



**National Institute of Bank Management,  
Pune**

**RFP for  
Upgradation of Local Area Network**

**October 7, 2016**

**Invitation of bids for  
Upgradation of Local Area Network  
at NIBM Institutional Area, Pune 411048**

**Important Information**

Address for Communication	The Head, Administrative Services National Institute of Bank Management NIBM PO, Kondhwa Khurd Pune 411 048
Telephone No	020-26716399, 26716000
Fax No	020-26834478
Email id	has@nibmindia.org
Date of Issue of RFP	October 7, 2016
Last date of Queries Submission	October 20, 2016 up to 5.00 p.m.
Pre-Bid meeting with bidders	October 26, 2016 at 3.30 p.m. at NIBM, Pune
Last date for receipt of RFP	November 18, 2016 - up to 5.00 p.m. at NIBM, Pune
Opening of Technical Offers	November 21, 2016 - at 3.30 p.m. at NIBM, Pune
Technical Presentations by Bidders	Last Week of November or First Week of December (Tentative)

## **Introduction**

NIBM, an autonomous apex institution for research, training, education and consultancy in bank management invites bids from reputed IT companies for Local Area Network Upgradation work of its institutional areas.

The work at NIBM involve use of high performance computer systems. Institutional Users are connecting to various servers placed in its Computer Centre through a Local Area Network.

## **Purpose of the Request of Proposal**

NIBM is having a local area network which is currently based on CAT-5 and is connected to the Internet through a 20 Mbps leased line. All the Servers meant for ERP, Library Information System, Accounting Services, Intranet, anti-virus, different analytical applications' licensing server are hosted at NIBM Computer Centre. There are around 250 nodes (desktops/laptops) which are connected to the network. The office network is spread mainly over five buildings/locations viz., Block-I, Block-II, Block-III, Lecture Hall Complex and Library. At present all these locations are connected with CAT-6 Cable and non-managed network switches.

The present requirement is to upgrade the Local Area Network (LAN) infrastructure to 1Gbps uplinks with CAT-6 cabling and all the end user port should have connectivity of 10/100/1000 Mbps. All locations specified in the details are expected to be connected with one-to-one Fiber Optic Cable to proposed managed Master Network Switch at NIBM Computer Centre. The work will also include troubleshooting and maintenance of all the hardware during the warranty period. **Cost of Three Years on-site comprehensive warranty on all devices and services should be included in the cost quoted in the quotation.** During this period, the selected vendor is expected to deal with the manufacturer on behalf of NIBM for any support and for getting replacement/s, if any. NIBM will not indulge itself in any manner in such activities during the warranty period. AMC amount for Fourth and Fifth Year should be quoted separately in the given format (Annexure-V).

## **Confidentiality**

The bidders, at all times, will consider all information and data received from the Institute in connection with the Request for Proposal confidential. In addition, the bidders shall not use or disclose any information to anyone without the Institute's written approval, except as and only to the extent necessary for the preparation of the proposal and, if awarded to the bidder, for the performance of the work.

## **Proposals**

All Proposals and contracts awarded as a result of this RFP are subject to the Institute's terms and conditions as stated in this RFP. The submission of any other terms and conditions by a Vendor may be grounds for rejection of the Vendor's proposal.

## **Schedule**

The dates specified on the Schedule (Section 1) of this RFP are subject to change by the Institute. Changes will be given to vendors via addendum or written vendor notices.

## **General information on selection process**

Following is a general description of the process by which a Contractor will be selected to provide required services:

- Request for Proposals is uploaded at the NIBM web-site for the prospective Bidders.
- Proposal will be received from each Bidder in a sealed package containing (1) A technical proposal, and, (2) A commercial proposal.
- The original Proposal shall be signed and dated by an official authorized to contractually bind the vendor.

- The Proposal must be received no later than the date and time specified on the cover sheet of the RFP.
- After all Proposals have been evaluated and the prospective Bidders or finalists have made the presentations, the Institute may negotiate with any Bidder who, in its judgment, may serve its interests. The Institute reserves the right to terminate negotiation with any Bidder at any time.
- Award shall be made after a Notice of Intent to Award is sent to finalists. A subsequent final contract shall be prepared by the Institute and signed by the Institute and the Bidder.

### **Instructions to Bidders**

This is an open and competitive process.

The proposal must contain the name of a duly authorized representative of the company submitting the proposal.

### **Two bid system**

Two separate Bids (one Technical Bid & other the Commercial Bid) must be submitted at the same time, giving full particulars in **separate sealed envelopes** at the NIBM's address on or 5 pm before the scheduled date as given above. Both envelopes should be securely sealed and stamped.

Both the envelopes must be super scribed with the following information:

- "Bid for NIBM Network Upgradation"
- Type of Offer (Technical or Commercial)
- Name of Bidder

**All Formats and Annexures should be stamped and signed by an authorized official of the bidder company. The bidder should also submit copy of the RFP duly stamped and signed on each page by the authorized official of the bidder company.**

### **Envelope-I (Technical Bid):**

The technical bid should be complete in all respects and contain all information asked for, **except prices**. The technical bid should be complete and should give all required information. The Technical Bid should accompany a DD / Pay Order of **Rs.25,000/- (Rupees Twenty Five Thousand only)** drawn on any Nationalized Bank in the Name of National Institute of Bank Management, Pune payable at Pune towards Earnest Money Deposit (EMD). Tender received without EMD or lesser amount will be summarily rejected. No exemption will be granted. The EMD shall be forfeited to NIBM Pune, if tenderer withdraws his tender after opening of the tender. Refund of EMD will be within 3 weeks after opening of the tender. The successful Bidder will be required to execute a Bank Guarantee for performance security as described in Annexure-IV.

### **Envelope-II (Commercial Bid):**

The Commercial bid should give all relevant price information and should not contradict the technical bid in any manner. The commercial bid should include all items asked for in Annexure-V as per the specifications mentioned in Annexure-VI.

The prices quoted in the commercial bid should be without any conditions. The bidder should submit an undertaking that there are no deviations to the specifications mentioned in the RFP. If the price of any item is not quoted, then it will be considered that, the vendor will supply the item at zero price. However, for the purpose of evaluation, the highest price quoted for such items by any other bidder, will be added notionally to be taken into consideration for evaluation purposes.

These two envelopes containing the Technical bids and Commercial bids should be separately submitted. Please note that if any envelope is found to contain both technical and commercial bid, then that offer will be rejected outright.

### **Qualification Criteria**

The bidders, who fulfill all the qualifications mentioned in "Qualification Criteria" (as mentioned below) of the tender, will only be eligible for further process i.e. technical evaluation.

### **Terms and Conditions**

Terms and conditions for bidders who participate in the tender are specified in the section called "Terms and Conditions". These terms and conditions will be binding on all the bidders. These terms and conditions will also form a part of the purchase order, to be issued to the successful bidder(s) on the outcome of the tender process.

### **Non-Transferability of Tender**

This tender document is not transferable. There should be a single bid from reputed IT Company. Consortium and subcontracting is not allowed.

### **Soft Copy of Tender Document**

The soft copy of the tender document will be made available on NIBM's website, [www.nibmindia.org](http://www.nibmindia.org). Interested bidder may download it from the web-site. However, NIBM shall not be held responsible in any way, for any errors / omissions / mistakes in the downloaded copy.

### **Offer Validity Period**

The offer shall be valid for a period of 30 days from the date of submission of bid or the extended date thereof. NIBM reserves the right to reject any bid which does not meet this requirement.

### **Pre-Bid Meeting**

For the purpose of clarification of doubts of the bidders on issues related to this RFP, NIBM intends to hold a Pre-Bid meeting on the date and time as indicated in the RFP. The queries of all the bidders, in writing, should reach by e-mail or by post on or before October 20, 2016 on the address mentioned above. It may be noted that no queries of any bidder shall be entertained / received after the Pre-Bid meeting. Clarifications on queries will be given in the Pre-Bid meeting. Only the authorized representatives of the bidders will be allowed to attend the Pre-Bid meeting.

### **Opening of Offers by NIBM**

Tender offers received within the prescribed closing date and time will be opened in the presence of bidders' representatives who choose to attend the opening of the tender on the specified date and time as mentioned earlier in the tender document. The bidder's representatives present shall sign a register of attendance and minutes provided they have been authorized by their respective companies to do so. A copy of the authorization letter should be brought for verification.

### **Scrutiny of Offers**

Scrutiny of Bids will be in three stages as under:

#### **(a) Eligibility Criteria:**

NIBM will first scrutinize the eligibility of the bidders as per "qualification criteria" of the RFP based on the documents submitted. The offers of bidders who fulfill the above eligibility criteria will be taken up for further scrutiny, i.e. technical evaluation. The decision of NIBM in this regard shall be final and no further correspondence in this regard will be entertained.

A committee will evaluate proposals against the mandatory criteria as detailed herein. Proposals meeting all the mandatory criteria will then be assessed and scored against the evaluation criteria.

Subject to the result of technical evaluation being satisfactory, it is the intent of NIBM to call for a discussion to showcase the bidder capability to implement the solution. This includes review of organization history, organization competency to execute similar projects, etc. The Bidder may be requested to give a demonstration of the similar projects executed.

**(b) Technical Evaluation:**

NIBM will scrutinize the offers and will determine whether the technical specifications along with documents have been furnished as per RFP and whether items are quoted as per **Annexure-V and Annexure-VI**. The technical evaluation will be done on the basis of the information provided in the "Bidder's Information" format along with supporting documents. The bidder will have to give presentation tentatively in the last week of November or first week of December, on the following points as a part of the technical evaluation:-

- a) Solution offered and Details of the Technical specifications
- b) Implementation Methodology
- c) Implementation Period
- d) Deliverables
- e) Project plan
- f) Demonstration of any of the similar project carried out in the past.

Technical evaluation will be done on the following aspects:

- I. Scrutiny/Verification of relevant Documents : 30 Marks
- II. Presentation by the bidder covering the above-mentioned points: 70 Marks

The commercial bid of the technically short-listed bidders will be opened and the bidders will be ranked as L1, L2, L3, etc. on the basis of their prices offered (final offered price will be calculated on the basis of the instructions contained in this document in this regard).

There would be a weight-age of 70% to the Technical score and 30% for the Commercial price. The maximum marks (Total score) for Technical and Commercial proposals would be 100. It would be normalized as under for each bidder:-

$$\text{Total Score} = 0.7 \times T(s) + 0.3 \times F(s)$$

Where;

$$F(s) = (LP / BP) \times 100$$

where:

- T(s) stands for technical score out of 100 for the bidder.
- F(s) stands for percentage of a bidder's commercial price compared to the lowest quoted price among the bidders whose commercial bids are opened.
- BP stands for Bidder's price.
- LP stands for lowest price among all the bidders.

The proposals will be ranked in terms of Total Scores arrived at as above. The proposal with the highest Total Score will be considered first for award of contract and will be invited for price and contract negotiation.

The bidders who qualify in technical evaluation will only be short listed for commercial evaluation. The decision of NIBM in this regard will be final.

**(c) Commercial Evaluation:**

NIBM will open and scrutinize the commercial offers of the technically qualified bidders only. The Commercial bids will have to be submitted in the format as per Annexure-V and Annexure-VI. Commercial bids should not have any alteration or overwriting. NIBM may reject or load the financial implication of any alteration, if found into the commercial bid submitted by the respective bidder. The calculation arrived by NIBM will be final and will be binding on the bidders. If any cost item in the commercial bid is found to be blank and not filled with any amount then it shall be considered as zero cost item and the same is offered to the NIBM free of any charge.

**Clarification of Offers**

To assist in the scrutiny, evaluation and comparison of offers, NIBM may, at its discretion, ask some or all bidders for clarification of their offer. The request for such clarifications and the response will necessarily be in writing. E-mail would be considered as an accepted mode of communication.

**No Commitment to Accept Lowest or Any Tender**

NIBM shall be under no obligation to accept the lowest or any other offer received in response to this tender notice and shall be entitled to reject any or all offers including those received, or incomplete offers, without assigning any reason whatsoever. NIBM reserves the right to make any changes in the terms and conditions of purchase. NIBM will not be obliged to meet and have discussions with any bidder, and or to listen to any representations. NIBM reserves the right to accept or reject, fully or partially, any or all offers without assigning any reason. The decision of NIBM in this regard is final and no further correspondence in this regard will be entertained.

**Submission of Bidder's Details**

It is mandatory to provide the Bidder's details in the exact format of given in the Annexure-II. The offer may not be evaluated by NIBM in case of non-adherence to the format or non-submission / partial submission of technical details as per the format given in the tender. NIBM will not allow/permit changes in the specifications once it is submitted.

**Any bid received in the office of the Head, Administrative Services at the address mentioned as above after the deadline prescribed for submission of bids in the opening page/table of RFP document or after the extended Bid due date, if any, will be treated as "Late Bid" and will not be opened/considered by NIBM and will be returned back unopened to the bidder.**

**Cost of Proposal Preparation**

Any costs incurred by the Bidder in preparing or submitting Proposals are the Bidder's sole responsibility; the Institute will not reimburse any Bidder for any costs incurred.

**Bidder's Representative**

Vendor will provide the name, address, and telephone number of the person(s) with the authority to bind the company and answer questions or provide clarification concerning the proposal.

**Proposal Acceptance Period**

This Proposal shall be binding upon the Vendor for 180 calendar days following the RFP opening date. Any Proposal on which the vendor shortens the acceptance period may be rejected.

**Withdrawal of Proposals**

A proposal may be withdrawn after its submission by written or facsimile request signed by the proposer or authorized representative, prior to the time and date specified for proposal submission.

Proposals may be withdrawn and resubmitted in the same manner if done prior to the submission deadline.

Withdrawal or modification offered in any other manner will not be considered.

### **Payment Terms and Schedule**

Payment shall be made in INR through bank transfer (NEFT). The payment during execution of the project shall be released as under:

- i) 60% of the total contract amount (excluding AMC Charges) on delivery of all Hardware, Networking & Communications Equipments.
- ii) 20% of the total contract amount (excluding AMC Charges) on installation & testing of all Hardware, Networking Communications Equipments.
- iii) 15% of the total contract amount (excluding AMC Charges) on commissioning and final acceptance testing of all Hardware, Networking & Communications Equipments.
- iv) Balance 5% of the total contract amount (excluding AMC Charges) will be released on receipt of a Bank Guarantee of the same amount (5%) till the end of Warranty Period of 3-years in the prescribed format (Annexure-III).

Sealed tenders in two envelop system (Separate envelop for TECHNICAL BID-CUM COMMERCIAL TERMS AND FINANCIAL BID) are invited, on behalf of the NIBM, by Director, NIBM from experienced firms in the prescribed format for Upgradation of Local Area Network at NIBM, NIBM Campus, Kondhwa Khurd, Pune 411048 as mentioned in the tender document.

Sealed tenders along with detailed information of the agency, addressed to the Director, National Institute of Bank Management, Kondhwa Khurd, NIBM P O, Pune 411 048, should be deposited in the tender box kept in Room No.1109, Block-I at NIBM between 2:00 pm to 5:00pm on any working day (Mon-Fri) on or before November 7, 2016.

The tender document (non-transferable) containing detailed specification, terms & conditions, etc. can be obtained from our website <http://www.nibmindia.org/tender.php> and should be submitted in the form mentioned above.

### **Ownership**

All intellectual as well as physical property rights of the final deliverable will remain with the Institute.

### **Scope of Work**

The total project should be treated as a Turn-Key Project which includes parallel laying of new cables/network outlets in the office premises without disturbing the existing network. Once the new setup is fully activated, taking away the existing cabling is also an integral part of this project. Selected vendor is expected to complete this project very neatly by installing new network cables, network devices, racks with proper labeling. It is expected that the vendor will handover fully configured Local Area Network system to NIBM with all proper documentation/layouts/diagrams.

### **Development Guidelines**

The vendor is expected to complete this upgradation without disturbing the existing network until completion and successful testing of total upgradation. The internal cable installation work needs to be done after office hours and on office holidays with a view of not to disturb users with drilling and other noises.

## **Delivery Period**

The delivery and commissioning of all the equipment mentioned in the Annexure-V should be completed within 12 weeks from the date of release of purchase order to the successful bidder.

## **4. Qualification Criteria**

### **4.1 Eligibility of the Bidder**

- (a) The bidder submitting the offers should be a Registered Company in India under the Companies Act, 1956 having a minimum turnover of 3 crore per year in the last three financial years i.e. 2013-2014, 2014-15 and 2015-16. This must be the individual Company's turnover and not that of group of Companies.
- (b) The bidder company should have made profits in the last three financial years i.e. 2013-2014, 2014-15 and 2015-16. A copy of last three financial years' relevant audited balance sheets should be submitted with the offer. The bidder should not have been blacklisted by any government organization / banks. Self-declaration to that effect should be submitted along with the technical bid.
- (c) The bidder should be a registered company in India with valid VAT/LST/CST, Service Tax registration TAN and PAN number allotted by the respective authorities.
- (d) The bidder should be a registered company with experience in the field of networking conceptualization, design, deployment and maintenance for at least two years as on March 31, 2016.
- (e) The bidder should have a support office with sufficient number of well-trained staff in Pune itself for at least last 2 year's presence.
- (f) The bidder should have successfully implemented at least 3 network installation projects in the last 3 years preferably for a University/Institute with similar network design that of NIBM.
- (g) Consortium bids will be considered only if the primary bidder in their own strengths meets the above requirements.



## Format of Tender Offer Covering Letter

Date:  
Place :

To:  
**Head of Administrative Services,  
National Institute of Bank Management  
NIBM PO, Kondhwe Khurd  
Pune – 411048**

Dear Sir,

### **Tender for Upgradation of Local Area Network of NIBM, Pune.**

1. We, the undersigned, offer designing and development of NIBM's internal network in conformity with the said tender documents in accordance with the prices indicated in the Commercial bid and made part of this tender.
2. We understand that the RFP provides generic specifications about all the items and it has not been prepared by keeping in view any specific bidder.
3. If our tender offer is accepted, we will obtain the guarantee of a bank for a sum equal to 10% of the Contract Price for the due performance of the Contract.
4. We agree to abide by this tender offer till 180 days from the date of opening of tender. Our offer shall remain binding upon us and may be accepted by NIBM any time before the expiration of that period.
5. Until a formal contract is prepared and executed, this tender offer, together with NIBM's written acceptance thereof and NIBM's notification of award, shall constitute a binding contract between us.

We understand that NIBM is not bound to accept the lowest or any offer the Institute may receive.

Dated this \_\_\_\_\_ day of \_\_\_\_\_ 2016

Signature: \_\_\_\_\_

**Details of the Bidder**

**Details filled in this form must be accompanied by sufficient Documentary**

**Evidence in order to verify the correctness of the information**

<i>Sr No</i>	<i>Item</i>	<i>Details</i>
1	Name of the Company	
2	Postal Address	
3	Telephone/Mobile and Fax Number	
4	Constitution of Company	
5	Name and designation of the person authorized to correspond with NIBM	
6	Email address	
7	Year of Commencement of Business	
8	Turnover of the company 2013-2014 2014-2015 2015-2016	
9	Net Profit of the company 2013-2014 2014-2015 2015-2016	
10	Sales Tax No	
11	PAN	
12	TAN	
13	Service Tax Registration No.	
14	Name and address of the principal banker with whom major credit facilities (Fund / Non fund) are being enjoyed (also mention names of Banks in consortium, name of the contact official of Bank, phone and fax numbers, etc.).	

**Proforma for the Bank Guarantee for Performance Security**  
**(To be executed on non-judicial stamp paper of appropriate value)**

Bank Guarantee No. :

Date :

Period of Bank Guarantee : \_\_\_\_\_ Valid up to : \_\_\_\_\_

Amount of Bank Guarantee : Rs \_\_\_\_\_

THIS DEED OF GUARANTEE executed at \_\_\_\_\_ on this \_\_\_ day of \_\_\_\_\_ 2016 by \_\_\_\_\_ a Banking Company constituted under the \_\_\_\_\_ Act, having its Head Office at \_\_\_\_\_ (hereinafter referred to as 'the guarantor', which expression shall, unless repugnant to the context or meaning, includes its successors and assigns).

**IN FAVOUR OF**

National Institute of Bank Management, a Society Registered under The Indian Societies Registration Act (XXI) of 1860, having its Office at NIBM PO, Kondhwa Khurd, Pune 411048 (hereinafter referred to as 'NIBM' which expression shall, unless repugnant to the context or meaning, include its successors and assigns).

**WHEREAS**

1. NIBM is desirous of engaging an agency for upgrading its local area network and for that purpose has invited tenders.
2. Pursuant to the acceptance by NIBM of the tender dated \_\_\_\_\_ submitted by \_\_\_\_\_ (hereinafter referred to as "the said constituents" which expression shall, unless repugnant to the context and meaning, includes its successors and assigns), NIBM has issued Purchase Order bearing no. \_\_\_\_\_ dated \_\_\_\_\_.
3. It is one of the terms of the said Purchase Order that our said Constituents shall furnish to NIBM a performance security bank guarantee for a sum of Rs.\_\_\_\_\_/ - (Rupees \_\_\_\_\_ only) equivalent to 10% of the value of Purchase Order for setting up the work of upgradation of NIBM's Local Area Network from a Nationalized / Scheduled Bank against any defect in respect of the said work of network upgradation which shall be valid for a duration of 36 months from the date of Completion Certificate of the said work of Local Area Network Upgradation of NIBM.
4. At the request of the said constituents, the guarantor has agreed to furnish the said guarantee.

**NOW THEREFORE THIS DEED OF GUARANTEE WITNESSETH THAT**

In consideration of the NIBM, at request of the guarantor to issue purchase order and award the said work to the said constituents against the bank guarantee issued by the guarantor for a sum of Rs.\_\_\_\_\_/ - (Rupees \_\_\_\_\_ only), equivalent to 10% of the value of Purchase Order, we, \_\_\_\_\_ the guarantor hereby unconditionally and irrevocably guarantee unto the NIBM that our said Constituents will diligently, efficiently and satisfactorily perform all their obligations pertaining to the rectification of defects both in respect of materials and workmanship which defects may arise during a period of 36 months from the date of successful completion of the said work of Local Area Network Upgradation of NIBM by the said constituents as per the specifications, terms and conditions of the said Purchase Order dated \_\_\_\_\_ failing which we

\_\_\_\_\_, the guarantor, \_\_\_\_\_ shall, on demand and without demur, pay unto NIBM the sum of Rs. \_\_\_\_\_/- (Rupees \_\_\_\_\_ only) at the NIBM at Pune.

**THE GUARANTOR HEREBY FURTHER COVENANTS THAT**

1. The guarantor shall pay the aforesaid sum to NIBM on demand in writing by NIBM without reference to the said constituent and notwithstanding any dispute or difference that may exist or arise between the NIBM and the said constituent.
2. That this guarantee shall be continuing guarantee and shall not be revoked by the guarantor without prior consent in writing of NIBM.
3. The decision of NIBM on the breach of any of the terms & conditions of the said contract/tender by our said constituent or their failure to perform obligations or discharge their duties under the said Purchase Order shall be final and binding on the guarantor and shall not be disputed by the guarantor inside or outside the court, tribunal, arbitration or other authority.
4. The notice of demand in writing issued by NIBM shall be conclusive proof as regards the amount due and payable to NIBM under this guarantee and it shall not be disputed by the guarantor either insider or outside the court, tribunal or arbitration or other authority.
5. Any neglect or forbearance on the part of NIBM in enforcing any of the terms and conditions of the said Purchase Order or any indulgence shown by NIBM to our said constituents or any variation in the said Purchase Order made by mutual agreement between NIBM and our said constituents or any other act or deed on the part of NIBM which but for this clause may have the effect of discharging the guarantor under the law relating to the guarantees shall not discharge the guarantor from its obligations herein and the guarantor shall be discharged only by compliance by the said constituent of all their obligations and duties under the said Purchase Order.
6. This guarantee shall not be affected by any infirmity or absence or irregularity in the exercise of the powers by or on behalf of our said constituent to submit the said tender and enter into the said contract or any change in the constitution or dissolution of the said constituent's firm or change in the name of the said firm.
7. It shall not be necessary for NIBM to exhaust its remedies against the said constituent before invoking this guarantee and the guarantee herein contained shall be enforceable against the guarantor notwithstanding any other security which the NIBM may have obtained or may obtain from the said constituent, may at the time when this guarantee is invoked be outstanding and unrealized.
8. The guarantor hereby agrees that this guarantee shall be valid and be in force for a period of 36 months i.e., upto \_\_\_\_\_ and the guarantor hereby agrees to renew this guarantee at the request of NIBM in the event of work given to the said constituents under the said Purchase Order is not completed.
9. Any claim arising under this guarantee shall be preferred by NIBM within a period of six months from the aforesaid date of expiry of this guarantee or in the event of any renewal, such renewal date and unless the claim is so preferred against the guarantor, the guarantor shall stand discharged of all its liabilities hereunder.

IN WITNESS WHEREOF the within named guarantor has caused these presents to be executed on its behalf by the hand of its duly authorized official on the date and the place first hereinabove written.

(Signature)

(Signature)

(Name)

Bank Rubber Stamp  
(Name)

(Official Address)

Designation with Bank Stamp Plus  
Attorney as per Power of Attorney  
No. Dated:

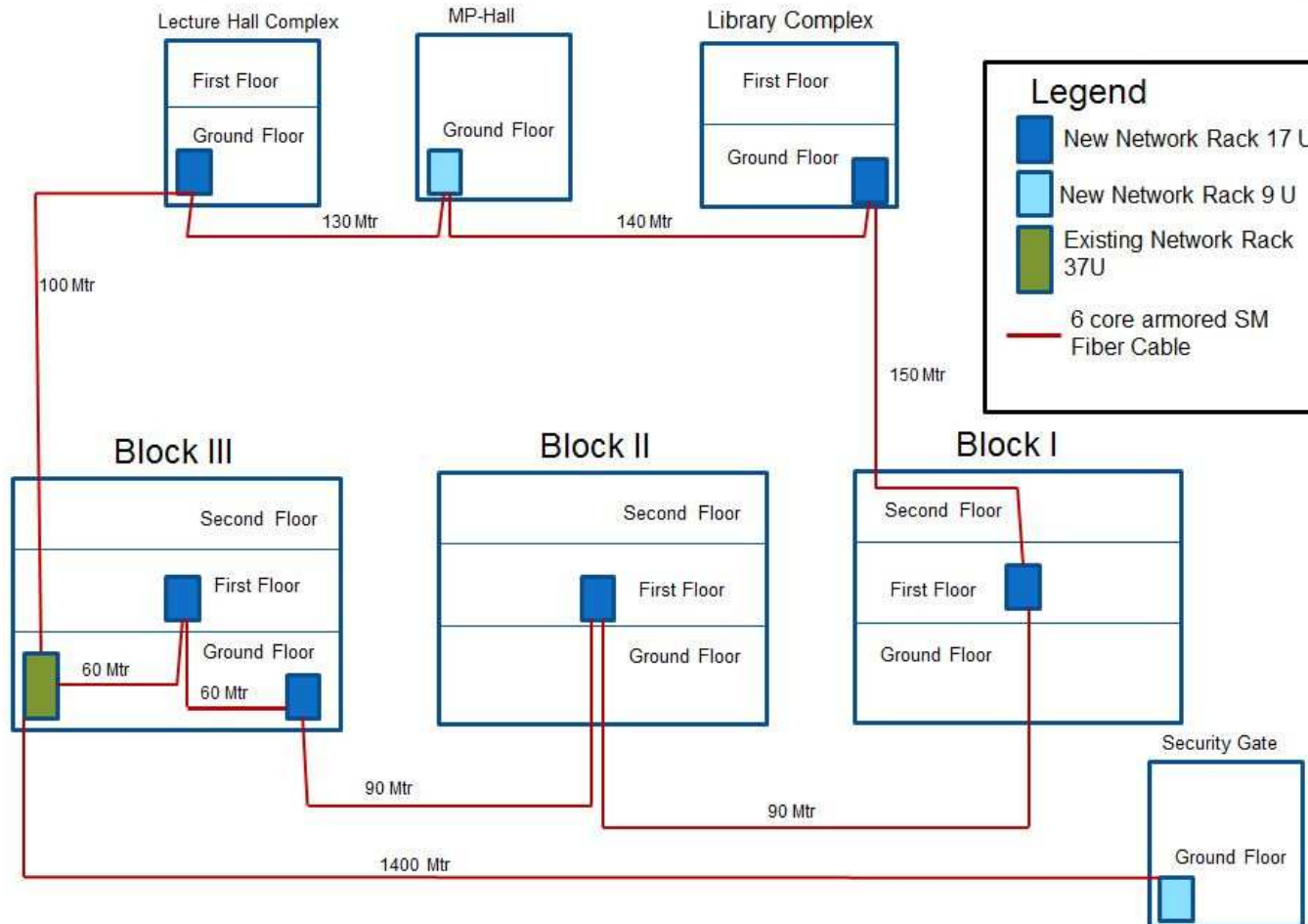
## Existing Count of Network Nodes

Location		User Head	Per Active Data	Total Active Data	Faceplate		
					Quad	Dual	
1	Block -I Total Active Point	64	1	64	0	64	
2	Block -II Total Active Point	63	1	72	0	72	
3	Block -III Total Active Point	44	1	44	0	44	
4	Block -III Total Active Point (Lab Point)	50	1	50	25	25	
5	Lecture Hall	10	1	10	0	10	
6	MP-Hall	4	1	4	0	4	
7	Library	16	1	16	0	16	
8	Main Gate Security	2	1	2	0	2	
				TOTAL	253	25	228

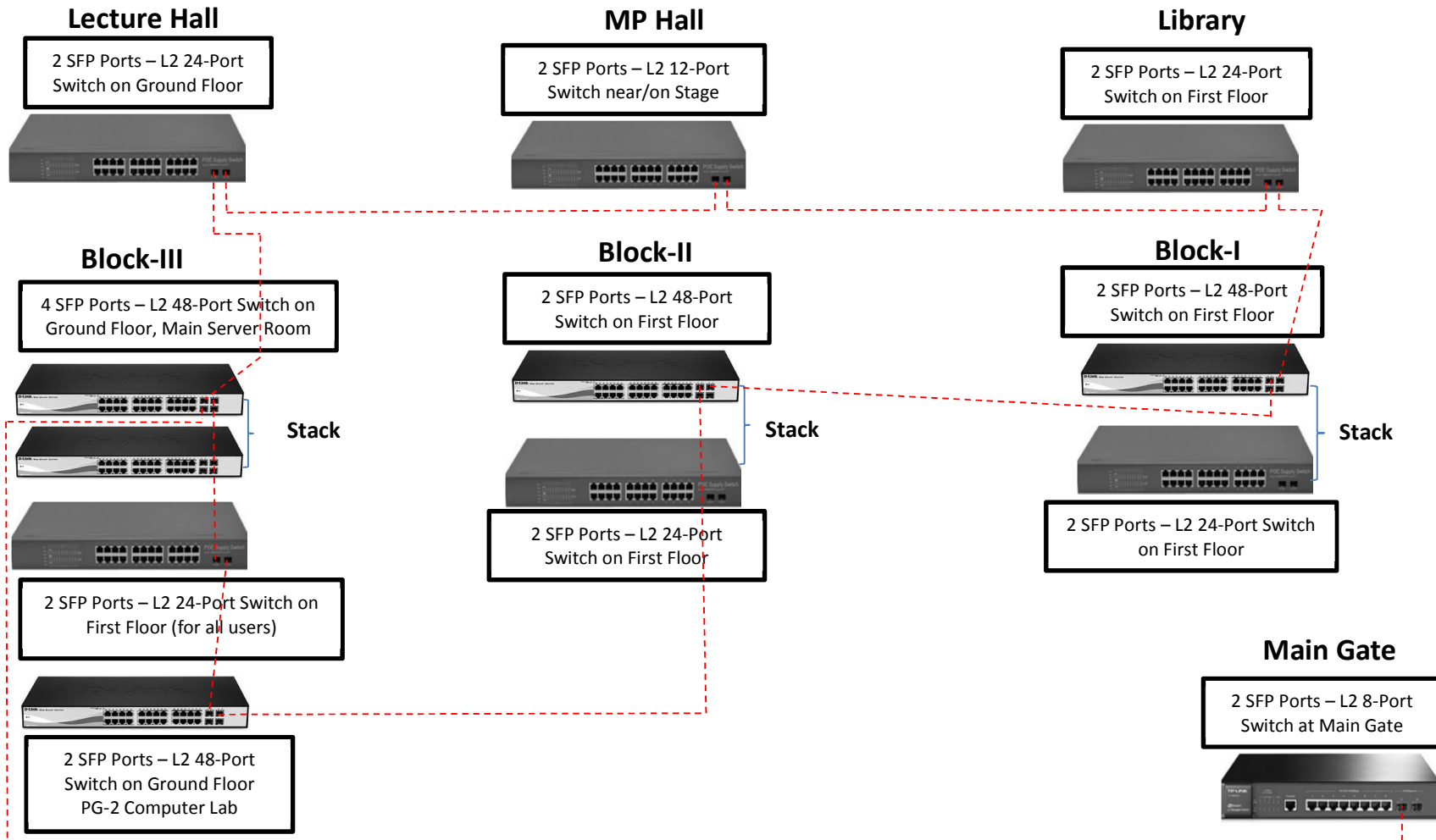
Total Active Data Points	253
Total Quad Faceplates	25
Total Dual Faceplates	228
TOTAL NODES	253
Average Length	65

Proposed Fiber Optic connectivity Diagram

SINGLE MODE FIBER BACK BONE CONNECTIVITY



# Active Component Connectivity





**Bill of Material**  
**(To be included in Commercial Bid)**

The Bidder should provide Bill of Material (details of all Modules / Components of Software including those bought-out, off-the-shelf or third-party products / items required) Module-wise, in the following format.

**List 1 # 7**  
**Fiber Backbone Distribution**

Sr No	Location From	Location To	Paths	Length	Runs	6 Core SM (Out Door)	Pigtail SM@Field Side	Pigtail SM@Rack Side	48 Fiber LIU SM	24 Fiber LIUSM	12 Fiber LIUSM
<b>6 core MM Cable out door</b>											
1	Block III Server Room	Block III First Floor	Primary	60	1	60	24	24	0	1	0
2	Block III First Floor	Block III Lab Room	Secondary	60	1	60	24	24	0	1	0
3	Block III Lab Room	Block II First Floor	Primary	90	1	90	24	24	0	1	0
4	Block II First Floor	Block I First Floor	Secondary	90	1	90	24	24	0	1	0
5	Block I First Floor	Library	Primary	150	1	150	24	24	0	1	0
6	Library	MP -Hall	Secondary	140	1	140	24	24	0	1	0
7	MP -Hall	Lecture hall	Primary	130	1	130	24	24	0	1	0
8	Lecture Hall	Block III Server Room	Secondary	100	1	100	24	24	0	1	0
					<b>Total</b>	<b>820</b>	<b>192</b>	<b>192</b>	<b>0</b>	<b>8</b>	<b>0</b>
<b>6 core SM Cable out door</b>											
9	Block III Server Room	Security Gate	Primary	1400	1	1400	24	24	0	2	0
					<b>Total</b>	<b>1400</b>	<b>24</b>	<b>24</b>	<b>0</b>	<b>2</b>	<b>0</b>

**Fiber Patch Cord Distribution**

Sr No	Location From	Location To	LC-LC MM Fiber Patch Cord 2 Mtr @Field	LC-LC MM Fiber Patch Cord 2 Mtr @Rack Side	LC-LC MM Fiber Patch Cord 2 Mtr @Rack Side	Block III Server Room LC-LC SM Fiber Patch Cord 2 Mtr @Rack Side
<b>6 core SM Cable out door</b>						
1	Block III Server Room	Block III First Floor	1	1		
2	Block III Server Room	Block III Lab Room	1	1		
3	Block III Server Room	Block II First Floor	1	1		
4	Block III Server Room	Block I First Floor	1	1		
5	Block III Server Room	Lecture Hall	1	1		
6	Block III Server Room	Library	1	1		
7	Block III Server Room	Existing Connectivity	1	1	6	6
	Block III Server Room					
			7	7	6	6

12 Core MM	Pigtail MM	Pigtail MM	48 Fiber	24 Fiber	12 Fiber
	@Field Side	@Rack Side	LIU MM	LIU MM	LIU MM
820	192	192	0	8	0

12 Core SM	Pigtail SM	Pigtail SM	48 Fiber	24 Fiber	12 Fiber
	@Field Side	@Rack Side	LIU SM	LIU SM	LIU SM
1400	24	24	0	2	0

**List 2 # 7**  
**Networking Supply**

Sr. No	Make	Description	Total Qty	UOM	Rate	Total	Taxes	Total with Taxes
<b>Workstation Side : Data (USER SIDE)</b>								
1		CAT6 UTP Cables (305 m per Box) Grey LSZH	58	Box				
2		CAT6 Information Outlets Active Data - Yellow	247	Each				
3		4-port faceplate, WHITE	25	Each				
4		2-port faceplate, WHITE	228	Each				
5		Cat6 SL Series Patch Cords LSZH - 7 Feet - Yellow - Active Data	247	Each				
<b>NETWORK RACK SIDE : Data</b>								
6		24-port unloaded, Angled Jack Panel, SL-Series, 1U - Active Data	12	Each				
7		Cable Support Bar for Jack Panel	12	Each				
8		CAT6 Information Outlets Data Active - Yellow	241	Each				
9		Cat6 SL Series Patch Cords LSZH - 3 Feet - Yellow - For Active Data	241	Each				
<b>Fiber Backbone (Single Mode)</b>								
10		12-core Outside Plant Cable - Corrugated Steeltape Armored, Loose-tube, 9/125 micron SM	1400	Mtrs				
11		24-fiber LC-Style, Singlemode, 19-inch Rack mount Patch Panel, 1U, Loaded with adapter Plates	2	Each				
12		LC-Style Pigtail, 9/125, Single mode, 1.5 meter	48	Each				
13		LC-LC Single mode 9/125 micron Duplex Patch Cord, 2 Meter	2	Each				
14		LC-LC Singlemode 9/125 micron Duplex Patch Cord, 2 Meter (Existing Setup)	12	Each				
15		LC-LC Single mode 9/125 micron Duplex Patch Cord, 2 Meter (Existing Setup)	12	Each				

Fiber Backbone (Multimode)							
16		12-core Outside Plant Cable - Corrugated Steel tape Armored, Loose - tube, 50/125 OM3 MM	820	Mtrs			
17		24-fiber LC-Style, Multimode, 19-inch Rack mount Patch Panel, 1U, Loaded with adapter Plates	8	Each			
18		LC-Style Pigtail, 50/125, OM3 Multi mode , 1.5 meter	192	Each			
19		LC-LC Multimode 50/125 micron Duplex Patch Cord, 2 Meter	16	Each			
				<b>Total</b>			

**List 3 # 7**  
**Active Networking Supply**

Sr No	Product Make	Particulars	UOM	Qty	Rate	Total	Taxes (%)	Total with Taxes
1		24-Port, 4 x 1G SFP, LAN Base Network Switches	Nos	7				
2		48-Port Data IP Services (should support EIGRP)	Nos	1				
2.1		4 x 1GE Network Module for Network Switch	Nos	1				
2.2		50CM Type 1 Stacking Cable	Nos	1				
2.3		Stack Power Cable 30 CM	Nos	1				
2.4		350W AC Config 1 Power Supply	Nos	1				
3		48 GigE, 4 x 1G SFP, LAN Base	Nos	5				
4		1000BASE-SX SFP transceiver module, MMF, 850nm	Nos	16				
5		1000BASE-LX/LH SFP transceiver module MMF/SMF 1310nm	Nos	2				
		<b>TOTAL (SUPPLY)</b>						

**List 4 # 7**  
**Miscellaneous Supply**

Sr. No	Make	Description	Total Qty	UOM	Rate	Total	Taxes (%)	Total with Taxes
1		100mm *50 mm Cable tray Powder Coated Off White Colour with Top Cover Included Hardware	110	Mtr				
2		50 mm *50 mm Cable tray Powder Coated Off White Colour with Top Cover Included Hardware	480	Mtr				
3		100mm *50 mm Cable tray L bracket Accessories	110	Ea				
4		50 mm *50 mm Cable tray L bracket Accessories	480	Ea				
5		25mm Pvc Casing capping /Conduits /Flexible Pipe with Accessories	720	Mtr				
6		50 mm Pvc Casing capping /Conduits /Flexible Pipe with Accessories	260	Mtr				
7		32 MM HDPE Pipe	1740	Mtr				
8		Surface Mount Boxes	304	Ea				
9		Labels for Jack Panels, Faceplates, Patch Cords & Consumables (Ties & Velcros)	9	Lot				
Total Amount								

**List 5 # 7  
Racks Supply**

Network RACKS								
Sr No	Product Make	Description	UOM	Qty	Rate	Total	Taxes (%)	Total with Taxes
1		17U Rack Frame/600/800/Steel/ (WALL MOUNT) with all accessories	Nos	6				
2		9U Rack Frame/600/600/Steel/(WALL MOUNT) with all accessories	Nos	2				
TOTAL (SUPPLY)								

**List 6 # 7**  
**Networking Services**

Sr. No	Part Code	Description	UOM	Total Qty	Rate	Total	Taxes (%)	Total with Taxes
1		Laying of UTP CAT 6 Cable (305 Mtr Box)	Box	58				
2		Laying of Fiber cable	Mtrs	2220				
3		Splicing of Pigtails and OTDR Testing	Each	240				
4		IO Termination including Testing.	Each	247				
5		Installation of Jackpanels	Each	12				
6		Installation of Faceplate	Each	253				
7		Installation of Network Rack	Each	8				
8		8x5 NBD OEM Support for Core Switch	1 Yr	7				
10		8x5 NBD OEM Support for Access Switch	1 Yr	5				
11		Dressing of Racks	Each	8				
12		Installation of 100mm *50 mm Cable tray Powder Coated Off White Color with Top Cover Included Hardware with accessories	Mtrs	110				
13		Installation of 50 mm *50 mm Cable tray Powder Coated Off White Color with Top Cover Included Hardware with accessories	Mtrs	480				
14		Installation of 25mm Pvc Casing caping /Conduits / Flexible Pipe with Accessories	Mtrs	720				



Sr. No	Part Code	Description	UOM	Total Qty	Rate	Total	Taxes (%)	Total with Taxes
15		Installation of 50 mm PVC Casing capping /Conduits / Flexible Pipe with Accessories	Mtrs	260				
16		Installation of 32 MM HDPE Pipe	Mtrs	1740				
17		Installation of Surface Mount Boxes	Each	304				
18		Civil Excavation & Refilling 600mm Depth and 300mm	Mtrs	1730				
19		Core cutting 75mm	Each	6				
20		Removing of Existing Cat 05 Cable /Racks / Switches /Casing Capping/Conduits /patch cords Jack Panels /Face plates /Backmount Boxes/Information outlet	Job	1				
21		Labels for Jack Panels, Faceplates, Patch Cords ,& LIU Fiber Patch cords Consumables (Ties & Velcros)	Job	1				
22		Project Management & Consultancy , Security for Inventory & Store, Construction of Store .etc.	Job	1				
23		<b>CDS - GUI based Interactive Software Cabling documentation System and 25 Year Warranty Certification.</b>	Job	1				
Total Amount								

**List 7 # 7**  
**Total Project Cost @ Single View**

Sr.No	Description	Price in INR	Taxes (Rs)	Total with Taxes
1	Networking Supply			
2	Active Networking Supply			
3	MiscellaneousSupply			
4	Racks Supply			
5	Networking Services			
<b>TOTAL AMOUNT</b>				

	Details	Amount in Indian Rs.
1)	Total cost for Local Area Network Upgradation of NIBM, Pune including the scope of work mentioned in the RFP	
2)	Cost for 4th year for maintenance and support (comprehensive)	
2-a)	Cost for 4th year for maintenance and support (non-comprehensive)	
3)	Cost for 5th year for maintenance and support (comprehensive)	
3-a)	Cost for 5th year for maintenance and support (non-comprehensive)	
	<b>Grand Total of above 3 items (1 + 2 + 3) =</b>	
	<b>Grand Total of above 3 items (1 + 2-a + 3-a) =</b>	

**The above amount will be taken for Final evaluation.**

Seal and Signature of Bidder: \_\_\_\_\_

Name : \_\_\_\_\_

Business Address : \_\_\_\_\_  
\_\_\_\_\_

Place : \_\_\_\_\_

Date: \_\_\_\_\_

### Technical Specifications for 48 Port Layer 3 Core Switch

#### Switch Architecture

- The Switch should have 48 ports of 1G data ports at line rate on every port and 4 Nos. of 1G SFP uplink ports.
- The Switch should support 2x 10G or 4x10G uplink modules if required in future.
- The Switch should have Redundant Power Supplies.
- The Switch should also support optional DC power supply.
- The Switch should be Stackable from Day 1 with dedicated stacking module and not using any ports available on switch.
- The Switch should have Console Port for Management.
- The Switch should have Multicore CPU Architecture.
- The Switch should have at least 2GB of Flash for storing OS and other Logs.
- The Switch should have at least 4GB of DRAM.
- The Switch should have at least 1 10/100/1000 dedicated Ethernet Management Port.
- The Switch should have at least 3 fans and in case of failure of any one of those the other fans should automatically speed up. Fans should be field replaceable.
- The Switch should have power savings mechanism wherein it should reduce the power consumption on ports not being used.
- The Switch should be Rack Mountable and should not take space more than 1RU.
- The Switch should support operating temperature up to 5000ft (1500m) -5 to +45 degrees C.
- The Switch should support operating relative humidity 10% to 95% noncondensing.
- The Switch should support for a wide range of pluggable 1G/10G transceiver modules for longer physical distance and enhanced physical security.

#### Switch Performance

- The Switch should have at least 176 GBPS non-blocking switching capacity.
- The Switch should have at least 130 MPPS of forwarding rate.
- The Switch should have at least 480 GBPS Stack Bandwidth.
- The Switch should support at least 32000 MAC Addresses.
- The Switch should support at least 24000 IPv4 routes.
- The Switch should support at least 4000 VLAN IDs & 1000 Switched virtual interfaces.
- The Switch should support 9198 bytes of Jumbo Frames.
- The switch should support 48,000 flow entries.

#### Stacking

- The Switch architecture should be able to stack at least 9 switches together.
- The Switch stack should be based on Distributed forwarding Architecture, where in each stack member forwards its own information on network.
- The Switch stack architecture should have centralized control and Management plane with Active Switch and all the information should be synchronized with Standby Switch.
- The Switch should support Stateful Switch Over (SSO) when switching over from Active to Standby switch in a Stack.

- The Switch stack architecture should be Plug & Play for attaching or removing any switch from the stack without any downtime.
- The Switch stack architecture should allow the end user to stack different port combination models of switches within the same family.
- The Switch stacking module should be hot-swappable.
- The Switch stacking should support 480GBPS of throughput.
- The Switch stacking should support single IP address management for the group of switches.
- The Switch stacking should support automatic upgrade when master switch receives a new software version.
- The Switch stacking should support single configuration.
- The Switch stacking should support stack cable length of 3m.

#### Layer 3 Features

- The Switch should support routing protocols such OSPF, BGPv4, IS-ISv4, EIGRP
- The Switch should support IPv6 Routing capable protocols such as OSPFv3 in hardware.
- The Switch should support IP Multicast and PIM, PIM Sparse Mode, PIM Dense Mode, PIM Sparse-dense Mode & Source-Specific Multicast
- The Switch should support basic IP Unicast routing protocols (static, RIPv1 & RIPv2).
- The Switch should support IPv6 & IPv4 Policy Based Routing (PBR)
- The Switch should support Inter-VLAN routing.
- The Switch should support HSRP for IPv4 & IPv6.
- The Switch should support VRRPv3.
- The Switch should support uRPF for IPv4 and IPv6.

#### Layer 2 Features

- The Switch should be able to discover (on both IPv4 & IPv6 Network) the neighboring device giving the details about the platform, IP Address, Link connected through etc, thus helping in troubleshooting connectivity problems.
- The Switch should support Detection of Unidirectional Links (in case of fiber cut) and to disable them to avoid problems such as spanning-tree loops.
- The Switch should support centralized VLAN Management, VLANs created on the core switch should be propagated automatically.
- The Switch should support 802.1d, 802.1s, 802.1w Spanning-Tree & its enhancement for fast convergence.
- The Switch should support 802.1q VLAN encapsulation.
- The Switch should support 802.3ad (LACP) to combine multiple network links for increasing throughput and providing redundancy.

#### Network Security Features

- The Switch should have Port security to secure the access to an access or trunk port based on MAC address to limit the number of learned MAC addresses to deny MAC address flooding.
- The Switch should support DHCP snooping to prevent malicious users from spoofing a DHCP server and sending out rogue addresses.
- The Switch should support Dynamic ARP inspection (DAI) to ensure user integrity by preventing malicious users from exploiting the insecure nature of ARP.

- The Switch should support IP source guard to prevent a malicious user from spoofing or taking over another user's IP address by creating a binding table between the client's IP and MAC address, port, and VLAN.
- The Switch should support Unicast Reverse Path Forwarding (RPF) feature to mitigate problems caused by the introduction of malformed or forged (spoofed) IP source addresses into a network by discarding IP packets that lack a verifiable IP source address.
- The Switch should support Bidirectional data support on the SPAN port to allow the intrusion detection system (IDS) to take action when an intruder is detected.
- The Switch should support flexible & multiple authentication mechanism, including 802.1X, MAC authentication bypass, and web authentication using a single, consistent configuration.
- The Switch should support RADIUS change of authorization and downloadable Access List for comprehensive policy management capabilities.
- The Switch should support Private VLANs to restrict traffic between hosts in a common segment by segregating traffic at Layer 2, turning a broadcast segment into a non-broadcast multi-access like segment to provide security & isolation between switch ports, which helps ensure that users cannot snoop on other users' traffic.
- The Switch should support Multi-domain authentication to allow an IP phone and a PC to authenticate on the same switch port while placing them on appropriate voice and data VLAN.
- The Switch should support MAC address notification to allow administrators to be notified of users added to or removed from the network.
- The Switch should support IGMP filtering to provide multicast authentication by filtering out nonsubscribers and limits the number of concurrent multicast streams available per port.
- The Switch should support VLAN ACLs on all VLANs prevent unauthorized data flows from being bridged within VLANs.
- The Switch should support IPv6 ACLs that can be applied to filter IPv6 traffic.
- The Switch should support Port-based ACLs for Layer 2 interfaces to allow security policies to be applied on individual switch ports.
- The Switch should support Secure Shell (SSH) Protocol, Kerberos, and Simple Network Management Protocol Version 3 (SNMPv3) to provide network security by encrypting administrator traffic during Telnet and SNMP sessions.
- The Switch should support TACACS and RADIUS authentication to facilitate centralized control of the switch and restricts unauthorized users from altering the configuration.
- The Switch should support Multi-level security on console access to prevent unauthorized users from altering the switch configuration.
- The Switch should support Bridge protocol data unit (BPDU) Guard to shut down Spanning Tree PortFast-enabled interfaces when BPDUs are received to avoid accidental topology loops.
- The Switch should support Spanning Tree Root Guard (STRG) to prevent edge devices not in the network administrator's control from becoming Spanning Tree Protocol root nodes.
- The Switch should support IPv6 RA Guard, DHCPv6 guard, IPv6 Snooping to prevent any Man-in-middle attack.
- The Switch should support Dynamic VLAN, Downloadable ACLs, Multi-Auth VLAN Assignment, MAC Based Filtering & Web Authentication security mechanism.

#### Operational Features

- The Switch should support software image update and switch configuration without user intervention.
- The Switch should support automatic interface configuration as devices connect to the switch port.

- The Switch should support system health checks within the switch.
- The Switch should support real-time network event detection and onboard automation.
- The Switch should be capable of being deployed by any installer at the site, without having any prior knowledge of the IOS CLIs.
- The Switch should support dynamic port and session configuration management.
- The Switch should support real-time network event detection and onboard automation in order to take informational, corrective actions when the monitored events occur (Embedded Event Manager).

#### Quality of Service (QoS) & Control

- The Switch should support hierarchical wired QoS including hierarchical classification, policing and shaping.
- The Switch should be capable of Downloading Downloadable Access List from network security engine based on user identity.
- The Switch should be capable of Queuing, Policing, Shaping and marking Traffic based on Class of Service (CoS) or DSCP.
- The Switch should support IP SLA feature set to verify services guarantee based on business critical IP Applications.
- The Switch should support Auto QoS for certain device types and enable egress queue configurations.
- The Switch should support 802.1p CoS and DSCP Field classification using marking and reclassification on a per-packet basis by source and destination IP address, MAC address, or Layer 4 Transmission Control Protocol/User Datagram Protocol (TCP/UDP) port number.
- The Switch should support Shaped Round Robin (SRR) scheduling to ensure differential prioritization of packet flows by intelligently servicing the ingress queues and egress queues. Weighted tail drop (WTD) to provide congestion avoidance at the ingress and egress queues before a disruption occurs. Strict priority queuing to ensure that the highest priority packets are serviced ahead of all other traffic.
- The Switch should support Rate limiting based on source and destination IP address, source and destination MAC address, Layer 4 TCP/UDP information, or any combination of these fields, using QoS ACLs (IP ACLs or MAC ACLs), class maps, and policy maps.
- The Switch should support Eight egress queues per port to enable differentiated management of different traffic types across the stack for wired traffic.

#### Application Visibility Features

- The Switch should support Full Flexible Neflow v9 which provides ability to characterize IP traffic and identify its source, traffic destination, timing, and application information and is critical for network availability, performance, and troubleshooting.
- The Switch should be capable of enabling FnF on all ports of the switch for Ingress and Egress Traffic.
- The Switch should support at least 48,000 Flows per switch
- The Switches when stacked together should be capable to exporting the flow independently / directly to the FnF Collector.
- The Switch should be capable of showing customized reports on OS CLI, based on Top Talkers, Top Destination, Top Protocols etc.
- The Switch should be capable of monitoring network traffic on Physical, VLAN
- The Switch should support hop-by-hop analysis of application level statistics for troubleshooting video applications.

### Network Services

- The Switch should be capable of enabling multicast Domain Name System (mDNS) to operate across Layer 3 boundaries (mDNS Gateway) providing location and role based services.
- The Switch should support scalable device profiling by snooping on control protocol traffic such as CDP, LLDP, MAC OUI, DHCP etc.
- The Switch should be capable of measuring user traffic performance and generating alerts (based on thresholds) and reports.

### Standards and Compliance

Switch should support following standards

- IEEE 802.1s
- IEEE 802.1w
- IEEE 802.1x
- IEEE 802.1x-Rev
- IEEE 802.3ad
- IEEE 802.3x full duplex on 10BASE-T, 100BASE-TX, and 1000BASE-T ports
- IEEE 802.1D Spanning Tree Protocol
- IEEE 802.1p CoS Prioritization
- IEEE 802.1Q VLAN
- IEEE 802.3 10BASE-T specification
- IEEE 802.3u 100BASE-TX specification
- IEEE 802.3ab 1000BASE-T specification
- IEEE 802.3z 1000BASE-X specification
- RMON I and II standards
- SNMPv1, SNMPv2c, and SNMPv3

### Safety Standards

- UL 60950-1 Second Edition
- CAN/CSA-C22.2 No. 60950-1 Second Edition
- EN 60950-1 Second Edition
- IEC 60950-1 Second Edition
- VCCI Class A
- CISPR22 Class A
- EN55022 Class A
- KN22 Class A

## **Technical Specifications for 24 Port L2 Switch**

### **General Features**

- The switch should have a minimum of 24 nos. 10/100/1000 Ethernet Ports and 4 Nos. of 1 Gigabit Ethernet SFP uplink ports.
- The switch should support a total of 28 Ports including uplink ports.
- The switch should support flexibility to configure hardware resource (TCAM) allocation for different features.

### **Performance and Scalability**

- The switch should support Full-duplex Switching bandwidth of 216 GBPS.
- The switch should support 64-Byte Packet Forwarding Rate of 71 MPPS and above.
- The switch should support a Dual Core CPU.
- The switch should support 128 MB of Flash memory.
- The switch should support 512 MB of DRAM.
- The switch should support 1023 Active VLANs.
- The switch should support 4096 VLAN IDs.
- The switch should support Jumbo frames of 9216 bytes.
- The switch should support Maximum transmission unit (MTU) of 9198 bytes.
- The switch should support up to 16000 Unicast MAC addresses.
- The switch should support up to 1000 IPv4 IGMP groups.
- The switch should support up to 1000 IPv6 IGMP groups.
- The switch should support up to 625 IPv4 Security ACEs.
- The switch should support up to 625 IPv6 Security ACEs.
- The switch should support up to 500 IPv4 QoS ACEs.
- The switch should support up to 500 IPv6 QoS ACEs.
- The switch should support up to 4 SPAN Sessions.

### **Stacking**

- The switch should support Stacking.
- Stacking should enable all switches to function as a single virtual switch.
- The switch should support dedicated Stacking Port and should not be used from uplink ports mentioned above.
- Stacking module should be Hot-swappable.
- Stacking should support a minimum of 8 Switches in a single stack.
- Stacking should support 80 GBPS of bi-directional throughput.
- Stacking should support single IP address management for the group of switches.
- Stacking should support single configuration.
- Stack should support automatic upgrade when the master switch receives a new software version.
- The switch should support configurable egress buffer allocation for different queues on the stack ports.

### **Power Supply**

- The switch should support an auto-ranging power supply with input voltages between 100 and 240V AC.



- The switch should support an External Redundant Power Supply.
- The switch should support variable speed fan.

#### Standards

- The switch should support IEEE 802.1D Spanning Tree Protocol.
- The switch should support IEEE 802.1p.
- The switch should support IEEE 802.1Q Trunking.
- The switch should support IEEE 802.1s Multiple Spanning Tree (MSTP).
- The switch should support IEEE 802.1w Rapid Spanning Tree (RSTP).
- The switch should support IEEE 802.1x.
- The switch should support IEEE 802.1ab (LLDP).
- The switch should support IEEE 802.3ad Link Aggregation Control Protocol (LACP).
- The switch should support IEEE 802.3ah (100BASE-X single/multimode fiber only).
- The switch should support IEEE 802.3x full duplex on 10BASE-T, 100BASE-TX, and 1000BASE-T ports.
- The switch should support IEEE 802.3 10BASE-T specification.
- The switch should support IEEE 802.3u 100BASE-TX specification.
- The switch should support IEEE 802.3ab 1000BASE-T specification.
- The switch should support IEEE 802.3z 1000BASE-X specification.
- The switch should support RMON I and II standards.
- The switch should support SNMP v1, v2c, and v3.

#### Certifications

- The switch should be certified with common criteria/NDPP Network Device Protection Profile.
- The switch should be IPv6 Certified.

#### RFC compliance

- The switch should support RFC 768 – UDP.
- The switch should support RFC 783 – TFTP.
- The switch should support RFC 791 – IP.
- The switch should support RFC 792 – ICMP.
- The switch should support RFC 793 – TCP.
- The switch should support RFC 826 – ARP.
- The switch should support RFC 854 – Telnet.
- The switch should support RFC 951 - Bootstrap Protocol (BOOTP).
- The switch should support RFC 959 – FTP.
- The switch should support RFC 1112 - IP Multicast and IGMP.
- The switch should support RFC 1157 - SNMP v1.
- The switch should support RFC 1166 - IP Addresses.
- The switch should support RFC 1256 - Internet Control Message Protocol (ICMP) Router Discovery.
- The switch should support RFC 1305 - NTP for accurate and consistent timestamp.
- The switch should support RFC 1492 - TACACS+.
- The switch should support RFC 1493 - Bridge MIB.
- The switch should support RFC 1542 - BOOTP extensions.
- The switch should support RFC 1643 - Ethernet Interface MIB.
- The switch should support RFC 1757 - RMON (history, statistics, alarms, and events).
- The switch should support RFC 1901 - SNMP v2C.

- The switch should support RFC 1902-1907 - SNMP v2.
- The switch should support RFC 1981 - Maximum Transmission Unit (MTU) Path Discovery IPv6.
- The switch should support RFC 2068 – HTTP.
- The switch should support RFC 2131 – DHCP.
- The switch should support RFC 2138 – RADIUS.
- The switch should support RFC 2233 - IF MIB v3.
- The switch should support RFC 2373 - IPv6 Aggregatable Addrs.
- The switch should support RFC 2460 - IPv6.
- The switch should support RFC 2461 - IPv6 Neighbor Discovery.
- The switch should support RFC 2462 - IPv6 Auto configuration.
- The switch should support RFC 2463 - ICMP IPv6.
- The switch should support RFC 2474 - Differentiated Services (DiffServ) Precedence.
- The switch should support RFC 2597 - Assured Forwarding.
- The switch should support RFC 2598 - Expedited Forwarding.
- The switch should support RFC 2571 - SNMP Management.
- The switch should support RFC 3046 - DHCP Relay Agent Information Option.
- The switch should support RFC 3376 - IGMP v3.
- The switch should support RFC 3580 - 802.1X RADIUS.

#### Layer-2 Features

- The switch should support Automatic Negotiation of Trunking Protocol, to help minimize the configuration & errors.
- The switch should support IEEE 802.1Q VLAN encapsulation.
- The switch should support Centralized VLAN Management. VLANs created on the Core Switches should be propagated automatically.
- The switch should support Spanning-tree PortFast A for fast convergence.
- The switch should support Spanning-tree root guard to prevent other edge switches becoming the root bridge.
- The switch should support IGMP filtering.
- The switch should support discovery of the neighboring device of the same vendor giving the details about the platform, IP Address, Link connected through etc., thus helping in troubleshooting connectivity problems.
- The switch should support Per-port broadcast storm control to prevent faulty end stations from degrading overall systems performance.
- The switch should support Per-port multicast storm control to prevent faulty end stations from degrading overall systems performance.
- The switch should support Per-port unicast storm control to prevent faulty end stations from degrading overall systems performance.
- The switch should support Voice VLAN to simplify IP telephony installations by keeping voice traffic on a separate VLAN.
- The switch should support Auto-negotiation on all ports to automatically select half- or full-duplex transmission mode to optimize bandwidth.
- The switch should support Automatic media-dependent interface crossover (MDIX) to automatically adjust transmit and receive pairs if an incorrect cable type (crossover or straight-through) is installed.

- The switch should support Unidirectional Link Detection Protocol (UDLD) and Aggressive UDLD to allow for unidirectional links caused by incorrect fiber-optic wiring or port faults to be detected and disabled on fiber-optic interfaces.
- The switch should support Local Proxy Address Resolution Protocol (ARP) working in conjunction with Private VLAN Edge to minimize broadcasts and maximize available bandwidth.
- The switch should support IGMP v1, v2 Snooping.
- The switch should support IGMP v3 Snooping.
- The switch should support IGMP v1, v2 Filtering.
- The switch should support IGMP Snooping Timer.
- The switch should support IGMP Throttling.
- The switch should support IGMP Querier.
- The switch should support Configurable IGMP Leave Timer.
- The switch should support MVR (Multicast VLAN Registration).

#### IT Simplicity

- The switch should support Software image update and switch configuration without user intervention.
- The switch should support automatic configuration of switch port as devices connects.
- The switch should support diagnostic commands to debug issues.
- The switch should support system health checks within the switch.
- The switch should support run-time Diagnostics without any down time.
- The switch should support real-time alerts and remediation advice when an issue is detected.
- The switch should prevent booting any counterfeit images.

#### Quality of Service (QoS) & Control

- The switch should support 4 or 8 configurable egress queues per port to enable differentiated management.
- The switch should support class map based traffic differentiation within the same queue.
- The switch should support shared egress buffers for all the ports.
- The switch should support dedicated egress buffers reserved for each port.
- The switch should support scheduling techniques for QoS.
- The switch should support Weighted Tail Drop (WTD) to provide congestion avoidance.
- The switch should support CoS/dscp remarking.
- The switch should support Standard 802.1p CoS field classification.
- The switch should support Differentiated services code point (DSCP) field classification.
- The switch should support Strict Priority Queuing mechanisms.
- The switch should support Rate Limiting function to guarantee bandwidth.
- The switch should support rate limiting based on source and destination IP address.
- The switch should support rate limiting based on source and destination MAC address.
- The switch should support rate limiting based on Layer 4 TCP and UDP information.
- The switch should support availability of up to 256 aggregate or individual polices per port.
- The switch should support QoS on the stack ports.
- The switch should support QoS configuration across the entire stack.
- The switch should support queue level statistics of dropped and enqueued frames for each port.

### Management

- The switch should support Command Line Interface (CLI) support for configuration & troubleshooting purposes.
- The switch should support four RMON groups (history, statistics, alarms, and events) for enhanced traffic management, monitoring, and analysis.
- The switch should support Layer 2 trace route to ease troubleshooting by identifying the physical path that a packet takes from source to destination.
- The switch should support Trivial File Transfer Protocol (TFTP) to reduce the Cost of administering software upgrades by downloading from a centralized location.
- The switch should support SNMP v1, v2c, and v3 of-band management.
- The switch should support Telnet interface support for comprehensive in-band management of-band management.
- The switch should support dedicated out-of-band management port.
- The switch should support USB Console Port.
- The switch should support SSH for secure access.
- The switch should support SCP for secure file transfer.
- The switch should support 2 USB ports for external storage.

### Green Features

- The switch should support solutions that monitors and conserves energy with customized policies.
- The switch should support Intelligent Power Management.
- The switch should support Energy Efficient Ethernet (EEE) on downlink ports.
- The switch should support hibernation mode to save power when switch is idle.
- The switch should support IEEE 802.1x authentication for dynamic port-based security.
- The switch should support MAB based authentication (MAB).
- The switch should support Port-based ACLs for Layer 2 interfaces to allow application of security policies on individual switch ports.
- The switch should support SSHv2 and SNMPv3 to provide network security by encrypting administrator traffic during Telnet and SNMP sessions.
- The switch should support TACACS+ and RADIUS authentication enable centralized control of the switch and restrict unauthorized users from altering the configuration.
- The switch should support MAC address notification to allow administrators to be notified of users added to or removed from the network.
- The switch should support Port security to secure the access to an access or trunk port based on MAC address.
- The switch should support Multi-level security on console access to prevent unauthorized users from altering the switch configuration.
- The switch should support Private VLAN.
- The switch should support faster authentication by triggering all the supported authentication methods simultaneously.
- The switch should support MAC based VLAN assignment which allows per user VLAN assignment on Multi-auth port.

### DHCP Features

- The switch should support DHCP snooping to allow administrators to ensure consistent mapping of IP to MAC addresses DHCP binding database, and to rate-limit the amount of DHCP traffic that enters a switch port.

- The switch should support DHCP Option 82 - Configurable Remote ID and Circuit ID.
- The switch should support DHCP Snooping Statistics and SYSLOG.

#### IPv6 Features

- The switch should be on the approved list of IPv6 Ready Logo phase II – Host.
- The switch should support IPv6 MLDv1 & v2 Snooping.
- The switch should support IPv6 Port Access Control Lists.
- The switch should support IPv6 Router Access Control Lists.
- The switch should support HTTP, HTTP(s) over IPv6.
- The switch should support IPv6 Stateless Auto Config.
- The switch should support IPv6 QoS.
- The switch should support SSH over IPv6.
- The switch should support IPv6 First-Hop Security.

#### Application Visibility

- The switch should support exporting sampled flow level statistics in the NetFlow Version 9 format for analysis on external collector.
- The switch should support analyzing sampled flow statistics on the switch.
- The switch should support flow capture in hardware without any additional CPU load.

#### Support & Warranty

- The switch should support next business day delivery of replacement hardware.
- The switch should support free software maintenance updates.

#### Dimension & Operating Conditions

- Switch should be 19" rack mountable.
- The switch should support Operating temperature of -5° to 45°C up to 5000 ft (1500 m).
- The switch should support Operating relative humidity 10% to 95% noncondensing.
- The switch should support storage temperature of -25° to 70°C up to 15,000 ft (4573 m).

## **Technical Specifications for 48 Port L2 Switch**

### **General Features**

- The switch should have a minimum of 48 nos. 10/100/1000 Ethernet Ports and 4 Nos. of 1 Gigabit Ethernet SFP uplink ports.
- The switch should support a total of 52 Ports including uplink ports.
- The switch should support flexibility to configure hardware resource (TCAM) allocation for different features.

### **Performance and Scalability**

- The switch should support Full-duplex Switching bandwidth of 216 GBPS.
- The switch should support 64-Byte Packet Forwarding Rate of 107 MPPS and above.
- The switch should support a Dual Core CPU.
- The switch should support 128 MB of Flash memory.
- The switch should support 512 MB of DRAM.
- The switch should support 1023 Active VLANs.
- The switch should support 4096 VLAN IDs.
- The switch should support Jumbo frames of 9216 bytes.
- The switch should support Maximum transmission unit (MTU) of 9198 bytes.
- The switch should support up to 16000 Unicast MAC addresses.
- The switch should support up to 1000 IPv4 IGMP groups.
- The switch should support up to 1000 IPv6 IGMP groups.
- The switch should support up to 625 IPv4 Security ACEs.
- The switch should support up to 625 IPv6 Security ACEs.
- The switch should support up to 500 IPv4 QoS ACEs.
- The switch should support up to 500 IPv6 QoS ACEs.
- The switch should support up to 4 SPAN Sessions.

### **Stacking**

- The switch should support Stacking.
- Stacking should enable all switches to function as a single virtual switch.
- The switch should support dedicated Stacking Port and should not be used from uplink ports mentioned above.
- Stacking module should be Hot-swappable.
- Stacking should support a minimum of 8 Switches in a single stack.
- Stacking should support 80 GBPS of bi-directional throughput.
- Stacking should support single IP address management for the group of switches.
- Stacking should support single configuration.
- Stack should support automatic upgrade when the master switch receives a new software version.
- The switch should support configurable egress buffer allocation for different queues on the stack ports.

### **Power Supply**

- The switch should support an auto-ranging power supply with input voltages between 100 and 240V AC.
- The switch should support an External Redundant Power Supply.
- The switch should support variable speed fan.

### Standards

- The switch should support IEEE 802.1D Spanning Tree Protocol.
- The switch should support IEEE 802.1p.
- The switch should support IEEE 802.1Q Trunking.
- The switch should support IEEE 802.1s Multiple Spanning Tree (MSTP).
- The switch should support IEEE 802.1w Rapid Spanning Tree (RSTP).
- The switch should support IEEE 802.1x.
- The switch should support IEEE 802.1ab (LLDP).
- The switch should support IEEE 802.3ad Link Aggregation Control Protocol (LACP).
- The switch should support IEEE 802.3ah (100BASE-X single/multimode fiber only).
- The switch should support IEEE 802.3x full duplex on 10BASE-T, 100BASE-TX, and 1000BASE-T ports.
- The switch should support IEEE 802.3 10BASE-T specification.
- The switch should support IEEE 802.3u 100BASE-TX specification.
- The switch should support IEEE 802.3ab 1000BASE-T specification.
- The switch should support IEEE 802.3z 1000BASE-X specification.
- The switch should support RMON I and II standards.
- The switch should support SNMP v1, v2c, and v3.

### Certifications

- The switch should be certified with common criteria/NDPP Network Device Protection Profile.
- The switch should be IPv6 Certified.

### RFC compliance

- The switch should support RFC 768 – UDP.
- The switch should support RFC 783 – TFTP.
- The switch should support RFC 791 – IP.
- The switch should support RFC 792 – ICMP.
- The switch should support RFC 793 – TCP.
- The switch should support RFC 826 – ARP.
- The switch should support RFC 854 – Telnet.
- The switch should support RFC 951 - Bootstrap Protocol (BOOTP).
- The switch should support RFC 959 – FTP.
- The switch should support RFC 1112 - IP Multicast and IGMP.
- The switch should support RFC 1157 - SNMP v1.
- The switch should support RFC 1166 - IP Addresses.
- The switch should support RFC 1256 - Internet Control Message Protocol (ICMP) Router Discovery.
- The switch should support RFC 1305 - NTP for accurate and consistent timestamp.
- The switch should support RFC 1492 - TACACS+.
- The switch should support RFC 1493 - Bridge MIB.
- The switch should support RFC 1542 - BOOTP extensions.
- The switch should support RFC 1643 - Ethernet Interface MIB.
- The switch should support RFC 1757 - RMON (history, statistics, alarms, and events).
- The switch should support RFC 1901 - SNMP v2C.
- The switch should support RFC 1902-1907 - SNMP v2.
- The switch should support RFC 1981 - Maximum Transmission Unit (MTU) Path Discovery IPv6.

- The switch should support RFC 2068 – HTTP.
- The switch should support RFC 2131 – DHCP.
- The switch should support RFC 2138 – RADIUS.
- The switch should support RFC 2233 - IF MIB v3.
- The switch should support RFC 2373 - IPv6 Aggregatable Addrs.
- The switch should support RFC 2460 - IPv6.
- The switch should support RFC 2461 - IPv6 Neighbor Discovery.
- The switch should support RFC 2462 - IPv6 Auto configuration.
- The switch should support RFC 2463 - ICMP IPv6.
- The switch should support RFC 2474 - Differentiated Services (DiffServ) Precedence.
- The switch should support RFC 2597 - Assured Forwarding.
- The switch should support RFC 2598 - Expedited Forwarding.
- The switch should support RFC 2571 - SNMP Management.
- The switch should support RFC 3046 - DHCP Relay Agent Information Option.
- The switch should support RFC 3376 - IGMP v3.
- The switch should support RFC 3580 - 802.1X RADIUS.

#### Layer-2 Features

- The switch should support Automatic Negotiation of Trunking Protocol, to help minimize the configuration & errors.
- The switch should support IEEE 802.1Q VLAN encapsulation.
- The switch should support Centralized VLAN Management. VLANs created on the Core Switches should be propagated automatically.
- The switch should support Spanning-tree PortFast A for fast convergence.
- The switch should support Spanning-tree root guard to prevent other edge switches becoming the root bridge.
- The switch should support IGMP filtering.
- The switch should support discovery of the neighboring device of the same vendor giving the details about the platform, IP Address, Link connected through etc., thus helping in troubleshooting connectivity problems.
- The switch should support Per-port broadcast storm control to prevent faulty end stations from degrading overall systems performance.
- The switch should support Per-port multicast storm control to prevent faulty end stations from degrading overall systems performance.
- The switch should support Per-port unicast storm control to prevent faulty end stations from degrading overall systems performance.
- The switch should support Voice VLAN to simplify IP telephony installations by keeping voice traffic on a separate VLAN.
- The switch should support Auto-negotiation on all ports to automatically select half- or full-duplex transmission mode to optimize bandwidth.
- The switch should support Automatic media-dependent interface crossover (MDIX) to automatically adjust transmit and receive pairs if an incorrect cable type (crossover or straight-through) is installed.
- The switch should support Unidirectional Link Detection Protocol (UDLD) and Aggressive UDLD to allow for unidirectional links caused by incorrect fiber-optic wiring or port faults to be detected and disabled on fiber-optic interfaces.



- The switch should support Local Proxy Address Resolution Protocol (ARP) working in conjunction with Private VLAN Edge to minimize broadcasts and maximize available bandwidth.
- The switch should support IGMP v1, v2 Snooping.
- The switch should support IGMP v3 Snooping.
- The switch should support IGMP v1, v2 Filtering.
- The switch should support IGMP Snooping Timer.
- The switch should support IGMP Throttling.
- The switch should support IGMP Querier.
- The switch should support Configurable IGMP Leave Timer.
- The switch should support MVR (Multicast VLAN Registration).

#### IT Simplicity

- The switch should support Software image update and switch configuration without user intervention.
- The switch should support automatic configuration of switch port as devices connects.
- The switch should support diagnostic commands to debug issues.
- The switch should support system health checks within the switch.
- The switch should support run-time Diagnostics without any down time.
- The switch should support real-time alerts and remediation advice when an issue is detected.
- The switch should prevent booting any counterfeit images.

#### Quality of Service (QoS) & Control

- The switch should support 4 or 8 configurable egress queues per port to enable differentiated management.
- The switch should support class map based traffic differentiation with in the same queue.
- The switch should support shared egress buffers for all the ports.
- The switch should support dedicated egress buffers reserved for each ports.
- The switch should support scheduling techniques for QoS.
- The switch should support Weighted Tail Drop (WTD) to provide congestion avoidance.
- The switch should support CoS/dscp remarking.
- The switch should support Standard 802.1p CoS field classification.
- The switch should support Differentiated services code point (DSCP) field classification.
- The switch should support Strict Priority Queuing mechanisms.
- The switch should support Rate Limiting function to guarantee bandwidth.
- The switch should support rate limiting based on source and destination IP address.
- The switch should support rate limiting based on source and destination MAC address.
- The switch should support rate limiting based on Layer 4 TCP and UDP information.
- The switch should support availability of up to 256 aggregate or individual polices per port.
- The switch should support QoS on the stack ports.
- The switch should support QoS configuration across the entire stack.
- The switch should support queue level statistics of dropped and enqueued frames for each port.

#### Management

- The switch should support Command Line Interface (CLI) support for configuration & troubleshooting purposes.
- The switch should support four RMON groups (history, statistics, alarms, and events) for enhanced traffic management, monitoring, and analysis.

- The switch should support Layer 2 trace route to ease troubleshooting by identifying the physical path that a packet takes from source to destination.
- The switch should support Trivial File Transfer Protocol (TFTP) to reduce the Cost of administering software upgrades by downloading from a centralized location.
- The switch should support SNMP v1, v2c, and v3 of-band management.
- The switch should support Telnet interface support for comprehensive in-band management of-band management.
- The switch should support dedicated out-of-band management port.
- The switch should support USB Console Port.
- The switch should support SSH for secure access.
- The switch should support SCP for secure file transfer.
- The switch should support 2 USB ports for external storage.

#### Green Features

- The switch should support solutions that monitors and conserves energy with customized policies.
- The switch should support Intelligent Power Management.
- The switch should support Energy Efficient Ethernet (EEE) on downlink ports.
- The switch should support hibernation mode to save power when switch is idle.

#### Network security features

- The switch should support IEEE 802.1x authentication for dynamic port-based security.
- The switch should support MAB based authentication (MAB).
- The switch should support Port-based ACLs for Layer 2 interfaces to allow application of security policies on individual switch ports.
- The switch should support SSHv2 and SNMPv3 to provide network security by encrypting administrator traffic during Telnet and SNMP sessions.
- The switch should support TACACS+ and RADIUS authentication enable centralized control of the switch and restrict unauthorized users from altering the configuration.
- The switch should support MAC address notification to allow administrators to be notified of users added to or removed from the network.
- The switch should support Port security to secure the access to an access or trunk port based on MAC address.
- The switch should support Multi-level security on console access to prevent unauthorized users from altering the switch configuration.
- The switch should support Private VLAN.
- The switch should support faster authentication by triggering all the supported authentication methods simultaneously.
- The switch should support MAC based VLAN assignment which allows per user VLAN assignment on Multi-auth port.

#### DHCP Features

- The switch should support DHCP snooping to allow administrators to ensure consistent mapping of IP to MAC addresses DHCP binding database, and to rate-limit the amount of DHCP traffic that enters a switch port.
- The switch should support DHCP Option 82 - Configurable Remote ID and Circuit ID.
- The switch should support DHCP Snooping Statistics and SYSLOG.

### IPv6 Features

- The switch should be on the approved list of IPv6 Ready Logo phase II – Host.
- The switch should support IPv6 MLDv1 & v2 Snooping.
- The switch should support IPv6 Port Access Control Lists.
- The switch should support IPv6 Router Access Control Lists.
- The switch should support HTTP, HTTP(s) over IPv6.
- The switch should support IPv6 Stateless Auto Config.
- The switch should support IPv6 QoS.
- The switch should support SSH over IPv6.
- The switch should support IPv6 First-Hop Security.

### Application Visibility

- The switch should support exporting sampled flow level statistics in the NetFlow Version 9 format for analysis on external collector.
- The switch should support analyzing sampled flow statistics on the switch.
- The switch should support flow capture in hardware without any additional CPU load.

### Support & Warranty

- The switch should support next business day delivery of replacement hardware.
- The switch should support free software maintenance updates.

### Dimension & Operating Conditions

- Switch should be 19" rack mountable.
- The switch should support Operating temperature of -5° to 45°C up to 5000 ft (1500 m).
- The switch should support Operating relative humidity 10% to 95% noncondensing.
- The switch should support storage temperature of -25° to 70°C up to 15,000 ft (4573 m).

## **Modules**

### Multimode

The 1000BASE-SX SFP, compatible with the IEEE 802.3z 1000BASE-SX standard, operates on legacy 50 µm multimode fiber links up to 550 m and on 62.5 µm Fiber Distributed Data Interface (FDDI)-grade multimode fibers up to 220 m. It can support up to 1km over laser-optimized 50 µm multimode fiber cable.

### Single Mode

The 1000BASE-LX/LH SFP, compatible with the IEEE 802.3z 1000BASE-LX standard, operates on standard single-mode fiber-optic link spans of up to 10 km and up to 550 m on any multimode fibers. When used over legacy multimode fiber type, the transmitter should be coupled through a mode conditioning patch cable.