

How to configure the IAC4500 Internet Access Controller for Billing by Volume Application with NCT480 IP DSLAM using port location mapping

Introduction

The following paper provides instructions on how to configure NetComm's IAC4500 Internet Access Controller with NetComm NCT480 IP DSLAM for 'billing by volume' application. It specifically focuses on the IAC4500's new feature 'billing by volume' under deployment scenarios A: Port Location Mapping for 802.1Q VLAN Tagging.

This document is being created at a time when the following versions of firmware were in production:

IAC4500: Firmware V1.02.05
NCT480: Firmware R2.32
(Note: IAC4500 with firmware V1.02.05 or later supports billing by volume)

The test PCs that used in this white paper were running WinXP with Internet browser IE7.0. (The web interface of the devices under test in this white paper are best viewed with Microsoft Internet Explorer 6.0 and above at 800 x 600 resolution)

It is recommended that the readers of this document has read and understood the IAC4500 & NCT480 user manual.

IAC4500 VLAN Management

The IAC4500 offers two methods of connection. User can either be issued a unique user name and password which is required on log in, or using VLAN tagging, the Port Location Mapping Feature in the IAC. 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.

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 NCT480 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 NCT480 and the IAC4500.



Port 1 (Room 101) ~ Port 48 (Room 148) with its individual Tag for IAC4500, for guest room



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The IAC4500 uses Port-Location Mapping (PLM) for Scenario A authentication only. Scenarios B and C are not covered in this paper. PLM insists that the network into which the IAC4500 is installed supports IEEE 802.1Q VLAN tagging for packets traveling between the IAC4500 and the network.

As the name suggests, PLM assigns a unique VLAN ID (VID) to each room or location in order to bill the room using a Property Management System (PMS, e.g. Micros Fidelio) installed at the premises.

The IAC4500's PLM feature will accept 802.1Q VLAN tagged packets and send back untagged packets to the device connected to a particular port. It is therefore important to confirm with the manufacturer of the 802.1Q VLAN device used on the network that it supports the ability to tag packets being sent to the IAC4500 and accept untagged packets being sent from the IAC4500 to the device.

Figure 1 illustrates the logical network diagram for NCT480 IP DSLAM working with an IAC4500.



Logical Network Diagram

Figure 1: NCT480 with IAC4500 Internet Access Controller

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NCT480 VLAN Management

There are 3 types of management interfaces available for NCT480 IP DSLAM system management. The web management interface, the CLI interface and the Telnet interface.

It is recommended to use the inbuilt web management interface for NCT480 system configuration. This white paper is written in the basis of using the web management interface of the NCT480 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, NCT480 will be configured to the following way in this test scenario.

- 1. All traffics from the 48 ADSL ports (data upstream direction) will leave the NCT480 with a VLAN tagged number (room number).
- 2. All the traffic coming from the IAC4500 to the NCT480 (data downstream direction) are with untagged default VLAN number 1.

The NCT480 running firmware R2.32 requires configuration make via its web interface to perform the above configuration. Please refer to screens shots shown in following section.

Step 1

Login to NCT480 web management interface. Default IP address for Eth-3 (system management port): 192.168.1.1/24 Default User Name: admin Default Password: admin

To check system firmware version, please navigate to Menu> System > Information

Alam O Ports d 8-195 A		25 59 22 27 41 43 28 32 27 41 43	Line 24-1 A
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🙆 Done			🔮 Internet

NCT480 R2.32 System Default Information

Navigate to:

Menu > Deployment > PVC Setting > Select "All Port" from the dropdown list and hit "Delete" to delete the default PVC. Then Click on "Bulk ADD" to recreate PVC for VLAN ID 101 ~ 148.

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Once "Bulk Add" completed.

The port will have a PVID of 101 ~ 148 instead of the default VLAN 1.

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Step 2

Navigate to:

Menu > Protocol > VLAN port > Ensure that the default VLAN ID is 1.

This means that all the downstream traffic from IAC4500 (untagged traffics) will be accepted and they will go via default VLAN group 1 in the Eth-1 to all the 48 ADSL ports of the NCT480.



Step 3

Navigate to: Menu > Protocol > Trunk VLAN Setting > ADD

This means Eth-1 will assign the data packets from VLAN group $101 \sim 148$ with their corresponding VLAN tag number when it leave the port to the IAC4500.

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Ethernet port-1 146 Tagged V	
Ethernet port-1 147 Tagged V	
Ethernet port-1 148 Tagged V	

Step 4

Navigate to: Menu > Commit & Reboot > Commit then Reboot system





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	NetCommIAC4500						
Domain Name	NetComm							
	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					
Location mornation	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 💌	🖞 : 🕜 💌 (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.

WAN/LAN Configuration Menu The Device IP Address and Subnet mask settings IP Address: 10.59.1.1 System Setting IP Address: IP Address: 10.59.1.1 Subnet Mask: 255.0.0.0 WAN/LAN IP Address IP Address: 10.59.1.1 Subnet Mask: 255.0.0.0 WAN MAC Address IP Charge to: IP Advanced Setting IP Address: IP Advanced Setting IP Address: IP Advanced Setting IP Address: IP Advanced Setting WAN Port Mode IP Advanced Setting IP Address: IP System Tools WAN Port Mode	Welformm.ev www.netcomm.com.eu		nternet Subscriber Se		
Configuration Menu System Setting System System WAN //LAN WAN //LAN NAT Pool Authentication Authentication Billing Accounting Port-Location Mapping System Tools WAN Port Mode WAN Port Mode The Device IP Address and Subnet mask settings IP Address: 10.59.1.1 Subnet Mask: 255.00.0 WAN MAC Address O Default O Get automatically from a DHCP server Vu have static IP information from your ISP IP Address: 172.17.1.34 Subnet Mask: 255.255.05 WAN Port Mode Default IP Gateway: 172.17.1.1 Server: 172.17.1.1 Secondary DNS Server: 42.2.2	Configuration Menu		WAN/LAN	1	
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	System Tools		Primary DNS Server: Secondary DNS Server:	172.17.1.1	
O PPPoE (Mostly for ADSL modern users)			O PPPoE (Mostly for ADSL	. modem users)	

 Set IAC4500 to use Built-in Authentication Scenario A – Bill by room number. Please navigate to Configuration Menu > System Setting > Authentication > Built-in Authentication > select option = Scenario A then click 'Apply' at the Scenario Guide and 'Apply' at the Authentication Configuration page



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🖉 http://10.59	.1.1/web8.cgi - Microsoft Inter	net Explorer provided by N	etComm		
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		scenario	Guide		
		Express way to fit you	r business model		
	Items check	Scenario A	O Scenario B	O Scenario C	
	PMS billing system	Yes Output bill to AG Number of copies	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 M (s),(1-140) Accumulation account will be deleted after logged in 7 days	
	BillingCharge mode	 Based on Room Based on Subscriber 	-	-	
	Default Billing Profile	Need to continue configuring "Billing" and choose at least one active billing profile	Need to continue configuring "Billing" and choose at least one active billing profile	Allow Credit Card Payment	
	Remarks	Need to continue configuring "Port-Location Mapping Table"			×
Done				Tr 😜 😜 Ir	iternet 🔍 90% 🝷 🛒

4. Create Billing Profiles. Please refer to screen shot below for three example billing profiles that used in this test scenario.

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Configuration Menu			Billing) Profile					
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MAT Pool	No	Active	Name	Description	Profile Setting				
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Billing	02	~	Profile 2	10 minutes \$1.00	Edit 📳				
Accounting Port-Location	03	V	Profile 3	25MB \$2.00	Edit 🗐				
Mapping	04				Edit				
Credit Card	05				Edit 📳				
Customization	06				Edit 📳				
Bandwidth	07				Edit 🗐				
Portal Page	08				Edit				
Advertisement	00								
Valled Carden	09						~		
IAC4500			Powered by	Handlink Technology.		Internet Subs	scriber Server III		

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Price		Duration	Charge	Check Time	Selective Unit					
		© 1 minute	0	Period Time finish	From:1 To:10					
		01	0	Period Time finish	From{1 To{10					
		® 1	10.00	Period Time finish	From:1 To:10					
	Time base	01	0	Expire when 00:01 Period Time finish	From:1 To:10					
		01	0	Expire when Sun. M 00:01 M Period Time finish	From:1 To:10					
		O Unlimited	0	Expire when 01 2 00:00						
		Volume		Charge						
	Traffic base	MByte Note: Do not support n	es (10~4000) nulti users using or	e account at the same time.						
Bandwidth	idth Note: You must activate the bandwidth management feature and select a class of service									
Limit	Maximum Upstream Ban	dwidth 💿 128 K	bps 🚽 🔿 0							
	Maximum Downstream B	Bandwidth 💿 512 K	bps 🖌 🔿 0							

🏉 http://1	0.59.1.1 <i>I</i> web140.	cgi - Microsoft I	Internet Exp	lorer provided by NetComm				
00-	🖉 http://10.59.1.1	1/web140.cgi						
File Edit	View Favorites To	ools Help						
* 🕸 👔	éhttp://10.59.1.1/we	b140.cgi				🏠 Home 🔻		
		DII	ing Prome sei	ung				
No	3							
Name	Profile 3							
Description	25MB \$2.00							
Price		Duration	Chause	Chaok Time	Coloctive Heit			
		Duration	Unarge	Check Time	Selective Unit			
			0	Period Time finish	To: 10			
			0		From:1			
			U	Period Time finish	то: 10			
				Period Time finish	From:1			
	0.7		U		101			
	○ Time base ○ Expire when ○U:UI M							
		01	0	Period Time finish	From: 1 To: 10			
				© Expire when Sun. ♥ 00:01 ♥				
					From:1			
		01	0	© Period Time finish	то: 10			
				○ Expire when 01 00:0(
		O Unlimited	0					
		Volume		Charge				
	Traffic base	25 MByte	es (10~4000)	2				
	Note: Do not support multi users using one account at the same time.							
Bandwidth Limit	Note: You must activate the bandwidth management feature and select a class of service							
	Maximum Upstream Ban	dwidth 💿 128 K	bps 🖌 🔿 🔿					
	Maximum Downstream B	andwidth 💿 512 K	bps 🋂 🖯 🛛					

Please note that traffic-based billing counts both the download and upload data volume.

 Create a port location mapping table with all the VLAN ID that were set in the NCT480 IP DSLAM. Please navigate to > system setting > port location mapping

	Port-Locat	ion Mapping	
Single Create			
Location Identifier (ID)	101	Port Identifier (ID)	101
Description	Room101		
Status: O No Charge	Charge for use C Blocked		Add to List

Address 🙆 http://10.59.1.1/enter.cgi 🖌 🄁 Go 🛛 Links 🂙 NetGomm® Internet Subscriber Server III PLUG AND PLA SECURE ACCESS CONTROLLER Port-Location Mapping List Configuration Menu Location ID Port ID Description Status Delete Configuration Menu 101 101 Room 101 Charge for use 🖻 🔄 System Setting 102 102 Room 102 Charge for use ---<u>-</u><u>System</u> 103 103 Room 103 Charge for use --- <u>Server</u> 104 104 Room 104 Charge for use 105 105 Room 105 Charge for use 106 106 Room 106 Charge for use --<u>Billing</u> 107 107 Room 107 Charge for use ---<u> Accounting</u> Port-Location Mapping 108 108 Room 108 Charge for use 109 109 Room 109 Charge for use E Advanced Setting 110 110 Room 110 Charge for use E System Status E System Tools 111 111 Room 111 Charge for use 112 112 Room 112 Charge for use 113 113 Room 113 Charge for use 114 114 Room 114 Charge for use 115 115 Room 115 Charge for use IAC4500 Internet Subscriber Serve

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Address 🛃 http://10.59.1.1/enter.cgi					*	🔁 Go 🛛 Links 🂙
Wetcomm.com.au		nternet Sub	DESCRIBER SERVER III	3		
	100	100		Charge for use		~
Configuration Menu	109	109		Charge for use		
Configuration Menu	110	110		Charge for use		
🖻 🗃 System Setting	111	111		Charge for use		
- <u>System</u>	112	112		Charge for use		
WAN/LAN	113	113		Charge for use		
NAT Pool	114	114		Charge for use		
Authentication	115	115		Charge for use		_
- Billing	116	116		Charge for use		
	117	117		Charge for use		
Port-Location	117	117		Charge for use		
Advanced Setting	118	118		Charge for use		
E System Status	119	119		Charge for use		
System Tools	120	120		Charge for use		
	121	121		Charge for use		
	122	122		Charge for use		
	123	123		Charge for use		
	124	124		Charge for use		
IAC4500		Powered by Han	i dlink Technology.	i -	Internet Sut	scriber Server III

6. Activate Bandwidth management according to Billing Profile settings: navigate to Configuration Menu > Advance Setting > Bandwidth Management > Select 'Bandwidth Management' and Select 'Class of Service based on RADIUS or billing profile settings' then click 'Apply'.

Aside: If you are planning to have equal bandwidth for all subscribers regardless which billing profiles they are under, you may select the first option on the Bandwidth management page.



7. Select the Property Management System (PMS). Click on PMS Configuration under System Settings > Billing and select the PMS and click Apply:

Billing Profile | PMS Configuration |

PMS Configuration							
Many hotels use PMS as a hotel in-door billing system for their guests including room service, mini-bar, telephone usage; as well as Internet service. By integrating with a hotel's PMS, the system can post charges for Internet access directly to a guest's hotel bill.							
Charge Mode (only for Port- Location Mapping enabled) ③ Based on Room ⑤ Based on Subscriber							
Regenerate password of static account with PMS checkout	Enable 🔽 (only for Scenario B)						
account with PMS checkout Image: Children Conty for Scenario B) Micros Fidelio Spectrum MK II Revenue Code 1 Description Internet Marriott Revenue Code Revenue Code 1 Revenue Code 1 PMS Type Marriott Revenue Code 1 Revenue Code 1 Revenue Code 1 Revenue Code 1 Reference Internet							
	 Proprietary 						

If the site does not have a listed PMS (Micros Fidelio, Spectrum MK II or Marriott, then select 'Proprietary' and use Net Retriever software (a middleware between IAC4500 and other PMS systems) to allow the IAC4500 to communicate and pass on the billing data to the PMS system. Then click 'Apply' to apply settings.

- 8. Save Configuration and Reboot System.
- 9. Back up configuration file & Port Location Mapping Table as they are two separate back up files.

Aside: This white paper does not include any IAC4500 management IP access list and IP/MAC/URL filtering as these settings varies from site to site. It is generally recommended that the appropriate settings are configured in the device to ensure some level of secure access control and that the necessary system log files are sent to system manager for system management.

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, like NB6Series_R2T8 Bridged modem then there is no need to reconfigure 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 NCT480 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.

🕹 Local A	rea Connection Status	? 🗙
General S	Support	
Connec	tion status	
2	Address Type:	Assigned by DHCP
~ <u>~</u>	IP Address:	10.59.1.2
	Subnet Mask:	255.0.0.0
	Default Gateway:	10.59.1.1
	Details	
Windows connecti Repair.	adid not detect problems with this on. If you cannot connect, click	Repair
		Close

5. Once a valid IP address received by the subscriber/guest room PC, open Internet browser. Attempt to access the Internet by browsing a website. If PLM has been setup correctly, the following page will be presented. You will then select and accepts Internet access condition and hit *Enter* then *OK*.

C	Login	- Micro	soft Inte	ernet Exp	olorer prov	ded by Ne	tComm													P 🗙
		- 🧧	http://1.	1.1.1/http.	www.google.c	:om.au/servic	e.cgi							•	< + , >	< G	oogle			P -
Fi	le Edit	View	Favorit	es Tools	Help														Lir	nks »
2	4	Coc	in										🟠 Home	•	S Feeds	; (J)	- 🖶 Prin	it 🔹 🔂 Page	🕶 💮 Tools	• »
Γ											_									~
									V	veicome	e									
				Please	choose fro	n the follov	ving serv	ice selectio	n 25	5MB \$2.00 day \$10.0)									
				*Please *Please	kindly note tha note that the t	t there will be ime block of s	e no refund elected se	d once connec rvice is based	ctivi 25 on con	5MB \$2.00) ige.									
				Please	click ENTE	R to confir	m your a	acceptance will be poste	of the ed dire	e usage cl rectly into	harge or (your gues	CANCEL st folio.	. to exit. T	'he s	elected s	ervice	e charge			
									Ente	er Can	icel									
									<u>NetC</u>	Comm Lim	nited									
								1	NetCo	omm NetA	ssure									
								1	VetAs	sure Dem	<u>io Site</u>									
L.									<u>NetAs</u>	ssure Live	e Site									
μ																Cop	yright (c) 20	04~2015 All Rig	hts Reserved.	



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This information will be sent to the PMS system via the PMS console port at the face panel of the IAC4500.

Note: if the following page is presented instead of the login page above, then the setup for scenario A: Port Location Mapping Billing is incorrect. Please review the above steps regarding port location mapping on devices mentioned above.

Welcome						
	Username:					
	Password:					
Enter						

6. Surf the Internet. Test complete!



(To view current IAC user list, please refer to Appendix A enclosed in this document.)

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

🖉 User Configuration Interface	e - Microsoft Internet Explorer provided by NetComm	_ 7 🗙
🔆 💽 👻 🙋 http://10.59.1.1/er	enter.cgi 💽 🄄 Karala Google	• •
File Edit View Favorites Tools	ls Help	Links »
🔶 🔅 🏉 User Configuration Inte	terface 💧 Home 🔹 🔊 Feeds (J) 🔹 🖨 Print 🔻 🔂 F	oage 🔹 🎯 Tools 🔹 🎽
WetComm.com.au	Internet Subscriber Server III	
Configuration Menu	Current User List	
Configuration Menu	refresh	Print List
System Setting	No. Type Username Billing Profile Login Time Expiration IP Address MAC Address	Disconnect
System Status	1 Location 102 3 Profile 3 2008/10/28 18:09:42 2008/11/02 18:09:42 10.59.1.10 00:0D:60:77:BC:FE	3
System Current User List	Disconnect Disc	connect All
DHCP Clients	MGD 1 Page Krist 4 Previous Next	: > End >>
Session List]
NAT Pool Table		
LAN Devices		
PMS Transaction		
Static Routing Table		
<u>System Tools</u>		
IAC4500	Powered by Handlink Technology. Internet St	ubscriber Server III

🖉 User Configuration Interfac	e - Microsoft Internet Explorer provid	led by NetComm		
	/enter.cgi		🖌 🛃 Koogle	P -
File Edit View Favorites To	ols Help			Links »
😭 🔅 🦉 User Configuration In	iterface		🚹 Home 🔹 🔊 Feeds (J) 🔹 🖷	Print 🔹 🛃 Page 🔹 🍈 Tools 🔹 🎇
WELEOTTIM® www.netcomm.com.eu		The Subscriber Server of the second s		
Configuration Menu			Billing Log	
Configuration Menu	refresh⊕			Export to Txt
System Setting Advanced Setting	No. Username/Location	Billing Profile Log Time	Usage Time/Volume	ill Service Type Charg
System Status	1 102	Profile 3 2008/10/28 18:09:42	25 MBytes 2	00 Private PN
Current User List	HGO 1 Page			ฬ First 🖪 Previous N
DHCP Clients				
Session List				
NAT Pool Table				
LAN Devices Billing Log				
PMS Transaction				
Static Routing Table				
E System Tools				
	<			>
IAC4500	I	^o owered by Handlink Technology.		Internet Subscriber Server III