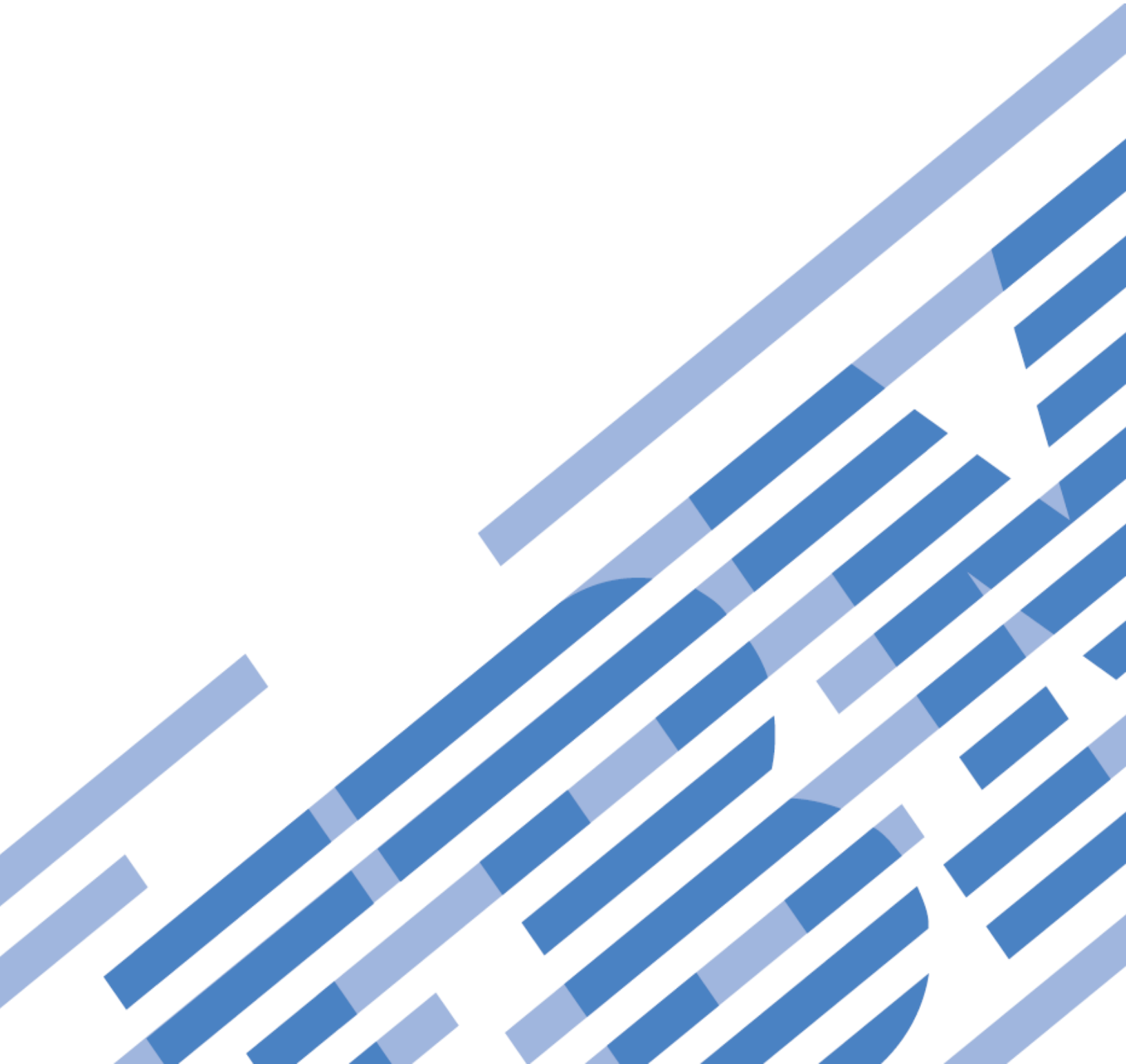
IBM C-Type Family and Cisco MDS 9000 Series Remote Support Overview



Applicable Products

Product: IBM C-Type Family & Cisco MDS 9000 Series
Product Version(s): 5.x, 6.x, 7.x, 8.x

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1.0 Overview

IBM® highly encourages you to take advantage of IBM Call Home and all its related features to allow you and IBM to partner for your success. Call Home is a support function embedded in all storage products. By enabling Call Home, the health and stability of your system is monitored every hour of every day throughout the year by the industry's top troubleshooting specialists at IBM Support. As an IBM client, the Call Home service will effectively provide you with reduced risk over an un-monitored system by alerting you of a system defect through My Notifications, automatically opening a Problem Management Record (PMR), and ultimately, decreasing system downtime through faster problem determination and resolution. Continue reading for a detailed explanation of IBM Call Home and other remote support tasks, available connection options, unique features, and instructions for configuring and maximizing the potential of this preventative maintenance feature.

2.0 Remote support task

IBM is committed to servicing the IBM C-Type Family and Cisco MDS 9000 products, whether it is warranty work, planned code upgrades, or management of a component failure, in a secure and professional manner. Dispatching service personnel for on-site assistance and maintenance is part of that commitment, but to minimize downtime and maximize efficiency, IBM support can perform support tasks remotely. The remote support tasks that can be performed are:

- Call Home
- Event Notifications

The ability to perform these support tasks remains dependent on proper configuration and the availability of an outside connection to IBM support. Additional information regarding the available remote support tasks, security features, and configuration instructions can be found in the paragraphs below.

2.1 Call Home

The IBM Call Home function is a predictive and preventative support feature that monitors the health and functionality of the system through event logs. Upon detection of a hardware or software error, IBM Call Home sends a notification to you and IBM support resources. A one-way communication is then opened between the IBM Network Advisor Storage Area Network (SAN) Switch and IBM support, which is used to open a PMR and transmit non-sensitive, defect-related information to authorized IBM support personnel for diagnostic purposes. No user data or content is ever included in the Call Home information sent to IBM support. Automatic transmission of this data often removes the need for a system administrator to manually collect and submit the packages as required in traditional troubleshooting methods; this allows IBM to provide you with more effective support sessions and ultimately, a decrease in time to problem resolution.

The contents of the diagnostic data sent to IBM support by a Call Home due to the occurrence of a serviceable event on a device can be viewed in Appendix A. The contents of the inventory data sent to IBM Support by a user-initiated test Call Home can be viewed in Appendix B.

2.1.1 Requirements to enable IBM Call Home support

The following requirements must be met for IBM Call Home to operate properly:

- The switch must have Internet Protocol (IP) connectivity to an e-mail server.
- The contact name (Simple Network Management Protocol or SNMP server contact), phone, and street address information must be configured before Call Home is enabled. This configuration is required to determine the origin of the messages received.
- A unique destination profile, named “service”, must be configured.

- The device has the necessary Domain Name Service (DNS) configuration (“IP domain-lookup” and “IP name-server a.b.c.d” for DNS look-ups or “IP host” for static entries) in order to resolve host names that may appear in destination addresses.
- The IBM machine time, model and serial number must be entered into the contract-id field in the following format:
  IBMXXXXYYYSSSSSSS

  IBM IBM
  XXXX IBM Machine Type *(e.g. 8978)*
  YYY IBM Model *(e.g. E08)*
  SSSSSSS IBM 7-digit serial number *(e.g. 1312345)*
  For example: `switch(config-callhome) # contract-id IBM8978E081312345`

2.1.2 Default Call Home settings

The following table specifies the default settings of Call Home.

Table 1: Default Call Home settings

Parameters	**Default**
Destination message size for a message sent in full text format	500,000
Destination message size for a message sent in full XML format	500,000
Destination message size for a message sent in short text format	4,000
DNS or IP address of the Simple Mail Transfer Protocol (SMTP) server to reach the server if no port is specified.	25
Alert group association with profile	All
Format type	XML
Call Home message level	0 (zero)

2.1.3 Call Home message severity levels

The Call Home message severity level feature allows the local system administrator to filter messages based on their level of urgency. Each destination profile (predefined and user-defined) is associated with a Call Home message level threshold. Any message with a value lower than the urgency threshold is not sent. The following table outlines the various severity levels.

Table 2: Call Home Severity Level Mapping

Call Home Level	**Keyword Used**	**Syslog Level**	**Description**
Catastrophic (9)	Catastrophic	N/A	Network wide catastrophic failure
Disaster (8)	Disaster	N/A	Significant network impact
Fatal (7)	Fatal	Emergency (0)	System is unusable
Critical (6)	Critical	Alert (1)	Critical conditions; immediate attention needed
Major (5)	Major	Critical (2)	Major conditions
Minor (4)	Minor	Error (3)	Minor conditions
Warning (3)	Warning	Warning (4)	Warning conditions
Notify (2)	Notification	Notice (5)	Basic notification and informational messages
Normal (1)	Normal	Information (6)	Normal event signifying return to normal state
Debug (0)	Debugging	Debug (7)	Debugging messages

2.1.4 Call Home event triggers

A Call Home is executed to IBM support when a serviceable event occurs on a device. The trigger events defined to initiate a Call Home are outlined in the table below. IBM support will be referenced as the “service” destination-profile as dictated in the Call Home configuration instructions found later in this document.

Table 3: Events that initiate a Call Home.

Event Name	Description	Alert Group	Severity
SW_CRASH	A software process has crashed with a stateless restart, indicating an interruption of a service.	System	5
SW_SYSTEM_INCONSISTENT	Inconsistency detected in software or file system	System	5
TEMPERATURE_ALARM	Thermal sensor indicates temperature has reached operating threshold.	Environmental	6
POWER_SUPPLY_FAILURE	Power supply has failed	Line Card Hardware	6
FAN_FAILURE	Cooling fan has failed	Line Card Hardware	5
LINECARD_FAILURE	Line card hardware operation failed.	Line Card Hardware, Supervisor Hardware	7
POWER_UP_DIAGNOSTICS_ FAILURE	Line card hardware has failed power-up diagnostics.	Supervisor Hardware	7
PORT_FAILURE	Hardware failure of interface port(s).	Supervisor Hardware	6
BOOTFLASH_FAILURE	Failure of boot compact flash card	Supervisor Hardware	7
NVRAM_FAILURE	Hardware failure of NVRAM on supervisor hardware	Supervisor Hardware	6
FREEDISK_FAILURE	Free disk space is below a threshold on supervisor hardware.	Supervisor Hardware	6
SUP_FAILURE	Supervisor hardware operation failed	Supervisor Hardware	7
POWER_UP_DIAGNOSTICS_ FAILURE	Supervisor hardware failed power-up diagnostics.	System	7
INBAND_FAILURE	Failure of in-band communications path.	System	7
EOBC_FAILURE	Ethernet out-of-band channel communications failure.	Environmental	6
MGMT_PORT_FAILURE	Hardware failure of management Ethernet port	Line Card Hardware	5

2.2 Diagnostic data offload

Events requiring service on the device generate a large amount of data called Call Home data packages to be sent to IBM support personnel. These data packages are sent in conjunction with a Call Home transmission to assist IBM support personnel in determining the cause of the impacting event. The diagnostic data included in both an error-initiated and a test Call Home can be found in the Appendixes.

For severe events, additional data packages from the affected component may be requested by IBM support after reviewing the information transmitted by the Call Home. If additional data must be acquired, the IBM support representative will inform your

company's system administrator as to which packages are desired. The client will then be responsible for downloading the support packages and adding them to their designated problem management record (PMR) on ECuRep to log all troubleshooting activities.

3.0 Cisco Data Center Network Manager (DCNM) for SAN

Cisco DCNM is a set of network management tools. This program enables the client to provision, monitor, and troubleshoot the data center network infrastructure, while still maintaining control and segmentation through role-based access control. The Cisco DCNM for SAN Essentials edition is included with every IBM C-Type Family or Cisco MDS 9000 hardware purchase at no charge and can be downloaded from www.cisco.com/go/dcnm. The application consists of:

3.1 DCNM-SAN Server

DCNM-SAN Server is a platform for advanced monitoring, troubleshooting, and configuration capabilities. DCNM-SAN Server provides centralized management services and performance monitoring. SNMP operations are used to efficiently collect fabric information.

Each computer configured as a Cisco DCNM-SAN Server can monitor multiple Fibre Channel SAN fabrics. Up to 16 clients (by default) can connect to a single Cisco DCNM-SAN Server concurrently (licensed feature). The Cisco DCNM-SAN Clients can also connect directly to a switch in fabrics that are not monitored by a Cisco DCNM-SAN Server, which ensures that you can manage any of your devices from a single console.

3.2 DCNM-SAN Client

Cisco DCNM-SAN Client is a Java and SNMP-based network fabric and device management tool with a GUI that displays real-time views of your network fabric, including IBM C-Type Family, Cisco Nexus 5000 and Cisco MDS 9000 devices, along with third-party switches, hosts, and storage devices.

3.3 Device Manager

Device Manager provides a graphical representation of a switch chassis, including the installed switching modules, the supervisor modules, the status of each port within each module, the power supplies, and the fan assemblies.

Also, Device Manager provides more detailed information for verifying or troubleshooting device-specific configuration than DCNM.

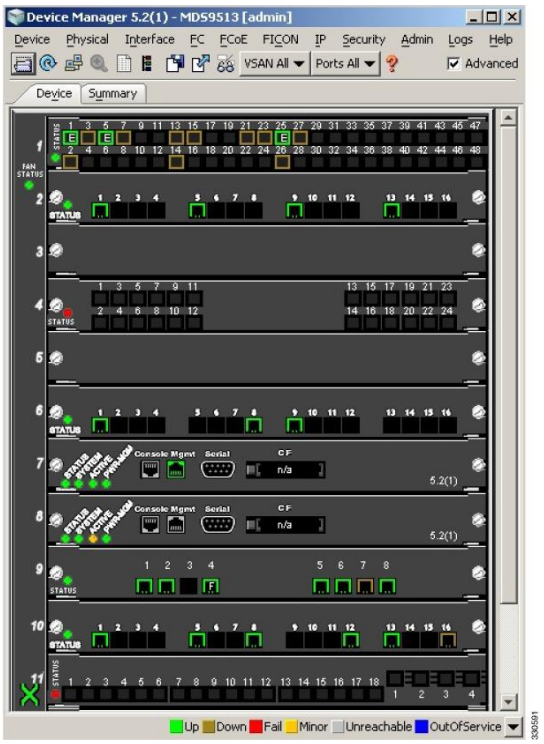

Fig. 1: Cisco Device Manager

Device Manager can perform switch-level configurations including the following:

- Configure zones for multiple VSANs.
- Manage ports, PortChannels, and trunking.
- Manage SNMPv3 security access to switches.
- Manage CLI security access to the switch.
- Manage alarms, events, and notifications.
- Save and copy configuration files and software image.
- View hardware configuration.
- View chassis, module, port status, and statistics.

3.4 DCNM-SAN Web Client

With DCNM-SAN Web Client you can monitor device events, performance, and inventory from a remote location using a web browser.

Fig. 2: Cisco DCNM for SAN Essential - Summary Dashboard

4.0 Instructions

4.1 Configuring Call Home

To configure IBM Call Home on a device, please follow these steps:

1. Assign contact information. In global configuration mode, enter the mandatory system contact using the `snmp-server contact` command. All fields are mandatory except customer-id and site-id. Use the following example as a guide:

```
switch# config t
switch(config)# snmp-server contact personname@companyname.com
switch(config)# callhome
switch(config-callhome)# email-contact username@company.com
switch(config-callhome)# phone-contact +1-800-123-4567
switch(config-callhome)# streetaddress 123 Any St., Mycity, 12345
switch(config-callhome)# switch-priority 0
switch(config-callhome)# customer-id Customer1234
switch(config-callhome)# site-id SiteXYZ
```

2. Add IBM information as the contract-id. The IBM machine type, model, plant and serial number must be entered into the `contract-id` field as defined below.

```
switch(config-callhome) # contract-id IBM8978E081312345
```

Which follows the following format:

IBMXXXXYYYSSSSSSS

IBM	IBM
XXXX	IBM Machine Type *(e.g. 8978)*
YYY	IBM Model *(e.g. E08)*
SSSSSSS	IBM 7-digit serial number *(e.g. 1312345)*

Table 5: IBM designated machine types for Cisco products

Description	IBM Model
IBM SAN32C-6 Switch	8977-T32
IBM SAN50C-R Switch	8977-R50
IBM SAN192C-6 Director	8978-E04
IBM SAN384C-6 Director	8978-E08
IBM SAN768C-6 Director	8978-E16
Cisco MDS 9250i Switch	9710-E01
Cisco MDS 9706 Director	9710-E06
Cisco MDS 9710 Director	9710-E08
Cisco MDS 9718 Director	9710-E16
Cisco MDS 9148S Switch	9711-S48
Cisco MDS 9132T Switch	9711-T32
Cisco MDS 9396S Switch	9711-S96
Cisco MDS 9124 Switch	2417-C24 or 2053-424
Cisco MDS 9148 Switch	2417-C48
Cisco MDS 9222i Switch	2054-E01
Cisco MDS 9506 Director	2054-E04 or 2062-D04
Cisco MDS 9509 Director	2054-E07 or 2062-D07
Cisco MDS 9513 Director	2054-E11 or 2062-E11

3. Configure an IBM service destination profile. Choose an email address depending on the physical location of the switch. Use the following example as a guide:

   callhome0@de.ibm.com – EMEA/Asia-Pacific
   callhome1@de.ibm.com – Americas

```
switch(config-callhome)# destination-profile service
switch(config-callhome)# destination-profile service e-mail-addr
callhome0@de.ibm.com
switch(config-callhome)# destination-profile service format full-txt
switch(config-callhome)# destination-profile service message-size 1000000
```

4. Associate alert-groups to the service profile. The IBM Call Home solution requires the configuration of a unique destination profile (service) with no other than the following alert-groups:

```
switch(config-callhome)# destination-profile service alert-group
environmental
switch(config-callhome)# destination-profile service alert-group
linecard-hardware
switch(config-callhome)# destination-profile service alert-group
supervisor-hardware
switch(config-callhome)# destination-profile service alert-group system
switch(config-callhome)# destination-profile service alert-group test
```

5. Configure e-mail options. An optional port number may also be configured (default is 25). Use the following example as a guide:

```
switch(config-callhome)# transport e-mail smtpserver 10.1.1.1 port 25
switch(config-callhome)# transport e-mail from user@company1.com
switch(config-callhome)# transport e-mail reply-to person@place.com
```

6. Enable Call Home. Remember to save the configuration to the `startup-config` at the end. Use the following example as a guide:

```
switch(config-callhome)# enable
switch(config-callhome)# end
switch # copy running-config startup-config
```

7. Test Call Home messages. To test the configuration and connection to IBM support, your local system administrator should simulate a message generation by issuing a test command like the following example:

```
switch# callhome test
```

4.2 Displaying Call Home Information

Your local system administrator can use the `show callhome` command to display the current Call Home configuration.

To display the configured Call Home information, use the following example as a guide:

```
switch# show callhome
callhome enabled
Callhome Information:
contact person: personname@companyname.com
contact person's email: username@company.com
contact person's phone number: +1-800-123-4567
street addr: 1234 Any St., Mycity, 12345
site id: SiteXYZ
customer id: Customer1234
contract id:IBM8978E081312345
switch priority:0
```

To display service destination profile information, use the following example as a guide:

```
switch# show callhome destination-profile profile service destination
profile information
maximum message size:1000000
message format:full-txt
message-level:0
transport-method:email
email addresses configured:
callhome0@de.ibm.com
url addresses configured:
alert groups configured:
environmental
linecard-hardware
supervisor-hardware
system
test
```

To display e-mail and SMTP information, use the following example as a guide:

```
switch# show callhome transport-email
from email addr: username@company.com
reply to email addr: username@company.com
smtp server:10.1.1.1
smtp server port:25
```

Appendix A: Call Home data contents

The following table outlines the plain text message format and the data sent to IBM support during an error-generated Call home event.

Table 6: Error-generated Call Home Message Format

Data Item (Plain Text)	**Description**
Time Stamp	Date and time stamp of an event in ISO time notation: *YYYY-MM-DD*T*HH:MM:SS* **Note**: The time zone or daylight savings time (DST) offset from UTC has already been added or subtracted. T is the hardcoded limiter for the time.
Message Name	The name of the message. Specific event names are listed in the 'Call Home event triggers' section in Table 3.
Message Type	Specifically "Call Home"
Message Group	Specifically "reactive"
Severity Level	Severity level of message (see Table 2)
Source ID	Product type for routing
Device ID	Unique device identifier (UDI) for the end device generating message. This field should empty if the message is non-specific to a fabric switch. Format is *type@Sid@serial*, where: • *type* is the product model number from backplane SEEPROM • @ is a separator character • *Sid* is "C", identifying the serial ID as a chassis serial number • *serial* is the number identified by the Sid field. Example: DS-C9509@C@12345678
Customer ID	User-configurable field used for contract info or other ID by any support service
Contract ID	User-configurable field used for contract info or other ID by any support service
Site ID	User-configurable field used for IBM-supplied site ID
Server ID	If the message is generated from the fabric switch, it is the unique device identifier (UDI) of the switch. The format is *type@Sid@serial*, where: • *type* is the product model number from backplane SEEPROM • @ is a separator character • *Sid* is "C", identifying the serial ID as a chassis serial number • *serial* is the number identified by the Sid field. Example: DS-C9509@C@12345678
Message Description	Short text describing the error
Device Name	The node that experienced the event. This is the host name of the device.
Contact Name	Name of person to contact for issues associated with the node experiencing the event
Contact Phone Number	Phone number of the person identified as the contact for this unit
Street Address	Field containing the street address for replacement part shipments associated with this unit
Model Name	The model name of the switch. This is the specific model as part of a product family name.
Serial Number	Chassis serial number of the unit
Chassis Part Number	Top assembly number of the chassis
Chassis Hardware Version	Hardware version of chassis
Supervisor Module Software Version	Top level software version

Affected FRU Name	Name of the affected FRU generating the event message
Affected FRU Serial Number	Serial number of the affected FRU
Affected FRU Part Number	Part number of the affected FRU
FRU Slot	Slot number of FRU generating the event message
FRU Hardware Version	Hardware version of the affected FRU
FRU Software Version	Software version(s) running on the affected FRU
Command Output Name	The exact name of the issued command
Attachment Type	Specifically command output
MIME Type	Normally text or plain or encoding type
Command Output Text	Output of command automatically executed

Appendix B: Test Call Home Data Contents

The following table outlines the plain text message format and the data sent to IBM support during a user-generated Call Home event that is used to test for proper configuration.

Table 7: User-generated Call Home message format

Data Item (Plain Text)	**Description**
Time Stamp	Date and time stamp of an event in ISO time notation: *YYYY-MM-DD*T*HH:MM:SS* **Note**: The time zone or daylight savings time (DST) offset from UTC has already been added or subtracted. T is the hardcoded limiter for the time.
Message Name	The name of the message. Specific event names are listed in the 'Call Home event triggers' section in Table 3.
Message Type	Specifically "Test Call Home"
Message Group	This field should be ignored by the receiving Call Home processing application, but may be populated with either "proactive" or "reactive."
Severity Level	Severity level of message (see Table 2)
Source ID	Product type for routing
Device ID	Unique device identifier (UDI) for end device generating message. This field should empty if the message is non-specific to a fabric switch. Format is *type@Sid@serial*, where: • *type* is the product model number from backplane SEEPROM • @ is a separator character • *Sid* is "C", identifying the serial ID as a chassis serial number • *serial* is the number identified by the Sid field. Example: DS-C9509@C@12345678
Customer ID	User-configurable field used for contract info or other ID by any support service.
Contract ID	User-configurable field used for contract info or other ID by any support service.
Site ID	User-configurable field used for IBM-supplied site ID.
Server ID	If the message is generated from the fabric switch, it is the unique device identifier (UDI) of the switch. The format is *type@Sid@serial*, where: • *type* is the product model number from backplane SEEPROM • @ is a separator character • *Sid* is "C", identifying the serial ID as a chassis serial number • *serial* is the number identified by the Sid field. Example: DS-C9509@C@12345678
Message Description	Short text describing the error
Device Name	Switch that experienced the event.
Contact Name	Name of person to contact for issues associated with the node experiencing the event.
Contact Phone Number	Phone number of the person identified as the contact for this unit.
Street Address	Field containing the street address for replacement part shipments associated with this unit.
Model Name	The model name of the switch. This is the specific model as part of a product family name.
Serial Number	Chassis serial number of the unit.
Chassis Part Number	Top assembly number of the chassis.
Command Output Text	Output of command automatically executed.
MIME Type	Normally text, plain or encoding type
Attachment Type	Specifically command output
Command Output Name	The exact name of the issued command.

Appendix C: Additional Publications and Resources

How to Access IBM Redbooks Publications

You can search for, view, or download IBM Redbooks® publications, Redpaper™ publications, Hints and Tips, draft publications and Additional materials, as well as order hardcopy IBM Redbooks publications or CD-ROMs, at this website:

www.redbooks.ibm.com

IBM Redbooks Publications

For information about ordering these publications, see “How to Access IBM Redbooks Publications” above. Note that some of the documents referenced here might be available in softcopy only.

- *Introduction to Storage Area Networks*, SG24-5470
- *IBM/Cisco Multiprotocol Routing: Introduction and Implementation*, SG24-7543

Online Resources

- IBM TotalStorage Hardware, Software, and Solution: www.ibm.com/systems/storage
- IBM TotalStorage Storage Networking: www.ibm.com/systems/storage/san
- IBM Support Portal
  - SAN32C-6
  - SAN50C-R
  - SAN192C-6
  - SAN384C-6
  - SAN768C-6
- Cisco: www.cisco.com
- Cisco: documentation locator

Cisco Publications

These publications are also relevant as further information sources:

- Cisco MDS 9000 Family Command References
- Cisco DCNM Configuration Guides
- Cisco MDS 9700 Series Hardware Installation Guide

Help from IBM

- IBM Support and Downloads: http://www.ibm.com/support
- IBM Global Services: http://www.ibm.com/services