Lab – Configuring a Wireless Router and Client

Topology



Linksys Router Settings

Network Name (SSID)	CCNA-Net
Network Password	cisconet
Router Password	cisco123

Objectives

- Part 1: Configure Basic Settings on a Linksys EA Series Router
- Part 2: Secure the Wireless Network
- Part 3: Review Additional Features on a Linksys EA Series Router
- Part 4: Connect a Wireless Client

Background / Scenario

Surfing the web from anywhere in the home or office has become common. Without wireless connectivity, users would be limited to connect only where there is a wired connection. Users have embraced the flexibility that wireless routers provide for accessing the network and the Internet.

In this lab, you will configure a Linksys Smart Wi-Fi router, which includes applying WPA2 security settings and activating DHCP services. You will review some added features available on these routers, such as USB storage, parental controls, and time restrictions. You will also configure a wireless PC client.

Required Resources

- 1 Linksys EA Series Router (EA4500 with firmware version 2.1.39.145204 or comparable)
- 1 Cable or DSL modem (Optional needed for Internet service and normally supplied by ISP)
- 1 PC with a Wireless NIC (Windows 7, Vista, or XP)
- Ethernet cables as shown in the topology

Part 1: Configure Basic Settings on a Linksys EA Series Router

The most efficient way to configure basic settings on an EA Series router is to run the Linksys EA Series Setup CD that came with the router. If the Setup CD is unavailable, download the Setup program from http://Linksys.com/support.

Step 1: Insert the Linksys EA-Series Setup CD into the PC.

When prompted, select **Set up your Linksys Router**. You will be asked to read and accept the License Terms for using the software. Click **Next >** after accepting the license terms.



Step 2: Cable the network as shown in the topology.

Follow the directions in the next window for connecting the power cable and Ethernet cable from your cable modem or DSL modem. You may connect the PC to one of the four unused Ethernet ports on the back of the router. After you have connected everything, click **Next** >.



Step 3: Configure Linksys router settings.

a. Allow time for the Linksys router settings window to display. Use the Linksys Router Settings table at the beginning of this lab to fill in the fields in this window. Click Next to display the summary router settings screen. Click Next.

Linksys Smart Wi-Fi Router Setup	
Linksys router settings Your wireless network name (SSID) and wireless password are shown below. You can change these settings now or later on. Also create a router password to prevent access to your router.	
WIRELESS Wireless network name (SSID): Wireless password: CCNA-Net Learn more ROUTER ADMINISTRATION	
Router password: cisco123 Learn more	
Cancel Back Next	

b. The **Create your Linksys Smart Wi-Fi account** window displays. A Linksys Smart Wi-Fi account associates your router to the account, allowing you to remotely manage the router using a browser or mobile device running the Smart Wi-Fi app. For this lab, bypass the account setup process. Click the **No** thanks box and press **Continue**.

Note: An account can be setup by browsing t	to	www.linksy	/ssmartwifi.com.
---	----	------------	------------------

Linksys Smart Wi-Fi Router Setup
Create your Linksys Smart Wi-Fi account Create your free Smart Wi-Fi account to experience and access your connected home from anywhere at any time. The account is optional and takes only a few minutes to set up.
 Why a Linksys Smart Wi-Fi account? Get anytime, anywhere access to your home network Access new and exciting Apps Use intelligent media prioritization for HD video and gaming Control kids' content even when you're away from home
Continue

c. A Sign In window displays. In the Access Router field, enter cisco123, and click Sign In.

Sign In Log in with your router password.	
	Access Router
	•••••
Add mobile devices, tablets, and TV's to your network	Sign In
	English (United States)
• • • • •	To login with your Linksys Smart Wi-Fi account, click here.
Use your Linksys Smart Wi-Fi account to access your home network from anywhere, at any time, even from your mobile device. Easily connect new devices, set parental controls, get access to Smart Wi-Fi mobile Apps, and more.	
For more information click here	

d. On the Linksys Smart Wi-Fi home page, click **Connectivity** to view and change basic router settings.

LINCSYS [®] Smart Wi-Fi	App Center
Smart Wi-Fi Tools	Network Status
Device List	Connected
💼 Guest Access	
A Parental Controls	THIS DEVICE ROUTER INTERNET
Media Prioritization	🔺 Parental Controls 🖾 🕅
Speed Test	Parental Controls are OFF:
🔤 USB Storage	Controlled devices:
Router Settings	None
Connectivity	🛋 Device List
Troubleshooting	Online devices:
🗟 Wireless	Local 7 Guest 0
5 Security	+ Add a Device

e. On the **Basic** tab, you can edit the SSID name and password, change the router password, perform firmware updates, and set the time zone for your router. (The router password and SSID information was set in Step 3a.) Select the correct time zone for your router from the drop-down box and click **Apply**.

cisco	Linksys Smart Wi-Fi		App Center	Help	CCNA-Net 👻	Sign Out 👻
<						
E,	Connectivity View and change router settings					
	Basic Internet Settings	Local Network Advanced Routing	Administration			
41	Network Name and Pass	sword Edit	Firmware Update			
	2.4 GHz network name (SSID):	CCNA-Net	Automatic		(Current Version: 2.1.3	39.145204)
	Network password:	cisconet	Check for Updates			
4	5 GHz network name (SSID):	CCNA-Net				
	Network password:	cisconet	Manual: No file chosen		Choose File	Start
~ ¢ •	Router Password Edit		Time Zone			
Ð	Router password: ********		(GMT-07:00) Arizona		•	
((î ⁰			Automatically adjust	st for Daylight !	Savings Time	
6			Port Lights			
			ON			
			Ok	c	ancel	Apply

f. The **Internet Settings** tab provides information about the Internet connection. In the example, the router automatically configured the connection for DHCP. Both IPv4 and IPv6 information can be displayed from this screen.

Connectivity View and change router settings Basic Internet Settings Local Network Advanced F	touting Administration	
Type of Internet Connection	Optional	
Connection Type: Automatic Configuration - DHCP	Domain name:	ph.cox.net
	MTU:	Auto
	Size:	0
	Ok	Cancel Apply

g. The Local Network tab controls the local DHCP server settings. The default local network settings specify the 192.168.1.0/24 network and the local IP address of the default router is 192.168.1.1. This can be changed by clicking Edit next to Router Details. DHCP Server settings can be changed on this screen. You can set the DHCP starting address, maximum number of DHCP users, client lease time, and static DNS servers. Click Apply to accept all changes made on this screen.

Note: If DHCP is used to obtain ISP connection information, these DNS addresses will most likely be populated with the ISP's DNS server information.

cisco	Linksys Smart Wi-Fi	App Center	Help	CCNA-	Net 👻	Sign Out 👻
<						
_ ⊑ a	Connectivity View and change router settings					X
	Basic Internet Settings Local Network Advanced Routin	ng Administration				
	Router Details	DHCP Server 📿 En	abled			
BJ	Host name: CCNA-Net	Start IP address:	192.1	68.1	. 100	
\odot	IP address: 192.168.1.1	Maximum number of users	s: 50	1 to	155	
4	Subnet mask: 255.255.0	IP address range:	192 .1 192 .1	168 .1 .100 168 .1 .149) to	
		Client lease time:	1440	Minu	ites	
°0 •		Static DNS 1:	68	105 28	16	
Ö		Static DNS 2:	68	105 29	16	
() ()		Static DNS 3:	0	0 0	0	
6		WINS:	0	0 0	0	
Ŭ		DHCP Reservations				
		Ok	С	Cancel		Apply

h. The Advanced Routing tab allows you to disable Network Address translation (NAT), which is enabled by default. This screen also allows you to add static routes. Click Apply to accept any desired changes made on this screen.

Connoctivity					
JONNECLIVILY	y ettings				
Pagin Internet Co	Hings Local Natwork	Advanced Pouting	Administration		
		Advanced Routing	Administration		
NAT Chabled					
tatic Routing					
Route name	Destination IP address	Subnet mask	Gateway	Interface	
					Add static route
			Ok	Cancel	Apply

i. The **Administration** tab provides controls for the management of the Smart Wi-Fi software. By chicking the appropriate box, you can activate remote management access to the router. You can also activate HTTPS access and restrict wireless management. Universal Plug and Play (UPnP) and Application Layer Gateway controls are also available on this screen. Click **Apply** to accept any desired changes made on this screen.

	E
Basic Internet Settings Local Network Advanced Routing	Administration
Local Management Access	Remote Access
HTTP I HTTPS	Allow remote access to Linksys Smart Wi-Fi Tools and Router
Access via wireless	Note: Disabling this setting prevents you from accessing your network over the Internet
UPnP 📝 Enabled	Application Layer Gateway
 Allow users to configure Allow users to disable Internet access 	SIP
	Ok Cancel Apply

Part 2: Secure the Wireless Network

In Part 2, you will secure the Linksys EA series router wireless network and review firewall and port forwarding options on a Linksys Smart Wi-Fi router.

Step 1: Add WPA security on the wireless routers.

a. From the Linksys Smart Wi-Fi home page, click Wireless.



b. The **Wireless** window displays the settings for both the 2.4 and 5 GHz radios. Use the **Edit** button next to each column to modify the security setting on each wireless frequency range. (The SSID and password were previously set in Part 1.) Click the **Security mode** drop-down list to select the **WPA2/WPA Mixed Personal** option for each range. Click **Apply** to save your settings, and then click **OK**.

Wireless MAC I	Filtering Wi-Fi Protected Setup		
2.4 GHz network	k Edit	5 GHz network	Edit
Network:	Inabled	Network:	Inabled
Network name (SSID):	CCNA-Net	Network name (SSID):	CCNA-Net
Password:	cisconet	Password:	cisconet
Network mode:	Mixed	Network mode:	Mixed
Security mode:	WPA2/WPA Mixed Personal	Security mode:	WPA2/WPA Mixed Personal
Channel width:	Auto	Channel width:	None WEP
Channel:	Auto	Channel:	WPA Personal WPA Enterprise WPA2 Personal

Step 2: Apply firewall and port forwarding settings.

a. From the Linksys Smart Wi-Fi home page, click **Security**. In the **Security** windows, the **Firewall**, **DMZ**, and **Apps and Gaming** tabs are available to view and change router security settings.



b. The Firewall tab displays firewall settings, where you can enable or disable IPv4 and IPv6 Stateful Packet Inspection (SPI) firewall protection, Virtual Private Network (VPN) Passthrough options, and Internet filters. Click Apply to accept any desired changes made on this screen.

Firewall DMZ	Apps and Gaming				
Firewall		Internet filte	rs		
IPv4 SPI firewall protection	n 🗹 Enabled	Filter anony	mous Internet requests		
IPv6 SPI firewall protection	n 🗹 Enabled	Filter multic	ast		
/PN Passthrough		Filter Intern	et NAT redirection		
IPSec Passthrough	Enabled	Filter ident	(Port 113)		
PPTP Passthrough	Enabled				
L2TP Passthrough	Enabled				
Pv6 Port Services					
Description	Protocol	IPv6 Address	Allow	Enabled	

c. The **Apps and Gaming** tab provides port forwarding capabilities. In the example, ports 5060 and 5061 have been opened for a VoIP Softphone application running on a local device at IP address 192.168.1.126. Click **Apply** to accept any desired changes made on this screen.

w and change router settings					
irewall DMZ Apps a	and Gaming				
IS Single Port Forwarding	ort Range Forwarding Port Rang	ge Triggering			
Application name	Start ~ End Port	Protocol	Device IP#	Enabled	
VoIP Softphone	5060 - 5061	Both	192.168.1.126	True	Edit/ Delete
				Add a new Port R	ange Forwardi

Part 3: Review Additional Features on a Linksys EA Series Router

In Part 3, you will review some of the additional features available on the Linksys EA series router.

Step 1: Review Smart Wi-Fi Tools.

a. From the Linksys Smart Wi-Fi home page, click Device List.



The **Device List** window displays the list of clients on the local network. Notice that there is a tab for the **Guest Network**. If the Guest network was activated, clients on that network would be displayed in the **Guest Network** tab.

			X
E.	Device List		Show widget on the homepage
(19)	View a list of connected devices and their status.		
	My Network Guest Network		+Add a Device
83 ©	Apple TV Online	CS-2099 Online	HP094B61 Online
	iPad	Network Device	OfficeDesktop
*0	Online	Online 0	Online
Ō	RES server (Samba, Linu	Rons-iPad Offline	Rons-IPhone Online
((⁶)	0	0	
6	Rosannes-IPhone Offline	CCNA-Net Online	
	0	0	
			Ok

b. From the Linksys Smart Wi-Fi home page, click **Guest Access**. Clients on the guest network only have access to the Internet and are unable to access other clients on the local network. To allow guest access, click on the **Allow guest access** toggle button. Click **Edit** link (next to the Guest network name and password) to change the Guest network password and click **OK** to accept the changes.

				E3
	Guest Access		Show widget on the homepage	
	Guest access allows visitors to connect to your wireless guest network and acce giving access to your other computers or personal data.	ess the Internet, without		
	Allow guest access			
83	OFF	Your guest sh	ould first connect to your guest network, rowser, and then enter the quest password.	
\odot	Guest network name and password Edit			
4	Guest network name (SSID): CCNA-Net-guest			
	Guest network password: raspberry45			
	Total guests allowed			
°¢	5 guests 💌			
Ð				
6				
			Ok Cancel	

c. From the Linksys Smart Wi-Fi home page, click **Parental Controls**. Use these settings to restrict Internet access on selected devices and to restrict time and websites. Click **OK** to save the settings.

_ î.	Parental Controls	rcan see.		Show widget on t	te homepage
▲ • В3 ©	Enable parental controls OFF Restrict Internet access on		Block Internet acce	255	
به ۵۵	iPad Rons-iPhone HP094B61 OfficeDesktop Rons-iPad CS-2099 Rosannes-iPhone	E	Never Always Specific Times Block specific sites	s	
6				Ok	Cancel

d. From the Linksys Smart Wi-Fi home page, click on **Media Prioritization**. These settings allows you to assign network bandwidth prioritization to selected devices on the local network. In the example, the device labeled Apple TV has been given the highest priority for network resources. To make prioritization changes, just drag and drop the listed devices, and click **OK** to save your settings.

High Priority				
Apple 1V				
RES server (Samb	n			
Rons-Phone	-			
Normal Priority	Drag at	And drug devices to prior	ta -	
Normal Priority Devices	Drag an	nd drop divides to priori	fta Applications Edt Dense	
Normal Priority Devices	Drag an		tta Applications Edit / Down (Select Application	
Normal Priority Devices	Drag at	A disp disposes to provid	Tax Applications Edt Deem Select Application	-
Normal Priority Devices	Drag at Crag at Cra	Pad and Process of Pro	ttor Applications Edit / Dente Select Application Online Games Edit / Dente	

e. From the Linksys Smart Wi-Fi home page, click **Speed Test**. Use this utility to test your Internet access speeds. The example shows the results of the speed test. The router stores the results of each speed tests and allows you to display that history.

	Speed Test Test your broadband speed.	
▲ ₿3		
S •	Download Speed 27.91 Mbps V 2584b 10m 20-m 11.04 Mbps 1	
ά	To Your Location: 72.201.208.215	
io G	Restart Test Show History	
(iii)		
	Ok	

f. From the Linksys Smart Wi-Fi home page, click USB Storage. Use this screen to review your USB drive settings. From here, you can click on the appropriate tab to set up FTP and Media Servers. You can also set up individual user accounts for access to these servers by clicking the tabs at the top of this screen. A USB storage device is plugged into the back of the router to use this option. Click OK to save any desired changes.

 USB Drive USB volume name: TOSHIBA USB volume name: TOSHIBA Space used: 167 MB used of 7,45 GB total. Stafely remove drive Refresh Safely remove drive Refresh Secure Folder Access: On Content is accessible using a username and password. Content is accessible using a username and password. DLNA server: CCNA-Net 	Connect a USB storage device to your network and configure how us Status Folder Access FTP Server Media Server	E Show widget on the homepage
	USB Drive USB volume name: TOSHIBA USB volume name: TOSHIBA Space used: 167 MB used of 7.45 GB total. Safely remove drive Refresh	Folder Access Access shared folders from a computer on your network. PC access (File explorer): \\192.168.1.1 MAC access (Finder): smb://192.168.1.1 FTP Server Access shared folders remotely using FTP. FTP server: ftp:// 209.165.200.225:21
	Content is accessible using a username and password.	Media Server (DLNA) Access media on your storage device. DLNA server: ICCNA-Net

Step 2: Troubleshoot the router.

From the Linksys Smart Wi-Fi home page, click **Troubleshooting**.

a. The **Status** tab provides a list of clients on the local network along with their NIC MAC and IP addresses. It also displays how they are connected to the network. Click **OK** to save any desired changes.

Status Diagnostics Log	JS			
Devices Report	MAC addressa	IDud address	Connection	Refresh
Name	MAC address	1PV4 address	Connection	
IPad	20:AA:4B:65:AF:24	192.168.87.122	vvireless	Open in brow
HP094B61	20:AA:4B:65:AF:24	192.168.87.9	Wireless	Print
OfficeDesktop	20:AA:4B:65:AF:24	192.168.87.138	LAN	
CS-2099	20:AA:4B:65:AF:24	192.168.87.126	LAN	
Apple TV	20:AA:4B:65:AF:24	192.168.87.125	Wireless	
RES server (Samba, LinuxMint)	20:AA:4B:65:AF:24	192.168.87.127	LAN	
Network Device	20:AA:4B:65:AF:24	192.168.87.148	LAN	
Name	MAC address	IPv6 address	Connection	DHCP client ta

b. The **Diagnostics** tab provides the ping and traceroute utilities. It also allows you to reboot the router, backup and restore the router configuration, restore a previous firmware version, release and renew the Internet addresses on your router, and reset to factory default settings. Click **OK** to save any desired changes.

	Troubleshooting Troubleshoot router settings		X
	Ping IPv4	Router configuration	
83	IP or host name:	Backup Restore	
\odot	Number to ping: 5	Router Firmware	
4	Start to Ping	Restore previous firmware	
	Trace route	Internet Address:	
	IP or host name:	IPv4: 209.165.200.225 Release and Renew	
*•	Start to Traceroute	IPv6: Release and Renew	
	Reboot	Factory reset	
(în)	Reboot the router	Reset to factory default settings	
6			
		OK	

c. The **Logs** tab provides Incoming and Outgoing, Security, and DHCP logs. You can print and clear these logs from this screen. Click **OK** to save any desired changes.

_	Troubleshooting		E
••• ••• •••	Status Diagnostic Logs Enable Logs ON Incoming log		
	Incoming log Destination port number Outgoing log LAN IP address I Destination URL or IP address 192 168.1.127 74.125.239.6 192.168.1.127 192.168.1.127 74.125.239.6 192.168.1.127 192.168.1.127 74.125.224.164 192.168.1.127 192.168.1.127 74.125.229.06 192.168.1.12 192.168.1.112 68.105.28.16 192.168.1.112 192.168.1.112 68.105.28.16 192.168.1.112 192.168.1.112 68.105.28.16 192.168.1.112 192.168.1.112 68.105.28.16 192.168.1.112 192.168.1.112 68.105.28.16 192.168.1.12 192.168.1.112 68.105.28.16 192.168.1.12 192.168.1.112 68.105.28.16 192.168.1.12 192.168.1.126 64.24.3.107.34 192.168.1.126 192.168.1.126 54.24.3.107.34 192.168.1.126	Service or port number www domain imaps domain https domain pop3s domain ntp domain	Refresh pen in browser Print Clear
ور س			Ok

Part 4: Connect a Wireless Client

In Part 4, you will configure the PC's wireless NIC to connect to the Linksys EA Series Router.

Note: This lab was performed using a PC running the Windows 7 operating system. You should be able to perform the lab with other Windows operating systems listed; however, menu selections and screens may vary.

Step 1: Use the Network and Sharing Center.

- a. Open the **Network and Sharing Center** by clicking the Windows **Start** button > **Control Panel** > **View network status and tasks** under Network and Internet heading in the Category View.
- b. In the left pane, click the Change adapter settings link.

The **Network Connections** window provides the list of NICs available on this PC. Look for your **Local Area Connection** and **Wireless Network Connection** adapters in this window.



Note: VPN adapters and other types of network connections may also be displayed in this window.

Step 2: Work with your wireless NIC.

a. Select and right-click the **Wireless Network Connection** option to display a drop-down list. If your wireless NIC is disabled, you must **Enable** it.



b. Right-click the Wireless Network Connection, and then click Connect/Disconnect. This displays a list of SSIDs in range of your wireless NIC. Select CCNA-Net, then click the Connect.

Currently connected to: Network 10 Internet access	\$ 3	*
Wireless Network Connection	^	
CCNA-Net	.ul	Ξ
Connect automatically	nect	
Budworth2	all	
Budworth	al	-
youarebeingwatched		
Resolute		
Judy's Wi-Fi Network	.ul	
soop	all	Ŧ
Open Network and Sharing Ce	nter	

c. When prompted, enter **cisconet** to supply the network security key, and then click **OK**.



d. The wireless icon should display in your taskbar when you have a wireless connection. Click this icon to display the list of SSIDs in range of your PC.



e. The SSID CCNA-Net should now show that you are connected to the CCNA-Net wireless network.



Reflection

Why would you not want to use WEP security for your wireless network?