IBM Spectrum Scale V4.2 delivers simple, efficient, and intelligent data management for high-performance, scale-out storage

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Help speed Big Data Analytics

- Faster, easier, and reliable workflows with native Hadoop support, multiprotocol NAS, and proven enterprise capabilities
- Highly available read and write caching accelerate applications

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Reference: YE001

Overview

IBM Spectrum Scale™ V4.2 is designed to be the easiest, most flexible, and data-efficient release of the industry-leading, software-defined storage solution. As data volumes grow and applications become more capable, more companies need the fast, highly available, and highly scalable data access of Spectrum Scale to drive their business. Spectrum Scale V4.2 spans the enterprise storage portfolio, including flash, disk, tape, local, and remote storage.

Spectrum Scale, designed to provide anytime, anywhere access to data, enables files and objects to be managed together with standardized interfaces such as POSIX, OpenStack Swift, NFS, SMB/CIFS, and extended S3 API interfaces, delivering a true *data without borders* capability for your environments.

Evolving alongside Big Data Analytics, Spectrum Scale V4.2 can improve time to insight by supporting Hadoop and non-Hadoop application data sharing. Avoiding data replication and movement can reduce costs, simplify workflows, and add enterprise features to business-critical data repositories. Big Data Analytics on Spectrum Scale can help reduce costs and increase security with data tiering, encryption, and support across multiple geographies.

The challenge

Today's data growth is challenging traditional storage and data management solutions. New applications are generating massive amounts of unstructured data such as video, audio, and text files, and data must be managed across standard and new cloud platforms. Being able to balance traditional workloads with new workloads and data types puts pressure on IT and storage administrators to deliver application performance and reduce data access bottlenecks that delay schedules and waste expensive resources.

Despite the growth in data, storage budgets remain relatively flat as CIOs seek to increase utilization of current storage and decrease the total lifetime cost of data under their management.

The solution

IBM Spectrum Scale can remove data-related bottlenecks by enabling parallel access to data to eliminate filer choke points or hot spots. IBM Spectrum Scale helps simplify data management by providing a single view across an enterprise storage portfolio to scale out simply and quickly. Spectrum Scale unifies data silos, including those across multiple geographies.

Spectrum Scale is used for diverse workloads across every industry to deliver performance, reliability, and availability of data which are essential to the business.

Key prerequisites

IBM Spectrum Scale: IBM Power Systems™ servers running AIX(R) or Linux™ operating systems, x86-64 servers running Linux or Microsoft™ Windows™ operating systems, and a minimum of 2 GB of system memory.

IBM Spectrum Scale for Linux on z Systems™: IBM z Systems™ servers or IBM LinuxONE systems running one of the following:

- Red Hat Enterprise Linux (RHEL) 7.1
- RHEL 6.5, 6.6, or 6.7
- SUSE Linux Enterprise Server (SLES) 12
- SLES 11 SP3 or SP4

Planned availability date

- November 20, 2015: Electronic delivery
- December 18, 2015: Physical media

Description

Improved client experience

A new GUI simplifies many storage administrator tasks and delivers monitoring capabilities. Built with the same modern user experience principles as other offerings in the Spectrum Storage family, it is intuitive and easy to learn. Common administrator tasks, such as provisioning additional capacity, can be accomplished faster and without knowledge of the command-line interface. System health, capacity, and performance displays can be used to identify trends and respond quickly to any issues that may arise.

Integration into IBM Spectrum Control with a common design provides portfolio visibility that spans multiple IBM Spectrum Scale installations and may include other storage. Common interfaces and dashboards for health monitoring can deliver significant cost savings through reduced management time and improved staff productivity.

A new command-line interface installation toolkit can quickly install IBM Spectrum Scale software, both base server management and protocol nodes.

Note: The GUI is available with Standard Edition and Advanced Edition only.

Seamless integration with Hadoop workloads

Version 4.2 offers seamless integration with Hadoop workloads without requiring changes to applications, and also integrates with Apache Ambari.

Spectrum Scale V4.2 has a new Hadoop connector design that will provide deeper integration with HDFS. This will allow applications that depend on HDFS a more seamless way to run on top of Spectrum Scale without any changes. This connector will also allow Spectrum Scale to support new Hadoop and HDFS features more quickly.

Ambari is an open source Apache tool used by many Hadoop distributions for deploying and managing Hadoop distributions. Spectrum Scale is now integrated with Ambari for BigInsights[(R)] IBM Open Platform for Apache Hadoop. This integration adds the ability to deploy, manage, monitor, upgrade, and debug Spectrum Scale through the Ambari dashboard for BigInsights.

Enhanced usability

Unified file and object storage enables different applications or services to access the same data without moving or altering it. Data can be written as either file or object and retrieved as either. Rather than use a copy and change gateway, IBM Spectrum Scale supports both protocols natively for higher performance and simplified administration. The common storage layer enables most of the IBM Spectrum Scale features, including authentication, encryption and tiering, for both object and file storage.

Quality of Service support allows administrators to prioritize user data services over background or maintenance I/O requirements. Administrators can set throttle levels for services such as long-running restripe or other services that may impact users of the IBM Spectrum Scale cluster.

IBM Spectrum Scale V4.2 adds policy-driven compression to reduce the size of data at rest. Intended primarily for cold data, compression is a background task that occurs after an initial write. Data is decompressed on read for each access. Using industry-standard compression algorithms, data compression is storage and CPU-resource efficient. Using IBM Spectrum Scale policies enables administrators to only compress data where it will be effective and efficient. Policy-driven compression can be configured to not waste resources attempting to compress data that is incompressible or slow down applications by adding overhead to reads.

Enhancements to IBM Spectrum Scale for Linux on z Systems

Support for IBM Spectrum Protect™ backup-archive and Space Management client

- IBM Spectrum Scale V4.2 Standard Edition extends support of backup and restore functions to protect data in your file system and also enables space management of your data.
- The Spectrum Scale policy engine is utilized to rapidly identify changed files and uses parallel execution of backup processes on multiple nodes to deliver scalability of the data protection process.
- Space Management functions extend the size of a Spectrum Scale file system beyond the disk-based storage pools by defining external storage pools on sequential access media and migrating seldom used data.

Asynchronous multisite disaster recovery

- IBM Spectrum Scale V4.2 Advanced Edition supports asynchronous disaster recovery (DR) at the fileset level. This enables you to create a primary (active) / secondary (passive) relationship at the fileset level.
- Data is asynchronously replicated to the secondary on a periodic basis. For initial setup of a primary/secondary site, data population of the secondary can be done out-of-band to help overcome network bandwidth limitations between DR sites. Primary/secondary communication channel can be NFSv3 or IBM Spectrum Scale.
- The DR capability supports failover to the secondary when there is a primary failure and the ability to failback when the primary comes back. You can setup a recovery point objective (RPO) which enables you to specify how often synchronized snapshots are created between the primary and the secondary. This is used during failover to restore the secondary to the last synchronized snapshot. The lower the granularity of the RPO, the lesser the data loss on a failover.

Product positioning

Businesses today are challenged by exponentially growing, unstructured data while IT budgets remain flat or are shrinking. IBM Spectrum Scale is a software-defined solution for this problem that enables continuous data access to a shared storage infrastructure. Spectrum Scale includes the following key values:

- Data silos can be unified with a global namespace to span across storage hardware types and brands for anytime, anywhere access to data. Unified file and object support removes the need for separate storage hardware.
- Software-defined storage efficiency enables seamless placement or movement of data to the right tier for storage cost and performance optimization. Spectrum Scale supports any combination of flash, disk, and tape with integrated tools and sophisticated policies.
- Global data collaboration breaks down data silos within the storage environment of the company, including the ability to share data globally across geographically dispersed data centres.
- Enterprise Data Protection with native encryption at rest delivers secure erase, accelerated backup and restore, and the ability to enable DR across multiple sites.
- Broad workload and client support, including POSIX, NFS, SMB/CIFS, and Open Stack Swift, delivers protocol flexibility.
- With choice of grid, distributed storage, or centralized shared storage for Hadoop, Spark, and commercial analytics environments, Spectrum Scale is optimised for Big Data Analytics. Distributed data and metadata, self-tuning cache, and FPO deliver higher performance for new generation workloads.

Spectrum Scale is the industry's most mature and widely deployed software-defined storage solution with thousands of systems deployed across the globe in practically every industry. Wherever data performance, access, efficiency, and scalability matter, IBM Spectrum Scale is a perfect fit.

Program number

Program number	VRM	Program name
5725-Q01[1]	4.2.0	IBM Spectrum Scale
5725-S28	4.2.0	IBM Spectrum Scale for Linux on z Systems
5641-GPF[2]	4.2.0	IBM Spectrum Scale

1
Program ordered from Passport Advantage(R) or Passport Advantage Express(R)

2
Program ordered from IBM POWER(R) or IBM Storage configurator

Product identification number

Program PID number	Maintenance 1 year PID number	Maintenance 3 year PID number	Maintenance 5 year PID number
5641-GPF	5641-GS1	5641-GS3	5641-GS5

Offering Information

Product information is available via the Offering Information website

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

Also, visit the Passport Advantage(R) website

http://www.ibm.com/software/passportadvantage

Publications

No publications are shipped with this program.

The following publications are available from the web:

- *IBM Spectrum Scale Concepts, Planning, and Installation Guide (GA76-0441)*
- *IBM Spectrum Scale Administration and Programming Reference (SA23-1452)*
- *IBM Spectrum Scale Advanced Administration and Programming Reference (SC23-7032)*
- *IBM Spectrum Scale Problem Determination Guide (GA76-0443)*
- *IBM Spectrum Scale Data Management API Guide (GA76-0442)*

To access these publications, refer to the IBM Spectrum Scale product collection in IBM Knowledge Center located at

http://www.ibm.com/support/knowledgecenter/SSFKCN/gpfs_welcome.html

This website contains the most recent IBM Spectrum Scale publications in PDF, HTML, and EPUB formats.

IBM Knowledge Center is a worldwide central repository of IBM technical publications hosted in a single application. You can find and navigate technical content more efficiently and easily with improved search, filtering, and user experience. Create your own collections of IBM documents with PDF output on-demand.

Services

Software Services

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 or to contact a Software Services sales specialist, visit

http://www.ibm.com/software/sw-services/

Technical information

Specified operating environment

Hardware requirements

IBM Spectrum Scale V4.2 is supported on IBM Power Systems and specified rack-based servers including:

- Power Systems
- PureFlex™
- Intelligent Cluster
- x86-64 rack-based servers

Minimum hardware requirements:

- IBM POWER5 processors, or later
- AMD Opteron processors
- Intel™ EM64T processors
- 2 GB of system memory

IBM Spectrum Scale for Linux on z Systems is supported on:

- IBM z™ System servers
- IBM LinuxONE systems

The minimum hardware requirements are:

- CP or IFL processors
- 2 GB of system memory

IBM Spectrum Scale for Linux on z Systems, V4.2 is supported with all storage systems using ECKD™ and with IBM System Storage(R) DS8000(R), IBM Storwize(R) V7000, IBM FlashSystem(R), IBM XIV(R), or IBM System Storage SAN Volume Controller (SVC).

Refer to the IBM Spectrum Scale FAQs for supported connectivity, and formally qualified disk subsystems at the following website

https://www.ibm.com/support/knowledgecenter/SSFKCN/
com.ibm.cluster.gpfs.doc/gpfs_faqs/g pfsclustersfaq.html?lang=en

Software requirements

IBM Spectrum Scale minimum operating system requirements:

- Red Hat Enterprise Linux (RHEL) 6.4 and 7.0
- SUSE Linux Enterprise Server (SLES) 11 SP3 and 12
- IBM AIX V6 and V7
- Debian 7 and 8

- Ubuntu Server 14.04
- For Microsoft Windows, the following are supported:
  - Windows Server 2008 x64 (SP2)
  - Windows Server 2008 R2
  - Windows 7 (Enterprise and Ultimate Editions) x64 SP 1
  - Windows Server 2012 R2 (Datacenter and Standard)
  - Windows Server 2012 (Datacenter and Standard)
  - Windows 8.1 (Enterprise Edition)

Note: IBM Spectrum Scale V4 Advanced Edition is not supported running on the Microsoft Windows operating system.

If using the IBM Spectrum Scale GUI, RHEL 7 or SLES 12 is required.

IBM Spectrum Scale V4 running Windows requires the installation of Cygwin. To download, go to

http://www.cygwin.com/

In order to support Hadoop workloads with Spectrum Scale, the GPFS™ Hadoop connector is required and can be obtained from developerWorks®.

https://www.ibm.com/developerworks/community/wikis/home?lang=en#!/wiki/General%20Parall el%20File%20System%20%28GPFS%29/page/GPFS%20Release%20for%20Enterprise%20Manager

IBM Spectrum Scale for Linux on z Systems operating system requirements:

- Red Hat Enterprise Linux (RHEL) 7.1
- RHEL 6.5, 6.6, or 6.7
- SUSE Linux Enterprise Server (SLES) 12
- SLES 11 SP3 or SP4

Note: IBM Spectrum Scale for Linux on z Systems has no dependency on a specific version of z/VM®.

The latest service updates are mandatory and available at

http://www-933.ibm.com/support/fixcentral/

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.

Limitations

IBM Spectrum Scale compression

Compression support excludes the following:

- Compressing files in snapshots
- Compressing clones and cloning compressed files
- Compressing files on AFM cache site and AFM-based asynchronous DR filesets
- Small file compression (files consuming less than 2 sub-blocks, compressing small files into inode)
- Nonregular files, such as directories
- Compression in an FPO environment

IBM Spectrum Scale QoS

- Only two classes supported: *Maintenance* and *other.*
- All user applications are being placed in the same class. There is no support for different applications being throttled differently.
- No throttling for applications which perform Direct I/O.
- Not supported on AFM cache and AFM-based asynchronous DR filesets
- Not supported in an FPO environment
- Not supported running Linux on z Systems

IBM Spectrum Scale object support

An object cluster can support either Asynch DR (Active-Passive using AFM) or Multi-region Active-Active.

- Clusters using Multi-region Active-Active clusters do not support containers with file access policy enabled.
- Clusters using Asynch DR (Active-Passive using AFM) do not support containers with compression policy enabled.
- Special files, like device or socket files and immutable files, cannot be accessed from the object interface.
- Not supported running Linux on z Systems

IBM Spectrum Scale Big Data and Analytics support

- Big Data and Analytics Hadoop Distributed File System (HDFS) Transparency will not support shared storage.
- Not supported running Linux on z Systems

IBM Spectrum Scale GUI

- Support for the GUI is limited to a cluster with up to 128 nodes.
- The GUI node must run the RHEL 7 or SLES 12 operating system.
- The GUI does not manage AFM caching and AFM based Asynchronous DR-specific functions.
- File systems and NSDs cannot be created with the GUI
- The GUI is not available with Express[R] Edition.
- Not supported running Linux on z Systems

IBM Spectrum Scale Advanced Edition

Current limitations of the IBM Spectrum Scale encryption function, available with the Advanced Edition, include:

- The encryption of directories, or other metadata, is not supported.
- Encrypted backup requires the user to provide a separate tape solution.
- IBM Spectrum Scale Native Encryption is not supported on Windows. The encryption function should be disabled when Windows nodes are in the cluster.
- Encryption is not supported running Linux on z Systems.

IBM Spectrum Scale protocols

- Protocol nodes cannot be a mix of IBM POWER[R] and Intel nodes.
- NFS and CIFS protocols are not supported with AFM caching filesets.
- IBM Spectrum Scale Clustered NFS (CNFS) and integrated protocol support using the cluster export services are not available on the same cluster.
- No SMB1 support.
- No IPV6 protocol support exporting the NFS/SMB/Swift protocols.

- If NFS stack, on IBM Spectrum Scale home, is migrated to the integrated protocol export, any remote cluster caching data needs to clear cache and have it repopulated.
- Protocols are not supported running Linux on z Systems.
- Refer to the FAQ for prerequisite information.

IBM Spectrum Scale for Linux on z Systems, V4.2

- Advanced Edition on z Systems does not support the encryption function.
- Heterogeneous clusters are supported with client nodes, without local storage access, running 64-bit versions of the RHEL or SLES operating system on POWER and x86 servers, and AIX on Power[R].
- IBM Spectrum Protect backup-archive and Space Management client are only supported starting with Spectrum Protect V7.1.4 running 64-bit versions of RHEL 7.1 and SLES 12.
- Linux on z Systems does not support:
  - The QoS function
  - Remote Cluster Mount
  - Having a GUI installed on a Linux on z Systems node
  - Big Data and Analytics

The IBM Spectrum Scale FAQ will be updated to reflect any changes in limitations as they become available.

https://www-01.ibm.com/support/knowledgecenter/SSFKCN/
com.ibm.cluster.gpfs.doc/gpfs_faq s/gpfsclustersfaq.html?lang=en

IBM Electronic Support

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 on-line tool, and build skills. All these tools are made available through your IBM support agreement. Read about the Electronic Support portfolio of tools

http://ibm.com/electronicsupport

Access the IBM Support Portal

http://ibm.com/support

Access the on-line Service Request tool

http://ibm.com/support/servicerequest

Planning information

IBM Spectrum Scale V4 running in a Windows environment requires you to install Cygwin for the shell execution environment. Subsystem for UNIX-based Applications is no longer being used.

IBM Spectrum Scale V4 is available in three editions:

- Express Edition delivers the base IBM Spectrum Scale function
- Standard Edition includes the base function plus ILM, AFM, and either integrated multi protocol support, which include Ganesha NFS, or traditional clustered NFS
- Advanced Edition includes encryption, asynchronous multisite DR, and all the features of the Standard Edition

A protocols option is available enabling you to eliminate external or public IP address failover within the protocol nodes, share the same back end between file and object protocols, and share files among NFS/SMB.

IBM Spectrum Scale for Linux on z Systems V4.2 is now available in three editions:

- Express Edition delivers the base IBM Spectrum Scale function
- Standard Edition includes the base function plus ILM and synchronous AFM
- Advanced Edition includes asynchronous multisite disaster recovery and all features of the Standard Edition (encryption is not available)

For details on how to configure Spectrum Scale optimally for Hadoop workloads refer to the *Deploying a big data solution using IBM Spectrum Scale* technical paper at

http://public.dhe.ibm.com/common/ssi/ecm/dc/en/dcw03051usen/
DCW03051USEN.PDF

Packaging

IBM Spectrum Scale V4.2 is available on DVD media and through electronic download as multiple eAssemblies from Passport Advantage or Passport Advantage Express.

Media options include:

- IBM Spectrum Scale Express Edition 4.2
- IBM Spectrum Scale Standard Edition 4.2
- IBM Spectrum Scale Standard Edition (Protocols) 4.2
- IBM Spectrum Scale Advanced Edition 4.2
- IBM Spectrum Scale Advanced Edition (Protocols) 4.2

Electronic options include:

- IBM Spectrum Scale Express 4.2 AIX Power
- IBM Spectrum Scale Express 4.2 Linux for Power
- IBM Spectrum Scale Express 4.2 Linux PWR8 LE
- IBM Spectrum Scale Express 4.2 Linux x86
- IBM Spectrum Scale Express 4.2 Windows x86
-
- IBM Spectrum Scale Standard 4.2 AIX Power
- IBM Spectrum Scale Standard 4.2 Linux for Power
- IBM Spectrum Scale Standard 4.2 Linux PWR8 LE
- IBM Spectrum Scale Standard 4.2 Linux x86
- IBM Spectrum Scale Standard 4.2 Windows x86
-
- IBM Spectrum Scale Advanced 4.2 AIX Power
- IBM Spectrum Scale Advanced 4.2 Linux for Power
- IBM Spectrum Scale Advanced 4.2 Linux PWR8 LE
- IBM Spectrum Scale Advanced 4.2 Linux x86
-
- IBM Spectrum Scale Standard 4.2 Linux for Power with Protocols
- IBM Spectrum Scale Standard 4.2 Linux x86 with Protocols
- IBM Spectrum Scale Advanced 4.2 Linux for Power with Protocols
- IBM Spectrum Scale Advanced 4.2 Linux x86 with Protocols

Also included are:

- IBM International Program License Agreement in multiple languages
- Proof of Entitlement (POE)

- Product readme file that describes the program's specified operating environment and program specifications
- IBM Spectrum Scale install images
  - Express Edition: gpfs.docs, gpfs.gpl, gpfs.msg, gpfs.gnr, gpfs.gskit
  - Standard Edition: gpfs.docs, gpfs.gpl, gpfs.msg, gpfs.gnr, gpfs.gskit, gpfs.ext
  - Advanced Edition: gpfs.docs, gpfs.gpl, gpfs.msg, gpfs.gnr, gpfs.gskit, gpfs.ext, gpfs.crypto
  - Protocols include: base gpfs rpms plus nfs-ganesha, SMB, Object, and Zimon rpms

IBM Spectrum Scale for Linux on z Systems, V4.2 is available on DVD media and through electronic download as multiple eAssemblies from Passport Advantage or Passport Advantage Express.

Media and electronic options include:

- IBM Spectrum Scale for Linux on z Systems Express Edition V4.2
- IBM Spectrum Scale for Linux on z Systems Standard Edition V4.2
- IBM Spectrum Scale for Linux on z Systems Advanced Edition V4.2

This program, when downloaded from a website, contains the applicable IBM license agreement and License Information, if appropriate, and will be presented for acceptance at the time of installation of the program. For future reference, the license and License Information will be stored in a directory such as LICENSE.TXT.

Security, auditability, and control

IBM Spectrum Scale products use the security and auditability features of the system in which they are installed.

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

Ordering information

This product is only available via Passport Advantage. It is not available as shrinkwrap.

Product Group: IBM Spectrum Storage™

Product: IBM Spectrum Scale (5725-Q01)
Product: IBM Spectrum Scale for Linux on z Systems (5725-S28)

Product Category: System Software

Passport Advantage

The following part numbers are new for 5725-S28:

Program name/Description	Part number
IBM Spectrum Scale for Lx on z System Advanced Client 10 PVU LIC + SW MAINT 12 mo	D1JI1LL
IBM Spectrum Scale for Lx on z System Advanced Client 10 PVU ANNUAL SW MAINT RNWL	E0M1PLL
IBM Spectrum Scale for Lx on z System Advanced Client 10 PVU SWMA REINSTATE 12 MO	D1JI2LL

Program name/Description	Part number
IBM Spectrum Scale for Lx on z System Advanced Server 10 PVU LIC + SW MAINT 12 MO	D1JI6LL
IBM Spectrum Scale for Lx on z System Advanced Server 10 PVU ANNUAL SW MAINT RNWL	E0M1QLL
IBM Spectrum Scale for Lx on z System Advanced Server 10 PVU SWMA REINSTATE 12 MO	D1JI7LL
IBM Spectrum Scale for Lx on z Sys Adv Svr from Std Svr 10 PVU trade-up LIC + SW S&S 12 mo	D1JI0LL
IBM Spectrum Scale for Lx on z Sys Adv Clt from Std Clt 10 PVU trade-up LIC + SW S&S 12 mo	D1JHVLL
IBM Spectrum Scale for Lx on z Sys Std Svr from Exp Svr 10 PVU trade-up LIC + SW S&S 12 mo	D1JHWLL
IBM Spectrum Scale for Lx on z Sys Std Clt from Exp Clt 10 PVU trade-up LIC + SW S&S 12 mo	D1JF4LL
IBM Spectrum Scale for Lx on z Sys Adv Svr from Exp Svr 10 PVU trade-up LIC + SW S&S 12 mo	D1JHZLL
IBM Spectrum Scale for Lx on z Sys Adv Clt from Exp Clt 10 PVU trade-up LIC + SW S&S 12 mo	D1JF7LL

The following are media pack part numbers for version 4.2:

Media Pack Description	Media Pack part number
IBM Spectrum Scale V4.2 Express Edition Media Pack English	BH049EN
IBM Spectrum Scale V4.2 Standard Edition Media Pack English	BH048EN
IBM Spectrum Scale V4.2 Advanced Edition Media Pack English	BH04AEN
IBM Spectrum Scale V4.2 Standard Ed with Protocols Media Pack English	BH04BEN
IBM Spectrum Scale V4.2 Advanced Ed with Protocols Media Pack English	BH04CEN
IBM Spectrum Scale for Linux on z Systems V4.2 Express Med Pk Eng	BH04DEN
IBM Spectrum Scale for Linux on z Systems V4.2 Standard Med Pk Eng	BH04EEN
IBM Spectrum Scale for Linux on z Systems V4.2 Advanced Med Pk Eng	BH04FEN

The following part numbers for 5725-S28 are not changed, but the metric is corrected:

Program name / Description	Part number
IBM Spectrum Scale Express Server for Lx on z System 10 PVU LIC + SW MAINT 12 mo	D1JHXLL
IBM Spectrum Scale Express Server for Lx on z System 10 PVU ANNUAL SW MAINT RNWL	E0M1NLL
IBM Spectrum Scale Express Server for Lx on z System 10 PVU SWMA REINSTATE 12 MO	D1JHYLL
IBM Spectrum Scale Express Client for Lx on z System 10 PVU LIC + SW MAINT 12 mo	D1JHGLL

Program name / Description	Part number
IBM Spectrum Scale Express Client for Lx on z System 10 PVU ANNUAL SW MAINT RNWL	E0M1MLL
IBM Spectrum Scale Express Client for Lx on z System 10 PVU SWMA REINSTATE 12 MO	D1JHULL
IBM Spectrum Scale Standard Server for Lx on z System 10 PVU LIC + SW MAINT 12 mo	D1JF5LL
IBM Spectrum Scale Standard Server for Lx on z System 10 PVU ANNUAL SW MAINT RNWL	E0M1LLL
IBM Spectrum Scale Standard Server for Lx on z System 10 PVU SWMA REINSTATE 12 MO	D1JF6LL
IBM Spectrum Scale Standard Client for Lx on z System 10 PVU LIC + SW MAINT 12 mo	D1JF2LL
IBM Spectrum Scale Standard Client for Lx on z System 10 PVU ANNUAL SW MAINT RNWL	E0M1KLL
IBM Spectrum Scale Standard Client for Lx on z System 10 PVU SWMA REINSTATE 12 MO	D1JF3LL

Note: Previously announced part numbers for 5725-Q01 are not changed and therefore not listed.

Passport Advantage customer: Media pack entitlement details

Customers with active maintenance or subscription for the products listed are entitled to receive the corresponding media pack.

Media packs description	Part number	Entitled Part Number
IBM General Parallel File System Version 4.1 Express Media Package English	BH044ML	BH049EN
IBM General Parallel File System Version 4.1 Standard Media Package English	BH043ML	BH048EN, BH04BEN
IBM General Parallel File System Version 4.1 Advanced Media Package English	BH045ML	BH04AEN, BH04CEN
IBM GPFS for Linux on System z$^{(R)}$ V4.1 Express Edition Media Pack English	BH047ML	BH04DEN

5641-GPF - IBM Spectrum Scale

No change to ordering information

Ordering from WTAAS for IBM POWER and Storage

This software license includes Software Maintenance, previously referred to as Software Subscription and Technical Support.

Extending coverage for a total of three or five years from the date of acquisition may be elected. Order the program number, feature number, and quantity to extend coverage for your software licenses.

The feature numbers associated with the Software Maintenance offerings listed below are not changed from what was previously announced .

5641-GS1 Maintenance no charge 1 year registration
5641-GS3 Maintenance 3 year registration (2 year uplift)

5641-GS5 Maintenance 5 year registration (4 year uplift)

Note: Software Maintenance Renewal and After License or Reinstatement are managed in Passport Advantage. Refer to Product ID 5725-Q01.

Charge metric

Program name	Part number or PID number	Charge metric
IBM Spectrum Scale	5725-Q01 and 5641-GPF	Socket
IBM Spectrum Scale for Linux on z Systems	5725-S28	10 PVU

Processor Value Unit (PVU)

PVU is a unit of measure by which the program can be licensed. The number of PVU entitlements required is based on the processor technology (defined within the PVU table by processor value, brand, type, and model number at the website below) and the number of processors made available to the program. IBM continues to define a processor, for the purpose of PVU-based licensing, to be each processor core on a chip (socket). A dual-core processor chip, for example, has two processor cores. The PVU table can be found at

http://www.ibm.com/software/lotus/passportadvantage/ pvu_licensing_for_customers.html

Licensee can deploy the program using either full capacity licensing or virtualization capacity (sub-capacity) licensing according to the Passport Advantage Sub-Capacity Licensing Terms (refer to the web page below). If using full capacity licensing, licensee must obtain PVU entitlements sufficient to cover all activated processor cores* in the physical hardware environment made available to or managed by the program, except for those servers from which the program has been permanently removed. If using virtualization capacity licensing, licensee must obtain entitlements sufficient to cover all activated processor cores made available to or managed by the program, as defined according to the Virtualization Capacity License Counting Rules at

http://www.ibm.com/software/lotus/passportadvantage/ Counting_Software_licenses_using_sp ecific_virtualization_technologies.html

* An activated processor core is a processor core that is available for use in a physical or virtual server, regardless of whether the capacity of the processor core can be or is limited through virtualization technologies, operating system commands, BIOS settings, or similar restrictions.

Notes:

- Some programs may require licenses for the program **and** what is being managed. In that case, the following applies. In addition to the entitlements required for the program directly, licensee must obtain PVU entitlements for this program sufficient to cover the processor cores managed by the program.
- Some programs may be licensed on a managed basis only. In that case, the following applies. Instead of the entitlements required for the program directly, licensee must obtain PVU entitlements for this program sufficient to cover the processor cores managed by the program.
- A few programs on an exception basis may be licensed on a referenced basis. In that case, the following applies. Rather than obtaining entitlements for the activated processor cores available to the program, licensee must obtain PVU entitlements for this program sufficient to cover the environment made available to the referenced program as if the program itself were executing everywhere the referenced program was executing, independent of the basis on which the referenced program is licensed.

Socket

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Limited warranty

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No

Passport Advantage applies

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No

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

Academic use allowance

Academic use allowance: Yes

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Corrections

(Corrected on November 16, 2015)
The IBM Spectrum Scale Big Data and Analytics support list in the Limitations section has been updated.