Wireless and Industrial Network

Authors: Mustafa Ali, Abid Hussain

Supervisor: Olga Torstensson

Examiner: Nicolina Måansson
Preface

Wireless networking is defined as "having no wires". In networking terminology, wireless is the term used to describe any computer network where there is no physical wired connection between sender and receiver, but the network is connected by radio waves or microwaves to maintain communication. Wireless networking operates specific equipment such as NICs, APs and routers in place of wires (copper or optical fiber) for connectivity.

We experiencing many benefits from a wireless network: We are accessing our network resources from any location within our wireless network coverage area. We are no longer tied to desk, we can access internet anytime anywhere within our wireless network coverage area. Wireless access to the Internet and our company key application and resources helps our staff to done their job easily within our wireless network coverage. We can easily expand wireless networks with existing equipment, while a wired network might require additional wiring. Wireless networks reduce wiring cost. We implemented different IEEE 802.11 security protocol for security protection of wireless network.

In our report we also focusing on two different sites these are located in Riga and Malmo. We are concentrating on their infrastructure planning, security and implementing them in both sites.
Abstract

The purpose of this report is to implement the wireless network in a company with two different sites which is located in Riga and Malmo. The main task of this report is to implement and configure wireless industrial network. This report is based on information we gathered from the ABC Company about their requirements for a wireless network.

Requirements of this ABC Company is focusing on their infrastructure planning, security and implementing them. Benefits and drawbacks of industrial wireless network will be described briefly in this report to get some idea how ABC Company will face the problem when they will implement their wireless network.
# TABLE OF CONTENTS

<table>
<thead>
<tr>
<th>Section</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Preface</td>
<td>3</td>
</tr>
<tr>
<td>1. Introduction</td>
<td>11</td>
</tr>
<tr>
<td>2. Problem and Goals</td>
<td>12</td>
</tr>
<tr>
<td>3. Wireless Benefits and IEEE 802.xx Standards</td>
<td>13</td>
</tr>
<tr>
<td>4. Wireless Network Sites Survey</td>
<td>15</td>
</tr>
<tr>
<td>4.1 WHAT IS INDUSTRIAL WIRELESS SITES SURVEYS?</td>
<td>15</td>
</tr>
<tr>
<td>4.2 REASONS OF WIRELESS INDUSTRIAL SURVEY</td>
<td>15</td>
</tr>
<tr>
<td>4.3 CATEGORIES OF WIRELESS SITES SURVEYS</td>
<td>16</td>
</tr>
<tr>
<td>4.4 PHYSICAL SURVEY OF RIGA AND MALMO SITES</td>
<td>16</td>
</tr>
<tr>
<td>4.5 RADIO FREQUENCY SITE SURVEY RIGA AND MALMO</td>
<td>16</td>
</tr>
<tr>
<td>4.6 INTERFERENCE IN SIGNAL STRENGTH OR RADIO</td>
<td>17</td>
</tr>
<tr>
<td>5. Different Software Tools</td>
<td>18</td>
</tr>
<tr>
<td>6. System Analysis</td>
<td>19</td>
</tr>
<tr>
<td>8. Wireless Network Infrastructure</td>
<td>21</td>
</tr>
<tr>
<td>8.1 INFRASTRUCTURE WIRELESS LAN</td>
<td>21</td>
</tr>
<tr>
<td>8.2 WIRELESS NETWORK COMPONENTS</td>
<td>21</td>
</tr>
<tr>
<td>8.3 ROUTERS</td>
<td>21</td>
</tr>
<tr>
<td>8.4 SWITCHES</td>
<td>22</td>
</tr>
<tr>
<td>8.5 WIRELESS ACCESS POINTS</td>
<td>22</td>
</tr>
<tr>
<td>8.6 USER DEVICES</td>
<td>22</td>
</tr>
<tr>
<td>9. Wireless Network Cover Area or Range of RF</td>
<td>23</td>
</tr>
<tr>
<td>10. Comparison between LAP and Wireless Lan controller</td>
<td>24</td>
</tr>
<tr>
<td>11. Implementation of industrial wireless network</td>
<td>25</td>
</tr>
</tbody>
</table>
12. Conclusion ................................................................................................. 30
13. References ................................................................................................. 32
14. Appendix..................................................................................................... 33
Figures

Fig 11.1 Network Diagram of Riga Site

Fig 11.2 Static IP Assigning

Fig 11.3 Root AP

Fig 11.4 Network Diagram of Malmo Site

Fig 11.5 Summary of Wireless Controller

Tables

Table 4.2: Survey of Industrial Wireless Sites
1. Introduction

Wireless network is a network which is created over the air media without using any physical connection. In a wireless network radio frequency has been used for transmitting and receiving between network nodes, for example computers and PDAs etc. There are many types of networks but the main wireless networks are wide area network, local area network and personal area network. The WLAN include the wide area technologies for example, 3g cellular, global system for mobile communication (GSM) and global positing system (GPS). WLAN is also focused on radio frequency which includes 802.xx standards and hyper lane.

Wireless devices give the connectivity to the internet thru access points (AP). Every AP has different capability of covering the areas. Within this area the number of users and data rates will determined by AP’s capability. This area is known as range or cell. Wireless LAN also provide roaming services for example, everyone can use internet connection inside the industry without disconnecting internet. There are also many limitations like frequency range which can effect on sending and receiving data.

Industrial wireless network gives the companies a great flexibility to implement the network, for example- ABC Company will host an exhibition in their company area. In order to provide internet connectivity to their guests they have to arrange additional connectivity there but only for a temporary period of times. In such cases providing access point (AP) in exhibition is less hassle and less expensive.
2. Problem and Goals

ABC Company is having problem in their wireless network. Riga and Malmo sites are not fully secured. Management staff and the factory staff using the same Riga wireless network which is unsecured because management staff having some important data which can leak out easily.

Another problem is that, some areas of the factory having low signal strength. Internet speed can also be slow if number of users increase. This site has two buildings and the company will need to provide internet service in one of the buildings and that will transfer to sub departments in other buildings. It is impossible to provide connectivity via cables everywhere without using wireless connection.

In Malmo site, there are three departments, which are Administrative, Engineering and Marketing. For each of these departments there will be separate vlan, which will separate the traffics. In this way this company will have a secured network and we will implement it thru wireless controller and access points.

The goals of this project are:

1. Separate the traffics into individual vlan.
2. Implement wireless network.
3. Improve security such as authenticity.
3. Wireless Benefits and IEEE 802.xx Standards

There are several benefits of wireless network. Users can get internet access without connecting to physical mediums, such as cables. They can send and receive files, chat, messaging, talking and many more features depending upon the capability of wireless devices. Due to wireless technology the time of installation is reduced because there is no need to spread wires, or any modifications to infrastructure in existing network. Wireless network also provide the great facility to surveillance, buildings and specific area where cables spreading are not possible. Spy or surveillance cameras are also connected through wireless network.

Wireless network increased the consumer flexibility. Administrators can easily change the configuration for temporary use like conference meeting and other requirements. Wireless network can easily expanded according to consumer requirements there will be not much cost required for the expansion of the network. Wireless network provide the facility to configure the devices remotely. Wireless network also lower down the implementation cost and provide the high quality network connectivity.

Wireless networking is based on the Radio Frequency. The IEEE has define varies level of standard for security level, data sending and receiving speed and the different area range of the signals. The following are the comparison of different standards [2].

IEEE 802.11 this is the original IEEE standard. This standard transfers data rate at 1 to2 Mbps. The spectrum band for this standard is 2.4GHz. It is based on Frequency Hopping Spread Spectrum (FHSS) or Direct Sequence Spread Spectrum (DSSS). The security is WEP or WPA. After that it was extended into 802.11b standard.

IEEE 802.11a Standard of link layer protocol is based on Orthogonal Frequency Division Multiplexing (OFDM). It operates on 5GHz and data rate is 54 Mbit/s. Its range is shorter than 802.11b. Signal are rapidly absorbed by the walls and other interference media but better sporting multimedia and voice. The 2.4 GHz ISM band
is much more crowded frequency space than the 5 GHz UNII bands one big advantage of using 802.11a WLAN equipment is that it operates in less crowded 5 GHz UNII Bands [6].

IEEE 802.11b Operates on 2.4GHz band spectrum and transmit data up to 11 Mb/s. The indoor range is 30 m (100 ft) with data transfer rate is 11 Mbit/s and outdoor range is 100 m (300 ft) 1 Mb/s. It is also based on DSSS modulation scheme. It provides WEP and WPA security. Because it operates in 2.4GHz there for devices with 802.11 suffer with microwave oven, Bluetooth devices and cordless phones. The mandatory PHYs are ERP-OFDM and ERP-DSSS/CCK. To achieve the higher data rates, a PHY technology called Extended Rate Physical OFDM (ERP-OFDM) is mandated [7].

IEEE 802.11g Operate on 2.4GHz band like 802.11b but uses the OFDM transmission scheme like 802.11a standard. It transmits data at the speed of 54 Mb/s or about 20 Mbit/s throughputs. The devices with 802.11b also face the interference from microwave ovens, Bluetooth devices cordless phones.

IEEE 802.11n operates on both 2.4GHz and 5GHz bands. This standard is improved by adding multi input multi out (MIMO) antennas.

IEEE 802.11.ac is under development. It will operate on 5GHz band. The data transmission speed will be 1GB and single link throughput will be 500 Mb/s.
4. Wireless Network Sites Survey

4.1 WHAT IS INDUSTRIAL WIRELESS SITES SURVEYS?

Industrial wireless sites surveys are the process of collection of information from the factory administration staff, department’s staff and the users who will use the internet. This information includes from factory architecture to the end users staff. The process of planning and designing a wireless network, in particular an 802.11 Wi-Fi wireless network, to provide a wireless solution that will deliver the required wireless coverage, data rates, network capacity, roaming capability and Quality of Service (QoS) [8].

The ultimate goal of a wireless site survey is to determine the number and placement of access points (or mesh nodes) that provides adequate signal coverage throughout a facility or city area [9].

4.2 REASONS OF WIRELESS INDUSTRIAL SURVEY

This survey is important for the implementation of effective industrial wireless network. It will help in future for planning and physical implementation of network. It will also helpful for the identification of wireless technology. Interference sources to avoid amount of capacity to need. There are following reasons of wireless sites surveys.

<table>
<thead>
<tr>
<th>Basic Information Gathering Reasons</th>
<th>Technical Reasons</th>
</tr>
</thead>
<tbody>
<tr>
<td>Collection of industrial requirements</td>
<td>RF interference sources</td>
</tr>
<tr>
<td>Information from Administrative staff and users staff</td>
<td>Security requirements</td>
</tr>
<tr>
<td>Buildings architecture information</td>
<td>RF area range requirements</td>
</tr>
</tbody>
</table>
### Table 4.2 Survey of Industrial Wireless Sites

<table>
<thead>
<tr>
<th>Existing network characteristics if exists</th>
<th>Power requirements</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Data sending and receiving Requirements</td>
</tr>
</tbody>
</table>

### 4.3 CATEGORIES OF WIRELESS SITES SURVEYS.

Survey divided into two different parts. First part of survey is focusing on network dependency on radio frequency (RF) and second part of survey is done on dependency on physical and RF methods.

### 4.4 PHYSICAL SURVEY OF RIGA AND MALMO SITES.

Physical survey is done in person. It is helpful to determine the rooms, hallways, galleries which will be supported by wireless infrastructure. In this survey the actual positions of wireless equipment is known and other things which will facilitate the wireless equipment. The distance between Switch and Router to the AP. The place and position of APs provide the RF in the desire area. The positions of external links like bridges. The electricity requirements plug places. Can the Ethernet cable run to the APs places? These questions are been used in this physical survey.

### 4.5 RADIO FREQUENCY SITE SURVEY RIGA AND MALMO SITES.

We conduct a survey by observing Radio Frequency in our company area because to implement a successful wireless network depends on surrounding radio frequency (RF), magnetic field and electrical field. I observed that how should I will
implement the network for the coverage of needed RF range. It helps for the selection of OFDM (Orthogonal Frequency Division Multiplexing 5 GHz) or ERP-OFDM (2.5 GHz). So it will be easy to decide which 802.11a, b, g or n channels selection for the Access Point.

4.6 INTERFERENCE IN SIGNAL STRENGTH OR RADIO FREQUENCY
Many objects in the building area absorb the signals and lower down the signals strength to the end users. So by the survey we can identify the sources of interference in the Radio Frequency. Some of the following are the interference sources in the RF.

The walls which are constructing by concrete are the interference sources to lower down the signals strength. Microwaves ovens operate at 2.4GHz there for these also suffer the radio frequency. If metal is used in the ceiling this would be interference medium for the RF. If the furniture and decoration material is made by metal they can also create obstacles in the radio frequency. Natural things like trees, bushes inside the building area or outside the building area. Digital Cordless Phones operate on 2.4GHz there for are the interference sources in RF. Bluetooth devices are also the source of interference.
5. Different Software Tools.

There are many types of software, which are used to analyze the radio frequency spectrum. Some of them are free of cost and some should be purchased. There are several software available in market such as NetStumbler, Kismet, KisMAC, BANDWIDTHPLACE TEST, SPEEDTEST .NET and WiFi Hopper. We can measure the signal strength, noise, MAC Address, SSID, network mode, encryption type, and Channels by help of this software.
6. System Analysis

This is the technical process of analyzing the existing system. By analyzing the existing system we can gather the information which will help us in later stage to find out the specific requirements of the company. This is called system analysis. By system analysis I got following information. Such as how many users are in the network and what are the maximum number users at the same time in the network? I also get information about the data packet sending and receiving. There is checklist for security requirements which need to be fulfilled in order to give the company a safe network.

The most important thing that got was that the peak time of network use and maximum throughput at that time.

This is the most important part of the survey. Basically the wireless network is open network as compared to wired network. So user authentication and data encryption technique should be undermining. Sometime AP signals travel in the public area and access can be got by someone by eavesdropping. In the wireless network the access to the network should be provided at different level like management staff has more access and rights and the factory staff less access to the internet resources. It also depends upon the policy of the company. In some case the wireless controller acts as gatekeeper at the network edge. All the users are authenticated through wireless controller. The access points associated with controller and leap protocol. The keys like WEP WPA2 AES or TKIP should be used according to requirements.

In selecting of network it is necessary to select network devices which provide the comprehensive range and provide better security solutions. The security measure should cover the following areas like authentication, confidentiality, integrity and auditing. Authentication provides the users authenticity to access the network resources. Sometime companies already have some infrastructure from which the users are authenticate like windows server. If there is not any authenticate server you can configure Radius Server or implement other services through which users can authenticate and these services should be compatible with 802.xx standards.

Transmitting data is hidden or secured by different encryption method is the confidentiality of that communication. So the data is encrypted by different algorithm and techniques which cannot be read by the wireless attackers. Data Encryption Standard (DES), Encryption Service Adapter (ESA) this is hardware base used in Cisco routers, MD5, Diffie-Hellman, Hash, Internet Key Exchange (IKE), Internet Security Association and Key Management Protocol (ISAKMP) and there are many others which are used to encryption of data. Integrity is the mechanism through which it is determine that the transmitted data has not been modified,
altered or damage. The secret key based or public key based algorithms are used to maintain this.

8. Wireless Network Infrastructure.

8.1 INFRASTRUCTURE WIRELESS LAN.

The physically organized device in the wireless network describes how the layout of the network will be. How the devices like Routers, Switches, Access Points, Bridges, user devices organized in the network.

8.2 WIRELESS NETWORK COMPONENTS.

The all devices used in the wireless network are the component of the wireless network. These components vary from wireless network to network. It depends upon the companies requirements. The main devices in a common wireless network are like Routers, Switch, Controllers, Access Points, Bridges, Repeaters, Antennas and user devices like laptops, desktop pcs, pda, mobile phones etc.

8.3 ROUTERS.

These are devices which are used to forward data between networks. These are also known as layer three devices because these work on layer three of the OSI Reference Model. In layer three data is send and receive on Internet Protocol (IP). Network Address Translation (NAT) and Port Address Translation (PAT) are used by the Routers to forward data by using single IP.
8.4 SWITCHES.

There are two kinds of switches layer two devices and layer three devices. The layer two devices works on MAC Address and layer three switch works on IP. The layer-3 switches are also known as multilayer switches.

8.5 WIRELESS ACCESS POINTS

These devices have the radio card through which user devices can connect to get the internet services. These devices can be configured through CLI or graphic mode using different browsers.

8.6 USER DEVICES.

User devices like laptops, notebook, personal computers with wireless NIC or PDAs are connected with wireless access points. Wireless NICs use different radio frequency and speed it depends upon the vender and company requirements.
9. Wireless Network Cover Area or Range of RF.

The wireless coverage area depends on many factors including radio frequency devices, data rate, interferences sources, physical area etc. For example Cisco 1200 Access Points have different indoor maximum range is 54 Mbit/s at the distance 90ft or 27 m and it lower down when the distance increase like at the distance 410 ft or 125 m the data speed is 1 Mbit/s. Similarly at outdoor maximum range is 54 Mbit/s at the distance 110 ft or 34 m and with the increase in distance it lower down to like at 710 ft or 213 m it only remain 1 Mbit/s [5].

In infrastructure networking the range or cell can be increased by using APs. The area cover by an APs is known as Basic Service Set (BSS). By combining of different BSS the area is known as Extended Service Set (ESS).
10. Comparison between LAP and Wireless Lan controller:

The cisco LAP (Lightweight access point) is part of the cisco unified wireless network architecture. The LAP provides dual band support for IEEE 802.11a, 802.11b, 802.11g, 802.11n and simultaneous air monitoring for dynamic, real time radio frequency (RF) management. One IEEE 802.11 AP can typically communicate with 30 client systems located within a radius of 103 m. Layer 2 encryption, that enable cisco WLANS to securely support voice, video, and data applications. The lightweight APs cannot act independently of a wireless lan controller (WLC). The APs are "zero touch" deployed, and individual configuration of APs is not necessary. The APs handle only real-time MAC functionality. The APs leave all the non-real-time MAC functionality to be processed by the WLC.

Cisco 2500 series wireless lan controller are responsible for system wide wireless LAN functions, such as security policies, intrusion prevention, RF management, quality of service (QoS), and mobility. WLC manages the AP configuration and firmware. WLC support IEEE 802.11a/b/g and 802.11n up to 500 Mbps. WLC connections up to 50 access point and 500 clients. WLC provide Layer 2 and Layer 3 mobility and (QOS) for voice and video, highly secure wireless guest access. WLC have integrated cisco clean air technology for self-healing, self-optimizing network that avoids RF interference.
In Riga site we configure Layer three and Layer two switch. In Layer three switch we create Three VLANS Factory Management, Factory Users, and Building two. We have created VLAN interfaces for every VLAN. We also create DHCP Pool for every VLAN because VLAN users can get ip address directly from that vlan dhcp pool. We used encapsulate dot1q trunk Protocol for communication between Layer three and Layer two switch. We used vtp server mode for transferring DHCP pool data to layer three switch.

In Layer two, switch we used switched port mode trunk protocol on that port which is directly connected with Layer three switch for communication between Layer three and Layer two switch. In layer two switch we applied switch port access protocol for assigning VLAN 11 for Factory Management. We connected access point for Factory Management with Layer two switch. We configured SSID and implement
security on this Access point. Every user who will connect with this access point get ip address from Factory Management vlan 11.

We connected one Link sys Router with Layer two switch for Factory users. We configured Link sys router and assigned Vlan 10 for Factory users. Every Factory user will get ip address of VLAN 10.

We connected Root AP and Repeater with Layer two switch for the Building Two site. We configured and Broadcast SSID for the Building Two users. We implemented security on Access point because unauthorized person cannot connect with Building Two SSID. On Repeater we configured same SSID and security which is already implemented on Root AP. We used Repeater to increase the strength and area of our wireless signals.

![Fig 11.2 Static IP Assigning](image)

We assign the static ip to our link sys wireless router. We write our SSID name and applied the desired security WEP.
This is our roop AP with host name RigaRootap and that the radios are up. It shows the static ip address and MAC address.
In Malmo site we configured layer 3 switch, layer 2 switch, wireless controller, ACS (Radius server) and Light weight APS. We also configured DHCP Server and encapsulate dot1q Protocol on layer 3 switch. We have created and assigned Three VLANS for different departments. In layer 2 switch we configured mode trunk protocol and switch port mode access protocol for communicating between access points. We configured wireless controller and create SSID for every department. After creating SSIDS on wireless controller we implemented 802.1 x securities on these SSIDs. We installed Radius server on PC for creating users and authenticating every user through Radius server. We assign Radius server as AAA SERVER and Wireless controller as AAA server client Role. We created users and implemented security 802.1x security on all of them. Every department users firstly authenticate from Radius server after that users will connect with his department SSID and get the ip address from DHCP SERVER.
Fig 11.5 Summary of Wireless Controller

This diagram shows the summary of the controller AP attached hostname and status of the AP.
12. Conclusion

In this report we have implemented and configured the wireless network in a company. We have to provide wireless network in the two buildings of site Riga. We have configured and implemented the APs for building 2 and building 1. Building 1 is linked with wireless bridge. This building is for future offices. The Linksys are for the factory staff. The management staff can connect their PDA when they are in building area.

In Malmo site redundancy sustainability is required. There are three vlan implemented in the company such as Engineers, Marketing and Factory Administration. We have implemented and configure Light Weight APs associated with controller and LEAP. The LEAP is also known as EAP. This is a mutual authentication protocol between the wireless client and the Access Point. There are certain amount of users are available in each vlan. So each users will be individually authenticated from the controller because Radius Server provide the per user authentication.

We kept in mind the IEEE 802.xx standards because IEEE 802.xx standards vary in security level and data transfer rate. So we also have taken the overview of authentication, integrity, confidentiality and the security feature.

Despite all the limitations and drawbacks wireless network provide great scalability, flexibility, speedy installation, low cost, time saving, centralizing management, and mobility of users are the great benefits of industrial wireless networking.
13. References


14. Appendix

14.1 Malmo site configuration

14.1.1 Wireless controller configuration

Notice: "show running-config" has been changed to be an alias to "show run-config". Use "show run-config commands" to display the configuration commands.
Press Enter to continue or <Ctrl-Z> to abort...

System Inventory
NAME: "Chassis" , DESCR: "2100 Series WLAN Controller:6 APs"
PID: AIR-WLC2106-K9,  VID: V05,  SN: JMX1439Z15Y
Burned-in MAC Address......................... F8:66:F2:62:30:40
Press Enter to continue or <ctrl-z> to abort

System Information
Manufacturer's Name............................. Cisco Systems Inc.
Product Name.................................... Cisco Controller
Product Version................................. 7.0.98.0
RTOS Version.................................... 7.0.98.0
Bootloader Version.............................. 4.0.191.0
Emergency Image Version...................... 7.0.98.0
Build Type...................................... DATA + WPS
System Name.................................... MALMO_WLC
System Location.................................
System Contact.................................
System ObjectID................................. 1.3.6.1.4.1.9.1.828
IP Address...................................... 172.32.1.100
System Up Time................................. 0 days 1 hrs 17 mins 59 secs
System Timezone Location.....................

33
Configured Country............................... SE - Sweden
Operating Environment........................... Commercial (0 to 40 C)
Internal Temp Alarm Limits....................... 0 to 65 C
Internal Temperature............................ +63 C
--More or (q)uit current module or <ctrl-z> to abort
State of 802.11b Network......................... Enabled
State of 802.11a Network......................... Enabled
Number of WLANs.................................. 4
Number of Active Clients......................... 1
Burned-in MAC Address............................ F8:66:F2:62:30:40
Press Enter to continue or <ctrl-z> to abort

Switch Configuration
802.3x Flow Control Mode........................ Disable
FIPS prerequisite features....................... Disabled
secret obfuscation............................... Enabled
Press Enter to continue or <ctrl-z> to abort

Network Information
RF-Network Name.............................. Malmo
Web Mode.................................. Disable
Secure Web Mode............................. Enable
Secure Web Mode Cipher-Option High......... Disable
Secure Web Mode Cipher-Option SSLv2...... Enable
Secure Shell (ssh)........................... Enable
Telnet.................................... Disable
Ethernet Multicast Forwarding............... Disable
Ethernet Broadcast Forwarding............... Disable
AP Multicast/Broadcast Mode............... Multicast Address : 0.0.0.0
IGMP snooping............................... Disabled
IGMP timeout................................ 60 seconds
User Idle Timeout............................ 300 seconds
ARP Idle Timeout............................ 300 seconds
Cisco AP Default Master..................... Disable
AP Join Priority............................. Disable
Mgmt Via Wireless Interface............... Disable
Mgmt Via Dynamic Interface................. Disable
Bridge MAC filter Config................... Enable
Bridge Security Mode....................... EAP
Mesh Full Sector DFS....................... Enable
--More or (q)uit current module or <ctrl-z> to abort
AP Fallback ................................ Enable
Web Auth Redirect Ports.................... 80
Fast SSID Change ......................... Disabled
IP/MAC Addr Binding Check ................. Enabled
Press Enter to continue or <ctrl-z> to abort

Port Summary

<table>
<thead>
<tr>
<th>Pr</th>
<th>Type</th>
<th>Stat</th>
<th>Mode</th>
<th>Mode</th>
<th>Status</th>
<th>Status</th>
<th>Trap</th>
<th>POE</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Normal</td>
<td>Forw</td>
<td>Enable</td>
<td>Auto</td>
<td>100</td>
<td>Full</td>
<td>Up</td>
<td>Enable</td>
</tr>
<tr>
<td>2</td>
<td>Normal</td>
<td>Disa</td>
<td>Enable</td>
<td>Auto</td>
<td>Auto</td>
<td>Down</td>
<td>Enable</td>
<td>N/A</td>
</tr>
<tr>
<td>3</td>
<td>Normal</td>
<td>Disa</td>
<td>Enable</td>
<td>Auto</td>
<td>Auto</td>
<td>Down</td>
<td>Enable</td>
<td>N/A</td>
</tr>
<tr>
<td>4</td>
<td>Normal</td>
<td>Disa</td>
<td>Enable</td>
<td>Auto</td>
<td>Auto</td>
<td>Down</td>
<td>Enable</td>
<td>N/A</td>
</tr>
<tr>
<td>5</td>
<td>Normal</td>
<td>Disa</td>
<td>Enable</td>
<td>Auto</td>
<td>Auto</td>
<td>Down</td>
<td>Enable</td>
<td>N/A</td>
</tr>
<tr>
<td>6</td>
<td>Normal</td>
<td>Disa</td>
<td>Enable</td>
<td>Auto</td>
<td>Auto</td>
<td>Down</td>
<td>Enable</td>
<td>N/A</td>
</tr>
<tr>
<td>7</td>
<td>Normal</td>
<td>Disa</td>
<td>Enable</td>
<td>Auto</td>
<td>Auto</td>
<td>Down</td>
<td>Enable</td>
<td>Enable (Power Off)</td>
</tr>
<tr>
<td>8</td>
<td>Normal</td>
<td>Disa</td>
<td>Enable</td>
<td>Auto</td>
<td>Auto</td>
<td>Down</td>
<td>Enable</td>
<td>Enable (Power Off)</td>
</tr>
</tbody>
</table>
AP Summary
Number of APs.................................... 1
Global AP User Name.............................. Not Configured
Global AP Dot1x User Name........................ Not Configured

<table>
<thead>
<tr>
<th>AP Name</th>
<th>Slots</th>
<th>AP Model</th>
<th>Ethernet MAC</th>
<th>Location</th>
<th>Port</th>
<th>Country</th>
<th>Priority</th>
</tr>
</thead>
<tbody>
<tr>
<td>AP1cdf.0f4e.be7c</td>
<td>2</td>
<td>AIR-LAP1131AG-E-K9</td>
<td>1c:df:0f:4e:be:7c</td>
<td>default location</td>
<td>1</td>
<td>SE</td>
<td>1</td>
</tr>
</tbody>
</table>

Press Enter to continue or <ctrl-z> to abort

AP Location
Site Name........................................ default-group
Site Description................................. <none>

<table>
<thead>
<tr>
<th>WLAN ID</th>
<th>Interface</th>
<th>Network Admission Control</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>management</td>
<td>Disabled</td>
</tr>
<tr>
<td>10</td>
<td>engineer</td>
<td>Disabled</td>
</tr>
<tr>
<td>11</td>
<td>marketing</td>
<td>Disabled</td>
</tr>
<tr>
<td>12</td>
<td>factoryadmin</td>
<td>Disabled</td>
</tr>
</tbody>
</table>

Press Enter to continue or <ctrl-z> to abort
<table>
<thead>
<tr>
<th>Parameter</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cisco AP Identifier</td>
<td>0</td>
</tr>
<tr>
<td>Cisco AP Name</td>
<td>AP1cdf.0f4e.be7c</td>
</tr>
<tr>
<td>Country code</td>
<td>SE - Sweden</td>
</tr>
<tr>
<td>Regulatory Domain allowed by Country</td>
<td>802.11bg:-E 802.11a:-E</td>
</tr>
<tr>
<td>AP Country code</td>
<td>SE - Sweden</td>
</tr>
<tr>
<td>AP Regulatory Domain</td>
<td>-E</td>
</tr>
<tr>
<td>Switch Port Number</td>
<td>1</td>
</tr>
<tr>
<td>MAC Address</td>
<td>1c:df:0f:4e:be:7c</td>
</tr>
<tr>
<td>IP Address Configuration</td>
<td>DHCP</td>
</tr>
<tr>
<td>IP Address</td>
<td>172.32.1.36</td>
</tr>
<tr>
<td>IP NetMask</td>
<td>255.255.255.0</td>
</tr>
<tr>
<td>Gateway IP Addr</td>
<td>172.32.1.1</td>
</tr>
<tr>
<td>CAPWAP Path MTU</td>
<td>1485</td>
</tr>
<tr>
<td>Telnet State</td>
<td>Disabled</td>
</tr>
<tr>
<td>Ssh State</td>
<td>Disabled</td>
</tr>
<tr>
<td>Cisco AP Location</td>
<td>default location</td>
</tr>
<tr>
<td>Cisco AP Group Name</td>
<td>default-group</td>
</tr>
<tr>
<td>Primary Cisco Switch Name</td>
<td></td>
</tr>
<tr>
<td>Primary Cisco Switch IP Address</td>
<td>Not Configured</td>
</tr>
<tr>
<td>Secondary Cisco Switch Name</td>
<td></td>
</tr>
<tr>
<td>Secondary Cisco Switch IP Address</td>
<td>Not Configured</td>
</tr>
<tr>
<td>Tertiary Cisco Switch Name</td>
<td></td>
</tr>
<tr>
<td>Tertiary Cisco Switch IP Address</td>
<td>Not Configured</td>
</tr>
</tbody>
</table>
Administrative State ....................... ADMIN_ENABLED
Operation State ............................ REGISTERED
Mirroring Mode .............................. Disabled
AP Mode ...................................... Local

Public Safety ............................... Disabled
AP SubMode .................................. Not Configured
Remote AP Debug ......................... Disabled
Logging trap severity level ............... informational
Logging syslog facility ................. kern
S/W Version ............................. 7.0.98.0
Boot Version .................. 12.3.8.0
Mini IOS Version ................. 3.0.51.0
Stats Reporting Period ................. 180
LED State............................... Enabled
PoE Pre-Standard Switch .......... Disabled
PoE Power Injector MAC Addr ....... Disabled
Power Type/Mode ....................... Power injector / Normal mode
Number Of Slots ....................... 2
AP Model .................................. AIR-LAP1131AG-E-K9
AP Image ................................ C1130-K9W8-M
IOS Version .............................. 12.4(23c)JA
--More or (q)uit current module or <ctrl-z> to abort
Reset Button ............................ Enabled
AP Serial Number ...................... FCZ1440Q0DK
AP Certificate Type .................. Manufacture Installed
AP User Mode ........................ AUTOMATIC
AP User Name .................. Not Configured
AP Dot1x User Mode ................. Not Configured
AP Dot1x User Name ............... Not Configured

38
Cisco AP system logging host..................... 255.255.255.255
AP Up Time..................................... 0 days, 07 h 09 m 27 s
AP LWAPP Up Time................................. 0 days, 01 h 16 m 07 s
Join Date and Time............................... Sun Aug 26 21:17:04 2012

Join Taken Time................................. 0 days, 00 h 12 m 40 s
Attributes for Slot 0
   Radio Type................................... RADIO_TYPE_80211g
   Administrative State ....................... ADMIN_ENABLED
   Operation State ......................... UP
   Radio Role ............................... ACCESS
   CellId .................................... 0
Station Configuration
   Configuration ................................. AUTOMATIC
   Number Of WLANs ............................ 4
   Medium Occupancy Limit .................... 100
   CFP Period ................................. 4
   CFP MaxDuration ............................ 60
   BSSID ..................................... 00:3a:99:0d:44:20

Operation Rate Set

   1000 Kilo Bits............................. MANDATORY

   2000 Kilo Bits............................. MANDATORY

   5500 Kilo Bits............................. MANDATORY
11000 Kilo Bits.......................... MANDATORY

6000 Kilo Bits.......................... SUPPORTED

9000 Kilo Bits.......................... SUPPORTED

12000 Kilo Bits.......................... SUPPORTED

18000 Kilo Bits.......................... SUPPORTED

24000 Kilo Bits.......................... SUPPORTED

36000 Kilo Bits.......................... SUPPORTED

48000 Kilo Bits.......................... SUPPORTED

54000 Kilo Bits.......................... SUPPORTED

Beacon Period ......................... 100

Fragmentation Threshold ............... 2346

Multi Domain Capability Implemented ...... TRUE

Multi Domain Capability Enabled .......... TRUE

Country String ......................... SE
Multi Domain Capability

Configuration ......................... AUTOMATIC

First Chan Num ....................... 1

Number Of Channels ................. 13

MAC Operation Parameters

Configuration ......................... AUTOMATIC

Fragmentation Threshold ............. 2346

Packet Retry Limit ................... 64

Tx Power

Num Of Supported Power Levels ...... 6

Tx Power Level 1 ..................... 14 dBm

Tx Power Level 2 ..................... 11 dBm

Tx Power Level 3 ..................... 8 dBm
Tx Power Level 4 .......................... 5 dBm

Tx Power Level 5 .......................... 2 dBm

Tx Power Level 6 .......................... -1 dBm

Tx Power Configuration .................... AUTOMATIC

Current Tx Power Level .................... 1

Phy OFDM parameters
--More or (q)uit current module or <ctrl-z> to abort

Configuration ............................ AUTOMATIC

Current Channel ......................... 11

Extension Channel ....................... NONE

Channel Width .................... 20 Mhz

Allowed Channel List ................. 1,2,3,4,5,6,7,8,9,10,11,12,

.......................................... 13

TI Threshold .......................... -50
Antenna Type............................... INTERNAL_ANTENNA

Internal Antenna Gain (in .5 dBi units)... 8

Diversity................................. DIVERSITY_ENABLED

Performance Profile Parameters

Configuration ............................. AUTOMATIC

Interference threshold............... 10 %

Noise threshold......................... -70 dBm

RF utilization threshold.............. 80 %

Data-rate threshold................. 1000000 bps

Client threshold......................... 12 clients

Coverage SNR threshold............... 12 dB

Coverage exception level........ 25 %

Client minimum exception level...... 3 clients

Rogue Containment Information

Containment Count....................... 0
CleanAir Management Information

CleanAir Capable............................ No

Cisco AP Identifier......................... 0

Cisco AP Name............................... AP1cdf.0f4e.be7c

Country code............................... SE - Sweden

Regulatory Domain allowed by Country.... 802.11bg:-E   802.11a:-E

AP Country code............................ SE - Sweden

AP Regulatory Domain....................... -E

Switch Port Number ....................... 1

MAC Address............................... 1c:df:0f:4e:be:7c

IP Address Configuration................... DHCP

IP Address................................. 172.32.1.36

IP NetMask................................. 255.255.255.0

Gateway IP Addr........................... 172.32.1.1
CAPWAP Path MTU................................. 1485

Telnet State..................................... Disabled

Ssh State........................................ Disabled

Cisco AP Location.............................. default location

Cisco AP Group Name............................ default-group

Primary Cisco Switch Name.................... Primary Cisco Switch IP Address.................. Not Configured

Secondary Cisco Switch Name............... Not Configured

Tertiary Cisco Switch Name................. Not Configured

Administrative State........................ ADMIN_ENABLED

Operation State.............................. REGISTERED

Mirroring Mode................................ Disabled
AP Mode ........................................ Local

Public Safety ................................. Disabled

AP SubMode ................................. Not Configured

Remote AP Debug ......................... Disabled

Logging trap severity level .......... informational

Logging syslog facility ................. kern

S/W Version ................................. 7.0.98.0

Boot Version ............................... 12.3.8.0

Mini IOS Version ......................... 3.0.51.0

Stats Reporting Period ................. 180

LED State ................................... Enabled

PoE Pre-Standard Switch ............... Disabled

PoE Power Injector MAC Addr ........ Disabled

Power Type/Mode ......................... Power injector / Normal mode

Number Of Slots ......................... 2
AP Model................................. AIR-LAP1131AG-E-K9

AP Image................................. C1130-K9W8-M

--More or (q)uit current module or <ctrl-z> to abort

IOS Version............................... 12.4(23c)JA

Reset Button............................. Enabled

AP Serial Number........................ FCZ1440Q0DK

AP Certificate Type....................... Manufacture Installed

AP User Mode............................. AUTOMATIC

AP User Name............................. Not Configured

AP Dot1x User Mode....................... Not Configured

AP Dot1x User Name....................... Not Configured

Cisco AP system logging host.......... 255.255.255.255

AP Up Time............................ 0 days, 07 h 09 m 27 s

AP LWAPP Up Time....................... 0 days, 01 h 16 m 07 s

Join Date and Time...................... Sun Aug 26 21:17:04 2012
Join Taken Time.................................. 0 days, 00 h 12 m 40 s

Attributes for Slot 1

Radio Type................................... RADIO_TYPE_80211a

Radio Subband................................ RADIO_SUBBAND_ALL

Administrative State ....................... ADMIN_ENABLED

Operation State .............................. UP

Radio Role .................................... ACCESS

CellId ....................................... 0

--More or (q)uit current module or <ctrl-z> to abort

Station Configuration

Configuration ............................... AUTOMATIC

Number Of WLANs ........................... 4

Medium Occupancy Limit .................... 100
CFP Period ................................ 4

CFP MaxDuration .......................... 60

BSSID ................................. 00:3a:99:0d:44:20

Operation Rate Set

6000 Kilo Bits........................... MANDATORY

9000 Kilo Bits........................... SUPPORTED

12000 Kilo Bits.......................... MANDATORY

18000 Kilo Bits.......................... SUPPORTED

24000 Kilo Bits.......................... MANDATORY

36000 Kilo Bits.......................... SUPPORTED

48000 Kilo Bits.......................... SUPPORTED

54000 Kilo Bits.......................... SUPPORTED

Beacon Period ............................ 100

Fragmentation Threshold ................... 2346

Multi Domain Capability Implemented ...... TRUE
Multi Domain Capability Enabled .......... TRUE

Country String ............................ SE

Multi Domain Capability

--More or (q)uit current module or <ctrl-z> to abort

Configuration ............................ AUTOMATIC

First Chan Num ............................ 36

Number Of Channels ....................... 16

MAC Operation Parameters

Configuration ............................ AUTOMATIC

Fragmentation Threshold ................... 2346

Packet Retry Limit ........................ 64
Tx Power

Num Of Supported Power Levels .......... 8

Tx Power Level 1 ......................... 17 dBm

Tx Power Level 2 ......................... 15 dBm

Tx Power Level 3 ......................... 14 dBm

Tx Power Level 4 ......................... 11 dBm

Tx Power Level 5 ......................... 8 dBm

Tx Power Level 6 ......................... 5 dBm

Tx Power Level 7 ......................... 2 dBm

Tx Power Level 8 ......................... -1 dBm

Tx Power Configuration ................. AUTOMATIC

Current Tx Power Level .................. 1

Phy OFDM parameters
--More or (q)uit current module or <ctrl-z> to abort

Configuration ............................. AUTOMATIC

Current Channel ........................... 64

Extension Channel ........................ NONE

Channel Width ............................. 20 Mhz

Allowed Channel List...................... 36,40,44,48,52,56,60,64,100,


TI Threshold ............................. -50

Antenna Type .............................. INTERNAL_ANTENNA

Internal Antenna Gain (in .5 dBi units) ... 8

Diversity ................................. DIVERSITY_ENABLED

Performance Profile Parameters

Configuration ............................. AUTOMATIC

Interference threshold .................... 10 %
Noise threshold............................ -70 dBm

RF utilization threshold................... 80 %

Data-rate threshold....................... 1000000 bps

Client threshold........................... 12 clients

Coverage SNR threshold..................... 16 dB

Coverage exception level................... 25 %

Client minimum exception level......... 3 clients

Rogue Containment Information

Containment Count......................... 0

--More or (q)uit current module or <ctrl-z> to abort

CleanAir Management Information

CleanAir Capable......................... No
Press Enter to continue or <ctrl-z> to abort

Press Enter to continue or <ctrl-z> to abort

AP Airewave Director Configuration

Number Of Slots.................................. 2

AP Name.......................................... AP1cdf.0f4e.be7c

MAC Address...................................... 1c:df:0f:4e:be:7c

Slot ID........................................ 0

Radio Type..................................... RADIO_TYPE_80211b/g

Sub-band Type.................................. All

Noise Information
Noise Profile......................... PASSED

Channel 1.......................... -94 dBm
Channel 2.......................... -91 dBm
Channel 3.......................... -93 dBm
Channel 4.......................... -91 dBm
Channel 5.......................... -91 dBm
Channel 6.......................... -93 dBm
Channel 7.......................... -95 dBm
Channel 8.......................... -90 dBm
Channel 9.......................... -92 dBm
Channel 10......................... -89 dBm
Channel 11......................... -91 dBm
Channel 12......................... -92 dBm
Channel 13......................... -89 dBm

Interference Information
More or (q)uit current module or <ctrl-z> to abort

Interference Profile......................... PASSED

Channel 1................................. -128 dBm @ 0 % busy
Channel 2................................. -128 dBm @ 0 % busy
Channel 3................................. -47 dBm @ 1 % busy
Channel 4................................. -45 dBm @ 4 % busy
Channel 5................................. -38 dBm @ 2 % busy
Channel 6................................. -61 dBm @ 1 % busy
Channel 7................................. -128 dBm @ 0 % busy
Channel 8................................. -128 dBm @ 0 % busy
Channel 9................................. -128 dBm @ 0 % busy
Channel 10................................. -128 dBm @ 0 % busy
Channel 11................................. -78 dBm @ 1 % busy
Channel 12................................. -128 dBm @ 0 % busy
Channel 13............................... -128 dBm @ 0 % busy

Load Information

Load Profile................................... PASSED

Receive Utilization.......................... 0 %

Transmit Utilization......................... 2 %

Channel Utilization.......................... 4 %

Attached Clients............................. 1 clients

Coverage Information

Coverage Profile............................. PASSED

Failed Clients............................... 0 clients

--More or (q)uit current module or <ctrl-z> to abort

Client Signal Strengths

RSSI -100 dbm................................ 0 clients

RSSI -92 dbm.................................. 0 clients
RSSI  -84 dbm......................... 0 clients

RSSI  -76 dbm......................... 0 clients

RSSI  -68 dbm......................... 0 clients

RSSI  -60 dbm......................... 0 clients

RSSI  -52 dbm......................... 1 clients

Client Signal To Noise Ratios

SNR   0 dB......................... 0 clients

SNR   5 dB......................... 0 clients

SNR   10 dB......................... 0 clients

SNR   15 dB......................... 0 clients

SNR   20 dB......................... 0 clients

SNR   25 dB......................... 0 clients

SNR   30 dB......................... 0 clients

SNR   35 dB......................... 0 clients

SNR   40 dB......................... 0 clients
SNR  45 dB............................ 1 clients

Nearby APs

Radar Information

Channel Assignment Information

Current Channel Average Energy.............. -80 dBm

Previous Channel Average Energy.......... -63 dBm

Channel Change Count...................... 1

Last Channel Change Time.................. Sun Aug 26 21:25:45 2012

Recommended Best Channel............... 11

RF Parameter Recommendations

Power Level.............................. 1

RTS/CTS Threshold....................... 2347

Fragmentation Threshold............... 2346
Antenna Pattern.............................. 0

Persisting Interference Devices

<table>
<thead>
<tr>
<th>Classtype</th>
<th>Channel</th>
<th>DC (%)</th>
<th>RSSI (dBm)</th>
<th>Last Update Time</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

All third party trademarks are the property of their respective owners.

Number Of Slots.............................. 2

AP Name.......................................... AP1cdf.0f4e.be7c

MAC Address...................................... 1c:df:0f:4e:be:7c

Slot ID........................................ 1

Radio Type..................................... RADIO_TYPE_80211a

Sub-band Type.................................. All

Noise Information

Noise Profile.................................. PASSED

Channel 36...................................... -94 dBm
--More or (q)uit current module or <ctrl-z> to abort

Channel 40.............................. -95 dBm
Channel 44.............................. -94 dBm
Channel 48.............................. -92 dBm
Channel 52.............................. -93 dBm
Channel 56.............................. -96 dBm
Channel 60.............................. -95 dBm
Channel 64.............................. -92 dBm
Channel 100............................. -93 dBm
Channel 104............................. -94 dBm
Channel 108............................. -94 dBm
Channel 112............................. -97 dBm
Channel 116............................. -91 dBm
Channel 132............................. -94 dBm
Channel 136.................................. -94 dBm

Channel 140.................................. -94 dBm

Interference Information

Interference Profile......................... PASSED

Channel 36................................... -128 dBm @ 0 % busy

Channel 40................................... -128 dBm @ 0 % busy

Channel 44................................... -128 dBm @ 0 % busy

Channel 48................................... -128 dBm @ 0 % busy

Channel 52................................... -128 dBm @ 0 % busy

Channel 56................................... -128 dBm @ 0 % busy

--More or (q)uit current module or <ctrl-z> to abort

Channel 60................................... -128 dBm @ 0 % busy

Channel 64................................... -128 dBm @ 0 % busy

Channel 100.................................. -128 dBm @ 0 % busy
Channel 104............................... -128 dBm @ 0 % busy

Channel 108............................... -128 dBm @ 0 % busy

Channel 112............................... -128 dBm @ 0 % busy

Channel 116............................... -128 dBm @ 0 % busy

Channel 132............................... -128 dBm @ 0 % busy

Channel 136............................... -128 dBm @ 0 % busy

Channel 140............................... -128 dBm @ 0 % busy

Rogue Histogram (20/40_ABOVE/40_BELOW)

............................................

Channel 36............................... 1/ 0/ 0

Channel 40............................... 1/ 0/ 0

Channel 44............................... 1/ 0/ 0

Channel 48............................... 0/ 0/ 0

Channel 52............................... 0/ 0/ 0

Channel 56............................... 0/ 0/ 0
Channel 60................................. 0/ 0/ 0
Channel 64................................. 0/ 0/ 0
Channel 100............................... 0/ 0/ 0
Channel 104............................... 0/ 0/ 0
Channel 108............................... 0/ 0/ 0

--More or (q)uit current module or <ctrl-z> to abort

Channel 112............................... 0/ 0/ 0
Channel 116............................... 0/ 0/ 0
Channel 132............................... 0/ 0/ 0
Channel 136............................... 0/ 0/ 0
Channel 140............................... 0/ 0/ 0

Load Information

Load Profile............................. PASSED

Receive Utilization..................... 0 %
Transmit Utilization......................... 0 %

Channel Utilization......................... 0 %

Attached Clients............................. 0 clients

Coverage Information

Coverage Profile............................. PASSED

Failed Clients............................... 0 clients

Client Signal Strengths

RSSI -100 dbm................................ 0 clients

RSSI -92 dbm.................................. 0 clients

RSSI -84 dbm.................................. 0 clients

RSSI -76 dbm.................................. 0 clients

RSSI -68 dbm.................................. 0 clients

RSSI -60 dbm.................................. 0 clients

RSSI -52 dbm.................................. 0 clients

Client Signal To Noise Ratios
--More or (q)uit current module or <ctrl-z> to abort

SNR  0 dB.................................. 0 clients

SNR  5 dB.................................. 0 clients

SNR  10 dB.................................. 0 clients

SNR  15 dB.................................. 0 clients

SNR  20 dB.................................. 0 clients

SNR  25 dB.................................. 0 clients

SNR  30 dB.................................. 0 clients

SNR  35 dB.................................. 0 clients

SNR  40 dB.................................. 0 clients

SNR  45 dB.................................. 0 clients

Nearby APs

Radar Information

Channel Assignment Information
Current Channel Average Energy............... unknown

Previous Channel Average Energy............... unknown

Channel Change Count............................ 0

Last Channel Change Time....................... Sun Aug 26 21:17:04 2012

Recommended Best Channel....................... 64

RF Parameter Recommendations

Power Level..................................... 1

RTS/CTS Threshold.............................. 2347

Fragmentation Threshold......................... 2346

Antenna Pattern.................................. 0

--More or (q)uit current module or <ctrl-z> to abort

Persistent Interference Devices

Classstype Channel DC (%%) RSSI (dBm) Last Update Time
All third party trademarks are the property of their respective owners.

Press Enter to continue or <ctrl-z> to abort

<table>
<thead>
<tr>
<th>802.11a Configuration</th>
</tr>
</thead>
<tbody>
<tr>
<td>802.11a Network.................. Enabled</td>
</tr>
<tr>
<td>11nSupport.................. Enabled</td>
</tr>
<tr>
<td>802.11a Low Band............. Enabled</td>
</tr>
<tr>
<td>802.11a Mid Band............ Enabled</td>
</tr>
<tr>
<td>802.11a High Band........... Enabled</td>
</tr>
</tbody>
</table>
802.11a Operational Rates

802.11a 6M Rate.............................. Mandatory

802.11a 9M Rate.............................. Supported

802.11a 12M Rate............................. Mandatory

802.11a 18M Rate............................. Supported

802.11a 24M Rate............................. Mandatory

802.11a 36M Rate............................. Supported

802.11a 48M Rate............................. Supported

802.11a 54M Rate............................. Supported

802.11n MCS Settings:

MCS 0........................................ Supported

MCS 1........................................ Supported

MCS 2........................................ Supported

MCS 3........................................ Supported

MCS 4........................................ Supported
MCS 5............................. Supported
MCS 6............................. Supported

--More or (q)uit current module or <ctrl-z> to abort

MCS 7............................. Supported
MCS 8............................. Supported
MCS 9............................. Supported
MCS 10............................ Supported
MCS 11............................ Supported
MCS 12............................ Supported
MCS 13............................ Supported
MCS 14............................ Supported
MCS 15............................ Supported

802.11n Status:

A-MPDU Tx:
Priority 0............................... Enabled

Priority 1............................... Disabled

Priority 2............................... Disabled

Priority 3............................... Disabled

Priority 4............................... Enabled

Priority 5............................... Enabled

Priority 6............................... Disabled

Priority 7............................... Disabled

Guard Interval ......................... Any

Beacon Interval.......................... 100

CF Pollable mandatory................... Disabled

CF Poll Request mandatory............... Disabled

--More or (q)uit current module or <ctrl-z> to abort

CFP Period............................... 4
CFP Maximum Duration............................. 60

Default Channel.................................. 36

Default Tx Power Level............................ 0

DTPC Status...................................... Enabled

Fragmentation Threshold.......................... 2346

TI Threshold...................................... -50

Legacy Tx Beamforming setting.................... Disabled

Traffic Stream Metrics Status..................... Disabled

Expedited BW Request Status....................... Disabled

World Mode......................................... Enabled

EDCA profile type................................ default-wmm

Voice MAC optimization status.................... Disabled

Call Admission Control (CAC) configuration

Voice AC:

Voice AC - Admission control (ACM)........... Disabled
Voice max RF bandwidth...................... 75

Voice reserved roaming bandwidth.......... 6

Voice load-based CAC mode................. Disabled

Voice tspec inactivity timeout............. Disabled

Voice max limit on number of call.......... 0

CAC SIP-Voice configuration

SIP Codec Type.............................. CODEC_TYPE_G711

--More or (q)uit current module or <ctrl-z> to abort

SIP call bandwidth......................... 64

SIP call bandwith sample-size............. 20

Voice Stream-Size......................... 84000

Voice Max-Streams......................... 2

Video AC:

Video AC - Admission control (ACM)........ Disabled
Video max RF bandwidth...................... Infinite

Video reserved roaming bandwidth............. 0

Best-effort AC - Admission control (ACM)....... Disabled

Background AC - Admission control (ACM)....... Disabled

Press Enter to continue or <ctrl-z> to abort

802.11a Advanced Configuration

<table>
<thead>
<tr>
<th>AP Name</th>
<th>MAC Address</th>
<th>Admin State</th>
<th>Operation State</th>
<th>Channel</th>
</tr>
</thead>
<tbody>
<tr>
<td>AP1cdf.0f4e.be7c</td>
<td>00:3a:99:0d:44:20</td>
<td>ENABLED</td>
<td>UP</td>
<td>64*</td>
</tr>
</tbody>
</table>

Press Enter to continue or <ctrl-z> to abort
802.11a Airewave Director Configuration

RF Event and Performance Logging

Channel Update Logging....................... Off
Coverage Profile Logging...................... Off
Foreign Profile Logging........................ Off
Load Profile Logging............................ Off
Noise Profile Logging........................... Off
Performance Profile Logging.................... Off
TxPower Update Logging........................ Off

Default 802.11a AP performance profiles

802.11a Global Interference threshold......... 10 %
802.11a Global noise threshold............... -70 dBm
802.11a Global RF utilization threshold...... 80 %
802.11a Global throughput threshold......... 1000000 bps
802.11a Global clients threshold............ 12 clients

Default 802.11a AP monitoring

802.11a Monitor Mode.......................... enable

802.11a Monitor Mode for Mesh AP Backhaul...... disable

802.11a Monitor Channels......................... Country channels

802.11a AP Coverage Interval................... 180 seconds

802.11a AP Load Interval......................... 60 seconds

802.11a AP Noise Interval......................... 180 seconds

--More or (q)uit current module or <ctrl-z> to abort

802.11a AP Signal Strength Interval........... 60 seconds

Automatic Transmit Power Assignment

Transmit Power Assignment Mode.................. AUTO

Transmit Power Update Interval................... 600 seconds

Transmit Power Threshold...................... -70 dBm
Transmit Power Neighbor Count .................. 3 APs

Min Transmit Power .............................. -100 dBm

Max Transmit Power .............................. 100 dBm

Transmit Power Update Contribution .......... SNI..

Transmit Power Assignment Leader ............ MALMO_WLC (172.32.1.100)

Last Run ....................................... 476 seconds ago

Coverage Hole Detection

802.11a Coverage Hole Detection Mode .......... Enabled

802.11a Coverage Voice Packet Count .......... 100 packets

802.11a Coverage Voice Packet Percentage ... 50%

802.11a Coverage Voice RSSI Threshold ....... -80 dBm

802.11a Coverage Data Packet Count .......... 50 packets

802.11a Coverage Data Packet Percentage ... 50%

802.11a Coverage Data RSSI Threshold ....... -80 dBm

802.11a Global coverage exception level ..... 25 %
802.11a Global client minimum exception level: 3 clients

Automatic Channel Assignment

Channel Assignment Mode: AUTO

More or (q)uit current module or <ctrl-z> to abort

Channel Update Interval: 600 seconds [startup]

Anchor time (Hour of the day): 0

Channel Update Contribution: SNI.

CleanAir Event-driven RRM option: Disabled

CleanAir Event-driven RRM sensitivity: Medium

Channel Assignment Leader: MALMO_WLC (172.32.1.100)

Last Run: 476 seconds ago

DCA Sensitivity Level: STARTUP (5 dB)

DCA 802.11n Channel Width: 20 MHz

DCA Minimum Energy Limit: -95 dBm
Channel Energy Levels

Minimum................................. unknown
Average................................. unknown
Maximum................................. unknown

Channel Dwell Times

Minimum................................. 0 days, 01 h 16 m 57 s
Average................................. 0 days, 01 h 16 m 57 s
Maximum................................. 0 days, 01 h 16 m 57 s

802.11a 5 GHz Auto-RF Channel List

Allowed Channel List....................... 36,40,44,48,52,56,60,64
Unused Channel List....................... 100,104,108,112,116,120,124,

128,132,136,140

DCA Outdoor AP option.................... Disabled

--More or (q)uit current module or <ctrl-z> to abort
Radio RF Grouping

802.11a Group Mode............................. AUTO

802.11a Group Update Interval.................. 600 seconds

802.11a Group Leader........................... MALMO_WLC (172.32.1.100)

802.11a Group Member.......................... MALMO_WLC (172.32.1.100)

802.11a Last Run............................... 476 seconds ago

802.11a CleanAir Configuration

Clean Air Solution............................... Disabled

Air Quality Settings:

Air Quality Reporting............................. Enabled

Air Quality Reporting Period (min)........... 15

Air Quality Alarms.............................. Enabled

Air Quality Alarm Threshold................... 35

Interference Device Settings:
Interference Device Reporting............ Enabled

Interference Device Types:

TDD Transmitter......................... Enabled

Jammer................................. Enabled

Continuous Transmitter............... Enabled

DECT-like Phone......................... Enabled

Video Camera............................ Enabled

WiFi Inverted........................... Enabled

More or (q)uit current module or <ctrl-z> to abort

WiFi Invalid Channel.................... Enabled

SuperAG................................. Enabled

Canopy................................. Enabled

WiMax Mobile........................... Enabled

WiMax Fixed............................ Enabled
Interference Device Alarms.................. Enabled

Interference Device Types Triggering Alarms:

  TDD Transmitter....................... Disabled
  Jammer................................. Enabled
  Continuous Transmitter............. Disabled
  DECT-like Phone..................... Disabled
  Video Camera......................... Disabled
  WiFi Inverted......................... Enabled
  WiFi Invalid Channel............... Enabled
  SuperAG................................ Disabled
  Canopy................................ Disabled
  WiMax Mobile........................ Disabled
  WiMax Fixed........................... Disabled

Additional Clean Air Settings:

  CleanAir Event-driven RRM State....... Disabled
CleanAir Driven RRM Sensitivity............ Medium

CleanAir Persistent Devices state............ Disabled

Radio RF Grouping

802.11b Group Mode......................... AUTO

802.11b Group Update Interval............... 600 seconds

802.11b Group Leader......................... MALMO_WLC (172.32.1.100)

--More or (q)uit current module or <ctrl-z> to abort

802.11b Group Member......................... MALMO_WLC (172.32.1.100)

802.11b Last Run............................ 492 seconds ago

83
802.11a CleanAir Configuration

Clean Air Solution............................. Disabled

Air Quality Settings:

Air Quality Reporting......................... Enabled

Air Quality Reporting Period (min).......... 15

Air Quality Alarms............................ Enabled

Air Quality Alarm Threshold............... 35

Interference Device Settings:

Interference Device Reporting.............. Enabled

Interference Device Types:

Bluetooth Link............................. Enabled

Microwave Oven......................... Enabled

802.11 FH................................. Enabled

Bluetooth Discovery...................... Enabled
TDD Transmitter................. Enabled

Jammer............................. Enabled

Continuous Transmitter......... Enabled

DECT-like Phone................... Enabled

Video Camera..................... Enabled

802.15.4........................... Enabled

--More or (q)uit current module or <ctrl-z> to abort

WiFi Inverted..................... Enabled

WiFi Invalid Channel............. Enabled

SuperAG............................ Enabled

Canopy............................. Enabled

Xbox............................... Enabled

WiMax Mobile...................... Enabled

WiMax Fixed....................... Enabled
Interference Device Alarms................. Enabled

Interference Device Types Triggering Alarms:

   Bluetooth Link......................... Disabled

   Microwave Oven......................... Disabled

   802.11 FH................................ Disabled

   Bluetooth Discovery..................... Disabled

   TDD Transmitter......................... Disabled

   Jammer.................................. Enabled

   Continuous Transmitter............... Disabled

   DECT-like Phone......................... Disabled

   Video Camera........................... Disabled

   802.15.4................................. Disabled

   WiFi Inverted......................... Enabled

   WiFi Invalid Channel................. Enabled

   SuperAG................................. Disabled
Canopy......................... Disabled

--More or (q)uit current module or <ctrl-z> to abort

Xbox............................... Disabled

WiMax Mobile...................... Disabled

WiMax Fixed....................... Disabled

Additional Clean Air Settings:

CleanAir Event-driven RRM State........... Disabled

CleanAir Driven RRM Sensitivity.......... Medium

CleanAir Persistent Devices state......... Disabled

802.11a CleanAir AirQuality Summary

AQ = Air Quality
DFS = Dynamic Frequency Selection

AP Name  Channel Avg AQ  Min AQ  Interferers DFS
Mobility Configuration

Symmetric Mobility Tunneling (current) .......... Enabled

Symmetric Mobility Tunneling (after reboot) ..... Enabled

Mobility Protocol Port........................... 16666

Default Mobility Domain......................... Malmo

Multicast Mode .................................. Disabled

Mobility Domain ID for 802.11r................... 0xd585

Mobility Keepalive Interval...................... 10

Mobility Keepalive Count......................... 3

Mobility Group Members Configured............... 1

Mobility Control Message DSCP Value............ 0
Controllers configured in the Mobility Group

<table>
<thead>
<tr>
<th>MAC Address</th>
<th>IP Address</th>
<th>Group Name</th>
<th>Multicast IP</th>
<th>Status</th>
</tr>
</thead>
<tbody>
<tr>
<td>f8:66:22:30:40</td>
<td>172.32.1.100</td>
<td>Malmo</td>
<td>0.0.0.0</td>
<td>Up</td>
</tr>
</tbody>
</table>

Press Enter to continue or <ctrl-z> to abort

Advanced Configuration

Probe request filtering......................... Enabled

Probes fwd to controller per client per radio.... 2

Probe request rate-limiting interval............ 500 msec

Aggregate Probe request interval................. 500 msec

EAP-Identity-Request Timeout (seconds)........... 30

EAP-Identity-Request Max Retries................ 2

EAP Key-Index for Dynamic WEP.................... 0
EAP Max-Login Ignore Identity Response........... enable

EAP-Request Timeout (seconds).................... 30

EAP-Request Max Retries.......................... 2

EAPOL-Key Timeout (milliseconds)................. 1000

EAPOL-Key Max Retries............................ 2

dot11-padding.................................... Disabled

Press Enter to continue or <ctrl-z> to abort

Location Configuration

RFID Tag data Collection.......................... Enabled

RFID timeout.................................... 1200 seconds

RFID mobility.................................... Oui:00:14:7e : Vendor:pango  State:Disabled

Press Enter to continue or <ctrl-z> to abort
Interface Configuration

Interface Name............................... ap-manager

MAC Address...................................... f8:66:f2:62:30:40

IP Address....................................... 172.32.100.100

IP Netmask....................................... 255.255.255.0

IP Gateway....................................... 172.32.100.1

External NAT IP State.......................... Disabled

External NAT IP Address........................ 0.0.0.0

VLAN............................................. 100

Physical Port.................................... 1

Primary DHCP Server........................... 172.32.100.1

Secondary DHCP Server......................... Unconfigured

DHCP Option 82................................. Disabled
ACL.............................................. Unconfigured
AP Manager....................................... Yes
Guest Interface.................................. No

Interface Name.................................... engineer
MAC Address.................................... f8:66:f2:62:30:40
IP Address...................................... 172.32.10.100
IP Netmask..................................... 255.255.255.0
IP Gateway...................................... 172.32.10.1
External NAT IP State.......................... Disabled
External NAT IP Address....................... 0.0.0.0
VLAN............................................ 10
Quarantine-vlan................................. 0
Physical Port.................................... 1
Primary DHCP Server........................... 172.32.10.1
Secondary DHCP Server.......................... Unconfigured

DHCP Option 82.................................. Disabled

ACL.............................................. Unconfigured

AP Manager....................................... No

Guest Interface.................................. No

Interface Name.................................. factoryadmin

MAC Address.................................... f8:66:f2:62:30:40

IP Address.................................. 172.32.12.100

IP Netmask.................................... 255.255.255.0

IP Gateway.................................... 172.32.12.1

External NAT IP State.......................... Disabled

External NAT IP Address....................... 0.0.0.0

VLAN........................................... 12
Quarantine-vlan............................... 0

Physical Port.................................. 1

Primary DHCP Server......................... 172.32.12.1

Secondary DHCP Server....................... Unconfigured

DHCP Option 82................................. Disabled

ACL................................................ Unconfigured

AP Manager..................................... No

Guest Interface............................... No

Interface Name............................... management

MAC Address................................. f8:66:f2:62:30:40

IP Address................................. 172.32.1.100

IP Netmask..................................... 255.255.255.0

IP Gateway.................................... 172.32.1.1

External NAT IP State....................... Disabled
External NAT IP Address...................... 0.0.0.0

VLAN........................................... untagged

Quarantine-vlan.............................. 0

Physical Port............................... 1

Primary DHCP Server........................ 172.32.1.1

Secondary DHCP Server..................... Unconfigured

DHCP Option 82............................... Disabled

ACL............................................. Unconfigured

AP Manager................................. No

Guest Interface............................. No

Interface Name............................. marketing

MAC Address............................... f8:66:f2:62:30:40

IP Address................................. 172.32.11.100
<table>
<thead>
<tr>
<th>Parameter</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>IP Netmask</td>
<td>255.255.255.0</td>
</tr>
<tr>
<td>IP Gateway</td>
<td>172.32.11.1</td>
</tr>
<tr>
<td>External NAT IP State</td>
<td>Disabled</td>
</tr>
<tr>
<td>External NAT IP Address</td>
<td>0.0.0.0</td>
</tr>
<tr>
<td>VLAN</td>
<td>11</td>
</tr>
<tr>
<td>Quarantine-vlan</td>
<td>0</td>
</tr>
<tr>
<td>Physical Port</td>
<td>1</td>
</tr>
<tr>
<td>Primary DHCP Server</td>
<td>172.32.11.1</td>
</tr>
<tr>
<td>Secondary DHCP Server</td>
<td>Unconfigured</td>
</tr>
<tr>
<td>DHCP Option 82</td>
<td>Disabled</td>
</tr>
<tr>
<td>ACL</td>
<td>Unconfigured</td>
</tr>
<tr>
<td>AP Manager</td>
<td>No</td>
</tr>
<tr>
<td>Guest Interface</td>
<td>No</td>
</tr>
<tr>
<td>Interface Name</td>
<td>virtual</td>
</tr>
</tbody>
</table>
MAC Address............

.......................... f8:66:f2:62:30:40

IP Address.............................. 1.1.1.1

DHCP Option 82.......................... Disabled

Virtual DNS Host Name.................. Disabled

AP Manager.............................. No

Guest Interface........................ No

Press Enter to continue or <ctrl-z> to abort

WLAN Configuration

WLAN Identifier.......................... 1

Profile Name............................. Malmo

Network Name (SSID)..................... Malmo
Status.............................. Enabled

MAC Filtering............................ Disabled

Broadcast SSID............................ Enabled

AAA Policy Override..................... Disabled

Network Admission Control

NAC-State............................... Disabled

Quarantine VLAN......................... 0

Number of Active Clients............... 0

--More or (q)uit current module or <ctrl-z> to abort

Exclusionlist Timeout.................... 60 seconds

Session Timeout.......................... 1800 seconds

CHD per WLAN........................... Enabled

Webauth DHCP exclusion.................. Disabled
Interface................................. management

WLAN ACL................................. unconfigured

DHCP Server......................... Default

DHCP Address Assignment Required......... Disabled

Quality of Service...................... Silver (best effort)

Scan Defer Priority.................. 4,5,6

Scan Defer Time....................... 100 milliseconds

WMM.................................. Allowed

Media Stream Multicast-direct......... Disabled

CCX - Aironetle Support............... Enabled

CCX - Gratuitous ProbeResponse (GPR).... Disabled

CCX - Diagnostics Channel Capability...... Disabled

Dot11-Phone Mode (7920)............... Disabled

Wired Protocol................. None

IPv6 Support........................ Disabled
Passive Client Feature........................ Disabled

Peer-to-Peer Blocking Action.................. Disabled

Radio Policy.................................. All

DTIM period for 802.11a radio............... 1

DTIM period for 802.11b radio............... 1

Radius Servers

Authentication............................... Global Servers

Accounting................................. Global Servers

Dynamic Interface........................... Disabled

Local EAP Authentication..................... Disabled

Security

802.11 Authentication:...................... Open System
Static WEP Keys............................... Disabled

802.1X........................................ Disabled

Wi-Fi Protected Access (WPA/WPA2)............ Disabled

CKIP ......................................... Disabled

Web Based Authentication....................... Disabled

Web-Passthrough............................... Disabled

Conditional Web Redirect....................... Disabled

Splash-Page Web Redirect........................ Disabled

Auto Anchor................................... Disabled

H-REAP Local Switching........................ Disabled

H-REAP Learn IP Address....................... Enabled

Client MFP.................................... Optional but inactive (WPA2 not configured)

Tkip MIC Countermeasure Hold-down Timer...... 60

Call Snooping.................................. Disabled
More or (q)uit current module or <ctrl-z> to abort

Roamed Call Re-Anchor Policy: Disabled

Band Select: Disabled

Load Balancing: Disabled

Mobility Anchor List

<table>
<thead>
<tr>
<th>WLAN ID</th>
<th>IP Address</th>
<th>Status</th>
</tr>
</thead>
<tbody>
<tr>
<td>-------</td>
<td>------------</td>
<td>--------</td>
</tr>
</tbody>
</table>

Press Enter to continue or <ctrl-z> to abort

WLAN Configuration

WLAN Identifier: 10

Profile Name: Malmo-engineers
Network Name (SSID).............................. Engineer-dep

Status........................................... Enabled

MAC Filtering.................................... Disabled

Broadcast SSID................................... Enabled

AAA Policy Override.............................. Disabled

Network Admission Control

NAC-State...................................... Disabled

Quarantine VLAN................................. 0

--More or (q)uit current module or <ctrl-z> to abort

Number of Active Clients......................... 1

Exclusionlist Timeout............................ 60 seconds

Session Timeout................................. 1800 seconds
CHD per WLAN.......................... Enabled

Webauth DHCP exclusion............... Disabled

Interface.......................... engineer

WLAN ACL.................. unconfigured

DHCP Server........................ Default

DHCP Address Assignment Required.......... Disabled

Quality of Service........ Silver (best effort)

Scan Defer Priority........ 4,5,6

Scan Defer Time........... 100 milliseconds

WMM.......................... Allowed

Media Stream Multicast-direct........ Disabled

CCX - Aironetle Support............... Enabled

CCX - Gratuitous ProbeResponse (GPR)........ Disabled

CCX - Diagnostics Channel Capability........ Disabled

Dot11-Phone Mode (7920)........ Disabled
Wired Protocol............................... None

IPv6 Support................................. Disabled

Passive Client Feature......................... Disabled

Peer-to-Peer Blocking Action............... Disabled

Radio Policy................................. All

--More or (q)uit current module or <ctrl-z> to abort

DTIM period for 802.11a radio............. 1

DTIM period for 802.11b radio............. 1

Radius Servers

Authentication.......................... Global Servers

Accounting.......................... Global Servers

Dynamic Interface....................... Disabled

Local EAP Authentication............. Disabled

Security
802.11 Authentication: .................. Open System (Allow shared key)

Static WEP Keys: .................. Enabled

   Key Index: .................. 1

   Encryption: .................. 40-bit WEP

802.1X: .................. Disabled

Wi-Fi Protected Access (WPA/WPA2): ............ Disabled

CKIP: .................. Disabled

Web Based Authentication: ............ Disabled

Web-Passthrough: ............ Disabled

Conditional Web Redirect: ............ Disabled

Splash-Page Web Redirect: ............ Disabled

Auto Anchor: ............ Disabled

H-REAP Local Switching: ............ Disabled

H-REAP Learn IP Address: ............ Enabled
--More or (q)uit current module or <ctrl-z> to abort

Client MFP.................................... Optional but inactive (WPA2 not configured)

Tkip MIC Countermeasure Hold-down Timer....... 60

Call Snooping.................................... Disabled

Roamed Call Re-Anchor Policy..................... Disabled

Band Select...................................... Disabled

Load Balancing................................... Disabled

Mobility Anchor List

<table>
<thead>
<tr>
<th>WLAN ID</th>
<th>IP Address</th>
<th>Status</th>
</tr>
</thead>
<tbody>
<tr>
<td>--------</td>
<td>------------</td>
<td>--------</td>
</tr>
</tbody>
</table>

Press Enter to continue or <ctrl-z> to abort
WLAN Configuration

WLAN Identifier.............................. 11

Profile Name................................. Marketing

Network Name (SSID).......................... Marketing-dep

Status........................................... Enabled

MAC Filtering.................................. Disabled

Broadcast SSID............................... Enabled

AAA Policy Override.......................... Disabled

Network Admission Control

NAC-State...................................... Disabled

Quarantine VLAN............................. 0
Number of Active Clients.......................... 0

Exclusionlist Timeout............................. 60 seconds

Session Timeout.................................... 1800 seconds

CHD per WLAN...................................... Enabled

Webauth DHCP exclusion............................ Disabled

Interface........................................... marketing

WLAN ACL.......................................... unconfigured

DHCP Server........................................ Default

DHCP Address Assignment Required............... Disabled

--More or (q)uit current module or <ctrl-z> to abort

Quality of Service................................. Silver (best effort)

Scan Defer Priority............................... 4,5,6

Scan Defer Time................................... 100 milliseconds

WMM.................................................. Allowed
Media Stream Multicast-direct.............. Disabled

CCX - Aironetle Support......................... Enabled

CCX - Gratuitous ProbeResponse (GPR)......... Disabled

CCX - Diagnostics Channel Capability......... Disabled

Dot11-Phone Mode (7920)....................... Disabled

Wired Protocol................................. None

IPv6 Support.................................. Disabled

Passive Client Feature......................... Disabled

Peer-to-Peer Blocking Action................... Disabled

Radio Policy................................. All

DTIM period for 802.11a radio............... 1

DTIM period for 802.11b radio............... 1

Radius Servers

Authentication................................. Global Servers

Accounting................................. Global Servers
Dynamic Interface............................. Disabled

Local EAP Authentication......................... Disabled

Security

--More or (q)uit current module or <ctrl-z> to abort

802.11 Authentication:......................... Open System (Allow shared key)

Static WEP Keys.............................. Enabled

Key Index:...................................... 1

Encryption..................................... 40-bit WEP

802.1X........................................ Disabled

Wi-Fi Protected Access (WPA/WPA2)......... Disabled

CKIP ......................................... Disabled

Web Based Authentication.................... Disabled

Web-Passthrough............................... Disabled
Conditional Web Redirect...................... Disabled

Splash-Page Web Redirect...................... Disabled

Auto Anchor................................... Disabled

H-REAP Local Switching....................... Disabled

H-REAP Learn IP Address....................... Enabled

Client MFP................................. Optional but inactive (WPA2 not configured)

Tkip MIC Countermeasure Hold-down Timer....... 60

Call Snooping................................ Disabled

Roamed Call Re-Anchor Policy.................. Disabled

Band Select.................................. Disabled

Load Balancing............................... Disabled

Mobility Anchor List

<table>
<thead>
<tr>
<th>WLAN ID</th>
<th>IP Address</th>
<th>Status</th>
</tr>
</thead>
</table>
WLAN Configuration

WLAN Identifier................................. 12
Profile Name................................. Factory-admin
Network Name (SSID)....................... Admin-dep
Status........................................... Enabled
MAC Filtering.................................... Disabled
Broadcast SSID.................................... Enabled
AAA Policy Override............................ Disabled
Network Admission Control

NAC-State................................. Disabled

Quarantine VLAN......................... 0

Number of Active Clients................. 0

Exclusionlist Timeout..................... 60 seconds

Session Timeout.......................... 1800 seconds

CHD per WLAN............................. Enabled

Webauth DHCP exclusion.................. Disabled

Interface................................. factoryadmin

WLAN ACL................................. unconfigured

DHCP Server.............................. Default

DHCP Address Assignment Required........ Disabled

--More or (q)uit current module or <ctrl-z> to abort

114
Quality of Service......................... Silver (best effort)

Scan Defer Priority......................... 4,5,6

Scan Defer Time............................. 100 milliseconds

WMM........................................... Allowed

Media Stream Multicast-direct............. Disabled

CCX - Aironet Support....................... Enabled

CCX - Gratuitous ProbeResponse (GPR)........ Disabled

CCX - Diagnostics Channel Capability........ Disabled

Dot11-Phone Mode (7920)..................... Disabled

Wired Protocol............................... None

IPv6 Support.................................. Disabled

Passive Client Feature....................... Disabled

Peer-to-Peer Blocking Action............... Disabled

Radio Policy................................. All

DTIM period for 802.11a radio.............. 1
DTIM period for 802.11b radio................. 1

Radius Servers

Authentication.................. Global Servers

Accounting.................. Global Servers

Dynamic Interface............. Disabled

Local EAP Authentication....... Disabled

Security

--More or (q)uit current module or <ctrl-z> to abort

802.11 Authentication:............ Open System (Allow shared key)

Static WEP Keys.............. Enabled

    Key Index:........................ 1

    Encryption:........................ 40-bit WEP

802.1X............................ Disabled

116
Wi-Fi Protected Access (WPA/WPA2).............. Disabled

CKIP ........................................... Disabled

Web Based Authentication...................... Disabled

Web-Passthrough............................... Disabled

Conditional Web Redirect...................... Disabled

Splash-Page Web Redirect...................... Disabled

Auto Anchor................................... Disabled

H-REAP Local Switching........................ Disabled

H-REAP Learn IP Address....................... Enabled

Client MFP..................................... Optional but inactive (WPA2 not configured)

Tkip MIC Countermeasure Hold-down Timer........ 60

Call Snooping................................. Disabled

Roamed Call Re-Anchor Policy.................... Disabled

Band Select.................................... Disabled

Load Balancing................................. Disabled
Mobility Anchor List

<table>
<thead>
<tr>
<th>WLAN ID</th>
<th>IP Address</th>
<th>Status</th>
</tr>
</thead>
</table>

-More or (q)uit current module or <ctrl-z> to abort

Press Enter to continue or <ctrl-z> to abort

Press Enter to continue or <ctrl-z> to abort

ACL Configuration

Press Enter to continue or <ctrl-z> to abort

118
CPU ACL Configuration

CPU Acl Name................................ NOT CONFIGURED

Wireless Traffic................................. Disabled

Wired Traffic.................................. Disabled

Press Enter to continue or <ctrl-z> to abort

RADIUS Configuration

Vendor Id Backward Compatibility................ Disabled

Call Station Id Case.............................. lower

Call Station Id Type.............................. IP Address
Aggressive Failover............................ Enabled

Keywrap......................................... Disabled

Fallback Test:

Test Mode..................................... Off

Probe User Name.............................. cisco-probe

Interval (in seconds)......................... 300

MAC Delimiter for Authentication Messages...... hyphen

MAC Delimiter for Accounting Messages......... hyphen

Authentication Servers

<table>
<thead>
<tr>
<th>Idx</th>
<th>Type</th>
<th>Server Address</th>
<th>Port</th>
<th>State</th>
<th>Tout</th>
<th>RFC3576</th>
<th>IPSec - AuthMode/Phase1/Group/Lifetime/Auth/Encr</th>
</tr>
</thead>
<tbody>
<tr>
<td>---</td>
<td>---</td>
<td>---------------</td>
<td>------</td>
<td>-------</td>
<td>------</td>
<td>---------</td>
<td>------------------------------------------------</td>
</tr>
</tbody>
</table>

Accounting Servers
<table>
<thead>
<tr>
<th>Idx</th>
<th>Type</th>
<th>Server Address</th>
<th>Port</th>
<th>State</th>
<th>Tout</th>
<th>RFC3576</th>
<th>IPSec - AuthMode/Phase1/Group/Lifetime/Auth/Encr</th>
</tr>
</thead>
</table>

-- More or (q)uit current module or <ctrl-z> to abort

Press Enter to continue or <ctrl-z> to abort

TACACS Configuration

Authentication Servers

<table>
<thead>
<tr>
<th>Idx</th>
<th>Server Address</th>
<th>Port</th>
<th>State</th>
<th>Tout</th>
</tr>
</thead>
</table>

-- --------------- ------ ------- ----
Authorization Servers

<table>
<thead>
<tr>
<th>Idx</th>
<th>Server Address</th>
<th>Port</th>
<th>State</th>
<th>Tout</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Accounting Servers

<table>
<thead>
<tr>
<th>Idx</th>
<th>Server Address</th>
<th>Port</th>
<th>State</th>
<th>Tout</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Press Enter to continue or <ctrl-z> to abort

LDAP Configuration

Press Enter to continue or <ctrl-z> to abort
Local EAP Configuration

User credentials database search order:

Primary ..................................... Local DB

Timer:

Active timeout .............................. 300

Configured EAP profiles:

EAP Method configuration:

EAP-FAST:

Server key ................................. <hidden>

TTL for the PAC ............................ 10

Anonymous provision allowed ............ Yes
Authority ID .............................. 436973636f0000000000000000000000

Authority Information .......................... Cisco A-ID

Press Enter to continue or <ctrl-z> to abort

HREAP Group Summary

HREAP Group Summary: Count: 0

Group Name # Aps

Press Enter to continue or <ctrl-z> to abort
HREAP Group Detail

Press Enter to continue or <ctrl-z> to abort

Route Info

Number of Routes.................................. 0

<table>
<thead>
<tr>
<th>Destination Network</th>
<th>Netmask</th>
<th>Gateway</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Press Enter to continue or <ctrl-z> to abort

Qos Queue Length Info
Platinum queue length............................ 100

Gold queue length............................... 75

Silver queue length............................... 50

Bronze queue length............................... 25

Press Enter to continue or <ctrl-z> to abort

Mac Filter Info

Press Enter to continue or <ctrl-z> to abort

Authorization List

Authorize MIC APs against AAA ................... disabled

Authorize LSC APs against Auth-List ............. disabled
APs Allowed to Join

AP with Manufacturing Installed Certificate.... no

AP with Self-Signed Certificate................ no

AP with Locally Significant Certificate........ no

Press Enter to continue or <ctrl-z> to abort

Load Balancing Info

Aggressive Load Balancing......................... per WLAN enabling

Aggressive Load Balancing Window................. 5 clients

Aggressive Load Balancing Denial Count.......... 3

Statistics

Total Denied Count............................... 0 clients
Total Denial Sent.............................. 0 messages

Exceeded Denial Max Limit Count............. 0 times

None 5G Candidate Count....................... 0 times

None 2.4G Candidate Count....................... 0 times

Press Enter to continue or <ctrl-z> to abort

Dhcp Scope Info

Press Enter to continue or <ctrl-z> to abort

Exclusion List ConfigurationUnable to retrieve exclusion-list entry

Press Enter to continue or <ctrl-z> to abort
CDP Configuration

Press Enter to continue or <ctrl-z> to abort

Country Channels Configuration

Configured Country............................. SE - Sweden

KEY: * = Channel is legal in this country and may be configured manually.

A = Channel is the Auto-RF default in this country.

. = Channel is not legal in this country.

C = Channel has been configured for use by Auto-RF.

x = Channel is available to be configured for use by Auto-RF.
(-, -) = (indoor, outdoor) regulatory domain allowed by this country.

-----------------:+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-

802.11bg :

Channels : 1 1 1 1

: 1 2 3 4 5 6 7 8 9 0 1 2 3 4

-----------------:+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-

SE (-E, -E): A **** A **** A **.

-----------------:+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+

802.11a :

Channels : 3 3 3 4 4 4 4 5 5 6 6 0 0 1 1 2 2 2 3 3 4 4 5 5 6 6

: 4 6 8 0 2 4 6 8 2 6 0 4 0 4 8 2 6 0 4 8 2 6 0 9 3 7 1 5

-----------------:+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+

SE (-E, -E): . A . A . A A A A A A A A A A A A A A A A A A A A A A A A A A A A A A A A A A A A A A A A A A A A A A A A A A A A A A A A A A A A

Press Enter to continue or <ctrl-z> to abort
WPS Configuration Summary

Auto-Immune

Auto-Immune........................................ Disabled

Client Exclusion Policy

Excessive 802.11-association failures........ Enabled

Excessive 802.11-authentication failures....... Enabled

Excessive 802.1x-authentication................ Enabled

IP-theft............................................ Enabled

Excessive Web authentication failure.......... Enabled

Signature Policy

Signature Processing............................ Enabled
Press Enter to continue or <ctrl-z> to abort

Custom Web Configuration

Radius Authentication Method..................... PAP

Cisco Logo....................................... Enabled

CustomLogo....................................... None

Custom Title..................................... None

Custom Message................................... None

Custom Redirect URL.............................. None

Web Authentication Type.......................... Internal Default

External Web Authentication URL............... None
Configuration Per Profile:

Press Enter to continue or <ctrl-z> to abort

Core dump Configuration

Core Dump is disabled

Press Enter to continue or <ctrl-z> to abort

Rogue AP Configuration
Rogue on wire Auto-Contain....................... Disabled

Rogue using our SSID Auto-Contain............... Disabled

Valid client on rogue AP Auto-Contain.......... Disabled

Rogue AP timeout.................................. 1200

MAC Address    Classification    # APs # Clients Last Heard

-----------------  ------------------ ----- --------- -----------------------
00:1b:0c:4a:21:c4 Unclassified       1     0         Sun Aug 26 22:34:43 2012
00:1f:6c:a9:08:00 Unclassified       1     0         Sun Aug 26 22:31:43 2012
00:22:6b:7c:08:20 Pending            1     0         Sun Aug 26 22:34:43 2012
00:25:9c:21:89:12 Pending            1     0         Sun Aug 26 22:34:43 2012
08:76:ff:06:af:b9 Unclassified       1     0         Sun Aug 26 22:34:43 2012

--More or (q)uit current module or <ctrl-z> to abort

1c:17:d3:16:2e:df Unclassified 1 0 Sun Aug 26 22:32:05 2012

135
Adhoc Rogue Configuration

Detect and report Ad-Hoc Networks............... Enabled

Auto-Contain Ad-Hoc Networks............... Disabled

<table>
<thead>
<tr>
<th>Client MAC Address</th>
<th>Adhoc BSSID</th>
<th>State</th>
<th># APs</th>
<th>Last Heard</th>
</tr>
</thead>
</table>

Rogue Client Configuration

Validate rogue clients against AAA............. Disabled

<table>
<thead>
<tr>
<th>MAC Address</th>
<th>State</th>
<th># APs Last Heard</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

136
Ignore List Configuration

MAC Address

Rogue Rule Configuration

Priority Rule Name State Type Match Hit Count

Press Enter to continue or <ctrl-z> to abort
Media-Stream Configuration

Multicast-direct State............................ disable

Allowed WLANs....................................

Stream Name   Start IP       End IP         Operation Status

------------- -------------- -------------- ----------------

---------- ---------- ---------- ---------------

URL.................................
E-mail.............................................

Phone...........................................

Note............................................

State.............................................. disable

2.4G Band Media-Stream Configuration

Multicast-direct......................... Enabled

Best Effort................................. Disabled

--More-- or (q)uit

Video Re-Direct............................ Enabled

Max Allowed Streams....................... Auto

Max Video Bandwidth....................... 50
Max Voice Bandwidth.............................. 75
Max Media Bandwidth.............................. 85
Min PHY Rate................................. 6000
Max Retry Percentage.......................... 80

5G Band Media-Stream Configuration

Multicast-direct............................... Enabled
Best Effort..................................... Disabled
Video Re-Direct.................................. Enabled
Max Allowed Streams............................ Auto
Max Video Bandwidth............................ 0
Max Voice Bandwidth............................ 75
Max Media Bandwidth............................ 85
Min PHY Rate............................... 6000

Max Retry Percentage....................... 80

Number of Clients............................ 0

--More-- or (q)uit

Client Mac  Stream Name  Stream Type  Radio  WLAN  QoS  Status

-----------  -----------  -----------  ----  ----  ------  -------

14.1.2 Malmo Switch Layer 2 Configuration

Building configuration...

Current configuration: 1343 bytes

! version 12.2
no service pad
service timestamps debug datetime msec
service timestamps log datetime msec
no service password-encryption

141
hostname Malmo
!
boot-start-marker
boot-end-marker
!
!
!
!
!
!
!
!
!
!
!
!
!
!
!
!
!
!
!
!
!
!
!
!
!
!
!
!
!
!
!
!
!
!
!
!
!
!
!
!
!
!
!
!
!
!
!
!
!
!
!
!
!
!
!
!
!
!
!
!
!
!
!
!
!
!
!
!
!
!
!
!
!
!
!
!
!
!
!
!
!
!
!
!
!
!
!
!
!
!
!
!
!
!
!
!
!
!
!
!
!
!
!
!
!
!
!
!
!
!
!
!
!
!
!
!
!
!
!
!
!
!
!
!
!
!
interface FastEthernet0/4
!

interface FastEthernet0/5
switchport access vlan 10
switchport mode access
spanning-tree portfast

interface FastEthernet0/6
switchport mode trunk
!

interface FastEthernet0/7
!

interface FastEthernet0/8
!

interface FastEthernet0/9
!

interface FastEthernet0/10
!

interface FastEthernet0/11
!

interface FastEthernet0/12
!

interface FastEthernet0/13
!

interface FastEthernet0/14
!

interface FastEthernet0/15
!

interface FastEthernet0/16

interface FastEthernet0/17
interface FastEthernet0/18
interface FastEthernet0/19
interface FastEthernet0/20
interface FastEthernet0/21
interface FastEthernet0/22
interface FastEthernet0/23
interface FastEthernet0/24
interface GigabitEthernet0/1
interface GigabitEthernet0/2
interface Vlan1
ip address dhcp
ip http server
ip http secure-server
ip sla enable reaction-alerts
line con 0
line vty 5 15
end
14.1.3 Malmo Switch Layer 3 Configuration

Building configuration...

Current configuration : 2514 bytes

! version 12.2
no service pad
service timestamps debug datetime msec
service timestamps log datetime msec
no service password-encryption

! hostname Malmo

! boot-start-marker
boot-end-marker

! no aaa new-model

system mtu routing 1500

ip routing
ip dhcp excluded-address 172.32.10.1 172.32.10.10
ip dhcp excluded-address 172.32.11.1 172.32.11.10
ip dhcp excluded-address 172.32.12.1 172.32.12.10
ip dhcp excluded-address 172.32.1.1 172.32.1.10

ip dhcp pool Marketing
  network 172.32.11.0 255.255.255.224
default-router 172.32.11.1
!

ip dhcp pool Factory_Admin
   network 172.32.12.0 255.255.255.224
   default-router 172.32.12.1
!

ip dhcp pool pool1
   network 172.32.1.0 255.255.255.0
   default-router 172.32.1.1
!

ip dhcp pool pool100
   network 172.32.100.0 255.255.255.0
   default-router 172.32.100.1
!

ip dhcp pool Engineers
   network 172.32.10.0 255.255.255.0
   default-router 172.32.10.1
!
!
!
!
!
!
!
!
!
!

spanning-tree mode pvst
spanning-tree extend system-id
!
vlan internal allocation policy ascending
!
!
interface Loopback0
  ip address 3.3.3.3 255.255.255.255

interface FastEthernet0/1

interface FastEthernet0/2

interface FastEthernet0/3

interface FastEthernet0/4

interface FastEthernet0/5

interface FastEthernet0/6
  switchport trunk encapsulation dot1q
  switchport mode trunk

interface FastEthernet0/7
  switchport trunk encapsulation dot1q
  switchport mode trunk

interface FastEthernet0/8
  switchport access vlan 10
  switchport mode access
  spanning-tree portfast

interface FastEthernet0/9
interface FastEthernet0/10
!
interface FastEthernet0/11
 switchport trunk encapsulation dot1q
 switchport mode trunk 
!
interface FastEthernet0/12 
!
interface FastEthernet0/13 
!
interface FastEthernet0/14 
!
interface FastEthernet0/15 
!
interface FastEthernet0/16 
!
interface FastEthernet0/17 
!
interface FastEthernet0/18 
!
interface FastEthernet0/19 
!
interface FastEthernet0/20 
!
interface FastEthernet0/21 
!
interface FastEthernet0/22 

interface FastEthernet0/23 
!
interface FastEthernet0/24
!
interface GigabitEthernet0/1
!
interface GigabitEthernet0/2
!
interface Vlan1
ip address 172.32.1.1 255.255.255.0
!
interface Vlan10
ip address 172.32.10.1 255.255.255.0
!
interface Vlan11
ip address 172.32.11.1 255.255.255.224
!
interface Vlan12
ip address 172.32.12.1 255.255.255.224
!
interface Vlan100
ip address 172.32.100.1 255.255.255.0

ip classless
ip http server
ip http secure-server
!
!
ip sla enable reaction-alerts
!
!
!
line con 0
line vty 5 15
!
End

14.2 Riga site configuration

14.2.1 Switch Layer 3 Configuration

Building configuration...

Current configuration : 1470 bytes
!
version 12.2
no service pad
service timestamps debug datetime msec
service timestamps log datetime msec
no service password-encryption
!
hostname Riga
!
boot-start-marker
boot-end-marker
!
!
!
!
no aaa new-model
system mtu routing 1500
ip routing
ip dhcp excluded-address 172.32.10.1 172.32.10.10
ip dhcp excluded-address 172.32.11.1 172.32.11.10
ip dhcp excluded-address 172.32.12.1 172.32.12.10
ip dhcp excluded-address 172.32.1.1 172.32.1.10
!
!
ip dhcp pool Factory Managment
  network 172.32.10.0 255.255.255.0
  default-router 172.32.10.1
!
ip dhcp pool Factory Users
  network 172.32.11.0 255.255.255.224
  default-router 172.32.11.1
!
ip dhcp pool Building2
  network 172.32.12.0 255.255.255.224
  default-router 172.32.12.1
!
ip dhcp pool pool1
  network 172.32.1.0 255.255.255.0
  default-router 172.32.1.1
!
!
!
spanning-tree mode pvst
spanning-tree extend system-id
!
vlan internal allocation policy ascending
!
!
interface Loopback0
ip address 4.4.4.4 255.255.255.255
!
interface FastEthernet0/1
switchport trunk encapsulation dot1q
switchport mode trunk
!
interface FastEthernet0/2
!
interface FastEthernet0/3
!
interface FastEthernet0/4
!
interface FastEthernet0/5
!
interface FastEthernet0/6
!
interface FastEthernet0/7
!
interface FastEthernet0/8
!
interface FastEthernet0/9
!
interface FastEthernet0/10
switchport trunk native vlan 1
switchport mode trunk
!
interface FastEthernet0/11
!
interface FastEthernet0/12
interface FastEthernet0/13
interface FastEthernet0/14
interface FastEthernet0/15
switchport access vlan 11
switchport mode access
switchport nonegotiate

interface FastEthernet0/16
interface FastEthernet0/17
interface FastEthernet0/18
interface FastEthernet0/19
interface FastEthernet0/20
interface FastEthernet0/21
interface FastEthernet0/22
interface FastEthernet0/23
interface FastEthernet0/24
switchport access vlan 12
switchport mode access
switchport nonegotiate
!
interface GigabitEthernet0/1
!
interface GigabitEthernet0/2

interface Vlan1
ip address 172.32.1.1 255.255.255.0
!
interface Vlan10
ip address 172.32.10.1 255.255.255.0
!
interface Vlan11
ip address 172.32.11.1 255.255.255.224
!
interface Vlan12
ip address 172.32.12.1 255.255.255.224
!
ip http server
ip http secure-server
ip sla enable reaction-alerts
!
line con 0
line vty 0 4
  password cisco
  login
line vty 5 15
  login
!
end
14.2.2 Riga Switch Layer 2 Configuration

Building configuration...

Current configuration : 1470 bytes

! version 12.2
no service pad
service timestamps debug datetime msec
service timestamps log datetime msec
no service password-encryption
!
hostname Riga
!
boot-start-marker
boot-end-marker
!
!
!
!
no aaa new-model
system mtu routing 1500
!
!
!
!
```

! spanning-tree mode pvst
spanning-tree extend system-id
!

vlan internal allocation policy ascending
!

! interface FastEthernet0/1
switchport trunk native vlan 1
switchport mode trunk
!

interface FastEthernet0/2
!

interface FastEthernet0/3
!

interface FastEthernet0/4
!

interface FastEthernet0/5
!

interface FastEthernet0/6
!

interface FastEthernet0/7
!

interface FastEthernet0/8
!

interface FastEthernet0/9
!

interface FastEthernet0/10
switchport trunk native vlan 1
```
switchport mode trunk
!
interface FastEthernet0/11
!
interface FastEthernet0/12
!
interface FastEthernet0/13
!
interface FastEthernet0/14
!
interface FastEthernet0/15
!
interface FastEthernet0/16
switchport access vlan 10
switchport mode access
switchport nonegotiate

interface FastEthernet0/17
!
interface FastEthernet0/18
!
interface FastEthernet0/19
!
interface FastEthernet0/20
!
interface FastEthernet0/21
!
interface FastEthernet0/22
!
interface FastEthernet0/23
interface FastEthernet0/24
switchport access vlan 11
switchport mode access
switchport nonegotiate
!
interface GigabitEthernet0/1
!
interface GigabitEthernet0/2

interface Vlan1
no ip address
!
ip http server
ip http secure-server
ip sla enable reaction-alerts
!
line con 0
line vty 0 4
  password cisco
login
line vty 5 15
login
!
end

14.2.3 Riga Root Ap Configuration
Building configuration...
Current configuration : 2546 bytes

! version 12.3
no service pad
service timestamps debug datetime msec
service timestamps log datetime msec
service password-encryption
!
hostname RigaRootap
!
enable secret 5 $1$rCfq$0Z7HdLWLXnla/ndX8QMd61
!
ip subnet-zero
!
!
no aaa new-model
!
dot11 ssid Pakistan
   vlan 12
   authentication open
   guest-mode
!

username Cisco password 7 032752180500
!
bridge irb
!
!
interface Dot11Radio0
no ip address
no ip route-cache
!
ssid Pakistan
!
speed basic-1.0 basic-2.0 basic-5.5 6.0 9.0 basic-11.0 12.0 18.0 24.0 36.0 48.0 54.0
station-role root
!
interface Dot11Radio0.2
  encapsulation dot1Q 2 native
  no ip route-cache
  bridge-group 1
  bridge-group 1 subscriber-loop-control
  bridge-group 1 block-unknown-source
  no bridge-group 1 source-learning
  no bridge-group 1 unicast-flooding
  bridge-group 1 spanning-disabled
!
interface Dot11Radio0.12
  encapsulation dot1Q 12
  no ip route-cache
  bridge-group 12
  bridge-group 12 subscriber-loop-control
  bridge-group 12 block-unknown-source
  no bridge-group 12 source-learning
  no bridge-group 12 unicast-flooding
  bridge-group 12 spanning-disabled
!
interface Dot11Radio1
  no ip address
no ip route-cache
shutdown
speed basic-6.0 9.0 basic-12.0 18.0 basic-24.0 36.0 48.0 54.0
station-role root
!
interface Dot11Radio1.2
encapsulation dot1Q 2 native
no ip route-cache
bridge-group 1
bridge-group 1 subscriber-loop-control
bridge-group 1 block-unknown-source
no bridge-group 1 source-learning
no bridge-group 1 unicast-flooding
bridge-group 1 spanning-disabled
!
interface Dot11Radio1.12
encapsulation dot1Q 12
no ip route-cache
bridge-group 12
bridge-group 12 subscriber-loop-control
bridge-group 12 block-unknown-source
no bridge-group 12 source-learning
no bridge-group 12 unicast-flooding
bridge-group 12 spanning-disabled
!
interface FastEthernet0
no ip address
no ip route-cache
duplex auto
speed auto
hold-queue 160 in

interface FastEthernet0.2
encapsulation dot1Q 2 native
no ip route-cache
bridge-group 1
no bridge-group 1 source-learning
bridge-group 1 spanning-disabled
!
interface FastEthernet0.12
encapsulation dot1Q 12
no ip route-cache
bridge-group 12
no bridge-group 12 source-learning
bridge-group 12 spanning-disabled
!
interface BVI1
ip address 192.168.12.4 255.255.255.0
no ip route-cache
!
ip default-gateway 192.168.12.1
ip http server
no ip http secure-server
ip http help-path
!
control-plane
!
bridge 1 route ip

162
14.2.4 Riga Repeater Configuration

Building configuration...

Current configuration : 1924 bytes
!
version 12.3
no service pad
service timestamps debug datetime msec
service timestamps log datetime msec
service password-encryption
!
hostname RepeaterRigasite
!
enable secret 5 $1$kjdo$BAjQo5h0dr0IFEBaDIZoQ.
!
ip subnet-zero
ip domain name fwl.com
!
!
no aaa new-model
!
dot11 ssid Pakistan
   vlan 12
   authentication open
   guest-mode
   infrastructure-ssid
!
!
username Cisco password 7 1531021F0725
!
bridge irb
!
!
interface Dot11Radio0
   no ip address
   no ip route-cache
!
ssid Pakistan
!
parent 1 001f.6ca9.0800
speed basic-1.0 basic-2.0 basic-5.5 6.0 9.0 basic-11.0 12.0 18.0 24.0 36.0 48.0 54.0
station-role repeater
!
interface Dot11Radio0.12
encapsulation dot1Q 12 native
no ip route-cache
bridge-group 1
bridge-group 1 subscriber-loop-control
bridge-group 1 block-unknown-source
no bridge-group 1 source-learning
no bridge-group 1 unicast-flooding
bridge-group 1 spanning-disabled
!
interface Dot11Radio1
no ip address
no ip route-cache
shutdown
speed basic-6.0 9.0 basic-12.0 18.0 basic-24.0 36.0 48.0 54.0
station-role root
!
interface Dot11Radio1.12
encapsulation dot1Q 12 native
no ip route-cache
bridge-group 1
bridge-group 1 subscriber-loop-control
bridge-group 1 block-unknown-source
no bridge-group 1 source-learning
no bridge-group 1 unicast-flooding
bridge-group 1 spanning-disabled

interface FastEthernet0
no ip address
no ip route-cache
duplex auto
speed auto
hold-queue 160 in
!
interface FastEthernet0.12
encapsulation dot1Q 12 native
no ip route-cache
bridge-group 1
no bridge-group 1 source-learning
bridge-group 1 spanning-disabled
!
interface BVI1
ip address 192.168.12.9 255.255.255.0
no ip route-cache
!
ip default-gateway 12.168.12.1
ip http server
no ip http secure-server
ip http help-path

!
control-plane
!
bridge 1 route ip
!
!
!
line con 0
line vty 0 4
login local
end