Semester: V **Subject:** Computer Network **Academic Year:** 2023 - 2024

Right project management & keeping stakeholders informed are key parts of getting your plans right. A network deployment has a lot of moving parts & your plans should account for project milestones. Additionally, if the network will be managed by a different team than those doing the implementation, you'll need a transition plans. If you're responsible for network management going forward, developing a plans for how you'll monitor and maintain the network is important as well.

Top 5 design Practices

1. Integrate security early on
2. Know when to use top-down vs bottom-up
3. Standardize everything
4. Plan for growth
5. Create and maintain network documentation.

Semester: V

4. choose the hardware and software

This step entails identifying the hardware and software you'll use. In some cases, this will happen in parallel with step 3. In others, some of the hardware or software may be specified early in the project. As a rule, selecting the specific hardware & software you'll use after you know what the network needs to do gives you the most flexibility.

During this stage, you'll choose specific cables, racks, network devices, servers, applications, cloud services etc. to make your design a reality. For custom parts or large orders, keep an mind potential supply-chain issues. If you can't get your structured cabling or access switches in time, you can slow down project completion.

5. Plan for implementation & beyond

With your network design & hardware/software selections ready, you can now plan for the implementation and beyond. This step entails creating a plan to deploy, configure, and test the network. In some cases (usually larger networks) this step may include small-scale test deployments to validate the design works before scaling out.

(7).

Semester: V **Subject:** Computer Network **Academic Year:** 2023 - 2024

Top-down Vs bottom-up design

Top-down & bottom-up are two approaches to network design based on the OSI model. With a top-down approach, you start designing your network at the application layer and work your way down the model finishing with the physical layer. The bottom-up design is exactly the opposite.

Top-down is generally considered a better approach when you start with business requirements and work your way down. However, top-down is also often more time-consuming. Bottom-up network design starts with the physical aspects of the networks and works upwards.

As a result, bottom-up can be quicker but can often lead to missed requirements or compromises on desired outcomes, as designing a network from the bottom up locks you into certain outcomes before you get to the application layer where users get work done.

(6).

Semester: V

Hierarchical network design; what are core, distribution, and access layers?

A traditional hierarchical network design is based on the idea of three basic network layers. Each layer handles a separate portion of the data flows on a network. Those layers are:

- Core layer: This is the layer that routes traffic between different geographical sites. In other words, it's the network backbone. The core layer is where high-throughput, expensive core routers shine.
- Distribution layer: This layer sits between the core and access layers. It acts as a boundary and implements network policies to restrict or allow data flows between different subnets within the network. Less expensive routers eg L3 switches are the common workhorses of the distribution layer.
- Access layer:- The access layer is the layer for endpoint devices like user PCs, printers and VoIP phones. Smaller "access switches" are responsible for switching packets and routing traffic at this layer.

in the design process. You need to assess the network's current state before you make any specific design recommendations. At the end of this step, you should understand the network layout, performance, data flows, applications, & services on the network, network security and physical & logical layout.

3. Design your network topology

Once you know your requirements and understand the current state of your network, you can begin blocking out the functional components of your network. During this step, you'll need to consider both the physical & logical aspects of your network. When it comes to physical network design you'll need to address things like:

- Running Copper and fiber cabling
- Number of switch ports required
- Wifi access point positioning
- Rack layout
- Cooling and power.

Logical n/w design deals with:

- IP addressing / subnetting
- VLANs
- Data flows
- Network topology.

Semester: V

Looking back at PPDIOO life cycle model, business requirements align with the prepare stage. This means you should work closely with stakeholders when identifying business requirements.

Once you've detailed the business requirements, it's time to move on to the technical/functional requirements. For example,

- Bandwidth
- Security requirements.
- Specific protocols the project must implement
- RTO/RPO (recovery time objective/recovery point objective) numbers.
- Uptime SLAs (Service Level Agreements).

2. Assess the current state of the network

Chances are, in most networks you're not starting with a clean state. Sometimes that's a good thing that makes life easier, other times it can complicate a project. For example, if all the structured cabling is already in place, that's one less thing to worry about. However, the existing cabling now becomes an issue to deal with.

Whatever the state of the network is, it's important you know early in the design

where the network is in production use. During this stage, monitoring is an important part of validating that the network is working as designed and being able to quickly address issues when it is not.

⇒) Optimize:- At some point in most network's life cycle, tweaks and optimizations are needed. This is the stage where those changes are identified. For major changes, the cycle begins again to plan and implement them.

Designing a network.

1) Identifying the requirements:

Before you begin any network design project, begin by gathering information and developing clear business and technical requirements. Without clearly defined targets, the rest of the design falls apart.

Business requirements help define what you need to do. That means things like:

- Support a new office
- Improve end-user experience
- Cut costs
- Comply with a new regulation
- Improve business continuity

Semester: V

Understanding PPDIOO & Network cycle models.

In the context of network design, a network life cycle model helps explain where and how network design fits into the broader life span of your network's components & overall structure. One of the most popular network life cycle model is Cisco's PPDIOO (Prepare, Plan, Design, Implement, Operate and Optimize) model:

⇒ Prepare: This is where you define high-level requirements and strategy. For eg., your deliverables from this phase may include requirements documentation and current state surveys.

⇒ Plan: This stage deals with specific network requirements based on information gathered in the planning stages.

⇒ Design: During the design stage, the information gathered from the previous two stages is used to create a detailed network design.

⇒ Implement: This is where the work gets done to configure and deploy the network infra structure. There is often testing to validate the design in this phase.

⇒ Operate: This is the portion of the life cycle where

Semester: V **Subject:** Computer Network **Academic Year:** 2023 - 2024

Module: 5.

With networks at the heart of the most modern business, network design can have a major impact on business outcomes. Finding the right balance of network performance, security, redundancy and cost require a unique mix of project management and technical skill.

What is n/w design?

Network design is the practice of planning and designing a communications network. That process starts with identifying business and technical requirements and constraints well just before the network implementation stage (when you actually do the work to deploy and configure what was designed).

Network analysis, IP addressing, hardware selection, and implementation planning are all part of network design.

In simple networks, like those found in most homes and small offices, network design is a straightforward process. In large enterprise networks, the network design process is often very complex and involves multiple stakeholders.