

IBM i
7.2

*Networking
OptiConnect*

IBM

Note

Before using this information and the product it supports, read the information in [“Notices” on page 43.](#)

This edition applies to IBM i 7.2 (product number 5770-SS1) and to all subsequent releases and modifications until otherwise indicated in new editions. This version does not run on all reduced instruction set computer (RISC) models nor does it run on CISC models.

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OptiConnect

OptiConnect is an IBM i system area network (SAN) that provides high-speed connectivity between multiple systems in a local environment with wide area network (WAN) and local area network (LAN) technologies.

What's new for IBM i 7.2



Read about new or significantly changed information for the OptiConnect topic collection.

HSL OptiConnect between systems is no longer supported. Only Virtual OptiConnect between logical partitions on a system is supported.

Information has been added about the Print OptiConnect Activity (PRTOPCACT) and Print OptiConnect Jobs (PRTOPCJOB) commands.

How to see what's new or changed

To help you see where technical changes have been made, this information center uses:

- The  image to mark where new or changed information begins.
- The  image to mark where new or changed information ends.

In PDF files you might see revision bars (|) in the left margin of new and changed information.

To find other information about what's new or changed this release, see the [Memo to users](#).

PDF file for OptiConnect

You can view and print a PDF file of this information.


To view or download the PDF version of this document, select [OptiConnect](#).

Saving PDF files

To save a PDF on your workstation for viewing or printing:

1. Right-click the PDF link in your browser.
2. Click the option that saves the PDF locally.
3. Navigate to the directory in which you want to save the PDF.
4. Click **Save**.

Downloading Adobe Reader

You need Adobe Reader installed on your system to view or print these PDFs. You can download a free copy from the [Adobe Web site](http://www.adobe.com/products/acrobat/readstep.html) (www.adobe.com/products/acrobat/readstep.html) .

Related reference

Related information for OptiConnect

Product manuals, websites, and other information center topic collections contain information that relates to the OptiConnect topic collection. You can view or print any of the PDF files.

OptiConnect concepts

OptiConnect refers to communications functions.

OptiConnect software is a priced, optional feature of the IBM i operating system (5770-SS1 option 23). OptiConnect software is required for OptiConnect communications.

OptiConnect connectivity advantages

OptiConnect provides high-speed system-to-system interconnection and is useful in high availability environments.

Planning and managing a computing system involves many decisions, such as where to place files, where to attach communications lines, and where to locate the most critical applications. Each system involved limits the decisions. Here are some of the limits:

- Processing capacity limits
- Distribution of users and applications across systems
- Maximum amount of storage, or maximum number of communications lines that are attached to the systems

OptiConnect software provides solutions to many of these problems. The OptiConnect system interconnection not only achieves high availability, but also helps in data-warehousing and database-parallelism architectures.

OptiConnect can be used to construct high availability solutions. Single-system high availability has an upper limit at the point of failure of that system. However, multiple systems that are connected together can be used to achieve levels that approach continuous availability. OptiConnect includes a set of application programming interfaces (APIs) that allows application programs to access the high-speed bus transport. These APIs are intended for use by IBM Business Partners in the development of high availability solutions. Applications that provide database mirroring using the OptiConnect connections are available from IBM Business Partners.

All OptiConnect technologies allow IBM i applications to perform intersystem database accesses across a high-performance interface. The ability to efficiently read and update data on connected systems provides the following benefits:

- Multiple clients can easily and efficiently access databases on a server by splitting the processor load for an application across the clients and server.

The clients run the nondatabase portion of an application, and the server runs the database activity. Multiple systems provide greater total processing capacity for database access than a single system can achieve. OptiConnect allows this increased capacity by decreasing processor load and using high-speed connections.

- Customer environments with multiple databases (or databases that can be partitioned into multiple databases) can extend the client/server database model to have multiple systems. Applications can access all the databases across OptiConnect connections regardless of the database location.

Ideally, applications and users are assigned to a system that contains the data that they use most heavily. Less heavily used data can reside on any of the other systems. This allows you to spread applications to achieve the best balance and throughput.

- Duplication of databases can be eliminated to decrease response time.

For example, if you currently maintain copies of data on several systems, you can connect the systems to achieve consistent response time. All applications can access and update one single database.

- OptiConnect functions can be used to duplicate copies of a database and update duplicated data more efficiently.

Related reference

[OptiConnect APIs](#)

OptiConnect and IBM i clustering

OptiConnect supports communication in a IBM i cluster.

A IBM i cluster is a collection of one or more systems or logical partitions that work together to provide a single, unified computing solution. Systems in a cluster are called *cluster nodes*. Communication between cluster nodes is based on TCP/IP protocols. OptiConnect software can be used to provide

this communication between cluster nodes. The major cluster communication functions supported by OptiConnect include cluster heartbeat, application IP takeover, and device IP takeover.

Related concepts

[High availability](#)

OptiConnect software capabilities

OptiConnect software supports several functions.

- Distributed data management (DDM)

All DDM operations for supported object types can run across OptiConnect, including data files, data areas, and data queues.

- Distributed Relational Database Architecture™ (DRDA)

OptiConnect supports Structured Query Language (SQL) applications by using the relational database directory to control access to databases on remote systems.

- DB2® Multisystem

DB2 Multisystem with its Db2® for i support for multinode files can run across OptiConnect, providing the data warehouse functions of IBM Query for i and two-phase commit.

- ObjectConnect

ObjectConnect can operate over OptiConnect to provide high-speed, system-to-system save and restore functions.

- Standard Advanced Program-to-Program Communication (APPC) conversations

Standard APPC conversations are available over OptiConnect with an OptiConnect communication controller.

- Systems Network Architecture distribution services (SNADS)

SNADS, display station pass-through, network printer pass-through, and other functions can run across OptiConnect.

- Socket support

This function allows applications that use TCP/IP to communicate over OptiConnect when they are running in a IBM i multiple-node network with Virtual OptiConnect.

- Products that provide efficient database mirroring for OptiConnect networks

These products are available from IBM Business Partners.

Related concepts

[APPC Programming PDF](#)

[Backup and recovery](#)

How OptiConnect works

The OptiConnect network connects multiple unique systems or logical partitions using the IBM i high-speed bus technologies.

The mechanism used by OptiConnect software to access database files on another system is modeled after the mechanism used by distributed data management (DDM). DDM uses a DDM file and Advanced Program-to-Program Communication (APPC) to redirect file access operations to another system. Similarly, OptiConnect uses DDM files and a special transport service to redirect file access operations to another system in an OptiConnect network. Thus, OptiConnect can achieve transport efficiencies that are not possible with a more general purpose, wide-area communications protocol.

Two things differentiate OptiConnect from traditional communications-based distributed operations. The first is a high-speed connection mechanism that takes advantage of the I/O bus or memory bus structure to connect multiple systems or logical partitions. The second is a device driver that is embedded in the operating system. This device driver streamlines the application access to data on a remote system.

After OptiConnect establishes system connections, much of the APPC protocol stack is bypassed. The OptiConnect fast-path connection for database transactions provides DDM access to databases anywhere in the OptiConnect network at a fraction of the standard communications code path. Data warehouse, Distributed Relational Database Architecture (DRDA), and data propagation functions, such as journaling, can use this technology.

Virtual OptiConnect

Virtual OptiConnect is a virtual connection between logical partitions running on the same system.

Virtual OptiConnect can refer to the OptiConnect feature that provides high-speed connectivity between two or more logical partitions on a single system using the memory-to-memory bus technology. There is no additional hardware required to support Virtual OptiConnect.

To activate the Virtual OptiConnect communication between logical partitions, see [“Activating logical partitions for Virtual OptiConnect”](#) on page 9.

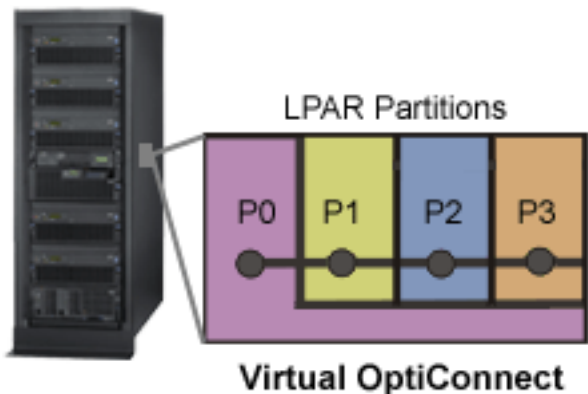


Figure 1. Virtual (inter-partition) OptiConnect

OptiConnect software

OptiConnect software is a priced, optional feature of the IBM i operating system.

OptiConnect components

OptiConnect has several basic required components. These components must not be deleted for any reason.

Library

The QSOC library holds all the objects that are used by OptiConnect:

- Programs
- Files
- Classes
- Commands
- Data areas
- Panel groups
- Subsystem descriptions
- Product loads
- Job queues
- Job descriptions

Subsystem

The OptiConnect connection manager job and agent jobs run in the QSOC subsystem unless a mode table has been configured to run under a different subsystem.

Jobs

OptiConnect has two kinds of jobs: the OptiConnect connection manager job (SOCMGR) and the agent jobs (SOCAnnnnnn). The SOCMGR job manages OptiConnect resources. There is one SOCMGR job per system. The SOCAnnnnnn agent jobs interface with the database on behalf of the application system. Each of the agent jobs is a data access job that works to get data to and from the remote system.

Job descriptions

There are three job descriptions for OptiConnect: QYYCMGR, QYYCDTSU, and QYYCSRA. QYYCMGR is the job description for the SOCMGR job. QYYCDTSU is the job description for all SOCAnnnnnn jobs. QYYCSRA is the job description for the ObjectConnect save and restore agent jobs. These job descriptions are included as part of OptiConnect.

Job queue

The QSOC job queue is used to submit OptiConnect jobs to the QSOC subsystem.

Autostart job

The SOCMGR job is automatically started when the QSOC subsystem is started.

User profile

The OptiConnect connection manager job runs under the QSOC user profile. The OptiConnect agent jobs run under the QUSER user profile, which can be changed through the QYYCDTSU job description. The authority and library list of the agent jobs can also be changed through the QYYCDTSU job description.

Routing entries

The routing entries used in starting subsystem jobs have compare values of QYYCDTSU, QYYCMGR, QYYCSRA, and QZDMAGNT. The compare value is matched against the routing data field in the job description that is placed in the job queue for this subsystem. When the job is pulled off the job queue, the routing data is compared to all of the routing entries in the subsystem. When a match is found, the program that is listed for the routing entry is run. The program is run by using the class that is specified for that job.

Commands

These are OptiConnect commands:

- Work with OptiConnect Activity (WRKOPCACT): This command displays information about the number of transactions and number of bytes that are read and written for both application and database systems. It also provides information about the status of system connections.
- Print OptiConnect Activity (PRTOPCACT): This command writes information about OptiConnect activity to a spooled output file or to a database output file.
- Print OptiConnect Jobs (PRTOPCJOB): This command writes a list of OptiConnect jobs and tasks to a spooled output file or to a database output file.
- Display OptiConnect Link Status (DSPOPCLNK): This command shows pertinent link information about multiple systems that are connected through the fiber-optic bus or HSL. These types of connections are not available in IBM i 7.2 or IBM POWER7 Systems or later.
- Verify OptiConnect Connection (VFYOPCCNN): This command runs the OptiConnect installation verification process.

Related concepts

Customizing OptiConnect

Depending on your needs, you can route Systems Network Architecture distribution services (SNADS) over OptiConnect or change the job description for the agent jobs.

OptiConnect job descriptions

The job descriptions for the connection manager job (SOCMGR) and the agent jobs (SOCAnnnnnn) are defined in the QSOC library when you install OptiConnect.

QSOC subsystem

The OptiConnect system jobs, as delivered by IBM, are set up to run in the QSOC subsystem.

Using the mode table

Modes describe session characteristics between the local and remote locations. The use of modes over OptiConnect provides greater flexibility than standard mode support over Advanced Program-to-Program Communication (APPC). You start modes over OptiConnect through a mode table.

Related tasks

Verifying OptiConnect software installation

After you install OptiConnect software, follow this procedure to verify that the installation is successful.

Related reference

Display OptiConnect Link Status (DSPOPCLNK) command

Print OptiConnect Activity (PRTOPCACT) command

Print OptiConnect Jobs (PRTOPCJOB) command

Verify OptiConnect Connections (VFYOPCCNN) command

Work with OptiConnect Activity (WRKOPCACT) command

QSOC subsystem

The OptiConnect system jobs, as delivered by IBM, are set up to run in the QSOC subsystem.

You can find a description of the QSOC subsystem in the QSOC library. To view the description, enter DSPSBSD (QSOC/QSOC).

The subsystem description contains the following information that pertains specifically to the OptiConnect operating environment:

• Autostart job entries

Autostart job entries list jobs that are initiated when the subsystem is started. An autostart job is defined for the QSOC subsystem and runs when the subsystem is started. This job initiates the OptiConnect connection manager job, SOCMGR.

When you select option 3 (Autostart job entries) on the Display Subsystem Description display, you can see a list of autostart entries.

• Job queue entries

You can display the job queue entries by selecting option 6 (Job queue entries) on the Subsystem Description display. The Display Job Queue Entries display shows the queues from which jobs are taken when a given subsystem is run.

• Routing entries

You can display the routing entries detail by selecting option 7 (Routing entries) on the Subsystem Description display. For more information about routing entries, see Work management.

Related concepts

OptiConnect components

OptiConnect has several basic required components. These components must not be deleted for any reason.

Related reference

Display Subsystem Description (DSPSBSD) command

OptiConnect job descriptions

The job descriptions for the connection manager job (SOCMGR) and the agent jobs (SOCAnnnnnn) are defined in the QSOC library when you install OptiConnect.

The SOCMGR job uses the QYYCMGR job description, and the SOCAnnnnnn jobs use the QYYCDTSU job description. These job descriptions can be changed to fit the customer environment.

The SOCMGR job maintains the agent jobs through the request data in the QYYCMGR job description.

By default, the `SOCAnnnnn` jobs run under the QUSER user profile.

Related concepts

[OptiConnect components](#)

OptiConnect has several basic required components. These components must not be deleted for any reason.

Related tasks

[Changing QUSER access authority](#)

By default, the OptiConnect agent jobs run under the QUSER user profile if you use the fast path method. You can change the user profile for these agent jobs to give them appropriate access authority to files on the database system.

Related reference

[QYYCMGR job description](#)

The OptiConnect connection manager job, SOCMGR, maintains the agent jobs through the request data in the QYYCMGR job description.

Installing OptiConnect

The first step for establishing OptiConnect connections is to install the OptiConnect hardware and software.

Note: You can install either the hardware or the software first, depending on what is more convenient for you.

Software requirements

You need to install OptiConnect software (5770-SS1 option 23) on your system. OptiConnect software is a priced, optional feature of the IBM i operating system.

Related tasks

[Installing OptiConnect software](#)

To install OptiConnect software on your system, follow these steps.

Hardware requirements

In a logical partitioning environment, no additional hardware is required because the connectivity between logical partitions is internal to the system.

The hardware communication option Virtual OptiConnect must be activated for each logical partition that uses the Virtual OptiConnect function.

Related concepts

[Virtual OptiConnect](#)

Virtual OptiConnect is a virtual connection between logical partitions running on the same system.

Installing OptiConnect software

To install OptiConnect software on your system, follow these steps.

1. Sign on to the system as the security officer (QSECOFR).
2. Enter `GO LICPGM` and press Enter.
3. Select option 11 (Install licensed programs) from the Work with Licensed Programs display and press Enter.

The Install Licensed Programs display is shown.

4. Enter 1 next to product option 23 for OptiConnect and press Enter.

When you install OptiConnect, library QSOC is installed on your system.

The optional features of the IBM i operating system that you can install are considered to be additional licensed programs.

If you want to remove OptiConnect software from your system, use the Delete Licensed Program (DLTLICPGM) command. You can back up the licensed program by using the Save Licensed Program (SAVLICPGM) command.

Related concepts

[Backup and recovery](#)

[Hardware requirements](#)

In a logical partitioning environment, no additional hardware is required because the connectivity between logical partitions is internal to the system.

[QSOC subsystem](#)

The OptiConnect system jobs, as delivered by IBM, are set up to run in the QSOC subsystem.

[Software requirements](#)

You need to install OptiConnect software (5770-SS1 option 23) on your system. OptiConnect software is a priced, optional feature of the IBM i operating system.

Related tasks

[Installing, upgrading, or deleting IBM i and related software](#)

[Verifying OptiConnect software installation](#)

After you install OptiConnect software, follow this procedure to verify that the installation is successful.

Related reference

[Delete Licensed Program \(DLTLICPGM\) command](#)

[Save Licensed Program \(SAVLICPGM\) command](#)

Verifying OptiConnect software installation

After you install OptiConnect software, follow this procedure to verify that the installation is successful.

1. Run the Check Product Option (CHKPRDOPT) command to ensure that the OptiConnect code and objects have been installed correctly.
2. Enter STRSBS QSOC/QSOC on all systems to start the OptiConnect QSOC subsystem.
3. Enter DSPMSG *SYSOPR on all systems to display the messages that were issued when the QSOC subsystem was started.

The following messages are displayed after a successful initiation of the OptiConnect connection manager:

```
Subsystem QSOC in library QSOC starting.  
Subsystem QSOC started.  
OptiConnect connection manager started at mm/dd/yy hh:mm:ss.  
OptiConnect connected to SYSTEMA using SOC01 at mm/dd/yy hh:mm:ss.  
OptiConnect connected to SYSTEMB using SOC02 at mm/dd/yy hh:mm:ss.
```

The number of messages (and adapter types within the messages) that you see depend on the following factors:

- Your hardware configuration
 - The systems to which you are connected
 - The systems that have started the OptiConnect subsystem
4. Enter VFYOPCCNN to begin the installation verification.
This ensures system-to-system connection in the cluster. Check your job log for the completion message `OptiConnect verification test completed with no errors.`
 5. Enter QSOC/WRKOPCACT to check the OptiConnect activity on the systems in the cluster.
You should see activity as a result of the Verify OptiConnect Connection (VFYOPCCNN) procedure. VFYOPCCNN causes the system to act as a client to each of the other systems in the network.
 6. Enter WRKHDWRSC TYPE(*CSA) to confirm that the hardware connections are operational and to show the operational status of the bus receiver cards.

TYPE(*CSA) displays a resource for each remote system that had, at some point, an operational connection to the system on which you are entering the command.

Related tasks

[Installing OptiConnect software](#)

To install OptiConnect software on your system, follow these steps.

Related reference

[Check Product Option \(CHKPRDOPT\) command](#)

[Display Messages \(DSPMSG\) command](#)

[Start Subsystem \(STRSBS\) command](#)

[Verify OptiConnect Connections \(VFYOPCCNN\) command](#)

[Work with Hardware Resources \(WRKHDWRSC\) command](#)

[Work with OptiConnect Activity \(WRKOPCACT\) command](#)

Activating logical partitions for Virtual OptiConnect

You need to configure and activate logical partitions such that they can communicate using Virtual OptiConnect.

You must install the OptiConnect feature on all the logical partitions that use Virtual OptiConnect. You must start the QSOC subsystem on each of these logical partitions.

To activate the Virtual OptiConnect communications between logical partitions, follow these steps based on your IBM i model:

• On model 5xx

1. From the Hardware Management Console (HMC), select **Server Management** and select the local partition profile properties.
2. Under the **OptiConnect** tab, select **Use Virtual OptiConnect**.
3. For the change to take effect, activate each logical partition from HMC.

• On model 8xx

1. Use the dedicated service tools (DST) or system service tools (SST) to configure each logical partition into the OptiConnect network.
2. From the primary partition, set the communication option **Connect to Virtual OptiConnect** to **Yes** for each logical partition (in addition to the primary partition) that uses the OptiConnect function.

Related concepts

[Virtual OptiConnect](#)

Virtual OptiConnect is a virtual connection between logical partitions running on the same system.

[Starting OptiConnect](#)

You start OptiConnect by starting the QSOC subsystem because OptiConnect runs in the QSOC subsystem.

Related tasks

[Installing OptiConnect software](#)

To install OptiConnect software on your system, follow these steps.

Configuring OptiConnect

You can use either the fast path method or the extended function path method to route data requests through OptiConnect. The fast path method provides faster communication, but it does not support two-phase commit as the extended function path method does.

Any IBM i applications that are written to use distributed data management (DDM) can use OptiConnect. This applies to both new and existing applications. Many applications that use an IBM i database can transparently use DDM without changes to the applications. OptiConnect uses the same mechanism as traditional DDM, where the DDM file controls access to a database. Applications that use OptiConnect

DDM to access a database can also use traditional Advanced Program-to-Program Communication (APPC) DDM to access another database at the same time.

The fast path method for routing data requests through OptiConnect involves specifying a special keyword in the DDM file. If you use the fast path method, OptiConnect agent jobs start in the OptiConnect connection manager and run in the QSOC subsystem. These jobs follow the OptiConnect job naming convention. The fast path method is the faster means of communications because of a shorter code path, but it does not support two-phase commit protocols.

If you use the extended function path method, OptiConnect agent jobs are started by the APPC attach manager and run in the QCMN subsystem. These jobs follow the standard DDM naming conventions for communication jobs. The extended function path method supports two-phase commit protocols.

Related concepts

[Distributed database programming](#)

Related tasks

[Basic troubleshooting procedure](#)

If you have a problem with OptiConnect, follow this procedure to determine the cause.

Configuring fast path routing

If you want fast communication, you can configure OptiConnect fast path routing. However, the fast path method does not support two-phase commit.

The fast path method uses a special device description of QYCTSOC. When an Advanced Program-to-Program Communication (APPC) conversation is directed at this device, the device driver redirects the conversation through the OptiConnect bus, bypassing most of the standard distributed database management (DDM), Distributed Relational Database Architecture (DRDA), and APPC code.

Note: The QYCTSOC device description is created during the OptiConnect software installation, but it always remains varied off. This device description is necessary and must not be deleted.

To route data requests over OptiConnect by using the fast path method, you must specify the QYCTSOC keyword in the device description parameter of a DDM file. You can use either the Create Distributed Data Management File (CRTDDMF) command or the Change Distributed Data Management File (CHGDDMF) command to add this information.

To create a new DDM file, follow these steps:

1. For the remote location (RMTLOCNAME) parameter, specify the name of the target system where the request will be performed. The name can be either real or logical.

You can use the Display Network Attributes (DSPNETA) command to display the real system name.

A *logical name* of the target system is the name of a data area in the QSOC library that contains the real system name. For example, the real name of the target system is REAL. If you want to use the logical name LOGICAL to identify the system, you need to create a data area called LOGICAL in QSOC and assign the value 'REAL' to the data area, as shown in the following Create Data Area (CRTDTAARA) command:

```
CRTDTAARA DTAARA(QSOC/LOGICAL) TYPE(*CHAR) LEN(8) VALUE('REAL')
```

A data area can contain only a single real system name. You can create more than one data area with the same value and thus create more than one logical name for the target system. By using a logical name of the target system in a DDM file, you can switch the real system names without changing the DDM file; you only need to change the value in the data area.

2. After you enter the rest of the information, press F10 (Additional parameters) and enter QYCTSOC for the device description.

OptiConnect does not specifically use the other parameters on the CRTDDMF command. However, make sure that you have specified either *YES or *NO for the share open data path (SHARE) parameter.

Note: When you specify QYCTSOC for the device, the RMTLOCNAME parameter is limited to a valid system name.

To change an existing DDM file, follow these steps:

1. Enter the name of the DDM file and the library, and then press Enter.
2. For the RMTLOCNAME parameter, specify the name of the target system where the request will be performed, and then press F10. The name can be either real or logical.
3. On the Additional Parameters display, enter QYCTSOC for the device description.

OptiConnect does not specifically use the other parameters on the CHGDDMF command. However, make sure that you have specified either *YES or *NO for the SHARE parameter.

OptiConnect, by default, accepts any values in the mode (MODE) parameter of a DDM file. However, if you want OptiConnect agent jobs to start with the user profile specified in the QYYCDTSU job description, you must use QYCTSOC in the MODE parameter. Any other value in the MODE parameter causes the OptiConnect agent jobs to start with the user profile and the job description that initiated the DDM conversation.

Related concepts

[Distributed database programming](#)

[Using the mode table](#)

Modes describe session characteristics between the local and remote locations. The use of modes over OptiConnect provides greater flexibility than standard mode support over Advanced Program-to-Program Communication (APPC). You start modes over OptiConnect through a mode table.

Related tasks

[Configuring extended function path routing](#)

You configure OptiConnect extended function path routing for two-phase commit and some Lotus Domino applications.

Related reference

[Change Distributed Data Management File \(CHGDDMF\) command](#)

[Create Data Area \(CRTDTAARA\) command](#)

[Create Distributed Data Management File \(CRTDDMF\) command](#)

[Display Network Attributes \(DSPNETA\) command](#)

Configuring extended function path routing

You configure OptiConnect extended function path routing for two-phase commit and some Lotus Domino applications.

The extended function path method requires the configuration of Advanced Program-to-Program Communication (APPC) controllers and devices. The controller description needs to have a link type of *OPC, which indicates to the device driver layer that the controller is attached to the optical bus (OptiConnect). The extended function path method cannot bypass some of the communication layers as the fast path method. However, this method is necessary for certain functions, such as two-phase commit, and for some Lotus Domino applications (LS:DO) that use LS:DO to access remote data.

To route data requests through OptiConnect without using the special device keyword, you create OptiConnect controllers and devices of link type *OPC. The remote system name must be the name of the target system.

To configure *OPC controllers and devices, follow these steps:

1. Create a controller description: CRTCTLAPPC CTLD(name) LINKTYPE(*OPC) RMTSYSNAME(sysname) ROLE(*PRI or *SEC) DSAP(##).

You must create a pair of *OPC controllers (one on each of the two systems that use OptiConnect to communicate). The data link role of one system must be *PRI (primary) and the data link role of the other system must be *SEC (secondary). The destination service access point (DSAP) value must match the source service access point (SSAP) value assigned to the remote controller. Valid DSAP values are 04, 08, 0C, 10, 14, ...78, 7C.

The following job log shows an example of creating an *OPC controller on one system SYSTEMA to connect to the other system SYSTEMB:

```
> CRTCTLAPPC CTLD(SYSBCTL) LINKTYPE(*OPC) RMTSYSNAME(SYSTEMB)
      ROLE(*PRI) DSAP(44)
      Description for controller SYSBCTL created.
```

2. Create a device description for a device attached to the controller: CRTDEVAPPC DEVD(SYSBDEV) RMTLOCNAME(SYSB) ONLINE(*NO) LCLLOCNAME(SYSA) CTL(SYSBCTL) APPN(*NO).

The *OPC controller only accepts devices that are created with APPN(*NO). The remote location (RMTLOCNAME) and local location (LCLLOCNAME) values specified for one system must match the LCLLOCNAME and RMTLOCNAME values specified for the other system in the pair. The Online at IPL (ONLINE) parameter must be set to *NO because you cannot vary on OptiConnect controllers and attached devices until the QSOC subsystem has started.

The following job log shows an example of creating a device description on SYSTEMA for a device attached to controller SYSBCTL:

```
> CRTDEVAPPC DEVD(SYSBDEV) RMTLOCNAME(SYSB) ONLINE(*NO)
      LCLLOCNAME(SYSA) CTL(SYSBCTL) APPN(*NO)
      Description for device SYSBDEV created.
```

3. On the other system in the pair, create a controller description that points to the description created in Step 1.

The following job log shows an example of creating a controller description on SYSTEMB to connect to SYSTEMA:

```
> CRTCTLAPPC CTLD(SYSACTL) LINKTYPE(*OPC)
      RMTSYSNAME(SYSTEMA) ROLE(*SEC) DSAP(44)
      Description for controller SYSACTL created.
```

4. Create a device description on SYSTEMB for a device attached to controller SYSACTL:

```
> CRTDEVAPPC DEVD(SYSADEV) RMTLOCNAME(SYSA) ONLINE(*NO)
      LCLLOCNAME(SYSB) CTL(SYSACTL) APPN(*NO)
      Description for device SYSADEV created.
```

5. Repeat steps “1” on page 11 and “2” on page 12 for all the system pairs in the OptiConnect network.
6. Vary on all *OPC controllers and devices to enable requests over OptiConnect.

When one *OPC controller in the pair is varied on, the status of the controller changes to ACTIVE/CNN PENDING or VARYON/CNN PENDING. This indicates that the OptiConnect path is not completely established. After the other *OPC controller is varied on, the status of both controllers changes to ACTIVE, and the OptiConnect connection is available for data transfer.

Note: You must start the QSOC subsystem on both systems before varying on the *OPC controllers and their attached devices. If the QSOC subsystem is ended on either of the systems, the controllers on that system and all connected systems change to the status ACTIVE/CNN PENDING or VARYON/CNN PENDING. After the QSOC subsystem is restarted, there cannot be any activity through these controllers until they are varied off and then back on.

Use the Vary Configuration (VRYCFG) command to vary on controllers and devices. The following job log shows an example of varying on controller SYSBCTL on SYSTEMA:

```
> VRYCFG CFGOBJ(SYSBCTL) CFGTYPE(*CTL) STATUS(*ON)
      Vary on completed for controller SYSBCTL.
      Vary on completed for device SYSBDEV.
```

The following job log shows an example of varying on controller SYSACTL on SYSTEMB:

```
> VRYCFG CFGOBJ(SYSACTL) CFGTYPE(*CTL) STATUS(*ON)
      Vary on completed for controller SYSACTL.
      Vary on completed for device SYSADEV.
```

7. Set up DDM files.

Use the same remote and local locations that are specified in the APPC device description. Use *LOC for the device description parameter. The remote and local locations that are defined for the devices attached to the *OPC controllers can also be used in Structured Query Language (SQL) relational database directories.

Although varying on the *OPC controllers and devices enables traffic over OptiConnect, varying off these devices and controllers does not necessarily block the traffic. To ensure that OptiConnect activity is stopped, use the vary option of the Work with OptiConnect Activity (WRKOPCACT) command, or end the QSOC subsystem.

The *OPC controllers can be used to provide APPC capabilities across the OptiConnect bus. An application program that uses the intersystem communications function (ICF) file interface, the Common Programming Interface for Communications (CPI-C), or the CICS® file interface can communicate with an application on a remote system through OptiConnect. Previously, only a DDM or an SQL application could use OptiConnect to communicate with a remote application.

The default QYCTSOC APPC device description has *PUBLIC authority *CHANGE, so any users can use OptiConnect. To keep the public from using OptiConnect, use the Revoke Object Authority (RVKOBJAUT) command, and then use the Grant Object Authority (GRTOBJAUT) command to grant *DEVDA access to specific users.

Note: The APPC device description does not describe a device. It is used to control authority and access to the OptiConnect path.

Related concepts

[Routing SQL over OptiConnect](#)

You can route static and dynamic Structured Query Language (SQL) over OptiConnect through Distributed Relational Database Architecture (DRDA).

Related tasks

[Configuring fast path routing](#)

If you want fast communication, you can configure OptiConnect fast path routing. However, the fast path method does not support two-phase commit.

Related reference

[Create Controller Description \(APPC\) \(CRTCTLAPPC\) command](#)

[Create Device Description \(APPC\) \(CRTDEVAPPC\) command](#)

[Create Distributed Data Management File \(CRTDDMF\) command](#)

[Grant Object Authority \(GRTOBJAUT\) command](#)

[Revoke Object Authority \(RVKOBJAUT\) command](#)

[Vary Configuration \(VRYCFG\) command](#)

[Work with OptiConnect Activity \(WRKOPCACT\) command](#)

Customizing OptiConnect

Depending on your needs, you can route Systems Network Architecture distribution services (SNADS) over OptiConnect or change the job description for the agent jobs.

Routing SNADS over OptiConnect

Systems Network Architecture distribution services (SNADS) can use the OptiConnect link to distribute data between systems through the fiber-optic cable.

When you configure SNADS over OptiConnect, the system uses the APPC controllers and device descriptions previously created in [“Configuring extended function path routing” on page 11](#). To configure a directory entry, a routing table entry, and a distribution queue, follow these steps:

1. Add a directory entry to point a user or several users (*ANY) to the remote system:

```
ADDIRE  USRID(xxx/*ANY)  (xxx is the address of remote system)
        USRD(xxx)        (xxx is the description)
        SYSNAME(xxx)     (xxx is the name of the remote system)
```

2. Create a distribution queue:

```
ADDSTQ DSTQ(xxx)      (xxx is the name of the queue)
      RMTLOCNAME(xxx)  (same as specified in the APPC DEVD)
      DSTQTYPE(*SNADS)
      MODE(*NETATR)    (or specify a mode)
      RMTNETID(*NETATR)
      LCLLOCNAME(xxx)  (same as specified in the APPC DEVD)
```

The values in the distribution queue for the remote location (RMTLOCNAME) and local location (LCLLOCNAME) parameters allow SNADS to select the correct APPC device description that points to the target system.

3. Create a routing table that points to the distribution queue:

```
ADDSTRTE SYSNAME(xxx)  (xxx is the name of the remote system)
      FAST(xxx)         (xxx is the name of the remote system)
      STATUS(xxx)       (xxx is the name of the remote system)
      DATAHIGH(xxx)   (xxx is the name of the remote system)
      DATALOW(xxx)    (xxx is the name of the remote system)
```

4. Verify that the QSOC and QSNADS subsystems are active on both systems.

Related reference

[Add Directory Entry \(ADDDIRE\) command](#)

[Add Distribution Queue \(ADDSTQ\) command](#)

[Add Distribution Route \(ADDSTRTE\) command](#)

Initial library list

By default, the library list of an OptiConnect agent job contains the system values of the system and user library lists.

The default library list of an OptiConnect agent job is sufficient to run standard distributed data management (DDM) functions because DDM objects, such as DDM files, DDM data areas, and DDM data queues, require you to specify a library at creation time.

The following functions, however, do not require you to specify the library for an object at creation time:

- Distributed Relational Database Architecture (DRDA)
- Lotus Domino scripts with LS:DO and @Commands
- DB2 triggers

Note: Changing the system value of the system or user library list can also enable DDM functions.

You can control the library list of the remote jobs by changing the SOCAⁿⁿⁿⁿⁿ job description, QYYCDTSU, to include the necessary libraries. For DRDA and Domino, you can either add the necessary library into the initial library list or library qualify your Structured Query Language (SQL) or Open Database Connectivity (ODBC) statements. For triggers, you must include the library in the initial library list.

Note: If the SOCAⁿⁿⁿⁿⁿ jobs were started, you need to use the End Subsystem (ENDSBS) command to end the QSOC subsystem and restart it so that the agent jobs can start with the new initial library list.

Related reference

[End Subsystem \(ENDSBS\) command](#)

[QYYCDTSU job description](#)

The OptiConnect agent jobs, `SOCAnnnnnn`, use the `QYYCDTSU` job description.

Changing QUSER access authority

By default, the OptiConnect agent jobs run under the QUSER user profile if you use the fast path method. You can change the user profile for these agent jobs to give them appropriate access authority to files on the database system.

To change the QUSER access authority, follow these steps:

1. Enter `CHGJOB QSOC/QYYCDTSU`, press F4 (Prompt), and press F10 (Additional parameters).
2. For the User parameter, change the default value QUSER to an appropriate user profile name, specifically, the user profile name that controls the agent job authority.

Related concepts

[OptiConnect job descriptions](#)

The job descriptions for the connection manager job (`SOCMGR`) and the agent jobs (`SOCAnnnnnn`) are defined in the `QSOC` library when you install OptiConnect.

Related reference

[Change Job Description \(CHGJOB\) command](#)

QYYCDTSU job description

The OptiConnect agent jobs, `SOCAnnnnnn`, use the `QYYCDTSU` job description.

The following figures show the `QYYCDTSU` job description for the `SOCAnnnnnn` jobs.

```

                                     Display Job Description
                                     System:  SYSTEMA
Job description:  QYYCDTSU      Library:  QSOC
User profile . . . . . : QUSER
CL syntax check . . . . . : *NOCHK
Hold on job queue . . . . . : *NO
End severity . . . . . : 30
Job date . . . . . : *SYSVAL
Job switches . . . . . : 00000000
Inquiry message reply . . . . . : *RQD
Job priority (on job queue) . . . . . : 5
Job queue . . . . . : QSOC
  Library . . . . . : QSOC
Output priority (on output queue) . . . . . : 5
Printer device . . . . . : *USRPRF
Output queue . . . . . : *USRPRF
  Library . . . . . :

                                     More . . .

Press Enter to continue.
F3=Exit  F12=Cancel
```

Figure 2. Display Job Description display - QYYCDTSU

```

Display Job Description
System: SYSTEMA
Job description: QYYCDTSU Library: QSOC
Message logging:
Level . . . . . : 4
Severity . . . . . : 0
Text . . . . . : *NOLIST
Log CL program commands . . . . . : *NO
Job log output . . . . . : *SYSVAL
Accounting code . . . . . : *USRPRF
Print text . . . . . : *SYSVAL
Routing data . . . . . : QYYCDTSU
Request data . . . . . : *NONE
More...
Press Enter to continue.
F3=Exit F12=Cancel

```

Figure 3. Display Job Description display - QYYCDTSU (continued)

```

Display Job Description
System: SYSTEMA
Job description: QYYCDTSU Library: QSOC
DDM conversation . . . . . : *KEEP
Device recovery action . . . . . : *SYSVAL
Time slice end pool . . . . . : *SYSVAL
Job message queue maximum size . . . . . : *SYSVAL
Job message queue full action . . . . . : *SYSVAL
Allow multiple threads . . . . . : *NO
Initial ASP group . . . . . : *NONE
Spooled file action . . . . . : *SYSVAL
Text . . . . . : SOC Agent Job Description
Bottom
Press Enter to continue.
F3=Exit F12=Cancel

```

Figure 4. Display Job Description display - QYYCDTSU (continued)

Related concepts

Initial library list

By default, the library list of an OptiConnect agent job contains the system values of the system and user library lists.

QYYCMGR job description

The OptiConnect connection manager job, SOCMGR, maintains the agent jobs through the request data in the QYYCMGR job description.

Figure 5 on page 17 shows the QYYCMGR job description for the SOCMGR job.

```

Display Job Description
Job description:  QYYCMGR      Library:  QSOC      System:  SYSTEMA

User Profile . . . . . : QSOC
CL syntax check . . . . . : *NOCHK
Hold on job queue . . . . . : *NO
End severity . . . . . : 30
Job date . . . . . : *SYSVAL
Job switches . . . . . : 00000000
Inquiry message reply . . . . . : *RQD
Job priority(on job queue) . . . . . : 3
Job queue . . . . . : QSOC
  Library . . . . . :      QSOC
Output priority (on output queue) . . . . . : 5
Printer device . . . . . : *USRPRF
Output queue . . . . . : *USRPRF
  Library . . . . . :

Press Enter to continue.

F3=Exit  F12=Cancel

More...

```

Figure 5. Display Job Description display - QYYCMGR

```

Display Job Description
Job description:  QYYCMGR      Library:  QSOC      System:  SYSTEMA

Message logging:
  Level . . . . . : 4
  Severity . . . . . : 0
  Text . . . . . : *NOLIST
Log CL program commands . . . . . : *NO
Job log output . . . . . : *SYSVAL
Accounting code . . . . . : *USRPRF
Print text . . . . . : *SYSVAL

Routing data . . . . . : QYYCMGR

Request date . . . . . : CALL PGM(QSOC/QYYCMGR) PARM(0 0 0)

Press Enter to continue.

F3=Exit  F12=Cancel

More...

```

Figure 6. Display Job Description display - QYYCMGR (continued)

```

                                Display Job Description
Job description:  QYYCMGR      Library:  QSOC      System:  SYSTEMA

DDM conversation . . . . . : *KEEP
Device recovery action . . . . . : *SYSVAL
Time slice end pool . . . . . : *SYSVAL
Job message queue maximum size . . . . . : *SYSVAL
Job message queue full action . . . . . : *SYSVAL
Allow multiple threads . . . . . : *NO
Initial ASP group . . . . . : *NONE
Spooled file action . . . . . : *SYSVAL
Text . . . . . : SOC Connection Manager Job
Description

                                Bottom

Press Enter to continue.

F3=Exit  F12=Cancel

```

Figure 7. Display Job Description display - QYYCMGR (continued)

The job description shows the routing data for QYYCMGR. This should be listed as one of the routing entries in the QSOC subsystem description. The request data (*CALL PGM(QSOC/QYYCMGR) PARM(0 0 0)*) is the actual program call that initiates OptiConnect. The parameters describe the pool of agents that are maintained on the application system and are passed to the OptiConnect connection manager. You can change these parameters to tune the system performance. The first number is the initial number of agents in the system (0). The second number is the minimum number of agents that are allowed in the pool (0). The third number is ignored (0).

Related concepts

OptiConnect job descriptions

The job descriptions for the connection manager job (SOCMGR) and the agent jobs (SOCAnnnnn) are defined in the QSOC library when you install OptiConnect.

OptiConnect performance factors

Several factors can affect the performance of OptiConnect.

OptiConnect performance factors

Several factors can affect the performance of OptiConnect.

- Storage pool

OptiConnect is initially installed to use the *BASE storage pool. You must determine if this storage pool and the amount of storage that is allocated to the pool are appropriate for each system in the cluster. Specify at least 16 MB per application system on the database system for OptiConnect.

- Job class and priority

The OptiConnect agents run under the QYYCAGNT class in the QSOC library. The agent job class is shipped to run at priority 20; however, the job automatically runs at the same priority as its corresponding source job.

- SOCMGR job description QYYCMGR

As part of the job description for the SOCMGR job, the request data calls the QYYCMGR program in the QSOC library. The following parameters are passed to the program:

- The first parameter value is the initial number of agent jobs that are started in the agent job pool. This number includes both active and available agent jobs. Active agent jobs are connected to a source DDM user job. Available agent jobs are those that are not currently connected to a user job, but are waiting to be used. When active jobs end, the connection manager submits jobs to maintain the number of jobs in the agent job pool. This parameter is similar to the prestart jobs parameter that is used when you start a subsystem. When the subsystem starts, jobs are available.

- The second parameter value is the minimum number of available agent jobs that are maintained in the agent job pool. When available agent jobs become active agent jobs, the connection manager submits jobs to maintain the number of available agent jobs. This number must always be less than 50.
- The third parameter value is ignored. Enter 0.

The default parameters are (0 0 0).

You can adjust these values to prestart a predetermined number of agent jobs. When a work request comes in, it is sent directly to an agent job already running or prestarted. The number of agent jobs should be adjusted according to the requirements of individual installations.

To prestart agent jobs, change the defaults for the QYYCMGR job description. To change these values, follow these steps:

1. Enter CHGJOBDSOC/QYYCMGR.
2. Press F4 (Prompt) and then press F10 (Additional parameters).

For the request data, change the default parameter values (0 0 0) to the values that you want.

Note: Prestart agent jobs can only be used by applications whose DDM files have QYCTSOC as the device. If the *OPC controller method is used, DDM prestart jobs must be configured.

Related reference

[QYYCMGR job description](#)

The OptiConnect connection manager job, SOCMGR, maintains the agent jobs through the request data in the QYYCMGR job description.

[Change Job Description \(CHGJOBDSOC\) command](#)

Advanced OptiConnect customization

OptiConnect provides several advanced customization functions.

Routing SQL over OptiConnect

You can route static and dynamic Structured Query Language (SQL) over OptiConnect through Distributed Relational Database Architecture (DRDA).

You can use either the fast path method or the extended function path method to route SQL over OptiConnect. The fast path method is easier to use, but you cannot use commitment control or distributed unit of work (*DUW) for this method. If commitment control or *DUW is needed, you need to use the extended function path method.

OptiConnect supports the use of static SQL with both dynamic and extended dynamic SQL. You can also use the Extended Dynamic Remote SQL (EDRS) APIs to route extended dynamic SQL over OptiConnect.

Routing SQL using the fast path method

To route SQL requests over OptiConnect using the fast path method, you need to specify special keywords in the relational database (RDB) directory.

The database system must have an RDB entry that matches the relational database name specified on the application systems with *LOCAL for the remote location (RMTLOCNAME) parameter. On the application systems, the RMTLOCNAME parameter must point to the system where the database resides. Each relational database name must be unique within the distributed network. Each entry identifies the method of accessing the relational database as well as other parameters.

To add an entry to the RDB directory, follow these steps:

1. Enter the Add Relational Database Directory Entry (ADDRDBDIRE) command.
2. Press F4 (Prompt) and then F9 (Show all parameters).

- a. Enter a name for the RDB parameter. The name on the application system must match the name on the database system.
- b. Enter the RMTLOCNAME parameter. On each application system, specify the name of the target system. On the database system, specify *LOCAL.
- c. Enter QYCTSOC for the APPC device description (DEV) parameter.
- d. Enter *LOC for the local location (LCLLOCNAME) parameter.

After creating the RDB directory entry, you need to recompile the SQL program to point to the RDB entry. When you recompile the SQL program, specify commitment control as *NONE and RDB connect method as *RUW.

Note: The RDB parameter must match the RDB parameter in the RDB entry.

Routing SQL using the extended function path method

To route SQL requests over OptiConnect using the extended function path method, you need to specify the RMTLOCNAME and LCLLOCNAME parameters in the RDB directory. Ensure that these parameter values match the extended function path descriptions previously created in [“Configuring extended function path routing”](#) on page 11.

Recompiling the SQL program pulls the target system name from the RDB entry, creates an SQL package, and runs the program on the target system.

Related tasks

[Configuring fast path routing](#)

If you want fast communication, you can configure OptiConnect fast path routing. However, the fast path method does not support two-phase commit.

Related reference

[Extended Dynamic Remote SQL \(EDRS\) APIs](#)

[Add Relational Database Directory Entry \(ADDRDBDIRE\) command](#)

Routing remote journals over OptiConnect

You can route remote journals over OptiConnect through the relational database (RDB) directory entry.

You can use either the fast path method or the extended function path method. The configuration requires the remote location name and other necessary information.

Related concepts

[Backup and recovery](#)

Using the mode table

Modes describe session characteristics between the local and remote locations. The use of modes over OptiConnect provides greater flexibility than standard mode support over Advanced Program-to-Program Communication (APPC). You start modes over OptiConnect through a mode table.

The mode table, QMTABLE, is not included with OptiConnect. It must be created if additional customization is required.

When the QSOC subsystem is started, the QSOC library is checked to see if QMTABLE exists. If QMTABLE exists, the parameters are used to start any OptiConnect agent jobs. Otherwise, a default set of values is placed in storage.

To create the OptiConnect mode table, enter `CALL QSOC/QYYCMUTL CREATE`. This creates the DDS source file QSOCDDS, with member QSOCDDS and a sample mode table QMSAMPLE in the QSOC library. You can create QMTABLE by copying this sample table or by using the DDS source file. QMTABLE must be a physical file in the QSOC library. You can use the data file utility (DFU) to change this table, adding one entry for each mode or location required.

For the fast path method, add the following entries:


```

WORK WITH DATA IN A FILE      Mode....: Entry
Format.....: MODREC          File....: QMTABLE

MODE:      QYCTSOC           RMTLOC:      *ANY
LCLLOC:    *ANY              JOB:         QYYCDTSU
JOBDLIB:   QSOC             JOBQ:        QSOC
JOBQLIB:   QSOC             DFTUSER:    *JOB
RCLRSC:    *RCLRSC         JOBPRIOR:   *DYNAMIC
INIJOB:    0                MINJOB:     0
USREXIT:   *OBJAUT         USREXITLIB: *LIBL
CONJRN:    *NONE           CONJRNL:    *LIBL
ROUTING:   QYYCDTSU        JOBSTDLY:   200
JOBENDLY:  0

```

Note: The ROUTING entry must always be QYYCDTSU to use the OptiConnect agent jobs that are supplied with the QSOC subsystem. No entry is required in the mode table for ObjectConnect.

The mode table is searched each time an agent job is started (DDM target) for a match against the keyed values. There are three keyed fields in QMTABLE: LCLLOC, RMTLOC, and MODE. The table is searched for the following values:

1. Target system name extracted from network attributes (matched against LCLLOC)
2. Source system name that was sent to the target system (matched against RMTLOC)
3. Mode that was also sent to the target system (matched against MODE)

A specific value for the three fields can be matched in the table or *ANY. A specific value is always taken over *ANY, regardless of the order of the entries in the table. The following priority scheme determines which table entry is used:

1. A specific LCLLOC match is taken over a specific RMTLOC or a specific MODE.
2. A specific RMTLOC match is taken over a specific MODE.

Note: The Fields column in the mode table is case-sensitive and all entries need to be in uppercase. [Table 1 on page 21](#) shows the fields and associated descriptions.

| <i>Table 1. Fields in the mode table</i> | |
|------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Field | Description |
| RMTLOC | Remote location (from the system point of view) |
| LCLLOC | Local location (from the system point of view) |
| MODE | Mode description from the DDM file |
| JOB | Job description for the agent job |
| JOBDLIB | Library for the agent job description |
| JOBQ | OptiConnect agent job queue (*JOB for value from job description) |
| JOBQLIB | Library for the OptiConnect agent job queue |
| DFTUSER ^{1, 2} | Default user profile for the OptiConnect agent job <ul style="list-style-type: none"> • *NONE means that the agent job runs under the same user profile as the client job¹. • *JOB means that the agent job uses the user profile from the job description. |

Table 1. Fields in the mode table (continued)

| Field | Description |
|----------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| RCLRSC | <p>*RCLRSC for disabling reclaim resources (default)</p> <ul style="list-style-type: none"> *DDMCONV for disabling reclaim DDM conversations *BOTH for disabling reclaim resources and reclaim DDM conversations *NONE for enabling both reclaim resources and reclaim DDM conversations <p>Note: Disabling means that OptiConnect conversations will not be reclaimed.</p> |
| JOBPRIOR | <p>*DYNAMIC for changing the agent job priority when the client job priority is changed (default)</p> <ul style="list-style-type: none"> *STATIC for changing the agent job priority when the agent job is started *NONE for not changing the agent job priority |
| INIJOB ³ | This is the minimum number of agent jobs that are maintained in the agent job pool. This number includes both active and available agent jobs. |
| MINJOB ³ | This is the minimum number of available agent jobs that are maintained in the agent job pool. When available agent jobs become active agent jobs, the connection manager submits jobs to maintain the number of available agent jobs. |
| USREXIT ⁴ | <p>Program name - name of exit program if present</p> <ul style="list-style-type: none"> *OBJAUT for object authority checking only when the job priority is changed (default) *REJECT for rejecting all connections when the agent job is started *NETATR for using the DDM EXIT value from network attributes |
| USREXITLIB | Library for the user exit program |
| CONJRNL | <p>Name of journal for connection journaling</p> <ul style="list-style-type: none"> *NONE for none. |
| CONJRNL LIB | Library for connection journaling |
| ROUTING | Routing data for job |
| JOBSTDLY | This value controls the rate at which prestart jobs are started in milliseconds. |
| JOBENDDLY | This value allows the OptiConnect connection manager to shut down before all idle jobs end. This allows the customer to continue with other operations, for example, backups. The remaining idle agent jobs end at a rate of 1 per JOBENDDLY milliseconds. |

Table 1. Fields in the mode table (continued)

| Field | Description |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------|
| Notes: | |
| ¹ The QSOC user profile must have *CHANGE authority to the user profile with which the agent job is submitted. If this authority does not exist, the agent job is not submitted and the client job hangs for two minutes until it times out. | |
| ² The DFTUSER field replaces the APPC attribute SECURELOC from standard DDM security. This provides greater flexibility than standard DDM because the required security can be set individually for each DDM file. | |
| ³ If DFTUSER is set to *NONE, prestart agent jobs cannot be started and the minimum number of agent jobs cannot be maintained. | |
| ⁴ The USREXIT field overrides the network attribute field DDMACC. | |

Reloading the mode table

You can change and reload the mode table without ending and restarting the QSOC subsystem.

To do this, run the following command:

```
CALL QSOC/QYYCMUTL RELOAD
```

Restrictions:

- A default user of *NONE cannot be changed to any other value. A default user of any other value cannot be changed to *NONE.
- If a job prestarts or available agent job counts are decreased, available jobs will not be ended. However, the job counts will come down because the jobs are used up by new DDM connections.
- If the new table has an incorrect entry that prevents jobs from starting and INIJOB and MINJOB are both zero, complete these tasks:
 1. Fix the error in the table. Change the INIJOB value to a nonzero value and reload the table.
 2. Change the INIJOB value back to zero and reload the table again (this does not work if the DFTUSER value is *NONE because no prestart jobs can start).

Journaling OptiConnect transactions

If journaling transactions across the OptiConnect link is required, the connection transactions can be journaled.

The journal name comes from the connection journal field of the OptiConnect mode table. All DDM connections made with remote systems are logged in this journal.

To log connection transactions, specify the journal name in the OptiConnect mode table, and then create the journal. Here are the field names in the journal:

1. Source fully qualified job name
2. Source system name
3. Target fully qualified job name
4. Target system name
5. Mode description
6. Timestamp

The SOCAⁿⁿⁿⁿⁿ job on the target system logs this information.

Submitting remote jobs

OptiConnect allows jobs to be submitted on the local system and started as a batch job on the target system transparently.

You must create these jobs using the Submit Job (SBMJOB) or Submit Database Jobs (SBMDBJOB) command. The transparency is achieved by replacing the QCMD routing entry in a subsystem description (SBSD) with an entry that will route the submitted job to the remote system.

Here is an example of configuring remote job submission:

1. Create a routing entry that calls QYYCROUT with two input parameters.

Note: Routing entries do not allow program parameters. You need to create a program to call QYYCROUT and pass the parameters. The program should look like the following CL program example ROUTEPGM:

```
PGM
CALL PGM(QSOC/QYYCROUT) PARM(ddmfile libname)
ENDPGM
```

2. Add a routing entry to a subsystem description (SBSD) and specify ROUTEPGM as the program to call.
3. Create or change a job description to specify the routing data that is to be the compare value for the routing entry just added.

Note: All jobs submitted with this job description will be run on the remote system by the QYYCROUT program.

4. When the job is submitted, QYYCROUT is started. QYYCROUT then extracts information from the DDM file passed in.

This DDM file is not used after this. Here are the parameters for the DDM file:

- DEV: QYCTSOC
 - MODE: BATCHJOB
 - LCLLOCNAME: *LOC
 - RMTLOCNAME: *target system name* (real or logical)
5. QYYCROUT creates a data queue and a DDM file in the QTEMP library. It starts a SOCAⁿ job and creates a data queue on the target system.
 6. QYYCROUT retrieves job attributes, cancel severity, and local data area (LDA). The job and LDA information is sent to the remote data queue on the target system. The target system runs a program to receive this information and changes the attributes of the target job to match the source job.
 7. QYYCROUT extracts information about inline data files and copies them to QTEMP in the target job.

The job queue on the source system receives request data one command at a time and runs each request on the target system. After each command is run, the target job returns an indication of whether cancel severity has been exceeded. This allows QYYCROUT to decide if the job should be terminated. Because commands are run one at a time, holding the job on the source system ends command execution on the target system until the job is released.

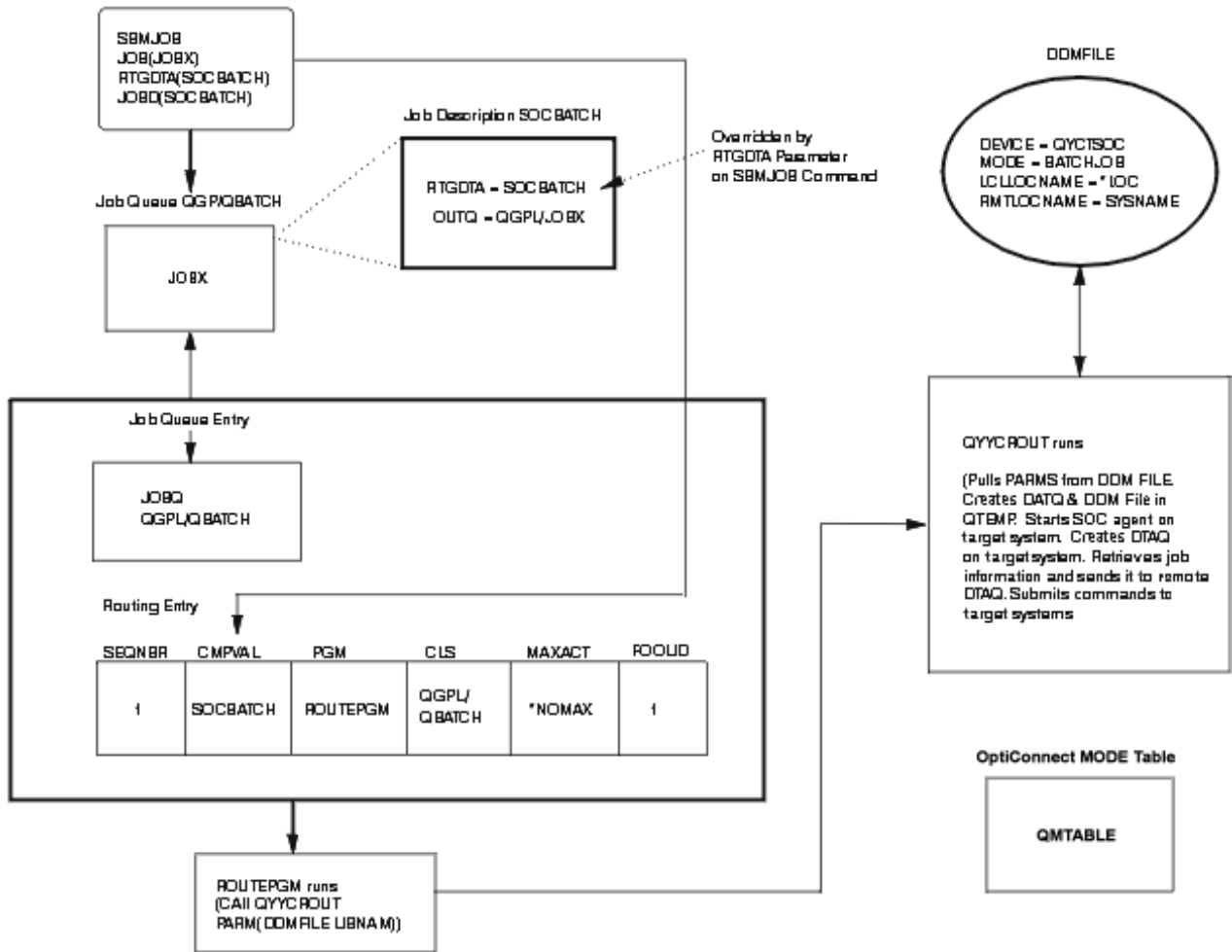
After all the requests have been received and run, and if message logging is set to something other than *NOLIST, the target job log is retrieved and written to QPJOBLOG. The user data field is set to the target system name.

To route the spooled file back to the source system, follow these steps:

1. Create a remote output queue by using the Create Output Queue (CRTOUTQ) command.
2. Specify the system name that you will be routing files to in the remote system (RMTSYS) parameter. This allows you to supply information to the remaining parameters.
3. For the remote printer queue (RMTprtQ) parameter, specify the output queue to which the remote writer sends the spooled file.

- Run the Start Remote Writer (STRRMTWTR) command on the target system. See [Figure 8](#) on page 25 and [Figure 9](#) on page 26.

Remote Job Submission Source System



RV4Pns.2

Figure 8. Remote job submission source system

Remote Job Submission Target System

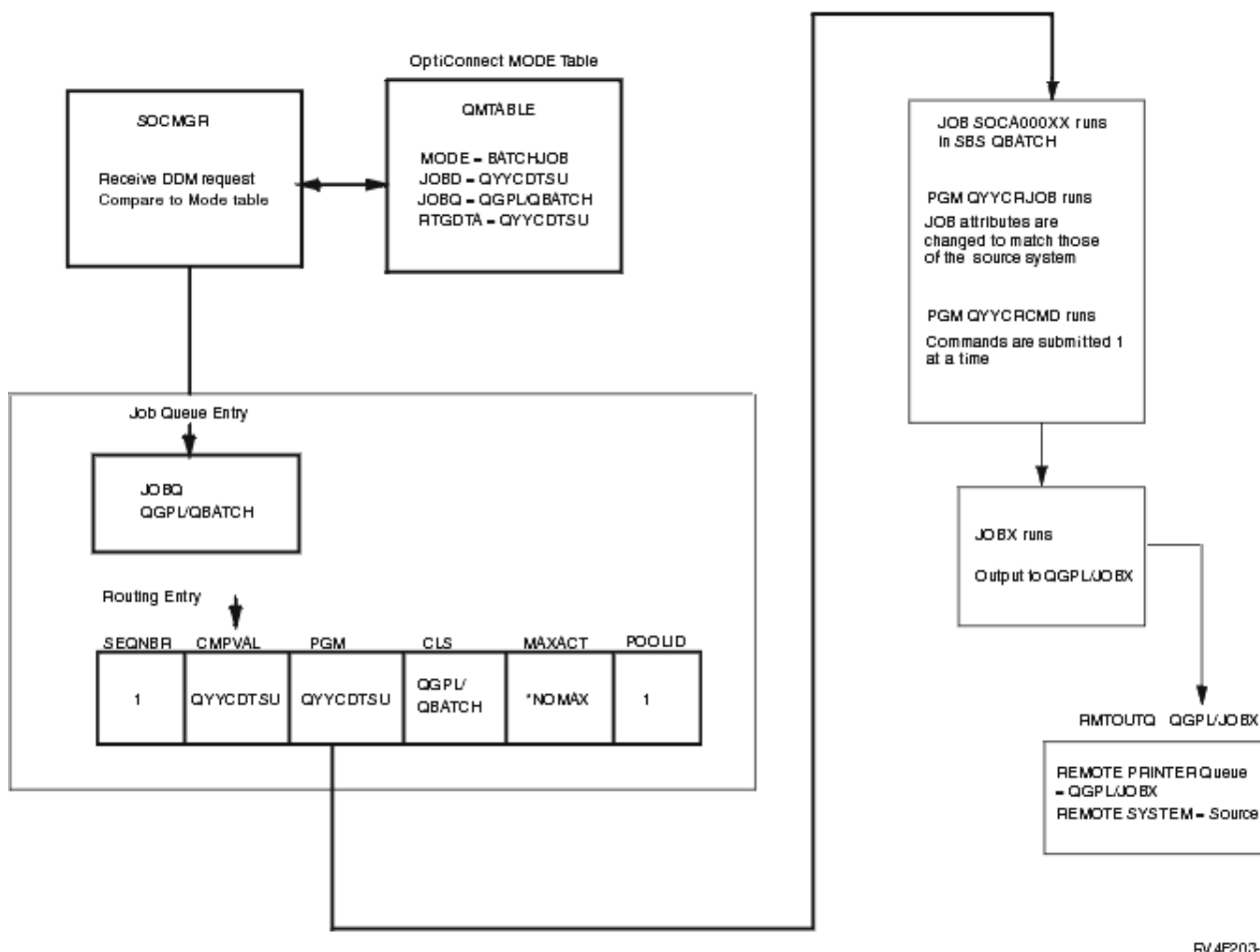


Figure 9. Remote job submission target system

Related reference

- [Create Output Queue \(CRTOUTQ\) command](#)
- [Submit Database Jobs \(SBMDBJOB\) command](#)
- [Submit Job \(SBMJOB\) command](#)

Configuring TCP/IP over OptiConnect

This function allows applications that use TCP/IP to communicate over OptiConnect. Applications must run in a IBM i cluster with the Virtual OptiConnect environment. Applications that are distributed across multiple systems can take advantage of the high bandwidth and the low latency of OptiConnect.

Features

The main purpose of the TCP/IP over OptiConnect function is to provide a standard IP interface.

This allows existing applications and services to work unchanged by simply defining a TCP/IP interface that uses OptiConnect. After you configure and start an interface, normal IP routing is used to send packets over OptiConnect.

The TCP/IP over OptiConnect function has the following features:

- It allows the configuration of TCP/IP interfaces across the OptiConnect link using standard methods (Configure TCP/IP (CFGTCP) command or System i® Navigator).

Note: Up to eight IP interfaces, each one on a separate subnet, can be configured for OptiConnect.

- It operates with standard functions (start, end, display).
- It supports IP packets, that is, all protocols that use IP, including TCP and User Datagram Protocol (UDP).
- It allows direct communication with other systems on the shared bus or buses, which have configured an IP interface with the same subnet.
- It supports broadcast and multicast.

Defining the OptiConnect TCP/IP interface

Before you start TCP/IP over OptiConnect, define a new interface to the TCP/IP configuration with the Add TCP/IP Interface (ADDTCPIFC) command. The interfaces defined are logical interfaces.

Required parameters

- Internet address (INTNETADR): This parameter specifies an IP address that the local system responds to on this interface. An interface is associated with a line description. The IP address is specified in the form *nnn.nnn.nnn.nnn*, where *nnn* is a decimal number ranging from 0 through 255. An IP address is not valid if it has all binary ones or all binary zeros for the network identifier (ID) portion or the host ID portion of the address. If you enter the IP address from a command line, enclose the address in single quotation marks (' ').
- Line description (LIND): The Add TCP/IP Interface (ADDTCPIFC) and Change TCP/IP Interface (CHGTCPIFC) commands have been changed to allow a new special value of *OPC for the LIND parameter. This special value is used to connect the TCP/IP interface with the OptiConnect transport layer.
- Subnet mask (SUBNETMASK): This parameter specifies the subnet mask, which is a bit mask that defines which portion of the IP address is treated as the (sub)network address and which portion is treated as a host address on the given subnet.

Optional parameter

- Associated local interface (LCLIFC): The local interface is an optional parameter with which the IP address, defined in INTNETADR, will be associated. Defining an interface with an associated local IP address means that the associated local IP address will be used as the source IP address in packets that originate from the interface. If no associated local IP address is specified, the source IP address on outbound packets will only be the INTNETADR IP address of the interface. Any local LAN (token ring, Ethernet, or Fiber Distributed Data Interface (FDDI)) or *VIRTUALIP interface can be used for LCLIFC.
 - *NONE: No associated local interface used.
 - *local-interface*: Specify an associated local interface for the interface to be added.

Note: The specified associated local interface must already exist.

Related reference

[Add TCP/IP Interface \(ADDTCPIFC\) command](#)

[Change TCP/IP Interface \(CHGTCPIFC\) command](#)

Configuring the TCP/IP interfaces for OptiConnect

There are two ways to configure the TCP/IP interfaces for OptiConnect.

In the first configuration, the OptiConnect bus is viewed similar to a local area network (LAN) and has a single subnet address. Each *OPC interface is assigned a unique IP address within the subnet, thus defining the host's connection to that subnet. Here is an example of this configuration:

```
System A:
  ADDTCPIFC INTNETADR('10.1.1.1') LIND(*OPC) SUBNETMASK('255.255.255.0')
System B:
  ADDTCPIFC INTNETADR('10.1.1.2') LIND(*OPC) SUBNETMASK('255.255.255.0')
System C:
  ADDTCPIFC INTNETADR('10.1.1.3') LIND(*OPC) SUBNETMASK('255.255.255.0')
```

In the second configuration, you use the associated local interface parameter (*local-interface*). Using this method, you can configure the OptiConnect interfaces as part of existing local subnets to which the system is attached by other local interfaces (for example, token ring or Ethernet interfaces). Each OptiConnect interface defines an endpoint of a point-to-point OptiConnect connection between two systems. The existing local interface is then specified as the associated local interface for the OptiConnect interface. Here is an example of this configuration:

```
System A:
ADDTCPIFC INTNETADR('9.1.1.1') LIND(TRNLINE) SUBNETMASK('255.255.255.0')
ADDTCPIFC INTNETADR('9.1.1.2') LIND(*OPC) SUBNETMASK('255.255.255.255') LCLIFC(9.1.1.1)
ADDTCPIFC INTNETADR('9.1.1.3') LIND(*OPC) SUBNETMASK('255.255.255.255') LCLIFC(9.1.1.1)
System B:
ADDTCPIFC INTNETADR('9.1.1.2') LIND(TRNLINE) SUBNETMASK('255.255.255.0')
ADDTCPIFC INTNETADR('9.1.1.1') LIND(*OPC) SUBNETMASK('255.255.255.255') LCLIFC(9.1.1.2)
ADDTCPIFC INTNETADR('9.1.1.3') LIND(*OPC) SUBNETMASK('255.255.255.255') LCLIFC(9.1.1.2)
System C:
ADDTCPIFC INTNETADR('9.1.1.3') LIND(TRNLINE) SUBNETMASK('255.255.255.0')
ADDTCPIFC INTNETADR('9.1.1.1') LIND(*OPC) SUBNETMASK('255.255.255.255') LCLIFC(9.1.1.3)
ADDTCPIFC INTNETADR('9.1.1.2') LIND(*OPC) SUBNETMASK('255.255.255.255') LCLIFC(9.1.1.3)
```

To use the associated local interface, you must configure an interface on each system, and both interfaces must be active. Based on the preceding example, the following lines represent a point-to-point configuration from System B to System C:

```
ADDTCPIFC INTNETADR('9.1.1.3') LIND(*OPC) SUBNETMASK('255.255.255.255') LCLIFC(9.1.1.2)
ADDTCPIFC INTNETADR('9.1.1.2') LIND(*OPC) SUBNETMASK('255.255.255.255') LCLIFC(9.1.1.3)
```

The advantage of the associated local interface technique is that there is no need to define new subnets for the OptiConnect bus. Subsequently, no external route tables need to be updated to provide connectivity between the OptiConnect interfaces and the rest of the TCP/IP network. Moreover, if one of the OptiConnect paths goes inactive, packets are automatically routed over the backup interface, for example, the TRNLINE in the second example. One disadvantage of this type of configuration is that an interface must be defined for every destination on the OptiConnect bus.

Related reference

[Add TCP/IP Interface \(ADDTCPIFC\) command](#)

OptiConnect and IP forwarding

IP forwarding and routing allows systems or partitions that are not connected to the same OptiConnect loop to communicate using TCP/IP.

To accomplish this, you need to configure a unique subnet for each loop, enable IP forwarding, and route packets from one subnet to another.

First, use the Change TCP/IP Attributes (CHGTCPA) command to turn on IP forwarding. This enables the forwarding of all packets, not just OptiConnect. Then define routes with the appropriate next hops to allow packets to flow to the destinations that you want.

The following example shows how to turn on IP forwarding on System B to allow System A to communicate with System C and System D:

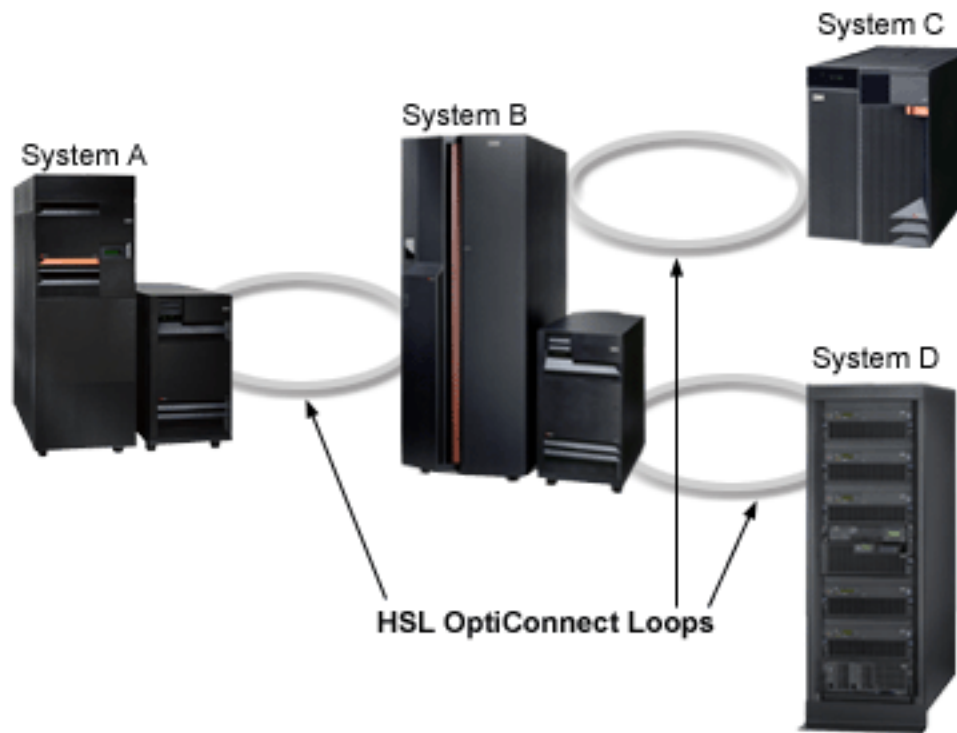


Figure 10. IP forwarding

1. Define a route to destination 10.0.1.0 with a mask of 255.255.0 and specify 10.0.0.2 as the next hop:

```
System A (10.0.0.1):
ADDTCPICF INTNETADR('10.0.0.1') LIND(*OPC) SUBNETMASK('255.255.255.0')
ADDTCPRTE RTEDEST('10.0.1.0') SUBNETMASK('255.255.255.0') NEXTHOP('10.0.0.2')
```

2. Turn on IP forwarding on System B:

```
System B (10.0.0.2 and 10.0.1.2):
CHGTCPA IPDTGFWD(*YES)
ADDTCPICF INTNETADR('10.0.0.2') LIND(*OPC) SUBNETMASK('255.255.255.0')
ADDTCPICF INTNETADR('10.0.1.2') LIND(*OPC) SUBNETMASK('255.255.255.0')
```

3. On System C and System D, define a route to destination 10.0.0.0 with a mask of 255.255.255.0 and specify 10.0.1.2 as the next hop:

```
System C (10.0.1.3):
ADDTCPICF INTNETADR('10.0.1.3') LIND(*OPC) SUBNETMASK('255.255.255.0')
ADDTCPRTE RTEDEST('10.0.0.0') SUBNETMASK('255.255.255.0') NEXTHOP('10.0.1.2')
```

```
System D (10.0.1.4):
ADDTCPICF INTNETADR('10.0.1.4') LIND(*OPC) SUBNETMASK('255.255.255.0')
ADDTCPRTE RTEDEST('10.0.0.0') SUBNETMASK('255.255.255.0') NEXTHOP('10.0.1.2')
```

Related reference

[Add TCP/IP Interface \(ADDTCPICF\) command](#)

[Change TCP/IP Attributes \(CHGTCPA\) command](#)

Proxy ARP with OptiConnect

Proxy address resolution protocol (ARP) allows physically distinct networks to appear as if they were a single, logical network.

The proxy ARP technique provides connectivity between physically separate networks without creating any new logical networks and updating any route tables.

Proxy ARP allows systems that are not connected to the local area network (LAN) to appear as if they were. When a system on the LAN wants to send data to one of the remote systems, it sends an ARP request, asking for the medium access control (MAC) address of the remote system. When the IBM i platform that acts as the proxy sees this request, it replies with the MAC address of the remote system. Conversely, the system that requests the ARP sends its MAC address to the IBM i platform. The IBM i platform then forwards the data to the remote system only if IP forwarding is set to *YES.

If you want to apply the preceding scenario in terms of OptiConnect, consider the following scenario:

- Two physically distinct networks: a LAN and a network consisting of an OptiConnect bus need to communicate. In the preceding point-to-point configuration example, we assume that all systems are connected to the same OptiConnect bus and token-ring line. Suppose that SYSTEM A has a token-ring connection and all access to SYSTEM B and SYSTEM C has to go through it. Proxy ARP provides the necessary connectivity between these physically distinct networks.

Starting the OptiConnect IP interface

To start a TCP/IP interface for OptiConnect, use the Start TCP/IP Interface (STRTCPIFC) command.

The STRTCPIFC command can be used to do the following tasks:

- Start interfaces that have been specified with the AUTOSTART(*NO) value on the Add TCP/IP Interface (ADDTCPIFC) and Change TCP/IP Interface (CHGTCPIFC) commands.
- Start an interface that was ended by the End TCP/IP Interface (ENDTCPIFC) command.

Related reference

[Start TCP/IP Interface \(STRTCPIFC\) command](#)

Ending the OptiConnect IP interface

To end a TCP/IP interface for OptiConnect, use the End TCP/IP Interface (ENDTCPIFC) command.

When you use the ENDTCPIFC command, datagrams addressed to the IP addresses that are associated with this interface are no longer accepted. You can use the ENDTCPIFC command to end an interface that you previously started with the Start TCP/IP Interface (STRTCPIFC) or Start TCP/IP (STRTCP) command.

Notes:

- You can start and end regular and associated interfaces independently from starting and ending OptiConnect (when OptiConnect is ended, the interface is inoperative).
- After you start the interface with the STRTCPIFC command, the interface status shows **Active** if OptiConnect is up, but only **Starting** if OptiConnect is down.
- If the interface was active at one point and the OptiConnect subsystem has been ended, the interface status shows **RCYPND** for recovery pending. After OptiConnect is started, the interface status automatically goes back to **Active**.
- The status of an associated interface shows **Starting** even if OptiConnect is up. In order for the associated interface to be completely active, the other interface must also be started with OptiConnect up.

Related reference

[End TCP/IP Interface \(ENDTCPIFC\) command](#)

[Start TCP/IP \(STRTCP\) command](#)

[Start TCP/IP Interface \(STRTCPIFC\) command](#)

Managing OptiConnect

You use control language (CL) commands to start and end OptiConnect and to monitor OptiConnect activity.

Starting OptiConnect

You start OptiConnect by starting the QSOC subsystem because OptiConnect runs in the QSOC subsystem.

When you start the QSOC subsystem, the OptiConnect connection manager, SOCMGR, starts as an autostart job. If prestart agent jobs (SOCAnnnnn) are defined, they also start automatically when the QSOC subsystem is started.

To start the QSOC subsystem, you must enter the Start Subsystem (STRSBS) command on each system: STRSBS QSOC/QSOC.

Related concepts

[Considerations for starting and ending OptiConnect](#)

Here are the tips on balancing the number of prestart agent jobs and the time it takes to start and end the QSOC subsystem.

Related reference

[Start Subsystem \(STRSBS\) command](#)

Ending OptiConnect

You end OptiConnect by ending the QSOC subsystem because OptiConnect runs in the QSOC subsystem.

Before you end the OptiConnect subsystem on a particular system, make sure that there are no OptiConnect application programs that are using the connection.

If you are using remote journaling over OptiConnect on this system, end it before ending the QSOC subsystem. You cannot use the Work with Active Jobs (WRKACTJOB) command to display the remote journal jobs.

To end OptiConnect, enter the End Subsystem (ENDSBS) command: ENDSBS QSOC *IMMED.

The time required to end the OptiConnect manager varies depending on the number of agent jobs to end in the subsystem. During this time, the QSOC subsystem cannot be restarted.

Note: Ending OptiConnect on one system does not affect OptiConnect activity between other systems on the same bus.

Related concepts

[Considerations for starting and ending OptiConnect](#)

Here are the tips on balancing the number of prestart agent jobs and the time it takes to start and end the QSOC subsystem.

Related reference

[End Subsystem \(ENDSBS\) command](#)

Considerations for starting and ending OptiConnect

Here are the tips on balancing the number of prestart agent jobs and the time it takes to start and end the QSOC subsystem.

When you end OptiConnect, you also end any prestart agent jobs. The more agent jobs, the longer it takes to end the QSOC subsystem. Similarly, when you start OptiConnect, the larger the initial number of agent jobs that you specified, the longer it takes to start the subsystem.

Prestart agent jobs use resources when they are started or ended, so you must consider how many prestart agent jobs you need.

For example, if there are many short transactions as when retail stores process credit card authorizations, increasing the number of prestart jobs might be beneficial. Although increasing the number of prestart jobs increases the time that it takes to start the QSOC subsystem, prestart jobs allow you to quickly process the credit card authorizations.

However, you might have longer or less numerous transactions, for example, when a teller at a bank signs on for the day. In this type of environment, you might want fewer prestart jobs and a shorter system startup.

Before you end the QSOC subsystem, you must vary off the *OPC controllers and the corresponding controllers on the other system. The ENDSBS QSOC command leaves the controllers in an unusable state that requires you to vary them off and then vary them on. If you vary off the controllers manually, less processing takes place when you end the subsystem.

Related concepts

Starting OptiConnect

You start OptiConnect by starting the QSOC subsystem because OptiConnect runs in the QSOC subsystem.

Ending OptiConnect

You end OptiConnect by ending the QSOC subsystem because OptiConnect runs in the QSOC subsystem.

Getting information about OptiConnect activity

You use control language (CL) commands to obtain information about OptiConnect activity, resources, and components.

Working with active jobs

To see a list of active jobs in the QSOC subsystem and monitor OptiConnect activity, use the Work with Active Jobs (WRKACTJOB) command. This can be helpful in determining the startup parameters that are passed to the OptiConnect connection manager.

To see the active jobs in the QSOC subsystem, enter `WRKACTJOB SBS(QSOC)`.

If the QSOC subsystem is running, you see a SOCMGR job. If an agent job has been started, you see one or more agent jobs (SOCA`nnnnnn` jobs) on the target system. Figure 11 on page 32 shows a sample of the Work with Active Jobs display. As you can see, the SOCMGR job is running, as well as one agent job (SOCA000001).

```

                                Work with Active Jobs                                SYSTEMA
                                                                                   02/15/08 15:13:17
CPU % .0   Elapsed time: 00:00:00      Active Jobs 60
Type options, press Enter.
  2=Change  3=Hold  4=End  5=Work with  6=Release  7=Display message
  8=Work with spooled files 13=Disconnect ...

Opt Subsystem/Job      User      Type  CPU %  Function      Status
-   QSOC                QSYS     SBS   .0     .             DEQW
-   SOCA000001          QSOC     BCH   .0     .             DEQW
-   SOCMGR              QSOC     ASJ   .0     PGM-QYYCMGR  DEQW

                                                                                   Bottom

Parameters or command
====>-----
F3=Exit      F5=Refresh    F7=Find      F10=Restart statistics
F11=Display elapsed data  F12=Cancel    F23=More options  F24=More keys

```

Figure 11. Work with Active Jobs display

To determine if agent jobs are active or inactive (prestarted), enter 5 (Work with) to the left of the job name. Select the option that allows you to see the call stack or open files. Inactive agent jobs are SOCAnnnnnn jobs with no open files.

Active agent jobs are often present until one of the following situations occurs:

- The source system job ends, or you log off.
- The source system job ends, or you use the Reclaim Resources (RCLRSC) command.
- The source system job ends, or you use the Reclaim DDM Conversations (RCLDDMCNV) command.

Related reference

- [Reclaim Distributed Data Management Conversations \(RCLDDMCNV\) command](#)
- [Reclaim Resources \(RCLRSC\) command](#)
- [Work with Active Jobs \(WRKACTJOB\) command](#)

Working with OptiConnect activity

To gather information about database transactions, fiber-optic bus activity, and the connection status of client and server systems, use the Work with OptiConnect Activity (WRKOPCACT) command.

You can also use the Print OptiConnect Activity (PRTOPCACT) command or the Print OptiConnect Jobs (PRTOPCJOB) command. Use these commands to write information to a spooled output file or a database output file.

To show the Work with OptiConnect Activity display, enter WRKOPCACT. When you run this command, three views of the Work with OptiConnect Activity display are available.

Figure 12. Work with OptiConnect Activity display

```

Work with OptiConnect Activity
System: SYSTEMA
Collection Start Time . . . . . : 15:03:46
Collection End Time . . . . . : 15:54:56
Collection Elapsed Time . . . . . : 00:51:10

Type options, press Enter.
  1=Vary on  2=Vary off

Opt  System      Total  Trans  Data  Data  %  Connection
     Resource    Trans /Sec  Count Rate Used Status
-----
     SYSTEMB      8      0      4      1      0 Varied on
       SOC13      0      0      2      1      0 Active
       SOC02      0      0      2      0      0 Active
     SYSTEMC      0      0      1      0      0 Active
       SOC08      0      0      1      0      0 Varied on
       SOC10      0      0      0      0      0 Active
     SYSTEMD      3      0      3      0      0 Varied on
       SOC07      0      0      1      0      0 Active
       SOC04      0      0      2      0      0 Active

Totals          11      0      8      1      0

F3=Exit    F5=Refresh  F13=Reset  F11=Client Statistics View  Bottom
F14=Jobs and Tasks                                F12=Cancel

```

Figure 12 on page 33 shows the Work with OptiConnect Activity display from the perspective of an application system. The display shows the connection status and total transactions between the system that issued the command and the other systems in the OptiConnect network.

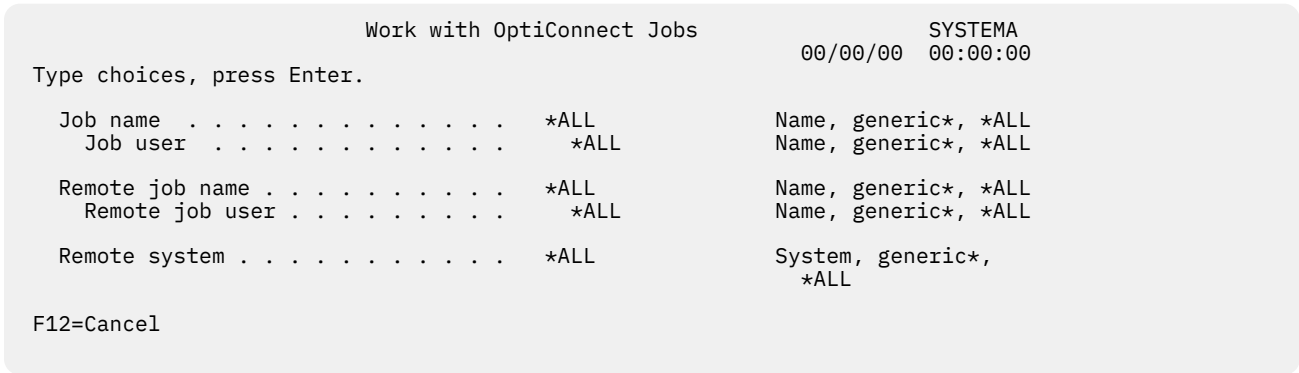
The activity is broken down by individual OptiConnect adapters for each system and defined over the collection period. The collection period is shown at the top of the display. To reset the collection data on this display, press F13 (Reset). You can also use the option to vary on or vary off the systems or resources.

Press F11 (Client Statistics View) to show this system's activity as a client. Press F11 again to show this system's activity as a server.

Press F14 (Jobs and Tasks) to see a list of OptiConnect jobs and tasks. OptiConnect jobs and tasks have one or more OptiConnect conversations attached. The initial prompt panel, shown in Figure 13 on page

34, allows the division of jobs and systems into subsets. If any of the input character strings are ended with an '*', the '*' are treated as a wildcard.

Figure 13. Work with OptiConnect Jobs display



After you enter the selection information and press Enter, the Work with OptiConnect Jobs and Tasks display shows the following information:

- Local job
The name of the job or task that exists on the system where you run the WRKOPCACT command.
- Local user
The user of the local job. This field is blank if the entry is a task.
- Remote job
The name of the job or task that exists on the remote system.
- Remote user
The user of the remote job.
- Remote number
The job number of the remote job.
- Remote system
The system where the remote job or task exists.

To select an option, enter the option number in the Opt column and press Enter. The function associated with the selected option is then performed for each of the selected jobs. For more information about the options available, move the cursor to the Opt column and press Help. The options are not available for tasks.

Note: You can enter an option next to one or more jobs.

You can select the following options:

- Option 5 (Work with Job)
Use this option to display the Work with Job (WRKJOB) menu. You can use the WRKJOB menu to end the local job and, consequently, the remote job as well. While the jobs are ending, the path status shows close pending (CLSPND). If you press F13 (Reset) after both jobs have ended, the job entry is removed from the list.
- Option 9 (End Remote Job)
Use this option to run the End Job (ENDJOB) command on the remote system. When the remote job is ended, the path status shows close pending (CLSPND). Local and remote job names remain in the job list entry until the local job is ended or distributed data management (DDM) conversations are reclaimed. You can reclaim these conversations using the Reclaim DDM Conversations (RCLDDMCNV) command. If the RCLDDMCNV command is used, the local job will not be ended, but it will be removed from the list after it is refreshed. At this point, it is no longer considered to be an OptiConnect job, although it is still available for other work.

If you press F11 (Display Statistics View), the Work with OptiConnect Jobs and Tasks display shows the following information:

- Path status

BUSY: The job or task has at least one OptiConnect transaction that has not been completed.

IDLE: There is no OptiConnect transaction in queue, and the job or task is not doing any OptiConnect communications work.

CLSPND: An OptiConnect close path is pending, and the path or conversation is in the process of closing down.

LBUSY: At least one transaction has not been completed, and it has been in queue for one second or more.

- Transaction count

The total number of OptiConnect requests that have been initiated since the last WRKOPCACT restarting. The transaction count is expressed in individual transactions and has been accumulated since either the last time OptiConnect was started or the last time the job and task data collection were reset.

- Response time

The total time, in seconds, waiting for OptiConnect transactions to be completed, divided by the completed transaction count. The completed transaction count is the previously defined transaction count if idle, or is the transaction count minus one if busy. Response time is an average that has been measured since either the last time OptiConnect was started or the last time the job and task data collection were reset.

- Data count

The data that is transferred by the job or task in KB. This figure has been accumulated since either the last time OptiConnect was started or the last time the job and task data collection were reset.

Note: If you have requested one or more remote jobs to end and you press F4 (Prompt), the End Remote OptiConnect Job (OPCJRCF) display is shown for each job. Otherwise, the Confirm End of Remote OptiConnect Jobs (OPCECNF) display is shown for a single confirmation.

Related reference

[End Job \(ENDJOB\) command](#)

[Reclaim Distributed Data Management Conversations \(RCLDDMCNV\) command](#)

[Work with OptiConnect Activity \(WRKOPCACT\) command](#)

[Print OptiConnect Activity \(PRTOPCACT\) command](#)

[Print OptiConnect Jobs \(PRTOPCJOB\) command](#)

Working with hardware resources

To display information about OptiConnect adapters, use the Work with Hardware Resources (WRKHDWRSC) command. The adapters shown on the display represent systems that are linked to this system.

To display OptiConnect adapters, enter `WRKHDWRSC TYPE(*CSA)`. This displays a resource for each remote system that had, at some point, an operational connection to the system on which you are entering the command.

Communication between two systems uses a pair of adapters: a source adapter and a target adapter. The source adapter is the adapter to which a system is connected with optical cables. The target adapters are any remaining adapters on the shared bus that are connected to other systems. The WRKHDWRSC command does not display the source adapters to which you are optically connected. It displays the target adapters for other system adapters on the shared bus. These, in turn, represent systems to which you can communicate.

Note: Virtual OptiConnect adapters are shown on the Work with Coupled Resources display. They have an adapter type of 268A and a text description of Nonhost Bus.

Some resources might have status Not detected because of a change in your configuration or because a remote system was not turned on when the OptiConnect system was started. If a remote system was not turned on when the OptiConnect system was started, turn on the remote system. The resource should become operational as soon as the initial program load (IPL) on that system is completed. The connection is still displayed even though the subsystem on the remote system is not operational.

To display resource details, such as physical locations and logical addresses, you can select option 7 (Display resource detail). Fields are blank for cards that physically reside in a bus on another system. Serial numbers are shown as zeros for these cards.

Related concepts

[Re-establishing system connections when OptiConnect is installed](#)

You must always use the Power Down System (PWRDWNSYS) command to turn off a system that is connected with OptiConnect.

Related tasks

[Basic troubleshooting procedure](#)

If you have a problem with OptiConnect, follow this procedure to determine the cause.

Related reference

[Work with Hardware Resources \(WRKHDWRSC\) command](#)

Displaying hardware resources

To display, print, or direct OptiConnect adapter information to an output file, use the Display Hardware Resource (DSPHDWRSC) command.

This OptiConnect adapter information includes the resource name, status, location, resource description, and the remote systems that are connected to the OptiConnect adapters. To print the information, enter DSPHDWRSC TYPE(*CSA) OUTPUT(*PRINT).

Related reference

[Display Hardware Resources \(DSPHDWRSC\) command](#)

Troubleshooting OptiConnect

You can follow a procedure to diagnose OptiConnect problems. Error messages and informational system reference codes (SRCs) can also help you troubleshoot these problems.

Basic troubleshooting procedure

If you have a problem with OptiConnect, follow this procedure to determine the cause.

In general, it is helpful to try the same distributed data management (DDM) transaction over a communications link, for example, over a local area network (LAN). If no error occurs, take the following steps to determine where OptiConnect is failing. If the error still occurs, the problem is not likely to be OptiConnect.

If all OptiConnect DDM accesses are failing, check the following items:

1. Enter WRKHDWRSC TYPE(*CSA) to verify that the system-to-system connections are operational.
2. Enter DSPOPCLNK to verify that the cables are operational.
3. Enter WRKACTJOB SBS(QSOC) to verify that the QSOC subsystem is running on both the application systems and the database system.
4. Verify that the SOCMGR job is running in the QSOC subsystem.

If the QSOC subsystem is not running, start it. If the subsystem is running but there is no SOCMGR job, either the SOCMGR job was ended or a software failure occurred. Enter WRKJOB QSOC to locate the

job log that is associated with the SOCMGR job. Display the log to determine why the SOCMGR job was ended. Report software failures to your service provider.

5. Verify that the OptiConnect connection manager established communications between the source and target systems.

Each time a connection is opened or closed, a message is sent to the system operator message queue. Connections are closed when the QSOC subsystem is ended, the SOCMGR job is ended, a system is turned off, or a failure occurs. To display the system operator messages, enter DSPMSG MSGQ (*SYSOPR). Otherwise, use DSPLOG LOG(QHST) to select a particular time period.

Note: To see only QSOC messages, use DSPMSG QSOC.

6. Enter WRKJOBQ JOBQ(QSOC/QSOC) to verify that the QSOC job queue is not held.
7. Verify that the correct remote location name, device, and mode are defined in the DDM file that is used for OptiConnect.

Follow these steps if you suspect a problem with a particular application:

1. Locate the failing job or job log on the source system.
2. Display the job log information and find this message: DDM JOB STARTED ON REMOTE SYSTEM.
3. Press F1 to display the detailed message text. The detailed message text shows the OptiConnect agent job name.
4. Locate the agent job on the target system.
5. Check the job log information for both the application and agent jobs to locate any unexpected errors.
6. If you encounter MSGCPF9167, see [“OptiConnect error messages” on page 38](#) for more information about communications messages.

Related concepts

Configuring OptiConnect

You can use either the fast path method or the extended function path method to route data requests through OptiConnect. The fast path method provides faster communication, but it does not support two-phase commit as the extended function path method does.

Working with hardware resources

To display information about OptiConnect adapters, use the Work with Hardware Resources (WRKHDWRSC) command. The adapters shown on the display represent systems that are linked to this system.

Related reference

Display Log (DSPLOG) command

Display Messages (DSPMSG) command

Display OptiConnect Link Status (DSPOPCLNK) command

Work with Active Jobs (WRKACTJOB) command

Work with Hardware Resources (WRKHDWRSC) command

Work with Job (WRKJOB) command

Work with Job Queue (WRKJOBQ) command

Re-establishing system connections when OptiConnect is installed

You must always use the Power Down System (PWRDWNSYS) command to turn off a system that is connected with OptiConnect.

If you do not use the PWRDWNSYS command, you might experience difficulties with system-to-system connections.

Certain conditions can cause system-to-system connections to be inoperative. Performing an initial program load (IPL) on one of the systems is the only way to reestablish these connections.

You can avoid these conditions by using the PWRDWNSYS command. However, some conditions, such as abnormal operations or loss of power on one system in the OptiConnect network, might make it necessary to perform an IPL. Here is a list of additional examples:

- Emergency power off (EPO)
- Utility or uninterruptible power supply failure
- Hardware failures
- Interrupted IPLs or failure of an IPL

If you suspect one of these conditions has occurred, use the Work with Hardware Resources (WRKHDWRSC) command to check the status of the bus expansion adapter. Report hardware failures to your IBM service representative.

Note: Problems can occur if the odd bus on the optical link card was connected to a nonOptiConnect expansion unit.

Related concepts

[Working with hardware resources](#)

To display information about OptiConnect adapters, use the Work with Hardware Resources (WRKHDWRSC) command. The adapters shown on the display represent systems that are linked to this system.

Related reference

[Power Down System \(PWRDWNSYS\) command](#)

[Work with Hardware Resources \(WRKHDWRSC\) command](#)

OptiConnect error messages

Listed here are the error codes and function codes for OptiConnect error messages.

OptiConnect error messages are contained in the QCPFMSG message file in the QSYS library. You can display and print these messages by entering the following Work with Message Files (WRKMSGF) or Work with Message Descriptions (WRKMSGD) command:

- WRKMSGF MSGF(QCPFMSG)
- WRKMSGD CPDADA1

When you are using OptiConnect, you can also display system messages in the same ways. These messages are also in the QCPFMSG message file.

The following list describes the major or minor codes for message CPDADA0. There are two pieces of information in the CPDADA0 secondary text. The first piece of information is the 'yyxx'X data, which includes an error code followed by a function code. The second piece of information, which the message identifies as a major or minor return code, is a code point that identifies (to the OptiConnect developer) where the operation fails.

The 'yyxx'X data can be interpreted as follows:

- yy = Error code (what failure is detected)
- xx = Function code (what function was being run)

Error codes:

01xx

Coupling environment not open. For example, the QSOC subsystem or the SOCMGR job is not started.

02xx

System name not found. This error causes message CPF9162: cannot establish DDM connection with remote system.

03xx

Source or agent connection ID not valid. For example, the source or target job ends the OptiConnect conversation without a clean disconnection.

04xx

Source or target conversation startup error. This error is typically due to timeout.

05xx

Bad conversation state. The job receives the wrong message type when waiting for a request, response, or control message (for example, the job is waiting for a request and receives a control message or any other combination of a request, response, or control message). Typically, this happens when the job receives a close-conversation message because of an unexpected error on the other job. Look at the target job log if the 05xx error occurs on the source job. Look at the source job log if the 05xx error occurs on the target job.

06xx

Communication error from the IPCF/transport layer. In a dual bus setup, this typically means that the operation cannot be done on either adapter. Most operations are automatically retried on the alternate connection if available. This is typically caused by the errors returned from Hardware Management Console (HMC) I/O.

07xx

Transaction ended. This error is almost always 070B: `Terminate waiting for response`. It indicates that an inflight request is ended without any response. It typically means that the associated target or source job fails and ends the OptiConnect conversation without sending a response. It can also occur if the communication between source and target systems is lost while a request is waiting for response. The 06xx error occurs only if the communication is lost during request or response transport, while the 07xx error results from a failure during wait for response.

90xx

Internal error. An unexpected or unhandled condition is detected by the OptiConnect device driver. A Vertical Licensed Internal Code log with a major or minor code of 0700/0DDD is logged when the error occurs. This can indicate a code problem or incorrect data; for example, 900B indicates bad data in the messages that are sent over the bus.

Note: There are some known cases in the device driver where this error results from loss of communication during certain states. That is, errors that should be 06xx show up as 90xx. A 90xx error, which happens at the same time when an `SOCnnnnn` OptiConnect connection closes the message, can be a 06xx error.

Function codes:

yy01

Open-stream. This function connects a job with the OptiConnect device driver. It fails only if Coupling environment not open = 0101.

yy03

Open-conversation; namely, Open-path. This function connects the source and agent job through the SOCMGR job on the target system.

yy05

Close-conversation; namely, Close-path. This function disconnects the source and agent job.

yy07

Send-request. This function sends a request message. Either the source job or the agent job can originate requests.

yy08

Receive-request. This function receives a request message.

yy0A

Send-response. This function sends a response message associated with a previous request message.

yy0B

Receive-response.

OptiConnect cluster diagnostics

These informational system reference codes (SRCs) are the most common OptiConnect network-related messages that are posted in the Product Activity Logs of systems in a cluster.

B600 69A8 Link Operational

This informational SRC indicates that a fiber-optic link has become operational again. The satellite system posts the message. The message is normally seen after the redundant link cable is reconnected.

B600 69C1 Loss of Contact With the Remote System

This informational SRC indicates that a remote system in an OptiConnect network has been brought down or has crashed. To prevent this SRC during the normal shutdown of a system in the cluster, run ENDSBS QSOC *IMMED before bringing the system down.

B600 69D8 Link Non-operational

This informational SRC indicates that the fiber-optic link between two systems has become nonoperational. Pulling a fiber-optic cable can cause this SRC. Because the OptiConnect hardware provides redundant links, the hardware can switch over to the other fiber-optic link and continue to operate both buses on the one remaining cable.

When you turn on a hub system, this SRC can occur during the initial program load (IPL) and can be ignored.

Related reference

[End Subsystem \(ENDSBS\) command](#)

Related information for OptiConnect

Product manuals, websites, and other information center topic collections contain information that relates to the OptiConnect topic collection. You can view or print any of the PDF files.

Manuals

- [APPC Programming, SC41-5443](#) 

This manual describes Advanced Program-to-Program Communication (APPC) support for application programmers. The manual includes configuration requirements, commands, problem management, and general networking considerations for APPC.

- [SNA Distribution Services, SC41-5410](#)

This manual discusses the network configuration using Systems Network Architecture distribution services (SNADS) and the Virtual Machine/Multiple Virtual Storage (VM/MVS) bridge. It also discusses object distribution functions, document library services, system distribution directory services, and shadowing. This manual is available from the [IBM Publications Center](#).

Websites

- [IBM i Web site](http://www.ibm.com/systems/i/)  (<http://www.ibm.com/systems/i/>)

Go to this website and search for *IBM i High Availability and Clusters* or *OptiConnect*.

Other information

- [Backup and recovery](#)
- [Installing, upgrading, or deleting IBM i and related software](#)
- [TCP/IP applications, protocols, and services](#)
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Related reference

[PDF file for OptiConnect](#)

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