Here is a **comprehensive sentence-by-sentence study note breakdown** of the document **“39. Wired Connections”**, structured into bullet points for clarity and optimized for **CompTIA A+ 1102 Objective 1.7**, which deals with **configuring Windows networking features**.

**✅ Structured Study Notes – Wired Connections in Windows Networking**

**🧠 Overview of Wired Networking in Windows**

* Windows supports both **wired and wireless connections**.
* This lesson focuses exclusively on **wired network connections**.

**🔌 Types of Wired Media**

* **Two main types** of wired connections:
  + **Copper (electrical)** – UTP/STP with RJ45 connectors.
  + **Fiber (optical)** – Requires fiber NICs and connectors.

**📦 Copper Cabling Types:**

* **Cat5, Cat6, Cat7, Cat8**
* Uses:
  + **UTP (Unshielded Twisted Pair)**
  + **STP (Shielded Twisted Pair)**
* Common termination: **RJ45 connector**

✅ Example: The author’s organization uses **Cat6/Cat7 UTP** terminated with **RJ45**, connected to Intel NICs.

**🖥️ Viewing Network Adapter Details in Windows**

**Steps:**

1. Open **Device Manager** from the Start Menu.
2. Expand **Network Adapters**.
3. Identify and **double-click your wired adapter** (e.g., Intel 82574L Gigabit Ethernet).
4. Review tabs in the **Properties window**.

**🔍 Properties Window Tab Breakdown**

**1. General Tab**

* Shows:
  + Device name/type (e.g., Network Adapter)
  + Manufacturer (e.g., Intel)
  + Location (e.g., PCIe Slot 3)
  + Status (e.g., “Working properly”)

**2. Advanced Tab**

* Advanced NIC settings (for advanced admins).
* Example: Enabling **jumbo frames** for SANs (e.g., 4088- or 9014-bytes vs 1500 standard).
  + A **jumbo frame** is an **Ethernet frame** that is **larger than the standard size** of 1500 bytes (the default **Maximum Transmission Unit** or **MTU**).
    - **Standard Ethernet frame** MTU: 1500 bytes
    - **Jumbo frame** MTU: Typically, **9000 bytes** (can range from ~4088 to 9014 bytes depending on the device)
  + When you **enable jumbo frames** for a **Storage Area Network (SAN)**, you are telling the **network devices (NICs, switches, SAN interfaces)** to send and receive **larger-than-normal packets** — typically up to **9000 bytes** instead of the default **1500 bytes**
* Leave default unless you understand the specific feature.

**3. Driver Tab**

* Details about the **network driver**: A **network driver** is a piece of **software that acts as a translator** between the **operating system** and the **network interface card (NIC)** or **network adapter**. Without the driver, the OS has **no way to control or communicate** with the network hardware.
  + Version
  + Date
  + Manufacturer
* Functions:
  + **Update driver**
  + **Rollback driver**
  + **Disable/Uninstall** device

**4. Details Tab**

Shows key-value data like:

* **Device Description** is the user-friendly name Windows assigns to a piece of hardware.
* You can find it in:
  + Device Manager → Right-click device → Properties → Details tab → Select “Device Description”
  + **🏷️ Example: “Intel(R) Ethernet Connection I219-V”**
* **💡 Purpose:**
  + Helps users and techs identify what the device is (e.g., network adapter, GPU, sound card).
  + Used in system tools, logs, and interfaces to show clear names instead of cryptic hardware codes.
* A **Hardware ID** is a **unique identifier** assigned to a device by the manufacturer.
* It consists of **Vendor ID** (VEN) and **Device ID** (DEV).
* Found in:
  + **Device Manager** → Device **Properties** → **Details tab** → Choose **“Hardware Ids”**

**🔍 Why Is Hardware ID Important?**

| **Use Case** | **Purpose** |
| --- | --- |
| ✅ **Driver installation** | Windows uses the Hardware ID to **match the correct driver** |
| ✅ **Troubleshooting unknown devices** | Helps you find out **what an unrecognized device really is** |
| ✅ **Manual driver search** | You can use it to look up the right driver on vendor websites |

📘 If a device shows up as **“Unknown device”**, the **Hardware ID** is your best tool to identify it and find the right driver.

**5. Events Tab:** The Events tab is found in Device Manager under the Properties of a hardware device. It shows a timeline of important events related to that device.

* Tracks history of the device.
* Example: Installation date (e.g., October 2021)
* *Device Manager → Right-click a device → Properties → Events tab*

**📅 What Does the Events Tab Show?**

It lists **chronological logs** of:

* When the device was **installed**
* When the driver was **updated**
* When the device was **started or stopped**
* If there were **driver issues**, crashes, or reinstallations

Each event entry includes:

* **Date and time**
* **Type of event** (e.g., “Device installed”, “Driver updated”, “Device configured”)
* Sometimes links to **more detailed logs** in Event Viewer

**6. Resources Tab**

* Displays:
  + **Memory range** used by NIC
  + Useful for **hardware troubleshooting**

The **Resources tab** shows which **hardware resources** are being used by a particular device, such as:

* **Memory Range**
* **I/O Range (Input/Output ports)**
* **IRQ (Interrupt Request)**
* **DMA (Direct Memory Access)**

**7. Power Management Tab**

* Key Options:
  1. **Allow the computer to turn off this device to save power**

→ Useful on laptops for energy conservation.

* 1. **Allow this device to wake the computer, powers it on remotely (Wake-on-LAN)**

→ Enables network-triggered boot-ups for patching or remote use.

🛠 Wake-on-LAN is important for **enterprise patch management** while devices are off.

**🌐 Accessing Wired Connection Settings**

**Steps:**

1. Click **network icon** in taskbar.
2. Open **Network & Internet Settings**.
3. View Ethernet status (e.g., “Ethernet 0 connected to a private network”).

**⚙️ Inspecting and Modifying Wired Properties**

* Click **Properties** under Ethernet.
* Key sections:
  + **Network Profile** (Public or Private)
  + **Metered Connection** (relevant for wireless)
  + **IP Settings** (automatic via DHCP or manual)

**🧾 Example IP Configuration (via DHCP)**

| **Setting** | **Value** |
| --- | --- |
| **IPv4 Address** | 192.168.150.135 |
| **DNS Server** | 192.168.150.2 |
| **DNS Suffix** | local domain |

* Indicates that IP info was assigned **automatically by a DHCP server**.

**🧱 Adapter & Network Specs Overview**

* Manufacturer: **Intel**
* Driver info visible (version, vendor, etc.)
* MAC Address (12-digit **hexadecimal hardware address**)
* Connection Speed:
  + Negotiated at **1000 Mbps (1 Gbps)**
  + Matches **Gigabit Ethernet NIC + Gigabit switch/router**

**📝 Key Takeaways for Exam and Practice**

| **Concept** | **Summary** |
| --- | --- |
| **Wired types** | Copper (Cat5–8), Fiber |
| **Connectors** | RJ45 (copper), Fiber-specific |
| **NIC settings** | View via Device Manager → Adapter Properties |
| **Power settings** | Includes Wake-on-LAN for remote boot |
| **IP/DNS config** | Can be manual or via DHCP |
| **Speed negotiation** | Should match hardware capability (e.g., 1 Gbps) |

**🎯 CompTIA A+ 1102 Relevance**

| **Objective** | **Relevance** |
| --- | --- |
| **1.7** | Configure Microsoft Windows networking features |
| **4.3** | Troubleshooting device connectivity and performance |

Would you like:

* A **quiz** based on this lesson?
* A **diagram of the NIC properties layout**?
* Or a **cheat sheet summarizing network hardware terms**?

Here is your **20-question multiple choice quiz** based on the **“Wired Connections Notes”** document, crafted specifically to reinforce the knowledge you need to **pass the CompTIA A+ 1102 exam (Objective 1.7 & 4.3)**.

**✅ 20 MCQs – Windows Wired Networking**

**1.** Which two types of media are used in wired Ethernet connections?

A. Bluetooth and fiber

B. UTP and wireless

C. Copper and fiber

D. Infrared and coaxial

**2.** What type of connector is most common on copper Ethernet cables?

A. USB-C

B. HDMI

C. RJ45

D. DB-25

**3.** Which cable categories are mentioned for copper Ethernet wiring?

A. Cat3, Cat4, Cat5

B. Cat5, Cat6, Cat7, Cat8

C. Cat2, Cat5e, Cat9

D. Cat6e, Cat7a, Cat9

**4.** Where in Windows can you view detailed information about your network adapter?

A. Control Panel → Network Reset

B. Task Manager → Services

C. Device Manager → Network Adapters

D. File Explorer → Network

**5.** What does the General tab in adapter properties show?

A. Installed updates only

B. Power usage history

C. Device name, manufacturer, slot, and status

D. MAC filtering rules

**6.** What are **jumbo frames**?

A. Large file downloads from the internet

B. Oversized device drivers

C. Ethernet frames larger than 1500 bytes MTU

D. Packets used only on dial-up

**7.** What is the typical MTU size for a jumbo frame?

A. 500 bytes

B. 1500 bytes

C. 2048 bytes

D. 9000 bytes

**8.** Why would you enable jumbo frames on a SAN?

A. To speed up downloads from web browsers

B. To reduce the number of small packets during large file transfers

C. To increase battery life

D. To block network devices

**9.** What is a **network driver**?

A. A hardware device

B. A cloud tool

C. A software layer that lets Windows talk to the NIC

D. A wireless authentication certificate

**10.** What happens if a network driver is missing or corrupted?

A. The CPU usage increases

B. Network traffic increases

C. The system cannot communicate with the network device

D. Bluetooth is disabled

**11.** What does the Details tab in Device Manager provide?

A. Connection speed

B. DNS status

C. Device Description and Hardware ID

D. BIOS boot order

**12.** Why is the **Hardware ID** important?

A. It stores the DNS server

B. It assigns IP addresses

C. It identifies the device for correct driver matching

D. It is used to encrypt backups

**13.** Which tab shows the installation date and driver history for a network device?

A. General

B. Advanced

C. Events

D. Security

**14.** What type of logs does the Events tab include?

A. Login timestamps

B. Wireless access points

C. Driver installs, updates, errors

D. Web browsing history

**15.** What does the Resources tab display?

A. IP addresses and DNS

B. I/O ranges, memory ranges, IRQs

C. Wi-Fi channel settings

D. Recycle bin logs

**16.** What is the **purpose of IRQ** in device configuration?

A. To store memory

B. To request help from BIOS

C. To let devices signal the CPU for attention

D. To manage user profiles

**17.** What does the **Power Management tab** allow?

A. Overclocking

B. Managing charging ports

C. Device power-saving and Wake-on-LAN settings

D. Screen brightness changes

**18.** What is **Wake-on-LAN** used for?

A. To update BIOS remotely

B. To boot the device via a network signal

C. To charge phones

D. To disable USB ports

**19.** Where can you view current IP address info on a wired connection?

A. Windows Recovery

B. Ethernet Properties in Settings

C. Task Manager → Startup

D. Disk Management

**20.** If a wired connection negotiates at 1000 Mbps, what type of link is it?

A. Fast Ethernet (100 Mbps)

B. Gigabit Ethernet (1 Gbps)

C. USB Ethernet

D. Fiber-channel over Ethernet

✅ Please reply with your answers like this:

1. C, 2. C, 3. B, ... up to 20

I’ll **grade your quiz** and provide **detailed explanations** for any incorrect responses to help you master the topic for the CompTIA A+ 1102 exam.

Awesome work! Let’s go through your quiz answers and see how well you did, with **grading and clear explanations** for each one.

**✅ Graded Quiz – Wired Connections (20 Questions)**

| **#** | **Your Answer** | **Correct Answer** | **✅/❌** | **Explanation** |
| --- | --- | --- | --- | --- |
| 1 | C | ✅ | ✅ | Wired connections include **copper (electrical)** and **fiber (optical)** media. |
| 2 | C | ✅ | ✅ | Copper Ethernet cables use **RJ45** connectors. |
| 3 | B | ✅ | ✅ | Common copper cable categories: **Cat5, Cat6, Cat7, Cat8**. |
| 4 | C | ✅ | ✅ | Device Manager → Network Adapters is where you view adapter details. |
| 5 | C | ✅ | ✅ | The General tab shows the **device name, manufacturer, location, and working status**. |
| 6 | C | ✅ | ✅ | **Jumbo frames** are Ethernet frames **larger than 1500 bytes MTU**. |
| 7 | D | ✅ | ✅ | Typical jumbo frame MTU = **9000 bytes**. |
| 8 | B | ✅ | ✅ | Jumbo frames help **reduce packet overhead** during large SAN transfers. |
| 9 | C | ✅ | ✅ | A network driver is a **software translator** between the OS and network hardware. |
| 10 | C | ✅ | ✅ | Without a network driver, the system **can’t talk to the NIC**. |
| 11 | C | ✅ | ✅ | The **Details tab** shows info like **Device Description** and **Hardware ID**. |
| 12 | C | ✅ | ✅ | Hardware ID helps match the **correct driver** to the hardware. |
| 13 | C | ✅ | ✅ | The **Events tab** logs **driver installs, updates, and changes**. |
| 14 | C | ✅ | ✅ | It shows install history, driver events, and errors. |
| 15 | B | ✅ | ✅ | The **Resources tab** shows **memory ranges, I/O ports, and IRQs**. |
| 16 | A | ❌ | **C** | **IRQ** (Interrupt Request) lets devices **signal the CPU** for attention — not store memory. |
| 17 | C | ✅ | ✅ | Power Management tab includes options for **power-saving and Wake-on-LAN**. |
| 18 | B | ✅ | ✅ | **Wake-on-LAN** boots a computer remotely via network signal. |
| 19 | B | ✅ | ✅ | IP address info is visible in **Ethernet Properties in Settings**. |
| 20 | B | ✅ | ✅ | 1000 Mbps = **Gigabit Ethernet (1 Gbps)**. |

**🧾 Your Score: 19 out of 20**

**✅ Excellent job!** You missed only **Question 16**, let’s review it:

**❌ Question 16 Explained**

**Your Answer**: A – “To store memory”

**Correct Answer**: C – “To let devices signal the CPU for attention”

* **IRQ (Interrupt Request)** is used by hardware devices to **interrupt the CPU** and request processing time — it has nothing to do with memory storage.