

AOS-W Instant 6.4.3.1-4.2.0.0 MIB



Reference Guide

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This guide provides information on Management Information Base (MIBs) supported in AOS-W Instant 6.4.3.1-4.2.0.0 software release.

Intended Audience

This manual is intended for network administrators and operators responsible for managing the AOS-W Instant (OAW-IAP).

Related Documents

In addition to this document, the AOS-W Instant product documentation includes the following:

- *AOS-W Instant Installation Guides*
- *AOS-W Instant User Guide*
- *AOS-W Instant CLI Reference Guide*
- *AOS-W Instant Quick Start Guide*
- *AOS-W Instant Syslog Messages Reference Guide*
- *AOS-W Instant Release Notes*

Conventions

The following conventions are used throughout this manual to emphasize important concepts:

Table 1: *Typographical Conventions*

Type Style	Description
<i>Italics</i>	This style is used to emphasize important terms and to mark the titles of books.
System items	This fixed-width font depicts the following: <ul style="list-style-type: none"> • Sample screen output • System prompts • Filenames, software devices, and specific commands when mentioned in the text
Commands	In the command examples, this style depicts the keywords that must be typed exactly as shown.
<Arguments>	In the command examples, italicized text within angle brackets represents items that you should replace with information appropriate to your specific situation. For example: <pre># send <text message></pre> In this example, you would type “send” at the system prompt exactly as shown, followed by the text of the message you wish to send. Do not type the angle brackets.

Type Style	Description
[Optional]	Command examples enclosed in brackets are optional. Do not type the brackets.
{Item A Item B}	In the command examples, items within curled braces and separated by a vertical bar represent the available choices. Enter only one choice. Do not type the braces or bars.

The following informational icons are used throughout this guide:



Indicates helpful suggestions, pertinent information, and important things to remember.



Indicates a risk of damage to your hardware or loss of data.



Indicates a risk of personal injury or death.

What is New in this Release

The version of the document contains the following updates:

Table 2: *New Features in AOS-W Instant 6.4.3.1-4.2.0.0*

Feature	Description
ipAddrTable	In AOS-W Instant 6.4.3.1-4.2.0.0 release, the ipAddrTable that includes the Virtual Controller IP address is introduced.
Virtual Controller as a separate interface	The Virtual Controller interface is added as a separate virtual interface along with br0 and tun0 interfaces in the ifTable MIB.

Contacting Support

Table 3: *Support Information*

Contact Center Online	
• Main Site	http://www.alcatel-lucent.com/enterprise
• Support Site	https://service.esd.alcatel-lucent.com
• Email	esd.support@alcatel-lucent.com
Service & Support Contact Center Telephone	

Contact Center Online

• North America	1-800-995-2696
• Latin America	1-877-919-9526
• EMEA	+800 00200100 (Toll Free) or +1-650-385-2193
• Asia Pacific	+65 6240 8484
• Worldwide	1-818-878-4507

This chapter provides information about Management Information Base (MIBs) supported in AOS-W Instant 6.4.3.1-4.2.0.0 software release.

MIBs

A MIB is a virtual database that contains information used for network management. Each managed device contains MIBs that define its properties. A separate MIB is provided for each defined property, such as the group of physical ports assigned to a VLAN or the statistical data of packets transferred at a specific rate.

MIB objects, such as a MIB table or a specific object in a MIB table, are identified with Object identifiers (OIDs). The OIDs are designated by text strings and integer sequences. For example, *Alcatel* and *1.3.6.1.4.1.6486* both represent the private enterprise node *Alcatel-Lucent*.

Figure 1 illustrates the high-level hierarchy of the Enterprise MIBs.

Figure 1 High-Level MIB Hierarchy

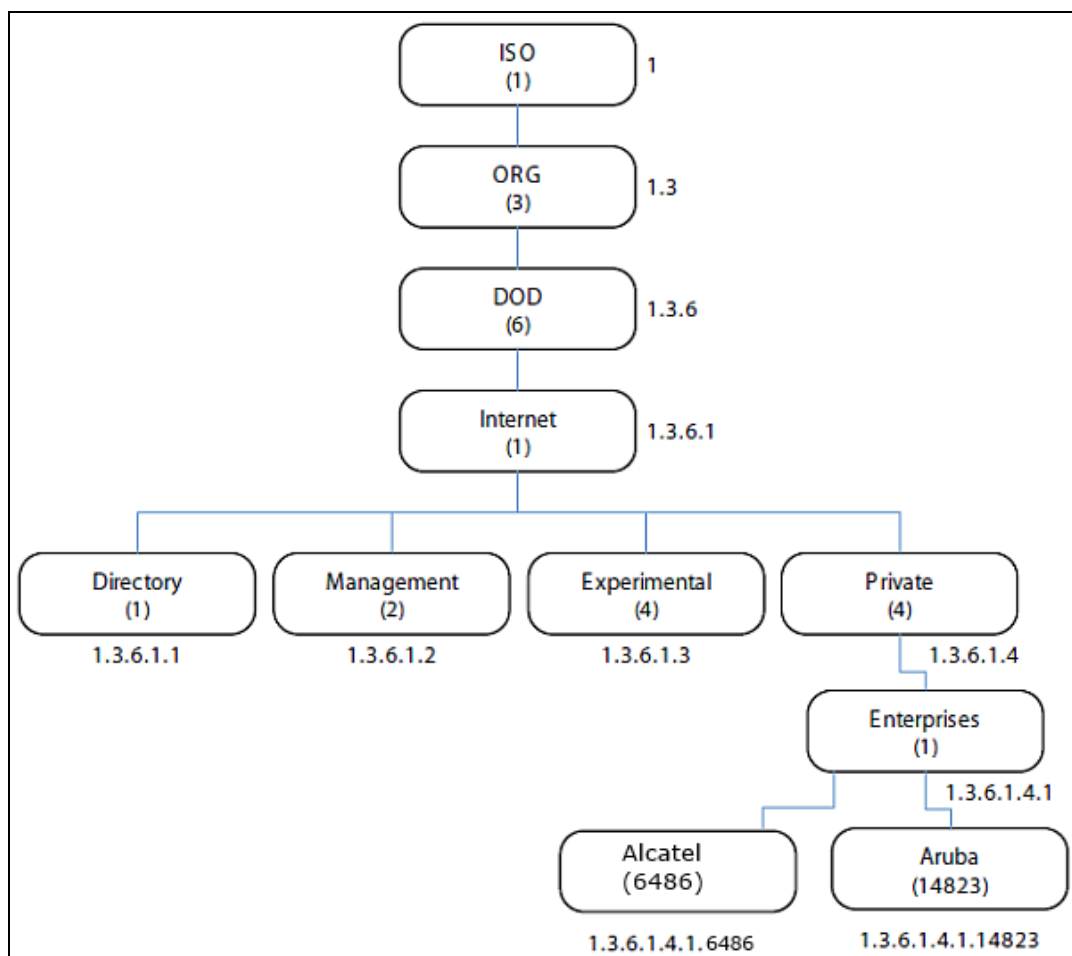


Table 4 indicates the numerical string that lists the nodes of the enterprise MIB hierarchy.

Table 4: MIB Node Identification - Enterprise Nodes

		Name
1	1	OSI
3	1.3	ORG
6	1.3.6	DOD
1	1.3.6.1	Internet
4	1.3.6.1.4	Private
1	1.3.6.1.4.1	Enterprise
6486	1.3.6.1.4.1.6486	Alcatel-Lucent

The information provided by a MIB is a file that describes network elements with numerical strings. This information is compiled into readable text by the SNMP manager. For information about reading MIB text files, see [Reading MIB Files on page 13](#).

SNMP

MIB objects can be accessed through the Simple Network Management Protocol (SNMP). To deliver information between devices, every object referenced in an SNMP message must be listed in the MIB. A component of a device that is not described in a MIB cannot be recognized by SNMP as there is no information for SNMP managers and SNMP agents to exchange.

The significant elements of SNMP are Managers, Agents, and MIBs:

- SNMP Managers (software application) are used for communicating and managing the devices that support SNMP Agents. SNMP Managers can also be used for sending configuration updates or controlling requests to manage a network device.
- SNMP Agents (software application) provide information from the network devices to the SNMP Managers. Network devices include workstations, routers, microwave radios, and other network components.
- MIBs are used for communication between the Managers and the Agents. The OIDs of the MIBs enable the Managers and Agents to communicate specific data requests and data returns.



AOS-W Instant MIBs support SNMPv1, SNMPv2, and SNMPv3. For information on configuring SNMP through the AOS-W Instant UI, see *AOS-W Instant 6.4.3.1-4.2.0.0 User Guide*.

To retrieve information from a MIB, the following information is required:

- SNMP version
- SNMP community name—*public* or *private*
- The IP Address of the virtual controller
- The OID of the MIB object

Table 5: MIB Keywords

Keyword	Description
Sequence	Refers to the sequence of objects of the MIB. This keyword is used with entry MIB objects to list the MIB objects that exchange information.
Syntax	Textual conventions, for example, <i>Integer32</i> .
Max-Access	Defines the object accessibility: <ul style="list-style-type: none"> • <i>read-only</i>: Can be retrieved but not modified • <i>read-write</i>: Can be retrieved and modified • <i>not-accessible</i>: Cannot be retrieved; it is for internal (device) use only • <i>accessible-for-notify</i>: Can be retrieved when a trap message (notification) is sent
Status	Defines the status of the object: <ul style="list-style-type: none"> • <i>current</i>: Indicates that the object status is up-to-date and valid. • <i>deprecated</i>: Indicates an obsolete definition. It permits new or continued implementation to maintain interoperability with existing implementations. • <i>obsolete</i>: Obsolete. It should not be implemented and/or can be removed if previously implemented.
Description	A text string that describes the object.

In addition, MIB files can be placed in the appropriate disk location to assist the user in locating desired OID values for monitoring.

It is assumed that the workstation is connected to the AOS-W Instant and a MIB browser is available. For most applications, the *root* of the MIB must be included in the OID—the OID begins with a decimal point as shown below.

```
.1.3.6.1.4.1.674.2.2.1.1.2.1
```

If you are using an application that is run through the Linux shell, you can use the following commands shown as examples:

- `snmpget -v1 -c <community name> <Instant IP address> <MIB OID/MIB name>`
- `snmpget -v2c -c <community name> <Instant IP address> <MIB OID/ MIB name>`
- `snmpget -v3 -c <community name> <Instant IP address> <MIB OID/ MIB name>`

The MIB objects can also be viewed from a MIB Browser GUI.

This chapter provides information on using MIBs.

- [Downloading MIB Files on page 11](#)
- [Reporting WLAN Health on page 11](#)
- [Reading MIB Files on page 13](#)
- [SNMP File on page 15](#)
- [HP OpenView on page 15](#)

Downloading MIB Files

The latest AOS-W Instant MIB files are available for registered customers at <https://service.esd.alcatel-lucent.com>.

For assistance to set up an account and access files, contact customer service. See [Contacting Support on page 6](#).

Reporting WLAN Health

SNMP MIBs are frequently used for running health checks on AOS-W Instant devices, through a MIB browser application.

To retrieve information from a MIB, the following information is required:

- SNMP version
- SNMP community name—*public* or *private*
- The IP Address of the Virtual Controller and the slave OAW-IAPs
- The OID of the MIB value you want to monitor

MIB files can be placed in the appropriate disk location to assist the user in locating desired OID values for monitoring. For most applications, the *root* of the MIB must be included in the OID—the OID begins with a decimal point as shown in the following example:

```
.1.3.6.1.4.1.674.2.2.1.1.2.1
```

SNMP Operations on OAW-IAPs

Although the virtual controller address is configured on management station, the following MIBs are specific to a particular OAW-IAP and therefore cannot be accessed from the Virtual Controller.

- [ifTable](#)
- [ifXTable](#)
- [dot1qTpFdbTable](#)

To enable the management station to access the IF-MIB and Q-BRIDGE-MIB tables and OAW-IAPs to send traps, you must configure the IP address of each OAW-IAP on the management station. The management station can automatically configure the OAW-IAP details, by obtaining the IP address of each OAW-IAP from the AP MIB ([aiAccessPointTable](#)), which lists all the slave OAW-IAPs in a swarm and is implemented on a virtual controller.



You do not have to set the SNMP community string and security parameters on each OAW-IAP as this configuration is common to all OAW-IAPs and is inherited from virtual controller.

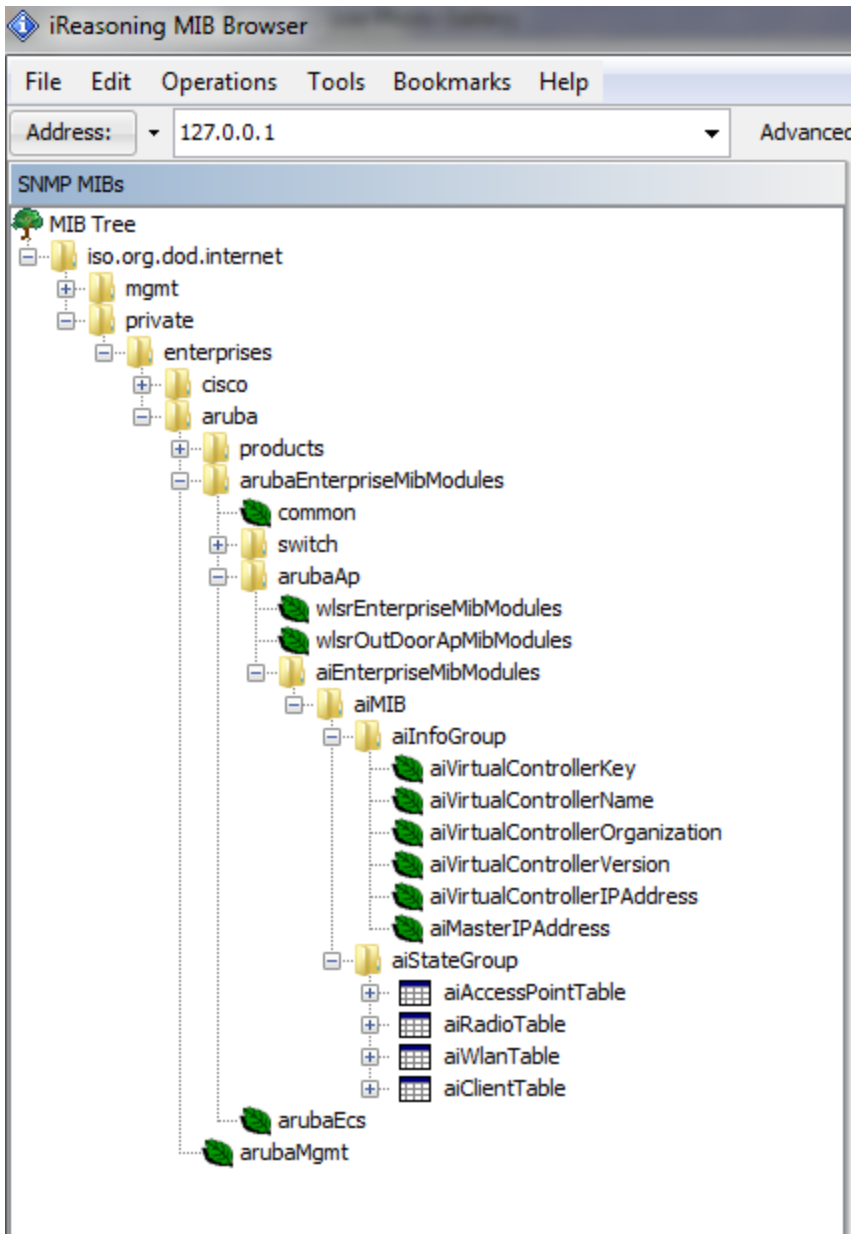
MIB Browsers

The following is an example of **snmpget** command to obtain information.

```
[root@localhost ~]# snmpget -v 2c -c public 10.65.77.8 .1.3.6.1.4.1.14823.2.3.3.1.1.2.0  
SNMPv2-SMI::enterprises.14823.2.3.3.1.1.2.0 = STRING: "Instant-CB:A5:52"
```

Figure 2 shows how information may be obtained through a graphical user interface (GUI). The user interface and the available features vary by application.

Figure 2 Graphical User Interface



Reading MIB Files

This section describes how to interpret the basic components of a MIB file. To determine the OIDs, view the file `snmp.h`. For more information, see [SNMP File on page 15](#).

MIB files describe a specific component of a network device. The files are numerical strings that are converted to ASCII text by the compiler of the SNMP manager. A word processor or text editor can be used to open the ASCII file. The contents of an example Alcatel-Lucent enterprise MIB file are as follows:

Opening Line

Following is the opening line, the beginning of the MIB file.

```
AI-AP-MIB DEFINITIONS ::= BEGIN
```

Imports

The *Imports* section lists the objects that are defined in external ASN.1 files and are used in the current MIB file.

```
IMPORTS
TEXTUAL-CONVENTION
FROM SNMPv2-TC

MODULE-IDENTITY,
OBJECT-TYPE,
snmpModules,
Integer32,
Counter32,
Counter64,
IpAddress,
NOTIFICATION-TYPE
FROM SNMPv2-SMI

DisplayString,
PhysAddress,
TimeInterval,
RowStatus,
StorageType,
TestAndIncr,
MacAddress,
TruthValue
FROM SNMPv2-TC

OBJECT-GROUP
FROM SNMPv2-CONF
aiEnterpriseMibModules
FROM ARUBA-MIB;
```

Inheritance

This section shows the vendor of the MIB and the inheritance, and provides an overall description.

A significant part of inheritance is the OID. The entire OID is not listed for each MIB object—instead, the parent of the object is shown. The OID can be determined from the parent object as follows.

aiEnterpriseMibModules is the parent object —its OID is 1.3.6.1.4.1.14823.2.3.3.

aiStateGroup OBJECT IDENTIFIER ::= { aiMIB 2 }, the OID is 1.3.6.1.4.1.14823.2.3.3.1.2.

aiVirtualControllerKey OBJECT-TYPE, the OID is 1.3.6.1.4.1.14823.2.3.3.1.1.1.0.

All MIBs and their related OIDs are listed in the snmp file. For more information, see [SNMP File on page 15](#).

aiEnterpriseMibModules

FROM ARUBA-MIB;

Identity

Identity is the opening description of the MIB. The information includes contact information for the vendor and a general description of the MIB.

```
aiMIB MODULE-IDENTITY
    LAST-UPDATED "0804160206Z"
    ORGANIZATION "Aruba Wireless Networks"
    CONTACT-INFO
        "Postal: 1322 Crossman Avenue
        Sunnyvale, CA 94089
        E-mail: dl-support@arubanetworks.com
        Phone: +1 408 227 4500"
    DESCRIPTION
        "This MIB is for managing AOS-W Instant WLAN"
    REVISION "0804160206Z"
    DESCRIPTION
        "The initial revision."
    ::= { aiEnterpriseMibModules 1 }
```

MIB Modules

MIB objects can be placed in logical groups such as [Group](#) and [Table](#). A group typically contains at least one global-object or table. The table lists the MIB objects that contain the information exchanged.

The first object of a table is an [Entry](#). The OIDs of the subsequent objects of this table are appended increments of the Entry OID.

The keyword SEQUENCE lists the objects of the table that contain device information. Each subsequent object (Informative MIB Object) inherits the OID of the Entry, and contains information sorted by the Syntax, Access, Status, and Description keywords.

Group

```
aiStateGroup OBJECT IDENTIFIER ::= { aiMIB 2 }
```

Table

```
aiAccessPointTable OBJECT-TYPE
    SYNTAX SEQUENCE OF AiAccessPointEntry
    MAX-ACCESS not-accessible
    STATUS current
    DESCRIPTION
        "This contains all access points connected to the
        virtual controller. This table is empty on AP where
        virtual controller is not active"
    ::= { aiStateGroup 1 }
```

Entry

```
aiAccessPointEntry OBJECT-TYPE
SYNTAX AiAccessPointEntry
MAX-ACCESS not-accessible
STATUS current
DESCRIPTION
" "
INDEX { aiAPMACAddress }
 ::= { aiAccessPointTable 1 } AiAccessPointEntry ::=
SEQUENCE {
aiAPMACAddress MacAddress,
aiAPName DisplayString,
aiAPIPAddress IpAddress,
aiAPSerialNum DisplayString,
aiAPModel OBJECT IDENTIFIER,
aiAPModelName DisplayString,
aiAPCPUUtilization Integer32,
aiAPMemoryFree Integer32,
aiAPUptime TimeTicks
```

Closing Line

Following is the closing line—the end of the MIBs file.

```
END
```

SNMP File

The `snmp.h` file lists the OIDs of all MIBs. Following are sections from `snmp.h` that show the complete OID of each of the Controller Transport Service (CTS) MIB elements. The list starts from the ancestral parent *iso*.

The SNMP file with all Alcatel-Lucent MIBs is listed in [Standard SNMP MIBs on page 17](#).

All AOS-W Instant MIBs inherit their OIDs from the Alcatel-Lucent MIB node. The following rows list the MIBs that precede CTS, starting from <i>iso</i> .	
{ "iso",	HASHNEXT("1") },
{ "org",	HASHNEXT("1.3") },
{ "dod",	HASHNEXT("1.3.6") },
{ "internet",	HASHNEXT("1.3.6.1") },
{ "private",	HASHNEXT("1.3.6.1.4") },
{ "enterprises",	HASHNEXT("1.3.6.1.4.1") },
{ "aruba",	HASHNEXT("1.3.6.1.4.1.14823") },
{ "arubaEnterpriseMibModules",	HASHNEXT("1.3.6.1.4.1.14823.2") },

HP OpenView

To install the MIB module for HP OpenView, log in as the root user and execute the following script:

```
# $OV_CONTRIB/NNM/Aruba/install
```

The chapter provides information about the AOS-W Instant MIB objects.

The AOS-W Instant MIB is listed in the file *alcatel-lucent-instant.my*. For information about downloading the MIB file, see [Downloading MIB Files on page 11](#).

Table 6: Supported AOS-W Instant MIBs and MIB Tables

Group	Description
aiInfoGroup	Contains details of the virtual controller.
aiStateGroup	<p>Contains information about status of the Access Point, Radio, WLAN, and Clients connected to an OAW-IAP. The following tables are available in the aiInfoGroup:</p> <ul style="list-style-type: none"> ● aiAccessPointTable—Contains all the access points connected to the virtual controller. This table is indexed by the MAC Address of the OAW-IAP. ● aiRadioTable—Contains all the radios of the access points connected to the virtual controller. This table is indexed by the MAC Address and radio number. ● aiWlanTable—Contains all the BSSIDs that are active on the virtual controller. This table is indexed by the MAC address and a WLAN Index of the OAW-IAP. ● aiClientTable—Contains information about all the clients connected to the virtual controller. When a client roams from one access point to another, all the counters in this table are reset to 0.
aiTrapGroup	Contains the details of traps that can be generated on an OAW-IAP. For more information, see Trap Hierarchy on page 18 .

For more information of MIB tables and objects, see the *alcatel-lucent-instant.my* MIB file.

This section provides information on the following standard MIBs modules and tables supported in this release of AOS-W Instant.

- system MIB
- dot1qTpFdbTable
- ifTable
- ifXTable
- ipAddrTable



In AOS-W Instant 6.4.3.1-4.2.0.0, the **ipAddrTable** that includes the Virtual Controller IP address is introduced. The Virtual Controller interface is added as a separate virtual interface along with br0 and tun0 interfaces in the ifTable MIB.

For more information on the MIB objects, see the SNMP standard MIBs in the MIB file.

This module defines the traps that can be generated by the OAW-IAP. Traps are MIB objects (variables) that transmit information to the SNMP Manager when an event occurs. Traps are included as varbinds (variable bindings) in the trap protocol data unit (PDU).

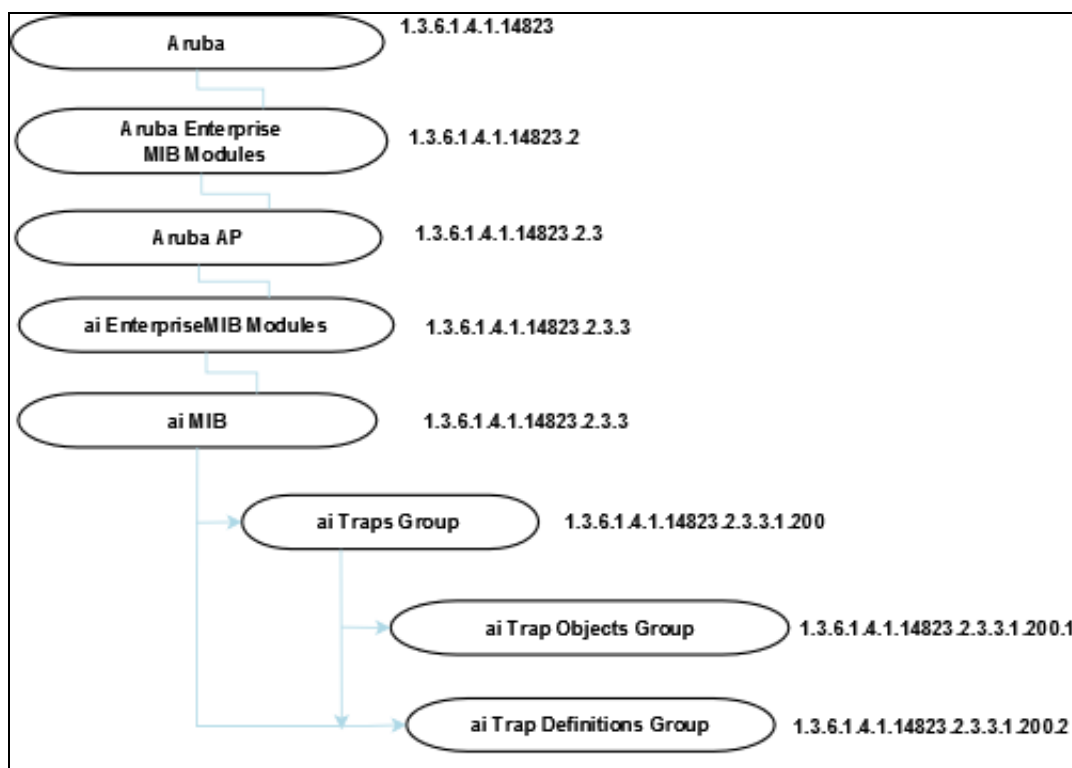


The traps for the OAW-IAP cluster are generated with the master OAW-IAP IP address as the source IP address. If the Virtual Controller IP is configured, the traps are generated from the Virtual Controller IP. However, the source IP address for the interface up and interface down traps is AP IP address.

Figure 3 shows the architecture of the Traps MIB relative to 1.3.6.1.4.1.14823 (iso.org.dod.internet.private.enterprise.aruba). The Traps are listed in the file *aruba-trap.my* MIB file. For information about downloading AOS-W Instant MIB files, see [Downloading MIB Files on page 11](#).

Trap Hierarchy

Figure 3 Trap Hierarchy



For a list of supported trap objects, see *aruba-trap.my* MIB file.

SNMP Traps

SNMP Traps are MIB objects (variables) that transmit information to the SNMP Manager when an event occurs. Traps are included as varbinds (variable bindings) in the trap protocol data unit (PDU).

The following traps are supported for the ifTable objects:

- linkDown
- linkUp

These traps are sent when there is change on a specific interface such as GRE or Ethernet. For more information on these traps, see the MIB file.