

SRM VALLIAMMAI ENGINEERING COLLEGE
(An Autonomous Institution)

SRM Nagar, Kattankulathur – 603 203

DEPARTMENT OF
ELECTRONICS AND COMMUNICATION ENGINEERING

QUESTION BANK



VI SEMESTER

PEC604 – SOFTWARE DEFINED NETWORKS

Regulation – 2023

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Prepared by

Dr. G. Udhayakumar, Professor/ ECE



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SUBJECT : PEC604 – SOFTWARE DEFINED NETWORKS

YEAR /SEM: III / VI

UNIT – I INTRODUCTION

History of Software Defined Networks (SDN) – Modern Data Center – Traditional Switch Architecture – Evolution of SDN – Working of SDN – Centralized and Distributed Control and Data Planes

PART – A

Table with 4 columns: Q. No., Questions, BT Level, Competence. Contains 24 rows of questions related to SDN.

PART – B

Table with 4 columns: Q. No., Questions, BT Level, Competence. Header row for Part B.

1	Explain the evolution of Software Defined Networks from traditional networks with a neat architecture diagram.	(13)	BTL3	Applying
2	Apply SDN concepts to compare traditional switch architecture with SDN-based switch architecture.	(13)	BTL3	Applying
3	Examine the working of SDN by separating control and data planes with suitable examples.	(13)	BTL4	Analyzing
4	Explain centralized control in SDN and analyze its advantages and limitations.	(13)	BTL4	Analyzing
5	Illustrate the role of SDN in modern data centers with a functional block diagram.	(13)	BTL3	Applying
6	Apply SDN principles to design a simple network with centralized control.	(13)	BTL3	Applying
7	Inspect the distributed control plane architecture and compare it with centralized SDN control.	(13)	BTL4	Analyzing
8	Explain the need for SDN in large-scale networks with real-time use cases.	(13)	BTL3	Applying
9	Explore how SDN improves network scalability and flexibility.	(13)	BTL4	Analyzing
10	Discuss the evolution of data plane operations in SDN-enabled networks.	(13)	BTL3	Applying
11	Analyze the impact of SDN on network management and configuration.	(13)	BTL4	Analyzing
12	Illustrate SDN architecture to overcome limitations of legacy networks.	(13)	BTL3	Applying
13	Describe the functional components of SDN with suitable diagrams	(13)	BTL3	Applying
14	Investigate the control and data plane interaction in SDN.	(13)	BTL4	Analyzing
15	Apply SDN concepts to implement traffic engineering in data centers.	(13)	BTL4	Analyzing
16	Explain SDN workflow with packet forwarding example.	(13)	BTL3	Applying
17	Assess the challenges faced during SDN adoption in traditional networks.	(13)	BTL4	Analyzing

UNIT – II OPEN FLOW & SDN CONTROLLERS

Open Flow Specification – Drawbacks of Open SDN, SDN via APIs, and SDN via Hypervisor- Based Overlays – SDN via Opening up the Device – SDN Controllers – General Concepts

PART – A

Q. No.	Questions	BT Level	Competence
1.	Define OpenFlow.	BTL1	Remembering

2.	Infer flow table.	BTL1	Remembering
3.	What is meant by a flow entry?	BTL1	Remembering
4.	Define southbound interface.	BTL1	Remembering
5.	Recall SDN controller.	BTL1	Remembering
6.	Name any two SDN controllers.	BTL1	Remembering
7.	What is meant by SDN via APIs?	BTL1	Remembering
8.	Define hypervisor-based overlay.	BTL1	Remembering
9.	What is meant by opening up the device in SDN?	BTL1	Remembering
10.	List two functions of an SDN controller.	BTL2	Understanding
11.	Mention the role of OpenFlow protocol.	BTL2	Understanding
12.	Illustrate match-action operation in OpenFlow.	BTL1	Remembering
13.	How does OpenFlow handle unknown packets?	BTL2	Understanding
14.	Infer controller-switch communication.	BTL1	Remembering
15.	Why is OpenFlow considered a southbound protocol?	BTL2	Understanding
16.	Why are SDN controllers required?	BTL2	Understanding
17.	State the drawbacks of OpenFlow.	BTL2	Understanding
18.	Mention briefly centralized controller concept.	BTL1	Remembering
19.	Differentiate SDN via OpenFlow and SDN via APIs.	BTL2	Understanding
20.	Why does scalability become an issue in SDN controllers?	BTL2	Understanding
21.	List two security issues in OpenFlow.	BTL1	Remembering
22.	Mention two advantages of SDN controllers.	BTL1	Remembering
23.	Assess the term control logic.	BTL1	Remembering
24.	Why are SDN controllers critical in SDN architecture?	BTL2	Understanding

PART – B

Q. No.	Questions		BT Level	Competence
1.	Explain OpenFlow architecture and analyze the role of flow tables.	(13)	BTL 3	Applying
2.	Apply OpenFlow protocol to explain packet processing in SDN switches.	(13)	BTL 3	Applying
3.	Illustrate the drawbacks of OpenFlow-based SDN.	(13)	BTL 4	Analyzing
4.	Discuss SDN via APIs and analyze its advantages over OpenFlow.	(13)	BTL 4	Analyzing
5.	Describe SDN via hypervisor-based overlays in virtualized networks.	(13)	BTL 3	Applying
6.	Examine the concept of opening up the device in SDN.	(13)	BTL 4	Analyzing
7.	Explain the architecture of SDN controllers with examples.	(13)	BTL 3	Applying
8.	Distinguish centralized vs distributed SDN controllers.	(13)	BTL 4	Analyzing
9.	Apply OpenFlow rules to design a simple forwarding application.	(13)	BTL 3	Applying
10.	Evaluate controller scalability issues and solutions.	(13)	BTL 4	Analyzing
11.	Explain southbound interface using OpenFlow protocol.	(13)	BTL 3	Applying
12.	Investigate security issues in OpenFlow-based SDN.	(13)	BTL 4	Analyzing
13.	Discuss about SDN controller concepts for load balancing.	(13)	BTL 3	Applying
14.	Analyze the interaction between SDN controller and switches.	(13)	BTL 4	Analyzing
15.	Explain general concepts of SDN controllers with real-world examples.	(13)	BTL 3	Applying
16.	Examine the performance bottlenecks in SDN controllers.	(13)	BTL4	Analyzing

17.	Describe SDN controller architecture in enterprise networks.	(13)	BTL4	Applying
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UNIT – III SOFTWARE DEFINED NETWORKING

Introduction- Deep Dive (North bound and south bound interface), active network, data and control plane separation abstraction, SDN Open flow prospects and challenges.

Q. No.	Questions	BT Level	Competence
1.	Define northbound interface.	BTL 1	Remembering
2.	Outline the southbound interface.	BTL 1	Remembering
3.	What is meant by abstraction in SDN?	BTL 1	Remembering
4.	State the active networks.	BTL 1	Remembering
5.	Infer network programmability.	BTL 1	Remembering
6.	What is meant by SDN deep dive?	BTL 1	Remembering
7.	Assess the OpenFlow prospects.	BTL 1	Remembering
8.	What is control plane abstraction.	BTL 1	Remembering
9.	Define data plane abstraction.	BTL 1	Remembering
10.	List two challenges of SDN.	BTL 2	Understanding
11.	What are the role of northbound APIs.	BTL 2	Understanding
12.	Briefly the importance of abstraction in SDN.	BTL 1	Remembering
13.	How does SDN enable network automation?	BTL 2	Understanding
14.	Mention the working principle of SDN control logic.	BTL 1	Remembering
15.	Why is separation of planes important in SDN?	BTL 2	Understanding
16.	Describe SDN programmability.	BTL 2	Understanding
17.	Outline SDN deployment challenges.	BTL 1	Remembering
18.	How does SDN improve network visibility?	BTL 2	Understanding
19.	Mention the role of APIs in SDN.	BTL 2	Understanding
20.	Why is SDN suitable for dynamic networks?	BTL 2	Understanding
21.	List two benefits of SDN abstraction.	BTL 2	Understanding
22.	Categorize the two OpenFlow challenges.	BTL 2	Understanding
23.	Why does SDN face scalability issues?	BTL 2	Understanding
24.	Justify SDN as programmable networking.	BTL 2	Understanding

PART – B

Q. No.	Questions		BT Level	Competence
1.	Explain northbound and southbound interfaces with examples.	(13)	BTL 3	Applying
2.	Discuss SDN abstraction concepts to simplify network management.	(13)	BTL 3	Applying
3.	Analyze control and data plane separation in SDN.	(13)	BTL 4	Analyzing
4.	Describe the active networks and their relevance to SDN.	(13)	BTL 3	Applying
5.	Investigate SDN OpenFlow prospects in future networks.	(13)	BTL 4	Analyzing
6.	With help of SDN architecture, implement QoS mechanisms.	(13)	BTL 3	Applying
7.	Inspect the challenges faced by SDN deployment.	(13)	BTL 4	Analyzing

8.	Explain SDN deep dive architecture with diagrams.	(13)	BTL 3	Applying
9.	Briefly explain SDN concepts to traffic monitoring.	(13)	BTL 3	Applying
10.	Discuss about the SDN-based network programmability.	(13)	BTL 4	Analyzing
11.	Explain the abstraction layers in SDN.	(13)	BTL 3	Applying
12.	Explore the challenges of SDN scalability.	(13)	BTL 4	Analyzing
13.	Apply SDN to optimize routing decisions.	(13)	BTL 3	Applying
14.	Explain SDN control logic with use cases.	(13)	BTL 3	Applying
15.	Analyze SDN challenges in real-time applications.	(13)	BTL 4	Analyzing
16.	Apply SDN concepts in enterprise network design.	(13)	BTL 3	Applying
17.	Discuss about SDN prospects and limitations.	(13)	BTL 4	Analyzing

UNIT – IV NETWORK FUNCTION VIRTUALIZATION

Introduction – NFC concepts, Frame work and Architecture – key challenges – high performance packet processing, comparison of NFC and SDN

Q. No.	Questions	BT Level	Competence
1.	Define Network Function Virtualization (NFV).	BTL 1	Remembering
2.	What is a Virtual Network Function	BTL 1	Remembering
3.	State NFV architecture.	BTL 1	Remembering
4.	What is meant by NFV-MANO?	BTL 1	Remembering
5.	Define packet processing.	BTL 1	Remembering
6.	List two objectives of NFV.	BTL 1	Remembering
7.	Define NFV framework.	BTL 1	Remembering
8.	Provide an overview of service chaining in network architecture.	BTL 1	Remembering
9.	Assess virtualization in networking.	BTL 1	Remembering
10.	List two examples of VNFs.	BTL 2	Understanding
11.	Why is NFV required?	BTL 2	Understanding
12.	What are the key components of NFV Reference Architecture?	BTL 1	Remembering
13.	In what ways does NFV reduce hardware dependency?	BTL 2	Understanding
14.	Name the layer in the NFV architecture that provides the physical and virtual resources	BTL 1	Remembering
15.	Differentiate NFV and traditional networking.	BTL 2	Understanding
16.	Mention the role of MANO in NFV.	BTL 2	Understanding
17.	Why is NFV important in cloud networks?	BTL 1	Remembering
18.	Outline the challenges in NFV deployment.	BTL 2	Understanding
19.	How does NFV improve service agility?	BTL 2	Understanding
20.	What are the mechanisms and methods for scaling network functions within an NFV environment?	BTL 2	Understanding
21.	List two NFV challenges.	BTL 2	Understanding
22.	Specify the benefits of NFV.	BTL 2	Understanding
23.	Distinguish the relationship between NFV and SDN.	BTL 2	Understanding
24.	Why is NFV suitable for telecom networks?	BTL 2	Understanding

PART – B

Q. No.	Questions		BT Level	Competence
1.	Explain NFV architecture and framework with diagrams.	(13)	BTL 3	Applying
2.	Discuss the concept of Network Functions Virtualization (NFV) and its impact on networking	(13)	BTL 3	Applying
3.	Explore key challenges in NFV implementation.	(13)	BTL 4	Analyzing
4.	Examine high-performance packet processing techniques.	(13)	BTL 4	Analyzing
5.	Justify how NFV improves network flexibility and scalability	(13)	BTL 4	Analyzing
6.	Evaluate benefits of NFV in telecom networks	(13)	BTL 4	Analyzing
7.	Discuss about NFV management and orchestration.	(13)	BTL 3	Applying
8.	Differentiate between NFV and SDN.	(13)	BTL 3	Applying
9.	Elaborate NFV benefits in cloud environments.	(13)	BTL 3	Applying
10.	Apply NFV concepts to firewall virtualization.	(13)	BTL 3	Applying
11.	Analyze NFV deployment challenges.	(13)	BTL 4	Analyzing
12.	Explain virtual network functions (VNFs).	(13)	BTL 3	Applying
13.	Investigate the performance optimization in NFV.	(13)	BTL 4	Analyzing
14.	Discuss the future trends and applications of NFV in cloud computing	(13)	BTL 3	Applying
15.	Identify and describe the potential security issues arising from NFV deployment	(13)	BTL 4	Analyzing
16.	Describe the components that support NFV framework.	(13)	BTL 3	Applying
17.	Compare and contrast SDN and NFV in terms of functionality and use cases	(13)	BTL 4	Analyzing

UNIT – V DATA CENTER NETWORKING

Introduction – characteristics and Challenges – protocols innovation – network telemetry- server less computing, content distribution in IP networks- Information centric networking

Q. No.	Questions	BT Level	Competence
1.	What is data center networking.	BTL 1	Remembering
2.	Define a data center.	BTL 1	Remembering
3.	State two characteristics of data center networks.	BTL 1	Remembering
4.	What does "network telemetry" mean?	BTL 1	Remembering
5.	Infer serverless computing.	BTL 1	Remembering
6.	Define content distribution network (CDN).	BTL 1	Remembering
7.	Define Information-Centric Networking (ICN).	BTL 1	Remembering
8.	What is meant by Named Data Networking (NDN)?	BTL 1	Remembering
9.	Assess scalability in data centers.	BTL 1	Remembering
10.	List the challenges of data center networking.	BTL 2	Understanding
11.	Specify traffic patterns in data centers.	BTL 2	Understanding
12.	Why is SDN required in data centers?	BTL 2	Understanding
13.	How does telemetry support network monitoring?	BTL 2	Understanding
14.	Briefly outline the key protocol advancements observed in modern data centers.	BTL 2	Understanding
15.	Why is low latency critical in data centers?	BTL 2	Understanding

16.	Mention the benefits of serverless computing.	BTL 2	Understanding
17.	How does SDN improve data center efficiency?	BTL 2	Understanding
18.	What are the ICN advantages over IP networking.	BTL 2	Understanding
19.	Outline content distribution in IP networks.	BTL 1	Remembering
20.	Why are large-scale data centers challenging to manage?	BTL 2	Understanding
21.	Name any two telemetry tools.	BTL 1	Remembering
22.	Mention two benefits of ICN.	BTL 2	Understanding
23.	What are future trends in data center networking.	BTL 1	Remembering
24.	Why is data center networking complex?	BTL 2	Understanding

PART – B

Q. No.	Questions		BT Level	Competence
1.	Explain data center networking architecture and characteristics.	(13)	BTL 3	Applying
2.	Identify and evaluate the significant barriers to efficient data center network operations.	(13)	BTL 4	Analyzing
3.	How can Software-Defined Networking (SDN) be implemented within a data center environment?	(13)	BTL 3	Applying
4.	Explain protocol innovations in data center networks.	(13)	BTL 3	Applying
5.	Examine network telemetry in data centers.	(13)	BTL 4	Analyzing
6.	Explore the feasibility and benefits of implementing serverless computing within an on-premises data center.	(13)	BTL 4	Analyzing
7.	Describe the mechanisms for content distribution within the Internet Protocol infrastructure?	(13)	BTL 3	Applying
8.	Explain the fundamental ideas behind the Information-Centric Networking (ICN) paradigm.	(13)	BTL 3	Applying
9.	Compare and contrast the benefits of Information-Centric Networking (ICN) with those of traditional IP-based networks	(13)	BTL 4	Analyzing
10.	How do network administrators use SDN to manage and optimize data center traffic flows?	(13)	BTL 3	Applying
11.	Explore scalability issues in data center networks.	(13)	BTL 4	Analyzing
12.	Discuss the key problems and issues associated with managing large data center facilities	(13)	BTL 4	Analyzing
13.	Evaluate the effectiveness of telemetry-based monitoring systems.	(13)	BTL 4	Analyzing
14.	Analyze the integration of SDN and NFV in data center networking.	(13)	BTL 4	Analyzing
15.	Can you describe the layout and connectivity of a modern data center network.	(13)	BTL 3	Applying
16.	Explore the future trends in data center networking.	(13)	BTL 4	Analyzing
17.	Apply ICN concepts to content delivery networks.	(13)	BTL 3	Applying