

BMC/CMC Management Console User's Guide

**NEC Express Server
Express5800 Series**

- 1. Overview**
- 2. Configuring the Server**
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ABOUT THIS USER' S GUIDE

This User's Guide provides the instructions for properly using the BMC/CMC Management Console. Please keep this document at hand for a quick reference and use it when you encounter any questions or troubles while using the BMC/CMC Management Console for remote control, monitoring, and management of the server.

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GLOSSARY

Term	Description
Active Directory	This means Microsoft's directory service.
BMC	Baseboard Management Controller This management controller complies with the IPMI specification and provides the monitoring capabilities of system's hardware without depending on the state and OS of the target server. This controller is standard and be equipped with the motherboard.
CMC	Chassis Management Controller This management controller complies with the IPMI specification and provides the monitoring capabilities of system FAN and power supply and each node status. This controller is standard and be equipped with the chassis.
CPU Throttling	This function suppresses the frequency of CPU depending on the load status of the server.
ESMPRO/Server Manager	The server management software that is introduced to the management PC.
IPMI	Intelligent Platform Management Interface It is a standard interface specification for monitoring the server's hardware without depending on the state and OS of the server.
LDAP	Lightweight Directory Access Protocol It is a protocol for connecting to a directory service.
SEL	System Event Log It is hardware log information that has been defined by the IPMI specification.
SOL	Serial Over LAN This function redirects the serial port input/output of the server to the management PC that is connected to the server in LAN.
Virtual KVM Viewer	Virtual Keyboard Video Mouse This function has virtually realized the video output and keyboard/mouse input of the server on management PC.
Virtual Media	This function has virtually recognized the USB Memory, CD/DVD ROM, FD media of the management PC on the server.
Management PC	The generic name of the personal computer which manages the server from remote in the network.
NIC	Network Interface Controller A controller that provides the server network interface function.
NCSI	Network Controller Sideband Interface A network controller interface that enable the connection of BMC to system LAN.
PEF	The function which enables BMC/CMC to alert when SEL event is logged. It also enables power control function.

SYMBOLS

The following symbols are used throughout this manual.



Items to be observed or points to be noted when using this product.



Items to be checked when using this product or software.



Information useful or convenient for you.



Example of troubles occurred.

PREFACE

The Web Management Console enables you to monitor the operating status of the server (power supplies, fans, temperature and so forth), to operate the server's keyboard, video, and mouse (KVM) from a remote console* and to access to CD-ROM/Floppy disk drives on a remote site*. The BMC/CMC Management Console is enabled by a system management LSI called "BMC (Baseboard Management Controller)/CMC (Chassis Management Controller)" and thus referred to as the "BMC/CMC" hereinafter in this User's Guide.

*The Virtual KVM and Virtual Media functions are optional.

1. Overview

The server comes standard with the system management LSI of BMC (Baseboard Management Controller)/CMC (Chassis Management Controller) and a management LAN port dedicated to the BMC/CMC. By connecting the management LAN port to your network, you can monitor and control the server from a remote site via a Web browser and SSH client.

With the optional N8115-32 Remote KVM and Media License, you can use Virtual Device. With using Virtual Device, you can operate the server's KVM (keyboard, video, and mouse) from a remote console and access CD-ROM/DVD-ROM/floppy disk drives and USB memory in a remote site (Virtual KVM/Media).

2. Configuring the Server

This chapter describes the settings necessary to configure the BMC in the server.

DEFAULT NETWORK SETTINGS

The BMC default network settings are as follows:

IP Address: 192.168.0.120

Default User 1:

User Name: admin

Password: password

Default User 2:

User Name: ADMIN

Password: ADMIN

The CMC default network settings are as follows:

IP Address: 192.168.0.120

User Name: admin

Password: password

- Connect the management LAN port to the private network on which the default IP address "192.168.0.120" is reachable. If the default IP address is not reachable on the network, assign a new IP address to the management LAN by using the BIOS setup menu in the server. Refer to "[Management LAN Settings](#)" in the next page for the settings.



For the device that can be controlled via the network, there is an unauthorized access risk from third party if your password is default value. It may cause information leakage, loss of system availability and integrity, and cyber-attack. The default password is provided only for first maintenance. Be sure to change the password during first setting. We do not assume any responsibility for the system damage is caused by unauthorized access with unchanged default password.

It is hard to prevent unauthorized access with lower strength (few digits) or easy to guess ("123456789", "abcdefg", "password", "Administrator" etc.) password. Please change to strong password which contain a combination of at least 8 letters include uppercase, lowercase, numbers and symbols.

<<How to Change Password>>

Please refer to "Change Default Password" in Chapter 5 "Using Remote

Management" in the BMC/CMC Management Console User's Guide.

- CMC Network setting only supported by Web browser, please refer to Chapter 5 "Using Remote Management" for detail explanation.



To check the CMC IP address, please refer "Chapter 5: Get CMC IP Address".

MANAGEMENT LAN SETTINGS

You can configure basic setting of management LAN settings of BMC for remote management using Web server function and command line interface of BMC by using some tools

- Web Browser
Please refer to Chapter 5 for details.
- BIOS Setup Utility
Press the DEL key during POST(Power on Self-Test) or displaying logo immediately after power on or reset the server to enter BIOS setup menu. Please refer to Maintenance Guide.

The item that can be set with each tool is different. Please refer to help of each tool for details of a set item. Below settings are required for IPv4 connection. Please refer to online help for IPv6 connection.

Setting Item	Web Browser	BIOS Setup Utility
BMC Network Dedicated / NCSI	OK	OK
Network Speed	OK	NG
Enable IPv4	OK	NG
Enable IPv4 DHCP	OK	OK
IPv4 Address	OK	OK
IPv4 Subnet mask	OK	OK
IPv4 Gateway	OK	OK

Dedicated / Shared (NCSI) (BMC only)

Select Shared (NCSI) to share a system LAN port with BMC LAN. If you use a management LAN port for the BMC, select Dedicated. The management LAN port is not available when this setting is set Shared (NCSI). (Default setting is dedicated. In some systems, this menu is not supported. Please refer to the User's Guide of your server for more details.)



If you set Shared (NCSI), the system LAN port that is shared and BMC are not able to communicate directly. To the system LAN port that is shared be able to communicate with BMC, please select Dedicated to disable 'Shared BMC LAN'.



If you set Shared (NCSI), the system LAN port that is initialized in system boot and network connection is lost temporarily.



Shared with Failover is not supported. Please don't set Shared with Failover.

Network Speed

Set link speed and Duplex mode.



Please configure the Management LAN to Auto Negotiation mode if the network switch is in Auto Negotiation mode. If the network switch is in other mode, please also configure the Management LAN to the same mode.



CMC supports only Auto Negotiation mode.

IPv4 Setting:

Enable IPv4 DHCP

When enable IPv4 DHCP, the IP address for the NIC is obtained from the DHCP server and the IP Address, Subnet Mask and Gateway fields are deactivated.

IPv4 Address

If DHCP is not used to automatically obtain an IP address, enter the BMC's IP address.

If DHCP has been used, an automatically obtained IP address will appear.

(IPv4 default setting is 192.168.0.120. IPv6 default setting is link local address (*2) rather than global address.)

Subnet Mask

If DHCP is not used to automatically obtain a subnet mask IP address, enter the subnet mask of your management LAN.

If DHCP has been used, an automatically obtained subnet mask IP address will appear. (Default setting is 255.255.255.0.)

Gateway

If DHCP is not used to automatically obtain a default gateway IP address, enter the default gateway of your management LAN. If DHCP has been used, an automatically obtained default gateway will appear. (Default setting is 0.0.0.0.)



The connections with BMC/CMC are disconnected If you change BMC/CMC network setting.

IPMI contains the vulnerability (CVE-2013-4786) that password hash can be obtained in the IPMI 2.0 specification.

[Abstraction of vulnerability]

The IPMI 2.0 specification supports RMCP+ Authenticated Key-Exchange Protocol (RAKP) authentication, which allows remote attackers to obtain password hashes and conduct offline password guessing attacks.

[Solution]

There is no solution for this issue. The authentication process in the IPMI 2.0 specification specifies that the server sends the SHA1, MD5 hash of the requested user's password to the client prior to client authentication. BMC/CMC sends the password hash for the requested user, this password hash can be cracked by offline password guessing attacks.



This feature is an important part of the IPMI 2.0 specification and cannot defeat this issue without deviating from the IPMI 2.0 specification. Therefore, we recommend below to reduce this risk.

- If you don't use IPMI, please disable IPMI over LAN. You can disable "Enable IPMI Over LAN" in [EMS]-[Configuration]-[IPMI] page of BMC/CMC Management Console
- If you use IPMI, please restrict access to the BMC/CMC Management Console using isolated management LAN/VLAN, access control lists (ACL) or VPN.
- Please use the latest BMC firmware.
- Please use the best policy for password management on your system and network. Please use a strong password.

3. Configuring a Management PC

This chapter describes the settings necessary for the remote management PC that will be connected to the server.

SUPPORTED BROWSERS

The following browsers are supported by, Windows 7 (SP1), Windows 8.1, Windows 10, Windows Server 2008 R2 (SP1), Windows Server 2012 R2, Windows Server 2016 and Red Hat Enterprise Linux 6.2 64bit:

- Microsoft Internet Explorer 11.0
- Firefox ESR52 or later
- Chrome 54 or later

* It's recommended that a browser be applied the latest service pack and the security patch.
* Beginning January 12, 2016, only the most current version of Internet Explorer available for a supported operating system will receive technical support and security upgrades. About Microsoft Lifecycle Support policy for Internet Explorer, please refer the following URL.

<https://www.microsoft.com/en-us/WindowsForBusiness/End-of-IE-support>

<https://support.microsoft.com/en-us/lifecycle#gp/Microsoft-Internet-Explorer>

SETTING YOUR BROWSER

Configure the following settings:

- Enable SSL.
- Allow JavaScript execution.
- Allow Java execution.
- Accept Cookies.
- Allow Popup.
- Enable Stylesheet.
- Enable HTTP1.1.

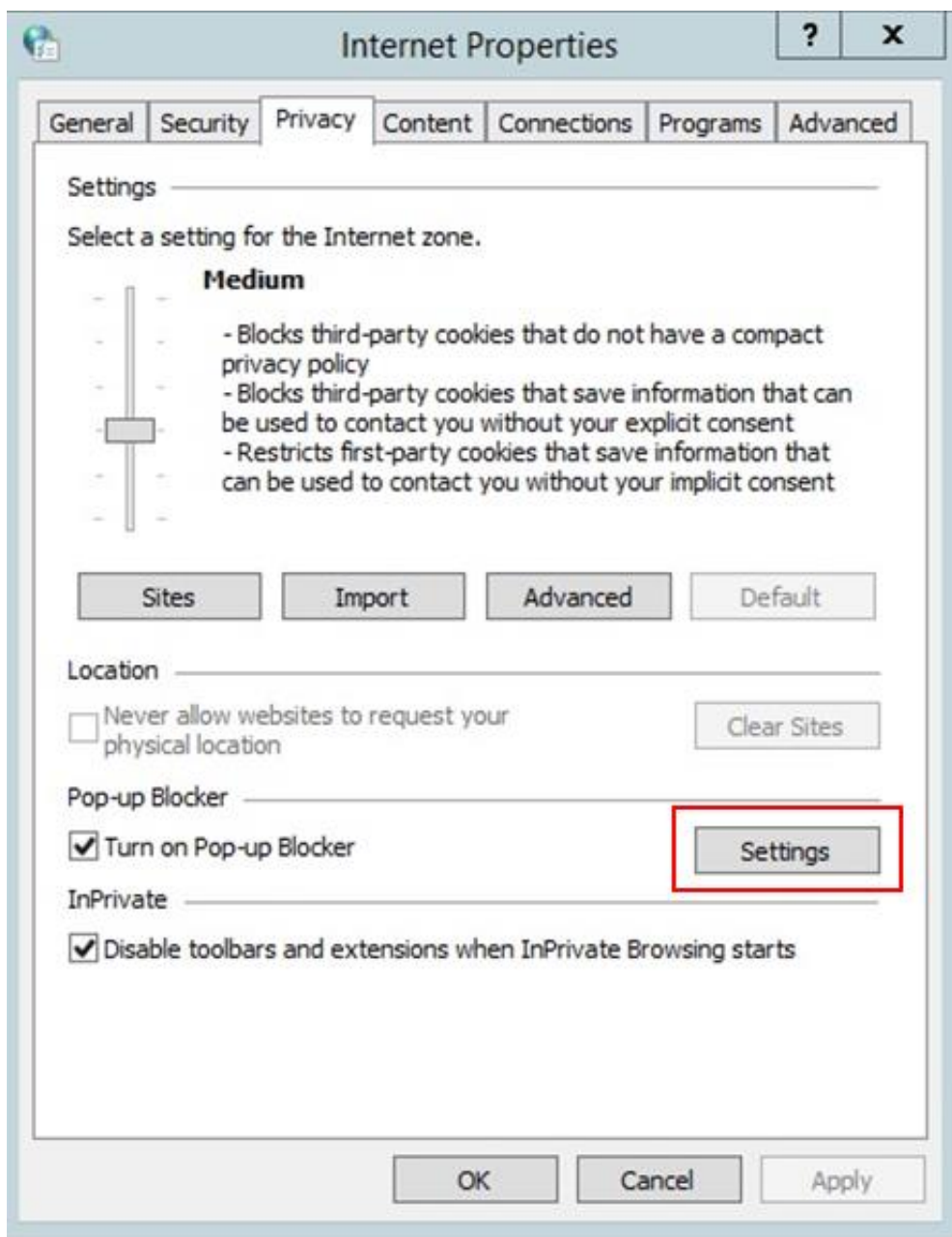
* If you use Microsoft Internet Explorer, the following configurations are required.

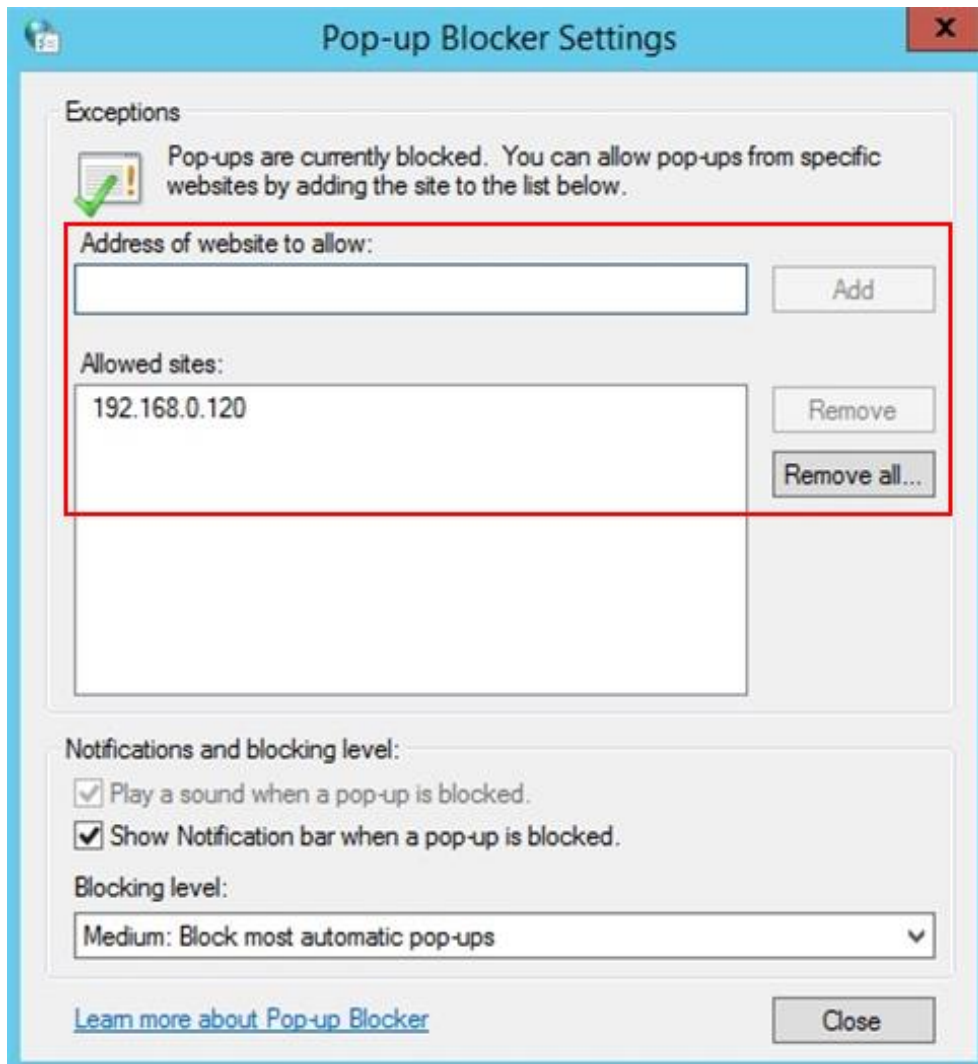
- Add BMC's address to Trusted Sites.
- Set Trusted Site's security level to Medium.
- If Enhanced Security is enabled, adding [about:blank] to Trusted Sites is required.
- If the "Do Not Save Encrypted Pages To Disk" of [Security]-[Advanced]-[Internet Options] is check on, un-check this item is required.

- If the “Play animations in web pages” of [Multimedia]-[Advanced]-[Internet Options] is check off, check this item is required.
- Because the security settings of browser are enhanced on server OS, if you use browser, you might find that some of the buttons has no response. In this case, it is necessary to be off the IE SEC settings.

* While using virtual KVM HTML5 version, adding BMC IP address to address of website to allow in pop-blocker settings is required. Below is the method for Internet Explorer 11.

- Adding BMC IP address to [Address of website to allow] in [Internet Properties]-[Privacy]-[Pop-up Blocker]-[Settings] is required.





JAVA RUNTIME ENVIRONMENT

The management PC requires Java Runtime Environment (JRE), Standard Edition 8.0.

It can't use Java Runtime Environment (JRE), Standard Edition 8.0 Update 171 or later. In addition, only the 32 bit version of Java Runtime Environment is supported.

It is necessary to set the following in the Java control panel.

- Add BMC's IP address (both HTTP/HTTPS) to [Exception Site List]-[Security].
- If the [Enable the next-generation Java Plug-in (requires browser restart)]-[Java Plug-in]-[Advanced] is not checked, please check. This item is required.



If you use Java8, you may see the dialog of 'Running this application may be a security risk'. In this case, you need to check 'I accept the risk and want to run this application' and press Run button.



If you use Java8, you may see the dialog of 'Block potentially unsafe components from being run?'. In this case, you need to press 'Don't Block' button or please choose the 'Enable-hide warning and run with protections' from the Mixed code of Advanced menu of Java control panel.



If you use Java8, it may take some time to start for certificate revocation checking of the signed Java Application. In this case, once you need to close the browser and choose the 'Do not check (not recommended)' from the [Perform signed code certificate revocation checks on] of Advanced menu of Java control panel and then login again from the browser.

4. Networking

TCP/IP PORTS

The BMC/CMC uses the TCP/IP ports listed below. If you use the BMC/CMC in a firewall environment, you need to allocate the port numbers (shown in the right column) to the individual non-block ports.

Module name	Port #	Protocol	Direction	Module name	Port #
Web browser (Non-Encryption)	Dynamic(*1)	TCP	↔	BMC/CMC	80(*3)
Web browser (Encryption)	Dynamic(*1)	TCP	↔	BMC/CMC	443(*3)
Virtual KVM/Media (Non-Encryption)	Dynamic(*1)	TCP	↔	BMC	2068(*2)
Virtual KVM/Media (Encryption)	Dynamic(*1)	TCP	↔	BMC	2068(*2)
SSH client	Dynamic(*1)	TCP	↔	BMC	22
SMTP server	25(*4)	TCP	↔	BMC/CMC	Dynamic
LDAP server	389(*5)	TCP	↔	BMC/CMC	Dynamic
SNMP server	162	UDP	↔	BMC/CMC	Dynamic
WS-Management (Non-Encryption)	Dynamic(*1)	TCP	↔	BMC	5985
WS-Management (Encryption)	Dynamic(*1)	TCP	↔	BMC	5986

*1 Using unassigned port which don't be used by OS or other SW.

*2 [Server Information]-[vKVM & vMedia]-[Configuration] to change the port number.

*3 [EMS]-[Configuration]-[Services] to change the port number.

*4 [Server Information]-[Event Management]-[Email Settings] to change the port number.

*5 [EMS]-[LDAP] to change the port number.



BMC/CMC doesn't support connection via HTTP proxy server.



It is recommended to use the network in more than 100BASE-TX (10Mbps bandwidth or more) for remote management feature.

5. Using Remote Management

OVERVIEW

The BMC/CMC Web Server function allows you to control the server's power and Virtual KVM (BMC only) from a remote console via a Web browser.

CONNECTING TO THE WEB SERVER

Access the following URL from the Web browser on the remote management PC:

`http://BMC_CMC_HostPort` or `https://BMC_CMC_HostPort`



Tips

The “BMC_CMC_HostPort” URL includes the BMC/CMC’s IP address or host name and a colon followed by a port number for HTTP or HTTPS connection: e.g. 192.168.0.120:443 If the port number is 443 for HTTPS (default) or 80 for HTTP, you may omit the port number.



Tips

If you connect with HTTP, Web Browser will auto redirect to HTTPS.



Tips

When you connect via SSL, security warning messages may appear.



Tips

If you did not register the SSL server certificate, the following page is displayed and HTTPS connection is blocked. In this case, select "Continue to this website" to continue (The image if you are using Internet Explorer is as follows).



There is a problem with this website's security certificate.

The security certificate presented by this website was not issued by a trusted certificate authority.

Security certificate problems may indicate an attempt to fool you or intercept any data you send to the server.

We recommend that you close this webpage and do not continue to this website.

[Click here to close this webpage.](#)

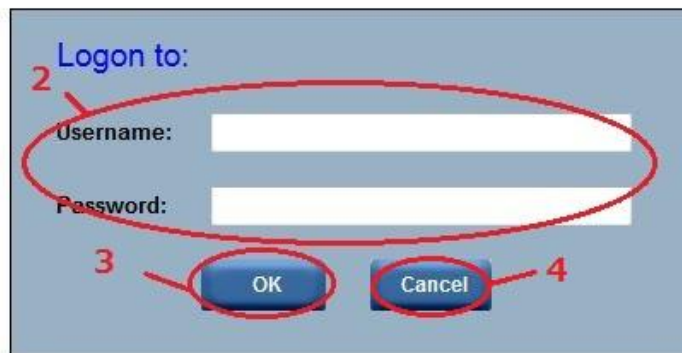
[Continue to this website \(not recommended\).](#)

[More information](#)

LOGIN AND LOGOUT

Login

When the login page appears, input the user name and password, and then click [Login].



1. The online help is displayed.
2. Please input username and password.
3. Please push "Login" button.
4. Press "Cancel" button to cancel login.



Do not use the "Forward", "Back" or "Reload" button in your browser after login.

Logout

Click "Logout" in the upper right corner of the window.

Support Help About Logout

After you log out, you return to the login page.



If the browser is slow during login procedure, please restart your browser or logout.



Login failure may occur after network setting to the BMC or shortly after the BMC reset. In this case, please try to login again.

HEADER MENU



1. Display the support status.
2. The online help is displayed.
3. Display the BMC/CMC information.

LOGIN USER INFORMATION

The login user information is displayed in the bottom of browser window after log in.



1 Welcome admin Administrator ! 2 Sun Jan 03 2010, 05:37:11 (UTC+0000) 3

The image shows a screenshot of a login message: "Welcome admin Administrator ! Sun Jan 03 2010, 05:37:11 (UTC+0000)". Three red circles with arrows point to specific parts of the message: circle 1 points to "admin", circle 2 points to "Administrator", and circle 3 points to the date and time "Sun Jan 03 2010, 05:37:11 (UTC+0000)".

1. Login user name is displayed.
2. Login user's privilege is displayed.
3. BMC/CMC date time is displayed.

BMC MENU

The screenshot displays the BMC Embedded Management Software interface. The top navigation bar includes 'Embedded Management Software' and links for 'Support', 'Help', 'About', and 'Logout'. A left sidebar menu is numbered 1 through 14, with red arrows pointing to 'Properties' (1) and 'Configuration' (2). The main content area shows the 'Properties' page, which includes a 'Refresh' button, 'Platform Information' table, and 'Firmware Information' table. A footer message reads 'Welcome admin (Administrator) ! Sun Jan 03 2010, 04:36:29 (UTC+0000)'.

Manufacturer	NEC
Product Name	Express5800/D120h [N8100-2539Y]
BIOS Version	D16h
BIOS Release Date	04/26/2017
CMC IPv4 Address	192.168.1.52

Product Name	MergePoint EMS
Product Information	MergePoint Embedded Management Software
Firmware Version	1.03
Firmware Updated	02 Jan 2010, 02:47:12 (UTC+0000)
ASIC Type	ast2500

A. The menu that can be selected is displayed.

B. Information selected by A is displayed. The screen of "Properties" is displayed in the above-mentioned example.

Menu

1 Properties

The server information and BMC firmware revision information are displayed.

2 Configuration

Set BMC configuration. (Network, Network Security, Security, Users, Services, Time Settings, Language)

3 Sessions

Display the user sessions who are online in BMC and disconnect the online user session.

4 LDAP

Set the LDAP configuration to certificate the LDAP user.

5 Update

Update the BMC, BIOS firmware regardless of power-off/on of the server.

6 Utilities

Reboot the BMC, reset the BMC to factory default, update logo, backup configuration, restore configuration.

7 LEDs

Control UID LED on/off.

8 Sensor Monitor

Monitor temperature sensors, voltage sensors, current sensors. Moreover, the sensors might not be displayed depending on the state of the system power.

9 Power

Power on/off system, power cycle system, hard reset system, NMI, soft off system. And show the power consumption, control the power limit management.

10 System Event Log

BMC's System Event Log (SEL) information is displayed.

11 Event Management

Configure the SNMP trap and mail alert settings according to Platform Event Filter (PEF) configuration.

12 Serial Over LAN

Configure the Serial Over Lan (SOL) configuration to do console redirection.

13 vKVM & vMedia

Launch vKVM viewer and configure the vKVM viewer and vMedia configuration. There are two kinds of vKVM viewer, Java version and HTML5 version.

14 Hardware

Display CPU usage, CPU information, memory information, storage information, system NIC information.



Please do not remove administrator privilege user. If you remove it and logout, you cannot add any new account at next login because there is no longer administrator privilege user.



Please do not change User ID 1. If you want to add or remove users in the IPMI command tool, you can use User ID from 2 to 16.



Click “Reboot” in Utilities only if a problem occurs in BMC. Do not click “Reboot” in usual operation. Do not shutdown the system, reboot the system, or perform any switch operation after clicking the “Reboot” for approximately 3 minutes.



The connections with BMC are disconnected if you change BMC network setting or reset the BMC.



Clicking the “Reboot” in Utilities page cannot reboot the server.



Following settings are not covered by backup and restore configuration. Please manually restore these settings.

- Timezone
- Virtual KVM Viewer
- Virtual media Session



If the hardware clock setting (RTC) is set by the server OS to the time in UTC offset, The timestamp of SEL (System Event Log) will be set to the time in UTC offset instead of local timestamp. Please notice that the time difference between UTC time and local time will occur.



Don't use ECO settings in NEC ESMPRO Manager if you use Power Consumption settings in BMC Management Console.



Power Consumption settings in BMC Management Console doesn't support Exception Action.



NEC ESMPRO Manager, Ezclct Viewer and Maintenance Utility in Offline tool can provide more detail information for System Event Log analysis.



Please use IP Destination 1-3 if you send SNMP trap by Platform Event Filter (PEF) to NEC ESMPRO Manager.

And also please configure Alert Acknowledges to be enabled in ESMPRO Configuration menu of Server Configuration Utility in Offline tool.

If you enable Alert Acknowledges in ESMPRO Configuration menu, please use IP Destination 4-8 for other software than NEC ESMPRO Manager.



Don't set Reboot/Power Cycle/Power Off in Platform Events. If you set these configuration, server may be rebooted or turned off forcibly while operating system is running, it may cause the loss of data in the server.



SNMP trap by Platform Event Filter (PEF) and Email alert send alert to all of destinations configured in IP Destination 1-8 and Email Alert 1-4 and send alert in the configured order.



SNMP trap by Platform Event Filter (PEF) and Email alert doesn't support alert to IPv6 link local address.



Use "Dump BIOS image" button in Update menu only when instructed by us. And use this function with the system power off.

For each BMC setting, the factory default value of the settings are as following table.



Clicking the "Factory Default" button in Utilities page to recover factory default value settings.

Menu	Setting	Factory Default value
Network	Mode	Dedicated
	Host Name	EMS
	DNS Domain Name	AvctDomain
	Global DNS	Enabled
	Global Dynamic DNS	By Interface
Network Interface Settings	Auto Negotiation	On
	Network Speed	1000Mb
	Duplex Mode	Full
General Settings	Enable Dynamic DNS	Disable
	Use DHCP for DNS Domain Name	Enable
	Respond to ARP	Enable
IPv4 Settings	Enabled	Enable
	Use DHCP	Disable
	IP Address	192.168.0.120
	Subnet Mask	255.255.255.0
	Gateway	192.168.0.1
	Use DHCP to obtain DNS server addresses	Disable
	Preferred DNS Server	0.0.0.0

	Alternate DNS Server	0.0.0.0
IPv6 Settings	Enabled	Enable
	Use Static	Enable
	Use DHCPv6	Enable
	Use Stateless	Enable
	Use DHCP to obtain DNS server addresses	Disable
	Preferred DNS Server	::
	Alternate DNS Server	::
	Traffic Class	0
	Hop Limit	64
	DUID	Depend on platform
	Static Address 1	1999::11/64, Enable
	Static Address 2	1999::12/64, Enable
IPv6 Router Settings	Static Router Enabled	Disable
	Dynamic Router Enabled	Disable
	Static Router 1 IP	::
	Static Router 1 MAC	00:00:00:00:00:00
	Static Router 1 Prefix	64
	Static Router 2 IP	::
	Static Router 2 MAC	00:00:00:00:00:00
	Static Router 2 Prefix	64
VLAN Settings	Enable VLAN ID	Disable
	VLAN ID	0
	Priority	0
Network Security	IP Blocking Enabled	Disable
	IP Blocking Fail Count	5
	IP Blocking Fail Window	60
	IP Blocking Penalty Time	300
Users	Password Policy Check Enable	Disable
Services	HTTP Port Number	80
	HTTPS Port Number	443
	Timeout	1800
Time Settings	Operation Mode	Disabled
	NTP Server 1	Blank
	NTP Server 2	Blank
	NTP Server 3	Blank
	Requested Mode's Update Frequency (minutes)	3
	Time Synchronization Method	Step Mode
	Use Server or Client Time Zone	Server Time Zone
	Server Time Zone	UTC
Language	Language	English
LDAP	Enable LDAP	Disable
	Enable Encryption for LDAP client	Enable
	Validate Server Certificate at Binding	Disable

	Certificate File Path	/etc/certs/cacerts/ldap.cert
	Use DNS to find servers	Disable
	Domain Source	Use Domain from Login
	Domain Name for DNS SRV request	Blank
	Service Name	ldap
	Domain Controller 1	Blank
	Domain Controller 1's Port	389
	Domain Controller 2	Blank
	Domain Controller 2's Port	389
	Domain Controller 3	Blank
	Domain Controller 3's Port	389
	Base Domain Name	Blank
	UID Search Object value	sAMAccountName
	Group Filter	Blank
	Binding Method	Use Login Credentials
	Client ID used with CC binding	Blank
	Client Password used with CC binding	Blank
	Group ID Attribute	memberOf
	Attribute to query permission in group	Blank
Power Consumption	Power Limit Management Activated	Disable
	Power Limit in Watts	0
	Sampling Period	0
	Correction Time Limit	0
Platform Events	Reboot	Enable
	Power Cycle	Enable
	Power Off	Enable
	Generate PET	Enable
	Global Alerting Enable	Disable
	Threshold Type, Temperature Critical Filter	None, Disable
	Threshold Type, Temperature Warning Filter	None, Disable
	Threshold Type, Voltage Critical Filter	None, Disable
	Threshold Type, Voltage Warning Filter	None, Disable
	Threshold Type, Fan Critical Filter	None, Disable
	Threshold Type, Fan Warning Filter	None, Disable
	Sensor-specific Type, Chassis Intrusion Critical Filter	None, Disable
	Sensor-specific Type, Processor Warning Filter	None, Disable
Sensor-specific Type, Processor	None, Disable	

	Critical Filter	
	Sensor-specific Type, Power Supply Warning Filter	None, Disable
	Sensor-specific Type, Power Supply Critical Filter	None, Disable
	Sensor-specific Type, Memory Warning Filter	None, Disable
	Sensor-specific Type, Memory Critical Filter	None, Disable
	Sensor-specific Type, Critical Interrupt Critical Filter	None, Disable
	Sensor-specific Type, Watchdog 2 Critical Filter	None, Disable
Trap Setting	IP Destination 1	Disable, IPv4, 0.0.0.0
	IP Destination 2	Disable, IPv4, 0.0.0.0
	IP Destination 3	Disable, IPv4, 0.0.0.0
	IP Destination 4	Disable, IPv4, 0.0.0.0
	IP Destination 5	Disable, IPv4, 0.0.0.0
	IP Destination 6	Disable, IPv4, 0.0.0.0
	IP Destination 7	Disable, IPv4, 0.0.0.0
	IP Destination 8	Disable, IPv4, 0.0.0.0
	Community Name	public
Email Setting	Sender Information From	EMS@AvctDomain
	Email Alert 1	Disable, Blank, EMS email alert
	Email Alert 2	Disable, Blank, EMS email alert
	Email Alert 3	Disable, Blank, EMS email alert
	Email Alert 4	Disable, Blank, EMS email alert
	SMTP IP Address	0.0.0.0
	SMTP Port Number	25
	Enable	Disable
	Username	Blank
	Password	Blank
	STARTTLS Mode	AUTO
	SASL Mode	AUTO
Serial Over Lan	Enable Serial Over LAN	Enable
	Baud Rate	115.2 kbps
	Channel Privilege Level Limit	Administrator
Virtual KVM Viewer Configuration	Enabled	Enable
	Max Sessions	4
	Remote Port	2068
	Video Encryption Enabled	Enable
	Preferred Client Type	Java
Virtual Media Session Configuration	Enabled	Enable
	Encryption Enabled	Disable



Example of a BMC E-mail alert:

Following contents are sent as E-mail alert.

Message: EMS

Event: CPU1_Status: Processor sensor, Processor Automatically Throttled was asserted

Date/Time: 2017-06-06 16:42:30

Severity: Warning

Product SN: xxxxxxxx

Hostname: xxxxxxxx

F/W version: x.x.x

CMC MENU

Embedded Management Software Support Help About Logout

A B

- 1 EMS
- 2 Properties
- 3 Configuration
 - Network
 - Network Security
 - Security
 - Users
 - Services
 - Time Settings
 - Language
- 4 Sessions
- 5 LDAP
- 6 Update
- 7 Utilities
- 8 Fan Profiles
- 9 Server Information
- 10 Sensor Monitor
- 11 Power
 - Control
 - Consumption
- 12 System Event Log
 - Event Management
 - Platform Events
 - Trap Settings
 - Email Settings
- Node Information
 - Node Status
 - Node MAC Address

Properties

[Refresh](#)

Firmware Information

Product Name	MergePoint EMS
Product Information	MergePoint Embedded Management Software
Firmware Version	0.63
Firmware Updated	05 Jun 2017, 04:04:27 (UTC+0000)
ASIC Type	ast1250

CPLD Information

BPB CPLD 0 Version	R15
BPB CPLD 1 Version	R15
BPB CPLD 2 Version	R15
BPB CPLD 3 Version	R15

Welcome admin (Administrator) ! Thu Jun 08 2017, 11:15:20 (UTC+0000)

- A. The menu that can be selected is displayed.
- B. Information selected by A is displayed. The screen of "Properties" is displayed in the above-mentioned example.

Menu

1 Properties

The server information and CMC revision information are displayed.

2 Configuration

Set CMC configuration (Network, Network Security, Security, Users, Services, Time Settings, Language).

3 Sessions

Display the user sessions who are online in CMC and disconnect the online user session.

4 LDAP

Set the LDAP configuration to certificate the LDAP user.

5 Update

Update the CMC, CPLD firmware regardless of power-off/on of the server.

6 Utilities

Reboot the CMC, reset the CMC to factory default, backup configuration, restore configuration.

7 Fan Profiles

Configure the fan policy. Please do not change this settings unless get special inform from NEC.

8 Sensor Monitor

Monitor temperature sensors, voltage sensors, current sensors, power supplies sensors, fan sensors. Moreover, the sensors might not be displayed depending on the state of the system power.

9 Power

Power on/off all nodes in the chassis. Show the all power consumption in the chassis.

10 System Event Log

CMC's System Event Log (SEL) information is displayed.

11 Event Management

Configure the SNMP trap and mail alert settings according to Platform Event Filter (PEF) configuration.

12 Node Information

Display node status and MAC address.



Please do not remove administrator privilege user. If you remove it and logout, you cannot add any new account at next login because there is no longer administrator privilege user.



Please do not change User ID 1. If you want to add or remove users in the IPMI command tool, you can use User ID from 2 to 16.



Click “Reboot” in Utilities only if a problem occurs in CMC. Do not click “Reboot” in usual operation. Do not shutdown the system, reboot the system, or perform any switch operation after clicking the “Reboot” for approximately 3 minutes.



The connections with CMC is disconnected if you change CMC network setting or reset the CMC.



Clicking the “Reboot” in Utilities page cannot reboot the server.



Following settings are not covered by backup and restore configuration. Please manually restore these settings.

- Language
- Timezone



NEC ESM PRO Manager, can provide more detail information for System Event Log analysis.



Please use IP Destination 1-3 if you send SNMP trap by Platform Event Filter (PEF) to NEC ESM PRO Manager.

And also please configure Alert Acknowledges to be enabled in ESM PRO Configuration menu of Server Configuration Utility in Offline tool.

If you enable Alert Acknowledges in ESM PRO Configuration menu, please use IP Destination 4-8 for other software than NEC ESM PRO Manager.



Don't set Reboot/Power Cycle/Power Off in Platform Events. If you set these configuration, server may be rebooted or turned off forcibly while operating system is running, it may cause the loss of data in the server.



SNMP trap by Platform Event Filter (PEF) and Email alert send alert to all of destinations configured in IP Destination 1-8 and Email Alert 1-4 and send alert in the configured order.



SNMP trap by Platform Event Filter (PEF) and Email alert doesn't support alert to IPv6 link local address.

For each CMC setting, the factory default value of the setting are as following table.



Clicking the “Factory Default” button in Utilities page to recover factory default value settings.

Menu	Setting	Factory Default value
Network	Mode	Dedicated
	Host Name	EMS
	DNS Domain Name	AvctDomain
	Global DNS	Enable
	Global Dynamic DNS	By Interface
Network Interface Settings	Auto Negotiation	On
	Network Speed	Disable
	Duplex Mode	Disable
General Settings	Enable Dynamic DNS	Disable
	Use DHCP for DNS Domain Name	Enable
	Respond to ARP	Enable
IPv4 Settings	Enabled	Enable
	Use DHCP	Disable
	IP Address	192.168.0.120
	Subnet Mask	255.255.255.0
	Gateway	192.168.0.1
	Use DHCP to obtain DNS server addresses	Disable
	Preferred DNS Server	0.0.0.0
	Alternate DNS Server	0.0.0.0
IPv6 Settings	Enabled	Enable
	Use DHCP	Enable

	Use Stateless	Enable
	IP Address 1	1990::11/64
	IP Address 2	1999::12/64
	Use DHCP to obtain DNS server addresses	Enable
	Preferred DNS Server	::
	Alternate DNS Server	::
VLAN Settings	Enable VLAN ID	Disable
	VLAN ID	0
	Priority	0
Network Security	IP Blocking Enabled	Disable
	IP Blocking Fail Count	5
	IP Blocking Fail Window	60
	IP Blocking Penalty Time	300
Services	HTTP Port Number	80
	HTTPS Port Number	443
	Timeout	1800
Time Settings	Operation Mode	Disabled
	NTP Server 1	Blank
	NTP Server 2	Blank
	NTP Server 3	Blank
	Requested Mode's Update Frequency (minutes)	3
	Time Synchronization Method	Step Mode
	Use Server or Client Time Zone	Server Time Zone
Server Time Zone	UTC	
Language	Language	English
LDAP	Enable LDAP	Disable
	Enable Encryption for LDAP client	Enable
	Validate Server Certificate at Binding	Disable
	Certificate File Path	/etc/certs/cacerts/ldap.cert
	Use DNS to find servers	Disable
	Domain Source	Use Domain from Login
	Domain Name for DNS SRV request	Blank
	Service Name	ldap
	Domain Controller 1	Blank
	Domain Controller 1's Port	389
	Domain Controller 2	Blank
	Domain Controller 2's Port	389
	Domain Controller 3	Blank
	Domain Controller 3's Port	389
	Base Domain Name	Blank
UID Search Object value	sAMAccountName	

	Group Filter	Blank
	Binding Method	Use Login Credentials
	Client ID used with CC binding	Blank
	Client Password used with CC binding	Blank
	Group ID Attribute	memberOf
	Attribute to query permission in group	Blank
Platform Events	Power Off	Enable
	Generate PET	Enable
	Global Alerting Enable	Disable
	Threshold Type, Temperature Critical Filter	None, Disable
	Threshold Type, Temperature Warning Filter	None, Disable
	Threshold Type, Voltage Critical Filter	None, Disable
	Threshold Type, Voltage Warning Filter	None, Disable
	Threshold Type, Fan Critical Filter	None, Disable
	Threshold Type, Fan Warning Filter	None, Disable
	Sensor-specific Type, Event Logging Disabled Critical Filter	None, Disable
	Sensor-specific Type, Event Logging Disabled Warning Filter	None, Disable
	Sensor-specific Type, Power Supply Critical Filter	None, Disable
	Sensor-specific Type, Power Supply Warning Filter	None, Disable
	Sensor-specific Type, Drive Slot Critical Filter	None, Disable
	Sensor-specific Type, Drive Slot Warning Filter	None, Disable
	Trap Setting	IP Destination 1
IP Destination 2		Disable,IPv4,0.0.0.0
IP Destination 3		Disable,IPv4,0.0.0.0
IP Destination 4		Disable,IPv4,0.0.0.0
IP Destination 5		Disable,IPv4,0.0.0.0
IP Destination 6		Disable,IPv4,0.0.0.0
IP Destination 7		Disable,IPv4,0.0.0.0
IP Destination 8		Disable,IPv4,0.0.0.0
Community Name	public	
Email Setting	Sender Information From	EMS@AvctDomain
	Email Alert 1	Disable, Blank

Email Alert 2	Disable, Blank
Email Alert 3	Disable, Blank
Email Alert 4	Disable, Blank
SMTP IP Address	0.0.0.0
SMTP Port Number	25
Enable	Disable
Username	Blank
Password	Blank
STARTTLS Mode	Auto
SASL Mode	Auto



Tips

Example of a CMC E-mail alert:

Following contents are sent as E-mail alert.

Message: EMS

Event: PSU1 Power Supply sensor, Power Supply input lost (AC/DC) was asserted

Date/Time: 2016-07-27 18:09:33

Severity: Critical

F/W version: x.x.x

GET CMC IP ADDRESS

CMC IP is in BMC Management Console.

1. Select Properties. CMC IP is displayed at CMC IPv4 Address.

The screenshot shows the BMC Management Console interface. The top navigation bar includes 'Embedded Management Software' and 'Support Help About Logout'. A left sidebar contains a tree view of navigation options under 'EMS', including 'Properties', 'Configuration', 'Server Information', and 'Hardware'. The main content area is titled 'Properties' and features a 'Refresh' button. It is divided into two sections: 'Platform Information' and 'Firmware Information'. The 'Platform Information' table lists various system details, with the 'CMC IPv4 Address' row circled in red. The 'Firmware Information' table lists details about the embedded management software.

Platform Information	
Manufacturer	NEC
Product Name	Express5800/D120h [N8100-2539Y]
BIOS Version	F08
BIOS Release Date	07/14/2017
CMC IPv4 Address	192.168.1.54

Firmware Information	
Product Name	MergePoint EMS
Product Information	MergePoint Embedded Management Software
Firmware Version	1.14
Firmware Updated	13 Jul 2017, 12:17:00 (UTC+0000)
ASIC Type	ast2500

Welcome admin (Administrator) ! Sun Jan 01 2017, 12:41:38 (UTC+0000)

CHANGE DEFAULT PASSWORD

1. Select Properties->Configuration->Users
2. Click User ID 2
3. Change User Name
4. Change Password
5. Apply Changes
6. To change User ID 3, please following step2~5.

Embedded Management Software Support Help About Logout

Users Apply Changes Refresh

To configure a particular user, click the User ID. If Password policy check is enabled, password strength checking will be enabled while updating user configuration.

Password Policy Check Enable

User ID	State	User Name	User Role	IPMI LAN Privilege	IPMI Serial Privilege	Serial Over LAN
1	Disabled		None	Administrator	Administrator	Enabled
2	Enabled	admin	Administrator	Administrator	Administrator	Enabled
3	Enabled	ADMIN	Administrator	Administrator	Administrator	Enabled
4	Disabled		None	None	None	Disabled
5	Disabled		None	None	None	Disabled
6	Disabled		None	None	None	Disabled
7	Disabled		None	None	None	Disabled
8	Disabled		None	None	None	Disabled
9	Disabled		None	None	None	Disabled
10	Disabled		None	None	None	Disabled
11	Disabled		None	None	None	Disabled
12	Disabled		None	None	None	Disabled
13	Disabled		None	None	None	Disabled
14	Disabled		None	None	None	Disabled
15	Disabled		None	None	None	Disabled
16	Disabled		None	None	None	Disabled

Welcome admin (Administrator) ! Sun Jan 01 2017, 12:45:08 (UTC+0000)

- EMS
 - Properties
 - Configuration
 - Network
 - Network Security
 - Security
 - Users
 - Services
 - Time Settings
 - Language
 - Sessions
 - LDAP
 - Update
 - Utilities
 - Server Information
 - LEDs
 - Sensor Monitor
 - Power
 - Control
 - Consumption
 - System Event Log
 - Event Management
 - Platform Events
 - Trap Settings
 - Email Settings
 - Serial Over LAN
 - vKVM & vMedia
 - Launch
 - Configuration
 - Hardware
 - CPU
 - Memory
 - Storage

User Configuration

5

Apply Changes Delete Back

Password Policy

Password Policy Check Enabled No

General

3

User ID	2
Enable User	<input checked="" type="checkbox"/>
User Name	admin
Change Password	<input checked="" type="checkbox"/>
New Password	*****
Confirm New Password	*****

4

User Privileges

User Role	Administrator
IPMI LAN Privilege	Administrator
IPMI Serial Privilege	Administrator
Enable Serial Over LAN	<input checked="" type="checkbox"/>

SYNCHRONIZE THE CLOCK WITH NTP SERVER

1. Select Properties->Configuration->Time Settings.
2. Select the Daemon Mode.
In Daemon Mode, it is updated approximately at 5 minute intervals.
3. Specify the NTP Server1 in the server name or IP address.
It can be connected redundantly by setting NTP Server2~3.
4. Select the Server Time Zone.
5. Press the "Select..." button and select the appropriate area from Time Zone List. In the case of UTC, please press "Set to UTC" button.
6. Apply Changes.

After completing the setting, please check the following.

7. The time is correctly displayed.

The screenshot shows the 'Time Settings' page in the Embedded Management Software. The page is divided into two main sections: 'Network Time Protocol' and 'Time Zone Setting'. In the 'Network Time Protocol' section, the 'Operation Mode' is set to 'Disabled'. The 'Time Zone Setting' section has the 'Client Time Zone' radio button selected, and the 'Server Time Zone' dropdown menu is set to 'UTC'. The 'Set to UTC' button is also visible. The page includes a sidebar with navigation options, a top navigation bar, and a footer with a welcome message and system time.

1. EMS
2. Properties
3. Configuration
4. Network
5. Network Security
6. Security
7. Users
8. Services
9. Time Settings
10. Language
11. Sessions
12. LDAP
13. Update
14. Utilities
15. Server Information
16. LEDs
17. Sensor Monitor
18. Power
19. Control
20. Consumption
21. System Event Log
22. Event Management
23. Platform Events
24. Trap Settings
25. Email Settings
26. Serial Over LAN
27. vKVM & vMedia
28. Launch
29. Configuration
30. Hardware
31. CPU
32. Memory
33. Storage
34. System NIC

Time Settings

Sync Time Now Apply Changes Refresh

Use this page to configure the Network Time Protocol and Time Zone settings.

Network Time Protocol

Operation Mode Disabled

NTP Server 1

NTP Server 2

NTP Server 3

Requested Mode's Update Frequency (minutes) 5

Time Synchronization Method Step Mode Slew Mode

Time Zone Setting

The Client Time Zone can be changed from modify the time zone of client operating system.

Use Server or Client Time Zone Server Time Zone Client Time Zone

Server Time Zone UTC Select... Set to UTC

Welcome admin (Administrator) Tue Jan 13 1970, 15:16:33 (UTC+0000)

Time Zone List

Area:

Aden	Almaty	Amman
Anadyr	Aqtau	Aqtobe
Ashgabat	Baghdad	Bahrain
Baku	Bangkok	Beirut
Bishkek	Brunei	Choibalsan
Chongqing	Colombo	Damascus
Dhaka	Dili	Dubai
Dushanbe	Gaza	Harbin
Ho Chi Minh	Hong Kong	Hovd
Irkutsk	Jakarta	Jayapura
Jerusalem	Kabul	Kamchatka
Karachi	Kashgar	Kathmandu
Kolkata	Krasnoyarsk	Kuala Lumpur
Kuching	Kuwait	Macau
Magadan	Makassar	Manila
Muscat	Nicosia	Novokuznetsk
Novosibirsk	Omsk	Oral

To change the time update interval, please following step1~5 additionally.

1. Select the Requested Mode.
2. Specify the Requested Mode's Update Frequency (minitues).
3. Select Step Mode.
4. Apply Changes.
5. Press "Sync Time Now" button to request NTP server manually.

Embedded Management Software Support Help About Logout

Time Settings

Use this page to configure the Network Time Protocol and Time Zone settings.

Network Time Protocol

Operation Mode	Disabled
NTP Server 1	
NTP Server 2	
NTP Server 3	
Requested Mode's Update Frequency (minutes)	3
Time Synchronization Method	<input checked="" type="radio"/> Step Mode <input type="radio"/> Slew Mode

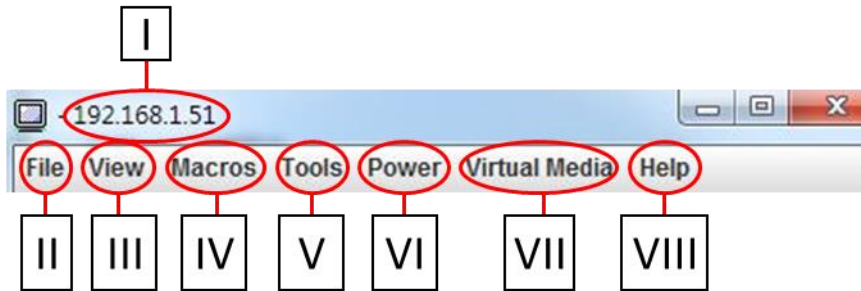
Time Zone Setting

Server Time Zone Client Time Zone

Server Time Zone: UTC Select... Set to UTC

Welcome admin (Administrator)! Tue Jan 13 1970, 15:16:33 (UTC+0000)

VKVM & VMEDIA (BMC ONLY, JAVA VERSION)



Menu

- I. Header
Display the virtual KVM source IP address.
- II. File
Capture virtual KVM screenshot.
- III. View
Change the screen size of the viewer.
- IV. Macros
Select the keyboard shortcut which is macro or hotkey macro from dropdown list, then send to the remote system.
- V. Tools
Configure the virtual KVM options.
- VI. Power
Configure the server power.
- VII. Virtual Media
Activate virtual media.
- VIII. Help
Display the help message.

VKVM & VMEDIA (BMC ONLY, HTML5 VERSION)



1. Disconnect virtual KVM.
2. Full screen.
3. Enable virtual keyboard.
4. Refresh virtual KVM screen.
5. Capture virtual KVM screenshot.
6. The setting options of change screen size, mouse and server power control.
7. Activate virtual media.
8. Send instant message to online user.
9. Select the keyboard shortcut which is macro or hotkey macro from dropdown list, then send to the remote system.
10. Display the status of CapsLock, NumLock and ScrollLock.



Tips

Virtual keyboard of virtual KVM viewer (HTML5) is recognized as English keyboard by the server OS. If you connect Japanese keyboard to the management PC, you can't key in some symbols. And also following keys are not available in virtual keyboard of virtual KVM viewer (HTML5 version).

- SysRq
- Pause
- Break

Please use screen keyboard which operating system provides if you need these keys.

6. Command Line Interface

OVERVIEW

With the BMC Command Line Interface, you can control the server from a remote SSH client. The BMC supports SSH (Version 2) protocol. CMC not support command line interface.



Operations not described in this chapter are not supported. Please don't do such operations because it may cause unexpected behavior.

CONNECTING TO BMC

Access the BMC IP address or DNS host name from SSH client on the remote management PC.



The SSH connection port is 22.



A security warning messages regarding your server certificate may be displayed when you access the BMC from a SSH client.

LOGIN AND LOGOUT

Login

Enter your user name and password at login prompt. A command prompt will be displayed after login.



The user account is common to the one for a remote management function via web browser.



The number of users who can log in the system using the command line interface at the same time is 4 users or less. Therefore, you cannot log in the system when other 4 users have been logging in the system using SSH clients via the command line interface. Check whether other users are logging in the system, if you cannot log in via the command line interface.

Logout

Enter the “exit” command at the command prompt. The SSH client will be disconnected from the BMC after logout.

BASIC COMMANDS

This section describes basic commands to use them as the command line interface. These basic commands manage the server by using the concept of command (verb) and target (Managed Element) proposed by DMTF (Distributed Management Task Force).

Each basic command functions to a specified target. The target points the managed element by address path much like the path to a file in a file system.

Both absolute path, which is started from "/admin", and relative path are available for pointing the target. Specifically, "." and ".." are supported. The "." means the current default target and the ".." means the parent target.

Each basic command functions to the current default target when the <target>, which is an argument pointing a target for the command, is not specified to the basic command. The current default target can be changed by the cd command. The current default target is "/admin1" when the command line interface session is started.

The current default target is displayed at the left side of the command prompt ("->").

Help string, command syntax, of each command appears when "-h" option is specified as the <options> of the command. The argument placed between "[" and "]" is omissible.



The user must have an account as the following user level to use the basic commands:

- **cd, exit, help, show and version can be used under an account as all user levels.**
- **stop, start and reset are needed an account as operator or administrator user level to use these commands.**
- **set is needed an account as administrator user level to use this command.**

cd

Syntax:

cd [<options>] [<target>]

Description:

The cd command changes the current default target to the target specified by the <target> argument.

exit

Syntax:

exit [<options>]

Description:

The exit command terminates and logs out the user session.

help

Syntax:

help [<options>] [<help topics>]

Description:

A basic command, <command>, can be specified for the <help topics>. The help command displays the help string for specified basic command when <command> argument is specified.

reset**Syntax:**

reset [<options>] [<target>]

Description:

The reset command performs a hardware reset on the <target>.

/admin1/system1 are available for the <target> of the reset command.
For /admin1/system1, the server is reset.

set**Syntax:**

set [<options>] [<target>] <propertyname>=<value>

Description:

The set command is used to set the value of one or more properties of target specified by the <target>. The command accepts a target specified by the <target> and series of <propertyname>=<value> pairs which is will try and apply. The <propertyname> means a name of property set by the command. The <value> means a new value set by the command.

One or more <propertyname>=<value> pairs can be specified by delimiting between each pair in space.

The set command requires <propertyname>=<value> command line argument except when -h is specified as the <options>.

show**Syntax:**

show [<options>] [<target>] [<properties>]

Description:

The show command is used to display information about the target specified by the <target> argument.

The command displays the target specified by the <target> as the first line of the information. It displays the current default target in the first line if <target> is not specified.

The default behavior of the command for the target specified by the <target> is as

follows. The command displays targets which are contained by the specified target after the "Targets" string. The command displays properties which are contained by the specified target after the "Properties" string. The properties are displayed in the form of property=value. The command displays basic commands (verbs) and special extended commands which are available for the specified target after the "Verbs" string.

The command displays the property specified by the <properties> in the form of property=value if the <properties> is specified. The command displays all properties which are contained by the specified target if the <properties> is not specified.

There is -display <arg values> option which can be specified by the <options> for the show command. The option can control the type of information that is displayed about the target specified by the <target>. Valid option argument values as the <arg values> for this option include "targets", "properties", "verbs", and "all". The option argument values can select the above "Targets", "Properties" and "Verbs" information that is displayed. "all" displays the whole. The default for the -display option control is "all".



It may take about 1 minute to display the target information depending on the configuration of the server.

start

Syntax:

start [<options>] [<target>]

Description:

/system1 is available for the target of the start command.

The start command performs a power on to the server if /system1 is specified by the <target>.

stop

Syntax:

stop [<options>] [<target>]

Description:

The stop command performs a normal power off request (OS shutdown request) or a forced power off request.

/system1 is available for the target of the stop command. The stop command with no option as the <options> performs a normal power off request (OS shutdown request) to the server if /system1 is specified by the <target>. The command with -f (or -force) as the <options> performs a forced power off request to the server if /system1 is specified by the <target>. The command with -w as the <options> performs a NMI dump request to do memory dump while the server has memory dump configuration if /system1 is specified by the <target>.

version

Syntax:

version [<options>]

Description:

The version command is used to display the version of the command line protocol specification which is supported.

REMOTE CONTROL

You can perform remote control of the server at the command prompt.



Performing remote control when the operating system is running may cause the loss of data in the server.



The user must have an account as operator or administrator for remote control.

Power ON

Enter the following command at the command prompt.

```
start system1
```

Forced Power OFF

Enter the following command at the command prompt.

```
stop -force system1  
or  
stop -f system1
```

OS Shutdown

Enter the following command at the command prompt.

```
stop system1
```



The above OS shutdown is equivalent to pressing the POWER switch when the power of the server is on. Your operating system must be set to shut down when you power off the system.

System Reset

Enter the following command at the command prompt.

```
reset system1
```



An above system reset is failed when the power of the server is off.

OS Dump Interrupt

You can execute OS dump by entering following command at the command prompt.

```
stop -w system1
```



The user must have an account as operator or administrator for executing the `stop -w system1` command.

USER SETTINGS

This section describes how to confirm and modify the user account through the command line interface. To move the current default target to a user account target which you would like to confirm or (and) modify, enter the following command at the command prompt. <N> means any value between 1 and 16: Therefore you can select a user account between account1 and account16. The <N> corresponds to an order from the list of user accounts top on the user account configuration page through a Web browser.

```
cd system1/sp1/account<N>
```

Enter the following command, if you would like to confirm the information which the selected user account has as its properties.

```
show
```

Enter the following command, if you would like to enable specific account

```
start system1/sp1/account<N>
```

Enter the following command, if you would like to disable specific account

```
stop system1/sp1/account<N>
```

Enter the following command if you would like to modify a property of the selected user account.

```
set <Property>=<New value>
```

The properties which the selected user account target contains are as follows:

- **UserID**

This corresponds to a user name (login name). It can't be change by Command Line Interface.

- **UserPassword**

This is the user password. "UserPassword=NULL" is displayed by show command but the password setting, value of this property, is not displayed. It becomes effective at next login if you change it.



The password accepts up to 20 half size alphanumeric characters and symbols.

NETWORK SETTINGS

This section describes how to confirm and modify the network setting for management LAN through the command line interface. To move the current default target to /admin1/system1/sp1/enetport1, enter the following command at the command prompt:

```
cd system1/sp1/enetport1
```

Enter the following command to show the properties of Ethernet port target.

```
show
```

The properties which the Ethernet port target contains are as follows:

- **PermanentAddress**

This specifies the MAC address for the management LAN in the right side of "PermanentAddress=". This property is read-only.

Followings describe how to confirm the DHCP setting for management LAN through the command line interface. To move the current default target to /admin1/system1/sp1/ipendpt1, enter the following command at the command prompt:

```
cd system1/sp1/ipendpt1
```

Enter the following command to show the properties of the DHCP target.

```
show
```

The properties which the DHCP target contains are as follows:

- **AddressOrigin**

This specifies whether DHCP is enabled for the management LAN. Note that, the valid values for this property are "3" and "4". "3" means that the DHCP is disabled. "4" means that the DHCP is enabled.

Followings describe how to confirm the gateway setting for management LAN through the command line interface. To move the current default target to /admin1/system1/sp1/remotesap1, enter the following command at the command prompt:

```
cd system1/sp1/remotesap1
```

Enter the following command to show the properties of the gateway target.

```
show
```

The properties which the gateway target contains are as follows:

- **InfoFormat**

The value is "3". This specifies the AccessInfo is IPv4 address. This property is read-only.

- **AccessInfo**

This specifies the IP address of the default gateway for the management LAN. This property is read-only.

Followings describe how to confirm the network setting with disabling DHCP for management LAN through the command line interface. To move the current default target to /admin1/system1/settings1/staticipsettings1, enter the following command at the command prompt:

```
cd system1/setting1/staticipsettings1
```

Enter the following command to show the properties of the static network setting target.

```
show
```

The properties which the static network setting target contains are as follows:

- **IPv4Address**

This specifies the IP address for the management LAN when DHCP is disabled.

- **SubnetMask**

This specifies the subnet mask for the management LAN when DHCP is disabled.

CONFIRMING SYSTEM INFORMATION

This section describes how to confirm the system information (CPU, Memory) through the command line interface.



The values of the properties for items not supported by the server is not displayed for the system information. Moreover, the values of the properties for items supported with the server might not be displayed the system information according to a state of a power supply and mounting such as a device of the system either.

Confirming CPU Information

To move the current default target to /admin1/system1, enter the following command at the command prompt.

```
cd /admin1/system1
```

Here, to confirm all the targets for CPU, enter the following command at the command prompt. All the CPU targets are represented as cpu<N> strings at "Targets" section. <N> means value of one-origin integer.

```
show
```

Next, when the following command is input, information of a specific CPU target is displayed at "Properties" section. Here, <N> means CPU target number which you would like to confirm.

```
show cpu<N>
```

The EnabledState property of the CPU target indicates the CPU status. "2" indicates CPU installed. "3" indicates that the CPU is defected. If the CPU is not installed the target will not be displayed. Each property display invalid value if EnabledState equal 3.

For example, enter the following command when you would like to confirm the information of CPU1.

```
show cpu1
```

The example of displaying information in this case is shown below.

```
/admin1/system1/cpu1
  properties
    CPUStatus = 1 (CPU Enabled)
    CurrentClockSpeed = 1800
    ElementName = Intel(R) Genuine processor
    EnabledState = 2 (Enabled)
    ExternalBusClockSpeed = 100
    Family = 179 (Intel(R) Xeon(TM))
    HealthState = 5 (OK)
    MaxClockSpeed = 4000
    OperationalStatus =
      {
        2 (OK)
      }
    RequestedState = 12 (Not Applicable)

  verbs
    show
    exit
    help
    ersion
```

Confirming Memory Information

To move the current default target to /admin1/system1, enter the following command at the command prompt.

```
cd /admin1/system1
```

To confirm all the targets for memory (DIMM), enter the following command at the command prompt. All the memory (DIMM) targets are represented as memory1 strings at "Targets" section.

```
show
```

Next, when the following command is input, information of a memory (DIMM) target is displayed at "Properties" section.

```
show memory1
```

The EnabledState property of the memory target indicates the memory (DIMM) status. "2" indicates memory (DIMM) installed. "3" indicates memory (DIMM) error. If the memory (DIMM) is not installed the target will not be displayed. For example, enter the following command when you would like to confirm the information of memory.

```
show memory1
```

The example of displaying information in this case is shown below.

```
/admin1/system1/memory1
properties
    Access = 3 (Read/Write Supported)
    BlockSize = 1048576
    ConsumableBlocks = 524288
    ElementName = sm1
    EnabledState = 2 (Enabled)
    HealthState = 5 (OK)
    NumberOfBlocks = 24576
    OperationalStatus =
        {
            2 (OK)
        }
    RequestedState = 12 (Not Applicable)
    Volatile = true
verbs
    show
    exit
    help
    version
```

7. WS-Management (Web Service for Management).

OVERVIEW

With the WS-Management Protocol, you can control the server and check the sensor of server. This service only available in BMC, CMC not support this service

POWER CONTROL

You can perform power control of the server.



Performing power control when the operating system is running may cause the loss of data in the server.



The user must have an account as operator or administrator for power control.

Power ON

Create the file `input-RequestPowerStateChange2.xml` and enter the following command, if you use WinRM.

```
winrm invoke RequestPowerStateChange
"cimv2/CIM_PowerManagementService?Name=PowerManagementService
+CreationClassName=CIM_PowerManagementService +SystemName=
SYSTEMNAME +SystemCreationClassName=CIM_UnitaryComputerSystem"
-r:http:// IP_ADDRESS:5985/wsman -a:digest -u: USERNAME -p: PASSWORD
-encoding:utf-8 -format:xml -file:input-RequestPowerStateChange2.xml
```

input-RequestPowerStateChange2.xml

```
<n1:RequestPowerStateChange_INPUT
  xmlns:n1="http://schemas.dmtf.org/wbem/wscim/1/cim-schema/2/CIM
_PowerManagementService"
  xmlns:wsa="http://schemas.xmlsoap.org/ws/2004/08/addressing"
  xmlns:wsman="http://schemas.dmtf.org/wbem/wsman/1/wsman.xsd">
  <n1:PowerState>2</n1:PowerState>
  <n1:ManagedElement>
    <wsa:ReferenceParameters>
      <wsman:ResourceURI>http://schemas.dmtf.org/wbem/wscim/1/cim-s
chema/2/CIM_ComputerSystem</wsman:ResourceURI>
      <wsman:SelectorSet>
        <wsman:SelectorName='CreationClassName'>CIM_ComputerSystem
          </wsman:Selector>
          <wsman:Selector Name='Name'>IPMI Controller
            32</wsman:Selector>
          </wsman:SelectorSet>
        </wsa:ReferenceParameters>
      </n1:ManagedElement>
    </n1:RequestPowerStateChange_INPUT>
```



Tips

Please change according to your environment.

“IP_ADDRESS” : IP address of BMC Web Management console.

“USERNAME/PASSWORD”: username/password of BMC Web Management console.

“SYSTEMNAME”: Specify according to the following one of procedures.

Run enumeration¹ for the `CIM_PowermanagementService` class by the WinRM, and specify the numeric value in `SystemName` shown in the response data.

(Ex: `SystemName = IPMI Controller 32`)



Tips

For HTTPS connection, please change the port from 5985 to 5986, and add below option.

`-skipCNcheck`

`-skipCAcheck`

`-skipRevocationcheck`

¹ `winrm e cimv2/CIM_PowerManagementService -r:http://IP_ADDRESS:5985/wsman -a:Digest -u:USERNAME -p:PASSWORD -encoding:utf-8`

Forced Power OFF

Create the file input-RequestPowerStateChange6.xml and enter the following command, if you use WinRM.

```
winrm invoke RequestPowerStateChange
"cimv2/CIM_PowerManagementService?Name=PowerManagementService
+CreationClassName=CIM_PowerManagementService +SystemName=
SYSTEMNAME +SystemCreationClassName=CIM_UnitaryComputerSystem"
-r:http:// IP_ADDRESS:5985/wsman -a:digest -u: USERNAME -p: PASSWORD
-encoding:utf-8 -format:xml -file:input-RequestPowerStateChange2.xml
```

input-RequestPowerStateChange6.xml

```
<n1:RequestPowerStateChange_INPUT
  xmlns:n1="http://schemas.dmtf.org/wbem/wscim/1/cim-schema/2/CIM
_PowerManagementService"
  xmlns:wsa="http://schemas.xmlsoap.org/ws/2004/08/addressing"
  xmlns:wsman="http://schemas.dmtf.org/wbem/wsman/1/wsman.xsd">
  <n1:PowerState>6</n1:PowerState>
  <n1:ManagedElement>
    <wsa:ReferenceParameters>
      <wsman:ResourceURI>http://schemas.dmtf.org/wbem/wscim/1/cim-s
chema/2/CIM_ComputerSystem</wsman:ResourceURI>
      <wsman:SelectorSet>
        <wsman:SelectorName='CreationClassName'>CIM_ComputerSystem
          </wsman:Selector>
          <wsman:Selector Name='Name'>IPMI Controller
            32</wsman:Selector>
          </wsman:SelectorSet>
        </wsa:ReferenceParameters>
      </n1:ManagedElement>
    </n1:RequestPowerStateChange_INPUT>
```



Tips

Please change according to your environment.

“IP_ADDRESS” : IP address of BMC Management console.

“USERNAME/PASSWORD”: username/password of BMC Management console.

“SYSTEMNAME”: Specify according to the following one of procedures.

Run enumeration² for the CIM_PowermanagementService class by the WinRM, and specify the numeric value in SystemName shown in the response data.

(Ex: SystemName = IPMI Controller 32)



Tips

For HTTPS connection, please change the port from 5985 to 5986, and add below option.

-skipCNcheck

-skipCAcheck

-skipRevocationcheck

² winrm e cimv2/CIM_PowerManagementService -r:http://IP_ADDRESS:5985/wsman -a:Digest -u:USERNAME -p:PASSWORD -encoding:utf-8

Power Cycle

Create the file `input-RequestPowerStateChange5.xml` and enter the following command, if you use WinRM.

```
winrm invoke RequestPowerStateChange
"http://schemas.dmtf.org/wbem/wscim/1/cim-schema/2/CIM_PowerManagementService?__cimnamespace=root/cimv2+Name=Host Power Management Service+CreationClassName=CIM_PowerManagementService+SystemName=SYSTEMNAME +SystemCreationClassName=CIM_HostComputerSystem"
-r:https://IP_ADDRESS/wsman -username:USERNAME -password:PASSWORD
-auth:basic -encoding:utf-8 -format:xml -file:input-RequestPowerStateChange10.xml
-skipCNcheck -skipCAcheck -skipRevocationcheck
```

input-RequestPowerStateChange5.xml

```
<n1:RequestPowerStateChange_INPUT
xmlns:n1="http://schemas.dmtf.org/wbem/wscim/1/cim-schema/2/CIM_Power
ManagementService"
xmlns:wsa="http://schemas.xmlsoap.org/ws/2004/08/addressing"
xmlns:wsman="http://schemas.dmtf.org/wbem/wsman/1/wsman.xsd">
<n1:PowerState>5</n1:PowerState>
<n1:ManagedElement>
<wsa:ReferenceParameters>
<wsman:ResourceURI>http://schemas.dmtf.org/wbem/wscim/1/cim-schema/2/
CIM_HostComputerSystem</wsman:ResourceURI>
<wsman:SelectorSet>
<wsman:Selector Name='__cimnamespace'>root/cimv2</wsman:Selector>
<wsman:Selector
Name='CreationClassName'>CIM_HostComputerSystem</wsman:Selector>
<wsman:Selector Name='Name'>Unknown.IPMI BMC DeviceID.DEVICEID__
VALUE</wsman:Selector>
</wsman:SelectorSet>
</wsa:ReferenceParameters>
</n1:ManagedElement>
</n1:RequestPowerStateChange_INPUT>
```



Tips

Please change according to your environment.

“IP_ADDRESS” : IP address of BMC Web Management console.

“USERNAME/PASSWORD”: username/password of BMC Web Management console.

“SYSTEMNAME”: Specify according to the following one of procedures.

Run enumeration³ for the `CIM_PowermanagementService` class by the WinRM, and specify the numeric value in `SystemName` shown in the response data.

(Ex: `SystemName = IPMI Controller 32`)

³ `winrm e cimv2/CIM_PowerManagementService -r:http://IP_ADDRESS:5985/wsman -a:Digest -u:USERNAME -p:PASSWORD -encoding:utf-8`



For HTTPS connection, please change the port form 5985 to 5986, and add below option.

- skipCNcheck
- skipCAcheck
- skipRevocationcheck

SENSOR INFORMATION

You can get sensor information either by enumeration of all sensors or by retrieving specified sensor.

Enumeration of All Sensors

Enter the following command, if you enumerate numeric sensors (e.g.: temperature, voltage) with WinRM.

```
winrm e cimv2/CIM_NumericSensor -r:http://IP_ADDRESS:5985/wsman  
-a:Digest -u:USERNAME -p:PASSWORD -encoding:utf-8
```

Enter the following command, if you enumerate non-numeric sensors (e.g.: PSU, Drives) with WinRM.

```
winrm e cimv2/CIM_Sensor -r:http://IP_ADDRESS:5985/wsman -a:Digest  
-u:USERNAME -p:PASSWORD -encoding:utf-8
```



Tips

Change according to your environment.

“IP_ADDRESS” : IP address of BMC Management console

“USERNAME/PASSWORD”: username/password of BMC Management console



Tips

For HTTPS connection, please change the port from 5985 to 5986, and add below option.

-skipCNcheck

-skipCAcheck

-skipRevocationcheck

Retrieving Specified Sensor

You can retrieve the sensor by specifying sensor number.

Enter the following command, if you retrieve the sensor of sensor number 43h with the WinRM.

```
winrm g "cimv2/CIM_NumericSensor?CreationClassName=CIM_NumericSensor  
+SystemCreationClassName=CIM_ComputerSystem+SystemName=SYSTEMNAME+De  
viceID=1.67.0.32.1.99" -r:http://IP_ADDRESS:5985/wsman -a:Digest -u:USERNAME  
-p:PASSWORD -encoding:utf-8
```



Tips

Change according to your environment.

“IP_ADDRESS” : IP address of BMC Management Console.

“USERNAME/PASSWORD”: username/password of BMC Management Console.

“SYSTEMNAME”: Specify according to the following one of procedures.

Run enumeration⁴ for the CIM_Sensor class by the WinRM, and specify the numeric value in SystemName shown in the response data. (Ex: SystemName=srv:20010419020F0A3C000A010000000000)



Tips

For HTTPS connection, please change the port from 5985 to 5986, and add below option.

- skipCNcheck
- skipCAcheck
- skipRevocationcheck



Tips

Specify the "Device ID" returned in the response of enumerating all sensors.

⁴ winrm e cimv2/CIM_PowerManagementService -r:http://IP_ADDRESS:5985/wsman -a:Digest -u:USERNAME -p:PASSWORD -encoding:utf-8

8. Troubleshooting

ERROR MESSAGES

Abnormality occurs while using remote management, and the error dialog might be displayed in management PC. Please refer to below messages for main message.

The error on login

No.	Error Message	Solution
1	Login forbidden. A GUI session has been created and is active. You can not login again from another tab or window of the same web browser.	Please check another tab or window of the same browser doesn't login and restart browser.

The error on launching Java virtual KVM viewer

No.	Error Message	Solution
1	The viewer has terminated. Reason: The network connection has been dropped.	Please check another tab or window of the same browser doesn't login and restart browser. If it has no effect, please reboot BMC and wait 3 minutes and then retry.

The error on launching HTML5 virtual KVM viewer

No.	Error Message	Solution
1	The session has timed out waiting for verification of the certificate. All the connections will be closed.	Please refer to Chapter 3, Configuring a Management PC, for allow Pop-up setting.

ATTENTION WHILE OPERATION



- Can't connect BMC Management Console.
- Please check network setting of BMC and management PC.
- If there is no problem in network setting, please restart web browser.

- ❓ Can't launch virtual KVM viewer. Or virtual KVM viewer doesn't work correctly.
 - Please check network setting of BMC and management PC.
 - If there is no problem in network setting, please restart web browser.
 - If above method doesn't have effect, please try one of following step.
 - Please reboot the BMC from BMC Management Console. After that wait 3 minutes then retry.
 - Please restart the server.

- ❓ No recovery event alert
 - The recovery event alert of filter event which set by platform event filter (PEF) list in platform events configuration is not performed.

- ❓ BMC network connection is disconnected on system reboot.
 - If you set Shared (NCSI), the system LAN port that is initialized in system boot and network connection is lost temporarily.

- ❓ The BMC/CMC date time is not the same with system date time.
 - Please use NTP server to synchronize date time between BMC/CMC and system.
 - If you enables NTP server in the environment where NTP server is unavailable, please disable NTP server. And also check attentions below.
 - If you install ESMPRO/ServerAgentService, BMC date time is synchronized with OS date time.
 - Please synchronize each nodes' date time. If the date time are different in nodes, it recommends to use NTP.

- ❓ The memory information of maximum capacity and passible installed capacity in BMC Web Console is different.
 - Memory maximum capacity is supported memory maximum capacity of 2 CPUs' configuration.
 - The memory possible installed capacity might be smaller than maximum capacity due to memory socket number limitation.

- ❓ The Node ID in Node Information of CMC Management Console is different from enclosure's slot number.
 - Below is Node ID and slot number table.

ID	Slot Number
Node01A	1
Node01B	2

Node02A	3
Node02B	4



System Event Log shows [?] as severity for some events.

- Please use NEC ESMPRO Manager, Ezclct Viewer and Maintenance Utility in Offline tool to check BMC System Event Log.

OTHERS TIPS

Should you have troubles while using the virtual KVM viewer operation , monitoring, and management of the server, please first check the system according to the online help to troubleshoot your issue prior to sending it for repair.

For the issues regarding your system operation, please refer to the User's Guide attached to your system.

If your issue is not described below, or should the provided instructions do not resolve your issue, please contact your service center.

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- U-Boot
- Gcc_tools
- Glibc
- Dosfstools
- Ethtool
- Iproute2
- Iptables
- iputils
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```
<program> Copyright (C) <year> <name of author>  
This program comes with ABSOLUTELY NO WARRANTY; for details type `show w'.  
This is free software, and you are welcome to redistribute it  
under certain conditions; type `show c' for details.
```

The hypothetical commands `show w' and `show c' should show the appropriate parts of the General Public License. Of course, your program's commands might be different; for a GUI interface, you would use an "about box".

You should also get your employer (if you work as a programmer) or school, if any, to sign a "copyright disclaimer" for the program, if necessary. For more information on this, and how to apply and follow the GNU GPL, see <http://www.gnu.org/licenses/>.

The GNU General Public License does not permit incorporating your program into proprietary programs. If your program is a subroutine library, you may consider it more useful to permit linking proprietary applications with the library. If this is what you want to do, use the GNU Lesser General Public License instead of this License. But first, please read <http://www.gnu.org/philosophy/why-not-lgpl.html>.

GNU Lesser General Public License V2

- argtable
- Lazarus
- Lazarus Component Library

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[This is the first released version of the library GPL. It is
numbered 2 because it goes with version 2 of the ordinary GPL.]

Preamble

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When we speak of free software, we are referring to freedom, not price. Our General Public Licenses are designed to make sure that you have the freedom to distribute copies of free software (and charge for this service if you wish), that you receive source code or can get it if you want it, that you can change the software or use pieces of it in new free programs; and that you know you can do these things.

To protect your rights, we need to make restrictions that forbid anyone to deny you these rights or to ask you to surrender the rights. These restrictions translate to certain responsibilities for you if

you distribute copies of the library, or if you modify it.

For example, if you distribute copies of the library, whether gratis or for a fee, you must give the recipients all the rights that we gave you. You must make sure that they, too, receive or can get the source code. If you link a program with the library, you must provide complete object files to the recipients so that they can relink them with the library, after making changes to the library and recompiling it. And you must show them these terms so they know their rights.

Our method of protecting your rights has two steps: (1) copyright the library, and (2) offer you this license which gives you legal permission to copy, distribute and/or modify the library.

Also, for each distributor's protection, we want to make certain that everyone understands that there is no warranty for this free library. If the library is modified by someone else and passed on, we want its recipients to know that what they have is not the original version, so that any problems introduced by others will not reflect on the original authors' reputations.

Finally, any free program is threatened constantly by software patents. We wish to avoid the danger that companies distributing free software will individually obtain patent licenses, thus in effect transforming the program into proprietary software. To prevent this, we have made it clear that any patent must be licensed for everyone's free use or not licensed at all.

Most GNU software, including some libraries, is covered by the ordinary GNU General Public License, which was designed for utility programs. This license, the GNU Library General Public License, applies to certain designated libraries. This license is quite different from the ordinary one; be sure to read it in full, and don't assume that anything in it is the same as in the ordinary license.

The reason we have a separate public license for some libraries is that they blur the distinction we usually make between modifying or adding to a program and simply using it. Linking a program with a library, without changing the library, is in some sense simply using the library, and is analogous to running a utility program or application program. However, in a textual and legal sense, the linked executable is a combined work, a derivative of the original library, and the ordinary General Public License treats it as such.

Because of this blurred distinction, using the ordinary General Public License for libraries did not effectively promote software sharing, because most developers did not use the libraries. We concluded that weaker conditions might promote sharing better.

However, unrestricted linking of non-free programs would deprive the users of those programs of all benefit from the free status of the libraries themselves. This Library General Public License is intended to permit developers of non-free programs to use free libraries, while

preserving your freedom as a user of such programs to change the free libraries that are incorporated in them. (We have not seen how to achieve this as regards changes in header files, but we have achieved it as regards changes in the actual functions of the Library.) The hope is that this will lead to faster development of free libraries.

The precise terms and conditions for copying, distribution and modification follow. Pay close attention to the difference between a "work based on the library" and a "work that uses the library". The former contains code derived from the library, while the latter only works together with the library.

Note that it is possible for a library to be covered by the ordinary General Public License rather than by this special one.

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A "library" means a collection of software functions and/or data prepared so as to be conveniently linked with application programs (which use some of those functions and data) to form executables.

The "Library", below, refers to any such software library or work which has been distributed under these terms. A "work based on the Library" means either the Library or any derivative work under copyright law: that is to say, a work containing the Library or a portion of it, either verbatim or with modifications and/or translated straightforwardly into another language. (Hereinafter, translation is included without limitation in the term "modification".)

"Source code" for a work means the preferred form of the work for making modifications to it. For a library, complete source code means all the source code for all modules it contains, plus any associated interface definition files, plus the scripts used to control compilation and installation of the library.

Activities other than copying, distribution and modification are not covered by this License; they are outside its scope. The act of running a program using the Library is not restricted, and output from such a program is covered only if its contents constitute a work based on the Library (independent of the use of the Library in a tool for writing it). Whether that is true depends on what the Library does and what the program that uses the Library does.

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You may charge a fee for the physical act of transferring a copy, and you may at your option offer warranty protection in exchange for a fee.

2. You may modify your copy or copies of the Library or any portion of it, thus forming a work based on the Library, and copy and distribute such modifications or work under the terms of Section 1 above, provided that you also meet all of these conditions:

- a) The modified work must itself be a software library.
- b) You must cause the files modified to carry prominent notices stating that you changed the files and the date of any change.
- c) You must cause the whole of the work to be licensed at no charge to all third parties under the terms of this License.
- d) If a facility in the modified Library refers to a function or a table of data to be supplied by an application program that uses the facility, other than as an argument passed when the facility is invoked, then you must make a good faith effort to ensure that, in the event an application does not supply such function or table, the facility still operates, and performs whatever part of its purpose remains meaningful.

(For example, a function in a library to compute square roots has a purpose that is entirely well-defined independent of the application. Therefore, Subsection 2d requires that any application-supplied function or table used by this function must be optional: if the application does not supply it, the square root function must still compute square roots.)

These requirements apply to the modified work as a whole. If identifiable sections of that work are not derived from the Library, and can be reasonably considered independent and separate works in themselves, then this License, and its terms, do not apply to those sections when you distribute them as separate works. But when you distribute the same sections as part of a whole which is a work based on the Library, the distribution of the whole must be on the terms of this License, whose permissions for other licensees extend to the entire whole, and thus to each and every part regardless of who wrote it.

Thus, it is not the intent of this section to claim rights or contest your rights to work written entirely by you; rather, the intent is to exercise the right to control the distribution of derivative or collective works based on the Library.

In addition, mere aggregation of another work not based on the Library with the Library (or with a work based on the Library) on a volume of a storage or distribution medium does not bring the other work under the scope of this License.

3. You may opt to apply the terms of the ordinary GNU General Public License instead of this License to a given copy of the Library. To do this, you must alter all the notices that refer to this License, so

that they refer to the ordinary GNU General Public License, version 2, instead of to this License. (If a newer version than version 2 of the ordinary GNU General Public License has appeared, then you can specify that version instead if you wish.) Do not make any other change in these notices.

Once this change is made in a given copy, it is irreversible for that copy, so the ordinary GNU General Public License applies to all subsequent copies and derivative works made from that copy.

This option is useful when you wish to copy part of the code of the Library into a program that is not a library.

4. You may copy and distribute the Library (or a portion or derivative of it, under Section 2) in object code or executable form under the terms of Sections 1 and 2 above provided that you accompany it with the complete corresponding machine-readable source code, which must be distributed under the terms of Sections 1 and 2 above on a medium customarily used for software interchange.

If distribution of object code is made by offering access to copy from a designated place, then offering equivalent access to copy the source code from the same place satisfies the requirement to distribute the source code, even though third parties are not compelled to copy the source along with the object code.

5. A program that contains no derivative of any portion of the Library, but is designed to work with the Library by being compiled or linked with it, is called a "work that uses the Library". Such a work, in isolation, is not a derivative work of the Library, and therefore falls outside the scope of this License.

However, linking a "work that uses the Library" with the Library creates an executable that is a derivative of the Library (because it contains portions of the Library), rather than a "work that uses the library". The executable is therefore covered by this License. Section 6 states terms for distribution of such executables.

When a "work that uses the Library" uses material from a header file that is part of the Library, the object code for the work may be a derivative work of the Library even though the source code is not. Whether this is true is especially significant if the work can be linked without the Library, or if the work is itself a library. The threshold for this to be true is not precisely defined by law.

If such an object file uses only numerical parameters, data structure layouts and accessors, and small macros and small inline functions (ten lines or less in length), then the use of the object file is unrestricted, regardless of whether it is legally a derivative work. (Executables containing this object code plus portions of the Library will still fall under Section 6.)

Otherwise, if the work is a derivative of the Library, you may

distribute the object code for the work under the terms of Section 6.
Any executables containing that work also fall under Section 6,
whether or not they are linked directly with the Library itself.

6. As an exception to the Sections above, you may also compile or link a "work that uses the Library" with the Library to produce a work containing portions of the Library, and distribute that work under terms of your choice, provided that the terms permit modification of the work for the customer's own use and reverse engineering for debugging such modifications.

You must give prominent notice with each copy of the work that the Library is used in it and that the Library and its use are covered by this License. You must supply a copy of this License. If the work during execution displays copyright notices, you must include the copyright notice for the Library among them, as well as a reference directing the user to the copy of this License. Also, you must do one of these things:

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- b) Accompany the work with a written offer, valid for at least three years, to give the same user the materials specified in Subsection 6a, above, for a charge no more than the cost of performing this distribution.
- c) If distribution of the work is made by offering access to copy from a designated place, offer equivalent access to copy the above specified materials from the same place.
- d) Verify that the user has already received a copy of these materials or that you have already sent this user a copy.

For an executable, the required form of the "work that uses the Library" must include any data and utility programs needed for reproducing the executable from it. However, as a special exception, the source code distributed need not include anything that is normally distributed (in either source or binary form) with the major components (compiler, kernel, and so on) of the operating system on which the executable runs, unless that component itself accompanies the executable.

It may happen that this requirement contradicts the license restrictions of other proprietary libraries that do not normally accompany the operating system. Such a contradiction means you cannot use both them and the Library together in an executable that you

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END OF TERMS AND CONDITIONS

Appendix: How to Apply These Terms to Your New Libraries

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To apply these terms, attach the following notices to the library. It is safest to attach them to the start of each source file to most effectively convey the exclusion of warranty; and each file should have at least the "copyright" line and a pointer to where the full notice is found.

<one line to give the library's name and a brief idea of what it does.>
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You should also get your employer (if you work as a programmer) or your school, if any, to sign a "copyright disclaimer" for the library, if necessary. Here is a sample; alter the names:

Yoyodyne, Inc., hereby disclaims all copyright interest in the library `Frob' (a library for tweaking knobs) written by James Random Hacker.

<signature of Ty Coon>, 1 April 1990
Ty Coon, President of Vice

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- libdaemon
- libnl
- libestr
- libntlm
- Free pascal

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Version 2.1, February 1999

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Most GNU software, including some libraries, is covered by the ordinary GNU General Public License. This license, the GNU Lesser General Public License, applies to certain designated libraries, and is quite different from the ordinary General Public License. We use this license for certain libraries in order to permit linking those libraries into non-free programs.

When a program is linked with a library, whether statically or using a shared library, the combination of the two is legally speaking a combined work, a derivative of the original library. The ordinary General Public License therefore permits such linking only if the entire combination fits its criteria of freedom. The Lesser General Public License permits more lax criteria for linking other code with the library.

We call this license the "Lesser" General Public License because it does Less to protect the user's freedom than the ordinary General Public License. It also provides other free software developers Less of an advantage over competing non-free programs. These disadvantages are the reason we use the ordinary General Public License for many libraries. However, the Lesser license provides advantages in certain special circumstances.

For example, on rare occasions, there may be a special need to encourage the widest possible use of a certain library, so that it becomes a de-facto standard. To achieve this, non-free programs must be allowed to use the library. A more frequent case is that a free library does the same job as widely used non-free libraries. In this case, there is little to gain by limiting the free library to free software only, so we use the Lesser General Public License.

In other cases, permission to use a particular library in non-free programs enables a greater number of people to use a large body of free software. For example, permission to use the GNU C Library in non-free programs enables many more people to use the whole GNU operating system, as well as its variant, the GNU/Linux operating system.

Although the Lesser General Public License is Less protective of the users' freedom, it does ensure that the user of a program that is linked with the Library has the freedom and the wherewithal to run that program using a modified version of the Library.

The precise terms and conditions for copying, distribution and modification follow. Pay close attention to the difference between a "work based on the library" and a "work that uses the library". The former contains code derived from the library, whereas the latter must be combined with the library in order to run.

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You may charge a fee for the physical act of transferring a copy, and you may at your option offer warranty protection in exchange for a fee.

2. You may modify your copy or copies of the Library or any portion of it, thus forming a work based on the Library, and copy and distribute such modifications or work under the terms of Section 1 above, provided that you also meet all of these conditions:

- a) The modified work must itself be a software library.
- b) You must cause the files modified to carry prominent notices stating that you changed the files and the date of any change.
- c) You must cause the whole of the work to be licensed at no charge to all third parties under the terms of this License.

d) If a facility in the modified Library refers to a function or a table of data to be supplied by an application program that uses the facility, other than as an argument passed when the facility is invoked, then you must make a good faith effort to ensure that, in the event an application does not supply such function or table, the facility still operates, and performs whatever part of its purpose remains meaningful.

(For example, a function in a library to compute square roots has a purpose that is entirely well-defined independent of the application. Therefore, Subsection 2d requires that any application-supplied function or table used by this function must be optional: if the application does not supply it, the square root function must still compute square roots.)

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Once this change is made in a given copy, it is irreversible for that copy, so the ordinary GNU General Public License applies to all subsequent copies and derivative works made from that copy.

This option is useful when you wish to copy part of the code of the Library into a program that is not a library.

4. You may copy and distribute the Library (or a portion or derivative of it, under Section 2) in object code or executable form under the terms of Sections 1 and 2 above provided that you accompany it with the complete corresponding machine-readable source code, which must be distributed under the terms of Sections 1 and 2 above on a medium customarily used for software interchange.

If distribution of object code is made by offering access to copy from a designated place, then offering equivalent access to copy the source code from the same place satisfies the requirement to distribute the source code, even though third parties are not compelled to copy the source along with the object code.

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Glenn Randers-Pehrson
glennrp at users.sourceforge.net
March 16, 2017

libwebsockets

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