Assignment-2:

[1. Differentiate between types of networks. 2](#_Toc200487258)

[I. Based on network size: 2](#_Toc200487259)

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[2. Define network architecture. Explain types of network architecture with advantages and disadvantages. 3](#_Toc200487261)

[3. Differentiate between connection-oriented and connectionless services. 3](#_Toc200487262)

1. Differentiate between types of networks.
2. Based on network size:

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| **Local Area Network (LAN)** | **Metropolitan Area Network (MAN)** | **Wide Area Network (WAN)** |
| Its coverage area is small (e.g. a room/building). | Its coverage area is medium (e.g. city/campus). | Its coverage area is large (e.g. country/worldwide). |
| Its bandwidth is high as devices are physically close to each other. | Its bandwidth is moderate, less than LAN but more than WAN. | Its bandwidth is low due to large distance and shared infrastructure. |
| It is privately owned and managed. | It may be managed by a private organization or a public authority. | It is owned and managed by public providers/ telecommunication companies. |
| Setup and maintenance cost is low. | Setup and maintenance cost is moderate depending on scale and infrastructure. | Setup and maintenance cost is high due to extensive infrastructure and long-distance transmission. |
| The transmission media used is twisted-pair, co-axial cables or Wi-Fi. | The transmission media used is twisted-pair or fiber optic cable | The transmission media used is fiber optic cables, radio, micro waves or satellite communication. |
| It supports small no. of computers | It supports moderate no. of computers. | It supports large no. of computers. |
| It simple and easy to install/manage. | It is moderately difficult to manage since it requires additional coordination with local authorities/ISPs. | It is complex to manage it requires global coordination and infrastructure management. |
| Latency is very low due to short distances. | Latency is moderate. | Latency is high due to long distances and routing delays. |
| Reliability is high in localized environments. | Reliability is moderate depending on service provider. | Reliability is variable due to redundancy and multiple paths to maintain availability. |
| E.g. Office, home, school networks. | E.g. City-wide ISP, university campus network. | E.g. Internet, multi-national corporate networks. |

1. Based on architecture:

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| **Client-Server Architecture** | **Peer-to-Peer Architecture** |
| End users (clients) access resources from a central computer (server). | All computers(peers) have equal privileges and can act as both client and server. |
| Clients communicate with each other via the server. | Peers can directly communicate with each other. |
| It is easier to back up data due to centralized storage. | It is difficult to back up data since data is distributed in different locations. |
| A dedicated server means overall performance of system is higher. | Overall performance is lower due to absence of a dedicated server. |
| Centralized management makes monitoring and maintenance easier. | Decentralized management can be complex and inconsistent. |
| It is more secure as the central server can enforce access controls and monitor usage. | It is less secure as all peers can access shared resources with equal privilege. |
| It requires a professional administrator to manage the network. | There is no need of a professional administrator as users can manage their own systems. |
| It is more expensive as powerful hardware and special software is required for server. | It is less expensive as it doesn’t need a dedicated server. |
| If server is down, whole network becomes unusable. | If one peer stops working, the network still can be used by other computers. |
| It is better for large-scale networks with many users. | It is better for small-scale networks with less users. |
| Resources like files, printers, and applications are managed and served from the server. | Resources are shared directly between peers without a central controller. |
| Load can be distributed using multiple servers (load balancing). | Network load is not centrally managed and may become uneven. |
| E.g. Web applications, databases. | E.g. File sharing networks (BitTorrent). |

1. Define network architecture. Explain types of network architecture with advantages and disadvantages.
2. Differentiate between connection-oriented and connectionless services.