IPv6 Readiness Assessment Document

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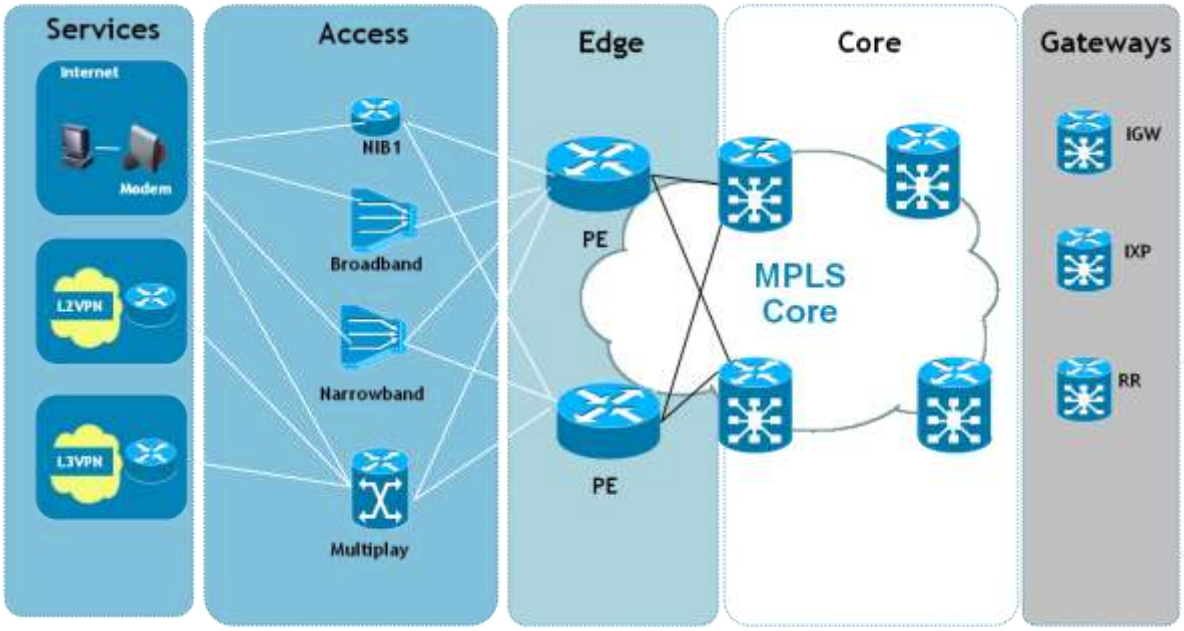
1. IPv6 Readiness Assessment

The main objective of the below questionnaire is to gather information on the existing status of the various network scenarios in a Service Provider Domain and ensure the customer readiness for implementation and migration to IPv6

1.1 IPv4 & IPv6 Plan

Items	Category	Question	Answer
1	IPv4 Address	IPv4 Address Block - public and private	
		% used and available IPv4 Address for Allocation	
		Infrastructure (bearer, signaling, OAM)	
		End users (mobiles, datacards etc.)	
		Any tactical plan for IPv4 preservation?	
2	IPv6 Address	Have you applied for IPv6 block for end users/ subscribers	
		Have you applied for IPv6 block for infrastructure (Micro allocation)	
		Any IPv6 planning done so far, if yes provide details	
		IPv6 Address Block - Global Unicast and Multicast	
		Any Existing IPv6 Addressing Schema	
		IPv6 Addressing Requirements	
		IPv6 Address Block advertised to Internet	
3	IPv6 service	Any IPv6 service currently offered?	
		Any market research study for IPv6 end users service requirement	
		IPv6 service prioritization (dual stack, native IPv6)	

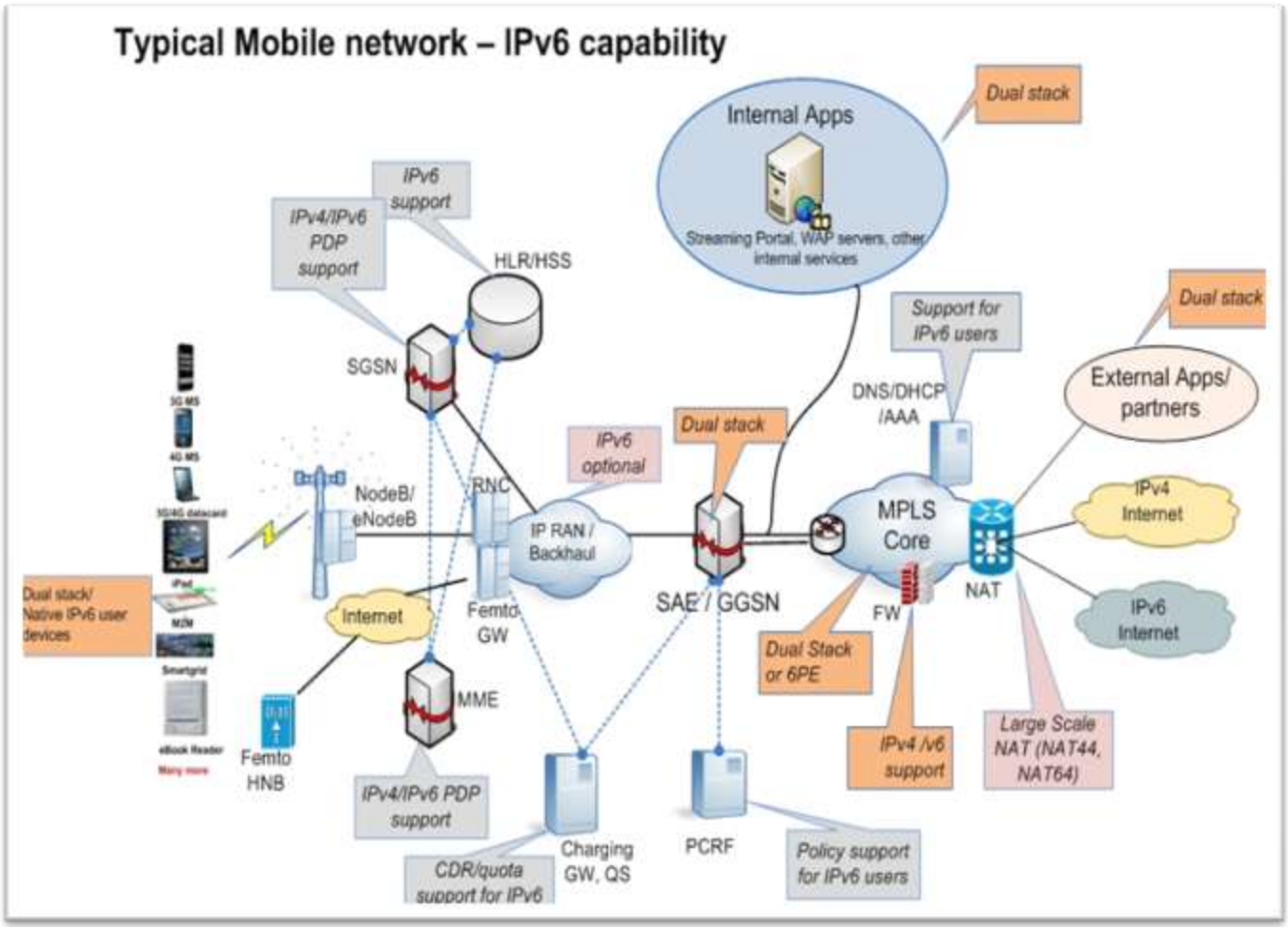
1.2 MPLS Core


Services
Internet
Modem
L2VPN
L3VPN
Access
NIB1
Broadband
Narrowband
Multiplay
Edge
PE
PE
Core
MPLS
Core
Gateways
IGW
IXP
RR

Items	Category	Question	Answer
1	NETWORK INFRASTRUCTUI	Vendor (specify details of all vendor equipments)	
		Hardware Platform - PE, P routers	
		Software Version - PE, P routers	
		IPv6 Capability (Hardware and Software)	
2	PHYSICAL TOPOLOGY	Devices in the Core and Edge (Existing BOM)	
		Detailed Physical Connectivity (Link Type)	
		Underlying Physical Network like SDH, Ethernet, L2 Aggregation, etc.	
		PE-CE connectivity scenarios (Leased Line, MetroE Rings, DSL, etc)	
4	ROUTING PROTOCOLS - IG	What is IGP implementation in MPLS core. IPv4/ IPv6	
		Detailed IGP Design (Security, Convergence, Areas, Throttling)	
5	BGP	BGP Design Details - RR, IBGP, EBGP and Upstream Peering	
		BGP IPv6 AFI (6PE)	
		Any IPv6 Internet Peering (National or International)	
6	MPLS & VPN	MPLS Design	
		PE-CE Protocols Deployed	
		MPLS TE Design - Link or Node Protection	
		L2 VPN or L3 VPN	
		BGP MPLS IPv6 L3 VPN (6VPE)	
		IPv4 & IPv6 IPsec based L3 VPN	
		VPN Deployment Model (Hub & Spoke)	
		MPLS ISP Peering Details for Inter-AS VPN or CSC services	
		Global or Unique Local IPv6 Addresses for VPN customers	
		CPEs Internet Access Requirements (IPv6 Proxy or Global Address or NAT)	
		MPLS DiffServ QoS Details for IPv4 and IPv6	

Items	Category	Question	Answer
7	SERVICES	Existing Service Portfolio	
		Existing Traffic Profiles and Applications	
		IPv6 Services	
		IPv6 Transition Mechanism	
		IPv4 QoS Design	
		IPv6 QoS Rquirements	
		IPv6 Multicast Requirements	
		IPv6 Multicast Addressing Scheme	
		Managed or Unmanaged CPEs	
		Dedicated or Dual-stacked CPE Link for IPv6 Services	
		Network Security (TACACS, RADIUS)	
		Infrastructure Security (CoPP, uRPF, RTBH, Access Lists, Limit MAC Table Size, etc.)	
		Network Management (Netflow, Syslog, SNMP, NTP, etc.)	
		Any Specific Service Requirements (Performance, SLA, QoS, etc.)	

1.3 Mobile Network Architecture Topology



1.3.1 Mobile Packet Core (GGSN, P/S Gateway, SGSN/MME)

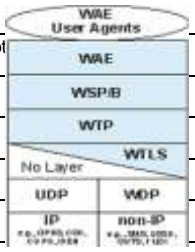
Items	Category	Question	Answer
	What is the existing mobile technology u	3GPP (GPRS/UMTS) or 3GPP2 (CDMA) ? 2.5G, 3G, or combination ?	
1	GGSN	Vendor	
		Hardware platform	
		Software version (Rel8 or prior)	
		IPv6 capability/roadmap	
2	SGSN	Vendor	
		Hardware platform	
		Software version (Rel8 or prior)	
		IPv6 capability	
3	P/S-GW	Vendor	
		Hardware platform	
		Software version (Rel8)	
		IPv6 support for S11, S5, S8, Sgi, S1-U	
4	MME	Vendor	
		Hardware platform	
		Software version (Rel8)	
		IPv6 support for S11 , S1-C	
5	Mobile IP address	IP address assignment for each APN	
		Local pool (GGSN maintain the local pool)	
		AAA (GGSN use AAA for authentication & IP address allocation)	
		DHCP (GGSN send HDCP query for IP address)	
		Statically assigned at the UE	
		Allocated from HLR/HSS	
6	APN & IPv6 requirement	Broadband Datacards	
		Mobile handset	
		iPhone, Blackberry	
		Enterprise APN	
7	Mobile/PDA UE	Vendor (List all vendors)	
		Type of phones (Models)	
		Supported PDP Types (IPv4 only, IPv4v6, IPv6 only)	
		Simultaneous V4 & V6 PDP support	

Items	Category	Question	Answer
8	Datacards	Vendor (List all vendors)	
		Software version (Rel8)	
		Supported PDP Types (IPv4 only, IPv4v6, IPv6 only)	
		Simultaneous V4 & V6 PDP support	
9	VRF	VRF configuration on Gi or SGi	
10	Load balancer	Any load balancer used in GGSN for load balancing	
11	Roaming	Roaming partners and IPv6 readiness	
		Is local breakout capability is used	
12	Deep Packet Inspection	Policy Control Enforcement Function (PCEF) implementation	
		Internal & external PCEF?	
		Layer-7 protocols for PCEF	
13	Performance	Total sessions per APN	
		Impact of dual stack on number session	
14	Charging Release	What 3GPP charging release enabled on mobile gateways	
15	PDP Type	What are the PDP types planned to be used ? IPv4, IPv6, IPv4v6	
16	Blackberry/Enterprise users	Any enterprise customers with/without IPsec used ?	
		Enterprise server IPv6 capability ?	
17	Ane backend database servers ?	Vendor	
		Hardware platform	
		Software version	
		IPv6 capability/roadmap	

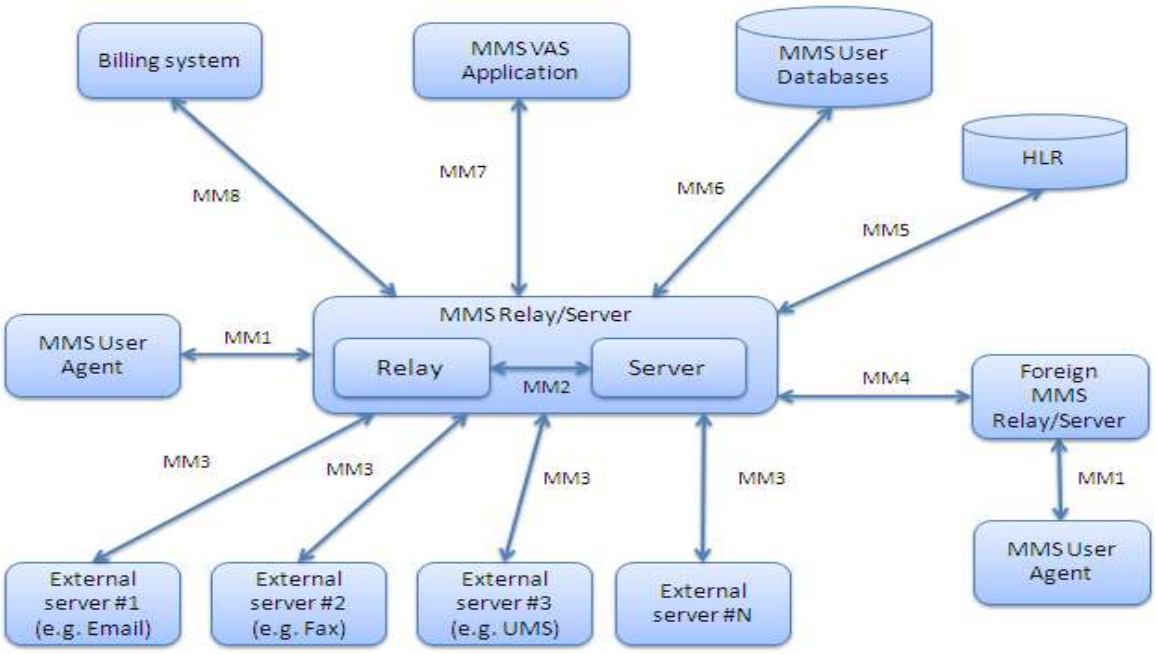
1.4 Application Platform

Items	Category	Question	Answer
1	DNS	Vendor	
		Hardware platform	
		Software version	
		DNS64 capability/roadmap	
		Interworking of A & AAAA functionality	
2	DHCP (if use	Vendor	
		Hardware platform	
		Software version	
		IPv6 capability/roadmap	
		is DHCPv6 planned to be used ?	
3	Policy (PCRF)	Vendor	
		Hardware platform	
		Software version	
		IPv6 support on Gy	
		IPv6 support on Gx	
4	PCEF	Policy Control Enforcement Platform (PCEF) vendor	
		Hardware platform	
		External/ internal PCEF	
		IPv6 support at Gx	
5	AAA	Vendor	
		Hardware platform	
		Software version	
		IPv6 capability/roadmap	
		capability to understand account records with IPv6 address	
6	HLR	Vendor	
		Hardware platform	
		Software version	
		IPv6 capability/roadmap	
		Is HLR/HSS authentication used and IPv6 awareness of HLR/HSS	
7	Billing	Vendor	
		Hardware platform	
		Software version	
		IPv6 capability/roadmap	
		what is the currently running 3GPP charging version	
		Any proprietary CDRs/TLVs used ? If so, please share details	
8	Quota Server	Vendor	
		Hardware platform	
		Software version	
		IPv6 capability/roadmap	
		capability to handle prepaid users with IPv4, IPv6 addresses	
		Any local redirect webpage when the quota is exhausted ?	

Items	Category	Question	Answer
1	WAP	Wireless Access Platform (WAP) vendor	
		Hardware platform	
		Software release and IPv6 readiness on different prot	
		Wireless datagram Protocol	
		Wireless Transection protocol	
		Wireless session protocol	
		Wireless Application environment	
		WAP Version - WAP 1.X, WAP2.0	
		WAP AAAA DNS query support	
		IPv6 charging support (WAP to billing collector)	
2	MMSC	Multimedia Messaging System vendor	
		Hardware platform	
		Software capability to handle Multimedia message with IPv6 header	
		IPv6 support on different interfaces	
3	VMS	Visual Voice Mail vendor	
		Hardware platform	
		Software capability - handling visual voice mail message with IPv6 header	
		IPv6 transport and Application layer support	
4	Lawful Intercept	Hardware vendor	
		Software capability for IPv6	
5	Data Accelerator	Is Data accelerator used?. Centralized or distributed (with mobile gateway)	
		Hardware vendor	
		Hardware platform	
		IPv6 transport and Application layer support	



Items	Category	Question	Answer
6	Moile/Streaming Video	Application server vendor	
		Hardware platform	
		Software release and IPv6 readiness on different protocols	
		IPv6 charging support	
		Support of TCP/UDP over IPv6 in the server	
7	Any other internal services/portals offe	Live Camera, MAPs, local news, music audio (List all)	
		IPv6 capability ?	
		How is the charging done for these services ?	
8	Prepaid users quota replenish website	IPv6 transport capability ?	



1.5 Broadband

Items	Category	Question	Answer
1	Network Infrastructure	e2e Touch points covering all the Vendor elements (specify details of all vendor equipments)	
		Hardware Platform - RG/CPE , DSLAM , BRAS , Transport (UPE/Agg/Core),	
		Software Version - PE, P routers	
		IPv6 Capability (Hardware and Software)	
2	Physical Topology	Devices in the Existing Broadband Setup covering all the e2e touch points (Existing BOM)	
		Detailed Physical Connectivity (Link Type)	
		Underlying Physical Network like Ethernet, L2 Aggregation,L3 Aggregation,ATM Aggregation etc.	
		BRAS connectivity (UNI-towards users/NNI--towards internet/network)	
4	Services	Current Residential Services Offered (HSI, IPTV,VoD,VoIP etc)	
		Top-up services/On-Deamand/Hot-Spot/Value Add services ??	
		Each Service detail Topology covering all the touch points	
		Service Models (1:1 , N:1 VLAN)	
5	RG/CPE	RG/CPE modes of operation (Routed , Bridged , Hybrid)	
		Physical Connectivity (UNI-Ethernet , WiFi) (NNI -DSL,Ethernet , PON , DOCSIS)	
		NAT Functionality (NAT44 etc)	
		QoS Capabilities (Policers,Queuing Models etc)	
6	BRAS/BNG	Deployment Model (LAC , LNS , PTA , LTS , ISG --L2 Agg , L3 Agg , ATM-AGG)	
		Centralized or Distributed	
		HW Capabilities (HW based , CPU based)	
		Redundancy (Hot-Standby or Load-sharing)	
		Subscriber Facing Interface (Ethernet , Sub-interface , ATM etc)	
		PPP/IP Session	
		PPP Encapsulations (PPPoE , PPPoATM , PPPoEoVLAN , PPPoEoQinQ)	
		IP Encapsulations (IPoE over Ethernet , IPoEoVLAN , IPoEoqinq)	
		QoS Capabilities (Policers,Queuing Models ,x Level HQoS , PQ's etc)	
		IP Address Assignment (via Radius , DHCP etc)	
		Public Address Assigned or Private	

Items	Category	Question	Answer
7	AAA	Authentication Type (Radius/Local , CHAP/PAP)	
		Local Address Pool or downloaded	
		Radius Server Type (CAR , Merit , Livingstone etc)	
		Radius Attributes currently used	
		DHCP Server	
		Accounting	
8	Billing / Policy/DB Serve	Centralized or Distributed Billing	
		Billing Server details (vendor , HW , SW , Capabilities)	
		LDAP server (user policy details)	
		Policy Engine Details	
		Mediation Server details	
		Web Portal Details	
		Data Base server details	
9	Transport	CPE to BRAS Transport (Layer 2 , ATM , IP , MPLS)	
		Dual-Stack enabled on the edge devices	
		All vendors N/W elements existing BoM (including HW / SW)	
		Tunneling capabilities	
		Translation Capabilities (NAT44 , NAT444 etc)	

1.6 RAN (Radio Access Network)

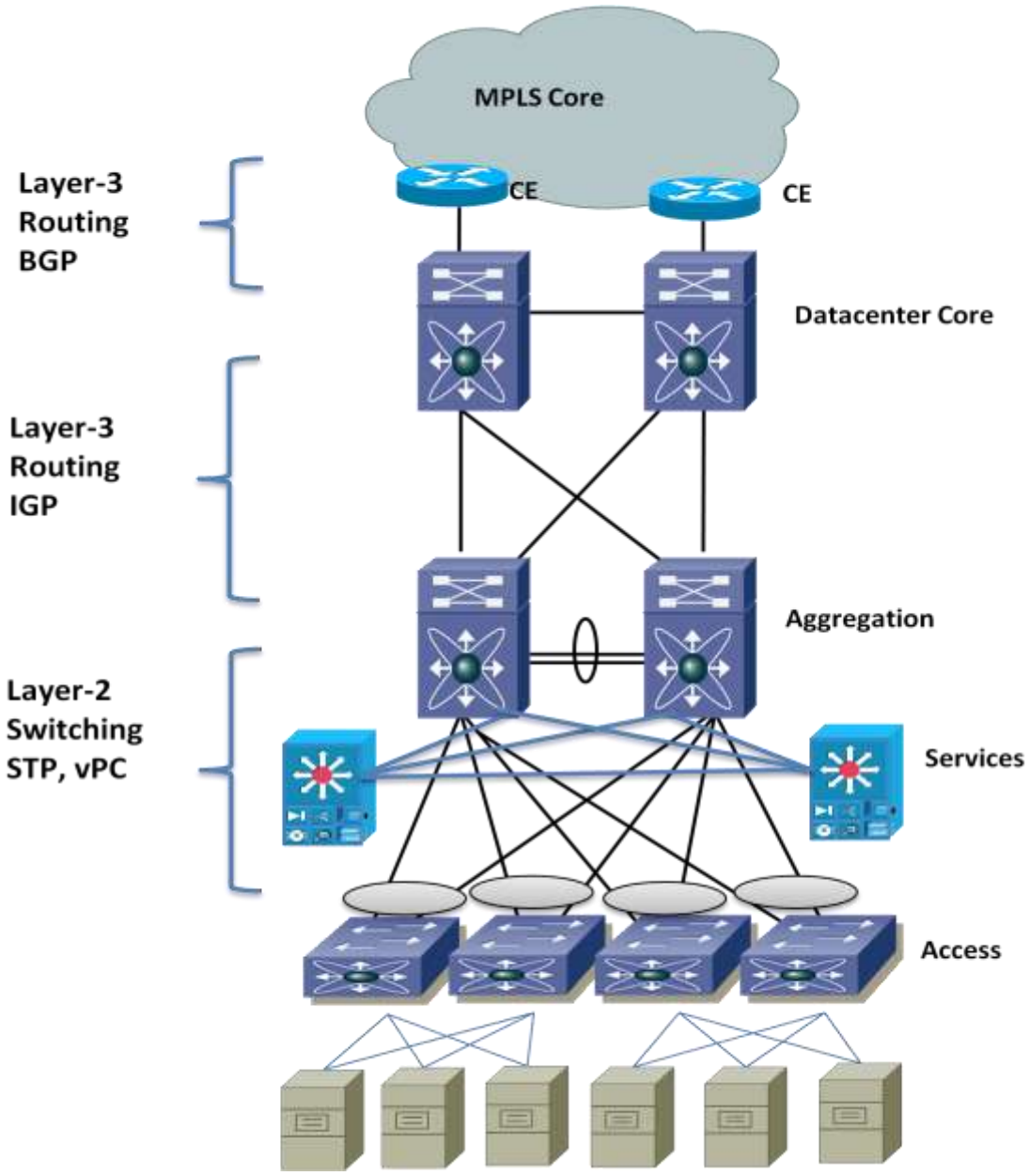
Items	Category	Question	Answer
1	RAN variations	What are different types of RAN backhaul (Ethernet, Microwave, DSL, E1, Pseudowire)	
2	IP Plan	Existing IPv4 Plan and usage summary in IP RAN (Public or private)	
		VLAN/subnet from each NodeB to aggregation sites and RNC (OAM and Bearer+signalling)	
3	QoS implementati	Existing QoS mechanism implemented in RAN -Classification, marking, queuing/policing	
		Bandwidth per RNC (~800 mbps or higher)	
		DSCP marking based on QCI (eNodeB) and queuing mechanism to route packets	
4	Routing	Is there any routing in IP-RAN or point to point connectivity	
		Is there plan for implementing dual-stack in IP-RAN	

1.7 VOIP_SBC

Items	Category	Question	Answer
1	SBC	Vendor	
		Hardware platform	
		Software version	
		IPv6 capability/roadmap	
		BHCA supported	
		IPv4 NAT implementation	
		Voice/video/VOD functions	
		Number of edge devices controlled	
		SBC package details	
2	IMS	Vendor	
		Hardware platform	
		Software version	
		IPv6 capability/roadmap	
		Access to internet	
		IP address details	
3	Voice Gateway	Vendor	
		Hardware platform	
		Software version	
		IPv6 capability/roadmap	
		SIP trunk details	
		Other voice trunk details	
		IP addressing scheme	
4	Video/VOD	Vendor	
		Hardware platform	
		Software version	
		IPv6 capability/roadmap	

1.8 Datacenter

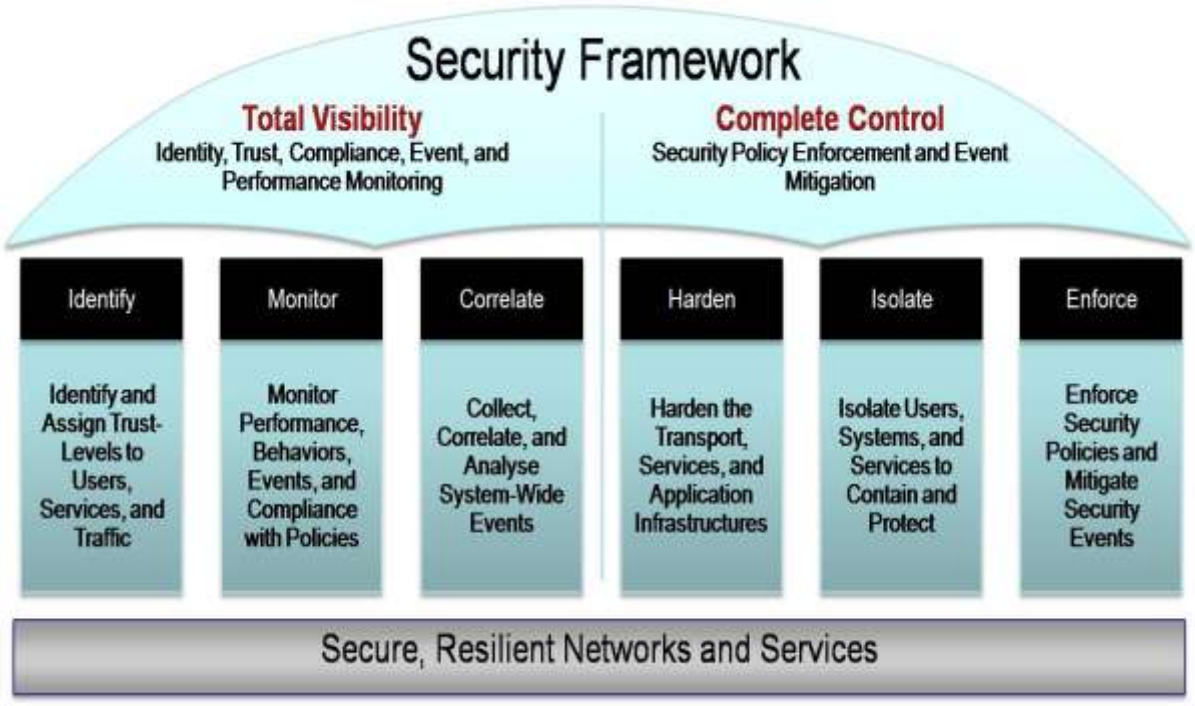
Building Block Architecture



Items	Category	Question	Answer
1	Load Balancer	Vendor	
		Hardware platform	
		Software version	
		IPv6 capability/roadmap	
		Virtual Loadbalancer implementation	
		Number of vip address	
		Number of servers	
		Number of server private IP address subnets	
		Server probes details	
2	Layer 2 switches details	Vendor	
		Hardware platform	
		Software version	
		IPv6 capability/roadmap for management access	
		Number of vlans	
		IPv6 support for layer-2 protocols - STP, vPC, HSRP, VRRP etc.	
3	Layer 3 protocols	Routing protocls used in the datacenter (OSPF, ISIS etc.)	
		IPv6 support for routing protocols	
		VRF configuration - IPv6 capability inside VRF's	
		IPv6 capability/roadmap	
		Virtual Device Contexts (VDC)	
4	SAN switch details	Vendor	
		Hardware platform	
		Software version	
		IPv6 capability/roadmap	
		FcOE roadmap	
		ISCSI based storage like netapp	
5	Datacenter interconnect	Data center interconnect details between Primary Data Center and Backup Data Center	
		Geo-location Application load balancing (DNS, AAA, any other mobile Apps)	
		Routed or switched DCI details	

1.9 NAT-PAT Security

Items	Category	Question	Answer
1	security architecture	Number of firewalls and multiple inspection points	
		SP infrastructure security from end user devices	
		SP infrastructure security from internet, external partners	
		Implementation of SP security framework	



Security techniques used in following area
Identity
Monitor
Correlate
Harden
Isloate
Enforce

Items	Category	Question	Answer
1	Firewall	Vendor	
		Hardware platform	
		Software version	
		IPv6 capability/roadmap	
		Virtual Firewall implementation	
		Number of NAT/PAT	
		Number of public address	
		Number of private address	
		DMZ details	
		Inside interface	
		Outside interface	
		Firewall Management	
		L2 vs L3	
2	Application Layer Gateway (ALG)	Vendor	
		Hardware platform	
		Software version	
		IPv6 capability/roadmap	
		Applications inspected	
		Policy enforced	

Items	Category	Question	Answer
3	Content Filtering	Vendor	
		Hardware platform	
		Software version	
		IPv6 capability/roadmap	
		Filetering based customer subnets	
		Government regulation	
4	Caching/proxy	Vendor	
		Hardware platform	
		Software version	
		IPv6 capability/roadmap	
5	DDOS Mitigation	Vendor	
		Hardware platform	
		Software version	
		IPv6 capability/roadmap	
6	Internet Firewall	Vendor	
		Hardware platform	
		Software version	
		IPv6 capability/roadmap	
7	Large Scale NAT	Vendor	
		Hardware platform	
		Software version	
		IPv6 capability/roadmap	
		IPv4 public address pool size	
		NAT/PAT performed	
		NAT 44 implemented	
		What is plan for NAT64 - stateless NAT64 or stateful NAT64?	

1.10 Network Management

Items	Category	Question	Answer
1	NMS framework	NMS Framework - How different NMS elements (IP-RAN, packet core, MPLS core etc inter-connected)	
		IPv6 support for NMS elements from different vendors	
		Implementation of FCAPS model	
2	Syslog server	Vendor	
		Hardware platform	
		Software version	
		IPv6 capability/roadmap	
		Number of SNMP devices	
		SNMP version	
3	Configuration storage	Vendor	
		Hardware platform	
		Software version	
		IPv6 capability/roadmap	
		Devices managed	
		TFTP details	
4	Remedy ticketing syst	Vendor	
		Hardware platform	
		Software version	
		IPv6 capability/roadmap	

Items	Category	Question	Answer
5	Change DB	Vendor	
		Hardware platform	
		Software version	
		IPv6 capability/roadmap	
6	Element/Device Mana	Vendor	
		Hardware platform	
		Software version	
		IPv6 capability/roadmap	
		Number of Device manager	
		Super manager	
7	SNMP Manager	Vendor	
		Hardware platform	
		Software version	
		IPv6 capability/roadmap	