

IBM Spectrum Control
5.4.1, November 2020

Installation Guide



Note:

Before using this information and the product it supports, read the information in [“Legal notices” on page 141](#).

This edition applies to version 5, release 4, modification 1 of IBM Spectrum Control (product numbers 5725-F93 and 5725-G33) and to all subsequent releases and modifications until otherwise indicated in new editions.

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About this guide

IBM Spectrum Control manages storage infrastructure by centralizing, automating, and simplifying the management of complex and heterogeneous storage environments. Use this guide to complete the steps that are required to install these products, including planning for installation and configuration.

Who should read this guide

This publication is intended for administrators or users who are installing IBM Spectrum Control. It also describes the hardware and software requirements for installing the product and provides an overview of the installation procedures.

Administrators and installers should be familiar with the following topics:

- General procedures for installing software on Microsoft Windows, AIX®, Linux®, HP-UX, and Oracle Solaris.
- Storage area network (SAN) concepts
- IBM Spectrum Control concepts
- IBM® Db2® Database concepts
- Simple Network Management Protocol (SNMP) concepts
- IBM® Tivoli® Enterprise Console concepts

Publications

A number of publications are provided with IBM Spectrum Control.

IBM Tivoli Storage Productivity Center for Replication is no longer installed with IBM Spectrum Control. For current Tivoli Storage Productivity Center for Replication users who upgrade to IBM Spectrum Control, Tivoli Storage Productivity Center for Replication will get uninstalled. See https://www.ibm.com/support/knowledgecenter/SS5R93_5.4.1/com.ibm.spectrum.sc.doc/fqz0_r_tpcr_roadmap.html.

The following section describes how to access these publications online.

Accessing publications online

Information about installing, configuring, using, upgrading, and uninstalling IBM Spectrum Control and related products is available online.

Use Table 1 on page vii to view and download these publications. Translated documents are available for some products.

Table 1. Locations of publications for IBM Spectrum Control and related products	
Product	Online location
IBM Cognos® Analytics	https://www.ibm.com/support/knowledgecenter/SSEP7J
IBM® Db2® Database	https://www.ibm.com/support/knowledgecenter/SSEPGG
IBM FlashSystem® 5000, IBM FlashSystem 5100, and IBM Storwize® V5000E	https://www.ibm.com/support/knowledgecenter/STHGUJ
IBM FlashSystem 7200 and IBM Storwize V7000	https://www.ibm.com/support/knowledgecenter/ST3FR7
IBM FlashSystem V840	http://www.ibm.com/support/knowledgecenter/ST2HTZ/

Table 1. Locations of publications for IBM Spectrum Control and related products (continued)

Product	Online location
IBM FlashSystem 840 and IBM FlashSystem 900	http://www.ibm.com/support/knowledgecenter/STKMQB_1.6.1
IBM FlashSystem 9200 and IBM FlashSystem 9100	http://www.ibm.com/support/knowledgecenter/STSLR9/
IBM FlashSystem V9000	http://www.ibm.com/support/knowledgecenter/STKMQV
IBM FlashSystem A9000	http://www.ibm.com/support/knowledgecenter/STJKMM
IBM FlashSystem A9000R	http://www.ibm.com/support/knowledgecenter/STJKN5
IBM Spectrum Accelerate	http://www.ibm.com/support/knowledgecenter/STZSWD/welcome
IBM Storage Insights	http://www.ibm.com/support/knowledgecenter/SSQRB8
IBM Spectrum Virtualize as Software Only	https://www.ibm.com/support/knowledgecenter/STVLF4/
IBM Spectrum Virtualize for Public Cloud	https://www.ibm.com/support/knowledgecenter/STHLEK/
IBM Spectrum Scale (General Parallel File System)	https://www.ibm.com/support/knowledgecenter/SSFKCN/gpfs_welcome.html
IBM Storwize V3500	https://www.ibm.com/support/knowledgecenter/STLM6B
IBM Storwize V3700	https://www.ibm.com/support/knowledgecenter/STLM5A
IBM FlashSystem 5000, IBM FlashSystem 5100, and IBM Storwize V5000E	https://www.ibm.com/support/knowledgecenter/STHGUJ
IBM Storwize V7000 Unified	https://www.ibm.com/support/knowledgecenter/ST5Q4U
IBM System Storage® DS8000®	http://www.ibm.com/support/knowledgecenter/ Go to the preceding website and search for the DS8000 series system that you want.
IBM System Storage N series	http://www.ibm.com/support/knowledgecenter/nseries/kc_welcome_nseries.html
IBM SAN Volume Controller	http://www.ibm.com/support/knowledgecenter/STPVGU
IBM XIV® Storage System	http://www.ibm.com/support/knowledgecenter/STJTAG
IBM WebSphere® Application Server	https://www.ibm.com/support/knowledgecenter/SSEQTP/mapfiles/product_welcome_was.html
IBM WebSphere Application Server Liberty	https://www.ibm.com/support/knowledgecenter/SSEQTP_liberty/as_ditamaps/was900_welcome_liberty.html

IBM Redbooks

The IBM Redbooks® are publications about specialized topics.

You can order publications through your IBM representative or the IBM branch office serving your locality. You can also search for and order books of interest to you by visiting the IBM Redbooks home page at <http://www.redbooks.ibm.com>.

Languages

Non-English publications are available from IBM Knowledge Center, which is available in certain non-English languages. It is displayed in the language that is appropriate for the browser locale setting.

When a locale does not have a non-English version, the information is displayed in English, which is the default language. Non-English PDFs are available when the information is translated.

Providing feedback about publications

Your feedback is important to help IBM provide the highest quality information.

To provide comments or suggestions about the product documentation, go to the IBM Knowledge Center for IBM Spectrum Control: <http://www.ibm.com/support/knowledgecenter/SS5R93>. Click **Feedback** at the bottom of any page and complete the form.

IBM Spectrum Control technical community

Connect, learn, and share with storage professionals: product support technical experts who provide their perspectives and expertise.

Access the IBM Spectrum Control technical community at <https://www.ibm.com/developerworks/servicemanagement/>.

Use IBM Spectrum Control technical community in the following ways:

- Become involved with transparent development, an ongoing, open engagement between other users and developers of IBM products.
- Connect one-on-one with the experts to collaborate and network about IBM and the Storage Management community.
- Read blogs to benefit from the expertise and experience of others.
- Use forums to collaborate with the broader user community.

Contacting IBM Software Support

You can contact IBM Software Support by phone, and you can register for support notifications at the technical support website.

- Go to the IBM Spectrum Control technical support website at https://www.ibm.com/mysupport/s/topic/OTO5000000IQWqGAO/spectrum-control?language=en_US&productId=01t50000004uZGZ.

To receive future support notifications, sign in under **Subscribe to support notifications**. You are required to enter your IBM ID and password. After you are authenticated, you can configure your subscription for IBM Spectrum Control technical support website updates.

- Customers in the United States can call 1-800-IBM-SERV (1-800-426-7378).
- For international customers, go to <https://www.ibm.com/planetwide/>.

You can also review the *IBM Software Support Handbook*, which is available at <https://www.ibm.com/support/pages/node/733923>.

The support website offers extensive information, including a guide to support services; frequently asked questions (FAQs); and documentation for all IBM Software products, including Redbooks and white papers. Translated documents are also available for some products.

When you contact IBM Software Support, be prepared to provide identification information for your company so that support personnel can readily assist you. Company identification information might also be needed to access various online services available on the website. See [“Reporting a problem” on page x](#).

Reporting a problem

Provide IBM Software Support with information about the problems that you report.

Have the following information ready when you report a problem:

- The IBM Spectrum Control version, release, modification, and service level number.
- The communication protocol (for example, TCP/IP), version, and release number that you are using.
- The activity that you were doing when the problem occurred, listing the steps that you followed before the problem occurred.
- The exact text of any error messages.

Conventions used in this guide

Information is given about the conventions that are used in this publication.

This publication uses several conventions for special terms and actions, and for operating system-dependent commands and paths.

The following typeface conventions are used in this publication:

Bold

- Flags that display with text
- Graphical user interface (GUI) elements (except for titles of windows and dialogs)
- Names of keys

Italic

- Variables
- Values that you must provide
- New terms
- Words and phrases that are emphasized
- Titles of documents

monospace

- Commands and command options
- Flags that display on a separate line
- Code examples and output
- Message text
- Names of files and directories
- Text strings that you must type, when they display within text
- Names of Oracle Java™ methods and classes
- HTML and XML tags that display like `this`, in monospace type

For syntax notations, remember the following details.

- In AIX, the prompt for the root user is `#`.
- In AIX and Linux, the commands are case-sensitive, so you must type commands exactly as they are shown.

Chapter 1. Planning

The following sections provide information to help plan your IBM Spectrum Control environment before you install the product. In a complex environment, good planning helps you avoid delays and problems in getting your system up and running.

Planning for installation

You can install IBM Spectrum Control by using the installation program or the command line in silent mode. Installing IBM Spectrum Control by using console mode is not supported. Also, upgrading the operating system of a server where IBM Spectrum Control is installed is not supported. If you must upgrade the server, contact the IBM Support team for IBM Spectrum Control Support to discuss your options.

Antivirus software considerations

Installing IBM Spectrum Control involves making use of your operating system in manners typical for installing new application software. If your antivirus software is set on the maximum mode, it might prevent some of your changes from being accepted.

To verify that your installation completes correctly, enable your antivirus software product to allow the following instances:

- The /etc/hosts file can be edited
- Files can be created in the /temp directory
- New executable files can be created in the C:\Program Files directory

Recommended skills and knowledge

Administrators and users of IBM Spectrum Control should be familiar with the following skills and topics:

- General procedures for installing software on Microsoft Windows, IBM AIX, and Linux operating systems
- Storage Area Network (SAN) concepts
- IBM Spectrum Control concepts
- IBM Db2 Database
- Simple Network Management Protocol (SNMP) concepts

Required user privileges for installation

Ensure that you have the required privileges to install Db2 and IBM Spectrum Control. If you are installing on a Windows operating system, you must install as a user with administrator privileges. If you are installing on an AIX or Linux operating system, you must install as a root user or as a non-root user who has sudo privileges.

Fully qualified host names

Some systems might be configured to return a short host name such as `server22`, instead of a fully qualified host name such as `server22.myorg.mycompany.com`. IBM Spectrum Control requires fully qualified host names, so you must install the product on a computer that has a fully qualified host name.

Restriction:

Hostnames cannot contain special characters, such as a space or an underscore. Use characters a through z, or characters 0 - 9.

For more information about determining whether you have a fully qualified domain name, see http://www.ibm.com/support/knowledgecenter/SS5R93_5.4.1/com.ibm.spectrum.sc.doc/fqz0_t_checking_fully_qualified_host_name.html.

Self signed certificate considerations

There are new certificate requirements from the CA/B Forum that are strictly enforced for macOS Catalina users that might affect your ability to access the IBM Spectrum Control GUI. During an upgrade of IBM Spectrum Control, certificates self-signed by IBM Spectrum Control will be made automatically compliant. However, if one or more of your certificates are not self-signed by IBM Spectrum Control, see [IBM Spectrum Control and macOS Catalina \(10.15\) Increased Security Policies on SSL Certificates](#) and validate that your certificates are compliant.

Starting with IBM Spectrum Control 5.3.6, all default self-signed certificates have an expiration date of 825 days based on the new certificate requirements from the CA/B Forum. By default, upgrades of IBM Spectrum Control always renew the expiration of all default self-signed certificates used by the product for another 825 days. However, if you have installed your own certificates, IBM Spectrum Control does not modify those certificates for you.

For more information about determining whether you have a fully qualified domain name, see .

For more information about determining whether you have a fully qualified domain name, see .

Hardware and software requirements

The IBM Spectrum Control server can require a large amount of memory, disk space, network bandwidth, and processor resources. To promote consistent availability and performance, install IBM Spectrum Control on a dedicated server where no other critical business applications, including IBM Copy Services Manager, are installed. IBM Software Support is not responsible for availability, performance, and functional problems that are caused by other business applications that are deployed on the same server as IBM Spectrum Control.

Before you install IBM Spectrum Control, apply all available updates and patches to the operating system on the target computer.

For information about hardware requirements, see “Hardware requirements ” on page 37.

For information about software requirements, see [Software requirements](#).

For information about updates to product and operating system support, see *Find the Supported Hardware, Products and Platforms Interoperability Matrix Links* at <https://www.ibm.com/support/pages/node/388393>.

Installation methods

You can install Db2 and IBM Spectrum Control by using the GUI or silent mode. In silent mode, a command is provided with the values in a response file.

Use the silent-mode installation to install on a server that cannot display graphics. For example, if you are installing on an AIX or Linux server that does not have the X Window System installed.

On a server that does not have the X Window System installed, you cannot change the Db2 and IBM Spectrum Control passwords within IBM Spectrum Control by using the change password tool. For information on how to change the passwords, see http://www.ibm.com/support/knowledgecenter/SS5R93_5.4.1/com.ibm.spectrum.sc.doc/fqz0_t_passwords_changing_no_x.html.

Installation images

Compressed installation images are available electronically. Download and extract these images to a location with adequate disk space. For disk space requirements by operating system, see *IBM Spectrum Control 5.3.x - Hardware Support: Memory, Processor and Disk Space* at [IBM Spectrum Control - Hardware Support: Memory, Processor and Disk Space](#).

Download the installation images for each product into a separate directory. The following list provides sample download directory paths:

- c:\downloads\DB2
- c:\downloads\SC

Extract the image files into a separate temporary directory for each product. For example:

- c:\temp\DB2
- c:\temp\SC



Attention: If you do not extract the files into separate directories for each product, the common paths or path structures might overwrite each other, and you cannot install the products.

Follow these rules for naming the directories:

- Do not include spaces in the directory name.
- Keep the directory name short.
- For Linux or AIX operating systems, do not include a period (.) at the end of the directory name.

During the extraction of multi-part images, if you are prompted to merge or replace folders or files with the same name, click **Merge/Replace**.

Installation files for the following components are provided with IBM Spectrum Control:

Db2

- Db2 for Windows (64-bit)
- Db2 for Linux (64-bit)
- Db2 for AIX (64-bit)

IBM Spectrum Control

- IBM Spectrum Control for AIX
- IBM Spectrum Control for Linux
- IBM Spectrum Control for Windows

In addition, installation files for the following optional agents are available with IBM Spectrum Control:

- IBM Spectrum Control Storage Resource agent for Windows
- IBM Spectrum Control Storage Resource agent for UNIX

On Windows operating systems, assign the appropriate security settings for the Db2 and IBM Spectrum Control compressed files by completing the following steps:

1. Right-click one of the compressed installation files.
2. Examine the **General** tab and determine whether the **Unblock** button is displayed.
3. If the **Unblock** button is displayed:
 - a. Right-click the compressed file and click **Properties**.
 - b. On the **General** tab, next to **Security**, click **Unblock**.
4. Verify that the compressed installation files no longer have the **Unblock** button displayed.

IBM Spectrum Control GUI

After IBM Spectrum Control is installed, use the GUI to complete your storage management tasks. The GUI runs in a web browser and includes the ability to monitor, manage, and troubleshoot storage resources. You can access this interface from anywhere that you have a web browser and connectivity to a network. You can also use the IBM Cognos Analytics reporting tool to generate, save, and view reports about the condition, capacity, and performance resources.

Installation language

When you install IBM Spectrum Control, you must select one of the following languages:

- English
- Czech
- French
- German
- Hungarian
- Italian
- Japanese
- Korean
- Polish
- Brazilian Portuguese
- Russian
- Spanish
- Chinese (Simplified)
- Chinese (Traditional)

For more information about changing the operating system for the user interface, see [“Changing languages”](#) on page 77.

Messages, online help, and text are displayed in the language that you select. You are not required to install a language pack after installation. When you use IBM Spectrum Control, the language that is displayed is the language setting of the operating system.

To install IBM Spectrum Control on a Windows domain, see [“Planning to install IBM Spectrum Control in a Windows domain”](#) on page 6 and [“Installing IBM Spectrum Control on a Windows domain”](#) on page 70.

Installation images on AIX

When you extract installation images, use the GNU tape archive (tar) program instead of the AIX tape archive program. The AIX tape archive program might truncate long file names, which can cause installation errors in IBM Spectrum Control.

To get the GNU tape archive program, go to <http://www.ibm.com/systems/power/software/aix/linux/toolbox/alpha.html#T>. Find **tar** in the **Package** column, and click **RPM** to download the program. You must specify this program as the default tape archive program in the PATH environment variable.

For more information on using the correct program to extract the IBM Spectrum Control installation media, see [How to install GNU tar on AIX operating system](#).

Product licenses

Learn about the product licenses that are available for IBM Spectrum Control. Current licenses are IBM Spectrum Control and IBM Spectrum Control Select Edition. The IBM Spectrum Control Advanced Edition license is still applied, if you owned it in a previous release.

IBM Spectrum Control 5.4.0 offers two licenses based on the type of metric that you use:

- The IBM Spectrum Control license is based on the total number of storage capacity units (SCUs) that are required so that all of your capacity is licensed for all of your storage systems. This license applies if you currently have the IBM Spectrum Control or IBM Virtual Storage Center license.
- The IBM Spectrum Control Select Edition license (and the IBM Virtual Storage Center for Storwize license) is based on the total number of licenses that you need for your storage systems that use enclosures.

Note: Only one difference exists between the IBM Spectrum Control and IBM Spectrum Control Select Edition licenses: the license metric (SCUs versus enclosures). The features are otherwise identical in both solutions. To view the features, see the *Product overview* topic in the IBM Spectrum Control Knowledge Center or in the *IBM Spectrum Control User's Guide*.

For more information about the product licenses, see the following topics in the IBM Spectrum Control Knowledge Center or see the *IBM Spectrum Control User's Guide*:

- [Functions that are available based on role and license at \[http://www.ibm.com/support/knowledgecenter/SS5R93_5.4.1/com.ibm.spectrum.sc.doc/fqz0_r_wg_functions_available.html\]\(http://www.ibm.com/support/knowledgecenter/SS5R93_5.4.1/com.ibm.spectrum.sc.doc/fqz0_r_wg_functions_available.html\)](http://www.ibm.com/support/knowledgecenter/SS5R93_5.4.1/com.ibm.spectrum.sc.doc/fqz0_r_wg_functions_available.html)
- [License compliance at \[http://www.ibm.com/support/knowledgecenter/SS5R93_5.4.1/com.ibm.spectrum.sc.doc/tpch_r_managed_capacity_breakdown.html\]\(http://www.ibm.com/support/knowledgecenter/SS5R93_5.4.1/com.ibm.spectrum.sc.doc/tpch_r_managed_capacity_breakdown.html\)](http://www.ibm.com/support/knowledgecenter/SS5R93_5.4.1/com.ibm.spectrum.sc.doc/tpch_r_managed_capacity_breakdown.html)

To view a complete list of devices that can be used with IBM Spectrum Control, go to <https://www.ibm.com/support/pages/node/388393>.

IBM Storage Insights for IBM Spectrum Control: IBM Storage Insights for IBM Spectrum Control is an IBM Cloud service that can help you predict and prevent storage problems before they impact your business. It is complementary to IBM Spectrum Control and is available at no additional cost if you have an active license with a current subscription and support agreement for IBM Virtual Storage Center, IBM Spectrum Storage Suite, or any edition of IBM Spectrum Control.

For more information and to view a list of features in the service, see [IBM Storage Insights for IBM Spectrum Control](#).

Definitions of licensing metrics

Learn more about the licensing metrics that are available for IBM Spectrum Control.

Three different license metrics are available for IBM Spectrum Control:

SCUs

Licenses are priced by the number of storage capacity units (SCUs) that you need for the capacity to be licensed for the storage system. The number of SCUs is based on the capacity and categories of drives that are used by the storage system. This metric is available for IBM Spectrum Control and IBM Virtual Storage Center.

Total TiB

Licenses are priced by the total capacity in tebibytes (TiB) for all storage systems that use the capacity license model. This metric is available for the IBM Virtual Storage Center Entry Edition and IBM Spectrum® Storage Suite license.

Enclosures

Licenses are priced by the number of drive slots and capacity in the storage enclosures. This metric is available for IBM Spectrum Control Select Edition and IBM Virtual Storage Center for Storwize license.

For each enclosure, the number of licenses is calculated by using the following rules. Calculations are rounded up to the nearest whole number.

1. The number of slots in the enclosure divided by 25.
2. The sum of the physical capacity of the disks in the enclosure divided by 500 TiB.
3. The higher number from rule 1 and rule 2 is the number of licenses that are needed for the enclosure.

To learn about the licensing of IBM Spectrum Control, click the Announcement in [Table 2 on page 6](#). Information about licenses is available in the section *Charge Metrics*.

Table 2. Product announcements for IBM Spectrum Control licenses		
License	Announcement	Revised Announcement
IBM Spectrum Control - Storage Capacity Unit	5.3.0.0	5.3.6.0
IBM Spectrum Control - Select/Enclosure license	5.3.0.0	5.3.7.0

Names of equivalent licenses in previous releases

IBM Spectrum Control licenses were known by different names in previous releases. Use this table to determine the names.

Table 3. IBM Spectrum Control licenses and their previous names	
Names of IBM Spectrum Control 5.4.0 licenses	Names of IBM Spectrum Control 5.3 licenses
IBM Spectrum Control	IBM Spectrum Control Standard Edition
IBM Spectrum Control Select Edition	IBM Spectrum Control Standard Select Edition

Planning to install IBM Spectrum Control in a Windows domain

Before you can install IBM Spectrum Control on a Windows domain, you must determine which installation method is appropriate, based on your environment.

Installation methods

Install Db2 and IBM Spectrum Control in one of the following ways:

- Use local user accounts to install both Db2 and IBM Spectrum Control.
- Use a local user account to install Db2 and a domain user account to install IBM Spectrum Control.
- Use domain user accounts to install both Db2 and IBM Spectrum Control.

Windows domain and local user accounts

When a computer is a member of a Windows domain, you can install IBM Db2 on the local computer or on a computer that is a member of a Windows domain. The installation process creates a local Db2 user account or a domain Db2 user account.

User accounts

Windows domain user accounts are used to manage multiple computers, and local user accounts can be used to manage one computer.

Restriction: Before you install IBM Spectrum Control by using a Windows domain or a local user account as the common user name, you must add the Windows domain user account or local user account to the local administrators group. The IBM Spectrum Control installation software recognizes only Windows domain or local user accounts (and not Windows domain or local groups) that are added to the local administrators group.

domain Db2 user account is an example of a Windows domain user account, and *local Db2 user account* is an example of a local user account.

Naming conventions for user accounts

You can install IBM Spectrum Control by using the same user account that is defined in both the local and Windows domain registries. The Windows operating system resolves this naming collision on computers that belong to a Windows domain by prefixing the user name with the host name or domain name. This user name is also called a *fully qualified user name*.

You must use the following naming conventions for each user account:

- *domain_name\administrator*

- *domain_name\user 1, domain_name\user2, domain_name\userN.*
- *host_name\administrator*
- *host_name\user1, host_name\user2, host_name\userN.*

For example, if the domain name is TPC51, and the user name is db2admin, the Windows domain user account is TPC51\db2admin. The naming convention for a local user account is *host_name\user name*. For example, if the host name is machine2, and the user name is db2admin, the user account is machine2\db2admin. You must enter the fully qualified user names in the common user name field when you install IBM Spectrum Control on computers that are members of a Windows domain.

Installation considerations

As part of your planning process, you must determine which user accounts to use when you install IBM Spectrum Control and Db2, consider the environment and security requirements.

IBM Spectrum Control uses WebSphere Application Server Liberty to authenticate the users for local and domain user accounts. When the computer that hosts the WebSphere Application Server Liberty process is a member of a Windows domain, by default local and domain user registries are used, but the Windows domain user registry takes precedence.

Related reference

[“Adding a computer to the Windows domain” on page 7](#)

Before you can install IBM Spectrum Control in a Windows domain, you must first add the computer on which you plan to install IBM Spectrum Control to the domain.

[“Installing Db2 by using a Windows domain user account” on page 8](#)

Before you install IBM Spectrum Control in a Windows domain, you must install Db2 and register the Db2 license key.

[“Creating a Windows domain common user account for IBM Spectrum Control” on page 9](#)

You must create a Windows domain common user account before you can install IBM Spectrum Control in a Windows domain.

[“Granting Db2 SYSADM authority to a Windows domain user account” on page 10](#)

If a Windows domain user account is used to install IBM Spectrum Control, the user account may not have the Db2 SYSADM authority, because Db2 goes to the domain controller computer to list the groups. Before you install IBM Spectrum Control, you must grant the Windows domain user accounts the Db2 SYSADM authority.

[“Installing IBM Spectrum Control on a Windows domain” on page 70](#)

You can install IBM Spectrum Control and Db2 by using a Windows domain or a local user account.

Adding a computer to the Windows domain

Before you can install IBM Spectrum Control in a Windows domain, you must first add the computer on which you plan to install IBM Spectrum Control to the domain.

You can log on to a computer that is a member of a Windows domain by entering a user name that is prefixed with the domain name. For example, you can enter TPC52\Administrator if you are the domain administrator of the TPC52 domain.

To add a computer to a Windows domain, complete the following steps:

1. Click **Start > Control Panel > Network and Internet > Network and Sharing Center**.
2. On the **Network and Sharing Center** window, click the left mouse button on your local area connection and click **Properties**.
3. Select the **Internet Protocol Version 4 (TCP/IP4)** check box, and click **Properties**.

Tip: If you are using Windows Server 2012, ensure that the **Client for Microsoft Networks** check box is selected.
4. On the **General** tab, select **Use the following DNS server addresses**.
5. In the **Preferred DNS server** field, enter the IP address of the domain controller computer.

6. In the **Alternate DNS server** field, enter the IP address of the alternate DNS server.
7. Click **Advanced**.
8. On the **DNS** tab, review the list of IP addresses.
9. In **DNS suffix for this connection** field, enter the fully qualified domain name.
10. Click **OK**.
11. Right-click **Computer** and select **Properties**.
12. In the Computer name, domain, and workgroup settings section, click **Change settings**.
13. Click **Change**.
14. On the Computer Name/Domain Changes window, select **Domain**, enter the fully qualified domain name, and click **OK**.
15. Enter the user name and password for the domain controller computer.

Important: The user name and password that you enter must be a domain administrator user name and password.

16. Click **OK** for the changes to take effect and to start the computer again.

Verifying that the Netlogon service is running

IBM Spectrum Control uses WebSphere Application Server Liberty to authenticate domain users. WebSphere Application Server Liberty requires that the Microsoft Netlogon service is enabled and running to authenticate these users.

To verify that the **Netlogon** service is running on the domain controller computer and the computer that is a member of a domain, complete the following steps:

1. Right-click **Computer** and select **Manage**.
2. In the navigation tree view, click **Server Manager > Configuration > Services**.
3. Verify that the **Netlogon** service is started.

If the service has a **Stopped/Disabled** status on the domain controller computer, you must also restart the computer that is a member of a Windows domain after you start the service on the domain controller computer.

Installing Db2 by using a Windows domain user account

Before you install IBM Spectrum Control in a Windows domain, you must install Db2 and register the Db2 license key.

The following table shows the privileges that are required for users associated with installing and running Db2 in a Windows domain environment:

<i>Table 4. User privileges related to Db2 in a Windows domain environment</i>	
User role	Required privileges
Installing Db2 on the target Windows domain member machine such that the Db2 instance owner (typically db2admin) is a domain user and the Db2 groups (typically DB2ADMNS and DB2USERS) are domain groups	Local Administrator and Domain Administrator The Db2 installation needs to access and update the Db2 user and group information in the Active Directory that is running on the Windows Domain Controller machine.
Db2 instance owner (typically db2admin) that runs Db2 after Db2 is installed	Local Administrator

Tip: It is recommended that you manually create the Db2 user (the user who will own the Db2 instance that gets created when Db2 is installed, typically *db2admin*), and the Db2 groups (typically *DB2ADMNS* and *DB2USERS*) in the Active Directory on the Domain Controller before you install Db2 on the Windows domain member machine. The Db2 user *must* be a member of both Db2 groups in the Active Directory and a member of the local Administrators group on the Windows domain member machine.

To install Db2 by using a Windows domain user account, complete the following steps:

1. Log on to Windows as a user that has the correct privileges.
2. In Windows Explorer, go to the directory where Db2 installation image is located.
3. Right-click `setup.exe` and select **Run as administrator**.
4. Complete the DB2 Setup program.
5. On the Set user information for the DB2 Administration Server page, in the User Information panel, select your domain.
6. Enter the name of the Db2 user (the user who will own the Db2 instance, typically *db2admin*) that you manually created in the Active Directory on the Domain Controller then enter and confirm the corresponding password.
7. On the Enable operating system security for DB2 objects page, complete the following steps:
 - a. Verify that **Enable operating system security** check box is selected.
 - b. In the DB2 administrators group and DB2 users group sections, select your domain and then enter the names of the Db2 groups that you manually created in the Active Directory on the Domain Controller.
 - c. Click **OK** in the dialog warning you that these groups already exist.

Creating a Windows domain common user account for IBM Spectrum Control

You must create a Windows domain common user account before you can install IBM Spectrum Control in a Windows domain.

To create a domain common user account for IBM Spectrum Control, complete the following steps:

1. Log on to the domain controller computer by using a domain administrator user account.
2. Click **Start > Administrative Tools > Active Directory Users and Computers**.
3. Right-click on the Users folder and select **New > User**.
4. On the domain controller computer, click **Start > All Programs > Administrative Tools > Active Directory Users and Computers**.
5. Right-click on the domain user you created and click **Properties > Member Of**.
6. On the Member of tab, click **Add** and add DB2ADMNS.
7. Click **Check Names**.
8. If the name you entered is located, click **OK**.
9. Repeat steps 4 - 8 and add the DB2USERS group.

Tip: The Domain Users group exists.
10. Follow the prompts to create the domain common user account for IBM Spectrum Control.
11. Log on to the domain client computer on which you want to install IBM Spectrum Control by using a domain administrator user account.

When you log in to computer that is a member of a Windows domain by using the domain administrator user account, and you encounter the 'DB2 UDB SQL5005C System Error' message, complete the following steps:

 - a. Log in to the computer that is a member of a domain by using the local user name.
 - b. Click **Server Manager > Configuration > Local Users and Groups > Groups > DB2ADMNS > Properties > Add**.
 - c. Add *domain\domain user name*.
 - d. Click **Check Names**.
 - e. If the user name that you checked for is underlined, click **Apply**.
12. Open **Server Manager**.
13. In the navigation tree, click **Server Manager > Configuration > Local Users and Groups > Groups**.

14. Add the domain common user name that you created in step 3 (commonid) to the local administrator group.

Restriction: When you install IBM Spectrum Control by using a Windows domain user account, the *sAMAccountName* and *userPrincipalName* (the User login name) Active Directory attributes in the Windows domain user account cannot contain spaces. The *sAMAccountName* must have the same value as the part of the *userPrincipalName* Active Directory attribute that precedes the @ character.

Granting Db2 SYSADM authority to a Windows domain user account

If a Windows domain user account is used to install IBM Spectrum Control, the user account may not have the Db2 SYSADM authority, because Db2 goes to the domain controller computer to list the groups. Before you install IBM Spectrum Control, you must grant the Windows domain user accounts the Db2 SYSADM authority.

To enter the commands, and Db2 SYSADM authority, complete the following steps:

1. Click **Start > Command Prompt**.
2. Right-click **Command Prompt** and select **Run as administrator**.
3. Enter these commands:

```
db2cmd
db2set -g DB2_GRP_LOOKUP=local,TOKENLOCAL
db2 force application all
db2stop
db2start
db2set -all
```

After you run the commands, you can log in to IBM Spectrum Control by using a user account that has Db2 SYSADM authority.

If you are logged in by using your Windows domain user account, you may not have the authorization to run the `db2 force application all` command.

Important: When you grant Db2 SYSADM authority, and the **db2 force application all** command does not work, you can enter the **db2stop** command instead of the **db2 force application all** command.

For more information about acquiring user group information in the Windows operating system, see [Using an access token to acquire users' group information \(Windows\)](#).

For more information about the **sysadmin_group** parameter, see [System administration authority \(SYSADM\)](#).

Related reference

[“Installing IBM Spectrum Control on a Windows domain” on page 70](#)

You can install IBM Spectrum Control and Db2 by using a Windows domain or a local user account.

Required user privileges in installation scenarios

When you are planning to install IBM Spectrum Control, there are users to consider for the installation.

These are the users to consider:

Application administrator

The user who logs in to the operating system and does the installation of IBM Spectrum Control.

Common user

The user that you set during the installation of IBM Spectrum Control. The user name that is used to run IBM Spectrum Control.

Db2® user

The user that you set during the installation of IBM Spectrum Control. The user name that is used to install and operate the database repository for IBM Spectrum Control.

There are user privileges that are required in various IBM Spectrum Control installation scenarios.

Important: The required user privileges for Common User and Db2 user *cannot* be changed or removed after you complete the installation of IBM Spectrum Control. You can change the required user privileges for the Application administrator after that user completes the installation of IBM Spectrum Control, but only if the Application administrator is *not* set as the Common User or Db2 user in IBM Spectrum Control.

The following table shows the required user privileges in IBM Spectrum Control installation scenarios:

Table 5. Required user privileges for an IBM Spectrum Control installation	
Installation scenario	Required privilege
Setting <i>only</i> the Common User, single-server installation, <i>not</i> in a Windows domain environment	<p>Application administrator:</p> <p>Windows operating system: You must be an Administrator and must have the <i>Debug programs</i> privilege and must <i>not</i> have the <i>Deny access to this computer from the network</i> privilege in the Windows operating system security policy. These privileges can be found in Administrative Tools -> Local Security Policy -> Local Policies -> User Rights Assignment</p> <p>Linux operating system: You must be a root user or a non-root user with sudo privileges.</p> <p>AIX operating system: You must be a root user or a non-root user with sudo privileges.</p> <p>Common user:</p> <p>Windows operating system: A member of the local Administrators group, a member of the local DB2 groups (typically DB2ADMNS and DB2USERS).</p> <p>Linux operating system: A member of the root group, a member of the DB2 group (typically db2iadm1).</p> <p>AIX® operating system: member of the system group, member of the DB2 group (typically db2iadm1).</p>

Table 5. Required user privileges for an IBM Spectrum Control installation (continued)

Installation scenario	Required privilege
<p>Setting the Common User and Db2 user, single-server installation, <i>not</i> a Windows domain environment</p>	<p>Application administrator:</p> <p>Windows operating system: You must be an Administrator and must have the <i>Debug programs</i> privilege and must <i>not</i> have the <i>Deny access to this computer from the network</i> privilege in the Windows operating system security policy. These privileges can be found in Administrative Tools -> Local Security Policy -> Local Policies -> User Rights Assignment</p> <p>Linux operating system: You must be a root user or a non-root user with sudo privileges.</p> <p>AIX operating system: You must be a root user or a non-root user with sudo privileges.</p> <p>Common User:</p> <p>Windows operating system: A member of the local Administrators group.</p> <p>Linux operating system: A member of the root group.</p> <p>AIX operating system: A member of the system group.</p> <p>Db2 user:</p> <p>Windows operating system: A member of the local DB2 groups (typically DB2ADMNS and DB2USERS).</p> <p>Linux operating system: A member of the DB2 group (typically db2iadm1).</p> <p>AIX operating system: A member of the DB2 group (typically db2iadm1).</p>
<p>Setting <i>only</i> the Common User, single-server installation, in a Windows domain environment with Db2 installed so the Db2 instance owner (typically db2admin) is a domain user and the Db2 groups (typically DB2ADMNS and DB2USERS) are domain groups.</p>	<p>Application administrator:</p> <p>You must be an Administrator and must have the <i>Debug programs</i> privilege and must <i>not</i> have the <i>Deny access to this computer from the network</i> privilege in the Windows operating system security policy. These privileges can be found in Administrative Tools -> Local Security Policy -> Local Policies -> User Rights Assignment</p> <p>Common user:</p> <p>A member of the local Administrators group, a member of the domain DB2 groups (typically DB2ADMNS and DB2USERS; these groups are stored in the domain Active Directory).</p>

Table 5. Required user privileges for an IBM Spectrum Control installation (continued)

Installation scenario	Required privilege
<p>Setting the Common User and Db2 user, single-server installation, in a Windows domain environment with Db2 installed so the Db2 instance owner (typically db2admin) is a domain user and the Db2 groups (typically DB2ADMNS and DB2USERS) are domain groups.</p>	<p>Application administrator:</p> <p>You must be an Administrator and must have the <i>Debug programs</i> privilege and must <i>not</i> have the <i>Deny access to this computer from the network</i> privilege in the Windows operating system security policy. These privileges can be found in Administrative Tools -> Local Security Policy -> Local Policies -> User Rights Assignment</p> <p>Common User: A member of the local Administrators group.</p> <p>Db2 user: A member of the domain DB2 groups (typically DB2ADMNS and DB2USERS; these groups are stored in the domain Active Directory).</p>
<p>Setting <i>only</i> the Db2 user, multiple server installation (Database repository), <i>not</i> in a Windows domain environment.</p>	<p>Application administrator:</p> <p>Windows operating system:</p> <p>You must be an Administrator and must have the <i>Debug programs</i> privilege and must <i>not</i> have the <i>Deny access to this computer from the network</i> privilege in the Windows operating system security policy. These privileges can be found in Administrative Tools -> Local Security Policy -> Local Policies -> User Rights Assignment</p> <p>Linux operating system: Must be a root user or a non-root user with sudo privileges.</p> <p>AIX operating system: Must be a root user or a non-root user with sudo privileges</p> <p>Db2 user:</p> <p>Windows operating system: A member of the local DB2 groups (typically DB2ADMNS and DB2USERS).</p> <p>Linux operating system: A member of the DB2 group (typically db2iadm1).</p> <p>AIX operating system: A member of the DB2 group (typically db2iadm1).</p>

Table 5. Required user privileges for an IBM Spectrum Control installation (continued)

Installation scenario	Required privilege
Setting <i>only</i> the Common User, multiple server installation (IBM Spectrum Control Servers), <i>not</i> in a Windows domain environment.	<p>Application administrator:</p> <p>Windows operating system:</p> <p>You must be an Administrator and must have the <i>Debug programs</i> privilege and must <i>not</i> have the <i>Deny access to this computer from the network</i> privilege in the Windows operating system security policy. These privileges can be found in Administrative Tools -> Local Security Policy -> Local Policies -> User Rights Assignment</p> <p>Linux operating system: Must be a root user or a non-root user with sudo privileges.</p> <p>AIX operating system: Must be a root user or a non-root user with sudo privileges.</p> <p>Common user:</p> <p>Windows operating system: A member of the local Administrators group.</p> <p>Linux operating system: A member of the root group.</p> <p>AIX operating system: A member of the system group.</p>
Setting <i>only</i> the Db2 user, multiple server installation (Database repository), in a Windows domain environment with Db2 installed so the Db2 instance owner (typically db2admin) is a domain user and the Db2 groups (typically DB2ADMNS and DB2USERS) are domain groups.	<p>Application administrator:</p> <p>You must be an Administrator and must have the <i>Debug programs</i> privilege and must <i>not</i> have the <i>Deny access to this computer from the network</i> privilege in the Windows operating system security policy. These privileges can be found in Administrative Tools -> Local Security Policy -> Local Policies -> User Rights Assignment</p> <p>Db2 user:</p> <p>A member of the domain DB2 groups (typically DB2ADMNS and DB2USERS; these groups are stored in the domain Active Directory).</p>
Setting <i>only</i> the Common User, multiple server installation (IBM Spectrum Control Servers), in a Windows domain environment.	<p>Application administrator:</p> <p>You must be an Administrator and must have the <i>Debug programs</i> privilege and must <i>not</i> have the <i>Deny access to this computer from the network</i> privilege in the Windows operating system security policy. These privileges can be found in Administrative Tools -> Local Security Policy -> Local Policies -> User Rights Assignment</p> <p>Common user:</p> <p>A member of the local Administrators group.</p>

Planning for configuration

Use this information to plan your IBM Spectrum Control environment. The information includes general configuration guidelines, TCP/IP ports, user names and user rights, and SMI-S support.

Planning for capacity

The following guidelines can help you determine the capacity for IBM Spectrum Control.

Consider the following guidelines when you determine your capacity requirements:

Database repository

For best performance, install the database repository across multiple physical disks, either through operating system striping or hardware RAID. You must have a minimum of three disks that are separate from the location of the IBM Spectrum Control host server's operating system and the directory of the IBM Spectrum Control product installation.

IBM Spectrum Control server

The IBM Spectrum Control server must meet the following requirements:

- The IBM Spectrum Control server must have dual 3.2 GHz processors with a minimum of 8 GB of random access memory (RAM).
- The IBM Spectrum Control server must be a dedicated computer for IBM Spectrum Control operations and not shared with other applications.
- Paging space: On AIX operating systems, the paging space must be at least half or, if possible, the same amount as the physical memory. You must periodically monitor paging space usage by running the `lsps -s` command and increasing the space if the percentage used is higher than 50%.

LSI SMI-S Provider

IBM Spectrum Control supports up to five storage systems with the LSI SMI-S Provider 1.3 or later.

Planning for IBM Spectrum Control authentication and authorization

An operating system user name is required to install and log on to IBM Spectrum Control for the first time. After you install IBM Spectrum Control, you can assign roles to users. Roles determine the product functions that are available to users.

User requirements for installing IBM Spectrum Control

The user name that you use when you run the IBM Spectrum Control installation program must belong to the following operating system groups. The user that you define as the common user during the IBM Spectrum Control installation must also belong to these groups. The IBM Spectrum Control installation program automatically maps these groups to the IBM Spectrum Control Administrator role.

Table 6. Operating system groups that are mapped to the Administrator role	
Operating System	Group
Windows	Administrators
AIX	system
Linux	root

The user name that is used to install the database repository must belong to one of the following Db2 groups. The user name that is used to install the database repository depends on your installation configuration. For example, if you installed IBM Spectrum Control on a single server and you did not enter separate user information for Db2, the database repository is installed by using the common user name. Therefore, the common user must have these Db2 privileges.

Table 7. Db2 groups that are required to install the database repository	
Operating System	Group
Windows	DB2ADMNS
AIX and Linux	db2iadm1

The IBM Spectrum Control installation program establishes a default authentication configuration by using the federated repositories feature of the WebSphere Application Server Liberty.

If you want to change the user authentication configuration, see http://www.ibm.com/support/knowledgecenter/SS5R93_5.4.1/com.ibm.spectrum.sc.doc/fqz0_c_change_user_auth_method.html.

For more information about installing IBM Spectrum Control on a Windows domain, see [“Planning to install IBM Spectrum Control in a Windows domain” on page 6](#) and [“Installing IBM Spectrum Control on a Windows domain” on page 70](#).

Defining roles for IBM Spectrum Control

After you install IBM Spectrum Control, you can assign roles for IBM Spectrum Control users. These roles are predefined in IBM Spectrum Control and are assigned at the group level. The role determines the authorization level for the users who are in the group. The authorization level determines the functions in IBM Spectrum Control that the user can access.

For example, if a user is in a group that is assigned to the Administrator role, the user has full access to all IBM Spectrum Control functions. However, if a user is in a group that is assigned to the Monitor role, the user has access to only a limited set of functions.

For more information about working with roles and groups, see [Role-based authorization](#).

User names and passwords

Several user names and passwords are required to install, configure, and use IBM Spectrum Control. There are also some requirements and limitations that you must understand before you install IBM Spectrum Control.

A worksheet is also provided to help you plan and document the user names and passwords that you use with IBM Spectrum Control. Keep the completed worksheet in a safe, secure place. Before you install IBM Spectrum Control, you must understand your local security policies and requirements. These policies can impose certain standards that you must consider when you create user names and passwords to comply with requirements.

Related reference

[“User name and password requirements” on page 16](#)

This information helps you create valid user names and passwords for IBM Spectrum Control and understand any special character restrictions.

[“Db2 user names and passwords” on page 19](#)

These are the rules for using Db2 user names and passwords.

[“Worksheet for user names and passwords” on page 23](#)

Use this worksheet to document the user names and passwords that you create when you install and administer IBM Spectrum Control. Space is provided for you to list more user names and passwords that you create when you configure more devices in IBM Spectrum Control.

User name and password requirements

This information helps you create valid user names and passwords for IBM Spectrum Control and understand any special character restrictions.

[Table 1](#) lists the user names and passwords that are used with IBM Spectrum Control and specifies the following criteria:

- User names must be local or a Windows domain account or an LDAP account

Restriction: If you use LDAP, IBM Spectrum Control must be configured for LDAP authentication.

- Valid user name characters must comply with the minimum and maximum length requirements
- Valid password characters must comply with the minimum and maximum length requirements

Restriction: If the IBM Spectrum Control common user name is the same as the IBM Spectrum Control Db2 user name (for example, if you did not use a custom Db2 user name to install IBM Spectrum Control), the corresponding password must be valid as a Db2 password and as a WebSphere Liberty password. For more information about valid Db2 and WebSphere Liberty passwords, see [Table 8 on page 17](#). This restriction applies during a IBM Spectrum Control installation and when you use the IBM Spectrum Control change password tool.

For more information about setting passwords on the Windows operating system, see the see the Microsoft Windows Dev Center - Desktop website at <http://msdn.microsoft.com/en-us/library/windows/desktop/ms675092%28v=vs.85%29.aspx>. Search for the *SAM-Account-Name* attribute.

Table 8. Valid characters for user names and passwords			
User name and password for	Windows domain OK?	LDAP OK?	Valid characters
IBM Spectrum Control installation	Yes	No	Not applicable
IBM Spectrum Control common user	Yes Restriction: You must follow these naming conventions: <ul style="list-style-type: none"> • Windows domain user name: <i>domain_name \user_name format</i> • Local user name: <i>machine_name \username format</i> 	No	<ul style="list-style-type: none"> • A through Z (uppercase characters) • a through z (lowercase characters) • 0 through 9 (numeric characters) • Special characters: '_' and '~' <p>Restriction: The user name cannot contain spaces, \$ and ! signs, must have at least 1 character and must not start with a number or underscore. On Windows operating systems, the only valid special characters are ` , ~ , # , % , ^ , (,) , - , _ , { , } , ' , and .</p>
IBM Spectrum Control common user passwords	Yes	Yes	<ul style="list-style-type: none"> • A through Z (uppercase characters) • a through z (lowercase characters) • 0 through 9 (numeric characters) • Special characters: [,] , ? , ` , ~ , ! , (,) , - , _ , * , % , + , and . <p>Restriction: Passwords cannot contain spaces, must have at least 1 character and must not start with a number, dash character {-}, or underscore.</p>

Table 8. Valid characters for user names and passwords (continued)

User name and password for	Windows domain OK?	LDAP OK?	Valid characters
Db2 administrator, Db2 user	Yes Restriction: You must follow these naming conventions: <ul style="list-style-type: none">Windows domain user name: <i>domain_name \user_name format</i>Local user name: <i>machine_name \username format</i>	Yes	<ul style="list-style-type: none">A through Z (uppercase characters)a through z (lowercase characters)0 through 9 (numeric characters)Special characters: ~, @, #, %, ^, -, (), _, { }". Restriction: User names and passwords cannot contain spaces and must have at least 1 character. User names also must not start with a number or underscore
Db2 passwords	Yes	Yes	<ul style="list-style-type: none">A through Z (uppercase characters)a through z (lowercase characters)0 through 9 (numeric characters)Special characters: \$, ~, @, #, (), -, _, { }, [], ?, *, %, +, and . Restriction: Passwords cannot contain spaces, must have at least 1 character and must not start with a number or underscore.
NAS Filer user name	No	No	<ul style="list-style-type: none">A through Z (uppercase characters)a through z (lowercase characters)0 through 9 (numeric characters)Special characters: ` ~ # % ^ & () - _ { } ' . Restriction: User names and passwords cannot contain spaces and must have at least 1 character.

Table 8. Valid characters for user names and passwords (continued)

User name and password for	Windows domain OK?	LDAP OK?	Valid characters
NAS Filer password	No	No	<ul style="list-style-type: none"> • A through Z (uppercase characters) • a through z (lowercase characters) • 0 through 9 (numeric characters) • Special characters: ` ~ @ # % ^ & * () - _ = + [] { } \ ; : ' " , . < > / ? <p>Restriction: User names and passwords cannot contain spaces and must have at least 1 character.</p>

Password restrictions for monitored resources:

- Cisco switches: The password that IBM Spectrum Control uses to connect to a Cisco switch can't contain these special characters: < >.
- XIV storage systems: The password that IBM Spectrum Control uses to connect to an XIV storage system can't contain this special character: &.

Db2 user names and passwords

These are the rules for using Db2 user names and passwords.

Db2 user names and passwords must follow these rules:

- UNIX user names and passwords cannot be more than eight characters long. They cannot begin with a numeric digit or end with \$.
- Group and instance names can contain 1 to 8 characters.
- Names cannot be any of the following:
 - USERS
 - ADMINS
 - GUESTS
 - PUBLIC
 - LOCAL
- Names cannot begin with:
 - IBM
 - SQL
 - SYS
- Names cannot include accented characters.
- UNIX users, groups, and instance names must be lowercase.

Required user roles for monitoring resources

When you add storage systems, switches, and hypervisors for monitoring, you must provide a user name and password for logging in to those resources. The role or user group that is assigned to the user name determines the data collection and storage functions that you can use.

The following roles are associated with the user names that IBM Spectrum Control uses to log in to resources. Specify user names when you add a resource for monitoring. These roles are different from IBM Spectrum Control roles, which are assigned to users that log in to IBM Spectrum Control. For more information about IBM Spectrum Control roles, see [Role-based authorization](#).

Any roles that are not listed, but include the privileges of the roles that are listed, can also be used for monitoring resources.

<i>Table 9. Required roles for storage system, switch, and hypervisor users</i>			
Resource	Required role for performance monitors	Required role for probes	Required role for provisioning, optimizing, and transforming
DS8000	Monitor role or higher	Monitor role or higher	Administrator, Physical operator, or Logical operator
SAN Volume Controller	For versions earlier than 8.3.1.2, Administrator, or SecurityAdmin. For version 8.3.1.2 or later, any role but some limitations might apply.	Monitor role or higher	Administrator
Storwize V3500 Storwize V3700 Storwize V5000 Storwize V7000	For versions earlier than 8.3.1.2, Administrator, or SecurityAdmin. For version 8.3.1.2 or later, any role but some limitations might apply.	Monitor role or higher	Administrator
Storwize V7000 Unified (block storage)	Administrator	Monitor role or higher	Administrator
FlashSystem 5000 FlashSystem 5100 FlashSystem 7200 FlashSystem 9100 FlashSystem 9200 FlashSystem V840 FlashSystem V9000	For versions earlier than 8.3.1.2, Administrator, or SecurityAdmin. For version 8.3.1.2 or later, any role but some limitations might apply.	Monitor role or higher	Administrator
IBM Spectrum Virtualize for Public Cloud	For versions earlier than 8.3.1.2, Administrator, or SecurityAdmin. For version 8.3.1.2 or later, any role but some limitations might apply.	Monitor role or higher	Administrator

Table 9. Required roles for storage system, switch, and hypervisor users (continued)

Resource	Required role for performance monitors	Required role for probes	Required role for provisioning, optimizing, and transforming
Storwize V7000 Unified (file storage)	Performance monitoring is not available	Monitor	Administrator, or Export Administrator + Storage Administrator.
XIV	Monitor role or higher	Any role	Storage administrator
IBM Spectrum Accelerate IBM FlashSystem A9000 IBM FlashSystem A9000R	Monitor role or higher	Any role	Not available
IBM FlashSystem 840 IBM FlashSystem 900	Monitor role or higher	Monitor role or higher	Not available
IBM Spectrum Scale (file storage)	Any role	Root or non-root*	Not available
IBM Spectrum Scale (object storage)	Performance monitoring is not available	The Keystone admin role. Information is collected only for the object storage accounts and containers that the user has access to. If you want to monitor all accounts and containers, the user must also be assigned the role that is defined in the reseller_admin_role configuration option in the Swift proxy server. The default value for the reseller_admin_role option is ResellerAdmin.	Not available
IBM Cloud Object Storage	Performance monitoring is not available	Operator, System Administrator, or Super User role	Not available
Dell EMC storage systems	Operator role or higher	Operator role or higher	Not available

Table 9. Required roles for storage system, switch, and hypervisor users (continued)

Resource	Required role for performance monitors	Required role for probes	Required role for provisioning, optimizing, and transforming
Hitachi storage systems	In Hitachi Device Manager: The user for the Export Tool must have the Storage Administrator (Performance Management) role	In Hitachi Command Suite: View Group or higher	Provisioning is not available
NetApp storage systems	Operator role or higher	Operator role or higher	Not available
Pure storage systems	Role with read-only permission or higher	Role with read-only permission or higher	Not available
Cisco switches	Network-admin	Network-admin	Not applicable
Brocade switches with Fabric OS 8.2.1 or later	User or admin role that has the chassis-role permission	User or admin role that has the chassis-role permission	Not applicable
Brocade switches with a Fabric OS version earlier than 8.2.1	Administrator user in Brocade Network Advisor (BNA)	Administrator user in BNA	Not applicable
Hypervisors (such as ESX, ESXi, and vCenter Servers)	Performance monitoring is not available	A role that has permission to browse through data stores. For example: Administrator role or Virtual Machine Power® User role.	Any role
Rollup servers	Performance monitoring is not available	Administrator	Not available
Note: * You can add IBM Spectrum Scale and GSS systems as a non-root user, but that user must have privileges to run a set of specified administration commands using the sudo command on the cluster node. For more information, see Monitoring without requiring root privileges .			

Worksheet for user names and passwords

Use this worksheet to document the user names and passwords that you create when you install and administer IBM Spectrum Control. Space is provided for you to list more user names and passwords that you create when you configure more devices in IBM Spectrum Control.

Table 10. User names and passwords for a IBM Spectrum Control installation		
Item	Description	Your input
IBM Spectrum Control and Db2 installation user <ul style="list-style-type: none">Windows: local administratorUNIX: root		
Db2 administrator user name and password	The Db2 administrator user name and password are created when you install Db2 and is required to install IBM Spectrum Control. On the Windows operating system, this user name must be a member of the DB2ADMNS group and Administrators group. On UNIX, the user name must be the instance owner of the instance you want to use. This user name and password are created when you install Db2.	
LDAP bind user name	This user name has the authority to log in and connect to the LDAP server for authentication. It is not needed if the LDAP server allows anonymous bind. This user name and password must be provided to you by your LDAP administrator.	
Storage subsystem user name for access from IBM Spectrum Control	This user name is the user name that IBM Spectrum Control uses to log in to a storage device.	
CIMOM or SMI provider login name	This user name has log in access to the CIMOM or SMI provider software that interfaces with a storage device or a switch in a fabric.	
NAS filer user name and password	IBM Spectrum Control uses this user name to log in to a NAS device.	

Related reference

[“User name and password requirements” on page 16](#)

This information helps you create valid user names and passwords for IBM Spectrum Control and understand any special character restrictions.

Ports used by IBM Spectrum Control

When you install IBM Spectrum Control, the ports must be opened through the firewall. You must disable the firewall program or open the ports to allow incoming requests to the IBM Spectrum Control ports. Review these ports before you install IBM Spectrum Control.

IBM Spectrum Control ports used for TCP/IP

Table 1 lists the IBM Spectrum Control default ports.

All ports in Table 1 are configured during installation using the installation program. For a silent mode installation, use the **varTCPPortRangeSP** parameter in the installation response file.

<i>Table 11. IBM Spectrum Control ports used by TCP/IP for incoming communication</i>	
Ports	Component and port information
9549	<p>Data server</p> <p>9549 listens for communications from the Device server, CLI, and Storage Resource agents.</p>
9550-9551 9553 9572	<p>Device server</p> <p>9550-9551 listens for communications from the Data server, Alert server, and Web server.</p> <p>9553 listens for logging commands.</p> <p>9572 listens for IBM WebSphere Application Server Liberty administrative commands.</p>
9556 9570 9571	<p>Alert server</p> <p>9556 listens for communications from the Device server.</p> <p>9570 listens for logging commands.</p> <p>9571 listens for WebSphere Application Server Liberty administrative commands.</p>
9510 9567	<p>Storage Resource agent</p> <p>9510 listens for communications from the Data server if the Storage Resource agent is deployed in daemon mode. The only exception is the Storage Resource agent that is deployed on the IBM Spectrum Control server at installation time, which listens on port 9567 instead.</p> <p>If the Storage Resource agent is deployed in non-daemon mode, the Storage Resource agent does not need any listening ports.</p> <p>The Data server uses RXA to communicate with the Storage Resource agent in non-daemon mode. RXA uses the following default ports for the protocols:</p> <p>22 SSH</p> <p>512 Remote Execution (REXEC)</p> <p>514 Remote Shell (rsh)</p> <p>445 Windows SMB protocol</p> <p>The Storage Resource agent sends responses back to the Data server on port 9549, in both daemon mode and non-daemon mode.</p>

Table 11. IBM Spectrum Control ports used by TCP/IP for incoming communication (continued)	
Ports	Component and port information
9554 9568 9569	<p>Web server</p> <p>9554 is used by WebSphere Application Server Liberty.</p> <p>The following ports are used for the GUI:</p> <ul style="list-style-type: none"> • 9568 (non-secure) • 9569 (secure) <p>9569 is used for the REST API.</p>
9562	<p>Export server</p> <p>9562 listens for communications from the Web server.</p>
50000	<p>Db2</p> <p>By default, Db2 listens on port 50000 for communication from IBM Spectrum Control and other clients. This default port can be changed only during the Db2 installation.</p>

Restrictions: The following restrictions apply to the ports that are listed in [Table 11 on page 24](#):

- The ports apply only to a fresh installation of IBM Spectrum Control. If you upgrade from an earlier version of IBM Spectrum Control that used different ports, those ports are reused for your installation.
- The ports are used for incoming communication and are configured during installation. *Do not* change these ports after your installation is complete.

Table 12. List of IP ports that are used by IBM Spectrum Control

Resource and ports	Port information
<p>Resources that run IBM Spectrum Virtualize</p> <p>Ports: 22, 5989 (both unidirectional)</p>	<p>For native interface:</p> <ul style="list-style-type: none"> • 22 listens for SSH communication from IBM Spectrum Control. • 5989 listens for other communication from IBM Spectrum Control. You can upload the SSH key once at setup time using the 5989 port. <p>By default, the IBM Spectrum Control Device server creates a connection between a IBM Spectrum Virtualize resource and a local port to listen for events from the IBM Spectrum Virtualize resource. The default range is 49152 to 65535. These ports are on the Device server only; you do not need to configure the firewall for them. The ports are used for a SSH tunnel to connect to the event port on the IBM Spectrum Virtualize resource. All communication to the IBM Spectrum Virtualize resource runs through the SSH connection. No other ports need to be open for IBM Spectrum Virtualize events.</p> <p>To change to a custom port range, use the CLI setdscfg command to change the values of the following parameters:</p> <ul style="list-style-type: none"> • NAPI.SVCEventListenerLPortBase • NAPI.SVCEventListenerLPortMax <p>After resetting the value, restart the Device server.</p> <p>For example, to set the range from 50100 to 65000, run these commands from the <i>installation_dir/cli/</i> subdirectory:</p> <p>For Windows operating system:</p> <pre>tpctool.bat setdscfg -user <user name> -pwd <password></pre> <pre>-property NAPI.SVCEventListenerLPortBase 50100</pre> <pre>tpctool.bat setdscfg -user <user name> -pwd <password></pre> <pre>-property NAPI.SVCEventListenerLPortMax 65000</pre> <p>For AIX and Linux operating systems:</p> <pre>./tpctool.sh setdscfg -user <user name> -pwd <password></pre> <pre>-property NAPI.SVCEventListenerLPortBase 50100</pre> <pre>./tpctool.sh setdscfg -user <user name> -pwd <password></pre> <pre>-property NAPI.SVCEventListenerLPortMax 65000</pre>

Table 12. List of IP ports that are used by IBM Spectrum Control (continued)

Resource and ports	Port information
FlashSystem 840 FlashSystem 900 Ports: 22, 5989, 161 (UDP) (all unidirectional)	For native interface: <ul style="list-style-type: none"> • 22 listens for SSH communication from IBM Spectrum Control. • 5989 listens for other communication from IBM Spectrum Control. You can upload the SSH key once at setup time using the 5989 port. For SNMP: <ul style="list-style-type: none"> • 161 (UDP) listens for SNMP communications from IBM Spectrum Control for performance monitoring. • The SNMP agent must be enabled for a storage system before IBM Spectrum Control can collect its performance data.
DS8000 Ports: 1751, 1750, 1755 (all bidirectional) Ports: 8451, 8452 (both unidirectional)	Native interface: 1751 (default) listens for communication from IBM Spectrum Control and other clients. If 1751 is unavailable, uses 1750. 1751 (default) sends hardware management console (HMC) information and events to IBM Spectrum Control. If 1751 is unavailable, uses 1750. 1755 sends and receives data for HTC when logs are being offloaded. 8451, 8452 DS8000 listens on these ports for communication with the DS8000 GUI.
<ul style="list-style-type: none"> • IBM XIV Storage System • IBM Spectrum Accelerate • FlashSystem A9000 • FlashSystem A9000R Port: 7778 (bidirectional)	The storage systems listen for communication from IBM Spectrum Control and other clients, and also send communications to IBM Spectrum Control.
IBM Spectrum Scale <ul style="list-style-type: none"> • File storage ports: 22, 9084 (both unidirectional) • Object storage ports: 5000, 8080, 35357 (all unidirectional) 	<ul style="list-style-type: none"> • File storage: <ul style="list-style-type: none"> – 22 listens for SSH communication from IBM Spectrum Control. – 9084 listens for performance data collection on the IBM Spectrum Scale cluster node where the collector component is running. <p>Important: Ensure that the queryinterface property is set to "0.0.0.0" in the /opt/IBM/zimon/ZIMonCollector.cfg file on the cluster node.</p> • Object storage: <ul style="list-style-type: none"> – 5000, 8080, 35357 listen for data about any object storage or OpenStack Swift configurations on the IBM Spectrum Scale cluster node where the collector component is running.
IBM Cloud Object Storage Port: 443 (unidirectional)	443 listens for HTTPS communication from IBM Spectrum Control.
Dell EMC Unity Port: 443 (unidirectional)	443 listens for communication from IBM Spectrum Control.

Table 12. List of IP ports that are used by IBM Spectrum Control (continued)

Resource and ports	Port information
Other Dell EMC storage systems Port: 5991 (unidirectional)	<p>5991 listens for events that are coming from Dell EMC CIMOMs .</p> <p>To change this port, use the CLI setdscfg command and change the value for the Event.ListenerPort parameter. Then, restart the Device server.</p> <p>For example, to set the port to 7200, run this command from the <i>installation_dir/cli/</i> subdirectory:</p> <p>For Windows operating system:</p> <pre>tpctool.bat setdscfg -user <user name> -pwd <password></pre> <pre>-property Event.ListenerPort 7200</pre> <p>For AIX and Linux operating systems:</p> <pre>./tpctool.sh setdscfg -user <user name> -pwd <password></pre> <pre>-property Event.ListenerPort 7200</pre> <p>You can also modify the protocol for listening to events that are coming from Dell EMC CIMOMs. By default, this protocol is set http.</p> <p>To change this protocol, use the CLI setdscfg command and change the value for the Event.ListenerProtocol parameter. Then, restart the External Process component.</p> <p>For example, to set the protocol to https, run this command from the <i>installation_dir/cli/</i> subdirectory:</p> <p>For Windows operating system:</p> <pre>tpctool.bat setdscfg -user <user name> -pwd <password></pre> <pre>-property Event.ListenerProtocol https</pre> <p>For AIX and Linux operating systems:</p> <pre>./tpctool.sh setdscfg -user <user name> -pwd <password></pre> <pre>-property Event.ListenerProtocol https</pre>
Hitachi VSP storage systems: <ul style="list-style-type: none"> • Hitachi Command Suite: Port: 2443 (unidirectional) • Hitachi Device Manager: Port: 2443 (unidirectional) 	2443 listens for communication from IBM Spectrum Control.
NetApp ONTAP 9 Port: 22 (unidirectional)	22 listens for communication from IBM Spectrum Control.

Table 12. List of IP ports that are used by IBM Spectrum Control (continued)

Resource and ports	Port information
Other NetApp storage systems Port: 80 (unidirectional)	80 listens for communication from IBM Spectrum Control using the NetApp Data ONTAP API (NAPI), if the storage system is a file storage system. If the NetApp storage system is a block storage system, the CIM agent ports are used to listen for communication from the Device server.
Pure storage systems Port: 443 (unidirectional)	443 listens for communication from IBM Spectrum Control.
SMI-S providers and CIM agents for switches and managed storage systems Ports: 5988, 5989, 5990 (unidirectional)	5988 listens for non-secure communication from the Device server. 5989 listens for secure communication from the Device server. 5990 IBM Spectrum Control listens on this port for events coming from CIM agents for managed storage systems. To change the port that IBM Spectrum Control uses to listen for events coming from CIM agents for managed storage systems, use the CLI setdscfg command. Change the value for the Indication.PermanentListenerPort parameter then restart the Device server. For example, to set the port to 7100, run this command from the <i>installation_dir/cli/</i> subdirectory: For Windows operating system: <pre>tpctool.bat setdscfg -user <user name> -pwd <password></pre> <pre>-property Indication.PermanentListenerPort 7100</pre> For AIX and Linux operating systems: <pre>./tpctool.sh setdscfg -user <user name> -pwd <password></pre> <pre>-property Indication.PermanentListenerPort 7100</pre>
Brocade switches, Fabric OS 8.2.1 and later Ports: 80, 443 (unidirectional)	80 listens for HTTP communication from IBM Spectrum Control. 443 listens for HTTPS communication from IBM Spectrum Control.

Table 12. List of IP ports that are used by IBM Spectrum Control (continued)

Resource and ports	Port information
IBM Spectrum Control Device server Ports: 162 (UDP), 5960 (UDP), (both unidirectional) Ports: 49152 (UDP) (bidirectional)	162 (UDP) listens for SNMP traps coming from managed storage systems. 5960 (UDP) listens for forwarded SNMP messages. 49152 (UDP) IBM Spectrum Control uses this port to forward SNMP traps. To change these ports, use these steps: 1. Log on to IBM Spectrum Control as a user with administrative privileges. 2. Stop the Device server. 3. Create a backup of the <i>installation_dir/device/conf/user.properties</i> file. 4. Change the parameter that corresponds to the port to an available port number and save the file. 162 SnmpTrapPort 5960 SnmpForwardedTrapListeningPort 49152 SnmpForwardingPort 5. Start the Device server.
All monitored resources 7 (ECHO port) (bidirectional)	Before you can discover resources, ensure that port 7 (ECHO port) is open on the resources, and Internet Control Message Protocol (ICMP) is available.

Related information

[setdscfg command](#)

[Starting and stopping the IBM Spectrum Control servers](#)

Planning for multipath subsystem device drivers

The subsystem device driver (SDD) is a software solution for multiple configuration environments in supported storage resources.

The subsystem device driver is installed on a host system with the native disk-device driver and provides the following functions:

- Enhanced data availability
- Dynamic input/output (I/O) load balancing across multiple paths
- Automatic path failover protection
- You can download licensed machine code at the same time that applications are running

For the most current support for multipath subsystem device drivers, go to [IBM Spectrum Control - Platform Support: Agents, Servers and Browsers - Multipathing section](#).

Note:

1. The AIX SDD cannot coexist with SDDPCM on the same system.
2. The Linux SDD driver is no longer available. Starting with Red Hat Enterprise Linux 5 and SUSE Linux Enterprise Server 10, only the DM_Multipath is available.

3. The SDD driver is no longer supported on HP, starting with HP-UX 11i 3 with Itanium®.

For more information about multipath subsystem device drivers, see <https://www.ibm.com/support/pages/node/651823>.

For more information about how to install, configure, and use the subsystem device drivers, see <https://www.ibm.com/support/pages/node/651689>.

Upgrading subsystem device drivers

SDD drivers cannot coexist on the same host with the SDDPCM, SDDDSM, or DM_Multiplath drivers. You must upgrade from the existing SDD drivers to the SDDPCM or SDDDSM driver. Part of the upgrade process is to unconfigure and remove all SDD vpath devices. After the upgrade and configuration of the devices, the device names might differ from the previous names. Each device is detected by IBM Spectrum Control as a new device. For information about how to upgrade SDD, see <http://www.ibm.com/support/docview.wss?rs=540&context=ST52G7&uid=ssg1S7000303>.

Dell EMC PowerPath Multipathing

Dell EMC PowerPath Multipathing supports a wide range of servers including cluster servers connected to Dell EMC storage systems. It tunes your storage area network and selects alternate paths for your data if necessary. It also integrates multiple path I/O capabilities, automatic load balancing, and path failover functions. For more information about Dell EMC PowerPath Multipathing, see <http://www.dellemc.com>. Search for **PowerPath**.

Planning for Storage Resource agents

Use Storage Resource agents to collect asset and configuration information about servers.

You can deploy Storage Resource agents from the IBM Spectrum Control GUI. You must have administrative privileges to deploy Storage Resource agents.

To deploy a Storage Resource agent from the GUI, go to **Servers > Servers**. Click **Add Server**, select **Deploy an agent for full server monitoring**, and select a method for adding a server. You can add a single server by manually entering server information or you can add multiple servers by importing configuration information from a file. If you add multiple servers, a time span is calculated during which the agents are deployed. The agents are deployed at regular intervals during the time span to avoid excessive load on the IBM Spectrum Control server.

For more information about deploying a Storage Resource agent, go to the product documentation at http://www.ibm.com/support/knowledgecenter/SS5R93_5.4.1/com.ibm.spectrum.sc.doc/fqz0_r_native_agents_deployment_considerations.html.

Protocol support for Storage Resource agents

When installing the Storage Resource agent, IBM Spectrum Control uses specific protocols for connectivity between the server and agent.

When installing the Storage Resource agent, IBM Spectrum Control uses the following protocol for connectivity between the server and agent (listed in order):

1. Secure Shell protocol (SSH).
2. Windows server message block protocol (SMB protocol).
3. Remote execution protocol (REXEC).
4. Remote shell protocol (RSH).

At run time, the connectivity that is used between the server and agent depends on the type of service that is running: On-Demand service (non-daemon service) or run as a service (daemon service).

On-Demand service (non-daemon service)

In this case, connectivity between the server and agent is established by using the same protocols as for installation of the agent: SSH, SMB, REXEC, or RSH.

run as a service (daemon service)

In this case, connectivity between the server and agent is established by using the secured socket connection. The server and agent have their respective certificates and no additional information is needed besides the certificates and the security that is provided by the SSH protocol.

Note: Running the Storage Resource agent in daemon mode requires only one socket connection to be open and thus simplifies any firewall rules that might be in place. However, the daemon mode always consumes resources (although a very small amount) when idle. In non-daemon mode, the Storage Resource agent only consumes resources when actively working for the IBM Spectrum Control server. Because the non-daemon mode uses the RXA protocol, additional firewall ports and security configuration are required.

The information required for these protocols is as follows:

SSH protocol

There are two cases where you can use the SSH protocol:

- You supply the user ID and password to connect to the server by using the SSH protocol. This user ID must have administrative privileges.
- You supply a user ID, certificate, and passphrase. You create the certificate and use that certificate when you connect to the agent. This certificate must be accessible from the server.

For information about how to create a certificate for SSH protocol connectivity, go to the documentation at http://www.ibm.com/support/knowledgecenter/SS5R93_5.4.1/com.ibm.spectrum.sc.doc/fqz0_r_create_certificate_ssh.html. This information uses Cygwin for the Storage Resource agent.

Windows SMB protocol

You supply the user ID and password. The user ID must have administrative privileges. You must also enable **File & Printer Sharing for Microsoft Windows** under **Network Properties** for the connected network adapter. Make sure that the Server service is running on the system.

REXEC protocol

You supply the user ID and password. The user ID must have administrative privileges. The system must be enabled for remote execution of commands.

RSH protocol

You supply the user ID with administrative privileges. The system must be enabled for the user to be able to run commands through the remote shell.

To enable RSH, edit the `.rhosts` file in the login directory of the user. The `rhosts` file provides access for the user to connect from a remote system.

If you elect to use a Microsoft directory, you can also get a list of domain computers. You are required to enter the domain controller, user ID, password, and certificate location. After the list is displayed, you can select a list of computers on which to deploy the agent.

After the agent is deployed, a probe job is automatically run.

The agent that is deployed on a Windows system has its registry information in the Windows registry. For UNIX or Linux, the registry information is stored in the following file: `/etc/Tivoli/TSRM/registryNA`.

For more information about setting up the environment for deploying a Storage Resource agent, go to IBM Knowledge Center at http://www.ibm.com/support/knowledgecenter/SS5R93_5.4.1/com.ibm.spectrum.sc.doc/fqz0_r_native_agents_deployment_considerations.html.

Planning for Internet Protocol Version 6

IBM Spectrum Control supports Internet Protocol Version 6 (IPv6) for communication between its components. The key IPv6 enhancement is the expansion of IP address spaces from 32 bits (up to 15 characters in length) to 128 bits (up to 45 characters in length).

Overview

You can install and run IBM Spectrum Control on systems that are enabled for IPv4, IPv6, or dual stack. *Dual stack* indicates that a system has both the IPv4 and IPv6 stacks enabled and both addresses configured.

You can use IPv6 addresses if one of the following conditions are met:

- The system where IBM Spectrum Control is installed is IPv6.
- Dual stack (IPv4 and IPv6) is enabled.

IBM Spectrum Control can communicate with the following external components over IPv6:

- SMI-S CIM agents
- SLP directory agents
- SNMP agents
- Storage resources
- SMTP server

Note: These external components must be IPv6 enabled to communicate with IBM Spectrum Control by using the IPv6 protocol.

Not all components and their related functions of IBM Spectrum Control are enabled for IPv6. Any functions that are not enabled for IPv6 are unavailable through the user interface when you install IBM Spectrum Control on an IPv6-only system.

If you have a system that is configured for dual stack networking, IBM Spectrum Control defaults to IPv4 addressing.

The preferred IPv6 address representation is written as eight groups of four hexadecimal digits `xxxx:xxxx:xxxx:xxxx:xxxx:xxxx:xxxx:xxxx`, where each x is a hexadecimal that represents 4 bits. You can also specify IPv6 addresses by using shortened formats that omit leading zeros or use double colons in place of a series of zeros. You can specify only one double colon (:) in an IPv6 address.

The following examples show an IPv6 address in the long form and in the short form:

Long form: `2001:DB8:0:0:0:0:0:0`

Short form: `2001:DB8::`

IPv6 and IBM Spectrum Control installation

If you are installing IBM Spectrum Control in an IPv6-only environment, the following requirements apply:

- For Windows operating systems, the IPv4 loopback interface is enabled.
- For AIX or Linux operating systems, the `localhost` option resolves to the IPv4 address 127.0.0.1, instead of the IPv6 address `::1`. This value is specified in the `/etc/hosts` file.

For Windows operating systems, the `localhost` option is specified in the `C:\Windows\system32\drivers\etc\hosts` directory and file.

Table 13. IPv4 and IPv6 configurations in a multiple-servers environment	
If the database repository server is configured for...	The IBM Spectrum Control server is configured for...
IPv4	IPv4

Table 13. IPv4 and IPv6 configurations in a multiple-servers environment (continued)

If the database repository server is configured for...	The IBM Spectrum Control server is configured for...
IPv4	Dual stack
Dual stack	IPv4
Dual stack	Dual stack
Dual stack	IPv6
IPv6	IPv6

Restriction: When you install the product on servers that are configured for IPv6 only, you cannot use IBM Tivoli Enterprise Console® events as triggered actions in alerts.

Planning to use LDAP for IBM Spectrum Control authentication

The Lightweight Directory Access Protocol (LDAP) is an application protocol that you can use to query and modify directory services running over TCP/IP. The IBM Spectrum Control installation program establishes a default authentication configuration using the federated repositories feature of the IBM WebSphere Application Server Liberty. You can configure IBM Spectrum Control for LDAP authentication as a post-installation activity.

A *directory* is a set of objects with similar attributes that are organized in a logical and hierarchical manner. An LDAP directory tree often reflects various political, geographic, and organizational boundaries, depending on the model chosen. The directory might contain entries representing people, organizational units, printers, documents, groups of people, or anything else that represents a tree entry (or multiple entries).

In the federated repositories framework, the IBM Spectrum Control installation program creates the following repositories:

File-based user repository

This repository contains the `tpcFileRegistryUser` user ID. This user password is the same as the common user password that you enter during the IBM Spectrum Control installation.

Operating system repository

This repository contains the users and groups managed by the local operating system.

With this default authentication configuration, you cannot use the IBM Spectrum Control single sign-on feature. Storage system element managers do not support the operating system repository or the file-based repository for single sign-on, even if the element manager is installed on the same system as IBM Spectrum Control.

To change the user authentication configuration, add or remove an LDAP repository in the federated repositories framework.

To authenticate user names on the IBM Spectrum Control by using an instance of Microsoft Active Directory, complete one of the following options:

Authenticate User names: Method one

1. Install IBM Spectrum Control on an AIX, Linux, or Windows operating system.
2. Configure IBM Spectrum Control for LDAP authentication.

The target LDAP repository is an instance of Active Directory running on Windows 2003 or later. This method provides the following benefits:

- The IBM Spectrum Control target system does not have to be a Windows system.
- The IBM Spectrum Control target system does not have to be a member of a Windows domain.
- There are fewer configuration steps for IBM Spectrum Control or Windows.

- The IBM Spectrum Control user names and group names do not have to include the Windows Domain Name.
- You can use the single-sign on feature between IBM Spectrum Control and storage system element managers.

Authenticate User names: Method two

1. Install IBM Spectrum Control on a Windows system that is a member of a Windows domain or on the Windows Domain Controller.
2. Configure IBM Spectrum Control for operating system authentication.

Planning for storage management

Plan for how to use IBM Spectrum Control to manage the storage and storage resources in your environment. In a complex environment, good planning helps you avoid delays and problems in getting your system up and running.

For information about how to plan for storage resources and actions, see the product documentation at [Planning for storage management](#).

Sudo command privileges

When you install, operate, or uninstall IBM Spectrum Control as a non-root user on AIX or Linux operating systems, you are required to have sudo privileges to multiple commands. Use command aliases in the `/etc/sudoers` file to configure your sudo privileges for multiple commands.

Example command aliases

The following command aliases are examples that you can create for installing, operating, and uninstalling IBM Spectrum Control:

- `Cmnd_Alias IBMSC_INSTALL = /usr/bin/xauth, /Downloads/Db2_11.5_image/server_dec/db2setup, /opt/ibm/db2/V11.5/cfg/db2ln, /Downloads/IBM_Spectrum_Control_image/SC/setup.bin`
- `Cmnd_Alias IBMSC_OPERATION = /opt/IBM/TPC/scripts/*.sh, /opt/IBM/TPC/scripts/ldap/*.sh, /opt/IBM/TPC/agent/bin/agent.sh, \ /opt/IBM/TPC/service/*.sh, /opt/IBM/TPC/service/changepasswords, /opt/IBM/TPC/client_images/*.sh, \ /opt/IBM/TPC/cli/*.sh, /opt/IBM/TPC/data/scripts/logCleanup.sh, /opt/IBM/TPC/data/scripts/EncryptPassword.sh, \ /opt/IBM/TPC/data/server/tools/repocopy, /opt/IBM/TPC/data/server/tools/runTPCDBMaintenance, \ /opt/IBM/TPC/device/bin/linux/setenv.sh, /opt/IBM/TPC/device/bin/linux/enableapialerts.sh, \ /opt/IBM/TPC/device/bin/linux/disableapialerts.sh, /opt/IBM/TPC/wlp/bin/server, \ /opt/IBM/TPC/wlp/bin/securityUtility, /opt/IBM/TPC/jre/bin/ikeyman, /opt/IBM/TPC/jre/bin/ikeycmd, /bin/kill`
- `Cmnd_Alias IBMSC_UNINSTALL = /opt/IBM/TPC/_uninst/uninstall`

The following examples show how to use the command aliases to provide non-root users privileges to the various commands:

```
username1 ALL=(root) SETENV: IBMSC_INSTALL
username2 ALL=(root) SETENV: IBMSC_OPERATION
username3 ALL=(root) SETENV: IBMSC_UNINSTALL
```

Chapter 2. Installing

Before you install IBM Spectrum Control, you must install IBM Db2 because Db2 is required for the IBM Spectrum Control database repository.

IBM Spectrum Control components

You can install IBM Spectrum Control in single-server or multiple-server environments. In a single-server environment, all components are installed on one server.

In single-server or multiple-server environments, when you install IBM Spectrum Control, the following components are installed:

- Database repository
- IBM Spectrum Control servers, which comprise the following components:
 - Data server
 - Device server
 - Alert server
 - Export server
 - Web server
 - IBM Spectrum Control GUI
 - Command-line interface (CLI)
 - Storage Resource agent

IBM Spectrum Control in an IPv4 or IPv6 environment

IBM Spectrum Control can use both IPv4 and IPv6 addresses for communication between its components.

If you have a system that is configured for dual-stack networking (with both IPv4 and IPv6 addresses), IBM Spectrum Control defaults to IPv4 addressing.

For information about using IPv4 and IPv6, see [Planning for Internet Protocol Version 6](#).

Hardware requirements

The hardware requirements of the IBM Spectrum Control server.

Important: IBM Spectrum Control server can require a large amount of memory, disk space, network bandwidth, and processor resources. To promote consistent availability and performance, install IBM Spectrum Control on a dedicated server where no other critical business applications, including IBM Copy Services Manager, are installed. IBM Software Support is not responsible for availability, performance, and functional problems that are caused by other business applications that are deployed on the same server as IBM Spectrum Control.

For information about the hardware requirements for IBM Spectrum Control, see *Hardware Support: Memory, Processor and Disk Space* at [IBM Spectrum Control - Hardware Support: Memory, Processor and Disk Space](#).

For information about the components that can be used with IBM Spectrum Control, see *Find the Supported Hardware, Products and Platforms Interoperability Matrix Links* at <https://www.ibm.com/support/pages/node/388393>.

Restriction: On AIX or Linux operating systems, when you use a Virtual Network Computing (VNC) client that is connected to a VNC server, do not use the following key combinations:

- Alt + H to start the Help page

- Alt + N to proceed to next page
- Alt + P to return to the previous page
- Alt + I to start an installation action on the Summary page

You must press **Tab** and then press **Enter** or the spacebar when the button you want to press is selected. For example, to start the Help, press **Tab** until the **Help** button is highlighted and then press **Enter** or the spacebar.

Software requirements

This section describes the software that is required to install and run your system. This section includes operating systems supported, browsers supported, databases supported, and other software required such as Db2 .

Software requirements for operating systems

The IBM Spectrum Control family supports a variety of operating systems.

Before you install IBM Spectrum Control, check the IBM Spectrum Control support site at <https://www.ibm.com/support/pages/node/6249361#Server> for the latest operating system support.

Software requirements for Storage Resource agents

Storage Resource agents can be used by IBM Spectrum Control in various operating systems.

For a list of the operating systems that are supported for Storage Resource agents, go to <https://www.ibm.com/support/pages/node/6249361#Agents>.

Software requirements for the database repository

IBM Spectrum Control uses Db2 as the database repository.

Important: You must use a 64-bit version of Db2 with IBM Spectrum Control. For more information about upgrading Db2 to Db2 11.1 or later, see [“Example of upgrading Db2 in a Windows environment” on page 105](#).

Supported versions of Db2

For a list of the supported Db2 versions, go to <http://www.ibm.com/support/pages/node/6249361#DB>.

Web browser support

The IBM Spectrum Control GUI runs in a web browser and includes the ability to monitor, manage, and troubleshoot storage resources. You can access this interface from anywhere that you have a web browser and connectivity to a network.

Before you start IBM Spectrum Control, ensure that you are using a supported web browser. For a list of web browsers that you can use with IBM Spectrum Control, see the support matrix at [IBM Spectrum Control - Platform Support: Servers, Agents, and Browsers - Web Browsers](#).

Note: The IBM Spectrum Control GUI requires the use of cookies to manage user preferences, such as table customization and frequently viewed charts. Ensure that cookies are enabled to use these features.

Software requirements for LDAP servers

The LDAP repositories that are available on Windows, Linux and AIX operating systems, can be used with IBM Spectrum Control.

For information about the LDAP repositories that are supported, see one of the following WebSphere Application Server Liberty web pages. On the **Supported Software** tab, click **LDAP Servers**. See [WebSphere Liberty - Detailed System Requirements](#).

Software requirements for CIM agents

IBM Spectrum Control requires CIM agents for some IBM storage devices.

CIM agents for switches and directors

CIM agents (SMI-S providers) are also required for switches and directors. For a complete list of switches and directors that are supported and the level of CIM agents that are required for each device, see <https://www.ibm.com/support/pages/node/388393>.

CIM agents for non-IBM storage systems

IBM Spectrum Control also supports some non-IBM storage systems. For example, IBM Spectrum Control supports HP, TagmaStore, CLARiiON, Symmetrix, and other storage systems.

For a complete list of storage systems that are supported and the level of CIM agents that are required for each device, see <https://www.ibm.com/support/pages/node/388393>.

Installing IBM Spectrum Control

IBM Spectrum Control provides an installation program that guides you through the installation process. You can use the installation program or the command line in silent mode.

Installation checklists for IBM Spectrum Control

The installation of IBM Spectrum Control requires you to install a number of components. You can use the following checklists to guide you through the installation procedures for each component. Use separate checklists for multiple server installations.

Prepare your environment for installation

Ensure that your target environment is ready for an installation.

Table 14. Prepare your environment for an installation check list		
Check	Required for	Task
<input type="checkbox"/>	Antivirus software	<p>Installing IBM Spectrum Control involves making use of your operating system in manners typical for installing new application software. If your antivirus software is set on the maximum mode, it might prevent some of your changes from being accepted.</p> <p>To verify that your installation completes correctly, enable your antivirus software product to allow the following instances:</p> <ul style="list-style-type: none">• The /etc/hosts file can be edited• Files can be created in the /temp directory• New executable files can be created in the C:\Program Files directory

Table 14. Prepare your environment for an installation check list (continued)

Check	Required for	Task
<input type="checkbox"/>	Fully qualified host names	IBM Spectrum Control requires fully qualified host names, so you must install the product on a computer that has a fully qualified host name. For example, <code>abc.tucson.example.com</code> is a fully qualified host name where <code>abc</code> is the host name and <code>tucson.example.com</code> is the full domain name.
<input type="checkbox"/>	Hardware prerequisites	For information about the hardware requirements for IBM Spectrum Control, see <i>Hardware Support: Memory, Processor and Disk Space</i> at https://www.ibm.com/support/pages/node/388393 .
<input type="checkbox"/>	Software prerequisites	<ul style="list-style-type: none"> • The IBM Spectrum Control family supports various operating systems, see “Software requirements for operating systems” on page 38 • For the database repository, see “Software requirements for the database repository” on page 38 • For LDAP servers, see “Software requirements for LDAP servers” on page 39
<input type="checkbox"/>	Required user privileges	<p>Ensure that you have the required privileges to install Db2 and IBM Spectrum Control.</p> <p>If you are installing on a Windows operating system, you must install as a user with administrator privileges. If you are installing on an AIX or Linux operating system, you must install as a root user or as a non-root user who has sudo privileges.</p> <p>If you want to install as a non-root user, your system administrator must complete configuration tasks on the target server before you begin the installation. These tasks are listed in “Installing Db2 on AIX or Linux” on page 45 and “Installing IBM Spectrum Control in a single-server AIX or Linux environment” on page 54.</p> <p>Ensure that Windows administrators have the Debug programs privilege.</p>
<input type="checkbox"/>	Download packages	<p>You must download the installation packages or images into a separate directory for each product. The following list provides suggested download directory paths:</p> <ul style="list-style-type: none"> • Windows operating systems: <ul style="list-style-type: none"> – <code>c:\downloads\DB2</code> – <code>c:\downloads\TPC</code> • AIX or Linux operating systems: <ul style="list-style-type: none"> – <code>/downloads/DB2</code> – <code>/downloads/TPC</code> <p>For more information, see “Planning for installation” on page 1</p>

Table 14. Prepare your environment for an installation check list (continued)

Check	Required for	Task
<input type="checkbox"/>	Language setting	Determine the operating system language that you want to use for IBM Spectrum Control. For optimal support, it's recommended that you use English. The web browser determines the language in which IBM Spectrum Control services and the IBM Spectrum Control GUI are displayed. For more information, see “Changing languages” on page 77 .

Windows domain

Before you can install IBM Spectrum Control on a Windows domain, you must determine which installation method is appropriate, based on your environment. For more information, see [“Planning to install IBM Spectrum Control in a Windows domain” on page 6](#)

Table 15. Windows domain installation check list

Check	Required for	Task
<input type="checkbox"/>	Windows domain and local user accounts	When a computer is a member of a Windows domain, you can install IBM® Db2® on the computer such that the Db2® installation process creates a local Db2® user account or a domain Db2 user account. See “Windows domain and local user accounts” on page 6 .
<input type="checkbox"/>	Adding a computer to the Windows domain	Before you can install IBM Spectrum Control in a Windows domain, you must first add the computer on which you plan to install IBM Spectrum Control to the domain, see “Adding a computer to the Windows domain” on page 7 .
<input type="checkbox"/>	Create Windows domain common user account	You must create a Windows domain common user account before you can install IBM Spectrum Control in a Windows domain, see “Creating a Windows domain common user account for IBM Spectrum Control” on page 9 .
<input type="checkbox"/>	Grant Db2 SYSADM authority to Windows domain user account	If a Windows domain user account is used to install IBM Spectrum Control, the user account might not have the Db2 SYSADM authority, because Db2 goes to the domain controller computer to list the groups. Before you install IBM Spectrum Control, you must grant the Windows domain user accounts the Db2 SYSADM authority, see “Granting Db2 SYSADM authority to a Windows domain user account” on page 10 .

Db2

Install Db2 11.5 on Linux, AIX, or Windows operating systems.

Table 16. Db2 installation check list

Check	Required for	Task
<input type="checkbox"/>	Prepare for Db2 installation	<ul style="list-style-type: none"> When you install Db2 11.5, a default user name and groups are created. This default user name and password are used to install IBM Spectrum Control. See “Preparing to install Db2®” on page 43.

Table 16. Db2 installation check list (continued)

Check	Required for	Task
<input type="checkbox"/>	Install on Windows	For information on how to install Db2 on Windows operating systems, see “Installing Db2 on Windows” on page 44.
<input type="checkbox"/>	Install Db2 by using a Windows domain user account	Before you install IBM Spectrum Control in a Windows domain, you must install Db2 and register the Db2 license key. You must have domain administrator access. You do not need to complete this task if you are planning to install Db2 by using a local user account, see “Installing Db2 by using a Windows domain user account” on page 8.
<input type="checkbox"/>	Install Db2 on AIX or Linux - GUI installation	For information on how to install Db2 on AIX or Linux by using the GUI installation process, see “Installing Db2 on AIX or Linux” on page 45.
<input type="checkbox"/>	Install Db2 on AIX by using the command line	For more information on how to install Db2 on AIX by using the command line, see “Installing Db2 on AIX by using the command-line” on page 47.
<input type="checkbox"/>	Verify Db2 installation	You can verify that Db2 11.5 is installed properly by using the command line processor (CLP) or the First Steps GUI, see “Verifying that Db2 is installed correctly” on page 49.

IBM Spectrum Control

Install IBM Spectrum Control by using the installation program or the command line in silent mode.

Table 17. Installation check list

Check	Required for	Task
<input type="checkbox"/>	Choose installation method	For more information about what methods are available to install IBM Spectrum Control, see “Planning for installation” on page 1
<input type="checkbox"/>	Install IBM Spectrum Control on a single server.	For more information about how to install IBM Spectrum Control on a single server, see “Installing IBM Spectrum Control in a single-server environment ” on page 53
<input type="checkbox"/>	Install IBM Spectrum Control on multiple servers.	For more information about how to install IBM Spectrum Control on multiple servers, see “Installing IBM Spectrum Control in a multiple-server environment ” on page 62

Db2

You can install the most recent version of Db2 that IBM Spectrum Control supports on the Linux, AIX, or Windows operating systems.

For more information about the supported versions, see [“Software requirements for the database repository”](#) on page 38.

Preparing to install Db2®

Before you install Db2, run the Db2 **db2prereqcheck** command on the target installation server to ensure that the server meets the prerequisites for Db2. For example, `db2prereqcheck -v 11.5.4.0`. You can ignore the section on the Db2 pureScale prerequisites.

Before you install Db2, a default username and groups are created. This default username and password are used to install IBM Spectrum Control. You can use the default username and password or provide your own.

Note: Windows operating systems do not support systems that are configured only for IP 6. (Windows is enabled for IP 6 and IP 4.)

Preparing to install Db2 on Windows

Before you install Db2 on Windows operating systems, ensure that you correctly configured your directory names.

Short file names

If Db2 is installed on a drive on which 8.3 file names are disabled, and the Db2 installation directory name has spaces in it, Db2 must be reinstalled on a drive that has 8.3 file names enabled, or in a directory that does not have spaces in the name.

To check the current 8.3 file name settings for a drive, in a Db2 command window, run the '**fsutil.exe behavior query disable8dot3**' command.

These are the values when you run the command:

- 0 = Create 8.3 short file names (default)
- 1 = Do not create 8.3 file names
- 2 = Set 8.3 file names on a per volume basis
- 3 = Disable 8.3 file names on all volumes, except the system volume

The registry state of `NtfsDisable8dot3NameCreation` is 0 , which means that 8.3 file names are enabled on all volumes.

To enable 8.3 file names on a global basis, run the **fsutil.exe behavior set disable8dot3 0** command.

Preparing to install Db2® on UNIX or Linux

To operate Db2® on operating systems such as UNIX or Linux, the instance owner, the fenced user, and the Db2® administration server user are required. These users and groups are automatically created when Db2® is installed.

The user ID you need to install IBM Spectrum Control must be the owner of the instance that you want to use; this user ID and password are created when you install Db2®.

Table 18 on page 43 provides a list of the default user and group names.

Table 18. Db2® setup default user and group names			
Required user	Default user name	Default group name	Description
instance owner	db2inst1	db2iadm1	Created in the instance owner home directory. This user ID controls all Db2® processes and owns all file systems and devices used by the databases contained within the instance.

Table 18. Db2® setup default user and group names (continued)

Required user	Default user name	Default group name	Description
fenced user	db2fenc1	db2fadm1	Used to run user-defined functions and stored procedures that are separate from the address space that is used by the Db2® database.

Related information

[Db2 User, user ID and group naming rules](#)

[Db2 password rules](#)

Installing Db2®

You can install IBM® Db2® on AIX, Linux, or Windows operating systems.

Installing Db2 on Windows

Before you can install IBM Spectrum Control, you must install Db2®.

If you are installing Db2 in a Windows domain environment: See [“Installing Db2 by using a Windows domain user account”](#) on page 8 for additional and alternate steps that are required for the installation of Db2.

To install Db2 on a Windows operating system, complete the following steps:

1. Log on with a user ID that has Administrator authority on Windows.
2. Use the extracted Db2 installation image. Windows Autorun starts the launchpad.

If you are using Windows Autorun, the installation program should start in 15-30 seconds. If the installation program does not start, complete one of the following steps:

- In a command prompt, to start the Db2 set up page, go to *web_image_extraction\server_folder* and run the **setup.exe** command.
- In Windows Explorer, go to *web_image_extraction\server_folder*, and double-click the *setup.exe* file.

Where *server_folder* in the preceding steps is the location of the Db2 installation program.

3. In the DB2 Setup Launchpad, click **Install a Product**.
4. Click **Install New** for **DB2 Version 11.5.4.0 Server Editions**.

Note: If you do not see the DB2 Setup program, it is probably running in the background. Look for a blinking icon in the Windows taskbar and click it to bring it to the foreground.

5. On the welcome page of the DB2 Setup program, click **Next**.
6. On the **Software License Agreement** page, review and accept the license agreement, and click **Next**.
7. On the **Select the installation type** page, click **Typical**, and click **Next**.
8. On the **Select the installation, response file creation, or both** page, select **Install DB2 Server Edition on this computer and save my settings in a response file**.
9. Enter a response file name or accept the default, and click **Next**.
10. On the **Select the installation folder** page, enter a directory or accept the default, and click **Next**.
11. On the **Set user information for the DB2 Administration Server** page, enter the following user information:
 - a. Leave the **Domain** field blank.
 - b. In the **User name** field, type the DB2 user ID that you want to use or accept the default.

- c. In the **Password** field, type a password and confirm the password by typing it again in the **Confirm password** field.
12. Select the **Use the same account for the remaining DB2 services** check box and click **Next**.
13. On the **Configure DB2 instances** page, click **Next**.
14. On the **Set up notifications** page, clear the **Set up your DB2 server to send notifications** check box, and click **Next**.
15. On the **Enable operating system security for DB2 objects** page, accept the defaults, and click **Next**.

The default is to enable operating system security.

Note: If you installed Db2 before on this system, and the DB2ADMS group exists, when you click **Next**, the following message is displayed:

```
Warning
The group name "DB2ADMS" already exists
in the system and will be granted complete
access to the DB2 folders and objects through
the operating system.
Click OK to continue installation, or click
Cancel to input another group name.
```

16. On the **Start copying files and create response file** page, review the current settings, and click **Finish**.
17. On the **Setup is complete** page, review the information, and click **Next**.
18. On the Install additional products page, click **Finish**.
19. The setup program closes and the **DB2 First Steps** page opens. Close the **DB2 First Steps** page.
20. Restart the system.

Note: To prevent the Db2 logs from filling up the C drive on the system you are installing on, you can set the *DIAGPATH* and *SPM_LOG_PATH* variables to point to an external, fast disk drive.

After you restart your computer, you must install IBM Spectrum Control. For more information about installing IBM Spectrum Control in a single-server environment, see [“Installing IBM Spectrum Control in a single-server Windows environment”](#) on page 54. For information about installing IBM Spectrum Control in a multiple-server environment, see [“Installing IBM Spectrum Control with a remote database by using the installation program”](#) on page 62.

Installing Db2 on AIX or Linux

You can install Db2® as a root user or non-root user on an AIX or Linux operating system by using the Db2 Setup program. To install Db2 as a non-root user, the user must have sudo privileges on the target AIX or Linux server.

The X Window System is required on the AIX or Linux server to install Db2 by using the installation program.

If you want to install Db2 as a non-root user, have your system administrator complete the following tasks on the target server before you begin the installation:

- If you are installing Db2 on an AIX server, install sudo on the server. The default AIX distribution does not include sudo. To get the sudo installation package, go to <http://www.ibm.com/systems/power/software/aix/linux/toolbox/date.html>. Find **sudo-version** in the **Package** column, and click **RPM** to download the package.
- Ensure that the non-root user has sudo privileges for the following commands on the server:
 - **xauth** (Enables the non-root user to provide access to their X Window System display for the root user.)
 - **db2setup** (Enables the non-root user to launch the Db2 installation program.)

You must enter the full path to the commands when you configure the sudo privileges. For example:

```
username    ALL=(root)    SETENV: /usr/bin/xauth,/home/username/Downloads/DB2/server_dec/db2setup
```

- Ensure that the following requirements are met to enable the installation of Db2 by using the Setup program:
 - The non-root user is able to use the X Window System on the target server and the X Window System DISPLAY environment variable is set correctly for the not-root user.
 - The DISPLAY environment variable is preserved in the sudo environment.
 - The root user has access to the X Window System display that is owned by the non-root user.

These display requirements do not apply if you install Db2 in silent mode.

- If you are installing Db2 on an AIX server, ensure that the ODMDIR environment variable is preserved in the sudo environment.

1. Log on to the target server as the root user or as a non-root user who has sudo privileges.
2. Use an extraction tool to extract the installation image files on the server.
3. In a command shell, change the directory to the location of the Db2 installation program db2setup, and then enter one of the following commands:

Root user

```
./db2setup
```

Non-root user

```
sudo ./db2setup
```

4. On the DB2 Setup Welcome page, click **New Install**.
5. On the Choose a Product page, select **DB2 Version 11.5.4.0 Server Editions** and click **Next**.
6. On the Configuration page:
 - a) Enter an installation directory or accept the default.
 - b) Select **Typical** as the installation type.
 - c) Select **Create an instance**.
 - d) Review and agree to the IBM terms.
 - e) Click **Next**.
7. On the Instance Owner page, select **New user**, and enter the following information:
 - a) User name
Db2 adds this user ID to the db2iadm1 group, and if this user ID does not exist, Db2 creates it.
 - b) Group name
 - c) Password
 - d) Home directory
The Db2 instance owner user is the user that you enter when you install IBM Spectrum Control.
8. Select **Use default UID** and **Use default GID**, and click **Next**.
9. On the Fenced User page, select **New user**, and enter the following information:
 - a) User name
Db2 adds this user ID to the db2fadm1 group, and if this user ID does not exist, Db2 creates it.
 - b) Group name
 - c) Password
 - d) Home directory
The fenced user is used to run user-defined functions and stored procedures that are separate from the address space that is used by the Db2 database.
10. Select **Use default UID** and **Use default GID**, and click **Next**.
11. On the Response File and Summary page:

- a) Select **Install DB2 Server Edition on this computer** and save my settings in a response file.
 - b) Enter a response file name or accept the default.
 - c) Review the Summary and click **Finish**.
12. On the **Setup has completed successfully** page, review the information, and click **Finish**.

To ensure that Db2 starts when the server starts, run the **db2iauto** command.

Root user

```
DB2_installation_directory/bin/db2iauto -on DB2_instance_name
```

Non-root user

```
sudo DB2_installation_directory/bin/db2iauto -on DB2_instance_name
```

Where *DB2_installation_directory* is the location of Db2 and *DB2_instance_name* is the instance that you created when you installed Db2. The default instance name is *db2inst1*.

Installing Db2 on AIX by using the command-line

You can install Db2 on AIX operating systems by using commands.

Ensure that you have:

- 2 - 3 GB of hard disk drive space for the Db2 installation tar file and extracted files.
- A file system with at least 30 GB for the IBM Spectrum Control repository.

To install Db2 on the AIX operating system by using a command prompt, complete the following steps:

1. Log in with a user ID that has root authority.
2. Do one of the following steps.
 - If you are not using a DVD, skip to step 5 and work from the directory where you have the Db2 source installation program.
 - If you are using a DVD, create a mount point that is called */cdrom* by entering `mkdir /cdrom`.
3. Insert the Db2 DVD into the DVD drive and mount the file system at the mount point.
On AIX operating system, you can use the **crfs** command to add an entry to */etc/filesystems* for the mount point.
4. Run the following commands:

```
/usr/sbin/crfs -v cdrfs -p ro -d'cd0' -m'/cdrom' -A'no'
mount /cdrom
```

The **crfs** command must be run only one time for a mount point. For each DVD you insert after that, you can use **mount** and **umount**, for example, **mount /cdrom** and **umount /cdrom**.

5. Enter `cd /cdrom` and go to the directory where the DVD-ROM is mounted.
6. Install the Db2 Manager.
 - a) Create a temporary directory (for example, *db2temp*) to hold the Db2 installer tar file and extracted files.
 - b) Copy or download the Db2 installer into *db2temp*. The name of the file varies depending on the location from where the file is downloaded or copied and the language to which it is associated.
 - c) If the Db2 installer file is compressed, use the appropriate extracting tool.
For example, if the name of the file is *v11.5_aix64_server.tar.gz*, enter **gunzip v11.5_aix64_server.tar.gz**. In this example, *v11.5_aix64_server.tar.gz* is displayed in the *db2temp* directory.
 - d) Create an installation directory by entering, for example, `mkdir install`.
 - e) Enter `cd install` to change to the new installation directory.
 - f) Extract the Db2 installation file.

For example, if the name of the installation file is `v11.5_aix64_server.tar`, enter `tar xvf ../v11.5_aix64_server.tar`.

g) Enter `cd /db2temp/install/server_dec` and go to the directory that contains the Db2 installation program `db2_install`.

h) Enter `./db2_install` to run the command-line installation program.

i) Select **SERVER**.

j) Select **no** from the **Do you want to install the DB2 pureScale Feature? [yes/no]** section.

The Installation Summary is displayed, which indicates a successful installation. Db2 is installed in `/opt/IBM/db2/V11.5`.

7. Create users and groups for use with Db2.

a) Enter `mkgroup id=999 db2iadm1`.

b) Enter `mkgroup id=998 db2fadm1`.

c) Enter `mkuser id=1004 pgrp=db2iadm1 groups=db2iadm1 home=/home/db2inst1 db2inst1`.

d) Enter `mkuser id=1003 pgrp=db2fadm1 groups=db2fadm1 home=/home/db2fenc1 db2fenc1`.

e) Verify the owner of the directories by entering `ls -ld /home/db2inst1`.

The directory ownership is displayed as follows:

- `/home/db2inst1` shows group `db2iadm1` and user `db2inst1`
- `/home/db2fenc1` shows group `db2fadm1` and user `db2fenc1`

If the directory ownership is not correct, run the following commands as appropriate:

```
chown -R db2inst1:db2iadm1 /home/db2inst1
chown -R db2fenc1:db2fadm1 /home/db2fenc1
```

f) Enter `passwd db2inst1` to set the password that you want to use for the Db2 instance.

g) Enter `pwdadm -f NOCHECK db2inst1`.

h) Enter `passwd db2fenc1` to set the password you want to use for the fenced user.

i) Enter `pwdadm -f NOCHECK db2fenc1`.

j) Enter `chgroup users=db2inst1,root db2iadm1`.

8. Create a Db2 instance:

a) Enter `/opt/IBM/db2/V11.5/instance/db2icrt -a server -u db2fenc1 db2inst1`.

b) Enter `./home/db2inst1/sqlllib/db2profile`.

9. Change the default location for database repositories.

By default, the location is `/home/db2inst1`. The `/home` output is typically not large enough for database repositories.

10. To change the default location:

a) Enter `db2 update dbm cfg using DFTDBPATH new_repository_path IMMEDIATE`, where *new_repository_path* represents the new location for the repository.

b) Enter `chown -R db2inst1:db2iadm1 new_repository_path` to assign ownership to `db2inst1` and permission to anyone in `db2iadm1` (same as the ownership for `/home/db2inst1`).

11. Configure Db2 communication:

a) Edit `/etc/services` and verify or add the following line at the end of the file: `db2c_db2inst1 50000/tcp`

b) Enter `db2 update dbm cfg using svcename db2c_db2inst1`.

c) Enter `db2set DB2COMM=tcpip`.

d) Enter `db2stop`.

e) Enter `db2start`.

12. From a command prompt, do the following to test your Db2 instance:
 - a. Enter `. /home/db2inst1/sqllib/db2profile` to source the environment.
 - b. Enter `db2level` to get information about the instance and Db2.
 - c. Enter `db2 create db test`.
 - d. Enter `db2 list db directory` to list information about all the databases that are created for this instance.
 - e. Enter `db2 connect` to test user `db2inst1` using the password to connect to the database.
 - f. Enter `db2 disconnect test` to disconnect from the test database.
 - g. Enter `db2 drop db test` to drop the test database.

Installing IBM Data Studio by using the DB2 setup program

IBM Data Studio installation is included with the Db2 10.1 or later product installation. The DB2 Setup program provides an option to install Data Studio components.

Use the DB2 Setup program to define your installation preferences and to install IBM Data Studio full client component.

To use the DB2 Setup program to install Data Studio, follow these steps:

1. Start the DB2 Setup program.
2. Select **Install Data Studio Components**.
3. Select **Install Data Studio full client component**.
4. Follow the instructions to install Data Studio.

Verifying that Db2 is installed correctly

You can verify that Db2® is installed properly by using the command-line processor (CLP) or the First Steps GUI.

To verify that Db2® is installed, complete the following steps:

1. Create the SAMPLE database.
2. Connect to the SAMPLE database.
3. Run a query against the SAMPLE database.
4. Drop the SAMPLE database.

Verifying Db2 installation using the command-line processor (CLP)

You can verify that Db2 is successfully installed using the command-line processor (CLP).

To verify that Db2 is installed using the command line processor, complete the following steps:

1. Log on to the system as a user with SYSADM authority.
2. Enter `db2start` to start the database manager.

In operating systems such as AIX and Linux, you must source the `db2profile` before you run the **db2start** command. For more information about sourcing the profile, go to the IBM Spectrum Control Knowledge Center and search for *Using the command line on AIX and Linux*.

3. Enter the **db2samp1** command to create the SAMPLE database.

This command might take a few minutes to process. There is no completion message. When the command prompt returns, the process is complete. The SAMPLE database is automatically cataloged with the database alias SAMPLE when it is created.

4. Enter the following commands in a Db2 command window to connect to the SAMPLE database, retrieve a list of all the employees who work in Department 20, and reset the database connection:

```
db2 connect to sample
db2 "select * from staff where dept = 20"
db2 connect reset
```

5. After verifying the installation, remove the SAMPLE database to free up disk space.

For more information about verifying Db2 installation, refer to the Db2 documentation for your operating system.

6. Enter `db2 drop database sample` to drop the SAMPLE database.

Verifying Db2 installation by using the First Steps tool

You can verify that Db2® is installed successfully, by using the First Steps tool.

- Ensure that the domain user account that you use to create the sample database has SYSADM or SYSCTRL authority.
- Install IBM Data Studio and the First Steps component.

The First Steps tool is part of the getting started component grouping in the Db2 setup program. It is installed as part of a typical installation or you can select the First Steps tool during a custom installation.

To verify the Db2® installation by using the First Steps tool, complete the following steps:

1. Log on to the system with the user account that you want to use to verify the installation.
2. Start First Steps by completing one of the following steps:
 - On operating systems such as AIX or Linux, run the `db2fs` command.
 - On Windows, run the `db2fs.bat` command.
3. On the **First Steps** window, select **Create Sample Databases**.
4. On the **Create Sample Databases** page, select the databases that you want to create and click **OK**.
By default, the SAMPLE database is created on the computer where Db2 is installed.
5. Click **OK**.
6. Open Data Studio.
7. Expand the navigation tree to view the SAMPLE database and SAMPLE database objects.
8. Select the Tables object to view the SAMPLE database tables.
9. After you verify the installation, remove the SAMPLE database to free disk space.
10. Enter the **db2 drop database sample** command to drop the SAMPLE database.

Licensing Db2

You can apply a valid license to Db2 by using the **db2licm** command.

The installation and operation of IBM Spectrum Control requires that Db2 is running on your system.

Important: After your Db2 11.1 trial license period expires, Db2 11.1 does not start without a valid license.

IBM Spectrum Control does not support the Db2 11.5 Community license.

To apply a valid license to Db2 with the **db2licm** command, complete the following steps:

1. Retrieve and extract a valid Db2 license that is supplied on the IBM Spectrum Control download site.
2. Open a Db2 command prompt or switch to the Db2 instance owner user and in the location where you extracted your Db2 license, change to the following directory:

```
awse_o/db2/license/          if you are using Db2 11.1
std_vpc/db2/license/         if you are using Db2 11.5
```

3. Run the following command:

Using Db2 11.1 on the Windows operating system:

```
Db2_installation_location\BIN\db2licm -a db2awse_o.lic
```

Using Db2 11.5 on the Windows operating system:

```
Db2_installation_location\BIN\db2licm -a db2std_vpc.lic
```

where *Db2_installation_location* is the base installation directory for Db2 on your computer. For example, `C:\Program Files\IBM\SQLLIB`.

Using Db2 11.1 on the AIX/Linux operating system:

```
Db2_installation_location/adm/db2licm -a db2awse_o.lic
```

Using Db2 11.5 on the AIX/Linux operating system:

```
Db2_installation_location/adm/db2licm -a db2std_vpc.lic
```

where *Db2_installation_location* is the base installation directory for Db2 on your computer. For example, */opt/ibm/db2/V11.5*.

Related information

[db2licm - License management tool command](#)

Starting the installation programs

There are various methods to start the IBM Spectrum Control installation programs and on various operating systems.

Installation program methods

You can use these methods to start the installation programs:

Installation images

You must select an installation image and download and extract these images to a location with adequate disk space.

Storage Resource agent

Contains the files to run local Storage Resource agent installations. You must download the file for the system on which you want the agent to be in.

- The Storage Resource agent location and operating system file name is the same as the product electronic image.
- The Storage Resource agent image is in *installation_dir/data/sra/operating_system_name*.

The operating systems that are supported for the Storage Resource agents are listed in the following table.

Table 19. Operating system for Storage Resource agents.	
Operating system	Operating system name
Windows	windows
AIX	aix_power
Linux x86	linux_ix86
Linux for Power Systems Servers	linux_power
Linux s390	linux_s390

Important:

- If you are using IBM Spectrum Control electronic installation images that are decompressed in a directory that has spaces in the name, IBM Spectrum Control does not install correctly.

For example, if you have the following directory name:

- On Windows operating systems:

```
C:\Spectrum Control\disk\SC
```

- On AIX and Linux operating systems:

```
/temp/Spectrum Control/disk/SC
```

IBM Spectrum Control does not install correctly.

When you remove the spaces, and rename the directory, for example:

- On Windows operating systems:

```
C:\SpectrumControl\disk\SC
```

- On AIX and Linux operating systems:

```
/temp/SpectrumControl/disk/SC
```

IBM Spectrum Control installs correctly.

- If you are using IBM Spectrum Control electronic installation images for Linux or AIX operating systems and you download the images to a directory, ensure that your folder name *does not* contain a . at the end of the folder name.

For example, if you have a directory name

```
C:\SpectrumControl\disk\SC.
```

When you rename the folder and remove the . at the end of the name, for example:

```
C:\SpectrumControl\disk\SC.August3
```

IBM Spectrum Control installs correctly.

Starting the installation program on the Windows operating system

To start the IBM Spectrum Control installation program by using an electronic image, complete the following steps.

1. Download the image into a directory.
2. Extract the image files.
3. At the command prompt, enter `cd source_installation_directory\SC` and then enter **setup.bat**.

Starting the installation program on the Linux operating system

To start the IBM Spectrum Control installation program from the electronic image, complete the following steps.

1. Enter the following to create a directory:

```
mkdir /SpectrumControl
```

2. Download the image into the SpectrumControl directory.
3. Enter this command to extract the image files:

```
tar -xzf filename.tar.gz
```

4. Ensure that the user name that you plan to use as the IBM Spectrum Control common user is in the root group and the db2iadm1 group. If the user name is not in a group, you can add the user as shown in the following command example. In this example, the user name is *db2inst1*.

```
usermod -a -G root db2inst1
```

5. Navigate to the /SpectrumControl/SC directory by entering:

```
cd /SpectrumControl/SC
```

6. Set up your shell environment to point to the instance where the database repository is installed. Source the db2profile for the instance that you want. For example, if the Db2 instance is db2inst1, you can source the db2profile by entering:

```
. /home/db2inst1/sqllib/db2profile
```

Remember: There is a space between . and /home.

7. Start the installation program by running the **./setup.bin** command from the same command shell that you used in [step 6](#).

Starting the installation program on the AIX operating system

To start the IBM Spectrum Control installation program from the electronic image, complete the following steps:

1. Enter the following to create a directory:

```
mkdir /SpectrumControl
```

2. Download the image into the SpectrumControl directory.
3. Enter this command to extract the image files:

```
tar -xzf filename.tar.gz
```

4. Ensure that the user name that you plan to use as the IBM Spectrum Control common user is in the system group and the db2iadm1 group. If the user name is not in a group, you can add the user as shown in the following command example. In this example, the user name is *db2inst1*.

```
usermod -G system db2inst1
```

Tip: If the user is already a member of secondary groups, the **usermod** command removes the db2inst1 user name from all of the secondary groups except for the system group. To preserve the existing secondary group memberships, provide a comma separated list of secondary groups after the **-G** flag. For more information, enter `man usermod` at the command prompt.

5. Navigate to the /SpectrumControl/SC directory.

```
cd /SpectrumControl/SC
```

6. Set up your shell environment to point to the instance where the database repository is installed. Source the db2profile for the instance that you want. For example, if the Db2 instance is db2inst1, you can source the db2profile by entering:

```
. /home/db2inst1/sqllib/db2profile
```

Remember: There is a space between . and /home.

7. Start the installation program by running the **./setup.bin** command from the same command shell that you used in [step 6](#).

Installing IBM Spectrum Control in a single-server environment

Install IBM Spectrum Control by using the installation program or the command line in silent mode.

Installation considerations

Before you begin the installation of IBM Spectrum Control, ensure that Db2 is installed. To learn how to install Db2, see [Installing Db2](#). If you install Db2 on a Windows server, reboot the system before you install IBM Spectrum Control.

When you install IBM Spectrum Control, a database that is called *TPCDB* is created. In this repository, the IBM Spectrum Control database schema is created, which describes the structure of the database

repository. If you already have the *TPCDB* database on your system, IBM Spectrum Control assigns a new default database repository name with a number as a suffix. For example, *TPCDB1*.

If the operating system on which you are installing IBM Spectrum Control is sensitive to spaces in directory paths, change the default installation location to not include spaces, for example, *C:\apps\IBM\SC*.

Installing IBM Spectrum Control in a single-server Windows environment

You can install IBM Spectrum Control by using the IBM Spectrum Control installation program.

To install IBM Spectrum Control in a single-server environment, complete the following steps:

1. Log on to the target server as a user who has administrator privileges.

Note: Confirm that your Windows firewalls are disabled in the Control Panel.

2. When you install IBM Spectrum Control, the TPCDB database is created in the location that you specify in the Db2 DFTDBPATH variable.

To determine the current DFTDBPATH value, run the following command in a Db2 CLI window:

```
get dbm cfg
```

If you want to install this database in a location that is other than the default location, run the following command in a Db2 CLI window:

```
update dbm cfg using DFTDBPATH path
```

where *path* is the new value for the DFTDBPATH variable.

3. Use an extraction tool to extract the installation image files on the server.
4. In a command window, change the directory to the location of the IBM Spectrum Control installation files and enter the following command:

```
setup.bat
```

5. Follow the prompts in the installation program to install IBM Spectrum Control.

If an error occurred during the IBM Spectrum Control installation process, review the IBM Spectrum Control installation log files to find details about the error.

Installing IBM Spectrum Control in a single-server AIX or Linux environment

You can install IBM Spectrum Control as a root user or non-root user on an AIX or Linux operating system by using the IBM Spectrum Control installation program. To install IBM Spectrum Control as a non-root user, the user must have sudo privileges on the target AIX or Linux server.

Ensure that X Window System is installed on the target AIX or Linux server. The X Window System is required to install IBM Spectrum Control by using the installation program.

If you want to install IBM Spectrum Control as a non-root user, have your system administrator complete the following tasks on the target server before you begin the installation:

- If you are installing IBM Spectrum Control on an AIX server, install sudo on the server. The default AIX distribution does not include sudo. To get the sudo installation package, go to [AIX Toolbox for Linux® Applications](#). Find **sudo-version** in the **Package** column, and click **RPM** to download the package.
- Ensure that the non-root user has sudo privileges for the following commands on the server:
 - **xauth** (Enables the non-root user to provide access to their X Window System display for the root user.)
 - **db2ln** (Enables the non-root user to create the links for the Db2 system files.)
 - **setup.bin** (Enables the non-root user to launch the IBM Spectrum Control installation program.)

You must enter the full path to the commands when you configure the sudo privileges. For example:

```
username ALL=(root) SETENV: /usr/bin/xauth,/opt/ibm/db2/V11.5/cfg/db2ln,/home/username/Downloads/IBMSC/SC/setup.bin
```


- If the sudo environment on the server uses the `secure_path` option, ensure that the following directories are included in the `secure_path` value for the non-root user who is installing IBM Spectrum Control:
 - `DB2_instance_owner_home_directory/sqlllib/bin` (Example: `/home/db2inst1/sqlllib/bin`)
 - `DB2_instance_owner_home_directory/sqlllib/adm` (Example: `/home/db2inst1/sqlllib/adm`)
 - `DB2_instance_owner_home_directory/sqlllib/misc` (Example: `/home/db2inst1/sqlllib/misc`)
- Ensure that the following requirements are met to enable the installation of IBM Spectrum Control by using the installation program:
 - The non-root user is able to use the X Window System on the target server and the X Window System `DISPLAY` environment variable is set correctly for the not-root user.
 - The `DISPLAY` environment variable is preserved in the sudo environment.
 - The root user has access to the X Window System display that is owned by the non-root user.

These display requirements do not apply if you install IBM Spectrum Control in silent mode.
- If you are installing IBM Spectrum Control on an AIX server, ensure that the `ODMDIR` environment variable is preserved in the sudo environment.

To install IBM Spectrum Control in a single-server environment, complete the following steps:

1. Log on to the target server as the root user or as a non-root user who has sudo privileges.
2. If you logged on as a non-root user, run the following command in a command shell:

```
sudo DB2_installation_directory/cfg/db2ln
```

For example:

```
sudo /opt/ibm/db2/V11.5/cfg/db2ln
```

3. When you install IBM Spectrum Control, the TPCDB database is created in the location that you specify in the `Db2 DFTDBPATH` variable.

To determine the current `DFTDBPATH` value, run the following command in a Db2 CLI window:

```
get dbm cfg
```

If you want to install this database in a location that is other than the default location:

- a. Run the following command in a Db2 CLI window:

```
update dbm cfg using DFTDBPATH path
```

where *path* is the new value for the `DFTDBPATH` variable.

- b. Run the **db2stop** and **db2start** commands to stop and restart Db2.
4. Use an extraction tool to extract the installation image files on the server.
 5. In a command shell, source the Db2 user profile `db2profile` for the Db2 instance owner.

For example:

```
. /home/db2inst1/sqlllib/db2profile
```

6. In a command shell, change the directory to the location of the IBM Spectrum Control installation program `setup.bin`, and then enter the following command:

Root user

```
./setup.bin
```

Non-root user

```
sudo -E ./setup.bin
```

7. Follow the prompts in the installation program to install IBM Spectrum Control.

If an error occurred during the IBM Spectrum Control installation process, review the IBM Spectrum Control installation log files to find details about the error.

Installing IBM Spectrum Control in a single-server environment by using silent mode

You can install IBM Spectrum Control by using silent mode. The installation program does not display any configuration options during the installation process.

If you plan to install IBM Spectrum Control as a non-root user, have your system administrator complete the tasks that are described in [“Installing IBM Spectrum Control in a single-server AIX or Linux environment”](#) on page 54 on the target server before you begin the installation.

If you are installing on a Windows operating system, confirm that your Windows firewalls are disabled in the Control panel.

To install IBM Spectrum Control in a single-server environment by using silent mode, complete the following steps:

1. Log on to the server where you want to install IBM Spectrum Control.

If you are installing on a Windows operating system, log on as a user who has administrator privileges.
If you are installing on an AIX or Linux operating system, log on as the root user or as a non-root user who has *sudo* privileges.

2. If you logged on as an AIX or Linux non-root user, run the following command in a command shell:

```
sudo Db2_installation_directory/cfg/db2ln
```

For example:

```
sudo /opt/ibm/db2/V11.5/cfg/db2ln
```

3. When you install IBM Spectrum Control, the TPCDB database is created in the location that you specify in the Db2 DFTDBPATH variable.

To determine the current DFTDBPATH value, run the following command from a Db2 CLI window:

```
get dbm cfg
```

If you want to install this database in a location that is other than the default location:

- a. Run the following command in a Db2 CLI window:

```
update dbm cfg using DFTDBPATH path
```

where *path* is the new value for the DFTDBPATH variable.

- b. If you are installing on an AIX or Linux operating system, run the **db2stop** and **db2start** commands to stop and restart Db2.

4. Edit and save the appropriate response file.

For more information about editing the response file, see [“Editing the response file”](#) on page 58.

5. If you are installing on an AIX or Linux operating system, in a command shell, source the Db2 user profile db2profile for the Db2 instance owner.

For example:

```
. /home/db2inst1/sqllib/db2profile
```

6. Run the silent mode installation program.

- For Windows operating systems, run the following command:

```
setup.bat -l language -i silent -f absolute_path_to_response_file
```

where *language* can be one of the following values:

- Czech - cs
- English - en
- French - fr
- German - de
- Hungarian - hu
- Italian - it
- Japanese - ja
- Korean - ko
- Polish - pl
- Brazilian Portuguese - pt_BR
- Russian - ru
- Spanish - es
- Chinese (Simplified) - zh_CN
- Chinese (Traditional) - zh_TW

absolute_path_to_response_file is the absolute path to the response file. For example, the following command specifies the language and the path:

```
setup.bat -l fr -i silent -f c:\TPC\silent_SingleServerTypical.properties
```

- For AIX or Linux operating systems, run the following command:

Root user

```
./setup.bin -l language -i silent -f /absolute_path_to_response_file
```

For example, the following command specifies the language and the path:

```
./setup.bin -l de -i silent -f /TPC/silent_SingleServerTypical.properties
```

Non-root user

```
sudo -E ./setup.bin -l language -i silent -f /absolute_path_to_response_file
```

For example, the following command specifies the language and the path:

```
sudo -E ./setup.bin -l de -i silent -f /TPC/silent_SingleServerTypical.properties
```

If you do not specify a language or if the language is not specified correctly, the installation program uses the English language as the default.

7. Monitor the progress of the installation.

- To view the progress of the silent mode installation on Windows operating systems, check the trace log in the following path:

```
installation_dir\logs\traceTPCInstall.log
```

- To view the progress of the silent mode installation on AIX or Linux operating systems, check the trace log in the following path:

```
installation_dir/logs/traceTPCInstall.log
```

Editing the response file

You must edit and save the appropriate response file when you install IBM Spectrum Control by using silent mode. The silent mode installation option for the response file is `-f absolute_path_to_response_file`. For example, in the Windows operating system, you enter `-f C:\installimage\silent_SingleServerTypical.properties`.

Use the following response files during a silent mode installation:

silent_SingleServerTypical.properties

This file specifies that all the IBM Spectrum Control components are installed on one server. You can customize this file by changing the ports for the Data server, Device server, Alert server, Export server, web server, and Storage Resource agent.

silent_SingleServerCustom.properties

This file specifies that all the IBM Spectrum Control components are installed on one server with the following customization options:

- Change the user name and password to install the database repository.
- Change the name of the database repository.
- Change the paths for the database repository.
- Change the path for the database repository log.
- Change the ports for the Data server, Device server, Alert server, Export server, web server, and Storage Resource agent.

silent_MultipleServer.properties

This file specifies the information that is required for a multiple-server environment. You can install the database repository on a remote server and install the other IBM Spectrum Control components on a local server.

Common response file parameters

These installation parameters are valid for all the response files.

CHOSEN_INSTALL_TYPE="option"

Specifies the installation type. Not all options are available in all the response files. [Table 20 on page 58](#) shows you the options that you can specify.

Table 20. Options for the CHOSEN_INSTALL_TYPE parameter	
Properties file	Valid options
silent_SingleServerTypical	<ul style="list-style-type: none">• Single Server Install• License Upgrade
silent_SingleServerCustom	<ul style="list-style-type: none">• Single Server Install• License Upgrade
silent_MultipleServer	<ul style="list-style-type: none">• Multiple Server Install• License Upgrade

For example:

```
CHOSEN_INSTALL_TYPE="Single Server Install"
```

LICENSE_ACCEPTED=false

Specifies whether the user accepts the IBM Spectrum Control license agreement. The options are as follows:

true

The user accepts all the terms and conditions of the IBM Spectrum Control license agreement.

false or any other value

The user does not accept the IBM Spectrum Control license agreement. The installation program exits.

USER_INSTALL_DIR=option

Specifies the location where you want to install IBM Spectrum Control.

On Windows operating systems, you must use double backslashes. For example:

```
USER_INSTALL_DIR=C:\\Program Files\\IBM\\TPC
```

The default value for Windows operating systems is C:\\Program Files\\IBM\\TPC.

Note: If the operating system on which you are installing IBM Spectrum Control is sensitive to spaces in directory paths, change the default installation location to not include spaces, for example, C:\\apps\\IBM\\SC.

The default value for AIX or Linux operating systems is /opt/IBM/TPC.

varSrvName=option

Specifies the fully qualified host name of the server.

If your system is configured for dual stack networking (with both IPv4 and IPv6 addresses), IBM Spectrum Control defaults to IPv4 addressing.

Ensure that DNS is configured correctly on your server and verify that these files exist on your target server:

- For Windows operating systems, C:\\Windows\\system32\\drivers\\etc\\hosts.
- For AIX or Linux operating systems, /etc/hosts.

These files must have an entry similar to the following example:

```
myserver.example.mycompany.com myserver
```

varTPCPortRangeSP=port

Specifies the first port in a range of ports. The default beginning port is 9549. These ports are used by the IBM Spectrum Control servers, and the Storage Resource agent.

varCommonUsrID=user_name

Specifies the user name to install IBM Spectrum Control. The default user name for Windows operating system is db2admin. The default user name for AIX or Linux operating system is db2inst1.

The user name that you select must have the following operating system privileges:

- For Windows operating systems, the user name must be in the administrators group.
- For Linux operating systems, the user name must be in the root group.
- For AIX operating systems, the user name must be in the system group.

If you are using the common user name to also install the database repository, the user name must have these Db2 privileges:

- For Windows operating systems, the user name must be in the DB2ADMNS group.
- For AIX or Linux operating systems, the user name must be in the db2iadm1 group.

varCommonUsrPw=password

Specifies the password for the common user name.

varFullRollback=value

Specifies whether a full rollback or partial rollback is done when an installation failure occurs. These are the values:

0

Specifies that a partial rollback occurs. This value is the default.

1

Specifies that a full rollback occurs.

varUseLicenseKeyOnImage=value

Specifies whether to use the license key file that is present on the installation image. The value can be:

0

Uses the license key that is present on the installation image (default value)

1

Provides the location of the license key file

Depending on the license package you purchased, one of these license files is included with IBM Spectrum Control in the product electronic image:

nodeLock.AE

IBM Spectrum Control license

nodeLock.AS

IBM Spectrum Control Select Edition license

varLicenseKeyFile=location_of_license_key_file

Specifies the path for the license key file. This value must be set if the **varUseLicenseKeyOnImage=1** parameter is specified.

On the Windows operating system, you must use double backslashes. For example:

```
C:\\license\\key\\nodeLock.AE
```

Response file parameters for advanced customization of the database repository

These parameters are used for the `silent_SingleServerCustom.properties` and `silent_MultipleServer.properties` response files to configure the database repository.

varDBAdmUsr=user_name

Specifies the user name that you must use to install the IBM Spectrum Control database. The user who logs in with this user name must be the owner of the Db2 instance where the database is created.

This user name must have these Db2 privileges:

- For Windows operating systems, the user name must be in the DB2ADMNS group. The default user name is db2admin.
- For AIX or Linux operating systems, the user name must be in the db2iadm1 group. The default user name is db2inst1.

varDBAdmPW=password

Specifies the password that is associated with the Db2 user name.

varDBName=database_name

Specifies the name of the IBM Spectrum Control database. The default database name is TPCDB.

Specify the database name by using the following rules:

- The name can contain the following characters:
 - a - z
 - A - Z
 - 0 - 9
- The name must be 1 - 8 characters long.

Restriction: The database name cannot have the following conditions:

- Contain a space or a blank.
- Begin with SYS, DBM, or IBM.
- Be the name of an existing database.

varDBPath=database_location, database_location, ...

Specifies the absolute paths for the database.

The database path must follow these rules:

- The path cannot be longer than 242 bytes.
- The path must be an absolute path and not a relative path, for example, C : \

You can specify a maximum of 10 database paths and separate them with commas. For example, in the Windows operating system, you would specify C : , D : . In the AIX or Linux operating system, you would specify /home/db2inst1, /testPath.

- For example, on the Windows operating system, if the database is on the C drive, you can add a D drive, an E drive.

On Windows operating systems, you must use double backslashes. For example:

```
C : \\DB2\\TPCDB,D : \\TPCDB,E : \\TPCDB
```

- For example, on the AIX operating system:

```
/home/db2inst1,/testPath
```

varDBLogPath=log_location

Specifies the absolute path where the database log files are stored. The default value of the variable is set to <dftdbpath>/<instance name>/<varDBName>/SQLLOG.

For example:

- On Windows operating systems, c : \\DB2\\TPCDB\\SQLLOG
- On AIX operating systems, /home/db2inst1/db2inst1/TPCDB/SQLLOG

Response file parameter for the multiple-server environment

This parameter is valid for the `silent_MultipleServer.properties` file.

varMultipleServerComponentList=components

Specifies the IBM Spectrum Control components to install.

database

Installs the IBM Spectrum Control database repository.

servers

Installs the Data server, Device server, Alert server, Web server, the Storage Resource agent, CLI, and the IBM Spectrum Control GUI.

Response file parameters for the remote database

The following parameters are used only in the `silent_MultipleServer.properties` response file to access the IBM Spectrum Control database on a remote server.

Remember: The Db2 database must be installed before you can use these parameters to access the database.

varRemoteDBSrvName=host_name

Specifies the fully qualified host name or IP address of the remote server where the IBM Spectrum Control database repository is installed.

IBM Spectrum Control accepts both IPv4 and IPv6 addresses. If you have a system that is configured for dual stack networking (with both IPv4 and IPv6 addresses), IBM Spectrum Control defaults to IPv4 addressing.

For example, an IPv6 address in long form can be 2001:DB8:0:0:0:0:0:0. An IPv6 address in short form can be 2001:DB8:: or 2001:DB8:0:0:0:0:0:0.

varRemoteDBPort=port

Specifies the Db2 port on the remote server. The default port is 50000.

varRemoteDBAdmUsr=user_name

Specifies the administrative user name to connect to the remote database. The default user name for the Windows operating system is db2admin. The default user name for the AIX or Linux operating system is db2inst1.

varRemoteDBAdmPW=password

Specifies the password for the user name.

varRemoteDBName=database_name

Specifies the IBM Spectrum Control database on the remote server. The default name is TPCDB.

Related reference

[“Ports used by IBM Spectrum Control” on page 23](#)

When you install IBM Spectrum Control, the ports must be opened through the firewall. You must disable the firewall program or open the ports to allow incoming requests to the IBM Spectrum Control ports. Review these ports before you install IBM Spectrum Control.

Installing IBM Spectrum Control in a multiple-server environment

You can install IBM Spectrum Control by using the installation program or by using silent mode from the command line. Note, installing IBM Spectrum Control by using console mode is not supported.

A multiple-server environment is ideal if you are monitoring large storage environments, where one server is not sufficient to manage the IBM Spectrum Control components.

If you have different administrators for Db2 and IBM Spectrum Control, this environment allows the database repository and Db2 to be installed and managed on a separate server.

Installation considerations

When you install IBM Spectrum Control, a database that is called TPCDB is created. In this repository, the IBM Spectrum Control database schema is created, which describes the structure of the database repository. If you already have the TPCDB database on your system, IBM Spectrum Control assigns a new default database repository name with a number as a suffix. For example, TPCDB1.

If the operating system on which you are installing IBM Spectrum Control is sensitive to spaces in directory paths, change the default installation location to not include spaces, for example, C:\apps\IBM\SC.

Related tasks

[Installing IBM Spectrum Control with a remote database by using the installation program](#)

You can install IBM Spectrum Control in a multiple-server environment by using the installation program.

[Installing IBM Spectrum Control with a remote database by using silent mode](#)

You can install IBM Spectrum Control in a multiple-server environment by using silent mode.

Installing IBM Spectrum Control with a remote database by using the installation program

You can install IBM Spectrum Control in a multiple-server environment by using the installation program.

For this procedure, the terms *Server A* and *Server B* denote the two servers. If you plan to install IBM Spectrum Control as a non-root user, have your system administrator complete the tasks that are described in [“Installing IBM Spectrum Control in a single-server AIX or Linux environment” on page 54](#) on both servers before you begin the installation.

Server A will have Db2 and the IBM Spectrum Control database repository installed. Server B will have the IBM Spectrum Control servers installed.

To install IBM Spectrum Control with a remote database by using the installation program, complete the following steps:

1. Complete the following steps on Server A:

a) Log on to Server A.

If you are installing on a Windows operating system, log on as a user who has administrator privileges. If you are installing on an AIX or Linux operating system, log on as the root user or as a non-root user who has sudo privileges.

Note: Confirm that your Windows firewalls are disabled in the Control Panel.

b) Install Db2 on Server A.

For more information about installing Db2, see [Installing Db2](#). If you install Db2 on a Windows server, restart the server before you install IBM Spectrum Control.

c) If you logged on as an AIX or Linux non-root user, run the following command in a command shell:

```
sudo DB2_installation_directory/cfg/db2ln
```

For example:

```
sudo /opt/ibm/db2/V11.5/cfg/db2ln
```

d) When you install IBM Spectrum Control, the TPCDB database is created in the location that you specify in the Db2 DFTDBPATH variable.

To determine the current DFTDBPATH value, run the following command in a Db2 CLI window:

```
get dbm cfg
```

If you want to install this database in a location that is other than the default location:

1) Run the following command in a Db2 CLI window:

```
update dbm cfg using DFTDBPATH path
```

where *path* is the new value for the DFTDBPATH variable.

2) If you are installing on an AIX or Linux operating system, run the **db2stop** and **db2start** commands to stop and restart Db2.

e) If you are installing on an AIX or Linux operating system, in a command shell, source the Db2 user profile `db2profile` for the Db2 instance owner.

For example:

```
./home/db2inst1/sqllib/db2profile
```

f) Start the IBM Spectrum Control installation program on Server A.

In a command window or command shell, change the directory to the location of the IBM Spectrum Control installation files and enter the following command:

Windows

```
setup.bat
```

AIX or Linux root user

```
./setup.bin
```

AIX or Linux non-root user

```
sudo -E ./setup.bin
```

- g) On the **Before You Begin** page, because only the IBM Spectrum Control database repository will be installed on Server A, click **Next**.
- h) On the **Choose Installation Location and Type** page, select **Multiple servers** and click **Next**.
- i) On the **Multiple Server Option: Select the Components** page, select **Database repository** and click **Next**.
- j) Follow the prompts in the installation program to install the IBM Spectrum Control database repository on Server A.
- k) After the installation is finished, review the message log on Server A to ensure that no errors occurred.
2. Complete the following steps on Server B:
- a) Log on to Server B.
- If you are installing on a Windows operating system, log on as a user who has administrator privileges. If you are installing on an AIX or Linux operating system, log on as the root user or as a non-root user who has sudo privileges.
- b) Start the IBM Spectrum Control installation program on Server B.
- In a command window or command shell, change the directory to the location of the IBM Spectrum Control installation files and enter the following command:

Windows

```
setup.bat
```

AIX or Linux root user

```
./setup.bin
```

AIX or Linux non-root user

```
sudo -E ./setup.bin
```

- c) On the **Choose Installation Location and Type** page, select **Multiple servers** and click **Next**.
- d) On the **Multiple Server Options: Select the Components** page, select **IBM Spectrum Control Servers** and click **Next**.



Attention: IBM Spectrum Control servers include the following components:

- IBM Spectrum Control GUI
 - CLI
 - Storage Resource agent
- e) Follow the prompts in the installation program to install the IBM Spectrum Control Servers on Server B.
- f) After the installation program is finished, review the message log on Server B to ensure that no errors occurred.

Related reference

[“Planning for IBM Spectrum Control authentication and authorization” on page 15](#)

An operating system user name is required to install and log on to IBM Spectrum Control for the first time. After you install IBM Spectrum Control, you can assign roles to users. Roles determine the product functions that are available to users.

[“Installing IBM Spectrum Control in a multiple-server environment ” on page 62](#)

You can install IBM Spectrum Control by using the installation program or by using silent mode from the command line. Note, installing IBM Spectrum Control by using console mode is not supported.

[“Starting the installation programs” on page 51](#)

There are various methods to start the IBM Spectrum Control installation programs and on various operating systems.

[“IBM Spectrum Control components” on page 37](#)

You can install IBM Spectrum Control in single-server or multiple-server environments. In a single-server environment, all components are installed on one server.

[“Verifying the installation” on page 75](#)

After you install IBM Spectrum Control, you can verify whether the installation was successful.

[“Reviewing the log files to resolve installation issues” on page 76](#)

If an error occurs during IBM Spectrum Control installation, you can review the error log files to resolve issues and continue the installation.

Installing IBM Spectrum Control with a remote database by using silent mode

You can install IBM Spectrum Control in a multiple-server environment by using silent mode.

For this procedure, the terms *Server A* and *Server B* denote the two servers. If you plan to install IBM Spectrum Control as a non-root user, have your system administrator complete the tasks that are described in [“Installing IBM Spectrum Control in a single-server AIX or Linux environment” on page 54](#) on both servers before you begin the installation.

If you are installing IBM Spectrum Control in silent mode on a Windows operating system, confirm that your Windows firewalls are disabled in the Control Panel.

Server A will have Db2 and the IBM Spectrum Control database repository installed. Server B will have the IBM Spectrum Control servers installed.

To install IBM Spectrum Control in a multiple-server environment by using silent mode, complete the following steps:

1. Complete the following steps on Server A:

a) Log on to Server A.

If you are installing on a Windows operating system, log on as a user who has administrator privileges. If you are installing on an AIX or Linux operating system, log on as the root user or as a non-root user who has sudo privileges.

b) Install Db2 on Server A.

For more information about installing Db2, see [Installing Db2](#). If you install Db2 on a Windows server, make sure that you restart the server before you install IBM Spectrum Control.

c) If you logged on as an AIX or Linux non-root user, run the following command in a command shell:

```
sudo DB2_installation_directory/cfg/db2ln
```

For example:

```
sudo /opt/ibm/db2/V11.5/cfg/db2ln
```

d) When you install IBM Spectrum Control, the TPCDB database is created in the location that you specify in the Db2 DFTDBPATH variable.

To determine the current DFTDBPATH value, run the following command in a Db2 CLI window:

```
get dbm cfg
```

If you want to install this database in a location that is other than the default location:

1) Run the following command in a Db2 CLI window:

```
update dbm cfg using DFTDBPATH path
```

where *path* is the new value for the DFTDBPATH variable.

2) If you are installing on an AIX or Linux operating system, run the **db2stop** and **db2start** commands to stop and restart Db2.

e) On Server A, set the following parameters in the `silent_MultipleServer.properties` response file to install the remote database repository.

- `LICENSE_ACCEPTED=true`
- `CHOSEN_INSTALL_TYPE="Multiple Server Install"`
- `varMultipleServerComponentList=database`
- `USER_INSTALL_DIR=option`
- `varSrvName=option`
- `varDBAdmUsr=user_name`
- `varDBAdmPW=password`
- `varDBName=database_name`
- `varDBPath=database_location`
- `varDBLogPath=log_location`

For more information about editing the `silent_MultipleServer.properties` file, see [“Editing the response file” on page 58](#).

f) Save the response file.

g) If you are installing on an AIX or Linux operating system, in a command shell, source the Db2 user profile `db2profile` for the Db2 instance owner.

For example:

```
. /home/db2inst1/sqllib/db2profile
```

h) Run the silent mode installation program on Server A.

- For Windows operating systems, run the following command:

```
setup.bat -l language -i silent -f absolute_path_to_response_file
```

where *language* can be one of the following values:

- Czech - cs
- English - en
- French - fr
- German - de
- Hungarian - hu
- Italian - it
- Japanese - ja
- Korean - ko
- Polish - pl
- Brazilian Portuguese - pt_BR
- Russian - ru
- Spanish - es
- Chinese (Simplified) - zh_CN
- Chinese (Traditional) - zh_TW

`absolute_path_to_response_file` is the absolute path to the response file. For example, the following command specifies the language and the path:

```
setup.bat -l fr -i silent -f c:\TPC\silent_MultipleServer.properties
```

- For AIX or Linux operating systems, run the following command:

Root user

```
./setup.bin -l language -i silent -f /absolute_path_to_response_file
```

For example, the following command specifies the language and the path:

```
./setup.bin -l de -i silent -f /TPC/silent_MultipleServer.properties
```

Non-root user

```
sudo -E ./setup.bin -l language -i silent -f /absolute_path_to_response_file
```

For example, the following command specifies the language and the path:

```
sudo -E ./setup.bin -l de -i silent -f /TPC/silent_MultipleServer.properties
```

If you do not specify a language or if the language is not specified correctly, the installation program uses the English language as the default.

i) Monitor the progress of the installation.

- To view the progress of the silent mode installation on Windows operating systems, check the trace log in the following path:

```
installation_dir\logs\traceTPCInstall.log
```

- To view the progress of the silent mode installation on AIX or Linux operating systems, check the trace log in the following path:

```
installation_dir/logs/traceTPCInstall.log
```

Tip: If there are preinstallation errors, you can review the `lax*out.txt` and `lax*err.txt` files that are in the `/tmp` and `%TEMP%` directories.

2. Complete the following steps on Server B:

a) Log on to Server B.

If you are installing on a Windows operating system, log on as a user who has administrator privileges. If you are installing on an AIX or Linux operating system, log on as the root user or as a non-root user who has sudo privileges.

b) On Server B, set the following parameters in the `silent_MultipleServer.properties` response file:

- `LICENSE_ACCEPTED=true`
- `CHOSEN_INSTALL_TYPE="Multiple Server Install"`
- `varMultipleServerComponentList=servers`
- `USER_INSTALL_DIR=option`
- `varSrvName=option`
- `varTPCPortRangeSP=port`
- `varCommonUsrID=user_name`
- `varCommonUsrPw=password`
- `varRemoteDBSrvName=host_name`
- `varRemoteDBPort=port`
- `varRemoteDBAdmUsr=user_name`
- `varRemoteDBAdmPW=password`
- `varRemoteDBName=database_name`

For more information about editing the `silent_MultipleServer.properties` file, see [“Editing the response file”](#) on page 58.

c) Run the silent mode installation program on Server B.

- For Windows operating systems, run the following command:

```
setup.bat -l language -i silent -f absolute_path_to_response_file
```

where *language* can be one of the following values:

- Czech - cs
- English - en
- French - fr
- German - de
- Hungarian - hu
- Italian - it
- Japanese - ja
- Korean - ko
- Polish - pl
- Brazilian Portuguese - pt_BR
- Russian - ru
- Spanish - es
- Chinese (Simplified) - zh_CN
- Chinese (Traditional) - zh_TW

absolute_path_to_response_file is the absolute path to the response file. For example, the following command specifies the language and the path:

```
setup.bat -l fr -i silent -f c:\TPC\silent_MultipleServer.properties
```

- For AIX or Linux operating systems, run the following command:

Root user

```
./setup.bin -l language -i silent -f /absolute_path_to_response_file
```

For example, the following command specifies the language and the path:

```
./setup.bin -l de -i silent -f /TPC/silent_MultipleServer.properties
```

Non-root user

```
sudo -E ./setup.bin -l language -i silent -f /absolute_path_to_response_file
```

For example, the following command specifies the language and the path:

```
sudo -E ./setup.bin -l de -i silent -f /TPC/silent_MultipleServer.properties
```

If you do not specify a language or if the language is not specified correctly, the installation program uses the English language as the default.

d) Monitor the progress of the installation.

- To view the progress of the silent mode installation on Windows operating systems, check the trace log in the following path:

```
installation_dir\logs\traceTPCInstall.log
```

- To view the progress of the silent mode installation on AIX or Linux operating systems, check the trace log in the following path:

```
installation_dir/logs/traceTPCInstall.log
```

Note: If there are preinstallation errors, you can review the `lax*out.txt` and `lax*err.txt` files that are in the `/tmp` and `%TEMP%` directories.

Related reference

[“Planning for IBM Spectrum Control authentication and authorization” on page 15](#)

An operating system user name is required to install and log on to IBM Spectrum Control for the first time. After you install IBM Spectrum Control, you can assign roles to users. Roles determine the product functions that are available to users.

[“Installing IBM Spectrum Control in a multiple-server environment ” on page 62](#)

You can install IBM Spectrum Control by using the installation program or by using silent mode from the command line. Note, installing IBM Spectrum Control by using console mode is not supported.

[“Starting the installation programs” on page 51](#)

There are various methods to start the IBM Spectrum Control installation programs and on various operating systems.

[“IBM Spectrum Control components ” on page 37](#)

You can install IBM Spectrum Control in single-server or multiple-server environments. In a single-server environment, all components are installed on one server.

[“Verifying the installation” on page 75](#)

After you install IBM Spectrum Control, you can verify whether the installation was successful.

[“Reviewing the log files to resolve installation issues” on page 76](#)

If an error occurs during IBM Spectrum Control installation, you can review the error log files to resolve issues and continue the installation.

Accessing IBM Spectrum Control server from a remote computer using Command Line Interface

Accessing client components on a remote computer helps you complete storage management tasks from a computer that does not have a IBM Spectrum Control server that is installed on it.

To access IBM Spectrum Control server on a remote computer, complete the following steps:

1. Go to the `client_images` subdirectory in the IBM Spectrum Control installation directory.

- On AIX or Linux operating systems, here is an example of a subdirectory:

```
/opt/IBM/TPC/client_images
```

- On Windows operating systems, here is an example of a subdirectory:

```
C:\Program Files\IBM\TPC\client_images
```

2. To create a client image, run one of the following commands for the operating system of the computer on which you want to access the command-line interface (CLI):

- On AIX or Linux operating systems, run the following command:

```
createClientImage.sh [aix | linux | windows | all]
```

When you include the `[aix | linux | windows | all]` parameters, you can create AIX, Linux, and Windows client images on a computer that is running AIX or Linux operating systems.

- On Windows operating systems run the following command:

```
createClientImage.bat [aix | linux | windows | all]
```

When you include the [aix | linux | windows | all] parameters, you can create AIX, Linux, and Windows client images on a computer that is running AIX and Linux or Windows operating systems.

Tip: Each parameter creates one of the following compressed client image files:

aix

Creates a TPC_CLIENT_AIX.tar image.

linux

Creates a TPC_CLIENT_LINUX.zip image.

windows

Creates a TPC_CLIENT_WIN.zip image.

all

Creates all of the client images.

3. Extract the appropriate compressed file on the remote computer.

- On AIX operating systems, extract the TPC_CLIENT_AIX.tar file to a folder, for example:

```
/opt/IBM/TPCClient
```

- On Linux operating systems, extract the TPC_CLIENT_LINUX.zip file to a folder, for example:

```
/opt/IBM/TPCClient
```

- On Windows operating systems, extract the TPC_CLIENT_WIN.zip file to a folder, for example:

```
c:/Program Files/IBM/TPCClient
```

4. Ensure that the following directories appear in the folder where you extracted the client image compressed file:

- cli
- jre

The cli folder contains the files to start the IBM Spectrum Control command-line interface and the Replication command-line interface. The jre folder contains other files that are necessary to start the command-line interface.

5. To start the IBM Spectrum Control command-line interface, run one of the following commands:

- On AIX or Linux operating systems:

```
/opt/IBM/TPCClient/cli/tpctool.sh
```

- On Windows operating systems:

```
C:\Program Files\IBM\TPCClient\cli\tpctool.bat
```

Installing IBM Spectrum Control on a Windows domain

You can install IBM Spectrum Control and Db2 by using a Windows domain or a local user account.

Installing Db2 and IBM Spectrum Control by using local user accounts

Prerequisite: If the local user account is used to install the database repository, this account must be a member of the Db2 administrator (DB2ADMNS) group.

To install IBM Spectrum Control and Db2 by using local user account, complete the following steps:

1. Install Db2 by using a local user account.
2. Log on to the Windows domain computer on which you plan to install IBM Spectrum Control by using a local user account that is a member of the local Administrators group and the local Db2 Administrators (DB2ADMNS) group.

3. On the **Single Server Installation Information** page, in the **User name** field, enter a local user account that is a member of local administrator group.

Installing Db2 by using a local user account and IBM Spectrum Control by using a domain user account

Prerequisite: If the local user account is used to install the database repository, this account must be a member of the Db2 administrator (DB2ADMNS) group.

To install Db2 with a local user account and IBM Spectrum Control with a domain user account, complete the following steps:

1. Install Db2 by using a local user account.
2. Log on to the Windows domain computer on which you plan to install IBM Spectrum Control by using a domain user account that is a member of the local Administrators group and the local Db2 Administrators (DB2ADMNS) group.

This user must have the **Act as part of the operating system** and **Login as a service** permissions set in the security policy.

3. On the **Single Server Installation Information** page, in the **User name** field, enter a domain user account (with a Windows domain name prefix) that is a member of the local administrators group.
4. Click **Configure Database repository**.
5. On the **Configure the Database Repository** page, enter the Db2 user name **without** a Windows domain name prefix, enter the password for the Db2 user, and click **Validate**.
6. When the validation is complete, click **OK** to return to the **Single Server Installation Information** page.

Restriction: If the domain security policy overrides the local security policy, you must set the indicators on the domain controller computer.

Installing Db2 and IBM Spectrum Control by using domain user accounts

Prerequisite: If the domain user account is used to install the database repository, this user account must have Db2 SYSADM authority.

To install IBM Spectrum Control and Db2 by using domain user accounts complete the following steps:

1. Install Db2 by using a domain user account.
2. Log on to the Windows domain computer on which you plan to install IBM Spectrum Control by using a domain user account that is a member of the local Administrators group and the domain Db2 Administrators (DB2ADMNS) group.
3. On the **Single Server Installation Information** page, in the **User name** field, enter a domain user account (with a Windows domain name prefix) that is a member of the local administrators group.
4. Click **Configure Database repository**.
5. On the **Configure the Database Repository** page, enter the Db2 user name **without** a Windows domain name prefix, enter the password for the Db2 user, and click **Validate**.
6. When the validation is complete, click **OK** to return to the **Single Server Installation Information** page.

Resolving Windows domain prevalidation errors

Adding Windows domain user accounts to a local group, such as Administrator or DB2ADMNS, and later deleting these user accounts from the domain controller computer can cause an error when the account is validated.

When you delete user accounts from the domain controller computer, a reference to the user account is created as a security ID on the computer that is a member of a Windows domain. If these references are not removed, the IBM Spectrum Control installation can fail.

To locate the references that have a security ID, complete these steps:

1. On the domain member computer, click **Start > Control Panel > Administrative Tools > Computer Management**. If you are prompted by a **User Account Control** window, click **Yes**.
2. In the Computer Management navigation tree view, expand the **Local Users and Groups** node and select **Groups**.
3. In the **Name** column, look for a security ID like the following example:
S-1-5-21-337177553-1671989427-887411491-500
4. To remove a reference, select the security ID and click **Delete**.
 - a. To add the user account back to the group, click **Add**. The user account now belongs to the group.

When a prevalidation error occurs, depending on the type of user account and the group, error messages might be displayed:

- BPCIN0109E An unexpected error occurred.....
For more information, review the log files and see the IBM Knowledge Center.

To resolve this situation, use these steps:

1. On the domain controller computer, open **Users and Groups** on the Active Directory.
2. Delete all groups from the user account, and then add the groups again.
3. Log on to the computer again that is the member of the domain.

You have to add the DB2ADMNS rights to the user account again.

Locate the installation log files, `lax*-out.txt` and `lax*-err.txt`, for more details about the root cause of the error message. For example,

```
name=DB2ADMNS An error occurred while enumerating the groups.  
The group could be found.
```

- BPCIN0244E An error occurred while enumerating the local administrator group membership. On the current computer, on the Properties page of this group, remove the user names that are displayed with a security ID (SID). An example of a SID is S-1-5-21-337177553-1671989427-887411491-500 and is used instead of a user name.
- BPCIN0245E An error occurred while enumerating the local DB2 administrator group membership. On the current computer, on the Properties page of this group, remove the user names that are displayed with a security ID (SID). An example of a SID is S-1-5-21-337177553-1671989427-887411491-500 and is used instead of a user name.

For more information about these messages, go to IBM Knowledge Center and search for the message number.

In the error message window, click **OK** to resume the installation program or **Quit** to restart the IBM Spectrum Control.

Related reference

[“Windows domain and local user accounts” on page 6](#)

When a computer is a member of a Windows domain, you can install IBM Db2 on the local computer or on a computer that is a member of a Windows domain. The installation process creates a local Db2 user account or a domain Db2 user account.

[“Adding a computer to the Windows domain” on page 7](#)

Before you can install IBM Spectrum Control in a Windows domain, you must first add the computer on which you plan to install IBM Spectrum Control to the domain.

[“Installing Db2 by using a Windows domain user account” on page 8](#)

Before you install IBM Spectrum Control in a Windows domain, you must install Db2 and register the Db2 license key.

[“Creating a Windows domain common user account for IBM Spectrum Control” on page 9](#)

You must create a Windows domain common user account before you can install IBM Spectrum Control in a Windows domain.

[“Granting Db2 SYSADM authority to a Windows domain user account” on page 10](#)

If a Windows domain user account is used to install IBM Spectrum Control, the user account may not have the Db2 SYSADM authority, because Db2 goes to the domain controller computer to list the groups. Before you install IBM Spectrum Control, you must grant the Windows domain user accounts the Db2 SYSADM authority.

Verifying the connection to the domain controller computer by using the Dcdiag tool

Use the Dcdiag command-line tool to help you determine whether the domain controller computer is registered with the domain name server (DNS), whether the controller can be pinged, and whether the controller has Lightweight Directory Access Protocol (LDAP) connectivity.

The Dcdiag tool is built into Windows Server versions 2019, 2016, and 2012 R2.

To use the Dcdiag tool, complete the following steps:

1. On a computer that is a member of a Windows domain, go to [https://docs.microsoft.com/en-us/previous-versions/windows/it-pro/windows-server-2012-r2-and-2012/cc731968\(v=ws.11\)](https://docs.microsoft.com/en-us/previous-versions/windows/it-pro/windows-server-2012-r2-and-2012/cc731968(v=ws.11)).
2. In a command prompt window, to run the tool, enter the following command:

```
DCDIAG /TEST:DNS /V /E /S:domaincontroller
```

Where *domaincontroller* is the name of the domain controller computer, for example, TPCDomain.

Important: You can run the command only if you are logged in with a Windows domain user name. If you try to run the command when you are logged in with a local user name, the following error message is displayed:

```
Connecting to directory service on server 10.10.10.10
LDAP bind failed with error 1326,
Logon failure: unknown user name or bad password.
```

When you run the **DCDIAG** command, and you connect to the domain controller computer, the output contains text such as `passed test Connectivity`. This text is displayed even if text such as `system1.srm.tpc.example.com failed test DNS": Testing server: Default-First-Site-Name\TPCDomain` is displayed at the end of the output.

The following output shows that the connection was successful:

```
Starting test: Connectivity
* Active Directory LDAP Services Check
*** Warning: could not confirm the identity
of this server in the directory versus
the names returned by DNS servers. If
there are problems accessing this directory
server then you may need to check that this
server is correctly registered with DNS
* Active Directory RPC Services Check
..... TPCDomain passed test Connectivity
```

Installing IBM Spectrum Control and associated products using minimal space on the Windows C: drive

There might be situations in which you do not want to install Db2 or IBM Spectrum Control on the C: drive.

For example, you might have limited space on the drive. You can install these products on a different drive that meets the space requirements for the products. You can also minimize the space that is used on the C: drive during the installation process by directing temporary files to another drive.

The procedures that are provided apply to installing the products on a single server using the appropriate installation programs. The procedures can be modified to suit different installation scenarios.

Installing Db2

Complete the following steps to install Db2 with minimal space used on the C: drive

1. Open a command window and complete the following steps in the same window session:
 - a. At the command prompt, change the directory to the location of the DB2 Setup program `setup.exe` file.
 - b. Run the following commands to change the TEMP and TMP environment variable settings to the drive and directory where you want to direct the temporary files that are created during the installation of Db2.

Important: The directory that is specified in these commands must be an existing directory. If the directory does not exist, you must create it before you start the installation of Db2.

```
set TEMP=drive_and_directory
set TMP=drive_and_directory
```

For example:

```
set TEMP=Q:\Temp
set TMP=Q:\Temp
```

2. Start the DB2 Setup program and follow the prompts in the program to complete a typical installation on a drive other than the C: drive. Ensure that you set the correct drive and directory on the following pages:
 - **Select the installation folder**
 - **Select the IBM SSH server installation folder and startup option**

After the installation, the files and directories that are related to Db2 use approximately 75 MB of space on the C: drive.

Installing IBM Spectrum Control

Complete the following steps to install IBM Spectrum Control with minimal space used on the C: drive:

1. Open a command window and complete the following steps in the same window session:
 - a. At the command prompt, change the directory to the location of the IBM Spectrum Control installation program `setup.bat` file.
 - b. Run the following commands to change the **TEMP** and **TMP** environment variable settings to the drive and directory where you want to direct the temporary files that are created during the installation of IBM Spectrum Control.

Important: The directory that is specified in these commands must be an existing directory. If the directory does not exist, you must create it before you start the installation of IBM Spectrum Control.

```
set TEMP=drive_and_directory
set TMP=drive_and_directory
```

For example:

```
set TEMP=Q:\Temp
set TMP=Q:\Temp
```

2. Start the IBM Spectrum Control program and follow the prompts to complete the installation on a drive other than the C: drive.

Ensure that you set the correct drive and directory on the following pages:

- Choose the Installation Location and Type page in the IBM Spectrum Control installation program.
- Configure the Database Repository page in the IBM Spectrum Control installation program.

After the installation, the files and directories that are related to IBM Spectrum Control use approximately 5 MB on the C: drive.

Verifying the installation

After you install IBM Spectrum Control, you can verify whether the installation was successful.

Use the following questions to guide you through the verification process.

Remember the following information when you are verifying the installation:

- You must use a user name with Db2 administrative privileges to run any Db2 commands.
- You must run any Db2 commands on the Db2 command line.

Was the TPCDB database created?

Run the following Db2 command:

```
db2 list db directory
```

This command returns information about the TPCDB database.

Are the tables and views present in the TPCDB database?

Run the following Db2 commands:

```
db2 connect to TPCDB
db2 list tables for schema TPC
db2 disconnect TPCDB
```

These commands indicate that you can connect to and disconnect from the IBM Spectrum Control database repository and lists the tables and views in the TPCDB database.

Is the Data server running?

On the Windows operating system:

Go to the Services listing and find **IBM Spectrum Control - Data Server**.

On the AIX or Linux operating system:

Run the following command:

```
ps -eaf | grep DataServer.jar
```

This command returns a list of the Data server processes in the process table.

Is the Device server running?

On the Windows operating system:

1. Go to the Services listing and find **IBM Spectrum Control - Device Server**.
2. In a Windows command window, go to the following directory:

```
installation_dir\wlp\bin\
```

where *installation_dir* is the top-level directory in which you installed IBM Spectrum Control (for example, C:\Program Files\IBM\TPC\).

3. Run the following command:

```
server.bat status deviceServer
```

This command returns a status of running.

On the AIX or Linux operating system:

1. In a command-line window, go to the following directory:

```
installation_dir/wlp/bin/
```

where *installation_dir* is the top-level directory in which you installed IBM Spectrum Control (for example, /opt/IBM/TPC/).

2. Run the following command:

```
./server status deviceServer
```

This command returns a status of running.

It can take several minutes after the Device server starts for all services to be running.

Are all Device server services running?

Go to

```
https://localhost:port/ITSRM/ServiceManager
```

Where *port* is the value of the WC_defaultHost_secure key in the *installation_dir*/device/portdef.props file. The default port number is 9551.

Is the Storage Resource agent running?

On the Windows operating system:

Go to the **Services** window and find **IBM Spectrum Control Storage Resource Agent**.

On the AIX or Linux operating system:

Run the following command:

```
ps -eaf | grep Agent
```

This command returns a list of the Storage Resource agent processes in the process table.

Is the web server running?

On the Windows operating system:

Go to the **Services** window and find **IBM Spectrum Control - Web Server**.

On the AIX or Linux operating system:

Run the following command:

```
ps -eaf | grep webServer
```

This command returns a list of the web server processes in the process table.

Can I log on to the IBM Spectrum Control GUI?

Open a web browser and enter the following web address:

```
https://host_name:port/srm
```

Where *host_name* is the fully qualified host name of the computer where the IBM Spectrum Control Web server is installed and *port* is the value of the httpsPort key in the *installation_dir*/wlp/usr/servers/webServer/server.xml file. The default port is 9569.

Reviewing the log files to resolve installation issues

If an error occurs during IBM Spectrum Control installation, you can review the error log files to resolve issues and continue the installation.

To resolve errors that occur during the preinstall steps in the IBM Spectrum Control installation program, complete the following steps:

1. Navigate to one of the following directories:
 - For the Windows operating system, go to %TEMP% directory
 - For the AIX or Linux operating system, go to /tmp directory
2. Review the following log files:

- lax-xxxxxx-out.txt
- lax-xxxxxx-err.txt

Tip: The files are InstallAnywhere log files and are automatically generated. The xxxxx are numeric characters that are assigned by the InstallAnywhere software.

To resolve errors after the IBM Spectrum Control installation starts, complete the following steps:

1. Navigate to one of the following default directories:
 - For the Windows operating system, go to C:\Program Files\IBM\TPC\logs
 - For the AIX or Linux operating system, go to /opt/IBM/TPC/logs
2. Review these log files:
 - msgTPCInstall.log
 - traceTPCInstall.log
 - sra\install\agent.trace
 - sra\install\agent_number.log
3. For agent log files, navigate to one of the following default directories:
 - For the Windows operating system, go to *SRA_location*\log
 - For the AIX or Linux operating system, go to *SRA_location*/log

where *SRA_location* is where the Storage Resource agent is installed.

If an installation error occurred and you decide to do a partial rollback, the msgTPCInstall.log and traceTPCInstall.log files are updated with additional information when you resume the installation.

Changing languages

You can change the operating system language and web browser that determines the language in which IBM Spectrum Control services and the IBM Spectrum Control GUI are displayed.

For IBM Spectrum Control, the following languages are supported:

- English
- Czech
- French
- German
- Hungarian
- Italian
- Japanese
- Korean
- Polish
- Brazilian Portuguese
- Russian
- Spanish
- Chinese (Simplified)
- Chinese (Traditional)

Changing the language of the IBM Spectrum Control GUI

Change the language that is displayed in your web browser for the IBM Spectrum Control GUI.

1. Choose one of these options to access the settings page in the web browser:

Option	Description
Mozilla Firefox (ESR 31 and later)	In the menu bar, click Tools > Options .
Google Chrome	Click the customization control in the upper-right corner of the page and click Settings .
Internet Explorer (v11 and later)	In the menu bar, click Tools > Internet Options .

2. Access the language settings in the web browser:

Option	Description
Mozilla Firefox (ESR 31 and later)	Scroll to the Language and Appearance section and click Choose .
Google Chrome	Scroll to the bottom of the Settings page and click Advanced .
Internet Explorer (v11 and later)	In the General tab on the Internet Options page , click Languages .

3. Select the language that you want to display:

Option	Description
Mozilla Firefox (ESR 31 and later)	Select the language that you want to display in the browser and click Move up until it's at the top of the list. Click Ok .
Google Chrome	Scroll to the Languages section, click the action customization next to the language that you want to display, and select Move to the top .
Internet Explorer (v11 and later)	Select the language that you want to display in the browser and click Move up until it's at the top of the list. Click Ok twice to return to the main browser page.

4. Refresh the browser tab where the IBM Spectrum Control GUI is displayed to apply the language setting.

Changing the operating system language for Windows

Change the operating system language for Windows.

To change the operating system language for Windows servers, for example from English to German (de_DE), complete these steps:

1. Choose one of these options:

Option	Description
Windows Server 2012	On the Dashboard page, hover the mouse over the lower left corner of the page next to the Server Manager taskbar button, and then click Start .
Windows Server 2012 R2, Windows Server 2016, Windows Server 2019	Click Start .

2. Click **Control Panel**.

3. Click **Clock, Language, and Region > Region and Language**.

Tip: The exact links that you click might vary between the different versions of Windows. For example, **Region** and **Language** might be separate links in more recent versions of Windows. In those cases, click **Language**.

4. On the **Format** tab, select a language and click **OK**.

Tip: The exact links that you click might vary between the different versions of Windows. For example, you might need to click the **Administrative** tab rather than the **Format** tab to change the system locale.

5. Restart all the IBM Spectrum Control services or restart the Windows server.

Changing the operating system language for AIX

Change the operating system language for AIX.

To change the operating system language for AIX systems, for example from English to German (de_DE), complete these steps:

1. At the command prompt, run the following commands:

```
chlang -m de_DE de_DE
export LANG=de_DE
```

2. Restart all the IBM Spectrum Control services or restart the AIX system.

Adding an installation license

If you installed IBM Spectrum Control and want to add a IBM Spectrum Control license so that you can monitor storage systems with different license models, you can use the installation program or silent-mode installation.

To determine the type of license you have, find these files in the `<installation_dir>/swidtag` directory:

ibm.com_IBM_Spectrum_Control-version.swidtag

Indicates that you have an IBM Spectrum Control license.

ibm.com_IBM_Spectrum_Control_Standard_Select_Edition-version.swidtag

Indicates that you have an IBM Spectrum Control Select Edition license.

Depending on the license you purchased, one of the following license key files can be found in the `license\key` sub-directory of the electronic image:

node1ock.AE

IBM Spectrum Control license

node1ock.AS

IBM Spectrum Control Select Edition license

Adding an installation license using the installation program

If you installed IBM Spectrum Control and want to add an IBM Spectrum Control license for additional function, you can do so by using the installation program.

To add the license to your system using the installation program, complete the following steps:

1. Log on to the IBM Spectrum Control system with the appropriate user privileges.
2. Start the IBM Spectrum Control installation program.
3. On the Choose Installation Location and Type page, select **License upgrade** and click **Next**.
4. On the Upgrade License page, select which license key file to use and click **Next**.
5. Verify the information on the Preinstallation Summary page and click **Install**.
6. On the Installation Completed page, click **Done**.

When the installer upgrades the license, it also stops and restarts the following IBM Spectrum Control servers: Web, Data, and Device.

Related reference

[“Planning for IBM Spectrum Control authentication and authorization” on page 15](#)

An operating system user name is required to install and log on to IBM Spectrum Control for the first time. After you install IBM Spectrum Control, you can assign roles to users. Roles determine the product functions that are available to users.

Adding an installation license using silent mode

If you installed IBM Spectrum Control and want to add an IBM Spectrum Control license to access more function, you can do so by using silent-mode installation.

To add the license to your system that uses the silent-mode installation, complete the following steps:

1. Log on to your IBM Spectrum Control system with the appropriate user privileges.
2. Modify the following parameters in the `silent_SingleServerTypical.properties`, `silent_SingleServerCustom.properties`, or `silent_MultipleServer.properties` file:
 - `CHOSEN_INSTALL_TYPE="License Upgrade"`
 - `varUseLicenseKeyOnImage=`
 - `varLicenseKeyFile=`

For more information, see [“Editing the response file” on page 58](#).

3. Save the appropriate response file.
4. Start the IBM Spectrum Control installation program.

For Windows operating system, run the command:

```
setup.bat -l language -i silent -f absolute_path_to_response_file
```

For AIX or Linux operating system, run the following command:

```
./setup.bin -l language -i silent -f absolute_path_to_response_file
```

When the installer upgrades the license, it also stops and restarts the IBM Spectrum Control Web, Data, and Device servers.

Related reference

[“Planning for IBM Spectrum Control authentication and authorization” on page 15](#)

An operating system user name is required to install and log on to IBM Spectrum Control for the first time. After you install IBM Spectrum Control, you can assign roles to users. Roles determine the product functions that are available to users.

Installing Storage Resource agents

You can install Storage Resource agents by using the IBM Spectrum Control user interface or a command.

You can select one of the following agent installation scenarios:

- To deploy a Storage Resource agent using the GUI, go to the product documentation at http://www.ibm.com/support/knowledgecenter/SS5R93_5.4.1/com.ibm.spectrum.sc.doc/fqz0_r_native_agents.html.
- To install the agent using a command, see [“Installing Storage Resource agents by using a command” on page 81](#).

Restriction:

- You cannot use Storage Resource agents as data sources for switches and fabrics. For Brocade switches, you must use CIM agents. For Cisco switches, you must use SNMP agents.
- Before you install or deploy a Storage Resource agent on a system, you must disable the firewall on that system.
- If you are using IBM PowerHA® SystemMirror® for AIX, a Storage Resource agent must be installed on each node of the cluster and all agents in a cluster must be configured to use the same listening port.
- To scan a cluster resource group, you must configure the cluster resource group to have at least one IP address that is accessible from the IBM Spectrum Control server.

To deploy a Storage Resource agent, you must log in as a user with the following authority:

On Windows operating systems

You must have Windows Administrator authority.

On UNIX or Linux operating systems

You must be logged in as the root user.

Installing Storage Resource agents by using a command

You typically install Storage Resource agents by using the IBM Spectrum Control GUI. However, if you must install Storage Resource agents locally, you can do so with limited support.

During this installation method, a return code of zero means that a successful installation occurred and a nonzero return code means that an unsuccessful installation occurred. If you have an unsuccessful installation, you must review the log files to determine the problem.

The **-force** option can be used when you have a Storage Resource agent point to multiple servers. If an agent is installed on one server, and another server wants to install an agent in the same location, the second server can use the **-force** option to install the agent.

If you use this installation method, when you enter a directory to install the Storage Resource agent, do not add an ending slash mark (\). For example, do not specify C:\agent1\. This action causes the installation to fail.

If you run the agent as a non-daemon service (on-demand service), you must make sure that at least one protocol is valid for a successful connection from the server to the agent. See [Table 21 on page 81](#) for the required parameters for each protocol.

Table 21. Parameters required for each protocol	
Protocol	Description
SSH	Requires the user ID and password or user ID, certificate, and passphrase.
Windows (SMB)	Requires the user ID and password.
RExec	Requires user ID and password.
RSH	Requires the user ID.

The Storage Resource Agent image contains the installation images for the Storage Resource agents in the following directory:

```
DVD_installation_image_location/data/sra/operating_system
```

See [Table 22 on page 81](#) for the Storage Resource agent installation images.

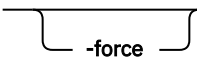

Table 22. Storage Resource agent installation images	
Operating system	Operating system name
AIX	aix_power
Linux x86	linux_ix86
Linux for Power Systems Servers	linux_power
Linux s390	linux_s390
Windows	windows

To install the Storage Resource agents locally, complete the following steps:

1. Go to the installation image location:

```
cd DVD_installation_image_location
```

2. Run the following command:

```
➤ bin/Agent — -install —  -serverPort — server_secure_port ➤➤  
➤ -serverIP — server_IP_address — -installLoc — Agent_install_location ➤  
➤  -debug MAX ➤➤  
➤ -agentPort — agent_port — -commtype daemon ➤➤  
➤ 1 ➤➤  
➤ -userID — user_ID — -password — password — -certFile — certificate_file ➤➤  
➤ 2 ➤➤  
➤ -passphrase — passphrase ➤➤  
➤ 3 ➤➤
```

Notes:

- ¹ Parameters when the agent is run as a daemon service.
- ² Parameters when the agent is run as a non-daemon service. See [Table 21 on page 81](#) to determine which parameter is required for each protocol.
- ³ Parameters when the agent is run as a non-daemon service. See [Table 21 on page 81](#) to determine which parameter is required for each protocol.

The parameters are as follows.

-install

Installs the Storage Resource agent.

-force

Forces the agent to be installed. The two different situations in which this parameter must be specified are as follows.

- If an earlier installation failed and there is residue on the system that causes further installations to fail. You must verify that all the parameters that are provided are valid, such as the installation location, port .
- If the agent is already installed from one server and you now must install the agent pointing to another server.

-serverPort *server_secure_port*

The default port for the Data server is 9549.

-serverIP *server_IP_address*

The IP address of the server. If the server can be reached through multiple IP addresses, then multiple IP addresses can be specified with IP addresses separated with a comma.

-installLoc "*Agent_install_location*"

Location where the agent is installed. Enclose the directory name in quotation marks, for example, "C:\Program Files\IBM\TPC_SRA".

-debug MAX

Optional parameter for debugging purposes.

-agentPort *agent_port*

If the agent is run as a daemon service, the agent port must be specified. The default agent port is 9510.

-commtype *daemon*

If the agent is run as a daemon service, then this parameter must be specified.

-userID *user_ID*

For non-daemon service. The user ID defined on the agent system. This user ID is used by the server to connect to the agent system.

-password *password*

For non-daemon service. Password for the user ID.

-certFile "*certificate_file*"

For non-daemon service. The certificate that is used for SSH communication between the server and agent. This certificate must be stored on the server system. Enclose the directory name in quotation marks, for example, "c:\keys\id_sra".

For information about SSH protocol and SSL protocol certificates, see http://www.ibm.com/support/knowledgecenter/SS5R93_5.4.1/com.ibm.spectrum.sc.doc/fqz0_r_create_certificate_ssh.html and http://www.ibm.com/support/knowledgecenter/SS5R93_5.4.1/com.ibm.spectrum.sc.doc/fqz0_r_create_custom_certificate_ssl.html.

-passphrase *passphrase*

For non-daemon service. The passphrase that is defined for the certificate that is used in SSH communication.

After you install a Storage Resource agent by using a command, you must schedule a probe to collect data about the associated resource. For information about how to schedule a probe, see https://www.ibm.com/support/knowledgecenter/en/SS5R93_5.4.1/com.ibm.spectrum.sc.doc/fqz0_t_creating_probes.html.

Installing IBM Cognos Analytics

You can install the optional IBM® Cognos® Analytics 11.0.9 or later reporting tool on one computer, on multiple servers for a distributed installation, or you can expand an existing single computer installation to another server to improve performance. Cognos Analytics provides an installation program that guides you through the installation process.

Once you have installed Cognos Analytics you can view predefined reports and create custom reports about IBM Spectrum Control. You can access reports from IBM Spectrum Control, and work with the reports in the Cognos Analytics reporting tool.

Installing Cognos Analytics in a single Windows environment

You can install Cognos Analytics in a Microsoft Windows environment by using the Cognos Analytics installation program.

The IBM Cognos Analytics 11.1 or later installation consists of the following components:

- Installer executable file
- Repository .zip file

When you run the installer, you must point to the server repository .zip file.

For Microsoft Windows operating system installations, ensure that you have administrator privileges for the Windows computer you are doing the installation on. Also, ensure that your computer has a TEMP system variable that points to the directory where you want to store temporary files. During installation, files from the disk are temporarily copied to this directory.

For more information, see [Verify system requirements](#).

For more information, see [Software Product Compatibility Reports](#).

1. Log in to your Windows computer as a user with administrative privileges.

2. Start the Cognos Analytics installer executable file.
3. Select the language to use for your installation and click **Next**.
4. On the **Repository selection** page, click **Choose**.
5. On the **Please Choose a File** page, select the server repository zip file and click **Open**.
6. Click **Next**.
7. On the **Product Install** page, select **IBM Cognos Analytics** and click **Next**.
8. On the **License Agreement** page, accept the license agreement and click **Next**.
9. On the **Location** page, provide your installation location and name of the **Shortcut** folder and click **Next**.

If you want the IBM Cognos Analytics installation to automatically create the installation location for you, click **Yes**.

10. On the **Installation type** page, select **Custom** and click **Next**.

The Custom option offers full flexibility to select the IBM Cognos Analytics components that you want to install. You might want to customize or integrate Cognos Analytics with third-party software? If so, this option is one you would select.

11. On the **Choose components** page, accept the default selections, and click **Next**.
12. On the **Pre-Installation Summary** page, review your information for accuracy and click **Install**.
13. When the installation is complete, click **Done**.

Related information

[Silent installation, uninstallation, and configuration](#)

[Uninstall IBM Cognos Analytics on Microsoft Windows operating systems](#)

Installing Cognos Analytics in a single Linux environment

You can install Cognos Analytics in a Linux environment by using the Cognos Analytics installation program. To run the graphical-mode installation program, your computer must support a Java-based graphical user interface.

The IBM Cognos Analytics 11.1 or later installation consists of the following components:

- Installer executable file
- Repository .zip file

When you run the installer, you must point to the server repository .zip file.

For Linux operating system installations, ensure that you are a root user for the computer you are doing the installation on.

Verify that the Cognos Analytics installer executable file has 755 permissions and that the Cognos Analytics repository .zip file has 644 permissions.

You *do not* need to set the **JAVA_HOME** environment variable before you start the IBM Cognos Analytics 11.0.9 or later installation program.

Verify that you have installed the following prerequisite packages on a Linux computer for IBM Cognos Analytics 11.0.9 or later.

The prerequisite packages for Red Hat Enterprise Linux (RHEL) 6 are:

```
glibc-2.12-1.166.el6 or later (both i686 and x86_64 packages)
libstdc++-4.4.7-16.el6 or later (both i686 and x86_64 packages)
nspr-4.9.2-1.el6 or later (both i686 and x86_64 packages)
nss-3.14.0-12.el6 or later (both i686 and x86_64 packages)
openmotif-2.3.3-5.el6 or later (both i686 and x86_64 packages)
```

The prerequisite packages for Red Hat Enterprise Linux (RHEL) 7 are:

```
glibc-2.17-55.el7 or later (both i686 and x86_64 packages)
libstdc++-4.8.2-16.el7 or later (both i686 and x86_64 packages)
nspr-4.10.2-4.el7 or later (both i686 and x86_64 packages)
```

```
nss-3.15.4-6.el7 or later (both i686 and x86_64 packages)
motif-2.3.4-7.el7 or later (both i686 and x86_64 packages)
```

The prerequisite packages for Red Hat Enterprise Linux (RHEL) 8 are:

```
unzip-6.0-41.el8.x86_64 or later
libstdc++-8.3.1-4.5.el8 or later (both i686 and x86_64 packages)
glibc-2.28-72.el8 or later (both i686 and x86_64 packages)
libXaw-1.0.13-10.el8.x86_64 or later
libXtst-1.2.3-7.el8.x86_64 or later
libXi-1.7.9-7.el8.x86_64 or later
libXft-2.3.2-10.el8 or later (both i686 and x86_64 packages)
libX11-1.6.7-1.el8 or later (both i686 and x86_64 packages)
motif-2.3.4-16.el8 or later (both i686 and x86_64 packages)
nss-3.44.0-9.el8_1 or later (both i686 and x86_64 packages)
nspr-4.21.0-2.el8_0 or later (both i686 and x86_64 packages)
libnsl-2.28-72.el8 or later (both i686 and x86_64 packages)
```

For more information, see [Verify system requirements](#).

For more information, see [Software Product Compatibility Reports](#).

You need to set the correct ulimit values in the `/etc/security/limits.conf` file for IBM Cognos Analytics 11.0.9 or later.

Here is an example of the entries you might need to add to the `/etc/security/limits.conf` file:

```
*      soft    nproc    unlimited
*      hard    nproc    unlimited
*      soft    nofile   8192
*      hard    nofile   8192
*      soft    stack    unlimited
*      hard    stack    unlimited
```

After you set and save your ulimit values, restart your computer and verify the correct ulimit values.

For more information, see [Set the ulimit values on UNIX and Linux operating systems](#).

1. Log in to your Linux computer as a root user.
2. Start the Cognos Analytics installer executable file.
3. Select the language to use for your installation and click **Next**.
4. On the **Repository selection** page, click **Choose**.
5. On the **Please Choose a File** page, select the server repository zip file and click **Open**.
6. Click **Next**.
7. On the **Product Install** page, select **IBM Cognos Analytics** and click **Next**.
8. On the **License Agreement** page, accept the license agreement and click **Next**.
9. On the **Location** page, provide your installation location and click **Next**.

If you want the IBM Cognos Analytics installation to automatically create the installation location for you, click **Yes**.

10. On the **Choose components** page, accept the default selections, and click **Next**.
11. On the **Pre-Installation Summary** page, review your information for accuracy and click **Install**.
12. When the installation is complete, click **Done**.

Related information

[Silent installation, uninstallation, and configuration](#)

[Uninstall IBM Cognos Analytics on UNIX or Linux operating systems](#)

Installing Cognos Analytics in a single AIX environment

You can install Cognos Analytics in an AIX environment by using the Cognos Analytics installation program. To run the graphical-mode installation program, your computer must support a Java-based graphical user interface.

The IBM Cognos Analytics 11.1 or later installation consists of the following components:

- Installer executable file
- Repository .zip file

When you run the installer, you must point to the server repository .zip file.

For AIX operating system installations, ensure that you are a root user for the computer you are installing on.

Verify that the Cognos Analytics installer executable file has 755 permissions and that the Cognos Analytics repository .zip file has 644 permissions.

You *do not* need to set the **JAVA_HOME** environment variable before you start the Cognos Analytics 11.0.9 or later installation program.

Verify that you have the following prerequisite packages installed on a AIX computer for Cognos Analytics 11.0.9 or later.

The prerequisites for AIX 7.1 and AIX 7.2 are:

- IBM XL C/C++ for AIX, V12.1 Runtime Environment. If using AIX XL C++ Runtime it is recommended to use 13.1.2.160112 or later.
- bos.pmapi.lib

For more information, see [Verify system requirements](#).

For more information, see [Software Product Compatibility Reports](#)

You need to set the correct ulimit values in the /etc/security/limits file for IBM Cognos Analytics 11.0.9 or later.

Here is an example of the entries you might need to add to the /etc/security/limits file:

```
default:
fsize = -1
core = -1
cpu = -1
rss = -1
stack = 16384
nofiles = 8192
```

After you set and save your ulimit values, restart your computer and verify the correct ulimit values.

For more information, see [Set the ulimit values on UNIX and Linux operating systems](#).

1. Log in to your AIX computer as a root user.
2. Start the Cognos Analytics installer executable file.
3. Select the language to use for your installation and click **Next**.
4. On the **Repository selection** page, click **Choose**.
5. On the **Please Choose a File** page, select the server repository zip file and click **Open**.
6. Click **Next**.
7. On the **Product Install** page, select **IBM Cognos Analytics** and click **Next**.
8. On the **License Agreement** page, accept the license agreement and click **Next**.
9. On the **Location** page, provide your installation location and click **Next**.

If you want the IBM Cognos Analytics installation to automatically create the installation location for you, click **Yes**.

10. On the **Choose components** page, accept the default selections, and click **Next**.
11. On the **Pre-Installation Summary** page, review your information for accuracy and click **Install**.
12. When the installation is complete, click **Done**.

Related information

[Silent installation, uninstallation, and configuration](#)

[Uninstall IBM Cognos Analytics on UNIX or Linux operating systems](#)

Configuring IBM Cognos Analytics

After you install the optional IBM® Cognos® Analytics, to view predefined reports and create custom reports about IBM Spectrum Control, you must copy Db2® files, create a content store database, save your configuration settings, and start the services.

Important: The configuration procedures assume that you are going to use Db2 for the Cognos Analytics content store. *It is not required* that the Cognos Analytics content store use Db2. Cognos Analytics supports other database products for the content store.

The IBM Spectrum Control database repository uses Db2. If you do not use Db2 for the content store, you still need to copy the Db2 JDBC driver files into the Cognos Analytics installation location and link the 32-Bit Db2 library file (Linux and AIX only) in order for Cognos Analytics to connect to the IBM Spectrum Control database repository.

A general overview to complete the configuration tasks in order to view predefined reports and create custom reports about IBM Spectrum Control:

- Copying Db2 files and linking Db2 libraries
- Creating the content store
- Creating a data source
- Importing pre-defined reports package

Related information

[Guidelines for creating the content store](#)

[Set up database connectivity for the content store database](#)

[Set Database Connection Properties for the content store](#)

Copying JDBC files for Db2 on Windows

You must copy JDBC driver files from your Db2® installation directory to your Cognos Analytics installation location.

Copy the following Db2 JDBC driver files from the *Db2_installation_dir\java* directory to the *Cognos_installation_dir\drivers* directory:

- *db2jcc.jar* - This JDBC driver file does not exist for Db2 11.5 or later
- *db2jcc_license_cu.jar*
- *db2jcc4.jar*

For more information, see [Configuration actions that are critical to the success of your installation](#).

Copying Db2 files and linking the Db2 library on Linux and AIX

You must copy JDBC driver files from your Db2® installation directory to your Cognos Analytics installation location and then link the Db2 library.

1. Copy the following Db2 JDBC driver files from the *Db2_installation_dir/java/* directory to the *Cognos_installation_dir/drivers/* directory:
 - *db2jcc.jar* - This JDBC driver file does not exist for Db2 11.5 or later
 - *db2jcc_license_cu.jar*
 - *db2jcc4.jar*

For more information, see [Configuration actions that are critical to the success of your installation](#).

2. Enter the following command as the root user:

```
cd Cognos_installation_dir/drivers/  
chmod +x db2jcc*.jar
```

3. Enter the following command as the root user:

On the Linux operating system:

```
ln -s Db2_instance_owner_home directory/sqlllib/lib32/libdb2.so Cognos_installation_dir/bin/
```

On the AIX operating system:

```
ln -s Db2_instance_owner_home directory/sqlllib/lib32/libdb2.a Cognos_installation_dir/bin/
```

In the IBM Spectrum Control Predefined Reports use Compatibility Query Mode, Cognos Analytics needs to use the 32-Bit Db2 library in order to connect to the IBM Spectrum Control database as a data source.

Creating a content store and starting Cognos Analytics on Windows

The information that you enter in IBM Cognos Configuration for Cognos Analytics is used to generate a script that you use to create the content store database.

1. Create the content store for Cognos Analytics.
 - a) From the **Windows Start** menu, select **IBM Cognos Analytics > IBM Cognos Configuration**.
 - b) In the **Explorer** window, expand **Data Access > Content Manager** and click **Content Store**.
 - c) In the **Type** property, enter **DB2 database**.
 - d) In the **Database server and port number** property, enter localhost or the fully qualified domain name of the machine where Db2 is installed.
For example, localhost:50000 or *FQDN_Of_Your_Machine*:50000 where 50000 is the default port number that is used by Db2. If you are using a different port number, ensure that you use that value. To determine the port that is used by Db2, examine the **varDBPort** parameter in the *installation_dir\config\InstallVariable.properties* file.
 - e) In the **User ID and password** property, enter the user name of the owner of the Db2 instance where the content store database will be located and the password that is associated with that user name.
Typically, this user name is *db2admin*. If the user name is a Windows domain user name, enter the user name *without* a Windows domain name prefix or suffix.
 - f) In the **Database name** property, verify that the default value is **cm**.
 - g) From the **File** menu, click **Save**.
 - h) In the **informational** window, click **Close**.
 - i) In the **Explorer** window, expand **Data Access > Content Manager** and click **Content Store**.
 - j) Right-click **Content Store** and click **Generate DDL**.
 - k) In the **informational** window, click **Close**.
 - l) From the **Windows Start** menu, select **IBM DB2 DB2COPY1 (Default) > DB2 Command Window - Administrator**. Then, enter the following command:

```
db2 -tvf "Cognos_installation_dir\configuration\schemas\content\db2\createDb.sql"
```

On Windows, add quotes around the directory path if it contains spaces. For example:

```
db2 -tvf "C:\Program Files\IBM\Cognos\analytics\configuration\schemas\content\db2\createDb.sql"
```

This process might take a few minutes.

- m) From the **Actions** menu, click **Test**.
You are testing the connection between content manager and the content store database.
- n) In the **informational** window, click **Close**.

For more information, see [Generating a script file to create a database for a DB2 content store](#).

2. Start Cognos Analytics (content manager and application services).

It might take Cognos Analytics a few minutes to start.

- a) In IBM Cognos Configuration, in the **Explorer** window, click **Local Configuration**.
 - b) From the **Actions** menu, click **Test**.

Tip: If you are not configuring Cognos Analytics to send notifications, you can ignore the testing the mail server connection failure message. If there is a failure related to NIST SP800-131A conformance, click **Details** in the dialog to see more information. The integration between Cognos Analytics and IBM Spectrum Control is not affected by this setting.
 - c) From the **Actions** menu, click **Start**.
3. Exit IBM Cognos Configuration.

Creating a content store and starting Cognos Analytics on Linux or AIX

The information that you enter in IBM Cognos Configuration for Cognos Analytics is used to generate a script that you use to create the content store database.

1. Create the content store for Cognos Analytics.
 - a) Enter the following commands to start IBM Cognos Configuration:

```
cd <Cognos_installation_dir>/bin64/
. /home/db2inst1/sqllib/db2profile
./cogconfig.sh
```

Notice the space between the . and the / in the second command.

Tip:

It's recommended to source-in the db2profile (. /home/db2inst1/sqllib/db2profile) anytime you are going to start IBM Cognos Configuration.

- b) In the **Explorer** window, expand **Data Access > Content Manager** and click **Content Store**.
- c) In the **Database server and port number** property, enter localhost or the fully qualified domain name of the computer where Db2 is installed.

For example, localhost:50000 or *FQDN_Of_Your_Machine*:50000 where 50000 is the default port number that is used by Db2. If you are using a different port number, ensure that you use that value. To determine the port that is used by Db2, examine the **varDBPort** parameter in the *installation_dir/config/InstallVariable.properties* file.
- d) In the **User ID and password** property, enter the user name of the owner of the Db2 instance where the content store database is located and the password that is associated with that user name.
- e) In the **Database name** property, verify that the default value is **cm**.
- f) From the **File** menu, click **Save**.
- g) In the **Explorer** window, go to **Data Access > Content Manager** and click **Content Store**.
- h) Right-click **Content Store** and click **Generate DDL**.
- i) In the **informational** window, click **Close**.
- j) While you are logged in to the Linux or AIX operating system as the root user, switch to the user that is the Db2 instance owner (for example, db2inst1).
- k) Enter the following Db2 command:

```
db2 -tvf Cognos_installation_dir/configuration/schemas/content/db2/createDb.sql
```

If the results of this command contain the following similar messages, you can safely ignore those messages because the Db2 instance owner already has the necessary privileges:

```
GRANT CREATETAB,BINDADD,CONNECT,IMPLICIT_SCHEMA ON DATABASE TO USER db2inst1
DB21034E The command was processed as an SQL statement because it was not a
valid Command Line Processor command. During SQL processing it returned:
SQL0554N An authorization ID cannot grant a privilege or authority to itself.
SQLSTATE=42502
```

```
GRANT CREATEIN,DROPIN,ALTERIN ON SCHEMA DB2COGNOS TO USER db2inst1
DB21034E The command was processed as an SQL statement because it was not a
valid Command Line Processor command. During SQL processing it returned:
SQL0554N An authorization ID cannot grant a privilege or authority to itself.
SQLSTATE=42502
```

```
GRANT USE OF TABLESPACE TSN_USR_cm TO USER db2inst1
DB21034E The command was processed as an SQL statement because it was not a
valid Command Line Processor command. During SQL processing it returned:
SQL0554N An authorization ID cannot grant a privilege or authority to itself.
SQLSTATE=42502
```

```
GRANT USE OF TABLESPACE TSN_REG_cm TO USER db2inst1
DB21034E The command was processed as an SQL statement because it was not a
valid Command Line Processor command. During SQL processing it returned:
SQL0554N An authorization ID cannot grant a privilege or authority to itself.
SQLSTATE=42502
```

- l) Go back to the root user.
 - m) From the **Actions** menu, click **Test**.
You are testing the connection between Content Manager and the content store database.
 - n) In the **informational** window, click **Close**.
For more information, see [Generating a script file to create a database for a DB2 content store](#).
2. Start Cognos Analytics (Content Manager and application services).
 - a) In IBM Cognos Configuration, in the **Explorer** window, click **Local Configuration**.
 - b) From the **Actions** menu, click **Test**.
Tip: If you are not configuring Cognos Analytics to send notifications, you can ignore the testing the mail server connection failure message. If there is a failure related to NIST SP800-131A conformance, click **Details** in the dialog to see more information. The integration between Cognos Analytics and IBM Spectrum Control is not affected by this setting.
 - c) From the **Actions** menu, click **Start**.
 3. When Cognos Analytics starts, exit IBM Cognos Configuration.

Creating Cognos Analytics data source for the IBM Spectrum Control database

You can create an IBM Cognos Analytics data source for your IBM Spectrum Control database.

The following table shows the Db2 actions that are required before you create an IBM Cognos Analytics data source for the IBM Spectrum Control database:

Table 23. Required Db2 actions for IBM Spectrum Control/Cognos Analytics integration scenarios	
IBM Spectrum Control - Cognos Analytics integration scenario	Required Db2 actions
IBM Spectrum Control database and Cognos Analytics on the same Windows or Linux computer	There are no Db2 actions required

Table 23. Required Db2 actions for IBM Spectrum Control/Cognos Analytics integration scenarios (continued)

IBM Spectrum Control - Cognos Analytics integration scenario	Required Db2 actions
<p>IBM Spectrum Control database and Cognos Analytics on the same AIX computer</p>	<p>Configure the connectivity with the IBM Spectrum Control database to use the loopback mode, or Cognos Analytics will fail to connect to the IBM Spectrum Control database source when running reports multiple times.</p> <p>Complete the following steps on the AIX computer:</p> <ol style="list-style-type: none"> 1. Log on to the computer as a user with root privileges 2. Switch to the user that is the Db2 instance owner (for example, <i>db2inst1</i>). 3. Run this command: <div data-bbox="899 722 1472 793" data-label="Text"> <pre>db2 catalog tcpip node loopbk remote 127.0.0.1 server 50000</pre> </div> <p>If your Db2 instance uses a different port other than 50000, provide that port value in the command.</p> 4. Run this command: <div data-bbox="899 961 1472 1033" data-label="Text"> <pre>db2 catalog database TPCDB as TPCDB_LP at node loopbk</pre> </div> <p>If your IBM Spectrum Control database has a name other than TPCDB, provide that database name in the command.</p> <p>If you have upgraded from an earlier version of IBM Spectrum Control, you might find that you already have the loopback connection configured and the above mentioned commands return errors. Confirm the configuration using the 'db2 list database directory' command and look for TPCDB_LP.</p>

Table 23. Required Db2 actions for IBM Spectrum Control/Cognos Analytics integration scenarios (continued)

IBM Spectrum Control - Cognos Analytics integration scenario	Required Db2 actions
<p>IBM Spectrum Control database on a different computer than where you installed Cognos Analytics, all platforms</p>	<p>Catalog the node and database for the remote IBM Spectrum Control database.</p> <p>Complete the following steps on the computer where you installed Cognos Analytics:</p> <ol style="list-style-type: none"> 1. On Windows operating system: Log in as a user with administrative privileges. <ol style="list-style-type: none"> a. On Linux or AIX operating system: Log in as a user with root privileges. 2. On Windows operating system, from the Start Menu, select IBM DB2 DB2COPY1 (Default) > DB2 Command Window - Administrator. <ol style="list-style-type: none"> a. On Linux or AIX operating system: Switch to the user that is the Db2 instance owner (for example, <i>db2inst1</i>). 3. Enter the following command to catalog the remote node: <pre>db2 catalog tcpip node <i>node_name</i> remote <i>server_fqdn</i> server <i>port</i></pre> <p>Where <i>node_name</i> is a new value you provide to name the node. For example, remoteSC. The <i>server_fqdn</i> value is the fully qualified domain name of the machine where the IBM Spectrum Control database resides. For example, <i>myserver.mycompany.com</i>. The <i>port</i> value is the port number that is used by Db2. The default value is 50000.</p> <p>Example:</p> <pre>db2 catalog tcpip node remoteSC remote myserver.mycompany.com server 50000</pre> 4. Enter the following command to catalog the remote database: <pre>db2 catalog database <i>database_name</i> as <i>alias</i> at node <i>node_name</i></pre> <p>Where <i>database_name</i> is the name of the IBM Spectrum Control database. Typically, this name is TPCDB. The <i>alias</i> value is a new value that you provide to reference the cataloged database. For example, remDB. The <i>node_name</i> value is the value that you set in Step 3.</p> <p>Example:</p> <pre>db2 catalog database TPCDB as remDB at node remoteSC</pre>

To create an Cognos Analytics data source for the IBM Spectrum Control database, complete the following steps:

1. Open a web browser and enter the following URL:

```
http://FQDN_Of_Your_Machine:9300/bi
```

Where `http` is the protocol, and `FQDN_Of_Your_Machine` is your fully qualified domain name, (for example, `myserver.mycompany.com`).

2. Select **Manage > Administration console**.
3. In the IBM Cognos Administration GUI, select the **Configuration** tab.
4. In the **Configuration** tab, select **Data Source Connections**.
5. On the toolbar, click the **New Data Source** icon. It is the first icon in the list.
6. On the **Specify a name and description** page, in the **Name** property, enter **TPCDB**.
You must enter the **TPCDB** value or the IBM Spectrum Control predefined reports will not generate successfully.
7. On the **Specify a name and description** page, click **Next**.
8. On the **Specify the connection** page, select **IBM DB2** from the **Type** field.
9. Verify that **Use the default object gateway** is selected.
10. Unmark **Configure JDBC connection** and click **Next**.
11. On the **Specify the IBM DB2 connection string** page, in the **DB2 database name** property, complete one of the following steps:
 - a) If the IBM Spectrum Control database is on the same Windows or Linux computer as where you installed Cognos Analytics (first row scenario from Table 1), enter the name of the IBM Spectrum Control database. Typically, this name is **TPCDB**.
 - b) If the IBM Spectrum Control database is on the same AIX computer as where you installed Cognos Analytics (second row scenario from Table 1), enter the alias value that you created when you cataloged the loopback database. Typically, this value is **TPCDB_LP**.
 - c) If the IBM Spectrum Control database is on a different computer than where you installed Cognos Analytics (third row scenario from Table 1), enter the *alias* value that you created when you cataloged the remote database. For example, **remDB**.
12. On the **Specify the IBM DB2 connection string** page, in the **Signon** section, do the following:
 - a) Verify that **Signons** is selected.
 - b) Select **Password**.
 - c) In the **User ID** property, enter the user name of the owner of the Db2 instance where the IBM Spectrum Control database is located. On a Window operating system, this user name is typically **db2admin**.
On Linux or AIX operating system, this user name is typically **db2inst1**.
 - d) In the **Password** and **Confirm password** properties, enter the password that is associated with the **User ID** property from the previous substep.
13. On the **Specify the IBM DB2 connection string** page, in the **Testing** section, click **Test the connection**.
14. On the **Test the connection** page, click **Test**.
15. When the test is successful, on the **View the results** page, click **Close**.
16. On the **Test the connection** page, click **Close**.
17. On the **Specify the IBM DB2 connection string** page, click **Next**.
18. On the **Specify the commands** page, click **Finish**.
19. Close your web browser.

Related information

[Creating a data source connection](#)

Using Cognos Analytics with multiple remote IBM Spectrum Control databases

You can configure multiple connections within a single Cognos Analytics data source to use Cognos Analytics with multiple remote IBM Spectrum Control databases.

On the machine where you have Cognos Analytics installed, you must catalog the node and the database for each remote IBM Spectrum Control database that you want to query when generating Cognos Analytics reports.

Follow the steps in the *Before you begin* section of “[Creating Cognos Analytics data source for the IBM Spectrum Control database](#)” on page 90 to catalog the node and the database for each remote IBM Spectrum Control database. Then, follow the steps in the *Procedure* section of the same topic to create the single data source for the IBM Spectrum Control databases and to create the first connection to a specific IBM Spectrum Control database within that data source.

At this point, you will have one data source named TPCDB defined in Cognos Analytics and within that one data source, you will have one connection defined, which is also named TPCDB.

It's assumed that Cognos Analytics is installed on its own machine and that you have multiple IBM Spectrum Control systems installed on separate machines.

To rename the TPCDB connection and to create more connections to other remote IBM Spectrum Control databases within the single data source, complete the following steps:

1. Open a web browser and enter the following URL:

```
http://FQDN_Of_Your_Machine:9300/bi
```

Where `http` is the protocol, and `FQDN_Of_Your_Machine` is your fully qualified domain name, (for example, `myserver.mycompany.com`) of the machine where you installed Cognos Analytics.

2. Select **Manage > Administration console**.
3. In the IBM Cognos Administration GUI, select the **Configuration** tab.
4. In the **Configuration** tab, select **Data Source Connections**.
5. On the **Data Source Connections** page, click the **TPCDB** data source. This action will drill down one level and you will see the **TPCDB** connection.
6. In **Actions**, click the **Set properties - TPCDB** icon; it's the first icon in the list.
7. On the **Set properties - TPCDB** page, change the **Name** value from **TPCDB** to a value that reflects the particular IBM Spectrum Control database that this connection uses (for example, `scserv1`).
8. Click **OK**.
You are returned to the **Data Source Connections** page and your first data source has been renamed.
9. On the **Data Source Connections** page, in the toolbar, click the **New Connection** icon. It's the first icon in the list.
10. On the **Specify a name and description - New Connection** page, in the **Name** property, enter a value that reflects the particular IBM Spectrum Control database that this connection will use (for example, `myserv2`).
11. On the **Specify a name and description - New Connection** page, click **Next**.
12. On the **Specify a name and description - New Connection** page, select **IBM Db2** from the **Type** field.
13. Verify that **Use the default object gateway** is selected.
14. Unmark **Configure JDBC connection** and click **Next**.
15. On the **Specify the IBM Db2 connection string - New Connection** page, in the **DB2 database name** property, enter the *alias* value that you created when you cataloged a particular remote IBM Spectrum Control database.
16. On the **Specify the IBM Db2 connection string - New Connection** page, in the **Signon** section, do the following:
 - a) Verify that **Signons** is selected.
 - b) Select **Password**.

- c) In the **User ID** property, enter the user name of the owner of the Db2 instance where the remote IBM Spectrum Control database is located. Note: On a Windows operating system, this user name is typically *db2admin*. On Linux or AIX operating systems, this user name is typically *db2inst1*.
- d) In the **Password** and **Confirm password** properties, enter the password that is associated with the **User ID** value from the previous substep.
17. On the **Specify the IBM Db2 connection string - New Connection** page, in the **Testing** section, click **Test the connection**.
18. Click **Test**.
19. When the test is successful, on the **View the results** page, click **Close**.
20. On the **Test the connection - New Connection** page, click **Close**.
21. On the **Specify the IBM Db2 connection string - New Connection** page, click **Next**.
22. On the **Specify the commands - New Connection** page, click **Finish**.

Your new connection is added to the list of connections defined for the single TPCDB data source. You can repeat Steps 10 - 23 to create a new connection for each remote IBM Spectrum Control database that you want to use when you generate reports. When you have multiple connections defined and you generate a report, you are prompted to select a specific connection to use for that report.

Importing IBM Spectrum Control pre-defined reports package

Complete this procedure to import the IBM Spectrum Control predefined reports package into the IBM Cognos Analytics reporting tool.

1. Copy the IBM Spectrum Control predefined reports package `TPC_deployment_pckg.zip` file from the `installation_dir\data\gui\` directory, on the machine where you installed IBM Spectrum Control, to the `Cognos_Install_Dir\deployment\` directory on the machine where you installed Cognos Analytics.
2. Import the package into Cognos Analytics.
 - a) Open a web browser and enter the following URL:

```
http://machine_FQDN:9300/bi
```

Where *machine_FQDN* is the fully qualified domain name of the machine where you installed Cognos Analytics. For example, *mycognos.mycompany.com*.



Warning: At this point Cognos Analytics is configured with anonymous access so that anyone is able to access it.

- b) Select **Manage > Administration console**.
- c) In the IBM Cognos Administration GUI, select the **Configuration** tab.
- d) In the **Configuration** tab, select **Content Administration**.
- e) On the toolbar, click the **New Import** icon.
It is the fourth icon in the list.
- f) On the **Select a deployment archive** page, select `TPC_deployment_pckg` and click **Next**.
- g) On the **Specify a name and description** page, enter a name for your import and click **Next**.
- h) On the **Select the public folders, directory, and library content** page, select the following entries:
 - IBM Spectrum Control Packages
 - IBM Spectrum Control Predefined Reports
 - IBM Spectrum Control Report Layouts
- i) Click **Next**.
- j) On the **Specify the general options** page, click **Next**.
- k) On the **Review the summary** page, click **Next**.
- l) On the **Select an action** page, select **Save and run once** and click **Finish**.

- m) On the **Run with Options** page, select **Upgrade all report specifications to the latest version** and **Assign new IDs during import**.
For more information, see [Run an import](#).

n) Click **Run**.

o) On the **IBM Cognos software** page, select **View the details of this import after closing this dialog** and click **OK**.

p) On the **View run history details** page, click **Refresh**.

Do *not* log off from the IBM Cognos Administration GUI until the import job is complete.

Important:

The import job might take 15 minutes or more to resolve. Click **Refresh** periodically to check the status.

q) After the import job is complete, on the **View an import deployment record** page, click **Close**.

r) Exit the IBM Cognos Administration GUI and return to the Cognos Analytics GUI.

3. Verify that the imported content is displayed in Cognos Analytics.

a) Open a web browser and enter the following URL:

```
http://machine_FQDN:9300/bi
```

Where *machine_FQDN* is the fully qualified domain name of the machine where you installed Cognos Analytics. For example, *mycognos.mycompany.com*.

b) On the **IBM Cognos Analytics Welcome** page, click **Team content**.

c) Verify that the following content is listed:

- IBM Spectrum Control Packages
- IBM Spectrum Control Predefined Reports
- IBM Spectrum Control Report Layouts

Configuring access to the Cognos Analytics reporting tool

Specify which user IDs and groups of user IDs can use reports, report tools, and report administration functions in the Cognos Analytics tool.

You can configure access in the following ways in the Cognos Analytics reporting tool:

- Create user IDs and groups of user IDs so that you can specify access for those users and groups.
- Assign administrative privileges to administrator IDs and remove administrative privileges from other user IDs.
- Specify which user IDs or groups can access individual reports or report folders.
- Specify which user IDs or groups can access individual Cognos Analytics reporting tool functions.

Information about how to configure security for Cognos Analytics is available in the IBM Knowledge Center for Cognos Analytics. Use the following links to view this information:



Table 24. Information about configuring security for Cognos Analytics	
Task	Link to information
Learn about the security model, authorization, and the default Cognos namespace in Cognos Analytics.	 Security model
Learn about the initial security settings in Cognos Analytics.	 Initial security

Table 24. Information about configuring security for Cognos Analytics (continued)

Task	Link to information
Learn about the initial access permissions in Cognos Analytics.	Initial access permissions
Learn about users, groups, and roles in Cognos Analytics.	Users, Groups, and Roles
Learn about configuring Cognos Analytics with LDAP authentication.	Configuring authentication providers
Learn about configuring access permissions in Cognos Analytics.	Access Permissions and Credentials Set access permissions for an entry

Reinstalling the software if a failure occurs

If an installation failure occurs, you do not have to uninstall components that were successfully installed. IBM Spectrum Control provides an option to partially, or fully, roll back the installation.

A full rollback uninstalls all the components (even if they were installed successfully), and a partial rollback uninstalls only the components that were not successfully installed. The partial rollback option helps you resolve the problems that are causing the installation failure. After you resolve the problem, you can install the remaining components. For example, if the correct libraries were not installed for the Linux operating system, and the installation stops. You can install the correct libraries and resume the installation.

If you install IBM Spectrum Control on the Windows operating system and select **Full Rollback**, you must restart the server after the rollback is complete.

If you originally selected a partial rollback, but decided to completely uninstall, you must run the uninstallation program before you reinstall IBM Spectrum Control.

The following table shows the results from a partial rollback. The components are listed in the order in which they were installed.

Table 25. Results from a partial rollback

If an installation failure occurs when you install this component...	Partial rollback results are...
IBM Spectrum Control common files and Java Runtime Environment	There is no partial rollback. The installation program completes a full rollback.
Database repository	The database repository is uninstalled.
Data server	The Data server is uninstalled.
WebSphere Application Server Liberty profile	WebSphere Application Server Liberty profile is uninstalled.
Alert server	The Alert server is uninstalled.
Device server	The Device server is uninstalled.
Export server	The Export server is uninstalled.
IBM Spectrum Control GUI	The IBM Spectrum Control GUI is uninstalled.

Table 25. Results from a partial rollback (continued)

If an installation failure occurs when you install this component...	Partial rollback results are...
CLI	The command-line interface is uninstalled.
Storage Resource agent	The Storage Resource agent is uninstalled.

Taking the first steps after installation

After IBM Spectrum Control is installed, configure it to monitor the resources in your environment.

Access the IBM Spectrum Control GUI

To configure IBM Spectrum Control for your environment, access the GUI.

For more information about how to start the GUI, see [Opening IBM Spectrum Control GUIs and CLIs at http://www.ibm.com/support/knowledgecenter/SS5R93_5.4.1/com.ibm.spectrum.sc.doc/fqz0_t_windows_start_tpc_apps.html](http://www.ibm.com/support/knowledgecenter/SS5R93_5.4.1/com.ibm.spectrum.sc.doc/fqz0_t_windows_start_tpc_apps.html).

To set up IBM Spectrum Control for monitoring and managing resources, complete the following tasks:

Add resources for monitoring.

You can add the following resources for monitoring:

- Storage systems
- Servers
- Hypervisors
- Switches
- Fabrics
- NetApp Filers

Configure the retention of data in the database repository

Determine how long that IBM Spectrum Control stores data about the resources that are being monitored.

(Optional) Configure the collection of data about the sizes of GPFS snapshots

By default, IBM Spectrum Control does not collect information about the size of GPFS snapshots. To view that information, you must enable IBM Spectrum Control to collect information about the size of GPFS snapshots.

For information about how to configure collection of snapshot size information, see [Collecting information about the sizes of GPFS snapshots](#).

Configure alert notifications for conditions that are detected on monitored resources

Determining when and how you're alerted to configuration and performance conditions within your storage environment is important to helping you maintain and administer storage resources. Many conditions can trigger alerts. IBM Spectrum Control provides default alert policies for each resource type, or you can configure alert definitions so that IBM Spectrum Control examines the data about your resources for the conditions that you specify.

Specify the users that can access the product and the functions that are available to them

Assign roles to groups of users to determine which functions are available in IBM Spectrum Control. When a user ID is authenticated to IBM Spectrum Control through the GUI, CLI, or APIs, membership in an operating system or LDAP group determines the authorization level of the user.

Deploy Storage Resource agents to set up data features

Deploy Storage Resource agents on servers to enable data collection and to monitor the fabrics that are visible to the server.

Monitor and manage resources

Access the IBM Spectrum Control GUI to monitor and manage your storage, including the following tasks:

- Monitor the status of resources
- View capacity and asset information about resources
- Troubleshoot the performance of resources
- Set performance thresholds and alerts
- View the relationships between resources
- Optimize storage
- Configure for the cloud and storage provisioning
- Generate detailed reports about resources

Remove the IBM Spectrum Control installation directory from the antivirus scan

Scans that are conducted by antivirus software cause more I/O write operations on the IBM Spectrum Control and server disk drives. For example, the antivirus software can be set to scan any file, record, or process that is written to or read from. The scan includes logs, read/write operations for database records, and Java processes that are used by IBM Spectrum Control. The antivirus software performs write operations on the objects that it identifies with these scans. These additional operations affect product performance and are visible in the performance monitoring tools for the operating system on which the IBM Spectrum Control server is installed. For example, on the Windows operating system, the Reliability and Performance Monitor might show an unusually high number of active write operations for IBM Spectrum Control. To improve performance, update your antivirus software so that it excludes the IBM Spectrum Control installation directory from scans.

For more information about these tasks and how to manage and monitor your resources with IBM

Spectrum Control, go to the product documentation at: http://www.ibm.com/support/knowledgecenter/SS5R93_5.4.1/com.ibm.spectrum.sc.doc/fqz0_c_wg_managing_resources.html.

Chapter 3. Upgrading and migrating

Learn about the key tasks in the upgrade process for IBM Spectrum Control.

The IBM Spectrum Control upgrade process guides you through the steps for upgrading to the current version.

Important: Upgrading the operating system of a server where IBM Spectrum Control is installed is not supported. If you upgrade the operating system of the server, IBM Spectrum Control might be unable to continue monitoring your resources. If you must upgrade the server, contact the IBM Support team for IBM Spectrum Control Support to discuss your options.

Preparing to upgrade

You can use the following information to help prepare your upgrade of IBM Spectrum Control. Good planning helps you avoid delays and problems when you upgrade your system.

General considerations



Attention:

- You cannot upgrade from any release before IBM Spectrum Control 5.3.0. If you are currently running a version of IBM Spectrum Control earlier than 5.3.0, you must upgrade to IBM Spectrum Control 5.3.0 or later. For more information, see [IBM Spectrum Control interoperability matrix](#).

When you are at IBM Spectrum Control 5.3.0 or later, you can upgrade to the highest version of IBM Spectrum Control.

- To help streamline, improve and clarify the product licenses for IBM Spectrum Control, the following licenses were renamed:
 - IBM Spectrum Control Standard Edition is now IBM Spectrum Control
 - IBM Spectrum Control Standard Select Edition is now IBM Spectrum Control Select Edition

If you have the Advanced edition from previous releases, you are not affected by the renaming of product licenses. After you upgrade to 5.4.0, you can pick up right where you left off. However, keep in mind that all licenses are impacted by the deprecated features that are listed at [Discontinued features in IBM Spectrum Control](#).

- Upgrading the operating system of a server where IBM Spectrum Control is installed is not supported. If you upgrade the operating system of the server, IBM Spectrum Control might be unable to continue monitoring your resources. If you must upgrade the server, contact the IBM Support team for IBM Spectrum Control Support to discuss your options.

Before you upgrade

Consider the following information before you upgrade:

- Before you upgrade IBM Spectrum Control, apply all available updates and patches to the operating system of the server where you installed IBM Spectrum Control. This is *not* the same as upgrading the operating system of the server where IBM Spectrum Control is installed, which is not supported.
- IBM Spectrum Control no longer supports Tivoli Storage Productivity Center for Replication. To learn more about how to download and install IBM Copy Services Manager, see [IBM Copy Services Manager](#).
- The time and space considerations that are required to upgrade IBM Spectrum Control varies from site to site. Several factors, such as how many devices are being monitored and the version from which you are upgrading, affect the time that is required for the upgrade to complete. In some cases, the upgrade might take up to several hours to complete.

Note, that when you upgrade IBM Spectrum Control, the database repository for metadata is reorganized to include all the latest changes and improvements that are included in the new release. During the upgrade, the database reorganization process might take some time to complete or appear to be frozen. This behavior is typical, especially for larger environments or when you are upgrading from a much older release.

To help ensure that the upgrade and database reorganization complete successfully, make sure that you have enough space on your file system:

- On a Windows operating system: 1 GB - 2 GB on the drive where you installed IBM Spectrum Control.
- On a Linux operating system: 100 MB - 300 MB in the /home file system and 1 GB - 2 GB in the / file system.
- On a AIX operating system: 100 MB - 300 MB in the /home file system and 1 GB - 2 GB in the /opt file system.
- When you do upgrades of IBM Spectrum Control an offline reorganization of tables in the database repository occurs. These table reorganizations do not use temporary table space, so you need to consider the amount of free disk space you need to have before your upgrade. During an upgrade of IBM Spectrum Control, you must have free disk space equivalent to the largest amount of disk space that is being used by a single table in the database repository.

To determine the largest amount of disk space that is being used by a single table in the database repository, complete the following tasks on the computer where the IBM Spectrum Control database repository is installed:

1. Open a Db2 command prompt or switch to the Db2 instance owner.
2. Run the following commands:

a. `db2 connect to <database name>`

b. `db2 "select MAX(physical_space) as needed_space from
(select decimal((DATA_OBJECT_P_SIZE+INDEX_OBJECT_P_SIZE+LONG_OBJECT_P_SIZE
+LOB_OBJECT_P_SIZE+XML_OBJECT_P_SIZE+COL_OBJECT_P_SIZE)/1024,10,2)
as physical_space from sysibmadm.admintabinfo where TABSCHEMA='TPC' order by
physical_space desc)"`

c. `db2 disconnect <database name>`

where *<database name>* is the name of the IBM Spectrum Control database repository, which is *TPCDB* by default.

Record the result from Step 2b and increase that value by 10 percent; this is the required amount of free disk space in megabytes.

The required free disk space must be available in each file system or drive where the database repository tables are stored.

To determine the file systems or drives where the database repository tables are stored, do the following tasks on the computer where the IBM Spectrum Control database repository is installed:

1. Examine the *installation_dir/config/InstallVariable.properties* file.
2. Record the value of the following parameters:

```
DFTDBPATH  
CSTDBPATH
```

Each directory that is listed in the previously mentioned values is in a file system (AIX /Linux) or in a drive (Windows). The required free disk space must be available in each file system or drive.

During the upgrade of IBM Spectrum Control, the reorganization of tables in the database repository is logged to the *installation_dir/logs/log/traceInstaller_0.log* file.

- On Windows operating systems, ensure that all command prompts are closed. If you have open command prompts that have a current working directory in the IBM Spectrum Control installation

directory structure, the upgrade might fail in various places because the upgrade process modifies certain directories.

- On Windows operating systems, ensure that the user who logs into the operating system to perform the upgrade of IBM Spectrum Control is an Administrator and does have the *Debug programs* privilege and does *not* have the *Deny access to this computer from the network* privilege in the Windows operating system security policy. These privileges can be found in **Administrative Tools -> Local Security Policy -> Local Policies -> User Rights Assignment**. After the upgrade of IBM Spectrum Control is complete, the required privileges for the user who performed the upgrade can be changed, but only if that user is *not* set as the Common User or the Db2 user in IBM Spectrum Control.
- The full X Window System must be installed to display the IBM Spectrum Control installation program on AIX and Linux operating systems.
- On Windows operating systems, if you installed the IBM Monitoring Agent, stop the Monitoring Agent for Windows OS Primary and Monitoring Agent for Windows OS Watchdog services. After your upgrade is complete, you can start these services again.

Security

Consider the following security information related to upgrades:

- Installing IBM Spectrum Control involves using your operating system in manners typical for installing new application software. If your antivirus software is set on the maximum mode, it might prevent some of your changes from being accepted. To verify that your upgrade completes correctly, enable your antivirus software product to allow the following instances:
 - The `/etc/hosts` file can be edited
 - Files can be created in the `/temp` directory
 - New executable files can be created in the `C:\Program Files` directory.
- If you upgrade from a release earlier than IBM Spectrum Control 5.3.6 to the current version of IBM Spectrum Control, the SSL certificates that are used by the Data server and Storage Resource agents are not updated automatically to the SHA-256 hash algorithm.

If you want to use SHA-256 hash algorithm after you upgrade to the current version of IBM Spectrum Control, you must perform the steps in [Replacing default SSL certificates with custom certificates](#).

- There are new certificate requirements from the [CA/B Forum](#) that are strictly enforced for macOS Catalina users that might affect your ability to access the IBM Spectrum Control GUI. During an upgrade of IBM Spectrum Control, certificates self-signed by IBM Spectrum Control will be made automatically compliant. However, if one or more of your certificates are not self-signed by IBM Spectrum Control, see [IBM Spectrum Control and macOS Catalina \(10.15\) Increased Security Policies on SSL Certificates](#) and validate that your certificates are compliant.
- Starting with IBM Spectrum Control 5.3.6, all default self-signed certificates have an expiration date of 825 days based on the new certificate requirements from the CA/B Forum. By default, upgrades of IBM Spectrum Control always renew the expiration of all default self-signed certificates used by the product for another 825 days. However, if you have installed your own certificates, IBM Spectrum Control does not modify those certificates for you.

After you upgrade

Consider the following information after you upgrade:

- If your upgrade process fails and a component cannot be upgraded, the upgrade process ends and the status of the component is shown as failed. When you start the upgrade process again, the installation program resumes upgrading the failed component.
- If you do a version upgrade of Db2 (examples: 10.5 to 11.1 or 11.1 to 11.5), you must apply a valid license to Db2 following the upgrade.
- After you upgrade to IBM Spectrum Control, all trace settings are reset to the default values. If you changed the trace settings, you must reset the trace settings after an upgrade.

Cognos Analytics

Consider the following information if you use Cognos Analytics 11:

- If you plan to upgrade your Cognos Analytics 11 environment, see [How to upgrade your version of Cognos Analytics](#). After you upgrade IBM Spectrum Control and upgrade your Cognos Analytics 11 environment, you can upgrade the pre-defined reports by importing the pre-defined reports package from the most updated version of IBM Spectrum Control into Cognos Analytics. See [“Importing IBM Spectrum Control pre-defined reports package”](#) on page 95.
- After you complete the upgrade of your Cognos Analytics 11 environment on Linux or AIX, verify that the link from the 32-Bit Db2 library to the *Cognos_installation_dir/bin/* directory is still present. If it is not present, perform Step 3 in [“Copying Db2 files and linking the Db2 library on Linux and AIX”](#) on page 87.
- When you complete the upgrade of your Cognos Analytics 11 environment, and you save the Cognos Configuration, if you encounter a failure in the **Check password for JVM truststore** step, and it generates the CAM-CRP-1613 error in the Details, see [How to regenerate cryptographic keys in Cognos Analytics 11](#).
- The IBM Cognos BI Reports component is no longer part of the IBM Spectrum Control product and is uninstalled during the upgrade. It is recommended that you back up your entire IBM Spectrum Control system before you proceed with an upgrade.

After you upgrade IBM Spectrum Control and are using IBM Cognos Analytics, import the pre-defined reports package into Cognos Analytics. See [“Importing IBM Spectrum Control pre-defined reports package”](#) on page 95.

Related concepts

[“Product licenses”](#) on page 4

Learn about the product licenses that are available for IBM Spectrum Control. Current licenses are IBM Spectrum Control and IBM Spectrum Control Select Edition. The IBM Spectrum Control Advanced Edition license is still applied, if you owned it in a previous release.

Backups

Before you upgrade, you must back up the entire IBM Spectrum Control system.

Related tasks

[“Licensing Db2”](#) on page 50

You can apply a valid license to Db2 by using the **db2licm** command.

Related reference

[“Editing the response file”](#) on page 58

You must edit and save the appropriate response file when you install IBM Spectrum Control by using silent mode. The silent mode installation option for the response file is `-f absolute_path_to_response_file`. For example, in the Windows operating system, you enter `-f C:\installimage\silent_SingleServerTypical.properties`.

Parameters in the `silent_Upgrade.properties` file

When you upgrade using the silent mode, use the `silent_Upgrade.properties` file.

[“Planning for installation”](#) on page 1

You can install IBM Spectrum Control by using the installation program or the command line in silent mode. Installing IBM Spectrum Control by using console mode is not supported. Also, upgrading the operating system of a server where IBM Spectrum Control is installed is not supported. If you must upgrade the server, contact the IBM Support team for IBM Spectrum Control Support to discuss your options.

Backups

Before you upgrade, you must back up the entire IBM Spectrum Control system.

The process involves backing up the following parts:

- IBM Spectrum Control database by using Db2 backup utilities.

For more information about backing up your database, see http://www.ibm.com/support/knowledgecenter/SS5R93_5.4.1/com.ibm.spectrum.sc.doc/fqz0_t_backing_up_tpc_database.html.

- The entire IBM Spectrum Control server by using software such as IBM Spectrum Protect.

Tip: The frequency of backups depends on the data protection policies of your company, the IBM Spectrum Control work load, and the size of the IBM Spectrum Control environment. Your backup plan must include documentation with the user names and passwords for Db2 and IBM Spectrum Control.

If you experience problems during the migration, use these backups to restore your original IBM Spectrum Control system and try to migrate again. For more information about restoring the IBM

Spectrum Control database, see https://www.ibm.com/support/knowledgecenter/en/SS5R93_5.4.1/com.ibm.spectrum.sc.doc/adm_restoring_tpcdb.html.

Restriction:

Do not restore the IBM Spectrum Control database from one version of IBM Spectrum Control into another version. For example, do not restore a backup from IBM Spectrum Control 5.3.3 into 5.3.4, or any other version.

Example of upgrading Db2 in a Windows environment

To complete an upgrade from IBM® DB2® 10.5 to IBM® Db2® 11.5, stop the IBM Spectrum Control servers before you begin the upgrade.

You can upgrade to the latest version of Db2® that IBM Spectrum Control supports before you install the latest version of IBM Spectrum Control.

Important: The following steps are an example of one way to upgrade from DB2 10.5 to Db2® 11.5 on a Windows operating system.

1. Stop all of the Windows services for the IBM Spectrum Control servers, including IBM Cognos Analytics (if you installed it on your system).
2. In a Db2 command window, run the following commands to force all users or applications to disconnect from Db2:

```
db2 force application all
db2 terminate
```

3. In a Db2 command window, run the following command to ensure that no applications are accessing Db2:

```
db2 list applications
```

4. Create a directory to back up the database.
For example: `C:\downloads\db2_backup`

5. In a Db2 command window, run the following command:

```
db2 BACKUP DATABASE database to C:\downloads\db2_backup
```

where *database* is the name of the IBM Spectrum Control database (usually TPCDB). If the Cognos Analytics database is installed (usually CM), make a similar backup of that database.

6. Stop all Db2 Windows services and exit Db2 in the Windows System Tray.
7. In Windows Explorer, go to the following directory:

```
C:\Db2_11.5_download_directory\SERVER_DEC\image
```

Where *Db2_11.5_download_directory* is where you downloaded the Db2 installation files.

8. Double-click the `setup.exe` file.
9. On the **DB2 Setup Launchpad** navigation tree view, click **Install a Product**.
10. On the **Install a Product** page, in the **DB2 Version 11.5 Server Editions** section, click **Work with Existing**.

11. In the **Work with an Existing DB2 Copy** window, select the DB2 copy for DB2 10.5.
12. Click **Launch DB2 Setup wizard**.
13. On the **Warning** window about upgrading DB2, click **OK**.
14. In the **DB2 Setup wizard**, complete the following steps:
 - a) On the **Welcome** page, click **Next**.
 - b) On the **Software License Agreement** page, review and accept the license agreement, and click **Next**.
 - c) On the **Select the installation type** page, select **Typical** and click **Next**.
 - d) On the **Select the installation, response file creation, or both** page, keep the default selection and click **Next**.
 - e) On the **Installation folder** page, click **Next**.
 - f) On the **Set the DB2 copy name** page, click **Next**.
 - g) On the **Set user information for the default DB2 instance** page, enter the correct user name and password values for the existing DB2 10.5 installation, and click **Next**.
 - h) On the **Enable operating system security for DB2 objects** page, ensure that the settings and values are correct for the existing DB2 10.5 installation, and click **Next**.
 - i) If the **Warning** window about existing group names is displayed, click **OK**.
 - j) On the **Start copying files and create response file** page, click **Finish**.
 - k) If **Warning** windows are displayed about a restart that is required to complete the setup, click **OK**.
 - l) On the **Setup is complete** page, click **Finish**.
 - m) In the **DB2 First Steps** page, click **Do not create profile**.
 - n) Close the **DB2 First Steps** window.
15. Apply a valid license to Db2.
16. In a **Db2 command** window, run the following command to upgrade the IBM Spectrum Control database to Db2 11.5:

```
db2 UPGRADE DATABASE database USER user_name USING password
```

where *database* is the name of the IBM Spectrum Control database (usually TPCDB), *user_name* is the user who owns the Db2 instance where the database is located (usually db2admin), and *password* is the password that is associated with that user name.

17. In a Db2 command window, run the following command to upgrade the Cognos Analytics (if installed) database to Db2 11.1:

```
db2 UPGRADE DATABASE database USER user_name USING password
```

Where *database* is the name of the Cognos Analytics database (usually CM), *user_name* is the user who owns the Db2 instance where the database is located (typically db2admin), and *password* is the password that is associated with that user name. You might encounter the following message when you upgrade the Cognos Analytics database to Db2 11.1:

```
SQL0954C Not enough storage is available in the application heap to process the statement.
```

18. Restart your computer and ensure that all of the Windows services for the IBM Spectrum Control servers, including Cognos Analytics are started.

Related tasks

[“Licensing Db2” on page 50](#)

You can apply a valid license to Db2 by using the **db2licm** command.

Related information

[Messages - SQL0750 - SQL0999](#)

[Applying fix packs in Db2 database environments](#)

[Upgrading a DB2 server \(Windows\)](#)

Example of upgrading Db2 in a AIX or Linux environment

To complete an upgrade from IBM® Db2® 11.1 to IBM Db2 11.5.4, stop the IBM Spectrum Control servers before you begin the upgrade.

You can upgrade to the latest version of Db2 that IBM Spectrum Control supports before you install the latest version of IBM Spectrum Control.

Important: The following steps are an *example* of one way to upgrade from Db2 11.1 to Db2 11.5.4 in a AIX or Linux environment.

1. Stop all IBM Spectrum Control servers, including IBM Cognos Analytics (if you installed it on your system).
2. Switch user to the Db2 instance owner (usually db2inst1).
3. From a command shell, run the following commands to force all users or applications to disconnect from Db2:

```
db2 force application all
```

```
db2 terminate
```

4. From a command shell, run the following command to ensure that no applications are accessing Db2:

```
db2 list applications
```

5. Create a directory to backup the database.
For example: /tmp/db2_backup
6. From a command shell, run the following command:

```
db2 BACKUP DATABASE database to /tmp/db2_backup
```

where *database* is the name of the IBM Spectrum Control database (usually TPCDB). If the Cognos Analytics database is installed (usually CM), make a similar backup of that database.

7. Switch user back to root.
8. From a command shell, change the directory to the location of the Db2 11.5.4 db2setup installation program and enter the following command:

```
./db2setup
```

9. On the **DB2 Setup Welcome** page, click **New Install**.
10. On the **Choose a Product** page, select **DB2 Version 11.5.4.0 Server Editions** and click **Next**.
11. On the **Configuration** page:
 - a) Enter an installation directory or accept the default.
 - b) Select **Typical** as the installation type.
 - c) **IMPORTANT:** Deselect **Create an instance**.
 - d) Review and agree to the IBM terms and click **Next**.
12. On the Response File and Summary page:
 - a) Select **Install DB2 Server Edition on this computer and save my settings in a response file**.
 - b) Enter a response file name or accept the default.
 - c) Review the Summary and click **Finish**
13. On the **Setup has completed successfully** page, review the information, and click **Finish**.
14. Switch user to the Db2 instance owner (usually db2inst1).
15. From a command shell, run the following command:

```
db2stop
```

16. Switch user back to root.
17. From a command shell, run the following commands:

```
installation_dir_for_Db2 11.5.4/instance/db2iupgrade Db2_instance
```

where *installation_dir_for_Db2 11.5.4* is the installation location of Db2 11.5.4 and *Db2_instance* is the Db2 instance where the database is located, usually db2inst1.

18. Switch user to the Db2 instance owner (usually db2inst1).
19. From a command shell, run the following command:

```
db2start
```

20. Apply a valid license to Db2.
21. From a command shell, run the following command to upgrade the IBM Spectrum Control database to Db2 11.5.4:

```
db2 UPGRADE DATABASE database USER user_name USING password
```

where *database* is the name of the IBM Spectrum Control database (usually TPCDB), *user_name* is the user who owns the Db2 instance where the database is located (usually db2inst1), and *password* is the password associated with that user name.

22. From a command shell, run the following command to upgrade the Cognos Analytics (if installed) database to Db2 11.5.4:

```
db2 UPGRADE DATABASE database USER user_name USING password
```

where *database* is the name of the Cognos Analytics database (usually CM), *user_name* is the user who owns the Db2 instance where the database is located (usually db2inst1), and *password* is the password associated with that user name.

23. Switch user back to root.
24. Start all of the IBM Spectrum Control servers, including Cognos Analytics (if you installed it on your system).

Related tasks

[“Licensing Db2” on page 50](#)

You can apply a valid license to Db2 by using the **db2licm** command.

Related information

[Applying fix packs in Db2 database environments](#)

[Upgrading a DB2 server \(Linux and UNIX\)](#)

Upgrading IBM Spectrum Control in a single-server environment

You can upgrade IBM Spectrum Control by using the installation program or silent mode.

In a single-server environment, to upgrade IBM Spectrum Control, see the following topics:

- [“Upgrading IBM Spectrum Control in a single-server Windows environment by using the installation program” on page 108](#)
- [“Upgrading IBM Spectrum Control in a single-server environment by using silent mode ” on page 111](#)

Upgrading IBM Spectrum Control in a single-server Windows environment by using the installation program

You can upgrade IBM Spectrum Control by using the installation program.

Before you upgrade, you must back up the entire IBM Spectrum Control system.

To upgrade IBM Spectrum Control in a single-server Windows environment, complete the following steps:

1. Log on to the IBM Spectrum Control computer with the appropriate user privileges.
2. Start the IBM Spectrum Control installation program.
 - a) Download the image into a directory.
 - b) Extract the image files.
 - c) Enter the following command: `cd image_directory\SC` and then enter `setup.bat`.
3. Follow the prompts in the installation program to upgrade IBM Spectrum Control.
4. After the upgrade is finished, review the message log to ensure that no errors occurred.

Related concepts

[“Backups” on page 104](#)

Before you upgrade, you must back up the entire IBM Spectrum Control system.

Related reference

[“Preparing to upgrade” on page 101](#)

You can use the following information to help prepare your upgrade of IBM Spectrum Control. Good planning helps you avoid delays and problems when you upgrade your system.

[“Reviewing the log files to resolve installation issues” on page 76](#)

If an error occurs during IBM Spectrum Control installation, you can review the error log files to resolve issues and continue the installation.

[“Planning for installation” on page 1](#)

You can install IBM Spectrum Control by using the installation program or the command line in silent mode. Installing IBM Spectrum Control by using console mode is not supported. Also, upgrading the operating system of a server where IBM Spectrum Control is installed is not supported. If you must upgrade the server, contact the IBM Support team for IBM Spectrum Control Support to discuss your options.

[“Starting the installation programs” on page 51](#)

There are various methods to start the IBM Spectrum Control installation programs and on various operating systems.

Upgrading IBM Spectrum Control in a single-server AIX or Linux environment by using the installation program

You can upgrade IBM Spectrum Control as a root user or non-root user on an AIX or Linux operating system by using the IBM Spectrum Control installation program. To upgrade IBM Spectrum Control as a non-root user, you must have sudo privileges on the target AIX or Linux server.

Before you upgrade, you must back up the entire IBM Spectrum Control system.

Ensure that X Window System is installed on the target AIX or Linux server. The X Window System is required to upgrade IBM Spectrum Control by using the installation program.

If you want to upgrade IBM Spectrum Control as a non-root user, have your system administrator complete the following tasks on the target server before you begin the upgrade:

- If you are upgrading IBM Spectrum Control on an AIX server, install sudo on the server. The default AIX distribution does not include sudo privileges. To get the sudo installation package, go to <http://www.ibm.com/systems/power/software/aix/linux/toolbox/date.html>. Find **sudo-version** in the **Package** column, and click **RPM** to download the package.
- Ensure that the non-root user has sudo privileges for the following commands on the server:
 - **xauth** (Enables the non-root user to provide access to their X Window System display for the root user.)
 - **setup.bin** (Enables the non-root user to launch the IBM Spectrum Control installation program.)

You must enter the full path to the commands when you configure the sudo privileges. For example:

```
username    ALL=(root)    SETENV: /usr/bin/xauth, /home/username/Downloads/IBMSC/SC/setup.bin
```


- If the sudo environment on the server uses the `secure_path` option, ensure that the following directories are included in the `secure_path` value for the non-root user who is upgrading IBM Spectrum Control:
 - `DB2_instance_owner_home_directory/sqlllib/bin` (Example: `/home/db2inst1/sqlllib/bin`)
 - `DB2_instance_owner_home_directory/sqlllib/adm` (Example: `/home/db2inst1/sqlllib/adm`)
 - `DB2_instance_owner_home_directory/sqlllib/misc` (Example: `/home/db2inst1/sqlllib/misc`)
- Ensure that the following requirements are met to enable the upgrade of IBM Spectrum Control by using the installation program:
 - The non-root user is able to use the X Window System on the target server and the X Window System `DISPLAY` environment variable is set correctly for the not-root user.
 - The `DISPLAY` environment variable is preserved in the sudo environment.
 - The root user has access to the X Window System display that is owned by the non-root user.

These display requirements do not apply if you upgrade IBM Spectrum Control in silent mode.

- If you are upgrading IBM Spectrum Control on an AIX server, ensure that the `ODMDIR` environment variable is preserved in the sudo environment.

1. Log on to the IBM Spectrum Control computer as the root user or as the non-root user who has sudo privileges.
2. Start the IBM Spectrum Control installation program.

- a) Create a directory. Enter:

```
mkdir /SpectrumControl
```

- b) Download the image into the `SpectrumControl` directory.

- c) Enter the following command to extract the image files:

```
tar -xzf filename.tar.gz
```

- d) Ensure that the user name that you plan to use as the IBM Spectrum Control common user is in the system group and the `db2iadm1` group.

If the user name is not in a group, you can add the user as shown in the following command example. In this example, the user name is `db2inst1`:

```
usermod -G system db2inst1
```

Tip: If the user is already a member of secondary groups, the **`usermod`** command removes the `db2inst1` user name from all the secondary groups except for the system group. To preserve the existing secondary group memberships, provide a comma separated list of secondary groups after the `-G` flag. For more information, enter `man usermod` at the command prompt.

- e) Go to the `/SpectrumControl/SC` directory:

```
cd /SpectrumControl/SC
```

- f) Set up your shell environment to point to the instance where the database repository is installed. Source the `db2profile` for the instance that you want. For example, if the Db2 instance is `db2inst1`, you can source the `db2profile` by entering:

```
./home/db2inst1/sqlllib/db2profile
```

Remember: There is a space between `.` and `/home`.

- g) Start the installation program by running the **`./setup.bin`** or **`sudo -E ./setup.bin`** command from the same command shell that you used in the previous step.

3. Follow the prompts in the installation program to upgrade IBM Spectrum Control.
4. After the upgrade is finished, review the message log to ensure that no errors occurred.

Related concepts

[“Backups” on page 104](#)

Before you upgrade, you must back up the entire IBM Spectrum Control system.

Related reference

[“Preparing to upgrade” on page 101](#)

You can use the following information to help prepare your upgrade of IBM Spectrum Control. Good planning helps you avoid delays and problems when you upgrade your system.

[“Reviewing the log files to resolve installation issues” on page 76](#)

If an error occurs during IBM Spectrum Control installation, you can review the error log files to resolve issues and continue the installation.

[“Planning for installation” on page 1](#)

You can install IBM Spectrum Control by using the installation program or the command line in silent mode. Installing IBM Spectrum Control by using console mode is not supported. Also, upgrading the operating system of a server where IBM Spectrum Control is installed is not supported. If you must upgrade the server, contact the IBM Support team for IBM Spectrum Control Support to discuss your options.

[“Starting the installation programs” on page 51](#)

There are various methods to start the IBM Spectrum Control installation programs and on various operating systems.

Upgrading IBM Spectrum Control in a single-server environment by using silent mode

You can upgrade IBM Spectrum Control by using silent mode. This upgrade method is useful if your computer cannot display graphics.

Before you upgrade, you must back up the entire IBM Spectrum Control system.

To upgrade IBM Spectrum Control in a single-server environment by using silent mode, complete the following steps:

1. Log on to the IBM Spectrum Control computer with the appropriate user privileges.
2. Edit and save the appropriate response file.
 - Edit the `silent_Upgrade.properties` file and set the following parameters:
 - `LICENSE_ACCEPTED=true`
 - `CHOSEN_INSTALL_TYPE="Upgrade"`
3. Run the silent mode installation program.
 - On Windows operating systems, run the following command:

```
setup.bat -l language -i silent -f absolute_path_to_response_file
```

where *language* can be one of the following values:

- Czech - cs
- English - en
- French - fr
- German - de
- Hungarian - hu
- Italian - it
- Japanese - ja
- Korean - ko
- Polish - pl

- Brazilian Portuguese - pt_BR
- Russian - ru
- Spanish - es
- Chinese (Simplified) - zh_CN
- Chinese (Traditional) - zh_TW

`absolute_path_to_response_file` is the absolute path to the response file. For example, the following command specifies the language and the path:

```
setup.bat -l fr -i silent -f
c:\SpectrumControl\silent_Upgrade.properties
```

- On the AIX or Linux operating system, you must source the Db2 profile, `db2profile`, for the instance owner of the Db2 database. The following text is an example of the command you run to source the user profile:

```
. /home/db2inst1/sqllib/db2profile
```

- On AIX or Linux operating systems, run the following command:

```
./setup.bin -l language -i silent -f /absolute_path_to_response_file
```

Where `absolute_path_to_response_file` is the absolute path to the response file. For example, the following command specifies the language and the path:

```
./setup.bin -l de -i silent -f /SpectrumControl/silent_Upgrade.properties
```

If you do not specify a language or if the language is not specified correctly, the installation program uses the English language as the default.

4. Monitor the progress of the upgrade.

- To view the progress of the silent mode installation on Windows operating systems, check the trace log in the following path:

```
installation_dir\logs\traceTPCInstall.log
```

- To view the progress of the silent mode installation on AIX or Linux operating systems, check the trace log in the following path:

```
installation_dir/logs/traceTPCInstall.log
```

Related concepts

[“Backups” on page 104](#)

Before you upgrade, you must back up the entire IBM Spectrum Control system.

Related reference

[“Planning for IBM Spectrum Control authentication and authorization” on page 15](#)

An operating system user name is required to install and log on to IBM Spectrum Control for the first time. After you install IBM Spectrum Control, you can assign roles to users. Roles determine the product functions that are available to users.

[“Editing the upgrade response file” on page 113](#)

When you upgrade using the silent mode, use the `silent_Upgrade.properties` file.

[“Reviewing the log files to resolve installation issues” on page 76](#)

If an error occurs during IBM Spectrum Control installation, you can review the error log files to resolve issues and continue the installation.

Editing the upgrade response file

When you upgrade using the silent mode, use the `silent_Upgrade.properties` file.

Parameters in the `silent_Upgrade.properties` file

The `silent_Upgrade.properties` file contains the following parameters:

`LICENSE_ACCEPTED=false`

Specifies whether you accept the IBM Spectrum Control license agreement. The options are:

`true`

You accept all the terms and conditions of the IBM Spectrum Control license agreement.

false or any other value

You do not accept the IBM Spectrum Control license agreement. The installation program exits.

`CHOSEN_INSTALL_TYPE="Upgrade"`

Specifies the upgrade type.

Important: Do not change the value for this parameter.

`varAlertKeystorePW=default`

`varDeviceKeystorePW=default`

`varWebKeystorePW=default`

Specify the password for the Alert server, Device server, and Web server keystore files.

The default keystore password is *default*. If any of the specified keystore passwords are incorrect, the upgrade exits.

Related tasks

[“Upgrading IBM Spectrum Control in a single-server environment by using silent mode” on page 111](#)

You can upgrade IBM Spectrum Control by using silent mode. This upgrade method is useful if your computer cannot display graphics.

Upgrading IBM Spectrum Control in a multiple-server environment

To upgrade IBM Spectrum Control in a multiple-server environment, start the installation program on the server on which the database repository is installed. After you complete the installation program on this server, you can start the start the installation program on the other server.

In a multiple-server environment, to upgrade IBM Spectrum Control, see the following topic:

- [“Upgrading to IBM Spectrum Control 5.3.0 or later with a remote database by using the installation program” on page 113](#)

Upgrading to IBM Spectrum Control 5.3.0 or later with a remote database by using the installation program

You can upgrade to IBM Spectrum Control 5.3.0 or later with a remote database by using the installation program.

Before you upgrade, you must back up the entire IBM Spectrum Control system.

For this procedure, the terms *Server A* and *Server B* denote the two servers. Server A has Db2 Server Edition and the IBM Spectrum Control database repository installed. Server B has all of the other IBM Spectrum Control components installed.

To upgrade using the installation program, complete the following steps:

1. Complete the following steps on Server B:
 - a) Log on to Server B with the appropriate user privileges.
 - b) On Server B, stop all IBM Spectrum Control services.

2. Complete the following steps on Server A:

- a) Log on to Server A with the appropriate user privileges.
- b) If necessary, upgrade Db2 on Server A to a version that is supported by IBM Spectrum Control.

For more information about the supported Db2 versions, see <http://www.ibm.com/support/pages/node/6249361#DB..> For more information about upgrading Db2, see [Upgrading Db2 servers](#).

Before you start the IBM Spectrum Control installation program on AIX or Linux operating systems, you must source the user profile, `db2profile`, for the instance owner of the Db2 database. The following text is an example of the command to source the user profile:

```
. /home/db2inst1/sqllib/db2profile
```

- c) Start the IBM Spectrum Control installation program on Server A.
 - d) Follow the prompts in the installation program to upgrade the database repository on Server A.
 - e) After the upgrade is finished on Server A, review the message log to ensure that no errors occurred.
3. Complete the following steps on Server B:
- a) Log on to Server B with the appropriate user privileges.
 - b) Start the IBM Spectrum Control installation program on Server B.
 - c) Follow the prompts in the installation program to upgrade the IBM Spectrum Control components on Server B.
 - d) After the upgrade is finished, review the message log file on Server B to ensure that no errors occurred.

Related concepts

[“Backups” on page 104](#)

Before you upgrade, you must back up the entire IBM Spectrum Control system.

Related reference

[“Preparing to upgrade” on page 101](#)

You can use the following information to help prepare your upgrade of IBM Spectrum Control. Good planning helps you avoid delays and problems when you upgrade your system.

[“Planning for IBM Spectrum Control authentication and authorization” on page 15](#)

An operating system user name is required to install and log on to IBM Spectrum Control for the first time. After you install IBM Spectrum Control, you can assign roles to users. Roles determine the product functions that are available to users.

[“Reviewing the log files to resolve installation issues” on page 76](#)

If an error occurs during IBM Spectrum Control installation, you can review the error log files to resolve issues and continue the installation.

Upgrading IBM Spectrum Control with a remote database by using silent mode

You can upgrade IBM Spectrum Control in a multiple-server environment with a remote database by using silent mode.

Before you upgrade, you must back up the entire IBM Spectrum Control system.

For this procedure, the terms *Server A* and *Server B* denote the two servers. Server A has Db2 and the IBM Spectrum Control database repository installed. Server B has all of the other IBM Spectrum Control components installed.

To upgrade IBM Spectrum Control by using silent mode, complete the following steps:

1. Complete the following steps on Server B:

- a) Log on to Server B with the appropriate user privileges.
- b) On Server B, stop all of the IBM Spectrum Control services.

See [Stopping the IBM Spectrum Control servers by using the GUI](#).

2. Complete the following steps on Server A:

- a) Log on to Server A with the appropriate user privileges.
- b) If necessary, upgrade Db2 on Server A to a version that is supported by IBM Spectrum Control.

For more information about the supported Db2 versions, see <http://www.ibm.com/support/pages/node/6249361#DB>. For more information about upgrading Db2, see [Upgrading DB2 servers](#).

c) Edit and save the appropriate response file.

- Edit the `silent_Upgrade.properties` file and set the following parameters:
 - `LICENSE_ACCEPTED=true`
 - `CHOSEN_INSTALL_TYPE="Upgrade"`

d) On AIX or Linux operating systems, source the user profile (db2profile) for the instance owner of the Db2 database.

For example:

```
. /home/db2inst1/sqllib/db2profile
```

e) Run the silent mode installation program on Server A.

- For Windows operating systems, run the following command:

```
setup.bat -l language -i silent -f absolute_path_to_response_file
```

where *language* can be one of the following values:

- Czech - cs
- English - en
- French - fr
- German - de
- Hungarian - hu
- Italian - it
- Japanese - ja
- Korean - ko
- Polish - pl
- Brazilian Portuguese - pt_BR
- Russian - ru
- Spanish - es
- Chinese (Simplified) - zh_CN
- Chinese (Traditional) - zh_TW

`absolute_path_to_response_file` is the absolute path to the response file. For example, the following command specifies the language and the path:

```
setup.bat -l fr -i silent -f  
c:\SpectrumControl\silent_Upgrade.properties
```

- For AIX or Linux operating systems, run the following command:

```
./setup.bin -l language -i silent -f /absolute_path_to_response_file
```

For example, the following command specifies the language and the path:

```
./setup.bin -l de -i silent -f /SpectrumControl/silent_Upgrade.properties
```

If you do not specify a language or if the language is not specified correctly, the installation program uses the English language as the default.

f) Monitor the progress of the upgrade on Server A.

- To view the progress of the silent mode installation on Windows operating systems, check the trace log in the following path:

```
installation_dir\logs\traceTPCInstall.log
```

- To view the progress of the silent mode installation on AIX or Linux operating systems, check the trace log in the following path:

```
installation_dir/logs/traceTPCInstall.log
```

3. Complete the following steps on Server B:

a) Log on to Server B with the appropriate user privileges.

b) Edit and save the appropriate response file on Server B.

- Edit the `silent_Upgrade.properties` file and set the following parameters:
 - `LICENSE_ACCEPTED=true`
 - `CHOSEN_INSTALL_TYPE="Upgrade"`

c) Run the silent mode installation program on Server B.

- For Windows operating systems, run the following command:

```
setup.bat -l language -i silent -f absolute_path_to_response_file
```

where *language* can be one of the following values:

- Czech - cs
- English - en
- French - fr
- German - de
- Hungarian - hu
- Italian - it
- Japanese - ja
- Korean - ko
- Polish - pl
- Brazilian Portuguese - pt_BR
- Russian - ru
- Spanish - es
- Chinese (Simplified) - zh_CN
- Chinese (Traditional) - zh_TW

`absolute_path_to_response_file` is the absolute path to the response file. For example, the following command specifies the language and the path:

```
setup.bat -l fr -i silent -f  
c:\SpectrumControl\silent_Upgrade.properties.properties
```

- For AIX or Linux operating systems, run the following command:

```
./setup.bin -l language -i silent -f /absolute_path_to_response_file
```

For example, the following command specifies the language and the path:

```
./setup.bin -l de -i silent -f /SpectrumControl/silent_Upgrade.properties
```

If you do not specify a language or if the language is not specified correctly, the installation program uses the English language as the default.

d) Monitor the progress of the upgrade on Server B.

- To view the progress of the silent mode installation on Windows operating systems, check the trace log in the following path:

```
installation_dir\logs\traceTPCInstall.log
```

- To view the progress of the silent mode installation on AIX or Linux operating systems, check the trace log in the following path:

```
installation_dir/logs/traceTPCInstall.log
```

Related concepts

[“Backups” on page 104](#)

Before you upgrade, you must back up the entire IBM Spectrum Control system.

Related reference

[“Preparing to upgrade” on page 101](#)

You can use the following information to help prepare your upgrade of IBM Spectrum Control. Good planning helps you avoid delays and problems when you upgrade your system.

[“Editing the upgrade response file” on page 113](#)

When you upgrade using the silent mode, use the `silent_Upgrade.properties` file.

[“Planning for IBM Spectrum Control authentication and authorization” on page 15](#)

An operating system user name is required to install and log on to IBM Spectrum Control for the first time. After you install IBM Spectrum Control, you can assign roles to users. Roles determine the product functions that are available to users.

[“Reviewing the log files to resolve installation issues” on page 76](#)

If an error occurs during IBM Spectrum Control installation, you can review the error log files to resolve issues and continue the installation.

Upgrading Storage Resource agents

Upgrade Storage Resource agents to ensure that they are at the same release level as the IBM Spectrum Control server.

When you apply maintenance to IBM Spectrum Control, you can upgrade Storage Resource agents immediately or at a later time. To ensure that all your agents are at the current release level and to manage your network load, schedule upgrades regularly.

If a Storage Resource agent is not at the same level as the IBM Spectrum Control server, the following limitations occur:

- New functions in the current release might not be available for the resources that are monitored by the agent.
- Problem fixes are not applied to the agent.

You can upgrade Storage Resource agents by using the following methods:

- Use the **Modify Agents > Upgrade** action on the **Servers** page in the GUI.
- Use a Storage Resource agent command.

To determine if a Storage Resource agent must be upgraded, complete the following steps:

1. In the menu bar, go to **Servers > Servers**.
2. View the values in the **Agent State** column.

If the state of the agent is **Upgraded needed**, the Storage Resource agent for the related server must be upgraded.

Starting agent upgrades

Upgrade a Storage Resource agent to the same release level as the IBM Spectrum Control server.

The ability to start the upgrade process for a Storage Resource agent is available when the following conditions are met:

- A Storage Resource agent must be deployed on the server that you want IBM Spectrum Control to monitor.
- An agent upgrade is not currently running for the server.
- The version of the agent that is deployed on the server is earlier than the IBM Spectrum Control server version.

To upgrade a Storage Resource agent that was not upgraded at maintenance time, complete the following steps:

1. In the menu bar, go to **Servers > Servers**.
2. On the **Servers** page, right-click the server that contains the Storage Resource agent to upgrade and select **Modify Agents > Upgrade**.
3. Select **Immediate** from the **Agent Upgrade** list on the **Upgrade Agent** window.
4. Click **Upgrade** to start the upgrade process.

Scheduling agent upgrades

Schedule the upgrade process for a Storage Resource agent.

You can schedule the upgrade process for a Storage Resource agent when the following conditions are met:

- A Storage Resource agent must be deployed on the server that you want IBM Spectrum Control to monitor.
- An agent upgrade is not currently running for the server.
- The version of the agent that is deployed on the server is earlier than the IBM Spectrum Control server version.

Tips:

- To manage the workload for a server and the network, schedule the agent upgrade for a time when the server and network are not busy.
- The scheduled time for an agent upgrade is based on the time zone of the IBM Spectrum Control server, not the time zone of the server where the Storage Resource agent is installed. For example, if an agent is installed on a server in the Central (CST) time zone, but the IBM Spectrum Control server is in the Pacific (PST) time zone, the time that is shown in the GUI when you schedule the upgrade is PST.

To schedule the upgrade of a Storage Resource agent that was not upgraded at maintenance time, complete the following steps:

1. In the menu bar, go to **Servers > Servers**.
2. On the **Servers** page, right-click the server that contains the Storage Resource agent to upgrade and select **Modify Agents > Upgrade**.
3. Select **Scheduled** from the **Agent Upgrade** list on the **Upgrade Agent** window.
4. Select the date and time and click **Upgrade** to schedule the agent upgrade.

Upgrading Storage Resource agents by using a command

You can manually upgrade Storage Resource agents.

To manually upgrade the Storage Resource agent, complete the following steps:

1. Go to the DVD location of the installation program (by using the Storage Resource Agent image) and go to the bin directory:

```
cd DVD_image_location/data/sra/operating_system_name
```

Where *DVD_image_location* is the location of the installation image for the Storage Resource agent.

2. Run the upgrade command:

```
bin/Agent — -upgrade — -installLoc — agent_install_directory —
```

```
bin/Agent — -commType Daemon —
```

¹

Notes:

¹ Parameter when the agent is run as a daemon service.

The parameters are:

-installLoc "agent_install_directory"

Location where the agent is installed. Enclose the directory name in quotation marks, for example, "C:\Program Files\IBM\TPC_SRA\".

-commType Daemon

If the agent is run as a daemon service, then this parameter must be specified.

Here is an example for a daemon-based service by using the default location:

```
bin/Agent -upgrade
-installLoc "/opt/IBM/TPC/"
-commType Daemon
```

Here is an example for a non-daemon service by using a non-default location:

```
bin/Agent
-upgrade -installLoc "C:\Program Files\IBM\TPC_SRA\"
```

Tip: If you run the upgrade program outside of the *DVD_image_location* installation directory, then you must specify the full path.

Upgrading SMI-S providers for storage systems

Before you upgrade an SMI-S provider (also called the CIM agent or CIMOM agent), ensure that IBM Spectrum Control supports the SMI-S provider that you want and that the provider is compatible with the firmware versions of your storage systems.

To ensure that an SMI-S provider is supported, review the supported products list for the current release of IBM Spectrum Control. For more information about the products that are supported by IBM Spectrum Control 5.3.0 or later, see <https://www.ibm.com/support/pages/node/388393>. Under Storage, click the link for the appropriate release. If you are uncertain about the SMI-S provider support, contact IBM customer support to help you with your upgrade plans.

Upgrading CIM agents

To upgrade a Common Information Model (CIM) agent, you must have the upgrade instructions that are supplied by the provider of the agent.

To upgrade the CIM agent, follow these steps:

1. Stop all IBM Spectrum Control server activity that might be dependent on the CIM agent (for example, performance monitor jobs, and discovery or probe jobs).
2. Stop the IBM Spectrum Control server services.

3. If any IBM Spectrum Control server processes remain, shut down the IBM Spectrum Control server for the duration of the CIM agent upgrade. If it is not possible to shut down the IBM Spectrum Control server, stop or kill the running processes.
4. Upgrade the CIM agent.
 - a. Refer to the instructions supplied by the CIM agent to perform the upgrade.
 - b. Verify that the CIM agent configuration is intact after the upgrade. Make sure that user accounts and passwords used with IBM Spectrum Control are still in place, and that all devices managed by the CIM agent are still listed.
5. Restart the IBM Spectrum Control server and IBM Spectrum Control server services.
6. Open the IBM Spectrum Control GUI.
7. Run a CIM object manager (CIMOM) discovery job.
8. Run a probe job for each storage system that is managed by the CIM agent.

Migrating alert definitions from Tivoli Storage Productivity Center 5.2.7

When you upgrade from Tivoli Storage Productivity Center 5.2.7 or earlier to IBM Spectrum Control 5.3 or later, all the alert definitions for performance and configuration conditions are automatically migrated.

Important: A direct upgrade from IBM Spectrum Control 5.2.7 or earlier to 5.4.0 or later is not supported. You must first upgrade to 5.3.

- For more information about upgrading from 5.2.7 or earlier to 5.3, see [Preparing for an upgrade](#).
- For more information about migrating alert definitions to alert policies from 5.2.7 or earlier to 5.3, see [Migrating alert definitions to alert policies](#).

Migrating alert definitions to alert policies

When you upgrade to IBM Spectrum Control V5.3.2 or later, all of your monitored resources retain their existing alert definitions and are not included in an alert policy. However, at any time, you can place resources into an alert policy or create a policy based on a resource.

Use alert policies to manage the alert definitions and notification settings that apply to different sets of resources. Here are some reasons to place resources in an alert policy:

- You want to manage alert conditions and notification settings for a group of resources of the same type. For example, if you have several SAN Volume Controller storage systems in your environment, you can create an alert policy so that the alert definitions are the same for all of the SAN Volume Controller systems. Note that alert policies manage one type of resource only.
- You want to use one alert policy for the storage systems in your test environment, and another for the storage systems in your production environment.

Tips:

- Alert policies manage one type of resource only.
- A resource can be managed by only one alert policy.
- If a resource is managed by a policy, the resource cannot have alert definitions and notification settings that are independent of the policy. The alert definitions and notification settings that apply to the resource come from the policy.

It is not a requirement for resources to be managed by an alert policy. You can define alert conditions and notification settings for individual resources.

You can also define alerts and notification settings for applications and general groups to manage alerts for groups of resource components such as volumes or pools.

Migrating alert definitions from resources to alert policies

If you want to create a new alert policy that uses the alert definitions from one of your resources, complete the following steps:

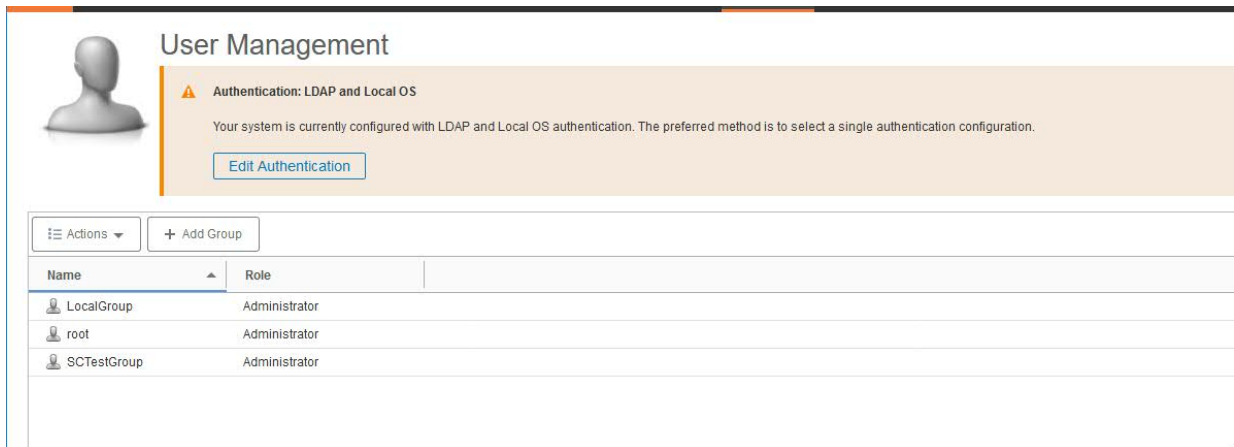
1. Go to the details page for the resource from which you want to create the policy. For example, to create an alert policy from a FlashSystem 9100, click **Storage > Block Storage Systems**.
2. Right-click the resource, then click **View Alert Definitions**.
3. Click **Create Policy** from the **Policy Actions** menu.
4. Type a name for the policy.
5. Make sure that the **Use alert definitions and notification settings from *resource_name*** option is selected.
6. Select any other resources that you want to add to the policy from the table of resources. Alert definitions in the policy are automatically applied to the resources you select. You can also choose to add resources later.

Scenario: Changing from LDAP and Local OS authentication to only LDAP or Local OS authentication after an upgrade

In this scenario, you change from LDAP and Local OS authentication to only LDAP or Local OS authentication.

You were running an earlier version of IBM Spectrum Control with both LDAP and Local OS authentication configured. You upgraded to the latest version of IBM Spectrum Control. The preferred method of authentication is to select either LDAP or Local OS authentication.

1. Back up the `ldapregistry.xml` file in the `installation_dir/wlp/usr/servers/webServer/registry/` directory.
2. Log on as an administrator to the IBM Spectrum Control GUI.
3. Click **Settings > User Management**.



4. Click **Edit Authentication**.
 - a) On the **Authentication Configuration** page, uncheck **LDAP**, if you want to change from LDAP and Local OS authentication to *only* Local OS authentication, and click **Save**.
 - b) On the **Authentication Configuration** page, uncheck **Local OS**, if you want to change from LDAP and Local OS authentication to *only* LDAP authentication and you **do not** want to alter your LDAP settings, and click **Save**.
 - c) On the **Authentication Configuration** page, uncheck **Local OS**, if you want to change from LDAP and Local OS authentication to *only* LDAP authentication and you **do** want to alter your LDAP settings, then start with Step 6 in

[Adding an LDAP repository to the federated repositories for IBM Spectrum Control](#)

Chapter 4. Uninstalling

You can uninstall IBM Spectrum Control by using the uninstallation program or by using silent mode from the command line.

To uninstall IBM Spectrum Control, uninstall these components and related software:

- Uninstall any Storage Resource agents installed on your remote systems.
- If all IBM Spectrum Control components are installed on one server, uninstall all components.
- If the database repository is installed on a separate server, uninstall the IBM Spectrum Control components on the first server, and then uninstall the database repository on the second server.
- Uninstall IBM® Db2®.

Note: On the Windows operating system, before you uninstall IBM Spectrum Control, if you installed the Monitoring Agent service, stop the **Monitoring Agent for Windows OS - Primary** and **Monitoring Agent for Windows OS - Watchdog** services.

Uninstalling IBM Spectrum Control in a single-server environment

In a single-server environment, you can uninstall IBM Spectrum Control by using the uninstallation program. The uninstallation process requires minimal user interaction.

To uninstall the software in a single-server environment:

1. Log on to the IBM Spectrum Control host server with the appropriate user privileges.
2. Start the IBM Spectrum Control uninstallation program for your operating system.
 - For the Windows operating system:
 - a. Click **Start > Control Panel > Programs > Programs and Features**.
 - b. Highlight **IBM Spectrum Control** and click **Uninstall/Change**.
 - For the AIX or Linux operating systems:

Run the following command from the root directory:

```
installation_dir/_uninst/uninstall
```

where *installation_dir* is where IBM Spectrum Control is installed.

3. Review the message that indicates that all the installed IBM Spectrum Control components are uninstalled.
4. Click **Uninstall** and click **Next**.

You cannot cancel the uninstallation process after it starts.
5. Restart the system if needed.

For the Windows operating system, you can restart the system now or later. You must restart the system to reinstall IBM Spectrum Control.

For the AIX or Linux operating system, you *do not* have to restart the system.

6. If an error occurred during the uninstallation process, review the installation log files.

Related reference

[“Planning for IBM Spectrum Control authentication and authorization” on page 15](#)

An operating system user name is required to install and log on to IBM Spectrum Control for the first time. After you install IBM Spectrum Control, you can assign roles to users. Roles determine the product functions that are available to users.

[“Reviewing the log files to resolve installation issues” on page 76](#)

If an error occurs during IBM Spectrum Control installation, you can review the error log files to resolve issues and continue the installation.

Uninstalling IBM Spectrum Control in a multiple-server environment

You can uninstall IBM Spectrum Control by using the uninstallation program. This uninstallation process requires minimal user interaction.

For this procedure, the terms *Server A* and *Server B* denote the two servers. The IBM Spectrum Control database repository is installed on *Server A* and the IBM Spectrum Control servers are installed on *Server B*.

To uninstall the software in a multiple-server environment, complete the following steps:

1. Complete these steps on *Server B*:

- a) Log on to *Server B* with the appropriate user privileges to uninstall the IBM Spectrum Control components.
- b) Start the IBM Spectrum Control uninstallation program.

For the Windows operating system, click **Start > Control Panel > Programs > Programs and Features**. Highlight **IBM Spectrum Control** and click **Uninstall/Change**.

For the AIX or Linux operating system, run the following command from the root directory:

```
installation_dir/_uninst/uninstall
```

where *installation_dir* is the location where IBM Spectrum Control is installed.

A window is displayed that indicates that all IBM Spectrum Control components installed on the system will be uninstalled.

- c) Click **Uninstall**. A confirmation is displayed.
- d) Click **Next** to start the uninstallation process.

Tip:

Remember the following for your operating system:

- For the Windows operating system, when the uninstallation process is finished, a window is displayed so you can choose to start your system now or later. You must restart the system before you can reinstall IBM Spectrum Control.
- For the AIX or Linux operating system, you do not have to restart your system.

2. Complete these steps for *Server A*:

- a) Log on to *Server A* with the appropriate user privileges to uninstall the IBM Spectrum Control database repository.
- b) Start the IBM Spectrum Control uninstallation program.
- c) Follow the instructions to uninstall the database repository.

3. If an error occurred during the installation process, review the installation log files.

Related reference

[“Planning for IBM Spectrum Control authentication and authorization” on page 15](#)

An operating system user name is required to install and log on to IBM Spectrum Control for the first time. After you install IBM Spectrum Control, you can assign roles to users. Roles determine the product functions that are available to users.

[“Reviewing the log files to resolve installation issues” on page 76](#)

If an error occurs during IBM Spectrum Control installation, you can review the error log files to resolve issues and continue the installation.

Uninstalling IBM Spectrum Control by using silent mode

You can uninstall IBM Spectrum Control by using silent mode. This mode is useful if your system is running from a terminal that cannot display graphics.

In silent mode, the following server configurations are possible:

Tip: The terms *Server A* and *Server B* denote the two servers in a multiserver environment.

Option 1

All IBM Spectrum Control components are installed on one server (single-server environment).

Option 2

The IBM Spectrum Control database repository is installed on Server A and all other IBM Spectrum Control components are installed on Server B.

To uninstall IBM Spectrum Control by using silent mode, complete the following steps:

1. Complete the following steps for option 1:

- a) Log on to the IBM Spectrum Control system with the appropriate user privileges.
- b) Start the uninstallation program.

- For the Windows operating system, run the following in the C:\ directory:

```
installation_dir\_uninst\uninstall.bat -i silent
```

- For the AIX or Linux operating systems, run the following command from the root directory:

```
installation_dir/_uninst/uninstall -i silent
```

where *installation_dir* is where IBM Spectrum Control is installed.

c) Restart the system, if needed.

- For the Windows operating systems, restart the system after the uninstallation process is complete.
- For the AIX or Linux operating systems, you do not have to restart your system.

2. Complete the following steps for option 2:

- a) Log on to Server B with the appropriate user privileges to uninstall IBM Spectrum Control.
- b) Start the uninstallation program.

- For the Windows operating system, run the following from the C:\ directory:

```
installation_dir\_uninst\uninstall.bat -i silent
```

- For the AIX or Linux operating system, run the following command from the root directory:

```
installation_dir/_uninst/uninstall -i silent
```

c) Restart the system, if needed.

- For the Windows operating systems, restart the system after the uninstallation process is complete.
- For the AIX or Linux operating systems, you do not have to restart your system.

d) Log on to Server A with the appropriate user privileges to uninstall the IBM Spectrum Control database repository.

e) Start the uninstallation program.

- For the Windows operating system, run the following command from the C:\ directory:

```
installation_dir\_uninst\uninstall.bat -i silent
```

f) Restart the system, if needed.

- For the Windows operating systems, restart the system after the uninstallation process is complete.
- For the AIX or Linux operating systems, you do not have to restart your system.

Related tasks

[“Manually uninstalling IBM Spectrum Control components on Windows” on page 127](#)

If the IBM Spectrum Control uninstallation process fails, you must manually uninstall the components.

[“Manually uninstalling IBM Spectrum Control components on AIX or Linux” on page 126](#)

If the IBM Spectrum Control uninstallation process fails, you must manually uninstall the components.

Related reference

[“Planning for IBM Spectrum Control authentication and authorization” on page 15](#)

An operating system user name is required to install and log on to IBM Spectrum Control for the first time. After you install IBM Spectrum Control, you can assign roles to users. Roles determine the product functions that are available to users.

[“Reviewing the log files to resolve installation issues” on page 76](#)

If an error occurs during IBM Spectrum Control installation, you can review the error log files to resolve issues and continue the installation.

Manually uninstalling IBM Spectrum Control components on AIX or Linux

If the IBM Spectrum Control uninstallation process fails, you must manually uninstall the components.

This procedure assumes the following conditions:

- You installed IBM Spectrum Control in the default directory.
- You used default ports.
- You used the default IBM Spectrum Control database repository named TPCDB.

To manually uninstall IBM Spectrum Control components, complete the following steps:

1. Run the following command to stop the Storage Resource agent:

```
kill -9 `ps -aef | grep /opt/IBM/TPC/agent| grep -v grep | awk '{ print $2 }'` 2> /dev/null
```

2. Run the following command to stop the Data server:

```
kill -9 `ps -aef | grep data | grep -v grep | awk '{ print $2 }'` 2> /dev/null
```

3. Run the following command to stop the Device server:

```
kill -9 `ps -aef | grep deviceServer | grep -v grep | awk '{ print $2 }'` 2> /dev/null
```

4. Run the following command to stop the Alert server:

```
kill -9 `ps -aef | grep alertServer | grep -v grep | awk '{ print $2 }'` 2> /dev/null
```

5. Run the following command to stop the Export server:

```
kill -9 `ps -aef | grep export | grep -v grep | awk '{ print $2 }'` 2> /dev/null
```

6. Run the following command to stop the GUI:

```
kill -9 `ps -aef | grep webServer | grep -v grep | awk '{ print $2 }'` 2> /dev/null
```

7. Run the following command to stop the data collector:

```
kill -9 `ps -aef | grep collector | grep -v grep | awk '{ print $2 }'` 2> /dev/null
```


8. Drop the database by completing the following steps:
 - a. Source the db2profile.
 - b. Enter db2 drop db TPCDB.
9. Go to the /db2_admin_home/db2_instance_name/ directory and ensure that the database directory is deleted.
10. Delete the following files and folders:
 - `rm -r `find /etc -name *tpcdsrv* -print``
 - `rm -r `find / -name *itsanm* -print``
 - `rm -r /etc/Tivoli/TSRM/registry`
 - `rm -r /etc/Tivoli/TSRM/registryNA`
 - `rm -r /etc/Tivoli/TSRM/lock`
 - `rm -fr /opt/IBM/TPC`

Manually uninstalling IBM Spectrum Control components on Windows

If the IBM Spectrum Control uninstallation process fails, you must manually uninstall the components.

This procedure assumes that the following conditions are met:

- You installed IBM Spectrum Control in the default directory.
- You used default ports.
- The Storage Resource agent service name is *Agent1*.
- You used the default IBM Spectrum Control database repository name *TPCDB*.

To manually uninstall IBM Spectrum Control components, complete the following steps in a Windows command window:

1. To uninstall the Storage Resource agent, run the following command:

```
sc stop Agent1
sc delete Agent1
```

2. To remove the Storage Resource agent registry entries, run the following command:

```
reg delete HKLM\SOFTWARE\IBM\TPCAGENT\1
```

where 1 is the instance of the Agent.

If you do not have multiple agents, you can also run the following command:

```
reg delete HKEY_LOCAL_MACHINE\SOFTWARE\IBM\TPCAGENT
```

Important: If you have multiple agents and you run this command, all of the agents are deleted.

3. To uninstall the Data server, run the following commands:

```
sc stop TSRMsrv1
sc delete TSRMsrv1
```

4. To stop the Device server and data collector, run the following command:

```
cd C:\Program Files\IBM\TPC\scripts
stopTPCdevice.bat
```

Tip: If the script does not exist, run the following command to stop the Device server:

```
sc stop deviceServer
```

If the script does not exist, run the following command to stop the data collector:

```
sc stop datacollector1
```

5. To delete the Device server, run the following command:

```
sc delete deviceServer
```

6. To delete the data collector, run the following command:

```
sc delete datacollector1
```

7. Run the following commands to uninstall the Alert server:

```
sc stop alertServer  
sc delete alertServer
```

8. Run the following commands to uninstall the Export server:

```
sc stop exportServer  
sc delete exportServer
```

9. Run the following commands to uninstall the Web server:

```
sc stop webServer  
sc delete webServer
```

10. Run the following commands to delete the wlp directories:

```
cd C:\Program Files\IBM\TPC  
del wlp
```

11. Run the following command to remove the IBM Spectrum Control directories:

```
rmdir /s/q "C:\Program Files\IBM\TPC"
```

12. Restart your computer.

Uninstalling Storage Resource agents

You can uninstall locally or remotely installed Storage Resource agents.

To uninstall a Storage Resource agent, use the GUI to remove the server that the agent is deployed on.

Uninstalling Storage Resource agents manually

You can manually uninstall Storage Resource agents.

To uninstall a Storage Resource agent, complete the following steps:

1. If the Storage Resource agent is on the Virtual I/O system, complete the following steps:
 - a. Log in with the **padmin** user ID.
 - b. Run the following command to set up the AIX environment:

```
oem_setup_env
```

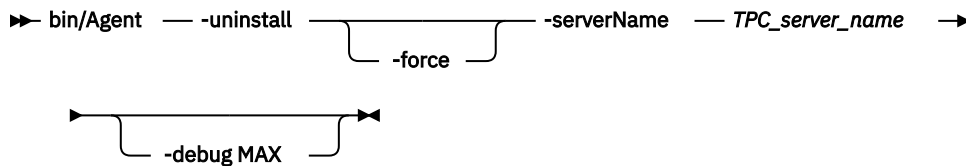
2. Go to the directory where the agent is installed:

```
agent_install_location
```

where *agent_install_location* is where the Storage Resource agent is installed.

3. Run the uninstallation command:

Restriction: Do not delete the Storage Resource agent component from the IBM Spectrum Control server by using the GUI or the command-line interface. This component must exist on the server to complete the uninstall process.



Where:

-uninstall

Uninstalls the agent.

-force

This optional parameter forces an uninstallation. If you use this parameter, do not provide the `serverName` parameter.

-serverName *TPC_server_name*

TPC_server_name is the Data server name as defined in IBM Spectrum Control. You can check the configuration file for the server name:

```
agent_install_location/config/Agent.config
```

where *agent_install_location* is where the agent is installed.

-debug MAX

This optional parameter is for debugging purposes. If you set the **-debug** parameter, then some files are not deleted.

Tip: If you run the uninstallation program from the bin directory, the bin directory is not deleted.

If you run the uninstallation program outside of the agent installation directory, then you must specify the full path.

If the uninstallation fails, you must look at the return codes. For more information about return codes, see http://www.ibm.com/support/knowledgecenter/SS5R93_5.4.1/com.ibm.spectrum.sc.doc/fqz0_r_return_codes_used_by_strg_resource_agent.html.

Deleting Storage Resource agent registry entries after a failed installation or uninstallation

If your IBM Spectrum Control installation or uninstallation fails, you must find and manually delete the Storage Resource agent registry entries that remain.

Deleting registry files in the Windows operating system

To delete registry entries after a failed installation or uninstallation in the Windows operating system:

1. In Windows Registry Editor, navigate to `HKEY_LOCAL_MACHINE > SOFTWARE > IBM > TPCAGENT> NUMBER` or `HKEY_LOCAL_MACHINE > SOFTWARE > IBM > TPCAGENT`.
2. Delete this entry:

```
[HKEY_LOCAL_MACHINE\SOFTWARE\IBM\TPCAGENT\1]
"Home"="C:\\Program Files\\IBM\\TPC"
"Port"="9567"
```

3. If the Storage Resource agent is running as a daemon service, delete the service.
For example, `sc delete AgentX`, where `AgentX` is the name of the Storage Resource agent.
4. Delete the folder in which the agent was installed.
Display the agent name and folder by running `services.msc` and right-click the service to see the properties.
5. For daemon agents, verify that the associated CAP file was deleted.

The CAP file is located in the %ALLUSERSPROFILE%\Application Data\IBM\CAP folder. The naming convention for this file is `srainstance_default.xml`.

Remember: After uninstalling a daemon agent, you must restart your system.

Deleting registry files on the UNIX or Linux operating systems

To delete registry entries after a failed installation or uninstallation on the UNIX or Linux operating systems:

1. Delete the Storage Resource agent entry that is associated with the IBM Spectrum Control installation on the local server.

The terms *Server A* and *Server B* are used in this procedure to denote the different servers.

When you install IBM Spectrum Control on Server A, a Storage Resource agent is also installed on Server A. When you deploy another Storage Resource agent from IBM Spectrum Control Server B to Server A, an entry is added to the file `/etc/Tivoli/TSRM/registryNA` on Server A. This entry is associated with the Storage Resource agent deployed from Server B.

If a failure occurs when you install or uninstall the Storage Resource agent from Server A, you must delete the entry from the `/etc/Tivoli/TSRM/registryNA` file that is associated with the agent on Server A. For example, you would delete these lines from the file:

```
Instance=1
Home=/opt/IBM/TPC
Port=9567
```

2. If the agent was a daemon, verify that the process is running and stop it.

- To list all the running processes, run the following command:

```
ps -ef
```

- To stop a process, run the following command:

```
kill -9 process_number
```

3. For daemon agents, verify that the associated CAP File was deleted.

The CAP file is located in the `/opt/IBM/CAP` directory. The naming convention for this file is `srainstance_default.xml`.

Removing servers

You can remove servers that you no longer want to monitor with IBM Spectrum Control.

You can use the GUI to remove servers. If a Storage Resource agent is deployed to the server, the agent is uninstalled.

When the server is removed, it is no longer monitored by IBM Spectrum Control. All the data that was collected about the server is removed from the database repository.

Tip: When you remove a server, it is only removed from IBM Spectrum Control. The server is not physically deleted from the storage environment.

To remove a server, complete the following steps:

1. In the menu bar, go to **Servers > Servers**.
2. On the **Servers** page, right-click the server where the agent is deployed and select **Remove**.
3. Click **Remove** to confirm that you want to remove the server.

Uninstalling Db2

Uninstall IBM® Db2® after you uninstall IBM Spectrum Control. You must use the Db2® uninstallation program to uninstall Db2.

For information about uninstalling Db2® 10.5 on the Windows operating system, go to [Uninstalling your DB2 database product \(Windows\)](#).

For information about uninstalling Db2® 11.1 on the Windows operating system, go to [Uninstalling your DB2 database product \(Windows\)](#).

For information about uninstalling Db2 11.5 on the Windows operating system, go to [Uninstalling your DB2 database product \(Windows\)](#).

Uninstalling Db2 on AIX or Linux

You can uninstall IBM® Db2® on UNIX or Linux systems.

To uninstall Db2® on AIX and Linux, complete the following steps:

1. As the Db2 instance user (typically db2inst1), drop the databases, and stop Db2.
 - a) If you are the user with root authority, run the **su - db2inst1** command to switch the user to the Db2 instance user. Otherwise, log in as the Db2 instance user.
 - b) Run the **db2 list db directory** command to list the databases that might not have been removed by the IBM Spectrum Control uninstallation program.
 - c) For each database name listed by the command in the previous step, run the **database_name** command. For example:

```
Command:
$ db2 drop db tcpdb
Response:
DB20000I The DROP DATABASE command completed successfully.
$ db2 drop db ibmcdb
Response:
DB20000I The DROP DATABASE command completed successfully.
```

- d) Run the **db2stop force** command. The following messages are displayed:

```
08/10/2015 21:46:13      0      0      SQL1064N  DB2STOP processing was successful.
SQL1064N  DB2STOP processing was successful.
```

- e) Run **db2 terminate**. The following message is displayed:

```
DB20000I The TERMINATE command completed successfully.
```

- f) Run the **exit** command to close the su shell or log out.

2. Drop the Db2 instance.

Note: This step must be performed as a user with root authority and run in a shell that has not had the db2profile sourced.

- a) Log in as a user with root authority.
 - b) Change to the Db2 instance directory. The default path depends on your operating system.

On AIX, run the **cd /opt/IBM/db2/V11.5/instance** command.

On Linux, run the **cd /opt/ibm/db2/V11.5/instance** command.

- c) Run the **./db2ilist** command to list the db2instance name (typically db2inst1).
 - d) Run the **./db2idrop db2inst1** command where *db2inst1* is the instance name reported by the **db2ilist** command in the previous step.

3. As the Db2 administration server (DAS) user (typically dasusr1), stop DAS.

- a) If you are the user with root authority, run **su - dasusr1** to switch user to the DAS user. Otherwise, log in as the DAS user.

- b) Run the **db2admin stop** command. The following message is displayed:

```
SQL4407W The DB2 Administration Server was stopped successfully.
```

- c) Run the **exit** command to close the su shell or log out.
4. Remove the Db2 administration server. You must remove the Db2 administration server before you remove the Db2 product.
- a) Log in as a user with **root** authority.
- b) Change to the Db2 instance directory. The default path depends on your operating system.
- On AIX, run the **cd /opt/IBM/db2/V11.5/instance**.
- On Linux, run the **cd /opt/ibm/db2/V11.5/instance**.
- c) Run the **./dasdrop** command. The following messages are displayed:

```
SQL4410W The DB2 Administration Server is not active.  
DBI1070I Program dasdrop completed successfully.
```

5. Uninstall Db2. Use the **db2_deinstall** command to remove Db2 products or Db2 components. The **db2_deinstall** command removes all Db2 products from your system.
- a) Change to the Db2 installation directory. The default path depends on your operating system.
- On AIX, run **cd /opt/IBM/db2/V11.5/install**.
- On Linux, run **cd /opt/IBM/db2/V11.5/install**.
- b) Run the **./db2_deinstall -a** command. The following messages are displayed:

```
DBI1016I Program db2_deinstall is performing uninstallation.  
Please wait.  
The execution completed successfully.  
For more information see the DB2 uninstallation log at  
"/tmp/db2_deinstall.log.pid".
```

6. Delete Db2 users and groups. The default user and group names are shown in the following commands.
- a) Run the following commands to remove the users:

```
userdel -r dasusr1  
userdel -r db2inst1  
userdel -r db2fenc1
```

- b) Run the appropriate commands for your operating system to remove the groups.

On AIX run the following commands:

```
rmgroup dasadm1  
rmgroup db2iadm1  
rmgroup db2fadm1
```

On Linux run the following commands:

```
groupdel dasadm1  
groupdel db2iadm1  
groupdel db2fadm1
```

7. Remove the Db2 directory.
- a) Run the **cd** command.
- b) Run the command to remove the Db2 directory on your operating system:
- On AIX, run the **rm -r /opt/IBM/db2** command.
- On Linux, run **rm -r /opt/ibm/db2** command.
8. Remove any Db2 definitions from **/etc/services**.

Uninstalling IBM Cognos Analytics

To uninstall IBM® Cognos® Analytics, follow the procedures in the Cognos Analytics documentation.

For information on uninstalling Cognos Analytics in a Microsoft Windows environment, go to [Uninstall IBM Cognos Analytics on Microsoft Windows operating systems](#).

For information on uninstalling Cognos Analytics in an UNIX or Linux® environment, go to [Uninstall IBM Cognos Analytics on UNIX or Linux operating systems](#).

Related information

[Silent installation, uninstallation, and configuration](#)

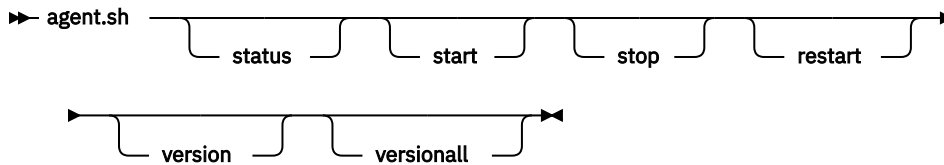
Chapter 5. Reference

agent.sh command

The **agent.sh** command lets you start, stop, and restart the Storage Resource agent. You can also display the status and version of the Storage Resource agent.

Note:

- You must have root authority to run this command.
- For Windows, the status, stop, and start functions are handled through the Windows Services panel.



Parameters:

status

Displays the current status of the Storage Resource agent. The status is returned is running or not running.

start

Starts the Storage Resource agent.

stop

Stops the Storage Resource agent.

restart

Stop and then start the Storage Resource agent.

version

Displays the current version of the Storage Resource agent.

versionall

Displays the version of the Storage Resource agent and its related components.

Appendix A. Accessibility features for IBM Spectrum Control

Accessibility features help users who have a disability, such as restricted mobility or limited vision, to use information technology products successfully.

Accessibility features

The following list includes the major accessibility features in IBM Spectrum Control:

- Keyboard-only operation in the GUI.
- A Knowledge Center that includes the following accessibility features:
 - The Knowledge Center is provided in XHTML 1.0 format, which is viewable in most web browsers. With XHTML, you can view documentation according to the display preferences that are set in your browser. XHTML supports screen readers and other assistive technologies.
 - All documentation for IBM Spectrum Control is available in Adobe Portable Document Format (PDF) by using the Adobe Acrobat Reader. To access PDFs, go to [Printable documentation](#).
 - All images in the Knowledge Center are provided with alternative text, so that visually impaired users can understand the contents of the images.
- Interfaces that are commonly used by screen readers.

The setting for the automatic-refresh button in the screen reader is toggled to the ON position by default. If you want the screen reader to read the previous text, complete the following steps:

1. Navigate to the Accessibility Settings Navigation region by using the arrow keys. The region is located after the IBM Spectrum Control application title.
2. Click **Enter** to toggle the automatic-refresh button to the OFF position. (An alert sounds to make you aware that the turn-off automatic-refresh toggle button was pressed.)
3. To move backward to the previously read text so that the screen reader can read it again, use the arrow keys. You can move backwards and forwards through the page.
4. When you are ready to move on, click **Enter** to toggle the automatic-refresh button to the ON position and to refresh the page. (An alert sounds to make you aware that the turn-on, automatic-refresh toggle button was pressed.)

Tip: Alternatively, let the toggle setting persist, and refresh as needed by pressing the F5 key.

Keyboard navigation

Most of the features of the IBM Spectrum Control GUI are accessible by using the keyboard. For those features that are not accessible, equivalent function is available by using the command-line interface (CLI), except as noted in the product release notes.

You can use keys or key combinations to perform operations and initiate many menu actions that can also be done through mouse actions. The following sections describe the keys or key combinations for different parts of the GUI:

For navigating in the GUI and the context-sensitive help system:

- To navigate to the next link, button, or topic within a panel, press Tab.
- To move to the previous link, button, or topic within a panel, press Shift+Tab.
- To select an object, when the object is in focus, press Enter.

For actions menus:

- To navigate to the grid header, press Tab.

- To reach the drop-down field, press the Left Arrow or Right Arrow key.
- To open the drop-down menu, press Enter.
- To select the menu items, press the Up Arrow or Down Arrow key.
- To start the action, press Enter.

For filters:

To specify a filter option and text:

1. Press Tab to navigate to the magnifying glass icon.
2. Press the Up Arrow or Down Arrow key to navigate the filtering list.
3. Press Enter to select a filtering option.
4. When a filtering option is selected, the cursor moves to the filter text box. Type the filter text and press Enter. To reset a filter, press Enter.

For text fields:

- To navigate to text fields, press Tab.
- To navigate to the fields that are available for editing, press Tab.
- To navigate to the next field or to the **Submit** button, press Tab.

For tables or lists:

- To navigate between column headers, focus on a column header and use the Left Arrow and Right Arrow keys to move to other column headers.
- To navigate between data cells, focus on a data cell and use the Left, Right, Up, Down, Pageup, and Pagedown Arrow keys.
- To sort a column, focus on a column header and press Enter. The focus remains on the column header after the sort occurs.
- To change the size of a column, focus on the column header, hold Shift+Control, and press the Left or Right Arrow keys.
- To follow a link in a data cell, focus on a data cell and press Shift+F9.
- To open a menu for a table row, focus on the row and press Shift+F10.
- To select consecutive rows, select the first row and hold Shift, press the Up or Down Arrow keys to go to the last row in the range, and press the Space bar to add the new rows to the selection.
- To select non-consecutive rows, select a row and hold Control, press the Up or Down Arrow keys, and press the Space bar to add the new row to the selection.


Restriction: For Chinese languages, the keyboard combination Control+Space bar is not enabled for selecting multiple rows at the same time.

Keyboard navigation with Firefox for Mac users: If you're using Firefox on a Mac with IBM Spectrum Control and want to use keyboard navigation, complete the following steps:

1. In Firefox, go to **Preferences > Advanced > General** and clear the check mark for **Always use the cursor keys to navigate within pages**. This step enables the use of Tab key to navigate between GUI elements.
2. In the URL address bar of Firefox, type **about:config** and press Enter.

Tip: If a warning prompt is displayed, click the button to accept the risk of changing browser settings. Existing settings won't be changed; instead, you'll be adding a preference setting for accessibility.
3. To add an accessibility preference for tab focus, right-click on the configuration page and select **New > Integer**.
4. In the New integer value window, type **accessibility.tabfocus** and click **OK**.
5. Type **7** to set the integer value and click **OK**.
6. Open your Mac's System Preferences app, go to **Keyboard > Shortcuts**, and select **All Controls**.

IBM and accessibility

For more information about IBM's commitment to accessibility, see the IBM Human Ability and Accessibility Center website at  <http://www.ibm.com/able>.

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Glossary

This glossary provides terms and definitions for IBM Spectrum Control.

The following cross-references are used in this glossary:

- *See* refers you from a nonpreferred term to the preferred term or from an abbreviation to the spelled-out form.
- *See also* refers you to a related or contrasting term.

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A

activation key

See [license key](#).

active management server

A management server from which the storage environment can be monitored and managed. The active management server replicates its database to the standby server.

advisory lock

A type of lock that a process holds on a region of a file that signals any other process to not use or lock the region or an overlapping region. Other processes are not forced to comply.

allocatable extent limit

A maximum total capacity for the system. The allocatable extent limit is calculated from pool extent sizes.

application key

See [license key](#).

array

An ordered collection, or group, of physical devices (disk drive modules) that are used to define logical volumes or devices. An array is a group of drives designated to be managed with a Redundant Array of Independent Disks (RAID).

asynchronous replication

A type of replication in which control is given back to the application as soon as the write operation is made to the source volume. Some time later, the write operation is made to the target volume. See also [synchronous replication](#).

audit log

An unalterable record of all commands or user interactions that are issued to the system.

authenticated user

A user who has logged in to the system with a valid account (user ID and password).

authentication

The mechanism by which a system determines what permissions a particular authenticated user has to access specific resources or actions. See also [authorization](#).

authorization

The mechanism by which a system determines what permissions a particular authenticated user has to access specific resources or actions. See also [authentication](#).

authorization code

An alphanumeric code generated for administrative functions, such as password resets or two-factor authentication bypass.

available capacity

The amount of usable capacity that is not yet used in a system, pool, array, or MDisk.

B

block storage

A unit of data storage on a device.

business continuity

The capability of a business to withstand outages and to operate mission-critical services normally and without interruption in accordance with predefined service-level agreements.

C

cache

Storage or memory that is used to improve access times to instructions, data, or both. For example, data that resides in cache memory is normally a copy of data that resides elsewhere in slower, less expensive storage, such as on a disk or on another network node.

cache eviction

A process by which data associated with a file is removed from the cache system. The data is removed either by using a Least Recently Used (LRU) algorithm when configured General Parallel File System (GPFS) hard or soft quota limits are exceeded or by issuing a command. When referenced again in the cache system, the data that is associated with the file is retrieved from the home system.

caching I/O group

The I/O group in the system that performs the cache function for a volume.

call home

A communication link established between a product and a service provider. The product can use this link to place a call to a service provider when it requires service. With access to the machine, service personnel can perform service tasks, such as viewing error and problem logs or initiating trace and dump retrievals.

capacity

The amount of data that can be contained on a storage medium.

capacity recycling

The amount of provisioned capacity that can be recovered without causing stress or performance degradation. This capacity identifies the amount of resources that can be reclaimed and provisioned to other objects in an environment.

capacity threshold

The percent of total usable physical capacity that used capacity must exceed before a notification is sent. See also [total usable physical capacity](#).

certificate

A digital document that binds a public key to the identity of the certificate owner, thereby enabling the certificate owner to be authenticated. A certificate is issued by a certificate authority and is digitally signed by that authority.

change volume

A volume that is used in Global Mirror that holds earlier consistent revisions of data when changes are made.

child pool

A user-defined capacity that is formed from capacity that is defined either in another pool or a system. See also [parent pool](#).

CIFS

See [Common Internet File System](#).

CIM

See [Common Information Model](#).

CIM agent

The code that consists of common building blocks that can be used instead of proprietary software or device-specific programming interfaces to manage devices that are compliant with the Common Information Model (CIM).

CIM object manager (CIMOM)

The common conceptual framework for data management that receives, validates, and authenticates the CIM requests from the client application. It then directs the requests to the appropriate component or service provider.

CIMOM

See [CIM object manager](#).

CKD

See [count key data](#).

CKD record

See [count-key-data record](#).

CLI

See [command-line interface](#).

client

A software program or computer that requests services from a server. See also [host](#), [server](#).

cloud account

An agreement with a cloud service provider to use storage or other services at that service provider. Access to the cloud account is granted by presenting valid credentials.

cluster

1. A collection of complete systems that work together to provide a single, unified computing capability.
2. A group of computers and other resources that operate together as a single system.
3. A loosely coupled collection of independent systems (or nodes) organized into a network for the purpose of sharing resources and communicating with each other.
4. In IBM System Storage DS8000, a partition capable of performing all DS8000 series functions. With two clusters in the DS8000 storage unit, any operational cluster can take over the processing of a failing cluster.
5. In Storwize® V7000, a pair of nodes that provides a single configuration and service interface.

command-line interface (CLI)

A computer interface in which the input and output are text based.

Common Information Model (CIM)

An implementation-neutral, object-oriented schema for describing network management or systems management information. The Distributed Management Task Force (DMTF) develops and maintains CIM specifications.

Common Internet File System (CIFS)

A protocol that manages shared, remote file access for applications to files, printers, serial ports, and so on over a TCP/IP network.

community name

The part of an SNMP message that represents a password-like name and that is used to authenticate the SNMP message.

compression

A function that removes repetitive characters, spaces, strings of characters, or binary data from the data being processed and replaces characters with control characters. Compression reduces the amount of storage space that is required for data.

compute node

An independent machine that contains one or more microprocessors, memory, storage, and network controllers and runs its own operating system and applications.

concurrent copy

A function of the DFSMSdss component that is used to back up any collection of data at a point in time with minimum down time for the database or application that uses the collection of data.

consistency group

A group of copy relationships between virtual volumes or data sets that are maintained with the same time reference so that all copies are consistent in time.

copyback

A process that moves data back to its expected or preferred location to maintain an array in a more efficient configuration after a failed drive is replaced.

copy set

The set of source volumes or target volumes involved in a FlashCopy operation.

count key data

1. An architecture for a direct access storage device (DASD) device or logical device that specifies the access mechanisms for the logical data units on the device through a specific set of supported channel commands. Extensions to the CKD command set form the basis of Extended CKD.
2. A data recording format that uses self-defining record formats in which each record on a volume is represented by up to three fields: a count field identifying the record and specifying its format, an optional key field that can be used to identify the data area contents, and an optional data field that typically contains the user data. See also [data record](#), [storage architecture type](#).

count-key-data record (CKD record)

See [data record](#).

CRU

See customer-replaceable unit.

customer-replaceable unit (CRU)

An assembly or part that can be replaced in its entirety by a user when any one of its components fails.

cylinder

A unit of storage on a count-key-data (CKD) device with a fixed number of tracks.

D

data collection

The process of obtaining performance and availability monitoring data and providing that data to a metric evaluator. Examples of data collectors include Domain Name System (DNS) probes, web page analyzers, or database analyzers. See also [discovery](#).

data consistency

A characteristic of the data at the target site where dependent write order is maintained to guarantee the recoverability of applications.

data record

A basic unit of data recording format. See also [count key data](#), [fixed-block architecture](#).

data reduction

A set of techniques that can be used to reduce the amount of usable capacity that is required to store data. Examples of data reduction include data deduplication and compression. See also [data reduction savings](#), [stored capacity](#).

data reduction savings

The total amount of usable capacity that is saved in a system, pool, or volume through the application of an algorithm such as compression or deduplication on the written data. This saved capacity is the difference between the written capacity and the used capacity. See also [data reduction](#).

data source

A storage resource or agent that provides data about a storage environment.

destage

To move data from cache to a nonvolatile storage medium.

discovery

The process of finding resources within an enterprise, including finding the new location of monitored resources that were moved. See also [data collection](#).

distributed RAID

An alternative RAID scheme where the number of drives that are used to store the array can be greater than the equivalent, typical RAID scheme. The same data stripes are distributed across a greater number of drives, which increases the opportunity for parallel I/O and hence improves overall array performance. See also [rebuild area](#).

DNS

See [Domain Name System](#).

Domain Name System (DNS)

The distributed database system that maps domain names to IP addresses.

drive

A data storage device. A drive can be either a magnetic disk drive or a solid-state drive (SSD).

drive class

A combination of drive technology and speed, which uniquely defines a class of drives that have approximately the same performance characteristics.

drive technology

A category of a drive that pertains to the method and reliability of the data storage techniques being used on the drive. Possible values include enterprise (ENT) drive, nearline (NL) drive, or solid-state drive (SSD).

E

ECKD

See [extended count key data](#).

effective capacity

The amount of provisioned capacity that can be created in a system or pool without running out of usable capacity given the current data reduction savings being achieved. This capacity equals the usable capacity divided by the data reduction savings percentage.

enclosure

The metal structure in which various electronic components are mounted.

encryption deadlock

The inability to access encryption keys to decrypt data. See also [encryption recovery key](#).

encryption key label

The list of encryption key labels used by the storage system to identify keys that will be used on the key server.

encryption key manager

See [encryption key server](#).

encryption key server

An internal or external system that runs a key manager that receives and then serves existing encryption keys or certificates to a storage system.

encryption recovery key

An encryption key that allows a method to recover from an encryption deadlock situation where the normal encryption key servers are not available. See also [encryption deadlock](#).

enterprise

Pertaining to a type of data storage device that has higher error recovery limits, vibration tolerance, and end-to-end error detection than standard desktop hard drives.

enterprise repository

A component of the data server that records and stores all information about the monitored computers' storage assets and their usage over time. The repository is organized into relational database tables and is accessed by the data server using Java Database Connectivity (JDBC).

event

An occurrence of significance to a task or system. Events can include completion or failure of an operation, a user action, or the change in state of a process.

extended count key data (ECKD)

An extension of the count-key-data (CKD) architecture. It includes additional commands that can be used to improve performance.

extent type

See [storage architecture type](#).

F

failback

The restoration of an appliance to its initial configuration after detection and repair of a failed network or component.

failover

An automatic operation that switches to a redundant or standby system or node in the event of a software, hardware, or network interruption.

FB

See [fixed block](#).

FBA

See [fixed-block architecture](#).

FC

See [Fibre Channel](#).

FC-AL

See [Fibre Channel Arbitrated Loop](#).

FCIP

See [Fibre Channel over IP](#).

FCP

See [Fibre Channel Protocol](#).

feature activation code

See [license key](#).

Fibre Channel (FC)

A technology for transmitting data between computer devices. It is especially suited for attaching computer servers to shared storage devices and for interconnecting storage controllers and drives. See also [zoning](#).

Fibre Channel Arbitrated Loop (FC-AL)

An implementation of the Fibre Channel standards that uses a ring topology for the communication fabric; refer to American National Standards Institute (ANSI) INCITS 272-1996, (R2001). In this topology, two or more Fibre Channel end points are interconnected through a looped interface.

Fibre Channel connection (FICON)

A Fibre Channel communication protocol designed for IBM mainframe computers and peripherals.

Fibre Channel extender

A device used to extend a Fibre Channel link over a greater distance than is supported by the standard, usually a number of miles or kilometers. Devices must be deployed in pairs at each end of a link.

Fibre Channel over IP (FCIP)

A network storage technology that combines the features of the Fibre Channel Protocol and the Internet Protocol (IP) to connect distributed SANs over large distances.

Fibre Channel Protocol (FCP)

The serial SCSI command protocol used on Fibre Channel networks. See also [open system](#).

FICON

See [Fibre Channel connection](#).

field-replaceable unit (FRU)

An assembly that is replaced in its entirety when any one of its components fails.

file module

A component that provides file systems to network users. A file module must be provided with storage for the file systems.

fileset

See [file set](#).

file set

1. A subset of a file system that provides granularity of functions such as snapshots or quotas within the file system.
2. A hierarchical grouping of files managed as a unit for balancing workload across a cluster.

file system (FS)

A collection of files and certain attributes associated with those files.

file system storage

Data storage that is organized into files and directories.

fixed block (FB)

See [fixed-block architecture](#).

fixed-block architecture (FBA)

An architecture for a virtual device that specifies the format of and access mechanisms for the virtual data units on the device. The virtual data unit is a block. All blocks on the device are the same size (fixed size). The system can access them independently. See also [data record](#), [storage architecture type](#).

FlashCopy

1. Pertaining to a point-in-time copy where a virtual copy of a volume is created. The target volume maintains the contents of the volume at the point in time when the copy was established. Any subsequent write operations to the source volume are not reflected on the target volume.
2. An optional feature of the Storage System DS family that can make an instant copy of data, that is, a point-in-time copy of a volume.

flash drive

A data storage device, which is typically removable and rewritable, that uses solid-state memory to store persistent data. See also [flash module](#).

flash module

A modular hardware unit containing flash memory, one or more flash controllers, and associated electronics. See also [flash drive](#).

flush-through mode

See [write-through mode](#).

form factor

The industry-standard physical dimensions of a storage system drive enclosure. Possible values include “3.5 inch”, “2.5 inch”, and “1.8 inch.”

frame

The hardware support structure, covers, and all electrical parts mounted therein that are packaged as one entity for shipping.

freeze

An operation in which a storage system blocks I/O from the host system to the affected volumes on the primary site. A freeze operation stops mirroring between the primary and secondary volumes to ensure data consistency at the secondary site. See also [thaw](#).

FRU

See [field-replaceable unit](#).

FS

See [file system](#).

full restore operation

A copy operation where a local volume is created by reading an entire a volume snapshot from cloud storage.

full snapshot

A type of volume snapshot that contains all the volume data. When a full snapshot is created, an entire copy of the volume data is transmitted to the cloud.

G

General Parallel File System (GPFS)

A high-performance shared-disk file system that can provide data access from nodes in a clustered system environment.

Global Copy

A non-synchronous long-distance copy option for data migration and backup. See also [remote mirror and copy](#).

globally unique identifier (GUID)

An algorithmically determined number that uniquely identifies an entity within a system.

Global Mirror

A method of an asynchronous replication that maintains data consistency across multiple volumes within or across multiple systems. Global Mirror is generally used where distances between the source site and target site cause increased latency beyond what the application can accept.

GPFS

See [General Parallel File System](#).

grain size

The unit size for allocating space on thin-provisioned volumes, such as 32, 64, 128, and 256 kibibyte. The grain size is defined when a volume is created.

GUID

See [globally unique identifier](#).

H

Hardware Management Console (HMC)

1. In a system storage environment, a system that acts as the focal point for configuration, management of Copy Services functions, and maintenance.
2. A system that controls managed systems, including the management of logical partitions and use of Capacity Upgrade on Demand. Using service applications, the HMC communicates with managed systems to detect and consolidate information, which can then be sent for analysis.

heat map

An overlay that shows where the user performed actions on a web page. The data is summarized and shown as a colored marker at the location of the user action over a snapshot of the web page. The overlay lets the user see where and how the web page user interacted with the web page.

HMC

See [Hardware Management Console](#).

host

A physical or virtual computer system that hosts computer applications, with the host and the applications using storage. See also [client](#), [host](#), [server](#).

host cluster

A configured set of physical or virtual hosts that share one or more storage volumes in order to increase scalability or availability of computer applications.

host interface card

See [interface card](#).

host object

A logical representation of a host within a storage system that is used to represent the host for configuration tasks.

host volume

A volume that represents the volume functional role from an application point of view. The host volume can be connected to a host or server. It receives read, write, and update application I/O, depending on the site to which the application is writing.

hot-spare

Pertaining to redundant hardware (such as an adapter, a disk, a drive, or a server) that is installed and available in the event of a hardware failure.

HyperSwap

Pertaining to a function that provides continuous, transparent availability against storage errors and site failures, and is based on synchronous replication.

hypervisor

Software or a physical device that enables multiple instances of operating systems to run simultaneously on the same hardware.

I

incremental restore operation

A copy operation where a local volume is modified to match a volume snapshot by reading from cloud storage only the parts of the volume snapshot that differ from the local volume.

incremental snapshot

A type of volume snapshot where the changes to a local volume relative to the volume's previous snapshot are stored on cloud storage.

input/output (I/O)

Pertaining to a device, process, channel, or communication path involved in data input, data output, or both.

interface card

An optional part of a node canister that provides the system with additional host and storage connectivity options.

interface node

A node that connects a system to an Internet Protocol (IP) network for file-serving capabilities by using service protocols.

Internet Small Computer System Interface (iSCSI)

An IP-based standard for linking data storage devices over a network and transferring data by carrying SCSI commands over IP networks. See also [Small Computer System Interface](#).

I/O

See [input/output](#).

I/O enclosure

A hardware unit in a storage system where data is transferred into and out of the system.

iSCSI

See [Internet Small Computer System Interface](#).

J

journal volume

A volume that holds a consistent copy of data until a new consistent copy is formed. The journal volume restores the last consistent point during a recovery.

K

key server

1. A server that negotiates the values that determine the characteristics of a dynamic virtual private network (VPN) connection that is established between two endpoints.
2. See [encryption key server](#).

L

launch-in-context

An operation in which a user starts a secondary application from a primary application to perform a specific task. Using the parameters, navigation instructions, and user credentials that are supplied by the primary application, the secondary application opens to the specific place in which to complete the task.

licensed capacity

The amount of capacity on a storage system that a user is entitled to configure.

license key

An alphanumeric code that activates a licensed function on a product.

license key file

A file that contains one or more licensed keys.

logical unit number (LUN)

In the Small Computer System Interface (SCSI) standard, a unique identifier used to differentiate devices, each of which is a logical unit (LU).

LUN

See [logical unit number](#).

M

machine signature

A string of characters that identifies a system. A machine signature might be required to obtain a license key.

Management Information Base (MIB)

In the Simple Network Management Protocol (SNMP), a database of objects that can be queried or set by a network management system.

management node

A node that is used for configuring, administering, and monitoring a system.

management server

A system that provides a central point of control for managing data replication.

management server relationship

A connection between two replication servers, where one server acts as the active server and replicates the data that is necessary for the standby server to take control of the replication environment.

maximum replication delay

The number of seconds that Metro Mirror or Global Mirror replication can delay a write operation to a volume.

Metro Global Mirror

1. A cascaded solution where Metro Mirror synchronously copies data to the target site. This Metro Mirror target is the source volume for Global Mirror that asynchronously copies data to a third site. This solution has the potential to provide a disaster recovery with no data loss at Global Mirror distances when the intermediate site does not participate in the disaster that occurs at the production site.

2. A three-site, high availability, disaster recovery solution. Metro Global Mirror uses synchronous replication to mirror data between a local site and an intermediate site, and asynchronous replication to mirror data from an intermediate site to a remote site.

Metro Mirror

A method of synchronous replication that maintains data consistency across multiple volumes within the system. Metro Mirror is generally used when the write latency caused by the distance between the source site and target site is acceptable to application performance.

MIB

See [Management Information Base](#).

N

namespace

The scope within which a Common Information Model (CIM) schema applies.

native interface

An interface that is specific to a system or subsystem.

nearline

Pertaining to a type of storage in which data is available in a short amount of time, but not instantly.

nearline SAS drive

A drive that combines the high capacity data storage technology of a Serial Advanced Technology Attachment (SATA) drive with the benefits of a serial-attached SCSI (SAS) interface for improved connectivity.

node

A single processing unit within a system. For redundancy, multiple nodes are typically deployed to make up a system.

O

open system

A system that complies with industry-defined interoperability standards. An open system can be connected to other systems complying with the same standards. See also [Fibre Channel Protocol](#), [Small Computer System Interface](#).

order confirmation code

See [authorization code](#).

overhead capacity

An amount of usable capacity that is occupied by metadata in a system or pool and other data that is used for system operations.

overprovisioned ratio

The ratio of provisioned capacity to usable capacity in a system or pool.

overprovisioning

The result of creating more provisioned capacity in a storage system or pool than there is usable capacity. Overprovisioning occurs when thin provisioning or data reduction techniques ensure that the used capacity of the provisioned volumes is less than their provisioned capacity.

P

parent pool

A storage pool that receives its capacity from MDisks and has, or will have, some of its capacity allocated to child pools. See also [child pool](#).

performance group

A collection of volumes that is assigned the same performance characteristics. See also [performance policy](#).

performance policy

A policy that specifies performance characteristics, for example quality of service (QoS). See also [performance group](#).

PFC

See [priority flow control](#).

ping

1. The command that sends an Internet Control Message Protocol (ICMP) echo-request packet to a gateway, router, or host with the expectation of receiving a reply.
2. A job that tracks the availability of assets and that is performed by an agent. Several ping jobs can be used to monitor the availability of any computer or subset of computers in the network.

pool

1. See [storage pool](#).
2. A grouping of storage space that consists of volumes, logical unit numbers (LUNs), or addresses that share a common set of administrative characteristics.

pool pair

Two storage pools that are required to balance workload. Each storage pool is controlled by a separate node.

port

The physical entity within a host, system, or storage system that performs the data communication (transmitting and receiving) over the Fibre Channel.

practice volume

A volume that can be used to test disaster-recovery actions while maintaining disaster-recovery capability.

primary site

A physical or virtual site that is made up of hardware, network, and storage resources. Typically, production operations run at the primary site. Data can be replicated to a secondary site for disaster recovery and failover operations. See also [secondary site](#).

primordial pool

Storage capacity that is unallocated on a storage device. Storage pools are created by allocating storage capacity from primordial pools.

priority flow control (PFC)

A link-level flow control mechanism, IEEE standard 802.1Qbb. PFC operates on individual priorities. Instead of pausing all traffic on a link, PFC is used to selectively pause traffic according to its class.

probe

A data collection job that itemizes and creates an inventory of assets, such as computers, controllers, disk drives, file systems, and logical units.

projected capacity

The estimated volume capacity that is available for volume creation, given the current average performance of any data compression, excluding thin-provisioning savings. See also [thin-provisioning savings](#).

protocol

A set of rules controlling the communication and transfer of data between two or more devices or systems in a communication network.

provisioned capacity

The total capacity of all volumes and volume copies in a system or pool.

R**rack**

A free-standing structure that can hold multiple servers, storage systems, chassis, switches, and other devices.

RAID

See [Redundant Array of Independent Disks](#).

RAID 0

A data striping technique, which is commonly called RAID Level 0 or RAID 0 because of its similarity to common, RAID, data-mapping techniques. It includes no data protection, however, so, strictly speaking, the appellation RAID is a misnomer. RAID 0 is also known as data striping.

RAID 1

A form of storage array in which two or more identical copies of data are maintained on separate media.

RAID 10

A collection of two or more physical drives that present to the host an image of one or more drives. In the event of a physical device failure, the data can be read or regenerated from the other drives in the RAID due to data redundancy.

RAID 5

A form of parity RAID in which the disks operate independently, the data stripe size is no smaller than the exported block size, and parity check data is distributed across the array's disks.

RAID 6

A form of RAID that can continue to process read and write requests to all of an array's virtual disks in the presence of two concurrent disk failures.

RAID level

The level of protection provided by the specific techniques of striping, mirroring, or parity used by a Redundant Array of Independent Disks (RAID).

RAID type

See [RAID level](#).

raw capacity

The reported capacity of the drives in the system before formatting or RAID (Redundant Array of Independent Disks) is applied.

rebuild area

Reserved capacity that is distributed across all drives in a redundant array of drives. If a drive in the array fails, the lost array data is systematically restored into the reserved capacity, returning redundancy to the array. The duration of the restoration process is minimized because all drive members simultaneously participate in restoring the data. See also [distributed RAID](#).

reclaimable capacity

The amount of provisioned capacity that can be recovered without causing stress or performance degradation. This capacity identifies the amount of resources that can be reclaimed and provisioned to other objects in an environment.

reclaimed capacity

See [reclaimable capacity](#).

recovery key

See [encryption recovery key](#).

recovery point objective

The maximum amount of data loss that can be tolerated during a service interruption.

Redundant Array of Independent Disks (RAID)

A collection of two or more physical disk drives that present to the host an image of one or more logical disk drives. In the event of a physical device failure, the data can be read or regenerated from the other disk drives in the array due to data redundancy.

remote mirror and copy

A feature of a storage server that constantly updates a secondary copy of a logical volume to match changes made to a primary logical volume. The primary and secondary volumes can be on the same storage server or on separate storage servers. See also [Global Copy](#).

repo

See [repository](#).

repository (repo)

A persistent storage area for data and other application resources.

reserved capacity

The amount of used capacity that is made up of capacity reserved for system use. See also [total usable physical capacity](#).

resource

In a storage environment, an entity that is monitored. Resources can include fabrics, switches, computers, and storage systems.

role

A job function that identifies the tasks that a user can perform and the resources to which a user has access. A user can be assigned one or more roles.

role pair

The association of two volume roles in a session that take part in a copy relationship. For example, in a Metro Mirror session, the role pair can be the association between host volumes at the primary site and host volumes at the secondary site (H1-H2).

S

scan

A data collection job that monitors storage usage and file statistics on the resources in an environment.

SCSI

See [Small Computer System Interface](#).

SCSI device

A product, such as a drive or adapter, connected to a host through an I/O interface using the Small Computer System Interface (SCSI) protocol. A SCSI device is either an initiator, target, or both. See also [Small Computer System Interface](#).

SCSI-FCP

See [SCSI Fibre Channel Protocol](#).

SCSI Fibre Channel Protocol (SCSI-FCP)

A standard that defines the protocol used to transfer Small Computer System Interface (SCSI) commands over the transport physical layer of the Fibre-Channel interface. This standard is published by ANSI as X3.269-1996.

SCSI initiator

The system component that initiates communications with attached targets.

SCSI target

A device that acts as a subordinate to a SCSI initiator and consists of a set of one or more logical units (LUs), each with an assigned logical unit number (LUN). The LUs on the SCSI target are typically I/O devices.

secondary site

A physical or virtual site that is made up of the hardware, network, and storage resources that support the recovery needs of the primary site. When a failure occurs at the primary site, operations can continue at the secondary site. See also [primary site](#).

server

A computer program or a device that provides functions for other programs or devices, called clients. See also [client](#), [host](#).

Server Message Block (SMB)

A protocol that manages requests and responses in a client/server environment so that clients on a network can share files, directories, and devices. See also [Server Message Block 2.0](#).

Server Message Block 2.0

A higher performing, more scalable version of Server Message Block (SMB). This protocol can send multiple commands in the same packet and uses larger buffer sizes. See also [Server Message Block](#).

session

A collection of source and target volumes that are managed to create consistent copies of data. The type of data replication that is associated with the session determines the actions that can be conducted for the volumes.

site awareness

The association of a location with each storage system in a session. Site awareness ensures that a volume can only be selected for a session if it matches the location of the site. Site awareness helps to prevent both reversing a hardware relationship and selecting volumes at the wrong location.

Small Computer System Interface (SCSI)

An ANSI-standard electronic interface that allows personal computers to communicate with peripheral hardware, such as disk drives, tape drives, CD-ROM drives, printers, and scanners faster and more flexibly than previous interfaces. See also [Internet Small Computer System Interface](#), [open system](#), [SCSI device](#).

SMB

See [Server Message Block](#).

SMI-S

See [Storage Management Initiative Specification](#).

solid-state drive (SSD)

1. A storage device that contains nonvolatile flash memory. A solid-state drive (SSD) has no moving mechanical components.
2. See [flash drive](#).

space

See [capacity](#).

space efficient

See [thin provisioning](#).

spare drive

A drive reserved in an array for rebuilding a failed drive in a RAID. Should a drive fail in a RAID, a spare drive from within that device adapter (DA) pair will be selected to rebuild it.

SSD

See [solid-state drive](#).

standard-provisioned volume

A volume that completely uses storage at creation.

standard provisioning

The ability to completely use a volume's capacity for that specific volume.

standby management server

A management server that is a backup for the active server. The replication environment cannot be monitored or managed from the standby server.

storage architecture type (storage type)

The type of storage architecture, either count key data (CKD) or fixed block (FB), for which an array, pool, or volume is provisioned. See also [count key data](#), [fixed-block architecture](#).

storage enclosure

A specialized chassis that is designed to hold and power drives while providing a mechanism to allow them to communicate to one or more separate computers.

Storage Management Initiative Specification (SMI-S)

A design specification developed by the Storage Networking Industry Association (SNIA) that specifies a secure and reliable interface with which storage management systems (SMSs) can identify, classify, monitor, and control physical and logical resources in a storage area network (SAN). The interface integrates the various devices to be managed in a SAN and the tools used to manage them.

storage node

A component of a storage system that provides internal storage or a connection to one or more external storage systems.

storage pod

1. A subcomponent of a network-attached storage (NAS) system that consists of two or more storage nodes and one or more supported storage systems.
2. A logical entity of components of a system consisting of two storage nodes, and one or two storage subsystems directly connected with these storage nodes.

storage pool (pool)

A collection of storage that identifies an underlying set of resources. These resources provide the capacity and management requirements for a volume or set of volumes.

storage resource group

A named collection of logically related resources that are monitored by IBM Spectrum Control. Monitored resources can include fabrics, switches, computers, storage systems, and other storage resource groups.

storage system

A system that provides persistent storage within a network. A storage system can include facilities for host attachment, user role authentication, a command-line interface (CLI), a graphical user interface (GUI), and storage devices that most often include Redundant Array of Independent Disks (RAID) controllers. It might also include agents for enabling third-party management software to monitor or manage the storage devices.

storage type

See [storage architecture type](#).

stored capacity

The amount of capacity that is used to store data that is written by a host after data reduction. See also [data reduction](#), [total usable physical capacity](#).

support assistance

A function that is used to provide support personnel access to the system to complete troubleshooting and maintenance tasks.

synchronous replication

A type of replication in which the application write operation is made to both the source volume and target volume before control is given back to the application. See also [asynchronous replication](#).

syslog

A standard for transmitting and storing log messages from many sources to a centralized location to enhance system management.

T**target volume**

A volume that receives data from a host volume or another intermediate volume.

thaw

An operation in which a storage system releases the block of the I/O from the host system to the affected volumes on the primary site. A thaw operation can occur after a freeze operation ends and consistency is formed on the secondary site. See also [freeze](#).

thin-provisioned volume

A volume that allocates storage when data is written to it.

thin provisioning

1. The ability to defer capacity allocation on a storage resource until data is actually written to it.
2. A mechanism that provides the ability to define logical volume sizes that are larger than the physical capacity installed on the system.

thin-provisioning savings

The total amount of usable capacity that is saved in a system, pool, or volume by consuming usable capacity only when needed as a result of write operations. The capacity that is saved is the difference between the provisioned capacity minus the written capacity. See also [projected capacity](#), [volume capacity](#), [written capacity](#).

total capacity savings

The total amount of usable capacity that is saved in a system, pool, or volume through thin provisioning and data reduction techniques. This saved capacity is the difference between the used usable capacity and the provisioned capacity.

total usable physical capacity

The amount of physical configured storage space that is available for stored capacity or reserved capacity. This capacity can consist of both internal storage through arrays and external storage through MDisk. See also [capacity threshold](#), [reserved capacity](#), [stored capacity](#).

track space-efficient volume (TSE volume)

A volume in which storage space is allocated on an as-needed basis by using space on the target volume only when tracks are copied from the source volume to the target volume.

transparent cloud tiering

The functions that use cloud storage as an extension of on-premises storage.

trial license

A temporary entitlement to use a licensed function.

TSE for FlashCopy

A thin-provisioning method in which storage space is allocated from a TSE repository on an as needed basis. See also [TSE repository](#).

TSE repository

The amount of capacity in a storage pool reserved for volumes that use a thin-provisioning method of TSE for FlashCopy. See also [TSE for FlashCopy](#).

TSE volume

See [track space-efficient volume](#).

U

unmapped volume capacity

The amount of volume capacity that is not mapped to a host. See also [volume capacity](#).

update

1. To apply fixes to a system.
2. Software maintenance such as a manufacturing refresh, refresh pack, or fix pack that changes the modification level of a product.
3. To modify a file or data set with current information.

upgrade

1. Any hardware or software change to a later release, or any hardware addition or software addition.
2. To install a new version or release of a product to replace an earlier version or release of the same product.

usable capacity

The amount of capacity that is provided for storing data on a system, pool, array, or MDisk after formatting and RAID techniques are applied.

used capacity

The amount of usable capacity that is taken up by data or overhead capacity in a system, pool, array, or MDisk after data reduction techniques have been applied.

user role

An identifier that is assigned to a user that defines the set of permissions that are granted to that user.

V

virtual capacity

See [provisioned capacity](#).

virtualization

The substitution of virtual resources for actual resources, where the virtual resources have the same functions and external interfaces as their counterparts, but differ in attributes, such as size, performance, and cost. Virtualization is commonly applied to physical hardware resources by combining multiple physical resources into shared pools from which users receive virtual resources.

virtualized capacity

The amount of capacity that is contributed to a storage pool by a given provisioning group.

virtual machine (VM)

An emulation of a particular computer system. Virtual machines operate based on the computer architecture and functions of a real or hypothetical computer. Their implementations might involve specialized hardware, software, or a combination of both.

virtual storage area network (VSAN)

A fabric within the storage area network (SAN).

VM

See [virtual machine](#).

volume

A fixed amount of physical or virtual storage on a data storage medium.

volume access set

The set of I/O groups that allows host access to a volume. This set can optionally include the caching I/O group.

volume capacity

The total capacity for all volumes in a system or storage pool. Volume capacity is defined by the client when a volume is created and surfaced to the host. See also [thin-provisioning savings](#), [unmapped volume capacity](#).

volume snapshot

A collection of objects on a cloud storage account that represents the data of a volume at a particular time.

VSAN

See [virtual storage area network](#).

W

worldwide ID (WWID)

A name identifier that is unique worldwide and that is represented by a 64-bit value that includes the IEEE-assigned organizationally unique identifier (OUI).

worldwide name (WWN)

A 64-bit, unsigned name identifier that is unique.

worldwide node name (WWNN)

A unique 64-bit identifier for a host containing a Fibre Channel port. See also [worldwide port name](#).

worldwide port name (WWPN)

A unique 64-bit identifier associated with a Fibre Channel adapter port. The WWPN is assigned in an implementation-independent and protocol-independent manner. See also [worldwide node name](#).

write-through mode

A process in which data is written to a storage device at the same time as the data is cached.

written capacity

The amount of usable capacity that would have been used to store written data in a system or pool if data reduction was not applied. See also [thin-provisioning savings](#).

written capacity limit

The largest amount of capacity that can be written to a drive, array, or MDisk. The limit can be reached even when usable capacity is still available.

WWID

See [worldwide ID](#).

WWN

See [worldwide name](#).

WWNN

See [worldwide node name](#).

WWPN

See [worldwide port name](#).

Z

z Global Mirror

A method of an asynchronous replication function that maintains data consistency across multiple volumes that are attached to a z/OS system. Time-based data consistency is maintained through the Data Facility Storage Management Subsystem (DFSMS) system data mover (SDM) component.

zone

A logical grouping of switches, switch ports, and their attached devices in a fabric.

zone alias

A name that is given to a collection of one or more zone members to be managed together.

zone set

A group of zones that function together on a fabric.

zoning

The grouping of multiple ports to form a virtual, private, storage network. Ports that are members of a zone can communicate with each other, but are isolated from ports in other zones. See also [Fibre Channel](#).

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