Note: Before using this information, read the general information in Appendix B “Notices” on page 205.
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Chapter 1. Introduction

The Lenovo XClarity Controller (XCC) is the next generation management controller that replaces the baseboard management controller (BMC) for Lenovo ThinkSystem servers.

It is the follow-on to the Integrated Management Module II (IMM2) service processor that consolidates the service processor functionality, Super I/O, video controller, and remote presence capabilities into a single chip on the server system board. It provides features such as the following:

- Choice of a dedicated or shared Ethernet connection for systems management
- Support for HTML5
- Support for access via XClarity Mobile
- XClarity Provisioning Manager
- Remote configuration using XClarity Essentials or XClarity Controller CLI.
- Capability for applications and tools to access the XClarity Controller either locally or remotely
- Enhanced remote-presence capabilities.
- REST API (Redfish schema) support for additional web-related services and software applications.

**Note:** The XClarity Controller currently supports Redfish Scalable Platforms Management API Specification 1.0.2 and schema 2016.2

**Notes:**

- In the XClarity Controller web interface, BMC is used in referring to the XCC.
- A dedicated systems-management network port may not be available on some ThinkSystem servers; for these servers access to the XClarity Controller is only available through a network port that is shared with the server operating system.
- For Flex servers, the Chassis Management Module (CMM) is the primary management module for systems-management functions. Access to the XClarity Controller is available through the network port on the CMM.

This document explains how to use the functions of the XClarity Controller in a ThinkSystem server. The XClarity Controller works with the XClarity Provisioning Manager and UEFI to provide systems-management capability for ThinkSystem servers.

To check for firmware updates, complete the following steps.

**Note:** The first time you access the Support Portal, you must choose the product category, product family, and model numbers for your server. The next time you access the Support Portal, the products you selected initially are preloaded by the website, and only the links for your products are displayed. To change or add to your product list, click the **Manage my product lists** link. Changes are made periodically to the website. Procedures for locating firmware and documentation might vary slightly from what is described in this document.

2. Under **Support**, select **Data Center**.
3. When the content is loaded, select **Servers**.
4. Under **Select Series**, first select the particular server hardware series, then under **Select SubSeries**, select the particular server product subseries, and finally, under **Select Machine Type** select the particular machine type.
XClarity Controller Standard, Advanced, and Enterprise Level features

With the XClarity Controller, Standard, Advanced, and Enterprise levels of XClarity Controller functionality are offered. See the documentation for your server for more information about the level of XClarity Controller installed in your server. All levels provide the following:

- Around-the-clock remote access and management of your server
- Remote management independent of the status of the managed server
- Remote control of hardware and operating systems

Note: Some features might not apply to Flex system servers.

The following is a list of XClarity Controller standard level features:

### XClarity Controller Standard Level features

The following is a list of XClarity Controller Standard Level features:

**Industry Standard Management Interfaces**

- IPMI 2.0 Interface
- Redfish
- CIM-XML
- DCMI 1.5
- SNMPv3
- SNMPv1 (Traps Only) requires minimum v2.10 or v2.12 XCC Firmware updates depending on server type. See XCC Firmware update Change file for details.

**Other Management Interfaces**

- Web
- Legacy CLI
- Front Panel USB - virtual operator panel via mobile device

**Power / Reset Control**

- Power On
- Hard/Soft Shutdown
- Scheduled Power Control
- System Reset
- Boot Order Control

**Event Logs**

- IPMI SEL
- Human Readable Log
- Audit Log

**Environmental Monitoring**

- Agent Free Monitoring
- Sensor Monitoring
• Fan Control
• LED Control
• Chipset Errors (Caterr, IERR, etc...)  
• System Health Indication
• OOB Performance Monitoring for I/O adapters
• Inventory Display and Export

RAS
• Virtual NMI
• Automatic Firmware Recovery
• Automated promotion of backup firmware
• POST Watchdog
• OS Loader Watchdog
• Blue Screen Capture (OS Failure)
• Embedded Diagnostic Tools

Network Configuration
• IPv4
• IPv6
• IP Address, Subnet Mask, Gateway
• IP Address Assignment Modes
• Host name
• Programmable MAC address
• Dual MAC Selection (if supported by server hardware)
• Network Port Reassignments
• VLAN Tagging

Network Protocols
• DHCP
• DNS
• DDNS
• HTTP/HTTPS
• SNMPv3
• SNMPv1 (Traps only)
• SSL
• SSH
• SMTP
• LDAP client
• NTP
• SLP
• SSDP
Alerts
- PET Traps
- CIM Indication
- SNMP TRAPs
- E-mail
- Redfish events

Serial Redirection
- IPMI SOL
- Serial port configuration

Security
- XClarity Controller Core Root of Trust for Measurement (CRTM)
- Digitally signed firmware updates
- Role Based Access Control (RBAC)
- Local User Accounts
- LDAP/AD User Accounts
- Secure Rollback of Firmware
- Chassis intrusion detection (only available on some server models)
- XCC remote assertion of UEFI TPM Physical Presence
- Audit logging of configuration changes and server actions
- Public-key (PK) Authentication
- System Retire/Repurpose

Remote Presence
- Remote Disk on Card (RDOC): Virtual Media mounting of remote ISO/IMG files via CIFS, NFS, HTTP, HTTPS, FTP, SFTP, and LOCAL

Power Management
- Real time Power Meter

License Management
- Activation Key Validation and Repository

Deployment & Configuration
- Remote Configuration
- Deployment & Configuration Tools and Driver Packs using the embedded XClarity Provisioning Manager
- Configuration Backup and Restore

Firmware Updates
- Agent Free Update
- Remote Update
XClarity Controller Advanced Level features

The following is a list of XClarity Controller Advanced Level features:

All of the XClarity Controller Standard Level features plus:

Alerts
• Syslog

Remote Presence
• Remote KVM

Serial Redirection
• Serial Redirection via SSH

Security
• Security Key Lifecycle Manager (SKLM)
• IP address blocking

Power Management
• Real time Power Graphics
• Historical Power Counters
• Temperature Graphics

Deployment & Configuration
• Remote OS Deployment using the embedded XClarity Provisioning Manager with the XClarity Controller Remote KVM feature

XClarity Controller Enterprise Level features

The following is a list of XClarity Controller Enterprise Level features:

All of the XClarity Controller Standard and Advanced Level features plus:

RAS
• Boot Capture

Remote Presence
• Quality/Bandwidth Control
• Virtual Console Collaboration (six users)
• Virtual Console Chat
• Virtual Media
  – Mounting of remote ISO/IMG files via remote console
  – Mounting file from Network: Mount an ISO or IMG image file from a file server (HTTPS, CIFS, NFS) to the host as a DVD or USB drive

Power Management
• Power Capping
• OOB Performance Monitoring - System Performance metrics

Deployment & Configuration
• Remote Deployment using Lenovo XClarity Administrator. When using the Lenovo XClarity Administrator for operating system deployment, see http://sysmgt.lenovofiles.com/help/index.jsp?topic=%2Fcom.lenovo.lxca.doc%2Fsupported_operating_system_images.html for details on the supported operating systems.

Upgrading XClarity Controller
If your server came with the Standard or Advanced level of the XClarity Controller firmware functionality, you might be able to upgrade the XClarity Controller functionality in your server. For more information about available upgrade levels and how to order, see Chapter 8 “License Management” on page 85.

Web browser and operating-system requirements
Use the information in this topic to view the list of supported browsers, cipher suites and operating systems for your server.

The XClarity Controller web interface requires one of the following web browsers:

• Chrome 48.0 or above (55.0 or above for remote console)
• Firefox ESR 38.6.0 or above
• Microsoft Internet Explorer 11 (above 11.0.9600.16384 for remote console)
• Microsoft Edge
• Safari 9.0.2 or above (iOS 7 or later and OS X)

Note: Support for the remote console feature is not available through the browser on mobile device operating systems.

The browsers listed above match those currently supported by the XClarity Controller firmware. The XClarity Controller firmware may be enhanced periodically to include support for other browsers.

Depending upon the version of the firmware in the XClarity Controller, web browser support can vary from the browsers listed in this section. To see the list of supported browsers for the firmware that is currently on the XClarity Controller, click the Supported Browsers menu list from the XClarity Controller login page.

For increased security, only high strength ciphers are now supported when using HTTPS. When using HTTPS, the combination of your client operating system and browser must support one of the following cipher suites:

• ECDHE-ECDSA-AES256-GCM-SHA384
• ECDHE-ECDSA-AES256-SHA384
• ECDHE-ECDSA-AES256-SHA
• ECDHE-ECDSA-AES128-GCM-SHA256
• ECDHE-ECDSA-AES128-SHA256
• ECDHE-ECDSA-AES128-SHA
• ECDHE-RSA-AES256-GCM-SHA384
• ECDHE-RSA-AES256-SHA384
• ECDHE-RSA-AES128-GCM-SHA256
• ECDHE-RSA-AES128-SHA256
• ECDHE-RSA-AES128-SHA
Your internet browser’s cache stores information about web pages that you visit so that they will load more quickly in the future. After a flash update of the XClarity Controller firmware, your browser may continue to use information from its cache instead of retrieving it from the XClarity Controller. After updating the XClarity Controller firmware, it is recommended that you clear the browser cache to ensure that web pages served by the XClarity Controller are displayed correctly.

**Multiple language support**

Use the information in this topic to view the list of languages supported by the XClarity Controller.

By default, the chosen language for the XClarity Controller web interface is English. The interface is capable of displaying multiple languages. These include the following:

- French
- German
- Italian
- Japanese
- Korean
- Portuguese (Brazil)
- Russian
- Simplified Chinese
- Spanish (international)
- Traditional Chinese

To choose the language of your preference, click the arrow beside the currently selected language. A drop-down menu will appear to let you choose your preferred language.

Text strings that are generated by the XClarity Controller firmware are displayed in the language dictated by the browser. If the browser specifies a language other than one of the translated languages listed above, the text is displayed in English. In addition, any text string that is displayed by the XClarity Controller firmware, but is not generated by the XClarity Controller (for example messages generated by UEFI, PCIe adapters, etc...) are displayed in English.

The input of language-specific text other than English, such as the Trespass message is currently not supported. Only text typed in English is supported.

**MIBs Introduction**

Use the information in this topic to access Management Information Base.

The SNMP MIBs can be downloaded from the [https://support.lenovo.com/](https://support.lenovo.com/) (Search by machine type on the portal). It includes the following four MIBs.

- The **SMI MIB** describes the Structure of Management Information for the Lenovo Data Center Group.
- The **Product MIB** describes the object identifier for Lenovo Products.
- The **XCC MIB** provides the inventory and monitoring information for Lenovo XClarity Controller.
- The **XCC Alert MIB** defines traps for alert conditions detected by Lenovo XClarity Controller.

**Note:** The import order for the four MIBs is SMI MIB → Product MIB → XCC MIB → XCC Alert MIB.
Notices used in this document

Use this information to understand the notices that are used in this document.

The following notices are used in the documentation:

- **Note:** These notices provide important tips, guidance, or advice.
- **Important:** These notices provide information or advice that might help you avoid inconvenient or problem situations.
- **Attention:** These notices indicate potential damage to programs, devices, or data. An attention notice is placed just before the instruction or situation in which damage might occur.
Chapter 2. Opening and Using the XClarity Controller Web Interface

This topic describes the login procedures and the actions that you can perform from the XClarity Controller web interface.

The XClarity Controller combines service processor functions, a video controller, and remote presence function in a single chip. To access the XClarity Controller remotely by using the XClarity Controller web interface, you must first log in. This chapter describes the login procedures and the actions that you can perform from the XClarity Controller web interface.

Accessing the XClarity Controller web interface

The information in this topic explains how to access the XClarity Controller web interface.

The XClarity Controller supports static and Dynamic Host Configuration Protocol (DHCP) IPv4 addressing. The default static IPv4 address assigned to the XClarity Controller is 192.168.70.125. The XClarity Controller is initially configured to attempt to obtain an address from a DHCP server, and if it cannot, it uses the static IPv4 address.

The XClarity Controller also supports IPv6, but it does not have a fixed static IPv6 IP address by default. For initial access to the XClarity Controller in an IPv6 environment, you can either use the IPv4 IP address or the IPv6 link-local address. The XClarity Controller generates a unique link-local IPv6 address, using the IEEE 802 MAC address by inserting two octets, with hexadecimal values of 0xFF and 0xFE in the middle of the 48-bit MAC as described in RFC4291 and flipping the 2nd bit from the right in the first octet of the MAC address. For example if the MAC address is 08-94-ef-2f-28-af, the link-local address would be as follows:

fe80::0a94:efff:fe2f:28af

When you access the XClarity Controller, the following IPv6 conditions are set as default:

• Automatic IPv6 address configuration is enabled.
• IPv6 static IP address configuration is disabled.
• DHCPv6 is enabled.
• Stateless auto-configuration is enabled.

The XClarity Controller provides the choice of using a dedicated systems-management network connection (if applicable) or one that is shared with the server. The default connection for rack-mounted and tower servers is to use the dedicated systems-management network connector.

The dedicated systems-management network connection on most servers is provided using a separate 1Gbit network interface controller. However, on some systems the dedicated systems-management network connection may be provided using the Network Controller Sideband Interface (NCSI) to one of the network ports of a multi-port network interface controller. In this case, the dedicated systems-management network connection is limited to the 10/100 speed of the sideband interface. For information and any limitations on the implementation of the management port on your system, see your system documentation.

Note: A dedicated systems-management network port might not be available on your server. If your hardware does not have a dedicated network port, the shared setting is the only XClarity Controller setting available.
Setting up the XClarity Controller network connection through the XClarity Provisioning Manager

Use the information in this topic to set up an XClarity Controller network connection through the XClarity Provisioning Manager.

After you start the server, you can use the XClarity Provisioning Manager to configure the XClarity Controller network connection. The server with the XClarity Controller must be connected to a DHCP server, or the server network must be configured to use the XClarity Controller static IP address. To set up the XClarity Controller network connection through the Setup utility, complete the following steps:

Step 1. Turn on the server. The ThinkSystem welcome screen is displayed.

Note: It may take up to 40 seconds after the server is connected to AC power for the power-control button to become active.

Step 2. When the prompt <F1> System Setup is displayed, press F1. If you have set both a power-on password and an administrator password, you must type the administrator password to access the XClarity Provisioning Manager.

Step 3. From the XClarity Provisioning Manager main menu, select UEFI Setup.

Step 4. On the next screen, select BMC Settings; then, click Network Settings.

Step 5. There are three XClarity Controller network connection choices in the DHCP Control field:

- Static IP
- DHCP Enabled
- DHCP with Fallback

Step 2. When the prompt <F1> System Setup is displayed, press F1. If you have set both a power-on password and an administrator password, you must type the administrator password to access the XClarity Provisioning Manager.

Step 3. From the XClarity Provisioning Manager main menu, select UEFI Setup.

Step 4. On the next screen, select BMC Settings; then, click Network Settings.

Step 5. There are three XClarity Controller network connection choices in the DHCP Control field:

- Static IP
- DHCP Enabled
- DHCP with Fallback
Step 6. Select one of the network connection choices.

Step 7. If you choose to use a static IP address, you must specify the IP address, the subnet mask, and the default gateway.

Step 8. You can also use the Lenovo XClarity Controller Manager to select a dedicated network connection (if your server has a dedicated network port) or a shared XClarity Controller network connection.

Notes:
- A dedicated systems-management network port might not be available on your server. If your hardware does not have a dedicated network port, the shared setting is the only XClarity Controller setting available. On the Network Configuration screen, select Dedicated (if applicable) or Shared in the Network Interface Port field.
- To find the locations of the Ethernet connectors on your server that are used by the XClarity Controller, see the documentation that came with your server.

Step 9. Click Save.

Step 10. Exit from the XClarity Provisioning Manager.

Notes:
- You must wait approximately 1 minute for changes to take effect before the server firmware is functional again.
- You can also configure the XClarity Controller network connection through the XClarity Controller web interface or command-line interface (CLI). In the XClarity Controller web interface, network connections can be configured by clicking BMC Configuration from the left navigation panel, and then selecting Network. In the XClarity Controller CLI, network connections are configured using several commands that depend on the configuration of your installation.
Logging in to the XClarity Controller

Use the information in this topic to access the XClarity Controller through the XClarity Controller web interface.

**Important:** The XClarity Controller is set initially with a user name of USERID and password of PASSW0RD (with a zero, not the letter O). This default user setting has Supervisor access. Change this user name and password during your initial configuration for enhanced security. After making the change, you are unable to set PASSW0RD as the login password again.

**Note:** In a Flex System, the XClarity Controller user accounts can be managed by a Flex System Chassis Management Module (CMM) and might be different than the USERID/PASSW0RD combination described above.

To access the XClarity Controller through the XClarity Controller web interface, complete the following steps:

1. Open a web browser. In the address or URL field, type the IP address or host name of the XClarity Controller to which you want to connect.
2. Select the desired language from the language drop-down list. The Login window is shown in the following illustration.
3. Type your user name and password in the XClarity Controller Login window. If you are using the XClarity Controller for the first time, you can obtain your user name and password from your system administrator. All login attempts are documented in the event log. Depending on how your system administrator configured the user ID, you might need to enter a new password after logging in.
4. Click **Log In** to start the session. The browser opens the XClarity Controller home page, as shown in the following illustration. The home page displays information about the system that the XClarity Controller manages plus icons indicating how many critical errors 🔄 and how many warnings ⚠ are currently present in the system.
The home page is essentially divided into two sections. The first section is the left navigation panel, which is a set of topics that allow you to perform the following actions:

- Monitor the server status
- Configure the server
- Configure the XClarity Controller or BMC
- Update the firmware

The second section is the graphical information provided to the right of the navigation panel. The modular format gives you a quick view of the server status and some quick actions that can be performed.

**Description of XClarity Controller functions on web interface**

The following is a table that describes the XClarity Controller functions in the left navigation panel.

**Note:** When navigating the web interface, you can also click the question mark icon for online help.

*Table 1. XClarity Controller functions*

<table>
<thead>
<tr>
<th>Tab</th>
<th>Selection</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Health Summary/Active System Events</td>
<td>Shows the current status of the major hardware components in the system.</td>
<td></td>
</tr>
<tr>
<td>System Information and Settings</td>
<td>Provides a summary of common system information.</td>
<td></td>
</tr>
<tr>
<td>Quick Actions</td>
<td>Provides a quick link to control the server power and location LED, and a button to download the service data.</td>
<td></td>
</tr>
<tr>
<td>Power Utilization/System Utilization/Temperature</td>
<td>Provides a quick overview of the current power utilization, system utilization and overall server temperature.</td>
<td></td>
</tr>
<tr>
<td>Tab</td>
<td>Selection</td>
<td>Description</td>
</tr>
<tr>
<td>-----</td>
<td>-----------</td>
<td>-------------</td>
</tr>
</tbody>
</table>
| Events | Remote Console Preview | Control the server at the operating system level. You can view and operate the server console from your computer. The remote console section in the XClarity Controller home page displays a screen image with a Launch button. The right tool bar includes the following quick actions:  
  • Capture Screen  
  • Settings  
  • Recorded Videos  
  • Latest Failure Screen |
| Event Log | | Provides a historical list of all hardware and management events. |
| Audit Log | | Provides a historical record of user actions, such as logging in to the Lenovo XClarity Controller, creating a new user, and changing a user password. You can use the audit log to track and document authentication and controls in IT systems. |
| Maintenance History | | Displays all the firmware update, configuration and hardware replacement history. |
| Alert Recipients | | Manage who will be notified of system events. It allows you to configure each recipient, and manage settings that apply to all event recipients. You can also generate a test event to verify the notification configuration settings. |
| Inventory | | Displays all the components in the system, along with their status and key information. You can click on a device to display additional information. |
| Utilization | | Displays ambient/component temperature, power utilization, voltage levels, system subsystem utilization and fan speed information of the server and its components in either graphic or tabular formats. |
| Storage | Detail | Displays the storage devices’ physical structure and storage configuration. |
| RAID Setup | | View or modify current RAID configuration, including the information of virtual disks and physical storage devices. |
| Remote Console | | Provides access to remote console functionality. You can use the virtual media feature to mount ISO or IMG files that are located on your system or on a network location that can be accessed by the BMC using CIFS, NFS, HTTPS, or SFTP. The mounted disk appears as a USB disk drive that is attached to the server. |
| Firmware Update | | • Displays firmware levels.  
  • Update the XClarity Controller firmware and server firmware. |
| Server Configuration | Adapters | Displays information of the network adapters installed and the settings that can be configured via the XClarity Controller. |
| | Boot Options | • Select the boot device for one-time boot during next server restart.  
  • Change boot mode and boot order settings. |
<table>
<thead>
<tr>
<th>Tab</th>
<th>Selection</th>
<th>Description</th>
</tr>
</thead>
</table>
| Power Policy    | • Configure the power redundancy during the event of a power supply failure.  
• Configure power capping policy.     
• Configure power restore policy.     |                                                                                                                                              |
| Server Properties | • Monitor various properties, status conditions, and settings for your server.  
• Manage server start timeouts to detect and recover from server hang.  
• Create Trespass Message. A Trespass Message is a message that you can create for users to see when they log in to the XClarity Controller. |                                                                                                                                              |
| Backup and Restore | Reset the configuration of the XClarity Controller to factory defaults, backup current configuration or restore configuration from a file. |                                                                                                                                              |
| License         | Manage activation keys for optional XClarity Controller features.          |                                                                                                                                              |
| Network         | Configure networking properties, status, and settings for the XClarity Controller. |                                                                                                                                              |
| Security        | Configure security properties, status, and settings for the XClarity Controller. |                                                                                                                                              |
| User/LDAP       | • Configure the XClarity Controller login profiles and global login settings.  
• View user accounts that are currently logged in to the XClarity Controller.  
• The LDAP tab configures user authentication for use with one or more LDAP servers. It also allows you to enable or disable LDAP security and manage its certificates. |                                                                                                                                              |
Chapter 3. Configuring the XClarity Controller

Use the information in this chapter to understand the options available for XClarity Controller configurations.

When configuring the XClarity Controller, the following key options are available:

- Backup and Restore
- License
- Network
- Security
- User/LDAP

Configuring user accounts/LDAP

Use the information in this topic to understand how user accounts are managed.

Click User/LDAP under BMC Configuration to create, modify, and view user accounts, and to configure LDAP settings.

The Local User tab shows the user accounts that are configured in the XClarity Controller, and which are currently logged in to the XClarity Controller.

The LDAP tab shows the LDAP configuration for accessing user accounts that are kept on an LDAP server.

User authentication method

Use the information in this topic to understand the modes that the XClarity Controller can use to authenticate login attempts.

Click Allow logons from to select how user login attempts are authenticated. You can select one of the following authentication methods:

- **Local only**: Users are authenticated by a search of the local user account configured in the XClarity Controller. If there is no match of the user ID and password, access is denied.
- **LDAP only**: The XClarity Controller attempts to authenticate the user with credentials kept on an LDAP server. The local user accounts in the XClarity Controller are not searched with this authentication method.
- **Local first, then LDAP**: Local authentication is attempted first. If local authentication fails; then, LDAP authentication is attempted.
- **LDAP first, then local user**: LDAP authentication is attempted first. If LDAP authentication fails; then, local authentication is attempted.

Notes:

- Only locally administered accounts are shared with the IPMI and SNMP interfaces. These interfaces do not support LDAP authentication.
- IPMI and SNMP users can login using the locally administered accounts when the Allow logons from field is set to **LDAP only**.

Creating a new user account

Use the information in this topic to create a new local user.
Create user
Click Create to create a new user account.

Complete the following fields: User name, Password, Confirm Password, and Authority Level. For further details on the authority level, see the following section.

User authority level
The following user authority levels are available:

Supervisor
The Supervisor user authority level has no restrictions.

Read only
The Read only user authority level has read-only access and cannot perform actions such as file transfers, power and restart actions, or remote presence functions.

Custom
The Custom user authority level allows a more customized profile for user authority with settings for the actions that the user is allowed to perform.

Select one or more of the following Custom user authority levels:

Adapter Configuration - Networking & Security
A user can modify configuration parameters on the Security, Network, and Serial Port pages.

User Account Management
A user can add, modify, or delete users, and change the global login settings.

Remote Console Access
A user can access the remote console.

Remote Console and Remote Disk Access
A user can access the remote console and the virtual media feature.

Remote Server Power/Restart
A user can perform power-on and restart functions for the server.

Adapter Configuration - Basic
A user can modify configuration parameters on the Server Properties and Events pages.

Ability to Clear Event Logs
A user can clear the event logs. Anyone can look at the event logs; but, this authority level is required to clear the logs.

Adapter Configuration - Advanced (Firmware Update, Restart BMC, Restore Configuration)
A user has no restrictions when configuring the XClarity Controller. In addition, the user is said to have administrative access to the XClarity Controller. Administrative access includes the following advanced functions: firmware updates, PXE network boot, restoring XClarity Controller factory defaults, modifying and restoring XClarity Controller settings from a configuration file, and restarting and resetting the XClarity Controller.

When a user sets the authority level of an XClarity Controller login ID, the resulting IPMI privilege level of the corresponding IPMI User ID is set according to the following priorities:

- If a user sets the XClarity Controller login ID authority level to Supervisor, the IPMI privilege level is set to Administrator.
- If a user sets the XClarity Controller login ID authority level to Read Only, the IPMI privilege level is set to User.
• If a user sets the XClarity Controller login ID authority level to any of the following types of access, the IPMI privilege level is set to Administrator:
  – User Account Management Access
  – Remote Console Access
  – Remote Console and Remote Disk Access
  – Adapter Configuration - Networking & Security
  – Adapter Configuration - Advanced
• If a user sets the XClarity Controller login ID authority level to Remote Server Power/Restart Access or Ability to Clear Event Logs, the IPMI privilege level is set to Operator.
• If a user sets the XClarity Controller login ID authority level to Adapter Configuration - Basic, the IPMI privilege level is set to User.

SNMPv3 Settings
To enable SNMPv3 access for a user, select the check box next to the SNMPv3 Settings. The following user access options are explained:

Access type
Only GET operations are supported. The XClarity Controller does not support SNMPv3 SET operations. SNMPv3 can only perform query operations.

Address for traps
Specify the trap destination for the user. This can be an IP address or hostname. Using traps, the SNMP agent notifies the management station about events, (for example, when a processor temperature exceeds the limit).

Authentication protocol
Only HMAC-SHA is supported as the authentication protocol. This algorithm is used by the SNMPv3 security model for authentication.

Privacy protocol
The data transfer between the SNMP client and the agent can be protected using encryption. The supported methods are CBC-DES and AES.

Notes: Even if repetitive strings of a password is used by an SNMPv3 user, access will still be allowed to the XClarity Controller. Two examples are shown for your reference.

• If the password is set to “11111111” (eight-digit number containing eight 1’s), the user can still access the XClarity Controller if the password is accidentally inputted with more than eight 1’s. For example, if the password is inputted as “1111111111” (ten-digit number containing ten 1’s), access will still be granted. The repetitive string will be considered having the same key.
• If the password is set to “bertbert”, the user can still access the XClarity Controller if the password is accidentally inputted as “bertbertbert”. Both passwords are considered to have the same key.


SSH Key
The XClarity Controller supports SSH Public Key Authentication (RSA key type). To add a SSH key to the local user account, select the check box next to the SSH Key. The following two options are provided:

Select key file
Select the SSH key file to be imported into the XClarity Controller from your server.
Enter key into a text field
Paste or type the data from your SSH key into the text field.

Notes:

• Some of Lenovo’s tools may create a temporary user account for accessing the XClarity Controller when the tool is run on the server operating system. This temporary account is not viewable and does not use any of the 12 local user account positions. The account is created with a random user name (for example, “20luN4SB”) and password. The account can only be used to access the XClarity Controller on the internal Ethernet over USB interface, and only for the CIM-XML and SFTP interfaces. The creation and removal of this temporary account is recorded in the audit log as well as any actions performed by the tool with these credentials.

• For the SNMPv3 Engine ID, the XClarity Controller uses a HEX string to denote the ID. This HEX string is converted from the default XClarity Controller host name. See the example below:

  The host name "XCC-7X06-S4AHJ300" is first converted into ASCII format: 88 67 67 45 55 88 48 54 45 83 52 65 72 74 51 48 48
  The HEX string is built using the ASCII format (ignore the spaces in between): 58 43 43 2d 37 58 30 36 2d 53 34 41 48 4a 33 30 30

Deleting a user account

Use the information in this topic to remove a local user account.

To delete a local user account, click the trash can icon on the row of the account that you wish to remove. If you are authorized, you can remove your own account or the account of other users, even if they are currently logged in, unless it is the only account remaining with User Account Management privileges. Sessions that are already in progress when user accounts are deleted will not be automatically terminated.

Using hashed passwords for authentication

Use the information in this topic to understand how to use hashed passwords for authentication.

Aside from the use of passwords and LDAP/AD user accounts, the XClarity Controller also supports third-party hashed passwords for authentication. The special password uses a one-way hash (SHA256) format and is supported by the XClarity Controller web, OneCLI, and CLI interfaces. However, please note that authentication of XCC SNMP, IPMI and CIM interfaces do not support third-party hashed passwords. Only the OneCLI tool and XCC CLI interface can create a new account with a hashed password or perform a hashed password update. The XClarity Controller also allows the OneCLI tool and XClarity Controller CLI interface to retrieve the hashed password if the capability of reading hashed password is enabled.

Setting hashed password via XClarity Controller web

Click Security under BMC Configuration, and scroll to the Security Password Manager section to enable or disable the Third-party Password function. If enabled, a third-party hashed password is employed for log-in authentication. Retrieval of the third-party hashed password from the XClarity Controller can also be enabled or disabled.

Note: By default, the Third-party Password and Allow Third-party Password Retrieval functions are disabled.

To check if the user password is Native or a Third-party Password, click User/LDAP under BMC Configuration for details. The information will be under the Advanced Attribute column.

Notes:
• Users will not be able to change a password if it is a third-party password, and the **Password** and **Confirm password** fields have been greyed out.

• If the third-party password has expired, a warning message will be shown during the user login process.

**Setting hashed password via OneCLI function**

• Enabling feature

```bash
$ sudo OneCli config set IMM.ThirdPartyPassword Enabled
```

• Creating hashed password (No Salt). The following shows an example logging to the XClarity Controller using the `password123` password.

```bash
$pwhash = `echo -n password123 | openssl dgst -sha256 | awk '{print $NF}'`
$ echo $pwhash 5e884898da28047151d0e56f8dc6292773603d0d6aabbdd62a11ef721d1542d8
$ sudo OneCli config set IMM.Loginid.2 admin
$ sudo OneCli config set IMM.SHA256Password.2 $pwhash
$ sudo OneCli config set IMM.SHA256PasswordSalt.2 ""
```

• Creating user with hashed password (With Salt). The following shows an example logging to the XClarity Controller using the `password123` password. Salt=abc.

```bash
$pwhash = `echo -n password123abc | openssl dgst -sha256 | awk '{print $NF}'`
$ echo $pwhash 292bcbe41bb078cf5bd258db60b63a4b337c8c954409442c7ad7148bc6428fee
$ sudo OneCli config set IMM.Loginid.3 Admin
$ sudo OneCli config set IMM.SHA256Password.3 $pwhash
$ sudo OneCli config set IMM.SHA256PasswordSalt.3 'abc'
```

• Retrieving the hashed password and salt.

```bash
$ sudo OneCli config set IMM.ThirdPartyPasswordReadable Enabled
$ sudo OneCli config show IMM.SHA256Password.3
$ sudo OneCli config show IMM.SHA256PasswordSalt.3
```

• Deleting the hashed password and salt.

```bash
$ sudo OneCli config set IMM.SHA256Password.3 ""
$ sudo OneCli config set IMM.SHA256PasswordSalt.3 ""
```

• Setting the hashed password to an existing account.

```bash
$ sudo OneCli config set IMM.Loginid.2 admin
$ sudo OneCli config set IMM.Password.2 Passw0rd123abc
$ sudo OneCli config set IMM.SHA256Password.2 $pwhash
$ sudo OneCli config set IMM.SHA256PasswordSalt.2 ""
```

**Note:** While the hashed password is being set, this password will immediately take effect. The original standard password will no longer be effective. In this example, the original standard password `Passw0rd123abc` cannot be used anymore until the hashed password is deleted.

**Setting hashed password via CLI function**

• Enabling feature

```bash
$ sudo OneCli config set IMM.ThirdPartyPassword Enabled
```
hashpw -sw enabled

- Creating hashed password (No Salt). The following shows an example logging to the XClarity Controller using the `password123` password.

```bash
$ pwhash = `echo -n password123 | openssl dgst -sha256 | awk '{print $NF}'`
5e884898da28047151d0e56f8dc6292773603d0d6aabbdd62a11ef721d1542d8

> users -2 -n admin -shp 5e884898da28047151d0e56f8dc6292773603d0d6aabbdd62a11ef721d1542d8 -a super
```

- Creating user with hashed password (With Salt). The following shows an example logging to the XClarity Controller using the `password123` password. Salt=abc.

```bash
$ pwhash = `echo -n password123 | openssl dgst -sha256 | awk '{print $NF}'`

$ echo $pwhash 292bcbc41bb078cf5bd258db60b63a4b337c8c954409442cfad7148bc6428fee

> users -3 -n Admin -shp 292bcbc41bb078cf5bd258db60b63a4b337c8c954409442cfad7148bc6428fee
-ssalt 'abc' -a super
```

- Retrieving the hashed password and salt.

```bash
> hashpw -re enabled

> users -3 -ghp -gsalt
```

- Deleting the hashed password and salt.

```bash
> users -3 -shp "" -ssalt ""
```

- Setting the hashed password to an existing account.

```bash
> users -2 -n admin -p Passw0rd123abc -shp 5e884898da28047151d0e56f8dc6292773603d0d6aabbdd62a11ef721d1542d8 -a super
```

**Note:** While the hashed password is being set, this password will immediately take effect. The original standard password will no longer be effective. In this example, the original standard password `Passw0rd123abc` cannot be used anymore until the hashed password is deleted.

After the hashed password has been set up, remember you do not use this to login to the XClarity Controller. When logging in, you will need to use the plaintext password. In the example shown below, the plaintext password is “password123”.

```bash
$ pwhash = 'echo -n password123 | openssl dgst -sha256 | awk '{print $NF}'`
5e884898da28047151d0e56f8dc6292773603d0d6aabbdd62a11ef721d1542d8

> users -2 -n admin -shp 5e884898da28047151d0e56f8dc6292773603d0d6aabbdd62a11ef721d1542d8 -a super
```

### Configuring global login settings

Use the information in this topic to configure login and password policy settings that apply to all users.

#### Web inactivity session timeout

Use the information in this topic to set the web inactivity session timeout option.

In the **Web inactivity session timeout** field, you can specify how long, in minutes, the XClarity Controller waits before it disconnects an inactive web session. The maximum wait time is 1,440 minutes. If set to 0, the web session never expires.
The XClarity Controller firmware supports up to six simultaneous web sessions. To free up sessions for use by others, it is recommended that you log out of the web session when you are finished rather than relying on the inactivity timeout to automatically close your session.

**Note:** If you leave the browser open on an XClarity Controller web page that automatically refreshes, your web session will not automatically close due to inactivity.

**Account security policy settings**

Use this information to understand and set the account security policy for your server.

**Notes:** In a Flex System, the account security policy settings are managed by the Flex System Chassis Management Module (CMM) and cannot be modified through the XCC. When the CMM is used to configure the account security policy, make note of the following:

- Unlike the XCC, the CMM does not have the *Password expiration warning period (days)* setting. When the *Password expiration period* is configured to be longer than 5 days in the CMM, the XCC will set the password expiration warning period to be 5 days. Conversely, if the setting is shorter than 5 days, the password expiration warning period will be the same as the value inputted in the *Password expiration period*.
- For the *Maximum number of login failures (times)* setting, the range set forth in the CMM is 0-100 times. However, the range defined in the XCC is 0-10 times. Thus, when the user selects a value that exceeds 10 times in the CMM, the XCC will still set the maximum number of login failures as 10 times.
- For the *Minimum password change interval (hours)* setting, the range set forth in the CMM is 0-1440 hours. However, the range defined in the XCC is 0-240 hours. Thus, when the user selects a value that exceeds 240 hours in the CMM, the XCC will still set the minimum password change interval to be 240 hours.

The following information is a description of the fields for the security settings.

**Force to change password on first access**

After setting up a new user with a default password, selection of this check box will force that user to change their password the first time that the user logs in. The default value for this field is to have the check box enabled.

**Force default account password must be changed on next login**

A manufacturing option is provided to reset the default USERID profile after the first successful login. When this check box is enabled, the default password must be changed before the account can be used. The new password is subject to all active password enforcement rules. The default value for this field is to have the check box enabled.

**Complex password required**

The option box is checked by default and the complex password must adhere to the following rules:

- Only contain the following characters (no white-space characters allowed): A-Z, a-z, 0-9, -!@#$%^&* ()+-=[]{};"'<>,?/.\
- Must contain at least one letter
- Must contain at least one number
- Must contain at least two of the following combinations:
  - At least one upper-case letter.
  - At least one lower-case letter.
  - At least one special character.
- No other characters (in particular, spaces or white-space characters) are allowed
- Passwords may have no more than two consecutive instances of the same character (i.e., “aaa”).
• The password cannot be literally same as the user name, simply repeating the user name one or more times, or a reverse character order of the user name.

• Passwords must be a minimum of 8 and a maximum of 32 characters long

If the option box is not checked, the number specified in the minimum password length can be set as 0–32 characters. The account password may be blank if minimum password length is set as 0.

**Password expiration period (days)**
This field contains the maximum password age that is permitted before the password must be changed. A value of 0 to 30 days is supported. The default value for this field is 14 days.

**Password expiration warning period (days)**
This field contains the number of days a user is warned before their password expires. If it is set to 0, no warnings are sent. A value of 0 to 30 days is supported. The default value for this field is 14 days.

**Minimum password length**
This field contains the minimum length of the password. 8 to 32 characters are supported for this field. The default value for this field is 10.

**Minimum password reuse cycle**
This field contains the number of previous passwords that cannot be reused. Up to ten previous passwords can be compared. Select 0 to allow the reuse of all previous passwords. A value of 0 to 10 is supported. The default value for this field is 5.

**Minimum password change interval (hours)**
This field contains how long a user must wait between password changes. A value of 0 to 240 hours is supported. The default value for this field is 1 hour.

**Maximum number of login failures (times)**
This field contains the number of failed login attempts that are allowed before the user is locked out for a period of time. A value of 0 to 10 is supported. The default value for this field is five login failures.

**Lockout period after maximum login failures (minutes)**
This field specifies how long (in minutes), the XClarity Controller subsystem will disable remote login attempts after the maximum number of login failures has been reached. A value of 0 to 2,880 minutes is supported. The default value for this field is 60 minutes.

**Configuring LDAP**
Use the information in this topic to view or change XClarity Controller LDAP settings.

LDAP support includes:
• Support for LDAP protocol version 3 (RFC-2251)
• Support for the standard LDAP client APIs (RFC-1823)
• Support for the standard LDAP search filter syntax (RFC-2254)

The LDAP implementation supports the following LDAP servers:
• Microsoft Active Directory Application Mode (Windows 2003 Server)
• Novell eDirectory Server, version 8.7, 8.8 and 9.4
• OpenLDAP Server 2.1, 2.2, 2.3 and 2.4

Click the LDAP tab to view or modify XClarity Controller LDAP settings.

The XClarity Controller can remotely authenticate a user’s access through a central LDAP server instead of, or in addition to the local user accounts that are stored in the XClarity Controller itself. Privileges can be designated for each user account using the IBMRBSPermissions string. You can also use the LDAP server to assign users to groups and perform group authentication, in addition to the normal user (password check) authentication. For example, an XClarity Controller can be associated with one or more groups, the user will pass group authentication only if the user belongs to at least one group that is associated with the XClarity Controller.

To configure an LDAP server, complete the following steps:

1. Under **LDAP Server Information**, the following options are available from the item list:

   - **Use LDAP server for Authentication only (with local authorization):** This selection directs the XClarity Controller to use the credentials only to authenticate to the LDAP server and to retrieve group membership information. The group names and privileges can be configured in the Active Directory Settings section.
   - **Use LDAP server for Authentication and Authorization:** This selection directs the XClarity Controller to use the credentials both to authenticate to the LDAP server and to identify a user’s permission.

   **Note:** The LDAP servers to be used for authentication can either be configured manually or discovered dynamically via DNS SRV records.

   - **Use Pre-Configured Servers:** You can configure up to four LDAP servers by entering each server's IP address or host name if DNS is enabled. The port number for each server is optional. If this field is left blank, the default value of 389 is used for non-secured LDAP connections. For secured connections, the default port value is 636. You must configure at least one LDAP server.
   - **Use DNS to Find Servers:** You can choose to discover the LDAP server(s) dynamically. The mechanisms described in RFC2782 (A DNS RR for specifying the location of services) are used to locate the LDAP server(s). This is known as DNS SRV. You need to specify a fully qualified domain name (FQDN) to be used as the domain name in the DNS SRV request.
     - **AD Forest:** In an environment with universal groups in cross domains, the forest name (set of domains) must be configured to discover the required Global Catalogs (GC). In an environment where cross-domain group membership does not apply, this field can be left blank.
     - **AD Domain:** You will need to specify a fully qualified domain name (FQDN) to be used as the domain name in the DNS SRV request.

   If you wish to enable secure LDAP, click the **Enable Secure LDAP** check box. In order to support secure LDAP, a valid SSL certificate must be in place and at least one SSL client trusted certificate must be imported into the XClarity Controller. Your LDAP server must support Transport Layer Security (TLS) version 1.2 to be compatible with the XClarity Controller secure LDAP client. For more information about certificate handling, see “SSL certificate handling” on page 37.

2. Fill in information under **Additional Parameters**. Below are explanations of the parameters.

   **Binding method**
   Before you can search or query the LDAP server, you must send a bind request. This field controls how this initial bind to the LDAP server is performed. The following bind methods are available:
   - **No Credentials Required**
Use this method to bind without a Distinguished Name (DN) or password. This method is strongly discouraged because most servers are configured to not allow search requests on specific user records.

- **Use Configured Credentials**
  Use this method to bind with the configured client DN and password.

- **Use Login Credentials**
  Use this method to bind with the credentials that are supplied during the login process. The user ID can be provided through a DN, a partial DN, a fully qualified domain name, or through a user ID that matches the UID Search Attribute that is configured on the XClarity Controller. If the credentials that are presented resemble a partial DN (e.g. cn=joe), this partial DN will be prepended to the configured Root DN in an attempt to create a DN that matches the user’s record. If the bind attempt fails, a final attempt will be made to bind by prepending cn= to the login credential, and prepending the resulting string to the configured Root DN.

If the initial bind is successful, a search is performed to find an entry on the LDAP server that belongs to the user who is logging in. If necessary, a second attempt to bind is made, this time with the DN that is retrieved from the user’s LDAP record and the password that was entered during the login process. If the second attempt to bind fails, the user is denied access. The second bind is performed only when the **No Credentials Required** or **Use Configured Credentials** binding methods are used.

**Root Distinguished Name (DN)**
This is the distinguished name (DN) of the root entry of the directory tree on the LDAP server (for example, dn=mycompany,dc=com). This DN is used as the base object for all search requests.

**UID Search Attribute**
When the binding method is set to **No Credentials Required** or **Use Configured Credentials**, the initial bind to the LDAP server is followed by a search request that retrieves specific information about the user, including the user’s DN, login permissions, and group membership. This search request must specify the attribute name that represents the user IDs on that server. This attribute name is configured in this field. On Active Directory servers, the attribute name is usually `sAMAccountName`. On Novell eDirectory and OpenLDAP servers, the attribute name is `uid`. If this field is left blank, the default is `uid`.

**Group Filter**
The **Group Filter** field is used for group authentication. Group authentication is attempted after the user’s credentials are successfully verified. If group authentication fails, the user’s attempt to log on is denied. When the group filter is configured, it is used to specify to which groups the XClarity Controller belongs. This means that to succeed the user must belong to at least one of the groups that are configured for group authentication. If the **Group Filter** field is left blank, group authentication automatically succeeds. If the group filter is configured, an attempt is made to match at least one group in the list to a group that the user belongs. If there is no match, the user fails authentication and is denied access. If there is at least one match, group authentication is successful.

The comparisons are case sensitive. The filter is limited to 511 characters and can consist of one or more group names. The colon (:) character must be used to delimit multiple group names. Leading and trailing spaces are ignored, but any other space is treated as part of the group name.

**Note:** The wildcard character (*) is no longer treated as a wildcard. The wildcard concept has been discontinued to prevent security exposures. A group name can be specified as a full DN or by using only the `cn` portion. For example, a group with a DN of `cn=adminGroup, dc=mycompany, dc=com` can be specified using the actual DN or with `adminGroup`.

Nested group membership is supported only in Active Directory environments. For example, if a user is a member of GroupA and GroupB, and GroupA is also a member of GroupC, the user is said...
to be a member of GroupC also. Nested searches stop if 128 groups have been searched. Groups in one level are searched before groups in a lower level. Loops are not detected.

Group Search Attribute
In an Active Directory or Novell eDirectory environment, the Group Search Attribute field specifies the attribute name that is used to identify the groups to which a user belongs. In an Active Directory environment, the attribute name is memberOf. In an eDirectory environment, the attribute name is groupMembership. In an OpenLDAP server environment, users are usually assigned to groups whose objectClass equals PosixGroup. In that context, this field specifies the attribute name that is used to identify the members of a particular PosixGroup. This attribute name is memberUid. If this field is left blank, the attribute name in the filter defaults to memberOf.

Login Permission Attribute
When a user is authenticated through an LDAP server successfully, the login permissions for the user must be retrieved. To retrieve the login permissions, the search filter that is sent to the server must specify the attribute name that is associated with login permissions. The Login Permission Attribute field specifies the attribute name. If this field is left blank, the user is assigned a default of read-only permissions, assuming that the user passes the user and group authentication.

The attribute value that is returned by the LDAP server searches for the keyword string IBMRBSPermissions=. This keyword string must be immediately followed by a bit string that is entered as 12 consecutive 0s or 1s. Each bit represents a set of functions. The bits are numbered according to their positions. The left-most bit is bit position 0, and the right-most bit is bit position 11. A value of 1 at a bit position enables the function that is associated with that bit position. A value of 0 at a bit position disables the function that is associated with that bit position.

The string IBMRBSPermissions=010000000000 is a valid example. The IBMRBSPermissions= keyword is used to allow it to be placed anywhere in this field. This enables the LDAP administrator to reuse an existing attribute; therefore, preventing an extension to the LDAP schema. This also enables the attribute to be used for its original purpose. You can add the keyword string anywhere in this field. The attribute that you use can allow for a free-formatted string. When the attribute is retrieved successfully, the value that is returned by the LDAP server is interpreted according to the information in the following table.

Table 2. Permission bits

<table>
<thead>
<tr>
<th>Bit position</th>
<th>Function</th>
<th>Explanation</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>Deny Always</td>
<td>A user will always fail authentication. This function can be used to block a particular user or users associated with a particular group.</td>
</tr>
<tr>
<td>1</td>
<td>Supervisor Access</td>
<td>A user is given administrator privileges. The user has read/write access to every function. If you set this bit, you do not have to individually set the other bits.</td>
</tr>
<tr>
<td>2</td>
<td>Read Only Access</td>
<td>A user has read-only access, and cannot perform any maintenance procedures (for example, restart, remote actions, or firmware updates) or make modifications (for example, the save, clear, or restore functions. Bit position 2 and all other bits are mutually exclusive, with bit position 2 having the lowest precedence. When any other bit is set, this bit will be ignored.</td>
</tr>
<tr>
<td>3</td>
<td>Networking and Security</td>
<td>A user can modify the Security, Network Protocols, Network Interface, Port Assignments, and Serial Port configurations.</td>
</tr>
<tr>
<td>4</td>
<td>User Account Management</td>
<td>A user can add, modify, or delete users and change the Global Login Settings in the Login Profiles window.</td>
</tr>
</tbody>
</table>
Table 2. Permission bits (continued)

<table>
<thead>
<tr>
<th>Bit position</th>
<th>Function</th>
<th>Explanation</th>
</tr>
</thead>
<tbody>
<tr>
<td>5</td>
<td>Remote Console Access</td>
<td>A user can access the remote server console.</td>
</tr>
<tr>
<td>6</td>
<td>Remote Console and Remote Disk Access</td>
<td>A user can access the remote server console and the remote disk functions for the remote server.</td>
</tr>
<tr>
<td>7</td>
<td>Remote Server Power/Restart Access</td>
<td>A user can access the power on and restart functions for the remote server.</td>
</tr>
<tr>
<td>8</td>
<td>Basic Adapter Configuration</td>
<td>A user can modify configuration parameters in the System Settings and Alerts windows.</td>
</tr>
<tr>
<td>9</td>
<td>Ability to Clear Event Logs</td>
<td>Note: All users can view the event logs; but, to clear the event logs the user is required to have this level of permission.</td>
</tr>
<tr>
<td>10</td>
<td>Advanced Adapter Configuration</td>
<td>A user has no restrictions when configuring the XClarity Controller. In addition the user has administrative access to the XClarity Controller. The user can perform the following advanced functions: firmware upgrades, PXE network boot, restore XClarity Controller factory defaults, modify and restore adapter configuration from a configuration file, and restart/reset the XClarity Controller.</td>
</tr>
<tr>
<td>11</td>
<td>Reserved</td>
<td>This bit position is reserved for future use. If none of the bits are set, the user has read-only authority. Priority is given to login permissions that are retrieved directly from the user record. If the login permission attribute is not in the user’s record, an attempt is made to retrieve the permissions from the groups to which the user belongs. This is performed as part of the group authentication phase. The user is assigned the inclusive OR of all the bits for all groups. If the Deny Always bit (position 0) is set for any of the groups, the user will be refused access. The Deny Always bit (position 0) always has precedence over every other bit. Note: If you give a user the ability to modify basic, networking, and/or security related adapter configuration parameters, you should consider giving this same user the ability to restart the XClarity Controller (bit position 10). Otherwise, without this ability, a user might be able to change parameters (for example, IP address of the adapter), but will not be able to have them take effect.</td>
</tr>
</tbody>
</table>

If none of the bits are set, the default will be set to Read Only for the user.

Note that priority is given to login permissions retrieved directly from the user record. If the user does not have the login permission attribute in its record, an attempt will be made to retrieve the permissions from the group(s) that the user belongs to, and, if configured, that match the group filter. In this case the user will be assigned the inclusive OR of all the bits for all of the groups. Similarly, the Read Only Access bit will only be set if all the other bits are zero. Moreover, note that if the Deny Always bit is set for any of the groups, the user will be refused access. The Deny Always bit always has precedence over every other bit.

3. Choose whether or not to Enable enhanced role-based security for Active Directory Users under Active Directory Settings (if Use LDAP server for Authentication and Authorization mode is used), or configure the Groups for Local Authorization (if Use LDAP server for Authentication only (with local authorization) mode is used).

- Enable enhanced role-based security for Active Directory Users
If enhanced role-based security setting is enabled, a free-formatted server name must be configured to act as the target name for this particular XClarity Controller. The target name can be associated with one or more roles on the Active Directory server through a Role Based Security (RBS) Snap-In. This is accomplished by creating managed targets, giving them specific names, and then associating them to the appropriate roles. If a name is configured in this field, it provides the ability to define specific roles for users and XClarity Controllers (targets) who are members of the same role. When a user logs in to the XClarity Controller and is authenticated via Active Directory, the roles that the user is a member of are retrieved from the directory. The permissions that are assigned to the user are extracted from the roles that also have as a member a target that matches the server name that is configured here, or a target that matches any XClarity Controller. Multiple XClarity Controllers can share the same target name. This could be used to group multiple XClarity Controllers together and assign them to the same role (or roles) by using a single managed target. Conversely each XClarity Controller can be given a unique name.

- **Groups for Local Authorization**

  Group Names are configured to provide local authorization specifications for groups of users. Each group name can be assigned permissions (Roles) that are the same as described in the table above. The LDAP server associates users with a group name. When the user logs in he is assigned the permissions that are associated with the group to which the user belongs. Additional groups can be configured by clicking the “+” icon or deleted by clicking the “x” icon.

---

**Configuring network protocols**

Use the information in this topic to view or establish network settings for the XClarity Controller.

**Configuring the Ethernet settings**

Use the information in this topic to view or change how the XClarity Controller communicates by way of an Ethernet connection.

The XClarity Controller uses two network controllers. One network controller is connected to the dedicated management port and the other network controller is connected to the shared port. Each of the network controllers is assigned its own burned in MAC address. If DHCP is being used to assign an IP address to the XClarity Controller, when a user switches between network ports or when a failover from the dedicated network port to the shared network port occurs, a different IP address may be assigned to the XClarity Controller by the DHCP server. It is recommended that when using DHCP, users should use the host name to access the XClarity Controller rather than relying on an IP address. Even if the XClarity Controller network ports are not changed, the DHCP server could possibly assign a different IP address to the XClarity Controller when the DHCP lease expires, or when the XClarity Controller reboots. If a user needs to access the XClarity Controller using an IP address that will not change, the XClarity Controller should be configured for a static IP address rather than DHCP.

Click **Network** under **BMC Configuration** to modify XClarity Controller Ethernet settings.

**Configuring the XClarity Controller Host Name**

The default XClarity Controller host name is generated using a combination of the string “XCC-" followed by the server machine type and server serial number (for example. “XCC-7X03-1234567890"). You can change the XClarity Controller host name by entering up to a maximum of 63 characters in this field. The host name must not include a period (.) and can contain only alphabet, numeric, hyphen and underscore characters.

**Ethernet Ports**

This setting controls the enablement of Ethernet ports used by management controller, including the shared and dedicated ports.
Once disabled, all Ethernet ports will not be assigned any IPv4 or IPv6 addresses, and prevents any further changes to any Ethernet configurations.

**Note:** This setting does not affect the USBLAN interface or the USB management port at the front of the server. Those interfaces have their own dedicated enablement settings.

### Configuring IPv4 network settings

To use an IPv4 Ethernet connection, complete the following steps:

1. Enable the IPv4 option.
   
   **Note:** Disabling the Ethernet interface prevents access to the XClarity Controller from the external network.

2. From the **Method** field, select one of the following options:
   
   - **Obtain IP from DHCP:** The XClarity Controller will obtain its IPv4 address from a DHCP server.
   
   - **Use static IP address:** The XClarity Controller will use the user specified value for its IPv4 address.

3. In the **Static address** field, type the IP address that you want to assign to the XClarity Controller.
   
   **Note:** The IP address must contain four integers from 0 to 255 with no spaces and separated by periods. This field will not be configurable if the method is set to Obtain IP from DHCP.

4. In the **Network mask** field, type the subnet mask that is used by the XClarity Controller.
   
   **Note:** The subnet mask must contain four integers from 0 to 255 with no spaces or consecutive periods and separated by periods. The default setting is 255.255.255.0. This field will not be configurable if the method is set to Obtain IP from DHCP.

5. In the **Default Gateway** field, type your network gateway router.
   
   **Note:** The gateway address must contain four integers from 0 to 255 with no spaces or consecutive periods and separated by periods. This field will not be configurable if the method is set to Obtain IP from DHCP.

### Configuring advanced Ethernet settings

Click the Advanced Ethernet tab to set additional Ethernet settings.

**Note:** In a Flex System, the VLAN settings are managed by a Flex System CMM and cannot be modified on the XClarity Controller.

To enable Virtual LAN (VLAN) tagging select the Enable VLAN check box. When VLAN is enabled and a VLAN ID is configured, the XClarity Controller only accepts packets with the specified VLAN IDs. The VLAN IDs can be configured with numeric values between 1 and 4094.

From the **MAC selection** list choose one of the following selections:

- **Use burned in MAC address**
  
  The Burned-in MAC address option is a unique physical address that is assigned to this XClarity Controller by the manufacturer. The address is a read-only field.

- **Use custom MAC address**
  
  If a value is specified, the locally administered address overrides the burned-in MAC address. The locally administered address must be a hexadecimal value from 000000000000 through FFFFFFFFFF.
must be in the form xx:xx:xx:xx:xx:xx where x is a hexadecimal number from 0 to 9 or “a” through “f”. The XClarity Controller does not support the use of a multicast address. The first byte of a multicast address is an odd number (the least significant bit is set to 1); therefore, the first byte must be an even number.

In the Maximum transmission unit field, specify the maximum transmission unit of a packet (in bytes) for your network interface. The maximum transmission unit range is from 60 to 1500. The default value for this field is 1500.

To use an IPv6 Ethernet connection, complete the following steps:

**Configuring IPv6 network settings**

1. Enable the IPv6 option.
2. Assign an IPv6 address to the interface using one of the following assignment methods:
   - Use stateless address autoconfiguration
   - Use stateful address configuration (DHCPv6)
   - Use statically assigned IP address

   **Notes:** When the Use statically assigned IP address is chosen, you will be asked to type the following information:
   - IPv6 Address
   - Prefix length
   - Gateway

**Configuring DNS**

Use the information in this topic to view or change XClarity Controller Domain Name System (DNS) settings.

**Note:** In a Flex System, DNS settings cannot be modified on the XClarity Controller. DNS settings are managed by the CMM.

Click **Network** under **BMC Configuration** to view or modify XClarity Controller DNS settings.

If you click the Use additional DNS address servers check box, specify the IP addresses of up to three Domain Name System servers on your network. Each IP address must contain integers from 0 to 255, separated by periods. These DNS server addresses are added to the top of the search list, so a host name lookup is done on these servers before one that is automatically assigned by a DHCP server.

**Configuring DDNS**

Use the information in this topic to enable or disable Dynamic Domain Name System (DDNS) protocol on the XClarity Controller.

Click **Network** under **BMC Configuration** to view or modify XClarity Controller DDNS settings.

Click the Enable DDNS check box, to enable DDNS. When DDNS is enabled, the XClarity Controller notifies a domain name server to change in real time, the active domain name server configuration of the XClarity Controller configured host names, addresses or other information that is stored in the domain name server.

Choose an option from the item list to decide how you want the domain name of the XClarity Controller to be selected.

- **Use custom domain name:** You can specify the domain name to which the XClarity Controller belongs.
• **Use domain name obtained from the DHCP server**: The domain name to which the XClarity Controller belongs is specified by the DHCP server.

### Configuring Ethernet over USB

Use the information in this topic to control the Ethernet over USB interface used for in-band communication between the server and the XClarity Controller.

Click **Network** under **BMC Configuration** to view or modify the XClarity Controller Ethernet over USB settings.

The Ethernet over USB is used for in-band communications to the XClarity Controller. Click the check box to enable or disable the Ethernet over USB interface.

**Important**: If you disable the Ethernet over USB, you cannot perform an in-band update of the XClarity Controller firmware or server firmware using the Linux or Windows flash utilities.

Select the method that The XClarity Controller uses to assign addresses to the endpoints of the Ethernet over USB interface.

- **Use IPv6 link-local address for Ethernet over USB**: This method uses IPv6 addresses based off the MAC address that have been allocated to the endpoints of the Ethernet over USB interface. Normally, the IPv6 link local address is generated using the MAC address (RFC 4862) but Windows 2008 and newer 2016 operating systems do not support a static link local IPv6 address on the host end of the interface. Instead the default Windows behavior regenerates random link local addresses while running. If the XClarity Controller Ethernet over USB interface is configured to use the IPv6 link local address mode, various functions that make use of this interface will not work because the XClarity Controller does not know what address Windows has assigned to the interface. If the server is running Windows use one of the other Ethernet over USB address configuration methods, or disable the default Windows behavior by using this command: `netsh interface ipv6 set global randomizeidentifiers=disabled`

- **Use IPv4 link-local address for Ethernet over USB**: An IP address in the 169.254.0.0/16 range is assigned to the XClarity Controller and server side of the network.

- **Configure IPv4 setting for Ethernet over USB**: With this method, it specifies the IP addresses and network mask that are assigned to the XClarity Controller and the server side of the Ethernet over USB interface.

**Notes:**

1. The OS IP configuration settings is not used to set the OS IP address of Ethernet Over USB interface, but is used to notify BMC that OS IP address of Ethernet over USB has changed.
2. Before you configure three IP settings for Ethernet over USB, you need to manually configure the OS IP address of Ethernet over USB interface in your local operating system.

Mapping of external Ethernet port numbers to Ethernet over USB port numbers is controlled by clicking the **Enable external Ethernet to Ethernet over USB port forwarding** checkbox and completing the mapping information for ports you wish to have forwarded from the management network interface to the server.

### Configuring SNMPv3

Use the information in this topic to configure SNMP agents.

Complete the following steps to configure the XClarity Controller SNMPv3 alert settings.

1. Click **Network** under **BMC Configuration**.
2. Check the corresponding check box to enable the SNMPv3 agent or SNMP Traps.
3. If enabling the SNMP Traps, select the following event types you wish to be alerted:
4. If enabling the SNMPv3 agent, complete the following fields:
   a. In the **BMC Contact** field, enter the name of the contact person.
   b. In the **Location** field, enter the site (geographical coordinates).

**Enabling or Disabling IPMI Network Access**

Use the information in this topic to control IPMI network access to the XClarity Controller.

Click **Network** under **BMC Configuration** to view or modify XClarity Controller IPMI settings. Complete the following fields to view or modify IPMI settings:

**IPMI over LAN Access**

   Click the switch to enable or disable IPMI network access to the XClarity Controller.

**Important:**

- If you are not using any tools or applications that access the XClarity Controller through the network using the IPMI protocol, it is highly recommended that you disable IPMI network access for improved security.
- IPMI over LAN access to the XClarity Controller is disabled by default.

**Configuring Network Settings with IPMI commands**

Use the information in this topic to configure the network settings using IPMI commands.

Because each BMC network setting is configured using separate IPMI requests and in no particular order, the BMC does not have the complete view of all of the network settings until the BMC is restarted to apply the pending network changes. The request to change a network setting may succeed at the time that the request is made, but later be determined to be invalid when additional changes are requested. If the pending network settings are incompatible when the BMC is restarted, the new settings will not be applied. After restarting the BMC, you should attempt to access the BMC using the new settings to ensure that they have been applied as expected.

**Service Enablement and Port Assignment**

Use the information in this topic to view or change the port numbers used by some services on the XClarity Controller.

Click **Network** under **BMC Configuration** to view or modify XClarity Controller port assignments. Complete the following fields to view or modify port assignments:

**Web**

   The port number is 80. This field is not user-configurable.

**Web over HTTPS**

   In this field specify the port number for Web Over HTTPS. The default value is 443.

**REST over HTTPS**

   The port number will automatically change to the one specified in the Web over HTTPS field. This field is not user-configurable.

**CIM over HTTP**
In this field specify the port number for CIM over HTTP. The default value is 5989.

**Note:** CIM is disabled by default.

**Remote Presence**
In this field specify the port number for Remote Presence. The default value is 3900.

**IPMI over LAN**
The port number is 623. This field is not user-configurable.

**Note:** IPMI is disabled by default.

**SFTP**
In this field specify the port number that is used for the SSH File Transfer Protocol (SFTP). The port number is 115. This field is not user-configurable.

**Note:** IMM.SFTPPortControl=open is required for OneCLI in-band updates.

**SLP**
In this field specify the port number that is used for the SLP. The port number is 427. This field is not user-configurable.

**Notes:** There are two service types that XClarity Controller reports:
- service: management-hardware.Lenovo:lenovo-xclarity-controller
- service: wbem

**SSDP**
The port number is 1900. This field is not user-configurable.

**SSH**
In this field specify the port number that is configured to access the command line interface through the SSH protocol. The default value is 22.

**SNMP Agent**
In this field specify the port number for the SNMP agent that runs on the XClarity Controller. The default value is 161. Valid port number values are from 1 to 65535.

**SNMP Traps**
In this field specify the port number that is used for SNMP traps. The default value is 162. Valid port number values are from 1 to 65535.

**Configuring Access Restriction**
Use the information in this topic to view or change the settings that block access from IP addresses or MAC addresses to the XClarity Controller.

Click **Network** under **BMC Configuration** to view or modify XClarity Controller access control settings.

**Block List and Time Restriction**
These options allow you to block specific IP/Mac addresses for specific period of time.

- **List of Blocked IP Addresses**
  - You can enter up to three IPv4 addresses or ranges and three IPv6 addresses or ranges separated by commas, which are not allowed to access the XClarity Controller. Refer to the IPv4 examples below:
- Single IPv4 address sample: 192.168.1.1
- Supernet IPv4 address sample: 192.168.1.0/24
- IPv4 range sample: 192.168.1.1–192.168.1.5

**List of Blocked MAC address**
- You can enter up to three MAC addresses separated by commas, which are not allowed to access the XClarity Controller. For example: 11:22:33:44:55:66.

**Restricted Access (one time)**
- You can schedule a one-time time interval during which the XClarity Controller cannot be accessed. For the time interval that you specify:
  - The beginning date and time must be later than the current XCC time.
  - The ending date and time must be later than the beginning date and time.

**Restricted Access (daily)**
- You can schedule one or more daily time intervals during which the XClarity Controller cannot be accessed. For each time interval that you specify:
  - The ending date and time must be later than the beginning date and time.

**Externally Triggered Block List**
These options allow you to setup automatic blocking of specific IP addresses (IPv4 and IPv6) from which client successively attempted to log in to XClarity Controller with different incorrect username or password.

Automatic blocking will dynamically determines when excessive login failures occur from a particular IP address and blocks that address from accessing XClarity Controller for a predetermined amount of time.

**Maximum number of login failures from a particular IP**
- The maximum number of times indicates the number of login failures allowed for a user with an incorrect password from a specific IP address before it becomes locked-out.
  - If set to 0, IP address will never be locked due to login failures.
  - The failed login counter for the specific IP address will be reset to zero after successful login from that IP address.

**Lockout period for blocking an IP**
- The minimum amount of time (in minutes) that must pass before a user can attempt to log back in again from a locked IP address.
  - If set to 0, access from the locked IP address remains blocked-out until the administrator explicitly unlocks it.

**Block List**
- The table Block List displays all locked IP addresses. You can unlock one or all IP addresses from the Block List.

**Configuring Front Panel USB Port to Management**
Use the information in this topic to configure the XClarity Controller Front Panel USB Port to Management.

On some servers the front panel USB port can be switched to attach either to the server or to the XClarity Controller. Connection to the XClarity Controller is primarily intended for use with a mobile device running the Lenovo XClarity Mobile app. When a USB cable is connected between the mobile device and the server’s front panel, an Ethernet over USB connection will be established between the mobile app running on the device and the XClarity Controller.
Click **Network** under **BMC Configuration** to view or modify XClarity Controller front panel USB port to management settings.

There are four types of settings that you can choose from:

**Host Only Mode**
- The front panel USB port is always connected only to the server.

**BMC Only Mode**
- The front panel USB port is always connected only to the XClarity Controller.

**Shared Mode: owned by BMC**
- The front panel USB port is shared by both the server and the XClarity Controller, but the port is switched to the XClarity Controller.

**Shared Mode: owned by Host**
- The front panel USB port is shared by both the server and the XClarity Controller, but the port is switched to the host.

For additional information about the Mobile app, see the following site:


**Notes:**

- If the front panel USB port is configured for Shared Mode, the port is connected to the XClarity Controller when there is no power, and is connected to the server when there is power. When there is power, the control of the front panel USB port can be switched back and forth between the server and the XClarity Controller. In shared mode, the port can also be switched between the host and the XClarity Controller by pressing and holding the front panel Identification button (for compute nodes it may be the USB management button) for more than 3 seconds.

- When configured in Shared Mode and the USB port is currently connected to the server, the XClarity Controller can support a request to switch the front panel USB port back to the XClarity Controller. When this request is executed, the front panel USB port will remain connected to the XClarity Controller until there is no USB activity to the XClarity Controller for the period specified by the inactivity timeout.

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**Configuring security settings**

Use the information in this topic to configure security protocols.

**Note:** The default minimum TLS version setting is TLS 1.2, but you can configure the XClarity Controller to use other TLS versions if needed by your browser or management applications. For more information, see “tls command” on page 146.

Click **Security** under **BMC Configuration** to access and configure security properties, status, and settings for your XClarity Controller.

**SSL overview**

This topic is an overview of the SSL security protocol.

SSL is a security protocol that provides communication privacy. SSL enables client/server applications to communicate in a way that prevents eavesdropping, tampering, and message forgery. You can configure the XClarity Controller to use SSL support for different types of connections, such as secure web server (HTTPS), secure LDAP connection (LDAPS), CIM over HTTPS, and SSH server, and to manage the certificates that are required for SSL.
SSL certificate handling

This topic provides information about the administration of certificates that can be used with the SSL security protocol.

You can use SSL with a self-signed certificate or with a certificate that is signed by a third-party certificate authority. Using a self-signed certificate is the simplest method for using SSL; but, it does create a small security risk. The risk arises because the SSL client has no way of validating the identity of the SSL server for the first connection that is attempted between the client and server. For example, it is possible that a third party might impersonate the XClarity Controller web server and intercept data that is flowing between the actual XClarity Controller web server and the user’s web browser. If, at the time of the initial connection between the browser and the XClarity Controller, the self-signed certificate is imported into the certificate store of the browser, all future communications will be secure for that browser (assuming that the initial connection was not compromised by an attack).

For more complete security, you can use a certificate that is signed by a certificate authority (CA). To obtain a signed certificate, you will need to select **Generate Certificate Signing Request (CSR)**. Select **Download Certificate Signing Request (CSR)** and send the Certificate-Signing Request (CSR) to a CA to obtain a signed certificate. When the signed certificate is received, select **Import Signed Certificate** to import it into the XClarity Controller.

The function of the CA is to verify the identity of the XClarity Controller. A certificate contains digital signatures for the CA and the XClarity Controller. If a well-known CA issues the certificate or if the certificate of the CA has already been imported into the web browser, the browser can validate the certificate and positively identify the XClarity Controller web server.

The XClarity Controller requires a certificate for use with HTTPS Server, CIM over HTTPS, and the secure LDAP client. In addition the secure LDAP client also requires one or more trusted certificates to be imported. The trusted certificate is used by the secure LDAP client to positively identify the LDAP server. The trusted certificate is the certificate of the CA that signed the certificate of the LDAP server. If the LDAP server uses self-signed certificates, the trusted certificate can be the certificate of the LDAP server itself. Additional trusted certificates must be imported if more than one LDAP server is used in your configuration.

SSL certificate management

This topic provides information about some of the actions that can be selected for certificate management with the SSL security protocol.

Click **Security** under **BMC Configuration** to configure the SSL certificate management.

When managing XClarity Controller certificates, you are presented with the following actions:

**Download Signed Certificate**
Use this link to download a copy of the currently installed certificate. The certificate can be downloaded in either PEM or DER format. The contents of the certificate can be viewed using a third-party tool such as OpenSSL (www.openssl.org). An example of the command line for viewing the contents of the certificate using OpenSSL would look something like the following:

```
openssl x509 -in cert.der -inform DER -text
```

**Download Certificate Signing Request (CSR)**
Use this link to download a copy of the certificate signing request. The CSR can be downloaded in either PEM or DER format.

**Generate Signed Certificate**
Generate a self-signed certificate. After the operation is completed, SSL may be enabled using the new certificate.

**Note:** When performing the Generate Signed Certificate action, a Generate self-signed certificate for HTTPS window opens. You will be prompted to complete the required and optional fields. You must complete the required fields. Once you have entered your information, click Generate to complete the task.

**Generate Certificate Signing Request (CSR)**
Generate a certificate signing request (CSR). After the operation is completed, the CSR file may be downloaded and sent to a certificate authority (CA) for signing.

**Note:** When performing the Generate Certificate Signing Request (CSR) action, a Generate Certificate Signing Request for HTTPS window opens. You will be prompted to complete the required and optional fields. You must complete the required fields. Once you have entered your information, click Generate to complete the task.

**Import a Signed Certificate**
Use this to import a signed certificate. To obtain a signed certificate, a certificate signing request (CSR) must first be generated and sent to a certificate authority (CA).

**Configuring the Secure Shell server**
Use the information in this topic to understand and enable the SSH security protocol.

Click **Network** under **BMC Configuration** to configure the Secure Shell server.

To use the SSH protocol, a key needs to be generated first to enable the SSH server.

**Notes:**
- No certificate management is required to use this option.
- The XClarity Controller will initially create a SSH server key. If you wish to generate a new SSH server key, click **Network** under **BMC Configuration**; then, click Regenerate key.
- After you complete the action, you must restart the XClarity Controller for your changes to take effect.

**IPMI over Keyboard Controller Style (KCS) Access**
Use the information in this topic to control IPMI over Keyboard Controller Style (KCS) access to the XClarity Controller.

The XClarity Controller provides an IPMI interface via the KCS channel that does not require authentication.

Click **Security** under **BMC Configuration** to enable or disable IPMI over KCS access.

**Note:** After you change the settings, you must restart the XClarity Controller for your changes to take effect.

**Important:** If you are not running any tools or applications on the server that access the XClarity Controller through the IPMI protocol, it is highly recommended that you disable the IPMI KCS access for improved security. XClarity Essentials does use the IPMI over KCS interface to the XClarity Controller. If you disabled the IPMI over KCS interface, re-enable it prior to running XClarity Essentials on the server. Then disable the interface after you have finished.

**Prevent System Firmware Down-Level**
Use the information in this topic to prevent system firmware from being changed to older firmware levels.
This feature allows you to decide whether or not to allow the system firmware to return to an older firmware level. 

Click **Network** under **BMC Configuration** to prevent system firmware down-level.

To enable or disable this feature, click **Network** under **BMC Configuration**. Any changes made will take effect immediately without the XClarity Controller requiring a restart.

**Assert Physical Presence**

Use the information in this topic to assert and de-assert Physical Presence from the XClarity Controller web page without being physically present at the server.

This feature is only available if the **Physical Presence Policy** is enabled through UEFI. Once enabled, you can access the physical presence feature by clicking **Security** under **BMC Configuration**.

**Configuring the Security Key Lifecycle Manager (SKLM)**

This topic provides information about the Security Key Lifecycle Manager (SKLM) software product that is used for creating and managing security keys.

The Security Key Lifecycle Manager (SKLM) is a software product for creating and managing security keys. The SKLM for ThinkSystem Self Encrypting Drives (SED) - Features on Demand (FoD) option is a ThinkSystem FoD option that enables centralized management of encryption keys. The encryption keys are used to gain access to data stored on SEDs in a ThinkSystem server.

A centralized SKLM (key repository) server provides the encryption keys to unlock the SEDs in the ThinkSystem server. The FoD option requires that a FoD Activation key be installed in the XClarity Controller FoD key repository. The Activation key for the FoD option is a unique identifier comprised of the machine type and serial number. To use the storage key/drive access functionality, the FoD key *ThinkSystem TKLM Activation for Secure Drive Encryption (Type 32796 or 801C)* must be installed in the XClarity Controller FoD key repository. See Chapter 8 “License Management” on page 85 for information pertaining to installing an activation key.

The SKLM FoD option is limited to ThinkSystem XClarity Controller-based servers. To increase security, the XClarity Controller can be placed in a separate management network. The XClarity Controller uses the network to retrieve encryption keys from the SKLM server; therefore, the SKLM server must be accessible to the XClarity Controller through this network. The XClarity Controller provides the communication channel between the SKLM server and the requesting ThinkSystem server. The XClarity Controller firmware attempts to connect with each configured SKLM server, stopping when a successful connection is established.

The XClarity Controller establishes communication with the SKLM server if the following conditions are met:

- A valid FoD activation key is installed in the XClarity Controller.
- One or more SKLM server host name/IP addresses are configured in the XClarity Controller.
- Two certificates (client and server) for communication with the SKLM server are installed in the XClarity Controller.

**Note:** Configure at least two (a primary and a secondary) SKLM servers for your device. If the primary SKLM server does not respond to the connection attempt from the XClarity Controller; connection attempts are initiated with the additional SKLM servers until a successful connection is established.

A Transport Layer Security (TLS) connection must be established between the XClarity Controller and the SKLM server. The XClarity Controller authenticates the SKLM server by comparing the server certificate submitted by the SKLM server, with the SKLM server certificate previously imported into the XClarity...
Controller’s trust store. The SKLM server authenticates each XClarity Controller that communicates with it and checks to verify that the XClarity Controller is permitted to access the SKLM server. This authentication is accomplished by comparing the client certificate that the XClarity Controller submits, with a list of trusted certificates that are stored on the SKLM server.

At least one SKLM server (key repository server) will be connected, and the device group is considered optional. The SKLM server certificate will need to be imported, while the client certificate needs to be specified. By default, the HTTPS certificate is used. If you wish to replace it, you can generate a new one.

**Configuring the key repository servers**
Use the information in this topic to create the host name or IP address and associated port information for the SKLM server.

The Key Repository Servers section consists of the following fields:

**Host Name or IP address**
Type the host name (if DNS is enabled and configured) or the IP address of the SKLM server in this field. Up to four servers can be added.

**Port**
Type the port number for the SKLM server in this field. If this field is left blank, the default value of 5695 is used. Valid port number values are 1 to 65535.

**Configuring the device group**
This topic contains information about the Device Group section.

A device group allows users to manage the self-encrypting drive (SED) keys on multiple servers as a group. A device group with the same name must also be created on the SKLM server.

The Device Group section contains the following field:

**Device Group**
A device group allows users to manage the keys for SEDs on multiple servers as a group. A device group with the same name must also be created on the SKLM server. The default value for this field is IBM_SYSTEM_X_SED.

**Establishing certificate management**
This topic provides information about client and server certificate management.

Client and server certificates are used to authenticate the communication between the SKLM server and the XClarity Controller located in the ThinkSystem server. Client and server certificate management are discussed in this section.

**Client Certificate Management**
This topic provides information about client certificate management.

Client certificates are classified as one of the following:

- An XClarity Controller self-assigned certificate.
- A certificate generated from an XClarity Controller certificate signing request (CSR) and signed (externally) by a third party CA.

A client certificate is required for communication with the SKLM server. The client certificate contains digital signatures for the CA and the XClarity Controller.
Notes:
- Certificates are preserved across firmware updates.
- If a client certificate is not created for communication with the SKLM server, the XClarity Controller HTTPS server certificate is used.
- The function of the CA is to verify the identity of the XClarity Controller.

To create a client certificate, click the plus icon (.addButton) and select one of the following items:
- Generate a New Key and a Self-Signed Certificate
- Generate a New Key and a Certificate Signing Request (CSR)

The **Generate a New Key and a Self-Signed Certificate** action item generates a new encryption key and a self-signed certificate. In the Generate New Key and Self-Signed Certificate window, type or select the information in the required fields and any optional fields that apply to your configuration, (see the following table). Click **OK** to generate your encryption key and certificate. A progress window displays while the self-signed certificate is being generated. A confirmation window is displayed when the certificate is successfully installed.

**Note:** The new encryption key and certificate replace any existing key and certificate.

<table>
<thead>
<tr>
<th>Field</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Country</td>
<td>From the list item, select the country where the BMC physically resides.</td>
</tr>
<tr>
<td>State or Providence</td>
<td>Type the state or providence where the BMC physically resides.</td>
</tr>
<tr>
<td>City or Locality</td>
<td>Type the city or locality where the BMC physically resides.</td>
</tr>
<tr>
<td>Organization Name</td>
<td>Type the company or organization name that owns the BMC.</td>
</tr>
<tr>
<td>BMC Host Name</td>
<td>Type the BMC host name that appears in the web address bar.</td>
</tr>
<tr>
<td>Contact Person</td>
<td>Type the name of the contact person that is responsible for the BMC.</td>
</tr>
<tr>
<td>Email address</td>
<td>Type the email address of the contact person responsible for the BMC.</td>
</tr>
<tr>
<td>Organization Unit</td>
<td>Type the unit within the company that owns the BMC.</td>
</tr>
<tr>
<td>Surname</td>
<td>Type the surname of the person responsible for the BMC. This field can contain a maximum of 60 characters.</td>
</tr>
<tr>
<td>Given Name</td>
<td>Type the given name of the person responsible for the BMC. This field can contain a maximum of 60 characters.</td>
</tr>
<tr>
<td>Initials</td>
<td>Type the initials of the person responsible for the BMC. This field can contain a maximum of 20 characters.</td>
</tr>
<tr>
<td>DN Qualifier</td>
<td>Type the Distinguished Name Qualifier for the BMC. This field can contain a maximum of 60 characters.</td>
</tr>
</tbody>
</table>

1. This is a required field.

After the client certificate has been generated you can download the certificate to storage on your XClarity Controller by selecting the **Download Certificate** action item.
The Generate a New Key and a Certificate Signing Request (CSR) action item generates a new encryption key and a CSR. In the Generate a New Key and a Certificate Signing Request window, type or select the information in the required fields and any optional fields that apply to your configuration, (see the following table). Click OK to generate your new encryption key and CSR.

A progress window displays while the CSR is being generated and a confirmation window is displayed upon successful completion. After generation of the CSR, you must send the CSR to a CA for digital signing. Select the Download Certificate Signing Request (CSR) action item and click OK to save the CSR to your server. You can then submit the CSR to your CA for signing.

Table 4. Generate a New Key and a Certificate Signing Request

Two column table with headers documenting the required and optional fields for the Generate a new key and certificate signing request action. The bottom row spans across both columns.

<table>
<thead>
<tr>
<th>Field</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Country¹</td>
<td>From the list item, select the country where the BMC physically resides.</td>
</tr>
<tr>
<td>State or Providence¹</td>
<td>Type the state or providence where the BMC physically resides.</td>
</tr>
<tr>
<td>City or Locality¹</td>
<td>Type the city or locality where the BMC physically resides.</td>
</tr>
<tr>
<td>Organization Name¹</td>
<td>Type the company or organization name that owns the BMC.</td>
</tr>
<tr>
<td>BMC Host Name¹</td>
<td>Type the BMC host name that appears in the web address bar.</td>
</tr>
<tr>
<td>Contact Person</td>
<td>Type the name of the contact person that is responsible for the BMC.</td>
</tr>
<tr>
<td>Email address</td>
<td>Type the email address of the contact person responsible for the BMC.</td>
</tr>
<tr>
<td>Organization Unit</td>
<td>Type the unit within the company that owns the BMC.</td>
</tr>
<tr>
<td>Surname</td>
<td>Type the surname of the person responsible for the BMC. This field can contain a maximum of 60 characters.</td>
</tr>
<tr>
<td>Given Name</td>
<td>Type the given name of the person responsible for the BMC. This field can contain a maximum of 60 characters.</td>
</tr>
<tr>
<td>Initials</td>
<td>Type the initials of the person responsible for the BMC. This field can contain a maximum of 20 characters.</td>
</tr>
<tr>
<td>DN Qualifier</td>
<td>Type the Distinguished Name Qualifier for the BMC. This field can contain a maximum of 60 characters.</td>
</tr>
<tr>
<td>Challenge Password</td>
<td>Type the password to the CSR. This field can contain a maximum of 30 characters.</td>
</tr>
<tr>
<td>Unstructured Name</td>
<td>Type additional information, such as an unstructured name that is assigned to the BMC. This field can contain a maximum of 60 characters.</td>
</tr>
</tbody>
</table>

¹. This is a required field.

The CSR is digitally signed by the CA using the user’s certificate processing tool, such as the OpenSSL or Certutil command line tool. All client certificates that are signed using the user’s certificate processing tool have the same base certificate. This base certificate must also be imported to the SKLM server so that all servers digitally signed by the user are accepted by the SKLM server.
After the certificate has been signed by the CA you must import it into the BMC. Select the **Import a Signed Certificate** action item and select the file to upload as the client certificate; then, click **OK**. A progress window displays while the CA-signed certificate is being uploaded. A Certificate Upload window is displayed if the upload process is successful. A Certificate Upload Error window is displayed if the upload process is not successful.

**Notes:**
- For increased security, use a certificate that is digitally signed by a CA.
- The certificate that is imported into the XClarity Controller must correspond to the CSR that was previously generated.

After a CA-signed certificate is imported into the BMC, select the **Download Certificate** action item. When you select this action item, the CA-signed certificate is downloaded from the XClarity Controller to store on your system.

**Server certificate management**
This topic provides information about server certificate management.

The server certificate is generated in the SKLM server and must be imported into the XClarity Controller before the secure drive access functionality will work. To import the certificate that authenticates the SKLM server to the BMC, click **Import a Certificate** from the Server Certificate Status section of the Drive Access page. A progress indicator is displayed as the file is transferred to storage on the XClarity Controller.

After the server certificate is successfully transferred to the XClarity Controller, the Server Certificate Status area displays the following content: A server certificate is installed.

If you want to remove a trusted certificate, click the corresponding **Remove** button.

**Extended Audit Log**
Use the information in this topic to control extended audit log.

This feature allows you to decide whether or not to include the log entries of IPMI set command (raw data) from LAN and KCS channels into the audit log.

Click **Security** under **BMC Configuration** on XCC web to enable/disable extended audit log.

**Note:** If the IPMI set command is from LAN channel, user name and source IP address will be included in the log message. And all IPMI commands with sensitive security information (e.g. password) are excluded.

**Backing up and Restoring the BMC configuration**
The information in this topic describes how to restore or modify the BMC configuration.

Select **Backup and Restore** under **BMC Configuration** to perform the following actions:
- View management controller configuration summary
- Backup or restore the management controller configuration
- View backup or restore status
- Reset the management controller configuration to its factory default settings
- Access the management controller initial setup wizard
**Backing up the BMC configuration**

The information in this topic describes how to back up the BMC configuration.

Select **Backup and Restore** under **BMC Configuration**. At the very top is the **Backup BMC configuration** section.

If a backup was previously made, you will see the details in the **Last backup** field.

To backup the current BMC configuration, follow the steps shown below:

1. Specify the password for the BMC backup file.
2. Select if you wish to encrypt the whole file or only sensitive data.
3. Begin the backup process by clicking **Start Backup**. During the process, you are not allowed to perform any restore/reset actions.
4. When the process is completed, a button will appear to let you download the and save the file.

**Note:** When the user sets up a new XClarity Controller user/password and performs a backup of the configuration, the default account/password (USERID/PASSW0RD) is included as well. Subsequently deleting the default account/password from the backup will result in the system showing a message notifying the user that there is a failure in restoring the XClarity Controller account/password. Users can ignore this message.

**Restoring the BMC configuration**

The information in this topic describes how to restore the BMC configuration.

Select **Backup and Restore** under **BMC Configuration**. Located below **Backup BMC Configuration** is the **Restore BMC from Configuration File** section.

To restore the BMC to a previously saved configuration, follow the steps shown below:

1. Browse to select the backup file and input the password when prompted.
2. Verify the file by clicking **View content** to view the details.
3. After verifying the content, click **Start Restore**.

**Resetting the BMC to Factory Default**

The information in this topic describes how to reset the BMC to the factory default settings.

Select **Backup and Restore** under **BMC Configuration**. Located below **Restore BMC from Configuration File** is the **Reset BMC to factory default** section.

To reset the BMC to factory defaults, follow the steps shown below:

1. Click **Start to Reset BMC to Factory Defaults**.

**Notes:**

- Only users with Supervisor user authority level can perform this action.
- The Ethernet connection is temporarily disconnected. You must log in the XClarity Controller web interface again after the reset operation is completed.
- Once you click **Start to Reset BMC to Factory Defaults**, all previous configuration changes will be lost. If you wish to enable LDAP when restoring the BMC configuration, you will need to first import a trusted security certificate before doing so.
• After the process is completed, the XClarity Controller will be restarted. If this is a local server, your TCP/IP connection will be lost and you may need to reconfigure the network interface to restore connectivity.

• Resetting the BMC to Factory Default is not affecting UEFI settings.

---

**Restarting the XClarity Controller**

The information in this topic explains how to restart your XClarity Controller.

For details on how to restart the XClarity Controller, see “Power actions” on page 58.
Chapter 4. Monitoring the server status

Use the information in this topic to understand how to view and monitor information for the server that you are accessing.

Once you log into the XClarity Controller, a system status page will be displayed. From this page, you can view the server hardware status, event and audit logs, system status, maintenance history and alert recipients.

Viewing the Health Summary/Active System Events

Use the information in this topic to understand how to view the Health Summary/Active System Events.

When you access the XClarity Controller homepage, the **Health Summary** is shown by default. A graphical representation is given, which shows the number of hardware components that have been installed and their respective health status. The hardware components that are being monitored include the following:

- Processor (CPU)
- Memory
- Local Storage
- PCI Adapters
- Power Supply
- Fan
- System Board
- Others

![Health Summary Diagram]

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If any of the hardware components is not operating normally, it will be marked by a critical or warning icon. A critical condition is indicated by a red circle icon, while a warning condition is indicated by a yellow triangle icon. By hovering the mouse icon over the critical or warning sign, up to three currently active events for that component will be shown.

To view the other events, click the Active System Events tab. A window will appear showing the events that are currently active in the system. Click View all event logs to view the entire event history.

If the hardware component is marked by a green check mark, it is operating normally, and there are no active events.

The text underneath the hardware component states the number of components installed. If you click the text, you will be directed to the Inventory page.

---

**Viewing the System Information**

This topic explains how to obtain a summary of common server information.

The System Information and Settings pane located to the left of the home page provides a summary of common server information, which includes the following:

- Machine name, power and operating system state
- Machine Type-Model
- Serial number
- System name
- Front USB ownership
- BMC license
- BMC IP address
- BMC host name
- UEFI version
- BMC version
- LXPM version
- Location

The server can be in one of the system states listed in the following table.

Table 5. System state descriptions

Two column table with headers documenting the system states of the server.
Table 5. System state descriptions (continued)

<table>
<thead>
<tr>
<th>State</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>System power off/State unknown</td>
<td>The server is powered off.</td>
</tr>
<tr>
<td>System on/starting UEFI</td>
<td>The server is powered on; but, UEFI is not running.</td>
</tr>
<tr>
<td>System running in UEFI</td>
<td>The server is powered on and UEFI is running.</td>
</tr>
<tr>
<td>System stopped in UEFI</td>
<td>The server is powered on; UEFI has detected a problem and has stopped running.</td>
</tr>
</tbody>
</table>
| Booting operating system or in unsupported operating system | The server might be in this state for one of the following reasons:  
  - The operating system loader has started; but, the operating system is not running  
  - The BMC Ethernet over USB interface is disabled.  
  - The operating system does not have the drivers loaded that support the Ethernet over USB interface. |
| Operating system booted                         | The server operating system is running.                                    |
| Suspend to RAM                                  | The server has been placed in standby or sleep state.                     |
| System running in memory test                   | The server is powered on and running memory diagnostic tools.             |
| System running in Setup                         | The server is powered on and the system has booted into UEFI F1 setup menu or LXPM menu. |
| System running in LXPM maintenance mode         | The server is powered on and the system has booted into the LXPM maintenance mode under which users can’t navigate through the LXPM menu. |

If you wish to change the system name, click the pencil icon. Type the system name you wish to use; then, click the green checkmark.

If you wish to change the front USB ownership, click the pencil icon and select the Front USB Ownership mode that you wish from the drop-down menu. Then, click the green checkmark.

If your server has a license other than the XClarity Controller Enterprise license, you may be able to purchase a license upgrade to enable enhanced features. To install the upgrade license after you have obtained an upgrade license, click the upward-pointing arrow icon.

To add, delete or export a license, click the rightward-pointing arrow icon.

To change the relevant settings for the BMC IP address, BMC host name, UEFI version, BMC version and location items, click the right-ward pointing arrow.

- For the IP address and host name, you will be led to the Ethernet Configuration section under Network.
- For the UEFI and BMC version items, you will be led to the Firmware Update page.
• For the location item, you will be led to the **Server Properties** section on the **Server Configuration** page.

### Viewing the System Utilization

By clicking **Utilization** in the left pane, a summary of common server utilization information is provided.

System utilization is a composite metric based on the real-time utilization of processor, memory, and I/O subsystems. The utilization data are all coming from the ME(Node manager) side, which includes the following:

- **CPU Utilization**
  - Aggregated C-State Residency
  - Measured time in C0 as a percentage of the used and max C0 residency (per second).
- **Memory Utilization**
  - Aggregated R/W volume of all Memory Channels.
  - Measured bandwidth calculated as a percentage of the used and max memory bandwidth available (per second).
- **I/O Utilization**
  - Aggregated R/W volume of Root Ports in the PCIe* Bus.
  - Measured bandwidth calculated as a percentage of the used and max I/O bandwidth available (per second).

### Viewing Event Logs

The **Event Log** provides a historical list of all hardware and management events.

Select the **Event Log** tab in **Events** to display the **Event Log** page. All events in the log are time stamped, using the XClarity Controller date and time settings. Some events also generate alerts when they occur, if they are configured to do so in **Alert Recipients**. You can sort and filter events in the event log.

The following is a description of the actions that can be performed in the **Event Log** page.

- **Customize table**: Select this action item to choose the type of information you wish to display in the table. A sequence number can be displayed to assist in determining the order of events when more than one event has the same timestamp.

  **Note**: Some sequence numbers are used by internal BMC processes, so it is normal that there may be gaps in the sequence numbers when the events are sorted by sequence number.

- **Clear logs**: Select this action item to delete the event logs.

- **Refresh**: Select this action item to update the display with any event log entries that may have occurred since the page was last displayed.
• **Type:** Select which event types to show. The event types include the following:

  - ![Error](image)
    Shows Error entries in the log

  - ![Warning](image)
    Shows Warning entries in the log

  - ![Informational](image)
    Shows Informational entries in the log

  Click each icon to turn off or on the types of errors to be displayed. Clicking the icon successively will toggle between showing and not showing the events. A blue box surrounding the icon indicates that type of event will be displayed.

• **Source type filter:** Select an item from the drop-down menu to display only the type of event log entries that you wish to be shown.

• **Time filter:** Select this action item to specify the interval of the events that you want to show.

• **Search:** To search for specific types of events or keywords, click the magnifying glass icon, and type a word to search for in the **Search** box. Note that the input is case-sensitive.

  **Note:** The maximum number of event log records is 1024. When the event logs are full, the new log entry will automatically overwrite the oldest one.

---

**Viewing Audit Logs**

The **Audit Log** provides a historical record of user actions, such as logging in to the XClarity Controller, creating a new user, and changing a user password.

You can use the audit log to track and document authentication, changes, and system actions.

Both the event log and the audit log support similar maintenance and viewing actions. To see the description of the display and filtering actions that can be performed on the Audit Log page, see “Viewing Event Logs” on page 50.

**Notes:**

- After running Lenovo’s tools on your server operating system, the Audit Log may contain records showing actions performed by a username (for example user “20luN4SB”) that you may not recognize. When some of the tools are run on the server operating system, they may create a temporary user account for accessing the XClarity Controller. The account is created with a random username and password and can only be used to access the XClarity Controller on the internal Ethernet over USB interface. The account can only be used to access the XClarity Controller CIM-XML and SFTP interfaces. The creation and removal of this temporary account is recorded in the audit log as well any actions performed by the tool with these credentials.

- The maximum number of audit log records is 1024. When the audit logs are full, the new log entry will automatically overwrite the oldest one.

---

**Viewing the Maintenance History**

The **Maintenance History** page includes information about the firmware update, configuration and hardware replacement history.
The contents of the maintenance history can be filtered to display certain types of events or certain intervals of time.

**Note:** The maximum number of maintenance history records is 250. When the maintenance history logs are full, the new log entry will automatically overwrite the oldest one.

---

**Configuring Alert Recipients**

To add and modify email and syslog notifications or SNMP TRAP recipients, use the information in this topic.

The following is a description of the actions that can be performed in the **Alert Recipients** tab.

The following actions items can be performed in the **Email/Syslog** recipients section.

- **Create:** Select this action item to create additional new Email recipients and Syslog recipients. Up to 12 Email and Syslog recipients can be configured.
  - **Create Email Recipient:** Select this action item to create an Email recipient.
    - Enter the name and email address of the recipient.
    - Select to enable or disable the event notification. If disable is selected, the account will remain configured, but no emails will be sent.
    - Select the types of events that the recipient will be notified of. If you click the drop-down next to the Critical, Attention, or System category labels you can select or deselect notifications for specific components in the category.
    - You can choose whether or not to have the event log contents included in the email alert.
    - The index specifies which of the 12 recipient slots is assigned.
    - You can configure the email server to which the events will be forwarded here or by clicking the SMTP Server action at the top of the section. See SMTP Server below for configuration details.
  - **Create Syslog Recipient:** Select this action item to create syslog recipients.
    - Enter the name and IP address or host name of the Syslog server.
    - Select to enable or disable the event notification. If disable is selected, the account will remain configured but no emails will be sent.
    - The index specifies which of the 12 recipient slots is assigned.
    - Select the types of events that will be sent to the Syslog server. If you click the drop-down menu next to the Critical, Attention, or System category labels you can select or deselect notifications for specific components in the category.

- **SMTP Server:** Select this action item to configure the relevant settings for the SMTP Email server. Only one email server can be configured. The same email configuration is used when sending alerts to all of the configured email recipients. The BMC automatically upgrades a plain text connection to an encrypted connection for mail transfer if the designated mail server supports STARTTLS.
  - Enter the host name or IP address and network port number of the Email server.
  - If the Email server requires authentication, select the **Require Authentication** check box and enter the username and password. Select the type of authentication that is required by the Email server, either a challenge-response method (**CRAM-MD5**) or simple credentials (**LOGIN**).
  - Some networks may block outgoing emails if the reverse path value is not as expected. By default, the XClarity Controller will use alertmgr@domain, where the domain is the Domain name as specified in the DDNS section of the XClarity Controller network web page. You can specify your own sender information in place of the default.
- You can test the connection to the Email server to ensure that the email settings have been configured correctly. The XClarity Controller will display a message indicating whether or not the connection is successful.

**Retry and Delay:** Select this action item to configure the relevant settings for the retry and delay options.
- The retry limit specifies the number of times that the XClarity Controller will attempt to send an alert if the initial attempt did not succeed.
- The delay between entries specifies the amount of time that the XClarity Controller will wait after sending an alert to one recipient before sending an alert to the next recipient.
- The delay between attempts specifies the amount of time that the XClarity Controller will wait after a failed attempt before retrying to send the alert.

**Protocol:** Select this action item to configure the relevant settings for connection protocol.
- You can choose between **TCP Protocol** or **UDP Protocol**, please note that this setting will apply to all syslog recipients.

If Email or Syslog Recipients have been created, they will be listed in this section.
- To edit the settings for an Email or Syslog Recipient click the pencil icon below the action header on the row next of the recipient that you wish to configure.
- To delete an Email or Syslog Recipient click the trash can icon.
- To send a test alert to an Email or Syslog Recipient, click the paper airplane icon.

The following actions can be performed in the **SNMPv3** user segment.

**Create:** Select this action item to create SNMPv3 TRAP recipients.
- Select the user account that is to be associated with the SNMPv3 TRAPs. The user account must be one of the twelve local user accounts.
- Specify the host name or IP address of the SNMPv3 manager that will receive the SNMPv3 TRAPs.
- The XClarity Controller uses the HMAC-SHA hash algorithm to authenticate with the SNMPv3 manager. This is the only algorithm supported.
- The privacy password is used with the privacy protocol to encrypt the SNMP data.
- The **SNMPv3 global setting** applies to all SNMPv3 TRAP recipients. These settings can be configured while creating an SNMPv3 TRAP recipient or by clicking the SNMPv3 Settings action at the top of the **SNMPv3** user segment.
  - Select to enable or disable SNMPv3 TRAPs. If disabled, the settings will remain configured but no SNMPv3 TRAPs will be sent.
  - The BMC Contact and Location information is required and is configured on the Server Properties web page. See “Setting Location and Contact” on page 75 for more information.
  - Select the types of events that will be cause TRAPs to be sent to the SNMPv3 manager. If you click the drop-down menu next to the Critical, Attention, or System category labels you can select or deselect notifications for specific components in the category.

**Note:** Data transfer between the SNMP client and the agent can be protected using encryption. The supported methods for **privacy protocol** are CBC-DES and AES.

If SNMPv3 TRAP recipients have been created, they will be listed in this section.
- To edit the settings for a SNMPv3 recipient, click the pencil icon below the action header on the row next of the recipient that you wish to configure.
- To delete a SNMPv3 recipient, click the trash can icon.
Capturing the latest OS failure screen data

Use the information in this topic to capture and view an operating system failure screen.

The operating system screen is automatically captured when the OS Watchdog timeout occurs. If an event occurs that causes the OS to stop running, the OS Watchdog feature is triggered and the screen contents are captured. The XClarity Controller stores only one screen capture. When the OS Watchdog timeout occurs, a new screen capture overwrites the previous screen capture. The OS Watchdog feature must be enabled to capture the OS failure screen. To set the OS Watchdog Time, see “Setting server timeouts” on page 76 for more information. The OS failure screen capture feature is available only with the XClarity Controller Advanced or Enterprise Level of functionality. See the documentation for your server for information about the level of XClarity Controller functionality that is installed in your server.

Click the Latest Failure Screen action in the Remote Console section of the XClarity Controller home page to view an image of the operating system display that was captured when the OS Watchdog timeout occurred. The capture can also be viewed by clicking Service, then Latest Failure Screen in the Quick Action section of the home page. If the system has not experienced an OS Watchdog timeout and captured the OS screen, a message indicating that the failure screen has not been created is displayed.
Chapter 5. Configuring the Server

Use the information in this chapter to understand the options available for server configurations.

When configuring the server, the following options are available:

- Adapters
- Boot options
- Power policy
- Server properties

Viewing the adapter information and configuration settings

Use the information in this topic to view information about the adapters installed in the server.

Click **Adapters** under **Server Configuration** to view information about the adapters installed in the server.

**Notes:**

- If the adapter does not support status monitoring, it will not be visible for monitoring or configuration. For inventory related information of all the installed PCI adapters, refer to the **Inventory** page.

Configuring system boot mode and order

To configure the system boot mode and order, use the information in this topic.

When you select **Boot Options** under **Server Configuration**, you can configure the system boot mode and order.

**Note:** No unauthenticated in-band method is allowed to change security related system settings. For example, Secure Boot must NOT be able to configure over unauthenticated in-band APIs from the OS or UEFI shell. This includes OneCLI running in-band and obtaining temporary credentials using IPMI, or any tools and APIs to configure Secure Boot, TPM, UEFI Setup password related settings. All security related settings must require proper authentication with sufficient privilege.

For the system boot mode, the following two options are available:

**UEFI Boot**

Select this option to configure a server that supports Unified Extensible Firmware Interface (UEFI). If you are booting UEFI-enabled operating systems, this option might shorten boot time by disabling legacy option ROMs.

**Legacy Boot**

Select this option if you are configuring a server to boot an operating system that requires legacy (BIOS) firmware. Select this option only if you are booting non-UEFI enabled operating systems.

To configure the system boot order, select a device from the list of **Available devices** and click the right arrow to add the device to the boot order. To remove a device from the boot order, select a device from the boot order list and click the left arrow to move the device back to the list of available devices. To change the boot order, select a device and click the up or down arrow to move the device up or down in priority.

When you make a change to the boot order, you must select a restart option before applying the change. The following options are available:
• **Restart server immediately**: The boot order changes are saved and the server is restarted immediately without shutting down the operating system.

• **Restart server normally**: The boot order changes are saved and the operating system is shutdown before restarting the server.

• **Manually restart later**: The boot order changes will be saved, but will not take effect until the next time the server is rebooted.

## Configuring one-time boot

To temporarily ignore the configured boot and instead boot to a specified device one time, use the information in this topic.

Click **Boot Options** under **Server Configuration** and select a device from the drop-down menu to configure the device that the system will boot to one-time on the next server restart. The following choices are available:

- **PXE network**
  
  Sets up your server to attempt a Preboot Execution Environment network boot.

- **Primary removable media**
  
  The server is booted from the default USB device.

- **Default CD/DVD**
  
  The server is booted from the default CD/DVD drive.

- **F1 system setup**
  
  The server is booted into the Lenovo XClarity Provisioning Manager.

- **Diagnostic Partition**
  
  The server is booted into the Diagnostics section of the Lenovo XClarity Provisioning Manager.

- **Default Hard Disk**
  
  The server is booted from the default disk drive.

- **Primary remote media**
  
  The server is booted from the mounted virtual media.

- **No one-time boot**
  
  The configured boot order is used. There is no one-time boot override of the configured boot order.

When you change the type of boot to be performed with the one-time boot device, you can also specify the boot to be a legacy boot or a UEFI boot. Click the **Prefer Legacy Boot** check box if you would like the boot to be a legacy BIOS boot. Uncheck the box if would like a UEFI boot. When you select a one-time change to the boot order, you must select a restart option before applying the change.

• **Restart server immediately**: The boot order change is saved and the server is restarted immediately without shutting down the operating system.

• **Restart server normally**: The boot order change is saved and the operating system is shutdown before restarting the server.

• **Manually restart later**: The boot order change is saved, but will not take effect until the next time the server is rebooted.

## Managing the server power

To view power management information and perform power management functions, use the information in this topic.
Select **Power Policy** under **Server Configuration** to view power management information and perform power management functions.

**Note:** In a chassis containing blade or high-density server nodes, the chassis cooling and power is controlled by the chassis management controller instead of the XClarity Controller.

### Configuring the power redundancy

To configure the power redundancy, use the information in this topic.

Available fields in the Power Redundancy section include the following:

- **Redundant (N+N):** In this mode, the server will remain operational in the event of a loss of one power supply.
  - **Zero Output Mode:** Once enabled under Redundant configuration, some PSUs will automatically enter into standby state under light load conditions. In this manner, the remaining PSU delivers the entire power load to increase efficiency.
- **Redundant (N+1):** In this mode, the server will remain operational in the event of a loss of one power supply when four power supplies are installed.
- **Non-redundant mode:** In this mode, the server is not guaranteed to remain operational if a power supply is lost. The server will throttle if a power supply fails in an attempt to remain running.

Click **Apply** after making the configuration changes.

### Configuring the power capping policy

To configure the power capping policy, use the information in this topic.

You can choose to enable or disable the power capping function. If power capping is enabled, a selection can be made to limit the amount of power used by the server. If power capping is disabled, the maximum power used by the server is determined by the Power Redundancy policy. To change the setting, first click **Reset**. Choose your preferred setting; then, click **Apply**.

Power capping can be enabled using AC power consumption measurements or DC power consumption measurements. From the drop-down menu, select the type of measurements that will be used to determine the power capping limit. When switching between AC and DC, the number on the slider will change accordingly.

There are two ways to change the power capping value:

- **Method 1:** Move the slider mark to the desired wattage to set the overall server power limit.
- **Method 2:** Input the value in the input box. The slider mark will automatically move to the corresponding position.

Click **Apply** after making the configuration changes.

**Note:** The **Power Policies** option is not available when the XClarity Controller is in a chassis containing blade or high-density server nodes. The power policy is controlled by the chassis management controller instead of the XClarity Controller.

### Configuring the power restore policy

To configure how the server reacts when the power is restored after a power loss, use the information in this topic.
When configuring the power restore policy, the following three options are available:

**Always Off**
The server will remain powered off even when power is restored.

**Restore**
The server will automatically be powered on when power is restored if the server was powered on at the time that the power failure occurred. Otherwise, the server power will remain off when power is restored.

**Always On**
The server will automatically power on when power is restored.

Click **Apply** after making the configuration changes.

**Note:** The **Power Restore Policies** option is not available in a chassis containing blade or high-density server nodes. The power restore policy is controlled by the chassis management controller instead of the XClarity Controller.

### Power actions

See the information in this topic to understand the power actions that can be made to the server.

Click **Power Action** in the **Quick Action** section of the XClarity Controller homepage.

The following table contains a description of the power and restart actions that can be performed on the server.

*Table 6. Power actions and descriptions*

<table>
<thead>
<tr>
<th>Power Action</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Power on server</td>
<td>Select this action item to power on the server and boot the operating system.</td>
</tr>
<tr>
<td>Power off server normally</td>
<td>Select this action item to shut down the operating system and power off the server.</td>
</tr>
<tr>
<td>Power off server immediately</td>
<td>Select this action item to power off the server without first shutting down the operating system.</td>
</tr>
<tr>
<td>Restart server normally</td>
<td>Select this action item to shut down the operating system and power cycle the server.</td>
</tr>
<tr>
<td>Restart server immediately</td>
<td>Select this action item to power cycle the server immediately without first shutting down the operating system.</td>
</tr>
<tr>
<td>Boot server to system setup</td>
<td>Select this item to power on or reboot the server and automatically boot into system setup without needing to press F1 during boot.</td>
</tr>
<tr>
<td>Trigger non-maskable interrupt (NMI)</td>
<td>Select this action item to force a Non-maskable Interrupt (NMI) on a “hung” system. Selection of this action item allows the platform operating system to perform a memory dump that can be used for debug purposes of the system hang condition. The auto reboot on NMI setting from the F1 system setup menu determines whether or not the XClarity Controller will reboot the server after the NMI.</td>
</tr>
</tbody>
</table>
Table 6. Power actions and descriptions (continued)

<table>
<thead>
<tr>
<th>Power Action</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Schedule power actions</td>
<td>Select this action item to schedule daily and weekly power and restart actions for the server.</td>
</tr>
<tr>
<td>Restart management controller</td>
<td>Select this action item to restart the XClarity Controller</td>
</tr>
<tr>
<td>AC Power Cycle Server</td>
<td>Select this action to power cycle the server.</td>
</tr>
</tbody>
</table>

**Note:** If the operating system is in the screen saver or locked mode when a shutdown of the operating system is attempted, the XClarity Controller might not be able to initiate a normal shutdown. The XClarity Controller will perform a hard reset or shutdown after the power off delay interval expires, while the operating system might still be running.

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## Managing and monitoring power consumption with IPMI commands

Use the information in this topic to manage and monitor power consumption using IPMI commands.

This topic describes how the Intel Intelligent Power Node Manager and the Data Center Manageability Interface (DCMI) can be used to provide power and thermal monitoring and policy-based power management for a server using Intelligent Platform Management Interface (IPMI) power management commands.

For servers using Intel Node Manager SPS 3.0, XClarity Controller users can use IPMI power management commands provided by Intel’s Management Engine (ME) to control the Node Manager features and to monitor server power consumption. Server power management can also be accomplished using DCMI power management commands. Example Node Manager and DCMI power management commands are provided in this topic.

### Managing the server power using Node Manager commands

Use the information in this topic to manage the server power using the Node Manager.

The Intel Node Manager firmware does not have an external interface; therefore, the Node Manager commands must first be received by the XClarity Controller and then sent to the Intel Node Manager. The XClarity Controller functions as a relay and a transport device for the IPMI commands using standard IPMI bridging.

**Note:** Changing Node manager policies using Node Manager IPMI commands might create conflicts with the XClarity Controller power management functionality. By default, bridging of the Node Manager commands is disabled to prevent any conflict.

For users who want to manage the server power using the Node Manager instead of the XClarity Controller, an OEM IPMI command consisting of (network function: 0x3A) and (command: 0xC7) is available for use.

To enable native Node Manager IPMI commands type: `ipmitool -H <$XClarity_Controller_IP> -U <USERID> -P <PASSW0RD> raw 0x3a 0xc7 0x01`

To disable native Node Manager IPMI commands type: `ipmitool -H <$XClarity_Controller_IP> -U <USERID> -P <PASSW0RD> raw 0x3a 0xc7 0x00`

The following information are examples of Node Manager power management commands.

**Notes:**
- By specifying IPMI channel 0 and a target address of 0x2c, you can use the IPMITOOL to send commands to the Intel Node Manager for processing. A request message is used to initiate an action and a response message is returned to the requester.
• Commands are displayed in the following format due to space limitations.

Power monitoring using the Get Global System Power Statistics, (command code 0xC8): Request:
ipmitool -H <$XClarity_Controller_IP> -U <USERID> -P <PASSW0RD> -b 0x00 -t 0x2c raw 0xE 0xC8 0x57 0x01 0x00 0x01 0x00 0x00 Response:57 01 00 38 00 04 00 41 00 39 00 ec 56 17 53 5a 86 00 00 50

Power capping using the Set Intel Node Manager Policy, (command code 0xC1): Request:
ipmitool -H <$XClarity_Controller_IP> -U <USERID> -P <PASSW0RD> -b 0x00 -t 0x2c raw 0x2e 0xC1 0x57 0x01 0x00 0x10 0x01 0xA0 0x00 0x00 0x00 0x60 0xea 0x00 0x00 0x00 0x00 0x1e 0x00 Response:57 01 00

Power savings using the Set Intel Node Manager Policy, (command code 0xC1): Request:
ipmitool -H <$XClarity_Controller_IP> -U <USERID> -P <PASSW0RD> -b 0x00 -t 0x2c raw 0x2e 0xC1 0x57 0x01 0x00 0x10 0x01 0x00 0x00 0x00 0x00 0x60 0xea 0x00 0x00 0x00 0x00 0x1e 0x00 Response:57 01 00

Get device ID function using the Get Intel Management Engine Device ID: Request:
ipmitool -H <$XClarity_Controller_IP> -U <USERID> -P <PASSW0RD> raw 0x06 0x01 Response:50 01 03 05 02 15 71 01 00 05 0b 03 40 20 01


Managing the server power using DCMI commands
Use the information in this topic to manage the server power using DCMI commands.

The DCMI provides monitoring and control functions that can be exposed through standard management software interfaces. Server power management functions can also be accomplished using DCMI commands.

The following information are examples of commonly used DCMI power management functions and commands. A request message is used to initiate an action and a response message is returned to the requester.

Note: Commands are displayed in the following formats due to space limitations.

Get Power Reading: Request: ipmitool -H <$XClarity_Controller_IP> -U <USERID> -P <PASSW0RD> raw 0x2c 0x02 0xdc 0x01 0x00 0x00 Response: dc 39 00 38 00 03 b0 03 00 e3 6f 0a 39 e8 03 00 00 40

Set Power Limit: Request: ipmitool -H <$XClarity_Controller_IP> -U <USERID> -P <PASSW0RD> raw 0x2c 0x04 0xdc 0x00 0x00 0x00 0x00 0xA0 0x00 0xe8 0x03 0x00 0x00 0x00 0x00 0xe8 0x03 Response: dc

Get Power Cap: Request: ipmitool -H <$XClarity_Controller_IP> -U <USERID> -P <PASSW0RD> raw 0x2c 0x03 0xdc 0x00 0x00 Response: dc 00 00 00 a0 00 e8 03 00 00 00 00 01 00

Activate the Power Limit: Request: ipmitool -H <$XClarity_Controller_IP> -U <USERID> -P <PASSW0RD> raw 0x2c 0x05 0xdc 0x01 0x00 0x00 Response: dc

Deactivate the Power Limit: Request: ipmitool -H <$XClarity_Controller_IP> -U <USERID> -P <PASSW0RD> raw 0x2c 0x05 0xdc 0x00 0x00 0x00 0x00 Response: dc

Note: On some servers, the Exception Actions for the Set Power Limit command might not be supported. For example, the Hard Power Off system and log events to SEL parameter might not be supported.

For the complete list of commands that are supported by the DCMI specification, see the latest release of the Data Center Manageability Interface Specification at https://www.intel.com/content/dam/www/public/us/en/documents/technical-specifications/dcmi-v1-5-rev-spec.pdf.
Remote Console Functionality

Use the information in this topic to understand how to remotely view and interact with the server console.

You can use the remote console functionality in the XClarity Controller web interface to view and interact with the server console. You can assign a disk image (ISO or IMG file) as a virtual drive on the server. The remote console functionality is available with the XClarity Controller Advanced and XClarity Controller Enterprise features and is only available through the web interface. You must log in to the XClarity Controller with a user ID that has Supervisor access or Remote Console Access privileges to use the remote console features. For more information about upgrading from XClarity Controller Standard to XClarity Controller Advanced or XClarity Controller Enterprise, see “Upgrading XClarity Controller” on page 6.

Use the remote console features to do the following:

- Remotely view video with graphic resolution up to 1280 x 1024 at 72 or 75Hz, regardless of the server state.
- Remotely access the server using the keyboard and mouse from a remote client.
- Mount ISO and IMG files that are located on your local system or on a remote system as virtual drives that are available for use by the server.
- Upload an IMG or ISO image to the XClarity Controller memory and mount it to the server as a virtual drive. Up to two files with a maximum total size of 50 MB may be uploaded into the XClarity Controller memory.

Notes:

- When the remote console feature is started in multi-user mode, (the XClarity Controller with the XClarity Controller Enterprise feature set supports up to six simultaneous sessions), the remote disk feature can be exercised by only one session at a time.
- The remote console is able to display only the video that is generated by the video controller on the system board. If a separate video controller adapter is installed and is used in place of the system’s video controller, the XClarity Controller remote console cannot display the video content from the added adapter.
- If you have firewalls in your network, a network port must be opened to support the remote console feature. To view or change the network port number used by the remote console feature, see “Service Enablement and Port Assignment” on page 33.
- The remote console feature uses HTML5 for displaying the server video on web pages. To use this feature your browser must support displaying video content using HTML5 elements.
- If you are using self-signed certificates and an IPv6 address to access the BMC with the Internet Explorer browser, the remote console session may fail to start due to a certificate error. To avoid this issue, the self-signed certificate can be added to the Internet Explorer Trust Root certificate Authorities:
  - Select Security under BMC Configuration and download the self-signed certificate.
  - Change certificate file extension to *.crt and double-click the Web certificate file.
  - Clear IE11 browser cache.
  - Click Install Certificate to install the certificate to the Certificate Store by following the Certificate Import Wizard steps.

Enabling the remote console functionality

This topic provides information about the remote console functionality.
As mentioned earlier, the XClarity Controller remote console functionality is available only in the XClarity Controller Advanced and XClarity Controller Enterprise features. If you do not have the privilege to operate the remote console, you will see a lock icon.

After you have purchased and obtained the activation key for the XClarity Controller Advanced upgrade, install it using the instructions under “Installing an activation key” on page 85.

To use the remote console functionality, complete the following steps:

1. Click the image with a white diagonally pointing arrow in the Remote Console section of the XClarity Controller homepage or the Remote Console web page.
2. Select one of the following modes:
   - Start remote console in single-user mode
   - Start remote console in multiuser mode

   **Note:** The XClarity Controller with XClarity Controller Enterprise feature set supports up to six simultaneous video sessions in the multiuser mode.

3. Select whether or not to allow others to request to send a disconnection request to a remote console user when someone wishes to use the remote console feature and the feature is already in use in Single User Mode, or when the maximum number of users are using the remote console feature in Multi User Mode. The **No response time interval** specifies how long the XClarity Controller will wait before automatically disconnecting the user if no response is received to the disconnection request.

4. Select whether or not to allow record the latest three server boot videos.

5. Click **Launch Remote Console** to open the remote console page in another tab. When all possible remote console sessions are in use, a dialog box will pop up. From this dialog box, the user can send a disconnection request to a remote console user who has enabled the setting to **Allow others to request my remote session disconnect**. The user can accept or deny the request to disconnect. If the user does not respond within the interval specified by the **No response time interval** setting, the user session will automatically be ended by the XClarity Controller.

**Remote power control**

This topic explains how to send server power and restart commands from the remote console window.

You can send server power and restart commands from the remote console window without returning to the main web page. To control the server power with the remote console, click **Power** and select one of the following commands:

**Power On Server**

Select this action item to power on the server and boot the operating system.

**Power Off Server Normally**

Select this action item to shut down the operating system and power off the server.

**Power Off Server Immediately**

Select this action item to power off the server without first shutting down the operating system.

**Restart Server Normally**

Select this action item to shut down the operating system and power cycle the server.

**Restart Server Immediately**

Select this action item to power cycle the server immediately without first shutting down the operating system.

**Boot Server to System Setup**
Select this item to power on or reboot the server and automatically boot into system setup without needing to press F1 during boot.

**Remote console capture screen**

Use the information in this topic to understand how to use the remote console screen capture feature.

The screen capture feature in the remote console window captures the video display contents of the server. To capture and save a screen image, complete the following steps:

Step 1. In the remote console window, click **Capture Screen**.

Step 2. In the pop-up window, click **Save File** and press **OK**. The file will be named rpviewer.png and will be saved to your default download folder.

**Note:** The screen capture image is saved as a PNG file type.

**Remote console keyboard support**

In the remote console window under **Keyboard**, the following option items are provided:

- Click **Virtual Keyboard** to launch the virtual keyboard. This feature is useful if you are using a tablet device that does not have a physical keyboard. The following options can be used to create macros and key combinations that can be sent to the server. The operating system on the client system that you are using may trap certain key combinations (for example Ctrl+Alt+Del) instead of transmitting them to the server. Other keys, such as F1 or Esc, may be intercepted by the program or browser that you are using. Macros provides a mechanism to send keystrokes to the server that the user might not be able to send.
- Click **Server Macros** to use server defined macros. Some server macros are predefined by the XClarity Controller firmware. Other server defined macros can be defined using Lenovo XClarity Essentials and downloaded from the XClarity Controller. These macros are defined for all users of the remote console feature.
- Click **Configure** to add or remove user defined macros. The user defined macros are defined only for the current remote console user. Other remote console users will not see each other’s user defined macros.
  - Click the Add Macros icon and press the key sequences that you desire; then, click **Add** to add a new macro.
  - To remove a user defined macro, select the macro from the list and click the trash can icon.
  - To send a user defined macro to the server select the **User Defined Macros** option, and click on the macro that you want to send.

**Remote console mouse support**

Use this information to understand the options for remote mouse control.

The remote console window offers several options for mouse control, including absolute mouse control, relative mouse control (no acceleration), and mouse control (RHEL, older Linux).

**Absolute and relative mouse control**

Use this information to access the absolute and relative options for controlling the mouse.

To access the absolute and relative options for controlling the mouse, complete the following steps:

Step 1. In the remote console window, click **Mouse**.

Step 2. Click **Mouse Settings** from the drop-down menu.
Step 3. Select one of the following Mouse Acceleration modes:

**Absolute Positioning (Windows, Newer Linux & Mac OS X)**
The client sends mouse location messages to the server that are relative to the origin (upper left area) of the viewing area.

**Relative Positioning, no acceleration**
The client sends the mouse location as an offset from the previous mouse position.

**Relative Positioning (older Linux)**
This mode applies an acceleration factor to align the mouse better on some Linux targets. The acceleration settings have been selected to maximize compatibility with older Linux distributions.

### Screen Video Record/Replay

Use the information in this topic to record or replay remote presence screen videos.

The XClarity Controller web interface provides a DVR-like feature to support recording and playback remote presence screen videos. This function only supports video recording to a network folder. Currently, NFS and CIFS protocols are supported. Below are the steps in using the record and replay function.

1. On the remote console web page, click **Screen Recording** to open the settings window.
2. In the settings window, the following information may need to be specified.
   - If the “CIFS” mount type is selected, specify the **Remote Folder**, **User Name**, and **Password** parameters. The format for the CIFS remote folder is “//<remote IP address>/<folder name>”. For example: //xxx.xxx.xxx.xxx/folder.
   - If the “NFS” mount type is selected, specify the **Remote Folder** parameter. The format for the NFS remote folder is “<remote IP address>:<folder name>”. For example: xxx.xxx.xxx.xxx:/folder.
   - Specify the video file name if necessary. If a file name has already been provided, an error message box will shown. To overwrite the existing file name, choose “Overwrite File Name”. If the “Auto” box is ticked, the video file name will be automatically generated.
   - “Max File Size” denotes the maximum video file size before the video recording will automatically stop.
   - “Max Recording Duration” denotes the maximum video recording duration before the recording will automatically stop.
3. Click **Start Recording** to start the video recording.
4. Click **Stop Recording** to stop the video recording. A popup window saying “Video Recording Completed” will appear, showing relevant video recording information.
5. Download the recorded videos from NFS or CIFS to your local folder. In the Remote Console Preview section of the XClarity Controller homepage, click **Recorded Videos** and select the video file to replay.

### Remote console screen modes

Use the information in this topic to configure the remote console screen modes.

To configure the remote console screen modes, click **Screen Mode**.

The following menu options are available:

**Full Screen**
This mode fills the client desktop with the video display. Pressing the Esc key in this mode will exit full screen mode. Because the remote console menu is not visible in full screen mode, you will have to exit...
full screen mode to use any of the features provided by the remote console menu such as the keyboard macros.

**Fit Screen**
This is the default setting when the remote console is launched. In this setting, the target desktop is completely displayed without scroll bars. The aspect ratio is maintained.

**Scaling Screen**
With scaling enabled, the video image is sized so that the complete image is scaled to fill the console window.

**Origin Screen**
The video image has the same dimensions as the server end. Scroll bars are displayed if needed to allow viewing of video image areas that do not fit within the window.

**Color Mode**
Adjusts the color depth of the remote console window. There are two color-mode choices:
- Color: 7, 9, 12, 15, and 23 bit
- Grayscale: 16, 32, 64, and 128 shades

**Note:** Color mode adjustments are usually made if your connection to the remote server has limited bandwidth and you wish to reduce the bandwidth demand.

**Media mount methods**
Use the information in this topic to understand how to perform media mounts.

Three mechanisms are provided to mount ISO and IMG files as virtual drives.
- Virtual drives can be added to the server from the remote console session by clicking Media.
- Directly from the remote console web page, without establishing a remote console session.
- Standalone tool

Users need Remote Console and Remote Disk Access privileges to use the virtual media features.

Files can be mounted as virtual media from your local system or from a remote server, and can be accessed over the network or uploaded into the XClarity Controller memory using the RDOC feature. These mechanisms are described below.

- Local media are ISO or IMG files that are located on the system that you are using to access the XClarity Controller. This mechanism is only available through the remote console session, not directly from the remote console web page and is only available with the XClarity Controller Enterprise features. To mount local media, click Activate in the Mount Local Media section. Up to four files can be concurrently mounted to the server.

**Notes:**
- When using the Google Chrome browser, an additional mounting option called Mount files/folders is available to let you drag and drop the file(s)/folder.
- If multiple concurrent remote console sessions are in progress with an XClarity Controller, this feature can be activated only by one of the sessions.

- Files that are located on a remote system can also be mounted as virtual media. Up to four files can be concurrently mounted as virtual drives. The XClarity Controller supports the following file sharing protocols:
  - CIFS - Common Internet File System:
- Enter the URL that locates the file on the remote system.
- If you want the file to be presented to the server as read-only virtual media, tick the check box.
- Enter the credentials that are needed for the XClarity Controller to access the file on the remote system.

**Note:** The XClarity Controller does not support spaces in the user name, password, or URL. Make sure that the CIFS server does not have login credentials configured with a space in the user name or password and that the URL does not contain a space.
- Mount options are optional and defined by the CIFS protocol.
- If the remote server belongs to a collection of servers, where the security is centrally handled, enter the domain name to which the remote server belongs.

**NFS - Network File System:**
- Enter the URL that locates the file on the remote system.
- If you want the file to be presented to the server as read-only virtual media, tick the checkbox.
- Mount options are optional and defined by the NFS protocol. Both NFSv3 and NFSv4 are supported. For example, to use NFSv3, you need to specify option ‘nfsvers=3’. If the NFS server uses AUTH_SYS security flavor to authenticate NFS operations, you need to specify option ‘sec=sys’.

**HTTPFS – HTTP Fuse-based File System:**
- Enter the URL that locates the file on the remote system.
- If you want the file to be presented to the server as read-only virtual media, tick the check box.

**Note:** Errors may occur during the mounting process for security certificates generated by Microsoft IIS. If this occurs, see “Media mount error issues” on page 73.

Click Mount all remote media to mount the file as virtual media. To remove virtual media, click the trash can icon to the right of the mounted media.

- Up to two files can be uploaded in the XClarity Controller memory and mounted as virtual media using the XClarity Controller RDOC feature. The total size for both files must not exceed 50 MB. These files will remain in the XClarity Controller memory until they are removed, even if the remote console session has ended. The RDOC feature supports the following mechanisms when uploading the files:

**CIFS - Common Internet File System:** See the description above for details.

**Example:**

To mount an ISO file named account_backup.iso that is located on the backup_2016 directory of a CIFS server at the 192.168.0.100 IP address as a read-only virtual drive on the server, you would fill in the fields as shown in the figure below. In this example, the server located at 192.168.0.100 is a member of a collection of servers under the domain “accounting”. The domain name is optional. If your CIFS server is not part of a domain, leave the Domain field blank. The CIFS “nocase” mount option is specified in the Mount Options field in this example indicating to the CIFS server that the uppercase/lowercase checking of the file name should be ignored. The Mount Options field is optional. The information entered by the user in this field is not used by the BMC and is simply passed on to the CIFS server when the mount request is made. Refer to the documentation for your CIFS server implementation to determine which options are supported by your CIFS server.
The BMC provides guidance when specifying the URL. If the URL being entered is not valid, the mount button will be greyed out and red text will be displayed under the URL field showing the expected format for the URL.

- **NFS - Network File System**: See the description above for details.

  **Example:**

  To mount an ISO file named US_team.iso that is located on the “personnel” directory of an NFS server at the 10.243.28.77 IP address as a read-only virtual drive on the server, you would fill in the fields as shown in the figure below. The NFS “port=2049” mount option specifies that network port 2049 should be used to transfer the data. The **Mount Options** field is optional. The information entered by the user in this field is passed on to the NFS server when the mount request is made. Refer to the documentation for your NFS server implementation to determine which options are supported by your NFS server.

The BMC provides guidance when specifying the URL. If the URL being entered is not valid, the mount button will be greyed out and red text will be displayed under the URL field showing the expected format for the URL.

- **HTTPS – Hypertext Transfer Protocol Secure:**
  - Enter the URL that locates the file on the remote system.
  - If you want the file to be presented to the server as read-only virtual media, tick the check box.
– Enter the credentials that are needed for the XClarity Controller to access the file on the remote system.

**Notes:**

– Errors may occur during the mounting process for security certificates generated by Microsoft IIS. If this occurs, see “Media mount error issues” on page 73.

– The XClarity Controller does not support spaces in the user name, password, or URL. Make sure that the CIFS server does not have login credentials configured with a space in the user name or password and that the URL does not contain a space. **Example:**

To mount an ISO file named EthernetDrivers.ISO that is located on the “newdrivers” directory of a HTTPS server with the domain name “mycompany.com” using network port 8080 as a read-only virtual drive on the server, you would fill in the fields as shown in the figure below.

The BMC provides guidance when specifying the URL. If the URL being entered is not valid, the mount button will be greyed out and red text will be displayed under the URL field showing the expected format for the URL.

*Example URL:* `https://ipaddress[:port]/path/to/file or HTTPS://domain-name[/port]/path/to/file. The domain-name can be alphanumeric characters, ",", "," or ",".

It must contain at least two domain items. The port number is optional.

– **SFTP – SSH File Transfer Protocol**

  – Enter the URL that locates the file on the remote system.
  
  – If you want the file to be presented to the server as read-only virtual media, tick the checkbox.

  – Enter the credentials that are needed for the XClarity Controller to access the file on the remote system.

**Notes:**

– The XClarity Controller does not support spaces in the user name, password, or URL. Make sure that the CIFS server does not have login credentials configured with a space in the user name or password and that the URL does not contain a space.

– When the XClarity Controller connects to a HTTPS server, a pop-up window will appear showing information of the security certificate used by the HTTPS sever. The XClarity Controller is unable to verify the authentic of the security certificate.

– **LOCAL - Common Internet File System:**

  – Browse your system for the ISO or IMG file that you want to mount.
  
  – If you want the file to be presented to the server as read-only virtual media, check the check box.

Click **Mount all RDOC files** to mount the file as virtual media. To remove the virtual media, click the trash can icon to the right of the mounted media.

**Standalone tool**
For users that require mounting of the devices or images (.iso / .img) using the XClarity Controller, users can use the rdmount standalone code part of the OneCLI package. Specifically, rdmount will open a connection to XClarity Controller and will mount the device or images to the host.

rdmount has the following syntax:

```
rdmount -s ip_address -d <iso or device path> -l <userid> -p <password> -w port (443)
```

Example to mount an iso file:

```
$ sudo ./rdmount -s 10.243.11.212 -d /home/user/temp/SLE-15-Installer-DVD-x86_64-RC2-DVD1.iso -l userid -p password -w 443
```

**Remote disk using Java client**

This sections describe how to mount local media using Java client.

you can use Java client to assign to the server a CD or DVD drive, a diskette drive, USB flash drive that is on your computer, or you can specify a disk image on your computer for the server to use. You can use the drive for functions such as restarting (booting) the server, updating code, installing new software on the server, and installing or updating the operating system on the server. You can access the remote disk. Drives and disk images are displayed as USB drives on the server.

**Notes:** The Remote Console Java supports one of the following Java environment, and it can be opened only if the HTML5 client is not running.

1. Oracle Java Runtime Environment 1.8/Java SE 8 or newer versions
2. OpenJDK 8. Distribution of AdoptOpenJDK with HotSpot JVM is supported.

If you use AdoptOpenJDK, you must use [https://openwebstart.com/](https://openwebstart.com/) under OSX, Windows, and Linux.

**Creating an image file**

To create a new image file from a specified source folder, complete the following steps:

1. Click the **Create Image** option under the **Virtual Media** tab in the Virtual Media Java Client window. The Create Image from Folder window is displayed.
2. Click the **Browse** button associated with the **Source Folder** field to select the specific source folder.
3. Click the **Browse** button associated with the **New Image File** field to select the image file to use.
4. Click the **Create Image** button.
Selecting devices to mount

To mount local image, folder and CD/DVD/USB drive, complete the following steps:

Click the **Select Devices to Mount** option under the **Virtual Media** tab in the Virtual Media Java Client window. The Select Devices to Mount window is displayed.

You can mount local image, folder and CD/DVD/USB drive by performing the following steps:

- **Mount Local Image:**
  1. Click the **Add Image** button to select the image you want to mount.
  2. Check the **Mapped** option.
3. Check the **Read Only** option to enable the function if needed.

4. Click the **Mount Selected** button and you can mount the local image successfully.

![Figure 3. Mount Local Image](image)

- **Mount Local Folder:**
  1. Click the **Map Folder** button to select the local folder you want to mount.
  2. Click the **Mount Selected** button and you can mount the local folder successfully.
Mount CD/DVD or USB Drive:

1. Click the **Scan Drives** button to detect plugged CD/DVD or USB Drive.
2. Check the **Mapped** option.
3. Check the **Read Only** option to enable the function if needed.
4. Click the **Mount Selected** button and you can mount the local image successfully.
The Select Devices to Mount window contains a list of the current local devices that are available for mounting. This window contains the following fields and buttons:

- The **Mapped** field contains the check box that allows you to select the devices to mount or map.
- The **Read Only** field contains the check box that allows you to select the mapped or mounted devices that will be *read-only* on the host server.
- The **Drive** field contains the device path on the local machine.
- Click the **Close** button to close the Select Devices to Mount window.
- Click the **Add Image** button to browse for the diskette image and ISO image file in your local file system that you want to add to the list of devices.
- Click the **Remove Image** button to remove an image that has been added to the list of devices.
- Click the **Mount Selected** button to mount or map all devices that are checked for mounting or mapping in the **Mapped** field.

**Note:** The folder will be mounted as read-only.

- Click the **Scan Drives** button to refresh the list of local devices.

**Selecting devices to unmount**

To unmount the host server devices, complete the following steps:

1. Click the **Unmount All** option under the **Virtual Media** tab in the Virtual Media Java Client window.
2. After selecting the **Unmount All** option you are presented with an Unmount All confirmation window. If you accept, all host server devices on the server are unmounted.

**Note:** You cannot unmount drives individually.

![Virtual Media Java Client screenshot](image)

**Figure 6. Unmount All**

**Media mount error issues**

Use the information in this topic to troubleshoot media mount error issues.
When using security certificates generated by Microsoft IIS, you may encounter errors during the mounting process. If this occurs, replace the security certificate with a new one generated by openssl. Specifically, the newly generated pfx file is loaded into the Microsoft IIS server.

Below is an example showing how the new security certificate is generated via openssl in the Linux operating system.

```
$ openssl
OpenSSL>

$ openssl genrsa 1024 > server.key
Generating RSA private key, 1024 bit long modulus
...........................................++++++
.......................................................++++++
e is 65537 (0x10001)

$ openssl req -new -key server.key > server.csr
You are about to be asked to enter information that will be incorporated into your certificate request.
What you are about to enter is what is called a Distinguished Name or a DN.
There are quite a few fields but you can leave some blank
For some fields there will be a default value,
If you enter '.', the field will be left blank.
-----
Country Name (2 letter code) [AU]:CN
State or Province Name (full name) [Some-State]:BJ
Locality Name (eg, city) []:HD
Organization Name (eg, company) [Internet Widgits Pty Ltd]:Lenovo
Organizational Unit Name (eg, section) []:Lenovo
Common Name (e.g. server FQDN or YOUR name) []:10.245.18.66
Email Address []:test@test.com

Please enter the following 'extra' attributes to be sent with your certificate request
A challenge password []:
An optional company name []:LNV

$ ls
server.csr  server.key

$ openssl req -x509 -days 3650 -key server.key -in server.csr > server.crt
You are about to be asked to enter information that will be incorporated into your certificate request.
What you are about to enter is what is called a Distinguished Name or a DN.
There are quite a few fields but you can leave some blank
For some fields there will be a default value,
If you enter '.', the field will be left blank.
-----
Country Name (2 letter code) [AU]:CN
State or Province Name (full name) [Some-State]:BJ
Locality Name (eg, city) []:BJ
Organization Name (eg, company) [Internet Widgits Pty Ltd]:Lenovo
Organizational Unit Name (eg, section) []:Lenovo
Common Name (e.g. server FQDN or YOUR name) []:10.245.18.66
Email Address []:test@test.com

$ ls
server.crt  server.csr  server.key

$ openssl pkcs12 -export -out server.pfx -inkey server.key -in server.crt
Enter Export Password:
Verifying - Enter Export Password:

$ ls
server.crt  server.csr  server.key  server.pfx
```
Exiting the remote console session
This topic explains how to end your remote console session.

To exit your remote console session, close the remote console and the virtual media session windows.

Downloading service data
Use the information in this topic to collect service information about your server. This process is normally only done at the request of service personnel to assist in resolving a server problem.

In the XClarity Controller home page, click the Service option in the Quick Action section and select Download Service Data. Click OK to download the service data.

The process of collecting the service and support data takes a few minutes to generate the service data. The file will be saved to your default download folder. The naming convention for the service data file follows this convention: <machine type and model>_<serial number>_xcc_<date>-<time>.tgz

For example: 7X2106Z01A_2345678_xcc_170511-175656.tgz.

In addition to the tgz format, the service data can also be downloaded using the tzz format. Tzz uses a different compression algorithm and can be extracted with a utility such as “lzop”.

Server Properties
Use the information in this topic to change or view relevant server properties.

Setting Location and Contact
Use the information in this topic to set various parameters to help identify the system for operations and support personnel.

Select Server Properties under Server Configuration, to configure the Location and Contact information.

Contact
Allows you to specify the name and phone number of the person who should be contacted if the system experiences a problem.

Note: This field is the same as the Contact field in the SNMPv3 configuration and is required to enable SNMPv3.

Rack Name
Allows you to locate the server more easily by specifying which rack it is in.

Note: The field is optional and is not configurable in a Flex node.

Room Number
Allows you to locate the server more easily by specifying which room it is in.

Building
Allows you to locate the server more easily by specifying which building it is in.

Lowest U
Allows you to locate the server more easily by specifying the position in the rack.

Note: The field is optional and is not configurable in a Flex node.
Address
Allows you to specify the full postal address where the server is located.

Note: When the relevant information has been inputted, it will appear as a single line in the Location field in the SNMPv3 section and XClarity Controller home page.

Setting server timeouts
Use the information in this topic to set timeouts for the server.

These timeouts are used to restore operation to a server that has hung.

Select Server Properties under Server Configuration, to configure the server timeouts. The following server timeout selections are provided:

OS Watchdog
The OS watchdog is used to monitor the operating system to ensure that it is not hung. The Ethernet over USB interface must be enabled for this feature. See “Configuring Ethernet over USB” on page 32 for details. The XClarity Controller contacts the operating system at an interval configured in the OS Watchdog Time selection. If the operating system does not respond before it is time for the next check, the XClarity Controller assumes that the operating system has hung. The XClarity Controller will capture the contents of the server display and then reboot the server in an attempt to restore operation. The XClarity Controller will reboot the server only once. If the operating system continues to hang after the reboot, instead of continually rebooting the server, the server will be left in the hung state so that the problem can be investigated and corrected. To rearm the OS watchdog, power the server off and back on. To enable the OS watchdog, select an interval from the OS Watchdog Time drop-down and click Apply. To disable the OS watchdog, select None on the OS Watchdog Time drop-down menu.

Loader Watchdog
The loader watchdog monitors the interval between the completion of POST and when the operating system begins running. The Ethernet over USB interface must be enabled for this feature. See “Configuring Ethernet over USB” on page 32 for details. When POST is completed, the XClarity Controller will capture the contents of the server display and then reboot the server in an attempt to restore operation. The XClarity Controller will reboot the server only once. If the operating system boot continues to hang after the reboot, instead of continually rebooting the server, the server will be left in the hung state so that the problem can be investigated and corrected. The loader watchdog is rearmed when server is switched off and back on or when the server successfully boots into the operating system. To enable the loader watchdog, select an interval from the Loader Watchdog drop-down and click Apply. To disable the loader watchdog select None on the Loader Watchdog drop-down.

Enable Power Off Delay
Use the Power Off Delay field to specify the number of minutes that the XClarity Controller subsystem will wait for the operating system to shutdown before forcing power off. To set the power off delay timeout value, select time interval from the drop-down and click Apply. To disable the XClarity Controller from forcing power off, select None from the drop-down selection.

Trespass message
To create a message that is displayed when a user logs in to the XClarity Controller, use the information in this topic.

Select Server Properties under Server Configuration. Use the Trespass Message option to configure a message that you want displayed to the user. When you are finished, click Apply.
The message text will be displayed in the Message area of the XClarity Controller login page when a user logs in.

Setting the XClarity Controller date and time

Use the information in this topic to understand XClarity Controller date and time settings. Instructions are provided to configure the XClarity Controller date and time. The XClarity Controller date and time is used to time stamp all events that are logged in the event log and alerts that are sent.

At the XClarity Controller home page, click the clock icon on the upper right-hand corner to view or change the XClarity Controller date and time. The XClarity Controller does not have its own real-time clock. You can configure the XClarity Controller to sync its time and date with a Network Time Protocol server or with the server’s real-time clock hardware.

Syncing with NTP

Complete the following steps to synchronize the XClarity Controller clock with the NTP server:

- Select Sync up time with NTP and specify the NTP server address.
- Additional NTP servers can be specified by clicking the “+” icon.
- Specify how frequently you want the XClarity Controller to sync with the NTP server.
- The time obtained from the NTP server is in Coordinated Universal Time (UTC) format.
  - If you want the XClarity Controller to adjust its time and date for your local region, select the time zone offset for your locale from the drop-down menu.
  - If your location observes Daylight Saving Time, tick the Automatically adjust for Daylight Saving Time (DST) checkbox.
- When your configuration changes are complete, click Apply.

Syncing with the Host

The time kept in the server’s real-time clock hardware may be in Coordinated Universal Time (UTC) format or may already have been adjusted and stored in local time format. Some operating systems store the real-time clock in UTC format while others store the time as local time. The server real-time clock does not indicate which format the time is in. Therefore when the XClarity Controller is configured to sync with the host’s real-time clock, the user can choose how the XClarity Controller uses the time and date that is obtained from the real-time clock.

- Local (example: Windows): In this mode, the XClarity Controller treats the time and date that is obtained from the real-time clock as local time with any applicable time zone and DST offsets already applied.
- UTC (example: Linux): In this mode, the XClarity Controller treats the time and date that is obtained from the real-time clock as Coordinated Universal Time, with no time zone or DST offsets already applied. In this mode, you can choose to adjust the time and date for your local region by selecting the time zone offset for your locale from the drop-down menu. If your location observes Daylight Saving Time, you can also tick the Automatically adjust for Daylight Saving Time (DST) check box.
- When your configuration changes are complete, click Apply.

Notes:

- When daylight saving occurs, any actions that were scheduled for the XClarity Controller to perform during the interval when the clock jumps forward will not be performed. For example, if the US daylight start time is 2:00 am on March 12th, and a power action is scheduled for 2:10 am on March 12th, this action will not occur. Once the time reaches 2:00 am, the XClarity Controller will instead read the time as 3:00 am.
- XClarity Controller Date and Time settings cannot be modified in a Flex System.
Chapter 6. Configuring the Storage

Use the information in this chapter to understand the options available for storage configurations.

When configuring the storage, following options are available:

- Detail
- RAID setup

RAID Detail

For using RAID detail function, use the information in this topic.

This function displays the storage devices’ physical structure and storage configuration along with details like their location, manufacturer, product name, status, capacity, interface, media, form factor and other info.

RAID Setup

To perform RAID setup functions, use the information in this topic.

Use the information in this topic to view and configure storage pools, associated virtual disks and drives for the RAID adapter. If the system is powered off, power it on in order to view the RAID information.

Viewing and configuring the virtual drives

Use the information in this topic to view and configure the virtual drives.

When you select RAID Setup under Server Configuration, the Array Configuration tab will be chosen and the existing virtual disks will be displayed by default. The logical drives are sorted by disk arrays and controllers. Detailed information about the virtual disk, such as the virtual disk strip size and bootable information is displayed.

To configure the RAID settings, click Enable Edit mode.

In edit mode, you can click the controller action menu, view the current RAID virtual disks and create new RAID virtual disks.

From the Controller Actions menu, you can perform the following actions:

Clear RAID configuration
- Clears all the configuration and data on the selected controller.

Manage foreign configuration
- Import any foreign drives that were detected. A foreign drive is a drive that was moved from a different RAID configuration to the current RAID controller

  Note: You will be notified if no foreign drives are detected.

Information of the current RAID virtual disks for a particular controller are shown as respective “virtual disk cards”. Each card displays information such as the virtual disk name, status, capacity and actions. The pencil icon allows you to edit the information, and the trash can icon enables you to delete the “virtual disk card”.

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**Note:** The capacity and RAID level cannot be changed.

If you click the virtual disk name, a virtual disk properties window will appear.

To create a new RAID virtual disk, follow the steps shown below:

**Note:** If there is no remaining storage capacity, you are unable to create a new virtual disk.

1. **Select drives or a disk array which has free storage capacity**
   a. When creating a virtual disk in a new disk array, you need to specify the RAID level. If there are not enough drives to select, and you click **Next**, an error message will appear under the RAID level field.

   For some RAID levels, span is required. There is also a minimum amount of drives that need to be present in the span.

   1) For these types of situations, the web interface will display **Span 1** by default.
   2) Select the drives and click **Add member** to add the drives to **Span 1**. When **Span 1** does not have enough drives, disable the **Add Span** link.
   3) Click **Add Span** to add **Span 2**. Select the drives and click **Add member** to add to **Span 2**.
   4) Click **Add member** to add drives to the last span. If you want to add drives to **Span 1** again, you need to click **Span 1** and select the drives to add to **Span 1**.
   5) If the number of spans reaches the maximum amount, disable **Add span**.

   b. To create virtual disks in an existing disk array, you need to select a disk array that has free capacity.

2. **Creating a virtual disk**
   a. By default, create a virtual disk that uses all the storage capacity. The **Add** icon is disabled when all of the storage is used. You can click the pencil icon to change the capacity or other properties.
   b. When you edit the first virtual disk to use only some of the storage capacity, the **Add** icon will be enabled. Click the icon to show the **Add Virtual Disk** window.
   c. If there is more than one virtual disk, the **Remove** icon will be enabled. This icon will not be shown if there is only one virtual disk. When you click the **Remove** icon, the selected row will be immediately deleted. There will be no confirmation window as the virtual disk has not been created yet.

   d. Click **Start Creating Virtual Disk** to start the process.

**Note:** When the controller is not supported, a message will appear.

**Viewing and configuring the storage inventory**

Use the information in this topic to view and configure the storage inventory.

Under the **Storage Inventory** tab, you can view and configure disk arrays, associated virtual drives and drives for the RAID controller.

- **For storage devices that support RAID configuration:**
  1. If the controller includes configured disk arrays, it will display the installed drives based on the disk array. The following describes the items that appear in the window.

     - **Table title:** Shows the disk array ID, RAID level and the total number of drives.
     - **Table content:** Lists the basic properties - drive name, RAID state, type, serial number, part number, FRU number and actions. You can go to the **Inventory** page to view all the properties that the XClarity Controller can detect.
     - **Actions:** The following shows the action items that can be performed. Some actions will not be available when the drive is in a different state.
       - **Assign hot spare:** Specifies the drive as global hot spare or a dedicated hot spare.
       - **Remove hot spare:** Removes the drive from the hot spare.
– **Make disk drive offline**: Sets the drive to offline.
– **Make disk drive online**: Sets the drive to online.
– **Make disk drive as reusable**: Sets the drive to reusable.
– **Make disk drive as missing**: Sets the drive as missing.
– **Make drive good to JBOD**: Adds drive to JBOD disk arrangement.
– **Make drive unconfigured good**: Makes the drive available to be configured into an array, or for use as an emergency hot spare.
– **Make drive unconfigured bad**: Marks the drive bad, preventing it from being used in an array or as an emergency hot spare.
– **Make disk drive as prepare for removal**: Sets the drive for removal.

2. If the controller includes drives that have not yet been configured, they will be displayed in the **Non-RAID drives** table. By clicking the **Convert JBOD to Ready to Configure** option, a window will appear showing all the drives that support this action item. You can select one or more drives to convert.

**For storage devices that do not support RAID configuration**: The XClarity Controller may not be able to detect the properties of some drives.
Chapter 7. Updating Server Firmware

To update server firmware, use information in this topic.

Overview

General Information about updating server firmware.

The Firmware Update option on the navigation panel has 4 features:

• **System Firmware**: Overview of system firmware status and version. And to perform system firmware update.
• **Adapter Firmware**: Overview of adapter firmware installed, their status and version. And to perform adapter firmware update.
• **PSU Firmware**: Overview of power supply unit firmware version. And to perform PSU firmware update.
• **Update from Repository**: Sync server firmware with remote CIFS/NFS repository for batch update.

The current status and versions of firmware for the BMC, UEFI, LXPM, LXPM drivers, and adapters are displayed, including the BMC primary and backup versions. There are four categories for the firmware status:

• **Active**: The firmware is active.
• **Inactive**: The firmware is not active.
• **Pending**: The firmware is waiting to become active.
• **N/A**: No firmware has been installed for this component.

Attention:

• Installing the wrong firmware update might cause the server to malfunction. Before you install a firmware or device-driver update, read any readme and change history files that are provided with the downloaded update. These files contain important information about the update and the procedure for installing the update, including any special procedure for updating from an early firmware or device-driver version to the latest version. As the web browser may contain XCC cache data, it is recommended to reload the web page after the XCC firmware has been upgraded.
• Some firmware updates require system restarting, which performs firmware activation or internal update. This process in system booting is called “system maintenance mode”, that does not allow user power actions temporarily. The mode is also enabled during firmware update. User shall not disconnect AC power when the system enters maintenance mode.

System, Adapter and PSU Firmware Update

Steps to update System firmware, Adapter firmware and PSU firmware.

To manually apply update for **System Firmware**, **Adapter Firmware** and **PSU Firmware**, complete the following steps:

1. Click **Update Firmware** within each feature. The Update Server Firmware window opens.
2. Click **Browse** to select the firmware update file that you want to use.
3. Navigate to the file you want to select and click **Open**. You are returned to the Update Server Firmware window with the selected file displayed.
4. Click **Next >** to begin the upload and verify process on the selected file. A progress meter will be displayed as the file is being uploaded and verified. You can view this status window to verify that the file
you selected to update is the correct file. For **System Firmware**, the status window will have information regarding the type of firmware file that is to be updated such as BMC, UEFI, or LXPM. After the firmware file is uploaded and verified successfully, click **Next** to select the device you want to update.

5. Click **Update** to begin the firmware update. A progress meter shows the progress of the update. When the firmware update is completed successfully, click **Finish**. If the update requires the XClarity Controller to be restarted in order to take effect, a warning message will be displayed. For details on how to restart the XClarity Controller, see “Power actions” on page 58.
Chapter 8. License Management

The Lenovo XClarity Controller License Management allows you to install and manage optional server and systems management features.

There are multiple levels of XClarity Controller firmware functionality and features available for your server. The level of the firmware features installed on your server vary based on hardware type.

You can upgrade the XClarity Controller functionality by purchasing and installing an activation key.

To order an activation key, contact your sales representative or business partner.

Use the XClarity Controller web interface or the XClarity Controller CLI to manually install an activation key that lets you use an optional feature you have purchased. Before activating a key:

- The activation key must be on the system that you are using to login to the XClarity Controller.
- You must have ordered the license key and received its authorization code via mail or email.

See “Installing an activation key” on page 85, “Removing an activation key” on page 86 or “Exporting an activation key” on page 86 for information about managing an activation key using the XClarity Controller web interface. See “keycfg command” on page 122 for information about managing an activation key using the XClarity Controller CLI.

To register an ID in administering your XClarity Controller license, click the following link: http://thinksystem.lenovofiles.com/help/index.jsp

Additional information about license management for Lenovo servers is available at the following Lenovo Press website:

https://lenovopress.com/redp4895-using-lenovo-features-on-demand

Attention: You cannot directly upgrade from Standard XClarity Controller to Enterprise Level functionality. You will need to first upgrade to Advanced Level before the Enterprise Level functionality can be activated.

Installing an activation key

Use the information in this topic to add an optional feature to your server.

To install an activation key, complete the following steps:

Step 1. Click License under BMC Configuration.
Step 2. Click Upgrade License.
Step 3. In the Add a new license window, click Browse; then, select the activation key file to add in the File Upload window and click Open to add the file or click Cancel to stop the installation. To finish adding the key, click OK, in the Add Activation Key window, or click Cancel to stop the installation.

The Success window indicates that the activation key is installed.

Notes:
- If the activation key is not valid, an error window will appear.

Step 4. Click OK to close the Success window.
Removing an activation key

Use the information in this topic to delete an optional feature from your server.

To remove a activation key, complete the following steps:

Step 1. Click License under BMC Configuration.
Step 2. Select the activation key to remove; then, click Delete.
Step 3. In the Confirm Activation Key Deletion window, click OK to confirm activation key deletion or click Cancel to keep the key file.
   The selected activation key is removed from the server and no longer appears in the License Management page.

Exporting an activation key

Use the information in this topic to export an optional feature from your server.

To export an activation key, complete the following steps:

Step 1. Click License under BMC Configuration.
Step 2. From the License Management page, select the activation key to export; then, click Export.
Step 3. In the Export the selected license window, click Export to confirm activation key exporting or click Cancel to cancel the key exporting request.
Step 4. Select the directory to save the file.
   The selected activation key is exported from the server.
Chapter 9. Lenovo XClarity Controller Redfish REST API

The Lenovo XClarity Controller provides a Redfish compliant set of easy-to-use REST APIs that can be used to access Lenovo XClarity Controller data and services from applications running outside of the Lenovo XClarity Controller framework.

This allows for easy integration of Lenovo XClarity Controller capabilities into other software, whether the software is running on the same system as the Lenovo XClarity Controller server, or on a remote system within the same network. These APIs are based on the industry standard Redfish REST API and are accessed via the HTTPS protocol.


Lenovo provides open source sample Redfish scripts that can be used as reference for developing software that communicates with Lenovo Redfish REST API. These sample scripts can be found here:

- Python: https://github.com/lenovo/python-redfish-lenovo
- PowerShell: https://github.com/lenovo/powershell-redfish-lenovo

DMTF specifications related to the Redfish API are available at: https://redfish.dmtf.org/. This website provides general specifications and other reference material on the Redfish REST API.
Chapter 10. Command-line interface

Use the information in this topic to enter commands that manage and monitor the XClarity Controller without having to use the XClarity Controller web interface.

Use the XClarity Controller command line interface (CLI) to access the XClarity Controller without having to use the web interface. It provides a subset of the management functions that are provided by the web interface.

You can access the CLI through a SSH session. You must be authenticated by the XClarity Controller before you can issue any CLI commands.

Accessing the command-line interface

Use the information in this topic to access the CLI.

To access the CLI, start an SSH session to the XClarity Controller IP address (see “Configuring serial-to-SSH redirection” on page 89 for more information).

Logging in to the command-line session

Use the information in this topic to log in to the command line session.

To log in to the command line, complete the following steps:

Step 1. Establish a connection with the XClarity Controller.
Step 2. At the user name prompt, type the user ID.
Step 3. At the password prompt, type the password that you use to log in to the XClarity Controller.

You are logged in to the command line. The command-line prompt is system>. The command-line session continues until you type exit at the command line. You are logged off and the session is ended.

Configuring serial-to-SSH redirection

This topic provides information about using the XClarity Controller as a serial terminal server.

Serial-to-SSH redirection enables a system administrator to use the XClarity Controller as a serial terminal server. A server serial port can be accessed from a SSH connection when serial redirection is enabled.

Note: The CLI console 1 command is used to start a serial redirection session with the COM port.

Example session

$ ssh USERID@10.240.1.12
Password:

system>

All traffic from the SSH session is routed to COM2.

ESC (
Type the exit key sequence to return to the CLI. In this example, press Esc and then type a left parenthesis. The CLI prompt displays to indicate return to the IMM CLI.

```
  system>
```

**Command syntax**

Review the guidelines in this topic to understand how to enter commands in the CLI.

Read the following guidelines before you use the commands:

- Each command has the following format:
  ```plaintext
cmd [arguments] [options]
  ```
- The command syntax is case sensitive.
- The command name is all lowercase.
- All arguments must immediately follow the command. The options immediately follow the arguments.
- Each option is always preceded by a hyphen (-). An option can be a short option (single letter) or a long option (multiple letters).
- If an option has an argument, the argument is mandatory, for example:
  ```plaintext
  ifconfig eth0 -i 192.168.70.34 -g 192.168.70.29 -s 255.255.255.0
  ```
  where `ifconfig` is the command, `eth0` is an argument, and `-i`, `-g`, and `-s` are options. In this example, all three options have arguments.
- Brackets indicate that an argument or option is optional. Brackets are not part of the command that you type.

**Features and limitations**

This topic contains information about CLI features and limitations.

The CLI has the following features and limitations:

- Multiple concurrent CLI sessions are allowed via SSH.
- One command is allowed per line (1024-character limit, including spaces).
- There is no continuation character for long commands. The only editing function is the Backspace key to erase the character that you just typed.
- The Up Arrow and Down Arrow keys can be used to browse through the last eight commands. The `history` command displays a list of the last eight commands, which you can then use as a shortcut to execute a command, as in the following example:

  ```plaintext
  system> history
  0 ifconfig eth0
  1 readlog
  2 readlog
  3 readlog
  4 history
  system> !0
  -state enabled
  -c dthens
  -i 192.168.70.125
  -g 0.0.0.0
  -s 255.255.255.0
  -n XClarity ControllerA00096B9E003A
  -r auto
  -d auto
  -m 1500
  ```
• In the CLI, the output buffer limit is 2 KB. There is no buffering. The output of an individual command cannot exceed 2048 characters. This limit does not apply in serial redirect mode (the data is buffered during serial redirect).

• Simple text messages are used to denote command execution status, as in the following example:
  system> power on
  ok
  system> power state
  Power: On
  State: System power off/State unknown
  system>

• The command syntax is case sensitive.

• There must be at least one space between an option and its argument. For example, `ifconfig eth0 -i192.168.70.133` is incorrect syntax. The correct syntax is `ifconfig eth0 -i 192.168.70.133`.

• All commands have the `-h`, `-help`, and `?` options, which give syntax help. All of the following examples will give the same result:
  system> power -h
  system> power -help
  system> power ?

• Some of the commands that are described in the following sections might not be available for your system configuration. To see a list of the commands that are supported by your configuration, use the `help` or `?` option, as shown in the following examples:
  system> help
  system> ?

• In a Flex System, some settings are managed by the CMM and cannot be modified on the XClarity Controller.

Alphabetical command listing

This topic contains a list of CLI commands in alphabetic order. Links are provided to topics for each command. Each command topic provides information about the command, its function, syntax, and usage.

The complete list of all XClarity Controller CLI commands, in alphabetical order, is as follows:

• “accseccfg command” on page 107
• “adapter command” on page 170
• “alertcfg command” on page 109
• “alertentries command” on page 153
• “asu command” on page 109
• “backup command” on page 112
• “batch command” on page 155
• “chconfig command” on page 158
• “chlog command” on page 160
• “chmanual command” on page 160
• “clearcfg command” on page 156
• “clearlog command” on page 94
• “clock command” on page 156
Utility commands

This topic provides an alphabetic list of utility CLI commands.

There are currently 3 utility commands:

**exit command**

Use this command to log off the CLI session,

Use the `exit` command to log off and end the CLI session.

**help command**

This command displays a list of all commands.

Use the `help` command to display a list of all commands with a short description for each. You can also type `?` at the command prompt.

**history command**

This command provides a list of previously issued commands.

Use the `history` command to display an indexed history list of the last eight commands that were issued. The indexes can then be used as shortcuts (preceded by !) to reissue commands from this history list.

Example:

```
system> history
```
Monitor commands

This topic provides an alphabetic list of monitor CLI commands.

There are currently 11 monitor commands:

**clearlog command**

This command is used to clear the IMM event log.

Use the `clearlog` command to clear the event log of the IMM. You must have the authority to clear event logs to use this command.

**Note:** This command is intended only for support personnel use.

The following table shows the arguments for the options.

Table 7. clearlog command

The following table is a one-row two column table consisting of the option and option descriptions.

<table>
<thead>
<tr>
<th>Option</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>`-t &lt;all</td>
<td>platform</td>
</tr>
</tbody>
</table>

Event type descriptions

- all: All event type, including platform event and audit event.
- platform: Platform event type.
- audit: Audit event type.

Example:

```
system> clearlog
All event log cleared successfully
system> clearlog -t platform
All event log cleared successfully
system> clearlog -t all
All event log cleared successfully
```
Platform event log cleared successfully
system> clearlog -t audit
Audit event log cleared successfully

**fans command**

This command is used to display the velocity of the server fans.

Use the `fans` command to display the speed for each of the server fans.

Example:

```
system> fans
fan1 75%
fan2 80%
fan3 90%
system>
```

**ffdc command**

This command is used to generate a new service data file.

Use the first failure data capture (ffdc) command to generate and transfer service data to Support.

The following list consist of commands to be used with the `ffdc` command:

- **generate**, create a new service data file
- **status**, check status of service data file
- **copy**, copy existing service data
- **delete**, delete existing service data

The following table shows the arguments for the options.

<table>
<thead>
<tr>
<th>Option</th>
<th>Description</th>
<th>Values</th>
</tr>
</thead>
<tbody>
<tr>
<td>-t</td>
<td>Type number</td>
<td>1 (processor dump) and 4 (service data). The processor dump contains all logs and files available. The service data contains only a subset of the logs and files. The default value is 1.</td>
</tr>
<tr>
<td>-f ^1</td>
<td>Remote filename or sftp target directory.</td>
<td>For sftp, use full path or trailing / on directory name (~/ or /tmp/). The default value is the system generated name.</td>
</tr>
<tr>
<td>-ip ^1</td>
<td>Address of the tftp/sftp server</td>
<td></td>
</tr>
<tr>
<td>-pn ^1</td>
<td>Port number of the tftp/sftp server</td>
<td>The default value is 69/22.</td>
</tr>
<tr>
<td>-u ^1</td>
<td>Username for the sftp server</td>
<td></td>
</tr>
<tr>
<td>-pw ^1</td>
<td>Password for the sftp server</td>
<td></td>
</tr>
</tbody>
</table>

1. Additional argument for `generate` and `copy` commands

Syntax:
ffdc [options]
option:
  -t 1 or 4
  -f
  -ip ip_address
  -pn port_number
  -u username
  -pw password

Example:
 system> ffdc generate
 Generating ffdc...
 system> ffdc status
 Type 1 ffdc: in progress
 system> ffdc copy -t 1 -ip 192.168.70.230 -u User2 -pw Passw0rd -f /tmp/
 Waiting for ffdc.....
 Copying ffdc...
 ok
 system> ffdc status
 Type 1 ffdc: completed
 8737AC1_DSY0123_xcc_120317-153327.tgz

 system> ffdc generate
 Generating ffdc...
 system> ffdc status
 Type 1 ffdc: in progress
 system> ffdc status
 Type 1 ffdc: in progress
 system> ffcc copy -t 1 -ip 192.168.70.230
 Copying ffcc...
 ok
 system> ffcc status
 Type 1 ffcc: completed
 8737AC1_DSY0123_xcc_120926-105320.tgz
 system>

hreport command

Use this command to show embedded health report.

The following table shows the hreport commands.

Table 9. hreport commands
The following table is a multi-row two column table consisting of the different hreport command descriptions.

<table>
<thead>
<tr>
<th>Option</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>generate</td>
<td>Create new health report</td>
</tr>
<tr>
<td>status</td>
<td>Check status</td>
</tr>
<tr>
<td>copy</td>
<td>Copy existing health report</td>
</tr>
<tr>
<td>delete</td>
<td>Delete existing health report</td>
</tr>
</tbody>
</table>

The following table shows the arguments for the generate and copy options.
Table 10. generate and copy command

The following table is a multi-row two column table consisting of the generate and copy command options and option descriptions.

<table>
<thead>
<tr>
<th>Option</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>-f</td>
<td>Remote filename or sftp target directory (default is system generated name (for sftp, use full path or trailing / on directory name (~ or /tmp/))</td>
</tr>
<tr>
<td>-ip</td>
<td>Address of tftp/sftp server</td>
</tr>
<tr>
<td>-pn</td>
<td>Port number of tftp/sftp server (default 69/22)</td>
</tr>
<tr>
<td>-u</td>
<td>Username for sftp server</td>
</tr>
<tr>
<td>-pw</td>
<td>Password for sftp server</td>
</tr>
</tbody>
</table>

**mhlog command**

Use this command to display maintenance history activity log entries.

The following table shows the arguments for the options.

Table 11. mhlog command

The following table is a multi-row two column table consisting of the options and option descriptions.

<table>
<thead>
<tr>
<th>Option</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>-c &lt;count&gt;</td>
<td>Display 'count' entries (1-250)</td>
</tr>
<tr>
<td>-i &lt;index&gt;</td>
<td>Display entries starting at index (1-250)</td>
</tr>
<tr>
<td>-f</td>
<td>Remote filename of log file</td>
</tr>
<tr>
<td>-ip</td>
<td>Address of tftp/sftp server</td>
</tr>
<tr>
<td>-pn</td>
<td>Port number of tftp/sftp server (default 69/22)</td>
</tr>
<tr>
<td>-u</td>
<td>Username for sftp server</td>
</tr>
<tr>
<td>-pw</td>
<td>Password for sftp server</td>
</tr>
</tbody>
</table>

**Example**

Display will look something like this:

<table>
<thead>
<tr>
<th>Type</th>
<th>Message</th>
<th>Time</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hardware</td>
<td>SAS Backplane1(SN: XXXX9CE009L) is added.</td>
<td>05/08/2020,04:23:18</td>
</tr>
<tr>
<td>Hardware</td>
<td>CPU 1(SKU NO: 50844440) is added.</td>
<td>05/08/2020,04:23:22</td>
</tr>
<tr>
<td>Hardware</td>
<td>CPU 2(SKU NO: 50844440) is added.</td>
<td>05/08/2020,04:23:22</td>
</tr>
<tr>
<td>Hardware</td>
<td>M2 Card(SN: R1SH9AJ0037) is added.</td>
<td>05/08/2020,04:23:22</td>
</tr>
<tr>
<td>Firmware</td>
<td>Primary XCC firmware is updated to TGBT99T by XCC Web.</td>
<td>05/08/2020,06:40:37</td>
</tr>
<tr>
<td>Firmware</td>
<td>Primary XCC firmware is activated to TGBT99T.</td>
<td>05/08/2020,06:51:26</td>
</tr>
<tr>
<td>Hardware</td>
<td>PSU1(SN: D10G94C0075) is added.</td>
<td>05/08/2020,06:43:28</td>
</tr>
</tbody>
</table>

**led command**

Use this command to display and set LED states.
The `led` command displays and sets the server LED states.

- Running the `led` command with no options displays the status of the front panel LEDs.
- The `led -d` command option must be used with `led -identify on` command option.

The following table shows the arguments for the options.

**Table 12. led command**

The following table is a multi-row three column table consisting of the options, option descriptions, and associated values for the options.

<table>
<thead>
<tr>
<th>Option</th>
<th>Description</th>
<th>Values</th>
</tr>
</thead>
<tbody>
<tr>
<td>-l</td>
<td>Get the status of all system and system subcomponent LEDs</td>
<td></td>
</tr>
<tr>
<td>-chklog</td>
<td>Turn off check log LED</td>
<td>off</td>
</tr>
<tr>
<td>-identify</td>
<td>Change state of enclosure identify LED</td>
<td>off, on, blink</td>
</tr>
<tr>
<td>-d</td>
<td>Turn on identification LED for specified time period</td>
<td>Time period (seconds)</td>
</tr>
</tbody>
</table>

Syntax:

```plaintext
led [options]
option:
  -l
  -chklog off
  -identify state
  -d time
```

Example:

```plaintext
system> led
Fault                  Off
Identify               On            Blue
Chklog                 Off
Power                  Off

system> led -l
Label                  Location                   State         Color
Battery                Planar                     Off
BMC Heartbeat          Planar                     Blink         Green
BRD                    Lightpath Card             Off
Channel A              Planar                     Off
Channel B              Planar                     Off
Channel C              Planar                     Off
Channel D              Planar                     Off
Channel E              Planar                     Off
Chklog                 Front Panel                Off
CNFG                   Lightpath Card             Off
CPU                    Lightpath Card             Off
CPU 1                  Planar                     Off
CPU 2                  Planar                     Off
DASD                   Lightpath Card             Off
DIMM                   Lightpath Card             Off
DIMM 1                 Planar                     Off
DIMM 10                Planar                     Off
DIMM 11                Planar                     Off
DIMM 12                Planar                     Off
DIMM 13                Planar                     Off
```
<table>
<thead>
<tr>
<th>Component</th>
<th>Status</th>
<th>Color</th>
</tr>
</thead>
<tbody>
<tr>
<td>DIMM 14</td>
<td>Planar</td>
<td>Off</td>
</tr>
<tr>
<td>DIMM 15</td>
<td>Planar</td>
<td>Off</td>
</tr>
<tr>
<td>DIMM 16</td>
<td>Planar</td>
<td>Off</td>
</tr>
<tr>
<td>DIMM 2</td>
<td>Planar</td>
<td>Off</td>
</tr>
<tr>
<td>DIMM 3</td>
<td>Planar</td>
<td>Off</td>
</tr>
<tr>
<td>DIMM 4</td>
<td>Planar</td>
<td>Off</td>
</tr>
<tr>
<td>DIMM 5</td>
<td>Planar</td>
<td>Off</td>
</tr>
<tr>
<td>DIMM 6</td>
<td>Planar</td>
<td>Off</td>
</tr>
<tr>
<td>DIMM 7</td>
<td>Planar</td>
<td>Off</td>
</tr>
<tr>
<td>DIMM 8</td>
<td>Planar</td>
<td>Off</td>
</tr>
<tr>
<td>DIMM 9</td>
<td>Planar</td>
<td>Off</td>
</tr>
<tr>
<td>FAN</td>
<td>Lightpath Card</td>
<td>Off</td>
</tr>
<tr>
<td>FAN 1</td>
<td>Planar</td>
<td>Off</td>
</tr>
<tr>
<td>FAN 2</td>
<td>Planar</td>
<td>Off</td>
</tr>
<tr>
<td>FAN 3</td>
<td>Planar</td>
<td>Off</td>
</tr>
<tr>
<td>Fault</td>
<td>Front Panel (+)</td>
<td>Off</td>
</tr>
<tr>
<td>Identify</td>
<td>Front Panel (+)</td>
<td>On</td>
</tr>
<tr>
<td>LINK</td>
<td>Lightpath Card</td>
<td>Off</td>
</tr>
<tr>
<td>LOG</td>
<td>Lightpath Card</td>
<td>Off</td>
</tr>
<tr>
<td>NMI</td>
<td>Lightpath Card</td>
<td>Off</td>
</tr>
<tr>
<td>OVER SPEC</td>
<td>Lightpath Card</td>
<td>Off</td>
</tr>
<tr>
<td>PCI 1</td>
<td>FRU</td>
<td>Off</td>
</tr>
<tr>
<td>PCI 2</td>
<td>FRU</td>
<td>Off</td>
</tr>
<tr>
<td>PCI 3</td>
<td>FRU</td>
<td>Off</td>
</tr>
<tr>
<td>PCI 4</td>
<td>FRU</td>
<td>Off</td>
</tr>
<tr>
<td>Planar</td>
<td>Planar</td>
<td>Off</td>
</tr>
<tr>
<td>Power</td>
<td>Front Panel (+)</td>
<td>Off</td>
</tr>
<tr>
<td>PS</td>
<td>Lightpath Card</td>
<td>Off</td>
</tr>
<tr>
<td>RAID</td>
<td>Lightpath Card</td>
<td>Off</td>
</tr>
<tr>
<td>Riser 1</td>
<td>Planar</td>
<td>Off</td>
</tr>
<tr>
<td>Riser 2</td>
<td>Planar</td>
<td>Off</td>
</tr>
<tr>
<td>SAS ERR</td>
<td>FRU</td>
<td>Off</td>
</tr>
<tr>
<td>SAS MISSING</td>
<td>Planar</td>
<td>Off</td>
</tr>
<tr>
<td>SP</td>
<td>Lightpath Card</td>
<td>Off</td>
</tr>
<tr>
<td>TEMP</td>
<td>Lightpath Card</td>
<td>Off</td>
</tr>
<tr>
<td>VRM</td>
<td>Lightpath Card</td>
<td>Off</td>
</tr>
<tr>
<td>system&gt;</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**readlog command**

This command displays the IMM event logs.

Use the `readlog` command to display the IMM event log entries. Five event logs are displayed at a time. The entries are displayed from the most recent to the oldest.

- **readlog** displays the first five entries in the event log, starting with the most recent, on its first execution, and then the next five for each subsequent call.
- **readlog -a** displays all entries in the event log, starting with the most recent.
- **readlog -f** resets the counter and displays the first 5 entries in the event log, starting with the most recent.
- **readlog -date date** displays event log entries for the specified date, specified in mm/dd/yy format. It can be a pipe (|) separated list of dates.
- **readlog -sev severity** displays event log entries for the specified severity level (E, W, I). It can be a pipe (|) separated list of severity levels.
- **readlog -i ip_address** sets the IPv4 or IPv6 IP address of the TFTP or SFTP server where the event log is saved. The -i and -I command options are used together to specify the location.
- **readlog -l filename** sets the file name of the event log file. The -i and -I command options are used together to specify the location.
**readlog** `-pn port_number` displays or sets the port number of the TFTP or SFTP server (default 69/22).

**readlog** `-u username` specifies the user name for the SFTP server.

**readlog** `-pw password` specifies the password for the SFTP server.

Syntax:
```
readlog [options]
option:
  -a
  -f
  -date date
  -sev severity
  -i ip_address
  -l filename
  -pn port_number
  -u username
  -pw password
```

Example:
```
system> readlog -f
1 I 2017-06-17T09:31:59.217 Remote Login Successful. Login ID: USERID
from SSH at IP address 10.134.78.180
2 I 2017-06-17T07:23:04.685 Remote Login Successful. Login ID: USERID
from webguis at IP address 10.134.78.180.
3 I 2017-06-16T11:00:35.581 Login ID: USERID from webguis at IP address 10.134.78.180 has logged off.
4 I 2017-06-16T11:00:15.174 Login ID: USERID from webguis at IP address 10.104.209.144 has logged off.
5 I 2017-06-16T10:40:14.352 Login ID: USERID from webguis at IP address 10.104.209.144 has logged off.
```

**syshealth command**

This command provides a summary of the health or active events.

Use the **syshealth** command to display a summary of the health or active events of the server. The power state, system state, hardware state (includes fan, power supply, storage, processor, memory), restart count, and IMM software status are displayed.

Syntax:
```
syshealth [argument]
argument:
  summary -display the system health summary
  activeevents -display active events
  cooling - display cooling devices health status
  power - display power modules health status
  storage - display local storage health status
  processors - display processors health status
  memory - display memory health status
```

Example:
```
system> syshealth summary
Power  On
State  OS booted
Restarts 29
```
temps command
This command displays all temperature and temperature threshold information.

Use the **temps** command to display all the temperatures and temperature thresholds. The same set of temperatures are displayed as in the web interface.

**Example**
```
Example
system> temps
Temperatures are displayed in degrees Fahrenheit/Celsius

<table>
<thead>
<tr>
<th>WR</th>
<th>W</th>
<th>T</th>
<th>SS</th>
<th>HS</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>80/27</td>
<td>N/A</td>
<td>N/A</td>
</tr>
<tr>
<td></td>
<td></td>
<td>80/27</td>
<td>N/A</td>
<td>N/A</td>
</tr>
<tr>
<td>66/19</td>
<td>73/23</td>
<td>82/28</td>
<td>88/31</td>
<td>92/33</td>
</tr>
<tr>
<td>59/15</td>
<td>70/21</td>
<td>83/28</td>
<td>90/32</td>
<td>95/35</td>
</tr>
</tbody>
</table>

system>
```

**Notes:**
1. The output has the following column headings:
   - WR: warning reset (Positive-going Threshold Hysteresis value)
   - W: warning (Upper non-critical Threshold)
   - T: temperature (Current value)
   - SS: soft shutdown (Upper critical Threshold)
   - HS: hard shutdown (Upper non-recoverable Threshold)
2. All temperature values are in degrees Fahrenheit/Celsius.
3. N/A represents not applicable.

volts command
Use this command to display the server voltage information.

Use the **volts** command to display all the voltages and voltage thresholds. The same set of voltages are displayed as in the web interface.
Note: The output has the following column headings:

- **HSL**: hard shutdown low (Lower non-recoverable Threshold)
- **SSL**: soft shutdown low (Lower critical Threshold)
- **WL**: warning low (Lower non-critical Threshold)
- **WRL**: warning reset low (Negative-going Threshold Hysteresis value)
- **V**: voltage (current value)
- **WRH**: warning reset high (Positive-going Threshold Hysteresis value)
- **WH**: warning high (Upper non-critical Threshold)
- **SSH**: soft shutdown high (Upper critical Threshold)
- **HSH**: hard shutdown high (Upper non-recoverable Threshold)

**v<sub>pd</sub> command**

This command displays configuration and informational data (vital product data) associated with the hardware and software of the server.

Use the **v<sub>pd</sub>** command to display vital product data for the system (sys), IMM (bmc), server BIOS (uefi), Lenovo XClarity Provisioning Manager (lxpm), server firmware (fw), server components (comp) and PCIe devices (pcie). The same information is displayed as in the web interface.

Syntax:
```
v<sub>pd</sub> sys - displays Vital Product Data for the system
v<sub>pd</sub> bmc - displays Vital Product Data for the management controller
v<sub>pd</sub> uefi - displays Vital Product Data for system BIOS
v<sub>pd</sub> lxpm - displays Vital Product Data for system LXPM
v<sub>pd</sub> fw - displays Vital Product Data for the system firmware
v<sub>pd</sub> comp - displays Vital Product Data for the system components
v<sub>pd</sub> pmem - displays Vital Product Data for Intel Optane PMem
v<sub>pd</sub> pcie - displays Vital Product Data for PCIe devices
```

Example:
```
  system> v<sub>pd</sub> bmc

  Type           Status      Version     Build     ReleaseDate
  ----           -------      -----      ------      -----------
  BMC (Primary)  Active      0.00       DVI399T    2017/06/06
  BMC (Backup)   Inactive    1.00       TEI3053     2017/04/13

  system>
```
Server power and restart control commands

This topic provides an alphabetic list of power and restart CLI commands.

There are currently 4 server power and restart commands:

**power command**

This command describes how to control the server power.

Use the `power` command to control the server power. To issue `power` commands, you must have the Remote Server Power/Restart Access authority level.

The following table contains a subset of commands that can be used with the `power` command.

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>power on</td>
<td>Use this command to turn on the server power.</td>
<td>on, off</td>
</tr>
<tr>
<td>power off</td>
<td>Use this command to turn off the server power.</td>
<td>on, off</td>
</tr>
</tbody>
</table>
| power cycle   | Use this command to turn off the server power and then turn on the server power.  
Note: The `-s` option shuts down the operating system before the server is turned off. |               |
| power enterS3 | Use this command to place the operating system into the S3 (sleep) mode.  
Note: This command is used only when the operating system is on. The S3 mode is not supported on all servers. |               |
| power rp      | Use this option to specify the host power restore policy.                    | alwayson|alwaysoff|restore |
| power S3resume| Use this command to wake up the operating system from the S3 (sleep) mode.  
Note: This command is used only when the operating system is on. The S3 mode is not supported on all servers. |               |
| power state   | Use this command to display the server power state and the current state of the server. | on, off       |

The following table contains the options for the `power on`, `power off`, and `power cycle` commands.

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>power on</td>
<td>Use this command to turn on the server power.</td>
<td></td>
</tr>
<tr>
<td>power off</td>
<td>Use this command to turn off the server power.</td>
<td></td>
</tr>
</tbody>
</table>
| power cycle   | Use this command to turn off the server power and then turn on the server power.  
Note: The `-s` option shuts down the operating system before the server is turned off. |               |
| power enterS3 | Use this command to place the operating system into the S3 (sleep) mode.  
Note: This command is used only when the operating system is on. The S3 mode is not supported on all servers. |               |
| power rp      | Use this option to specify the host power restore policy.                    | alwayson|alwaysoff|restore |
| power S3resume| Use this command to wake up the operating system from the S3 (sleep) mode.  
Note: This command is used only when the operating system is on. The S3 mode is not supported on all servers. |               |
| power state   | Use this command to display the server power state and the current state of the server. | on, off       |
Table 14. power command (continued)

<table>
<thead>
<tr>
<th>Option</th>
<th>Description</th>
<th>Values</th>
</tr>
</thead>
<tbody>
<tr>
<td>-s</td>
<td>Use this option to shut down the operating system before the server is turned off. <strong>Note:</strong> The -s option is implied when using the -every option for the power off and power cycle commands.</td>
<td></td>
</tr>
<tr>
<td>-every</td>
<td>Use this option with the power on, power off, and power cycle commands to control the server power. You can set up the dates, times, and frequency (daily or weekly) to power on, power off, or power cycle your server. <strong>Note:</strong> The values for this option are presented on separate lines due to space limitations.</td>
<td>Sun</td>
</tr>
<tr>
<td>-t</td>
<td>Use this option to specify the time in hours and minutes to power on the server, shut down the operating system, and power off or restart the server. Use the following format: hh:mm</td>
<td></td>
</tr>
<tr>
<td>-d</td>
<td>Use this option to specify the date to power on the server. This is an additional option for the power on command. <strong>Note:</strong> The -d and -every options, cannot be used together on the same command. Use the following format: mm/dd/yyyy</td>
<td></td>
</tr>
<tr>
<td>-clear</td>
<td>Use this option to clear the scheduled power on date. This is an additional option for the power on command.</td>
<td></td>
</tr>
</tbody>
</table>

Syntax:

- `power on`
- `power off [-s]`
- `power state`
- `power cycle [-s]`

The following information are examples of the `power` command.

To shut down the operating system and power off the server every Sunday at 1:30, enter the following command:

```
system> power off
-every Sun -t 01:30
```

To shut down the operating system and restart the server every day at 1:30, enter the following command:

```
system> power cycle
-every Day -t 01:30
```

To power on the server every Monday at 1:30, enter the following command:

```
system> power on
-every Mon -t 13:00
```

To power on the server on Dec 31 2013 at 11:30 PM, enter the following command:

```
system> power on
-d 12/31/2013 -t 23:30
```

To clear a weekly power cycle, enter the following command:

```
system> power cycle
-every clear
```
**reset command**

This command describes how to reset the server.

Use the `reset` command to restart the server. To use this command, you must have power and restart access authority.

The following table shows the arguments for the options.

*Table 15. reset command*

The following table is a multi-row three column table consisting of the options, option descriptions, and associated values for the options.

<table>
<thead>
<tr>
<th>Option</th>
<th>Description</th>
<th>Values</th>
</tr>
</thead>
<tbody>
<tr>
<td>-s</td>
<td>Shut down the operating system before the server is reset.</td>
<td></td>
</tr>
<tr>
<td>-d</td>
<td>Delay performing the reset for the given number of seconds.</td>
<td>0 - 120</td>
</tr>
<tr>
<td>-nmi</td>
<td>Generate a non-maskable interrupt (NMI) on the server.</td>
<td></td>
</tr>
</tbody>
</table>

Syntax:
```
reset [option]
```

*option*:
- -s
- -d
- -nmi

**fuelg command**

This command displays information about the server power.

Use the `fuelg` command to display information about server power usage and configure server power management. This command also configures policies for power redundancy loss. The following table shows the arguments for the options.

*Table 16. fuelg command*

The following table is a multi-row three column table consisting of the options, option descriptions, and associated values for the options.

<table>
<thead>
<tr>
<th>Option</th>
<th>Description</th>
<th>Values</th>
</tr>
</thead>
<tbody>
<tr>
<td>-pme</td>
<td>Enable or disable power management and capping on the server.</td>
<td>on, off</td>
</tr>
<tr>
<td>-pcapmode</td>
<td>Set the power capping mode for the server.</td>
<td>input, output</td>
</tr>
<tr>
<td>-pcap</td>
<td>A numeric value that falls within the range of power capping values displayed when running the fuelg command, with no options, on the target.</td>
<td>numeric wattage value</td>
</tr>
<tr>
<td>-history</td>
<td>Display power consumption or performance history</td>
<td>pc, perf</td>
</tr>
<tr>
<td>-period</td>
<td>A numeric value to display history (1, 6, 12, 24 hours)</td>
<td>numeric value in hours</td>
</tr>
</tbody>
</table>
### Table 16. fuelg command (continued)

<table>
<thead>
<tr>
<th>Option</th>
<th>Description</th>
<th>Values</th>
</tr>
</thead>
</table>
| -pm    | Set the policy mode for loss of redundant power. | • bt- basic with throttling  
         |            | • rt- redundant with throttling (default)  
         |            | • ort- N_1 redundant with throttling |
| -zm    | Enable or disable zero output mode. This setting can only be set when the policy mode is set to redundant with throttling. | on, off |
| -perf  | Display the current compute utilization, including system, microprocessor, and I/O. | percentage |
| -pc    | Display current power consumption | • output- display current DC power consumption. For Rack and Tower servers it will include the power consumption of the system, CPU, memory and other components, For ITE blade servers it will only include the system power consumption.  
         |            | • input- Display current input power consumption, including system power consumption. |

Syntax:
```
fuelg [options]
```
```plaintext
option:
 -pme on|off
 -pcapmode input|output
 -pcap
 -history
 -period
 -pm bt|rt
 -zm on|off
 -perf
 -pc input|output
```

Example:
```
system> fuelg
-pme: on
```
```
system>
```

### pxeboot command

This command displays and sets the condition of the Preboot eXecution Environment.

Running pxeboot with no options, returns the current Preboot eXecution Environment setting. The following table shows the arguments for the options.

### Table 17. pxeboot command

The following table is a single-row three column table consisting of the option, option description, and associated values for the option.
Table 17. pxeboot command (continued)

<table>
<thead>
<tr>
<th>Option</th>
<th>Description</th>
<th>Values</th>
</tr>
</thead>
<tbody>
<tr>
<td>-en</td>
<td>Sets the Preboot eXecution Environment condition for the next system restart.</td>
<td>enabled, disabled</td>
</tr>
</tbody>
</table>

Syntax:

pxeboot [options]

option:

- en state

Example:

system> pxeboot
-en disabled
system>

Serial redirect command

This topic contains the serial redirect command.

There is only one serial redirect command: the “console command” on page 107.

console command

This command is used to start a serial redirect console session.

Use the console command to start a serial redirect console session to the designated serial port of the IMM.

Syntax:

calendar 1

Configuration commands

This topic provides an alphabetic list of configuration CLI commands.

There are currently 41 configuration commands:

accseccfg command

Use this command to display and configure account security settings.

Running the accseccfg command with no options displays all account security information. The following table shows the arguments for the options.

Table 18. accseccfg command

The following table is a multi-row three column table consisting of the options, option descriptions, and associated values for the options.

<table>
<thead>
<tr>
<th>Option</th>
<th>Description</th>
<th>Values</th>
</tr>
</thead>
<tbody>
<tr>
<td>-am</td>
<td>Sets user authentication method.</td>
<td>local, ldap, localldap, ldaplocal</td>
</tr>
<tr>
<td>-lp</td>
<td>Lockout period after maximum login failures (minutes).</td>
<td>Between 0 and 2880, 0 = lockout period does not expire</td>
</tr>
</tbody>
</table>
### Table 18. accsecfg command (continued)

<table>
<thead>
<tr>
<th>Option</th>
<th>Description</th>
<th>Values</th>
</tr>
</thead>
<tbody>
<tr>
<td>-pe</td>
<td>Password expiration time period (days).</td>
<td>Between 0 and 365, 0 = never expire</td>
</tr>
<tr>
<td>-pew</td>
<td>Password expiration warning time period <strong>Note</strong>: The Password expiration warning time period must be less than Password expiration time period.</td>
<td>Between 0 and 30, 0 = never warn</td>
</tr>
<tr>
<td>-pl</td>
<td>Password length.</td>
<td>If password complexity rules are enabled, the password length is between 8 and 32. Otherwise, it is between 0 and 32.</td>
</tr>
<tr>
<td>-ci</td>
<td>Minimum password change interval (hours).</td>
<td>Between 0 and 240, 0 = change immediately</td>
</tr>
<tr>
<td>-if</td>
<td>Maximum number of login failures.</td>
<td>Between 0 and 10, 0 = never locked</td>
</tr>
<tr>
<td>-chgdft</td>
<td>Change default password after first login.</td>
<td>on, off</td>
</tr>
<tr>
<td>-chgnw</td>
<td>Change new user password after first login.</td>
<td>on, off</td>
</tr>
<tr>
<td>-rc</td>
<td>Password reuse cycle.</td>
<td>Between 0 and 10, 0 = reuse immediately</td>
</tr>
<tr>
<td>-wt</td>
<td>Web and Secure Shell inactivity session timeout (minutes).</td>
<td>Between 0 and 1440</td>
</tr>
</tbody>
</table>

**Syntax:**
```
accsecfg [options]
```

**option:**
- -legacy
- -high
- -custom
- -am authentication method
- -lp lockout_period
- -pe time_period
- -pr state
- -pc state
- -pd number_characters
- -pl number_characters
- -ci minimum_interval
- -if number_failures
- -chgdft state
- -chgnw state
- -rc reuse_cycle
- -wt timeout

**Example:**
```
system> accsecfg
-legacy
-am local
-lp 2
-pe 0
-pr off
-pd 1
```
alertcfg command

Use this command to display and configure the IMM global remote alert parameters.

Running the alertcfg command with no options displays all global remote alert parameters. The following table shows the arguments for the options.

Table 19. alertcfg command

The following table is a multi-row three column table consisting of the options, option descriptions, and associated values for the options.

<table>
<thead>
<tr>
<th>Option</th>
<th>Description</th>
<th>Values</th>
</tr>
</thead>
<tbody>
<tr>
<td>-dr</td>
<td>Sets wait time between retries before the IMM resends an alert.</td>
<td>0 to 4.0 minutes, in 0.5 minute increments</td>
</tr>
<tr>
<td>-da</td>
<td>Sets wait time before the IMM sends an alert to the next recipient in the list.</td>
<td>0 to 4.0 minutes, in 0.5 minute increments</td>
</tr>
<tr>
<td>-rl</td>
<td>Sets the number of additional times that the IMM attempts to send an alert, if previous attempts were unsuccessful.</td>
<td>0 to 8</td>
</tr>
</tbody>
</table>

Syntax:
alertcfg [options]
  options:
    -rl retry_limit
    -dr retry_delay
    -da agent_delay

Example:
system> alertcfg
  -dr 1.0
  -da 2.5
  -rl 5
  system>

asu command

This command is used to configure UEFI settings.

Advanced Settings Utility commands (ASU) are used to configure UEFI settings. The host system must be rebooted for any UEFI setting changes to take effect.

The following table contains a subset of commands that can be used with the asu command.
Table 20. `asu` command

The following table is a multi-row three column table consisting of a subset of commands that can be used in conjunction with the `asu` command. Descriptive information and associated values for the commands are provided.

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>delete</td>
<td>Use this command to delete an instance or record of a setting. The setting must be an instance that allows deletion, for example, iSCSI.AttemptName.1.</td>
<td>setting_instance</td>
</tr>
<tr>
<td>help</td>
<td>Use this command to display help information for one or more settings.</td>
<td>setting</td>
</tr>
</tbody>
</table>
| set       | Use this command to change the value of a setting. Set the UEFI setting to the input value. **Notes:**  
- Set one or more setting/value pairs.  
- The setting can contain wildcards if it expands to a single setting.  
- The value must be enclosed in quotes if it contains spaces.  
- Ordered list values are separated by the equal symbol (=). For example, set B*.Bootorder "CD/DVD Rom=Hard Disk 0=PXE Network." | setting_value      |
| showgroups| Use this command to display the available setting groups. This command displays the names of known groups. Group names may vary depending on the installed devices. | setting             |
| show      | Use this command to display the current value of one or more settings.       | setting             |
| showvalues| Use this command to display all possible values for one or more settings. **Notes:**  
- This command will display information about the allowable values for the setting.  
- The minimum and maximum number of instances allowed for the setting is displayed.  
- The default value will be displayed if available.  
- The default value is enclosed with opening and closing angle brackets (< and >).  
- Text values show the minimum and maximum length and regular expression. | setting             |

**Notes:**
- In the command syntax, `setting` is the name of a setting that you want to view or change, and `value` is the value that you are placing on the setting.  
- `Setting` can be more than one name, except when using the `set` command.  
- `Setting` can contain wildcards, for example an asterisk (*) or a question mark (?).  
- `Setting` can be a group, a setting name, or all.

Examples of the syntax for the `asu` command are presented in the following list:
To display all of the asu command options enter `asu --help`.
To display verbose help for all commands enter `asu -v --help`.
To display verbose help for one command enter `asu -v set --help`.
To change a value enter `asu set setting value`.
To display the current value enter `asu show setting`.
To display settings in long batch format enter `asu show -l -b all`.
To display all possible values for a setting enter `asu showvalues setting`. Example `show values` command:
```
system> asu showvalues S*.POST*
SystemRecovery.POSTWatchdogTimer==<Disable>=Enable
SystemRecovery.POSTWatchdogTimerValue=numeric min=5 max=20 step=1 default=5
system>
```

The following table shows the arguments for the options.

**Table 21. asu options**

The following table is a multi-row three column table consisting of the options, option descriptions, and associated values for the options.

<table>
<thead>
<tr>
<th>Option</th>
<th>Description</th>
<th>Values</th>
</tr>
</thead>
<tbody>
<tr>
<td>-b</td>
<td>Display in batch format.</td>
<td></td>
</tr>
<tr>
<td>--help</td>
<td>Display command usage and options. The --help option is placed before the command, for example asu --help show.</td>
<td></td>
</tr>
<tr>
<td>--help</td>
<td>Display help for the command. The --help option is placed after the command, for example, asu show --help.</td>
<td></td>
</tr>
<tr>
<td>-l</td>
<td>Long format setting name (include the configuration set).</td>
<td></td>
</tr>
<tr>
<td>-m</td>
<td>Mixed format setting name (use the configuration id).</td>
<td></td>
</tr>
<tr>
<td>-v</td>
<td>Verbose output.</td>
<td></td>
</tr>
</tbody>
</table>

1. The --help option can be used with any command.
2. The -v option is used only between `asu` and the command.

Syntax:
```
asu [options] command [cmdopts]
```

options:
- `-v` verbose output
- `--help` display main help

cmdopts:
- `--help` help for the command

**Note:** See individual commands for more command options.

Use the asu transaction commands to set multiple UEFI settings and create and execute batch mode commands. Use the `tropen` and `trset` commands to create a transaction file containing multiple settings to be applied. A transaction with a given id is opened using the `tropen` command. Settings are added to the set.
using the `trset` command. The completed transaction is committed using the `trcommit` command. When you are finished with the transaction, it can be deleted with the `trrm` command.

**Note:** The UEFI settings restore operation will create a transaction with an id using a random three digit number.

The following table contains transaction commands that can be used with the `asu` command.

**Table 22. asu transaction commands**

The following table is a multi-row three column table consisting of the transactions commands, the command descriptions, and associated values for the commands.

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td><code>tropen id</code></td>
<td>This command creates a new transaction file containing several settings to be set.</td>
<td><code>Id</code> is the identifying string, 1 - 3 alphanumeric characters.</td>
</tr>
<tr>
<td><code>trset id</code></td>
<td>This command adds one or more settings or value pairs to a transaction.</td>
<td><code>Id</code> is the identifying string, 1 - 3 alphanumeric characters.</td>
</tr>
<tr>
<td><code>trlist id</code></td>
<td>This command displays the contents of the transaction file first. This can be useful when the transaction file is created in the CLI shell.</td>
<td><code>Id</code> is the identifying string, 1 - 3 alphanumeric characters.</td>
</tr>
<tr>
<td><code>trcommit id</code></td>
<td>This command commits and executes the contents of the transaction file. The results of the execution and any errors will be displayed.</td>
<td><code>Id</code> is the identifying string, 1 - 3 alphanumeric characters.</td>
</tr>
<tr>
<td><code>trrm id</code></td>
<td>This command removes the transaction file after it has been committed.</td>
<td><code>Id</code> is the identifying string, 1 - 3 alphanumeric characters.</td>
</tr>
</tbody>
</table>

Example of establishing multiple UEFI settings:

```
asu tropen TR1
asu trset TR1 UEFI.BootModes.SystemBootMode "UEFI and Legacy"
asu trset TR1 BootOrder.BootOrder "CD/DVD Rom=Hard Disk 0=PXE Network"
asu trset TR1 BootOrder.WolBootOrder "CD/DVD Rom=Hard Disk 0=PXE Network"
asu trset TR1 UEFI.DevicesandIOPorts.COM1BaudRate 115200
asu trset TR1 UEFI.DevicesandIOPorts.COM1DataBits 8
asu trset TR1 UEFI.DevicesandIOPorts.COM1FlowControl Disable
asu trset TR1 UEFI.DevicesandIOPorts.COM1Parity None
asu trset TR1 UEFI.DevicesandIOPorts.COM1StopBits 1
asu trset TR1 UEFI.DevicesandIOPorts.COMPort1 Enable
asu trcommit TR1
```

**backup command**

Use this command to create a backup file containing the current system security settings.

The following table shows the arguments for the options.

**Table 23. backup command**

The following table is a multi-row three column table consisting of the options, option descriptions, and associated values for the options.
Table 23. backup command (continued)

<table>
<thead>
<tr>
<th>Option</th>
<th>Description</th>
<th>Values</th>
</tr>
</thead>
<tbody>
<tr>
<td>-f</td>
<td>Backup file name</td>
<td>Valid file name</td>
</tr>
<tr>
<td>-pp</td>
<td>Password or pass-phrase used to encrypt passwords inside the backup file</td>
<td>Valid password or quote-delimited pass-phrase</td>
</tr>
<tr>
<td>-ip</td>
<td>IP address of TFTP/SFTP server</td>
<td>Valid IP address</td>
</tr>
<tr>
<td>-pn</td>
<td>Port number of TFTP/SFTP server</td>
<td>Valid port number (default 69/22)</td>
</tr>
<tr>
<td>-u</td>
<td>Username for SFTP server</td>
<td>Valid user name</td>
</tr>
<tr>
<td>-pw</td>
<td>Password for SFTP server</td>
<td>Valid password</td>
</tr>
<tr>
<td>-fd</td>
<td>Filename for XML description of backup CLI commands</td>
<td>Valid filename</td>
</tr>
</tbody>
</table>

Syntax:
```
backup [options]
  option:
    -f  filename
    -pp password
    -ip ip address
    -pn port number
    -u username
    -pw password
    -fd filename
```

Example:
```
system> backup f xcc-back.cli pp xxxxxx ip 192.168.70.200
ok
system>
```

**dhcpiinfo command**

Use this command to view the DHCP server-assigned IP configuration for eth0.

Use the **dhcpiinfo** command to view the DHCP server-assigned IP configuration for eth0, if the interface is configured automatically by a DHCP server. You can use the **ifconfig** command to enable or disable DHCP.

Syntax:
```
dhcpiinfo eth0
```
The following table describes the output from the example.

**Table 24. dhcpinfo command**

The following table is a multi-row two column table describing the options that are used in the previous example.

<table>
<thead>
<tr>
<th>Option</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>-server</td>
<td>DHCP server that assigned the configuration</td>
</tr>
<tr>
<td>-n</td>
<td>Assigned host name</td>
</tr>
<tr>
<td>-i</td>
<td>Assigned IPv4 address</td>
</tr>
<tr>
<td>-g</td>
<td>Assigned gateway address</td>
</tr>
<tr>
<td>-s</td>
<td>Assigned subnet mask</td>
</tr>
<tr>
<td>-d</td>
<td>Assigned domain name</td>
</tr>
<tr>
<td>-dns1</td>
<td>Primary IPv4 DNS server IP address</td>
</tr>
<tr>
<td>-dns2</td>
<td>Secondary IPv4 DNS IP address</td>
</tr>
<tr>
<td>-dns3</td>
<td>Tertiary IPv4 DNS server IP address</td>
</tr>
<tr>
<td>-i6</td>
<td>IPv6 address</td>
</tr>
<tr>
<td>-d6</td>
<td>IPv6 domain name</td>
</tr>
<tr>
<td>-dns61</td>
<td>Primary IPv6 DNS server IP address</td>
</tr>
<tr>
<td>-dns62</td>
<td>Secondary IPv6 DNS IP address</td>
</tr>
<tr>
<td>-dns63</td>
<td>Tertiary IPv6 DNS server IP address</td>
</tr>
</tbody>
</table>

**dns command**

Use this command to view and set the DNS configuration of the IMM.

**Note:** In a Flex System, DNS settings cannot be modified on the IMM. DNS settings are managed by the CMM.

Running the *dns* command with no options displays all DNS configuration information. The following table shows the arguments for the options.
Table 25. dns command

The following table is a multi-row three column table consisting of the options, option descriptions, and associated values for the options.

<table>
<thead>
<tr>
<th>Option</th>
<th>Description</th>
<th>Values</th>
</tr>
</thead>
<tbody>
<tr>
<td>-state</td>
<td>DNS state</td>
<td>on, off</td>
</tr>
<tr>
<td>-ddns</td>
<td>DDNS state</td>
<td>enabled, disabled</td>
</tr>
<tr>
<td>-i1</td>
<td>Primary IPv4 DNS server IP address</td>
<td>IP address in dotted decimal IP address format.</td>
</tr>
<tr>
<td>-i2</td>
<td>Secondary IPv4 DNS IP address</td>
<td>IP address in dotted decimal IP address format.</td>
</tr>
<tr>
<td>-i3</td>
<td>Tertiary IPv4 DNS server IP address</td>
<td>IP address in dotted decimal IP address format.</td>
</tr>
<tr>
<td>-i61</td>
<td>Primary IPv6 DNS server IP address</td>
<td>IP address in IPv6 format.</td>
</tr>
<tr>
<td>-i62</td>
<td>Secondary IPv6 DNS IP address</td>
<td>IP address in IPv6 format.</td>
</tr>
<tr>
<td>-i63</td>
<td>Tertiary IPv6 DNS server IP address</td>
<td>IP address in IPv6 format.</td>
</tr>
<tr>
<td>-p</td>
<td>IPv4/IPv6 priority</td>
<td>ipv4, ipv6</td>
</tr>
</tbody>
</table>

Syntax:

dns [options]

option:
- -state state
- -ddns state
- -i1 first_ipv4_ip_address
- -i2 second_ipv4_ip_address
- -i3 third_ipv4_ip_address
- -i61 first_ipv6_ip_address
- -i62 second_ipv6_ip_address
- -i63 third_ipv6_ip_address
- -p priority

Note: The following example shows an IMM configuration where DNS is disabled.

Example:

system> dns
- -state : disabled
- -i1 : 0.0.0.0
- -i2 : 0.0.0.0
- -i3 : 0.0.0.0
- -i61 : ::
- -i62 : ::
- -i63 : ::
- -ddns : enabled
- -dnsrc : DHCP
- -dnn :
- -ddncur : labs.lenovo.com
- -p : ipv6
- -dscvry : enabled

system>

The following table describes the options used in the previous example.

Table 26. dns command output

The following table is a multi-row two column table describing the options used in the previous example.
Table 26. dns command output (continued)

<table>
<thead>
<tr>
<th>Option</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>-state</td>
<td>State of DNS (on or off)</td>
</tr>
<tr>
<td>-i1</td>
<td>Primary IPv4 DNS server IP address</td>
</tr>
<tr>
<td>-i2</td>
<td>Secondary IPv4 DNS IP address</td>
</tr>
<tr>
<td>-i3</td>
<td>Tertiary IPv4 DNS server IP address</td>
</tr>
<tr>
<td>-i61</td>
<td>Primary IPv6 DNS server IP address</td>
</tr>
<tr>
<td>-i62</td>
<td>Secondary IPv6 DNS IP address</td>
</tr>
<tr>
<td>-i63</td>
<td>Tertiary IPv6 DNS server IP address</td>
</tr>
<tr>
<td>-ddns</td>
<td>State of DDNS (enabled or disabled)</td>
</tr>
<tr>
<td>-dnsrc</td>
<td>Preferred DDNS domain name (dhcp or manual)</td>
</tr>
<tr>
<td>-ddn</td>
<td>Manually specified DDN</td>
</tr>
<tr>
<td>-ddncur</td>
<td>Current DDN (read only)</td>
</tr>
<tr>
<td>*P</td>
<td>Preferred DNS servers (ipv4 or ipv6)</td>
</tr>
</tbody>
</table>

**encaps command**

Use this command to let the BMC quit encapsulation mode.

The following table shows the arguments for the options.

Table 27. encaps command

The following table is a one-row two column table consisting of the options and option descriptions.

<table>
<thead>
<tr>
<th>Option</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>lite off</td>
<td>Let BMC quit encapsulation mode and open global access to all users</td>
</tr>
</tbody>
</table>

**ethhtousb command**

Use the `ethtousb` command to display and configure Ethernet to Ethernet-over-USB port mapping.

The command allows you to map an external Ethernet port number to a different port number for Ethernet-over-USB.

Running the `ethtousb` command with no options displays Ethernet-over-USB information. The following table shows the arguments for the options.

Table 28. ethtousb command

The following table is a multi-row three column table consisting of the options, option descriptions, and associated values for the options.
### Table 28. `ethtousb` command (continued)

<table>
<thead>
<tr>
<th>Option</th>
<th>Description</th>
<th>Values</th>
</tr>
</thead>
<tbody>
<tr>
<td><code>-en</code></td>
<td>Ethernet-over-USB state</td>
<td>enabled, disabled</td>
</tr>
<tr>
<td><code>-mx</code></td>
<td>Configure port mapping for</td>
<td>Port pair, separated by a</td>
</tr>
<tr>
<td></td>
<td>index x</td>
<td>colon (:), of the form</td>
</tr>
<tr>
<td></td>
<td></td>
<td><code>port1:port2</code></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><code>-rm</code></td>
<td>Remove port mapping for</td>
<td>Port map indexes are</td>
</tr>
<tr>
<td></td>
<td>specified index</td>
<td>displayed using the</td>
</tr>
<tr>
<td></td>
<td></td>
<td><code>ethtousb</code> command with no</td>
</tr>
<tr>
<td></td>
<td></td>
<td>options.</td>
</tr>
</tbody>
</table>

**Syntax:**

```
ethtousb [options]
option:
  -en  state
  -mx  xport_pair
  -rm  map_index
```

**Example:**

```
system> ethtousb  -en enabled -m1 100:200 -m2 101:201
system> ethtousb
  -en enabled
  -m1 100:200
  -m2 101:201
system> ethtousb -rm 1
```

---

### firewall command

Use this command to configure the firewall to restrict access from certain addresses and optionally limits access time frame. If no option is specified, the current settings will be displayed.

The following table shows the arguments for the options.

**Table 29. `firewall` command**

The following table is a multi-row three column table consisting of the options and option descriptions.

<table>
<thead>
<tr>
<th>Option</th>
<th>Description</th>
<th>Values</th>
</tr>
</thead>
<tbody>
<tr>
<td><code>-bips</code></td>
<td>Block 1-3 IP addresses (comma separated, CIDR or range)</td>
<td>Valid IP addresses&lt;br&gt;Note: IPv4 and IPv6 addresses can use CIDR format to block a range of addresses.</td>
</tr>
<tr>
<td><code>-bmacs</code></td>
<td>Block 1-3 MAC addresses (comma separated)</td>
<td>Valid MAC addresses&lt;br&gt;Note: MAC address filtering works only with specific addresses.</td>
</tr>
<tr>
<td><code>-bbd</code></td>
<td>Block begin date</td>
<td>Date with format <code>&lt;YYYY-MM-DD&gt;</code></td>
</tr>
<tr>
<td><code>-bed</code></td>
<td>Block end date</td>
<td>Date with format <code>&lt;YYYY-MM-DD&gt;</code></td>
</tr>
<tr>
<td><code>-bbt</code></td>
<td>Block begin time</td>
<td>Time with format <code>&lt;HH:MM&gt;</code></td>
</tr>
</tbody>
</table>
Table 29. firewall command (continued)

<table>
<thead>
<tr>
<th>Option</th>
<th>Description</th>
<th>Values</th>
</tr>
</thead>
<tbody>
<tr>
<td>-bet</td>
<td>Block end time</td>
<td>Time with format <a href="">HH:MM</a></td>
</tr>
<tr>
<td>-bti</td>
<td>Block 1-3 time intervals (comma separated)</td>
<td>Time range with format <a href="">HH:MM-HH:MM</a></td>
</tr>
<tr>
<td></td>
<td>e.g., <code>firewall -bti 01:00–02:00,05:05–10:30</code> will block access during 01:00-02:00 &amp; 05:05-10:30 every day</td>
<td></td>
</tr>
<tr>
<td>-clr</td>
<td>Clear the firewall rule for a given type</td>
<td>ip, mac, datetime, interval, all</td>
</tr>
</tbody>
</table>

The following options are for IP address blocking

<table>
<thead>
<tr>
<th>Option</th>
<th>Description</th>
<th>Values</th>
</tr>
</thead>
<tbody>
<tr>
<td>-iplp</td>
<td>IP address lockout period in minutes.</td>
<td>Numeric value between 0 and 2880, 0 = never expire</td>
</tr>
<tr>
<td>-iplf</td>
<td>Maximum number of login failures before IP address is locked out. <strong>Note:</strong> If this value is not 0, then it must be greater than or equal to &lt;Maximum number of login failures&gt; that is set by &lt;accessecfg -lf&gt;</td>
<td>Numeric value between 0 and 32, 0 = never lock</td>
</tr>
<tr>
<td>-ipbl</td>
<td>Show/configure the list of IP addresses being locked out.</td>
<td>del, clrall, show</td>
</tr>
</tbody>
</table>

- **del**: delete an IPv4 or IPv6 address from block list
- **clrall**: clear all blocking IP
- **show**: show all blocking IPs

Example:
- “firewall”: Show all options' value and IP addresses blocking list.
- “firewall -bips 192.168.1.1,192.168.1.0/24,192.168.1.1-192.168.1.5”: Block the access from multi IPs
- “firewall -bti 01:00–02:00,05:05–10:30,14:15-20:00”: Block all access during 01:00-02:00, 05:05-10:30, 14:15-20:00 every day.
- “firewall -clr all”: Clear all rules of “Block List and Time Restriction”.
- “firewall -iplp 60”: Set IP address lockout period to 60 minutes.
- “firewall -iplf 5”: Set maximum number of login failures to 5 times.
- “firewall -ipbl -del 192.168.100.1”: Delete 192.168.100.1 from IP address blocking list.
- “firewall -ipbl -del 3fcc:1234::2”: Delete 3fcc:1234::2 from IP address blocking list.
- “firewall -ipbl -delall”: Delete all blocking IP addresses.
- “firewall -ipbl -show”: Show all blocking IP addresses.

**gprofile command**

Use this command to display and configure group profiles for the IMM.

The following table shows the arguments for the options.

Table 30. gprofile command

The following table is a multi-row three column table consisting of the options, option descriptions, and associated values for the options.
Table 30. gprofile command (continued)

<table>
<thead>
<tr>
<th>Option</th>
<th>Description</th>
<th>Values</th>
</tr>
</thead>
<tbody>
<tr>
<td>-clear</td>
<td>Delete a group</td>
<td>enabled, disabled</td>
</tr>
<tr>
<td>-n</td>
<td>The name of the group</td>
<td>String of up to 63 characters for <code>group_name</code>. The <code>group_name</code> must be unique.</td>
</tr>
<tr>
<td>-a</td>
<td>Role-based authority level</td>
<td>supervisor, operator, rbs &lt;role list&gt;: nsc</td>
</tr>
<tr>
<td>-h</td>
<td>Display the command usage and options</td>
<td></td>
</tr>
</tbody>
</table>

Syntax:
```
gprofile [1 - 16 group_profile_slot_number] [options]
```

options:
- `-clear state`
- `-n group_name`
- `-a authority level`
  - `-nsc network and security`
  - `-am user account management`
  - `-rca remote console access`
  - `-rcvma remote console and remote disk access`
  - `-pr remote server power/restart access`
  - `-bc basic adapter configuration`
  - `-cel ability to clear event logs`
  - `-ac advanced adapter configuration`
- `-h help`

hashpw command

Use this command with the `-sw` option to enable/disable the third-party password function or with the `-re` option to enable/disable the allowance of retrieving third-party password.

The following table shows the arguments for the options.

Table 31. hashpw command

The following table is a multi-row three column table consisting of the options, option descriptions, and associated values for the options.

<table>
<thead>
<tr>
<th>Option</th>
<th>Description</th>
<th>Values</th>
</tr>
</thead>
<tbody>
<tr>
<td><code>-sw</code></td>
<td>Third-Party Password switch status</td>
<td>enabled, disabled</td>
</tr>
<tr>
<td><code>-re</code></td>
<td>Third-Party Password read status</td>
<td>enabled, disabled</td>
</tr>
</tbody>
</table>

Note: Read can be set if the switch is enabled.

Example:
```
system> hashpw -sw enabled -re enabled
system> users -5 -n guest5 -shp ef92b778bafef771e89245b89ecbc08a44a4e166c06659911881f383d4473e94f - r Administrator
system> users -5 ghp
```

<table>
<thead>
<tr>
<th>Account</th>
<th>Login ID</th>
<th>Advanced Attribute</th>
<th>Role</th>
<th>Password Expires</th>
</tr>
</thead>
<tbody>
<tr>
<td>-------</td>
<td>--------</td>
<td>-------------------</td>
<td>-----</td>
<td>------------------</td>
</tr>
</tbody>
</table>

Chapter 10. Command-line interface 119
**ifconfig command**

Use this command to configure the Ethernet interface.

Type `ifconfig eth0` to display the current Ethernet interface configuration. To change the Ethernet interface configuration, type the options, followed by the values. To change the interface configuration, you must have at least Adapter Networking and Security Configuration authority.

**Note:** In a Flex System, the VLAN settings are managed by a Flex System CMM and cannot be modified on the IMM.

The following table shows the arguments for the options.

*Table 32. ifconfig command*

The following table is a multi-row three column table consisting of the options, option descriptions, and associated values for the options.

<table>
<thead>
<tr>
<th>Option</th>
<th>Description</th>
<th>Values</th>
</tr>
</thead>
<tbody>
<tr>
<td><code>-b</code></td>
<td>Burned-in MAC Address (read-only and not configurable)</td>
<td></td>
</tr>
<tr>
<td><code>-state</code></td>
<td>Interface state</td>
<td>disabled, enabled</td>
</tr>
<tr>
<td><code>-c</code></td>
<td>Configuration method</td>
<td>dhcp, static, dthens (dthens corresponds to the try dhcp server, if it fails use static config option on the web interface)</td>
</tr>
<tr>
<td><code>-i</code></td>
<td>Static IP address</td>
<td>Address in valid format.</td>
</tr>
<tr>
<td><code>-g</code></td>
<td>Gateway address</td>
<td>Address in valid format.</td>
</tr>
<tr>
<td><code>-s</code></td>
<td>Subnet mask</td>
<td>Address in valid format.</td>
</tr>
<tr>
<td><code>-n</code></td>
<td>Host name</td>
<td>String of up to 63 characters. The string can include letters, digits, periods, underscores, and hyphens.</td>
</tr>
<tr>
<td><code>-r</code></td>
<td>Data rate</td>
<td>10, 100, auto</td>
</tr>
<tr>
<td><code>-d</code></td>
<td>Duplex mode</td>
<td>full, half, auto</td>
</tr>
<tr>
<td><code>-m</code></td>
<td>MTU</td>
<td>Numeric between 60 and 1500.</td>
</tr>
<tr>
<td><code>-l</code></td>
<td>LAA</td>
<td>MAC address format. Multicast addresses are not allowed (the first byte must be even).</td>
</tr>
<tr>
<td><code>-dn</code></td>
<td>Domain name</td>
<td>Domain name in valid format.</td>
</tr>
<tr>
<td><code>-auto</code></td>
<td>Autonegotiation setting, which determines whether the Data rate and Duplex network settings are configurable</td>
<td>true, false</td>
</tr>
<tr>
<td><code>-ghn</code></td>
<td>Obtain hostname from DHCP</td>
<td>disabled, enabled</td>
</tr>
<tr>
<td><code>-nic</code></td>
<td>switch NIC mode¹</td>
<td>shared, dedicated, shared:nicX²</td>
</tr>
<tr>
<td><code>-failover²</code></td>
<td>Failover mode</td>
<td>none, shared, shared:nicX</td>
</tr>
<tr>
<td><code>-nssync³</code></td>
<td>Network setting synchronization</td>
<td>enabled, disabled</td>
</tr>
</tbody>
</table>
### Table 32. `ifconfig` command (continued)

<table>
<thead>
<tr>
<th>Option</th>
<th>Description</th>
<th>Values</th>
</tr>
</thead>
<tbody>
<tr>
<td><code>-address_table</code></td>
<td>Table of automatically-generated IPv6 addresses and their prefix lengths</td>
<td>This value is read-only and is not configurable.</td>
</tr>
<tr>
<td></td>
<td><strong>Note:</strong> The option is visible only if IPv6 and stateless auto-configuration are enabled.</td>
<td></td>
</tr>
<tr>
<td><code>-ipv6</code></td>
<td>IPv6 state</td>
<td>disabled, enabled</td>
</tr>
<tr>
<td><code>-lla</code></td>
<td>Link-local address</td>
<td>The link-local address is determined by the IMM. This value is read-only and is not configurable.</td>
</tr>
<tr>
<td></td>
<td><strong>Note:</strong> The link-local address only appears if IPv6 is enabled.</td>
<td></td>
</tr>
<tr>
<td><code>-ipv6static</code></td>
<td>Static IPv6 state</td>
<td>disabled, enabled</td>
</tr>
<tr>
<td><code>-i6</code></td>
<td>Static IP address</td>
<td>Static IP address for Ethernet channel 0 in IPv6 format.</td>
</tr>
<tr>
<td><code>-p6</code></td>
<td>Address prefix length</td>
<td>Numeric value between 1 and 128.</td>
</tr>
<tr>
<td><code>-g6</code></td>
<td>Gateway or default route</td>
<td>IP address for the gateway or default route for Ethernet channel 0 in IPv6.</td>
</tr>
<tr>
<td><code>-dhcp6</code></td>
<td>DHCPv6 state</td>
<td>enabled, disabled</td>
</tr>
<tr>
<td><code>-sa6</code></td>
<td>IPv6 stateless autoconfig state</td>
<td>enabled, disabled</td>
</tr>
<tr>
<td><code>-vlan</code></td>
<td>Enable or disable the VLAN tagging</td>
<td>enabled, disabled</td>
</tr>
<tr>
<td><code>-vlanid</code></td>
<td>Network packet identification tag for the IMM</td>
<td>Numeric value between 1 and 4094.</td>
</tr>
</tbody>
</table>

**Notes:**
1. `-nic` will also show the status of nic. `[active]` indicates which nic XCC is currently using
   
   For example:
   `-nic: shared:nic3
   nic1: dedicate
   nic2: ext card slot #3
   nic3: ext card slot 5 [active]`
   
   Indicates that nic3 is in shared mode, on slot 5, nic2 is on slot3, nic1 is XCC dedicated port and XCC is using nic3.
2. The shared:nicX value is available on servers that have an optional mezzanine network card installed. This mezzanine network card can be used by the IMM.
3. If the IMM is configured to use the dedicated management network port, the `-failover` option will direct the IMM to switch to the shared network port if the dedicated port is disconnected.
4. If the failover mode is enabled, the `-nssync` option directs the IMM to use the same network settings that are used on the dedicated management network port for the shared network port.

**Syntax:**
```bash
ifconfig eth0 [options]
```

**options:**
- `-state` `interface_state`
- `-c` `config_method`
- `-i static_ipv4_ip_address`
- `-g ipv4_gateway_address`
- `-s subnet_mask`
- `-n hostname`
- `-r data_rate`
- `-d duplex_mode`
- `-m max_transmission_unit`

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-l locally_administered_MAC
-b burned_in_MAC_address
-dn domain_name
-auto state
-nic state
-failover mode
-nssync state
-address_table
-lla ipv6_link_local_addr
-dhcp6 state
-ipv6 state
-ipv6static state
-sa6 state
-i6 static_ipv6_ip_address
-g6 ipv6_gateway_address
-p6 length
-vlan state
-vlanid VLAN ID

Example:

  system> ifconfig eth0
  -state    :   enabled
  -c        :   dthens
  -gnh      :   disabled
  -i        :   192.168.70.125
  -g        :   0.0.0.0
  -s        :   255.255.255.0
  -n        :   IMM00096B9E003A
  -auto     :   true
  -r        :   auto
  -d        :   auto
  -vlan     :   disabled
  -vlanid   :   1
  -m        :   1500
  -b        :   00:09:6B:9E:00:3A
  -l        :   00:00:00:00:00:00
  -dn :
  -ipv6     :   enabled
  -ipv6static :   disabled
  -i6        :   ::
  -g6        :   ::
  -dhcp6     :   enabled
  -sa6       :   enabled
  -lla      :   fe80::6eae:8bff:fe23:91ae
  -nic : shared:nic3
    nic1: dedicate
    nic2: ext card slot #3
    nic3: ext card slot #5 [active]
  -address_table    :

  system> ifconfig eth0 -c static -i 192.168.70.133
These configuration changes will become active after the next reset of the IMM.

keycfg command

Use this command to display, add, or delete activation keys.

Activation keys control access to optional IMM functionality.
Notes:

- When the `keycfg` command is run without any options, the list of installed activation keys is displayed. Key information displayed includes an index number for each activation key, the type of activation key, the date through which the key is valid, the number of uses remaining, the key status, and a key description.
- Add new activation keys through file transfer.
- Delete old keys by specifying the number of the key or the type of key. When deleting keys by type, only the first key of a given type is deleted.

The following table shows the arguments for the options.

<table>
<thead>
<tr>
<th>Option</th>
<th>Description</th>
<th>Values</th>
</tr>
</thead>
<tbody>
<tr>
<td>-add</td>
<td>Add activation key</td>
<td>Values for the -ip, -pn, -u, -pw, and -f command options</td>
</tr>
<tr>
<td>-ip</td>
<td>IP address of TFTP server with activation key to add</td>
<td>Valid IP address for TFTP server</td>
</tr>
<tr>
<td>-pn</td>
<td>Port number for TFTP/SFTP server with activation key to add</td>
<td>Valid port number for TFTP/SFTP server (default 69/22)</td>
</tr>
<tr>
<td>-u</td>
<td>User name for SFTP server with activation key to add</td>
<td>Valid user name for SFTP server</td>
</tr>
<tr>
<td>-pw</td>
<td>Password for SFTP server with activation key to add</td>
<td>Valid password for SFTP server</td>
</tr>
<tr>
<td>-f</td>
<td>File name for activation key to add</td>
<td>Valid file name for activation key file</td>
</tr>
<tr>
<td>-del</td>
<td>Delete activation key by index number</td>
<td>Valid activation key index number from <code>keycfg</code> listing</td>
</tr>
<tr>
<td>-deltype</td>
<td>Delete activation key by key type</td>
<td>Valid key type value</td>
</tr>
</tbody>
</table>

Syntax:

```
keycfg [options]
option:
  -add
    -ip tftp/sftp server ip address
    -pn pn port number of tftp/sftp server (default 69/22)
    -u username for sftp server
    -pw password for sftp server
    -f filename
    -del n ( where n is a valid ID number from listing)
    -deltype x ( where x is a Type value)
```

Example:

```
system> keycfg
ID  Type  Valid      Uses  Status      Description
1   4     10/10/2010  5      "valid"    "IMM remote presence"
2   3     10/20/2010  2      "valid"    "IMM feature"
3   32796 NO CONSTRAINTS NO CONSTRAINTS "valid"    "IBM Security Key Lifecycle Manager for SEDs FoD"
system>
```
**Note:** The **Description** field for ID number 3 is displayed on separate lines due to space limitations.

**ldap command**

Use this command to display and configure the LDAP protocol configuration parameters.

The following table shows the arguments for the options.

*Table 34. ldap command*

The following table is a multi-row three column table consisting of the options, option descriptions, and associated values for the options.

<table>
<thead>
<tr>
<th>Option</th>
<th>Description</th>
<th>Values</th>
</tr>
</thead>
<tbody>
<tr>
<td>-a</td>
<td>User authentication method</td>
<td>local only, LDAP only, local first then LDAP, LDAP first then local</td>
</tr>
<tr>
<td>-aom</td>
<td>Authentication only mode</td>
<td>enabled, disabled</td>
</tr>
<tr>
<td>-b</td>
<td>Binding method</td>
<td>anonymous, bind with ClientDN and password, bind with Login Credential</td>
</tr>
<tr>
<td>-c</td>
<td>Client distinguished name</td>
<td>String of up to 127 characters for client_dn</td>
</tr>
<tr>
<td>-d</td>
<td>Search domain</td>
<td>String of up to 63 characters for search_domain</td>
</tr>
<tr>
<td>-f</td>
<td>Group filter</td>
<td>String of up to 127 characters for group_filter</td>
</tr>
<tr>
<td>-fn</td>
<td>Forest name</td>
<td>For active directory environments. String of up to 127 characters.</td>
</tr>
<tr>
<td>-g</td>
<td>Group search attribute</td>
<td>String of up to 63 characters for group_search_attr</td>
</tr>
<tr>
<td>-l</td>
<td>Login permission attribute</td>
<td>String of up to 63 characters for string</td>
</tr>
<tr>
<td>-p</td>
<td>Client password</td>
<td>String of up to 15 characters for client_pw</td>
</tr>
<tr>
<td>-pc</td>
<td>Confirm client password</td>
<td>String of up to 15 characters for confirm_pw</td>
</tr>
<tr>
<td></td>
<td>Command usage is: ldap -p client_pw -pc confirm_pw</td>
<td></td>
</tr>
<tr>
<td></td>
<td>This option is required when you change the client password. It compares the confirm_pw argument with the client_pw argument. The command will fail if the arguments do not match.</td>
<td></td>
</tr>
<tr>
<td>-ep</td>
<td>Encrypted password</td>
<td>Backup/restore password (internal use only)</td>
</tr>
<tr>
<td>-r</td>
<td>Root entry distinguished name (DN)</td>
<td>String of up to 127 characters for root_dn</td>
</tr>
<tr>
<td>-rbs</td>
<td>Enhanced Role-Based Security for active directory users</td>
<td>enabled, disabled</td>
</tr>
<tr>
<td>-s1ip</td>
<td>Server 1 host name/IP address</td>
<td>String up to 127 characters or an IP address for host name/ip_addr</td>
</tr>
<tr>
<td>-s2ip</td>
<td>Server 2 host name/IP address</td>
<td>String up to 127 characters or an IP address for host name/ip_addr</td>
</tr>
<tr>
<td>-s3ip</td>
<td>Server 3 host name/IP address</td>
<td>String up to 127 characters or an IP address for host name/ip_addr</td>
</tr>
<tr>
<td>-s4ip</td>
<td>Server 4 host name/IP address</td>
<td>String up to 127 characters or an IP address for host name/ip_addr</td>
</tr>
<tr>
<td>-s1pn</td>
<td>Server 1 port number</td>
<td>A numeric port number up to 5 digits for port_number</td>
</tr>
</tbody>
</table>
Table 34. ldap command (continued)

<table>
<thead>
<tr>
<th>Option</th>
<th>Description</th>
<th>Values</th>
</tr>
</thead>
<tbody>
<tr>
<td>-s2pn</td>
<td>Server 2 port number</td>
<td>A numeric port number up to 5 digits for port_number</td>
</tr>
<tr>
<td>-s3pn</td>
<td>Server 3 port number</td>
<td>A numeric port number up to 5 digits for port_number</td>
</tr>
<tr>
<td>-s4pn</td>
<td>Server 4 port number</td>
<td>A numeric port number up to 5 digits for port_number</td>
</tr>
<tr>
<td>-t</td>
<td>Server target name</td>
<td>When the rbs option is enabled, this field specifies a target name that can be associated with one or more roles on the Active Directory server through the Role-Based Security (RBS) Snap-In tool.</td>
</tr>
<tr>
<td>-u</td>
<td>UID search attribute</td>
<td>String of up to 63 characters for search_attrib</td>
</tr>
<tr>
<td>-v</td>
<td>Get LDAP server address through DNS</td>
<td>off, on</td>
</tr>
<tr>
<td>-h</td>
<td>Displays the command usage and options</td>
<td></td>
</tr>
</tbody>
</table>

Syntax:

```
ldap [options]
```

options:

- a loc|ldap|locld|ldloc
- aom enable/disabled
- b anon|client|login
- c client_dn
- d search_domain
- f group_filter
- fn forest_name
- g group_search_attr
- l string
- p client_pw
- pc confirm_pw
- ep encrypted_pw
- r root_dn
- rbs enable|disabled
- s1ip host name/ip_addr
- s2ip host name/ip_addr
- s3ip host name/ip_addr
- s4ip host name/ip_addr
- s1pn port_number
- s2pn port_number
- s3pn port_number
- s4pn port_number
- t name
- u search_attrib
- v off/on
- h

ntp command

Use this command to display and configure the Network Time Protocol (NTP).

The following table shows the arguments for the options.

Table 35. ntp command

The following table is a multi-row three column table consisting of the options, option descriptions, and associated values for the options.
Table 35. ntp command (continued)

<table>
<thead>
<tr>
<th>Option</th>
<th>Description</th>
<th>Values</th>
</tr>
</thead>
<tbody>
<tr>
<td>-en</td>
<td>Enables or disables the Network Time Protocol.</td>
<td>enabled, disabled</td>
</tr>
<tr>
<td>-i</td>
<td>Name or IP address of the Network Time Protocol server. This is the index number of the Network Time Protocol server.</td>
<td>The name of the NTP server to be used for clock synchronization. The range of the index number of the NTP server is from -i1 through -i4.</td>
</tr>
<tr>
<td>-f</td>
<td>The frequency (in minutes) that the IMM clock is synchronized with the Network Time Protocol server.</td>
<td>3 - 1440 minutes</td>
</tr>
<tr>
<td>-synch</td>
<td>Requests an immediate synchronization with the Network Time Protocol server.</td>
<td>No values are used with this parameter.</td>
</tr>
</tbody>
</table>

1. -i is the same as i1.

Syntax:
tp [options]
options:
- en state
- i hostname/ip_addr
- f frequency
- synch

Example:
system> ntp
- en: disabled
- f: 3 minutes
- i: not set

portcfg command

Use this command to configure the IMM for the serial redirection feature.

The IMM must be configured to match the server internal serial port settings. To change the serial port configuration, type the options, followed by the values. To change the serial port configuration, you must have at least Adapter Networking and Security Configuration authority.

Note: The server external serial port can only be used by the IMM for IPMI functionality. The CLI is not supported through the serial port. The serred and cliauth options that were present in the Remote Supervisor Adapter II CLI are not supported.

Running the portcfg command with no options displays serial port configuration. The following table shows the arguments for the options.

Note: The number of data bits (8) is set in the hardware and cannot be changed.

Table 36. portcfg command

The following table is a multi-row three column table consisting of the options, option descriptions, and associated values for the options.
Table 36. portcfg command (continued)

<table>
<thead>
<tr>
<th>Option</th>
<th>Description</th>
<th>Values</th>
</tr>
</thead>
<tbody>
<tr>
<td>-b</td>
<td>Baud rate</td>
<td>9600, 19200, 38400, 57600, 115200</td>
</tr>
<tr>
<td>-p</td>
<td>Parity</td>
<td>none, odd, even</td>
</tr>
<tr>
<td>-s</td>
<td>Stop bits</td>
<td>1, 2</td>
</tr>
<tr>
<td>-climode</td>
<td>CLI mode</td>
<td>0, 1, 2</td>
</tr>
<tr>
<td></td>
<td>Where:</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• 0 = none: The CLI is disabled</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• 1 = cliems: The CLI is enabled with EMS-compatible keystroke sequences</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• 2 = cluser: The CLI is enabled with user-defined keystroke sequences</td>
<td></td>
</tr>
</tbody>
</table>

Syntax:
portcfg [options]
options:
  - b baud_rate
  - p parity
  - s stopbits
  - climode mode

Example:
- system> portcfg
  -b: 57600
  -climode: 2 (CLI with user defined keystroke sequence)
  -p: even
  -s: 1
- system> portcfg -b 38400
  ok
- system>

**portcontrol command**
Use this command to turn a network service port on or off.

Currently this command only supports control of the port for the IPMI protocol. Type `portcontrol` to display the IPMI port state. To enable or disable the IPMI network port, type the `-ipmi` option followed by the **on** or **off** values.

Table 37. portcontrol command

The following table is a multi-row three column table consisting of the options, option descriptions, and associated values for the options.

<table>
<thead>
<tr>
<th>Option</th>
<th>Description</th>
<th>Values</th>
</tr>
</thead>
<tbody>
<tr>
<td>-all</td>
<td>Enable or disable all interfaces and discovery protocols</td>
<td>on, off</td>
</tr>
<tr>
<td>-cim</td>
<td>Enable or disable CIM discovery</td>
<td>on, off</td>
</tr>
<tr>
<td>-ipmi</td>
<td>Enable or disable the ipmi access via LAN</td>
<td>on, off</td>
</tr>
</tbody>
</table>
Table 37. portcontrol command (continued)

<table>
<thead>
<tr>
<th>Option</th>
<th>Description</th>
<th>Values</th>
</tr>
</thead>
<tbody>
<tr>
<td>-ipmi-kcs</td>
<td>Enable or disable ipmi access from server</td>
<td>on, off</td>
</tr>
<tr>
<td>-rest</td>
<td>Enable or disable REST discovery</td>
<td>on, off</td>
</tr>
<tr>
<td>-slp</td>
<td>Enable or disable SLP discovery</td>
<td>on, off</td>
</tr>
<tr>
<td>-snmp</td>
<td>Enable or disable SNMP discovery</td>
<td>on, off</td>
</tr>
<tr>
<td>-ssdp</td>
<td>Enable or disable SSDP discovery</td>
<td>on, off</td>
</tr>
<tr>
<td>-cli</td>
<td>Enable or disable CLI discovery</td>
<td>on, off</td>
</tr>
<tr>
<td>-web</td>
<td>Enable or disable WEB discovery</td>
<td>on, off</td>
</tr>
</tbody>
</table>

Syntax:
portcontrol [options]
options:
   -ipmi on/off

Example:
system> portcontrol
cim : on
ipmi : on
ipmi-kcs : on
rest : on
slp : on
snmp : off
ssdp : on
cli : on
web : on

ports command
Use this command to display and configure IMM ports.

Running the ports command with no options displays information for all IMM ports. The following table shows the arguments for the options.

Table 38. ports command
The following table is a multi-row three column table consisting of the options, option descriptions, and associated values for the options.

<table>
<thead>
<tr>
<th>Option</th>
<th>Description</th>
<th>Values</th>
</tr>
</thead>
<tbody>
<tr>
<td>-open</td>
<td>Display open ports</td>
<td></td>
</tr>
<tr>
<td>-reset</td>
<td>Reset ports to default settings</td>
<td></td>
</tr>
<tr>
<td>-http</td>
<td>HTTP port number</td>
<td>Default port number: 80</td>
</tr>
</tbody>
</table>
### Table 38. ports command (continued)

<table>
<thead>
<tr>
<th>Option</th>
<th>Description</th>
<th>Values</th>
</tr>
</thead>
<tbody>
<tr>
<td>-httpsp</td>
<td>HTTPS port number</td>
<td>Default port number: 443</td>
</tr>
<tr>
<td>-sshp</td>
<td>SSH legacy CLI port number</td>
<td>Default port number: 22</td>
</tr>
<tr>
<td>-snmpap</td>
<td>SNMP agent port number</td>
<td>Default port number: 161</td>
</tr>
<tr>
<td>-snmptp</td>
<td>SNMP traps port number</td>
<td>Default port number: 162</td>
</tr>
<tr>
<td>-rpp</td>
<td>Remote presence port number</td>
<td>Default port number: 3900</td>
</tr>
<tr>
<td>-cimhp</td>
<td>CIM over HTTP port number</td>
<td>Default port number: 5988</td>
</tr>
<tr>
<td>-cimhsp</td>
<td>CIM over HTTPS port number</td>
<td>Default port number: 5989</td>
</tr>
</tbody>
</table>

**Syntax:**

```plaintext
ports [options]
```

**option:**

- `open`
- `reset`
- `-httpsp port_number`
- `-http port_number`
- `-sshp port_number`
- `-snmpap port_number`
- `-snmptp port_number`
- `-rpp port_number`
- `-cimhp port_number`
- `-cimhsp port_number`

**Example:**

```plaintext
system> ports
  -https 80
  -httpsp 443
  -rpp 3900
  -snmpap 161
  -snmptp 162
  -sshp 22
  -cimhp 5988
  -cimhsp 5989
system>
```

### rdmount command

Use this command to mount remote disk images or network shares.

The following table shows the arguments for the options.

**Table 39. rdmount command**

The following table is a multi-row two column table consisting of the options and option descriptions.

**Notes:**

- Up to two files can be uploaded in the XClarity Controller memory and mounted as virtual media using the XClarity Controller RDOC feature. The total size for both files must not exceed 50 MB. The uploaded images are read only unless the `–rw` option is used.
- When using the HTTP, SFTP, or FTP protocols to mount or map the images, the total size for all the images must not exceed 50 MB. There is no size limit if the NFS or SAMBA protocols are used.
Table 39. rdmount command (continued)

<table>
<thead>
<tr>
<th>Option</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>-r</td>
<td>rdoc operation (if used, must be first option)</td>
</tr>
<tr>
<td>-r -map</td>
<td>mount the RDOC images</td>
</tr>
<tr>
<td>-r -unmap &lt;filename&gt;</td>
<td>unmount the mounted RDOC images</td>
</tr>
<tr>
<td>-r -maplist</td>
<td>shows the mounted RDOC images via the XClarity Controller web browser and the CLI interface</td>
</tr>
<tr>
<td>-map</td>
<td>-t &lt;samba</td>
</tr>
<tr>
<td></td>
<td>-ro read-only</td>
</tr>
<tr>
<td></td>
<td>-rw read-write</td>
</tr>
<tr>
<td></td>
<td>-u user</td>
</tr>
<tr>
<td></td>
<td>-p password</td>
</tr>
<tr>
<td></td>
<td>-l file location (URL format)</td>
</tr>
<tr>
<td></td>
<td>-o option (extra option string for samba and nfs mounts)</td>
</tr>
<tr>
<td></td>
<td>-d domain (domain for samba mount)</td>
</tr>
<tr>
<td>-maplist</td>
<td>shows the mapped images</td>
</tr>
<tr>
<td>-unmap &lt;id</td>
<td>filename&gt;</td>
</tr>
<tr>
<td>-mount</td>
<td>mount the mapped images</td>
</tr>
<tr>
<td>-unmount</td>
<td>unmount the mounted images</td>
</tr>
</tbody>
</table>

**restore command**

Use this command to restore system settings from a backup file.

The following table shows the arguments for the options.

Table 40. restore command

The following table is a multi-row three column table consisting of the options, option descriptions, and associated values for the options.

<table>
<thead>
<tr>
<th>Option</th>
<th>Description</th>
<th>Values</th>
</tr>
</thead>
<tbody>
<tr>
<td>-f</td>
<td>Backup file name</td>
<td>Valid file name</td>
</tr>
<tr>
<td>-pp</td>
<td>Password or pass-phrase used to encrypt passwords inside the backup file</td>
<td>Valid password or quote-delimited pass-phrase</td>
</tr>
<tr>
<td>-ip</td>
<td>IP address of TFTP/SFTP server</td>
<td>Valid IP address</td>
</tr>
<tr>
<td>-pn</td>
<td>Port number of TFTP/SFTP server</td>
<td>Valid port number (default 69/22)</td>
</tr>
<tr>
<td>-u</td>
<td>Username for SFTP server</td>
<td>Valid user name</td>
</tr>
<tr>
<td>-pw</td>
<td>Password for SFTP server</td>
<td>Valid password</td>
</tr>
</tbody>
</table>

Syntax:
restore [options]
option:
   -f filename
   -pp password
   -ip ip_address
   -pn port_number
   username
   -pw password

Example:
    system> restore f xcc-back.cli pp xxxxxx ip 192.168.70.200
           ok
    system>

**restored defaults command**

Use this command to restore all IMM settings to the factory default.

- There are no options for the `restored defaults` command.
- You will be asked to confirm the command before it is processed.

**Syntax**:
    restored defaults

**Example**:
    system> restored defaults

    This action will cause all IMM settings to be set to factory defaults.

If this is the local system, you will lose your TCP/IP connection as a result. You will need to reconfigure the IMM network interface to restore connectivity. After the IMM configuration is cleared, the IMM will be restarted.

    Proceed? (y/n)
    Y
    Restoring defaults

**roles command**

Use this command to display or configure roles.

The following table shows the arguments for the options.

Table 41. roles command

The following table is a multi-row three column table consisting of the options, option descriptions, and associated values for the options.
### Table 41. roles command (continued)

<table>
<thead>
<tr>
<th>Option</th>
<th>Description</th>
<th>Values</th>
</tr>
</thead>
<tbody>
<tr>
<td>-n</td>
<td>Role to configure</td>
<td>Limited to 32 characters</td>
</tr>
<tr>
<td>-p</td>
<td>Set privileges</td>
<td>custom:am</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• am: User account management access</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• rca: Remote console access</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• rcvma: Remote console and remote disk (virtual media) access</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• pr: Remote server power/restart access</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• cel: Ability to clear event logs</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• bc: Adapter Configuration (basic)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• nsc: Adapter Configuration (network and security)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• ac: Adapter Configuration (advanced)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• us: UEFI Security</td>
</tr>
<tr>
<td>Note:</td>
<td></td>
<td>the above custom permission flags can be used in any combination</td>
</tr>
<tr>
<td>-d</td>
<td>Delete a row</td>
<td></td>
</tr>
</tbody>
</table>

### Syntax

`roles [-options] - display/configure roles`
- `role_account` - `role number[3-31]`

**options:**
- `n` - role name (limited to 32 characters)
- `p` - privilege (custom:am|rca|rcvma|pr|cel|bc|nsc|ac|us)
  - `am` - User account management access
  - `rca` - Remote console access
  - `rcvma` - Remote console and remote disk (virtual media) access
  - `pr` - Remote server power/restart access
  - `cel` - Ability to clear event logs
  - `bc` - Adapter Configuration (basic)
  - `nsc` - Adapter Configuration (network and security)
  - `ac` - Adapter Configuration (advanced)
  - `us` - UEFI Security
  - Note: the above custom permission flags can be used in any combination
- `d` - delete a row

### Example

```
system> roles -3 -n test1 -p custom:am|rca|rcvma
ok
```

```
user> roles
 Account | Role       | Privilege                  | Assigned To |
---------|------------|-----------------------------|-------------|
 0        | Administrator | all                        | USERID      |
 1        | ReadOnly    | none                        |             |
 2        | Operator    | custom:pr|cel|bc|nsc      |             |
 3        | test1       | custom:am|rca|rcvma        |             |
```
**seccfg command**

Use this command to perform firmware rollback.

The following table shows the arguments for the options.

*Table 42. seccfg command*

The following table is a multi-row two column table consisting of the options and option descriptions.

<table>
<thead>
<tr>
<th>Option</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>-fwrb</td>
<td>Allows firmware rollback to previous versions (yes/no)</td>
</tr>
<tr>
<td>-rppen</td>
<td>Remote physical presence enable (read only)</td>
</tr>
<tr>
<td>-rppto</td>
<td>Remote physical presence timeout (read only)</td>
</tr>
<tr>
<td>-rpp &lt;yes/no?&gt;</td>
<td>Physical presence (if enabled by BIOS)</td>
</tr>
</tbody>
</table>

**set command**

Use this command to change some IMM settings.

- Some IMM settings can be changed with a simple set command.
- Some of these settings, such as environment variables, are used by the CLI.

The following table shows the arguments for the options.

*Table 43. set command*

The following table is a single-row three column table consisting of the command description and associated information.

<table>
<thead>
<tr>
<th>Option</th>
<th>Description</th>
<th>Values</th>
</tr>
</thead>
<tbody>
<tr>
<td>value</td>
<td>Set value for specified path or setting</td>
<td>Appropriate value for specified path or setting.</td>
</tr>
</tbody>
</table>

Syntax:

```
set [options]
option:
  value
```

**smtp command**

Use this command to display and configure settings for the SMTP interface.

Running the smtp command with no options displays all SMTP interface information. The following table shows the arguments for the options.

*Table 44. smtp command*

The following table is a multi-row three column table consisting of the options, option descriptions, and associated values for the options.
Table 44. smtp command (continued)

<table>
<thead>
<tr>
<th>Option</th>
<th>Description</th>
<th>Values</th>
</tr>
</thead>
<tbody>
<tr>
<td>-auth</td>
<td>SMTP authentication support</td>
<td>enabled, disabled</td>
</tr>
<tr>
<td>-authhepw</td>
<td>SMTP authentication encrypted password</td>
<td>Valid password string</td>
</tr>
<tr>
<td>-authmd</td>
<td>SMTP authentication method</td>
<td>CRAM-MD5, LOGIN</td>
</tr>
<tr>
<td>-authn</td>
<td>SMTP authentication user name</td>
<td>String (limited to 256 characters)</td>
</tr>
<tr>
<td>-authpw</td>
<td>SMTP authentication password</td>
<td>String (limited to 256 characters)</td>
</tr>
<tr>
<td>-pn</td>
<td>SMTP port number</td>
<td>Valid port number</td>
</tr>
<tr>
<td>-s</td>
<td>SMTP server IP address or host name</td>
<td>Valid IP address or host name (63 character limit)</td>
</tr>
</tbody>
</table>

Syntax:

smtp [options]

Option:

- auth enabled|disabled
- authhepw password
- authmd CRAM-MD5|LOGIN
- authn username
- authpw password
- s ip_address_or_hostname
- pn port_number

Example:

system> smtp
- s test.com
- pn 25
system>

snmp command

Use this command to display and configure SNMP interface information.

Running the snmp command with no options displays all SNMP interface information. The following table shows the arguments for the options.

Table 45. snmp command

The following table is a multi-row three column table consisting of the options, option descriptions, and associated values for the options.

<table>
<thead>
<tr>
<th>Option</th>
<th>Description</th>
<th>Values</th>
</tr>
</thead>
<tbody>
<tr>
<td>-a3</td>
<td>SNMPv3 agent</td>
<td>on, off</td>
</tr>
<tr>
<td>Notes:</td>
<td>To enable the SNMPv3 agent, the following criteria must be met:</td>
<td></td>
</tr>
<tr>
<td></td>
<td>IMM contact specified using the -cn command option.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>IMM location specified using the -l command option.</td>
<td></td>
</tr>
<tr>
<td>-t1</td>
<td>SNMPv1 traps</td>
<td>on, off</td>
</tr>
<tr>
<td>-t</td>
<td>SNMPv3 traps</td>
<td>on, off</td>
</tr>
</tbody>
</table>
### Table 45. snmp command (continued)

<table>
<thead>
<tr>
<th>Option</th>
<th>Description</th>
<th>Values</th>
</tr>
</thead>
</table>
| -l     | IMM location                 | String (limited to 47 characters).  
  Notes:  
  • Arguments containing spaces must be enclosed in quotation marks.  
  • No leading or trailing spaces are allowed in arguments.  
  • Clear the IMM location by specifying no argument or by specifying an empty string as the argument, such as "". |
| -cn    | IMM contact name             | String (limited to 47 characters).  
  Notes:  
  • Arguments containing spaces must be enclosed in quotation marks.  
  • No leading or trailing spaces are allowed in arguments.  
  • Clear the IMM contact name by specifying no argument or by specifying an empty string as the argument, such as "". |
| -c     | SNMP community name          | String (limited to 15 characters).  
  Notes:  
  • Arguments containing spaces must be enclosed in quotation marks.  
  • No leading or trailing spaces are allowed in arguments.  
  • Clear an SNMP community name by specifying no argument or by specifying an empty string as the argument, such as "". |
| -ci    | SNMP community IP address/host name | Valid IP address or hostname (limited to 63 characters).  
  Notes:  
  • An IP address or host name can only contain dots, underscores, minus signs, letters and digits. No embedded spaces or consecutive periods are allowed.  
  • Clear an SNMP community IP address or host name by specifying no argument. |

**Syntax:**

```
snmp [options]
```

**Example:**

```
system> snmp  
-t enabled  
-a3 enabled  
-l ZhangjiangMansion  
-cn Kelvin  
-t1 enabled  
-c community1  
-ci host1  
```

---

Chapter 10. Command-line interface 135
**snmpalerts command**

Use this command to manage alerts sent via the SNMP.

Running `snmpalerts` with no options displays all SNMP alert settings. The following table shows the arguments for the options.

*Table 46. snmpalerts command*

The following table is a multi-row three column table consisting of the options, option descriptions, and associated values for the options.

<table>
<thead>
<tr>
<th>Option</th>
<th>Description</th>
<th>Values</th>
</tr>
</thead>
<tbody>
<tr>
<td>-status</td>
<td>SNMP alert status</td>
<td>on, off</td>
</tr>
<tr>
<td>-crt</td>
<td>Sets critical events that send alerts</td>
<td>all, none, custom:te</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Custom critical alert settings are specified using a pipe separated list of values of the form `snmpalerts -crt custom:te</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• te: critical temperature threshold exceeded</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• vo: critical voltage threshold exceeded</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• po: critical power failure</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• di: hard disk drive failure</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• fa: fan failure</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• cp: microprocessor failure</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• me: memory failure</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• in: hardware incompatibility</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• re: power redundancy failure</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• ot: all other critical events</td>
</tr>
<tr>
<td>-crt-enabled</td>
<td>Send critical event alerts</td>
<td>enabled, disabled</td>
</tr>
<tr>
<td>-wrn</td>
<td>Sets warning events that send alerts</td>
<td>all, none, custom:rp</td>
</tr>
<tr>
<td></td>
<td>Custom warning alert settings are specified using a pipe separated list of values of the form `snmpalerts -wrn custom:rp</td>
<td>te`, where custom values are:</td>
</tr>
<tr>
<td></td>
<td>• rp: power redundancy warning</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• te: warning temperature threshold exceeded</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• vo: warning voltage threshold exceeded</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• po: warning power threshold exceeded</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• fa: non-critical fan event</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• cp: microprocessor in degraded state</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• me: memory warning</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• ot: all other warning events</td>
<td></td>
</tr>
<tr>
<td>-wrn-enabled</td>
<td>Send warning event alerts</td>
<td>enabled, disabled</td>
</tr>
</tbody>
</table>
Table 46. snmpalerts command (continued)

<table>
<thead>
<tr>
<th>Option</th>
<th>Description</th>
<th>Values</th>
</tr>
</thead>
<tbody>
<tr>
<td>-sys</td>
<td>Sets routine events that send alerts</td>
<td>all, none, custom:lo</td>
</tr>
<tr>
<td></td>
<td>Custom routine alert settings are specified using a pipe separated list of values of the form **snmpalerts -sys custom:lo</td>
<td>tio**, where custom values are:</td>
</tr>
<tr>
<td></td>
<td>• lo: successful remote login</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• tio: operating system timeout</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• ot: all other informational and system events</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• po: system power on/off</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• bf: operating system boot failure</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• til: operating system loader watchdog timeout</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• pf: predicted failure (PFA)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• el: event log 75% full</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• ne: network change</td>
<td></td>
</tr>
<tr>
<td>-sysen</td>
<td>Send routine event alerts</td>
<td>enabled, disabled</td>
</tr>
</tbody>
</table>

Syntax:

```
snmpalerts [options]
```

Options:

- `-status status`
- `-crt event_type`
- `-crten state`
- `-wn event_type`
- `-wnen state`
- `-sys event_type`
- `-sysen state`

**srcfg command**

Use this command to indicate the key sequence to enter the CLI from the serial redirection mode.

To change the serial redirect configuration, type the options, followed by the values. To change the serial redirect configuration, you must have at least Adapter Networking and Security Configuration authority.

**Note:** The IMM hardware does not provide for a serial port to serial port pass-through capability. Therefore the `-passthru` and `-entercliseq` options which are present in the Remote Supervisor Adapter II CLI are not supported.

Running the **srcfg** command with no options displays the current serial redirection keystroke sequence. The following table shows the arguments for the **srcfg -entercliseq** command option.

Table 47. srcfg command

The following table is a single-row three column table consisting of the option, option description, and value information for the option.
Table 47. srcfg command (continued)

<table>
<thead>
<tr>
<th>Option</th>
<th>Description</th>
<th>Values</th>
</tr>
</thead>
<tbody>
<tr>
<td>-entercliseq</td>
<td>Enter a CLI keystroke sequence</td>
<td>User-defined keystroke sequence to enter the CLI.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Note: This sequence must have at least one character and at most 15 characters. The caret symbol (^) has a special meaning in this sequence. It denotes Ctrl for keystrokes that map to Ctrl sequences (for example, ^[ for the escape key and ^M for carriage return). All occurrences of ^ are interpreted as part of a Ctrl sequence. Refer to an ASCII-to-key conversion table for a complete list of Ctrl sequences. The default value for this field is ^[ which is Esc followed by (.</td>
</tr>
</tbody>
</table>

Syntax:
srcfg [options]
options:
- entercliseq entercli_keyseq

Example:
system> srcfg
- entercliseq ^[Q
system>

**sshcfg command**

Use this command to display and configure SSH parameters.

Running the sshcfg command with no options displays all SSH parameters. The following table shows the arguments for the options.

Table 48. sshcfg command

This following table is a multi-row three column table consisting of the options, option descriptions, and associated values for the options.

<table>
<thead>
<tr>
<th>Option</th>
<th>Description</th>
<th>Values</th>
</tr>
</thead>
<tbody>
<tr>
<td>-cstatus</td>
<td>State of SSH CLI</td>
<td>enabled, disabled</td>
</tr>
<tr>
<td>-hk gen</td>
<td>Generate SSH server private key</td>
<td></td>
</tr>
<tr>
<td>-hk rsa</td>
<td>Display server RSA public key</td>
<td></td>
</tr>
</tbody>
</table>

Syntax:
sshcfg [options]
option:
- cstatus state
- hk gen
- hk rsa

Example:
system> sshcfg
- cstatus enabled
CLI SSH port 22
1 SSH public keys installed
system>
ssl command
Use this command to display and configure the SSL parameters.

To enable an SSL client, a client certificate must be installed. Running the ssl command with no options displays SSL parameters. The following table shows the arguments for the options.

Table 49.  ssl command
The following table is a multi-row three column table consisting of the options, option descriptions, and associated values for the options.

<table>
<thead>
<tr>
<th>Option</th>
<th>Description</th>
<th>Values</th>
</tr>
</thead>
<tbody>
<tr>
<td>-ce</td>
<td>Enables or disables an SSL client</td>
<td>on, off</td>
</tr>
<tr>
<td>-se</td>
<td>Enables or disables an SSL server</td>
<td>on, off</td>
</tr>
<tr>
<td>-cime</td>
<td>Enables or disables CIM over HTTPS on the SSL server</td>
<td>on, off</td>
</tr>
</tbody>
</table>

Syntax:

```
portcfg [options]
options:
  -ce state
  -se state
  -cime state
```

Parameters: The following parameters are presented in the option status display for the ssl command and are output only from the CLI:

Server secure transport enable
This status display is read-only and cannot be set directly.

Server Web/CMD key status
This status display is read-only and cannot be set directly. Possible command line output values are as follows:

- Private Key and Cert/CSR not available
- Private Key and CA-signed cert installed
- Private Key and Auto-gen self-signed cert installed
- Private Key and Self-signed cert installed
- Private Key stored, CSR available for download

SSL server CSR key status
This status display is read-only and cannot be set directly. Possible command line output values are as follows:

- Private Key and Cert/CSR not available
- Private Key and CA-signed cert installed
- Private Key and Auto-gen self-signed cert installed
- Private Key and Self-signed cert installed
- Private Key stored, CSR available for download

SSL client LDAP key status
This status display is read-only and cannot be set directly. Possible command line output values are as follows:
Private Key and Cert/CSR not available
Private Key and CA-signed cert installed
Private Key and Auto-gen self-signed cert installed
Private Key and Self-signed cert installed
Private Key stored, CSR available for download

**SSL client CSR key status**
This status display is read-only and cannot be set directly. Possible command line output values are as follows:

- Private Key and Cert/CSR not available
- Private Key and CA-signed cert installed
- Private Key and Auto-gen self-signed cert installed
- Private Key and Self-signed cert installed
- Private Key stored, CSR available for download

**sslcfg command**
Use this command to display and configure the SSL for the IMM and manage certificates.

Running the `sslcfg` command with no options displays all SSL configuration information. The `sslcfg` command is used to generate a new encryption key and self-signed certificate or certificate signing request (CSR). The following table shows the arguments for the options.

**Table 50. sslcfg command**
The following table is a multi-row three column table consisting of the options, option descriptions, and associated values for the options.

<table>
<thead>
<tr>
<th>Option</th>
<th>Description</th>
<th>Values</th>
</tr>
</thead>
</table>
| `-server` | SSL server status | enabled, disabled  
*Note:* The SSL server can be enabled only if a valid certificate is in place. |
| `-client` | SSL client status | enabled, disabled  
*Note:* The SSL client can be enabled only if a valid server or client certificate is in place. |
| `-cim` | CIM over HTTPS status | enabled, disabled  
*Note:* CIM over HTTPS can be enabled only if a valid server or client certificate is in place. |
| `-cert` | Generate self-signed certificate | server, client, sysdir, storekey  
*Notes:*  
- Values for the `-c`, `-sp`, `-cl`, `-on`, and `-hn` command options are required when generating a self-signed certificate.  
- Values for the `-cp`, `-ea`, `-ou`, `-s`, `-gn`, `-in`, and `-dq` command options are optional when generating a self-signed certificate. |
| `-csr` | Generate a CSR | server, client, sysdir, storekey  
*Notes:*  
- Values for the `-c`, `-sp`, `-cl`, `-on`, and `-hn` command options are required when generating a CSR.  
- Values for the `-cp`, `-ea`, `-ou`, `-s`, `-gn`, `-in`, `-dq`, `-cpwd`, and `-un` command options are optional when generating a CSR. |
Table 50. sslcfg command (continued)

<table>
<thead>
<tr>
<th>Option</th>
<th>Description</th>
<th>Values</th>
</tr>
</thead>
<tbody>
<tr>
<td>-i</td>
<td>IP address for TFTP/SFTP server</td>
<td>Valid IP address. <strong>Note:</strong> An IP address for the TFTP or SFTP server must be specified when uploading a certificate, or downloading a certificate or CSR.</td>
</tr>
<tr>
<td>-pn</td>
<td>Port number of TFTP/SFTP server</td>
<td>Valid port number (default 69/22)</td>
</tr>
<tr>
<td>-u</td>
<td>User name for SFTP server</td>
<td>Valid user name</td>
</tr>
<tr>
<td>-pw</td>
<td>Password for SFTP server</td>
<td>Valid password</td>
</tr>
<tr>
<td>-l</td>
<td>Certificate filename</td>
<td>Valid filename. <strong>Note:</strong> A filename is required when downloading or uploading a certificate or CSR. If no filename is specified for a download, the default name for the file is used and displayed.</td>
</tr>
<tr>
<td>-dnld</td>
<td>Download certificate file</td>
<td>This option takes no arguments; but, must also specify values for the <code>-cert</code> or <code>-csr</code> command option (depending on the certificate type being downloaded). This option takes no arguments; but, must also specify values for the <code>-i</code> command option, and <code>-l</code> (optional) command option.</td>
</tr>
<tr>
<td>-upld</td>
<td>Imports certificate file</td>
<td>This option takes no arguments, but must also specify values for the <code>-cert</code>, <code>-i</code>, and <code>-l</code> command options.</td>
</tr>
<tr>
<td>-tcx</td>
<td>Trusted certificate x for SSL client</td>
<td>import, download, remove. <strong>Note:</strong> The trusted certificate number, x, is specified as an integer from 1 to 3 in the command option.</td>
</tr>
<tr>
<td>-c</td>
<td>Country</td>
<td>Country code (2 letters). <strong>Note:</strong> Required when generating a self-signed certificate or CSR.</td>
</tr>
<tr>
<td>-sp</td>
<td>State or province</td>
<td>Quote-delimited string (maximum 60 characters). <strong>Note:</strong> Required when generating a self-signed certificate or CSR.</td>
</tr>
<tr>
<td>-cl</td>
<td>City or locality</td>
<td>Quote-delimited string (maximum 50 characters). <strong>Note:</strong> Required when generating a self-signed certificate or CSR.</td>
</tr>
<tr>
<td>-on</td>
<td>Organization name</td>
<td>Quote-delimited string (maximum 60 characters). <strong>Note:</strong> Required when generating a self-signed certificate or CSR.</td>
</tr>
<tr>
<td>-hn</td>
<td>IMM host name</td>
<td>String (maximum 60 characters). <strong>Note:</strong> Required when generating a self-signed certificate or CSR.</td>
</tr>
<tr>
<td>-cp</td>
<td>Contact person</td>
<td>Quote-delimited string (maximum 60 characters). <strong>Note:</strong> Optional when generating a self-signed certificate or CSR.</td>
</tr>
<tr>
<td>-ea</td>
<td>Contact person email address</td>
<td>Valid email address (maximum 60 characters). <strong>Note:</strong> Optional when generating a self-signed certificate or CSR.</td>
</tr>
<tr>
<td>-ou</td>
<td>Organizational unit</td>
<td>Quote-delimited string (maximum 60 characters). <strong>Note:</strong> Optional when generating a self-signed certificate or CSR.</td>
</tr>
<tr>
<td>-s</td>
<td>Surname</td>
<td>Quote-delimited string (maximum 60 characters). <strong>Note:</strong> Optional when generating a self-signed certificate or CSR.</td>
</tr>
<tr>
<td>-gn</td>
<td>Given name</td>
<td>Quote-delimited string (maximum 60 characters). <strong>Note:</strong> Optional when generating a self-signed certificate or CSR.</td>
</tr>
<tr>
<td>-in</td>
<td>Initials</td>
<td>Quote-delimited string (maximum 20 characters). <strong>Note:</strong> Optional when generating a self-signed certificate or CSR.</td>
</tr>
<tr>
<td>-dq</td>
<td>Domain name qualifier</td>
<td>Quote-delimited string (maximum 60 characters). <strong>Note:</strong> Optional when generating a self-signed certificate or CSR.</td>
</tr>
</tbody>
</table>
Table 50. sslcfg command (continued)

<table>
<thead>
<tr>
<th>Option</th>
<th>Description</th>
<th>Values</th>
</tr>
</thead>
<tbody>
<tr>
<td>-cpwd</td>
<td>Challenge password</td>
<td>String (minimum 6 characters, maximum 30 characters)</td>
</tr>
<tr>
<td></td>
<td></td>
<td><strong>Note:</strong> Optional when generating a CSR.</td>
</tr>
<tr>
<td>-un</td>
<td>Unstructured name</td>
<td>Quote-delimited string (maximum 60 characters)</td>
</tr>
<tr>
<td></td>
<td></td>
<td><strong>Note:</strong> Optional when generating a CSR.</td>
</tr>
</tbody>
</table>

Syntax:

```
sslcfg [options]
```

option:

- `-server state`
- `-client state`
- `-cim state`
- `-cert certificate_type`
- `-csr certificate_type`
- `-i ip_address`
- `-p` or `-number`
- `-l` or `-filename`
- `-u` or `-un`
- `-pw` or `-password`
- `-l` or `-filename`
- `-upld`
- `-tc` or `xaction`
- `-c` or `country_code`
- `-sp` or `state_or_province`
- `-cl` or `city_or_locality`
- `-on` or `organization_name`
- `-hn` or `bmc_hostname`
- `-cp` or `contact_person`
- `-ea` or `email_address`
- `-ou` or `organizational_unit`
- `-s` or `surname`
- `-gn` or `given_name`
- `-in` or `initials`
- `-dq` or `dn_qualifier`
- `-cpwd` or `challenge_password`
- `-un` or `unstructured_name`

Examples:

```
system> sslcfg
-server enabled
-client disabled
-sysdir enabled
SSL Server Certificate status:
   A self-signed certificate is installed
SSL Client Certificate status:
   A self-signed certificate is installed
SSL CIM Certificate status:
   A self-signed certificate is installed
SSL Client Trusted Certificate status:
   Trusted Certificate 1: Not available
   Trusted Certificate 2: Not available
   Trusted Certificate 3: Not available
   Trusted Certificate 4: Not available

Client certificate examples:
```

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To generate a CSR for a storage key, enter the following command:

```bash
system> sslcfg -csr storekey -c US -sp NC -cl rtp -on Lenovo -hn XCC-5cf3fc6e0c9d -cp Contact -ea "" -ou ""
ok
```

The above example is displayed on multiple lines due to space limitations.

To download a certificate from the IMM to another server, enter the following command:

```bash
system> sslcfg -csr storekey -dnld -i 192.168.70.230 -l storekey.csr
ok
```

To upload the certificate processed by the Certificate Authority (CA), enter the following command:

```bash
system> sslcfg -cert storekey -upld -i 192.168.70.230 -l tklm.der
```

To generate a self-signed certificate, enter the following command:

```bash
system> sslcfg -cert storekey -c US -sp NC -cl rtp -on Lenovo -hn XCC-5cf3fc6e0c9d -cp Contact -ea "" -ou ""
ok
```

The above example is displayed on multiple lines due to space limitations.

SKLM Server certificate example:

To import the SKLM server certificate, enter the following command:

```bash
system> storekeycfg -add -ip 192.168.70.200 -f tklm-server.der
ok
```

**storekeycfg command**

Use this command to configure the host name or IP address and network port for a SKLM server.

You can configure up to four SKLM server targets. The `storekeycfg` command is also used to install and remove the certificates that are used by the IMM for authentication to the SKLM server.

The following table shows the arguments for the options.

<table>
<thead>
<tr>
<th>Option</th>
<th>Description</th>
<th>Values</th>
</tr>
</thead>
<tbody>
<tr>
<td>-add</td>
<td>Add the activation key</td>
<td>Values are -ip, -pn, -u, -pw, and -f command options</td>
</tr>
<tr>
<td>-ip</td>
<td>Host name or IP address for the TFTP/SFTP server</td>
<td>Valid host name or IP address for TFTP/SFTP server</td>
</tr>
<tr>
<td>-pn</td>
<td>Port number of the TFTP or SFTP server</td>
<td>Valid port number for TFTP/SFTP server (default value is 69/22)</td>
</tr>
<tr>
<td>-u</td>
<td>User name for SFTP server</td>
<td>Valid user name for SFTP server</td>
</tr>
<tr>
<td>-pw</td>
<td>Password for SFTP server</td>
<td>Valid password for SFTP server</td>
</tr>
<tr>
<td>-f</td>
<td>File name for activation key</td>
<td>Valid file name for activation key file name</td>
</tr>
</tbody>
</table>
Table 51. storekeycfg command (continued)

<table>
<thead>
<tr>
<th>Option</th>
<th>Description</th>
<th>Values</th>
</tr>
</thead>
<tbody>
<tr>
<td>-del</td>
<td>Use this command to delete the activation key by index number</td>
<td>Valid activation key index number from keycfg listing</td>
</tr>
<tr>
<td>-dgrp</td>
<td>Add the device group</td>
<td>Device group name</td>
</tr>
<tr>
<td>-sxip</td>
<td>Add the host name or IP address for the SKLM server</td>
<td>Valid host name or IP address for SKLM server. Numeric value of 1, 2, 3, or 4.</td>
</tr>
<tr>
<td>-sxpn</td>
<td>Add the port number of the SKLM server</td>
<td>Valid port number for SKLM server. Numeric value of 1, 2, 3, or 4.</td>
</tr>
<tr>
<td>-testx</td>
<td>Test the configuration and connection to the SKLM server</td>
<td>Numeric value of 1, 2, 3, or 4</td>
</tr>
<tr>
<td>-h</td>
<td>Display the command usage and options</td>
<td></td>
</tr>
</tbody>
</table>

Syntax:
storekeycfg [options]

options:
- add state
- ip ip_address
- pn port_number
- u username
- pw password
- f filename
- del key_index
- dgrp device_group_name
- sxip ip_address
- sxpn port_number
- testx numeric value of SKLM server
- h

Examples:
To import the SKLM server certificate, enter the following command:
system> storekeycfg
add -ip 192.168.70.200 -f tklm-server.der
system> ok

To configure the SKLM server address and port number, enter the following command:
system> storekeycfg
-sxip 192.168.70.249
system> ok

To set the device group name, enter the following command:
system> storekeycfg
-dgrp IBM_SYSTEM_X_SED
system> ok

**syncrep command**

Use this command to launch firmware sync from remote repository.

The following table shows the arguments for the options.
Table 52. *syncrep command*

The following table is a multi-row three column table consisting of the options, option descriptions, and associated values for the options.

<table>
<thead>
<tr>
<th>Option</th>
<th>Description</th>
<th>Values</th>
</tr>
</thead>
<tbody>
<tr>
<td>-t</td>
<td>Protocol to connect repository</td>
<td>samba, nfs</td>
</tr>
<tr>
<td>-l</td>
<td>Location of remote repository</td>
<td>In URL format</td>
</tr>
<tr>
<td>-u</td>
<td>User</td>
<td></td>
</tr>
<tr>
<td>-p</td>
<td>Password</td>
<td></td>
</tr>
<tr>
<td>-o</td>
<td>Option</td>
<td>Extra option string for samba and nfs mounts</td>
</tr>
<tr>
<td>-d</td>
<td>Domain</td>
<td>Domain for samba mount</td>
</tr>
<tr>
<td>-q</td>
<td>Query current update status</td>
<td></td>
</tr>
<tr>
<td>-c</td>
<td>Cancel the sync process</td>
<td></td>
</tr>
</tbody>
</table>

**Syntax**

`syncrep [options]` Launch firmware sync from remote repository

options:
- `-t <samba|nfs>` protocol to connect repository
- `-l` location of remote repository (URL format)
- `-u` User
- `-p` Password
- `-o` option (extra option string for samba and nfs mounts)
- `-d` domain (domain for samba mount)
- `-q` query current update status
- `-c` cancel the sync process

**Example**

(1) start sync with repository

`system> syncrep -t samba -l url -u user -p password`

(2) query current update status

`system> syncrep -q`

(3) cancel the sync process

`system> syncrep -c`

**thermal command**

Use this command to display and configure the thermal mode policy of the host system.

Running the `thermal` command with no options displays the thermal mode policy. The following table shows the arguments for the options.

Table 53. *thermal command*

The following table is a multi-row three column table consisting of the options, option descriptions, and associated values for the options.

<table>
<thead>
<tr>
<th>Option</th>
<th>Description</th>
<th>Values</th>
</tr>
</thead>
<tbody>
<tr>
<td>-mode</td>
<td>Thermal mode selection</td>
<td>normal, performance, minimal, efficiency, custom</td>
</tr>
<tr>
<td>-table</td>
<td>Vendor, device identification (ID) and alternate thermal table</td>
<td></td>
</tr>
</tbody>
</table>
Syntax:
thermal [options]

option:
  -mode thermal_mode
  -table vendorID_devicetable_number

Example:
system> thermal
  -mode normal
  -table 80860126 1 10DE0DFA 3
system>

timeouts command
Use this command to display or change the timeout values.

- To display the timeouts, type timeouts.
- To change timeout values, type the options followed by the values.
- To change timeout values, you must have at least Adapter Configuration authority.

The following table shows the arguments for the timeout values. These values match the graduated scale pull-down options for server timeouts on the web interface.

Table 54. timeouts command
The following table is a multi-row four column table consisting of the options, option descriptions, and associated values for the options.

<table>
<thead>
<tr>
<th>Option</th>
<th>Timeout</th>
<th>Units</th>
<th>Values</th>
</tr>
</thead>
<tbody>
<tr>
<td>-f</td>
<td>Power off delay</td>
<td>minutes</td>
<td>disabled, 0.5, 1, 2, 3, 4, 5, 7.5, 10, 15, 20, 30, 60, 120</td>
</tr>
<tr>
<td>-l</td>
<td>Loader timeout</td>
<td>minutes</td>
<td>disabled, 0.5, 1, 1.5, 2, 2.5, 3, 3.5, 4, 4.5, 5, 7.5, 10, 15, 20, 30, 60, 120</td>
</tr>
<tr>
<td>-o</td>
<td>Operating system timeout</td>
<td>minutes</td>
<td>disabled, 2.5, 3, 3.5, 4</td>
</tr>
</tbody>
</table>

Syntax:
timeouts [options]

options:
  -f  power_off_delay_watchdog_option
  -o  OS_watchdog_option
  -l  loader_watchdog_option

Example:
system> timeouts
  -o disabled
  -l 3.5
system> timeouts -o 2.5
  ok
system> timeouts
  -o 2.5
  -l 3.5

tls command
Use this command to set the minimum TLS level.
The following table shows the arguments for the options.

**Table 55. tls command**

The following table is a multi-row three column table consisting of the options, option descriptions, and associated values for the options.

<table>
<thead>
<tr>
<th>Option</th>
<th>Description</th>
<th>Values</th>
</tr>
</thead>
<tbody>
<tr>
<td>-min</td>
<td>Select the minimum TLS level</td>
<td>1.0, 1.1, 1.2</td>
</tr>
<tr>
<td>-h</td>
<td>List the usage and options</td>
<td></td>
</tr>
</tbody>
</table>

**Notes:**

1. When the cryptography mode is set to the NIST-800-131A Compliance mode, the TLS version must be set to 1.2.

Syntax:

tls [options]

option:

- -min 1.0|1.1|1.2
- -h

Examples:

To get the usage for the tls command, issue the following command:

```
system> tls
-h
```

To obtain the current tls version, issue the following command:

```
system> tls
-min 1.0
```

To change the current tls version to 1.2, issue the following command:

```
system> tls
-min 1.2
ok
```

**trespass command**

Use this command to configure and display the trespass messages.

The trespass command can be used to configure and display the trespass messages. The trespass messages will be displayed to any user logging in through the WEB or CLI interface.

The following table shows the arguments for the options.

**Table 56. uefipw command**

The following table is a multi-row two column table consisting of the options and option descriptions.

<table>
<thead>
<tr>
<th>Option</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>-s</td>
<td>Configure trespass messages</td>
</tr>
<tr>
<td>-h</td>
<td>Lists usage and options</td>
</tr>
</tbody>
</table>
Syntax:
usage:
    trespass display the trespass message
    -s <trespass message> configure trespass message
    -h - Lists usage and options

**uefipw command**

Use this command to configure UEFI admin passwords. The password is write-only.

The **uefipw** command can be used with the “-p” option to configure the UEFI admin password for XCC or with the “-ep” option for LXCA to configure the UEFI admin password by CLI interface. The password is write-only.

The following table shows the arguments for the options.

*Table 57. uefipw command*

The following table is a multi-row two column table consisting of the options and option descriptions.

<table>
<thead>
<tr>
<th>Option</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>-cp</td>
<td>Current password (limited to 20 characters)</td>
</tr>
<tr>
<td>-p</td>
<td>New password (limited to 20 characters)</td>
</tr>
<tr>
<td>-cep</td>
<td>Current password encrypted</td>
</tr>
<tr>
<td>-ep</td>
<td>New password encrypted</td>
</tr>
</tbody>
</table>

**usbeth command**

Use this command to enable or disable the in-band LAN over USB interface.

Syntax:
usbeth [options]
options:
    -en <enabled|disabled>

Example:
system>usbeth
    -en : disabled
system>usbeth -en enabled
    ok
system>usbeth
    -en : disabled

**usbfp command**

Use this command to control the BMC use of the front panel USB port
The following table shows the arguments for the options.

**Table 58. usbfp command**

The following table is a multi-row two column table consisting of the options and option descriptions.

<table>
<thead>
<tr>
<th>Option</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>-mode &lt;bmc</td>
<td>server</td>
</tr>
<tr>
<td>-it &lt;minutes&gt;</td>
<td>Inactivity timeout in minutes (shared mode)</td>
</tr>
<tr>
<td>-btn &lt;on</td>
<td>off&gt;</td>
</tr>
<tr>
<td>-own &lt;bmc</td>
<td>server &gt;</td>
</tr>
</tbody>
</table>

**users command**

Use this command to access all user accounts and their authority levels.

The users command is also used to create new user accounts and modify existing accounts. Running the users command with no options displays a list of users and some basic user information. The following table shows the arguments for the options.

**Table 59. users command**

The following table is a multi-row three column table consisting of the options, option descriptions, and associated values for the options.

<table>
<thead>
<tr>
<th>Option</th>
<th>Description</th>
<th>Values</th>
</tr>
</thead>
<tbody>
<tr>
<td>-user_index</td>
<td>User account index number</td>
<td>1 through 12, inclusive, or all for all users.</td>
</tr>
<tr>
<td>-n</td>
<td>User account name</td>
<td>Unique string containing only numbers, letters, periods, and underscores. Minimum of 4 characters and maximum of 16 characters.</td>
</tr>
<tr>
<td>-p</td>
<td>User account password</td>
<td>String that contains at least one alphabetic and one non-alphabetic character. Minimum of 6 characters and maximum of 20 characters. Null creates an account without a password that the user must set during their first login.</td>
</tr>
<tr>
<td>-r</td>
<td>Role name</td>
<td>As listed in “roles command” on page 131 command</td>
</tr>
<tr>
<td>-ep</td>
<td>Encryption password (for backup/restore)</td>
<td>Valid password</td>
</tr>
<tr>
<td>-clear</td>
<td>Erase specified user account</td>
<td>User account index number to erase must be specified, following the form: users -clear -user_index</td>
</tr>
</tbody>
</table>

Null creates an account without a password that the user must set during their first login.
<table>
<thead>
<tr>
<th>Option</th>
<th>Description</th>
<th>Values</th>
</tr>
</thead>
<tbody>
<tr>
<td>-curr</td>
<td>Display users currently logged in</td>
<td></td>
</tr>
<tr>
<td>-sauth</td>
<td>SNMPv3 authentication protocol</td>
<td>HMAC-MD5, HMAC-SHA, none</td>
</tr>
<tr>
<td>-spriv</td>
<td>SNMPv3 privacy protocol</td>
<td>CBC-DES, AES, none</td>
</tr>
<tr>
<td>-spw</td>
<td>SNMPv3 privacy password</td>
<td>Valid password</td>
</tr>
<tr>
<td>-sepw</td>
<td>SNMPv3 privacy password (encrypted)</td>
<td>Valid password</td>
</tr>
<tr>
<td>-sacc</td>
<td>SNMPv3 access type</td>
<td>get, set</td>
</tr>
<tr>
<td>-strap</td>
<td>SNMPv3 trap host name</td>
<td>Valid host name</td>
</tr>
</tbody>
</table>
| -pk    | Display SSH public key for user | User account index number. **Notes:**  
• Each SSH key assigned to the user is displayed, along with an identifying key index number.  
• When using the SSH public key options, the -pk option must be used after the user index (-userindex option), of the form: users -2 -pk.  
• All keys are in OpenSSH format.  
| -e     | Display entire SSH key in OpenSSH format (SSH public key option) | This option takes no arguments and must be used exclusive of all other users -pk options. **Note:** When using the SSH public key options, the -pk option must be used after the user index (-userindex option), of the form: users -2 -pk -e. |
| -remove| Remove SSH public key from user (SSH public key option) | Public key index number to remove must be given as a specific -key_index or -all for all keys assigned to the user. **Note:** When using the SSH public key options, the -pk option must be used after the user index (-userindex option), of the form: users -2 -pk -remove -1. |
| -add   | Add SSH public key for user (SSH public key option) | Quote-delimited key in OpenSSH format **Notes:**  
• The -add option is used exclusive of all other users -pk command options.  
• When using the SSH public key options, the -pk option must be used after the user index (-userindex option), of the form: users -2 -pk -add "AAAAB3NzC1yc2EAAAABAIAwAAAAQEAyfnTUzRF7pdBuaBy4dO/aIfasa/6t+o/wLznuC4aD  
HM1UmmMyU0CiIaNOy4QmGjKqCqjKEhrYgmtAoVfKApvY39GpnsGRC/glGWLMcnmrKL5kxHNoqIcwbT1NPceoKHj46X7E  
mqlfWnAhjhDpcVFjagM3Ek2y7w/tB6rwGgN7OP  
H3U1tzcJy6mEAnIrzejUorR98Q3/B9cJD77ydGKe8rPdI2  
hIEpXR5dNUjupA1Yd8PSMmgduASKEd3eRRZTBL3SATMu  
cUsTkYjlxqex10Qz4+N5ORdMbwNcwsx+mTEAvvcpJhug  
a70UNPGlJML6k7je3iQ8Xd2pXbOZQ=="
### Table 59. users command (continued)

<table>
<thead>
<tr>
<th>Option</th>
<th>Description</th>
<th>Values</th>
</tr>
</thead>
</table>
| -upld  | Upload an SSH public key (SSH public key option) | Requires the -i and -l options to specify key location. **Notes:**  
  - The -upld option is used exclusive of all other users -pk command options (except for -i and -l).  
  - To replace a key with a new key, you must specify a -key_index. To add a key to the end of the list of current keys, do not specify a key index.  
  - When using the SSH public key options, the -pk option must be used after the user index (-userindex option), of the form: users -2 -pk -upld -i tftp://9.72.216.40/ -l file.key. |
| -dnld  | Download the specified SSH public key (SSH public key option) | Requires a -key_index to specify the key to download and the -i and -l options to specify the download location on another computer running a TFTP server. **Notes:**  
  - The -dnld option is used exclusive of all other users -pk command options (except for -i, -l, and -key_index).  
  - When using the SSH public key options, the -pk option must be used after the user index (-userindex option), of the form: users -2 -pk -dnld -1 -i tftp://9.72.216.40/ -l file.key. |
| -i     | IP address of TFTP/SFTP server for uploading or downloading a key file (SSH public key option) | Valid IP address **Note:** The -i option is required by the users -pk -upld and users -pk -dnld command options. |
| -pn    | Port number of TFTP/SFTP server (SSH public key option) | Valid port number (default 69/22) **Note:** An optional parameter for the users -pk -upld and users -pk -dnld command options. |
| -u     | User name for SFTP server (SSH public key option) | Valid user name **Note:** An optional parameter for the users -pk -upld and users -pk -dnld command options. |
| -pw    | Password for SFTP server (SSH public key option) | Valid password **Note:** An optional parameter for the users -pk -upld and users -pk -dnld command options. |
| -l     | File name for uploading or downloading a key file via TFTP or SFTP (SSH public key option) | Valid file name **Note:** The -l option is required by the users -pk -upld and users -pk -dnld command options. |
| -af    | Accept connections from host (SSH public key option) | A comma-separated list of hostnames and IP addresses, limited to 511 characters. Valid characters include: alphanumeric, comma, asterisk, question mark, exclamation point, period, hyphen, colon and percent sign. |
| -cm    | Comment (SSH public key option) | Quote-delimited string of up to 255 characters. **Note:** When using the SSH public key options, the -pk option must be used after the user index (-userindex option), of the form: users -2 -pk -cm "This is my comment.". |

**Syntax:**

```
users [-options] - display/configure user accounts
```

**options:**

```
   -[1-12]  - user account number
```

---

**Chapter 10. Command-line interface**  

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Example:

```
system> users
Account   Login ID      Advanced Attribute              Role            Password Expires
-------   --------      ------------------            ------            ----------------
1         USERID                  Native                Administrator                   89 day(s)
system> users -2 -n sptest -p Passw0rd12 -r Administrator
The user is required to change the password when the user logs in to the management server for the first time
ok
```

```
system> hashpw –sw enabled –re enabled
system> users -5 -n guestS5 -shp 292bcbbc41bb878cf5bd258db60b63a4b337c8c954409442cfad7148bc6428fee –ssalt abc –r Administrator
system> users -5 ghp
292bcbbc41bb878cf5bd258db60b63a4b337c8c954409442cfad7148bc6428fee
system> users -5 gsalt
abc
```

**IMM control commands**

This topic provides an alphabetic list of IMM control CLI commands.

There are currently 7 IMM control commands:
alertentries command

Use this command to manage alert recipients.

- alertentries with no options display all alert entry settings.
- alertentries -number -test generates a test alert to the given recipient index number.
- alertentries -number (where number is 0 - 12) display alert entry settings for the specified recipient index number or allow you to modify the alert settings for that recipient.

The following table shows the arguments for the options.

Table 60. alertentries command

The following table is a multi-row three column table consisting of the options, option descriptions, and associated values for the options.

<table>
<thead>
<tr>
<th>Option</th>
<th>Description</th>
<th>Values</th>
</tr>
</thead>
<tbody>
<tr>
<td>-number</td>
<td>Alert recipient index number to display, add, modify, or delete</td>
<td>1 through 12</td>
</tr>
<tr>
<td>-status</td>
<td>Alert recipient status</td>
<td>on, off</td>
</tr>
<tr>
<td>-type</td>
<td>Alert type</td>
<td>email, syslog</td>
</tr>
<tr>
<td>-log</td>
<td>Include event log in alert email</td>
<td>on, off</td>
</tr>
<tr>
<td>-n</td>
<td>Alert recipient name</td>
<td>String</td>
</tr>
<tr>
<td>-e</td>
<td>Alert recipient email address</td>
<td>Valid email address</td>
</tr>
<tr>
<td>-ip</td>
<td>Syslog IP address or host name</td>
<td>Valid IP address or host name</td>
</tr>
<tr>
<td>-pn</td>
<td>Syslog port number</td>
<td>Valid port number</td>
</tr>
<tr>
<td>-del</td>
<td>Delete specified recipient index number</td>
<td></td>
</tr>
<tr>
<td>-test</td>
<td>Generate a test alert to specified recipient index number</td>
<td></td>
</tr>
<tr>
<td>-crt</td>
<td>Sets critical events that send alerts</td>
<td>all, none, custom:te</td>
</tr>
</tbody>
</table>

Custom critical alert settings are specified using a pipe separated list of values of the form alertentries -crt custom:te|vo, where custom values are:

- te: critical temperature threshold exceeded
- vo: critical voltage threshold exceeded
- po: critical power failure
- di: hard disk drive failure
- fa: fan failure
- cp: microprocessor failure
- me: memory failure
- in: hardware incompatibility
- re: power redundancy failure
- ot: all other critical events
<table>
<thead>
<tr>
<th>Option</th>
<th>Description</th>
<th>Values</th>
</tr>
</thead>
<tbody>
<tr>
<td>-crten</td>
<td>Send critical event alerts</td>
<td>enabled, disabled</td>
</tr>
<tr>
<td>-wrn</td>
<td>Sets warning events that</td>
<td>all, none, custom:rp</td>
</tr>
<tr>
<td></td>
<td>send alerts</td>
<td>Custom warning alert settings are specified using a pipe separated list of values of the form `alertentries -wrn custom:rp</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• rp: power redundancy warning</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• te: warning temperature threshold exceeded</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• vo: warning voltage threshold exceeded</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• po: warning power threshold exceeded</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• fa: non-critical fan event</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• cp: microprocessor in degraded state</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• me: memory warning</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• ot: all other warning events</td>
</tr>
<tr>
<td>-wrnen</td>
<td>Send warning event alerts</td>
<td>enabled, disabled</td>
</tr>
<tr>
<td>-sys</td>
<td>Sets routine events that</td>
<td>all, none, custom:lo</td>
</tr>
<tr>
<td></td>
<td>send alerts</td>
<td>Custom routine alert settings are specified using a pipe separated list of values of the form `alertentries -sys custom:lo</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• lo: successful remote login</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• tio: operating system timeout</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• ot: all other informational and system events</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• po: system power on/off</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• bf: operating system boot failure</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• til: operating system loader watchdog timeout</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• pf: predicted failure (PFA)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• el: event log 75% full</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• ne: network change</td>
</tr>
<tr>
<td>-sysen</td>
<td>Send routine event alerts</td>
<td>enabled, disabled</td>
</tr>
<tr>
<td></td>
<td>Options:</td>
<td></td>
</tr>
<tr>
<td></td>
<td><code>alertentries</code> [options]</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Options:</td>
<td></td>
</tr>
<tr>
<td></td>
<td><code>-number</code> recipient_number</td>
<td></td>
</tr>
<tr>
<td></td>
<td><code>-status</code> status</td>
<td></td>
</tr>
<tr>
<td></td>
<td><code>-type</code> alert_type</td>
<td></td>
</tr>
<tr>
<td></td>
<td><code>-log</code> include_log_state</td>
<td></td>
</tr>
<tr>
<td></td>
<td><code>-n</code> recipient_name</td>
<td></td>
</tr>
<tr>
<td></td>
<td><code>-e</code> email_address</td>
<td></td>
</tr>
<tr>
<td></td>
<td><code>-ip</code> ip_addr_or_hostname</td>
<td></td>
</tr>
<tr>
<td></td>
<td><code>-pn</code> port_number</td>
<td></td>
</tr>
<tr>
<td></td>
<td><code>-del</code></td>
<td></td>
</tr>
<tr>
<td></td>
<td><code>-test</code></td>
<td></td>
</tr>
<tr>
<td></td>
<td><code>-crt</code> event_type</td>
<td></td>
</tr>
<tr>
<td></td>
<td><code>-crten</code> state</td>
<td></td>
</tr>
<tr>
<td></td>
<td><code>-wrn</code> event_type</td>
<td></td>
</tr>
<tr>
<td></td>
<td><code>-wrnen</code> state</td>
<td></td>
</tr>
<tr>
<td></td>
<td><code>-sys</code> event_type</td>
<td></td>
</tr>
</tbody>
</table>
Example:
```
system> alertentries
1. test
2. <not used>
3. <not used>
4. <not used>
5. <not used>
6. <not used>
7. <not used>
8. <not used>
9. <not used>
10. <not used>
11. <not used>
12. <not used>
```
```
system> alertentries -1
-status off
-log off
-n test
-e test@mytest.com
-crt all
-wrn all
-sys none
```

**batch command**

Use this command to execute one or more CLI commands that are contained in a file.

- Comment lines in the batch file begin with a \\#.
- When running a batch file, commands that fail are returned along with a failure return code.
- Batch file commands that contain unrecognized command options might generate warnings.

The following table shows the arguments for the options.

*Table 61. batch command*

The following table is a multi-row three column table consisting of the options, option descriptions, and associated values for the options.

<table>
<thead>
<tr>
<th>Option</th>
<th>Description</th>
<th>Values</th>
</tr>
</thead>
<tbody>
<tr>
<td>-f</td>
<td>Batch file name</td>
<td>Valid file name</td>
</tr>
<tr>
<td>-ip</td>
<td>IP address of TFTP/SFTP server</td>
<td>Valid IP address</td>
</tr>
<tr>
<td>-pn</td>
<td>Port number of TFTP/SFTP server</td>
<td>Valid port number (default 69/22)</td>
</tr>
<tr>
<td>-u</td>
<td>Username for SFTP server</td>
<td>Valid user name</td>
</tr>
<tr>
<td>-pw</td>
<td>Password for SFTP server</td>
<td>Valid password</td>
</tr>
</tbody>
</table>

Syntax:
```
batch [options]
option:
  -f filename
  -ip ip_address
  -pn port_number
```
clearcfg command

Use this command to set the IMM configuration to its factory defaults.

You must have at least Advanced Adapter Configuration authority to issue this command. After the configuration of the IMM is cleared, the IMM is restarted.

clock command

Use this command to display the current date and time. You can set the UTC offset and daylight saving time settings

The BMC obtains the time from the host server or NTP server.

The time obtained from the host may be local time or UTC time. The host option should be set to UTC if NTP is not used and the host uses UTC format. UTC offset can be in the format of +0200, +2:00, +2, or 2, for positive offsets, and -0500, -5:00 or -5, for negative offsets. UTC offset and daylight savings times are used with NTP or when the host mode is UTC.

For a UTC offset of +2, -7, -6, -5, -4 and -3 special daylight saving time settings are required.

- For +2, the daylight saving time options are as follows: off, ee (Eastern Europe), tky (Turkey), bei (Beirut), amm (Amman), jem (Jerusalem).
- For -7, the daylight saving time settings are as follows: off, mtn (Mountain), maz (Mazatlan).
- For -6, the daylight saving time settings are as follows: off, mex (Mexico), cna (Central North America).
- For -5, the daylight saving time settings are as follows: off, cub (Cuba), ena (Eastern North America).
- For -4, the daylight saving time settings are as follows: off, asu (Asuncion), cui (Cuiaba), san (Santiago), cat (Canada - Atlantic).
- For -3, the daylight saving time settings are as follows: off, gtb (Godthab), bre (Brazil - East).

Syntax:
clock [options]
options:
- u UTC offset
- dst on/off/special case
- host - local | utc, format of time obtained from host (default: utc)
Windows systems use local, Linux uses utc

Example:
system> clock
12/12/2011 13:15:23 GMT-5:00 dst on

identify command

Use this command to turn the chassis identification LED on or off, or to have it flash.
The -d option can be used with the -s on option to turn the LED on for only the number of seconds specified with the -d option. The LED turns off after the number of seconds elapses.

Syntax:
```
identify [options]
options:
- s on/off/blink
- d seconds
```

Example:
```
system> identify
- s off
system> identify -s on -d 30
ok
```

**info command**

Use this command to display and configure information about the IMM.

Running the **info** command with no options displays all IMM location and contact information. The following table shows the arguments for the options.

**Table 62. info command**
The following table is a multi-row three column table consisting of the options, option descriptions, and associated values for the options.

<table>
<thead>
<tr>
<th>Option</th>
<th>Description</th>
<th>Values</th>
</tr>
</thead>
<tbody>
<tr>
<td>-name</td>
<td>IMM name</td>
<td>String</td>
</tr>
<tr>
<td>-contact</td>
<td>Name of IMM contact person</td>
<td>String</td>
</tr>
<tr>
<td>-location</td>
<td>IMM location</td>
<td>String</td>
</tr>
<tr>
<td>-room(^1)</td>
<td>IMM room identifier</td>
<td>String</td>
</tr>
<tr>
<td>-rack(^1)</td>
<td>IMM rack identifier</td>
<td>String</td>
</tr>
<tr>
<td>-rup(^1)</td>
<td>Position of IMM in rack</td>
<td>String</td>
</tr>
<tr>
<td>-ruh</td>
<td>Rack unit height</td>
<td>Read only</td>
</tr>
<tr>
<td>-bbay</td>
<td>Blade bay location</td>
<td>Read only</td>
</tr>
</tbody>
</table>

\(^1\) Value is read only and cannot be reset if the IMM resides in a Flex System.

Syntax:
```
info [options]
option:
- name xcc_name
- contact contact_name
- location xcc_location
- room room_id
- rack rack_id
- rup rack_unit_position
- ruh rack_unit_height
- bbay blade_bay
```

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spreset command
Use this command to restart the IMM.

You must have at least Advanced Adapter Configuration authority to issue this command.

---

**Service advisor commands**

This topic provides an alphabetic list of service advisor CLI commands.

There are currently 3 service advisor commands:

**chconfig command**

Use this command to display and configure the Service Advisor settings.

- The Service Advisor Terms and Conditions must be accepted, using the `chconfig -li` command option, before configuring any other parameters.
- All contact information fields, as well as the Service Support Center field (using `chconfig -sc` command option), are required before the Support of Service Advisor can be enabled.
- All HTTP Proxy fields must be set, if an HTTP proxy is required.

The following table shows the arguments for the options.

*Table 63. chconfig command*

The following table is a multi-row three column table consisting of the options, option descriptions, and associated values for the options.

<table>
<thead>
<tr>
<th>Option</th>
<th>Description</th>
<th>Values</th>
</tr>
</thead>
<tbody>
<tr>
<td>-li</td>
<td>View or accept the Service Advisor Terms and Conditions</td>
<td>view, accept</td>
</tr>
<tr>
<td></td>
<td><strong>Note:</strong> Terms and Conditions must be accepted before configuring any other parameters.</td>
<td></td>
</tr>
<tr>
<td>-sa</td>
<td>Support status of the Service Advisor</td>
<td>enabled, disabled</td>
</tr>
<tr>
<td></td>
<td><strong>Notes:</strong> To enable Service Advisor, the following criteria must be met:</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• The country code is required.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• All options in the Service Advisor Contact Information are required.</td>
<td></td>
</tr>
<tr>
<td>-sc</td>
<td>Country code for the Service Support Center</td>
<td>Two-character ISO country code</td>
</tr>
</tbody>
</table>

Service Advisor contact information options:

<table>
<thead>
<tr>
<th>Option</th>
<th>Description</th>
<th>Values</th>
</tr>
</thead>
<tbody>
<tr>
<td>-cn</td>
<td>Name of primary contact person</td>
<td>Quote-delimited string (30 characters maximum)</td>
</tr>
<tr>
<td>-cph</td>
<td>Phone number of primary contact person</td>
<td>Quote-delimited string (5 - 30 characters)</td>
</tr>
<tr>
<td>-ce</td>
<td>Email address of primary contact person</td>
<td>Valid email address of the form userid@hostname (30 characters maximum)</td>
</tr>
<tr>
<td></td>
<td><strong>Note:</strong> Alphanumeric characters '.', '-', or '_' are acceptable as userid or hostname. Email address must contain at least two domain items and the last domain item should be 2–4 alphabetic characters.</td>
<td></td>
</tr>
<tr>
<td>Option</td>
<td>Description</td>
<td>Values</td>
</tr>
<tr>
<td>--------</td>
<td>-----------------------------------------------------------------------------</td>
<td>--------------------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>-co</td>
<td>Organization or company name of primary contact person</td>
<td>Quote-delimited string (30 characters maximum)</td>
</tr>
<tr>
<td>-ca</td>
<td>Address of the machine location</td>
<td>Quote-delimited string (30 characters maximum)</td>
</tr>
<tr>
<td>-cci</td>
<td>City of the machine location</td>
<td>Quote-delimited string (30 characters maximum)</td>
</tr>
<tr>
<td>-cs</td>
<td>State of the machine location</td>
<td>Quote-delimited string (30 characters maximum)</td>
</tr>
<tr>
<td>-cz</td>
<td>Postal code of the machine location</td>
<td>Quote-delimited string (9 characters maximum)</td>
</tr>
</tbody>
</table>

Alternate Service Advisor contact information options:

<table>
<thead>
<tr>
<th>Option</th>
<th>Description</th>
<th>Values</th>
</tr>
</thead>
<tbody>
<tr>
<td>-an</td>
<td>Name of alternate contact person</td>
<td>Quote-delimited string (30 characters maximum)</td>
</tr>
<tr>
<td>-aph</td>
<td>Phone number of alternate contact person</td>
<td>Quote-delimited string (5 - 30 characters)</td>
</tr>
<tr>
<td>-ae</td>
<td>Email address of alternate contact person</td>
<td>Valid email address of the form userid@hostname (30 characters maximum)</td>
</tr>
<tr>
<td></td>
<td><strong>Note:</strong> Alphanumeric characters ',', '-' or '_' are acceptable as userid or hostname. Email address must contain at least two domain items and the last domain item should be 2–4 alphabetic characters.</td>
<td></td>
</tr>
<tr>
<td>-ao</td>
<td>Organization or company name of alternate contact person</td>
<td>Quote-delimited string (30 characters maximum)</td>
</tr>
<tr>
<td>-aa</td>
<td>Address of the alternate machine location</td>
<td>Quote-delimited string (30 characters maximum)</td>
</tr>
<tr>
<td>-aci</td>
<td>City of the alternate machine location</td>
<td>Quote-delimited string (30 characters maximum)</td>
</tr>
<tr>
<td>-as</td>
<td>State of the alternate machine location</td>
<td>Quote-delimited string (30 characters maximum)</td>
</tr>
<tr>
<td>-az</td>
<td>Postal code of the alternate machine location</td>
<td>Quote-delimited string (9 characters maximum)</td>
</tr>
</tbody>
</table>

HTTP proxy settings options:

<table>
<thead>
<tr>
<th>Option</th>
<th>Description</th>
<th>Values</th>
</tr>
</thead>
<tbody>
<tr>
<td>-loc</td>
<td>HTTP proxy location</td>
<td>Fully qualified host name or IP address for HTTP proxy (63 characters maximum)</td>
</tr>
<tr>
<td>-po</td>
<td>HTTP proxy port</td>
<td>Valid port number (1 - 65535)</td>
</tr>
<tr>
<td>-ps</td>
<td>HTTP proxy status</td>
<td>enabled, disabled</td>
</tr>
<tr>
<td>-pw</td>
<td>HTTP proxy password</td>
<td>Valid password, quote-delimited (15 characters maximum)</td>
</tr>
<tr>
<td>-epw</td>
<td>HTTP proxy encrypted password</td>
<td>Valid password, quote-delimited (15 characters maximum)</td>
</tr>
<tr>
<td>-u</td>
<td>HTTP proxy user name</td>
<td>Valid user name, quote-delimited (30 characters maximum)</td>
</tr>
</tbody>
</table>

Syntax:
```
chconfig [options]
```

options:
```
- li view|accept
- sa enable|disable
- sc service_country_code
```
chmanual command

Use this command to generate a manual call home request.

**Note:** Call home message recipients are configured using the `chconfig` command.

- The `chmanual -test` command generates a call home test message.

The following table shows the arguments for the options.

<table>
<thead>
<tr>
<th>Option</th>
<th>Description</th>
<th>Values</th>
</tr>
</thead>
<tbody>
<tr>
<td>-test</td>
<td>Generates a test message to call home recipients</td>
<td></td>
</tr>
</tbody>
</table>

Syntax:
```
chmanual [options]
```
Generates a manual Call Home or a Test Call Home
- `-test`: Generate a test Call Home.

chlog command

Use this command to display the last five call home events and cancel the case associated with the event by caseNumber..

The `chlog` command displays the last five entries from the call-home activity log that were generated by the server or the user. The most recent call home entry is shown first. The server will not send duplicate events if they are not acknowledged as corrected in the activity log.

The following table shows the arguments for the options.

<table>
<thead>
<tr>
<th>Option</th>
<th>Description</th>
<th>Values</th>
</tr>
</thead>
</table>

**Table 65. chconfig command**

The following table is a multi-row three column table consisting of the options, option descriptions, and associated values for the options.
Table 65. chconfig command (continued)

<table>
<thead>
<tr>
<th>Option</th>
<th>Description</th>
<th>Values</th>
</tr>
</thead>
<tbody>
<tr>
<td>-c</td>
<td>cancel the case associated with the event by caseNumber</td>
<td>caseNumber</td>
</tr>
</tbody>
</table>

Syntax:
chlog[-options]

Displays the last five call home events that were generated either by the system or the user (most recent call home entry first.)

- c: cancel the case associated with the event by caseNumber

Agent-less commands

This topic provides an alphabetic list of Agent-less commands.

There are currently 3 Agent-less commands:

storage command

Use this command to display and configure (if supported by the platform) information about the server's storage devices that are managed by the IMM.

The following table shows the arguments for the options.

Table 66. storage command

The following table is a multi-row three column table consisting of the options, option descriptions, and associated values for the options.

<table>
<thead>
<tr>
<th>Option</th>
<th>Description</th>
<th>Values</th>
</tr>
</thead>
<tbody>
<tr>
<td>-list</td>
<td>List the storage targets managed by the IMM.</td>
<td>controllers</td>
</tr>
<tr>
<td></td>
<td>Where target is:</td>
<td></td>
</tr>
</tbody>
</table>
|               |  • controllers: list the supported RAID controllers
|               |  • pools: list the storage pools associated with the RAID controller
|               |  • volumes: list the storage volumes associated with the RAID controller
|               |  • drives: list the storage drives associated with the RAID controller |
| -list -target target_id | List the storage targets managed by the IMM according to the target_id. | pools|volumes|drives |ctrl[x]|pool[x] |
|               | Where target and target_id are:                  |        |
|               |  • pools ctrl[x]: list the storage pools associated with the RAID controller, based on the target_id
|               |  • volumes ctrl[x]|pool[x]: list the storage volumes associated with the RAID controller, based on the target_id
<p>|               |  • drives ctrl[x]|pool[x]: list the storage drives associated with the RAID controller, based on the target_id |</p>
<table>
<thead>
<tr>
<th>Option</th>
<th>Description</th>
<th>Values</th>
</tr>
</thead>
<tbody>
<tr>
<td>-list flashdimmss</td>
<td>List the Flash DIMMs managed by the IMM.</td>
<td></td>
</tr>
<tr>
<td>-list devices</td>
<td>Display the status of all disks and Flash DIMMS managed by the IMM.</td>
<td></td>
</tr>
<tr>
<td>-show target_id</td>
<td>Display information for the selected target that is managed by the IMM.</td>
<td>Where target_id is: ctrl[x]/vol[x]/disk[x]/pool[x]</td>
</tr>
<tr>
<td>-show target_id info</td>
<td>Display detailed information for the selected target that is managed by the IMM.</td>
<td>Where target_id is: ctrl[x]/vol[x]/disk[x]/pool[x]</td>
</tr>
<tr>
<td>-show target_id firmware</td>
<td>Display the firmware information for the selected target that is managed by the IMM.</td>
<td>Where target_id is: ctrl[x]/disk[x]/flashdimm[x]</td>
</tr>
<tr>
<td>-showlog target_id&lt;m:n</td>
<td>all&gt;³</td>
<td>Where target_id is: ctrl[x]</td>
</tr>
<tr>
<td></td>
<td>Display the event logs of the selected target that is managed by the IMM.</td>
<td>m:n=all</td>
</tr>
<tr>
<td></td>
<td>Where m:n is one to the maximum number of event logs</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Where all are all of the event logs</td>
<td></td>
</tr>
<tr>
<td>-config ctrl -scanforngn -target target_id³</td>
<td>Detect the foreign RAID configuration.</td>
<td>Where target_id is: ctrl[x]</td>
</tr>
<tr>
<td>-config ctrl -imptforngn -target target_id³</td>
<td>Import the foreign RAID configuration.</td>
<td>Where target_id is: ctrl[x]</td>
</tr>
<tr>
<td>-config ctrl -clrforgn -target target_id³</td>
<td>Clear the foreign RAID configuration.</td>
<td>Where target_id is: ctrl[x]</td>
</tr>
<tr>
<td>-config ctrl -clrcfg -target target_id³</td>
<td>Clear the RAID configuration.</td>
<td>Where target_id is: ctrl[x]</td>
</tr>
<tr>
<td>-config drv -mkoffline -target target_id³</td>
<td>Change the drive state from online to offline.</td>
<td>Where target_id is: disk[x]</td>
</tr>
<tr>
<td>-config drv -mkonline -target target_id³</td>
<td>Change the drive state from offline to online.</td>
<td>Where target_id is: disk[x]</td>
</tr>
<tr>
<td>-config drv -mkmissing -target target_id³</td>
<td>Mark the offline drive as an unconfigured good drive.</td>
<td>Where target_id is: disk[x]</td>
</tr>
<tr>
<td>-config drv -prprm -target target_id³</td>
<td>Prepare an unconfigured good drive for removal.</td>
<td>Where target_id is: disk[x]</td>
</tr>
<tr>
<td>-config drv -undopprm -target target_id³</td>
<td>Cancel the prepare an unconfigured good drive for removal operation.</td>
<td>Where target_id is: disk[x]</td>
</tr>
<tr>
<td>-config drv -mkbad -target target_id³</td>
<td>Change the unconfigured good drive to a unconfigured bad drive.</td>
<td>Where target_id is: disk[x]</td>
</tr>
<tr>
<td>Option</td>
<td>Description</td>
<td>Values</td>
</tr>
<tr>
<td>------------------------</td>
<td>----------------------------------------------------------------------------</td>
<td>------------------------------------------------------------------------</td>
</tr>
<tr>
<td>-config drv -mkgood</td>
<td>Change an unconfigured bad drive to a unconfigured good drive.</td>
<td>Where target_id is: disk[x]5</td>
</tr>
<tr>
<td>-target target_id3</td>
<td>Or Convert the just a bunch of disks (JBOD) drive to an unconfigured good drive.</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>-config drv -addhsp</td>
<td>Assign the selected drive as a hot spare to one controller or to existing storage pools.</td>
<td>Where target_id is: disk[x]5</td>
</tr>
<tr>
<td>[dedicated pools] -target target_id3</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>-config drv -rmhsp</td>
<td>Remove the hot spare.</td>
<td>Where target_id is: disk[x]5</td>
</tr>
<tr>
<td>-target target_id3</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>-config vol -remove</td>
<td>Remove one volume.</td>
<td>Where target_id is: vol[x]5</td>
</tr>
<tr>
<td>-target target_id3</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>-config vol -set [-N]</td>
<td>Modify the properties of one volume.</td>
<td>• [-N volume_name] is the name of the volume</td>
</tr>
<tr>
<td>[-w] [-r] [-i] [-a]</td>
<td></td>
<td>• [-w &lt;0</td>
</tr>
<tr>
<td>[-d] [-b] -target</td>
<td></td>
<td>- Type 0 for the Write Through policy</td>
</tr>
<tr>
<td>target_id3</td>
<td></td>
<td>- Type 1 for the Write Back policy</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- Type 2 for the Write With Battery Backup Unit (BBU) policy</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• [-r &lt;0</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- Type 0 for the No Read Ahead policy</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- Type 1 for the Read Ahead Policy</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- Type 2 for the Adaptive Read Ahead policy</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• [-i &lt;0</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- Type 0 for the Direct I/O policy</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- Type 1 for the Cached I/O policy</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• [-a &lt;0</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- Type 0 for the Read Write policy</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- Type 2 for the Read Only policy</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- Type 3 for the Blocked policy</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• [-d &lt;0</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- Type 0 if the policy is unchanged</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- Type 1 to enable policy</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- Type 2 to disable policy</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• [-b &lt;0</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- Type 0 to enable initialization</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- Type 1 to disable initialization</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• -target_id is vol[x]5</td>
</tr>
<tr>
<td>Option</td>
<td>Description</td>
<td>Values</td>
</tr>
<tr>
<td>--------</td>
<td>-------------</td>
<td>--------</td>
</tr>
<tr>
<td>-config vol -add&lt;[-R] [-D disk] [-H disk] [-1 hole] &gt; [-N] [-w] [-r]</td>
<td>Create one volume for a new storage pool when the target is a controller. or Create one volume with an existing storage pool when the target is a storage pool.</td>
<td>- [R 0</td>
</tr>
<tr>
<td>-config vol -add[-i] [-a] [-d] [-f] [-S] [-P] -target target_id</td>
<td>Create one volume for a new storage pool when the target is a controller. or Create one volume with an existing storage pool when the target is a storage pool.</td>
<td>- [i 0</td>
</tr>
</tbody>
</table>
### Table 66. storage command (continued)

<table>
<thead>
<tr>
<th>Option</th>
<th>Description</th>
<th>Values</th>
</tr>
</thead>
</table>
| `-config vol -getfreecap`   | Get the free capacity amount of the drive group.      | • `-R <0|1|5|1E|6|10|50|60|0|0|1|E|RLQ0|1|E|0|RLQ0>` This option defines the RAID level and is only used with a new storage pool  
| `-R` [-D disk] [-H disk]    |                                                        | • `-D disk [id11]:[id12]:..[id21]:[id22]:..` This option defines the drive group (including spans) and is only used with a new storage pool  
| `-target target_id`        |                                                        | • `-H disk [id1]:[id2]:..` This option defines the hot spare group and is only used with a new storage pool  
| `--help`                   | Display the command usage and options                 | `--ctrl[x]`                                                            |

**Notes:**
1. This command is only supported on servers where the IMM can access the RAID controller.
2. Firmware information is displayed only for associated controllers, disks, and Flash DIMMs. Firmware information for associated pools and volumes are not displayed.
3. Information is displayed on multiple lines due to space limitations.
4. This command is only supported on servers that support RAID logs.
5. This command is only supported on servers that support RAID configurations.
6. The Enable value does not support RAID level 1 configurations.
7. A partial list of available options are listed here. The remaining options for the `storage -config vol -add` command are listed in the following row.

**Syntax:**
```
storage [options]
```
```
option:
  -config ctrl|drv|vol -option [-options] -target target_id
  -list controllers|pools|volumes|drives
  -list pools -target ctrl[x]
  -list volumes -target ctrl[x]|pool[x]
  -list drives -target ctrl[x]|pool[x]
  -list devices
  -list flashdimms
  -show target_id
  -show {ctrl[x]|pool[x]|disk[x]|vol[x]|flashdimm[x]} info
  -show {ctrl[x]|disk[x]|flashdimm[x]}firmware
  -showlog ctrl[x]:m:n:all
  -h help
```

**Examples:**
```
system> storage
  -config ctrl -ctrlcfg -target ctrl[0]
  ok
system> storage
  -config ctrl -ctrlforn -target ctrl[0]
  ok
system> storage
  -config ctrl -imptforn -target ctrl[0]
  ok
system>
```

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system> storage -config ctrl -scanforgn -target ctrl[0]
Detect 1 foreign configuration(s) on controller ctrl[0]

system> storage -config drv -addhsp -dedicated pool[0-1] -target disk[0-0]
ok

system> storage -config drv -addhsp -target disk[0-0]
ok

system> storage -config drv -mkbad -target disk[0-0]
ok

system> storage -config drv -mkgood -target disk[0-0]
ok

system> storage -config drv -mkmissing -target disk[0-0]
ok

system> storage -config drv -mkoffline -target disk[0-0]
ok

system> storage -config drv -mkonline -target disk[0-0]
ok

system> storage -config drv -prprm -target disk[0-0]
ok

system> storage -config drv -rmhsp -target disk[0-0]
ok

system> storage -config drv -undopprm -target disk[0-0]
ok

system> storage -config vol -add -1 1 -target pool[0-1]
ok

system> storage -config vol -add -R 1 -D disk[0-0]:disk[0-1] -w 1 -r 2 -i 0 -a 0 -d 0 -f 0
-N LD_volume -S 100000 -P 64K -H disk[0-2] -target ctrl[0]
ok

system> storage -config vol -getfreecap -R 1 -D disk[0-0]:disk[0-1] -H disk[0-2] -target ctrl[0]
The drive group configuration is good with free capacity 500000MB

system> storage -config vol -remove -target vol[0-1]
ok

system>
system> **storage**
-config vol -set -N LD_volume -w 0 -target vol[0-0]
ok
system>

system> **storage**
-list controllers
ctrl[0] ServerRAID M5110e(Slot No. 0)
ctrl[1] ServerRAID M5110f(Slot No. 1)

system>

system> **storage**
-list drives
disk[0-0] Drive 0
disk[0-1] Drive 1
disk[0-2] Drive 2

system>

system> **storage**
-list flashdimms
flashdimm[1] Flash DIMM 1
flashdimm[4] Flash DIMM 4
flashdimm[9] Flash DIMM 9

system>

system> **storage**
-list pools
pool[0-0] Storage Pool 0
pool[0-1] Storage Pool 1

system>

system> **storage**
-list volumes

system> storage -list volumes
vol[0-0] Volume 0
vol[0-1] Volume 1
Vol[0-2] Volume 2

system>

system> **storage**
-list drives -target ctrl[0]
disk[0-0] Drive 0
disk[0-1] Drive 1
disk[0-2] Drive 2

system>

system> **storage**
-list drives -target pool[0-0]
disk[0-0] Drive 0
disk[0-1] Drive 1

system>

system> **storage**
-list pools -target ctrl[0]
pool[0-0] Storage Pool 0

system>

system> **storage**
-list volumes -target ctrl[0]
vol[0-0] Volume 0
vol[0-1] Volume 1

system>

system> **storage**
-list volumes -target pool[0-0]
vol[0-0] Volume 0
vol[0-1] Volume 1

system>

system> **storage**
-list volumes -target pool[0-0]
vol[0-0] Volume 0
vol[0-1] Volume 1

system>

system> **storage**
-show ctrl[0] firmware
Total Firmware number: 2

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Name: RAID Firmware1
Description: RAID Firmware
Manufacture: IBM
Version: 4.01(3)T
Release Date: 01/05/2013
Name: RAID Firmware2
Description: RAID Firmware
system> storage
-show ctrl[0] info
Product Name: ServerRAID M5110e
Firmware Package Version: 23.7.0.1.2
Battery Backup: Installed
Manufacture: IBM
UUID: 1234567890123456
Model Type / Model: 1234AHH
Serial No.: 12345678901
FRU No.: 5005076049CC4
Part No.: 1S12004
Cache Model Status: Unknown
Cache Model Memory Size: 300MB
Cache Model Serial No.: PBKUU0XTA0P04Y
PCI Slot Number: 0
PCI Bus Number: 2
PCI Device Number: 2
PCI Function Number: 10
PCI Device ID: 0x1000
PCI Subsystem Device ID: 0x1413
Ports: 2
Port 1: 12345678901234
Port 2: 12345678901235
Storage Pools: 2
pool[0] Pool 0
pool[1] Pool 1
Drives: 3
disk[0-0] Drive 0
disk[0-1] Drive 1
disk[0-2] Drive 2
system>
storage
-show disk[0-0] firmware
Total Firmware number: 1
Name: Drive
Description:
Manufacture:
Version: BE24
Release Date:
system>
storage
-show disk[0-0] info
Product Name: ST98394893
State: Online
Slot No.: 0
Disk Type: SATA
Media Type: HHD
Health Status: Normal
Capacity: 100.000GB
Speed: 6.0Gb/s
Current Temperature: 33C
Manufacture: ATA
Device ID: 5
Enclusure ID: 0x00FC
Machine Type:
Model:
Serial No.: 9XJKKL
FRU No.:
Part No.:
system>
system> storage
-show flashdimm[15]
Name: CPU1 DIMM 15
Health Status: Normal
Operational Status: Online
Capacity(GB): 400GB
Model Type: DDR3
Part Number: 93E4040GGM101PAT
FRU S/N: 44000000
Manuf ID: Diablo Technologies
Temperature: 0C
Warranty Writes: 100%
Write Endurance: 100%
F/W Level: A201.0.0.49152
system>
system> storage
-show pool[0-0]
RAID State: RAID 0
RAID Capacity: 67.000GB (0.000GB free)
Drives: 2
disk[0-0] Drive 0
disk[0-1] Drive 1
Volumes: 2
vol[0-0] Volume 0
vol[0-1] Volume 1
system>
system> storage
-show pool[0-1] info
RAID State: RAID 1
RAID Capacity: 231.898GB (200.000GB free)
Holes: 2
#1 Free Capacity: 100.000GB
#2 Free Capacity: 100.000GB

Drives: 2
disk[0-1] Drive 1
disk[0-2] Drive 2

Volume: 1
vol[0-1] LD_volume
system>
system> storage
-show vol[0-0]
Name: Volume 0
Stripe Size: 64KB
Status: Offline
Capacity: 100.000GB
system>
system> storage
-show vol[0-0] info
Name: LD_volume
Status: Optimal
Stripe Size: 64KB
Bootable: Not Bootable
adapter command

This command is used to display PCIe adapter inventory information.

If the adapter command is not supported, the server responds with the following message when the command is issued:
Your platform does not support this command.
If you remove, replace, or configure any adapters, you must restart the server (at least once) to view the updated adapter information.

The following table shows the arguments for the options.

Table 67. adapter command

The following table is a multi-row three column table consisting of the options, option descriptions, and associated values for the options.

<table>
<thead>
<tr>
<th>Option</th>
<th>Description</th>
<th>Values</th>
</tr>
</thead>
<tbody>
<tr>
<td>-list</td>
<td>List all PCIe adapters in the server</td>
<td></td>
</tr>
<tr>
<td>-show target_id</td>
<td>Show the detailed information for the target PCIe adapter</td>
<td>target_id [info</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• info: display the hardware information for the adapter</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• firmware: display all firmware information for the adapter</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• ports: display all Ethernet port information for the adapter</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• chips: display all GPU chip information for the adapter</td>
</tr>
<tr>
<td>-h</td>
<td>Display the command usage and options</td>
<td></td>
</tr>
</tbody>
</table>

Syntax:
adapter [options]
option:
  -list
  -show target_id [info|firmware|ports|chips]
  -h help

Examples:
system> adapter
list
ob-1     Flex System CN4054 10Gbps Virtual Fabric Adapter
ob-2     GPU Card 1
slot-1    Raid Controller 1
slot-2    Adapter 01:02:03
system> adapter
show ob-1 info
Product Name: Flex System CN4054 10Gbps Virtual Fabric Adapter
Card Interface: PCIe x 16
Function Count: 2

Function Name: xxx Emulx xx component1
Segment Number: 2348
Bus Number: 23949
Device Number: 1334
Function Number: 21
Vendor Id: 12
Device Id: 33
Revision Id: 1
Class Code: 2
Sub Vendor: 334
Sub Device: 223
Slot Description: a slot
Slot Type: 23
Slot Data Bus Width: 0
Hot Plug: 12
PCI Type: 11
Blade Slot Port: xxx
UUID: 39302938485
Manufacturer: IBM
Serial Number: 998AAGG
Part Number: ADB233
Model: 345
Function Sku: 221
Fod Uid: 2355
Required Daughter: 0
Max Data Width: 0
Connector Layout: pci x

Package Type: dici
Function Name: xxx nVidia xx component2
Segment Number: 2348
Bus Number: 23949
Device Number: 1334
Function Number: 21
Vendor Id: 12
Device Id: 33
Revision Id: 1
Class Code: 2
Sub Vendor: 334
Sub Device: 223
Slot Description: a slot
Slot Type: 23
Slot Data Bus Width: 0
Hot Plug: 12
PCI Type: 11
Blade Slot Port: xxx
UUID: 39302938485
Manufacturer: IBM
Serial Number: 998AAGG
Part Number: ADB233
Model: 345
Function Sku: 221
Fod Uid: 2355
Required Daughter: 0
Max Data Width: 0
Connector Layout: pci x
mvstor command

Use this command to get M.2 related inventory information and manage the virtual volumes.

The following table shows the arguments for the options.

<table>
<thead>
<tr>
<th>Option</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>-h/?</td>
<td>Print the help info for this command</td>
</tr>
<tr>
<td>-version</td>
<td>Display the controller firmware information</td>
</tr>
<tr>
<td>-disks</td>
<td>Display the media disks information</td>
</tr>
<tr>
<td>-volumes</td>
<td>Display the virtual volumes information</td>
</tr>
<tr>
<td>-create</td>
<td>Create a virtual volume, the VD_Name, RaidLevel and StripeSize can be specified</td>
</tr>
<tr>
<td>-delete</td>
<td>Delete a virtual volume</td>
</tr>
<tr>
<td>-import</td>
<td>Import a foreign virtual volume. After importing the virtual volume, a system reboot will rebuild the virtual volume automatically.</td>
</tr>
</tbody>
</table>

Usage

mvstor [-options] - raid configuration for SATA/NVMe RAID boot solution.

options:
- version - displays controller firmware version.
- disks - displays information of media disks.
- volumes - displays information of virtual disks
- create -slot <slot_no> -name <vd name> -level <0|1> -stripe <32|64|128|256|512> - create virtual volume.
  Marvell SATA RAID: stripe size can only be 32k or 64k
  Marvell NVMe RAID: vd name is unapplicable. The name will always be VD_0.
- delete -slot <slot_no> -id <0|1> - delete the virtual volume
- import -slot <slot_no> -id <0|1> - import a foreign virtual volume

Example

system> mvstor -version

<table>
<thead>
<tr>
<th>Controller Slot</th>
<th>Device Name</th>
<th>Version</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>ThinkSystem M.2 SATA 2-Bay RAID Enablement Kit</td>
<td>2.3.20.1203</td>
</tr>
</tbody>
</table>

system> mvstor -disks

<table>
<thead>
<tr>
<th>Controller Slot</th>
<th>Device Name</th>
<th>Capacity</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>M.2 Bay0</td>
<td>128GB</td>
</tr>
<tr>
<td>1</td>
<td>M.2 Bay1</td>
<td>128GB</td>
</tr>
</tbody>
</table>

system> mvstor -volumes

<table>
<thead>
<tr>
<th>Controller Slot</th>
<th>VD_ID</th>
<th>VD_Name</th>
<th>PD_Member</th>
<th>RaidLevel</th>
<th>StripeSize</th>
<th>VD_Capacity</th>
<th>VD_Status</th>
<th>VD_ID</th>
<th>VD_Name</th>
<th>PD_Member</th>
<th>RaidLevel</th>
<th>StripeSize</th>
<th>VD_Capacity</th>
<th>VD_Status</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>0</td>
<td>VD_Test</td>
<td>0,1</td>
<td>1</td>
<td>64k</td>
<td>117 GB</td>
<td>Optimal</td>
<td>1</td>
<td>64k</td>
<td>29 GB</td>
<td>Optimal</td>
<td>64k</td>
<td>117 GB</td>
<td>Optimal</td>
</tr>
</tbody>
</table>

XClarity Controller with Intel Xeon SP (1st, 2nd Gen) User's Guide
Support commands
This topic provides an alphabetic list of Support commands.

There is only one support command: the “dbgshimm command” on page 173.

**dbgshimm command**
Use this command to unlock network access to the secure debug shell.

**Note:** This command is intended only for support personnel use.

The following table shows the arguments for the options.

**Table 69. dbgshimm command**
The following table is a multi-row two column table consisting of the options and option descriptions.

<table>
<thead>
<tr>
<th>Option</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>status</td>
<td>Display status</td>
</tr>
<tr>
<td>enable</td>
<td>Enable debug access (default if no option specified)</td>
</tr>
<tr>
<td>disable</td>
<td>Disable debug access</td>
</tr>
</tbody>
</table>
Chapter 11. IPMI interface

This chapter describes the IPMI interface supported by the XClarity Controller.

For details of the standard IPMI commands, refer to the Intelligent Platform Management Interface (IPMI) Specification document (version 2.0 or above). This document provides descriptions on the OEM parameters used with the standard IPMI and OEM IPMI commands supported by the XClarity Controller firmware.

Managing the XClarity Controller with IPMI

Use the information in this topic to manage the XClarity Controller using the Intelligent Platform Management Interface (IPMI).

The XClarity Controller comes with a user ID set initially to a user name of USERID and password of PASSW0RD (with a zero, not the letter O). This user has Supervisor access.

**Important:** Change this user name and password during your initial configuration for enhanced security.

In a Flex System, a user can configure a Flex System CMM to centrally manage the XClarity Controller IPMI user accounts. In this circumstance, you might not be able to access the XClarity Controller using the IPMI until the CMM has configured the IPMI user IDs.

**Note:** The user ID credentials configured by the CMM might be different than the USERID/PASSW0RD combination described above. If no IPMI user IDs have been configured by the CMM, the network port associated with the IPMI protocol will be closed.

The XClarity Controller also provides the following IPMI remote server management capabilities:

**IPMI Command-line interfaces**

The IPMI command line interface provides direct access to server-management functions through the IPMI 2.0 protocol. You can use the IPMItool to issue commands to control server power, view server information, and identify the server. For more information about the IPMItool, see “Using IPMItool” on page 175.

**Serial over LAN**

To manage servers from a remote location, use the IPMItool to establish a Serial over LAN (SOL) connection. For more information about the IPMItool, see “Using IPMItool” on page 175.

Using IPMItool

Use the information in this topic to access information about the IPMItool.

The IPMItool provides various tools that you can use to manage and configure an IPMI system. You can use the IPMItool in-band or out-of-band to manage and configure the XClarity Controller.

For more information about the IPMItool, or to download the IPMItool, go to [https://github.com/ipmitool/ipmitool](https://github.com/ipmitool/ipmitool).
IPMI Commands with OEM Parameters

Get / Set LAN Configuration Parameters

In order to reflect the capabilities provided by the XCC for some of the network settings, the values for some of the parameter data is defined as shown below.

DHCP

In addition to the usual methods of obtaining an IP address, the XCC provides a mode where it attempts to obtain an IP address from a DHCP server for a given period of time and if unsuccessful fails over to using a static IP address.

The following table is a multi-row three column table consisting of the options, option descriptions, and associated values for the options.

<table>
<thead>
<tr>
<th>Parameter</th>
<th>#</th>
<th>Parameter Data</th>
</tr>
</thead>
<tbody>
<tr>
<td>IP Address Source</td>
<td>4</td>
<td>data 1</td>
</tr>
<tr>
<td></td>
<td></td>
<td>[7:4] – reserved</td>
</tr>
<tr>
<td></td>
<td></td>
<td>[3:0] – address source</td>
</tr>
<tr>
<td></td>
<td></td>
<td>0h = unspecified</td>
</tr>
<tr>
<td></td>
<td></td>
<td>1h = static address (manually configured)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>2h = address obtained by XCC running DHCP</td>
</tr>
<tr>
<td></td>
<td></td>
<td>3h = address obtained by BIOS or system software</td>
</tr>
<tr>
<td></td>
<td></td>
<td>4h = address obtained by XCC running other address assignment protocol.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>The XCC uses the value 4h to indicate the address mode of DHCP with failover to static.</td>
</tr>
</tbody>
</table>

Ethernet Interface Selection

The XCC hardware contains dual 10/100 Ethernet MACs with RMII interfaces. The XCC hardware also contains dual 1Gbps Ethernet MACs with RGMII interfaces. One of the MACs is usually connected to the shared server NIC and the other MAC is used as a dedicated system management port. Only one Ethernet port on a server is active at a given time. Both ports will not be simultaneously enabled.

On some servers, the system designers may choose to connect up only one or the other of these Ethernet interfaces on the system planar. In those systems, only the Ethernet interface that is connected on the planar is supported by the XCC. A request to use the unconnected port returns a CCh completion code.

The package IDS for all optional network cards are numbered as follows:

- optional card #1, package ID = 03h (eth2),
- optional card #2, package ID = 04h (eth3),

The following table is a multi-row three column table consisting of the options, option descriptions, and associated values for the options.
<table>
<thead>
<tr>
<th>Parameter</th>
<th>#</th>
<th>Parameter Data</th>
</tr>
</thead>
<tbody>
<tr>
<td>OEM Parameter</td>
<td>C0h</td>
<td>data1</td>
</tr>
<tr>
<td></td>
<td></td>
<td>00h = eth0</td>
</tr>
<tr>
<td></td>
<td></td>
<td>01h = eth1</td>
</tr>
<tr>
<td></td>
<td></td>
<td>02h = eth2</td>
</tr>
<tr>
<td></td>
<td></td>
<td>etc…</td>
</tr>
<tr>
<td></td>
<td></td>
<td>FFh = disable all external network ports</td>
</tr>
<tr>
<td></td>
<td></td>
<td>XCC supports a 2nd optional data byte to specify which channel in a package is used</td>
</tr>
<tr>
<td></td>
<td></td>
<td>data2</td>
</tr>
<tr>
<td></td>
<td></td>
<td>00h = channel 0</td>
</tr>
<tr>
<td></td>
<td></td>
<td>01h = channel 1</td>
</tr>
<tr>
<td></td>
<td></td>
<td>etc…</td>
</tr>
<tr>
<td></td>
<td></td>
<td>If data2 is not specified in the request, channel 0 is assumed</td>
</tr>
</tbody>
</table>

The data1 byte is used to specify the logical package. It may be a dedicated systems management NIC or an NCSI interface into the NIC shared with the server.

The data2 byte is used to specify the channel for logical package, if the package is an NCSI device. If the data2 is not specified in the request and the logical package is an NCSI device, channel, 0 is assumed. If the data2 is specified in the request but the logical package is not an NCSI device, the channel information is ignored.

Examples:

Appendix A. If channel 2 of the shared NIC on the planar (package ID = 0, eth0) is to be used as the management port, the input data would be: 0xC0 0x00 0x02

Appendix B: If the first channel of the first network mezzanine card is to be used, the input would be: 0xC0 0x02 0x0

**Ethernet over USB Enable/Disable**

The parameter below is used to enable or disable the XCC inband interface.

The following table is a multi-row three column table consisting of the options, option descriptions, and associated values for the options.
<table>
<thead>
<tr>
<th>Parameter</th>
<th>#</th>
<th>Parameter Data</th>
</tr>
</thead>
<tbody>
<tr>
<td>OEM Parameter</td>
<td>C1h</td>
<td>data 1</td>
</tr>
</tbody>
</table>

(This parameter number is used by the XCC to enable or disable the Ethernet over USB interface.)

This parameter in the Get LAN Configuration Parameters command does not use a Set Selector or a require Block Selector, so these fields should be set to 00h.

The response data will return 3 bytes:

- Byte 1 = completion code
- Byte 2 = revision
- Byte 3 = 00h (disabled), or 01h (enabled)

The data1 byte is used to specify the logical package. It may be a dedicated systems management NIC or an NCSI interface into the NIC shared with the server.

The data2 byte is used to specify the channel for logical package, if the package is an NCSI device. If the data2 is not specified in the request and the logical package is an NCSI device, channel 0 is assumed. If data2 is specified in the request but the logical package is not an NCSI device, the channel information is ignored.

Examples:

Appendix A. If channel 2 of the shared NIC on the planar (package ID = 0, eth0) is to be used as the management port, the input data would be: 0xC0 0x00 0x02

Appendix B: If the first channel of the first network mezzanine card is to be used, the input would be: 0xC0 0x02 0x0

**IPMI option for getting the DUID-LLT**

An additional read-only value that needs to be exposed via IPMI is the DUID. According to RFC3315, this format of DUID is based on the Link Layer Address Plus Time.
<table>
<thead>
<tr>
<th>Parameter</th>
<th>#</th>
<th>Parameter Data</th>
</tr>
</thead>
<tbody>
<tr>
<td>OEM Parameter</td>
<td>C2h</td>
<td></td>
</tr>
<tr>
<td>(This parameter number is</td>
<td></td>
<td></td>
</tr>
<tr>
<td>used by the XCC to enable</td>
<td></td>
<td></td>
</tr>
<tr>
<td>or disable the Ethernet</td>
<td></td>
<td></td>
</tr>
<tr>
<td>over USB interface.)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>This parameter in the Get</td>
<td></td>
<td></td>
</tr>
<tr>
<td>LAN Configuration</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Parameters command does</td>
<td></td>
<td></td>
</tr>
<tr>
<td>not use a Set Selector or</td>
<td></td>
<td></td>
</tr>
<tr>
<td>a require Block Selector,</td>
<td></td>
<td></td>
</tr>
<tr>
<td>so these fields should be</td>
<td></td>
<td></td>
</tr>
<tr>
<td>set to 00h.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>The response data will</td>
<td></td>
<td></td>
</tr>
<tr>
<td>return 3 bytes:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Byte 1 = completion code</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Byte 2 = Parameter Revision</td>
<td></td>
<td></td>
</tr>
<tr>
<td>(as in IPMI spec)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Byte 3 = length of</td>
<td></td>
<td></td>
</tr>
<tr>
<td>following data bytes</td>
<td></td>
<td></td>
</tr>
<tr>
<td>(16 bytes currently)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Byte 4-n DUID_LLT</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Ethernet configuration parameters**

The parameters below may be used to configure specific Ethernet settings.

<table>
<thead>
<tr>
<th>Parameter</th>
<th>#</th>
<th>Parameter Data</th>
</tr>
</thead>
<tbody>
<tr>
<td>OEM Parameter</td>
<td>C3h</td>
<td></td>
</tr>
<tr>
<td>(This parameter number is</td>
<td></td>
<td></td>
</tr>
<tr>
<td>used by the XCC to enable</td>
<td></td>
<td></td>
</tr>
<tr>
<td>or disable Auto-negotiation</td>
<td></td>
<td></td>
</tr>
<tr>
<td>setting for Ethernet</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Interface.)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>The response data will</td>
<td></td>
<td></td>
</tr>
<tr>
<td>return 3 bytes:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Byte 1 = completion code</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Byte 2 = revision</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Byte 3 = 00h (disabled),</td>
<td></td>
<td></td>
</tr>
<tr>
<td>or 01h (enabled)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Note: On Flex and Stark</td>
<td></td>
<td></td>
</tr>
<tr>
<td>systems the auto-negotiation</td>
<td></td>
<td></td>
</tr>
<tr>
<td>setting is not changeable</td>
<td></td>
<td></td>
</tr>
<tr>
<td>because it could break the</td>
<td></td>
<td></td>
</tr>
<tr>
<td>network communication path</td>
<td></td>
<td></td>
</tr>
<tr>
<td>via the CMM and SMM.</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<p>| OEM Parameter              | C4h|                |
| (This parameter number is  |    |                |
| used by the XCC to get or  |    |                |
| set the Data rate of       |    |                |
| Ethernet Interface.)       |    |                |
| The response data will     |    |                |
| return 3 bytes:           |    |                |
| Byte 1 = completion code   |    |                |
| Byte 2 = revision          |    |                |
| Byte 3 = 00h (10Mb), or 01h|    |                |
| (100Mb)                    |    |                |</p>
<table>
<thead>
<tr>
<th>Parameter</th>
<th>#</th>
<th>Parameter Data</th>
</tr>
</thead>
<tbody>
<tr>
<td>OEM Parameter</td>
<td>C5h</td>
<td>data 1</td>
</tr>
<tr>
<td>(This parameter number is used by the XCC to get or set the Duplex setting of the Ethernet interface.)</td>
<td></td>
<td>0x00 = Half Duplex&lt;br&gt;0x01 = Full Duplex</td>
</tr>
<tr>
<td>The response data will return 3 bytes:</td>
<td></td>
<td>Byte 1 = completion code&lt;br&gt;Byte 2 = revision&lt;br&gt;Byte 3 = 00h (Half Duplex), or 01h (Full Duplex)</td>
</tr>
<tr>
<td>OEM Parameter</td>
<td>C6h</td>
<td>data 1</td>
</tr>
<tr>
<td>(This parameter number is used by the XCC to get or set the Maximum transmission unit (MTU) of the Ethernet interface.)</td>
<td></td>
<td>Size of MTU</td>
</tr>
<tr>
<td>The response data will return 3 bytes:</td>
<td></td>
<td>Byte 1 = completion code&lt;br&gt;Byte 2 = revision&lt;br&gt;Byte 3-4 = size of MTU</td>
</tr>
<tr>
<td>OEM Parameter</td>
<td>C7h</td>
<td>data 1 - 6</td>
</tr>
<tr>
<td>(This parameter number is used by the XCC to get or set Locally administered MAC address.)</td>
<td></td>
<td>Mac Address</td>
</tr>
<tr>
<td>The response data will return 3 bytes:</td>
<td></td>
<td>Byte 1 = completion code&lt;br&gt;Byte 2 = revision&lt;br&gt;Byte 3 – 8 = Mac Address</td>
</tr>
</tbody>
</table>

**IPMI option for getting the Link-Local Address**

This is a read-only parameter to retrieve the IPV6 Link-Local Address.
<table>
<thead>
<tr>
<th>Parameter</th>
<th>#</th>
<th>Parameter Data</th>
</tr>
</thead>
<tbody>
<tr>
<td>OEM Parameter</td>
<td>C8h</td>
<td></td>
</tr>
</tbody>
</table>

This parameter is used to obtain the Link-Local address of the XCC:

The response data will return the following:
- Byte 1 = completion code
- Byte 2 = Parameter Revision (as in IPMI spec)
- Byte 3 = IPV6 address prefix length
- Byte 4-19 Local Link address in binary format

**IPMI option for enabling/disabling IPv6**

This is a read/write parameter to enable/disable IPv6 in the XCC.

<table>
<thead>
<tr>
<th>Parameter</th>
<th>#</th>
<th>Parameter Data</th>
</tr>
</thead>
<tbody>
<tr>
<td>OEM Parameter</td>
<td>C9h</td>
<td>data 1</td>
</tr>
</tbody>
</table>

This parameter is used to enable/disable IPv6 in the XCC.

- Byte 1 = completion code
- Byte 2 = Parameter Revision (as in IPMI spec)
- Byte 3 = 00h (disabled), or 01h (enabled)

**Ethernet-over-USB Pass-through to external network**

The parameter below is used to configure the Ethernet-over-USB to external Ethernet pass-through.

<table>
<thead>
<tr>
<th>Parameter</th>
<th>#</th>
<th>Parameter Data</th>
</tr>
</thead>
<tbody>
<tr>
<td>OEM Parameter</td>
<td>C9h</td>
<td>data 1</td>
</tr>
</tbody>
</table>

0x00 = disabled
0x01 = enabled
<table>
<thead>
<tr>
<th>Parameter</th>
<th>#</th>
<th>Parameter Data</th>
</tr>
</thead>
<tbody>
<tr>
<td>OEM Parameter</td>
<td>CAh</td>
<td>Set LAN Configuration Parameters:</td>
</tr>
<tr>
<td></td>
<td></td>
<td>data 1</td>
</tr>
<tr>
<td></td>
<td></td>
<td>reserved (= 00h)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>data 2:3</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Ethernet over USB Port number, LSByte first</td>
</tr>
<tr>
<td></td>
<td></td>
<td>data 4:5</td>
</tr>
<tr>
<td></td>
<td></td>
<td>External Ethernet Port number, LSByte first</td>
</tr>
<tr>
<td></td>
<td></td>
<td>The number of bytes to follow can vary (1, 4, or 16 bytes) depending upon the</td>
</tr>
<tr>
<td></td>
<td></td>
<td>addressing mode:</td>
</tr>
<tr>
<td></td>
<td></td>
<td>data 6</td>
</tr>
<tr>
<td></td>
<td></td>
<td>00h = disable the pass-through</td>
</tr>
<tr>
<td></td>
<td></td>
<td>01h = use the CMM’s IP address</td>
</tr>
<tr>
<td></td>
<td></td>
<td>data 6:9</td>
</tr>
<tr>
<td></td>
<td></td>
<td>IPv4 external network IP address in binary form</td>
</tr>
<tr>
<td></td>
<td></td>
<td>data 6:21</td>
</tr>
<tr>
<td></td>
<td></td>
<td>IPv6 external network IP address in binary form</td>
</tr>
<tr>
<td></td>
<td></td>
<td><strong>OEM Parameter</strong></td>
</tr>
<tr>
<td></td>
<td>CBh</td>
<td>Data 1:4</td>
</tr>
<tr>
<td></td>
<td></td>
<td>IP address of XCC -side lan over usb interface.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Data 5:8</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Netmask of XCC -side lan over usb interface.</td>
</tr>
</tbody>
</table>

This parameter in the Get/Set LAN Configuration Parameters command does not use a Set Selector or a require Block Selector, so these fields should be set to 00h.

The Get response data will return the following:

- Byte 1 = completion code
- Byte 2 = revision
- Byte 3 = reserved (00h)
- Bytes 4:5 = Ethernet-over-USB Port number (LSByte first)
- Bytes 6:7 = External Ethernet Port number (LSByte first)

The number of bytes to follow can vary (1, 4, or 16 bytes) depending upon the addressing mode:

- Byte 8 = pre-defined modes:
  - 00h = the pass-through is disabled
  - 01h = the CMM’s IP address is used
- Bytes 8:11 = IPv4 external network IP address in binary form
- Bytes 8:23 = IPv6 external network IP address in binary form

Completion codes:

- 00h – success
- 80h – parameter not supported
- C1h – command not supported
- C7h – request data length invalid
<table>
<thead>
<tr>
<th>Parameter</th>
<th>#</th>
<th>Parameter Data</th>
</tr>
</thead>
<tbody>
<tr>
<td>Byte 3:10 = IP address and Netmask value (MS-byte) first</td>
<td></td>
<td></td>
</tr>
<tr>
<td>OEM Parameter</td>
<td>CCh</td>
<td>Data 1:4</td>
</tr>
<tr>
<td>This parameter is used to set and get the lan over usb ip address of the Host OS:</td>
<td></td>
<td>IP address of Host-side lan over usb interface.</td>
</tr>
<tr>
<td>The response data will return the following:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Byte 1 = completion code</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Byte 2 = Parameter Revision (as in IPMI spec)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Byte 3:6 = IP address (MS-byte) first</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Query Logical Package Inventory**

The parameter below is used to query NCSI package inventory.
**Parameter** | **#** | **Parameter Data**
---|---|---
OEM Parameter | D3h | Get/Set LAN Configuration Parameters:

This parameter in the Get/Set LAN Configuration Parameters command does not use a Set Selector or a require Block Selector, so these fields should be set to 00h.

Query package inventory operation

The query package information operation is performed by issuing the request with two 0x00 data bytes besides the D3h parameter number.

Query package inventory :

--> 0x0C 0x02 0x00 0xD3 0x00 0x00

The XCC response includes a byte of information for each package that is present:

- bits 7:4 = number of NCSI channels in the package
- bits 3:0 = the logical package number

Response

--> 0x00 0x00 0x40 0x01 0x32

indicates that 3 logical packages are present:

- package 0 has 4 NCSI channels
- package 1 is not an NCSI NIC, so it does not support NCSI channels
- package 2 has 3 NCSI channels

---

**Get/Set Logical Package Data**

The parameter below is used to read and to set the priority assigned to each package.
<table>
<thead>
<tr>
<th>Parameter</th>
<th>#</th>
<th>Parameter Data</th>
</tr>
</thead>
<tbody>
<tr>
<td>OEM Parameter</td>
<td>D4</td>
<td>Get/Set LAN Configuration Parameters:</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Bit [7-4] = priority of the logical package (1 = highest, 15 = lowest)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Bit [3-0] = logical package number</td>
</tr>
</tbody>
</table>

The command supports 2 operations:
- Read package priority
- Set package priority

Read package priority operation

The read package priority operation is performed by issuing the request with two 0x00 data bytes besides the D4h parameter number.

Read package priority:

--> 0x0C 0x02 0x01 0xD4 0x00 0x00

Response:

--> 0x00 0x00 0x00 0x12 0x23

logical package 0 = priority 0
logical package 2 = priority 1
logical package 3 = priority 2

Set package priority operation

The set package priority operation is performed by issuing the request with one or more parameters in addition to the D4h parameter number.

Set package priority:

--> 0x0C 0x01 0x01 0xD4 0x00 0x12 0x23

set logical package 0 = priority 0
set logical package 2 = priority 1
set logical package 3 = priority 2

Response:
### Get/Set XCC networking synchronization status

<table>
<thead>
<tr>
<th>Parameter</th>
<th>#</th>
<th>Parameter Data</th>
</tr>
</thead>
<tbody>
<tr>
<td>OEM Parameter</td>
<td>D5h</td>
<td>data 1</td>
</tr>
<tr>
<td>The byte is used to config to synchronize networking setting between dedicated and shared nic mode</td>
<td></td>
<td></td>
</tr>
<tr>
<td>This parameter in the Get LAN Configuration Parameters command does not use a Set Selector or a require Block Selector, so these fields should be set to 00h.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>The response data will return 3 bytes:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Byte 1 = completion code</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Byte 2 = revision</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Byte 3 = 00h (enabled) , or 01h (disabled)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

The byte is used to config to synchronize networking setting between dedicated and shared nic mode, the default value was 0h here, it mean XCC will automatically update networking setting between mode change and use shared nic (on board) as major reference, if set as 1h, each networking setting will be independent here, which is we can configure different networking setting between mode, such as VLAN enable on Dedicated and set VLAN disable on Shared NIC mode.

### Get/Set XCC networking mode
<table>
<thead>
<tr>
<th>Parameter</th>
<th>#</th>
<th>Parameter Data</th>
</tr>
</thead>
<tbody>
<tr>
<td>OEM Parameter</td>
<td>D6h</td>
<td>Set LAN Configuration Parameters:</td>
</tr>
<tr>
<td></td>
<td></td>
<td>data 1</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Netmode to set</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Get LAN Configuration Parameters:</td>
</tr>
<tr>
<td></td>
<td></td>
<td>data 1</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Netmode to get, This is an optional data, defaults to</td>
</tr>
<tr>
<td></td>
<td></td>
<td>query current netmode</td>
</tr>
</tbody>
</table>

### OEM IPMI Commands

The XCC supports the following IPMI OEM commands. Each command requires a different level of privilege as listed below.

<table>
<thead>
<tr>
<th>Code</th>
<th>Netfn 0x2E Commands</th>
<th>Privilege</th>
</tr>
</thead>
<tbody>
<tr>
<td>0xC0</td>
<td>Reset XCC to Default</td>
<td>PRIV_USR</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Code</th>
<th>Netfn 0x3A Commands</th>
<th>Privilege</th>
</tr>
</thead>
<tbody>
<tr>
<td>0x00</td>
<td>Query Firmware version</td>
<td>PRIV_USR</td>
</tr>
<tr>
<td>0x0D</td>
<td>Board Information</td>
<td>PRIV_USR</td>
</tr>
<tr>
<td>0x1E</td>
<td>Chassis Power Restore Delay Options</td>
<td>PRIV_USR</td>
</tr>
<tr>
<td>0x38</td>
<td>NMI and Reset</td>
<td>PRIV_USR</td>
</tr>
<tr>
<td>0x49</td>
<td>Initiate Data Collection</td>
<td>PRIV_USR</td>
</tr>
<tr>
<td>0x4A</td>
<td>Push File</td>
<td>PRIV_USR</td>
</tr>
<tr>
<td>0x4D</td>
<td>Data Collection Status</td>
<td>PRIV_USR</td>
</tr>
<tr>
<td>0x50</td>
<td>Get Build Information</td>
<td>PRIV_USR</td>
</tr>
<tr>
<td>0x55</td>
<td>Get/Set Host Name</td>
<td>PRIV_USR</td>
</tr>
<tr>
<td>0x6B</td>
<td>Query FPGA Firmware Revision Level</td>
<td>PRIV_USR</td>
</tr>
<tr>
<td>0x6C</td>
<td>Query Board Hardware Revision Level</td>
<td>PRIV_USR</td>
</tr>
<tr>
<td>Code</td>
<td>NetFn 0x3A Commands</td>
<td>Privilege</td>
</tr>
<tr>
<td>------</td>
<td>---------------------</td>
<td>-----------</td>
</tr>
<tr>
<td>0x6D</td>
<td>Query PSoC Firmware Revision Level</td>
<td>PRIV_USR</td>
</tr>
<tr>
<td>0x98</td>
<td>FP USB Port Control</td>
<td>PRIV_USR</td>
</tr>
<tr>
<td>0xC7</td>
<td>Native NM IPMI Switch</td>
<td>PRIV_ADM</td>
</tr>
</tbody>
</table>

**Reset XCC to Default Command**

This command resets the XCC configuration setting to the default values.

<table>
<thead>
<tr>
<th>Code</th>
<th>Command</th>
<th>Request, Response Data</th>
<th>Description</th>
</tr>
</thead>
</table>
| 0xCC | Reset XCC to Default | **Request:**  
Byte 1 – 0x5E  
Byte 2 – 0x2B  
Byte 3 – 0x00  
Byte 4 – 0x0A  
Byte 5 – 0x01  
Byte 6 – 0xFF  
Byte 7 – 0x00  
Byte 8 – 0x00  
Byte 9 – 0x00  
**Response:**  
Byte 1 – Completion Code  
Byte 2 – 0x5E  
Byte 3 – 0x2B  
Byte 4 – 0x00  
Byte 5 – 0x0A  
Byte 6 – 0x01  
Byte 7 – Response Data  
0 = Success  
non-zero = Failure | This command resets the XCC configuration settings to the default values. |

**Board / Firmware Information Commands**

This section lists the commands for querying the board and firmware information.
<table>
<thead>
<tr>
<th>Code</th>
<th>Command</th>
<th>Request, Response Data</th>
<th>Description</th>
</tr>
</thead>
</table>
| 0x00  | Query Firmware Version | **Request:**  
No data on request  
**Response:**  
Byte 1 – Completion Code  
Byte 2 – Major version  
Byte 3 – Minor version | This command returns the major and minor version numbers of the firmware. If the command is made with the optional 1 byte of request data, the XCC response also returns the third field (Revision) of the version.  
(Major.Minor.Revision) |
| 0x0D  | Query Board Information | **Request:** N/A  
**Response:**  
Byte 1 – System ID  
Byte 2 – Board Revision | This command returns the Board ID and planar revision. |
| 0x50  | Query Build Information | **Request:** N/A  
**Response:**  
Byte 1 – Completion Code.  
Bytes 2:10 – ASCII Build Name  
Bytes 11:23 – ASCII Build Date  
Bytes 24:31 – ASCII Build Time | This command returns the build name, build date, and build time.  
The build name and build date strings have a zero termination.  
The format of the build date is YYYY-MM-DD.  
e.g. “ZUBT99A ”  
“2005-03-07”  
“23:59:59” |
### Code Command Request, Response Data Description

<table>
<thead>
<tr>
<th>Code</th>
<th>Command</th>
<th>Request, Response Data</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>0x6B</td>
<td>Query FPGA Firmware Revision Level</td>
<td><strong>Request:</strong>&lt;br&gt;Byte 1 – FPGA Device Type*&lt;br&gt;FPGA Device Type&lt;br&gt;0 = Local (Active level)&lt;br&gt;1 = CPU Card 1 (Active level)&lt;br&gt;2 = CPU Card 2 (Active level)&lt;br&gt;3 = CPU Card 3 (Active level)&lt;br&gt;4 = CPU Card 4 (Active level)&lt;br&gt;5 = Local Primary ROM&lt;br&gt;6 = Local Recovery ROM&lt;br&gt;&lt;br&gt;<strong>Response:</strong>&lt;br&gt;Byte 1 – Completion Code&lt;br&gt;Byte 2 – Major revision level&lt;br&gt;Byte 3 – Minor revision level&lt;br&gt;Byte 4 – Sub-Minor revision level&lt;br&gt;(Test Byte on XCC platforms)</td>
<td>This command returns the revision level of the FPGA firmware.&lt;br&gt;If Byte 1 is omitted then Local (Active level) will be selected.</td>
</tr>
<tr>
<td>0x6C</td>
<td>Query Board Hardware Revision Level</td>
<td><strong>Request:</strong>&lt;br&gt;No Data.&lt;br&gt;&lt;br&gt;<strong>Response:</strong>&lt;br&gt;Byte 1 – Completion Code&lt;br&gt;Byte 2 – Revision level</td>
<td>This command returns the revision level of the board hardware where the FPGA resides.</td>
</tr>
<tr>
<td>0x6D</td>
<td>Query PSoC Firmware Revision Level</td>
<td><strong>Request:</strong>&lt;br&gt;None&lt;br&gt;&lt;br&gt;<strong>Response:</strong>&lt;br&gt;Byte 1 – Completion Code&lt;br&gt;Byte 2 – bin#&lt;br&gt;Byte 3 – APID&lt;br&gt;Byte 4 – Rev&lt;br&gt;Byte 5-6 – FRU ID</td>
<td>This command returns the revision level of all of the detected PSoC devices.&lt;br&gt;Note: bin# represents a physical location. Consult the system specification for details.</td>
</tr>
</tbody>
</table>
### System Control Commands

The IPMI specification provides basic power and reset control. Lenovo adds additional control functions.

#### Net Function = 0x3A

<table>
<thead>
<tr>
<th>Code</th>
<th>Command</th>
<th>Request, Response Data</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Bytes 6:N – repeat of Bytes 2-6 for each detected PSOC</td>
<td></td>
</tr>
</tbody>
</table>

#### Net Function = 0x2E

<table>
<thead>
<tr>
<th>Code</th>
<th>Command</th>
<th>Request, Response Data</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>0x1E</td>
<td>Chassis</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Power</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Restore</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Delay</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Options</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td><strong>Request:</strong></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td><strong>Byte 1</strong></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Request Type:</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>0x00 = Set Delay Options</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>0x01 = Query Delay Options</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td><strong>Byte 2</strong></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>(if byte 1 = 0x00)</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>0x00 = Disabled (default)</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>0x01 = Random</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>0x02 - 0xFF Reserved</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td><strong>Response:</strong></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Byte 1 – Completion Code</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Byte 2 – Delay Options (for Query request only)</td>
<td></td>
</tr>
</tbody>
</table>

This setting is used, when the chassis power restore policy is set to always power-on or restore to power-on (if previously powered-on), after AC is applied/returns. There are 2 choices: Disabled (the default setting, no delay when powered-on), and Random. The random delay setting, provides a random delay between 1 and 15 seconds, from the time AC is applied/returns and when the server is automatically powered-on.

The command is supported by XCC only on Rack servers.

#### Net Function = 0x38

<table>
<thead>
<tr>
<th>Code</th>
<th>Command</th>
<th>Request, Response Data</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>0x38</td>
<td>NMI and reset</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td><strong>Request:</strong></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Byte 1 – Number of seconds</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>0 = NMI Only</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Byte 2 – Reset type</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>0 = soft reset</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>1 = power cycle</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td><strong>Response :</strong></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Byte 1 – Completion code</td>
<td></td>
</tr>
</tbody>
</table>

This command is used to perform a system NMI. Optionally the system can be reset (rebooted) or power cycled after the NMI.

If the “Number of Seconds” field is not 0, then the system will be reset or power cycled after the specified number of seconds.

Byte 2 of the request is optional. If byte 2 is not provided, or if it has a value of 0x00, a soft reset is performed. If byte 2 is 0x01, the system is power cycled.
Miscellaneous Commands

This section is for commands that do not fit into any other section.
<table>
<thead>
<tr>
<th>Code</th>
<th>Command</th>
<th>Request, Response Data</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>0x55</td>
<td>Get/Set Hostname</td>
<td><strong>Request Length = 0:</strong> Empty Request Data</td>
<td>Use this command to Get/Set the Hostname.</td>
</tr>
<tr>
<td></td>
<td></td>
<td><strong>Response:</strong></td>
<td>When setting the Hostname, the desired value must be terminated by a 00h. The hostname is limited to 63 characters plus the null.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Byte 1</td>
<td>Completion Code</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Bytes 2-65</td>
<td>Current Hostname. ASCIIZ, Null terminated string.</td>
</tr>
<tr>
<td></td>
<td></td>
<td><strong>Request Length 1-64:</strong></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Bytes 1-64</td>
<td>DHCP Hostname. ASCIIZ Terminate with 00h</td>
</tr>
<tr>
<td>0x98</td>
<td>FP USB Port Control</td>
<td><strong>Request:</strong></td>
<td>This command is used for query status/configuration of FP USB port, configure mode/timeout of FP USB port and switch USB port owner between host and BMC</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Byte 1</td>
<td>Get current owner of front panel USB port</td>
</tr>
<tr>
<td></td>
<td></td>
<td>01h:</td>
<td>Get current owner of front panel USB port</td>
</tr>
<tr>
<td></td>
<td></td>
<td><strong>Response:</strong></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Byte 1 – Completion Code</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Byte 2</td>
<td>Owned by host</td>
</tr>
<tr>
<td></td>
<td></td>
<td>00h:</td>
<td>Owned by host</td>
</tr>
<tr>
<td></td>
<td></td>
<td>01h:</td>
<td>Owned by BMC</td>
</tr>
<tr>
<td></td>
<td></td>
<td><strong>Request:</strong></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Byte 1</td>
<td>Get the configuration of front panel USB port</td>
</tr>
<tr>
<td></td>
<td></td>
<td>02h:</td>
<td>Get the configuration of front panel USB port</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Hysteresis in seconds will be set when automatically switching the</td>
</tr>
</tbody>
</table>
## Net Function = 0x3A

<table>
<thead>
<tr>
<th>Code</th>
<th>Command</th>
<th>Request, Response Data</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td><strong>Response:</strong></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td><strong>Byte 1 – Completion Code</strong></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td><strong>Byte 2</strong></td>
<td></td>
</tr>
<tr>
<td>00h:</td>
<td></td>
<td>Dedicated to host</td>
<td></td>
</tr>
<tr>
<td>01h:</td>
<td></td>
<td>Dedicated to BMC</td>
<td></td>
</tr>
<tr>
<td>02h:</td>
<td></td>
<td>Shared mode</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td><strong>Byte 3:4 – Inactivity timeout in minutes (MSB first)</strong></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td><strong>Byte 5 – Enable ID button</strong></td>
<td></td>
</tr>
<tr>
<td>00h:</td>
<td></td>
<td>Disabled</td>
<td></td>
</tr>
<tr>
<td>01h:</td>
<td></td>
<td>Enabled</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td><strong>Byte 6 – Hysteresis (optional) in seconds</strong></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td><strong>Request:</strong></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td><strong>Byte 1</strong></td>
<td></td>
</tr>
<tr>
<td>03h:</td>
<td></td>
<td>set the configuration of front panel USB port</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td><strong>Byte 2</strong></td>
<td></td>
</tr>
<tr>
<td>00h:</td>
<td></td>
<td>Dedicated to host</td>
<td></td>
</tr>
<tr>
<td>01h:</td>
<td></td>
<td>Dedicated to BMC</td>
<td></td>
</tr>
<tr>
<td>02h:</td>
<td></td>
<td>Shared mode</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td><strong>Byte 3:4 – Inactivity timeout in minutes (MSB first)</strong></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td><strong>Byte 5 – Enable ID button</strong></td>
<td></td>
</tr>
<tr>
<td>00h:</td>
<td></td>
<td>Disabled</td>
<td></td>
</tr>
<tr>
<td>01h:</td>
<td></td>
<td>Enabled</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td><strong>Byte 6 – Hysteresis (optional) in seconds</strong></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td><strong>Response:</strong></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td><strong>Byte 1 – Completion Code</strong></td>
<td></td>
</tr>
</tbody>
</table>

**Description:**

- **SD530 Servers**

  On the SD530 platform the port is optional and if present is wired directly to the XCC, and only to the XCC. Switching the port to the Host in not available.
  - When the command is issued with byte 1 = 1, the XCC will always respond that the port is owned by the BMC.
  - When the command is issued with byte 1 = 2, the XCC will always respond that the port is dedicated to the BMC.
  - When the command is issued with byte 1 = 3 or byte 1 =4, the XCC will respond with completion code D6h.

- **Non-SD530 Servers**

  On the non-SD530 platform the XCC’s use of the front panel USB port can be disabled by switching to the “Host Only” mode.

  When the command is issued with byte 1 = 5 or byte 1 =6, the XCC will respond with completion code D6h.
<table>
<thead>
<tr>
<th>Code</th>
<th>Command</th>
<th>Request, Response Data</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>00h:</td>
<td>Switch to host</td>
<td></td>
<td></td>
</tr>
<tr>
<td>01h:</td>
<td>Switch to BMC</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Response:**

Byte 1 – Completion Code

Byte 1

<table>
<thead>
<tr>
<th>05h:</th>
<th>Enable/ Disable the front panel USB port</th>
<th></th>
</tr>
</thead>
</table>

Byte 2

<table>
<thead>
<tr>
<th>00h:</th>
<th>Disable</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>01h:</td>
<td>Enable</td>
<td></td>
</tr>
</tbody>
</table>

**Response:**

Byte 1 – Completion Code

**Request:**

Byte 1

<table>
<thead>
<tr>
<th>06h:</th>
<th>Read the Enable/ Disable state of the front panel USB port</th>
<th></th>
</tr>
</thead>
</table>

**Response:**

Byte 1 - Completion Code

Byte 2

<table>
<thead>
<tr>
<th>0xC7</th>
<th>Native NM IPMI Switch</th>
<th><strong>Request Length</strong> = 0:</th>
<th>Empty request data</th>
</tr>
</thead>
</table>

**Response:**

Byte 1 | Completion Code | |

Bytes 2 | Current Enable/ Disable Status | | This command is used to enable/ disable the bridging function of XCC for Native Intel IPMI commands. |
<table>
<thead>
<tr>
<th>Code</th>
<th>Command</th>
<th>Request, Response Data</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td><strong>Request Length = 1:</strong></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Byte 1</td>
<td>Native NM IPMI Interface Enable/Disable attribute 00h – Disable 01h – Enable</td>
</tr>
<tr>
<td></td>
<td></td>
<td><strong>Response:</strong></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Byte 1</td>
<td>Completion Code</td>
</tr>
</tbody>
</table>
Chapter 12. Edge servers

This topic describes specific functions for Edge servers.

Notes:
1. The system requires you to change the XCC password on your first login.
2. The IPMI-over-LAN is disabled by default.
3. The IPMI-over-KCS is disabled by default.

System Lockdown Mode

When System Lockdown Mode is in active state, it means that the system is under lockdown mode. You could activate the system and unlock it, otherwise the host system will not be allowed to boot.

Note: System Lockdown Mode is only available for SE350 with Security Pack but not SE350 standard. Version can be checked at Home tab under System Information and Settings.

Click Security under BMC Configuration and scroll to System Lockdown Mode.

System Lockdown Mode

To activate the system and exit System Lockdown Mode, complete the following steps.
1. Click Inactive button and a Key Vault Activation window will pop-up to show the Challenge Text.
2. Contact your IT administrator and provide Challenge Text.
3. Obtain Challenge Response from your IT administrator and enter it in Key Vault Activation window.
4. Click OK button and then Click Apply.
5. If all setting works correctly, you will see System Lockdown Mode changes to Inactive.

Note: When System Lockdown Mode is in active state, any access to system secrets is denied, such as SED keys.

To force the system to enter System Lockdown Mode, complete the following steps.
1. Click Active button.
2. Click OK button and then Click Apply.

Motion Detection

You can enable this function to protect your server by detecting any physical movement of your server. If Motion Detection is enabled, you can set the following items depending on your preference and configuration.

• Sensitivity Level: Select the sensitivity level from Low, Medium and High according to your preference
• Orientation: Select your configuration from Stand Desktop, Wall Mount (Horizontal), Wall Mount (Vertical), Bookshelf and Ceiling Mount.

Note: Motion Detection would be disabled automatically when the system entering the lockdown mode.

Chassis Intrusion Detection

You can enable this function to protect your server by detecting any physical movement of the top cover.
Additional Configurations

If the Wireless enabled LOM Package is installed, there are three settings you can choose for a detected tamper event.

Under some unusual circumstances, Challenge Text may fail to be verified by ThinkShield Key Vault Portal, it might be necessary to reset the device internal counter prior to activate the device under your IT administrator’s request.

SED Authentication Key (AK) Manager

To the system installed with SED (self-encrypting drive), this feature controls BMC to deploy SED key. You can use SED key to encrypt boot and data drives and boot the system without manual intervention.

Note: This operation is not allowed when the system is not activated (System Lockdown Mode is asserted) or current user does not have the authority to manage SED key.

Note: System Lockdown Mode is only available for SE350 with Security Pack but not SE350 standard. Version can be checked at Home tab under System Information and Settings.

Note: The SE350 also supports an auto backup feature as long as the either ThinkSystem M.2 Enablement Kit or ThinkSystem M.2 Mirroring Enablement Kit is healthy. If hardware is damaged, but both SED and M.2 Kit are healthy, they can be installed into another SE350 and the SED AK can then be restored. However, in order to be prepared for a full hardware crash, Lenovo recommends making a SED AK backup.

Click Security under BMC Configuration and scroll to SED Authentication Key (AK) Manager.

Change the SED AK

Generate SED AK from Passphrase: Set the password and reenter it for the confirmation. Click Re-generate to get the new SED AK.

Generate a Random SED AK: Click Re-generate to get a Random SED AK.

Backup the SED AK: Set the password and re-enter it for the confirmation. Click Start Backup to back the SED AK; then, download the SED AK file and store it safely for future use.

Note: If you use the backup SED AK file to restore a configuration, the system will ask for the password that you set here.

Recover the SED AK: You can only perform this task while the SED is not functioning properly. There are two ways to recover the SED AK:

- Recover SED AK using Passphrase: Use the password that set in Generate SED AK from Passphrase mode to recover the SED AK.
- Recover SED AK from Backup file: Upload the backup file generated in Backup the SED AK mode and enter the corresponding backup file password to recover the SED AK.

Edge Networking

This function page only supported while the Wireless enabled LOM Package is installed.

For the network topology preset tables, please see https://thinksystem.lenovofiles.com/help/topic/SE350/pdf_files.html for more details.

Wi-Fi Connectivity

Click Enabled and you can configure settings according to your Wi-Fi configuration.

LTE Connectivity

This allows you to control LTE connectivity for the Edgenetwork board.

Edge Network Board Address
<table>
<thead>
<tr>
<th>IPv4 or IPv6 status</th>
<th>DHCP Server status</th>
<th>Method</th>
</tr>
</thead>
<tbody>
<tr>
<td>Disabled</td>
<td>Disabled</td>
<td>Obtain IP from DHCP</td>
</tr>
<tr>
<td>Enabled</td>
<td>Enabled</td>
<td>Use static IP address</td>
</tr>
<tr>
<td>Enabled</td>
<td>Disabled</td>
<td>Obtain IP from DHCP or Use static IP address depending on your usage.</td>
</tr>
</tbody>
</table>

BMC Network Bridge
You can access the BMC via Down Link Ports, Wi-Fi Ports, Up Link Ports or None.

Note: Select None refers that this function is disabled.

Edge Network Board Troubleshooting
Restart Immediately: You can restart the network board by this button.
Reset To Factory Defaults: You can reset the network board to default setting by this button.
Appendix A. Getting help and technical assistance

If you need help, service, or technical assistance or just want more information about Lenovo products, you will find a wide variety of sources available from Lenovo to assist you.

On the World Wide Web, up-to-date information about Lenovo systems, optional devices, services, and support are available at:

http://datacentersupport.lenovo.com

**Note:** This section includes references to IBM web sites and information about obtaining service. IBM is Lenovo’s preferred service provider for ThinkSystem.

**Before you call**

Before you call, there are several steps that you can take to try and solve the problem yourself. If you decide that you do need to call for assistance, gather the information that will be needed by the service technician to more quickly resolve your problem.

**Attempt to resolve the problem yourself**

You can solve many problems without outside assistance by following the troubleshooting procedures that Lenovo provides in the online help or in the Lenovo product documentation. The Lenovo product documentation also describes the diagnostic tests that you can perform. The documentation for most systems, operating systems, and programs contains troubleshooting procedures and explanations of error messages and error codes. If you suspect a software problem, see the documentation for the operating system or program.

You can find the product documentation for your ThinkSystem products at the following location:

http://thinksystem.lenovofiles.com/help/index.jsp

You can take these steps to try to solve the problem yourself:

- Check all cables to make sure that they are connected.
- Check the power switches to make sure that the system and any optional devices are turned on.
- Check for updated software, firmware, and operating-system device drivers for your Lenovo product. The Lenovo Warranty terms and conditions state that you, the owner of the Lenovo product, are responsible for maintaining and updating all software and firmware for the product (unless it is covered by an additional maintenance contract). Your service technician will request that you upgrade your software and firmware if the problem has a documented solution within a software upgrade.
- If you have installed new hardware or software in your environment, check [http://www.lenovo.com/serverproven/](http://www.lenovo.com/serverproven/) to make sure that the hardware and software is supported by your product.
- Go to [http://datacentersupport.lenovo.com](http://datacentersupport.lenovo.com) and check for information to help you solve the problem.
  - Check the Lenovo forums at [https://forums.lenovo.com/t5/Datacenter-Systems/ct-p/sv_1e](https://forums.lenovo.com/t5/Datacenter-Systems/ct-p/sv_1e) to see if someone else has encountered a similar problem.

You can solve many problems without outside assistance by following the troubleshooting procedures that Lenovo provides in the online help or in the Lenovo product documentation. The Lenovo product documentation also describes the diagnostic tests that you can perform. The documentation for most systems, operating systems, and programs contains troubleshooting procedures and explanations of error
messages and error codes. If you suspect a software problem, see the documentation for the operating system or program.

Gathering information needed to call Support

If you believe that you require warranty service for your Lenovo product, the service technicians will be able to assist you more efficiently if you prepare before you call. You can also see http://datacentersupport.lenovo.com/warrantylookup for more information about your product warranty.

Gather the following information to provide to the service technician. This data will help the service technician quickly provide a solution to your problem and ensure that you receive the level of service for which you might have contracted.

- Hardware and Software Maintenance agreement contract numbers, if applicable
- Machine type number (Lenovo 4-digit machine identifier)
- Model number
- Serial number
- Current system UEFI and firmware levels
- Other pertinent information such as error messages and logs

As an alternative to calling Lenovo Support, you can go to https://www-947.ibm.com/support/servicerequest/Home.action to submit an Electronic Service Request. Submitting an Electronic Service Request will start the process of determining a solution to your problem by making the pertinent information available to the service technicians. The Lenovo service technicians can start working on your solution as soon as you have completed and submitted an Electronic Service Request.

Collecting service data

To clearly identify the root cause of a server issue or at the request of Lenovo Support, you might need collect service data that can be used for further analysis. Service data includes information such as event logs and hardware inventory.

Service data can be collected through the following tools:

- **Lenovo XClarity Controller**
  
  You can use the Lenovo XClarity Controller web interface or the CLI to collect service data for the server. The file can be saved and sent to Lenovo Support.
  
  - For more information about using the web interface to collect service data, see http://sysmg.lenovofiles.com/help/topic/com.lenovo.systems.management.xcc.doc/NN1ia_c_servicesandsupport.html.
  
  - For more information about using the CLI to collect service data, see http://sysmg.lenovofiles.com/help/topic/com.lenovo.systems.management.xcc.doc/nn1ia_r_fdccommand.html.

- **Lenovo XClarity Administrator**

  Lenovo XClarity Administrator can be set up to collect and send diagnostic files automatically to Lenovo Support when certain serviceable events occur in Lenovo XClarity Administrator and the managed endpoints. You can choose to send diagnostic files to Lenovo Support using Call Home or to another service provider using SFTP. You can also manually collect diagnostic files, open a problem record, and send diagnostic files to the Lenovo Support Center.

  You can find more information about setting up automatic problem notification within the Lenovo XClarity Administrator at http://sysmg.lenovofiles.com/help/topic/com.lenovo.lxca.doc/admin_setupcallhome.html.

- **Lenovo XClarity Provisioning Manager**
Use the Collect Service Data function of Lenovo XClarity Provisioning Manager to collect system service data. You can collect existing system log data or run a new diagnostic to collect new data.

- **Lenovo XClarity Essentials**

Lenovo XClarity Essentials can be run in-band from the operating system. In addition to the hardware service data, Lenovo XClarity Essentials can collect information about the operating system, such as the operating system event log.

To obtain service data, you can run the `getinfo` command. For more information about running the `getinfo`, see [http://sysmgmt.lenovofiles.com/help/topic/toolsctr_cli_lenovo/onecli_r_getinfo_command.html](http://sysmgmt.lenovofiles.com/help/topic/toolsctr_cli_lenovo/onecli_r_getinfo_command.html).

### Contacting Support

You can contact Support to obtain help for your issue.

Appendix B. Notices

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Lenovo (United States), Inc.
1009 Think Place
Morrisville, NC 27560
U.S.A.
Attention: Lenovo VP of Intellectual Property

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Linux is a registered trademark of Linus Torvalds.

Other company, product, or service names may be trademarks or service marks of others.

Important notes

Processor speed indicates the internal clock speed of the microprocessor; other factors also affect application performance.

CD or DVD drive speed is the variable read rate. Actual speeds vary and are often less than the possible maximum.

When referring to processor storage, real and virtual storage, or channel volume, KB stands for 1 024 bytes, MB stands for 1 048 576 bytes, and GB stands for 1 073 741 824 bytes.

When referring to hard disk drive capacity or communications volume, MB stands for 1 000 000 bytes, and GB stands for 1 000 000 000 bytes. Total user-accessible capacity can vary depending on operating environments.

Maximum internal hard disk drive capacities assume the replacement of any standard hard disk drives and population of all hard-disk-drive bays with the largest currently supported drives that are available from Lenovo.

Maximum memory might require replacement of the standard memory with an optional memory module.

Each solid-state memory cell has an intrinsic, finite number of write cycles that the cell can incur. Therefore, a solid-state device has a maximum number of write cycles that it can be subjected to, expressed as total bytes written (TBW). A device that has exceeded this limit might fail to respond to system-generated commands or might be incapable of being written to. Lenovo is not responsible for replacement of a device that has exceeded its maximum guaranteed number of program/erase cycles, as documented in the Official Published Specifications for the device.

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Some software might differ from its retail version (if available) and might not include user manuals or all program functionality.

Particulate contamination

Attention: Airborne particulates (including metal flakes or particles) and reactive gases acting alone or in combination with other environmental factors such as humidity or temperature might pose a risk to the device that is described in this document.
Risks that are posed by the presence of excessive particulate levels or concentrations of harmful gases include damage that might cause the device to malfunction or cease functioning altogether. This specification sets forth limits for particulates and gases that are intended to avoid such damage. The limits must not be viewed or used as definitive limits, because numerous other factors, such as temperature or moisture content of the air, can influence the impact of particulates or environmental corrosives and gaseous contaminant transfer. In the absence of specific limits that are set forth in this document, you must implement practices that maintain particulate and gas levels that are consistent with the protection of human health and safety. If Lenovo determines that the levels of particulates or gases in your environment have caused damage to the device, Lenovo may condition provision of repair or replacement of devices or parts on implementation of appropriate remedial measures to mitigate such environmental contamination. Implementation of such remedial measures is a customer responsibility.

Table 70. Limits for particulates and gases

<table>
<thead>
<tr>
<th>Contaminant</th>
<th>Limits</th>
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</table>
| Particulate | • The room air must be continuously filtered with 40% atmospheric dust spot efficiency (MERV 9) according to ASHRAE Standard 52.2.1.  
• Air that enters a data center must be filtered to 99.97% efficiency or greater, using high-efficiency particulate air (HEPA) filters that meet MIL-STD-282.  
• The deliquescent relative humidity of the particulate contamination must be more than 60%.2  
• The room must be free of conductive contamination such as zinc whiskers. |
| Gaseous    | • Copper: Class G1 as per ANSI/ISA 71.04-19853  
• Silver: Corrosion rate of less than 300 Å in 30 days |

2 The deliquescent relative humidity of particulate contamination is the relative humidity at which the dust absorbs enough water to become wet and promote ionic conduction.

**Telecommunication regulatory statement**

This product may not be certified in your country for connection by any means whatsoever to interfaces of public telecommunications networks. Further certification may be required by law prior to making any such connection. Contact a Lenovo representative or reseller for any questions.

**Electronic emission notices**

When you attach a monitor to the equipment, you must use the designated monitor cable and any interference suppression devices that are supplied with the monitor.

Additional electronic emissions notices are available at:

### Taiwan BSMI RoHS declaration

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<th>汞 (Hg)</th>
<th>鉻 (Cd)</th>
<th>六價鉻 (Cr(VI))</th>
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備考1："超出0.1 wt%"及"超出0.01 wt%"係指限用物質之百分比含量超出百分比含量基準值。
Note1："exceeding 0.1 wt%" and "exceeding 0.01 wt%" indicate that the percentage content of the restricted substance exceeds the reference percentage value of presence condition.

備考2："○"係指該項限用物質之百分比含量未超出百分比含量基準值。
Note2："○" indicates that the percentage content of the restricted substance does not exceed the percentage of reference value of presence.

備考3："-"係指該項限用物質為排除項目。
Note3：The "-" indicates that the restricted substance corresponds to the exemption.

### Taiwan import and export contact information

Contacts are available for Taiwan import and export information.
委製商/進口商名稱: 台灣聯想環球科技股份有限公司
進口商地址: 台北市南港區三重路 66 號 8 樓
進口商電話: 0800-000-702
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