Request for Proposal (RFP) for Selection of Implementation Agency for Implementation, Operations and Maintenance of State NOC

Vol 1 of 2

Enquiry No. : OCAC-NEGP-INFRA-0010-2018-19009 Dated 08.03.2019

Revised RFP, after incorporating the responses to Pre-Bid Queries, issued on 02.04.2019

Sl No.	Items	Date & Time
1	Availability of Bid Document in the website (www.ocac.in and www.odisha.gov.in)	08.03.2019
2	Last date of receiving pre-bid queries	15.03.2019 at 5:00 PM
3	Pre-bid conference	18.03.2019 at 11:30 AM
4	Publication of corrigendum, if any	02.04.2019
5	Last date and time for submission of RFP	18.04.2019 at 2:00 PM
6	Opening of Pre-Qualification Bids (PQ)	18.04.2019 at 4:00 PM
7	Opening of Technical Bids (TB)	To be intimated later.
8	Opening of Price Bid (PB)	To be intimated later.

ODISHA COMPUTER APPLICATION CENTRE (OCAC)

OCAC Building, Plot No. – N-1/7-D, Acharya Vihar Square, RRL PO, Bhubaneswar-13, Odisha

Tel: 0674-2567064/2567280, FAX- 0674-2567842

Contents

1   Fact Sheet

This Fact Sheet comprising important factual data of the tender is for quick reference of the bidder.

Clause Reference	Topic
The Proposal	OCAC invites tenders from reputed firms/bidders for the **Selection of Implementation Agency for Implementation, Operations and Maintenance of State NOC** as described in "Scope of Work" of this RFP document. The bidder must possess the requisite experience, strength and capabilities in providing the services necessary to meet the requirements, as described in the tender document.
Method of Selection	**Least cost based method (L1)** shall be used to select the Bidder. The Bidder has to submit the bid in three separate sealed envelopes marked as Pre-Qualification (PQ), Technical Bid (TB) and Price Bid (PB) in a Single enclosed envelope
Document Fee	RFP Document fee of **Rs. 10,000/-** in form of Demand Draft must be submitted along with the proposal. The RFP document fee must be in favor of Odisha Computer Application Centre drawn on any scheduled commercial bank and payable at Bhubaneswar.
EMD	Earnest Money Deposit (EMD) of amount Rs. 40,00,000/- in shape of Bank Guarantee in favor of Odisha Computer Application Centre drawn on any scheduled commercial bank and payable at Bhubaneswar and should be valid for 6 months Bidders who already participated in the tender last time and submitted the EMD, need not submit it again.
PBG	Performance Bank Guarantee (PBG) @ 10% of the cost of project from any nationalized/scheduled commercial bank in the prescribed format attached in this RFP, in favor of the Odisha Computer Application Centre shall be submitted by the successful bidder within 15 days of issue of work order.
Scope of Work	Selected agency is expected to deliver the services listed in Scope of Work required for successful execution. Responsibility of the services for a period of six years. Selected bidder need to start the services at designated site within 15 days of signing of the Contract.
Language	Bid must be prepared by the Bidder in English language only
Currency	The bidder should quote in Indian Rupees only. The Total Price inclusive of taxes and duties will be considered for evaluation.

Validity Period	Proposals/bid must remain valid minimum for 180 days from the last date of bid submission.
Bid to be submitted on or before last date of submission at:	The proposal must be submitted to: The General Manager (Admin.) Odisha Computer Application Centre (OCAC) OCAC Building, Plot No.-N-1/7-D, Acharya Vihar Square, RRL Post Office, Bhubaneswar-751013 (INDIA)

2 Abbreviation

Abbreviations	Description
NIA	NOC Implementing Agency
NOC	Network Operations Center
PIA	Project Implementing Agency
OCAC	Odisha Computer Application Center
EMS	Element Management System
NMS	Network Management System
KVM	Keyboard Video Mouse
EMD	Earnest Money Deposit
OSS	Operating System Support
BSS	Business System Support
PDU	Power Distribution Unit
S-NOC	State NOC
PoA	Power of Attorney
RFP	Request for Proposal
UPS	Uninterrupted Power Supply
OEM	Original Equipment Manufacturer
OPTCL	Odisha Power Transmission Corporation Limited
TPA	Third Party Agency

3   Request for Proposal

Odisha Computer Application Centre (OCAC) invites RFP from the firms/bidders towards Selection of Implementation Agency for Implementation, Operations and Maintenance of State NOC as described in "Scope of Work" of this RFP. The Agency shall be responsible for implementing the State NOC and providing the operations and maintenance support for 6 years from the date of FAT.

4   Background Information

Odisha Computer Application Centre, the Designated Technical Directorate of Information Technology Department, Government of Odisha, has evolved through years as a center of excellence in Training, IT solutions and e-Governance. It has contributed significantly to the steady growth of IT in the state.

Odisha Power Transmission Corporation Limited (OPTCL), one of the largest Transmission Utility in the country was incorporated in March 2004 under the Companies Act, 1956 as a company wholly owned by the Government of Odisha to undertake the business of transmission and wheeling of electricity in the State. The registered office of the Company is situated at Bhubaneswar, the capital of the State of Odisha. Its projects and field units are spread all over the State.

BharatNet is a project of national importance to establish a highly scalable network infrastructure accessible on a non-discriminatory basis, to provide on demand, affordable broadband connectivity of 2 Mbps to 20 Mbps for all households and on demand capacity to all institutions, to realize the vision of Digital India, in partnership with States and the private sector. The entire project is being funded by Universal service Obligation Fund (USOF), which was set up for improving telecom services in rural and remote areas of the country. The objective is to facilitate the delivery of e-governance, e-health, e-education, e-banking, Internet and other services to the rural India.

OPTCL is in the process of selecting and onboarding the Project Implementation Unit for the implementation of the phase II of the afore mentioned network infrastructure.

4.1   Basic Information

Any contract that may result from this RFP processes will be issued for a term of total 6 years and 6 months which would include implementation of the State NOC by 6 months and providing the operations and maintenance support for 6 years from the date of Go-Live.

Proposals must be received not later than time, date and venue mentioned in the Fact Sheet. Proposals that are received late will not be considered in this procurement process.

4.1.1   Definitions

- "Request for Proposal (RFP)", means this detailed notification seeking a set of solution(s), services(s), materials and/or any combination of them.
- "State" shall mean the state of Odisha.
- "S-NOC" shall mean State NOC.
- "GoI" shall stand for the Government of India.
- "GoO" shall mean Government of Odisha.

- "OCAC", shall mean the Odisha Computer Application Centre, the Designated Technical Directorate of Information Technology Department, Government of Odisha

- "Bidder" means any firm offering the solution(s), service(s) and /or materials required in the RFP. The word Bidder when used in the pre award period shall be synonymous with Bidder, and when used after award of the Contract shall mean the successful Bidder or Vendor with whom Government of Odisha signs the agreement for rendering of services for.

- "Requirements" shall mean and include schedules, details, description, statement of technical data, performance characteristics, standards (Indian as well as International) as applicable and specified in the RFP.

- "Site" shall mean the location(s) for which the Contract has been issued and where the service shall be provided as per agreement.

- "Default Notice" shall mean the written notice of Default of the Agreement issued by one Party to the other in terms hereof.

- "Termination Notice" means the written notice of termination of the Agreement issued by one Party to the other in terms hereof.

- "Fraudulent Practice" means a misrepresentation of facts in order to influence a procurement process or the execution of a Contract and includes collusive practice among Bidders (prior to or after Bid submission) designed to establish Bid prices at artificial non-competitive levels and to deprive the Government of Odisha of the benefits of free and open competition.

- "Law" shall mean any Act, notification, by law, rules and regulations, directive, ordinance, order or instruction having the force of law enacted or issued by the Central Government and/ or the Government of Odisha or any other Government or regulatory authority or political subdivision of government agency.

- "LoI" means issuing of Letter of Intent which shall constitute the intention of the bidder to place the Purchase Order with the successful bidder.

- "Party" means Government of Odisha or Bidder, individually and "Parties" means Government of Odisha and Bidder, collectively.

- "NIA" means the network implementing agency to be selected through this RFP

- "TPA" means the Third Party Agency

5   Instruction to Bidder

5.1   General

- The terms and conditions given in the RFP, subsequent corrigendum if any released by OCAC against this RFP and release of corrigendum if any for NIA of Odisha State NOC shall apply.

- Each bidder shall submit only one Proposal. The bidder who submits or participates in more than one Proposal will be disqualified.

- Consortium is not allowed.

- While every effort has been made to provide comprehensive and accurate background information with desired responsibilities and requirements. Bidders must form their own conclusions about the support needed to meet the requirements based on their past experience.

- All information supplied by bidders may be treated as contractually binding on the bidders, on successful award of the assignment by the OCAC.

- No commitment of any kind, contractual or otherwise shall exist unless and until a formal written contract has been executed by or on behalf of the OCAC. Any notification of preferred bidder status by the OCAC shall not give rise to any enforceable rights by the Bidder. The OCAC may cancel this procurement at any time prior to a formal written contract being executed by or on behalf of the OCAC.

5.2   Completeness of the Tender

a) Submission of the bid shall be deemed to have been done after careful study and examination of the RFP document with full understanding of its implications.

b) Failure to comply with the requirements of this paragraph or any clause of the RFP document may render non-compliant and the RFP document may be rejected. Bidders must:-

- Include all documentation specified in this RFP document;

- Follow the format prescribed in this RFP document and respond to each element in the order as set out in this RFP document.

- Comply with all requirements as set out within this RFP document.

5.3   Key Requirements of Bid

5.3.1   Right to Accept Any Proposal and To Reject Any or All Proposal(s)

- OCAC reserves the right to accept or reject any proposal at any time prior to award of contract, without thereby incurring any liability to the affected bidder or bidders or any obligation to inform the affected bidder or bidders of the grounds for such action.

- OCAC makes no commitments, express or implied, that this process will result in a business transaction with anyone.

- The submission of RFP does not constitute an offer by OCAC. The bidder's participation in this process may result in selecting the bidder to engage towards execution of the contract.

5.3.2 Cost of RFP and EMD

- RFP Document shall be downloaded from the official site mentioned in the cover page. The bidders are required to submit the non-refundable RFP document fee of Rs. 10,000/- only in shape of an account payee Demand Draft in favor of Odisha Computer Application Centre and payable at Bhubaneswar from any of the scheduled commercial bank.

- Bidders shall submit, along with their General Bid, EMD of Rs. 40,00,000/- only in the shape of a bank guarantee issued by any scheduled commercial bank only in favor of Odisha Computer Application Centre and shall be valid for 180 days from the due date of the RFP.

- EMD of all unsuccessful bidders would be refunded by OCAC within 45 days of award of work order to successful NIA.

- The EMD amount is interest free and will be refundable to the unsuccessful bidders without any accrued interest on it.

- The Bid submitted without RFP Document fee & EMD will be summarily rejected.

- The EMD may be forfeited:
    - ✓ If a bidder withdraws its bid during the period of bid validity.
    - ✓ In case of a successful bidder, if the bidder fails to sign the contract in accordance with this tender paper.
    - ✓ If found to have a record of poor performance such as having abandoned work, having been black-listed, having inordinately delayed completion and having faced Commercial failures or found to have furnished false/ forged documents etc.

5.3.3 Performance bank Guarantee

- An unconditional and irrevocable Performance Bank Guarantee (PBG) equivalent to **10%** of the cost of project from any nationalized / scheduled commercial bank in the prescribed format given in this RFP, in favor of the Odisha Computer Application Centre shall be submitted by the successful bidder within **15 days** of issue of work order.

- Failure of submission PBG within the specified time period may lead to cancel the Work Order.

- The Bank guarantee shall be valid till **60 days** beyond completion of all the contractual obligations.

- In the event of the bidder being unable to service the contract for whatever reason, OCAC would evoke the PBG. OCAC shall notify the Bidder in writing of the exercise of its right to receive such compensation within **14 days,** indicating the contractual obligation(s) for which the Bidder is in default.

5.3.4 Pre-Bid Queries

Bidders are requested to submit their queries by e-mail to o gm_ocac@ocac.in and bijoy.mishra@ocac.in as per the format given below on or before 15.03.2019, 5:00 PM.

Company Name	Person Name	Designation, e-Mail, Contact Number		
Page No.	Section	Sub-Section	Clarification	Remarks

5.3.5 Responses to Pre-Bid Queries and Issue of Corrigendum

1. The Nodal Officer mentioned in the RFP document will endeavor to provide timely response to all queries. However, OCAC makes no representation or warranty as to the completeness or accuracy of any response made in good faith, nor does OCAC undertake to answer all the queries that have been posed by the applicants. The responses to the queries from all applicants will be published on OCAC website.

2. At any time prior to the last date for receipt of RFP, OCAC may, for any reason, whether at its own initiative or in response to a clarification requested by a prospective applicant, modify the RFP Document by a corrigendum.

3. The Corrigendum (if any) & clarifications to the queries from all applicants will be published by OCAC on the website.

4. Any such corrigendum shall be deemed to be incorporated into this RFP.

5. In order to provide prospective applicants reasonable time for taking the corrigendum into account, OCAC may, at its discretion, extend the last date for the receipt of RFP.

5.3.6   Submission of Proposals

1. The bidders shall submit their RFP document as per the format given in this RFP document in the following manner -

   - ✓ Pre-Qualification Bid in first envelope [RFP document duly signed, Cost of RFP document, EMD and other necessary supporting documents]
   - ✓ Technical Bid in second envelope [Technical supporting documents]
   - ✓ Price Bid in third envelope

2. The response to Pre-Qualification, Technical Bid and Price Bid (As mentioned in point a.) should be covered in separate sealed envelope super-scribing "Pre-Qualification Bid", "Technical Bid" and "Price Bid" respectively.

3. Please Note that Prices shall not be indicated in the Technical Bid but shall only be indicated in the Price Bid.

4. The three envelopes containing copies of Pre-Qualification Bid, Technical Bid and Price Bid shall be put in another single sealed envelope clearly marked "RFP for Selection of NIA for Odisha State NOC".

5. The outer envelope thus prepared shall also indicate clearly the name, address, telephone number, E-mail ID and fax number of the bidder.

6. All the pages of the RFP bid must be sequentially numbered and must contain the list of contents with page numbers. Any deficiency in the documentation may result in the rejection of the bid.

7. The original bid shall be prepared in indelible ink. It shall contain no interlineations or overwriting, except as necessary to correct errors made by the bidder itself. Any such corrections must be initialed by the person (or persons) who sign(s) the tender paper.

8. All pages of the bid shall be initialed and stamped by the person who signs the bid.

5.3.7   Authentication of Bids

The RFP document shall be accompanied by an Authorization Letter / power-of-attorney in the name of the authorized signatory of the proposal.

5.4   Preparation and Submission of Bid

5.4.1   Preparation Costs

The bidder shall be responsible for all costs incurred in connection with participation in the bid process, including site visits but not limited to, costs incurred in conduct of informative and other diligence activities, participation in meetings/ discussions/ presentations, preparation of bid, in providing any additional information required by OCAC to facilitate the evaluation process, and in negotiating a definitive contract

or all such activities related to the bid process. OCAC will in no case be responsible or liable for those costs, regardless of the conduct or outcome of the bidding process.

5.4.2 Language

The proposal shall be filled by the bidder in English language only. If any supporting documents submitted are in any language other than English, translation of the same in English language is to be duly attested by the bidders. For purposes of interpretation of the proposal, the English translation shall govern.

5.4.3 Venue and Deadline for Submission of Bid

Proposals, in its complete form in all respects as specified in the RFP document, must be submitted on or before the last date and time of submission of bid as mentioned on the cover page of the RFP bid at the address specified below in person at OCAC. No other way of submission of bid including submission through courier shall be considered.

The General Manager (Admin),

OCAC Building, Plot No.-N-1/7-D,

Acharya Vihar Square, RRL Post Office,

Bhubaneswar-751013 (INDIA)

5.4.4 Late Bids

- Bids received after the due date and the specified time (including the extended period if any) for any reason whatsoever, shall not be entertained and shall be returned unopened.

- The bids submitted by telex/ telegram/ fax/ e-mail etc. shall not be considered. No correspondence will be entertained on this matter.

- OCAC shall not be responsible for any postal delay or non-receipt / non-delivery of the documents. No further correspondence on the subject will be entertained.

6 Criteria for Evaluation

The selection process consists of below three stages -

1. Pre-Qualification

2. Technical Evaluation

3. Commercial Evaluation

6.1 Pre-Qualification

#	Clause	Documents Required	Page No. of the supporting document in Bid Document	Compliance Status (Yes / No)
1	The bidder should be a company registered under the Companies Act, 1956 since last 5 years. Or Partnership firm registered under LLP Act 2008.	Copy of Certificate of incorporation, Copy of Certificate consequent to change of name, if applicable has to be submitted.		
2	Bidder should have experience of at least one successful implementation (FAT) of State / Nationwide Network Operations Center (**500 or more elements**).	Work orders and implementation completion certificates (FAT certificate/ Project completion certificate/ any other relevant document confirming completion of the work executed with area of activity).		
3	Bidder should have been in the business and executed works for a period of Five (5) years as on 31st March, 2018.	Copy of the audited balance sheet for last 5 years as on 31st March, 2018.		
4	The Bidder's Average Annual Turnover should be **Rs. 60 Crore** or	Copy of the audited balance sheet / Statutory Auditor's Certificate.		

	more in last 3 financial years - ending at March 31, 2018.			
5	The bidder must have ISO 27001 and ISO 9001 Certificate	ISO 27001 and ISO 9001 valid certificate		
6	The Bidder shall not be under a Declaration of Ineligibility for corrupt or fraudulent practices or blacklisted with any of the Government agencies.	Declaration in this regard by the authorized signatory of the bidder on its own letterhead.		
7	OSS OEM/s shall be in the 'Gartner's magic quadrant as per the latest report' or the OSS solution should have been 'successfully implemented* in any Telecom or BharatNet project in last 5 years in India or abroad'. *Successful implementation of OSS shall be validated by 'a project completion certificate' or 'Final acceptance certificate or report signed off by the client and shall be operations after FAT'.	Work order and Implementation completion / Project Completion Certificate / any other relevant documents from the client.		
8	The bidder should have an office in Bhubaneswar. However, if the local presence is not there in Bhubaneswar, the bidder should give an undertaking for establishment of an office, within one month of award of the contract.	Relevant Documents or Undertaking signed by the Authorized Signatory		

Note: - Only bidders qualifying in Pre-Qualification evaluation would be considered for the technical evaluation as per below criteria.

6.2   Technical Evaluation

In order to determine whether the bidders are qualified and whether the technical aspects are substantially responsive to the requirements set forth in the bidding documents, the Tendering Authority will examine the information supplied by the Bidders and shall award points to the bidders on the basis of the following parameter.

#	Parameter	Documents Required	Marking Criteria	Maximum Score
1	Bidder's experience in Implementing Network Operations Center in terms of numbers of assignments performed/executed for any State Government / Central Government Projects in last 5 years. The minimum number of nodes / elements monitored from the NOC should be 500 or more for each of the projects.	Work orders and implementation completion certificates (FAT certificate/ Project completion certificate/ any other relevant document confirming completion of the work executed with area of activity).	2 or more assignments =15 Marks One Assignment = 12 Marks.	15
2	Bidder's experience in Maintaining Network Operations Center in terms of numbers of assignments performed/executed for any State Government / Central Government Projects in last 5 years. The minimum number of Nodes / Network elements monitored from the NOC should be 500 or more for each of the projects.	Work orders and Project completion certificate/ Project On-going certificate/ any other relevant document with area of activity.	2 or more assignments =15 Marks One Assignment = 12 Marks	15
3	Average Annual Turnover	Copy of the audited balance sheet & Statutory Auditor's Certificate.	Minimum 60 Cr = 10.5 Marks 61 Cr to 100 Cr = 13 Marks	15

#	Parameter	Documents Required	Marking Criteria	Maximum Score
			> 100 Cr = 15 Marks	
4	Approach and Methodology	Technical Proposal	Understanding of the Scope = 5 marks Approach & Methodology = 10 marks Solution Proposed = 10 Marks	25
5	Resource Proposed	CVs in Technical Proposal	Based on quality of resources proposed	10
6	OSS OEM/s shall be in the 'Gartner's magic quadrant as per the latest report' or the OSS solution should have been 'successfully implemented* in any Telecom or BharatNet project in last 5 years in India or abroad'. *Successful implementation of OSS shall be validated by 'a project completion certificate' or 'Final acceptance certificate or report signed off by the client and shall be operations after FAT'.	Work orders and implementation completion certificates (FAT certificate/ Project completion certificate/ any other relevant document confirming completion of the work executed with area of activity).	Deployment in 1 projects – 15 marks Deployment in 2 or more projects – 20 marks	20

Note: - As a part of Technical Qualification Process, those bidders who have scored >=70 marks would be considered for opening of commercial bid.

6.3 Notification of Award

OCAC will award the contract to the successful bidder whose proposal has been determined to be substantially responsive as per the process outlined above. The bidder with the lowest price quote shall be considered as L1 and award of the contract shall be made to the bidder with the lowest cost (L1). If the L1 bidder refuses / fails to accept the Work Order within Ten days, the next higher responsive bidder (L2) will be proposed to accept the Work Order at the rates offered by the lowest bidder (L1). If L1 bidder refuses / fails at any stage of contract, the entire work can be given to the L2 bidder at L1 rate. OCAC reserves the right to negotiate prices during evaluation if found necessary. OCAC will notify the successful bidder in writing or by fax or email, that its proposal has been accepted. In case the tendering process / public procurement process has not been completed within the stipulated period, OCAC may like to request the bidders to extend the validity period of the bid. In such case such extended period shall be accepted as mutually agreed upon. Notification of award will constitute the formation of the contract.

6.4 Signing of Contract

After the OCAC notifies the successful bidder that its proposal has been accepted, OCAC shall enter into a contract within thirty (30) days of the award of the contract or within such extended period, as may be specified by the Authorized Representative of OCAC., incorporating all clauses and the proposal of the bidder with the successful bidder. The Draft Service Level Agreement (SLA) will be provided as a separate document.

6.5 Failure to Agree with the Terms and Conditions of the RFP

Failure of the successful bidder to agree with the Draft Service Level Agreement (SLA) and Terms & Conditions of the RFP shall constitute sufficient grounds for the annulment of the award, in which event OCAC may award the contract to the next best value bidder or call for new proposals from the interested bidders. In such a case, the OCAC shall forfeit the EMD of the successful bidder.

6.6 Period of Contract

The period of the contract shall be for a period of three (3) years initially from the date of successful FAT. Both the parties may extend the period on yearly basis (maximum 3 years) on mutual agreement on similar terms and conditions.

6.7 Key Stakeholders

The key stakeholders are -

- ✓ Odisha Computer Application Center (OCAC)
- ✓ The BharatNet Project Implementation Agency (PIA)

- ✓ Odisha Power Transmission Corporation Limited (OPTCL) as the State Implementing Agency (SIA)
- ✓ The Third Party Agency (TPA)

7   Scope of Work

As part of the BharatNet project a State Network Operations Centre (hereinafter referred to as "S-NOC") shall be established for monitoring the telecom network infrastructure laid as part of Bharatnet Phase II across specified locations in Odisha. The S-NOC shall analyze network problems, perform troubleshooting, communicate with various network maintenance officials / technicians and track problems through resolution. The key objective of the S-NOC is to ensure the health and availability of the components of the network laid under the BharatNet project. When necessary, S-NOC shall escalate problems to the appropriate stakeholders on the basis of an agreed escalation matrix.

The Network Implementation Agency (NIA) to be selected through this RFP shall be responsible for

o   Implementation of the S-NOC,
o   Maintenance of the S-NOC, and
o   Providing the 1st level helpdesk services for the BharatNet network to be laid by the PIA.

The Project Implementation Agency of the BharatNet Phase II in their comprehensive annual maintenance contract phase shall maintain the implemented network for 2 years after 1 year of initial warranty (total 3 years). The scope of work portion of the agreement between the PIA and OPTCL would be shared as a part of the RFP as annexure for a clear understanding of the scope of PIA during the AMC phase. OPTCL is the state implementing agency for the aforementioned project.

To monitor the BharatNet network the NIA would be responsible to build the Operation Centre area consisting of the Network Operation Area (S-NOC), server room, meeting room, etc.

The NIA shall be responsible for design, supply, installation and setting up of the necessary basic infrastructure for operation center area in terms of civil, interior, electrical and Air-Conditioning System, Fire Prevention, Detection and Suppression System, Lighting system, Power to devices, multi-layer Physical Security, infrastructure like bio-metric based access-control system, CCTV/ surveillance systems, rodent repellent etc.

During the O&M phase the NIA shall be responsible for monitoring and maintaining the S-NOC so implemented. It is expected that the overall availability of the S-NOC shall be ~99.982% along with all its individual components.

The monitoring system to be implemented as a part of the S-NOC shall be capable of auto ticketing for any faults (prediction of faults) both for the components of the S-NOC and the network laid as part of the BharatNet project. Any fault or incident in the infrastructure of the S-NOC shall be repaired / restored by the NIA to meet the availability goal of 99.982%.

Any incident/ fault/ request related to the BharatNet network shall be auto assigned to the PIA team. The NIA shall configure the helpdesk to automatically route / assign ticket immediately as soon as an incident / alarm is triggered. The NIA shall be responsible to configure the NMS/ OSS contact database in such a way that the information of the tickets are automatically sent via email to the relevant person or team.

Please refer to section 7.6 of this document for detailed scope of work of the NIA.

7.1   Design Considerations for S-NOC

The envisaged S-NOC shall be equipped with modern infrastructure that will allow substantial economies of scale and designed with more energy efficiency. Consideration will be also given to the external environment. Some of the salient features of the S-NOC are listed as below:

Availability

Redundancy and high availability shall be provisioned for all the major components for State NOC for BharatNet Phase-II using methods such as clustering, hot-standby, RAID and HSRP/VRRP etc. Non-IT components from Transformer to DG sets, LT Panel, PDUs, PAC, etc., will be in N+1 mode. UPS systems considered in N+N mode to cater full load of the critical components at the time of single electrical path

failure. All IT components such as routers, firewalls, switches, servers, etc., will be in high availability or cluster mode (active-active or active-passive).

The computing infrastructure shall be configured in High-Available mode such that redundancy is maintained. Equipment with dual redundant power supplies have been considered.

Automatic Transfer Switch ATS for single-power supply rack-mount equipment providing fail-safe redundancy has been considered. Virtualization may be used to improve the optimization of hardware used resulting in footprint of the hardware as well as power consumption. Virtualization shall also enable dynamic resource allocation in case of increase/decrease in load.

Flexibility

Flexibility is one of the major advantages of any Data Centre environment where different modules can be added based on the requirements. Here for the State NOC for BharatNet Phase-II, the modular approach will allow flexibility to add system resources based on requirements. The civil, electrical and mechanical infrastructure will be built at the initial stage with raw power arrangement as per requirement to bear the 100% load of the S-NOC for 5 years but DG sets, UPS, the computing environment to be implemented based on requirements as on date. As the UPS is modular in nature it can be added with a modular approach. At initial stage, DG sets and PACs will be as per current load and additional equipment will be added at a later stage to fulfill the requirements.

Scalability

The civil and passive components such as power panels, raised flooring for NOC room, PAC areas, BMS room, Intelligent BMS system, CCTV, access controls will be ready for the entire setup at the beginning of implementation of S-NOC. However, modular devices such as UPS, computing infrastructures, etc., will be scaled based on the demand to reduce the capital expenditure. With scalability as a prime feature of the S-NOC, the initial infrastructure requirement can be deployed without spending capital expenditure for future requirements. Another advantage of a modular based infrastructure is that the equipment can be implemented on demand and thus will reduce consumption of electricity and cooling.

As part of the overall design, scalability has been considered as an important consideration for all solution components to ensure that this S-NOC of BharatNet Phase-II for the state of Odisha can support roll-out of any new other application/EMS/other modules or can support additional nodes of BharatNet Phase-I

without impacting the overall design. The scalability can support the applications for six to eight years considering the roadmap.

In the Compute Layer, modular and high performance computing systems have been considered since they provide horizontal scaling option with virtualization layer to host applications. The systems shall be configured with sufficient slots for future scalability.

The S-NOC network shall be configured with 10G links at the access layer and 40G links at the aggregate layer from day 1. The router shall be capable of supporting 10G ports and aggregation/core switch shall be capable of supporting 40G ports as well. All other network devices shall be configured with sufficient ports for future scalability.

The storage layer shall consist of unified storage for handling different type of data being stored. The storage shall be scalable for future requirements by adding more number of drives in the existing storage subsystem.

Security

The S-NOC shall be implemented with robust security controls across all layers which are required to ensure protection of critical information from any unauthorized access.

All infrastructure hosting critical data and application shall be hosted in the Militarized Zone (MZ). In addition, consoles for managing network shall be in the Management Zone. The S-NOC will be protected from external and internal threats by deploying Firewall for controlling access to the S-NOC. The firewall will have Intrusion Prevention System capability inbuilt for protection from advanced threats and shall have the capability to protect from DDoS attacks.

Performance

The infrastructure to be deployed at S-NOC shall be high-performance and state-of-the-art systems.

The Computing Infrastructure shall be Latest Generation x86_64 Bit processor. The Compute Infrastructure shall have high performance connectivity to network (10 Gbps) and storage (16 Gbps). The Network backbone for State NOC shall be on 10G at the access layer and 40G at the aggregation layer on day 1 which can scalable up to 100G at the aggregation layer.

The proposed infrastructure shall be easily manageable from the serviceability perspective, thereby reducing the downtime of the critical applications. All the hardware infrastructure shall have redundant and hot swappable components such as fans, power supplies, disks, etc.

7.2 Design Considerations of Physical Infrastructure

Following are the key design considerations:

- ➢ Approx. 1500 sq. ft. of total space has been allocated for S-NOC. Design of civil layout has been done considering the allocated area.
- ➢ Entire civil construction work and interior work will be done in the initial phase.

7.2.1 State NOC Layout

OCAC has an existing area of around 1500 sq. ft. with capability to have 12 racks in an approx. 540 sq. ft. server farm area. Initially to start with the server farm will be built with 6 no's of rack capacity. As an expansion strategy, the server room can host 12 racks in total. The standard space requirements is considered to host the 12 racks, the floor space of hot aisles and cold aisles along with the space for the back and front doors of the rack cabinet, as well as free space for service area. The physical layout of envisaged S-NOC is given in the next section.
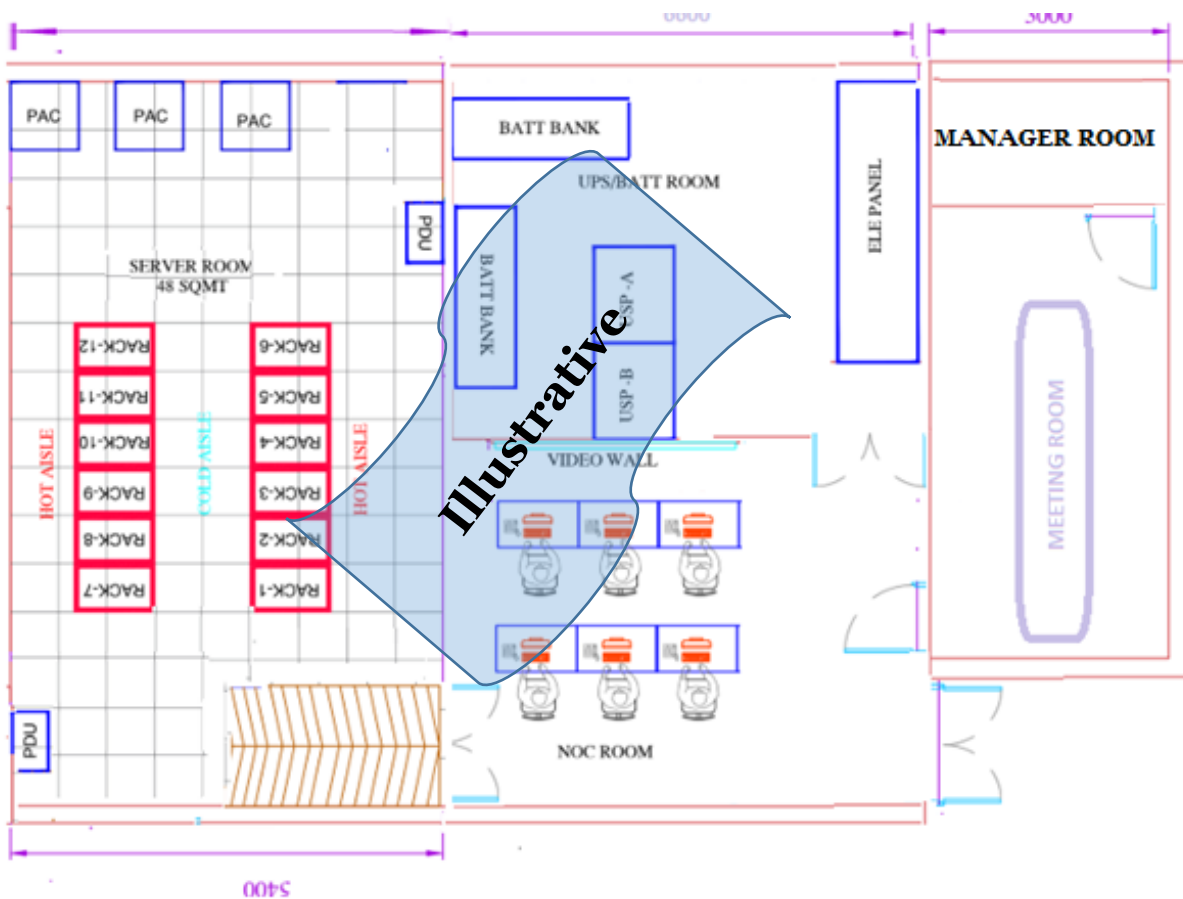
Figure 1 Illustrative Layout

Reference Size of Functional Areas in State Network Operation Centre:

S-NOC shall be built with *Server Area, NOC Sitting Area, UPS and Battery Room, Meeting Room, Manager Room* etc. Indicative sizes of the above stated functional areas are given in the table below. The sizing in the table is a reference to provide an overall idea of the required space in S-NOC. The size may vary due to dimensions of the final list of components (e.g. rack cabinet size) proposed for the S-NOC.

At the time of interior design (civil) and construction face, best standards for building NOC shall be followed by System Integrator for the following work:

Walls and Plastering	Doors
Raised Floor	Painting
Raised Flooring Panels	Insulation Work
Stringer	Pest Control
Suspended Ceiling for Cable Trays	Glow Signage
False Ceiling for auxiliary areas	Other miscellaneous civil work in accordance with site requirements

Note: List provided above may be taken as reference and comprehensive work plan requires to be prepared by prospective bidder.

Raised floors to be built for Server Area and other areas as necessary. The height of the raised floor shall be minimum for 450 mm and the raised flooring panels should have enough capability to handle loads of equipment.

7.2.2   Electrical System Design

For S-NOC, it is recommended to have redundant raw power arrangement from dedicated transformer, which is being used for OSDC/OSWAN. There should be two Power Panels with auto interlocking capacity for identifying only one active power source to the LT panel. There should be two LT panel with DG Sync panel (automatic failover panel) so that automatic start of DG's takes place in case of power failure. DG's will only be utilized in the case of power failure from transformer.

The critical load of the UPS will provide power to the IT equipment's (Computing environment) and the ECM Fans of the Precision AC's, to maintain the temperature for a few minutes even during non-availability of power at the PAC's. The non-critical load will be for non-computing environments such as lights, comfort air conditioning and other auxiliary areas. PAC main power will be connected from LT panel directly and to protect the PAC from drastic voltage variation.

Design consideration for the electrical environment is as follows:

a. **Diesel Generator (DG) Set:** Diesel Generator (DG) sets with high efficiency to be deployed, which shall be fuel efficiency certified by the Pollution Control Board. DG sets to work as per the load conditions synchronized through the automatic failover panel and number of diesel generators will be decided as per corresponding facility requirements.

b. **UPS:** Modular UPS with high efficiency to be deployed as per load requirements with flexibility for expansion. The UPS to have inbuilt redundancy along with redundant power delivery path. The UPS solution should include intelligent PDU for rack level monitoring, flexible output with Isolation transformer.

c. **Battery Bank: VRLA** type battery banks for the UPS to be selected for high efficiency and long service life.

d. **Electrical Panels:** Electrical panels to be fitted with proper Automatic Power Factor Correction (APFC) components and Surge Protecting Devices (SPD). Electrical panels to have redundant path ensuring 100% backup to avoid emergency breakdown.

e. **Power Distribution Units**: Modular Power Distribution Units (PDUs) should be procured and deployed as per capacity requirement.

f. **Power Cable Ducts**: Power cable ducts to be rated for high current capacity with cables having PVC insulated low loss copper conductor.

Key components of the Electrical systems are described in sections below:

7.2.2.1 Power Supply
OCAC will provide the raw power connectivity from the existing transformer which supplies power to the existing Data Centre/SWAN infrastructures, lighting arrangements, and other facilities for the OCAC building.

a. The estimated required power for the new State NOC for BharatNet project will be approximately 150 kVA.

b. The primary backup power supply to the facility shall be diesel generator sets of adequate capacity along with suitable fuel storage for longer runtime during major power failure. However, the DG sets will operate with UPS combinations.

c. Total 3 No's of UPS of 40 kVA each needs to be consider. Initially 2 UPS will be supplied by the bidder to cater the load of 40 kVA and in future additional 40 kVA UPS will be installed as and when required, so that, in N+1 mode, total 80 kVA load can be catered.

d. The PDU is considered to distribute power till rack level and for the total number of termination required for the entire server farm area. There should be free MCCB in each PDU to use in case of failure of any connection.

e. Two separate connections to the rack is provisioned for the Rack power distribution, one from PDU-1 where the power source will be from UPS 1 and the other from PDU- 2 where the power source will be from UPS 2.

f. The precision air-conditioners and all racks rated with 100% full capacity population inside NOC Server farm should have dual power inputs to have power from both the directions. The precision AC fan motors should have UPS power supply to have proper CFM during power failure or change over. The PAC ducting for server farm area from all the PACs to be ready from day 1. Total 18 TR of PAC will be required for which minimum 3 no's of 9 TR PACs can be considered by the bidder. Initially 2 no's of 9 TR PACs will be supplied by the bidder but civil and cabling arrangement should be carried out for total 3 no's of 9 TR PACs, so that, as and when required 3rd PAC can be procured and installed without any cabling or civil work.

g. Electrical equipment such as LT Panel, AMF Panel, DG sets etc. will be installed in the ground floor outside building.

h. From DG sets to AMF panel to LT panel, all these electrical cabling needs to be carried out by the bidder.

7.2.2.2 *Diesel Generator System*

The primary alternative to the power supply system for S-NOC of Odisha BharatNet project is DG set and we have considered two DG sets to take over the full load of the S-NOC during main power failure.

a. Diesel Generator sets will be installed and separated from the OCAC building to minimize the risk of explosion or fire events.

b. The DG sets will be monitored and checked regularly by running each of them daily and those sets will be ready to work continuously round the clock with full load and at the rated output (prime rated).

c. All DG sets shall include features such as special acoustic treatment for noise reduction, automated mains failure (AMF), auto synchronizing cum load sharing, auto starting and auto battery chargers, automatically operated fuel transmission system through diesel pumps and pipeline, etc.

d. Diesel tanks for storing adequate amount of diesel to run the NOC infrastructure for long hours will be designed.

As per the requirement to handle full load of the S-NOC, two DG sets each with rated capacity of 150 kVA are considered that will work in N+1 mode to support redundancy.

7.2.2.3 UPS System

Uninterruptible Power Supply (UPS) system considered in the State NOC design would be modular and scalable in nature. The UPS system will be handling the load of 60 kVA power required for the critical components of the NOC and so the requirement is considered as 66 kVA UPS by taking 10% buffer load as safety factor to the UPS. We have considered to have total two numbers of UPS system of to cater load up to 80 kVA each, which will run in N+N mode and maintain the redundancy. Initially the UPS will be having capacity of 40 kVA as 6 racks only considered to install by day 1. As and when number racks will increase, we can install additional modules to scale up. The power module units of UPS systems would be connected in parallel inside a standard rack without the need for any additional system controller. The electrical components like PDU, circuit breaker etc. are considered based on the capacity of number of racks to be connected to the UPS systems. UPS is considered to provide backup of minimum 30 minutes on full load of the critical components of S-NOC and to the EMC fan of PACs.

a. While main AC power supply will fail, the critical AC load will be powered by the UPS systems without any interruption and will get power from the battery system. Again while AC main power gets restored the power to the rectifier initially will be restricted by a gradual power walk- in. And then following the short power walk- in period, the rectifier powers the UPS systems and simultaneously recharges the battery through the battery converter. This function is automatic and will not cause any interruption to the critical systems of the NOC.

b. The UPS will be parallel in nature and for higher capacity or higher reliability, power modules can be added parallel to existing modules inside the UPS rack cabinet. These additional power modules would automatically share the load. Each power module shall have its own intelligent control logic to avoid

single point off failure. There should not be any common controller that controls all power modules in parallel.

c. The UPS system shall have the ability to perform self-test with full dummy load capacity. In this mode, UPS rectifier, inverter and static bypass switch shall be tested up to full load capacity. Power consumption shall be tested using batteries and to check full load losses of UPS.

d. Each UPS system shall comprise 100% scalable and preferably hot swappable power modules. This feature will allow the user to upgrade, downgrade, and manage the system without any interruption.

e. For auxiliary areas, separate UPS system will not be considered as the load of the same is too less. Main UPS will cater the load to auxiliary areas.

7.2.3   Cooling System

S-NOC will be containing precision air conditioning (PAC) and comfort air conditioning (CAC) systems as per requirement.

7.2.3.1   *Precision Air Condition (PAC)*

Criteria for designing the cooling requirement of the State NOC for Odisha BharatNet project are as follows-

a. An air-conditioning system with full backup should be implemented for server farm area. The air conditioning units has been designed to address the current planned load as well as the future estimated loads. The PAC system will work in N+1 mode for maintaining redundancy.

b. For high capacity racks having high heat dissipation, air-conditioning from the top of the racks or in-row cooling has been planned.

c. Temperature and moisture sensors shall be placed in the server room.

d. For PAC, overall energy efficiency ratio should be around 97%, with step down compressor, ECM fan, etc., so that PUE target can be estimated at below 1.75.

e. HVAC system to be designed to cool the pay load area and maintain around 22 ($\pm$ 2) deg. C temperature and humidity at 50% (50$\pm$ 5 range) with air cooled Precision Air Conditioners (PAC).

f. Refrigerant gas in the PACs to be eco-friendly gas such as R-407C or R-410A, etc.

g.   Other than server farm areas there will be split comfort air-conditioners covering all auxiliary areas as per requirement.

h.   For UPS rooms, there will be comfort air conditioners installed.

Cool air feed to the S-NOC server farm shall be bottom-charged or downward flow type using the raised floor as supply plenum through perforated aluminum tiles for airflow distribution. Air conditioning considered should be capable of providing sensible cooling capacities at the design ambient temperature and humidity with adequate airflow. The Precision Air-Conditioning system shall capable to be integrated with the BMS for effective monitoring.

Following criteria have been considered while designing the cooling systems:

1.   Cooling must be delivered where needed

2.   NOC server farm will need precision air-conditioning

3.   Controls must be adaptable to change

4.   Need of frequent air exchange

5.   Future capacity expansion

According to the area allocated and considering the full load of the S-NOC Server room, the provisioned capacity of the PAC systems shall be approximately 18 TR. As the PAC system will have modular scroll variable compressors inbuilt, these PAC systems will automatically utilize its compressors as per requirement. Bidder may consider minimum 2 numbers of 18 TR or minimum 3 numbers of 9 TR PACs as a part of their solution.

7.2.3.2   Comfort Air Condition (CAC)

The CAC requirement for the S-NOC auxiliary areas are given as below-

Name of the Area	Approx. Area (Sq. ft.)	CAC (TR)	Qty
NOC Room	330	2.5	2
UPS Room	330	2	2
Meeting Room	216	2.5	1

7.3 Design Consideration of IT Infrastructure

While designing the solution of IT infrastructure, we have assessed the current and future demand of Odisha BharatNet Project. We have considered major components such as servers, storage, backup solution, networking components, logical security components, NMS/EMS solution, Virtualization and software licenses as a part of the solution.

Description of each component and solution are given in the sections below.

7.3.1 Servers

7.3.1.1 Generic Considerations

a. State NOC is envisioned to monitor the entire BharatNet project. Initially this will cater the requirement to monitor GPON equipment whereas later part of the project, the S-NOC will be utilized to monitor the IP-MPLS, DWDM/OTN, FTTX etc. under the BharatNet Project.

b. There is separate implementation agency who are responsible for implementation of Optical Fiber network who will be coming up with Element Management Solution (EMS) to be hosted in the S-NOC.

c. NMS and OSS will be implemented by the NOC implementation agency to fetch data from the EMS and all the reports will be generated from the NMS and OSS.

d. **For billing there will be a separate CRM/BSS system in future which needs to be integrated with NMS and OSS. The bidder shall be responsible for propose a NMS and OSS solution which will be required to integrate with CRM/BSS solution in future.**

e. For backup, active directory services and other management related activities, there will be separate servers to be installed by the NIA.

f. In order to optimize the computing resources, server virtualization shall be used. Bidder shall consider high availability while proposing their solution.

g. The services that are deployed on partitions/virtual images and are required in cluster and/or load-balancing mode, shall be deployed in such a manner that the load sharing/failover is across the physical servers and NOT amongst partitions of the same server. In case of a hardware or software component failure in one partition, other partitions must not be shut down or rebooted.

h. Applications and databases in the NOC environment have diverse processing requirements and the servers have been considered with x86_64 architecture.

7.3.1.2   Server Sizing Consideration - Existing Applications

a. Two numbers of physical servers are considered for active directory, backup and management activities.

b. Bidder to propose their solution by assessing the project requirement and should supply adequate number of servers with latest generation processor to implement NMS OSS and other management solution.

c. Each Server whether it is blade or rack servers would have minimum -

- At least two numbers of latest generation x86_64 Bit processor having   minimum 16 Core with minimum 2.20 GHz processors

- Should have at least 256 GB of RAM with scalability up to 1 TB of DDR4 memory with all CPU configurations

- Minimum 22 MB of L3 Cache per processor

- ~10 Gbps Network Throughput and ~16 Gbps SAN throughput.

- 1.2 TB of usable drive space.

Additional storage requirements for each VM can be arranged from the SAN. Bidder should consider additional storage requirement as part of their proposed solution.

7.3.2   Storage solutions

A Storage Area Network (SAN) solution containing a Unified Storage and redundant SAN switches shall be hosted to cater to the storage requirements of State NOC. A hybrid storage array with a mix SAS and NL-SAS hard drives shall be deployed to cater to the mixed workload. The storage shall support both block level and file level data.

The storage shall be configured with dynamic tiers of data across drives as per the usage of data. The complete storage solution shall support no single point of failure feature such as disk controllers, disk

drives, cache, micro-code, power supplies, battery, fan subsystems, FC controller, ports, etc. There shall be no significant degradation in performance due to any single point of failure.

15 TB usable space to be provided for data storage. Storage required for OS and application software and for other management servers (like Active directory, NMS modules, OSS, Backup etc., with their redundant servers as applicable) shall be considered separately by the bidder as part of their solution..

Storage Sizing Considerations -

For Management servers, Virtual Machines, Structured Database, Web servers, etc., the assumed storage size of structured data is 15 TB. The SAN storage shall scalable up to minimum 100 TB.

7.3.3   Backup solution

A tape library shall be hosted to take backup of application and management data. The tape library shall be deployed with at least 2 number of LTO-7 Drives. It should be capable of finishing the backups within the stipulated backup window as per policy to be defined by the OCAC. Also, this tape library specifically will be used for keeping backup offsite using tapes. With the tape library, total minimum 12 numbers of tape cartridges are considered with minimum 72 TB capacity in total.

7.3.4   NMS and OSS solution

The NMS and OSS solution shall provide a centralized ITIL v3 compliant helpdesk management tool for various processes such as incident management, problem management, change management, asset management, configuration management, service level management, capacity management, availability management, release management, and IT Service Continuity Management to manage IT operations. The tool should address the following high level requirements:

S. No	Solution Area	Requirements
a.	**Incident and Problem management**	• Incident and Problem lifecycle management • Knowledge management of RCAs • Problem correlation capability
b.	**Change management**	• Logging ticket for all changes • Sub Tasks management for the all the involved teams contributing to the change • CAB approval mechanism for designated changes

		• Alignment with release management
c.	**Release management**	• Preparation of release calendar • Release sign off workflow
d.	**Device management**	• Asset discovery • Device uptime and utilization tracking • Device mapping with the hardening checklist • Pushing security policies on the registered devices
e.	**Consolidated dashboard**	• Feeds to be consolidated from individual monitoring tools • Reports of infrastructure resource utilization • Event Correlation capability for early detection and alert mechanism for events
f.	**Database performance monitoring**	• DB process and services utilization thresholds tracking Alert mechanism with ticket logging • Baselining capability
g.	**Helpdesk services**	• Call logging and escalation mechanism • Interface for various resolver groups

a. The NMS and OSS should support application performance monitoring capabilities to monitor the availability and response time for all applications. In case of any issues, the tool should be able to trace the root cause of the issue.

b. The NMS and OSS shall provide an integrated dashboard to monitor IT services and provide capability to drill down to the infrastructure components impacting respective services. The dashboard shall provide consolidated events from all NMS and OSS components and should provide event correlation.

c. The NMS and OSS solution shall provide centralized management and monitoring of the complete IT infrastructure (including the devices/solutions given below) to monitor the availability and performance of all devices and solutions for BharatNet project round the clock.

i. Entire GPON network of BharatNet by collecting data from EMS. The solution should have the capability to discover, manage and monitor IP-MPLS, DWDM/OTN, and FTTX network as well.

ii. Network and Security Devices at Server Farm area

iii. Servers (physical and virtual) at Server Farm area

iv. Applications and middleware platform

v. Databases

vi. Virtualization Platform

vii. Storage and Backup Devices

d. The Server Farm area solution should provide automated discovery to detect any changes (addition/deletion/updates) in the infrastructure landscape.

e. The NMS and OSS solution shall integrate with the AD, LDAP and BSS solution.

f. The NMS and OSS solution should also provide a web based interface in addition to the client based interface.

g. The solution should be scalable and should support integration with third party solutions.

h. The solution shall have centralized patch management modules to update OS and software related patches inside the S-NOC.

i. The NMS and OSS solution shall provide in-build reporting functionality as well as customized reports on the health of the system (performance, availability, configuration, inventory etc.) to different stakeholders.

7.3.5   Network

7.3.5.1   *Proposed Network Architecture (High Level Design)*
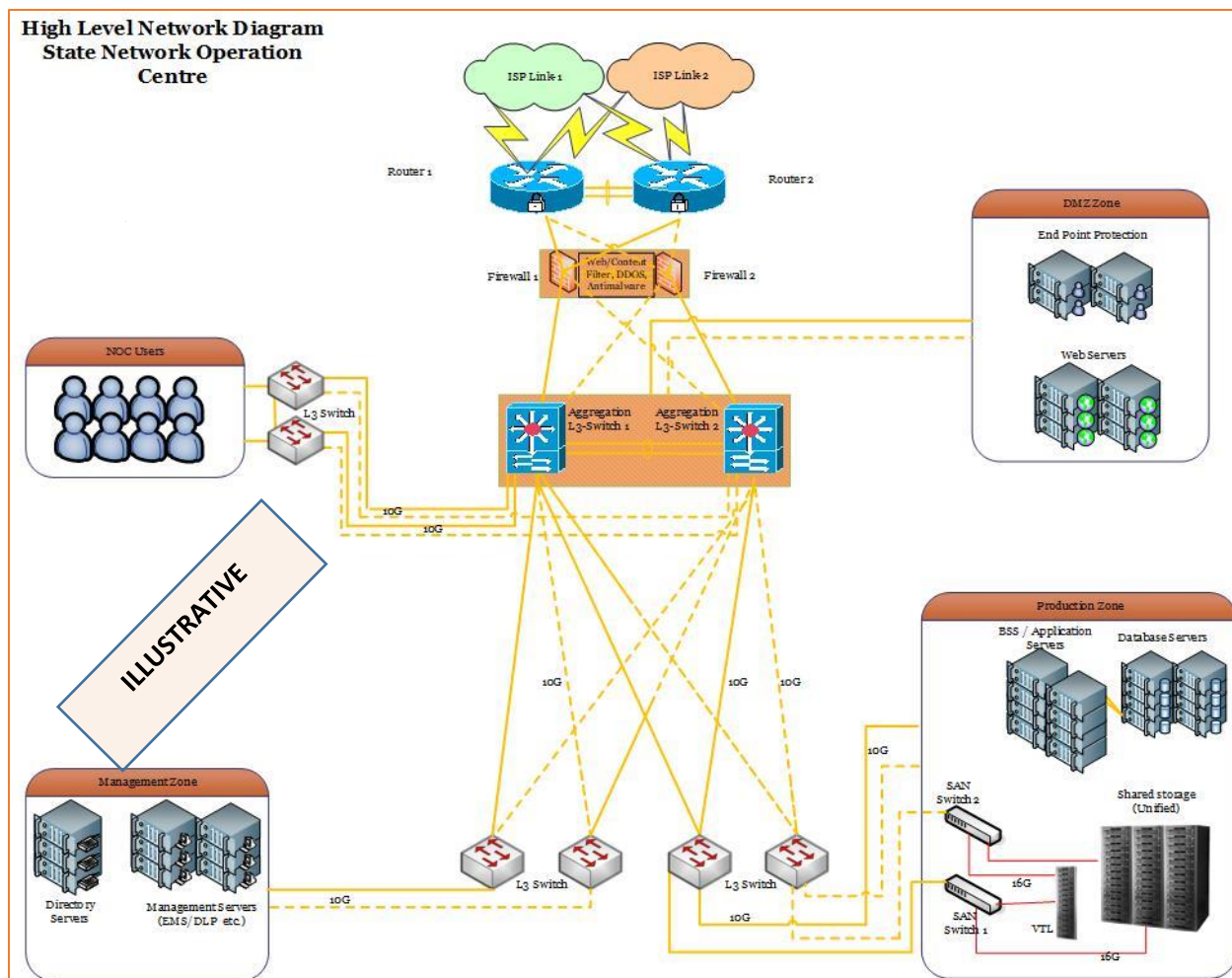
Figure 2 Illustrative Network Diagram

Considering the requirement of BharatNet project, the proposed network has been designed to secure and manage all infrastructure for the S-NOC. The network traffic should be properly isolated and secured using different contexts in the security equipment, multiple segments in the routing and switching equipment and finally through isolated security zones as applicable. This would ensure data leakage prevention, data protection, while ensuring availability of services to users under strict authenticity and access control.

Brief description of each of the major components are given in the below sections.

7.3.5.2   Redundant internet links

The S-NOC shall be connected with two internet links for providing access to BharatNet Network components. The links should be used for getting traps from GPON equipment by the EMS. The estimation of bandwidth requirement is based on the following considerations.

- Number of concurrent devices connected to send traps to the EMS from Internet are assumed to be 7000.

- Data upload/download by each device is assumed as 70 Kbps. Therefore, minimum throughput requirement would be 490 Mbps.

- Considering scalability bandwidth proposed is 1 Gbps. As per the requirement bandwidth can be upgraded further.

- Two Links from different ISP to be deployed for High Availability (N+N).

7.3.5.3   Routers

The router shall connect S-NOC to the Internet. The routers shall be deployed in high availability to avoid any single point of failure. Two set of routers are considered for internet traffic.

Router Sizing Considerations

- Number of concurrent users/nodes accessing applications from Internet are assumed to be 7000.

- Data upload/download by each user/nodes is assumed to be 70 Kbps. Therefore, minimum throughput requirement would be 490 Mbps.

- Considering the future requirement of providing services to the citizens and for catering load of entire BharatNet network using IP-MPLS, DWDM/OTN, FTTX etc., the initial throughput of the router is considered as 5 Gbps which should be scalable up to 10 Gbps in future.

- Routers would be deployed in High Availability (N+N) with redundant power supplies.

- The routers shall support for IPv4 and IPv6.

- The router should be capable of supporting minimum 4 no's of 10 Gbps SFP+ modules, and 4 no's of 1 Gbps copper modules scalable upto 6 no's of 1 Gbps Ethernet ports.

- In future, while BharatNet will be integrated with SDC and SWAN to cater all the G2G, G2B and G2C services, separate core router will be procured as per the requirement.

7.3.5.4   Spine switches

The spine switches will be placed at perimeter security zone under the firewall and all perimeter security devices will get connected to the spine switch.

Sizing Considerations

- Each spine switch would have 40 G uplink Ports .

- Each spine switch would have 10 G Ports to connect other network elements like NOC User devices, management servers at DMZ zone, blade chassis etc.

- The spine switches shall be deployed in high availability (N+N) for redundancy.

7.3.5.5   *Leaf switches*

Proposed servers (Blade/Rack servers for NMS, OSS etc.) shall be connected to the aggregation switches on 10G ports. There will be two numbers of access switch (Type-I) initially for Management (for NOC Users, helpdesk connectivity etc.) and 2 numbers of access switch (Type-II) for connecting Management modules of servers (either Blade or Rack servers). Bidder can propose connectivity according to their solution. Logical Security

The Network Operations Centre network architecture shall be divided into multiple zones to control the access of critical data.

Production Zone: This will be the most secured zone and will host all applications, storage, Tape library, Database, etc. where no internet connectivity is required. All the inbound/outbound traffic from/to Production Zone will be scanned by Firewall. Users coming through Internet or Intranet will not be allowed to directly land in Production Zone.

Management Zone: This zone is considered to host all management servers like different NMS modules, OSS, Active Directory etc. Infrastructure in the proposed facility will be accessible from this zone only. This zone will have only limited access to NOC infrastructure as per the role specific requirement and there should not be any internet access to this zone as well.

De-militarized Zone (DMZ) - This security zone will host web services accessible from Internet. This security zone will host Patch management server, end point protection servers etc.

NOC Users: Local NOC LAN users will be accessing the server farm for monitoring and managing devices from this zone. Rule based access will be provided to access other zones.

7.3.5.6   Firewalls

Pair of firewalls working in high availability mode will be implemented and these will act as a layer of defense at the NOC and will filter the incoming traffic from the Internet and LAN respectively. These firewalls will support to operate at the gateway perimeter in Active-Active load-balancing mode and will secure the communication layers. One of the interfaces of firewall will be configured as outside interface connecting to router for EMS/NMS traps and public traffic coming from internet. These Firewalls control the network resources and application access on the basis of source IP address, destination IP address, protocol, ports, specific services, etc. Access list or rule can be configured on firewall to block unauthorized access.

Next Generation firewall has been considered which will include functionalities of Virtual Private Network (VPN), DDoS, Malware Protection, IPS, WAF, URL Filtering, Virtual Firewalls, SSL and SSH Inspection, Application Awareness, etc.

Sizing Considerations

- Assuming that 490 Mbps traffic would come from Internet at a given point in time, the same traffic will be passed by firewall to the internal network. Also, the internal traffic for zone to zone communication will be passing through the firewalls. Considering that the firewall will be a next generation firewall, a minimum throughput of 10 Gbps is considered.

- The firewall will be deployed in High Availability (N+N) to avoid single point of failure.

- The firewall should support minimum 4 nos. of 10 Gbps SFP+ scalable upto 6 nos. of 10 Gbps SFP+ & 4 nos of 1 Gbps copper ports. Apart from the data ports, separate management ports for HA should be available.

7.3.5.7   Enterprise End Point Protection

Enterprise End point protection is considered for hosts for protecting against host based attacks. The proposed solution shall have single agent for Anti-virus and Anti-spam, Firewall, Intrusion prevention, Web Reputation, File Reputation, Real Times Analysis, and Device Control installed on all the servers in the S-NOC. End Point Protection solution should have the capability of centralized administration and control of the end-point devices using end point orchestrator. End point protection solution shall have direct internet access to get all security signature updates on regular basis.

7.3.6 Virtualization

Virtualization is a framework or methodology of dividing the resources of a computer into multiple execution environments, by applying one or more concepts or technologies such as hardware and software partitioning, time-sharing, partial or complete machine simulation.

Virtualization is the foundation of cloud computing and forms the base for offering cloud services and is very essential for an organization to be aware of the virtualization technology and its benefits.

It is recommended to adopt optimization of software efficient architecture, which would optimize utilization of available storage space, by use of virtualization technology. Optimization would allocate storage on demand, which will eliminate physical space in the storage and improve utilization rate. Such 'thin provisioning' of storage would increase the capacity utilization efficiency.

7.3.7 Software Licenses

Following infrastructure software shall be deployed to manage the S-NOC infrastructure and for other requirements of the department.

7.3.7.1 *Operating System*

Enterprise class operating system based on CPU sockets shall be installed on all server instances. Bidder to propose the best possible solution using enterprise class Operating Systems as part of their solutions.

7.3.7.2 *Virtualization Software Licenses*

Virtualization software shall provide a Virtualization layer to optimize the use of hardware and NOC resources by partitioning a physical server into multiple virtual instances hosting independent applications.

The virtualization layer shall be installed directly on the bare metal server hardware with no dependency on a general purpose OS for greater reliability and security.

Virtualization shall provide High Availability capabilities for the virtual machines in the sense, if in case one server fails, all the Virtual machines running on that server shall automatically failover to another physical server running same virtualization software.

Virtualization software licenses shall be socket based and shall be deployed to virtualize high performance computing systems and Blade Infrastructure for hosting different applications.

7.3.7.3   *Directory Services*

Bidder's solution shall provide access to only those applications/resources that the user is authorized to. The solution shall have ability to assign users to one or more roles.

Solution shall ensure multi factor authentication for re-authentication or sensitive resource access.

Solution should include/integrate seamlessly with LDAP v3 compliant directory system (Ex: Active Directory, Oracle Directory Services, IBM Tivoli Directory, etc.) as identity stores, access control system authorization stores, internal user account, and policy stores.

7.3.7.4   *Backup Software and Agent Licenses*

Backup software shall be deployed according to the capacity of data that needs to be backed up for the NOC.

7.4   Design Considerations of Passive Components

While designing the solution of Non-IT infrastructure, we have assessed the current and future demand of BharatNet Project and considered major passive components such as water leakage detection, rodent repellent, access control system as part of physical security, CCTV solution, Fire prevention system, Integrated Building Management System, etc.), VESDA, grounding system, Rack, cabling etc. to monitor and protect active components of the S-NOC.

Description of each component and solution are given in the sections below.

7.4.1 Water Leakage Detection System

The Water Leakage Detection (WLD) System is provisioned to detect any seepage of water into the critical areas of the server farm area, where IT equipment are hosted. Without the detection of water leakage or seepage, serious malfunction of IT systems may occur.

The design considerations and features of Water Leakage Detection System will be as below –

a. Water leak detection system uses tape or cable type sensors.

b. The tape or wire of WLD system needs to be laid in particular zone under raised floor and the PAC units which are probable source of water leakage.

c. The WLD system will detect the leakage of water.

d. The WLD system will alert any seepage of water due to condensation of water vapor or water leakage around areas where IT equipment are hosted.

e. The system will trigger the IBMS system for audio alarm and LED indication in the WLD panel.

7.4.2 Rodent Repellent System

Rodent can be a major risk for the NOC if proper measure not taken. Prevailing rodents in the areas above the false ceiling of auxiliary areas and below the raised floors is an important aspect to ensure no damage and continuity of various types of cables laid out in these areas.

The Rodent Repellent System will be nonchemical, non-toxic, electronically operated. It will prevent entry of rodents and other unwanted pests in important technical areas and above and below ceiling and raised floors respectively.

It is considered to have ultrasonic pest repellents in the raised flooring and false ceiling areas to repel the pests without killing them. Also it's recommended to have periodic pest control using non-toxic chemical spray, which can be done to effectively fight the pest menace on quarterly basis.

7.4.3 Physical Security

International NOC infrastructure standard provides information to planners regarding the protection of NOC assets whether by means of physical security or fire prevention. These standards make recommendations on improving the physical security of the NOC, which includes criteria such as video

surveillance recording frame rates, access control levels and hardware, and site selection. We have considered a comprehensive, integrated and layered approach to ensure optimum physical security for the State NOC for BharatNet project.

7.4.3.1   *Access Control System*

One of the primary objectives of the physical access control system is to restrict the unauthorized access and complete monitoring of the activity of personals at different technical areas. The access control system will be used to control the access of door at all points with reader and controllers; emergency exits, etc. within the S-NOC. The system shall comply with the relevant standards like CE, UL294 etc.

The Access control system will be an embedded application, which would match the controller to support various applications and shall have the following features:

- The system shall be based on a multiple client server architecture.

- The system shall capture all alerts and logs and be capable to generate and review all system alarms, access control activity, and operator actions, etc.

- The system shall also allow custom reporting through interface.

- System should be capable of segregating events and alarms.

- The system shall allow online archiving of history logs, along with database back up of system configuration and cardholder details.

- The system shall have option to configure email alarms as per requirements.

- It shall be capable of capturing images, extract images which can be then used to create photo identification badges.

- The Access control system software shall seamlessly integrate to Integrated Building Management System.

- The Access control system software shall be in high availability mode.

- The system shall be providing access to multiple operators simultaneously to administer the system from convenient locations connected via a LAN/WAN.

- The system also would allow partitioning.

For critical areas 3 factor authentication system, which includes biometric access control will be provisioned. Whereas for access to non-critical areas, two factor authentication will be provisioned.

7.4.3.2   Visitor Management System

The security arrangements of S-NOC infrastructure is intended to be the best and so, visitors to the S-NOC shall be screened, registered, signed in quickly and allowed to visit only the relevant areas. The access to S-NOC will be provided by issuing S-NOC visitor pass along with visitor access card issued to the visitor on temporary basis via integration with access control devices. These challenges of the visitor management and lobby management activities are to manage Visitor Management process and Visitor Management Systems.

The Visitor Management System will consist of storage which will be used to store the photo of the visitors along with necessary details, lists of visitors who visited the S-NOC etc. The Visitor Management System shall contain logs of duration of stay of the visitor, and other details of visitors. Data shall be stored using latest compression techniques and be available as per backup policy.

7.4.4   CCTV Solution

The primary objective of implementing a dedicated IP CCTV system for NOC is to capture video of physical movements of personnel or equipment at different areas inside S-NOC. It will also ensure effective surveillance of the area and create a record for post event analysis. The critical area of the S-NOC along with the Non-Critical area needs to be under constant video surveillance. Cameras should be placed properly to cover all the critical areas of the S-NOC.

Cameras with suitable lenses shall be used to cover and view all critical areas such as Server farm area, NOC room, UPS and Battery room and other auxiliary areas. The IP CCTV system shall provide an on-line display of videos on screen which shall be monitored from the BMS system on 24/7 basis.

The IP CCTV system consists of fixed cameras - integrated dome cameras (fixed) and integrated pan/tilt/zoom cameras that can be controlled from the BMS system. It shall be a combination of color fixed and PTZ cameras, which are considered in the design for continuous duty.

The system and each of its devices are considered to meet the site environmental conditions and shall operate satisfactorily under the specified permitted voltage, frequency variation band of the power supply source system and ambient temperature of the site. IP66 enclosure based outdoor cameras are to be considered for monitoring DG sets area.

The IP CCTV System proposed to fulfill the overall surveillance requirements and enhance the level of security necessary for S-NOC. It shall be complete in all respects and comprise the following minimum items.

A set of fixed cameras, integrated dome cameras (fixed), pan / tilt / zoom (PTZ) cameras and integrated dome (PTZ) cameras with remote control operation of focus and zoom.

The CCTV solution will consist of required cameras, video and telemetry cables, and monitor to view the multiplexed output, IP CCTV cabinets, which shall be provided to terminate the cable from the cameras from where these signals are distributed to the monitors. All necessary video amplifiers, interfaces, etc., that forms the part of the IP CCTV system shall be installed in the cabinet.

IP based Digital Video Recorder (DVR) to provide a high quality recorder capable of storage and play back of images from at a rate of up to 400FPS (PAL) is also considered. The video recorder shall possess an internal watchdog, duplex operation, watermarking of each frame, 8 alarm inputs, software configurable video motion detection and scheduled event recording along with latest operating system.

7.4.5   Fire Prevention System

The fire suppression and prevention system is designed for the following areas: *Server Farm Area, NOC Room, UPS rooms and Meeting room.*

Separate set of handheld extinguishers are provisioned for places where HT panels, distribution boards etc. will be installed and for DG set areas.

The Fire Suppression System shall have a clean agent fire suppression system cylinder, seamless cylinders, discharge hose, fire detectors and panels, and all other accessories required to provide a complete operational system, meeting applicable requirements of NFPA 2001 Clean Agent Fire Extinguishing Systems, NFPA 70 National Electric Code, NFPA 72 National Fire Alarm Code, and/or ISO standards. These standards shall be used to ensure the performance as a system with UL/FM approvals and installed in compliance with all applicable requirements of the local codes and standards.

A properly designed fire control and suppression system would also contribute to a 'Green Data Centre'. There are green fluorinated ketone gases, such as Novec-1230 or inert gases like Inergen, etc. It is recommended to use green gases in the fire control and suppression system, which are non-ozone depleting as well as breathable for human beings.

7.4.6   Integrated BMS

The Integrated Building Management System (IBMS) is another very important component in the S-NOC facility which requires high-end security attention.

The IBMS would be based on GUI software which shall be high- performance building automation system for monitoring and managing building's devices and systems, including HVAC, lighting, hydraulics, water, electrical equipment and more. An application of Buildings Integrator platform would utilize open system standards to seamlessly integrate every control and information system within the facility/enterprise. Buildings Integrator platform shall have single- window control over all building operations and all the relevant data which need to maximize building performance. In addition, Building Manager would capture current and historical data for advanced analysis and reporting and would install, customize, and maintain Building Manager for all the requirements to create the ideal solution for a wide range of operations.

The IBMS would have distributed system architecture with adoption of open technologies and supporting wide variety of open systems. There would be many sensors and operator interfaces for creating and managing displays, executing and acknowledging alarms, initiating printing, configuring system parameters, recording and playing back videos, etc.

Following are industry's best practices with respect to IBMS:

- Would uses industry- standard hardware and Standard Edition operating Systems.

- Would support the leading open standards such as BACnet or Modbus.

- Should be UL Listed to Standards UL864 (Fire), UL2017 (Signaling Systems), UL916 (Energy Management Systems), UL1017, UL1076 (Security), UL1610 (Central Station) and UL 294 (Access Control).

- Would have web based user interface.

- Would be designed and developed to International Standards ISO 9001 for quality Enterprise Buildings Integrator platform.

7.4.7 Intelligent Racks

The racks populated with Servers, Network, Storage devices, etc., should be lined up in to two rows, with their front door facing each other. There should not be any successive gaps between two racks. In current scenario, the space available for Server room is around 540 sq. ft.

The gap between two rows will be of 4ft. consisting cold-aisle and gap between two rows will be 3 ft. consisting hot-aisle. Total 12 number of intelligent racks are provisioned in the S-NOC server farm area whereas initially 6 racks will be installed.

The preferred specifications for the racks suggested for the State NOC are as minimum as follows.

a. Intelligent 42U 750mm Wide x 1070mm racks.

b. EIA-310 compliant 19″ equipment racks are considered.

c. The racks should be ready for accommodating high density equipment.

d. Cable access slots in the rooftop to pass through overhead cable egress. Unobstructed cable access through a raised floor shall pass through the bottom of the rack.

e. Perforated doors at front and rear to provide ample ventilation for servers, networking equipment, storage devices, etc.

f. Front door can be moved to the opposite side with rear doors or can be interchanged. Side panels will be lockable utilizing a single key as for front door. Doors will be removable with simple lift-off design.

g. In-built power distribution system for power distribution among the equipment installed in the rack.

h. Each rack will be provisioned with two power distribution units which can be monitored and managed through SNMP.

i. High density cable managers with improved cable access roof for supporting large cable bundles are considered.

j. Racks will be compatible for Cold Aisle Containment.

A few racks to be considered to be supplied with Automatic Power Transfer Switch if the bidder provide any solution with single power corded equipment.

7.4.8 Cabling

To achieve telecommunications infrastructure redundancy, redundant cross-connect areas and pathways that are physically separated would definitely increase the reliability of the communications infrastructure. In the design of the telecommunication infrastructure, multiple access providers such as redundant routers, redundant spine switches etc., have been incorporated, which would provide a defined level of redundancy. However, the duplication in services and hardware has to be done in a manner to make sure that single points of failure have been eliminated.

In backbone and horizontal cabling, the following generic specifications are recommended.

- 100-ohm balanced twisted-pair cabling (ANSI/TIA-568-C.2); Category 6 or higher

- Category 6a is recommended for new installations to support 10G over Ethernet

- For backbone cabling, use of Category 6a (preferably)/6e cabling should be limited to analog voice Applications only.

- For distances less than 250 meter or so, multimode optical fiber cabling (ANSI/TIA- 568-C.3), 850-nm laser-optimized 50/125 μm.

- For longer distance single-mode optical fiber cabling (ANSI/TIA-568-C.3).

Cable ducts shall be of such dimension that the cables laid in it do not touch one another. If found necessary, the cable shall be fixed with clamps on the walls of the duct. Cables shall be laid on the walls or trays as required using suitable clamping or fastening arrangement. Cables shall be neatly arranged on the trays in such a manner that a crisscrossing is avoided and final take-off to switch gear is easily facilitated.

7.4.9 Grounding system

A proper grounding and earthing system would immensely contribute to the IT infrastructure reliability and availability. To achieve extreme levels of facility availability and to keep pace with modern business demands, significant focus should be on the grounding system for the S-NOC facility.

The basic two purposes of designing a grounding system are to provide a least resistant path to the ground and to equalize the electrical potentials across the passive metallic components such as chassis, racks, cabinets etc. These two purposes are achieved through some fundamental guidelines which are strongly recommended to be followed. These are described below.

- The grounding infrastructure should be a planned one and should be designed and implemented by skilled professionals using high quality materials and components only.

- One should be able to visually inspect the grounding infrastructure at every point of contact, e.g. the equipment chassis, the rack, the common bonding network (CBN) to the earth.

- During any change, modification, enhancement of the facility, grounding system should be properly accessible.

- The entire grounding network should be so designed that any current (in common or differential mode owing to any surge or similar transient event) would remain away from sensitive equipment.

- There should be robust bonding of all metallic components (e.g. cable trays, racks, enclosures, ladder racks etc.) in the NOC with the grounding network to create same electrical potential for all conductive material ensuring minimum flow of stray current across the system.

- The non-conductive chassis paints in the racks, cabinets, enclosures and other metal-chassis components inside the NOC pay-load area prevents proper electrical continuity among which is necessary for personnel safety and to avoid any damage due to ESD build up. It is also important for adequate earthing for sensitive communication infrastructure such as switches, servers, storage boxes and power strips. During bonding, therefore, scraping of paint on the chassis and use of paint piercing hardware would be absolutely necessary.

Considering the importance of the proper grounding, it is recommended that the following grounding system installation guidelines should be adhered to by the implementing agency:

- The AC power panel, the UPS systems, the DG set panel etc. should be bonded by a trained and licensed electrician.

- Services of the same electrician should be taken to run the bus bar network throughout the facility building and also to build the grid of the CBN network below the raised floor. Raised floor height is considered to be 900 mm.

- All the racks, cabinets, enclosures etc. are to be bonded to the CBN during initial installation only.

- All equipment in the rack should be bonded to the rack during installation only. The communication system technician should ensure grounding of the host of equipment to the bus bar.

- As far as possible services of the same set of technicians should be taken for all these bonding and grounding work to avoid any miss-out in electrical continuity within racks, cabinets, enclosures etc.

- Use of proper type of grounding connectors should be there that do not loosen over time thus degrading the electrical bond.

- Proper hardware, designed to make an electrical bond such as specially designed screws, platinum-iridium fingers for doors, carbon-impregnated washers etc., should be used.

- Special care should be taken in bonding structural components of racks, cabinets, enclosures etc. so that no personnel safety hazard, failing to ESD protection etc. can happen due to faulty bonding.

- Use of permanent copper compression lug not loosening over time, should be there.

- Use of thread-forming screws and paint-piercing washers and studs which cut through the durable paint coating of NOC racks and cabinets, should be there to create proper metallic bonds.

- All hardware components, jumper cables etc., which create good electrical bonds and can carry rated currents, should only be used.

- Installation kit, containing grounding strips, bus bars, jumpers, anti-oxidants to ensure long time reliability of electrical bonds etc.

- Power connectors tested for stringent Network Equipment Building Systems (NEBS) Level 3 test, to cater to the real-world scenarios such as earthquakes, lightning strikes, AC power faults etc., should only be used for the S-NOC.

7.4.9.1 *Earthing Requirements*

Various IT and non-IT components in the S-NOC would need the earthing to meet the performance quality for respective system/equipment and also to meet the personnel safety. Given design has specified the BoM/BoQ in the design for the facility and accordingly requirements of earth points have been worked out notionally. However actual number of earth pits would be decided after having conducted the earth resistance test, as per NEC (USA) standard.

Each cabinet or rack should have a suitable connection point to which the rack framework grounding conductor can be bonded. Options for this connection point are:

o Rack ground bus: A dedicated copper ground bar or copper strip should be attached to the rack. A bond between the ground bar or strip and the rack should exist. The mounting screws should be of the thread-forming type, not self-tapping or sheet metal screws. Thread-forming screws are trilobular and create threads by the displacement of metal without creating chips or curls, which could damage adjacent equipment.

- Direct connection to the rack: If dedicated copper ground bars or strips and associated thread forming screws are not used, then paint should be removed from the rack at the connection point, and the surface should be brought to a shiny gloss for proper bonding using an approved antioxidant.

- Bonding to the rack is to be done on the following guidelines.

- When bonding the rack framework grounding conductor to the connection point on the cabinet or rack, it is desirable to use two-hole lugs. The use of two-hole lugs helps to insure that the ground connection does not become loose due to excessive vibration or movement of the attaching cable. The connection to the rack should have the following characteristics:

  - Bare metal-to-metal contact
  - Antioxidant recommended

- Bonding to the NOC grounding infrastructure should be done as per following guidelines.

- Opposite end of the rack framework grounding conductor should be attached to the NOC grounding infrastructure. The connection should use a compression type copper tap that is UL/CSA listed.

- Rack continuity should be achieved by grounding every structural member of the cabinet or rack. This is achieved by assembling the cabinet or rack in such a way that there is electrical continuity throughout its structural members.

It is recommended that rack-mounted equipment be bonded and grounded via the chassis, in accordance with the manufacturer's instructions. Provided the rack is bonded and grounded, the equipment chassis should be bonded to the rack using one of the following methods:

- To meet the chassis grounding requirements; the manufacturer may supply a separate grounding hole or stud. This should be used with a conductor of proper size to handle any fault currents up to the limit of the circuit protection device feeding power to the equipment unit. One end of this chassis grounding conductor will be bonded to the chassis hole or stud, and the other end will be properly bonded to the copper ground bar or strip. In some instances, it may be preferable to bypass the copper ground bar or strip and bond the chassis grounding conductor directly to the NOC grounding infrastructure.

- If the equipment manufacturer suggests grounding via the chassis mounting flanges and the mounting flanges are not painted, the use of thread-forming tri-lobular screws and normal washers will provide an acceptable bond to the rack.

- If the equipment mounting flanges are painted, the paint can be removed, or the use of the same thread-forming screws and aggressive internal-external tooth lock washers, designed for this application, will supply an acceptable bond to safety ground through the rack.

- Sometimes it is attempted to achieve grounding through the equipment ac (alternating current) power cables also. Although ac powered equipment typically has a power cord that contains a ground wire, the integrity of this path to ground cannot be easily verified. Rather than relying on the ac power cord ground wire, it is desirable that equipment be grounded in a verifiable manner.

7.5   Features of S-NOC

- ✓ **Network Supervision and Monitoring** - Monitor the complete network 24x7x365, to keep network and systems functioning in a stable operation mode. The NIA would be responsible to report any incidents in the service desk (automatically), assign same and follow-up with the resolution of the incident with the PIA. The NIA shall have an escalation mechanism in place and follow same.

- ✓ **Configuration Management** – Assist the PIA team to ensure the proper configuration of network, systems and applications for the provision of reliable and high quality end-user services. The NIA shall assist the PIA with the discovery of the current configuration of the equipment and report to OCAC with the configuration report post the deployment / change in configuration.

- ✓ **Change Management** – Assist the PIA to ensure efficient day-to-day management of short-term network changes and optimization, including their implementation through a guided change management procedure based in ITIL v3 standards. The NIA shall be responsible for raising/ assisting in raising the change request in the Service Desk tool in consultation with the PIA and stakeholders. Following the change request procedure, closing the change request and reporting the change would be responsibility of the NIA.

- ✓ **Performance Management** – Provide insights from the reports of the EMS system to the PIA for efficient performance management procedures ensuring a reliable, high-quality network performance and service.

- ✓ **Service and Network Provisioning -** Define all necessary actions to be performed when a request for a new customer service is issued by customer care, and control the actions performed at S-NOC level or field level until completion. Monitor that the PIA ensures timely provisioning of the network / services as per the acceptable SLA.

- ✓ **Scheduled Activities Planning** – Document the regular plans for all scheduled activities, including preventive maintenance in the service desk and monitor the adherence. Respect a schedule, and

achievement of the plan. This is linked to the change management function which ensures overall synchronization of all network activities.

✓ **IT and DB Management** – The NIA shall ensure day-to-day management of all the relevant application systems (Dashboard, NMS, EMS), IT systems (compute and network) and databases (administration, backups)

✓ **Security Management** – The NIA shall be responsible for defining and implementing the security policies, guidelines, and best practices, etc. for the S-NOC. The NIA shall also be responsible to check the status of the security devices deployed for the backbone network and ensure that the PIA follows the ISO 27001 standards in maintaining same.

✓ **Quality Management** – Monitor the quality of services provided by the PIA based on the approved quality management policies, and ensure implementation and usage for competitive quality of service

✓ **Network Inventory Management** - Ensure consistent management of network equipment, and accurate, up-to-date documentation of it.

✓ **Spare Parts Management** – Assist the PIA in managing spare part handling and logistics to minimize repair/swap turn-around times for defective items. The NIA shall keep the status of the inventory of the spare in the system and report same regularly to OCAC.

✓ **Asset Inventory Management** - Ensure consistent inventory management for all assets including infrastructure, buildings, tools, spares, and equipment.

✓ **Escalation matrix management**- The S-NOC would ensure that a proper escalation database in place (emails, phone numbers) and should be capable of escalation of issues as per the escalation guidelines agreed between the PIA and OPTCL.

7.6   Services of S-NOC

The Services Catalogue for the S-NOC has to be prepared by the NIA in consultation with the PIA, OPTCL and OCAC and get a sign off from the OCAC.

7.6.1   NMS and OSS

✓ SI is required to also design size, supply, implement and maintain an NMS along with OSS. The solution shall be able to support the proposed hardware and software components deployed by the PIA over the tenure of the contract.

✓ The solution shall be capable of providing early warning signals to the Helpdesk Agents on the performance issues, and future infrastructure capacity augmentation. The solution shall also support single pane / dashboard with visibility across multiple areas of applications for monitoring. NIA is

required to design, supply, install, customize, test, implement, rollout and maintain the EMS application and hardware as per the requirements of this RFP.

7.6.2 Monitoring, Management & Reporting with Enterprise Management System

The EMS system shall provide for the regular monitoring, management and reporting of the ICT infrastructure of the project assets installed in the respective operations center as well as field locations. It shall be noted that the activities performed by the NIA shall be under the supervision of OCAC.

7.6.2.1 Availability – Monitoring, Management and Reporting

This part of the specification shall ensure the monitoring, management, and reporting parameters of availability like discovery, configuration, faults, service levels etc. including but not limited to the following

- ➢ The proposed system shall support multiple types of discovery like IP range discovery – including built-in support for IPv6, Seed router based discovery and discovery whenever new devices are added with capability to exclude specific devices
- ➢ The proposed system shall support exclusion of specific IP addresses or IP address ranges.
- ➢ The system shall provide discovery & inventory of physical network devices like Layer-2 & Layer-3 switches, Routers and other IP devices and shall provide mapping of LAN & WAN connectivity.
- ➢ The discovery shall be able to identify and model of the ICT asset.
- ➢ The proposed system shall provide a detailed asset report, organized by vendor name and device, listing all ports for all devices. The proposed system shall provide sufficient reports that identify unused ports in the managed network infrastructure that can be reclaimed and reallocated. The proposed system shall also intelligently determine which ports are operationally dormant.
- ➢ The proposed system shall determine device availability and shall exclude outages from the availability calculation with an option to indicate the reason.
- ➢ The proposed system shall provide out of the box root cause analysis.
- ➢ The proposed system should be able to generate utilization of physical as well as virtual servers.
- ➢ The proposed system shall include the ability to monitor and visualize a virtualized system infrastructure by discovering and monitoring virtual machines and providing ability to depict the logical relationships between virtual servers and virtual machines.
- ➢ The proposed system shall support SNMPv3-based network discovery and management out-of-box without the need for any external third-party modules.
- ➢ The proposed system shall be able to administer configuration changes to network elements by providing toolkits to automate the following administrative tasks of effecting configuration

changes to network elements like Capture running & startup configuration, Upload configuration etc.

➢ The proposed system shall provide sufficient reports pertaining to asset and change management, alarms and availability of critical network resources as well as network response times for critical links.

➢ The proposed system shall able to perform real-time or scheduled capture of device configurations. It shall also provide features to capture, view & upload network device configuration.

➢ The proposed system shall able to store historical device configurations captured in the database and thereby enable comparison of current device configuration against a previously captured configuration as well as compare the current configuration against any user-defined standard baseline configuration policy.

➢ The proposed system shall be able to monitor compliance & enforce change control policies within the diverse infrastructure by providing data & tools to run compliance reports, track & remediate violations, and view history of changes

➢ The proposed tool shall display configuration changes differences in GUI within central Console. Also this shall be able to identify which user has made changes or modifications to device configurations using the Interface.

7.6.2.2   *Network Performance Monitoring, Management and Reporting*

➢ The System shall have all the capabilities of a Network Management System which shall provide Real time network monitoring and Measurement offend-to-end Network performance & availability to define service levels and further improve upon them.

➢ The tool shall provide a live list displaying the various health and threshold exceptions that are occurring in the managed infrastructure.

➢ The proposed system shall use intelligent alarm algorithms to learn the behavior of the network infrastructure components over a period of time

➢ The Network Performance Management console shall provide a consistent report generation interface from a single central console.

➢ This central console shall also provide all required network performance reports (including latency, threshold violations, packet errors, availability, bandwidth utilization etc.) for the network infrastructure. The proposed system shall identify over-and under-utilized links and assist in maximizing the utilization of current resources.

- ➢ The proposed system shall enable complete customization flexibility of performance reports for network devices

- ➢ The proposed system shall be able to auto-calculate resource utilization baselines for the entire network equipment and allow user to set corresponding upper and lower threshold limits.

- ➢ The management system shall be able to auto-discover the network including the network elements.

- ➢ The offered NMS system shall employ Graphical User Interface that allows users to monitor the network through a multilevel window.

- ➢ The offered NMS system shall allow the Users to perform, but not restricted to, the following operations –

- ➢ View the alarm conditions of the Network elements

- ➢ View the performance parameters of an individual link.

- ➢ Zoom in and out on the Network Map including the ability to define a custom sub- network map. The graphical user interface shall provide a cascading menu and a graphical display of the shelf layout that allows users to move from shelf to board to port menus and execute commands for that menu.

- ➢ The Graphical User Interface shall provide an End-to-end Network view that could span sub networks.

- ➢ The offered NMS shall support managing ports (enable / disable).

- ➢ The offered NMS shall support the ability to perform a remote inventory.

- ➢ This shall include the ability to download software loads, activate new software loads, or get information about the active software load).

- ➢ The offered NMS shall provide the facility to perform backup & restore of the node configuration via non-volatile memory on the Routers or via the NMS database.

- ➢ Users shall have the ability to define customizable alarms in terms of severity levels and filtering.

- ➢ Alarms shall be consistent in terms of marking them with appropriate colors.

- ➢ There shall be mechanisms to provide for fault isolation.

- ➢ There shall be connectivity and loopback testing capability in all technologies to help isolate faults.

- ➢ There shall be alarm correlation to prevent a flood of alarms.

- ➢ Equipment alarms shall be localized up to the board and port level of a specific shelf of a specific node.

- ➢ The alarms shall be audible and/or bring up a pop-up window if appropriate.

- ➢ The NMS shall allow users to create a Trouble Ticket for any alarms. This trouble ticket should allow users to enter comments on that alarm.

- ➢ There shall be a mechanism for alarms and logging including all user actions.

- The logging shall be customizable for specific types of events or alarms.
- The management system shall provide the ability to set thresholds on performance metrics and generate alarms from these thresholds.
- The management system shall provide capacity planning reports that provide long-term traffic analysis to help in deciding whether to upgrade links or nodes.
- Illegal access to the management system shall be prevented; all users shall have a User Id and Password, which defines their access level with the management system.
- The offered NMS system shall allow for Domain creation and partitioning, each domain being a different access level of part of the network or different function.
- It shall be possible to assign specific users to a particular domain, so the domain access can be restricted to the assigned users only.
- Additions of Routers and other network elements to the NMS shall not require any licenses as long as the maximum capacity of the proposed NMS is not reached.
- Software updates including maintenance versions shall be free of cost for the entire continuous duration.
- The Network Management System shall include all the hardware and software requirements including servers, workstation, PC, system and third party software licenses and services.
- The offered management system shall be equipped with the XML, SNMP, etc. with open and standard interfaces for easy integration. The NIA shall specify the management procedure and interface for the local and remote management of the offered system.
- Redundancy of the systems in the NOC shall be automatic. In the event of a failure, the management system should revert to the standby system without the need for user intervention.
- The proposed management system must have ability to log all user access and user actions.
- EMS interface combined must provide accurate accounting of bandwidth consumption delayed by at most 4 hours, at least on a rolling 4 hour basis. EMS should also have the facility to monitor the UPS (SNMP enabled).
- The system shall be able to capture and control different types of Contract /Service Level Agreements (SLAs). Service Level Agreements at different levels - SLAs may be at the client level, the product/service level or the contract level. SLA repository - SLA information may reside in OM or in an external system.
- Segmentation of Service Level Agreements - Ability to view, choose from an inventory list, introduce and/or apply a standard or customized product Service Level Agreement (SLA), based on segments and customer type.
- Allow multiple service levels to be defined for help desk, change tickets or user developed

- Applications. Provide response, resolution service level tracking at customer SLA and/or internal operation SLA level.
- The system should have the necessary functionality to analyses performance with respect to the established Service Level Agreement. It translates Contract (QoS/SLA) performance data received into a form suitable for Contract (QoS/SLA) analysis.

7.6.2.3 *Case Management*
- The system will provide the necessary functionality to define different types of cases, along with the states for each case type and associated configurations and work flow. Following types as an example can be configured: General Queries, Service related complaints, billing related etc.
- Cases and Case Management could apply to any area of assurance, Billing, or fulfilment, but presumably in the customer layer.
- System should be capable to generate unique Complaint Number / Docket Number / Inquiry Number
- Support parent/child correlation between related trouble tickets and tasks e.g. allow the status of child trouble tickets to be automatically updated when the parent trouble ticket is updated or allow the child trouble tickets to be automatically closed when the parent trouble ticket is closed.

7.6.3 Video Wall for S-NOC
- The video wall will be installed in the S-NOC for viewing the live feed & status of network components along with the alarms and reports generated by EMS for 24X7 environment
- The video wall will be connected to the operator workstations and should have the capability to project any operator screen in the control room onto the video wall
- The video wall controller should support video feed input from minimum 25 screens and an output to minimum 12 screens

7.6.4 Helpdesk Services
- The NIA shall be required to setup a centralized helpdesk at the location specified by OCAC
- SI shall provide the support to the PIA for all the locations, through a suitable helpdesk system, to ensure that the BharatNet solution is functioning as intended and that all problems associated with operations are resolved satisfactorily during the PIA contract period. The NIA shall provide a web enabled helpdesk management system with SMS and email based alert system for the Helpdesk Call management for the PIA and SLA reporting.

➢ The NIA shall provision for the infrastructure necessary for managing the Help Desk at the Help Desk location both for O&M of S-NOC and arrangements for PIA technical team. The NIA shall provide multiple channels to log a complaint such as Toll-free lines, landlines, helpdesk tool, E-mail, direct walk-in etc. (in addition to automated ticketing for faults identified via EMS/NMS)

➢ The Helpdesk shall act as a single point of contact for all users whether for service requests, incidents or problems. It shall encompass Helpdesk, Asset Management and Vendor Management. In addition, it shall offer a focused approach to the PIA and OCAC for delivering integrated Service Management and provide an interface for other functions in IT Services Continuity Management like Maintenance Contracts, Software Licenses etc.

➢ The NIA shall implement effective Helpdesk Management procedures to leverage the knowledge gained in providing faster and better solutions, create knowledge bases and prevent recurrence of problems.

➢ The NIA is required to provide adequate manpower for helpdesk at S-NOC Operations Center. However, if the NIA believes that in order to meet the SLAs, additional capacity is required, the same may be provided by the NIA at no additional cost. It is also to be noted any supervisors required for the Helpdesk Operators shall be over and above the minimum operators mentioned above.

➢ Typical helpdesk activities (indicative) shall include, but not limited to:
  ✓ Helpdesk should address the requests for extending technical support on hardware, network, application etc. to users
  ✓ Deployment of web-based tool for the helpdesk
  ✓ Provide Help Desk facility for agreed SLAs for reporting technical incidents / issues /problems with the network infrastructure.
  ✓ Help desk facility to be provided with Toll-free lines, landlines, helpdesk tool, E-mail, direct walk-in etc.
  ✓ The system should have a call logging system in line with the severity levels as per the SLAs.
  ✓ The Help desk shall log user calls related to system and assign an incident/ call ID number.
  ✓ Severity shall be assigned to each call as per the SLAs.
  ✓ The helpdesk shall escalate the calls, to the appropriate levels, if necessary as per the escalation matrix agreed upon with purchaser/authorized entity

➢ Helpdesk Solution shall further have the capability to upload frequently asked questions and solutions.

➢ Telephone connectivity/email will be arranged separately for Helpdesk System.

> NIA needs to arrange Desktop/Laptop, Telephone Hand Set /Automatic Call distributer, etc. for minimum 6 (Helpdesk, NOC Engineer, etc.) persons.

Note - The NIA shall be responsible for procurement, installation, commissioning and operations & maintenance of helpdesk including supply & installation of IT / Non IT infrastructure along with necessary application software licenses required for the smooth functioning of the Central Helpdesk.

Minimum quantity of physical servers are given in the BOM and each physical server supplied by the bidder shall meet minimum specifications mentioned in the RFP. Bidder to propose actual no's of servers they require for entire NMS and OSS solution. Bidder can consider virtualization of servers for optimal utilization of physical infrastructure. The solution should support minimum 7000 nodes for future scalability. Initially around 3000 nodes will be managed using NMS and OSS. The utilization of computing resources should not breach threshold value of 70%. If computing resources of physical servers or virtual machines cross threshold value of 70%, bidder will be responsible for upgrading the hardware without any additional cost to OCAC.

7.7 Manpower of S-NOC

Profile	Nos.	Qualification and Experience
Project Manager	1	B.E/ B.Tech/ MCA/M-Tech with 7+ years of experience. Certifications - ITILv3, PMP/PRINCE2 certified
NOC Expert	1	B.E/ B.Tech/MCA, M.Sc (Computer science) 5+ experience must in setting up and maintenance on NOC
Network cum System Admin	1	B.E/B.Tech/MCA, total 3+ years of experience. OEM Certified Network cum System administrator with minimum 2 years' experience as a network and system administrator in large data center
Helpdesk tech. Support	6	Diploma/B.Sc in computer science /BCA, Total 3+ years of experience, minimum 2 years' experience in similar profile in any NOC

7.8   Roles and Responsibilities Matrix

7.8.1   Summary of Roles of Responsibilities

The roles of the stakeholders shall change over a period of time as the project will evolve from design to implementation phase only. Below mentioned Table summarizes the roles and responsibilities of key resources of stakeholders involved in the project.

Role	Responsibility Center	Roles and Responsibility
Implementation Agency Project Leader	• OCAC	• Shall spearhead the coordination strategy for the project across all stakeholders. • Shall have the authority to approve deliverables, release circulars/notifications. • Shall coordinate with the Project Management Unit to finalize a comprehensive reporting framework which shall cater to various stakeholders especially decision makers for supervising implementation. • Shall ensure compliance to the specifications defined in the area of application design, infrastructure and management. Head the Change Approval Board and provide the final approval for any project related changes that have to be performed during development and maintenance phases • Monitor and review the success of the system and ensuring its effective and efficient running. • Maintain daily, weekly and monthly reports for the same for higher management. • Work in connection with other IT experts in the organization. • Address key security and privacy requirements for secure business solutions. • Provide extensive technical, strategic advice and guidance to the System Integrator/NIA for proper implementation.

		• Act as an active member of the CAB and provide technical inputs on IT related changes in the software. Identify and highlight potential risks
Project Manager	• NIA	• Run the project from design and development to implementation. • Define requirements and plan project lifecycle for deployment. • Define resources and schedule for the project's implementation. • Create strategies for risk mitigation and contingency planning. • Plan and schedule project deliverables, goals, and milestones. • Direct and oversee project implementation team. • Efficiently identifies and solves project issues. • Design and maintain technical and project documentation. • Act as an active member of the Change Approval Board (CAB) and highlight any risks / issues that could take place in the software system if a particular change is implemented. • Co-ordinate with the team members for effective delivery. Communicate with the Project Management Unit
Non IT Infrastructure Team	• NIA	• This team would be responsible for the design, development, installation, configuration of the OCAC NOC Maintain technical documentation for the installed components in the NOC
IT Infrastructure Team	• NIA	• The team shall be responsible for managing the computers, network and other infrastructure facilities required for the project.

		• The team should maintain backup of digital content after user acceptance. This team will support the System Administrator at OCAC for all technical issues.
Third Party Audit	Third Party Agency	• Ensure compliance to the requirements of S-NOC as per the clauses of the RFP, information security guidelines, interoperability standards, data storage requirements and business continuity principles. • Assess technology obsolescence risk and propose technology risk mitigation plan. • Validate the delivery and installation schedule and commissioning plan. • Perform the FAT and ensure Go-Live • Ensure that the SLA reports are validated and suggest the liquidated damages / penalty to be deducted from the QGR • Shall validate all the invoices before forwarding to OCAC for approval and payment.
Helpdesk team	NIA	The NIA is required to provide helpdesk operators (6 nos. initially) at the S-NOC for operating the S-NOC and managing the helpdesk/service desk (for monitoring of the BharatNet network) as per the scope specified in this RFP. The Operators shall perform various activities including: • Understanding the query/issue in the reported request / incident. • In case of technical issues for which a resolution is not possible instantly, the operator shall submit the request into the service desk/ helpdesk system for PIA to act upon and further escalation if required. • Log/ process all service requests and dispatch them to relevant personnel of PIA who shall perform the task.
State Implementation Agency	OPTCL	• Share the scope of Operations and Maintenance (/AMC) terms of reference (between OPTCL and PIA)

BharatNet Phase II Project Implementation Agency	PIA	• Communicate with the NIA helpdesk team regarding the closure of the incidents raised in the helpdesk / service desk system

7.9   OCAC Obligations

OCAC will facilitate all necessary space, raw power arrangement (upto transformer) and necessary approvals for implementing the S-NOC. The NIA needs to liaison with OCAC for all necessary approvals. OCAC will facilitate and co-ordinate to liaison with other stakeholders such as BharatNet implementation agency, OPTCL, BBNL etc. Any delay for implementation which is not attributable to NIA shall be reported by the NIA in writing immediately so that OCAC may record the cause of the delay and take necessary actions. OCAC will provide comments or approvals for the documents or reports submitted by the NIA in a timely manner for smooth execution of the project.

8   Payment Schedule

8.1   Implementation Phase

#	Payment Schedule for Implementation Phase	% of CAPEX (A)	% of OPEX (B)	% of Implementation Cost (C)	Remarks
1.	On delivery of all the items as per BoQ (Delivery report to be submitted by the NIA to the TPA. TPA shall verify the delivery report.)	25%	0%	0%	Payable on successful check of all the equipment by OCAC appointed Consultant / Officer. The payment will be released against a bank guarantee of amounting 10% of the total project cost.
2.	On Successful installation of all the items as per BoQ (Installation report to be submitted by the NIA to the TPA. TPA shall verify the Installation report.)	25%	0%	0%	Payable on successful check of all the equipment by TPA
3.	On successful final acceptance test (FAT report to be submitted by the TPA)	20%	0%	0%	Payable on successful FAT of implemented

#		30%	0%	100%	Data Centre in accordance to the requirements by TPA.
4.	Go-Live (Report of successful operations and maintenance for 15 days from the date of Go-Live to be submitted by TPA)	30%	0%	100%	10% Payment of CAPEX to be released on Go-Live and rest of 20% of CAPEX to be released after Successful run of the S-NOC helpdesk for 3 months and against bank guarantee of the same amount which should be valid for 18 months
Total		**100%**	**0%**	**100%**	

CAPEX - Hardware cost + 1st year warranty cost

OPEX - Support cost and warranty/AMC cost for entire project duration i.e. 6 years

8.2   O&M Phase

#	Payment Schedule for Operations Phase	Fee Payable	Remarks

1	Quarterly Payment for O&M and Helpdesk services (SLA Audit report to be submitted by TPA)	OPEX (Support cost and warranty/AMC cost for entire project duration i.e. 6 years) cost to be paid in equal installments on quarterly basis (QGR).	At the end of successful completion of each quarter and on submission of attendance proof of the NOC personnel.

9   Implementation Schedule

Week	Activity	Remarks
S + 0	Project Implementation Kick-off by NIA	This would be done within 1 week of award of contract. The consultant shall work out the on boarding.
S + 3	Preparation & Submission of S-NOC layout	The NIA shall design the S-NOC layout in consultation with the OCAC team
S + 4	Approval of the Layout	OCAC shall approve the layout before NIA start their Non-IT infrastructure work
S + 5	S-NOC Design & approval	The NIA shall design the S-NOC technical (IT) blueprint in consultation with the OCAC team. OCAC shall approve the layout before NIA start their Non-IT infrastructure work
S + 9	Civil construction as required for S-NOC area & Civil and interior installation activities	NIA shall carry out interior Civil work as required to complete the civil work required for S-NOC. Also all the minor civil work like internal painting, tiles work, false flooring, false ceiling, civil work for installation of doors, partitions, AC's etc. will be carried out by NIA at this stage.
S + 21	Commissioning of S-NOC	While non-IT components will be installed, PAT for Non-IT components will be carried out by the OCAC and TPA

		On acceptance of Non-IT implementation, IT components will be delivered and implemented.
		PAT for IT components will be carried out once the commissioning of IT components done by the TPA and OCAC
S+ 23	Final Acceptance Tests of S-NOC	**OCAC** shall draft the FAT checklist. Final Acceptance Test will be carried out by NIA in the presence of TPA with reference to implementation of new S-NOC infrastructure.
S + 26	Go-Live	On satisfactory acceptance by OCAC the NIA shall start the O&M phase

10 Service Level Agreement

Note:

> *The purpose of this Service Level Agreement (hereinafter referred to as SLA) is to clearly define the levels of service which shall be provided by the NIA to OCAC for the duration of this contract.*

> *The NIA and OCAC shall regularly review the performance of the services being provided by the NIA and the effectiveness of this SLA*

10.1 Definition

For purposes of this Service Level Agreement, the definitions and terms as specified in the contract along with the following terms shall have the meanings set forth below:

- "Uptime" shall mean the time period for which the specified services / components with specified technical and service standards are available to OCAC or relevant user / beneficiary. Uptime, in percentage, of any component (Non IT & IT) can be calculated as:

  Uptime = {1- [(Downtime) / (Total Time – Scheduled Maintenance Time)]} * 100

- "Downtime" shall mean the time period for which the specified services / components with specified technical and service standards are not available to OCAC or relevant user / beneficiary and excludes the scheduled outages planned in advance for the NOC and the link failures that are OCAC's responsibility.

- "Incident" refers to any event / abnormalities in the functioning of the NOC Equipment / specified services that may lead to disruption in normal operations of the NOC services.

- "Helpdesk Support" shall mean the 24x7 on premise support center which shall handle Fault reporting, Trouble Ticketing and related enquiries during this contract.

- "Resolution Time" shall mean the time taken in resolving (diagnosing, troubleshooting and fixing) an incident after it has been reported at the helpdesk. The resolution time shall vary based on the severity of the incident reported at the help desk. The severity would be as follows:

- Critical: Incidents whose resolution shall require additional investment in components or time or shall involve coordination with OEMs. These incidents shall impact the overall functioning of the NOC. For example, purchase of printer, router, software bug fixing etc.

- Medium: Incidents, whose resolution shall require replacement of hardware or software parts, requiring significant interruption in working of that individual component. For example, installation of operating system, replacement of switch etc.

- Low: Incidents whose resolution shall require changes in configuration of hardware or software, which will not significantly interrupt working of that component. For example, installation of printer on a client etc.

10.2 Category of SLAs

This SLA document provides for minimum level of services required as per contractual obligations based on performance indicators and measurements thereof. The NIA shall ensure provisioning of all required services while monitoring the performance of the same to effectively comply with the performance levels. The services provided by the NIA shall be reviewed by the OCAC that shall:

Regularly check performance of the NIA against this SLA.

Discuss escalated problems, new issues and matters still outstanding for resolution.

Review of statistics related to rectification of outstanding faults and agreed changes.

Obtain suggestions for changes to improve the service levels.

10.2.1 Implementation Service Levels

The following measurements and targets shall be used to track and report the implementation performance on a regular basis. The targets shown in the following table are applicable for the duration of the contract. All the targets for the completion of the implementation activity are calculated on a weekly basis. Please note that the Bidder should provide comprehensive, end-to-end service to implement the OCAC BharatNet State NOC Infrastructure, including replacement of the equipment in case of physical damage. No reason shall be entertained (unless those mentioned in Force Majeure) in case of unavailability of any service given in the scope of work in this RFP and the appropriate penalty shall be levied.

Measurement	Target	Severity	Penalty
Final Acceptance Testing	23 weeks from the date of receiving the LoI	Critical	A Penalty as 1% per week for first two weeks, 2% per week for every subsequent week. Subject to maximum of 10%. Penalty will be computed on CAPEX value of contract.

10.2.2 Operations and Maintenance Service Levels

Sr	Measurement	Target	Severity	Penalty

1.	Individual Server Availability (including the OS, database and application running on it)	>= 99.982 %	Critical	No Penalty
		<99.982 %		1% of the QGR for every 1 hours of down time at a stretch or in-parts up to total down time of 10hours. This down time shall be calculated over and above the total hours of downtime permissible. Beyond 10 hours of down time, 2% of the QGR for every 0.5 hour of down time at a stretch or in parts.
2.	Storage Availability	>= 99.982 %	Critical	No Penalty
		<99.982 %		1% of the QGR for every 1 hours of down time at a stretch or imparts up to total down time of 10hours. This down time shall be calculated over and above the total hours of downtime permissible. Beyond 10 hours of down time, 2% of the QGR for every 0.5 hour of down time at a stretch or in parts.
3.	Tape Library Availability	>= 99.982 %	Medium	No Penalty
		<99.982 %		1% of the QGR for every 1 hours of down time at a stretch or imparts up to total down time of 10hours. This down time shall be calculated over and above the total hours of downtime permissible. Beyond 10 hours of down time, 2% of the QGR for every 1 hour of down time at a stretch or in parts.
4.	Connectivity to Disaster Recovery Site (With	>= 99.982 %	Critical	No Penalty
		<99.982 %		1.5% of the QGR for every 0.5 hours of down time at a stretch or

Sr	Measurement	Target	Severity	Penalty
	regards to DR site availability)			imparts up to total down time of 10 hours. This down time shall be calculated over and above the total hours of downtime permissible. Beyond 10 hours of down time, 1.5% of the QGR for every 0.5 hour of down time at a stretch or in parts.
5.	Connectivity with Internet (With regards to equipment only)	>= 99.982 %	Critical	No Penalty
		<99.982 %		1.5% of the QGR for every 0.5 hours of down time at a stretch or imparts up to total down time of 10hours. This down time shall be calculated over and above the total hours of downtime permissible. Beyond 10 hours of down time, 1.5% of the QGR for every 0.5 hour of down time at a stretch or in parts.
6.	Scheduled downtime for Preventive maintenance Per Week • 1am to 5am on Sundays • Any further requirement for scheduled downtime as per approval from OCAC	Notification of >= 7 days in advance	Medium	No Penalty
		Notification of less than 7 days		0.5% of the QGR per incident

10.2.3 Physical Infrastructure Service Levels

Sr	Measurement	Target	Severity	Penalty
1.	Power Availability	>= 99.982 %	Critical	No Penalty

		<99.982 % to >= 99.950 %		2% of the QGR
		>=98.00 % to <99.50 %		5% of the QGR
		>=95.00 % to <98.00 %		8% of the QGR
		<95%		0.5% of the QGR for every 1 hours of down time at a stretch or in parts up to total down time in addition to the penalty mentioned above. This down time shall be calculated over and above the total hours of downtime permissible till 95.00 % availability.
2.	Cooling system Temperature to be maintained 20°± 2° at all times Relative humidity to be maintained 50°± 5° at all times	>= 99.982 %	Critical	No Penalty
		<99.982 % to >= 99.950 %		2% of the QGR
		>=98.00 % to <99.50 %		5% of the QGR
		>=95.00 % to <98.00 %		8% of the QGR
		<95%		0.5% of the QGR for every 1 hours of down time at a stretch or in parts up to total down time in addition to the penalty mentioned above. This down time shall be calculated over and above the total hours of downtime permissible till 95.00 % availability.
3.	Surveillance: CCTV Availability would include DVR system availability, availability of CCTV	>= 99.982 %	Critical	No Penalty
		<99.982 % to >= 99.950 %		2% of the QGR
		>=98.00 % to <99.50 %		5% of the QGR
		>=95.00 % to <98.00 %		8% of the QGR

	recording – 180 days of backup data from the present date	<95%		0.5% of the QGR for every 1 hours of down time at a stretch or in parts up to total down time in addition to the penalty mentioned above. This down time shall be calculated over and above the total hours of downtime permissible till 95.00 % availability.
4.	Complete BMS, system. This parameter applies to any individual component of BMS system, i.e., VESDA, Fire detection, fire suppression, water leak detection, S&EMU, Rodent repellant etc. For any component downtime, the penalty will be applicable	>= 99.982 %	Critical	No Penalty
		<99.982 % to >= 99.950 %		2% of the QGR
		>=98.00 % to <99.50 %		5% of the QGR
		>=95.00 % to <98.00 %		8% of the QGR
		<95%		0.5% of the QGR for every 1 hours of down time at a stretch or in parts up to total down time in addition to the penalty mentioned above. This down time shall be calculated over and above the total hours of downtime permissible till 95.00 % availability.
5.	NOC Infrastructure Management (Measure all the components at the end terminal level)	>= 99.982 %	Critical	No Penalty
		<99.982 % to >= 99.950 %		2% of the QGR
		>=98.00 % to <99.50 %		5% of the QGR
		>=95.00 % to <98.00 %		8% of the QGR
		<95%		0.5% of the QGR for every 1 hours of down time at a stretch or in parts up to total down time

				in addition to the penalty mentioned above. This down time shall be calculated over and above the total hours of downtime permissible till 95.00 % availability.

10.2.4 Helpdesk Services

Time in which a complaint / query is resolved after it has been responded to by the IT service management. In the Help desk Services SLA, if the NIA does not resolve any logged incident for more than the allowed resolution time, then the NIA is advised to escalate that criticality of the incident to next higher level.

#	Type of Incident	Target	Penalty
1	Incident logging	T = 5 minutes	No Penalty
		T1=T+5 Min	0.1% of the QGR for every late logging
		T2=T1+10 Min	0.5% of the QGR for every late logging
		>T2	2% of the QGR for every late logging
2	Assign / Escalation	T = 5 mins.	No Penalty
		T1=T+5 Min	0.5% of the QGR for every late assignment
		T2=T1+10 Min	2% of the QGR for every late assignment

10.2.5 Compliance and Reporting Process Service Levels

Sr	Measurement	Target	Severity	Penalty
1	Submission of MIS reports.	Report for previous month to be submitted by 7th of next Month	Medium	1% of the QGR for every 1 day of delay in submission of

	The NIA shall submit the MIS reports as requested by OCAC			incremental basis to a maximum of 5%
2	Implementing Change Requests: The NIA would implement approved change request within 2 days of its approval	100% of all approved change requests	Medium	1% of QGR for >5 violations of Service Parameter
3	Customization of EMS reports	Customized reports shall be created and submitted within 7 days from date of request submitted by NIAA.	Medium	1% of QGR for every 7 days delay in submission of customized reports to a maximum of 10% of QGR.

10.2.6 Manpower Resources Service Levels

In cases where 24x7 man power is not available the support personnel should be available over phone. On critical situations or when directed by OCAC, the support personnel must be available on site within 3 hours of request from NIAA. Non-availability of the support personnel as stated above will be treated equivalent to single occasion downtime for critical components. The manpower deployed by the NIA should be on rolls of the respective NIA and not contracted or outsourced personnel.

Measurement	Target	Severity	Penalty
Resource availability for all services requested	>= 99% averaged over all resources designated for System Integration (NOC Operations)	Critical	No Penalty

under Operations and Maintenance	services and calculated on a quarterly basis		
Resource availability would be calculated as: (No. of shift days for which resource present at the designated location / Total No. of shift days) x 100	< 99% to >= 97% averaged over all resources designated for System Integration (NOC Operations) services and calculated on a quarterly basis		2% of QGR
	< 97% to >= 95% averaged over all resources designated for System Integration (NOC Operations) services and calculated on a quarterly basis		5% of QGR
	< 95% to >= 90% averaged over all resources designated for System Integration (NOC Operations) services and calculated on a quarterly basis		8% of QGR
	< 90% averaged over all resources designated for System Integration		Maximum penalty may be imposed i.e. 10% of

	(NOC Operations) services and calculated on a quarterly basis		QGR or on actual whichever is higher

Example: to illustrate the manpower availability in case there are there are 3 shifts per day which will have 2 people in shift 1, 1 in shift 2 and 1 in shift 3.

Total shift per day will be = 4 (2 x 1 + 1 x 1 + 1 x 1) per quarter it would be = 360 shifts

In a quarter if two people were not present in shift 1 for 7 days then, 2 x 7 = 14 shifts will be considered for the unavailability of manpower.

Uptime % = (shifts in which manpower was available / total number of shifts) x 100

Uptime = (1 — 14/360) x 100

Uptime % = 96.11%

- *Maximum penalty on manpower is limited to maximum of 10% of QGR. Manpower related penalty is additional to the penalty applicable for other services. Manpower related penalty will be either as per the SLA or as per actual rates of manpower absent during the quarter and the highest among these penalty will be applicable to the NIA.*

10.3   SLA Review Process

- Either OCAC or NIA may raise an issue by documenting the business or technical problem, which presents a reasonably objective summary of both points of view and identifies specific points of disagreement with possible solutions.

- A meeting or conference call will be conducted to resolve the issue in a timely manner. The documented issues will be distributed to the participants at least 24 hours prior to the discussion if the issue is not an emergency requiring immediate attention.

- The OCAC and the NIA shall develop an interim solution, if required, and subsequently the permanent solution for the problem at hand. The NIA will then communicate the resolution to all interested parties.

- In case the issue is still unresolved, the arbitration procedures described in the Terms & Conditions section will be applicable.

10.3.1   Penalty Conditions

1. In O&M period, maximum of 10% Penalty will be computed on the value of QGR (exclusive of taxes) for a particular quarter.

2. In the case of maximum Penalty of 10% being imposed on the NIA for two consecutive QGR, then the performance of the NIA will be reviewed and also may be subjected to cancellation of the order for failure of service level provided by the NIA or higher Penalty of 20% will be imposed on the NIA due to non-maintenance of Service levels.

11 General Terms and Conditions of Contract

11.1 Purchaser

Odisha Computer Application Centre,
Plot No.-N-1/7-D,
Nayapalli, Near Planetarium,
Acharya Vihar Square,
Bhubaneswar-751013

11.2 Cost of Proposal

The bidder shall bear all the costs associated with the preparation and submission of its Proposal, including site visits, and the GoO/OCAC will in no case be responsible or liable for those costs, regardless of the conduct or outcome of the proposal process.

11.3 Amendment of RFP Documents

At any time prior to the deadline for submission of Proposal, OCAC reserves the right to modify and amend any of the stipulated condition/criterion in the RFP, depending upon project priorities vis-à-vis urgent commitments. Such amendments in shape of corrigendum/addendum shall be hosted in the websites where the original RFP was hosted. The bidder shall acknowledge the receipt of each corrigendum/addendum by submitting a signed copy of it along with the Technical bid to the RFP issuing authority. Failure to acknowledge receipt of each corrigendum/addendum shall be interpreted as receipt of the corrigendum/addendum by the bidder and no claim will be entertained or accepted in this regard.

11.4 Correction of Errors

Bidders are advised to exercise greatest care in entering the pricing figures. No excuse that mistakes have been made or requests for prices to be corrected will be entertained after the quotations are opened. All corrections, if any, should be initialed by the person signing the bid form before submission, failing which the figures for such items may not be considered. Arithmetic errors in bids will be corrected as follows:-
Where there is a discrepancy between the amounts in figures and in words, the amount in words shall govern. Where there is a discrepancy between the unit rate and the line item total resulting from multiplying the unit rate by the quantity, the unit rate will govern unless, in the opinion of department, there is obviously a gross error such as a misplacement of a decimal point, in which case the line item total will govern.

11.5 Contacting Department

Any effort by bidders to influence the officials in the examination, evaluation, ranking of Proposals, and recommendation for award of Contract may result in the rejection of the Bidder's Proposal. Queries, requests if any regarding the bid should be forwarded to the RFP issuing authority at the address specified in this RFP.

11.6 Disqualification

The bid is liable to be disqualified if:-

- Bid not submitted in accordance with this RFP.
- During validity of the bid or its extended period, if any, the bidder increases his quoted prices without the consent of department to change the bid quote.
- The bidder puts his own conditions with the bid.
- Bid received in incomplete form or not accompanied by EMD.
- Bid received after due date and time.
- Bid not accompanied by all requisite documents.
- Bidder fails to enter into a contract within 30 working days of the date of notice of the award of tender or within such extended period, as may be specified by an authorized representative.

11.7 Performance Bank Guarantee

The successful bidder shall furnish an unconditional and irrevocable Performance Bank Guarantee (PBG) for 10% (ten percent) of the contract price within 15 days of issue of Purchase Order or prior to signing of the contract whichever is earlier after which contract/agreement will be signed with the selected bidder. The PBG must be from the nationalized / scheduled commercial bank in India. All charges whatsoever such as premium, commission etc. with respect to the Performance Bank Guarantee shall be borne by the bidder. The Performance Bank Guarantee may be discharged / returned by OCAC upon being satisfied that there has been due performance of the obligations of the Bidder under the contract. However, no interest shall be payable on the Performance Bank Guarantee. In the event of the bidder being unable to service the contract for whatever reason, OCAC would evoke the PBG. OCAC shall notify the Bidder in writing of the exercise of its right to receive such compensation within 14 days, indicating the contractual obligation(s) for which the Bidder is in default. This Performance Bank Guarantee (PBG) shall remain valid for sixty days beyond all the contractual obligations.

If the PBG is not submitted within 15 days of issuance of work order, the EMD may be forfeited by OCAC. Once contract is signed with the successful bidder, the Bank Guarantee towards EMD will be refunded by OCAC within 30 days from contract signing date.

After the PBG submitted by the bidder for 6 years and 6 months period, they need to renew the PBG for further period of the contract and the PBG shall be valid for minimum contract period + 6 months.

11.8 Liquidated Damages

a) In the event Bidder fails to provide the Services in accordance with the Service Standard, Bidder shall be liable for penalty as per the terms and conditions of Service Level Agreements (SLAs) to be agreed between the NIA and the administration of OCAC.

b) Department is entitled to withhold (deduct) from the payment due or the Performance Bank Guarantee the liquidated damages that have become due.

11.9 Termination of Contract

A. Termination for default

OCAC without prejudice to any other remedy for breach of Contract or noncompliance with service levels, by written notice of default sent to the Bidder, may terminate the Contract fully or in part:

- If the selected Bidder fails to deliver any or all Contracted services as per service standards specified in the Contract or
- If the selected Bidder fails to perform any other obligation(s) under the Contract as per the contract timeline and for the period of contract, or
- If the selected Bidder has engaged in corrupt or fraudulent practices in competing for or in executing the Contract

In the event OCAC terminates the Contract in whole or in part, OCAC may procure, upon such terms and in such manner as it deems appropriate, services similar to those undelivered, and the selected Bidder shall be liable to OCAC for any excess costs for such similar services. However, the Bidder may continue performance of the Contract to the extent not terminated. OCAC would not be liable to pay any damages to the selected Bidder in cases comprising Termination for default.

Premature termination of the contract would happen due to conditions of breach happening due to reasons solely and entirely attributable to the bidder, provided prior 30 days written notice to rectify the same is given by the OCAC and failure by the bidder to rectify in the notice period.

B. Termination for insolvency

OCAC may at any time terminate the Contract by giving written notice to the selected Bidder / if the selected Bidder / becomes bankrupt or otherwise insolvent. In this event, termination will be without compensation to the selected Bidder, provided that such termination will not prejudice or affect any right of action or remedy which has accrued or will accrue thereafter to the OCAC.

C. Termination for Convenience

OCAC, by written notice of 30 days sent to the vendor, may terminate the Contract, in whole or in part, at any time for its convenience. The notice of termination shall specify that termination is for its convenience. In case of termination for convenience, OCAC would pay to the bidder cost of services provided till the date of the termination. The PBG in such a case would be refunded to the successful bidder.

11.10 Force Majeure Condition

a) The successful Bidder shall not be liable for forfeiture of its Performance bank guarantee, Liquidated Damages, or termination for default if and to the extent that it's delay in performance or other failure to perform its obligations under the Contract is the result of an event of Force Majeure.

b) For purposes of this clause, "Force Majeure" means an event beyond the control of the Bidder and not involving the successful Bidder fault or negligence, and not foreseeable. Such events may include, but are not restricted to, acts of the OCAC in its sovereign capacity, wars or revolutions, fires, floods, epidemics, quarantine restrictions and freight embargoes.

c) If a Force Majeure situation arises, the Bidder shall promptly notify the authorized representative of OCAC in writing of such condition and the cause thereof. Unless otherwise directed by the authorized representative of OCAC in writing, the Bidder shall continue to perform its obligations under the Contract as far as is reasonably practical, and shall seek all reasonable alternative means for performance not prevented by the Force Majeure event.

11.11 Prices

The Bidder shall quote a fixed price for the entire project on a single responsibility basis. The successful bidder is held responsible for the overall deliverables during the period of contract. The Contract price shall be the only payment, payable by OCAC to the Successful Bidder for completion of the contractual obligations by the Successful Bidder under the Contract, subject to the terms of payment specified in the Contract. The total price inclusive of taxes and duties will be considered for evaluation. So, the bidder must mention the base price and the tax component separately. The prices once offered must remain firm and must not be subject to escalation for any reason whatsoever within the period of the project. All tax, cess, duty or any other levy (excluding any income tax) (by whatsoever name called) will be paid extra as per the rate prevalent at the time of billing.

11.12 Intellectual Property Rights (IPR)

11.12.1 OCAC shall own and have a right in perpetuity to use all newly created Intellectual Property Rights which have been developed solely during execution of this Contract, including but not limited to all processes, products, specifications, reports, drawings and other documents which have been newly created and developed by the NIA solely during the performance of Services and for the purposes of interalia use or sub-license of such Services under this Contract. The NIA undertakes to disclose all such Intellectual Property Rights arising in performance of the Services to OCAC and execute all such agreements/documents and file all relevant applications, effect transfers and obtain all permits and approvals that may be necessary in this regard to effectively transfer and conserve the Intellectual Property Rights of OCAC.

11.12.2 NIA will continue to retain their rights in the materials they bring under this agreement and NIA would inform OCAC, details of such materials.

11.12.3 Notwithstanding anything to the contrary contained herein, the NIA will defend, indemnify and hold harmless, OCAC against any suit or claim brought by a third party that the possession or use of the software, programs, firmware and hardware, materials or documents infringes such third parties intellectual property rights or is a misuse of its Confidential Information.

11.13 General Confidentiality

Except with the prior written consent of OCAC or its client department/organisation, the NIA and the Personnel shall not at any time communicate to any person or entity any confidential information acquired in the course of the Services, nor shall the NIA and the Personnel make public the recommendations formulated in the course of, or as a result of, the Services.

11.14 Operation of the Contract

The Parties recognize that it is impractical in this Contract to provide for every contingency which may arise during the life of the Contract, and the Parties hereby agree that it is their intention that this Contract shall operate fairly as between them, and without detriment to the interest of either of them, and that, if during the term of this Contract either Party believes that this Contract is operating unfairly, the Parties will use their best efforts to agree on such action as may be necessary to remove the cause or causes of such unfairness, but no failure to agree on any action pursuant to this Clause shall give rise to a dispute subject to arbitration in accordance with Clause 11.15 hereof.

11.15 Settlement of Disputes

11.15.1 The Purchaser and the NIA shall make every effort to resolve amicably by direct informal negotiation on any disagreement or dispute arising between them under or in connection with the Contract.

11.15.2 If, after thirty (30) days from the commencement of such informal negotiations, the Purchaser and the NIA have been unable to resolve amicably a Contract dispute, the dispute should be referred to the Chief Executive Officer, OCAC for resolution.

11.15.3 If, after thirty (30) days from the commencement of such reference, Chief Executive Officer, OCAC have been unable to resolve amicably a Contract dispute between the Purchaser and the NIA, either party may require that the dispute be referred to the Commissioner-cum-Secretary to Govt., E&IT Department, Govt. of Odisha.

11.15.4 Any dispute or difference whatsoever arising between the parties (Purchaser and NIA) to the Contract out of or relating to the construction, meaning, scope, operation or effect of the Contract or the validity of the breach thereof, which cannot be resolved through the process specified above, shall be referred to a sole Arbitrator to be appointed by mutual consent of both the parties herein. In the event the parties cannot agree to sole arbitrator, such arbitrator shall be appointed in accordance with the Indian Arbitration and Conciliation Act, 1996.

11.15.5 The arbitration proceedings shall be held at Odisha and the language of the arbitration shall be English.

11.16 Adherence to Safety Procedures, Rules & Regulations

11.16.1 The NIA shall take all measures to ensure compliance with all applicable laws and shall ensure that the Personnel are aware of consequences of non-compliance or violation of laws including Information Technology Act, 2000 (and amendments thereof).

11.16.2 Statutory Audit

a) The deliverables prepared for this project are subject to audit (by TPA, CAG or other entities). The NIA should help OCAC during preparation of compliances of audit without any additional cost.

b) All technical documents/deliverables shall be in favour of the OCAC and shall be submitted to the OCAC before final payment or on demand.

c) All records pertaining to this work shall be made available to the OCAC and its authorized agencies upon request for verification and/or audit, on the basis of a written request.

11.17 Limitation of Liability

11.17.1 Neither Party shall be liable to the other Party for any indirect or consequential loss or damage (including loss of revenue and profits) arising out of or relating to the Contract.

11.17.2 Notwithstanding anything to the contrary elsewhere contained in this or any other contract between the parties, neither party shall, in any event, be liable for (1) any indirect, special, punitive, exemplary, speculative or consequential damages, including, but not limited to, any loss of use, loss of data, business interruption, and loss of income or profits, irrespective of whether it had an advance notice of the possibility of any such damages; or (2) damages relating to any claim that arose more than one year before institution of adversarial proceedings thereon.

11.17.3 Subject to the above and notwithstanding anything to the contrary elsewhere contained herein, the maximum aggregate liability of the NIA under this Agreement shall not exceed the contract value of the NIA under this Agreement. Maximum liability of the bidder for this project will be limited to 100% of total value of the contract or the amount actually paid to the bidder whichever is lower.

11.18 Indemnity

11.18.1 The NIA shall indemnify OCAC from and against any costs, loss, damages, expense, claims including those from third parties or liabilities of any kind howsoever suffered, arising or incurred inter alia during and after the Contract period out of:

a) Any negligence or wrongful act or omission by the NIA or any third party associated with NIA in connection with or incidental to this Contract or;

b) Any breach of any of the terms of this Contract by the NIA, the NIA's Team or any third party

c) Any infringement of patent, trademark/copyright arising from the use of the supplied goods and related services or any party thereof

11.18.2 The NIA shall also indemnify OCAC against any privilege, claim or assertion made by a third party with respect to right or interest in, service provided as mentioned in any Intellectual Property Rights and licenses

11.18.3 All indemnification obligations shall be subject to the Limitation of Liability clause.

12 Annexures

12.1 Annexure: G-1 - Particulars of Bidder

(To be in company letter head)

Particulars of the Bidder

RFP Enquiry No: Date:

1. Name of the Firm/Organization:

2. Organization Status of Registration:

3. Address of Corporate Office:

4. Address of Office in Odisha (if any):

5. Telephone No: Fax No:

6. Email Address:

7. Website:

8. Registration No of Certificate of Incorporation & Date:

9. Registration No of Sales Tax/ VAT & Date:

10. Registration No of Service Tax:

11. Permanent Account Number of Income Tax & Date of Regn.:

12. No. of years of proven experience of providing similar Services:

Signature of the Bidder

12.2 Annexure: G-2 - Self declaration of not be under Ineligibility for corrupt and fraudulent practice

(To be in company letter head)

Self-declaration of not be under Ineligibility for corrupt and fraudulent practice

RFP Enquiry No: Date:

To

The General Manager (Admin.)

Odisha Computer Application Centre,

OCAC Building, Plot No. N-1/7-D

Acharya Vihar Square, RRL Post Office

Bhubaneswar – 751013

Sir/Madam, in response to the RFP No. _____ , Ms./Mr._____ as a _____, I / We hereby declare that our firm/organization/company is having unblemished past record and have not been declared blacklisted by any Central/State Government/PSU institution and there has been no pending litigation with any government department on account of similar services. I/We further declare that our company has not defaulted in executing any Government order in the past.

Signature of Bidder   Signature of Witness

Date   Date

Place   Place

12.3 Annexure: G-3 - Authorization Letter

RFP Enquiry No:

To

The General Manager (Admin.)

Odisha Computer Application Centre,

OCAC Building, Plot No. N-1/7-D

Acharya Vihar Square, RRL Post Office

Bhubaneswar – 751013

Sir/Madam,

_____is hereby authorized to sign relevant documents on behalf of the firm/organization/company in dealing with the RFP No**: _____**. He /She is also authorized to attend meetings & submit the commercial information as may be required by you in the course of processing above said application.

Thanking You

Authorized Signatory

12.4 Annexure: G-4 - Acceptance of Terms & Conditions Contained In the RFP Document

(To be in company letter head)

Acceptance of Terms & Conditions Contained In the RFP Document

RFP Enquiry No: Date:

To

The General Manager (Admin.)

Odisha Computer Application Centre,

OCAC Building, Plot No. N-1/7-D

Acharya Vihar Square, RRL Post Office

Bhubaneswar – 751013

Sir/Madam,

I have carefully gone through the Terms & Conditions contained in the RFP No: _____, regarding _____. I declare that all the provisions of this RFP document are acceptable to my company. I further certify that I am an authorized signatory of my company and am, therefore, competent to make this declaration.

Signature of Witness   Signature of Bidder

Place   Place

Date   Date

12.5 Annexure: G-5 - Format for List of Previous Work Orders Executed

(To be in company letter head)

Format for List of Previous Work Orders Executed

RFP Enquiry No: Date:

Sl. No.	Name of Client	Name of Project	Project Brief	Project Cost	Status

Note: The information provided in the above table must supported by copies of relevant work order and completion certificate.

Signature of Witness   Signature of Bidder

Place   Place

Date   Date

12.6   Annexure: G-6 - Price Bid Letter

(To be in company letter head)

Price Bid Letter

RFP Enquiry No: Date:

To The General Manager (Admin),

Odisha Computer Application Centre,

OCAC Building, Plot No. N-1/7-D

Acharya Vihar Square, RRL Post Office

Bhubaneswar – 751 013

Subject:

Sir/Madam,

We, the undersigned, offer to provide our services for selection of NIA for Odisha State Network Operations Center for BharatNet in accordance with your RFP Document _____ Dated _____ and our Bid (Price Bid). Our Price Bid is attached in Annexure: G-7.

1. **Price and Validity**

   All the prices mentioned in our RFP are in accordance with the terms as specified in the RFP documents. We declare that our Bid Price is for the entire scope of the work as specified in the appropriate section in the RFP. All the prices and other terms and conditions of this Bid are valid minimum for a period 180 days from the date of opening of the Bid. Subject to further extended period as mutually agreed upon.

   We hereby confirm that our prices do not include any taxes and duties. We understand that the actual payment would be made as per the existing tax rates during the time of payment.

2. **Unit Rates**

   We have indicated in the relevant forms enclosed, the unit rates for the purpose of on account of payment as well as for price adjustment in case of any increase to / decrease from the scope of work under the contract.

3. **Qualifying Data**

We confirm having submitted the information as required by you in your Instruction to Bidders. In case you require any other further information/documentary proof in this regard before evaluation of our bid, we agree to furnish the same in time to your satisfaction.

4. **Bid Price**

We declare that our Bid Price is for the entire scope of the work as specified in the RFP. These prices are indicated at Price Bid attached with our bid as part of the Bid.

We understand you are not bound to accept any tender you receive.

We hereby declare that our bid is made in good faith, without collusion or fraud and the information contained in the bid is true and correct to the best of our knowledge and belief.

We understand that our bid is binding on us and that you are not bound to accept a bid you receive.

Thanking you,

We remain,

Yours sincerely,

Authorized Signature:

Name and Title of Signatory:

Name of Firm:

Address:

12.7 Annexure: G-7 - Price Bid Format

12.7.1 Abstract of Cost Components

#	ITEM	Cost (INR)	Tax (INR)	Total Price (INR)
1	**CAPEX (C)**			
2	**OPEX (O)**			
3	**Implementation Cost (I)**			
TOTAL (O+C+I):				
TOTAL IN WORDS:				

Note:

- *OPEX (O) cost cannot be less than the CAPEX (C)*

12.7.1.1 CAPEX (C)

#	S-NOC Components	Unit	Qty	Unit Price including 1 year warranty/support	Cost (INR)	Tax (%)	Total Tax (INR)	Total Cost (INR)
	IT Infrastructure (CA)							
1.	Physical server: x-86 blade/rack servers (minimum 2 processor, 16 core/processor, 2.0 Ghz, Minimum 256 Gb RAM) - for Active Directory, Backup, other management servers - 2 no's - for NMS, OSS - 3 no's	No's	5					
2.	Blade enclosure (if applicable)	No's	As required					
3.	SAN Storage - 15 TB usable and scalable upto 100TB usable	No's	1					
a.	Additional storage disks for scalability	TB	10					

#	S-NOC Components	Unit	Qty	Unit Price including 1 year warranty/support	Cost (INR)	Tax (%)	Total Tax (INR)	Total Cost (INR)
4.	SAN Switch - 24 ports scalable upto 48 ports	No's	2					
5.	Tape Library along with tape cartridges	No's	1					
6.	Backup solution - volume based	TB	15					
7.	Intelligent Racks	No's	6					
8.	Internet routers	No's	2					
9.	Firewall	No's	2					
10.	L3 Aggregation/Spine Switch	No's	2					
11.	L3 Access/Leaf Switch – Type 1	No's	2					
12.	L3 Access/Leaf Switch – Type 2	No's	2					
13.	LAN passive components including Cabling for the entire SNOC Area	Set	1					
14.	Windows Server OS Data Center Edition (Latest version)	No's	1					
15.	Windows Server OS Standard Edition (Latest version)	No's	As required					
16.	Linux Server Enterprise Edition (Latest version)	No's	As required					
17.	Any Other Software for Virtualization	No's	As required					
18.	NMS & OSS	Set	1					
19.	End Point Protection Solution	No's	1					
a.	Licenses for Physical Server (Windows)	No's	As required					
b.	Licenses for Physical Server (Linux)	No's	As required					
c.	Licenses for Virtual Server (Windows)	No's	As required					
d.	Licenses for Virtual Server (Linux)	No's	As required					

#	S-NOC Components	Unit	Qty	Unit Price including 1 year warranty/support	Cost (INR)	Tax (%)	Total Tax (INR)	Total Cost (INR)
20.	Desktop/Laptop, Telephone Hand Set, Automatic Call distributer, etc.	No's	For minimum of 6 persons					
21.	Any Other IT components (please specify)	Unit	As required					
Non-IT (CB)								
22.	Civil & Interior Works (Including Brick work, masonry work, painting, diesel storage tank, Partition, False floor, Raised Floor, False ceiling, Water proofing, etc.	Set	1					
23.	Electrical Cabling (including electrical panel, Earthing, NOC internal electrical wiring, DB, Switchgears, UPS, DG Set, all NOC Areas- for 12 racks, Lighting & fixtures, etc.)	Set	1					
24.	Generator Set (Each 150 KVA)	No's	2					
25.	UPS (modular) for the Server Farm Area for 12 racks and Auxiliary areas; 40 kVA with VRLA battery and minimum 30 Min. backup on full load	No's	2					
26.	Precision Air Conditioning System for the Server Farm Area as per the specifications - 9 TR	No's	2					
27.	Comfort Air Conditioning for the Auxiliary Area as per the specifications- ~ 10 TR	Set	1					
28.	Fire Suppression and Detection System (for all Areas)	Set	1					
29.	VESDA System (for all Areas)	Set	1					

#	S-NOC Components	Unit	Qty	Unit Price including 1 year warranty/support	Cost (INR)	Tax (%)	Total Tax (INR)	Total Cost (INR)
30.	Water Leak Detection System (for all Areas)	Set	1					
31.	Access Control System (for all Areas)	Set	1					
32.	IP CCTV System (for all Areas)	Set	1					
33.	Public Address System (for all Areas)	Set	1					
34.	Fire Proof Enclosure for Media Storage	Set	2					
35.	Rodent Repellent System (for all Areas)	Set	1					
36.	Fire extinguisher	Set	1					
37.	Building Management Solution (for the DC Area, as well as for rest of the floor)	Set	1					
38.	Video Wall (3x3) with Controller	Set	1					
39.	Any Other (please specify)*		1					
	Total CAPEX (CA+CB)							
Total CAPEX in Words :								

12.7.1.2 OPEX (O)

#	S-NOC Components	Unit	Qty	Warranty/ Support cost for 2nd year (INR)	Warranty/ Support cost for 3rd year (INR)	AMC/ Support cost for 4th year (INR)	AMC/ Support cost for 5th year (INR)	AMC/ Support cost for 6th year (INR)	Tax (%)	Total Tax (INR)	Total AMC/ Support Cost (INR)
IT Infrastructure (OA)											

#	S-NOC Components	Unit	Qty	Warranty/ Support cost for 2nd year (INR)	Warranty/ Support cost for 3rd year (INR)	AMC/ Support cost for 4th year (INR)	AMC/ Support cost for 5th year (INR)	AMC/ Support cost for 6th year (INR)	Tax (%)	Total Tax (INR)	Total AMC/ Support Cost (INR)
1.	Physical server: x-86 blade/rack servers (minimum 2 processor, 16 core/processor, 2.0 Ghz, Minimum 256 Gb RAM) - for Active Directory, Backup, other management servers - 2 no's - for NMS, OSS - 3 no's	No's	5								
2.	Blade enclosure (if applicable)	No's	As required								
3.	SAN Storage - 15 TB usable and scalable upto 100TB usable	No's	1								
a.	Additional storage disks for scalability	TB	10								
4.	SAN Switch - 24 ports scalable upto 48 ports	No's	2								
5.	Tape Library along with tape cartriges	No's	1								
6.	Backup solution - volume based	TB	15								
7.	Intelligent Racks	No's	6								
8.	Internet routers	No's	2								

#	S-NOC Components	Unit	Qty	Warranty/ Support cost for 2nd year (INR)	Warranty/ Support cost for 3rd year (INR)	AMC/ Support cost for 4th year (INR)	AMC/ Support cost for 5th year (INR)	AMC/ Support cost for 6th year (INR)	Tax (%)	Total Tax (INR)	Total AMC/ Support Cost (INR)
9.	Firewall	No's	2								
10.	L3 Aggregation/Spine Switch	No's	2								
11.	L3 Access/Leaf Switch – Type 1	No's	2								
12.	L3 Access/Leaf Switch – Type 2	No's	2								
13.	LAN passive components including Cabling for the entire SNOC Area	Set	1								
14.	Windows Server OS Data Center Edition (Latest version)	No's	1								
15.	Windows Server OS Standard Edition (Latest version)	No's	As required								
16.	Linux Server Enterprise Edition (Latest version)	No's	As required								
17.	Any Other Software for Virtualization	No's	As required								
18.	NMS & OSS	Set	1								
19.	End Point Protection Solution	No's	1								
a.	Licenses for Physical Server (Windows)	No's	As required								
b.	Licenses for Physical Server (Linux)	No's	As required								

#	S-NOC Components	Unit	Qty	Warranty/ Support cost for 2nd year (INR)	Warranty/ Support cost for 3rd year (INR)	AMC/ Support cost for 4th year (INR)	AMC/ Support cost for 5th year (INR)	AMC/ Support cost for 6th year (INR)	Tax (%)	Total Tax (INR)	Total AMC/ Support Cost (INR)
c.	Licenses for Virtual Server (Windows)	No's	As required								
d.	Licenses for Virtual Server (Linux)	No's	As required								
20.	Desktop/Laptop, Telephone Hand Set, Automatic Call distributer, etc.	No's	For minimum of 6 persons								
21.	Any Other IT components (please specify)	Unit	As required								
Non-IT (OB)											
22.	Civil & Interior Works (Including Brick work, masonry work, painting, diesel storage tank, Partition, False floor, Raised Floor, False ceiling, Water proofing, etc.	Set	1								
23.	Electrical Cabling (including electrical panel, Earthing, NOC internal electrical wiring, DB, Switchgears, UPS, DG Set, all NOC Areas-for 12 racks, Lighting & fixtures, etc.)	Set	1								

#	S-NOC Components	Unit	Qty	Warranty/ Support cost for 2nd year (INR)	Warranty/ Support cost for 3rd year (INR)	AMC/ Support cost for 4th year (INR)	AMC/ Support cost for 5th year (INR)	AMC/ Support cost for 6th year (INR)	Tax (%)	Total Tax (INR)	Total AMC/ Support Cost (INR)
24.	Generator Set (Each 150 KVA)	No's	2								
25.	UPS (modular) for the Server Farm Area for 12 racks and Auxiliary areas; 40 kVA with VRLA battery and minimum 30 Min. backup on full load	No's	2								
26.	Additional modules for scalability	kVA	40								
a.	Precision Air Conditioning System for the Server Farm Area as per the specifications - 9 TR with N+1 redundancy	No's	2								
27.	Comfort Air Conditioning for the Auxiliary Area as per the specifications- ~ 10 TR	Set	1								
28.	Fire Suppression and Detection System (for all Areas)	Set	1								
29.	VESDA System (for all Areas)	Set	1								
30.	Water Leak Detection System (for all Areas)	Set	1								
31.	Access Control System (for all Areas)	Set	1								

#	S-NOC Components	Unit	Qty	Warranty/ Support cost for 2nd year (INR)	Warranty/ Support cost for 3rd year (INR)	AMC/ Support cost for 4th year (INR)	AMC/ Support cost for 5th year (INR)	AMC/ Support cost for 6th year (INR)	Tax (%)	Total Tax (INR)	Total AMC/ Support Cost (INR)
32.	IP CCTV System (for all Areas)	Set	1								
33.	Public Address System (for all Areas)	Set	1								
34.	Fire Proof Enclosure for Media Storage	Set	2								
35.	Rodent Repellent System (for all Areas)	Set	1								
36.	Fire extinguisher	Set	1								
37.	Building Management Solution (for the DC Area, as well as for rest of the floor)	Set	1								
38.	Video Wall (3x3) with Controller	Set	1								
39.	Any Other (please specify)*		1								

*Please add additional servers, network devices, software licenses required for the proposed solution by the bidder.

Manpower Cost (OC) in INR													
Sl No.	Resource	Unit	Qty	Cost Per Resource	1st Year Cost	2nd Year Cost	3rd Year Cost	4th Year Cost	5th Year Cost	6th Year Cost	Tax (%)	Total Tax (INR)	Total Cost
1	Project Manager	No's	1										
2	NOC Expert	No's	1										
3	Network cum System Admin	No's	1										

Manpower Cost (OC) in INR													
Sl No.	Resource	Unit	Qty	Cost Per Resource	1st Year Cost	2nd Year Cost	3rd Year Cost	4th Year Cost	5th Year Cost	6th Year Cost	Tax (%)	Total Tax (INR)	Total Cost
4	Helpdesk tech. Support	No's	6										

Total OPEX (O) = OA+OB+OC (INR)	
Total OPEX in Words :	

12.7.1.3 Implementation Cost (I)

#	Item	Cost (INR)	Tax (%)	Total Tax (INR)	Total Cost (INR)
1	Implementation Cost				
Grand Total in words:					

12.7.2 Detailed Breakup of Software Components

Module-wise Price Breakup for NMS, OSS Licenses (Total Cost should be in line with cost quoted in Price Bid format)						
Sl. No.	Modules	Unit	Qty	Cost (INR)	Tax (INR)	Total Cost (INR)
1	NMS Module 1 with 1 Year Support	No's	As required			
2	NMS Module 2 with 1 Year Support	No's	As required			
3	NMS Module 3 with 1 Year Support	No's	As required			
..	…..	No's	As required			
..	…..	No's	As required			
..	OSS Module 1 with 1 Year Support	No's	As required			
	OSS Module 2 with 1 Year Support	No's	As required			
	…..	No's	As required			

Module-wise Price Breakup for NMS, OSS Licenses (Total Cost should be in line with cost quoted in Price Bid format)						
Sl. No.	Modules		Unit	Qty	Cost (INR)	Tax (INR)	Total Cost (INR)
	…..		No's	As required			
Total Cost for NMS and OSS with 1 year of support							

Module-wise Price Breakup for NMS, OSS Licenses (Total Cost should be in line with cost quoted in Price Bid format)										
Sl. No.	Modules	Unit	Qty	2nd year (INR)	3rd Year (INR)	4th year (INR)	5th Year (INR)	6th Year (INR)	Tax (%)	Total Tax (INR)
1	NMS Module 1 with yearly support cost	No's	As required							
2	NMS Module 2 with yearly support cost	No's	As required							
3	NMS Module 3 with yearly support cost	No's	As required							
..	…..	No's	As required							
..	…..	No's	As required							
..	OSS Module 1 with yearly support cost	No's	As required							
..	OSS Module 2 with yearly support cost	No's	As required							
..	…..	No's	As required							

Module-wise Price Breakup for NMS, OSS Licenses (Total Cost should be in line with cost quoted in Price Bid format)										
Sl. No.	Modules	Unit	Qty	2nd year (INR)	3rd Year (INR)	4th year (INR)	5th Year (INR)	6th Year (INR)	Tax (%)	Total Tax (INR)
..	.....	No's	As required							
Total Cost for NMS and OSS support for 2nd to 6th year										

Module-wise Price Breakup for Additional Licenses for NMS, OSS										
Sl. No.	Modules	Unit	Qty	1st year (INR)	2nd Year (INR)	3rd Year (INR)	4th year (INR)	5th Year (INR)	6th Year (INR)	Tax (%)
1	NMS Module 1 with yearly support cost	No's	1							
2	NMS Module 2 with yearly support cost	No's	1							
3	NMS Module 3 with yearly support cost	No's	1							
..	.....	No's	1							
..	.....	No's	1							
..	OSS Module 1 with yearly support cost	No's	1							
..	OSS Module 2 with yearly support cost	No's	1							
..	.....	No's	1							
..	.....	No's	1							

12.8   Annexure: G-8 - Proposed Manpower Details

Proposed Manpower Details

Sl. No.	Role	Name of Resources	Qualification, Relevant Experience & Certifications

CV Format for Manpower

The format for submission of CVs is the following:

Position Proposed –

Name –

Present Designation –

Years with the firm –

Nationality –

Areas of Specialization –

Certifications –

DoB –

Key experience suitable to the proposed assignment –

Name of Assignment	
Year	
Location	
Client	
Main project features	
Position held	
Activities performed	

Education/Training Programs –

Academic Qualifications			
Degree	*Specialization*	*Year of Passing*	*Institute*

(Under this heading, summarize college/ university and other specialized education of staff member, giving names of colleges, dates and degrees obtained)

Experience –

(Under this heading, list of positions held by staff member since graduation, giving dates, names of employing organization, title and duration of positions held and location of assignments. For experience in last ten years also give types of activities performed and Owner references, where appropriate.)

Duration and dates of entry and exit	
Employer	
Position held	
Key Duties Assigned:	
Duration and dates of entry and exit	

Signature (Concerned employee):

Counter Signature of Authorized Signatory:

Full Name:

Address:

Date:

Note: 1. certified supporting documents to be enclosed evidencing the above criteria of such personnel mentioned above.

12.9 Annexure: G-9 - Performance Bank Guarantee

Performance Bank Guarantee

To The General Manager (Admin)

Odisha Computer Application Centre

Plot No. - N-1/7-D, Acharya Vihar

P.O.-RRL, Bhubaneswar - 751013

EPBX: 0674-2567280/2567064/2567295 Fax: +91-0674-2567842

Whereas, << name of the agency and address >> (hereinafter called "the Bidder") has undertaken, in pursuance of contract no. << insert contract no. >> dated. <<Insert date >> to provide Implementation services for << name of the assignment >> to OCAC (hereinafter called "the beneficiary") And whereas it has been stipulated by in the said contract that the Bidder shall furnish you with a bank guarantee by a recognized bank for the sum specified therein as security for compliance with its obligations in accordance with the contract; And whereas we, << name of the bank >> a banking company incorporated and having its head /registered office at << address of the registered office >> and having one of its office at << address of the local office >>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 Rs.<< insert value >> (Rupees << insert value in words >> only) and we undertake to pay you, 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 Rs.<< insert value >> (Rupees << insert value in words >> only) 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 Bidder 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 Bidder shall in any way release us from any liability under this guarantee and we hereby waive notice of any such change, addition or modification.

This Guarantee shall be valid until << Insert Date >>) notwithstanding anything contained herein:

I. Our liability under this bank guarantee shall not exceed Rs<< insert value >> (rupees << insert value in words >> only).

II. This bank guarantee shall be valid up to << insert expiry date >>)

III. It is condition of our liability for payment of the guaranteed amount or any part thereof arising under this bank guarantee that we receive a valid written claim or demand for payment under this bank guarantee on or before << insert expiry date >>) failing which our liability under the guarantee will automatically cease.

(Authorized Signatory of the Bank)

Seal

Date