Computer Fundamentals: Hardware

PC HARDWARE AND USE CASES

Overview

Peripherals

- External devices connected to a computer with cables or wirelessly
- Printers, mice, keyboards, printers, card readers and so on

Power Supplies

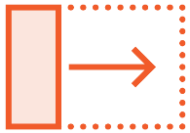
- Consider internal components

PC Configuration Scenarios

- Which hardware components will meet computing needs?

Peripherals

Peripherals



Can provide input to the computer or generate/manipulate output from it

Provide additional capabilities not built into standard computing devices, often configured via a web-based interface

Can be connected with cables or wirelessly (Bluetooth, Wi-Fi)

Common Input Peripherals

Mouse

Keyboard

Scanner

Chip card reader

Common Output Peripherals

Display monitor

Speakers

Printer

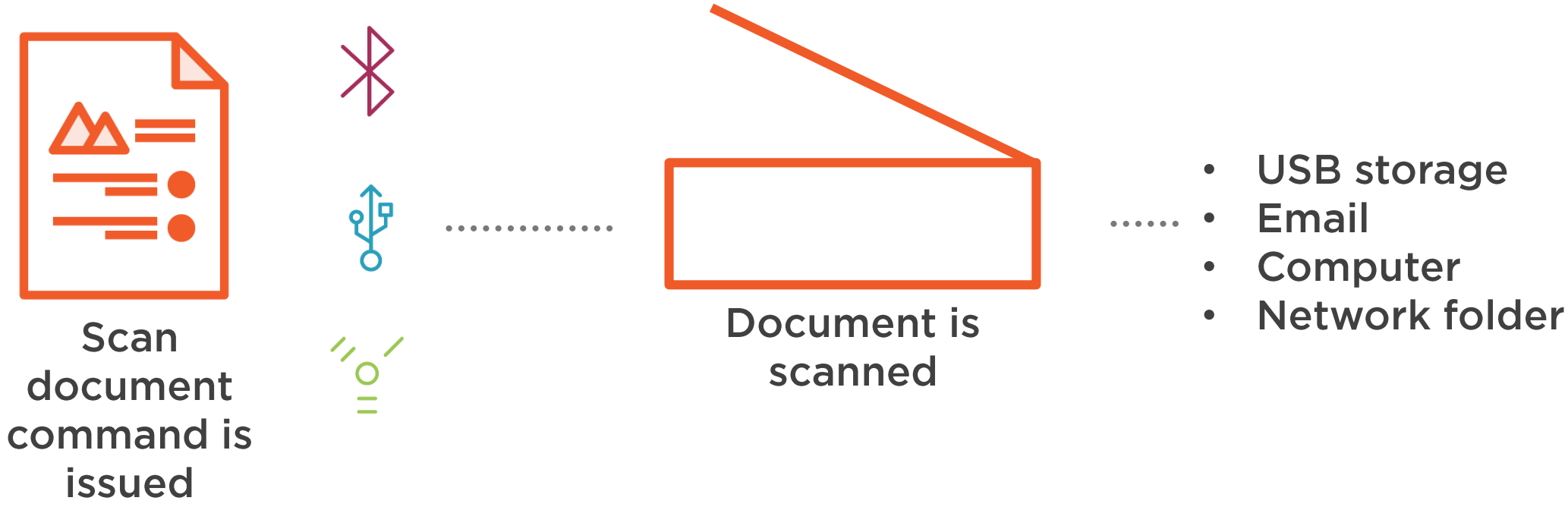
External USB storage

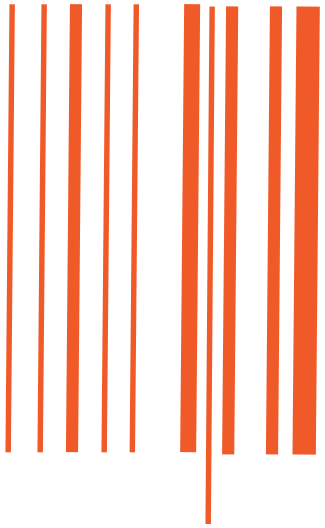
Input Peripherals

Scanner

- Converts physical documents or photos to digital files
- Connectivity through
  - USB cable
  - Network cable
  - Wirelessly via Bluetooth or Wi-Fi
- Often part of a Multi-Function Device (MDF)

The Scanning Process





Barcode Scanner

- Scans codes from merchandise, tickets
- Quick Response (QR) codes can store more information such as URLs, SMS text messages, coupons
- Connectivity through
  - Serial cable
  - USB cable
  - Network cable
  - Wirelessly via Bluetooth or Wi-Fi

Input Peripherals

Touchpad

Screen sensors detect finger movement

Signature Pad

Sensors detect pressure from a pen

Game Controller

Wired and wireless

USB and Bluetooth

Input Peripherals

KVM Switch

Input: Mouse, keyboard

Output: Display

Used in server rooms to reduce the number of I/O peripherals

Card Reader

Magnetic card

Smart card

Chip card

Tap Pay Device

Near field communication (NFC)

Wireless connection, approximately 4cm

KVM Switch

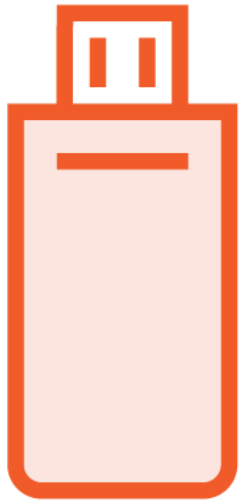
Demo

Install and use a QR virtual barcode scanner app

Output Peripherals

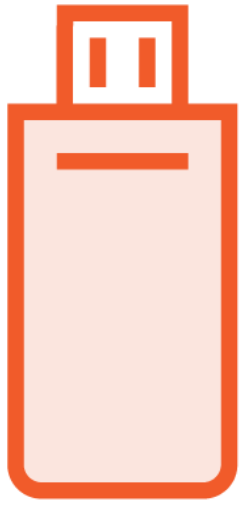
Printers

- Convert digital files to physical printed documents
- Connectivity through
  - USB cable
  - Network cable
  - Wirelessly via Bluetooth or Wi-Fi
- Often part of a Multi-Function Device (MDF)



Local External Storage

- Connectivity
  - USB
  - Network cable
  - Wirelessly via Bluetooth, Wi-Fi
  - Encryption of data at rest
  - Data Leakage Prevention
    - DLP
    - Can prevent writing data



Network External Storage

- Connectivity
  - Network cable
  - Wirelessly via Bluetooth, Wi-Fi
  - Encryption of data at rest
- Network Attached Storage (NAS)
- Storage Area Networks (SAN)
- iSCSI
- Shared folders
- Cloud storage

Network Attached Storage (NAS)

Output Peripherals

Monitor

Size

Screen resolution

Number of monitors

Connection (HDMI, DVI)

Optical Drive

CDs

DVDs

Blu-Ray

Read and/or write

Speakers

Connectivity via Bluetooth or cables

Output Peripherals

Headset

Input and output

Wired and wireless connectivity

Projector

Brightness is measured in lumens

Wired and wireless connectivity

Supported display resolution

Demo

Configure dual monitors in Windows 10

Power Supply Units

Power Supply Units

- PSU
- Rated in watts (W)
  - Consider the number of internal components requiring power
- Form factor such as ATX, Flex ATX
- Connectors
  - Motherboard 24 pin
  - SATA
  - 6/8 pin PCI-Express

Power Supply Units

Input Voltage

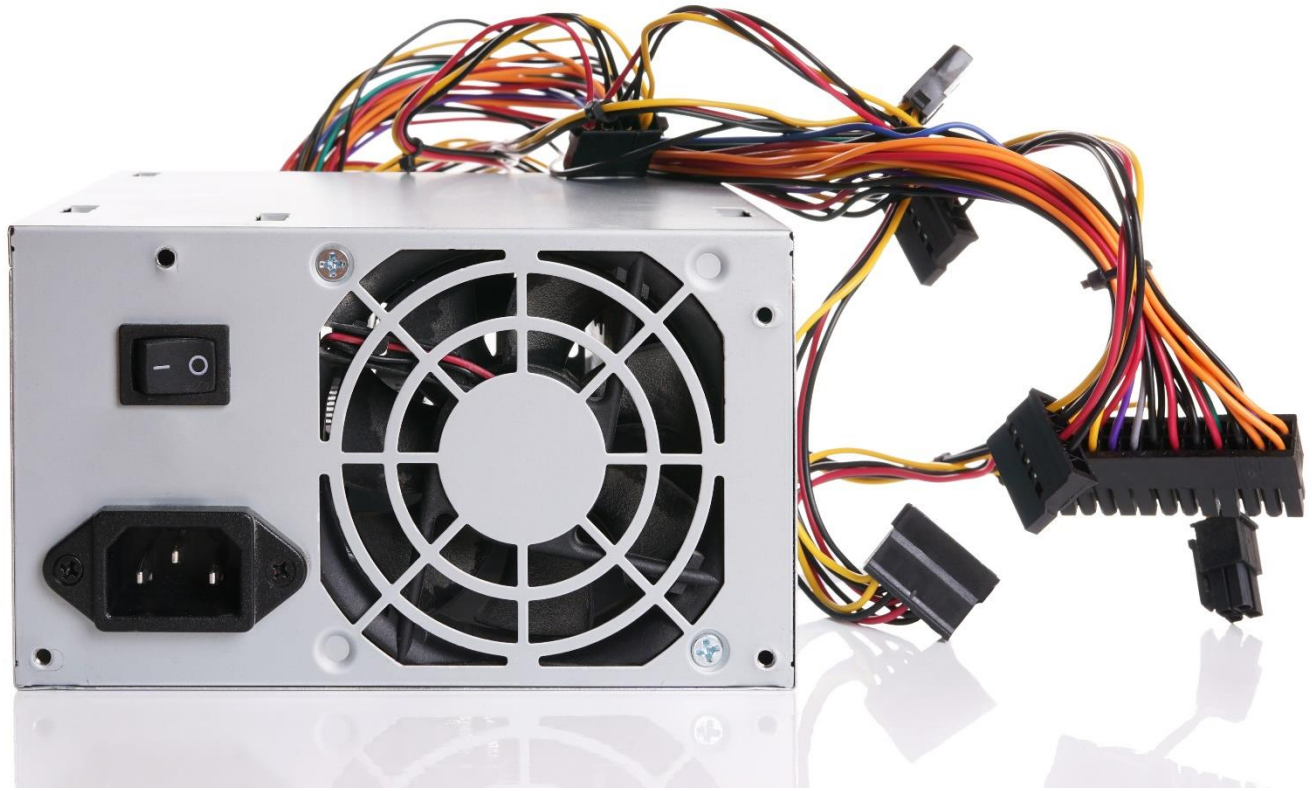
- Alternating Current (AC)
- Switch on the back of the power supply or automatic
- 115V: Countries such as the United States
- 220V: European countries

Power Supply Units

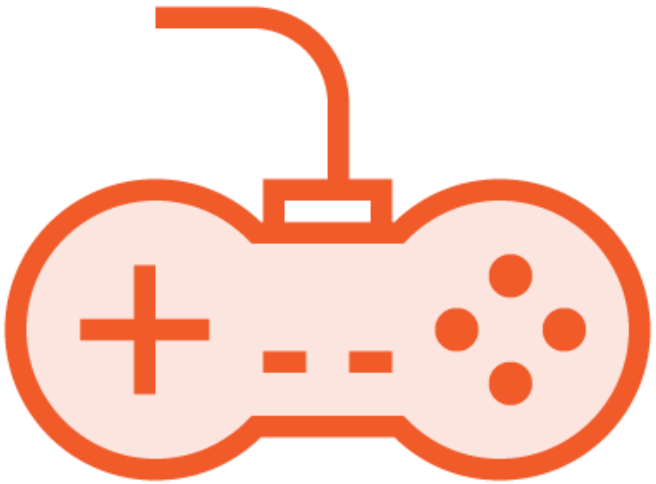
Output Voltage

- Direct Current (DC)
- Depends on the power connector
- 3.3/5.5V: Power to digital circuits
- 12V: Power to motors (fans, hard disk drives)

Power Supply Unit (PSU)



PC Configuration Scenarios



Gaming System

PSU

- Video card power draw

Motherboard

- Slots and support for other components

CPU speed and number of cores

RAM for OS + games

High-end video card GPU

High-end sound card

Gaming controller

- Wired or wireless

SSD storage

Graphic Design System

CPU speed and number of cores

RAM for OS + apps + cached large files

High-end video card GPU

SSD storage

Touchpad

Drawing pad such as Bamboo device

- USB connection

A/V Editing System

CPU speed and number of cores

RAM for OS + apps + cached large files

High-end video card GPU

SSD storage

Dual monitors

RAM

High-end video card GPU

High-end sound card

Camera

Virtualization Host

Hypervisor

- Type 1: Bare metal
- Type 2: Runs on top of existing OS

CPU speed and number of cores

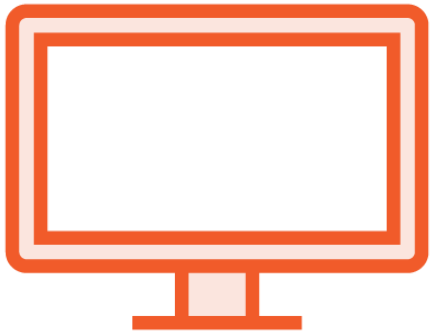
Enough RAM for hypervisor + VM guests

- Dynamic memory
- Failover clustering of VMs

Fast disk subsystem

- Reduce VM guest disk contention
- Local or network

Multiple NICs



Thin/Thick Client

Normally used for office productivity

Thin client

- Requires little computing power
- Does not have local mass storage

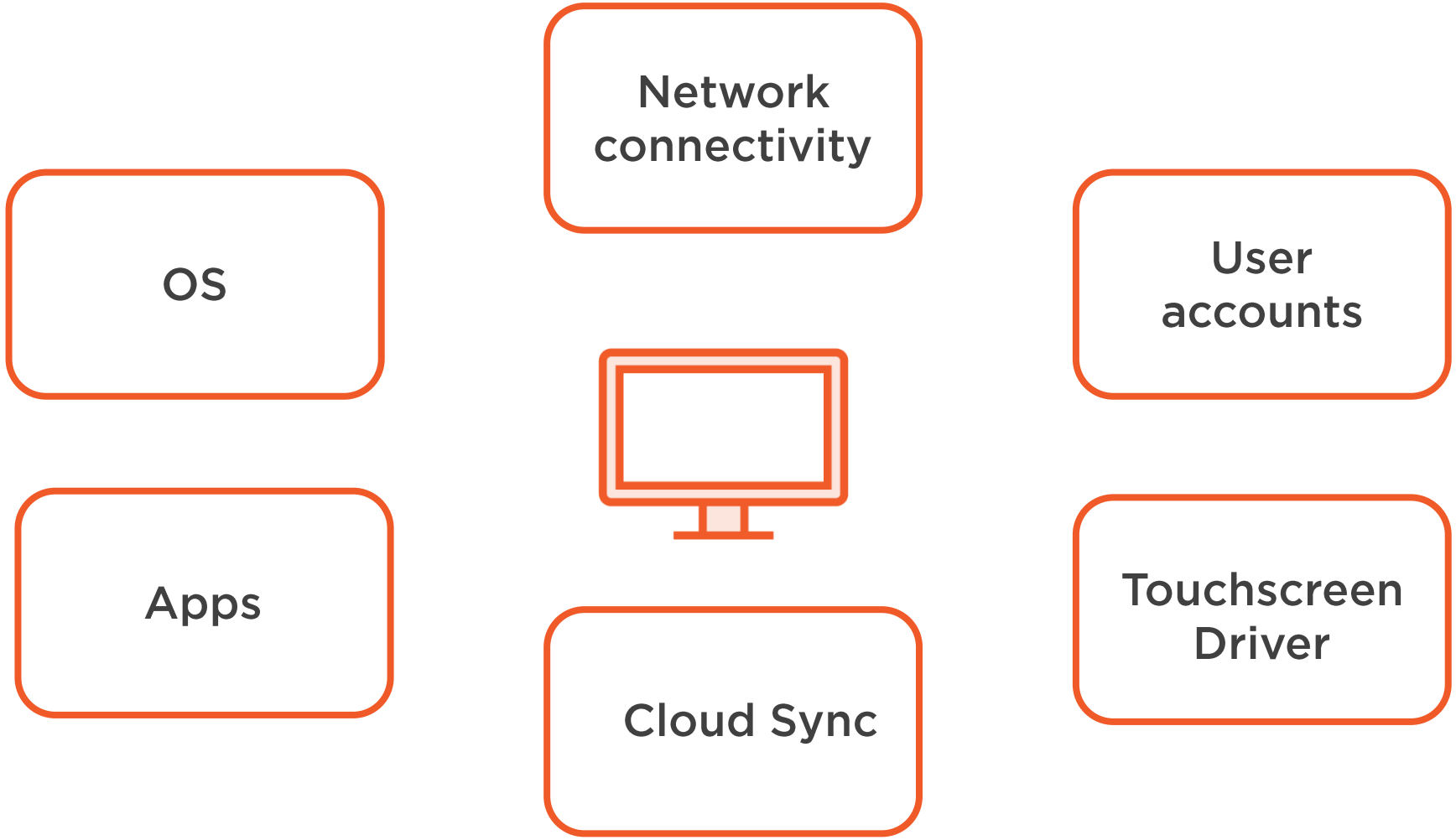
Thick client

- Local mass storage
- Requires more compute power

POS Systems

- Card readers
- Signature pad

Thin/Thick Client Configuration



Demo

Configure hardware for a VMware Workstation machine guest

Demo

Configure hardware for a public cloud provider virtual machine guest

Summary

Peripherals

- External devices connected to a computer with cables or wirelessly
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Power Supplies

- Consider internal components

PC Configuration Scenarios

- Which peripheral will meet the requirement?