

RFP Volume 2

For Appointment of an Agency for Design, Site Preparation, Supply, Installation, Configuration, Operations and Maintenance of physical and

IT infrastructure for

MEGHALAYA STATE DATA CENTRE

at

Shillong

(Technical Specification)



Meghalaya Information Technology Society

**(A Society under Information Technology Department,
Govt. of Meghalaya)**

NIC Building, Secretariat Hill, Shillong 793 001

RFP Volume II – Technical Specifications

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1 Introduction

This Volume II is for establishment of Meghalaya State Data Centre (MSDC) at Shillong city. MSDC is proposed to be established at "2nd Floor of NIC Building, Secretariat Hill Road, Shillong - 793001". Total space for MSDC would be around 1836 sq. ft. and Server farm area is proposed to be of 1032 sq. ft. Bidders are requested to do site survey of MSDC at their own cost before bidding and it would help the bidder while proposing a suitable, best of the class, keeping scalability and cost effective solution for entire project duration including operations & maintenance phase. As per the MIT (GoI) guidelines, MSDC would be of MEDIUM Category. The purpose of the Volume II of RFP is to enable the bidders to know the minimum functional, technical & operational requirements for MSDC project. However, the design, layout, bill of material, etc can be changed at the time of actual implementation cum establishment of MSDC, as per the best proposal submitted by the various bidders, if suitable.

This volume II provides the minimum functional, technical & operational requirements of the MSDC project including IT Infrastructure, Non-IT Infrastructure required for a Data Centre. The Volume II is bifurcated in multiple sections as:

- IT Infrastructure requirements
- Non-IT Infrastructure requirements
- Bill of Material

Bidders are requested to submit their queries before bid submission, as per the details given in the Section 1.6 of Volume I of this RFP. For MSDC project, Meghalaya Information Technology Society (MITS) is the State Implementing Agency on behalf of State Government of Meghalaya. for any information regarding MSDC, bidders may contact following officers of MSDC:

Commissioner & Secretary - IT

Meghalaya Information Technology Society (MITS)

Information Technology Department, Government of Meghalaya

Ground Floor, N.I.C. Building,

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Secretariat Hill Road,
Shillong – 793001, Meghalaya

1.1. Existing Infrastructure projects in State

Meghalaya State has not yet set up the SWAN but the process for the same is under way and will be completed by the middle of 2009. It will involve connecting several government ministries / departments by state-of-art IT and communication network.

As per our Country's e-Governance framework the SWANs, SDCs & CSCs are the three pillars for providing the G2C, G2G & G2B service to the citizen nationwide. The SWAN, SDC and CSC needs to be tightly integrated for providing the services. The SWAN would be the network and communication backbone across the state administration cum governance which would be integrated to both SDC as well as Front ending CSC's, SWAN and SDC would be integreat through Giga fiber/ethernet link.

The thing that is to be noted here is that Meghalaya is situated in the Seismic Zone 5, and accordingly due consideration has to be given by the bidder while designing the Data Centre.

2. Technical Requirements

This section describes the overall IT infrastructure as well as Non-IT Infrastructure function and technical specifications for the MSDC project. The bidder has to meet all these defined requirements hereunder.

2.1. SDC Architecture – IT

Proposed Design Highlights

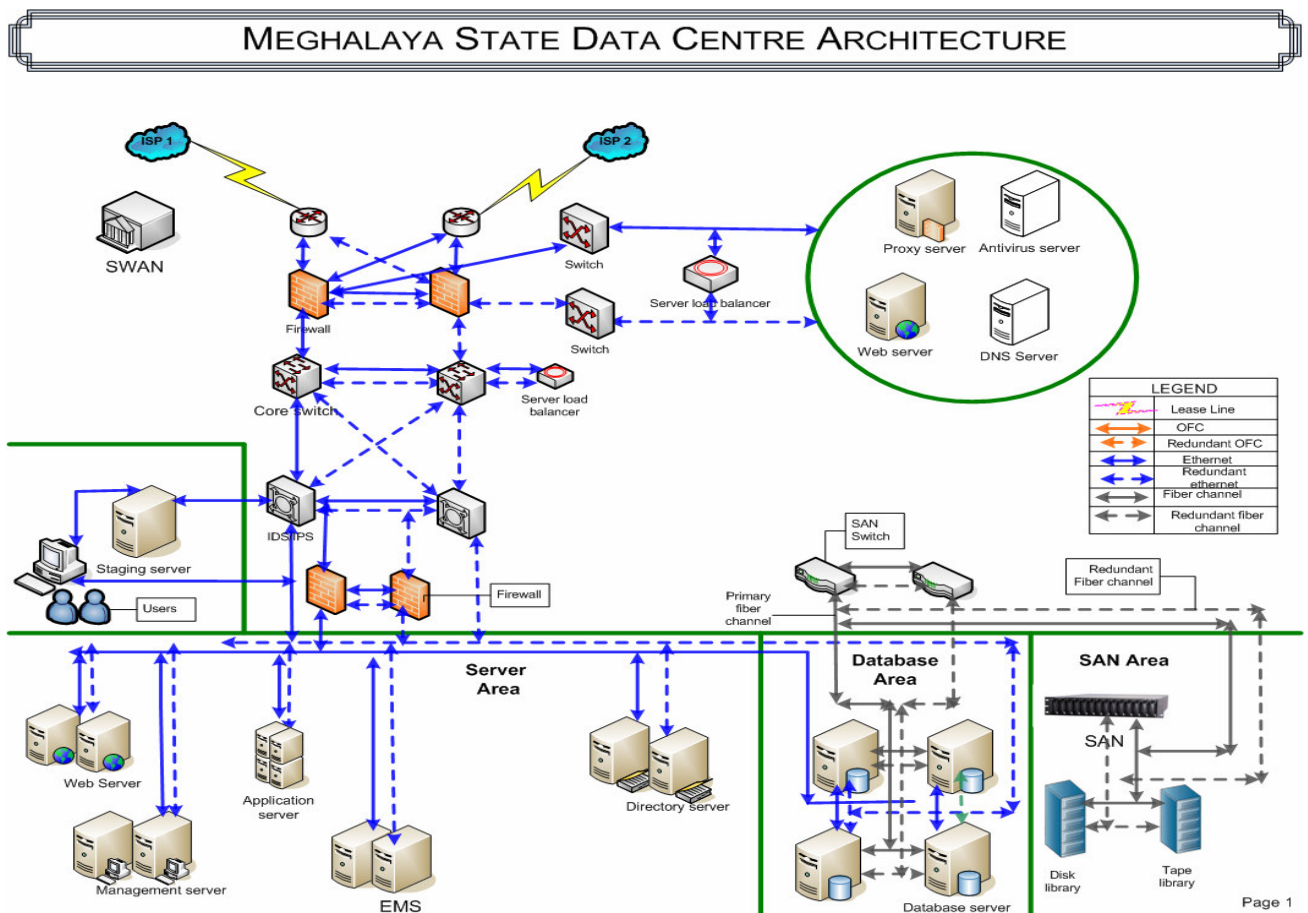
- MSDC switch would be connected to Meghalaya SWAN Core Switch through gigabit connectivity using OFC /CAT 6 in redundancy. The required integration needs be done by the bidder including cabling and laying.
- It should be also noted that the Meghalaya SWAN would also be carrier for CSC information or dataflow between the Citizens / Government Users (Departments/ Offices) and the MSDC. This proposed solution should bridge between the intranet i.e. Meghalaya SWAN users and MSDC environment.
- The proposed perimeter/external firewall by the bidder would also have capability

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to handle the high data traffic and multiple SSL/VPN encapsulations for secured data transfer between Meghalaya SWAN/CSC/Internet and MSDC.

- External Firewall would provide first layer of protection between the extranets (SWAN/ CSC/ Internet) and DMZ (which has hosted the application server).
- Intrusion Detection & prevention system should detect malicious traffic and further protect the MSDC environment after firewall; Intrusion system would also detect (and prevent) any intrusion from Internet/extranet network in high availability mode.
- Firewall would be deployed in high availability mode to protect DMZ and trusted zone.

The Proposed MSDC architecture is being depicted in the schematic as:



- All the servers would be connected to Core Switch
- The Application servers would be accessing the database from the backend in order to process the user / citizens queries/requests.

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- The Database servers (RDBMS) would be further hosted in higher security layer, comprising of components such as Firewall and Intrusion Prevention system.
- Application and System layer at SDC would be Multi-layered and designed to adhere to the open industry standards like XML, SOAP etc.
- The MSDC shall provide various Infrastructure Services such as Firewall Service, Directory Service, Web Service, Database Service, mailing and data storage services etc. which would be shared among all the applications / State departments participating in the MSDC. Using these services, the MSDC ensures centralized delivery of citizen / departmental services
- For Securing the SDC, the Intrusion prevention systems shall carryout state-full inspection and multiple layers of Firewalls shall manage the access control.
- In this secure infrastructure it has to be ensured that the security devices in the network such as Firewalls, Anti-virus/Spam Filters, proxy servers, anti-virus are in high-availability mode, and these components should be evenly distributed to optimize performance.
- The business related services would also have a potential of having multi-channel access / integration in future, as the data returned by the components would be in XML /SOAP format. Unicode would be the technology used for dissemination of information in multi-lingual format, though the existing data is stored in font based format. Since, several outside entities will access SDC services, and hence it is important to use international standards such as the Unicode etc.
- Implementing agency should provide monitoring access to Third Party Auditor / client/ designated officer for auditing purposes.
- Another key consideration should be done for hosting the Legacy applications.SG has to migrate / port the applications to n tier architecture, which would be provided using SDC

Server and Application Set-up

MSDC would be hosting various e-governance applications, information portal, Citizen centric services applications and multiple databases. In order to meet requirements of the State Government Departments, Servers, Storage, Security infrastructure, application software and network infrastructure would be required for facilitate the applications such as:

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2.1.1.1. Web Servers

Web based applications are easily accessible from any sort of the network, Intranet, internet or extranet. Therefore, Web server plays a vital role in SDC. Most of the new G2C applications are having web interfaces, which require web servers for such services. The web servers would also be used for web hosting for different departments.

2.1.1.2. Application Server

Application would be required as middle tier for various web based applications. Application server would take care of the necessary workflow and web server would be required for the interfacing with the end user. Both the web and app. server would be seamlessly integrated to provide high availability and performance. With the use of server load balancers, user requests would be distributed among various clustered/common servers. It is proposed to have two separate applications solutions for Unix/Linux and Windows environment.

2.1.1.3. Database Server

The database/repository provides all the relevant information required to process any Citizen/Government request or to render any e-Governance services with the use of MSDC. Database server would be required to store and access data with ease. This would also be integrated with multiple applications, residing at MSDC.

2.1.1.4. Directory Server (Enterprise Access Server)

Using Directory services SDC administrator should be able to define centralized authentication & authorization mechanisms for users. This would enable associate policies such as security, management etc on all servers/systems from a centralized console and enhances security, reduces IT complexity and increase overall efficiency. It should be LDAP v3 compliant, in order to have integrated interoperability, security & manageability. It would also enable central authentication thus enabling single sign-on (SSO) mechanism. Therefore this user directory would enable easy manageability that is creation, modification and deletion of user records. It would further help to integrate with various other services like messaging, proxy, etc. The directory services should also be able to cater the requirements of the State for Client workstations also at MSDC. It should support atleast 100 users and scalable upto 500 in future.

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2.1.1.5. Firewall

A firewall is a dedicated appliance in High availability mode which inspects network traffic passing through it, and denies or permits passage based on a set of rules. A firewall's basic task is to regulate some of the flow of traffic between computer networks of different trust levels. It is proposed to have perimeter as well as internal firewall which acts as different layer of security for MSDC IT infrastructure. Furthermore both the proposed firewalls i.e. perimeter firewall & internal firewall should be of different OEM and DCO should ensure that there should not be any interoperability & functional issues in terms of security & network infrastructure.

2.1.1.6. DNS Server

DNS server would be required for various website and web application hosted for public access. The internet users will query for the domains on the DNS (Public DNS) server deployed at the SDC in DMZ.

2.1.1.7. DHCP Servers

DHCP would be assisting the System administrators for dynamic IP allocation to devices/ users. Furthermore, the key users (require SDC services), who would be connecting using remote access, would be requiring a valid IP address after successful authentication. DHCP would be very beneficial to such users.

2.1.1.8. Management Server

The management server would help in administration of heterogeneous systems at MSDC. The management server would help in efficient and reliable administration of all the computing and networking devices and enable:

- Inventory Management
- Patch management
- Monitor the availability of Services
- Fault Management
- Performance Management

2.1.1.9. Intrusion Prevention System

Any attempts of intrusion over a network will be detected, logged into a database (which will form the basis of reports generated) and further protecting the MSDC infrastructure,. This would provide proactive information while the network is being compromised based

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on certain network patterns detected. All the Critical servers will be enabled with host based IPS also.

2.1.1.10. Staging Server

It would be required to deploy a separate server as Staging server where all the new services/ Application are deployed for testing on this staging server before it is brought on to the production servers. The software components required on this system - Operating System: Windows Enterprise Edition & Linux Advanced edition, the other services are installed on this server as and when required by the new application being staged.

2.1.1.11. Enterprise Management System(EMS)

The management server would help in administration of heterogeneous systems at MSDC. The management server would help in efficient and reliable administration of all the computing and networking devices and enable:

1. Inventory Management
2. Patch management
3. Monitor the availability of Services
4. Fault Management
5. Performance Management
6. Helpdesk Management System

An ITIL based Helpdesk system would be used for assisting the service delivery by DCO for MSDC. Helpdesk system would automatically generate the incident tickets and log the call. Such calls are forwarded to the desired system support personnel deputed by the DCO. These personnel would look into the problem, diagnose and isolate such faults and resolve the issues timely. The helpdesk system would be having necessary workflow for transparent, smoother and cordial SDC support framework.

1. Provide flexibility of logging incident manually via windows GUI and web interface.
2. The web interface console of the incident tracking system would allow viewing, updating and closing of incident tickets.
3. System should provide Knowledge base
4. Provide seamless integration to events/incident automatically from NMS / EMS.
5. Allow categorization on the type of incident being logged.

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6. Provide classification to differentiate the criticality of the incident via the priority levels, severity levels and impact levels.
7. Each incident could be able to associate multiple activity logs entries manually or automatically events / incidents from other security tools or EMS or NMS.
8. Provide audit logs and reports to track the updating of each incident ticket.
9. Proposed incident tracking system would be ITIL compliant.
10. It should integrate with Enterprise Management System event management and support automatic problem registration, based on predefined policies.
11. It should be able to log and escalate user interactions and requests.
12. It should provide status of registered calls to end-users over email and through web.

2.1.1.12. Server Load Balancer

The load balancer would be required for distributing work loads to a set of networked computer servers in such a manner that the computing resources are used in an optimal manner. The load balancer should support segmentation/virtualization to distribute load for multiple services, servers. This would increase the availability of the server and will also increase the performance, as multiple servers would be sharing the service load. The load balancer would be used for the following servers:

- Application Server
- Web Servers
- Database Servers
- Other servers as required

2.1.1.13. Backup Server

Backup server would be used for backing up the key data on regular interval. The backing up of the data would be an automated process. Whenever desired the backed up data can be restored/retrieved to the desired system configuration.

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2.2. Technical Specifications - IT Components

2.2.1. Core Switch

- Hardware Architecture (19" Rack mountable)
 - Redundant Supervisor / Switching / Routing engine. The switching & routing performance claimed on the chassis should not degrade with failure of any one of the switching/routing engine modules. Redundancy should be on supervisor on different switching fabric.
 - Internal Redundant Power Supply
 - Power supply 230 Volt 50Hz input
 - Modular Chassis
- Interfaces / Slots
 - Minimum 5 Slots
 - All service cards should be hot-swappable
 - 2 x 48 ports GE (10/100/1000Mbps) and upgradeable
 - 1 X 2 Ports Giga fibre
- Performance
 - High back plane speed 300 GBPS or more
 - Forwarding rate should be 250 Mpps (non-blocking)
- L2 Features
 - IEEE 802.1Q VLAN encapsulation
 - 802.1s
 - 802.1w
 - IGMP snooping v1 and v2
- IP Routing Protocols
 - Static Routing
 - OSPF
 - RIP
 - HSRP /VRRP
 - IPv4 & IPv6

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- Security
 - Standard and extended ACL's on all ports
 - AAA and RADIUS authentication
 - Secure Shell (SSH) Protocol
 - Time-based ACLs.
- Manageability & Up gradation
 - Console port for administration & management
 - SNMP v1, v2 & v3
 - Should have management using CLI/GUI using Web interface
 - Should have FTP/TFTP for upgrading the operating System
- Standards
 - IEEE 802.1x
 - IEEE 802.3x full duplex on 10BASE-T and 100BASE-TX ports
 - IEEE 802.1D Spanning-Tree Protocol
 - IEEE 802.1p class-of-service (CoS) prioritization
 - IEEE 802.1Q VLAN
 - IEEE 802.3 10BASE-T specification
 - IEEE 802.3u 100BASE-TX specification
 - IEEE 802.3af support

2.2.2. Access Switches

Application switches shall be implemented in the DMZ and shall be connected to the core LAN switch and the router.

- **Rack Mountable:** Mountable in standard 19" U.
- 48 ports: 10/ 100/1000 Base auto-sensing
- No of Giga Fiber Ports: 2 Nos
- At least one console port for CLI based configuration
- Min 32 Gbps switching fabric
- Min 35 Mpps forwarding rate
- IEEE 802.3ad support required

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- **Management:**
 - SSH v2,SNMP v1/v2c/v3,IGMP, RMON I, VLANs, GUI, Web based interface,
 - Compatibility with network mgmt with auto discovery & management.
 - Manageability on per port basis.
 - Per-port broadcast, multicast, unicast storm control to prevent faulty end stations from degrading overall systems performance.
- **Security:**
 - 802.1x ,
 - RADIUS support
 - MAC address based port level filtering support
- **Quality of Service:** The switches should support the aggregate QoS model by enabling classification, policing/metering & marking functions on a per-port basis at ingress and queuing/scheduling function at egress
 - The switches should support QoS classification of incoming packets for QoS flows based on Layer 2, Layer 3, and Layer 4 fields.
 - The switches should support identification of traffic based on Layer 3 ToS field – DSCP values.
- Support for rate limiting with granularity of traffic flows.
- TFTP & NTP support,
- Compliant to Standards such as IEEE 802.1x, 802.1w, 802.1s, 802.3x, 802.1D, 802.1p, 802.1Q, 802.3ad, 802.3u, 802.3ab, 802.3z

2.2.3. Internet Router

- Hardware Architecture (19" Rack mountable)
 - Should have IP, MPLS etc
 - Redundant & hot swappable power supply
 - On-line insertion and removal for cards
 - Modular Chassis
 - Power supply for 230 V AC 50 Hz with Redundant power supply
 - Min 400 Kpps of throughput required

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- Interface / Slots
 - Minimum 2 x 10/100/1000 Mbps Ethernet ports and scalable to 4 Ports
 - Min 4 x E1 Ports
 - Dedicated Console port
 - Should support variety of interface V.35, Ch E1 etc.
- Security
 - GRE and IP Sec 3DES/AES VPN for configuration of VPN tunnels.
 - Encryption - IP Sec 3DES/AES
 - NAT, PAT
 - Access control - Multilevel
 - Support ACL's to provide supervision and control.
 - Multiple Privilege Levels for managing & monitoring
 - Support for Remote Authentication User Service (RADIUS) and AAA
- Routing Protocols
 - Static Routes
 - RIPv1, RIPv2
 - OSPFv2 and v3.
 - BGP4
- Protocols
 - PPP, Multi-link PPP
 - HDLC
 - IPv4, IPv6
 - MPLS L2 & L3
 - VRRP / HSRP
- Congestion
 - Random Early Detection
 - Weighted Fair Queuing
 - Selective Packet Discard
- IP Multicasting

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- IGMPv1&v2, PIM-SM, PIM-DM or MOSPF
- Management
 - Accessibility using Telnet, SSH, Console access.
 - Software upgrades using FTP, TFTP, etc.
 - SNMP Support for v1, v2 , v3
 - Using CLI, GUI based software utility and using web interfaces
 - Support for Syslog
- Debug & Diagnostics
 - Display of input and output error status on all interfaces
 - Display of Dynamic ARP table
 - Display of physical layer line status signals like DCD, DSR, DTR, RTS, CTS on all interfaces
 - Display of Routing table
 - Trace-route, Ping, extended PING

2.2.4. Network Intrusion Prevention System (NIPS)

- The NIPS solution should have be comprehensive of hardware, software, licences etc.
- Minimum 4 numbers of Gigabit segments and scalable to 8 number of Giga segment
- Should have at least 2 GB of RAM and upgradeable to 4 GB
- Should deliver a throughput of at least 2 Gbps and upgradeable to 4 Gbps
- Should have a dedicated port for management
- Should have an option for redundant power supply

Operational Modes

- Should work in inline as well as passive (IDS) mode
- Should protect at inline segments
- Should have support for 802.1q
- Should be capable of having separate policies for individual, groups and subnets.
- Product series should have valid NSS approved or ICESA or EAL Labs certified.

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Support

- OEM Support should be available 24*7 through email and telephone at no additional cost and should be part of annual maintenance
- Should have a certified support centre

Features

- Should support fail-open to four Gigabit segments in case of hw/sw failure
- Should protect against DoS / DDoS / SYN-flood/ TCP-flood /UDP-flood
- Must have “Zero-day” protection against DoS / DDoS and worm attacks based on traffic behaviour. Also it should mitigate Zero day http floods and brute force attack & vulnerability scanning attempts based on traffic behaviour analysis
- Capable of applying the security policies based on VLAN ID, Source/Destination subnets
- Should support peer-to-peer traffic detection.
- Action on detection
 - Block attacks in real time, Drop Attack Packets, Packet Logging
 - Reset Connections, Action per Attack
 - Support for detailed intrusion alarms
- Stateful Operation
 - TCP Reassembly
 - IP Defragment
 - Bi-directional Inspection
 - Forensic Data Collection
- Signature Detection
 - Vendors Signature Database – Minimum 1000
 - Device should have capability to add User Defined Signatures
 - Should support Automatic signature synchronization from OEM database server on web
- Extensive protocol monitoring: should support monitoring of protocols such as TCP/IP, ICMP, FTP, UDP, SMTP, HTTP, SNMP, DNS, RPC, NetBios, Telnet etc
- Should also have the ability to monitor 802.1 (trunked) traffic.

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- Alerting SNMP, SMTP support
 - Log File, Syslog support
- Management

Console, SSH, Telnet, HTTPS, HTTP, SNMP v1, v2

2.2.5. Host based Intrusion Prevention System (HIPS)

The Servers would be provisioned with HIPS at MSDC.

- DCO should propose complete solution for HIPS (software, licences, etc.)
- The HIPS should offer protection against entire classes of attacks, including port scans, buffer overflows, Trojan horses, malformed packets, malicious HTML requests, and e-mail worms.
- Should provide automated, real-time intrusion detection and protection by analyzing events, operating system logs and inbound/outbound network traffic on enterprise servers
- There should be a separate Management Center for Server Security Agents which will provide all management functions for all agents in a centralized manner.
- The HIPS should offer an enterprise-scalable architecture; the HIPS should be scalable to thousands of agents per manager.
- The HIPS should use the HTTP and SSL protocols for the management interface and for the communication between the HIPS and management center.
- The HIPS should reside between the applications and the kernel, enabling maximum application visibility with minimal impact to the stability and performance of the underlying operating system.
- When an application attempts an operation, the HIPS should check the operation against the application's security policy, making a real-time allow or deny decision on its continuation and determining if logging the request is appropriate.
- By combining security policies implementing distributed firewall, operating system lockdown and integrity assurance, malicious mobile code protection, and audit event collection capabilities in default policies for servers, the HIPS should provide defence-in-depth protection for exposed systems.
- Correlation should be performed both on the agent and on the Management

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Center console. Agent-based correlation should be supported. The Management Center for HIPS should provide all management functions for all HIPS agents in a centralized manner from the security management software (to be provided).

- The HIPS should be supported on the following platforms:
 - Microsoft Windows
 - Solaris (SPARC)
 - Red Hat Enterprise Linux
 - SuSE Linux Server
 - HP-UX
 - AIX

2.2.6. Perimeter Firewall

- Physical attributes
 - Should be mountable on 19” Rack
 - Modular Chassis
 - Redundant power supply
- Interfaces
 - 4 x GE and upgradeable to 8
 - Console Port 1 number
- Performance and Availability
 - Throughput: minimum 4 Gbps
 - Concurrent session: minimum 400K
 - Simultaneous VPN tunnels: Min 5K
- Routing Protocols
 - Static Routes
 - RIPv1, RIPv2
 - OSPF
- Protocols
 - TCP/IP, PPTP
 - RTP, L2TP

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- IPSec / GRE, DES/3DES/AES
- PPPoE, EAP-TLS, RTP
- FTP, HTTP, HTTPS
- SNMP, SMTP
- DHCP, DNS
- Support for IPv6
- Other support
 - 802.1Q, NAT, PAT, IP Multicast support, Remote Access VPN, Time based Access control lists, URL Filtering, support VLAN, Layer 2 Firewall, Virtual Firewall, Radius/ TACACS
- Management
 - Console, Telnet, SSHv2, Browser based configuration
 - SNMPv1, SNMPv2

2.2.7. Internal Firewall

- Physical attributes
 - Should be mountable on 19” Rack
 - Modular Chassis
 - Redundant power supply
- Interfaces
 - 4 x GE and upgradeable to 8
 - Console Port 1 number
 - Performance and Availability
 - Firewall Throughput Min 2 Gbps upgradeable to 4 Gbps
 - Concurrent connections: Min 400K
 - Simultaneous VPN tunnels: Min 5K
- Routing Protocols
 - Static Routes
 - RIPv1, RIPv2
 - OSPF

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- Protocols
 - TCP/IP, PPTP
 - RTP, L2TP
 - IPSec / GRE, DES/3DES/AES
 - PPPoE, EAP-TLS, RTP
 - FTP, HTTP, HTTPS
 - SNMP, SMTP
 - DHCP, DNS
 - support for IPv6
- Other support
 - 802.1Q, NAT, PAT, IP Multicast support, Remote Access VPN, Time based Access control lists, URL Filtering, support VLAN, Layer 2 Firewall, Virtual Firewall, Radius/ TACACS
- Management
 - Console, Telnet, SSHv2, Browser based configuration
 - SNMPv1, SNMPv2

2.2.8. EM64T Server (Type 1)

- Min 2 x Quad Core Processor or equivalent @ 2.13 GHz or above, CPU, expandable to 4 physical processor
- Latest OS support: Windows Server Enterprise Edition / Red Hat® Enterprise Linux 4 & 5 / SUSE® Linux Enterprise Server 9
- FSB: At least 1066 MT/s / Direct Memory Access Technology.
- Cache: Min 2 x 2MB
- Memory (RAM): Min. 32 GB, scalability to 64 GB FB-DDR2
- All cards should be on 64 bit PCI-X/PCI-e slots.
- 25% of total slots should be free for future expansion. Alternatively, vendors should not consume more than 75% of available slots in the server.
- SAS controller: 64-bit PCI or PCI express.
- RAID controller with RAID 0/1/5 with at least 256 MB battery backed write cache.
- SAS disk – capacity: up to 4x146 GB 10 K rpm, hot plug,

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- 2 x Dual Port 10/100/1000 Mbps Ethernet Adapter, should be TOE enabled/ with dedicated chipset for network I/O
- 2 x 4GBps Fibre Channel Adapter
- Optical / diskette: 8X/24X slim-line DVD ROM drive
- Security: Power-on password / admin password / unattended boot / selectable boot / boot without keyboard.
- Cooling fans: Minimum Four fans / multi speed / Hot swap and redundant/ fan failure signals front panel alarm LED / fan in each power supply / fan on each processor
- Min 2 AC power supplies / supports dual input sources / redundant / hot-swap / auto-restart support
- OEM to provide its own systems management software.
- Pre-failure Alerts for CPU, Memory & Hard Disk.
- The OS along with virtualization software to allocate resources shall be bundled with the offer. Virtualization S/W should be capable of creating virtual H/W & S/W environment for providing independent instances of supported/supplied operating system environment along with required applications. Each virtual environment can be created, deleted without affecting applications running under other virtual environment.
- Remote management tool should provide Secure Sockets Layer (SSL) 128 bit encryption and Secure Shell (SSH) Version 2 and support VPN for secure access over internet.
- Remote Management hardware to monitor server remotely even when server power is off.
- Rack mountable

2.2.9. EM64T Server (Type 2)

- Minimum 2x Quad core physical processor with Min 2.1Ghz or above with 1066Mhz FSB/ direct memory access and upgradeable
- Cache: Min 2 x 2MB
- Minimum Memory: 16 GB, Scalability to 64 GB
- 3X146 GB Hot plug SAS HDD 2.5" 10K RPM HDD or More
- Hot Pluggable and Redundant Power Supply and cooling fans

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- 2 x Dual Port 10/100/1000 Mbps Ethernet Adapter, should be TOE enabled / with Dedicated Chipset for Network I/O
- 2 x 4 Gbps Fibre Channel port.
- RAID Controller with RAID 0/1/5 with 256 MB battery back write cache
- Remote Management Hardware to monitor the server even when the server is powered off
- Remote Management should support SSL encryption.
- SSH v2 should support.
- 8x/16x DVD ROM
- LED or any other management feature to identify failed components within the sub system even when server is switched off.
- Server components should be UL/ FCC/ ROHS complied
- Rack mountable

2.2.10. Blade Server

- Single blade chassis should accommodate minimum 6 (Quad-Processor)/8 (Dual Processor) and scalable to Min 10 or higher hot pluggable blades.
- 7U to 12U Rack-mountable
- Should have the capability for installing all industry standard flavours of Windows, Linux and Unix Operating Environments
- Single console for all blades in the enclosure or KVM Module
- DVD ROM can be internal or external, which can be shared by all the blades allowing remote installation of S/W and OS
- Two hot-plug, redundant 1Gbps Managed Ethernet module, with minimum 4 port copper switch uplink (to the external Ethernet at 10/100/1000 Mbps) and minimum 10 port embedded gigabit down link (which connects each blade server at 1Gbps). Module should be (Internal/external) having Layer 3 functionality - routing, filtering, traffic queuing etc.
- 4 Gbps Fibre Channel SAN switch module with minimum 10 ports. It should connect to the external Fibre Channel switch, and ultimately to the storage device.

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- **Power Supplies:**
 - Hot Swap power supplies to be provided as per power requirement calculation
 - Power supplies should have N+N or N+1 redundancy.
- Hot Swappable and redundant Cooling Unit
- Pre-Failure Alerts on Hard disk drives, processors, blowers, memory
- **Management:**
 - Systems management and deployment tools to aid in Blade Server configuration and OS deployment,
 - Remote management should provide SSL encryption capabilities through internet
 - Blade enclosure should have provision for remote/ local management, troubleshooting and for health check
 - Ability to monitor server performance over time
- Built-in KVM switch (Chassis should have provision of accommodating Optional redundant KVM switch) or virtual KVM feature over IP.
- Dedicated management network port should have separate path for management
- Support heterogeneous environment: Xeon and RISC/EPIC CPU blades must be in same chassis with scope to run Win2003 Server, Red Hat Linux, Suse Linux, 64 Bit UNIX.

Blade Specifications:

- 2 quad core @ 2.0 GHz or above/ 2 dual core @3 GHz or above with 8 MB shared L2 cache, 1333 MHz/ 2000MT/s FSB.
- Blade can be half/full height
- 16 GB DDR2 RAM with 2 No's of free slots for future expandable capability.
- Memory should be upgradeable to At least 32 GB or higher
- Onboard controller to deliver a maximum data transfer of 3.0Gb/s (300MB/s) dedicated per device.

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- 2 X (1000BASE-T) Tx Gigabit LAN ports support on blade server
- 2 X 4 Gbps redundant Fiber Channel ports.
- 2 X 146 GB SAS HDD (300MB/s dedicated per device) system disk with mirroring using integrated RAID 0,1 on internal disks
- Should support heterogeneous OS platforms

2.2.11. Database (RDBMS)

- The system software for RDBMS must provide all the administration tools, notification services, Enterprise reporting services, business intelligence, analysis services, high availability, and management tools at no additional cost to the government.
- The RDBMS must provide full use licenses & should allow hosting of other application on the same system.
- The system software must provide perpetual & full use licenses.
- The proposed software should be based on open standards.

2.2.12. Storage and Backup Solution

2.2.12.1. SAN Switch

- Minimum 16 FC ports fully populated (each with minimum port speed 4Gbps), upgradeable to 32 ports with all necessary cables and accessories for connecting Servers /Devices to SAN and two additional 10 Gbps FC ports.
- Should support multiple OS
- Should have dual Fans and Hot plug power supplies
- Should have GUI/ web based Fabric Manager for administration and configuration
- Should have inbuilt diagnostics features like Power On Self Test, FC Trace route, FC Ping etc
- The switch must support Radius authentication when managing from GUI, console or telnet to prevent unauthorized access and must support Secure Shell (SSH) encryption to provide additional security for Telnet sessions to the switch.
- The switch must be able to support port aggregation up to 4 physical Fiber Channel ports to provide aggregated links. The ports aggregation must not be

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limited to ports within the same module. The switch must support the aggregation of any ports from any module.

2.2.12.2. SAN

- The proposed Storage array should have Atleast Dual active-active storage Controllers with battery backed cache supporting to Atleast 72 hours or cache de-staging mechanism of complete cache protection. The array proposed should be in an end-to-end 4Gbps architecture
- The storage array shall be configured with atleast 4 GB of mirrored cache scalable to 8 GB cache across two storage controllers for disk I/O operations.
- The Storage subsystem should have at least 4 nos. of 4Gbps front-end host ports for an aggregate port bandwidth of 16Gbps and at least 4 nos. of 4Gbps back-end drive ports for an aggregate port bandwidth of 16Gbps. Any vendor who does not have 4Gbps Ports should provide sufficient number of ports to match the required aggregate front-end and back-end port bandwidth.
- The storage subsystem should be supported for at least raw capacity of 50 TB.
- Must be able to support intermix disk capacity 146GB, 300GB or higher FC & SATA/ FATA disks
- All the necessary management software to be supplied to configure and manage the storage subsystem, RAID configurations, logical drives. Space optimized snapshot. The management features should be of dynamic capabilities so as to avoid downtime of the storage system.
- Dynamic Features should include – Dynamic array RAID migration, Dynamic Array/Volume and LUNs expansion and Dynamic Replication Mode Switching. All features should be available while the system/applications are online.
- Redundant power supplies, batteries and cooling fans.
- Multi-path & Load balancing software for all SAN connected servers shall be provided. In case any vendor supporting the above licenses for either server based or capacity based then should At least configure the multi-path licenses for At least 15 servers and entire supported capacity respectively.
- The offered system should be pre-configured with at least 10 TB of raw capacity out of which 5 TB shall be configured using 300GB 4Gbps FC 15 K RPM Drives

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and 5 TB shall be configured in 750GB or higher SATA/FATA Drives..

- Storage should support RAID level 0, 1 & 5. All RAID shall be hardware based RAID
- Should support multi OS like Windows, LINUX, AIX, HP-UX, SUN Solaris etc...

2.2.12.3. SAN Storage management software

- Should support storage virtualization, i.e. Easy logical drive expansion
- Should support hot-swappable physical drive raid array expansion with the addition of extra hard disks
- Should support expansion with drives of lower performance
- Should be able to allocate logical spaces to multiple operating Systems in the same storage facility
- Should be able to support clustered and individual servers at the same time
- Should be able to take "snapshots" of the stored data to another logical drive.
- Vendor should also offer storage performance monitoring and management software

2.2.12.4. Tape Library

- Should support LTO-4 or latest technology based library with at least four LTO-4 drives scalable to minimum 10 drives
- The proposed LTO library solution should be capable for providing a backup window of about 8 hour and multiple frequencies per day.
- The native LTO-4 capacity should be 800GB and native data transfer speed should be 120Mb/s.
- The compression ration should be 2:1
- The library should be natively configured with Barcode Reader
- Vendor shall provide 50 x LTO 4 labelled Cartages + 5 Cleaning Cartages

2.2.12.5. Backup Software

- The proposed Backup Solution should be available on various OS platforms such as Windows and UNIX platforms and be capable of supporting SAN based backup / restore from various platforms including UNIX, Linux, and Windows.

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- As envisaged the proposed Backup Solution should provide a backup window of about 8 hour and multiple frequencies per day. It should also provide a complete backup every weekend and incremental backup per day.
- Software should have full command line/ GUI support on above mention OS
- Software should have an inbuilt feature for Tape to tape copy feature (cloning, within the tape library) to make multiple copies of the tapes without affecting the clients for sending tapes offsite as part of disaster recovery strategy
- The proposed backup solution shall be offered with appropriate Client license for SAN based backup as well as LAN based backup.
- The proposed Backup Solution has in-built media management and supports cross platform Device & Media sharing in SAN environment.
- Backup Software is able to rebuild the Backup Database/Catalogue from tapes in the event of catalogue loss/corruption.
- The proposed Backup Solution has online backup solution for different type of Databases such as Oracle, MS SQL, DB2 etc on various OS
- The Proposed backup solution shall be designed in such a fashion so that every client/server in a SAN can share the robotic
- Backup solution should have the capabilities of backup restore & archival.
- Backup Solution shall be able to copy data across firewall.
- Backup solution should support multi-streaming (backup of multiple backup clients onto the same drive concurrently).
- The Backup software must reduce the recovery window by collating data based on certain parameters like clients, application, etc onto single tape or single set of tape. This activity must not be done during backup, and must be an offline activity, within the tape library.
- The Backup software must also be capable of reorganizing the data onto tapes within the library by migrating data from one set of tapes into another, so that the space available is utilized to the maximum. The software must be capable of setting this utilization threshold for tapes.

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2.2.13. Server Load Balancer

Server Load balancer requirements:

- Minimum 2 x 10/100/1000Mbps Ethernet Ports & upgrade able to 4 ports
- The offered setup shall support 19” Rack mounting.
- Minimum memory: 1 GB
- Minimum 2Gbps throughput and should be upgradeable to 4Gbps
- Server Load Balancing Mechanism
 - Cyclic, Hash, Least numbers of users
 - Weighted Cyclic, Least Amount of Traffic
 - Response Time
- Redundancy Features
 - Hardware level Redundancy
 - Provision for SLB to work in Active-Active mode
 - VRRP /or equivalent protocol support
 - Segmentation / Virtualization support / Resource Allocation
- Server Load Balancing Features
 - Server and Client process coexist
 - UDP Stateless
 - Service Failover
 - Backup/Overflow
 - Direct Server Return
 - Client NAT
 - Port Multiplexing-Virtual Ports to Real Ports Mapping
 - DNS Load Balancing
- Load Balancing Applications
 - Application/ Web Server, MMS, RTSP, Streaming Media
 - DNS, FTP- ACTIVE & PASSIVE, REXEC, RSH,
 - LDAP, RADIUS
- Content Intelligent SLB
- HTTP Header Super Farm
- URL-Based SLB
- SLB should support below Management options
 - Web Based Management

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- Secure Web Based Management
- SSH
- TELNET
- SNMP v1,2, 3
- Command Line

2.2.14. Workstations

- Processor @ 2.0 GHz or higher with 1066 MHz FSB
- Min 2 MB L2 Cache Memory
- Intel Chipset 975x/Q 35 Express Chipset
- 2 GB Dual Channel DDR2 RAM upgradeable to 4 GB memory
- 2 x 160 GB SATA HDD @ 7200 RPM & 3 GB/s
- Min. 4 SATA Ports and 4 DIMM Memory Slots
- FDD - 1 X 1.44 MB
- Dual Layer DVD-RW 16x or higher Optical Drive
- 56K PCI Modem
- 17" TFT WXGA color monitor (Min. 1280x1024 resolution)
- 2 x 10/100/1000 Mbps (Gigabit Ethernet) Network Interface Controller
- Optical Scroll Mouse
- Min. Two USB 2.0 Ports on Front Panel
- Ports: 1x Parallel, 1xSerial, 1xPS/2 Mouse, 1x PS/2 KBD,1xVGA, 4xUSB, Audio, MIC etc... on the rear panel
- 2 x Std. PCI Slots, 3 x PCI Express 16x expansion slots
- Pre-installed Operating System with patches, license, 5 years' Support/ Subscription, Standard Desktop software (like office tools)
- Security Solution for recovery of data and OS against accidental deletion, formatting, virus attack and corruption of registry

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2.2.15. Management & Monitoring System (EMS)

Basic Requirements

- Solution should be inclusive with hardware, OS, patches, etc.
- Solution should provide for future scalability of the whole system without major architectural changes.
- Should be SNMP v1, v2, v3, and MIB-II compliant.
- Filtering of events should be possible, with advance sort option based on components, type of message, time etc.
- Should support Web Interface.
- Should provide accessibility to database running underneath
- Solution should be open, distributed, scalable, and multi-platform and open to third party integration.
- Should provide fault and performance management for multi-vendor TCP/IP networks.
- Should provide monitoring access to Third Party Auditor / client/ designated officer for auditing purposes.

Security

- Should be able to provide secured windows based consoles as well as secured web-based consoles for accessibility to EMS.
- Should have web browser interface with user name and Password Authentication.
- Administrator/ Manager should have privilege to create/modify/delete user.

Polling Cycle

- Support discriminated polling.
- Should be able to update device configuration changes such as re-indexing of ports.

Fault Management

- Should be able to get fault information in real time and present the same in alarm window with description, affected component, time stamp etc.
- Should be able to get fault information from heterogeneous devices —

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routers, switches, servers etc.

- Event related to Servers should go to a common enterprise event console where a set of automated tasks can be defined based on the policy.
- Should have ability to correlate events across the entire infrastructure components of SDC.
- Should support automatic event correlation in order to reduce events occurring in SDC.
- Should support advanced filtering to eliminate extraneous data / alarms in Web browser and GUI.
- Should be configurable to suppress events for key systems/devices that are down for routine maintenance or planned outage.
- Should be able to monitor on user-defined thresholds for warning/ critical states and escalate events to event console of enterprise management system.

Discovery

- Should provide accurate discovery of layer 3 and heterogeneous layer 2 switched networks for Ethernet, LAN and Servers etc.
- Should Provide a graphical query language to automatically create and maintain application maps
- Should provide out-of-the-box views for most common environments like IIS, J2EE, SAP, Oracle
- Should be able to schedule discovery to keep the configuration management system up to date and track history of changes to configuration of discovered items
- Manual discovery can be done for identified network segment, single or multiple devices.

Presentation

- Should be able to discover links with proper colour status propagation for complete network visualization.
- Should support dynamic object collections and auto discovery. The topology of the entire Network should be available in a single map.
- Should give user option to create his /or her map based on certain group of

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devices or region.

- Should provide custom visual mapping of L2 and L3 devices connectivity and relationships.

Agents

- Should monitor various operating system parameters such as processors, memory, files, processes, file systems etc. where applicable using agents on the servers to be monitored.
- Provide performance configuration to enable agent configuration to be done from a central GUI based console that provide a common look and feel across various platforms in the enterprise. These agents could then dynamically reconfigure them to use the profiles they receive.
- Should have automated service discovery, policy deployment and actions to enable busy IT personnel to focus on more strategic initiatives

Server Monitoring

- Should be able to monitor/ manage large heterogeneous systems environment continuously.
- Should be able to manage distributed, heterogeneous systems - Windows, UNIX & LINUX etc.
- Should support Virtual platforms
- Windows OS
 - Should monitor / manage following:
 - Event log monitoring
 - Virtual and physical memory statistics
 - Paging and swap statistics
 - Operating System
 - Memory
 - Logical disk
 - Physical disk
 - Process
 - Processor
 - Paging file

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- IP statistics
- ICMP statistics
- Network interface traffic
- Cache
- Services
- MS Active Directory
- Capture Reboot alerts
- Should be capable of view/start/stop the services on windows servers
- The agent should be capable of storing events / data locally if communication to the management server is not possible due to some problem. This capability will help us avoid losing critical events

Unix / Linux

- Should monitor with statistics :
 - System CPU, idle CPU and wait I/O
 - System virtual memory (includes swapping and paging)
 - System load
 - Disk Usage
 - Disk inode usage on each file system
 - Network interface traffic
 - Critical System log integration

Infrastructure Services

- IIS / Tomcat / Web server statistics
- HTTP service
- HTTPS service
- FTP server statistics
- POP/ SMTP Services
- ICMP services
- Database Services – Monitor various critical relational database management system (RDBMS) parameters such as database tables / table spaces, logs

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etc.

Reporting

- Should be able to generate reports on predefined / customized hours.
- Should be able to present the reports through web and also generate “pdf” / CSV reports of the same.
- Should provide user flexibility to create his /or her custom reports on the basis of time duration, group of elements, custom elements etc.
- Should provide information regarding interface utilization and error statistics for physical and logical links.
- Should create historical performance and trend analysis for capacity planning.
- Should be capable to send the reports through e-mail to pre-defined user with pre-defined interval.
- Should have capability to exclude the planned-downtimes or downtime outside SLA.
- Should be able to generate SLA Reports.
- Should be able to generate web-based reports both near real time and historical data for the systems and network devices.
- Should be able to generate the reports for Server, Application, infrastructure services and Network devices in SDC environment.

Availability Reports

- Availability and Uptime – Daily, Weekly, Monthly and Yearly Basis
- Trend Report
- Custom report
- MTBF and MTTR reports

Performance Reports

- Device Performance – CPU and Memory utilized
- Interface errors
- Server and Infrastructure services statistics
- Trend report based on Historical Information

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- Top N report
- Custom report
- SLA Reporting
- Computation of SLA for entire SDC Infrastructure
- Automated Daily, Weekly, Monthly, Quarterly and Yearly SLA reports

Data collection

- For reporting, required RDBMS to be provided with all licenses.
- Should support ODBC or relevant database and interfaces to popular RDBMS.
- Should have sufficient Storage capacity should to support all reporting data for 5 Years of SDC operation.

Integration

- Should be able to receive and process SNMP traps from infrastructure components such as router, switch, servers etc.
- Should be able integrate with Helpdesk system for incidents.
- Should be able to send e-mail or Mobile –SMS to pre-defined users for pre-defined faults.
- Should trigger automated actions based on incoming events / traps. These actions can be automated scripts/batch files.
- EMS should integrate with automatic discovery to analyze changes to configuration items.

Patch Management.

- It should be capable of acquiring new patches for operating system and applications which are coming under SOW of the DCO at MSDC.
- It shall be able to work over static proxy connections.
- It shall have capability exclude or include products for which patch downloads are required in the organization.
- It shall be capable of a scheduling to scan to the end desktops, servers, network devices to keep the patch levels to the minimum risk levels.
- Generate reports on various Compliance

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- It shall have capability to report non Compliance in the enterprise against the patch levels in a graphical manner to help administrators prioritize the tasks and evaluate the risks / exposures.
- It shall have capability to apply security patches and service packs to server operating system with minimum reboot of the server thus minimizing the disruption to service provided by the server
- It shall have the ability for defining selective reboot after the patch is applied.
- It shall prompt to end users for a need to reboot to make the security patch mandatory and make the organization more secure.

Network Management

- The Network Management function must monitor performance across heterogeneous networks from one end of the enterprise to the other.
- It should proactively analyze problems to improve network performance.
- The Network Management function should create a graphical display of all discovered resources.
- The Network Management function should have extensive reporting facility, providing the ability to format and present data in a graphical and tabular display
- The Network Management function should collect and analyze the data. Once collected, it should automatically store data gathered by the NMS system in a database. This enterprise-wide data should be easily accessed from a central location and used to help with capacity planning, reporting and analysis.
- The Network Management function should also collect traffic statistics on client/server sessions, which cross the LAN on which it is running.
- The Network Management function should also provide information on performance of Ethernet segments, including capacity utilization and error statistics for the segment and the top contributing hosts, WAN links and routers.
- Alerts should be shown on the Event Management map when thresholds are exceeded and should subsequently be able to inform Network Operations Center (NOC) and notify concerned authority using different methods such as pagers, emails, etc.

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- It should be able to automatically generate a notification in the event of a link failure to ensure proper handling of link related issues.
- The Systems and Distributed Monitoring (Operating Systems) of EMS should be able to monitor:
 - Processors: Each processor in the system should be monitored for CPU utilization. Current utilization should be compared against user-specified warning and critical thresholds.
 - File Systems: Each file system should be monitored for the amount of file system space used, which is compared to user-defined warning and critical thresholds.
 - Log Files: Logs should be monitored to detect faults in the operating system, the communication subsystem and in applications. The function should also analyze the files residing on the host for specified string patterns.
 - System Processes: The System Management function should provide real-time collection of data from all system processes. This should identify whether or not an important process has stopped unexpectedly. Critical processes should be automatically restarted using the System Management function.
 - Memory: The System Management function should monitor memory utilization and available swap space.
 - Event Log: User-defined events in the security, system, and application event logs must be monitored.

SLA Monitoring

The SLA Monitoring function of the EMS is by far the most important requirement of the SDC Project. Equally important from the point of the Partner is that the payments by SDA on account of the performance are linked to a measurement of the quarterly averages of SLA parameters. In this context the SLA Monitoring component of EMS will have to possess the following capabilities:

- EMS should integrate with the application software component of portal software that measures performance of system against the following SLA parameters:
 - Response times of Portal;

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- No of transactions handled in application server in terms of number of concurrent sessions;
- Uptime of data centre;
- Meantime for restoration of Data Centre etc;
- EMS should compile the performance statistics from all the IT systems involved including the EQMS and compute the average of the parameters over a quarter, and compare it with the SLA metrics laid down in the RFP.
- The EMS should help to compute the weighted average score of the SLA metrics and arrive at the quarterly service charges payable to the Agency after applying the system of penalties and rewards.
- The SLA monitoring component of the EMS should be under the control of the authority that is nominated to the mutual agreement of Director the partner so as to ensure that it is in a trusted environment.

The SLA monitoring component of the EMS should be subject to random third party audit to vouchsafe its accuracy, reliability and integrity.

Reporting

- The Reporting and Analysis tool should provide a ready-to-use view into the wealth of data gathered by Management system and service management tools. It should consolidate data from all the relevant modules and transform it into easily accessible business-relevant information. This information, should be presented in a variety of graphical formats can be viewed interactively (slice, dice, drill down, drill through).
- The tool should allow customers to explore the real-time data in a variety of methods and patterns and then produce reports to analyze the associated business and service affecting issues.
- The presentation of reports should be in an easy to analyze graphical form enabling the administrator to put up easily summarized reports to the management for quick action (Customizable Reports). The software should be capable of supporting the needs to custom make some of the reports as per the needs of the organization
- Provide Historical Data Analysis: The software should be able to provide a time snapshot of the required information as well as the period analysis of the same in order to help in various capacity planning decisions.

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Security, Operations & Compliance

- The solution should be able to collect logs from various devices such as IDS/IPS, firewalls, antivirus servers, Operating systems and database servers.
- It should have mechanism to store the logs in raw form in a secured & encrypted fashion.
- It should have tools to analyse the archived logs for deeper inspection and analysis.
- The system should have out of the box reports available for supported devices and compliance standards like ISO27001, etc
- The system should support querying from real time logs and filtering of events.

Helpdesk Management System

- Solution should be a comprehensive and fully integrated IT service management software suite that enables organization IT to improve service levels, balance resources and control costs.
- With embedded ITIL-based best practices, Service management Solution should allow organization to quickly deploy consistent, integrated work processes across every part of your organization IT organization.
- From the moment a call comes into the service desk, through incident, problem, change and release management, every service management process should be automated and optimized.
- The suite should provide request, catalogue and service level management modules for comprehensive service management.
- The solution should provide configuration management capabilities that establish an ITIL based configuration management database (CMDB).
- Enabling a wide range of out-of-the-box processes for service support and service delivery.
- Service management Solution should be a web-based technology foundation and service oriented architecture.
- The solution should be ITIL compliant in at least 7 of the 10 areas and verified by an authorized third party organization like pink elephant. Please submit the

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verification document for the same.

Service Desk

- The Service Desk module shall be a centralized starting point for all service management activities.
- All service requests shall be channelled through Service Desk, whether they are initiated by a phone call, an e-mail message or the self service interface, enabling IT to centralize, assign tasks, manage and resolve issues efficiently.
- Service Desk shall manage call information and automates service desk processes. It shall provide service agent tools to document, capture and update information about a customer's reported issue, and then leverage knowledge management tools to increase first-call resolution.
- It shall allow the solution to be captured and re-used when issues recur, and report on overall service desk performance.

Incident Management

- The Incident Management module shall automate the entire incident resolution lifecycle, from the time a service disruption is reported through final service restoration.
- Incident Management shall promote technician efficiency by delivering in-depth CI information to help resolve incidents faster and achieve SLA targets.
- Incident Management shall include powerful out-of-the-box categorization, as well as routing and escalation workflows that can be triggered based on criteria such as SLA, impact, urgency, CI, location or customer.
- Once an incident is resolved, Incident Management shall provide an automated feedback loop to validate the solution and capture it for future use.
- It shall help in monitoring whether service level objectives are being met, and alert when business rules are violated

Problem Management

- The Problem Management module shall provide a framework for identifying and eliminating the underlying problems that cause recurring incidents.
- Problem Management module shall provide problem control: the identification and documentation of a problem and any workarounds.

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- Once a problem has been identified a known error record shall be created.
- Known errors and workarounds shall be shared with Service Desk and Incident Management, so associated incidents can be resolved quickly.
- From the known error a request for change may be triggered leading to a permanent solution.
- All of these steps shall be under the control of the problem manager, including the ability to assign diagnostic tasks to appropriate technicians.
- Problem Management shall provide the ability to link multiple incidents to problems, problems to known errors, and known errors to changes.
- Problem Management shall allow routing of problem records based on technical skill sets, locations or availability.

Change Management

- The Change Management module shall provide a powerful rule based workflow system for controlling changes throughout their lifecycle: from initial request to approval, to planning and implementation, and to monitoring and evaluation.
- An intuitive change calendar shall provide a global view of all changes in the schedule.
- The module shall be highly tailorable to the processes unique to our organization and it shall accommodate both planned and unplanned changes.
- Change Management module shall document changes through time and categorizes and assigns resources in more effective ways.
- It shall allow changes to run in serial or parallel paths with multiple dependencies.
- Change Management shall provide comprehensive approval capabilities that maintain agreement among stakeholders about what changes are made, and that change were made correctly.
- In addition, it shall automatically update configuration management data, so changes to the IT infrastructure are accurately reflected in the CMDB.
- The Change Management module shall also support ITIL's Release Management process.
- Out-of-the-box templates shall contain all of the phase and task definitions needed to manage the release process from initial assessment to final rollout,

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including optional activities such as the scheduling of training.

- Release management shall utilize by Configuration Management database Capability, which shall allow all of the CIs affected by the release to be treated as a consistent entity.

Service Level Management

- The Service Level Management module shall help keep IT services aligned with business needs.
- It shall allow an easy to develop standardized service level objectives for calls, incidents, problems and changes.
- It shall allow construction of service level agreements that can be applied to various CIs, people and business services.
- Once in place, SLAs shall be the automated mechanism by which IT tasks are prioritized and distributed.
- When a business-critical service “Active Directory” is disrupted, the associated SLAs shall dictate how the people, processes and tasks are prioritized relative to other tasks in the queue.
- Response time and availability criteria shall be used to determine key thresholds; that managers and technicians can monitor and respond to SLA-based tasks appropriately.
- It shall provide line-item cost calculations for both parts and labour, and empower organization IT to develop rules that limit spending according to contract parameters.

2.2.16. Antivirus Software

- Solution must be capable to protect all the servers, workstation etc. installed under MSDC
- Must protect from any virus attacks in real time without compromising performance of the system
- Must be capable of providing multiple layers of security and installation on both the gateway as well as sever level
- Must be capable of detecting and cleaning virus infected files as well as scanning for ZIP, RAR compressed files, and TAR, archive files etc.
- Must support upgrade and update without doing server off-line

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- Must use multiple scan engines during the scanning process
- Must have in-memory scanning so as to minimize Disk IO
- Must have Multi-threaded scanning
- Must have scanning of nested compressed files
- Must be capable of specifying the logic with which scan engines are applied; such as the most recently updated scan engine
- Must be automated and not require manual intervention
- Must have content filtering, spam detection etc.
- Must have an anti-spam solution
- Must support various types of reporting formats such as CSV, HTML and text files
- Each login through server must be properly scanned without any failure
- Must be capable of being managed by a central management station

2.2.17. Directory Services

The configuration of the directory shall depend upon state specific requirements. The directory services shall provide the following features at the minimum:

- Directory Services should be compliant with LDAP v3
- Support for integrated LDAP compliant directory services to record information for users, and system resources
- Should support integrated authentication mechanism across operating system, messaging services
- Should support directory services for ease of management and administration/replication
- Should provide support for Group policies and software restriction policies
- Should support security features, such as Kerberos, smart cards, public key infrastructure (PKI), etc
- Should provide support for X.500 naming standards
- Should support Kerberos for logon and authentication
- Should support that password reset capabilities for a given group or groups of users can be delegated to any nominated user

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- Should support that user account creation/deletion rights within a group or groups can be delegated to any nominated user
- Should provide support for Group policies and software restriction policies
- Should provide the audit capability to log old and new values when changes are made to objects and their attributes; Should provide delete protection for directory objects
- Should support the deployment of a read only additional directory server which may be deployed in a different location so as to prevent any changes from the other location
- Directory services should support directory database snapshot tool, which should support creating snapshots of the directory database & should allow directory administrator to view the objects within the snapshot to determine the restore requirements when necessary.
- The Object types supported should include: Users Object Type; Groups (Security & Distribution Groups which can be static or dynamic) , Printers , Containers for purposes of grouping, administration and policy control

2.2.18. DNS

- Support integration with other network services like DHCP, directory, etc.
- Should have DNS zone storage in Directory
- Should have conditional DNS forwarders e.g. forwarding based on a DNS Domain name in the query.
- Should allow clients to dynamically update resource records secure and non-secure
- Should have incremental zone transfer between servers
- Should provide security features like access control list
- Should have several new resource record (RR) types like service location (SRV), etc.
- Should have Round robin on all resource record (RR) types

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2.2.19. Syslog server:

- DCO should propose complete solution for entire MSDC environment
- Should support GUI or Web Based Access
- Should be able to receives, logs, displays and forwards Syslog messages
- Should provide real-time alerting, filtering and management of Syslog messages.
- Should report on event logs from distributed Windows host and, Syslog from UNIX hosts, Routers and Switches
- Ability to filter reports/Syslog based on
- IP Address / Hostname
- Message string or pattern matching
- Severity
- Time or any custom defined rule

Should support with any Database (same box)

2.2.20. Proxy

- Should support High Performance web caching
- Should support web caching features like fast random access memory
- caching and disk caching to enhance web performance
- Should support distributed and hierarchical caching
- Should support integration with directory services
- Should support caching rules and policies
- Should support integration with LDAP V3 based Directory
- Should support ACL's based on user/ IP
- Should support URL and IP based content filtering

2.2.21. KVM Switch

Keyboard, Video Display Unit and Mouse Unit (KVM) and/or other Control Devices/PCs may be used for the IT Infrastructure Management for which the necessary consoles/devices shall be placed in the location earmarked as Administration Area where the Admin staff will be seated. The KVM unit should provide the following functionalities:

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- It should be rack-mountable
- It should have a minimum of 8 ports scalable upto 16 ports.
- It should have local user port for rack access.
- The KVM switch should be SNMP enabled. It should be operable from remote locations.
- It should have a 15 inch TFT monitor with built-in touchpad and a movable front panel.
- It should support multiple operating system
- It should have serial device switching capabilities
- It should have dual power with failover and built-in surge protection
- It should support multi-user access and collaboration

2.2.22. Data Cabling

2.2.22.1. UTP Cable

- Type Unshielded Twisted Pair, Category 6, TIA / EIA 568-B2
- Material:
 - Conductors 23 AWG solid bare copper or better
 - Insulation Polyethylene
 - Jacket Flame Retardant PVC
- Approvals
 - UL Listed
 - ETL verified to TIA / EIA Cat 6
- Operating temperature
 - -20 Deg. C to +60 Deg. C
- Frequency tested up to
 - 500 MHz
- Delay Skew
 - 40-45ns MAX.
- Impedance 100 Ohms + / - 5 ohms, 1 to 600 MHz.
- Performance characteristics to be provided along with bid
 - Attenuation, Pair-to-pair and PS NEXT, ELFEXT and PSELFEXT, Return

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Loss, ACR and PS ACR

2.2.22.2. UTP Jacks

- Type
 - PCB based, Unshielded Twisted Pair, Category 6, TIA / EIA 568-B.2
- Durability
 - Modular Jack 750 mating cycles
 - Wire terminal 200 termination cycles
- Accessories
 - Strain relief and bend-limiting boot for cable
 - Integrated hinged dust cover
- Materials
 - Housing Polyphenylene oxide, 94V-0 rated
 - Wiring blocks Polycarbonate, 94V-0 rated
 - Jack contacts Phosphorous bronze, plated with 1.27micro-meter thick gold
- Approvals
 - UL listed
- Performance Characteristics to be provided with bid
 - Attenuation, NEXT, PS NEXT, FEXT and Return Loss

2.2.22.3. UTP Jack Panels

- Type
 - 24-port, PCB based, Unshielded Twisted Pair, Category 6, TIA / EIA 568-B.2
- Category
 - Category 6
- Port Identification
 - 9mm or 12mm Labels on each of 24-ports (to be included in supply)
- Height 1 U (1.75 inches)
- Durability
 - Modular Jack 750 mating cycles
 - Wire terminal (110 block) 200 termination cycles
- Accessories

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- Strain relief and bend limiting boot for cable
- Materials
 - Housing Polyphenylene oxide, 94V-0 rated
 - Wiring blocks Polycarbonate, 94V-0 rated
 - Jack contacts Phosphorous bronze, plated with 1.27micro-meter thick gold
 - Panel Black, powder coated steel
- Approvals
 - UL listed
- Termination Pattern
 - TIA / EIA 568 A and B;
- Performance Characteristics to be provided along with bid
 - Attenuation, NEXT, PS NEXT, FEXT and Return Loss

2.2.22.4. Faceplates

- Type
 - 1-port, White surface box
- Material
 - ABS / UL 94 V-0

2.2.22.5. Workstation / Equipment Cords

- Type
 - Unshielded Twisted Pair, Category 6, TIA / EIA 568-B.2
- Conductor
 - 24 AWG 7 / 32, stranded copper
- Length
 - 7-feet
- Category
 - Category 6
- Plug
 - Housing Clear polycarbonate
 - Terminals Phosphor Bronze, 50 micron gold plating over selected area and gold flash over remainder, over 100 micron nickel underplate
 - Load bar PBT polyester

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- Jacket
 - PVC
- Insulation
 - Flame Retardant Polyethylene

2.2.22.6. Specifications for Fiber Optic Cabling Systems

- Cable Type
 - 6-core, Multimode, 10G Ethernet OM3, Armored, loose-tube, Gel Filled
- Fiber type
 - 50 / 125, Laser Grade, 250 micron primary coated buffers
- Cable Construction
 - BELLCORE GR 20 / IEC 794-1
- Attenuation
 - @850nm 3.5 dB / KM
 - @1300nm 1.5 dB / KM
- Bandwidth
 - @850nm 1500 MHz-KM
 - @1300nm 500 MHz-KM
- Network Support
 - 1000 Base SX900m
 - 1000 Base Lx 550m without Mode Conditioning launches patch cord.
- Operating Temperature
 - -40 Degree C to +50 Degree C
- Armour
 - Corrugated Steel tape Armour

2.2.22.7. Fiber Optic Connectors

- Connector Type
 - SC-Style, Simplex
- Operating temperature
 - -40 Degree C to +85 Degree C
- Durability & colour
 - MM connectors 500 cycles, Beige
 - SM connectors 220 cycles, Blue

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- Ferrules
 - Pre-radiused Ceramic Ferrules
- Attenuation
 - Not more than 0.75 dB per mated pair

2.2.22.8. Fiber Optic Patch panels

- Fiber optic patch panel
 - 19-inch, Rack mounted Fiber optic patch panel
- Height
 - 2 U, 3.5 inches
- # of fibers
 - 6, 12, 24 or 48
- # of OSP Cables for termination
 - Minimum 2
- Grounding
 - 2 Nos. of earthing lugs, pre-loaded
- Cable Management rings
 - Front and rear cable management rings, pre-loaded
- # of 6-port / 12-port adapter plates
 - 4 / 4 Max.

2.2.22.9. Fiber Optic Adapter plates

- Fiber Optic adapter plate
 - 6-port, SC-Style, SM & MM
- Attenuation
 - Max of 0.75 dB per mated pair

2.2.22.10. Fiber Optic Patch Cord

- Fiber Optic Patch Cords
 - 50/ 125 Ethernet Patch Cord
- Bandwidth
 - @850nm 500 MHz-KM
 - @1300nm 500 MHz-KM
- Insertion Loss

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- Less than 0.5 dB

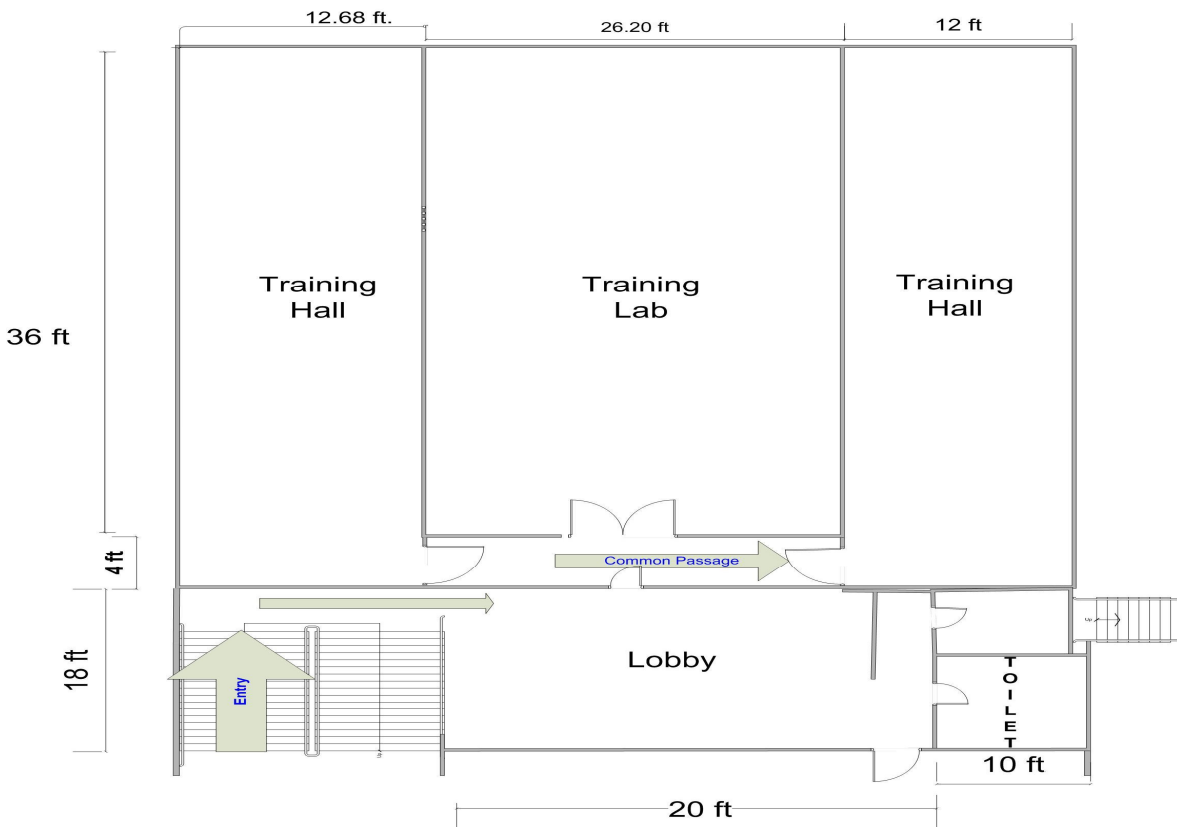
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2.3. SDC Architecture – Physical Infrastructure

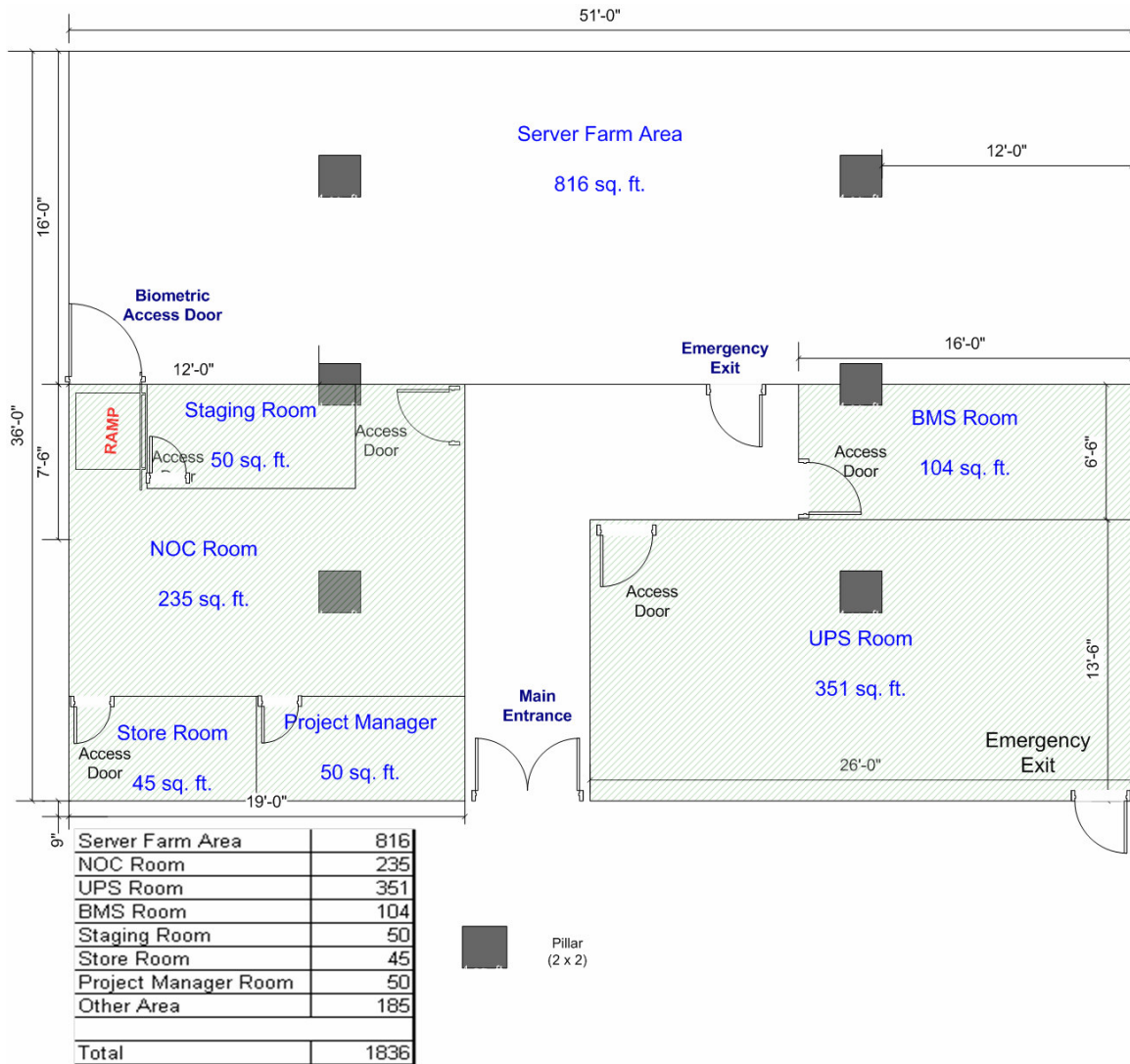
2.3.1. Layout of Data Centre

In the schematic below, entire SDC area is logically divided in Zones as per MIT guidelines. Each of these zones are having different objective described further in this section. The respective area of each Zone would actually vary, primarily on the basis of number of applications and Size of the State. Total SDC area for Meghalaya SDC would be approximately 1836 sq feet respectively. Dimensions of different zones can be changed as per the bidder/ DCO recommendations. For security purposes the entire SDC area would be under video surveillance and every movement will be monitored, all the doors accessible to Server Farm will have Biometric and Smart Card based Security

Meghalaya SDC AS – IS Layout



Meghalaya SDC TO – BE Layout



- **Zone A** – This DC Server room area would host servers, server racks, storage racks and Networking component. The area required for Zone A should approximately be 816 sq feet for MSDC.
- **Zone B** – Comprises of NOC room, Help Desk area, BMS Area, Testing /Monitoring room, Store Room and Project manger room.
- **Zone C** – Comprises of room for power panels, AHU, UPS, Fire suppressions, Telecom Room, etc. This zone requires approximately 351 sq. ft. for MSDC.

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Following is existing interior of site:

- ⇒ Clear height: 10.5 feet
- ⇒ No. of windows = 20
- ⇒ No. of Beams = 3
- ⇒ No. of Pillars= 3
- ⇒ Pillar to Pillar distance= 9 ft
- ⇒ No. of doors= 4
- ⇒ Site strenthning: 450-500 KG/sq meter

Additional Points:

1. The wall which acts as a partion dividing the to be Server Farm Area from the passage needs to be extended upto the ceiling
2. There are 20 windows in all in the proposed site which need to be removed and necessary civil work done in this regard
3. The partions between the proposed Server Farm Area and proposed Staging and NOC Area also the partion between proposed Server Farm Area and proposed UPS and BMS & Helpdesk Areas have half walls (4 ft) and glass partions which have to be taken care of and necessary site preparation work carried out as per the judgement of the bidder with reference to the Proposed Floor Layout of MSDC

A detailed description of key areas of SDC is given below:

2.3.1.1. Server Farm Area

The server farm area within the SDC will host / co-locate SG Intranet Web Servers, Authentication Server, and various Departmental Application Servers including the Database Servers. These servers may be Low end to High-end depending upon the applications hosted on them. These servers may be online or only for repository purpose.. The applications, which are running on the central-computing servers, will have load balancing and high availability features.

This area will contain all the networking components from routers, switches to passive components. The data communication component area will terminate SWAN connections, LAN Connections and host a network monitoring station for LAN & WAN.

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All the Data Center LAN connections will be provided through switches placed in this area.

This area will host the Security components. The security architecture will provide controlled access to the web and database servers from Internet and other networks. This would be multi-layer architecture with two layers of firewall separating the Internet, web, and database/application and Intranet zones.

2.3.1.2. NOC and Helpdesk Room

This room will have all the necessary arrangements for the Database, Systems, Application, Authentication and Other Server Administrators. Per shift it is expected to employ one administrator for each of the categories.

SDC shift operators taking care of daily operational activities of SDC will use this area. There will be one Data Center In charge per shift sitting in this area along with shift operators (one each for specific activities like backup, daily Data Center administration / operations etc.)

2.3.1.3. Backup & Media Storage Area

This area will be used for storing all backed up Digital Linear Tapes (DLT). This area will house a 3 x 3 x 6 Feet fireproof cabinet for storing roughly 350 tapes. It is also highly recommended to have an offsite back up location at some suitable place. The offsite backup place should also have a fire and heat proof safe cabinet.

2.3.1.4. UPS & Electrical Room

This area shall house all the Un-Interrupted Power Supply Units and Batteries accompanying this component. As these components generate good amount of radiation it is advised to house these components in a room separate from main SDC room.

2.3.2. Humidity, Ventilation and Air Conditioning Systems

For MSDC server farm area, the proposed total capacity of precision AC is 32 TR. The PAC solution will be N+1 configuration, with the best rating as per the proposal submitted. One of the PAC units will be always in standby mode and total PAC units should not exceed four PAC units e.g. (Active (16 TR x 2) + Standby (16 TR)), The MSDC should be precision environment controlled. The temperature inside Server Farm area should be maintained at 20 degree centigrade with a precision of ± 2 degrees. Air Conditioning should be ensured to the extent of 99.749%. It is proposed to have air

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supply through false floor

2.3.2.1. Air Conditioning

Since Zone A is a critical area, a separate air conditioning system (precision air conditioning) should be exclusively installed to maintain the required temperature for Zone A. Zone B & C can have a common air conditioning system for comfort. The Cooling Solution proposed should also contain rack placement diagram, which should be in line with proper air distribution and cooling requirement of MSDC. The general requirements for the two zones are as specified below:

- **Zone A (Server Farm Area)** – Zone A should be provided with precision air conditioning on a 24 x 7 operating basis at least meeting with Tier - II architecture requirements and having enough provision to scale it to next level as may be required in a later stage. The units should be able to switch the air conditioner on and off automatically and alternately for effective usage. The units should be down-flow fashion, air-cooled conditioning system. Precision Air Conditioning systems specifically designed for stringent environmental Control with automatic monitoring and control of cooling, heating, humidification, dehumidification and air filtration function should be installed.
- **Zone B/C (NOC, BMS, AHU & UPS Room):** Zone B/C should be provided with split-type comfort air-cooled system (at least meeting with Tier - II architecture requirements). Help Desk & NOC area should be provided with a separate air conditioning system, so that the air conditioning units can be switched off whenever required.

2.3.2.2. Ducting Requirements

It is Ideal for higher power system the gap between false floor and true floor should be used to deliver conditioned air to the desired space, the Floor Discharge System to eliminate the requirement of duct. This can be taken care as and when such system comes to SDC to such needs. However, proper ducting mechanisms should be ensured for the requirement of Air Conditioning.

2.3.2.3. Natural Convection

As the conditioned air is supplied through the grills with volume control dampers on the

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floor, the cold air-cools the component in a much faster and efficient manner as it does moves up, after extracting heat from the component. This follows the natural convection path of the air. The warm air should be sucked at the top by machine, air-conditioned and then supplied back to the room.

2.3.2.4. Air Distribution

The air is to be distributed evenly by providing grills with VCDs (Volume Control Dampers) in the floor tiles.

2.3.2.5. Flexibility

The system should give the flexibility of discharging air at whatever point required even if the furniture is relocated. Changing the grill/tiles carrying grills, at suitable location does this.

2.3.2.6. Air conditioning system

The SDC shall be provided with fully redundant Microprocessor based Precision Air-conditioning system. The precision unit shall be air-cooled refrigerant-based system. Cool air feed to the SDC shall be bottom-charged or downward flow type using raised floor as supply plenum using perforated aluminium tiles for Airflow distribution. The return airflow shall be through ducts on false ceiling to cater to the natural upwardly movement of hot air. Cooling shall be done by the Air-conditioning system only. Forced cooling using Fans on False floor, etc is not acceptable. The following points must be addressed by the air conditioning system:

- **Temperature requirements**

The environment inside the SDC shall need to be continuously maintained at $20^{\circ} \pm 2^{\circ}$ Centigrade. It is advised that the temperature and humidity be controlled at desired levels. The necessary alarms for variation in temperatures shall be monitored on a 24x7 basis and logged for providing reports.

- **Relative Humidity (RH) requirements**

Ambient RH levels shall need to be maintained at $45\% \pm 5$ non-condensing. Humidity sensors shall be deployed. The necessary alarms for variation in RH shall be monitored on a 24x7 basis and logged for providing reports.

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- **Temperature & Relative Humidity Recorders**

Temperature and Relative Humidity Recorders shall preferably be deployed for recording events of multiple locations within the SDC. Records of events for about past 7 days shall be recorded and presentable whenever required by Meghalaya Information Technology Society (MITS). Automatic recording of temperature and humidity using sensors located at various locations within the SDC is necessary.

- **Air quality levels**

The SDC shall be kept at highest level of cleanliness to eliminate the impact of air quality on the hardware and other critical devices. The SDC shall be deployed with efficient air filters to eliminate and arrest the possibility of airborne particulate matter which may cause air-flow clogging, gumming up of components, causing short-circuits, blocking the function of moving parts, causing components to overheat, etc. Air filters to provide up-to 5 Micron particulate shall be deployed.

2.3.2.7. Additional Points

- The precision air-conditioners should be capable of maintaining a temperature range of 20 degree with a maximum of 2-degree variation on higher and lower side and relative humidity of 50% with a maximum variation of 5% on higher and lower side.
- The precision air-conditioners shall have 2 independent refrigeration circuits (each comprising 1 no scroll compressors, refrigeration controls and condensers) and dual blowers for flexibility of operations and better redundancy.
- The unit casing shall be in double skin construction for longer life of the unit and low noise level.
- For close control of the SDC environment conditions (Temp. and RH) the controller shall have (PID) proportional integration and differential.
- The precision unit shall be air-cooled refrigerant-based system to avoid chilled water in critical space.
- The internal cooling design shall follow cold aisle and hot aisle concept as recommended by Ashrae.
- The refrigerant used shall be environment friendly HFC, R-407-C/ equivalent in view of long term usage of the data center equipments, availability of spares and refrigerant.

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- For close control of the data center environment conditions (Temp. and RH) the controller shall have (PID) proportional integration and differential.
- The precision unit shall be air-cooled refrigerant-based system to avoid chilled water in critical space.
- For PAC greater than 10Tr it is recommended that the refrigeration circuit should be dual type, each circuit should have one no of scroll compressor. Refrigeration controls, condenser and dual blower

2.3.3. False Ceiling

The top false ceiling would have 7–12 Inches of space from the actual Room ceiling. This false ceiling will house AC ducting, cables of Electrical lighting; Fire fighting, Rodent Control and CCTV components.

2.3.4. False Flooring

The false flooring would have 15 inches of space from the actual floor. This false flooring will house AC ducting, electrical cabling, Data Cabling (Passive), Rodent Control, etc. Network and electrical cables should be separately laid and should maintain a gap of minimum 2 feet between them so as to avoid electro-magnetic interference. DCO should comply with the OEM recommendation and industry practices for laying the Electrical and networking (passive) cables.

2.3.5. Rodent Repellent

The entry of Rodents and other unwanted pests should be controlled using non-chemical, non-toxic devices. Ultrasonic pest repellents shall be provided in the false flooring and ceiling to repel the pests without killing them. However periodic pest control using Chemical spray can be done once in 3 months as a contingency measure to effectively fight the pest menace.

- Configuration: Master console with necessary transducer and Cabling
- Operating Frequency: Above 20 KHz (Variable)
- Sound Output: 50 dB to 110 dB (Not audible to humans)
- Power output: 800 mW per transducer
- Power consumption: 15 W approximately
- Power Supply: 230 V AC 50 Hz

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- Mounting: Wall / Table Mounting

2.3.6. UPS Requirements & Features

2.3.6.1. UPS Requirements & Features

UPS System design concept is based on redundancy and availability, with true double conversion - online system. To support the dual bus system configuration, two units of UPS should be installed. The Zone A area should be having two UPS system one on each bus and other areas like NOC and help desk should have a separate UPS system. Dual redundant UPS systems will take care of following needs –

1 Servers/ Network Devices

2 Access Control / Fire Detection, suppression / surveillance system

The solution should be automatic with power supply from the transformer as the primary source and automatic switchover to DG set as a secondary source for the data centre. Earthing should be provided from the electrical room control panel to the Earthing pits.

For MSDC it is proposed that UPS should be of 120 KVA with N+1 configuration.

2.3.6.2. UPS Modes of Operation

The UPS shall operate as an ON LINE transfer system in the following modes:

Normal - The UPS inverter continuously supplies the critical AC load. The rectifier / charger derives power from AC Input source and supplies DC power to the Inverter while simultaneously load charging power reserve battery.

Emergency (Failure of AC Input) – Upon failure of AC Input power, the critical AC load will be supplied by the Inverter, which without any switching obtains power from the battery. There shall be no interruption in power to the critical load upon failure or restoration of the AC input source.

Recharge – Upon AC power restoration the rectifier / charger shall automatically restart and assume the inverter and battery recharge loads.

Paralleling Operations: The output of UPS systems should be directly connected at the

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load distribution panel through individual circuit breakers (part of the distribution panel). The load at the output should be shared equally by all the UPS systems. The paralleling control mechanism should be available with individual UPS.

The battery circuit breaker MCCB shall have O/L and U/V protection.

PDU with isolation transformer shall be used for power distribution inside the data center if the UPS location is more than 30 metres from the Data center.

The UPS shall have built in isolation transformer at the output.

2.3.6.3. Battery Requirements

Battery Bank should be designed to provide 30 minutes back up at full load on each UPS. Battery should be sealed and maintenance free type. The UPS Module should have the battery circuit breaker mounted near to the batteries. When this breaker is opened no battery voltage should be present in the enclosure. The UPS module should be automatically disconnected when the battery reaches to minimum discharge voltage level or when signalled by other control functions. Remote tripping of Battery circuit breaker facility shall be also incorporated. The batteries should be housed in suitable Racks. Battery installation shall be outside the data center area to avoid fire hazard as recommended by NFPA

2.3.6.4. Power Distribution

- Battery installation shall be outside the SDC area to avoid fire hazard as recommended by NFPA guidelines.
- For power transfer from normal to emergency, automatic power transfer switches (ATS) with by pass shall be used as per tier regulations. The ATS shall have overlapping neutral as stipulated by IEEE for electronic switching applications.
- Power cabling inside the SDC shall be of copper. The cables and conduits used inside the SDC shall be of FRLS quality.
- Signal referencing copper earthing to be used using braided copper wire of 6 Gauge inside the SDC.

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2.3.6.5. Technical Specifications of UPS

- Input Standard Voltage, 380 /400 / 415 V 3 Phase, 3 or 4 wire, +10 %, -15%
- Input Frequency, 50 Hz, +5% or -5%
- Output Steady State Voltage, 380 / 400 / 415 V +1% or -1%
- Output Frequency, 50 Hz, +0.25Hz to 0.5Hz
- Output Transient Voltage Stability, < 5% or –5% for a load change from 0% to 100%
- Overload – 125% for 10 minutes and 150% for 60 seconds
- Efficiency at full rated load, Not less than 90%
- Total Harmonic Content – With < 2% of Linear Load and < 5% for Non Linear Load
- Crest factor should be 3:1
- Input Harmonic Filter (for <10% Input current distortion)
- Acoustic Noise 70-75 dBA
- DC ripple (with & without Battery connected) < 1%
- Automatic shutdown of component for longer power outages
- Monitoring and logging the status of the power supply
- Physical Protection IP 20
- Relative Humidity up to 95%
- Displaying the voltage/current draw of the component
- Automatic restarting of component following a power outage
- Displaying the current voltage on the line
- Providing alarms on some error connections
- Providing protection against short circuits
- Operating Temperature range - 0 to 40 Celsius
- Design compliance with IEC and ISO
- Software that must be installed and integrated suitable operating system
- Supplies True Online UPS Power
- Non-Linear load compatible
- Capability to handle high Crest Factor load
- Ventilation- Air cooling with Integral Fans
- Built in Reliability & High Efficiency
- Low Audible Noise

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- Compact Footprint
- Front Access for easy Maintenance
- The power factor of the UPS system shall not be less than 0.8 at all load conditions
- Input Current Harmonics < 10%
- The battery circuit breaker MCCB shall have O/L and U/V protection.
- PDU with isolation transformer shall be used for power distribution inside the data centre if the UPS location is more than 30 metres from the Data centre.
- The UPS shall have built in isolation transformer for re-referencing and to limit neutral- ground voltage to 1.50 volts as stipulated by server manufactures.

2.3.7. Diesel Generator Set

The total load of the DG Set after calculating the load of UPS, PAC, and Lighting etc shall be 400 KVA in N+1 configuration. The DG Set solution will be N+1 configuration, with the best rating as per the proposal submitted for redundant purpose.

The diesel generator set should be in N+1 redundancy mode. The total load of DG Set shall be 400 KVA which shall be equally divided into 3 units (example 200 KVA + 200 KVA) in active-active mode and another unit of 200 KVA shall be in standby mode.

The cumulative capacity of the fuel tank should be capable to maintain SLA. The vendor should ensure that the DG Set is integrated with the BMS. It should be of 0.8 power factor (at NTP) developing 415 volts, 50 Hz, 3 phase, 4 wire A.C. Supply shall be complete with engine, alternator, base frame, acoustic enclosure, fuel tank, residential silencer, exhaust pipe and AMF panel, self starter, battery etc. etc. complete in all respects. All components (excluding AMF panel silencer & exhaust pipe) shall be accommodated in enclosure. Brief specification of various components shall be as under and makes as indicated in the list of acceptable makes.

- Diesel Engine: The Engine shall be water cooled, electric starting, Naturally Aspirated, 1500 RPM, four stroke multiple cylinder, diesel operated conforming to relevant BS/ IS standards with Dry Type Air Cleaner, Compact Radiator with Recovery Bottle and Pusher type Fan, Engine with Coolant, Engine mounted panel with wiring harness, Holset Coupling and Industrial Silencer, as per engine manufacturers design standards.

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- ALTERNATOR: The alternator shall be synchronous, brush less developing min required load continuously at 1500 RPM generating 415 volts 0.8 power factor, 3 phase, 50 Hz AC supply. The alternator shall be self excited, self regulated and foot mounted directly coupled to the engine with flexible coupling. The alternator shall conform to relevant BS: 5000/ IS: 4722 standards. The alternator winding shall have class “F/H” insulation and bearing shall be ball and roller type permanently lubricated. The alternator excitation system shall be complete with automatic voltage regulator having fast response to load changes.
- Base Frame: Sturdy, fabricated, welded construction, channel iron Base Frame for mounting the above Engine and Alternator.
- AMF PANEL: The AMF panel shall be manufactured by firm having CPRI certificate and shall be designed to provide complete protection to engine, alternator and starting and stopping DG set automatically on mains failure/resumption. The panel shall be accessible through a separate door and shall be suited to min 400 KVA capacity of DG Set. There should be a common AMF Panel for all the numbers of units of DG Set proposed by the bidder.
- DG Set should be fully integrated with BMS.
- ACCOUSTIC ENCLOSURE: The enclosure shall be fabricated out of 16 SWG CRCA/M.S. sheet and shall be of bolted construction type. The enclosure shall be powder coated after 7-tank treatment process. The enclosure shall accommodate complete DG set including fuel tank, batteries etc. the insulation inside the enclosure will be provide with fiber glass/ minerals wool and sound level shall be finished with perforated CRCA/M.S. sheet duly powder coated. Adequate number of doors with handed & locking arrangement shall be provided for accesses to various components of the DG set. Blower shall be provided for ventilation so that DG set can deliver desired output. The power shall be connected with load side of the AMF Panel and shall continue to operate for 5 Minute after stopping the engine for discharging heat.
- FUEL TANK: Necessary litres capacity Fuel Tank with mounting brackets to run for minimum 12 hours complete with level indicator, fuel inlet and outlet, air vent, drain plug, inlet arrangement for direct filling and set of fuel hoses for inlet and return.
- BATTERY: Dry uncharged maintenance free batteries with leads and terminals.

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- SILENCER & EXHAUST PIPE: The silencer shall be residential type and may be installed outside the enclosure. The exhaust pipe shall extend from the DG set to required height above the enclosure. Fibre glass insulation 50mm. Thick with aluminium cladding 1 mm. Thick shall be provided on the entire length of exhaust pipe. Metallic bellows shall be provided for vibration isolation. The load of the exhaust pipe & silencer shall not be transferred to the enclosure of D.G. Set. Suitable support from ground level with G.I. pipe/M.S. girder shall be provided.
- Installation of DG set: The DG Set will be installed outside the NIC Building

2.3.8. Electrical Work for SDC

The electrical cabling Work shall include the following.

- Main electrical panel in Data Center
- Power cabling
- UPS Distribution Board
- UPS point wiring
- Power Cabling for Utility component and Utility Points etc
- Online UPS
- Separate Earth Pits for the component

The distribution of power from the UPS room to the following shall be considered:

- All proposed component for the production environment
- Existing servers and other component
- UPS 2 Nos. each of minimum 120 KVA with static bypass arrangement
- Sub distribution panels for UPS
- Final Distribution shall be through Power Distributions Units (PDU)/MCB Distribution Boxes. Power in the racks and other component's shall be provided with two sockets with power coming from separate UPS in each of these sockets. The two UPS power shall be given Static Transfer Switch (STS). All the systems in the rack will be connected to this STS.

Specifications for Electrical Cabling: Fire retardant cables of rated capacity exceeding the power requirement of fully blown configuration of the existing and proposed

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component to be used. For expansion needs suitable redundant power points to be provided at suitable locations. All materials used shall conform to IS standards as per industry practice.

- **Bunching of Wires** – Wires carrying current shall be so bunched in the conduit that the outgoing and return wires are drawn into the same conduit. Wires originating from two different phases shall not be run in the same conduit.
- **Drawing of Conductors** – The drawing Aluminium / Copper conductor wires shall be executed with due regards to the following precautions while drawing insulated wires in to conduits. Care shall be taken to avoid scratches and kinks, which cause breakages.
- **Joints** – All joints shall be made at main switches, distribution boards, socket outlets, lighting outlets and switch boxes only. No joints shall be made inside conduits and junctions boxes. Conductors shall be continuous from outlet to outlet.
- **Mains & Sub-Mains** – Mains & sub-mains wires where called for shall be of the rated capacity and approved make. Every main and sub-main shall be drawn into an independent adequate size conduit. Adequate size draw boxes shall be provided at convenient locations to facilitate easy drawing of the mains and sub-mains. An independent earth wire of proper rating shall be provided. The earth wires shall run along the entire length of the mains and sub-mains.
- **Load Balancing** – Balancing of circuits in three-phase installation shall be planned before the commencement of wiring.
- **Color Code of the Conductors** – Color code shall be maintained for the entire wiring installation, Red, Yellow, Blue for three phases and “OFF” circuit black for neutral and green for earth (or bare earth).
- **Fixing of the Conduits** – Conduits junction boxes shall be kept in position and proper holdfasts shall be provided. Conduits shall be so arranged as to facilitate easy drawing of the wires through them. Adequate junction boxes of approved shape & size shall be provided. All conduits shall be installed so as to avoid stream and hot water pipes. After conduits, junction boxes, outlet boxes & switch boxes are installed in position their outlets shall be properly plugged so that water, mortar, insects or any other foreign matter does not enter into conduit system. Conduits shall be laid in a neat and organize manner as directed and

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approved by the Information Technology Department Personnel or person on their behalf. Conductors shall be planned so as not to conflict with any other service pipe lines / ducts.

- Protection – To minimize condensation or sweating inside the conductors all outlets of conduit system shall be adequately ventilated and approved by the proper competent authority. All screwed and socketed connections shall be adequately made fully water tight, and use proper joining materials.
- Switch-Outlet Boxes and Junction Boxes – All boxes shall conform to all prevailing Indian Standards. The cover plates shall be of best quality Hylam sheets or ISI grade Urea Formaldehyde Thermosetting insulating material, which should be mechanically strong and fire retardant. Proper support shall be provided to the outer boxes to fix the cover plates of switches as required. Separate screwed earth terminals shall be provided inside the box for earthing purpose.
- Inspection Boxes – Rust proof inspection boxes of required size having smooth external and internal Finish shall be provided to permit periodical inspection and to facilitate removal and replacement of wires when required.

2.3.9. Rack 36 U

- 19" 36U racks shall be used in the Data Centre for hosting the departmental website, CSC interface and other department applications of Government of Meghalaya. All the racks should be mounted on the floor with castor wheels with brakes.
- The racks should conform to EIA-310 Standard for Cabinets, Racks, Panels and Associated Equipment and accommodate industry standard 19" rack mount equipment.
- Front and Back doors should be perforated with at least 63% or higher perforations.
- All racks should be OEM racks with Adjustable mounting depth, Multi-operator component compatibility, Numbered U positions, Powder coat paint finish and Protective grounding provisions.
- All racks should have dual power strips, and redundant cooling fan sets, mounting hardware 2 Packs, Blanking Panel.

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- All racks must be lockable on all sides with unique key for each rack
- Racks should be compatible with floor-throw as well as top-throw data centre cooling systems.
- All Server Racks should have the following things in addition to the above mentioned hardware
 - Rack mount Keyboard and Monitor
 - PS/2 Interface adapter
 - USB Interface adapter
- Racks should have Rear Cable Management channels, Roof and base cable access
- Wire managers
 - Two vertical and four horizontal
- Power distribution
 - (10 points – 5Amp sockets) power distribution
- Door
 - The racks must have steel (solid / grill / mesh) front / rear doors and side panels. Racks should NOT have glass doors / panels.
 - Both the front and rear doors should be designed with quick release hinges allowing for quick and easy detachment without the use of tools.
- Fan trays
 - With 4 fans
- Depth
 - 1000 mm
- Metal
 - Aluminium extruded profile
- Side panel
 - Detachable side panels
- Width
 - 19” equipment mounting, extra width is recommended for managing voluminous cables.

2.3.10. Civil & Architectural work

The civil work includes furnishing the data center area in all aspects. The

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furnishing includes but not limited to the following

- Cement Concrete Work
- Cutting and chipping of existing floors
- Trench works
- Masonry works
- Hardware and Metals
- Glazing
- Paint work
- False Flooring
- False Ceiling
- Storage
- Furniture & fixture
- Partitioning
- Doors and Locking
- Painting
- Fire proofing all surfaces
- Insulating

The selected bidder should adhere to the following civil and interior specifications:

2.3.10.1. Flooring

Providing & fixing steel cementitious raised access floor of FFH upto 450mm finished with antistatic high pressure laminate in size 600 x 600 mm x 35 mm with point load 450 kg and uniform distribution load (UDL) 1350 kg per sq. metre as per following specifications: Panel Type - M 1000, Under structure- Edge Support Rigid Grid, Wear resistance (g / cm²) - < 0.08, Bottom profile - Hemispherical shape, Pedestal -all steel construction & silver zinc plated, Exposed surface- Special weather coating on entire surface of the tiles. The same should also be provided with wire manager and tile lifter etc.

- At least 1' 6" High from existing floor level using antistatic laminated tiles.

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- Supply & Fixing of 1.5 mm Antistatic Laminate skirting matching with floor tiles with 8mm thick MDF Board / Bison Board up to a height of 4"
- Supplying and fixing vinyl flooring with homogeneous flexible vinyl flooring of approved shade 2.0 mm thick in roll forms and manufacturers specification over the existing floor. Before laying, the existing flooring should be made free from dust and undulations. The finished flooring should be free from air bubbles and thoroughly cleaned without undulations.
- Providing and laying premium quality Granite white/ cream tiles of size 2'-0" x 2'-0", 8.5 mm thick set in cement mortar and pointing with approved tile joint filler compound of approved make of matching shade as per manufacturer's specification as directed. The work shall include the preparation of base surface, cleaning, and acid wash.
- do - for skirting up to a height of 4"
- Providing and fixing 9 mm thick floor insulation below the false flooring and joints should be finished properly as per manufacturer's specification.

2.3.10.2. False Ceiling

- Providing and fixing in position gypsum board false ceiling/metal false ceiling with approved G.I./Al/Steel Frame work and hangers including openings for lights etc. to be framed with teak wood members at no extra cost etc. as per specification and description complete.
- Plain horizontal surface.
- Plain vertical surface up to 1" feet high.
- Providing and fixing 9 mm thick insulation above the false ceiling and joints should be finished properly as per manufacturer's specification. The rate shall be inclusive of cleaning the surface to make it free from dust.

2.3.10.3. Furniture and Fixture

- Workstation size of 2'0" depth made with 1.5mm thick laminate of standard make over 19mm thick commercial board complete with wooden beading including cutting holes & fixing of cable manager etc complete with French polish. The desktop will be 25mm thick. & Edges shall be factory post-formed. The desk shall have the necessary drawers, keyboard trays, cabinets, etc. along with sliding /

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- opening as per design, complete with approved quality drawer slides, hinges, locks, etc
- Providing & making of storage unit with 18 mm thick MDF board along with 1.5 mm approved laminate colour out side and 2 coat of enamel paint inside the storage of size 1'6"x1'9"x2'4". The rate inclusive of handle, lock, sliding channel and necessary hardware, etc. complete with French polish
 - Cabin table of depth 2'-0" made with 1.5mm thick laminate of standard make over 19mm thick commercial board complete with wooden beading including cutting holes & fixing of cable manager etc complete with French polish.
 - Providing, making & fixing 6" high laminated strip using 1.5mm thick laminate over 10mm thick commercial board on all vertical surface in the entire server & ancillary areas including low ht partition, brick wall, partition wall, cladding etc complete with French polish in all respect.
 - Providing, making & fixing an enclosure for gas cylinder of Shutters and Partitions along with wooden support and 18 mm thick MDF board along with 1.5 mm approved laminate colour out side and 2 coat of enamel paint inside the shutter. The rate inclusive of handle, lock, loaded hinges, tower bolt and necessary hardware, etc. complete with French polish.
 - Fire proof safe (300 Litres or above). It should be 2 hour fire rated.

2.3.10.4. Partitions

- Providing and fixing in position low height partition wall of 75 mm thick plain gyp-board partition using 12.5 mm thick gyp-board on both sides with GI steel metal vertical stud frame of size 48 mm fixed in the floor channels of 50mm wide to provide a strong partition. Glass wool Insulation inside shall be provided as required. Fixing is by self-tapping screw with vertical studs being at 610 mm intervals. The rate shall include making cutouts for switchboard, sockets, grill etc. for which no extra will be paid separately The rate shall include for preparing the surface smoothly and all as per manufacture's specification etc.
- Providing and fixing in position full height partition wall of 75 mm thick plain gyp-board partition using 12.5 mm thick gyp-board on both sides with GI steel metal vertical stud frame of size 48 mm fixed in the floor and ceiling channels of 50mm wide to provide a strong partition. Glass wool Insulation inside shall be

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provided as required. Fixing is by self-tapping screw with vertical studs being at 610 mm intervals. The rate shall include making cutouts for switchboard, sockets, grill etc. for which no extra will be paid separately. The rate shall include for preparing the surface smoothly and all as per manufacture's specification etc. Finally finishing with one coat of approved brand of fire resistant coating.

- With Glazing including the framework of 4" x 2" wood section complete (in areas like partition between server & operations & maintenance room and between UPS & G&G workstation areas.).
- Providing & fixing Fire Rated Wire Glass minimum 6 mm thick for all glazing in the partition wall complete. (External windows not included in this).
- Providing and fixing in position of 75 mm thick plain gyp-board partition using 12.5 mm thick gyp-board on both sides with GI steel metal vertical stud frame of size 48 mm fixed in the floor and ceiling channels of 50mm wide to provide a strong partition. Fixing is by self tapping screw with vertical studs being at 610 mm intervals. The joints shall be finished with joint paper tape by using jointing compound of India gypboard Ltd., and applying over it 3 layers of the filler compound to provide a smooth surface. Finally finishing with one coat of approved brand of fire resistant coating. The partition will be mainly to clad the shaft walls.
- All doors should be minimum 4 ft wide.

2.3.10.5. Painting

- Providing and applying acrylic plastic emulsion paint of approved make and shade to give an even shade over a primer coat as per manufacturers recommendations after applying painting putty to level and plumb and finishing with 2 coats of plastic emulsion. Base coating shall be as per manufacturer's recommendation for coverage of paint.
- Providing and laying POP punning over cement plaster in perfect line and level with thickness of 10 - 12 mm including making good chases, grooves, edge banding, scaffolding pockets etc.
- Applying approved fire retardant coating on all vertical surfaces, furniture etc as per manufacturer's specification.

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2.3.10.6. Civil Work

- Providing and laying 115 mm thick brick work in cement mortar of 1:4 (1 cement: 4 sand) with bricks of approved quality chamber bricks of class designation 50
- Providing & making SS signage with text in etched & black painted of Dline make or equivalent to be located as directed (wall mounted) for space nomenclature/ directions.
- Plastering with cement mortar 1:5 (1 cement : 5 sand) of 12 mm thick in interior face of the walls and concrete columns including hacking the concrete surface brushing, scaffolding, curing and surface shall be smooth trowel finish as per standard specification.
- Anti-termite treatment of the entire critical area.

2.3.10.7. PVC Conduit

- The conduits for all systems shall be high impact rigid PVC heavy-duty type and shall comply with I.E.E regulations for non-metallic conduit 1.6 mm thick as per IS 9537/1983.
- All sections of conduit and relevant boxes shall be properly cleaned and glued using appropriate epoxy resin glue and the proper connecting pieces, like conduit fittings such as Mild Steel and should be so installed that they can remain accessible for existing cable or the installing of the additional cables.
- No conduit less than 20mm external diameter shall be used. Conduit runs shall be so arranged that the cables connected to separate main circuits shall be enclosed in separate conduits, and that all lead and return wire of each circuit shall be run to the same circuit.
- All conduits shall be smooth in bore, true in size and all ends where conduits are cut shall be carefully made true and all sharp edges trimmed. All joints between lengths of conduit or between conduit and fittings boxes shall be pushed firmly together and glued properly.
- Cables shall not be drawn into conduits until the conduit system is erected, firmly fixed and cleaned out. Not more than two right angle bends or the equivalent shall be permitted between draw or junction boxes. Bending radius shall comply with I.E.E, regulations for PVC pipes.

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- Conduit concealed in the ceiling slab shall run parallel to walls and beams and conduit concealed in the walls shall run vertical or horizontal.
- The chase in the wall required in the recessed conduit system, shall be neatly made and shall be of angle dimensions to permit the conduit to be fixed in the manner desired. Conduit in chase shall be held by steel hooks of approved design of 60cm centre the chases shall be filled up neatly after erection of conduit and brought to the original finish of the wall with cement concrete mixture 1:3:6 using 6mm thick stone aggregate and coarse sand.

2.3.10.8. Wiring

- PVC insulated copper conductor cable shall be used for sub circuit runs from the distribution boards to the points and shall be pulled into conduits. They shall be stranded copper conductors with thermoplastic insulation of 650 / 1100 volts grade. Colour code for wiring shall be followed.
- Looping system of wiring shall be used but wires shall not be jointed. No reduction of strands is permitted at terminations. No wire smaller than 3.029 sq.mm shall be used.
- Wherever wiring is run through trunking or raceways, the wires emerging from individual distributions shall be bunched together with cable straps at required regular intervals. Identification ferrules indicating the circuit and D. B number shall be used for sub main, sub circuit wiring. The ferrules shall be provided at both ends of each sub main and sub-circuit.
- Where, single phase circuits are supplied from a three phase and a neutral distribution board, no conduit shall contain wiring fed from more than one phase in any one room in the premises, where all or part of the electrical load consists of lights, fans and/or other single phase current consuming devices, all shall be connected to the same phase of the supply.
- Circuits fed from distinct sources of supply or from different distribution boards or M.C.Bs shall not be bunched in one conduit. In large areas and other situations where the load is divided between two or three phases, no two single-phase switches connected to different phases shall be mounted within two meters of each other.
- All splicing shall be done by means of terminal blocks or connectors and no

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twisting connection between conductors shall be allowed.

- Metal clad sockets shall be of dia cast non-corroding zinc alloy and deeply recessed contact tubes. Visible scraping type earth terminal shall be provided. Socket shall have push on protective cap.
- All power sockets shall be piano type with associates switch of same capacity. Switch and socket shall be enclosed in a M. S. sheet steel enclosure with the operating knob projecting. Entire assembly shall be suitable for wall mounting with Bakelite be connected on the live wire and neutrals of each circuit shall be continuous everywhere having no fuse or switch installed in the line excepting at the main panels and boards. Each power plug shall be connected to each separate and individual circuit unless specified otherwise. The power wiring shall be kept separate and distinct from lighting and fan wiring. Switch and socket for light and power shall be separate units and not combined one.
- Balancing of circuits in three phases installed shall be arranged before installation is taken up. Unless otherwise specified not more than ten light points shall be grouped on one circuit and the load per circuit shall not exceed 1000 watts The earth continuity insulated copper wire in Green colour shall be run inside the conduit to earth the third pin or socket outlets, earth terminal of light fixtures, fan etc. as required. Lights points shall be either of single control, twin control or multiple points controlled by a single switch / MCB as per scheduled of work. Bare copper wire shall be provided with each circuit from DB as specified in the item of work and terminated in earth bar of DBs and switch boxes with proper lugs as required maximum number of PVC insulated 650 / 1100 grade copper conductors' cable which can be drawn in a conduit.

2.3.10.9. Earthing

- All electrical components are to be earthen is to by connecting two earth tapes from the frame of the component ring will be connected via several earth electrodes. The cable armour will be earthen through the cable glands. Earthing shall be in conformity with provision of rules 32, 61, 62, 67 & 68 of Indian Electricity rules 1956 and as per IS- 3843-1986. All the applicable IT infrastructure in the Data Center shall be earthed.
- Earthing should be done inside the Data Centre for the entire power system and

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provisioning should be there to earth UPS systems, Power distribution units, AC units etc. so as to avoid a ground differential. State shall provide the necessary space required to prepare the earthing pits.

- All metallic objects on the premises that are likely to be energized by electric currents should be effectively grounded.
- The connection to the earth or the electrode system should have sufficient low resistance in the range of 0 to 25 ohm to ensure prompt operation of respective protective devices in event of a ground fault, to provide the required safety from an electric shock to personnel & protect the equipment from voltage gradients which are likely to damage the equipment.
- Recommended levels for equipment-grounding conductors should have very low impedance level less than 0.25 ohm.
- The Earth resistance shall be automatically measured on an online basis at a pre-configured interval and corrective action should be initiated based on the observation. The automatic earthing measurements should be available on the UPS panel itself in the UPS room.
- There should be enough space between data and power cabling and there should not be any cross wiring of the two, in order to avoid any interference, or corruption of data.

2.3.10.10. Cable Work

Electrical cabling:

- Cable ducts should be of such dimension that the cables laid in it do not touch one another. If found necessary the cable shall be fixed with clamps on the walls of the duct .Cables shall be laid on the walls/on the trays as required using suitable clamping/ fixing arrangement as required. Cables shall be neatly arranged on the trays in such manner that a crisis crossing is avoided and final take off to switch gear is easily facilitated.
- All cables will be identified close to their termination point by cable number as per circuit schedule. Cable numbers will be punched on 2mm thick aluminium strips and securely fastened to the. In case of control cables all covers shall be identified by their wire numbers by means of PVC ferrules. For trip circuit identification additional red ferrules are to be used only in the switch gear /

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control panels, cables shall be supported so as to prevent appreciable sagging. In general distance between supports shall not be greater than 600mm for horizontal run and 750mm for vertical run.

- Each section of the rising mains shall be provided with suitable wall straps so that same the can be mounted on the wall.
- Whenever the rising mains pass through the floor they shall be provided with a built-in fire proof barrier so that this barrier restricts the spread of fire through the rising mains from one section to the other adjacent section.
- Neoprene rubber gaskets shall be provided between the covers and channel to satisfy the operating conditions imposed by temperature weathering, durability etc.
- Necessary earthing arrangement shall be made alongside the rising mains enclosure by Mean of a GI strip of adequate size bolted to each section and shall be earthed at both ends. The rising mains enclosure shall be bolted type.

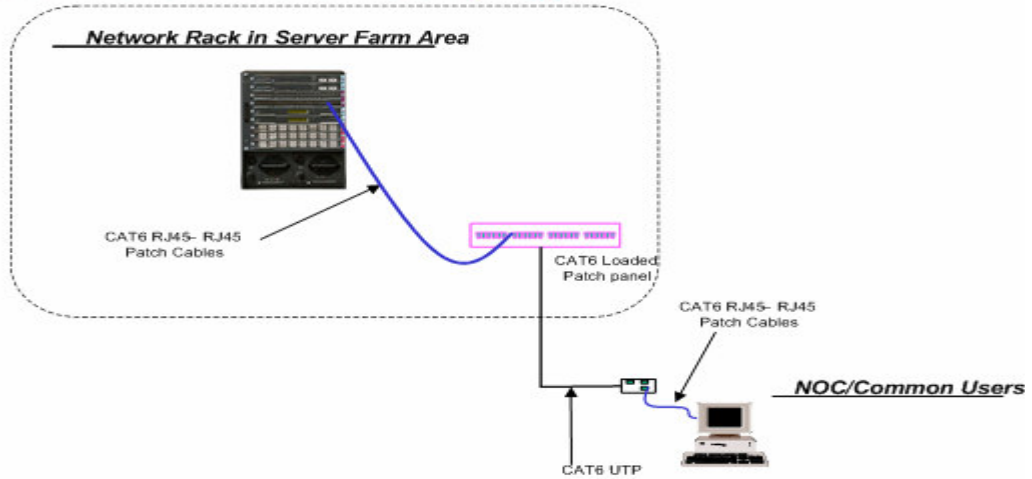
Structured cabling:

- All required cables should be laid up to the rack level in the Data Centre.
- Dedicated raceways / cable-trays should be used for laying LAN.
- Doing cabling as required in project duration is responsibility of DCO
- All the cable raceways shall be adequately grounded and fully concealed with covers.
- The cables should be appropriately marked and labeled.
- There should be enough space between data and power cabling and there should not be any cross wiring of the two, in order to avoid any interference, or corruption of data

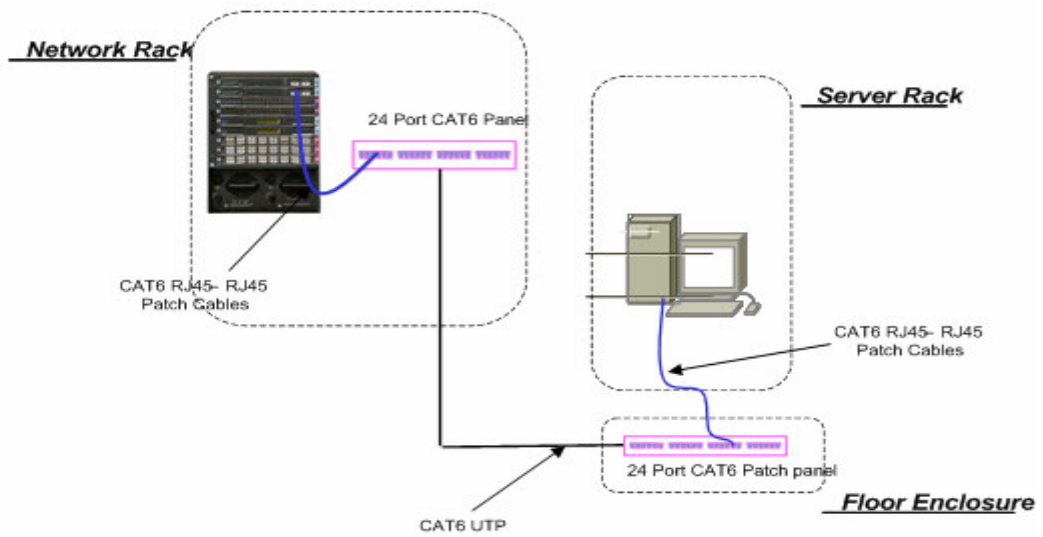
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Cable design

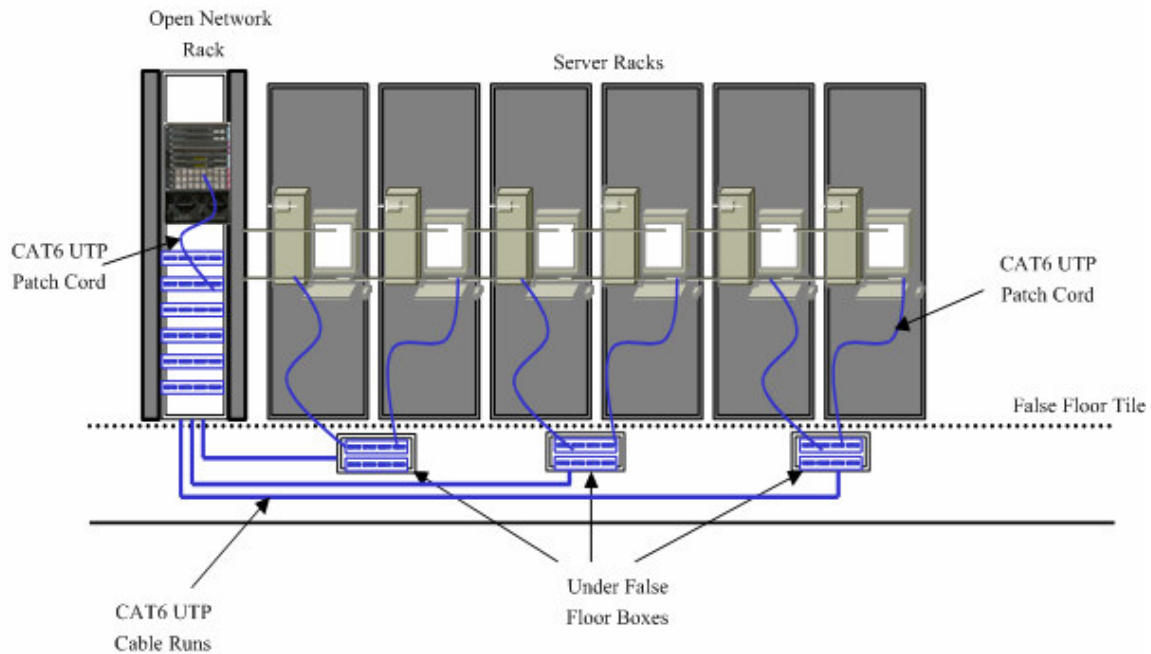
NOC/Common User Data Connectivity Diagram



Sever Data Connectivity



Inter Rack UTP Connectivity



2.3.11. ELECTRICAL BLOCK DIAGRAM

The Electric layout is depending upon the feasibility of site and the DCO will give the facility for the layout and its physical structure at the time of implementation.

2.3.12. Fire Detection and Control Mechanism

2.3.12.1. System Description

- The Fire alarm system shall be an automatic 1 to n (e.g. 24) zone single loop addressable fire detection and alarm system, utilizing conventional detection and alarm sounders.
- Detection shall be by means of automatic heat and smoke detectors located throughout the Data Center (ceiling, false floor and other appropriate areas where fire can take place) with break glass units on escape routes and exits.

2.3.12.2. Control and indicating component

- The control panel shall be a microprocessor based single loop addressable unit, designed and manufactured to the requirements of EN54 Part 2 for the control

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and indicating component and EN54 Part 4 for the internal power supply.

- All controls of the system shall be via the control panel only.
- All site-specific data shall be field programmable and stored in an integral EEPROM. The use of EPROM's requiring factory 'burning' and re-programming is not acceptable.
- All internal components of the control panel shall be fully monitored.
- The control panel shall be capable of supporting a multi device, multi zone 2-wire detection loop. Removal of 1 or more detection devices on the loop shall not render the remaining devices on the loop inoperable.
- The system status shall be made available via panel mounted LEDs and a backlit 8 line x 40-character alphanumeric liquid crystal display.
- All user primary controls shall be password protected over 4 access levels in accordance with EN54 Part 2. Essential controls, such as Start / Stop sounders and Cancel fault buzzer, etc. will be clearly marked.
- Cancel fault and display test functions shall be configurable to be accessed from level 1 or level 2.
- All system controls and programming will be accessed via an alphanumeric keypad. The control panel will incorporate form fill menu driven fields for data entry and retrieval.
- The control panel shall log a minimum of 700 events comprising of 100 event fire log and 200 event fault, disablement and historic logs, giving time, date, device reference and status of indication.
- Fire, fault and disablement events shall be logged as they occur. Visual and audible conformation shall be given on an array of LEDs, the Liquid Crystal Display and the internal supervisory buzzer.
- The control panel shall have an integral automatic power supply and maintenance free sealed battery, providing a standby capacity of a minimum 72 hours and further 30 minutes under full alarm load conditions. The system shall be capable of full re-charge within 24 hours following full system discharge. The performance of the power supply and batteries shall be monitored and alarm rose, should a fault be detected. The system shall protect the batteries from deep discharge.

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- All terminations within the control panel with the exception of the 230V mains connection will be via removable terminal screw fixing points.
- The control panel will have a programmable maintenance reminder to inform the user that maintenance of the system is required. This function shall provide the user with the option of a monthly, quarterly, annually or bi-annually reminder prompts. The maintenance reminder will be indicated on the control panel. This message shall be resettable by the user and will not require the intervention of specialist support. The control panel will provide programmable free text field as part of the maintenance reminder facility.
- The system will include a detection verification feature. The user shall have the option to action a time response to a fire condition. This time shall be programmable up to 10 minutes to allow for investigation of the fire condition before activating alarm outputs. The operation of a manual call point shall override any verify command.

2.3.12.3. Manual Controls

- Start sounders
- Silence sounders
- Reset system
- Cancel fault buzzer
- Display test
- Delay sounder operation
- Verify fire condition
- Enter or modify device text label
- Setup maintenance reminder
- Assign or modify zones
- Disable zones, device, sounders, FRE contact, auxiliary contacts
- Enable zones, device, sounders, FRE contact, auxiliary contacts
- Action weekly test
- Disable loop

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Cable entries – The control panel will include the necessary top entry and rear entry cable entry points via 20mm knockouts.

Manual call points (MCP)

- MCP's shall be addressable and of the steady pressure break glass type manufactured to the requirements of BS 5839: Part 2. A test key shall be provided to allow the routine testing of the unit to meet the requirements of BS 5839 Part 1 1988, without the need for special tools or the need to unfasten the cover plate.
- The device shall be automatically addressed by the CIE on power up of the loop without the need of the insertion of a pre-programmed EPROM or setting of DIL switches. The device shall incorporate a short circuit isolation device and a red LED indicator.
- The MCP shall be suitable for surface or flush mounting. When flush mounted the device shall be capable of fixing to an industry standard single gang box.

2.3.12.4. Smoke detectors

Smoke detectors shall be of the optical or ionization type. Devices shall be compatible with the CIE conforming to the requirements of EN54 Part 7 and be LPCB approved. The detectors shall have twin LEDs to indicate the device has operated and shall fit a common addressable base.

2.3.12.5. Heat detectors

- Heat detectors shall be of the fixed temperature (58° C) or rate of temperature rise type with a fixed temperature operating point.
- Devices shall be compatible with the CIE conforming to the requirements of EN54 Part 5 and be LPCB approved.
- The detectors shall have a single LED to indicate the device has operated and shall fit a common addressable base.

2.3.12.6. Addressable detector bases

- All bases shall be compatible with the type of detector heads fitted and the control system component used. Each base shall comprise all necessary electronics including a short circuit isolator.

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- The device shall be automatically addressed by the CIE on power up of the loop without the need of the insertion of a pre-programmed EPROM or setting of DIL switches.
- Detector bases shall fit onto an industry standard conduit box.

2.3.12.7. Audible Alarms

Electronic sounders shall be colored red with adjustable sound outputs and at least 3 sound signals. The sounders should be suitable for operation with a 24V DC supply providing a sound output of at least 100dBA at 1 meter and 75 dBA min, for a bed head or sounder base type device. The sounder frequency shall be in the range of 500Hz to 1000Hz.

2.3.12.8. Commissioning

- The fire detection and alarm system will be programmable and configurable via an alpha numeric keypad on the control panel.
- The labelling of Device and Zone labels should be part of the system.
- Necessary Software to the control panel

2.3.13. Fire Suppression Systems

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

- The Clean Agent system considered for Total flooding application shall be in compliance with the provisions of Kyoto Protocol.
- Care should be taken that none of the Greenhouse Gases identified in the Kyoto Protocol is used for fire suppression application.
- The minimum criterion for the selection of the Clean Agent will be on the following parameters

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- Zero Ozone Depleting Potential.
- Global Warming Potential not exceeding one.
- Atmospheric Lifetime not exceeding one week.
- The clean agent fire suppression system with FK-5-1-12 and Inert Gas based systems are accepted as a replacement of HCFC and HFC as per Kyoto Protocol.
- The Clean Agent considered for the suppression system must be suitable for man able occupied areas with NOAEL Level (No observable adverse effect level) of 10% as compared to the design concentration to ensure high safety margin for the human who might be present in the hazard area.
- The minimum design standards shall be as per NFPA 2001, 2004 edition or latest revisions.
- Care shall be given to ensure proper early warning detection system with minimum sensitivity of 0.03% per foot obscuration as per NFPA 318 & NFPA 72 to ensure that one gets a very early warning to investigate the incipient fire much before the other detectors activate the fire suppression system automatically.
- All system components furnished and installed shall be warranted against defects in design, materials and workmanship for the full warranty period which is standard with the manufacturer, but in no case less than five (5) years from the date of system acceptance
- Additionally, Portable Extinguishers (CO₂ or Halon based Extinguishers are not acceptable) shall be placed at strategic stations throughout the Data Centre.

2.3.14. High Sensitivity Smoke Detection System

General

The HSSD system shall provide a early warning of fire in it's incipient stage, analyze the risk, and provide alarm and actions appropriate to the risk The system shall include, but not be limited to, a Display Control Panel, Detector Assembly, and the properly designed sampling pipe network. The system equipment shall be supplied by the manufacturer or by its authorized distributor.

Regulatory Requirements

- National Electrical Code (NEC)
- Factory Mutual

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- Local Authority having Jurisdiction

System Description

- The HSSD system should provide an early warning of a fire in its incipient stage. HSSD Detector shall be installed to sample the air from a protected area. In operation the air from the protected area should be drawn through a piping network in the detector unit by an aspirating fan unit to the detector assembly. The air should be illuminated by a laser light source. Smoke particles should scatter this light to a sensitive solid-state photo sensor. An Analogue signal to be transmitted to the display control panel which displays the smoke obscuration levels in a bar graph display. Each increment in the bar graph should represent 120% of the full-scale sensitivity of the detector.
- Three independently programmable alarm points should provide additional visual indications on the display control cards and activate associated relays for additional annunciation and alarm. Similar systems, which incorporate a nephelometric type detector and require periodic replacement of the light source unless all the conditions are met, shall not be considered in any manner.

Engineering Sampling Pipe Network

- Piping networks shall be laid out to provide detection points with spacing. Piping shall be as specified on manufacturer's shop drawings and shall be 1" to 1/2" I.D. smooth bore pipe with airtight connections.
- For piping installed above a dropped ceiling, the open end[s] of the sampling pipe[s] shall penetrate the ceiling tile to act as an additional sampling point.
- Pipes shall be suspended from ceiling slab-using hangers or clamp at intervals of no more than 4 feet to ensure the stability of the piping and reduce the possibility of cracks and breaks at the joints.
- All connections and joints shall be made with standard connections designed to be compatible with the pipe materials. All joints shall be secured according to standard practices.
- All joints shall be airtight to prevent air leakage or infiltration, which may adversely affect the desired venturi effect in the piping.
- Provide all sampling point pipe caps with predrilled holes per manufacturer's shop drawings.
- Sample pipe network shall be of the closed end engineered design. Systems

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using “Open End” design will not be allowed.

- The design program for the air sampling pipe network shall be listed or approved by Underwriters Laboratories or Factory Mutual [FM].
- The design program for the air sampling pipe network shall provide a balanced engineered system and ensure equal sensitivity at each sampling point.

Engineered Design Drawings

- Drawings showing all sampling pipe layouts and the locations of the sampling points. Non-symmetrical type piping systems shall include a copy of the “Sniff” software calculation printout.
- Drawings are to include point-to-point wiring diagrams and all necessary scaled floor plans showing conduit layouts and detector locations.
- The finished drawings shall be stamped “approved” by an authorized design distributor.

Wiring

- All field wire shall be as per design provided by vendor.

Monitoring Software

Should have monitoring facility and has many tools which make monitoring a large network simple. It has a series of menus that allow us to store data about network configurations so that they can be applied to other situations. The menu items also allow us to easily create new smoke zones and assign devices to these zones.

The menus should allow us to perform diagnostic tests on devices within the network. Some of the main features of the software package are listed below.

- Complete system monitoring
- Indication and acknowledgement of all alarms and faults
- Comprehensive event logging and smoke trending
- Zone display representation
- Modem access
- Complete system status overview
- Simple device configuration
- Floor Plans

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- Password protection
- On-line help
- Off-line configuration of devices
- Drag and Drop addressing of devices Home

2.3.15. Access Control System

An access control system consisting of a central PC, intelligent controllers, proximity readers, power supplies, proximity cards, and all associated accessories is required to make a fully operational on line access control system. Access control shall be provided for doors. These doors shall be provided with electric locks, and shall operate on fail-safe principle. The lock shall remain unlocked in the event of a fire alarm, or in the event of a power failure. The fire alarm supplier shall make potential free contacts available for releasing the locks in a fire condition especially for staircase and main doors. Entry to the restricted area shall be by using biometric security and also by showing a proximity card near the reader and exit shall be using a push button installed in the secure area. The system shall monitor the status of the doors through magnetic reed contacts. . The entire SDC Area of the proposed building would be under video surveillance and every movement will be recorded.

2.3.15.1. ACCESS CONTROL SYSTEM

The Access Control System shall be modular in nature, and shall permit expansion of both capacity and functionality through addition of controllers, card readers and sensors. The System shall incorporate the necessary hardware, software, and firmware to collect, transmits and process alarm, tamper and trouble conditions, access requests, and advisories in accordance with the security procedures of the facility. The system shall control the flow of authorized personnel traffic through the secured areas of the facility.

2.3.15.2. OPERATIONAL REQUIREMENT

The access control system shall be a web based access control system whereby any computer can be used to operate the controller (or control panel) directly using a standard web browser program available freely. The controller shall be a black-box design with embedded software built-in, including a web server program. The basic functions are:

- Card access control

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- Alarm monitoring and handling procedures
- Time Attendance data capture and post processing

TECHNICAL SPECIFICATIONS

2.3.15.3. Control panel with Power supply, IP on board.

- The controller should be a microprocessor-based device conforming to UL 294
- Control Panel has to configure with minimum 6 numbers of doors.
- It should feature a direct LAN/WAN connection to the controller bus structure in addition to Serial connections, all of which shall be designed for use in communication with the ACS server.
- It should have built in RDBMS database capable to store personnel particulars like name, Rank, Designation, department, card information and time zone.
- It should be capable of reporting the following alarm conditions to the ACS file server:
 - (i) Enclosure door tamper
 - (ii) Primary power failure
 - (iii) Low Battery Conditions
 - (iv) Loss of Communications
 - (v) All access control violations
- Provision to integrate with Intruder alarm, Elevator Control, CCTV & DVR, Photo ID, Building Automation.

2.3.15.4. Management Software for Access control system

- The system should have a simple, easy to use graphical user interface which is browser based, and all functions shall be accessible by use of either mouse or keyboard. Help text shall be provided for each screen function, and shall be sufficiently interactive that a user may access page help directly and be provided with explicit information relevant to the particular screen being displayed.
- The software Navigation window should facilitate easy access to personnel details, remote controlling of controller operations and operating modes etc.
- Should have provision to provide door wise access report for time monitoring of users.
- Should have Global and local anti-pass back/anti-tailgate capability.

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- System must have provision of creation of data bank, easy retrieval of information and validity expiry warning.
- The software shall seamlessly support and integrate with the smart cards and other access control hardware which is part of the total solution.

2.3.15.5. Contact less Access Control Readers:

- Contact less smart card readers shall work on 13.56 MHz frequency, comply with ISO 15693, ISO 14443A (CSN), and ISO 14443B
- All RF data transmission between the card and the reader shall be encrypted, using a secure algorithm and 64-bit authentication keys.
- Typical contact less smart card read range shall be 2” – 3”
- Contact less smart card readers shall be UL 294, FCC and CE certified. It should be IP55 Rated
- Contact less smart card readers shall meet the following environmental specifications:
 - Operating temperature: -35 to 65 degrees C
 - Operating humidity: 5% to 95% relative humidity non-condensing
 - Weatherized design suitable to withstand harsh environments
 - Material: UL94 Polycarbonate
- Warranty of contact less smart card readers shall be lifetime against defects in materials and workmanship.

2.3.15.6. Biometric Contact less Smart Card Readers:

- Read/write contact less smart card reader with keypad, LCD display and fingerprint biometric authentication. Should provide to choose level of security with various combinations of PIN, card and fingerprint (Biometric).
- The fingerprint reader should read fingerprint template(s) from a Smart Card and verify with a live finger placed on the fingerprint sensor, giving an audible and visual indication to indicate successful/unsuccessful authentication.
- The reader should provide the following audiovisual indications:-
 - An audio transducer should provide various tone sequences to signify: access granted, access denied, power up and diagnostics.
 - A high-intensity light bar shall provide clear visual status (red/green/amber) that is visible even in bright sunlight.

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- All RF data transmission between the card and the reader shall be encrypted, using a secure algorithm and 64-bit authentication keys.
- Should be compact but rugged to withstand handling by multiple users. Verification time should be less than 1 sec.
- May have separate fingerprint enrolment/programming facility to transfer fingerprint to smart card.

2.3.15.7. Access Cards

- Access cards shall be used with access readers to gain entry to access controlled portals (e.g.; doors, gates, turnstiles). and to hold information specific to the user.
- The card shall meet the following standards for contact less smart cards: ISO 15693 and ISO 14443B2.
- The card shall meet ISO 7810 specifications for length, width, thickness, flatness, card construction and durability, and shall be in a form suitable for direct two-sided dye-sublimation or thermal transfer printing on the specified badge printer.
- The card shall support read/write capability, with a 16 Kbits [2048 bytes] of EEPROM memory. Data retention shall be 10 years, nominal.
- Each Application Area on the card shall be secured with a 64-bit unique, diversified security key, such that data stored in that area cannot be accessed or modified until the card and reader have completed a mutual authentication process.
- The card shall be warranted against defects in materials and workmanship for two (2) years.

2.3.15.8. Electro Magnetic Door Lock

- Should have holding force of min 600lbs.
- Should be mountable on wooden/Glass doors.
- Should have provision to be wired with Fire alarm.

2.3.16. CCTV System

General

- All systems and components shall have been thoroughly tested and proven in actual use.

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- All systems and components shall be provided with a one-day turnaround repair express and 24-hour parts replacement. The manufacturer on warranty and non-warranty items shall guarantee the repair and parts expresses.
- Specifications included in this section are indicative and considered as a minimum; component and software that shall be acquired at the time of implementing the project shall be the latest versions available in the market.

System Capabilities

- The system shall provide visual images from the cameras located through out the facility. The cameras located shall be fed into the Digital Video Recorder (DVR) located in the security room.
- The Digital Video Server shall consist of up to 16 channels Digital Multiplexer with built-in recording.
- The Main Security Control Room, which shall house the Monitors and the Digital Video Management Server.
- No. of days of CCTV recording :: 30 days

Camera

General Requirements

- The product specified shall be a fixed dome, 530 TVL high resolution color camera using a 1/3 inch format interline Super HAD CCD imager (795h x 596v effective pixels) pre-packaged in an a dome on a moulded PC/Acryl housing, and comes complete with a 2.8~10 mm varifocal DC iris lens. The Camera should be CE/FCC Certified.
- The camera specified shall be easily surface mounted on ceilings or walls and provide manually adjustable viewing positions of 360° pan and 65° tilt position.
- The camera dome shall provide easy adjustment of zoom position through zoom position screws.
- The Camera should work with minimum illumination of 0.1 lux @ F1.2, 30 IRE, AGC On condition.
- The cameras shall provide high picture quality through Digital signal processing and real colour picture through ATW.

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Environmental Requirements:

- Temperature:
 - 1) Operating: -10°C to +55°C
 - 2) Storage: -20°C to +70°C
- Humidity: 0% to 90% RH, non-condensing.

Stand Alone Digital Video Recorder

- 16 analog video input channels
- 1 channel audio recording & playback
- Recording, Playback, Back-up, Network recording, and Network playback at the same time (Pentaplex)
- DVR should be capable of handling 16 video inputs with MPEG4 & JPEG dual codec.
- The DVR shall record multiple camera signals while simultaneously providing live multiscreen viewing and playback.
- Total 480/400 fps (NTSC/PAL) recording speed for recording.
- Total 480/400 fps (NTSC/PAL) display speed
- Built-in splitter for split screen monitoring (1/4/ 9/13/16 split mode)
- Max. 4TB storage capacity (Through IEEE 1394 port for external HDD)
- Intelligent file system for managing event recording data
- 16 sensor inputs and 4 alarm outputs
- The DVR shall contain an internal video motion detector function that triggers an alarm when movement within a user-defined area of the image is detected.
- Built-in hardware motion detection
- PTZ Control (Preset support) - DVR should have PTZ controls keys on the DVR front control panel.
- User-friendly 32bit True-color Graphic OSD Menu
- Dynamic IP (DHCP, Floating IP) support
- Embedded Linux OS for excellent stability and reliability
- IR remote controller (User can control PTZ with remote controller); and three-axis joystick controller.
- Rated voltage: 220-240 VAC 50/60Hz.

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Environmental Specifications:

- A. Temperature: Operating: +5°C to +40°C
- B. Relative Humidity: Operating: <93% non-condensing.
- SAFETY LISTINGS: CE/FCC.

2.3.16.1. Stand Alone Digital Video Recorder

- 16 analog video input channels
- 1 channel audio recording & playback
- Recording, Playback, Back-up, Network recording, and Network playback at the same time (Pentaplex)
- DVR should be capable of handling 16 video inputs with MPEG4 & JPEG dual codec.
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ENVIRONMENTAL SPECIFICATIONS:

- A. Temperature: Operating: +5°C to +40°C
- B. Relative Humidity: Operating: <93% non-condensing.
- C. SAFETY LISTINGS: CE/FCC

2.3.17. Building Management System (BMS)

The building management system shall be implemented for effective management, monitoring and Integration of various components like HVAC systems, Access Control systems, fire detection system etc.

The BMS shall perform the following general functions including but not limited to:

- Building Management & Control
- Data Collection & archival
- Alarm Event & Management
- Trending
- Reports & MIS Generation
- Maintenance & Complaint Management
- Network Integration

The scope of work shall include designing supplying and installing of Building management (Automation) System. The work shall consist of furnishing all materials, equipment's and appliances necessary to install the said system, complete with Sensors, Direct Digital Controllers, Communication Controllers and Supervisory Software complete with necessary software/hardware support for interfacing with other systems. It shall include laying of cabling duct, conduits and power supply etc., necessary for installation of the system with supply of appropriate type products as indicated in the specification and Bill of Quantities. The controller shall be 32 bit based Microprocessor Controller and shall sit directly on the TCP / IP network. The Controller shall be Web Based, Web Enabled, Real Time Clock, and Web Browser with Communication speed min of 10 Mbps.

Agency shall design & provide a full Building automation system on the basis of truly distributed intelligence and shall comprise of the following general functional sub systems.

- Air Conditioning Management & Control
 - Precision AC Units.

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- Temperature monitoring and controls at all specified positions/locations
- Energy Management
 - LT Panel Energy Monitoring
 - UPS Monitoring
- Safety & Security Systems Integration.
 - Fire Alarm System Integration.
 - HSSD (High Sensitivity Smoke Detection System) System Integration.
 - Access Control System.
 - Gas System Integration.
 - CCTV
 - Water leakage Detection System
- Diesel Generator Integration
 - Fuel Consumption
 - Load Current

2.3.18. Water Leak Detection System

The water leak detector shall be installed to detect any seepage of water into the critical area (Server Area & UPS Room). It shall consist of water leak detection cable/ tape sensor, detection module and control panel. The cable/ tape shall be installed in the ceiling & floor areas around the periphery.

2.3.18.1. Water Leak Detection Panel

The panel shall be microprocessor based one, and should be modular in design. The system shall have different zones and detectors shall be connected to the panel through the zone module. Each area of the premise shall be divided into specific zones such that the user if required shall isolate any zone.

The entire system shall be backed by maintenance free battery. The system shall be totally tamper proof and activate an alarm if the control panel is opened, the sensors tampered with or if the system cable is cut even in the disarming state.

The Panel shall provide volt free contacts to connect to BMS System.

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2.3.18.2. Water leak detection Module:

Zone Sensor module is surface mounted below the false floor/ above false ceiling where localized detection is required. The zone Module shall provide monitored circuitry for connection to WLD panel. The Zone Modules shall be housed in suitable housings.

2.3.18.3. Tape sensors:

Tapes are covered with plastic netting to prevent short circuits when used in metal trays or conduits and shall enable the tape to be folded at right angles to allow easy routing. Water leak detection tape shall provide for the earliest detection of water accumulation in the false ceiling/ False floor, or as decided by the AHJ.

2.3.19. Fire Proof Enclosures for Media Storage

Capacity	300 Litres
Temperature to Withstand	1000° C for at least 1 hour
Internal Temperature	30° C after exposure to high temperature For 1 hour
Locking	2 IO-lever high security cylindrical / Electronic lock

2.3.20. Public Address System

The PA system is required for:

- Making public announcement from the Security Control Room and Facility Manager's room. Clear and crisp announcement should reach to the entire Facility area.
- Microphones should be provided to make announcements / respond to announcement from the designated location within the Facility.
- To play light music if required.

Microphone

- Frequency Response should be 50 -1500 Hz.
- Sensitivity should be minimum of 2.2mV/Pa.
- 500Ω Impedance should be present.

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Amplifier

- Power output should be 90W Max., 65W RMS at 10% THD
- Output regulation should be less than 2 dB, no load to full load at 1kHz
- Input channels should be 4 × Mic 0.65mV/4.7k Ω , 1 × Aux 100mV/470 k Ω
- 50-15,000Hz \pm 3dB frequency response
- Signal to Noise Ratio of minimum 60dB
- Tone Controls should have bass of 10dB at 100Hz & treble of 10dB at 10kHz
- Outputs should be preamp 200mV/600 Ω
- Power supply for operation is DC: 12V (12V Car Battery), AC: 220-240V 50/60Hz

Speakers

- Input Power required is 16W RMS / 24W Max.
- Rated voltage should be 100V
- Low Impedance must be 8 Ω
- Frequency response should range between 85-20,000Hz.
- Speaker must have a woofer & tweeter.

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3. Bill of Material

3.1. Servers:

S. No	Descriptions	Item	Qty	Units
1.	Database Server	EM64T (Type 1)	4	Nos
2.	Blade Chassis	Chassis	2	Nos
3.	Application/ Web Server (In High Availability Mode)	Blades	10	Nos
4.	Management Server	Blade	2	Nos
5.	Back up server	EM64T (Type 2)	1	Nos
6.	Staging server	EM64T (Type 2)	1	Nos
7.	Antivirus Server	Blade	2	Nos
8.	Proxy Server	Blade	1	Nos
9.	Syslog server	EM64T (Type 2)	1	Nos
10.	EMS with helpdesk, licences as required in RFP	Complete solution	1	Nos
11.	Storage with licenses (Complete solution)	SAN Box	1	Nos
12.	Tape Library	Tape Library	1	Nos
13.	Desktop/ Workstation for Monitoring & Data Center Management	Desktop/Workstation	6	Nos

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3.2. Networking Components

S. No	Item Descriptions	Qty	Units
14.	Internet Router	2	Nos
15.	Access Switch	4	Nos
16.	Core Switch	2	Nos
17.	External firewall	1	Nos
18.	Server Load Balancer	2	Nos
19.	NIPS	2	Nos
20.	HIPS with client licenses	20	Nos
21.	SAN Switch	2	Nos
22.	Internal Firewall	1	Nos
23.	KVM	5	Nos

3.3. Licenses:

S. No	Item Descriptions	Qty	Units
24.	Microsoft Windows Server Enterprise Edition (Latest Version)	15	Nos
25.	Red hat Linux Server Ent Edition (With Clustering)	2	Nos
26.	MS SQL Enterprise latest Edition (dual processor (Quad core) licence) in active-active clustering mode	2	Nos
27.	Oracle DB Enterprise Server (one Processor (4 core) License) in active – passive clustering mode	2	
28.	Directory Services with 100 client licences	1	Nos
29.	Anti Virus Software with 50 client licenses (complete solution for data centre)	1	Nos

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S. No	Item Descriptions	Qty	Units
30.	Proxy Software	1	Nos
31.	Syslog software (complete solution for data centre)	1	Nos
32.	Backup Software	1	Nos

Note: Please note that all components/Licenses purchase from the selected bidder under MSDC project from the day one shall be with the name of Client.

3.4. Non-IT Components:

S. No	Item Descriptions	Qty	Units
33.	UPS for Server Area (120 KVA in N+1 configuration)	N+1	Nos
34.	UPS for BMS, NOC & Staging Area (2 KVA each)	3	Nos
35.	Precision AC (32 TR in N+1 configuration)	N+1	Nos
36.	Split AC (2 TR each for UPS, NOC, BMS, Staging Room, Project Manager Room)	As required	Nos
37.	Diesel Generator Set (400 KVA in N+1 configuration)	N+1	Nos
38.	Rodent Repellent Solution <ul style="list-style-type: none"> • Main Console Unit • Satellite Transducers with cabling as required • Any other items required 	1	Set
39.	Water Leakage Detection System <ul style="list-style-type: none"> • BMS Compatible Water Leak detection Panel 	1	Set
40.	19" 36 U Server/ Network Rack	10	Nos
41.	CCTV	1	Set
42.	Access Control System	1	Lump sum

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S. No	Item Descriptions	Qty	Units
43.	High Sensitivity Smoke Detection System	1	Set
44.	Hand held Fire Extinguisher – Class (NAF P4)	To be specified by the bidder	Lump sum
45.	Fire Detection, Control & Suppression System	To be specified by the bidder	Lump sum
46.	Fire Proof Enclosure for Media Storage	1	Nos
47.	Building Management Software including Hardware, license etc.	1	Nos.
48.	Public Address System <ul style="list-style-type: none"> • Amplifier • Microphone • Speaker • End to End cabling and other components for installation and commissioning of the system within 1836 sq ft. of area • Any Other Component required 	1	Set
49.	Electric Work including: <ul style="list-style-type: none"> • Electrical cabling (entire MSDC area including all utility components and UPS) • Earthing • Lighting & fixtures • Main Electric Panel • Any other components required 	As required	
50.	Civil Work including: <ul style="list-style-type: none"> • Cement Concrete Work • Cutting and chipping of existing 	As required	

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S. No	Item Descriptions	Qty	Units
	floors <ul style="list-style-type: none"> • Masonry works • Hardware and Metals • Glazing • Paint work • False Flooring • False Ceiling • Diesel Storage Tank • Furniture & fixture • Partitioning • Doors and Locking • Painting • Fire proofing all surfaces • Insulating • Any other component required 		
51.	Supply & installation of data cabling	As required	Lump sum
52.	15 voice port cabling with minimum 15 lines EPABX system	1	Set

Note

- The Quantities mentioned in the BoM are indicative and may change at the time of Order placement.

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4. Abbreviations:

S. No	Abbreviation	Description
1	AAA	Authentication, authorization and accounting
2	ACL	Access Control List
3	AHU	Air Condition
4	AMF	Automatic Mains Off
5	ARP	Address resolution protocol
6	ATS	Automatic power transfer switches
7	BGP	Border Gateway Protocol
8	BMS	Building Management System
9	CCTV	Close Circuit Television
10	CIE	Control And Indicating Equipment
11	CLI	Command line interface
12	CMDB	Configuration management database
13	CPU	Central Processing Unit
14	CSC	Citizen Service Centre
15	DBA	Database Administrator
16	DCD	Document Content Description
17	DCO	Data Centre Operator
18	DG Set	Diesel Generator Set
19	DHCP	Dynamic Host Configuration Protocol
20	DLT	Digital Linear Tapes
21	DMZ	De-Militarized Zone
22	DNS	Domain Name Server
23	DTR	Data Terminal Ready
24	DVR	Digital Video Recorder
25	EAL	Evaluation Assurance Level
26	EEPROM	Electrically Erasable Programmable Read Only Memory
27	EMS	Enterprise Management System
28	EPROM	Erasable Programmable Read Only Memory

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S. No	Abbreviation	Description
29	FC	Fiber Channel
30	FCIP	Fiber Channel over IP
31	FRLS	Flame Retardant Low Smoke
32	FSB	Fast Serial Bus
33	FTP	File Transfer Protocol
34	G2B	Government To Business
35	G2C	Government To Citizen
36	G2G	Government To Government
37	GBIC	Giga Bit interface
38	Gbps	Gigabits per second
39	GE	Gigabit Ethernet
40	Ghz	Giga Hertz
41	GUI	Graphical User Interface
42	H/W	Hardware
43	HDD	Hard Disk Drive
44	HDLC	High Level Data Link Control
45	HFC	Hybrid Fiber Coaxial
46	HIPS	Host Intrusion Prevention System
47	HSSD	High Sensitivity Smoke Detection
48	HTML	Hypertext Markup Language
49	HVAC	Humidity, Ventilation And Air Conditioning
50	Hz	Hertz
51	I/O	Input/Output
52	ICMP	Internet Control Message Protocol
53	IDS	Intrusion Detection System
54	IEC	International Electrotechnical Commission
55	IEEE	International electrical and electronics engineers
56	IP	Internet Protocol
57	IPS	Intrusion Prevention System
58	IR	Infra Red
59	ISO	Organisation Of Industry Standards
60	IT	Information Technology

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S. No	Abbreviation	Description
61	ITIL	Information Technology Infrastructure Library
62	JPEG	Joint Photographic Experts Group
63	Kbps	Kilobits per second
64	KVA	Kilo Volt Ampere
65	KVM	Keyboard, Video Display Unit and Mouse Unit
66	L2	Layer 2
67	LACP	Link Aggregation Control Protocol
68	LAN	Local Area Network
69	LBS	Load Bus Synchronization System
70	LED	Light emitting diode
71	LTO	Linear Tape Open
72	LUNs	Logical unit number
73	MAC	Media Access Control
74	Mbps	Megabits per second
75	MCB	Main Circuit Board
76	MCP	Manual Call Points
77	MDF	Medium Density Fiber Board
78	MIS	Management Information System
79	MOSPF	Multicast Open Shortest Path First
80	MPEG	Moving Picture Experts Group
81	MPLS	Multiple Protocol Layer System
82	MSDC	Meghalaya State Data Centre
83	NAT	Network Address Translation
84	NEC	National Electrical Code
85	NFPA	National Fire Protection Association
86	NIC	National Informatics Centre
87	NMS	Network Management System
88	NOC	Network Operation and Control
89	NOS	Network Operating System
90	NTP	Network Time Protocol
91	OEM	Original Equipment Manufacturer
92	OFC	Optical Fiber Channel

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S. No	Abbreviation	Description
93	OS	Operating System
94	OSPF	Open Shortest Path First
95	PAC	Precision Air Conditioning
96	PAT	Port Address Translation
97	PC	Personal Computer
98	PDU	Power Distribution Unit
99	PID	Proportional integration and differential
100	PIN	Personal Information Number
101	PKI	Public Key Infrastructure
102	POP	Point of Presence
103	PPP	Public Private Partnership
104	PSU	Public Sector Undertakings
105	PVC	Polyvinyl Chloride
106	QoS	Quality of Service
107	RADIUS	Remote Authentication Dial-in User Service
108	RAID	Random Array of Inexpensive Disks
109	RAM	Ran Access Memory
110	RDBMS	Relational Database Management System
111	RF	Radio Frequency
112	RH	Relative Humidity
113	RIP	Routing Information Protocol
114	ROM	Read Only Memory
115	RPC	Remote Procedure Call
116	RPM	Revolutions Per Minute
117	RPM	Revolutions Per Minute
118	RR	Resource record
119	S/W	Software
120	SAN	Storage Area Network
121	SAS	Secure Attention Sequence
122	SDC	State Data Centre
123	SFP	Small Form Factor Pluggable
124	SLA	Service Level Agreement

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S. No	Abbreviation	Description
125	SNMP	Small Network Management Protocol
126	SOAP	Simple Object Access Protocol
127	SQL	Structured Query Language
128	SSH	Secure Shell
129	SSL	Secured Socket Layer
130	SSO	Single Sign-on
131	STM	Synchronous Transport Module
132	SWAN	State Wide Area Network
133	TB	Tera Byte
134	TCP	Transmission Control Protocol
135	TFTP	Trivial File Transfer Protocol
136	UDP	User Datagram Protocol
137	UL	Unordered List
138	UPS	Uninterrupted Power Supply
139	URL	Uniform resource Locator
140	USB	Universal Serial Bus
141	VCD	Volume Control Damper
142	VDC	Virtual Design and Construction
143	VLAN	Virtual Local Area Network
144	VPN	Virtual Private Network
145	VRRP	Virtual Router Redundancy Protocol
146	VSAN	Virtual Storage Area Network
147	WAN	Wide Area Network
148	WLD	Water Leakage Detection
149	XML	Extensible Markup Language