



NetCommWireless

Quality of Service (QoS) Setup Guide (NB604n)

NB604n and Quality of Service (QoS)

The following Quality of Service (QoS) settings offer a basic setup example, setting up 2 devices connecting to an NB604n router, one with the highest 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 NB604n router to provide different priorities to different applications, users, or data flows, or to guarantee a certain level of performance to a data flow.

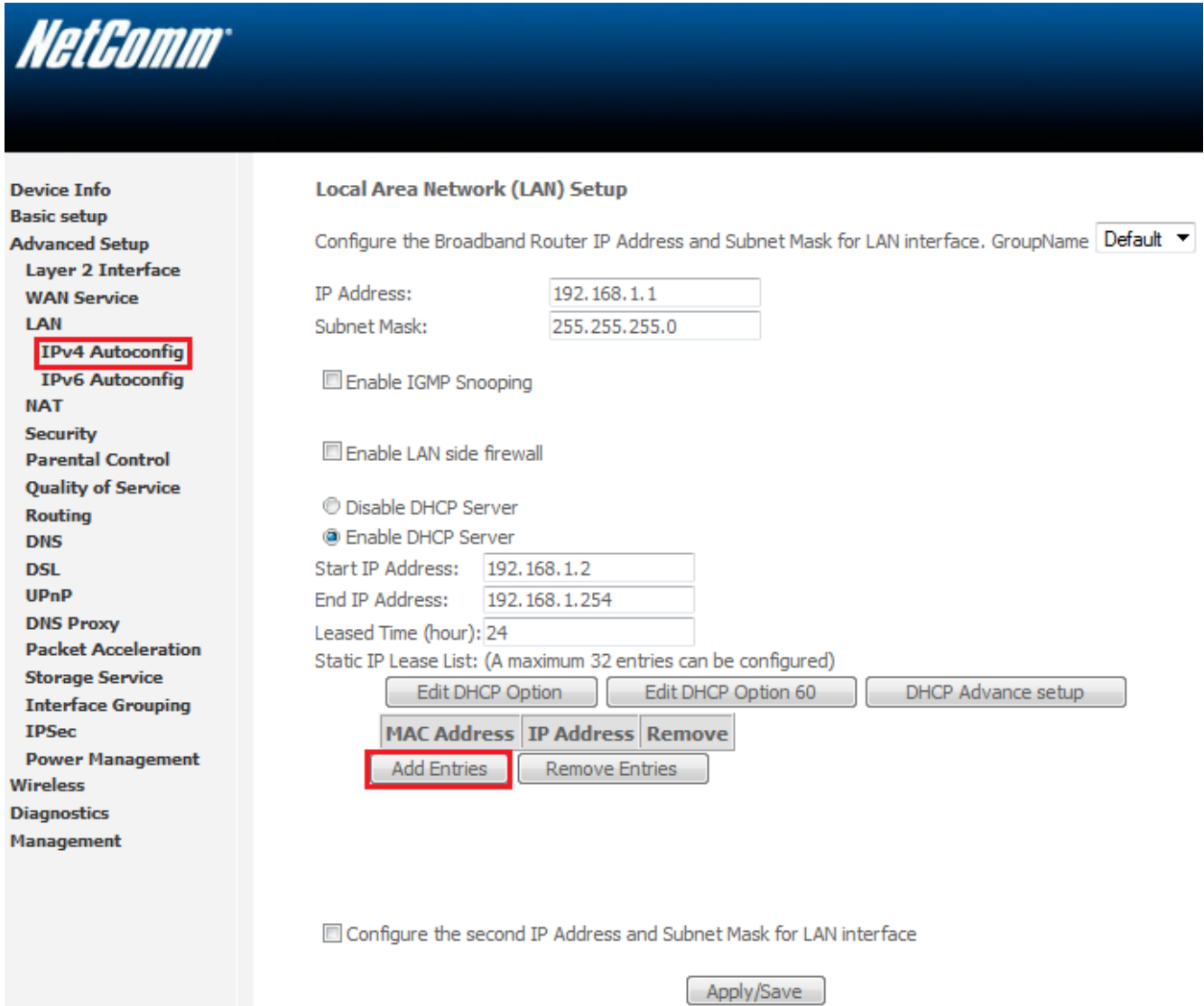
In this implementation Quality of Service employs DSCP – Differentiated Services Code Point – a computer networking architecture that specifies a simple, scalable and coarse-grained mechanism for classifying, managing network traffic.

This example guide sets up QoS with two devices (PC and laptop) connecting via ethernet cable to an NB604n router. One device (PC) is assigned high priority traffic while the other device (laptop) is assigned a low priority. 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.

Quality of Service (QoS) Setup: Part 1 Reserve IP addresses

It is necessary to reserve an IP address for a device that is connecting to the NB604n router so that the QoS settings can manage each device and set data packet traffic priority by MAC and IP address.

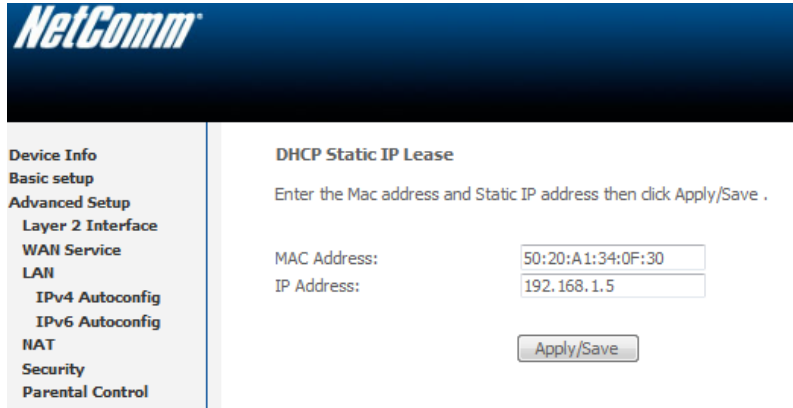
1. Navigate to <http://192.168.1.1> in a web browser.
2. Enter 'admin' (without quotes) for both the username and password and click Ok.
3. Select **Advanced** > **LAN** > **IPv4 Autoconfig**.



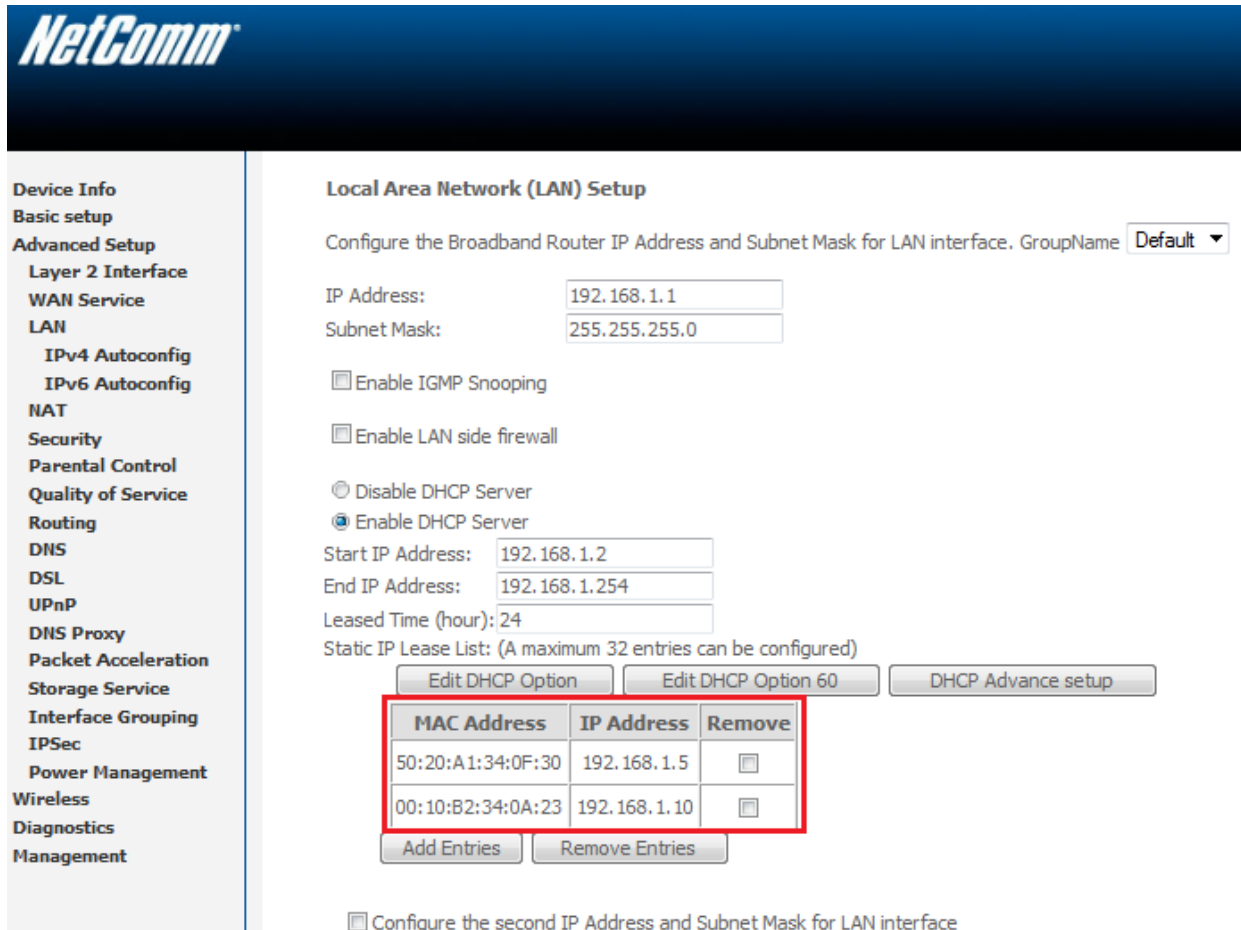
The screenshot shows the NetComm router's web interface. The left sidebar contains a navigation menu with the following items: Device Info, Basic setup, Advanced Setup, Layer 2 Interface, WAN Service, LAN, IPv4 Autoconfig (highlighted with a red box), IPv6 Autoconfig, NAT, Security, Parental Control, Quality of Service, Routing, DNS, DSL, UPnP, DNS Proxy, Packet Acceleration, Storage Service, Interface Grouping, IPsec, Power Management, Wireless, Diagnostics, and Management. The main content area is titled "Local Area Network (LAN) Setup" and includes a dropdown menu for "GroupName" set to "Default". Below this, there are input fields for "IP Address" (192.168.1.1) and "Subnet Mask" (255.255.255.0). There are several checkboxes: "Enable IGMP Snooping" (unchecked), "Enable LAN side firewall" (unchecked), "Disable DHCP Server" (selected), and "Enable DHCP Server" (selected). Below these are input fields for "Start IP Address" (192.168.1.2), "End IP Address" (192.168.1.254), and "Leased Time (hour):" (24). A section for "Static IP Lease List: (A maximum 32 entries can be configured)" contains buttons for "Edit DHCP Option", "Edit DHCP Option 60", and "DHCP Advance setup". Below this is a table with columns "MAC Address", "IP Address", and "Remove". The "Add Entries" button is highlighted with a red box. At the bottom, there is a checkbox for "Configure the second IP Address and Subnet Mask for LAN interface" and an "Apply/Save" button.

4. Click the **Add Entries** button.

- 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.
- 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.



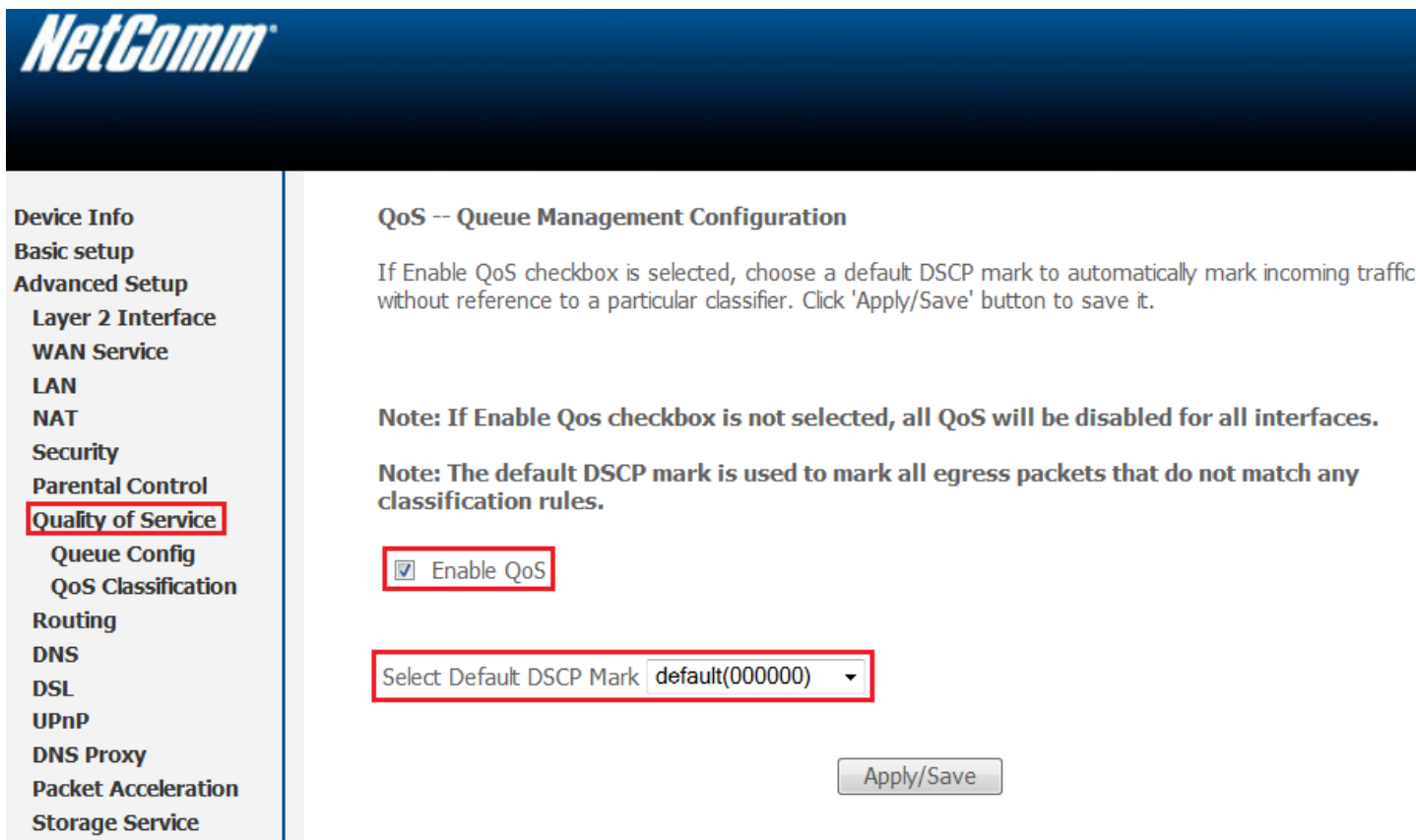
- Click the **Apply/Save** button.
- Complete steps 4 through 7 for each device connected to the NB604n router. Each entry will be listed in the Static IP Lease List as shown below.



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

The following guide shows how to setup 2 devices to an NB604n router, one with high priority QoS, one with low priority QoS.

9. Select **Advanced Setup > Quality of Service**

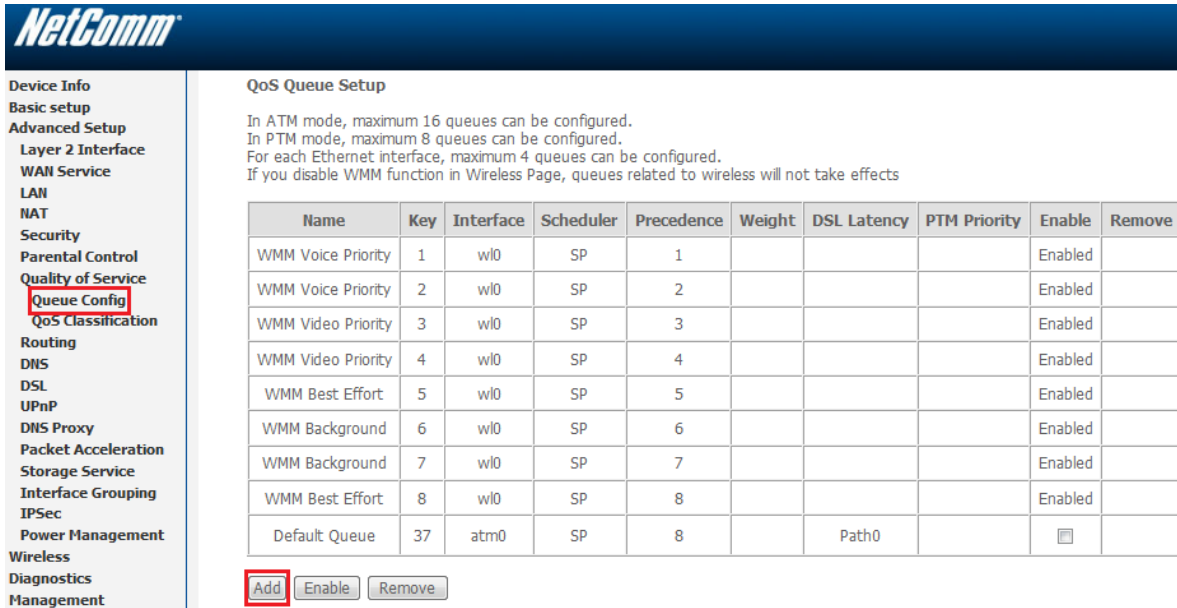


The screenshot shows the NetComm router configuration interface. On the left is a navigation menu with the following items: Device Info, Basic setup, Advanced Setup, Layer 2 Interface, WAN Service, LAN, NAT, Security, Parental Control, Quality of Service (highlighted with a red box), Queue Config, QoS Classification, Routing, DNS, DSL, UPnP, DNS Proxy, Packet Acceleration, and Storage Service. The main content area is titled "QoS -- Queue Management Configuration". It contains the following text: "If Enable QoS checkbox is selected, choose a default DSCP mark to automatically mark incoming traffic without reference to a particular classifier. Click 'Apply/Save' button to save it." Below this are two notes: "Note: If Enable QoS checkbox is not selected, all QoS will be disabled for all interfaces." and "Note: The default DSCP mark is used to mark all egress packets that do not match any classification rules." There is a checkbox labeled "Enable QoS" which is checked and highlighted with a red box. Below it is a dropdown menu labeled "Select Default DSCP Mark" with "default(000000)" selected, also highlighted with a red box. At the bottom right is an "Apply/Save" button.

10. Check the "Enable QoS" checkbox.
11. Select the **Default DSCP Mark** as **default(000000)**.
12. Click the **Apply/Save** button.

High Priority QoS Queue Configuration

13. Select **Advanced** > **Quality of Service** > **Queue Config**.



The screenshot shows the NetComm web interface for QoS Queue Setup. On the left is a navigation menu with 'Queue Config' highlighted. The main content area is titled 'QoS Queue Setup' and contains a table of existing queues. Below the table are 'Add', 'Enable', and 'Remove' buttons. The 'Add' button is highlighted with a red box.

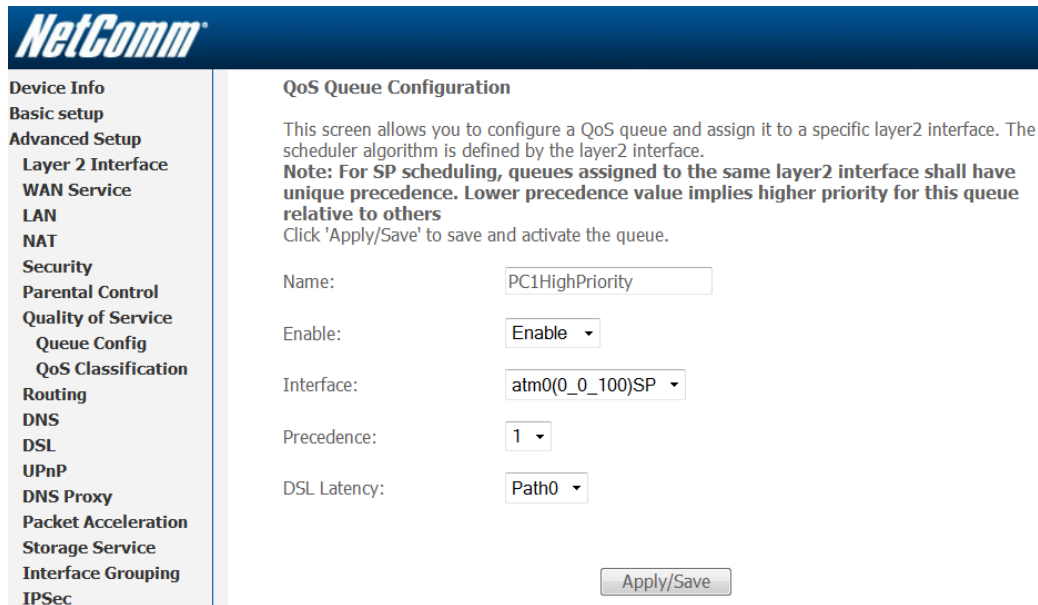
QoS Queue Setup

In ATM mode, maximum 16 queues can be configured.
In PTM mode, maximum 8 queues can be configured.
For each Ethernet interface, maximum 4 queues can be configured.
If you disable WMM function in Wireless Page, queues related to wireless will not take effects

Name	Key	Interface	Scheduler	Precedence	Weight	DSL Latency	PTM Priority	Enabled	Remove
WMM Voice Priority	1	wl0	SP	1				Enabled	
WMM Voice Priority	2	wl0	SP	2				Enabled	
WMM Video Priority	3	wl0	SP	3				Enabled	
WMM Video Priority	4	wl0	SP	4				Enabled	
WMM Best Effort	5	wl0	SP	5				Enabled	
WMM Background	6	wl0	SP	6				Enabled	
WMM Background	7	wl0	SP	7				Enabled	
WMM Best Effort	8	wl0	SP	8				Enabled	
Default Queue	37	atm0	SP	8		Path0		<input type="checkbox"/>	

Add

14. Click the **Add** button.



The screenshot shows the NetComm web interface for QoS Queue Configuration. The left navigation menu has 'Queue Config' selected. The main content area is titled 'QoS Queue Configuration' and contains a form with fields for Name, Enable, Interface, Precedence, and DSL Latency. An 'Apply/Save' button is at the bottom.

QoS Queue Configuration

This screen allows you to configure a QoS queue and assign it to a specific layer2 interface. The scheduler algorithm is defined by the layer2 interface.
Note: For SP scheduling, queues assigned to the same layer2 interface shall have unique precedence. Lower precedence value implies higher priority for this queue relative to others
Click 'Apply/Save' to save and activate the queue.

Name:

Enable:

Interface:

Precedence:

DSL Latency:

15. Enter a **name** of 15 characters or less to reflect the device will use high priority QoS – eg. **PC1HighPriority**
16. Set **Enable** to "**Enable**".
17. Set the **Interface** (Australian customers use **atm0(0_8_35)**, NZ customers use **atm0(0_0_100)**).
18. Enter a **Precedence**. For the highest priority set it to **1**. For the lowest priority use **3**.
19. Set the **DSL Latency** as **Path0**.
20. Click the **Apply/Save** button.

Low Priority QoS Queue Configuration

21. Select **Advanced** > **Quality of Service** > **Queue Config**.
22. Click the **Add** button.

NetComm

Device Info

- Basic setup
- Advanced Setup
 - Layer 2 Interface
 - WAN Service
 - LAN
 - NAT
 - Security
 - Parental Control
 - Quality of Service
 - Queue Config
 - QoS Classification
 - Routing
 - DNS
 - DSL
 - UPnP
 - DNS Proxy
 - Packet Acceleration
 - Storage Service
 - Interface Grouping
 - IPSec

QoS Queue Configuration

This screen allows you to configure a QoS queue and assign it to a specific layer2 interface. The scheduler algorithm is defined by the layer2 interface.

Note: For SP scheduling, queues assigned to the same layer2 interface shall have unique precedence. Lower precedence value implies higher priority for this queue relative to others

Click 'Apply/Save' to save and activate the queue.

Name:

Enable:

Interface:

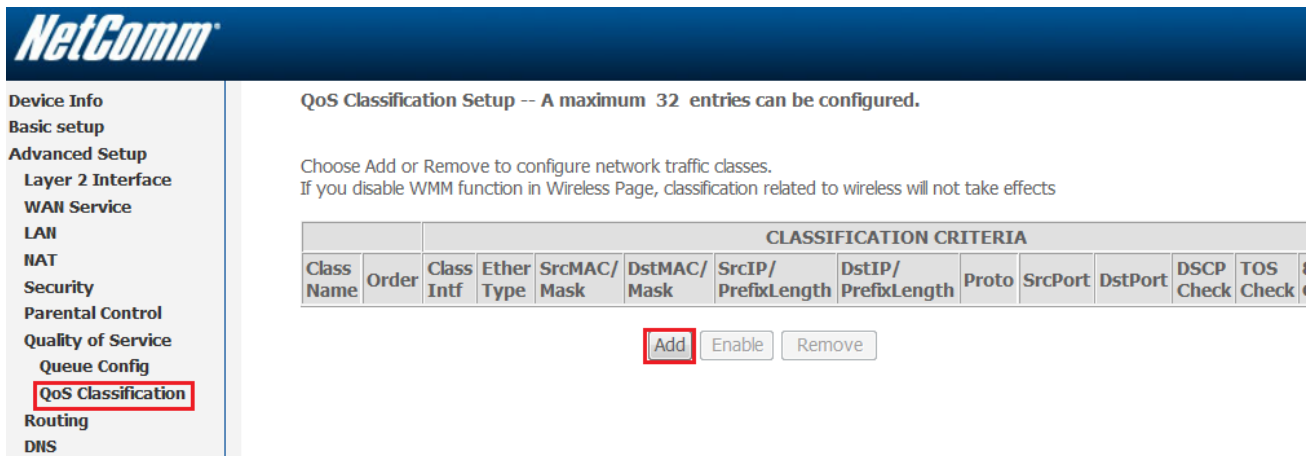
Precedence:

DSL Latency:

23. Enter a **name** of 15 characters or less to reflect the device will use low priority QoS – eg. **PC2LowPriority**.
24. Set **Enable** to "**Enable**".
25. Set the **Interface** (Australian customers use **atm0(0_8_35)**, NZ customers use **atm0(0_0_100)**).
26. Enter a **Precedence**. For the lowest priority set it to **3**. For the highest priority use **1**.
27. Set the **DSL Latency** as **Path0**.
28. Click the **Apply/Save** button.

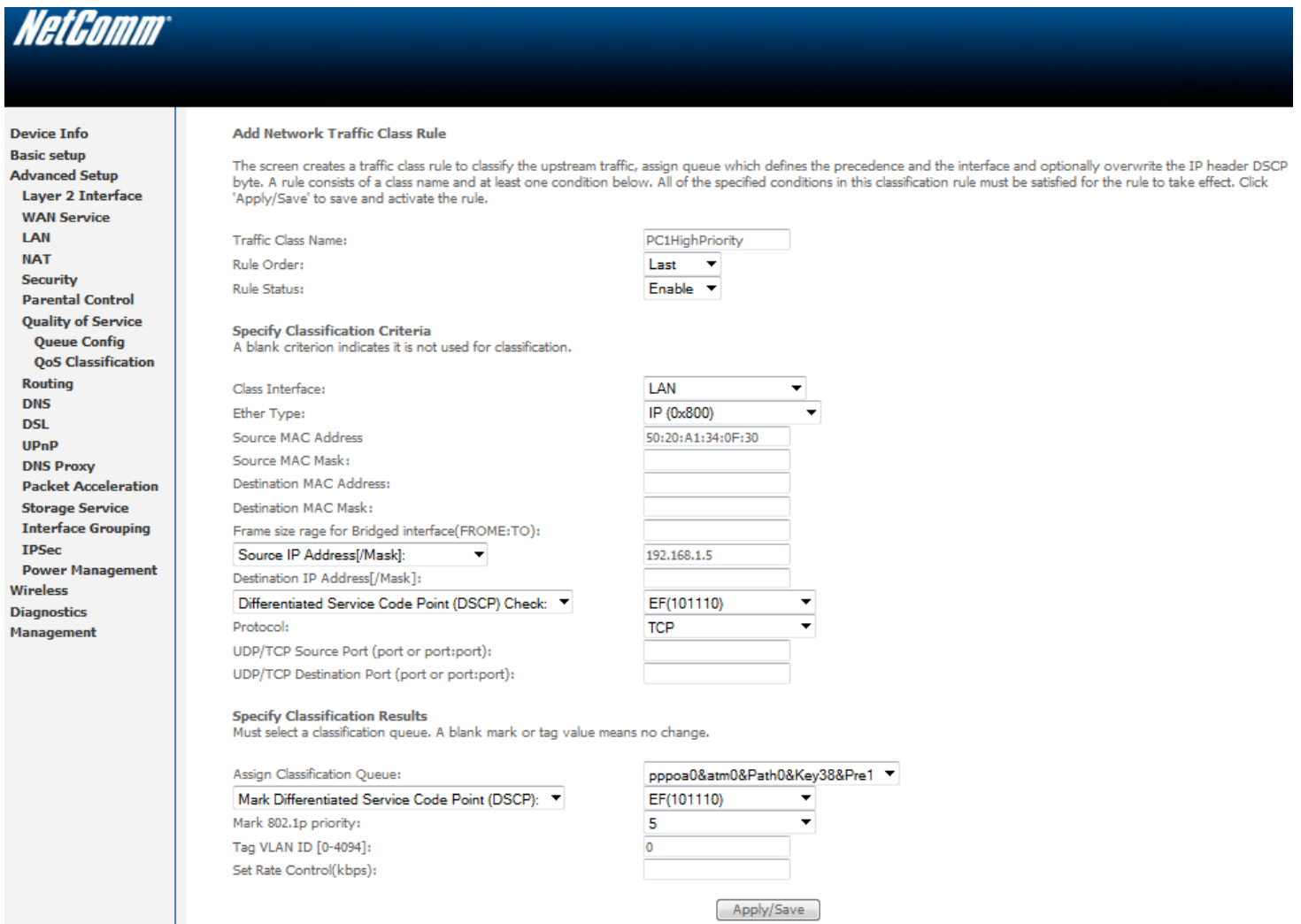
High Priority QoS Classification

29. Select **Advanced > Quality of Service > QoS Classification**.



The screenshot shows the NetComm web interface for QoS Classification Setup. The left sidebar contains a navigation menu with 'QoS Classification' highlighted. The main content area is titled 'QoS Classification Setup -- A maximum 32 entries can be configured.' Below the title, there is a text box stating 'Choose Add or Remove to configure network traffic classes. If you disable WMM function in Wireless Page, classification related to wireless will not take effects'. A table with columns for Class Name, Order, Class Intf, Ether Type, SrcMAC/Mask, DstMAC/Mask, SrcIP/PrefixLength, DstIP/PrefixLength, Proto, SrcPort, DstPort, DSCP Check, and TOS Check is visible. Below the table are three buttons: 'Add', 'Enable', and 'Remove', with the 'Add' button highlighted by a red box.

30. Click the **Add** button.



The screenshot shows the NetComm web interface for 'Add Network Traffic Class Rule'. The left sidebar contains a navigation menu with 'QoS Classification' highlighted. The main content area is titled 'Add Network Traffic Class Rule' and contains a text box explaining the rule creation process. Below the text box, there are several form fields for configuring the rule: Traffic Class Name (PC1HighPriority), Rule Order (Last), Rule Status (Enable), Specify Classification Criteria (Class Interface: LAN, Ether Type: IP (0x800), Source MAC Address: 50:20:A1:34:0F:30, Source MAC Mask, Destination MAC Address, Destination MAC Mask, Frame size range for Bridged interface(FROM:TO), Source IP Address[/Mask]: 192.168.1.5, Destination IP Address[/Mask]), Differentiated Service Code Point (DSCP) Check (EF(101110)), Protocol (TCP), UDP/TCP Source Port (port or port:port), and UDP/TCP Destination Port (port or port:port). Below these fields, there is a section for 'Specify Classification Results' with fields for Assign Classification Queue (pppoa0&atm0&Path0&Key38&Pre1), Mark Differentiated Service Code Point (DSCP) (EF(101110)), Mark 802.1p priority (5), Tag VLAN ID [0-4094] (0), and Set Rate Control(kbps). An 'Apply/Save' button is located at the bottom right.

31. Enter a **Traffic Class Name** reflecting the High Priority QoS rule; eg. **PC1HighPriority**.
32. Leave the **Rule Order** as **Last**.
33. Set the **Rule Status** to **Enable**.
34. Set the Class Interface according to how the device connects to the router. In the example above **LAN** is selected. Other options are **Wireless**, **Local** and **USB**.
35. Set the **Ether Type** to **IP(0x800)**. Other options include ARP(0x8086), Ipv6(0x86DD), PPPoE_DISC(0x8863), 8865(0x8865), 8866(0x8866), 8021Q(0x8100).
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.
37. 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 192.168.1.5.
38. 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.
39. 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.
40. 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.
41. Set the **Differentiated Service Code Point (DSCP) Check** to **EF(101110)**.
42. Set the **Protocol** to **TCP**. Other options include UDP, ICMP or IGMP.
43. Set "**Assign Classification Queue**" to Priority 1 (in the example above pppoa0&atm0&Path0&Key38&Pre1). Other options are priority 2 and 3. Priority 1 gives the highest priority with priority 3 being the lowest.
44. Set **Mark Differentiated Service Code Point (DSCP)** as **EF(101110)**.
45. Set **Mark 802.1p Priority** as **5**. In the scale 0-7, 0 is best effort, 6 and 7 are reserved for networking performance so set 5 as the highest priority.
46. Click the **Apply/Save** button.

Low Priority QoS Classification

47. Select **Advanced** > **Quality of Service** > **QoS Classification**.

48. Click the **Add** button.

The screenshot shows the NetComm web interface for configuring QoS. The left sidebar contains a navigation menu with categories like Device Info, Basic setup, Advanced Setup, Layer 2 Interface, WAN Service, LAN, NAT, Security, Parental Control, Quality of Service, Queue Config, QoS Classification, Routing, DNS, DSL, UPnP, DNS Proxy, Packet Acceleration, Storage Service, Interface Grouping, IPSec, Power Management, Wireless, Diagnostics, and Management. The main content area is titled "Add Network Traffic Class Rule". It includes a descriptive paragraph, a form for rule configuration, and an "Apply/Save" button. The form fields are as follows:

Traffic Class Name:	PC2LowPriority
Rule Order:	Last
Rule Status:	Enable
Specify Classification Criteria A blank criterion indicates it is not used for classification.	
Class Interface:	LAN
Ether Type:	IP (0x800)
Source MAC Address:	00:10:B2:34:0A:23
Source MAC Mask:	
Destination MAC Address:	
Destination MAC Mask:	
Frame size range for Bridged interface(FROM:TO):	
Source IP Address[/Mask]:	192.168.1.10
Destination IP Address[/Mask]:	
Differentiated Service Code Point (DSCP) Check:	AF11(001010)
Protocol:	TCP
UDP/TCP Source Port (port or port:port):	
UDP/TCP Destination Port (port or port:port):	
Specify Classification Results Must select a classification queue. A blank mark or tag value means no change.	
Assign Classification Queue:	pppoa0&atm0&Path0&Key39&Pre3
Mark Differentiated Service Code Point (DSCP):	AF11(001010)
Mark 802.1p priority:	0
Tag VLAN ID [0-4094]:	0
Set Rate Control(kbps):	

Apply/Save

49. Enter a **Traffic Class Name** reflecting the High Priority QoS rule; eg. **PC2LowPriority**.

50. Leave the **Rule Order** as **Last**.

51. Set the **Rule Status** to **Enable**.

52. Set the Class Interface according to how the device connects to the router. In the example above **LAN** is selected. Other options are **Wireless**, **Local** and **USB**.

53. Set the **Ether Type** to **IP(0x800)**. Other options include ARP(0x8086), Ipv6(0x86DD), PPPoE_DISC(0x8863), 8865(0x8865), 8866(0x8866), 8021Q(0x8100).

54. 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.

55. 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 192.168.1.10.
56. 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.
57. 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.
58. 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.
59. Set the **Differentiated Service Code Point (DSCP) Check** to **AF11(001010)**.
60. Set the **Protocol** to **TCP**. Other options include UDP, ICMP or IGMP.
61. Set "**Assign Classification Queue**" to Priority 3 (in the example above pppoa0&atm0&Path0&Key39&Pre3). Other options are priority 1 and 2. Priority 1 gives the highest priority with priority 3 being the lowest.
62. Set **Mark Differentiated Service Code Point (DSCP)** as **AF11(001010)**.
63. Set **Mark 802.1p Priority** as **0**. In the scale 0-7, 0 is best effort, 6 and 7 are reserved for networking performance so set 0 as the lowest priority.
64. Click the **Apply/Save** button.
65. You now have 2 Quality of Service rules implemented for 2 devices connecting to the NB604n router.

NetComm

Device Info
Basic setup
Advanced Setup
Layer 2 Interface
WAN Service
LAN
NAT
Security
Parental Control
Quality of Service
Queue Config
QoS Classification
Routing
DNS
DSL
UPnP
DNS Proxy
Packet Acceleration
Storage Service
Interface Grouping
IPSec
Power Management
Wireless
Diagnostics
Management

QoS Classification Setup -- A maximum 32 entries can be configured.

Choose Add or Remove to configure network traffic classes.
If you disable WMM function in Wireless Page, classification related to wireless will not take effects

Class Name	Order	Class Intf	Ether Type	SrcMAC/ Mask	DstMAC/ Mask	CLASSIFICATION CRITERIA			CLASSIFICATION RESULTS														
						SrcIP/ PrefixLength	DstIP/ PrefixLength	Proto	SrcPort	DstPort	DSCP Check	TOS Check	802.1P Check	Queue Key	DSCP Mark	TOS Mark	802.1P Mark	VlanID Tag	Rate Control	Frame size	Enable	Remove	
PC1HighPriority	1	LAN	IP	50:20:A1:34:0F:30		192.168.1.5		TCP				EF			38	EF	5	0				<input checked="" type="checkbox"/>	<input type="checkbox"/>
PC2LowPriority	2	LAN	IP	00:10:B2:34:0A:23		192.168.1.10		TCP				AF11			39	AF11	0	0				<input checked="" type="checkbox"/>	<input type="checkbox"/>

Add Enable Remove

66. Select **Management > Settings > Restore Default**. Click the **Restore Default Settings** button to restart the router and save the new settings.
67. To test your Quality of Service settings try running speed-tests (<http://speedtest.net>) on both pcs/devices **simultaneously**.