



Vidyavardhini's College of Engineering and Technology

Department of Artificial Intelligence & Data Science

AY: 2025-26

Class:	TE	Semester:	V
Course Code:	CSC501	Course Name:	CN

Name of Student:	SHRUTI GAUCHANDRA
Roll No. :	18
Assignment No.:	05
Title of Assignment:	ENTERPRISE NETWORK DESIGN
Date of Submission:	22/09/25
Date of Correction:	04/10/25

Evaluation

Performance Indicator	Max. Marks	Marks Obtained
Completeness	5	05
Demonstrated Knowledge	3	03
Legibility	2	02
Total	10	10

Performance Indicator	Exceed Expectations (EE)	Meet Expectations (ME)	Below Expectations (BE)
Completeness	5	3-4	1-2
Demonstrated Knowledge Legibility	3	2	1
Legibility	2	1	0

Checked by

Name of Faculty : Mrs. SNEHA YADAV

Signature : 
Date : 04/10/25

CSC501.5

Apply Cisco Service Oriented network model and classic three-layer hierarchical model for Enterprise Network Design.

Q1. A company wants to improve application performance and resource utilization across its enterprise network. Find how the Cisco SONA architecture layers be applied to design an optimized and scalable network infrastructure for this scenario with appropriate design.

- ① The Cisco framework allows customers to build a more intelligent network infrastructure.
- ② A company that wants to improve application performance and resource utilization can adopt the Cisco SONA (Service Oriented Network Architecture) framework.
- ③ The Cisco SONA framework demonstrates building of integrated systems and it also guides the enterprises evolution towards more intelligent networks.
- ④ These framework improves the flexibility and increase efficiency of enterprises.
- ⑤ Architecture:

P.T.O.

- ⑥ The figure shows how integrated systems allow a dynamic, flexible architecture.
- ⑦ It offers operational efficiency.

⑧ Layers of SONA :

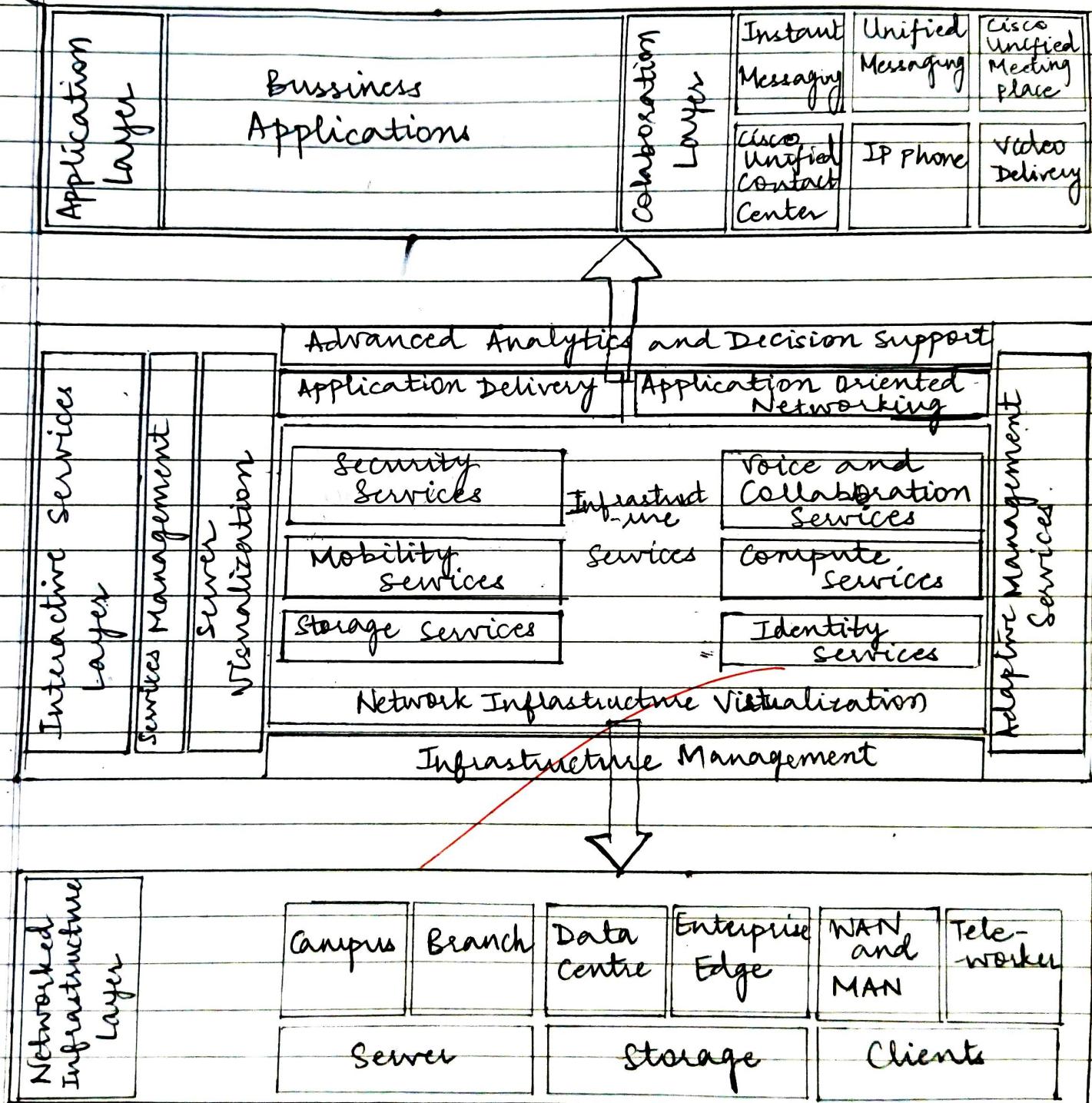
It defines 3 layers:

- (i) Networked Infrastructure layer
- (ii) Interactive services layer
- (iii) Application layer.

(i) Networked infrastructure layer :

- (a) In this, all IT resources are interconnected across a converged network foundation.
- (b) The IT resources contains servers, storage and clients.
- (c) The IT resources exist in different places in the network.
- (d) Different places in the network include the campus, branch, data center, enterprise edge, WAN, MAN and Teleworker etc.
- (e) The main aim of this layer is to provide connectivity, anytime and anywhere.
- (f) This layer contains the network devices, and links to connect servers, storage, and clients in different places in the network.
- (g) Resource utilization is improved by leveraging technologies like virtualization and adaptive bandwidth allocation, ensuring that the network segments handle load efficiently without bottlenecks.

Cisco Service Oriented Network Architecture.



(ii) Interactive services layer:

- ① Interactive services layer includes application networking as well as infrastructure services.
- ② Interactive services layer allows efficient resource allocation to applications and business processes delivered through the networked infrastructure.
- ③ The following are the services included in interactive services layer:
 - ① Mobility services
 - ② Wireless services
 - ③ Voice and collaboration services
 - ④ Storage services
 - ⑤ Compute services
 - ⑥ Network infrastructure visualization
 - ⑦ Adaptive network management services
 - ⑧ High availability
 - ⑨ IP multicast
 - ⑩ Security and identity services.

④ This foundation manages and orchestrates the network services, including service virtualization, device management, analytics and automation.

⑤ With centralized monitoring and performance management tools, network administrators gather insights, thus maintaining optimal performance and resource usage across the network.

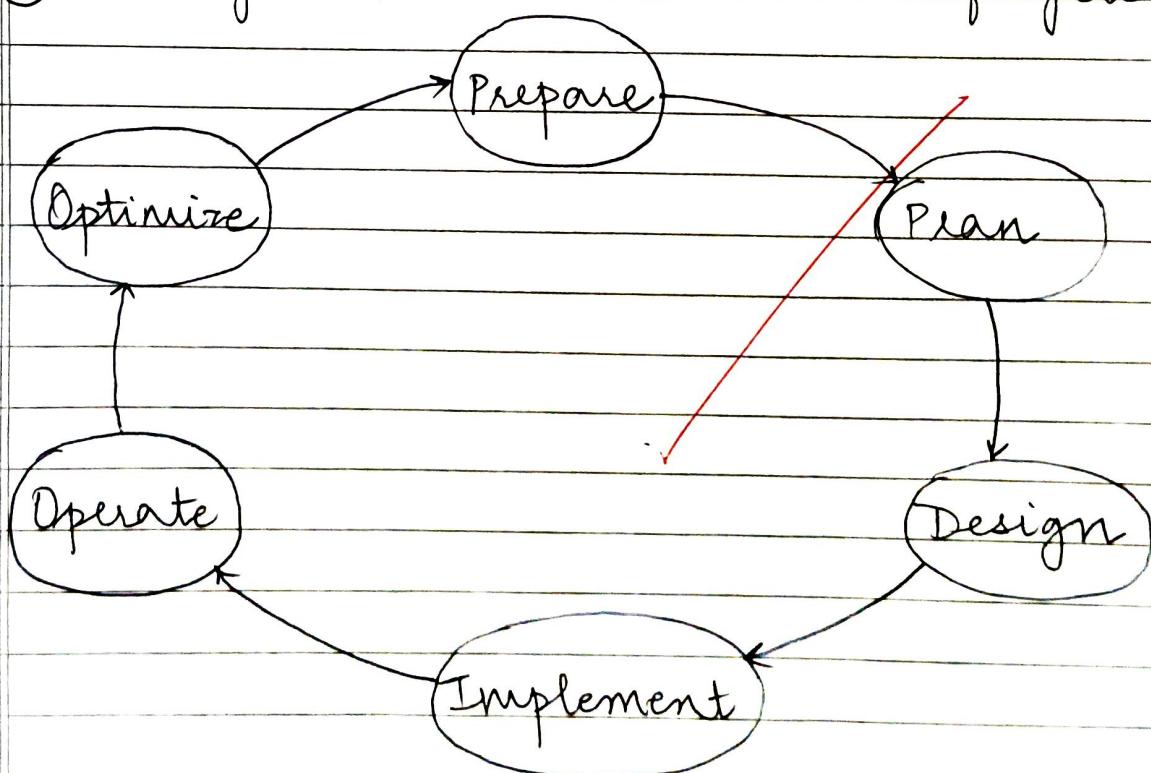
(iii) Application Layer:

- (a) This layer includes business applications as well as collaboration applications.
- (b) This layer meets business requirements and achieves efficiencies by controlling the interactive service layer.
- (c) The collaborative applications included in the application layer are:
 - (1) Instant messaging.
 - (2) Video delivery using Cisco digital media system.
 - (3) IP telephony.
 - (4) Cisco IP communicator & Cisco unified IP phones.
 - (5) Cisco Unified meeting place.
 - (6) Cisco Unified contact centre.
 - (7) Cisco Unity.
- (d) By centralizing applications here, the network can prioritize traffic flows based on business importance.

Q2. A financial institution is modernising its data centre to support growing demands, increased security and improved performance for its real-time transaction processing systems.

Identify the different phases of PPDIOD methodology to ensure that networks are designed, deployed, and maintained in a structured and efficient manner.

- ① The network design methodology is derived from the Cisco Prepare, Plan, Design, Implement, Operate, and Optimize (PPDIO) methodology.
- ② It ensures that networks meet organizational goals and evolve efficiently through structured stages.
- ③ The given is PPDIOD Network Lifecycle.



(i) Prepare phase:

- (a) This phase involves establishment of the business requirements, developing a network strategy and proposing a high-level conceptual architecture, identifying technologies which can support the network architecture.
- (b) Strategy is developed under to assess the business case for the proposed architecture financial justification.

(ii) Plan phase:

- (a) The main function of this phase is to identify the network requirements.
- (b) It identifies the requirements based on the goals for the network, where the network will be installed, required network services so and forth.
- (c) This phase manages the tasks, responsibilities, critical milestones and resources needed to implement the changes to the network.

(iii) Design phase:

- (a) After planning of network requirements, the next phase is design phase.
- (b) The specialists design the network according to planned requirements.
- (c) The designer includes any additional data gathered during network analysis and audit, when updating the existing network.

- (d) The generated network design specification is a complete detailed design that meets the current requirements.
- (e) This includes specifications to support availability, reliability, security, scalability and performance.

(iv) Implement phase:

- (a) Implementation and verification starts from after approving the network design.
- (b) The implementation of network is done according to the design specifications.
- (c) The goal is to integrate devices without disrupting the existing network.

(v) Operate phase:

- (a) Operation is the final test of the correctness of design.
- (b) This phase maintains the network health through day-to-day operations.
- (c) The reactive fault detection and correction as well as performance monitoring takes place in daily operations that provides initial data for the optimise phase.

(vi) Optimize phase:

- (a) This phase is based on the management of proactive network.
- (b) The goal is to identify and resolve issues before the real problems arise & affects the organization.