



IBM Spectrum Virtualize Software V7.8.1 delivers new functions for the Spectrum Virtualize family of offerings

Table of contents

| | |
|---|---|
| 1 Overview | 12 Publications |
| 2 Key prerequisites | 13 Technical information |
| 4 Planned availability date | 17 Ordering information |
| 4 Description | 22 Terms and conditions |
| 5 Product positioning | 26 Prices |
| 6 Program number | 27 Latin America distribution |

At a glance

IBM Spectrum Virtualize™ V7.8.1 delivers support for the latest platforms in the IBM® Storwize® product family, and adds the following functions and improvements:

- Increased background FlashCopy® transfer rates for faster local copy services
- Host cluster I/O throttling for improved performance management
- Host groups with GUI support for easier management
- Port Congestion Statistic for Fibre Channel performance support and management
- Resizing of volumes in remote mirror relationships
- Consistency protection for Metro and Global Mirror relationships
- Support for SuperMicro SuperServer 2028U-TRTP+ for Spectrum Virtualize as Software Only offering

Overview

IBM Spectrum Virtualize software delivers a powerful solution for storage virtualization, offering advanced storage capabilities such as high availability, Real-time Compression™, EasyTier data tiering, encryption, Distributed RAID, clustering for performance and capacity scalability, and enterprise-class local and remote copy services.

IBM Spectrum Virtualize V7.8.1 adds the following benefits:

- **Host cluster I/O throttling:** I/O throttling can be managed at the host level (individual or groups) and at managed disk levels for improved performance management.
- **Host groups with GUI support:** Host groups can be more easily managed through the GUI, adding more management flexibility to existing CLI support.
- **Increased background FlashCopy transfer rates:** This feature enables you to increase the rate of background FlashCopy transfers, providing faster copies as the infrastructure allows. This takes advantage of the higher performance capabilities of today's systems, processing the copy in a shorter period of time.
- **Port Congestion Statistic :** Zero buffer credits help detect SAN congestion in performance-related issues, improving support in high-performance environments.

- **Resizing of volumes in remote mirror relationships:** Target volumes in remote mirror relationships will be automatically resized when source volumes are resized.
- **Consistency protection for Metro/Global Mirror relationships:** An automatic restart of mirroring relationships after a link fails between the mirror sites improves disaster recovery scenarios, helping to ensure the applications are protected throughout the process.
- **Support of SuperMicro servers for the Spectrum Virtualize as Software Only offering:** Support for x86-based Intel™ servers by SuperMicro for Spectrum Virtualize Software Only is available with this release. Supermicro SuperServer 2028U-TRTP+ is supported to run Spectrum Virtualize Software. This is a great option for end clients, managed service or cloud service providers deploying private clouds, building hosted services, or using software-defined storage on third party Intel servers. This is a fully inclusive license with all key features available on Spectrum Virtualize in a single, downloadable image.

Key prerequisites

Software requirements

IBM SAN Volume Controller V7.8.1 (5641-VC7, 5641-CP7, 5725-M19, and 5725-H04) has the same software prerequisites as IBM SAN Volume Controller (SVC) V7.7.

IBM Spectrum Virtualize software only V7.8.1 (5725-Z61) has the same software prerequisites as IBM SAN Volume Controller V7.8.1.

Enterprise Class Support for IBM SAN Volume Controller (5773-ECS) is required on IBM SAN Volume Controller with a three-year warranty (2147-SV1) and requires feature number 1792.

IBM Spectrum Virtualize Software for SAN Volume Controller Encryption Software V7.8.1 (5641-B01 and 5725-Y35) requires PID 5641-VC7.

IBM Storwize V7000 V7.8.1 (5639-CB7, 5639-XB7, 5639-EB7, 5639-VM7, 5639-EV7, 5639-RM7, and 5639-CP7) has the same software prerequisites as IBM Storwize V7000 V7.7.

IBM Storwize V5000 V7.8.1 (5639-CT7, 5639-XT7, and 5639-ET7) has the same software prerequisites as IBM Storwize V5000 V7.7.

IBM Spectrum Virtualize Software for Storwize V5010 V7.8.1 (5639-SV1) requires the base software feature. All other features are optional.

IBM Spectrum Virtualize Software for Storwize V5020 V7.8.1 (5639-SV2) requires the base software feature. All other features are optional.

IBM Spectrum Virtualize Software for Storwize V5030 V7.8.1 (5639-SV3) requires the base software feature. All other features are optional.

IBM Spectrum Virtualize Software for Storwize V50x0 Expansion V7.8.1 (5639-SV4) requires the base software feature. There are no optional software features on the expansions.

For all current storage systems and host environments supported with the IBM FlashSystem[®] V840, go to the [IBM FlashSystem V840](#) website.

For all current storage systems and host environments supported with the IBM FlashSystem V9000, go to the [IBM FlashSystem V9000](#) website

Refer to the [Description](#) section for more information about these products and their software requirements.

Hardware requirements

IBM Spectrum Virtualize software only requires at least one pair of supported Intel servers. The hardware requirements for this release include:

- Supermicro SuperServer 2028U-TRTP+ dual CPU Intel Xeon™ processor E5-2600 v4-v3 family (up to 160W TDP) Dual Socket R3 (LGA 2011)
- 2 ports 16 Gb Fibre Channel (FC) host bus adapter (HBA) LPe16002-M5
- 2 ports 16 Gb FC HBA LPe31002-M6
- 4 ports 16 Gb FC HBA LPe31004-M6
- Mellanox Intel 10 GbE iSCSI HBA if iSCSI connection is desired

Hardware requirements to support Lenovo servers as announced in R7.7.1:

- Lenovo x3650 M5 - single or dual CPU Xeon E5-2667 v3 8c 3.2 GHz
- 2 CPUs are required if running Real-time Compression software
- Emulex G5 16 Gb FC HBAs
- Mellanox Intel 10 GbE iSCSI HBAs

For all Spectrum Virtualize software only systems, you must ensure that your system running IBM Spectrum Virtualize software is powered by an adequate uninterruptible power supply to avoid data loss if there is a mainline power failure.

This enhancement fulfills a portion of the Statement of General Direction found in Software Announcement [LP16-0281](#), dated August 23, 2016.

IBM Spectrum Virtualize Software for SAN Volume Controller requires at least one pair of IBM System Storage[®] SAN Volume Controller storage engines (2145-SV1, 2145-DH8, 2145-CF8, 2145-CG8, or 2147-SV1) for installation.

IBM Spectrum Virtualize Software for SAN Volume Controller Encryption Software V7.8.1 (5641-B01 and 5725-Y35) requires the Encryption Enablement Feature ACE2.

IBM Spectrum Virtualize Software for Storwize V7000 Controller Software (5639-CB7) requires at least one IBM Storwize V7000 control enclosure (2076-AF6, 2076-624, or 2076-524) for installation.

IBM Spectrum Virtualize Software for Storwize V7000 Expansion Software (5639-XB7) requires at least one IBM Storwize V7000 expansion enclosure (2076-92F, 2076-AFF, 2076-12F, or 2076-24F) for installation. The high-density enclosure (2076-92F) requires four of the base software charge codes to support the number of disk slots in the system.

IBM Spectrum Virtualize Software for Storwize V7000 External Data Virtualization Software (5639-EB7) requires at least one IBM Storwize V7000 enclosure (2076-AF6, 2076-624, 2076-524, 2076-112, 2076-124, 2076-212, 2076-224, 2076-312, or 2076-324) for installation.

IBM Spectrum Virtualize Software for Storwize V5000 (5639-CT7) requires at least one IBM Storwize V5000 control enclosure (2077-12C, 2077-24C, 2078-12C, or 2078-24C) for installation.

IBM Spectrum Virtualize Software for Storwize V5000 Expansion Software (5639-XT7) requires at least one IBM Storwize V5000 expansion enclosure (2077-12E, 2077-24E, 2078-12E, or 2078-24E) for installation.

IBM Spectrum Virtualize Software for Storwize V5000 External Data Virtualization Software (5639-ET7) requires at least one IBM Storwize V5000 control enclosure (2077-112, 2077-124, 2077-212, 2077-224, 2077-312, 2077-324, 2077-AF3, 2078-112, 2078-124, 2078-212, 2078-224, 2078-312, 2078-324, or 2078-AF3) for installation.

IBM Spectrum Virtualize Software for Storwize V5010 V7.8.1 (5639-SV1) requires at least one IBM Storwize V5010 control enclosure (2077-112, 2077-124, 2078-112, or 2078-124) for installation.

IBM Spectrum Virtualize Software for Storwize V5020 V7.8.1 (5639-SV2) requires at least one IBM Storwize V5020 control enclosure (2077-212, 2077-224, 2078-212, or 2078-224) for installation.

IBM Spectrum Virtualize Software for Storwize V5030 V7.8.1 (5639-SV3) requires at least one IBM Storwize V5030 control enclosure (2077-AF3, 2077-312, 2077-324, 2078-AF3, 2078-312, or 2078-324) for installation. The compression feature for V5030 requires the 64 GB cache feature (#ACHD) on models 312 and 324 for machine types 2077 and 2078.

IBM Spectrum Virtualize Software for Storwize V50x0 Expansion V7.8.1 (5639-SV4) requires at least one IBM Storwize V50x0 expansion enclosure (2077-92F, 2077-12F, 2077-24F, 2077-AFF, 2078-92F, 2078-12F, 2078-24F, or 2078-AFF) for installation. The high-density enclosure (2077-92F or 2078-92F) requires four of the base software charge codes to support the number of disk slots in the system.

IBM FlashSystem V840 Software V7.8.1 (5639-FS7) requires an IBM FlashSystem V840 Storage System (9846-AC1 and 9846-AE1, or 9848-AC1 and 9848-AE1) for installation.

IBM FlashSystem V9000 Software V7.8.1 (5639-RB7) requires at least two IBM FlashSystem V9000 Control Enclosures (9846-AC2 or 9848-AC2) and at least one IBM FlashSystem V9000 Storage Enclosure (9846-AE2 or 9848-AE2) or Expansion Enclosure (9846-12F, 9846-24F, 9846-92F, 9848-12F, 9848-24F, or 9848-92F). The high-density expansion enclosure (9846-92F or 9848-92F) requires four FlashSystem™ V9000 Software licenses.

Current support summaries, including specific software, hardware, and firmware levels supported, are maintained at their respective support websites:

- [SAN Volume Controller](#)
- [Storwize V7000](#)
- [Storwize V5000](#)
- [Storwize V3700](#)
- [Storwize V3500](#)
- [IBM FlashSystem V840](#)
- [IBM FlashSystem V9000](#)

Planned availability date

March 17, 2017

Refer to the [Availability of national languages](#) section for national language availability.

Description

Spectrum Virtualize V7.8.1 brings several enhancements to the IBM Spectrum Virtualize suite of offerings, including the Storwize family, SVC, and Spectrum Virtualize as Software Only.

Previous FlashCopy transfer rates were limited to 64 MB per second, requiring extended transfer time on some higher end systems. With the performance of the current models, customers will be able to increase the maximum rate up to 256 MB per second, requiring shorter windows for point-in-time copy transfers and improving system availability at maximum performance. For instance, customers

who perform their background copies over the weekend will be able to complete copies overnight, further improving flexibility in their FlashCopy management strategy.

I/O throttling is extended to hosts, host groups, and managed disk groups to extend the ability to control the volume of I/O operations served by SVC systems. This control is based on configurable attributes such as bandwidth and IOPS requirements. This will improve the performance management of Spectrum Virtualize systems and deliver increased flexibility in throttling. Host group support is also added to the GUI, completing the integration that begun with CLI support in version 7.8.

Encryption key management is improved by adding support for multiple key servers to manage the encryption keys. This provides redundancy options to the key management strategy, and improves tolerance of key server outages and failures.

Port Congestion Statistic can help detect SAN congestion in performance-related situations. Adding support for the Port Congestion Statistic feature can assist in troubleshooting performance issues and locating the congestion in Fibre Channel traffic. These statistics will be provided for all ports on the system, regardless of the speed of the port.

Resizing of volumes in remote mirror relationships will enable target volumes to be automatically and nondisruptively resized when source volumes are resized. This functionality is key in addressing disaster recovery requirements when workload capacity varies overtime, and enables LUNs to be resized and to capacity use to be optimized while keeping replicated data available.

Improvements in consistency protection for Global and Metro Mirror implementations is provided by automatically restarting the relationships after an outage. This prevents the storage administrator from having to manually restart the relationship after the connection is restored, improving disaster recovery capabilities. With the auto-restart feature, disaster recovery capabilities are retained during the resynchronization of the relationship. Change volumes are used to manage the consistency in remote mirror configurations.

Spectrum Virtualize as Software Only expands its support to cover SuperMicro SuperServer 2028U-TRTP+, in addition to previously supported systems.

Accessibility by people with disabilities

A US Section 508 Voluntary Product Accessibility Template (VPAT) containing details on accessibility compliance can be found on the [IBM Accessibility](#) website.

Product positioning

Customers today face a challenging business environment. There is a need to store more information to make their business more competitive and for IT to be responsive and support initiatives, all while controlling IT costs and limiting the amount of staff required to support IT.

IBM Spectrum Virtualize systems deliver management of storage from entry and midrange up to enterprise disk systems, and enable hosts to attach through SAN, FCoE, or iSCSI to existing Ethernet networks. IBM Spectrum Virtualize is designed to be easy to use, enabling existing staff to start working with it rapidly. IBM Spectrum Virtualize uses virtualization, thin provisioning, and compression technologies to improve storage utilization and meet changing needs quickly and easily. In this way, Spectrum Virtualize products are the ideal complement to server virtualization strategies.

IBM Spectrum Virtualize also enables migration of data from existing storage systems to new ones, simplifying implementation and minimizing disruption. These

are offerings for customers with existing SAN, FCoE, or iSCSI networks who seek to reduce the complexities and costs of managing their storage.

IBM Spectrum Virtualize is a cross-industry offering for customers who are mainly focused on cost savings while dealing with complexity and increasing storage requirements. These customers also focus on scaling capability with reasonable costs, including disaster recovery and data protection functions (Remote Mirroring, FlashCopy), high availability (stretched clusters and HyperSwap^(R)), performance features (SSD and Easy Tier^(R)), and security enhancements (encryption).

Availability of national languages

Planned and supported geography translations will be available for download by March 17, 2017, at the following product websites:

- [SAN Volume Controller](#)
- [Storwize V7000](#)
- [Storwize V5000](#)
- [Storwize V3700](#)
- [Storwize V3500](#)
- [IBM FlashSystem V840](#)
- [IBM FlashSystem V9000](#)

Translation information, if available, can be found at the [Translation Reports](#) website.

Program number

| Program number | VRM | Program name |
|-----------------------|------------|---|
| 5641-VC7 | 7.8.1 | IBM Spectrum Virtualize Software for SAN Volume Controller V7 |
| 5725-M19 | 7.8.1 | IBM Spectrum Virtualize Software for SAN Volume Controller V7 (for Passport Advantage) |
| 5641-CP7 | 7.8.1 | IBM Spectrum Virtualize Software for SAN Volume Controller Real-time Compression Software V7 |
| 5725-H04 | 7.8.1 | IBM Spectrum Virtualize Software for SAN Volume Controller Real-time Compression Software V7 (for Passport Advantage) |
| 5641-B01 | 7.8.1 | IBM Spectrum Virtualize Software for SAN Volume Controller Encryption Software V7 |
| 5725-Y35 | 7.8.1 | IBM Spectrum Virtualize Software for SAN Volume Controller Encryption Software V7 (for Passport Advantage) |
| 5725-Z61 | 7.8.1 | IBM Spectrum Virtualize software only V7 |
| 5639-VM7 | 7.8.1 | IBM Spectrum Virtualize Software for Storwize V7000 |
| 5639-EV7 | 7.8.1 | IBM Spectrum Virtualize Software for Storwize |

| Program number | VRM | Program name |
|-----------------------|------------|---|
| | | V7000 External Virtualization Software |
| 5639-RM7 | 7.8.1 | IBM Spectrum Virtualize Software for Storwize V7000 Remote Mirroring Software |
| 5639-CP7 | 7.8.1 | IBM Spectrum Virtualize Software for Storwize V7000 Real-time Compression Software |
| 5639-CB7 | 7.8.1 | IBM Spectrum Virtualize Software for Storwize V7000 Controller Software |
| 5639-XB7 | 7.8.1 | IBM Spectrum Virtualize Software for Storwize V7000 Expansion Software |
| 5639-EB7 | 7.8.1 | IBM Spectrum Virtualize Software for Storwize V7000 External Data Virtualization Software |
| 5639-ST7 | 7.8.1 | IBM Spectrum Virtualize Software for Storwize V5000 |
| 5639-CT7 | 7.8.1 | IBM Spectrum Virtualize Software for Storwize V5000 Controller Software |
| 5639-XT7 | 7.8.1 | IBM Spectrum Virtualize Software for Storwize V5000 Expansion Software |
| 5639-ET7 | 7.8.1 | IBM Spectrum Virtualize Software for Storwize V5000 External Data Virtualization Software |
| 5639-SV1 | 7.8.1 | IBM Spectrum Virtualize Software for Storwize V5010 |
| 5639-SV2 | 7.8.1 | IBM Spectrum Virtualize Software for Storwize V5020 |
| 5639-SV3 | 7.8.1 | IBM Spectrum Virtualize Software for Storwize V5030 |
| 5639-SV4 | 7.8.1 | IBM Spectrum Virtualize Software for V50x0 Expansion |
| 5639-FS7 | 7.8.1 | IBM FlashSystem Software V7 |
| 5639-FC7 | 7.8.1 | IBM FlashSystem Real-Time Compression Software V7 |
| 5639-FR7 | 7.8.1 | IBM FlashSystem Remote Mirroring Software V7 |
| 5639-FV7 | 7.8.1 | IBM FlashSystem External Virtualization Software V7 |
| 5639-RB7 | 7.8.1 | IBM FlashSystem V9000 Software V7 |

Product identification number

IBM Spectrum Virtualize Software for SAN Volume Controller V7

| Program PID number | Maintenance 1 year PID number | Maintenance 3 year PID number |
|---------------------------|--------------------------------------|--------------------------------------|
| 5641-VC7 | 5641-VCA reg | 5641-VCC reg |

| Maintenance 2 year PID number | Maintenance 4 year PID number | Maintenance 5 year PID number |
|-------------------------------|-------------------------------|-------------------------------|
| 5641-VCB reg | 5641-VCD reg | 5641-VCE reg |

IBM Spectrum Virtualize Software for SAN Volume Controller Real-time Compression Software V7

| Program PID number | Maintenance 1 year PID number | Maintenance 3 year PID number |
|-------------------------------|-------------------------------|-------------------------------|
| 5641-CP7 | 5641-CS1 reg | 5641-CS3 reg |
| Maintenance 2 year PID number | Maintenance 4 year PID number | Maintenance 5 year PID number |
| 5641-CS2 reg | 5641-CS4 reg | 5641-CS5 reg |

IBM Spectrum Virtualize Software for SAN Volume Controller Encryption Software V7

| Program PID number | Maintenance 1 year PID number | Maintenance 2 year PID number |
|-------------------------------|-------------------------------|-------------------------------|
| 5641-B01 | 5641-B02 reg | 5641-B03 reg |
| Maintenance 3 year PID number | Maintenance 4 year PID number | Maintenance 5 year PID number |
| 5641-B04 reg | 5641-B05 reg | 5641-B06 reg |

IBM Spectrum Virtualize Software for Storwize V7000 V7

| Program PID number | Maintenance 1 year PID number | Maintenance 3 year PID number |
|-------------------------------|-------------------------------|-------------------------------|
| 5639-VM7 | 5639-SM1 reg/ren | 5639-SM3 reg |
| | 5639-SM2 afl | 5639-SM4 renewal |
| | | 5639-SM5 afl |
| Maintenance 2 year PID number | Maintenance 4 year PID number | Maintenance 5 year PID number |
| 5639-SM6 reg | 5639-SM7 reg | 5639-SM8 reg |

IBM Spectrum Virtualize Software for Storwize V7000 External Virtualization Software V7

| Program PID number | Maintenance 1 year PID number | Maintenance 3 year PID number |
|-------------------------------|-------------------------------|-------------------------------|
| 5639-EV7 | 5639-EVA reg/ren | 5639-EVD reg |
| | 5639-EVB afl | 5639-EVE renewal |
| | | 5639-EVF afl |
| Maintenance 2 year PID number | Maintenance 4 year PID number | Maintenance 5 year PID number |
| 5639-EVC reg | 5639-EVG reg | 5639-EVH reg |

IBM Spectrum Virtualize Software for Storwize V7000 Remote Mirroring Software V7

| Program PID number | Maintenance 1 year PID number | Maintenance 3 year PID number |
|-------------------------------|-------------------------------|-------------------------------|
| 5639-RM7 | 5639-RMA reg/ren | 5639-RMD reg |
| | 5639-RMB afl | 5639-RME ren |
| | | 5639-RMF afl |
| Maintenance 2 year PID number | Maintenance 4 year PID number | Maintenance 5 year PID number |
| 5639-RMC reg | 5639-RMG reg | 5639-RMH reg |

IBM Spectrum Virtualize Software for Storwize V7000 Real-time Compression Software V7

| Program PID number | Maintenance 1 year PID number | Maintenance 3 year PID number |
|--------------------------------------|--------------------------------------|--------------------------------------|
| 5639-CP7 | 5639-CS1 reg/ren | 5639-CS3 reg |
| | 5639-CS2 afl | 5639-CS4 renewal |
| | | 5639-CS5 afl |
| Maintenance 2 year PID number | Maintenance 4 year PID number | Maintenance 5 year PID number |
| 5639-CS6 reg | 5639-CS7 reg | 5639-CS8 reg |

IBM Spectrum Virtualize Software for Storwize V7000 Controller Software V7

| Program PID number | Maintenance 1 year PID number | Maintenance 3 year PID number |
|--------------------------------------|--------------------------------------|--------------------------------------|
| 5639-CB7 | 5639-CBA reg/ren | 5639-CBC reg |
| | 5639-CBB afl | 5639-CBD renewal |
| | | 5639-CBE afl |
| Maintenance 2 year PID number | Maintenance 4 year PID number | Maintenance 5 year PID number |
| 5639-CBF reg | 5639-CBG reg | 5639-CBH reg |

IBM Spectrum Virtualize Software for Storwize V7000 Expansion Software V7

| Program PID number | Maintenance 1 year PID number | Maintenance 3 year PID number |
|--------------------------------------|--------------------------------------|--------------------------------------|
| 5639-XB7 | 5639-XBA reg/ren | 5639-XBC reg |
| | 5639-XBB afl | 5639-XBD renewal |
| | | 5639-XBE afl |
| Maintenance 2 year PID number | Maintenance 4 year PID number | Maintenance 5 year PID number |
| 5639-XBF reg | 5639-XBG reg | 5639-XBH reg |

IBM Spectrum Virtualize Software for Storwize V7000 External Data Virtualization Software V7

| Program PID number | Maintenance 1 year PID number | Maintenance 3 year PID number |
|--------------------------------------|--------------------------------------|--------------------------------------|
| 5639-EB7 | 5639-EBA reg/ren | 5639-EBC reg |
| | 5639-EBB afl | 5639-EBD renewal |
| | | 5639-EBE afl |
| Maintenance 2 year PID number | Maintenance 4 year PID number | Maintenance 5 year PID number |
| 5639-EBF reg | 5639-EBG reg | 5639-EBH reg |

IBM Spectrum Virtualize Software for Storwize V5000 Software V7

| Program PID number | Maintenance 1 year PID number | Maintenance 3 year PID number |
|--------------------------------------|--------------------------------------|--------------------------------------|
| 5639-ST7 | 5639-S13 reg/ren | 5639-S15 reg |
| | 5639-S14 afl | 5639-S16 renewal |
| | | 5639-S17 afl |
| Maintenance 2 year PID number | Maintenance 4 year PID number | Maintenance 5 year PID number |
| 5639-S18 reg | 5639-S19 reg | 5639-S20 reg |

IBM Spectrum Virtualize Software for Storwize V5000 Controller Software V7

| Program PID number | Maintenance 1 year PID number | Maintenance 3 year PID number |
|--------------------------------------|--------------------------------------|--|
| 5639-CT7 | 5639-CTA reg/ren 5639-CTB afl | 5639-CTC reg 5639-CTD renewal 5639-CTE afl |
| Maintenance 2 year PID number | Maintenance 4 year PID number | Maintenance 5 year PID number |
| 5639-CTF reg | 5639-CTG reg | 5639-CTH reg |

IBM Spectrum Virtualize Software for Storwize V5000 Expansion Software V7

| Program PID number | Maintenance 1 year PID number | Maintenance 3 year PID number |
|--------------------------------------|--------------------------------------|--|
| 5639-XT7 | 5639-XTA reg/ren 5639-XTB afl | 5639-XTC reg 5639-XTD renewal 5639-XTE afl |
| Maintenance 2 year PID number | Maintenance 4 year PID number | Maintenance 5 year PID number |
| 5639-XTF reg | 5639-XTG reg | 5639-XTH reg |

IBM Spectrum Virtualize Software for Storwize V5000 External Data Virtualization Software V7

| Program PID number | Maintenance 1 year PID number | Maintenance 3 year PID number |
|--------------------------------------|--------------------------------------|--|
| 5639-ET7 | 5639-ETA reg/ren 5639-ETB afl | 5639-ETC reg 5639-ETD renewal 5639-ETE afl |
| Maintenance 2 year PID number | Maintenance 4 year PID number | Maintenance 5 year PID number |
| 5639-ETF reg | 5639-ETG reg | 5639-ETH reg |

IBM Spectrum Virtualize Software for Storwize V5010 V7

| Program PID number | Maintenance 1 year PID number | Maintenance 3 year PID number |
|--------------------------------------|--------------------------------------|--|
| 5639-SV1 | 5639-SVA reg/ren 5639-SVB afl | 5639-SVC reg 5639-SVD renewal 5639-SVE afl |
| Maintenance 2 year PID number | Maintenance 4 year PID number | Maintenance 5 year PID number |
| 5639-SVF reg | 5639-SVG reg | 5639-SVH reg |

IBM Spectrum Virtualize Software for Storwize V5020 V7

| Program PID number | Maintenance 1 year PID number | Maintenance 3 year PID number |
|--------------------------------------|--------------------------------------|--|
| 5639-SV2 | 5639-SVJreg/ren 5639-SVK afl | 5639-SVL reg 5639-SVM renewal 5639-SVN afl |
| Maintenance 2 year PID number | Maintenance 4 year PID number | Maintenance 5 year PID number |
| 5639-SVP reg | 5639-SVQ reg | 5639-SVR reg |

IBM Spectrum Virtualize Software for Storwize V5030 V7

| Program PID number | Maintenance 1 year PID number | Maintenance 3 year PID number |
|---------------------------|--------------------------------------|--------------------------------------|
| 5639-SV3 | 5639-SVS reg/ren | 5639-SVU reg |

| Program PID number | Maintenance 1 year PID number | Maintenance 3 year PID number |
|--------------------------------------|--------------------------------------|--------------------------------------|
| | 5639-SVT afl | 5639-SVV renewal |
| | | 5639-SVW afl |
| Maintenance 2 year PID number | Maintenance 4 year PID number | Maintenance 5 year PID number |
| 5639-SVX reg | 5639-SVY reg | 5639-SVZ reg |

IBM Spectrum Virtualize Software for Storwize V50x0 Expansion V7

| Program PID number | Maintenance 1 year PID number | Maintenance 3 year PID number |
|--------------------------------------|--------------------------------------|--------------------------------------|
| 5639-SV4 | 5639-SSJ reg/ren | 5639-SSL reg |
| | 5639-SSK afl | 5639-SSM renewal |
| | | 5639-SSN afl |
| Maintenance 2 year PID number | Maintenance 4 year PID number | Maintenance 5 year PID number |
| 5639-SSP reg | 5639-SSQ reg | 5639-SSR reg |

IBM FlashSystem Software V7

| Program PID number | Maintenance 1 year PID number | Maintenance 3 year PID number |
|--------------------------------------|--------------------------------------|--------------------------------------|
| 5639-FS7 | 5639-FSA reg/ren | 5639-FSC reg |
| | 5639-FSB afl | 5639-FSD renewal |
| | | 5639-FSE afl |
| Maintenance 2 year PID number | Maintenance 4 year PID number | Maintenance 5 year PID number |
| 5639-FSF reg | 5639-FSG reg | 5639-FSH reg |

IBM FlashSystem Real-Time Compression Software V7

| Program PID number | Maintenance 1 year PID number | Maintenance 3 year PID number |
|--------------------------------------|--------------------------------------|--------------------------------------|
| 5639-FC7 | 5639-FCA reg/ren | 5639-FCC reg |
| | 5639-FCB afl | 5639-FCD renewal |
| | | 5639-FCE afl |
| Maintenance 2 year PID number | Maintenance 4 year PID number | Maintenance 5 year PID number |
| 5639-FCF reg | 5639-FCG reg | 5639-FCH reg |

IBM FlashSystem Remote Mirroring Software V7

| Program PID number | Maintenance 1 year PID number | Maintenance 3 year PID number |
|--------------------------------------|--------------------------------------|--------------------------------------|
| 5639-FR7 | 5639-FRA reg/ren | 5639-FRC reg |
| | 5639-FRB afl | 5639-FRD renewal |
| | | 5639-FRE afl |
| Maintenance 2 year PID number | Maintenance 4 year PID number | Maintenance 5 year PID number |
| 5639-FRF reg | 5639-FRG reg | 5639-FRH reg |

IBM FlashSystem External Virtualization Software V7

| Program PID number | Maintenance 1 year PID number | Maintenance 3 year PID number |
|---------------------------|--------------------------------------|--------------------------------------|
| 5639-FV7 | 5639-FVA reg/ren | 5639-FVC reg |
| | 5639-FVB afl | 5639-FVD renewal |
| | | 5639-FVE afl |

| Maintenance 2 year PID number | Maintenance 4 year PID number | Maintenance 5 year PID number |
|-------------------------------|-------------------------------|-------------------------------|
| 5639-FVF reg | 5639-FVG reg | 5639-FVH reg |

IBM FlashSystem V9000 Software V7

| Program PID number | Maintenance 1 year PID number | Maintenance 3 year PID number |
|-------------------------------|-------------------------------|-------------------------------|
| 5639-RB7 | 5639-RBA reg/ren | 5639-RBC reg |
| | 5639-RBB afl | 5639-RBD renewal |
| | | 5639-RBE afl |
| Maintenance 2 year PID number | Maintenance 4 year PID number | Maintenance 5 year PID number |
| 5639-RBF reg | 5639-RBG reg | 5639-RBH reg |

Software Maintenance renewals for Spectrum Virtualize for SVC and Spectrum Virtualize Software only are managed in Passport Advantage.

Offering Information

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

More information is also available on the [Passport Advantage and Passport Advantage Express^{\(R\)}](#) website.

Publications

No publications are shipped with these programs.

The following publications can be downloaded in PDF format from the websites below:

| Title | Order number |
|--|--------------|
| <i>IBM SAN Volume Controller Model 2145-DH8 Hardware Installation Guide</i> | GC27-3923 |
| <i>IBM SAN Volume Controller Hardware Maintenance Guide</i> | GC27-2283 |
| <i>IBM SAN Volume Controller Troubleshooting Guide</i> | GC27-2284 |
| <i>IBM SAN Volume Controller and Storwize Family Command-Line Interface User's Guide</i> | GC27-2287 |
| <i>IBM Storwize V7000 Read First</i> | GC27-2293-01 |
| <i>IBM Storwize V7000 Gen 2 Quick Installation Guide</i> | GC27-6500 |
| <i>IBM Storwize V7000 Troubleshooting, Recovery, and Maintenance Guide</i> | GC27-2291-02 |
| <i>IBM Storwize V5000 Gen 2 Quick Installation Guide</i> | CG27-8581 |
| <i>IBM Storwize V5000 Installation Poster</i> | SC27-5923-00 |
| <i>IBM Storwize V5000 Read First Flyer</i> | GI13-2860-00 |
| <i>IBM Systems Safety Notices</i> | G229-9054-06 |

To view online information and link to a download site, go to the [IBM Storwize V5000](#) page in IBM Knowledge Center, then see the publications listed under the 7.7.0 release.

To order additional selected hardcopy publications for a fee or to download free PDF format publications, go to the [IBM Publications Center](#) website.

To directly download publications in PDF format, go to the IBM product support website.

- [SAN Volume Controller](#)
- [Storwize V7000](#)
- [Storwize V5000](#)
- [Storwize V3700](#)
- [Storwize V3500](#)
- [IBM FlashSystem V840](#)
- [IBM FlashSystem V9000](#)

Contact your IBM representative.

IBM Publications Center

Hard copies of selected publications are available for a fee from the IBM Publications Center, as well as free softcopy publications. The Publications Center is a worldwide central repository for IBM product publications and marketing material with a catalog of 70,000 items. Extensive search facilities are provided. A large number of publications are available online in various file formats, and they can all be downloaded.

Technical information

Specified operating environment

Hardware requirements

IBM Spectrum Virtualize Software for SAN Volume Controller requires at least one pair of IBM System Storage SVC (2145-SV1, 2145-DH8, 2145-CF8, 2145-CG8, or 2147-SV1) storage engines for installation.

IBM Spectrum Virtualize Software for SAN Volume Controller Encryption Software V7.8.1 (5641-B01 and 5725-Y35) requires the Encryption Enablement feature ACE2.

IBM Spectrum Virtualize Software for Storwize V7000 Controller Software (5639-CB7) requires at least one IBM Storwize V7000 control enclosure (2076-AF6, 2076-624, or 2076-524) for installation.

IBM Spectrum Virtualize Software for Storwize V7000 Expansion Software (5639-XB7) requires at least one IBM Storwize V7000 expansion enclosure (2076-92F, 2076-AFF, 2076-312, or 2076-324) for installation. The high-density enclosure (2076-92F) requires four of the base software charge codes to support the number of disk slots in the system.

IBM Spectrum Virtualize Software for Storwize V7000 External Data Virtualization Software (5639-EB7) requires at least one IBM Storwize V7000 enclosure (2076-AF6, 2076-624, 2076-524, 2076-112, 2076-124, 2076-312, or 2076-324) for installation.

IBM Spectrum Virtualize Software for Storwize V5000 (5639-CT7) requires at least one IBM Storwize V5000 control enclosure (2077-112, 2077-124, 2077-212, 2077-224, 2077-312, 2077-324, 2078-112, 2078-124, 2078-212, 2078-224, 2078-312, or 2078-324) for installation.

IBM Spectrum Virtualize Software for Storwize V5000 Expansion Software (5639-XT7) requires at least one IBM Storwize V5000 expansion enclosure (2077-12E, 2077-24E, 2078-12E, or 2078-24E) for installation.

IBM Spectrum Virtualize Software for Storwize V5000 External Data Virtualization Software (5639-ET7) requires at least one IBM Storwize V5000 control enclosure (2077-112, 2077-124, 2077-212, 2077-224, 2077-312, 2077-324, 2077-AF3, 2078-112, 2078-124, 2078-212, 2078-224, 2078-312, 2078-324, or 2078-AF3) for installation.

IBM Spectrum Virtualize Software for Storwize V5010 V7.8.1 (5639-SV1) requires at least one IBM Storwize V5010 control enclosure (2077-112, 2077-124, 2078-112, or 2078-124) for installation.

IBM Spectrum Virtualize Software for Storwize V5020 V7.8.1 (5639-SV2) requires at least one IBM Storwize V5020 control enclosure (2077-212, 2077-224, 2078-212, or 2078-224) for installation.

IBM Spectrum Virtualize Software for Storwize V5030 V7.8.1 (5639-SV3) requires at least one IBM Storwize V5030 control enclosure (2077-AF3, 2077-312, 2077-324, 2078-AF3, 2078-312, or 2078-324) for installation. The compression feature for V5030 requires the 64 GB cache feature (#ACHD) on models 312 and 324 for machine types 2077 and 2078.

IBM Spectrum Virtualize Software for Storwize V50x0 Expansion V7.8.1 (5639-SV4) requires at least one IBM Storwize V50x0 expansion enclosure (2077-92F, 2077-12F, 2077-24F, 2077-AFF, 2078-92F, 2078-12F, 2078-24F, or 2078-AFF) for installation. The high-density enclosure (2077-92F or 2078-92F) requires four of the base software charge codes to support the number of disk slots in the system.

IBM FlashSystem V840 Software V7.8.1 (5639-FS7) requires an IBM FlashSystem V840 Storage System (9846-AC1 and 9846-AE1, or 9848-AC1 and 9848-AE1) for installation.

IBM FlashSystem V9000 Software V7.8.1 (5639-RB7) requires at least two IBM FlashSystem V9000 Control Enclosures (9846-AC2 or 9848-AC2) and at least one IBM FlashSystem V9000 Storage Enclosure (9846-AE2 or 9848-AE2) or Expansion Enclosure (9846-12F, 9846-24F, 9846-92F, 9848-12F, 9848-24F, or 9848-92F). The high-density expansion enclosure (9846-92F or 9848-92F) requires four FlashSystem V9000 Software licenses.

Current support summaries, including specific software, hardware, and firmware levels supported, are maintained at their respective support websites:

- [SAN Volume Controller](#)
- [Storwize V7000](#)
- [Storwize V5000](#)
- [Storwize V3700](#)
- [Storwize V3500](#)
- [IBM FlashSystem V840](#)
- [IBM FlashSystem V9000](#)

Software requirements

Installation of IBM Spectrum Virtualize Software V7.8.1 can be done directly from systems running Storwize Family Software V7.6.

For current hardware and software interoperability dependencies, and other product environment and configuration information, refer to the respective support website:

- [SAN Volume Controller](#)
- [Storwize V7000](#)
- [Storwize V5000](#)
- [Storwize V3700](#)
- [Storwize V3500](#)
- [IBM FlashSystem V840](#)

- [IBM FlashSystem V9000](#)

IBM includes one year of software maintenance with each program license acquired. The initial period of software maintenance can be extended by the purchase of a renewal option when ordered through Passport Advantage or Passport Advantage Express.

Note: Only IBM Spectrum Virtualize Software for SVC can be ordered through Passport Advantage.

When ordering using the program number with feature codes, software maintenance can be extended by selecting the applicable two-, three-, four-, or five-year software maintenance registration program number and features.

There are no software licenses required or available for IBM Storwize V3500 and IBM Storwize V3700.

For the IBM Spectrum Virtualize Software for SVC software only, all software maintenance renewals will be managed and invoiced through Passport Advantage.

Refer to the [Description](#) section for new storage system and host environment support added by this release. For all current storage systems and host environments supported, go to the respective support website.

- [SAN Volume Controller](#)
- [Storwize V7000](#)
- [Storwize V5000](#)
- [Storwize V3700](#)
- [Storwize V3500](#)
- [IBM FlashSystem V840](#)
- [IBM FlashSystem V9000](#)

Compatibility

For further information about currently supported environments and operating guidelines, go to the respective support website:

- [SVC](#)
- [Storwize V7000](#)
- [Storwize V5000](#)
- [Storwize V3700](#)
- [Storwize V3500](#)
- [IBM FlashSystem V840](#)
- [IBM FlashSystem V9000](#)

Limitations

This program only operates on specified storage hardware as detailed in the [Hardware requirements](#) section.

For additional information, refer to the [Usage restriction](#) section in the Terms and conditions section of this announcement, and to the License Information document that is available on the [IBM Software License Agreement](#) website.

Additional information on configuration limitations and configuration guidelines is further documented in the README file accompanying the Spectrum Virtualize Software or in furnished publications for this product available at the [IBM SVC](#), [IBM Storwize V7000](#), [IBM Storwize V5000](#), [IBM Storwize V3700](#), [IBM Storwize V3500](#), [IBM FlashSystem V840](#), or [IBM FlashSystem V9000](#) support websites.

Encryption and other functions in this announcement may be subject to limitations and restrictions for supported configurations, environments, and use. Refer to the *V7.7 Configuration Limits and Restrictions* document for details.

To view this document, access the [IBM Systems Support](#) website.

Select the applicable product (such as Storwize V5000) in the **Product Finder** menu.

Enter *7.8 Configuration Limits and Restrictions* in the Search Support field and check the *Search only...* box.

Planning information

Customer responsibilities

Planning for, and provision of, the power and environmental support of the required IBM Spectrum Virtualize product, including its storage engines, is a customer responsibility.

Planning considerations for IBM Spectrum Virtualize Software are listed in IBM Knowledge Center under the respective product:

- [IBM SAN Volume Controller](#)
- [IBM Spectrum Virtualize software only](#)
- [Storwize V7000](#)
- [Storwize V5000](#)
- [Storwize V3700](#)
- [Storwize V3500](#)
- [IBM FlashSystem V840](#)
- [IBM FlashSystem V9000](#)

Customers with a 5641-VC7 or 5641-CP7 license are responsible to combine the total terabytes managed and required Storage Capacity Units for each function from individual SVC License Manager (cluster) reports to ensure they are within the enterprise license entitlement (within that country) for each function.

Customers with enclosure licenses for optional functions, such as Easy Tier and FlashCopy, are responsible to combine the total number of enclosures managed for each function to ensure they are within the enterprise license entitlement (within that country) for each function.

Customers with a 5641-Z61 license are responsible to combine the total terabytes managed and required Storage Capacity Units to ensure they are within the enterprise license entitlement (within that country) for each function.

Packaging

New order packaging

License information documents for IBM Spectrum Virtualize Software programs ship with the hardware on which these programs are preloaded.

The *IBM Agreement for Acquisition of Support and Addendum for Support*, Z125-6011, is shipped with each new Spectrum Virtualize Software order.

SVC

IBM Spectrum Virtualize Software for SVC V7 (5641-VC7, 5641-CP7, and 5641-B01) is preinstalled on, and shipped with, the required IBM 2145 SVC Storage Engines.

After receipt of an order for IBM Spectrum Virtualize Software for SVC 5641-VC7, the Business Partner or customer will be required to register and accept Passport Advantage or Passport Express terms and conditions. Upon registration, the

customer will be authorized for the electronic download of software code updates. The product includes the license and one year of support, with up to four additional years available for purchase with the product.

In addition to the IBM Agreement for Acquisition of Software Maintenance, the following are shipped with each new IBM System Storage SVC order:

- *License Information for IBM System Storage SAN Volume Controller V7, GI13-2841*
- *IBM System Storage SAN Volume Controller Read First file, GA32-0843*

Storwize V7000

IBM Spectrum Virtualize Software for Storwize V7000 V7 (5639-VM7, 5639-EV7, 5639-RM7, and 5639-CP7) is preinstalled on, and shipped with, the required IBM 2076 Storwize V7000 disk systems.

In addition to the IBM Agreement for Acquisition of Software Maintenance, the License Information for IBM System Storage SVC and IBM Storwize V7000 Version 7, GI13-2841, is shipped with each new IBM Storwize V7000 Controller order.

Storwize V5000

IBM Spectrum Virtualize Software for Storwize V5000 (5639-ST7, 5639-SV1, 5639-SV2, 5639-SV3, or 5639-SV4) is preinstalled on, and shipped with, the required IBM 2077 or 2078 IBM Storwize V5000 Disk Systems.

The paid invoice acts as Proof of Entitlement (PoE) for all orders of IBM Spectrum Virtualize Software V7. All associated media listed in the [Publications](#) section are also shipped with the new hardware order. One media set per IBM Spectrum Virtualize system will be shipped.

Subsequent media orders

For additional available publications, refer to the [Publications](#) section.

For assistance in placing orders with or without media features, contact your IBM representative.

Publications are in English.

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 Virtualize Software can use an existing LDAP for authentication, for example interfacing with Microsoft™ Active Directory.

Use of supplementary antivirus software is recommended, but not required.

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

Ordering information for Passport Advantage

Passport Advantage (PPA) enables greater flexibility to help customers manage their software licenses and Subscription and Support renewals. Customers can now have a common anniversary date for Subscription and Support renewals for all IBM

software, under a PPA agreement, including IBM Storage software. The anniversary date, established at the order ship date for the initial product acquisition, will remain unchanged while their Passport Advantage or Passport Advantage Express agreement remains in effect.

IBM Spectrum Virtualize Software Only V7 can be ordered in two licensing models:

- Monthly license with optional automatic renewals
- Perpetual Licensing with optional automatic renewals

Program name: **IBM Spectrum Virtualize Software V7 (5725-Z61)**

| Description | Part number |
|---|-------------|
| IBM Spectrum Virtualize Software V7 Stg Cap Unit Monthly License | D1PHVLL |
| IBM Spectrum Virtualize Software V7 Stg Cap Unit Lic + SW S&S 12 Mo | D1PHTLL |
| IBM Spectrum Virtualize Software V7 Stg Cap Unit Annual SW S&S Rnwl | E0MZNLL |
| IBM Spectrum Virtualize Software V7 Stg Cap Unit SW S&S Reinstate 12 Mo | D1PHULL |

The product in the above table are also available via web download from Passport Advantage.

IBM Spectrum Virtualize can be ordered as a monthly license with optional automatic renewals.

To order for Passport Advantage, specify the desired part number and quantity.

Passport Advantage customer: Media pack entitlement details

A Passport Advantage media pack will not be generated. Read first information, will be available with downloaded code updates from Passport Advantage.

Media pack information can be found on the [Passport Advantage](#) website.

Ordering information for Non-Passport Advantage

IBM Spectrum Virtualize Software for SAN Volume Controller products identified in this announcement (5641-VC7, 5641-CP7, and 5641-B01) will be ordered through existing channels using existing configurator and ordering tools. However, the fulfillment processes have been modified to improve customer records management associated with Software Subscription and Support, often referred to as Software Maintenance. Software Subscription and Support will be entitled through Passport Advantage or Passport Advantage Express.

The products 5641-VC7, 5641-CP7, and 5641-B01, when selected during the configuration process with each hardware system, will be enabled for the system unit for which the product was ordered. Optionally, software and license only configurations can be created for 5641-VC7, 5641-CP7, and 5641-B01 based on existing supported hardware system units in the customer business environment. Offerings in this announcement are available exclusively through electronic download.

To order a basic license, specify the program number and the one-time charge feature number in the quantity desired.

The program is available through electronic download only.

Charge metric

| Program name | Part number or PID number | Charge metric |
|---|----------------------------------|---|
| IBM Spectrum Virtualize Software for SAN Volume Controller V7 | 5641-VC7 | Per SCU increments for SVC Base License. Per terabyte increments for FlashCopy and Remote Mirror. |
| IBM Spectrum Virtualize Software for SAN Volume Controller V7 (for Passport Advantage) | 5725-M19 | Per SCU increments for SVC Base License. Per terabyte increments for FlashCopy and Remote Mirror. |
| IBM Spectrum Virtualize Software for SAN Volume Controller Real-time Compression Software V7 | 5641-CP7 | Per SCU increments |
| IBM Spectrum Virtualize Software for SAN Volume Controller Real-time Compression Software V7 (for Passport Advantage) | 5725-H04 | Per SCU increments |
| IBM Spectrum Virtualize Software for SAN Volume Controller Encryption Software V7 | 5641-B01 | Per Storage Device |
| IBM Spectrum Virtualize Software for SAN Volume Controller Encryption Software V7 (for Passport Advantage) | 5725-Y35 | Per Storage Device |
| IBM Spectrum Virtualize software only V7 | 5725-Z61 | Per SCU |
| IBM Spectrum Virtualize Software for Storwize V7000 V7 | 5639-VM7 | Per Storage Device |
| IBM Spectrum Virtualize Software for Storwize V7000 External Virtualization software V7 | 5639-EV7 | Per Storage Device |
| IBM Spectrum Virtualize Software for Storwize V7000 Remote Mirroring software V7 | 5639-RM7 | Per Storage Device |
| IBM Spectrum Virtualize Software for Storwize V7000 Real-time Compression software V7 | 5639-CP7 | Per Storage Device |
| IBM Spectrum Virtualize Software for Storwize V7000 Controller software V7 | 5639-CB7 | Per Storage Device |
| IBM Spectrum Virtualize Software for Storwize V7000 Expansion software V7 | 5639-XB7 | Per Storage Device |
| IBM Spectrum Virtualize Software for Storwize V7000 External data virtualization software V7 | 5639-EB7 | Per Storage Device |
| IBM Spectrum Virtualize Software for Storwize V5000 software V7 | 5639-ST7 | Per Storage Device |
| IBM Spectrum Virtualize Software for Storwize V5000 Controller software V7 | 5639-CT7 | Per Storage Device |

| Program name | Part number or PID number | Charge metric |
|--|----------------------------------|----------------------|
| IBM Spectrum Virtualize Software for Storwize V5000 Expansion software V7 | 5639-XT7 | Per Storage Device |
| IBM Spectrum Virtualize Software for Storwize V5000 External data virtualization software V7 | 5639-ET7 | Per Storage Device |
| IBM Spectrum Virtualize Software for Storwize V5010 software V7 | 5639-SV1 | Per Storage Device |
| IBM Spectrum Virtualize Software for Storwize V5020 software V7 | 5639-SV2 | Per Storage Device |
| IBM Spectrum Virtualize Software for Storwize V5030 software V7 | 5639-SV3 | Per Storage Device |
| IBM Spectrum Virtualize Software for Storwize V50x0 Expansion software V7 | 5639-SV4 | Per Storage Device |
| IBM FlashSystem V840 Software V7.8 | 5639-FS7 | Per Storage Device |
| IBM FlashSystem V840 Real-time Compression Software V7.8 | 5639-FC7 | Per Storage Device |
| IBM FlashSystem V840 Remote Mirroring Software V7.8 | 5639-FR7 | Per Storage Device |
| IBM FlashSystem V840 External Virtualization Software V7.8 | 5639-FV7 | Per Storage Device |
| IBM FlashSystem V9000 Software V7.8 | 5639-RB7 | Per Storage Device |

New orders for Spectrum Virtualize Software

For Spectrum Virtualize Software V7 program number orders, first order the appropriate hardware for the initial system or cluster, then order the Spectrum Virtualize Software license.

Note: Real-time Compression, External Virtualization, Remote Mirroring, and Encryption software product identifiers are optional, and are ordered along with or where there is already a complete Spectrum Virtualize system, like the SAN Volume Controller 2145 or the Storwize V7000 2076 hardware, in place with the appropriate required Spectrum Virtualize software license for that system.

New orders for IBM FlashSystem V840 Software V7.8.1 for FlashSystem V840

For new IBM FlashSystem V840 Software V7.8.1 orders, first order the appropriate hardware for the initial system or cluster, then order the IBM FlashSystem V840 Software V7.8.1 license.

Note: Real-time Compression, External Virtualization, and Remote Mirroring, software product identifiers are optional. They can be ordered at the same time as the IBM FlashSystem V840 Software V7.8.1 and the corresponding FlashSystem V840 hardware, or they can be ordered after the initial purchase, assuming the system is appropriately configured and licensed.

New orders for IBM FlashSystem V9000 Software V7.8.1

For new IBM FlashSystem V9000 Software V7orders, first order the appropriate hardware for the initial system or cluster, then order the IBM FlashSystem V9000 Software V7 license.

License metric definition

Storage Device "Per Storage Device" means one per SVC node. The Storage Device in this metric is the SVC node itself.

Terabyte

One terabyte (TB) of managed storage = 2 to the power of 40 bytes = 1,099,511,627,776 bytes, trillion bytes.

Storage Capacity Units

A Storage Capacity Unit (SCU) is measuring the managed capacity in a way that the price is differentiated by the technology used to store the data.

Sufficient entitlements must be obtained for the number of SCUs required to cover the terabyte of usable capacity managed by the program as set forth below.

Storage capacity managed by the program is classified into the following three categories:

- Category 1: Flash and solid-state drives (SSDs)
- Category 2: Serial Attached SCSI (SAS) drives, Fibre Channel drives, and systems using Category 3 drives with advanced architectures to deliver high-end storage performance.
- Category 3: Near Line SAS (NL-SAS) and Serial ATA (SATA) drives

Any storage capacity used that is not listed above is classified as Category 1.

The abstract concept of SCUs enables the amount of capacity used per category to change over time, as long as the total amount of SCUs required is equal or less than the entitlements that a customer owns.

Each SCU entitlement can be used to cover the following number of terabytes by category:

- * 1 SCU equates to 1.00 TB of Category 1
- * 1 SCU equates to 1.18 TB of Category 2
- * 1 SCU equates to 4.00 TB of Category 3

When calculating the count of SCUs per category, fractions will be rounded up to the following integer number.

The following seven tiers are units of measure by which the program can be licensed and apply when purchased for SVC implementation:

- Storage Capacity Unit (1-100)
- Storage Capacity Unit (101-250)
- Storage Capacity Unit (251-500)
- Storage Capacity Unit (501-750)
- Storage Capacity Unit (751-1250)
- Storage Capacity Unit (1251-2000)
- and Storage Capacity Unit (2001+)

Storage Device

Storage Device is a unit of measure by which the Program can be licensed. A Storage Device is an independently powered, channel-attached device that stores or controls the storage of data on solid state drives, such as disk controllers and their respective expansion units, each constituting separate Storage Devices. Licensee must obtain entitlements for every Storage Device which runs, uses services provided by, or otherwise accesses the Program and for every Storage Device on which the Program is installed. Instead of the entitlements required for the Program directly, Licensee must obtain entitlements for this Program sufficient to cover the Storage Devices managed by the Program.

A Drive Bay or Drive Slot are attachment points in a storage chassis or expansion unit in which HDDs or SSDs can be installed. For each Storage Device with more than twenty five (25) Drive Bays or Drive Slots, Licensee must obtain a separate entitlement for each quantity of 25 (rounded up) Drive Bays or Drive Slots capable of housing HDDs or SSDs managed by the Program. The entitlements needed are for the number of drive bays or slots available and does not depend on the number of HDDs or SSDs actually installed.

Customers requesting ESD

Downloading from the electronic software delivery website requires an active Software Maintenance Agreement for each product to be downloaded and registered with the [ESS](#) website.

Website registration requires:

- A valid customer number
- A software order number associated with the customer number

Terms and conditions

The information provided in this announcement letter is for reference and convenience purposes only. The terms and conditions that govern any transaction with IBM are contained in the applicable contract documents such as the IBM International Program License Agreement, IBM International Passport Advantage Agreement, and the IBM Agreement for Acquisition of Software Maintenance.

Licensing

IBM International Program License Agreement including the License Information document and Proof of Entitlement (PoE) govern your use of the program. PoEs are required for all authorized use. Part number products only, offered outside of Passport Advantage, where applicable, are license only and do not include Software Maintenance.

This software license includes Software Subscription and Support (also referred to as Software Maintenance).

Agreement for Acquisition of Software Maintenance

The IBM Agreement for Acquisition of Software Maintenance (Z125-6011) applies for Subscription and Support (also referred to as Software Maintenance) and does not require customer signatures.

These programs are licensed under the IBM Program License Agreement (IPLA) and the associated Agreement for Acquisition of Software Maintenance, which provide for support with ongoing access to releases and versions of the program. IBM includes one year of Software Subscription and Support (also referred to as Software Maintenance) with the initial license acquisition of each program acquired. The initial period of Software Subscription and Support (also referred to as Software Maintenance) can be extended by the purchase of a renewal option, if available. These programs have a one-time license charge for use of the program

and an annual renewable charge for the enhanced support that includes telephone assistance (voice support for defects during normal business hours), as well as access to updates, releases, and versions of the program as long as support is in effect.

License Information number

GI13-2841 License Information for:

- 5641-VC7 -IBM Spectrum Virtualize SAN Volume Controller Software V7.8
- 5641-CP7 -IBM Spectrum Virtualize SAN Volume Controller Compression Software V7.8
- 5641-B01 -IBM Spectrum Virtualize SAN Volume Controller Encryption Software V7.8
- 5639-VM7 -IBM Spectrum Virtualize V7000 Software V7.8
- 5639-EV7 -IBM Spectrum Virtualize V7000 External Virtualization Software V7.8
- 5639-RM7 -IBM Spectrum Virtualize V7000 Remote Mirroring Software V7.8
- 5639-CP7 -IBM Spectrum Virtualize V7000 Compression Software V7.8
- 5639-ST7 -IBM Spectrum Virtualize V5000 Software V7.8
- 5639-CB7 -IBM Spectrum Virtualize V7000 Controller Software V7.8
- 5639-XB7 -IBM Spectrum Virtualize V7000 Expansion Software V7.8
- 5639-EB7 -IBM Spectrum Virtualize V7000 External Data Virtualization Software V7.8

L-SSCZ-ACJTYT License Information for:

- IBM Spectrum Virtualize software only

L-SSCZ-A6RND2 License Information for:

- 5639-SV1 -IBM Spectrum Virtualize Software for Storwize V5010
- 5639-SV2 -IBM Spectrum Virtualize Software for Storwize V5020
- 5639-SV3 -IBM Spectrum Virtualize Software for Storwize V5030
- 5639-SV4 -IBM Spectrum Virtualize Software for Storwize V50x0 Expansion

SC27-6420 License Information for:

- 5639-FS7 -IBM FlashSystem V840 Software V7
- 5639-FV7 -IBM FlashSystem V840 External Virtualization Software V7
- 5639-FR7 -IBM FlashSystem V840 Remote Mirroring Software V7
- 5639-FC7 -IBM FlashSystem V840 Real-time Compression Software V7

LC27-6698 License Information for:

- 5639-RB7 -IBM FlashSystem V9000 Software V7

On or near the planned availability date, the current License Information documents will be available for review on the [IBM Software License Agreement](#) website.

Limited warranty applies

Yes

Limited warranty

IBM warrants that when the program is used in the specified operating environment, it will conform to its specifications. The warranty applies only to the unmodified portion of the program. IBM does not warrant uninterrupted or error-free operation

of the program or that IBM will correct all program defects. You are responsible for the results obtained from the use of the program.

IBM provides you with access to IBM databases containing information on known program defects, defect corrections, restrictions, and bypasses at no additional charge. For further information, see the [IBM Software Support Handbook](#).

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

Program support

Subscription and Support includes telephone assistance, as well as access to updates, releases, and versions of the program as long as support is in effect. You will be notified of discontinuance of support with 12 months' notice.

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 (1) for programs acquired under the IBM International Passport Advantage offering, this term applies only to your first acquisition of the program and (2) 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)

No

Passport Advantage applies

Yes, information is available on the [Passport Advantage and Passport Advantage Express](#) website.

Usage restriction

Yes

SVC standard software (5641-VC7)

This program (5641-VC7) is licensed on per SCU with cumulative license basis for SVC Base License and SVC Real Time Compression, on a per-terabyte (with cumulative tiers) capacity basis for SVC FlashCopy and SVC Remote Mirror, and licensed on a per-storage device for SVC Encryption. (Refer to the [Ordering information](#) section for information on charges for this program.) Users may only install this program on IBM System Storage SAN Volume Controller 2145-DH8, 2145-CG8, or 2145-CF8, storage engines, or subsequent IBM replacements of these.

IBM SAN Volume Controller standard software and its associated features are licensed to the customer (enterprise). Note that a customer who has physical sites in multiple countries may consolidate their licenses only within each country. Check with your sales representative and review all necessary conditions prior to licensing.

A customer's right to use the IBM FlashCopy for SAN Volume Controller and Metro/Global Mirror for SAN Volume Controller features of this program is also limited to the amount of authorizations obtained from IBM. The authorizations for FlashCopy and for Metro/Global Mirror cannot exceed the total capacity authorization for the

amount of managed storage on all clusters. Use of FlashCopy features requires license authorizations for only the FlashCopy sources, not the targets.

Use of Metro/Global Mirror features requires license authorizations for both the Metro/Global Mirror source and target capacities in use.

Customers may use the encryption feature once they purchase feature ACE2 on the hardware, and the encryption PID (5641-B01 or 5725-Y35) software enablement offering. Only one encryption software product is required per SVC node, regardless of the capacity of the system. Every SVC node in an SVC cluster must have encryption enabled for it to function.

This program is only supported for use with host servers, storage sub-systems, and SAN configurations identified by IBM as being supported for attachment to the IBM System Storage SAN Volume Controller. This program is delivered together with code provided under separate license agreements, including, but not limited to, open source license agreements.

Storwize V7000

The following Program Unique Terms apply. This program is licensed for use with the IBM Storwize V7000 system with which the program was delivered, and only to manage the capacity specified in the proof of entitlement document for that license. A separate license is required for each IBM Storwize V7000 storage enclosure. The following paragraph titled "Disabling device" applies to the use of the IBM Storwize V7000 Software components. The term "Program" in these paragraphs shall mean the IBM Storwize V7000 Software components.

Disabling device: The Program may include a disabling device that will prevent certain features from being used. You will not tamper with such disabling device or otherwise change the Program.

Transferability: The Program 5639-VM7, 5639-CB7, or 5639-XB7 are nontransferable between IBM Storwize V7000 systems and are only to be used on the IBM Storwize V7000 system for which it was purchased. If the system is transferred to a new owner, the program license transfers with the system. However, Software Maintenance does not transfer, and a new maintenance agreement must be purchased by the new owner.

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Storwize V5000

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Disabling device: The Program may include a disabling device that will prevent certain features from being used. You will not tamper with such disabling device or otherwise change the Program.

Transferability: The Programs 5639-ST7, 5639-CT7, or 5639-XT7 are non-transferable between IBM Storwize V5000 systems and are only to be used on the IBM Storwize V5000 system for which it was purchased. If the system is transferred to a new owner, the program license transfers with the system. However, Software Maintenance does not transfer, and a new maintenance agreement must be purchased by the new owner.

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Variable charges apply

No

Educational allowance available

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

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