

Response to consolidated list of pre-bid queries - EOI no. NPCI/EOI/2024-25/01 dated 30.04.2024 - Expression of Interest (EOI) for identifying Hardware Platform agnostic Network Operating System (NOS) Solution

Sr. No	Document Reference	Page No.	Clause No.	Description in RFP	Clarification Sought	Additional Comments	NPCI Response
1	EOI for NOS Solution	37	4	IPv4/IPv6 routing: Static, IS-IS, IS-IS-MT, OSPF	<p>ISIS is mostly used by Service Providers as their IGP.</p> <p>BGP/OSPF is preferred in EVPN/VxLAN as IGP .</p> <p>Request NPCI to remove ISIS or have it as optional.</p>		While these are mandatory requirements, the bidders are requested to respond with best possible solution fulfilling required technical specifications as per EOI and the same will be evaluated as part of technical evaluation to decide the next course of action
2	EOI for NOS Solution	37	4	BGP (iBGP, eBGP, L3VPN, LS-SPF, LSVR underlay PIC Edge, next hop tracking, 4-byte ASN, BGP Aggregate...), VRF support.	<p>LS-SPF, LS-VR, PIC Edge are generally not required for enterprise EVPN/VXLAN deployments.</p> <p>Request NPCI to remove them or have it as optional</p>		While these are mandatory requirements, the bidders are requested to respond with best possible solution fulfilling required technical specifications as per EOI and the same will be evaluated as part of technical evaluation to decide the next course of action
3	EOI for NOS Solution	37	4	IPv4 over IPv6 and IPv6 over IPv4	<p>Our NOS "Enterprise SONiC" supports Dual Stack of IPv4/v6 natively and hence tunnelling will not be required in the DC.</p> <p>Request NPCI to remove them or have it as optional.</p>		While these are mandatory requirements, the bidders are requested to respond with best possible solution fulfilling required technical specifications as per EOI and the same will be evaluated as part of technical evaluation to decide the next course of action

4	EOI for NOS Solution	37	6	EVPN/MPLS	1) Modern Datacentres deploy VXLAN with EVPN to achieve L3VPN over a IP based network in a CLOS architecture without need of MPLS.		While these are mandatory requirements, the bidders are requested to respond with best possible solution fulfilling required technical specifications as per EOI and the same will be evaluated as part of technical evaluation to decide the next course of action
5	EOI for NOS Solution	37	6	L3VPN over SRv6	EVPN/VxLAN interops with different HW & NOS, so provides better and deterministic interoperability. Request NPCI to remove L3VPN over MPLS or have it as optional. 2. Modern DC's are built with 100G/400G Leaf-Spine CLOS architecture where a leaf connects to all the spines thereby eliminating the need for Traffic Engineering within a DC.		While these are mandatory requirements, the bidders are requested to respond with best possible solution fulfilling required technical specifications as per EOI and the same will be evaluated as part of technical evaluation to decide the next course of action
6	EOI for NOS Solution	37	6	L3VPN over MPLS	Request NPCI to remove L3VPN over SRv6 or have it as optional.		While these are mandatory requirements, the bidders are requested to respond with best possible solution fulfilling required technical specifications as per EOI and the same will be evaluated as part of technical evaluation to decide the next course of action
7	EOI for NOS Solution	37	7	Process restart ability (support for BGP, RIB, FIB, IS-IS, OSPF, RPOL)	Enterprise SONiC supports commonly used routing protocols like BGP and OSPF. Request to remove ISIS and RPOL	Process restart ability (support for BGP, RIB, FIB, OSPF)	While these are mandatory requirements, the bidders are requested to respond with best possible solution fulfilling required technical specifications as per EOI and the same will be evaluated as part of technical evaluation to decide the next course of action

8	EOI for NOS Solution	37	7	Maintenance Mode (BGP, IS-IS, OSPF)	Enterprise SONiC supports commonly used routing protocols like BGP and OSPF. Request to remove IS-IS	Maintenance Mode (BGP, OSPF)	While these are mandatory requirements, the bidders are requested to respond with best possible solution fulfilling required technical specifications as per EOI and the same will be evaluated as part of technical evaluation to decide the next course of action
9	EOI for NOS Solution	37	8	BGP Flow spec	BGP Flowspec is more of a WAN related feature and used when Large number of BGP neighbours are used to handle DDoS attacks. In DC, the same is done with Policy Based Routing. Any specific use-case for BGP Flowspec in NPCI?		While these are mandatory requirements, the bidders are requested to respond with best possible solution fulfilling required technical specifications as per EOI and the same will be evaluated as part of technical evaluation to decide the next course of action
10	EOI for NOS Solution	37	10	Streaming platform: Kafka	gNMI/Telegraf provides streaming telemetry and is widely deployed with 3rd party tools. Request NPCI to consider GNMI based Telemetry or Kafka		Kafka preferred
11	EOI for NOS Solution	37	12	PTP/1588 • T-BC, T-TC	PTP is generally used in telecom networks. Request NPCI to remove or make it optional.		While these are mandatory requirements, the bidders are requested to respond with best possible solution fulfilling required technical specifications as per EOI and the same will be evaluated as part of technical evaluation to decide the next course of action

12	EOI for NOS Solution				While we are okay to all terms and conditions, however the timelines are too very stringent, and we request your reconsideration on the same please.		Please refer Corrigendum 2 - Corrigendum 2 - EOI for identifying Hardware Platform agnostic Network Operating System (NOS) Solution
13	Annexure J	33	3	Understanding of NPCI network design, Scalability, Interoperability with existing network solution, roadmap for seamless SDN implementation, Security compliance	Need more details in terms of 1. Network Protocols used in design 2. Existing Hardware's for interoperability check with the SW 3. Security compliance 4. SDN architecture, what is SDN controller and methodology of communication between SDN controller and NOS 5. More details on Seamless SDN Implementation		Should be part of Phase-II
14	Annexure L	37	11	Timing/Synchronization	In a data centre network, Clock can be received over NTP as well and hence request to pls remove from Leaf Switch		While these are mandatory requirements, the bidders are requested to respond with best possible solution fulfilling required technical specifications as per EOI and the same will be evaluated as part of technical evaluation to decide the next course of action
15	Annexure L	37	10	Programmable Framework	Netconf/Openconfig can equally work same as RESTAPI and RESTCONF and hence request to pls make RESTAPI and RESTCONF optional		While these are mandatory requirements, the bidders are requested to respond with best possible solution fulfilling required technical specifications as per EOI and the same will be evaluated as part of technical evaluation to decide the next course of action

16	Annexure L	37	6	Resiliency- NSF	ECMP can be used in a Data Centre Network and hence NSF can be Optional		While these are mandatory requirements, the bidders are requested to respond with best possible solution fulfilling required technical specifications as per EOI and the same will be evaluated as part of technical evaluation to decide the next course of action
17	Annexure L	37	6	Resiliency- RSU	During the Upgradation, Image is first copied in to memory and then installed. Pls confirm if this is the understanding		While these are mandatory requirements, the bidders are requested to respond with best possible solution fulfilling required technical specifications as per EOI and the same will be evaluated as part of technical evaluation to decide the next course of action
18	Annexure L	37	5	Overlay/VPN Features - L3VPN over SRv6	There are chipset limitations with SRv6 and hence Interop will be challenge for some of the use cases and hence request to pls change this to SR MPLS/MPLS		While these are mandatory requirements, the bidders are requested to respond with best possible solution fulfilling required technical specifications as per EOI and the same will be evaluated as part of technical evaluation to decide the next course of action
19	EOI Schedule	6	6	Last date & time for bid submission	As this is important bid and lots of documentation required, within 7 days it is not possible. Request you to increase by a week till 21st May 2024.		Bid submission extended till 21-May-24, refer corrigendum 2 published on NPCI website
20	Important note	3			Is there any EMD amount relaxation to MSME registered companies?		EMD amount is applicable to MSME

21	Chapter 5	11	5.2B.2	Eligibility Criteria for Bidders	request to give fair chance to every participant and change the turnover clause from 60 crores to 15 crores because one company might be at growing stage at that moment or please consider group turnover.		No change in EOI clause
22	Annexure K	35	3	Service Level Agreement	part replacement time for RMA should be one business day instead of 4 hrs.		Non-Negotiable
23	EOI for NOS Solution	6	Notice Inviting Expression of Interest & Corrigendum-1	NPCI invites proposals from NOS suppliers who have experience in supplying, implementing, and supporting Hardware Platform agnostic Network Operating System (NOS) solution. NOS software should have the capability to work across • Multiple processor vendors • Multiple processor types • Multiple ODM members	Request to amend the clause as NPCI invites proposals from NOS suppliers, Supplier i.e. bidder or its OEM have experience in supplying, implementing, and supporting Hardware Platform agnostic Network Operating System (NOS) solution. NOS software should have the capability to work across • Multiple processor vendors • Multiple processor types • Multiple ODM members.		As clarified in the pre-bid meeting.
24	EOI for NOS Solution		Additional Query		Silicon One be part of the roadmap of the software solution?		As clarified in the pre-bid meeting.
25	EOI for NOS Solution		Additional Query	Control Plane Scale	Are they any scalability requirements along these parameters e.g. IPv4 and IPv6 routes, Control Plane convergence time, HW Programming time and HW Programming rate.		Please refer in Corrigendum 1

26	EOI for NOS Solution	37	ANNEXURE I	Broad network hardware configuration:	We have observed two different types of Leaf switches in the topology diagram. However, in Annexure L, only one type of Leaf switch is mentioned. We require clarification regarding this Leaf switches.	it's two different SFP's. 10/25 and 40/100. Same leaf switch should accommodate both.
27	EOI for NOS Solution	37	ANNEXURE I	Broad network hardware configuration:	We require clarification regarding the specifications for Spine and Super Spine, as outlined in Annexure L. It states that both Spine and Super Spine require 32 ports of 100/400G. We seek further clarity on the interface speeds designated for Spine and Super Spine	Partner can propose additional model for Spine, Super Spine. Border leaf and leaf
					NOS Type: Should the NOS be Community Version (with attendant risks) or can be vendor developed based on Open Source ?	optional
					NOS (Network Operating System) Usage: Based on Architecture diagram in Pg9 & Leaf - Spine HW config requirement in pg 37, The NOS fitment is for Enterprise Datacentre, but based on the feature ask, few features asked are for WAN. Pls clarify whether the NOS is for DC Use Case or WAN?	both
					Secure Zero Touch Provisioning: Does NPCI require Secure Zero Touch Provisioning of the Fabric during deployment or Manual Provisioning is preferred?	ZTP mandatory

<p>Production Implementations: Does the NOS that is to be supplied need to be validated as Production deployment in reasonable number of large customers base (Atleast 50+)</p>		<p>not required</p>
<p>NOS Development: What is the expectation of minimum number of Development NOS Engineers and associated support system from the NOS vendor?</p>		<p>query more relevant for Phase-II</p>
<p>NOS Deployment: What is the minimum scale for switches in NPCI environment that is sought over a year of deployment?</p>		<p>query more relevant for Phase-II</p>
<p>NOS Code Security: What is NPCI's expectation on Code Security Hardening process from the NOS vendor? Does NPCI require NOS to be Vulnerability Assessed before General Release of the Code and is there an expectation of regular Vulnerability Assessment, periodically using standard VAPT tools?</p>		<p>CIS benchmarks and 100% security clearance</p>

<p>Validation: How Does NPCI Plan to perform HW and feature Validation with multiple HWs?</p> <ol style="list-style-type: none"> 1. Does NPCI expect same to be tested in NPCI Labs? 2. NOS Supplier to perform Validation of NOS features with Different Open Networking Hardware and do self certification? 3. NOS Supplier to Perform Testing of the HW against new features on same NOS periodically? 		<p>testing with min. two hardware in NPCI lab setup</p>
<p>Security Vulnerability Fix: What is NPCI's view on regular Security Vulnerability Assessment from the NOS supplier?</p>		<p>100% security clearance</p>
<p>New Feature Availability: How does NPCI want to handle new feature, new version requirement (New Features could be NPCI special ask or introduced via community, testing/validation)? Periodicity and the Process - NPCI expects NOS vendor to follow.</p>		<p>yes</p>
<p>Support Structure: Does NPCI need single point of contact for HW & NOS Support or Separate, and how will different HW support/service level agreements be owned up?</p>		<p>single point of contact</p>

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EOI for NOS Solution

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Open source (Linux preferred)

					3rd Party Security Certification: Does NPCI need NOS to be 3rd party security certified (Like EAL, USGv6, FIPS 140-2, Common Criteria)? Is this a mandatory need, considering the financial setup that NPCI runs?		yes
					3rd Party Tools Validation & Integration: Does the NOS need to be validated with 3rd Party Tools in terms of Life Cycle Management?		Yes
					Cable & Optics Validation for NOS: Does NOS vendor need to own & validate Cable & Optics for different HW vendors as this is traditionally a HW OEM domain?		yes/ open specs preferred
				IPv4/IPv6 routing: Static, IS-IS, IS-IS-MT, OSPF	ISIS is used by Service Providers as their IGP, while BGP is widely preferred and used for EVPN/VxLAN for both underlay and overlay preferred. Request NPCI to share ISIS use case for clarity		While these are mandatory requirements, the bidders are requested to respond with best possible solution fulfilling required technical specifications as per EOI and the same will be evaluated as part of technical evaluation to decide the next course of action
				BGP (iBGP, eBGP, L3VPN, LS-SPF, LSVR underlay PIC Edge, next hop tracking, 4-byte ASN, BGP Aggregate...), VRF support.	LS-SPF, LS-VR, PIC Edge: Request NPCI to share Use case for same.		While these are mandatory requirements, the bidders are requested to respond with best possible solution fulfilling required technical specifications as per EOI and the same will be evaluated as part of technical evaluation to decide the next course of action
79	EOI for NOS	36	4				

	Solution			128-way ECMP and resilient hashing	Max Number of uplink in each Leaf Switches is 8, any requirement of 128-way ECMP		While these are mandatory requirements, the bidders are requested to respond with best possible solution fulfilling required technical specifications as per EOI and the same will be evaluated as part of technical evaluation to decide the next course of action
				IPv4 over IPv6 and IPv6 over IPv4	In Modern DC Architecture, All Networking devices support Dual Stack of IPv4/v6 natively. Does NPCI plan to tunnel IPv4 & IPv6 Traffic.		While these are mandatory requirements, the bidders are requested to respond with best possible solution fulfilling required technical specifications as per EOI and the same will be evaluated as part of technical evaluation to decide the next course of action
30	EOI for NOS Solution	36	5	EVPN/MPLS L3VPN over SRv6 L3VPN over MPLS	1. Modern Datacentres deploy VXLAN with EVPN to achieve L3VPN over a IP based network in a CLOS architecture without need of MPLS. EVPN/VxLAN interops with		While these are mandatory requirements, the bidders are requested to respond with best possible solution fulfilling required technical
31	EOI for NOS Solution	36	6	Process restart ability (support for BGP, RIB, FIB, IS-IS, OSPF, RPOL)	Routing Process is containerized in modern NOSs, and will restart if there is any issue noticed within the system. Any requirement for RIB & FIB specific process restart?		While these are mandatory requirements, the bidders are requested to respond with best possible solution fulfilling required technical specifications as per EOI and the same will be evaluated as part of technical evaluation to decide the next course of action
				Maintenance Mode (BGP, IS-IS, OSPF)	Is Maintenance mode Mandatory for Day1 or can be part of 6 Month Roadmap?		good to have from day-1

32	EOI for NOS Solution	36	7	BGP Flow spec	BGP Flowspec is more of a WAN related feature and used when Large number of BGP neighbours are used to handle DDoS attacks. In DC, the same is done with Policy Based Routing. Any specific use-case for BGP Flowspec in NPCI?		While these are mandatory requirements, the bidders are requested to respond with best possible solution fulfilling required technical specifications as per EOI and the same will be evaluated as part of technical evaluation to decide the next course of action
33	EOI for NOS Solution	37	9	Kafka	gNMI/Telegraf provides streaming telemetry and is widely deployed with 3rd party tools. Is Kafka mandatory for NPCI or can be handled with Gnmi supported NOS?		kafka is preferred
34	EOI for NOS Solution	37	11	PTP/1588 • T-BC, T-TC	PTP has Hardware dependency and will be a challenge to deploy in DC Leaf type of Environments where the requirement is more for Switching & Multi-tenancy. Is PTP a mandatory requirement or Timing/Synchronization can be addressed with NTP?		While these are mandatory requirements, the bidders are requested to respond with best possible solution fulfilling required technical specifications as per EOI and the same will be evaluated as part of technical evaluation to decide the next course of action
35	EOI for NOS Solution	34	2	Response & Resolution as per severity mentioned in the Description	Service SLAs asked are very aggressive from a HW point of view, specially as this is a NOS vendor selection and SLA asked is on overall Solution. What if the 3rd party HW vendors, don't agree to support such aggressive Response and Resolution times for HW, how will that be addressed and can NPCI help to get HW vendor acceptance on same?		4 hrs RMA clause should be adhere.

36	EOI for NOS Solution			Payment Terms	Payment terms not mentioned , Request you to kindly share the same.		This is EOI which is to explore solutions on technical front. NPCI is not asking any commercials in the bid. The payment terms will be part of RFP.
37	EOI for NOS Solution			Delivery Period	Delivery Period / timeline not mentioned .		This is EOI which is to explore solutions on technical front. NPCI is not asking any commercials in the bid. The delivery period will be part of RFP.
38	EOI for NOS Solution	34	Penalty	Rs. 50,000/- or 0.10% of the total value of the PO whichever is lower for every reduction of 0.10% in uptime.	We request you to kindly reduce the fixed charges & the percentage to 0.25%		Not applicable for EOI and will be removed. However, the clause will be included in RFP.