



audemat
WorldCast Systems | Group

apt | deliver

ecreso | transmit

audemat | monitor



When Simple isn't so Simple Using SNMP in Broadcast Facility control

Using SNMP in Broadcast Facility Control – Sacramento Ennes conférence 02/12/11



audemat
WorldCast Systems | Group

apt | deliver

ecreso | transmit

audemat | monitor



Do more, with less

Using SNMP in Broadcast Facility Control – Sacramento Ennes conférence 02/12/11



audemat
WorldCast Systems | Group

apt | deliver

ecreso | transmit

audemat | monitor

Economic Challenges



Using SNMP in Broadcast Facility Control – Sacramento Ennes conférence 02/12/11



audemat
WorldCast Systems | Group

apt | deliver

ecreso | transmit

audemat | monitor



Do More, with Less

Using SNMP in Broadcast Facility Control – Sacramento Ennes conférence 02/12/11



audemat
WorldCast Systems | Group

apt | deliver

ecreso | transmit

audemat | monitor



Do More, with Less

Using SNMP in Broadcast Facility Control – Sacramento Ennes conference 02/12/11



audemat
WorldCast Systems | Group

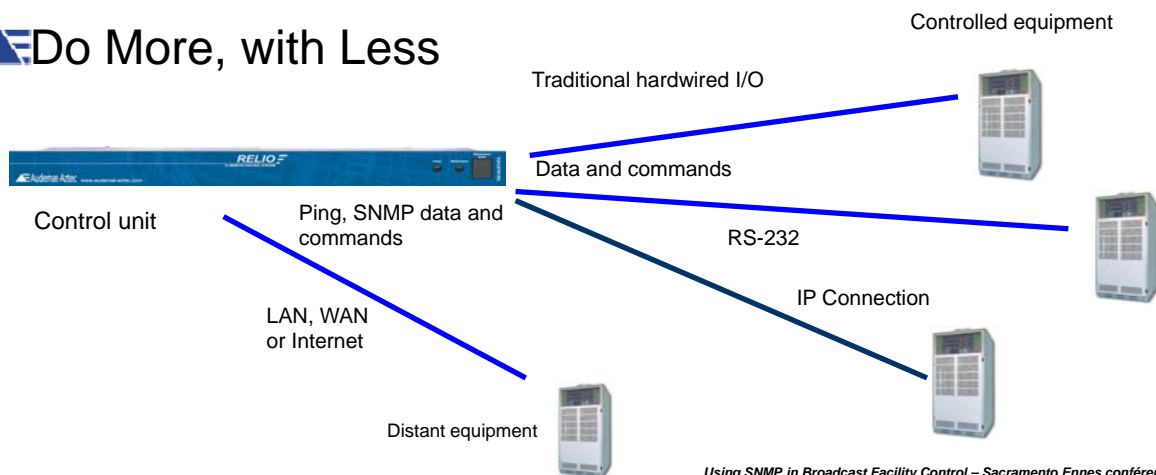
apt | deliver

ecreso | transmit

audemat | monitor

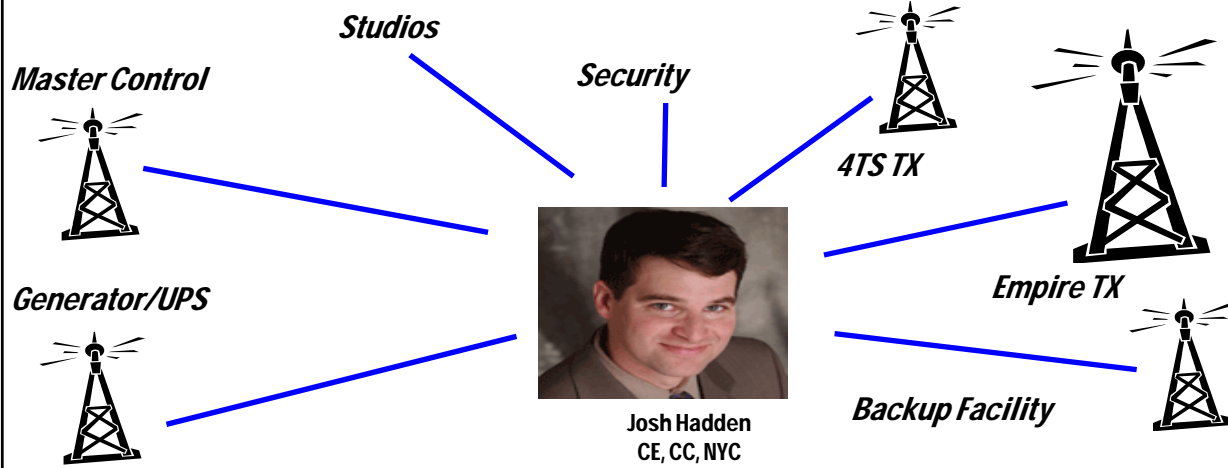
Connectivity – new Pathways = more productivity

Do More, with Less



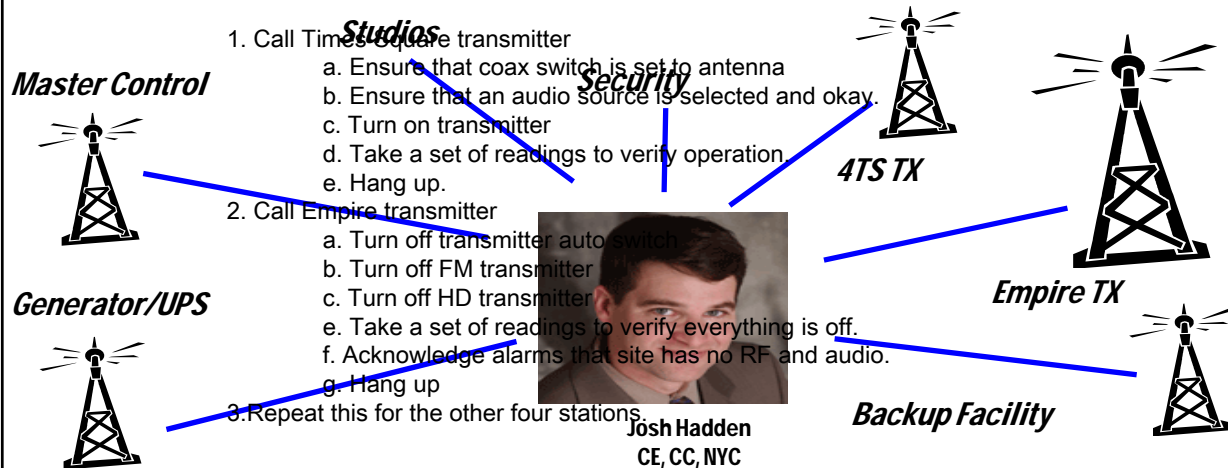
Using SNMP in Broadcast Facility Control – Sacramento Ennes conference 02/12/11

Using SNMP makes life easier



Using SNMP in Broadcast Facility Control – Sacramento Ennes conference 02/12/11

Using SNMP makes life easier



Using SNMP in Broadcast Facility Control – Sacramento Ennes conference 02/12/11

Switching between transmitter sites

Empire TX

4TS TX



Josh Hadden
CE, CC, NYC

- Ping, SNMP data and commands
- a. Verify coax switch positions.
 - b. Verify audio source and availability of that source.
 - c. If audio source is not okay, then select one that is.
 - d. Turn on transmitter
 - e. Verify all critical readings -TPO, VSWR, faults, etc.
 - f. Mask alarms at site going off line.
 - g. Shut off HD transmitter
 - h. Shut off FM transmitter
 - i. Contact STUDIO relio and verify presence of audio and RF.
 - j. After five minutes verify that PPM noise is still present.
 - k. Repeat for each station!
1. Connect to any Relio via phone, computer, or tablet.
 2. Enable PPM noise control (to prevent accidental button pushes)
 3. Select which station(s) to switch.

Switching between transmitter sites

Empire TX

4TS TX

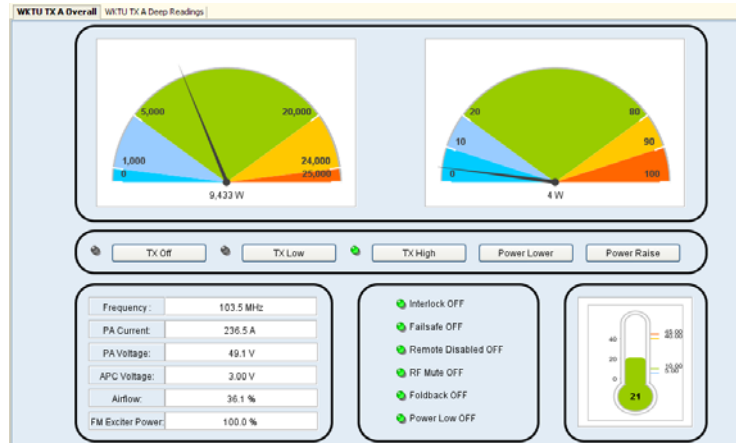


Josh Hadden
CE, CC, NYC

A.P.I. Scriptlet – designing the view

Design view / control panel to display information

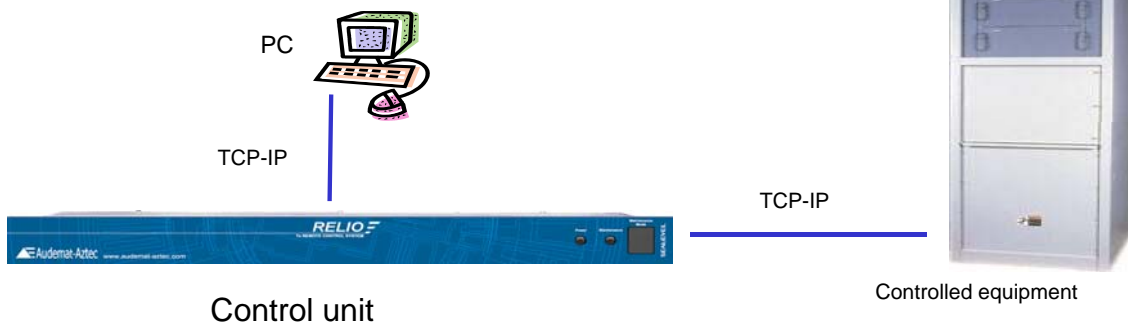
Data and control functions obtained using SNMP can be integrated with other data and controls from traditional I/O or from serial data.



Using SNMP in Broadcast Facility Control – Sacramento Ennes conference 02/12/11

Advanced IP connectivity

- IP from control point to control unit
- IP from control unit to controlled equipment



Using SNMP in Broadcast Facility Control – Sacramento Ennes conference 02/12/11



audemat
WorldCast Systems | Group

apt | deliver

ecreso | transmit

audemat | monitor

IP Ping command

- ▲ Ping sends simple data packet to another network address
 - Check that the target unit is on line
 - Send alarm if no response to ping



Using SNMP in Broadcast Facility Control – Sacramento Ennes conference 02/12/11



audemat
WorldCast Systems | Group

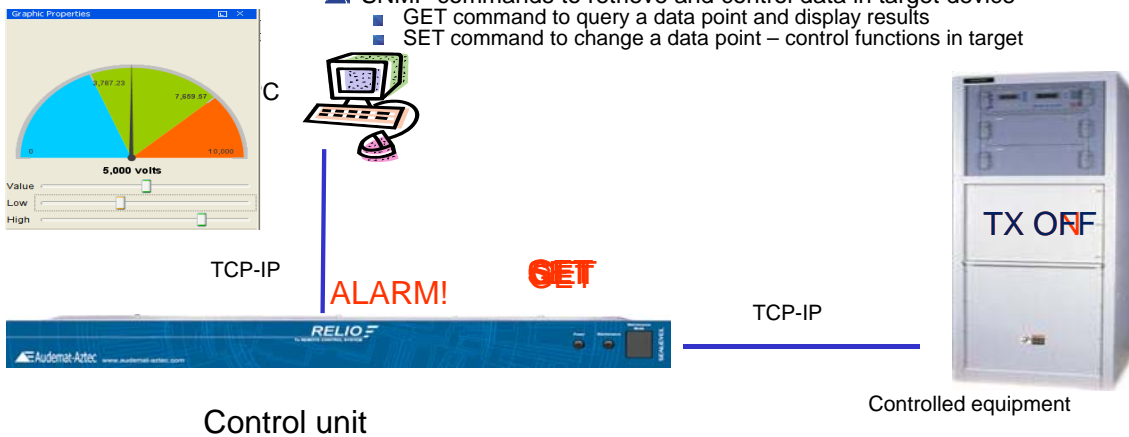
apt | deliver

ecreso | transmit

audemat | monitor

IP SNMP

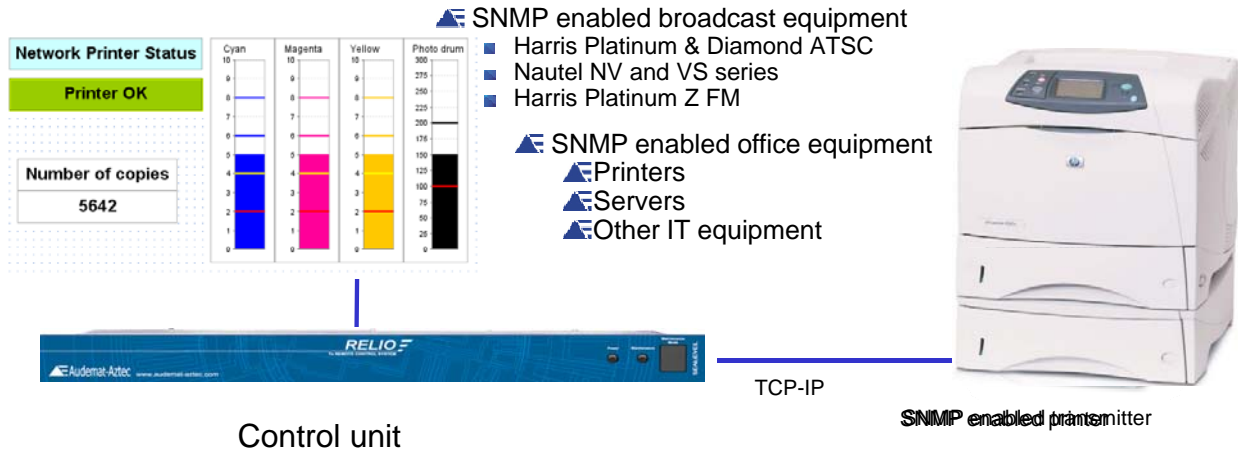
- ▲ SNMP commands to retrieve and control data in target device
 - GET command to query a data point and display results
 - SET command to change a data point – control functions in target



Using SNMP in Broadcast Facility Control – Sacramento Ennes conference 02/12/11



IP SNMP possibilities



Using SNMP in Broadcast Facility Control – Sacramento Ennes conference 02/12/11



SNMP – The Simple Network Management Protocol

Simple Network Management Protocol

- Standardized protocol Created in 1988 for computerized equipment
- UDP based network protocol that defines a set of network standards including an application layer and a database
- Controlling equipment is called an SNMP 'Manager'
- Controlled equipment is called an SNMP 'Agent'
- Data Objects are each assigned a unit number called the Object Identifier, or OID

: := 1.3.6.1.4.1.5299.15.12.1.11.1.1.8

Using SNMP in Broadcast Facility Control – Sacramento Ennes conference 02/12/11

▲ **Object Identifiers** are the 'address' of each data point in the Agent

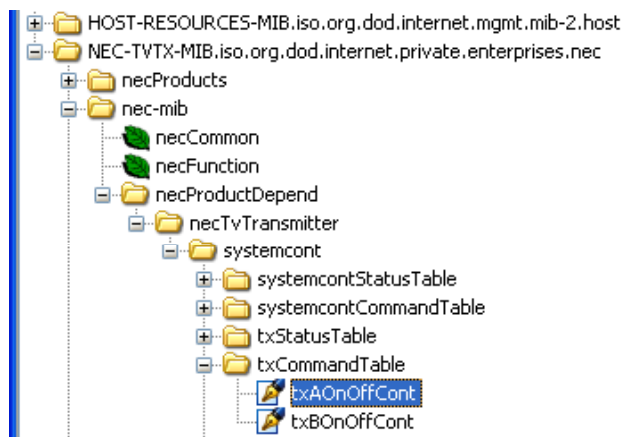
```

VALUE alarmPendingGenAlarmsalarmDescription
  Syntax: [UNIVERSAL 4] OCTET STRING
  Access: read-only
  Status: mandatory
  Description: No description
)
 ::= 1.3.6.1.4.1.5299.15.12.1.11.1.1.8
  
```

- Written in Abstract Syntax Notation 1 (ASN1) language
- OIDs and their descriptions are collected and published in a file called a Management Information Base, or MIB

▲ **The Management Information Base, or MIB**, is a directory tree 'menu' of the OIDs available on a particular SNMP Agent device.

▲ **Some of the numbers of the OID represent 'branches' of the MIB tree.**



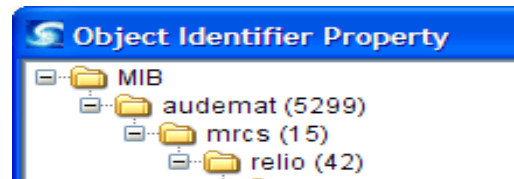
Reading an OID – the generic half

OIDs specify a data point in a particular piece of equipment

- BUT – they start with the broadest possible terms:

1.3.6.1.4.1.5299.15.42.1.10.3.4.1.3.552

- 1 – ISO, the international standards organization
- 3 – specifies an ISO-recognized organization
- 6 – Department of Defense, creator of the Internet
- 1 – Internet OID
- 4 – Private Organization
- 1 – Business Enterprise
- 5299 – Audemat/Worldcast Systems

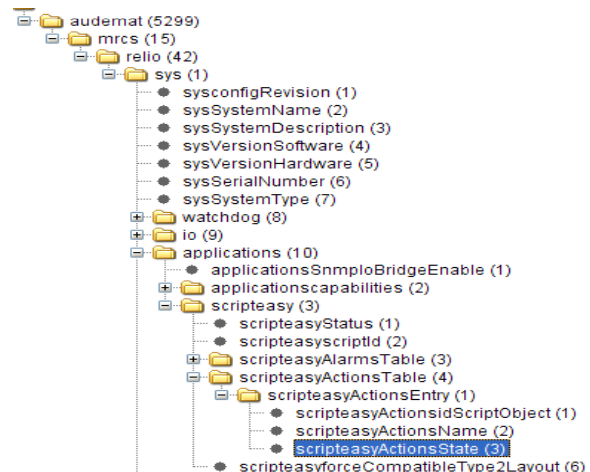


Using SNMP in Broadcast Facility Control – Sacramento Ennes conference 02/12/11

Reading an OID - Working down the MIB tree

1.3.6.1.4.1.5299.15.42.1.10.3.4.1.3.552

- 15 – MRCS
- 42 – Relio
- 1 – System
- 10 – Apps
- 3 – Scripteasy
- 4 – SE Actions Table
- 1 – SE Actions Entry
- 3 – SE Actions State
- 552 – Index value for that specific button



Using SNMP in Broadcast Facility Control – Sacramento Ennes conference 02/12/11

Special OIDs – the Index value

- ▲ Some OIDs cannot be completely defined in the MIB
 - Objects created in software after unit is designed
- ▲ Example – A software button in Scripteasy
 - OID for buttons in the MIB is generic
 - To define a specific button, add the Index value




Generic button OID from MIB: 1.3.6.1.4.1.5299.15.42.1.10.3.4.1.3

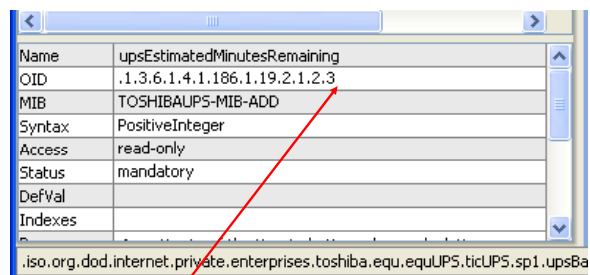
OID of a specific button in the software: 1.3.6.1.4.1.5299.15.42.1.10.3.4.1.3.361

Index Value 

Truncated OIDs

- ▲ Some OIDs are only partially published in the MIB
 - Borrows structure and other elements from standard MIBs and RFC files
 - Example from MIB of Toshiba UPS

upsEstimatedMinutesRemaining OBJECT-TYPE
SYNTAX PositiveInteger
UNITS "minutes"
ACCESS read-only
STATUS mandatory
DESCRIPTION
"An estimate of the time to battery charge depletion under the present load conditions if the utility power is off and remains off, or if it were to be lost and remain off"
 ::= { upsBattery 3 } 



Name	upsEstimatedMinutesRemaining
OID	.1.3.6.1.4.1.186.1.19.2.1.2.3
MIB	TOSHIBAUPS-MIB-ADD
Syntax	PositiveInteger
Access	read-only
Status	mandatory
DefVal	
Indexes	

OID as seen in MIB browser



MIBs that cry out for other MIBs

- ▲ Several 'standard' industry MIBs help define structure of tables, format of data, etc.
- ▲ Manufacturers can import data from a standard MIB when designing their own MIB
- ▲ Reduces the time needed to create an entire MIB from scratch
- ▲ Also reduces the chance of syntax or other errors in the OIDs

IMPORTS

DisplayString, TimeStamp, TimeInterval, TestAndIncr, AutonomousType

FROM SNMPv2-TC

enterprises

FROM RFC1155-SMI

OBJECT-TYPE

FROM RFC-1212

TRAP-TYPE

FROM RFC-1215;

← Imports from Toshiba MIB file

Using SNMP in Broadcast Facility Control – Sacramento Ennes conference 02/12/11

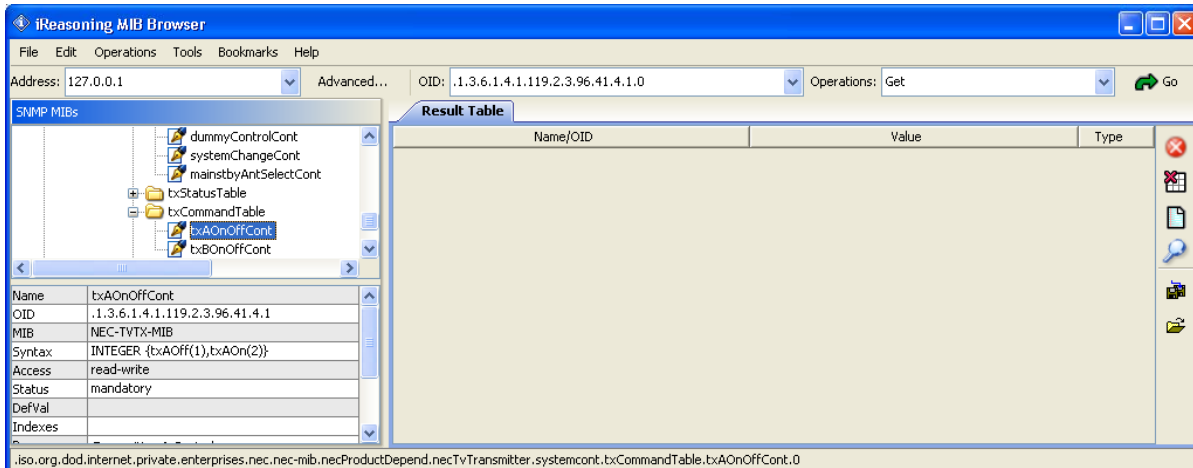


Standard public MIBs

- ▲ Some of the common public MIB files used to create other MIBs
 - RFC-1155, which establishes basic syntax, object types and index structures
 - RFC-1212, type notations
 - SNMPV2-TC, textual conventions and table structures
 - SNMPV2-SMI, defines the Structure of Management Information
 - RFC-1215, updated object types
 - SNMP-FRAMEWORK, definitions and textual conventions

Using SNMP in Broadcast Facility Control – Sacramento Ennes conference 02/12/11

Importance of a MIB browser



The screenshot shows the iReasoning MIB Browser interface. The left pane displays a tree of SNMP MIBs, with 'txAOFFCont' selected. The right pane shows a 'Result Table' with the following data:

Name/OID	Value	Type
txAOFFCont		

Below the table, a detailed view of the selected object is shown:

Name	txAOFFCont
OID	.1.3.6.1.4.1.119.2.3.96.41.4.1
MIB	NEC-TVTX-MIB
Syntax	INTEGER {txAOFF(1),txAOFF(2)}
Access	read-write
Status	mandatory
DefVal	
Indexes	

Using SNMP in Broadcast Facility Control – Sacramento Ennes conference 02/12/11

When data is not just data

- ▲ Manager device sends a GET request, Agent returns a GETRESPONSE
 - both contain the OID for the object
 - Many types of data could be in an Object:
 - Integer
 - Floating point number
 - String
 - OID
 - ▲ So, data returned can be almost any length
 - Data returned in a GETRESPONSE is returned as a variable binding
 - First byte of response data informs Manager of length of data packet

Using SNMP in Broadcast Facility Control – Sacramento Ennes conference 02/12/11



When data is not just data

- ▲ SNMP objects may return data in an atypical form
 - Ex: Indicating the amount of free space on a hard drive
 - Integer 0 – 100 indicating percentage
 - Integer 0 – ? indicating megabytes used
 - Integer 0 – ? indicating blocks used, cylinders.....
 - String
 - OID

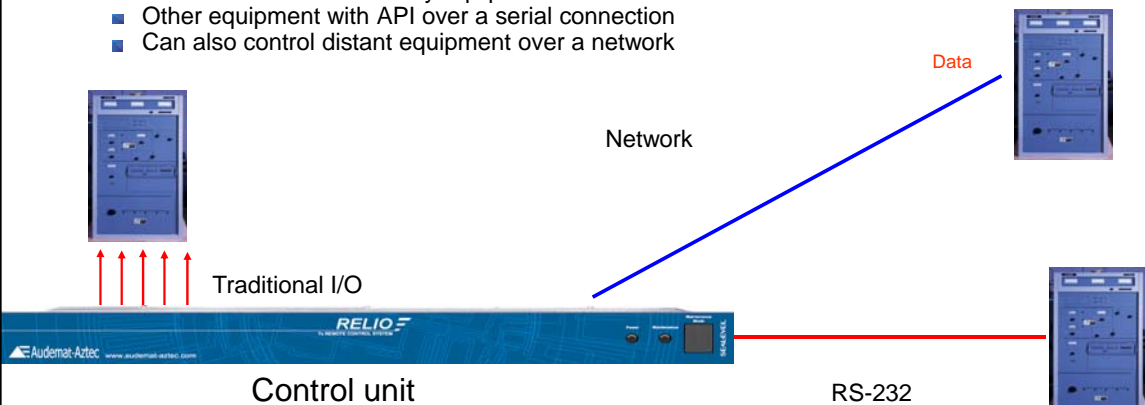
- ▲ So, often it is necessary to shift our perspective, or perform some kind of mathematical manipulation on the data to make it comprehensible and useable in the real world

Using SNMP in Broadcast Facility Control – Sacramento Ennes conference 02/12/11



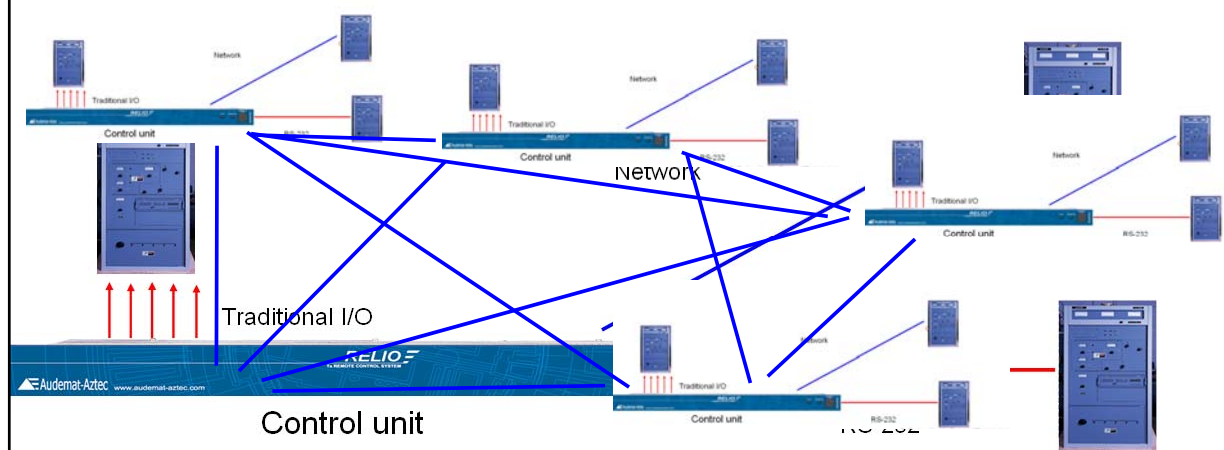
Many paths, many possibilities

- ▲ Using advanced connections – IP and serial
 - One unit can control nearby equipment with traditional I/O
 - Other equipment with API over a serial connection
 - Can also control distant equipment over a network



Using SNMP in Broadcast Facility Control – Sacramento Ennes conference 02/12/11

Many paths, many possibilities



Using SNMP in Broadcast Facility Control – Sacramento Ennes conference 02/12/11



Facility Control Functions
in other equipment

Using SNMP in Broadcast Facility Control – Sacramento Ennes conference 02/12/11



audemat
WorldCast Systems | Group

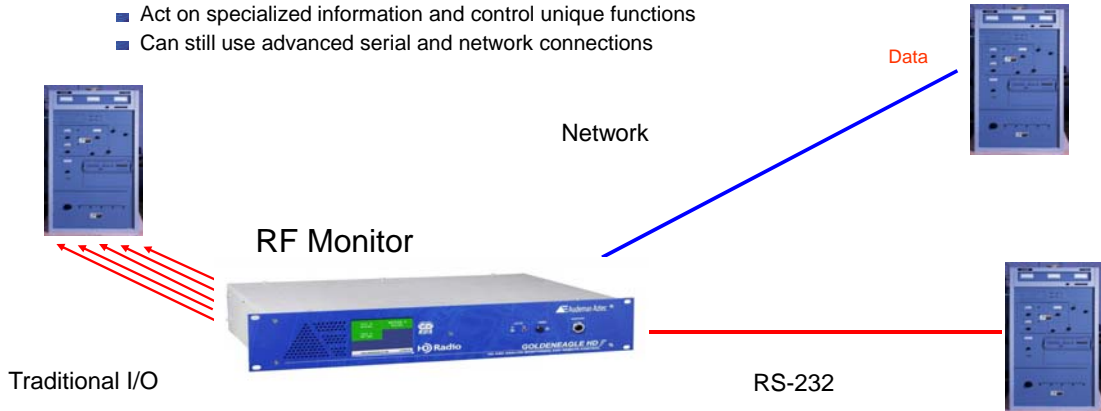
apt | deliver

ecreso | transmit

audemat | monitor

Many paths, many possibilities

- ▲ Facility control device can be integrated into other equipment
 - Save space, energy and \$\$\$
 - Act on specialized information and control unique functions
 - Can still use advanced serial and network connections



Using SNMP in Broadcast Facility Control – Sacramento Ennes conference 02/12/11



audemat
WorldCast Systems | Group

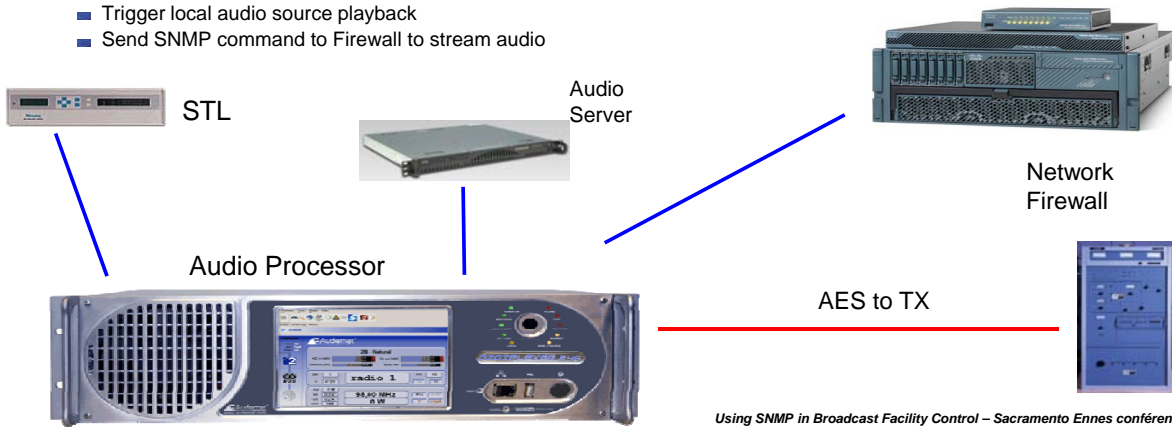
apt | deliver

ecreso | transmit

audemat | monitor

Many paths, many possibilities

- ▲ Facility control integrated into Audio Processor
 - Loss of audio from STL
 - Trigger local audio source playback
 - Send SNMP command to Firewall to stream audio



Using SNMP in Broadcast Facility Control – Sacramento Ennes conference 02/12/11



audemat
WorldCast Systems | Group

apt | deliver

ecreso | transmit

audemat | monitor

EasyLink

▲ Even small devices, or ones with limited traditional I/O connections, can still be powerful parts of a facility control plan



Audio Switcher

Contact closure



ASTRAL Audio Codec



RS-232



Using SNMP in Broadcast Facility Control – Sacramento Ennes conference 02/12/11



audemat
WorldCast Systems | Group

apt | deliver

ecreso | transmit

audemat | monitor



CONCLUSION

Using SNMP in Broadcast Facility Control – Sacramento Ennes conference 02/12/11

■ Connectivity

SNMP
RS-232

■ Ability to make decisions



▲ Do More, with Less

Using SNMP in Broadcast Facility Control – Sacramento Ennes conference 02/12/11



Thank you

▲ Tony Peterle
▲ Technical Support Manager
Worldcast Systems Group, Miami FL
(305) 249-3110
peterle@audemat.com

▲ Thanks also to
▲ Josh Hadden, Clear Channel, New York

Using SNMP in Broadcast Facility Control – Sacramento Ennes conference 02/12/11



audemat
WorldCast Systems | Group

apt | deliver

ecreso | transmit

audemat | monitor



QUESTION AND ANSWER TIME

Using SNMP in Broadcast Facility Control – Sacramento Ennes conference 02/12/11