About Cisco UCS MIB Files

This chapter includes the following sections:

Cisco UCS MIB Files

Cisco UCS MIB files are a set of objects that are private extensions to the IETF standard MIB II. MIB II is documented in RFC 1213, *Management Information Base for Network Management of TCP/IP-based Internets: MIB-II*. Portions of MIB-II have been updated since RFC 1213. See the IETF website http://www.ietf.org for the latest updates to this MIB.

If your NMS cannot get requested information from a fabric interconnect or Cisco UCS Manager, then the MIB that allows that specific data collection might be missing. Typically, if an NMS cannot retrieve a particular MIB variable, either the NMS does not recognize that MIB variable, or the agent does not support the MIB variable. If the NMS does not recognize a specific MIB variable, you might need to load the MIB into the NMS, usually with a MIB compiler. For example, you might need to load the Cisco UCS private MIB or the supported RFC MIB into the NMS to execute the required data collection. If the agent does not support a specific MIB variable, you must find out what version of system software you are running. Different software releases support different MIBs.

Note Cisco and IETF MIBs are updated frequently. You should download the latest MIBs from Cisco.com whenever you upgrade the Cisco UCS software versions.

Cisco UCS MIB Support List Locations

See the following support lists:

- For Cisco UCS Manager, Release 1.4 and later, see: ftp://ftp.cisco.com/pub/mibs/supportlists/ucs/ucs-manager-supportlist.html

Cisco UCS Manager

In Cisco UCS, a fault is a mutable object that is managed by Cisco UCS Manager. Each fault represents a failure in the Cisco UCS instance or an alarm threshold that has been raised. During the life cycle of a fault, it can change from one state or severity to another.

Each fault includes information about the operational state of the affected object at the time the fault was raised. If the fault is transitional and the failure is resolved, then the object transitions to a functional state.

A fault remains in Cisco UCS Manager until the fault is cleared and deleted according to the settings in the fault collection policy.

The following table lists the Cisco UCS traps included in the CISCO-UNIFIED-COMPUTING-NOTIF-MIB.

Table 1: CISCO-UNIFIED-COMPUTING-NOTIF-MIB Traps

Trap	Description
cucsFaultActiveNotif The OID for this SNMP trap is .1.3.6.1.4.1.9.9.719.0.1.	This notification is generated by a Cisco UCS instance whenever a fault is raised.
cucsFaultClearNotif The OID for this SNMP trap is .1.3.6.1.4.1.9.9.719.0.2.	This notification is generated by a Cisco UCS instance whenever a fault is cleared.

All Cisco UCS Manager faults are available with SNMP using the cucsFaultTable table and the CISCO-UNIFIED-COMUTING-FAULT-MIB. The table contains one entry for every fault instance. Each entry has variables to indicate the nature of a problem, such as its severity and type. The same object is used to model all Cisco UCS fault types, including equipment problems, FSM failures, configuration or environmental issues, and connectivity issues. The cucsFaultTable table includes all active faults (those that have been raised and need user attention), and all faults that have been cleared but not yet deleted because of the retention interval.

The **cucsFaultTable** table has the same information as the <*faultInst*> objects that can be queried through the XML API. In the Cisco UCS Manager GUI, faults are available in from the **Admin** tab under **All** > **Faults, Events and Audit Logs** > **Faults**.

The following table describes the attributes exposed by the cucsFaultTable.

Table 2: cucsFaultTable Attritubes

Attribute	Description
Fault Instance ID (Table Index)	A unique integer that identifies the fault.
Affected Object DN	The distinguished name of the mutable object that has the fault.
Affected Object OID	The Object identifier (OID) of the mutable object that has the fault.
Creation Time	The time that the fault was created.
Last Modification	The time when any of the attributes were modified.
Code	A code that provides information specific to the nature of the fault.
Type	The fault type.
Cause	The probable cause of the fault.
Severity	The severity of the fault.
Occurrence	The number of times that a fault has occurred since it was created.
Description	A human readable string that contains all information related to the fault.

In Release 1.3 and later, Cisco UCS Manager sends a cucsFaultActiveNotif event notification whenever a fault is raised. There is one exception to this rule: Cisco UCS Manager does not send event notifications for FSM faults. The trap variables indicate the nature of the problem, including the fault type. Cisco UCS Manager sends a cucsFaultClearNotif event notification whenever a fault has been cleared. A fault is cleared when the underlying issue has been resolved.

In Release 1.4 and later, the cucsFaultActiveNotif and cucsFaultClearNotif traps are defined in the CISCO-UNIFIED-COMPUTING-NOTIFS-MIB. All faults can be polled using SNMP GET operations on the cucsFaultTable, which is defined in the CISO-UNIFIED-COMPUTING-FAULT-MIB.

For more details about Cisco UCS Manager faults, see Cisco UCS Faults and Error Messages Reference.

Use Cases for Cisco UCS Manager MIBs

Common use cases for Cisco UCS Manager MIBs are described below.

Receiving Fault Event Notifications

If you want to use SNMP traps for fault event notification in your NMS, you must first load the prerequisite MIBs (see Prerequisite MIBs), then load the MIBs listed below.

Important You should load the MIBs in the order listed to eliminate most of the load-order issues.

- CISCO-UNIFIED-COMPUTING-MIB.my
- CISCO-UNIFIED-COMPUTING-TC-MIB.my
- CISCO-UNIFIED-COMPUTING-FAULT-MIB.my
- CISCO-UNIFIED-COMPUTING-NOTIFS-MIB.my

The following table describes the traps included in the CISCO-UNIFIED-COMPUTING-NOTIFS-MIB.

Table 3: CISCO-UNIFIED-COMPUTING-NOTIFS MIB Traps

Trap	Description
cucsFaultActiveNotif The OID that corresponds to this SNMP trap is .1.3.6.1.4.1.9.9.719.0.1.	This notification is generated by a Cisco UCS instance whenever a fault is raised.
cucsFaultClearNotif The OID that corresponds to this SNMP trap is .1.3.6.1.4.1.9.9.719.0.2.	This notification is generated by a Cisco UCS instance whenever a fault is cleared.

Gathering Inventory Information

Cisco UCS MIBs can be used to gather information about the compute equipment in your Cisco UCS inventory. Inventory information includes data such as blades, serial numbers, DIMMs, and other intelligence related to system equipment.

See Purpose of the Cisco UCS MIBs, to learn more about which MIBs you need to add to your NMS to collect the inventory data that interests you.

Gathering Statistics

If you want to use SNMP as a way to gather statistics, use the table below as a guide to what MIBs to load and what tables in each MIB to query.

Note The table lists the statistics most commonly monitored in Cisco UCS Manager, but it does not contain an exhaustive list of all statistics that can be monitored. To gather statistics beyond those listed below, refer to Purpose of the Cisco UCS MIBs, review the content of the various packages, and download the additional MIB files necessary to meet your specific needs.

Table 4: MIBs to Use for Gathering Statistics

Statistics Type	MIB that Gathers the Statistic	Statistics Table Name in SNMP
Ethernet	CISCO-UNIFIED-COMPUTING-ETHER-MIB .1.3.6.1.4.1.9.9.719.1.16 is the parent OID where the key statistics reside.	**etherPauseStats—**Packet paused **etherLossStats—**Packet loss **etherErrStats—**Packet errors **etherTxStats—**Packets transmitted **etherRxStats—**Packets received
Adapter	CISCO-UNIFIED-COMPUTING-ADAPTOR-MIB .1.3.6.1.4.1.9.9.719.1.3 is the parent OID where the key statistics reside.	**adaptorEthPortBySizeLargeStats** **adaptorEthPortBySizeSmallStats** **adaptorEthPortStats** **adaptorEthPortOutsizedStats** **adaptorEthPortMcastStats**
Fiber channel	CISCO-UNIFIED-COMPUTING-FC-MIB .1.3.6.1.4.1.9.9.719.1.20 is the parent OID where the key statistics reside.	**fcStatsTable** **fcErrStatsTable**
Blade and rack level	CISCO-UNIFIED-COMPUTING-COMPUTE-MIB .1.3.6.1.4.1.9.9.719.1.9 is the parent OID where the key statistics reside.	**computeMbPowerStats—**Provides all motherboard power statistics for every blade. **computeMbTempStats—**Provides all motherboard temperature statistics for every blade.
Rack level	CISCO-UNIFIED-COMPUTING-COMPUTE-MIB .1.3.6.1.4.1.9.9.719.1.9 is the parent OID where the key statistics reside.	**computeMbPowerStats—**Provides all motherboard power statistics for every blade. **computeMbTempStats—**Provides all motherboard temperature statistics for every blade.
Processor	CISCO-UNIFIED-COMPUTING-PROCESSOR-MIB .1.3.6.1.4.1.9.9.719.1.41 is the parent OID where the key statistics reside.	**processorEnvStats—**Provides all CPU power and temperature statistics for every CPU socket.

Statistics Type	MIB that Gathers the Statistic	Statistics Table Name in SNMP
Equipment	CISCO-UNIFIED-COMPUTING-EQUIPMENT-MIB .1.3.6.1.4.1.9.9.719.1.15 is the parent OID where the key statistics reside.	**equipmentFanStats—**Provides all statistics for every physical fan in every chassis in a UCS domain. **equipmentFanModuleStats—**Provides all fan module temperature statistics for every fan module in every chasis in a UCS domain. **equipmentChassisStats—**Provides all chassis level temperature statistics for every chassis in a UCS domain. **equipmentPsuStats—**Provides all chassis level power and temperature statistics for every power supply in a UCS domain. **equipmentIOCardStats—**Provides all chassis level power and temperature statistics for every fabric extender in a UCS domain.
Memory statistics	CISCO-UNIFIED-COMPUTING-MEMORY-MIB .1.3.6.1.4.1.9.9.719.1.30 is the parent OID where the key statistics reside.	**memoryUnitEnvStats—**Provides all memory DIMM temperature statistics for every memory module.
Switching statistics	CISCO-UNIFIED-COMPUTING-SW-MIB .1.3.6.1.4.1.9.9.719.1.46 is the parent OID where the key statistics reside.	**sysEnvStats—**Provides all fabric interconnect level power statistics for every fabric interconnect in a UCS domain.

Types of MIBs

The Cisco UCS Management is based on the XML over HTTP model, which provides a rich data model to configure and monitor the system. This model includes polices, service profiles, configuration and monitoring data, and statistics.

To simplify the integration of Cisco UCS with SNMP based NMS, Cisco UCS Manager exposes the model through SNMP, based on the following Cisco UCS releases:

- In Release 1.0 and later, IETF networking MIBs, such as the IF-MIB and the ENTITY-MIB are implemented.

Note The IETF network MIBs provide information specific only to fabric interconnects.

- In Release 1.4 and later, the entire Cisco UCS Manager data model is exposed through the read-only Cisco UCS MIBs. All objects that can be retrieved through the Cisco UCS Manager XML API can also be retrieved through Cisco UCS Manager MIBs.

Note Each release maintains complete coverage of the XML API model via private MIBs.

Cisco Extensions to the IF-MIB

The IF-MIB supports basic management status and control of interfaces and sublayers within a network switch. Multiple standard and Cisco-specific MIBs use ifIndex from the IF-MIB to extend management for specific interface types. Cisco MIBs also enhance the two interface notifications, linkUp and linkDown, from the IF-MIB to provide a clearer indication of the reason for these notifications. Cisco MIBs add two varbinds to **linkUp** and **linkDown** as shown in the following table.

Table 5: Varbinds Added to IF-MIB Notifications

Notification	Varbinds Added
linkUp	ifDescr
linkDown	ifDescr

See the http://www.cisco.com/en/US/docs/unified_computing/ucs/sw/cli/config/guide/2.1/b_UCSM_CLI_Configuration_Guide_2_1.html for details about enabling link notifications that use these additional varbinds.

Cisco Extensions to the ENTITY-MIB

The ENTITY-MIB provides basic management and identification of physical and logical entities within a network switch. Cisco support for the ENTITY-MIB focuses on the physical entities within a switch. This MIB provides details about each module, power supply, and fan tray within a switch chassis. It provides enough information to correctly map the containment of these entities within the switch.

Cisco has developed a number of private extensions to the ENTITY-MIB to provide more details for these physical entities. Each MIB extension shares the common index value, entPhysicalIndex, which allows the management application developer to link information across multiple MIBs.

The following table lists the Cisco MIB extensions that are linked to the ENTITY-MIB by entPhysicalIndex.

Table 6: ENTITY-MIB Extensions

MIB	Description
CISCO-ENTITY-EXT-MIB	Extends the entity physical table for modules with processors. For each of these modules, this MIB provides memory statistics and LED information.

MIB	Description
CISCO-ENTITY-FRU-CONTROL-MIB	Manages field replaceable units, such as power supplies, fans, and modules.
CISCO-ENTITY-SENSOR-MIB	Provides sensor data for environmental monitors such as temperature gauges.
CISCO-IMAGE-UPGRADE-MIB	Provides module image management based on entity physical index.