CS610 – Computer Networks

Assignment No. 1

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Question#1:
You are a network technician in a company using a 10Base-T Ethernet network. Several users report intermittent disconnection issues, specially when transferring large files. You decide to use a network analyzer called as sniffer to diagnose the problem…….

Solution:

1. **What could be causing the high collision rate in this setup?**

➢ In a 10Base-T Ethernet setup using a hub:

The main reason is that your network is using a **hub**, not a switch. In a hub-based **10Base-T Ethernet** network, all computers share the same communication space. So, when two or more users send data at the same time, it **causes a collision**. This happens more when users send big files.

2. **Why might frames be getting dropped due to unknown types?**

- Frames may be dropped due to:

- Some NICs or devices are sending **non-standard or unsupported protocols**
- There's **incorrect configuration** or **outdated drivers**
- Malware or rogue applications are generating malformed or unexpected traffic

3. **How can a network analyzer help resolve these issues?**

A network analyzer monitors real-time traffic to identify devices causing collisions. It detects unknown or mismatched protocols, inspects packets to spot incorrect configurations, and shows network load, helping reveal congestion due to poor topology like using hubs instead of switches.

Question#2:

You are assigned to set up a new LAN in an office space with 20 desktop computers located in close proximity. Your manager wants a cost-effective, easy-to-maintain solution with minimal downtime in case of cable issues. You have access to the following technologies:

- Thick Ethernet
- Thin Ethernet

10Base-T Ethernet with hubs Also, each computer requires a compatible Network Interface Card (NIC)

Solution:

1. **Which Ethernet technology would you recommend for this setup and why?**

- Recommended: 10Base-T Ethernet with hubs

Due to:

- **Cost-effective**: Ethernet hubs are relatively inexpensive, and Category 5/5e UTP cables used in 10Base-T are widely available and cheap.
- **Easy maintenance**: Each device connects independently to a hub using a star topology, making it easy to identify and isolate issues.
- **Minimal downtime**: If one cable or NIC fails, only the affected computer goes offline, the rest of the network continues to function.
- **Future scalability**: Easier to upgrade to switches or faster Ethernet standards like 100Base-T or Gigabit Ethernet later on.

2. **What kind of NIC would be most suitable in this case?**

- NIC: Standard 10Base-T Ethernet NIC with RJ-45 port

Reason:

- Widely available, low-cost, and supported by all modern operating systems.
- Uses RJ-45 connectors compatible with UTP cables.
- Can often support higher speeds (e.g., 100 Mbps or 1 Gbps), allowing for future upgrades.

3. What are the limitations of the technologies you did not choose?

- **Technology:** Thick Ethernet (10Base5)
- **Limitation:**
    - Thick cable, hard install
    - Costly and inflexible
    - Breaks affect all
    - Difficult to modify
- **Technology:** Thin Ethernet (10Base2)
- **Limitation:**
    - Shared cable issues
    - Needs terminators ends
    - Hard to scale
    - Troubleshooting is slow

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