Network Topology

Understanding the different network topologies is crucial for designing and managing effective network infrastructure.

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Types of Network Topologies

Bus

A single cable connects all devices. Simple but limited bandwidth and prone to failure.

Star

Devices connect to a central hub. Easy to manage and expand, but hub failure disrupts the network.

Ring

Devices connect in a closed loop. High data transmission rate, but failure at one point breaks the entire network.

Mesh

Multiple connections between devices. Redundant paths for high reliability, but complex to install and manage.

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Bus Topology

Cost-Effective

Uses less cable and requires fewer connectors.

Easy to Install

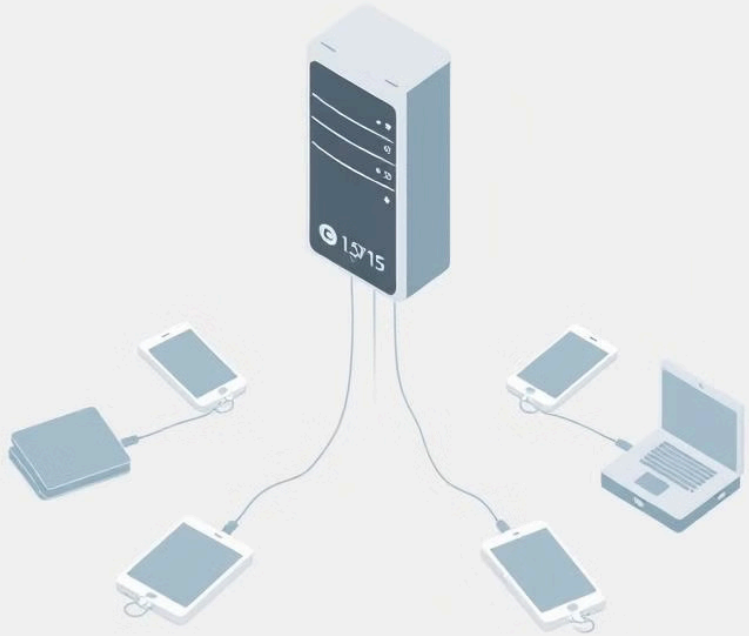
Simple setup with fewer connections to make.

Limited Bandwidth

Single cable restricts data flow.

Single Point of Failure

Cable failure disrupts the entire network.



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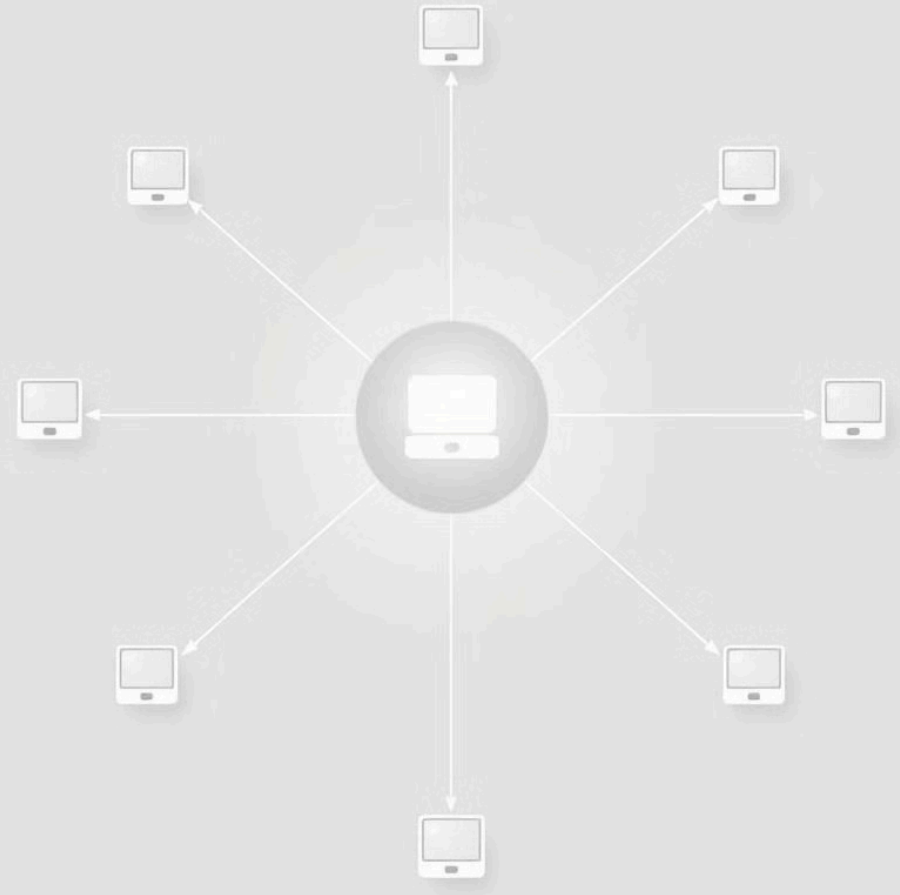

Star Topology

Centralized Control

Easy management and monitoring.

Easy Expansion

Adding new devices is simple.

Single Point of Failure

Hub failure disrupts all connections.

Higher Cost

Requires more cable and a central hub.

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Ring Topology

1. **High Data Rate**

   Data flows smoothly in one direction.

2. **Fault Tolerance**

   Data can be rerouted if one device fails.

3. **Complex Installation**

   Difficult to add or remove devices.

4. **Single Point of Failure**

   Break in the loop disrupts the entire network.

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Mesh Topology

1

High Reliability

Multiple paths ensure data transmission even if a connection fails.

2

Scalability

Can accommodate a large number of devices.

3

High Cost

Requires more cable and complex configuration.

4

Difficult to Manage

Managing multiple connections can be challenging.

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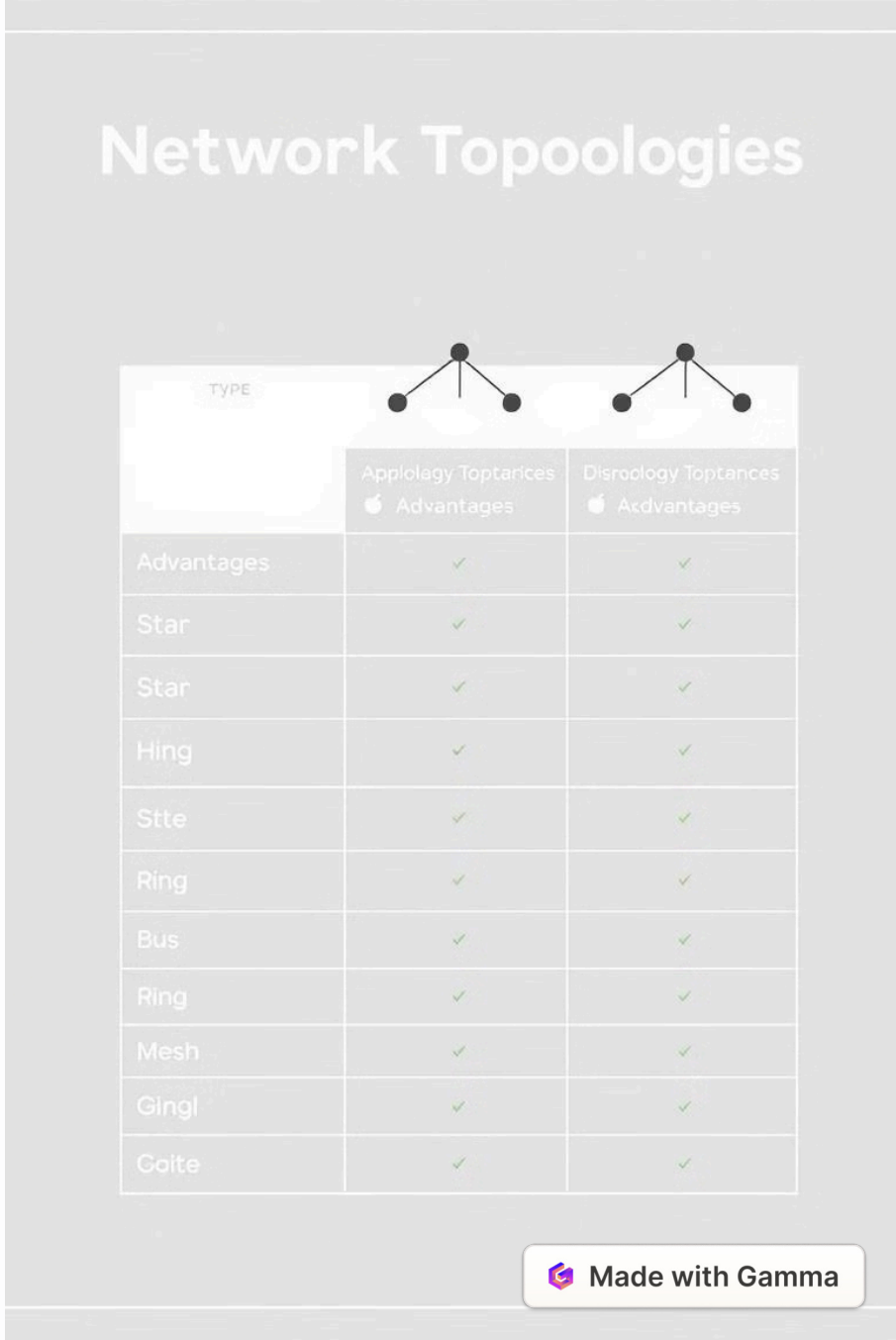
Advantages and Disadvantages of Topologies

Topology	Advantages	Disadvantages
Bus	Cost-effective, easy to install	Limited bandwidth, single point of failure
Star	Easy to manage, scalable	Single point of failure, higher cost
Ring	High data rate, fault tolerant	Complex installation, single point of failure
Mesh	High reliability, scalable	High cost, difficult to manage



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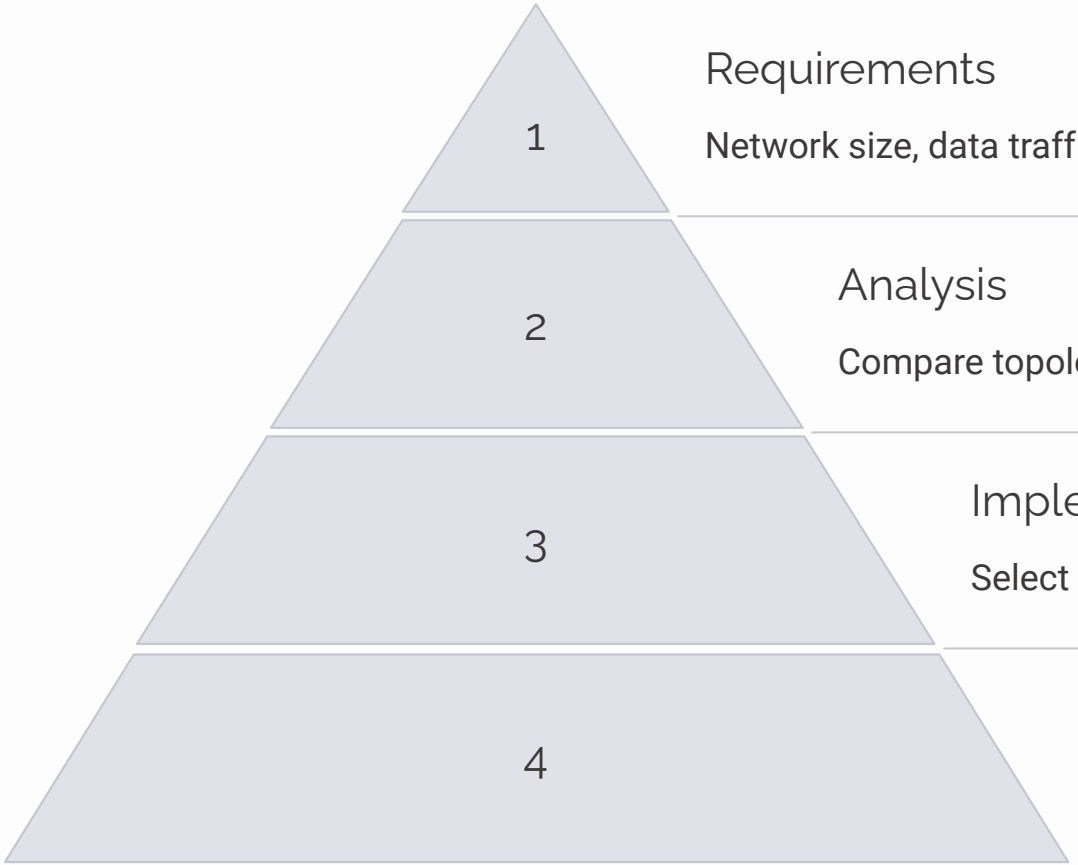
Choosing the Right Network Topology



Requirements

Network size, data traffic, budget, reliability needs.

Analysis

Compare topologies based on requirements.

Implementation

Select the best topology for optimal performance.

Monitoring

Regularly assess and adjust based on changing needs.

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