

1. Technical requirement for QoS Equipment

TT	Technical requirements	State of Compliance (Compliant or Not Compliant)	Notes
1	General requirements		
	- The Bider must provide the solutions suitable with all of features on the document.		Mandatory
	- The Bider must provide general architecture and functional block diagram of the proposed product.		Mandatory
	- The Bider must offer completed items for deployment even not mentioned in the bidding document.		Mandatory
	- The Bidder shall propose their solution, network and each equipment configuration also as all the protocols, features and accessories which will be used in the network.		Mandatory
	- Support detailed technical specifications including: performance, power consumption, reliability, physical interfaces.		Mandatory
	- Bidder must explain in detail how all of features, functions and parameters, which supported by the proposed network architecture and proposed equipments can be achieved through their proposed network architecture design and their equipments design		Mandatory
	- The bidder shall state dimensions, weight of his equipments. The equipment should be installed in standard rack 19 inch.		Mandatory
	- The bidder shall state that all installation material is synchronous with equipments and enough to install equipments. If vendor sends to Viettel not enough installation material, he would resend to Viettel without any fee.		Mandatory
	- Equipments must guarantee 99.99% availability of all the active parts.		Mandatory
	- The network shall have sufficient redundancy such as processors, switch fabric, control links, storage, power supplies, and I/O port capacity.. depend on product's architecture.		Mandatory
	- Equipments must be configured with the latest and stablest version or firmware		Mandatory
	- Equipment must support in-service patching and upgrading		Mandatory
2	Performance		
	Throughput capacity	min 4 Gbps Full duplex	Mandatory
	Concurrent Flows	min 2 Million	Mandatory
3	QoS features		



3.1	<p>The product must identify and set policy/priority for each user group or package service:</p> <ul style="list-style-type: none"> - The product support identification, definition and creation of user classes or service packages that shall have the different service experience quality - At any time, high-end user class always have a higher service experience quality compared to the low-end user class. - Each user in a class of service shall have fair treatment or the product must guarantee bandwidth for each user. - In each class, each service has different priorities/policies and the product should guarantee bandwidth for each service. - The product must support QoS base on 5 attributes of IPV4 (Dest Address, Source Address, Protocol, Dest Port, Source Port) 		Mandatory
3.2	Support QoS base on MPLS label, AS number		Optional
3.3	Support QoS for IPV6 protocol base on (Dest Address, Source Address)		Optional
3.4	The product must have ability to regulate traffic ensuring that any user of one class or group has equal to the bandwidth partition divided by the number of active users.		Optional
3.5	The solution must identify and set policy/priority for each service such as Video streaming, VoIP and limit un-wanted traffic such as P2P...		Mandatory
3.6	High-end user class must have higher priority with un-wanted traffic (such as P2P) than low-end subscriber class.		Optional
3.7	The solution must support various of QoS classes (at least 1000 classes of QoS) to meet creating new service packages and new types of traffic.		Mandatory
3.8	The product must identify for new services and can update firmware to set policy/priority for new services		Optional
4	Policy features		
4.1	+ The solution must support following policies for each user, group of users or type of traffic (protocols):		
	- Available Rate Support: when bandwidth is available, the product should allow users, group of users or type of traffic use bandwidth higher than its committed bandwidth.		Mandatory
	- Fixed Rate support: the product guarantee fixed bandwidth for each user, group of users of one type of traffic.		Mandatory
	- User's traffic Rate Control: the product has ability of control the maximum and minimum traffic rate of user, group of users or type of traffic.		Mandatory
	- Traffic Load Balancing: the product share traffic between ports to guarantee bandwidth for user.		Mandatory
	- Bi-directional and asymmetric traffic Management		Mandator
	- Timing/event policy (automatically change QoS on user's demand)		Optional
	- QoS Signaling Standard: TIA-1039		Optional
4.2	- The product support "Behavioral traffic control"		Optional

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4.3	+ The product could assign individual TCP or UDP sessions (belong to traffic of a specific user group) with a specific bandwidth partition based on all or some of the following flow criteria:		
		- Flow duration in seconds	Optional
		- User's traffic transferred (measured by bytes)	Optional
		- Instantaneous traffic rate range	Optional
		- Average packet size	Optional
4.4	The product supports over-subscription in a class of service plan		Optional
4.5	The product could allow for bursting and use of bandwidth un-utilized by other subscribers in a policy partition.		Optional
4.6	Treat each subscriber in a similar subscription plan equally i.e. If all active users are heavily loaded, each of them should get similar amounts of bandwidth		Optional
5	Scalability		
	The product must be modular for easy upgrade capacity		Mandatory
6	High Availability		
	By pass support		Mandatory
	Active-active and active-standby modes support		Mandatory
	Inline mode support		Mandatory
	Outline mode support		Optional
	Dual power module for redundancy		Optional
7	Deployment		
	The product must be deployed in various scenarios such as in gateway layer (between core and gateway routers) or distribution layer (between Bras and PE router)		Mandatory
	The bidder must provide system design and detailed deployment plans, enclosed configuration for each of the above scenarios.		Mandatory
8	L2 functions		
	EtherChannel	- Logical aggregation of similar links, switch-level load balance and redundancy, support IEEE 802.3ad Link Aggregation Control Protocol (LACP)	Optional
	L2 Protocol	-The product support operating in MPLS environment as well as L2TP, QinQ (stacked VLANs), PPPoE, GRE... protocols	Optional
9	L3 functions		
9.1	Routing		
		- Support IPv4	Mandatory
		- Support IPv6	Optional
		- Asymmetrical routing scenarios: the product must identify the each traffic within uni-directional Flow	Mandatory

		and keep the profile on each flow	
9.2	Broadcast Limitation	- Defining exact bandwidth for broadcast traffic	Mandatory
		- Support following protocol: Static Routes, RIPv1, RIPv2, OSPF, OSPFv2, BGP4...	Mandatory
		- Access Control List - Ping, TraceRoute	Optional
10	Security Features		
	802.1x Authenticate	- Port-based authentication with 802.1x to restrict unauthorized clients from connecting to a switch through accessible ports	Optional
	Support the following security functions		
		- MAC address filtering	Optional
		- IP address filtering	Optional
		- MAC address anti-spoofing	Optional
		- IP Access List	Optional
		- Limitation of broadcast storms	Optional
		- Limitation traffic of ARP packet	Optional
		- Limitation of MAC address per port	Optional
		- Dynamic binding MAC address with port and IP	Optional
		- Restrict unauthorized network access	Optional
11	Management and Maintenance		
		- Command Line Interface	Mandatory
		- SNMPv1, SNMPv2 Traps	Optional
		- MIB, MIB-II Support	
		- Web-based support	Mandatory
		- Centralized Management and Reporting: vendor should provide centralized management software for managing, changing and applying policies and configurations to all elements (bandwidth management boxes)	Optional
		- Support many levels which difference privilege	Optional
		- Support system log	Optional
		- Support level alarms	Optional
		- Can remote maintenance,	Mandatory



		monitor via network management system (NMS)	
		- Can write logs, alarm in database by software to review later	Optional
		Support bandwidth reporting: Top user, applications (protocols), abuse management for marketing analysis purposes.	Optional
12	Backup, Restore and Upgrade		Optional
		- Support backup, restore configuration file	Optional
		- Support upgrade OS to have news features	Optional
13	Interfaces		
	Interfaces according to IEEE 802.3x	- Support 1000base-LX port, single-mode, 1310nm - Number of interfaces: min 8 1000base-LX ports	Mandatory
		- Support 10GE ports , single-mode, 1310nm	Optional
	Supervisor Redundancy	- Must be support redundant supervisor capable for automatic fail-over on switch	Mandatory
14	Others		
14.1	Power Supply		
		1+1 Power Supply Protection, Hot-Swappable Power Supplies	Mandatory
	DC power	-48V DC (Rated voltage Range: -40 ÷ -55 V DC) or 100-240V AC ± 10% (auto-ranging)	Optional
	Heat Dissipation system	- Using fans for heat dissipation to cool the system.	Optional
14.2	Environment Conditions		Optional
	Ambient working temperature:	-5 ÷ 45°C	
	Ambient working humidity:	5 ÷ 95%, non-condensing	
	Electromagnetic Compatibility	Relevant parts of following standards are valid: EN 300 386, FCC Part 15, CISPR 22 and/or GR-1089-CORE.	Optional
14.3	Documents	- Basic and Enhanced Documents: Technical Manual, System Manual, Installation Manual, Operation Manual, Command Manual, Troubleshooting Manual	Optional