

Tender

for

Expansion of Present Network Components

at

Indian Institute of Technology Jodhpur

NIT No. : IITJ/SPS/CC/1/1(I)/2016-17/28

NIT Issue Date : 23 September 2016

Last Date of Submission : 17 October 2016 by 3:00 PM



॥ त्वं ज्ञानमयो विद्वानमयोऽसि ॥

Indian Institute of Technology Jodhpur
Old Residency Road, Ratanada, Jodhpur – 342011, Rajasthan
Telefax: 0291- 2449011, email: sps@iitj.ac.in

Notice Inviting Tender

Indian Institute of Technology (IIT), Jodhpur, Rajasthan (hereinafter referred to as the “Institute”), an Educational Institute of National Importance, invites sealed tender(s) in two-bid format for “Expansion of Network Components” at the Institute as per the specification given in the schedule attached with the tender as Annexure – I. The tender document can be downloaded from the Institute website at URL Link: <http://www.iitj.ac.in> or from Central Public Procurement Portal link: <http://www.eprocure.gov.in>.

The tenderer shall be required to submit the Earnest Money Deposit (EMD) for an amount of Rs.18,00,000/ (Rupees Eighteen Lac only) which is refundable and a non-refundable tender fee for an amount of Rs.1,000/- (Rupees One Thousand only) by way of demand drafts only. The demand drafts shall be drawn in favour of “Director, IIT Jodhpur” payable at Jodhpur. The demand drafts for earnest money deposit & tender fee must be enclosed in the envelope containing the technical bid.

Offer in the financial bid should be written in English and price should be written in both figures and words. The offer should be typed or written in ink pen or ball pen. Use of pencil will be ignored. All the pages of the Technical / Financial Bid shall be page numbered and all the relevant supporting documents as required must be enclosed.

Envelope of technical bid & financial bid should be separately sealed and then placed in a third envelope, to be sealed and superscribed with tender number, due date of submission and addressed to:

“Officer-in-charge
Office of Stores & Purchase
Indian Institute of Technology Jodhpur
Old Residency Road, Ratanada
Jodhpur – 342011, Rajasthan”

Sealed tender should reach the Institute, latest by October 17, 2016 by 03:00 PM. Tender(s) received beyond the last date of submission will be rejected. No tender will be entertained by E-mail or FAX.

At any time prior to the deadline of submission of bid, Institute for any reason, whether at its own initiative or in response of a clarification requested by a prospective tenderer, modify the tender by amendment and it will be published on the website.

Technical bid(s) will be opened on October 17, 2016 at 04:00 PM in the Conference Hall, Administrative Block of the Institute in the presence of the tenderer(s) or their authorized representative(s), who are present at the scheduled date and time.

Date and time of the opening of the financial bid(s) will be decided after the technical bid(s) have been evaluated by the Institute. The financial bid(s) of only those tenderer(s) will be opened, who qualifies the technical evaluation, on the specified date and time. The date, time & place of opening of the financial bid(s) will be intimated in due course of time.

In the event of the due date of receipt and opening of the tender being declared as a holiday for the Institute, then due date of receipt / opening of the tender will be the next working day at the same time.

The tenderer are requested to read the tender document carefully and ensure to compliance with all the instructions herein. Non-compliance of the instructions contained in this document may disqualify the tenderer from the tendering exercise.

The Institute reserves the right to select certain items in single or multiple units and reject the others or all as mentioned in the schedule and to revise or alter the specifications before acceptance of any tender and accept or reject any or all tenders, wholly or partly or close the tender without assigning any reason whatsoever.

INSTRUCTIONS TO TENDERER

Tender should be submitted in two parts, Part – I (Technical Bid) & Part – II (Financial Bid). Envelope of Part – I should be super-scribed as “Tender for Expansion of Network Components”, Part – I Technical Bid” and Envelope of Part – II should be super-scribed as “Tender for Expansion of Network Components”, Part – II Financial Bid”.

1. Pre – Qualification Criteria for Bidders (to be submitted as per format given as Annexure-A) :

- a) Only manufacturer(s) or their sole authorized distributor / agent are eligible to bid. Authorization letter in the prescribed format (Annexure – II) from Original Equipment Manufacturer (OEM) in favor of authorized Agent to bid / negotiate / conclude the order against this tender, must be enclosed with technical bid.
- b) The tenderer shall be required to submit the Earnest Money Deposit (EMD) for an amount of Rs.18,00,000/- (Rupees Eighteen Lac only) which is refundable and a non-refundable tender fee for an amount of Rs.1,000/- (Rupees One Thousand only) by way of demand drafts only. The demand drafts shall be drawn in favour of “Director, IIT Jodhpur” payable at Jodhpur. The demand drafts for Earnest Money Deposit & tender fee must be enclosed in the envelope containing the technical bid.
- c) The tenderer should have a minimum 03 (three) years of experience for supply & successful installation of goods of similar specifications. At least 02 (two) latest satisfactory installation reports for networks and IP phone must be enclosed with the technical bid.

- d) Annual turnover of the tenderer for each of the last three financial years should not be less than Rs.25,00,00,000/-(Rupees Twenty Five Crore). Financial statements with net profit, duly audited / certified by Chartered Accountant (CA) of the last three financial years along with the copies of Income Tax Return (ITR) must be enclosed with the technical bid.
- e) Signed & stamped compliance sheet of the technical specification of the goods with technical printed literature along with Bill of Material (BoM) mentioning all the terms & conditions clearly, must be enclosed with the technical bid.
- f) The tenderer should not have been debarred or blacklisted by any Central / State Government Departments of India. An affidavit to that effect on Non-Judicial stamp paper of Rs.10/- duly notarized must be enclosed with the technical bid in prescribed format. The proforma of the affidavit is attached with the tender as Annexure – III.
- g) Signed & stamped guarantee / warranty declaration certificate must be enclosed with the technical bid in prescribed format as attached as Annexure – IV.
- h) The tenderer viz. the Indian Agents and / or the foreign firms should furnish a certificate that the rates quoted by the tenderer are not more than those quoted to any other Institution in India or abroad during the last one year, with supporting documents.
- i) The tenderer shall submit the copy of the tender document and addenda thereto, if any, with each page should be signed and stamped to confirm the acceptance of the entire term & conditions of the tender.

2. Earnest Money Deposit (EMD):

The tenderer shall be required to submit the Earnest Money Deposit (EMD) for an amount of Rs.18,00,000/- (Rupees Eighteen Lac only) which is refundable and a non-refundable tender fee for an amount of Rs.1,000/- (Rupees One Thousand only) by way of demand drafts only. The demand drafts shall be drawn in favour of “Director, IIT Jodhpur”, Payable at Jodhpur”.

The firm(s) who are registered with the National Small Industries Corporation (NSIC) / or Small Scale Industries (SSI) for the subjected goods are exempted to furnishing the EMD and tender fee. Self-attested photocopy of the valid registration certificate must be enclosed with the technical bid.

The demand drafts for earnest money deposit & tender fee must be enclosed in the envelope containing the technical bid. Any technical bid is found without the demand drafts of earnest money deposit and tender fee will be rejected. The Institute will not be liable to pay any interest on such an amount. The

earnest money deposit shall be forfeited, if the tenderer withdraws its bid during the period of tender validity.

The earnest money deposit of the tenderer, whose tender has been accepted, will be returned on the submission of the performance security. Earnest money deposit of the successful tenderer shall be forfeited, if it refuses or neglects to execute the order or fails to furnish the required performance security within 90 days of issue of Purchase Order.

After the award of the contract to the successful tenderer, the earnest money deposit of the unsuccessful tenderer(s) will be refunded within 30 days.

3. **Validity:**

Quoted rates must be valid for a period of 180 days from the date of the closing of the tender. The overall offer for the assignment and tenderer quoted price shall remain unchanged during the period of validity. If the tenderer quotes the validity shorter than the required period, the same will be treated as unresponsive and it may be rejected.

In case the tenderer withdraws, modifies or changes his offer during the validity period, the tender is liable to be rejected and the earnest money deposited shall be forfeited without assigning any reason thereof. The tenderer should also be ready to extend the validity, if required, without changing any terms, conditions etc. of their original tender.

4. **Delivery & Installation:**

All the goods ordered must be delivered within 07 weeks from the date of the receipt of the purchase order / date of opening of Letter of Credit. Installation / commissioning shall be done within 06 weeks by the supplier after receiving confirmation from the Institute.

In case the tenderer need / or quoted more time for the completion of the order / project, for evaluation and comparison , Institute will convert all the proposal in single format with up-loading the LD charges of the extra time required on the quoted price.

Satisfactory Installation: Satisfactory installation / commissioning and handing over of the equipment mean the faultless functioning of the equipment for a minimum period of 30 days after satisfactory installation.

Liquidated Damages (LD): If the supplier would fail to perform the delivery of the equipment and/ or which is not ready to use within stipulated time then penalty at the rate of 1% per week subject to maximum of 10% of the order value will be deducted.

Extension of Delivery & Installation Period: If the supplier is unable to complete the project / order within the stipulated time, for which the supplier is responsible, then the supplier shall request for the extension of the delivery/installation period before the expiry of delivery/installation period with valid reason for the delay which will be recommended by the Committee of the Institute, and then it may be extended.

In case the supplier fails to complete the order / project within the stipulated time, Institute reserves the right to cancel the contract / order and to confiscate/forfeit the performance security / EMD.

5. **Guarantee / Warranty:**

Tender must be quoted with the five (05) years comprehensive on-site Warranty / Guarantee and it will commence from the date of the satisfactory installation / commissioning of equipment against the defect of any manufacturing, workmanship or poor quality of components, and tenderer shall also give the guarantee / warranty declaration in prescribed format as attached with tender as Annexure – IV. During the service contract period, the firm shall provide **sufficient residence engineers (at least one)** for onsite support. Minimum qualification of these engineers should be Graduate with five years relevant experience in the same field.

In addition to quoting for the Guarantee / Warranty for the equipment, tenderer(s) must quote the charges for Annual Maintenance Contract (AMC) for a period of two (2) years for maintaining the equipment at the Institute site, after the expiry of the period of warranty/guarantee. During the service contract period, the firm shall provide two preventive maintenance visits and in addition attending to all emergent and breakdown calls.

The AMC charges should be quoted for labour cost only and should not include the cost of any replacement parts/components that may need replacement. During the service contract period, replacement of parts / components shall be made available by the Institute to the supplier at the Institute's own expense. The charges shall be paid to the firm in half-yearly installments after satisfactory service.

In addition to quoting the charges for the AMC, the bidder must also quote the charges for Comprehensive Maintenance Contract (CMC) for a period of two (2) years after the expiry of warranty / guarantee. The CMC charges should be quoted for labour as well as cost of any replacement parts / component that may be required for keeping the equipment functional.

It is essential to quote the charges and terms & conditions for the service contract, Tender not containing service contract charges shall be considered incomplete and shall be rejected.

In case, supplier fails to repair / or rectify the equipment during the warranty / guarantee period, Institute may employ or pay other person/company for repairing the equipment, and all such damages, loss and expenses shall be recovered from the supplier.

Downtime: During both warranty and service contract (AMC/CMC) period not more than 5% downtime will be permissible. For downtime exceeding 1%, penalty equal to 1/365 of the 5% of the order value per day may be imposed. Downtime will be counted from the date and time of the filing of complaint with in the business hours.

During the AMC the time taken by the Institute in providing the spares till the function of the of the unit will not be calculated as down time but the period of AMC will be extended equivalent to the period the unit remain out of order.

If the Institute opts to enter CMC during this period the equipment along with accessories has to be maintained for 347 days in a block of 365 days. However, 5 days time will be allowed to procure the spares in case the same has to imported and 5 days will not be counted as downtime.

6. Training of Personnel:

The supplier shall provide the technical training to the personnel involved in the use of the equipment at the Institute premises, immediately after completing the installation of the equipment for a minimum period of a one week at the company cost.

7. Tender Preparation Expenses:

All costs incurred by the tenderer in the preparation of the tender, presentation and negotiating the contract including the site visits etc. will be borne by the tenderer themselves and in no case will be reimbursable by the Institute.

8. Financial Bid:

The rates should be quoted inclusive of the essential charges on FOR at destination site basis in the prescribed format (Annexure – VI) with complete description. Name of the manufacturer, model number must be indicated clearly in the proforma invoice / quotation, failing which the same shall be liable for rejection.

Where the equipment is composed of several subunits / component, the rate should be quoted for each subunit / component separately otherwise quotation is liable to be rejected. The Institute reserves the right to increase or decrease the number of subunits / components and number of equipment according to its

requirements. The words “Not Quoting” should be clearly written against any item of equipment for which the tenderer is not quoting. The AMC / CMC rates are to be quoted separately in the financial bid.

Institute is registered with DSIR, Govt. of India (Custom Duty Notification No. 51/96- Custom dt: 23 July, 1996 and Central Excise Duty Notification No. 10/97- Central Excise dt: 1 March, 1997) and is therefore, exempted from Excise Duty and partial exempted from Custom Duty (CD applicable to IIT Jodhpur is 5.15%). Exemption Certificate of the same shall be issued.

NB: If any of the conditions mentioned in the tender enquiry document are alter / changed / modified / add any new condition, which are not compliance with tender enquiry document, by tenderer in their proposal, which may be treated as unresponsive and it may be rejected.

9. **Tender Evaluation:**

The Institute will evaluate the entire tenders, strictly on the basis of the terms & conditions incorporated in the tender enquiry document and terms, conditions etc. as stipulated by the tenderer(s) in their tender to determine whether these comply in all respects, as specified in the tender enquiry document.

During the evaluation / scrutiny of the tenders, at any stage, if it is found that any of the tenderer(s) terms and conditions are not in compliance with tender enquiry document, Institute may seek the clarification within the specified time and if the tenderer fails to reply / or do not agree / accept the terms and conditions, their tender will be treated as unresponsive and it is liable for rejection.

If the schedule of requirements contains more than one schedule, then offers for each schedule are to be evaluated and ranked separately, if it is in the benefit of the Institute, order may be awarded accordingly.

Evaluation of the proposals shall be done in two stages as:

(a) Stage – I (Technical Evaluation): Technical evaluation of the proposals shall be done in two stages as:

➤ **Sub-Stage – A (Essential pre-qualification criteria):**

- Institute will examine all the bid(s) to determine whether they qualify the essential pre-qualification criteria, whether tenderer has submitted the EMD & Tender fee with technical bid, whether all the documents as mentioned / or required in the tender to be submitted with technical bid, has submitted, whether all the documents are in prescribed format and has been properly signed & stamped and whether the bid are completed and generally in order.
- Tender(s) which will not qualify Sub-Stage–A or conditional tender are to be treated as unresponsive and it may be rejected.

➤ Sub-Stage – B (Technical Specification):

- The Institute will examine the detailed technical specification of the quoted model, whether these are complying with the specification as mentioned in tender document.
- The tender which are not compliance with the tender specifications will be summarily rejected.

After the evaluation of technical bid(s), a list of the tenderer(s) who qualify the technical evaluation (Sub – Stage – A & B) shall be made. Shortlisted tenderer(s) shall be informed for the date, time and place of opening of the financial bid(s) and they may depute their representative/s to attend the opening of the financial bid(s). The financial bid(s) of the only technically qualified tenderer(s) will be opened.

(b) Stage – II (Financial Evaluation): Financial bid(s) of the only technically qualified tenderer(s) will be opened for financial evaluation.

The financial bid(s) will be evaluated on the basis of the cost of the item with its all taxes, freight, and other charges, as quoted. AMC/CMC charges will be considered separately, and these contracts will be on the discretion of the Institute to opt for.

If there is discrepancy between the unit price and total price (which is obtained by the multiplying the unit price by the quantity), the unit price shall prevail and the total price corrected accordingly and same is to be conveyed to the tenderer with specified target time, if the tenderer does not agree with the observation of the Institute, the tender is liable to be ignored.

10. Award of Contract:

After due evaluation of the financial bid(s), the Institute will award the order to the lowest evaluated responsive tenderer (hereinafter referred to as the “Supplier”). Order once placed to the tenderer will not be transferred to any other SI/distributor, except OEM distributor.

11. Performance Security:

After the award of work, the supplier shall be required to submit the performance security in the form of irrevocable bank guarantee in the prescribed format (Annexure – V) issued by any Nationalised/Scheduled Bank / or Fixed Deposit Receipt, for an amount equal to the 10% of order value and **it will be kept valid for a period of 60 days beyond the date of completion of warranty period. Warranty Period will be commenced from the date of the installation of the supplied item. Hence, be careful at the time of calculation of the validity date of Performance Bank Guarantee.**

On expiry of the warranty period the supplier will have to submit the fresh performance security for AMC / CMC period, if the Institute goes for maintenance contract. The fresh performance security to cover the service contract shall be submitted atleast one month before the expiry of previous performance security and it shall be 5% of the order value and it will be valid for period of maintenance contract period plus 60 days. Performance Security will be returned after completion all the contractual obligations.

12. Payment Term:

- I. 70% payment of the total order value will be released against receipt of the goods and submit the inspection report at the Institute premises.
- II. 20% payment release after successfully installation and inspection.
- III. Balance 10% of the order value shall be released after the submission of the performance security.

13. Site Preparation:

The supplier shall inform to the Institute about the site preparation, if any, needed for the installation of equipment, immediately after the receipt of the purchase order. The supplier must provide complete details regarding space and all the other infrastructural requirements needed for the equipment, which the Institute should arrange before the arrival of the equipment to ensure its timely installation and smooth operation thereafter.

The supplier shall visit the Institute and see the site whether the equipment is to be installed and may offer his advice and render assistance to the Institute in the preparation of the site and other pre-installation requirements.

14. Merger / Acquisition of Foreign Principal:

In case of merger of Foreign Principal with another Firm or acquisition of Foreign Principal by another firm, it shall be obligatory for the New Entity so formed after the merger of the Acquiring Firm, as the case may be, to take over all the duties and obligations / liabilities of the Foreign Principal and the New Entity / Acquiring Firm would *ipso facto* become liable for all acts of commission or omission on the part of original Foreign Principal as well as Indian Agent.

15. Change of Indian Agent:

In case the Foreign Principal changes in Indian Agent then it shall be obligatory for Foreign Principal to automatically transfers all the duties and obligations to the New Indian Agent, failing which the Foreign

Principal would *ipso facto* become liable for all acts of commission or omission on the part of New Indian Agent.

16. Force Majeure:

Any delay due to Force Majeure will not be attributable to the bidder. Force Majeure events shall mean one or more of the following acts or events: Acts of God or events beyond the reasonable control of the Affected Party which could not reasonably have been expected to occur, exceptionally adverse weather conditions, lightning, earthquake, cyclone, flood, volcanic eruption or fire or landslide; Radioactive contamination or ionizing radiation; Strikes or boycotts (other than those involving the Supplier or its employees/representatives or attributable to any act or omission of any of them) interrupting supplies and services of the Project for a period exceeding a continuous period of 7 (seven) days; An act of war (whether declared or undeclared), invasion, armed conflict or act of foreign enemy, blockade, embargo, riot, insurrection, terrorist or military action, civil commotion or politically motivated sabotage which prevents rendering of supplies or specified services by the Supplier for a period exceeding a continuous period of 7 (seven) days.

17. Arbitration and Laws:

In case of any dispute or difference arising out of or in connection with the tender conditions / order and Contract, the Institute and the Supplier will address the dispute / difference for a mutual resolution and failing which, the matter shall be referred for arbitration to a sole Arbitrator to be appointed by the Institute. The Arbitration shall be held in accordance with the provisions of the Arbitration and Conciliation Act, 1996 and the venue of arbitration shall be at Jodhpur only. The resolution of the Arbitrator shall be final and binding on both the parties.

18. Jurisdiction:

The courts at Jodhpur alone will have the jurisdiction to try any matter, dispute or reference between parties arising out of this tender / contract. It is specifically agreed that no court outside and other than Jodhpur court shall have jurisdiction in the matter.

---X---

Annexure-A

S. No.	Description of Pre – Qualification Criteria for Bidders	Enclosures attached (Yes/No)
a	Only manufacturer(s) or their sole authorized distributor / agent are eligible to bid. Authorization letter in the prescribed format (Annexure – II) from Original Equipment Manufacturer (OEM) in favor of authorized Agent to bid / negotiate / conclude the order against this tender, must be enclosed with technical bid.	
b	The tenderer shall be required to submit the Earnest Money Deposit (EMD) for an amount of Rs.18,00,000/- (Rupees Eighteen Lac only) which is refundable and a non-refundable tender fee for an amount of Rs.1,000/- (Rupees One Thousand only) by way of demand drafts only. The demand drafts shall be drawn in favour of “Director, IIT Jodhpur” payable at Jodhpur. The demand drafts for Earnest Money Deposit & tender fee must be enclosed in the envelope containing the technical bid.	
c	The tenderer should have a minimum 03 (three) years of experience for supply & successful installation of goods of similar specifications. At least 02 (two) latest satisfactory installation reports for networks and IP phone must be enclosed with the technical bid.	
d	Annual turnover of the tenderer for each of the last three financial years should not be less than Rs.25,00,00,000/-(Rupees Twenty Five Crore). Financial statements with net profit, duly audited / certified by Chartered Accountant (CA) of the last three financial years along with the copies of Income Tax Return (ITR) must be enclosed with the technical bid.	
e	Signed & stamped compliance sheet of the technical specification of the goods with technical printed literature along with Bill of Material (BoM) mentioning all the terms & conditions clearly, must be enclosed with the technical bid.	
f	The tenderer should not have been debarred or blacklisted by any Central / State Government Departments of India. An affidavit to that effect on Non-Judicial stamp paper of Rs.10/- duly notarized must be enclosed with the technical bid in prescribed format. The proforma of the affidavit is attached with the tender as	

	Annexure – III.	
g	Signed & stamped guarantee / warranty declaration certificate must be enclosed with the technical bid in prescribed format as attached as Annexure – IV.	
h	The tenderer viz. the Indian Agents and / or the foreign firms should furnish a certificate that the rates quoted by the tenderer are not more than those quoted to any other Institution in India or abroad during the last one year, with supporting documents.	
i	The tenderer shall submit the copy of the tender document and addenda thereto, if any, with each page should be signed and stamped to confirm the acceptance of the entire term & conditions of the tender.	

Annexure – I

A) Supply And Installation of network components

Sr. N	Switch Type	Specification	Quantity
1	Core Switch	Annexure 1	2
2	Distribution Switch 12 Ports	Annexure 2	13
3	Distribution Switch 24 Ports	Annexure 3	3
4	Converged Access Switch 48 Ports	Annexure 4	2
5	Access Switch 48 Ports PoE/PoE+	Annexure 5	31
6	Access Switch 48 Ports	Annexure 6	24
7	Access Switch 24 Ports PoE/PoE+	Annexure 7	73
8	Access Switch 24 Ports	Annexure 8	1
9	Access Switch 8 Ports PoE/PoE+	Annexure 9	26
10	Stacking Module for Access Switches	Annexure 10	54
11	1 Gig SFP Module (SMF)	Annexure 11	66
12	1 Gig UTP Module	Annexure 12	20
13	10 Gig SFP Module (SMF)	Annexure 13	186
14	10 Gig SFP Module (MMF)	Annexure 14	26
15	40 Gig QSFP Module (MMF)	Annexure 15	8
16	Wireless Access point (Indoor)	Annexure 16	150
17	Wireless Access point (Outdoor)	Annexure 17	10
18	150 ApLicense Upgrade for Existing WLC	Annexure 18	2
19	2x10 Gig Uplink Module for Existing Switch	Annexure 19	3
20	IP Communication Manager in HA	Annexure 20	1
21	Voice Gateway System	Annexure 21	2
22	Video Conferencing System	Annexure 22	1
23	IP Phone Type I	Annexure 23	50
24	IP Phone Type II	Annexure 24	20
25	IP Phone Type III	Annexure 25	125
26	IP Phone Type IV	Annexure 26	20
27	IP Phone Type V	Annexure 27	2
<p>Note: The required quantity is mentioned above, however, the same may increase or decrease as per any change in need.</p>			

B) GENERAL CAMPUS WIDE NETWORK REQUIREMENT AND GUIDELINES

1. All Switches, Wireless Access Points and Wireless LAN Controller should be from same OEM.
2. All Wireless Access Points asked in RFP should be fully compatible to existing Wireless LAN Controllers.
3. All Switches asked in RFP should be fully compatible with existing switches.
4. All Switches, Wireless Access Points and Existing Wireless LAN Controllers should have capability to manage, configure and troubleshoot from Network management system with a single pane of glass.
5. Proposed Wired, Wireless and VPN users infrastructure should have capability to authenticate with a single pane of glass from Network Admission Control and Authentication System.
6. All SFP, SFP+ and QSFP should be from same OEM as of switches.
7. IP EPABX, IP Phones and Video IP Phones should be from same OEM.
8. OEM for equipment like Switches, Wireless Access Points and IP EPABX should be listed in the leaders quadrant of the Gartner Magic Quadrant.

ANNEXURE 1 : CORE SWITCHES

S. No.	Generic Requirements	Compliance	Remarks
1	General Hardware and Interface requirements		
1.1	Switch should have minimum 48 nos. 1/10 Gig-T, minimum 48 nos. SFP+ ports and 8 nos. of 40 Gig QSFP ports.		
1.2	All critical components like Supervisor modules, fabric modules, and controller modules should be redundant. Failure of one component must not degrade performance of switch.		
1.3	Switch should have hot swappable 1:1 redundant internal power supply and hot swappable fan modules.		
1.4	Switch should be modular chassis and should have minimum 2 blank slots for scalability in addition to asked ports.		
1.5	Switching system should be scalable to additional 96 no. of 10 Gig and 8 nos. of 40 Gig Ports.		

2	PERFORMANCE REQUIREMENTS		
2.1	Switching system shall have minimum 2.5 Tbps of switching fabric scalable to 5 Tbps and 1.9 Bpps of forwarding rate scalable to 3.8 Bpps.		
2.2	Shall have minimum 48K MAC Addresses.		
2.3	Shall have minimum 1K Active VLANs.		
2.4	Shall have minimum 16K IPv4 and IPv6 unitcast routes.		
2.5	Shall have minimum 8K IPv4 and IPv6 multicast groups.		
2.6	Shall have minimum 4K IPv4 and IPv6 QoS and Security ACLs.		
2.7	Shall have hardware based feature for load balancing and traffic redirection feature.		
2.8	Shall have static routing, OSPFv2, OSPFv3 and BGPv4.		
2.9	Shall have policy based routing and virtual routing and forwarding feature.		
2.10	Shall have Protocol-independent multicast (PIM) for IP multicast routing is supported, including PIM sparse mode (PIM-SM)/PIM dense mode (PIM-DM)/PIM sparse-dense mode and source-specific multicast (SSM).		
3	IEEE STANDARDS		
3.1	Should support IEEE Standards of Ethernet: IEEE 802.1D, 802.1s, 802.1w, 802.3ad, 802.3x, 802.1p, 802.1Q, 802.3/802.3u, 802.3ab, 802.3z.		
4	QUALITY OF SERVICE (QoS) REQUIREMENTS		
4.1	Switch shall have 802.1p class of service, IP differentiated service code point (DSCP) and cross stack QoS.		
4.2	Switch shall have minimum 8 egress queues per port and strict priority queuing.		
5.	SYSTEM MANAGEMENT AND ADMINISTRATION		
5.1	Switch should support SSHv2, SNMPv2c, SNMPv3, NTPv3/ NTPv4.		
5.2	Switch should support AAA using RADIUS and TACACS+.		

5.3	Switch should support software upgrades via TFTP or FTP.		
5.4	Switch should support IPv4 and IPv6 ACLs, VLAN , Port and Time based access list with time ranges.		
5.5	Switch shall have Switch Port Analyzer (SPAN) and Remote Switch Port Analyzer (RSPAN) .		
5.6	Switch shall have secure VTP protocol to reduce administrative burden of configuring VLANs on multiple switches in turn eliminating the configuration errors & troubleshooting in secure manner.		
5.7	Switch shall have Internet Group Management Protocol (IGMP) Snooping for IPv4 and IPv6, MLD v1 and v2 Snooping.		
5.8	Switch shall have per port broadcast, multicast and unicast storm control.		
5.9	Switch shall have Unidirectional Link Detection Protocol (UDLD), Aggressive UDLD, Link Aggregation Control Protocol (LACP)/Port Aggregation Protocol (PagP)		
5.10	Switch should be Software Defined Networking Ready with Open flow protocol support.		
6	Regulatory Compliance		
6.1	Switch shall conform to UL 60950 or IEC 60950 or CSA 60950 or EN 60950 Standards for Safety requirements of Information Technology Equipment.		
6.2	Switch shall conform to EN 55022 Class A/B or CISPR22 Class A/B or CE Class A/B or FCC Class A/B Standards for EMC (Electro Magnetic Compatibility) requirements.		
7	Evaluation Compliance		
7.1	Switch / Switch's Operating System should be tested and certified or in process of certification for EAL 2/NDPP or above under Common Criteria Certification.		
7.2	Switch should be IPv6 Certified/IPv6 logo ready.		

ANNEXURE 2 : DISTRIBUTION SWITCH 12 PORTS

Sr. No.	Generic Requirements	Compliance	Remarks
1	General Hardware and Interface requirements		
1.1	Switch should have minimum 12 nos. SFP+ ports and additional 2 nos. SFP+uplink ports		
1.2	Switch should have minimum 240 Gbps of stacking bandwidth with dedicated stacking ports and cables with minimum 4 switch in stack.		
1.3	Switch should have 1:1 redundant internal power supply.		
1.4	Power supply modules, fan modules and transceivers modules should be hot swappable.		
2	PERFORMANCE REQUIREMENTS		
2.1	Switch shall have minimum 280Gbps of switching fabric and 208Mpps of forwarding rate.		
2.2	Shall have minimum 24K MAC Addresses.		
2.3	Shall have minimum 1K Active VLANs.		
2.4	Shall have minimum 8K IPv4 and IPv6 unicast routes.		
2.5	Shall have minimum 4K IPv4 and IPv6 multicast groups.		
2.6	Shall have minimum 2K IPv4 and IPv6 QoS and Security ACLs.		
2.7	Shall have minimum 24K netflow entries.		
2.4	Shall have static routing, OSPFv2, OSPFv3 and BGPv4.		
2.5	Shall have policy based routing and virtual routing and forwarding feature.		
2.6	Shall have Protocol-independent multicast (PIM) for IP multicast routing is supported, including PIM		

	sparse mode (PIM-SM)/PIM dense mode (PIM-DM)/PIM sparse-dense mode and source-specific multicast (SSM).		
3	IEEE STANDARDS		
3.1	Should support IEEE Standards of Ethernet: IEEE 802.1D, 802.1s, 802.1w, 802.1x, 802.3ad, 802.3x, 802.1p, 802.1Q, 802.3, 802.3u, 802.3ab, 802.3z.		
4	QUALITY OF SERVICE (QoS) REQUIREMENTS		
4.1	Switch shall have 802.1p class of service, IP differentiated service code point (DSCP) and cross stack QoS.		
4.2	Switch shall have committed information rate, rate limiting and flow based rate limiting.		
4.3	Switch shall have minimum 8 egress queues per port and strict priority queuing.		
5.	SYSTEM MANAGEMENT AND ADMINISTRATION		
5.1	Switch should support SSHv2, SNMPv2c, SNMPv3, NTPv3 and NTPv4.		
5.2	Switch should support AAA using RADIUS and TACACS+.		
5.3	Switch should support port security, DHCP snooping, Dynamic ARP inspection, IP Source guard, BPDU Guard, Spanning tree root guard and IPv6 First Hop Security.		
5.4	Switch should support software upgrades via TFTP or FTP.		
5.5	Switch should support IPv4 and IPv6 ACLs, VLAN , Port and Time based access list with time ranges.		
5.6	Switch shall have Switch Port Analyzer (SPAN) and Remote Switch Port Analyzer (RSPAN) .		
5.7	Switch shall have secure VTP with MD5 protocol to reduce administrative burden of configuring VLANs on multiple switches in turn eliminating the configuration errors & troubleshooting in secure manner.		
5.8	Switch shall have Layer 2 trace route for ease of		

	troubleshooting by identifying the physical path that a packet takes from source to destination.		
5.9	Switch shall have Internet Group Management Protocol (IGMP) Snooping for Ipv4 and Ipv6, MLD v1 and v2 Snooping and Multicast VLAN Registration protocol.		
5.10	Switch shall have per port broadcast, multicast and unicast storm control.		
5.11	Switch shall have Unidirectional Link Detection Protocol (UDLD), Aggressive UDLD, Link Aggregation Control Protocol (LACP), Port Aggregation Protocol (PagP) and Dynamic Trunking Protocol (DTP).		
5.12	Should support Time Domain Reflector (TDR) feature to diagnose and resolve cabling problems.		
5.14	Switch should be Software Defined Networking Ready with Open flow protocol support.		
6	Regulatory Compliance		
6.1	Switch shall conform to UL 60950 or IEC 60950 or CSA 60950 or EN 60950 Standards for Safety requirements of Information Technology Equipment.		
6.2	Switch shall conform to EN 55022 Class A/B or CISPR22 Class A/B or CE Class A/B or FCC Class A/B Standards for EMC (Electro Magnetic Compatibility) requirements.		
7	Evaluation Compliance		
7.1	Switch / Switch's Operating System should be tested and certified for EAL 2/NDPP or above under Common Criteria Certification.		
7.2	Switch should be IPv6 Certified/IPv6 logo ready.		

ANNEXURE 3 : DISTRIBUTION SWITCH 24 PORTS

S. No.	Generic Requirements	Compliance	Remarks
1	General Hardware and Interface requirements		
1.1	Switch should have minimum 24 nos. SFP+ ports and		

	should be upgradable to 2 nos. of 40 Gig QSFP ports.		
1.2	Switch should have one dedicated slot for stacking and should support minimum 480 Gbps of stacking bandwidth with dedicated stacking ports and cables with minimum 4 switch in stack.		
1.3	Switch should have 1:1 redundant internal power supply.		
1.4	Power supply modules, fan modules and transceivers modules should be hot swappable.		
2	PERFORMANCE REQUIREMENTS		
2.1	Switch shall have minimum 640Gbps of switching fabric and 450Mpps of forwarding rate.		
2.2	Shall have minimum 24K MAC Addresses.		
2.3	Shall have minimum 1K Active VLANs.		
2.4	Shall have minimum 8K IPv4 and IPv6 unicast routes.		
2.5	Shall have minimum 4K IPv4 and IPv6 multicast groups.		
2.6	Shall have minimum 2K IPv4 and IPv6 QoS and Security ACLs.		
2.7	Shall have minimum 24K netflow entries.		
2.8	Shall have static routing, OSPFv2, OSPFv3 and BGPv4.		
2.9	Shall have policy based routing and virtual routing and forwarding feature.		
2.10	Shall have Protocol-independent multicast (PIM) for IP multicast routing is supported, including PIM sparse mode (PIM-SM)/PIM dense mode (PIM-DM)/PIM sparse-dense mode and source-specific multicast (SSM).		
3	IEEE STANDARDS		
3.1	Should support IEEE Standards of Ethernet: IEEE 802.1D, 802.1s, 802.1w, 802.1x, 802.3ad, 802.3x, 802.1p, 802.1Q, 802.3, 802.3u, 802.3ab, 802.3z.		

4	QUALITY OF SERVICE (QoS) REQUIREMENTS		
4.1	Switch shall have 802.1p class of service, IP differentiated service code point (DSCP) and cross stack QoS.		
4.2	Switch shall have committed information rate, rate limiting and flow based rate limiting.		
4.3	Switch shall have minimum 8 egress queues per port and strict priority queuing.		
5.	SYSTEM MANAGEMENT AND ADMINISTRATION		
5.1	Switch should support SSHv2, SNMPv2c, SNMPv3, NTPv3 and NTPv4.		
5.2	Switch should support AAA using RADIUS and TACACS+.		
5.3	Switch should support port security, DHCP snooping, Dynamic ARP inspection, IP Source guard, BPDU Guard, Spanning tree root guard and IPv6 First Hop Security.		
5.4	Switch should support software upgrades via TFTP or FTP.		
5.5	Switch should support IPv4 and IPv6 ACLs, VLAN , Port and Time based access list with time ranges.		
5.6	Switch shall have Switch Port Analyzer (SPAN) and Remote Switch Port Analyzer (RSPAN) .		
5.7	Switch shall have secure VTP with MD5 protocol to reduce administrative burden of configuring VLANs on multiple switches in turn eliminating the configuration errors & troubleshooting in secure manner.		
5.8	Switch shall have Layer 2 trace route for ease of troubleshooting by identifying the physical path that a packet takes from source to destination.		
5.9	Switch shall have Internet Group Management Protocol (IGMP) Snooping for IPv4 and IPv6, MLD v1 and v2 Snooping and Multicast VLAN Registration protocol.		
5.10	Switch shall have per port broadcast, multicast and		

	unicast storm control.		
5.11	Switch shall have Unidirectional Link Detection Protocol (UDLD), Aggressive UDLD, Link Aggregation Control Protocol (LACP), Port Aggregation Protocol (PAgP) and Dynamic Trunking Protocol (DTP).		
5.12	Should support Time Domain Reflector (TDR) feature to diagnose and resolve cabling problems.		
5.13	Switch should be Software Defined Networking Ready with Open flow protocol support.		
6	Regulatory Compliance		
6.1	Switch shall conform to UL 60950 or IEC 60950 or CSA 60950 or EN 60950 Standards for Safety requirements of Information Technology Equipment.		
6.2	Switch shall conform to EN 55022 Class A/B or CISPR22 Class A/B or CE Class A/B or FCC Class A/B Standards for EMC (Electro Magnetic Compatibility) requirements.		
7	Evaluation Compliance		
7.1	Switch / Switch's Operating System should be tested and certified for EAL 2/NDPP or above under Common Criteria Certification.		
7.2	Switch should be IPv6 Certified/IPv6 logo ready.		

ANNEXURE 4 : CONVERGED ACCESS SWITCH 48 PORTS

S. No.	Generic Requirements	Compliance	Remarks
1	General Hardware and Interface requirements		
1.1	Switch should have minimum 16 Nos. of SFP+ ports, 16 Nos. of FCoE ports and 16 nos. of FC ports and upgradable to 4 nos. of 40 Gig QSFP ports.		
1.2	Switch should be loaded with 16 Nos. of SFP+ MMF modules, 16 Nos. of FCoE MMF Modules and 8 nos. of 8 Gig FC Modules with necessary licenses if required.		

1.3	Switch should have hot swappable 1:1 redundant internal power supply and hot swappable fan modules.		
2	PERFORMANCE REQUIREMENTS		
2.1	Switching system shall have minimum 1.2Tbps of switching fabric and 950 Mpps of forwarding rate.		
2.2	Shall have minimum 48K MAC Addresses.		
2.3	Shall have minimum 1K Active VLANs.		
2.4	Shall have minimum 16K IPv4 and IPv6 unicast routes.		
2.5	Shall have minimum 8K IPv4 and IPv6 multicast groups.		
2.6	Shall have minimum 4K IPv4 and IPv6 QoS and Security ACLs.		
2.7	Shall have static routing, OSPFv2, OSPFv3 and BGPv4.		
2.8	Shall have policy based routing and virtual routing and forwarding feature and should support 1K VRFs entries.		
2.9	Shall have Protocol-independent multicast (PIM) for IP multicast routing is supported, including PIM sparse mode (PIM-SM)/PIM dense mode (PIM-DM)/PIM sparse-dense mode and source-specific multicast (SSM).		
2.10	Shall support Data Center Bridging and Data Center Bridging exchange with no drop and priority flow control.		
3	IEEE STANDARDS		
3.1	Should support IEEE Standards of Ethernet: IEEE 802.1D, 802.1s, 802.1w, 802.3ad, 802.3x, 802.1p, 802.1Q, 802.3ab, 802.3z, 802.3ae, 802.3ba, 802.1Qaz, 802.1Qbb		
4	QUALITY OF SERVICE (QoS) REQUIREMENTS		
4.1	Switch shall have 802.1p class of service, IP differentiated service code point (DSCP) and cross stack QoS.		

4.2	Switch shall have minimum 8 egress queues per port and strict priority queuing.		
5.	SYSTEM MANAGEMENT AND ADMINISTRATION		
5.1	Switch should support SSHv2, SNMPv2c, SNMPv3, NTPv3/ NTPv4.		
5.2	Switch should support AAA using RADIUS and TACACS+.		
5.3	Switch should support software upgrades via TFTP or FTP.		
5.4	Switch should support IPv4 and IPv6 ACLs, VLAN , Port and Time based access list with time ranges.		
5.5	Switch shall have Switch Port Analyzer (SPAN) and Remote Switch Port Analyzer (RSPAN) .		
5.6	Switch shall have secure VTP protocol to reduce administrative burden of configuring VLANs on multiple switches in turn eliminating the configuration errors & troubleshooting in secure manner.		
5.7	Switch shall have Internet Group Management Protocol (IGMP) Snooping for IPv4 and IPv6, MLD v1 and v2 Snooping.		
5.8	Switch shall have per port broadcast, multicast and unicast storm control.		
5.9	Switch shall have Unidirectional Link Detection Protocol (UDLD), Aggressive UDLD, Link Aggregation Control Protocol (LACP)/Port Aggregation Protocol (PagP)		
5.10	Switch should be Software Defined Networking Ready with Openflow protocol support.		
6	Regulatory Compliance		
6.1	Switch shall conform to UL 60950 or IEC 60950 or CSA 60950 or EN 60950 Standards for Safety requirements of Information Technology Equipment.		
6.2	Switch shall conform to EN 55022 Class A/B or CISPR22 Class A/B or CE Class A/B or FCC Class A/B Standards for EMC (Electro Magnetic Compatibility) requirements.		

7	Evaluation Compliance		
7.1	Switch / Switch's Operating System should be tested and certified for EAL 2/NDPP or above under Common Criteria Certification.		
7.2	Switch should be IPv6 Certified/IPv6 logo ready.		

ANNEXURE 5 : ACCESS SWITCHES 48 PORT PoE/PoE+

S. No.	Generic Requirements	Compliance	Remarks
1	General Hardware and Interface requirements		
1.1	Switch shall have minimum 48 nos. 10/100/1000 Base-T ports with PoE+ capability and minimum 370W of PoE Power and additional 2 nos. SFP+ uplink ports.		
1.2	Switch shall one dedicated slot for minimum 48 Gbps of stacking bandwidth with dedicated stacking ports and cables with minimum 8 switch in stack.		
1.3	Switch should support internal/external redundant power supply.		
2	PERFORMANCE REQUIREMENTS		
2.1	Shall have minimum 136Gbps of switching fabric and 101Mpps of forwarding rate.		
2.2	Shall have minimum 12K MAC Addresses.		
2.3	Shall have minimum 1K Active VLANs.		
2.4	Shall have minimum 1K IPv4 and IPv6 multicast groups.		
2.5	Shall have minimum 1K IPv4 and IPv6 QoS and Security ACLs.		
3	IEEE STANDARDS		
3.1	Should support IEEE Standards of Ethernet: IEEE 802.1D, 802.1s, 802.1w, 802.1x, 802.3ad, 802.3x, 802.1p, 802.1Q, 802.3, 802.3u, 802.3ab, 802.3z, 802.3az, 802.3af, 802.3at.		
4	QUALITY OF SERVICE (QoS) REQUIREMENTS		

4.1	Switch shall have 802.1p class of service, IP differentiated service code point (DSCP) and cross stack QoS.		
4.2	Switch shall have committed information rate, rate limiting and flow based rate limiting.		
4.3	Switch shall have minimum 8 egress queues per port and strict priority queuing.		
5.	SYSTEM MANAGEMENT AND ADMINISTRATION		
5.1	Switch should support SSHv2, SNMPv2c, SNMPv3, NTPv3 and NTPv4.		
5.2	Switch should support AAA using RADIUS and TACACS+.		
5.3	Switch should support port security, DHCP snooping, Dynamic ARP inspection, IP Source guard, BPDU Guard, Spanning tree root guard and IPv6 First Hop Security.		
5.4	Switch should support software upgrades via TFTP or FTP.		
5.5	Should support 802.1x authentication and accounting with Dynamic VLAN assignment.		
5.6	Switch should support IPv4 and IPv6 ACLs, VLAN , Port and Time based access list with time ranges.		
5.7	Switch Shall have Switch Port Analyzer (SPAN) and Remote Switch Port Analyzer (RSPAN) .		
5.8	Switch shall have secure VTP with MD5 protocol to reduce administrative burden of configuring VLANs on multiple switches in turn eliminating the configuration errors & troubleshooting in secure manner.		
5.9	Switch shall have Layer 2 trace route for ease of troubleshooting by identifying the physical path that a packet takes from source to destination.		
5.10	Switch shall have Internet Group Management Protocol (IGMP) Snooping for IPv4 and IPv6, MLD v1 and v2 Snooping and Multicast VLAN Registration protocol.		

5.11	Switch shall have per port broadcast, multicast and unicast storm control.		
5.12	Switch shall have Unidirectional Link Detection Protocol (UDLD), Aggressive UDLD, Link Aggregation Control Protocol (LACP), Port Aggregation Protocol (PAgP) and Dynamic Trunking Protocol (DTP).		
5.13	Switch shall have Time Domain Reflector (TDR) feature to diagnose and resolve cabling problems.		
5.14	Switch should be Software Defined Networking Ready with Openflowprotocol support.		
6	Regulatory Compliance		
6.1	Switch shall conform to UL 60950 or IEC 60950 or CSA 60950 or EN 60950 Standards for Safety requirements of Information Technology Equipment.		
6.2	Switch shall conform to EN 55022 Class A/B or CISPR22 Class A/B or CE Class A/B or FCC Class A/B Standards for EMC (Electro Magnetic Compatibility) requirements.		
7	Evaluation Compliance		
7.1	Switch / Switch's Operating System should be tested and certified for EAL 2/NDPP or above under Common Criteria Certification.		
7.2	Switch should be IPv6 Certified/IPv6 logo ready.		

ANNEXURE 6 : ACCESS SWITCHES 48 PORT

S. No.	Generic Requirements	Compliance	Remarks
1	General Hardware and Interface requirements		
1.1	Switch shall have minimum 48 nos. 10/100/1000 Base-T ports with additional 2 nos. SFP+ uplink ports.		
1.2	Switch shall one dedicated slot for minimum 48 Gbps of stacking bandwidth with dedicated stacking ports and cables with minimum 8 switch in stack.		
1.3	Switch should support internal/external redundant		

	power supply.		
2	PERFORMANCE REQUIREMENTS		
2.1	Shall have minimum 136Gbps of switching fabric and 101Mpps of forwarding rate.		
2.2	Shall have minimum 12K MAC Addresses.		
2.3	Shall have minimum 1K Active VLANs.		
2.4	Shall have minimum 1K IPv4 and IPv6 multicast groups.		
2.5	Shall have minimum 1K IPv4 and IPv6 QoS and Security ACLs.		
3	IEEE STANDARDS		
3.1	Should support IEEE Standards of Ethernet: IEEE 802.1D, 802.1s, 802.1w, 802.1x, 802.3ad, 802.3x, 802.1p, 802.1Q, 802.3, 802.3u, 802.3ab, 802.3z, 802.3az.		
4	QUALITY OF SERVICE (QoS) REQUIREMENTS		
4.1	Switch shall have 802.1p class of service, IP differentiated service code point (DSCP) and cross stack QoS.		
4.2	Switch shall have committed information rate, rate limiting and flow based rate limiting.		
4.3	Switch shall have minimum 8 egress queues per port and strict priority queuing.		
5.	SYSTEM MANAGEMENT AND ADMINISTRATION		
5.1	Switch should support SSHv2, SNMPv2c, SNMPv3, NTPv3 and NTPv4.		
5.2	Switch should support AAA using RADIUS and TACACS+.		
5.3	Switch should support port security, DHCP snooping, Dynamic ARP inspection, IP Source guard, BPDU Guard, Spanning tree root guard and IPv6 First Hop Security.		
5.4	Switch should support software upgrades via TFTP or FTP.		

5.5	Should support 802.1x authentication and accounting with Dynamic VLAN assignment.		
5.6	Switch should support IPv4 and IPv6 ACLs, VLAN , Port and Time based access list with time ranges.		
5.7	Switch Shall have Switch Port Analyzer (SPAN) and Remote Switch Port Analyzer (RSPAN).		
5.8	Switch shall have secure VTP with MD5 protocol to reduce administrative burden of configuring VLANs on multiple switches in turn eliminating the configuration errors & troubleshooting in secure manner.		
5.9	Switch shall have Layer 2 trace route for ease of troubleshooting by identifying the physical path that a packet takes from source to destination.		
5.10	Switch shall have Internet Group Management Protocol (IGMP) Snooping for Ipv4 and Ipv6, MLD v1 and v2 Snooping and Multicast VLAN Registration protocol.		
5.11	Switch shall have per port broadcast, multicast and unicast storm control.		
5.12	Switch shall have Unidirectional Link Detection Protocol (UDLD), Aggressive UDLD, Link Aggregation Control Protocol (LACP), Port Aggregation Protocol (PagP) and Dynamic Trunking Protocol (DTP).		
5.13	Switch shall have Time Domain Reflector (TDR) feature to diagnose and resolve cabling problems.		
5.14	Switch should be Software Defined Networking Ready with Open flow protocol support.		
6	Regulatory Compliance		
6.1	Switch shall conform to UL 60950 or IEC 60950 or CSA 60950 or EN 60950 Standards for Safety requirements of Information Technology Equipment.		
6.2	Switch shall conform to EN 55022 Class A/B or CISPR22 Class A/B or CE Class A/B or FCC Class A/B Standards for EMC (Electro Magnetic Compatibility) requirements.		

7	Evaluation Compliance		
7.1	Switch / Switch's Operating System should be tested and certified for EAL 2/NDPP or above under Common Criteria Certification.		
7.2	Switch should be IPv6 Certified/IPv6 logo ready.		

ANNEXURE 7 : ACCESS SWITCHES 24 PORT PoE/PoE+

S. No.	Generic Requirements	Compliance	Remarks
1	General Hardware and Interface requirements		
1.1	Switch shall have minimum 24 nos. 10/100/1000 Base-T portswith PoE+ capability and minimum 370W of PoE Power and additional 2 nos. SFP+ uplink ports.		
1.2	Switch shall one dedicated slot for minimum 48 Gbps of stacking bandwidth with dedicated stacking ports and cables with minimum 8 switch in stack.		
1.3	Switch should support internal/external redundant power supply.		
2	PERFORMANCE REQUIREMENTS		
2.1	Shall have minimum 88Gbps of switching fabric and 65Mpps of forwarding rate.		
2.2	Shall have minimum 12K MAC Addresses.		
2.3	Shall have minimum 1K Active VLANs.		
2.4	Shall have minimum 1K IPv4 and IPv6 multicast groups.		
2.5	Shall have minimum 1K IPv4 and IPv6 QoS and Security ACLs.		
3	IEEE STANDARDS		
3.1	Should support IEEE Standards of Ethernet: IEEE 802.1D, 802.1s, 802.1w, 802.1x, 802.3ad, 802.3x, 802.1p, 802.1Q, 802.3, 802.3u, 802.3ab, 802.3z, 802.3az, 802.3af, 802.3at.		
4	QUALITY OF SERVICE (QOS) REQUIREMENTS		

4.1	Switch shall have 802.1p class of service, IP differentiated service code point (DSCP) and cross stack QoS.		
4.2	Switch shall have committed information rate, rate limiting and flow based rate limiting.		
4.3	Switch shall have minimum 8 egress queues per port and strict priority queuing.		
5.	SYSTEM MANAGEMENT AND ADMINISTRATION		
5.1	Switch should support SSHv2, SNMPv2c, SNMPv3, NTPv3 and NTPv4.		
5.2	Switch should support AAA using RADIUS and TACACS+.		
5.3	Switch should support port security, DHCP snooping, Dynamic ARP inspection, IP Source guard, BPDU Guard, Spanning tree root guard and IPv6 First Hop Security.		
5.4	Switch should support software upgrades via TFTP or FTP.		
5.5	Should support 802.1x authentication and accounting with Dynamic VLAN assignment.		
5.6	Switch should support IPv4 and IPv6 ACLs, VLAN , Port and Time based access list with time ranges.		
5.7	Switch Shall have Switch Port Analyzer (SPAN) and Remote Switch Port Analyzer (RSPAN) .		
5.8	Switch shall have secure VTP with MD5 protocol to reduce administrative burden of configuring VLANs on multiple switches in turn eliminating the configuration errors & troubleshooting in secure manner.		
5.9	Switch shall have Layer 2 trace route for ease of troubleshooting by identifying the physical path that a packet takes from source to destination.		
5.10	Switch shall have Internet Group Management Protocol (IGMP) Snooping for Ipv4 and Ipv6, MLD v1 and v2 Snooping and Multicast VLAN Registration protocol.		

5.11	Switch shall have per port broadcast, multicast and unicast storm control.		
5.12	Switch shall have Unidirectional Link Detection Protocol (UDLD), Aggressive UDLD, Link Aggregation Control Protocol (LACP), Port Aggregation Protocol (PagP) and Dynamic Trunking Protocol (DTP).		
5.13	Switch shall have Time Domain Reflector (TDR) feature to diagnose and resolve cabling problems.		
5.14	Switch should be Software Defined Networking Ready with Openflowprotocol support.		
6	Regulatory Compliance		
6.1	Switch shall conform to UL 60950 or IEC 60950 or CSA 60950 or EN 60950 Standards for Safety requirements of Information Technology Equipment.		
6.2	Switch shall conform to EN 55022 Class A/B or CISPR22 Class A/B or CE Class A/B or FCC Class A/B Standards for EMC (Electro Magnetic Compatibility) requirements.		
7	Evaluation Compliance		
7.1	Switch / Switch's Operating System should be tested and certified for EAL 2/NDPP or above under Common Criteria Certification.		
7.2	Switch should be IPv6 Certified/IPv6 logo ready.		

ANNEXURE 8 : ACCESS SWITCHES 24 PORT

S. No.	Generic Requirements	Compliance	Remarks
1	General Hardware and Interface requirements		
1.1	Switch shall have minimum 24 nos. 10/100/1000 Base-T ports and additional 2 nos. SFP+ uplink ports.		
1.2	Switch shall one dedicated slot for minimum 48 Gbps of stacking bandwidth with dedicated stacking ports and cables with minimum 8 switch in stack.		
1.3	Switch should support internal/external redundant		

	power supply.		
2	PERFORMANCE REQUIREMENTS		
2.1	Shall have minimum 88Gbps of switching fabric and 65Mpps of forwarding rate.		
2.2	Shall have minimum 12K MAC Addresses.		
2.3	Shall have minimum 1K Active VLANs.		
2.4	Shall have minimum 1K IPv4 and IPv6 multicast groups.		
2.5	Shall have minimum 1K IPv4 and IPv6 QoS and Security ACLs.		
3	IEEE STANDARDS		
3.1	Should support IEEE Standards of Ethernet: IEEE 802.1D, 802.1s, 802.1w, 802.1x, 802.3ad, 802.3x, 802.1p, 802.1Q, 802.3, 802.3u, 802.3ab, 802.3z, 802.3az.		
4	QUALITY OF SERVICE (QoS) REQUIREMENTS		
4.1	Switch shall have 802.1p class of service, IP differentiated service code point (DSCP) and cross stack QoS.		
4.2	Switch shall have committed information rate, rate limiting and flow based rate limiting.		
4.3	Switch shall have minimum 8 egress queues per port and strict priority queuing.		
5.	SYSTEM MANAGEMENT AND ADMINISTRATION		
5.1	Switch should support SSHv2, SNMPv2c, SNMPv3, NTPv3 and NTPv4.		
5.2	Switch should support AAA using RADIUS and TACACS+.		
5.3	Switch should support port security, DHCP snooping, Dynamic ARP inspection, IP Source guard, BPDU Guard, Spanning tree root guard and IPv6 First Hop Security.		
5.4	Switch should support software upgrades via TFTP or FTP.		

5.5	Should support 802.1x authentication and accounting with Dynamic VLAN assignment.		
5.6	Switch should support IPv4 and IPv6 ACLs, VLAN , Port and Time based access list with time ranges.		
5.7	Switch Shall have Switch Port Analyzer (SPAN) and Remote Switch Port Analyzer (RSPAN) .		
5.8	Switch shall have secure VTP with MD5 protocol to reduce administrative burden of configuring VLANs on multiple switches in turn eliminating the configuration errors & troubleshooting in secure manner.		
5.9	Switch shall have Layer 2 trace route for ease of troubleshooting by identifying the physical path that a packet takes from source to destination.		
5.10	Switch shall have Internet Group Management Protocol (IGMP) Snooping for Ipv4 and Ipv6, MLD v1 and v2 Snooping and Multicast VLAN Registration protocol.		
5.11	Switch shall have per port broadcast, multicast and unicast storm control.		
5.12	Switch shall have Unidirectional Link Detection Protocol (UDLD), Aggressive UDLD, Link Aggregation Control Protocol (LACP), Port Aggregation Protocol (PagP) and Dynamic Trunking Protocol (DTP).		
5.13	Switch shall have Time Domain Reflector (TDR) feature to diagnose and resolve cabling problems.		
5.14	Switch should be Software Defined Networking Ready with Open flow protocol support.		
6	Regulatory Compliance		
6.1	Switch shall conform to UL 60950 or IEC 60950 or CSA 60950 or EN 60950 Standards for Safety requirements of Information Technology Equipment.		
6.2	Switch shall conform to EN 55022 Class A/B or CISPR22 Class A/B or CE Class A/B or FCC Class A/B Standards for EMC (Electro Magnetic Compatibility) requirements.		

7	Evaluation Compliance		
7.1	Switch / Switch's Operating System should be tested and certified for EAL 2/NDPP or above under Common Criteria Certification.		
7.2	Switch should be IPv6 Certified/IPv6 logo ready.		

ANNEXURE 9 : ACCESS SWITCHES 8 PORT POE/POE+

S. No.	Generic Requirements	Compliance	Remarks
1	General Hardware and Interface requirements		
1.1	Switch shall have minimum 8 nos. 10/100/1000 Base-T portswith PoE+ capability and minimum 124W of PoE Power and additional 2 nos. SFP uplink ports.		
2	PERFORMANCE REQUIREMENTS		
2.1	Shall have minimum 20Gbps of switching fabric and 15Mpps of forwarding rate.		
2.2	Shall have minimum 8K MAC Addresses.		
2.3	Shall have minimum 250 Active VLANs.		
3	IEEE STANDARDS		
3.1	Should support IEEE Standards of Ethernet: IEEE 802.1D, 802.1s, 802.1w, 802.1x, 802.3ad, 802.3x, 802.1p, 802.1Q, 802.3, 802.3u, 802.3ab, 802.3z, 802.3az, 802.3af, 802.3at.		
4	QUALITY OF SERVICE (QOS) REQUIREMENTS		
4.1	Switch shall have 802.1p class of service, IP differentiated service code point (DSCP) and cross stack QoS.		
4.2	Switch shall have committed information rate, rate limiting and flow based rate limiting.		
4.3	Switch shall have minimum 8 egress queues per port and strict priority queuing.		
5.	SYSTEM MANAGEMENT AND ADMINISTRATION		
5.1	Switch should support SSHv2, SNMPv2c, SNMPv3,		

	NTPv3 and NTPv4.		
5.2	Switch should support AAA using RADIUS and TACACS+.		
5.3	Switch should support port security, DHCP snooping, Dynamic ARP inspection, IP Source guard, BPDU Guard, Spanning tree root guard and IPv6 First Hop Security.		
5.4	Switch should support software upgrades via TFTP or FTP.		
5.5	Should support 802.1x authentication and accounting with Dynamic VLAN assignment.		
5.6	Switch should support IPv4 and IPv6 ACLs, VLAN , Port and Time based access list with time ranges.		
5.7	Switch shall have Switch Port Analyzer (SPAN) and Remote Switch Port Analyzer (RSPAN) .		
5.8	Switch shall have secure VTP with MD5 protocol to reduce administrative burden of configuring VLANs on multiple switches in turn eliminating the configuration errors & troubleshooting in secure manner.		
5.9	Switch shall have Layer 2 trace route for ease of troubleshooting by identifying the physical path that a packet takes from source to destination.		
5.10	Switch shall have Internet Group Management Protocol (IGMP) Snooping for Ipv4 and Ipv6, MLD v1 and v2 Snooping and Multicast VLAN Registration protocol.		
5.11	Switch shall have per port broadcast, multicast and unicast storm control.		
5.12	Switch shall have Unidirectional Link Detection Protocol (UDLD), Aggressive UDLD, Link Aggregation Control Protocol (LACP), Port Aggregation Protocol (PagP) and Dynamic Trunking Protocol (DTP).		
5.13	Switch shall have Time Domain Reflector (TDR) feature to diagnose and resolve cabling problems.		
5.14	Switch should be Software Defined Networking		

	Ready with Open flow protocol support.		
6	Regulatory Compliance		
6.1	Switch shall conform to UL 60950 or IEC 60950 or CSA 60950 or EN 60950 Standards for Safety requirements of Information Technology Equipment.		
6.2	Switch shall conform to EN 55022 Class A/B or CISPR22 Class A/B or CE Class A/B or FCC Class A/B Standards for EMC (Electro Magnetic Compatibility) requirements.		
7	Evaluation Compliance		
7.1	Switch / Switch's Operating System should be tested and certified for EAL 2/NDPP or above under Common Criteria Certification.		
7.2	Switch should be IPv6 Certified/IPv6 logo ready.		

ANNEXURE 10 : STACKING MODULE FOR ACCESS SWITCHES

S. No.	Generic Requirements	Compliance	Remarks
1	General Hardware and Interface requirements		
1.1	Should have 2 dedicated staking ports.		
1.2	Should have minimum 48 Gbps of stacking capability with each stacking port.		
1.3	Should have dedicated stacking cables.		
1.4	Should be from same OEM of access switches.		

ANNEXURE 11 : 1 GIG SFP MODULES (SMF)

S. No.	Generic Requirements	Compliance	Remarks
1	General Hardware and Interface requirements		
1.1	Connector types LC		
1.2	1000 Base-X		

1.3	Support 1Gbps upto 10 KM on SMF		
1.4	Should be from same OEM of switches.		

ANNEXURE 12 : 1 GIG UTP MODULES

S. No.	Generic Requirements	Compliance	Remarks
1	General Hardware and Interface requirements		
1.1	Connector types RJ-45		
1.2	1000 Base-T		
1.3	Support 1Gbps upto 100 M on Cat 5 UTP		
1.4	Should be from same OEM of switches.		

ANNEXURE 13 : 10 GIG SFP MODULES (SMF)

S. No.	Generic Requirements	Compliance	Remarks
1	General Hardware and Interface requirements		
1.1	Connector types LC		
1.2	10G Base-LR		
1.3	Support 10 Gbps upto 10 KM on SMF		
1.4	Should be from same OEM of switches.		

ANNEXURE 14 : 10 GIG SFP MODULES (MMF)

S. No.	Generic Requirements	Compliance	Remarks
1	General Hardware and Interface requirements		
1.1	Connector types LC		
1.2	10G Base-SR		
1.3	Support 10 Gbps upto 350 M on MMF		

1.4	Should be from same OEM of switches.		
-----	--------------------------------------	--	--

ANNEXURE 15 : 40 GIG QSFP MODULES (MMF)

S. No.	Generic Requirements	Compliance	Remarks
1	General Hardware and Interface requirements		
1.1	Connector types LC		
1.2	40 Gig BiDi		
1.3	Support 40Gbps upto 100M on MMF		
1.4	Should be from same OEM of switches.		

ANNEXURE 16 : WIRELESS ACCESS POINT (INDOOR)

S. No.	Specification	Compliance	Remarks
1	Access Points proposed must include radios for 2.4 GHz and 5 GHz with 802.11ac Wave 2		
2	The Access Point should have a capability to handle high density environment with more number of concurrent users by having more memory and CPU of 1GB RAM and 1.8 GHz of processor respectively.		
3	Access point must support flexible Dynamic Frequency Selection across 20Mhz, 40Mhz, 80MHz and 160Mhz wide channels to combat performance problems due to wireless interference. And when radar is detected, it should be able to identify the exact 20 Mhz channel & should be able to block that channel only		
4	Access point must have an additional USB port for future use.		
5	Access point should have 2x10/100/1000 Ethernet and serial/console port.		
6	Must support 4X4 multiple-input multiple-output (MIMO) and three spatial streams.		
7	Must support the physical rate of 2.6Gbps on 5GHz radios.		

8	The access point should have a capability to enable both the radios on 5Ghz for serving the client thereby increasing the bandwidth capacity to 5.2 Gbps per access point.		
9	Must support minimum of 23dbm of transmit power on both 2.4 Ghz& 5GHz Radio.		
10	The AP must be capable of optimizing the SNR exactly at the position where 802.11a/g/n/ac client is placed (beam forming) without requiring any support or feedback from clients, hence it should work with all 802.11a/g/n/ac clients.		
11	Should have detecting and classifying non-Wi-Fi wireless transmissions while simultaneously serving network traffic.		
12	Should support configuring the access point as network connected sensor to access any network location covered by the access point to get real-time Spectrum analysis data.		
13	Must incorporate radio resource management for power, channel, coverage hole detection and performance optimization.		
14	Must have -90 dB or better Receiver Sensitivity.		
15	Must support Proactive Key Caching and/or other methods for Fast Secure Roaming.		
16	Must support Management Frame Protection.		
17	Should support locally-significant certificates on the APs using a Public Key Infrastructure (PKI).		
18	Must operate as a sensor for wireless IPS.		
19	Should support non-Wi-Fi detection for off-channel rogues and Containment for both radio while serving the client simultaneously.		
20	Access Points must support Hardware-based encrypted user data and management traffic between controller and Access point for better security.		
21	AP model proposed must be able to be both a client-serving AP and a monitor-only AP for Intrusion Prevention services.		
22	Mesh support should support QoS for voice over		

	wireless.		
23	Must be plenum-rated (UL2043).		
24	Must support 16 WLANs per AP for SSID deployment flexibility.		
25	Must continue serving clients when WAN link to controller is back up again, should not reboot before joining		
26	The APs must support centralized wireless mode with the use of a controller, but the APs must also support operation in autonomous mode without the presence of any controller, when needed.		
27	When operated in remote AP mode, the AP must not disconnect any clients when the connection to the controller fails or in the case the failed connection has been restored again.		
28	When operated in remote AP mode, the AP must be able to authenticate new users with local radius server directly at the AP itself in case of link failure to controller.		
29	Access point should able to do the spectrum scanning for WiFi and non-WiFi interference for both on-channel and off-channel at all 20Mhz ,40Mhz, 80Mhz and 160Mhz channels		
30	Must support telnet and/or SSH login to APs directly for troubleshooting flexibility.		
31	Must support Power over Ethernet)/ power injectors.		
32	802.11e and WMM		

ANNEXURE 17 : WIRELESS ACCESS POINT (OUTDOOR)

S. No.	Specifications	Compliance	Remarks
1	Access Points proposed must include radios for both 2.4 GHz and 5 GHz.		
2	AP should support dual band antenna ports.		
3	Must support a variety of antenna options. (Omni and directional)		
4	Must support 2X2 multiple-input multiple-output (MIMO) with two spatial streams		
5	Must support 802.11ac, Wave 2 and backward		

	compatible with 802.11n standards		
6	Must support 80 MHz wide channels in 5 GHz.		
7	Must support WAP enforced load-balance between 2.4Ghz and 5Ghz band.		
8	Must support upto 30dbm or higher of transmit power		
9	Access point should 802.11ac, 802.11n and 802.11a/b/g Beam forming		
10	The Wireless Backhaul/Mesh shall operate in 5Ghz		
11	Support Encrypted and authenticated connectivity between all backhaul components		
12	Access point should have multiple wired uplink interfaces including 10/100/1000BASE-T Ethernet autosensing (RJ-45) and a build-in SFP port		
13	Should have console port		
14	Wireless AP should support beam forming technology to improve downlink performance of all mobile devices, including one-, two-, and three-spatial-stream devices on 802.11ac without taking the inputs from client.		
15	Wireless AP Should able to detect and classify non-Wi-Fi wireless transmissions.		
16	Must incorporate radio resource management for power, channel, coverage hole detection and performance optimization		
17	Access point shall support powering from AC /DC/ UPOE.		
18	Access point shall support pole, wall and Cable strand mounting options.		
19	The equipment shall support up to 100 MPH sustained winds & 165 MPH wind gusts.		
20	The Access point shall be IP67 and NEMA rated		
21	The Access point shall support operating temperature of -40 to 65°C		
22	802.11e and WMM		
23	WiFi Alliance Certification for WMM and WMM power save		
24	Must support Reliable Multicast to Unicast conversion to maintain video quality at AP level		
25	Must support QoS and Video Call Admission Control capabilities.		
26	Must support Spectrum analysis including @ 80 MHz		
27	Same model AP that serves clients must be able to be dedicated to monitoring the RF environment.		
28	Should support mesh capabilities for temporary connectivity in areas with no Ethernet cabling.		
29	Must support 16 WLANs per AP for BSSID deployment flexibility.		
30	Must support telnet and SSH login to APs directly for troubleshooting flexibility.		

ANNEXURE 18 : 150 AP LICENSE UPGRADE FOR EXISTING WLC

S. No.	Specification	Compliance	Remarks
1	150 AP License upgrade for Existing WLC 5508		

ANNEXURE 19 : 2x10 GIG UPLINK MODULE FOR EXISTING SWITCH

S. No.	Specification	Compliance	Remarks
1	2x10 Gig Uplink Modules for existing 3560X Switches. Same modules should have capability to be used as 4x1 Gig or 2x10 Gig+2x1 Gig Module.		

ANNEXURE 20 : IP COMMUNICATION MANAGER IN HA

S. No.	Minimum Specifications	Compliance	Remarks
1	The IP telephony system should be a converged communication System with ability to run TDM and IP on the same platform using same software load based on server and Gateway architecture.		
2	The system should be capable of supporting analog and IP Telephones. System have hardware, software and licensing for 1000 perpetual licenses from day 1 and should be scalable to 1000 IP Phones on same hardware. However the IP EPABX system / cluster should have the capability to scale upto 5000 users (with additional hardware) to achieve the future capacity. System should have minimum 200 licenses for soft client calling feature.		
3	All the users to be managed in a single database, which is managed centrally, no multiple databases. CLI facility for all users should be provisioned from day 1.		
4	The system should be based on server gateway architecture with external server running on Linux OS. No card based processor systems should be quoted.		

5	The voice network architecture and call control functionality should support both SIP & H.323.		
6	The call control system should be fully redundant solution with no single point of failure and should provide 1:1 redundancy. The solution must provide geographical redundancy by separating the servers over LAN/WAN. i.e. if the server in the main data center fails, the other server, which is installed at geographically different location over LAN/WAN should take over the entire communication network load.		
7	The system to have distributed architecture and the centralized control for all the IP PBX entities in the network.		
8	The communication feature server and gateway should support IPv6 from day 1 so as to be future proof.		
9	It should support Survivable Call Control functionality so that the survivable system at the remote location shall provide fall back call control service in case the remote site loses all connectivity to the main Call Control system placed at datacenter. It is expected that the survivability call control system will provide a minimal set of essential telephony features to the end users that could be a subset of the feature that are available from the main call control system.		
10	It should be possible for the IP phone to be connected on the same line which is connected to the computer i.e. Single wire to desk.		
11	Call control server / appliance should be Intel based hardware with necessary configuration to support the desired expandability. No proprietary hardware is acceptable. It is desired to have support for virtualization.		
12	The system software version offered should be the latest release as on the date of supply of EPABX as available globally.		
13	The offered solution must have standards based QoS implementation.		

14	System should allow direct registration / profile creation of SIP endpoints onto it and perform all functions of Proxy / Registrar / Redirect etc		
15	In progress Internal / PSTN Calls at each of the locations should not be interrupted in the event of Call Server failure or WAN link failure.		
16	Quality of Services (QoS) would be configured to administer the call and ensure voice traffic get priority over normal traffic.		
17	The System should support Call Admission Control to configure number of calls that can be active between locations.		
18	Should support Active Directory integration for directory synchronization and user authentication.		
	Call processing and call control functionality		
20	Should support signaling standards / Protocols – SIP, H.323, Q.Sig.		
21	Voice CODEC support <input type="checkbox"/> G.711, G.729, G.729ab & G.722		
22	Video codecs: H.264		
23	Video telephony support (H.323, and SIP)		
24	Support for configuration database (contains system and device configuration information, including dial plan)		
25	Having inbuilt administration web based administration. No additional thick client for administration on the Admin PC. Should also support HTTPS for management.		
26	Call control system should provide for SIP trunks for integration with other exchanges or Applications for interoperability. Bidder to bundle at least 100 SIP/IP trunk licenses with the offer.		
27	Should support 6 party adhoc conferencing.		
28	Should support at least 15 meet-me audio conference of upto 8 party in each conference.		

	System Management and monitoring		
29	The System should have GUI support web based management console		
30	System should provide management tool to monitor system performance, device status, device discovery and CTI applications.		
31	Should provide alert notifications for troubleshooting performance		
32	Generate various alerts online on management console in different colors when values go over / below preconfigured threshold levels.		
33	Should monitor the system in real time on a set of preconfigured parameters.		
34	The management platform must provide different levels for accessing the system based on the role being played by the user who is accessing the system. The administrator should have the highest authority.		
	Security		
35	The protection of signaling connections over IP by means of authentication, Integrity and encryption should be carried out using TLS.		
36	The password and Access Control must Include the following:		
	Passwords to prevent the possibility of an aggressor to easily read or deduce system or account access password.		
	Password aging with Configurable time periods.		
37	System should support SRTP for media encryption and signaling encryption by TLS.		
38	Secure HTTP support for Call Server Administration, Serviceability, User Pages, and Call Detail Record Analysis and Reporting Tool. Should support Secure Sockets Layer (SSL) for directory.		
39	Phone Security: TFTP files (configuration and firmware loads) are signed with the self signed certificate of the TFTP server. The Call Server system		

	admin will be able to disable http and telnet on the IP phones		
	System Features		
40	Hunt groups		
41	Dial plan partitioning		
42	The system should support at least 12 digit numbering scheme.		
43	Distributed call processing		
44	Hotline and private line automated ring down (PLAR)		
45	Multi Level Precedence and Preemption (MLPP)		
46	Q.SIG (International Organization for Standardization [ISO])		
47	SIP trunk (RFC 3261) and line side (RFC 3261 based services)		
48	SIP trunk Call Admission Control (SIP CAC)		
49	Time of day, day of week, and day of year routing and restrictions		
50	The proposed system should support automatic route selection (ARS) and least Cost routing (LCR) features to route the calls based on priorities related to user profile, tariff, and network availability, along the most cost effective path. This service will be transparent for users and irrespective of the physical carrier connection.		
51	Distinctive Ringing: The system should provide audibly different station ringing patterns to distinguish between internal and external calls		
52	IP Phone Address Book Synchronizer—allows users to synchronize Microsoft Outlook or Outlook Express address books with Personal Address Book.		
	User Features		
53	User should be able to log in from any IP Phone using username and password and all the privilege should		

	extend to that physical IP phone		
54	Mobility features providing Simultaneous ringing on both Desk phone and GSM Mobile phone. This feature should allow for seamless transfer of a live call from Mobile phone to desk phone and vice a-versa.		
55	Should support at least 8 party Ad-hoc conferencing on IP phones.		
56	Message waiting indicator (MWI)		
57	Abbreviated Dial		
58	Call park and pickup		
59	Call status per line (state, duration, number)		
60	Calling Line Identification (CLID)		
61	Calling party name identification		
62	Direct inward dial (DID)		
63	Direct outward dial (DOD)		
64	Directory dial from phone—corporate, personal		
65	Directories—missed, placed, received calls list stored on IP phones		
66	Distinctive ring (on net vs. off net)		
67	Shared Line support		
68	Multiple line appearances per phone		
69	Station volume controls (audio, ringer)		
70	Transfer		
71	Video (SIP and H.323)		
72	Boss secretary feature support		
73	On hook dialing		
74	Call waiting		
75	Call Conference		
	Soft Client with Presence Services		

76	Solution should provide a "presence" application for users, so that they can see the availability status of their contacts in their contact list.		
77	The common supported status for this application should be available, busy, idle, away etc.		
78	Should support the users to see other user's IP phone's on/off hook states.		
79	The instant messaging application should support manual setting of user status to: Available, Away, Do Not Disturb (DND) etc.		
80	Shall provide support for open protocols like XMPP.		
81	Presence based IM client should be available for Desktops (Windows & Mac), as well as for Mobile phones (Android / iPhone)		
82	Should support management of contact list and personal settings from Presence based desktop application		
	Video Telephony Features and Support		
83	The call control system should provide integrated video telephony features to the users so that user with IP Phone and video telephony end point should be able to place video calls with the same user model as audio calls.		
84	The users should be able to transfer video calls to other Video phone users.		
85	Call Server should provide a common control agent for signaling, configuration, and serviceability for voice and video end points.		
86	Call control system should handle CODEC and video capabilities of the endpoints, bandwidth negotiation to determine if video/audio call can take place.		
	Upgrade Protection for Software Licenses:		
87	Bidders should include Upgrade Protection for all the Software Licenses quoted for this requirement. The Upgrade Protection should cover period of 5 years. During this 5 year period the bidder should provide software upgrade of any major and minor release free		

	of cost to customer.		
--	----------------------	--	--

ANNEXURE 21 : VOICE GATEWAY SYSTEM

S. No.	Minimum Specifications	Compliance	Remarks
1	Should provide 3 x 10/100/1000 interfaces		
2	Router should have minimum forwarding rate of 300 Kpps		
3	Gateway should be modular with minimum 4 slots for voice interface.		
4	Shall support variety of Voice interfaces like FXO, FXS, Channelized PRI (E1), E&M, Fast Ethernet and Gigabit Ethernet.		
5	Should be provided with 2 x E1 ports Day 1 to terminate 2 PRIs It shall support redundant power supply.		
6	It should support embedded hardware encryption acceleration (DES, 3DES and AES), voice- and video-capable digital signal processor (DSP) slots or equivalent.		
7	It should support embedded Voice- and video-capable digital signal processor (DSP) slots or equivalent feature.		
8	Should support cRTP to compress voice (RTP) streams.		

ANNEXURE 22 : VIDEO CONFERENCING SYSTEM

S. No.	Minimum Specifications	Compliance	Remarks
1	The MCU must be a hardware based MCU providing		

	at least 50 ports of HD with scalability to 90 ports HD in a single chassis without cascading and without any port loss.		
2	The MCU should be able to scale the capacity without losing any of the features and functionalities. MCU should support 1080p 30fps and 720p 30 fps video resolution protocols.		
3	MCU should support advanced features such as Continuous Presence of all participants should be available so that any 16 sites can be selected to appear on the screen in CP mode.		
4	Should support H.264 even in Continuous presence and should support at least two concurrent meeting from day 1.		
5	MCU should register with purposed IP Communication Manager and be interoperable with purposed Video IP Phones, IP Phones and Soft Clients.		
6	Should support H.263, H.263+, H.263++, H.264 video algorithms		
7	Along with the Support for basic algorithms like G.711 and G.722.1 the MCU should also support wideband Audio protocols to provide HD quality audio during video meetings using protocols such as MPEG 4 AAC -LC and MPEG 4 AAC -LD or equivalent		
8	It must be possible to have both SIP/H323 devices in the same conference call		
9	The MCU should support transcoding of different Audio/video Protocols.		
10	MCU should be able to combine HD and SD in the same conference without degrading the HD resolution from and to the HD endpoints.		
11	The MCU should have an video encode resource per participant		
12	The MCU should have H.239/BFCP protocol for sending and receiving dual video streams (Presenter + Presentation). This should be available for all the ports.		

13	The MCU should allow active speaker selection/dynamic continuous presence.		
14	The MCU must support the ability to view at least 20 sites simultaneously on the screen. These sites can be any sites as selected by the administrator and not restricted to the last 20 sites that were active.		
15	The MCU must support at least 10 different layouts and must support active speaker along with second last active speaker both visible in bigger panes.		
16	Should have ability to connect each site @ 4 Mbps		
17	Should support intelligent down speeding, packet pacing and packet loss concealment		
18	10/100/1000Mbps Ethernet Port		
19	Should have the ability to work on both IPV4 and IPV6 without any degradation of performance from day one.		
20	The MCU should support 128 Bit strong AES encryption/H.235/SRTP for calls		
21	The MCU must support encryption for calls on SIP.		
22	MCU should be equipped with packet loss handling algorithm for video and audio		

ANNEXURE 23 : IP PHONE TYPE I

S. No.	Minimum Specifications	Compliance	Remarks
1	The phone should meet the following specifications		
2	The phone should be SIP based.		
3	Should have 128 x 30 or better pixel-based display		
4	Should have full duplex speaker phone and dedicated headset port with RJ-9 interface.		
5	It should support G.711 and G.729a/b audio compression codes.		
6	Should provide the directory services to the user by displaying the missed, received and dialed call details including the caller ID and calling time.		

7	Should support IEEE 802.3af POE and external AC power adapter option.		
8	The phone should have two 10/100 BASE-T Ethernet ports, one for the LAN connection and the other for connecting to PC/laptop.		
9	The phone should support QoS mechanism through 802.1p/q.		
10	Support for online firmware upgrades using Trivial File Transfer Protocol (TFTP)		

ANNEXURE 24 : IP PHONE TYPE II

S. No.	Minimum Specifications	Compliance	Remarks
1	The phone should meet the following specifications		
2	The phone should be SIP based.		
3	Should have 2.4-in. (6-cm) color display with 240 x 320 pixel resolution		
4	Should have full duplex speaker phone and should supports third-party Bluetooth 3.0 headsets and a 3.5-mm headphone jack		
5	Should support G.711a, G.711u, G.729a, G.729ab, G.722, ILBC, WAV, iSAC		
6	Should provide the directory services to the user by displaying the missed, received and dialed call details including the caller ID and calling time.		
7	Should support exceptional voice quality with high-definition (HD) voice		
8	Should include extended battery and external AC power adapter option.		
9	Should support 802.11a, 802.11b, 802.11g, 802.11n and 802.11ac		
10	Should support TLS, SRTP, certificates, Device Authentication, File authentication, Signaling Authentication		

11	Should support WPA, EAP-FAST, EAP-TLS, AES		
12	Should support Ingress Protection Standard IP67 and MIL-STD-810G Drop and Vibration procedures		
13	The phone should support XML based services and applications.		
14	Support for online firmware upgrades using Trivial File Transfer Protocol (TFTP)		

ANNEXURE 25 : IP PHONE TYPE III

S. No.	Minimum Specifications	Compliance	Remarks
1	The phone should meet the following specifications		
2	The phone should be SIP based.		
3	Should have 3.5” or higher diagonal Display and supporting resolution of 320 x 160 or better pixel.		
4	Should have full duplex speaker phone and dedicated headset port with RJ-9 interface.		
5	It should support G.711, G.722, G.729a and iLBC audio compression codes.		
6	Should provide the directory services to the user by displaying the missed, received and dialed call details including the caller ID and calling time.		
7	Should have 4 or more programmable line keys.		
8	Should support IEEE 802.3af POE and external AC power adapter option.		
9	The phone should have two 10/100/1000 BASE-T Ethernet ports, one for the LAN connection and the other for connecting to PC/laptop.		
10	The phone should support QoS mechanism through 802.1p/q.		
11	The phone should support XML based services and applications.		

ANNEXURE 26 : IP PHONE TYPE IV

S. No.	Minimum Specifications	Compliance	Remarks
1	Integrated 7-inch capacitive touch screen, with support for multi-touch gestures		
2	HD video with H.264 and AVC video calling up to 1080p at 30 fps		
3	Enhanced wideband audio support (through G.722 or Internet Speech Audio Codec [iSAC] codes) using the handset, headset, or speakerphone		
4	Choice of 802.11a/b/g/n desktop Wi-Fi connectivity or Gigabit Ethernet network connectivity with an integrated switch port for a co-located PC		
5	Embedded Bluetooth radio and two standard type A high-speed Universal Serial Bus (USB 2.0) ports for optional accessories (for example, headsets for external camera, thumb drive or memory stick, keyboard, and mouse)		
6	Dual independent displays with an external monitor using High-Definition Multimedia Interface (HDMI) with resolution up to 1920 x 1200 (WUXGA)		
7	Android 4.1.1 operating system and Google Play Store access for third-party applications		
8	Integrated collaborative application suites: Messaging (IM), presence, email, calendar, contacts, visual voicemail		
9	Should support Extension Mobility		
10	Calling name and number display		
11	Call waiting, call forward, call transfer and Three-way calling (conference) feature		
12	On- and off-network distinctive ringing		
13	Software upgrade supported using a Trivial File Transfer Protocol (TFTP) server		
14	Provisioning of network parameters through Dynamic		

	Host Configuration Protocol (DHCP)		
15	Should support SRTP and VPN		
16	Should support G.722 wideband, G.711a, G711u, iLBCm G.729a, G.729ab, G.729b		
17	Extensible Authentication Protocol: Extensible Authentication Protocol-Flexible Authentication via Secure Tunneling (EAP-FAST)		
18	BFCP for viewing shared content		

ANNEXURE 27 : IP PHONE TYPE V

S. No.	Minimum Specifications	Compliance	Remarks
1	The solution should be an OEM integrated executive video phone with a minimum 23" display, codec, inbuilt integrated camera , inbuilt Microphones and speakers. All the components 23" display , codec, camera, microphones should be from the same OEM. The codec should be tightly integrated with the 23" screen, so that less space is occupied on the Executive's table. The system should also function as a PC Monitor.		
2	Should support H.264 and 1080p with 16:9 aspect ratio and SIP		
3	The system should support resolutions up to 1080p with BFCP standard		
4	Should support G.722,G.711, G.729 or equivalent		
5	Should have 2 x 10/100/1000 and Wi-Fi connectivity		
6	The system should be interoperable with the centralized IP PBX software		
7	Operating System should be Android/equivalent		

Brief Description of Institute's Campus Wide Network

Indian Institute of Technology Jodhpur has set up a robust, scalable, state-of-the-art Campus Wide Local Area Network connecting its various blocks, hostels and residential area in existing campus. The Campus Local Area Network (LAN) is structured on 2-tier network architecture wherein access locations are directly connected/aggregated to core switches points. Existing campus wide local area network has been built with following design principles:

- Hierarchical
 - Facilitates understanding the role of each device at every tier
 - Simplifies deployment, operation, and management
 - Reduces fault domains at every tier
- Modularity
 - Allows the network to grow on an on-demand basis
- Resiliency
 - Satisfies user expectations for keeping network always on
- Flexibility
 - Allows intelligent traffic load sharing by using all network resources

Each layer is built as well-defined structured module with specific roles and functions in the LAN network. Introducing modularity in the LAN hierarchical design further ensures that the LAN network remains resilient and flexible to provide critical network services as well as to allow for growth and changes that may occur in IIT Jodhpur Campus LAN.

Access layer

The access layer represents the network edge, where traffic enters or exits the campus network. Primary function of access layer switch is to provide network access to the user. Access layer switches connecting to the Core Switch to perform network foundation technologies which are given as:

- Limiting VLANs to a single closet whenever possible.
- Running Rapid PVST+ to avoid Layer 2 loops in network.
- Running secure VTP with MD5 protocol to reduce administrative burden of configuring VLANs on multiple switches in turn eliminating the configuration errors & troubleshooting in secure manner. VLANs configured on Core or Distribution switches are updating to access switches automatically in secure manner.
- Trunks are set to on/on with no negotiate, pruning unused VLANs on access switches.
- Quality of service (QoS) and per port MAC Address Based Security is implemented on access switch ports.
- 802.1x authentication to filter out unauthorized users.

To meet network application and end-user demands, switching platforms are implemented to provide intelligent services to various types of endpoints at the network edge which in turn help to use network as platform for various future applications requirement for voice, video and data. Building intelligence into access layer switches allows them to operate more efficiently, optimally, and securely.

Core layer

The core layer is the network backbone that connects all access layers of the IIT Jodhpur Campus LAN, provides for connectivity between end devices, computing and data storage services located within the data center and other areas alongwith services within the network. The core layer is serving as the aggregator for all the other campus blocks, and ties the campus together with the rest of the network.

The core layer interfacing between the distribution layer and server access layer provides for many key functions, such as the following:

- Aggregating and terminating Layer 2 broadcast domains from server access switches
- Running Rapid PVST+ to avoid Layer 2 loops in network for servers access switches
- Running secure VTP with MD5 protocol to reduce administrative burden of configuring VLANs on multiple switches in turn eliminating the configuration errors & troubleshooting in secure manner. VLANs configured on Core or Distribution switches are updating to access switches automatically in secure manner
- Trunks are set to on/on with no negotiate, pruning unused VLANs on access switches
- Layer 3 routing between multiple distribution layers and running EIGRP as routing protocol for fast convergence and equal cost path sharing
- Providing intelligent switching, routing, and network access policy functions to access the rest of the network

Other than above mentioned functions all switches in the campus network are capable to perform layer 3 traceroute, layer 2 traceroute and layer 2 debugging for troubleshooting. Distribution and access switches asked in RFP must be fully compatible with protocols running in existing Campus LAN Network.

List of equipments used in current Campus Wide Network

S.No.	Description	Make	Mode
1	ASA-5585X-PWR-PC	Cisco	HA
2	WSA-S680-K9	Cisco	HA
3	ESA-C380-K9	Cisco	HA
4	SMA-M680-K9 (For central monitoring)	Cisco	Single
5	NAS Storage 300 TB	EMC	Single

Original Equipment Manufacturer (OEM) Criteria:

- The OEM of the equipment's quoted for should have a minimum of 10 custom paid spare depots in India to support failure of equipment's and better resolution.

- The OEM should support next business day delivery against defective spares in major locations in India. OEM should have 24x7x365 support in India with a direct TAC support in the country.
- The OEM should have a registered office in India from last 10 Years.
- The Network Solution comprising of all active components should be from single OEM.
- OEM should be ISO 9001:2000 & ISO 14001 certified.

Annexure – II

FORMAT FOR MANUFACTURER'S AUTHORISATION LETTER TO AGENT (on letter head)

Ref. No.

Date:

To,
The Director
Indian Institute of Technology Jodhpur
Old Residency Road, Ratanada, Jodhpur - 342011.

Sub.: Authorization Letter.

Dear Sir,

We, _____, who are established and reputed manufacturers of _____, having factory at _____, hereby authorize M/s. _____ (name & address of Indian distributor /agent) to bid, negotiate and conclude the orderwith you for the above goods manufactured by us.

We shall remain responsible for the tender / contract / agreement negotiated by the said M/s. _____, jointly and severely.

We ensure that we would also support / facilitate the M/s _____ on regular basis with technology / product updates for up-gradation / maintains / repairing / servicing of the supplied goods manufactured by us, during the warranty period.

In case duties of the Indian agent / distributor are changed or agent / distributor is changed it shall be obligatory on us to automatically transfer all the duties and obligations to the new Indian Agent failing which we will ipso-facto become liable for all acts of commission or omission on the part of new Indian Agent / distributor.

Yours faithfully,

[Name & Signature]

for and on behalf of M/s. _____ [Name of manufacturer]

Note: This letter of authorisation should be on the letterhead of the manufacturing concern and should be signed by a person competent and having the power of attorney to bind the manufacturer. A copy of notarised power of attorney should also be furnished.

Annexure – III

DECLARATION REGARDING BLACKLISTING/DEBARRING FOR TAKING PART IN TENDER.

(To be executed & attested by Public Notary / Executive Magistrate on Rs.10/- non-judicial Stamp paper by the bidder)

I / We _____ Manufacture / Partner(s)/ Authorized Distributor /agent of M/S. _____ hereby declare that the firm/company namely M/s. _____ has not been blacklisted or debarred in the past by Union / State Government or organization from taking part in Government tenders in India.

Or

I / We _____ Manufacture / Partner(s)/ Authorized Distributor / agent of M/s. _____ hereby declare that the Firm/company namely M/s. _____ was blacklisted or debarred by Union / State Government or any Organization from taking part in Government tenders for a period of _____ years w.e.f. _____ to _____. The period is over on _____ and now the firm/company is entitled to take part in Government tenders.

In case the above information found false I/we are fully aware that the tender/ contract will be rejected/cancelled by Director, IIT Jodhpur, and EMD/ Performance Security shall be forfeited.

In addition to the above Director, IIT Jodhpur will not be responsible to pay the bills for any completed / partially completed work.

DEPONENT

Name _____

Address _____

Attested:

(Public Notary / Executive Magistrate)

Annexure – IV

CERTIFICATE OF GUARANTEE/WARRANTY (on letter head)

I / We certify that the guarantee / warranty shall be given for a period of five (05) years starting from the date of the satisfactory installation, commissioning and handing over of the equipment and the work completed under the contract. During the guarantee / warranty period, I / we shall provide the “after sale service” and the replacement of defective / or any part(s) of the equipment or rectification of defects of work of the equipment will be free of cost. The replacement of the parts shall be arranged by us, at our own cost and responsibility. We undertake that the above guarantee / warranty shall begin only from the date of handing over of the equipment. The benefit of change in dates of the guarantee / warranty period shall be in the interest of the user / your organization.

During the warranty period, we will provide **residence engineers (at least one) at your site (Graduate with 5 year relevant experience)**.

Uptime Guarantee: During the guarantee / warranty period, we will be responsible to maintain the equipment including all the accessories in the satisfactory faultless working conditions for a period 347 days (i.e. 95% uptime) in a block of 365 days.

- All complaints will be attended by us within 4 working days of receipt of the complaint in our office.
- In case there is delay of more than 4 days in attending the complaint from our side then the Institute can count the number of days in excess of the permissible response time in the downtime. The above said response time of 4 days for attending to a complaint by us will not be counted in the downtime.
- Penalty: We shall pay a penalty equivalent to 0.5 % of the order value of the equipment for every week or part thereof delay in rectifying the defect.

No deduction or advantage of any kind on account of Sundays, half days or Public / Govt. holidays observed by the Institute shall be allowed from the total down time permissible as defined above. The right to accept the reason(s) for delay and consider reduction or waive off the penalty for the same shall be at the sole discretion of the Institute.

I / We shall try to repair the equipment at Institute premises. However, in case it is not possible to repair the equipment at Institute premises, we will take out the equipment to our site on our own expenses. We shall take the entire responsibility for the safe custody and transportation of the equipment taken out for repairs till the equipment is rehabilitated to the Institute after repair. If any loss of equipment occurred during our custody, we will restore it / compensate to Institute for such losses.

I / We guarantee that in case we fail to carry out the maintenance work within the stipulated period, the Institute reserves the right to get the maintenance work carried out at our risk, cost and responsibility after informing us. All the expenses including excess payment for repairs / maintenance shall be adjusted against the Performance Bank Guarantee. In case the expenses exceed the amount of the Performance Bank Guarantee, the same shall be recoverable from us with / without interest in accordance with the circumstances.

I / We undertake to perform calibration after every major repair / breakdown / taking the equipment out for repair from the Institute premises.

I / We guarantee that we will supply spare parts, if and when required on agreed basis for an agreed price. The agreed basis could be an agreed discount on the published catalogue price.

I / We guarantee to the effect that before going out of production of the spare parts, we will give the adequate advance notice to Institute so that Institute may undertake to procure the balance of the life time requirements of the spare parts.

Authorized signatory of the company with seal

Annexure-V

BANK GUARANTEE FORM FOR PERFORMANCE SECURITY

The Director
Indian Institute of Technology Jodhpur,
Jodhpur (India) 342011.

WHEREAS..... (Name and address of the Supplier) (hereinafter called “the Supplier”) has undertaken, in pursuance of contract no..... dated (hereinafter called “the contract”) to supply

AND WHEREAS it has been stipulated by you in the said contract that the Supplier shall furnish you with a bank guarantee by a scheduled/nationalized bank recognised by you for the sum specified therein as security for compliance with its obligations in accordance with and due performance of the contract;

AND WHEREAS we have agreed to give the Supplier such a bank guarantee;

NOW THEREFORE we hereby affirm that we are guarantors and responsible to you, on behalf of the Supplier, up to a total of(amount of the guarantee in words and figures), and we hereby irrevocably and absolutely undertake to pay you immediately, upon your first written demand declaring the Supplier to be in default under the contract and without cavil or argument, any sum or sums within the limits of (amount of guarantee) as aforesaid, without your needing to prove or to show grounds or reasons for your demand or the sum specified therein.

We hereby waive the necessity of your demanding the said debt from the Supplier before presenting us with the demand.

We further agree that no change or addition to or other modification of the terms of the contract to be performed there under or of any of the contract documents which may be made between you and the

Supplier shall in any way release us from any liability under this guarantee and we hereby waive notice of any such change, addition or modification.

The Bank guarantee shall be interpreted in accordance with the laws of India. The Guarantor Bank represents that this Bank Guarantee has been established in such form and with such content that is fully enforceable in accordance with its terms as against the Guarantor Bank in the manner provided herein.

The Bank Guarantee shall not be affected in any manner by reason of merger, amalgamation, restructuring or any other change in the constitution of the Guarantor Bank or the Supplier. The Bank further undertakes not to revoke this Guarantee during its currency except with the previous express consent of the Buyer in writing.

The Bank declares that it has power to issue this Guarantee and discharge the obligations contemplated herein, the undersigned is duly authorized and has full power to execute this Guarantee for an on behalf of the Bank.

This guarantee shall be valid up to and including the day of, 20.....

.....
(Signature with date of the authorised officer of the Bank)

.....
Name and designation of the officer

.....
Seal, name & address of the Bank and address of the Branch

Annexure - VI

Format for Financial Bid

(To be submitted on the letterhead of the company / firm)

Ref. No.

Dated:

S. No.	Description	Qty.	Unit Rate	Total Amount
1.	Basic Price of each equipment as per Annexure-VI-A			
2.	Other charges (if any, specify in brief)			
3.	VAT / CST (As applicable)			
		Total		
4.	AMC charges (After warranty for 2 years)	Charges for 1 st year		
		Charges for 2 nd year		
5.	CMC charges (After warranty for 2 years)	Charges for 1 st year		
		Charges for 2 nd year		

Note:

1. I/We have gone through the entire terms & conditions as stipulated in the tender enquiry document and confirm to accept and abide the same.
2. No other charges would be payable by the Institute.
3. Rates of AMC and CMC are to be quoted in Indian Rupees only as these shall be paid in Indian Rupees only.
4. CMC has to be for all parts and may also include consumables and reagents. The charges for the service contract will be paid half-yearly in arrears for satisfactory service or as per the mutually agreed upon schedule.

Authorized signatory of the company with seal

Annexure – VI-A

Supply and Installation of Network Components:

Sr. N	Switch Type	Unit Price (in INR)	Quantity	Net Price (in INR)
1	Core Switch		2	
2	Distribution Switch 12 Ports		13	
3	Distribution Switch 24 Ports		3	
4	Converged Access Switch 48 Ports		2	
5	Access Switch 48 Ports PoE/PoE+		31	
6	Access Switch 48 Ports		24	
7	Access Switch 24 Ports PoE/PoE+		73	
8	Access Switch 24 Ports		1	
9	Access Switch 8 Ports PoE/PoE+		26	
10	Stacking Module for Access Switches		54	
11	1 Gig SFP Module (SMF)		66	
12	1 Gig UTP Module		20	
13	10 Gig SFP Module (SMF)		186	
14	10 Gig SFP Module (MMF)		26	
15	40 Gig QSFP Module (MMF)		8	
16	Wireless Access point (Indoor)		150	
17	Wireless Access point (Outdoor)		10	
18	150 ApLicense Upgrade for Existing WLC		2	
19	2x10 Gig Uplink Module for Existing Switch		3	
20	IP Communication Manager in HA		1	
21	Voice Gateway System		2	
22	Video Conferencing System		1	
23	IP Phone Type I		50	
24	IP Phone Type II		20	
25	IP Phone Type III		125	
26	IP Phone Type IV		20	
27	IP Phone Type V		2	
Total Price (in INR)				
