

# IBM i 7.3 Technology Refresh 6 and Portfolio Update

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## At a glance

IBM<sup>®</sup> i 7.3 Technology Refresh 6 brings several enhancements to the IBM i Portfolio, including the base OS, selected Licensed Program Products (LPPs), hardware, and firmware. Some of the highlights are:

- IBM Db2<sup>®</sup> for i improves the functionality and performance of SQL and adds new function for database engineers.
- Application developers will see enhancements to RPG, Node.JS, and Python, and the addition of new tools and the R language.
- Rest APIs have been extended to now allow SQL to be called directly using the HTTP connection.
- In the IBM i Portfolio, many of the LPPs such as IBM Backup, Recovery and Media Services for i (BRMS), IBM PowerHA<sup>®</sup> SystemMirror<sup>®</sup> for i, and Administration Runtime Expert have had significant function added.
- Users of the desktop tools for application development, IBM Rational<sup>®</sup> Developer for i (RDi), system management, and IBM i Access Client Solutions (ACS) will enjoy significant new functionality.
- New fast start with the new IBM Db2 Web Query for i EZ-Install package.
- IBM Domino<sup>®</sup> 10.0.1 and IBM Traveler 10.0.1.1 are now supported on the IBM i operating system.
- ARCAD Observer for IBM i and ARCAD Converter for IBM i have been refreshed for traditional developers.
- Many additional features in the IBM i Portfolio have been updated.

## Overview

IBM i 7.3 Technology Refresh 6 (TR6) enhancements include added function, based on input from clients, in the areas of Db2 for i, application development, system management, open source, and support for new hardware and firmware.

IBM i 7.3 TR6 brings a wealth of enhancements to all areas of the IBM i Portfolio, including the base OS, many LPPs, and hardware and firmware. Some of the highlights are:

- The Integrated Web Services (IWS) server support is extended to enable the easy creation of REST or SOAP APIs that leverage SQL directly. In the past, an ILE program was required, and now SQL can be used directly through the HTTP request.
- Db2 for i is focused on improving the functionality and performance of SQL as well as adding new function for database engineers.

- Additional IBM i services are added to IBM i, providing an alternative to using commands and APIs.
- The Node.js and Python ecosystems continue to grow. This includes several package additions and enhancements, as well as newly added IBM i support for popular frameworks. It's easier than ever to integrate these languages with IBM i or write advanced programs that utilize cryptography, data science, or machine learning.
- Several enhancements also allow for better general connectivity through SSL or ODBC. These enhancements can benefit all PASE technologies.
- Other additions include the R programming language and a host of new tools for both users and developers.
- The IBM Copy Services Manager for IBM DS8000<sup>(R)</sup> is the strategic technology used to manage Metro Mirror or Global Mirror replication and other advanced storage capabilities. The integration of the Copy Services Manager with PowerHA enables PowerHA to support advanced function such as the three-site HyperSwap<sup>(R)</sup> with a Global Mirror link.
- BRMS is the number one solution choice of IBM i clients for the automation of backup recovery operations. The enhancements for BRMS include a new tape device, faster restore operations, turn-key control group backup recovery automation, and more.
- Access Client Solutions (ACS) has new features and functions specifically for system managers and database engineers.
- Get a fast start to advanced, visual reporting, and business intelligence with Db2 Web Query for i.
- ARCAD Observer for IBM i and ARCAD Converter for IBM i are being refreshed to include the latest versions of these products.
- IBM i 7.3 TR6 will also support the latest firmware, providing the most up-to-date IBM POWER9<sup>TM</sup> functionality.
- New support for I/O adapters, devices, and the new PCIe3 6-slot fan-out module is also included in IBM i 7.3 TR6.
- IBM Domino 10.0.1 and IBM Traveler 10.0.1.1 are now supported on the IBM i Operating System.

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## Key requirements

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IBM i 7.3 TR6 is supported on selected IBM Power<sup>(R)</sup> Systems servers with:

- IBM POWER9 technology-based processors
- IBM POWER8<sup>(R)</sup> technology-based processors
- IBM POWER7<sup>(R)</sup> or IBM POWER7 + processors

Clients using blades or IBM PureFlex<sup>(R)</sup> systems, and those using servers with IBM POWER6<sup>(R)</sup> or IBM POWER6 + or earlier processors, need to move to newer systems to take advantage of the new features in IBM i 7.3 TR6.

For up-to-date information on all types of code levels needed for support of a particular feature, see the [Power Systems Prerequisites](#) website.

See the [Technical Information](#) section for specific hardware and software prerequisites.

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## Planned availability date

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May 10, 2019

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## Description

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IBM i 7.3 TR6 includes many enhancements to IBM i 7.3 and the IBM i Portfolio of products in the areas of Db2 for i, application development, system management, open source, and support for new hardware and firmware.

### **IBM i developerWorks<sup>®</sup> Technology Updates wiki**

Technical detail for IBM i enhancements delivered with IBM i 7.3 TR6 can be found on the IBM i developerWorks Technology Updates wiki. This wiki has existed since 2010 and contains information about IBM i enhancements, organized by subject matter.

To make it easy to find IBM i 7.3 TR6 specific enhancements, see the aggregated list of enhancements found on the [developerWorks](#) wiki landing page. Note that only a subset of IBM i TR6 enhancements are delivered through the TR PTF Group. Each category of enhancements contains details on how those enhancements are delivered.

The IBM i Technology Updates wiki in developerWorks contains details of IBM i operating system enhancements. To view technical details for the topics found in this announcement letter, see the [IBM i 7.3 TR6 enhancements](#) website.

### **IBM i Operating System**

Many components of the IBM i Operating System have been enhanced in IBM i 7.3 TR6.

#### ***Integrated Web Services server***

The Integrated Web Services (IWS) server support enables users to create APIs based on ILE programs and service programs. In IBM i 7.3 TR6, IWS API support has been enhanced to allow the creation of REST and SOAP APIs based on SQL statements. The SQL statements are processed against Db2 for i database management systems. The support enables the creation of APIs that can process XML, JSON, and user-defined media resources. This now means that the database on IBM i can be accessed directly using the HTTP REST support. No JDBC or ODBC connection is needed when using the IWS support.

For additional details, see the [Integrated Web Services for IBM i](#) web page.

#### ***Easier retranslation of program objects***

No retranslation of programs is required to work with IBM i 7.3 TR6. However, there are times when a retranslation may be beneficial to ensure that programs are using the latest technology updates for performance, efficiency, and so on. For this purpose, IBM is providing the new QBNCVTPGM tool. See the [Simple IBM i program and module conversion](#) technical article on developerWorks for more information.

### **Db2 for i**

With IBM i 7.3 TR6, Db2 for i continues to focus on new and advanced SQL capabilities and the ability to use SQL to access IBM i operating system detail. Further, Db2 for i delivers new capabilities for the database engineer.

Database application developers have new capabilities for constructing data-centric SQL solutions:

- A new variant of INSERT can be used to populate rows using default values.
- The RPG SQL Precompiler is enhanced to support constants as host variables.
- The SYSTOOLS.SPLIT User Defined Table Function (UDTF) can be used to deconstruct aggregated lists of values using SQL.

In the tradition of recent Technology Refreshes, IBM i Services are added and enhanced, providing useful SQL-based alternatives to IBM i commands and APIs:

- The DATA\_AREA\_INFO view and UDTF enable SQL users to query the existence, attributes, and data within data areas (\*DTAARA).
- The ASP\_JOB\_INFO view returns one row for each job that is currently using a specific ASP. This service is an SQL alternative to the Work with ASP Jobs (WRKASPJOB) CL command.
- The OBJECT\_PRIVILEGES view is enhanced to return authorization list detail, bringing equivalent functionality to the SQL alternative to the Display Object Authority (DSPOBJAUT) CL command.
- The MESSAGE\_FILE\_DATA view returns data that can be found using the Display Message Description (DSPMSGD) CL command, opening up new options for managing messages using SQL.

Examples of these new services can be found in the latest versions of Access Client Solutions within the Run SQL Scripts interface under the category "Insert from Examples".

New capabilities are added for the database engineer:

- The CREATE INDEX statement has been enhanced to include result column names matching the behavior of the ALIAS and RENAME keywords that are supported for logical files.
- The PARSE\_STATEMENT UDTF is enhanced to return detail for DROP statements and referential constraints, making it easier to deploy advanced impact analysis.
- System Limits processing has been extended to additionally track the growth of database files by size, providing the data needed for clients to proactively manage IBM i file size.

These and other enhancements are delivered through Db2 PTF Group SF99703. See the [IBM i Technology Updates](#) wiki on developerWorks to learn more about these and other Db2 for i enhancements.

## **IBM i Licensed Program Products (LPPs)**

### ***Rational Development Studio for i (RDS)***

#### RPG IV

Rational Development Studio for i is evolving to meet the demands of a modern programmer. The RPG language continues to transform to a modern business language. With RDS 7.3 TR6, the following enhancements have been added (some of these were made available in earlier TRs through PTFs):

- The SAMEPOS keyword positions a subfield at the same starting position as another subfield.
- New PSDS subfields:
  - Internal job ID, in positions 380 to 395
  - System name, in positions 396 - 403
- The ON-EXIT section runs every time that a procedure ends, whether the procedure ends normally or abnormally.
- When a qualified data structure is defined using free-form syntax, a subfield can be directly defined as a nested data structure subfield using DCL-DS and END-DS to define the subfield.
- The new DATA-INTO operation code reads data from a structured document, such as JSON, into an RPG variable. It requires a parser to parse the document. The DATA-INTO operation calls the parser, and the parser passes the information in the document back to the DATA-INTO operation, which places the information into the RPG variable.
- Built-in function %PROC() returns the external name of the current procedure.
- Complex qualified names can be used in more places:
  - Built-in function %ELEM
  - Built-in function %SIZE

- Operation code DEALLOC
- Operation code RESET
- New built-in functions %MAX and %MIN can be used in definition statements and calculation statements.
- ALIGN(\*FULL) defines the length of a data structure as a multiple of its alignment. This is important for avoiding storage-corruption problems when calling functions written in ILE C.
- The CRTBNDRPG and CRTRPGMOD commands now support compiling from Unicode source by specifying either an EBCDIC CCSID or \*JOB for the new TGCCSID parameter.

For more information about the RPG IV enhancements, including the PTFs that provide the enhancements, see the [RPG Cafe](#).

### **IBM i Access Client Solutions (ACS) V1.1.8.2**

IBM i Access Client Solutions is the strategic interface for accessing and managing IBM i. A new version (1.1.8.2) includes many new features and updates for both IBM i system managers and database engineers.

#### Run SQL Scripts

- Open and Save support to IFS and stream files extends the options for how scripts are maintained and used.
- When a "Database of Choice" has been selected, the information is retained, making it easier to resume work. Additionally, connections to an IASP are retained.
- The Insert from Examples capability is extended to include new SQL examples, making it easier and faster to include precoded examples.
- New JDBC Connection properties are available for assigning alternate server name and other attributes.
- The new design of the Formatter enables it to understand SQL syntax, creating more consistency for formatting, especially with complex SQL statements.
- The new formatter also provides the ability to verify the syntax of your SQL, highlighting error information, line numbers, and issues.
- Leveraging the new "for Update" option, users who have access can update and edit the data values within a database table directly from Run SQL Scripts.

#### Schemas

- To facilitate the creation of new projects, the ability to copy and paste schemas has been added.

#### Printer Output

- Most printed output displays the system name. Based on requests from clients, ACS V1.1.8.2 allows for removing the system name from the Printer Output download path.

#### Integrated File System

- Prompt for the location of the current IFS download location on the target PC.
- A new "Include" filter to improve performance by limiting the data returned from the server when viewing directories with a large number of files.

#### ODBC Driver for i

- The IBM i Access ODBC driver has been ported to IBM i. This allows any standard ODBC client to be able to communicate to the local database on i. It also allows an application to be developed using the IBM i Access ODBC driver for Windows<sup>™</sup>/Linux<sup>(R)</sup> and deployed to IBM i using the same ODBC driver.

## System Configuration

- The System Configuration panel can now be leveraged as the primary location for launching ACS activities.
- Keyboard shortcuts have been added to menu options, improving navigation and simplifying the user's experience. Also, right-clicking on a system on the System Configuration panel will show a context menu of available actions.
- To accommodate different user preferences, you can sort the data within a column on the System Configuration panel.
- Easily see the specified description field to understand the system being selected.
- The Hardware Management Interface has undergone dramatic improvement. Some of these are:
  - A customized list of possible interfaces has been added.
  - It is possible to now specify more than two options.
  - The main ACS panel will be updated based on the configured Hardware Management Interfaces for the selected system.

## Additional enhancements

- Japanese new era support has been added to ACS.
- Prior to ACS 1.1.7.2, when importing an ACS configuration to a target machine, it was necessary to have the user profile of the saved configuration already on the target. With ACS 1.1.8.2, this requirement is removed, and the saved default user profile is not required to exist when importing a configuration.
- New ability to specify a list of included components, thereby excluding those not on the list.

## Improved Entitled System Support (ESS) delivery

In response to client feedback regarding making Access Client Solutions easier to find and download on the ESS website, feature 6290 under 5770-SS1 will be automatically defaulted on orders of 5770-SS1 for version 7.2 and later releases. On the ESS website, under Software Downloads, select 5770-SS1 IBM i, then select your language group; then in the download packages, refer to feature "6290: Access Client Solutions".

Feature 6290 will be available in e-config on June 11, 2019.

For the latest updates and access to the most recent version, see the [IBM i Access Client Solutions](#) web page.

## **Administration Runtime Expert**

Administration Runtime Expert is used by system administrators to enhance the abilities to manage the systems in their environment. In IBM i 7.3 TR6, Administration Runtime Expert has made significant enhancements to the product. PTF management now includes the ability to manage PTFs with preconditions as well as handling delayed PTFs. With the ability of Administration Runtime Expert to compare and manage PTFs across multiple systems, this provides more usability. Additional enhancements are:

- The dashboard interface has been updated to handle an independent workset for every user to easily allow the dashboard to be used for a call center environment.
- Result history now shows the formatted view instead of just the text view.
- Support for case-sensitive template rename.
- Attach the zip file of a verification result to the notification mail.
- Restrict user's access by the role. If a user's role is "operator", the user has access only to the console and has no ability to edit groups and systems.

## **Rational Developer for i, 9.6.x**

Rational Developer for i (RDi), 9.6.x, is the strategic suite of tools for IBM i developers. This desktop environment gives developers an efficient and highly productive environment for writing business applications. The primary focus of these and other recent enhancements has been to provide continuous improvement in the areas of reliability, productivity, security, and currency.

- Added an API to allow SystemTextEditors to report an IBM i connection and member properties, thereby making actions and third-party vendors independent of the parser for this information.
- Users can zoom in and out in the editor using command keys, allowing a more efficient way to hone in code more quickly.
- Settings are now available to allow free-form RPG comments to be repeated from a previous operation code.
- Code coverage has undergone two significant improvements:
  - Code coverage results have an improved web-faced view.
  - Code coverage source view now displays in Browse mode.
- PDM Perspective, brought to RDi users in 2018, has been refined and includes new enhancements to make the view even more compatible with PDM.
  - Added Alt-F13 to enable users to repeat options in a manner similar to PDM on the options field of the Member Object table view
  - Added new multiple entry actions to improve Object Table multiple object actions, enabling users to copy repeat options in one panel instead of a series of pop-up commands
- RPG ILE Parser includes the capability to search for code that appears to be out of place and reports these discoveries with annotations, allowing developers to quickly find anomalies in their code.
- Improved SQL formatting
  - New API is now available and usable by ACS and RDi.
  - Smart enter key is included, allowing easier line splitting.
  - Developers can now choose either automatic formatting or to specifically request when formatting should occur.
- RDi has added a Toggle editor to the outline view, allowing the display of procedure and subroutine names while navigating in the editor.

For these new enhancements, additional updates, and APAR fixes, see the [Fix list for Rational Developer for i](#) website, to be posted on April 29, 2019.

### ***PowerHA SystemMirror for i***

A key value proposition for PowerHA on IBM i is that it integrates the functionality of IBM SAN storage: in particular, the IBM DS8000 and the IBM Storwize<sup>(R)</sup> family of storage servers. This integration enables PowerHA for i to manage the storage operations as an integral part of clustering operations such as failover/fallback operations and FlashCopy<sup>(R)</sup> operations. With PowerHA SystemMirror Enterprise Edition, the integration with the IBM Copy Services Manager for the DS8000 enables PowerHA to support HyperSwap with a Global Mirror link. HyperSwap is an active/active storage configuration whereby two of the DS8000s are linked through Metro Mirror, while at the user/application level, it actually appears as a single shared storage resource (switchable LUN configuration). If one of the storage servers in the HyperSwap configuration goes away, the application workload simply continues I/O operations to the alternate DS8000 in the HyperSwap pair without interruption. Adding the capability to support a Global Mirror link to the HyperSwap pair provides the third site for disaster recovery operations, all under the management of the PowerHA for i cluster.

For more information, see the [IBM PowerHA SystemMirror for i](#) wiki page.

### ***Backup, Recovery, and Media Services for i (BRMS)***

The BRMS 7.3 TR6 enhancements include:

- Turn-key cloud control group deployment that enables clients to easily set up custom control groups for cloud.
- Ability to enable the green screen command to change control group attributes, which were previously available only in the GUI.
- Backup for changes to journaled objects is now the default setting; that is, the default for SAVLIBBRM command has been changed to OBJJRN(\*YES).
- New \*OBJ list named QALLSPLF to back up all spooled files, which improves restore performance.
- Support for the 3592-60F tape drive with \*FMT3592A6 and FMT3592A6E densities.
- Enhanced log information that uses the system timestamp to preserve message order when messages are logged at the same second. They are displayed using DSPLOGBRM.

For more information, see the [IBM Backup, Recovery & Media Services \(BRMS\) for i](#) wiki page.

### ***Db2 Web Query***

Get a fast start to advanced, visual reporting and business intelligence with Db2 Web Query for i. Get running quickly using Web Query's newly enhanced EZ-Install package. Flatten the learning curve through readily available tutorials, a new Date Dimension table creation procedure, and new sample reports for the IBM i Systems Administrator. To learn more about EZ-Install, see the [DB2<sup>\(R\)</sup> Web Query for i](#) installation web page.

### ***ARCAD Observer (Version 1.1.2)***

ARCAD Observer for IBM i supports the understanding of business applications. It includes graphical diagramming, I/O diagramming, and other analysis capabilities to understand business applications.

**Note:** The latest version of ARCAD Observer (10.08.02) is being incorporated into this LPP.

### ***ARCAD Converter (Version 1.1.2)***

ARCAD RPG Converter for IBM i automates the conversion of any RPG IV source code to free-form RPG, achieving near 100% conversion accuracy. It supports unitary or mass conversion.

**Note:** The latest version of ARCAD Transformer (10.09.03) is being incorporated into this LPP.

### **Open source**

#### ***Node.js ecosystem enhancements***

The idb-connector and idb-pconnector packages 1.x releases are now generally available and are no longer in technology preview status. The idb-connector package provides direct API access to Db2 using the conventional (callback-based) JavaScript<sup>TM</sup> conventions.

The itoolkit package, which allows a Node.js application to call IBM i functions, such as service programs, programs, commands, and so on, is enhanced to allow for new transport methods. With this enhancement, SSH or ODBC connections can be used to communicate with IBM i through the itoolkit package.

A Db2 for i dialect has been created for Sequelize.js. Sequelize is a popular, promise-based ORM for Node.js.

A new connector allows Db2 for i to be used as a data source for LoopBack<sup>(R)</sup> applications. LoopBack is a JavaScript framework that allows for rapid creation and deployment of REST APIs. It comes with a built-in API explorer and the ability to

define a robust data model for your application. It can also be used with IBM API Connect<sup>(R)</sup> and several other tools.

### ***Python ecosystem enhancements***

A number of Python packages have been made available in RPM form. This enables the packages to be easily installed with the yum package manager. The new packages allow for security enhancements, and more options for application development, data science, and machine learning.

The updated Python Machine Learning and Data Science libraries are included in the following packages:

- Pillow
- asn1crypto
- bcrypt
- cffi
- cryptography
- devel
- ibm\_db
- idna
- itoolkit
- lxml
- numpy
- pandas
- pip
- pycparser
- pynacl
- scikit-learn
- scipy
- tkinter

### ***General connectivity enhancements***

The delivery of SSL certificates through a ca-certificates RPM allows for easier SSL communication with standard sources. For instance, interactions with https-based APIs or websites may no longer need manual certificate setup.

The IBM i Access ODBC driver has been ported to IBM i. This allows any standard ODBC client to be able to communicate to the local database on i. It also allows an application to be developed using the IBM i Access ODBC driver for Windows/Linux and deployed to IBM i using the same ODBC driver.

### ***R***

R brings another programming language to IBM i. Although it has a wide variety of uses, R excels at statistical computing and data mining. Db2 can be accessed from R by installing the RODBC package and using the newly delivered ODBC driver.

### ***Newly added tools***

The number of developer and user tools available continues to grow rapidly. A few examples include the following packages, available in RPM form:

- Apache ActiveMQ, a robust message broker
- Apache Ant and Maven, build automation tools
- vim, a terminal-based editor

- yum-utils, a collection of tools and programs for managing yum repositories and installed software for more advanced users
- Midnight Commander, a terminal-based utility for exploring the filesystem and performing various tasks like FTP transfers, file compares, and much more

## Firmware and hardware

IBM i 7.3 TR6 supports FW930, which provides the most up-to-date POWER9 functionality.

Additional I/O support includes several Power features:

- Enhanced support for the PCIe Gen4 dual port 100 Gb Ethernet adapter. IBM i adds both dedicated and native SR-IOV support for the Network Interface Card (NIC) function. This adapter is already available for use in IBM i configurations with Virtual I/O Server (VIOS).
- New PCIe3 6-Slot Fanout Module for the PCIe3 Expansion Drawer.
- New optical cable cards for attaching the PCIe3 I/O Expansion drawer with the new PCIe3 6-Slot Fanout Module. The cards for the Scale Out models are single wide so they do not block the adjacent PCIe Gen4 x16 card slot.
- New 387 GB, 775 GB, and 1.55 TB Enterprise SAS 4k and 5xx SFF-3 and SFF-2 SSDs.
- New 931 GB, 1.86 TB, and 3.72 TB Mainstream SAS 4K SFF-3 and SFF-2 SSDs.

## Domino 10.0.1

A significant new release for the Domino product has been released. This new release is packed with many updates and new function. Some of the highlights include:

- Automatic Notes<sup>®</sup> client updates
- MarvelClient Essentials for IBM Notes Management solution
- Publishing statistics to external services
- Larger database (256 GB) and folders
- Apache Tika conversion filter for attachments searches
- Features that save you time, such as Indexing/clusters/database replicas management

For more details on all the latest features, see Software Announcement [218-538](#), dated December 18, 2018.

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## Product positioning

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IBM i 7.3 is the latest version of the IBM i operating environment. It runs on a Power Systems server and offers a highly scalable and virus-resistant architecture with a proven reputation for exceptional business resiliency. Companies that run applications on i running on a Power server are able to focus on innovation and delivering new value to their business, not on managing their data center operations.

IBM i delivers a fully integrated and trusted combination of relational database, security, web services, networking, and storage management capabilities that are required to run business applications. For example, IBM installs and integrates the SQL standards-based Db2 database for i with advanced database management utilities, plus additional middleware components such as multiple file system options, directory capability, an HTTP web server that is powered by Apache, a web application server, and a web services environment.

IBM develops, fully tests, and preloads these core middleware components of i together. The preintegration and testing of i is a key factor in enabling companies to

realize lower operations costs by deploying applications faster and maintaining them with less staff.

Virtualization and workload management are also built into the IBM i operating environment to enable businesses to consolidate and run multiple applications and components together on the same system, helping to drive up system usage and delivering a better return on IT investments. This broad and highly stable database and middleware foundation is ideal for efficiently deploying business processing applications.

### **Architecture for simplicity, stability, and security**

Another important advantage for i is the underlying architecture of the operating system, which enables simplicity, stability, and security. These are not add-on features, but inherent aspects of the operating system. Here are a few examples:

#### **Simplicity**

The relational database in i is an integrated component that is built on a set of integrated storage management capabilities unique to i and its predecessors. This storage management is based on the single-level storage architecture that treats all of the storage managed by i as one long stream of memory that encompasses the system memory and the storage on disks. This architecture makes it critical for the operating system to decide where to store any given piece of data, which removes the user from having to manage data placement. This method makes management of storage and the database objects contained in that storage significantly simpler.

#### **Stability**

IBM i architecturally separates the address spaces of user applications and the operating system, so it is difficult for poorly written or malicious software to intrude upon the underlying operating system support. This is one of several attributes that can help keep i running for days, weeks, and months without unexpected restarting of the operating system.

Several architectural attributes of i have contributed to the stability of the system over the years. First, applications compiled on i are compiled to a set of intermediate code instructions defined as the Technology Independent Machine Interface (TIMI). This enables i to fundamentally change the implementation of underlying hardware, firmware, and virtualization features, without requiring rewriting, changing, or even recompiling the applications written by users. This sort of forward compatibility can be a tremendous business advantage, and it enables the movement of software developed and compiled several years to even decades before to run on later generations of the i operating system.

#### **Security**

IBM i and its predecessors have an object-based architecture. Each entity on the system is an object, which has a set of prescribed operations that can be performed on it and connections from the object to those other objects that are allowed to perform various operations. An object that does not have a legal edit operation cannot be edited. It cannot be renamed to another kind of object. If the object does have an edit operation, known as *change* for most objects, it only has a defined set of attributes that can be edited, and then only by users who have authority to do that editing.

Objects can easily be hidden from other users by use of the library list objects, and security enhanced by the object-based security associated with all objects. And users who all have a similar role on the system can be grouped for role-based security, again as part of the base architecture of the system. While the i operating system supports Java™, PHP, web services, and other open source programming methods, the underlying architecture offers a level of integration, stability, simplicity, and security that makes it significantly different from comparable operating systems. These aspects can deliver excellent business value to its users.

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## Reference information

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For additional information on IBM i, see:

- Software Announcement [219-216](#), dated April 23, 2019(IBM Db2 Mirror for i)
- Software Announcement [219-214](#), dated April 23, 2019(IBM i 7.4)
- Hardware Announcement [119-001](#), dated April 23, 2019(IBM Power Systems enhancements)
- Software Announcement [219-182](#), dated April 23, 2019(IBM Power Virtualization offers new enhancements)
- Software Announcement [219-183](#), dated April 23, 2019(IBM Power Systems Hardware Management Console (HMC) Virtual Appliance Version 9 offers new enhancements)
- Software Announcement [218-538](#), dated December 18, 2018(IBM Domino V10.0.1)
- Software Announcement [219-117](#), dated February 5, 2019(Notes and Domino 10.0.1 and IBM i Series 10.0)

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## Program number

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Program number	VRM	Program name
5770-SS1	7.3	IBM i 7.3 TR6
5770-NLV	7.3	IBM National Languages for i

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## Offering Information

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Product information is available on the [IBM Offering Information](#) website.

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## Publications

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None

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## Services

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### Software Services

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IBM Software Services has the breadth, depth, and reach to manage your services needs. You can leverage the deep technical skills of our lab-based, software services team and the business consulting, project management, and infrastructure expertise of our IBM Global Services team. Also, we extend our IBM Software Services reach through IBM Business Partners to provide an extensive portfolio of capabilities. Together, we provide the global reach, intellectual capital, industry insight, and technology leadership to support a wide range of critical business needs.

To learn more about IBM Software Services, contact your Lab Services Sales or Delivery Leader.

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## Technical information

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### Specified operating environment

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### Hardware requirements

IBM i 7.3 TR6 is supported on selected Power Systems servers with POWER9, POWER8, POWER7 +, or POWER7 processors. Clients using blades or PureFlex systems, and those using servers with POWER6 or POWER6 + or earlier processors, need to move to newer systems to take advantage of the new features in i 7.3 TR6.

For up-to-date information on all types of code levels needed for support of a particular feature, see the [IBM Prerequisite](#) website.

For additional information, see the [System to IBM i maps](#) website.

### **Software requirements**

To find the supporting technical details for the topics found in this announcement letter for IBM i 7.3, see the [TR6 enhancements](#) website.

### **Planning information**

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IBM i 7.3 is the last release to support POWER7 or POWER7 + processor-based systems.

### **Packaging**

This offering is delivered through the internet and as physical media.

### **Security, auditability, and control**

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IBM i uses the security and auditability features of IBM i.

The client is responsible for evaluation, selection, and implementation of security features, administrative procedures, and appropriate controls in application systems and communication facilities.

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## **Ordering information**

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Consult your IBM representative.

There is no new ordering information in this release.

### **Charge metric**

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Not applicable

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## **Terms and conditions**

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## **License Information number**

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Yes

## **Limited warranty**

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## **Volume orders (IVO)**

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No

### **Passport Advantage applies**

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No

### **Usage restrictions**

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### **IBM Operational Support Services - SoftwareXcel**

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No

### **System i Software Maintenance applies**

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Yes

### **Variable charges apply**

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No

### **Educational allowance available**

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Yes. A 15% education allowance applies to qualified education institution clients.

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## **Statement of good security practices**

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## Prices

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## Order now

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