IBM i 7.4 Technology Refresh 5 delivers significant enhancements

Overview

IBM^(R) i is one of three operating systems that run on IBM Power^(R) servers. At its core, the IBM i operating system is a platform designed to adapt to the needs of business computing, with the expectation that both business and computing will change over time. Its defining characteristic, the "integration" represented by the "i" in IBM i, enables clients to get more value from advanced technology with fewer resources and higher reliability.

Technical details for IBM i enhancements delivered with IBM i 7.4 Technology Refresh 5 (TR5) can be found at the IBM i Technology Updates wiki.

A list of specific IBM i 7.4 TR5 enhancements can be found on the IBM i 7.4 TR5 wiki landing page.

IBM i 7.4 TR5

IBM i 7.4 TR5 introduces a new web interface for IBM Navigator for i and highlights the new features available in the operating system and in many of the IBM i Licensed Program Products (LPPs), such as IBM Cloud^(R) Storage Solutions and IBM Rational^(R) Developer for i.

Hardware and I/O support

Clients wishing to move to the new Power10 hardware will need to install IBM i 7.4 TR5.

IBM i operating system

IBM i Common Cryptographic Architecture Cryptographic Service Provider (CCA CSP)

IBM i CCA CSP, delivered as IBM i Option 35, supports the IBM 4769 Cryptographic Coprocessor with release 5.6.x for CCA.

IBM Navigator for i

The web-based Navigator for i interface has been completely redesigned and implemented to give users and administrators a state-of-the-art web experience for monitoring and managing the IBM i operating system.

IBM i Access Client Solutions (ACS)

This strategic interface for accessing and managing IBM i has been enhanced to improve the Integrated File System (IFS) interface as well as provide SQL assist to the Run SQL Scripts interface.

Db2^(R) for i

Db2 for i is enhanced to include new capabilities for SQL application developers, database engineers, and others interested in modern and advanced security management. This technology refresh adds new functions for HTTP requests, enabling the consumption of web services.

IBM i Services

IBM i Services, the SQL alternative to APIs and CL commands, continues to be a focal point for improvements, providing enhanced productivity and insight to users.

IBM Rational Development Studio for i

IBM RPG is a modern, relevant language. By continuing to listen to the development community, IBM delivers the enhancements that best meet their needs. This technology refresh includes new built-ins and other capabilities.

IBM Cloud Storage Solutions for i

IBM ´s strategic solution for saving IBM i data and backups to cloud-hosted storage now provides additional target environments for saving data, as well as improved performance and increased size limits of objects to be saved.

IBM Rational Developer for i

IBM delivers Rational Developer for i (RDi) 9.6.0.11, which provides additional focus on developer productivity and usability with enhancements that help modern programming. Additionally, version 9.6.0.11 includes significant improvements to help RPG developers refactor and modernize RPG code.

IBM Backup, Recovery, and Media Services for i

IBM Backup and Recovery Media Services for i (BRMS) provides parallel backup and recovery support as well as full support for Flash Copy when working with IBM Cloud Storage Solutions for i.

IBM i open source

As the industry moves to more integration between open source options for operations and application development environments, IBM is also expanding these environments to include additional open source technologies. In this technology refresh, there is a focus usability, interoperability with other technologies, and application development.

Key requirements

IBM i 7.4 TR5 is supported on selected IBM Power servers with IBM Power8, IBM Power9, and IBM Power10 technology-based processors.

Clients using servers with earlier processors need to move to newer systems to take advantage of the features in IBM i 7.4.

For up-to-date information on all types of code levels needed for support of a particular feature, see the IBM Prerequisites website.

See the **Technical Information** section for specific hardware and software prerequisites.

Planned availability date

- September 10, 2021: All announced products except for IBM i CCA support

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- September 30, 2021: IBM i CCA support

Description

IBM i 7.4 TR5

IBM i 7.4 TR5 includes many enhancements to the IBM i portfolio of products, several of which come in response to user feedback given through the RFE process.

IBM i operating system

IBM i CCA for the Cryptographic Coprocessor 4769

IBM i CCA 5.6.x supports use of this adapter is with IBM i 7.4 TR5, plus additional PTFs. For the latest information, including PTF numbers, see IBM i CCA Release 5.6.x support for Crypto Coprocessor 4769 in the IBM i Technology Updates wiki.

Navigator for i

Navigator for i has been completely reimagined from the ground up. Leveraging the very latest in web technology, the new interface is designed to be a multisystem management client, enabling the easy monitoring and management of many IBM i endpoint nodes from a single interface. Many of the much-requested functions from Management Central have been pulled forward to greatly simplify managing IBM i environments.

For the latest on this new interface, see IBM Navigator for i support page.

IBM i ACS

IBM i ACS provides features and functions that benefit all IBM i users, including developers who employ Run SQL Scripts to develop or execute SQL or CL commands.

This technology refresh includes significant Run SQL Scripts enhancements, such as:

- Improved memory management, benefiting those who have Run SQL Scripts windows open.
- Commit and Rollback as new options for the Run SQL Scripts tool bar. Users no longer need to remember to code the Commit; they can now simply click a button to commit changes.
- Additional Insert from Examples, making it easy to be successful with SQL and IBM i Services.
- New awareness and controls for a Run SQL Scripts session has a pending transaction, making it easier for users to know that their changes are not yet completed.
- Protections from closing a Run SQL Scripts session with a pending transaction.
- Improved ease-of-use controls for saving a Run SQL Scripts result set to a file within Db2 for i.

These and other ACS enhancements are further described in the IBM i Technology Updates wiki.

ACS is available from the ESS download site, or it can be obtained by installing the latest HTTP PTF Group on your IBM i.

Additionally, ACS could be obtained from the IBM i Access family product web page.

Db2 for i

Db2 for i, the integrated database for IBM i known for containing the attributes valued by business computing solutions, is enhanced to include new capabilities for SQL application developers, database engineers, and anyone interested in modern and advanced security management.

Db2 for i enhancements

With this update, Db2 for i provides a new set of functions for HTTP requests to consume web services. These functions enable SQL programmers to use representational state transfer (REST) through SQL, including embedded SQL within Integrated Language Environment[(R)] (ILE) programs like RPG and COBOL.

The new functions, based in QSYS2, have advantages over the established and widely used SYSTOOLS HTTP functions. These new functions do not rely on Java[TM] and provide other ease-of-use benefits.

Db2 for i Services

Db2 for i continues its history of providing advanced and easy-to-use tooling to database engineer. For example, ACTIVE_QUERY_INFO returns details about active SQL Query Engine (SQE) queries in one or more jobs, providing a new dimension to managing workloads and jobs.

To learn more about the Db2 for IBM i enhancements, see the IBM i Technology Updates wiki page.

IBM i Services

This technology refresh enhances the portfolio of IBM i Services, the strategic method for gaining access to IBM i objects and system information. Leveraging the power of SQL and the Db2 for i SQE, application developers, database engineers, and system managers now have the ability to explore IBM i objects and data in ways that were not possible with previous technologies.

Many IBM i Services have been added or enhanced, providing useful SQL-based alternatives to IBM i commands and APIs. For example, SECURITY_INFO includes additional columns of security configuration information that improves the ability to manage IBM i security.

SYSTOOLS

Db2 for i provides working examples and tools in the SYSTOOLS schema. Similar to previous technology refreshes, SYSTOOLS is enhanced with tools to help clients take a giant leap forward with extreme automation using SQL. The highlight of these changes is the Audit journal function, which provides table functions unique to specific audit journal entry types. Not only do the table functions return the basic audit journal detail, but they also extract the entry-specific detail into easily consumed return columns.

All of these Db2 for i enhancements, including Db2 Services, IBM i Services, and SYSTOOLS, are delivered through the Db2 PTF Group.

For further detail on these and other IBM i Services enhancements, including SYSTOOLS, see the IBM i Technology Updates wiki.

IBM i Licensed Program Products

Rational Development Studio for i (5770-WDS)

The RPG language is widely used in the IBM i community. Based on user feedback, the following functions have been added:

- New built-in functions %MAXARR and %MINARR. Using one of these new functions can return the index of the maximum or minimum element in the array.
- Support %FIELDS for the SORTA operation for a data structure array. This new capability enables programmers to sort a data structure by more than one subfield.
- See the value of a named constant in the debugger. With this technology refresh, when DEBUG(*CONSTANTS) is specified, named constants can be evaluated in the debugger.

For details on these and many more updates, see the RPG Cafe website.

Cloud Storage Solutions for i (5733-ICC)

Cloud Storage Solutions for i is a connector that facilitates the saving of IBM i data, SAVEs, and IBM Backup, Recovery, and Media Services (BRMS) artifacts into cloud-based storage. With this technology refresh, the following enhancements have been made:

- IBM adds support for the following target locations:
  - IBM Cloud Object Storage
  - IBM Spectrum$^{(R)}$ Protect
  - Amazon Web Services (AWS)
  - Google Cloud Storage
- The maximum size of objects to be saved is increased.
- The performance for sending objects to the cloud target is improved.

For the latest details, see the IBM Cloud Storage Solutions page.

For details on using Cloud Storage Solutions for i with BRMS, see BRMS & IBM Cloud Storage Solutions for i wiki page.

RDi 9.6.0.11 (5733-RDW or Passport Advantage$^{(R)}$ p/n D0C5FLL and D0ZN3LL)

With an on-going focus on developer productivity and usability, RDi helps modern programmers improve productivity. The latest updates offered in RDi 9.6.0.11 include significant improvements to the refactoring capabilities and modernization assists available in the product. The following new features have been added:

- A new user experience that targets green screen developers, providing an easier transition as they move to the desktop tools experience and a comfortable user interface while also enabling access to many of the modern new capabilities
- Refactor constant numeric
- Refactor procedure to include more parameters
- Hyperlink on /include
- /include hover text
- Enhanced outline decorators for file I/O

For more details, see the Fix for Rational Developer for i support page.

IBM Backup and Recovery Media Services for i (5770-BR1)

BRMS provides support for policy-oriented setup and execution of backup, recovery, archive, and other removable-media-related operations.

In this Technology Refresh, BRMS has added two new capabilities when working with IBM Cloud Storage Solutions for i:

- Parallel backup and recovery support. This improves the client performance by running multiple concurrent transfers using IBM Cloud Storage Solutions for i.
- Support of full system FlashCopy$^{(R)}$ environments. This provides the proper volume selection support needed to remove the current BRMS restriction that prevents full system FlashCopy environments using IBM Cloud Storage Solutions for i.

IBM i open source

The open source ecosystem continues to grow, with particular emphasis on the RPM-based set of deliveries. These enhancements include tools to help with task scheduling and communication with multiple databases, as well as to make SSH

access more powerful. There are important updates to both Node.js and Python. To get started with RPMs, see the IBM i RPM Open Source repository.

Node.js 16

Node.js has been updated to include version 16, the latest long-term support (LTS) release.

Version 16 has numerous improvements in performance, security, and diagnostics. For more information on the Node.js release schedule, see the Nodejs GitHub wiki page.

The IBM i 7.4 repository may need to be installed. For more information, see the Release-specific IBM repositories documentation page.

GNU Compiler Collection (GCC) 10

A newer version of GCC is available. This version brings numerous performance improvements, bug fixes, and support for newer language standards.

The IBM i 7.4 repository may need to be installed. For more information, see Release-specific IBM repositories documentation page.

Python 3.9

A newer version of the Python runtime is also available. In addition to being a newer LTS release, the new version of Python brings numerous language enhancements, including dictionary merge and update operators, string manipulation improvements, assignment expressions, and much more. For more information, see the What's New In Python 3.9 article page.

tn5250

The open source "tn5250" emulator is now available for IBM Portable Application Solutions Environment for i (PASE for i). This enables easy 5250 access from any Secure Shell (SSH) terminal. For more information, see the Source Forge Telnet Client tn5250 emulator project.

dos2unix

Dealing with files with differing line endings has been a common pain point when transferring files between operating systems. The dos2unix project provides a set of simple conversion utilities that convert new lines in files between DOS/Windows^{TM} (CRLF), Unix (LF), and Classic Mac OS (CR). Most notably, the "dos2unix" command converts between Microsoft^{TM} Windows-style line endings to Unix-style line endings, and "unix2dos" does the opposite.

hexdump

While there are several ways to view the binary contents of a file, there's now an easy and robust tool for SSH users. With the "hexdump" utility, the individual bytes within a file can be easily analyzed.

Cron

Cron, the popular UNIX$^{(R)}$ scheduling tool, is now available on IBM i as part of the "cronie" package. This software is a modern version of the cron daemon, used by the most Linux$^{(R)}$ distributions. The "anacron" tool is also available. Unlike cron, which requires a scheduler job to be running continuously, anacron can be invoked at periodic intervals.

For more information, see the Cronie Git Hub project page.

Ghostscript

Ghostscript is a PostScript™ and PDF interpreter that is primarily used to generate PDFs from various input formats. For more information, see the Ghostscript web site.

FreeTDS libraries

FreeTDS is a project to document and implement the Tabular Data Stream (TDS) protocol. This protocol is used by Sybase and Microsoft SQL Server databases. IBM i applications, particularly PASE applications, will be able to access those databases using FreeTDS, enabling better integration between Db2 and other systems. FreeTDS includes interfaces for DB-Lib, CT-Lib, and ODBC. For more information, see the FreeTDS website.

New bash built-ins: liblist, cl, getjobid

Bash is the shell, or command language interpreter, for the GNU environment.

Several new built-ins are available in the latest release of the bash shell. These new functions greatly enhance the usability of the bash environment for users, enabling easy manipulation of the current job, invocation of CL commands, or modification of the library list.

For more information, see the bash builtins post page.

Power support

IBM i provides support for the latest hardware, firmware, virtualization, and I/O offerings that provide operational efficiency and increased configuration flexibility as a new generation of Power servers is introduced:

- Power E1080 Enterprise server with Power10 technology-based processor cores
- New PCIe x16 to CXP Converter Card for attaching expansion drawers
- New PCIe3 Crypto Coprocessor 4769 adapter
- 1 GbE Base-T Transceiver RJ45 for the 25/10 Gb Ethernet adapter
- PCIe4 32 Gb dual-port optical Fibre Channel (FC) adapter adds native dedicated driver support
- HMC and Virtualization enhancements, such as Live Partition Mobility (LPM) support for virtual optical devices

For more information about these and other Power functions, see the Hardware and Firmware section of the IBM i Technology Updates wiki.

Reference information

For additional information, see Software Announcement:

- 221-150, dated September 8, 2021, IBM i 7.3 TR11
- 221-297, dated September 8, 2021, Virtualization enhancements
- 121-053, dated September 8, 2021, IBM Power Systems enhancements
- 121-046, dated September 8, 2021, Power E1080 (9080-HEX)
- 221-217, dated September 8, 2021, IBM Hardware Management Console Virtual Appliance 10.1

Program number

Program number	VRM	Program name
5770-SS1	7.4	IBM i 7.4 TR5

Offering Information

Product information is available on the IBM Offering Information website.

Services

Software Services

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

Technical information

Specified operating environment

Hardware requirements

IBM i 7.4 TR5 is supported on select Power servers with Power8, Power9, or Power10 processors. Clients using blades or IBM PureFlex$^{(R)}$ systems, and those using servers with Power7, Power7+, or earlier processors, need to move to newer systems to take advantage of the features in IBM i 7.4 TR5.

For up-to-date information about all types of code levels needed for support of a particular feature, see the IBM Prerequisites website.

For additional information, see theSystem to IBM i mapswebsite.

Software requirements

To find the supporting technical details and software requirements for IBM i 7.4, see the TR5 enhancements website.

IBM Support

IBM Support is your gateway to technical support tools and resources that are designed to help you save time and simplify support. IBM Support can help you find answers to questions, download fixes, troubleshoot, submit and track problem cases, and build skills. Learn and stay informed about the transformation of IBM Support, including new tools, new processes, and new capabilities, by going to the IBM Support Insider.

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Volume orders (IVO)

Yes. Contact your IBM representative.

Passport Advantage applies

No

Software Subscription and Support applies

For operating system software, the revised IBM Operational Support Services - SoftwareXcel offering will provide support for those operating systems and associated products that are not available with the Software Subscription and Support (Software Maintenance) offering.

This will ensure total support coverage for your enterprise needs, including IBM and selected non-IBM products. For complete lists of products supported under both the current and revised offering, go to the Supported product list website.

System i Software Maintenance applies

No

Variable charges apply

Yes

Educational allowance available

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

Statement of good security practices

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Prices

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