Intel® Compute Module Power Control for Clusters

A guide to using Simple Network Management Protocol (SNMP) V3 commands to remotely power on/off an Intel® Compute Module MFS5000SI or Intel® Compute Module MFS5520VI.

Revision 1.1

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Enterprise Platforms and Services Division - Marketing

Revision History

Date	Revision Number	Modifications
March 30, 2009	1.0	Initial release.
April 17, 2009	1.1	Added support for Intel® Compute Module MFS5520VI

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1. Introduction

1.1 Overview

Each installed compute module in an Intel® Modular Server System MFSYS25/MFSYS35 can be powered on or off remotely via the Simple Network Management Protocol (SNMP) V3 interface on the Intel® Management Module. This power control function can be used by clustering algorithms such as STONITH to turn a compute module (server) 'on' or 'off'. This document provides information on how to configure SNMP v3 for the Intel® Modular Server System MFSYS25/MFSYS35 and how to power on and off a compute module remotely by issuing SNMP V3 commands.

1.2 Supported Products

The following products support remote power on and off of a compute module using SNMPv3 set commands. Refer to the installed Unified Firmware Update (UFU) release notes for speicific SNMP support information.

- Intel® Modular Server System MFSYS25 with UFU v2.7 or later
- Intel® Modular Server System MFSYS35 with UFU v2.7 or later
- Intel® Compute Module MFS5000SI with UFU v2.7 or later
- Intel® Compute Module MFS5520VI with UFU v3.0 or later

2. SNMP V3 Configuration

In order to remotely power on or off an installed compute module, you must first configure the SNMP settings on the Intel® Modular Server System MFSYS25/MFSYS35 and then activate the SNMP v3 user account.

Steps to Configure SNMP Settings:

1. Login to the Intel® Modular Server Control UI.

   Refer to the *Intel® Modular Server System MFSYS25/MFSYS35 User Guide* for step-by-step instructions.

2. From the left navigation menu, select **Settings** > **SNMP** >**SNMP Options**.

   The SNMP Options screen is used to configure the SNMP Agent and Trap Destination settings. This enables external SNMP management applications to communicate with the SNMP agent on the Management Module. The SNMP Options settings must be configured in order to use SNMP v2, SNMP v3, or both SNMP v2 and SNMP v3.

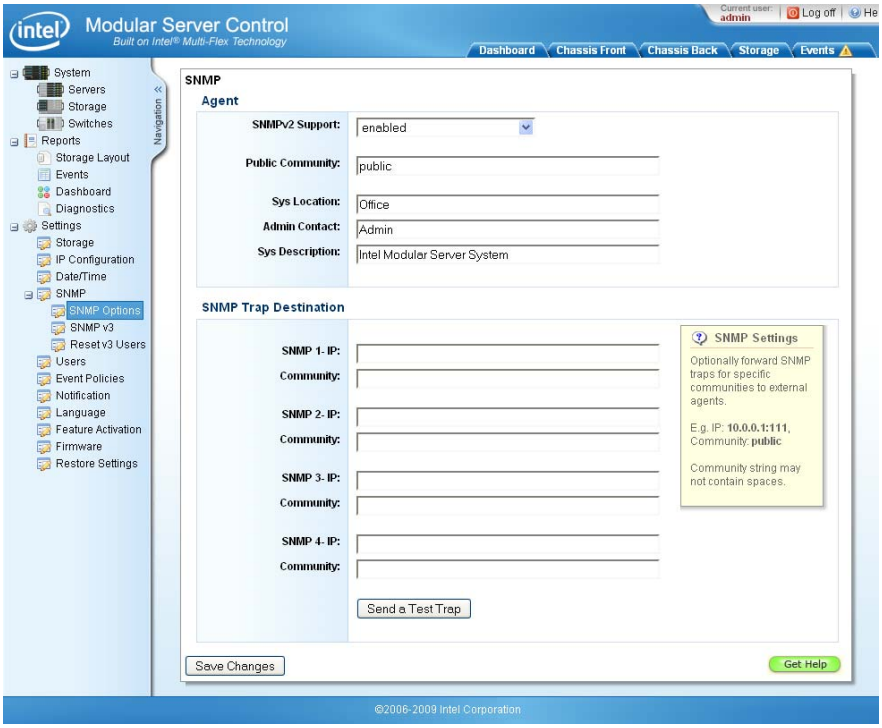

Figure 1. SNMP Options

3. In the Agent section, configure SNMP Agent Settings as follows:

   a. **SNMP v2 Support**: The first option on the screen under the Agents section is to enable or disable SNMP v2. By default, this setting is set to 'enabled'. The Intel®

Modular Server System supports read-only access to system information via SNMP v2. To use SNMP v3, SNMP v2 does not need to be enabled; however, before changing this setting, verify that your management software does not require SNMP v2 access.

b. **Public Community**: The Public Community string entered in the Agents section is used by the external SNMP management applications for communication with the SNMP V2c agent. By default, this is set to public.

c. Enter the **System Location**.

d. Enter the **Administration Contact**.

e. Enter the **System Description**.

4. In the SNMP Trap Destination section, configure the SNMP Trap Destination Settings by entering the IP address and Community string for each destination. By default, SNMP uses UDP port 162. To change this in the destination IP setting, append a colon to the IP address followed by the UDP port number (for example 10.7.155.62:162).

5. Click the **Send a Test Trap** button and verify the trap was received by the target system.

6. Click **Save Changes** to apply the configuration changes

Steps to Activate the SNMP v3 User Account

1. From the left navigation menu, select **Settings** > **SNMP** > **SNMP v3**.

   SNMP v3 adds support for strong authentication and private communication. The Authentication feature provides a means to verify users or agents and the privacy feature provides a way to encrypt the data to prevent unauthorized access. The SNMP v3 Access screen enables the IT administrator to configure and activate the SNMP v3 user account with these additional authentication and privacy features.

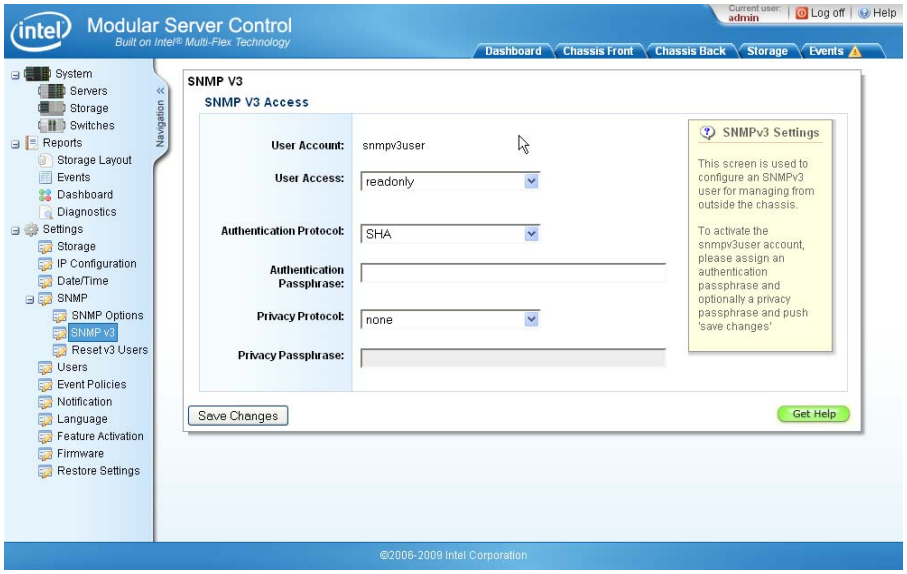

Figure 2. SNMP V3 User Account Access

2. Set the **User Access** to **readwrite**.

   Read/write access enables the SNMP v3 user account to get current power state information and power on/off the Intel® Compute Modules remotely. Read/write access does not enable an SNMP v3 user account to remotely configure the Intel® Modular Server System. Full hardware management and configuration is only supported via the Intel® Modular Server Control interface. For more information regarding SNMP v3 supported features, refer to the installed *Unified Firmware Update (UFU) Release Notes*.

3. Select the authentication protocol and set the Authentication passphrase.

   The authentication protocol is used by the management console to authenticate the user account. Select either **SHA** (secure hash algorithm) or **MD5** (Message-Digest algorithm 5). By default, **SHA** is selected.

4. Select the Privacy protocol and assign the privacy passphrase.

   The privacy protocol is used to encrypt the SNMP data. Select **DES** (Data Encryption Standard), **AES** (Advanced Encryption Standard), or **none**. By default, **none** is selected.

3. GET/SET Compute Module Power State

A compute module can be powered on or off by issuing an SNMP SET request to the power LED Object ID (OID) for the target compute module.

The power LED OID for each of the six compute modules (servers) is listed below:

Server_1 =".1.3.6.1.4.1.343.2.19.1.2.10.202.1.1.6.1"

Server_2 =".1.3.6.1.4.1.343.2.19.1.2.10.202.1.1.6.2"

Server_3 =".1.3.6.1.4.1.343.2.19.1.2.10.202.1.1.6.3"

Server_4 =".1.3.6.1.4.1.343.2.19.1.2.10.202.1.1.6.4"

Server_5 =".1.3.6.1.4.1.343.2.19.1.2.10.202.1.1.6.5"

Server_6 =".1.3.6.1.4.1.343.2.19.1.2.10.202.1.1.6.6"

Note: *For detailed descriptions of the MIB objects, refer to the appropriate mib file included in the installed Intel® Modular Server System MFSYS25/MFSYS35 Unified Firmware Update (UFU) zip package.*

The OIDs shown above can be 'set' to one of the following three integer values.

- OFF=0
- FORCED_OFF=3
- ON=2

Setting the power state to 'OFF' will initiate a graceful shutdown of the compute module. A graceful shutdown occurs when the operating system (OS) is properly shutdown before powering off the compute module. This mechanism only works if the OS on the compute module is functional, and is configured to properly respond to ACPI power control requests. To ensure that the server powers off regardless of the fitness or configuration of the OS, you must use 'FORCED_OFF'.

3.1 Verify Current Compute Module Power State

Before changing the power state of a compute module, you must first verify the current power state of the target compute module.

You can retrieve the power state of a compute module using the SNMP GET command:

```
snmpget -v3 -l auth -a <securityProtocol> -A <passphrase> \
     -u <user> <CMM_IP> $Server_6
```

Table 1. SNMP v3 Parameters

Parameter	Description
-v3	SNMP v3
-l	Security Level
-a <securityProtocol>	Enter the authentication protocol (SHA or MD5) for the SNMP V3 user account. The authentication protocol was configured using the Intel® Server Control UI. Refer to step 3 under "Steps to Activate the SNMP v3 User Account" above.
-A <passphrase>	Enter the authentication passphrase. The authentication passphrase was configured using the Intel® Modular Server Control UI. Refer to step 3 under "Steps to Activate the SNMP v3 User Account" above.
-u <user>	Enter the SNMP v3 activated User Account name. By default, the user account name is set to snmpv3user. To view the user account name, log in to the Intel® Modular Server Control UI and select Settings > SNMP > SNMP v3.
<CMM_IP>	Enter the external Intel® Management Module IP Address. This is the same IP address used in the URL to start the Intel® Modular Server Control UI.

For example, using the default Intel® Management Module IP Address (192.168.150.150) and the default SNMP v3 user account (snmpv3user) when the authentication protocol is set to SHA and the passphase is set to 'mytest', the snmpget command looks like this:

```
snmpget –v3 –l auth –a SHA –A mytest \
     –u snmpv3user 192.168.150.150 $Server_6
```

The output string from this command, when successfully executed, will show the power state of the compute module as either on or off. For example:

```
… INTEGER: on(2)

… INTEGER: off(0)
```

3.2 Power Compute Module On or Off

The SNMP SET command can be used to change the power state of a compute module. The following examples show the SNMP SET commands to power on and power off the compute module in bay/slot 6 (Server_6). Refer to Table 1. SNMP v3 Parameters for supporting information.

SNMP SET command examples:

- To immediately power off the compute module in bay/slot 6 (Server_6) regardless of the OS state, use the following command:

```
snmpset -v3 -l auth -a <securityProtocol> -A <passphrase> \
     -u <user> <CMM_IP> $Server_6 i $FORCED_OFF
```

- To gracefully power off the compute module in bay/slot 6 (Server_6), use the following command.

```
snmpset -v3 -l auth -a <securityProtocol> -A <passphrase> \
      -u <user> <CMM_IP> $Server_6 i $OFF
```

Note: *This command shuts down the OS properly before powering off the compute module.*

- To power on the compute module in bay/slot 6 (Server_6), use the following command:

```
snmpset -v3 -l auth -a <securityProtocol> -A <passphrase> \
      -u <user> <CMM_IP> $Server_6 i $ON
```

When a SNMP command is successful, the process status returned ($?) should be zero. The output string should contain one of the following sub-strings indicating the current server power state:

```
… INTEGER: forcedOff(3)

… INTEGER: on(2)
```

The results of the above operations are logged in the system event log (SEL). To view the events from the Intel® Modular Server Control UI, either click on the Events tab from the top menu or select Events from the left navigational menu under Reports. The Events screen displays all open events recorded in the SEL. For more information regarding the Events screen or about using the Intel® Modular Server Control UI, refer to the *Intel® Modular Server System MFSYS25/MFSYS35 User Guide.*

Glossary

This appendix contains important terms used in the preceding chapters.

Word / Acronym	Definition
ACPI	Advanced Configuration and Power Interface
AES	Advanced Encryption Standard - SNMP v3 user account privacy protocol
DES	Data Encryption Standard – SNMP v3 user account privacy protocol
MD5	Message-Digest Algorithm – SNMP v3 user account authentication protocol
OID	Object ID
SHA	Secure Hash Algorithm – SNMP v3 user account authentication protocol
SNMP	Simple Network Management Protocol

Reference Documents

Refer to the following documents for additional information:

- *Intel® Modular Server System MFSYS25/MFSYS35 User Guide*, Intel Corporation.
- *Unified Firmware Update Release Notes*, Intel Corporation.
- Intel® Modular Server System MFSYS25/MFSYS35 MIB files. For detailed SNMP information, refer to the MIB_Files.zip archive included in the installed *Unified Firmware Update* package.