

MIB 3.3

SAMPLE

Reference Guide

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An Overview of This Manual

This manual is for network administrators and operators responsible for managing the Company controller, also known as *switch*.

Contents

This manual provides information about CompanyOS MIBs. Unless otherwise stated in the following table, each chapter provides information about the hierarchy, OIDs, and descriptions of the statistical information the MIBs provide.

Chapter	Contents
Chapter 1 MIBs Overview	Introductory information about CompanyOS MIBs—hierarchy, relationship with SNMP, and Traps.
Chapter 2 FAQs	Information and tips about MIB files.
Chapter 3 AP and AM	Information about access points (AP) and air monitors (AM).
Chapter 4 Authentication	Information about authorization—network access.
Chapter 5 Controller Transport Service	Information about the Controller Transport Service (CTS)—synchronization of database and data sections.
Chapter 6 External Services Interface	Information about the ESI module of wireless management— redirecting traffic to filter or other network appliances.
Chapter 7 IF External	Information about interfaces—physical ports, configured VLANs, port memberships.
Chapter 8 Mesh	Information about Mesh topology.
Chapter 9 Mobility	Information about the CompanyOS mobility subsystem—roaming agents.
Chapter 10 Monitor	Information about monitoring network traffic—transfer rate, errors, and so on.
Chapter 11 Signal Noise Ratio	Information about signal quality and packets—signal strength, number of packets.
Chapter 12 Switch	Information about switches, including storage and memory utilization, and the wireless stations associated with the access points.
Chapter 13 System External	Information about the utilization of system resources.

Chapter	Contents
Chapter 14 Textual Conventions	Information about Textual Conventions (TC)—TCs do not have OIDs.
Chapter 15 Traps	Descriptions of traps, information that is delivered when an event occurs.
Chapter 16 User	Information about users—parties connected to the switch.
Chapter 17 User6	Information about IPv6 users—parties connected to the switch that are using IPv6
Chapter 18 Voice	Information about Voice over IP—call status and call details.
Chapter 19 WLAN	Information about wide local area network (WLAN).
Chapter 20 SNMP MIBs Reference	Reference—list of SNMP MIBs and associated OIDs.

Related Documents

The following items are part of the complete documentation for the CompanyOS 3.3 Software:

- *CompanyOS 3.3 Quick Start Guide*
- *CompanyOS 3.3 User Guide*
- *CompanyOS 3.3 CLI Reference Guide*
- *CompanyOS 3.3 Software Upgrade Guide*
- *CompanyOS 3.3 Release Notes*

Textual Conventions

Table 1 presents the conventions used throughout this manual to emphasize important concepts:

Table 1 *Textual 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: Sample screen output, System prompts, Filenames, software devices, and certain commands when mentioned in the text.
Commands	In the command examples, this bold font depicts text that the user must type exactly as shown.

Frequently Used Acronyms

Table 2 defines frequently used acronyms.

Table 2 *Frequently Used Acronyms*

Acronym	Definition
3DES	Triple DES
ACL	Access Control List
ADP	CompanyOS Discovery Protocol
AM	Air Monitor
AP	Access Point
ARM	Adaptive Radio Management
BSSID	Basic Service Set Identifier
CA	Certificate Authority
CAC	Call Admission Control
CHAP	Challenge Handshake Authentication Protocol
CLI	Command Line Interface
CRL	Certificate Revocation List
CSA	Channel Switch Announcement
CSR	Certificate Signing Request
CW	Contention Window
DA	Destination Address
DES	Data Encryption Standard
DHCP	Dynamic Host Configuration Protocol
DNS	Domain Name Service
DOS	Denial of Service
DPD	Dead Peer Detection
DSS	Direct Spread Spectrum
EAP	Extensible Authentication Protocol
EDCA	Enhanced Distributed Channel Access
EIRP	Effective Isotropic Radiated Power
ESI	External Services Interface
ESSID	Extended Service Set Identifier
GRE	Generic Routing Encapsulation
GUI	Graphical User Interface
HAT	Home Agent Table
HT	High Throughput
IAS	Internet Authentication Service

Table 2 *Frequently Used Acronyms (Continued)*

Acronym	Definition
IDS	Intrusion Detection System
IGMP	Internet Group Management Protocol
IKE	Internet Key Exchange
IP	Internet Protocol
IV	Initialization Vectors
kB	Kilobyte
LAN	Local Area Network
LDAP	Lightweight Directory Access Protocol
LI	Listening Interval
MAC	Media Access Control
MB	Megabyte
MCHAP	Microsoft Challenge Handshake Authentication Protocol
MIB	Management Information Base
NAS	Network Address Server
NAT	Network Address Translation
NIC	Network Interface Card
NTP	Network Time Protocol
OFDM	Orthogonal Frequency Division Multiplexing
OID	Object Identifier
OUI	Organizational Unit Identifier
PAP	Password Authentication Protocol
PEAP	Protected EAP
PEF	Policy Enforcement Firewall
PIN	Personal Identification Number
PoE	Power over Ethernet
PPTP	Point-to-Point Tunneling Protocol
PSK	Pre-Shared Key
QoS	Quality of Service
RADIUS	Remote Authentication Dial In User Service
RAP	Remote Access Point
RF	Radio Frequency
RMON	Remote Monitor
RSA	Rivest-Shamir-Aldeman (encryption algorithm)
SIP	Session Initiation Protocol

Table 2 *Frequently Used Acronyms (Continued)*

Acronym	Definition
SNMP	Simple Network Management Protocol
SSH	Secure Shell
SSID	Service Set Identifier
TIM	Traffic Indication Map
TLS	Transport Layer Security
ToS	Type of Service
TSPEC	Traffic Specification
VLAN	Virtual Local Area Network
VoIP	Voice over IP
VPN	Virtual Private Network
VRRP	Virtual Router Redundancy Protocol
VSA	Vendor Specific Attributes
WEP	Wired Equivalent Protocol
WINS	Windows Internet Naming Service
WLAN	Wireless Local Area Network
WMM	Wireless MultiMedia / Wi-Fi Multimedia
WMS	WLAN Management System
WPA	Wi-Fi Protected Access

Contacting Company

Web Site Support

Main Site	http://www.Companynetworks.com
Support Site	http://www.Companynetworks.com/support
Software Licensing Site	https://licensing.Companynetworks.com
Support Email	support@Companynetworks.com

Telephone Numbers

• Company Corporate	+1 (408) 227-4500
• FAX	+1 (408) 227-4550
• Support	
United States	800-WI-FI-LAN (800-943-4526)
France	+33 (0) 1 70 72 55 59
United Kingdom	+44 (0) 20 7127 5989
Germany	+49 (0) 69 38 09 77 22 8
All other countries	+1 (408) 754-1200

This chapter provides an overview of CompanyOS Enterprise MIBs with the following sections:

- [MIBs](#)
- [SNMP](#)
- [Traps](#)

MIBs

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

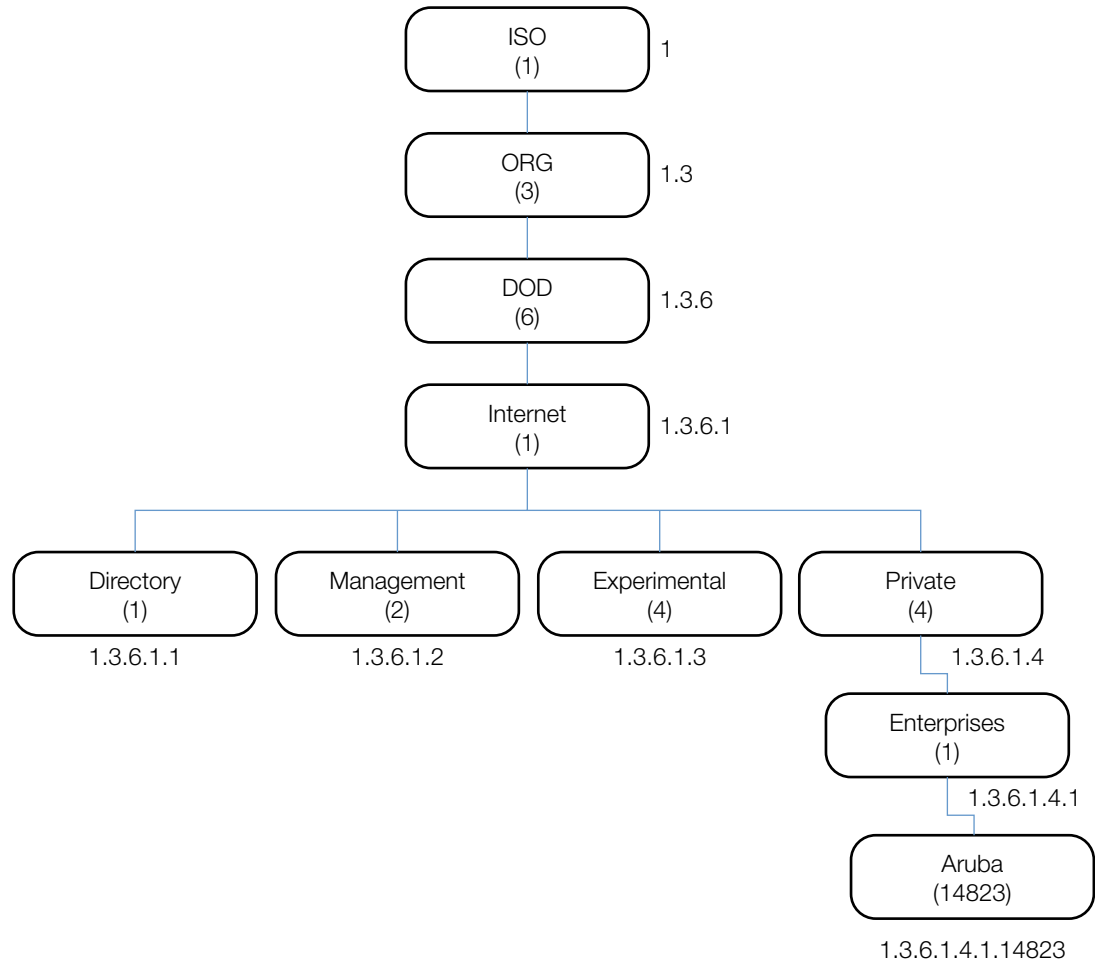
MIB objects, such as a MIB table or a specific element of data in a MIB table, are identified with Object Identifiers (OIDs). The OIDs are designated by text strings and integer sequences. For example, *Company* and *1.3.6.1.4.1.14832* both represent the private enterprise node *Company*, as shown in [Figure 1 on page 20](#). *Company* is the parent of the proprietary MIBs that support Company controllers. The numerical string lists the nodes of the MIB hierarchy, as shown in [Table 3](#).

Table 3 *MIB Node Identification*

Integer	String	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
14832	1.3.6.1.4.1.14832	Company

[Figure 1](#) illustrates the high-level hierarchy of the MIBs. This document only covers the enterprise MIBs, objects designed to specifically support Company devices. Standard MIBs are not covered.

Figure 1 *High-Level MIB Hierarchy*



MIB is one of the elements of Simple Network Management Protocol (SNMP), which is used to manage network devices. To deliver information between devices, every object referred to in an SNMP message must be listed in the MIB. If a component of a device is not described in a MIB, that component cannot be recognized by SNMP—there is no information for SNMP managers and SNMP agents to exchange. 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 32](#).

SNMP

Three significant elements of SNMP are Managers, Agents, and MIBs.

- Managers (software application) are consoles that are used to communicate with and manage devices that support SNMP Agents. Managers collect information by polling Agents. Managers can also be used to send configuration updates or send controlling requests to actively manage a network device.
- Agents (software application) provide information from the network devices to the 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.

- To ensure functionality with SNMP, MIB objects must be defined with the proper *keywords*, as shown in [Table 4](#).

CompanyOS Enterprise MIBs support SNMPv1, SNMPv2, and SNMPv3.

Table 4 *MIB Keywords*

Keyword	Description
Sequence	The sequence of objects of the MIB. This keyword is used mostly with entry MIB objects to list the MIB objects that exchange information.
Syntax	Textual conventions, such as <i>Integer32</i> .
Max-Access	Defines the object accessibility: <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: <i>current</i> : up to date <i>deprecated</i> : rolled back to a previous version
Description	A text string that describes the object.



History may be included in some MIB tables—it lists in which CompanyOS release the MIB was updated or otherwise changed.

Traps

An event is a change on a network device, such as a change in value that crosses threshold. Some events are categorized as alarms, other events only provide information. When an event occurs on a network device, SNMP notifications are sent out as traps or information requests.

- Traps are unconfirmed notifications—the receiver does not acknowledge to the sender that the information was received.
- Inform requests are confirmed notifications—the receiver acknowledges to the sender that the information was received.

Following are descriptions of trap types.

- **Discrete Alarm Inputs**
 These traps, also known as digital inputs or contact closures, are used for monitoring equipment failures, intrusion alarms, beacons, and flood and fire detectors.
- **Analog Alarm Inputs**
 Analog alarms measure characteristics that can affect equipment performance—variable levels of voltage or current, temperature, humidity, and pressure.
- **Ping Alarms**
 Ping alarms are used to ping network devices at regular intervals. If a device fails to respond, an alarm (SNMP trap) will be sent.
- **Control Relays**
 Relay outputs enable operating remote site equipment.
- **Terminal Server Function**

The terminal server function enables connection to remote-site serial devices. For example, device connection to serial ports enables telnet access via LAN.

CompanyOS traps are described in the following chapter and sections.

- [Chapter 15, “Traps” on page 287](#)
- [wlsrTrapObjectsGroup on page 82](#)
- [wlsrTrapsGroup on page 86](#)
- [wlsxSwitchTraps Group on page 235](#)
- [Switch Traps–Notifications on page 240](#)
- [Platform Traps on page 244](#)
- [IPv6 Authentication Traps on page 248](#)

This chapter provides information on and examples of using MIBs.

- [Downloading MIB Files](#)
- [Monitoring WLAN Health](#)
- [Reading MIB Files](#)
- [SNMP File](#)
- [HP OpenView](#)
- [MIB Limitations](#)

Downloading MIB Files

The most recent CompanyOS MIB files are available for registered customers at

<https://support.Companynetworks.com>

For assistance to set up an account and access files, please contact customer service. See [Contacting Aruba Networks on page 17](#).

Monitoring WLAN Health

This section lists SNMP MIBs that are frequently used to run health checks on Company devices, which can be performed 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 Company controller
- The OID of the MIB

In addition, the MIB files must be available for the application to access and placed in the appropriate disk location. If MIB files need to be acquired, see [Downloading MIB Files](#), above.

It is assumed that the workstation is connected to the Company controller and that 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.

```
.1.3.6.1.4.1.14823.2.2.1.1.2.1
```

MIB Browsers

If using an application that is run through CLI (a *cmd* window), the command would resemble the following:

```
snmpget -v 2c -c <snmp community name> <controller IP address><MIB OID>
```

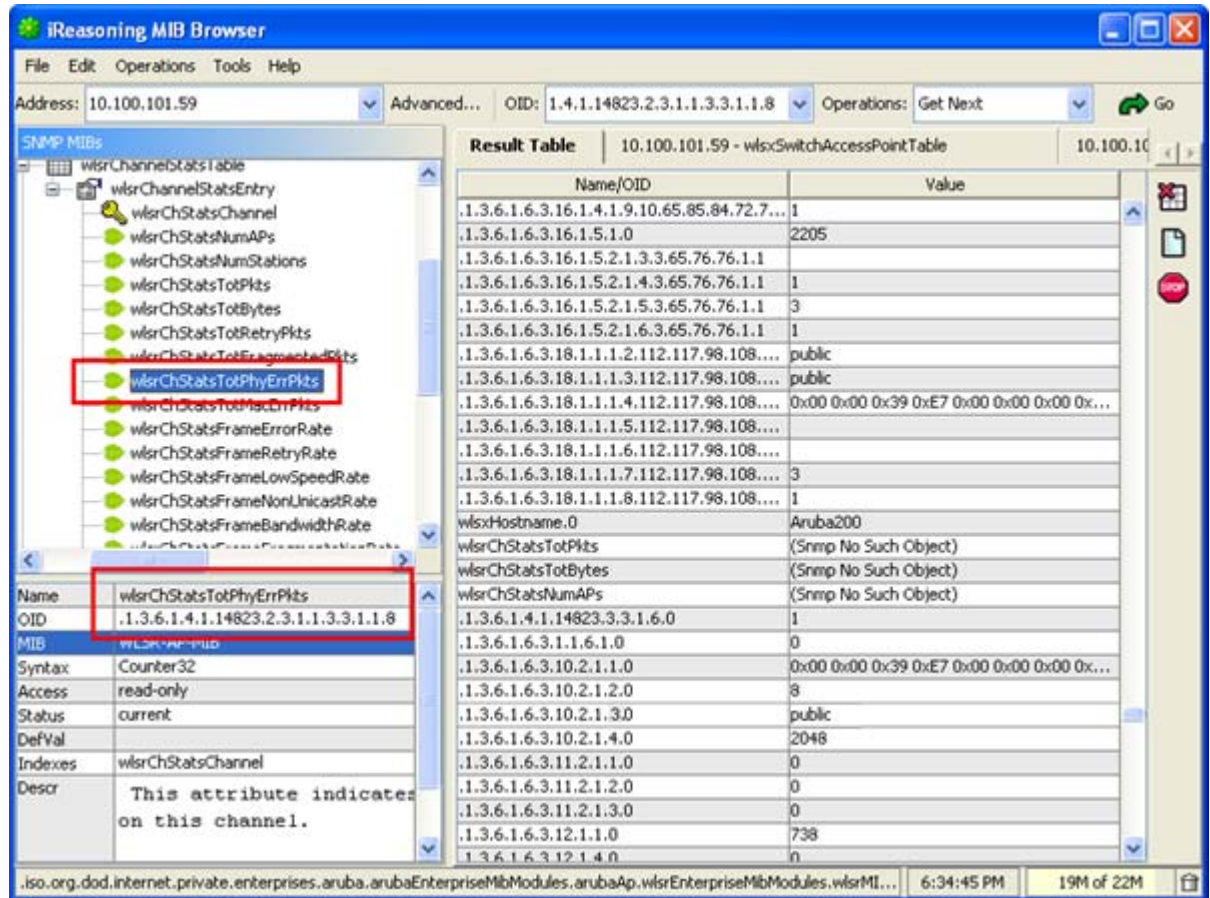
[Figure 2](#) shows an example of submitting a command to obtain information.

Figure 2 CLI Interface

```
C:\usr\bin>snmpget -v 2c -c public 10.100.101.59 .1.3.6.1.4.1.14823.2.2.1.1.1.1
WLSX-SWITCH-MIB::wlsxHostName = GLOBALS: Aruba200
```

Figure 3 shows how information may be obtained through a graphical user interface (GUI). The user interface and the available features vary by application.

Figure 3 Graphical User Interface



WLAN Health Information

This sections lists frequently used MIBs for system health checks. Examples of executing a command via CLI are also provided. Health check information can be acquired through other MIB browsers, as described in [MIB Browsers on page 23](#).

- Number of Current Authentications per AP
- Number of Current APs per Controller
- Number of Down APs per Controller
- Number of Successful 802.1x Authentications
- Number of Rogue APs per Controller—Count per Building
- Number of Interfering APs per Controller
- Noise Level per AP
- AP Information from Master Controller
- Information from Any AP
- Frame Retry Rate per AP BSSID
- Frame Low-Speed Rate per AP BSSID
- Frame Retry Rate per AP Channel
- Frame Low-Speed Rate per AP Channel
- Frame Receive Errors per AP Channel
- Total Current Channel Bandwidth (kbps) per AP
- Tx Packets per AP BSSID (32-bit counter)
- Tx Bytes per AP BSSID (32-bit counter)
- Rx Packets per AP BSSID (32-bit counter)
- Rx Bytes per AP BSSID (32-bit counter)
- Total Bandwidth per AP BSSID (kbps)
- Free Memory
- SNR of Wireless Devices per AP

- Frame Receive Error Rate per AP BSSID
- SNR of APs

Number of Current Authentications per AP

wlsxSwitchUserTable .1.3.6.1.4.1.14823.2.2.1.1.2.1

```
snmpwalk -v 2c -m ALL -c <snmp community name> <controller IP addr>
.1.3.6.1.4.1.14823.2.2.1.1.2.1 | grep -c <AP Location ID x.y.z>
```

Number of Current APs per Controller

wlsxSwitchTotalNumAccessPoints .1.3.6.1.4.1.14823.2.2.1.1.3.1

```
snmpget -v 2c -m ALL -c <SNMP community string> <Local controller IP>
.1.3.6.1.4.1.14823.2.2.1.1.3.1
```

Number of Down APs per Controller

globalAPState .1.3.6.1.4.1.14823.2.2.1.1.3.4.1.6

```
snmpwalk -v 2c -m ALL -c <snmp community name> <Master controller IP addr>
.1.3.6.1.4.1.14823.2.2.1.1.3.4.1.6 | grep -c 'INTEGER: 2'
```

Number of Successful 802.1x Authentications

wlsxSwitchUserTable .1.3.6.1.4.1.14823.2.2.1.1.2.1

To list the current dot1x users, enter:

```
snmpwalk -v 2c -m ALL -c <snmp community name> <controller IP addr>
.1.3.6.1.4.1.14823.2.2.1.1.2.1 | grep -c "<dot1x>"
```

Number of Rogue APs per Controller—Count per Building

wlsrAmRAPType .1.3.6.1.4.1.14823.2.3.1.1.4.1.1.6

```
snmpwalk -v 2c -m ALL -c <snmp community name> <AP IP addr>
.1.3.6.1.4.1.14823.2.3.1.1.4.1.1.6 | grep -c "unsecure"
```

Number of Interfering APs per Controller

wlsrAmRAPType .1.3.6.1.4.1.14823.2.3.1.1.4.1.1.6

```
snmpwalk -v 2c -m ALL -c <snmp community name> <AP IP addr>
.1.3.6.1.4.1.14823.2.3.1.1.4.1.1.6 | grep -c "interfering"
```

Noise Level per AP

apChannelNoise .1.3.6.1.4.1.14823.2.2.1.1.3.3.1.13

```
snmpwalk -v 2c -c <snmp community name> <controller IP addr>
.1.3.6.1.4.1.14823.2.2.1.1.3.3.1.13 | grep "<ap bssid in decimal format>"
```

AP Information from Master Controller

wlsxSwitchGlobalAPTable .1.3.6.1.4.1.14823.2.2.1.1.3.4

The following command retrieves the BSSIDs and local controller IP of each AP.

```
snmpwalk -v 2c -m ALL -c <snmp community name> <Master controller IP addr>
.1.3.6.1.4.1.14823.2.2.1.1.3.4
```

Information from Any AP

wlsrConfigTable .1.3.6.1.4.1.14823.2.3.1.1.1.1

The following information can be retrieved from an AP:

Current configuration of SSID, Mode, Current Channel, Tx-Power, RTS Threshold, Retry Limit, Preamble, Beacon Interval, Power Mgmt, Load Balance, Supported Rates, DTIM Period, LMS Address, Encryption, Status, Ageout, MTU, Location, Hide SSID, Deny Broadcast, BG mode, Radio Chipset, Regulatory Domain, Country Code, and Tx Rates.

```
snmpwalk -v 2c -m ALL -c <snmp community name> <AP IP addr>
.1.3.6.1.4.1.14823.2.3.1.1.1.1
```

Frame Retry Rate per AP BSSID

apBSSFrameRetryRate .1.3.6.1.4.1.14823.2.2.1.1.3.5.1.13

```
snmpwalk -v 2c -c <snmp community name> <controller IP addr>
.1.3.6.1.4.1.14823.2.2.1.1.3.5.1.13 | grep "<ap bssid in decimal format>"
```

Frame Low-Speed Rate per AP BSSID

apBSSFrameLowSpeedRate .1.3.6.1.4.1.14823.2.2.1.1.3.5.1.14

```
snmpwalk -v 2c -c <snmp community name> <controller IP addr>
.1.3.6.1.4.1.14823.2.2.1.1.3.5.1.14 | grep "<ap bssid in decimal format>"
```

Frame Receive Error Rate per AP BSSID

apBSSFrameReceiveErrorRate .1.3.6.1.4.1.14823.2.2.1.1.3.5.1.17

```
snmpwalk -v 2c -c <snmp community name> <controller IP addr>
.1.3.6.1.4.1.14823.2.2.1.1.3.5.1.17 | grep "<ap bssid in decimal format>"
```

Frame Retry Rate per AP Channel

apChannelFrameRetryRate .1.3.6.1.4.1.14823.2.2.1.1.3.5.1.3

```
snmpwalk -v 2c -c <snmp community name> <controller IP addr>
.1.3.6.1.4.1.14823.2.2.1.1.3.5.1.3 | grep "<ap bssid in decimal format>"
```

Frame Low-Speed Rate per AP Channel

apChannelFrameLowSpeedRate .1.3.6.1.4.1.14823.2.2.1.1.3.5.1.4

```
snmpwalk -v 2c -c <snmp community name> <controller IP addr>
.1.3.6.1.4.1.14823.2.2.1.1.3.5.1.4 | grep "<ap bssid in decimal format>"
```

Frame Receive Errors per AP Channel

This information is available from any Company controller.

apChannelFrameReceiveErrorRate .1.3.6.1.4.1.14823.2.2.1.1.3.5.1.7

```
snmpwalk -v 2c -c <snmp community name> <controller IP addr>
.1.3.6.1.4.1.14823.2.2.1.1.3.5.1.7 | grep "<ap bssid in decimal format>"
```

Total Current Channel Bandwidth (kbps) per AP

apChannelBwRate .1.3.6.1.4.1.14823.2.2.1.1.3.5.1.2

```
snmpwalk -v 2c -c <snmp community name> <controller IP addr>
.1.3.6.1.4.1.14823.2.2.1.1.3.5.1.2 | grep "<ap bssid in decimal format>"
```

Tx Packets per AP BSSID (32-bit counter)

apBSSTxPackets .1.3.6.1.4.1.14823.2.2.1.1.3.5.1.8

```
snmpwalk -v 2c -c <snmp community name> <controller IP addr>
.1.3.6.1.4.1.14823.2.2.1.1.3.5.1.8 | grep "<ap bssid in decimal format>"
```

Tx Bytes per AP BSSID (32-bit counter)

apBSSTxBytes .1.3.6.1.4.1.14823.2.2.1.1.3.5.1.9

```
snmpwalk -v 2c -c <snmp community name> <controller IP addr>
.1.3.6.1.4.1.14823.2.2.1.1.3.5.1.9 | grep "<ap bssid in decimal format>"
```

Rx Packets per AP BSSID (32-bit counter)

apBSSRxPackets .1.3.6.1.4.1.14823.2.2.1.1.3.5.1.10

```
snmpwalk -v 2c -c <snmp community name> <controller IP addr>
.1.3.6.1.4.1.14823.2.2.1.1.3.5.1.10 | grep "<ap bssid in decimal format>"
```

Rx Bytes per AP BSSID (32-bit counter)

apBSSRxBytes .1.3.6.1.4.1.14823.2.2.1.1.3.5.1.11

```
snmpwalk -v 2c -c <snmp community name> <controller IP addr>
.1.3.6.1.4.1.14823.2.2.1.1.3.5.1.11 | grep "<ap bssid in decimal format>"
```

Total Bandwidth per AP BSSID (kbps)

apBSSBwRate .1.3.6.1.4.1.14823.2.2.1.1.3.5.1.12

```
snmpwalk -v 2c -c <snmp community name> <controller IP addr>
.1.3.6.1.4.1.14823.2.2.1.1.3.5.1.12 | grep "<ap bssid in decimal format>"
```

Free Memory

sysXMemoryFree .1.3.6.1.4.1.14823.2.2.1.1.11.1.4

```
snmpget -v 2c -m ALL -c <snmp community name> <controller IP addr>
.1.3.6.1.4.1.14823.2.2.1.1.11.1.4.1
```

SNR of Wireless Devices per AP

staSignalToNoiseRatio .1.3.6.1.4.1.14823.2.2.1.1.2.2.1.7

```
snmpwalk -v 2c -c <snmp community name> <controller IP addr>
.1.3.6.1.4.1.14823.2.2.1.1.2.2.1.7 | grep "<ap bssid in decimal format>"
```

SNR of APs

apSignalToNoiseRatio .1.3.6.1.4.1.14823.2.2.1.1.3.3.1.14

```
snmpwalk -v 2c -c <snmp community name> <controller IP addr>
.1.3.6.1.4.1.14823.2.2.1.1.3.3.1.14 | grep "<ap bssid in decimal format>"
```

Reading MIB Files

This section describes how to interpret the basic components of a MIB file. To determine the OIDs, viewing the file `snmp.h` may be necessary, which is described in [SNMP File on page 32](#). For additional information about MIB files, see [MIBs on page 19](#). For a listing of SNMP MIB OIDs, see [Chapter 20, “SNMP MIBs Reference” on page 475](#).

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 CompanysOS MIB file, `Company-cts.my`, are described below.

Opening Line

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

```
WLSX-CTS-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,
    MODULE-IDENTITY,
    OBJECT-TYPE,
    snmpModules,
    Integer32,
    Unsigned32,
    Counter32,
    IPAddress,
    NOTIFICATION-TYPE
    FROM SNMPv2-SMI

    TDomain,
    DisplayString,
```

```

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

OBJECT-GROUP
FROM SNMPv2-CONF

```

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 tree for the CTS MIB is illustrated in [Figure 4 on page 32](#). The OID can be determined from the parent object as follows.

`wlsxEnterpriseMibModules` is the parent object of the CTS MIB—its OID is 1.3.6.1.4.1.14823.2.2.1.

`wlsxCtsMIB MODULE-IDENTITY` shows `wlsxEnterpriseMibModules 11`, which indicates 11 is appended to the OID of `wlsxEnterpriseMibModules`. The resultant OID is 1.3.6.1.4.1.14823.2.2.1.11.

`wlsxCtsOpGroup OBJECT IDENTIFIER ::= { wlsxCtsMIB 1 }` indicates the OID is 1.3.6.1.4.1.14823.2.2.1.11.1.

`wlsxCtsRequestTable OBJECT-TYPE` shows `wlsxCtsOpGroup 1`, which indicates the OID is 1.3.6.1.4.1.14823.2.2.1.11.1.1.

All MIBs and their related OIDs are listed in the `snmp` file of CompanyOS. For more information, see [SNMP File on page 32](#).

```

wlsxEnterpriseMibModules
FROM Company-MIB;

```

Identity

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

```

wlsxCtsMIB MODULE-IDENTITY
    LAST-UPDATED "0609240301Z"
    ORGANIZATION "Company Wireless Networks"
    CONTACT-INFO
        "Postal:      1322 Crossman Avenue
                    Sunnyvale, CA 94089
        E-mail:      dl-support@Companynetworks.com
        Phone:      +1 408 227 4500"
    DESCRIPTION
        "This MIB module defines MIB objects which provide
        information about the Controller Transport Service (Cts) in the
        Company controller."
    REVISION      "0609240301Z"
    DESCRIPTION
        "The initial revision."
    ::= { wlsxEnterpriseMibModules 11 }

```

MIB Modules

MIB objects can be placed in logical groups, [Group](#) and [Table](#). One MIB file can consist of multiple groups. A group typically contains at least one table. The table lists the MIB objects that contain the information that is exchanged.

The first object of a table is an [Entry](#). The keyword [SEQUENCE](#) lists the objects of the table that contain device information. Each subsequent object ([Informative MIB Objects](#)) inherits the OID of the Entry, and contains information sorted by keywords: Syntax, Access, Status, Description. For details about keywords, see [MIBs on page 19](#).

The OID of the Entry is `wlsxCtsRequestEntry` is `wlsxCtsRequestTable 1`, which represents `1.3.6.1.4.1.14823.2.2.1.11.1.1.1`. The OIDs of the subsequent objects of this table are appended increments of the Entry OID. For example, the OID of `wlsxCtsIndex` is `wlsxCtsRequestEntry 1`, which represents `1.3.6.1.4.1.14823.2.2.1.11.1.1.1.1`.

Group

```
wlsxCtsOpGroup      OBJECT IDENTIFIER ::= { wlsxCtsMIB 1 }
```

Table

```
wlsxCtsRequestTable OBJECT-TYPE
    SYNTAXSEQUENCE OF WlsxCtsRequestEntry
    MAX-ACCESSnot-accessible
    STATUScurrent
    DESCRIPTION
        "
        "
    ::= { wlsxCtsOpGroup 1 }
```

Entry

```
wlsxCtsRequestEntry OBJECT-TYPE
    SYNTAX WlsxCtsRequestEntry
    MAX-ACCESS not-accessible
    STATUScurrent
    DESCRIPTION
        " "
    INDEX { wlsxCtsIndex }
    ::= { wlsxCtsRequestTable 1 }
```

```
WlsxCtsRequestEntry ::=
    SEQUENCE
    {
        wlsxCtsIndexInteger32,
        wlsxCtsOpcodeDisplayString,
        wlsxCtsCookieDisplayString,
        wlsxCtsURLDisplayString,
        wlsxCtsFlagsBITS,
        wlsxCtsStatusRowStatus
    }
```

Informative MIB Objects

```
wlsxCtsIndex OBJECT-TYPE
    SYNTAX Integer32
    MAX-ACCESS not-accessible
    STATUScurrent
```

```

DESCRIPTION
"
CTS transport index
0 - Config Sync
1 - Counters Sync
2 - RF Plan Sync
"
::= { wlsxCtsRequestEntry 1 }

wlsxCtsOpcode OBJECT-TYPE
    SYNTAX DisplayString
    MAX-ACCESS read-write
    STATUS current
    DESCRIPTION
    "
    CTS operation opcode
    "
    ::= { wlsxCtsRequestEntry 2 }

wlsxCtsStatus OBJECT-TYPE
    SYNTAX RowStatus
    MAX-ACCESS read-write
    STATUS current
    DESCRIPTION
    "
    CTS row status
    "
    ::= { wlsxCtsRequestEntry 6 }

```

Closing Line

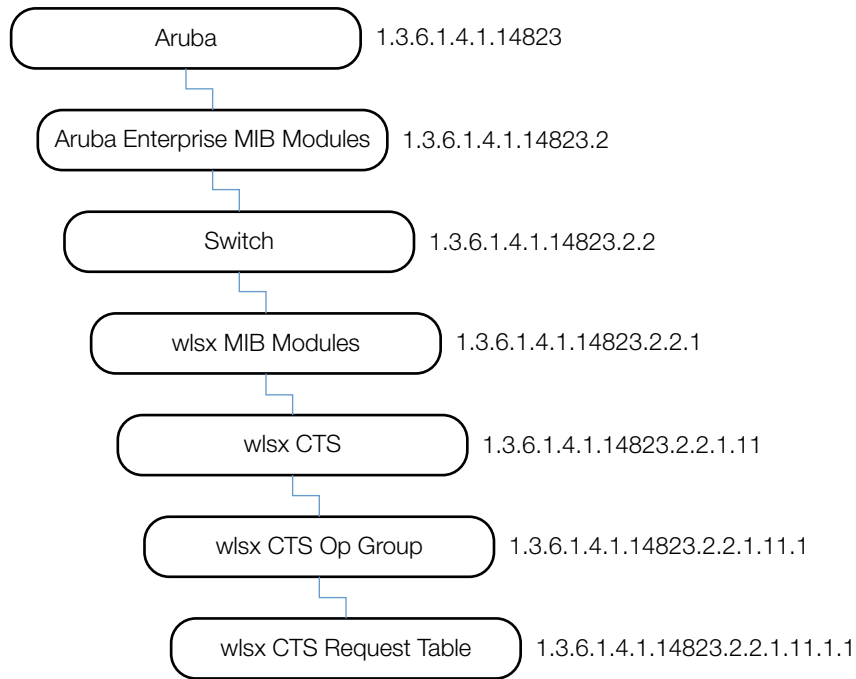
Following is the closing line—the end of the MIBs file.

```
END
```

OID Flow Chart

Figure 4 illustrates the tree of the CTS MIB, relative to the Company MIB.

Figure 4 CTS OIDs Relative to Company



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 Company MIBs is listed in [Chapter 20, “SNMP MIBs Reference”](#) on page 475.

All CompanyOS MIBs inherit their OIDs from the *Company* MIB node. The following rows list the MIBs that precede CTS, starting from *iso*.

```
{ "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") },
{ "Company",                             HASHNEXT("1.3.6.1.4.1.14823") },
{"CompanyEnterpriseMibModules",          HASHNEXT("1.3.6.1.4.1.14823.2") },
{ "switch",                              HASHNEXT("1.3.6.1.4.1.14823.2.2") },
{ "wlsxEnterpriseMibModules",            HASHNEXT("1.3.6.1.4.1.14823.2.2.1") },
```


The following rows list the CTS MIB OIDs.

```
{ "wlsxCtsMIB",                                HASHNEXT("1.3.6.1.4.1.14823.2.2.1.11") },
{ "wlsxCtsOpGroup",                            HASHNEXT("1.3.6.1.4.1.14823.2.2.1.11.1") },
{ "wlsxCtsRequestTable",                      HASHNEXT("1.3.6.1.4.1.14823.2.2.1.11.1.1") },
{ "wlsxCtsRequestEntry",                     HASHNEXT("1.3.6.1.4.1.14823.2.2.1.11.1.1.1") },
{ "wlsxCtsIndex",                            HASHNEXT("1.3.6.1.4.1.14823.2.2.1.11.1.1.1.1") },
{ "wlsxCtsOpcode",                           HASHNEXT("1.3.6.1.4.1.14823.2.2.1.11.1.1.1.1.2") },
{ "wlsxCtsCookie",                           HASHNEXT("1.3.6.1.4.1.14823.2.2.1.11.1.1.1.1.3") },
{ "wlsxCtsURL",                              HASHNEXT("1.3.6.1.4.1.14823.2.2.1.11.1.1.1.1.4") },
{ "wlsxCtsFlags",                            HASHNEXT("1.3.6.1.4.1.14823.2.2.1.11.1.1.1.1.5") },
{ "wlsxCtsStatus",                           HASHNEXT("1.3.6.1.4.1.14823.2.2.1.11.1.1.1.1.6") },
```

HP OpenView

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

```
# $OV_CONTRIB/NNM/Company/install
```

For detailed assistance to use HP OpenView, please contact the Company System Management Support group at the Company Technical Service Center. For contact information, see [Contacting Aruba Networks on page 17](#).

MIB Limitations

Following are the known limitations and constraints of CompanyOS MIBs.

Table 5 *Limitations and Constraints*

MIB	Module	Limitation
Switch	wlsxSwitchListTable	Information can only be queried from the master switch—only the table of the master switch is populated. If a local switch is queried, an empty table will be returned.
Switch	wlsxSwitchGlobalAPTable	Information can only be queried from the master switch—only the table of the master switch is populated. If a local switch is queried, an empty table will be returned.
Textual Conventions	<i>All objects</i>	Textual conventions objects do not include object identification (OID).

A

access point	35
agent	127
air monitor	35
Alarm	
analog	21
discrete	21
ping	21
analog alarm inputs	21
authentication	95

C

call status	363
control relay	21
controller	203,
351	
CTS	103

E

ESI	107
-----------	-----

F

FA	127
foreign agent	127

H

HA	127
History	
ArubaOS 2.3	
lsxSysExtFanTable	261
lsxSysExtFanTraySerialNumber	252
lsxSysExtInternalTemperature	252
lsxSysExtLicenseSerialNumber	252
lsxSysExtSwitchBaseMacaddress	251
lsxSysXProcessorEntry	208
nUserAssignedVLAN	345
nUserAuthenticationMethod	342
nUserAuthServerName	343
nUserBWContractId	345
nUserBWContractName	345
nUserBWContractUsage	345
nUserConnectedPort	346
nUserConnectedSlot	346
nUserDefaultVLAN	344
nUserExtVPNAddress	343
nUserHomeAgentIpAddress	344

nUserHomeVLAN	344
nUserIpAddress	341
nUserIsOnHomeAgent	343
nUserIsWired	346
nUserMobilityStatus	344
nUserName	342
nUserPhyAddress	341
nUserRole	342
nUserSubAuthenticationMethod	342
nUserUpTime	342
sysExtCardAssemblyNo	260
sysExtCardFpgaRevision	261
sysExtCardHwRevision	260
sysExtCardManufacturingDate	260
sysExtCardNumOffFastethernetPorts	259
sysExtCardNumOfPorts	259
sysExtCardSlot	259
sysExtCardStatus	261
sysExtCardSwitchChip	261
sysExtCardType	259
sysExtCardUserSlot	261
sysExtFanIndex	262
sysExtFanStatus	262
sysExtLicenseExpires	267
sysExtLicenseFlags	267
sysExtLicenseIndex	266
sysExtLicenseInstalled	266
sysExtLicenseKey	266
sysExtLicenseService	267
sysExtMemoryFree	258
sysExtMemoryIndex	257
sysExtMemorySize	257
sysExtMemoryUsed	258
sysExtProcessorDescr	255
sysExtProcessorID	254
sysExtProcessorLoad	255
sysExtStorageIndex	256
sysExtStorageName	256
sysExtStorageSize	256
sysExtStorageType	256
sysExtStorageUsed	256
sysExtSwitchIPAddress	264
sysExtSwitchLocation	264
sysExtSwitchName	265
sysExtSwitchRole	264
sysExtSwitchSerNo	265
sysExtSwitchStatus	265
sysExtSwitchSWVersion	265
sysXMemoryFree	212
sysXMemorySize	212
sysXMemoryUsed	212

sysXProcessorDescr	209	wlanAPLocation	391
sysXProcessorID	209	wlanAPMacAddress	388
sysXProcessorLoad	209	wlanAPMode	389
sysXStorageIndex	210	wlanAPModelName	391
sysXStorageName	211	wlanAPMonitorMode	393
sysXStorageSize	210	wlanAPName	389
sysXStorageType	210	wlanAPNumAps	387
sysXStorageUsed	210	wlanAPNumBootstraps	392
wlanAPBSSID	399	wlanAPNumClients	411
wlanAPBssidAPMacAddress	402	wlanAPNumRadios	390
wlanAPBssidChannel	401	wlanAPNumReboots	392
wlanAPBssidInactiveTime	401	wlanAPRadioChannel	396
wlanAPBssidLoadBalancing	402	wlanAPRadioMode	396
wlanAPBssidMode	401	wlanAPRadioNumActiveBSSIDs	397
wlanAPBssidNumAssociatedStations	402	wlanAPRadioNumAssociatedClients	397
wlanAPBssidPhyNumber	402	wlanAPRadioNumber	395
wlanAPBssidPhyType	400	wlanAPRadioNumMonitoredBSSIDs	397
wlanAPBssidPort	400	wlanAPRadioNumMonitoredClients	397
wlanAPBssidRogueType	400	wlanAPRadioTransmitPower	396
wlanAPBssidSlot	400	wlanAPRadioType	396
wlanAPBssidUpTime	401	wlanAPRadioUtilization	397
wlanAPBuilding	391	wlanAPRxBytes	412
wlanAPChannelErrorRate	414	wlanAPRxDeauthentications	412
wlanAPChannelNumber	444	wlanAPRxPkts	411
wlanAPChannelThroughput	412	wlanAPSerialNumber	389
wlanAPChBusyRate	448	wlanAPStatsPkts1024To1518	443
wlanAPChCoverageIndex	446	wlanAPStatsPkts128To255	443
wlanAPChFrameBandwidthRate	447	wlanAPStatsPkts256To511	443
wlanAPChFrameFragmentationRate	447	wlanAPStatsPkts512To1023	443
wlanAPChFrameLowSpeedRate	447	wlanAPStatsPkts63Bytes	442
wlanAPChFrameNonUnicastRate	447	wlanAPStatsPkts64To127	442
wlanAPChFrameRetryErrorRate	448	wlanAPStatsTotBytesAt11Mbps	420
wlanAPChInterferenceIndex	446	wlanAPStatsTotBytesAt12Mbps	421
wlanAPChNumAPs	448	wlanAPStatsTotBytesAt18Mbps	422
wlanAPChNumStations	445	wlanAPStatsTotBytesAt1Mbps	419
wlanAPChTotBytes	445	wlanAPStatsTotBytesAt24Mbps	422
wlanAPChTotFragmentedPkts	445	wlanAPStatsTotBytesAt2Mbps	420
wlanAPChTotPhyErrPkts	446	wlanAPStatsTotBytesAt36Mbps	422
wlanAPChTotPkts	445	wlanAPStatsTotBytesAt5Mbps	420
wlanAPChTotRetryPkts	445	wlanAPStatsTotBytesAt6Mbps	421
wlanAPCurrentChannel	411	wlanAPStatsTotBytesAt9Mbps	424
wlanAPdot11aAntennaGain	390	wlanAPStatsTotCtrlBytes	441
wlanAPdot11gAntennaGain	390	wlanAPStatsTotCtrlPkts	441
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