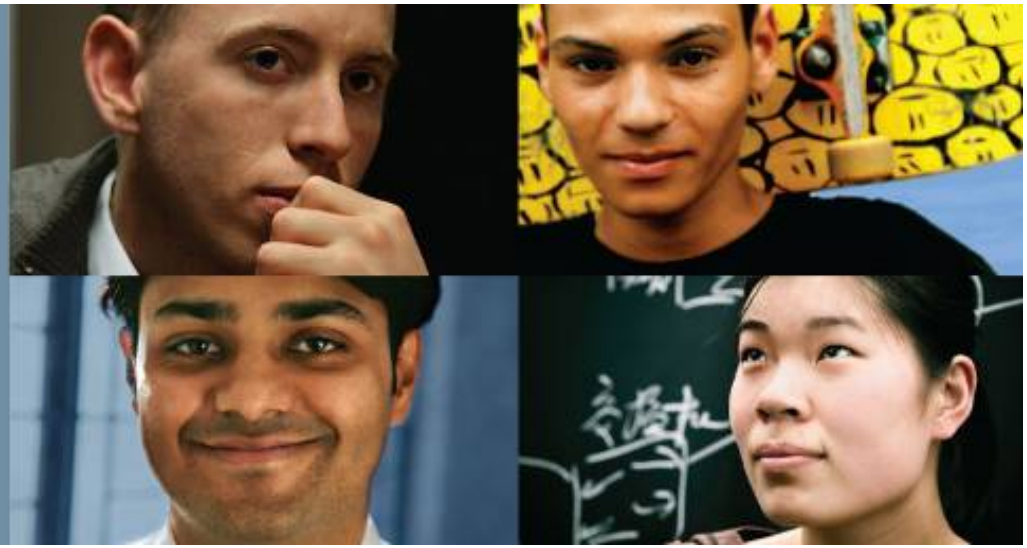
TNE10006/TNE60006: Networks and Switching



Wireless Concepts

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Outline

- Why Wireless
- Wireless Technologies
- Comparing with wired Ethernet
- Wireless Devices

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Why Go Wireless?

- Productivity is no longer restricted to a fixed work location or a defined time period
- People now expect to be connected at any time and place, from the office to the airport or the home
- Users now expect to be able to roam wirelessly
- Roaming enables a wireless device to maintain Internet access without losing a connection

Properties of Wireless Media

Wireless does have some areas of concern including:

- Coverage area
- Interference
- Security

Types of Wireless Media

	• IEEE 802.11 standards
	• Commonly referred to as Wi-Fi.
	• Uses CSMA/CA
	• Variations include:
	  • 802.11a: 54 Mbps, 5 GHz
	  • 802.11b: 11 Mbps, 2.4 GHz
	  • 802.11g: 54 Mbps, 2.4 GHz
	  • 802.11n: 600 Mbps, 2.4 and 5 GHz
	  • 802.11ac: 1 Gbps, 5 GHz
	  • 802.11ad: 7 Gbps, 2.4 GHz, 5 GHz, and 60 GHz

	• IEEE 802.15 standard • Supports speeds up to 3 Mb/s • Provides device pairing over distances from 1 to 100 meters.
	• IEEE 802.16 standard • Provides speeds up to 1 Gbps • Uses a point-to-multipoint topology to provide wireless broadband access.

Wireless Media

802.11 Wi-Fi Standards

Standard	Maximum Speed	Frequency	Backwards Compatible
802.11a	54 Mbps	5 GHz	No
802.11b	11 Mbps	2.4 GHz	No
802.11g	54 Mbps	2.4 GHz	802.11b
802.11n	600 Mbps	2.4 GHz or 5 GHz	802.11b/g
802.11ac	1.3 Gbps (1300 Mbps)	2.4 GHz and 5.5 GHz	802.11b/g/n
802.11ad	7 Gbps (7000 Mbps)	2.4 GHz, 5 GHz and 60 GHz	802.11b/g/n/ac

SWINBURNE INTERNET ARCHITECTURES

WLAN Components

Comparing WLANs to LANs

Characteristic	802.11 Wireless LAN	802.3 Ethernet LANs
Physical Layer	Radio Frequency (RF)	Cable
Media Access	Collision Avoidance	Collision Detection
Availability	Anyone with a radio NIC in range of an access point	Cable connection required
Signal Interference	Yes	Inconsequential
Regulation	Additional regulation by country authorities	IEEE standard dictates

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Wireless NICs

Wireless deployment requires:

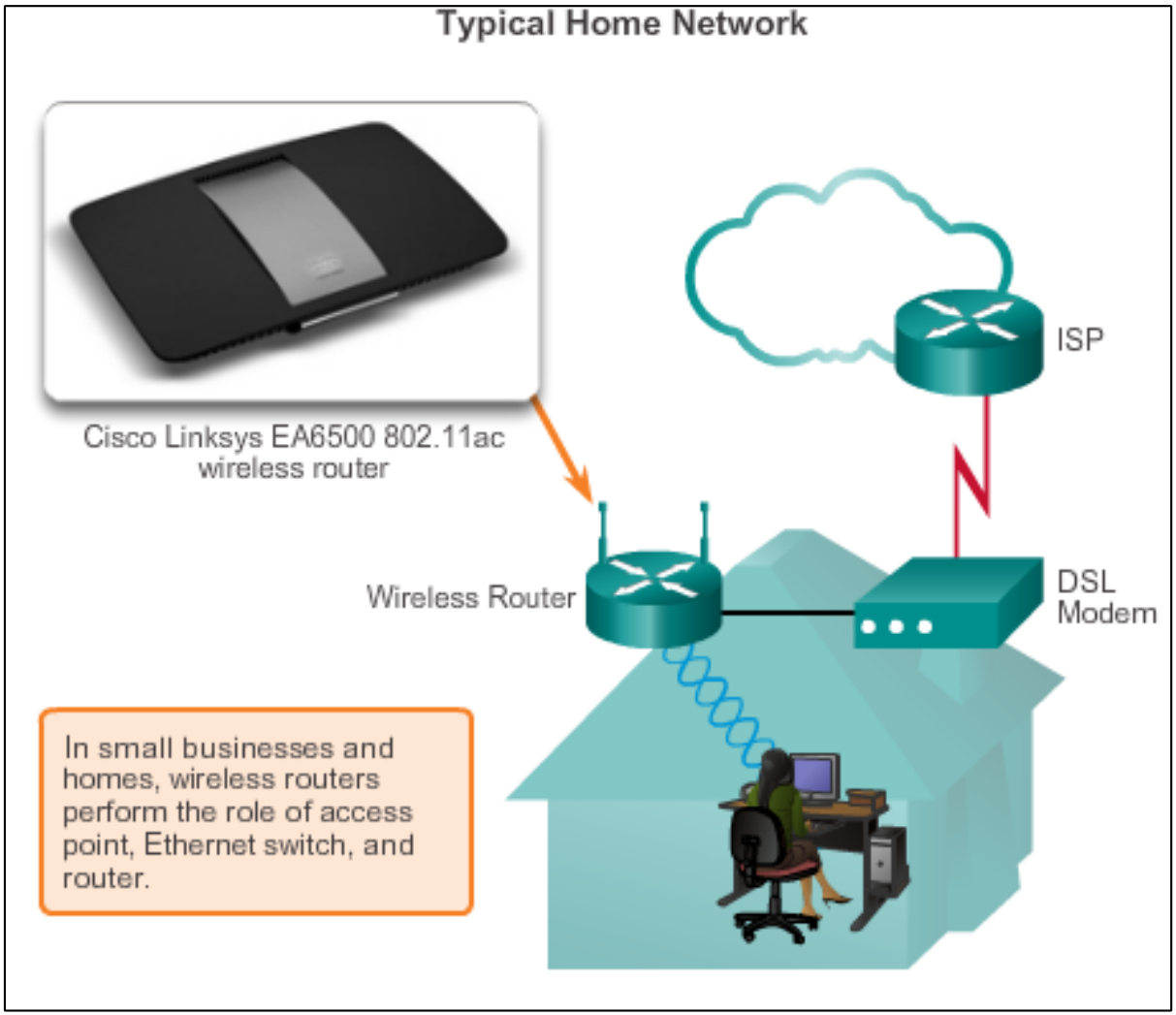
- End devices with wireless NICs
- Infrastructure device, such as a wireless router or wireless AP

SOHO/Home Wireless Solutions

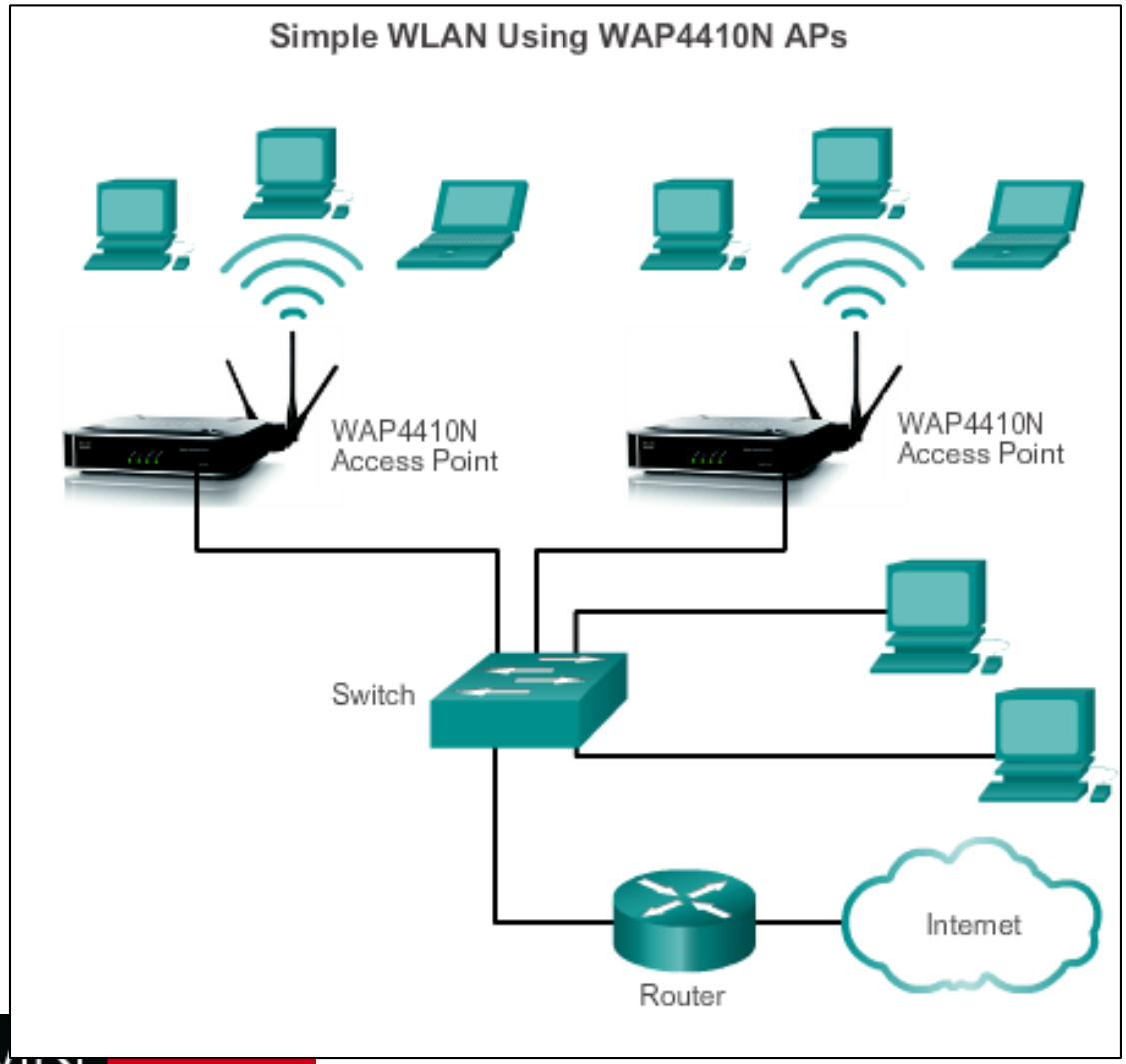
A home user typically interconnects wireless devices using a small, integrated wireless router.

These serve as:

- access point
- Ethernet switch
- router

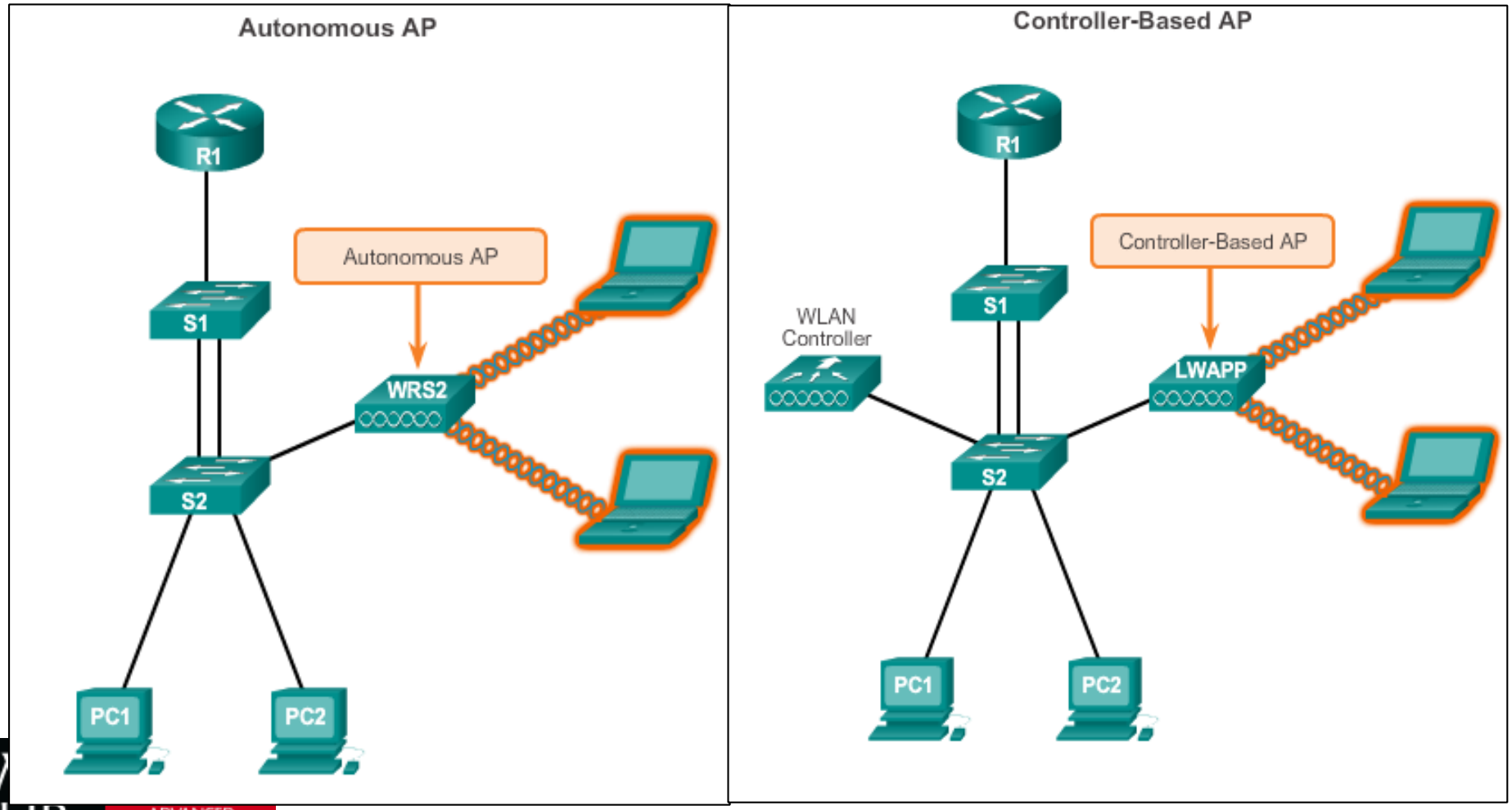


SOHO/Home Wireless Solutions



- Each AP is configured and managed individually.
- This can become a problem when several APs are required.

Business Wireless Solutions



Summary

In this lecture, we covered:

- Why Wireless
- Wireless Technologies
- Comparing with wired Ethernet
- Wireless Devices