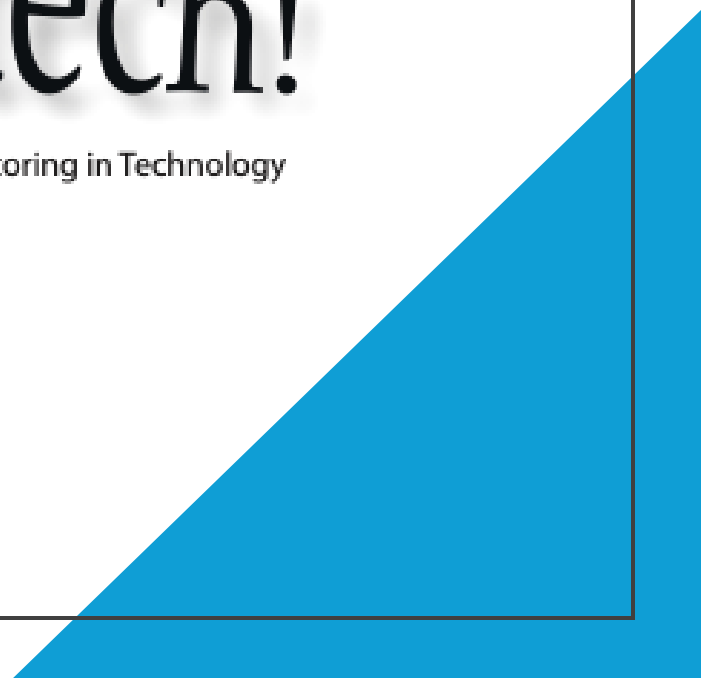


Understanding Input/Output Device Interfaces

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Student Engagement & Mentoring in Technology



Why Understanding Hardware and Connectivity Matters?

IT professionals must understand **networking, peripherals, and display technologies** for troubleshooting and setup. We'll cover:

Networking Basics (wired, wireless, and connectors)

Peripheral Devices (USB, FireWire, SATA)

Graphic Devices (VGA, DVI, HDMI, DisplayPort)

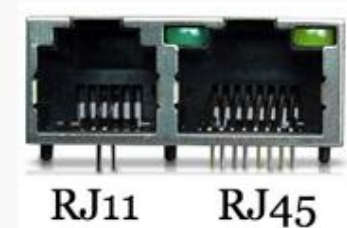
Networking Basics

Networking allows devices to communicate and share data.

Two main types:

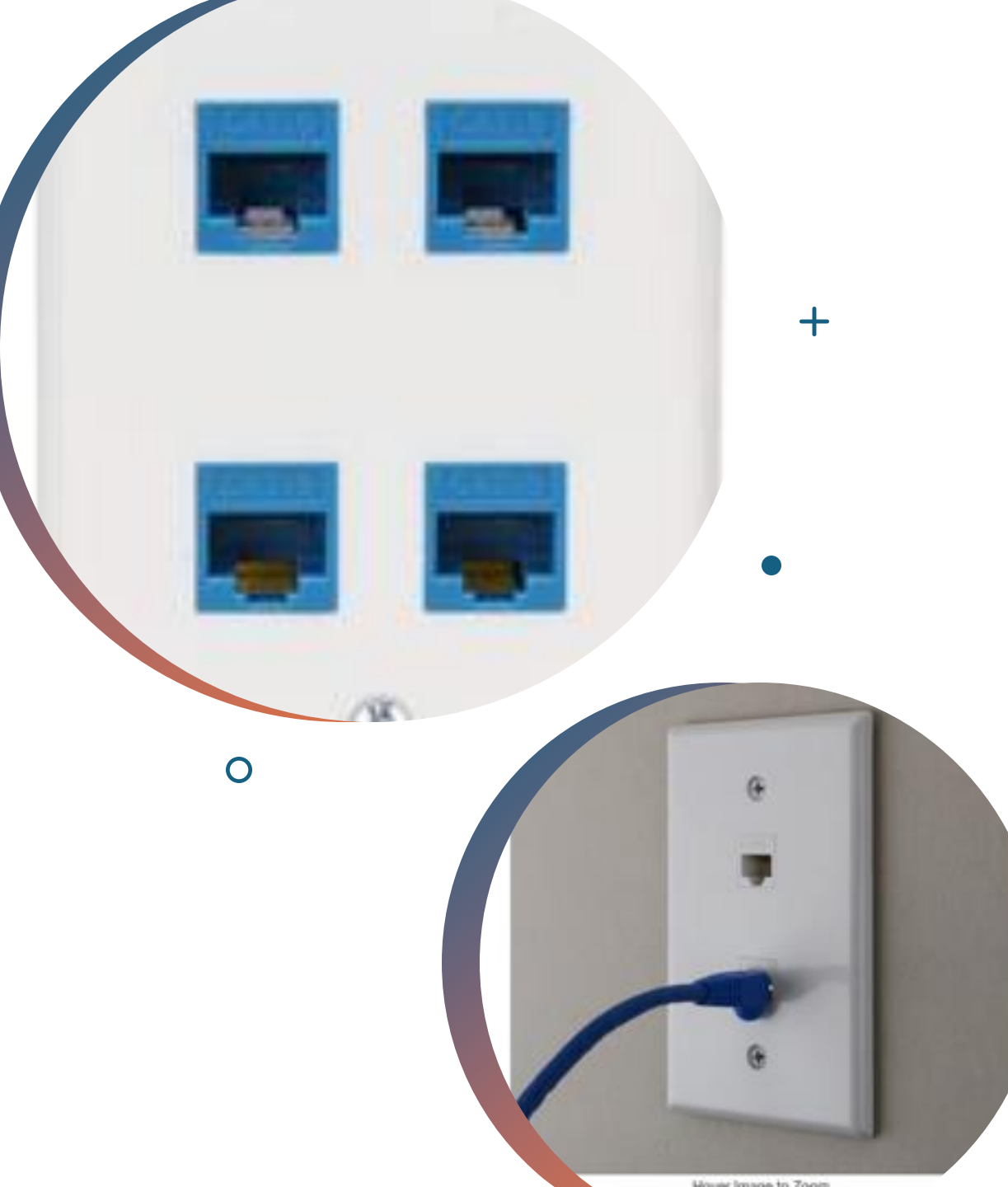
1. Wired Networks (Ethernet cables, RJ-45)

2. Wireless Networks (Wi-Fi, Access Points)



Wired Networks

- **More stable & secure** than wireless networks.
- Uses **Ethernet cables** (Cat5e, Cat6, Cat7).
- **Devices:** Modems, routers, switches.



Ethernet and RJ-45 Connectors

- **RJ-45 Connector:** Used for Ethernet cables.
- **8-pin connector** supports up to **10 Gbps speeds**.
- Found in **routers, PCs, and network switches**.

RJ45 Connector



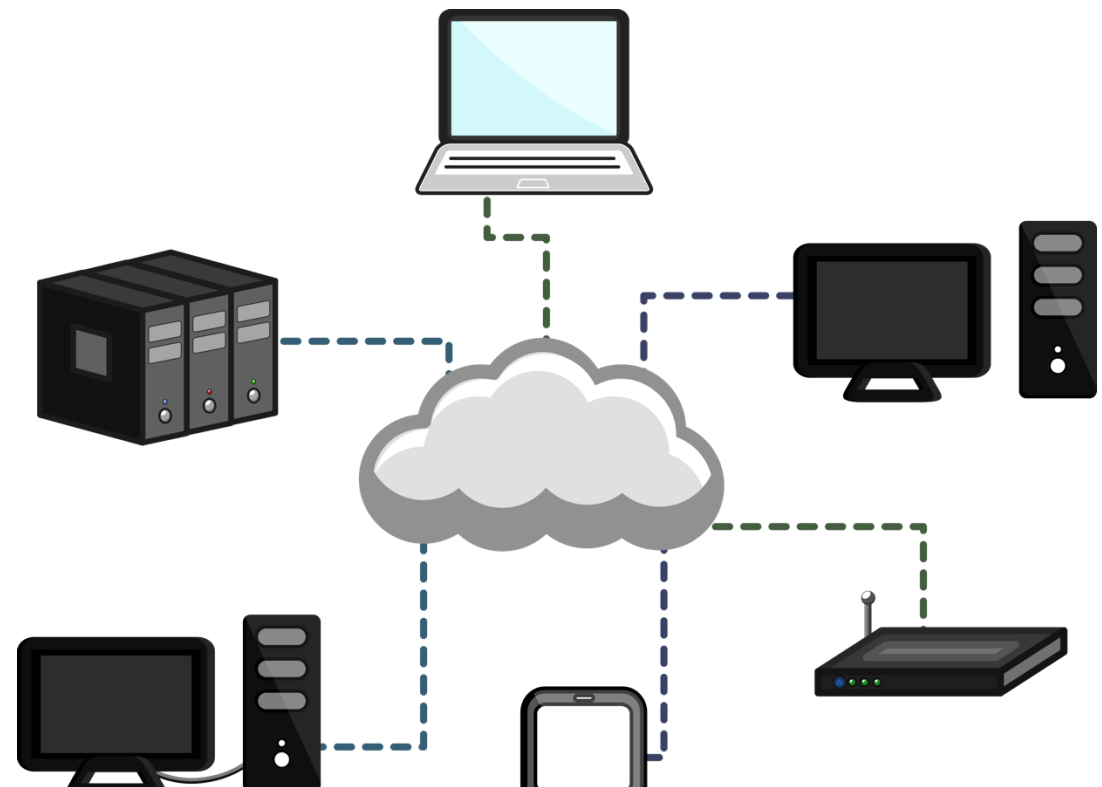
Wireless Networks

- Wireless networks use **radio waves** instead of cables.
- Common Wi-Fi standards:
 - **802.11n (Wi-Fi 4)** – 600 Mbps
 - **802.11ac (Wi-Fi 5)** – 3.5 Gbps
 - **802.11ax (Wi-Fi 6)** – 9.6 Gbps
- **Key Components:** Routers, access points, network adapters.



Understanding Peripheral Devices

- **Peripherals** are external devices that expand a computer's functionality.
- **Examples:**
 - **Input Devices:** Keyboards, mice, scanners.
 - **Output Devices:** Monitors, printers, speakers.
 - **Storage Devices:** External hard drives, USB drives.

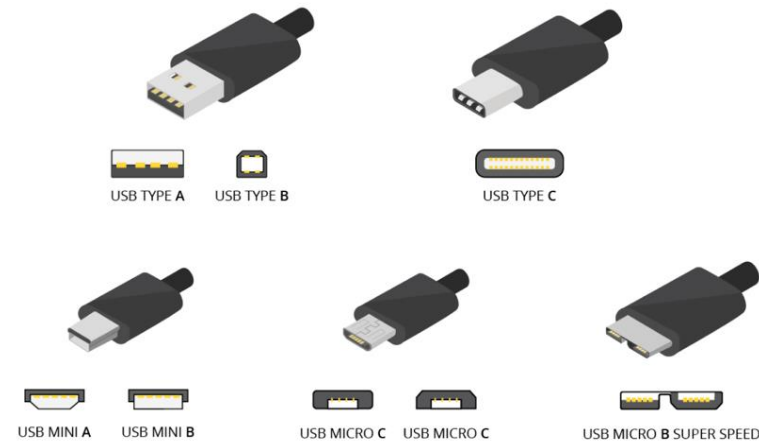


USB Connectors

Universal Serial Bus (USB) – The Most Common Connection

USB Types & Speeds:

- **USB 2.0** – 480 Mbps
- **USB 3.0** – 5 Gbps
- **USB 3.1/3.2** – 10-20 Gbps
- **USB-C** – Reversible & supports 40 Gbps (with Thunderbolt)



FireWire & SATA

- **FireWire (IEEE 1394):** Used for **video editing & external storage**.
 - **FireWire 400** – 400 Mbps
 - **FireWire 800** – 800 Mbps
- **SATA (Serial ATA):** Standard for **internal and external drives**.
 - **SATA III** – 6.0 Gbps
 - **eSATA** – External SATA for high-speed external storage.

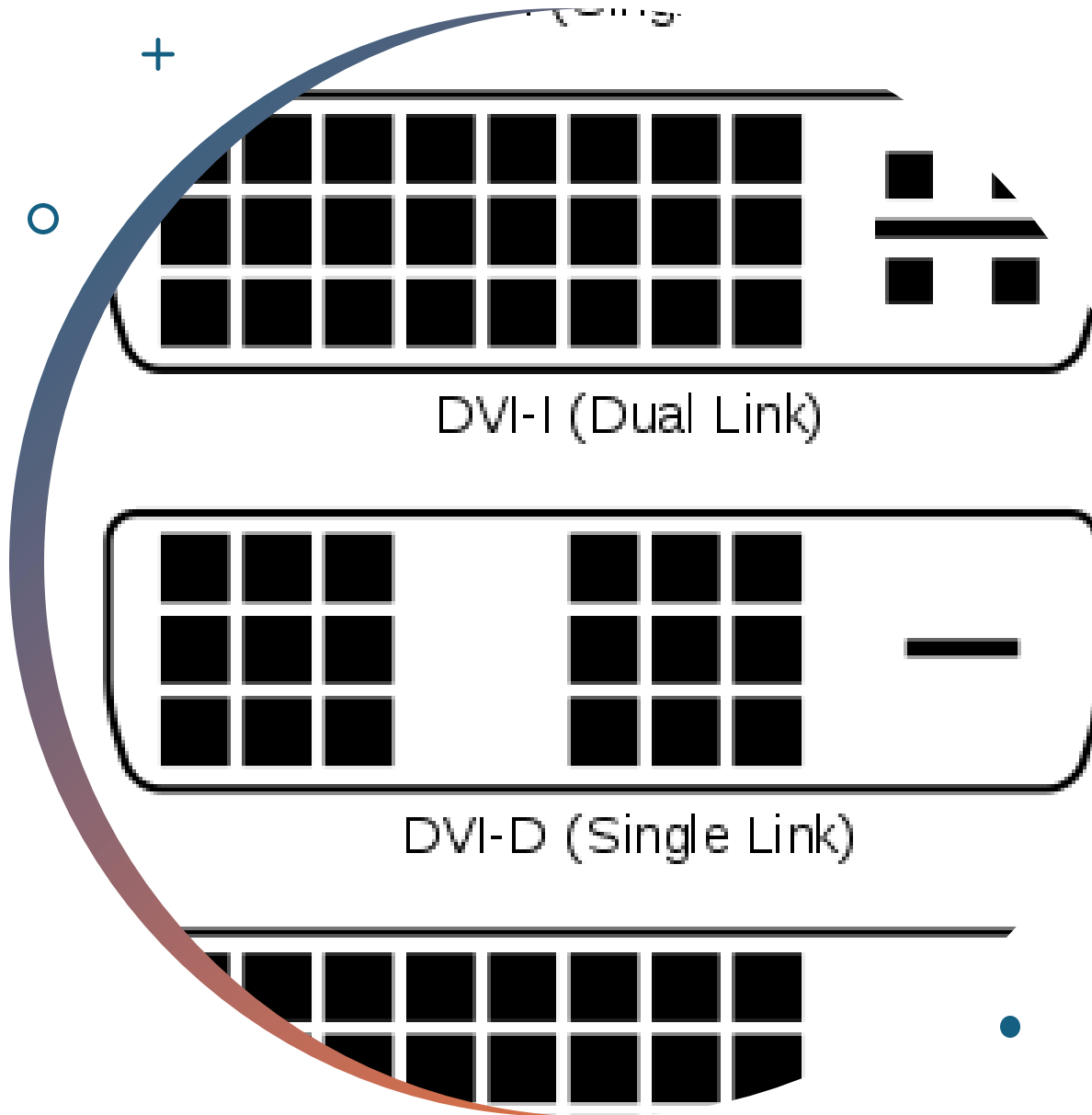


Understanding Graphic Devices

What Are Graphic Devices?

- A **graphics device (GPU/graphics card)** processes visual data.
- **Types of GPUs:**
 - **Integrated Graphics** – Built into the CPU (e.g., Intel UHD).
 - **Dedicated GPU** – Separate graphics card (e.g., NVIDIA, AMD).





VGA and DVI

- **VGA (Video Graphics Array):**
 - Analog signal, 15-pin blue connector.
 - Max resolution: **1080p** (older monitors).
- **DVI (Digital Visual Interface):**
 - Digital/analog hybrid, **better than VGA.**
 - Max resolution: **2560×1600.**

HDMI & DisplayPort

Modern Display Standards: HDMI & DisplayPort

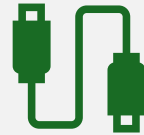
- **HDMI (High-Definition Multimedia Interface)**
 - Carries video & audio.
 - Supports 4K, 8K, and HDR.
- **DisplayPort (DP)**
 - Supports higher refresh rates (gaming, 4K at 120Hz).



Key Takeaways



Networking: Wired (Ethernet, RJ-45) vs. Wireless (Wi-Fi).



Peripherals: USB, FireWire, and SATA for external devices.



Graphics: VGA & DVI (older), HDMI & DisplayPort (modern).

Questions?

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