

NetComm[®]

 *Dynalink*

Quality of Service (QoS) Setup Guide

(NB6Plus4W Rev2)

NB6Plus4W Rev2 and Quality of Service (QoS)

The following Quality of Service (QoS) settings offer a basic setup example, setting up 2 devices connecting to an NB6Plus4W Rev2 Series 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 Nb6 Rev2 Series 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 NB6 Rev2 series router. One device (PC) is assigned a 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 NB6Plus4W Rev2 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**.

The screenshot displays the NetComm router's web management interface. The top navigation bar includes 'Quick Start', 'Status', 'Advanced', 'Wireless', and 'Management'. The left sidebar lists various configuration categories, with 'Local Network' selected. Under 'Local Network', 'DHCP Server' is highlighted. The main content area is titled 'DHCP Server Configuration' and contains the following settings:

- Enable DHCP Server: (Selected)
- Start IP Address:
- End IP Address:
- Leased Time (hour):
- Enable DHCP option 66:
- TFTP Server IP:
- Static IP Lease List: (A maximum 32 entries can be configured)

MAC Address	IP Address	Remove
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Buttons: Add Entries, Remove Entries, Relay On, Relay to Server IP: Address: , Apply/Save

Bottom status bar: Done | Internet | Protected Mode: On | 100%

4. Press the **Add Entries** 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.

The screenshot displays the NetComm router's web management interface. At the top, there is a navigation bar with the NetComm logo and menu items: Quick Start, Status, Advanced (highlighted), Wireless, and Management. A language dropdown menu is set to English. On the left side, a dark sidebar contains a list of configuration categories: Local Network, IP Address, DHCP Server, UPnP, IGMP Snooping, Layer2 Interface, Internet, IP Routing, Virtual Servers, Firewall, NAT ALG, Quality of Service, and Port Mapping. The main content area is titled "DHCP Static IP Lease" and contains the instruction: "Enter the Mac address and Static IP address then click Apply/Save .". Below this, there are two input fields: "MAC Address:" with the value "00:1A:92:11:52:B5" and "IP Address:" with the value "192.168.1.4". An "Apply/Save" button is positioned below the IP address field. At the bottom left of the sidebar, the firmware version is listed as "4.24p", the DSL version as "A2pB025c.d22i", and the wireless version as "5.10.120.0". The browser's status bar at the bottom shows "Internet | Protected Mode: On" and a zoom level of "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.

The screenshot shows the NetComm web interface for DHCP Server Configuration. The page title is "DHCP Server Configuration". Below the title, there is a description: "Enabling DHCP Server on LAN interface can provide the proper IP address settings to your computer." There are two radio buttons: "Disable DHCP Server" (unselected) 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). There is also a checkbox for "Enable DHCP option 66" which is unchecked, and a "TFTP Server IP" field with the value 10.11.12.13. A red box highlights the "Static IP Lease List" section, which contains a table with two entries. Below the table are "Add Entries" and "Remove Entries" buttons. At the bottom, there is a "Relay On" radio button and a "Relay to Server IP: Address" field.

DHCP Server Configuration

Enabling DHCP Server on LAN interface can provide the proper IP address settings to your computer.

Disable DHCP Server
 Enable DHCP Server

Start IP Address:
End IP Address:
Leased Time (hour):

Enable DHCP option 66
TFTP Server IP:

Static IP Lease List: (A maximum 32 entries can be configured)

MAC Address	IP Address	Remove
00:1A:92:11:52:B5	192.168.1.4	<input type="checkbox"/>
00:0F:B0:FA:92:57	192.168.1.9	<input type="checkbox"/>

Relay On Relay to Server IP: Address:

Firmware: 4.24p
DSL: A2pB025c.d22i
Wireless: 5.10.120.0

Internet | Protected Mode: On 100%

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

The following guide shows how to setup 2 devices to an NB6Plus4W Rev2 router, one with high priority QoS, one with low priority QoS.

9. Select Advanced > Quality of Service
10. Check the "Enable QoS" checkbox.
11. Select the **Default DSCP Mark** as **default(000000)**.

The screenshot shows the NetComm router's web interface. The top navigation bar includes 'Quick Start', 'Status', 'Advanced', 'Wireless', and 'Management'. The left sidebar lists various configuration options, with 'Quality of Service' selected. The main content area is titled 'QoS -- Queue Management Configuration'. It contains instructions and two notes. A red box highlights the 'Enable QoS' checkbox (checked) and the 'Select Default DSCP Mark' dropdown menu (set to 'default(000000)'). Below this is an 'Apply/Save' button. The 'QoS Queue Setup' section states that a maximum of 16 entries can be configured and provides a table of existing queues.

QoS -- Queue Management Configuration

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.

Note: If Enable QoS checkbox is not selected, all QoS will be disabled for all interfaces.

Note: The default DSCP mark is used to mark all egress packets that do not match any classification rules.

Enable QoS
 Enable QoS
Select Default DSCP Mark: default(000000) ▼

Apply/Save

QoS Queue Setup -- A maximum 16 entries can be configured.

If you disable WMM function in Wireless Page, queues related to wireless will not take effects

Name	Key	Interface	Precedence	DSL Latency	PTM Priority	Enable	Remove
WMM Voice Priority	4	Wireless	1			Enabled	
WMM Voice Priority	5	Wireless	2			Enabled	
WMM Video Priority	6	Wireless	3			Enabled	

12. Press the Apply/Save button.

High Priority QoS Queue Configuration

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

The screenshot displays the NetComm web interface. At the top, the NetComm logo is on the left, and navigation icons for Quick Start, Status, Advanced (highlighted), Wireless, and Management are on the right. A language dropdown menu is set to English. On the left side, a dark sidebar contains a menu with categories: Local Network, Layer2 Interface, Internet, IP Routing, Virtual Servers, Firewall, NAT ALG, Quality of Service (with sub-items Queue Config and QoS Classification), and Port Mapping. The main content area is titled 'QoS Queue Configuration'. It contains a text block explaining the configuration process and a form with the following fields: Name (text input: PC1HighPriority), Enable (dropdown: Enable), Interface (dropdown: pppoa_0_0_100), Precedence (dropdown: 1), and DSL Latency (dropdown: Path0). An 'Apply/Save' button is located below the form. At the bottom left of the sidebar, firmware and software versions are listed: Firmware: 4.24p, DSL: A2pB025c.d22i, Wireless: 5.10.120.0. The browser's status bar at the bottom shows 'Done', 'Internet | Protected Mode: On', and a zoom level of 100%.

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** (Australia customers use **pppoe_0_8_35**, NZ customers use **pppoa_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. Press the Apply/Save button.

Low Priority QoS Queue Configuration

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

Local Network
Layer2 Interface
Internet
IP Routing
Virtual Servers
Firewall
NAT ALG
Quality of Service
Queue Config
QoS Classification
Port Mapping

Firmware: 4.24p
DSL: A2pB025c.d22i
Wireless: 5.10.120.0

QoS Queue Configuration

The screen allows you to configure a QoS queue entry and assign it to a specific network interface. Each of the queues can be configured for a specific precedence. The queue entry configured here will be used by the classifier to place ingress packets appropriately. **Note: Lower integer values for precedence imply higher priority for this queue relative to others** Click 'Apply/Save' to save and activate the queue.

Name:

Enable:

Interface:

Precedence:

DSL Latency:

Done Internet | Protected Mode: On 100%

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** (Australia customers use **pppoe_0_8_35**, NZ customers use **pppoa_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. Press the Apply/Save button.

High Priority QoS Classification

29. Select **Advanced** > **Quality of Service** > **QoS Classification**.
30. Press the **Add** button.

The screenshot displays the NetComm web interface for configuring a QoS rule. The navigation menu includes: Quick Start, Status, **Advanced**, Wireless, and Management. The left sidebar shows a tree view with 'Quality of Service' expanded to 'QoS Classification'. The main content area is titled 'Add Network Traffic Class Rule' and contains the following sections:

- Add Network Traffic Class Rule**

The screen creates a traffic class rule to classify the upstream traffic, assign queue which defines the precedence and the interface and optionally overwrite the IP header DSCP byte. A rule consists of a class name and at least one condition below. All of the specified conditions in this classification rule must be satisfied for the rule to take effect. Click 'Save/Apply' to save and activate the rule.
- Traffic Class Name:** PC1HighPriority
- Rule Order:** Last
- Rule Status:** Enable
- Specify Classification Criteria**

A blank criterion indicates it is not used for classification.

Class Interface:	Ethernet
Ether Type:	IP(0x800)
Source MAC Address:	00:1A:92:11:52:85
Source MAC Mask:	
Destination MAC Address:	
Destination MAC Mask:	
Source IP Address:	192.168.1.4
Source Subnet Mask:	255.255.255.0
Destination IP Address:	
Destination Subnet Mask:	
Differentiated Service Code Point (DSCP) Check:	EF(101110)
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:	36ppoe_0_0_100 Priority1
Mark Differentiated Service Code Point (DSCP):	EF(101110)
Mark 802.1p priority:	5
Tag VLAN ID [0-4094]:	0

An 'Apply/Save' button is located at the bottom right of the configuration area.

31. Enter a **Traffic Class Name** reflecting the High Priority QoS rule; eg. **PC1_High_Priority**.
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 **Ethernet** 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 192.168.1.4.
38. Enter the **Source Subnet Mask** as 255.255.255.0.
39. 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.
40. 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.
41. 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.
42. Set the **Differentiated Service Code Point (DSCP) Check** to **EF(101110)**.
43. Set the **Protocol** to **TCP**. Other options include UDP, ICMP or IGMP.
44. Set "**Assign Classification Queue**" to Priority 1 (in the example above 49pppoa_0_0_100 Priority 1). Other options are priority 2 and 3. Priority 1 gives the highest priority with priority 3 being the lowest.
45. Set **Mark Differentiated Service Code Point (DSCP)** as **EF(101110)**.
46. 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.

Low Priority QoS Classification

47. Press the Apply/Save button.
48. Select **Advanced** > **Quality of Service** > **QoS Classification**.
49. Press the **Add** button.

The screenshot displays the NetComm web management interface. At the top, there is a navigation bar with icons for 'Quick Start', 'Status', 'Advanced', 'Wireless', and 'Management'. The 'Advanced' section is selected. On the left, a sidebar menu lists various configuration options, with 'Quality of Service' > 'QoS Classification' highlighted. The main content area is titled 'Add Network Traffic Class Rule'. It contains a descriptive paragraph, followed by configuration fields for 'Traffic Class Name' (PC2LowPriority), 'Rule Order' (Last), and 'Rule Status' (Enable). Below this is the 'Specify Classification Criteria' section, which includes fields for 'Class Interface' (Ethernet), 'Ether Type' (IP(vx800)), 'Source MAC Address' (00:0F:B0:FA:92:57), 'Source IP Address' (192.168.1.9), 'Differentiated Service Code Point (DSCP) Check' (AF11(001010)), and 'Protocol' (TCP). The 'Specify Classification Results' section includes 'Assign Classification Queue' (37pppoe_0_0_100 Priority3), 'Mark Differentiated Service Code Point (DSCP)' (AF11(001010)), 'Mark 802.1p priority' (0), and 'Tag VLAN ID [0-4094]' (1). An 'Apply/Save' button is located at the bottom of the form. The Windows taskbar at the bottom shows the system tray with 'Internet' and '75%' indicators.

50. Enter a **Traffic Class Name** reflecting the High Priority QoS rule; eg. **PC1LowPriority**.
51. Leave the **Rule Order** as **Last**.
52. Set the **Rule Status** to **Enable**.
53. Set the Class Interface according to how the device connects to the router. In the example above **Ethernet** is selected. Other options are **Wireless, Local** and **USB**.
54. Set the **Ether Type** to **IP(0x800)**. Other options include ARP(0x8086), Ipv6(0x86DD), PPPoE_DISC(0x8863), 8865(0x8865), 8866(0x8866), 8021Q(0x8100).
55. 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.
56. 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 192.168.1.9.
57. Enter the **Source Subnet Mask** as 255.255.255.0.
58. 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.
59. 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.
60. 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.
61. Set the **Differentiated Service Code Point (DSCP) Check** to **AF11(001010)**.
62. Set the **Protocol** to **TCP**. Other options include UDP, ICMP or IGMP.
63. Set "**Assign Classification Queue**" to Priority 3 (in the example above 51pppoa_0_0_100 Priority 3). Other options are priority 1 and 2. Priority 1 gives the highest priority with priority 3 being the lowest.
64. Set **Mark Differentiated Service Code Point (DSCP)** as **AF11(001010)**.
65. 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.

66. Press the Save/Apply button.

67. You now have 2 Quality of Service rules implemented for 2 devices connecting to the NB6Plus4W Rev2 router.

NetComm Quick Start | Status | Advanced | Wireless | Management

Language: English

Local Network
Layer2 Interface
Internet
IP Routing
Virtual Servers
Firewall
NAT ALG
Quality of Service
Queue Config
QoS Classification
Port Mapping

QoS Classification Setup -- A maximum 32 entries can be configured.
Choose Add or Remove to configure network traffic classes.

CLASSIFICATION CRITERIA														CLASSIFICATION RESULTS				
Class Name	Order	Class Intf	Ether Type	SrcMAC/ Mask	DstMAC/ Mask	SrcIP/ Mask	DstIP/ Mask	Proto	Src Port	Dst Port	DSCP Check	802.1P Check	Queue Key	DSCP Mark	802.1P Mark	VlanID Tag	Enable	Remove
PC1HighPriority	1	Ethernet	IP	00:1A:92:11:52:B5		192.168.1.4/24		TCP			EF		36	EF	5	0	<input checked="" type="checkbox"/>	<input type="checkbox"/>
PC2LowPriority	2	Ethernet	IP	00:0F:B0:FA:92:57		192.168.1.9/24		TCP			AF11		37	AF11	0	1	<input checked="" type="checkbox"/>	<input type="checkbox"/>

Add

Removal: 4.24p
OS: 2.0.0.110.0
Winbox: 3.10.120.0

Done Internet 75%

68. Select **Management > Reset router**. Press the **Reboot** button to restart the router and save the new settings.

69. To test your Quality of Service settings try running speed-tests (<http://speedtest.net>) on both pcs/devices **simultaneously**.