GOVERNMENT OF INDIA
(Ministry of Home Affairs)
DIRECTORATE GENERAL
CENTRAL RESERVE POLICE FORCE
EAST BLOCK-7, SEC-1, R.K. PURAM, NEW DELHI-110066

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No. B.V-7/2019-20-C (QRs) Dated, the 14 February'2020

To

The Directorate General
Assam Rifles
Shillong-793010
Email: hqdgar@hotmail.com

Subject: **Reg QRs/TDs of "Records Integration and Up-gradation".**

Please find enclosed here with QRs and TDs in respect of "Records Integration and Up-gradation" as per Annexure-A & Annexure-B respectively duly approved by the competent authority for further necessary action.

Encl: (QRs & TDs of "Records Integration and Up-gradation").

{Harjinder Singh}
DIG (Equipment)
Directorate General, CRPF

TECHNICAL SPECIFICATION

Records Integration and complete Upgrade

SCOPE OF WORK

S. No	Particulars	Compliance	Remarks
A	**Introduction**		
1.	The technology used and the system is obsolete as its already more than 5 years and no upgrade has happened. Newer technologies can utilize hardware resources in a more optimum way. Web technologies available have a very high IOPS compared to the existing one. Indexing for DB is a major issue and reporting happens from the same DB as Read/Write Operations. No Data security measures exists on Data Level and Application Level. No Graphical Dashboard exists. With available data, system is not performing any analysis which will make the decision ease for the management. System is also not providing any considerable analytics.		
B	**Proposed System**		
2.	The System will have an open API model to integrate all existing application such ARGIS, ARESA, CPBO and UPAO.		
3.	A centralized Data Repository will ensure that all data are synced with each other and is instantly available.		
4.	A central Repository will also enable central policy management for all functional applications.		
5.	Entry module for Units should be based on latest technologies and Web Services.		
6.	The system will be optimized for low bandwidth factor for remote locations.		
7.	Replicated DB will be provided on the locations so that reporting will be accessed with an ease.		
8.	Graphical dashboard for admin will be available for quickly visualizing details like Vacancies available and shows the people who are qualified for the respective criteria.		
9.	Graphical Dashboard will also give count of posting base don locations, period , ranks etc.		
10.	System will provide details for probable candidates for a selected vacancy based on various policies mentioned in the policy master.		
11.	System will provide analytics based on the location of a unit and also suggest how to improve strength.		
12.	System will provide suggestion where recruitment rallies should be conducted based on the previous locations where rallies have been conducted.		
13.	System will also suggest skillset available.		
C	**Deployment in Cloud Environment and Integrating with other Applications.**		

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14.	*Creating a cloud environment will allow optimum delivery* of services and various locations. Record Cloud will enable administrators to shift Infrastructure on the fly to whichever department wherever required.		
15.	Cloud will also enable easy management of various parameters like terminals, servers, devices, signatures etc.		
16.	Integrating it with services like Data Security to keep transparently encrypted at all times, Use PKI to enable Digital Signing of All Documents using CCA India approved tokens and allow login and access privileges based on Single Sign on and Centralized identity and access management.		
17.	Integrating it with ARMS will allow auto triggering of emails to concerned departments like when a posting order is processed an email will be sent to the locations where SOS/TOS is about to occur.		
18.	Integrating Recruitment rally will enable easy generation of requirements, generation of rally locations, auto storing of records for selected candidates through ARTC&s.		
19.	*A Consolidated Record Sheet can be accessed by the* user from his unit using any terminal or Information Kiosk. The Document will consist of his complete record including his Part II Orders, Salary Statements etc.		
20.	UHD RFID Cards will allow individuals to login. The cards can be linked with PKI to provide digital signatures to all individuals and they can use the cards to login into terminals, access their details from kiosk, or do their day to day work based on their access rights.		
21.	Data Security in form of Authentication, Authorization, Encryption and Audit logs will be available for all transactions including that of the administrator.		
22.	A Centralized policy manager will enable creating of all policies centrally which can be used by various concerned departments like a change in pay and allowances policy, changes in subscription policy, changes in OTTB, changes in porting policy, promoting policy etc.		
23.	The System will Automatically on generation of Pension documents will transfer all details from effective to non-effective DB. This will ensure performance of functional and active DB as non-effective data will not be processed *every time.*		
24.	Physical documents can be stored with RFID based tags. This will enable locating the file very easy using Tag Finders and also on the system. The racks can be configured with RFID readers and will automatically detect any file available in the specified rack.		
25.	A simplified search option will be provided which will enable operators and users to find details by just typing a keywork and based on their access privileges the system will show search results.		
26.	A detailed MIS for various activities like details of individuals who retired between two dates, personnel belonging to a state, retired on a particular rank etc. will be available.		

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27.	A case management module will help in keeping NE but active files in a separate active zone for example files *under litigation etc.*		
28.	The entire system should be deployed on ARWAN and should be accessible over ARWAN to all locations of AR. The data accessibility has to be optimized for minimum bandwidth consumption using Caching at Local Systems and server side processing.		
29.	The entire system will be deployed centrally through which each branch can utilize their computing power of their localized system and should get the benefits of the centralized Engineered Storage.		
30.	The system should store a Centralized Database which is *to be used by all the modules for different branches.*		
31.	The system should store all data pertaining to all automations related to records and will be accessed by various automation systems through a central console.		
32.	The system should just take one entry and the same data should be replicated to all other sections of records instantly.		
33.	Data verification will be done by the one single branch or user and same verified data will also be accessible to all other branch.		
34.	The system should give alert to the user if the personnel data is not verified properly and until the process is not completed *the system should not proceed to further* process.		
35.	The system should check and validate duplicity of the data.		
36.	The system should validate personnel data so that the data should only be saved when the mandatory fields are filled properly.		
37.	The system should perform background audit of each and every entries or transaction made by the user. The audit reports should be available to the System Administrator as and when required and for any specific period and time.		
38.	The system should also track the login details of the user and should generate a login audit report. The Login should be configured with AR Access Key for authentication, encryption and signing if required.		
39.	The system should have common database pertaining data to Posting, Promotion so that systems can instantly use them as and when needed.		
RECORD MODULES			
40.	The system should store master unit details.		
41.	The system should store master ranks details.		
42.	The system should store master branch details.		
43.	The system should store master Qualification Types		
44.	The system should store master cast category.		
45.	The system should store master religion details.		
46.	The system should store master pay scale details.		
47.	The system should store master pay matrix details.		
48.	The system should store master leave category details.		
49.	The system should store master allowances details.		
50.	The system should store master deductions details.		
51.	The system should store master award type details.		
52.	The system should store master state details.		
53.	The system should store master nationality details.		
54.	The system should be capable of Storing the Personal *Details*		

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55.	The system should be capable of Storing the Unit Details		
56.	The system should be capable of Storing the Enrollment Details		
57.	The system should be capable of Storing the Education Details		
58.	The system should be capable of Storing the Address Details		
59.	The system should be capable of Storing the Martial Details		
60.	The system should be capable of creating a Create Level User who will be responsible for BRO Creation		
61.	The system should be capable of creating a Verify Level User who will be responsible for Verifying the BROs Created		
62.	The system should be capable of creating a Authorize Level User who will be responsible for Authorizing the BROs verified		
63.	The system should allow the Create level user to create BROs related to Desertion		
64.	The system should allow the Create level user to create BROs related to Dismiss Details		
65.	The system should allow the Create level user to create BROs related to Posting		
66.	The system should allow the Create level user to create BROs related to Separation		
67.	The system should allow the Create level user to create BROs related to Strength increase		
68.	The system should allow the Create level user to create BROs related to Strength increase		
69.	The system should allow the Create level user to create BROs related to Allowance		
70.	The system allow the Create level user to create BROs related to Awards/Medals		
71.	The system should allow the Create level user to create BROs related to Child Education		
72.	The system should allow the Create level user to create BROs related to Financial Assistance		
73.	The system should allow the Create level user to create BROs related to Hostel		
74.	The system should allow the Create level user to create BROs related to Leave entry		
75.	The system should allow the Create level user to create BROs related to Officiating Pay		
76.	The system allow the Create level user to create BROs related to Pay Fixation		
77.	The system should allow the Create level user to create BROs related to Promotion		
78.	The system should allow the Create level user to create BROs related to Family		
79.	The system should allow the Create level user to create BROs related to Family Planning		
80.	The system allow the Create level user to create BROs related to Former Service		
81.	The system allow the Create level user to create BROs related to Hospitalization		
82.	The system should allow the Create level user to create BROs related to Injuries		
83.	The system should allow the Create level user to create BROs related to Medical Categorization		
84.	The system should allow the Create level user to create BROs related to Miscellaneous Details		
85.	The system should allow the Create level user to create		

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	BROs related to Punishment		
86.	The system should allow the Create level user to create BROs related to Qualification		
87.	The system should allow the Create level user to create BROs related to Review of service		
88.	The system should allow the Create level user to create BROs related to Cancellation of BROs		
89.	The system allow the Create level user to create BROs related to Casualty Amendment		
90.	The system should be capable of Uploading BROs Created on the Server Online		
91.	*The system should allow the Create level user to Check* BRO Details		
92.	The system should allow the Verify level user to Verify BRO Details		
93.	The system should allow user to capture and generate reports based on the following enclosures:		
94.	Enclosure-A (Details of Group I to Group IV part II order format)		
95.	Enclosure-B (Report format for part II order)		
96.	Enclosure-C (Details of ALL PROMOTION CADRE PART II ORDER format)		
97.	Enclosure-D (Details of Assam Rifles Ex- Servicemen association (ARESA))		
98.	Enclosure-E (Details of Conveyance Adv Scheme format)		
99.	Enclosure-F (Details of Loan Application Form For Grant Of House Building Loan From ARGIF)		
100.	Enclosure-G (Details of Proposal For Introduction Of Computer Advance Scheme From ARGIS Fund For Purchase Of Computer For ARGIS Members (AR CADRE OFFRs, ARMOs, JCOs AND OR))		
101.	Enclosure-H (Details of Marriage Loan Scheme From ARGIS Fund To Meet The Expenditure On Marriage Of Wards (Daughter/Son) Of ARGIS Members (AR CADRE OFFRs, ARMOs, JCOs AND OR))		
102.	Enclosure-J (Details of Education Loan Scheme From ARGIS To Meet The Expense On Higher Education For Wards And Wives Of ARGIS Members (AR CADRE OFFRs, ARMOs, JCOs AND OR))		
103.	Enclosure-K (Details of History of Service)		
104.	Enclosure-L (Details of Family Pension)		
105.	Enclosure-M (Details of Receipt and Dispatch)		
106.	Enclosure-N (Occurrences and Abbreviation)		
107.	Enclosure-P (Details of Leave formats)		
108.	Enclosure-Q (Format for Daily and monthly Feeding Str Unit & Att Personal)		
109.	Enclosure-R (Details of Online Posting Requisition Module)		
110.	Enclosure-S (Details of Registers Online and reports)		
111.	Enclosure-T (Format for Ex-Servicemen Contributory Health Scheme (ECHS) membership form)		
112.	Enclosure-U (Details of Annual Confidential Report forms)		
113.	Enclosure-V (Details of Statement Showing Fixation Of Pay In Terms Of Central Civil Services (Revised Pay) Rules, 2016		
114.	Enclosure-W (Details of Individual profile Card, Posting In/Out Records register: Teaching Staff & CIV Para Med Staff)		
115.	Enclosure-X (Formats for Causality form, Recruit Progress Chart, Leave Account form, Agreement format, Medical Categorization, wound & Injuries form, Absence, Desertion, rejoining Form, Service Non-reckonable		

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	towards pension and Gratuity form, Hospital admission/ Transfers/ Discharges form, Former Service, Records of *Punishment, regimental and Instructional Appointments* form, Posting and transfer forms, Promotion details, Qualification details, Home address details, Records of particulars		
116.	Enclosure-Y (Details of Non payment of insurance Cover by SBI/Banks, Advisory on DSP Account)		
117.	Enclosure-Z (Details of Death cases)		
118.	Enclosure-AA (Online Grievances form)		
119.	Enclosure-AB (Details of Change Request & Enhancement)		
CPBO INTEGRATION			
120.	The system should seamlessly gather data from record and PAO module for bill processing.		
121.	CPBO should only generate the final pay slip of the individuals after the PAO generates the credits statement.		
122.	CPBO can automatically update bill information based on new rank and location where the personnel is posted.		
123.	The system should automatically display provident fund data to CPBO instantly when the data is updated from the GPF section.		
124.	The system should have multi-layered checks to ensure that only eligible individuals pay slips are generated. The slips should have a cross reference from the PAY generated Credit Statement.		
125.	The system should automatically calculate leave encashment of the personnel when the person retires from Assam Rifles		
126.	The system should be able to verify the data entered by the CPBO.		
127.	The system should be able to credit the bill to the individual's account upon successful verification.		
128.	The system should be able to generate credit report for payment after the verification of final bills received from CPBO.		
129.	**Requirement Analysis**		
	Analyse user requirements to arrive at a proposed solution for the system in terms of Software characteristics. This Phase is initiated on approval of a project Proposal. The deliverables this Phase define the proposed System in enough details to justify the recommendations presented and to prepare an implementation plan. This Phase may include following activities: (i) Examine the current System (ii) Define System context and objectives of the proposed System (iii) Build Conceptual Data Model (iv) Build Conceptual Process Model (v) Establish basic System concepts by Conceptualizing Prototype. Prepare a User Requirement Specification and System Requirement Specification and get it approved.		
130.	**High Level Design**		
	Define the overall functioning of the System and establish the Functional and Physical rules and design guidelines. The functional definition of the System is presented in the documentation in a manner understandable to the user as well as development Team. This Phase may include following activities: (i) Build Functional Data Model		

	(ii) Build Functional Process Model (iii) Define System performance criteria (iv) Define Architectural Standards (v) Build Prototype Prepare Functional Specifications for Unit Process		
131.	**Low Level Design**		
	Do the detailed design of the Software components and write specifications of various software components based on High Level Design. The Function design documentation should allow the user to approve the description of each Unit Process and contain sufficient details to allow the development Team to process with System Construction activities. The Phase includes following activities: (i) Build Physical Data Model (ii) Build Physical Process Model Write Specifications for Unit Process		
132.	**Construction, Compilation and Testing**		
	Produce Unit tested Software components. This include following activities: (i) Program Physical Data Model (ii) Program Physical Process Model (iii) Prepare User guides and documentation (iv) Conduct Unit Testing with demo data.		
133.	**Training, finalizing implementation.**		
	Providing Training on all modules as per plan and schedule provided by HQ DGAR. The phase will be the final phase which will consist of the following : (i) On Hand Training along with implementation. (ii) Once the users are confident a final phase of training will be provided. (iii) Package will be handed over in running condition.		
134.	**Documentation**		
	Providing Detailed documentation for managing system technically and at User Level. Documentation to Include Technical Documentation & User Manual for the Entire Developed System.		
135.	The Platform should be platform independent and should run on Linux.		
136.	The system Should run on Virtualized environment.		

2. Hyper Convergent Infrastructure with Licenses

S. No.	Parameter	Specification	Compliance (Yes/ No)	Remarks
1	Make/Brand	HCI appliance OEM shall be in the Leaders category consecutively in last two published Gartner's Magic Quadrant reports on "Hyperconverged Infrastructure".		
2	Hyper Converged Appliance	Hyper converged appliance, which comes Factory Installed with various software including Software Defined Storage and hypervisor. SDS should NOT be top-up or add-on software license bundled on generic x86 server. It should be an integral part of appliance.		
3		Proposed HCI Appliance should be in all flash drive configuration using not more than 2TB capacity drives. Usable capacity per-node should be after all overheads in respect of core/memory/storage being		

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		used for deduplication, compression and optimization.		
4		Solution must be able to integrate storage, compute, networking, hypervisor, real-time deduplication, compression, and optimization along with powerful data management, data protection, and disaster recovery capabilities in a standard x86 server building block.		
5		Nodes should offer Storage Features such as De-duplication and Compression. Replication / backup license(s) should be provided for the full capacity of the system. Storage performance monitoring software should be included. Future capacity growth shall not warrant any additional software license on the storage landscape.		
6		Proposed hardware must be capable to de-duplicate, compress & optimize all data inline, in real-time with fine data granularity of minimum 8KB data blocks.		
7		Solution should ensure minimum impact to production workloads and guaranteed CPU and RAM available to user applications while doing global dedupe, compression and optimization.		
8		The Hypervisors are to be installed in the nodes along with Cloud / Virtualization Management. The management node requirements, if any should be included by default and management node to be considered outside of the HCI nodes. All offered licenses for virtualization manager are to be of non-embedded type and should have no limitation of functionality.		
9		Should also have capability to use Network Virtualization (SDN).		
10	Nodes Required	Minimum 4 (Four)		
11	Processor	Latest Generation Intel® (Skylake) Processors product family, >=3.00 GHz per Core. Populated with minimum 2 sockets per node.		
12	Total Physical Cores	72 Cores (Including all the Nodes)		
13	Processor Cache	Min. 22 MB L3 Cache		
14	Total Physical RAM	Min. 500GB DDR4. Scalability to double or more of provisioned RAM		
15	Total Usable Storage	Min. 25 TB Usable capacity post Deduplication and compression for the entire cluster in HA state. The proposed solution must be able to sustain one node failure and it should in no way affect/degrade the production services & usable resources, to the end user application.		
16	Network	Minimum 4 x 10Gb SFP+ (SR) Ethernet ports (each Node) and 4 x 1Gb RJ45 Ethernet ports (Additional ports to be configured by bidders as per their solution requirement). Additionally, Minimum 1 no		

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		1Gb RJ45 Ethernet management port.		
17	Data Protection Features	Backup functionality as an integrated feature or separate server / software license to be offered.		
18		Backup must be an independent copy of source Virtual Server and must allow restore of deleted or corrupted source Virtual Server		
19		Replication across separate data centre with the ability to carry simultaneous out bi-directional replication between two data centres and with the ability to replicate Any-to-Any in a Mesh Data Centre deployment of more than 3 DC's.		
20		The ability to define backup policy per data store, a group of VMs or specific VM		
21		Data Protection should have RPO of 10 minutes for local backups		
22		The ability to execute backup tasks during office hours without impacting to production workloads		
23		Data loss protection against single node failure in cluster		
24		The proposed solution must be able to provide backup reports for audit purpose		
25	Hypervisor	VMWare ESX Hypervisor needs to be proposed with the HCI Appliance for this requirement.		
26		Proposed solution must be able to support the following VM-Centricity and Mobility feature:		
27		i) Backups for specific VMs and Clone specific VMs		
28		ii) Ability to move specific VMs between data centres		
29		iii) VM-level backup instead of forcing protection at the data store or protection domain level		
30	Data Recovery Features	Data recovery should be independent of source Virtual Server		
31		Solution should provide a backup catalogue to allow any Virtual Server to be recovered to any specific point-in-time		
32		Data recovery process should be simple with an RTO in minutes		
33	Storage Controller in Nodes	SAS RAID controller with minimum 4GB cache for RAID 0, 1 and 5		
34	Rack Unit	Minimum 2U or higher rack unit (RU) configuration Appliance with Sliding Rails and Cable Management Arm.		
35	Redundancy & Business Continuity	Dedicated non-shared Redundant platinum rated AC power supplies on each of the proposed HCI appliance nodes and should be able to sustain single power supply failure per-node.		
36		Solution should be able to sustain one node failure per cluster.		
37		Solution should be able to sustain 1 NIC port failure per node.		
38		During a single component failure of any type in any node, production services should not be affected or degraded in		

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		anyway.		
39		Solution should be able to sustain multiple points of failure with no loss of functionalities or data.		
40		Availability of Data Store with zero RPO for all VMs is to be ensured in the event up to 2 Node failure for the stretch clusters at D3 domain.		
41		In the event of a Hard drive failure, appliance should not be affected and virtual machines should continue to run on the appliance. Drive replacement should be seamless to virtual machines hosted on the appliance.		
42		Solution should be able to sustain 2 SSD Disk failure per physical node, and 1 HDD failure simultaneously in each node of cluster across all nodes in cluster.		
43	Disaster Recovery Features	The solution must provide a simple failover operation.		
44		The solution must allow changing of IP address of recovered Virtual Servers to match target data centre.		
45		The solution should allow changing Virtual Server settings (example vCPU, vRAM, vSwitch) if required		
46		The solution must allow the option to test DR failover to separate network with no impact to production workloads		
47		The solution should have feature to assist in failback process to Primary datacentre		
48		Hyperconverged solution should have a guaranteed local cluster backup time of 1 minute		
49		Data Protection should have a minimum RPO of 10 minutes for local backups		
50		Data recovery process should be simple with an RTO in minutes		
51	Manageability	The ability for a single administrator to manage all aspects of the Hyper-convergence from within the Virtualization Manager or server OEM browser based software for all sites.		
52		Globally manage Backup Policies per Data store or per VM.		
53		VM-centric management through a single pane of glass via the virtualization manager or server OEM browser based software.		
54		Programmatic/API interface to enable automated tasks like failover/failback.		
55		System remote management should support browser based graphical remote console along with Virtual Power button, remote boot using USB/CD/DVD Drive. It should be capable of offering upgrade of software and patches from a remote client using Media/image/folder.		
56		Should help provide proactive notification of actual or impending component failure alerts on critical components like CPU, Memory and HDD.		

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57		System should support embedded remote support to transmit hardware events directly to OEM or an authorized partner for automated phone home support		
58	Scalability	Minimum scalability of 12 nodes in the same cluster.		
59		Hyper-converged solution must be able to allow in-box upgrade of CPU, RAM and storage capacity as well as scale-out expansion		
60		Hyper-converged solution should support addition of compute/access nodes to provide additional compute resources		
61	Server Security	Should maintain repository for firmware and drivers recipes in the flash drive associated to management port. This is to aid rollback or patching of compromised firmware. Should also store Factory Recovery recipe preloaded to rollback to factory tested secured firmware		
62		For firmware security, Hyperconverged system should support remote management chip creating a fingerprint in the silicon, preventing system from booting up unless the firmware matches the fingerprint. This feature should be immutable		
63	OS Support	Windows 2012 and 2016 Standard/Data Center, SUSE Enterprise Linux, RHEL 6.x, (All latest flavors of Linux and Windows) in Virtual Machines		
64	Serviceability	Proposed Nodes shall provide insights, forecasting and recommendations for quicker problem resolutions including automating case creation or alternate solution on proactive support services with proactive parts dispatch directly from OEM.		
73	Warranty	On-site Comprehensive Warranty and Service including all spares, and service offering with NBD on-site for parts as well as telephone support 24 hours.		

3. Artificial Intelligence

S. No	Description of Requirements		Compliance (Yes/No)	Remarks
1	The system should have deep learning platform providing unprecedented performance with industry leading 1 GPUs, fast GPU interconnect, high bandwidth fabric and a configurable GPU topology to match your workloads.			
2	The system should have the ability to autonomously learn, predict, and adapt using massive data sets.			
3	**Processor/Cache**			
	CPU	• 2 x Intel Xeon Scalable Processors with 3UPI links, 2.4GHz Processor base frequency		
	Cores			

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	GPU	• 20 cores with Intel HT Technology • 4 NVIDIA TESLA V100 SXM2 GPUs • 300 GB/s GPU-to-GPU NVIDIA NVLINK		
3	**System Memory** Memory Capacity Memory Type	• 12 DIMM slots • 384GB DDR4- 2666 ECC DIMM • 2666/2400/2133MHz ECC DDR4 SDRAM		
4	**SSD**	• 4 x 1.92TB		
5	**On-Board Devices** Chipset SATA Network Connectivity IPMI	• Intel C621 chipset • SATA3 (6Gbps) with RAID 0, 1, 5, 10 • Intel X540 Dual Port 10GBase-T • Support for Intelligent Platform Management Interface v.2.0		
6	**Input/Output** SATA LAN USB VGA	• 4 SATA3 (6Gbps) ports • 2 RJ45 10GBase-T ports and 1 RJ45 Dedicated IPMI LAN port • Minimum 2 USB 3.0 ports • 1 VGA port		
7	**Chassis** Form Factor	• 4U Rackmount		
8	**Expansion Slots** PCI-Express	• 4 PCI-E 3.0 x 16 slots		
9	**Drive Bays** Hot-swap	• 2 Hot-swap 2.5" SAS/SATA drive bays		
10	**Power Supply**	• 2000W Redundant Power Supplies Titanium Level		

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4. High End Switch

S. No	Specification	Compliance Yes/No	Remarks
1	**Architecture**		

a.	The switch should have at least 48 SFP+ ports , 24 1G/10G Base T ports, 8 x10 G SFP+, 8 x1 G-SFP from day-1		
b.	The Switch should support,1 RJ-45 serial console port,1 RJ-45 out-of-band management port and 1 USB 2.0 port		
c.	The switch should support dual power supply and 2 fan tray slots		
d.	The switch Shall support 1000 Base-SX, LX, LH		
e.	The switch Shall Support 10Gbase-SR,LR,LRM,ER		
f.	The switch should have 1GB flash, 4 GB SDRAM		
g.	The Switch should have 16 MB packet buffer size		
h.	The switch should have 10 Gbps Latency < 1µs (64-byte packets)		
i.	All the ports in the Switch should be 2U 19" Rack-Mountable		
j.	At least 2.5Tbps switching capacity		
k.	The switch shall have switching throughput of minimum 1900 million pps		
l.	MAC Address table size of 200,000 entries		
m.	Switch should at least support 100,000 routing entries IPv4, 50,000 entries (IPv6)		
2	**Quality of Service (QoS)**		
a.	The Switch should support Strict Priority (SP), WRR, WDRR, WFQ, SP+WRR, SP+WDRR, SP+WFQ, Configurable Buffer, Time range, Queue Shaping, CAR with 8kbps granularity		
b.	The Switch should support packet filtering at L2 (Layer 2) through L4 (Layer 4); flow classification based on source MAC address, destination MAC address, source IP (IPv4/IPv6) address, destination IP (IPv4/IPv6) address, port, protocol, and VLAN.		
3	**Data center optimized**		
a.	The Switch should have cut-through and nonblocking architecture		
b.	The switch should support up to four switches can be combined to deliver unmatched scalability of virtualized access layer switches and flatter two-tier networks and switch should support single IP management upto four Switch		
c.	The Switch should have Advanced modular operating system		
d.	The Switch should support TRILL, SPB and EVB/VEPA		
e.	The Switch should support Reversible airflow		
f.	The Switch should have Internal redundant and hot-pluggable power supplies and dual fan trays		
g.	The Switch should support for IEEE 802.1Qbb Priority Flow Control (PFC), Data Center Bridging Exchange (DCBX), IEEE 802.1Qaz Enhanced Transmission Selection (ETS), Explicit Congestion Notification (ECN) for converged FCoE, iSCSI and RoCE environments.		
h.	The Switch should support FCoE		
i.	The Switch should support Jumbo frames sizes of up to 10,000 bytes on Gigabit Ethernet and 10-Gigabit ports		
j.	The Switch should support VXLAN Support		
k.	The Switch should support VXLAN Layer 2 Gateway support for up to 4k tunnels		
l.	The Switch should support Dynamic VXLAN configuration		
m.	The Switch should support OVSDB for dynamic VXLAN configuration		
4	**Manageability**		
a.	The Switch should support ingress and egress port monitoring and traceroute and ping		

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b.	The Switch should support multiple configuration files to be stored to a flash image		
c.	The Switch should support sFlow (RFC 3176)		
d.	The Switch should support SNMP v1, v2c and v3		
e.	The Switch should support Out-of-band interface		
f.	The Switch should support Remote configuration and management		
g.	The Switch should support ISSU and hot patching		
h.	The Switch should support automatic configuration via DHCP autoconfiguration		
i.	The Switch should support NTP, SNTP and PTP		
5	**Resiliency and high availability**		
a.	The Switch shall have the capability to extend the control plane across multiple active switches making it a virtual switching fabric, enabling interconnected switches to perform as single Layer-2 switch and Layer-3 router The switch should support up to six switches can be combined to deliver unmatched scalability of virtualized access layer switches and flatter two-tier networks and switch should support single IP management upto six Switch		
b.	The Switch should support IEEE 802.1w Rapid Convergence Spanning Tree Protocol		
c.	The Switch should support IEEE 802.1s Multiple Spanning Tree		
d.	The Switch should support Virtual Router Redundancy Protocol (VRRP)		
e.	The Switch should support Hitless patch upgrades		
f.	The Switch should support Bidirectional Forwarding Detection (BFD) to enables link connectivity monitoring and reduces network convergence time for RIP, OSPF, BGP, IS-IS, VRRP, MPLS, and switch virtulisation technology		
g.	The Switch should support Device Link Detection Protocol (DLDP)		
h.	The Switch should support Graceful restart for OSPF, BGP, and IS-IS		
6	**Layer 2 switching**		
a.	The Switch should support MAC-based VLAN		
b.	The Switch should support Address Resolution Protocol (ARP) and supports static, dynamic, and reverse ARP and ARP proxy		
c.	The Switch should support IEEE 802.3x Flow Control		
d.	The Switch should support Ethernet Link Aggregation		
e.	The Switch should support support STP (IEEE 802.1D), Rapid STP (RSTP, IEEE 802.1w), and Multiple STP (MSTP, IEEE 802.1s)		
f.	The Switch should support for 4,096 VLANs based on port, MAC address, IPv4 subnet, protocol, and guest VLAN; supports VLAN mapping		
g.	The Switch should support for IGMP Snooping, Fast-Leave, and Group-Policy; IPv6 IGMP Snooping provides Layer 2 optimization of multicast traffic		
h.	The Switch should support DHCP support at Layer 2		
7	**Layer 3 services**		
a.	The Switch should support Address Resolution Protocol (ARP)		
b.	The Switch should determines the MAC address of another IP host in the same subnet; supports static ARPs; gratuitous ARP allows detection of duplicate IP addresses; proxy ARP allows normal ARP operation between subnets or when subnets are separated by a Layer 2 network		

c.	The Switch should support simplifies the management of large IP networks and supports client and server; DHCP Relay enables DHCP operation across subnets		
d.	The Switch should support for Connectivity Fault Management (IEEE 802.1AG) and Ethernet in the First Mile (IEEE 802.3AH); provides additional monitoring that can be used for fast fault detection and recovery		
8	**Layer 3 routing**		
a.	The Switch should support Virtual Router Redundancy Protocol (VRRP) and VRRP Extended		
b.	The Switch should support Policy-based routing		
c.	*The Switch should support Equal-Cost Multipath (ECMP)*		
9	**Layer 3 IPv4 routing**		
a.	The Switch should support static routes, RIP and RIPv2, OSPF, BGP, and IS-IS		
b.	*The Switch should support Border Gateway Protocol 4* (BGP-4)		
c.	Intermediate system to intermediate system (IS-IS)		
d.	The Switch should support Static IPv6 routing		
e.	The Switch should support separate stacks for IPv4 and IPv6 to ease the transition from an IPv4-only network to an IPv6-only network design		
f.	The Switch should support Routing Information Protocol next generation (RIPng) extends RIPv2 to support IPv6 addressing		
g.	The Switch should support OSPF support for IPv6, BGP-4 to support Multiprotocol BGP (MBGP), including support for IPv6 addressing, IS-IS for IPv6		
h.	The Switch should allow custom filters for increased performance and security; supports ACLs, IP prefix, AS paths, community lists, and aggregate policies		
i.	The Switch should enables link connectivity monitoring and reduces network convergence time for RIP, OSPF, BGP, IS-IS, VRRP, MPLS, and switch virtualisation technology		
j.	The Switch should Multicast Routing PIM Dense and Sparse modes		
10	**Layer 3 IPv6 routing**		
a.	The Switch should static routing, RIPng, OSPFv3, BGP4+ for IPv6, and IS-ISv6		
b.	Green IT and power		
c.	The Switch should able to shut off unused ports and utilizes variable-speed fans, reducing energy costs		
11	**Management**		
a.	The Switch should allow users to copy switch files to and from a USB flash drive		
b.	*The Switch should support Multiple configuration files* and stores easily to the flash image		
c.	The Switch should SNMPv1, v2c, and v3		
d.	The Switch should Out-of-band interface		
e.	The Switch should enable traffic on a port to be simultaneously sent to a network analyzer for monitoring		
f.	The Switch should support Remote configuration and management		
g.	The Switch should support IEEE 802.1AB Link Layer Discovery Protocol (LLDP)		
h.	The Switch should support sFlow (RFC 3176)		
i.	The Switch should leverag RADIUS to link a custom list of CLI commands to an individual network administrator's login; an audit trail documents activity		
j.	The Switch should support Dual flash images		

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k.	The Switch should provide support of local and remote logging of events via SNMP (v2c and v3) and syslog; provides log throttling and log filtering to reduce the number of log events generated		
l.	The Switch should provide support management access through a modem port and terminal interface, as well as in-band and out-of-band Ethernet ports; provides access through terminal interface, Telnet, or secure shell (SSH)		
m.	The Switch should restrict access to critical configuration commands; offers multiple privilege levels with password protection; ACLs provide Telnet and SNMP access; local and remote syslog capabilities allow logging of all access		
n.	The Switch should provide a central repository for system and network information; aggregates all logs, traps, and debugging information generated by the system and maintains them in order of severity; outputs the network information to multiple channels based on user-defined rules		
o.	The Switch should mirror ingress/egress ACL-selected traffic from a switch port or VLAN to a local or remote switch port anywhere on the network		
12	**Security**		
a.	The Switch should provide IP Layer 3 filtering based on source/destination IP address/subnet and source/destination TCP/UDP port number		
b.	The Switch should support RADIUS/TACACS+		
c.	The Switch should support Secure shell encrypt all transmitted data for secure remote CLI access over IP networks		
d.	The Switch should support IEEE 802.1X and RADIUS network logins		
e.	The Switch should support allow access only to specified MAC addresses, which can be learned or specified by the administrator		
f.	The Switch should support LLDP-MED (Media Endpoint Discovery)		
13	**Software Defined Networking (SDN) Capability**		
a.	The Switch should have OpenFlow 1.3.1 protocol capability to enable software-defined networking from Day one		
b.	The Switch should Allow the separation of data (packet forwarding) and control (routing decision) paths, to be controlled by an external SDN Controller, utilizing Openflow protocol		

5. Application Load Balancer

S. No.	Description of Requirements	Compliance (Yes/No)	Remarks
1.	**Architecture**		
a.	Should be high performance purpose built hardware with multicore CPU support.		
b.	The appliance should have 8 GB RAM and 5 Gbps of system throughput to support multiple load balancing features and functions		
c.	The appliance should have minimum 4 triple speed 10/100/1000 Mbps Gigabit copper ports & option for 2 * 10G SFP+ ports		
d.	Solid state drive (SSD) for high I/O performance and dual power supply support		
e.	Hardware based SSL acceleration with 2Gbps of bulk SSL throughput and 2800 2k SSL transactions per second (TPS)		
f.	USB based fast failover support for automated configuration synchronization and improved failover time		

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	as compare to traditional cluster		
g.	In order to meet high performance requirements load balancer must support virtual grouping (not clustering) of the appliances and must appear as single system.		
h.	Multiple appliances in virtual group/domain should allow administrator to configure one or more applications application (virtual services) across both physical appliances to meet high performance requirement		
2.	**Load balancing features**		
a.	Should able to load balancer both TCP and UDP based applications with layer 2 to layer 7 load balancing support		
b.	The appliance should support server load balancing algorithms i.e. round robin, weighted round robin, least connection, Persistent IP, Hash IP, Hash Cookie, consistent hash IP, shortest response, proximity, snmp, SIP session ID, hash header etc.		
c.	Should support Multi-level virtual service policy routing – Static, default and backup policies for intelligent traffic distribution to backend servers		
d.	Support for policy nesting at layer7 and layer4, solution should able to combine layer4 and layer7 policies to address the complex application integration.		
e.	Script based functions support for content inspection, traffic matching and monitoring of HTTP, SOAP, XML, diameter, generic TCP, TCPS. Load balancer should support ePolicies to customize new features in addition to existing feature/functions of load balancer		
f.	Traffic load balancing using ePolicies should support algorithms including round robin, least connections, shortest response, persistence ip, hash ip, hash ip and port, consistent hash ip and snmp		
g.	Should provide application & server health checks for well-known protocols such as ARP, ICMP, TCP, DNS, RADIUS, HTTP/HTTPS, RTSP etc..		
3.	**IPv6 gateway and Application acceleration**		
a.	Should provide performance optimization using TCP connection multiplexing, TCP buffering and IEEE 802.3ad link aggregation. Support for TCP optimization options including windows scaling, timestamp & Selective Acknowledgement for enhanced TCP transmission speed TCP optimization option configuration should be defined on per virtual service basis not globally.		
b.	Appliance should provide real time Dynamic Web Content Compression to reduce server load and solution should provide selective compression for Text, HTML, XML, DOC, Java Scripts, CSS, PDF, PPT, and XLS Mime types.		
c.	should provide advanced high performance memory/packet based reverse proxy Web cache; fully compliant with HTTP1.1 to enhance the speed and performance of web servers		
d.	Should provide support for cache rules/filters to define granular cache policies based on cache-control headers, host name, file type, max object size, TTL objects etc..		
e.	Should provide secure online application delivery using hardware-based high performance integrated SSL acceleration hardware. SSL hardware should support both 2048 and 4096 bit keys for encrypted application access.		
f.	Should support certificate parser and solution should		

	integrate with client certificates to maintain end to end security and non-repudiation		
g.	The appliance should support Certificate format as "OpenSSL/Apache, *.PEM", "MS IIS, *.PFX", and "Netscape, *.DB".		
h.	Should support OCSP protocol to check the validity of the certificates online. Certificate bases access control, CRL's (HTTP, FTP, and LDAP) support.		
i.	Should provide full ipv6 support and OEM should be IPv6 gold-certified. OEM should be listed vendor for ipv6 phase-2 certification.		
j.	IPv6 gateway should provide compressive support for IPv6 functions to help with ipv4-to-ipv6 transition without business disruption and must provide support for dual stack, DNS64, NAT 64, DNS 46, NAT 46, IPv6 NAT		
k.	Should support various deployment modes for seamless integration including reverse proxy (IPv6 to IPv4, IPv4 to IPv6) and IPv6 to IPv6 transparent and reverse proxy mode.		
4.	**Network and application security**		
a.	Should support advance ACL's to protect against network based flooding attacks. Administrator should able to define ACL's rules based on connections per second (CPS) and concurrent connections (CC), cookie value.		
b.	Appliance should have security features like reverse proxy firewall, Syn-flood and dos attack protection features from the day of installation.		
c.	Should support integrated network based firewall to protect against network based attacks; administrator should able to configure the security policies on per interface basis.		
d.	Proposed solution provide integrated WAF functionality to protect against layer7 attacks and should support deep packet inspection of HTTP & HTTPS traffic in reverse proxy mode		
e.	Application firewall should support built in rules to counter application attack, provision should be there to customize predefined application security rules. Should support all kind of attacks including OWASP top 10		
f.	WAF module should support both detection and prevention mode and policies should be enforced on per virtual services.		
5.	**Clustering and failover**		
a.	Should provide comprehensive and reliable support for high availability with Active-active & active standby unit redundancy mode. Should support USB based fast failover.		
b.	should support built in failover decision/health check conditions (both hardware and software based) including CPU overheated, SSL card, port health, CPU utilization, system memory, process health check and gateway health check to support the failover in complex application environment		
c.	Should have option to define customized rules for gateway health check - administrator should able to define a rule to inspect the status of the link between the unit and a gateway		
d.	Support for automated configuration synchronization support at boot time and during run time to keep consistence configuration on both units.		
e.	should support floating MAC address to avoid MAC table updates on the upstream routers/switches and to		

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	minimize the failover delay		
f.	Support for multiple communication links for real-time configuration synchronizations including HA group, gateway health check, decision rules, SSF sessions etc.. and heartbeat information		
g.	Clustering function should support IPv6 VIP's (virtual service) switchover		
h.	N+1 clustering support with active-active and active-standby configurations.		
6.	**Centralized management**		
a.	Centralized management appliance should have extensive reporting and logging with inbuilt tcpdump like tool and log collecting functionality		
b.	The appliance should have SSH CLI, Direct Console, SNMP, Single Console per Cluster with inbuilt reporting.		
c.	Should support XML-RPC for integration with 3rd party management and monitoring		

6. Server and Device Monitoring System

S. No.	PARTICULARS	COMPLIANCE (YES/NO)	REMARKS
1.	Should be a comprehensive management platform that delivers integrated, modular management capabilities across fault, configuration, accounting, performance, and security (FCAPS) needs		
2.	Should support minimum 50 wired devices from day 1 and the solution should be scalable up to 1500 wired devices without any hardware or software up-gradation.		
3.	Should allow automatic topology discovery and creation of network maps for layer 2 as well as layer 3 networks including all the available VLANs		
4.	Should have network inventory polling capability for IP network nodes, available line cards, modules, ports, physical links, VLAN interfaces and all the other SNMP capable devices in the network.		
5.	Should allow extensive fault management with real time event and alarm notifications including system logs		
6.	Should allow centralized creation and management of VLAN and ACL policies		
7.	Should have scheduled device configuration back-up and restore functionality		
8.	Should have automatic detection of configuration changes for easy trouble shooting and isolation.		
9.	Should allow monitoring and management of 3rd party devices and end points.		
10.	Should have the functionality of scheduled configuration roll out		
11.	Should have the functionality to perform scheduled or unscheduled network wide software or firmware upgrades		
12.	Should have the ability to customize NMS dash board.		
13.	Should allow grouping of devices for applying any particular change/task		
14.	Should have 64-bit support		
15.	Should support centralized as well as distributed deployment.		
16.	Should support virtualization management; management and monitoring of both physical and virtual networks. It should provide insight into and management of virtual networks and reduce migration complexity by aligning and automatic network policies		

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	with virtual images.		
17.	Should support role based access control		
18.	Should be with software update and upgrade assurance during the warranty period		
19.	Should have support for add-on modules on the same software platform for monitoring and management of routers, wireless controller, wireless access points and wireless client devices.		
20.	Should facilitate enable centralized management of proposed network elements with a variety of automated tasks, including discovery, categorization, baseline configurations, software images, configuration comparison tools, version tracking, change alerts, and more		
21.	Should support centralized VLAN Management to view current VLAN configuration, VLAN topology, bulk VLAN deployment etc.		
	a) Should provide high-performance, scalable network log audit and analysis support with auditing online activities of internal users		
	b) Should support various log formats such as NAT, flow, NetStream including log formats that allows audit security-sensitive operations and digest data from HTTP, FTP, and SMTP packets		
	c) Should support policy driven log filtering		
	d) Should support log collection from devices that do not otherwise support the standard protocols such as Flow, NAT, NetStream, sFlow/Netflow etc.		
	e) Should support user activity auditing of at least 50 users from day 1 and this should be optionally extendable up to 1500 users.		
22.	Should offer following RADIUS/AAA features: a) Shall support user identity authentication based on the access policies associated with infrastructure resources, such as routers, switches, license for 100 users from day 1. b) Shall provide a full-featured RADIUS server that supports centralized authentication, authorization, and accounting management. c) Network-agnostic device fingerprinting capabilities based on HTTP+MAC+DHCP device recognition for BYOD. d) Shall support authentication modes like 802.1X, VPN, portal, and wireless access identity modes like PAP, CHAP,EAP-MD5, EAP-TLS, and PEAP to fit into applications with different security requirements. e) Shall provide centralized policy creation to set the appropriate access rights for each type of user and device across the network.		
23.	Should be a ITILv3 compliant comprehensive management platform that delivers integrated, modular management capabilities across fault, configuration, accounting, performance, and security (FCAPS) needs.		
24.	Offered software should have compatibility with Microsoft Windows or Linux operating systems		
25.	Offered software should be scalable up to 1500 wired devices and 1500 users.		

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7. Unified Thread Management

S. No	Specification	Compliance (Yes/No)	Remarks
General Requirements			
(a)	Network security appliance should support "Stateful" policy inspection technology. It should also have application intelligence for commonly used TCP/IP protocols like telnet, ftp etc.		
(b)	The proposed vendor must have a track record of continuous improvement in threat detection (IPS) and must have successfully completed NSS Labs' NGFW Methodology v7.0 testing with a minimum exploit blocking rate of 99%		
(c)	OEM should be in Leaders quadrant of Gartner's – in Enterprise Firewall Magic Quadrant as per the latest report		
(d)	Appliance shall be ICSA certified for Firewall, IPS & Gateway AntiVirus functionalities		
Hardware & Interface requirements			
(a)	14 x 1GE RJ45 inbuilt interfaces, 12 x 1GE SFP interface slots from day one		
(b)	The Appliance should have USB & Console Ports		
Performance and Availability			
(a)	The Firewall should be on multiprocessor architecture with minimum 20Gbps of Firewall throughput & support of 3,500,000 concurrent sessions, and 200,000 new sessions per second from day one and Firewall Latency should not be more than 3µs		
(b)	Minimum IPS throughput of 4500 Mbps for real world traffic or enterprise mix traffic		
(c)	Minimum Threat Prevention Throughput (measured with Application Control and IPS and Anti-Malware enabled) of 3000 Mbps for real world traffic or enterprise mix traffic		
(d)	IPSec VPN throughput: minimum 10 Gbps		
(e)	Simultaneous VPN tunnels: 1000		
(f)	Proposed solution must support minimum 3.2 Gbps of SSL Inspection throughput		
(g)	Proposed solution must support minimum 10 virtual firewall from day one		
Routing Protocols			
(a)	Static Routing		
(b)	Policy Based Routing		
(c)	The Firewall should support dynamic routing protocol like RIP, OSPF, BGP, ISIS		
Firewall Features			
(a)	Firewall should provide application inspection for LDAP, SIP, H.323, SNMP, FTP,SMTP, HTTP, DNS, ICMP, DHCP, RPC,SNMP, IMAP, NFS etc		
(b)	IPv6-enabled inspection services for applications based on HTTP, FTP, SMTP, ICMP, TCP, and UDP		
(c)	Allows secure deployment of next-generation IPv6 networks, as well as hybrid environments that require simultaneous, dual stack support of IPv4 and IPv6		
(d)	The firewall should support transparent (Layer 2) firewall or routed (Layer 3) firewall Operation		
(e)	The Firewall should support ISP link load balancing.		
(f)	Firewall should support link aggregation functionality to group multiple ports as single port.		

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(g)	Firewall should support minimum VLANS 2048		
(h)	Firewall should support static NAT, policy based NAT and PAT		
(j)	Firewall should support IPSec data encryption		
(k)	It should support the IPSec VPN for both site-site and remote access VPN		
(l)	Firewall should support IPSec NAT traversal.		
(m)	Support for standard access lists and extended access lists to provide supervision and control		
(n)	Control SNMP access through the use of SNMP and MD5 authentication.		
(o)	Firewall system should support virtual tunnel interfaces to provision route-based IPSec VPN		
(p)	The Firewall should have integrated solution for SSL VPN		
(q)	Should support LDAP, RADIUS, Windows AD, PKI based Authentication & should have integrated 2-Factor Authentication server support & this two factor authentication can be used for VPN users for accessing internal network from outside and for Local users accessing internet from inside the network and for administrative access to the appliance or all of them		
(r)	The solution should have basic server load balancing functionality as an inbuilt feature		
(s)	Licensing should be a per device and not user or IP based (should support unlimited users)		
Integrated IPS Features Set			
(a)	IPS should have DDoS and DoS anomaly detection and protection mechanism with threshold configuration.		
(b)	Support SYN detection and protection for both targets and IPS devices.		
(c)	The device shall allow administrators to create Custom IPS signatures		
(d)	Should have a built-in Signature and Anomaly based IPS engine on the same unit		
(e)	Signature based detection using real time updated database & should have minimum 10000+ IPS signature database from day one		
(f)	Supports automatic security updates directly over the internet. (ie no dependency of any intermediate device)		
(g)	Signature updates do not require reboot of the unit.		
(h)	Configurable IPS filters to selectively implement signatures based on severity, target (client/server) and operating systems		
(j)	IPS Actions: Default, monitor, block, reset, or quarantine		
(k)	Should support packet capture option		
(l)	IP(s) exemption from specified IPS signatures		
(m)	Should support IDS sniffer mode		
AntiVirus & AntiBot			
(a)	Firewall should support antimalware capabilities , including antivirus, botnet traffic filter and antispyware		
(b)	Solution should be able to detect and prevent unique communication patterns used by BOTs i.e. information about botnet family		
(c)	Solution should be able to block traffic between infected host and remote operator and not to legitimate destination		

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(d)	Should have antivirus protection for protocols like HTTP, HTTPS, IMAPS, POP3S, SMTPS protocols etc.		
(e)	Solution should have an option of packet capture for further analysis of the incident		
(f)	Solution should uncover threats hidden in SSL links and communications		
(g)	The AV should scan files that are passing on CIFS protocol		
(h)	The proposed system shall provide ability to allow, block attachments or downloads according to file extensions and/or file types		
(j)	The proposed system should be able to block or allow oversize file based on configurable thresholds for each protocol types and per firewall policy.		
Other support			
	Should support features like Web-Filtering, Application-Control & Gateway level DLP from day one		
(a)	The proposed system should have integrated Enterprise-class Web Content Filtering solution with database which should support over 250 million webpages in 72+ categories and 68+ languages without external solution, devices or hardware modules.		
(b)	Should support detection over 3,000+ applications in multiple Categories: Botnet, Collaboration, Email, File Sharing, Game, General Interest, Network Service, P2P, Proxy, Remote Access, Social Media, Storage Backup, Update, Video/Audio, VoIP, Industrial, Special, Web (Others)		
(c)	The product must supports Layer-7 based UTM/Firewall virtualization, and all UTM features should be supported in each virtual firewall like Threat Prevention, IPS, Web filter, Application Control, content filtering etc.		
(d)	The solution should have the flexibility to write security policies based on IP Address & User Name & Endpoint Operating System		
(e)	QoS features like traffic prioritization, differentiated services,. Should support for QoS features for defining the QoS policies.		
(f)	It should support the VOIP traffic filtering		
(g)	Appliance should have identity awareness capabilities		
(h)	The firewall must support Active-Active as well as Active-Passive redundancy.		
(j)	Solution must support VRRP clustering protocol.		
Management & Reporting functionality			
(a)	Support for Built-in Management Software for simple, secure remote management of the security appliances through integrated, Web-based GUI.		
(b)	Support accessible through variety of methods, including console port, Telnet, and SSHv2		
(c)	Support for both SNMPv2 and SNMPv2c, providing in-depth visibility into the status of appliances.		
(d)	Should have capability to import configuration and software files for rapid provisioning and deployment using Trivial File Transfer Protocol (TFTP), HTTP, HTTPS		
(e)	The solution should have option for firewall configuration audit & compliance check to be done in automated or manula process		

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(f)	Should capable to provide a convenient method for alerting administrators when critical events are encountered, by sending e-mail alert messages to administrator defined e-mail addresses		
(g)	Solution must allow administrator to choose to login in read only or read-write mode		

8. Network Traffic Manager

S No	Description of requirement		Compliance (Yes/No)	Remarks
	BANDWIDTH CONTROLLER			
1	**An additional device for bandwidth control should be provided along with the system. The features are as follows.**			
	General Features	(i) The system should ensure reliable performance for network dependent applications.		
		(ii)The system should reduce the impact of non-strategic traffic, and diagnose and resolve network problems		
		(iii) The system should identify and control bandwidth hogs so that network administrators can identify problem users, applications and websites and apply automated policies to limit or prevent bandwidth allocation.		
		(iv) The system should have the feature to easily monitor recreational traffic like video streaming and P2P sharing.		
	Technical Features	**(i) Real-time Monitoring:** The system should monitor the health of network in real time and give insight about how applications are performing, bandwidth consumed by users, applications across the network		
		(ii) Policy-Based Shaping: The system should have the feature to prioritize how and when users, applications and websites can consume bandwidth on network.		
		(iii)Interactive Analytics: Intuitive dashboard feature should be there to visualize activities by all users.		
		(iv)Application Acceleration: The system should support acceleration and caching features.		
		(v)Predictive Recommendations: The system should have the feature to study the patterns and trends in the network and automatically make suggestions to repair and improve network performance.		
		(vi) QX Boost for Skype application: Improve the quality of experience For voice, video and application sharing. QX Boost for Skype for Business correlates Skype®		

		call data with network information to provide a complete end-to-end view of your call traffic, down to the Device level.		
	Hardware Features	**(i)Traffic shaping and Acceleration**		
		(a) Shaping Throughput: - 1 Gbps		
		(b) Concurrent Flows: - 220,000		
		(c) Packets per second: - 200,000/s		
		(d) New Connection Rates: - 10,000/s		
		(e) Acceleration Throughout: - 30 Mbps		
		(f) Edge Cache Throughput: - 50 *Mbps*		
		(g) Optimized Connections: - 6,000		
		(h) APS Objects 250		
		(i) SLA Objects 250		
		(j) PDF Reports 60		
		(k) Traffic Policies 1024		
		(ii) Interface Capability		
		(a) The system should have 1 x RJ45 based dedicated console port for management purpose.		
		(b) The system should have at least 3 x 1G (Copper) bypass bridge pair and 2x 1G (Fiber) bypass bridge pair. Also, the system should have one additional NIC slot for future expansion.		
		(iii) Physical Parameters		
		(a) Form Factor: -1U rack mountable		
		(b) Power Rating: - 17W @ 0.13A, 22W @ 0.16A (Max)		
		(c) Environment: - 0 deg cel to 40 deg cel, 5% to 90% operating humidity.		

Two units of undermentioned device should provide with the system.

A		**<u>System Parameters</u>**			
		Speech band	*300 to 3400 Hz*		
		Modulation	Pulse Code Modulation		
		No. of channels per system	32 (30 speech channels, 1 terminal Signaling and 1 Sync. Channel)		
		Sampling frequency	*8000 Hz*		
		No of sample bits	8 per channel		
		Total bits per frame	256		
		Bit rate	2048 Kbps ± 50 ppm		
		Construction and Architecture	Chassis based modular multiplexer shelf capable of supporting minimum 12 slots for integration of data, voice, fax and LAN traffic		

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		Universal Slots	All slots (other than for power and control) should be universal i.e. capable of accepting any type of voice/data/fax card manufactured by the same OEM.		
		Add-Drop or Drop - Insert Function	a) Should be able to add-drop/drop-insert voice and data at channel (64 kbps) multiple channel (nx64 Kbps) and at E1. b) Add-drop should be software configurable by user in the field		
		Digital Cross Connect function	a) It should have an inbuilt cross connect facility on the same equipment b) Cross Connect : It should be able to map the following voice interfaces: i) E1 to E1 ii) E&M (two wire or four wire) to e1 and vice versa iii) FXO/FXS to E1 and vice versa c) Add-drop should be achievable by software by user in the field		
		Redundancy	Dual controller, dual power with load sharing		
		Protection	1 for 1 protection , E1, T1, FOM		
			PDH ring protection, QE1, QT1, FOM, Mini QE1, 3E1 for DS0 SNCP protection		
		Management	*Console, Telnet, SNMP, and In band* management support		
			Craft interface port for connection to external LCD display		
			Compatible to a SNMP based GUI network management system		
		No. of Slots	Should have 16 or more hot plug-in slots with capability to support following cards.		
			Single E1/Quad E1 (G.703)/ Mini-Quad E1/3*E1 card-DS0 SNCP protection		
			X.21/V.35/RS232/EIA530		
			2W/4W E&M		
			QFXO/QFXS/12FXo/12FXS/24FXO/24FXS		
			10/100 Base-T Router Card		
			2/4 channel G.SHDSL card		
			8-channel Dry Contact I/O		
			Magneto Interface Card		
			***TDMoE (TDM over Ethernet) with 2* Combo GigaBit (GbE) interface for IP uplink**		
B		**Interface Support: - The system shall support below mentioned interfaces/Cards.**			
		<u>Network Line Interface-E1 should comply with the following specifications:-</u>			
		Number of ports	1E1 / 4E1 / 3E1		
		Line Rate	2.048 Mbps ± 50 ppm		
		Line Code	AMI or HDB3		
		Input Signal	ITU G.703		

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	Output Signal	ITU G.703		
	Framing	ITU G.704		
	Connector	BNC/RJ48C , DB25S for Mini Quad E1		
	Electrical	120 ohm twisted pair		
	Jitter	ITU G.823		
	2* 10/100 Ethernet Router Card with capability to handle 64 WANs should comply with the following specifications			
	Number of ports	2 LAN ports, Max. 64 WAN ports, Each WAN port has data rate n x 64K bps, 1≤ n ≤32 (≤ 4Mbps for total of all 64 WAN ports		
	Physical Interface	10/100 BaseT x 2		
	Connector	RJ45		
	Routing protocol	RIP-I, RIP-II, OSPF, Static		
	Supporting Protocols	PPP (IPCP/BCP), MLPPP, HDLC, Frame Relay, and Cisco compatible HDLC, NAT/NAPT, DHCP		
	Diagnostic	Ping, Trace route		
	QoS	Rate limit		
	8* 10/100 Ethernet Router Card with capability to handle 64 WANs			
	Number of ports	8 LAN ports, Max. 64 WAN ports. Each WAN port has data rate n x 64K bps.		
	Physical Interface	10/100 BaseT x 8		
	Connector	RJ45		
	Routing protocol	RIP-I, RIP-II, OSPF, Static		
	Supporting Protocols	PPP (IPCP/BCP), MLPPP, HDLC, Frame Relay, and Cisco compatible HDLC, NAT/NAPT, DHCP		
	Diagnostic	Ping, Trace route		
	QoS	Rate limit		
	Voice Card (8EM) port (interfaces) should comply with the following specifications:-			
	(a) Connector: RJ45 connector (b) Alarm conditioning: CGA busy after 2.5 seconds of LOS ,LOF (c) Encoding: a low or u low user selectable together for all. (d) Impedance: balanced 600 or 900 ohms. (e) Longitudinal rejection : 55 dB (f) Loss adjustment : -21 to +10 dB/0.1dB step transmit and receive (g) Single/ distortion: >46 dB with 1004 Hz, 0 dBm input (h) Frequency response: -0.25 to-1 dB from 300 to 3400Hz (i) Signaling : Type 1,Type 2,Type 3,Type 4,Type 5 transmit only			

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	Voice card (12 FXS/ 12 FXO/ 24 FXS/24 FXO) port (interfaces) should comply with the following specifications:-		-	
	(a) 12 FXS/FXO Connector : Twelve RJ11 (b) 24 FXS/FXO Connector : One RJ21X (c) Alarm conditioning : CGA busy after 2.5 seconds of LOS ,LOF (d) Encoding : A-law or μ-law, user selectable together for all (e) AC Impedance: : balanced 600 or 900 ohms (f) Longitudinal Conversion Loss : > 46dB (g) Cross talk measure : Max -70dBm0 (h) Gain Adjustment : -21 to +10 dB / 0.1dB step transmit & receive (i) Signal/ Distortion : > 25dB with 1004 Hz, 0dBm input (j) Frequency Response : - 0.25 to -1 dB from 300 to 3400 Hz, coincide with ITU-T G.712 (k) Loss adjustment: -21 to +10 dB/ 0.1 dB step transmit and receive (l) Signal / Distortion:. 46 dB with 1004 Hz , 0dBm input (m) Frequency response: - 0 .25 to -1 dB from 300 to 3400 Hz , coincide with ITU-T. (n) Ideal channel noise : Max -65 dB Mop (o) Inter- modulation : coincide with ITU-T B.712 (p) 2Wire return loss : > 2 dB echo , > 20 dB signing (q) FXS loop feed : Nominal -48 V dc with 20 mA current limit (r) Signaling : Loop Start, DTMF, pulse, PLAR, Battery Reverse			
	G.SHDSL Line port (interfaces) should comply with the following specifications:-			
	Number of ports	2 or 4		
	Line Rate for 4-channel G.shdsl	n x 64Kbps (n= 3 to 31)		
	Line Rate for 2-channel G.shdsl	n x 64Kbps (n= 3 to 15)		
	Line Code	16-TCPAM, full duplex with adaptive echo cancellation		
	Connector	RJ45		
	Electrical	Unconditioned 19-26 AWG twisted pair		
	Sealing current	Max. 20 MA source current		
	Clock Source	From System, Line		
	Diagnostic Test	G.SHDSL Loopback: To-LINE, To-bus		
	TDM over Ethernet Card			

	Combo Gigabit Ethernet (GbE) Interface	-> *Number of Ports* 2 -> Speed 10/100/1000M bps -> Connector RJ45 for twisted pair GbE, LC for optical GbE, auto detection		
	Gigabit Ethernet (GbE) Interface	-> Number of Port 2 -> Speed 10/100/1000 BaseT -> Connector RJ45		
	Ethernet Function	MDI/MDIX for 10/100/1000M BaseT auto-sensing Ping function contained ARP Per port, programmable MAC hardware address learn limiting (max. MAC table 8192 (8k) entry)		
	Basic Features:			
	Packet Transparency	Packet transparency support for all types of packet types including IEEE 802.1q VLAN and 802.1ad (Q-in-Q)		
	QoS	User configurable 802.1p CoS, ToS in outgoing IP frame		
	Traffic Control	(a) Ingress packet Rate limiting buckets per port for Ethernet port (b) Supporting Rate-based and Priority-based rate limiting for LAN port. (c) Pause frame issued when the traffic exceeding the limited rate before packet dropped following IEEE802.3X		
	Link Aggregation	WAN support link aggregation		
	Jitter & Wander	PPM: per G.823 Traffic PPB: per G.823 Synchronous*		
	Standard Compliance			
	IETF	TDMoIP (RFC5087), SAToP (RFC4553), CESoPSN (RFC5086)		
	IEEE	802.1q, 802.1p, 802.1d, 802.3, 802.3u, 802.3x, 802.3z, 802.1s, 802.1w, 802.1AX		
	Co-directional port (interfaces) should comply with the following specifications:-			
	Interface	ITU G.703 64 Kbps co-directional interface		
	Connector	120ohm, RJ48		
	Line Distance	Up to 500 meters		
	Loopback	DTE Payload Loopback, Local Loopback		
	Voice Card 12 MAG (Magneto)			
	(a) Connector : Twelve RJ11 (b) Alarm Conditioning CGA busy after 2.5 seconds of LOS, LOF. (c) Encoding A-law or μ-law, user selectable together for all.			

	(d) Impedance Balanced 600 or magneto telephone impedance match. (e) Longitudinal Conversion Loss > 46dB. (f) Gain Adjustment -21 to +10 dB / 0.1dB step transmit & receive. (g) *Signal/ Distortion > 25dB with 1004 Hz, 0dBm* input. (h) Frequency Response - 0.25 to -1 dB from 300 to 3400 Hz, coincide with ITU-T G.712. (i) Idle Channel Noise Max. –65 dBm0p. (j) *Min Detectable Ringing Voltage 16 Vrms.* (k) Ringing Detectable Across L1 and L2 (Tip and Ring), L1 and GND (Tip and GND) (l) Single Ring Type: ring for 2 sec. and stop, or ring for 4 sec. and stop. (m) Continuous Ring Type: 1 sec on 2 sec off, or 2 sec on 4 sec off (n) Ringing Send across L1 and L2 (Tip and Ring), L1 and GND (Tip and GND). (o) Signaling Magneto MRD (Ringing across Tip and Ring or Tip and Ground). (p) Signaling Bit A, B, C, D Programmable. (q) Signaling is carried transparently by the digitizing process.			
C	**Clock Source**	Internal, E1/T1 Line, External		
D	**Alarm Relay**	Alarm Relay: max. Voltage 3 Vdc/ max. current: 1A Fuse alarm, and performance alarm		
E	**System Configuration Parameters**	Active Configuration, Stored Configuration, and Default Configuration		
F	**Supervisor**			
	RS232 Console Port (VT100)	10 Base-T, Ethernet, SNMP In-band 64 Kbps supports HDLC/PPP, SSH		
G	**Performance Monitor**			
	Separate Registers	Network, user, and remote site		
	Performance Reports	Reports include E1 Bursty Errored Second, Severe Errored Second, and Degraded Minutes. Also available in Statistics (%)		
	Alarm Queue	To record the latest alarm type, location, and date & time		
	Threshold	Bursty Seconds, Severely Errored Second, Degraded Minutes		
H	**Diagnostics**			
	Loopback	E1/T1 interface (Line Loopback, Payload Loopback, Local Loopback), DTE Loopback (DTE-to-DTE, DTE to Line)		
	Test Pattern	For Controller: 221-1, 215-1, 211-1, 29-1, and 4-bye user define pattern		
J	**Front Panel**			
	LED	1 per V.35-interface, ACO, Power, SYNC/TEST, LOF, BPV, RAI/AIS		
K	**Physical /Electrical**			

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	Dimensions	432.4 x 220 x 223.5 mm (W×H×D)		
	Power	Single/ Dual -48 Vdc: -36 to -75 Vdc, 100 Watts max.		
		Single/ Dual -48 Vdc: -36 to -75 Vdc, 150 Watts max.		
		Single/ Dual -24 Vdc: -18 to -36 Vdc, 150 Watts max		
	Temperature	0-55°C		
	Humidity	0-95%RH (non-condensing)		
	Mounting	Desk-top stackable, 19" /23" rack mountable		
	Line Power supply	Available only with DC power for G.SHDSL card only		
	Power Consumption	Max 110 Watts		
	The OEM should have authorized R & D & Repair/Replacement center in India with presence in India of about 10 Years			
L	**Certification**	EN55022 Class A, EN50024, FCC Part 15 ,Class A, FCC Part 68, CS-03, IEC60950, UL60950, IEC 61850-3, IEEE 1613		
M	**Compliance**	ITU G.703, G.704, G.706, G.732, G.736, G.823, G.826, G.711, G.712, G.775, O.151, V.11, V.28, V.54		
N	**Card Configuration required as part of supply.**			
		Controller (CPU) card -1 no		
		48 V Dc Power Supply Card- 1 No		
		3-Port E1 card – 1 No		
		2-port Router Card – 1 No		
P	**DC Power Source (-48V)**	**(j)** Input 230 VAC (Range 170-264 VAC, single phase, 50 Hz).		
		(k) Output Current :- 8 Amp		
		(l) Size: - 485(W) x385(D) x165(H) mm with screw terminals at front		
		(m) Should have short circuit protection.		

9. Network Time Server

S. No	Description of Requirements		Compliance (Yes/No)	Remarks
	Power Supply:			
1	Voltage	230 +/- 10% V AC		
2	Frequency	47-55 Hz		
	Functions/ Features :			
3	Time Facility	Using Universal Time co-ordination(UTC)		
4	Propagation delay Compensation	Supported		
5	Accuracy	# +/- 250 Nanosecond		
6	Time Accuracy	Better than 1 PPM		
7	*LCD Display*	Front panel LCD display to show status, time and no. of satellites		
8	**Inputs**	GPS Antenna input through BNC connector.		
9		Power Supply		

	Outputs			
10	NTP output (2 nos. customizable) for NTP client access through RJ-45 .Both Ports shall be independent			
11	RS232 serial port output (2 Nos)			
12	Pulse output: 1 PPS, ½PPM, 1PPM (Configurable).			
13	*Support Client request per Second*	*10,000*		
	Antenna			
14	Length of GPS	50 meters		
15	Gain	Over 30 DB		
16	RECEIVER,GLOBAL POSITIONING SYSTEM,DISPLAY TYPE:LCD;DISPLAY SIZE:2 X 3.5 *INCH;DISPLAY* RESOLUTION:240X400 PIXELS;DATA INTERFACE:ETHERNET;PC INTERFACE:ETHERNET;;EXPANSION SLOT TYPE:USB;WAY POINTS:2; Server FREQUENCY:48-55 HZ; OPERATING TEMPERATURE:0-55 *DEG.C;ELECTRICAL RATING:230* VAC;ADDITIONAL INFORMATION:WITH ANTENNA and Surge Arrestor			

10. Authentication Tokens

S. No	*Description of Requirements*		Compliance (Yes/No)	Remarks
1.	Certification	FIPS 140-2 Level 2 or as per CCA Guidelines CC / EAL 4+		
2.	Asymmetric Key Operations	• PKCS#11 compliant • RSA signature: 2048 bit or higher • Secure hash: MD5, SHA -1, SHA-256, SHA -512 ECC P-Curves		
3.	Memory	64 KB or more		
4.	Credential Storage	• X.509 V3 certificates, • secure symmetric key storage • Microsoft Windows Credentials		
5.	Platform Support	Windows7, 10, Windows Server 2012and higher server OS, Linux OS		
6.	Random Number Generator	ANSI X9.31 PRNG or NIST DRBG SP 800 90 CTR mode		
7.	Data Transfer rate	125 Kbps or more		

11. Lightning Protection System

Sl. No	Description of Requirement	Compliance (Yes/No)	Remarks
1.	The Lightening protection should have radius of protection of 79 meters in Zone-I at 5 mtr height.		
2.	The Lightening Arrestor Should have profiled, in alterable and good conductor structure to generate a forced air circulation at its tip and in prolonged (Venturi System) air intakes and peripheral ejectors.		
3.	The Lightening should have mechanical stimulation system, no battery or electronics is to be used.		
4.	Lightening Arrestor should be equally effective of both positive and negative lightning strikes.		

5.	The necessary fixing bracing PCC/grouting above the building/installation with testing commissioning to entire *satisfaction of Engineer- in —charge*		
6.	The installation of the system shall be carried out under the supervision of certified trained engineer from OEM of complete all as specified and directed.		
7.	The certified Engineer have to produce the Certificate of Certified Engineer from OEM and having knowledge of International Standards.		
8.	Supply and installation of gun metal elevation rod 2 mtrs long from OEM with necessary bracing clamps, drilling, 1 fixing and grouting arrangement etc complete all as specified and directed		
9.	Supply and laying underground LT cable PVC insulated, PVC sheathed copper conductor single core,70 sqmm with necessary connection, laying, clipping on insulated pads, saddles all as specified and directed		
10.	Should provide M&L for Gel compound earthing with earth enhancing compound with 25kgs including copper earth strip of size 25x3 mm with necessary clipping on insulated pads/saddles with earth pit to minimum resistance value complete all as specified and directed		

12. Smart Rack

Description	Parameter	Technical Requirement	Compliance (Yes/No)	Remarks
System specifications	(WxDxH)	Maximum 800x1200x2150mm(42U)		
	Power supply input	Minimum Dual Feed AC 230V/1P/50Hz.		
	IT Load	3kW		
	Minimum Usable U space for IT Equipments	34 U		
	Installation Site	Should be suitable for Elevated floor installation / general ground installation		
	Utility Entry	Should have provision for both Top/Bottom as Standard		
	System supported languages	Should support English as language for operation by default		
	Cabinet interior lighting	LED - with door limit switch		
	Exterior colors	Black or as per OEM standard		
	Front & back door	Front toughened glass, rear plain dual door		
	Local interface	Colour TouchScreen Display		
	Monitoring	Power, Cooling, Smoke, WLD, temperature and humidity, UPS, door sensor to be integrated for monitoring		
	Sensor	Minimum 1 No. Spot sensor for water leak detection		
		Minimum 1 No. Temperature and humidity sensors		
		Minimum 1 No. Smoke sensor		
		Minimum 1 No. Proximity sensors for doors		
		Minimum 1 No. Beacon- for local alarm		

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Power subsystem	UPS capacity	Minimum 6 kVA UPS		
	UPS rated input	230VAC		
	Input Voltage Range	160 V - 285 V		
	Input Frequency Range	40-70Hz		
	Input Power Factor	0.98		
	Input power consumption meter	Energy meter with digital display should be installed at input to monitor		
	Output Max Power	6kVA/5.4kW		
	Efficiency	94% at 100 % Load in online & *98%in Green Mode*		
	Backup Time	15 Mins - 1 Battery Pack		
	RPDU parameters	Basic Rack PDU should be provided, Zero U, 32A, 230V, (20)C13 & (4)C19		
Cooling subsystem	Total air conditioning cooling Capacity	3.5kW		
	Minimum Air flow	*700CMH*		
	Air conditioning installation	Should be Rack mount type, not more than 5U		
	Outdoor ambient temperature	-20°C ~ +45°C		
	Refrigerant	Environmental Friendly R410A		
	Emergency fan module	Minimum 1 No. at front (Inlet) and top (Exhaust)		
		OEM for UPS, Racks, PDU, Sensors should be same including the monitoring software. OEM should be minimum ISO 9001, ISO 14001 and ISO 50001.		

Lt Col Ripunjay Kumar
ARSU

Maj Gen Balwinder Singh
ADG AR
HQ DGAR

AVIRAT PANDEY
AC/GD, ITBP

Shashank Sharma
Ad (Exe), CISF

Ravindra Kumar
Ad comdt SSB.

B. S. Rathour AC
NSG

Approved/ Not Approved

(Sukhdeep Sangwan)
Lt Gen
Director General Assam Rifles

TRIAL DIRECTIVES

RECORDS INTEGRATION AND UP-GRADATION

All parameters/ specifications mentioned in QRs will be checked by the Board of Officers by ascertaining/ verifying following checks in the presence of Vendor/ Supplier/Manufacturer. In case of any discrepancies/ problem, the representative of firm will demonstrate the features to the Board of Officers. Further, If proper testing Instrument for testing these parameters are not available with customer, same will be arranged by the firm.

i) Physical Check:- In this category specifications of the equipment will be checked by B.O.O. Physical as per QRs.

ii) Functional Check:- In this category supplier will show practically all features/ configuration whom against to the board of officers during trial.

iii) Submission of Certificate:- Specification which cannot be checked due to lack of testing facilities/ expertise, certificate of any Govt lab or NABL/ILAC accredited laboratory be submitted by the firm.

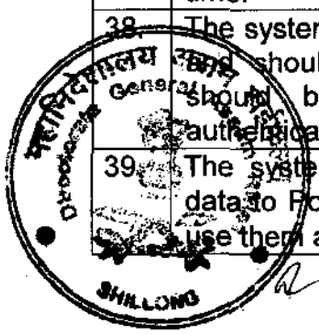
1. **Records Integration and complete Upgrade**

SCOPE OF WORK

S. No	Particulars	Trial Directives
A	**Introduction**	
1.	The technology used and the system is obsolete as its already more than 5 years and no upgrade has happened. Newer technologies can utilize hardware resources in a more optimum way. Web technologies available have a very high IOPS compared to the existing one. Indexing for DB is a major issue and reporting happens from the same DB as Read/Write Operations. No Data security measures exists on Data Level and Application Level. No Graphical Dashboard exists. With available data, system is not performing any analysis which will make the decision ease for the management. System is also not providing any considerable analytics.	
B	**Proposed System**	
2.	The System will have an open API model to integrate all existing application such ARGIS, ARESA, CPBO and UPAO.	BOO to check these features practically on ground by validating date being shared between the mentioned modules.
3.	A centralized Data Repository will ensure that all data are synced with each other and is instantly available.	BOO to check practically on ground that same data is not entered twice and also validate the same in database.
4.	A central Repository will also enable central policy management for all functional applications.	BOO to check practically on ground that same data is not entered twice and also validate the same on database.
5.	Entry module for Units should be based on latest technologies and Web Services.	BOO to check the same on staging server and also check latest technologies in use from internet.
6.	The system will be optimized for low bandwidth factor for remote locations.	BOO to check the same by submitting data and running the application in debug mode from staging server and validating the response time.
7.	Replicated DB will be provided on the locations so that reporting will be accessed with an ease.	BOO to check this practically on staging and production server.
8.	Graphical dashboard for admin will be available for quickly visualizing details like Vacancies available and shows the people who are qualified for the respective criteria.	BOO to check this practically on staging and production server.
9.	Graphical Dashboard will also give count of posting based on locations, period , ranks etc.	BOO to check this practically on staging and production server.

10.	System will provide details for probable candidates for a selected vacancy based on various policies mentioned in the policy master.	BOO to check this practically on staging and production server.
11.	System will provide analytics based on the location of a unit and also suggest how to improve strength.	BOO to check this practically on staging and production server.
12.	System will provide suggestion where recruitment rallies should be conducted based on the previous locations where rallies have been conducted.	B BOO to check this practically on staging and production server.
13.	System will also suggest skillset available.	BOO to check this practically on staging and production server.
C	**Deployment in Cloud Environment and Integrating with other Applications.**	
14.	Creating a cloud environment will allow optimum delivery of services and various locations. Record Cloud will enable administrators to shift Infrastructure on the fly to whichever department wherever required.	BOO to check this practically on staging and production server.
15.	Cloud will also enable easy management of various parameters like terminals, servers, devices, signatures etc.	BOO to check this practically on staging and production server.
16.	Integrating it with services like Data Security to keep transparently encrypted at all times, Use PKI to enable Digital Signing of All Documents using CCA India approved tokens and allow login and access privileges based on Single Sign on and Centralized identity and access management.	BOO to check the same with system study and verify the same practically in the staging and production server
17.	Integrating it with ARMS will allow auto triggering of emails to concerned departments like when a posting order is processed an email will be sent to the locations where SOS/TOS is about to occur.	BOO to check the same with system study and verify the same practically in the staging and production server.
18.	Integrating Recruitment rally will enable easy generation of requirements, generation of rally locations, auto storing of records for selected candidates through ARTC&s.	BOO to check the same with system study and verify the same practically in the staging and production server
19.	A Consolidated Record Sheet can be accessed by the user from his unit using any terminal or Information Kiosk. The Document will consist of his complete record including his Part II Orders, Salary Statements etc.	BOO to check this practically using any terminal or Information Kiosk of the units
20.	UHD RFID Cards will allow individuals to login. The cards can be linked with PKI to provide digital signatures to all individuals and they can use the cards to login into terminals, access their details from kiosk, or do their day to day work based on their access rights.	BOO to check this practically on staging and production server.
21.	Data Security in form of Authentication, Authorization, Encryption and Audit logs will be available for all transactions including that of the administrator.	BOO to check this practically on staging and production server.
22.	A Centralized policy manager will enable creating of all policies centrally which can be used by various concerned departments like a change in pay and allowances policy, changes in subscription policy, changes in OTTB, changes in porting policy, promoting policy etc.	BOO to check this practically on staging and production server.
23.	The System will Automatically on generation of Pension documents will transfer all details from effective to non-effective DB. This will ensure performance of functional and active DB as non-effective data will not be processed every time.	BOO to check this practically on staging and production server and verify the same in the DB.

24.	Physical documents can be stored with RFID based tags. This will enable locating the file very easy using Tag Finders and also on the system. The racks can be configured with RFID readers and will automatically detect any file available in the specified rack.	BOO to check this practically on staging and production server.
25.	A simplified search option will be provided which will enable operators and users to find details by just typing a keywork and based on their access privileges the system will show search results.	BOO to check this practically on staging and production server.
26.	A detailed MIS for various activities like details of individuals who retired between two dates, personnel belonging to a state, retired on a particular rank etc. will be available.	BOO to check this practically by submitting data on staging and production server.
27.	A case management module will help in keeping NE but active files in a separate active zone for example files under litigation etc.	BOO to check this practically on staging and production server
28.	The entire system should be deployed on ARWAN and should be accessible over ARWAN to all locations of AR. The data accessibility has to be optimized for minimum bandwidth consumption using Caching at Local Systems and server side processing.	BOO to check the same practically by visiting all locations of AR and by submitting data and running the application in debug mode from staging server and validating the response time
29.	The entire system will be deployed centrally through which each branch can utilize their computing power of their localized system and should get the benefits of the centralized Engineered Storage.	BOO to check this practically by visiting all branches of AR
30.	The system should store a Centralized Database which is to be used by all the modules for different branches.	BOO to check this practically on staging and production server.
31.	The system should store all data pertaining to all automations related to records and will be accessed by various automation systems through a central console.	BOO to check this practically on staging and production server.
32.	The system should just take one entry and the same data should be replicated to all other sections of records instantly.	BOO to check this practically by submitting data on staging and production server.
33.	Data verification will be done by the one single branch or user and same verified data will also be accessible to all other branch.	BOO to check this practically on staging and production server.
34.	The system should give alert to the user if the personnel data is not verified properly and until the process is not completed the system should not proceed to further process.	BOO to check this practically on staging and production server.
35.	The system should check and validate duplicity of the data.	BOO to check this practically on ground that same data is not entered twice and also validate the same in database
36.	The system should validate personnel data so that the data should only be saved when the mandatory fields are filled properly.	BOO to check this practically on staging and production server.
37.	The system should perform background audit of each and every entries or transaction made by the user. The audit reports should be available to the System Administrator as and when required and for any specific period and time.	BOO to check this practically by generating audit report on staging and production server.
38.	The system should also track the login details of the user and should generate a login audit report. The Login should be configured with AR Access Key for authentication, encryption and signing if required.	BOO to check this practically by submitting data and generating audit report on staging and production server
39.	The system should have common database pertaining data to Posting, Promotion so that systems can instantly use them as and when needed.	BOO to check this practically by submitting data that data are stored in common database.



RECORD MODULES		
40.	The system should store master unit details.	BOO to check the system study and verify the same with the application in the staging and production server.
41.	The system should store master ranks details.	BOO to check the system study and verify the same with the application in the staging and production server
42.	The system should store master branch details.	BOO to check the system study and verify the same with the application in the staging and production server
43.	The system should store master Qualification Types	BOO to check the system study and verify the same with the application in the staging and production server
44.	The system should store master cast category.	BOO to check the system study and verify the same with the application in the staging and production server
45.	The system should store master religion details.	BOO to check the system study and verify the same with the application in the staging and production server
46.	The system should store master pay scale details.	BOO to check the system study and verify the same with the application in the staging and production server
47.	The system should store master pay matrix details.	BOO to check the system study and verify the same with the application in the staging and production server
48.	The system should store master leave category details.	BOO to check the system study and verify the same with the application in the staging and production server
49.	The system should store master allowances details.	BOO to check the system study and verify the same with the application in the staging and production server
50.	The system should store master deductions details.	BOO to check the system study and verify the same with the application in the staging and production server
51.	The system should store master award type details.	BOO to check the system study and verify the same with the application in the staging and production server
52.	The system should store master state details.	BOO to check the system study and verify the same with the application in the staging and production server
53.	The system should store master nationality details.	BOO to check the system study and verify the same with the application in the staging and production server
54.	The system should be capable of Storing the Personal Details	BOO to check the system study and verify the same with the application in the staging and production server.
55.	The system should be capable of Storing the Unit Details	BOO to check the system study and verify the same with the

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		application in the staging and production server
56.	The system should be capable of Storing the Enrollment Details	BOO to check the system study and verify the same with the application in the staging and production server
57.	The system should be capable of Storing the Education Details	BOO to check the system study and verify the same with the application in the staging and production server
58.	The system should be capable of Storing the Address Details	BOO to check the system study and verify the same with the application in the staging and production server
59.	The system should be capable of Storing the Martial Details	BOO to check the system study and verify the same with the application in the staging and production server
60.	The system should be capable of creating a Create Level User who will be responsible for BRO Creation	BOO to check the system study and verify the same with the application in the staging and production server
61.	The system should be capable of creating a Verify Level User who will be responsible for Verifying the BROs Created	BOO to check the system study and verify the same with the application in the staging and production server
62.	The system should be capable of creating a Authorize Level User who will be responsible for Authorizing the BROs verified	BOO to check the system study and verify the same with the application in the staging and production server.
63.	The system should allow the Create level user to create BROs related to Desertion	BOO to check the system study and verify the same with the application in the staging and production server.
64.	The system should allow the Create level user to create BROs related to Dismiss Details	BOO to check the system study and verify the same with the application in the staging and production server.
65.	The system should allow the Create level user to create BROs related to Posting	BOO to check the system study and verify the same with the application in the staging and production server.
66.	The system should allow the Create level user to create BROs related to Separation	BOO to check the system study and verify the same with the application in the staging and production server.
67.	The system should allow the Create level user to create BROs related to Strength increase	BOO to check the system study and verify the same with the application in the staging and production server.
68.	The system should allow the Create level user to create BROs related to Strength increase	BOO to check the system study and verify the same with the application in the staging and production server.
69.	The system should allow the Create level user to create BROs related to Allowance	BOO to check the system study and verify the same with the application in the staging and production server.
70.	The system allow the Create level user to create BROs related to Awards/Medals	BOO to check the system study and verify the same with the application in the staging and production server.
71.	The system should allow the Create level user to create BROs related to Child Education	BOO to check the system study and verify the same with the

		application in the staging and production server.
72.	The system should allow the Create level user to create BROs related to Financial Assistance	BOO to check the system study and verify the same with the application in the staging and production server.
73.	The system should allow the Create level user to create BROs related to Hostel	BOO to check the system study and verify the same with the application in the staging and production server.
74.	The system should allow the Create level user to create BROs related to Leave entry	BOO to check the system study and verify the same with the application in the staging and production server.
75.	The system should allow the Create level user to create BROs related to Officiating Pay	BOO to check the system study and verify the same with the application in the staging and production server.
76.	The system allow the Create level user to create BROs related to Pay Fixation	BOO to check the system study and verify the same with the application in the staging and production server.
77.	The system should allow the Create level user to create BROs related to Promotion	BOO to check the system study and verify the same with the application in the staging and production server.
78.	The system should allow the Create level user to create BROs related to Family	BOO to check the system study and verify the same with the application in the staging and production server.
79.	The system should allow the Create level user to create BROs related to Family Planning	BOO to check the system study and verify the same with the application in the staging and production server.
80.	The system allow the Create level user to create BROs related to Former Service	BOO to check the system study and verify the same with the application in the staging and production server.
81.	The system allow the Create level user to create BROs related to Hospitalization	BOO to check the system study and verify the same with the application in the staging and production server.
82.	The system should allow the Create level user to create BROs related to Injuries	BOO to check the system study and verify the same with the application in the staging and production server.
83.	The system should allow the Create level user to create BROs related to Medical Categorization	BOO to check the system study and verify the same with the application in the staging and production server.
84.	The system should allow the Create level user to create BROs related to Miscellaneous Details	BOO to check the system study and verify the same with the application in the staging and production server.
85.	The system should allow the Create level user to create BROs related to Punishment	BOO to check the system study and verify the same with the application in the staging and production server.
86.	The system should allow the Create level user to create BROs related to Qualification	BOO to check the system study and verify the same with the application in the staging and production server.
87.	The system should allow the Create level user to create BROs related to Review of service	BOO to check the system study and verify the same with the

		application in the staging and production server.
88.	The system should allow the Create level user to create BROs related to Cancellation of BROs	BOO to check the system study and verify the same with the application in the staging and production server..
89.	The system allow the Create level user to create BROs related to Casualty Amendment	BOO to check the system study and verify the same with the application in the staging and production server.
90.	The system should be capable of Uploading BROs Created on the Server Online	BOO to check the system study and verify the same with the application in the staging and production server.
91.	The system should allow the Create level user to Check BRO Details	BOO to check the system study and verify the same with the application in the staging and production server.
92.	The system should allow the Verify level user to Verify BRO Details	BOO to check the system study and verify the same with the application in the staging and production server.
93.	The system should allow user to capture and generate reports based on the following enclosures:	BOO to check the system study and verify the reports.
94.	Enclosure-A (Details of Group I to Group IV part II order format)	BOO to check the system study and verify the reports.
95.	Enclosure-B (Report format for part II order)	BOO to check the system study and verify the reports.
96.	Enclosure-C (Details of ALL PROMOTION CADRE PART II ORDER format)	BOO to check the system study and verify the reports.
97.	Enclosure-D (Details of Assam Rifles Ex- Servicemen association (ARESA))	BOO to check the system study and verify the reports.
98.	Enclosure-E (Details of Conveyance Adv Scheme format)	BOO to check the system study and verify the reports.
99.	Enclosure-F (Details of Loan Application Form For Grant Of House Building Loan From ARGIF)	BOO to check the system study and verify the reports.
100.	Enclosure-G (Details of Proposal For Introduction Of Computer Advance Scheme From ARGIS Fund For Purchase Of Computer For ARGIS Members (AR CADRE OFFRs, ARMOs, JCOs AND OR))	BOO to check the system study and verify the reports.
101.	Enclosure-H (Details of Marriage Loan Scheme From ARGIS Fund To Meet The Expenditure On Marriage Of Wards (Daughter/Son) Of ARGIS Members (AR CADRE OFFRs, ARMOs, JCOs AND OR))	BOO to check the system study and verify the reports.
102.	Enclosure-J (Details of Education Loan Scheme From ARGIS To Meet The Expense On Higher Education For Wards And Wives Of ARGIS Members (AR CADRE OFFRs, ARMOs, JCOs AND OR))	BOO to check the system study and verify the reports.
103.	Enclosure-K (Details of History of Service)	BOO to check the system study and verify the reports.
104.	Enclosure-L (Details of Family Pension)	BOO to check the system study and verify the reports.
105.	Enclosure-M (Details of Receipt and Dispatch)	BOO to check the system study and verify the reports.
106.	Enclosure-N (Occurrences and Abbreviation)	BOO to check the system study and verify the reports.
107.	Enclosure-P (Details of Leave formats)	BOO to check the system study and verify the reports.
108.	Enclosure-Q (Format for Daily and monthly Feeding Str Unit & Att Personal)	BOO to check the system study and verify the reports.
109.	Enclosure-R (Details of Online Posting Requisition Module)	BOO to check the system study and verify the reports.
110.	Enclosure-S (Details of Registers Online and reports)	BOO to check the system study

		and verify the reports.
111.	Enclosure-T (Format for Ex-Servicemen Contributory Health Scheme (ECHS) membership form)	BOO to check the system study and verify the reports.
112.	Enclosure-U (Details of Annual Confidential Report forms)	BOO to check the system study and verify the reports.
113.	Enclosure-V (Details of Statement Showing Fixation Of Pay In Terms Of Central Civil Services (Revised Pay) Rules, 2016	BOO to check the system study and verify the reports.
114.	Enclosure-W (Details of Individual profile Card, Posting In/Out Records register: Teaching Staff & CIV Para Med Staff)	BOO to check the system study and verify the reports.
115.	Enclosure-X (Formats for Causality form, Recruit Progress Chart, Leave Account form, Agreement format, Medical Categorization, wound & Injuries form, Absence, Desertion, rejoining Form, Service Non-reckonable towards pension and Gratuity form, Hospital admission/ Transfers/ Discharges form, Former Service, Records of Punishment, regimental and Instructional Appointments form, Posting and transfer forms, Promotion details, Qualification details, Home address details, Records of particulars	BOO to check the system study and verify the reports.
116.	Enclosure-Y (Details of Non payment of insurance Cover by SBI/Banks, Advisory on DSP Account)	BOO to check the system study and verify the reports.
117.	Enclosure-Z (Details of Death cases)	BOO to check the system study and verify the reports.
118.	Enclosure-AA (Online Grievances form)	BOO to check the system study and verify the reports.
119.	Enclosure-AB (Details of Change Request & Enhancement)	BOO to check the system study and verify the reports.
CPBO INTEGRATION		
120.	The system should seamlessly gather data from record and PAO module for bill processing.	BOO to check the system study and verify the reports.
121.	CPBO should only generate the final pay slip of the individuals after the PAO generates the credits statement.	BOO to check the system study and verify the reports.
122.	CPBO can automatically update bill information based on new rank and location where the personnel is posted.	BOO to check the system study and verify the reports.
123.	The system should automatically display provident fund data to CPBO instantly when the data is updated from the GPF section.	BOO to check the system study and verify the reports.
124.	The system should have multi-layered checks to ensure that only eligible individuals pay slips are generated. The slips should have a cross reference from the PAY generated Credit Statement.	BOO to check the system study and verify the reports.
125.	The system should automatically calculate leave encashment of the personnel when the person retires from Assam Rifles	BOO to check the system study and verify the reports.
126.	The system should be able to verify the data entered by the CPBO.	BOO to check the system study and verify the reports.
127.	The system should be able to credit the bill to the individual's account upon successful verification.	BOO to check the system study and verify the reports.
128.	The system should be able to generate credit report for payment after the verification of final bills received from CPBO.	BOO to check the system study and verify the reports.
129.	**Requirement Analysis**	
	Analyse user requirements to arrive at a proposed solution for the system in terms of Software characteristics. This Phase is initiated on approval of a project Proposal. The deliverables this Phase define the proposed System in enough details to justify the recommendations presented and to prepare an implementation plan. This Phase may include following activities: (i) Examine the current System (ii) Define System context and objectives of the	BOO to check the system study and verify the same with the application in the staging production server.

	proposed System (iii) Build Conceptual Data Model (iv) Build Conceptual Process Model (v) Establish basic System concepts by Conceptualizing Prototype. Prepare a User Requirement Specification and System Requirement Specification and get it approved.	
130.	**High Level Design**	
	Define the overall functioning of the System and establish the Functional and Physical rules and design guidelines. The functional definition of the System is presented in the documentation in a manner understandable to the user as well as development Team. This Phase may include following activities: (i) Build Functional Data Model (ii) Build Functional Process Model (iii) Define System performance criteria (iv) Define Architectural Standards (v) Build Prototype Prepare Functional Specifications for Unit Process	BOO to check the system study and verify the same with the application in the staging production server.
131.	**Low Level Design**	
	Do the detailed design of the Software components and write specifications of various software components based on High Level Design. The Function design documentation should allow the user to approve the description of each Unit Process and contain sufficient details to allow the development Team to process with System Construction activities. The Phase includes following activities: (i) Build Physical Data Model (ii) Build Physical Process Model *Write Specifications for Unit Process*	BOO to check the system study and verify the same with the application in the staging production server.
132.	**Construction, Compilation and Testing**	
	Produce Unit tested Software components. This include following activities: (i) Program Physical Data Model (ii) Program Physical Process Model (iii) Prepare User guides and documentation (iv) Conduct Unit Testing with demo data.	BOO to check the system study and verify the same with the application in the staging production server.
133.	**Training, finalizing implementation.**	
	Providing Training on all modules as per plan and *schedule provided by HQ DGAR.* The phase will be the final phase which will consist of the following : (i) On Hand Training along with implementation. (ii) Once the users are confident a final phase of training will be provided. (iii) Package will be handed over in running condition.	BOO to check practically on ground that the training is provided by the vendor
134.	**Documentation**	
	Providing Detailed documentation for managing system technically and at User Level. Documentation to Include Technical Documentation & User Manual for the Entire Developed System.	BOO to check this practically by the documents submitted by the vendor
135.	The Platform should be platform independent and should run on Linux.	BOO to check this practically by running the application on different platform and on linux on staging and production server
136.	The System Should run on Virtualized environment.	BOO to check this practically by running the application on virtualized environment.

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2. Hyper Convergent Infrastructure with Licenses

Sl. No.	Parameter	Specification	Trial Directives
1	Make/Brand	HCI appliance OEM shall be in the Leaders category consecutively in last two published Gartner's Magic Quadrant reports on "Hyperconverged Infrastructure".	BOO to verify Gartner Magic Quadrant report submitted by vendor
2	Hyper Converged Appliance	Hyper converged appliance, which comes Factory Installed with various software including Software Defined Storage and hypervisor. SDS should NOT be top-up or add-on software license bundled on generic x86 server. It should be an integral part of appliance.	BOO to verify from certificate of compliance from the OEM/ Brochure
3		Proposed HCI Appliance should be in all flash drive configuration using not more than 2TB capacity drives. Usable capacity per-node should be after all overheads in respect of core/memory/storage being used for deduplication, compression and optimization.	BOO to verify practically on ground
4		Solution must be able to integrate storage, compute, networking, hypervisor, real-time deduplication, compression, and optimization along with powerful data management, data protection, and disaster recovery capabilities in a standard x86 server building block.	BOO to verify from certificate of compliance from the OEM/ Brochure
5		Nodes should offer Storage Features such as De-duplication and Compression. Replication / backup license(s) should be provided for the full capacity of the system. Storage performance monitoring software should be included. Future capacity growth shall not warrant any additional software license on the storage landscape.	BOO to verify from certificate of compliance from the OEM/ Brochure
6		Proposed hardware must be capable to de-duplicate, compress & optimize all data inline, in real-time with fine data granularity of minimum 8KB data blocks.	BOO to verify from certificate of compliance from the OEM/ Brochure
7		Solution should ensure minimum impact to production workloads and guaranteed CPU and RAM available to user applications while doing global dedupe, compression and optimization.	BOO to verify from certificate of compliance from the OEM/ Brochure
8		The Hypervisors are to be installed in the nodes along with Cloud / Virtualization Management. The management node requirements, if any should be included by default and management node to be considered outside of the HCI nodes. All offered licenses for virtualization manager are to be of non-embedded type and should have no limitation of functionality.	BOO to verify from certificate of compliance from the OEM/ Brochure
9		Should also have capability to use Network Virtualization (SDN).	BOO to verify from certificate of compliance from the OEM/ Brochure
10	Nodes Required	Minimum 4 (Four)	BOO to verify practically on ground
11	Processor	Latest Generation Intel® (Skylake) Processors product family, >=3.00 GHz per Core. Populated with minimum 2 sockets per node.	BOO to verify practically on ground

12	Total Physical Cores	72 Cores (Including all the Nodes)	BOO to verify practically on ground
13	Processor Cache	Min. 22 MB L3 Cache	BOO to verify practically on ground
14	Total Physical RAM	Min. 500GB DDR4. Scalability to double or more of provisioned RAM	BOO to verify practically on ground
15	Total Usable Storage	Min. 25 TB Usable capacity post Deduplication and compression for the entire cluster in HA state. The proposed solution must be able to sustain one node failure and it should in no way affect/degrade the production services & usable resources, to the end user application.	BOO to verify practically on ground
16	Network	Minimum 4 x 10Gb SFP+ (SR) Ethernet ports (each Node) and 4 x 1Gb RJ45 Ethernet ports (Additional ports to be configured by bidders as per their solution requirement). Additionally, Minimum 1 no 1Gb RJ45 Ethernet management port.	BOO to verify practically on ground
17	Data Protection Features	Backup functionality as an integrated feature or separate server / software license to be offered.	BOO to verify from certificate of compliance from the OEM/ Brochure
18		Backup must be an independent copy of source Virtual Server and must allow restore of deleted or corrupted source Virtual Server	BOO to verify from certificate of compliance from the OEM/ Brochure
19		Replication across separate data centre with the ability to carry simultaneous out bi-directional replication between two data centres and with the ability to replicate Any-to-Any in a Mesh Data Centre deployment of more than 3 DC's.	BOO to verify from certificate of compliance from the OEM/ Brochure
20		The ability to define backup policy per data store, a group of VMs or specific VM	BOO to verify from certificate of compliance from the OEM/ Brochure
21		Data Protection should have RPO of 10 minutes for local backups	BOO to verify from certificate of compliance from the OEM/ Brochure
22		The ability to execute backup tasks during office hours without impacting to production workloads	BOO to verify from certificate of compliance from the OEM/ Brochure
23		Data loss protection against single node failure in cluster	BOO to verify from certificate of compliance from the OEM/ Brochure
24		The proposed solution must be able to provide backup reports for audit purpose	BOO to verify from certificate of compliance from the OEM/ Brochure
25	Hypervisor	VMWare ESX Hypervisor needs to be proposed with the HCI Appliance for this requirement.	BOO to verify from certificate of compliance from the OEM/ Brochure
26		Proposed solution must be able to support the following VM-Centricity and Mobility feature:	BOO to verify from certificate of compliance from the OEM/ Brochure
27		i) Backups for specific VMs and Clone specific VMs	BOO to verify from certificate of compliance from the OEM/ Brochure
28		ii) Ability to move specific VMs between data centres	BOO to verify from certificate of compliance from the OEM/ Brochure
29		iii) VM-level backup instead of forcing protection at the data store or protection domain level	BOO to verify from certificate of compliance from the OEM/ Brochure
30	Data	Data recovery should be independent of	BOO to verify from certificate of

	Recovery Features	source Virtual Server	compliance from the OEM/ Brochure
31		Solution should provide a backup catalogue to allow any Virtual Server to be recovered to any specific point-in-time	BOO to verify from certificate of compliance from the OEM/ Brochure
32		Data recovery process should be simple with an RTO in minutes	BOO to verify from certificate of compliance from the OEM/ Brochure
33	Storage Controller in Nodes	SAS RAID controller with minimum 4GB cache for RAID 0, 1 and 5	BOO to verify practically on ground
34	Rack Unit	Minimum 2U or higher rack unit (RU) configuration Appliance with Sliding Rails and Cable Management Arm.	BOO to verify practically on ground
35	Redundancy & Business Continuity	Dedicated non-shared Redundant platinum rated AC power supplies on each of the proposed HCI appliance nodes and should be able to sustain single power supply failure per-node.	BOO to verify from certificate of compliance from the OEM/ Brochure
36		Solution should be able to sustain one node failure per cluster.	BOO to verify from certificate of compliance from the OEM/ Brochure
37		Solution should be able to sustain 1 NIC port failure per node.	BOO to verify from certificate of compliance from the OEM/ Brochure
38		During a single component failure of any type in any node, production services should not be affected or degraded in anyway.	BOO to verify from certificate of compliance from the OEM/ Brochure
39		Solution should be able to sustain multiple points of failure with no loss of functionalities or data.	BOO to verify from certificate of compliance from the OEM/ Brochure
40		Availability of Data Store with zero RPO for all VMs is to be ensured in the event up to 2 Node failure for the stretch clusters at D3 domain.	BOO to verify from certificate of compliance from the OEM/ Brochure
41		In the event of a Hard drive failure, appliance should not be affected and virtual machines should continue to run on the appliance. Drive replacement should be seamless to virtual machines hosted on the appliance.	BOO to verify from certificate of compliance from the OEM/ Brochure
42		Solution should be able to sustain 2 SSD Disk failure per physical node, and 1 HDD failure simultaneously in each node of cluster across all nodes in cluster.	BOO to verify from certificate of compliance from the OEM/ Brochure
43	Disaster Recovery Features	The solution must provide a simple failover operation.	BOO to verify from certificate of compliance from the OEM/ Brochure
44		The solution must allow changing of IP address of recovered Virtual Servers to match target data centre.	BOO to verify from certificate of compliance from the OEM/ Brochure
45		The solution should allow changing Virtual Server settings (example vCPU, vRAM, vSwitch) if required	BOO to verify from certificate of compliance from the OEM/ Brochure
46		The solution must allow the option to test DR failover to separate network with no impact to production workloads	BOO to verify from certificate of compliance from the OEM/ Brochure
		The solution should have feature to assist in failback process to Primary datacentre	BOO to verify from certificate of compliance from the OEM/ Brochure
48		Hyperconverged solution should have a guaranteed local cluster backup time of 1 minute	BOO to verify from certificate of compliance from the OEM/ Brochure
		Data Protection should have a minimum RPO of 10 minutes for local backups	BOO to verify from certificate of compliance from the OEM/

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			Brochure
50		Data recovery process should be simple with an RTO in minutes	BOO to verify from certificate of compliance from the OEM/ Brochure
51	Manageability	The ability for a single administrator to manage all aspects of the Hyper-convergence from within the Virtualization Manager or server OEM browser based software for all sites.	BOO to verify from certificate of compliance from the OEM/ Brochure
52		Globally manage Backup Policies per Data store or per VM.	BOO to verify from certificate of compliance from the OEM/ Brochure
53		VM-centric management through a single pane of glass via the virtualization manager or server OEM browser based software.	BOO to verify from certificate of compliance from the OEM/ Brochure
54		Programmatic/API interface to enable automated tasks like failover/failback.	BOO to verify from certificate of compliance from the OEM/ Brochure
55		System remote management should support browser based graphical remote console along with Virtual Power button, remote boot using USB/CD/DVD Drive. It should be capable of offering upgrade of software and patches from a remote client using Media/image/folder.	BOO to verify from certificate of compliance from the OEM/ Brochure
56		Should help provide proactive notification of actual or impending component failure alerts on critical components like CPU, Memory and HDD.	BOO to verify from certificate of compliance from the OEM/ Brochure
57		System should support embedded remote support to transmit hardware events directly to OEM or an authorized partner for automated phone home support	BOO to verify from certificate of compliance from the OEM/ Brochure
58	Scalability	Minimum scalability of 12 nodes in the same cluster.	BOO to verify from certificate of compliance from the OEM/ Brochure
59		Hyper-converged solution must be able to allow in-box upgrade of CPU, RAM and storage capacity as well as scale-out expansion	BOO to verify from certificate of compliance from the OEM/ Brochure
60		Hyper-converged solution should support addition of compute/access nodes to provide additional compute resources	BOO to verify from certificate of compliance from the OEM/ Brochure
61	Server Security	Should maintain repository for firmware and drivers recipes in the flash drive associated to management port. This is to aid rollback or patching of compromised firmware. Should also store Factory Recovery recipe preloaded to rollback to factory tested secured firmware	BOO to verify from certificate of compliance from the OEM/ Brochure
62		For firmware security, Hyperconverged system should support remote management chip creating a fingerprint in the silicon, preventing system from booting up unless the firmware matches the fingerprint. This feature should be immutable	BOO to verify from certificate of compliance from the OEM/ Brochure
63	OS Support	Windows 2012 and 2016 Standard/Data Center, SUSE Enterprise Linux, RHEL 6.x, (All latest flavors of Linux and Windows) in Virtual Machines	BOO to verify from certificate of compliance from the OEM/ Brochure

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64	Serviceability	Proposed Nodes shall provide insights, forecasting and recommendations for quicker problem resolutions including automating case creation or alternate solution on proactive support services with proactive parts dispatch directly from OEM.	BOO to verify from certificate of compliance from the OEM/ Brochure
73	Warranty	On-site Comprehensive Warranty and Service including all spares, and service offering with NBD on-site for parts as well as telephone support 24 hours.	BOO to verify from certificate of compliance from the OEM/ Brochure

3. Artificial Intelligence

S. No	Description of Requirements		Trial Directives
1	The system should have deep learning platform providing unprecedented performance with industry leading 1 GPUs, fast GPU interconnect, high bandwidth fabric and a configurable GPU topology to match your workloads.		BOO to verify from certificate of compliance from the OEM/ Brochure
2	The system should have the ability to autonomously learn, predict, and adapt using massive data sets.		BOO to verify from certificate of compliance from the OEM/ Brochure
3	**Processor/Cache** CPU Cores GPU	• 2 x Intel Xeon Scalable Processors with 3UPI links, 2.4GHz Processor base frequency • 20 cores with Intel HT Technology • 4 NVIDIA TESLA V100 SXM2 GPUs • 300 GB/s GPU-to-GPU NVIDIA NVLINK	BOO to verify practically on ground
3	**System Memory** Memory Capacity Memory Type	• 12 DIMM slots • 384GB DDR4- 2666 ECC DIMM • 2666/2400/2133MHz ECC DDR4 SDRAM	BOO to verify practically on ground
4	**SSD**	• 4 x 1.92TB	BOO to verify practically on ground
5	**On-Board Devices** Chipset SATA Network Connectivity IPMI	• Intel C621 chipset • SATA3 (6Gbps) with RAID 0, 1, 5, 10 • Intel X540 Dual Port 10GBase-T • Support for Intelligent	BOO to verify practically on ground

		Platform Management Interface v.2.0	
6	**Input/Output** SATA LAN USB VGA	• 4 SATA3 (6Gbps) ports • 2 RJ45 10GBase-T ports and 1 RJ45 Dedicated IPMI LAN port • Minimum 2 USB 3.0 ports • 1 VGA port	BOO to verify practically on ground
7	**Chassis** Form Factor	• 4U Rackmount	BOO to verify practically on ground
8	**Expansion Slots** PCI-Express	• 4 PCI-E 3.0 x 16 slots	BOO to verify practically on ground
9	**Drive Bays** Hot-swap	• 2 Hot-swap 2.5" SAS/SATA drive bays	BOO to verify practically on ground
10	**Power Supply**	• 2000W Redundant Power Supplies Titanium Level	BOO to verify practically on ground

4. High End Switch

S. No	Specification	Trial Directives
1	**Architecture**	
a.	The switch should have at least 48 SFP+ ports , 24 1G/10G Base T ports, 8 x10 G SFP+, 8 x1 G-SFP from day-1	BOO to verify practically on ground
b.	The Switch should support,1 RJ-45 serial console port,1 RJ-45 out-of-band management port and 1 USB 2.0 port	BOO to verify practically on ground
c.	The switch should support dual power supply and 2 fan tray slots	BOO to verify practically on ground
d.	The switch Shall support 1000 Base-SX, LX, LH	BOO to verify practically on ground
e.	The switch Shall Support 10Gbase-SR,LR,LRM,ER	BOO to verify practically on ground
f.	The switch should have 1GB flash, 4 GB SDRAM	BOO to verify practically on ground
g.	The Switch should have 16 MB packet buffer size	BOO to verify practically on ground
h.	The switch should have 10 Gbps Latency < 1µs (64-byte packets)	BOO to verify practically on ground
i.	All the ports in the Switch should be 2U 19" Rack-Mountable	BOO to verify practically on ground
j.	At least 2.5Tbps switching capacity	BOO to verify from certificate of compliance from the OEM/ Brochure
k.	The switch shall have switching throughput of minimum 1900 million pps	BOO to verify from certificate of compliance from the OEM/ Brochure
l.	MAC Address table size of 200,000 entries	BOO to verify from certificate of compliance from the OEM/ Brochure
m.	Switch should at least support 100,000 routing entries IPV4, 50,000 entries (IPv6)	BOO to verify from certificate of compliance from the OEM/ Brochure
2	**Quality of Service (QoS)**	
a.	The Switch should support Strict Priority (SP), WRR, WDRR, WFQ, SP+WRR, SP+WDRR, SP+WFQ, Configurable Buffer, Time range, Queue Shaping, CAR with 8 Qps granularity	BOO to verify from certificate of compliance from the OEM/ Brochure

b.	The Switch should support packet filtering at L2 (Layer 2) through L4 (Layer 4); flow classification based on source MAC address, destination MAC address, source IP (IPv4/IPv6) address, destination IP (IPv4/IPv6) address, port, protocol, and VLAN.	BOO to verify from certificate of compliance from the OEM/ Brochure
3	**Data center optimized**	
a.	The Switch should have cut-through and nonblocking architecture	BOO to verify from certificate of compliance from the OEM/ Brochure
b.	The switch should support up to four switches can be combined to deliver unmatched scalability of virtualized access layer switches and flatter two-tier networks and switch should support single IP management upto four Switch	BOO to verify from certificate of compliance from the OEM/ Brochure
c.	The Switch should have Advanced modular operating system	BOO to verify from certificate of compliance from the OEM/ Brochure
d.	The Switch should support TRILL, SPB and EVB/VEPA	BOO to verify from certificate of compliance from the OEM/ Brochure
e.	The Switch should support Reversible airflow	BOO to verify from certificate of compliance from the OEM/ Brochure
f.	The Switch should have Internal redundant and hot-pluggable power supplies and dual fan trays	BOO to verify from certificate of compliance from the OEM/ Brochure
g.	The Switch should support for IEEE 802.1Qbb Priority Flow Control (PFC), Data Center Bridging Exchange (DCBX), IEEE 802.1Qaz Enhanced Transmission Selection (ETS), Explicit Congestion Notification (ECN) for converged FCoE, iSCSI and RoCE environments.	BOO to verify from certificate of compliance from the OEM/ Brochure
h.	The Switch should support FCoE	BOO to verify from certificate of compliance from the OEM/ Brochure
i.	The Switch should support Jumbo frames sizes of up to 10,000 bytes on Gigabit Ethernet and 10-Gigabit ports	BOO to verify practically on ground
j.	The Switch should support VXLAN Support	BOO to verify from certificate of compliance from the OEM/ Brochure
k.	The Switch should support VXLAN Layer 2 Gateway support for up to 4k tunnels	BOO to verify from certificate of compliance from the OEM/ Brochure
l.	The Switch should support Dynamic VXLAN configuration	BOO to verify from certificate of compliance from the OEM/ Brochure
m.	The Switch should support OVSDB for dynamic VXLAN configuration	BOO to verify from certificate of compliance from the OEM/ Brochure
4	**Manageability**	
a.	The Switch should support ingress and egress port monitoring and traceroute and ping	BOO to verify from certificate of compliance from the OEM/ Brochure
b.	The Switch should support multiple configuration files to be stored to a flash image	BOO to verify from certificate of compliance from the OEM/ Brochure
c.	The Switch should support sFlow (RFC 3176)	BOO to verify from certificate of compliance from the OEM/ Brochure
d.	The Switch should support SNMP v1, v2c and v3	BOO to verify from certificate of compliance from the OEM/ Brochure
e.	The Switch should support Out-of-band interface	BOO to verify from certificate of compliance from the OEM/ Brochure
f.	The Switch should support Remote configuration and management	BOO to verify from certificate of compliance from the OEM/

		Brochure
g.	The Switch should support ISSU and hot patching	BOO to verify from certificate of compliance from the OEM/ Brochure
h.	The Switch should support automatic configuration via DHCP autoconfiguration	BOO to verify from certificate of compliance from the OEM/ Brochure
i.	The Switch should support NTP, SNTP and PTP	BOO to verify from certificate of compliance from the OEM/ Brochure
5	**Resiliency and high availability**	
a.	The Switch shall have the capability to extend the control plane across multiple active switches making it a virtual switching fabric, enabling interconnected switches to perform as single Layer-2 switch and Layer-3 router The switch should support up to six switches can be combined to deliver unmatched scalability of virtualized access layer switches and flatter two-tier networks and switch should support single IP management upto six Switch	BOO to verify from certificate of compliance from the OEM/ Brochure
b.	The Switch should support IEEE 802.1w Rapid Convergence Spanning Tree Protocol	BOO to verify from certificate of compliance from the OEM/ Brochure
c.	The Switch should support IEEE 802.1s Multiple Spanning Tree	BOO to verify from certificate of compliance from the OEM/ Brochure
d.	The Switch should support Virtual Router Redundancy Protocol (VRRP)	BOO to verify from certificate of compliance from the OEM/ Brochure
e.	The Switch should support Hitless patch upgrades	BOO to verify from certificate of compliance from the OEM/ Brochure
f.	The Switch should support Bidirectional Forwarding Detection (BFD) to enables link connectivity monitoring and reduces network convergence time for RIP, OSPF, BGP, IS-IS, VRRP, MPLS, and switch virtulisation technology	BOO to verify from certificate of compliance from the OEM/ Brochure
g.	The Switch should support Device Link Detection Protocol (DLDP)	BOO to verify from certificate of compliance from the OEM/ Brochure
h.	The Switch should support Graceful restart for OSPF, BGP, and IS-IS	BOO to verify from certificate of compliance from the OEM/ Brochure
6	**Layer 2 switching**	
a.	The Switch should support MAC-based VLAN	BOO to verify from certificate of compliance from the OEM/ Brochure
b.	The Switch should support Address Resolution Protocol (ARP) and supports static, dynamic, and reverse ARP and ARP proxy	BOO to verify from certificate of compliance from the OEM/ Brochure
c.	The Switch should support IEEE 802.3x Flow Control	BOO to verify from certificate of compliance from the OEM/ Brochure
d.	The Switch should support Ethernet Link Aggregation	BOO to verify from certificate of compliance from the OEM/ Brochure
e.	The Switch should support support STP (IEEE 802.1D), Rapid STP (RSTP, IEEE 802.1w), and Multiple STP (MSTP, IEEE 802.1s)	BOO to verify from certificate of compliance from the OEM/ Brochure
f.	The Switch should support for 4,096 VLANs based on port, MAC address, IPv4 subnet, protocol, and guest VLAN; supports VLAN mapping	BOO to verify from certificate of compliance from the OEM/ Brochure
g.	The Switch should support for IGMP Snooping, Fast-Leave, and Group-Policy; IPv6 IGMP Snooping provides Layer 2 optimization of multicast traffic	BOO to verify from certificate of compliance from the OEM/ Brochure

h.	The Switch should support DHCP support at Layer 2	BOO to verify from certificate of compliance from the OEM/ Brochure
7	**Layer 3 services**	
a.	The Switch should support Address Resolution Protocol (ARP)	BOO to verify from certificate of compliance from the OEM/ Brochure
b.	The Switch should determines the MAC address of another IP host in the same subnet; supports static ARPs; gratuitous ARP allows detection of duplicate IP addresses; proxy ARP allows normal ARP operation between subnets or when subnets are separated by a Layer 2 network	BOO to verify from certificate of compliance from the OEM/ Brochure
c.	The Switch should support simplifies the management of large IP networks and supports client and server; DHCP Relay enables DHCP operation across subnets	BOO to verify from certificate of compliance from the OEM/ Brochure
d.	The Switch should support for Connectivity Fault Management (IEEE 802.1AG) and Ethernet in the First Mile (IEEE 802.3AH); provides additional monitoring that can be used for fast fault detection and recovery	BOO to verify from certificate of compliance from the OEM/ Brochure
8	**Layer 3 routing**	
a.	The Switch should support Virtual Router Redundancy Protocol (VRRP) and VRRP Extended	BOO to verify from certificate of compliance from the OEM/ Brochure
b.	The Switch should support Policy-based routing	BOO to verify from certificate of compliance from the OEM/ Brochure
c.	The Switch should support Equal-Cost Multipath (ECMP)	BOO to verify from certificate of compliance from the OEM/ Brochure
9	**Layer 3 IPv4 routing**	
a.	The Switch should support static routes, RIP and RIPv2, OSPF, BGP, and IS-IS	BOO to verify from certificate of compliance from the OEM/ Brochure
b.	The Switch should support Border Gateway Protocol 4 (BGP-4)	BOO to verify from certificate of compliance from the OEM/ Brochure
c.	Intermediate system to intermediate system (IS-IS)	BOO to verify from certificate of compliance from the OEM/ Brochure
d.	The Switch should support Static IPv6 routing	BOO to verify from certificate of compliance from the OEM/ Brochure
e.	The Switch should support separate stacks for IPv4 and IPv6 to ease the transition from an IPv4-only network to an IPv6-only network design	BOO to verify from certificate of compliance from the OEM/ Brochure
f.	The Switch should support Routing Information Protocol next generation (RIPng) extends RIPv2 to support IPv6 addressing	BOO to verify from certificate of compliance from the OEM/ Brochure
g.	The Switch should support OSPF support for IPv6, BGP-4 to support Multiprotocol BGP (MBGP), including support for IPv6 addressing, IS-IS for IPv6	BOO to verify from certificate of compliance from the OEM/ Brochure
h.	The Switch should allow custom filters for increased performance and security; supports ACLs, IP prefix, AS paths, community lists, and aggregate policies	BOO to verify from certificate of compliance from the OEM/ Brochure
	The Switch should enables link connectivity monitoring and reduces network convergence time for RIP, OSPF, BGP, IS-IS, VRRP, MPLS, and switch virtualisation technology	BOO to verify from certificate of compliance from the OEM/ Brochure
	The Switch should Multicast Routing PIM Dense and Sparse modes	BOO to verify from certificate of compliance from the OEM/ Brochure
10	**Layer 3 IPv6 routing**	
	The Switch should static routing, RIPng, OSPFv3, BGP4+ for IPv6, and IS-ISv6	BOO to verify from certificate of compliance from the OEM/ Brochure

b.	Green IT and power	BOO to verify from certificate of compliance from the OEM/ Brochure
c.	The Switch should able to shut off unused ports and utilizes variable-speed fans, reducing energy costs	BOO to verify from certificate of compliance from the OEM/ Brochure
11	**Management**	
a.	The Switch should allow users to copy switch files to and from a USB flash drive	BOO to verify from certificate of compliance from the OEM/ Brochure
b.	The Switch should support Multiple configuration files and stores easily to the flash image	BOO to verify from certificate of compliance from the OEM/ Brochure
c.	The Switch should SNMPv1, v2c, and v3	BOO to verify from certificate of compliance from the OEM/ Brochure
d.	The Switch should Out-of-band interface	BOO to verify from certificate of compliance from the OEM/ Brochure
e.	The Switch should enable traffic on a port to be simultaneously sent to a network analyzer for monitoring	BOO to verify from certificate of compliance from the OEM/ Brochure
f.	The Switch should support Remote configuration and management	BOO to verify from certificate of compliance from the OEM/ Brochure
g.	The Switch should support IEEE 802.1AB Link Layer Discovery Protocol (LLDP)	BOO to verify from certificate of compliance from the OEM/ Brochure
h.	The Switch should support sFlow (RFC 3176)	BOO to verify from certificate of compliance from the OEM/ Brochure
i.	The Switch should leverag RADIUS to link a custom list of CLI commands to an individual network administrator's login; an audit trail documents activity	BOO to verify from certificate of compliance from the OEM/ Brochure
j.	The Switch should support Dual flash images	BOO to verify from certificate of compliance from the OEM/ Brochure
k.	The Switch should provide support of local and remote logging of events via SNMP (v2c and v3) and syslog; provides log throttling and log filtering to reduce the number of log events generated	BOO to verify from certificate of compliance from the OEM/ Brochure
l.	The Switch should provide support management access through a modem port and terminal interface, as well as in-band and out-of-band Ethernet ports; provides access through terminal interface, Telnet, or secure shell (SSH)	BOO to verify from certificate of compliance from the OEM/ Brochure
m.	The Switch should restrict access to critical configuration commands; offers multiple privilege levels with password protection; ACLs provide Telnet and SNMP access; local and remote syslog capabilities allow logging of all access	BOO to verify from certificate of compliance from the OEM/ Brochure
n.	The Switch should provide a central repository for system and network information; aggregates all logs, traps, and debugging information generated by the system and maintains them in order of severity; outputs the network information to multiple channels based on user-defined rules	BOO to verify from certificate of compliance from the OEM/ Brochure
o.	The Switch should mirror ingress/egress ACL-selected traffic from a switch port or VLAN to a local or remote switch port anywhere on the network	BOO to verify from certificate of compliance from the OEM/ Brochure
12	**Security**	
a.	The Switch should provide IP Layer 3 filtering based on source/destination IP address/subnet and source/destination TCP/UDP port number	BOO to verify from certificate of compliance from the OEM/ Brochure
b.	The Switch should support RADIUS/TACACS+	BOO to verify from certificate of compliance from the OEM/ Brochure

c.	The Switch should support Secure shell encrypt all transmitted data for secure remote CLI access over IP networks	BOO to verify from certificate of compliance from the OEM/ Brochure
d.	The Switch should support IEEE 802.1X and RADIUS network logins	BOO to verify from certificate of compliance from the OEM/ Brochure
e.	The Switch should support allow access only to specified MAC addresses, which can be learned or specified by the administrator	BOO to verify from certificate of compliance from the OEM/ Brochure
f.	The Switch should support LLDP-MED (Media Endpoint Discovery)	BOO to verify from certificate of compliance from the OEM/ Brochure
13	**Software Defined Networking (SDN) Capability**	
a.	The Switch should have OpenFlow 1.3.1 protocol capability to enable software-defined networking from Day one	BOO to verify from certificate of compliance from the OEM/ Brochure
b.	The Switch should Allow the separation of data (packet forwarding) and control (routing decision) paths, to be controlled by an external SDN Controller, utilizing Openflow protocol	BOO to verify from certificate of compliance from the OEM/ Brochure

5. Application Load Balancer

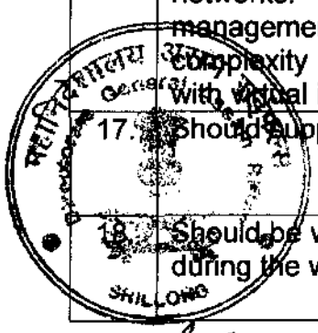
S. No.	Description of Requirements	Trial Directives
1.	**Architecture**	
a.	Should be high performance purpose built hardware with multicore CPU support.	BOO to verify from certificate of compliance from the OEM/ Brochure
b.	The appliance should have 8 GB RAM and 5 Gbps of system throughput to support multiple load balancing features and functions	BOO to verify from certificate of compliance from the OEM/ Brochure
c.	The appliance should have minimum 4 triple speed 10/100/1000 Mbps Gigabit copper ports & option for 2 * 10G SFP+ ports	BOO to verify practically on ground
d.	Solid state drive (SSD) for high I/O performance and dual power supply support	BOO to verify from certificate of compliance from the OEM/ Brochure
e.	Hardware based SSL acceleration with 2Gbps of bulk SSL throughput and 2800 2k SSL transactions per second (TPS)	BOO to verify from certificate of compliance from the OEM/ Brochure
f.	USB based fast failover support for automated configuration synchronization and improved failover time as compare to traditional cluster	BOO to verify from certificate of compliance from the OEM/ Brochure
g.	In order to meet high performance requirements load balancer must support virtual grouping (not clustering) of the appliances and must appear as single system.	BOO to verify from certificate of compliance from the OEM/ Brochure
h.	Multiple appliances in virtual group/domain should allow administrator to configure one or more applications application (virtual services) across both physical appliances to meet high performance requirement	BOO to verify from certificate of compliance from the OEM/ Brochure
2.	**Load balancing features**	
a.	Should able to load balancer both TCP and UDP based applications with layer 2 to layer 7 load balancing support	BOO to verify from certificate of compliance from the OEM/ Brochure
b.	The appliance should support server load balancing algorithms i.e. round robin, weighted round robin, least connection, Persistent IP, Hash IP, Hash Cookie, consistent hash IP, shortest response, proximity, snmp, SIP Session ID, hash header etc.	BOO to verify from certificate of compliance from the OEM/ Brochure
c.	Should support Multi-level virtual service policy routing – Static, default and backup policies for intelligent traffic distribution to backend servers	BOO to verify from certificate of compliance from the OEM/ Brochure
d.	Support for policy nesting at layer7 and layer4, solution should able to combine layer4 and layer7 policies to	BOO to verify from certificate of compliance from the OEM/

	address the complex application integration.	Brochure
e.	Script based functions support for content inspection, traffic matching and monitoring of HTTP, SOAP, XML, diameter, generic TCP, TCPS. Load balancer should support ePolicies to customize new features in addition to existing feature/functions of load balancer	BOO to verify from certificate of compliance from the OEM/ Brochure
f.	Traffic load balancing using ePolicies should support algorithms including round robin, least connections, shortest response, persistence ip, hash ip, hash ip and port, consistent hash ip and snmp	BOO to verify from certificate of compliance from the OEM/ Brochure
g.	Should provide application & server health checks for well-known protocols such as ARP, ICMP, TCP, DNS, RADIUS, HTTP/HTTPS, RTSP etc..	BOO to verify from certificate of compliance from the OEM/ Brochure
3.	**IPv6 gateway and Application acceleration**	
a.	Should provide performance optimization using TCP connection multiplexing, TCP buffering and IEEE 802.3ad link aggregation. Support for TCP optimization options including windows scaling, timestamp & Selective Acknowledgement for enhanced TCP transmission speed TCP optimization option configuration should be defined on per virtual service basis not globally.	BOO to verify from certificate of compliance from the OEM/ Brochure
b.	Appliance should provide real time Dynamic Web Content Compression to reduce server load and solution should provide selective compression for Text, HTML, XML, DOC, Java Scripts, CSS, PDF, PPT, and XLS Mime types.	BOO to verify from certificate of compliance from the OEM/ Brochure
c.	should provide advanced high performance memory/packet based reverse proxy Web cache; fully compliant with HTTP1.1 to enhance the speed and performance of web servers	BOO to verify from certificate of compliance from the OEM/ Brochure
d.	Should provide support for cache rules/filters to define granular cache policies based on cache-control headers, host name, file type, max object size, TTL objects etc..	BOO to verify from certificate of compliance from the OEM/ Brochure
e.	Should provide secure online application delivery using hardware-based high performance integrated SSL acceleration hardware. SSL hardware should support both 2048 and 4096 bit keys for encrypted application access.	BOO to verify from certificate of compliance from the OEM/ Brochure
f.	Should support certificate parser and solution should integrate with client certificates to maintain end to end security and non-repudiation	BOO to verify from certificate of compliance from the OEM/ Brochure
g.	The appliance should support Certificate format as "OpenSSL/Apache, *.PEM", "MS IIS, *.PFX", and "Netscape, *.DB".	BOO to verify from certificate of compliance from the OEM/ Brochure
h.	Should support OCSP protocol to check the validity of the certificates online. Certificate bases access control, CRL's (HTTP, FTP, and LDAP) support.	BOO to verify from certificate of compliance from the OEM/ Brochure
i.	Should provide full ipv6 support and OEM should be IPv6 gold-certified. OEM should be listed vendor for ipv6 phase-2 certification.	BOO to verify from certificate of compliance from the OEM/ Brochure
j.	IPv6 gateway should provide compressive support for IPv6 functions to help with ipv4-to-ipv6 transition without business disruption and must provide support for dual stack, DNS64, NAT 64, DNS 46, NAT 46, IPv6 NAT	BOO to verify from certificate of compliance from the OEM/ Brochure
k.	Should support various deployment modes for seamless integration including reverse proxy (IPv6 to IPv4, IPv4 to IPv6) and IPv6 to IPv6 transparent and reverse proxy mode.	BOO to verify from certificate of compliance from the OEM/ Brochure
4.	**Network and application security**	
a.	Should support advance ACL's to protect against network based flooding attacks. Administrator should	BOO to verify from certificate of compliance from the OEM/

	able to define ACL's rules based on connections per second (CPS) and concurrent connections (CC), cookie value.	Brochure
b.	Appliance should have security features like reverse proxy firewall, Syn-flood and dos attack protection features from the day of installation.	BOO to verify from certificate of compliance from the OEM/ Brochure
c.	Should support integrated network based firewall to protect against network based attacks; administrator should able to configure the security policies on per interface basis.	BOO to verify from certificate of compliance from the OEM/ Brochure
d.	Proposed solution provide integrated WAF functionality to protect against layer7 attacks and should support deep packet inspection of HTTP & HTTPS traffic in reverse proxy mode	BOO to verify from certificate of compliance from the OEM/ Brochure
e.	Application firewall should support built in rules to counter application attack, provision should be there to customize predefined application security rules. Should support all kind of attacks including OWASP top 10	BOO to verify from certificate of compliance from the OEM/ Brochure
f.	WAF module should support both detection and prevention mode and policies should be enforced on per virtual services.	BOO to verify from certificate of compliance from the OEM/ Brochure
5.	**Clustering and failover**	
a.	Should provide comprehensive and reliable support for high availability with Active-active & active standby unit redundancy mode. Should support USB based fast failover.	BOO to verify from certificate of compliance from the OEM/ Brochure
b.	should support built in failover decision/health check conditions (both hardware and software based) including CPU overheated, SSL card, port health, CPU utilization, system memory, process health check and gateway health check to support the failover in complex application environment	BOO to verify from certificate of compliance from the OEM/ Brochure
c.	Should have option to define customized rules for gateway health check - administrator should able to define a rule to inspect the status of the link between the unit and a gateway	BOO to verify from certificate of compliance from the OEM/ Brochure
d.	Support for automated configuration synchronization support at boot time and during run time to keep consistence configuration on both units.	BOO to verify from certificate of compliance from the OEM/ Brochure
e.	should support floating MAC address to avoid MAC table updates on the upstream routers/switches and to minimize the failover delay	BOO to verify from certificate of compliance from the OEM/ Brochure
f.	Support for multiple communication links for real-time configuration synchronizations including HA group, gateway health check, decision rules, SSF sessions etc.. and heartbeat information	BOO to verify from certificate of compliance from the OEM/ Brochure
g.	Clustering function should support IPv6 VIP's (virtual service) switchover	BOO to verify from certificate of compliance from the OEM/ Brochure
h.	N+1 clustering support with active-active and active-standby configurations.	BOO to verify from certificate of compliance from the OEM/ Brochure
6.	**Centralized management**	
a.	Centralized management appliance should have extensive reporting and logging with inbuilt tcpdump like tool and log collecting functionality	BOO to verify from certificate of compliance from the OEM/ Brochure
b.	The appliance should have SSH CLI, Direct Console, SNMP, Single Console per Cluster with inbuilt reporting.	BOO to verify from certificate of compliance from the OEM/ Brochure
c.	Should support XML-RPC for integration with 3rd party management and monitoring	BOO to verify from certificate of compliance from the OEM/ Brochure

6. Server and Device Monitoring System

Sl. No.	PARTICULARS	Trial Directives
1.	Should be a comprehensive management platform that delivers integrated, modular management capabilities across fault, configuration, accounting, performance, and security (FCAPS) needs	BOO to verify from certificate of compliance from the OEM/ Brochure
2.	Should support minimum 50 wired devices from day 1 and the solution should be scalable up to 1500 wired devices without any hardware or software up-gradation.	BOO to verify practically on ground
3.	Should allow automatic topology discovery and creation of network maps for layer 2 as well as layer 3 networks including all the available VLANs	BOO to verify from certificate of compliance from the OEM/ Brochure
4.	Should have network inventory polling capability for IP network nodes, available line cards, modules, ports, physical links, VLAN interfaces and all the other SNMP capable devices in the network.	BOO to verify from certificate of compliance from the OEM/ Brochure
5.	Should allow extensive fault management with real time event and alarm notifications including system logs	BOO to verify from certificate of compliance from the OEM/ Brochure
6.	Should allow centralized creation and management of VLAN and ACL policies	BOO to verify from certificate of compliance from the OEM/ Brochure
7.	Should have scheduled device configuration back-up and restore functionality	BOO to verify from certificate of compliance from the OEM/ Brochure
8.	Should have automatic detection of configuration changes for easy trouble shooting and isolation.	BOO to verify from certificate of compliance from the OEM/ Brochure
9.	Should allow monitoring and management of 3rd party devices and end points.	BOO to verify from certificate of compliance from the OEM/ Brochure
10.	Should have the functionality of scheduled configuration roll out	BOO to verify from certificate of compliance from the OEM/ Brochure
11.	Should have the functionality to perform scheduled or unscheduled network wide software or firmware upgrades	BOO to verify from certificate of compliance from the OEM/ Brochure
12.	Should have the ability to customize NMS dash board.	BOO to verify from certificate of compliance from the OEM/ Brochure
13.	Should allow grouping of devices for applying any particular change/task	BOO to verify from certificate of compliance from the OEM/ Brochure
14.	Should have 64-bit support	BOO to verify from certificate of compliance from the OEM/ Brochure
15.	Should support centralized as well as distributed deployment.	BOO to verify from certificate of compliance from the OEM/ Brochure
16.	Should support virtualization management; management and monitoring of both physical and virtual networks. It should provide insight into and management of virtual networks and reduce migration complexity by aligning and automatic network policies with virtual images.	BOO to verify from certificate of compliance from the OEM/ Brochure
17.	Should support role based access control	BOO to verify from certificate of compliance from the OEM/ Brochure
18.	Should be with software update and upgrade assurance during the warranty period	BOO to verify from certificate of compliance from the OEM/ Brochure



19.	Should have support for add-on modules on the same software platform for monitoring and management of routers, wireless controller, wireless access points and wireless client devices.	BOO to verify from certificate of compliance from the OEM/ Brochure
20.	Should facilitate enable centralized management of proposed network elements with a variety of automated tasks, including discovery, categorization, baseline configurations, software images, configuration comparison tools, version tracking, change alerts, and more	BOO to verify from certificate of compliance from the OEM/ Brochure
21.	Should support centralized VLAN Management to view current VLAN configuration, VLAN topology, bulk VLAN deployment etc.	BOO to verify from certificate of compliance from the OEM/ Brochure
	a) Should provide high-performance, scalable network log audit and analysis support with auditing online activities of internal users	BOO to verify from certificate of compliance from the OEM/ Brochure
	b) Should support various log formats such as NAT, flow, NetStream including log formats that allows audit security-sensitive operations and digest data from HTTP, FTP, and SMTP packets	BOO to verify from certificate of compliance from the OEM/ Brochure
	c) Should support policy driven log filtering	BOO to verify from certificate of compliance from the OEM/ Brochure
	d) Should support log collection from devices that do not otherwise support the standard protocols such as Flow, NAT, NetStream, sFlow/Netflow etc.	BOO to verify from certificate of compliance from the OEM/ Brochure
	e) Should support user activity auditing of at least 50 users from day 1 and this should be optionally extendable up to 1500 users.	BOO to verify from certificate of compliance from the OEM/ Brochure
22.	Should offer following RADIUS/AAA features: a) Shall support user identity authentication based on the access policies associated with infrastructure resources, such as routers, switches, license for 100 users from day 1. b) Shall provide a full-featured RADIUS server that supports centralized authentication, authorization, and accounting management. c) Network-agnostic device fingerprinting capabilities based on HTTP+MAC+DHCP device recognition for BYOD. d) Shall support authentication modes like 802.1X, VPN, portal, and wireless access identity modes like PAP, CHAP,EAP-MD5, EAP-TLS, and PEAP to fit into applications with different security requirements. e) Shall provide centralized policy creation to set the appropriate access rights for each type of user and device across the network.	BOO to verify from certificate of compliance from the OEM/ Brochure
23.	Should be a ITILv3 compliant comprehensive management platform that delivers integrated, modular management capabilities across fault, configuration, accounting, performance, and security (FCAPS) needs.	BOO to verify from certificate of compliance from the OEM/ Brochure
24.	Offered software should have compatibility with Microsoft Windows or Linux operating systems	BOO to verify from certificate of compliance from the OEM/ Brochure
25.	Offered software should be scalable up to 1500 wired devices and 1500 users.	BOO to verify from certificate of compliance from the OEM/ Brochure

7. Unified Thread Management

S. No	Specification	Trial Directives
General Requirements		
(a)	Network security appliance should support "Stateful" policy inspection technology. It should also have application intelligence for commonly used TCP/IP protocols like telnet, ftp etc.	BOO to verify from certificate of compliance from the OEM/ Brochure
(b)	The proposed vendor must have a track record of continuous improvement in threat detection (IPS) and must have successfully completed NSS Labs' NGFW Methodology v7.0 testing with a minimum exploit blocking rate of 99%	BOO to verify the testing report presented by the vendor
(c)	OEM should be in Leaders quadrant of Gartner's – in Enterprise Firewall Magic Quadrant as per the latest report	BOO to verify the Gartner's report presented by the vendor
(d)	Appliance shall be ICSA certified for Firewall, IPS & Gateway AntiVirus functionalities	BOO to verify the ICSA certification.
Hardware & Interface requirements		
(a)	14 x 1GE RJ45 inbuilt interfaces, 12 x 1GE SFP interface slots from day one	BOO to verify practically on ground
(b)	The Appliance should have USB & Console Ports	BOO to verify practically on ground
Performance and Availability		
(a)	The Firewall should be on multiprocessor architecture with minimum 20Gbps of Firewall throughput & support of 3,500,000 concurrent sessions, and 200,000 new sessions per second from day one and Firewall Latency should not be more than 3µs	BOO to verify from certificate of compliance from the OEM/ Brochure
(b)	Minimum IPS throughput of 4500 Mbps for real world traffic or enterprise mix traffic	BOO to verify from certificate of compliance from the OEM/ Brochure
(c)	Minimum Threat Prevention Throughput (measured with Application Control and IPS and Anti-Malware enabled) of 3000 Mbps for real world traffic or enterprise mix traffic	BOO to verify from certificate of compliance from the OEM/ Brochure
(d)	IPSec VPN throughput: minimum 10 Gbps	BOO to verify from certificate of compliance from the OEM/ Brochure
(e)	Simultaneous VPN tunnels: 1000	BOO to verify from certificate of compliance from the OEM/ Brochure
(f)	Proposed solution must support minimum 3.2 Gbps of SSL Inspection throughput	BOO to verify from certificate of compliance from the OEM/ Brochure
(g)	Proposed solution must support minimum 10 virtual firewall from day one	BOO to verify from certificate of compliance from the OEM/ Brochure
Routing Protocols		
(a)	Static Routing	BOO to verify from certificate of compliance from the OEM/ Brochure
(b)	Policy Based Routing	BOO to verify from certificate of compliance from the OEM/ Brochure
(c)	The Firewall should support dynamic routing protocol like RIP, OSPF, BGP, ISIS	BOO to verify from certificate of compliance from the OEM/ Brochure
Firewall Features		
(a)	Firewall should provide application inspection for LDAP, SIP, H.323, SNMP, FTP,SMTP, HTTP, DNS, ICMP, DHCP, RPC,SNMP, IMAP, NFS etc	BOO to verify from certificate of compliance from the OEM/ Brochure
(b)	IPv6-enabled inspection services for applications based on HTTP, FTP, SMTP, ICMP, TCP, and UDP	BOO to verify from certificate of compliance from the OEM/

		Brochure
(c)	Allows secure deployment of next-generation IPv6 networks, as well as hybrid environments that require simultaneous, dual stack support of IPv4 and IPv6	BOO to verify from certificate of compliance from the OEM/ Brochure
(d)	The firewall should support transparent (Layer 2) firewall or routed (Layer 3) firewall Operation	BOO to verify from certificate of compliance from the OEM/ Brochure
(e)	The Firewall should support ISP link load balancing.	BOO to verify from certificate of compliance from the OEM/ Brochure
(f)	Firewall should support link aggregation functionality to group multiple ports as single port.	BOO to verify from certificate of compliance from the OEM/ Brochure
(g)	Firewall should support minimum VLANS 2048	BOO to verify from certificate of compliance from the OEM/ Brochure
(h)	Firewall should support static NAT, policy based NAT and PAT	BOO to verify from certificate of compliance from the OEM/ Brochure
(j)	Firewall should support IPSec data encryption	BOO to verify from certificate of compliance from the OEM/ Brochure
(k)	It should support the IPSec VPN for both site-site and remote access VPN	BOO to verify from certificate of compliance from the OEM/ Brochure
(l)	Firewall should support IPSec NAT traversal.	BOO to verify from certificate of compliance from the OEM/ Brochure
(m)	Support for standard access lists and extended access lists to provide supervision and control	BOO to verify from certificate of compliance from the OEM/ Brochure
(n)	Control SNMP access through the use of SNMP and MD5 authentication.	BOO to verify from certificate of compliance from the OEM/ Brochure
(o)	Firewall system should support virtual tunnel interfaces to provision route-based IPSec VPN	BOO to verify from certificate of compliance from the OEM/ Brochure
(p)	The Firewall should have integrated solution for SSL VPN	BOO to verify from certificate of compliance from the OEM/ Brochure
(q)	Should support LDAP, RADIUS, Windows AD, PKI based Authentication & should have integrated 2-Factor Authentication server support & this two factor authentication can be used for VPN users for accessing internal network from outside and for Local users accessing internet from inside the network and for administrative access to the appliance or all of them	BOO to verify from certificate of compliance from the OEM/ Brochure
(r)	The solution should have basic server load balancing functionality as an inbuilt feature	BOO to verify from certificate of compliance from the OEM/ Brochure
(s)	Licensing should be a per device and not user or IP based (should support unlimited users)	BOO to verify from certificate of compliance from the OEM/ Brochure
Integrated IPS Features Set		
(a)	IPS should have DDoS and DoS anomaly detection and protection mechanism with threshold configuration.	BOO to verify from certificate of compliance from the OEM/ Brochure
(b)	Support SYN detection and protection for both targets and IPS devices.	BOO to verify from certificate of compliance from the OEM/ Brochure
(c)	The device shall allow administrators to create Custom IPS signatures	BOO to verify from certificate of compliance from the OEM/ Brochure
(d)	Should have a built-in Signature and Anomaly based IPS engine on the same unit	BOO to verify from certificate of compliance from the OEM/

		Brochure
(e)	Signature based detection using real time updated database & should have minimum 10000+ IPS signature database from day one	BOO to verify from certificate of compliance from the OEM/ Brochure
(f)	Supports automatic security updates directly over the internet. (ie no dependency of any intermediate device)	BOO to verify from certificate of compliance from the OEM/ Brochure
(g)	Signature updates do not require reboot of the unit.	BOO to verify from certificate of compliance from the OEM/ Brochure
(h)	Configurable IPS filters to selectively implement signatures based on severity, target (client/server) and operating systems	BOO to verify from certificate of compliance from the OEM/ Brochure
(j)	IPS Actions: Default, monitor, block, reset, or quarantine	BOO to verify from certificate of compliance from the OEM/ Brochure
(k)	Should support packet capture option	BOO to verify from certificate of compliance from the OEM/ Brochure
(l)	IP(s) exemption from specified IPS signatures	BOO to verify from certificate of compliance from the OEM/ Brochure
(m)	Should support IDS sniffer mode	BOO to verify from certificate of compliance from the OEM/ Brochure
AntiVirus & AntiBot		
(a)	Firewall should support antimalware capabilities , including antivirus, botnet traffic filter and antispyware	BOO to verify from certificate of compliance from the OEM/ Brochure
(b)	Solution should be able to detect and prevent unique communication patterns used by BOTs i.e. information about botnet family	BOO to verify from certificate of compliance from the OEM/ Brochure
(c)	Solution should be able to block traffic between infected host and remote operator and not to legitimate destination	BOO to verify from certificate of compliance from the OEM/ Brochure
(d)	Should have antivirus protection for protocols like HTTP, HTTPS, IMAPS, POP3S, SMTPS protocols etc.	BOO to verify from certificate of compliance from the OEM/ Brochure
(e)	Solution should have an option of packet capture for further analysis of the incident	BOO to verify from certificate of compliance from the OEM/ Brochure
(f)	Solution should uncover threats hidden in SSL links and communications	BOO to verify from certificate of compliance from the OEM/ Brochure
(g)	The AV should scan files that are passing on CIFS protocol	BOO to verify from certificate of compliance from the OEM/ Brochure
(h)	The proposed system shall provide ability to allow, block attachments or downloads according to file extensions and/or file types	BOO to verify from certificate of compliance from the OEM/ Brochure
(j)	The proposed system should be able to block or allow oversize file based on configurable thresholds for each protocol types and per firewall policy.	BOO to verify from certificate of compliance from the OEM/ Brochure
Other support		
	Should support features like Web-Filtering, Application-Control & Gateway level DLP from day one	BOO to verify from certificate of compliance from the OEM/ Brochure
(a)	The proposed system should have integrated Enterprise-class Web Content Filtering solution with database which should support over 250 million webpages in 72+ categories and 68+ languages without external solution, devices or hardware modules.	BOO to verify from certificate of compliance from the OEM/ Brochure
	Should support detection over 3,000+ applications in multiple Categories: Botnet, Collaboration, Email, File	BOO to verify from certificate of compliance from the OEM/

	Sharing, Game, General Interest, Network Service, P2P, Proxy, Remote Access, Social Media, Storage Backup, Update, Video/Audio, VoIP, Industrial, Special, Web (Others)	Brochure
(c)	The product must supports Layer-7 based UTM/Firewall virtualization, and all UTM features should be supported in each virtual firewall like Threat Prevention, IPS, Web filter, Application Control, content filtering etc.	BOO to verify from certificate of compliance from the OEM/ Brochure
(d)	The solution should have the flexibility to write security policies based on IP Address & User Name & Endpoint Operating System	BOO to verify from certificate of compliance from the OEM/ Brochure
(e)	QoS features like traffic prioritization, differentiated services,. Should support for QoS features for defining the QoS policies.	BOO to verify from certificate of compliance from the OEM/ Brochure
(f)	It should support the VOIP traffic filtering	BOO to verify from certificate of compliance from the OEM/ Brochure
(g)	Appliance should have identity awareness capabilities	BOO to verify from certificate of compliance from the OEM/ Brochure
(h)	The firewall must support Active-Active as well as Active-Passive redundancy.	BOO to verify from certificate of compliance from the OEM/ Brochure
(j)	Solution must support VRRP clustering protocol.	BOO to verify from certificate of compliance from the OEM/ Brochure
Management & Reporting functionality		
(a)	Support for Built-in Management Software for simple, secure remote management of the security appliances through integrated, Web-based GUI.	BOO to verify from certificate of compliance from the OEM/ Brochure
(b)	Support accessible through variety of methods, including console port, Telnet, and SSHv2	BOO to verify from certificate of compliance from the OEM/ Brochure
(c)	Support for both SNMPv2 and SNMPv2c, providing in-depth visibility into the status of appliances.	BOO to verify from certificate of compliance from the OEM/ Brochure
(d)	Should have capability to import configuration and software files for rapid provisioning and deployment using Trivial File Transfer Protocol (TFTP), HTTP, HTTPS	BOO to verify from certificate of compliance from the OEM/ Brochure
(e)	The solution should have option for firewall configuration audit & compliance check to be done in automated or manula process	BOO to verify from certificate of compliance from the OEM/ Brochure
(f)	Should capable to provide a convenient method for alerting administrators when critical events are encountered, by sending e-mail alert messages to administrator defined e-mail addresses	BOO to verify from certificate of compliance from the OEM/ Brochure
(g)	Solution must allow administrator to choose to login in read only or read-write mode	BOO to verify from certificate of compliance from the OEM/ Brochure

8. Network Traffic Manager

SI No	Description of requirement	Trial Directives
	BANDWIDTH CONTROLLER	
1	**An additional device for bandwidth control should be provided along with the system. The features are as follows.**	

General Features	(i) The system should ensure reliable performance for network dependent applications.	BOO to verify from certificate of compliance from the OEM/ Brochure
	(ii)The system should reduce the impact of non-strategic traffic, and diagnose and resolve network problems	BOO to verify from certificate of compliance from the OEM/ Brochure
	(iii) The system should identify and control bandwidth hogs so that network administrators can identify problem users, applications and websites and apply automated policies to limit or prevent bandwidth allocation.	BOO to verify from certificate of compliance from the OEM/ Brochure
	(iv) The system should have the feature to easily monitor recreational traffic like video streaming and P2P sharing.	BOO to verify from certificate of compliance from the OEM/ Brochure
Technical Features	**(i) Real-time Monitoring:** The system should monitor the health of network in real time and give insight about how applications are performing, bandwidth consumed by users, applications across the network	BOO to verify from certificate of compliance from the OEM/ Brochure
	(ii) Policy-Based Shaping: The system should have the feature to prioritize how and when users, applications and websites can consume bandwidth on network.	BOO to verify from certificate of compliance from the OEM/ Brochure
	(iii)Interactive Analytics: Intuitive dashboard feature should be there to visualize activities by all users.	BOO to verify from certificate of compliance from the OEM/ Brochure
	(iv)Application Acceleration: The system should support acceleration and caching features.	BOO to verify from certificate of compliance from the OEM/ Brochure
	(v)Predictive Recommendations: The system should have the feature to study the patterns and trends in the network and automatically make suggestions to repair and improve network performance.	BOO to verify from certificate of compliance from the OEM/ Brochure
	(vi) QX Boost for Skype application: Improve the quality of experience For voice, video and application sharing. QX Boost for Skype for Business correlates Skype® call data with network information to provide a complete end-to-end view of your call traffic, down to the Device level.	BOO to verify from certificate of compliance from the OEM/ Brochure
Hardware Features	**(i)Traffic shaping and Acceleration**	
	(a) Shaping Throughput: - 1 Gbps	BOO to verify from certificate of compliance from the OEM/ Brochure
	(b) Concurrent Flows: - 220,000	BOO to verify from certificate of compliance from the OEM/ Brochure
	(c) Packets per second: - 200,000/s	BOO to verify from certificate of compliance from the OEM/ Brochure
	(d) New Connection Rates: - 10,000/s	BOO to verify from certificate of compliance from the OEM/ Brochure

		(e) Acceleration Throughout: - 30 Mbps	BOO to verify from certificate of compliance from the OEM/ Brochure
		(f) Edge Cache Throughput: - 50 Mbps	BOO to verify from certificate of compliance from the OEM/ Brochure
		(g) Optimized Connections: - 6,000	BOO to verify from certificate of compliance from the OEM/ Brochure
		(h) APS Objects 250	BOO to verify from certificate of compliance from the OEM/ Brochure
		(i) SLA Objects 250	BOO to verify from certificate of compliance from the OEM/ Brochure
		(j) PDF Reports 60	BOO to verify from certificate of compliance from the OEM/ Brochure
		(k) Traffic Policies 1024	BOO to verify from certificate of compliance from the OEM/ Brochure
		(ii) Interface Capability	
		(a) The system should have 1 x RJ45 based dedicated console port for management purpose.	BOO to verify practically on ground
		(b) The system should have at least 3 x 1G (Copper) bypass bridge pair and 2x 1G (Fiber) bypass bridge pair. Also, the system should have one additional NIC slot for future expansion.	BOO to verify practically on ground
		(iii) Physical Parameters	
		(a) Form Factor: -1U rack mountable	BOO to verify practically on ground
		(b) Power Rating: - 17W @ 0.13A, 22W @ 0.16A (Max)	BOO to verify from certificate of compliance from the OEM/ Brochure
		(c) Environment: - 0 deg cel to 40 deg cel, 5% to 90% operating humidity.	BOO to verify from certificate of compliance from the OEM/ Brochure
A	**System Parameters**		
	Speech band	300 to 3400 Hz	BOO to verify from certificate of compliance from the OEM/ Brochure
	Modulation	Pulse Code Modulation	BOO to verify from certificate of compliance from the OEM/ Brochure
	No. of channels per system	32 (30 speech channels, 1 terminal Signaling and 1 Sync. Channel)	BOO to verify from certificate of compliance from the OEM/ Brochure
	Sampling frequency	8000 Hz	BOO to verify from certificate of compliance from the OEM/ Brochure
	No of sample bits	8 per channel	BOO to verify from certificate of compliance from the OEM/ Brochure
	Total bits per frame	256	BOO to verify from certificate of compliance from the OEM/ Brochure
	Bit rate	2048 Kbps ± 50 ppm	BOO to verify from certificate of compliance from the OEM/ Brochure
	Construction and	Chassis based modular multiplexer shelf capable of supporting minimum	BOO to verify practically on ground

		Architecture	12 slots for integration of data, voice, fax and LAN traffic	
		Universal Slots	All slots (other than for power and control) should be universal i.e. capable of accepting any type of voice/data/fax card manufactured by the same OEM.	BOO to verify practically on ground
		Add-Drop or Drop - Insert Function	a) Should be able to add-drop/drop-insert voice and data at channel (64 kbps) multiple channel (nx64 Kbps) and at E1. b) Add-drop should be software configurable by user in the field	BOO to verify from certificate of compliance from the OEM/ Brochure
		Digital Cross Connect function	a) It should have an inbuilt cross connect facility on the same equipment b) Cross Connect : It should be able to map the following voice interfaces: i) E1 to E1 ii) E&M (two wire or four wire) to e1 and vice versa iii) FXO/FXS to E1 and vice versa c) Add-drop should be achievable by software by user in the field	BOO to verify from certificate of compliance from the OEM/ Brochure
		Redundancy	Dual controller, dual power with load sharing	BOO to verify from certificate of compliance from the OEM/ Brochure
		Protection	1 for 1 protection , E1, T1, FOM	BOO to verify from certificate of compliance from the OEM/ Brochure
			PDH ring protection, QE1, QT1, FOM, Mini QE1, 3E1 for DS0 SNCP protection	BOO to verify from certificate of compliance from the OEM/ Brochure
		Management	Console, Telnet, SNMP, and In band management support	BOO to verify from certificate of compliance from the OEM/ Brochure
			Craft interface port for connection to external LCD display	BOO to verify from certificate of compliance from the OEM/ Brochure
			Compatible to a SNMP based GUI network management system	BOO to verify from certificate of compliance from the OEM/ Brochure
		No. of Slots	Should have 16 or more hot plug-in slots with capability to support following cards.	BOO to verify practically on ground
			Single E1/Quad E1 (G.703)/ Mini-Quad E1/3*E1 card-DS0 SNCP protection	BOO to verify practically on ground
			X.21/V.35/RS232/EIA530	BOO to verify practically on ground
			2W/4W E&M	BOO to verify practically on ground
			QFXO/QFXS/12FXo/12FXS/24FXO/2	BOO to verify practically on

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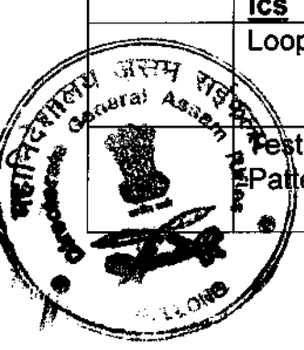
		4FXS	ground
		10/100 Base-T Router Card	BOO to verify practically on ground
		2/4 channel G.SHDSL card	BOO to verify practically on ground
		8-channel Dry Contact I/O	BOO to verify practically on ground
		Magneto Interface Card	BOO to verify practically on ground
		TDMoE (TDM over Ethernet) with 2 Combo GigaBit (GbE) interface for IP uplink	
B	**Interface Support: - The system shall support below mentioned interfaces/Cards.**		
	Network Line Interface-E1 should comply with the following specifications:-		
	Number of ports	1E1 / 4E1 / 3E1	BOO to verify from certificate of compliance from the OEM/ Brochure
	Line Rate	2.048 Mbps ± 50 ppm	BOO to verify from certificate of compliance from the OEM/ Brochure
	Line Code	AMI or HDB3	BOO to verify from certificate of compliance from the OEM/ Brochure
	Input Signal	ITU G.703	BOO to verify from certificate of compliance from the OEM/ Brochure
	Output Signal	ITU G.703	BOO to verify from certificate of compliance from the OEM/ Brochure
	Framing	ITU G.704	BOO to verify from certificate of compliance from the OEM/ Brochure
	Connector	BNC/RJ48C , DB25S for Mini Quad E1	BOO to verify from certificate of compliance from the OEM/ Brochure
	Electrical	120 ohm twisted pair	BOO to verify from certificate of compliance from the OEM/ Brochure
	Jitter	ITU G.823	BOO to verify from certificate of compliance from the OEM/ Brochure
	2* 10/100 Ethernet Router Card with capability to handle 64 WANs should comply with the following specifications		
	Number of ports	2 LAN ports, Max. 64 WAN ports, Each WAN port has data rate n x 64K bps, 1≤ n ≤32 (≤ 4Mbps for total of all 64 WAN ports	BOO to verify practically on ground
	Physical Interface	10/100 BaseT x 2	BOO to verify practically on ground
	Connector	RJ45	BOO to verify practically on ground
	Routing protocol	RIP-I, RIP-II, OSPF, Static	BOO to verify from certificate of compliance from the OEM/

			Brochure
	Supporting Protocols	PPP (IPCP/BCP), MLPPP, HDLC, Frame Relay, and Cisco compatible HDLC, NAT/NAPT, DHCP	BOO to verify from certificate of compliance from the OEM/ Brochure
	Diagnostic	Ping, Trace route	BOO to verify from certificate of compliance from the OEM/ Brochure
	QoS	Rate limit	BOO to verify from certificate of compliance from the OEM/ Brochure
	8* 10/100 Ethernet Router Card with capability to handle 64 WANs		
	Number of ports	8 LAN ports, Max. 64 WAN ports. Each WAN port has data rate n x 64K bps.	BOO to verify practically on ground
	Physical Interface	10/100 BaseT x 8	BOO to verify practically on ground
	Connector	RJ45	BOO to verify practically on ground
	Routing protocol	RIP-I, RIP-II, OSPF, Static	BOO to verify from certificate of compliance from the OEM/ Brochure
	Supporting Protocols	PPP (IPCP/BCP), MLPPP, HDLC, Frame Relay, and Cisco compatible HDLC, NAT/NAPT, DHCP	BOO to verify practically on ground
	Diagnostic	Ping, Trace route	BOO to verify from certificate of compliance from the OEM/ Brochure
	QoS	Rate limit	BOO to verify from certificate of compliance from the OEM/ Brochure
	Voice Card (8EM) port (interfaces) should comply with the following specifications:-		
	(a) Connector: RJ45 connector (b) Alarm conditioning: CGA busy after 2.5 seconds of LOS ,LOF (c) Encoding: a low or u low user selectable together for all. (d) Impedance: balanced 600 or 900 ohms. (e) Longitudinal rejection : 55 dB (f) Loss adjustment : -21 to +10 dB/0.1dB step transmit and receive (g) Single/ distortion: >46 dB with 1004 Hz, 0 dBm input (h) Frequency response: -0.25 to-1 dB from 300 to 3400Hz (i) Signaling : Type 1,Type 2,Type 3,Type 4,Type 5 transmit only		BOO to verify practically on ground and with the brochure
	Voice card (12 FXS/ 12 FXO/ 24 FXS/24 FXO) port (interfaces) should comply with the following specifications:-		-
	(a) 12 FXS/FXO Connector : Twelve RJ11 (b) 24 FXS/FXO Connector : One RJ21X (c) Alarm conditioning : CGA busy after 2.5 seconds of LOS ,LOF (d) Encoding : A-law or μ-law, user selectable together for all (e) AC Impedance: : balanced 600 or 900 ohms		BOO to verify from certificate of compliance from the OEM/ Brochure

	(f) Longitudinal Conversion Loss : > 46dB (g) Cross talk measure : Max -70dBm0 (h) Gain Adjustment : -21 to +10 dB / 0.1dB step transmit & receive (i) Signal/ Distortion : > 25dB with 1004 Hz, 0dBm input (j) Frequency Response : - 0.25 to -1 dB from 300 to 3400 Hz, coincide with ITU-T G.712 (k) Loss adjustment: -21 to +10 dB/ 0.1 dB step transmit and receive (l) Signal / Distortion:. 46 dB with 1004 Hz , 0dBm input (m) Frequency response: - 0 .25 to -1 dB from 300 to 3400 Hz , coincide with ITU-T. (n) Ideal channel noise : Max -65 dB Mop (o) Inter- modulation : coincide with ITU-T B.712 (p) 2Wire return loss : > 2 dB echo , > 20 dB signing (q) FXS loop feed : Nominal -48 V dc with 20 mA current limit (r) Signaling : Loop Start, DTMF, pulse, PLAR, Battery Reverse		
	G.SHDSL Line port (interfaces) should comply with the following specifications:-		
	Number of ports	2 or 4	BOO to verify practically on ground
	Line Rate for 4-channel G.shdsl	n x 64Kbps (n= 3 to 31)	BOO to verify from certificate of compliance from the OEM/ Brochure
	Line Rate for 2-channel G.shdsl	n x 64Kbps (n= 3 to 15)	BOO to verify from certificate of compliance from the OEM/ Brochure
	Line Code	16-TCPAM, full duplex with adaptive echo cancellation	BOO to verify from certificate of compliance from the OEM/ Brochure
	Connecto r	RJ45	BOO to verify from certificate of compliance from the OEM/ Brochure
	Electrical	Unconditioned 19-26 AWG twisted pair	BOO to verify from certificate of compliance from the OEM/ Brochure
	Sealing current	Max. 20 MA source current	BOO to verify from certificate of compliance from the OEM/ Brochure
	Clock Source	From System, Line	BOO to verify from certificate of compliance from the OEM/ Brochure
	Diagnosti c Test	G.SHDSL Loopback: To-LINE, To-bus	BOO to verify from certificate of compliance from the OEM/ Brochure
	TDM over Ethernet Card		
	Combo Gigabit Ethernet (GbE) Interface	-> Number of Ports 2 -> Speed 10/100/1000M bps -> Connector RJ45 for twisted pair GbE, LC for optical GbE, auto detection	BOO to verify practically on ground
	Gigabit Ethernet (GbE)	-> Number of Port 2 -> Speed 10/100/1000 BaseT -> Connector RJ45	BOO to verify practically on ground

	Interface		
	Ethernet Function	MDI/MDIX for 10/100/1000M BaseT auto-sensing Ping function contained ARP Per port, programmable MAC hardware address learn limiting (max. MAC table 8192 (8k) entry)	BOO to verify practically on ground
	Basic Features:		
	Packet Transparency	Packet transparency support for all types of packet types including IEEE 802.1q VLAN and 802.1ad (Q-in-Q)	BOO to verify from certificate of compliance from the OEM/ Brochure
	QoS	User configurable 802.1p CoS, ToS in outgoing IP frame	BOO to verify from certificate of compliance from the OEM/ Brochure
	Traffic Control	(a) Ingress packet Rate limiting buckets per port for Ethernet port (b) Supporting Rate-based and Priority-based rate limiting for LAN port. (c) Pause frame issued when the traffic exceeding the limited rate before packet dropped following IEEE802.3X	BOO to verify from certificate of compliance from the OEM/ Brochure
	Link Aggregation	WAN support link aggregation	BOO to verify from certificate of compliance from the OEM/ Brochure
	Jitter & Wander	PPM: per G.823 Traffic PPB: per G.823 Synchronous*	BOO to verify from certificate of compliance from the OEM/ Brochure
	Standard Compliance		
	IETF	TDMoIP (RFC5087), SAToP (RFC4553), CESoPSN (RFC5086)	BOO to verify from certificate of compliance from the OEM/ Brochure
	IEEE	802.1q, 802.1p, 802.1d, 802.3, 802.3u, 802.3x, 802.3z, 802.1s, 802.1w, 802.1AX	BOO to verify from certificate of compliance from the OEM/ Brochure
	Co-directional port (interfaces) should comply with the following specifications:-		
	Interface	ITU G.703 64 Kbps co-directional interface	BOO to verify from certificate of compliance from the OEM/ Brochure
	Connector	120ohm, RJ48	BOO to verify practically on ground
	Line Distance	Up to 500 meters	BOO to verify from certificate of compliance from the OEM/ Brochure
	Loopback	DTE Payload Loopback, Local Loopback	
	Voice Card 12 MAG (Magneto)		
	(a) Connector : Twelve RJ11 (b) Alarm Conditioning CGA busy after 2.5 seconds of LOS, LOF. (c) Encoding A-law or μ-law, user selectable together for all.		BOO to verify from certificate of compliance from the OEM/ Brochure

	(d) Impedance Balanced 600 or magneto telephone impedance match. (e) Longitudinal Conversion Loss > 46dB. (f) Gain Adjustment -21 to +10 dB / 0.1dB step transmit & receive. (g) Signal/ Distortion > 25dB with 1004 Hz, 0dBm input. (h) Frequency Response - 0.25 to -1 dB from 300 to 3400 Hz, coincide with ITU-T G.712. (i) Idle Channel Noise Max. –65 dBm0p. (j) Min Detectable Ringing Voltage 16 Vrms. (k) Ringing Detectable Across L1 and L2 (Tip and Ring), L1 and GND (Tip and GND) (l) Single Ring Type: ring for 2 sec. and stop, or ring for 4 sec. and stop. (m) Continuous Ring Type: 1 sec on 2 sec off, or 2 sec on 4 sec off (n) Ringing Send across L1 and L2 (Tip and Ring), L1 and GND (Tip and GND). (o) Signaling Magneto MRD (Ringing across Tip and Ring or Tip and Ground). (p) Signaling Bit A, B, C, D Programmable. (q) Signaling is carried transparently by the digitizing process.		
C	**Clock Source**	Internal, E1/T1 Line, External	BOO to verify from certificate of compliance from the OEM/ Brochure
D	**Alarm Relay**	Alarm Relay: max. Voltage 3 Vdc/ max. current: 1A Fuse alarm, and performance alarm	BOO to verify from certificate of compliance from the OEM/ Brochure
E	**System Configuration Parameters**	Active Configuration, Stored Configuration, and Default Configuration	BOO to verify from certificate of compliance from the OEM/ Brochure
F	**Supervisor**		
	RS232 Console Port (VT100)	10 Base-T, Ethernet, SNMP In-band 64 Kbps supports HDLC/PPP, SSH	BOO to verify practically on ground
G	**Performance Monitor**		
	Separate Registers	Network, user, and remote site	BOO to verify from certificate of compliance from the OEM/ Brochure
	Performance Reports	Reports include E1 Bursty Errored Second, Severe Errored Second, and Degraded Minutes. Also available in Statistics (%)	BOO to verify from certificate of compliance from the OEM/ Brochure
	Alarm Queue	To record the latest alarm type, location, and date & time	BOO to verify from certificate of compliance from the OEM/ Brochure
	Threshold	Bursty Seconds, Severely Errored Second, Degraded Minutes	BOO to verify from certificate of compliance from the OEM/ Brochure
H	**Diagnostics**		
	Loopback	E1/T1 interface (Line Loopback, Payload Loopback, Local Loopback), DTE Loopback (DTE-to-DTE, DTE to Line)	BOO to verify from certificate of compliance from the OEM/ Brochure
	Test Pattern	For Controller: 221-1, 215-1, 211-1, 29-1, and 4-bye user define pattern	BOO to verify from certificate of compliance from the OEM/ Brochure



J	**Front Panel**		
	LED	1 per V.35-interface, ACO, Power, SYNC/TEST, LOF, BPV, RAI/AIS	BOO to verify practically on ground
K	**Physical /Electrical**		
	Dimensions	432.4 x 220 x 223.5 mm (W×H×D)	BOO to verify practically on ground
	Power	Single/ Dual -48 Vdc: -36 to -75 Vdc, 100 Watts max.	BOO to verify from certificate of compliance from the OEM/ Brochure
		Single/ Dual -48 Vdc: -36 to -75 Vdc, 150 Watts max.	BOO to verify from certificate of compliance from the OEM/ Brochure
		Single/ Dual -24 Vdc: -18 to -36 Vdc, 150 Watts max	BOO to verify from certificate of compliance from the OEM/ Brochure
	Temperature	0-55°C	BOO to verify from certificate of compliance from the OEM/ Brochure
	Humidity	0-95%RH (non-condensing)	BOO to verify from certificate of compliance from the OEM/ Brochure
	Mounting	Desk-top stackable, 19" /23" rack mountable	BOO to verify practically on ground
	Line Power supply	Available only with DC power for G.SHDSL card only	BOO to verify from certificate of compliance from the OEM/ Brochure
	Power Consumption	Max 110 Watts	BOO to verify from certificate of compliance from the OEM/ Brochure
	The OEM should have authorized R & D & Repair/Replacement center in India with presence in India of about 10 Years		BOO to verify from certificate of compliance from the OEM/ Brochure
L	**Certification**	EN55022 Class A, EN50024, FCC Part 15 ,Class A, FCC Part 68, CS-03, IEC60950, UL60950, IEC 61850-3, IEEE 1613	BOO to verify the certification provided by the vendor
M	**Compliance**	ITU G.703, G.704, G.706, G.732, G.736, G.823, G.826, G.711, G.712, G.775, O.151, V.11, V.28, V.54	BOO to verify from the brochure
N	**Card Configuration required as part of supply.**		
		Controller (CPU) card -1 no	BOO to verify from certificate of compliance from the OEM/ Brochure
		48 V Dc Power Supply Card- 1 No	BOO to verify from certificate of compliance from the OEM/ Brochure
		3-Port E1 card – 1 No	BOO to verify from certificate of compliance from the OEM/ Brochure
		2-port Router Card – 1 No	BOO to verify from certificate of compliance from the OEM/ Brochure

P	**DC Power Source (-48V)**	**(j)** Input 230 VAC (Range 170-264 VAC, single phase, 50 Hz).	BOO to verify from certificate of compliance from the OEM/ Brochure
		(k) Output Current :- 8 Amp	BOO to verify from certificate of compliance from the OEM/ Brochure
		(l) Size: - 485(W) x385(D) x165(H) mm with screw terminals at front	BOO to verify practically on ground
		(m) Should have short circuit protection.	BOO to verify practically on ground

9. Network Time Server

S. No	Description of Requirements		Trial Directives
	Power Supply:		
1	Voltage	230 +/- 10% V AC	BOO to verify from certificate of compliance from the OEM/ Brochure
2	Frequency	47-55 Hz	BOO to verify from certificate of compliance from the OEM/ Brochure
	Functions/ Features :		
3	Time Facility	Using Universal Time co-ordination(UTC)	BOO to verify from certificate of compliance from the OEM/ Brochure
4	Propagation delay Compensation	Supported	BOO to verify from certificate of compliance from the OEM/ Brochure
5	Accuracy	# +/- 250 Nanosecond	BOO to verify from certificate of compliance from the OEM/ Brochure
6	Time Accuracy	Better than 1 PPM	BOO to verify from certificate of compliance from the OEM/ Brochure
7	LCD Display	Front panel LCD display to show status, time and no. of satellites	BOO to verify practically on ground
8	**Inputs**	GPS Antenna input through BNC connector.	BOO to verify practically on ground
9		Power Supply	BOO to verify practically on ground
	Outputs		
10	NTP output (2 nos. customizable) for NTP client access through RJ-45 .Both Ports shall be independent		BOO to verify practically on ground
11	RS232 serial port output (2 Nos)		BOO to verify practically on ground
12	Pulse output: 1 PPS, ½PPM, 1PPM (Configurable).		BOO to verify practically on ground
	Support Client request per Second	10,000	BOO to verify practically on ground

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SHILLONG

	Antenna		
14	Length of GPS	50 meters	BOO to verify practically on ground with appropriate test eqpt
15	Gain	Over 30 DB	BOO to verify practically on ground with appropriate test eqpt
16	RECEIVER,GLOBAL POSITIONING SYSTEM,DISPLAY TYPE:LCD;DISPLAY SIZE:2 X 3.5 INCH;DISPLAY RESOLUTION:240X400 PIXELS;DATA INTERFACE:ETHERNET;PC INTERFACE:ETHERNET;;EXPANSION SLOT TYPE:USB;WAY POINTS:2; Server FREQUENCY:48-55 HZ; OPERATING TEMPERATURE:0-55 DEG.C;ELECTRICAL RATING:230 VAC;ADDITIONAL INFORMATION:WITH ANTENNA and Surge Arrestor		BOO to verify practically on ground with appropriate test eqpt

10. Authentication Tokens

S. No	Description of Requirements		Trial Directives
1.	Certification	FIPS 140-2 Level 2 or as per CCA Guidelines CC / EAL 4+	BOO to verify the certification provided by the vendor
2.	Asymmetric Key Operations	• PKCS#11 compliant • RSA signature: 2048 bit or higher • Secure hash: MD5, SHA -1, SHA-256, SHA -512 ECC P-Curves	BOO to verify from certificate of compliance from the OEM/ Brochure
3.	Memory	64 KB or more	BOO to verify from certificate of compliance from the OEM/ Brochure
4.	Credential Storage	• X.509 V3 certificates, • secure symmetric key storage • Microsoft Windows Credentials	BOO to verify from certificate of compliance from the OEM/ Brochure
5.	Platform Support	Windows7, 10, Windows Server 2012and higher server OS, Linux OS	BOO to verify from certificate of compliance from the OEM/ Brochure
6.	Random Number Generator	ANSI X9.31 PRNG or NIST DRBG SP 800 90 CTR mode	BOO to verify from certificate of compliance from the OEM/ Brochure
7.	Data Transfer rate	125 Kbps or more	BOO to verify from certificate of compliance from the OEM/ Brochure

11. Lightning Protection System

Sl. No	Description of Requirement	Trial Directives
1.	The Lightening protection should have radius of protection of 79 meters in Zone-I at 5 mtr height.	BOO to verify practically on ground
2.	The Lightening Arrestor Should have profiled, in alterable and good conductor structure to generate a forced air circulation at its tip and in prolonged (Venturi System) air intakes and peripheral ejectors.	BOO to verify practically on ground

3.	The Lightening should have mechanical stimulation system, no battery or electronics is to be used.	BOO to verify practically on ground
4.	Lightening Arrestor should be equally effective of both positive and negative lightning strikes.	BOO to verify from certificate of compliance from the OEM/ Brochure
5.	The necessary fixing bracing PCC/grouting above the building/installation with testing commissioning to entire satisfaction of Engineer- in —charge	BOO to verify from certificate of compliance from the OEM/ Brochure
6.	The installation of the system shall be carried out under the supervision of certified trained engineer from OEM of complete all as specified and directed.	BOO to verify from certificate of compliance from the OEM/ Brochure
7.	The certified Engineer have to produce the Certificate of Certified Engineer from OEM and having knowledge of International Standards.	BOO to verify Certificate of Certified Engineer from OEM
8.	Supply and installation of gun metal elevation rod 2 mtrs long from OEM with necessary bracing clamps, drilling, 1 fixing and grouting arrangement etc complete all as specified and directed	BOO to verify practically on ground
9.	Supply and laying underground LT cable PVC insulated, PVC sheathed copper conductor single core,70 sqmm with necessary connection, laying, clipping on insulated pads, saddles all as specified and directed	BOO to verify practically on ground
10.	Should provide M&L for Gel compound earthing with earth enhancing compound with 25kgs including copper earth strip of size 25x3 mm with necessary clipping on insulated pads/saddles with earth pit to minimum resistance value complete all as specified and directed	BOO to verify practically on ground

12. Smart Rack

Description	Parameter	Technical Requirement	Trial Directives
System specifications	(WxDxH)	Maximum 800x1200x2150mm(42U)	BOO to verify practically on ground
	Power supply input	Minimum Dual Feed AC 230V/1P/50Hz.	BOO to verify practically on ground
	IT Load	3kW	
	Minimum Usable U space for IT Equipments	34 U	BOO to verify practically on ground
	Installation Site	Should be suitable for Elevated floor installation / general ground installation	BOO to verify practically on ground
	Utility Entry	Should have provision for both Top/Bottom as Standard	BOO to verify practically on ground
	System supported languages	Should support English as language for operation by default	BOO to verify practically on ground
	Cabinet interior lighting	LED - with door limit switch	BOO to verify practically on ground
	Exterior colors	Black or as per OEM standard	BOO to verify practically on ground
	Front & back door	Front toughened glass, rear plain dual door	BOO to verify practically on ground

	Local interface	Colour TouchScreen Display	BOO to verify practically on ground
	Monitoring	Power, Cooling, Smoke, WLD, temperature and humidity, UPS, door sensor to be integrated for monitoring	BOO to verify from certificate of compliance from the OEM/ Brochure
	Sensor	Minimum 1 No. Spot sensor for water leak detection	BOO to verify practically on ground
		Minimum 1 No. Temperature and humidity sensors	BOO to verify practically on ground
		Minimum 1 No. Smoke sensor	BOO to verify practically on ground
		Minimum 1 No. Proximity sensors for doors	BOO to verify practically on ground
		Minimum 1 No. Beacon- for local alarm	BOO to verify practically on ground
Power subsystem	UPS capacity	Minimum 6 kVA UPS	BOO to verify practically on ground
	UPS rated input	230VAC	BOO to verify from certificate of compliance from the OEM/ Brochure
	Input Voltage Range	160 V - 285 V	BOO to verify from certificate of compliance from the OEM/ Brochure
	Input Frequency Range	40-70Hz	BOO to verify from certificate of compliance from the OEM/ Brochure
	Input Power Factor	0.98	BOO to verify from certificate of compliance from the OEM/ Brochure
	Input power consumption meter	Energy meter with digital display should be installed at input to monitor	BOO to verify from certificate of compliance from the OEM/ Brochure
	Output Max Power	6kVA/5.4kW	BOO to verify from certificate of compliance from the OEM/ Brochure
	Efficiency	94% at 100 % Load in online & 98%in Green Mode	BOO to verify from certificate of compliance from the OEM/ Brochure
	Backup Time	15 Mins - 1 Battery Pack	BOO to verify from certificate of compliance from the OEM/ Brochure
	RPDU parameters	Basic Rack PDU should be provided, Zero U, 32A, 230V, (20)C13 & (4)C19	BOO to verify from certificate of compliance from the OEM/ Brochure
Cooling subsystem	Total air conditioning cooling Capacity	3.5kW	BOO to verify from certificate of compliance from the OEM/ Brochure
	Minimum Air flow	700CMH	BOO to verify from certificate of compliance from the OEM/ Brochure
	Air conditioning installation	Should be Rack mount type, not more than 5U	BOO to verify practically on ground

	Outdoor ambient temperature	-20°C ~ +45°C	BOO to verify from certificate of compliance from the OEM/ Brochure
	Refrigerant	Environmental Friendly R410A	BOO to verify from certificate of compliance from the OEM/ Brochure
	Emergency fan module	Minimum 1 No. at front (Inlet) and top (Exhaust)	BOO to verify practically on ground
		OEM for UPS, Racks, PDU, Sensors should be same including the monitoring software. OEM should be minimum ISO 9001, ISO 14001 and ISO 50001.	BOO to verify with ISO certification submitted by the vendor

Lt Col Ripunjay Kumar
ARSU

Maj Gen Balwinder Singh
ADG AR
HQ DGAR

AVIRAT PANDEY
AC/GD
ITBP

AC/GD (TC/IT)
NSG

Approved/ ~~Not Approved~~

(~~Sukhdeep~~ Sangwan)
Lt Gen
Director General Assam Rifles