



IBM i 7.1 Technology Refresh 8 offers performance, usability, and integration enhancements

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At a glance

IBM® i 7.1 Technology Refresh 8 (IBM i 7.1 TR8) extends IBM i to support the latest hardware and firmware enhancements for IBM POWER7+™ servers.

Additionally, these software products are enhanced:

- IBM DB2® for i adds new functions and features to allow clients to store, secure, and access their critical business data with better performance and includes new support for database engineering personnel.
- IBM Rational® Developer for i 9.0.2 (RDi) provides new function in its IBM i Application Development tools, including free-format support for RPG, which allows developers to use the Eclipse-based tool as a development platform.
- The WebSphere® Application Server Liberty Profile is the new foundation for IBM i Integrated Application Server, enabling clients to use the latest web serving technology from IBM.

IBM i 7.1 TR8 includes options for increased capacity, higher-performing configurations, and new technology that allows options for Ethernet adapter sharing across partitions:

- Native SR-IOV for Ethernet adapter sharing without VIOS
- Native support for the 16 Gb Fibre Channel adapter to allow increased bandwidth for external storage configurations
- Support for Power® Enterprise Pools for POWER7+ 770 and 780 models
- New PCIe Gen 3 SAS adapters for more I/O operations per second (IOPS) and greater throughput
- New PCIe Gen 3 SAS tape adapter to support the full bandwidth of LTO-5 and LTO-6 tape drives

Overview

IBM i running on an IBM Power Systems™ server offers a highly scalable and virus-resistant architecture with a proven reputation for exceptional business resiliency. Running applications based on IBM i has helped companies over many years to focus on innovation and on delivering new value to their business, not just on managing their data center operations.

IBM i integrates a trusted combination of relational database, security, web services, networking, and storage management capabilities. It provides a broad and highly stable database and middleware foundation for efficiently deploying business

processing applications, with support for over 5,000 solutions from over 2,500 ISVs. IBM i solutions are offered through an extensive, highly skilled worldwide network of IBM Business Partners that is backed by IBM's trusted services and support infrastructure.

IBM i 7.1 TR8 includes support for new hardware options on POWER7+ servers that allow increased capacity and higher performing configurations. Single root I/O virtualization (SR-IOV), which is the newest in I/O technology, is being introduced, allowing for Ethernet adapter sharing across partitions on select POWER7+ systems, similar to the popular Integrated Virtual Ethernet (IVE) support on older POWER6® servers.

With IBM i 7.1 TR8, DB2 for i continues to focus on performance, usability, and additional function. By moving up to the suggested DB2 PTF Group, clients will have a database that provides significant new capabilities for database engineers.

IBM Rational has added support for Free Format RPG into the Rational Developer for i product. Also, the Integrated Application Server has been updated to use the WebSphere Liberty Profile as its base. This provides a seamless upgrade path for web applications as clients need to move to the more robust WebSphere Application Server environment.

Key prerequisites

IBM i 7.1 TR8 is supported on IBM Power Systems servers, IBM PureFlex™ systems and blades with POWER7® or POWER7+ processors, Power Systems servers and blades with POWER5, POWER5+, POWER6, or POWER6+™ processors, and IBM i servers with POWER6 processors.

Refer to the [Technical information](#) section for specific hardware and software prerequisites.

Planned availability date

June 6, 2014

Description

Software enhancements

Integrated Application Server

The Integrated Web Server is now based on the new WebSphere Application Server Liberty Profile. At its core, the Liberty Profile is a dynamic profile of the WebSphere Application Server family that enables the application server to provision only the features required by the application (or set of applications) deployed to the server. This allows the application to invoke only the components necessary to do the job and to do it lightning fast, with a smaller footprint.

The IBM Web Administration for i GUI interface has been updated to provide full support for the new Liberty-based Integrated Application Server. Administrators can create, start, stop, and deploy applications and tune for performance from this single integrated web interface.

This support is delivered through HTTP PTF Group.

DB2 for i enhancements

With IBM i 7.1 TR8, DB2 for i continues to focus on performance, usability, and additional function. By moving up to the suggested DB2 PTF Group, clients will have

a database that provides significant new capabilities and that runs better, faster, and smarter. The following enhancements are included:

- Database engineers have new capabilities for designing, reviewing, re-architecting, and customizing database objects.
 - The QSYS2/GENERATE_SQL() procedure can be used to capture SQL DDL statements for database objects. This information will be used to track and archive information about the database base objects. Database engineers can review this information, compare archived information, and project future information.
 - Partitioned tables can be created with misordered partition ranges, making it easier to clone and deploy new partitioned tables.
 - The QSYS2/RESTART_IDENTITY() procedure makes it easier to restart identity values after copying a table.
- Performance is improved and database performance analysis just got easier:
 - The Toolbox JDBC driver has improved variable-length compression support for blocked INSERTs.
 - The SQL Query Engine (SQE) is improved to detect and control complex query optimization, yielding better query performance while protecting system resources.
 - The QSYS2/DUMP_PLAN_CACHE_topN() procedure provides an easy way to find the most expensive queries in the SQL Plan Cache, making it simpler to focus performance analysis on the heaviest queries.
 - The QSYS2/EXTRACT_STATEMENTS() procedure provides an SQL interface to extract deep details from SQL Performance Monitors and SQL Plan Cache snapshots, making it possible to automate database analysis.
 - The QSYS2/SYSPACKAGESTMTSTAT catalog makes it easy to identify the most frequently executed static SQL statements by observing per-statement statistics in SQL packages, service programs, and programs.
 - New DB2 for i statistical catalogs (QSYS2/SysPackageStmtStat and QSYS2/SysProgramStmtStat) are added, making it easy to analyze the usage characteristics at the SQL statement level.
 - DRDA® connections are branded with client special register default values, making it simpler to recognize and understand workload identity.

These and many other enhancements are delivered with the DB2 PTF Group SF99701. Visit the IBM i Technology Updates wiki on developerWorks® to learn more about these and other DB2 for IBM i enhancements

<http://www.ibm.com/developerworks/ibmi/techupdates/db2>

To see the DB2 for IBM i PTF Group details, visit

<http://www.ibm.com/developerworks/ibmi/techupdates/db2/groupptf>

Rational Development Studio for i

IBM Rational Development Studio for i (RDS) provides RPG, COBOL, C, and C++ compilers as well as textual host-based development tools for creating IBM i applications.

RDS for i offers three separately orderable, chargeable capabilities, or features:

- ILE compilers: The latest generation of RPG, COBOL, C, and C++ compilers for IBM i feature modernized language capabilities and supporting key capabilities for integrating IBM i applications with other IT assets; for example, cross-language/cross platform solution debugging and Rational Open Access RPG Edition
 - RPG IV: As of October 2013, RPG IV has been updated to support a near free-format syntax. All specifications except Input and Output (I & O) specifications have been enabled for a new modern free-format expression. Details can be found at

https://www.ibm.com/developerworks/community/wikis/home?lang=en#!/wiki/We13116a562db_46_7e_bcd4_882013aec57a/page/New%20with%20IBM%20i%207.1%20TR%207%20-%20Free-form%20H,%20F,%20D%20and%20P%20statements%20for%20RPG

- COBOL continues to support the advancements of the language and operating system. These include things like taking advantage of multi-threading capabilities inherent in the IBM i operating system. While no specific COBOL commands are required, the underpinnings of the language runtime exploit these new capabilities.
- Heritage compilers: The prior generation of compilers. These older compilers include S/38 RPG, S/36 RPG II, and many other heritage environments. These compilers are considered stabilized and continue to be available to clients needing to maintain their older application code.
- Application Development ToolSet (ADTS): The host-based, textual or "green screen" development tools for IBM i. These tools have been stabilized since IBM i 6.1 and continue to be provided as a feature of the RDS product.

Rational Developer for i V9.1

Rational Developer for i is the strategic desktop development tool for creating IBM i applications. The latest release, RDi version 9.1, has been enhanced to be completely RPG free-format capable. In addition, new code coverage tooling has been added to RDi.

Hardware enhancements

Specifics for IBM i 7.1 TR8

IBM i 7.1 TR8 improves support for the latest POWER7+ servers and includes options for increased capacity, higher-performing configurations, and new technology that allows options for Ethernet adapter sharing across partitions. Among the highlights:

- New SR-IOV technology for NIC allows native sharing of Ethernet adapters without VIOS in the configuration and allows increased performance and quality of service control when VIOS is in the configuration.
- Native (non-VIOS) configurations with 16 Gb Fibre Channel adapter support is added.
- Native (non-VIOS) SAS configurations can now support up to two EXP24S SFF Gen2-bay drawers (#5887) cascaded from an EXP30 Ultra Drawer (#EDR1).
- The number of virtual disks allowed per virtual SCSI adapter in an IBM i server partition is increased.

IBM i 7.1 TR8 PTF Group is required for native support. Planned availability is June 6, 2014.

IBM i configurations with VIOS are supported for IBM i 6.1 with 6.1.1 machine code, and later releases. General availability is April 25, 2014.

Hardware announcements available prior to IBM i 7.1 TR8

The previous technology refresh, IBM i 7.1 TR7, includes support for these hardware functions:

- New level of system firmware for the POWER7+ 770 and 780 models that includes support for Power Enterprise Pools, which establish a new level of flexibility and value for systems that operate together as a pool of resources
- New PCIe Gen3 SAS adapters (#EJ0J, #EJ0L, and #EJ0M) that introduce the next generation of IBM SAS adapter technology to exploit the SSD flash technology evolution, with twice as many solid-state drives as earlier PCIe Gen2 SAS adapters, more IOPS, and greater throughput (MB/s)
- New PCIe Gen3 SAS tape adapter (#EJ0X) that supports the full bandwidth of LTO-5 and LTO-6 tape drives

- New PCIe Gen1 Bisync Adapter (#EN13 and #EN14) for those who still need binary synchronous communications
- Improved write performance for IBM i configurations with VIOS that use the EXP30 Ultra SSD I/O Drawer (#5888)

References

For more details on these hardware and I/O enhancements, including more information about planned availability and hardware requirements, refer to Hardware Announcement [ZG14-0010](#), dated January 14, 2014. Also, refer to Hardware Announcement [ZG14-0089](#), dated April 08, 2014.

For an IBM i specific description of these hardware enhancements, refer to

<https://www.ibm.com/developerworks/ibmi/techupdates/hw>

Product positioning

IBM i 7.1 is the latest version of the IBM i operating environment. IBM i runs on an IBM 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 IBM 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 provides a fully integrated and trusted combination of relational database, security, web services, networking, and storage management capabilities required to run business applications. For example, IBM installs and integrates the SQL standards-based DB2 database for IBM i with advanced database management utilities, plus additional middleware components such as multiple file system options, directory capability, an HTTP web server powered by Apache, a web application server, and a web services environment.

IBM develops, fully tests, and preloads these core middleware components of IBM i together. The preintegration and testing of IBM i is a key factor in enabling companies to realize lower operations costs by deploying applications faster and maintaining them with fewer 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, driving up system utilization 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 key differentiator for IBM i is the underlying architecture of the operating system, which provides for 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 IBM i is an integrated component that is built on a set of integrated storage management unique to IBM i and its predecessors. This storage management is based on the single-level storage architecture that treats all of the storage managed by IBM i as one long stream of memory that encompasses the system memory as well as 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 makes management of storage and the database objects contained in that storage significantly simpler.

Stability

IBM i also 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 IBM i running for days, weeks, and months without unexpected restarting of the operating system.

Several architectural attributes of IBM i contribute to the stability of the system over the years. First, applications compiled on IBM i are compiled to a set of intermediate code instructions defined as the Technology Independent Machine Interface (TIMI). This allows IBM 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 is a tremendous business advantage and has allowed the movement of software developed and compiled several years to even decades previously to run on later generations of the IBM 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 which 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, secured by the object-based security associated with all objects. And users who all have a similar role on the system can be grouped together for role-based security, again as part of the base architecture of the system.

While the IBM i operating system supports open programming methods such as Java™, PHP, web services, and so on, the underlying architecture provides a level of integration, stability, simplicity, and security that is a significant differentiator. These aspects provide excellent business value to its users.

Program number

Program number	VRM	Program name
5770-SS1	V7.1	IBM i V7.1

Product identification number

Program PID number	Maintenance 1-year PID number	Maintenance 3-year PID number
5770-SS1	N/A	N/A

Offering Information

Product information is available via the Offering Information website

<http://www.ibm.com/common/ssi>

Publications

No publications are shipped with these programs.

Technical information

Specified operating environment

Hardware requirements

A supported Power server with POWER7+, POWER7, POWER6+, POWER6, POWER5+, or POWER5 processor is required to run IBM i 7.1 TR8.

See the IBM Prerequisite website for the up-to-date specifics for all types of code levels needed for support of a particular feature

https://www-912.ibm.com/e_dir/eServerPrereq.nsf

Software requirements

For specific software requirements, see the IBM i Technology Updates wiki on developerWorks at

<http://www.ibm.com/developerworks/ibmi/techupdates/>

The program's specifications and specified operating environment information may be found in documentation accompanying the program, if available, such as a readme file, or other information published by IBM, such as an announcement letter. Documentation and other program content may be supplied only in the English language.

Companion products

The MSP Utility Pricing Offer is a program that leverages channel-led discounting for Managed Service providers who purchase a Cloud Hosting Infrastructure built with IBM hardware and software.

Limitations

Full native I/O support by IBM i 7.1 is provided, but IBM i 6.1 I/O support of POWER7+ servers requires all I/O to be virtualized by either IBM i 7.1 or by VIOS. Also note that not all I/O can be virtualized, including asynchronous communication adapters and cryptographic adapters. Alternatively, hardware feature EB34 may be purchased to allow IBM i 6.1 I/O support to run natively on POWER7+ servers. IBM i 6.1 is orderable on PureFlex systems as an MES. IBM i 6.1 is not orderable on initial orders of PureFlex hardware.

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The IBM Support Portal is your gateway to technical support. This includes IBM Electronic Support tools and resources, for software and hardware, to help save time and simplify support. The Electronic Support tools can help you find answers to questions, download fixes, troubleshoot, automate data collection, submit and track problems through the Service Request online tool, and build skills. All these tools are made available through your IBM support agreement, at no additional charge. Read about the Electronic Support portfolio of tools

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Access the IBM Support Portal

<http://ibm.com/support>

Access the online Service Request tool

<http://ibm.com/support/servicerequest>

User group requirements

A strong and passionate worldwide user community focuses on all aspects of IBM i running on Power servers. The community includes online groups and face-to-face community gatherings. The COMMON organization has branches around the world, including COMMON North America, iSUC in Japan, COMMON Europe, and Interaction in Australia/New Zealand.

IBM continues to recognize key community leaders through the IBM champion program. The 14 current IBM i Champions have been recognized for their work in the betterment of user groups, social media, and the Academic Initiative. To learn about the IBM Champions program, visit

https://www.ibm.com/developerworks/community/profiles/html/advancedSearch.do?profileTag s=power_systems&profileType=champion&lang=en

Planning information

Security, auditability, and control

These programs use the security and auditability features of the host hardware or software. The customer 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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License Information number

GC52-0885

The program's License Information will be available for review on the IBM Software License Agreement website

<http://www.ibm.com/software/sla/sladb.nsf>

Limited warranty applies

Yes

Limited warranty

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IBM will maintain this information for at least one year after the original licensee acquires the program (warranty period).

Money-back guarantee

If for any reason you are dissatisfied with the program and you are the original licensee, you may obtain a refund of the amount you paid for it, if within 30 days of your invoice date you return the program and its PoE to the party from whom you obtained it. If you downloaded the program, you may contact the party from whom you acquired it for instructions on how to obtain the refund.

For clarification, note that for programs acquired under any of IBM's On/Off Capacity on Demand (On/Off CoD) software offerings, this term does not apply since these offerings apply to programs already acquired and in use by you.

Volume orders (IVO)

Yes. Contact your IBM representative.

Passport Advantage applies

No

Software Subscription and Support applies

Yes. All distributed software licenses include Software Subscription and Support (also referred to as Software Maintenance) for a period of 12 months from the date of acquisition, providing a streamlined way to acquire IBM software and assure

technical support coverage for all licenses. Extending coverage for a total of three years from date of acquisition may be elected.

While your Software Subscription and Support is in effect, IBM provides you assistance for your routine, short duration installation and usage (how-to) questions, and code-related questions. IBM provides assistance via telephone and, if available, electronic access, only to your information systems (IS) technical support personnel during the normal business hours (published prime shift hours) of your IBM support center. (This assistance is not available to your end users.) IBM provides Severity 1 assistance 24 hours a day, every day of the year. For additional details, consult your IBM Software Support Handbook at

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System i® Software Maintenance applies

Yes

Variable charges apply

No

Educational allowance available

Yes. When ordering through the program number process, a 15% education allowance applies to qualified education institution customers.

Education Software Allowance Program applies when ordering through the program number process.

ESAP available

Yes, to qualified customers.

Statement of good security practices

IT system security involves protecting systems and information through prevention, detection, and response to improper access from within and outside your enterprise. Improper access can result in information being altered, destroyed, or misappropriated or can result in misuse of your systems to attack others. Without a comprehensive approach to security, no IT system or product should be considered completely secure and no single product or security measure can be completely effective in preventing improper access. IBM systems and products are designed to be part of a comprehensive security approach, which will necessarily involve additional operational procedures, and may require other systems, products, or services to be most effective. IBM does not warrant that systems and products are immune from the malicious or illegal conduct of any party.

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Electronic Service Agent™ and the IBM Electronic Support web portal are dedicated to providing fast, exceptional support to IBM Systems customers. The IBM Electronic Service Agent tool is a no-additional-charge tool that proactively monitors and reports hardware events, such as system errors, performance issues, and inventory. The Electronic Service Agent tool can help you stay focused on your company's strategic business initiatives, save time, and spend less effort managing day-to-day

IT maintenance issues. Servers enabled with this tool can be monitored remotely around the clock by IBM Support, all at no additional cost to you.

Now integrated into the base operating system of AIX® V5.3, AIX V6.1, and AIX V7.1, Electronic Service Agent is designed to automatically and electronically report system failures and utilization issues to IBM, which can result in faster problem resolution and increased availability. System configuration and inventory information collected by the Electronic Service Agent tool also can be viewed on the secure Electronic Support web portal, and used to improve problem determination and resolution by you and the IBM support team. To access the tool main menu, simply type `smitty esa_main`, and select Configure Electronic Service Agent. In addition, ESA now includes a powerful web user interface, giving the administrator easy access to status, tool settings, problem information, and filters. For more information and documentation on how to configure and use Electronic Service Agent, refer to

<http://www.ibm.com/support/electronic>

The IBM Electronic Support portal is a single Internet entry point that replaces the multiple entry points traditionally used to access IBM Internet services and support. This portal enables you to gain easier access to IBM resources for assistance in resolving technical problems. The My Systems and Premium Search functions make it even easier for Electronic Service Agent tool-enabled customers to track system inventory and find pertinent fixes.

Benefits

Increased uptime: The Electronic Service Agent tool is designed to enhance the Warranty or Maintenance Agreement by providing faster hardware error reporting and uploading system information to IBM Support. This can translate to less wasted time monitoring the symptoms, diagnosing the error, and manually calling IBM Support to open a problem record. Its 24x7 monitoring and reporting mean no more dependence on human intervention or off-hours customer personnel when errors are encountered in the middle of the night.

Security: The Electronic Service Agent tool is designed to be secure in monitoring, reporting, and storing the data at IBM. The Electronic Service Agent tool securely transmits via either the Internet (HTTPS or VPN) or modem, and can be configured to communicate securely through gateways to provide you a single point of exit from your site. Communication is one way. Activating Electronic Service Agent does not enable IBM to call into your system. System inventory information is stored in a secure database, which is protected behind IBM firewalls. It is viewable only by you and IBM. Your business applications or business data is never transmitted to IBM.

More accurate reporting: Because system information and error logs are automatically uploaded to the IBM Support center in conjunction with the service request, you are not required to find and send system information, decreasing the risk of misreported or misdiagnosed errors. Once inside IBM, problem error data is run through a data knowledge management system and knowledge articles are appended to the problem record.

Customized support: Using the IBM ID entered during activation, you can view system and support information in the My Systems and Premium Search sections of the Electronic Support website at

<http://www.ibm.com/support/electronic>

My Systems provides valuable reports of installed hardware and software using information collected from the systems by Electronic Service Agent. Reports are available for any system associated with your IBM ID. Premium Search combines the function of search and the value of Electronic Service Agent information, providing advanced search of the technical support knowledgebase. Using Premium Search and the Electronic Service Agent information that has been collected from your system, you are able to see search results that apply specifically to your systems.

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