................................................................................................... 42
Scope of data in IccBuf reference returned from 'read' methods.................................................................. 43

**Chapter 3. Foundation Classes: reference**........................................................................................ 45
Mapping EXEC CICS calls to Foundation Class methods........................................................................... 46
Mapping Foundation Class methods to EXEC CICS calls.......................................................................... 51
Icc structure............................................................................................................................................... 58
<table>
<thead>
<tr>
<th>Class/Constructor/Method</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Functions</td>
<td>58</td>
</tr>
<tr>
<td>Enumerations</td>
<td>60</td>
</tr>
<tr>
<td>IccAbendData class</td>
<td>62</td>
</tr>
<tr>
<td>IccAbendData constructor (protected)</td>
<td>62</td>
</tr>
<tr>
<td>Public methods</td>
<td>62</td>
</tr>
<tr>
<td>Inherited public methods</td>
<td>66</td>
</tr>
<tr>
<td>Inherited protected methods</td>
<td>67</td>
</tr>
<tr>
<td>IccAbsTime class</td>
<td>67</td>
</tr>
<tr>
<td>IccAbsTime constructor</td>
<td>67</td>
</tr>
<tr>
<td>Public methods</td>
<td>68</td>
</tr>
<tr>
<td>Inherited public methods</td>
<td>71</td>
</tr>
<tr>
<td>Inherited protected methods</td>
<td>71</td>
</tr>
<tr>
<td>IccAlarmRequestId class</td>
<td>72</td>
</tr>
<tr>
<td>IccAlarmRequestId constructors</td>
<td>72</td>
</tr>
<tr>
<td>Public methods</td>
<td>73</td>
</tr>
<tr>
<td>Inherited public methods</td>
<td>74</td>
</tr>
<tr>
<td>Inherited protected methods</td>
<td>74</td>
</tr>
<tr>
<td>IccBase class</td>
<td>74</td>
</tr>
<tr>
<td>IccBase constructor (protected)</td>
<td>74</td>
</tr>
<tr>
<td>Public methods</td>
<td>75</td>
</tr>
<tr>
<td>Protected methods</td>
<td>76</td>
</tr>
<tr>
<td>Enumerations</td>
<td>77</td>
</tr>
<tr>
<td>IccBuf class</td>
<td>78</td>
</tr>
<tr>
<td>IccBuf constructors</td>
<td>78</td>
</tr>
<tr>
<td>Public methods</td>
<td>80</td>
</tr>
<tr>
<td>Inherited public methods</td>
<td>88</td>
</tr>
<tr>
<td>Inherited protected methods</td>
<td>88</td>
</tr>
<tr>
<td>Enumerations</td>
<td>88</td>
</tr>
<tr>
<td>IccClock class</td>
<td>89</td>
</tr>
<tr>
<td>IccClock constructor</td>
<td>89</td>
</tr>
<tr>
<td>Public methods</td>
<td>89</td>
</tr>
<tr>
<td>Inherited public methods</td>
<td>92</td>
</tr>
<tr>
<td>Inherited protected methods</td>
<td>93</td>
</tr>
<tr>
<td>Enumerations</td>
<td>93</td>
</tr>
<tr>
<td>IccCondition structure</td>
<td>94</td>
</tr>
<tr>
<td>Enumerations</td>
<td>94</td>
</tr>
<tr>
<td>IccConsole class</td>
<td>95</td>
</tr>
<tr>
<td>IccConsole constructor (protected)</td>
<td>96</td>
</tr>
<tr>
<td>Public methods</td>
<td>96</td>
</tr>
<tr>
<td>Inherited public methods</td>
<td>98</td>
</tr>
<tr>
<td>Inherited protected methods</td>
<td>99</td>
</tr>
<tr>
<td>Enumerations</td>
<td>99</td>
</tr>
<tr>
<td>IccControl class</td>
<td>99</td>
</tr>
<tr>
<td>IccControl constructor (protected)</td>
<td>99</td>
</tr>
<tr>
<td>Public methods</td>
<td>100</td>
</tr>
<tr>
<td>Inherited public methods</td>
<td>103</td>
</tr>
<tr>
<td>Inherited protected methods</td>
<td>104</td>
</tr>
<tr>
<td>IccConvId class</td>
<td>104</td>
</tr>
<tr>
<td>IccConvId constructors</td>
<td>104</td>
</tr>
<tr>
<td>Public methods</td>
<td>105</td>
</tr>
<tr>
<td>Inherited public methods</td>
<td>105</td>
</tr>
<tr>
<td>Inherited protected methods</td>
<td>105</td>
</tr>
<tr>
<td>IccDataQueue class</td>
<td>106</td>
</tr>
<tr>
<td>IccDataQueue constructors</td>
<td>106</td>
</tr>
<tr>
<td>Public methods</td>
<td>106</td>
</tr>
<tr>
<td>Inherited public methods</td>
<td>108</td>
</tr>
<tr>
<td>Inherited protected methods</td>
<td>108</td>
</tr>
<tr>
<td>IccDataQueueId class</td>
<td>109</td>
</tr>
<tr>
<td>Section</td>
<td>Page</td>
</tr>
<tr>
<td>------------------------------------------------------------------------</td>
<td>------</td>
</tr>
<tr>
<td>Enumerations</td>
<td>236</td>
</tr>
<tr>
<td>IccTerminalData class</td>
<td>237</td>
</tr>
<tr>
<td>IccTerminalData constructor (protected)</td>
<td>237</td>
</tr>
<tr>
<td>Public methods</td>
<td>237</td>
</tr>
<tr>
<td>Inherited public methods</td>
<td>243</td>
</tr>
<tr>
<td>Inherited protected methods</td>
<td>243</td>
</tr>
<tr>
<td>IccTime class</td>
<td>244</td>
</tr>
<tr>
<td>IccTime constructor (protected)</td>
<td>244</td>
</tr>
<tr>
<td>Public methods</td>
<td>244</td>
</tr>
<tr>
<td>Inherited public methods</td>
<td>245</td>
</tr>
<tr>
<td>Inherited protected methods</td>
<td>246</td>
</tr>
<tr>
<td>Enumerations</td>
<td>246</td>
</tr>
<tr>
<td>IccTimeInterval class</td>
<td>246</td>
</tr>
<tr>
<td>IccTimeInterval constructors</td>
<td>246</td>
</tr>
<tr>
<td>Public methods</td>
<td>247</td>
</tr>
<tr>
<td>Inherited public methods</td>
<td>247</td>
</tr>
<tr>
<td>Inherited protected methods</td>
<td>248</td>
</tr>
<tr>
<td>IccTimeOfDay class</td>
<td>248</td>
</tr>
<tr>
<td>IccTimeOfDay constructors</td>
<td>248</td>
</tr>
<tr>
<td>Public methods</td>
<td>249</td>
</tr>
<tr>
<td>Inherited public methods</td>
<td>250</td>
</tr>
<tr>
<td>Inherited protected methods</td>
<td>250</td>
</tr>
<tr>
<td>IccTPNameId class</td>
<td>250</td>
</tr>
<tr>
<td>IccTPNameId constructors</td>
<td>251</td>
</tr>
<tr>
<td>Public methods</td>
<td>251</td>
</tr>
<tr>
<td>Inherited public methods</td>
<td>252</td>
</tr>
<tr>
<td>Inherited protected methods</td>
<td>252</td>
</tr>
<tr>
<td>IccTransId class</td>
<td>252</td>
</tr>
<tr>
<td>IccTransId constructors</td>
<td>252</td>
</tr>
<tr>
<td>Public methods</td>
<td>253</td>
</tr>
<tr>
<td>Inherited public methods</td>
<td>253</td>
</tr>
<tr>
<td>Inherited protected methods</td>
<td>254</td>
</tr>
<tr>
<td>IccUser class</td>
<td>254</td>
</tr>
<tr>
<td>IccUser constructors</td>
<td>254</td>
</tr>
<tr>
<td>Public methods</td>
<td>255</td>
</tr>
<tr>
<td>Inherited public methods</td>
<td>257</td>
</tr>
<tr>
<td>Inherited protected methods</td>
<td>257</td>
</tr>
<tr>
<td>IccUserId class</td>
<td>258</td>
</tr>
<tr>
<td>IccUserId constructors</td>
<td>258</td>
</tr>
<tr>
<td>Public methods</td>
<td>258</td>
</tr>
<tr>
<td>Inherited public methods</td>
<td>259</td>
</tr>
<tr>
<td>Inherited protected methods</td>
<td>259</td>
</tr>
<tr>
<td>IccValue structure</td>
<td>259</td>
</tr>
<tr>
<td>Enumeration</td>
<td>259</td>
</tr>
<tr>
<td>main function</td>
<td>260</td>
</tr>
<tr>
<td>Notices</td>
<td>263</td>
</tr>
<tr>
<td>Index</td>
<td>269</td>
</tr>
</tbody>
</table>
This PDF describes how to use the CICS C++ foundation classes, which allow an application programmer to access CICS services that are available via the EXEC CICS API.

For details of the terms and notation used, see Conventions and terminology used in the CICS documentation in IBM Knowledge Center.

**Date of this PDF**

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Chapter 1. Installation and setup

This section describes the CICS foundation classes installed on your CICS server.

Getting ready for object oriented CICS

You must be familiar with object oriented concepts and technology, the C++ language and with CICS in order to understand the topics that follow.

This is not intended to be an introduction to any of these subjects.

Installed contents

The CICS foundation classes package consists of several files or data sets. These contain the:

- header files
- executables (DLL's)
- samples
- other CICS Transaction Server for z/OS files

This section describes the files that comprise the CICS C++ Foundation Classes and explains where you can find them on your CICS server.

Header files

The header files are the C++ class definitions needed to compile CICS C++ Foundation Class programs.

<table>
<thead>
<tr>
<th>C++ Header File</th>
<th>Classes Defined in this Header</th>
</tr>
</thead>
<tbody>
<tr>
<td>ICCABDEH</td>
<td>IccAbendData</td>
</tr>
<tr>
<td>ICCBASEH</td>
<td>IccBase</td>
</tr>
<tr>
<td>ICCBUFEH</td>
<td>IccBuf</td>
</tr>
<tr>
<td>ICCCLKEH</td>
<td>IccClock</td>
</tr>
<tr>
<td>ICCCNDEH</td>
<td>IccCondition (struct)</td>
</tr>
<tr>
<td>ICCCONEH</td>
<td>IccConsole</td>
</tr>
<tr>
<td>ICCCTLEH</td>
<td>IccControl</td>
</tr>
<tr>
<td>ICCDATEH</td>
<td>IccDataQueue</td>
</tr>
<tr>
<td>ICCEH</td>
<td>see “1” on page 2</td>
</tr>
<tr>
<td>ICCEVTEH</td>
<td>IccEvent</td>
</tr>
<tr>
<td>ICCEXCEH</td>
<td>IccException</td>
</tr>
<tr>
<td>ICCFILEH</td>
<td>IccFile</td>
</tr>
<tr>
<td>ICCFILEH</td>
<td>IccFileIterator</td>
</tr>
<tr>
<td>ICCGLBEH</td>
<td>Icc (struct) (global functions)</td>
</tr>
<tr>
<td>ICCJRNIEH</td>
<td>IccJournal</td>
</tr>
<tr>
<td>ICCMSGEH</td>
<td>IccMessage</td>
</tr>
<tr>
<td>ICCPRGEH</td>
<td>IccProgram</td>
</tr>
</tbody>
</table>
### C++ Header File

<table>
<thead>
<tr>
<th>C++ Header File</th>
<th>Classes Defined in this Header</th>
</tr>
</thead>
<tbody>
<tr>
<td>ICCRECEH</td>
<td>IccRecordIndex, IccKey, IccRBA and IccRRN</td>
</tr>
<tr>
<td>ICCRESEH</td>
<td>IccResource</td>
</tr>
<tr>
<td>ICCRIDEH</td>
<td>IccResourceId + subclasses (such as IccConvId)</td>
</tr>
<tr>
<td>ICCSEMEH</td>
<td>IccSemaphore</td>
</tr>
<tr>
<td>ICCSESEH</td>
<td>IccSession</td>
</tr>
<tr>
<td>ICCSRQEH</td>
<td>IccStartRequestQ</td>
</tr>
<tr>
<td>ICCSYSEH</td>
<td>IccSystem</td>
</tr>
<tr>
<td>ICCTIMEH</td>
<td>IccTime, IccAbsTime, IccTimeInterval, IccTimeOfDay</td>
</tr>
<tr>
<td>ICCTMDEH</td>
<td>IccTerminalData</td>
</tr>
<tr>
<td>ICCTMPEH</td>
<td>IccTempStore</td>
</tr>
<tr>
<td>ICCTRMEH</td>
<td>IccTerminal</td>
</tr>
<tr>
<td>ICCTSKEH</td>
<td>IccTask</td>
</tr>
<tr>
<td>ICCUSREH</td>
<td>IccUser</td>
</tr>
<tr>
<td>ICCVALEH</td>
<td>IccValue (struct)</td>
</tr>
</tbody>
</table>

### Note:
1. A single header that #includes all the listed header files is supplied as ICCEH
2. The file ICCMAIN is also supplied with the C++ header files. This contains the `main` function stub that should be used when you build a Foundation Class program.
3. Header files are located in CICSTS55.CICS.SDFHC370.

### Location

PDS: CICSTS55.CICS.SDFHC370.

### Dynamic link library

The Dynamic Link Library is the runtime environment that is needed to support a CICS C++ Foundation Class program.

### Location

ICCFCDLL module in PDS: CICSTS55.CICS.SDFHLOAD.

### Sample source code

The samples are provided to help you understand how to use the classes to build object oriented applications.

### Location

PDS: CICSTS55.CICS.SDFHSAMP.
Running the sample applications

If you have installed the resources defined in the member DFHCURDS, you should be ready to run some of the sample applications.

The sample programs are supplied as source code in library CICSTS55.CICS.SDFHSAMP and before you can run the sample programs, you need to compile, pre-link and link them. To do this, use the procedure ICCFCCL in data set CICSTS55.CICS.SDFHPROC.

ICCFCCL contains the Job Control Language needed to compile, pre-link and link a CICS user application. Before using ICCFCCL you may find it necessary to perform some customization to conform to your installation standards. See also Compiling programs.

Sample programs such as ICC$BUF, ICC$CLK and ICC$HEL require no additional CICS resource definitions, and should now execute successfully.

Other sample programs, in particular the DTP samples named ICC$SES1 and ICC$SES2, require additional CICS resource definitions. Refer to the prologues in the source of the sample programs for information about these additional requirements.

Other data sets for CICS Transaction Server for z/OS

CICSTS55.CICS.SDFHSACK contains the member
- ICCFCIMP - 'sidedeck' containing import control statements

CICSTS55.CICS.SDFHPROC contains the members
- ICCFC - JCL to compile a CFC user program
- ICCFCCL - JCL to compile, prelink and link a CFC user program
- ICCFCGL - JCL to compile and link an XPLINK program that uses CFC libraries.
- ICCFCL - JCL to prelink and link a CFC user program

CICSTS55.CICS.SDFHLOAD contains the members
- DFHCURDS - program definitions required for CICS system definition.
- DFHCURDI - program definitions required for CICS system definition.
Chapter 2. Using the CICS foundation classes

This section describes the CICS foundation classes and how to use them. There is a formal listing of the user interface in Foundation Classes: reference.

C++ Objects

This section describes how to create, use, and delete objects.

This section describes how to create, use, and delete objects. In our context an object is an instance of a class. An object cannot be an instance of a base or abstract base class. It is possible to create objects of all the concrete (non-base) classes described in the reference part of this book.

Creating an object

If a class has a constructor it is executed when an object of that class is created. This constructor typically initializes the state of the object. Foundation Classes’ constructors often have mandatory positional parameters that the programmer must provide at object creation time.

C++ objects can be created in one of two ways:

1. Automatically, where the object is created on the C++ stack. For example:

   ```
   ClassX objX
   ClassY objY(parameter1);
   } //objects deleted here
   ```

   Here, objX and objY are automatically created on the stack. Their lifetime is limited by the context in which they were created; when they go out of scope they are automatically deleted (that is, their destructors run and their storage is released).

2. Dynamically, where the object is created on the C++ heap. For example:

   ```
   ClassX* pObjX = new ClassX;
   ClassY* pObjY = new ClassY(parameter1);
   } //objects NOT deleted here
   ```

   Here we deal with pointers to objects instead of the objects themselves. The lifetime of the object outlives the scope in which it was created. In the previous sample the pointers (pObjX and pObjY) are 'lost' as they go out of scope but the objects they pointed to still exist! The objects exist until they are explicitly deleted as shown here:

   ```
   ClassX* pObjX = new ClassX;
   ClassY* pObjY = new ClassY(parameter1);
   : pObjX->method1();
   pObjY->method2();
   :
   delete pObjX;
   delete pObjY;
   ```

Most of the samples in this book use automatic storage. You are advised to use automatic storage, because you do not have remember to explicitly delete objects, but you are free to use either style for CICS C++ Foundation Class programs. For more information on Foundation Classes and storage management see “Storage management” on page 42.
Using an object

Any of the class public methods can be called on an object of that class. The following example creates object `obj` and then calls method `doSomething` on it:

```c++
ClassY obj("TEMP1234");
obj.doSomething();
```

Alternatively, you can do this using dynamic object creation:

```c++
ClassY* pObj = new ClassY("parameter1");
pObj->doSomething();
```

Deleting an object

When an object is destroyed its destructor function, which has the same name as the class preceded with ~ (tilde), is automatically called. (You cannot call the destructor explicitly).

If the object was created automatically it is automatically destroyed when it goes out of scope.

If the object was created dynamically it exists until an explicit `delete` operator is used.

Overview of the foundation classes

This topic is a formal introduction to what the Foundation Classes can do for you.

See ICC$HEL: C++ Hello World sample for a simple example to get you started. The section takes a brief look at the CICS C++ Foundation Class library by considering the categories in turn.

See Foundation classes reference for more detailed information on the Foundation Classes.

Every class that belongs to the CICS Foundation Classes is prefixed by `Icc`.

Base classes

All classes inherit, directly or indirectly, from `IccBase`.

```c++
struct IccBase {
    struct IccRecordIndex;
    struct IccResource;
    struct IccControl;
    struct IccTime;
    struct IccResourceId;
};
```

Figure 1. Base classes

All resource identification classes, such as `IccTermId`, and `IccTransId`, inherit from `IccResourceId` class. These are typically CICS table entries.

All CICS resources—in fact any class that needs access to CICS services—inherit from `IccResource` class.

Base classes enable common interfaces to be defined for categories of class. They are used to create the foundation classes, as provided by IBM, and they can be used by application programmers to create their own derived classes.

```c++
struct IccBase {
    // The base for every other foundation class. It enables memory management and allows objects to be interrogated to discover which type they are.
};
```
IccControl
The abstract base class that the application program has to subclass and provide with an implementation of the run method.

IccResource
The base class for all classes that access CICS resources or services. See “Resource classes” on page 8.

IccResourceId
The base class for all table entry (resource name) classes, such as IccFileId and IccTempStoreId.

IccTime
The base class for the classes that store time information: IccAbsTime, IccTimeInterval and IccTimeOfDay.

Resource identification classes
Resource identification classes are as follows.

IccBase
IccResourceId
IccConvId
IccDataQueueId
IccFileId
IccGroupId
IccJournalId
IccJournalTypeId
IccLockId
IccPartnerId
IccProgramId
IccRequestId
IccAlarmRequestId
IccSysId
IccTempStoreId
IccTermId
IccTPNameId
IccTransId
IccUserId

Figure 2. Resource identification classes

CICS resource identification classes define CICS resource identifiers – typically the name of the resource as specified in its RDO resource definition. For example an IccFileId object represents a CICS file name. All concrete resource identification classes have the following properties:

• The name of the class ends in Id.
• The class is a subclass of the IccResourceId class.
• The constructors check that any supplied resource identifier meets CICS standards. For example, an IccFileId object must contain a 1 to 8 byte character field; providing a 9-byte field is not tolerated.

The resource identification classes improve type checking; methods that expect an IccFileId object as a parameter do not accept an IccProgramId object instead. If character strings representing the resource names are used instead, the compiler cannot check for validity – it cannot check whether the string is a file name or a program name.

Many of the resource classes, described in “Resource classes” on page 8, contain resource identification classes. For example, an IccFile object contains an IccFileId object. You must use the resource object, not the resource identification object, to operate on a CICS resource. For example, you must use IccFile, rather than IccFileId to read a record from a file.
<table>
<thead>
<tr>
<th>Class</th>
<th>CICS resource</th>
</tr>
</thead>
<tbody>
<tr>
<td>IccAlarmRequestId</td>
<td>alarm request</td>
</tr>
<tr>
<td>IccConvId</td>
<td>conversation</td>
</tr>
<tr>
<td>IccDataQueueId</td>
<td>transient data queue</td>
</tr>
<tr>
<td>IccFileId</td>
<td>file</td>
</tr>
<tr>
<td>IccGroupId</td>
<td>group</td>
</tr>
<tr>
<td>IccJournalId</td>
<td>journal</td>
</tr>
<tr>
<td>IccJournalTypeId</td>
<td>journal type</td>
</tr>
<tr>
<td>IccLockId</td>
<td>(Not applicable)</td>
</tr>
<tr>
<td>IccPartnerId</td>
<td>APPC partner definition files</td>
</tr>
<tr>
<td>IccProgramId</td>
<td>program</td>
</tr>
<tr>
<td>IccRequestId</td>
<td>request</td>
</tr>
<tr>
<td>IccSysId</td>
<td>remote system</td>
</tr>
<tr>
<td>IccTempStoreId</td>
<td>temporary storage queue</td>
</tr>
<tr>
<td>IccTermId</td>
<td>terminal</td>
</tr>
<tr>
<td>IccTPNameId</td>
<td>remote APPC TP name</td>
</tr>
<tr>
<td>IccTransId</td>
<td>transaction</td>
</tr>
<tr>
<td>IccUserId</td>
<td>user</td>
</tr>
</tbody>
</table>

**Resource classes**

All CICS resource classes inherit from the **IccResource** base class.

```plaintext
IccBase
  IccResource
  IccAbendData
  IccClock
  IccConsole
  IccControl
  IccDataQueue
  IccFile
  IccFileIterator
  IccJournal
  IccProgram
  IccSemaphore
  IccSession
  IccStartRequestQ
  IccSystem
  IccTask
  IccTempStore
  IccTerminal
  IccTerminalData
  IccUser
```

*Figure 3. Resource classes*

These classes model the behavior of the major CICS resources, for example:
• Terminals are modelled by **IccTerminal**.
• Programs are modelled by **IccProgram**.
• Temporary Storage queues are modelled by **IccTempStore**.
• Transient Data queues are modelled by **IccDataQueue**.

Any operation on a CICS resource may raise a CICS condition; the **condition** method of **IccResource** (see [IccResource method: condition](#)) can interrogate it.

*(Any class that accesses CICS services **must** be derived from **IccResource**).*

<table>
<thead>
<tr>
<th>Class</th>
<th>CICS resource</th>
</tr>
</thead>
<tbody>
<tr>
<td>IccAbendData</td>
<td>task abend data</td>
</tr>
<tr>
<td>IccClock</td>
<td>CICS time and date services</td>
</tr>
<tr>
<td>IccConsole</td>
<td>CICS console</td>
</tr>
<tr>
<td>IccControl</td>
<td>control of executing program</td>
</tr>
<tr>
<td>IccDataQueue</td>
<td>transient data queue</td>
</tr>
<tr>
<td>IccFile</td>
<td>file</td>
</tr>
<tr>
<td>IccFileIterator</td>
<td>file iterator (browsing files)</td>
</tr>
<tr>
<td>IccJournal</td>
<td>user or system journal</td>
</tr>
<tr>
<td>IccProgram</td>
<td>program (outside executing program)</td>
</tr>
<tr>
<td>IccSemaphore</td>
<td>semaphore (locking services)</td>
</tr>
<tr>
<td>IccSession</td>
<td>session</td>
</tr>
<tr>
<td>IccStartRequestQ</td>
<td>start request queue; asynchronous transaction starts</td>
</tr>
<tr>
<td>IccSystem</td>
<td>CICS system</td>
</tr>
<tr>
<td>IccTask</td>
<td>current task</td>
</tr>
<tr>
<td>IccTempStore</td>
<td>temporary storage queue</td>
</tr>
<tr>
<td>IccTerminal</td>
<td>terminal belonging to current task</td>
</tr>
<tr>
<td>IccTerminalData</td>
<td>attributes of <strong>IccTerminal</strong></td>
</tr>
<tr>
<td>IccTime</td>
<td>time specification</td>
</tr>
<tr>
<td>IccUser</td>
<td>user (security attributes)</td>
</tr>
</tbody>
</table>
Support Classes

Support classes are as follows.

- IccBase
- IccBuf
- IccEvent
- IccException
- IccMessage
- IccRecordIndex
- IccKey
- IccRBA
- IccRRN
- IccResource
- IccTime
- IccAbsTime
- IccTimeInterval
- IccTimeOfDay

Figure 4. Support classes

These classes are tools that complement the resource classes: they make life easier for the application programmer and thus add value to the object model.

<table>
<thead>
<tr>
<th>Resource class</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>IccAbsTime</td>
<td>Absolute time (milliseconds since January 1 1900)</td>
</tr>
<tr>
<td>IccBuf</td>
<td>Data buffer (makes manipulating data areas easier)</td>
</tr>
<tr>
<td>IccEvent</td>
<td>Event (the outcome of a CICS command)</td>
</tr>
<tr>
<td>IccException</td>
<td>Foundation Class exception (supports the C++ exception handling model)</td>
</tr>
<tr>
<td>IccTimeInterval</td>
<td>Time interval (for example, five minutes)</td>
</tr>
<tr>
<td>IccTimeOfDay</td>
<td>Time of day (for example, five minutes past six)</td>
</tr>
</tbody>
</table>

**IccAbsTime, IccTimeInterval** and **IccTimeOfDay** classes make it simpler for the application programmer to specify time measurements as objects within an application program. **IccTime** is a base class: **IccAbsTime**, **IccTimeInterval**, and **IccTimeOfDay** are derived from **IccTime**.

Consider method **delay** in class **IccTask**, whose signature is as follows:

```cpp
void delay(const IccTime& time, const IccRequestId* reqId = 0);
```

To request a delay of 1 minute and 7 seconds (that is, a time interval) the application programmer can do this:

```cpp
IccTimeInterval time(0, 1, 7);
task()->delay(time);
```

**Note:** The task method is provided in class **IccControl** and returns a pointer to the application's task object.

Alternatively, to request a delay until 10 minutes past twelve (lunchtime?) the application programmer can do this:

```cpp
IccTimeOfDay lunchtime(12, 10);
task()->delay(lunchtime);
```
The **IccBuf** class allows easy manipulation of buffers, such as file record buffers, transient data record buffers, and COMMAREA buffers (for more information on **IccBuf** class see “Buffer objects” on page 12).

**IccMessage** class is used primarily by **IccException** class to encapsulate a description of why an exception was thrown. The application programmer can also use **IccMessage** to create their own message objects.

**IccException** objects are thrown from many of the methods in the Foundation Classes when an error is encountered.

The **IccEvent** class allows a programmer to gain access to information relating to a particular CICS event (command).

### Using CICS resources

To use a CICS resource, such as a file or program, you must first create an appropriate object and then call methods on the object.

### Creating a resource object

When you create a resource object you create a representation of the actual CICS resource (such as a file or program). You do not create the CICS resource; the object is the application's view of the resource. The same is true of destroying objects.

Use an accompanying resource identification object when creating a resource object. For example:

```cpp
IccFileId id("XYZ123");
IccFile file(id);
```

This allows the C++ compiler to protect you against doing something wrong such as:

```cpp
IccDataQueueId id("WXYZ");
IccFile file(id); // gives error at compile time
```

The alternative of using the text name of the resource when creating the object is also permitted:

```cpp
IccFile file("XYZ123");
```

### Singleton classes

Many resource classes, such as **IccFile** , can be used to create multiple resource objects within a single program.

```cpp
IccFileId id1("File1");
IccFileId id2("File2");
IccFile file1(id1);
IccFile file2(id2);
```

However, some resource classes are designed to allow the programmer to create only one instance of the class; these are called singleton classes. The following Foundation Classes are singleton:

- **IccAbendData** provides information about task abends.
- **IccConsole** , or a derived class, represents the system console for operator messages.
- **IccControl** , or a derived class, such as **IccUserControl** , controls the executing program.
- **IccStartRequestQ** , or a derived class, allows the application program to start CICS transactions (tasks) asynchronously.
- **IccSystem** , or a derived class, is the application view of the CICS system in which it is running.
- **IccTask** , or a derived class, represents the CICS task under which the executing program is running.
- **IccTerminal** , or a derived class, represents your task's terminal, provided that your principal facility is a 3270 terminal.
Any attempt to create more than one object of a singleton class results in an error—a C++ exception is thrown.

A class method, `instance`, is provided for each of these singleton classes, which returns a pointer to the requested object and creates one if it does not already exist. For example:

```
IccControl* pControl = IccControl::instance();
```

**Calling methods on a resource object**

Any of the public methods can be called on an object of that class.

For example:

```
IccTempStoreId id("TEMP1234");
IccTempStore temp(id);
temp.writeItem("Hello TEMP1234");
```

Method `writeItem` writes the contents of the string it is passed ("Hello TEMP1234") to the CICS Temporary Storage queue “TEMP1234”.

**Buffer objects**

The Foundation Classes make extensive use of `IccBuf` objects—buffer objects that simplify the task of handling pieces of data or records.

Understanding the use of these objects is a necessary precondition for much of the rest of this book.

Each of the CICS Resource classes that involve passing data to CICS (for example by writing data records) and getting data from CICS (for example by reading data records) make use of the `IccBuf` class. Examples of such classes are `IccConsole`, `IccDataQueue`, `IccFile`, `IccFileIterator`, `IccJournal`, `IccProgram`, `IccSession`, `IccStartRequestQ`, `IccTempStore`, and `IccTerminal`.

**IccBuf class**

`IccBuf`, which is described in detail in the reference part of this book, provides generalized manipulation of data areas.

Because it can be used in a number of ways, there are several `IccBuf` constructors that affect the behavior of the object. Two important attributes of an `IccBuf` object are now described.

**Data area ownership**

`IccBuf` has an attribute indicating whether the data area has been allocated inside or outside of the object.

The possible values of this attribute are 'internal' and 'external'. It can be interrogated by using the `dataAreaOwner` method.

**Internal/External ownership of buffers**

When `DataAreaOwner = external`, it is the application programmer's responsibility to ensure the validity of the storage on which the `IccBuf` object is based. If the storage is invalid or inappropriate for a particular method applied to the object, unpredictable results will occur.

**Data area extensibility**

This attribute defines whether the length of the data area within the `IccBuf` object, once created, can be increased.

The possible values of this attribute are 'fixed' and 'extensible'. It can be interrogated by using the `dataAreaType` method.
As an object that is 'fixed' cannot have its data area size increased, the length of the data (for example, a file record) assigned to the **IccBuf** object must not exceed the data area length, otherwise a C++ exception is thrown.

**Note:** By definition, an 'extensible' buffer **must** also be 'internal'.

### IccBuf constructors

There are several forms of the **IccBuf** constructor, used when creating **IccBuf** objects. Some examples are shown here.

```cpp
IccBuf buffer;
```

This creates an 'internal' and 'extensible' data area that has an initial length of zero. When data is assigned to the object the data area length is automatically extended to accommodate the data being assigned.

```cpp
IccBuf buffer(50);
```

This creates an 'internal' and 'extensible' data area that has an initial length of 50 bytes. The data length is zero until data is assigned to the object. If 50 bytes of data are assigned to the object, both the data length and the data area length return a value of 50. When more than 50 bytes of data are assigned into the object, the data area length is automatically (that is, without further intervention) extended to accommodate the data.

```cpp
IccBuf buffer(50, IccBuf::fixed);
```

This creates an 'internal' and 'fixed' data area that has a length of 50 bytes. If an attempt is made to assign more than 50 bytes of data into the object, the data is truncated and an exception is thrown to notify the application of the error situation.

```cpp
struct MyRecordStruct
{
  short id;
  short code;
  char data(30);
  char rating;
};
MyRecordStruct myRecord;
IccBuf buffer(sizeof(MyRecordStruct), &myRecord);
```

This creates an **IccBuf** object that uses an 'external' data area called myRecord. By definition, an 'external' data area is also 'fixed'. Data can be assigned using the methods on the **IccBuf** object or using the myRecord structure directly.

```cpp
IccBuf buffer("Hello World");
```

This creates an 'internal' and 'extensible' data area that has a length equal to the length of the string "Hello World". The string is copied into the object's data area. This initial data assignment can then be changed using one of the manipulation methods (such as `insert`, `cut`, or `replace`) provided.

```cpp
IccBuf buffer("Hello World");
buffer << " out there";
IccBuf buffer2(buffer);
```

Here the copy constructor creates the second buffer with almost the same attributes as the first; the exception is the data area ownership attribute – the second object always contains an 'internal' data area that is a copy of the data area in the first. In the given example buffer2 contains "Hello World out there" and has both data area length and data length of 21.
IccBuf methods

An IccBuf object can be manipulated using a number of supplied methods; for example you can append data to the buffer, change the data in the buffer, cut data out of the buffer, or insert data into the middle of the buffer.

The operators const char*, =, +=, ==, !=, and << have been overloaded in class IccBuf. There are also methods that allow the IccBuf attributes to be queried. For more details see the reference section.

Working with IccResource subclasses

To illustrate working with IccResource subclasses, consider writing a queue item to CICS temporary storage using IccTempstore class.

```cpp
IccTempStore store("TEMP1234");
IccBuf buffer(50);
```

The IccTempStore object created is the application's view of the CICS temporary storage queue named "TEMP1234". The IccBuf object created holds a 50-byte data area (it also happens to be 'extensible').

```cpp
buffer = "Hello Temporary Storage Queue";
store.writeItem(buffer);
```

The character string "Hello Temporary Storage Queue" is copied into the buffer. This is possible because the operator= method has been overloaded in the IccBuf class.

The IccTempStore object calls its writeItem method, passing a reference to the IccBuf object as the first parameter. The contents of the IccBuf object are written out to the CICS temporary storage queue.

Now consider the inverse operation, reading a record from the CICS resource into the application program's IccBuf object:

```cpp
buffer = store.readItem(5);
```

The readItem method reads the contents of the fifth item in the CICS Temporary Storage queue and returns the data as an IccBuf reference.

The C++ compiler resolves the given line of code into two method calls, readItem defined in class IccTempStore and operator= which has been overloaded in class IccBuf. This second method takes the contents of the returned IccBuf reference and copies its data into the buffer.

The given style of reading and writing records using the foundation classes is typical. The final example shows how to write code – using a similar style to the above example – but this time accessing a CICS transient data queue.

```cpp
IccDataQueue queue("DATQ");
IccBuf buffer(50);
buffer = queue.readItem();
buffer << "Some extra data";
queue.writeItem(buffer);
```

The readItem method of the IccDataQueue object is called, returning a reference to an IccBuf which it then assigns (via operator= method, overloaded in class IccBuf) to the buffer object. The character string – "Some extra data" – is appended to the buffer (via operator chevron « method, overloaded in class IccBuf). The writeItem method then writes back this modified buffer to the CICS transient data queue.

You can find further examples of this syntax in the samples presented in the following sections, which describe how to use the foundation classes to access CICS services.

Refer to the reference section for further information on the IccBuf class. You might also find the supplied sample – ICC$BUF – helpful.
Using CICS Services

This section describes how to use CICS services. The services are considered in turn.

File control

The file control classes **IccFile**, **IccFileId**, **IccKey**, **IccRBA**, and **IccRRN** allow you to read, write, update and delete records in files.

In addition, **IccFileIterator** class allows you to browse through all the records in a file.

An **IccFile** object is used to represent a file. It is convenient, but not necessary, to use an **IccFileId** object to identify a file by name.

An application program reads and writes its data in the form of individual records. Each read or write request is made by a method call. To access a record, the program must identify both the file and the particular record.

VSAM (or VSAM-like) files are of the following types:

**KSDS**
Key-sequenced: each record is identified by a key – a field in a predefined position in the record. Each key must be unique in the file.

The logical order of records within a file is determined by the key. The physical location is held in an index which is maintained by VSAM.

When browsing, records are found in their logical order.

**ESDS**
Entry-sequenced: each record is identified by its relative byte address (RBA).
Records are held in an ESDS in the order in which they were first loaded into the file. New records are always added at the end and records may not be deleted or have their lengths altered.

When browsing, records are found in the order in which they were originally written.

**RRDS file**
Relative record: records are written in fixed-length slots. A record is identified by the relative record number (RRN) of the slot which holds it.

Reading records

A read operation uses two classes – **IccFile** to perform the operation and one of **IccKey**, **IccRBA**, and **IccRRN** to identify the particular record, depending on whether the file access type is KSDS, ESDS, or RRDS.

The **readRecord** method of **IccFile** class reads the record.

**Reading KSDS records**
Before reading a record you must use the **registerRecordIndex** method of **IccFile** to associate an object of class **IccKey** with the file.

You must use a key, held in the **IccKey** object, to access records. A 'complete' key is a character string of the same length as the physical file's key. Every record can be separately identified by its complete key.

A key can also be 'generic'. A generic key is shorter than a complete key and is used for searching for a set of records. The **IccKey** class has methods that allow you to set and change the key.

**IccFile** class has methods **isReadable**, **keyLength**, **keyPosition**, **recordIndex**, and **recordLength**, which help you when reading KSDS records.
**Reading ESDS records**
You must use a relative byte address (RBA) held in an `IccRBA` object to access the beginning of a record.

Before reading a record you must use the `registerRecordIndex` method of `IccFile` to associate an object of class `IccRBA` with the file.

`IccFile` class has methods `isReadable`, `recordFormat`, `recordIndex`, and `recordLength` that help you when reading ESDS records.

**Reading RRDS records**
You must use a relative record number (RRN) held in an `IccRRN` object to access a record.

Before reading a record you must use `registerRecordIndex` method of `IccFile` to associate an object of class `IccRRN` with the file.

`IccFile` class has methods `isReadable`, `recordFormat`, `recordIndex`, and `recordLength` which help you when reading RRDS records.

**Writing records**
Writing records is also known as "adding records".

This topic describes writing records that have not previously been written. Writing records that already exist is not permitted unless they have been previously been put into 'update' mode. See “Updating records” on page 17 for more information.

Before writing a record you must use `registerRecordIndex` method of `IccFile` to associate an object of class `IccKey`, `IccRBA`, or `IccRRN` with the file. The `writeRecord` method of `IccFile` class writes the record.

A write operation uses two classes – `IccFile` to perform the operation and one of `IccKey`, `IccRBA`, and `IccRRN` to identify the particular record, depending on whether the file access type is KSDS, ESDS, or RRDS.

If you have more than one record to write, you can improve the speed of writing by using mass insertion of data. You begin and end this mass insertion by calling the `beginInsert` and `endInsert` methods of `IccFile`.

**Writing KSDS records**
You must use a key, held in an `IccKey` object to access records.

A 'complete' key is a character string that uniquely identifies a record. Every record can be separately identified by its complete key.

The `writeRecord` method of `IccFile` class writes the record.

`IccFile` class has methods `isAddable`, `keyLength`, `keyPosition`, `recordIndex`, `recordLength`, and `registerRecordIndex` which help you when writing KSDS records.

**Writing ESDS records**
You must use a relative byte address (RBA) held in an `IccRBA` object to access the beginning of a record.

`IccFile` class has methods `isAddable`, `recordFormat`, `recordIndex`, `recordLength`, and `registerRecordIndex` that help you when writing ESDS records.

**Writing RRDS records**
Use the `writeRecord` method to add a new ESDS record.
IccFile class has methods isAddable, recordFormat, recordIndex, recordLength, and registerRecordIndex that help you when writing RRDS records.

**Updating records**

Updating a record is also known as "rewriting a record".

Before updating a record you must first read it, using readRecord method in 'update' mode. This locks the record so that nobody else can change it.

Use rewriteRecord method to update the record. Note that the IccFile object remembers which record is being processed and this information is not passed in again.

For an example, see code fragment: "Read record for update".

The base key in a KSDS file must not be altered when the record is modified. If the file definition allows variable-length records, the length of the record can be changed.

The length of records in an ESDS, RRDS, or fixed-length KSDS file must not be changed on update.

For a file defined to CICS as containing fixed-length records, the length of record being updated must be the same as the original length. The length of an updated record must not be greater than the maximum defined to VSAM.

**Deleting records**

Records can never be deleted from an ESDS file.

*Deleting normal records*

The deleteRecord method of IccFile class deletes one or more records, provided they are not locked by virtue of being in 'update' mode.

The records to be deleted are defined by the IccKey or IccRRN object.

*Deleting locked records*

The deleteLockedRecord method of IccFile class deletes a record which has been previously locked by virtue of being put in 'update' mode by the readRecord method.

**Browsing records**

Browsing, or sequential reading of files uses another class – IccFileIterator.

An object of this class must be associated with an IccFile object and an IccKey, IccRBA, or IccRRN object. After this association has been made the IccFileIterator object can be used without further reference to the other objects.

Browsing can be done either forwards, using readNextRecord method or backwards, using readPreviousRecord method. The reset method resets the IccFileIterator object to point to the record specified by the IccKey or IccRBA object.

Examples of browsing files are shown in page Code fragment "List all records in assending order of key".

**Example of file control**

This sample program demonstrates how to use the IccFile and IccFileIterator classes.

The source for this sample can be found in C++ sample programs, in file ICC$FIL. Here the code is presented without any of the terminal input and output that can be found in the source file.

```cpp
#include "icceh.hpp"
#include "iccmain.hpp"
```
The first two lines include the header files for the Foundation Classes and the standard main function which sets up the operating environment for the application program.

```cpp
const char* fileRecords[] =
{ //NAME KEY PHONE USERID
  "BACH, J S 003 00-1234 BACH ",
  "BEETHOVEN, L 007 00-2244 BEET ",
  "CHOPIN, F 004 00-3355 CHOPIN ",
  "HANDEL, G F 005 00-4466 HANDEL ",
  "MOZART, W A 008 00-5577 WOLFGANG "
};
```

This defines several lines of data that are used by the sample program.

```cpp
void IccUserControl::run()
{
}
```

The run method of IccUserControl class contains the user code for this example. As a terminal is to be used, the example starts by creating a terminal object and clearing the associated screen.

```cpp
short recordsDeleted = 0;
IccFileId id("ICCKFILE");
IccKey key(3, IccKey::generic);
IccFile file( id );
file.registerRecordIndex( &key );
key = "00";
recordsDeleted = file.deleteRecord();
```

The key and file objects are first created and then used to delete all the records whose key starts with "00" in the KSDS file "ICCKFILE". key is defined as a generic key having 3 bytes, only the first two of which are used in this instance.

```cpp
IccBuf buffer(40);
  key.setKind( IccKey::complete );
  for (short j = 0; j < 5; j++)
  { buffer = fileRecords[j];
    key.assign(3, fileRecords[j]+15);
    file.writeRecord( buffer );
  }
```

This next fragment writes all the data provided into records in the file. The data is passed by means of an IccBuf object that is created for this purpose. setKind method is used to change key from ‘generic’ to ‘complete’.

The for loop between these calls loops round all the data, passing the data into the buffer, using the operator= method of IccBuf, and thence into a record in the file, by means of writeRecord. On the way the key for each record is set, using assign, to be a character string that occurs in the data (3 characters, starting 15 characters in).

```cpp
IccFileIterator fIterator( &file,
  &key );
key = "000";
buffer = fIterator.readNextRecord();
while (fIterator.condition() == IccCondition::NORMAL)
{ term->sendLine("- record read: [%s]",(const char*) buffer);
  buffer = fIterator.readNextRecord();
}
```

The loop shown here lists to the terminal, using sendLine, all the records in ascending order of key. It uses an IccFileIterator object to browse the records. It starts by setting the minimum value for the key which, as it happens, does not exist in this example, and relying on CICS to find the first record in key sequence.

The loop continues until any condition other than NORMAL is returned.
key = "\xFF\xFF\xFF";
fIterator.reset(&key);
buffer = fIterator.readPreviousRecord();
while (fIterator.condition() == IccCondition::NORMAL)
{
  buffer = fIterator.readPreviousRecord();
}

The next loop is nearly identical to the last, but lists the records in reverse order of key.

key = "008";
buffer = file.readRecord(IccFile::update);
buffer.replace(4, "5678", 23);
file.renameRecord(buffer);

This fragment reads a record for update, locking it so that others cannot change it. It then modifies the record in the buffer and writes the updated record back to the file.

buffer = file.readRecord();

The same record is read again and sent to the terminal, to show that it has indeed been updated.

return;
}

The end of run, which returns control to CICS.

See C++ sample programs for the expected output from this sample.

**Program control**

This section describes how to access and use a program other than the one that is currently executing.

Program control uses **IccProgram** class, one of the resource classes.

Programs may be loaded, unloaded and linked to, using an **IccProgram** object. An **IccProgram** object can be interrogated to obtain information about the program. See **IccProgram class** for more details.

The example shown here shows one program calling another two programs in turn, with data passing between them via a COMMAREA. One program is assumed to be local, the second is on a remote CICS system. The programs are in two files, ICC$PRG1 and ICC$PRG2. See C++ sample programs for the location of these files and the expected output from these sample programs.

Most of the terminal IO in these samples has been omitted from the code that follows.

```cpp
#include "icceh.hpp"
#include "iccmain.hpp"
void IccUserControl::run()
{
  IccSysId sysId( "ICC2" );
  IccProgram icc$prg2( "ICC$PRG2" );
  IccProgram remotePrzog( "ICC$PRG3" );
  IccBuf commArea( 100, IccBuf::fixed );

  The first program (ICC$PRG1) creates an **IccSysId** object representing the remote region, and two **IccProgram** objects representing the local and remote programs that will be called from this program. A 100 byte, fixed length buffer object is also created to be used as a communication area between programs.

Chapter 2. Using the CICS foundation classes  19
icc$prg2.load();
if (icc$prg2.condition() == IccCondition::NORMAL)
{
    term->sendLine( "Loaded program: %s <&s> Length=%ld Address=%x",
                    icc$prg2.name(),
                    icc$prg2.conditionText(),
                    icc$prg2.length(),
                    icc$prg2.address() );
    icc$prg2.unload();
}

The program then attempts to load and interrogate the properties of program ICC$PRG2.

```
    commArea = "DATA SET BY ICC$PRG1";
    icc$prg2.link( &commArea );
```

The communication area buffer is set to contain some data to be passed to the first program that
ICC$PRG1 links to (ICC$PRG2). ICC$PRG1 is suspended while ICC$PRG2 is run.

The called program, ICC$PRG2, is a simple program, the gist of which is as follows:

```
    IccBuf& commArea = IccControl::commArea();
    commArea = "DATA RETURNED BY ICC$PRG2";
    return;
```

ICC$PRG2 gains access to the communication area that was passed to it. It then modifies the data in this
communication area and passes control back to the program that called it.

The first program (ICC$PRG1) now calls another program, this time on another system, as follows:

```
    remoteProg.setRouteOption( sysId );
    commArea = "DATA SET BY ICC$PRG1";
    remoteProg.link( &commArea );
```

The `setRouteOption` requests that calls on this object are routed to the remote system. The
communication area is set again (because it will have been changed by ICC$PRG2) and it then links
to the remote program (ICC$PRG3 on system ICC2).

The called program uses CICS temporary storage but the three lines we consider are:

```
    IccBuf& commArea = IccControl::commArea();
    commArea = "DATA RETURNED BY ICC$PRG3";
    return;
```

Again, the remote program (ICC$PRG3) gains access to the communication area that was passed to it. It
modifies the data in this communication area and passes control back to the program that called it.

```
    return;
    }
```

Finally, the calling program itself ends and returns control to CICS.

### Starting transactions asynchronously

The `IccStartRequestQ` class enables a program to start another CICS transaction instance
asynchronously (and optionally pass data to the started transaction).

The same class is used by a started transaction to gain access to the data that the task that issued the
start request passed to it. Finally start requests (for some time in the future) can be cancelled.

### Starting transactions

You can use any of the following methods to establish what data will be sent to the started transaction.

- `registerData` or `setData`
- `setQueueName`
- `setReturnTermId`
- `setReturnTransId`
  The actual start is requested using the `start` method.

### Accessing start data

A started transaction can access its start data by invoking the `retrieveData` method.

This method stores all the start data attributes in the `IccStartRequestQ` object such that the individual attributes can be accessed using the following methods:

- `data`
- `queueName`
- `returnTermId`
- `returnTransId`

### Cancelling unexpired start requests

Unexpired start requests (that is, start requests for some future time that has not yet been reached) can be cancelled using the `cancel` method.

### Example of starting transactions

Start transaction ISR1 on terminal PEO1 on system ICC1.

<table>
<thead>
<tr>
<th>CICS system</th>
<th>ICC1</th>
<th>ICC2</th>
</tr>
</thead>
<tbody>
<tr>
<td>Transaction</td>
<td>ISR1/ITMP</td>
<td>ISR2</td>
</tr>
<tr>
<td>Program</td>
<td>ICC$SRQ1/ICC$TMP</td>
<td>ICC$SRQ2</td>
</tr>
<tr>
<td>Terminal</td>
<td>PEO1</td>
<td>PEO2</td>
</tr>
</tbody>
</table>

This issues two start requests; the first is cancelled before it has expired. The second starts transaction ISR2 on terminal PEO2 on system ICC2. This transaction accesses its start data and finishes by starting transaction ITMP on the original terminal (PEO1 on system ICC1).

The programs and the expected output from them, can be found in C++ sample programs as files ICC$SRQ1 and ICC$SRQ2. Here the code is presented without the terminal IO requests.

Transaction ISR1 runs program ICC$SRQ1 on system ICC1. Let us consider this program first:

```cpp
#include "icceh.hpp"
#include "iccmain.hpp"

void IccUserControl::run()
{
These lines include the header files for the Foundation Classes, and the main function needed to set up the class library for the application program. The run method of `IccUserControl` class contains the user code for this example.

```cpp
IccRequestId req1;
IccRequestId req2("REQUEST1");
IccTimeInterval ti(0,0,5);
IccTermId remoteTermId("PE02");
IccTransId ISR2("ISR2");
IccTransId ITMP("ITMP");
IccBuf buffer;
IccStartRequestQ* startQ = startRequestQ();
```

Here we are creating a number of objects:

- `req1`
  An empty `IccRequestId` object ready to identify a particular start request.
 req2
  An IccRequestId object containing the user-supplied identifier "REQUEST1".

 ti
  An IccTimeInterval object representing 0 hours, 0 minutes, and 5 seconds.

 remoteTermId
  An IccTermId object; the terminal on the remote system where we start a transaction.

 ISR2
  An IccTransId object; the transaction we start on the remote system.

 ITMP
  An IccTransId object; the transaction that the started transaction starts on this program's terminal.

 buffer
  An IccBuf object that holds start data.

 Finally, the startRequestQ method of IccControl class returns a pointer to the single instance (singleton) class IccStartRequestQ.

     startQ->setRouteOption( "ICC2" );
     startQ->registerData( &buffer );
     startQ->setReturnTermId( terminal()->name() );
     startQ->setReturnTransId( ITMP );
     startQ->setQueueName( "startqnm" );

 This code fragment prepares the start data that is passed when we issue a start request. The setRouteOption says we will issue the start request on the remote system, ICC2. The registerData method associates an IccBuf object that will contain the start data (the contents of the IccBuf object are not extracted until we issue the start request). The setReturnTermId and setReturnTransId methods allow the start requester to pass a transaction and terminal name to the started transaction. These fields are typically used to allow the started transaction to start another transaction (as specified) on another terminal, in this case ours.

 The setQueueName is another piece of information that can be passed to the started transaction.

     buffer = "This is a greeting from program 'icc$srq1'!!";
     req1 = startQ->start( ISR2, &remoteTermId, &ti );
     startQ->cancel( req1 );

 Here we set the data that we pass on the start requests. We start transaction ISR2 after an interval ti (5 seconds). The request identifier is stored in req1. Before the five seconds has expired (that is, immediately) we cancel the start request.

     req1 = startQ->start( ISR2, &remoteTermId,
                   &ti, &req2 );
     return;
 }

 Again we start transaction ISR2 after an interval ti (5 seconds). This time the request is allowed to expire so transaction ISR2 is started on the remote system. Meanwhile, we end by returning control to CICS.

 Let us now consider the started program, ICC$SRQ2.

     IccBuf buffer;
     IccRequestId req("REQUESTX");
     IccTimeInterval ti(0,0,5);
     IccStartRequestQ* startQ = startRequestQ();

 Here, as in ICC$SRQ1, we create a number of objects:

 buffer
  An IccBuf object to hold the start data we were passed by our caller (ICC$SRQ1).

 req
  An IccRequestId object to identify the start we will issue on our caller's terminal.
An **IccTimeInterval** object representing 0 hours, 0 minutes, and 5 seconds.

The **startRequestQ** method of **IccControl** class returns a pointer to the singleton class **IccStartRequestQ**.

```cpp
if ( task()->startType() != IccTask::startRequest )
{
    term->sendLine(
        "This program should only be started via the StartRequestQ");
    task()->abend( "OOPS" );
}
```

Here we use the **startType** method of **IccTask** class to check that ICC$SRQ2 was started by the **start** method, and not in any other way (such as typing the transaction name on a terminal). If it was not started as intended, we abend with an "OOPS" abend code.

```cpp
startQ->retrieveData();
```

We retrieve the start data that we were passed by ICC$SRQ1 and store within the **IccStartRequestQ** object for subsequent access.

```cpp
buffer = startQ->data();
term->sendLine( "Start buffer contents = [%s]", buffer.dataArea() );
term->sendLine( "Start queue= [%s]", startQ->queueName() );
term->sendLine( "Start rtrn = [%s]", startQ->returnTransId().name() );
term->sendLine( "Start rtrm = [%s]", startQ->returnTermId().name() );
```

The start data buffer is copied into our **IccBuf** object. The other start data items (queue, returnTransId, and returnTermId) are displayed on the terminal.

```cpp
task()->delay( ti );
```

We delay for five seconds (that is, we sleep and do nothing).

```cpp
startQ->setRouteOption( "ICC1" );
```

The **setRouteOption** signals that we will start on our caller's system (ICC1).

```cpp
startQ->start(
    startQ->returnTransId(),startQ->returnTermId());
return;
```

We start a transaction called ITMP (the name of which was passed by ICC$SRQ1 in the returnTransId start information) on the originating terminal (where ICC$SRQ1 completed as it started this transaction).

Having issued the start request, ICC$SRQ1 ends, by returning control to CICS.

Finally, transaction ITMP runs on the first terminal. This is the end of this demonstration of starting transactions asynchronously.

**Transient Data**

The transient data classes, **IccDataQueue** and **IccDataQueueId**, allow you to store data in transient data queues for subsequent processing.

You can:

- Read data from a transient data queue (**readItem** method)
- Write data to a transient data queue (**writeItem** method)
- Delete a transient data queue (**empty** method)

An **IccDataQueue** object is used to represent a temporary storage queue. An **IccDataQueueId** object is used to identify a queue by name. Once the **IccDataQueueId** object is initialized it can be used to identify
the queue as an alternative to using its name, with the advantage of additional error detection by the C++ compiler.

The methods available in **IccDataQueue** class are similar to those in the **IccTempStore** class. For more information on these see “Temporary storage” on page 25.

**Reading data**
The **readItem** method is used to read items from the queue.

It returns a reference to the **IccBuf** object that contains the information.

**Writing data**
The **writeItem** method of **IccDataQueue** adds a new item of data to the queue, taking the data from the buffer specified.

**Deleting queues**
The **empty** method deletes all items on the queue.

**Example of managing transient data**
This sample program demonstrates how to use the **IccDataQueue** and **IccDataQueueId** classes.

It can be found, along with the expected output, in **C++ sample programs** as file ICC$DAT. Here the code is presented without the terminal IO requests.

```cpp
#include "icceh.hpp"
#include "iccmain.hpp"

void IccUserControl::run()
{
    short itemNum =1;
    IccBuf buffer( 50 );
    IccDataQueueId id( "ICCQ" );
    IccDataQueue queue( id );
    queue.empty();

    for (short i=0 ; i<3 ; i++)
    {
        buffer = queueItems[i];
        queue.writeItem( buffer );
    }
}
```

This defines some buffer for the sample program.
This loop writes the three data items to the transient data object. The data is passed by means of an `IccBuf` object that was created for this purpose.

```c++
buffer = queue.readItem();
while ( queue.condition() == IccCondition::NORMAL )
{
    buffer = queue.readItem();
}
```

Having written out three records we now read them back in to show they were successfully written.

```c++
return;
}
```

The end of `run`, which returns control to CICS.

**Temporary storage**

The temporary storage classes, `IccTempStore` and `IccTempStoreId`, allow you to store data in temporary storage queues.

You can:

- Read an item from the temporary storage queue (`readItem` method)
- Write a new item to the end of the temporary storage queue (`writeItem` method)
- Update an item in the temporary storage queue (`rewriteItem` method)
- Read the next item in the temporary storage queue (`readNextItem` method)
- Delete all the temporary data (`empty` method)

An `IccTempStore` object is used to represent a temporary storage queue. An `IccTempStoreId` object is used to identify a queue by name. Once the `IccTempStoreId` object is initialized it can be used to identify the queue as an alternative to using its name, with the advantage of additional error detection by the C++ compiler.

The methods available in `IccTempStore` class are similar to those in the `IccDataQueue` class. For more information on these see “Transient Data” on page 23.

**Reading items**

The `readItem` method of `IccTempStore` reads the specified item from the temporary storage queue. It returns a reference to the `IccBuf` object that contains the information.

**Writing items**

Writing items is also known as "adding" items.

This section describes writing items that have not previously been written. Writing items that already exist can be done using the `rewriteItem` method. See “Updating items” on page 25 for more information.

The `writeItem` method of `IccTempStore` adds a new item at the end of the queue, taking the data from the buffer specified. If this is done successfully, the item number of the record added is returned.

**Updating items**

Updating an item is also known as "rewriting" an item.

The `rewriteItem` method of `IccTempStore` class is used to update the specified item in the temporary storage queue.
Deleting items

You cannot delete individual items in a temporary storage queue.

To delete all the temporary data associated with an \texttt{IccTempStore} object use the \texttt{empty} method of \texttt{IccTempStore} class.

Example of Temporary Storage

This sample program demonstrates how to use the \texttt{IccTempStore} and \texttt{IccTempStoreId} classes.

This program, and the expected output from it, can be found in C++ sample programs, as file ICC$TMP. The sample is presented here without the terminal IO requests.

```cpp
#include "icceh.hpp"
#include "iccmain.hpp"
#include <stdlib.h>

const char* bufferItems[] = {
"Hello World - item 1",
"Hello World - item 2",
"Hello World - item 3"
};

void IccUserControl::run()
{
    short itemNum = 1;
    IccTempStoreId id("ICCSTORE");
    IccTempStore store( id );
    IccBuf buffer( 50 );
    store.empty();

    for (short j=1 ; j <= 3 ; j++)
    {
        buffer = bufferItems[j-1];
        store.writeItem( buffer );
    }

    buffer = store.readItem( itemNum );
    while ( store.condition() == IccCondition::NORMAL )
    {
        buffer.insert( 9, "Modified ");
        store.rewriteItem( itemNum, buffer );
        itemNum++;
        buffer = store.readItem( itemNum );
    }
}
```

This defines some buffer for the sample program.

The \texttt{run} method of \texttt{IccUserControl} class contains the user code for this example.

This fragment first creates an identification object, \texttt{IccTempStoreId} containing the field "ICCSTORE". It then creates an \texttt{IccTempStore} object representing the temporary storage queue "ICCSTORE", which it empties of records.

This loop writes the three data items to the Temporary Storage object. The data is passed by means of an \texttt{IccBuf} object that was created for this purpose.

This next fragment reads the items back in, modifies the item, and rewrites it to the temporary storage queue. First, the \texttt{readItem} method is used to read the buffer from the temporary storage object. The data in the buffer object is changed using the \texttt{insert} method of \texttt{IccBuf} class and then the \texttt{rewriteItem} method overwrites the buffer. The loop continues with the next buffer item being read.
itemNum = 1;
buffer = store.readItem( itemNum );
while ( store.condition() == IccCondition::NORMAL )
{
    term->sendLine( " - record %d = [%s]", itemNum,
        (const char*)buffer );
    buffer = store.readNextItem();
}

This loop reads the temporary storage queue items again to show they have been updated.

return;
}

The end of run , which returns control to CICS.

Terminal control

The terminal control classes, IccTerminal , IccTermId , and IccTerminalData , allow you to send data to, receive data from, and find out information about the terminal belonging to the CICS task.

An IccTerminal object is used to represent the terminal that belongs to the CICS task. It can only be created if the transaction has a 3270 terminal as its principal facility. The IccTermId class is used to identify the terminal. IccTerminalData , which is owned by IccTerminal , contains information about the terminal characteristics.

Sending data to a terminal

The send and sendLine methods of IccTerminal class are used to write data to the screen.

The set… methods allow you to do this. You may also want to erase the data currently displayed at the terminal, using the erase method, and free the keyboard so that it is ready to receive input, using the freeKeyboard method.

Receiving data from a terminal

The receive and receive3270data methods of IccTerminal class are used to receive data from the terminal.

Finding out information about a terminal

You can find out information about both the characteristics of the terminal and its current state.

The data object points to the IccTerminalData object that contains information about the characteristics of the terminal. The methods in IccTerminalData allow you to discover, for example, the height of the screen or whether the terminal supports Erase Write Alternative. Some of the methods in IccTerminal also give you information about characteristics, such as how many lines a screen holds.

Other methods give you information about the current state of the terminal. These include line , which returns the current line number, and cursor , which returns the current cursor position.

Example of terminal control

This sample program demonstrates how to use the IccTerminal , IccTermId , and IccTerminalData classes.

This program, and the expected output from it, can be found in C++ sample programs, as file ICC$TRM.

#include "icceh.hpp"
#include "iccmain.hpp"
The first two lines include the header files for the Foundation Classes and the standard **main** function that sets up the operating environment for the application program.

```cpp
void IccUserControl::run()
{
    IccTerminal& term = *terminal();
    term.erase();
}
```

The **run** method of **IccUserControl** class contains the user code for this example. As a terminal is to be used, the example starts by creating a terminal object and clearing the associated screen.

```cpp
term.sendLine( "First part of the line..." );
term.send( "... a continuation of the line." );
term.sendLine( "Start this on the next line" );
term.sendLine( 40, "Send this to column 40 of current line" );
term.send( 5, 10, "Send this to row 5, column 10" );
term.send( 6, 40, "Send this to row 6, column 40" );
```

This fragment shows how the **send** and **sendLine** methods are used to send data to the terminal. All of these methods can take **IccBuf** references (const IccBuf&) instead of string literals (const char*).

```cpp
term.setNewLine();
```

This sends a blank line to the screen.

```cpp
term.setColor( IccTerminal::red );
term.sendLine( "A Red line of text." );
term.setColor( IccTerminal::blue );
term.setHighlight( IccTerminal::reverse );
term.sendLine( "A Blue, Reverse video line of text." );
```

The **setColor** method is used to set the color of the text on the screen and the **setHighlight** method to set the highlighting.

```cpp
term << "A cout style interface... " " << endl;
term << "you can " "chain input together; " " " " use different types, eg numbers: " " " " (short)123 " " " " (long)4567890 " " " " (double)123456.7891234 " " " " endl;
term << "... and everything is buffered till you issue a flush." " " " " flush;
```

This fragment shows how to use the iostream–like interface **endl** to start data on the next line. To improve performance, you can buffer data in the terminal until **flush** is issued, which sends the data to the screen.

```cpp
term.send( 24,1, "Program 'icc$trm' complete: Hit PF12 to End" );
term.waitForAID( IccTerminal::PF12 );
term.erase();
```

The **waitForAID** method causes the terminal to wait until the specified key is hit, before calling the **erase** method to clear the display.

```cpp
return;
}
```

The end of **run**, which returns control to CICS.

### Time and date services

The **IccClock** class controls access to the CICS time and date services.

**IccAbsTime** holds information about absolute time (the time in milliseconds that have elapsed since the beginning of 1900), and this can be converted to other forms of date and time. The methods available on **IccClock** objects and on **IccAbsTime** objects are very similar.
Example of time and date services

This sample program demonstrates how to use **IccClock** class.

The source for this program, and the expected output from it, can be found in C++ sample programs, as file ICC$CLK. The sample is presented here without the terminal IO requests.

```cpp
#include "icceh.hpp"
#include "iccmain.hpp"
void IccUserControl::run()
{
    The first two lines include the header files for the Foundation Classes and the standard **main** function that sets up the operating environment for the application program.

    The **run** method of **IccUserControl** class contains the user code for this example.

    IccClock clock;

    This creates a clock object.

    term->sendLine( "date() = [%s]",
        clock.date() );
    term->sendLine( "date(DDMMYY) = [%s]",
        clock.date(IccClock::DDMMYY) );
    term->sendLine( "date(DDMMYY,':') = [%s]",
        clock.date(IccClock::DDMMYY,:));
    term->sendLine( "date(MMDDYY) = [%s]",
        clock.date(IccClock::MMDDYY));
    term->sendLine( "date(YYDDD) = [%s]",
        clock.date(IccClock::YYDDD));

    Here the **date** method is used to return the date in the format specified by the **format** enumeration. In order the formats are system, DDMMYY, DD:MM:YY, MMDDYY and YYDDD. The character used to separate the fields is specified by the **dateSeparator** character (that defaults to nothing if not specified).

    term->sendLine( "daysSince1900() = %ld",
        clock.daysSince1900() );
    term->sendLine( "dayOfWeek() = %d",
        clock.dayOfWeek() );
    if ( clock.dayOfWeek() == IccClock::Friday )
        term->sendLine( 40, "Today IS Friday" );
    else
        term->sendLine( 40, "Today is NOT Friday" );

    This fragment demonstrates the use of the **daysSince1900** and **dayOfWeek** methods. **dayOfWeek** returns an enumeration that indicates the day of the week. If it is Friday, a message is sent to the screen, ‘Today IS Friday’; otherwise the message ‘Today is NOT Friday’ is sent.

    term->sendLine( "dayOfMonth() = %d",
        clock.dayOfMonth() );
    term->sendLine( "monthOfYear() = %d",
        clock.monthOfYear() );

    This demonstrates the **dayOfMonth** and **monthOfYear** methods of **IccClock** class.

    term->sendLine( "time() = [%s]",
        clock.time() );
    term->sendLine( "time('-') = [%s]",
        clock.time('-') );
    term->sendLine( "year() = [%ld]",
        clock.year() );

    The current time is sent to the terminal, first without a separator (that is HHMMSS format), then with '-' separating the digits (that is, HH-MM-SS format). The year is sent, for example 1996.

    return;
}

The end of **run**, which returns control to CICS.
Compiling, executing, and debugging

This section describes how to compile, execute, and debug a CICS Foundation Class program.

Compiling a CICS Foundation Class program

To compile and link a CICS Foundation Class program you need access to the program source, a compiler, header files and a dynamic link library.

You need access to the following items:

- The source of the program you are compiling
  
  Your C++ program source code needs `#include` statements for the Foundation Class headers and the Foundation Class `main()` program stub:

  ```cpp
  #include "icceh.hpp"
  #include "iccmain.hpp"
  ```

- The IBM C++ compiler
- The Foundation Classes header files (see Header files)
- The Foundation Classes dynamic link library (DLL). The ICCFCDLL module is in CICSTS55.CICS.SDFHLOAD.

Note that, when using the Foundation Classes, you do not need to translate the "EXEC CICS " API before compile.

The following sample job statements show how to compile, prelink and link a program called ICC$HEL:

```cpp
//ICC$HEL JOB 1,user_name,MSGCLASS=A,CLASS=A,NOTIFY=userid
//PROCLIB JCLLIB ORDER=(
//CICSTS55.CICS .SDFHPROC)
//ICC$HEL EXEC ICCFCCL,INFILE=
//indatasetname (ICC$HEL),OUTFILE=
//outdatasetname (ICC$HEL)
//
```

Header files

The header files are the C++ class definitions needed to compile CICS C++ Foundation Class programs.

<table>
<thead>
<tr>
<th>C++ Header File</th>
<th>Classes Defined in this Header</th>
</tr>
</thead>
<tbody>
<tr>
<td>ICCABDEH</td>
<td>IccAbendData</td>
</tr>
<tr>
<td>ICCBASEH</td>
<td>IccBase</td>
</tr>
<tr>
<td>ICCBUFEH</td>
<td>IccBuf</td>
</tr>
<tr>
<td>ICCLKEH</td>
<td>IccClock</td>
</tr>
<tr>
<td>ICCCNDEH</td>
<td>IccCondition (struct)</td>
</tr>
<tr>
<td>ICCCONEH</td>
<td>IccConsole</td>
</tr>
<tr>
<td>ICCCTLEH</td>
<td>IccControl</td>
</tr>
<tr>
<td>ICCDATEH</td>
<td>IccDataQueue</td>
</tr>
<tr>
<td>ICCEH</td>
<td>see “1” on page 31</td>
</tr>
<tr>
<td>ICCEVTEH</td>
<td>IccEvent</td>
</tr>
<tr>
<td>C++ Header File</td>
<td>Classes Defined in this Header</td>
</tr>
<tr>
<td>-----------------</td>
<td>-------------------------------</td>
</tr>
<tr>
<td>ICCEXCEH</td>
<td>IccException</td>
</tr>
<tr>
<td>ICCFILEH</td>
<td>IccFile</td>
</tr>
<tr>
<td>ICCFLIEH</td>
<td>IccFileIterator</td>
</tr>
<tr>
<td>ICCGLBEH</td>
<td>Icc (struct) (global functions)</td>
</tr>
<tr>
<td>ICCJRNEH</td>
<td>IccJournal</td>
</tr>
<tr>
<td>ICCMSGEH</td>
<td>IccMessage</td>
</tr>
<tr>
<td>ICCPRGEH</td>
<td>IccProgram</td>
</tr>
<tr>
<td>ICRECEH</td>
<td>IccRecordIndex, IccKey, IccRBA and IccRRN</td>
</tr>
<tr>
<td>ICRESEH</td>
<td>IccResource</td>
</tr>
<tr>
<td>ICCRIDEH</td>
<td>IccResourceId &amp; subclasses (such as IccConvId)</td>
</tr>
<tr>
<td>ICCSEMEH</td>
<td>IccSemaphore</td>
</tr>
<tr>
<td>ICCSEESEH</td>
<td>IccSession</td>
</tr>
<tr>
<td>ICSRQEH</td>
<td>IccStartRequestQ</td>
</tr>
<tr>
<td>ICSSYSEH</td>
<td>IccSystem</td>
</tr>
<tr>
<td>ICTIMEH</td>
<td>IccTime, IccAbsTime, IccTimeInterval, IccTimeOfDay</td>
</tr>
<tr>
<td>ICTMDEH</td>
<td>IccTerminalData</td>
</tr>
<tr>
<td>ICCTMPEH</td>
<td>IccTempStore</td>
</tr>
<tr>
<td>ICCTRMEH</td>
<td>IccTerminal</td>
</tr>
<tr>
<td>ICCTSKEH</td>
<td>IccTask</td>
</tr>
<tr>
<td>ICCUSREH</td>
<td>IccUser</td>
</tr>
<tr>
<td>ICCVALEH</td>
<td>IccValue (struct)</td>
</tr>
</tbody>
</table>

**Note:**
1. A single header that #includes all the listed header files is supplied as ICCEH
2. The file ICCMAIN is also supplied with the C++ header files. This contains the main function stub that should be used when you build a Foundation Class program.
3. Header files are located in CICSTS55.CICS.SDFHC370.

**Executing Programs**

To run a compiled and linked (that is, executable) Foundation Classes program you need to do the following.

1. Make the executable program available to CICS. This involves making sure the program is in a suitable directory or load library. Depending on your server, you may also need to create a CICS program definition (using CICS resource definition facilities) before you can execute the program.
2. Logon to a CICS terminal.
3. Run the program.

**Program debugging**

Having successfully compiled, linked, and attempted to run your Foundation Classes program, you might need to debug it.

There are three options available to help debug a CICS Foundation Classes program:
• Use a symbolic debugger
• Run the Foundation Class Program with tracing active
• Run the Foundation Class Program with the CICS Execution Diagnostic Facility

**Symbolic debugger**

You can use a symbolic debugger to step through the source of your CICS Foundation Classes program. Debug Tool is shipped as a feature with IBM C/C++. To debug a CICS Foundation Classes program with a symbolic debugger, compile the program with a flag that adds debugging information to your executable program. For CICS Transaction Server for z/OS, this flag is TEST(ALL).

For more information, see [Debug Tool for z/OS](#).

**Tracing**

You can configure the CICS Foundation Classes to write a trace file for debugging purposes.

Exception tracing is always active. The CETR transaction controls the auxiliary and internal traces for all CICS programs including those developed using the C++ classes.

**Execution diagnostic facility**

You can use the Execution Diagnostic Facility (EDF) to step through your CICS program, stopping at each EXEC CICS call. The display screen shows the procedural EXEC CICS call interface rather than the CICS Foundation Class type interface.

To enable EDF, use the preprocessor macro `ICC_EDF` in your source code before including the file `ICCMAIN`.

```c
#define ICC_EDF //switch EDF on
#include "iccmain.hpp"
```

Alternatively use the appropriate flag on your compiler CPARM to declare ICC_EDF.

**Conditions, errors, and exceptions**

This section describes how the Foundation Classes have been designed to respond to various error situations they might encounter.

**Foundation Class Abend codes**

For serious errors (such as insufficient storage to create an object) the Foundation Classes immediately terminate the CICS task.

All CICS Foundation Class abend codes are of the form ACLx. If your application is terminated with an abend code starting 'ACL' then please refer to CICS messages.

**C++ Exceptions and the Foundation Classes**

C++ exceptions are managed using the reserved words `try`, `throw`, and `catch`.

Refer to your compiler’s documentation or one of the C++ books in the bibliography for more information.

Here is sample ICC$EXC1 (see C++ sample programs):
The first two lines include the header files for the Foundation Classes and the standard `main` function that sets up the operating environment for the application program.

We then declare class `Test`, which has one public method, `tryNumber`. This method is implemented inline so that if an integer greater than ten is passed an exception is thrown. We also write out some information to the CICS terminal.

```cpp
void IccUserControl::run()
{
  IccTerminal* term = IccTerminal::instance();
  term->erase();
  *term << "This is program 'icc$exc1' ..." << endl;
  try {
    Test test;
    test.tryNumber( 1 );
    test.tryNumber( 7 );
    test.tryNumber( 11 );
    test.tryNumber( 6 );
  }
  catch( const char* exception ) {
    term->setLine( 22 );
    *term << "Exception caught: " << exception << endl << flush;
  }
  term->send( 24,1,"Program 'icc$exc1' complete: Hit PF12 to End" );
  term->waitForAID( IccTerminal::PF12 );
  term->erase();
  return;
}
```

The `run` method of `IccUserControl` class contains the user code for this example.

After erasing the terminal display and writing some text, we begin our `try` block. A `try` block can scope any number of lines of C++ code.

Here we create a `Test` object and invoke our only method, `tryNumber`, with various parameters. The first two invocations (1, 7) succeed, but the third (11) causes `tryNumber` to throw an exception. The fourth `tryNumber` invocation (6) is not executed because an exception causes the program execution flow to leave the current `try` block.

We then leave the `try` block and look for a suitable `catch` block. A suitable `catch` block is one with arguments that are compatible with the type of exception being thrown (here a `char*`). The `catch` block writes a message to the CICS terminal and then execution resumes at the line after the `catch` block.

The output from this CICS program is as follows:

```
This is program 'icc$exc1'...
Number passed = 1
Number passed = 7
Number passed = 11
>>Out of Range - throwing exception
Exception caught: !!Number is out of range!!
Program 'icc$exc1' complete: Hit PF12 to End
```

The CICS C++ Foundation Classes do not throw `char*` exceptions as in the previous sample but they do throw `IccException` objects instead.
There are several types of `IccException`. The `type` method returns an enumeration that indicates the type. Here is a description of each type in turn.

**ObjectCreationError**
An attempt to create an object was invalid. This happens, for example, if an attempt is made to create a second instance of a singleton class, such as `IccTask`.

**InvalidArgument**
A method was called with an invalid argument. This happens, for example, if an `IccBuf` object with too much data is passed to the `writeItem` method of the `IccTempStore` class by the application program.

It also happens when attempting to create a subclass of `IccResourceId`, such as `IccTermId`, with a string that is too long.

The following sample can be found in C++ sample programs, as file `ICC$EXC2`. The sample is presented here without many of the terminal IO requests.

```cpp
#include "icceh.hpp"
#include "iccmain.hpp"

void IccUserControl::run()
{
  try
  {
    IccTermId id1( "1234" );
    IccTermId id2( "12345" );
  }
  catch( IccException& exception )
  {
    terminal()->send( 21, 1, exception.summary() );
  }
  return;
}
```

In the previous example the first `IccTermId` object is successfully created, but the second caused an `IccException` to be thrown, because the string “12345” is 5 bytes where only 4 are allowed. See C++ sample programs for the expected output from this sample program.

**InvalidMethodCall**
A method cannot be called. A typical reason is that the object cannot honor the call in its current state. For example, a `readRecord` call on an `IccFile` object is only honored if an `IccRecordIndex` object, to specify which record is to be read, has already been associated with the file.

**CICSCondition**
A CICS condition, listed in the `IccCondition` structure, has occurred in the object and the object was configured to throw an exception.

**FamilyConformanceError**
Family subset enforcement is on for this program and an operation that is not valid on all supported platforms has been attempted.

**InternalError**
The CICS foundation classes have detected an internal error. Please call service.

**CICS conditions**
The CICS foundation classes provide a powerful framework for handling conditions that happen when executing an application.

Accessing a CICS resource can raise a number of CICS conditions as documented in Foundation classes reference.

A condition might represent an error or information being returned to the calling application; the deciding factor is often the context in which the condition is raised.

The application program can handle the CICS conditions in a number of ways. Each CICS resource object, such as a program, file, or data queue, can handle CICS conditions differently, if required.

A resource object can be configured to take one of the following actions for each condition it can encounter:
Manual condition handling (noAction)

This is the default action for all CICS conditions (for any resource object).

This means that the condition must be handled manually, using the condition method. For example:

```cpp
IccTempStore temp("TEMP1234");
IccBuf buf(40);
temp.setActionOnCondition(IccResource::noAction,
IccCondition::QIDERR);
buf = temp.readNextItem();
switch (temp.condition())
{
    case IccCondition::QIDERR:
        //do whatever here
        :
    default:
        //do something else here
}
```

Automatic condition handling (callHandleEvent)

Activate this for any CICS condition, such as QIDERR, as follows.

```cpp
IccTempStore temp("TEMP1234");
temp.setActionOnCondition(IccResource::callHandleEvent,
IccCondition::QIDERR);
```

When a call to any method on object 'temp' causes CICS to raise the QIDERR condition, handleEvent method is automatically called. As the handleEvent method is only a virtual method, this call is only useful if the object belongs to a subclass of IccTempStore and the handleEvent method has been overridden.

Make a subclass of IccTempStore, declare a constructor, and override the handleEvent method.

```cpp
class MyTempStore : public IccTempStore
{
    public:
        MyTempStore(const char* storeName) : IccTempStore(storeName) {};
        HandleEventReturnOpt handleEvent(IccEvent& event);
};
```

Now implement the handleEvent method.

```cpp
IccResource::HandleEventReturnOpt
MyTempStore::handleEvent(IccEvent& event)
{
    switch (event.condition())
    {
        case ...
        case IccCondition::QIDERR:
            //Handle QIDERR condition here.
            :
        default:
            return rAbendTask;
    }
```
This code is called for any MyTempStore object which is configured to 'callHandleEvent' for a particular CICS condition.

### Exception handling (throwException)
Activate this for any CICS condition, such as QIDERR, as follows.

```
IccTempStore temp("TEMP1234");
temp.setActionOnCondition(IccResource::throwException,
IccCondition::QIDERR);
```

Exception handling is by means of the C++ exception handling model using try, throw, and catch. For example:

```
try {
    buf = temp.readNextItem();
    ...
} catch (IccException& exception) {
    //Exception handling code
    ...
}
```

An exception is thrown if any of the methods inside the try block raise the QIDERR condition for object 'temp'. When an exception is thrown, C++ unwinds the stack and resumes execution at an appropriate catch block – it is not possible to resume within the try block. For a fuller example, see sample ICC$EXC3.

**Note:** Exceptions can be thrown from the Foundation Classes for many reasons other than this example – see "C++ Exceptions and the Foundation Classes" on page 32 for more details.

### Severe error handling (abendTask)
This option allows CICS to terminate the task when certain conditions are raised.

Activate this for any CICS condition, such as QIDERR, as follows:

```
IccTempStore temp("TEMP1234");
temp.setActionOnCondition(IccResource::abendTask,
IccCondition::QIDERR);
```

If CICS raises the QIDERR condition for object 'temp' the CICS task terminates with an ACL3 abend.

### Platform differences
The CICS Foundation Classes, as described here, are designed to be independent of the particular CICS platform on which they are running. There are however some differences between platforms; these, and ways of coping with them, are described here.

**Note:** References in this section to other CICS platforms are included for completeness. There have been Technology Releases of the CICS Foundation Classes on those platforms.

Applications can be run in one of two modes:

- **fsAllowPlatformVariance**
  Applications written using the CICS Foundation Classes are able to access all the functions available on the target CICS server.

- **fsEnforce**
  Applications are restricted to the CICS functions that are available across all CICS Servers (z/OS and UNIX).
The default is to allow platform variance and the alternative is to force the application to only use features which are common to all CICS platforms.

The class headers are the same for all platforms and they “support” (that is, define) all the CICS functions that are available through the Foundation Classes on any of the CICS platforms. The restrictions on each platform are documented in Foundation classes reference. Platform variations exist at:

- object level
- method level
- parameter level

Object level

Some objects are not supported on certain platforms.

For example, IccConsole objects cannot be created on CICS(r) for AIX® as CICS(r) for AIX(r) does not support console services.

Any attempt to create an IccConsole object on CICS(r) for AIX(r) causes an IccException object of type 'platformError' to be thrown, but would be acceptable on the other platforms.

```java
IccConsole* cons = console(); //No good on CICS for AIX
```

If you initialize your application with 'fsEnforce' selected (see initializeEnvironment) the previous examples both cause an IccException object, of type 'familyConformanceError' to be thrown on all platforms.

Unlike objects of the IccConsole and IccJournal classes, most objects can be created on any CICS server platform. However the use of the methods can be restricted. Foundation Classes: reference fully documents all platform restrictions.

Method level

Methods that run successfully on one platform can cause a problem on another platform.

Consider, for example method programId in the IccControl class:

```java
void IccUserControl::run()
{
    if (strcmp(programId.name(), "PROG1234") == 0)
//do something
}
```

Here method programId executes correctly on CICS TS for z/OS but throws an IccException object of type 'platformError' on CICS(r) for AIX(r).

Alternatively, if you initialize your application with family subset enforcement on (see initializeEnvironment function of Icc structure), method programId throws an IccException object of type 'familyConformanceError' on any CICS server platform.

Parameter level

At this level a method is supported on all platforms, but a particular positional parameter has some platform restrictions.

Consider method abend in IccTask class.
Abends 1 to 4 run successfully on all CICS server platforms.

If family subset enforcement is off, abend 5 throws an `IccException` object of type 'platformError' on a CICS(r) for AIX(r) platform, but not on a CICS Transaction Server for z/OS platform.

If family subset enforcement is on, abend 5 throws an `IccException` object of type 'familyConformanceError', irrespective of the target CICS platform.

### Polymorphic Behavior

Polymorphism (poly = many, morphe = form) is the ability to treat many different forms of an object as if they were the same.

Polymorphism is achieved in C++ by using inheritance and virtual functions. Consider the scenario where we have three forms (ExpenseForm, LoanForm, PurchaseForm) that are specializations of a general Form:
Each form needs printing at some time. In procedural programming, we would either code a print function to handle the three different forms or we would write three different functions (printExpenseForm, printLoanForm, printPurchaseForm).

In C++, this can be achieved far more elegantly as follows:

```cpp
class Form {
public:
    virtual void print();
};
class ExpenseForm : public Form {
public:
    virtual void print();
};
class LoanForm : public Form {
public:
    virtual void print();
};
class PurchaseForm : public Form {
public:
    virtual void print();
};
```

Each of these overridden functions is implemented so that each form prints correctly. Now an application using form objects can do this:

```cpp
Form* pForm[10]
//create Expense/Loan/Purchase Forms...
for (short i=0 ; i < 9 ; i++)
pForm->print();
```

Here we create ten objects that might be any combination of Expense, Loan, and Purchase Forms. However, because we are dealing with pointers to the base class, Form, we do not need to know which sort of form object we have; the correct print method is called automatically.

Limited polymorphic behavior is available in the Foundation Classes. Three virtual functions are defined in the base class IccResource:

```cpp
virtual void clear();
virtual const IccBuf& get();
virtual void put(const IccBuf& buffer);
```

These virtual methods have been implemented in the subclasses of IccResource wherever possible:

<table>
<thead>
<tr>
<th>Class</th>
<th>clear</th>
<th>get</th>
<th>put</th>
</tr>
</thead>
<tbody>
<tr>
<td>IccConsole</td>
<td>×</td>
<td>×</td>
<td>✓</td>
</tr>
<tr>
<td>IccDataQueue</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>IccJournal</td>
<td>×</td>
<td>×</td>
<td>✓</td>
</tr>
<tr>
<td>IccSession</td>
<td>×</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>IccTempStore</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>IccTerminal</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
</tbody>
</table>

These virtual methods are not supported by any subclasses of IccResource except those in the table. Note: The default implementations of clear, get, and put in the base class IccResource throw an exception to prevent the user from calling an unsupported method.
Example of polymorphic behavior

The following sample can be found in the samples directory as file ICC$RES2.

It is presented here without the terminal IO requests. See C++ sample programs.

```cpp
#include "icceh.hpp"
#include "iccmain.hpp"
char* dataItems[] = {
    "Hello World - item 1",
    "Hello World - item 2",
    "Hello World - item 3"
};
void IccUserControl::run()
{
    // Here we include Foundation Class headers and the main function. dataItems contains some sample data items. We write our application code in the run method of IccUserControl class.
    IccBuf buffer( 50 );
    IccResource* pObj[2];

    // We create an IccBuf object (50 bytes initially) to hold our data items. An array of two pointers to IccResource objects is declared.
    pObj[0] = new IccDataQueue("ICCQ");
    pObj[1] = new IccTempStore("ICCTEMPS");

    // We create two objects whose classes are derived from IccResource – IccDataQueue and IccTempStore.
    for ( short index=0; index <= 1 ; index++ )
    {
        pObj[index]->clear();
    }

    // For both objects we invoke the clear method. This is handled differently by each object in a way that is transparent to the application program; this is polymorphic behavior.
    for ( index=0; index <= 1 ; index++ )
    {
        for (short j=1 ; j <= 3 ; j++)
        {
            buffer = dataItems[j-1];
            pObj[index]->put( buffer );
        }
    }

    // Now we put three data items in each of our resource objects. Again the put method responds to the request in a way that is appropriate to the object type.
    for ( index=0; index <= 1 ; index++ )
    {
        buffer = pObj[index]->get();
        while ( pObj[index]->condition() == IccCondition::NORMAL )
        {
            buffer = pObj[index]->get();
        }
        delete pObj[index];
    }
    return;
}
```

The data items are read back in from each of our resource objects using the get method. We delete the resource objects and return control to CICS.
Storage management

C++ objects are usually stored on the stack or heap. Objects on the stack are automatically destroyed when they go out of scope, but objects on the heap are not.

Many of the objects that the CICS Foundation Classes create internally are created on the heap rather than the stack. This can cause a problem in some CICS server environments.

On CICS Transaction Server for z/OS, CICS and Language Environment® manage all task storage so that it is released at task termination (normal or abnormal).

In a CICS for AIX environment, storage allocated on the heap is not automatically released at task termination. This can lead to "memory leaks" if the application programmer forgets to explicitly delete an object on the heap, or, more seriously, if the task abends.

This problem has been overcome in the CICS Foundation Classes by providing operators `new` and `delete` in the base Foundation Class, `IccBase`. These can be configured to map dynamic storage allocation requests to CICS task storage, so that all storage is automatically released at task termination. The disadvantage of this approach is a performance hit as the Foundation Classes typically issue a large number of small storage allocation requests rather than a single, larger allocation request.

This facility is affected by the `Icc::initializeEnvironment` call that must be issued before using the Foundation Classes. (This function is called from the default `main` function; see `main function`.)

The first parameter passed to the `initializeEnvironment` function is an enumeration that takes one of these three values:

- **cmmDefault**
  - The default action is platform dependent:
    - **z/OS**
      - same as 'cmmNonCICS' - see the 'cmmNonCICS' section.
    - **UNIX**
      - same as 'cmmCICS' - see the 'cmmCICS' section.

- **cmmNonCICS**
  - The `new` and `delete` operators in class `IccBase` do not map dynamic storage allocation requests to CICS task storage; instead the C++ default `new` and `delete` operators are invoked.

- **cmmCICS**
  - The `new` and `delete` operators in class `IccBase` map dynamic storage allocation requests to CICS task storage (which is automatically released at normal or abnormal task termination).

The default `main` function supplied with the Foundation Classes calls `initializeEnvironment` with an enum of 'cmmDefault'. You can change this in your program without changing the supplied "header file" `ICCMAIN` as follows:

```c++
#define ICC_CLASS_MEMORY_MGMT Icc::cmmNonCICS
#include "iccmain.hpp"
```

Alternatively, set the option `DEV(ICC_CLASS_MEMORY_MGMT)` when compiling.

Parameter passing conventions

The convention used for passing objects on Foundation Classes method calls is if the object is mandatory, pass by reference; if it is optional pass by pointer.

For example, consider method `start` of class `IccStartRequestQ`, which has the following signature:

```cpp
const IccRequestId& start( const IccTransId& transId,
const IccTime* time=0,
const IccRequestId* reqId=0 );
```
Using the preceding convention, we see that an `IccTransId` object is mandatory, while an `IccTime` and an `IccRequestId` object are both optional. This enables an application to use this method in any of the following ways:

```cpp
IccTransId trn("ABCD");
IccTimeInterval int(0,0,5);
IccRequestId req("MYREQ");
IccStartRequestQ* startQ = startRequestQ();
startQ->start( trn );
startQ->start( trn, &int );
startQ->start( trn, &int, &req );
startQ->start( trn, 0, &req );
```

### Scope of data in IccBuf reference returned from 'read' methods

Many of the subclasses of `IccResource` have 'read' methods that return `const IccBuf` references; for example, `IccFile::readRecord`, `IccTempStore::readItem` and `IccTerminal::receive`.

Care should be taken if you choose to maintain a reference to the `IccBuf` object, rather than copy the data from the `IccBuf` reference into your own `IccBuf` object. For example, consider the following

```cpp
IccBuf buf(50);
IccTempStore store("TEMPSTOR");
buf = store.readNextItem();
```

Here, the data in the `IccBuf` reference returned from `IccTempStore::readNextItem` is immediately copied into the application's own `IccBuf` object, so it does not matter if the data is later invalidated. However, the application might look like this

```cpp
IccTempStore store("TEMPSTOR");
const IccBuf& buf = store.readNextItem();
```

Here, the `IccBuf` reference returned from `IccTempStore::readNextItem` is not copied into the application's own storage and care must therefore be taken.

**Note:** You are recommended not to use this style of programming to avoid using a reference to an `IccBuf` object that does not contain valid data.

The returned `IccBuf` reference typically contains valid data until one of the following conditions is met:

- Another 'read' method is invoked on the `IccResource` object (for example, another `readNextItem` or `readItem` method in the example).
- The resource updates are committed (see method `IccTask::commitUOW`).
- The task ends (normally or abnormally).
Chapter 3. Foundation Classes: reference

This section contains the reference information on the foundation classes and structures that are provided as part of CICS. The classes and structures are arranged in alphabetic order. All the functionality you require to create object-oriented CICS programs is included within these classes and structures.

All of the classes and structures begin with the unique prefix Icc. Do not create your own classes with this prefix.

Icc structure contains some functions and enumerations that are widely applicable. IccValue structure consists of a large enumeration of all the CVDA values used in traditional CICS programs.

The description of each class starts with a simple diagram that shows how it is derived from IccBase class, the basis of all the other classes. This is followed by a short description and an indication of the name of the header file that includes it and, where appropriate, a sample source file that uses it.

Within each class or structure description are, where appropriate, the following sections:

1. Inheritance diagram
2. Brief description of class
3. Header file where class is defined. For the location of the C++ header files on your system see Header files.
4. Sample program demonstrating class. For the location of the supplied C++ sample programs on your system see C++ sample programs.
5. Icc... constructors
6. Public methods (in alphabetic order)
7. Protected methods (in alphabetic order)
8. Inherited public methods (in tabular form)
9. Inherited protected methods (in tabular form)
10. Enumerations

Methods, including constructors, start with a formal function prototype that shows what a call returns and what the parameters are. There follows a description, in order, of the parameters. To avoid duplication, inherited methods just have an indication of the class from which they are derived (and where they are described).

The convention for names is:

1. Variable names are shown as variable.
2. Names of classes, structures, enumerations and methods are shown as method
3. Members of enumerations are shown as 'enumMember'.
4. The names of all the supplied classes and structures begin with Icc.
5. Compound names have no separators, but have capital letters to demark the beginning of second and subsequent words, as in IccJournalTypeId.
6. Class and structure names and enumeration types begin with capital letters. Other names begin with lowercase letters.

For further information on how to use these classes, see Using the CICS foundation classes.
### Mapping EXEC CICS calls to Foundation Class methods

The following table shows the correspondence between CICS calls made using the EXEC CICS API and the equivalent calls from the Foundation Classes.

<table>
<thead>
<tr>
<th>EXEC CICS</th>
<th>Class</th>
<th>Method</th>
</tr>
</thead>
<tbody>
<tr>
<td>ABEND</td>
<td>IccTask</td>
<td>abend</td>
</tr>
<tr>
<td>ADDRESS COMMAREA</td>
<td>IccControl</td>
<td>commArea</td>
</tr>
<tr>
<td>ADDRESS CWA</td>
<td>IccSystem</td>
<td>workArea</td>
</tr>
<tr>
<td>ADDRESS EIB</td>
<td>No direct access to EIB: please use appropriate method on appropriate class.</td>
<td></td>
</tr>
<tr>
<td>ADDRESS TCTUA</td>
<td>IccTerminal</td>
<td>workArea</td>
</tr>
<tr>
<td>ADDRESS TWA</td>
<td>IccTask</td>
<td>workArea</td>
</tr>
<tr>
<td>ALLOCATE</td>
<td>IccSession</td>
<td>allocate</td>
</tr>
<tr>
<td>ASKTIME</td>
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<td>Class</td>
<td>Method</td>
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<td>isSOSI</td>
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<td>IccTask</td>
<td>startType, isCommitSupported, isStartDataAvailable</td>
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<td>sysId</td>
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<td>workArea</td>
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<td>IccClock</td>
<td>cancelAlarm</td>
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<td>CANCEL</td>
<td>IccStartRequestQ</td>
<td>cancel</td>
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<td>IccUser</td>
<td>changePassword</td>
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<td>IccTask</td>
<td>setPriority</td>
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<td>IccSession</td>
<td>connectProcess</td>
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<td>EXEC CICS</td>
<td>Class</td>
<td>Method</td>
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<td>IccTempStore</td>
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<td>IccTask</td>
<td>dump</td>
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<td>IccTask</td>
<td>setDumpOpts</td>
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<td>IccFileIterator</td>
<td>IccFileIterator (destructor)</td>
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<td>enterTrace</td>
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<td>IccSession</td>
<td>state, stateText</td>
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<td>IccSession</td>
<td>extractProcess</td>
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<td>date</td>
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<td>IccClock</td>
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<td>getStorage</td>
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<td>IccControl</td>
<td>setAbendHandler, cancelAbendHandler, resetAbendHandler</td>
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<td>IccFile</td>
<td>accessMethod</td>
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<td>INQUIRE FILE BROWSE</td>
<td>IccFile</td>
<td>isBrowsable</td>
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<td>isDeletable</td>
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<td>INQUIRE FILE ENABLESTATUS</td>
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<td>enableStatus</td>
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<td>EXEC CICS</td>
<td>Class</td>
<td>Method</td>
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<td>----------------------------------------------</td>
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<td>keyPosition</td>
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<td>openStatus</td>
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<td>IccFile</td>
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<td>recordFormat</td>
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<td>isRecoverable</td>
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<td>IccSession</td>
<td>issueAbend</td>
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<td>IccSession</td>
<td>issueConfirmation</td>
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<td>ISSUE ERROR</td>
<td>IccSession</td>
<td>issueError</td>
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<td>IccSession</td>
<td>issuePrepare</td>
</tr>
<tr>
<td>ISSUE SIGNAL</td>
<td>IccSession</td>
<td>issueSignal</td>
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<tr>
<td>LINK</td>
<td>IccProgram</td>
<td>link</td>
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<tr>
<td>LINK INPUTMSG INPUTMSGLEN</td>
<td>IccProgram</td>
<td>setInputMessage</td>
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<td>LOAD</td>
<td>IccProgram</td>
<td>load</td>
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<td>POST</td>
<td>IccClock</td>
<td>setAlarm</td>
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<td>IccFile</td>
<td>readRecord</td>
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<td>READNEXT</td>
<td>IccFileIterator</td>
<td>readNextRecord</td>
</tr>
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<td>READPREV</td>
<td>IccFileIterator</td>
<td>readPreviousRecord</td>
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<td>READQ TD</td>
<td>IccDataQueue</td>
<td>readItem</td>
</tr>
<tr>
<td>READQ TS</td>
<td>IccTempStore</td>
<td>readItem</td>
</tr>
<tr>
<td>RECEIVE (APPC)</td>
<td>IccSession</td>
<td>receive</td>
</tr>
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<td>RECEIVE (3270)</td>
<td>IccTerminal</td>
<td>receive, receive3270Data</td>
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<td>RELEASE</td>
<td>IccProgram</td>
<td>unload</td>
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<td>RESETBR</td>
<td>IccFileIterator</td>
<td>reset</td>
</tr>
<tr>
<td>RETRIEVE</td>
<td>IccStartRequestQ</td>
<td>retrieveData</td>
</tr>
<tr>
<td>RETRIEVE INTO, LENGTH</td>
<td>IccStartRequestQ</td>
<td>data</td>
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<td>RETRIEVE QUEUE</td>
<td>IccStartRequestQ</td>
<td>queueName</td>
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<tr>
<td>RETRIEVE RTRANSID</td>
<td>IccStartRequestQ</td>
<td>returnTransId</td>
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<tr>
<td>RETRIEVE RTERMID</td>
<td>IccStartRequestQ</td>
<td>returnTermId</td>
</tr>
<tr>
<td>RETURN</td>
<td>IccControl</td>
<td>main</td>
</tr>
</tbody>
</table>

Note: The `retrieveData` method gets the start information from CICS and stores it in the IccStartRequestQ object: the information can then be accessed using `data, queueName, returnTermId` and `returnTransId` methods.
<table>
<thead>
<tr>
<th>EXEC CICS</th>
<th>Class</th>
<th>Method</th>
</tr>
</thead>
<tbody>
<tr>
<td>RETURN TRANSID</td>
<td>IccTerminal</td>
<td>setNextTransId</td>
</tr>
<tr>
<td>RETURN IMMEDIATE</td>
<td>IccTerminal</td>
<td>setNextTransId</td>
</tr>
<tr>
<td>RETURN COMMAREA LENGTH</td>
<td>IccTerminal</td>
<td>setNextCommArea</td>
</tr>
<tr>
<td>RETURN INPUTMSG, INPUTMSGLEN</td>
<td>IccTerminal</td>
<td>setNextInputMessage</td>
</tr>
</tbody>
</table>

**Note:** Returning (using C++ reserved word **return**) from method **run** in class **IccControl** results in an EXEC CICS RETURN.

| RETURN TRANSID | IccTerminal | setNextTransId |
| RETURN IMMEDIATE | IccTerminal | setNextTransId |
| RETURN COMMAREA LENGTH | IccTerminal | setNextCommArea |
| RETURN INPUTMSG, INPUTMSGLEN | IccTerminal | setNextInputMessage |

**Note:** Issue this call before returning from **IccControl::run**.

| REWRITE | IccFile | rewriteRecord |
| SEND (APPC) | IccSession | send, sendInvite, sendLast |
| SEND (3270) | IccTerminal | send, sendLine |
| SEND CONTROL CURSOR | IccTerminal | setCursor setLine, setNewLine |
| SEND CONTROL ERASE | IccTerminal | erase |
| SEND CONTROL FREEKB | IccTerminal | freeKeyboard |
| SET FILE ADD|BROWSE|DELETE|... | IccFile | setAccess |
| SET FILE EMPTYSSTATUS | IccFile | setEmptyOnOpen |
| SET FILE OPEN STATUS| ENABLESTATUS | IccFile | setStatus |
| SIGNOFF | IccTerminal | signoff |
| SIGNON | IccTerminal | signon |
| START TRANSID AT/AFTER | IccStartRequestQ | start |
| START TRANSID FROM LENGTH | IccStartRequestQ | setData, registerDataBuffer |
| START TRANSID NOCHECK | IccStartRequestQ | setStartOpts |
| START TRANSID PROTECT | IccStartRequestQ | setStartOpts |
| START TRANSID QUEUE | IccStartRequestQ | setQueueName |
| START TRANSID REQID | IccStartRequestQ | start |
| START TRANSID TERMID | IccStartRequestQ | start |
| START TRANSID USERID | IccStartRequestQ | start |
| START TRANSID RTERMD | IccStartRequestQ | setReturnTermId |
| START TRANSID RTRANSID | IccStartRequestQ | setReturnTransId |

**Note:** Use methods **setData**, **setQueueName**, **setReturnTermId**, **setReturnTransId**, **setStartOpts** to set the state of the **IccStartRequestQ** object before issuing start requests with the **start** method.

| STARTBR | IccFileIterator | IccFileIterator (constructor) |
| SUSPEND | IccTask | suspend |
| SYNCPOINT | IccTask | commitUOW |
Mapping Foundation Class methods to EXEC CICS calls

The following table shows the correspondence between CICS calls made using the Foundation Classes and the equivalent EXEC CICS API calls.

<table>
<thead>
<tr>
<th>EXEC CICS</th>
<th>Class</th>
<th>Method</th>
</tr>
</thead>
<tbody>
<tr>
<td>SYNCPOINT ROLLBACK</td>
<td>IccTask</td>
<td>rollBackUOW</td>
</tr>
<tr>
<td>UNLOCK</td>
<td>IccFile</td>
<td>unlockRecord</td>
</tr>
<tr>
<td>VERIFY PASSWORD</td>
<td>IccUser</td>
<td>verifyPassword</td>
</tr>
<tr>
<td>WAIT CONVID</td>
<td>IccSession</td>
<td>flush</td>
</tr>
<tr>
<td>WAIT EVENT</td>
<td>IccTask</td>
<td>waitOnAlarm</td>
</tr>
<tr>
<td>WAIT EXTERNAL</td>
<td>IccTask</td>
<td>waitExternal</td>
</tr>
<tr>
<td>WAIT JOURNALNUM</td>
<td>IccJournal</td>
<td>wait</td>
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<tr>
<td>WRITE</td>
<td>IccFile</td>
<td>writeRecord</td>
</tr>
<tr>
<td>WRITE OPERATOR</td>
<td>IccConsole</td>
<td>write, writeAndGetReply</td>
</tr>
<tr>
<td>WRITEQ TD</td>
<td>IccDataQueue</td>
<td>writeItem</td>
</tr>
<tr>
<td>WRITEQ TS</td>
<td>IccTempStore</td>
<td>writeItem, rewriteItem</td>
</tr>
</tbody>
</table>

Table 1. IccAbendData Class

<table>
<thead>
<tr>
<th>Method</th>
<th>EXEC CICS</th>
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<tbody>
<tr>
<td>abendCode</td>
<td>ASSIGN ABCODE</td>
</tr>
<tr>
<td>ASRAInterrupt</td>
<td>ASSIGN ASRAINTRPT</td>
</tr>
<tr>
<td>ASRAKeyType</td>
<td>ASSIGN ASRAKEY</td>
</tr>
<tr>
<td>ASRAPSW</td>
<td>ASSIGN ASRAPSW</td>
</tr>
<tr>
<td>ASRARegisters</td>
<td>ASSIGN ASRAREGS</td>
</tr>
<tr>
<td>ASRASpaceType</td>
<td>ASSIGN ASRASPC</td>
</tr>
<tr>
<td>ASRAStorageType</td>
<td>ASSIGN ASRASTG</td>
</tr>
<tr>
<td>isDumpAvailable</td>
<td>ASSIGN ABDUMP</td>
</tr>
<tr>
<td>originalAbendCode</td>
<td>ASSIGN ORGABCODE</td>
</tr>
<tr>
<td>programName</td>
<td>ASSIGN ABPROGRAM</td>
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</tbody>
</table>

Table 2. IccAbsTime Class

<table>
<thead>
<tr>
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<th>EXEC CICS</th>
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</thead>
<tbody>
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<td>date</td>
<td>FORMATTIME YYDDD/YYMMDD/etc.</td>
</tr>
<tr>
<td>dayOfMonth</td>
<td>FORMATTIME DAYOFMONTH</td>
</tr>
<tr>
<td>dayOfWeek</td>
<td>FORMATTIME DAYOFWEEK</td>
</tr>
<tr>
<td>daysSince1900</td>
<td>FORMATTIME DAYCOUNT</td>
</tr>
<tr>
<td>monthOfYear</td>
<td>FORMATTIME MONTHOFYEAR</td>
</tr>
<tr>
<td>time</td>
<td>FORMATTIME TIME</td>
</tr>
</tbody>
</table>
### Table 2. IccAbsTime Class (continued)

<table>
<thead>
<tr>
<th>Method</th>
<th>EXEC CICS</th>
</tr>
</thead>
<tbody>
<tr>
<td>year</td>
<td>FORMATTIME YEAR</td>
</tr>
</tbody>
</table>

### Table 3. IccClock Class

<table>
<thead>
<tr>
<th>Method</th>
<th>EXEC CICS</th>
</tr>
</thead>
<tbody>
<tr>
<td>cancelAlarm</td>
<td>CANCEL</td>
</tr>
<tr>
<td>date</td>
<td>FORMATTIME YYDDD/YYMMDD/etc.</td>
</tr>
<tr>
<td>dayOfMonth</td>
<td>FORMATTIME DAYOFMONTH</td>
</tr>
<tr>
<td>dayOfWeek</td>
<td>FORMATTIME DAYOFWEEK</td>
</tr>
<tr>
<td>daysSince1900</td>
<td>FORMATTIME DAYCOUNT</td>
</tr>
<tr>
<td>monthOfYear</td>
<td>FORMATTIME MONTHOFYEAR</td>
</tr>
<tr>
<td>setAlarm</td>
<td>POST</td>
</tr>
<tr>
<td>time</td>
<td>FORMATTIME TIME</td>
</tr>
<tr>
<td>update</td>
<td>ASKTIME</td>
</tr>
<tr>
<td>year</td>
<td>FORMATTIME YEAR</td>
</tr>
</tbody>
</table>

### Table 4. IccConsole Class

<table>
<thead>
<tr>
<th>Method</th>
<th>EXEC CICS</th>
</tr>
</thead>
<tbody>
<tr>
<td>write</td>
<td>WRITE OPERATOR</td>
</tr>
<tr>
<td>writeAndGetReply</td>
<td>WRITE OPERATOR</td>
</tr>
</tbody>
</table>

### Table 5. IccControl Class

<table>
<thead>
<tr>
<th>Method</th>
<th>EXEC CICS</th>
</tr>
</thead>
<tbody>
<tr>
<td>callingProgramId</td>
<td>ASSIGN INVOKINGPROG</td>
</tr>
<tr>
<td>cancelAbendHandler</td>
<td>HANDLE ABEND CANCEL</td>
</tr>
<tr>
<td>commArea</td>
<td>ADDRESS COMMAREA</td>
</tr>
<tr>
<td>initData</td>
<td>ASSIGN INITPARM &amp; INITPARMLEN</td>
</tr>
<tr>
<td>programId</td>
<td>ASSIGN PROGRAM</td>
</tr>
<tr>
<td>resetAbendHandler</td>
<td>HANDLE ABEND RESET</td>
</tr>
<tr>
<td>setAbendHandler</td>
<td>HANDLE ABEND PROGRAM</td>
</tr>
</tbody>
</table>

### Table 6. IccDataQueue Class

<table>
<thead>
<tr>
<th>Method</th>
<th>EXEC CICS</th>
</tr>
</thead>
<tbody>
<tr>
<td>empty</td>
<td>DELETEQ TD</td>
</tr>
<tr>
<td>readItem</td>
<td>READQ TD</td>
</tr>
<tr>
<td>writeItem</td>
<td>WRITEQ TD</td>
</tr>
<tr>
<td>Method</td>
<td>EXEC CICS</td>
</tr>
<tr>
<td>---------------------</td>
<td>---------------------------------------------------------------------------</td>
</tr>
<tr>
<td>access</td>
<td>INQUIRE FILE ADD</td>
</tr>
<tr>
<td>accessMethod</td>
<td>INQUIRE FILE ACCESSMETHOD</td>
</tr>
<tr>
<td>deleteRecord</td>
<td>DELETE FILE RIDFLD</td>
</tr>
<tr>
<td>deleteLockedRecord</td>
<td>DELETE FILE</td>
</tr>
<tr>
<td>enableStatus</td>
<td>INQUIRE FILE ENABLESTATUS</td>
</tr>
<tr>
<td>isAddable</td>
<td>INQUIRE FILE ADD</td>
</tr>
<tr>
<td>isBrowsable</td>
<td>INQUIRE FILE BROWSE</td>
</tr>
<tr>
<td>isDeletable</td>
<td>INQUIRE FILE DELETE</td>
</tr>
<tr>
<td>isEmptyOnOpen</td>
<td>INQUIRE FILE EMPTYSTATUS</td>
</tr>
<tr>
<td>isReadable</td>
<td>INQUIRE FILE READ</td>
</tr>
<tr>
<td>isRecoverable</td>
<td>INQUIRE FILE RECOVSTATUS</td>
</tr>
<tr>
<td>isUpdatable</td>
<td>INQUIRE FILE UPDATE</td>
</tr>
<tr>
<td>keyPosition</td>
<td>INQUIRE FILE KEYPOSITION</td>
</tr>
<tr>
<td>openStatus</td>
<td>INQUIRE FILE OPENSTATUS</td>
</tr>
<tr>
<td>readRecord</td>
<td>READ FILE</td>
</tr>
<tr>
<td>recordFormat</td>
<td>INQUIRE FILE RECORDFORMAT</td>
</tr>
<tr>
<td>recordLength</td>
<td>INQUIRE FILE RECORDSIZE</td>
</tr>
<tr>
<td>rewriteRecord</td>
<td>REWRITE FILE</td>
</tr>
<tr>
<td>setAccess</td>
<td>SET FILE ADD BROWSE DELETE etc.</td>
</tr>
<tr>
<td>setEmptyOnOpen</td>
<td>SET FILE EMPTYSTATUS</td>
</tr>
<tr>
<td>setStatus</td>
<td>SET FILE OPENSTATUS ENABLESTATUS</td>
</tr>
<tr>
<td>type</td>
<td>INQUIRE FILE TYPE</td>
</tr>
<tr>
<td>unlockRecord</td>
<td>UNLOCK FILE</td>
</tr>
<tr>
<td>writeRecord</td>
<td>WRITE FILE</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Method</th>
<th>EXEC CICS</th>
</tr>
</thead>
<tbody>
<tr>
<td>IccFileIterator (constructor)</td>
<td>STARTBR FILE</td>
</tr>
<tr>
<td>~IccFileIterator (destructor)</td>
<td>ENDBR FILE</td>
</tr>
<tr>
<td>readNextRecord</td>
<td>READNEXT FILE</td>
</tr>
<tr>
<td>readPreviousRecord</td>
<td>READPREV FILE</td>
</tr>
<tr>
<td>reset</td>
<td>RESETBR FILE</td>
</tr>
<tr>
<td><strong>Table 9. IccJournal Class</strong></td>
<td></td>
</tr>
<tr>
<td>-------------------------------</td>
<td></td>
</tr>
<tr>
<td><strong>Method</strong></td>
<td><strong>EXEC CICS</strong></td>
</tr>
<tr>
<td>wait</td>
<td>WAIT JOURNALNUM</td>
</tr>
<tr>
<td>writeRecord</td>
<td>WRITE JOURNALNUM</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th><strong>Table 10. IccProgram Class</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Method</strong></td>
</tr>
<tr>
<td>link</td>
</tr>
<tr>
<td>load</td>
</tr>
<tr>
<td>unload</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th><strong>Table 11. IccResource Class</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Method</strong></td>
</tr>
<tr>
<td>condition</td>
</tr>
<tr>
<td>setRouteOption</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th><strong>Table 12. IccSemaphore Class</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Method</strong></td>
</tr>
<tr>
<td>lock</td>
</tr>
<tr>
<td>tryLock</td>
</tr>
<tr>
<td>unlock</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th><strong>Table 13. IccSession Class</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Method</strong></td>
</tr>
<tr>
<td>allocate</td>
</tr>
<tr>
<td>connectProcess</td>
</tr>
<tr>
<td>converse</td>
</tr>
<tr>
<td>extractProcess</td>
</tr>
<tr>
<td>flush</td>
</tr>
<tr>
<td>free</td>
</tr>
<tr>
<td>issueAbend</td>
</tr>
<tr>
<td>issueConfirmation</td>
</tr>
<tr>
<td>issueError</td>
</tr>
<tr>
<td>issuePrepare</td>
</tr>
<tr>
<td>issueSignal</td>
</tr>
<tr>
<td>receive</td>
</tr>
<tr>
<td>send</td>
</tr>
<tr>
<td>sendInvite</td>
</tr>
</tbody>
</table>
### Table 13. IccSession Class (continued)

<table>
<thead>
<tr>
<th>Method</th>
<th>EXEC CICS</th>
</tr>
</thead>
<tbody>
<tr>
<td>sendLast</td>
<td>SEND CONVID LAST</td>
</tr>
<tr>
<td>state</td>
<td>EXTRACT ATTRIBUTES</td>
</tr>
</tbody>
</table>

### Table 14. IccStartRequestQ Class

<table>
<thead>
<tr>
<th>Method</th>
<th>EXEC CICS</th>
</tr>
</thead>
<tbody>
<tr>
<td>cancel</td>
<td>CANCEL</td>
</tr>
<tr>
<td>retrieveData</td>
<td>RETRIEVE</td>
</tr>
<tr>
<td>start</td>
<td>START TRANSID</td>
</tr>
</tbody>
</table>

### Table 15. IccSystem Class

<table>
<thead>
<tr>
<th>Method</th>
<th>EXEC CICS</th>
</tr>
</thead>
<tbody>
<tr>
<td>applName</td>
<td>ASSIGN APPLID</td>
</tr>
<tr>
<td>beginBrowse</td>
<td>INQUIRE (FILE, TDQUEUE, etc) START</td>
</tr>
<tr>
<td>dateFormat</td>
<td>FORMATTIME DATEFORM</td>
</tr>
<tr>
<td>endBrowse</td>
<td>INQUIRE (FILE, TDQUEUE, etc) END</td>
</tr>
<tr>
<td>freeStorage</td>
<td>FREEMAIN</td>
</tr>
<tr>
<td>getFile</td>
<td>INQUIRE FILE</td>
</tr>
<tr>
<td>getNextFile</td>
<td>INQUIRE FILE NEXT</td>
</tr>
<tr>
<td>getStorage</td>
<td>GETMAIN SHARED</td>
</tr>
<tr>
<td>operatingSystem</td>
<td>INQUIRE SYSTEM OPSYS</td>
</tr>
<tr>
<td>operatingSystemLevel</td>
<td>INQUIRE SYSTEM OPREL</td>
</tr>
<tr>
<td>release</td>
<td>INQUIRE SYSTEM RELEASE</td>
</tr>
<tr>
<td>releaseText</td>
<td>INQUIRE SYSTEM RELEASE</td>
</tr>
<tr>
<td>sysId</td>
<td>ASSIGN SYSID</td>
</tr>
<tr>
<td>workArea</td>
<td>ADDRESS CWA</td>
</tr>
</tbody>
</table>

### Table 16. IccTask Class

<table>
<thead>
<tr>
<th>Method</th>
<th>EXEC CICS</th>
</tr>
</thead>
<tbody>
<tr>
<td>abend</td>
<td>ABEND</td>
</tr>
<tr>
<td>commitUOW</td>
<td>SYNCPOINT</td>
</tr>
<tr>
<td>delay</td>
<td>DELAY</td>
</tr>
<tr>
<td>dump</td>
<td>DUMP TRANSACTION</td>
</tr>
<tr>
<td>enterTrace</td>
<td>ENTER TRACENUM</td>
</tr>
<tr>
<td>facilityType</td>
<td>ASSIGN STARTCODE, TERMCODE, PRINSYSID, FCI</td>
</tr>
<tr>
<td>freeStorage</td>
<td>FREEMAIN</td>
</tr>
<tr>
<td>isCommandSecurityOn</td>
<td>ASSIGN CMDSEC</td>
</tr>
</tbody>
</table>
### Table 16. IccTask Class (continued)

<table>
<thead>
<tr>
<th>Method</th>
<th>EXEC CICS</th>
</tr>
</thead>
<tbody>
<tr>
<td>isCommitSupported</td>
<td>ASSIGN STARTCODE</td>
</tr>
<tr>
<td>isResourceSecurityOn</td>
<td>ASSIGN RESSEC</td>
</tr>
<tr>
<td>isRestarted</td>
<td>ASSIGN RESTART</td>
</tr>
<tr>
<td>isStartDataAvailable</td>
<td>ASSIGN STARTCODE</td>
</tr>
<tr>
<td>principalSysId</td>
<td>ASSIGN PRINSYSID</td>
</tr>
<tr>
<td>priority</td>
<td>ASSIGN TASKPRIORITY</td>
</tr>
<tr>
<td>rollBackUOW</td>
<td>SYNCPOINT ROLLBACK</td>
</tr>
<tr>
<td>setPriority</td>
<td>CHANGE TASK PRIORITY</td>
</tr>
<tr>
<td>startType</td>
<td>ASSIGN STARTCODE</td>
</tr>
<tr>
<td>suspend</td>
<td>SUSPEND</td>
</tr>
<tr>
<td>triggerDataQueueId</td>
<td>ASSIGN QNAME</td>
</tr>
<tr>
<td>userId</td>
<td>ASSIGN USERID</td>
</tr>
<tr>
<td>waitExternal</td>
<td>WAIT EXTERNAL / WAITCICS</td>
</tr>
<tr>
<td>waitOnAlarm</td>
<td>WAIT EVENT</td>
</tr>
<tr>
<td>workArea</td>
<td>ADDRESS TWA</td>
</tr>
</tbody>
</table>

### Table 17. IccTempStore Class

<table>
<thead>
<tr>
<th>Method</th>
<th>EXEC CICS</th>
</tr>
</thead>
<tbody>
<tr>
<td>empty</td>
<td>DELETEQ TS</td>
</tr>
<tr>
<td>readItem</td>
<td>READQ TS ITEM</td>
</tr>
<tr>
<td>readNextItem</td>
<td>READQ TS NEXT</td>
</tr>
<tr>
<td>rewriteItem</td>
<td>WRITEQ TS ITEM REWRITE</td>
</tr>
<tr>
<td>writeItem</td>
<td>WRITEQ TS ITEM</td>
</tr>
</tbody>
</table>

### Table 18. IccTerminal Class

<table>
<thead>
<tr>
<th>Method</th>
<th>EXEC CICS</th>
</tr>
</thead>
<tbody>
<tr>
<td>erase</td>
<td>SEND CONTROL ERASE</td>
</tr>
<tr>
<td>freeKeyboard</td>
<td>SEND CONTROL FREEKB</td>
</tr>
<tr>
<td>height</td>
<td>ASSIGN SCRNHT</td>
</tr>
<tr>
<td>netName</td>
<td>ASSIGN NETNAME</td>
</tr>
<tr>
<td>receive</td>
<td>RECEIVE</td>
</tr>
<tr>
<td>receive3270Data</td>
<td>RECEIVE BUFFER</td>
</tr>
<tr>
<td>send</td>
<td>SEND</td>
</tr>
<tr>
<td>sendLine</td>
<td>SEND</td>
</tr>
<tr>
<td>setCursor</td>
<td>SEND CONTROL CURSOR</td>
</tr>
</tbody>
</table>
### Table 18. IccTerminal Class (continued)

<table>
<thead>
<tr>
<th>Method</th>
<th>EXEC CICS</th>
</tr>
</thead>
<tbody>
<tr>
<td>setLine</td>
<td>SEND CONTROL CURSOR</td>
</tr>
<tr>
<td>setNewLine</td>
<td>SEND CONTROL CURSOR</td>
</tr>
<tr>
<td>signoff</td>
<td>SIGNOFF</td>
</tr>
<tr>
<td>signon</td>
<td>SIGNON</td>
</tr>
<tr>
<td>waitForAID</td>
<td>RECEIVE</td>
</tr>
<tr>
<td>width</td>
<td>ASSIGN SCRNWD</td>
</tr>
<tr>
<td>workArea</td>
<td>ADDRESS TCTUA</td>
</tr>
</tbody>
</table>

### Table 19. IccTerminalData Class

<table>
<thead>
<tr>
<th>Method</th>
<th>EXEC CICS</th>
</tr>
</thead>
<tbody>
<tr>
<td>alternateHeight</td>
<td>ASSIGN ALTSCRNHT</td>
</tr>
<tr>
<td>alternateWidth</td>
<td>ASSIGN ALTSCRNWD</td>
</tr>
<tr>
<td>defaultHeight</td>
<td>ASSIGN DEFSCRNHT</td>
</tr>
<tr>
<td>defaultWidth</td>
<td>ASSIGN DEFSCRNWD</td>
</tr>
<tr>
<td>graphicCharSetId</td>
<td>ASSIGN GCHARS</td>
</tr>
<tr>
<td>graphicCharCodeSet</td>
<td>ASSIGN GCODES</td>
</tr>
<tr>
<td>isAPLKeyboard</td>
<td>ASSIGN APLKYBD</td>
</tr>
<tr>
<td>isAPLText</td>
<td>ASSIGN APLTEXT</td>
</tr>
<tr>
<td>isBTrans</td>
<td>ASSIGN BTRANS</td>
</tr>
<tr>
<td>isColor</td>
<td>ASSIGN COLOR</td>
</tr>
<tr>
<td>isEWA</td>
<td>ASSIGN ESASUPP</td>
</tr>
<tr>
<td>isExtended3270</td>
<td>ASSIGN EXTDS</td>
</tr>
<tr>
<td>isGoodMorning</td>
<td>ASSIGN GMMI</td>
</tr>
<tr>
<td>isHighlight</td>
<td>ASSIGN HILIGHT</td>
</tr>
<tr>
<td>isKatakana</td>
<td>ASSIGN KATAKANA</td>
</tr>
<tr>
<td>isMSRControl</td>
<td>ASSIGN MSRCONTROL</td>
</tr>
<tr>
<td>isFieldOutline</td>
<td>ASSIGN OUTLINE</td>
</tr>
<tr>
<td>isPS</td>
<td>ASSIGN PS</td>
</tr>
<tr>
<td>isSOSI</td>
<td>ASSIGN SOSI</td>
</tr>
<tr>
<td>isTextKeyboard</td>
<td>ASSIGN TEXTKYBD</td>
</tr>
<tr>
<td>isTextPrint</td>
<td>ASSIGN TEXTPRINT</td>
</tr>
<tr>
<td>isValidation</td>
<td>ASSIGN VALIDATION</td>
</tr>
</tbody>
</table>
Table 20. IccUser Class

<table>
<thead>
<tr>
<th>Method</th>
<th>EXEC CICS</th>
</tr>
</thead>
<tbody>
<tr>
<td>changePassword</td>
<td>CHANGE PASSWORD</td>
</tr>
<tr>
<td>verifyPassword</td>
<td>VERIFY PASSWORD</td>
</tr>
</tbody>
</table>

**Icc structure**

This structure holds global enumerations and functions for the CICS Foundation Classes. These globals are defined within this structure to avoid name conflicts.

**Header file:** ICCGLBEH

**Functions**

Functions in Icc structure are as follows.

**boolText**

Returns the text that represents the boolean value described by the parameters, such as "yes" or "on".

```
static const char* boolText (Bool test, BoolSet set = trueFalse)
```

**test**

A boolean value, defined in this structure, that has one of two values, chosen from a set of values given by `set`.

**set**

An enumeration, defined in this structure, that indicates from which pair of values `test` is selected. The default is to use true and false.

**catchException**

This is the function of last resort, used to intercept `IccException` objects that the application fails to catch. It can be called from the `main` function in the stub program, listed in ICCMAIN header file, and described in “main function” on page 260. All OO CICS programs should use this stub or a close equivalent.

```
static void catchException(IccException& exception)
```

**exception**

A reference to an `IccException` object that holds information about a particular type of exception.
**conditionText**

Returns the symbolic name associated with a condition value. For example, if `conditionText` is called with `condition` of `IccCondition::NORMAL`, it returns "NORMAL", if it is called with `condition` of `IccCondition::IOERR`, it returns "IOERR", and so on.

```cpp
static const char* conditionText(IccCondition::Codes condition)
```

**condition**

An enumeration, defined in the `IccCondition` structure, that indicates the condition returned by a call to CICS.

**initializeEnvironment**

Initializes the CICS Foundation Classes. The rest of the class library can only be called after this function has been called. It is called from the `main` function in the stub program, listed in ICCMAIN header file, and described in [CICS C++ main function](#). All OO CICS programs should use this stub or a close equivalent.

```cpp
static void initializeEnvironment (ClassMemoryMgmt mem = cmmDefault,
                                   FamilySubset fam = fsDefault,
                                   Icc::Bool EDF)
```

**mem**

An enumeration, defined in this structure, that indicates the memory management policy for the foundation classes.

**fam**

An enumeration, defined in this structure, that indicates whether the use of CICS features that are not available on all platforms is permitted.

**EDF**

A boolean that indicates whether EDF tracing is initially on.

**isClassMemoryMgmtOn**

Returns a boolean value, defined in this structure, that indicates whether class memory management is on.

```cpp
static Bool isClassMemoryMgmtOn()
```

**isEDFOn**

Returns a Boolean value, defined in this structure, that indicates whether EDF tracing is on at the global level.

```cpp
static Bool isEDFOn()
```

See [setEDF in this structure](#), [isEDFOn](#) and [setEDF in `IccResource` class](#) on “[IccResource class](#)” on page 163 and [Program debugging](#).
isFamilySubsetEnforcementOn
Returns a boolean value, defined in this structure, that indicates whether it is permitted to use CICS features that are not available on all platforms.

static Bool isFamilySubsetEnforcementOn()

returnToCICS
This call returns the program flow to CICS.

static void returnToCICS()
It is called by the main function in the stub program, listed in ICCMAIN header file, and described in “main function” on page 260. All OO CICS programs should use this stub or a close equivalent.

setEDF
Sets EDF tracing on or off at the global level.

static void setEDF(Icc::Bool onOff = off)

onOff
A boolean, defined in this structure, that indicates whether EDF tracing is enabled. As EDF is more suitable for tracing programs that use EXEC CICS calls than object oriented programs, the default is off.

unknownException
This function is called by the main function in ICCMAIN header file and is used to intercept unknown exceptions.

static void unknownException()
See “main function” on page 260 and catchException in this structure).

Enumerations
References in this section to other CICS platforms, such as CICS(r) for AIX, are included for completeness. There have been Technology Releases of the CICS Foundation Classes on those platforms.

Bool
Three equivalent pairs of boolean values are as follows.
- true, yes, on
- false, no, off
true, yes, and on evaluate to 1, while false, no, and off evaluate to zero. Thus you can code test functions as follows:

```c
if (task()->isStartDataAvailable())
{
    //do something
}
```

**Note:** 'true' and 'false' are compiler keywords in the z/OS 1.2 C/C++ compiler and will not be generated by ICCGLBEH when using this compiler, or any later version.

**BoolSet**

BoolSet enumerations are as follows.

- trueFalse
- yesNo
- onOff

**ClassMemoryMgmt**

ClassMemoryMgmt enumerations are as follows.

- **cmmDefault**
  - The defaults for the different platforms are:
    - **z/OS**
      - cmmNonCICS
    - **UNIX**
      - cmmCICS

- **cmmNonCICS**
  - The C++ environment performs the memory management required by the program.
  - In z/OS Language Environment ensures that the storage for CICS tasks is released at the end of the task, or if the task terminates abnormally.
  - On CICS for AIX dynamic storage release does not occur at normal or abnormal task termination. This means that programs are susceptible to memory leaks.

- **cmmCICS**
  - The new and delete operators defined in IccBase class map storage allocations to CICS; storage is automatically released at task termination.

**FamilySubset**

FamilySubset enumerations are as follows.

- **fsDefault**
  - The defaults for the different platforms are all the same: fsAllowPlatformVariance

- **fsEnforce**
  - Enforces Family Subset conformance; that is, it disallows use of any CICS features that are not available on all CICS servers (OS/2, AIX, and z/OS).
  - **Note:** CICS OS/2 is no longer supported.

- **fsAllowPlatformVariance**
  - Allows each platform to access all the CICS features available on that platform.
GetOpt
This enumeration is used on a number of methods throughout the classes. It indicates whether the value held internally by the object is to be returned to the caller, or whether it has to be refreshed from CICS first.

**object**
If the value has been previously retrieved from CICS and stored within the object, return this stored value. Otherwise, get a copy of the value from CICS and store within the object.

**CICS**
Force the object to retrieve a fresh value from CICS (and store it within the object) even if there is already a value stored within the object from a previous invocation.

Platforms
Indicates on which operating system the program is being run.

Possible values are:
• OS2
• UNIX
• MVS™

IccAbendData class
This is a singleton class used to retrieve diagnostic information from CICS about a program abend.

IccBase
  IccResource
  IccAbendData

Header file: ICCABDEH

IccAbendData constructor (protected)
IccAbendData constructor in IccAbendData class

Constructor
IccAbendData()

Public methods
These are the public methods in this class.

The opt parameter
Many methods have the same parameter, opt, which is described under the abendCode method.

abendCode
Returns the current 4-character abend code.

const char* abendCode(Icc::GetOpt opt = Icc::object)
**opt**

An enumeration, defined in the **Icc** structure, that indicates whether a value should be refreshed from CICS or whether the existing value should be retained. The possible values are described under the **GetOpt** enumeration in the **Icc** structure in “GetOpt” on page 62.

**Conditions**

INVREQ

**ASRAInterrupt**

Returns 8 characters of status word (PSW) interrupt information at the point when the latest abend with a code of ASRA, ASRB, ASRD, or AICA occurred. The field contains binary zeroes if no ASRA or ASRB abend occurred during the execution of the issuing transaction, or if the abend originally occurred in a remote DPL server program.

```cpp
const char* ASRAInterrupt(Icc::GetOpt opt = Icc::object)
```

**Conditions**

INVREQ

**ASRAKeyType**

Returns an enumeration, defined in **IccValue**, that indicates the execution key at the time of the last ASRA, ASRB, AICA, or AEYD abend, if any.

The possible values are:

**CICSEXECKEY**

The task was executing in CICS-key at the time of the last ASRA, ASRB, AICA, or AEYD abend. Note that all programs execute in CICS key if CICS subsystem storage protection is not active.

**USEREXECKEY**

The task was executing in user-key at the time of the last ASRA, ASRB, AICA, or AEYD abend. Note that all programs execute in CICS key if CICS subsystem storage protection is not active.

**NONCICS**

The execution key at the time of the last abend was not one of the CICS keys; that is, not key 8 or key 9.

**NOTAPPLIC**

There has not been an ASRA, ASRB, AICA, or AEYD abend.

```cpp
IccValue::CVDA ASRAKeyType(Icc::GetOpt opt = Icc::object)
```

**Conditions**

INVREQ
ASRAPSW

Returns an 8-character status word (PSW) at the point when the latest abend with a code of ASRA, ASRB, ASRD, or AICA occurred. The field contains nulls if no ASRA, ASRB, ASRD, or AICA abend occurred during the execution of the issuing transaction, or if the abend originally occurred in a remote DPL server.

```cpp
const char* ASRAPSW(Icc::GetOpt opt = Icc::object)
```

Conditions

INVREQ

ASRARRegisters

Returns the contents of general registers 0–15, as a 64-byte data area, at the point when the latest ASRA, ASRB, ASRD, or AICA abend occurred. The contents of the registers are returned in the order 0, 1, ..., 15. Note that nulls are returned if no ASRA, ASRB, ASRD, or AICA abend occurred during the execution of the issuing transaction, or if the abend originally occurred in a remote DPL server program.

```cpp
const char* ASRARRegisters(Icc::GetOpt opt = Icc::object)
```

Conditions

INVREQ

ASRASpaceType

Returns an enumeration, defined in IccValue structure, that indicates what type of space, if any, was in control at the time of the last ASRA, ASRB, AICA, or AEYD abend.

Possible values are:

**SUBSPACE**

The task was executing in either its own subspace or the common subspace at the time of the last ASRA, ASRB, AICA, or AEYD abend.

**BASESPACE**

The task was executing in the base space at the time of the last ASRA, ASRB, AICA, or AEYD abend. Note that all tasks execute in the base space if transaction isolation is not active.

**NOTAPPLIC**

There has not been an ASRA, ASRB, AICA, or AEYD abend.

```cpp
IccValue::CVDA ASRASpaceType(Icc::GetOpt opt = Icc::object)
```

Conditions

INVREQ
**ASRAStorageType**

Returns an enumeration, defined in **IccValue** structure, that indicates what type of storage, if any, was being addressed at the time of the last ASRA, ASRB, AICA, or AEYD abend.

Possible values are:

**CICS**
CICS-key storage is being addressed. This can be in one of the CICS dynamic storage areas (CDSA or ECDSA), or in one of the read-only dynamic storage areas (RDSA or ERDSA) if either of the following apply:
- CICS is running with the NOPROTECT option on the RENTPGM system initialization parameter
- storage protection is not active

**USER**
User-key storage in one of the user dynamic storage areas (RDSA or ERDSA) is being addressed.

**READONLY**
Read-only storage in one of the read-only dynamic storage areas (RDSA or ERDSA) when CICS is running with the PROTECT option on the RENTPGM system initialization parameter.

**NOTAPPLIC**
One of:
- No ASRA or AEYD abend has been found for this task.
- The storage affected by an abend is not managed by CICS.
- The ASRA abend is not caused by a 0C4 abend.
- An ASRB or AICA abend has occurred since the last ASRA or AEYD abend.

**IccValue::CVDA ASRAStorageType(Icc::GetOpt opt = Icc::object)**

**Conditions**

**INVREQ**

**instance**

Returns a pointer to the single **IccAbendData** object. If the object does not already exist, it is created by this method.

**static IccAbendData* instance()**

**isDumpAvailable**

Returns a boolean, defined in **Icc** structure, that indicates whether a dump has been produced. If it has, use **programName** method to find the name of the failing program of the latest abend.

**Icc::Bool isDumpAvailable(Icc::GetOpt opt = Icc::object)**
**Conditions**

INVREQ

**originalAbendCode**

Returns the original abend code for this task in case of repeated abends.

\[
\text{const char* originalAbendCode(Icc::GetOpt opt = Icc::object)}
\]

**Conditions**

INVREQ

**programName**

Returns the name of the program that caused the abend.

\[
\text{const char* programName(Icc::GetOpt opt = Icc::oldValue)}
\]

**Conditions**

INVREQ

**Inherited public methods**

These are the public methods inherited by this class.

<table>
<thead>
<tr>
<th>Method</th>
<th>Class</th>
</tr>
</thead>
<tbody>
<tr>
<td>actionOnCondition</td>
<td>IccResource</td>
</tr>
<tr>
<td>actionOnConditionAsChar</td>
<td>IccResource</td>
</tr>
<tr>
<td>actionsOnConditionsText</td>
<td>IccResource</td>
</tr>
<tr>
<td>classType</td>
<td>IccBase</td>
</tr>
<tr>
<td>className</td>
<td>IccBase</td>
</tr>
<tr>
<td>condition</td>
<td>IccResource</td>
</tr>
<tr>
<td>conditionText</td>
<td>IccResource</td>
</tr>
<tr>
<td>customClassNum</td>
<td>IccBase</td>
</tr>
<tr>
<td>handleEvent</td>
<td>IccResource</td>
</tr>
<tr>
<td>id</td>
<td>IccResource</td>
</tr>
<tr>
<td>isEDFOn</td>
<td>IccResource</td>
</tr>
<tr>
<td>name</td>
<td>IccResource</td>
</tr>
<tr>
<td>operator delete</td>
<td>IccBase</td>
</tr>
<tr>
<td>operator new</td>
<td>IccBase</td>
</tr>
</tbody>
</table>
Method                          Class
setActionOnAnyCondition         IccResource
setActionOnCondition            IccResource
setActionsOnConditions          IccResource
setEDF                           IccResource

**Inherited protected methods**
These are the protected methods inherited by this class.

<table>
<thead>
<tr>
<th>Method</th>
<th>Class</th>
</tr>
</thead>
<tbody>
<tr>
<td>setClassName</td>
<td>IccBase</td>
</tr>
<tr>
<td>setCustomClassNum</td>
<td>IccBase</td>
</tr>
</tbody>
</table>

### IccAbsTime class
This class holds information about absolute time, the time in milliseconds that has elapsed since the beginning of the year 1900.

**IccBase**
- **IccResource**
- **IccTime**
- **IccAbsTime**

**Header file:** ICCTIMEH

### IccAbsTime constructor
IccAbsTime constructor in IccAbsTime class.

**Constructor (1)**

\[
\text{IccAbsTime(const char* } \text{ absTime)}
\]

**absTime**
The 8-byte value of time, in packed decimal format.

**Constructor (2)**
The copy constructor.

\[
\text{IccAbsTime(const IccAbsTime& } \text{ time)}
\]
Public methods

These are the public methods in this class.

**date**

Returns the date, as a character string.

```cpp
const char* date (IccClock::DateFormat format = IccClock::defaultFormat,
    char dateSeparator = '\0')
```

**format**

An enumeration, defined in **IccClock** class, that indicates the format of the date. The default is to use the installation default, the value set when the CICS region is initialized.

**dateSeparator**

The character that separates the different fields of the date The default is no separation character.

**Conditions**

INVREQ

**dayOfMonth**

Returns the day of the month in the range 1 to 31.

```cpp
unsigned long dayOfMonth()
```

**Conditions**

INVREQ

**dayOfWeek**

Returns an enumeration, defined in **IccClock** class, that indicates the day of the week.

```cpp
IccClock::DayOfWeek dayOfWeek()
```

**Conditions**

INVREQ

**daysSince1900**

Returns the number of days that have elapsed since the first day of 1900.

```cpp
unsigned long daysSince1900()
```
Conditions
INVREQ

hours
Returns the hours component of the time.

virtual unsigned long hours() const

milliSeconds
Returns the number of milliseconds that have elapsed since the first day of 1900.

long double milliSeconds()

minutes
Returns the minutes component of the time.

virtual unsigned long minutes() const

monthOfYear
Returns an enumeration, defined in IccClock class, that indicates the month of the year.

IccClock::MonthOfYear monthOfYear()

Conditions
INVREQ

operator=
Assigns one IccAbsTime object to another.

IccAbsTime& operator=(const IccAbsTime& absTime)

packedDecimal
Returns the time as an 8-byte packed decimal string that expresses the number of milliseconds that have elapsed since the beginning of the year 1900.
const char* packedDecimal() const

seconds
Returns the seconds component of the time.

virtual unsigned long seconds() const

time
Returns the time as a text string.

const char* time(char timeSeparator = '\0')

timeSeparator
The character that delimits the time fields. The default is no time separation character.

Conditions
INVREQ
timeInHours
Returns the number of hours that have elapsed since the day began.

unsigned long timeInHours()
timeInMinutes
Returns the number of minutes that have elapsed since the day began.

unsigned long timeInMinutes()
timeInSeconds
Returns the number of seconds that have elapsed since the day began.

unsigned long timeInSeconds()

year
Returns the year as a 4-digit integer, e.g. 1996.
unsigned long year()

**Conditions**
INVREQ

**Inherited public methods**
These are the inherited public methods in IccAbsTime class.

<table>
<thead>
<tr>
<th>Method</th>
<th>Class</th>
</tr>
</thead>
<tbody>
<tr>
<td>actionOnCondition</td>
<td>IccResource</td>
</tr>
<tr>
<td>actionOnConditionAsChar</td>
<td>IccResource</td>
</tr>
<tr>
<td>actionsOnConditionsText</td>
<td>IccResource</td>
</tr>
<tr>
<td>classType</td>
<td>IccBase</td>
</tr>
<tr>
<td>className</td>
<td>IccBase</td>
</tr>
<tr>
<td>condition</td>
<td>IccResource</td>
</tr>
<tr>
<td>conditionText</td>
<td>IccResource</td>
</tr>
<tr>
<td>customClassName</td>
<td>IccBase</td>
</tr>
<tr>
<td>handleEvent</td>
<td>IccResource</td>
</tr>
<tr>
<td>hours</td>
<td>IccTime</td>
</tr>
<tr>
<td>isEDFOn</td>
<td>IccResource</td>
</tr>
<tr>
<td>minutes</td>
<td>IccTime</td>
</tr>
<tr>
<td>operator delete</td>
<td>IccBase</td>
</tr>
<tr>
<td>operator new</td>
<td>IccBase</td>
</tr>
<tr>
<td>setActionOnAnyCondition</td>
<td>IccResource</td>
</tr>
<tr>
<td>setActionOnCondition</td>
<td>IccResource</td>
</tr>
<tr>
<td>setActionsOnConditions</td>
<td>IccResource</td>
</tr>
<tr>
<td>setEDF</td>
<td>IccResource</td>
</tr>
<tr>
<td>timeInHours</td>
<td>IccTime</td>
</tr>
<tr>
<td>timeInMinutes</td>
<td>IccTime</td>
</tr>
<tr>
<td>timeInSeconds</td>
<td>IccTime</td>
</tr>
<tr>
<td>type</td>
<td>IccTime</td>
</tr>
</tbody>
</table>

**Inherited protected methods**
Inherited protected methods in IccAbsTime class:

<table>
<thead>
<tr>
<th>Method</th>
<th>Class</th>
</tr>
</thead>
<tbody>
<tr>
<td>setClassName</td>
<td>IccBase</td>
</tr>
<tr>
<td>setCustomClassNum</td>
<td>IccBase</td>
</tr>
</tbody>
</table>
IccAlarmRequestId class

An IccAlarmRequestId object represents a unique alarm request.

IccAlarmRequestId

It contains the 8-character name of the request identifier and a pointer to a 4-byte timer event control area. IccAlarmRequestId is used by the setAlarm method of IccClock class when setting an alarm, and the waitOnAlarm method of IccTask when waiting for an alarm.

Header file: ICCRIDEH

IccAlarmRequestId constructors

IccAlarmRequestId constructors:

Constructor (1)

Creates a new object with no information present.

IccAlarmRequestId()

Constructor (2)

Creates an object with information already set.

IccAlarmRequestId(const char* nam, const void* timerECA)

name

The 8-character name of the request.

timerECA

A pointer to a 4-byte timer event control area.

Constructor (3)

The copy constructor.

IccAlarmRequestId(const IccAlarmRequestId& id)

id

A reference to an IccAlarmRequestId object.
Public methods  
These methods are used to copy information into an \texttt{IccAlarmRequestId} object.

**isExpired**  
Returns a boolean, defined in \texttt{Icc} structure, that indicates whether the alarm has expired.

\begin{verbatim}
Icc::Bool isExpired()
\end{verbatim}

**operator= (1)**  
\begin{verbatim}
IccAlarmRequestId& operator=(const IccRequestId& \textit{id})
\end{verbatim}

\textit{id}  
A reference to an \texttt{IccRequestId} object.

**operator= (2)**  
\begin{verbatim}
IccAlarmRequestId& operator=(const IccAlarmRequestId& \textit{id})
\end{verbatim}

\textit{id}  
A reference to an \texttt{IccAlarmRequest} object.

**operator= (3)**  
\begin{verbatim}
IccAlarmRequestId& operator=(const char* \textit{requestName})
\end{verbatim}

\textit{requestName}  
The 8-character name of the alarm request.

**setTimerECA**  
\begin{verbatim}
void setTimerECA(const void* \textit{timerECA})
\end{verbatim}

\textit{timerECA}  
A pointer to a 4-byte timer event control area.
**timerECA**

Returns a pointer to the 4-byte timer event control area.

```c
const void* timerECA() const
```

**Inherited public methods**

These are the public methods inherited by this class.

<table>
<thead>
<tr>
<th>Method</th>
<th>Class</th>
</tr>
</thead>
<tbody>
<tr>
<td>classType</td>
<td>IccBase</td>
</tr>
<tr>
<td>className</td>
<td>IccBase</td>
</tr>
<tr>
<td>customClassNum</td>
<td>IccBase</td>
</tr>
<tr>
<td>name</td>
<td>IccResourceId</td>
</tr>
<tr>
<td>nameLength</td>
<td>IccResourceId</td>
</tr>
<tr>
<td>operator delete</td>
<td>IccBase</td>
</tr>
<tr>
<td>operator new</td>
<td>IccBase</td>
</tr>
</tbody>
</table>

**Inherited protected methods**

These are the protected methods inherited by this class.

<table>
<thead>
<tr>
<th>Method</th>
<th>Class</th>
</tr>
</thead>
<tbody>
<tr>
<td>operator=</td>
<td>IccResourceId</td>
</tr>
<tr>
<td>setClassName</td>
<td>IccBase</td>
</tr>
<tr>
<td>setCustomClassNum</td>
<td>IccBase</td>
</tr>
</tbody>
</table>

**IccBase class**

IccBase class is the base class from which all CICS Foundation Classes are derived.

**IccBase**

(The methods associated with IccBase are described here although, in practice, they can only be called on objects of the derived classes).

**Header file:** ICCBASEH

**IccBase constructor (protected)**

IccBase constructor (protected) in IccBase class

**Constructor**

IccBase(ClassType type)
type
An enumeration that indicates what the subclass type is. For example, for an IccTempStore object, the class type is 'cTempStore'.

Public methods
These are the public methods in this class.

The opt parameter
Many methods have the same parameter, opt, which is described under the abendCode method in "abendCode" on page 62.

classType
Returns an enumeration that indicates what the subclass type is. For example, for an IccTempStore object, the class type is 'cTempStore'. The possible values are listed under ClassType on page ClassType.

ClassType classType() const

className
Returns the name of the class. For example, an IccTempStore object returns "IccTempStore". Suppose a class MyDataQueue inherits from IccDataQueue. If MyDataQueue calls setClassName("MyDataQueue"), MyDataQueue::className(IccBase::customName) returns "MyDataQueue" and MyDataQueue::className(IccBase::baseName) returns "IccDataQueue". An IccDataQueue object returns "IccDataQueue" for both opt values.

const char* className(NameOpt opt=customName)

opt
An enumerator, defined in this class, that indicates whether to return the base name of the class or the name as customized by a derived class.

customClassNum
Returns the number that an application designer has associated with a subclass that he or she has designed.

unsigned short customClassNum() const

operator delete
Destroys an object in an orderly manner.

void operator delete(void* object)
**object**
A pointer to an object that is to be destroyed.

**operator new**
Creates a new object of given size. This operator enables the Foundation Classes to use CICS storage allocation (see “initializeEnvironment” on page 59).

```cpp
void* operator new(size_t size)
```

**size**
The size of the object that is to be created, in bytes.

**Protected methods**

**setClassName**
Sets the name of the class. It is useful for diagnostic purposes to be able to get a string representation of the name of the class to which an object belongs.

```cpp
void setClassName(const char* className)
```

**className**
The name of the class. For example, if you create a class `MyTempStore` that is a specialization of `IccTempStore`, you might call `setClassName("MyTempStore").`

**setCustomClassNum**
Assigns an identification number to a subclass that is not an original part of the classes, as supplied.

```cpp
void setCustomClassNum(unsigned short number)
```

**number**
The number that an application designer associates with a subclass for identification purposes.
Enumerations

Enumerations in IccBase class:

ClassType

The names are derived by deleting the first two characters from the name of the class.

The possible values are:

• cAbendData
• cAlarmRequest
• cBuf
• cClock
• cConsole
• cControl
• cConvId
• cCUSTOM
• cDataQueue
• cDataQueueId
• cEvent
• cException
• cFile
• cFileId
• cFileIterator
• cGroup
• cGroupId
• cJournal
• cJournalId
• cJournalType
• cLockId
• cMessage
• cPartnerId
• cProgram
• cProgramId
• cRecordIndex
• cRequest
• cSemaphore
• cSession
• cStartRequestQ
• cSysId
• cSystem
• cTask
• cTempStore
• cTempStoreId
• cTermId
• cTerminal
• cTerminalData
• cTime
• cTPNameId
• cTransId
• cUser
• cUserId

Note: cCUSTOM allows the class library to be extended by non-IBM developers.

NameOpt
NameOpt in Enumerations:

See “className” on page 75.

baseName
Returns the default name assigned to the class as provided by IBM.

customName
Returns the name assigned using setClassName method from a subclass or, if setClassName has not been invoked, the same as baseName.

IccBuf class

IccBuf class is supplied for the general manipulation of buffers.

IccBase
IccBuf

This class is used by other classes that make calls to CICS, but does not itself call CICS services. See Buffer objects.

Header file: ICCBUFSEH
Sample: ICC$BUF

IccBuf constructors

IccBuf constructors in IccBuf class:

Constructor (1)
Creates an IccBuf object, allocating its own data area with the given length and with all the bytes within it set to NULL.

IccBuf (unsigned long length = 0,
    DataAreaType type = extensible)

length
The initial length of the data area, in bytes. The default length is 0.

type
An enumeration that indicates whether the data area can be dynamically extended. Possible values are extensible or fixed. The default is extensible.
Constructor (2)
Creates an IccBuf object that cannot be extended, adopting the given data area as its own. See warning about Internal/External ownership of buffers.

IccBuf (unsigned long length,
       void* dataArea)

length
The length of the supplied data area, in bytes

dataArea
The address of the first byte of the supplied data area.

Constructor (3)
Creates an IccBuf object, allocating its own data area with the same length as the text string, and copies the string into its data area.

IccBuf (const char* text,
        DataAreaType type = extensible)

text
A null-terminated string to be copied into the new IccBuf object.

type
An enumeration that indicates whether the data area can be extended. Possible values are extensible or fixed. The default is extensible.

Constructor (4)
The copy constructor—creates a new IccBuf object that is a copy of the given object. The created IccBuf object always has an internal data area.

IccBuf(const IccBuf& buffer)

buffer
A reference to an IccBuf object that is to be copied into the new object.
Public methods

These are the public methods in this class.

**append (1)**

Appends data from the given data area to the data area in the object.

```
IccBuf& append (unsigned long length,
             const void* dataArea)
```

*length*  
The length of the source data area, in bytes

*dataArea*  
The address of the source data area.

**append (2)**

Append data, in the form of format string and variable argument, to the data area in the object. This is the same as the form used by printf in the standard C library. Note that it is the responsibility of the application programmer to ensure that the optional parameters are consistent with the format string.

```
IccBuf& append (const char* format,
          ...
```

*format*  
The null-terminated format string

*...*  
The optional parameters.

**assign (1)**

Assigns data from the given data area to the data area in the object.

```
IccBuf& assign (unsigned long length,
             const void* dataArea)
```

*length*  
The length of the source data area, in bytes

*dataArea*  
The address of the source data area.
assign (2)
Assigns data, in the form of format string and variable argument, to the data area in the object. This is the same as the form used by printf in the standard C library.

IccBuf& assign (const char* format, ...

format
The format string
...
The optional parameters.

cut
Makes the specified cut to the data in the data area and returns a reference to the IccBuf object.

IccBuf& cut (unsigned long length, unsigned long offset = 0)

length
The number of bytes to be cut from the data area.

offset
The offset into the data area. The default is no offset.

dataArea
Returns the address of data at the given offset into the data area.

const void* dataArea(unsigned long offset = 0) const

offset
The offset into the data area. The default is no offset.

dataAreaLength
Returns the length of the data area in bytes.

unsigned long dataAreaLength() const
**dataAreaOwner**

Returns an enumeration that indicates whether the data area has been allocated by the `IccBuf` constructor or has been supplied from elsewhere.

**DataAreaOwner dataAreaOwner() const**

The possible values are listed under “DataAreaOwner” on page 88.

**dataAreaType**

**DataAreaType dataAreaType() const**

Returns an enumeration that indicates whether the data area can be extended. The possible values are listed under “DataAreaType” on page 88.

**dataLength**

Returns the length of data in the data area. This cannot be greater than the value returned by `dataAreaLength`.

**unsigned long dataLength() const**

**insert**

Inserts the given data into the data area at the given offset and returns a reference to the `IccBuf` object.

```cpp
IccBuf& insert (unsigned long length, const void* dataArea, unsigned long offset = 0)
```

**length**

The length of the data, in bytes, to be inserted into the `IccBuf` object.

**dataArea**

The start of the source data to be inserted into the `IccBuf` object.

**offset**

The offset in the data area where the data is to be inserted. The default is no offset.

**isFMHContained**

```
Icc::Bool isFMHContained() const
```

Returns a boolean, defined in `Icc` structure, that indicates whether the data area contains FMHs (function management headers).
**operator const char**

**operator const char\*() const**

Casts an `IccBuf` object to a null terminated string.

```cpp
IccBuf data("Hello World");
cout << (const char*) data;
```

**operator= (1)**

Assigns data from another buffer object and returns a reference to the `IccBuf` object.

```
IccBuf& operator=(const IccBuf& buffer)
```

*buffer*

A reference to an `IccBuf` object.

**operator= (2)**

Assigns data from a null-terminated string and returns a reference to the `IccBuf` object. See also the `assign` method.

```
IccBuf& operator=(const char* text)
```

*text*

The null-terminated string to be assigned to the `IccBuf` object.

**operator+= (1)**

Appends data from another buffer object and returns a reference to the `IccBuf` object.

```
IccBuf& operator+=(const IccBuf& buffer)
```

*buffer*

A reference to an `IccBuf` object.
operator+= (2)
Appends data from a null-terminated string and returns a reference to the \texttt{IccBuf} object. See also the \texttt{append} method.

\texttt{IccBuf} \& \texttt{operator\+\=(const char* text)}

\textit{text}
The null-terminated string to be appended to the \texttt{IccBuf} object.

\texttt{operator==}
Returns a boolean, defined in \texttt{Icc} structure, that indicates whether the data contained in the buffers of the two \texttt{IccBuf} objects is the same. It is true if the current lengths of the two data areas are the same and the contents are the same.

\texttt{Icc::Bool operator\==(const IccBuf\& buffer) const}

\textit{buffer}
A reference to an \texttt{IccBuf} object.

\texttt{operator\!=}
Returns a boolean, defined in \texttt{Icc} structure, that indicates whether the data contained in the buffers of the two \texttt{IccBuf} objects is different. It is true if the current lengths of the two data areas are different or if the contents are different.

\texttt{Icc::Bool operator\!=\=(const IccBuf\& buffer) const}

\textit{buffer}
A reference to an \texttt{IccBuf} object.

\texttt{operator\« (1)}
Appends another buffer.

\texttt{operator\«(const IccBuf\& buffer)}
operator« (2)
Appends a string.

operator«(const char* text)

operator« (3)
Appends a character.

operator«(char ch)

operator« (4)
Appends a character.

operator«(signed char ch)

operator« (5)
Appends a character.

operator«(unsigned char ch)

operator« (6)
Appends a string.

operator«(const signed char* text)

operator« (7)
Appends a string.

operator«(const unsigned char* text)

operator« (8)
Appends a short.

operator«(short num)
operator« (9)
Appends an unsigned short.

operator«(unsigned short num)

operator« (10)
Appends a long.

operator«(long num)

operator« (11)
Appends an unsigned long.

operator«(unsigned long num)

operator« (12)
Appends an integer.

operator«(int num)

operator« (13)
Appends a float.

operator«(float num)

operator« (14)
Appends a double.

operator«(double num)

operator« (15)
Appends a long double.

operator«(long double num)
Appends data of various types to the **IccBuf** object. The types are converted to a 'readable' format, for example from a long to a string representation.

**overlay**

Makes the data area external and fixed. Any existing internal data area is destroyed. See warning about Internal/External ownership of buffers.

**IccBuf**& overlay (unsigned long *length*,
             void* *dataArea*)

*length*  
The length of the existing data area.

*dataArea*  
The address of the existing data area.

**replace**

Replaces the current contents of the data area at the given offset with the data provided and returns a reference to the **IccBuf** object.

**IccBuf**& replace (unsigned long *length*,
                   const void* *dataArea*,
                   unsigned long *offset* = 0)

*length*  
The length of the source data area, in bytes.

*dataArea*  
The address of the start of the source data area.

*offset*  
The position where the new data is to be written, relative to the start of the **IccBuf** data area. The default is no offset.

**setDataLength**

Changes the current length of the data area and returns the new length. If the **IccBuf** object is not extensible, the data area length is set to either the original length of the data area or *length*, whichever is less.

**unsigned long setDataLength(unsigned long *length*)**
**length**
The new length of the data area, in bytes

**setFMHContained**
Allows an application program to indicate that a data area contains function management headers.

```cpp
void setFMHContained(Icc::Bool yesNo = Icc::yes)
```

**yesNo**
A boolean, defined in Icc structure, that indicates whether the data area contains FMHs. The default value is yes.

**Inherited public methods**
These are the public methods inherited by this class.

<table>
<thead>
<tr>
<th>Method</th>
<th>Class</th>
</tr>
</thead>
<tbody>
<tr>
<td>className</td>
<td>IccBase</td>
</tr>
<tr>
<td>classType</td>
<td>IccBase</td>
</tr>
<tr>
<td>customClassNum</td>
<td>IccBase</td>
</tr>
<tr>
<td>operator delete</td>
<td>IccBase</td>
</tr>
<tr>
<td>operator new</td>
<td>IccBase</td>
</tr>
</tbody>
</table>

**Inherited protected methods**
These are the protected methods inherited by this class.

<table>
<thead>
<tr>
<th>Method</th>
<th>Class</th>
</tr>
</thead>
<tbody>
<tr>
<td>setClassName</td>
<td>IccBase</td>
</tr>
<tr>
<td>setCustomClassNum</td>
<td>IccBase</td>
</tr>
</tbody>
</table>

**Enumerations**

**DataAreaOwner**
Indicates whether the data area of a IccBuf object has been allocated outside the object.

Possible values are:

- **internal**
  - The data area has been allocated by the IccBuf constructor.

- **external**
  - The data area has been allocated externally.

**DataAreaType**
Indicates whether the data area of a IccBuf object can be made longer than its original length.

Possible values are:
extensible
   The data area can be automatically extended to accommodate more data.

fixed
   The data area cannot grow in size. If you attempt to assign too much data, the data is truncated, and
   an exception is thrown.

IccClock class

The IccClock class controls access to the CICS time and date services.

IccBase
   IccResource
   IccClock

Header file: ICCCLKEH
Sample: ICC$CLK

IccClock constructor

Constructor

IccClock(UpdateMode update = manual)

update
   An enumeration, defined in this class, that indicates whether the clock is to update its time
   automatically whenever a time or date service is used, or whether it is to wait until an explicit update
   method call is made. If the time is updated manually, the initial clock time is the time when the
   IccClock object object is created.

Public methods

These are the public methods in this class.

absTime
   Returns a reference to an IccAbsTime object that contains the absolute time as provided by CICS.

IccAbsTime& absTime()

cancelAlarm
   Cancels a previous setAlarm request if the alarm time has not yet been reached, that is, the request has
   not expired.

   void cancelAlarm(const IccRequestId* reqId = 0)
reqId
An optional pointer to the IccRequestId object that holds information on an alarm request.

Conditions
ISCINVREQ, NOTAUTH, NOTFND, SYSIDERR

date
Returns the date as a string.

const char* date (DateFormat format = defaultFormat,
             char dateSeparator = '\0')

format
An enumeration, defined in this class, that indicates in which format you want the date to be returned.
dateSeparator
The character that is used to separate different fields in the date. The default is no separation character.

Conditions
INVREQ

dayOfMonth
Returns the day component of the date, in the range 1 to 31.

unsigned long dayOfMonth()

Conditions
INVREQ

dayOfWeek
Returns an enumeration, defined in this class, that indicates the day of the week.

DayOfWeek dayOfWeek()

Conditions
INVREQ
**daysSince1900**
Returns the number of days that have elapsed since 1st January, 1900.

```cpp
unsigned long daysSince1900()
```

**Conditions**
INVREQ

**milliSeconds**
Returns the number of milliseconds that have elapsed since 00:00 on 1st January, 1900.

```cpp
long double milliSeconds()
```

**monthOfYear**
Returns an enumeration, defined in this class, that indicates the month of the year.

```cpp
MonthOfYear monthOfYear()
```

**setAlarm**
Sets an alarm at the time specified in time. It returns a reference to an IccAlarmRequestId object that can be used to cancel the alarm—see cancelAlarm method.
See also the “waitOnAlarm” on page 209 method of class IccTask.

```cpp
const IccAlarmRequestId& setAlarm (const IccTime& time,
const IccRequestId* reqId = 0)
```

**time**
A reference to an IccTime object that contains time information. As IccTime is an abstract class time is, in practise, an object of class IccAbsTime, IccTimeOfDay, or IccTimeInterval.

**reqId**
An optional pointer to an IccRequestId object that is used to identify this particular alarm request.

**Conditions**
EXPIRED, INVREQ
time
Returns the time as a text string.

const char* time(char timeSeparator = '\0')

timeSeparator
The character that delimits the time fields. The default is no separation character.

Conditions
INVREQ

update
Updates the clock time and date from CICS. See the IccClock constructor.

void update()

year

unsigned long year()
Returns the 4-figure year number, such as 1996.

Conditions
INVREQ

Inherited public methods
These are the public methods inherited by this class.

<table>
<thead>
<tr>
<th>Method</th>
<th>Class</th>
</tr>
</thead>
<tbody>
<tr>
<td>actionOnCondition</td>
<td>IccResource</td>
</tr>
<tr>
<td>actionOnConditionAsChar</td>
<td>IccResource</td>
</tr>
<tr>
<td>actionsOnConditionsText</td>
<td>IccResource</td>
</tr>
<tr>
<td>classType</td>
<td>IccBase</td>
</tr>
<tr>
<td>className</td>
<td>IccBase</td>
</tr>
<tr>
<td>condition</td>
<td>IccResource</td>
</tr>
<tr>
<td>conditionText</td>
<td>IccResource</td>
</tr>
<tr>
<td>customClassNum</td>
<td>IccBase</td>
</tr>
<tr>
<td>handleEvent</td>
<td>IccResource</td>
</tr>
<tr>
<td>id</td>
<td>IccResource</td>
</tr>
</tbody>
</table>
Method | Class
--- | ---
isEDFOn | IccResource
name | IccResource
operator delete | IccBase
operator new | IccBase
setActionOnAnyCondition | IccResource
setActionOnCondition | IccResource
setActionsOnConditions | IccResource
setEDF | IccResource

**Inherited protected methods**

These are the protected methods inherited by this class.

Method | Class
--- | ---
setClassName | IccBase
setCustomClassNum | IccBase

**Enumerations**

**DateFormat**

- defaultFormat
- DDMMYY
- MMDDYY
- YYDDD
- YYDDMM
- YYMMDD
- DDMYYY
- MDDYY
- YYYYDDD
- YYYYDDMM
- YYYYMMDD

**DayOfWeek**

Indicates the day of the week.

- Sunday
- Monday
- Tuesday
- Wednesday
- Thursday
- Friday
- Saturday
**MonthOfYear**

Indicates the month of the year.

- January
- February
- March
- April
- May
- June
- July
- August
- September
- October
- November
- December

**UpdateMode**

Indicates whether the clock is automatically updated.

- **manual**
  The clock initially holds the time at which it was created. It is subsequently updated only when an `update` method call is made.

- **automatic**
  The clock is updated to the current CICS time and date whenever any time or date method is called (for example, `daysSince1900`).

**IccCondition structure**

This structure contains an enumeration of all the CICS condition codes.

**Header file**: ICCCNDEH

**Enumerations**

**Codes**

The possible values are:

<table>
<thead>
<tr>
<th>Value</th>
<th>Value</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>NORMAL</td>
<td>35</td>
</tr>
<tr>
<td>1</td>
<td>ERROR</td>
<td>36</td>
</tr>
<tr>
<td>2</td>
<td>RDATT</td>
<td>37</td>
</tr>
<tr>
<td>3</td>
<td>WRBRK</td>
<td>38</td>
</tr>
<tr>
<td>4</td>
<td>ICCEOF</td>
<td>39</td>
</tr>
<tr>
<td>5</td>
<td>EODS</td>
<td>40</td>
</tr>
<tr>
<td>6</td>
<td>EOC</td>
<td>41</td>
</tr>
<tr>
<td>7</td>
<td>INBFMH</td>
<td>42</td>
</tr>
<tr>
<td>Value</td>
<td>Value</td>
<td>Value</td>
</tr>
<tr>
<td>--------</td>
<td>---------</td>
<td>-------------</td>
</tr>
<tr>
<td>8</td>
<td>ENGINPT</td>
<td>43</td>
</tr>
<tr>
<td>9</td>
<td>NONVAL</td>
<td>44</td>
</tr>
<tr>
<td>10</td>
<td>NOSTART</td>
<td>45</td>
</tr>
<tr>
<td>11</td>
<td>TERMIDERR</td>
<td>46</td>
</tr>
<tr>
<td>12</td>
<td>FILENOTFOUND</td>
<td>47</td>
</tr>
<tr>
<td>13</td>
<td>NTFND</td>
<td>48</td>
</tr>
<tr>
<td>14</td>
<td>DUPREC</td>
<td>49</td>
</tr>
<tr>
<td>15</td>
<td>DUPKEY</td>
<td>50</td>
</tr>
<tr>
<td>16</td>
<td>INVREQ</td>
<td>51</td>
</tr>
<tr>
<td>17</td>
<td>IOERR</td>
<td>52</td>
</tr>
<tr>
<td>18</td>
<td>NOSPACE</td>
<td>53</td>
</tr>
<tr>
<td>19</td>
<td>NOTOPEN</td>
<td>54</td>
</tr>
<tr>
<td>20</td>
<td>ENDFILE</td>
<td>55</td>
</tr>
<tr>
<td>21</td>
<td>ILLOGIC</td>
<td>56</td>
</tr>
<tr>
<td>22</td>
<td>LENGERR</td>
<td>57</td>
</tr>
<tr>
<td>23</td>
<td>QZERO</td>
<td>58</td>
</tr>
<tr>
<td>24</td>
<td>SIGNAL</td>
<td>59</td>
</tr>
<tr>
<td>25</td>
<td>QBUSY</td>
<td>60</td>
</tr>
<tr>
<td>26</td>
<td>ITEMERR</td>
<td>61</td>
</tr>
<tr>
<td>27</td>
<td>PGMIDERR</td>
<td>62</td>
</tr>
<tr>
<td>28</td>
<td>TRANSIDERR</td>
<td>63</td>
</tr>
<tr>
<td>29</td>
<td>ENDDATA</td>
<td>64</td>
</tr>
<tr>
<td>30</td>
<td>INVTSREQ</td>
<td>65</td>
</tr>
<tr>
<td>31</td>
<td>EXPIRED</td>
<td>66</td>
</tr>
<tr>
<td>32</td>
<td>RETPAGE</td>
<td>67</td>
</tr>
<tr>
<td>33</td>
<td>RTEFAIL</td>
<td>68</td>
</tr>
<tr>
<td>34</td>
<td>RTESOME</td>
<td>69</td>
</tr>
</tbody>
</table>

Range

**maxValue**

The highest CICS condition, currently 103.

**IccConsole class**

This is a singleton class that represents the CICS console.

**IccBase**

**IccResource**

**IccConsole**

**Header file:** ICCCONEH
Sample: ICC$CON

IccConsole constructor (protected)

Constructor
No more than one of these objects is permitted in a task. An attempt to create more objects causes an exception to be thrown.

IccConsole()

Public methods
These are the public methods in this class.

The opt parameter
Many methods have the same parameter, opt, which is described under the abendCode method in "abendCode" on page 62.

instance
Returns a pointer to the single IccConsole object that represents the CICS console. If the object does not already exist, it is created by this method.

static IccConsole* instance()

put
Writes the data in send to the CICS console. put is a synonym for write. See Polymorphic Behavior.

virtual void put(const IccBuf& send)

send
A reference to an IccBuf object that contains the data that is to be written to the console.

replyTimeout

unsigned long replyTimeout() const
Returns the length of the reply timeout in milliseconds.

resetRouteCodes
void resetRouteCodes()
Removes all route codes held in the IccConsole object.

setAllRouteCodes

void setAllRouteCodes()
Sets all possible route codes in the IccConsole object, that is, 1 through 28.

setReplyTimeout (1)

void setReplyTimeout(IccTimeInterval& interval)

interval
A reference to a IccTimeInterval object that describes the length of the time interval required.

setReplyTimeout (2)
The two different forms of this method are used to set the length of the reply timeout.

void setReplyTimeout(unsigned long seconds)

seconds
The length of the time interval required, in seconds.

setRouteCodes
Saves route codes in the object for use on subsequent write and writeAndGetReply calls. Up to 28 codes can be held in this way.

void setRouteCodes (unsigned short numRoutes,
                     ...)

numRoutes
The number of route codes provided in this call—the number of arguments that follow this one.

... One or more arguments, the number of which is given by numRoutes. Each argument is a route code, of type unsigned short, in the range 1 to 28.
write

Writes the data in `send` to the CICS console.

```cpp
void write (const IccBuf& send,
            SeverityOpt opt = none)
```

**send**

A reference to an `IccBuf` object that contains the data that is to be written to the console.

**opt**

An enumeration that indicates the severity of the console message.

**Conditions**

INVREQ, LENGERR, EXPIRED

**writeAndGetReply**

Writes the data in `send` to the CICS console and returns a reference to an `IccBuf` object that contains the reply from the CICS operator.

```cpp
const IccBuf& writeAndGetReply (const IccBuf& send,
                                 SeverityOpt opt = none)
```

**send**

A reference to an `IccBuf` object that contains the data that is to be written to the console.

**opt**

An enumeration that indicates the severity of the console message.

**Conditions**

INVREQ, LENGERR, EXPIRED

**Inherited public methods**

These are the public methods inherited by this class.

<table>
<thead>
<tr>
<th>Method</th>
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<tbody>
<tr>
<td>actionOnCondition</td>
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<tr>
<td>actionOnConditionAsChar</td>
<td>IccResource</td>
</tr>
<tr>
<td>actionsOnConditionsText</td>
<td>IccResource</td>
</tr>
<tr>
<td>classType</td>
<td>IccBase</td>
</tr>
<tr>
<td>className</td>
<td>IccBase</td>
</tr>
<tr>
<td>condition</td>
<td>IccResource</td>
</tr>
<tr>
<td>conditionText</td>
<td>IccResource</td>
</tr>
</tbody>
</table>
Method | Class
--- | ---
customClassNum | IccBase
handleEvent | IccResource
id | IccResource
isEDFOn | IccResource
name | IccResource
operator delete | IccBase
operator new | IccBase
setActionOnAnyCondition | IccResource
setActionOnCondition | IccResource
setActionsOnConditions | IccResource
setEDF | IccResource

**Inherited protected methods**

These are the protected methods inherited by this class.

<table>
<thead>
<tr>
<th>Method</th>
<th>Class</th>
</tr>
</thead>
<tbody>
<tr>
<td>setClassName</td>
<td>IccBase</td>
</tr>
<tr>
<td>setCustomClassNum</td>
<td>IccBase</td>
</tr>
</tbody>
</table>

**Enumerations**

**SeverityOpt**

Possible values are:

- none
- warning
- error
- severe

**IccControl class**

IccControl class controls an application program that uses the supplied Foundation Classes.

**IccControl constructor (protected)**
Constructor

IccControl()

Public methods

These are the public methods in this class.

callingProgramId

Returns a reference to an IccProgramId object that represents the program that called this program. The returned IccProgramId reference contains a null name if the executing program was not called by another program.

const IccProgramId& callingProgramId()

Conditions

INVREQ

cancelAbendHandler

Cancels a previously established exit at this logical program level.

void cancelAbendHandler()

Conditions

NOTAUTH, PGMIDERR

commArea

Returns a reference to an IccBuf object that encapsulates the COMMAREA—the communications area of CICS memory that is used for passing data between CICS programs and transactions.

IccBuf& commArea()

Conditions

INVREQ

console

Returns a pointer to the single IccConsole object. If this object has not yet been created, this method creates the object before returning a pointer to it.
IccConsole* console()

initData

const IccBuf& initData()
Returns a reference to an IccBuf object that contains the initialization parameters specified for the program in the INITPARM system initialization parameter.

**Conditions**
INVREQ

instance
Returns a pointer to the single IccControl object. The object is created if it does not already exist.

static IccControl* instance()

isCreated

static Icc::Bool isCreated()
Returns a boolean value that indicates whether the IccControl object already exists. Possible values are true or false.

programId

const IccProgramId& programId()
Returns a reference to an IccProgramId object that refers to this executing program.

**Conditions**
INVREQ

resetAbendHandler
Reactivates a previously cancelled abend handler for this logical program level. (See cancelAbendHandler on page "cancelAbendHandler" on page 100).

void resetAbendHandler()

**Conditions**
NOTAUTH, PGMIDERR
**returnProgramId**

Returns a reference to an **IccProgramId** object that refers to the program that resumes control when this logical program level issues a return.

```cpp
const IccProgramId& returnProgramId()
```

**run**

```cpp
virtual void run() = 0
```

This method should be implemented in a subclass of **IccControl** by the application programmer.

**session**

```cpp
IccSession* session()
```

Returns a pointer to the **IccSession** object that represents the principal facility for this program. An exception is thrown if this program does not have a session as its principal facility.

**setAbendHandler (1)**

```cpp
void setAbendHandler(const IccProgramId& programId)
```

**programId**

A reference to the **IccProgramId** object that indicates which program is affected.

**setAbendHandler (2)**

These methods set the abend handler to the named program for this logical program level.

```cpp
void setAbendHandler(const char* programName)
```

**programName**

The name of the program affected.

**Conditions**

NOTAUTH, PGMIDERR
**startRequestQ**

Returns a pointer to the **IccStartRequestQ** object. If this object has not yet been created, this method creates the object before returning a pointer to it.

**IccStartRequestQ**

* startRequestQ()

**system**

**IccSystem**

* system()

Returns a pointer to the **IccSystem** object. If this object has not yet been created, this method creates the object before returning a pointer to it.

**task**

**IccTask**

* task()

Returns a pointer to the **IccTask** object. If this object has not yet been created, this method creates the object before returning a pointer to it.

**terminal**

**IccTerminal**

* terminal()

Returns a pointer to the **IccTerminal** object. If this object has not yet been created, this method creates the object before returning a pointer to it.

This method has a condition, that the transaction must have a terminal as its principal facility. That is, there must be a physical terminal involved.

**Inherited public methods**

These are the public methods inherited by this class.

<table>
<thead>
<tr>
<th>Method</th>
<th>Class</th>
</tr>
</thead>
<tbody>
<tr>
<td>actionOnCondition</td>
<td>IccResource</td>
</tr>
<tr>
<td>actionOnConditionAsChar</td>
<td>IccResource</td>
</tr>
<tr>
<td>actionsOnConditionsText</td>
<td>IccResource</td>
</tr>
<tr>
<td>classType</td>
<td>IccBase</td>
</tr>
<tr>
<td>className</td>
<td>IccBase</td>
</tr>
<tr>
<td>condition</td>
<td>IccResource</td>
</tr>
<tr>
<td>conditionText</td>
<td>IccResource</td>
</tr>
<tr>
<td>customClassNum</td>
<td>IccBase</td>
</tr>
</tbody>
</table>
**Method**
handleEvent
id
isEDFOn
name
operator delete
operator new
setActionOnAnyCondition
setActionOnCondition
setActionsOnConditions
setEDF

**Class**
IccResource
IccResource
IccResource
IccResource
IccResource
IccResource
IccResource
IccResource
IccResource

**Inherited protected methods**
These are the protected methods inherited by this class.

<table>
<thead>
<tr>
<th>Method</th>
<th>Class</th>
</tr>
</thead>
<tbody>
<tr>
<td>setClassName</td>
<td>IccBase</td>
</tr>
<tr>
<td>setCustomClassNum</td>
<td>IccBase</td>
</tr>
</tbody>
</table>

**IccConvId class**

IccConvId class is used to identify an APPC conversation.

**IccBase**

| IccResourceId
| IccConvId |

IccConvId class is used to identify an APPC conversation.

**Header file:** ICCRIDEH

**IccConvId constructors**

**Constructor (1)**

IccConvId(const char* convName)

**convName**
The 4-character name of the conversation.

**Constructor (2)**
The copy constructor.
IccConvId(const IccConvId& convId)

convId
A reference to an IccConvId object.

Public methods
These are the public methods in this class.

operator=(1)

IccConvId& operator=(const char* convName)

operator=(2)
Assigns new value.

IccConvId& operator=(const IccConvId id)

Inherited public methods
These are the public methods inherited by this class.

<table>
<thead>
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<th>Method</th>
<th>Class</th>
</tr>
</thead>
<tbody>
<tr>
<td>classType</td>
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</tr>
<tr>
<td>className</td>
<td>IccBase</td>
</tr>
<tr>
<td>customClassNum</td>
<td>IccBase</td>
</tr>
<tr>
<td>name</td>
<td>IccResourceId</td>
</tr>
<tr>
<td>nameLength</td>
<td>IccResourceId</td>
</tr>
<tr>
<td>operator delete</td>
<td>IccBase</td>
</tr>
<tr>
<td>operator new</td>
<td>IccBase</td>
</tr>
</tbody>
</table>

Inherited protected methods
These are the protected methods inherited by this class.

<table>
<thead>
<tr>
<th>Method</th>
<th>Class</th>
</tr>
</thead>
<tbody>
<tr>
<td>operator=</td>
<td>IccResourceId</td>
</tr>
<tr>
<td>setClassName</td>
<td>IccBase</td>
</tr>
<tr>
<td>setCustomClassNum</td>
<td>IccBase</td>
</tr>
</tbody>
</table>
IccDataQueue class

This class represents a CICS transient data queue.

IccBase
  IccResource
  IccDataQueue

Header file: ICCDATEH
Sample: ICC$DAT

IccDataQueue constructors

Constructor (1)

IccDataQueue(const IccDataQueueId& id)

id
  A reference to an IccDataQueueId object that contains the name of the CICS transient data queue.

Constructor (2)

IccDataQueue(const char* queueName)

queueName
  The 4-byte name of the queue that is to be created. An exception is thrown if queueName is not valid.

Public methods

These are the public methods in this class.

clear
  A synonym for empty. See Polymorphic Behavior.

  virtual void clear()

empty

  void empty()
  Empties the queue, that is, deletes all items on the queue.
**Conditions**
ISCINVREQ, NOTAUTH, QIDERR, SYSIDERR, DISABLED, INVREQ

**get**
A synonym for `readItem`. See Polymorphic Behavior.

```cpp
virtual const IccBuf& get()
```

**put**
A synonym for `writeItem`. See Polymorphic Behavior.

```cpp
virtual void put(const IccBuf& buffer)
```

**buffer**
A reference to an `IccBuf` object that contains data to be put into the queue.

**readItem**

```cpp
const IccBuf& readItem()
```

Returns a reference to an `IccBuf` object that contains one item read from the data queue.

**Conditions**
IOERR, ISCINVREQ, LENGERR, NOTAUTH, NOTOPEN, QBUSY, QIDERR, QZERO, SYSIDERR, DISABLED, INVREQ

**writeItem (1)**

```cpp
void writeItem(const IccBuf& item)
```

**item**
A reference to an `IccBuf` object that contains data to be written to the queue.

**writeItem (2)**
Writes an item of data to the queue.
void writeItem(const char* text)

*text*
Text that is to be written to the queue.

**Conditions**
IOERR, ISCINVREQ, LENGERR, NOSPACE, NOTAUTH, NOTOPEN, QIDERR, SYSIDERR, DISABLED, INVREQ

**Inherited public methods**
These are the public methods inherited by this class.

<table>
<thead>
<tr>
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</tr>
</thead>
<tbody>
<tr>
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<tr>
<td>actionOnConditionAsChar</td>
<td>IccResource</td>
</tr>
<tr>
<td>actionsOnConditionsText</td>
<td>IccResource</td>
</tr>
<tr>
<td>className</td>
<td>IccBase</td>
</tr>
<tr>
<td>classType</td>
<td>IccBase</td>
</tr>
<tr>
<td>condition</td>
<td>IccResource</td>
</tr>
<tr>
<td>conditionText</td>
<td>IccResource</td>
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<td>IccBase</td>
</tr>
<tr>
<td>handleEvent</td>
<td>IccResource</td>
</tr>
<tr>
<td>id</td>
<td>IccResource</td>
</tr>
<tr>
<td>isEDFOn</td>
<td>IccResource</td>
</tr>
<tr>
<td>isRouteOptionOn</td>
<td>IccResource</td>
</tr>
<tr>
<td>name</td>
<td>IccResource</td>
</tr>
<tr>
<td>operator delete</td>
<td>IccBase</td>
</tr>
<tr>
<td>operator new</td>
<td>IccBase</td>
</tr>
<tr>
<td>routeOption</td>
<td>IccResource</td>
</tr>
<tr>
<td>setActionOnAnyCondition</td>
<td>IccResource</td>
</tr>
<tr>
<td>setActionOnCondition</td>
<td>IccResource</td>
</tr>
<tr>
<td>setActionsOnConditions</td>
<td>IccResource</td>
</tr>
<tr>
<td>setEDF</td>
<td>IccResource</td>
</tr>
<tr>
<td>setRouteOption</td>
<td>IccResource</td>
</tr>
</tbody>
</table>

**Inherited protected methods**
These are the protected methods inherited by this class.

<table>
<thead>
<tr>
<th>Method</th>
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</tr>
</thead>
<tbody>
<tr>
<td>setClassName</td>
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</tr>
<tr>
<td>setCustomClassNum</td>
<td>IccBase</td>
</tr>
</tbody>
</table>
**IccDataQueueId class**

*IccDataQueueId* is used to identify a CICS Transient Data Queue name.

*IccBase*

*IccResourceId*

*IccDataQueueId*

*IccDataQueueId* is used to identify a CICS Transient Data Queue name.

**Header file:** ICCRIDEH

**IccDataQueueId constructors**

**Constructor (1)**

*IccDataQueueId(const char* queueName)*

*queueName*  
The 4-character name of the queue

**Constructor (2)**

*IccDataQueueId(const IccDataQueueId& id)*

*id*  
A reference to an *IccDataQueueId* object.

**Public methods**

These are the public methods in this class.

**operator= (1)**

*IccDataQueueId& operator=(const char* queueName)*

*queueName*  
The 4-character name of the queue

**operator= (2)**

Assigns new value.
**IccDataQueueId operator=(const IccDataQueueId &id)**

`id`  
A reference to an **IccDataQueueId** object.

**Inherited public methods**

These are the public methods inherited by this class.

<table>
<thead>
<tr>
<th>Method</th>
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<tr>
<td>classType</td>
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</tr>
<tr>
<td>className</td>
<td>IccBase</td>
</tr>
<tr>
<td>customClassNum</td>
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</tr>
<tr>
<td>name</td>
<td>IccResourceId</td>
</tr>
<tr>
<td>nameLength</td>
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<tr>
<td>operator delete</td>
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**Inherited protected methods**

These are the protected methods inherited by this class.

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<tbody>
<tr>
<td>operator=</td>
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<td>setClassName</td>
<td>IccBase</td>
</tr>
<tr>
<td>setCustomClassNum</td>
<td>IccBase</td>
</tr>
</tbody>
</table>

**IccEvent class**

The **IccEvent** class contains information on a specific CICS call, called a CICS event.

**IccBase**  
**IccEvent**

**Header file:** ICCEVTEH  
**Sample:** ICC$RES1

**IccEvent constructor**

**Constructor**

* IccEvent (const IccResource* object,  
* const char* methodName)
**object**
A pointer to the **IccResource** object that is responsible for this event.

**methodName**
The name of the method that caused the event to be created.

**Public methods**
These are the public methods in this class.

**className**
Returns the name of the class responsible for this event.

```cpp
const char* className() const
```

**classType**

```cpp
IccBase::ClassType classType() const
```

Returns an enumeration, described under **classType** on page “classType” on page 75 in **IccBase** class, that indicates the type of class that is responsible for this event.

**condition**
Returns an enumerated type that indicates the condition returned from this CICS event. The possible values are described under the **Codes** type in the **IccCondition** structure.

```cpp
IccCondition::Codes condition(IccResource::ConditionType type = IccResource::majorCode) const
```

**type**
An enumeration that indicates whether a major code or minor code is being requested. Possible values are 'majorCode' or 'minorCode'. 'majorCode' is the default value.

**conditionText**

```cpp
const char* conditionText() const
```

Returns the text of the CICS condition code, such as "NORMAL" or "LENGERR".

**methodName**
const char* methodName() const

Returns the name of the method responsible for this event.

summary

const char* summary()

Returns a summary of the CICS event in the form:

```
CICS event summary: IccDataQueue::readItem condition=23 (QZERO) minor=0
```

Inherited public methods

These are the public methods inherited by this class.

<table>
<thead>
<tr>
<th>Method</th>
<th>Class</th>
</tr>
</thead>
<tbody>
<tr>
<td>className</td>
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Inherited protected methods

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<tbody>
<tr>
<td>setClassName</td>
<td>IccBase</td>
</tr>
<tr>
<td>setCustomClassNum</td>
<td>IccBase</td>
</tr>
</tbody>
</table>

IccException class

IccException class contains information about CICS Foundation Class exceptions.

IccBase

IccException

It is used to create objects that are 'thrown' to application programs. They are generally used for error conditions such as invalid method calls, but the application programmer can also request an exception is thrown when CICS raises a particular condition.

Header file: ICCEXCEH

Samples: ICC$EXC1, ICC$EXC2, ICC$EXC3

IccException constructor

Constructor
IccException (Type exceptionType,
   IccBase::ClassType classType,
   const char* className,
   const char* methodName,
   IccMessage* message,
   IccBase* object = 0,
   unsigned short exceptionNum = 0)

exceptionType
   An enumeration, defined in this class, that indicates the type of the exception

classType
   An enumeration, defined in this class, that indicates from which type of class the exception was thrown

className
   The name of the class from which the exception was thrown

methodName
   The name of the method from which the exception was thrown

message
   A pointer to the IccMessage object that contains information about why the exception was created.

object
   A pointer to the object that threw the exception

exceptionNum
   The unique exception number.

Note: When the IccException object is created it takes ownership of the IccMessage object given on the constructor. When the IccException is deleted, the IccMessage object is deleted automatically by the IccException destructor. Therefore, do not delete the IccMessage object before deleting the IccException object.

Public methods
These are the public methods in this class.

className
Returns the name of the class responsible for throwing this exception.

const char* className() const

classType

IccBase::ClassType classType() const
Returns an enumeration, described under ClassType in IccBase class, that indicates the type of class which threw this exception.

message
**IccMessage** message() const
Returns a pointer to an **IccMessage** object that contains information on any message associated with this exception.

**methodName**

**const char** methodName() const
Returns the name of the method responsible for throwing this exception.

**number**

**unsigned short** number() const
Returns the unique exception number. This is a useful diagnostic for IBM service. The number uniquely identifies from where in the source code the exception was thrown.

**summary**

**const char** summary() const
Returns a string containing a summary of the exception. This combines the **className**, **methodName**, **number**, **Type**, and **IccMessage::text** methods into the following form:

```
CICS exception summary: 094 IccTempStore::readNextItem type=CICSCondition
```

**type**

**Type** type() const
Returns an enumeration, defined in this class, that indicates the type of exception.

**typeText**

**const char** typeText() const
Returns a string representation of the exception type, for example, "objectCreationError", "invalidArgument".
Inherited public methods
These are the public methods inherited by this class.

<table>
<thead>
<tr>
<th>Method</th>
<th>Class</th>
</tr>
</thead>
<tbody>
<tr>
<td>className</td>
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<td>operator new</td>
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Inherited protected methods
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</tbody>
</table>

Enumerations

Type

objectCreationError
An attempt to create an object was invalid. This happens, for example, if an attempt is made to create a second instance of a singleton class, such as IccTask.

invalidArgument
A method was called with an invalid argument. This happens, for example, if an IccBuf object with too much data is passed to the writeItem method of the IccTempStore class by the application program. An attempt to create an IccFileId object with a 9-character filename also generates an exception of this type.

invalidMethodCall
A method call cannot proceed. A typical reason is that the object cannot honor the call in its current state. For example, a readRecord call on an IccFile object is only honored if an IccRecordIndex object, to specify which record is to be read, has already been associated with the file.

CICSCCondition
A CICS condition, listed in the IccCondition structure, has occurred in the object and the object was configured to throw an exception.

platformError
An operation is invalid because of limitations of this particular platform.

A platformError exception can occur at 3 levels:
1. An object is not supported on this platform.
2. An object is supported on this platform, but a particular method is not.
3. A method is supported on this platform, but a particular positional parameter is not.
See Platform differences for more details.

familyConformanceError
Family subset enforcement is on for this program and an operation that is not valid on all supported platforms has been attempted.

internalError
The CICS Foundation Classes have detected an internal error. Please call your support organization.
IccFile class

IccFile class enables the application program to access CICS files.

IccBase
  IccResource
  IccFile

Header file: ICCFILEH
Sample: ICC$FIL

IccFile constructors

Constructor (1)

IccFile (const IccFileId& id,
      IccRecordIndex* index = 0)

id
  A reference to the IccFileId object that identifies which file is being operated on

index
  An optional pointer to the IccRecordIndex object that identifies which record in the file is being operated on.

Constructor (2)

To access files using an IccFile object, it must have an IccRecordIndex object associated with it. If this association is not made when the object is created, use the registerRecordIndex method.

IccFile (const char* fileName,
      IccRecordIndex* index = 0)

fileName
  The 8-character name of the file

index
  An optional pointer to the IccRecordIndex object that identifies which record in the file is being operated on.
Public methods

These are the public methods in this class.

The opt parameter

Many methods have the same parameter, opt, which is described under the abendCode method in “abendCode” on page 62.

access

Returns a composite number indicating the access properties of the file. See also isReadable, isBrowsable, isAddable, isDeletable, and isUpdatable methods.

unsigned long access(Icc::GetOpt opt = Icc::object)

opt

An enumeration, defined in Icc structure, that indicates whether you can use a value previously retrieved from CICS (object), or whether the object should retrieve a fresh value from CICS.

accessMethod

Returns an enumeration, defined in IccValue, that represents the access method for this file. Possible values are:

• VSAM
• BDAM
• SFS

IccValue::CVDA accessMethod(Icc::GetOpt opt = Icc::object)

opt

See access method.

Conditions

END, FILENOTFOUND, ILLOGIC, NOTAUTH

beginInsert (VSAM only)

Signals the start of a mass insertion of data into the file.

void beginInsert()
**deleteLockedRecord**
Deletes a record that has been previously locked by `readRecord` method in update mode. (See also `readRecord` method.)

```cpp
void deleteLockedRecord(unsigned long updateToken = 0)
```

**updateToken**
A token that indicates which previously read record is to be deleted. This is the token that is returned from `readRecord` method when in update mode.

**Conditions**
DISABLED, DUPKEY, FILENOTFOUND, ILLOGIC, INVREQ, IOERR, ISCINVREQ, NOTAUTH, NOTFIND, NOTOPEN, SYSIDERR, LOADING

**deleteRecord**
Deletes one or more records, as specified by the associated `IccRecordIndex` object, and returns the number of deleted records.

```cpp
unsigned short deleteRecord()
```

**Conditions**
DISABLED, DUPKEY, FILENOTFOUND, ILLOGIC, INVREQ, IOERR, ISCINVREQ, NOTAUTH, NOTFIND, NOTOPEN, SYSIDERR, LOADING

**enableStatus**
Returns an enumeration, defined in `IccValue`, that indicates whether the file is enabled to be used by programs.
Possible values are:
- DISABLED
- DISABLING
- ENABLED
- UNENABLED

```cpp
IccValue::CVDA enableStatus(Icc::GetOpt opt = Icc::object)
```

**opt**
See `access` method.
Conditions
END, FILENOTFOUND, ILLOGIC, NOTAUTH

endInsert (VSAM only)
Marks the end of a mass insertion operation. See beginInsert.

void endInsert()

isAddable
Indicates whether more records can be added to the file.

Icc::Bool isAddable(Icc::GetOpt opt = Icc::object)

opt
See access method.

Conditions
END, FILENOTFOUND, ILLOGIC, NOTAUTH

isBrowsable
Indicates whether the file can be browsed.

Icc::Bool isBrowsable(Icc::GetOpt opt = Icc::object)

opt
See access method.

Conditions
END, FILENOTFOUND, ILLOGIC, NOTAUTH

isDeletable
Indicates whether the records in the file can be deleted.

Icc::Bool isDeletable(Icc::GetOpt opt = Icc::object)
**isEmptyOnOpen**

Returns a Boolean that indicates whether the EMPTYREQ option is specified. EMPTYREQ causes the object associated with this file to be set to empty when opened, if it is a VSAM data set defined as reusable.

```
Icc::Bool isEmptyOnOpen(Icc::GetOpt opt = Icc::object)
```

**isReadable**

Indicates whether the file records can be read.

```
Icc::Bool isReadable(Icc::GetOpt opt = Icc::object)
```

**isRecoverable**

```
Icc::Bool isRecoverable(Icc::GetOpt opt = Icc::object)
```
isUpdatable
Indicates whether the file can be updated.

\[
\text{Icc::Bool isUpdatable(Icc::GetOpt } \text{ opt } = \text{ Icc::object})
\]

\textit{opt}
See access method.

Conditions
END, FILENOTFOUND, ILLOGIC, NOTAUTH

keyLength
Returns the length of the search key.

\[
\text{unsigned long keyLength(Icc::GetOpt } \text{ opt } = \text{ Icc::object})
\]

\textit{opt}
See access method.

Conditions
END, FILENOTFOUND, ILLOGIC, NOTAUTH

keyPosition
Returns the position of the key field in each record relative to the beginning of the record. If there is no key, zero is returned.

\[
\text{long keyPosition(Icc::GetOpt } \text{ opt } = \text{ Icc::object})
\]

\textit{opt}
See access method.

Conditions
END, FILENOTFOUND, ILLOGIC, NOTAUTH

openStatus
Returns a CVDA that indicates the open status of the file. Possible values are:
IccValue::CVDA openStatus(Icc::GetOpt opt = Icc::object)

**opt**
See access method.

**CLOSED**
The file is closed.

**CLOSING**
The file is in the process of being closed. Closing a file may require dynamic deallocation of data sets and deletion of shared resources, so the process may last a significant length of time.

**CLOSEREQUEST**
The file is open and one or more application tasks are using it. A request has been received to close it.

**OPEN**
The file is open.

**OPENING**
The file is in the process of being opened.

**Conditions: END, FILENOTFOUND, ILLOGIC, NOTAUTH**

**readRecord**
Reads a record and returns a reference to an IccBuf object that contains the data from the record.

```
const IccBuf& readRecord (ReadMode mode = normal,
                         unsigned long* updateToken = 0)
```

**mode**
An enumeration, defined in this class, that indicates in which mode the record is to be read.

**updateToken**
A pointer to an unsigned long token that will be updated by the method when mode is update and you want to make multiple read updates. The token uniquely identifies the update request and is passed to the deleteLockedRecord, rewriteRecord, or unlockRecord methods.

**Conditions**
DISABLED, DUPKEY, FILENOTFOUND, ILLOGIC, INVREQ, IOERR, ISCINVREQ, LENGERR, NOTAUTH, NOTFND, NOTOPEN, SYSIDERR, LOADING

**recordFormat**
Returns a CVDA that indicates the format of the data. Possible values are:

```
IccValue::CVDA recordFormat(Icc::GetOpt opt = Icc::object)
```
opt
See access method.

**FIXED**
The records are of fixed length.

**UNDEFINED (BDAM data sets only)**
The format of records on the file is undefined.

**VARIABLE**
The records are of variable length. If the file is associated with a data table, the record format is always variable length, even if the source data set contains fixed-length records.

**Conditions:** END, FILENOTFOUND, ILLOGIC, NOTAUTH

**recordIndex**
Returns a pointer to an IccRecordIndex object that indicates which records are to be accessed when using methods such as readRecord, writeRecord, and deleteRecord.

IccRecordIndex* recordIndex() const

**recordLength**
Returns the length of the current record.

unsigned long recordLength(Icc::GetOpt opt = Icc::object)

opt
See access method.

**Conditions**
END, FILENOTFOUND, ILLOGIC, NOTAUTH

**registerRecordIndex**

void registerRecordIndex(IccRecordIndex* index)

index
A pointer to an IccKey, IccRBA, or IccRRN object that will be used by methods such as readRecord, writeRecord, etc.
**rewriteRecord**
Updates a record with the contents of *buffer*.

```cpp
void rewriteRecord (const IccBuf& buffer,
                   unsigned long updateToken = 0)
```

- **buffer**
  A reference to the *IccBuf* object that holds the new record data to be written to the file.
- **updateToken**
  The token that identifies which previously read record is to be rewritten. See *readRecord*.

**Conditions**
DISABLED, FILENOTFOUND, ILLOGIC, INVREQ, IOERR, ISCINVREQ, NOTAUTH, NOTFND, NOTOPEN, SYSIDERR, LOADING

**setAccess**
Sets the permitted access to the file.
For example:

```cpp
define file.setAccess(IccFile::readable + IccFile::notUpdatable);
```

```cpp
void setAccess(unsigned long access)
```

- **access**
  A positive integer value created by ORing (or adding) one or more of the values of the Access enumeration, defined in this class.

**Conditions**
FILENOTFOUND, INVREQ, IOERR, NOTAUTH

**setEmptyOnOpen**

```cpp
void setEmptyOnOpen(Bool trueFalse)
```

Specifies whether or not to make the file empty when it is next opened.

**Conditions**
FILENOTFOUND, INVREQ, IOERR, NOTAUTH
setStatus
Sets the status of the file.

void setStatus(Status status)

status
An enumeration, defined in this class, that indicates the required status of the file after this method is called.

Conditions
FILENOTFOUND, INVREQ, IOERR, NOTAUTH

type
Returns a CVDA that identifies the type of data set that corresponds to this file. Possible values are:

IccValue::CVDA type(Icc::GetOpt opt = Icc::object)

opt
See access method.

ESDS
The data set is an entry-sequenced data set.

KEYED
The data set is addressed by physical keys.

KSDS
The data set is a key-sequenced data-set.

NOTKEYED
The data set is not addressed by physical keys.

RRDS
The data set is a relative record data set.

VRRDS
The data set is a variable relative record data set.

Conditions: END, FILENOTFOUND, ILLOGIC, NOTAUTH

unlockRecord
Unlock a record, previously locked by reading it in update mode. See readRecord.

void unlockRecord(unsigned long updateToken = 0)
**updateToken**
A token that indicates which previous **readRecord** update request is to be unlocked.

**Conditions**
DISABLED, FILENOTFOUND, ILLOGIC, IOERR, ISCVREQ, NOTAUTH, NOTOPEN, SYSIDERR, INVREQ

**writeRecord**
Write either a single record or a sequence of records, if used with the **beginInsert** and **endInsert** methods.

```cpp
void writeRecord(const IccBuf& buffer)
```

**buffer**
A reference to the **IccBuf** object that holds the data that is to be written into the record.

**Conditions**
DISABLED, DUPREC, FILENOTFOUND, ILLOGIC, INVREQ, IOERR, ISCVREQ, LENGERR, NOSPACE, NOTAUTH, NOTOPEN, SYSIDERR, LOADING, SUPPRESSED

**Inherited public methods**
These are the public methods inherited by this class.

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</tr>
<tr>
<td>routeOption</td>
<td>IccResource</td>
</tr>
<tr>
<td>setActionOnAnyCondition</td>
<td>IccResource</td>
</tr>
</tbody>
</table>
**Method**
- `setActionOnCondition`  
- `setActionsOnConditions`  
- `setEDF`  
- `setRouteOption`

**Class**
- `IccResource`

**Inherited protected methods**

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<td><code>setClassName</code></td>
<td><code>IccBase</code></td>
</tr>
<tr>
<td><code>setCustomClassNum</code></td>
<td><code>IccBase</code></td>
</tr>
</tbody>
</table>

**Enumerations**

**Access**

- **readable**
  - File records can be read by CICS tasks.
- **notReadable**
  - File records cannot be read by CICS tasks.
- **browsable**
  - File records can be browsed by CICS tasks.
- **notBrowsable**
  - File records cannot be browsed by CICS tasks.
- **addable**
  - Records can be added to the file by CICS tasks.
- **notAddable**
  - Records cannot be added to the file by CICS tasks.
- **updatable**
  - Records in the file can be updated by CICS tasks.
- **notUpdatable**
  - Records in the file cannot be updated by CICS tasks.
- **deletable**
  - Records in the file can be deleted by CICS tasks.
- **notDeletable**
  - Records in the file cannot be deleted by CICS tasks.
- **fullAccess**
  - Equivalent to readable AND browsable AND addable AND updatable AND deletable.
- **noAccess**
  - Equivalent to notReadable AND notBrowsable AND notAddable AND notUpdatable AND notDeletable.

**ReadMode**

ReadMode is the mode in which a file is read.

- **normal**
  - No update is to be performed (that is, read-only mode)
update
The record is to be updated. The record is locked by CICS until:

• it is rewritten using the rewriteRecord method or
• it is deleted using the deleteLockedRecord method or
• it is unlocked using the unlockRecord method or
• the task commits or rolls back its resource updates or
• the task is abended.

SearchCriterion
equalToKey
The search only finds an exact match.

gteqToKey
The search finds either an exact match or the next record in search order.

Status
open
File is open, ready for read/write requests by CICS tasks.
closed
File is closed, and is therefore not currently being used by CICS tasks.
enabled
File is enabled for access by CICS tasks.
disabled
File is disabled from access by CICS tasks.

IccFileId class

IccFileId is used to identify a file name in the CICS system.

IccBase
IccResourceId
IccFileId

Header file: ICCRIDEH

IccFileId constructors

Constructor (1)

IccFileId(const char* fileName)

fileName
The name of the file.

Constructor (2)
IccFileId(const IccFileId& \textit{id})

\textit{id}  
A reference to an \textbf{IccFileId} object.

**Public methods**
These are the public methods in this class.

\textbf{operator=} \textbf{(1)}

\begin{verbatim}
IccFileId& operator=(const char* \textit{fileName})
\end{verbatim}

\textit{fileName}  
The 8-byte name of the file.

\textbf{operator=} \textbf{(2)}
Assigns new value.

\begin{verbatim}
IccFileId& operator=(const IccFileId& \textit{id})
\end{verbatim}

\textit{id}  
A reference to an \textbf{IccFileId} object.

**Inherited public methods**
These are the public methods inherited by this class.

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<td>name</td>
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</tr>
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</tr>
<tr>
<td>setClassName</td>
<td>IccBase</td>
</tr>
<tr>
<td>setCustomeClassNum</td>
<td>IccBase</td>
</tr>
</tbody>
</table>

IccFileIterator class

This class is used to create IccFileIterator objects that can be used to browse through the records of a CICS file, represented by an IccFile object.

IccBase
   IccResource
     IccFileIterator

Header file: ICCFILEIEH
Sample: ICC$FIL

IccFileIterator constructor

Constructor

The IccFile and IccRecordIndex object must exist before the IccFileIterator is created.

IccFileIterator (IccFile* file, IccRecordIndex* index, IccFile::SearchCriterion search = IccFile::gteqToKey)

file
   A pointer to the IccFile object that is to be browsed

index
   A pointer to the IccRecordIndex object that is being used to select a record in the file

search
   An enumeration, defined in IccFile, that indicates the criterion being used to find a search match. The default is gteqToKey.

Conditions

DISABLED, FILENOTFOUND, ILLOGIC, INVREQ, IOERR, ISCINVREQ, NOTAUTH, NOTFND, NOTOPEN, SYSIDERR, LOADING
Public methods

These are the public methods in this class.

readNextRecord
Read the record that follows the current record.

```cpp
const IccBuf& readNextRecord (IccFile::ReadMode mode = IccFile::normal,
                                 unsigned long* updateToken = 0)
```

**mode**
An enumeration, defined in IccFile class, that indicates the type of read request.

**updateToken**
A returned token that is used to identify this unique update request on a subsequent rewriteRecord, deleteLockedRecord, or unlockRecord method on the file object.

Conditions
DUPKEY, ENDFILE, FILENOTFOUND, ILLOGIC, INVREQ, IOERR, ISCINVREQ, LENGERR, NOTAUTH, NOTFIND, SYSIDERR

readPreviousRecord
Read the record that precedes the current record.

```cpp
const IccBuf& readPreviousRecord (IccFile::ReadMode mode = IccFile::normal,
                                   unsigned long* updateToken = 0)
```

**mode**
An enumeration, defined in IccFile class, that indicates the type of read request.

**updateToken**
See readNextRecord.

Conditions
DUPKEY, ENDFILE, FILENOTFOUND, ILLOGIC, INVREQ, IOERR, ISCINVREQ, LENGERR, NOTAUTH, NOTFIND, SYSIDERR

reset
Resets the IccFileIterator object to point to the record identified by the IccRecordIndex object and the specified search criterion.

```cpp
void reset (IccRecordIndex* index,
            IccFile::SearchCriterion search = IccFile::gteqToKey)
```

Chapter 3. Foundation Classes: reference 131
index
A pointer to the **IccRecordIndex** object that is being used to select a record in the file.

**search**
An enumeration, defined in **IccFile**, that indicates the criterion being used to find a search match. The default is `gteqToKey`.

**Conditions**

FILENOTFOUND, ILLOGIC, INVREQ, IOERR, ISCINVREQ, NOTAUTH, NOTFND, SYSIDERR

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</table>
IccGroupId class

IccGroupId class is used to identify a CICS group.

IccBase
  IccResourceId
  IccGroupId

IccGroupId class is used to identify a CICS group.

Header file: ICCRIDEH

IccGroupId constructors

Constructor (1)

IccGroupId(const char* groupName)

groupName
  The 8-character name of the group.

Constructor (2)

The copy constructor.

IccGroupId(const IccGroupId& id)

id
  A reference to an IccGroupId object.

Public methods

These are the public methods in this class.

operator= (1)

IccGroupId& operator=(const char* groupName)

groupName
  The 8-character name of the group.
operator= (2)
Assigns new value.

IccGroupId& operator=(const IccGroupId& id)

id
A reference to an IccGroupId object.

Inherited public methods
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<td>setCustomClassNum</td>
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</tbody>
</table>

IccJournal class

IccJournal class represents a user or system CICS journal.

IccBase
IccResource
IccJournal

Header file: ICCJRNEH
Sample: ICC$JRN

IccJournal constructors

Constructor (1)
**IccJournal** (const IccJournalId& \textit{id},
unsigned long \textit{options} = 0)

\textit{id} 
A reference to an \textbf{IccJournalId} object that identifies which journal is being used.

\textit{options} 
An integer, constructed from the \textbf{Options} enumeration defined in this class, that affects the behavior of \texttt{writeRecord} calls on the \textbf{IccJournal} object. The values may be combined by addition or bitwise ORing, for example:

\begin{verbatim}
    IccJournal::startIO | IccJournal::synchronous
\end{verbatim}

The default is to use the system default.

**Constructor (2)**

**IccJournal** (unsigned short \textit{journalNum},
unsigned long \textit{options} = 0)

\textit{journalNum} 
The journal number (in the range 1-99)

\textit{options} 
See above.

**Public methods**

These are the public methods in this class.

**clearPrefix**

Clears the current prefix as set by \texttt{registerPrefix} or \texttt{setPrefix}. If the current prefix was set using \texttt{registerPrefix}, then the \textbf{IccJournal} class only removes its own reference to the prefix. The buffer itself is left unchanged. If the current prefix was set by \texttt{setPrefix}, then the \textbf{IccJournal}'s copy of the buffer is deleted.

\begin{verbatim}
    void clearPrefix()
\end{verbatim}

**journalTypeId**

Returns a reference to an \textbf{IccJournalTypeId} object that contains a 2-byte field used to identify the origin of journal records.

\begin{verbatim}
    const IccJournalTypeId& journalTypeId() const
\end{verbatim}
put
A synonym for writeRecord—puts data into the journal. See Polymorphic Behavior for information on polymorphism.

virtual void put(const IccBuf& buffer)

buffer
A reference to an IccBuf object that holds data to be put into the journal.

registerPrefix

void registerPrefix(const IccBuf* prefix)
Stores pointer to prefix object for use when the writeRecord method is called on this IccJournal object.

setJournalTypeId (1)

void setJournalTypeId(const IccJournalTypeId& id)

setJournalTypeId (2)
Sets the journal type—a 2 byte identifier—included in the journal record created when using the writeRecord method.

void setJournalTypeId(const char* jtypeid)

setPrefix (1)

void setPrefix(const IccBuf& prefix)

setPrefix (2)
void setPrefix(const char* prefix)

Stores the current contents of prefix for inclusion in the journal record created when the writeRecord method is called.

wait

Waits until a previous journal write has completed.

void wait (unsigned long requestNum=0,
          unsigned long option = 0)

requestNum
The write request. Zero indicates the last write on this journal.

option
An integer that affects the behaviour of writeRecord calls on the IccJournal object. Values other than 0 should be made from the Options enumeration, defined in this class. The values may be combined by addition or bitwise ORing, for example IccJournal::startI0 + IccJournal::synchronous. The default is to use the system default.

writeRecord (1)

unsigned long writeRecord (const IccBuf& record,
                           unsigned long option = 0)

record
A reference to an IccBuf object that holds the record

option
See above.

writeRecord (2)

Writes the data in the record to the journal. The returned number represents the particular write request and can be passed to the wait method in this class.

unsigned long writeRecord (const char* record,
                           unsigned long option = 0)

record
The name of the record
### option
See above.

### Conditions
IOERR, JIDERR, LENGERR, NOJBUFSP, NOTAUTH, NOTOPEN

### Inherited public methods
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### Inherited protected methods
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</table>

### Enumerations

### Options
The behaviour of writeRecord calls on the IccJournal object.
The values can be combined in an integer by addition or bitwise ORing.
startIO
   Specifies that the output of the journal record is to be initiated immediately. If 'synchronous' is specified for a journal that is not frequently used, you should also specify 'startIO' to prevent the requesting task waiting for the journal buffer to be filled. If the journal is used frequently, startIO is unnecessary.

noSuspend
   Specifies that the NOJBUFSP condition does not suspend an application program.

synchronous
   Specifies that synchronous journal output is required. The requesting task waits until the record has been written.

IccJournalId class

   IccJournalId is used to identify a journal number in the CICS system.

   IccBase
     IccResourceId
     IccJournalId

   Header file: ICCRIDEH

IccJournalId constructors

   Constructor (1)

   IccJournalId(unsigned short journalNum)

   journalNum
      The number of the journal, in the range 1 to 99

   Constructor (2)

   The copy constructor.

   IccJournalId(const IccJournalId& id)

   id
      A reference to an IccJournalId object.
Public methods
These are the public methods in this class.

**number**
Returns the journal number, in the range 1 to 99.

```cpp
unsigned short number() const
```

**operator= (1)**

```cpp
IccJournalId& operator=(unsigned short journalNum)
```

*journalNum*  
The number of the journal, in the range 1 to 99

**operator= (2)**
Assigns new value.

```cpp
IccJournalId& operator=(const IccJournalId& id)
```

*id*  
A reference to an `IccJournalId` object.

Inherited public methods
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<td>customClassNum</td>
<td>IccBase</td>
</tr>
<tr>
<td>name</td>
<td>IccResourceId</td>
</tr>
<tr>
<td>nameLength</td>
<td>IccResourceId</td>
</tr>
<tr>
<td>operator delete</td>
<td>IccBase</td>
</tr>
<tr>
<td>operator new</td>
<td>IccBase</td>
</tr>
</tbody>
</table>
Inherited protected methods

These are the protected methods inherited by this class.

<table>
<thead>
<tr>
<th>Method</th>
<th>Class</th>
</tr>
</thead>
<tbody>
<tr>
<td>operator=</td>
<td>IccResourceId</td>
</tr>
<tr>
<td>setClassName</td>
<td>IccBase</td>
</tr>
<tr>
<td>setCustomClassNum</td>
<td>IccBase</td>
</tr>
</tbody>
</table>

**IccJournalTypeId class**

An *IccJournalTypeId* class object is used to help identify the origin of a journal record—it contains a 2-byte field that is included in the journal record.

**IccBase**

*IccResourceId*

*IccJournalTypeId*

An *IccJournalTypeId* class object is used to help identify the origin of a journal record—it contains a 2-byte field that is included in the journal record.

**Header file**: ICCRIDEH

**IccJournalTypeId constructors**

**Constructor (1)**

*IccJournalTypeId(const char* journalTypeName)*

*journalTypeName*  
A 2-byte identifier used in journal records.

**Constructor (2)**

*IccJournalTypeId(const IccJournalId& id)*

*id*  
A reference to an *IccJournalTypeId* object.

**Public methods**

These are the public methods in this class.

*operator= (1)*
void operator=(const IccJournalTypeId& id)

id
A reference to an IccJournalTypeId object.

operator= (2)
Sets the 2-byte field that is included in the journal record.

void operator=(const char* journalTypeName)

journalTypeName
A 2-byte identifier used in journal records.

Inherited public methods
These are the public methods inherited by this class.

<table>
<thead>
<tr>
<th>Method</th>
<th>Class</th>
</tr>
</thead>
<tbody>
<tr>
<td>classType</td>
<td>IccBase</td>
</tr>
<tr>
<td>className</td>
<td>IccBase</td>
</tr>
<tr>
<td>customClassNum</td>
<td>IccBase</td>
</tr>
<tr>
<td>name</td>
<td>IccResourceId</td>
</tr>
<tr>
<td>nameLength</td>
<td>IccResourceId</td>
</tr>
<tr>
<td>operator delete</td>
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<td>IccBase</td>
</tr>
<tr>
<td>setCustomClassNum</td>
<td>IccBase</td>
</tr>
</tbody>
</table>

IccKey class

IccKey class is used to hold a search key for an indexed (KSDS) file.

IccBase
IccRecordIndex
IccKey

Header file: ICCRECEH

142 CICS TS for z/OS: C++ OO Class Libraries
IccKey constructors

Constructor (1)

IccKey (const char* initValue, 
   Kind kind = complete)

Constructor (2)

IccKey (unsigned short completeLength,  
   Kind kind= complete)

Constructor (3)

IccKey(const IccKey& key)

Public methods

These are the public methods in this class.

assign
Copies the search key into the IccKey object.

void assign (unsigned short length,  
   const void* dataArea)

length
The length of the data area

dataArea
A pointer to the start of the data area that holds the search key.

completeLength
Returns the length of the key when it is complete.
unsigned short completeLength() const

kind

Kind kind() const
Returns an enumeration, defined in this class, that indicates whether the key is generic or complete.

operator=(1)

IccKey& operator=(const IccKey& key)

operator=(2)

IccKey& operator=(const IccBuf& buffer)

operator=(3)
Assigns new value to key.

IccKey& operator=(const char* value)

operator==(1)

Icc::Bool operator==(const IccKey& key) const

operator==(2)

Icc::Bool operator==(const IccBuf& text) const

operator==(3)
Tests equality.
Icc::Bool operator==(const char* text) const

operator!=(1)

Icc::Bool operator!=(const IccKey& key) const

operator!=(2)

Icc::Bool operator==(const IccBuf& text) const

operator!=(3)
Tests inequality.

Icc::Bool operator!=(const char* text) const

setKind
Changes the type of key from generic to complete or vice versa.

void setKind(Kind kind)

kind
An enumeration, defined in this class, that indicates whether the key is generic or complete.

value

const char* value()
Returns the start of the data area containing the search key.
Inherited public methods

These are the public methods inherited by this class.

<table>
<thead>
<tr>
<th>Method</th>
<th>Class</th>
</tr>
</thead>
<tbody>
<tr>
<td>className</td>
<td>IccBase</td>
</tr>
<tr>
<td>classType</td>
<td>IccBase</td>
</tr>
<tr>
<td>customClassNum</td>
<td>IccBase</td>
</tr>
<tr>
<td>length</td>
<td>IccRecordIndex</td>
</tr>
<tr>
<td>operator delete</td>
<td>IccBase</td>
</tr>
<tr>
<td>operator new</td>
<td>IccBase</td>
</tr>
<tr>
<td>type</td>
<td>IccRecordIndex</td>
</tr>
<tr>
<td>value</td>
<td>IccRecordIndex</td>
</tr>
</tbody>
</table>

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<tr>
<th>Method</th>
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<tbody>
<tr>
<td>setClassName</td>
<td>IccBase</td>
</tr>
<tr>
<td>setCustomClassNum</td>
<td>IccBase</td>
</tr>
</tbody>
</table>

Enumerations

**Kind**

- **complete**
  Specifies that the supplied key is not generic.

- **generic**
  Specifies that the search key is generic. A search is satisfied when a record is found with a key whose prefix matches the supplied key.

**IccLockId class**

*IccLockId* class is used to identify a lock request.

**IccBase**

- **IccResourceId**
- **IccLockId**

*IccLockId* class is used to identify a lock request.

*Header file*: ICCRIDEH

**IccLockId constructors**

**Constructor (1)**

*IccLockId*(const char* name)
*name*
   The 8-character name of the lock request.

**Constructor (2)**
   The copy constructor.

*IccLockId(const IccLockId& *id*)

*id*
   A reference to an *IccLockId* object.

**Public methods**
   These are the public methods in this class.

*operator= (1)*

*IccLockId& operator=(const char* *name*)

*name*
   The 8-character name of the lock request.

*operator= (2)*
   Assigns new value.

*IccLockId& operator=(const IccLockId& *id*)

*id*
   A reference to an *IccLockId* object.

**Inherited public methods**
   These are the public methods inherited by this class.

<table>
<thead>
<tr>
<th>Method</th>
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</tr>
</thead>
<tbody>
<tr>
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</tr>
</thead>
<tbody>
<tr>
<td>operator=</td>
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</tr>
<tr>
<td>setClassName</td>
<td>IccBase</td>
</tr>
<tr>
<td>setCustomClassNum</td>
<td>IccBase</td>
</tr>
</tbody>
</table>

IccMessage class

IccMessage can be used to hold a message description.

IccBase
   IccMessage

It is used primarily by the IccException class to describe why the IccException object was created.

Header file: ICCMSGEH

IccMessage constructor

Constructor

IccMessage (unsigned short number, const char* text, const char* className = 0, const char* methodName = 0)

number
   The number associated with the message
text
   The text associated with the message
className
   The optional name of the class associated with the message
methodName
   The optional name of the method associated with the message.
Public methods

These are the public methods in this class.

**className**
Returns the name of the class with which the message is associated, if any. If there is no name to return, a null pointer is returned.

```cpp
const char* className() const
```

**methodName**

```cpp
const char* methodName() const
```
Returns the name of the method with which the message is associated, if any. If there is no name to return, a null pointer is returned.

**number**

```cpp
unsigned short number() const
```
Returns the number of the message.

**summary**

```cpp
const char* summary()
```
Returns the text of the message.

**text**

```cpp
const char* text() const
```
Returns the text of the message in the same way as summary.

Inherited public methods

These are the public methods inherited by this class.

<table>
<thead>
<tr>
<th>Method</th>
<th>Class</th>
</tr>
</thead>
<tbody>
<tr>
<td>className</td>
<td>IccBase</td>
</tr>
<tr>
<td>classType</td>
<td>IccBase</td>
</tr>
<tr>
<td>customClassNum</td>
<td>IccBase</td>
</tr>
</tbody>
</table>
Method | Class
---|---
operator delete | IccBase
operator new | IccBase

### Inherited protected methods

These are the protected methods inherited by this class.

<table>
<thead>
<tr>
<th>Method</th>
<th>Class</th>
</tr>
</thead>
<tbody>
<tr>
<td>setClassName</td>
<td>IccBase</td>
</tr>
<tr>
<td>setCustomClassNum</td>
<td>IccBase</td>
</tr>
</tbody>
</table>

### IccPartnerId class

IccPartnerId class represents CICS remote (APPC) partner transaction definitions.

IccBase
  IccResourceId
  IccPartnerId

IccPartnerId class represents CICS remote (APPC) partner transaction definitions.

**Header file:** ICCRIDEH

### IccPartnerId constructors

#### Constructor (1)

IccPartnerId(const char* *partnerName*)

*partnerName*  
The 8-character name of an APPC partner.

#### Constructor (2)

The copy constructor.

IccPartnerId(const IccPartnerId& *id*)

*id*  
A reference to an IccPartnerId object.

### Public methods
operator= (1)

`IccPartnerId& operator=(const char* partnerName)`

*partnerName*

The 8-character name of an APPC partner.

operator= (2)

Assigns new value.

`IccPartnerId& operator=(const IccPartnerId& id)`

*id*

A reference to an *IccPartnerId* object.

**Inherited public methods**

These are the public methods inherited by this class.

<table>
<thead>
<tr>
<th>Method</th>
<th>Class</th>
</tr>
</thead>
<tbody>
<tr>
<td><code>classType</code></td>
<td><em>IccBase</em></td>
</tr>
<tr>
<td><code>className</code></td>
<td><em>IccBase</em></td>
</tr>
<tr>
<td><code>customClassNum</code></td>
<td><em>IccBase</em></td>
</tr>
<tr>
<td><code>name</code></td>
<td><em>IccResourceId</em></td>
</tr>
<tr>
<td><code>nameLength</code></td>
<td><em>IccResourceId</em></td>
</tr>
<tr>
<td><code>operator delete</code></td>
<td><em>IccBase</em></td>
</tr>
<tr>
<td><code>operator new</code></td>
<td><em>IccBase</em></td>
</tr>
</tbody>
</table>

**Inherited protected methods**

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<table>
<thead>
<tr>
<th>Method</th>
<th>Class</th>
</tr>
</thead>
<tbody>
<tr>
<td><code>operator=</code></td>
<td><em>IccResourceId</em></td>
</tr>
<tr>
<td><code>setClassName</code></td>
<td><em>IccBase</em></td>
</tr>
<tr>
<td><code>setCustomClassNum</code></td>
<td><em>IccBase</em></td>
</tr>
</tbody>
</table>

Chapter 3. Foundation Classes: reference 151
IccProgram class

The IccProgram class represents any CICS program outside of your currently executing one, which the IccControl object represents.

IccBase
    IccResource
    IccProgram

Header file: ICCPRGEH
Sample: ICC$PRG1, ICC$PRG2, ICC$PRG3

IccProgram constructors

Constructor (1)

IccProgram(const IccProgramId& id)

id
    A reference to an IccProgramId object.

Constructor (2)

IccProgram(const char* progName)

progName
    The 8-character name of the program.

Public methods

The opt parameter

Many methods have the same parameter, opt, which is described under the abendCode method in “abendCode” on page 62.

address

Returns the address of a program module in memory. This is only valid after a successful load call.

const void* address() const
clearInputMessage

Cleans the current input message which was set by `setInputMessage` or `registerInputMessage`. If the current input message was set using `registerInputMessage` then only the pointer is deleted: the buffer is left unchanged. If the current input message was set using `setInputMessage` then `clearInputMessage` releases the memory used by that buffer.

```cpp
void clearInputMessage()
```

**entryPoint**

```cpp
const void* entryPoint() const
```

Retrns a pointer to the entry point of a loaded program module. This is only valid after a successful `load` call.

**length**

```cpp
unsigned long length() const
```

Returns the length of a program module. This is only valid after a successful `load` call.

**link**

```cpp
void link (const IccBuf* commArea = 0,  
           const IccTransId* transId = 0,  
           CommitOpt opt = noCommitOnReturn)
```

- **commArea**
  - An optional pointer to the `IccBuf` object that contains the COMMAREA—the buffer used to pass information between the calling program and the program that is being called.

- **transId**
  - An optional pointer to the `IccTransId` object that indicates the name of the mirror transaction under which the program is run if it is a remote (DPL) program link.

- **opt**
  - An enumeration, defined in this class, that affects the behavior of the link when the program is remote (DPL). The default (noCommitOnReturn) is not to commit resource changes on the remote CICS region until the current task commits its resources. The alternative (commitOnReturn) means that the resources of the remote program are committed whether or not this task subsequently abends or encounters a problem.

**Conditions:** INVREQ, NOTAUTH, PGMIDERR, SYSIDERR, LENGERR, ROLLEDBACK, TERMERR
**Restrictions**

Links may be nested, that is, a linked program may link to another program. However, due to implementation restrictions, you may only nest such programs 15 times. If this is exceeded, an exception is thrown.

**load**

```cpp
void load(LoadOpt opt = releaseAtTaskEnd)
```

**opt**

An enumeration, defined in this class, that indicates whether CICS should automatically allow the program to be unloaded at task termination (releaseAtTaskEnd), or not (hold).

**Conditions:** NOTAUTH, PGMIDERR, INVREQ, LENGERR

**registerInputMessage**

Store pointer to InputMessage for when the link method is called.

```cpp
void registerInputMessage(const IccBuf& msg)
```

**setInputMessage**

Specifies data to be made available, by the IccSession::receive() method, to the called program, when using the link method in this class.

```cpp
void setInputMessage(const IccBuf& msg)
```

**unload**

Allow a program to be unloaded. It can be reloaded by a call to load.

```cpp
void unload()
```

**Conditions**

NOTAUTH, PGMIDERR, INVREQ
Inherited public methods

These are the public methods inherited by this class.

<table>
<thead>
<tr>
<th>Method</th>
<th>Class</th>
</tr>
</thead>
<tbody>
<tr>
<td>actionOnCondition</td>
<td>IccResource</td>
</tr>
<tr>
<td>actionOnConditionAsChar</td>
<td>IccResource</td>
</tr>
<tr>
<td>actionsOnConditionsText</td>
<td>IccResource</td>
</tr>
<tr>
<td>className</td>
<td>IccBase</td>
</tr>
<tr>
<td>classType</td>
<td>IccBase</td>
</tr>
<tr>
<td>condition</td>
<td>IccResource</td>
</tr>
<tr>
<td>conditionText</td>
<td>IccResource</td>
</tr>
<tr>
<td>customClassNum</td>
<td>IccBase</td>
</tr>
<tr>
<td>handleEvent</td>
<td>IccResource</td>
</tr>
<tr>
<td>id</td>
<td>IccResource</td>
</tr>
<tr>
<td>isEDFOn</td>
<td>IccResource</td>
</tr>
<tr>
<td>isRouteOptionOn</td>
<td>IccResource</td>
</tr>
<tr>
<td>name</td>
<td>IccResource</td>
</tr>
<tr>
<td>operator delete</td>
<td>IccBase</td>
</tr>
<tr>
<td>operator new</td>
<td>IccBase</td>
</tr>
<tr>
<td>routeOption</td>
<td>IccResource</td>
</tr>
<tr>
<td>setActionOnAnyCondition</td>
<td>IccResource</td>
</tr>
<tr>
<td>setActionOnCondition</td>
<td>IccResource</td>
</tr>
<tr>
<td>setActionsOnConditions</td>
<td>IccResource</td>
</tr>
<tr>
<td>setEDF</td>
<td>IccResource</td>
</tr>
<tr>
<td>setRouteOption</td>
<td>IccResource</td>
</tr>
</tbody>
</table>

Inherited protected methods

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<tbody>
<tr>
<td>setClassName</td>
<td>IccBase</td>
</tr>
<tr>
<td>setCustomClassNum</td>
<td>IccBase</td>
</tr>
</tbody>
</table>

Enumerations

CommitOpt

<table>
<thead>
<tr>
<th>noCommitOnReturn</th>
<th>Changes to resources on the remote CICS region are not committed until the current task commits its resources. This is the default setting.</th>
</tr>
</thead>
<tbody>
<tr>
<td>commitOnReturn</td>
<td>Changes to resources on the remote CICS region are committed whether or not the current task subsequently abends or encounters a problem.</td>
</tr>
</tbody>
</table>
LoadOpt
releaseAtTaskEnd
Indicates that CICS should automatically allow the program to be unloaded at task termination.
hold
Indicates that CICS should not automatically allow the program to be unloaded at task termination. (In this case, this or another task must explicitly use the unload method).

IccProgramId class

IccProgramId objects represent program names in the CICS system.

IccBase
  IccResourceId
  IccProgramId

Header file: ICCRIDEH

IccProgramId constructors

Constructor (1)

IccProgramId(const char* progName)

progName
The 8-character name of the program.

Constructor (2)
The copy constructor.

IccProgramId(const IccProgramId& id)

id
A reference to an IccProgramId object.

Public methods

operator= (1)

IccProgramId& operator=(const char* progName)
**progName**
The 8-character name of the program.

**operator= (2)**
Assigns new value.

**IccProgramId& operator=(const IccProgramId& id)**

**id**
A reference to an **IccProgramId** object.

**Inherited public methods**
These are the public methods inherited by this class.

<table>
<thead>
<tr>
<th>Method</th>
<th>Class</th>
</tr>
</thead>
<tbody>
<tr>
<td>classType</td>
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</tr>
<tr>
<td>className</td>
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<tr>
<td>customClassNum</td>
<td>IccBase</td>
</tr>
<tr>
<td>name</td>
<td>IccResourceId</td>
</tr>
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<tr>
<td>setCustomClassNum</td>
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</tr>
</tbody>
</table>

**IccRBA class**
An **IccRBA** object holds a relative byte address which is used for accessing VSAM ESDS files.

**IccBase**
**IccRecordIndex**
**IccRBA**
An **IccRBA** object holds a relative byte address which is used for accessing VSAM ESDS files.

**Header file:** ICCRECEH

**IccRBA constructor**
Constructor

\texttt{IccRBA(unsigned long initRBA = 0)}

\textit{initRBA}
An initial value for the relative byte address.

Public methods

\texttt{operator=} (1)

\texttt{IccRBA\& operator= (const IccRBA\& rba)}

\texttt{operator=} (2)
Assigns a new value for the relative byte address.

\texttt{IccRBA\& operator= (unsigned long num)}

\textit{num}
A valid relative byte address.

\texttt{operator==} (1)

\texttt{Icc::Bool operator== (const IccRBA\& rba) const}

\texttt{operator==} (2)
Tests equality

\texttt{Icc::Bool operator== (unsigned long num) const}
operator!= (1)

Icc::Bool operator!=(const IccRBA& rba) const

operator!= (2)
Tests inequality

Icc::Bool operator!=(unsigned long num) const

number

unsigned long number() const
Returns the relative byte address.

**Inherited public methods**
These are the public methods inherited by this class.

<table>
<thead>
<tr>
<th>Method</th>
<th>Class</th>
</tr>
</thead>
<tbody>
<tr>
<td>className</td>
<td>IccBase</td>
</tr>
<tr>
<td>classType</td>
<td>IccBase</td>
</tr>
<tr>
<td>customClassNum</td>
<td>IccBase</td>
</tr>
<tr>
<td>length</td>
<td>IccRecordIndex</td>
</tr>
<tr>
<td>operator delete</td>
<td>IccBase</td>
</tr>
<tr>
<td>operator new</td>
<td>IccBase</td>
</tr>
<tr>
<td>type</td>
<td>IccRecordIndex</td>
</tr>
<tr>
<td>value</td>
<td>IccRecordIndex</td>
</tr>
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</table>

**Inherited protected methods**
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<tr>
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<th>Class</th>
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</thead>
<tbody>
<tr>
<td>setClassName</td>
<td>IccBase</td>
</tr>
<tr>
<td>setCustomClassNum</td>
<td>IccBase</td>
</tr>
</tbody>
</table>
**IccRecordIndex class**

CICS File Control Record Identifier.

```
IccBase
  IccRecordIndex
  IccKey
  IccRBA
  IccRRN
```

CICS File Control Record Identifier. Used to tell CICS which particular record the program wants to retrieve, delete, or update. **IccRecordIndex** is a base class from which **IccKey**, **IccRBA**, and **IccRRN** are derived.

**Header file:** ICCRECEH

**IccRecordIndex constructor (protected)**

**Constructor**

```
IccRecordIndex(Type type)
```

**type**

An enumeration, defined in this class, that indicates whether the index type is key, RBA, or RRN.

**Note:** This is protected because you should not create **IccRecordIndex** objects; see subclasses **IccKey**, **IccRBA**, and **IccRRN**.

**Public methods**

**length**

Returns the length of the record identifier.

```
unsigned short length() const
```

**type**

```
Type type() const
```

Returns an enumeration, defined in this class, that indicates whether the index type is key, RBA, or RRN.
Inherited public methods

These are the public methods inherited by this class.

<table>
<thead>
<tr>
<th>Method</th>
<th>Class</th>
</tr>
</thead>
<tbody>
<tr>
<td>className</td>
<td>IccBase</td>
</tr>
<tr>
<td>classType</td>
<td>IccBase</td>
</tr>
<tr>
<td>customClassNum</td>
<td>IccBase</td>
</tr>
<tr>
<td>operator delete</td>
<td>IccBase</td>
</tr>
<tr>
<td>operator new</td>
<td>IccBase</td>
</tr>
</tbody>
</table>

Inherited protected methods

These are the protected methods inherited by this class.

<table>
<thead>
<tr>
<th>Method</th>
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</tr>
</thead>
<tbody>
<tr>
<td>setClassName</td>
<td>IccBase</td>
</tr>
<tr>
<td>setCustomClassNum</td>
<td>IccBase</td>
</tr>
</tbody>
</table>

Enumerations

Type

Type indicates the access method.

Possible values are:
• key
• RBA
• RRN

IccRequestId class

An IccRequestId is used to hold the name of a request.

IccBase
  IccRequestId

An IccRequestId is used to hold the name of a request. This request identifier can subsequently be used to cancel a request—see, for example, start and cancel methods in IccStartRequestQ class.

Header file: ICCRIDEH

IccRequestId constructors

Constructor (1)

An empty IccRequestId object.

IccRequestId()
Constructor (2)

```cpp
IccRequestId(const char* requestName)
```

*requestName*

The 8-character name of the request.

Constructor (3)

The copy constructor.

```cpp
IccRequestId(const IccRequestId& id)
```

*id*

A reference to an `IccRequestId`.

Public methods

operator= (1)

```cpp
IccRequestId& operator=(const IccRequestId& id)
```

*id*

A reference to an `IccRequestId` object whose properties are copied into this object.

operator= (2)

Assigns new value.

```cpp
IccRequestId& operator=(const char* requestName)
```

*requestName*

An 8-character string which is copied into this object.
Inherited public methods

These are the public methods inherited by this class.

<table>
<thead>
<tr>
<th>Method</th>
<th>Class</th>
</tr>
</thead>
<tbody>
<tr>
<td>classType</td>
<td>IccBase</td>
</tr>
<tr>
<td>className</td>
<td>IccBase</td>
</tr>
<tr>
<td>customClassNum</td>
<td>IccBase</td>
</tr>
<tr>
<td>name</td>
<td>IccResourceId</td>
</tr>
<tr>
<td>nameLength</td>
<td>IccResourceId</td>
</tr>
<tr>
<td>operator delete</td>
<td>IccBase</td>
</tr>
<tr>
<td>operator new</td>
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Inherited protected methods

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<th>Method</th>
<th>Class</th>
</tr>
</thead>
<tbody>
<tr>
<td>operator=</td>
<td>IccResourceId</td>
</tr>
<tr>
<td>setClassName</td>
<td>IccBase</td>
</tr>
<tr>
<td>setCustomClassNum</td>
<td>IccBase</td>
</tr>
</tbody>
</table>

IccResource class

IccResource class is a base class that is used to derive other classes.

IccBase
IccResource

The methods associated with IccResource are described here although, in practise, they are only called on objects of derived classes.

IccResource is the parent class for all CICS resources—tasks, files, programs, etc. Every class inherits from IccBase, but only those that use CICS services inherit from IccResource.

Header file: ICCRESEH
Sample: ICC$RES1, ICC$RES2

IccResource constructor (protected)

Constructor

IccResource(IccBase::ClassType classType)

classType
An enumeration that indicates what the subclass type is. For example, for an IccTempStore object, the class type is cTempStore. The possible values are listed under ClassType in the description of the IccBase class.
Public methods

**actionOnCondition**

Returns an enumeration that indicates what action the class will take in response to the specified condition being raised by CICS. The possible values are described in this class.

**ActionOnCondition actionOnCondition(IccCondition::Codes condition)**

*condition*

The name of the condition as an enumeration. See IccCondition structure for a list of the possible values.

**actionOnConditionAsChar**

**char actionOnConditionAsChar(IccCondition::Codes condition)**

This method is the same as `actionOnCondition` but returns a character, rather than an enumeration, as follows:

- **0 (zero)**
  
  No action is taken for this CICS condition.

- **H**
  
  The virtual method `handleEvent` is called for this CICS condition.

- **X**
  
  An exception is generated for this CICS condition.

- **A**
  
  This program is abended for this CICS condition.

**actionsOnConditionsText**

Returns a string of characters, one character for each possible condition. Each character indicates the actions to be performed for that corresponding condition.

The characters used in the string are described in “actionOnConditionAsChar” on page 164. For example, the string: `0X00H0A ...` shows the actions for the first seven conditions are as follows:

- **condition 0 (NORMAL)**
  
  action=0 (noAction)

- **condition 1 (ERROR)**
  
  action=X (throwException)

- **condition 2 (RDATT)**
  
  action=0 (noAction)

- **condition 3 (WRBRK)**
  
  action=0 (noAction)

- **condition 4 (ICCEOF)**
  
  action=H (callHandleEvent)
const char* actionsOnConditionsText()

clear
Clears the contents of the object. This method is virtual and is implemented, wherever appropriate, in the derived classes. See Polymorphic Behavior for a description of polymorphism. The default implementation in this class throws an exception to indicate that it has not been overridden in a subclass.

virtual void clear()

condition
Returns a number that indicates the condition code for the most recent CICS call made by this object.

unsigned long condition(ConditionType type = majorCode) const

type
An enumeration, defined in this class, that indicates the type of condition requested. Possible values are majorCode (the default) and minorCode.

conditionText

const char* conditionText() const

Returns the symbolic name of the last CICS condition for this object.

get

virtual const IccBuf& get()

Gets data from the IccResource object and returns it as an IccBuf reference. This method is virtual and is implemented, wherever appropriate, in the derived classes. See Polymorphic Behavior for a description of polymorphism. The default implementation in this class throws an exception to indicate that it has not been overridden in a subclass.

handleEvent

This virtual function may be re-implemented in a subclass (by the application programmer) to handle CICS events (see IccEvent class on page “IccEvent class” on page 110).
virtual HandleEventReturnOpt handleEvent(IccEvent& event)

**event**
A reference to an **IccEvent** object that describes the reason why this method is being called.

**id**

const IccResourceId* id() const

Returns a pointer to the **IccResourceId** object associated with this **IccResource** object.

**isEDFOn**

**Icc::Bool isEDFOn() const**

Returns a boolean value that indicates whether EDF trace is active. Possible values are yes or no.

**isRouteOptionOn**

**Icc::Bool isRouteOptionOn() const**

Returns a boolean value that indicates whether the route option is active. Possible values are yes or no.

**name**

const char* name() const

Returns a character string that gives the name of the resource that is being used. For an **IccTempStore** object, the 8-character name of the temporary storage queue is returned. For an **IccTerminal** object, the 4-character terminal name is returned. This is equivalent to calling `id() → name`.

**put**

Puts information from the buffer into the **IccResource** object. This method is virtual and is implemented, wherever appropriate, in the derived classes. See Polymorphic Behavior for more information on polymorphism. The default implementation in this class throws an exception to indicate that it has not been overridden in a subclass.

virtual void put(const IccBuf& buffer)
buffer
A reference to an IccBuf object that contains data that is to be put into the object.

routeOption

const IccSysId& routeOption() const
Returns a reference to an IccSysId object that represents the system to which all CICS requests are routed—explicit function shipping.

setActionOnAnyCondition
Specifies the default action to be taken by the CICS foundation classes when a CICS condition occurs.

void setActionOnAnyCondition(ActionOnCondition action)

action
The name of the action as an enumeration. The possible values are listed under the description of this class.

setActionOnCondition
Specifies what action is automatically taken by the CICS foundation classes when a given CICS condition occurs.

void setActionOnCondition (ActionOnCondition action,
IccCondition::Codes condition)

action
The name of the action as an enumeration. The possible values are listed under the description of this class.

condition
See IccCondition structure.

setActionsOnConditions

void setActionsOnConditions(const char* actions = 0)
**actions**
A string that indicates what action is to be taken for each condition. The default is not to indicate any actions, in which case each condition is given a default *ActionOnCondition* of noAction. The string should have the same format as the one returned by the *actionsOnConditionsText* method.

**setEDF**
Switches EDF on or off for this resource object. These methods force the object to route CICS requests to the named remote system. This is called explicit function shipping.

```cpp
void setEDF(Icc::Bool onOff)
```

**onOff**  
A boolean value that selects whether EDF trace is switched on or off.

**setRouteOption (1)**
The parameters are:

```cpp
void setRouteOption(const IccSysId& sysId)
```

**sysId**  
The *IccSysId* object that represents the remote system to which commands are routed.

**setRouteOption (2)**
This option is only valid for certain classes: Attempting to use this method on other subclasses of *IccResource* causes an exception to be thrown.

Valid classes are:
- *IccDataQueue*
- *IccFile*
- *IccFileIterator*
- *IccProgram*
- *IccStartRequestQ*
- *IccTempStore*

To turn off the route option specify no parameter, for example:

```cpp
obj.setRouteOption()
```

```cpp
void setRouteOption(const char* sysName = 0)
```

**sysName**  
The 4-character name of the system to which commands are routed.
Inherited public methods

These are the public methods inherited by this class.

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<td>IccBase</td>
</tr>
<tr>
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<tr>
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Inherited protected methods

These are the protected methods inherited by this class.

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<tbody>
<tr>
<td>setClassName</td>
<td>IccBase</td>
</tr>
<tr>
<td>setCustomClassNum</td>
<td>IccBase</td>
</tr>
</tbody>
</table>

Enumerations

**ActionOnCondition**

Possible values are:

- **noAction**
  - Carry on as normal; it is the application program's responsibility to test CICS conditions using the `condition` method, after executing a method that calls CICS services.

- **callHandleEvent**
  - Call the virtual `handleEvent` method.

- **throwException**
  - An `IccException` object is created and thrown. This is typically used for more serious conditions or errors.

- **abendTask**
  - Abend the CICS task.

**HandleEventReturnOpt**

Possible values are:

- **rContinue**
  - The CICS event proceeded satisfactorily and normal processing is to resume.

- **rThrowException**
  - The application program could not handle the CICS event and an exception is to be thrown.

- **rAbendTask**
  - The application program could not handle the CICS event and the CICS task is to be abended.

**ConditionType**

Possible values are:

- **majorCode**
  - The returned value is the CICS RESP value. This is one of the values in `IccCondition::codes`. 
The returned value is the CICS RESP2 value.

**IccResourceId class**

This is a base class from which **IccTransId** and other classes, whose names all end in "Id", are derived.

**IccBase**

- **IccResourceId**

  Many of these derived classes represent CICS resource names.

**Header file: ICCRIDEH**

**IccResourceId constructors (protected)**

**Constructor (1)**

```cpp
IccResourceId (IccBase::ClassType typ, const IccResourceId& id)
```

*type*

An enumeration, defined in **IccBase** class, that indicates the type of class.

*id*

A reference to an **IccResourceId** object that is used to create this object.

**Constructor (2)**

```cpp
IccResourceId (IccBase::ClassType type, const char* resName)
```

*type*

An enumeration, defined in **IccBase** class, that indicates the type of class.

*resName*

The name of a resource that is used to create this object.

**Public methods**

These are the public methods in this class.

**name**

Returns the name of the resource identifier as a string. Most **...Id** objects have 4- or 8-character names.

```cpp
const char* name() const
```
nameLength

unsigned short nameLength() const

Returns the length of the name returned by the name method.

Protected methods

operator=
Set an IccResourceId object to be identical to id.

IccResourceId& operator=(const IccResourceId& id)

id
A reference to an IccResourceId object.

Inherited public methods

These are the public methods inherited by this class.

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Inherited protected methods

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<tr>
<td>setCustomClassNum</td>
<td>IccBase</td>
</tr>
</tbody>
</table>

IccRRN class

An IccRRN object holds a relative record number and is used to identify records in VSAM RRDS files.

Icc RRN

IccRecordIndex

IccRRN

An IccRRN object holds a relative record number and is used to identify records in VSAM RRDS files.

Header file: ICCRECEH
IccRRN constructors

Constructor

IccRRN(unsigned long initRRN = 1)

* initRRN
  The initial relative record number—an integer greater than 0. The default is 1.

Public methods

These are the public methods in this class.

operator= (1)

IccRRN& operator=(const IccRRN& rrn)

operator= (2)
Assigns a new value for the relative record number.

IccRRN& operator=(unsigned long num)

* num
  A relative record number—an integer greater than 0.

operator==(1)

Icc::Bool operator==(const IccRRN& rrn) const

operator==(2)
Tests equality

Icc::Bool operator==(unsigned long num) const
operator!= (1)

Icc::Bool operator!= (const IccRRN& rrn) const

operator!= (2)
Tests inequality

Icc::Bool operator!=(unsigned long num) const

number

unsigned long number() const
Returns the relative record number.

**Inherited public methods**
These are the public methods inherited by this class.

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</tr>
<tr>
<td>customClassNum</td>
<td>IccBase</td>
</tr>
<tr>
<td>length</td>
<td>IccRecordIndex</td>
</tr>
<tr>
<td>operator delete</td>
<td>IccBase</td>
</tr>
<tr>
<td>operator new</td>
<td>IccBase</td>
</tr>
<tr>
<td>type</td>
<td>IccRecordIndex</td>
</tr>
<tr>
<td>value</td>
<td>IccRecordIndex</td>
</tr>
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<td>setCustomClassNum</td>
<td>IccBase</td>
</tr>
</tbody>
</table>
IccSemaphore class

This class enables synchronization of resource updates.

**IccBase**
- IccResource
- IccSemaphore

**Header file:** ICCSEMEH

**Sample:** ICC$SEM

IccSemaphore constructor

**Constructor (1)**

```
IccSemaphore (const char* resource,
             LockType type = byValue,
             LifeTime life = UOW)
```

**resource**
- A text string, if type is byValue, otherwise an address in storage.

**type**
- An enumeration, defined in this class, that indicates whether locking is by value or by address. The default is by value.

**life**
- An enumeration, defined in this class, that indicates how long the semaphore lasts. The default is to last for the length of the UOW.

**Constructor (2)**

```
IccSemaphore (const IccLockId& id,
              LifeTime life = UOW)
```

**id**
- A reference to an IccLockId object

**life**
- An enumeration, defined in this class, that indicates how long the semaphore lasts. The default is to last for the length of the UOW.
Public methods
These are the public methods in this class.

**lifeTime**
Returns an enumeration, defined in this class, that indicates whether the lock lasts for the length of the current unit-of-work ('UOW') or until the task terminates('task').

```cpp
Lifetime lifeTime() const
```

**lock**

```cpp
void lock()
```
Attempts to get a lock. This method blocks if another task already owns the lock.

**Conditions**
ENQBUSY, LENGERR, INVREQ

**tryLock**
Attempts to get a lock. This method does not block if another task already owns the lock. It returns a boolean that indicates whether it succeeded.

```cpp
Icc::Bool tryLock()
```

**Conditions**
ENQBUSY, LENGERR, INVREQ

**type**
Returns an enumeration, defined in this class, that indicates what type of semaphore this is.

```cpp
LockType type() const
```

**unlock**

```cpp
void unlock()
```
Release a lock.

**Conditions**
LENERR, INVREQ
Inherited public methods

These are the public methods inherited by this class.

<table>
<thead>
<tr>
<th>Method</th>
<th>Class</th>
</tr>
</thead>
<tbody>
<tr>
<td>actionOnCondition</td>
<td>IccResource</td>
</tr>
<tr>
<td>actionOnConditionAsChar</td>
<td>IccResource</td>
</tr>
<tr>
<td>actionsOnConditionsText</td>
<td>IccResource</td>
</tr>
<tr>
<td>classType</td>
<td>IccBase</td>
</tr>
<tr>
<td>className</td>
<td>IccBase</td>
</tr>
<tr>
<td>condition</td>
<td>IccResource</td>
</tr>
<tr>
<td>conditionText</td>
<td>IccResource</td>
</tr>
<tr>
<td>customClassNum</td>
<td>IccBase</td>
</tr>
<tr>
<td>handleEvent</td>
<td>IccResource</td>
</tr>
<tr>
<td>id</td>
<td>IccResource</td>
</tr>
<tr>
<td>isEDFOn</td>
<td>IccResource</td>
</tr>
<tr>
<td>name</td>
<td>IccResource</td>
</tr>
<tr>
<td>operator delete</td>
<td>IccBase</td>
</tr>
<tr>
<td>operator new</td>
<td>IccBase</td>
</tr>
<tr>
<td>setActionOnAnyCondition</td>
<td>IccResource</td>
</tr>
<tr>
<td>setActionOnCondition</td>
<td>IccResource</td>
</tr>
<tr>
<td>setActionsOnConditions</td>
<td>IccResource</td>
</tr>
<tr>
<td>setEDF</td>
<td>IccResource</td>
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<td>IccBase</td>
</tr>
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</table>

Enumerations

**LockType**

**byValue**

The lock is on the contents (for example, name).

**byAddress**

The lock is on the memory address.

**LifeTime**

**UOW**

The semaphore lasts for the length of the current unit of work.

**task**

The semaphore lasts for the length of the task.
IccSession class

This class enables APPC and DTP programming.

IccSession constructors (public)

Constructor (1)

*IccSession(const IccPartnerId& id)*

*id*  
A reference to an *IccPartnerId* object

Constructor (2)

*IccSession (const IccSysId& sysId, const char* profile = 0)*

*sysId*  
A reference to an *IccSysId* object that represents a remote CICS system

*profile*  
The 8-character name of the profile.

Constructor (3)

*IccSession (const char* sysName, const char* profile = 0)*

*sysName*  
The 4-character name of the remote CICS system with which this session is associated

*profile*  
The 8-character name of the profile.
IccSession constructor (protected)

Constructor
This constructor is for back end DTP CICS tasks that have a session as their principal facility. In this case the application program uses the session method on the IccControl object to gain access to their IccSession object.

IccSession()

Public methods
These are the public methods in this class.

allocate
Establishes a session (communication channel) to the remote system.

void allocate(AllocateOpt option = queue)

option
An enumeration, defined in this class, that indicates what action CICS is to take if a communication channel is unavailable when this method is called.

Conditions
INVREQ, SYSIDERR, CBIDERR, NETNAMEIDERR, PARTNERIDERR, SYSBUSY

connectProcess (1)
This method can only be used if an IccPartnerId object was used to construct this session object.

void connectProcess (SyncLevel level, const IccBuf* PIP = 0)

level
An enumeration, defined in this class, that indicates what sync level is to be used for this conversation

PIP
An optional pointer to an IccBuf object that contains the PIP data to be sent to the remote system

connectProcess (2)
void connectProcess (SyncLevel level,
    const IccTransId& transId,
    const IccBuf* PIP = 0)

level
    An enumeration, defined in this class, that indicates what sync level is to be used for this conversation

transId
    A reference to an IccTransId object that holds the name of the transaction to be started on the remote system

PIP
    An optional pointer to an IccBuf object that contains the PIP data to be sent to the remote system

connectProcess (3)
Starts a partner process on the remote system in preparation for sending and receiving information.

void connectProcess (SyncLevel level,
    const IccTPNameId& TPName,
    const IccBuf* PIP = 0)

level
    An enumeration, defined in this class, that indicates what sync level is to be used for this conversation

TPName
    A reference to an IccTPNameId object that contains the 1–64 character TP name.

PIP
    An optional pointer to an IccBuf object that contains the PIP data to be sent to the remote system

Conditions
INVREQ, LENGERR, NOTALLOC, PARTNERIDERR, NOTAUTH, TERMERR, SYSBUSY

converse
    converse sends the contents of send and returns a reference to an IccBuf object that holds the reply from the remote APPC partner.

const IccBuf& converse(const IccBuf& send)

send
    A reference to an IccBuf object that contains the data that is to be sent.

Conditions
EOC, INVREQ, LENGERR, NOTALLOC, SIGNAL, TERMERR
**convId**

Returns a reference to an **IccConvId** object that contains the 4-byte conversation identifier.

```cpp
const IccConvId& convId()
```

**errorCode**

```cpp
const char* errorCode() const
```

Returns the 4-byte error code received when **isErrorSet** returns true. See the relevant DTP Guide for more information.

**extractProcess**

```cpp
void extractProcess()
```

Retrieves information from an APPC conversation attach header and holds it inside the object. See **PIPList**, **process**, and **syncLevel** methods to retrieve the information from the object. This method should be used by the back end task if it wants access to the PIP data, the process name, or the synlevel under which it is running.

**Conditions**

INVREQ, NOTALLOC, LENGERR

**flush**

Ensure that accumulated data and control information are transmitted on an APPC mapped conversation.

```cpp
void flush()
```

**Conditions**

INVREQ, NOTALLOC

**free**

Return the APPC session to CICS so that it may be used by other tasks.

```cpp
void free()
```

**Conditions**

INVREQ, NOTALLOC
get
A synonym for receive. See Polymorphic Behavior for information on polymorphism.

virtual const IccBuf& get()

isErrorSet

Icc::Bool isErrorSet() const
Returns a boolean variable, defined in Icc structure, that indicates whether an error has been set.

isNoDataSet

Icc::Bool isNoDataSet() const
Returns a boolean variable, defined in Icc structure, that indicates if no data was returned on a send—just control information.

isSignalSet

Icc::Bool isSignalSet() const
Returns a boolean variable, defined in Icc structure, that indicates whether a signal has been received from the remote process.

issueAbend

void issueAbend()
Abnormally ends the conversation. The partner transaction sees the TERMERR condition.

Conditions
INVREQ, NOTALLOC, TERMERR

issueConfirmation
Sends positive response to a partner’s send request that specified the confirmation option.

void issueConfirmation()
Conditions
INVREQ, NOTALLOC, TERMERR, SIGNAL

issueError
Signals an error to the partner process.

void issueError()

Conditions
INVREQ, NOTALLOC, TERMERR, SIGNAL

issuePrepare
This only applies to DTP over APPC links. It enables a syncpoint initiator to prepare a syncpoint worker for syncpointing by sending only the first flow ('prepare to commit') of the syncpoint exchange.

void issuePrepare()

Conditions
INVREQ, NOTALLOC, TERMERR

issueSignal
Signals that a mode change is needed.

void issueSignal()

Conditions
INVREQ, NOTALLOC, TERMERR

PIPList
Returns a reference to an IccBuf object that contains the PIP data sent from the front end process. A call to this method should be preceded by a call to extractProcess on back end DTP processes.

IccBuf& PIPList()

process

const IccBuf& process() const
Returns a reference to an \texttt{IccBuf} object that contains the process data sent from the front end process. A call to this method should be preceded by a call to \texttt{extractProcess} on back end DTP processes.

\textbf{put}

A synonym for \texttt{send}. See Polymorphic Behavior for information on polymorphism.

\begin{verbatim}
virtual void put(const IccBuf& data)
\end{verbatim}

\textit{data}

A reference to an \texttt{IccBuf} object that holds the data to be sent to the remote process.

\textbf{receive}

\begin{verbatim}
const IccBuf& receive()
\end{verbatim}

Returns a reference to an \texttt{IccBuf} object that contains the data received from the remote system.

\textbf{Conditions}

EOC, INVREQ, LENGERR, NOTALLOC, SIGNAL, TERMERR

\textbf{send (1)}

\begin{verbatim}
void send (const IccBuf& send, SendOpt option = normal)
\end{verbatim}

\textit{send}

A reference to an \texttt{IccBuf} object that contains the data that is to be sent.

\textit{option}

An enumeration, defined in this class, that affects the behavior of the \texttt{send} method. The default is normal.

\textbf{send (2)}

Sends data to the remote partner.

\begin{verbatim}
void send(SendOpt option = normal)
\end{verbatim}
**option**
An enumeration, defined in this class, that affects the behavior of the `send` method. The default is normal.

**Conditions**
INVREQ, LENGERR, NOTALLOC, SIGNAL, TERMERR

**sendInvite (1)**

```cpp
void sendInvite (const IccBuf& send,
                SendOpt option = normal)
```

**send**
A reference to an `IccBuf` object that contains the data that is to be sent.

**option**
An enumeration, defined in this class, that affects the behavior of the `sendInvite` method. The default is normal.

**sendInvite (2)**
Sends data to the remote partner and indicates a change of direction, that is, the next method on this object will be `receive`.

```cpp
void sendInvite(SendOpt option = normal)
```

**option**
An enumeration, defined in this class, that affects the behavior of the `sendInvite` method. The default is normal.

**Conditions**
INVREQ, LENGERR, NOTALLOC, SIGNAL, TERMERR

**sendLast (1)**

```cpp
void sendLast (const IccBuf& send,
               SendOpt option = normal)
```

**send**
A reference to an `IccBuf` object that contains the data that is to be sent.
**option**

An enumeration, defined in this class, that affects the behavior of the `sendLast` method. The default is normal.

**sendLast (2)**

Sends data to the remote partner and indicates that this is the final transmission. The `free` method must be invoked next, unless the sync level is 2, when you must commit resource updates before the `free`. (See `commitUOW` on page “commitUOW” on page 203 in `IccTaskClass`).

```cpp
void sendLast(SendOpt option = normal)
```

**option**

An enumeration, defined in this class, that affects the behavior of the `sendLast` method. The default is normal.

**Conditions**

INVREQ, LENGERR, NOTALLOC, SIGNAL, TERMERR

**state**

Returns a CVDA, defined in `IccValue` structure, that indicates the current state of the APPC conversation.

Possible values are:

- ALLOCATED
- CONFFREE
- CONFSEND
- FREE
- PENDFREE
- PENDRECEIVE
- RECEIVE
- ROLLBACK
- SEND
- SYNCFREE
- SYNCFREE
- SYNCRECEIVE
- SYNCSEND
- NOTAPPLIC

`IccValue::NOTAPPLIC` is returned if there is no APPC conversation state.

```cpp
IccValue::CVDA state(StateOpt option = lastCommand)
```

**option**

An enumeration, defined in this class, that indicates how to report the state of the conversation
Conditions
INVREQ, NOTALLOC

stateText
Returns the symbolic name of the state that state method would return. For example, if state returns IccValue::ALLOCATED, stateText would return "ALLOCATED".

const char* stateText(StateOpt option = lastCommand)

option
An enumeration, defined in this class, that indicates how to report the state of the conversation

syncLevel

SyncLevel syncLevel() const
Returns an enumeration, defined in this class, that indicates the synchronization level that is being used in this session. A call to this method should be preceded by a call to extractProcess on back end DTP processes.

Inherited public methods
These are the public methods inherited by this class.

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</tr>
<tr>
<td>classType</td>
<td>IccBase</td>
</tr>
<tr>
<td>className</td>
<td>IccBase</td>
</tr>
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<td>IccResource</td>
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<tr>
<td>operator new</td>
<td>IccBase</td>
</tr>
<tr>
<td>setActionOnAnyCondition</td>
<td>IccResource</td>
</tr>
<tr>
<td>setActionOnCondition</td>
<td>IccResource</td>
</tr>
</tbody>
</table>
Method | Class  
---|---
setActionsOnConditions | IccResource  
setEDF | IccResource

**Inherited protected methods**

These are the protected methods inherited by this class.

<table>
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<th>Method</th>
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</tr>
</thead>
<tbody>
<tr>
<td>setClassName</td>
<td>IccBase</td>
</tr>
<tr>
<td>setCustomClassNum</td>
<td>IccBase</td>
</tr>
</tbody>
</table>

**Enumerations**

**AllocateOpt**

- **queue**
  If all available sessions are in use, CICS is to queue this request (and block the method) until it can allocate a session.

- **noQueue**
  Control is returned to the application if it cannot allocate a session. CICS raises the SYSBUSY condition.

Indicates whether queuing is required on an `allocate` method.

**SendOpt**

- **normal**
  The default.

- **confirmation**
  Indicates that a program using SyncLevel level1 or level2 requires a response from the remote partner program. The remote partner can respond positively, using the `issueConfirmation` method, or negatively, using the `issueError` method. The sending program does not receive control back from CICS until the response is received.

- **wait**
  Requests that the data is sent and not buffered internally. CICS is free to buffer requests to improve performance if this option is not specified.

**StateOpt**

Use StateOpt to indicate how the state of a conversation is to be reported.

- **lastCommand**
  Return the state at the time of the completion of the last operation on the session.

- **extractState**
  Return the explicitly extracted current state.

**SyncLevel**

- **level0**
  Sync level 0

- **level1**
  Sync level 1
**IccStartRequestQ class**

This is a singleton class that enables the application programmer to request an asynchronous start of another CICS transaction.

- **IccBase**
  - **IccResource**
    - **IccStartRequestQ**

(see the `start` method on page “start” on page 192).

An asynchronously started transaction uses the `IccStartRequestQ` class method `retrieveData` to gain the information passed to it by the transaction that issued the `start` request.

An unexpired start request can be cancelled by using the `cancel` method.

- **Header file:** ICCSRQEH
- **Sample:** ICC$SRQ1, ICC$SRQ2

**IccStartRequestQ constructor (protected)**

- **Constructor**

  ```
  IccStartRequestQ()
  ```

**Public methods**

These are the public methods in this class.

- **cancel**
  
  Cancels a previously issued `start` request that has not yet expired.

  ```
  void cancel (const IccRequestId& reqId,
  const IccTransId* transId = 0)
  ```

- **reqId**
  
  A reference to an `IccRequestId` object that represents the request to be cancelled

- **transId**
  
  An optional pointer to an `IccTransId` object that represents the transaction that is to be cancelled.

**Conditions**

- ISCINVREQ, NOTAUTH, NOTFND, SYSIDERR
clearData

clearData clears the current data that is to be passed to the started transaction.

void clearData()
The data was set using setData or registerData.
If the data was set using registerData, only the pointer to the data is removed, the data in the buffer is left unchanged.
If the data was set using setData, then clearData releases the memory used by the buffer.

data
Returns a reference to an IccBuf object that contains data passed on a start request. A call to this method should be preceded by a call to retrieveData method.

const IccBuf& data() const

instance

static IccStartRequestQ* instance()
Returns a pointer to the single IccStartRequestQ object. If the object does not exist it is created. See also startRequestQ method on page “startRequestQ” on page 103 of IccControl.

queueName

const char* queueName() const
Returns the name of the queue that was passed by the start requester. A call to this method should be preceded by a call to retrieveData method.

registerData

Registers an IccBuf object to be interrogated for start data on each subsequent start method invocation. This just stores the address of the IccBuf object within the IccStartRequestQ so that the IccBuf object can be found when using the start method. This differs from the setData method, which takes a copy of the data held in the IccBuf object during the time that it is invoked.

void registerData(const IccBuf* buffer)

buffer
A pointer to the IccBuf object that holds data to be passed on a start request.
void reset()
Clears any associations previously made by set... methods in this class.

retrieveData
Used by a task that was started, via an async start request, to gain access to the information passed by the start requester. The information is returned by the data, queueName, returnTermId, and returnTransId methods.

void retrieveData(RetrieveOpt option = noWait)

option
An enumeration, defined in this class, that indicates what happens if there is no start data available.

Conditions
ENDDATA, ENVDEFERR, IOERR, LENGERR, NOTFND, INVREQ

Note: The ENVDEFERR condition will be raised if all the possible options (setData, setQueueName, setReturnTermId, and setReturnTransId) are not used before issuing the start method. This condition is therefore not necessarily an error condition and your program should handle it accordingly.

returnTermId
Returns a reference to an IccTermId object that identifies which terminal is involved in the session. A call to this method should be preceded by a call to retrieveData method.

const IccTermId& returnTermId() const

returnTransId

const IccTransId& returnTransId() const

Returns a reference to an IccTransId object passed on a start request. A call to this method should be preceded by a call to retrieveData method.

setData

void setData(const IccBuf& buf)
Copies the data in `buf` into the `IccStartRequestQ`, which passes it to the started transaction when the `start` method is called. See also `registerData` on page 189 for an alternative way to pass data to started transactions.

**setQueueName**

Requests that this queue name be passed to the started transaction when the `start` method is called.

```cpp
void setQueueName(const char* queueName)
```

*queueName*  
An 8-character queue name.

**setReturnTermId (1)**

```cpp
void setReturnTermId(const IccTermId& termId)
```

*termId*  
A reference to an `IccTermId` object that identifies which terminal is involved in the session.

**setReturnTermId (2)**

Requests that this return terminal ID be passed to the started transaction when the `start` method is called.

```cpp
void setReturnTermId(const char* termName)
```

*termName*  
The 4-character name of the terminal that is involved in the session.

**setReturnTransId (1)**

```cpp
void setReturnTransId(const IccTransId& transId)
```

*transId*  
A reference to an `IccTransId` object.
setReturnTransId (2)
Requests that this return transaction ID be passed to the started transaction when the start method is called.

void setReturnTransId(const char* transName)

transName
The 4-character name of the return transaction.

setStartOpts
Sets whether the started transaction is to have protection and whether it is to be checked.

void setStartOpts (ProtectOpt popt = none,
                   CheckOpt copt = check)

popt
An enumeration, defined in this class, that indicates whether start requests are to be protected

copt
An enumeration, defined in this class, that indicates whether start requests are to be checked.

start
Asynchronously starts the named CICS transaction. The returned reference to an IccRequestId object identifies the start request and can be used subsequently to cancel the start request.

const IccRequestId& start (const IccTransId& transId,
                           const IccTermId* termId,
                           const IccTime* time = 0,
                           const IccRequestId* reqId = 0)

or

const IccRequestId& start (const IccTransId& transId,
                           const IccUserId* userId,
                           const IccTime* time = 0,
                           const IccRequestId* reqId = 0)

or

const IccRequestId& start (const IccTransId& transId,
                           const IccTime* time = 0,
                           const IccRequestId* reqId = 0)
transId
A reference to an IccTransId object that represents the transaction to be started

termId
A reference to an IccTermId object that identifies which terminal is involved in the session.

userId
A reference to an IccUserId object that represents the user ID.

time
An (optional) pointer to an IccTime object that specifies when the task is to be started. The default is for the task to be started immediately.

reqId
An (optional) pointer to an IccRequestId object that is used to identify this start request so that the cancel can cancel the request.

Conditions
INVREQ, IOERR, ISCINVREQ, LENGERR, NOTAUTH, SYSIDERR, TERMIDERR, TRANSIDERR, USERIDERR

Inherited public methods
These are the public methods inherited by this class.

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<tbody>
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</tr>
<tr>
<td>actionsOnConditionsText</td>
<td>IccResource</td>
</tr>
<tr>
<td>className</td>
<td>IccBase</td>
</tr>
<tr>
<td>classType</td>
<td>IccBase</td>
</tr>
<tr>
<td>condition</td>
<td>IccResource</td>
</tr>
<tr>
<td>conditionText</td>
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</tr>
<tr>
<td>customClassNum</td>
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</tr>
<tr>
<td>handleEvent</td>
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</tr>
<tr>
<td>id</td>
<td>IccResource</td>
</tr>
<tr>
<td>isEDFOn</td>
<td>IccResource</td>
</tr>
<tr>
<td>isRouteOptionOn</td>
<td>IccResource</td>
</tr>
<tr>
<td>name</td>
<td>IccResource</td>
</tr>
<tr>
<td>operator delete</td>
<td>IccBase</td>
</tr>
<tr>
<td>operator new</td>
<td>IccBase</td>
</tr>
<tr>
<td>routeOption</td>
<td>IccResource</td>
</tr>
<tr>
<td>setActionOnAnyCondition</td>
<td>IccResource</td>
</tr>
<tr>
<td>setActionOnCondition</td>
<td>IccResource</td>
</tr>
<tr>
<td>setActionsOnConditions</td>
<td>IccResource</td>
</tr>
<tr>
<td>setEDF</td>
<td>IccResource</td>
</tr>
<tr>
<td>setRouteOption</td>
<td>IccResource</td>
</tr>
</tbody>
</table>
Inherited protected methods

These are the protected methods inherited by this class.

<table>
<thead>
<tr>
<th>Method</th>
<th>Class</th>
</tr>
</thead>
<tbody>
<tr>
<td>setClassName</td>
<td>IccBase</td>
</tr>
<tr>
<td>setCustomClassNum</td>
<td>IccBase</td>
</tr>
</tbody>
</table>

Enumerations

RetrieveOpt
- noWait
- wait

ProtectOpt
- none
- protect

CheckOpt
- check
- noCheck

IccSysId class

IccSysId class is used to identify a remote CICS system.

IccBase
  IccResourceId
  IccSysId

IccSysId class is used to identify a remote CICS system.

Header file: ICCRIDEH

IccSysId constructors

Constructor (1)

IccSysId(const char* name)

name
The 4-character name of the CICS system.

Constructor (2)
The copy constructor.
IccSysId(const IccSysId& id)

id
A reference to an IccSysId object.

Public methods
These are the public methods in this class.

operator= (1)

IccSysId& operator=(const IccSysId& id)

id
A reference to an existing IccSysId object.

operator= (2)
Sets the name of the CICS system held in the object.

IccSysId& operator=(const char* name)

name
The 4-character name of the CICS system.

Inherited public methods

<table>
<thead>
<tr>
<th>Method</th>
<th>Class</th>
</tr>
</thead>
<tbody>
<tr>
<td>classType</td>
<td>IccBase</td>
</tr>
<tr>
<td>className</td>
<td>IccBase</td>
</tr>
<tr>
<td>customClassNum</td>
<td>IccBase</td>
</tr>
<tr>
<td>name</td>
<td>IccResourceId</td>
</tr>
<tr>
<td>nameLength</td>
<td>IccResourceId</td>
</tr>
<tr>
<td>operator delete</td>
<td>IccBase</td>
</tr>
<tr>
<td>operator new</td>
<td>IccBase</td>
</tr>
</tbody>
</table>

Inherited protected methods
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<table>
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<tr>
<th>Method</th>
<th>Class</th>
</tr>
</thead>
<tbody>
<tr>
<td>operator=</td>
<td>IccResourceId</td>
</tr>
</tbody>
</table>
IccSystem class

This is a singleton class that represents the CICS system. It is used by an application program to discover information about the CICS system on which it is running.

IccBase
   IccResource
   IccSystem

Header file: ICCSYSEH
Sample: ICC$SYS

IccSystem constructor (protected)

Constructor

IccSystem()

Public methods

These are the public methods in this class.

applName

Returns the 8-character name of the CICS region.

const char* applName()

Conditions

INVREQ

beginBrowse (1)

void beginBrowse (ResourceType resource,
   const IccResourceId* resId = 0)

resource

An enumeration, defined in this class, that indicates the type of resource to be browsed within the CICS system.
**resId**
An optional pointer to an **IccResourceId** object that indicates the starting point for browsing through the resources.

**beginBrowse (2)**
Signals the start of a browse through a set of CICS resources.

```c
void beginBrowse (ResourceType resource, const char* resName)
```

*resource*
An enumeration, defined in this class, that indicates the type of resource to be browsed within the CICS system.

*resName*
The name of the resource that is to be the starting point for browsing the resources.

**Conditions**
END, FILENOTFOUND, ILLOGIC, NOTAUTH

**dateFormat**
Returns the default dateFormat for the CICS region.

```c
const char* dateFormat()
```

**endBrowse**
Signals the end of a browse through a set of CICS resources.

```c
void endBrowse(ResourceType resource)
```

**Conditions**
END, FILENOTFOUND, ILLOGIC, NOTAUTH

**freeStorage**
Releases the storage obtained by the **IccSystem getStorage** method.

```c
void freeStorage(void* pStorage)
```
Conditions
INVREQ

ggetFile (1)

IccFile* getFile(const IccFileId& id)

id
A reference to an IccFileId object that identifies a CICS file.

ggetFile (2)
Returns a pointer to the IccFile object identified by the argument.

IccFile* getFile(const char* fileName)

fileName
The name of a CICS file.

Conditions
END, FILENOTFOUND, ILLOGIC, NOTAUTH

ggetNextFile
This method is only valid after a successful beginBrowse(IccSystem::file) call. It returns the next file object in the browse sequence in the CICS system.

IccFile* getNextFile()

Conditions
END, FILENOTFOUND, ILLOGIC, NOTAUTH

ggetStorage
Obtains a block of storage of the requested size and returns a pointer to it. The storage is not released automatically at the end of task; it is only released when a freeStorage operation is performed.

void* getStorage(unsigned long size,
char initByte = -1,
unsigned long storageOpts = 0)
size
The amount of storage being requested, in bytes

initByte
The initial setting of all bytes in the allocated storage

storageOpts
An enumeration, defined in IccTask class, that affects the way that CICS allocates storage.

Conditions
LENGERR, NOSTG

instance
Returns a pointer to the singleton IccSystem object. The object is created if it does not already exist.

static IccSystem* instance()

operatingSystem

char operatingSystem()
Returns a 1-character value that identifies the operating system under which CICS is running:
A
  AIX
N
  Windows
X
  z/OS

Conditions
NOTAUTH

operatingSystemLevel
Returns a halfword binary field giving the release number of the operating system under which CICS is running. The value returned is ten times the formal release number (the version number is not represented). For example, MVS/ESA Version 3 Release 2.1 would produce a value of 21.

unsigned short operatingSystemLevel()

Conditions
NOTAUTH

IccSystem public method: release
Returns the level of the CICS system. The value is taken from the number returned in the RELEASE parameter of the EXE CICS INQUIRE SYSTEM command.

For example, the release level returned for CICS Transaction Server for z/OS Version 4 Release 2 is 670.
unsigned long release()

**Conditions**
NOTAUTH

**releaseText**
Returns the same as `release`, except as a 4-character string. For example, CICS Transaction Server for z/OS [Version 1] Release 3 would return "0130".

const char* releaseText()

**Conditions**
NOTAUTH

**sysId**
Returns a reference to the **IccSysId** object that identifies this CICS system.

**IccSysId**& sysId()

**Conditions**
INVREQ

**workArea**
Returns a reference to the **IccBuf** object that holds the work area for the CICS system.

**const IccBuf**& workArea()

**Conditions**
INVREQ

**Inherited public methods**
These are the public methods inherited by this class.

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<tr>
<td>Method</td>
<td>Class</td>
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<tr>
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</tr>
<tr>
<td>customClassNum</td>
<td>IccBase</td>
</tr>
<tr>
<td>handleEvent</td>
<td>IccResource</td>
</tr>
<tr>
<td>id</td>
<td>IccResource</td>
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<tr>
<td>isEDFOn</td>
<td>IccResource</td>
</tr>
<tr>
<td>name</td>
<td>IccResource</td>
</tr>
<tr>
<td>operator delete</td>
<td>IccBase</td>
</tr>
<tr>
<td>operator new</td>
<td>IccBase</td>
</tr>
<tr>
<td>setActionOnAnyCondition</td>
<td>IccResource</td>
</tr>
<tr>
<td>setActionOnCondition</td>
<td>IccResource</td>
</tr>
<tr>
<td>setActionsOnConditions</td>
<td>IccResource</td>
</tr>
<tr>
<td>setEDF</td>
<td>IccResource</td>
</tr>
</tbody>
</table>

**Inherited protected methods**

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<table>
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<tr>
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</thead>
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<tr>
<td>setClassName</td>
<td>IccBase</td>
</tr>
<tr>
<td>setCustomClassNum</td>
<td>IccBase</td>
</tr>
</tbody>
</table>

**Enumerations**

**ResourceType**

- autoInstallModel
- connection
- dataQueue
- exitProgram
- externalDataSet
- file
- journal
- modename
- partner
- profile
- program
- requestId
- systemDumpCode
- tempStore
- terminal
- transactionDumpCode
- transaction
- transactionClass
**IccTask class**

**IccTask** is a singleton class used to invoke task related CICS services.

**IccBase**
- **IccResource**
- **IccTask**

**Header file:** ICCTSKEH

**Sample:** ICC$TSK

### IccTask Constructor (protected)

**Constructor**

**IccTask()**

### Public methods

These are the public methods in this class.

#### The opt parameter

Many methods have the same parameter, `opt`, which is described under the `abendCode` method in "abendCode" on page 62.

**abend**

Requests CICS to abend this task.

```cpp
void abend (const char* abendCode = 0,
            AbendHandlerOpt opt1 = respectAbendHandler,
            AbendDumpOpt opt2 = createDump)
```

**abendCode**

The 4-character abend code

**opt1**

An enumeration, defined in this class, that indicates whether to respect or ignore any abend handling program specified by `setAbendHandler` method in **IccControl** class

**opt2**

An enumeration, defined in this class, that indicates whether a dump is to be created.
IccAbendData* abendData()

Returns a pointer to an IccAbendData object that contains information about the program abends, if any, that relate to this task.

commitUOW

void commitUOW()

Commit the resource updates within the current UOW for this task. This also causes a new UOW to start for subsequent resource update activity.

Conditions
INVREQ, ROLLEDBACK

delay

Requests that this task be delayed for an interval of time, or until a specific time.

void delay (const IccTime& time,
           const IccRequestId* reqId = 0)

time

A reference to an object that contains information about the delay time. The object can be one of these types:

IccAbsTime
Expresses time as the number of milliseconds since the beginning of the year 1900.

IccTimeInterval
Expresses an interval of time, such as 3 hours, 2 minutes, and 1 second.

IccTimeOfDay
Expresses a time of day, such as 13 hours, 30 minutes (1-30 pm).

reqId
An optional pointer to an IccRequestId object that can be used to cancel an unexpired delay request.

Conditions
EXPIRED, INVREQ

dump

Requests CICS to take a memory dump for this task. (See also setDumpOpts.) Returns the character identifier of the dump.

const char* dump (const char* dumpCode,
                  const IccBuf* buf = 0)
**dumpCode**
A 4-character label that identifies this dump

**buf**
A pointer to the **IccBuf** object that contains additional data to be included in the dump.

**Conditions**
INVREQ, IOERR, NOSPACE, NOSTG, NOTOPEN, OPENERR, SUPPRESSED

**enterTrace**
Writes a user trace entry in the CICS trace table.

```cpp
void enterTrace (unsigned short traceNum,
const char* resource = 0,
IccBuf* data = 0,
TraceOpt opt = normal)
```

**traceNum**
The trace identifier for a user trace table entry; a value in the range 0 through 199.

**resource**
An 8-character name to be entered in the resource field of the trace table entry.

**data**
A pointer to the **IccBuf** object containing data to be included in the trace record.

**opt**
An enumeration, defined in this class, that indicates whether tracing should be normal or whether only exceptions should be traced.

**Conditions**
INVREQ, LENGERR

**facilityType**
Returns an enumeration, defined in this class, that indicates what type of principal facility this task has. This is usually a terminal, such as when the task was started by someone keying a transaction name on a CICS terminal. It is a session if the task is the back end of a mapped APPC conversation.

```cpp
FacilityType facilityType()
```

**Conditions**
INVREQ

**freeStorage**
Releases the storage obtained by the **IccTask getStorage** method.
void freeStorage(void* pStorage)

Conditions
INVREQ

getStorage
Obtains a block of storage of the requested size. The storage is released automatically at the end of task, or when the freeStorage operation is performed. See also getStorage on page “getStorage” on page 198 in IccSystem class.

void* getStorage (unsigned long size,
    char initByte = -1,
    unsigned short storageOpts = 0)

size
The amount of storage being requested, in bytes
initByte
The initial setting of all bytes in the allocated storage
storageOpts
An enumeration, defined in this class, that affects the way that CICS allocates storage.

Conditions
LENGERR, NOSTG

instance
Returns a pointer to the singleton IccTask object. The object is created if it does not already exist.

static IccTask* instance();

isCommandSecurityOn

Icc::Bool isCommandSecurityOn()
Returns a boolean, defined in Icc structure, that indicates whether this task is subject to command security checking.

Conditions
INVREQ
**isCommitSupported**

Returns a boolean, defined in **Icc** structure that indicates whether this task can support the **commit** method. This method returns true in most environments; the exception to this is in a DPL environment (see link on page “link” on page 153 in **IccProgram**).

```cpp
Icc::Bool isCommitSupported()
```

**Conditions**

INVREQ

**isResourceSecurityOn**

Returns a boolean, defined in **Icc** structure, that indicates whether this task is subject to resource security checking.

```cpp
Icc::Bool isResourceSecurityOn()
```

**Conditions**

INVREQ

**isRestarted**

Returns a boolean, defined in **Icc** structure, that indicates whether this task has been automatically restarted by CICS.

```cpp
Icc::Bool isRestarted()
```

**Conditions**

INVREQ

**isStartDataAvailable**

Returns a boolean, defined in **Icc** structure, that indicates whether start data is available for this task. See the **retrieveData** method in **IccStartRequestQ** class if start data is available.

```cpp
Icc::Bool isStartDataAvailable()
```

**Conditions**

INVREQ

**number**

Returns the number of this task, unique within the CICS system.
unsigned long number() const

principalSysId

IccSysId& principalSysId(Icc::GetOpt opt = Icc::object)

Returns a reference to an IccSysId object that identifies the principal system identifier for this task.

**Conditions**
INVREQ

**priority**

Returns the priority for this task.

unsigned short priority(Icc::GetOpt opt = Icc::object)

**Conditions**
INVREQ

**rollBackUOW**

Roll back (backout) the resource updates associated with the current UOW within this task.

void rollBackUOW()

**Conditions**
INVREQ, ROLLEDBACK

**setDumpOpts**

Set the dump options for this task. This method affects the behavior of the dump method defined in this class.

void setDumpOpts(unsigned long opts = dDefault)

**opts**

An integer, made by adding or logically ORing values from the DumpOpts enumeration, defined in this class.
**setPriority**

Changes the dispatch priority of this task.

```cpp
void setPriority(unsigned short pri)
```

*pri*  
The new priority.

**Conditions**

INVREQ

**setWaitText**

Sets the text that will appear when someone inquires on this task while it is suspended as a result of a *waitExternal* or *waitOnAlarm* method call.

```cpp
void setWaitText(const char* name)
```

*name*  
The 8-character string label that indicates why this task is waiting.

**startType**

**StartType startType()**

Returns an enumeration, defined in this class, that indicates how this task was started.

**Conditions**

INVREQ

**suspend**

Suspend this task, allowing other tasks to be dispatched.

```cpp
void suspend()
```

**transId**

```cpp
const IccTransId& transId()
```

Returns the *IccTransId* object representing the transaction name of this CICS task.

**triggerDataQueueId**
const IccDataQueueId& triggerDataQueueId()

Returns a reference to the IccDataQueueId representing the trigger queue, if this task was started as a result of data arriving on an IccDataQueue. See startType method.

**Conditions**

INVREQ

**userId**

Returns the ID of the user associated with this task.

const IccUserId& userId(Icc::GetOpt opt = Icc::object)

**opt**

An enumeration, defined in Icc structure, that indicates whether the information already existing in the object is to be used or whether it is to be refreshed from CICS.

**Conditions**

INVREQ

**waitExternal**

Waits for events that post Event Control Blocks (ECBs).

The call causes the issuing task to be suspended until one of the ECBs has been posted—that is, one of the events has occurred. The task can wait on more than one ECB and can be dispatched as soon as any of them are posted. For more information about ECB, see WAIT EXTERNAL.

void waitExternal (long** ECBList,  
unsigned long numEvents,  
WaitPurgeability opt = purgeable,  
WaitPostType type = MVSPost)

**ECBList**

A pointer to a list of addresses of ECBs that represent events.

**numEvents**

The number of events in ECBList.

**opt**

An enumeration, defined in this class, that indicates whether the wait is purgeable.

**type**

An enumeration, defined in this class, that indicates whether the post type is a standard MVS POST.

**Conditions**

INVREQ

**waitOnAlarm**

Suspends the task until the alarm goes off (expires).

See also “setAlarm” on page 91 in IccClock.
void waitOnAlarm(const IccAlarmRequestId& id)

**id**
A reference to the **IccAlarmRequestId** object that identifies a particular alarm request.

**Conditions**
INVREQ

**workArea**
Returns a reference to the **IccBuf** object that holds the work area for this task.

**IccBuf& workArea()**

**Conditions**
INVREQ

**Inherited public methods**
These are the public methods inherited by this class.

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<td>actionsOnConditionsText</td>
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<tr>
<td>setCustomClassNum</td>
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</tr>
</tbody>
</table>

Enumerations

AbendHandlerOpt

*respectAbendHandler*
   Allows control to be passed to an abend handling program if one is in effect.

*ignoreAbendHandler*
   Does not allow control to be passed to any abend handling program that may be in effect.

AbendDumpOpt

*createDump*
   Take a transaction dump when servicing an abend request.

*suppressDump*
   Do not take a transaction dump when servicing an abend request.

DumpOpts

The values may be added, or bitwise ORed, together to get the intended combination.

The values may be added, or bitwise ORed, together to get the intended combination. For example

```
IccTask::dProgram + IccTask::dDCT + IccTask::dSIT.
```

`dDefault`

`dComplete`

`dTask`

`dStorage`

`dProgram`

`dTerminal`

`dTables`

`dDCT`

`dFCT`

`dPCT`

`dPPT`
FacilityType

none
The task has no principal facility, that is, it is a background task.

terminal
This task has a terminal as its principal facility.

session
This task has a session as its principal facility, that is, it was probably started as a back-end DTP program.

dataqueue
This task has a transient data queue as its principal facility.

StartType

DPL
Distributed program link request

dataQueueTrigger
Trigger by data arriving on a data queue

startRequest
Started as a result of an asynchronous start request. See IccStartRequestQ class.

FEPIRequest
Front end programming interface.

terminalInput
Started via a terminal input

CICSInternalTask
Started by CICS.

StorageOpts

ifSOSReturnCondition
If insufficient space is available, return NOSTG condition instead of blocking the task.

below
Allocate storage below the 16Mb line.

userDataKey
Allocate storage in the USER data key.

CICSDataKey
Allocate storage in the CICS data key.

TraceOpt

normal
The trace entry is a standard entry.

exception
The trace entry is an exception entry.
**WaitPostType**

**MVSPost**
ECB is posted using the MVS POST service.

**handPost**
ECB is hand posted (that is, using some method other than the MVS POST service).

**WaitPurgeability**

**purgeable**
Task can be purged via a system call.

**notPurgeable**
Task cannot be purged via a system call.

---

**IccTempStore class**

**IccTempStore** objects are used to manage the temporary storage of data.

**IccBase**

**IccResource**

**IccTempStore**

*(IccTempStore* data can exist between transaction calls.)*

**Header file:** ICCTMPEH

**Sample:** ICC$TMP

---

**IccTempStore constructors**

**Constructor (1)**

```
IccTempStore (const IccTempStoreId& id, 
Location loc = auxStorage)
```

**id**
Reference to an **IccTempStoreId** object

**loc**
An enumeration, defined in this class, that indicates where the storage is to be located when it is first created. The default is to use auxiliary storage (disk).

**Constructor (2)**

```
IccTempStore (const char* storeName, 
Location loc = auxStorage)
```
storeName

Specifies the 8-character name of the queue to be used. The name must be unique within the CICS system.

loc

An enumeration, defined in this class, that indicates where the storage is to be located when it is first created. The default is to use auxiliary storage (disk).

Public methods

These are the public methods in this class.

The opt parameter

Many methods have the same parameter, opt, which is described under the abendCode method in "abendCode" on page 62.

clear

A synonym for empty. See Polymorphic Behavior for information on polymorphism.

virtual void clear()

empty

void empty()

Deletes all the temporary data associated with the IccTempStore object and deletes the associated TD queue.

Conditions

INVREQ, ISCINVREQ, NOTAUTH, QIDERR, SYSIDERR

get

A synonym for readNextItem. See Polymorphic Behavior for information on polymorphism.

virtual const IccBuf& get()

numberOfItems

unsigned short numberOfItems() const

Returns the number of items in temporary storage. This is only valid after a successful writeItem call.

put

A synonym for writeItem. See Polymorphic Behavior for information on polymorphism.
virtual void put(const IccBuf& buffer)

*buffer* 
A reference to an *IccBuf* object that contains the data that is to be added to the end of the temporary storage queue.

**readItem** 
Reads the specified item from the temporary storage queue and returns a reference to the *IccBuf* object that contains the information.

**const IccBuf& readItem(unsigned short itemNum)**

*itemNum* 
Specifies the item number of the logical record to be retrieved from the queue.

**Conditions**
INVREQ, IOERR, ISCINVREQ, ITEMERR, LENGERR, NOTAUTH, QIDERR, SYSIDERR

**readNextItem**
Reads the next item from a temporary storage queue and returns a reference to the *IccBuf* object that contains the information.

**const IccBuf& readNextItem()**

**Conditions**
INVREQ, IOERR, ISCINVREQ, ITEMERR, LENGERR, NOTAUTH, QIDERR, SYSIDERR

**rewriteItem**
The parameters are:This method updates the specified item in the temporary storage queue.

**void rewriteItem (unsigned short itemNum, const IccBuf& item, NoSpaceOpt opt = suspend)**

*itemNum* 
Specifies the item number of the logical record that is to be modified

*item* 
The name of the *IccBuf* object that contains the update data.

*opt* 
An enumeration, defined in this class, that indicates whether the application program is to be suspended if a shortage of space in the queue prevents the record being added. suspend is the default.
Conditions
INVREQ, IOERR, ISCINVREQ, ITEMERR, LENGERR, NOSPACE, NOTAUTH, QIDERR, SYSIDERR

writeItem (1)

unsigned short writeItem (const IccBuf& item,
        NoSpaceOpt opt = suspend)

item
The name of the IccBuf object that contains the data that is to added to the end of the temporary storage queue.

opt
An enumeration, defined in this class, that indicates whether the application program is to be suspended if a shortage of space in the queue prevents the record being added. suspend is the default.

writeItem (2)
This method adds a new record at the end of the temporary storage queue. The returned value is the item number that was created (if this was done successfully).

unsigned short writeItem (const char* text,
        NoSpaceOpt opt = suspend)

text
The text string that is to added to the end of the temporary storage queue.

opt
An enumeration, defined in this class, that indicates whether the application program is to be suspended if a shortage of space in the queue prevents the record being added. suspend is the default.

Conditions
INVREQ, IOERR, ISCINVREQ, ITEMERR, LENGERR, NOSPACE, NOTAUTH, QIDERR, SYSIDERR

Inherited public methods
These are the public methods inherited by this class.

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</table>
### Method

<table>
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<td>classType</td>
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<tr>
<td>isEDFOn</td>
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</tr>
<tr>
<td>isRouteOptionOn</td>
<td>IccResource</td>
</tr>
<tr>
<td>name</td>
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</tr>
<tr>
<td>operator delete</td>
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</tr>
<tr>
<td>routeOption</td>
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</tr>
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</tr>
<tr>
<td>setCustomClassNum</td>
<td>IccBase</td>
</tr>
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</table>

### Enumerations

#### Location

- **auxStorage**
  Temporary store data is to reside in auxiliary storage (disk).
- **memory**
  Temporary store data is to reside in memory.

#### NoSpaceOpt
Take this action if a shortage of space in the queue prevents the record being added immediately.

- **suspend**
  Suspend the application program.
- **returnCondition**
  Do not suspend the application program, but raise the NOSPACE condition instead.
**IccTempStoreId class**

*IccTempStoreId* class is used to identify a temporary storage name in the CICS system.

**IccBase**
- IccResourceId
- IccTempStoreId

**Header file:** ICCRIDEH

**IccTempStoreId constructors**

**Constructor (1)**

*IccTempStoreId*(const char* *name*)

*name*  
The 8-character name of the temporary storage entry.

**Constructor (2)**

The copy constructor.

*IccTempStoreId*(const IccTempStoreId& *id*)

*id*  
A reference to an *IccTempStoreId* object.

**Public methods**

These are the public methods in this class.

**operator= (1)**

*IccTempStoreId& operator=(const char* *name*)

*name*  
The 8-character name of the temporary storage entry.

**operator= (2)**

Assigns a new value.


\texttt{IccTempStoreId\& \texttt{operator\textbar=}=(\texttt{const IccTempStoreId\& id})}

\textit{id} 
A reference to an \texttt{IccTempStoreId} object.

\section*{Inherited public methods}
These are the public methods inherited by this class.

\begin{tabular}{|l|l|}
\hline
Method & Class \\
\hline
classType & IccBase \\
className & IccBase \\
customClassNum & IccBase \\
name & IccResourceId \\
nameLength & IccResourceId \\
operator delete & IccBase \\
operator new & IccBase \\
\hline
\end{tabular}

\section*{Inherited protected methods}
These are the protected methods inherited by this class.

\begin{tabular}{|l|l|}
\hline
Method & Class \\
\hline
operator= & IccResourceId \\
setClassName & IccBase \\
setCustomClassNum & IccBase \\
\hline
\end{tabular}

\section*{IccTermId class}
IccTermId class is used to identify a terminal name in the CICS system.

IccTermId
IccResourceId
IccTermId

Header file: ICCRIDEH

\section*{IccTermId constructors}

\section*{Constructor (1)}

\texttt{IccTermId(const char* \texttt{name})}

\textit{name} 
The 4-character name of the terminal
Constructor (2)
The copy constructor.

\[ \text{IccTermId}(\text{const IccTermId& } \text{id}) \]

\( \text{id} \)  
A reference to an \text{IccTermId} object.

Public methods
These are the public methods in this class.

\textbf{\text{operator= (1)}}

\[ \text{IccTermId& operator=} (\text{const char* } \text{name}) \]

\( \text{name} \)  
The 4-character name of the terminal

\textbf{\text{operator= (2)}}
Assigns a new value.

\[ \text{IccTermId& operator=} (\text{const IccTermId& } \text{id}) \]

\( \text{id} \)  
A reference to an \text{IccTermId} object.

Inherited public methods
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<td>name</td>
<td>IccResourceId</td>
</tr>
<tr>
<td>nameLength</td>
<td>IccResourceId</td>
</tr>
<tr>
<td>operator delete</td>
<td>IccBase</td>
</tr>
<tr>
<td>operator new</td>
<td>IccBase</td>
</tr>
</tbody>
</table>
Inherited protected methods

These are the protected methods inherited by this class.

<table>
<thead>
<tr>
<th>Method</th>
<th>Class</th>
</tr>
</thead>
<tbody>
<tr>
<td>operator=</td>
<td>IccResourceId</td>
</tr>
<tr>
<td>setClassName</td>
<td>IccBase</td>
</tr>
<tr>
<td>setCustomClassNum</td>
<td>IccBase</td>
</tr>
</tbody>
</table>

IccTerminal class

This is a singleton class that represents the terminal that belongs to the CICS task. It can only be created if the transaction has a 3270 terminal as its principal facility, otherwise an exception is thrown.

IccBase
   IccResource
   IccTerminal

Header file: ICCTRMEH
Sample: ICC$TRM

IccTerminal constructor (protected)

Constructor

IccTerminal()

Public methods

These are the public methods in this class.

The opt parameter

Many methods have the same parameter, opt, which is described under the abendCode method in “abendCode” on page 62.

AID

Returns an enumeration, defined in this class, that indicates which AID (action identifier) key was last pressed at this terminal.

AIDVal AID()

clear

virtual void clear()

A synonym for erase. See Polymorphic Behavior for information on polymorphism.
**cursor**

`unsigned short cursor()`

Returns the current cursor position as an offset from the upper-left corner of the screen.

**data**

`IccTerminalData* data()`

Returns a pointer to an `IccTerminalData` object that contains information about the characteristics of the terminal. The object is created if it does not already exist.

**erase**

`void erase()`

Erase all the data displayed at the terminal.

**Conditions**

INVREQ, INVPARTN

**freeKeyboard**

Frees the keyboard so that the terminal can accept input.

`void freeKeyboard()`

**Conditions**

INVREQ, INVPARTN

**get**

A synonym for `receive`. See [Polymorphic Behavior](#) for information on polymorphism.

`virtual const IccBuf& get()`

**height**

`unsigned short height(Icc::getopt opt = Icc::object)`
Returns how many lines the screen holds.

**Conditions**

INVREQ

**inputCursor**
Returns the position of the cursor on the screen.

```cpp
unsigned short inputCursor()
```

**instance**

```cpp
static IccTerminal* instance()
```

Returns a pointer to the single `IccTerminal` object. The object is created if it does not already exist.

**line**

```cpp
unsigned short line()
```

Returns the current line number of the cursor from the beginning of the screen.

**netName**

```cpp
const char* netName()
```

Returns the 8-byte string representing the network logical unit name of the principal facility.

**operator» (1)**
Sets the foreground color for data subsequently sent to the terminal.

```cpp
IccTerminal& operator « (Color color)
```

**operator» (2)**
Sets the highlighting used for data subsequently sent to the terminal.

```cpp
IccTerminal& operator « (Highlight highlight)
```
operator« (3)
Writes another buffer.

IccTerminal& operator « (const IccBuf& buffer)

operator« (4)
Writes a character.

IccTerminal& operator « (char ch)

operator« (5)
Writes a character.

IccTerminal& operator « (signed char ch)

operator« (6)
Writes a character.

IccTerminal& operator « (unsigned char ch)

operator« (7)
Writes a string.

IccTerminal& operator « (const char* text)

operator« (8)
Writes a string.

IccTerminal& operator « (const signed char* text)
**operator« (9)**
Writes a string.

**IccTerminal& operator « (const unsigned char* text)**

**operator« (10)**
Writes a short.

**IccTerminal& operator « (short num)**

**operator« (11)**
Writes an unsigned short.

**IccTerminal& operator « (unsigned short num)**

**operator« (12)**
Writes a long.

**IccTerminal& operator « (long num)**

**operator« (13)**
Writes an unsigned long.

**IccTerminal& operator « (unsigned long num)**

**operator« (14)**
Writes an integer.

**IccTerminal& operator « (int num)**
operator « (15)
Writes a float.

IccTerminal& operator « (float num)

operator « (16)
Writes a double.

IccTerminal& operator « (double num)

operator « (17)
Writes a long double.

IccTerminal& operator « (long double num)

operator « (18)

IccTerminal& operator « (IccTerminal& (*)(IccTerminal&))
Enables the following syntax:

```
Term « "Hello World" « endl;
Term « "Hello again" « flush;
```

put

virtual void put(const IccBuf& buf)

A synonym for sendLine. See Polymorphic Behavior for information on polymorphism.

receive

Receives data from the terminal

const IccBuf& receive(Case caseOpt = upper)
**caseOpt**
An enumeration, defined in this class, that indicates whether text is to be converted to uppercase.

**Conditions**
EOC, INVREQ, LENGERR, NOTALLOC, SIGNAL, TERMERR

**receive3270Data**
Receives the 3270 data buffer from the terminal

```cpp
const IccBuf& receive3270Data(Case caseOpt = upper)
```

**caseOpt**
An enumeration, defined in this class, that indicates whether text is to be converted to uppercase.

**Conditions**
INVREQ, LENGERR, TERMERR

**send (1)**

```cpp
void send(const IccBuf& buffer)
```

**buffer**
A reference to an `IccBuf` object that holds the data that is to be sent.

**send (2)**

```cpp
void send (const char* format, ...
```

**format**
A format string, as in the `printf` standard library function.

... The optional arguments that accompany `format`.

**send (3)**
void send (unsigned short row,
        unsigned short col,
        const IccBuf& buffer)

row
    The row where the writing of the data is started.
col
    The column where the writing of the data is started.
buffer
    A reference to an IccBuf object that holds the data that is to be sent.

send (4)
Writes the specified data to either the current cursor position or to the cursor position specified by the arguments.

void send (unsigned short row,
        unsigned short col,
        const char* format,
        ...)

row
    The row where the writing of the data is started.
col
    The column where the writing of the data is started.
format
    A format string, as in the printf standard library function.
...
    The optional arguments that accompany format.

Conditions
INVREQ, LENGERR, TERMERR

send3270Data (1)

void send3270Data(const IccBuf& buffer)

buffer
    A reference to an IccBuf object that holds the data that is to be sent.

send3270Data (2)
void send3270 Data(const char* format, ...)  

format  
A format string, as in the printf standard library function  

...  
The optional arguments that accompany format.  

send3270Data (3)  

void send3270Data (unsigned short col,  
const IccBuf& buf)  

col  
The column where the writing of the data is started  

buffer  
A reference to an IccBuf object that holds the data that is to be sent.  

send3270Data (4)  
Writes the specified data to either the next line of the terminal or to the specified column of the current line.  

void send3270Data (unsigned short col,  
const char* format, ...)  

col  
The column where the writing of the data is started  

format  
A format string, as in the printf standard library function  

...  
The optional arguments that accompany format.  

Conditions  
INVREQ, LENGERR, TERMERR  

sendLine (1)  

void sendLine(const IccBuf&buffer)
buffer
   A reference to an IccBuf object that holds the data that is to be sent.

sendLine (2)

    void sendLine (const char* format,
                   ...

format
   A format string, as in the printf standard library function

... The optional arguments that accompany format.

sendLine (3)

    void sendLine (unsigned short col,
                   const IccBuf& buf)

col
   The column where the writing of the data is started

buffer
   A reference to an IccBuf object that holds the data that is to be sent.

sendLine (4)

    void sendLine (unsigned short col,
                   const char* format,
                   ...

col
   The column where the writing of the data is started

format
   A format string, as in the printf standard library function

... The optional arguments that accompany format.
Conditions
INVREQ, LENGERR, TERMERR

setColor
Changes the color of the text subsequently sent to the terminal.

void setColor(Color color=defaultColor)

color
An enumeration, defined in this class, that indicates the color of the text that is written to the screen.

setCursor (1)

void setCursor(unsigned short offset)

offset
The position of the cursor where the upper-left corner is 0.

setCursor (2)
Two different ways of setting the position of the cursor on the screen.

void setCursor(unsigned short row,
              unsigned short col)

row
The row number of the cursor where the top row is 1

col
The column number of the cursor where the left column is 1

Conditions
INVREQ, INVPARTN

setHighlight
Changes the highlighting of the data subsequently sent to the terminal.

void setHighlight(Highlight highlight = normal)
highlight
An enumeration, defined in this class, that indicates the highlighting of the text that is written to the screen.

setLine
Moves the cursor to the start of line lineNum, where 1 is the first line of the terminal. The default is to move the cursor to the start of line 1.

void setLine(unsigned short lineNum = 1)

lineNum
The line number, counting from the start.

Conditions
INVREQ, INVPARTN

setNewLine
Requests that numLines blank lines be sent to the terminal.

void setNewLine(unsigned short numLines = 1)

numLines
The number of blank lines.

Conditions
INVREQ, INVPARTN

setNextCommArea
Specifies the COMMAREA that is to be passed to the next transaction started on this terminal.

void setNextCommArea(const IccBuf& commArea)

commArea
A reference to the buffer that is to be used as a COMMAREA.

setNextInputMessage
Specifies data that is to be made available, by the receive method, to the next transaction started at this terminal.
void setNextInputMessage(const IccBuf& message)

message
A reference to the buffer that holds the input message.

setNextTransId
Specifies the next transaction that is to be started on this terminal.

void setNextTransId (const IccTransId& transid,
NextTransIdOpt opt = queue)

transid
A reference to the IccTransId object that holds the name of a transaction

opt
An enumeration, defined in this class, that indicates whether transId should be queued or started immediately (that is, it should be the very next transaction) at this terminal.

signoff

void signoff()
Signs off the user who is currently signed on. Authority reverts to the default user.

Conditions
INVREQ

signon (1)

void signon (const IccUserId& id,
    const char* password = 0,
    const char* newPassword = 0)

id
A reference to an IccUserId object

password
The 8-character existing password.

newPassword
An optional 8-character new password.
**signon (2)**

Signs the user on to the terminal.

```cpp
void signon (IccUser& user,
            const char* password = 0,
            const char* newPassword = 0)
```

*user*  
A reference to an *IccUser* object

*password*  
The 8-character existing password.

*newPassword*  
An optional 8-character new password. This method differs from the first *signon* method in that the *IccUser* object is interrogated to discover *IccGroupId* and language information. The object is also updated with language and ESM return and response codes.

**Conditions**

INVREQ, NOTAUTH, USERIDERR

**waitForAID (1)**

Waits for any input and returns an enumeration, defined in this class, that indicates which AID key is expected.

```cpp
AIDVal waitForAID()
```

**waitForAID (2)**

Waits for the specified AID key to be pressed, before returning control. This method loops, receiving input from the terminal, until the correct AID key is pressed by the operator.

```cpp
void waitForAID(AIDVal aid)
```

*aid*  
An enumeration, defined in this class, that indicates which AID key was last pressed.

**Conditions**

EOC, INVREQ, LENGERR, NOTALLOC, SIGNAL, TERMERR

**width**

Returns the width of the screen in characters.
**unsigned short width(Icc::getopt** opt = Icc::object)

**Conditions**

INVREQ

**workArea**

Returns a reference to the **IccBuf** object that holds the terminal work area.

**IccBuf& workArea()**

**Inherited public methods**

These are the public methods inherited by this class.

<table>
<thead>
<tr>
<th>Method</th>
<th>Class</th>
</tr>
</thead>
<tbody>
<tr>
<td>actionOnCondition</td>
<td>IccResource</td>
</tr>
<tr>
<td>actionOnConditionAsChar</td>
<td>IccResource</td>
</tr>
<tr>
<td>actionsOnConditionsText</td>
<td>IccResource</td>
</tr>
<tr>
<td>classType</td>
<td>IccBase</td>
</tr>
<tr>
<td>className</td>
<td>IccBase</td>
</tr>
<tr>
<td>condition</td>
<td>IccResource</td>
</tr>
<tr>
<td>conditionText</td>
<td>IccResource</td>
</tr>
<tr>
<td>customClassNum</td>
<td>IccBase</td>
</tr>
<tr>
<td>handleEvent</td>
<td>IccResource</td>
</tr>
<tr>
<td>id</td>
<td>IccResource</td>
</tr>
<tr>
<td>isEDFOn</td>
<td>IccResource</td>
</tr>
<tr>
<td>name</td>
<td>IccResource</td>
</tr>
<tr>
<td>operator delete</td>
<td>IccBase</td>
</tr>
<tr>
<td>operator new</td>
<td>IccBase</td>
</tr>
<tr>
<td>.setActionOnAnyCondition</td>
<td>IccResource</td>
</tr>
<tr>
<td>setActionOnCondition</td>
<td>IccResource</td>
</tr>
<tr>
<td>setActionOnCondition</td>
<td>IccResource</td>
</tr>
<tr>
<td>setActionsOnConditions</td>
<td>IccResource</td>
</tr>
<tr>
<td>setEDF</td>
<td>IccResource</td>
</tr>
</tbody>
</table>

**Inherited protected methods**

These are the protected methods inherited by this class.

<table>
<thead>
<tr>
<th>Method</th>
<th>Class</th>
</tr>
</thead>
<tbody>
<tr>
<td>setClassName</td>
<td>IccBase</td>
</tr>
<tr>
<td>setCustomClassNum</td>
<td>IccBase</td>
</tr>
</tbody>
</table>
Enumerations

AIDVal
- ENTER
- CLEAR

PA1 to PA3
PF1 to PF24

Case
- upper
- mixed

Color
defaultColor
- blue
- red
- pink
- green
- cyan
- yellow
- neutral

Highlight
defaultHighlight
- blink
- reverse
- underscore
**NextTransIdOpt**

- **queue**
  Queue the transaction with any other outstanding starts queued on the terminal.

- **immediate**
  Start the transaction immediately, that is, before any other outstanding starts queued on the terminal.

---

**IccTerminalData class**

*IccTerminalData* is a singleton class owned by *IccTerminal*. It contains information about the terminal characteristics.

See “data” on page 222 in *IccTerminal* class).

**IccBase**

**IccResource**

**IccTerminalData**

**Header file:** ICCTMDEH

**Sample:** ICC$TRM

---

**IccTerminalData constructor (protected)**

**Constructor**

*IccTerminalData()*

---

**Public methods**

These are the public methods in this class.

**The opt parameter**

Many methods have the same parameter, *opt*, which is described under the *abendCode* method in "abendCode" on page 62.

**alternateHeight**

Returns the alternate height of the screen, in lines.

```cpp
unsigned short alternateHeight(Icc::GetOpt opt = Icc::object)
```

**opt**

An enumeration that indicates whether the information in the object should be refreshed from CICS before being extracted. The default is not to refresh.

**Conditions**

INVREQ
alternateWidth
Returns the alternate width of the screen, in characters.

unsigned short alternateWidth(Icc::GetOpt opt = Icc::object)

Conditions
INVREQ

defaultHeight
Returns the default height of the screen, in lines.

unsigned short defaultHeight(Icc::GetOpt opt = Icc::object)

Conditions
INVREQ

defaultWidth
Returns the default width of the screen, in characters.

unsigned short defaultWidth(Icc::GetOpt opt = Icc::object)

Conditions
INVREQ

graphicCharCodeSet
Returns the binary code page global identifier as a value in the range 1 to 65534, or 0 for a non-graphics terminal.

unsigned short graphicCharCodeSet(Icc::GetOpt opt = Icc::object)

Conditions
INVREQ
graphicCharSetId
Returns the graphic character set global identifier as a number in the range 1 to 65534, or 0 for a non-graphics terminal.

```c
unsigned short graphicCharSetId(Icc::GetOpt opt = Icc::object)
```

**Conditions**
INVREQ

isAPLKeyboard
Returns a boolean that indicates whether the terminal has the APL keyboard feature.

```c
Icc::Bool isAPLKeyboard(Icc::GetOpt opt = Icc::object)
```

**Conditions**
INVREQ

isAPLText
Returns a boolean that indicates whether the terminal has the APL text feature.

```c
Icc::Bool isAPLText(Icc::GetOpt opt = Icc::object)
```

**Conditions**
INVREQ

isBTrans
Returns a boolean that indicates whether the terminal has the background transparency capability.

```c
Icc::Bool isBTrans(Icc::GetOpt opt = Icc::object)
```

**Conditions**
INVREQ
**isColor**
Returns a boolean that indicates whether the terminal has the extended color capability.

\[ \text{Icc::Bool isColor(Icc::GetOpt opt = Icc::object)} \]

**Conditions**
INVREQ

**isEWA**
Returns a Boolean that indicates whether the terminal supports Erase Write Alternative.

\[ \text{Icc::Bool isEWA(Icc::GetOpt opt = Icc::object)} \]

**Conditions**
INVREQ

**isExtended3270**
Returns a Boolean that indicates whether the terminal supports the 3270 extended data stream.

\[ \text{Icc::Bool isExtended3270(Icc::GetOpt opt = Icc::object)} \]

**Conditions**
INVREQ

**isFieldOutline**
Returns a boolean that indicates whether the terminal supports field outlining.

\[ \text{Icc::Bool isFieldOutline(Icc::GetOpt opt = Icc::object)} \]

**Conditions**
INVREQ
**isGoodMorning**

Returns a boolean that indicates whether the terminal has a 'good morning' message.

\[
\text{Icc::Bool isGoodMorning(Icc::GetOpt opt = Icc::object)}
\]

**Conditions**

INVREQ

**isHighlight**

Returns a boolean that indicates whether the terminal has extended highlight capability.

\[
\text{Icc::Bool isHighlight(Icc::GetOpt opt = Icc::object)}
\]

**Conditions**

INVREQ

**isKatakana**

Returns a boolean that indicates whether the terminal supports Katakana.

\[
\text{Icc::Bool isKatakana(Icc::GetOpt opt = Icc::object)}
\]

**Conditions**

INVREQ

**isMSRControl**

Returns a boolean that indicates whether the terminal supports magnetic slot reader control.

\[
\text{Icc::Bool isMSRControl(Icc::GetOpt opt = Icc::object)}
\]

**Conditions**

INVREQ
**isPS**
Returns a boolean that indicates whether the terminal supports programmed symbols.

\[ \text{Icc::Bool isPS(Icc::GetOpt opt = Icc::object)} \]

**Conditions**
INVREQ

**isSOSI**
Returns a boolean that indicates whether the terminal supports mixed EBCDIC/DBCS fields.

\[ \text{Icc::Bool isSOSI(Icc::GetOpt opt = Icc::object)} \]

**Conditions**
INVREQ

**isTextKeyboard**
Returns a boolean that indicates whether the terminal supports TEXTKYBD.

\[ \text{Icc::Bool isTextKeyboard(Icc::GetOpt opt = Icc::object)} \]

**Conditions**
INVREQ

**isTextPrint**
Returns a boolean that indicates whether the terminal supports TEXTPRINT.

\[ \text{Icc::Bool isTextPrint(Icc::GetOpt opt = Icc::object)} \]

**Conditions**
INVREQ
**isValidation**

Returns a boolean that indicates whether the terminal supports validation.

\[ \text{Icc::Bool isValidation(Icc::GetOpt opt = Icc::object)} \]

**Conditions**

INVREQ

**Inherited public methods**

These are the public methods inherited by this class.

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<th>Class</th>
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<td>actionOnConditionAsChar</td>
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</tr>
<tr>
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<td>IccBase</td>
</tr>
<tr>
<td>className</td>
<td>IccBase</td>
</tr>
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<td>condition</td>
<td>IccResource</td>
</tr>
<tr>
<td>conditionText</td>
<td>IccResource</td>
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<td>customClassNum</td>
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<td>setActionOnAnyCondition</td>
<td>IccResource</td>
</tr>
<tr>
<td>setActionOnCondition</td>
<td>IccResource</td>
</tr>
<tr>
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<tr>
<td>setEDF</td>
<td>IccResource</td>
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**Inherited protected methods**

These are the protected methods inherited by this class.

<table>
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<tr>
<td>setName</td>
<td>IccBase</td>
</tr>
<tr>
<td>setCustomClassNum</td>
<td>IccBase</td>
</tr>
</tbody>
</table>
IccTime class

IccTime is used to contain time information and is the base class from which IccAbsTime, IccTimeInterval, and IccTimeOfDay classes are derived.

IccBase
  IccResource
    IccTime

Header file: ICCTIMEH

IccTime constructor (protected)

Constructor

IccTime (unsigned long hours = 0,
          unsigned long minutes = 0,
          unsigned long seconds = 0)

hours
  The number of hours
minutes
  The number of minutes
seconds
  The number of seconds

Public methods

These are the public methods in this class.

hours
  Returns the hours component of time—the value specified in the constructor.

  virtual unsigned long hours() const

minutes

virtual unsigned long minutes() const
  Returns the minutes component of time—the value specified in the constructor.

seconds
virtual unsigned long seconds() const

Returns the seconds component of time—the value specified in the constructor.

**timeInHours**

virtual unsigned long timeInHours()

Returns the time in hours.

**timeInMinutes**

virtual unsigned long timeInMinutes()

Returns the time in minutes.

**timeInSeconds**

virtual unsigned long timeInSeconds()

Returns the time in seconds.

**type**

Type type() const

Returns an enumeration, defined in this class, that indicates what type of subclass of *IccTime* this is.

**Inherited public methods**

These are the public methods inherited by this class.

<table>
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<td>IccResource</td>
</tr>
<tr>
<td>className</td>
<td>IccBase</td>
</tr>
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<td>classType</td>
<td>IccBase</td>
</tr>
<tr>
<td>condition</td>
<td>IccResource</td>
</tr>
<tr>
<td>conditionText</td>
<td>IccResource</td>
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<tr>
<td>customClassNum</td>
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<td>handleEvent</td>
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<tr>
<td>operator delete</td>
<td>IccBase</td>
</tr>
<tr>
<td>Method</td>
<td>Class</td>
</tr>
<tr>
<td>---------------------------------------------</td>
<td>----------</td>
</tr>
<tr>
<td>operator new</td>
<td>IccBase</td>
</tr>
<tr>
<td>setActionOnAnyCondition</td>
<td>IccResource</td>
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<td>setActionsOnConditions</td>
<td>IccResource</td>
</tr>
<tr>
<td>setEDF</td>
<td>IccResource</td>
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</tbody>
</table>

**Inherited protected methods**

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<thead>
<tr>
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</tr>
</thead>
<tbody>
<tr>
<td>setClassName</td>
<td>IccBase</td>
</tr>
<tr>
<td>setCustomClassNum</td>
<td>IccBase</td>
</tr>
</tbody>
</table>

**Enumerations**

**Type**

**absTime**

The object is of *IccAbsTime* class. It is used to represent a current date and time as the number of milliseconds that have elapsed since the beginning of the year 1900.

**timeInterval**

The object is of *IccTimeInterval* class. It is used to represent a length of time, such as 5 minutes.

**timeOfDay**

The object is of *IccTimeOfDay* class. It is used to represent a particular time of day, such as midnight.

**IccTimeInterval class**

This class holds information about a time interval.

**IccBase**

**IccResource**

**IccTime**

**IccTimeInterval**

**Header file:** ICCTIMEH

**IccTimeInterval constructors**

**Constructor (1)**

*IccTimeInterval (unsigned long hours = 0, unsigned long minutes = 0, unsigned long seconds = 0)*
**hours**
The initial hours setting. The default is 0.

**minutes**
The initial minutes setting. The default is 0.

**seconds**
The initial seconds setting. The default is 0.

**Constructor (2)**
The copy constructor.

**IccTimeInterval(const IccTimeInterval& time)**

**Public methods**
These are the public methods in this class.

**operator=**
Assigns one IccTimeInterval object to another.

**IccTimeInterval& operator=(const IccTimeInterval& timeInterval)**

**set**
Changes the time held in the IccTimeInterval object.

**void set (unsigned long hours,**
  **unsigned long minutes,**
  **unsigned long seconds)**

**Inherited public methods**
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<table>
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</tr>
</thead>
<tbody>
<tr>
<td>actionOnCondition</td>
<td>IccResource</td>
</tr>
</tbody>
</table>
Method | Class
--- | ---
actionOnConditionAsChar | IccResource
actionsOnConditionsText | IccResource
classType | IccBase
className | IccBase
condition | IccResource
conditionText | IccResource
customClassNum | IccBase
handleEvent | IccResource
hours | IccTime
isEDFOn | IccResource
minutes | IccTime
operator delete | IccBase
operator new | IccBase
setActionOnAnyCondition | IccResource
setActionOnCondition | IccResource
setActionsOnConditions | IccResource
setEDF | IccResource
timeInHours | IccTime
timeInMinutes | IccTime
timeInSeconds | IccTime
type | IccTime

**Inherited protected methods**

These are the protected methods inherited by this class.

Method | Class
--- | ---
setClassName | IccBase
setCustomClassNum | IccBase

**IccTimeOfDay class**

This class holds information about the time of day.

**IccBase**

**IccResource**

**IccTime**

**IccTimeOfDay**

**Header file:** ICCTIMEH

**IccTimeOfDay constructors**
Constructor (1)

IccTimeOfDay (unsigned long hours = 0,
         unsigned long minutes = 0,
         unsigned long seconds = 0)

hours
    The initial hours setting. The default is 0.
minutes
    The initial minutes setting. The default is 0.
seconds
    The initial seconds setting. The default is 0.

Constructor (2)

The copy constructor

IccTimeOfDay(const IccTimeOfDay& time)

Public methods

These are the public methods in this class.

operator=
    Assigns one IccTimeOfDay object to another.

IccTimeOfDay& operator=(const IccTimeOfDay& timeOfDay)

set
    Changes the time held in the IccTimeOfDay object.

void set (unsigned long hours,
         unsigned long minutes,
         unsigned long seconds)

hours
    The new hours setting
minutes
    The new minutes setting
seconds
The new seconds setting

Inherited public methods
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</tr>
</thead>
<tbody>
<tr>
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<td>IccResource</td>
</tr>
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<td>actionOnConditionAsChar</td>
<td>IccResource</td>
</tr>
<tr>
<td>actionsOnConditionsText</td>
<td>IccResource</td>
</tr>
<tr>
<td>className</td>
<td>IccBase</td>
</tr>
<tr>
<td>condition</td>
<td>IccResource</td>
</tr>
<tr>
<td>conditionText</td>
<td>IccResource</td>
</tr>
<tr>
<td>customClassNum</td>
<td>IccBase</td>
</tr>
<tr>
<td>handleEvent</td>
<td>IccResource</td>
</tr>
<tr>
<td>hours</td>
<td>IccTime</td>
</tr>
<tr>
<td>isEDFOn</td>
<td>IccResource</td>
</tr>
<tr>
<td>minutes</td>
<td>IccTime</td>
</tr>
<tr>
<td>operator delete</td>
<td>IccBase</td>
</tr>
<tr>
<td>operator new</td>
<td>IccBase</td>
</tr>
<tr>
<td>setActionOnAnyCondition</td>
<td>IccResource</td>
</tr>
<tr>
<td>setActionOnCondition</td>
<td>IccResource</td>
</tr>
<tr>
<td>setActionsOnConditions</td>
<td>IccResource</td>
</tr>
<tr>
<td>setEDF</td>
<td>IccResource</td>
</tr>
<tr>
<td>timeInHours</td>
<td>IccTime</td>
</tr>
<tr>
<td>timeInMinutes</td>
<td>IccTime</td>
</tr>
<tr>
<td>timeInSeconds</td>
<td>IccTime</td>
</tr>
<tr>
<td>type</td>
<td>IccTime</td>
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</tbody>
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<td>setClassName</td>
<td>IccBase</td>
</tr>
<tr>
<td>setCustomClassNum</td>
<td>IccBase</td>
</tr>
</tbody>
</table>

IccTPNameId class

IccTPNameId class holds a 1-64 byte TP partner name.

IccBase
IccResourceId
IccTPNameId
**IccTPNameId** class holds a 1-64 byte TP partner name.

**Header file:** ICCRIDEH

**IccTPNameId constructors**

**Constructor (1)**

*IccTPNameId(const char* name)*

*name*  
The 1- to 64-character TP name.

**Constructor (2)**

The copy constructor.

*IccTPNameId(const IccTPNameId& id)*

*id*  
A reference to an *IccTPNameId* object.

**Public methods**

These are the public methods in this class.

**operator=(1)**

*IccTPNameId& operator=(const char* name)*

*name*  
The 1- to 64-character TP name.

**operator=(2)**

Assigns a new value.

*IccTPNameId& operator=(const IccTPNameId& id)*
id
A reference to an **IccTPNameId** object.

**Inherited public methods**
These are the public methods inherited by this class.

<table>
<thead>
<tr>
<th>Method</th>
<th>Class</th>
</tr>
</thead>
<tbody>
<tr>
<td>classType</td>
<td>IccBase</td>
</tr>
<tr>
<td>className</td>
<td>IccBase</td>
</tr>
<tr>
<td>customClassNum</td>
<td>IccBase</td>
</tr>
<tr>
<td>name</td>
<td>IccResourceId</td>
</tr>
<tr>
<td>nameLength</td>
<td>IccResourceId</td>
</tr>
<tr>
<td>operator delete</td>
<td>IccBase</td>
</tr>
<tr>
<td>operator new</td>
<td>IccBase</td>
</tr>
</tbody>
</table>

**Inherited protected methods**
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<table>
<thead>
<tr>
<th>Method</th>
<th>Class</th>
</tr>
</thead>
<tbody>
<tr>
<td>operator=</td>
<td>IccResourceId</td>
</tr>
<tr>
<td>setClassName</td>
<td>IccBase</td>
</tr>
<tr>
<td>setCustomClassNum</td>
<td>IccBase</td>
</tr>
</tbody>
</table>

**IccTransId class**

**IccTransId** class identifies a transaction name in the CICS system.

**IccBase**
- **IccResourceId**
- **IccTransId**

**Header file:** ICCRIDEH

**IccTransId constructors**

**Constructor (1)**

**IccTransId(const char* name)**

**name**
The 4-character transaction name.
Constructor (2)
The copy constructor.

IccTransId(const IccTransId& id)

id
A reference to an IccTransId object.

Public methods
These are the public methods in this class.

operator= (1)

IccTransId& operator=(const char* name)

name
The 4-character transaction name.

operator= (2)
Assigns a new value.

IccTransId& operator=(const IccTransId& id)

id
A reference to an IccTransId object.

Inherited public methods
These are the public methods inherited by this class.

<table>
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<tr>
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<th>Class</th>
</tr>
</thead>
<tbody>
<tr>
<td>classType</td>
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</tr>
<tr>
<td>className</td>
<td>IccBase</td>
</tr>
<tr>
<td>customClassNum</td>
<td>IccBase</td>
</tr>
<tr>
<td>name</td>
<td>IccResourceId</td>
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<tr>
<td>nameLength</td>
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</tr>
<tr>
<td>setClassName</td>
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</tr>
<tr>
<td>setCustomClassNum</td>
<td>IccBase</td>
</tr>
</tbody>
</table>

IccUser class

This class represents a CICS user.

**IccBase**
- IccResource
  - IccUser

**Header file:** ICCUSREH

**Sample:** ICC$USR

IccUser constructors

**Constructor (1)**

`IccUser (const IccUserId& id, const IccGroupId* gid = 0)`

- **id**
  - A reference to an `IccUserId` object that contains the user ID name
- **gid**
  - An optional pointer to an `IccGroupId` object that contains information about the user's group ID.

**Constructor (2)**

`IccUser (const char* userName, const char* groupName = 0)`

- **userName**
  - The 8-character user ID
- **groupName**
  - The optional 8-character group ID.
Public methods

These are the public methods in this class.

**changePassword**
Attempts to change the user's password.

```c++
void changePassword (const char* password,
                     const char* newPassword)
```

*password*
The user's existing password—a string of up to 8 characters

*newPassword*
The user's new password—a string of up to 8 characters.

**Conditions**

INVREQ, NOTAUTH, USERIDERR

**daysUntilPasswordExpires**
Returns the number of days before the password expires. This method is valid after a successful **verifyPassword** method call in this class.

```c++
unsigned short daysUntilPasswordExpires() const
```

**ESMReason**

```c++
unsigned long ESMReason() const
```

Returns the external security reason code of interest if a **changePassword** or **verifyPassword** method call is unsuccessful.

**ESMResponse**

```c++
unsigned long ESMResponse() const
```

Returns the external security response code of interest if a **changePassword** or **verifyPassword** method call is unsuccessful.

**groupId**

```c++
const IccGroupId& groupId() const
```

Returns a reference to the **IccGroupId** object that holds information on the user's group ID.
invalidPasswordAttempts

unsigned long invalidPasswordAttempts() const
Returns the number of times the wrong password has been entered for this user since the last successful signon. This method should only be used after a successful verifyPassword method.

language

const char* language() const
Returns the user's language after a successful call to signon in IccTerminal.

lastPasswordChange

const IccAbsTime& lastPasswordChange() const
Returns a reference to an IccAbsTime object that holds the time when the password was last changed. This method should only be used after a successful verifyPassword method.

lastUseTime

const IccAbsTime& lastUseTime() const
Returns a reference to an IccAbsTime object that holds the time when the user ID was last used. This method should only be used after a successful verifyPassword method.

passwordExpiration

const IccAbsTime& passwordExpiration() const
Returns a reference to an IccAbsTime object that holds the time when the password will expire. This method should only be used after a successful verifyPassword method.

setLanguage

void setLanguage(const char* language)
Sets the IBM-defined national language code that is to be associated with this user. This should be a three character value.

verifyPassword
void verifyPassword(const char* password)

Checks that the supplied password matches the password recorded by the external security manager for this IccUser.

Conditions
INVREQ, NOTAUTH, USERIDERR

Inherited public methods
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<td>handleEvent</td>
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</tr>
<tr>
<td>id</td>
<td>IccResource</td>
</tr>
<tr>
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</tr>
<tr>
<td>name</td>
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</tr>
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<tr>
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</tr>
<tr>
<td>setActionOnAnyCondition</td>
<td>IccResource</td>
</tr>
<tr>
<td>setActionOnCondition</td>
<td>IccResource</td>
</tr>
<tr>
<td>setActionsOnConditions</td>
<td>IccResource</td>
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<tr>
<td>setName</td>
<td>IccBase</td>
</tr>
<tr>
<td>setCustomClassNum</td>
<td>IccBase</td>
</tr>
</tbody>
</table>
IccUserId class

IccUserId class represents an 8-character user name.

IccBase
  IccResourceId
  IccUserId

IccUserId class represents an 8-character user name.

Header file: ICCRIDEH

IccUserId constructors

Constructor (1)

IccUserId(const char* name)

name
  The 8-character name of the user ID.

Constructor (2)

The copy constructor.

IccUserId(const IccUserId& id)

id
  A reference to an IccUserId object.

Public methods

These are the public methods in this class.

operator= (1)

IccUserId& operator=(const char* name)

name
  The 8-character name of the user ID.
operator= (2)
Assigns a new value.

IccUserId& operator=(const IccUserId& id)

id
A reference to an IccUserId object.

Inherited public methods
These are the public methods inherited by this class.

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<td>IccBase</td>
</tr>
<tr>
<td>name</td>
<td>IccResourceId</td>
</tr>
<tr>
<td>nameLength</td>
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</tr>
<tr>
<td>setCustomClassNum</td>
<td>IccBase</td>
</tr>
</tbody>
</table>

IccValue structure
This structure contains CICS-value data areas (CVDAs) as an enumeration.

Header file: ICCVALEH

Enumeration

Listing of valid CVDAs
Valid CVDAs are listed in the CVDAs and numeric values topics in the System Programming reference information.
main function

You are recommended to include this code in your application.

It initializes the CICS Foundation Classes correctly, provides default exception handling, and releases allocated memory after it is finished. You may substitute your own variation of this main function, but this should rarely be necessary.

Source file: ICCMAIN

The stub has three functions:

1. It initializes the Foundation Classes environment. You can customize the way it does this by using #defines that control:
   - Memory management (see Storage management)
   - Family Subset enforcement (see “FamilySubset” on page 61)
   - EDF enablement (see Program debugging)
2. It provides a default definition of a class IccUserControl, derived from IccControl, that includes a default constructor and run method.
3. It invokes the run method of the user’s control object using a try-catch construct.

The following information is the functional part of the main code:

```cpp
int main()
{
    Icc::initializeEnvironment(ICC_CLASS_MEMORY_MGMT,
                                ICC_FAMILY_SUBSET,
                                ICC_EDF_BOOL);
    try
    {
        ICC_USER_CONTROL control;
        control.run();
    }
    catch(IccException& exc)
    {
        Icc::catchException(exc);
    }
    catch(...)
    {
        Icc::unknownException();
    }
    Icc::returnToCICS();
}
```

1. This is the main C++ entry point.
2. This call initializes the environment and is essential. The three parameters have previously been defined to the defaults for the platform.
3. Run the user’s application code, using try and catch, in case the application code does not catch exceptions.
4. Create control object.
5. Invoke run method of control object (defined as pure virtual in IccControl).
Catch any `IccException` objects not caught by the application.

Call this function to abend task.

Catch any other exceptions not caught by application.

Call this function to abend task.

Return control to CICS.
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Programming Interfaces that allow the customer to write programs to obtain the services of CICS Transaction Server for z/OS, Version 5 Release 5 (CICS TS 5.5) are included in the following sections of the online product documentation:

- Developing applications
- Developing system programs
- CICS security
- Developing for external interfaces
- Reference: application development
- Reference: system programming
- Reference: connectivity

Information that is NOT intended to be used as a Programming Interface of CICS TS 5.5, but that might be misconstrued as Programming Interfaces, is included in the following sections of the online product documentation:

- Troubleshooting and support
- Reference: diagnostics

If you access the CICS documentation in manuals in PDF format, Programming Interfaces that allow the customer to write programs to obtain the services of CICS TS 5.5 are included in the following manuals:

- Application Programming Guide and Application Programming Reference
- Business Transaction Services
• Customization Guide
• C++ OO Class Libraries
• Debugging Tools Interfaces Reference
• Distributed Transaction Programming Guide
• External Interfaces Guide
• Front End Programming Interface Guide
• IMS Database Control Guide
• Installation Guide
• Security Guide
• CICS Transactions
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• Data Areas
• Diagnosis Reference
• Problem Determination Guide
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Special Characters

... (parameter)  
in sendLine 230

Numerics

0 (zero)  
in actionOnConditionAsChar 164

A

A  
in actionOnConditionAsChar 164  
in operatingSystem 199
abend  
in IccTask class 202  
in Parameter level 37
abend codes 32
abendCode  
in IccAbendData class 62
abendCode (parameter)  
in abend 202
abendData  
in IccTask class 202
AbendDumpOpt  
in Enumerations 211  
in IccTask class 211
AbendHandlerOpt  
in Enumerations 211  
in IccTask class 211
abendTask  
in ActionOnCondition 169  
in CICS conditions 35
absTime  
in IccClock class 89  
in Type 246
absTime (parameter)  
in Constructor 67  
in operator= 69
access  
in IccFile class 117
Access  
in Enumerations 127  
in IccFile class 127
access (parameter)  
in setAccess 124
Accessing start data  
in Starting transactions asynchronously 21  
in Using CICS Services 21
accessMethod  
in IccFile class 117
action (parameter)  
in setActionOnAnyCondition 167  
in setActionOnCondition 167
actionOnCondition  
in IccResource class 164
ActionOnCondition  
in Enumerations 169  
in IccResource class 169
actionOnConditionAsChar  
in IccResource class 164
actions (parameter)  
in setActionsOnConditions 167, 168
actionsOnConditionsText  
in IccResource class 165
addable  
in Access 127
address  
in IccProgram class 152
AID  
in IccTerminal class 221
aid (parameter)  
in waitForAID 234
AIDVal  
in Enumerations 236  
in IccTerminal class 236
AIX, CICS for  
in Platform differences 36
allocate  
in IccSession class 178
AllocateOpt  
in Enumerations 187  
in IccSession class 187
alternateHeight  
in IccTerminalData class 237  
in Public methods 237
alternateWidth  
in IccTerminalData class 238  
in Public methods 238
append  
in IccBuf class 80
applName  
in IccSystem class 196
ASRAInterrupt  
in IccAbendData class 63  
in Public methods 63
ASRAKeyType  
in IccAbendData class 63  
in Public methods 63
ASRAPSW  
in IccAbendData class 64
ASRARegisters  
in IccAbendData class 64  
in Public methods 64
ASRASpaceType  
in IccAbendData class 64  
in Public methods 64
ASRASpaceType  
in IccAbendData class 64  
in Public methods 64
assign  
in Example of file control 18  
in IccBuf class 80, 81
assign (continued)
in IccKey class 143
automatic
in UpdateMode 94
Automatic condition handling (callHandleEvent)
in CICS conditions 35
in Conditions, errors, and exceptions 35
automatic creation 5
automatic deletion 5
auxStorage
in Location 217

B
base class
overview 6
Base classes
in Overview of the foundation classes 6
baseName (parameter)
in NameOpt 78
BASESPACE
in ASRASpaceType 64
BDAM 15
beginBrowse
in IccSystem class 196, 197
beginInsert
in Writing records 16
beginInsert (VSAM only)
in IccFile class 117
in Public methods 117
below
in StorageOpts 212
blink
in Highlight 236
blue
in Color 236
Bool
in Enumerations 60
in Icc structure 60
BoolSet
in Enumerations 61
in Icc structure 61
boolText
in Functions 58
in Icc structure 58
browsable
in Access 127
browsing records 17
Browsing records
in File control 17
in Using CICS Services 17
buf (parameter)
in dump 203, 204
in put 226
in send3270Data 229
in sendLine 230
in setData 190, 191
buffer
in Example of starting transactions 22
buffer (parameter)
in Constructor 79
in operator!= 83
in operator== 84
in operator+= 83
buffer (parameter) (continued)
in operator= 83
in operator== 84
in Polymorphic Behavior 40
in put 107, 136, 166, 167, 215
in registerData 189
in rewriteRecord 124
in send 227, 228
in send3270Data 228, 229
in sendLine 230
in writeRecord 126
Buffer objects
Data area extensibility 12
Data area ownership 12
IccBuf constructors 13
IccBuf methods 14
Working with IccResource subclasses 14
buffers 12, 14
byAddress
in LockType 176
byValue
in LockType 176

C
C++ exceptions 32
C++ Exceptions and the Foundation Classes
in Conditions, errors, and exceptions 32
callHandleEvent
in ActionOnCondition 169
in CICS conditions 35
calling conventions 42
Calling methods on a resource object
in Overview of the foundation classes 12
in Using CICS resources 12
callingProgramId
in IccControl class 100
in Public methods 100
cancel
in Cancelling unexpired start requests 21
in IccRequestId class 161
in IccStartRequestQ class 188
cancelAbendHandler
in IccControl class 100
cancelAlarm
in IccClock class 89
Cancelling unexpired start requests
in Starting transactions asynchronously 21
in Using CICS Services 21
Case
in Enumerations 236
in IccTerminal class 236
caseOpt (parameter)
in receive 227
in receive3270Data 227
catch
in C++ Exceptions and the Foundation Classes 32, 33
in Exception handling (throwException) 36
in main function 260
catchException
in Functions 58
in Icc structure 58
ch (parameter)
in operator<< 85, 224
changePassword
  in IccUser class 255
  in Public methods 255
cchar
  in C++ Exceptions and the Foundation Classes 33
CheckOpt
  in Enumerations 194
  in IccStartRequestQ class 194
CICS
  in ASRAStorageType 65
  in GetOpt 62
  in Platform differences 36
CICS conditions
  abendTask 36
  automatic condition handling 35
  Automatic condition handling (callHandleEvent) 35
  callHandleEvent 35
  exception handling 36
  Exception handling (throwException) 36
  in Conditions, errors, and exceptions 34
  manual condition handling 35
  Manual condition handling (noAction) 35
  noAction 35
  severe error handling 36
  Severe error handling (abendTask) 36
  throwException 36
CICS for AIX
  in Platform differences 36
CICS resources 11
CICSCondition
  in C++ Exceptions and the Foundation Classes 34
  in Type 115
CICSDataKey
  in StorageOpts 212
CICSEXECKEY
  in ASRAKeyType 63
CICSInternalTask
  in StartType 212
class
  base 6
  resource 8
  resource identification 7
  singleton 11
  support 10
ClassMemoryMgmt
  in Enumerations 61
  in Icc structure 61
className
  in IccBase class 75
  in IccEvent class 111
  in IccException class 113
  in IccMessage class 149
className (parameter)
  in Constructor 113, 148
  in setClassName 76
classType
  in IccBase class 75
  in IccEvent class 111
  in IccException class 113
ClassType
  in Enumerations 77
  in IccBase class 77
classType (parameter)
  in Constructor 113, 163
clear
  in Example of polymorphic behavior 41
  in IccDataQueue class 106
  in IccResource class 165
  in IccTempStore class 214
  in IccTerminal class 221
  in Polymorphic Behavior 40
CLEAR
  in AIDVal 236
clearData
  in IccStartRequestQ class 189
clearInputMessage
  in IccProgram class 153
clearPrefix
  in IccJournal class 135
closed
  in Status 128
cmmCICS
  in ClassMemoryMgmt 61
  in Storage management 42
cmmDefault
  in ClassMemoryMgmt 61
  in Storage management 42
cmmNonCICS
  in ClassMemoryMgmt 61
  in Storage management 42
Codes
  in Enumerations 94
  in IccCondition structure 94
col (parameter)
  in send 228
  in send3270Data 229
  in sendLine 230
  in setCursor 231
Color
  in Enumerations 236
  in IccTerminal class 236
color (parameter)
  in operator« 223
  in setColor 231
commArea
  in IccControl class 100
  in CommArea (parameter)
  in link 153
  in setNextCommArea 232
commitOnReturn
  in CommitOpt 155
CommitOpt
  in Enumerations 155
  in IccProgram class 155
commitUOW
  in IccTask class 203
compiling programs 30
Compiling Programs
  in Compiling, executing, and debugging 30
  complete
    in Kind 146
    complete key 15
    completeLength
      in IccKey class 143
      in Public methods 143
    completeLength (parameter)
      in Constructor 143
    condition

Index 271
condition (continued)
in IccResource class 165
in Manual condition handling (noAction) 35
in Resource classes 9
condition (parameter)
in actionOnCondition 164
in actionOnConditionAsChar 164
in conditionText 59
in setActionOnCondition 167
condition 0 (NORMAL)
in actionsOnConditionsText 164
condition 1 (ERROR)
in actionsOnConditionsText 164
condition 2 (RDATT)
in actionsOnConditionsText 164
condition 3 (WRBRK)
in actionsOnConditionsText 164
condition 4 (ICCEOF)
in actionsOnConditionsText 164
condition 5 (EODS)
in actionsOnConditionsText 165
condition 6 (EOC)
in actionsOnConditionsText 165
Conditions, errors, and exceptions
Automatic condition handling (callHandleEvent) 35
Exception handling (throwException) 36
Manual condition handling (noAction) 35
Method level 37
Object level 37
Parameter level 37
Severe error handling (abendTask) 36

conditionText
in Functions 59
in Icc structure 59
in IccEvent class 111
in IccResource class 165
ConditionType
in Enumerations 169
in IccResource class 169
confirmation
in SendOpt 187
connectProcess
in IccSession class 178, 179
in Public methods 178, 179
console
in IccControl class 100
Constructor
in IccAbendData class 62
in IccAbendData constructor (protected) 62
in IccAbsTime class 67
in IccAbsTime constructor 67
in IccAlarmRequestId class 72
in IccAlarmRequestId constructors 72
in IccBase class 74
in IccBase constructor (protected) 74
in IccBuf class 78, 79
in IccBuf constructors 78, 79
in IccClock class 89
in IccClock constructor 89
in IccConsole class 96
in IccConsole constructor (protected) 96
in IccControl class 100
in IccControl constructor (protected) 100
Constructor (continued)
in IccConvId class 104
in IccConvId constructors 104
in IccDataQueue class 106
in IccDataQueue constructors 106
in IccDataQueueId class 109
in IccDataQueueId constructors 109
in IccEvent class 110
in IccEvent constructor 110
in IccException class 112
in IccException constructor 112
in IccFile class 116
in IccFile constructors 116
in IccFileId class 128
in IccFileId constructors 128
in IccFileIterator class 130
in IccFileIterator constructor 130
in IccGroup class 133
in IccGroup constructors 133
in IccJournal class 134, 135
in IccJournal constructors 134, 135
in IccJournalId class 139
in IccJournalId constructors 139
in IccJournalType class 141
in IccJournalTypeId class 141
in IccKey class 143
in IccKey constructors 143
in IccLockId class 146, 147
in IccLockId constructors 146, 147
in IccMessage class 148
in IccMessage constructor 148
in IccPartnerId class 150
in IccPartnerId constructors 150
in IccProgram class 152
in IccProgram constructors 152
in IccProgramId class 156
in IccProgramId constructors 156
in IccRBA class 158
in IccRBA constructor 158
in IccRecordIndex class 160
in IccRecordIndex constructor (protected) 160
in IccRequest class 161, 162
in IccRequestId constructors 161, 162
in IccResource class 163
in IccResource constructor (protected) 163
in IccResourceId class 170
in IccResourceId constructors (protected) 170
in IccRRN class 172
in IccRRN constructors 172
in IccSemaphore class 174
in IccSemaphore constructor 174
in IccSession class 177, 178
in IccSession constructor (protected) 178
in IccSession constructors (public) 177
in IccStartRequestQ class 188
in IccStartRequestQ constructor (protected) 188
in IccSysId class 194
in IccSysId constructors 194
in IccSystem class 196
in IccSystem constructor (protected) 196
in IccTask class 202
in IccTask constructor (protected) 202
in IccTempStore class 213
in IccTempStore constructors 213
Constructor (continued)
in IccTempStoreId class 218
in IccTempStoreId constructors 218
in IccTermId class 219, 220
in IccTermId constructors 219, 220
in IccTerminal class 221
in IccTerminal constructor (protected) 221
in IccTerminalData constructor (protected) 237
in IccTime class 244
in IccTime constructor (protected) 244
in IccTimeInterval class 246, 247
in IccTimeInterval constructors 246, 247
in IccTimeOfDay class 249
in IccTimeOfDay constructors 249
in IccTPNameId class 251
in IccTPNameId constructors 251
in IccTransId class 252, 253
in IccTransId constructors 252, 253
in IccUser class 254
in IccUser constructors 254
in IccUserId class 258
in IccUserId constructors 258

converse
in IccSession class 179
convId
in IccSession class 180
convId (parameter)
in Constructor 105
convName (parameter)
in Constructor 104
in operator= 105
copt (parameter)
in setStartOpts 192
createDump
in AbendDumpOpt 211
creating a resource object 11
Creating a resource object
in Overview of the foundation classes 11
in Using CICS resources 11
Singleton classes 11
Creating an object
in C++ Objects 5
creating object 5
current (parameter)
in setPrefix 137
cursor
in Finding out information about a terminal 27
in IccTerminal class 222
customClassNum
in IccBase class 75
in Public methods 75
cut
in IccBuf class 81
in IccBuf constructors 13
CVDA
in Enumeration 259
in IccValue structure 259
cyan
in Color 236

data
in Accessing start data 21
in Finding out information about a terminal 27
in IccStartRequestQ class 189
in IccTerminal class 222
data (parameter)
in enterTrace 204
in put 183
data area extensibility 12
Data area extensibility
in Buffer objects 12
in IccBuf class 12
data area ownership 12
Data area ownership
in Buffer objects 12
in IccBuf class 12
dataArea
in IccBuf class 81
dataArea (parameter)
in append 80
in assign 80, 143
in Constructor 79
in insert 82
in overlay 87
in replace 87
dataAreaLength
in IccBuf class 81
in Public methods 81
dataAreaOwner
in Data area ownership 12
in IccBuf class 82
DataAreaOwner
in Enumerations 88
in IccBuf class 88
dataAreaType
in Data area extensibility 12
in IccBuf class 82
DataAreaType
in Enumerations 88
in IccBuf class 88
dataItems
in Example of polymorphic behavior 41
dataLength
in IccBuf class 82
dataqueue
in FacilityType 212
dataQueueTrigger
in StartType 212
date
in IccAbsTime class 68
in IccClock class 90
date services 28
dateFormat
in IccSystem class 197
DateFormat
in Enumerations 93
in IccClock class 93
dateSeparator (parameter)
in date 68, 90
in Example of time and date services 29
dayOfMonth
in Example of time and date services 29
in IccAbsTime class 68
in IccClock class 90

Index 273
dayOfWeek
  in Example of time and date services 29
  in IccAbsTime class 68
  in IccClock class 90
DayOfWeek
  in Enumerations 93
  in IccClock class 93
daysSince1900
  in Example of time and date services 29
  in IccAbsTime class 68
  in IccClock class 91
daysUntilPasswordExpires
  in IccUser class 255
dComplete
  in DumpOpts 211
dDCT
  in DumpOpts 211
dDefault
  in DumpOpts 211
dDebugging Programs
  in Compiling, executing, and debugging 31
defaultColor
  in Color 236
defaultHeight
  in IccTerminalData class 238
  in Public methods 238
defaultHighlight
  in Highlight 236
defaultWidth
  in IccTerminalData class 238
  in Public methods 238
delay
  in IccTask class 203
  in Support Classes 10
deletable
  in Access 127
delete
  in Deleting an object 6
  in Storage management 42
delete operator 5
deleteLockedRecord
  in Deleting locked records 17
  in IccFile class 118
deleteRecord
  in Deleting normal records 17
  in IccFile class 118
deleteRecord method 17
Deleting an object
  in C++ Objects 6
deleting items 26
Deleting items
  in Temporary storage 26
  in Using CICS Services 26
Deleting locked records
  in Deleting records 17
  in File control 17
Deleting normal records
  in Deleting records 17
  in File control 17
deleting queues 24
Deleting queues
  in Transient Data 24
  in Using CICS Services 24
deleting records 17
Deleting records
  Deleting locked records 17
  Deleting normal records 17
  in File control 17
  in Using CICS Services 17
dFCT
  in DumpOpts 211
DFHCURDI 3
DFHCURDS 3
disable
  in Status 128
doSomething
  in Using an object 6
dPCT
  in DumpOpts 211
DPL
  in StartType 212
dPPT
  in DumpOpts 211
dProgram
  in DumpOpts 211
dSIT
  in DumpOpts 212
dStorage
  in DumpOpts 211
dTables
  in DumpOpts 211
dTask
  in DumpOpts 211
dTCT
  in DumpOpts 212
dTerminal
  in DumpOpts 211
dTRT
  in DumpOpts 212
dump
  in IccTask class 203
dumpCode (parameter)
  in dump 203, 204
DumpOpts
  in Enumerations 211
  in IccTask class 211
dynamic creation 5
dynamic deletion 5
dynamic link library 2
Dynamic link library
  in Installed contents 2
  Location 2

E
ECBList (parameter)
  in waitExternal 209
EDF (parameter)
  in initializeEnvironment 59
empty
  in Deleting items 26
  in Deleting queues 24
  in IccDataQueue class 106
  in IccTempStore class 214
  in Temporary storage 25
  in Transient Data 23
enabled
enabled (continued)
in Status 128
enableStatus
in IccFile class 118
endBrowse
in IccSystem class 197
endInsert
in Writing records 16
endInsert (VSAM only)
in IccFile class 119
in Public methods 119
end
in Example of terminal control 28
ENTER
in AIDVal 236
enterTrace
in IccTask class 204
entryPoint
in IccProgram class 153
Enumeration
CVDA 259
in IccValue structure 259
Enumerations
AbendDumpOpt 211
AbendHandlerOpt 211
Access 127
ActionOnCondition 169
AIDVal 236
AllocateOpt 187
Bool 60
BoolSet 61
Case 236
CheckOpt 194
ClassMemoryMgmt 61
ClassType 77
Codes 94
Color 236
CommitOpt 155
ConditionType 169
DataAreaOwner 88
DataAreaType 88
DateFormat 93
DayOfWeek 93
DumpOpts 211
FacilityType 217
FamilySubset 61
GetOpt 62
HandleEventReturnOpt 169
Highlight 236
in Icc structure 60
in IccBase class 77
in IccBuf class 88
in IccClock class 93
in IccCondition structure 94
in IccConsole class 99
in IccException class 115
in IccFile class 127
in IccJournal class 138
in IccKey class 146
in IccProgram class 155
in IccRecordIndex class 161
in IccResource class 169
in IccSemaphore class 176
in IccSession class 187

Enumerations (continued)
in IccStartRequestQ class 194
in IccSystem class 201
in IccTask class 211
in IccTempStore class 217
in IccTerminal class 236
in IccTime class 246
Kind 146
LifeTime 176
LoadOpt 156
Location 217
LockType 176
MonthOfYear 94
NameOpt 78
NextTransIdOpt 237
NoSpaceOpt 217
Options 138
Platforms 62
ProtectOpt 194
Range 95
ReadMode 127
ResourceType 201
RetrieveOpt 194
SearchCriterion 128
SendOpt 187
SeverityOpt 99
StartType 212
StateOpt 187
Status 128
StorageOpts 212
SyncLevel 187
TraceOpt 212
Type 115, 161, 246
UpdateMode 94
WaitPostType 213
WaitPurgeability 213
equalToKey
in SearchCriterion 128
erase
in Example of terminal control 28
in IccTerminal class 222
in Sending data to a terminal 27
errorCode
in IccSession class 180
ESDS
in File control 15
ESDS file 15
ESMReason
in IccUser class 255
ESMResponse
in IccUser class 255
event (parameter)
in handleEvent 166
Example of file control
in File control 17
in Using CICS Services 17
Example of managing transient data
in Transient Data 24
in Using CICS Services 24
Example of polymorphic behavior
in Miscellaneous 41
in Polymorphic Behavior 41
Example of starting transactions
in Starting transactions asynchronously 21
Example of starting transactions (continued)
in Using CICS Services 21
Example of Temporary Storage
in Temporary storage 26
in Using CICS Services 26
Example of terminal control
in Terminal control 27
in Using CICS Services 27
Example of time and date services
in Time and date services 29
in Using CICS Services 29

exception
in TraceOpt 212
exception (parameter)
in catchException 58
Exception handling (throwException)
in CICS conditions 36
in Conditions, errors, and exceptions 36
exceptionNum (parameter)
in Constructor 113
exceptions 32
exceptionType (parameter)
in Constructor 113

Executing Programs
in Compiling, executing, and debugging 31
extensible
in DataAreaType 89
external
in DataAreaOwner 88
extractProcess
in IccSession class 180
extractState
in StateOpt 187

F

facilityType
in IccTask class 204
FacilityType
in Enumerations 212
in IccTask class 212
fam (parameter)
in initializeEnvironment 59
familyConformanceError
in C++ Exceptions and the Foundation Classes 34
in Type 115
FamilySubset
in Enumerations 61
in Icc structure 61
FEPIRequest
in StartType 212
file (parameter)
in Constructor 130
in Example of file control 18

File control
browsing records 17
deleting records 17
terminal control 27
deleting locked records 17
deleting normal records 17
example 17
rewriting records 17
fullAccess
in Access 127
functions
boolText 58
catchException 58
conditionText 59
in Icc structure 58
initializeEnvironment 59
isClassMemoryMgmtOn 59

File control (continued)
deleting records 17
Example of file control 17
in Using CICS Services 15
Reading ESDS records 16
Reading KSDS records 15
Reading records 15
Reading RRDS records 16
updating records 17
Writing ESDS records 16
Writing KSDS records 16
Writing records 16
Writing RRDS records 16

fileName (parameter)
in Constructor 116, 128
in getFile 198
in operator= 129

Finding out information about a terminal
in Terminal control 27
in Using CICS Services 27

fixed
in DataAreaType 89
flush
in Example of terminal control 28
in IccSession class 180
for
in Example of file control 18

Form
in Polymorphic Behavior 40
format (parameter)
in append 80
in assign 81
in date 68, 90
in Example of time and date services 29
in sendLine 230

Foundation Class Abend codes
in Conditions, errors, and exceptions 32
free
in IccSession class 180
freeKeyboard
in IccTerminal class 222
in Sending data to a terminal 27
freeStorage
in IccSystem class 197
in IccTask class 204
fsAllowPlatformVariance
in FamilySubset 61
in Platform differences 36
fsDefault
in FamilySubset 61
fsEnforce
in FamilySubset 61
in Platform differences 36

fullAccess
in Access 127
functions
boolText 58
catchException 58
conditionText 59
in Icc structure 58
initializeEnvironment 59
isClassMemoryMgmtOn 59

F
## Functions (continued)
- `isEDFOn` 59
- `isFamilySubsetEnforcementOn` 60
- `returnToCICS` 60
- `setEDF` 60
- `unknownException` 60

### G
- **generic**
  - in `Kind` 146
- **generic key** 15
- **get**
  - in `Example of polymorphic behavior` 41
  - in `IccDataQueue class` 107
  - in `IccResource class` 165
  - in `IccSession class` 181
  - in `IccTempStore class` 214
  - in `IccTerminal class` 222
  - in `Polymorphic Behavior` 40
- **getFile**
  - in `IccSystem class` 198
- **getNextFile**
  - in `IccSystem class` 198
- **GetOpt**
  - in `Enumerations` 62
  - in `Icc structure` 62
- **getStorage**
  - in `IccSystem class` 198
  - in `IccTask class` 205
- **gid** (parameter)
  - in `Constructor` 254
- **graphicCharCodeSet**
  - in `IccTerminalData class` 238
- **graphicCharSetId**
  - in `IccTerminalData class` 239
- **green**
  - in `Color` 236
- **groupId**
  - in `IccUser class` 255
- **groupName** (parameter)
  - in `Constructor` 133
  - in `operator=` 133
- **gteqToKey**
  - in `SearchCriterion` 128

### H
- **H**
  - in `actionOnConditionAsChar` 164
- **handleEvent**
  - in `Automatic condition handling (callHandleEvent)` 35
  - in `IccResource class` 165
- **HandleEventReturnOpt**
  - in `Enumerations` 169
  - in `IccResource class` 169
- **handPost**
  - in `WaitPostType` 213
- **Header files**
  - in `Installed contents` 1, 30
  - in `Location` 2
- **height**
  - in `IccTerminal class` 222

### Highlight
- in `Enumerations` 236
- in `IccTerminal class` 236
- **highlight** (parameter)
  - in `operator<` 223
  - in `setHighlight` 231, 232
- **hold**
  - in `LoadOpt` 156
- **hours**
  - in `IccAbsTime class` 69
  - in `IccTime class` 244
- **hours** (parameter)
  - in `Constructor` 244, 246, 247, 249
  - in `set` 247, 249

### I
- **Icc**
  - in `Foundation Classes—reference` 45
  - in `Foundation Classes: reference` 45
  - in `Method level` 37
  - in `Overview of the foundation classes` 6
- **Icc structure**
  - in `Bool` 60
  - in `BoolSet` 61
  - in `class MemoryMgmt` 61
  - in `conditionText` 59
  - in `FamilySubset` 61
  - in `GetOpt` 62
  - in `initializeEnvironment` 59
  - in `isClassMemoryMgmtOn` 59
  - in `isEDFOn` 59
  - in `isFamilySubsetEnforcementOn` 60
  - in `Platforms` 62
  - in `returnToCICS` 60
  - in `setEDF` 60
  - in `unknownException` 60
  - in `Icc::initializeEnvironment`
    - in `Storage management` 42
- **ICC$BUF** 3
- **ICC$CLK** 3
- **ICC$HEL** 3
- **ICC$SES1** 3
- **ICC$SES2** 3
- **IccAbendData**
  - in `Singleton classes` 11
- **IccAbendData class**
  - in `abendCode` 62
  - in `ASRAInterrupt` 63
  - in `ASRAKeyType` 63
  - in `ASRASPSW` 64
  - in `ASRAReset` 64
  - in `ASRASpaceType` 64
  - in `ASRASStorageType` 65
  - in `Constructor` 62
  - in `instance` 65
  - in `isDumpAvailable` 65
  - in `originalAbendCode` 66
  - in `programName` 66
- **IccAbendData constructor (protected)**
  - in `Constructor` 62
  - in `IccAbendData class` 62
IccAbsTime
  in Base classes 7
  in delay 203
  in IccTime class 244
  in Support Classes 10
  in Time and date services 28
IccAbsTime class
  Constructor 67
date 68
dayOfMonth 68
dayOfWeek 68
daysSince1900 68
hours 69
milliSeconds 69
minutes 69
monthOfYear 69
operator= 69
packedDecimal 69
seconds 70
time 70
timeInHours 70
timeInMinutes 70
timeInSeconds 70
year 70
IccAbsTime constructor
  Constructor 67
  in IccAbsTime class 67
IccAbsTime,
  in Support Classes 10
IccAlarmRequestId
  in IccAlarmRequestId class 72
IccAlarmRequestId class
  Constructor 72
  isExpired 73
  operator= 73
  setTimerECA 73
timerECA 74
IccAlarmRequestId constructors
  Constructor 72
  in IccAlarmRequestId class 72
IccBase
  in Base classes 6
  in Foundation Classes—reference 45
  in IccAbendData class 62
  in IccAbsTime class 67
  in IccAlarmRequestId class 72
  in IccBase class 74
  in IccBuf class 78
  in IccClock class 89
  in IccConsole class 95
  in IccControl class 99
  in IccConvId class 104
  in IccDataQueue class 106
  in IccDataQueueId class 109
  in IccEvent class 110
  in IccException class 112
  in IccFile class 116
  in IccFileId class 128
  in IccFileIterator class 130
  in IccGroupId class 133
  in IccJournal class 134
  in IccJournalId class 139
  in IccJournalTypeId class 141

IccBase (continued)
  in IccKey class 142
  in IccLockId class 146
  in IccMessage class 148
  in IccPartnerId class 150
  in IccProgram class 152
  in IccProgramId class 156
  in IccRBA class 157
  in IccRecordIndex class 160
  in IccRequestId class 161
  in IccResourceId class 163
  in IccResource class 170
  in IccRBA class 171
  in IccSemaphore class 174
  in IccSession class 177
  in IccStartTimeRequestQ class 188
  in IccSysId class 194
  in IccSystem class 196
  in IccTask class 202
  in IccTempStore class 213
  in IccTempStoreId class 218
  in IccTermId class 219
  in IccTerminal class 221
  in IccTerminalData class 237
  in IccTime class 244
  in IccTimeInterval class 246
  in IccTimeOfDay class 248
  in IccTPNameId class 250
  in IccUserId class 252
  in IccUserId class 254
  in IccUser class 258
  in IccResource class 262
  in IccResource class 264
  in IResource class 8
  in Resource identification classes 7
  in Storage management 42
  in Support Classes 10
IccBase class
  className 75
classType 75
ClassType 77
Constructor 74
customClassNum 75
NameOpt 78
operator delete 75
operator new 76
overview 6
setClassName 76
setCustomClassNum 76
IccBase constructor (protected)
  Constructor 74
  in IccBase class 74
IccBuf
  in Buffer objects 12
  in C++ Exceptions and the Foundation Classes 34
  in Data area extensibility 12, 13
  in Data area ownership 12
  in Example of file control 18
  in Example of managing transient data 25
  in Example of polymorphic behavior 41
  in Example of starting transactions 22, 23
  in Example of Temporary Storage 26
  in Example of terminal control 28
  in IccBuf class 12, 78
  in IccBuf constructors 13
  in IccBuf methods 14
IccBuf (continued)
in Reading data 24
in Reading items 25
in Scope of data in IccBuf reference returned from 'read'
methods 43
in Support Classes 11
in Working with IccResource subclasses 14
IccBuf class
append 80
assign 80, 81
Constructor 78, 79
constructors 13
cut 81
data area extensibility 12
Data area extensibility 12
data area ownership 12
Data area ownership 12
dataArea 81
dataAreaLength 81
dataAreaOwner 82
DataAreaOwner 88
dataAreaType 82
DataAreaType 88
dataLength 82
IccBuf constructors 13
IccBuf methods 14
in Buffer objects 12
insert 82
isFMHContained 82
methods 14
operator const char* 83
operator= 84
operator= 84, 86
operator+= 83, 84
operator= 83
operator== 84
overlay 87
replace 87
setDataLength 87
setFMHContained 88
Working with IccResource subclasses 14
IccBuf constructors
Constructor 78, 79
in Buffer objects 13
in IccBuf class 13, 78
IccBuf methods
in Buffer objects 14
in IccBuf class 14
IccBuf reference 43
IccClock
in Example of time and date services 29
in IccAlarmRequestId class 72
in IccClock class 89
in Time and date services 28
IccClock class (continued)
millisSeconds 91
monthOfYear 91
MonthOfYear 94
setAlarm 91
time 92
update 92
UpdateMode 94
year 92
IccClock constructor
Constructor 89
in IccClock class 89
IccCondition
in C++ Exceptions and the Foundation Classes 34
IccCondition structure
Codes 94
Range 95
IccConsole
in Buffer objects 12
in Object level 37
in Singleton classes 11
IccConsole class
Constructor 96
instance 96
overview 11
put 96
replyTimeout 96
resetRouteCodes 96
setAllRouteCodes 97
setReplyTimeout 97
setRouteCodes 97
SeverityOpt 99
write 98
writeAndReply 98
IccConsole constructor (protected)
Constructor 96
in IccConsole class 96
IccControl
in Base classes 7
in Example of starting transactions 22, 23
in IccControl class 99
in IccProgram class 152
in main function 260
in Mapping EXEC CICS calls to Foundation Class
methods 46
in Method level 37
in Singleton classes 11
in Support Classes 10
IccControl class
callingProgramId 100
cancelAbendHandler 100
commArea 100
console 100
Constructor 100
initData 101
instance 101
isCreated 101
overview 7, 11
programId 101
resetAbendHandler 101
returnProgramId 102
run 102
session 102
setAbendHandler 102
IccControl class (continued)

- startRequestQ 103
- system 103
- task 103
- terminal 103

IccControl constructor (protected)

- Constructor 100
- in IccControl class 99

IccControl::run

- in Mapping EXEC CICS calls to Foundation Class methods 46

IccConvId

- in IccConvId class 104
- Constructor 104
- operator= 105

IccConvId constructors

- Constructor 104
- in IccConvId class 104

IccDataQueue

- in Buffer objects 12
- in Example of managing transient data 24
- in Example of polymorphic behavior 41
- in Resource classes 9
- in Temporary storage 25
- in Transient Data 23, 24
- in Working with IccResource subclasses 14
- in Writing data 24

IccDataQueue class

- clear 106
- Constructor 106
- empty 106
- get 107
- put 107
- readItem 107
- writeItem 107

IccDataQueue constructors

- Constructor 106
- in IccDataQueue class 106

IccDataQueueId

- in Example of managing transient data 24
- in IccDataQueueId class 109
- in Transient Data 23, 24

IccDataQueueId class

- Constructor 109
- operator= 109

IccDataQueueId constructors

- Constructor 109
- in IccDataQueueId class 109

IccEvent

- in IccEvent class 110
- in Support Classes 11

IccEvent class

- className 111
- classType 111
- condition 111
- conditionText 111
- Constructor 110
- methodName 111
- summary 112

IccEvent constructor

- Constructor 110
- in IccEvent class 110

IccException

- in C++ Exceptions and the Foundation Classes 33, 34
- in IccException class 112
- in IccMessage class 146
- in main function 261
- in Method level 37
- in Object level 37
- in Parameter level 38
- in Support Classes 11

IccException class

- CICSCondition type 34
- className 113
- classType 113
- Constructor 112
- familyConformanceError type 34
- internalError type 34
- invalidArgument type 34
- invalidMethodCall type 34
- message 113
- methodName 114
- number 114
- objectCreationError type 34
- summary 114
- type 114
- Type 115
- typeText 114

IccException constructor

- Constructor 112
- in IccException class 112

ICFC 3
- ICCFC 3
- ICCFCCL 3
- ICCFCGL 3
- ICCFCIMP 3
- ICCFCL 3

IccFile

- in Browsing records 17
- in Buffer objects 12
- in C++ Exceptions and the Foundation Classes 34
- in Deleting locked records 17
- in Deleting normal records 17
- in Example of file control 17
- in File control 15
- in IccFile class 116
- in IccFileIterator class 130
- in Reading ESDS records 16
- in Reading KSDS records 15
- in Reading records 15
- in Reading RRDS records 16
- in Resource identification classes 7
- in Singleton classes 11
- in Updating records 17
- in Writing ESDS records 16
- in Writing KSDS records 16
- in Writing records 16
- in Writing RRDS records 17

IccFile class

- access 117
- Access 127
- accessMethod 117
- beginInsert (VSAM only) 117
- Constructor 116
- deleteLockedRecord 17, 118
- deleteRecord 118
- deleteRecord method 17

280  CICS TS for z/OS: C++ OO Class Libraries
IccFile class (continued)
    enableStatus 118
    endInsert (VSAM only) 119
    isAddable 119
    isBrowsable 119
    isDeletable 119
    isEmptyOnOpen 120
    isReadable 120
    isReadable method 15, 16
    isUpdatable 120
    keyLength 121
    keyLength method 15
    keyPosition 121
    keyPosition method 15
    openStatus 121
    ReadMode 127
    readRecord 122
    readRecord method 15
    recordFormat 122
    recordFormat method 16
    recordIndex 123
    recordIndex method 15, 16
    recordLength 123
    recordLength method 15, 16
    registerRecordIndex 16, 123
    registerRecordIndex method 15
    rewriteRecord 124
    rewriteRecord method 17
    SearchCriterion 128
    setAccess 124
    setEmptyOnOpen 124
    setStatus 125
    Status 128
    type 125
    unlockRecord 125
    writeRecord 126
    writeRecord method 16
IccFile constructors
    Constructor 116
    in IccFile class 116
IccFile::readRecord
    in Scope of data in IccBuf reference returned from 'read'
methods 43
IccFileId
    in Base classes 7
    in File control 15
    in IccFileId class 128
    in Resource identification classes 7
IccFileId class
    Constructor 128
    operator= 129
    overview 7, 15
    reading records 15
IccFileId constructors
    Constructor 128
    in IccFileId class 128
IccFileIterator
    in Browsing records 17
    in Buffer objects 12
    in Example of file control 17, 18
    in File control 15
    in IccFileIterator class 130
IccFileIterator class (continued)
    Constructor 130
    overview 15
    readNextRecord 131
    readNextRecord method 17
    readPreviousRecord 17, 131
    reset 131
IccFileIterator constructor
    Constructor 130
    in IccFileIterator class 130
IccGroupId
    in IccGroupId class 133
IccGroupId class
    Constructor 133
    operator= 133, 134
IccGroupId constructors
    Constructor 133
    in IccGroupId class 133
IccJournal
    in Buffer objects 12
    in IccJournal class 134
    in Object level 37
IccJournal class
    clearPrefix 135
    Constructor 134, 135
    journalTypeId 135
    Options 138
    put 136
    registerPrefix 136
    setJournalTypeId 136
    setPrefix 136
    wait 137
    writeRecord 137
IccJournal constructors
    Constructor 134, 135
    in IccJournal class 134
IccJournalId
    in IccJournalId class 139
IccJournalId class
    Constructor 139
    number 140
    operator= 140
IccJournalId constructors
    Constructor 139
    in IccJournalId class 139
IccJournalTypeId
    in Foundation Classes—reference
    45
    in IccJournalTypeId class 141
IccJournalTypeId class
    Constructor 141
    operator= 141, 142
IccJournalTypeId constructors
    Constructor 141
    in IccJournalTypeId class 141
IccKey
    in Browsing records 17
    in Deleting normal records 17
    in File control 15
    in IccKey class 142
    in IccRecordIndex class 160
    in Reading KSDS records 15
    in Reading records 15
    in Writing KSDS records 16
IccKey (continued)
in Writing records 16
IccKey class
assign 143
completeLength 143
Constructor 143
kind 144
Kind 146
operator!= 145
operator= 144
operator== 144
reading records 15
setKind 145
value 145
IccKey constructors
Constructor 143
in IccKey class 143
IccLockId
in IccLockId class 146
IccLockId class
Constructor 146, 147
operator= 147
IccLockId constructors
Constructor 146, 147
in IccLockId class 146
IccMessage
in IccMessage class 148
in Support Classes 11
IccMessage class
className 149
Constructor 148
methodName 149
number 149
summary 149
text 149
IccMessage constructor
Constructor 148
in IccMessage class 148
IccPartnerId
in IccPartnerId class 150
IccPartnerId class
Constructor 150
operator= 151
IccPartnerId constructors
Constructor 150
in IccPartnerId class 150
IccProgram
in Buffer objects 12
in IccProgram class 152
in Program control 19
in Resource classes 9
IccProgram class
address 152
clearInputMessage 153
CommitOpt 155
Constructor 152
entryPoint 153
length 153
link 153
load 154
LoadOpt 156
program control 19
setInputMessage 154
unload 154
IccProgram constructors
Constructor 152
in IccProgram class 152
IccProgramId
in IccProgramId class 156
in Resource identification classes 7
IccProgramId class
Constructor 156
operator= 156, 157
IccProgramId constructors
Constructor 156
in IccProgramId class 156
IccRBA
in Browsing records 17
in File control 15
in IccRBA class 157
in IccRecordIndex class 160
in Reading ESDS records 16
in Reading records 15
in Writing ESDS records 16
in Writing records 16
in Writing RRDS records 16
IccRBA class
Constructor 158
number 159
operator!= 159
operator= 158
operator== 158
reading records 15
IccRBA constructor
Constructor 158
in IccRBA class 157
IccRecordIndex
in C++ Exceptions and the Foundation Classes 34
in IccRecordIndex class 160
IccRecordIndex class
Constructor 160
length 160
type 160
Type 161
IccRecordIndex constructor (protected)
Constructor 160
in IccRecordIndex class 160
IccRequestId
in Example of starting transactions 21, 22
in IccRequestId class 161
in Parameter passing conventions 43
IccRequestId class
Constructor 161, 162
operator= 162
IccRequestId constructors
Constructor 161, 162
in IccRequestId class 161
IccResource
in Base classes 6, 7
in Example of polymorphic behavior 41
in IccResource class 163
in Polymorphic Behavior 40
in Resource classes 9
in Scope of data in IccBuf reference returned from 'read'
methods 43
IccResource class
actionOnCondition 164
ActionOnCondition 169
IccResource class (continued)
  actionOnConditionAsChar 164
  actionsOnConditionsText 165
  clear 165
  condition 165
  conditionText 165
  ConditionType 169
  Constructor 163
  get 165
  handleEvent 165
  HandleEventReturnOpt 169
  id 166
  isEDFOn 166
  isRouteOptionOn 166
  name 166
  overview 6, 7
  put 166
  routeOption 167
  setActionOnAnyCondition 167
  setActionOnCondition 167
  setActionsOnConditions 167
  setEDF 168
  setRouteOption 168
  working with subclasses 14
IccResource constructor (protected)
  Constructor 163
  in IccResource class 163
IccResourceId
  Constructor 170
  in Base classes 6, 7
  in C++ Exceptions and the Foundation Classes 34
  in Resource identification classes 7
IccResourceId class
  Constructor 170
  name 170
  nameLength 171
  operator= 171
  overview 6, 7
IccResourceId constructors (protected)
  Constructor 170
  in IccResourceId class 170
IccRRN
  in Browsing records 17
  in Deleting normal records 17
  in File control 15
  in IccRecordIndex class 160
  in IccRRN class 171
  in Reading records 15
  in Reading RRDS records 16
  in Writing records 16
IccRRN class
  Constructor 172
  number 173
  operator!= 173
  operator= 172
  operator== 172
  reading records 15
IccRRN constructors
  Constructor 172
  in IccRRN class 172
IccSemaphore class (continued)
  LockType 176
  tryLock 175
type 175
  unlock 175
IccSemaphore constructor
  Constructor 174
  in IccSemaphore class 174
IccSession
  in Buffer objects 12
IccSession class
  allocate 178
  AllocateOpt 187
  connectProcess 178, 179
  Constructor 177, 178
  converse 179
  convId 180
  errorCode 180
  extractProcess 180
  flush 180
  free 180
  get 181
  isErrorSet 181
  isNoDataSet 181
  isSignalSet 181
  issueAbend 181
  issueConfirmation 181
  issueError 182
  issuePrepare 182
  issueSignal 182
  PIPLlist 182
  process 182
  put 183
  receive 183
  send 183
  sendInvite 184
  sendLast 184, 185
  SendOpt 187
  state 185
  StateOpt 187
  stateText 186
  syncLevel 186
  SyncLevel 187
IccSession constructor (protected)
  Constructor 178
  in IccSession class 178
IccSession constructors (public)
  Constructor 177
  in IccSession class 177
IccStartRequestQ
  in Accessing start data 21
  in Buffer objects 12
  in Example of starting transactions 22, 23
  in IccRequestId class 161
  in IccStartRequestQ class 188
  in Mapping EXEC CICS calls to Foundation Class methods 46
  in Parameter passing conventions 42
  in Singleton classes 11
  in Starting transactions asynchronously 20
IccStartRequestQ class
  cancel 188
  CheckOpt 194
clearData 189
IccStartRequestQ class (continued)
  Constructor 188
  data 189
  instance 189
  overview 11
  ProtectOpt 194
  queueName 189
  registerData 189
  reset 190
  retrieveData 190
  RetrieveOpt 194
  returnTermId 190
  returnTransId 190
  setData 190
  setQueueName 191
  setReturnTermId 191
  setReturnTransId 191, 192
  setStartOpts 192
  start 192
IccStartRequestQ constructor (protected)
  Constructor 188
  in IccStartRequestQ class 188
IccSysId
  in IccSysId class 194
  in Program control 19
IccSysId class
  Constructor 194
  operator= 195
IccSysId constructors
  Constructor 194
  in IccSysId class 194
IccSystem
  in Singleton classes 11
IccSystem class
  applName 196
  beginBrowse 196, 197
  Constructor 196
  dateFormat 197
  endBrowse 197
  freeStorage 197
  getFile 198
  getNextFile 198
  getStorage 198
  instance 199
  operatingSystem 199
  operatingSystemLevel 199
  overview 11
  release 199
  releaseText 200
  ResourceType 201
  sysId 200
  workArea 200
IccSystem constructor (protected)
  Constructor 196
  in IccSystem class 196
IccTask
  in C++ Exceptions and the Foundation Classes 34
  in Example of starting transactions 23
  in IccAlarmRequestId class 72
  in IccTask class 202
  in Parameter level 37
  in Singleton classes 11
  in Support Classes 10
IccTask class (continued)
  abend 202
  abendData 202
  AbendDumpOpt 211
  AbendHandlerOpt 211
  commitUOW 203
  Constructor 202
  delay 203
  dump 203
  DumpOpts 211
  enterTrace 204
  facilityType 204
  FacilityType 212
  freeStorage 204
  getStorage 205
  instance 205
  isCommandSecurityOn 205
  isCommitSupported 206
  isResourceSecurityOn 206
  isRestarted 206
  isStartDataAvailable 206
  number 206
  overview 11
  principalSysId 207
  priority 207
  rollBackUOW 207
  setDumpOpts 207
  setPriority 208
  setWaitText 208
  startType 208
  StartType 212
  StorageOpts 212
  suspend 208
  TraceOpt 212
  transId 208
  triggerDataQueueId 208
  userId 209
  waitExternal 209
  waitOnAlarm 209
  WaitPostType 213
  WaitPurgeability 213
  workArea 210
IccTask Constructor (protected)
  Constructor 202
  in IccTask class 202
IccTask::commitUOW
  in Scope of data in IccBuf reference returned from 'read'
  methods 43
IccTempstore
  in Working with IccResource subclasses 14
IccTempStore
  in Automatic condition handling (callHandleEvent) 35
  in Buffer objects 12
  in C++ Exceptions and the Foundation Classes 34
  in Deleting items 26
  in Example of polymorphic behavior 41
  in Example of Temporary Storage 26
  in IccTempStore class 213
  in Reading items 25
  in Resource classes 9
  in Temporary storage 25
  in Transient Data 24
  in Updating items 25
  in Working with IccResource subclasses 14
IccTempStore (continued)
in Writing items 25
IccTempStore class
   clear 214
   Constructor 213
   empty 214
   get 214
   Location 217
   NoSpaceOpt 217
   numberOfItems 214
   put 214
   readItem 215
   readNextItem 215
   rewriteItem 215
   writeItem 216
IccTempStore constructors
   Constructor 213
      in IccTempStore class 213
IccTempStore::readItem
      in Scope of data in IccBuf reference returned from 'read' methods 43
IccTempStore::readNextItem
      in Scope of data in IccBuf reference returned from 'read' methods 43
IccTempStoreId
   in Base classes 7
   in Example of Temporary Storage 26
   in IccTempStoreId class 218
   in Temporary storage 25
IccTempStoreId class
   Constructor 218
   operator= 218
IccTempStoreId constructors
   Constructor 218
      in IccTempStoreId class 218
IccTermId
   in Base classes 6
   in C++ Exceptions and the Foundation Classes 34
   in Example of starting transactions 22
   in Example of terminal control 27
   in IccTermId class 219
   in Terminal control 27
IccTermId class
   Constructor 219, 220
   operator= 220
      in IccTermId class 219
IccTermId constructors
   Constructor 219, 220
      in IccTermId class 219
IccTerminal
   in Buffer objects 12
   in Example of terminal control 27
   in Finding out information about a terminal 27
   in IccTerminalData class 237
   in Receiving data from a terminal 27
   in Resource classes 8, 9
   in Singleton classes 11
   in Terminal control 27
IccTerminal class
   AID 221
   AIDVal 236
   Case 236
   clear 221
   Color 236
IccTerminal class (continued)
   Constructor 221
   cursor 222
   data 222
   erase 222
   freeKeyboard 222
   get 222
   height 222
   Highlight 236
   inputCursor 223
   instance 223
   line 223
   netName 223
   NextTransIdOpt 237
   operator<< 223–226
   put 226
   receive 226
   receive3270Data 227
   registerInputMessage 154
   send 227, 228
   send3270Data 228, 229
   sendLine 229, 230
   setColor 231
   setCursor 231
   setHighlight 231
   setLine 232
   setNewLine 232
   setNextCommArea 232
   setNextInputMessage 232
   setNextTransId 233
   signoff 233
   signon 233, 234
   waitForAID 234
   width 234
   workArea 235
IccTerminal constructor (protected)
   Constructor 221
      in IccTerminal class 221
IccTerminal::receive
      in Scope of data in IccBuf reference returned from 'read' methods 43
IccTerminalData
   in Example of terminal control 27
   in Finding out information about a terminal 27
   in IccTerminalData class 237
   in Terminal control 27
IccTerminalData class
   alternateHeight 237
   alternateWidth 238
   Constructor 237
   defaultHeight 238
   defaultWidth 238
   graphicCharCodeSet 238
   graphicCharSetId 239
   isAPLKeyboard 239
   isAPLText 239
   isBTrans 239
   isColor 240
   isEWA 240
   isExtended3270 240
   isFieldOutline 240
   isGoodMorning 241
   isHighlight 241
   isKatakana 241
IccTerminalData class (continued)
  isMSRControl 241
  isPS 242
  isSOSI 242
  isTextKeyboard 242
  isTextPrint 242
  isValidation 243
IccTerminalData constructor (protected)
  Constructor 237
  in IccTerminalData class 237
IccTime
  in Base classes 7
  in IccTime class 244
  in Parameter passing conventions 43
  in Support Classes 10
IccTime class
  Constructor 244
  hours 244
  minutes 244
  overview 7
  seconds 244
  timeInHours 245
  timeInMinutes 245
  timeInSeconds 245
  type 245
  Type 246
IccTime constructor (protected)
  Constructor 244
  in IccTime class 244
IccTimeInterval
  in Base classes 7
  in delay 203
  in Example of starting transactions 22, 23
  in IccTime class 244
  in Support Classes 10
IccTimeInterval class
  Constructor 246, 247
  operator= 247
  set 247
IccTimeInterval constructors
  Constructor 246, 247
  in IccTimeInterval class 246
IccTimeOfDay
  in Base classes 7
  in delay 203
  in Example of starting transactions 22, 23
  in IccTime class 244
  in Support Classes 10
IccTimeOfDay class
  Constructor 249
  operator= 249
  set 249
IccTimeOfDay constructors
  Constructor 249
  in IccTimeOfDay class 248
IccTPNameId
  in IccTPNameId class 251
IccTPNameId class
  Constructor 251
  operator= 251
IccTPNameId constructors
  Constructor 251
  in IccTPNameId class 251
IccTransId
  in Base classes 6
IccTransId (continued)
  in Example of starting transactions 22
  in IccResourceId class 170
  in IccTransId class 252
  in Parameter passing conventions 43
IccTransId class
  Constructor 252, 253
  operator= 253
  overview 6
IccTransId constructors
  Constructor 252, 253
  in IccTransId class 252
IccUser class
  changePassword 255
  Constructor 254
  daysUntilPasswordExpires 255
  ESMReason 255
  ESMResponse 255
  groupId 255
  invalidPasswordAttempts 256
  language 256
  lastPasswordChange 256
  lastUseTime 256
  passwordExpiration 256
  setLanguage 256
  verifyPassword 256
IccUser constructors
  Constructor 254
  in IccUser class 254
IccUserControl
  in C++ Exceptions and the Foundation Classes 33
  in Example of file control 18
  in Example of managing transient data 24
  in Example of polymorphic behavior 41
  in Example of starting transactions 21
  in Example of Temporary Storage 26
  in Example of terminal control 28
  in Example of time and date services 29
  in main function 260
  in Program control 19
  in Singleton classes 11
IccUserId
  in IccUserId class 258
IccUserId class
  Constructor 258
  operator= 258, 259
IccUserId constructors
  Constructor 258
  in IccUserId class 258
IccValue
  in Foundation Classes: reference 45
IccValue structure
  CVDA 259
Id
  in IccResourceId class 166
Id
  in Resource identification classes 7
id (parameter)
  in Constructor 72, 106, 109, 116, 129, 133, 135, 139,
  141, 147, 150, 152, 156, 162, 170, 174, 177, 195, 213,
  218, 220, 251, 253, 254, 258
  in getFile 198
  in operator= 73, 105, 110, 129, 134, 140, 142, 147,
  151, 157, 162, 171, 195, 219, 220, 251–253, 259
id (parameter) (continued)
in setJournalTypeId 136
in signon 233
in waitOnAlarm 210
ifSOSReturnCondition
in StorageOpts 212
ignoreAbendHandler
in AbendHandlerOpt 211
immediate
in NextTransIdOpt 237
index (parameter)
in Constructor 116, 130
in registerRecordIndex 123
in reset 132
Inherited protected methods
in IccAbendData class 67
in IccAbsTime class 71
in IccAlarmRequestId class 74
in IccBuf class 88
in ICClock class 93
in ICCConsole class 99
in ICCControl class 104
in ICCConvId class 105
in ICCDataQueue class 108
in ICCDataQueueId class 110
in ICCEvent class 112
in ICCException class 115
in ICCFile class 127
in ICCFileId class 130
in ICCFileIterator class 132
in ICCGroupId class 134
in ICCJournal class 141
in ICCJournalTypeId class 142
in ICCKey class 146
in ICCLockId class 148
in ICCMessage class 150
in ICCPartnerId class 151
in ICCProgram class 155
in ICCProgramId class 157
in ICCRBA class 159
in ICCRecordIndex class 161
in ICCRequestId class 163
in ICCSemaphore class 171
in ICCSession class 176
in ICCStartRequestQ class 193
in ICcSysId class 195
in ICCSystem class 200
in ICCTask class 210
in ICCTempStore class 216
in ICCTempStoreId class 219
in ICCTermId class 220
in ICCTerminal class 235
in ICCTerminalData class 243
in ICCTime class 246
in ICCTimeInterval class 248
in ICCTimeOfDay class 250
in ICCTransId class 254
in ICCUser class 257
in ICCUserId class 259
Inherited public methods
in IccAbendData class 66

Inherited public methods (continued)
in IccAbsTime class 71
in IccAlarmRequestId class 74
in IccBuf class 88
in ICClock class 92
in ICCConsole class 98
in ICCControl class 103
in ICCConvId class 105
in ICCDataQueue class 108
in ICCDataQueueId class 110
in ICCEvent class 112
in ICCException class 115
in ICCFile class 126
in ICCFileId class 129
in ICCFileIterator class 132
in ICCGroupId class 134
in ICCJournal class 138
in ICCJournalId class 140
in ICCJournalTypeId class 142
in ICCKey class 146
in ICCLockId class 147
in ICCMessage class 149
in ICCPartnerId class 151
in ICCProgram class 155
in ICCProgramId class 157
in ICCRBA class 159
in ICCRecordIndex class 161
in ICCRequestId class 163
in ICCSemaphore class 171
in ICCRRN class 173
in ICCSession class 176
in ICCStartRequestQ class 193
in ICcSysId class 195
in ICCSystem class 200
in ICCTask class 210
in ICCTempStore class 216
in ICCTempStoreId class 219
in ICCTermId class 220
in ICCTerminal class 235
in ICCTerminalData class 243
in ICCTime class 245
in ICCTimeInterval class 247
in ICCTimeOfDay class 250
in ICCTPNameId class 252
in ICCTransId class 253
in ICCUser class 257
in ICCUserId class 259

initByte (parameter)
in getStorage 198, 199, 205
initData
in ICCControl class 101
in Public methods 101
initializeEnvironment
in Functions 59
in ICC structure 59
in Method level 37
in Storage management 42
initRBA (parameter)
in Constructor 158
initRRN (parameter)
in Constructor 172
initValue (parameter)
in Constructor 143
inputCursor
  in IccTerminal class 223
insert
  in Example of Temporary Storage 26
  in IccBuf class 82
  in IccBuf constructors 13
Installed contents
  Location 2
instance
  in IccAbendData class 65
  in IccConsole class 96
  in IccControl class 101
  in IccStartRequestQ class 189
  in IccSystem class 199
  in IccTask class 205
  in IccTerminal class 223
  in Singleton classes 12
internal
  in DataAreaOwner 88
internalError
  in C++ Exceptions and the Foundation Classes 34
  in Type 115
interval (parameter)
  in setReplyTimeout 97
invalidArgument
  in C++ Exceptions and the Foundation Classes 34
  in Type 115
invalidMethodCall
  in C++ Exceptions and the Foundation Classes 34
  in Type 115
invalidPasswordAttempts
  in IccUser class 256
isAddable
  in IccFile class 119
  in Writing ESDS records 16
  in Writing KSDS records 16
  in Writing RRDS records 17
isAPLKeyboard
  in IccTerminalData class 239
  in Public methods 239
isAPLText
  in IccTerminalData class 239
  in Public methods 239
isBrowsable
  in IccFile class 119
isBTrans
  in IccTerminalData class 239
isClassMemoryMgmtOn
  in Functions 59
  in Icc structure 59
isColor
  in IccTerminalData class 240
isCommandSecurityOn
  in IccTask class 205
isCommitSupported
  in IccTask class 206
isCreated
  in IccControl class 101
isDeletable
  in IccFile class 119
isDumpAvailable
  in IccAbendData class 65
isEDFOn
  in Functions 59
isEDFOn (continued)
  in Icc structure 59
  in IccResource class 166
isEmptyOnOpen
  in IccFile class 120
isErrorSet
  in IccSession class 181
isEWA
  in IccTerminalData class 240
isExpired
  in IccAlarmRequestId class 73
isExtended3270
  in IccTerminalData class 240
  in Public methods 240
isFamilySubsetEnforcementOn
  in Functions 60
  in Icc structure 60
isFieldOutline
  in IccTerminalData class 240
  in Public methods 240
isFMHContained
  in IccBuf class 82
  in Public methods 82
isGoodMorning
  in IccTerminalData class 241
  in Public methods 241
isHighlight
  in IccTerminalData class 241
isKatakana
  in IccTerminalData class 241
isMSRControl
  in IccTerminalData class 241
isNoDataSet
  in IccSession class 181
isPS
  in IccTerminalData class 242
ISR2
  in Example of starting transactions 22
isReadable
  in IccFile class 120
  in Reading ESDS records 16
  in Reading KSDS records 15
  in Reading RRDS records 16
isReadable method 15, 16
isRecoverable
  in IccFile class 120
isResourceSecurityOn
  in IccResource class 166
isReset
  in IccTask class 206
isRestarted
  in IccTask class 206
isRouteOptionOn
  in IccResource class 166
  in Public methods 166
isSignalSet
  in IccSession class 181
isSOSI
  in IccTerminalData class 242
isStartDataAvailable
  in IccTask class 206
issueAbend
  in IccSession class 181
issueConfirmation
  in IccSession class 181
issueError
issueError (continued)
in IccSession class 182
issuePrepare
in IccSession class 182
issueSignal
in IccSession class 182
isTextKeyboard
in IccTerminalData class 242
in Public methods 242
isTextPrint
in IccTerminalData class 242
in Public methods 242
isUpdatable
in IccFile class 121
isValidation
in IccTerminalData class 243
item (parameter)
in rewriteItem 215
in writeItem 107, 216
itemNum (parameter)
in readItem 215
in rewriteItem 215
ITMP
in Example of starting transactions 22

J
journalNum (parameter)
in Constructor 135, 139
in operator= 140
journalTypeId
in IccJournal class 135
journalTypeName (parameter)
in Constructor 141
in operator= 142
jtypeid (parameter)
in setJournalTypeId 136

K
key
complete 15
generic 15
key (parameter)
in Constructor 143
in Example of file control 18
in operator= 145
in operator= 144
in operator= 144
keyLength
in IccFile class 121
in Reading KSDS records 15
in Writing KSDS records 16
keyLength method 15
keyPosition
in IccFile class 121
in Reading KSDS records 15
in Writing KSDS records 16
keyPosition method 15
kind
in IccKey class 144
Kind
in Enumerations 146
Kind (continued)
in IccKey class 146
kind (parameter)
in Constructor 143
in setKind 145
KSDS
in File control 15
KSDS file 15
L
language
in IccUser class 256
language (parameter)
in setLanguage 256
lastCommand
in StateOpt 187
lastPasswordChange
in IccUser class 256
lastUseTime
in IccUser class 256
length
in IccProgram class 153
in IccRecordIndex class 160
length (parameter)
in append 80
in assign 80, 143
in Constructor 78, 79
in cut 81
in insert 82
in overlay 87
in replace 87
in setDataLength 87, 88
level (parameter)
in connectProcess 178, 179
level0
in SyncLevel 187
level1
in SyncLevel 187
level2
in SyncLevel 188
life (parameter)
in Constructor 174
lifeTime
in IccSemaphore class 175
LifeTime
in Enumerations 176
in IccSemaphore class 176
line
in Finding out information about a terminal 27
in IccTerminal class 223
lineNum (parameter)
in setLine 232
link
in IccProgram class 153
load
in IccProgram class 154
LoadOpt
in Enumerations 156
in IccProgram class 156
loc (parameter)
in Constructor 213, 214
Location
in Dynamic link library 2
Location (continued)
in Enumerations 217
in Header files 2
in IccTempStore class 217
in Installed contents 2
in Sample source code 2
lock
in IccSemaphore class 175

LockType
in Enumerations 176
in IccSemaphore class 176

M
main
in C++ Exceptions and the Foundation Classes 33
in Example of file control 18
in Example of managing transient data 24
in Example of polymorphic behavior 41
in Example of starting transactions 21
in Example of Temporary Storage 26
in Example of terminal control 28
in Example of time and date services 29
in Header files 2, 31
in main function 260
in Program control 19
in Storage management 42
majorCode
in ConditionType 169
manual
in UpdateMode 94
 Manual condition handling (noAction)
in CICS conditions 35
in Conditions, errors, and exceptions 35
maxValue
in Range 95
mem (parameter)
in initializeEnvironment 59
memory
in Location 217
message
in IccException class 113
message (parameter)
in Constructor 113
in setNextInputMessage 233
method
in Foundation Classes—reference
45
Method level
in Conditions, errors, and exceptions 37
in Platform differences 37
methodName
in IccEvent class 111
in IccException class 114
in IccMessage class 149
methodName (parameter)
in Constructor 110, 111, 113, 148
milliSeconds
in IccAbsTime class 69
in IccClock class 91
minorCode
in ConditionType 170
minutes
in IccAbsTime class 69

minutes (continued)
in IccTime class 244
minutes (parameter)
in Constructor 244, 246, 247, 249
in set 247, 249
Miscellaneous
 Example of polymorphic behavior 41
mixed
in Case 236
mode (parameter)
in readNextRecord 131
in readPreviousRecord 131
in readRecord 122
monthOfYear
in Example of time and date services 29
in IccAbsTime class 69
in IccClock class 91
MonthOfYear
in Enumerations 94
in IccClock class 94
msg (parameter)
in clearInputMessage 153
in registerInputMessage 154
in setInputMessage 154
MVS/ESA
in ClassMemoryMgmt 61
in Storage management 42
MVSPost
in WaitPostType 213
MyTempStore
 in Automatic condition handling (callHandleEvent) 36

N
N
in operatingSystem 199
name
in IccResource class 166
in IccResourceId class 170
name (parameter)
in Constructor 72, 147, 194, 218, 219, 251, 252, 258
in operator= 147, 195, 218, 220, 251, 253, 258
in setWaitText 208
nameLength
in IccResourceId class 171
NameOpt
in Enumerations 78
in IccBase class 78
netName
in IccTerminal class 223
neutral
in Color 236
new
in Storage management 42
new operator 5
newPassword (parameter)
in changePassword 255
in signon 233, 234
NextTransIdOpt
in Enumerations 237
in IccTerminal class 237
noAccess
in Access 127
noAction
operator= (continued)
in IccLockId class 147
in IccPartnerId class 151
in IccRequestId class 156, 157
in IccRBAClass 158
in IccResourceId class 159
in IccResourceLockId class 171
in IccSysId class 172
in IccTempStoreId class 178
in IccTermId class 220
in IccTimeInterval class 247
in IccTimeOfDay class 249
in IccTPNameId class 251
in IccTransId class 253
in IccUserId class 258, 259
in Protected methods 171
in Public methods 69, 247
in Working with IccResource subclasses 14

operator==
in IccBuf class 84
in IccKey class 144
in IccRBAClass 158
in IccRRN class 172

opt (parameter)
in abendCode 62, 63
in access 117
in accessMethod 117
in alternateHeight 237
in alternateWidth 238
in ASRAInterrupt 63
in ASRAKeyType 63
in ASRAPSW 64
in ASRAS_registers 64
in ASRASpaceType 64
in ASRASStorageType 65
in className 75
in defaultHeight 238
in defaultWidth 238
in enableStatus 118
in enterTrace 204
in graphicCharCodeSet 238
in graphicCharSetId 239
in height 222
in isAddable 119
in isAPLKeyboard 239
in isAPLText 239
in isBrowsable 119
in isBTrans 239
in isColor 240
in isDeletable 119, 120
in isDumpAvailable 65
in isEmptyOpen 120
in isEWA 240
in isExtended3270 240
in isFieldOutline 240
in isGoodMorning 241
in isHighlight 241
in isKatakana 241
in isMSRControl 241
in isPS 242
in isReadable 120
in isRecoverable 120
in isSOSI 242

opt (parameter) (continued)
in isTextKeyboard 242
in isTextPrint 242
in isUpdatable 121
in isValidation 243
in keyLength 121
in keyPosition 121
in link 153
in load 154
in openStatus 122
in originalAbendCode 66
in principalSysId 207
in priority 207
in programName 66
in recordFormat 122, 123
in recordLength 123
in rewriteItem 215
in setNextTransId 233
in type 125
in userId 209
in waitExternal 209
in width 235
in write 98
in writeAndGetReply 98
in writeItem 216

opt1 (parameter)
in abend 202

opt2 (parameter)
in abend 202

option (parameter)
in allocate 178
in retrieveData 190
in send 183, 184
in sendInvite 184
in sendLast 184, 185
in state 185
in stateText 186
in wait 137
in writeRecord 137, 138

Options
in Enumerations 138
in IccJournal class 138

options (parameter)
in Constructor 135

opts (parameter)
in setDumpOpts 207

originalAbendCode
in IccAbendData class 66

Other data sets for CICS
in Installed contents 3

overlay
in IccBuf class 87

overview of Foundation Classes 6

Overview of the foundation classes
Calling methods on a resource object 12
Creating a resource object 11

P

PA1 to PA3
in AIDVal 236

packedDecimal
in IccAbsTime class 69

Parameter level
Parameter level (continued)
in Conditions, errors, and exceptions 37
in Platform differences 37
parameter passing 42
Parameter passing conventions
in Miscellaneous 42
partnerName (parameter)
in Constructor 150
in operator= 151
password (parameter)
in changePassword 255
in signon 233, 234
in verifyPassword 257
passwordExpiration
in IccUser class 256
PF1 to PF24
in AIDVal 236
pink
in Color 236
PIP (parameter)
in connectProcess 178, 179
PIPList
in IccSession class 182
platform differences
method level 37
object level 37
parameter level 37
Platform differences
in Conditions, errors, and exceptions 36
Method level 37
Object level 37
Parameter level 37
platformError
in Type 115
Platforms
in Enumerations 62
in Icc structure 62
polymorphic behavior 38
Polymorphic Behavior
Example of polymorphic behavior 41
in Miscellaneous 38
popt (parameter)
in setStartOpts 192
prefix (parameter)
in registerPrefix 136
in setPrefix 136, 137
pri (parameter)
in setPriority 208
principalSysId
in IccTask class 207
in Public methods 207
print
in Polymorphic Behavior 40
priority
in IccTask class 207
in Public methods 207
process
in IccSession class 182
profile (parameter)
in Constructor 177
progName (parameter)
in Constructor 152, 156
in operator= 156, 157
program control (continued)
extample 19
introduction 19
Program control
in Using CICS Services 19
programId
in IccControl class 101
in Method level 37
in Public methods 101
programId (parameter)
in setAbendHandler 102
programName
in IccAbendData class 66
in Public methods 66
programName (parameter)
in setAbendHandler 102
Protected methods
in IccBase class 76
in IccResourceId class 171
operator= 171
setClassName 76
setCustomClassNum 76
ProtectOpt
in Enumerations 194
in IccStartRequestQ class 194
pStorage (parameter)
in freeStorage 197
Public methods
abend 202
abendCode 62
abendDate 202
absTime 89
access 117
accessMethod 117
actionOnCondition 164
actionOnConditionAsChar 164
actionsOnConditionsText 165
address 152
AID 221
allocate 178
alternateHeight 237
alternateWidth 238
append 80
applName 196
ASRAInterrupt 63
ASRAKeyType 63
ASRARegisters 64
ASRASpaceType 65
assign 80, 81, 143
beginBrowse 196, 197
beginInsert (VSAM only) 117
callingProgramId 100
cancel 188
cancelAbendHandler 100
cancelAlarm 89
cchangePassword 255
className 75, 111, 113, 149
classType 75, 111, 113
clear 106, 165, 214, 221
clearData 189
clearInputMessage 153
clearPrefix 135
<table>
<thead>
<tr>
<th>Public methods (continued)</th>
</tr>
</thead>
<tbody>
<tr>
<td>commArea 100</td>
</tr>
<tr>
<td>commitUOW 203</td>
</tr>
<tr>
<td>completeLength 143</td>
</tr>
<tr>
<td>condition 111, 165</td>
</tr>
<tr>
<td>conditionText 111, 165</td>
</tr>
<tr>
<td>connectProcess 178, 179</td>
</tr>
<tr>
<td>console 100</td>
</tr>
<tr>
<td>converse 179</td>
</tr>
<tr>
<td>convId 180</td>
</tr>
<tr>
<td>cursor 222</td>
</tr>
<tr>
<td>customClassNum 75</td>
</tr>
<tr>
<td>cut 81</td>
</tr>
<tr>
<td>data 189, 222</td>
</tr>
<tr>
<td>dataArea 81</td>
</tr>
<tr>
<td>dataAreaLength 81</td>
</tr>
<tr>
<td>dataAreaOwner 82</td>
</tr>
<tr>
<td>dataAreaType 82</td>
</tr>
<tr>
<td>dataLength 82</td>
</tr>
<tr>
<td>date 68, 90</td>
</tr>
<tr>
<td>dateFormat 197</td>
</tr>
<tr>
<td>dayOfMonth 68, 90</td>
</tr>
<tr>
<td>dayOfWeek 68, 90</td>
</tr>
<tr>
<td>daysSince1900 68, 91</td>
</tr>
<tr>
<td>daysUntilPasswordExpires 255</td>
</tr>
<tr>
<td>defaultHeight 238</td>
</tr>
<tr>
<td>defaultWidth 238</td>
</tr>
<tr>
<td>delay 203</td>
</tr>
<tr>
<td>deleteLockedRecord 118</td>
</tr>
<tr>
<td>deleteRecord 118</td>
</tr>
<tr>
<td>dump 203</td>
</tr>
<tr>
<td>empty 106, 214</td>
</tr>
<tr>
<td>enableStatus 118</td>
</tr>
<tr>
<td>endBrowse 197</td>
</tr>
<tr>
<td>endInsert (VSAM only) 119</td>
</tr>
<tr>
<td>enterTrace 204</td>
</tr>
<tr>
<td>entryPoint 153</td>
</tr>
<tr>
<td>erase 222</td>
</tr>
<tr>
<td>errorCode 180</td>
</tr>
<tr>
<td>ESMReason 255</td>
</tr>
<tr>
<td>ESMResponse 255</td>
</tr>
<tr>
<td>extractProcess 180</td>
</tr>
<tr>
<td>facilityType 204</td>
</tr>
<tr>
<td>flush 180</td>
</tr>
<tr>
<td>free 180</td>
</tr>
<tr>
<td>freeKeyboard 222</td>
</tr>
<tr>
<td>freeStorage 197, 204</td>
</tr>
<tr>
<td>get 107, 165, 181, 214, 222</td>
</tr>
<tr>
<td>getHeader 198</td>
</tr>
<tr>
<td>getNextFile 198</td>
</tr>
<tr>
<td>getStorage 198, 205</td>
</tr>
<tr>
<td>graphicCharCodeSet 238</td>
</tr>
<tr>
<td>graphicCharSetId 239</td>
</tr>
<tr>
<td>groupId 255</td>
</tr>
<tr>
<td>handleEvent 165</td>
</tr>
<tr>
<td>height 222</td>
</tr>
<tr>
<td>hours 69, 244</td>
</tr>
<tr>
<td>id 166</td>
</tr>
<tr>
<td>in IccAbendData class 62</td>
</tr>
<tr>
<td>in IccAbsTime class 68</td>
</tr>
<tr>
<td>in IccAlarmRequestClass 73</td>
</tr>
<tr>
<td>in IccBase class 75</td>
</tr>
<tr>
<td>in IccBuf class 80</td>
</tr>
<tr>
<td>in IccClock class 89</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Public methods (continued)</th>
</tr>
</thead>
<tbody>
<tr>
<td>in IccConsole class 96</td>
</tr>
<tr>
<td>in IccControl class 100</td>
</tr>
<tr>
<td>in IccConvId class 105</td>
</tr>
<tr>
<td>in IccDataQueue class 106</td>
</tr>
<tr>
<td>in IccDataQueueId class 109</td>
</tr>
<tr>
<td>in IccEvent class 111</td>
</tr>
<tr>
<td>in IccException class 113</td>
</tr>
<tr>
<td>in IccFile class 117</td>
</tr>
<tr>
<td>in IccFileId class 129</td>
</tr>
<tr>
<td>in IccFileIterator class 131</td>
</tr>
<tr>
<td>in IccGroupId class 133</td>
</tr>
<tr>
<td>in IccJournal class 135</td>
</tr>
<tr>
<td>in IccJournalId class 140</td>
</tr>
<tr>
<td>in IccJournalType class 141</td>
</tr>
<tr>
<td>in IccKey class 143</td>
</tr>
<tr>
<td>in IccLockId class 147</td>
</tr>
<tr>
<td>in IccMessage class 149</td>
</tr>
<tr>
<td>in IccPartnerId class 150</td>
</tr>
<tr>
<td>in IccProgram class 152</td>
</tr>
<tr>
<td>in IccProgramId class 156</td>
</tr>
<tr>
<td>in IccRBA class 158</td>
</tr>
<tr>
<td>in IccRecordIndex class 160</td>
</tr>
<tr>
<td>in IccRequestId class 162</td>
</tr>
<tr>
<td>in IccResource class 164</td>
</tr>
<tr>
<td>in IccResourceId class 170</td>
</tr>
<tr>
<td>in IccRRN class 172</td>
</tr>
<tr>
<td>in IccSemaphore class 175</td>
</tr>
<tr>
<td>in IccSession class 178</td>
</tr>
<tr>
<td>in IccStartRequest class 188</td>
</tr>
<tr>
<td>in IccSysId class 195</td>
</tr>
<tr>
<td>in IccSystem class 196</td>
</tr>
<tr>
<td>in IccTask class 202</td>
</tr>
<tr>
<td>in IccTempStore class 214</td>
</tr>
<tr>
<td>in IccTempStoreId class 218</td>
</tr>
<tr>
<td>in IccTermId class 220</td>
</tr>
<tr>
<td>in IccTerminal class 221</td>
</tr>
<tr>
<td>in IccTerminalData class 237</td>
</tr>
<tr>
<td>in IccTime class 244</td>
</tr>
<tr>
<td>in IccTimeInterval class 247</td>
</tr>
<tr>
<td>in IccTimeOfDay class 249</td>
</tr>
<tr>
<td>in IccTPNameId class 251</td>
</tr>
<tr>
<td>in IccTransId class 253</td>
</tr>
<tr>
<td>in IccUser class 255</td>
</tr>
<tr>
<td>in IccUserId class 258</td>
</tr>
<tr>
<td>in IccUserRole class 258</td>
</tr>
<tr>
<td>initData 101</td>
</tr>
<tr>
<td>inputCursor 223</td>
</tr>
<tr>
<td>instance 65, 96, 101, 189, 199, 205, 223</td>
</tr>
<tr>
<td>invalidPasswordAttempts 256</td>
</tr>
<tr>
<td>isAddable 119</td>
</tr>
<tr>
<td>isAPLKeyboard 239</td>
</tr>
<tr>
<td>isAPLText 239</td>
</tr>
<tr>
<td>isBrowsable 119</td>
</tr>
<tr>
<td>isBTrans 239</td>
</tr>
<tr>
<td>isColor 240</td>
</tr>
<tr>
<td>isCommandSecurityOn 205</td>
</tr>
<tr>
<td>isCommitSupported 206</td>
</tr>
<tr>
<td>isCreated 101</td>
</tr>
<tr>
<td>isDeletable 119</td>
</tr>
<tr>
<td>isDumpAvailable 65</td>
</tr>
<tr>
<td>isEDFOn 166</td>
</tr>
<tr>
<td>isEmptyOnOpen 120</td>
</tr>
</tbody>
</table>
Public methods (continued)

isErrorSet 181
isEWA 240
isExpired 73
isExtended3270 240
isFieldOutline 240
isFMHContained 82
isGoodMorning 241
isHighlight 241
isKatakana 241
isMSRControl 241
isNoDataSet 181
isPS 242
isReadable 120
isRecoverable 120
isResourceSecurityOn 206
isRestarted 206
isRouteOptionOn 166
isSignalSet 181
issueAbend 181
issueConfirmation 181
issueError 182
issuePrepare 182
issueSignal 182
isTextKeyboard 242
isTextPrint 242
isUpdateable 121
isValidation 243
journalTypeId 135
keyLength 121
keyPosition 121
kind 144
language 256
lastPasswordChange 256
lastUseTime 256
length 153, 160
lifeTime 175
line 223
link 153
load 154
lock 175
message 113
methodName 111, 114, 149
milliSeconds 69, 91
minutes 69, 244
monthOfYear 69, 91
name 166, 170
nameLength 171
netName 223
number 114, 140, 149, 159, 173, 206
numberOfItems 214
openStatus 121
operatingSystem 199
operatingSystemLevel 199
operator const char* 83
operator delete 75
operator new 76
operator!= 84, 145, 159, 173
operator== 84, 86, 223–226
operator+= 83, 84

Public methods (continued)

operator= 69, 73, 83, 105, 109, 129, 133, 134, 140–142, 144, 147, 151, 156–158, 162, 172, 195, 218, 220, 247, 249, 251, 253, 258, 259
operator-= 84, 144, 158, 172
originalAbendCode 66
overlay 87
packedDecimal 69
passwordExpiration 256
PIPList 182
principalSysId 207
priority 207
process 182
programId 101
programName 66
put 96, 107, 136, 166, 183, 214, 226
queueName 189
readItem 107, 215
readNextItem 215
readNextRecord 131
readPreviousRecord 131
readRecord 122
receive 183, 226
receive3270Data 227
recordFormat 122
recordIndex 123
recordLength 123
registerData 189
registerInputMessage 154
registerPrefix 136
registerRecordIndex 123
release 199
releaseText 200
replace 87
replyTimeout 96
reset 131, 190
resetAbendHandler 101
resetRouteCodes 96
retrievedata 190
returnProgramId 102
returnTermId 190
returnTransId 190
rewriteItem 215
rewriteRecord 124
rollbackuow 207
routeOption 167
run 102
seconds 70, 244
send 183, 227, 228
send3270Data 228, 229
sendInvite 184
sendLast 184, 185
sendLine 229, 230
session 102
set 247, 249
setAbendHandler 102
setAccess 124
setActionOnAnyCondition 167
setActionOnCondition 167
setActionsOnConditions 167
setAlarm 91

Index 295
Public methods (continued)

- setAllRouteCodes
- setColor
- setCursor
- setData
- setDataLength
- setDumpOpts
- setEDF
- setEmptyOnOpen
- setFMHContained
- setHighlight
- setInputMessage
- setJournalTypeId
- setKind
- setLanguage
- setLine
- setNewLine
- setNextCommArea
- setNextInputMessage
- setNextTransId
- setPrefix
- setPriority
- setQueueName
- setReplyTimeout
- setReturnTermId
- setReturnTransId
- setRouteCodes
- setRouteOption
- setStartOpts
- setStatus
- setTimerECA
- setWaitText
- signoff
- signon
- start
- startRequestQ
- startType
- state
- stateText
- summary
- suspend
- syncLevel
- sysId
- system
- task
- terminal
- text
- time
- timeInHours
- timeInMinutes
- timeInSeconds
- timerECA
- transId
- triggerDataQueueId
- tryLock
- type
- unload
- unlock
- unlockRecord
- update
- userId
- verifyPassword
- wait
- waitExternal
- waitForAID
- waitOnAlarm
- width
- workArea
- write
- writeAndGetReply
- writeItem
- writeRecord
- year
- purgeable
- put
- Q
- queue
- R
- rAbendTask
- Range
- rba
- rContinue
- readable
- reading data
- Reading data
- Reading ESDS records
- Reading items

296 CICS TS for z/OS: C++ OO Class Libraries
Reading items (continued)
in Temporary storage 25
in Using CICS Services 25
Reading KSDS records
in File control 15
in Reading records 15
Reading records
in File control 15
in Using CICS Services 15
Reading ESDS records 16
Reading KSDS records 15
Reading RRDS records 16
Reading RRDS records
in File control 16
in Reading records 16
readItem
in Example of Temporary Storage 26
in IccDataQueue class 107
in IccTempStore class 215
in Reading data 24
in Reading items 25
in Scope of data in IccBuf reference returned from 'read'
methods 43
in Temporary storage 25
in Transient Data 23
in Working with IccResource subclasses 14
ReadMode
in Enumerations 127
in IccFile class 127
readNextItem
in IccTempStore class 215
in Scope of data in IccBuf reference returned from 'read'
methods 43
in Temporary storage 25
readNextRecord
in Browsing records 17
in IccFileIterator class 131
in Public methods 131
readNextRecord method 17
READONLY
in ASRAStorageType 65
readPreviousRecord
in Browsing records 17
in IccFileIterator class 131
readRecord
in C++ Exceptions and the Foundation Classes 34
in Deleting locked records 17
in IccFile class 122
in Reading records 15
in Updating records 17
readRecord method 15
receive
in IccSession class 183
in IccTerminal class 226
in Receiving data from a terminal 27
receive3270data
in Receiving data from a terminal 27
receive3270Data
in IccTerminal class 227
in Public methods 227
receiving data from a terminal 27
Receiving data from a terminal
in Terminal control 27
in Using CICS Services 27
record (parameter)
in writeRecord 137
recordFormat
in IccFile class 122
in Reading ESDS records 16
in Reading RRDS records 16
in Writing ESDS records 16
in Writing RRDS records 17
recordFormat method 16
recordIndex
in IccFile class 123
in Reading ESDS records 16
in Reading KSDS records 15
in Reading RRDS records 16
in Writing ESDS records 16
in Writing KSDS records 16
in Writing RRDS records 17
recordIndex method 15, 16
recordLength
in IccFile class 123
in Reading ESDS records 16
in Reading KSDS records 15
in Reading RRDS records 16
in Writing ESDS records 16
in Writing KSDS records 16
in Writing RRDS records 17
recordLength method 15, 16
red
in Color 236
registerData
in Example of starting transactions 22
in IccStartRequestQ class 189
in Starting transactions 20
registerInputMessage
in IccTerminal class 154
registerPrefix
in IccJournal class 136
in Public methods 136
registerRecordIndex
in IccFile class 123
in Reading ESDS records 16
in Reading KSDS records 15
in Reading RRDS records 16
in Writing ESDS records 16
in Writing KSDS records 16
in Writing RRDS records 17
registerRecordIndex method 15
relative byte address 15
relative record number 15
release
in IccSystem class 199
releaseAtTaskEnd
in LoadOpt 156
releaseText
in IccSystem class 200
remoteTermId
in Example of starting transactions 22
replace
in IccBuf class 87
in IccBuf constructors 13
replyTimeout
in IccConsole class 96
req
scope of data 43
Scope of data in IccBuf reference returned from 'read'
methods
in Miscellaneous 43
scope of references 43
SDFHLOAD 3
SDFHPROC 3
SDFHSOCK 3
search (parameter)
in Constructor 130
in reset 132
SearchCriterion
in Enumerations 128
in IccFile class 128
seconds
in IccAbsTime class 70
in IccTime class 244
seconds (parameter)
in Constructor 244, 246, 247, 249
in set 247, 249, 250
in setReplyTimeout 97
send
in Example of terminal control 28
in IccSession class 183
in IccTerminal class 227, 228
send (parameter)
in converse 179
in put 96
in send 183
in sendInvite 184
in sendLast 184
in write 98
in writeAndGetReply 98
send3270Data
in IccTerminal class 228, 229
sending data to a terminal 27
Sending data to a terminal
in Terminal control 27
in Using CICS Services 27
sendInvite
in IccSession class 184
sendLast
in IccSession class 184, 185
sendLine
in Example of file control 18
in Example of terminal control 28
in IccTerminal class 229, 230
SendOpt
in Enumerations 187
in IccSession class 187
sequential reading of files 17
session
in FacilityType 212
in IccControl class 102
set
in IccTimeInterval class 247
in IccTimeOfDay class 249
set (parameter)
in boolText 58
set...
in Sending data to a terminal 27
setAbendHandler
in IccControl class 102
setAccess (continued)
in IccFile class 124
setActionOnAnyCondition
in IccResource class 167
setActionOnCondition
in IccResource class 167
setActionsOnConditions
in IccResource class 167
setAlarm
in IccAlarmRequestId class 72
in IccClock class 91
setAllRouteCodes
in IccConsole class 97
setClassName
in IccBase class 76
in Protected methods 76
setColor
in Example of terminal control 28
in IccTerminal class 231
setCursor
in IccTerminal class 231
setCustomClassNum
in IccBase class 76
in Protected methods 76
setData
in IccStartRequestQ class 190
in Starting transactions 20
setDataLength
in IccBuf class 87
setDumpOpts
in IccTask class 207
setEDF
in Functions 60
in Icc structure 60
in IccResource class 168
setEmptyOnOpen
in IccFile class 124
in Public methods 124
setFMHContained
in IccBuf class 88
in Public methods 88
setHighlight
in Example of terminal control 28
in IccTerminal class 231
setInputMessage
in IccProgram class 154
in Public methods 154
setJournalTypeId
in IccJournal class 136
setKind
in Example of file control 18
in IccKey class 145
setLanguage
in IccUser class 256
setLine
in IccTerminal class 232
setNewLine
in IccTerminal class 232
setNextCommArea
in IccTerminal class 232
in Public methods 232
setNextInputMessage
in IccTerminal class 232
setNextTransId
setNextTransId (continued)  
in IccTerminal class 233
setPrefix  
in IccJournal class 136
setPriority  
in IccTask class 208  
in Public methods 208
setQueueName  
in Example of starting transactions 22  
in IccStartRequestQ class 191  
in Starting transactions 20
setReplyTimeout  
in IccConsole class 97
setReturnTermId  
in Example of starting transactions 22  
in IccStartRequestQ class 191  
in Starting transactions 20
setReturnTransId  
in Example of starting transactions 22  
in IccStartRequestQ class 191, 192  
in Starting transactions 21
setRouteCodes  
in IccConsole class 97
setRouteOption  
in Example of starting transactions 22, 23  
in IccResource class 168  
in Program control 20  
in Public methods 168
setStartOpts  
in IccStartRequestQ class 192
setStatus  
in IccFile class 125
setTimerECA  
in IccAlarmRequestId class 73
setWaitText  
in IccTask class 208
Severe error handling (abendTask)  
in CICS conditions 36  
in Conditions, errors, and exceptions 36
SeverityOpt  
in Enumerations 99  
in IccConsole class 99
signoff  
in IccTerminal class 233
signon  
in IccTerminal class 233, 234  
in Public methods 233, 234
singleton class 11
Singleton classes  
in Creating a resource object 11  
in Using CICS resources 11
size (parameter)  
in getStorage 198, 199, 205  
in operator new 76
start  
in Example of starting transactions 23  
in IccRequestId class 161  
in IccStartRequestQ class 188, 192  
in Mapping EXEC CICS calls to Foundation Class methods 46  
in Parameter passing conventions 42  
in Starting transactions 21
Starting transactions  
in Starting transactions asynchronously 20
Starting transactions (continued)  
in Using CICS Services 20
starting transactions asynchronously 20
Starting transactions asynchronously  
Accessing start data 21  
Cancelling unexpired start requests 21  
Example of starting transactions 21  
in Using CICS Services 20
Starting transactions 20
startTime  
in Options 139
startRequest  
in StartType 212
startRequestQ  
in Example of starting transactions 22, 23  
in IccControl class 103
startType  
in Example of starting transactions 23  
in IccTask class 208
StartType  
in Enumerations 212  
in IccTask class 212
state  
in IccSession class 185
StateOpt  
in Enumerations 187  
in IccSession class 187
stateText  
in IccSession class 186
Status  
in Enumerations 128  
in IccFile class 128
status (parameter)  
in setStatus 125
Storage management  
in Miscellaneous 42
StorageOpt  
in Enumerations 212  
in IccTask class 212
storageOpt (parameter)  
in getStorage 198, 199, 205
storeName (parameter)  
in Constructor 213
SUBSPACE  
in ASRASpaceType 64
summary  
in IccEvent class 112  
in IccException class 114  
in IccMessage class 149
support classes 10
Support Classes  
in Overview of the foundation classes 10
suppressDump  
in AbendDumpOpt 211
suspend  
in IccTask class 208  
in NoSpaceOpt 217
synchronous  
in Options 139
syncLevel  
in IccSession class 186
SyncLevel  
in Enumerations 187  
in IccSession class 187
sysId
  in IccSystem class 200
  in Constructor 177
  in setRouteOption 168
sysName
  parameter
  in Constructor 177
  in setRouteOption 168
system
  in IccControl class 103

T
  task
    in IccControl class 103
    in LifeTime 176
  temporary storage
    deleting items 26
    example 26
    introduction 25
    reading items 25
    updating items 25
    Writing items 25
  Temporary storage
    Deleting items 26
    Example of Temporary Storage 26
    in Using CICS Services 25
    Reading items 25
    Updating items 25
    Writing items 25
  termId
    parameter
    in setReturnTermId 191
    in start 192, 193
  terminal
    finding out about 27
    in FacilityType 212
    in IccControl class 103
    receiving data from 27
    sending data to 27
  terminal control
    example 27
    finding out information 27
    introduction 27
    receiving data 27
    sending data 27
  Terminal control
    Example of terminal control 27
    Finding out information about a terminal 27
    in Using CICS Services 27
    Receiving data from a terminal 27
    Sending data to a terminal 27
  terminalInput
    in StartType 212
  termName
    parameter
    in setReturnTermId 191
  Test
    in C++ Exceptions and the Foundation Classes 33
    parameter
    in boolText 58
  text
    in IccMessage class 149
    parameter
    in Constructor 79, 148
    in operator!= 145
  throw
    in C++ Exceptions and the Foundation Classes 32
    in Exception handling (throwException) 36
  throwException
    in ActionOnCondition 169
    in CICS conditions 35
  ti
    in Example of starting transactions 22, 23
  time
    in IccAbsTime class 70
    in IccClock class 92
  time
    parameter
    in Constructor 67, 247, 249
    in delay 203
    in setAlarm 91
    in start 192, 193
  Time and date services
    Example of time and date services 29
    in Using CICS Services 28
  time services 28
  timeInHours
    in IccAbsTime class 70
    in IccTime class 245
  timeInMinutes
    in IccAbsTime class 70
    in IccTime class 245
  timeInSeconds
    in IccAbsTime class 70
    in IccTime class 245
  timeInterval
    in Type 246
  timeInterval
    parameter
    in operator= 247
  timeOfDay
    in Type 246
  timeOfDay
    parameter
    in operator= 249
  timerECA
    in IccAlarmRequestId class 74
  timerECA
    parameter
    in Constructor 72
    in setTimerECA 73
  timeSeparator
    in Type 70, 92
  TPName
    parameter
    in connectProcess 179
  traceNum
    parameter
    in enterTrace 204
  TraceOpt
    in Enumerations 212
    in IccTask class 212
  tracing
    activating trace output 32
  transId
    in IccTask class 208
  transid
    parameter
    in setNextTransId 233
  transId
    parameter
    (continued)
transId (parameter) (continued)
in cancel 188
in connectProcess 179
in link 153
in setNextTransId 233
in setReturnTransId 191
in start 192, 193

transient data
deleting queues 24
evolution 24
introduction 23
reading data 24
Writing data 24

Transient Data
Deleting queues 24
Example of managing transient data 24
in Using CICS Services 23
Reading data 24
Writing data 24

transName (parameter)
in setReturnTransId 192

triggerDataQueueId
in IccTask class 208

trueFalse (parameter)
in setEmptyOnOpen 124

try
in C++ Exceptions and the Foundation Classes 32, 33
in Exception handling (throwException) 36
in main function 260

tryLock
in IccSemaphore class 175

tryNumber
in C++ Exceptions and the Foundation Classes 33
type
in C++ Exceptions and the Foundation Classes 34
in IccException class 114
in IccFile class 125
in IccRecordIndex class 160
in IccSemaphore class 175
in IccTime class 245

Type
in Enumerations 115, 161, 246
in IccException class 115
in IccFile class 125
in IccRecordIndex class 161
in IccSemaphore class 175
in IccTime class 245
type (parameter)
in condition 111, 165
in Constructor 74, 75, 78, 79, 160, 170, 174
in waitExternal 209
typeText
in IccException class 114

unlock
in IccSemaphore class 175
unlockRecord
in IccFile class 125
UOW
in LifeTime 176
updatable
in Access 127
update
in IccClock class 92
in ReadMode 128
update (parameter)
in Constructor 89
UpdateMode
in Enumerations 94
in IccClock class 94
updateToken (parameter)
in deleteLockedRecord 118
in readNextRecord 131
in readPreviousRecord 131
in readRecord 122
in rewriteRecord 124
in unlockRecord 125, 126

updating items 25
Updating items
in Temporary storage 25
in Using CICS Services 25

updating records 17
Updating records
in File control 17
in Using CICS Services 17

upper
in Case 236
USER
in ASRAStorageType 65
user (parameter)
in signon 234
userDataKey
in StorageOpts 212
USEREXECKEY
in ASRAKeyType 63

userId
in IccTask class 209

userName (parameter)
in Constructor 254
Using an object
in C++ Objects 6
using CICS resources 11
Using CICS resources
Calling methods on a resource object 12
Creating a resource object 11
in Overview of the foundation classes 11
Singleton classes 11

Using CICS Services
Accessing start data 21
Browsing records 17
Cancelling unexpired start requests 21
Deleting items 26
Deleting queues 24
Deleting records 17
Example of file control 17
Example of managing transient data 24
Using CICS Services (continued)
  Example of starting transactions 21
  Example of Temporary Storage 26
  Example of terminal control 27
  Example of time and date services 29
  Finding out information about a terminal 27
  Reading data 24
  Reading items 25
  Reading records 15
  Receiving data from a terminal 27
  Sending data to a terminal 27
  Starting transactions 20
  Updating items 25
  Updating records 17
  Writing data 24
  Writing items 25
  Writing records 16

V
value
  in IccKey class 145
value (parameter)
  in operator= 144
variable (parameter)
  in Foundation Classes—reference 45
verifyPassword
  in IccUser class 256
  in Public methods 256
VSAM 15

W
wait
  in IccJournal class 137
  in SendOpt 187
waitExternal
  ECBList (parameter)
    in waitExternal 209
  in IccTask class 209
  numEvents (parameter)
    in waitExternal 209
  opt (parameter)
    in waitExternal 209
  type (parameter)
    in waitExternal 209
waitForAID
  in Example of terminal control 28
  in IccTerminal class 234
waitOnAlarm
  in IccAlarmRequestId class 72
  in IccTask class 209
WaitPostType
  in Enumerations 213
  in IccTask class 213
WaitPurgeability
  in Enumerations 213
  in IccTask class 213
width
  in IccTerminal class 234
workArea
  in IccSystem class 200
workArea (continued)
    in IccTask class 210
    in IccTerminal class 235
Working with IccResource subclasses
  in Buffer objects 14
  in IccBuf class 14
write
  in IccConsole class 98
writeAndGetReply
  in IccConsole class 98
writeItem
  in C++ Exceptions and the Foundation Classes 34
  in Calling methods on a resource object 12
  in IccDataQueue class 107
  in IccTempStore class 216
  in Temporary storage 25
  in Transient Data 23
  in Working with IccResource subclasses 14
  in Writing data 24
  in Writing items 25
writeRecord
  in Example of file control 18
  in IccFile class 126
  in IccJournal class 137
  in Writing KSDS records 16
  in Writing records 16
  in Writing RRDS records 16
writeRecord method
  IccFile class 16
Writing data
  in Transient Data 24
  in Using CICS Services 24
Writing ESDS records
  in File control 16
  in Writing records 16
Writing items
  in Temporary storage 25
  in Using CICS Services 25
Writing KSDS records
  in File control 16
  in Writing records 16
Writing records
  in File control 16
  in Using CICS Services 16
  in Writing ESDS records 16
  in Writing KSDS records 16
  in Writing RRDS records 16
Writing RRDS records
  in File control 16
  in Writing records 16

X
X
  in actionOnConditionAsChar 164
  in operatingSystem 199
XPLINK 3

Y
year
  in IccAbsTime class 70
  in IccClock class 92
yellow

  in Color 236

yesNo (parameter)

  in setFMHContained 88