

AlliedWare Plus™ OS

How To | Configure the Switch and MRTG to Graph Traffic Rates for each VLAN via SNMP using VLAN Statistics

Introduction

This document describes how to monitor the throughput for each VLAN on an x600 series switch. To do this, you utilise the VLAN statistics, and then configure Multi Router Traffic Grapher (MRTG) to query the VLAN statistics Management Information Base (MIB) via Simple Network Management Protocol (SNMP). MRTG can then use the results it obtains to create graphical representations of the traffic throughput over different periods of time.

This solution has several advantages over the previous AlliedWare solution using QoS traffic classes. It is easier to configure the switch and to graph upload and download traffic, and you do not need to place the switch into QoS enhanced mode, which can introduce table size limitations.

Note: VLAN statistics are only supported on the x600 series switches; therefore you cannot use this method to graph traffic rates for VLANs on any other switches. For more information on VLAN statistics, see the “VLAN Statistics” section of the “VLAN Commands” chapter of the Software Reference.

This document assumes that you are already familiar with MRTG. For more information and to download it, see oss.oetiker.ch/mrtg/.

What information will you find in this document?

This How To Note includes the following information:

- "Switch Configuration" on page 3
- "MRTG configuration" on page 6
- "Examples of the graphical results" on page 10

Which products and software version does it apply to?

This How To Note applies to the following Allied Telesis switches running the AlliedWare Plus OS:

- x600 series switches

VLAN statistics are supported on x600 series switches running software version 5.3.3 or later.

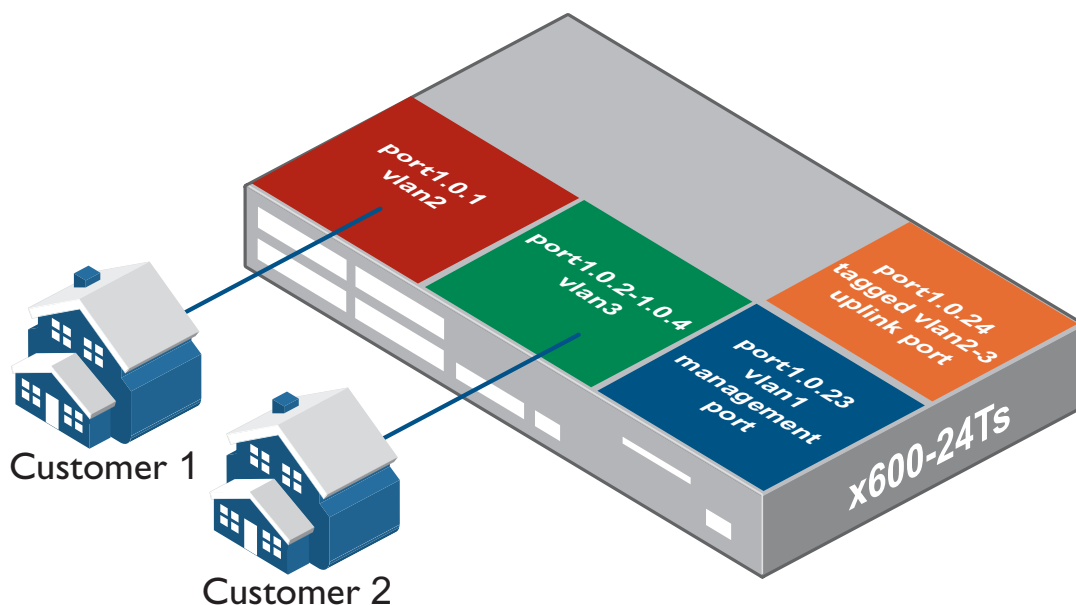
Related How To Notes

You also may find the following How To Notes useful:

- *How To Configure the Switch and MRTG to Graph Traffic Rates for each VLAN via SNMP*

How To Notes are available from www.alliedtelesis.com/resources/literature/howto.aspx.

Example



Switch Configuration

1. Create the customer VLAN

Use the commands:

```
awplus(config)#vlan database
awplus(config-vlan)#vlan 2-3
```

2. Add the customer ports to the customer VLANs

Use the commands:

```
awplus(config)#int port1.0.1
awplus(config-if)#description customer 1 port 1
awplus(config-if)#switchport access vlan 2

awplus(config-if)#int port1.0.2
awplus(config-if)#description customer 2 port 1
awplus(config-if)#switchport access vlan 3

awplus(config-if)#int port1.0.3
awplus(config-if)#description customer 2 port 2
awplus(config-if)#switchport access vlan 3

awplus(config-if)#int port1.0.4
awplus(config-if)#description customer 2 port 3
awplus(config-if)#switchport access vlan 3
```

3. Add the uplink port as a tagged member of the customer VLANs

Use the commands:

```
awplus(config)#int port1.0.24
awplus(config-if)#description uplink port
awplus(config-if)#switchport mode trunk
awplus(config-if)#switchport trunk allowed vlan add 2-3
```

4. Create the VLAN statistics instances on the customer ports for upload traffic

Use the commands:

```
awplus(config)#int port1.0.1
awplus(config-if)#vlan 2 statistics name clu

awplus(config)#int port1.0.2-1.0.4
awplus(config-if)#vlan 3 statistics name c2u
```

Note: Although it is possible to create longer, more meaningful names for VLAN statistics instances, for this example short names have been specified to keep the MRTG configuration as simple as possible. For example, “clu” instead of “customer I upload”.

The SNMP Object Identifier (OID) to use in MRTG for each VLAN statistics instance is comprised of, in this order:

- the base OID for “atVlanStatCollectionIngressOctects”
- a decimal number denoting the number of characters in the name of the VLAN statistics instance
- the ASCII value for each character in the name of the VLAN statistics instance.

Example: For the VLAN statistics name “clu”, the OID will be:

```
atVlanStatCollectionIngressOctects.3.99.49.100
```

3 = Number of characters in the VLAN statistics name

99 = ASCII value of “c”

49 = ASCII value of “l”

100 = ASCII value of “u”

5. Create the VLAN statistics instances on the uplink port for download traffic

Use the commands:

```
awplus(config)#int port1.0.24
awplus(config-if)#vlan 2 statistics name c1d
awplus(config-if)#vlan 3 statistics name c2d
```

6. Configure SNMP

Use the command:

```
awplus(config)#snmp-server community test rw
```

7. Configure the management IP address

Use the commands:

```
awplus(config)#int vlan1
awplus(config-if)#ip address 10.1.1.1/24
```

MRTG configuration

Using cfmaker as a starting point

The simplest way to create the MRTG configuration is to use MRTG's "cfmaker" to create the base template configuration and then edit the configuration file manually to use the SNMP OID. It is not possible to use cfmaker to automatically create the complete config file.

MRTG's cfmaker creates a config script by contacting the router via SNMP and reading particular MIB objects, such as system description, or the number of interfaces. The cfmaker PC must be able to contact the router via its IP address, SNMP must be correctly configured on the router, and you must specify the correct community name in the cfmaker command on the PC.

We used the following cfmaker command:

```
perl cfmaker test@10.1.1.1 --ifref=descr --global "WorkDir: C:\www\mrtg" -
-output mrtg.cfg
```

The resulting config file contains an entry for each interface. Each entry starts with several commented-out lines like the following:

```
### Interface 50 >> Descr: 'port50' | Name: 'port50' | Ip: '' | Eth: '' ###
### The following interface is commented out because:
### * it is operationally DOWN
### * has a speed of 0 which makes no sense
```

There will be an entry created in the configuration template file for every interface on the device, whether it is up or down. Interfaces which are physically or administratively down will display with all attributes commented out.

Modifying the configuration template

After using cfmaker to get a configuration template, you modified the template to use the SNMP OIDs of the VLAN statistics instances, rather than the physical interfaces created by cfmaker. Because the number of entries you need depends on the number of VLAN statistics instances you want to graph, you can delete any automatically generated entries that aren't required, and if more entries are required you can add these manually, provided they follow the same format.

This section contains our modified configuration template, showing which variables you should set in order for MRTG to obtain the VLAN statistics information via SNMP. Any line preceded by "#" is a comment, and is ignored by MRTG.

More information about the syntax is given after the excerpt, in particular about the syntax for the Target and MaxBytes parameters.

```

### Interface 5001 >> Descr: 'Customer1' | Name: 'vlan2' | Ip: '' | Eth: '' ###

Target[10.1.1.1_5001]:
1.3.6.1.4.1.207.8.4.4.3.16.1.2.1.5.3.99.49.117&1.3.6.1.4.1.207.8.4.4.3.16.1.2.1.5.3.99.49
.100:test@10.1.1.1:::2
SetEnv[10.1.1.1_5001]: MRTG_INT_IP="" MRTG_INT_DESCR="port1.0.1"
MaxBytes[10.1.1.1_5001]: 1250000
Title[10.1.1.1_5001]: Traffic Analysis for Customer 1 -- awplus
PageTop[10.1.1.1_5001]: <h1>Traffic Analysis for Customer 1 -- awplus</h1>
    <div id="sysdetails">
        <table>
            <tr>
                <td>System:</td>
                <td>awplus in </td>
            </tr>
            <tr>
                <td>Maintainer:</td>
                <td></td>
            </tr>
            <tr>
                <td>Description:</td>
                <td>port1.0.1 </td>
            </tr>
            <tr>
                <td>ifType:</td>
                <td>vlan</td>
            </tr>
            <tr>
                <td>ifName:</td>
                <td>vlan 2</td>
            </tr>
            <tr>
                <td>Max Speed:</td>
                <td>12.5 MBytes/s</td>
            </tr>
        </table>
    </div>

### Interface 5002 >> Descr: 'Customer2' | Name: 'vlan3' | Ip: '' | Eth: '' ###

Target[10.1.1.1_5002]:
1.3.6.1.4.1.207.8.4.4.3.16.1.2.1.5.3.99.50.117&1.3.6.1.4.1.207.8.4.4.3.16.1.2.1.5.3.99.50
.100:test@10.1.1.1:::2
SetEnv[10.1.1.1_5002]: MRTG_INT_IP="" MRTG_INT_DESCR="port1.0.1"
MaxBytes[10.1.1.1_5002]: 3750000
Title[10.1.1.1_5002]: Traffic Analysis for Customer 2 -- awplus
PageTop[10.1.1.1_5002]: <h1>Traffic Analysis for Customer 2 -- awplus</h1>
    <div id="sysdetails">
        <table>
            <tr>
                <td>System:</td>
                <td>awplus in </td>
            </tr>
            <tr>
                <td>Maintainer:</td>
                <td></td>
            </tr>
            <tr>
                <td>Description:</td>
                <td>customer 2</td>
            </tr>
            <tr>
                <td>ifType:</td>
                <td>vlan</td>
            </tr>
            <tr>
                <td>ifName:</td>
                <td>vlan 3</td>
            </tr>
            <tr>
                <td>Max Speed:</td>
                <td>37.5 MBytes/s</td>
            </tr>
        </table>
    </div>

WorkDir: c:\www\mrtg

```

Explanation of parameters

There are five parameters in the previous excerpt: Target, SetEnv, MaxBytes, Title, and PageTop.

In this file entry, the Title and PageTop parameters set the graphical display descriptions and layout. The SetEnv parameter lets you pass data to a threshold script. We left the SetEnv parameter unchanged from the default.

The Target and MaxBytes parameters are most important. The syntax for these is complex, and is described below.

Caution: The values of these parameters must use the format shown, or the configuration file will not work correctly.

MaxBytes parameter

The syntax is:

```
MaxBytes[switchIPAddress_configurationFileEntry]: MaxPortSpeedInBytes
```

The parameters inside the brackets are automatically generated by cfgmaker, and you do not have to modify them.

The MaxBytes parameter determines the maximum value for the MRTG graph to display. Therefore, if the customer VLAN has more than one port, it is important that you adjust this value so the graph takes the total bandwidth into account.

Set the MaxPortSpeedInBytes parameter value to: (the number of ports in the customer VLAN) x (the maximum speed in bytes of a single port).

Target parameter

The syntax is:

```
Target[switchIPAddress_configurationFileEntry]:SNMP_OID_in&SNMP_OID_out:
SNMPCommunity@switchIPAddress::::SNMPversion
```

The parameters inside the brackets are automatically generated by cfgmaker, and you do not have to modify them.

The SNMP_OID_in and SNMP_OID_out parameters specify the SNMP OIDs that MRTG will query to obtain the “in” traffic (traffic “downloaded”) and the “out” traffic (traffic “uploaded”) respectively.

The SNMP Object Identifier (OID) to use in MRTG for each VLAN statistics instance is comprised of, in this order:

- the base OID for “atVlanStatCollectionIngressOctects”
- a decimal number denoting the number of characters in the name of the VLAN statistics instance
- the ASCII value for each character in the name of the VLAN statistics instance.

Example: For the VLAN statistics name “clu”, the OID will be:

atVlanStatCollectionIngressOctects.3.99.49.100

3 = Number of characters in the VLAN statistics name

99 = ASCII value of “c”

49 = ASCII value of “l”

100 = ASCII value of “u”

You can either manually work out the ASCII representation of the VLAN statistics name, or it can be easier to use an SNMP MIB browser to do a SNMPWALK of the “atVlanStatCollectionIngressOctects” OID once the VLAN statistics names are configured on the switch.

The OID for “atVlanStatCollectionIngressOctects” is as follows:

1.3.6.1.4.1.207.8.4.4.3.16.1.2.1.5

The SNMPCommunity and switchIPAddress parameters are self explanatory, although it is very important to use the correct syntax as shown above.

The SNMPversion parameter must be preceded by five colons, and must always be set to 2.

Examples of the graphical results

Below are samples of the graphical output created by MRTG for the above configuration example. MRTG actually produces output as HTML pages with embedded PNG image files, but the HTML pages look very similar to what is shown below.

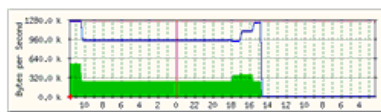
Customer 1

Traffic Analysis for Customer 1 – awplus

System: awplus in
 Maintainer:
 Description: port1.0.1
 ifType: vlan
 ifName: vlan 2
 Max Speed: 12.5 MBytes/s

The statistics were last updated Thursday, 5 November 2009 at 11:43,
 at which time 'awplus' had been up for 2 days, 17:41:04.

'Daily' Graph (5 Minute Average)



	Max	Average	Current
In	549.7 kBs (44.0%)	280.1 kBs (22.4%)	548.8 kBs (43.9%)
Out	1242.1 kBs (99.4%)	971.9 kBs (77.5%)	1242.1 kBs (99.4%)

'Weekly' Graph (30 Minute Average)



	Max	Average	Current
In	548.8 kBs (43.9%)	275.7 kBs (22.1%)	548.8 kBs (43.9%)
Out	1242.1 kBs (99.4%)	962.1 kBs (77.0%)	1242.1 kBs (99.4%)

'Monthly' Graph (2 Hour Average)



	Max	Average	Current
In	328.9 kBs (26.3%)	241.4 kBs (19.3%)	250.2 kBs (20.0%)
Out	1121.4 kBs (89.7%)	875.2 kBs (70.0%)	932.7 kBs (74.6%)

'Yearly' Graph (1 Day Average)



	Max	Average	Current
In	0.0 B/s (0.0%)	0.0 B/s (0.0%)	0.0 B/s (0.0%)
Out	0.0 B/s (0.0%)	0.0 B/s (0.0%)	0.0 B/s (0.0%)

GREEN ### Incoming Traffic in Bytes per Second
 BLUE ### Outgoing Traffic in Bytes per Second

MRTG MULTI ROUTER TRAFFIC GRAPHER
 2.16.2
 Tobias Oetiker -toetiker@oetiker.ch-
 and Dave Rand -dave@bunq.com-

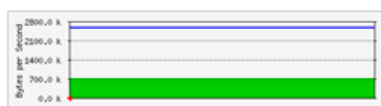
Customer 2

Traffic Analysis for Customer 2 – awplus

System: awplus in
 Maintainer:
 Description: customer 2
 ifType: vlan
 ifName: vlan 3
 Max Speed: 37.5 MBytes/s

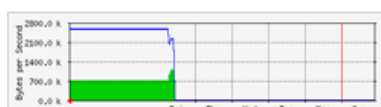
The statistics were last updated Monday, 9 November 2009 at 10:42

'Daily' Graph (5 Minute Average)



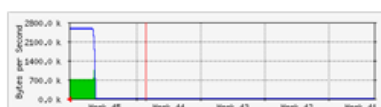
	Max	Average	Current
In	719.1 kB/s (19.2%)	719.1 kB/s (19.2%)	719.1 kB/s (19.2%)
Out	2562.1 kB/s (68.3%)	2562.1 kB/s (68.3%)	2562.1 kB/s (68.3%)

'Weekly' Graph (30 Minute Average)



	Max	Average	Current
In	1098.5 kB/s (29.3%)	735.2 kB/s (19.6%)	719.1 kB/s (19.2%)
Out	2562.1 kB/s (68.3%)	2533.1 kB/s (67.6%)	2562.1 kB/s (68.3%)

'Monthly' Graph (2 Hour Average)



	Max	Average	Current
In	1048.0 kB/s (27.9%)	730.1 kB/s (19.5%)	719.1 kB/s (19.2%)
Out	2562.1 kB/s (68.3%)	2513.9 kB/s (67.0%)	2562.1 kB/s (68.3%)

'Yearly' Graph (1 Day Average)



	Max	Average	Current
In	750.5 kB/s (20.0%)	734.8 kB/s (19.6%)	719.1 kB/s (19.2%)
Out	2562.1 kB/s (68.3%)	2493.8 kB/s (66.5%)	2562.1 kB/s (68.3%)

GREEN === Incoming Traffic in Bytes per Second

BLUE === Outgoing Traffic in Bytes per Second

MRTG MULTI ROUTER TRAFFIC GRAPHER

2.16.2

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