

Application Note



Product: Ascom FreeNET VoWiFi
Purpose: Configuration Guide for Cisco 2000, 4400 Series WLAN Controllers and Aironet 1000, 1130, 1200 Series Access Points (LWAPP) running Cisco Version 4.x WLC software.
Date: November 9th, 2007

Introduction

This document outlines the necessary steps and guidelines to optimally configure Cisco 2000, 4400 Series WLAN Controllers and Cisco Aironet 1000, 1100, 1200 Series Access Points (LWAPP) with the Ascom FreeNET VoWiFi system.

This guide should be used in conjunction with the appropriate Cisco configuration guide(s) and is intended for someone knowledgeable on the configuration of Cisco WLAN systems and Ascom FreeNET VoWiFi systems.

The steps, screen shots, and command line syntax depicted throughout this document were based upon Cisco Controller model WLC2006 with software version 4.1.185.0.

Product Summary and Network Topology

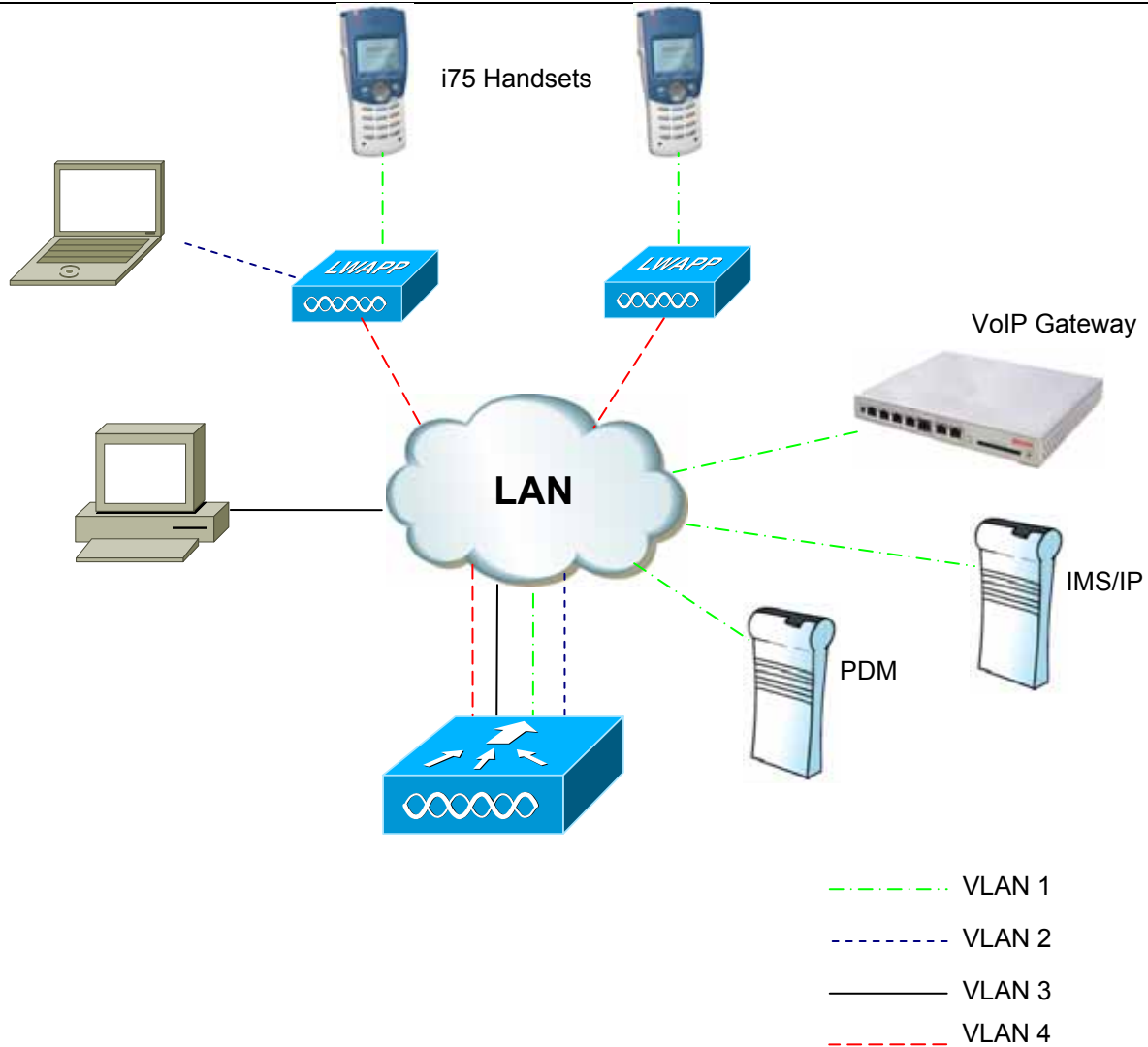
Manufacturer	Cisco Systems, Inc. www.cisco.com
WLAN Controller Products	2000, 4400 Series
Access Point Products	1000, 1130, 1200 Series AP (LWAPP)
WLC software version	4.1.185.0
I75 software version	1.4.21
Radio	802.11b/g
Encryption	WEP, TKIP, AES-CCMP
Authentication	PSK, 802.1X, CCKM
Quality of Service	WMM, U-APSD, DSCP, CoS (802.1p/q), TSPEC
Other IEEE Standards	802.11d

Please visit www.ascomwireless.com/pd to obtain the latest software or contact Ascom Technical Support at 1-877-71ASC0M and follow the software upgrade procedure outlined in the appropriate product manual.

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WLAN/LAN Preparations

1. The APs and WLAN Controllers should be operational and accessible on the network.
2. The appropriate edge and core switches and routers should be operational and configured appropriately based upon the configuration dependencies outlined in this document.
3. The routing and VLAN configurations should be operational and configured appropriately based upon the configuration dependencies outlined in this document.
4. The requirements for VoIP and VoWiFi outlined by the LAN/WLAN vendor and Ascom should be according to specification. See the FreeNET VoWiFi System Planning Guide for additional details.

Controller Configuration

1. Connect and login to the WLAN Controller via a web browser by navigating to the IP address of the particular WLAN Controller(s).
2. Navigate to Controller → General and disable Aggressive Load Balancing (See figure 1).

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General

802.3x Flow Control Mode	Disabled ▾
LWAPP Transport Mode	Layer 3 ▾
Ethernet Multicast Mode	Disabled ▾
Broadcast Forwarding	Disabled ▾
Aggressive Load Balancing	Disabled ▾
Peer to Peer Blocking Mode	Disabled ▾
Over The Air Provisioning of AP	Enabled ▾
AP Fallback	Enabled ▾
Fast SSID change	Disabled ▾
Default Mobility Domain Name	TAC_REF
RF-Network Name	TAC_REF
User Idle Timeout (seconds)	300
ARP Timeout (seconds)	300
Web Radius Authentication	PAP ▾
802.3 Bridging	Disabled ▾

Figure 1

3. Navigate to Controller → Interfaces and add a new Ascom voice VLAN (see figure 2). Setup the appropriate settings according to this particular VLAN configuration in your network.

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Interfaces > Edit

General Information

Interface Name	vlan 6
MAC Address	00:19:e7:66:e7:e0

Interface Address

VLAN Identifier	<input type="text" value="6"/>
IP Address	<input type="text" value="172.20.105.55"/>
Netmask	<input type="text" value="255.255.255.0"/>
Gateway	<input type="text" value="172.20.105.1"/>

Physical Information

Port Number	<input type="text" value="1"/>
-------------	--------------------------------

Configuration

Quarantine	<input type="checkbox"/>
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DHCP Information

Primary DHCP Server	<input type="text" value="172.20.105.1"/>
Secondary DHCP Server	<input type="text"/>

Figure 2

4. Navigate to Controller → QoS Profiles and edit the Platinum profile.
5. Set the Wired QoS Protocol – Protocol Type to 802.1P and set the 802.1P tag value to 6 (see figure 3).

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QoS Profile Name	platinum
Description	<input type="text" value="For Voice Applications"/>
Per-User Bandwidth Contracts (k) *	
Average Data Rate	<input type="text" value="0"/>
Burst Data Rate	<input type="text" value="0"/>
Average Real-Time Rate	<input type="text" value="0"/>
Burst Real-Time Rate	<input type="text" value="0"/>
Over the Air QoS	
Maximum RF usage per AP (%)	<input type="text" value="100"/>
Queue Depth	<input type="text" value="100"/>
Wired QoS Protocol	
Protocol Type	<input type="text" value="802.1p"/> ▼
802.1p Tag	<input type="text" value="6"/>
<i>* The value zero (0) indicates the feature is disabled</i>	

Figure 3

- Set the other QoS Profiles according to IEEE 802.11e UP in table 1 below.

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AVVID 802.1p UP-Based Traffic Type	AVVID IP DSCP	AVVID 802.1p UP	IEEE 802.11e UP
Network control	–	7	–
Inter-network control (LWAPP control, 802.11 management)	48	6	7
Voice	46 (EF)	5	6
Video	34 (AF41)	4	5
Voice control	26 (AF31)	3	4
Background (Gold)	18 (AF21)	2	2
Background (Gold)	20 (AF22)	2	2
Background (Gold)	22 (AF23)	2	2
Background (Silver)	10 (AF11)	1	1
Background (Silver)	12 (AF12)	1	1
Background (Silver)	14 (AF13)	1	1
Best Effort	0 (BE)	0	0, 3
Background	2	0	1
Background	4	0	1
Background	6	0	1

Table 1

Wireless Configuration

1. Navigate to Wireless → 802.11b/g/n → Network.
2. Verify that the 802.11b/g Network Status and 802.11g Support are enabled.
3. For optimum performance, set the data rates as illustrated in figure 4.

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802.11b/g Global Parameters	
General	
802.11b/g Network Status	<input checked="" type="checkbox"/> Enabled
802.11g Support	<input checked="" type="checkbox"/> Enabled
Beacon Period (milli-seconds)	<input type="text" value="100"/>
DTIM Period (beacon intervals)	<input type="text" value="5"/>
Short Preamble	<input checked="" type="checkbox"/> Enabled
Fragmentation Threshold (bytes)	<input type="text" value="2346"/>
Pico Cell Mode	<input type="checkbox"/> Enabled
DTPC Support	<input checked="" type="checkbox"/> Enabled
CCX Location Measurement	
Mode	<input type="checkbox"/> Enabled
Data Rates**	
1 Mbps	Mandatory
2 Mbps	Mandatory
5.5 Mbps	Mandatory
6 Mbps	Supported
9 Mbps	Supported
11 Mbps	Mandatory
12 Mbps	Supported
18 Mbps	Supported
24 Mbps	Supported
36 Mbps	Supported
48 Mbps	Supported
54 Mbps	Supported

Figure 4

4. Set the Beacon Period to 100ms and the DTIM Period to 5 (see figure 4).
5. Enable DTPC Support (see figure 4).
6. Navigate to Wireless → Country and select US for the Country Code (see figure 5).

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Country

[List of access point models and protocols supported per country and regulatory domain](#)

Configured Country Code(s) US

Regulatory Domain 802.11a: -AB
802.11bg: -AB

Select	Country Code	Name
<input type="checkbox"/>	AE	United Arab Emirates
<input type="checkbox"/>	AR	Argentina
<input type="checkbox"/>	AT	Austria
<input type="checkbox"/>	AU	Australia
<input type="checkbox"/>	BR	Brazil
<input type="checkbox"/>	BE	Belgium
<input type="checkbox"/>	BG	Bulgaria
<input type="checkbox"/>	CA	Canada

Figure 5

7. Navigate to Wireless → Access Points → Radios → 802.11b/g/n. You will see a list of all available APs for the WLAN Controller (see figure 6).

802.11b/g/n Radios

AP Name	Base Radio MAC	Admin Status	Operational Status	Channel	Power Level	Antenna
AP2	00:0b:85:52:21:f0	Disable	DOWN	11	5	Internal
AP77.c6e8.b2fe	00:16:46:2b:78:40	Enable	UP	11	1	External
APA	00:19:a9:cf:ce:c0	Enable	UP	1	2	External

Figure 6

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8. It is recommended to configure each individual AP's RF Channel Assignment and Tx Power Level Assignment manually. In order to efficiently perform this task, it's recommended to initially set the WLAN controller and APs to automatic mode, let the system stabilize and then manually set the RF Channel and Tx Power based upon the automatic calculation (see figure 7).

The screenshot shows two configuration sections. The first section, titled "RF Channel Assignment**", displays "Current Channel" as 11. Under "Assignment Method", the "Global" radio button is unselected, and the "Custom" radio button is selected, with a dropdown menu showing the value 11. Below this, a note states: "** Only Channels 1,6 and 11 are nonoverlapping". The second section, titled "Tx Power Level Assignment", displays "Current Tx Power Level" as 1. Under "Assignment Method", the "Global" radio button is unselected, and the "Custom" radio button is selected, with a dropdown menu showing the value 1.

Figure 7

WLANs

1. Navigate to the WLAN tab and create a new WLAN for the Ascom voice network.
2. Configure the following settings for this new WLAN (see figure 8):
 - Set the WLAN Status to Enabled
 - Set the Radio Policy to 802.11g only
 - Set the Interface to the Ascom Voice VLAN
 - Set the Broadcast SSID to Enabled
 - Configure the desired layer 2 security settings
 - Set the Quality of Service (QoS) to Platinum (voice)
 - Set the WMM Policy to Required
 - Set Aironet IE to Enabled

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The screenshot shows the 'WLANs > Edit' configuration page with the 'Security' tab selected. The configuration includes:

- Profile Name: Ascom
- WLAN SSID: ascom
- WLAN Status: Enabled
- Security Policies: **WEP**
(Modifications done under security tab will appear after applying the c...)
- Radio Policy: 802.11g only (dropdown menu)
- Interface: vlan 6 (dropdown menu)
- Broadcast SSID: Enabled

Figure 8

Quality of Service

WMM Power Save (U-APSD)

In order for the Ascom VoWiFi system to properly operate with U-APSD enabled, there are a couple of important items that must be configured correctly.

- a. The WLAN profile must have WMM enabled.
- b. The handset's uplink and downlink packet categorization must be symmetrical (e.g. RTP packets on uplink and downlink mapped to user priority 6). This requires proper QoS configuration of the LAN/WLAN as stated above.

Call Admission Control, TSPEC

If call admission control is desired, follow the below steps to configure the WLC(s) accordingly.

Note: The handset TSPEC Call Admission Control parameter must be enabled.

1. Navigate to Wireless → 802.11b/g/n → Voice

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2. Set Admission Control to Enabled
3. If desired, set Load-based AC to Enabled
4. Set the desired Max RF and Reserved Roaming Percentage (%) values

802.11b > Voice Parameters

Call Admission Control (CAC)

Admission Control (ACM) Enabled

Load-based AC Enabled

Max RF Bandwidth (%)

Reserved Roaming Bandwidth (%)

Expedited bandwidth

Traffic Stream Metrics

Metrics Collection

Figure 9

Related Documents

System Description VoWiFi System	TD 92313GB
Function Description VoWiFi System	TD 92314GB
Considerations for Ascom VoWiFi System Planning	TD 92408GB
Configuration Manual i75 VoWiFi Handset	TD 92431GB
Installation & Operation Manual Portable Device Manager, Windows	TD 92325GB
Installation & Operation Manual Portable Device Manager, System	TD 92378GB

Contact information

For any additional questions, please contact Ascom Technical Assistance Center at 1-877-71-ASCOM.