

**المواصفات الفنية الخاصة بالمناقصة العامة**

**رقم المناقصة : (٢٠١٠/٩٥)**

**الخاصة بشراء وتوريد وتركيب وتشغيل Metro**

**GPON + Ethernet Switches وحدات**

**مع التدريب**

**المؤسسة العامة للاتصالات السلكية واللاسلكية**

**الإدارة العامة للمشتريات والمخازن**

**إدارة المشتريات - قسم العقود والمناقصات**

## **Specifications for IP/MPLS expansion tender:**

The tender consists of two parts:

### **1.Ethernet Switches:**

Yemen Telecom already adopted an IP/MPLS network which consist of core and edge routers. The Ethernet Switches will be connected to the nearest edge router as an aggregation through dark fibre or over SDH ( Ethernet over SDH). The Ethernet Switches will provide various IP services such as voice networking, data networking (unicast and multicast) and IPTV.

### **2.GPON System :**

GPON is part of the access network which provide high speed services ( Data, internet, IPTV ...etc ). GPON system will be connected to the the nearest edge router or to an Ethernet switch.

If the bidder has a product which provide GPON and Ethernet services in the same platform it will preferable.

**The bidder has to provide a detailed proposal to all of the proposed equipments in hardcopy and softcopy in addition to that it is required to fill out the tables below and to reference each item in the table to the proposal documentation pages. Any item that is not referenced will be considered as non-complied item.**



## Part 1: Ethernet Switches

id	Specifications	Compliance		YT comments	Vendor comments
		Yes (Y)	NO (N)		
C.1	Carrier class switch				
C.2	Carrier class availability			The supplier must provide MTBF (mean time between failures) figures for all proposed parts including CPUs, power supply.	
C.3	Support universal card slots				
C.4	Support Link Aggregation				
C.5	Support Metro Ethernet Forum UNI Type 1				
C.6	Support MEF 9 and 14 Certification				
C.7	Minimum throughput 64 Gbps				
C.8	Support routing protocols			- Static -RIP v1,v2 -OSPF	
C.9	Non blocking switching capacity				
C10	Modular and expandable.				
C11	Hot swappable cards ( control and line cards)				
C12	Shall have reliability, and availability.				
C13	Redundant power DC				
C14	Redundant switch fabric				
C15	Redundant fans and coolers				
C16	Support 4 Ethernet ports (minimum) of 10Gbps speed.				
C17	Support 90 Ethernet ports (minimum) of 1Gbps speed.				
C18	Hitless software upgrade				
C19	Support remote management and maintenance function				

C20	Shall be delivered with the latest release and all supported features				
C21	Support SFP, SFP+ and XFP Modules			The supplier must provide modules which are supported	
C22	Support Link Aggregation Control Protocol (LACP)				
C23	MAC Bridging STP/RSTP				
C24	Support Ethernet Virtual Connections (EVCs)				
C25	Support QinQ				
C26	Support Selective QinQ				
C27	Support Inner and Outer VLAN classification				
C28	Support IEEE bridging				
C29	Support Tunneling				
C30	Support Label Distribution Protocol (LDP)				
C31	Support Differentiated Services (DiffServ) -aware traffic engineering				
C32	Support MPLS L2VPN				
C33	Support MPLS L3VPN				
C34	Support MPLS traffic engineering (including TE-FRR)				
C35	Support external RADIUS				
C36	Support minimum 32K MAC addresses				
C37	Support minimum 4K VLAN				
C38	Support Port mirroring				
C39	Support VLAN mirroring				
C40	Support limiting bandwidth for a specific port.			Switch must be able to control bandwidth	

**Others:**

- The proposed equipment have to support the connection with routers according to the ITU and IETF recommendations.
- A minimum of 40% of switches slots should be empty for future expansion. **(It's preferable and is not mandatory )**
- All the required hardware and software necessary for the system must be quoted.
- Control cards includes all others cards that is necessary for system operation.
- Price list for all other supported cards, licensing, accessories ..etc **must be provided.**

**Management system:**

- **Management system package should be quoted as an optional item.**
- The supplier has to provide detailed information on the management system that includes service creation, operation, network faults, security... etc.
- Hardware necessary for management system should be quoted.

id	Specification	Compliance		YT comments	Vendor comments
		Yes (Y)	NO (N)		
N1	QoS			Manage and monitor QoS	
N2	VLANs			Manage and monitor VLANs	
N3	MAP			Shall support: -Map that detects alarms in real time. -View network topology - View percentage of the used and not used bandwidth for a specific link.	
N4	Service creation				
N5	View VLANS,				
N6	firmware			-support download firmware to network equipments -Obtain the current firmware in service.	
N7	Save and restore			-Save the configuration	



				stored in a node in scheduled task.	
N8	Provision all interfaces graphically			Including physical and logical	
N9	Preferable to provision MPLS LSP, backup bath LSP, VLANs via VPLS, IP VPN				
N10	QoS configuration				
N11	Has the ability to define filtering on any interface.				
N12	Alarms types should be colored				
N13	Alarms and all user activity and actions have to be stored.				
N14	Ability to collect performance metric at link, SLP, VLAN, IP VLAN, VPLS levels				
N15	All users should have user name and password which define their access level with management system				

- All the required hardware and software necessary for the management system must be quoted.
- The bidder has to supply all the necessary MIBs that allow the provided equipment to be monitored and provisioned from the Network Operation Center (NOC).
- The proposed solution should support, but not limited to, management interfaces like Command line interface (CLI), and (SNMP V1, V2.)

**License:**

- The bidder has to provide a fully licensed system that ensures all services and functions to operate.

**Support:**

**Support should be quoted as an optional item.**

The bidder has to propose support with the following specifications:

- Delivering the latest software upgrade.
- 24X 7 help desk support to help solving problems and facilitating the process of installation.
- Remote maintenance and diagnostic.
- Online documentation and support tools.
- Replacement of defective parts in mutually agreed time frame.

**Training:**

The bidder has to provide outside training in company training central for 5 persons. The training should include all the necessary subjects regarding the proposed equipments that enable the staff to do all the operation and maintenance.

**Profile:**

The bidder has to provide the areas and countries where the proposed products were installed. Providing a third party tester report is highly recommended as a reference to the company and to the equipments proposed.

**Delivery:**

The bidder has to provide the necessary time required for delivering the proposed equipments.

**Installation and commissioning:**

The bidder has to provide installation period and commissioning for 5 sites.



**Bill of quantity:**

	<b>ITEM</b>	<b>Qty</b>
Bc1	Chassis	<b>10</b>
Bc2	Control cards/ <b>Chassis</b>	<b>2</b>
Bc3	10/100/1000 Mbps electrical ports / <b>Chassis</b>	<b>12</b>
Bc4	SFP based 10/100/1000 Mbps ports / <b>Chassis</b>	<b>48</b>
Bc5	SFP 10/100/1000 Mbps 10 km SMF ( <b>LX</b> )	<b>100</b>
Bc6	SFP 10/100/1000 Mbps 550m MMF ( <b>SX</b> )	<b>150</b>
Bc7	SFP 10/100/1000 Mbps electrical	<b>30</b>
Bc8	SFP 10/100/1000 Mbps 40 km SMF ( <b>XD</b> )	<b>10</b>
<b>Spare parts :</b>		
Bc9	Control card	<b>2</b>
Bc10	10/100/1000 Mbps electrical line card	<b>2</b>
Bc11	SFP based 10/100/1000 Mbps line card	<b>3</b>

- Control card must be provided redundant in all chassis.
- The rest of the SFP modules will be ordered in future.





## Part 2: GOPN System Network

The bidder has to supply the following equipment of the GPON network according to the following specs.:-

Id	Specifications	Compliance		YT comments	Vendor comments
		Yes (Y)	NO (N)		
1	Non-Blocking architecture				
2	Support 1000 Subscriber/chassis (Minimum)				
3	Wire speed delivery				
4	Support universal card slots				
5	Redundant switching fabric				
6	Redundant power system DC				
7	Hitless software upgrade				
8	Redundant fans				
9	High availability system			The system must be "carrier grade"	
10	Scalable system				
11	Hot swappable cards				
12	Minimum total throughput 40 Gbps				
13	Remotely software upgrade			Through management system.	
14	Standard ITU-T (G.984.1, G.984.2, G.984.3, G.984.4, G.984.5 & G.984.6)				
15	Support 10GE optical Interface uplink Standard XFP Transceiver module				
16	2 port 1GE optical interface uplink (Minimum) Standard SFP Transceiver module				
17	Support Link Aggregation				
18	Switching capacity : 60Gb/s (Minimum)				
19	Support for all services: voice , video , data.				
20	Physical reach of at least 20Km with a logical reach , Support within the protocol of 60km				
21	1.25Gbps Downstream and 1.25Gbps upstream line rates				
22	Support Multiple bit rate with the same protocol				
23	Protocol level security for the down				

	link due to the multicast nature of PON				
24	Support for 32 users per optical fiber (minimum)				
25	Optical budget : 28db (minimum)				
26	Supports transparent LAN service (TLS) to the optical				
27	Support GEM				
28	Support (FEC) Forward Error Correction				
29	Support (AES) Advanced Encryption Standard 128 bit key size				
30	Support QoS : 802.1p ,8 QoS classes, Traffic (Shaping , Policing) , T_CONTS				
31	Support bandwidth management: DBA Dynamic Bandwidth Allocation ,CAC Connection Admission Control				
32	IGMP v1, v2, v3				
33	IGMP proxy				
34	Layer 2 and Layer 3 Ethernet Switching				
35	Forced Forwarding				
36	Support VLAN 802.1Q				
37	Support Bridging 802.1D				
38	Priority Queuing (802.1p)				
39	QinQ VLAN tagging				
40	Link Aggregation Control Protocol (LACP)				
41	Support routing protocols			-RIP v1,v2 -OSPF	
42	Support external RADIUS				
43	Multi protocol encapsulation			Must support RFC 1483	
44	IPv4				

- All the required hardware and software necessary for the system must be quoted.
- The proposed GPON access solution will function as a VoIP access gateway in the future under the control of any of PTC's soft switches.
- GPONs must support smooth migration to NGN and IMS . They also have to support stand alone function, dual homing, and passive backplane.
  - The system shall be based on integrated architecture with one versatile shelf for all kinds of services and support subscriber boards protection in compliance with ITU-T K.20.
  - All buffers must comply with related international standards.
  - The GPONs shall support smooth migration to IPv6 in the future.
  - Control cards includes all others cards that is necessary for system operation.
  - Price list for all other supported cards, licensing, accessories ..etc **must be provided.**

### Management system:

The supplier has to provide detailed information on the management system that include service creation, operation, network faults, security... etc.

Hardware necessary for management system should be quoted.

id	Specification	Compliance		YT comments	Vendor comments
		Yes (Y)	NO (N)		
N1	VLANs			Manage and monitor VLANs	
N2	MAP			Shall support: -Map that detects alarms in real time. -View network topology	
N3	Service creation				
N4	View VLANS				
N5	firmware			-support download firmware to network equipments -Obtain the current firmware in service.	
N6	Save and restore			-Save the configuration stored in a node in scheduled task.	
N7	Provision all interfaces graphically			Including physical and logical	
N8	QoS configuration				
N9	Has the ability to define filtering on any interface.				
N10	Alarms types should be colored				
N11	Alarms and all user activity and actions have to be stored.				
N12	All users should have user name and password which define their access level with management system				

- The bidder has to supply all the necessary MIBs that allow the provided equipment to be monitored and provisioned from the Network Operation Center (NOC).
- The supplier has to provide detailed information on the management system that include service creation, operation, network faults, security... etc.
- The proposed solution should support, but not limited to, management interfaces like Command line interface (CLI), and,(SNMP V1, V2



**License:**

- The bidder has to provide a fully licensed system that ensures all services and functions to operate.
- The proposed equipment have to support the connection with routers according to the ITU and IETF recommendations.
- All other licensing for the service which not mentioned in the Bill of quantity must be provided for future expansion.

**Support:**

The bidder has to propose support with the following specifications:

- Delivering the latest software upgrade.
- 24X 7 help desk support to help solving problems and facilitating the process of installation.
- Remote maintenance and diagnostic.
- Online documentation and support tools.
- Replacement of defective parts in mutually agreed time frame.

**Training:**

The bidder has to provide outside training in company training central for 6 persons. The training should include all the necessary subjects regarding the GPON and the proposed equipments that enable the staff to do all the operation and maintenance.

**Profile:**

The bidder has to provide the areas and countries where the proposed products were installed. Providing a third party tester report is highly recommended as a reference to the company and to the equipments proposed.

**Delivery:**

The bidder has to provide the necessary time required for delivering the proposed equipments.

**Installation and commissioning:**

The bidder has to provide installation period and commissioning for 2 sites.

**Bill of quantity:**

	ITEM	Qty
	<b>OLT:</b>	
Bo1	Chassis	10
Bo2	Control cards/ Chassis	2
Bo3	GE uplink cards/ Chassis	2
Bo4	GPON port/ Chassis	8
	<b>Passive Splitter:</b>	
Bo5	1:2	20
Bo6	1:4	20
Bo7	1:8	20
Bo8	1:16	20
	<b>ONT:</b>	
Bo9	ONT	100

