Ministry of Education

Request for Proposal for

Supply, Construction, Installation, Training and Commissioning of Modular Data Centre Infrastructure Project on Turnkey Basis for Center for Educational Information and Communication Technology

Addis Ababa

2015

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1. Background:

The Government of Ethiopia has a national ICT policy that maps ways for leveraging ICT in priority sectors, including Education. In response to this priority, a task force was put together by Ministry of Education (MoE) to conduct a brief feasibility study to understand the current challenges and opportunities in leveraging ICTs to improve the delivery of quality education. According to the study, there were the following findings:

- Secondary & preparatory schools are currently utilizing Satellite Educational Television programs in the classroom, but this is not interactive and would require a Blended Learning approach in the form of face-to-face and computer-mediated activities via online and mobile applications;

- The capacity, usage, and management of existing ICT infrastructures are incapable to implement and handle technologies that the support Blended Learning system;
- There currently isn't a formal, effective, and coordinated ICT-supported monitoring and evaluation (M&E) framework in place that monitors the usage of ICT infrastructure in schools, and measures the effectiveness of ICT in improving the quality of education
- There is a low level of awareness to ICT as an education tool amongst teachers and students;
- Weak interventions currently exist for addressing Special Education and culturally contextualized educational needs;
- Human capacity to deploy and administer future ICT implementations on federal, regional, and school levels is very low.

However, Most of the concerns here have been addressed during the feasibility study of the cooperation project and all concerns including the ICT policy issues will be solved as part of other components of the project.

It is also the case that the Government of Ethiopia (GOE) has placed poverty alleviation on the top of its development agenda and is determined to make use of ICTs as a tool in its fight against poverty.

As part of its strategy for technology enhanced learning and innovation Ministry of Education(MOE/CEICT) is plan to build new modular data center on the ground floor of the old building, at the center, which will house servers, includes blade servers, storages, backup systems, core network equipment etc. Data center infrastructure is the heartbeat of ICT of any organization. The data center infrastructure will have faster, high available, disaster tolerant, safe infrastructures to mission critical applications and services for present and future emerging demands.

The Datacenter will help the center to centralize control, consolidate and simplify management, increase security and operational efficiencies, speed up application rollouts as well as host IT requirements. It will lay the foundation for emerging technologies with scalable and flexible designs.

In order to achieve this mission a good IT infrastructure is required; data centers are a top priority. Data centers are now seen as a key business parameter, and not as an external facility for storage of information and business operation models. They have become critical for the very functioning of a big business enterprise.

The purpose of this project is, therefore, to construct new Modular Datacenter infrastructure for optimization of IT productivity and resource utilization. The proposed architecture will help to align datacenter resources with business priorities. The ministry therefore invites interested, experienced and qualified companies to come up with their solution.

Important Note: The site layout design for the data center infrastructure has been identified. It is mandatory to conduct site survey in order to get comprehensive understanding and come up with complete competitive solution.

- **It is important to consider these requirements as minimum and generic. Bidders are expected to come with their complete competitive solutions.**
- **As the project is on turnkey basis, partial offer will be automatically rejected**

2. Introduction

The purpose of this document is to provide a technical perspective for the supplier to develop and submit a comprehensive proposal for implementing datacenter for a suitable educational private cloud system for Ethiopia's secondary schools. This is an educational private cloud project indeed. It is Infrastructure as a Service (IaaS) at this stage to develop it further to be able to provide Software as a Service (SaaS) and platform as services (paas) in line with the telecom infrastructure development. This infrastructure project is designed considering the existing video content for the schools and future digital interactive content development, e-learning and e-library applications that will be implemented in line with this project. Sizing for hardware and Network is done based on this and we believe prospective suppliers have been provided with enough information with this regard at different sections of this document.

The proposed educational private cloud shall have four logical components, among those, the infrastructure and Platform, the software application and user service component shall be procured in this bid.

Online remote interactive video training and guidance –Delivers live classes and realizes remote interaction, collaboration and conferencing, and helps learner conduct efficient and real-time online training and online Q&A, Creating a live course, Enrolling in a live course, Attending a live class, Interactive teaching and answering, Course materials, Live recording, etc

Management & Support of Content Lifecycle: Learning developers can create, store, reuse, manage and deliver digital learning content from a central object repository.

The system manages the development process by providing some level of workflow tools to manage a multi-developer, team environment. Currently we already have 150 Gbps amount of curriculum-based educational materials including digital text books that can be published online in PDF formats. There are also 150 Gbps already developed and digitized video educational materials produced as part of the television broadcasted programs. These can easily be integrated into the proposed e-learning/LMS applications. We are also planning to start the pilot project in parallel to develop digital interactive contents that shall be integrated with the proposed application software.

Considering the above contents, the suppliers can propose the infrastructure that can accommodate the existing and future contents. As ICT for education expands throughout the world, Ethiopia is keen to catch the wave, and through a systematic approach to introducing technology innovations into the school system, the Ministry of Education along with the Center for Educational ICT hope to build a robust technology platform for Ethiopia's education system.

3. Objective

The objective of the project is designing, supplying, constructing, installing and setting up, training and commissioning of modular datacenter infrastructure: datacenter facilities, power systems, network operation center etc. on the turnkey bases.

3.1. Specific objectives

The proposed School Net Cloud should have five logical components that will be integrated to provision the services required for the Schools.

I. Infrastructure

The infrastructure is the hardware and hypervisor resources, which are the basic parts that give storage, computing and networking capacity. All other components are implemented on top of these resources.

II. Platform

This is the layer that provides all the required operating systems, run time environments and necessary middleware depending on the specific software to be selected for the respective service.

III. Software

Software is the specific application for LMS, media distribution, Collaboration, content delivery etc for the current scope of the assignment with future expansion to include other applications.

IV. Private Cloud Controller/Management System

This is the critical system that will provide management, configuration, deployment, and monitoring of all underlying resources. This system is highly recommended to be a single pane of management for all layers. The controller also facilitates the provisioning of services for the schools.

V. User Services

User services are the School Net Cloud service to be provided for the users. Those are the LMS, media distribution, Collaboration, content delivery, digital library etc services.

3.2 Core Features of School Net Cloud

The proposed LMS, media distribution, Collaboration, content delivery is required to fulfil the following core features. These features are mandatory and the solution should specifically demonstrate how they are addressed.

- High Availability,
- Load Balancing,
- Scalability,
- Security,
- Backup and Restore,
- Disaster Recovery site integration readiness,
- Deep Integration of Hardware and Software,
- Integrated and single pane of management,
- Automation of tasks (expert patterns or templates)

3.3 School-Net Cloud Services for the Central Data Center

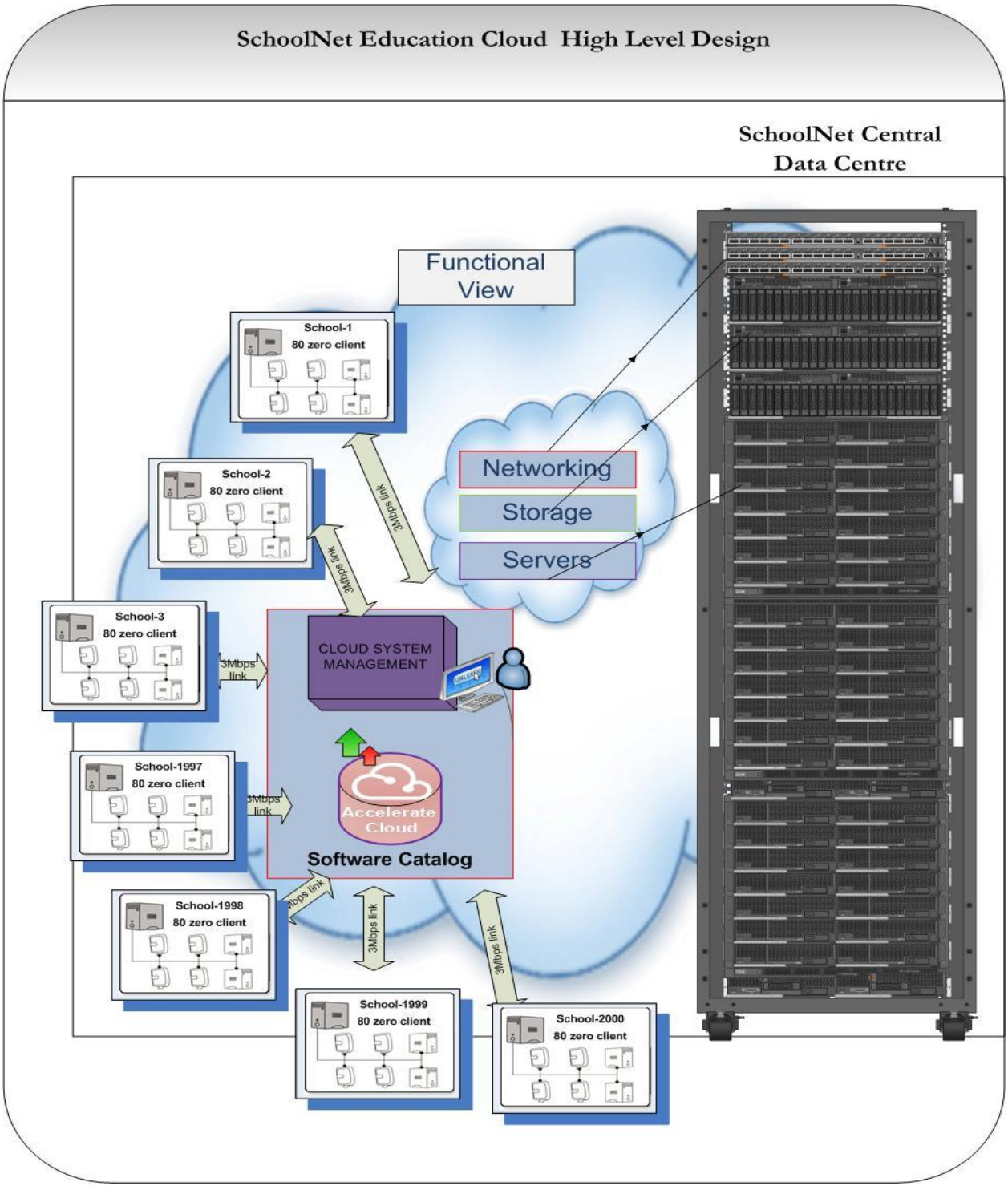
The proposed Cloud computing uses web technologies or those mentioned above to host applications in a private (on the Internet) datacenter, accessing them over a private network, or a secure channel over the Internet.

Our approach will be building a private cloud that will connect all the schools with the central data center and with each other. So that students can have the potential to make any educational materials application access ubiquitous, and accessible from the office, home, road, or your hand, with a thin client device or software.

The proposed School-Net cloud will be hosted centrally and will provide the below services for the schools:

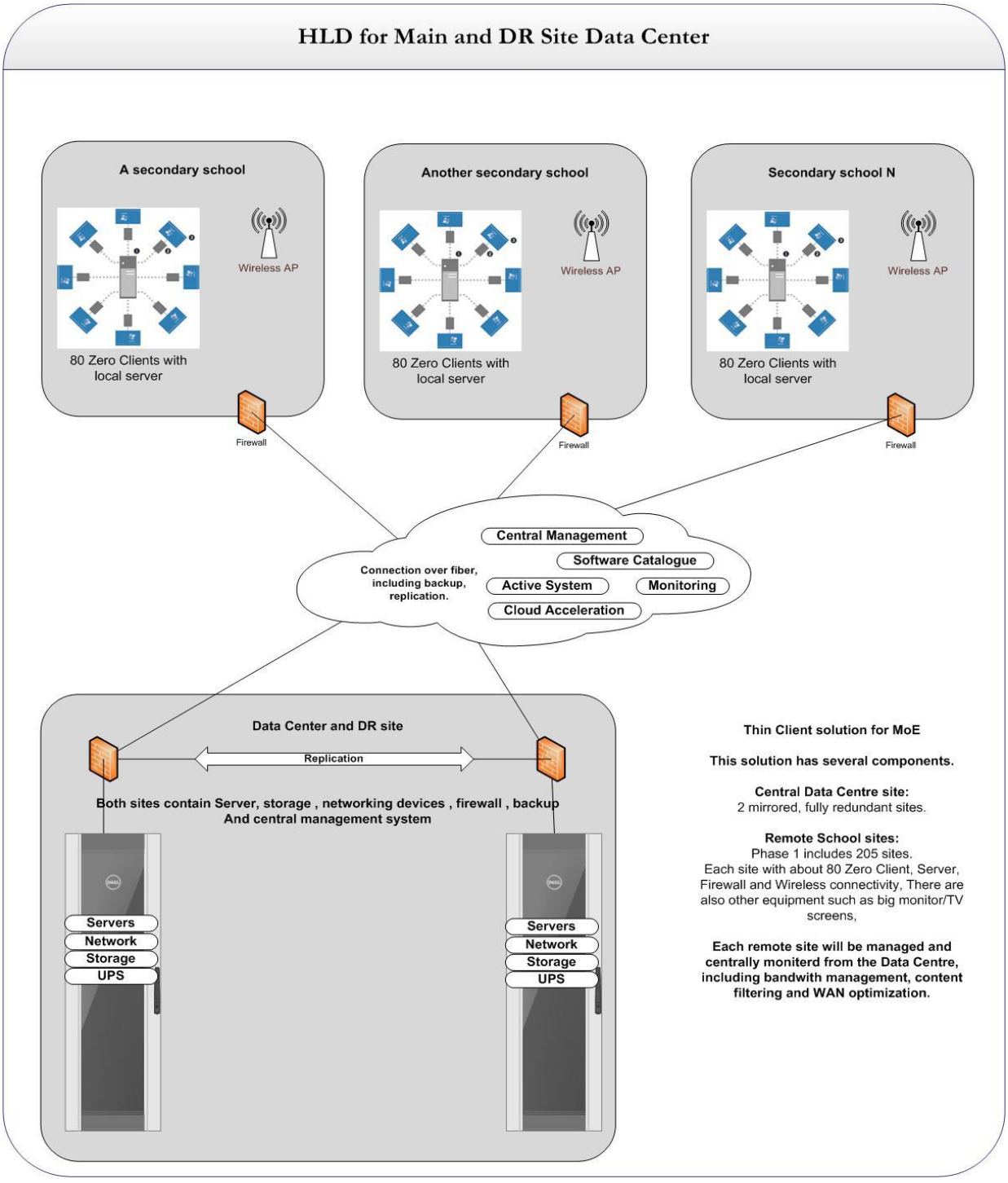
- Infrastructure as a service
- E-learning
- Monitoring and evaluation tools
- Bandwidth and content management
- WAN optimization
- Video as a service
- Back up as a service
- Content and applications (school.com, khan academy etc)
- Central management for all the devices and applications Remote Technical Support & Maintenance, etc
- Learning Management System (LMS)

Bellows are the proposed HLD for the SchoolNet cloud solutions



We will have also a disaster recovery site that could be installed at EthERNet data center or at the national data center.

Below are the proposed solutions for the DR and main sites.



School-Net Cloud Services For the school

I. Connectivity & Access at school premises

The Network Infrastructure for the all schools should allow uninterrupted access to electronic resources like e-learning and E-library system that will enable teaching and learning activities. Hence, we will upgrade the existing VSAT with the terrestrial cabling technologies. This will be taken care of by MOE.

4. Scope

The project scope of work includes but not limited the followings:

a. Design, supply, construction, installation, setting up, training and commissioning of Modular data center facility, virtualization, datacenter environment interior and exterior design and workmanship such as raised floor, glass walls, fire rated and water proof ceiling, fire proof and water proof cladding, fire proof doors, paintings, bricking, plastering, etc., HVAC systems such as cooling, humidity, air exhaust systems etc., fire detection, alarming and suppression systems, rack and aisle containment, datacenter environment and facility management systems, access control systems, video surveillance system, power systems and power integration, network operation center construction etc.

b. cabling infrastructure to the datacenter. The bidder is required to come up with best solutions, necessary equipment and materials for 10G connectivity of the data center.

c. Human Capacity Development and Knowledge Transfer

For sustainability, maintenance, enhancement and expansion of IT infrastructures, systems and services knowledge and experience sharing is very important. The following knowledge transfer mechanisms are mandatory.

- Advanced international trainings for minimum of 10 staffs on data enter and related facilities

- Onsite and hands on trainings on datacenter facilities for minimum of 10 staffs assigned by the center.

Relevant trainings include but not limited to:

- Datacenter cabling and structured cabling principles
- Power systems of datacenter
- Cooling systems and modular datacenter aisle containments
- Central data center management systems
- Operation maintenance
- All active devices etc.

5. Expected Deliverables (Time)

5.1. **Expected Documents:**

a. Detail document about datacenter high Level design document including all facilities and descriptions
b. Detail document about datacenter facilities detailed design documents with implementation drawings
c. Detail document about design and implantation documents of electrical systems

6. Activities/Responsibilities of Vendor

The "Vendor" or "Contractor" will provide the following among others:

- Solution, Architecture and Design
- Procurement of Hardware, Software and other components for solution
- Systems Integration and Installation
- Testing & Commissioning
- Manufacturer Training & Knowledge Transfer

- Annual Maintenance
- Project initiation document to supply and install all the system.
- Low Level Design (LLD) Document for the system
- Install devices at site
- Conduct acceptance test after installation
- Training for the system and network administrators
- Provide As-built document
- A properly installed, tested and working central Datacenter
- Requirement study document
- Detailed Technical Specifications (Both Hardware and Software) with bill of material document.
- Project Initiation Document
- Low Level Design document
- Equipment/Devices Manuals
- Training Manuals
- Administrator Training
- SPG document
- ATP document
- AS-built document

7. Implementation Plan

Bidder to provide a detailed plan (written explanation and actual project plan) for the activities that involved in implementing the new solution. Plan will include all activities to gather necessary information on current processes; design of any new processes; identification of transition activities to take the processes/systems to the new design; documentation of new/modified processes; training; and the actual execution of those activities. The project plan should indicate the activities, duration, number and skill level of resources needed

8. Service and Support

The entire proposed product should carry 3 years support and service before and after warranty

9. Compliance Requirements

We ask Bidders to respond the details of the compliance provided and their proposed solution as concisely and specifically as possible.

10. Duration

It is envisaged that the project should be completed within 8 months from the date of signing of the contract.

11. Training

The supplier should conduct manufacturer training for the entire product and solutions to be supplied and implemented.

a. Trainings manuals on:

- Cloud management system
- media Distribution,
- network management, security
- Power distribution and lightening systems
- Cooling systems
- Access control system
- Video surveillance system
- Fire detection, alarming and suppression system
- Modular datacenter aisle containments
- Datacenter central management systems
- etc.

Proposed trainings (abroad and onsite) and industrial certifications should be provided with both technical and financial documents. Supply, installation and commissioning of equipment and material required for the project.

b. Standards

The Modular Datacenter design should be based on ANSI/TIA-942 Telecommunications Infrastructure Standard, which is the worldwide most widely recognized standard and important reference of for Datacenter design. The main Purpose of using the TIA-942 standard is so as to ensure the datacenter to accommodate the needs of the equipment and technologies such as:

- Adequately sized cabling pathways
- Adequately sized and properly located IT Infrastructure spaces
- Adhere to cabling distance restrictions for planned applications
- Structured cabling system for the data centers using standardized architecture and media
- Accommodate a wide range of applications (WAN, LAN, SAN, Channels, Consoles, Building automation systems, etc.)
- Accommodate current and known future protocols (10 Gigabit Ethernet & 10 Gigabit Fiber Channel etc.)
- Labeling scheme recommendations, etc.

Therefore, design of the datacenter should refer to the following international standards:

- ANSI/TIA-942-2005: Telecommunications Infrastructure Standard for Datacenters
- ANSI/TIA/EIA-568-B.1: Commercial Building Telecommunications Cabling Standard; Part 1 General Requirements
- ANSI/TIA/EIA-568-B.2: Commercial Building Telecommunications Cabling Standard; Part 2 Balanced Twisted-Pair Cabling Components
- ANSI/TIA/EIA-568-B.3: Optical Fiber Cabling Components Standard

- ANSI/TIA-569-B: Commercial Building Standard for Telecommunications Pathways and Spaces
- ANSI/TIA/EIA-606-A: Administration Standard for Commercial Telecommunications Infrastructure
- ANSI/TIA/EIA-J-STD-607, Commercial Building Grounding (Earthling) and Bonding Requirements for Telecommunications
- ANSI/TIA-758-A: Customer-Owned Outside Plant Telecommunications Cabling Standard
- IEEE C2-2002: National Electrical Safety Code
- NFPA 70: National Electrical Code
- IEEE Std. 1100: Recommended Practice for Powering and Grounding Electronic Equipment
- IEEE Std. 446: Recommended Practice for Emergency and Standby Power Systems for Industrial and Commercial Applications
- GB 50174-2008: Code for Design of Electronic Information System Room

12. Summary of Proposed Solution

The basic parameters of the proposed modular data center solution are as follows:

- Implement 2 modular datacenters with cold aisle containments consisting of 26 IT racks configured, 3 network racks, 3 rack based power distribution units and 8 in-row air conditioners (N+1 redundancy)
- Average Power density per IT rack is estimated to be 6 kW
- Average Power density per network rack is estimated to be 2 kW
- Cooling capacity of 35KW per in-row air conditioner
- Implement 2 units of intelligent modular UPS with 2N redundancy, each modular UPS initially configured with 320 KVA capacity and scalable up to 480KVA.
- Implement UPS battery bank that can supports of minimum of 60 minutes' backup/run time

- Implement 2 units of 35 kW precision air conditioner with 1+1 redundancy in power room
- Implement 1 unit of 5 kW comfort air conditioner in NOC room
- Implement central data center environment management system
- Implement fire detection, alarm and FM200 suppression system in server room and power room
- Implement the access control systems
- Implement 2*2 46-inch video-wall multi-screen display system in NOC room
- Design and implement electric systems
- This is the minimum scope. Bidder should consider future expansions

12.1. Data Center site overview and layout

Important Note:

The site of the proposed data center can be customized for state of the art design and installation. For this end it is mandatory to conduct visit and survey of the site in order to get the exact measurement, comprehensive understanding and complete competitive proposal of the turnkey project. The datacenter site is located at the center , ground floor of old building, Addis Ababa. The room height from the floor to next floor is 3.5 meter .

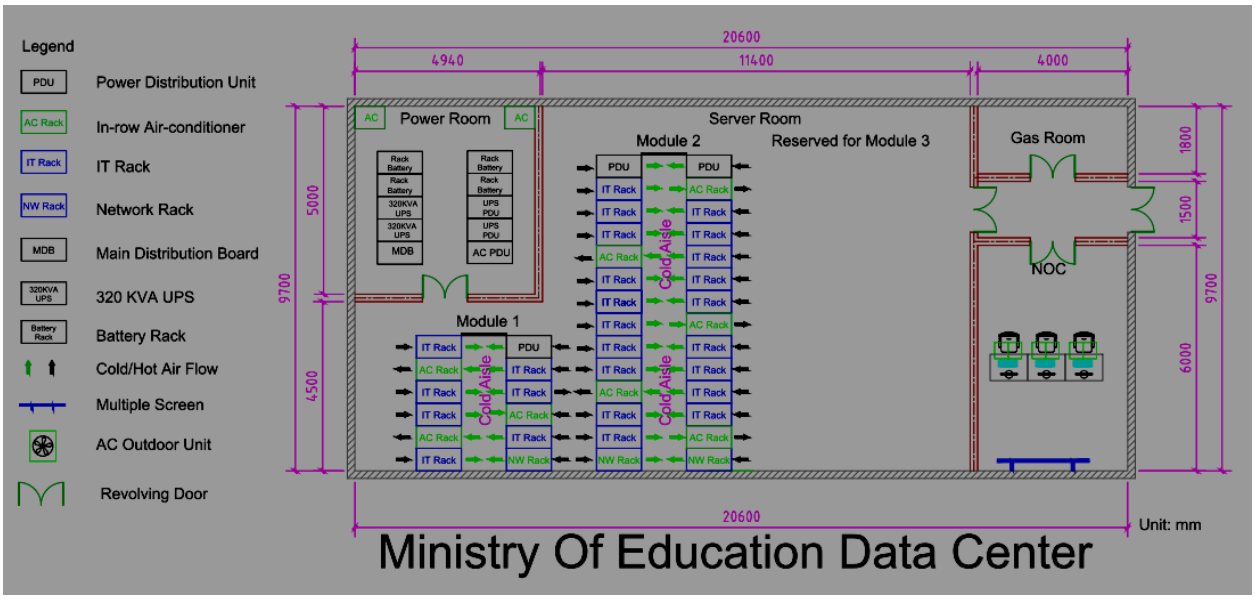


Figure 1: - proposed ceict Data Center design

Data center space Layouts diagram

Note:	
Area of IT room	133.08 m^2
Area of power house	24.00 m^2
Area of NOC	24.00 m^2
Area of corridor	6.00 m^2
Area of Gas Room	7.20 m^2
Ceiling area	194.28 m^2
Access floor area	194.28 m^2
Cladding area	152.70 m^2

12.2. General Requirements

Servers

c. 2x Blade Enclosure

d. 16x Host Blade Server

e. 4x Management Rack Server

f. 2x Keyboard Mouse Monitor

g. 2x Management Software with Remote Access and Lifecycle Controller

h. 4x Rack Mount UPS systems

12.3. Storages (SAN):

i. 2x SAN Storage with 1500TB and scalble to 3000TB on NL-SAS + 7TB on SSD- Raw Disk Space. 10GbE iSCSI based

12.4. Networking

j. 2x 10GbE Rack Switch

k.2x Out of Band management network switch

l. 4x Aggregation Switches

m. 2x SAN switch

12.5. Software

n. 2x Data Center Infrastructure Monitoring System

o. 1x SAN Storage Monitoring and reporting system

p. 1x licensed Windows Server 2012 Datacenter with enabled Hyper-V or Equivalent

q. 1x licensed MS Systems Centre Virtual Machine Manager or Equivalent

r. 1x Data Center Virtualization and Server Consolidation

s. Data Backup software

12.6. Network Core , Security , Optimization & Data Protection

t. 2x **Unified threat management (UTM) fire wall**

u. 2x Core Switch on High Availability Setup (HA)

12.7. Data Replication And Protection

v. 1x Data Replication Software

w.1x Backup Software

x. 4x Disk Backup Storage Unit

12.8. 1x Distribution Media Server and Portal and Scheduling Solutions

12.9. Cloud Monitor and End-User Experience Monitor

y. Infrastructure Monitor and Virtual Desktop Monitor

12.10. Data Center Infrastructure

Network Operation and Integrated Command Control Center

a. Rack and Aisle Containments requirements

- Modular design for datacenter
- For data center module 1: 1.20 meter x 3.60 meter =4.32 m2 contained cold aisles ,adopt two row racks design, 6 racks per row
- For data center module 2: 1.20 meter x 8.40 meter =10.08 m2 contained cold aisles
- 42U 600mm*1200mm*2000mm IT and network racks (W*D*H) with a complete set of power, cabling and air flow management accessories
- All rack should contain two 32 Amp vertical basic power strips
- All racks should come up with cable through system for power and low-voltage cable channeling
- All racks should come with horizontal and vertical cable manager
- All racks should come with blank panels for containment
- Lockable perforated front and rear doors
- 1200mm width passageway between rack rows
- Containment system must have top cover/skylights and should open automatically if fire encountered
- Containment area (both hot and cold aisles) should be designed with sliding door openings
- Containment system should have lightning inside, and emergency light

should also be considered (emergency lightening should be proposed for the rooms and containments)

b. Data center interior requirement

- Raised floor should be non-perforated with minimum thickness of 32mm and size of L600mm x W600mm x H200mm (adjustable) in the server room is required (bidder can propose best design by considering the room height)
- Load bearing capacity should be minimum of 1200 kg per square meter
- All spaces of the datacenter (IT room, power room, corridor, NOC, gas room) should have raised floor and false ceiling
- Datacenter wall should be painted before fire proofing with aluminum composite cladding system
- Supply and installation in the false ceiling of elegant lighting fixtures and the lamps that these require, to provide an illumination level at a minimum of 500 laces in the horizontal plane and 200 lux in the vertical plane
- Supply and installation of electric circuits for these lights, operated from switches in datacenter near each doors
- Supply and installation of low-intensity emergency lights to avoid blackouts at power failure
- Supply and installation of illuminated "Exit" signs above the relevant doors and connected to the UPS systems
- All partitions are required to come up with glass (NOC and IT room, Gas and IT room)
- Glass partitions should be minimum of 2 hours' fire rated, minimum of 16mm tick and tampered type
- Lighting system must be intelligently controlled (propose your own by considering sensor for physical movement, by sound or by using card) and well illuminated. The lightening system should be well finished and

aesthetically elegant with data center designed fixtures, these lightning should be implemented in the IT Room, Power Room and NOC room.

c. Power System requirements

- Diesel generator system with all installation materials and accessories should be supplied and installed
- Auto switch (ATS) to generator must be supplied and installed
- PDU power source should be from two UPSs
- IT and NW racks power source should from two PDUs
- Fuel reservoir and automatic fueling system should be designed and deployed

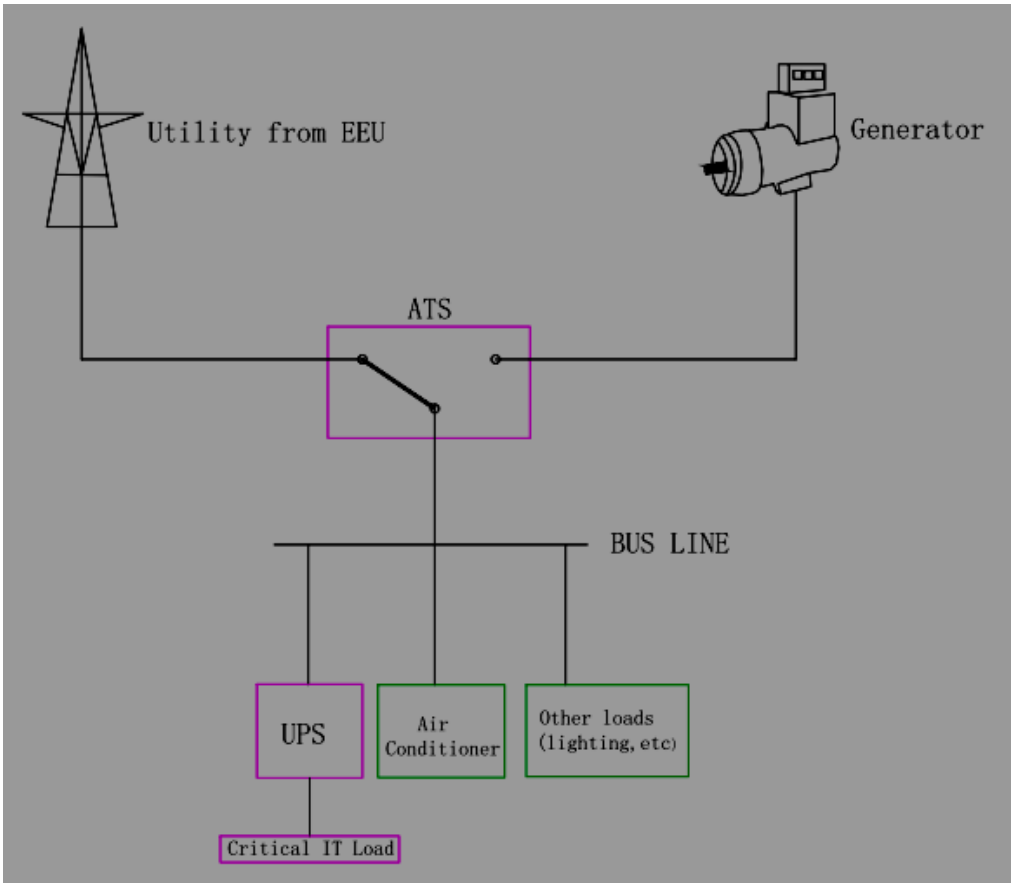


Figure 3 Data Center electrical powering system

d. Power Distribution requirement

- Average power density of IT rack is 6kW

- Average Power density of NW rack is 2kW
- Dual feed per rack (from two UPS system)
- The status of power system should be monitored by DCIMS
- Grounding system of datacenter is mandatory.

e. UPS requirement

- Two modular UPS, easy to expand as per requirement
- Rated capacity of each intelligent UPS is minimum of450 KVA/360KW scalable to 750 KVA/600KW
- Power module of UPS should be hot swappable
- Built-in bypass module should be provided and it shall be hot swappable
- At online mode, the system efficiency of UPS should be 96% at half rated load.
- At bypass mode, the operating efficiency shall be no less than 99%
- The Ups system should have 7-inch color LCD display for console monitoring
- The running /backup time of the UPS must be minimum of 60 minutes.

f. Power Distribution Unit : 42U rack mountable

- Supporting input 380/400 VAC and 50Hz/60Hz to match most area in global
- Supporting dual power input
- Supporting SNMP or RS485 protocol to compatible with the DCIMS
- Supporting monitoring the three phase voltage, current, load rate, frequency, power factor, active power, appearance power, inactive power, neuter current, voltage distortion rate, current distortion, total power consuming
- Supporting voice and light alarm

  PDU should contain Surge protection system and grounding

- UPS and IT PDF's should support monitoring of the parameters including input circuit voltage and current, switch state, apparent power, active power, electricity and other indicators

g. Diesel Generator

- 400 KVA diesel generator system with power factor of 0.8
- Supporting SNMP or RS485 protocol to compatible with the DCIMS
- Diesel generator should be hospital rated type for noise level (please note that the nearby buildings are lecture, office and meeting rooms)
- Diesel generator should have canopy and sound silencer
- Engine type for Diesel generator is preferred to be known brands
- Generator should have an ATS system to integrate with main power line
- Diesel reservoir of minimum of 1000 liters with automatic fueling system should be designed and implemented
- The diesel generator it is better to be sound proof and must have concrete basement sittings and its own generator room.

h. Air conditioning system requirements

- In row cooler type air-conditioners should be used for IT room
- Containment system should be set in a way that it contains hot and cold aisle for each IT racks. Each data center module should have at least three in-row cooler units (module 1 has 3 in-row coolers, module 2 has 5 in-row coolers,)
- In-row cooler should be positioned next to the IT racks in order to get direct cooling
- Two 35 KW precision Air-conditioning units will be deployed in power room
- One 5KW comfort air-conditioning will be deployed in NOC room.
- All AC unit should be equipped with the water leakage detecting system

- Cooling system should have temperature and humidity sensors integrated in the monitoring system
- Air-conditioning unit should use environment friendly/environment green refrigerant gases
- Installation of both indoors and out-door units of the Air-conditioning system should be very structured, safety protected, and finely curved
- Bidders should supply outdoor units mount, copper tubes, data and power cables with associated installation accessories and cablings
- Civil and reconditioning works are expected from the bidder

i. Data center infrastructure monitoring systems (DCIM)

- IP based surveillance, access control systems, different sensors, fire detection should be integrated
- Web based application software for datacenter remote management should be supplied with unlimited licenses
- DCIM System applies browser/server (B/S) architecture
- Supports hierarchical display of temperature cloud map, supports temperature hotspot identification.
- Supports configuration technology, user to draw the data center based on the actual layout of the room, supports to create and layout the devices in the data center view.

- DCIM system should have full functionalities for operation and maintenance. Functionalities include management of roles and privileges, alarms, logs, reports, resources, performances, power distributions, capacity, power usage effectiveness (PUE), video access control and etc.
- Must achieve datacenter security with unattended operation using flexible alarming systems, such as remote SMS, Email, lightening alerts.

- Temperature and Humidity monitoring sensors need to be positioned within IT room and power house
- Temperature and humidity sensors need to be placed within datacenter: special consideration in containments and beneath raised floor
- Environment management system should contain smoke and heat detection sensors
- Water leakage sensors should be integrated with environment management system
- IP based surveillance system should be integrated with the environment management system
- Door access control system should be integrated with environment management system
- All sensors should be monitored from the NOC
- Environment management system should send alerts via SMS, email, light, and alarm

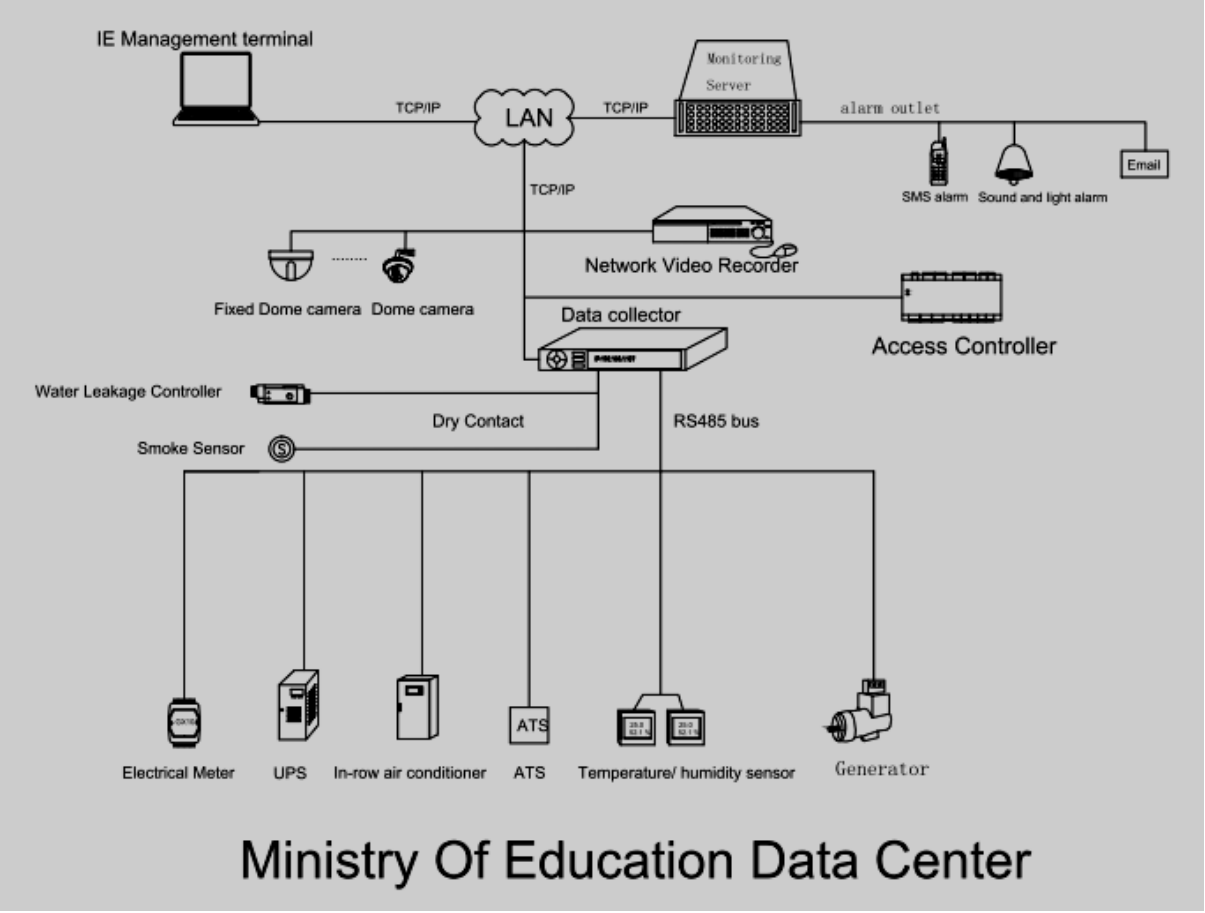


Figure 3 Central management system.

j. Security

- IP based surveillance for inside and perimeter of the datacenter
- All room doors including main entries should be equipped with access control systems (biometric, card, digital keys)
- All lightening fixtures should be controlled by the opening of doors

k. Fire detection, alarm and suppression system : Fire protection System

l. Optical fibre backbones 10Gmigration

- optical fibers backbones should be 10G connectivity to the data centers
- The bidder expected to come up with implementation methodology

with necessary 10G connectivity equipment and materials

- Installation equipment and materials such as modular SFP switches, modular patch panels, accessories, cores optical cables, SFP modules, patch cords, and installation materials and services are expected from the bidder. All equipment and materials are expected to support 10G connection at both ends.

m. Structure Cabling

IT room and NOC room have large number of devices with complex network schemes, in order to make cables orderliness, maintainability and expandability a structured cabling system layout is necessary. The structured cabling is a complete system of cabling and associated hardware which provides a comprehensive network infrastructure. The structured cabling solution consists of cables, cable component compliant patch panels, wall outlets, patch cords, aggregation switches. The structured cabling should be implemented for the IT, NOC and Studio room requirements such as operating **beyond 10 Gigabit Ethernet connectivity** and will maximizes and accommodate growth to higher speed networks.

Important Note: Bidders are expected to design structured cabling, supply and implement the solution.

n. Civil works

All Civil and reconditioning works and supplying of materials of datacenter, reinforcement slab, fuel reservoir, automatic fueling system, outdoor units mount reinforcement slab, construction of ramp at the outside door, stairs the inside door, paintings, construction of manholes, supply of dust protection material, reconditioning works etc. are expected from a vendor

Remark:

- **It is turnkey project. Materials supply and services are expected from the bidder.**

	Data center civil works	
	Feature	Description of Civil Works
	Wall Cladding	For square meter mentioned
1	Interior	For square meter mentioned
2	Interior reconditioning	Data center designed fire resistant cladding
3	Support and control element	Fully concrete
4	Exterior finish	Water, fire and external force resistant cladding
	Ceiling Cladding	For square meter mentioned
1	Composure	Strong metal sheath, metal stud wall, fiber glass Insulation and interior gypsum board
2	Cladding	Fiber protective cladding
	Construction of generator house and Fuel reservoir	
	Feature	Description Of The Civil Work
1	Civil work	Construction of generator house
2	Area size	Length, width, and height annexed
3	Construction material type	Concrete edges and double brick walls
4	Ceiling	Data center designed
5	Floor	Cement finishing
6	Fuel reservoir for automatic fueling	
No.	Main power house and other rooms refurnishing	
	Feature	Description Of The Civil Work
1	Civil work	All rooms and power house refurnishing
2	Area size	For the facility mentioned
3	Refurnishing material type	Data center designed material and Paintings
4	Ceiling	Data center designed protective ceiling
5	Floor	Cement constructed
6	Slaps	For generator, fuel reservoir, AC outdoor
7	Ramp	At one of the equipment entry gate
8	Stairs	At the two entries
9	etc.	

Important

13. Detail requirements and bill of materials

13.1. Details of the Device List

1. Server

1.1 Blade Enclosure

Features	Description
Form Factor:	• 12U Modular. Holds up to sixteen Half-width blade servers
I/O Modules:	• Minimum of four total blade I/O modules for two fully redundant fabrics on a fully passive midplane. Capability of 1/10 Gb Ethernet to servers, 40Gb Ethernet to top-of-rack switches, Fiber Channel 8 Gb, and InfiniBand QDR/FDR10/FDR. • Fabric A - 1/10Gb Ethernet connectivity with FCoE and converged iSCSI deployment. 24 internal 10GE ports providing full redundancy to the blade servers on fabric A. • Fabric B - 1 Gb Ethernet switch with up to 24 ports (16 internal), , simple mode, and 4 x fixed copper 10/100/1000Mb Ethernet uplinks and up to four additional 10GbE uplinks.
Power and Cooling	• Minimum of six hot-plug power supplies that allow the following configurations: ○ 3+3 and 2+2 (AC redundancy) ○ 2+1, 3+1, 4+2, and 5+1 (power supply redundancy). • Minimum of 80 PLUS Titanium Efficiency rating for Energy consumption • Fresh-Air cooling with in-let temperature up to 45°c covered under manufacture warranty • Should allow for lightly loaded power supplies to automatically go into standby mode. • Minimum of 14hot pluggable, redundant fan modules.
Input Devices	• Minimum of Two USB Keyboard/Mouse connections and one Video connection. • Front Control Panel with interactive Graphical LCD
Management	• Provides a built-in touch LCD and LCD function

	description document for users to configure and maintain basic parameters. • The local KVM function is supported so that all nodes and modules in the chassis can be centrally managed over one physical port. If server model for bidding does not support the local KVM function, configure external KVM switches with the same number of subracks. • The server can be configured with the DVD-ROM drive. • The chassis is configured with redundant hot-swappable management modules. • Users can access, manage, and diagnose faults for hardware devices in the blade server architecture locally or remotely using the virtual media and remote KVM. • The server provides a power history curve of a single compute node or the entire chassis for one day or one week.
Warranty	Three years manufacturer Support and Service

1.2 Host Blade Server

Features	Description
Processor	• 2x Intel Xeon E5-2680 3.0 GHz, 20M Cache, 8.0GT/s QPI, Turbo, 8C, 130W or higher
Memory	• 64GB (8x 8GB RDIMM, 2133 MHz, Standard Volt, Dual Rank, x4) or higher. Must have 24 memory slots and be upgradeable to a total of 768Gb of ram. • Minimum Total number off DIMM slots on mainboard should

	be twenty four
Internal Storage	• 4x 300GB SAS 15K Hard Drives on Raid 1 Configuration.
Communications	• Two internal SD cards dedicated for hypervisor and one dedicated for vFlash media support
Form Factor	• Half width blade
Power	• Supplied by Blade Enclosure. Fresh-Air cooling with in-let Temperature up to 45c covered under manufacture warranty.
I/O Mezzanine Cards	• Fabric A - 1x Dual Port 10Gb KR or equivalent. • Fabric B - 1x Intel I350 Quad Port 1 Gb or equivalent.
Video Card	• Integrated G200 or higher
BIOS	• UEFI compliant
Management	• Remote Management with Lifecycle Controller. • IPMI 2.0 compliant.
Warranty	• Three years manufacturer Support and Service • Service Contract Required

1.3 Management Rack Server

Features	Description
Form factor	• 1U Rack server, ready to racked with sliding rails and cable management
Processor	• 2x Intel Xeon E5-2620 3.00GHz, 15M Cache, 7.2GT/s QPI, Turbo, 6C, 95W, DDR3-1333MHz
Memory	• 64GB (8x 8GB RDIMM, 2113 MHz, Low Volt, Single Rank, x4)
Internal Storage	• 3x 300GB, SAS 12Gbps, 2.5-in, 15K RPM Hard Drive (Hot-plug) on RAID 1 configuration
Networking	• 1x 1GbE Quad Port Network Card or higher • 1x 10GbE dual port Network card or higher

Power	• Redundant and hot plug Power Supplies with auto ranging • Minimum of 80 PLUS Titanium Efficiency rating for Energy consumption. • Fresh-Air cooling with in-let temperature up to 45c covered under manufacture warranty.
Warranty	• Three years manufacturer Support and Service • Service Contract Required

1.4 Full width Rack

Features	Description
Form factor	• 42U Rack with Doors and Side panels
Dimensions	• Width: not more than 23.8" (605mm), Depth: 42.1" (1070mm), • Weight: not more than around 298 lbs (135 kg)
Accessibility	• Removable 'tail-bars' for easy cable routing. • Dual rear doors with latch mechanism. • Reversible front door. • Removable front and rear doors. • Rotating rear casters. • Easily accessible leveling feet.
Power Distribution and Cables	• 4x Full Half-Height 1ph 32A 120-240V PDU with connectivity to UPS • 10x 1U Closeout Filler Panel for Rack
Warranty	• Three years manufacturer Support and Service • Service Contract Required

1.5 Keyboard Mouse and Monitor Console

Features	Description

Form factor	• 1U Rack mount
Display	• 18.5" widescreen LED-backlit display
Rack Support	• Ready Rails™ II sliding rails for tool-less mounting in 4-post racks with square or unthreaded round holes
Power Distribution and Cables	• 4x Half-Height 1ph 16A 120-240V PDU with connectivity to UPS • 10x 1U Closeout Filler Panel for Rack
Warranty	• Three years manufacturer Support and Service • Service Contract Required

1.6 Server Management Software

Features	Description
Interface and Standards Support	• IPMI 2.0 Compliant • Web-based GUI • SNMP and IPMI Discovery • WSMAN • SMASH-CLP (SSH) • Racadm command-line (SSH and local), Racadm command-line (remote)
Connectivity	• Shared/failover network modes (rack and tower only) • DNS, VLAN tagging, IPv4, I • Pv6, Dynamic DNS • Dedicated NIC 1Gbps
Security and Authentication	• Role-based authority • Local users, SSL Encryption • Active Directory, LDAP support • Two-factor authentication, Single sign-on, PK Authentication (for SSH)
Remote Management and	• Embedded Diagnostics

Remediation	• Remote firmware update • Server power control • Serial-over-LAN (with and without proxy) • Last crash screen and video capture/playback • Remote Management and Remediation: Boot video capture/ playback • Virtual Media and Virtual Console with sharing feature • Remote Virtual Console Launch, Virtual Folders, Virtual Console Chat, Remote File Share, Virtual Flash Partitions
Monitoring and Power	• Sensor monitoring and alerting • SNMP and Email Alerts • Historical power counters • Power budgeting • Real-time power monitoring, graphing and capping.
Logging	• System Event Log, RAC Log, Trace Log, Lifecycle Controller Log
Lifecycle Controller	• Local Configuration, Local updates, Driver Packs, Remote Services (through WSMAN), Backup and Restore, Part Replacement
Warranty	• Three years manufacturer Support and Service • Service Contract Required

2. SAN Storage

Features	Description
Storage Architecture	• Support for NAS, IP SAN, and FC SAN without extra NAS gateway. • Multi-controller architecture supports a maximum of 8 controllers.
Cache Capacity	• Up to 512 GB capacity of unified storage cache
Storage Capacity	• Minimum Total 1500 TB Raw Capacity with enterprise 99,999

	uptime. • Storage tiering with Minimum 7TB on SSDs and 1500TB on NL-SAS HDDs
Connectivity	• Support for 8 Gbit/s Fibre Channel ports, 1 Gbit/s iSCSI ports, 10 Gbit/s iSCSI ports, 10 Gbit/s FCoE ports, 16 Gbit/s Fibre Channel ports, 56 Gbit/s IB ports. • At least four 10GbE ports per controller and one dedicated Management port
Additional H/W Capabilities	• Controller Failover / Cluster Modes. • 12G SAS backplane. • Cache to Flash (If power to the array is lost the contents of cache are written to the flash drive). • Fast recovery technology that minimizes the disk failure period and reduces risks. • Redundant power modules, fan modules, controllers, and caches under the power failure protection. • Hot swappable disks, power modules, and I/O modules •
Included Software Capabilities (Perpetual - all inclusive model)	• Heterogeneous storage virtualization,Dynamic storage tiering • Non-disruptive array addition and removal,Thin provisioning,VMware VAAI, SRM, and VASA compatibility certificates,Support for RAID 0, 1, 3, 10, 50, 5, and 6.. • Data Protection: Synchronous Replication and Asynchronous Replication with FC and IP, Data volume mirroring Self Encrypting Drives (SED) support, Hot Spare Drives, Data snapshots, Volume cloning, Data volume replication , Data destruction • Performance: Intelligent tiering on hybrid arrays (SSD & HDD), Intelligent data cache, Intelligent service quality control,

	Intelligent cache partitioning, Intelligent data migration. • Multi-path / IO support, Auto-load balancing • Management: Global topology view, Cpacity analysis, performance analysis, fault diagnosis, end to end service visualization to manage different models of devices, MNon-disruptive firmware upgrade, Phone home & email home,
Warranty	• Three years manufacturer Support and Service • Service Contract Required

3. Networking

3.1 Rack able 10GbE Managed Switch

Features	Description
Ports	• 48x 10 Gigabit Ethernet SFP+ ports, 4x 40 Gigabit Ethernet QSFP+ ports, 1 RJ45 management port with RS232 signaling,
Performance	• Switching Fabric performance – 1.44Tbps (full-duplex) • 720Gbps (half-duplex), User traffic Capacity - 1080 Mpps, Stacking Capacity - 240 Gbps, Queues per Port - 8 queues, Switching latency - 800ns, Packet buffer memory - 12MB
Warranty	• Three years manufacturer Support and Service • Service Contract Required

3.2 Out of Band Management Switch

Features	Description
Ports	• 44x 10/100/1000 Base-T ports, 4x SFP Ports, 1x RJ45 management port with RS232 signaling

Performance	• Switching fabric capacity- 256 Gbps, User traffic capacity - 144 Mpps, Stacking capacity - 6448 Gbps per stack member, Queues per port - 4 queues, Switching latency - <5 µs for 64 byte frames, Packet buffer memory - 4MB
Warranty	• Three years manufacturer Support and Service • Service Contract Required

3.3 Blade Interconnect Aggregation Switch

Features	Description
Ports	• 48x 10 Gigabit Ethernet SFP+ ports, 4x 40 Gigabit Ethernet QSFP+ ports, 1 RJ45 management port with RS232 signaling
Performance	• MAC addresses - 288K, Switch fabric capacity – 1.44 Tbps (full-duplex), Forwarding capacity - 1080 Mpps, Link aggregation - Up to 16 members per group, 128 LAG groups, Queues per port - 84 queues, Packet buffer memory - 9MB, Stacking bandwidth - up to 240Gbps (two 40GbE port bidirectional). • Support intra-chassis networking (east/west system communication) with 10GbE throughput. • Allow server administrator to push blade chassis networking features to top-of-rack switch
Warranty	• Three years manufacturer Support and Service • Service Contract Required

4. Software

4.1 Systems Manager for Integrated System

Features	Description
Requirement	• Manages the Server/Storage/Networking/Blade Intergrated

	system at DC and DR Sites with: • Template based infrastructure and workload deployment. • Management of physical and virtual infrastructure and workloads. • Repeatable deployment, integration, and management models.
Warranty	• Three years manufacturer Support and Service • Service Contract Required

4.2 SAN Storage Monitoring and Reporting Software

Features	Description
Requirement	• Centralized event monitoring of the SAN Storage Infrastructure • Historical performance reporting • Single view of alerts • Capacity trending • Rich data on IOPS, capacity, latency, network activity • Drill-down to group management • Live View
Operating System	• Windows Server 2012 Datacentre with enabled Hyper-V or Equivalent
Virtual Server Manager	• Microsoft Systems Centre Virtual Machine Manager or Equivalent
Warranty	• Three years manufacturer Support and Service • Service Contract Required

5. Network Core , Security , Optimization & Data Protection

5.1 Unified threat management (UTM)Next Generation Firewall and Gateway Security Appliance

Features	Description
Interfaces	10 Fiber/Copper of 1 Gbps of 10Gbps with transceivers for all the 1Gbps and 10 of the 10Gbps, 1 HA, 2 USB
Management	• CLI, SSH, GUI, GMS
Performance	• Stateful Throughput 20 Gbps, Full DPI Performance 2.2 Gbps, Intrusion Prevention Throughput 8.8 Gbps, 3DES/AES VPN Throughput 18 Gbps, Maximum number of L2TP connections 15,000，Maximum number of GRE connections 1024，Maximum number of IPSec connections15,000Maximum Connections 1,500,000, Maximum DPI Connections 1,250,000, New Connections/Sec 300000, Site-to-Site VPN Tunnels 10000, Global VPN Clients Standard/Maximum 2,000 / 10,000 , Unique Malware Threats Blocked 1,000,000+, VLAN Interfaces 512,
Standard Features	• Network Traffic Visualization, Netflow/IPFIX Reporting, SNMP, Single Sign-on (SSO), Voice over IP (VoIP) Security, Interface to Interface Scanning, PortShield Security, Port Aggregation, Link Redundancy, Policy-based Routing ,Route-based VPN ,Dynamic Bandwidth Management, 802.11n Wireless Support Stateful High Availability, Multi-WAN, Load Balancing, Object-based Management, Policy-based NAT, Inbound Load Balancing, IKEv2 VPN, Active/Active UTM, Terminal Services Authentication/Citrix Support, Onboard Quality of Service (QoS), SSL Control, IPv6, Automated Failover/Failback, Analog Modem Failover, 3G Cellular Modem Failover, Unlimited File Size Protection,

Additional Security Requirements	• Gateway Anti-Virus, Anti-Spyware, Intrusion Prevention, Application Intelligence and Control, URL and Content Filtering are **Mandatory**
Warranty	• Three years manufacturer Support and Service • Service Contract Required

5.2 Data Centre Core Switch (Chassis based)

Features	Description
Backplane capacity	• 6Tbps
Switching capacity	• 3.84T
Throughput	• 2880Mpps
Slots	• 6
10GE port (fiber trans-receiver)	• minimum 10
1 GE Port (fiber transreciver)	• Minimum 12
1 GE port (Ethernet line card)	• Minimum 48
Cluster or virtual switching	• Should be supported and included in the offer
VLAN	• Should Support access, trunk, and hybrid VLAN, the default VLAN, VLAN switching, QinQ and selective QinQ and dynamic VLAN allocation based on MAC
MAC address	• Should Support dynamic learning and aging of MAC addresses, Should support static, dynamic, and blackhole MAC address entries, Filters packets based on source MAC addresses, and Restricts MAC address learning based on ports and VLANs.
STP	• Should Support STP, RSTP, and MSTP, BPDU protection, root protection, and loop protection, and BPDU tunnels
IP routing	• Should Support IPv4 routing protocols, such as RIP, OSPF, BGP, IS-IS, RIPng, OSPFv3, ISISv6, and BGPv4
Multicast	• Should Support IGMP v1/v2/v3, IGMP v1/v2/v3 snooping, PIM

	DM, PIM SM, PIM SSM, MSDP, MBGP, prompt leave of multicast members, multicast traffic control, multicast querier and Should support suppression on multicast packets and multicast CAC
MPLS	• Should Support basic MPLS functions, MPLS OAM, MPLS TE, and MPLS VPN/VLL/VPLS
Reliability	• LACP , Enhanced-Trunk.VRRP and BFD for VRRP, BFD for BGP, IS-IS, OSPF, Static routing.NSF and GR for BGP, IS-IS, OSPF, LDP, TE FRR, IP FRR, Ethernet OAM (802.3ah and 802.1ag), DLDP, ISSU and CSS/VSS/CSS2
QoS	• Should Support traffic classification based on the Layer-2 header, Layer-3 information, Layer-4 information, and 802.1p priority. Should support the actions of ACL, CAR, re-mark, schedule, queue scheduling algorithms of PQ, WRR, DRR, PQ+WRR,PQ+DRR, congestion avoidance mechanisms such as WRED and tail drop, H-QoS and traffic shaping
Configuration and Maintenance	• Should Support Console, Telnet, and SSH terminals, network management protocols, such as SNMPv1/v2/v3, uploading and downloading through FTP and TFTP, BootROM upgrade, remote upgrade, hot patches and user operation logs
Security and Management	• Should Support802.1x authentication, portal authentication, NAC, RADIUS
Service Function	• Should Support Firewall, NAT, Netstream, IPSec and Load Balance
Power	• Redundant power supply, 220v/50 Hz
Warranty	• Three years manufacturer Support and Service • Service Contract Required

6. Data Replication And Protection

6.1 Data Replication Software

Features	Description
Required Capabilities	• Visualized physical and logical disaster recovery topologies support end-to-end monitoring of protection paths. • Provide disaster recovery reports to meet statistical requirements, support disaster recovery service operating reports and drill reports • Use the B/S architecture Support real-time RPO monitoring and RTO statistics.
Warranty	• Three years manufacturer Support and Service • Service Contract Required

6.2 Data Protection (Backup) Software

Features	Description
Required Capabilities	• A cross-platform backup and recovery software solution that safeguards data and applications in both physical and virtual environments. • Single management console managing local and remote sites with policy-based job management. • Application Intelligent backup and restore capabilities for Oracle, SQL Server Sybase Exchange, MySQL and PostgreSQL, DB2, Exchange, E-mail, Informix, SharePoint, ERP and SAP HANA. • Provide the deduplication function by default and supports source-side, target-side, media-side, and global deduplication. Source-side deduplication and global deduplication can be switched over flexibly on the page.

	• Automatically resumes data backup and recovery jobs of Oracle, Exchange, and mainstream file systems from the breakpoints. • Support the invoking of storage hardware snapshot. • Load balancing and failover. • Provide a GUI-based centralized configuration and management platform of backup services. • Provide a unified management platform of reports and alarms •
Warranty	• Three years manufacturer Support and Service • Service Contract Required

6.3 Disk Backup Unit

Features	Description
Architecture	• 2U Rack-ready •
Capacity	• 135TB Logical Capacity, expandable to 405TB logical capacity
Connectivity	• 6 Port 1GbE (10BaseT), 2 Port 10GbE (10BaseT) per node or 2 Port 10GbE (SFP+) per node
Required capabilities	• Data reduction through deduplication, Many-to-one replication for disaster recovery, Broad, integrated software support, Proactively detect data corruption due to hardware faults. RAID 6 configuration, DMA/ISV certifications: • NetVault • vRanger • AppAssure V4.X • CommVault Simpana • Symantec Backup Exec

	• Symantec NetBackup • Networker • Veeam • TSM • Arcserve • Oracle RMAN
Warranty	• Three years manufacturer Support and Service • Service Contract Required

6.4 Disk Backup Unit

Features	Description
Architecture	• SAN and NAS integration, Support for NAS, IP SAN, and FC SAN. • Multi-controller architecture .
Capacity	• 500TB available Capacity, expandable to 1000TB available capacity
Connectivity	• 4 Port 1GbE (10BaseT), per node or 4 Port 10GbE (SFP+) per node
Required capabilities	• Up to 96 GB unified storage cache. • Support for 8 Gbit/s Fibre Channel ports, 1 Gbit/s iSCSI ports, 10 Gbit/s iSCSI ports, 10 Gbit/s FCoE ports. • Support 12 Gbit/s SAS 3.0 disk channels. • Support for RAID 0, 1, 3, 10, 50, 5, and 6. • Fast recovery technology that minimizes the disk failure period and reduces risks. • Redundant power modules, fan modules, controllers, and caches under the power failure protection.

	• Hot swappable disks, power modules, and I/O modules. •
Warranty	• Three years manufacturer Support and Service • Service Contract Required

7. Cloud web disk services

Features	Description
File management	• Support files upload or download, version management, favorite
Multi-terminal synchronization and backup	• Support web, PC synchronization client, PC cloud manager client, and mobile client. • Multi-PC synchronization. • Intelligent terminal selective synchronization. • Flash transfer. • Offline data utilization. • Local file backup.
System capability	• Deployed in multiple data centers (MDC). • Upload based on the close proximity principle (base on MDC). • Support public cloud, hybrid cloud, and private cloud deployment. • Support ten-billion level files and directories. • UAS controlled, each node 200 concurrent requests (HTTPS) or 500 concurrent requests (HTTP). • File-level deduplication.
Sharing and collaboration	• Sharing and release of links. • Online preview of Office, PDF and images. • Group. • Role-specific access control. • Team space.

	• Dynamic messaging. • System bulletin.
Security	• Mobile client integrates with customers' existing MDM systems. • User access and device audit. • Operation log. • Fine-grained security control.
Integration	• Open API. • AD and LDAP user interconnection. • Integration with Outlook. • Integration with Office

8. Distribution Media Server and Portal and Scheduling Solutions

7.1 Distribution Media Server

The proposed Distribution Media Server should be the backbone of the schoolnet content delivery network. It should also enable efficient video broadcasts to large students at schools by supporting a variety of endpoints, including popular smartphones and media tablets. Students in regional schools anywhere in the country should have to view high-definition video, either live or stored, without taxing data connections to a central data center.

The proposed media server typically shall be deployed at the network edge, is a single integrated platform which intelligently provides media redistribution, media transformation and the serving and storage of video-on-demand content. A single stream of media from a central data center should support tens of thousands of live views and then should be stored locally for on-demand access by thousands more.

There should also be an option for the media server to be used as a video conference streaming gateway to integrate with SIP-based video conference systems to stream conferences to thousands students and teachers , including to their mobile devices. For the proposed media server, permissions and reports on content access are managed centrally; across the schools.

The proposed media server shall be deployed on the network edge to support endpoints requiring RTP, RTMP (Flash), HLS (Apple Adaptive), MPEG2TS (Transport Stream) and Smooth Streaming streams as well as firewall friendly HTTP progressive downloads. The solution should be fully integrated with the proposed portal server media management platform. The platform should have an embedded OS appliance, designed to minimize maintenance.

Details Specification

Features	Description
Media Redistribution	• Ingests and reflects media streams, unicast to unicast or unicast to multicast. • Enables one stream to serve thousands of users.
Media Transformation	• Converts standard H.264 RTP to Flash, Apple Adaptive and Transport Stream providing video to diverse endpoints including PCs, MACs, media tablets and smartphones.
Video-on-Demand	• Local content storage and video serving allow frequent content to be access locally without burdening data connections to larger central sites.
Intelligent Central Management	• Content is created once and then intelligently managed by the portal server, regardless of the location. Stored content is appropriately distributed to local media server so users have

	faster access to frequently viewed content without the need to contend with constrained WAN or Internet links.
Security	• Designed to meet the security requirements of demanding government information assurance policies
Incoming Protocol Supported	• RTP, RTMP , MPEG2TS with KLV, FTP for VOD file transfer ,Smooth Stream from IIS Server ,SIP
Outgoing Protocol Supported	• RTP - unicast & multicast ,RTMP - unicast ,MPEG2TS with KLV - unicast & multicast ,HLS - unicast ,HTTP (Progressive Download) unicast ,Smooth Stream ,Stored Windows Media via Progressive Download
Management	• HTTP/HTTPS for management • IGMPv3
Recommended Users	• More than 1000 concurrent users
Maximum Throughput	• 3Gbps
Memory	• 32GB
Content Storage (drives)	• (6) 1TB RAID 5
Network	• 4 Gigabit Ethernet
Warranty	• Three years manufacturer Support and Service • Service Contract Required

14. Data Center Virtualization and Server Consolidation

14.1. Functional Performance Requirements of the System

This Data Center Virtualization and Server Consolidation invite vendors to propose and design which will reduce overall power consumption, cooling needs and cost effective cloud data center virtualized platform.

It is anticipated that vitalizing the proposed servers and storage into fewer logical devices will accomplish the cloud data center services.

MOE/ CEICT/ would like to pick the successful design-response to this RFP into the future demand of the CEICT cloud based data center.

Total solution will meet or exceed the following:

- Our future production virtual infrastructure requires 99.999% uptime during business hours (8am-5pm Monday-Saturday) and 99.9% during non-business hours (including scheduled maintenance).
- We are currently using greater than 72TB of data that will be migrated to the proposed SANs. This array will be in use for the coming at least 10years
- The successful solution will implement the proposed virtualization platform move virtual machines to new hosts with the capacity to move virtual machines and associated storage from one location to another, due to performance, power, or maintenance needs, without client disruption, automatically or at administrative option.
- Proposed solution should be capable of handling the failure of one physical server by moving all affected VMs to another physical server and all affected storage locations without interruption of existing applications and services. Thus the proposed solution should possess sufficient reserve resources (processor, storage, and I/O) to handle current system demand, anticipated growth, and failover functions

14.2. Consolidation and Virtualization Requirement

Vendor should also consider:

- ✓ Server virtualization software VMware, vSphere with Operations Management and VMware vSphere Data Protection Advanced as a benchmark.(if the vendor propose other virtualization platform , it should be listed on Gartner)

- ✓ Application programming interfaces (APIs), other tools, or solution/software development kits (SDKs) which helpful to create Virtual and physical server environments.

- ✓ Management and monitoring tools must be included in any proposal. It would be preferable if management tools integrate with both Microsoft System and other proprietary and Open Source systems.

- ✓ The virtualization platform has proven to be among the most cost-effective virtualization platforms available today. The virtualization platform employs a bare-metal virtualization engine that consumes less than 5% of physical CPU resources, yet this engine improves server utilization up to 80% and reduces

costs for IT infrastructure deployment by 30%.The virtualization platform provides visual application templates to implement one-click application deployment and highly effective operation and maintenance (O&M). In addition, the virtualization platform licenses are charged only by the number of physical CPUs the services use, and not counting any other in-use physical resources.

- ✓ Server virtualization software must provide sufficient virtual servers to support any servers.
- ✓ virtualization platform (Software) must allow for server load balancing
- ✓ Software must allow for movement of virtual servers from one server to another with minimal service interruption
- ✓ Software should provide cluster support
- ✓ Software must include virtual server monitoring tools
- ✓ Software must include template based virtual server creation
- ✓ Software must be able to support multiple virtual server operating systems, including but not limited Windows Server 2008, Windows Server20012, Linux SUSE and Centos 6 and others

- ✓ A clear and detailed list of all software and hardware proposed by the vendor must be provided and Vendor should also quote professional services for installation of hardware.
- ✓ Vendor should provide all necessary software components and will include demonstration and hands-on training to CEICT staff in converting physical servers to virtual.

- ✓ All information technologies must provide support for the English. Specifically, all display technologies and software must support the ISO character set and perform sorting according to ISO

- ✓ It should enable the use of ultra-powerful virtual machines that possess up to 64 virtual CPUs and scalable to 128 CPUs

- ✓ Should allow virtual machines to access shared storage devices (Fibre Channel,iSCSI, etc.)

- ✓ Provide integration with supported third-party data protection, multipathing and disk array solutions

- ✓ provides dynamic allocation of shared storage capacity

- ✓ Provides dynamic, hardware-independent load balancing and resource allocation for virtual machines in a cluster, using policy-driven automation to reduce management complexity while meeting SLAs.

- ✓ Should enable live migration of virtual machines between servers with no disruption to users or loss of service, eliminating the need to schedule application downtime for planned server maintenance

- ✓ Should enable live migration of virtual-machine disks with no disruption to users, eliminating the need to schedule application downtime for planned storage
- ✓ maintenance or storage migrations

- ✓ provides cost-effective, automated restart within minutes for all applications if a hard ware or operating system failure occurs

- ✓ Provides continuous availability of any application in the event of a hardware failure—with no data loss or downtime

- ✓ Provides simple, cost effective backup and recovery for virtual machines.

- ✓ Should secure virtual machines with offloaded antivirus and antimalware solutions without the need for agents inside the virtual machine

- ✓ Should optimize server power consumption within each cluster.

- ✓ Should place critical components into memory regions identified as “reliable” on supported hardware. It also protects components from an uncorrectable memory error

- ✓ Reducing the required backup storage by up to 95 percent

- ✓ Should have capabilities of De duplication, VADP integration, Changed Block Tracking backup, Changed Block Tracking restore

- ✓ Simple backup design for administrators-Streamlined management, Flexible restore options, Restore rehearsal

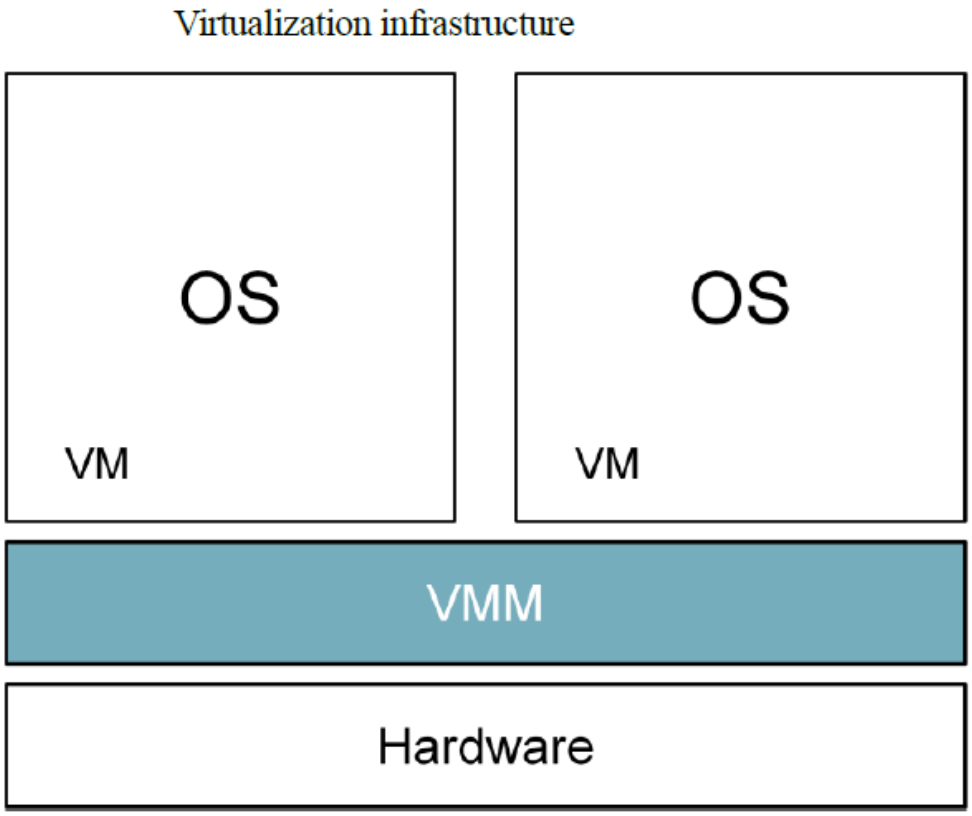
- ✓ Protection for Business-Critical Applications

- ✓ It Should be support VSS
- ✓ The successful bidder(s) will provide complete factory training to Ten CEICT staff on the specifics of the virtualization and monitoring. It would be desirable to involve CEICT staff in the installation and configuration of all software, configuration and installation of virtualization environment.
- ✓ Local training should also be provided.

- ✓ Operation management features-Health monitoring and performance analytics, Capacity management and optimization, Operations dashboards and root-cause analysis

- ✓ Virtualization software cost and licensing shall be provided for a minimum of 3 years.

- ✓ (Provide 3 years warranty and 3 years post warranty.)Included all required license for 6 years



14.3. Detail Specifications

No	specifications	capacity
1	It support number of hosts supported by a Virtualization Resource Management (VRM) node	Up to 256
2	Number of sites in VRM domain	12
3	number of host clusters supported by a VRM node	20
4	number of hosts supported by a host cluster(LUN storage per storage virtualization)	64 per 16 and scalable to 128/32
5	number of VMs in one host cluster	100 and scalable to 1000
6	number of administrators by the system	30
7	number of physical servers supported by the system	100 and scalable to 500

8	number of VMs supported by the system	3000 and scalable to 20000
9	Number of CPU logical cores per machine	64 scalable to 128
10	Number of RAM per server	192GB scalable to 768GB
11	Number of VMs	32 scalable to 128
12	Number of VMs supported by a VRM	1024 scalable to 3000
13	Number of VMs supported by a host	32 scalable to 128
14	Number of virtual CPU supported by a VM	16 scalable to 32
15	Number of Virtual network Interface cards supported by a VM	4 scalable to 6
16	Number of disks supported by a VM	4 scalable to 8
17	Number of memory size supported by a VM	192GB scalable to 768GB
18	Number of disk capacity supported by a VM	16TB

SAN switch detail specifications

no	specifications	Capacity
1	Number of ports	24
2	Port types	FL_Port, F_Port, M_Port, E_Port, U_ Port, N_Port
3	Port rates	1,2,4,8 gbits
4	Maximum latency	Local switching port: 700 ns
5	Total bandwidth	192 Gbit/s: 24 ports x 8 Gbit/s Or 384 Gbit/s: 24 ports x 8 Gbit/s x 2 (full duplex
6	Media type	SFP, SFP+, LC connector, SWL, LWL, ELWL S
7	Maximum frame size	2112 byte payload
8	Frame buffer	700 frames dynamically assigned; a maximum of 484 frames per port
9	Hot-swappable components	SFP optical transceivers, fans and one power supply
10	Servers supported	Any server
11	Operating systems supported	Microsoft Windows NT, Windows 2012, Windows 2008 Red Hat Linux, Red Hat Linux Advanced Server SUSE Linux, SUSE Linux Enterprise Server (SLES) IBM AIX Other select operating systems
12	Storage products supported	All selected storage systems
13	Fibre Channel switches supported	Any storage system
14	Fiber-optic cable	Fiber-optic cables are required and available in various lengths in single-mode and multi-mode formats
15	Service class	Class 2, Class 3, Class F (inter-switch frames)
16	Manageability	Telnet, HTTP, SNMP v1/v3 (FE MIB, FC Management

		MIB); auditing, system logs, change management tracking; SMI-S compliant; SMI-S script toolkit; administrative domains; trial licenses for add-on capabilities

Data protection and backup system

Back Up and Storage

- The Tape Libraries meet demanding storage requirement of CEICT businesses needing unattended tape backup, disaster recovery, or low cost long-term archive capability.

Specifications

- Storage density more than 720 TB and compression using LTO-7 tape
- Driver Type LTO-7 tape and above
- Capacity 500TB compressed 2.5.1
- Host Interface 8Gb fiber channel or 6Gb/sec SAS
- Transfer rate 1.4 TB/hr.
- Number of cartridge slots 80 and scalable to 250
- Encryption capability AES 256-bit
- Form factor 6U
- Easy-to use web based remote management
- Integrated bar code reader
- Tool-free tape drive upgrades

Data Backup software

Specifications

No	Specifications	Capacity	Remark
1	Concurrent Jobs	it can handle up to 100 concurrent jobs	
2	Virtual machine indexing support	It should support full	
3	VM content back up	Must support	
4	Catalog(IDB-Internal Database	scales to multiple TeraBytes	
5	Platform	Support cloud connector, Microsoft SCVMM console add-in, virtualization	

		software web plug-in, intelligentpolices for SQL server and other services,	
6	Instant application and single file granular recovery from any storage type—disk or tape	Must support	
7	Off-host backup and deep VMware and Microsoft Hyper-V integration	Must support	
8	Automated virtual machine protection	Must support	
9	Must support	Must support	
10	Reporting across third-party applications	Must support	
11	the data back software bundle	To all server, clients tape drive and data base agent(s)	

Detail requirements and bill of materials for data center infrastructure:

No.	Items	Description	Quantity	Unit
Rack and Aisle Containment System				
1.	**Server Rack**	42U Height, 19" standard intelligent IT rack 600mm*1200mm*2000mm(W*D*H) rack or similar standard IT rack Dust protection: Class IP 20	**26**	**Pieces**

		Load bearing capacity should be minimum of 1200 kg per square meter		
		Top equipped with holes for entrances and cable outlets rack equipped with vertical cable guides		
		With 2 doors (front and rear) single leaf or double leaf		
		Each rack should have 35 pieces of blank Panels for cooling containment		
		Each rack should have a salver to contain equipment width less than 19"		
		Each rack should contain two pieces 32Amp vertical power strips		
		Each rack should contain one pieces horizontal cable manager to manage cables		
		Each rack should contain one pieces vertical cable manager		
		Each rack should contain cable rings to arrange cables in vertical direction		
2.	**Network Rack**	42U Height, 19" standard intelligent IT rack	**3**	**Pieces**
		600mm*1200mm*2000mm(W*D*H) rack or similar standard IT rack		
		Dust protection: Class IP 20		
		At least bearing a load of 1200 kg		
		Top equipped with holes for entrances and cable outlets rack equipped with vertical cable guides		
		With 2 doors (front and rear) single leaf or double leaf		
		Each rack should have 35 PCS blank Panels for cooling containment		
		Each rack should have salver to contain equipment width of less than 19"		

		Each rack should contain two pieces of 32 Amp vertical power strips		
		Each rack should contain one pieces of horizontal cable manager to manage cables		
		Each rack should contain one pieces of vertical cable manager		
		Each rack should contain ten cable rings to arrange cables in vertical direction		
3.	**Aisle Containment System**	With 1200 width of contain hot aisle	**2**	**set**
		Proposed skylight for contain aisle: With skylight on the top of aisle and the skylight can be revolved		
		Proposed doors for contain door: With slide doors at side of the containment and the door with card reader to control access		
		With temperature sensors and smoke sensors inside of the aisle		
Cooling system				
4.	In-row air conditioner	In row precise air conditioners, air cooled	**8**	**set**
		Input voltage: 380V three phase input frequency :50Hz work temperature: -5℃-40℃		
		Proposed Cooling capacity :35KW (33170BTU/h)		
		Proposed air Flow:4000 m3/h-7000m3/h		
		Compressor: Direct current frequency conversion compressor or digital scroll compressor or similar high efficiency solution		
		Refrigerant: R410 or similar		

		Reliability: a. support redundancy radiating EC fans b. Integrated temperature sensors c. support the function of being monitored by data center monitoring system d. well water leakage detecting function		
		Communication: support FE, MODBUS, RS485 or similar communication method.		
5.	Precision Air conditioner for Power house	Proposed type: surface mount precision air conditioner Cooling capacity should be 35000W(~33170BTU/h)	**2**	**set**
		Known brands should be proposed.		
		It should be Rack mount and data center designed		
6.	Comfort Air conditioner for NOC room	Proposed type: split type air conditioner	1	**set**
		Cooling capacity should be 5000W(~4760BTU/h)		
		Known brands should be proposed.		
Power System and Power System Installation				
7.	**Intelligent Modular UPS**	Proposed input voltage range: 80V-280V(Phase Voltage)	**2**	**set**
		Input frequency range (Hz):40Hz-70Hz		
		Rated capacity: 320 KVA, scalable to 480KVA Input voltage: 380V three phase; input frequency :50Hz/60Hz output voltage: 380V three phase; output frequency :50Hz		
		Proposed type: online double conversion UPS（AC-DC-AC）modular design, each module with the capacity of 40KVA		

		Proposed efficiency: Efficiency of 96% at half load Output power factor > 0.95		
		Bypass module should be hot swapped Bypass module should be centralized		
		UPS should come up with 7-inch color LCD touch screen		
		Proposed parameters: Total harmonic distortion of input current: <3%(linear load, rated load) <5%(nonlinear load, rated load) Total harmonic distortion of output voltage: <1% (linear load, rated load) <3% (nonlinear load, rated load)		
		Proposed Communication Method: support IP, SNMP, RS485, MODBUS or similar communication method support web browser or similar method to view the UPS running status and remote control		
		Proposed Overload capacity: 110% overload no less than 60mins; 125% over load no less than 10mins; 150% overload no less than 60 seconds		
		Support Rechargeable battery, and shall have startup battery along with the UPS. Integrated or in a separate unit		
8.	**Battery Bank**	Firm Structure: use the material of stainless steel or similar material or battery frame	**2**	**set**

		Space: battery pack should come with 42U standard rack/shelve or normal battery rack		
		Runtime: battery should support data center for a minimum of 15 minutes		
9.	**Main Distribution Board**	Model: Input: MCCB: 800A/4P*1PCS Output for UPS: MCCB 630A/3P*2PCS Output for AC: MCCB 630A/3P*1PCS	**1**	**Pieces**
		Need to have dust protection		
		Support monitor the parameter including input circuit voltage and current, switch state, apparent power, active power, electricity and other indicators through a screen		
		Must Support SNMP protocol, upload report through RS485, FE interface.		
		Appropriated earthling cables		
		It should be 42 U rack mountable		
		Should have lighting protection and surge protection		
10.	**PDU for IT Racks**	Form factor: 42U rack Model: Input: MCCB:250A/3P*2PCS Output: MCB: 16A/3P*40PCS	**3**	**Pieces**
		Support monitor the parameter including input circuit voltage and current, switch state, apparent power, active power, electricity and other indicators through a screen		
		Must Support SNMP protocol, upload report through RS485, FE interface.		
		Support harmonic detection including input circuit 5, 7, 11 times voltage current harmonic detection and total harmonic detecting		

		Must support 2 input ways (from both UPS source)		
		Need to have dust protection		
		Should be appropriated earthling cables		
		Should have lighting protection and surge protection		
		It should be rack mountable on 42 standard rack		
		Should have bypass breaker		
11.	**PDUs of two UPSs**	Input MCCB:630A/3P*1PCS output MCCB: 250A/3P*5PCS	**2**	**Pieces**
		Support monitor the parameter including input circuit voltage and current, switch state, apparent power, active power, electricity and other indicators through a screen		
		Must Support SNMP protocol, upload report through RS485, FE interface.		
		Proposed protection: Dust protection : IP20		
		Should be appropriated earthling cables		
		Should have lighting protection and surge protection for power regulation		
12.	**PDU for air conditioner**	input: MCCB 630A/3P*1PCS MCB for AC indoor Unit 40A/3P* 16PCS MCB for AC outdoor Unit 10A/3P*16PCS	1	**piece**
		Support monitor the parameter including input circuit voltage and current, switch state, apparent power, active power, electricity and other indicators through a screen		
		Must Support SNMP protocol, upload report through RS485, FE interface.		
		Proposed protection: Dust protection : IP20		

		Should be appropriated earthling cables		
		Should have lighting protection and surge protection for power regulation		
13.	**Diesel Generator**	Capacity: 400 KVA diesel generator system	1	**set**
		Should support SNMP or RS485 protocol to compatible with the DCIMS		
		Should have Diesel reservoir and a sub reservoir to contain at a minimum of 1000liter		
		Diesel generator should be hospital rated type for noise level (please note that the nearby buildings are lecture and meeting rooms)		
		Diesel generator shall have canopy and sound silencer		
		It must come up with rack mountable ATS 1000A/4P		
		Engine type for Diesel generator is preferred to be Cummins or Perkins, or other known brands		
		Generator should have an ATS system to integrate with main power line		
14.	**Power distribution and Cabling system**	All cables, materials, accessories and supply and power installation layout and implementation: power cable from transformer/generator to DC's main power distribution panel cable from main power panel to sub power distribution panels from sub power panel to terminals(IT racks, air conditioners, lights, screens, work stations, etc...) should provide the cables and materials and implement. Lightening lamps and fixtures must be elegant for aesthetic beauty and high illumination	1	**set**

		Power cable such as communication cables, control cables, surveillance system cables, etc… should be provide power cable and implement		
		Bidders should supply and implement Cable tray, cable trunk and materials		
		Earthling and lighting protecting, all devices with in DCF should be connected to central grounding, permanent grounding should be implemented using Furze or Maronite Bidders should provide materials and implementation		
		Floor box appropriate rating single phase and three phase electric sockets should be water proofed and must be placed at different locations of the data center	**10**	**set**
		Cable entry system for data cable, power cable, and other cable entry to & from the DCF should be deployed; each frame should support at least 20 cables.	**4**	**set**
		Lightening system: cables, lightening accessories, electric switches from emergency and uniform and standard illumination must be supplied and implemented	**1**	**set**
Data Center Infrastructure Management (DCIM) System				
15.	**Hardware**	Proposed monitoring Server: Storages, management servers, blade servers, backup tape UTM firewall, Switches, network cables, trunk, etc		**as per spec**
		Sensor: temperature/ humidity sensor , smoke sensor ,water leakage sensor	**1**	**set**
		SMS module: supporting Alarm SMS to Data Center Administrator's mobile phone or similar ways	**1**	**set**

16.	**Software**	A set of DCIM application software system: Including OS, application, management, virtualization, media distribution etc Support installation on the work station and license and services must be provided		**as per spec**
		Basic requirement: Monitoring the server room power, access, security, alarm, UPS, Air conditioner work status, running logs The OS should be Win7 and above or Linux	**1**	**Package**
Security system				
17.	**Fire rated doors**	Fire rate Door and frame shall include provisions for all necessary attachments and access control locking devices; installation shall include supply and fixing of hardware fittings, hinges, handles, floor springs, and hydraulic door closer	**5**	**Pieces**
18.	**Video surveillance system**	Server with camera station software	**1**	**Pieces**
		Proposed switch: 24-port 10/100/1000, Poe switch	**1**	**Pieces**
		Dome and fixed dome IP camera, highest resolution standard for the purpose, indoor/outdoor	**16**	**Pieces**
		Hard Disk: 10*4TB	**1**	**Pieces**
19.	**Door and lighting Access Control system**	Proposed hardware: Including Card reader(fingerprint & IC card reader), IC card, Exit button (biometric), Magnetic locks (for glass door, and steel doors), door returner/closure, lightening fixtures on and off	**5**	**set**
		Software: software and license		
	Important note: Complete materials and professional services are bidder responsibility			

Fire Detection and Suppression System				
20.	**Extinguishing Gas**	Proposed gas: FM200, 160KG gas with canister	**2**	**set**
21.	**Control panel**	Fire alarm control panel, two zone, conventional, support for actuator to trigger gas suppression system Support RS485 communication port Support automatic& manual switch	**2**	**Pieces**
22.	**Sensor**	Smoke & temperature fire detector with early detection mechanism	**1**	**set**
23.	**Alarm**	Sound and light alarm	**3**	**set**
24.	**Fire extinguishing equipment**	Installation accessories for gas: pipe, nozzles, valves and fittings	**2**	**Set**
Data center interior decoration				
25.	**Ceiling and Floor**	Fire rated and water proof Ceiling for all rooms	194.28	m^2
		Fire rated and water proof Raised Floor/accessory for all rooms	194.28	m^2
26.	**Walls**	Repainting and reconditioning of brick walls	**Depend on survey**	m^2
		Full Glass wall for partition	**Depend on survey**	m^2
Grounding and Lighting protection System				
27.	**Grounding & lighting protection system**	For DC room grounding and lighting protection	**1**	**set**

NOC and Studio				
28.	**Multi-screen display system**	Multi-screen display system: 2*2 46 -inch full HDLED screen unit; control system Including controller, LED screen mount and or Mounting kits and accessories or must be supplied and installed by vendor.	**1**	**set**
29.	**all in one computers for management**	All in one computer/ workstation: Minimum HDD =1TB ,display:32" LCD, processor: core i7, Minimum RAM:8GB, Chairs and tables for NOC room must be designed and supplied and installed	**2**	**Pieces**
30.	**Furnishing the NOC room**	Furnishing the NOC room with necessary chairs, tables and supply materials are duties and responsibilities of the bidder	**1**	**set**
Structured Horizontal cabling				
31.	**Structured Horizontal cabling of the datacenter**	The structured cabling is a complete system of cabling and associated hardware which provides a comprehensive network infrastructure. The structured cabling solution consists of cables, cable component compliant patch panels, wall outlets, patch cords, aggregation switches. The structured cabling should be implemented for the IT and NOC room requirements such as operating **beyond 10 Gigabit Ethernet** and will maximizes and accommodate growth to higher speed networks. Remark: equipment, materials and services are bidder responsibility	**1**	**set**

Civil works				
32.	**Civil works**	Datacenter civil works, Generator house, reinforcement slabs, fuel reservoir, automatic fueling system, outdoor AC unit mount reinforcement slab, interior and exterior reconditioning works, doors, rerouting civil works, ramps, stairs, manholes, poles reinforcement, are expected from bidder Important Note: Bidders are requested to collect the softcopy of the generator and automatic fueling system house design	**1**	**set**
Knowledge Transfer and Experience Sharing				
33.	**Knowledge Transfer**	Supplies of manufacturer and onsite trainings are expected from vendor.		

Important note:

- *Standardized and state of the art implementation will never be compromised*
- *Equipment and materials must be data center designed. Third party's accreditation such as Uptime Institute will be reviewed*

Evaluation criteria for technical qualification

Technical evaluation shall be guided by the under listed criteria. Bidder requires baseline technical score of 75 % in order to be considered for financial evaluation. This is Quality Cost Based Selection. The technical score share will be 70% and whereas financial

share will be 30%. Bidders with highest consolidated score will be merited the project.

Technical Evaluation Criteria for Qualification			
No.	**Criteria**	**Max. Score**	**Remark**
1	**Company Profile**	**20**	
	Experience and showcases: ▪ Experience of data center facility implementation ▪ Showcases of implemented datacenters (minimum of two fully completed data center projects in Africa) Important Note: ▪ attach certificate of successful data center infrastructure completion	10	
	▪ Existence of the supplier in the business for the last five years	5	
	▪ Maturity of the solutions and Market share of the technology	5	
2	**Hardware, Software, Service Technical Requirements compliance and Certificate of accreditation**	**45**	

	▪ Detail technical requirements compliance of equipment and materials **(10 Point)** ▪ Software and service compliance **(10 Points)** ▪ Interoperability Compliance, Accredited third party certifications **(5 points)** **(It is turnkey solution. Bidders are expected to ensure that "List of Goods and related Services" are comprehensive and complete)** **Important Note:** ▪ Falling to do so will result in rejection from the bid	25	

	High level design of facilities completeness and clarity: ▪ Electrical System (Generator, PDU, Grounding, Lightening, Cabling) ▪ Raised Floor, cladding, false ceiling ▪ Fire detection, alarm and suppression system ▪ Cooling system ▪ DCIM system ▪ Rack layout and containment system ▪ Access Control and surveillance system ▪ Environment details for interior design including glass partitions, walls, ceiling, lightning ▪ Network Operation Center ▪ Core Networking design(UTM, Core switch, storage, server , consolidation and virtualization etc) Important Note: ▪ Schematic drawings and designs of infrastructure and facilities should be attached	20	
3	**Project Implementation/ Deployment Plan**	**15**	
	Team structure and Responsibility matrix	3	
	Reporting arrangement, Delivery schedule, Scheduling of implementation/deployment of activities and Clarity of time frame and Change control procedures and risk management procedures	5	

	Qualifications and Experience of technical Experts: ▪ Project Manager: Highly skilled in project management and experienced data center implementation Important Note: ▪ attach relevant certificates of technical experts	5	
	▪ Minimum of 7 technical engineers, highly skilled and experienced in data center implementation	2	
4	**Knowledge transfer and experience sharing**	**15**	
	▪ International trainings and relevant certifications on major facilities	7	
	▪ provide the detailed schedule and location of training center	5	
	▪ Onsite training, provide the detailed training subjects and schedule	3	
5	**Support and warranty**	**5**	
	Post deployment executions : 3-years warranty (Replace or repair) and 3 –years support after acceptance N.B. If the manufacture default warranty is more than two years, the default manufacturer warranty shall be considered.	5	
6	**Must Meet Criteria**		
	Tender Specific Manufacturer Authorization Form (MAF). MAF and collaboration shall be subjected to confirmation by the manufacture for all major hardware and software.		**Mandatory**
	Datasheet		**Mandatory**
	Compliance table		**Mandatory**

	BoQ without Price in your technical Document	**Mandatory**
	Site Survey	**Mandatory**

Important note:

- **As the project is on turnkey basis, partial offer will be automatically rejected**
- *Show* **case visits and demonstrations will be part of technical capacity evaluations**
- *Standardized and state of the art implementation will never be compromised*
- *Samples of cladding, ceiling, access floor materials, bricks etc. shall be subjected to tensile strength testing at the University research materials testing center. If materials fail tests, it is subjected to automatic rejection*
- *Equipment and materials must be data center designed. Third party accreditation such as Gartner or equivalent will be considered*

Total	**100**	

- *The contractor shall be responsible for providing all necessary types and quantity of connectors, cabling, documentation, user and administrator manuals and others accessories necessary for implementation in CEICT Data Center, in general all accessories and required items.*