



## **NCT240 IP DSLAM with IAC4500 VLAN Tagging Implementation**

The NetComm NCT240 24 Port IP DSLAMs support 802.1Q VLAN Tagging. This white paper is written to help IP DSLAM system integrator to set up and configure NetComm's NCT240 IP DSLAMs running firmware version V3.0.9 to work with an IAC4500 Internet Access Controller for Internet access and billing application using the VLAN Tagging and Port Location Mapping. It is recommended that the readers of this document has read and understood the Installation Guide and User Manual of the NCT240 IP DSLAM.

The NCT240 IP DSLAM combined with an IAC4500 offers two methods of connection. User can either be issued with a unique user name and password which is required on log in, or using VLAN tagging and the *Port Location Mapping* Feature in the IAC4500. Rooms can then be recognized via its room number.

Both options in the IAC4500 offer zero configurations for subscribers/hotel room guests. Guests simply plug the Ethernet cable into their laptop, enter a username and password or simply accepts the terms and conditions and they are connected without changing any settings at all.

Figure 1 illustrates the logical network diagram for NCT240 IP DSLAM working with an IAC4500.

## Logical Network Diagram

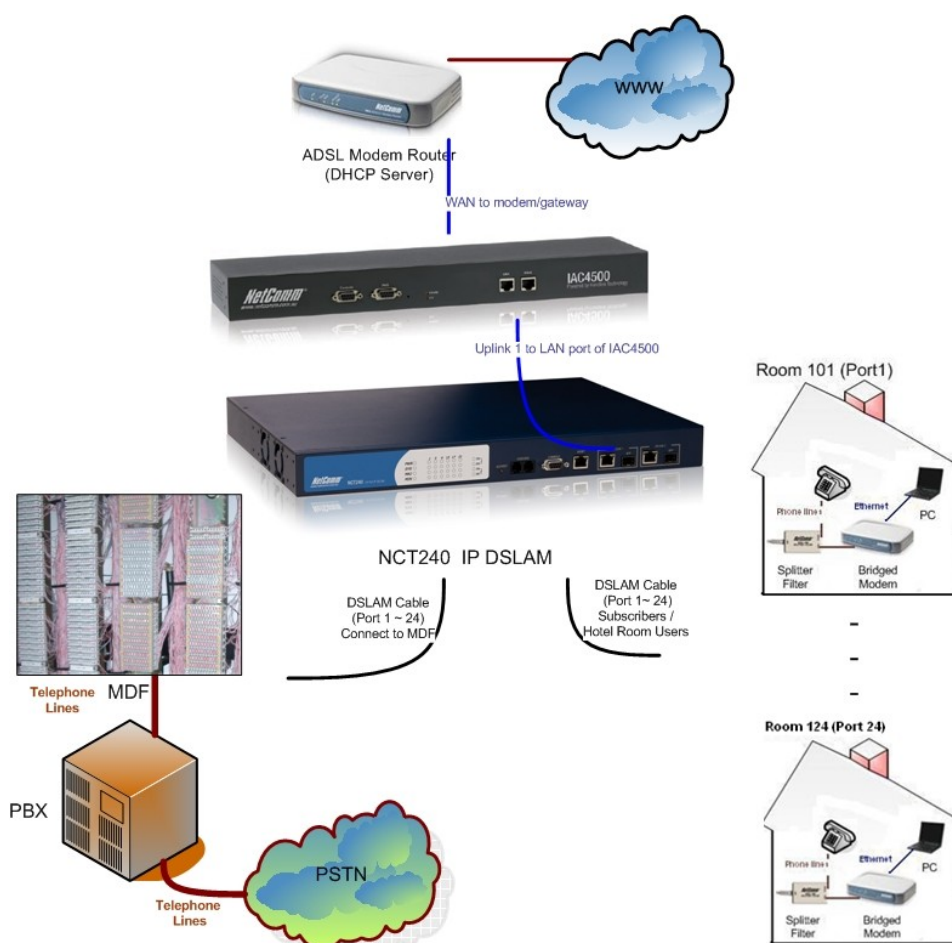


Figure 1: NCT240 with IAC4500 Internet Access Controller

## VLAN Management

A VLAN allows a physical network to be divided into several logical networks. A device can belong to more than one VLAN group. Devices that are not in the same VLAN groups can not talk to each other. VLAN can provide isolation and security to users and increase performance by limiting broadcast domain. VLAN tag can be added to the MAC header to identify the VLAN membership of a frame across bridges. A tagged frame is four bytes longer than an untagged frame. Each port of NCT240 is capable of passing tagged or untagged frames.

Each port has its own Ingress rule. If Ingress rule accept tagged frames only, the switch port will drop all incoming non-tagged frames. If Ingress rule accept all frame type, the switch port simultaneously allow the incoming tagged and untagged frames. An untagged frame doesn't carry any VID to which it belongs. When an untagged frame is received, Ingress Process insert a tag contained the PVID into the untagged frame. Each physical port has a default VID called PVID (Port VID). PVID is assigned to untagged frames or priority tagged frames (frames with null (0) VID) received on this port. Figure 2 illustrates the VLAN Tagging relationship between the NCT240 and the IAC4500.

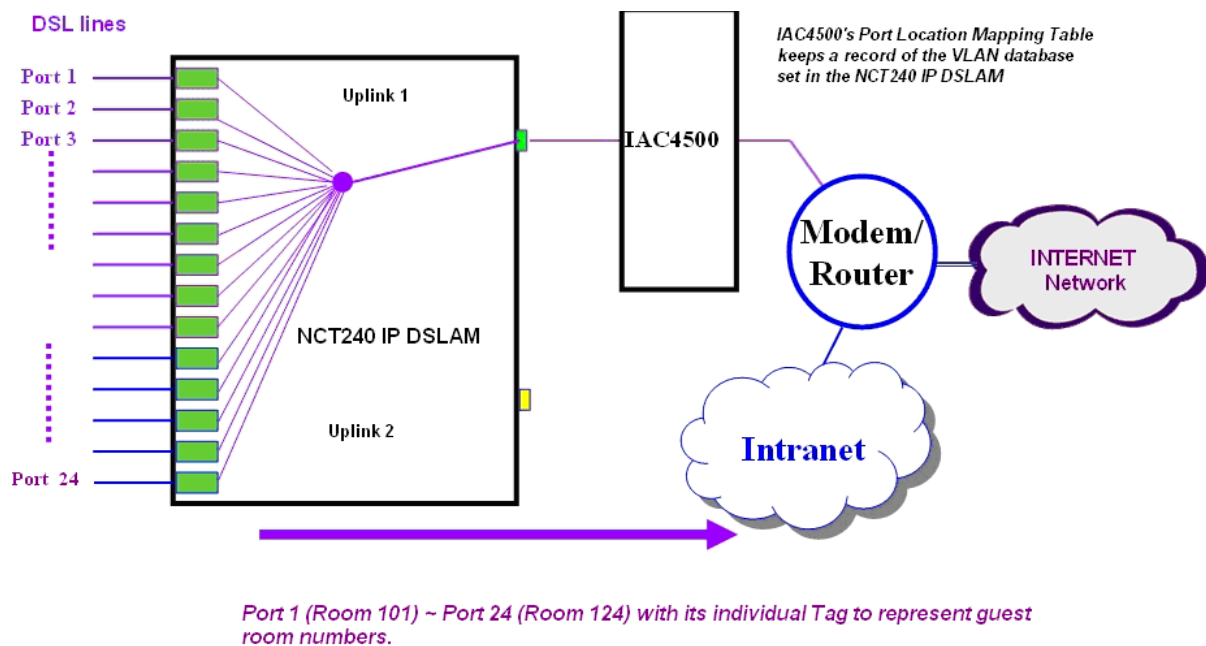


Figure 2: 802.1Q VLAN Tagging relationship between NCT240 and IAC4500

## NCT240 VLAN Tagging Configuration

There are 3 types of management interfaces available for NCT240 IP DSLAM system management. The web management interface, the CLI interface and the Telnet interface.

It is recommended to use the built-in web management interface for NCT240 system configuration. This white paper is written in the basis of using the web management interface of the NCT240 IP DSLAM.

The characteristic nature of IAC4500's 802.1Q VLAN tagging feature is that the IAC will accept VLAN tagged packets from its LAN network and **only** respond to its LAN network with untagged packets. Due to this VLAN tagging behaviour of the IAC4500, NCT240 will be configured to the following way in this test scenario.

1. All traffics from the 24 ADSL ports (data upstream direction) will leave the NCT240 with a VLAN tagged number (room number).
2. All the traffic coming from the IAC4500 to the NCT240 (data downstream direction) are with untagged default VLAN number 1.

Please refer to screens shots shown in following section.

## Step 1

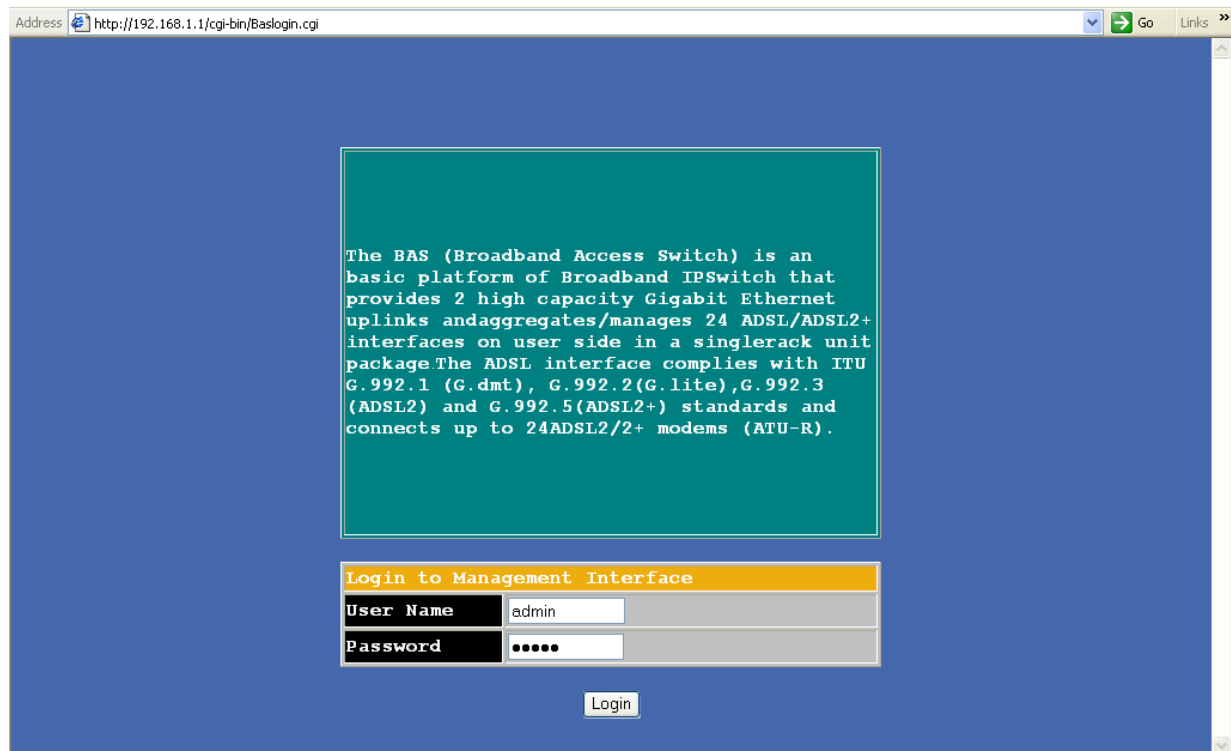
Connect the PC to the management port. Manually configure your PC to 192.168.1.x address (eg: 192.168.1.2/24)

Login to NCT240 web management interface.

Default IP address for ixp0 (system management port): **192.168.1.1/24**

Default User Name: admin

Default Password: admin



Navigate to:

Home > Switch > VLAN

- Basic VLAN Settings > (Refer to settings as shown) then click Apply then OK.
- VLAN Switch Mode > (Refer to settings as shown) then click Apply then OK.
- VLAN Frame Type > (Refer to settings as shown) then click Apply then OK.

Address <http://192.168.1.1/main.html> Go Links »

## Broadband Access Switch

[Home](#) [Logout](#)

- Home
- + System
- + ADSL
- Switch
  - VLAN
  - EthPortSetting
  - MAC
  - IGMP Snooping
  - IGMP Group List
  - 802.1x
  - QueueMap
  - DHCP Relay Option82
  - LoopTest
  - RSTP
- + Status
- + IP
- + Performance
- + Statistics
- + Configuration

### VLAN Basic Setting

DeviceID:0 TargetID:0 [VlanAdvSetting](#) [DisplayVlanSetting](#)

#### Basic VLAN Setting

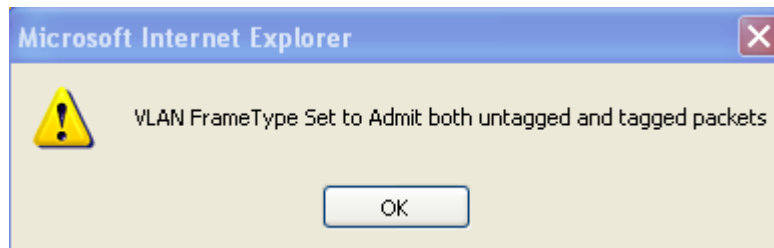
Default VLAN	Priority	MinPortID	PVC ID	MaxPortID	PVC ID
101 (0~4095)	0 (0~7)	1	1	1	1

#### VLAN SwitchMode

Mode
Forwarding by MAC only

#### VLAN FrameType

FrameType	MinPortID	PVC ID	MaxPortID	PVC ID
Admit both untagged and tagged packets	1	1	1	1



By following the above settings, it means that ADSL port 1 (PVC1: 8/35) packets are to be assigned with a VLAN 101 number and will be tagged as they leave the uplink of the NCT240 IP DSLAM. NCT240 will both admit untagged and tagged packets.

Repeat the above VLAN configuration to create VLAN 101 ~ VLAN 124 for all the 24 ADSL Ports in the NCT240. Example: refer to screen shot for VLAN 102 configuration shown as follows

Address <http://192.168.1.1/main.html> Go Links »

## Broadband Access Switch

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- Switch
  - VLAN
  - EthPortSetting
  - MAC
  - IGMP Snooping
  - IGMP Group List
  - 802.1x
  - QueueMap
  - DHCP Relay Option82
  - LoopTest
  - RSTP
- Status
- IP
- Performance
- Statistics
- Configuration

### VLAN Basic Setting

DeviceID:0 TargetID:0 [VlanAdvSetting](#) [DisplayVlanSetting](#)

#### Basic VLAN Setting

Default VLAN	Priority	MinPortID	PVC ID	MaxPortID	PVC ID
102 (0~4095)	0 (0~7)	2	1	2	1

#### VLAN SwitchMode

Mode
Forwarding by MAC only

#### VLAN FrameType

FrameType	MinPortID	PVC ID	MaxPortID	PVC ID
Admit both untagged and tagged packets	2	1	2	1

To view the current VLAN setting, click on **DisplayVLANSettings** to view the current VLAN information for all the 24 ADSL ports.

Address <http://192.168.1.1/main.html> Go Links »

## Broadband Access Switch

[Home](#) [Logout](#)

- Home
- System
- ADSL
- Switch
  - VLAN
  - EthPortSetting
  - MAC
  - IGMP Snooping
  - IGMP Group List
  - 802.1x
  - QueueMap
  - DHCP Relay Option82
  - LoopTest
  - RSTP
- Status
- IP
- Performance
- Statistics
- Configuration

### Display VLAN Setting

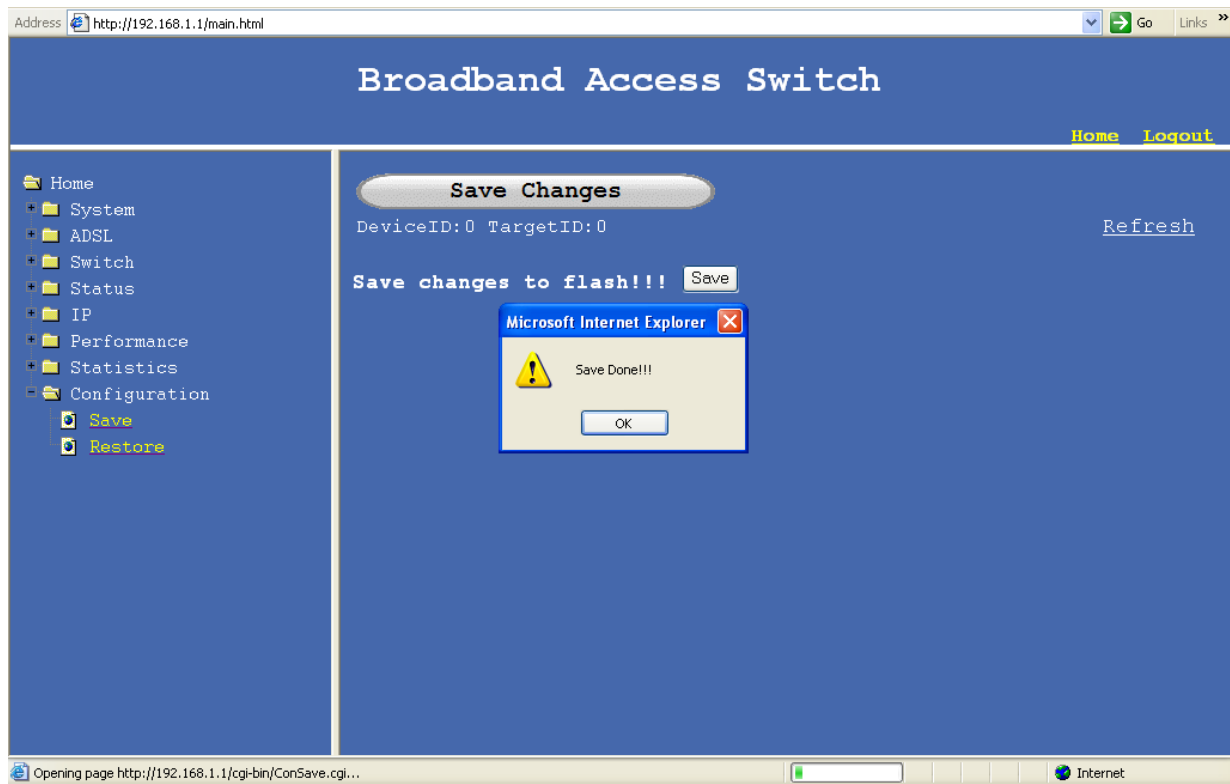
DeviceID:0 TargetID:0 [VlanAdvSetting](#) [VlanBasicSetting](#) [Refresh](#)

Port	PVC	Default VLAN	Priority	Stack VLAN	Stack Priority	RX Strip	RX Tag	TX Strip	TX Tag
1	1	101	0	101	0	0	1	1	0
1	2	0	0	0	0	0	0	0	0
1	3	0	0	0	0	0	0	0	0
1	4	0	0	0	0	0	0	0	0
1	5	0	0	0	0	0	0	0	0
1	6	0	0	0	0	0	0	0	0
1	7	0	0	0	0	0	0	0	0
1	8	0	0	0	0	0	0	0	0
2	1	102	0	102	0	0	1	1	0
2	2	0	0	0	0	0	0	0	0
2	3	0	0	0	0	0	0	0	0
2	4	0	0	0	0	0	0	0	0
2	5	0	0	0	0	0	0	0	0
2	6	0	0	0	0	0	0	0	0
2	7	0	0	0	0	0	0	0	0

## Step 2

Navigate to:

Home > Configuration > Save > click on Save then Ok.



## IAC4500 Internet Access Controller Configuration

The following settings are made to the IAC4500. Connect the PC to the LAN port of the IAC4500.

IAC4500 Default IP Address: 10.59.1.1/8

Default User Name: admin


Default Password: admin

### 1. Enter all system information to the IAC4500

System	
System/Host Name	NetCommIAC4500
Domain Name	NetComm
Location Information	Location Name: NetComm Ltd Max.=50
	Address: Unit 1, 2 -6 Orion Rd Max.=200
	City: Lane Cove Max.=50
	State / Province: NSW Max.=50
	Zip / Postal Code: 2066 Max.=10
	Country: Australia Max.=50
	Contact Name: Max.=50
	Contact Telephone: 02 9424 2000 Max.=50
	Contact FAX: 02 9424 2010 Max.=50
	Contact Email: support@netcomm.com.au Max.=50
Date: 2007 / 4 / 26 (Year/Month/Day)	
Time: 13 : 04 : 30 (Hour : Minute : Second)	

2. Configure IAC4500 WAN/LAN settings – configure the WAN to a mode and with IP addresses that suitable for your network environment. Eg You may set the IAC4500 WAN to a static IP of 172.17.1.34/24 with gateway 172.17.1.1/24.





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**Configuration Menu**

- Configuration Menu
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  - Server
  - NAT Pool
  - Authentication
  - Billing
  - Accounting
  - Port-Location Mapping
- Advanced Setting
- System Status
- System Tools

WAN/LAN											
<b>LAN</b>	The Device IP Address and Subnet mask settings IP Address: <input type="text" value="10.59.1.1"/> Subnet Mask: <input type="text" value="255.0.0.0"/>										
<b>WAN MAC Address</b>	<input checked="" type="radio"/> Default <input type="radio"/> Change to: <input type="text" value="00"/> : <input type="text" value="00"/> : <input type="text" value="00"/> : <input type="text" value="00"/> : <input type="text" value="00"/> : <input type="text" value="00"/>										
<b>WAN Port Mode</b>	<input type="radio"/> Get automatically from a DHCP server  <input checked="" type="radio"/> Use fixed IP address You have static IP information from your ISP <table style="width: 100%;"> <tr> <td style="width: 40%;">IP Address:</td> <td><input type="text" value="172.17.1.34"/></td> </tr> <tr> <td>Subnet Mask:</td> <td><input type="text" value="255.255.255.0"/></td> </tr> <tr> <td>Default IP Gateway:</td> <td><input type="text" value="172.17.1.1"/></td> </tr> <tr> <td>Primary DNS Server:</td> <td><input type="text" value="172.17.1.1"/></td> </tr> <tr> <td>Secondary DNS Server:</td> <td><input type="text" value="4.2.2.2"/></td> </tr> </table> <input type="radio"/> PPPoE ( Mostly for ADSL modem users )	IP Address:	<input type="text" value="172.17.1.34"/>	Subnet Mask:	<input type="text" value="255.255.255.0"/>	Default IP Gateway:	<input type="text" value="172.17.1.1"/>	Primary DNS Server:	<input type="text" value="172.17.1.1"/>	Secondary DNS Server:	<input type="text" value="4.2.2.2"/>
IP Address:	<input type="text" value="172.17.1.34"/>										
Subnet Mask:	<input type="text" value="255.255.255.0"/>										
Default IP Gateway:	<input type="text" value="172.17.1.1"/>										
Primary DNS Server:	<input type="text" value="172.17.1.1"/>										
Secondary DNS Server:	<input type="text" value="4.2.2.2"/>										

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### 3. Set IAC4500 to use Built-in Authentication Scenario A – Bill by room number

Authentication Configuration															
<b>Authentication Type</b>	<div style="margin-bottom: 10px;"> <input type="radio"/> No Authentication         </div> <div style="margin-bottom: 10px;"> <input type="radio"/> User Agreement           <div style="margin-left: 20px;"> <input type="radio"/> Redirect URL Link <input type="text"/> <a href="#">Code</a>  <input checked="" type="radio"/> Standard User Agreement page         </div> </div> <div style="margin-bottom: 10px;"> <input checked="" type="radio"/> <b>Built-in Authentication</b>  <small>Three pre-configured options are provided for easy setup. Select an option that best suits your network needs. You must then proceed to configure the "Billing" and "Accounting" settings to complete your setup.</small>            Current preset option: <span style="color: red;">Scenario A</span> <a href="#">Select option</a> </div> <div> <input type="radio"/> RADIUS           <table border="1" style="width: 100%; border-collapse: collapse; margin-top: 5px;"> <tr> <td colspan="2"><input type="checkbox"/> Check Local Account first</td> </tr> <tr> <td colspan="2"> <input checked="" type="radio"/> Accumulation  <input type="radio"/> Time to Finish (No idle timeout)         </td> </tr> <tr> <td style="width: 40%;">Primary RADIUS Server</td> <td> <table style="width: 100%;"> <tr> <td style="width: 40%;">Server IP address</td> <td><input type="text"/></td> </tr> <tr> <td>Authentication Port</td> <td><input type="text" value="0"/></td> </tr> <tr> <td>Accounting Port</td> <td><input type="text" value="0"/></td> </tr> <tr> <td>Shared Secret</td> <td><input type="text"/></td> </tr> </table> </td> </tr> </table> </div>	<input type="checkbox"/> Check Local Account first		<input checked="" type="radio"/> Accumulation <input type="radio"/> Time to Finish (No idle timeout)		Primary RADIUS Server	<table style="width: 100%;"> <tr> <td style="width: 40%;">Server IP address</td> <td><input type="text"/></td> </tr> <tr> <td>Authentication Port</td> <td><input type="text" value="0"/></td> </tr> <tr> <td>Accounting Port</td> <td><input type="text" value="0"/></td> </tr> <tr> <td>Shared Secret</td> <td><input type="text"/></td> </tr> </table>	Server IP address	<input type="text"/>	Authentication Port	<input type="text" value="0"/>	Accounting Port	<input type="text" value="0"/>	Shared Secret	<input type="text"/>
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Server IP address	<input type="text"/>														
Authentication Port	<input type="text" value="0"/>														
Accounting Port	<input type="text" value="0"/>														
Shared Secret	<input type="text"/>														

Billing Profile				
Currency: \$ (Number of decimals places: 2)				
No	Active	Name	Description	Profile Setting
01	<input checked="" type="checkbox"/>	Profile 1	1 day \$10.00	<a href="#">Edit</a>
02	<input type="checkbox"/>			<a href="#">Edit</a>
03	<input type="checkbox"/>			<a href="#">Edit</a>
04	<input type="checkbox"/>			<a href="#">Edit</a>
05	<input type="checkbox"/>			<a href="#">Edit</a>
06	<input type="checkbox"/>			<a href="#">Edit</a>
07	<input type="checkbox"/>			<a href="#">Edit</a>
08	<input type="checkbox"/>			<a href="#">Edit</a>
09	<input type="checkbox"/>			<a href="#">Edit</a>
10	<input type="checkbox"/>			<a href="#">Edit</a>
				<a href="#">Apply</a>

Default Billing Profile is used in this test scenario.

Scenario Guide			
Express way to fit your business model			
Items check	<input checked="" type="radio"/> Scenario A	<input type="radio"/> Scenario B	<input type="radio"/> Scenario C
PMS billing system	Yes <input type="checkbox"/> Output bill to AG Number of copies: 1	Yes	No
Infrastructure	Port-Location Mapping	General	General
Need username/password when guests go to Internet	No	Yes	Yes
Need to create static accounts	Option	Yes	Option
Allow guests to select service when first login	Yes	Yes	No
Billing mode	Time to Finish	Time to Finish	<input checked="" type="radio"/> Time to Finish <input type="radio"/> Accumulation Idle Timeout: 5 Min(s): (1 - 1440) Accumulation account will be deleted after logged in 7 days
BillingCharge mode	<input checked="" type="radio"/> Based on Room <input type="radio"/> Based on Subscriber	-	-
Default Billing Profile	Need to continue configuring "Billing" and choose at least one active	Need to continue configuring "Billing" and choose at least one active	<input type="checkbox"/> Allow Credit Card Payment

- Create a port location mapping table with all the VLAN ID that were set in the NCT240 IP DSLAM.

Port-Location Mapping	
<b>Single Create</b>	
Location Identifier (ID)	101
Port Identifier (ID)	101
Description	Room101
Status: <input type="radio"/> No Charge <input checked="" type="radio"/> Charge for use <input type="radio"/> Blocked	
<a href="#">Add to List</a>	

Address <http://10.59.1.1/enter.cgi> [Go](#) [Links](#) »

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**Port-Location Mapping List**

Location ID	Port ID	Description	Status	Delete
101	101	Room 101	Charge for use	<input type="checkbox"/>
102	102	Room 102	Charge for use	<input type="checkbox"/>
103	103	Room 103	Charge for use	<input type="checkbox"/>
104	104	Room 104	Charge for use	<input type="checkbox"/>
105	105	Room 105	Charge for use	<input type="checkbox"/>
106	106	Room 106	Charge for use	<input type="checkbox"/>
107	107	Room 107	Charge for use	<input type="checkbox"/>
108	108	Room 108	Charge for use	<input type="checkbox"/>
109	109	Room 109	Charge for use	<input type="checkbox"/>
110	110	Room 110	Charge for use	<input type="checkbox"/>
111	111	Room 111	Charge for use	<input type="checkbox"/>
112	112	Room 112	Charge for use	<input type="checkbox"/>
113	113	Room 113	Charge for use	<input type="checkbox"/>
114	114	Room 114	Charge for use	<input type="checkbox"/>
115	115	Room 115	Charge for use	<input type="checkbox"/>

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Address <http://10.59.1.1/enter.cgi> [Go](#) [Links](#) »

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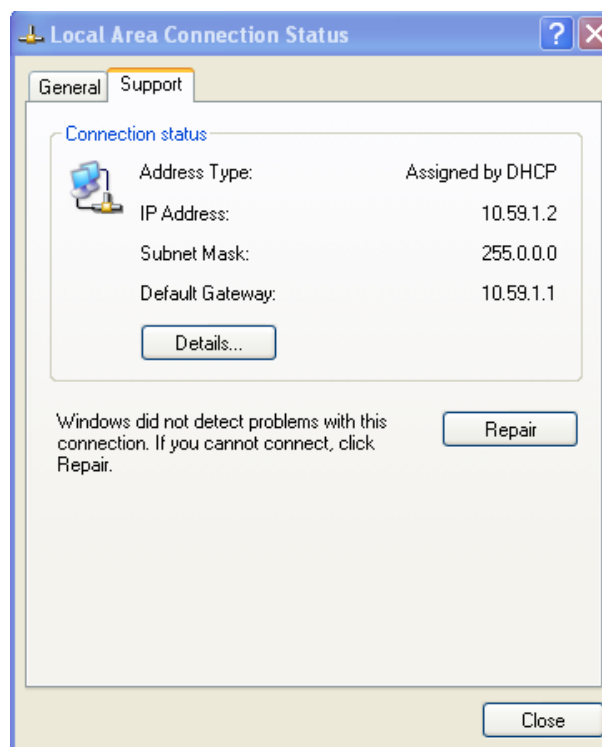
108	108		Charge for use	<input type="checkbox"/>
109	109		Charge for use	<input type="checkbox"/>
110	110		Charge for use	<input type="checkbox"/>
111	111		Charge for use	<input type="checkbox"/>
112	112		Charge for use	<input type="checkbox"/>
113	113		Charge for use	<input type="checkbox"/>
114	114		Charge for use	<input type="checkbox"/>
115	115		Charge for use	<input type="checkbox"/>
116	116		Charge for use	<input type="checkbox"/>
117	117		Charge for use	<input type="checkbox"/>
118	118		Charge for use	<input type="checkbox"/>
119	119		Charge for use	<input type="checkbox"/>
120	120		Charge for use	<input type="checkbox"/>
121	121		Charge for use	<input type="checkbox"/>
122	122		Charge for use	<input type="checkbox"/>
123	123		Charge for use	<input type="checkbox"/>
124	124		Charge for use	<input type="checkbox"/>

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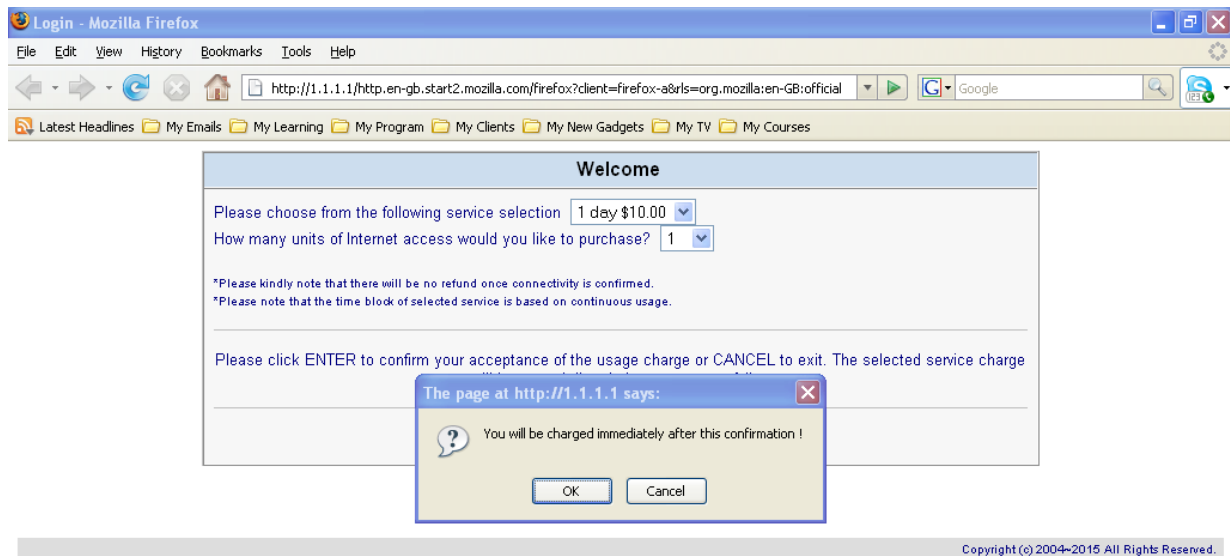
5. Save Configuration and Reboot System.
6. Back up configuration file & Port Location Mapping Table.

## Connect Test Modems & Test Internet Access

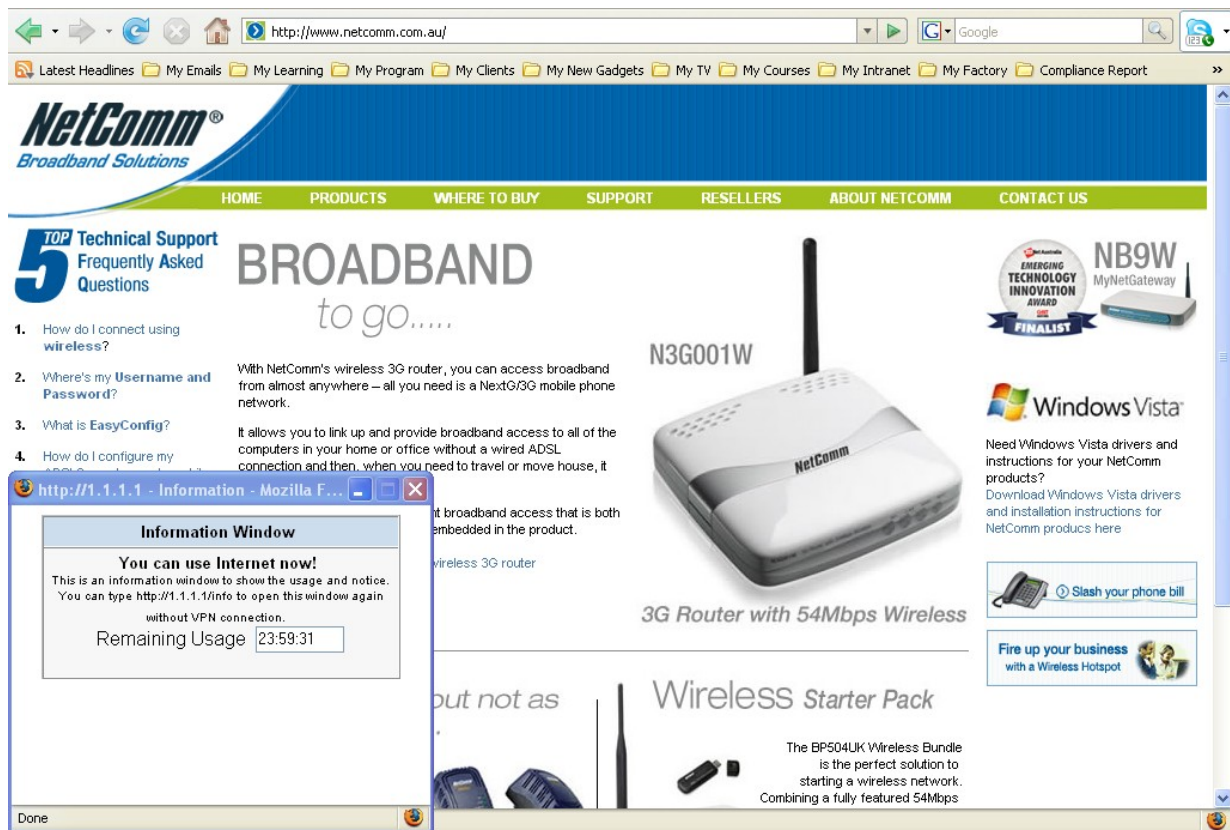
1. Set the test modems at the guest rooms to WAN: Bridged Mode; LAN DHCP Server OFF. If the CPE you are using is loaded with NetComm Bridged firmware, then there is no need to re-configure the modem in the room, it will be just a plug and play device for this test scenario.
2. Connect the test modems to an ADSL Port of the NCT240 DSLAM system (The ADSL data point socket in the guest room) and wait for ADSL light on the test modem turn solid green.
3. Connect test PC to the LAN Port of the test modem. (Note: TCP/IP setting of the PC is to be set to *obtain IP Address/ DNS address from DHCP server automatically*).
4. Wait for a valid IP address assigned by the IAC4500 to your subscriber PC.



5. Once a valid IP address received by the subscriber/guest room PC, open Internet browser & select and accepts Internet access condition and hit **Enter** then **OK**.



## 6. Surf the Internet. Test complete!



## Appendix A

To view or disconnect current IAC4500 login user, please login to the IAC4500 and navigate to Configuration Menu > System Status > Current User List

The screenshot displays the NetComm Internet Subscriber Server III web interface. The browser address bar shows `http://10.59.1.1/enter.cgi`. The page header includes the NetComm logo and the title "Internet Subscriber Server III PLUS AND PLAY SECURE ACCESS CONTROLLER".

On the left, a "Configuration Menu" sidebar lists various options: Configuration Menu, System Setting, Advanced Setting, System Status (selected), System, Current User List (highlighted), DHCP Clients, Session List, NAT Pool Table, LAN Devices, Billing Log, PMS Transaction, Static Routing Table, and System Tools.

The main content area is titled "Current User List" and features a "refresh" button and a "Print List" button. Below these is a table with the following data:

No.	Type	Username	Billing Profile	Login Time	Expiration	IP Address	MAC Address	Disconnect	
1	Location	101	1	Profile 1	2007/10/22 17:46:22	2007/10/23 17:46:22	10.59.1.2	00:0D:60:77:BC:FB	<input type="checkbox"/>

Below the table, there are two red buttons: "Disconnect" and "Disconnect All". At the bottom of the table area, there is a pagination control showing "1" of "1" pages, with navigation links for "First", "Previous", "Next", and "End".

The footer of the page contains the text "IAC4500", "Powered by Handlink Technology.", and "Internet Subscriber Server III".