



Cisco AssureWave Wireless LAN Controller

Release 7.0.240.0 Test Results

Version History

Version number	Date	Notes
0.1	Feb 15, 2013	Draft
0.2	March 13, 2013	Final version

Executive Summary

AssureWave is a Cisco initiative that provides Wireless LAN service providers with their Cisco software version of choice.

The AssureWave program collects topology, application, and client information from various sources such as Sales Engineers, TAC and directly from customers to build test networks that simulate particular vertical environments. These test networks run additional scenarios based on this vertical information to better cover various interoperability matrices. The vertical test beds are built upon existing horizontal technologies such as Mobility, Voice, and Routing/Switching. In addition, existing Best Practices and Deployment Guides from the different technologies are referenced and deployed in the networks. This release tested the HealthCare, Retail, Enterprise and Higher Education vertical market scenarios.

The AssureWave program also proactively enlists additional testing from 3rd party partners in addition to any existing Cisco partnerships. This comprehensive testing of client and application interoperability results in a smoother introduction of a complete end-to-end wireless ecosystem.

This document summarizes what was tested for each market segment; in which specific combinations of devices and features were tested; a test summary and recommendation; and relevant open caveats.



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Contents

- Executive Summary..... 1**
- HealthCare Vertical Market 1**
 - What Was Tested.....1**
 - Healthcare Test Topology2**
 - Devices and Software Tested.....3**
- Retail Vertical Market 10**
 - What Was Tested..... 10**
 - Retail Test Topology 11**
 - Devices and Software Tested..... 12**
- Higher Education Vertical Market..... 16**
 - What Was Tested..... 16**
 - Education Test Topology 17**
 - Devices and Software Tested..... 18**
- Enterprise Vertical Market..... 22**
 - What Was Tested..... 22**
 - Enterprise Test Topology 24**
 - Devices and Software Tested..... 26**



HealthCare Vertical Market

What Was Tested

- Cisco Wireless LAN Controller (4400 , 5508, WiSM, WISM2 and 3750 Integrated) N-1 and N-2 upgrades (N-2, N-1 being previous major releases and N being current version).
- Cisco WCS N-1 Upgrade (N-1 being the previous major release and N being current version).
- Cisco Mobility Services Engine (MSE) Appliance N-1 Upgrade (N-1 being the previous major release and N being current version).
- Simultaneous client encryption methods—Open, WEP, WPA and WPA2.
- Simultaneous client EAP authentication modes—LEAP, PEAP, EAP-FAST, EAP-TLS.
- Layer 2 (inter/intra controller) and Layer 3 roaming scenarios (with voice and data clients).
- High Availability—Controller/AP, access layer failover testing.
- Voice clients including the Cisco 7921/25/26/9971, Spectralink 8030/8450, Ascom i62 and Vocera B2000/3000 badges with one-to-one, one-to-many (as applicable), wireless-to-landline, and PTT.
- Guest Access (wired and wireless) with Open/EAP authentication methods.
- Location tracking with data/voice clients and active RFID tags.
- Interoperability between various data, voice, and RFID devices on both the 2.4 and 5Ghz bands as applicable.
- Radio Resource Management (RRM) functionality
- IPv4 Media Streaming and Multicast with Roaming
- Vlan Pooling.
- Wireless Medical Patient Monitoring Systems , IV Pumps , etc. with WEP , WPA2-PSK security with a/b/g radios.
- SNMP stress



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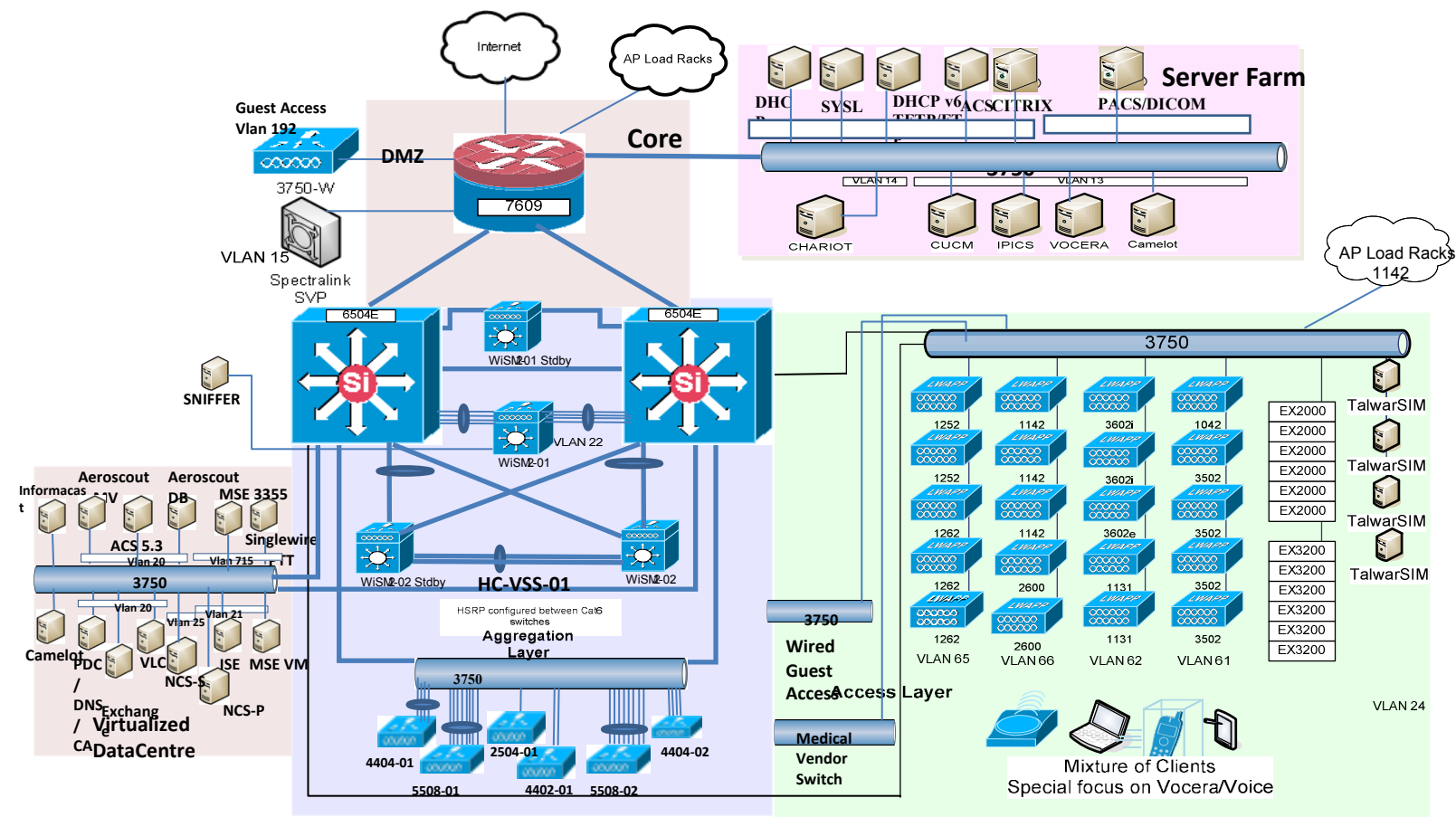
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Healthcare Test Topology

Figure 1 shows the test topology for the Healthcare vertical market.

Assurewave Topology - Healthcare



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Devices and Software Tested

The following devices and software were tested as part of the AssureWave healthcare vertical market.

Table 1 Infrastructure Devices Tested for Healthcare

Infrastructure Device Information	
Device	Version
WS-C6504-E w/WS-SUP720-3B w/WS-X6548-GE-45AF w/WS-SVC-WISM-1-K9 w/ WS-SVC-WISM2-K9 WS-C6504-E w/ VS-S2T-10G w/ WS-X6148-GE-45AF w/ WS-SVC-WISM2-K9 WS-C6504-E w/ VS-S2T-10G w/ WS-X6148-GE-45AF	12.2(33)SXJ4 15.0(1)SY2
WS-C3750G-24PS-S WS-C3750G-48PS-S WS-C3750X-48PS-S	12.2(44)SE 15.0(1)SE
CISCO7609 w/WS-SUP720-3B w/WS-X6548-GE-45AF w/WS-SVC-FWM-1-K9	12.2(33)SXJ2

Table 2 Controller and Access Point Devices Tested for Healthcare

Controller / Access Point Information	
Device	Version
AIR-WLC5508-500	7.0.240.0
WS-SVC-WISM2-1-K9	7.0.240.0
WS-SVC-WISM-1-K9	7.0.240.0
WS-C3750G-24WS-S25	7.0.240.0
AIR-LAP1131AG-A-K9	7.0.240.0
AIR-LAP1142N-A-K9	7.0.240.0
AIR-LAP1242AG-A-K9	7.0.240.0
AIR-LAP1252AG-A-K9	7.0.240.0
AIR-LAP1262AG-A-K9	7.0.240.0
AIR-CAP3502E-A-K9	7.0.240.0



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Controller / Access Point Information	
Device	Version
AIR-CAP3502I-A-K9	7.0.240.0
AIR-LAP1232AG-A-K9	7.0.240.0
AIR-LAP1042N-A-K9	7.0.240.0
AIR-AP1232AG-A-K9	12.3(8)JEE (as WGB)
AIR-AP1242AG-A-K9	12.4(25d)JA2 (as WGB)
AIR-AP1131AG-A-K9	12.4(25d)JA2(as WGB)

Table 3 Network Server Devices Tested for Healthcare

Network Server Information	
Server Type	Version
Microsoft AD, DHCP, DNS, TFTP and FTP Services	Windows 2008 R2 Server
Microsoft CA Services	Windows 2008 R2 Server
Microsoft IAS (NPS - Radius) Server	Windows 2008 R2 Server
Cisco ACS Radius Server	4.2(0) Build 124
Microsoft DHCPv6 Server	Windows 2008 Server (Standard)
Cisco ACS Radius Server	5.2.0.26
Microsoft Exchange Server 2010	Windows 2008 R2 Server
Cisco Identity Services Engine (ISE)	1.1.1.268
Cisco Unified Call Manager (CUCM)	8.6(2a)
Vocera Server	4.3/SP1
Vocera Client Gateway	4.3/SP1
Aero Scout Mobile View Server	4.4.3.9
VLC Media Player	2.0.5
Cisco WCS	7.0.240.0
Cisco WCS - Secondary	7.0.240.0
Cisco MSE 3355 Appliance	7.0.240.0
Linux RH SYSLOG/NTP Server	Linux RH Enterprise AS4
Spectralink SVP-100 Server (SRP)	230.009/071.002/173.037/174.037/175.037
Spectralink PRI GW	213.001/071.005/213.034/171.012/172.012

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Table 4 Application Products Tested for Healthcare

Application Information	
Application	Version
IPICS	2.0(2)
AeroScout Tag Engine	4.4.2.11
AeroScout MobileView Server	4.4.3.9
Singlewire Informacast	8.1.0
Singlewire Push To Talk	2.4.0
Citrix Presentation Server	4.5
Ekahau RTLS Engine	RTLS version 5.6.11
Ekahau Vision	1.7.14

Table 5 Voice Client Devices Tested for Healthcare

Voice Client Information	
Device	Version
Ascom i62 Phone	4.1.12
Cisco 7921 Phone	1.4.4.3
Cisco 7925 Phone	1.4.4.3
Cisco 7926 Phone	1.4.4.3
Cisco 9971 Phone	9.3.1.33
Spectralink 8030	119.081/131.030/132.030 (SIP)
Spectralink 8450	4.0.0.15769 (SIP)
Vocera Badge B2000/B3000	4.3/SP1 (Build 1942)
Vocera Smartphone	2.3.4.0119

Table 6 Laptop Client Devices Tested for Healthcare

Laptop Client Information			
Device	OS	Chipset	Driver
Acer Aspire AO722	Win 7 Pro SP1(32 bit)	Atheros AR5B125	9.2.0.412
Acer TravelMate 5744-6467	Win 7 Pro SP1 (64 bit)	Atheros AR5B125	10.0.0.221
HP Probook 4430s	Win 8 Enterprise (64 bit)	Atheros AR9285	10.0.0.221
Dell Latitude 5530	Win 7 Pro SP1 (64 bit)	DW 1540 a/g/n	5.100.82.112
Dell Latitude 5530	Win 8 Pro Enterprise (64 bit)	DW 1540 a/g/n	6.30.59.26
Dell Latitude 5430	Win7 Pro SP1 (64 bit)	Intel N 6205 AGN	15.1.1.1

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Laptop Client Information			
Device	OS	Chipset	Driver
HP UltraBook Folio 13-2000	Win 7 Pro SP1 (64 bit)	Intel N 1030 bgn	14.2.0.10
HP Probook 6560b	Win 7 Pro (64 bit)	Broadcom 43224 AGN	5.60.350.23
HP Elitebook 8460p	Win 7 Pro (64 bit)	Broadcom 43224 AGN	5.100.82.82
Lenovo X120e(AMD)	Win7 Pro SP1 (64 bit)	Lenovo 1x1 11b/g/n Half Mini Adapter	1003.10.1112.2010
Fujitsu Lifebook P701	Win7 Pro (32 bit)	Intel N 6205 AGN	15.1.1.1
Toshiba Tecra R850	Win7 Pro SP1 (32 bit)	Intel N 6230 AGN	14.1.1.3
Acer TravelMate 8481T	Win 7 Pro SP1 (64 bit)	Intel N 6205 AGN	15.1.1.1
HP 3115M	Win 7 Home Premium (64 bit)	Intel N 6230 AGN	14.2.0.10
Acer Aspire 3624WXM	WinXP/SP3	Atheros AR5005G	4.0.0.14001
Acer Aspire 9500	WinXP Pro (x86)	Atheros 5005G	4.0.0.14001
Apple MacBook Air	MacOS 10.6.7	AirPort Extreme	5.10.131.36.9
Apple MacBook Pro	MacOS 10.5.8	AirPort Extreme	1.4.16.2
Asus Eee PC 1016PT	Win7 Pro (x86)	Intel 6200 AGN	13.5.0.6
Asus Eee PC 900	WinXP Home (x86)	Atheros AR5007EG	5.3.0.45
Asus R1F K018E	Win7 Ent (x86)	Intel 3945ABG	13.3.0.24
Dell Latitude E5410	Win7 Pro (x86)	Intel 6200 AGN	13.3.0.24
Dell Latitude E5410	Win7 Pro (x86)	Intel 6300 AGN	14.2.0.10
Dell Latitude E5410	Win8 Pro (x64)	Intel 6300 AGN	15.6.0.19
Dell Latitude E5410	Win7 Pro (x86)	Dell DW1520 AGN	5.60.48.35
Sony Vaio SVE151D11L	Win7 Pro (64 bit)	Atheros AR9485WB-EG	9.2.0.489
Sony Vaio SVE151D11L	Win8 Pro (64 bit)	Atheros AR9485WB-EG	Microsoft 3.0.0.130
Fujitsu Lifebook LH530	Win7 Pro (x64)	Atheros AR9285 GN	8.0.0.258
Fujitsu Lifebook T4215	Win7 Pro (x86)	Intel 3945ABG	13.3.0.24
Fujitsu Lifebook T4410	Win7 Pro (x86)	Intel 5100 AGN	12.4.1.4
Fujitsu Lifebook T580	Win7 Pro (x86)	Atheros AR928X	10.0.0.75
HP EliteBook 6930p	Win7 Ent (x64)	Intel 5300 AGN	14.3.2.1
HP EliteBook 6930p	WinXP Pro (x86)	Intel 5300 AGN	13.4.0.9
HP ProBook 6455b	Win7 Pro (x86)	Broadcom 4313 BG	5.60.350.11

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Laptop Client Information			
Device	OS	Chipset	Driver
HP ProBook 6550b	Win7 Pro (x86)	Broadcom 43224 AGN	5.60.350.11
HP/Compaq Compaq 6530b	Win7 Ent (x64)	Intel 5100 AGN	14.3.2.1
HP/Compaq Compaq 6530b	WinXP Pro (x86)	Intel 5100 AGN	13.4.0.9
HP/Compaq Compaq 6730b	Win7 Ent (x86)	Intel 5100 AGN	13.3.0.24
HP/Compaq Compaq 6830s	Win7 Ent (x86)	Intel 5100 AGN	13.3.0.24
HP/Compaq Compaq 6910p	Win7 Ent (x64)	Intel 4965 AGN	12.4.1.4
Lenovo N100	WinXP Pro (x86)	Intel 3945 AG	13.4.0.139
Lenovo SL400 2743-89U	Win7 Ent (x86)	Intel 5100 AGN	13.3.0.24
Lenovo T61	WinXP/SP3 (x86)	Intel 3945 AG	13.3.0.137
Motion Computing MC-C5v	Win7 Pro (x86)	Intel 6200 AGN	14.2.0.10
Motion Computing MC-F5	WinXP/Tablet/SP3	Intel 3945 ABG	13.4.0.139
Motion Computing J3400	Win7 Pro (x86)	Intel 5300 AGN	13.3.0.137
Panasonic ToughBook CF-52	Win7 Pro (x86)	Intel 5100 AGN	13.4.0.9
Panasonic ToughBook CF-U1	Win7 Ent (x86)	Intel 5100 AGN	13.1.1.1
Sony Vaio PCG-6Q1L	Win7 Ent (x86)	Intel 3945 ABG	12.4.1.4
Sony Vaio/PCG-7133L	Win7 Ent (x64)	Intel 4965 AGN	13.3.0.137
Sony Vaio/PCG-7X1L	Win7 Ent (x86)	Intel 3945 AG	13.4.0.139
Toshiba Satellite A135-S2386	WinXP Pro (x86)	Linksys WPC600N	4.150.31.0
Toshiba Satellite A135-S4467	Win7 Ent (x86)	Intel 3945 AG	12.4.1.4
Toshiba Satellite U205-S5034	WinXP Pro (x86)	Intel 3945 AG	13.3.0.137
Toshiba Tecra A9-S9018X	WinXP Pro (x86)	Intel 4965 AGN	13.4.0.139
Toshiba Tecra M10-S3452	Win7 Ent (x64)	Intel 5100 AGN	13.4.0.9

Table 7 Tablet/Smartphone Devices Tested for Healthcare

Tablet/Smartphone Client Information		
Device	OS	Version
Apple iPod Touch	iOS	6.1.2 (10B146)
Apple iPad 2	iOS	6.1.2 (10B146)
Apple iPad 3	iOS	6.1.2 (10B146)
Apple iPhone 4S	iOS	6.1.2 (10B146)

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Tablet/Smartphone Client Information		
Device	OS	Version
Apple iPhone 5	iOS	6.1.2 (10B146)
Archos 43 Internet Tablet	Android	2.3.26
Samsung Galaxy Tab 7	Android	2.2.1
Google Nexus 7	Android	4.2.2 / 4.1.2
Samsung Galaxy Tab 8.9	Android	4.0.4
Samsung Galaxy Tab 10	Android	4.0.4
Dell Streak 7	Android	2.2.2
Asus Transformer TF101	Android	4.0.3
Toshiba THRiVE Tablet AT105	Android	4.0.4
Sony Tablet S SGPT111US	Android	3.2
Lenovo Thinkpad Tablet	Android	4.0.3
Motorola XOOM	Android	4.0.3
Blackberry Playbook	Blackberry	1.0.5.2342

Table 8 Supplicant Devices Tested for Healthcare

Supplicant Information	
Device	Version
Cisco AnyConnect	3.1.00495
Microsoft Windows ZeroConfig	Windows XP Pro, Win7 , Windows 8 , Intel Proset , HP Connection Manager

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Table 9 Other Client Devices Tested for Healthcare

Other Client Information	
PDA/Handhelds	Version/Comments
Motorola MC75A (Healthcare version)	WM 6.5 Classic/CE OS 05.02.21840
Tags/Exciters	Version/Comments
AeroScout Active RFID Tags	T2, T2 w/Call Button, T3, T4, T5h, T6
AeroScout EX2000B Exciters	BOOT 60702/DSP 30811
AeroScout EX3210 Exciters	BOOT 60702/DSP 30811
Ekahau Active RFID Tags (CCX Mode)	T301A, T301B, T301BD, T301Ex, T301i, T301is, T301t, T301W
Medical Devices	Version/Comments
CareFusion Alaris PC 8015 Series IV Pumps w/Systems Manager	PCU SW: 9.5.32.2, SM: 9.0
Dräger Infinity Delta Monitors w/Central Station	VFW-8.3
Dräger M300 Monitors w/Central Station	VF8.10
Nihon Kohden BSM-6501A/6701A Monitors w/Central Station	IPL: 01-03, CPU: 03-10, CHR: 03-10 Radio – 4.54
Philips IntelliVue X2/MP2 Patient Monitors w/Central Station	App Sw - J Version J.10.30 / Radio SW version A.01.09 / Hw Revision – A.00.12
Philips IntelliVue MX40 Patient Monitors w/Central Station	Sw Version B.1.0.22 / Hw Rev A.01.00
Baxter Spectrum Smart IV Pumps (b & b/g radio battery Module)	v6.02.06
WelchAllyn Vital Signs Monitor (CVSM 6000)	1.70.03
WelchAllyn Propaq LT	Radio FW: 2.30.02
WelchAllyn Micropaq	Radio FW: 2.30.02
Other	Version/Comments

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Retail Vertical Market

What Was Tested

- Cisco Wireless LAN Controller (4404, WiSM, WiSM2, 5508 and 7510 Integrated) N-1 and N-2 upgrades (N-2, N-1 being previous major releases and N being current version).
- Cisco WCS N-1 Upgrade (N-1 being the previous major release and N being current version).
- Cisco Mobility Services Engine (MSE) Appliance N-1 Upgrade (N-1 being the previous major release and N being current version).
- Simultaneous client Encryption/Authentication modes (e.g. WEP, WPA,WPA2, 802.1x with various methods).
- Layer 2 (inter/intra controller) and Layer 3 roaming scenarios (inter/intra controller with voice and data clients).
- High Availability (including Controller/AP, access layer failover testing).
- Voice clients including the Cisco 7920/7921 with PPT.
- Handheld clients including Symbol handhelds(MC9090, MC7090, MC3090, MC5590), Intermec handhelds(CK3, CN3, CK31), Psion 7535 G2, and PSC handhelds(Falcon 4420)
- Application-specific and Point of Sale scenarios with various Symbol, Intermec, HHP, Falcon handhelds, Zebra QL320 plus printers, Hobart wireless scales, Cisco's video surveillance solution.
- Hybrid-REAP with central and local switching, web-auth with roaming, voice, L2 roaming, CCKM, and IGMP snooping
- Guest Access (wired and wireless) with various authentication (open / local account / RADIUS account)
- Location tracking with data/voice clients and active Intermec, tags.
- Client interoperability testing with CCX and non-CCX handhelds, smart phones, laptops.
- Radio Resource Management (RRM) functionality
- IRCM(Inter Release Controller Mobility) with Layer 2 / Layer 3 roaming
- ClientLink with legacy clients



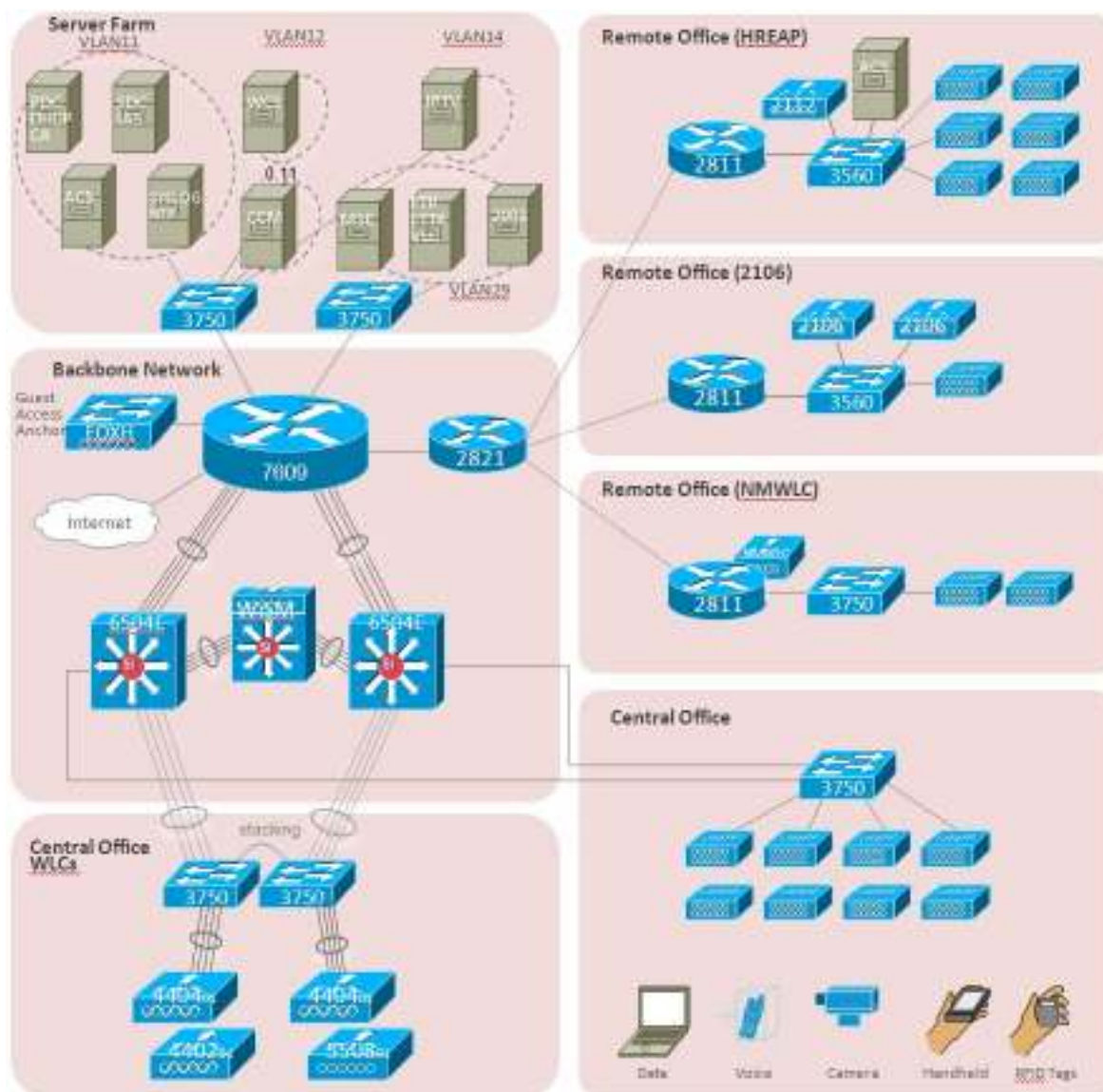
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Retail Test Topology

Figure 2 shows the test topology for the Retail vertical market.



Devices and Software Tested

The following devices and software were tested as part of the AssureWave Retail vertical market.

Table 10 Infrastructure Device Devices Tested for Retail

Infrastructure Device Information	
Device	Version
WS-C6504-E w/WS-SUP2T w/WS-X6548-GE-45AF w/WS-SVC-WISM-1-K9 w/WS-SVC-WISM-2-K9	15.0(1)SY1
WS-C3750G-48PS-S WS-C3750E-24PS	15.0(1)SE3 12.2(25)SEE2,
CISCO7609 w/WS-SUP720-3B w/WS-X6548-GE-45AF WS-SVC-FWM-1-K9	12.2(33)SXJ2
Cisco 2611XM Terminal Servers (4)	12.3(6f)
Cisco 2811/2821 ISR	12.4 (24)T

Table 11 Controller and Access Point Devices Tested for Retail

Controller/AP Information	
Device	Version
WS-SVC-WISM2-1-K9	7.0.240.0
AIR-WLC4404-100	7.0.240.0
WS-C3750G-24WS-S25	7.0.240.0
NME-AIR-WLC8-K	7.0.240.0
WS-SVC-WISM-2-K9	7.0.240.0
WS-SVC-WISM-1-K9	7.0.240.0
AIR-WLC2106-K9	7.0.240.0
AIR-LAP1242AG-A-K9	7.0.240.0
AIR-LAP1131AG-A-K9	7.0.240.0
AIR-LAP1252AGN-A-K9	7.0.240.0
AIR-AP1242AG-A-K9	7.0.240.0
AIR-AP1131AG-A-K9	7.0.240.0
AIR-AP1232AG-A-K9	12.3(8)JEE (as WGB)



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Controller/AP Information	
Device	Version
AIR-AP1242AG-A-K9	12.4(25d)JA2 (as WGB)

Table 12 Network Server Devices Tested for Retail

Network Server Information	
Device	Version
Microsoft DHCP Server	Windows 2003 SE/SP1 Server
Microsoft DNS Server	Windows 2003 SE/SP1 Server
Microsoft TFTP/FTP Server	Windows 2003 SE/SP1 Server
Cisco ACS Radius Server	5.2.0.26
Microsoft CA	Windows 2000 Server/SP4
Cisco Unified Call Manager (CCM)	v7.1.5.33900-10
Cisco WCS	7.0.240.0
Cisco MSE 3350	7.0.240.0
Cisco IPTV Server	3.5.7.1 (on Windows 2000/SP4 Server)
Linux RH SYSLOG Server	Linux RH Enterprise AS4
Linux RH NTP Server	Linux RH Enterprise AS4
ACS-Express	5.1
Point Of Sale Server	Windows 2003 SE/SP1 Server
Cisco Video Surveillance Operations Manager	SUSE Linux / Cisco VSOM v6.3.1

Table 13 Voice Client Devices Tested for Retail

Voice Client Information	
Device	Version
Cisco 7921 Phone	1.4.2

Table 14 Laptop Clients Devices Tested for Retail

Laptop Client Information			
Device	OS	Chipset	Driver
HP Compaq 6910p	WinXP pro/SP3	Intel 4965ABGN	14.3.2.1
IBM T61	WinVistaBus/SP2	Intel 4965AGN	14.3.2.1

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Laptop Client Information			
Device	OS	Chipset	Driver
IBM T61	Win XP pro/SP3	Intel 4965AGN	14.3.2.1
MacBookAir	MacOS 10.5.8	AirPort Extreme ABGN (Broadcom BCM43xx 1.0)	5.10.91.21
Asus Eee Box B202	WinXP home/SP3	Ralink 802.11n wireless	1.1.0
Dell E5410	Win7 pro	Intel 6300AGN	15.1.1.1
Dell inspiron 1525	Win XP pro/SP3	Dell 1505 draft 11n	4.170.25.12
Toshiba	Win Vista home	Intel 3945AG	13.4.0.139
Cisco	CB Adaptor	CB21ag	4.2
Fujitsu	Win 7	Intel Advanced 6205	15.1.1.1
Fujitsu	Win 7	Intel Advanced 6205	14.0.0.113
Sony Vaio	Win 7	Intel 6200 AGN	13.3.0.24
HP 6450B	Win 7	Broadcom 43224 A/G/N	5.60.48.36
HP mini and a Realtek	Win 7	RT3090 B/G/N version	3.1.16.1
Compaq mini with version	Win 7	Broadcom 4313 B/G/N	5.60.350.11 driver

Table 15 Supplicant Devices Tested for Retail

Supplicant Information	
Device	Version
Cisco Secure Services Client	5.1.1.18
Intel ProSet	13.1.1.0, 14.1
Cisco Aironet Desktop Utility	4.5.0.84
Microsoft Windows ZeroConfig	Windows XP Pro, Vista
OAC (Odyssey)	4.52, 4.60
Fusion (windows CE)	2.57.0.0.022B-CE-PHOTON
Fusion (Windows Mobile)	2.55.1.0.010R-WM-PHOTON

Table 16 Other Client Devices Tested for Retail

Other Client Information	
PDA/Handhelds	Version/Comments
Intermec CK31 (2), 761 (2)	WinCE 4.20.0/FW 3.00.19.0748
Intermec CK3	WinMobile 6.1
Intermec CN3	WinCE 5.0

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Other Client Information	
PDA/Handhelds	Version/Comments
Intermec CK30	WinCE.NET
Psion 7535 G2	WinCE 5.0
Psion Workabout Pro Gen II	WinCE 5.0
PSC Falcon 4420 (27)	WinCE 4.20.0/FW 1.80
Symbol MC9060G (4)	WinCE 4.20.0/Version 3.17
Symbol MC9090CR	Windows Mobile 5.0
Symbol MC9060G	WinCE 4.20.0/Version 3.17
Symbol MC7090	Windows Mobile 5.0
Symbol MC3090	WinCE 5.0
Symbol MC5590	Windows Mobile 6.5
Symbol WT4090	WinCE 5.0
Symbol PPT8846	WinCE 4.20
Symbol MK2250	WinCE 4.20/ AirBEAM CE client 2.16
Datalogic FalconX3	Windows Mobile 6.3 Pro , Summit Client Utility version 3.03.11

Other	Version/Comments
Cisco VTAdvantage w/Camera	2.0.1
Intermec CV60	Mobile Vehicle Computer/WinXP
Intermec CV30	Mobile Vehicle Computer/WinCE 5.0
Motorola VC5090	Mobile Vehicle Computer/WinCE 5.0
Zebra QL320 , QL420	11.71
Cisco CIVS-IPC-2500W	Wireless IP camera v1.1 (802.11bg)
TRENDnet TV-IP410W/A IP Camera	Wireless IP camera (802.11bg)
Hobart QUANTUM	Wireless scale With Symbol Spectrum NIC (802.11b)

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Higher Education Vertical Market

What Was Tested

- Cisco Wireless LAN Controller (WiSM and 5508) N-1 and N-2 upgrades (N-2, N-1 being previous major releases and N being current version).
- Cisco WCS N-1 Upgrade (N-1 being the previous major release and N being current version).
- Cisco Mobility Services Engine (MSE) N-1 Upgrade (N-1 being the previous major release and N being current version).
- Cisco Mobility Services Engine (MSE) Appliance N-1 Upgrade (N-1 being the previous major release and N being current version).
- Simultaneous client Encryption/Authentication modes (e.g. WEP, WPA, WPA2, WebAuth, and 802.1x with various methods).
- Layer 2 (inter/intra controller) and Layer 3 roaming scenarios, with and symmetric tunneling.
- High Availability (including Controller/AP, access layer failover testing) with HSRP and redundant supervisors for WiSM modules.
- Guest Access (wired and wireless) with various authentication methods.
- Multicast Traffic to Wireless Clients.
- Device profiling
- BitTorrent file sharing traffic to Wireless Clients.
- Networked Gaming Applications between Wireless Clients.
- Rogue Access Point and Rogue Client detection and containment.
- Security applications and appliances scanning/attacking network infrastructure including but not limited to Codenomicon, QualysGuard, NMAP, and Nessus.
- Radio Resource Management (RRM) functionality



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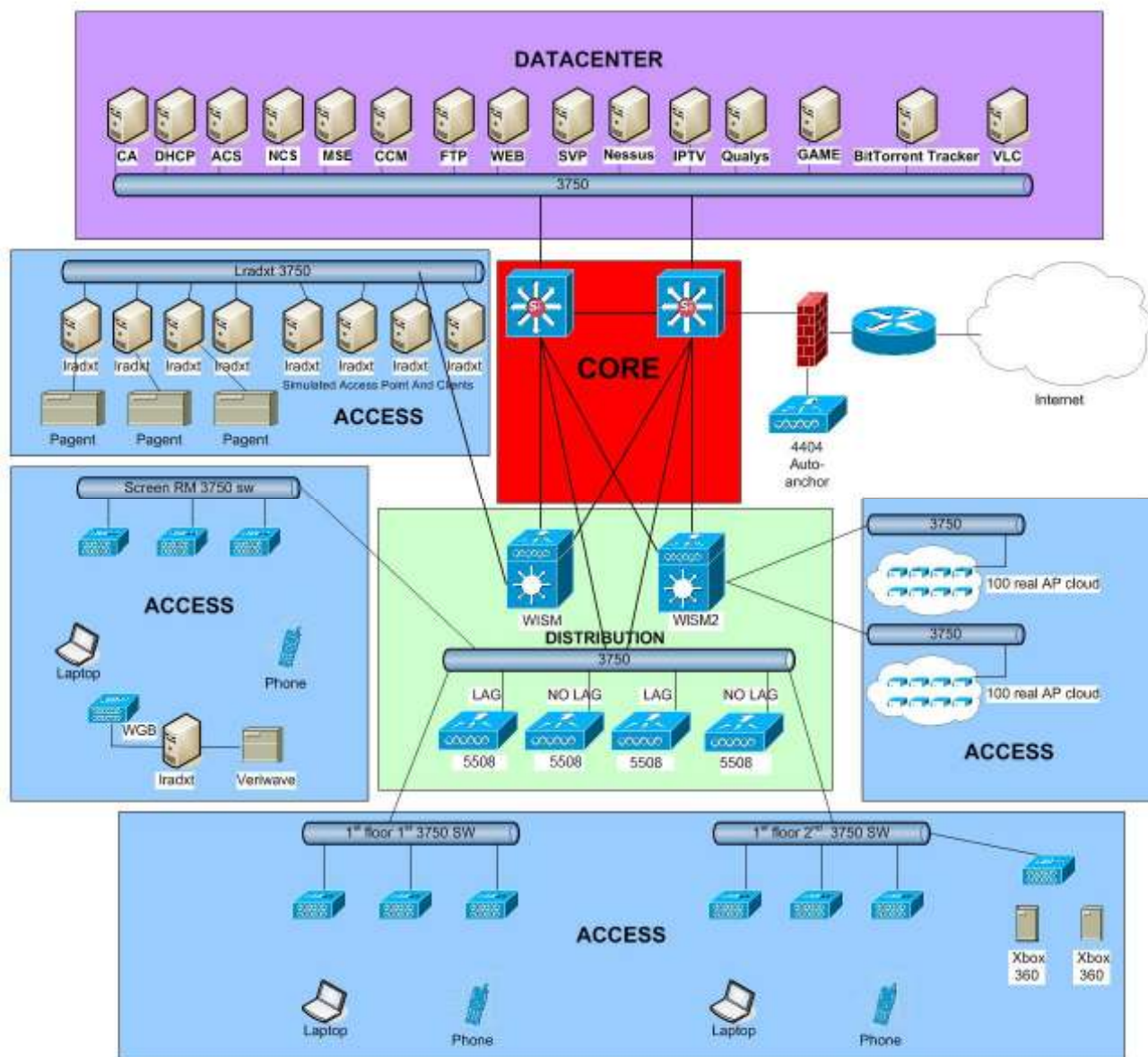
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Education Test Topology

Figure 3 shows the test topology for the Higher Education vertical market.

AssureWave: Education Vertical



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Devices and Software Tested

The following devices and software were tested as part of the AssureWave Higher Education vertical market.

Table 17 Infrastructure Devices Tested for Education

Infrastructure Device Information	
Device	Version
WS-C6504-E w/WS-SUP720-3B w/WS-X6548-GE-45AF w/WS-SVC-WISM-1-K9 w/WS-SVC-WISM-2-K9	12.2(18)SXF7 12.2(33)SXJ
WS-C3750G-24PS-S WS-C3750G-48PS-S WS-C3750E-24PD	12.2(25)SEE3, 12.2(44)SE, 12.2(37)SE1, 12.2(25)SEB4,
CISCO7609 w/WS-SUP720-3B w/WS-X6548-GE-45AF	12.2(18)SXF
Cisco 2611XM Terminal Servers (3)	12.4(12)
Catalyst 4506	12.2(40)SG(2.41)

Table 18 Controller and Access Point Devices Tested for Education

Controller/AP Information	
Device	Version
AIR-WLC5508-500	7.0.240.0
WS-SVC-WISM-1-K9	7.0.240.0
WS-SVC-WISM-2-K9	7.0.240.0
AIR-LAP1142N-A-K9	7.0.240.0
AIR-AP1131AG-N-K9	7.0.240.0
AIR-LAP1242AG-A-K9	7.0.240.0
AIR-AP1252AG-A-K9	7.0.240.0
AIR-LAP1252AG-A-K9	7.0.240.0
AIR-LAP3502E-A-K9	7.0.240.0
AIR-AP1242AG-A-K9	12.4(10b)JA (as WGB)



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Table 19 Network Server Devices Tested for Education

Network Server Information	
Device	Version
Microsoft DHCP Server	Windows 2008 SR1 Server
Microsoft DNS Server	Windows 2003 SE/SP1 Server
Microsoft TFTP/FTP Server	Windows 2003 SE/SP1 Server
Cisco ACS Radius Server	4.1 (on Windows 2000/SP4 Server)
Game Server	Valve Steam Half-Life 2 Dedicated Server
Microsoft CA	Windows 2003 Server/SP2
Cisco Unified Call Manager (CCM)	5.1.3.7000-5
BitTorrent Tracker	BNBT EasyTracker 7.7r3.2004.10.27
VLC Media Player	0.9.9a
Cisco WCS	7.0.240.0
Cisco MSE Appliance	7.0.240.0
Cisco IPTV Server	3.5.7.1 (on Windows 2000/SP4 Server)
Linux RH SYSLOG Server	Linux RH Enterprise AS4
Linux RH NTP Server	Linux RH Enterprise AS4
Qualys	QualysGuard Enterprise
BitTorrent Server/Client	Azureus 3.0.4.2

Table 20 Laptop Client Devices Tested for Education

Laptop Client Information			
Device	OS	Chipset	Driver
Apple PowerBook	10.6.7	Airport A/G/N	1.0 5.10.131.36.9
Apple MacBook	10.6.7 10.6.8	Airport A/G/N	1.0 5.10.131.36.9 1.0 5.10.131.42.4
Apple MacBook Air	10.6.7	Airport A/G/N	1.0 5.10.131.36.9
Apple MacBook	10.7 10.7.4	Airport A/G/N	1.0 5.100.98.75.6 1.0 5.106.198.4.2
Apple MacBook	10.6.7	Airport A/G/N	1.0 5.10.131.36.9
Sony VGN-N350E	Microsoft Vista	Intel 3945ABG	13.4.0.139
Sony VGN-N250N	Microsoft Vista	Intel 3945ABG	13.4.0.139
Sony VGN-N1306	Microsoft XP	Intel 3945ABG	13.4.0.139
Compaq Presario C500	Microsoft Vista	Broadcom 802.11BG	4.102.15.56

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Laptop Client Information			
Device	OS	Chipset	Driver
Compaq Presario V6000	Microsoft Vista	Broadcom 802.11BG	4.102.15.56
Compaq 5201US	Microsoft Vista	Broadcom 802.11BG	4.10.40.1
HP Compaq nx9420	Microsoft Vista	Intel 3945ABG	13.4.0.139
HP Mini 1035NR	Microsoft XP	Broadcom 802.11B/G	4.170.77.3
Lenovo T60 ThinkPad	Microsoft Vista	Intel 3945ABG	13.4.0.139
Lenovo X60s ThinkPad	Microsoft XP	Intel 4965AGN	14.3.0.6
Lenovo 3000 N100	Microsoft Vista	Broadcom 802.11BG	4.102.15.56
Toshiba A135-S4427	Microsoft Vista	Intel 3945ABG	13.4.0.139
Toshiba A135-S4447	Microsoft Vista	Intel 3945ABG	13.4.0.139
Toshiba A135-S4467	Microsoft Vista	Intel 3945ABG	13.4.0.139
Toshiba A135-S2386	Microsoft Vista	Atheros AR5006EG	7.1.0.90
Toshiba Satellite A205-S4639	Microsoft Vista	Intel 4965AGN	13.4.0.139
Toshiba Satellite P205-S6267	Microsoft Vista	Intel 4965AGN	12.4.0.21
Toshiba Satellite A205-S4577	Microsoft Vista	Intel 3945ABG	12.4.0.21
Toshiba Tecra A6-EZ6411	Microsoft Vista	Intel 3945ABG	12.4.0.21
Lenovo W510	Windows 7	Intel 6300 AGN	15.1.1.1
Toshiba Satellite A205-S4577	Microsoft Vista	Intel 5100 N	14.3.0.6
Dell Latitude 5530	Win 7 Pro SP1 (64 bit)	DW 1540 a/g/n	5.100.82.112

Table 21 Suppliant Devices Tested for Education

Suppliant Information	
Device	Version
Cisco Secure Services Client	5.1.0.56
Intel ProSet	12.4.0.21, 14.2, 15.1.1.1
ADU	4.4.0.88
ZeroConfig	(with Windows)

Table 22 Other Devices Tested for Education

Other Device Information	
PDA/Handhelds	Version/Comments
Microsoft Xbox 360	Microsoft Xbox 360 Wireless Adapters
Apple iPod Touch Gen2	Version 3.1.3(7E18) 802.11G connections

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Brother MFC-845CW	Wireless Printer
Apple iPhone 4, 4S	Version 6.0, 6.1.2
iPhone 5	6.1.2
iPod 5	6.1.2
Apple iPad	Version 5.1.1
Apple iPad2	Version 6.1.2
Apple iPad3	Version 6.1.2
Lexmark Wireless Printer	Pinnacle Pro 901
Samsung Galaxy Tab 7	2.2.1
Kindle Fire	6.0



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Enterprise Vertical Market

What Was Tested

- Cisco Wireless LAN Controller (5508, 4402, 2106, 4404, WiSM, WiSM-2 7500 and 3750 Integrated) N-1 and N-2 upgrades (N-2, N-1 being previous major releases and N being current version).
- Cisco WCS N-1 Upgrade (N-1 being the previous major release and N being current version).
- Cisco Mobility Services Engine (MSE) Appliance N-1 Upgrade (N-1 being the previous major release and N being current version).
- Controller operation with LAG.
- Controller operation with multiple AP managers to cover different customer flavors (WISM-only support LAG).
- Multicast operation with unicast mode.
- Multicast operation with multicast mode.
- 16 WLANs configured with different types of security and class of service—802.1x, WPA/WPA2 (LEAP/PEAP/TLS), web-auth, etc.
- Multicast operation with PIM sparse-dense mode in wired network routing.
- Controller, AP, authentication servers operating across MPLS VPN network.
- Six controllers configured in one roaming domain.
- For layer3 roaming, both symmetric tunnel and un-symmetric tunnel cases are covered. The controllers are configured in the same mode, either symmetric tunnel or un-symmetric tunnel).
- Flex mode controller and AP support
- Layer2 roaming (CCKM and non-CCKM).
- Auto-anchor and auto-anchor N+1.
- WGB (including layer 2 and layer 3 roaming).
- TACACS+ for controller administration and accounting.
- Wired guest access.
- IDS and IPS.
- Radio Resource Management (RRM) functionality
- Voice Calls with Cisco 7920/7921 IP phones and Spectralink.
- Network redundancy with HSRP and controller redundancy with configuring primary/secondary/tertiary controllers.
- Controllers trunked to Catalyst 3750 switches with the management interfaces of the controllers and access points deployed in different subnets.
- Hybrid-REAP support, including central switching and local switching.
- Controller access controller and traffic control via access-list.
- Longevity test with multiple SNMP walk to cause CPU as high as 90%



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- Lradxt to simulate 150 APs and 3000 clients.
- Roaming during heavy traffic.
- 120 simulated clients with Veriwave.
- Reliable multicast for video



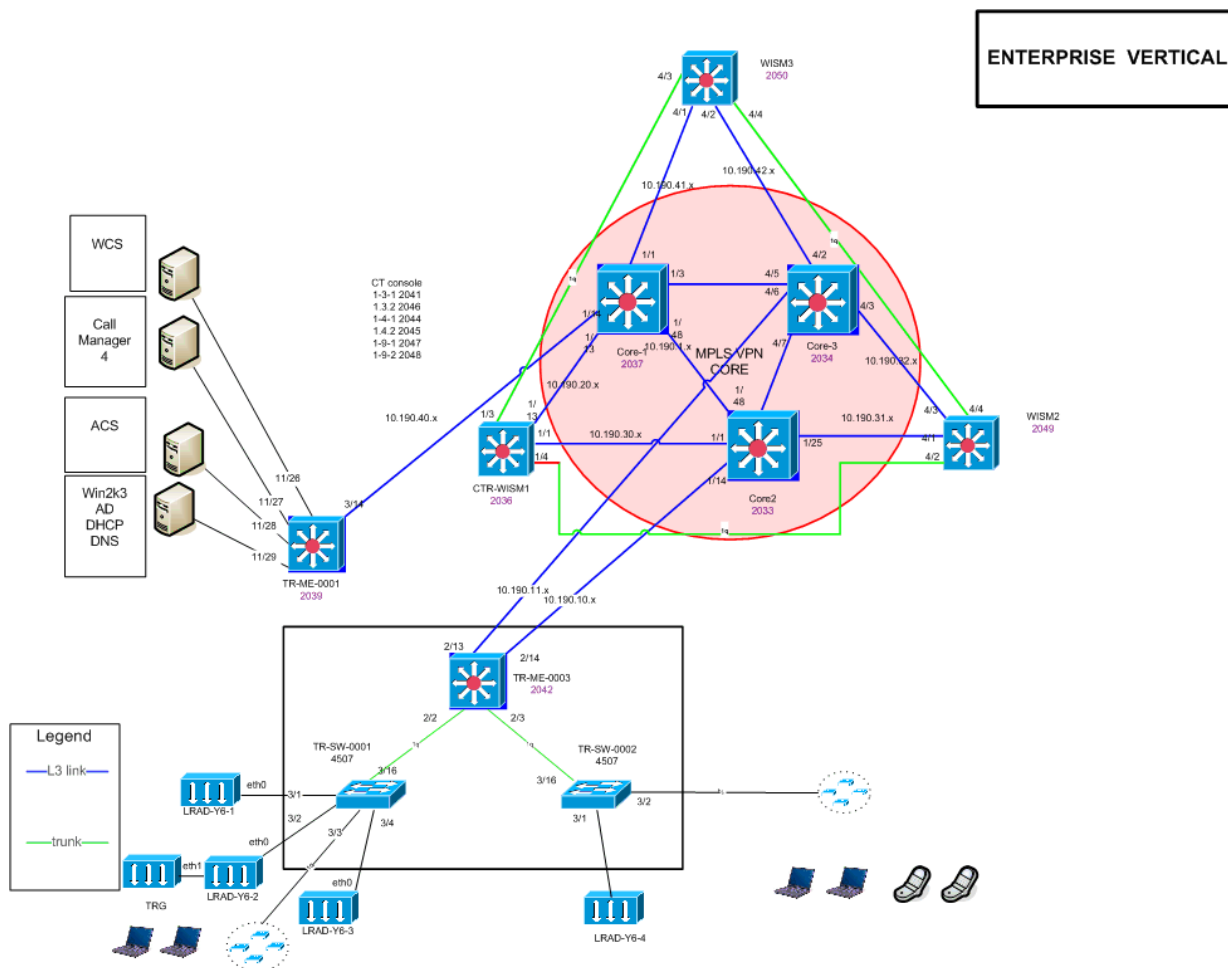
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Enterprise Test Topology

Figure 4 shows the MPLS/VPN based core test topology for the Enterprise vertical market.

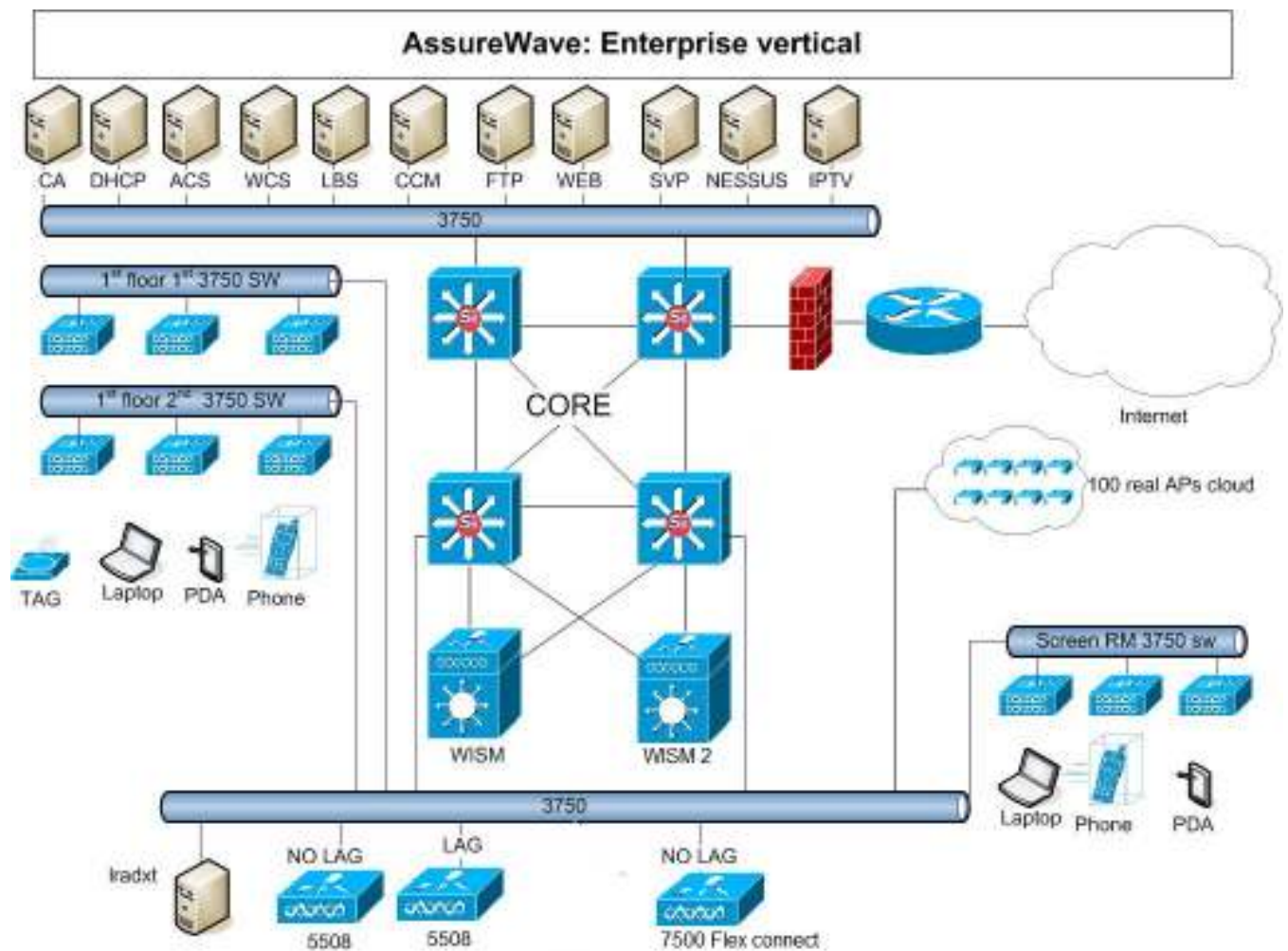


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Figure 5 shows the standard IP core network.



Devices and Software Tested

The following devices and software were tested as part of the AssureWave Enterprise vertical market.

Table 23 Infrastructure Devices Tested for Enterprise

Infrastructure Device Information	
Device	Version
WS-C6504-E w/WS-SUP720-3B w/WS-X6548-GE-45AF w/WS-SVC-WISM-1-K9 WS-C6509-E w/WS-SVC-WISM-1-K9 w/WS-SVC-WISM-1-K9 w/WS-SVC-WISM2-K9	12.2(18)SXF12 122(33).SXJ
WS-C3750G-24PS-S WS-C3750G-48PS-S WS-C3750E-24PS-S	12.2(40)SE
CISCO7609 w/WS-SUP720-3B w/WS-X6548-GE-45AF w/WS-SVC-FWM-1-K9	12.2(18)SXF7
Cisco 2611XM Terminal Servers	12.3(6f)

Table 24 Controller and Access Point Devices Tested for Enterprise

Controller/AP Information	
Device	Version
AIR-WLC5508-500	7.0.240.0
AIR-WLC7500	7.0.240.0
WS-C3750G-24WS-S25	7.0.240.0
WS-SVC-WISM-1-K9	7.0.240.0
WS-SVC-WISM-2-K9	7.0.240.0
AIR-LAP1242AG-A-K9	7.0.240.0
AIR-LAP1131AG-A-K9	7.0.240.0
AIR-LAP1240AGN-A-K9	7.0.240.0
AIR-LAP1142N-A-K9	7.0.240.0
AIR-LAP1262N-A-K9	7.0.240.0
AIR-LAP3502E-A-K9	7.0.240.0
AIR-LAP1042N-A-K9	7.0.240.0
AIR-AP1242AG-A-K9	7.0.240.0



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Controller/AP Information	
Device	Version
AIR-AP1131AG-A-K9	7.0.240.0
AIR-AP1232AG-A-K9	12.3(11)JX1 (as WGB)
AIR-AP1242AG-A-K9	12.4(10b)JA (as WGB)
AIR-AP1131AG-A-K9	12.4(10b)JA (as WGB)

Table 25 Network Server Devices Tested for Enterprise

Network Server Information	
Server Type	Version
Microsoft AD, DHCP, DNS, TFTP and FTP Services	Windows 2003 SE/SP1 Server
Microsoft CA Services	Windows 2000/SP4 Server
Cisco ACS Radius Server	4.2 (on Windows 2003 SE/SP1 Server)
Cisco ACS Appliance Server	5.0 appliance 5.2.0.26
Cisco Unified Call Manager (CUCM)	8.0.3
Cisco WCS	7.0.240.0
Cisco IPTV Server	3.5.7.1 (on Windows 2000/SP4 Server)
Linux RH SYSLOG Server	Linux RH Enterprise AS4
Linux RH NTP Server	Linux RH Enterprise AS4
Spectralink SVP-100 Server	173.028/174.028/175.028 (SCCP)

Table 26 Application Software Products Tested for Enterprise

Application Software Information	
Application	Version
IPTV scheduled and on demand	v3.4
V-brick media appliance	V2.0.0b

27 Voice Client Devices Tested for Enterprise

Voice Client Information	
Device	Version
Cisco 7920 Phone	3.0.2
Cisco 7921 Phone	1.4.2
Cisco IP Communicator	2.1.1

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Table 28 Laptop Client Devices Tested for Enterprise

Laptop Client Information			
Device	OS	Chipset	Driver
Acer Aspire 3623WXCi	WinXP/SP2	Atheros AR5005G	4.0.0.14001
Acer Aspire 3624WXM	WinXP/SP2	Atheros AR5005G	5.3.0.35
Acer Aspire 5610-4537	Vista/HP	Intel 3945ABG	13.4.0.139
HP Probook 4710s	WinXP/SP2	Intel 5100 AGN	14.3.2.1
Toshiba Satellite A105	WinXP/SP2	Intel 3945ABG	13.4.0.139
Toshiba Satellite A135	Vista/HP	Intel 3945ABG	13.4.0.139
Toshiba Tecra 8000	WinXP/SP2	Cisco CB21ABG	4.5.0.310
HP 6530b	WinXP/SP2	Intel 5100 AGN	14.3.0.6
Toshiba U205	Vista/HP	Intel 3956ABG	13.4.0.139
Compaq 5201US	Microsoft Vista	Broadcom802.11BG	4.10.40.1
HP Compaq nx9420	Microsoft Vista	Intel 3945ABG	13.4.0.139
Lenovo T60 ThinkPad	Microsoft Vista	Intel 3945ABG	13.4.0.139
Lenovo T61 ThinkPad	Microsoft XP	Intel 4965ABG	15.1.1.1
Lenovo X60s ThinkPad	Microsoft XP	Intel 3945ABG	13.4.0.139
Lenovo 3000 N100	Microsoft Vista	Broadcom802.11B	4.102.15.56
Fujitsu Lifebook A-Series	Microsoft Vista	Broadcom802.11BG	7.1.0.90
Lenovo W510 ThinkPad	Windows 7	Intel 6300 N	15.1.1.1

Table 29 Supplicant Devices Tested for Enterprise

Supplicant Information	
Device	Version
Cisco Secure Services Client	4.2, 5.0.1
Intel ProSet	13.5.0, 14.2, 15.1.1
Cisco Aironet Desktop Utility	4.5.0.88
Microsoft Windows ZeroConfig	Windows XP Pro, Vista

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AssureWave Test Summary and Recommendation

Test Summary

The AssureWave certification for this release is **Pass**.

Please refer to the 7.0.240.0 Release Notes for additional information pertaining to this release. Carefully review the Open Caveats list below to make a determination if any of these issues may affect your installation

We summarize our testing results into three categories:

- **Pass**—The underlying assumption for certifying and publishing a Cisco AssureWave release is that testing passed because all individual tests passed. Failure of any test has to be properly resolved or closed, or the Cisco AssureWave engineering team must determine that the defect that caused failure will not affect network performance.
- **Fail**—If a given test fails and the effect on Cisco's customer base is deemed broad enough, the entire release fails. Failed releases are neither certified nor documented. If a test fails and the effect on the customer base is determined to be minor, the release may still be certified, with Distributed Defect Tracking System entries noted so that customers can review the testing to see if they are affected.

Open Caveats

This release contains the following significant open caveats

For the entire list please review the release notes

http://www.cisco.com/en/US/docs/wireless/controller/release/notes/crn7_0_240_0.html

- **CSCto61773 RLDP shows disabled in GUI even though enabled from the CLI.**

Symptom: Autocontain and autoRLDP commands do not work independently.

Conditions: Using the CLI, if auto contain is enabled for 'rogue on wire' and you try to enable autoRLDP for only monitor mode APs, the autocontain configuration gets disabled. The same issue can be noticed if the commands are tried in the reverse order.

Workaround: Use the GUI to configure autocontain 'rogue on wire' and autoRLDP using only monitor mode APs.

- **CSCtq91516 Not able to configure LAG when interface is untagged.**

Symptom: Not able to configure LAG when there is an untagged interface.



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Conditions: If an untagged interface is present on the controller and is mapped to an interface group when you are enabling the controller, when you try to delete the untagged interface, it is not deleted because it is mapped to an interface group.

Workaround: Remove the interface from the interface group.

- **CSCtr22540 Cisco 5508 Controller removing CPU ACL entry has no effect.**

Symptom: Removing an entry from an ACL that is applied on a CPU has no effect: modifications are not applied.

Conditions: N/A

Workaround: Reapplying the ACL on a CPU resolves this issue.

- **CSCts14535 H-REAP Standalone AP does not update controller about the client location.**

Symptom: Client entry on the controller is not being updated by the H-REAP AP in standalone mode.

Conditions: Client roams on standalone mode APs which then connect back to the controller in connected mode. Cisco 5508 Controller running 7.0.116.0 release.

Workaround: None.

