

Chapter 7: Multimedia and Future Networking

Introduction

- **Multimedia- Definitions**
 - Any kind of system that supports more than one kind of media
 - Multimedia means integration of continuous media (e.g. audio, video) and discrete media (e.g. text graphics , images) through which digital information can be conveyed to the user in appropriate way.

1

2

Multimedia Applications

- Multimedia plays major role in following areas
 - Business
 - Advertisements
 - Training materials
 - Presentations
 - Customer support services
 - Entertainment
 - Interactive Games
 - Enabling Technology
 - Accessibility to web based materials
 - Teaching-learning disabled children & adults
 - Fine Arts & Humanities
 - Museum tours
 - Art exhibitions
 - Presentations of literature

3

SCTP(Stream Control Transmission Protocol)

- It is a computer networking Communications protocol which operates at the transport layer
- It serves similar role of TCP and UDP
 - It is message oriented like UDP and provides reliable, in sequence transport of message like UDP
- It differs by providing multi-homing and redundant paths to increase reliability

4

- SCTP offers following services to its users
 - Acknowledged error-free non-duplicated transfer of user data
 - Data fragmentation
 - Sequenced delivery of user data
 - Optional bundling of multiple user messages into a single SCTP packet.
 - Network-level fault tolerance through supporting of multi-homing at either or both ends

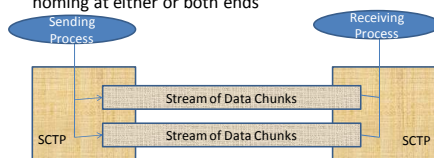


Fig: SCTP

5

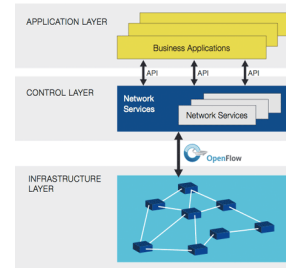
SDN (Software Defined Network)

- SDN is a new modularized network architecture that separates the control plane from the data plane.
- SDN is changing the way networks are designed and handled.
- SDN is an evolutionary approach to network design and functionality based on the ability to programmatically modify the behavior of network devices.
- SDN is the future of network technology that will change the way that network engineers and designers build and operate their networks to achieve business requirements.

- SDN enables networks to become open standards, nonproprietary, and easy to program and manage.
- SDN will give enterprises and carriers more control of their networks, allow them to tailor and to optimize their networks to reduce the overall cost of keeping the network.
- OpenFlow is the first and most dominant standard communication interface for SDN.
- OpenFlow protocol is a standardized interface that enables flow tables in switches and routers to be programmed.
- OpenFlow protocol allows separation of the control plane and the forwarding plane.

7

SDN Architecture



8

- In traditional network, the application layer contains network applications or functions like IDS, load balancer or firewalls whereas in SDN it consist of application that uses controller to manage data plane behavior
- The Control layer is the brain of SDN
 - It resides on server and manages policies and the flow of traffic
- The infrastructure layer is made of the physical switches in the network.
- The three layers communicate using respective northbound and southbound API.
 - Eg., Applications talk to controller through northbound interfaces while controller and switch communicate using southbound interface such as openflow

9

Benefits of SDN

- Network management Simplicity
- Fast service deployment
- Automated configuration
- Network Virtualization
- Reducing the operational expense

10

SDN Control and Data Plane

- Control Plane
 - Makes decision about where to send data traffic
 - Its functions includes system configuration, management and exchange of routing table information
 - Control plane packets are destined to or locally originated by router itself
 - The route controller exchange the topology information with other routers and construct a routing table based on routing protocols
 - Control plane packets are processed by the router to update the routing table information

11

- Data Plane
 - Also known as forwarding plane
 - Forwards traffic to the next hop according to control plane logic
 - Data plane packets go through the router
 - The routers/switches use what the control plane built to dispose of incoming and outgoing frames and packets

12

NFV(Network Function Virtualization)

- NFV provides a new way to create, distribute and operate networking services
- NFV allows network operators to manage and expand their network capabilities
- It makes easier to load-balance, scale up and down, and move functions across distributed hardware resources.
- It is the process of decoupling the network functions from proprietary hardware appliances.
 - These functions (such as firewall, deep packet inspection, intrusion prevention) become virtual network function(VNF)

13

• Differences between SDN and NFV

- The basic Concepts
 - SDN separates control and data plane
 - NFV transfers network functions from dedicated appliances to generic servers
- Area of Operation
 - SDN operates in campus, data centers and cloud environment
 - NFV targets the service provider network
- Initial Application Target
 - SDN software targets cloud
 - NFV targets routers, firewall, gateways, WAN,CDN
- Protocols
 - SDN- Open Networking Foundation (ONF)
 - NFV- None

14

NGN

Introduction

- packet-based network
- QoS-enabled transport technologies
- independent of the underlying transport related technologies.
- It enables unfettered access for users to networks and to competing service providers and services of their choice.
- It supports generalized mobility

15

Characteristics

- packet-based transfer
- decoupling of service provision from transport
- support for a wide range of services
 - real time, streaming, non-real time and multimedia
- generalized mobility
- interworking with legacy networks via open interfaces
- unrestricted access by users to different service providers
- converged services between fixed/mobile

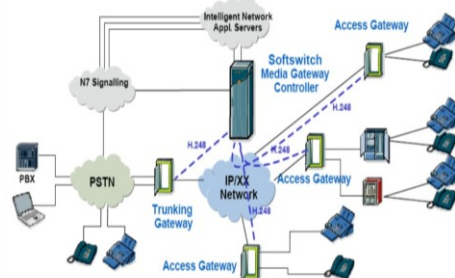
16

• Applications of NGN

- Voice telephone services
- Multimedia services
- Data services
- Content delivery services
- Global mobility services
- VPN Services
- Broadcasting/Multicasting services
- E-Commerce
- Machine to machine communication
- Session Controller based internet services

17

NGN Elements



Source: ITU/BDT NGN Network Architecture

NGN Layers

- Access layer elements includes different Media Gateways that support connection to and from the access network with the core network.
- Core layer is the network handling converged services based on IP.
- Control layer is the call server that provides call control functions and also provides the control of the Media Gateway.
- Service layer is an IT platform that plays the role of an IN-SCE (Intelligent Network Service Creation Environment) extending their functionality in order

Thank you!!!!