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## **Quality of Service Setup Guide**

(NB6Plus4Wn)

## **NB6Plus4Wn Quality of Service Setup Guide**

The following Quality of Service (QoS) settings offer a basic setup example, setting up 3 devices connecting to an NB6Plus4Wn router, one with the highest priority QoS priority data traffic, one with medium priority QoS priority data traffic and the other with the lowest priority QoS priority data traffic flow. All other data packet traffic through the router assumes a default best effort setting.

Quality of Service refers to the reservation of bandwidth resources on the Nb6Plus4Wn router to provide different priorities to different applications, users, or data flows, or to guarantee a certain level of performance to a data flow.

In this implementation Quality of Service employs DSCP – Differentiated Services Code Point – a computer networking architecture that specifies a simple, scalable and coarse-grained mechanism for classifying, managing network traffic.

This example guide sets up QoS with three devices (VoIP ATA, gaming console and laptop) connecting via ethernet cable and via wireless to the NB6Plus4Wn router. Before Quality of Service can be implemented the first step involves reserving an IP address for each device linking the MAC address of each device to each IP address.

## QoS Setup Part 1: Reserving an IP address

It is necessary to reserve an IP address for a device that is connecting to the NB6Plus4Wn router so that the QoS settings can manage each device and set data packet traffic priority by MAC and IP address.

1. Navigate to <http://192.168.1.1> in a web browser.
2. Enter 'admin' (without quotes) for both the username and password and click Ok.
3. Select **Advanced** > **Local Network** > **DHCP Server**.

4. Press the Reserved IP Address List button.

5. Enter the MAC address of the computer/device you are connecting to the router. The MAC address is a 12 character set of numbers and letters (A-F), with every 2 characters separated by a colon.
6. Enter the IP address of the computer/device. This is the local address in the range of 192.168.1.x where x = 2 to 254.

http://192.168.1.1/dhcpmacflt.html - Windows Internet E...

http://192.168.1.1/dhcpmacflt.html

**Add a new reserved IP address entry**

PC's MAC Address:  
(e.g., 00:90:96:01:2A:3B)

Assigned IP Address:  
(e.g., 192.168.1.2)

00:1A:92:11:52:B5

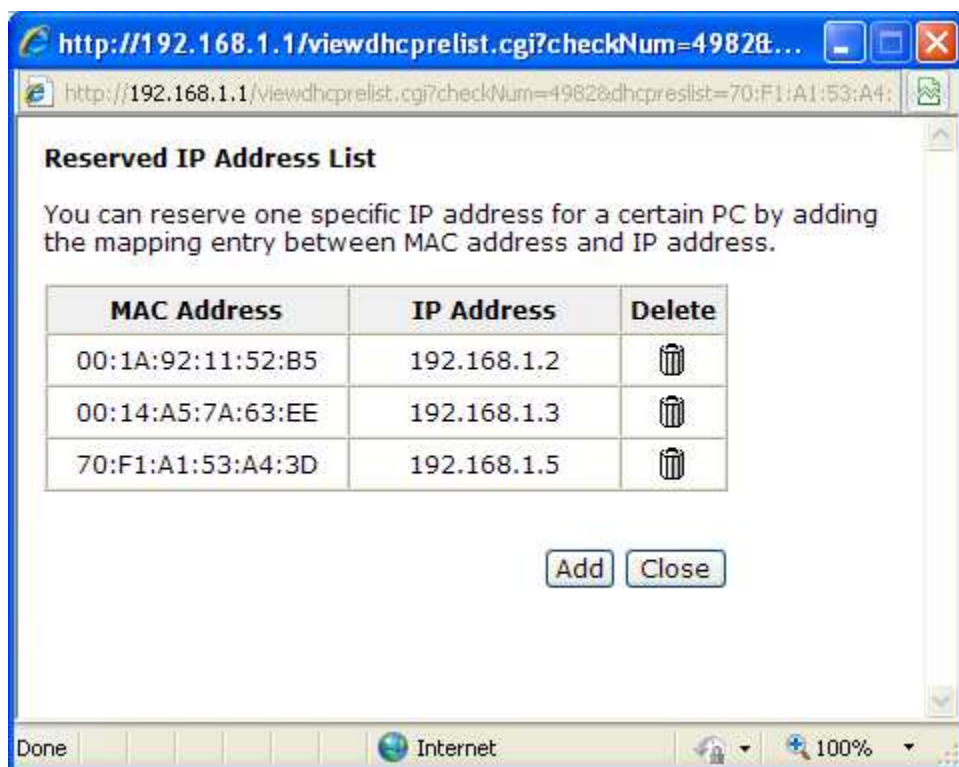
192.168.1.2

< Back Apply

Done Internet 100%


7. Press the Apply button.


8. Complete steps 4 through 7 for each device connected to the NB6 series router. Each entry will be listed in the Static IP Lease List as shown below.





## Quality of Service (QoS) Setup: Part 2 QoS Configuration Settings


9. Select Advanced > Quality of Service
10. Select "**Enabled**" checkbox.
11. Select the **Default Differentiated Service Code Point (DSCP)** as **BE (0x00)** (Best Effort).




 Quick Start

 Status

 **Advanced**

 Wireless

 Management

Language: English ▼

Local Network

Internet

IP Routing

Virtual Server

NAT ALG

Firewall

**Quality of Service**

Queue Configuration

Traffic Classification

Port Mapping

Quality of Service

To exploit the Quality of Service function provided by this device, you need to enable QoS first and create queues which are associated with egress interface and transmission priority. Then you can classify the packets from ingress interfaces by configuring various classification criteria. If the packets match all of the specified criteria, they will be transmitted in priority through egress interface which are defined in specified queue.

Quality of Service:

☐ Disabled ☒ Enabled

Apply Cancel

Default DiffServ Codepoint(DSCP):

BE - 0x00 ▼

Default DSCP is used to overwrite the corresponding DSCP value of all egress packets that do not match any classification rules. If the Auto Marking is selected, the DSCP value will be marked according to 802.1p value.

Queue Configuration

Those queues configured here will be used by traffic classification rules to place packets from ingress interfaces appropriately. Lower numbers of queue priority imply higher transmission priority.

Queue ID	Egress Interface	Queue Priority	Edit
<div>Add</div>			

12. Press the Apply button.

## High Priority QoS Queue Configuration

13. Select **Advanced** > **Quality of Service** > **Queue Configuration**.
14. Press the **Add** button.

The screenshot shows the NetComm web interface. At the top, the NetComm logo is on the left, and navigation tabs (Quick Start, Status, Advanced, Wireless, Management) are in the center. The 'Advanced' tab is selected. On the right, there is a 'Language: English' dropdown. On the left side, a sidebar menu lists various settings: Local Network, Internet, IP Routing, Virtual Server, NAT ALG, Firewall, Quality of Service (selected), Queue Configuration (selected), Traffic Classification, and Port Mapping. The main content area is titled 'Add New QoS Queue' and contains the following fields:

- Queue ID: 9
- Queue Status: ☐ Disabled ☒ Enabled
- Egress Interface: pppoa\_0\_100\_1 (dropdown menu)
- Queue Priority: 1 (Highest) (dropdown menu)

Below the Queue Priority field, there is a note: 'Lower numbers imply higher transmission priority.' At the bottom of the form are two buttons: '< Back' and 'Apply'.

At the bottom left of the sidebar, the following information is displayed:

Firmware: 3.103z  
ADSL2+ : A2pB025c.d20h  
Wireless : 4.174.64.12

15. Set the **Queue Status** to Enabled.
16. Set the **Egress Interface** as pppoa\_0\_100\_1 if you are in New Zealand or pppoe\_8\_35\_1 if you are in Australia.
17. Set the **Queue Priority** to 1(Highest).
18. Press the **Apply** button.

## Medium Priority QoS Queue Configuration

19. Select **Advanced** > **Quality of Service** > **Queue Configuration**.
20. Press the **Add** button.

The screenshot shows the NetComm router's web interface. At the top, the NetComm logo is on the left, and navigation tabs for Quick Start, Status, Advanced (selected), Wireless, and Management are on the right. Below the tabs is a language dropdown set to English. On the left side, a sidebar menu lists various settings: Local Network, Internet, IP Routing, Virtual Server, NAT ALG, Firewall, Quality of Service (selected), Queue Configuration (selected), Traffic Classification, and Port Mapping. The main content area is titled 'Add New QoS Queue' and contains the following fields: Queue ID (10), Queue Status (radio buttons for Disabled and Enabled, with Enabled selected), Egress Interface (a dropdown menu showing 'pppoa\_0\_100\_1'), and Queue Priority (a dropdown menu showing '2'). A note next to the priority field states 'Lower numbers imply higher transmission priority.' At the bottom of the form are '< Back' and 'Apply' buttons. In the bottom left corner of the sidebar, the following information is displayed: Firmware: 3.103z, ADSL2+: A2pB025c.d20h, and Wireless: 4.174.64.12.

NetComm

Quick Start | Status | **Advanced** | Wireless | Management

Language: English

**Local Network**  
**Internet**  
**IP Routing**  
**Virtual Server**  
**NAT ALG**  
**Firewall**  
**Quality of Service**  
    **Queue Configuration**  
    Traffic Classification  
**Port Mapping**

Firmware: 3.103z  
ADSL2+: A2pB025c.d20h  
Wireless: 4.174.64.12

**Add New QoS Queue**

Queue ID: 10

Queue Status: ☐ Disabled ☒ Enabled

Egress Interface: pppoa\_0\_100\_1

Queue Priority: 2 Lower numbers imply higher transmission priority.

< Back Apply

**WARNING:**  
Router's settings are  
changed. New settings  
are only valid after  
restarting router.







21. Set the **Queue Status** to Enabled.
22. Set the **Egress Interface** as pppoa\_0\_100\_1 if you are in New Zealand or ppoe\_8\_35\_1 if you are in Australia.
23. Set the **Queue Priority** to 2.
24. Press the **Apply** button.



## Low Priority QoS Queue Configuration

25. Select **Advanced** > **Quality of Service** > **Queue Configuration**.

26. Press the **Add** button.



Quick Start : Status : **Advanced** : Wireless : Management

Language: English ▼

**Local Network**  
**Internet**  
**IP Routing**  
**Virtual Server**  
**NAT ALG**  
**Firewall**  
**Quality of Service**  
Queue Configuration  
Traffic Classification  
Port Mapping

### Add New QoS Queue

Queue ID: 11

Queue Status: ☐ Disabled ☒ Enabled

Egress Interface:

Queue Priority:  Lower numbers imply higher transmission priority.

Firmware: 3.103z  
ADSL2+ : A2pB025c.d20h  
Wireless : 4.174.64.12

**WARNING:**  
Router's settings are  
changed. New settings  
are only valid after  
restarting router.


27. Set the **Queue Status** to Enabled.






28. Set the **Egress Interface** as pppoa\_0\_100\_1 if you are in New Zealand or pppoe\_8\_35\_1 if you are in Australia.

29. Set the **Queue Priority** to 3.

30. Press the **Apply** button.

You should now have three fields in the Queue Configuration table under Advanced > Quality of Service > Queue Configuration similar to the screenshot below.





Quick Start : Status : **Advanced** : Wireless : Management

Language: English

Local Network

Internet

IP Routing

Virtual Server

NAT ALG

Firewall

Quality of Service

Queue Configuration

Traffic Classification

Port Mapping

Firmware: 3.103z

ADSL2+ : A2pB025c.d20h

Wireless : 4.174.64.12

**WARNING:**

Router's settings are changed. New settings are only valid after [restarting router.](#)

### Quality of Service

To exploit the Quality of Service function provided by this device, you need to enable QoS first and create queues which are associated with egress interface and transmission priority. Then you can classify the packets from ingress interfaces by configuring various classification criteria. If the packets match all of the specified criteria, they will be transmitted in priority through egress interface which are defined in specified queue.

Quality of Service:

☐ Disabled ☒ Enabled

Apply Cancel







Default DiffServ Codepoint(DSCP):

BE - 0x00

Default DSCP is used to overwrite the corresponding DSCP value of all egress packets that do not match any classification rules. If the Auto Marking is selected, the DSCP value will be marked according to 802.1p value.

### Queue Configuration

Those queues configured here will be used by traffic classification rules to place packets from ingress interfaces appropriately. Lower numbers of queue priority imply higher transmission priority.

Queue ID	Egress Interface	Queue Priority	Edit
9	pppoa_0_100_1	1 (Highest)	 
10	pppoa_0_100_1	2	 
11	pppoa_0_100_1	3	 

Done

Internet

100%

## High Priority QoS Classification

31. Select **Advanced** > **Quality of Service** > **Traffic Classification**.
32. Press the **Add** button.

**NetComm** Quick Start | Status | **Advanced** | Wireless | Management

Language: English

**Local Network**  
Internet  
IP Routing  
Virtual Server  
NAT ALG  
Firewall  
Quality of Service  
Queue Configuration  
Traffic Classification  
Port Mapping

**Modify Traffic Classification Rule**

All of specified criteria must be matched for the rule to take effect.

Rule Name: VoIP\_ATA\_High\_Priority

Rule Order: 1

Queue Status: ☐ Disabled ☒ Enabled

Classified Packets: ☐ Bridge Layer ☒ IP Layer

**Classification Criteria**

Ingress Interfaces (Packets come from): ☒ Ethernet ☒ Wireless

Source MAC Address: 00:1a:92:11:52:b5 MAC Mask:

Destination MAC Address: MAC Mask:

Protocol: UDP

Source IP Address: 192.168.1.2 Subnet Mask: 255.255.255.0

Source Port (start-end): -

Destination IP Address: Subnet Mask:

Destination Port (start-end): -

DiffServ Codepoint (DSCP): EF - 0xb8

**Classification Result**

Queue ID: 9: pppoa\_0\_100\_1 Priority: 1 (Highest)

DiffServ Class (DSCP): EF - 0xb8

WAN 802.1p: 5

**WARNING!**  
Router's settings are changed.  
New settings are only valid  
after restarting router.

< Back Apply

Done Internet 75%

33. Enter a **Rule Name** reflecting the High Priority QoS rule; eg. **VoIP\_ATA\_High\_Priority**.

34. Leave the **Rule Order** as **Last**, set the **Queue Status** to **Enable**, set **Classified Packets** as **IP Layer**.
35. Set the **Ingress Interfaces** according to how the device connects to the router. In the example above **Ethernet** and **Wireless** are selected.
36. Enter the **Source MAC Address** of the device, the unique 12 character signature with every 2 characters separated by a colon(:), that you previously entered to reserve the device's IP address.
39. Enter the **Source MAC Mask** of the device if required. If not required or if you are unsure leave the field blank.
40. Enter a **Destination MAC Address** if the connection is to a single device. This is useful for VPN connections. If you wish the destination MAC address to be any address leave the field blank.
41. Enter the **Protocol** from the options of TCP, UDP, ICMP, AH, ESP, GRE or User Defined.
42. Enter the **Source IP Address** of the device that you previously entered into the Static IP Lease List, in the range of 192.168.1.x In the example above the IP address is 192.168.1.2.
43. Enter the **Source Subnet Mask** as 255.255.255.0.
37. Enter the **Source Start and End Port Number(s)**. If the port is a single port enter the same port number in both fields. If you wish to use any port leave these fields blank.
38. Enter a **Destination IP Address** if the connection is to a single device. This is useful for VPN connections. If you wish the destination IP address to be any address leave the field blank.
39. Enter a **Destination Subnet Mask** if you have entered a Destination MAC address and Destination IP address. This would normally be 255.255.255.0 unless your system administrator advises otherwise. If you have not entered a Destination MAC or IP address leave the field blank.
40. Set the **Differentiated Service Code Point (DSCP) Check** to **EF(101110)**. EF stands for expedited forwarding and is ideal for VoIP or video data packets
41. Set "**Queue ID**" to Priority 1 (in the example above 9 pppoa\_0\_100\_1 Priority 1(Highest)). Other options or priority 2 and 3. Priority 1 gives the highest priority with priority 3 being the lowest.
42. Set **Mark Differentiated Service Code Point (DSCP)** as **EF(0xB8)**.
43. Set **WAN 802.1p Priority** as **5** and press Apply. In the scale 0-7, 0 is best effort, 6 and 7 are reserved for networking performance so set 5 as the highest priority.

## Medium Priority QoS Classification

44. Select **Advanced** > **Quality of Service** > **Traffic Classification**.
45. Press the **Add** button.

**NetComm** Quick Start | Status | **Advanced** | Wireless | Management

Language: English

**Local Network**  
Internet  
IP Routing  
Virtual Server  
NAT ALG  
Firewall  
Quality of Service  
Queue Configuration  
Traffic Classification  
Port Mapping

**Add New Traffic Classification Rule**

All of specified criteria must be matched for the rule to take effect.

Rule Name:

Rule Order:

Queue Status: ☐ Disabled ☒ Enabled

Classified Packets: ☐ Bridge Layer ☒ IP Layer

**Classification Criteria**

Ingress Interfaces (Packets come from): ☒ Ethernet ☒ Wireless

Source MAC Address:  MAC Mask:

Destination MAC Address:  MAC Mask:

Protocol:

Source IP Address:  Subnet Mask:

Source Port (start-end):  -

Destination IP Address:  Subnet Mask:

Destination Port (start-end):  -

DiffServ Codepoint (DSCP):

**Classification Result**

Queue ID:

DiffServ Class (DSCP):

WAN 802.1p:

The corresponding DSCP value in the IP header of the outgoing packets can be overwritten by selected value.  
If 802.1q VLAN tagging is enabled on Internet connection, WAN 802.1p value of the upstream packets can be overwritten by selected value.

**WARNING:**  
Router's settings are changed.  
New settings are only valid after restarting router.

Done Internet 75%

46. Enter a **Rule Name** reflecting the High Priority QoS rule; eg. **Games\_Console\_High\_Priority**.

47. Leave the **Rule Order** as **Last**, set the **Queue Status** to **Enable**, set **Classified Packets** as **IP Layer**.
48. Set the **Ingress Interfaces** according to how the device connects to the router. In the example above **Ethernet** and **Wireless** are selected.
49. Enter the **Source MAC Address** of the device, the unique 12 character signature with every 2 characters separated by a colon(:), that you previously entered to reserve the device's IP address.
44. Enter the **Source MAC Mask** of the device if required. If not required or if you are unsure leave the field blank.
45. Enter a **Destination MAC Address** if the connection is to a single device. This is useful for VPN connections. If you wish the destination MAC address to be any address leave the field blank.
46. Enter the **Protocol** from the options of TCP, UDP, ICMP, AH, ESP, GRE or User Defined.
47. Enter the **Source IP Address** of the device that you previously entered into the Static IP Lease List, in the range of 192.168.1.x In the example above the IP address is 192.168.1.4.
48. Enter the **Source Subnet Mask** as 255.255.255.0.
50. Enter the **Source Start and End Port Number(s)**. If the port is a single port enter the same port number in both fields. If you wish to use any port leave these fields blank.
51. Enter a **Destination IP Address** if the connection is to a single device. This is useful for VPN connections. If you wish the destination IP address to be any address leave the field blank.
52. Enter a **Destination Subnet Mask** if you have entered a Destination MAC address and Destination IP address. This would normally be 255.255.255.0 unless your system administrator advises otherwise. If you have not entered a Destination MAC or IP address leave the field blank.
53. Set the **Differentiated Service Code Point (DSCP) Check** to **AF32(0x70)**. AF stands for assured forwarding.
54. Set "**Queue ID**" to Priority **2** (in the example above 10 pppoa\_0\_100\_1 Priority 2). Other options or priority 1 and 3. Priority 1 gives the highest priority with priority 3 being the lowest.
55. Set **Mark Differentiated Service Code Point (DSCP)** as **AF32(0x70)**.
- 56.
57. Set **WAN 802.1p Priority** as **3** and press Apply. In the scale 0-7, 0 is best effort, 6 and 7 are reserved for networking performance so set 5 as the highest priority.



## Low Priority QoS Classification

58. Select **Advanced** > **Quality of Service** > **Traffic Classification**.
59. Press the **Add** button.

**NetComm** Quick Start | Status | **Advanced** | Wireless | Management

Language: English

Local Network  
Internet  
IP Routing  
Virtual Server  
NAT ALG  
Firewall  
Quality of Service  
Queue Configuration  
Traffic Classification  
Port Mapping

### Add New Traffic Classification Rule

All of specified criteria must be matched for the rule to take effect.

Rule Name:

Rule Order:

Queue Status: ☐ Disabled ☒ Enabled

Classified Packets: ☐ Bridge Layer ☒ IP Layer

#### Classification Criteria

Ingress Interfaces (Packets come from): ☒ Ethernet ☒ Wireless

Source MAC Address:  MAC Mask:

Destination MAC Address:  MAC Mask:

Protocol:

Source IP Address:  Subnet Mask:

Source Port (start-end):  -

Destination IP Address:  Subnet Mask:

Destination Port (start-end):  -

DiffServ Codepoint (DSCP):

#### Classification Result

Queue ID:

DiffServ Class (DSCP):  The corresponding DSCP value in the IP header of the outgoing packets can be overwritten by selected value. If 802.1q VLAN tagging is enabled on Internet connection, WAN 802.1p value of the upstream packets can be overridden by selected value.

WAN 802.1p:

Warning: Router's settings are changed. New settings are only valid after restarting router.

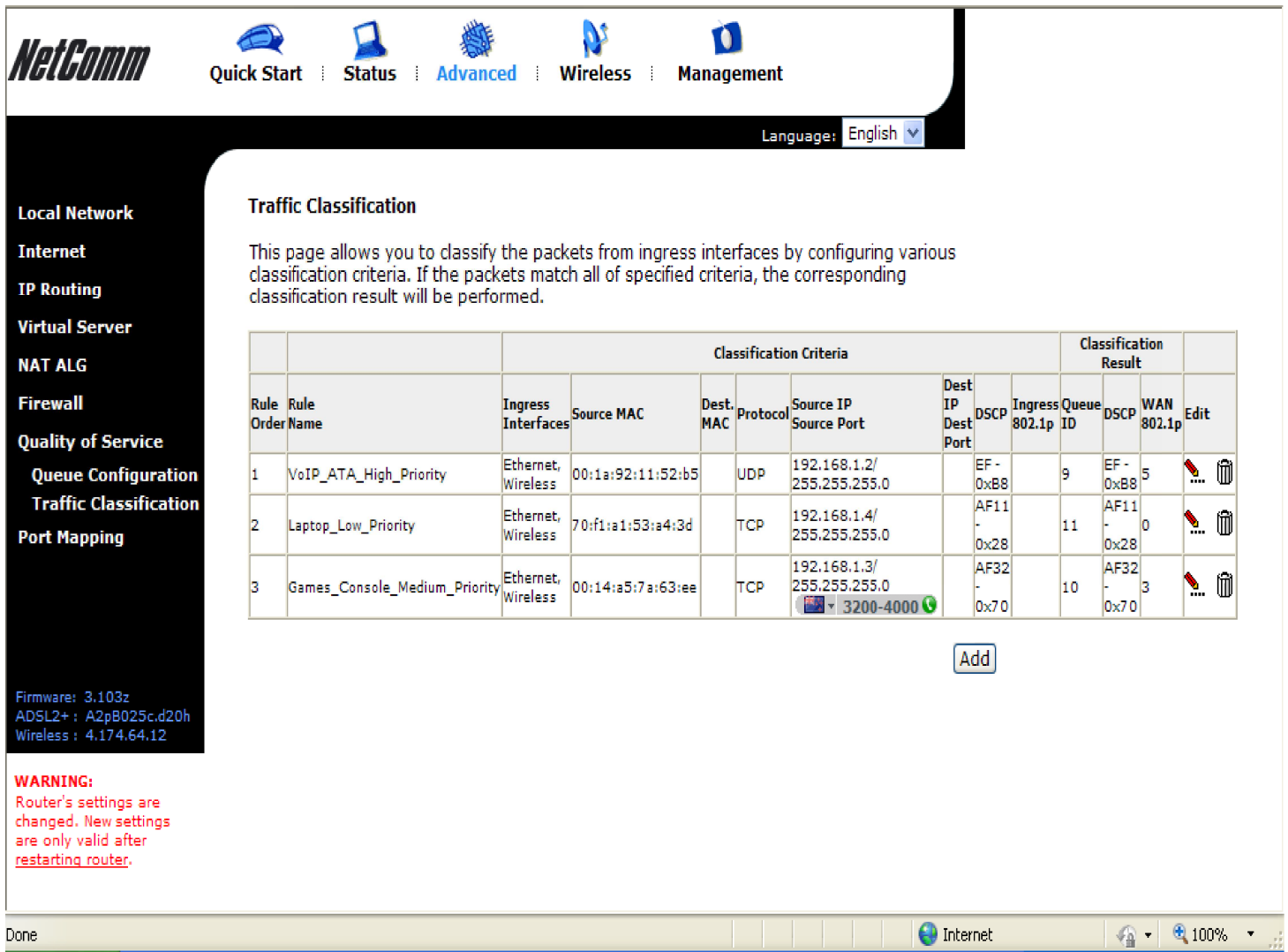
Done Internet 75%

60. Enter a **Rule Name** reflecting the High Priority QoS rule; eg. **Laptop\_Low\_Priority**.

61. Leave the **Rule Order** as **Last**, set the **Queue Status** to **Enable**, set **Classified Packets** as **IP Layer**.
62. Set the **Ingress Interfaces** according to how the device connects to the router. In the example above **Ethernet** and **Wireless** are selected.
63. Enter the **Source MAC Address** of the device, the unique 12 character signature with every 2 characters separated by a colon(:), that you previously entered to reserve the device's IP address.
49. Enter the **Source MAC Mask** of the device if required. If not required or if you are unsure leave the field blank.
50. Enter a **Destination MAC Address** if the connection is to a single device. This is useful for VPN connections. If you wish the destination MAC address to be any address leave the field blank.
51. Enter the **Protocol** from the options of TCP, UDP, ICMP, AH, ESP, GRE or User Defined.
52. Enter the **Source IP Address** of the device that you previously entered into the Static IP Lease List, in the range of 192.168.1.x In the example above the IP address is 192.168.1.4.
53. Enter the **Source Subnet Mask** as 255.255.255.0.
64. Enter the **Source Start and End Port Number(s)**. If the port is a single port enter the same port number in both fields. If you wish to use any port leave these fields blank.
65. Enter a **Destination IP Address** if the connection is to a single device. This is useful for VPN connections. If you wish the destination IP address to be any address leave the field blank.
66. Enter a **Destination Subnet Mask** if you have entered a Destination MAC address and Destination IP address. This would normally be 255.255.255.0 unless your system administrator advises otherwise. If you have not entered a Destination MAC or IP address leave the field blank.
67. Set the **Differentiated Service Code Point (DSCP) Check** to **AF11(0x28)**.
68. Set "**Queue ID**" to Priority **3**, the lowest(in the example above 10 pppoa\_0\_100\_1 Priority 3). Other options or priority 1 and 3. Priority 1 gives the highest priority with priority 3 being the lowest.
69. Set **Mark Differentiated Service Code Point (DSCP)** as **AF11(0x28)**.
70. Set **WAN 802.1p Priority** as **3** and press Apply. In the scale 0-7, 0 is best effort, 6 and 7 are reserved for networking performance so set 5 as the highest priority.



71. You are now three QoS queue classification entries on the router at Advanced > Quality of Service > Traffic Classification similar to the screenshot below.



**NetComm** Quick Start | Status | **Advanced** | Wireless | Management

Language: English

**Local Network**  
**Internet**  
**IP Routing**  
**Virtual Server**  
**NAT ALG**  
**Firewall**  
**Quality of Service**  
    Queue Configuration  
    **Traffic Classification**  
**Port Mapping**

**Traffic Classification**

This page allows you to classify the packets from ingress interfaces by configuring various classification criteria. If the packets match all of specified criteria, the corresponding classification result will be performed.

Rule Order	Rule Name	Classification Criteria							Classification Result			Edit	
		Ingress Interfaces	Source MAC	Dest. MAC	Protocol	Source IP Source Port	Dest IP Dest Port	DSCP	Ingress 802.1p	Queue ID	DSCP		WAN 802.1p
1	VoIP_ATA_High_Priority	Ethernet, Wireless	00:1a:92:11:52:b5		UDP	192.168.1.2/ 255.255.255.0		EF - 0xB8		9	EF - 0xB8	5	
2	Laptop_Low_Priority	Ethernet, Wireless	70:f1:a1:53:a4:3d		TCP	192.168.1.4/ 255.255.255.0		AF11 - 0x28		11	AF11 - 0x28	0	
3	Games_Console_Medium_Priority	Ethernet, Wireless	00:14:a5:7a:63:ee		TCP	192.168.1.3/ 255.255.255.0		AF32 - 0x70		10	AF32 - 0x70	3	

**Add**

Firmware: 3.103z  
ADSL2+: A2pB025c.d20h  
Wireless: 4.174.64.12

**WARNING:**  
Router's settings are changed. New settings are only valid after restarting router.

Done Internet 100%

72. Select the Restarting Router option at the bottom left of the screen or select **Management > Reset Router** and press the reboot button to reboot the router and complete the QoS setup.