Characterizing the existing network

Designing and Supporting Computer Networks – Chapter 3.1

Overview

Upon successfully completing this chapter, you will be able to:

- Characterize an existing network to identify strengths and weaknesses present in the design.

- Choose the appropriate hardware and software upgrades to prepare the network for the integration of new technologies.

- Upgrade the Cisco IOS software on a router or switch.

- Describe the process to perform a wireless site survey.

- Create a detailed network Design Requirements document.

Examine the existing network

- Typically, the **first step** in installing a new network is to take a detailed <u>look at the existing network</u>.

- The NetworkingCompany designer examines the existing network to:

  - Determine if the **design goals are realistic** and feasible

  - Determine if the **existing network meets the expectations** for scalability, availability, security, and manageability

  - Identify where new equipment, infrastructure upgrades, and new services **can be integrated**

  - Ensure that **old and new** network devices, media, and functions can work together

Upgrading the Stadium Network

- Like most organizations, the stadium has a **pre-existing network**.

- The management wants to install a new network to:

  - **Better manage** its existing voice, video and data networks

  - **Improve** customer service

  - **Reduce** costs

Network documentation

- The network documentation should include:

    - **Logical and physical diagrams** of the network

    - **Floor plans** showing the location of wiring closets and wiring runs

    - Inventory lists of **installed network equipment**

    - Current network **configuration files**

    - Inventory lists of **network applications**

Obtaining Information About Routers

- The **Cisco IOS** software offers useful commands to gain information from a router to create a network diagram. Some of these commands are:

  - `show version`

  - `show running-config`

  - `show ip route`

  - `show cdp neighbors detail`

  - `show controllers`

  - `show tech-support`

- The `show tech-support` command can collect a large amount of information about a router. The output from this command **varies depending on** the router or switch platform and configuration.
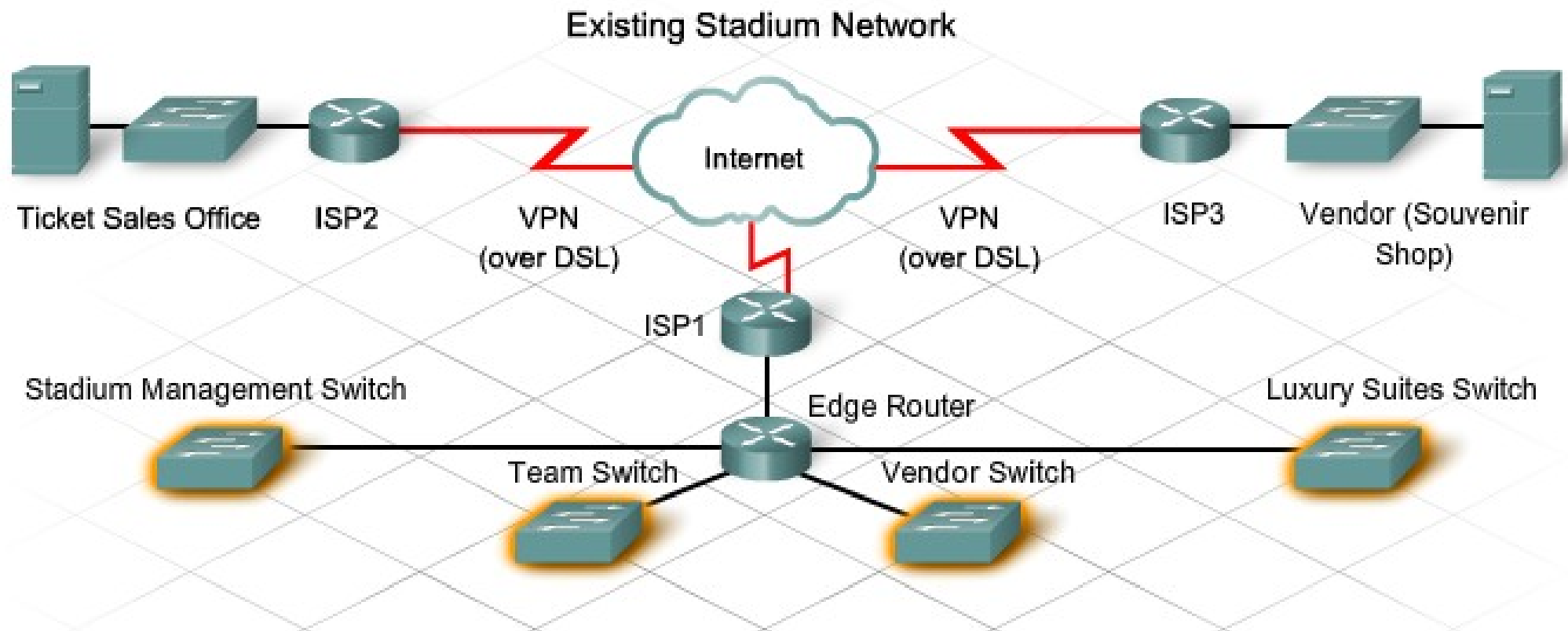
Obtaining Information About Switches

- Many of **router commands** are used to gain information on a Cisco switch.

- Other useful switch commands include:

    - `show vlan`

    - `show vtp`

    - `show spanning-tree`

Creating an Existing Network Overview Diagram

- On the **stadium network project**, the **first** diagram that the network designer creates is a high-level view of all of the stadium network sites, the **logical diagram**.

- The diagram shows:

  - The **main stadium** network

  - The **souvenir shop**

  - The **ticket outlet** locations

  - Connectivity to **remote sites**

  - Connectivity to **business partners**

- The designer diagrams the **WAN connections** between the networks and the equipment at each location where the WAN terminates.

- This network diagram illustrates **how the information flows** from one area of the network to another. This helps the designer locate problem areas.

Logical diagram

Existing Stadium Network

Ticket Sales Office ISP2 VPN (over DSL) Internet VPN (over DSL) ISP3 Vendor (Souvenir Shop)

ISP1

Stadium Management Switch Edge Router Luxury Suites Switch

Team Switch Vendor Switch

Logical Diagram of the Main Stadium LAN

- The designer creates a logical network diagram that shows the **major pieces of networking equipment** and how they interconnect.

- This diagram includes:

  - **Routers** and **switches**

  - **Wireless Access Points**

  - Critical **telecommunications equipment** (CSU/DSU, modems, etc.)

  - **Firewalls** and intrusion detection devices (IDS)

  - **Management** stations

  - **Servers** and **server farms**

Modular block diagram

- A modular block diagram is a **simplified version of the network.**

- The diagram shows the **major functions** in modular form.

- It helps the designer to determine the **underlying architecture** on which the network is built.

- The designer **compares** the block diagram to the ideal network design represented by the Cisco **Enterprise Network** Architectures.

- The designer identifies **areas that must be redesigned** or upgraded.

Old flat network
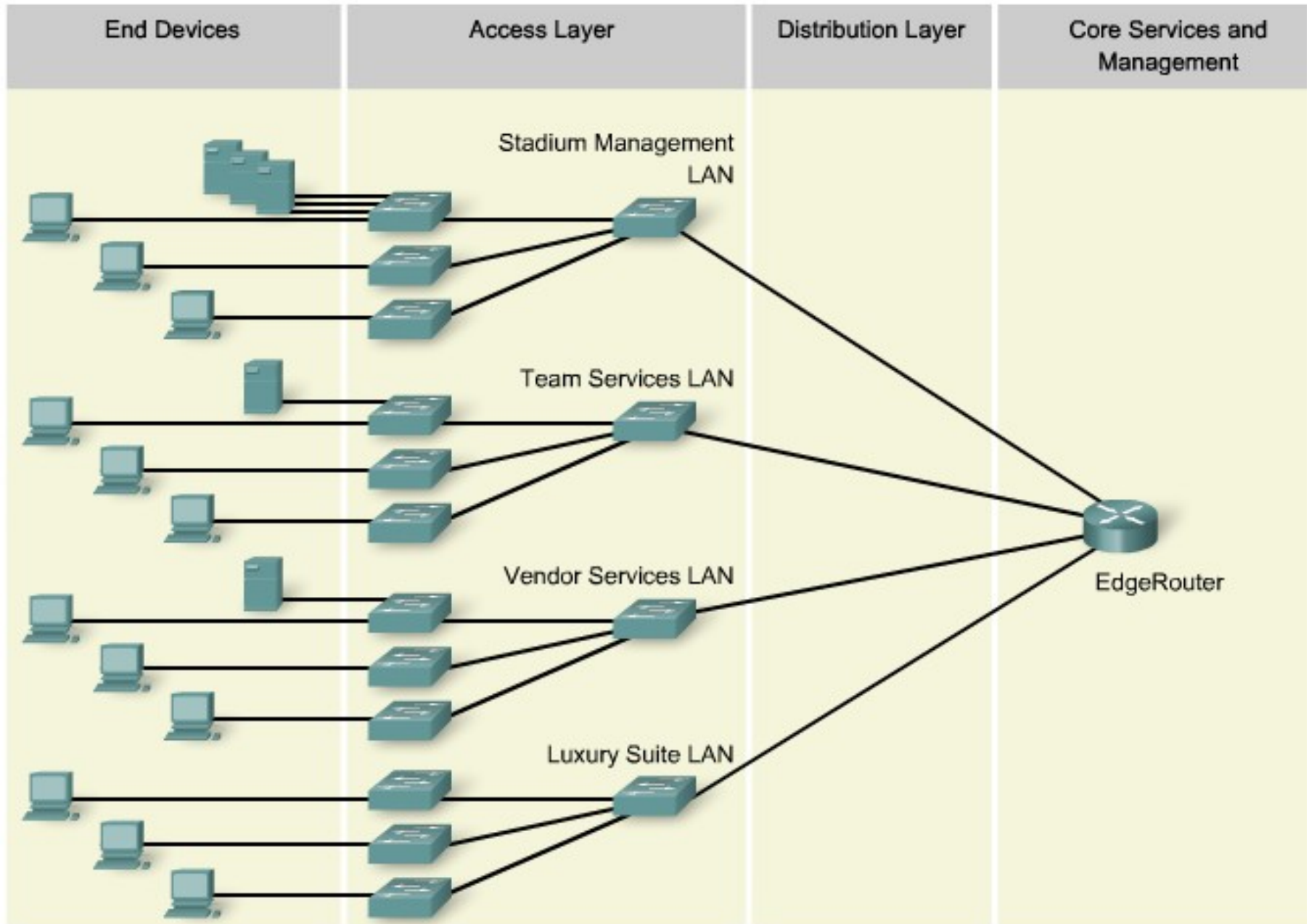
Strengths and weakness of the existing stadium network

- **Strengths**:

  - New wiring and adequate wiring closets

  - Adequate space for a new data center

  - Servers and PCs are current models and will not need to be replaced

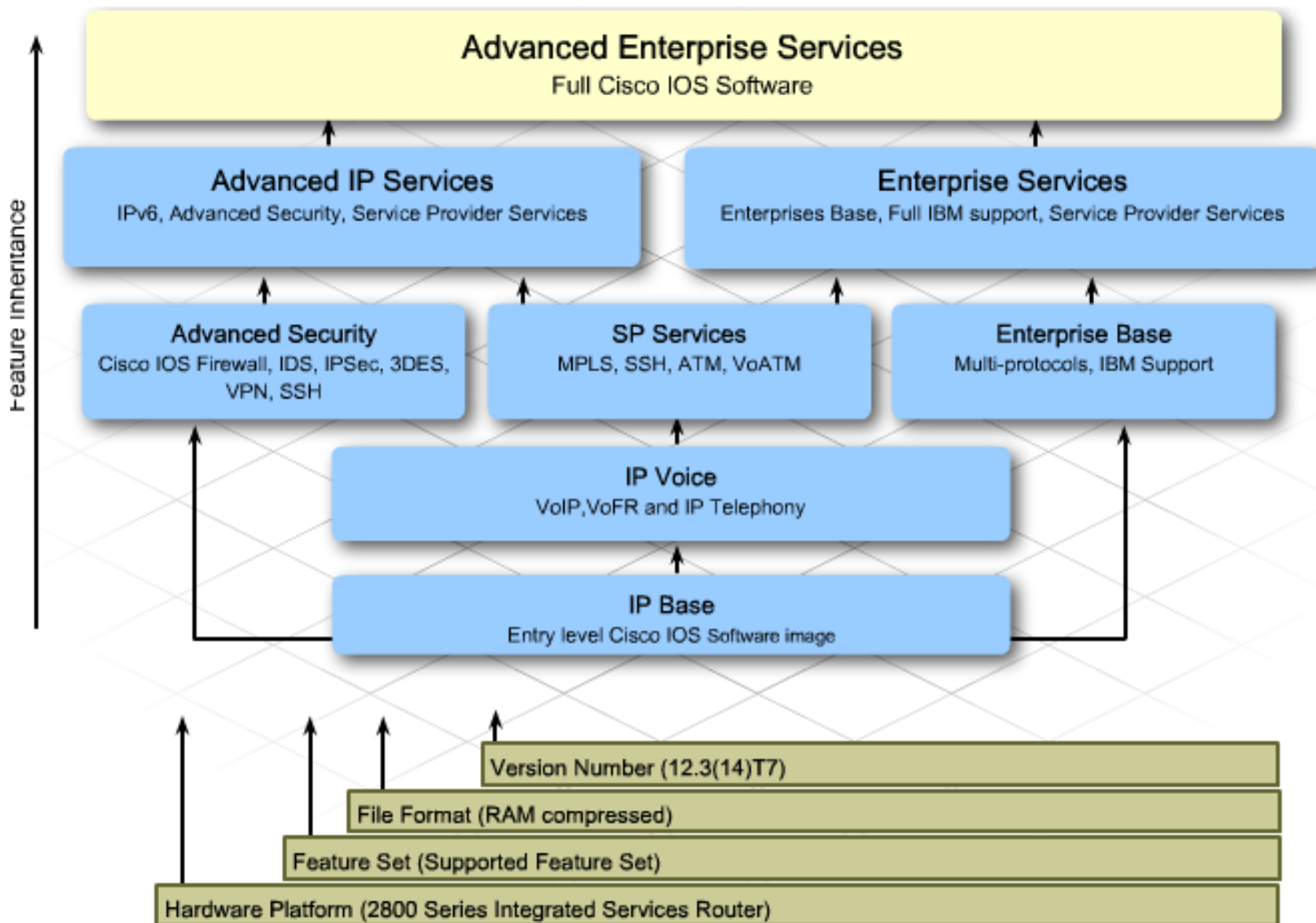 - Some existing network switches and routers can be used in the new design

- **Weaknesses**:

  - Flat network design

  - No Distribution Layer

  - No true Core Layer

  - Servers poorly located

  - Multiple networks that can be difficult to maintain

  - Inadequate IP addressing structure

  - No dedicated bandwidth for WAN connectivity

  - Poorly-implemented wireless

  - Limited security implementations

Installed Cisco IOS Software

- In the stadium network, three types of network devices will be **included in the new design**:

  - 16 Cisco 2960 switches

  - 1 Cisco 1841 router

  - 3 non-Cisco routers

- After the NetworkingCompany staff determines which Cisco IOS software versions and hardware components **need to be installed**, they are able to estimate the time necessary for the upgrades of the Cisco equipment.

- The non-Cisco routers will be updated at a later time.

IOS Software File Naming Conventions

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