

## Annexure 10–Scope of Work

### A. Project Scope

Bank has requirement of Network Routers. Bank will award the contract to the successful bidder and the bidder should deliver the service with the scope as briefed below:

#### 1. Detailed Scope of work :

The brief scope of Work of the successful bidder is to Supply, Commission, Installation, Configuration and Maintenance of Network Router. The services covered as part of the vendor includes, but not limited to the following:

- Supply, Installation & Maintenance of Network Routers as per Bank's requirement with coordination of Bank's identified teams at Bank's identified location.
- The Network Routers should be supplied with 3 years OEM comprehensive Onsite Warranty and 2 years OEM comprehensive Onsite AMC for both hardware and software (24x7 support).
- Bank reserves the right to shift the Network Router to new location/s services will continue to be in force at the new location.
- The Successful bidder should have support for a minimum period of 5 years from the date of announcement of end of sale/end of life.
- The successful bidder shall co-ordinate with Bank's identified team to support for configuration issues, hardware replacement etc.
- The successful bidder will configure, install, de-install, re-install, re-configure (in case Bank need any configure change) at no extra cost during the entire contract period.
- Supply, commission, install, test, configure, integrate with existing system and maintain the Network Router and add on components, which are approved by the bank.
- Break-fix support of supplied Network Router and OS/ firmware upgrades for the appliance.
- The successful bidder shall provide patches/ upgrades of OS/ firmware during warranty and AMC period without any extra cost to Bank. The successful bidder will provide timely proactive deployment of latest firmware versions / security patches in coordination with Bank's identified team.
- The resolution/replacement time for any issue shall be 4 hours. There should be 24x7x365 support for any technical issue for all the supplied products through this RFP directly from the OEM and the bidder.
- Bank shall freeze installation setup, configuration and schedule in mutual consultation with the successful bidder and Bank's identified teams.
- Confidentiality of the Bank's setup must be maintained by successful bidder.
- Engineer from successful bidder must have adequate knowledge for handling the installation, configuration and support & services for supplied hardware.
- Successful bidder need to provide complete call logging details along with escalation matrix.
- The successful bidder need to specify various infrastructure requirements which need to be provided for commissioning and smooth functioning of the equipment.
- If any services, functions or responsibilities are not specifically described in this scope but are an inherent, necessary or customary part of the services and are required for proper performance or provision of the services in accordance with the scope, they shall be deemed to be included within the scope of the services, as if such services, functions or responsibilities were specifically required and described in this scope and shall be provided by the bidder at no additional cost to the Bank.

- After installation the successful bidder need to provide ~~OEM authorized certification~~/training to Bank's identified people, regarding installation, configuration, operation, basic troubleshooting etc as per Bank's requirement by **OEM certified trainer**.
- Successful Bidder is expected to provide post installation support to the Bank. The successful bidder will provide the assistance whenever required. Warranty and AMC support will be provided by the successful bidder.
- Successful Bidder should provide the complete documentation including technical, operations, user manual, etc.
- Following documents should be delivered by the Successful Bidder to the Bank including user manuals, installation manuals, operation manuals, design documents, process documents, technical manuals, technical specification, system configuration documents, debugging/diagnostics documents etc

The proposed Network Router should be in the form of hardware box and should comply with technical specification given below. If the make and model proposed by the Successful bidder do not comply with technical specification given below for Network Router, the Successful vendor would have deemed not to be meeting the Technical requirements hence will be disqualified in technical bid evaluation.

#### Technical Specification for Network Router

Proposed Make: ..... Proposed Model:.....

SN	Description	Bidder's Compliance (Yes/No)	If yes, detail description how the solution/component would be compliant
<b>1</b>	<b>Router Hardware</b>		
a.	The router should be modular in architecture with a services-based hardware architecture		
b.	Should have redundant power supplies		
c.	Should have individual dedicated control plane processor and data plane processor module.		
d.	Control plane Processor should have support for internal memory to support multiple software images for backup purposes and future scalability.		
e.	Control Plane Processor should have 8GB of DRAM from day-1 which can be scalable upto 64GB on Motherboard		
f.	Control plane Processor should have a support to perform the following control processor functions:		
	- building L2 & L3 forwarding information tables.		
	- Support to allow for centralized configuration of router including services like stateful firewall etc.		
	- Support for negotiating and maintaining IPsec authentication, encryption methods, and encryption keys.		
	- Load the software image onto installed modules		
g.	The Data Plane Processor should have the following functions		

	- MAC classification & Layer 2 and Layer 3 forwarding,		
	- QoS classification, policing and shaping		
	- Security access control lists (ACLs),		
	- Support for VPNs and load balancing,		
	- Support flow-export mechanism		
h.	The Data Plane Processor should additionally support the following functions & can be enabled using appropriate software licences only if required, without the need for additional hardware		
	- Firewall.		
	- Network Address Translation (NAT)		
i.	The Data Plane Processor should support the following performance specifications:		
j.	Router should have an integrated auxiliary, console & 10/100 management interface, in addition it should support a standard USB interface to allow for software image & configuration portability.		
k.	Should be standard network rack mountable. All necessary accessories for mounting the router in the standard network rack should be part of the deliverable		
l.	Should have status and health LEDs to diagnose system status on device.		
m.	Should be a single chassis solution		
n.	Modules & Power supplies should be hot swappable without the need of powering down the chassis during replacement.		
o.	Router should have at least 2 Line Card Slots		
<b>2</b>	<b>Router Performance</b>		
a.	Router should have a dedicated data plane Processor, independent of the control plane Processor, capable of supporting 45Mpps forwarding rate and at least 100Gbps throughputs.		
b.	Support for at least 1 Million IPv4 routes and 1 Million IPv6 routes		
c.	Support for 100K multicast routes and 44K groups		
<b>3</b>	<b>High Availability</b>		
a.	The router architecture should have two independent operating system processes to run side by side on the same kernel in hot-standby mode, each in its own protected memory space. Consequently, the router should support for a feature which can offer substantial high availability support for a compact routing solution. Active and standby images are not required to be the same (neither the same image nor from the same release).		
b.	Support Fast software Upgrades while the router is in service		

c.	Support Stateful failover between software images with no loss of L2/L3 tables		
d.	Support Non-Stop Forwarding support to ensure data forwarding during software switch-over or upgrade		
e.	Should have support for modular software images, so that each software process runs independent of the other thus allowing for higher stability. Should also support online upgrade of patches for specific processes without affecting traffic forwarding operations on the router.		
<b>4</b>	<b>Physical Interfaces Support</b>		
a.	Should support the following interfaces: Fast Ethernet and Gigabit Ethernet, 10Gigabit Ethernet , 40Gig and 100Gig Interfaces on the System		
b.	All the above ports should be in compliance with 802.3 standards		
c.	Should be capable of supporting 802.1q VLANs and VLAN trunking.		
d.	Should support port aggregation for higher bandwidth and redundancy.		
e.	The Gigabit Ethernet port should support multimode and single mode fiber connectivity		
f.	The router should support wide variety of interfaces including nx64, V.35, E1, E3 and STM-1 and Ethernet 10Mbps to 10Gbps WAN interfaces		
g.	Modules should support online insertion and removal (OIR)		
<b>5</b>	<b>Layer 3 Routing Protocols</b>		
a.	The router must support the IPv4 and IPv6 stack in hardware and software. It must support both IPv4 and IPv6 routing domains separately and concurrently. It must also support the ability to bridge between IPv4 and IPv6 routing domains.		
b.	The router must support RIPv1 & RIPv2, OSPF, BGPv4 and IS-IS routing protocol.		
<b>6</b>	<b>IPv6 Support</b>		
a.	Should support IP version 6 in hardware.		
b.	Should support IPv6 static route, OSPFv3, IS-IS support for IPv6, Multiprotocol BGP extensions for IPv6, IPv6 route redistribution.		
c.	The router shall support dual stack IPv6 on all interfaces and IPv6 over IPv4 tunnelling, IPv6 Multicast protocols – Ipv6 MLD, PIM-Sparse Mode, and PIM – SSM, IPv6 Security Functions – ACL, IPv6 Firewall, SSH over IPv6, MPLS Support for IPv6 - IPv6 VPN over MPLS (6VPE) Inter-AS options, IPv6 VPN over MPLS (6VPE), IPv6 transport over MPLS (6PE)		
d.	The router should support for IPv6 Multicast.		

e.	Should support IPv6 Quality of Service		
f.	Should perform IPv6 transport over IPv4 network (6 to 4 tunnelling).		
g.	Should support SNMP over IPv6 for management.		
h.	<b>Device must be compatible with IPv6 and can be used for IPv6 without any additional licenses/ software</b>		
<b>7</b>	<b>Quality of Service</b>		
a.	Should support multilevel hierarchical queuing, which includes traffic classification; two-rate, three-color policing		
b.	Should have RSVP		
c.	The router should have IP precedence and also able to configure classes of service		
d.	Should be able support accounting based on IP precedence		
e.	Support for Flexible number of queues per interface		
f.	The router should have ingress and egress Committed Access Rate (CAR) features.		
g.	Support for at least three levels of hierarchy		
h.	Should be possible to configure CAR based on IP precedence, TCP port number or by application flow		
i.	The router should have congestion management techniques like RED and WRED		
j.	The router should support wide variety of queueing technologies like WRED, LLQ etc		
k.	Support for 64 Kbps policing / queueing granularity.		
<b>8</b>	<b>Security</b>		
a.	The router should have multiple level of privileges and authentication for user access, along with SSH support for secured device access		
b.	Should Support MACSEC on Ethernet Ports		
c.	Should support RADIUS and TACACS+ for AAA		
d.	The software should support Network Address Translation (NAT)		
e.	Should have source and destinations based ACLs, time based ACLs, VLAN.		
f.	Should support HMAC authentication for routing protocols		
g.	Support for packet filtering and firewall functionality		
h.	The router should support IPSec encryption for data confidentiality.		
i.	The router should support 3DES and AES encryption standards		
j.	Should support protection against anti-replay attacks & perform Unicast Reverse Path Forwarding.		
k.	The Data Plane Processor should support the following performance specifications:		

l.	Should have support for firewall (Firewall is not required from day 1). Should support upto 95Gbps Firewall throughput with upto 6000000 Firewall Sessions and 8000000 NAT Sessions.		
m.	Should have the capability to support at least 15 Gbps IPSEC and 8000 IPSEC tunnels from day 1 (internal / external).		
<b>9</b>	<b>Management Features</b>		
a.	The router should support in-band and out of band management		
b.	Should be possible to boot the router from a remote system		
c.	Should have SNMP v1 , v2 and v3 support		
d.	Should support Telnet client functionality		
e.	Should support TFTP for downloading software		
f.	The router should be able to support multiple images for smoother upgradation		
g.	Should support online and extensive debugging features		
h.	Should support fine grained data collection including detail traffic statistics by protocol and IP address.		
<b>10</b>	<b>Interface (Minimum Requirement to be populated from Day 1)</b>		
a.	2 x 40G QSFP ports ( <b>Both ports should be populated with Multi-Mode SFP (Fiber) along with transreceivers from Day 1</b> )		
b.	24 x 1000 Base-T ports ( <b>Port should support 10/100/1000 Mbps and both optical &amp; copper transceivers. 24 Copper Transceivers are to be provided on Day 1</b> )		
c.	10 x 10G SFP+ ports ( <b>Port should support 1/10 Gbps and both optical &amp; copper transceivers. On day 1 there should be 5 copper transceiver and 5 MM fiber transceiver provided</b> )		
d.	4-x Serial T1 Ports		
e.	8-x Channelized T1/E1 Ports		
f.	one free slots for future scalability		
<b>11</b>	<b>Certification</b>		
a	Router OS should be at least EAL2 (Common Criteria) or above or NDPP Certified.		
<b>12</b>	<b>SDN Support capability</b>		
a.	The router should have a capability to interoperate with any SDN architecture		
b.	The router should have multiple protocol support on SDN other than openflow, like NETConf, REST etc.,		
<b>13</b>	<b>Support</b>		
a.	The proactive support services should be available where Bank can get break fix support within 4 Hr from		

	call logging (24 x 7 x 365) replacement of the faulty component		
b.	Uptime of individual device should be maintained minimum 99.99%		
c.	Quarterly proactive maintenance / patch upgradation to be done by the Successful bidder.		
d.	Successful bidder shall track and update the OS/Patches/Software/Firmware/Signatures/Patterns etc in the devices as and when new updates / upgrades / advisory of new OS/Patches/Software/Firmware/Signatures/Patterns etc. are released by Original Equipment manufacturer (OEM) or competent authority or competent organization or Client during the validity of the contract period. Updates/upgrades of OS / Patches / Software/ Firmware / Signatures/Patterns etc. from OEM shall be reviewed as per Bank's IT Infrastructure and applied.		
e.	Successful bidder should have Operational and technical advice services which should include Working with the Customer, the assigned team takes an active role in providing advice and guidance regarding the routine delivery of the Customer's critical IT services and the running of service management processes and technology related to the covered environment. This service feature is intended to provide brief guidance only to Customers.		