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

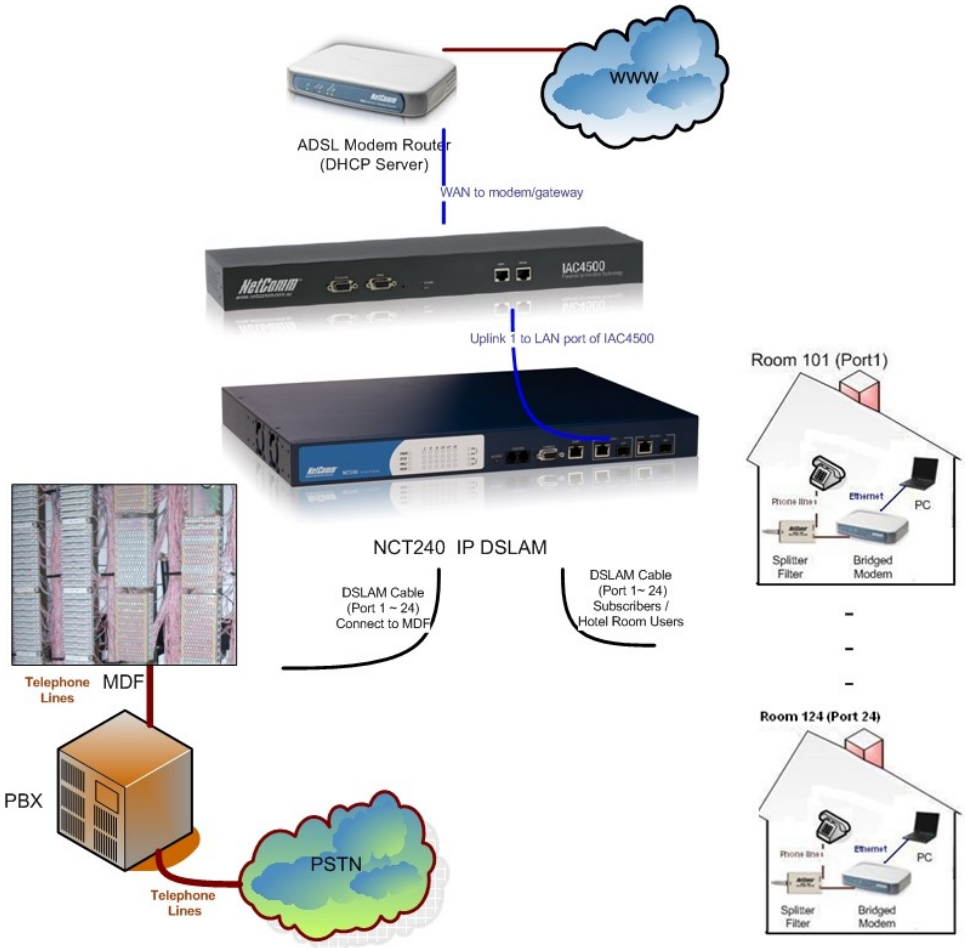


Figure 1: NCT240 with IAC4500 Internet Access Controller

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.

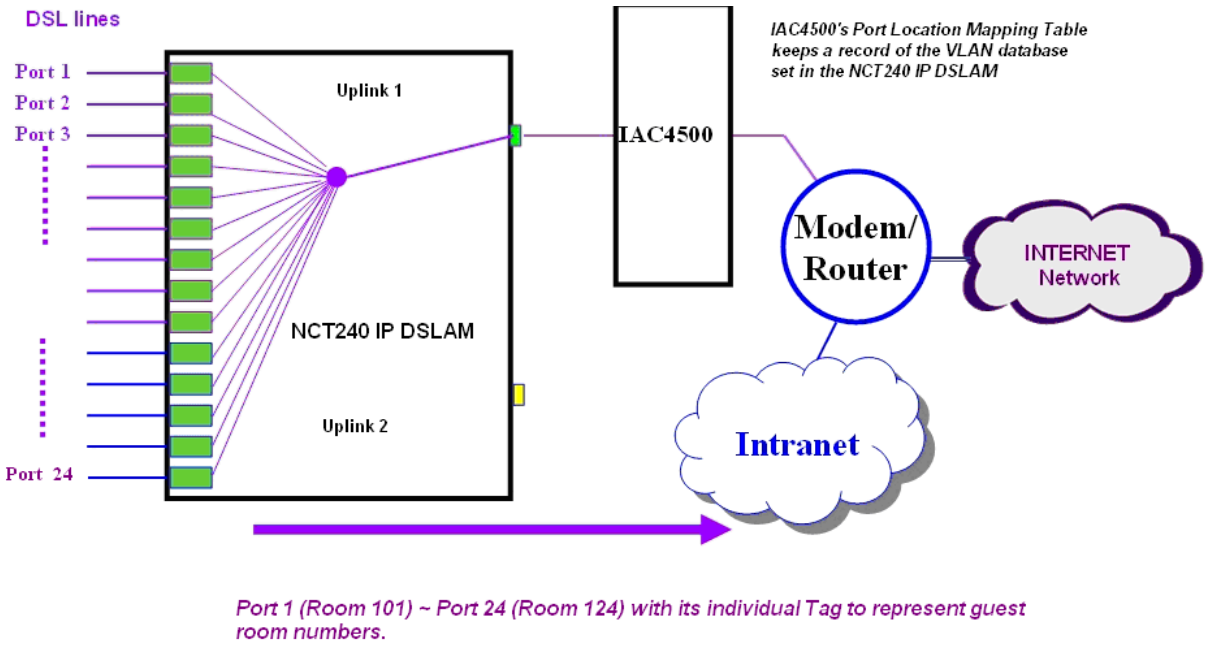


Figure 2: 802.1Q VLAN Tagging relationship between NCT240 and IAC4500

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 form 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.

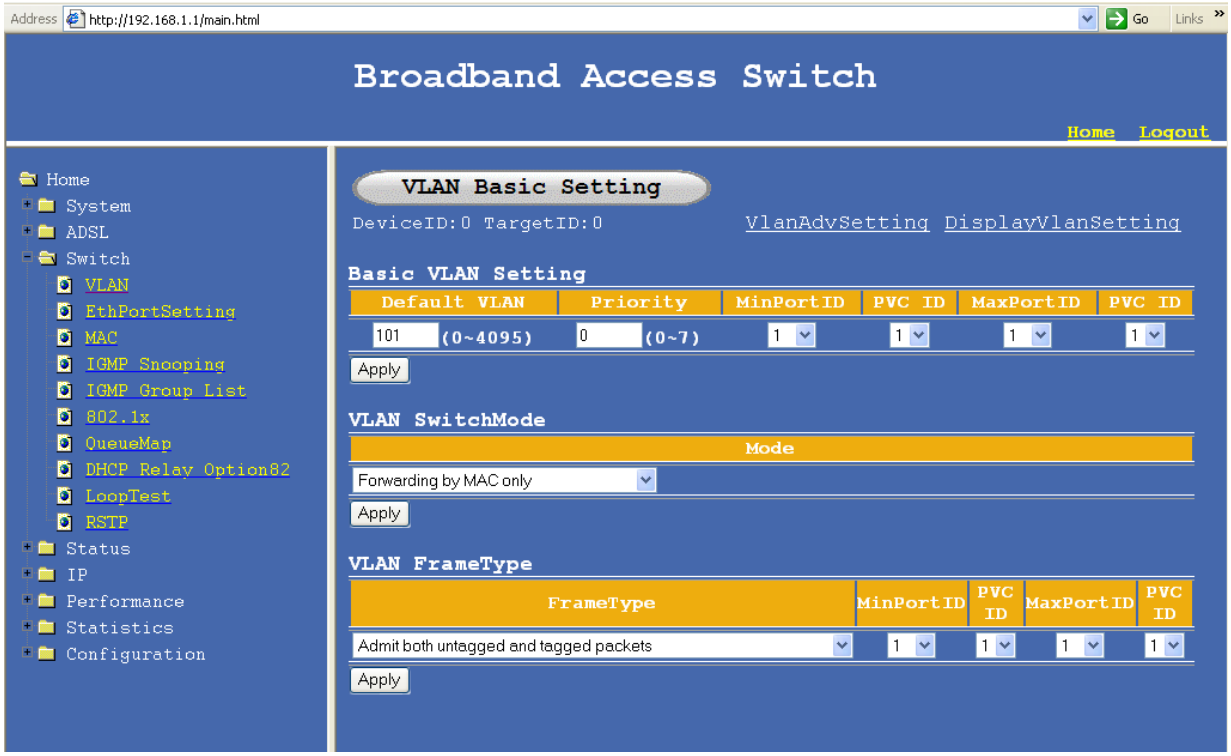
Please refer to screens shots shown in following section.

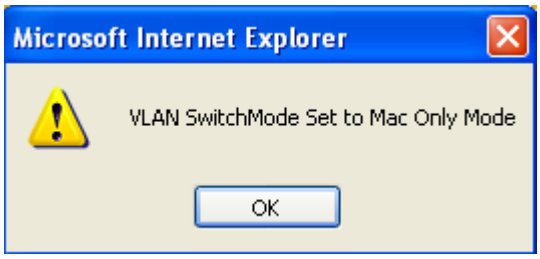
Step 1
Connect the PC to the management port. Manually configure your PC to 192.168.1.x address (eg: 192.168.1.2/24)

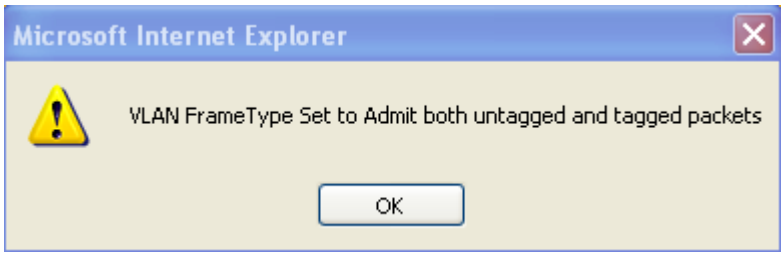
Login to NCT240 web management interface.
Default IP address for ixp0 (system management port): **192.168.1.1/24**
Default User Name: admin
Default Password: admin

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.

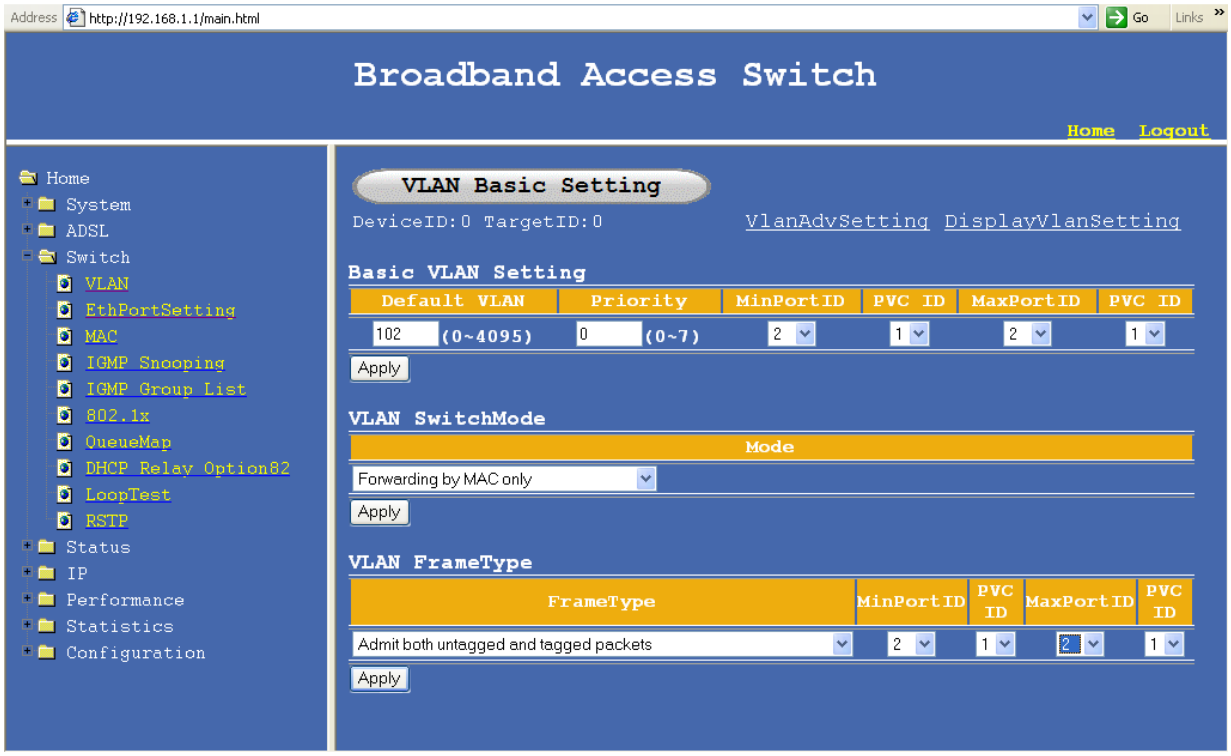




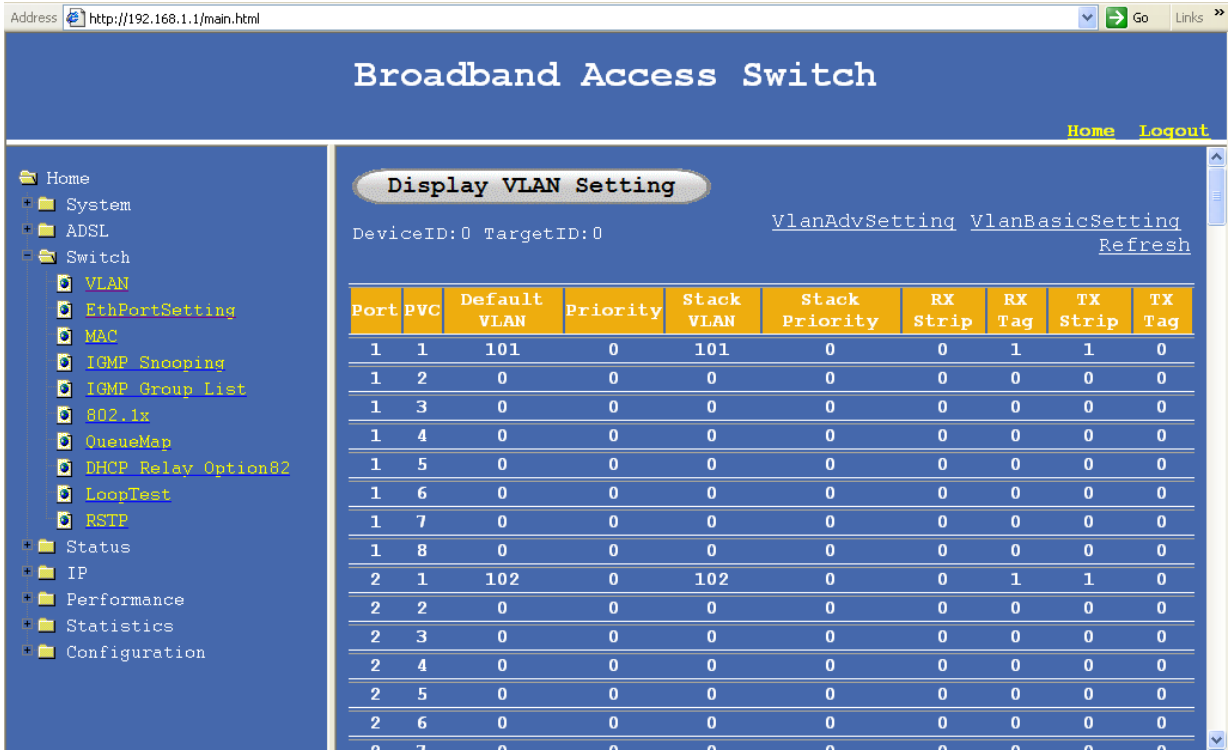


By following the above settings, it means that ADSL port 1 (PVC1: 8/35) packets are to be assigned with a VLAN 101 number and will be tagged as they leave the uplink of the NCT240 IP DSLAM. NCT240 will both admit untagged and tagged packets.

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

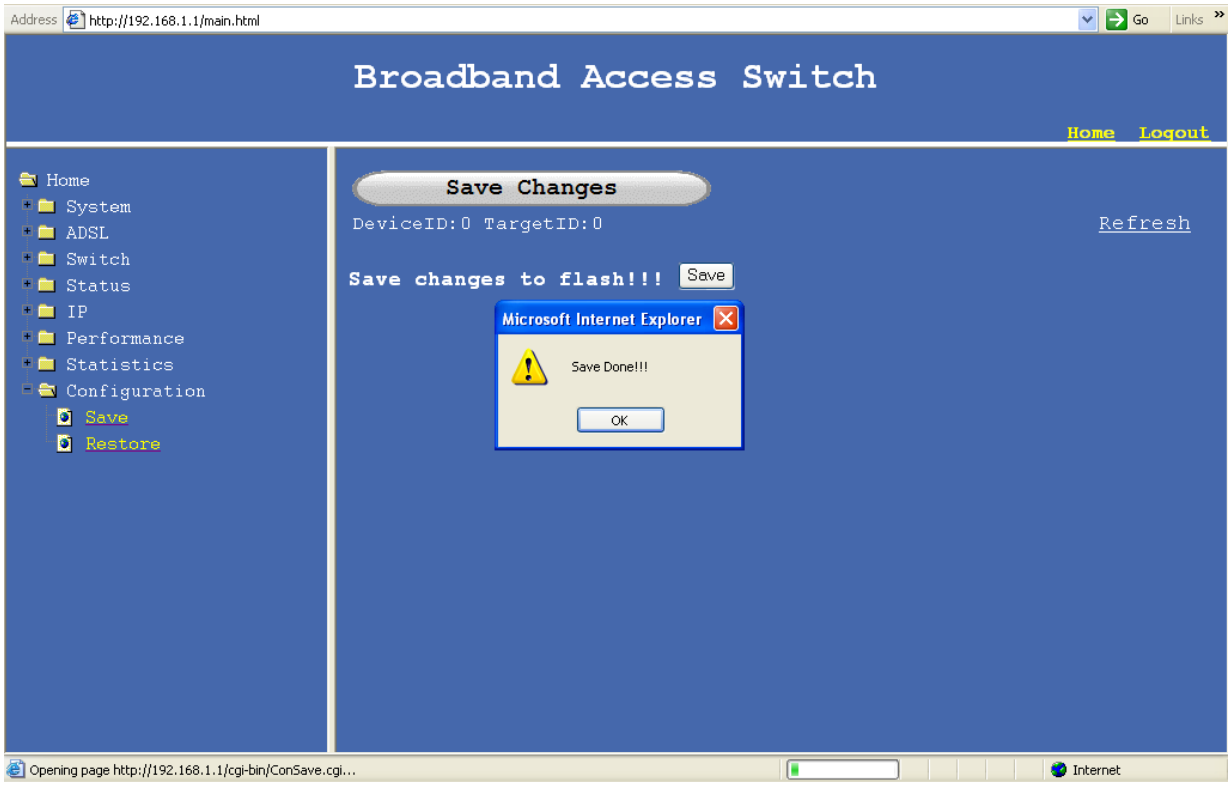


To view the current VLAN setting, click on ***DisplayVLANSettings*** to view the current VLAN information for all the 24 ADSL ports.



Step 2

Navigate to:
Home > Configuration > Save > click on Save then Ok.

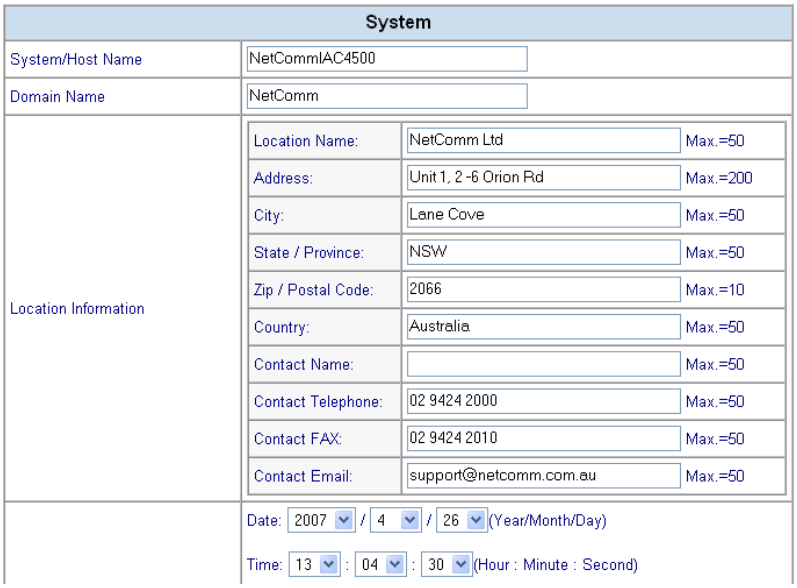


IAC4500 Internet Access Controller Configuration

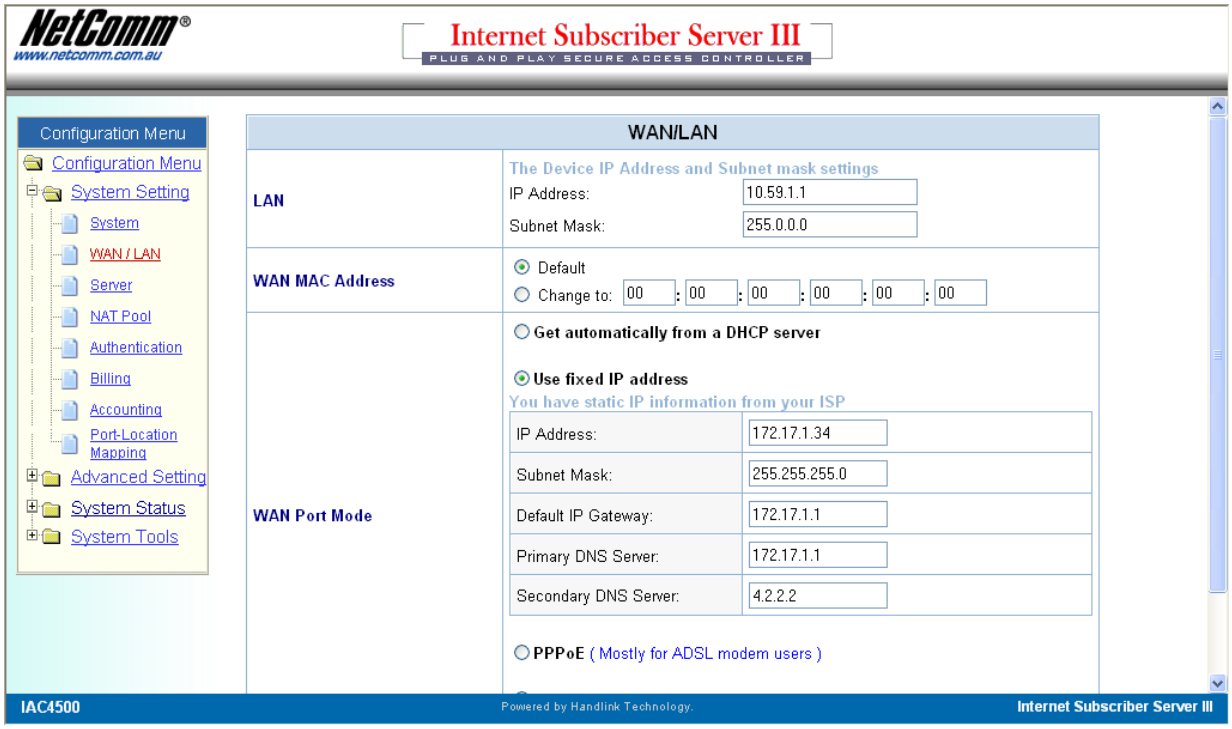
The following settings are made to the IAC4500. Connect the PC to the LAN port of the IAC4500.

IAC4500 Default IP Address: 10.59.1.1/8
Default User Name: admin
Default Password: admin

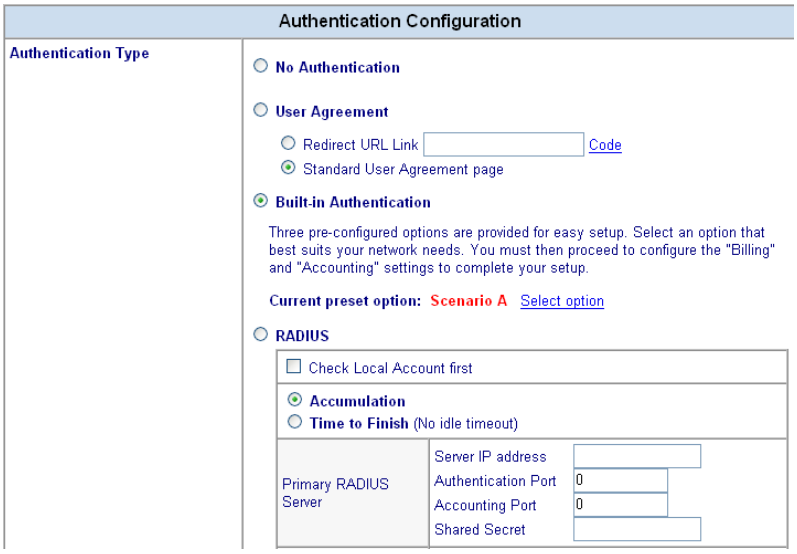
1. Enter all system information to the IAC4500



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.



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



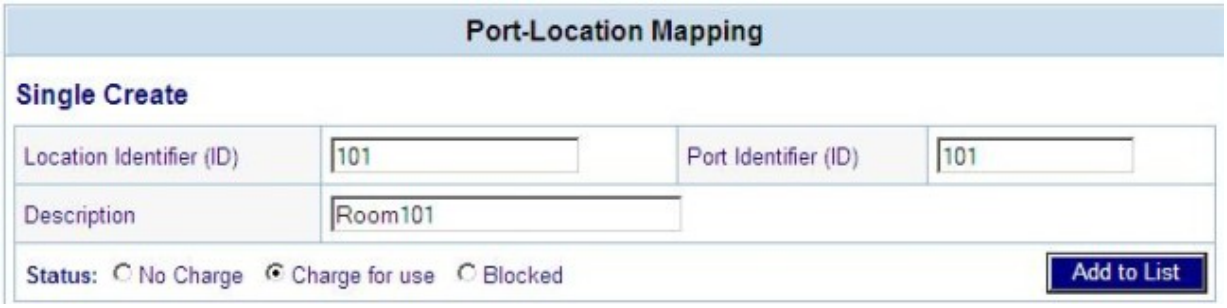
Default Billing Profile is used in this test scenario.

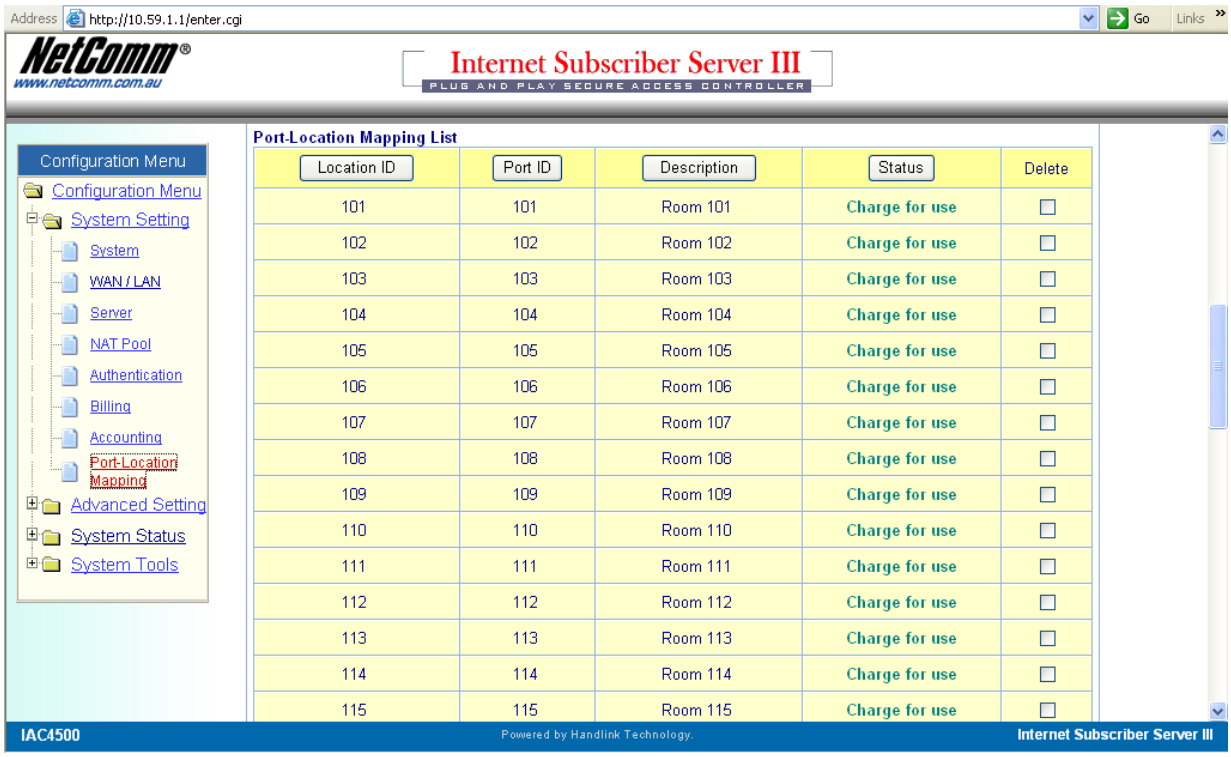
Scenario Guide

Express way to fit your business model

Items check	Scenario A	Scenario B	Scenario C
PMS billing system	Yes 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	Time to Finish Accumulation Idle Timeout 5 Min(s).(1 - 1440) Accumulation account will be deleted after logged in 7 days
Billing**Charge** mode	Based on Room Based on Subscriber	-	-
Default **Billing Profile**	Need to continue configuring "Billing" and choose at lease one active	Need to continue configuring "Billing" and choose at lease one active	Allow Credit Card Payment

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





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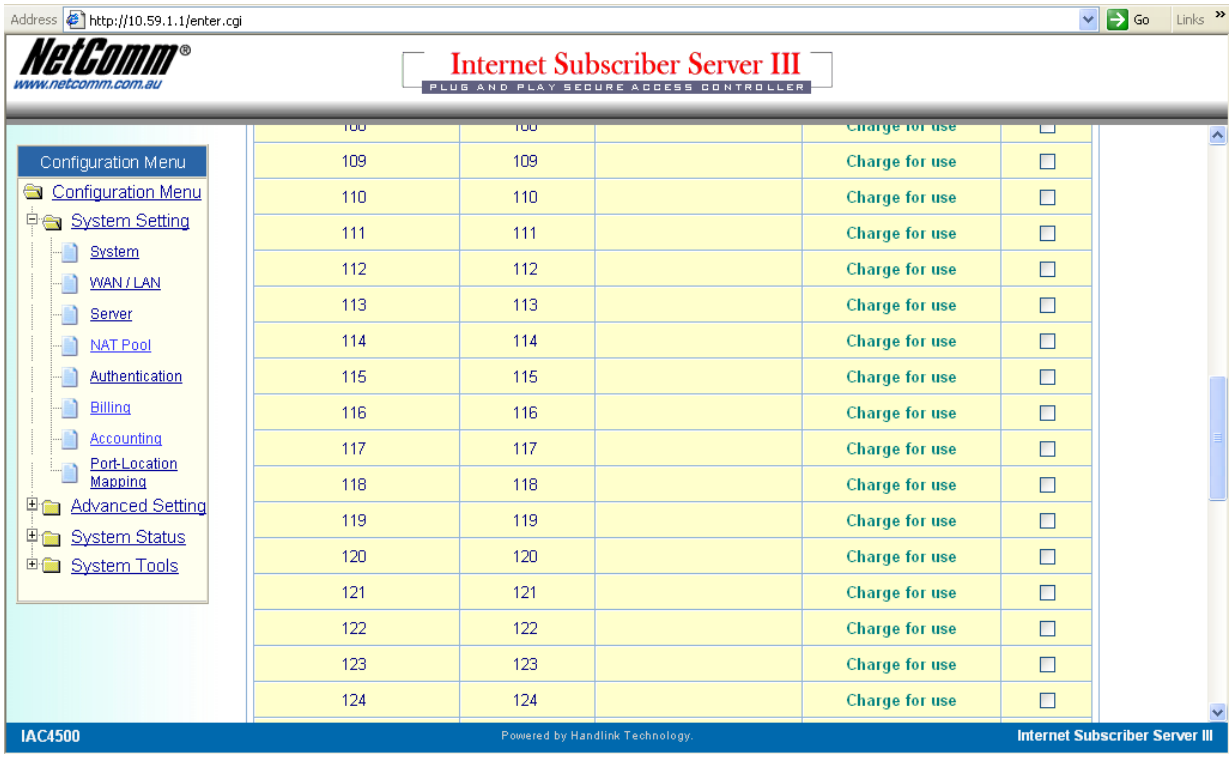
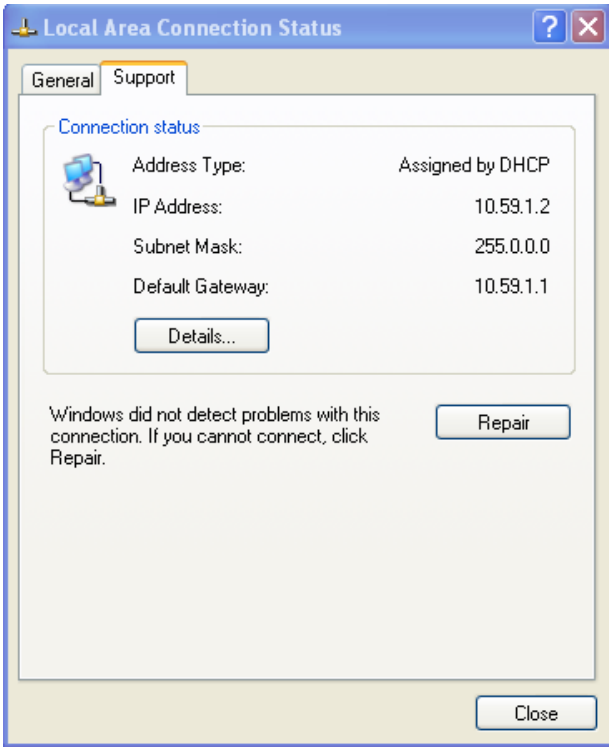


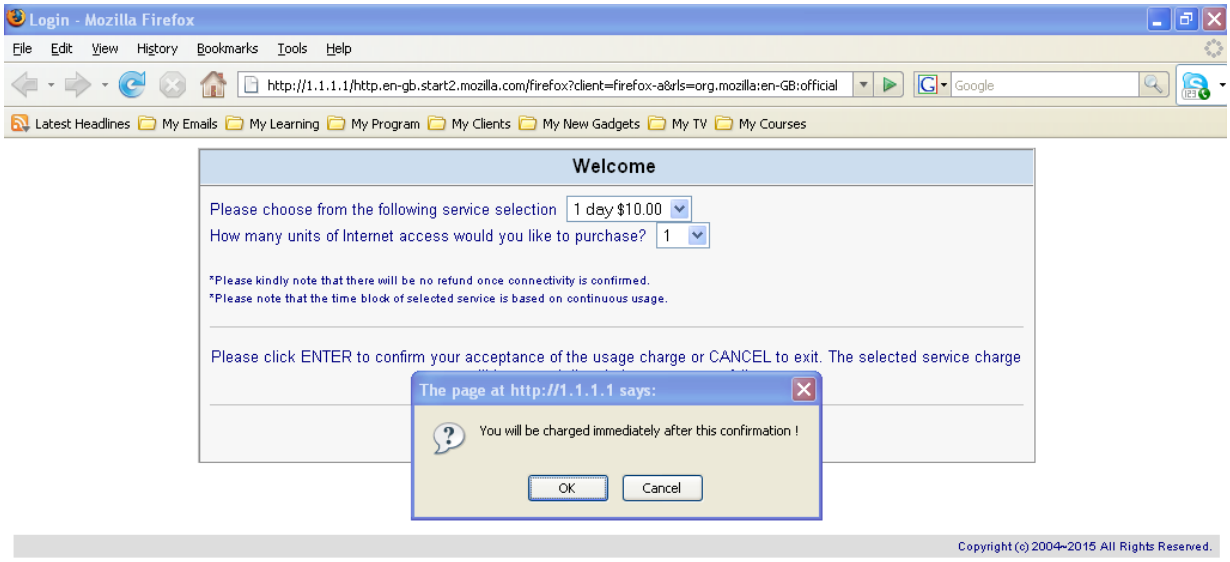
5. Save Configuration and Reboot System.
6. Back up configuration file & Port Location Mapping Table.

Connect Test Modems & Test Internet Access

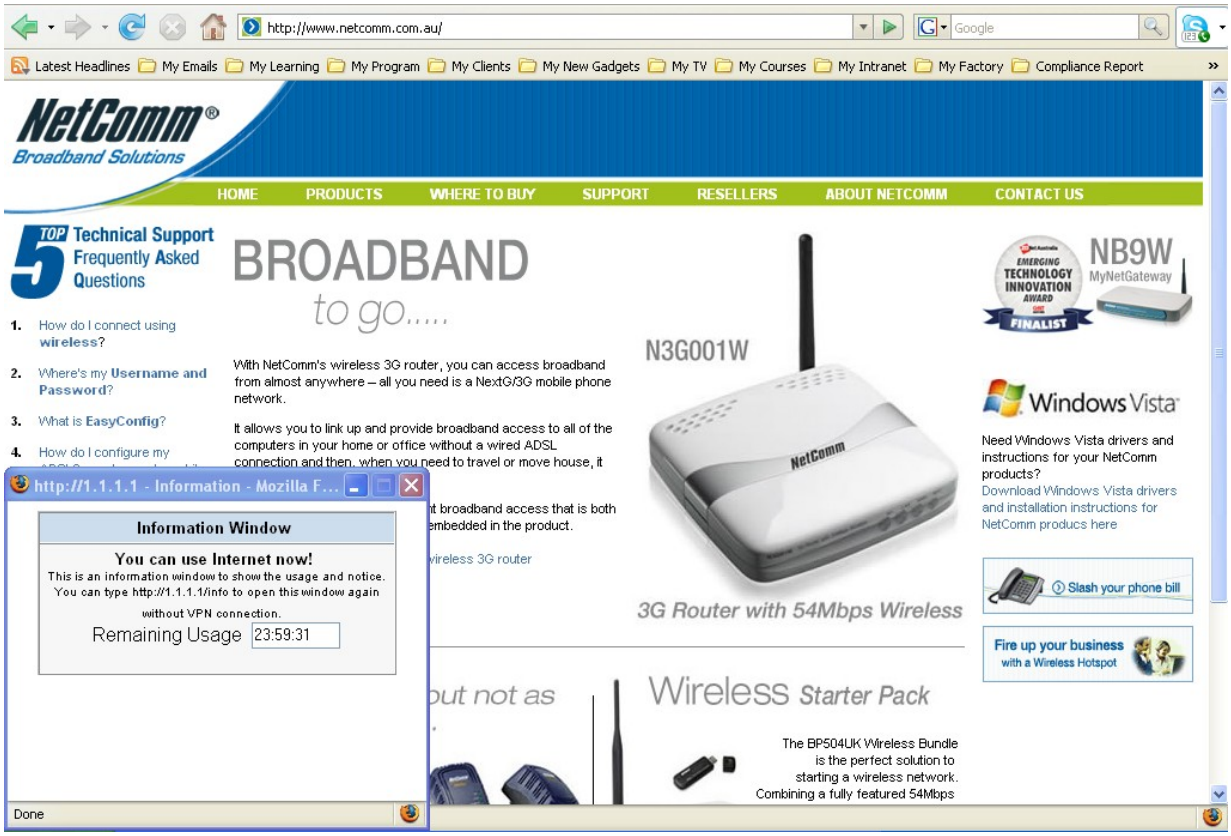
1. Set the test modems at the guest rooms to WAN: Bridged Mode; LAN DHCP Server OFF. If the CPE you are using is loaded with NetComm Bridged firmware, then there is no need to re-configure the modem in the room, it will be just a plug and play device for this test scenario.
2. Connect the test modems 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