

```
public interface IGUIFactory {  
    public IButton createButton();  
}  
  
public class WinFactory implements IGUIFactory {  
    @Override  
    public IButton createButton() {  
        return new WinButton();  
    }  
}  
  
public class OSXFactory implements IGUIFactory {  
    @Override  
    public IButton createButton() {  
        return new OSXButton();  
    }  
}  
  
public class WinButton implements IButton {  
    @Override  
    public void paint() {  
        System.out.println("WinButton");  
    }  
}  
  
public class OSXButton implements IButton {  
    @Override  
    public void paint() {  
        System.out.println("OSXButton");  
    }  
}  
  
public class Main {  
    public static void main(String[] args) {  
        IFactory factory = new WinFactory();  
        IButton button = factory.createButton();  
        button.paint();  
    }  
}  
  
// THIS IS JUST FOR THE EXAMPLE  
// WITH ABSTRACT FACTORY  
@return  
public static String appearance() {  
    final String[] appearance = {"Win", "OSX"};  
    appearanceArray = appearance;  
    appearanceArray = appearance;  
    appearanceArray = appearance;  
    final java.util.Random random = new java.util.Random();  
    final int randomIndex = random.nextInt(appearanceArray.length);  
    return appearanceArray[randomIndex];  
}
```

# Standard Hardware Specifications

(On cloud & On premise)

v1.0

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Vendors must comply with instructions (page 6 to 18)

على المورد الالتزام بالتعليمات في الصفحات من 6 إلى 18

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## Instructions:

This document contains the NIC approved specifications for On-cloud & On-Premise sites and office equipment.

### In using this document, you must note the following:

1. Individual device **specifications are not complete** without the General requirements.
2. Specifications are **Minimum of requirements only**. For complete solutions, bidders must ensure proposed equipment also satisfies the requirements of the complete solution.
3. As may be required by some projects, individual compiling RFPs **may add some requirements** such as **more RAM, faster processors, more storage**...etc.
4. Items marked '**TBS**' (To Be Specified) at the end of a spec sheet signify optional specifications which should be addressed by an RFP. Where RFP does not specify a particular choice, it is the bidder's responsibility to enquire as to which selection is needed; Otherwise bidder may be liable to supply highest cost option at the presented cost.
5. Comments or suggestions **to improve future versions of this document only** may be sent to **SPECS@NIC.GOV.SA**. All official communication with regard to bids or contracts must be presented to the appropriate department as per main RFP requirements.
6. **This document is NOT specific to any one project or RFP. It may contain specifications for items not requested by some projects. It is meant to be a generic document for reference use by all projects. Specific details of which items are required should be included in the main body of the project/RFP document.**
7. This document is updated periodically. It shall be the responsibility of the bidder to verify that they have a latest version of the document.

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## General requirements

### A. New Manufacturer Supported Products

- All products must be new, not re-furnished or re-manufactured. When requested, Vendors must immediately present Original Manufacturer (or agent) certification to this effect.
- Vendor must submit a formal letter, to NIC from the original manufacturer / company, that shows that the manufacturer / company will support the hardware / machines, that will be delivered as part of the vendor's contract, for the whole period of the Contract.
- Where communication hardware is being proposed, the vendor must procure & deliver the equipment through "Gold Partner" agent / representative".

### B. Labeling and Naming Convention:

- Where installation is required at NIC Sites, all devices must be labeled in accordance with the "Naming Convention for Devices at NIC" attached to this document.

### C. Power

- All equipment delivered, unless otherwise specified, shall be capable of operating normally when supplied with AC power within the range of 230-400 V with a frequency of 60 Hz  $\pm$  1 %, inclusive, and should be protected from over-voltage, overheating and out-of-tolerance current surges. Voltage switching should be automatic if possible. And all cables must be American "NEMA 5-15P", SASO (SAUDI STANDARD) and NEC (NATIONAL ELECTRICAL CODE) compatible.

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#### D. Environmental Conditions

- Unless otherwise determined, equipment shall meet all operational performance specifications while subjected to the following Minimum of conditions:
- Air Temperatures (Storage) : -5 to 50 degrees Centigrade.
- (Operating) : 10 to 40 degrees Centigrade.
- Relative Humidity (Storage) : 5 to 90 percent (non-condensing)
- (Operating) : 20 to 80 percent (non-condensing).

#### E. Additional requirements

1. All Hardware must be compliant with relevant C E Mark standard(s) or equivalent SASO, UL, or FCC standard(s).
2. All Hardware and software must be compatible with Windows (10 or later versions.) and all necessary drivers must be included.
3. **Each equipment's (server, switch, router, blade server..., etc.) should have 2 power supply active: active.**
4. **Dual power supply: Each cabinet must be having 2 power supply to feeding it from 2 different source.**
5. All necessary consumables, cables, connectors, interface cards...etc must be included.
6. Bidder must be ready upon request from NIC, to provide samples of ALL proposed equipment for testing and evaluation within FIVE days of bid presentation.
7. Bidder must provide original manuals, catalogs, and specs sheets along with the bid.
8. Bidder must make available a qualified technician for assistance during the testing of the sample equipment.
9. Bidder MUST identify and quote for any consumables necessary for proper operation of equipment.
10. Bidder MUST identify and clarify any special operating conditions and requirements for proper operation of equipment.
11. At discretion of NIC as represented by sector making their RFP documents, contractor must deliver all equipment to NIC (National Information Center) fully assembled or assembled on site.
12. If delivered to NIC, once NIC has tested\accepted equipment, contractor shall deliver and install all equipment at NIC sites under the supervision of NIC staff.

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13. For SFPs and modules must be from original vendor of device itself.

#### F. General Printer Requirements:

Where applicable, depending on type of printer (paper, plastic card) all delivered printers must meet the following Minimum of specifications:

1. Prints from all windows applications using English, Arabic, or graphics.
2. Printer shall print on the following media types: Paper (copier, recycled, glossy, coated, laser), labels, envelops, transparencies.
3. Must be able to handle sheets of varying thicknesses. Bidder must specify Minimum of and Maximum total thickness allowed by the printer.
4. Printer shall not cause deformation to the printed Document.
5. Printer should come with a status indicator panel to aid problem determination.
6. Desktop size and operates under normal office temperature and environment.
7. Bidder shall supply any printer drivers required for the printing of textual data and photographic images.
8. Preference will be given to printers that detect low toner levels and NOT ALLOW low quality or faded printing.
9. Bidder must supply detailed specifications of the proposed Printers, such as special operating conditions, print quality, print resolution, printer memory, print time and statistics of mean-time-between-failures and mean-time-to-repair etc.
10. The chemical characteristics of the printing should be in accordance to ISO 7501.
11. The printer and its consumables must be fully developed products.
12. Printer consumables MUST NOT include any liquids or difficult to handle items. Toner cartridges must be easy to replace by individuals with minimal training.
13. Printer shall not produce toxic hazards, nor shall it produce a document, which presents a toxic hazard. (Toxicity defined in ISO 7810).
14. Printed image must conform to exact and narrow edge tolerances.
15. The Print Contrast Signal (PCS) must conform to ISO 1831-1980, such that  $PCS/min \geq 0.6$  at the B900 spectral band.

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16. Inks and chemicals used must produce an image that remains readable and resist deterioration from exposure to light during normal use (see ISO 7810).
17. Long periods between consumable changes.
18. The Bidder shall specify the type, state the nature and cost of printing material and other consumables required for the printer.
19. The bidder must identify and justify the need for any proprietary consumables.
20. Consumable specifications must be declared, and other sources for consumables must be identified. Consumables sufficient for one year of operation must be included separately in the proposal.

#### G. Warranty:

The Bidder shall provide a product warranty that includes all deliverable components. The Contractor shall guarantee all equipment, software and work activities contained in the contract against all faults during the entire warranty period.

1. The Contractor shall commit to the following warranty terms (individual devices may have additional warranty details as required).
2. The duration of this warranty shall be three **(3) years from final acceptance**. Unless clearly specified in the contract, OEM warrantee providing less coverage shall not be accepted.
3. OEM warrantee may have additional rights which are not relinquished by these requirements.
4. The warranty shall include the repair or replacement of the unit(s) during the warranty period by the Contractor. The replacement unit(s) shall meet the related specifications without further repair or modification.
5. The Contractor shall be liable for all costs including, but not limited to, the costs of material, labor, travel, transport and living expenses associated with the collection and return of the units covered by the warranty.
6. The date of manufacture or assembly of any equipment, parts or consumables, shall not be more than six months before delivery.
7. The Bidder shall state the location of his repair center(s) for all items not being repaired onsite.
8. NIC has the right to require a replacement if the repair is deemed to be impractical.

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9. If NIC or its representative reports faults to the Contractor for correction, the Contractor shall perform corrective action with all possible speed. **If the faults do NOT affect the availability and reliability of the system as defined by MOI** they must be rectified within a maximum 10 days after the fault is initially reported). If the faults are not corrected within this period, NIC may proceed to do the work at the Contractor's risk and expense, but without prejudice to any other rights NIC may have against the Contractor with respect to the failure of the Contractor to rectify such faults. All critical faults that cause a partial or complete work stoppage must be rectified IMMEDIATELY.
10. Contractor shall make replacement components available for any failed component during the warranty period.
11. Should service be interrupted during this warranty period, due to failure of the product, the Contractor shall extend the warranty period at no cost to NIC for a period equal to the period of interruption of service.
12. The Contractor shall guarantee the availability of spare parts and technical assistance for all components (or appropriate alternatives) to ensure the product runs for at least ten (10) years, without major changes, at the completion of final acceptance. Six months advance notice is required on any discontinued part(s) with a suggestion for alternatives.
13. All hard disks should be fixed at NIC location if possible, if can't be fixed it should be replaced and NIC will keep the damaged ones.

#### H. LAN Cabling Specifications:

The Structured Cabling Distribution System design will be based on the requirements and facilities drawings, which will be supplied to the Bidder. The Bidder, with permission, shall have an opportunity to walk through the premises prior to submission of the proposal if necessary.

The Horizontal Cable architecture is to be based on Category 6 (CAT 6) 4-pair copper system and runs should not exceed 90 meters. A Fiber-optic can be used as necessary to connect communications closets (for multiple floors/buildings).

Number of frames, outlets, and other LAN infrastructure components must be designed for at least 15% spare capacity per area.

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#### I. Distribution Frames:

Contractor will design, procure and install all required Distribution Frames. The cross-connect patch field shall be mounted in the available cabinets. More cabinets may be installed as needed.

Distribution Frames will be located on each floor in an Interconnect Distribution Frame (IDF) to ensure horizontal cable runs do not exceed 90 meters. The IDF shall house the data distribution equipment, fiber terminations of the riser cable and the horizontal cables associated with the Information Outlet's (IO's) assigned to that floor. Each IDF shall be connected to a Main Distribution Frame (MDF) via the intra-building fiber backbone. All patch panels should be modular.

Each floor should be designed to house one equipment room. Each equipment room should be located so that the maximum horizontal cable distance between closets, and the farthest IO, is limited to 90 meters or less as specified in ETA/TIA 568 A and the appropriate clauses of ISO DIS 11801. Due to the possible variations in designs, contractor must identify and recommend any changes in the layout of wiring closets that best utilize the recommended implementation.

#### J. Information Outlets (IO's):

14. Must have high performance Cat-6 socket(s) 4-pair modular RJ-45 interface(s).
15. Must be mounted in existing floor distribution boxes in 45-degree faceplates.
16. Each IO may be cabled with one, two or three (4-pair) Unshielded Twisted Pair (UTP), high speed Cat-6 cable.

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#### K. Installation Methodology, Documentation, Quality, & Standards:

1. EIA/TIA 568A and the ISO 11801 shall be considered as Minimum of performance specifications. Special consideration shall be given to higher performing cables in terms of Near End Cross talk.
2. The system will be based on open distribution architecture so that existing equipment and facilities, as well as future equipment for multiple vendors, can be supported by the proposed system.
3. The cabling system must support the high-speed data at any of the work areas and must support transmission of various protocols and LAN standards.
4. All system products and components shall be from a well-known manufacturer. Proposal should include manufacturer name and country where products were made.
5. Materials and equipment shall be the standard products of a manufacturer regularly engaged in the manufacture of structured cabling products and not custom designed especially for this project.
6. All systems and components shall have been thoroughly tested and proven in actual use/function for at least 1 year prior to proposal.
7. Under no circumstances shall a contractor permit any horizontal UTP cable run to contain more than 3 cm of untwisted wire. This includes the sum of the untwisting from both the cable terminations at the patch panel and the I/O socket. Manual re-twisting of wire is not permitted. Under no circumstances shall splices of UTP Cable be permitted.
8. Upon completion of the installation, the contractor will furnish a complete set documentation including, but not limited to, Backbone (riser) & horizontal diagrams, Technical description, labeling, color coding, and as-built drawings on proper papers showing cable routes and termination points based on preliminary drawings provided.
9. All equipment will be mounted in the available Communication Cabinets in each IDF and Communication Cabinets in MDF. Sufficient space shall be provided to allow the installation of active components. All Cabinets must include front glass door, solid doors to the rear & with key set (and a master key set for all delivered Cabinets), power strip and ventilation fan set.
10. Installation of all cables, patch cords, patch panels, IO's, and Comm. Cabinets shall be in accordance with applicable sections of the current edition of the applicable local codes for signaling systems, specifically EIA/TIA 568 B.

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**TBS:** تعني يجب تحديدها من قبل كاتب الوثيقة. فإن لم يتم تحديدها فعلى المقاول الاستفسار عنها وإلا سيكون مسئولاً عن توريد أفضل الخيارات بالسعر المقدم في العرض

Vendors must comply with instructions (page 6 to 18)

على المورد الالتزام بالتعليمات في الصفحات من 6 إلى 18



11. All wiring that is exposed to potential electrical hazardous voltages and currents must be protected with the appropriate heat coils and sneak current protection as prescribed in the appropriate electrical code for Saudi Arabia. In addition, the contractor must comply with all regulations set forth by the US National Electrical Code (NEC) Article 250. Cables shall not be installed in the same cable tray, riser or floor trench compartment with AC power.
12. All cables not installed in conduit, floor trenches or raceways shall be properly secured and neat in appearance.
13. Cables shall not be stressed such that twisting, stretching or kinking occurs.
14. Cable shall not run through structural members or in contact with pipes, ducts or other potentially damaging items.
15. Cables shall be terminated; no cable shall contain un-terminated elements.
16. As a Minimum of , each IO shall be labeled as to its function and a unique number to identify the cable link.
17. UTP and fiber optic cables shall have a Minimum of 6 inches of slack cable loosely coiled into the outlet boxes. Minimum of manufactures bend radius for each type of cable shall not be exceeded.
18. Patch Panels shall be modular and mounted in equipment racks with sufficient modular jacks to accommodate the installed cable plant. It is recommended that cable guides shall be provided above and below each panel.

#### L. Testing:

17. Contractor must submit an outline of the recommended test criteria prior to the installation of the cable system with a complete detailed acceptance test procedure covering the proposed Structured Cabling Distribution System.
18. Contractor must test for grounds, shorts, crosses and reverses, attenuation measurements for signal loss, Optical Time Domain Reflecto-meter test etc.
19. Each circuit leg and complete circuit shall be tested for insertion loss at 650 and 1300 mm using a light source similar to that used for the intended communications equipment. High-resolution optical time domain Reflecto-meter tests shall be performed for one end of each fiber. Scale of the OTDR trace shall be such that the entire circuit appears over a Minimum of 80 percent of the X-axis.
20. When measurement is made on Category 5e links by suitable Tester, the following measurements must be performed:
21. Wire map, PSNEXT, Length, FEXT, Delay, ELFEXT, Delay Skew, PSELFEXT, Attenuation, Return loss, NEXT.

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على المورد الالتزام بالتعليمات في الصفحات من 6 إلى 18

22. Contractor must give printed reports showing that ALL nodes have passed all required tests. Then a randomly selected 20% of nodes shall be tested with NIC representatives to verify the above reports.

#### M. Cabling Warranty:

For the cabling, the contractor will offer a **Minimum of a 15-year product warranty for all passive components and a 15-year warranty for systems assurance**. Contractor will provide a clear definition of the benefits of such a warranty. All associated paperwork, including a copy of the registration document and certificates, must be provided.

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على المورد الالتزام بالتعليمات في الصفحات من 6 إلى 18

## N. Label Scheme:

A) UTP Part: -

The UTP part is divided into two parts: -

Part 1) Cabinet Area (wiring Closet):-

The cabinet label for Building should be written as: -

(Building Name - Floor# - Area name)

Building Name: -

To follow the protocol below: -

Building Name	Code of Building	Note
Admin Building	A	
Research Building	R	
Training Building	T	
Computer Building	C	

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على المورد الالتزام بالتعليمات في الصفحات من 6 إلى 18

Floor# : -

To follow the protocol below:-

Floor Name	Code of floor (Floor #)	Note
Ground	0	
First	1	
Second	2	
Third	3	
Fourth	4	
Fifth	5	
Sixth	6	
Basement	99	

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**Vendors must comply with instructions ( page 6 to 18 )** على المورد الالتزام بالتعليمات في الصفحات من 6 إلى 18

Area Name: -

Use Capital Letters (A, B, C.) for are name (see example below).

No.	Status	Cabinets label
1	One cabinet in Ground floor, Computer Building	C0A
2	One cabinet in First floor, Admin Building	A1A
3	Two cabinet in Second floor, Admin Building	A2A,A2B

Part 2) Node Area (Work Area): -

The labeling scheme for Node Area is: -

(Cabinet Label - Patch Panel Number – Port Number)

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على المورد الالتزام بالتعليمات في الصفحات من 6 إلى 18

Cabinet Label: -

As in UTP (Part 1) above (Building Name - Floor # - Area Name).

Patch Panel Number: -

Each PATCHMAX Panel in cabinet to be numbered as follows:-

Patch Panel	Patch Panel Code	Place
PATCHMAX 1	I	Bottom of Cabinet
PATCHMAX 2	II	Over PATCHMAX 1
PATCHMAX 3	III	Over PATCHMAX 2
PATCHMAX 4	IV	Over PATCHMAX 3
PATCHMAX 5	V	Over PATCHMAX 4
PATCHMAX 6	VI	Over PATCHMAX 5
PATCHMAX 7	VII	Over PATCHMAX 6

Port Number: -

It is the port number in the PATCHMAX Panel. The ranges will be 1 to 24.

## Notes for UTP Labels: -

Yellow numbered labels should be used in terminated cables in PATCHMAX Panel.

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 Vendors must comply with instructions ( page 6 to 18 ) على المورد الالتزام بالتعليمات في الصفحات من 6 إلى 18

Black Labels should be used for numbering PATCHMAX panel. Labels should be placed in the bottom right corner of the PATCHMAX Panel and nodes.

Transparent tape should be used to fix black labels onto the cabinets and or nodes.

B) Fiber Part: -

The outdoor fiber and the indoor fiber cables label should be written as: -

(Source Cabinet Name Label – Destination Cabinet Name Label)

Source Cabinet Name Label: -

As in UTP (Part 1) above (Building Name - Floor # - Area Name).

Destination Cabinet Name Label: -

As in UTP (Part 1) above (Building Name - Floor # - Area Name).

## Note for Fiber Cables: -

Black Labels should be used for numbering the PATCHMAX Opti-SPEED panel. Labels should be placed in the bottom of the Distribution Module in Panel.

This label scheme certified from Lucent Technologies.

### O. LAN Cabling Specifications:

The Structured Cabling Distribution System design will be based on the requirements and facilities drawings, which will be supplied to the Bidder. The Bidder, with permission, shall have an opportunity to walk through the premises prior to submission of the proposal if necessary.

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Vendors must comply with instructions (page 6 to 18)

على المورد الالتزام بالتعليمات في الصفحات من 6 إلى 18



# 1. PCs

## 1.1. All in One

<b>Must be a brand name product.</b>	
<b>1. Hardware architecture</b>	
1.1	Minimum Intel® 9th generation Intel® Core™ i7-9700 or above. Optional AMD processors with equivalent performance & features are acceptable
1.2	Intel Q370 Chipset or Higher
1.3	Minimum 256GB SSD
1.4	Minimum 500 GB 7200 rpm SATA OR 256GB SSD
1.5	8x Slim line DVD+/-RW.
1.6	Original Diagnostics and Drivers DVD included with each Box.
<b>2. Performance Requirement</b>	
2.1	At least 85% Efficient Power supply.
2.2	Minimum Integrated Intel® UHD Graphics 630; supports optional discrete graphics solutions from AMD and nVidia
<b>3. Features</b>	
3.1	TBS: A genuine pre-loaded Microsoft® Windows 10 Professional 64 Bit OEM License from factory. Will be verified by Microsoft Saudi before Hardware Acceptance.(Drop if enterprise license exists such as at NIC).
3.2	TBS: At least 1 USB 3.1 port Gen 2 Type-C; 4 USB 3.1 Type-A ; 1RJ45; 1 Display Port; 1UAJ; 1 Line-Out; 1 HDMI.
3.3	USB 2.0, Display Port or HDMI, 1RJ-45 , Mic & Audio out, Internal Speaker.
3.4	English/Arabic (QWERTY) Wireless Keyboard and mouse of same brand as computer.
3.5	Integrated Ethernet LAN 10/100/1000, Support WiFi, Bluetooth.

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Vendors must comply with instructions (page 6 to 18)

على المورد الالتزام بالتعليمات في الصفحات من 6 إلى 18

3.6	TBS: 27" Wide Viewing Angle Touch screen, Full HD 1920x 1080 resolution with anti-glare coating with Height Adjustable Stand
3.7	Integrated 2.0MP FHD webcam
<b>4. Security</b>	
4.1	TBS: Antivirus program preloaded. (Drop if enterprise license exists such as at NIC).
4.2	Support Trusted Platform Module (TPM) 2.0
<b>5. Warranty</b>	
5.1	Three years Next Business Day on-site warranty upgrade including HW, SW and 24x7 access to manufacturer support center (3-3-3).
5.2	Three years warranty on-Site service.

**TBS: To Be S**pecified in RFP. If not specified, bidder must ascertain selection or be liable for highest cost option at bid price.  
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Vendors must comply with instructions ( page 6 to 18 )

على المورد الالتزام بالتعليمات في الصفحات من 6 إلى 18

## 1.2. Desktop Computer Specifications

Must be a brand name product.		Category			
		Low	Mid	High	Developer
<b>1. Hardware architecture</b>					
1.1	TBS: Minimum Of Intel® [insert chosen category value] or above. Optional AMD processors with equivalent performance & features are acceptable.	9th generation of Intel® Core™ i3-9100	9th generation of Intel® Core™ i5-9600	9th generation of Intel® Core™ i7-9700	Xeon® Bronze 3106 (1.7 GHz, 11 MB cache, 8 cores) with vPro™ Technology
1.2	Integrated Raid card supports RAID 0/1/5/10.	X	X	X	√
1.3	TBS: Minimum of [insert chosen category value] DDR4	8GB RAM (1x 8GB) 2666MHz	8GB RAM (1x 8GB) 2666MHz	16GB RAM (1x16GB) 2666MHz	32GB(2x16GB)
1.4	TBS: Minimum of [insert chosen category value].	500GB SATA III (7.200 RPM) OR 128GB SSD	500GB SATA III (7.200 RPM) OR 256GB SSD	1TB SATA III (7.200 RPM) OR 512GB SSD	1TB HDD OR SSD
1.5	TBS: Minimum of (8X DVD/±RW)				
1.6	Original Diagnostics and Drivers DVD included with each Box.				
<b>2. Performance Requirements</b>					
2.1	At least 85% Efficient Power supply.				
2.2	[insert chosen category value].	Minimum Integrated Intel® UHD Graphics 630; supports optional discrete graphics solutions from AMD and nVidia			Graphics NVIDIA® Quadro® P4000 (4 GB)
<b>3. Features</b>					
		Low	Mid	High	Developer

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على المورد الالتزام بالتعليمات في الصفحات من 6 إلى 18

3.1	TBS: A genuine pre-loaded Microsoft® Windows 10 Professional 64 Bit OEM License from factory. Will be verified by Microsoft Saudi before Hardware Acceptance.(Drop if enterprise license exists such as at NIC).				
3.2	TBS: At least 1 USB 3.1 port Gen 2 Type-C; 4 USB 3.1 Type-A ; 3 USB 2.0 ; 1RJ45; 1VGA;1 serial; 2 Display Port; 2 PS/2; 1 UAJ; 1 Line-Out; 1 HDMI.	+ 2 Internal USB 2.0			
3.3	TBS: Minimum of 23" LED monitor, VGA, DVI-D, DP (1920x1080) (same brand as PC).				
3.4	Integrated Gigabit Ethernet LAN 10/100/1000 .				
3.5	Support Anti Intrusion chassis switch and security lock slot available.				
3.6	Mini tower Chassis.				
3.7	Optic Mouse and Mouse pad. Keyboard, Mouse, and BIOS of same brand as PC.				
3.8	TBS: At least <span style="color: red;">[insert chosen category value]</span> .	One PCI and One PCIe x16 ports			2 PCIe x16 Slots,1 PCIe x1Slot ,1 PCI Slot
3.9	Supports PCI Express Generation 3.	X	X	√	√
3.11	Supports boot from USB.	X	X	X	√
3.12	Support SSD Hard drive.	√	√	√	X
<b>4. Security</b>		<b>Low</b>	<b>Mid</b>	<b>High</b>	<b>Developer</b>
4.1	TBS: Antivirus program preloaded. (Drop if enterprise license exists such as at NIC).				
4.2	Support Trusted Platform Module (TPM) 2.0				
<b>5. Warranty</b>		<b>Low</b>	<b>Mid</b>	<b>High</b>	<b>Developer</b>
5.1	Three years Next Business Day on-site warranty upgrade including HW, SW and 24x7 access to manufacturer support center (3-3-3).				
5.2	Three years warranty on-Site service.				

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على المورد الالتزام بالتعليمات في الصفحات من 6 إلى 18

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**Vendors must comply with instructions ( page 6 to 18 )** على المورد الالتزام بالتعليمات في الصفحات من 6 إلى 18

### 1.3. Notebook

Must be a brand name product.		Category		
		Low	Mid	High
<b>1. Hardware architecture</b>				
1.1	TBS: Minimum Intel® 9th generation [insert chosen category value] or above. Optional AMD processors with equivalent performance & features are acceptable.	Intel® Core™ i5	Intel® Core™ i7	Intel® Core™ i9
1.2	TBS: Minimum of [insert chosen category value].	8GB RAM (1x 8GB) 2666MHz DDR4	16GB RAM (1x 16GB) 2666MHz DDR4	32GB RAM (1x 32GB) 2666MHz DDR4-SDRAM
1.3	TBS: Minimum of [insert chosen category value] SSD.	256GB	500GB	1000GB
1.4	TBS: Optional: Minimum of (8X DVD±RW).			
1.5	Original Diagnostics and Drivers DVD included with each Box.			
<b>2. Performance Requirements</b>				
2.1	TBS: At least 13hr battery.			
2.2	TBS: Minimum Integrated Intel® UHD Graphics 630; supports optional discrete graphics solutions from AMD and nVidia .			
<b>3. Features</b>				
3.1	TBS: A genuine pre-loaded Microsoft® Windows 10 Professional 64 Bit OEM License from factory. Will be verified by Microsoft Saudi before Hardware Acceptance. (Drop if enterprise license exists such as at NIC).			
3.2	TBS: At least 1 USB-C; 2 USB-A; HDMI; RJ-45.(Optional: memory card reader).			
3.3	14" FHD (1920X1080). (optional: Touch screen display).			
3.4	Integrated Gigabit Ethernet 10/100/1000, Bluetooth® 5.0, Wireless card.			
3.5	87/88 key, full size, spill resistant Arabic/English keyboard with arrow keys.			
3.6	Touch pad pointer on palm rest.			

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Vendors must comply with instructions (page 6 to 18)

على المورد الالتزام بالتعليمات في الصفحات من 6 إلى 18

3.7	High quality speakers, Stereo headphone/Microphone.			
3.8	TBS: Optional: HD video webcam.			
3.9	Universal (230/400 auto switching) AC Power Adapter.			
3.10	Must include Nylon carrying case same brand as manufacturer.			
3.11	TBS: Optional: integrated LTE/HSPA+ Mobile Broadband.			
<b>4. Security</b>				
4.1	TBS: Antivirus program preloaded. (Drop if enterprise license exists such as at NIC).			
4.2	Support Trusted Platform Module (TPM) 2.0			
<b>5. Warranty</b>				
5.1	Three years Next Business Day on-site warranty upgrade including HW, SW and 24x7 access to manufacturer support center (3-3-3).			
5.2	Three years warranty on-Site service.			

#### 1.4. RUGGEDIZED Notebooks

<b>Must meet NIC General HW requirements plus the following Minimum of requirements</b>				
<b>1. Hardware architecture</b>		<b>Low</b>	<b>Mid</b>	<b>High</b>
1.1	Minimum of Intel® 8th generation. Optional AMD processors with equivalent performance & features are acceptable	Intel®8th generation		
1.2	TBS: Minimum of [insert chosen category value].	8GB DDR3L RAM at 1600MHz		
1.3	TBS: Minimum of [insert chosen category value] SSD.	256 GB		
1.4	TBS: Integrated Intel® HD Graphics 515			
1.5	Wireless card 802.11 a/b/g/n with Bluetooth 4.0, EVDO,GSM, EDGE, UMTS.			
1.6	Steel-reinforced Cable Lock Slot, Media Module and Hard Drive locks			
1.7	MULTI DVD WRITER MINIMUM OF (16X DVD+/-RW).			

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على المورد الالتزام بالتعليمات في الصفحات من 6 إلى 18



1.8	Integrated Ethernet LAN 10/100/1000
1.9	12.1" or Bigger WXGA (1280x800) Outdoor View able Touch Screen LED OR 14" HD (1366x768) Anti-Glare LED OR 14" HD+ (1600x900) Anti-Glare LED .
1.10	Integrated Mobile Broadband 3G/4G Tri-band HSDPA & GPS & GPRS adapter with at least 2 integrated broadband antennas.
1.11	TBS: External& Internal Antenna for GPS.
1.12	87/88 keys, full size, spill resistant Arabic/English keyboard with arrow keys(Automatic Back Light to auto illuminate in dark environments).
1.13	Touch pad pointer on palm rest.
1.14	At Least 85 WHr 9 Cell "Smart" Lithium Ion battery featuring Express Charge. Bidder must supply battery life information.
1.15	Additional 9 Cell Battery Slice.
1.16	charging through the battery of the vehicle and also the possible link to solar cells.
1.17	High Definition Audio codec speaker, 2.0W with integrated omni-directional microphone and two speakers.
1.18	One Type VII PCMCIA or ExpressCard/54, 5-in-1 card reader.
1.19	Ports: IEEE-1394, docking connector, 4 USB 3.0 (at least one eSATA port, One USB PowerShare), and headphone/speaker out.
1.20	Display TV output port supporting HDMI & DVI connections via adapters.
1.21	Integrated Smart Card reader.
1.22	Trusted Platform Module (TPM).
1.23	w eight of no more than 5 kg.
1.24	12.1" or Bigger WXGA (1280x800) Outdoor View able Touch Screen LED OR 14" HD (1366x768) Anti-Glare LED OR 14" HD+ (1600x900) Anti-Glare LED .
<b>2. Warranty</b>	
2.1	Three years warranty on Site service.
2.2	Three years Next Business Day on-site warranty upgrade including HW, SW and 24x7 access to manufacturer support center (3-3-3).
2.3	Three-year warranty on-Site service.

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على المورد الالتزام بالتعليمات في الصفحات من 6 إلى 18

## 2. Mobile Device

### 2.1. Mobiles Device for Basher System

Must be a brand name product	
1. Hardware architecture	
1.1	Back Camera: LED Flash 5MP at least.
1.2	Touch Screen: 5 inch at least.
1.3	Ram: 2G at least. CPU dual core 1 GHz
1.4	Memory: 16G at least.
1.5	SIM card only, Wi-Fi must be disabled.
1.6	GPS: A-GPS support and GLONASS.
1.7	Support of secured storage area.
1.8	Support for fingerprint login.
1.9	Application Locks.
1.1	Maintained by Application Store and Messaging System
1.11	Support Android OS.
1.12	Device Metadata must be numeric.
1.13	Support MDM Solution.
1.14	Back Camera: LED Flash 5MP at least.
1.15	Touch Screen: 5 inch at least.
1.16	Ram: 2G at least. CPU dual core 1 GHz

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Vendors must comply with instructions ( page 6 to 18 )

على المورد الالتزام بالتعليمات في الصفحات من 6 إلى 18

## 2. Warranty

2.1	3 Years full warranty
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### 2.2. Banan Mobile Device

<b>Must be a brand name product.</b>		
<b>1. Hardware architecture</b>		
1.1	CPU	Octa-core (4x2.4 GHz Cortex-A73 & 4x1.8 GHz cortex-A53)
1.2	Memory	Memory: 4 GB
1.3	Hard drive	Hard drive: 32 GB
1.4	Ports	32* 10G port (via breakout) or 8* 40G ports
1.5	Ports	4* 100G ports
<b>2. Features</b>		
2.1	<b>Display:</b> IPS-NEO LCD capacitive touchscreen, 16M colors, 1080 x 1920 pixels, 16:9 ratio (~432 ppi density).	
2.2	<b>Camera:</b> Rear: 12 MP, Front: 8 MP.	
2.3	<b>WLAN:</b> Wi-Fi 802.11 a/b/g/n/ac, dual-band, DLNA, WiFi Direct, hotspot.	
2.4	<b>Bluetooth:</b> 4.2, A2DP, LE, aptX.	
2.5	<b>GPS:</b> Yes, with A-GPS, GLONASS, BDS, GALILEO.	
2.6	Support NFC.	
2.7	USB: 2.0, Type-C 1.0	
2.8	<b>Main Battery:</b> 3200 mAh Li-Ion.	
2.9	<b>Secondary Battery:</b> 10000 mAh Li-Ion attached with the device.	
2.10	<b>Fingerprint:</b> 500 PPI resolution, Sensing Area: 0.8" x 1.0" / 20.32 mm x 25.4 mm, FBI PIV FAP 30 CERTIFIED.	
2.11	<b>LED:</b> LED lighting for secondary Battery status, Fingerprint Status (On/Off).	

**TBS: To Be S**pecified in RFP. If not specified, bidder must ascertain selection or be liable for highest cost option at bid price.  
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Vendors must comply with instructions (page 6 to 18)

على المورد الالتزام بالتعليمات في الصفحات من 6 إلى 18

2.12	<b>Switch:</b> Switch On/Off the fingerprint connection.
2.13	<b>Support Bannan Application.</b>
2.14	<b>Framework:</b> FieldBio.
2.15	<b>IP rating IP65m abtu0dystm waterproof, anti-shock.</b>
2.16	<b>Work Time:</b> 24 hours without stop.
2.17	<b>Mobile Detachable:</b> Mobile can be detached/replaced and used as standalone mobile.
2.18	<b>Fingerprint Detachable:</b> Fingerprint FAP30 can be replaced and detached.
	<b>Charging:</b>
	a. Supports Fast Charging.
	b. Dual Charging: Charge mobile and secondary battery in the same time.
2.19	The Device and Fingerprint Capturing can be used and work while charging
<b>3. Warranty</b>	
3.1	3 Years full warranty

### 3. Keyboards

#### 3.1. Numeric Keypad

<b>Must be a brand name product.</b>		
<b>1. Hardware architecture</b>		
	<b>Type of Keyboards</b>	
1.1	<b>Standard keyboard with no additions</b>	
1.2	<b>Wireless Desktop Keyboard &amp; Mouse</b>	<ul style="list-style-type: none"> <li>• 2.4GHz Interface.</li> <li>• USB wireless receiver.</li> <li>• Keyboard And Mouse must be comfortable.</li> <li>• USB wireless receiver.</li> </ul>

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على المورد الالتزام بالتعليمات في الصفحات من 6 إلى 18

		<ul style="list-style-type: none"> <li>• Compatible with Windows 10 or later versions.</li> <li>•</li> </ul>
1.3	<b>Keyboard with integrated Smart Card Reader</b>	<ul style="list-style-type: none"> <li>• High-speed USB interface connected and powered.</li> <li>• Fully Compatible with all ISO 7816 compliant smart cards.</li> <li>• Drop down NOT drag on card contacts.</li> <li>•</li> </ul>
1.4	<b>Keyboard with integrated optical fingerprint scanner. Fingerprint scanner must meet the following specifications</b>	<ul style="list-style-type: none"> <li>• 500 dpi Resolution.</li> <li>• Meet FBI/IAFIS Image Quality Specification EFTS Appendix F (CJIS-RS0010).</li> <li>• Compliant with IAFIS and NIST image standard.</li> <li>• Dynamic Range True 8 bits/pixel = 256 gray levels.</li> <li>• Scan Area 1" x 1".</li> </ul>
1.5	<b>Keyboard with both fingerprint scanner and Smart Card Reader</b>	
1.6	<b>Keyboard with OCR, smart card and e-passport reader and Arabic Engraved lettering with the following specs</b>	<ul style="list-style-type: none"> <li>• High-speed USB base technology.</li> <li>• ICAO conform RFID reading for biometric passports, and conventional travel documents.</li> <li>• Fully integrated ICAO RFID Reader.</li> <li>• Five different data entry devices: e-Passport Reader, Keyboard, OCR, BCR and MSR.</li> <li>• High speed USB.</li> <li>• No additional standalone hardware or power supply is required</li> </ul>
1.7	<b>Keyboard with OCR reader and Arabic engraved lettering with the following specs</b>	<ul style="list-style-type: none"> <li>• USB technology, smart card (RFID).</li> <li>• Minimum desk space.</li> <li>• Bi-directional swipe.</li> <li>• High speed USB.</li> <li>• Four different data entry devices: Keyboard, OCR, BCR and MSR.</li> <li>• "future Proof" modular design</li> <li>• No additional standalone hardware or power supply is required</li> </ul>
1.8	<b>Numeric Keyboard</b>	<ul style="list-style-type: none"> <li>• USB interface connected and powered.</li> <li>• Contains at least 10 number keys and Enter key</li> </ul>
<b>2. Features</b>		
2.1	Arabic / English characters.	
2.2	Must conform to standard Arabic character positioning. E.g. Such that the Arabic character 'د' must be immediately to the left of the QUERTY keyboard number '1'.	

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**Vendors must comply with instructions (page 6 to 18)** على المورد الالتزام بالتعليمات في الصفحات من 6 إلى 18

2.3	Main Battery: 3200 mAh Li-Ion.
<b>3. Warranty</b>	
3.1	3 Years full warranty

### 3.2. Contact Smart Card Reader

<b>Must be a brand name product.</b>	
<b>1. Hardware architecture</b>	
3.1	<p>Supported Standards:</p> <ul style="list-style-type: none"> <li>i. ISO/IEC 7816-1,2,3,4: IC Cards with contacts.</li> <li>ii. EMV Terminal Level 1 version 4.1.</li> <li>iii. Mondex ChipSafe Plus Purse 2 (CT30).</li> <li>iv. Microsoft Windows Hardware Quality - Labs (WHQL), Windows Logo Program WLP 2.0.</li> <li>v. USB 2.0 Full speed certified (USB readers listed on usb.org website).</li> <li>vi. CCID - Chip Card Interface Device 1.1 (USB &amp; ExpressCard readers).</li> </ul>
3.2	<p>Certifications &amp; Standards:</p> <ul style="list-style-type: none"> <li>i. VDE.</li> <li>ii. GS.</li> <li>iii. cRUus.</li> </ul>

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على المورد الالتزام بالتعليمات في الصفحات من 6 إلى 18

- iv. CE.
- v. FCC.
- vi. WHQL.
- vii. EMV 2000 Level

## 2. Features

2.1	Product type is Smart Card Reader and Media Supported Smart Card.
2.2	Supports ISO 7816 Class A, B and C cards (5 V, 3 V, 1.8 V).
2.3	Supports up to TA1=17 (826 Kbps with a 4.8Mhz reader clock) for CT30.
2.4	Supports up to TA1=97 (500 Kbps with a 4Mhz reader clock) for CT510 and CT700.
2.5	Supports up to TA1=96 (340 Kbps with a 4Mhz reader clock) for other readers.
2.6	Reads from and writes to all ISO 7816-1,2,3,4 microprocessor cards, T=0 and T=1 protocols.
2.7	Product type is Smart Card Reader and Media Supported Smart Card.
2.8	Supports ISO 7816 Class A, B and C cards (5 V, 3 V, 1.8 V).
2.9	8 friction contacts - ISO location.
2.10	100,000 insertion cycles.
2.11	EMV Level 1 mechanically compliant.
2.12	Embossed smart cards supported

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على المورد الالتزام بالتعليمات في الصفحات من 6 إلى 18



2.13	100 mA Input current
<b>3. Warranty</b>	
3.1	3 Years full warranty

### 3.3. Contactless Smart Card Reader

<b>Must be a brand name product.</b>	
<b>1. Hardware architecture</b>	
1.1	<p>Smart Card Interface:</p> <ul style="list-style-type: none"> <li>vii. Operating frequency: 15.56 MHz.</li> <li>viii. Baud rate: 106 Kbps to 848 Kbps.</li> <li>ix. Compliant with Mifare and ISO 14443 type A and B, T=CL protocol.</li> <li>x. Reading distance: 0 cm to 10 cm depending on antenna size.</li> <li>xi. Up to 4 SAM contact interfaces, ISO 7816, T=0 and T=1 protocols, 115 Kbps</li> </ul>
<b>2. Features</b>	
2.1	High-level command set.
2.2	Mifare Application Directory (MAD).
2.3	Card insertion / removal detection.
2.4	E-purse command set.

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Vendors must comply with instructions ( page 6 to 18 )

على المورد الالتزام بالتعليمات في الصفحات من 6 إلى 18

2.5	Firmw are dow nload.
2.6	Compliant with ICAO epassports and FIPS 201 / - PIV governmental cards.
2.7	Compliant with PayPass level 1 payment specifications
<b>3. Warranty</b>	
3.1	3 Years full warranty

### 3.4. Dual Capability Smart Card Reader

<b>Must be a brand name product.</b>	
<b>1. Hardware architecture</b>	
1.1	Up-to-date architecture.
1.2	Ability to drive any type of ISO14443-A&B T=CL contactless smart cards.
1.3	Ability to drive any type of MIFARE®contactless smart cards.
1.4	Ability to drive any type of ISO7816 contact smart card or SIMSAM card.
1.5	Support for smart card with a higher baud rate (contact and contactless).
1.6	Standard USB Full speed interface, bus powered (no external power supply required).
1.7	Unique USB serial number, which enables that the device can be plugged into any USB slot on a computer without having to re-install the driver.
1.8	Standard CCID interface for both smart card slot (contact and contactless)
<b>2. Features</b>	
2.1	Easily upgradeable download of the latest features.
2.2	Standard HID interface for device administration.

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على المورد الالتزام بالتعليمات في الصفحات من 6 إلى 18

2.3	No need of a proprietary USB driver. The standard CCID and HID drivers of the computer can be used.
2.4	PC/SC V2.0 compliant.
2.5	Embedded protection against dual interface smart card damage and switch feature to select the active interface (contact or contactless).
<b>3. Warranty</b>	
3.1	3 Years full warranty

## 4. Servers

### 4.1. Blade Server

		Category		
		Low (2 way)	Mid (2 way)	High
1. Hardware architecture & Performance Requirements				
1.1	Minimum of [insert chosen category value].	Two Intel® Xeon® Processor Xeon-Gold 6258R (2.7GHz/28-core/205W) or above		Four Intel® Xeon® Processor Xeon-Platinum 8280L (2.7GHz/28-core/205W)
1.2	Minimum of [insert chosen category value].	Intel® C621 Chipset or higher: Intel Server System R2000WF Family a. AES New Instructions. b. Intel® Hyper-Threading Technology. c. Intel® Virtualization Technology (VT-x) and for Directed I/O (VT-d). d. Intel® Trusted Execution Technology (TXT).		Intel® C602J Chipset or higher: 2nd Generation Intel® Xeon® Scalable Processors a. AES New Instructions. b. Intel® Hyper-Threading Technology. c. Intel® Virtualization Technology (VT-x). d. Intel® Trusted Execution Technology (TXT).

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1.3	Minimum of [insert chosen category value]	1 TB of (16 x 64GB) (Quad Rank x4 DDR4-2933) Registered DIMMs, expandable to 1.5 TB	HPE 128GB (1x128GB) Octal Rank x4 DDR4-2666 CAS-22-19-19 3DS Load Reduced Memory Kit 4.5TB
1.4	Two FC 32Gb Dual Port PCI-e Fiber Channel Host Bus Adapter (If required SAN connectivity)	√	√
1.5	Minimum of [insert chosen category value]	M.2 SATA SSD Option Drives 1.9 TB 2 x 960GBATA M.2 Drives (internal w/ adaptor) RAID 0,RAID 1,RAID 0+1	M.2 SATA SSD Option Drives 1.9 TB 2 x 960GBATA M.2 Drives (internal w/ adaptor)
1.6	Minimum of [insert chosen category value]	X	4 x SFF hot-plug drive bays for SAS, SATA, SAS SDD, SATA SSD, NVMe PCIe SSD, or up to 8 uFF with Smart Drive Carrier adapter Not show n: 4 internal M.2 drives, USB or uSD drives
1.7	One dedicated 1Gb/s port for Servers management.	√	√
1.8	<b>TBS:</b> Minimum of Embedded 4 x10Gb/s Converged network ports that support network virtualization (16 ports) , 3 more slots are available to accommodate more LAN/SAN dual channel converged network adapters for a total bandwidth of 100Gb/s.	√	√
<b>2. Features</b>		<b>Low</b>	<b>Mid</b>
2.1	Additional HBA is required 2 ports to be dedicated for DB backup for DB servers.	√	√

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2.2	Integrated Management card with full management features to support: a. Remote server control. b. Remote servers deployment. c. Remote server power and performance monitor. d. Support unlimited servers migration from X to X (X is physical or Virtual).			
2.3	Installation and startup services to include HW, OS and network configuration.	√	√	√
2.4	Installation and startup services for the servers management SW and integrate this with NIC servers management system.	√	√	√
2.5	Should have 2 power supply active: active.			
2.6	All servers HW components must be integrated at the manufacturer factory.			
2.7	Supports PCI Express Generation 3.	√	√	√
2.8	Form factor: [insert chosen category value].	Half height or single width	Full height or double width	Full height
<b>3. Warranty</b>		<b>Low</b>	<b>Mid</b>	<b>High</b>
3.1	3 years 24x7 support on labor and parts, this warranty should be from the main vendor directly (i.e. Dell, HP, IBM) to cover the following: a. HW and servers management SW. b. 4 hours response time. c. Tool free call center # manned 24x7.			

## 5. Data Center Devices

### 5.1. Rack Cabinet

	<b>Must be a brand name product.</b>
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على المورد الالتزام بالتعليمات في الصفحات من 6 إلى 18

1. Hardware architecture	
1.1	NetShelter SX 42U 750mm Wide x 1070mm Deep Enclosure with Sides Black Perforated from front and back.
1.2	Rack Smart PDU 2G, Metered, ZeroU, 22.0kW(32A), 230V, (30) C13 & (12) C19.
1.3	NetBotz Door Switch Sensors (Two).
1.4	Temperature & Humidity Sensor.
1.5	Modular toolless 1U Airflow Management Blanking Panel to prevent air recirculation by occupying unused rack space.
1.6	Cable Management Rings.
1.7	Vertical Cable Manager for NetShelter SX 750mm Wide 42U (Two).
1.8	Vertical Cable Organizer.
2. Fiber	
2.1	iPatch® G2 LC Fiber Shelf, sliding for splicing .
2.2	PGTAIL,RISR,LS,0.9MM,SPL Singel-mode.
2.3	PGTAIL,RISR,LS,0.9MM,SPL Multi-mode.
2.4	360G2 1U Sliding Modular Cassette Shelf for Pre-Terminated .
2.5	360 360DM-12LC-Singel-mode Module.
2.6	360 360DM-12LC-Multi-mode Module.
3. UTP	
3.1	1100 Evolve Panel, 24 port without modules.
3.2	Cat 6 F/UTP Cable, 4 pair count, 1000 ft (305 m) length.
3.3	Cat 6A F/UTP Cable, 4 pair count, 1000 ft (305 m) length.
3.4	Category 6 U/UTP Information Outlets, white.

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3.5	Faceplate.
<b>4. Warranty</b>	
4.1	3 Years full warranty

## 5.2. Blade Enclosure – Option 1

<b>Must be a brand name product.</b>	
<b>1. Hardware architecture</b>	
1.1	Server blade enclosure should be Scalable design to meet future demands and fits in max 10U.
1.2	3. Enclosure should accommodate up to 12 half height or 6 full height blade servers or mixed blade servers. Servers should support latest Intel/AMD processors, hot-pluggable SAS/SATA/SD Drives and DDR4 Memory DIMMS.
1.3	4. Up to 10 interconnect bays with support high-speed fabrics for any I/O, Ethernet, SAN, InfiniBand and converged Network technology.
1.4	5. Enclosure must Support non-zoned Redundant & Hot Pluggable Power Supply configuration and support N+N with a choice of single or 3 phase (NIC support single power inputs) and View real time thermal data at every level – component in the rack.
1.5	6. Redundant Cooling fans that support the failure of at least one fan.
1.6	Server blade enclosure should be Scalable design to meet future demands and fits in max 10U.
1.7	<p>The enclosure must be populated with 2 redundant interconnect modules that support:</p> <ul style="list-style-type: none"> <li>• 20 Gb/s Converged Ethernet (FCoE) to host the downlinks of the dual channel 20 Gb/s converged adapter LOM (LAN On Motherboard) on the blade server.</li> <li>• Virtualized network.</li> <li>• Servers profile provisioning within and or across the blade enclosures.</li> <li>• 4 uplink that support 1Gb/s, 40GB or 4X 10Gb/s.</li> <li>• 4 uplinks that support 40GB or 4 X 10Gb/s LAN or 8/16/Gb/s SAN.</li> <li>• 4 uplinks that support 40Gb/s LAN</li> <li>• All uplinks ports must be populated with the proper SFP (to be surveyed at the time of order). The winning vendor must coordinate with NIC network admin on the network integration and cabling.</li> </ul>

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2. Features	
2.2	The enclosure should have Integrated KVM.
2.3	Enclosure should support Dynamic Power Supply Engagement functionality, which (if enabled) puts lightly loaded power supplies into standby mode, driving up the utilization and thus the efficiency on the active supplies.
2.4	Must be have 2-power supply to feeding it from 2 different source.
2.5	Front Control Panel with interactive Graphical LCD to monitor and configure the blade enclosure.
2.6	Two USB Keyboard/Mouse connections and one Video connection.
2.7	Redundant Management Controllers supports multiple levels of user roles and permissions, including integration into Microsoft Active Directory Services with 2nd Ethernet port supports daisy chaining of CMCs for improved cable management.
2.8	Enclosure should support FC8 and 10GbE Switches end to end.
2.9	Enclosure Back Plane should not have any active component.
2.1	Enclosure should not have single point of failure.
2.11	16. Enclosure should support high availability with all hot-swappable modular components, including server and I/O modules.
2.12	<p>Blade management SW that support but not limited to the following:</p> <ul style="list-style-type: none"> <li>• Automatic discovery and mapping of new servers.</li> <li>• Classification of server roles and their criticality to the business with associated power policies that enable key business services to stay running in the event of power emergencies.</li> <li>• Automate hardware configuration through OS and application deployment.</li> <li>• Automate updates of firmware and OS components together within a single task.</li> <li>• Template-based virtual machine deployment.</li> </ul>

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على المورد الالتزام بالتعليمات في الصفحات من 6 إلى 18



	<ul style="list-style-type: none"> <li>Automate the migration of workloads from existing physical and virtual servers to new physical/virtual servers.</li> <li>Analyze system health and performance.</li> <li>Prevent virtual failures: Take predictive actions automating the movement of virtual machines before hardware issues in VMware ESX/vSphere, Microsoft Hyper-V, and Citrix Xen Server environments.</li> <li>Control from anywhere.</li> </ul>
2.13	2x32 A PDU core only.
2.14	19. Installation and startup services to include HW, OS, network configuration and SAN connectivity.
2.15	20. Installation and startup services for the servers management SW and integrate this with NIC servers management system.
2.16	21. All servers HW components must be integrated at the manufacturer factory.
2.17	2x32 A PDU core only.
2.18	19. Installation and startup services to include HW, OS, network configuration and SAN connectivity.
2.19	All servers HW components must be integrated at the manufacturer factory.
<b>3. Warranty</b>	
3.1	<p>3 years 24x7 support on labor and parts, this warranty should be from the main vendor directly (i.e. Dell, HP, IBM) to cover the following:</p> <ol style="list-style-type: none"> <li>HW and server management SW.</li> <li>4-hour response time.</li> <li>Tool free call center # manned 24x7.</li> </ol>

### 5.3. Blade Enclosure – Option 2

	<b>Must be a brand name product.</b>
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**Vendors must comply with instructions (page 6 to 18)** على المورد الالتزام بالتعليمات في الصفحات من 6 إلى 18

1. Hardware architecture	
1.1	Server blade enclosure should be Scalable design to meet future demands and fits in max 10U.
1.2	Enclosure should accommodate up to 12 half height or 6 full height blade servers or mixed blade servers or mix 5 storage module with 80TB each.
1.3	Servers should support latest Intel, hot-pluggable SAS/SATA/SD Drives and DDR4 Memory DIMMS.
1.4	Internal (DAS, SAN, iSCSI)
1.5	External Storage (FC-SAN, iSCSI, NAS etc)
1.6	The storage module should offer the expansion via multiple drive types (12G SAS or 6G SATA HDD and SSD Smart Drives) to be configured in the same storage module. It should support mixing of different drive types (SAS/SATA, SSD/HDD) and sizes in a single enclosure.
1.7	Each switching module should support minimum of 240Gb of uplink bandwidth and 240Gbps of downlink bandwidth (internal server connectivity). Each downlink port can be carved up (physical) into multiple ports (Ethernet, FC), and the administrator should be able to configure separate downlink speeds using Ethernet or FC protocols or both simultaneously. This provides the administrator to control the bandwidth availability for the operating system/application.
1.8	The network interface card (converged network adapter) on the compute nodes should support following functionalities:
1.9	IEEE quality of service (QoS) 802.1p tagging
1.10	IEEE 802.1Q virtual local area network (VLAN)
	TCP, IP, UDP checksum offload, Large Send Offload (LSO), TCP, Segmentation Offload (TSO)
2. Features	
2.1	The solution should comply with the industry definition of Composable Infrastructure; where the physical compute, storage and network (compute) fabric resources can be assembled and configured in various combinations to improve the efficiency and accelerate application serviceability.
2.2	The solution should provide resources that are logically pooled so that administrators don't have to physically configure hardware to support a specific software application. Instead, the software's developer defines the application's requirements for physical infrastructure using policies and compute profiles.
2.3	The composable solution should be able to provide internal and external storage simultaneously using industry standard protocols
2.4	The solution should support the use of application programming interface (API) to create (compose) the infrastructure it needs to run on bare metal, as a virtual machine (VM) or as a container.

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على المورد الالتزام بالتعليمات في الصفحات من 6 إلى 18

2.5	The offered solution be able to optimize any application and store all data on a single infrastructure with fluid pools of physical and virtual compute, storage, and fabric.
2.6	The proposed Solution should be based on blade server enclosure/chassis architecture.
2.7	The enclosure (itself) should provide consolidation of compute, fabric and storage resources ( up to 12 bay ) .
2.8	The proposed solution's enclosure/chassis should support half-height, full-height or full-height double-wide compute modules. This would ensure the solution can run any kind of workload and better VM density in case of virtualized workloads.
2.9	Vendor will have to make sure that all the components within the proposed solution are tested to work together and there should be no compatibility or interoperability issues between the hardware (compute, network & storage) and software components (management, hypervisor, OS, software defined compute & storage elements) or the solution.
2.10	Vendor will have to make sure that the firmware and driver versions are fully compatible and tested with the proposed solution.
2.11	The solution should have the ability to flexibly scale up and scale down as the workloads dictate and precisely align operating expense to actual usage.
2.12	Proposed solution should be able to host/provision traditional applications (bare metal/virtual) that are designed to support and automate existing business processes such as collaboration, data processing and analytics, supply chain, and web infrastructure.
2.13	The solution should be able to host/provision new breed of applications and services which drive revenue and new customer experiences by leveraging Mobility, Big Data, and Cloud Native technologies.
2.14	The solution (as a one infrastructure) should be able to host Virtualized, bare-metal, containerized and hyper-converged (based on software-defined-storage) workloads. The actual requirement of hosting different servers in a single enclosure/chassis may vary and could span on multiple enclosures/chassis. However, vendor should offer the solution in the best consolidated manner.
2.15	The solution should be able to host variety of compute nodes/servers (homogenous and heterogeneous within a single enclosure) having 2-socket or 4-socket CPU architecture. This would ensure better VM density (in case of virtualization) compared to a homogeneous 2-socket processing node. This would also provide better consolidation within the datacenter.
2.16	Vendor should clearly mention the throughput or backplane capacity of the enclosure/chassis.
2.17	The proposed enclosure/chassis should support interconnect/switchover modules with active/active or active/backup network connectivity.
2.18	The proposed system's bandwidth and throughput should be aligned with the bandwidth (Ethernet, FC/FCoE & iSCSI) required per server and there should be no bottle neck in the architecture.
2.19	The enclosure should provide a composable physical storage module/node which should be able to provide direct attached storage or shared storage space to the compute nodes internal or external to the enclosures.

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2.20	The storage module should support large disk configurations and should be configurable for different workloads. (Virtualized as well as bare metal). Any number of drive bays in a storage module can be configured with any compute node, allowing for efficient utilization of available drives.
2.21	The storage module should be configurable as direct attached storage and as a hyper-converged storage (software defined storage) simultaneously.
2.22	Bare-metal and virtualized workloads (servers) should be able to access the storage module directly (zoned drives) or via software defined storage (as hyper-converged solution) simultaneously.
2.23	The storage module should provide complete storage array functionality for virtualized environments and should provide the basis for turnkey iSCSI storage consumption with iSCSI offload support in a huge number of CNAs.
2.24	In case of virtualized environment the solution should support industry leading hypervisors (VMware, MS Hyper-V, Linux KVM).
2.25	In case of virtualized workloads, the storage solution should be certified/qualified with VMware Compatibility Guide, Microsoft Windows Server Catalog, VMware Site Recovery Manager VMware Metro Storage Cluster etc. Vendors are open to mention the equivalent capabilities provided by the proposed solution. It is vendor's discretion to use the suitable feature as per the business requirements.
2.26	The storage module should support hypervisor based advanced features such as vMotion and Live Migration without purchasing external storage system.
2.27	Keeping in mind of the future expansion, vendor should clearly mention the expansion capability of the storage module(s) within the enclosure.
2.28	The proposed enclosure/chassis should support interconnect/switchover modules with active/active or active/backup network connectivity.
2.29	In case of hybrid disk drives in a hyper-converged solution, the storage solution should optimize data (frequently accessed tier/non-frequently accessed tier) transparently between different storage tiers.
2.30	The enclosure or the compute architecture must have embedded fabric architecture which should be configured as part of the composable infrastructure.
2.31	The system must support an architecture that can be spread over multiple racks, ensure there is a pre-engineered network design and the whole system are managed as one product.
2.32	Network connectivity between multiple cabinets as the solution should be able to spread across several racks. The solution should optimize east-west traffic and should enhance the application performance by providing clustering between the nodes/enclosure/chassis without the need of having top-of-the-rack switches.
2.33	Network resources should allow granular configuration and allocation of bandwidth to compute resources (VMs or OS).
2.34	Network configuration should allow dedicated quality of service within the compute resources; this should be in addition to the network (physical switch based) quality of service. This would ensure optimized east-west traffic and better application serviceability.
2.35	The proposed architecture must support out-of-band management solution. True and end to end Out-of-Band Management is a must requirement as it allows to manage infrastructure during security problems, Routing and Spanning Tree Protocol loops and Denial of Service attacks. In case of network attack the operations team should have network access (GUI, CLI) to the overall stack.
2.36	The compute fabric (network) should offer disaggregated, rack-scale design architecture to consolidate data center network connections, reduce hardware and management complexity, and scale network bandwidth across multiple enclosures.

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على المورد الالتزام بالتعليمات في الصفحات من 6 إلى 18

2.37	Interconnect/Switching module should support Ethernet as well Fiber Channel connectivity using a single module.
2.38	Installation and startup services to include HW, OS, network configuration and SAN connectivity.
2.39	Installation and startup services for the servers management SW and integrate this with NIC servers management system.
2.40	All servers HW components must be integrated at the manufacturer factory.
2.41	Enclosure should support FC8 and 10GbE Switches end to end.
2.42	Enclosure Back Plane should not have any active component.
2.43	Enclosure should not have single point of failure.
2.44	Enclosure should support high availability with all hot-swap modular components, including server and I/O modules.
2.45	Two USB Keyboard/Mouse connections and one Video connection.
2.46	Must be have 2 power supply to feeding it from 2 different source.
2.47	The enclosure must be populated with 2 redundant interconnect modules that support:
2.48	10 Gb/s Converged Ethernet (FCoE) to host the downlinks of the dual channel 10Gb/s converged adapter LOM (LAN On Motherboard) on the blade server.
2.49	Virtualized network.
2.50	Servers profile provisioning within and or across the blade enclosures.
2.51	4 uplink that support 1Gb/s, 40GB or 4X 10Gb/s.
2.52	4 uplinks that support 40GB or 4 X 10Gb/s LAN or 8/16/Gb/s SAN.
2.53	4 uplinks that support 40Gb/s LAN
2.54	
<b>3. Warranty</b>	
3.1	<p>3 years 24x7 support on labor and parts, this warranty should be from the main vendor directly (i.e. Dell, HP, IBM) to cover the following:</p> <ul style="list-style-type: none"> <li>• HW and server management SW.</li> <li>• 4-hour response time.</li> <li>• Tool free call center # manned 24x7.</li> </ul>

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## 6. Load Balancer devices

### 6.1. High End Load Balancer

Must be a brand name product.		Category	
1. Hardware architecture		Load Balancer	Load Balancer - Blade
1.1	CPU	CPU: 2x 14-core	CPU: 1x 10-core
1.2	Memory	Memory: 512 GB	Memory: 64 GB
1.3	Hard drive	Hard drive: 1.6 TB SSD	Hard drive: 800 GB SSD
1.4	Ports	32* 10G port (via breakout) or 8* 40G ports	16* 10G port (via breakout) or 4* 40G ports
1.5	Ports	4* 100G ports	
2. Performance Requirements			
2.1	The goods must support hot swappable PSU for redundancy		
2.2	The goods must be CSA, ANSI/UL, CB, EN, IEC, and FCC certified		
2.3	Layer 4	Layer 4 Traffic throughput of up to 320Gbps	Layer 4 Traffic throughput of up to 80Gbps
2.4	Layer 4	Layer 4 Concurrent Connections of 300M	Layer 4 Concurrent Connections of 48M
2.5	Layer 4	Layer 4 TCP Connections per Second 4.2M	Layer 4 TCP Connections per Second 1M
2.6	Layer 7	Layer 7 Traffic throughput of up to 160Gbps	Layer 7 Traffic throughput of up to 80Gbps
2.7	Layer 7	Layer 7 Requests per Second 10M	Layer 7 Requests per Second 2M
2.8	Layer 7	Layer 7 Connections per Second 1.4M	Layer 7 Connections per Second 200K

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3. Features	
3.1	The goods must be CSA, ANSI/UL, CB, EN, IEC, and FCC certified.
4. Security	
4.1	SSL TPS (2K keys) of 160K TPS (in hardware)
4.2	SSL TPS (ECDSA P-256) of 100K (in hardware)
4.3	SSL bulk crypto of 50Gbps
4.4	Federates identity, drives adaptive multi-factor authentication (MFA) and supports single sign-on (SSO) to apps anywhere.
4.5	Identity federation and SSO
4.6	Secure and managed web access, Centralizes authentication, authorization, and endpoint inspection via web app proxy.
4.7	Identity aware proxy, Deploys Zero Trust model validation based on granular context, securing every app access request.
4.8	Hardware Compression of 60Gbps
5. Warranty	
5.1	3 years 24x7 comprehensive support from OEM with maximum 2 hours of response time / 4 hour Call-to-Resolution Services & Support ever be a hardware failure replacement

## 7. Communication Devices

### 7.1. Campus Core Switch

1. Hardware architecture		Low	Mid	High
1.1	DRAM <insert the value>	16GB	16GB	16GB
1.2	Max 1 GE ports <insert the value>	48	384	192
1.3	Max 10 GE ports <insert the value>	48	192	192
1.4	Max 25 GE ports <insert the value>	48	0	192
1.5	Max 40 GE ports <insert the value>	4	0	96

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على المورد الالتزام بالتعليمات في الصفحات من 6 إلى 18



1.6	Max 100 GE ports <insert the value>	4	0	48
1.7				
<b>2. Performance Requirements</b>		<b>Low</b>	<b>Mid</b>	<b>High</b>
2.1	Reliability and availability	StackWise Virtual	StackWise Virtual	
2.2		Software Maintenance Upgrades (SMUs)	Software Maintenance Upgrades (SMUs)	
2.3		Graceful Insertion and Removal (GIR)	Graceful Insertion and Removal (GIR)	
<b>3. FW features</b>				
3.1	Feature	Fixed	<b>7 Slots Chassis</b>	<b>6 Slots Chassis</b>
3.2	Stack wise Virtual	Supported	Supported	Supported
3.3	Switching Capacity / Per slot capacity	Up to 6.4-Tbps switching capacity with up to 2 Bpps of forwarding performance	120 Gbps/slot. Up to 1.44 Tbps wired switching capacity (IPv4) with 900 Mpps of throughput Up to 6.4 Tbps bandwidth per slot	Hardware ready to support up to 25.6 Tbps in wired switching capacity, with up to 6.4 Tbps bandwidth per slot. 4-Terabits-per-second (Tbps) with Virtual Switching System 80-Gbps per slot
3.4	MAC Table	Up to 82,000	Up to 64,000	Up to 128,000
3.5	Routes	Up to 212,000	64,000 / 32,000	Up to 256,000
3.6	Net-flow	64,000	384,000	98,000

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3.7	ACLs	27,00	18K	27,000
3.8	Software Features	<p>IP routing protocols provide the fundamental infrastructure for the delivery of advanced IP services across the Cisco Catalyst 9500 Series. Whether based on Internet Engineering Task Force (IETF) standards or Cisco innovations, these protocols enable Cisco to offer the broadest portfolio of IP routing technologies. All share industry-leading scalability, availability, manageability, fast convergence, and high-performance capabilities.</p> <ul style="list-style-type: none"> <li>IP unicast routing protocols (including static; Routing Information Protocol version 1 [RIPv1], version 2 [RIPv2], and next generation [RIPng]; and Open Shortest Path First [OSPF] routed access)</li> </ul>	<p>IP unicast routing protocols (static, Routing Information Protocol Version 1 [RIPv1], RIPv2, RIPng, and Open Shortest Path First [OSPF] Routed Access) are supported for small network routing applications with the Network Essentials stack. Equal-cost routing facilitates Layer 3 load balancing and redundancy across the stack.</p> <ul style="list-style-type: none"> <li>Advanced IP unicast routing protocols (Full OSPF, Enhanced Interior Gateway Routing Protocol [EIGRP], Border Gateway Protocol Version 4 [BGPv4], and Intermediate System-to-Intermediate System Version 4 [IS-ISv4]) are supported for load balancing and constructing scalable LANs. IPv6 routing using OSPFv3 and EIGRPv6 is supported in hardware for maximum</li> </ul>	<p>IP unicast routing protocols (including static, Routing Information Protocol Version 1 [RIPv1], RIPv2, RIPng, and Open Shortest Path First [OSPF], Routed Access) are supported for small network routing applications. Equal-cost routing facilitates Layer 3 load balancing and redundancy across the stack.</p> <ul style="list-style-type: none"> <li>Advanced IP unicast routing protocols (including Full [OSPF], Enhanced Interior Gateway Routing Protocol [EIGRP], and Intermediate System-to-Intermediate System Version 4 [IS-ISv4]) are supported for load balancing and for constructing scalable LANs. IPv6 routing (using</li> </ul>

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		<p>are supported for small network routing applications with the Network Essentials stack.</p> <ul style="list-style-type: none"> <li>Advanced IP unicast routing protocols (such as OSPF, Enhanced Interior Gateway Routing Protocol [EIGRP], Border Gateway Protocol Version 4 [BGPv4], and Intermediate System-to-Intermediate System Version 4 [IS-ISv4]) are supported for load balancing and for constructing scalable LANs. IPv6 routing (using OSPFv3 and EIGRPv6) is supported in hardware for maximum performance.</li> <li>Protocol-Independent Multicast (PIM) for IP multicast routing is supported, including PIM Sparse Mode (PIM SM),</li> </ul>	<p>performance.</p> <ul style="list-style-type: none"> <li>Protocol-Independent Multicast (PIM) for IP multicast routing is supported, including PIM Sparse Mode (PIM SM), and Source-Specific Multicast (SSM).</li> <li>IPv6 addressing is supported on interfaces with appropriate show commands for monitoring and troubleshooting.</li> </ul>	<p>OSPFv3 and EIGRPv6) is supported in hardware for maximum performance.</p> <ul style="list-style-type: none"> <li>Protocol-Independent Multicast (PIM) for IP multicast routing is supported, including PIM sparse mode (PIM SM), and Source-Specific Multicast (SSM).</li> <li>IPv6 addressing is supported on interfaces with appropriate show commands for monitoring and troubleshooting.</li> </ul>
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		<p>bidirectional PIM, and Source-Specific Multicast (SSM).</p> <ul style="list-style-type: none"> <li>IPv6 addressing is supported on interfaces with appropriate show commands for monitoring and troubleshooting.</li> <li>Seamless MPLS integrates multiple networks into a single MPLS domain. This removes the need for service-specific configurations in network transport nodes.</li> </ul>		
<b>4. Security features</b>				
4.1	Security Features	<p>Support for AES-256 with the powerful MACsec-256-bit encryption algorithm available on all models</p> <ul style="list-style-type: none"> <li>Trustworthy solutions: Secure Unique Device Identification (SUDI) support for Plug and Play, enabling tamper-proof device identity</li> </ul>	<p>Advanced Encryption Standard 256 (AES-256) support with the powerful MACsec-256 encryption algorithm is available in hardware.</p> <ul style="list-style-type: none"> <li>Trustworthy solutions: Secure Unique Device Identification (SUDI) support for Plug and Play (PnP) tamper-proof device identity capability</li> </ul>	<p>Advanced Encryption Standard 256 (AES-256) support with the powerful MACsec-256 encryption algorithm is available in hardware.</p> <ul style="list-style-type: none"> <li>Trustworthy solutions: Secure Unique Device Identification (SUDI)</li> </ul>

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		capability, which secures zero-touch provisioning by allowing your device to show a certificate to the server to be able to get onto your network	secures zero-touch provisioning by allowing your device to show a certificate to the server to be able to get on your network.	support for Plug and Play (PnP) tamper-proof device identity capability secures zero-touch provisioning by allowing your device to show a certificate to the server to be able to get on your network.
4.2				
<b>5. Management</b>				
5.1				
<b>6. Training</b>				
6.1	Technical training for 4 persons			
<b>7. Warranty</b>				
7.1	3 years 24x7 comprehensive support from OEM with maximum 2 hours of response time / 4 hour Call-to-Resolution Services & Support ever be a hardware failure replacement			
7.2	Products shall not reach end of support/life within 5 years			

## 7.2. Data Center Core/Aggregation Switch

1. Hardware architecture		Low	Mid	High
1.1	DRAM <insert the value>	4GB	8GB	16GB
1.2	Max 1 GE ports <insert the value>	384	192	534
1.4	Max 10 GE ports <insert the value>	192	192	180

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1.4	Max 25 GE ports <insert the value>	0	192	0
1.5	Max 40 GE ports <insert the value>	0	96	44
1.6	Max 100 GE ports <insert the value>	0	48	0
<b>2. Performance Requirements</b>		<b>Low</b>	<b>Mid</b>	<b>High</b>
2.1	SDN Capabilities	8 Chassis slots	16 Chassis slots	Fixed Chassis
2.2	Performance	1.6 Tbps 1.44 bpps	2.88 Tbps 2.16 bpps	12.8 Tbps 4.3 bpps
2.3	Form factor	13	21	2
2.4	Bandwidth per slot	3.84	3.84	3.84
2.5	Bandwidth per system	15	30	60
2.6	Maximum number of 1/10G BASE-T ports	192	384	768
2.7	Maximum number of 10 GE ports	576	1152	2304
2.8	Maximum number of 40 GE ports	144	288	576
2.9	Maximum number of 100GE ports	144	288	576
<b>3. SW features</b>				
3.1	Supervisor A+	4-core, 8-Thread 1.8-GHz x86 CPU, with 16 GB of RAM and 64-GB SSD		
3.2	Supervisor B+	6-core, 12-Thread 1.9-GHz x86 CPU, with 24 GB of RAM and 256-GB SSD drive		
3.3	100GE modules	36 x 100 GE, NX-OS, ACI Spine, MACSec. 7.2Tbps*, Buffer 160MB *Chassis must have only X9736C-FX line cards, otherwise Tbps: 3.2		36 x 100 GE, NX-OS, 6.4Tbps, Buffer 32MB
3.4	40GE modules	36 x 40 GE	36 x 40 GE ACI leaf	36 x 40 GE ACI spine

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Vendors must comply with instructions (page 6 to 18)

على المورد الالتزام بالتعليمات في الصفحات من 6 إلى 18

3.5	Routes	128,000		
3.6	IP host entries	IPv4: 208,000 IPv6: 104,000		
3.7	VLANs	3,967	3,967	3,967
3.8	MAC entries	90,000		
<b>4. Security features</b>				
4.1	Security Features	<ul style="list-style-type: none"> <li>• Encrypted Traffic Analytics (ETA) <ul style="list-style-type: none"> <li>• IEEE 802.1x</li> </ul> </li> <li>• IEEE 802.1AE AES-256 MACsec encryption (switch to switch)</li> <li>• Trustworthy systems: Trust Anchor capabilities include: Image signing, Secure Boot, Trust Anchor module</li> </ul>		IEEE 802.1x, IEEE 802.1AE
4.2				
<b>5. Management</b>				
5.1				
<b>6. Training</b>				
6.1	Technical training for 4 persons			
<b>7. Warranty</b>				
7.1	3 years 24x7 comprehensive support from OEM with maximum 2 hours of response time / 4 hour Call-to-Resolution Services & Support ever be a hardware failure replacement			
7.2	Products shall not reach end of support/life within 5 years			
<b>8. Integration</b>				

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Vendors must comply with instructions (page 6 to 18)

على المورد الالتزام بالتعليمات في الصفحات من 6 إلى 18

### 7.3. Cloud Network Switch

1. Hardware architecture		10/25G ACI Leaf	40/100G ACI Leaf	ACI Spine
1.1		Support for standards based VXLAN EVPN fabrics, inclusive of hierarchical multi-site support	Support for standards based VXLAN EVPN fabrics, inclusive of hierarchical multi-site support	<ul style="list-style-type: none"> <li>Up to 4 line cards</li> <li>4 power supplies</li> <li>6 fabric modules of the same type</li> <li>2 system controllers</li> <li>2 supervisors of the same type</li> <li>3 fan trays</li> </ul>
1.2		Three-tier BGP architectures, enabling horizontal, non-blocking IPv6 network fabrics at web-scale.	Three-tier BGP architectures, enabling horizontal, non-blocking IPv6 network fabrics at web-scale.	
2. Performance Requirements		10/25G ACI Leaf	40/100G ACI Leaf	ACI Spine
2.1		48 x 1/10/25-Gbps fiber ports and 12 x 40/100-Gbps QSFP28 ports	36 x 40/100-Gbps QSFP28 ports	Delivers non-blocking performance at a latency of 5 microseconds or less at 400-, 100-, 50-, 40-, 25-, 10-, and 1-Gigabit Ethernet speeds.
2.2		Supports 4.8 Tbps of bandwidth and over 1.8 bpps	supports 7.2 Tbps of bandwidth and over 2.4 bpps	2 Supervisors with 6 core, 12 thread 2.2GHz x86, 24GB

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Vendors must comply with instructions ( page 6 to 18 )

على المورد الالتزام بالتعليمات في الصفحات من 6 إلى 18

				DRAM, and 256GB SSD
2.4		Maximum number of Longest Prefix Match (LPM) routes: 896,000	Maximum number of Longest Prefix Match (LPM) routes: 896,000	36-port 100-Gigabit Ethernet Quad Small Form-Factor Pluggable 28 (QSFP28) line card
				Every QSFP28 supports 1x100-, 2x50-, 1x40-, 4x25-, 4x10-, and 1x10-Gigabit Ethernet
<b>3. FW features</b>				
3.1		Segment routing allows the network to forward Multiprotocol Label Switching (MPLS) packets and engineer traffic without Resource Reservation Protocol (RSVP) Traffic Engineering (TE). It provides a control-plane alternative for increased network scalability and virtualization.	Segment routing allows the network to forward Multiprotocol Label Switching (MPLS) packets and engineer traffic without Resource Reservation Protocol (RSVP) Traffic Engineering (TE). It provides a control-plane alternative for increased network scalability and virtualization.	
3.2		Comprehensive protocol support for Layer 3 (v4/v6) unicast and multicast routing protocol suites, including BGP, Open Shortest Path First (OSPF), Enhanced Interior Gateway Routing Protocol (EIGRP), Routing Information Protocol Version 2 (RIPv2), Protocol Independent Multicast Sparse Mode	Comprehensive protocol support for Layer 3 (v4/v6) unicast and multicast routing protocol suites, including BGP, Open Shortest Path First (OSPF), Enhanced Interior Gateway Routing Protocol (EIGRP), Routing Information	

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على المورد الالتزام بالتعليمات في الصفحات من 6 إلى 18



		(PIM-SM), Source-Specific Multicast (SSM), and Multicast Source Discovery Protocol (MSDP).	Protocol Version 2 (RIPv2), Protocol Independent Multicast Sparse Mode (PIM-SM), Source-Specific Multicast (SSM), and Multicast Source Discovery Protocol (MSDP).	
3.3		Day zero automation through Power On Auto Provisioning, drastically reducing provisioning time.	Day zero automation through Power On Auto Provisioning, drastically reducing provisioning time.	
3.4		Industry leading integrations for leading develops configuration management applications – Ansible, Chef, Puppet, SALT. Extensive Native YANG and industry standard OpenConfig model support through RESTCONF/NETCONF.	Industry leading integrations for leading develops configuration management applications – Ansible, Chef, Puppet, SALT. Extensive Native YANG and industry standard OpenConfig model support through RESTCONF/NETCONF.	
<b>4. Security features</b>				
4.1		Pervasive API's for all switch CLI functions (JSON based RPC over HTTP/HTTPS).	Pervasive API's for all switch CLI functions (JSON based RPC over HTTP/HTTPS).	
4.2		Pervasive API's for all switch CLI functions (JSON based RPC over HTTP/HTTPS).	Pervasive API's for all switch CLI functions (JSON based RPC over HTTP/HTTPS).	
4.3				
<b>5. Warranty</b>				
5.1		Advantage License	Advantage License	
5.2		Vendor Support: 36 months 8x5xNBD	Vendor Support: 36 months 8x5xNBD	Vendor Support: 36 months 8x5xNBD
5.3		SDN Subscription for 3 years	SDN Subscription for 3 years	

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Vendors must comply with instructions (page 6 to 18)

على المورد الالتزام بالتعليمات في الصفحات من 6 إلى 18

## 8. VSAT Equipment

### 8.1. Campus and remote-site Router

1. Hardware architecture		Low	Mid	High
1.1	Form factor	1 RU	1 RU	2 RU
1.2	Integrated WAN Ports	GE / SFP GE SFP	2 PoE GE / SFP 2 GE / SFP	2 PoE GE / SFP 2 GE / SFP
1.3	IPv4 routing protocols	RIP v1/v2, EIGRP, OSPF, BGP, PBR, PFR	RIP v1/v2, EIGRP, OSPF, BGP, PBR, PFR	RIP v1/v2, EIGRP, OSPF, BGP, PBR, PFR
1.4	IPv6 routing protocols	EIGRP, RIP, OSPFv3, IS-IS,	EIGRP, RIP, OSPFv3, IS-IS,	EIGRP, RIP, OSPFv3, IS-IS,
1.5	PoE support (w attage)	250 W	250 W	500 W
2. Performance Requirements		Low	Mid	High
2.1	Performance	100 Mbps Upgradable to 300 Mbps	500 Mbps Upgradable to 1 Gbps	1 Gbps Upgradable to 2 Gbps
2.2	Management port	2 GE (Integrated out of Band)	4 GE (Integrated out of Band)	5 GE (Integrated out of Band)
2.3	Network Interface Modules (NIM)	2	3	3
2.4	Enhanced Services Modules (SM-X)	single-wide	N/A	2 single- or 1 double- wide
2.5	USB Ports (type A)	1	2	2

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على المورد الالتزام بالتعليمات في الصفحات من 6 إلى 18

2.6	Integrated Services Card (ISC) slots	2 (PVDM 4)	4 (PVDM 4)	5 (PVDM 4)
2.6	Default/max Flash	4 GB / 16 GB	8 GB / 32 GB	8 GB / 32 GB
2.7	Default/max DRAM	4 GB / 16 GB	4 GB / 16 GB	4 GB / 16 GB
<b>3. FW features</b>				
3.1	Server virtualization platform (UCS E-Series) and Network Compute Engine (NCE)	2-core single-wide, 2-core NCE 4-core single-wide, 4-core NCE	4-core NCE	2-core single-wide, 2-core NCE 4-core single-wide, 4-core NCE 4-core double-wide 6-core double-wide 8-core double-wide
3.2	Unified Survivable Remote Site	Up to 100	Up to 1200	Up to 2000
3.3	Telephony support	Up to 100	Up to 1200	Up to 2000
	Unified Communications	Up to 100	Up to 350	Up to 450
<b>4. Security features</b>				
4.1	Zone-based firewall and NAT services	VRF-Aware Firewall and Network Address Translation (NAT)	VRF-Aware Firewall and Network Address Translation (NAT)	VRF-Aware Firewall and Network Address Translation (NAT)

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على المورد الالتزام بالتعليمات في الصفحات من 6 إلى 18

4.2	IPSEC VPN services	FlexVPN, Easy VPN remote server, Enhanced Easy VPN, Dynamic Multipoint VPN (DMVPN)	FlexVPN, Easy VPN remote server, Enhanced Easy VPN, Dynamic Multipoint VPN (DMVPN)	FlexVPN, Easy VPN remote server, Enhanced Easy VPN, Dynamic Multipoint VPN (DMVPN)
4.3	License	Must include Security license	Must include Security license	Must include Security license
<b>5. Management</b>				
5.1				
<b>6. Training</b>				
6.1	Technical training for 4 persons			
<b>7. Warranty</b>				
7.1	3 years 24x7 comprehensive support from OEM with maximum 2 hours of response time / 4 hour Call-to-Resolution Services & Support ever be a hardware failure replacement			
7.2	Product shall not reach end of support/life within 5 years			

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على المورد الالتزام بالتعليمات في الصفحات من 6 إلى 18

## 8.2. Enterprise Head Office/Large Campus Router

Must be a brand name product.		Category	
1. Hardware architecture		MPLS RR Routers	IGW Edge routers
1.1	DRAM shared across route processor, ESP, and SIP	4-GB DRAM shared across route processor, ESP, and SIP	16-GB DRAM shared across route processor, ESP, and MIP
1.2	Shared port adapters slots	3 Shared port adapters slots	1 Ethernet port adapter
1.3	Gigabit Ethernet SFP ports Built-in	6 Gigabit Ethernet SFP ports Built-in	8 Gigabit Ethernet SFP ports Built-in Gigabit Ethernet ports
1.4	TenGigabit Ethernet SFP ports Built-in	8 TenGigabit Ethernet SFP ports Built-in	Eight 10 Gigabit Ethernet Small Form-Factor Plus Pluggable (SFP+) Built-in 10 Gigabit Ethernet port
2. Performance Requirements			
2.1		ESP bandwidth: 100Gbps	ESP bandwidth: 100Gbps
2.2		4x 10G BASE-LX/LH SFP transceiver module, MMF/SMF, 1310nm, DOM	Add the require 10GBASE-LR SFP Module, 10GBASE-SR SFP Module
2.3		4x 100GBASE-LX/LH SFP transceiver module, MMF/SMF, 1310nm, DOM	
3. Features			
3.1			Advanced Enterprise Services License
4. Security			
4.1		Embedded hardware-based encryption Up to 4-Gbps crypto support throughput	Embedded hardware-based encryption Up to 25-Gbps crypto support throughput

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على المورد الالتزام بالتعليمات في الصفحات من 6 إلى 18

5. Warranty			
5.1		Vendor Support 36 months, 8x5xNBD	Vendor Support 36 months, 8x5xNBD

### 8.3. ASBR Routers

Must be a brand name product.				
1. Hardware architecture		Line Card 1	Line Card 2	Line Card 3
1.1		4-ports of 100 Gigabit Ethernet per line card	24 ports of 10 Gigabit/1 Gigabit Ethernet ports per line card	8 ports of 100 Gigabit Ethernet per line card
1.2		100-Gbps line-rate throughput per port	24-port dual-rate 10GE/1GE line card: 200-Gbps line-rate throughput, 240:200 oversubscription	100-Gbps line-rate throughput per port
1.3		Combined IP, MPLS, Ethernet, Layer 2 VPN (L2VPN), and Layer 3 VPN (L3VPN) services	Line-card online insertion and removal (OIR) support without system effects	Line card online insertion and removal (OIR) support without system impact
1.4		4 CPAK optical transceiver module, 100GBASE-SR4, 100m OM4	4 10GBASE-SR SFP Module	Combined IP, MPLS, Ethernet, Layer 2 VPN (L2VPN), and Layer 3 VPN (L3VPN) services
1.5		4-port 100GE Advanced IP license for SE Line Card	Adv IP License for full scale VRFs for 24-port 10G/1G SE LC	
2. Performance Requirements				
2.1		NetFlow, IEEE 802.1ag, IEEE 802.3ah, ITU Y.1731, IP service-level agreement (IP SLA), virtual circuit connectivity verification (VCCV), ping, and traceroute.	Combined IP, MPLS, Ethernet, Layer 2 VPN (L2VPN), and Layer 3 VPN (L3VPN) services. Only LAN mode is supported.	NetFlow, IEEE 802.1ag, IEEE 802.3ah, ITU Y.1731, IP service-level agreement (IP SLA), virtual circuit

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على المورد الالتزام بالتعليمات في الصفحات من 6 إلى 18

				connectivity verification (VCCV), ping, and traceroute
<b>3. Features</b>				
3.1	Modular Router with 8 line-card slots			
3.2	Vertical Slot orientation			
3.3	Dual redundant RSPs with integrated fabric in 2 slots			
3.4	6 + 1 redundant fabrics			
3.5	Common components: 2 RSPs ,5 fabric cards ,2 fan trays ,2 PEMs (either DC or AC) ,1 fan filter			
3.6	19-in. Rack Mounting			
3.7	2x Route Switch Processor:			
3.8	Switching Capacity: Non Redundant per Router: 33.6T			
3.9	Provides transparent non-blocking, low -latency packet forwarding			
3.10	Timing: Two independent clock source connections			
3.11	Two 32GB Solid-State Drives (SSDs)			
3.12	Embedded Universal Series Bus (eUSB) memory port			
<b>4. Security</b>				
4.1				
<b>5. Warranty</b>				

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Vendors must comply with instructions (page 6 to 18)

على المورد الالتزام بالتعليمات في الصفحات من 6 إلى 18

5.1		Vendor Support 36 months, 8x5xNBD	Vendor Support 36 months, 8x5xNBD	
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#### 8.4. PE Router

Must be a brand name product.		Category	Line Card 2	Line Card 3
1. Hardware architecture		Line Card 1	Line Card 2	Line Card 3
1.1		4-ports of 100 Gigabit Ethernet per line card	24 ports of 10 Gigabit/1 Gigabit Ethernet ports per line card	8 ports of 100 Gigabit Ethernet per line card
1.2		100-Gbps line-rate throughput per port	24-port dual-rate 10GE/1GE line card: 200-Gbps line-rate throughput, 240:200 oversubscription	100-Gbps line-rate throughput per port
1.3		Combined IP, MPLS, Ethernet, Layer 2 VPN (L2VPN), and Layer 3 VPN (L3VPN) services	Combined IP, MPLS, Ethernet, Layer 2 VPN (L2VPN), and Layer 3 VPN (L3VPN) services. Only LAN mode is supported.	Combined IP, MPLS, Ethernet, Layer 2 VPN (L2VPN), and Layer 3 VPN (L3VPN) services
1.4		4 CPAK optical transceiver module, 100GBASE-SR4, 100m OM4	4 10GBASE-SR SFP Module	
1.5		4-port 100GE Advanced IP license for SE Line Card	Adv IP License for full scale VRFs for 24-port 10G/1G SE LC	8-port 100GE Advanced IP license for SE Line Card
2. Performance Requirements				
2.1		NetFlow, IEEE 802.1ag, IEEE 802.3ah, ITU Y.1731, IP service-level agreement (IP SLA), virtual circuit connectivity verification (VCCV), ping, and traceroute.	Combined IP, MPLS, and Ethernet, Layer 2 VPN (L2VPN), and Layer 3 VPN (L3VPN) services. Only LAN mode is supported.	NetFlow, IEEE 802.1ag, IEEE 802.3ah, ITU Y.1731, IP service-level agreement (IP SLA), virtual circuit connectivity verification (VCCV), ping, and traceroute

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Vendors must comply with instructions (page 6 to 18)

على المورد الالتزام بالتعليمات في الصفحات من 6 إلى 18



3. Features			
3.1	Modular Router with 8 line-card slots		
3.2	Vertical Slot orientation		
3.3	Dual redundant RSPs with integrated fabric in 2 slots		
3.4	6 + 1 redundant fabrics		
3.5	Common components: 2 RSPs ,5 fabric cards ,2 fan trays ,2 PEMs (either DC or AC) ,1 fan filter		
3.6	19-in. Rack Mounting		
3.7	2x Route Switch Processor:		
3.8	Switching Capacity: Non Redundant per Router: 33.6T		
3.9	Provides transparent non-blocking, low-latency packet forwarding		
3.1	Timing: Two independent clock source connections		
3.11	Two 32GB Solid-State Drives (SSDs)		
3.12	Embedded Universal Serial Bus (eUSB) memory port		
4. Security			
4.1			Embedded hardware-based encryption: Up to 25-Gbps crypto support throughput
5. Warranty			

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على المورد الالتزام بالتعليمات في الصفحات من 6 إلى 18

5.1		Vendor Support 36 months, 8x5xNBD	Vendor Support 36 months, 8x5xNBD	Vendor Support 36 months, 8x5xNBD
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#### 8.5. VSAT HUB INDOOR UNIT EQUIPMENT

#### 8.6. VSAT FIXED REMOTE SITE OUTDOOR UNIT

#### 8.7. VSAT FIXED REMOTE SITE INDOOR UNIT

#### 8.8. VSAT FLY AWAY REMOTE SITE OUTDOOR & INDOOR UNITS

#### 8.9. VSAT MOBILE REMOTE TERMINAL COMM. SYSTEM

#### 8.10. VSAT MOBILE POWER SUPPLY SYSTEM

### 9. Printers

#### 9.1. Laser Printer

<b>Must be a brand name product.</b>		<b>Category</b>		
<b>1. Hardware architecture</b>		<b>Personal Laser Printer</b>	<b>Personal Color Laser Printer</b>	<b>Color Ink Jet Printer</b>
1.1	Toner	Black toner laser printer	Color laser printer.	Full Color Ink Jet printer.
1.2	Port connection	Hi-speed USB2.0 port connection.	Hi-speed USB2.0 port connection	Hi-Speed USB 2.0 port.
1.3	Minimum of Memory	<b>TBS:</b> Minimum of Memory <b>512MB.</b>	<b>TBS:</b> Minimum of Memory <b>128MB DRAM</b>	<b>TBS:</b> Minimum of Memory <b>128 MB DDR RAM</b>
1.4	Processor	1200MHz	1200MHz	500MHz
1.5	Size	<b>A4</b> and Letter Size Feeder tray w with Minimum of 250-sheet capacity	<b>A4</b> and Letter Size Feeder tray w with Minimum of 250-sheet capacity	<b>A4, A3</b> and Letter Size Feeder tray w with Minimum of 200-sheet capacity

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1.6	Resolution	Minimum of 1200 dpi resolution Enhancement technology (REt).	Minimum of 600 x 600 dpi resolution	Minimum of 1200x1200 dpi black; Color Best: Up to 4800 x 1200 optimized dpi color
<b>2. Performance Requirements</b>		Personal Laser Printer	Personal Color Laser Printer	Built-in Ethernet connectivity Color Ink Jet Printer
2.1	Page per minute	45 page per minute or higher	<b>TBS: 27</b> page per minute or higher color and mono printing	33 page per minute monochrome, 20 page color or higher
<b>3. Features</b>		Personal Laser Printer	Personal Color Laser Printer	Color Ink Jet Printer
3.1	Printer shall accept freely adjustable paper sizes through a manual feed slot.			
3.2	ARABIC/LATIN Bi-Directional.			
3.3	220 V regulated Power Supply.			
<b>4. Security</b>				
4.1				
<b>5. Warranty</b>				
5.1	3 years Full Warranty			

## 9.2. Network Printer:

Must be a brand name product.		Category			
<b>1. Hardware architecture</b>		Network Laser Printer (A4)	Network Color Laser Printer (A4)	Network Laser Printer (A3)	Network Color Laser Printer (A3)
1.1	Toner	Black toner laser printer	Full Color laser printer.	Black toner laser printer	Full Color laser printer
1.2	Port connection	Hi-Speed USB 2.0 ports	Hi-Speed USB 2.0 ports	2 Hi-Speed USB 2.0 ports	Hi-Speed USB 2.0 ports

**TBS: To Be S**pecified in RFP. If not specified, bidder must ascertain selection or be liable for highest cost option at bid price.  
**TBS:** تعني يجب تحديدها من قبل كاتب الوثيقة. فإن لم يتم تحديدها فعلى المقاول الاستفسار عنها والإسكود مسؤلاً عن توريد أفضل الخيارات بالسعر المقدم في العرض

Vendors must comply with instructions ( page 6 to 18 )

على المورد الالتزام بالتعليمات في الصفحات من 6 إلى 18

1.3	Minimum of Memory	<b>TBS:</b> Minimum of Memory <b>512MB</b>	<b>TBS:</b> Minimum of Memory 1 GB	<b>TBS:</b> Minimum of Memory 1GB	<b>TBS:</b> Minimum of Memory 1.5GB
1.4	Processor	1.2 GHz	1.2 GHz	800MHz	800MHz
1.5	Size	<b>A4</b> Paper size, <b>TWO</b> multi-size feeder trays with Minimum of 500-sheet capacity each	<b>A4</b> , Paper size Two Feeder trays with Minimum of 500-sheet capacity	Support A4, A3, RA3 paper sizes; Feeder trays with Minimum 1100 sheets	Support A4, A3 paper sizes; Feeder trays with Minimum 1100 sheets
1.6	Resolution	Minimum of 1200 x 1200 dpi resolution	Minimum of 1200 x 1200 dpi resolution		
1.7	Ethernet	Built-in Gigabit Ethernet 10/100/1000T network port; Hardware Integration Pocket (HIP)	Built-in Fast Ethernet 10/100/1000Base-TX network port	Gigabit Ethernet 10/100/1000T network, Foreign Interface, Hardware Integration Pocket	Gigabit Ethernet 10/100/1000T network.
<b>2. Performance Requirements</b>		<b>Network Laser Printer (A4)</b>	<b>Network Color Laser Printer (A4)</b>	<b>Network Laser Printer (A3)</b>	<b>Network Color Laser Printer (A3)</b>
2.1	Page per minute	<b>TBS:</b> 50 page per minute or higher	<b>TBS:</b> 38 page per minute monochrome and color or higher	black: Up to 45 ppm, color: Up to 45 ppm Built-in automatic two-sided printing	Up to 45 ppm, color: Up to 45 ppm; Laser technology; ImageREt 4800 technology. Built-in automatic two-sided printing
<b>3. Features</b>		<b>Network Laser Printer (A4)</b>	<b>Network Color Laser Printer (A4)</b>	<b>Network Laser Printer (A3)</b>	<b>Network Color Laser Printer (A3)</b>
3.1	Printer shall accept freely adjustable paper sizes through a manual feed slot.				
3.2	ARABIC/LATIN Bi-Directional				
3.3	<b>TBS:</b> (Optional) Mobile printing capability.				
<b>4. Security</b>					

**TBS: To Be Specified** in RFP. If not specified, bidder must ascertain selection or be liable for highest cost option at bid price.  
**TBS:** تعني يجب تحديدها من قبل كاتب الوثيقة. فإن لم يتم تحديدها فعلى المقاول الاستفسار عنها وإلا سيكون مسئولاً عن توريد أفضل الخيارات بالسعر المقدم في العرض  
 على المورد الالتزام بالتعليمات في الصفحات من 6 إلى 18  
**Vendors must comply with instructions (page 6 to 18)**

4.1				
<b>5. Warranty</b>				
5.1	3 years Full Warranty			

### 9.3. Dot Matrix Printer

<b>Must be a brand name product.</b>		<b>Category</b>		
<b>1. Hardware architecture</b>		Personal	Network	High Speed Dot Matrix (Line) Printer
1.1	Print head	Min 24 pin print head	Min 24 pin print head	136 Column print width @ 10 cpi.
1.2	Buffer Memory	<b>TBS:</b> Minimum of 128 K	<b>TBS:</b> Minimum of 128 K	Minimum of 4 Mega Byte Buffer Memory upgradeable to 20 Meg
1.3	Ports	1 Serial and 1 Parallel Ports	1 Serial and 1 Parallel Ports	Minimum of 1 Serial and 1 Parallel Ports (auto switching).
<b>2. Performance Requirements</b>		Personal	Network	High Speed Dot Matrix (Line) Printer
2.1	Printing speed	<b>TBS:</b> 825 CPS printing speed.	<b>TBS:</b> Minimum of 1150 CPS printing speed	<b>TBS:</b> Minimum of 2000 Lines per minute printing speed
<b>3. Features</b>		Personal Laser Printer	Personal Color Laser Printer	Color Ink Jet Printer
3.1	Bilingual support			
3.2	Continuous Form and Cut Sheet. (Quote separately for cut sheet feeder).			
3.3	Supports User Defined Code Page.			
3.4	Minimum of Three Built in Arabic Fonts			
3.5	Windows Driver to enhance the Printing speeds (Text / Graphics) in Arabic and Latin from Windows application.			

**TBS: To Be Specified** in RFP. If not specified, bidder must ascertain selection or be liable for highest cost option at bid price.  
**TBS:** تعني يجب تحديدها من قبل كاتب الوثيقة. فإن لم يتم تحديدها فعلى المقاول الاستفسار عنها وإلا سيكون مسئولاً عن توريد أفضل الخيارات بالسعر المقدم في العرض

Vendors must comply with instructions (page 6 to 18)

على المورد الالتزام بالتعليمات في الصفحات من 6 إلى 18

3.6	Automatic Gap Adjustment. (AGA).		
3.7	Automatic Paper Path Selection.		
3.8	Automatic Front Insertion		
<b>4. Security</b>			
4.1			
<b>5. Warranty</b>			
5.1	1. 3 years Full Warranty		

#### 9.4. In-Book Dot-Matrix Form Printer

<b>Must be a brand name product.</b>		<b>Category</b>		
<b>1. Hardware architecture</b>				
1.1	Print head	24 needles, noise optimized, Bi-directional logic-seeking		
1.2	Buffer Memory	Flash ROM to easily and locally upgrade printer program		
1.3	Ports	Serial and Parallel ports		
<b>2. Performance Requirements</b>				
2.1	Printing speed	90 Column widths @ 10CPI		
<b>3. Features</b>		Personal Laser Printer	Personal Color Laser Printer	Color Ink Jet Printer
3.1				
3.2	LCD display for easier printer configuration.			
3.3	Supports 1+4 copies			

**TBS: To Be S**pecified in RFP. If not specified, bidder must ascertain selection or be liable for highest cost option at bid price.  
**TBS:** تعني يجب تحديدها من قبل كاتب الوثيقة. فإن لم يتم تحديدها فعلى المقاول الاستفسار عنها وإلا سيكون مسئولاً عن توريد أفضل الخيارات بالسعر المقدم في العرض

Vendors must comply with instructions ( page 6 to 18 )

على المورد الالتزام بالتعليمات في الصفحات من 6 إلى 18

3.4	Passbook Upright and Horizontal folds not less than 4 mm (Book thickness when opened)
3.5	Passbook processing speed: 2.2 seconds or better
3.6	Automatic Document Alignment
3.7	High-precision positioning
3.8	Print Head can be replaced by the customer without any tools
3.9	Automatic head adjustment for paper thickness.
3.10	Dynamic font selection:
3.11	Bold, Italics, Underlining, Elegant print, Superscript, and Subscript
3.12	Compatible with the following operating systems: <ul style="list-style-type: none"> <li>- Windows 10 or later versions.</li> <li>- IBM Mainframes</li> <li>- HP mainframes</li> <li>- Unix</li> </ul>
3.13	Built-in universal Arabization (7 bit & 8 bit solutions).
3.14	Support Arabic and Latin code pages including but not limited to ASMO 449,ASMO 449+, ASMO 708,ASMO 708+, Al-Arabi, IBM 864, NCR 96,IBM Xbasic.
3.15	Supports user defined code pages.
3.16	Many styles of barcodes.
3.17	Windows Driver to enhance the printing speeds (Text/Graphics) in Arabic and Latin from Windows application.
3.18	Supports emulation for the following printers: IBM Pro-printer, Epson FX, Epson LQ, ANSI, HP, Olivetti, PR40/PR50/PR2, Unisys, Oki.
3.19	
3.20	Ribbon life: 10 million characters.
3.21	Rated voltage 120/240 VCA.
3.22	Weight not more than 9 kg.

**TBS: To Be S**pecified in RFP. If not specified, bidder must ascertain selection or be liable for highest cost option at bid price.  
**TBS:** تعني يجب تحديدها من قبل كاتب الوثيقة. فإن لم يتم تحديدها فعلى المقاول الاستفسار عنها وإلا سيكون مسئولاً عن توريد أفضل الخيارات بالسعر المقدم في العرض

Vendors must comply with instructions (page 6 to 18)

على المورد الالتزام بالتعليمات في الصفحات من 6 إلى 18

4. Security				
4.1	Compliance with the following standards: UL1950, EN60950, CSA 22.2 No. 950, IEC950, EN 55022-B, EN50082-2, FCC K1A, Noise complying to SN29067-3 class 2, Mechanics complying with SN29067-2 (2M2)			
5. Warranty				
5.1	3 years Full Warranty			

#### 9.5. Label Printer

Must be a brand name product.		Category		
1. Hardware architecture				
1.1	Print head	Dot Matrix or Thermal Transfer print mechanism		
1.2	Buffer Memory	<b>TBS:</b> Minimum of 256KB SRAM; 512KB Flash		
1.3	Ports	Serial and Parallel ports		
1.4	Resolution	<b>TBS:</b> Minimum of 200-dots-per-inch resolution		
2. Performance Requirements				
2.1	Printing speed	Print Speed Minimum of 6" (152mm) per second		
3. Features		Personal Laser Printer	Personal Color Laser Printer	Color Ink Jet Printer
3.1	Print label width range up to Minimum of 100mm.			
3.2	Label length Maximum no less than 250mm.			
3.3	Minimum of range of total label thickness 0.003" (0.07mm) to 0.0075" (0.18mm)			
3.4	Compatible with Windows 10 or later versions.			
3.5	Field upgradeable to accept new symbolizes within its resolution.			
3.6	USB 2.0 Interface.			

**TBS: To Be Specified** in RFP. If not specified, bidder must ascertain selection or be liable for highest cost option at bid price.  
**TBS:** تعني يجب تحديدها من قبل كاتب الوثيقة. فإن لم يتم تحديدها فعلى المقاول الاستفسار عنها وإلا سيكون مسئولاً عن توريد أفضل الخيارات بالسعر المقدم في العرض

Vendors must comply with instructions (page 6 to 18)

على المورد الالتزام بالتعليمات في الصفحات من 6 إلى 18



3.7	Rugged construction (All metal construction preferred)
3.8	Small footprint/ for use in locations w ith low desktop real-estate availability
3.9	<b>TBS:</b> 220 V regulated Pow er Supply
<b>4. Security</b>	
4.1	Bar Codes/Symbologies EAN-8, EAN-13; Standard 2 of 5; Code 39; Code 93; Code 128 with subsets A/B/C and UCC Case Codes; UPC-A, UPC-E; UCC/EAN-128; Interleaved 2 of 5; UPC-A with 2 or 5 digit supplements; Codabar ; PDF-417; Macro PDF-417; Maxi Code; Data Matrix;
<b>5. Warranty</b>	
5.1	3 years Full Warranty

### 9.6. Receipt Printer

	<b>Must be a brand name product.</b>	
<b>1. Hardware architecture</b>		
1.1	Print head	Dot Matrix or Thermal Line printing
1.2	Buffer Memory	Minimum of 4KB/45 byte data buffer
1.3	Ports	Interfaces Bi-directional parallel, RS-486, USB, 10 Base-T /F
1.4	Resolution	<b>TBS:</b> Minimum of 200 dpi X 200 dpi resolution
<b>2. Performance Requirements</b>		
2.1	Printing speed	Print Speed Minimum of 200 mm per second
<b>3. Features</b>		
3.1	Compatible with Windows 10 or later versions.	
3.2	Field upgradeable to accept new symbologies within its resolution	

**TBS: To Be S**pecified in RFP. If not specified, bidder must ascertain selection or be liable for highest cost option at bid price.  
**TBS:** تعني يجب تحديدها من قبل كاتب الوثيقة. فإن لم يتم تحديدها فعلى المقاول الاستفسار عنها وإلا سيكون مسئولاً عن توريد أفضل الخيارات بالسعر المقدم في العرض

Vendors must comply with instructions ( page 6 to 18 )

على المورد الالتزام بالتعليمات في الصفحات من 6 إلى 18

3.3	Small footprint/ for use in locations with low desktop real-estate availability
3.4	<b>TBS:</b> 220 V , 24VDC $\pm$ 7 %regulated Power Supply (with AC adapter if necessary).
<b>4. Security</b>	
4.1	Bar Codes/Symbologies UPC-A, UPC-E, JAN8 (EAN), JAN13 (EAN), CODE 39, CODE 93, CODE 128, ITF, CODABAR
<b>5. Warranty</b>	
5.1	3 years Full Warranty

### 9.7. Passport Printer Specifications

	<b>Must be a brand name product.</b>	
<b>1. Hardware architecture</b>		
1.1	Print head	Thermal Re-transfer Technology, with color Solid Pigment Ink.
1.2	Buffer Memory	
1.3	Ports	USB and Ethernet interface
1.4	Resolution	600 DPI; 256 steps color on CMYKUV panels, which will produce 18.6 million colors
<b>2. Performance Requirements</b>		
2.1	Printing speed	60 seconds or less print speed from inserting to ejecting the book
<b>3. Features</b>		
3.1	Compatible with the latest Crystagram Film Rolls for the Saudi Passports.	
3.2	A color touch screen LCD provides the operator with an easy to follow graphical interface with dynamic messages, icons and images.	
3.3	Build-in CCD Camera for recognizing the pre-printed booklet number.	
3.4	USB and Ethernet interface.	

**TBS: To Be Specified** in RFP. If not specified, bidder must ascertain selection or be liable for highest cost option at bid price.  
**TBS:** تعني يجب تحديدها من قبل كاتب الوثيقة. فإن لم يتم تحديدها فعلى المقاول الاستفسار عنها وإلا سيكون مسئولاً عن توريد أفضل الخيارات بالسعر المقدم في العرض

Vendors must comply with instructions (page 6 to 18)

على المورد الالتزام بالتعليمات في الصفحات من 6 إلى 18

3.5	Power Source: 220V AC, 50/60 Hz.
3.6	Equipped with Fingerprint, PIN and Smart Card Authentication methods.
3.7	Easy consumables replacement in Cassette Shape.
3.8	Produce ICAO Compliant Passports.
3.9	Accept printing from NIC system without any changes on the current process.
3.1	Easily accommodates passports of different sizes.
3.11	Weight and dimensions suitable for desktop usage and can be handled by few individuals without mechanical assistance.
3.12	Compliance with RoHS, FCC and CE.
3.13	Book Feeder Specifications(Toppan eP600): <ul style="list-style-type: none"> <li>a) Can accommodate at least 50 passports and up to 100 passports depend on the passport thickness.</li> <li>b) Compatible and integrated with Toppan eP600 Printer.</li> <li>c) Power will be supplied from the eP600 Printer without the need of external power source.</li> <li>d) Equipped with physical lock for security purposes.</li> <li>e) Book feeder cassette to easy load the passports.</li> </ul>
5. Warranty	
5.1	3 years Full Warranty

## 9.8. Card Printers

<b>Must be a brand name product.</b>	
1. Hardware architecture	
1.1	Print head Print head: Lifetime
1.2	Buffer Memory Memory 32MB RAM
1.3	Ports Interface USB 2.0 & Ethernet standard

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Vendors must comply with instructions ( page 6 to 18 )

على المورد الالتزام بالتعليمات في الصفحات من 6 إلى 18

1.4	Resolution	Print Resolution 300 DPI
<b>2. Performance Requirements</b>		
2.1	Printing speed	<ol style="list-style-type: none"> <li>1. Single-side YMC Print Speed Up to 1200 cards per 8-hour shift/24 seconds per card (YMC with transfer)*</li> <li>2. Single-side YMCK Print Speed Up to 992 cards per 8-hour shift/29 seconds per card (YMCK with transfer)*</li> <li>3. Dual-side YMCKK Print Speed Up to 720 cards per 8-hour shift/40 seconds per card (YMCKK with transfer)*</li> </ol>
<b>3. Features</b>		
3.1	Multiple Print Mode Selection	
3.2	Simultaneous Printing / Encoding	
3.3	Printer Password Protection Workbench and display	
3.4	Locking Card Input Hopper	
3.5	Locking Card Output Hopper	
3.6	Lockable Printer and Laminator Housing	
3.7	Supported Software Drivers Windows® Server 2016 (64 bit) or later and 10 or later versions.	
3.8	(32 & 64 bit); Mac OS X v10.4/v10.5; and Linux***	
3.9	Power Input 100-240 VAC, 3.5 A MAX, 50 Hz - 60 Hz	
3.1	Agency Approvals UL, CE, IC, FCC Class-A, CCC, BSMI, KC, MIC, S-Mark	
3.11	Touch Screen Display 3.2" display for status and help information	
3.12	Dual-Cooling Fans	
3.13	Replaceable Fan Filter	
3.14	Card Input Capacity (2 Hoppers) 400 cards (.030" / .762mm)	
3.15	Dual Input Hopper Capability Yes	
3.16	Card Output Capacity (1 Hopper) 200 cards (.030" / .762mm)	
3.17	Card Thickness .030" (30 mil) to .050" (50 mil) / .762mm to 1.27mm	

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**Vendors must comply with instructions (page 6 to 18)**

على المورد الالتزام بالتعليمات في الصفحات من 6 إلى 18

3.18	Card Exception Feed
3.19	Card Cleaning Station Two
3.2	Cartridge Loadable Ribbons
3.21	Fluorescing/UV Ribbon
3.22	Full-Color – YMC (maximum images per roll) 750
3.23	Full-Color – YMCK (maximum images per roll) 500
3.24	Full-Color – YMCKK (maximum images per roll) 500
3.25	Full-Color – Half-Panel YMCK (maximum images per roll) 1000
3.26	HDP Film (maximum images per roll) 1500
3.27	Dimensions 15.5" H x 28.2" W x 14.0" D / 394mmH x 716mmW x 356mmD
3.28	Weight (printer only) Dual-sided only: 61 lbs / 27.7 kg
3.29	Heavy Duty Metal Enclosure
3.3	Fully Accessible Card Path
3.31	Dual-Sided Simultaneous Lamination
3.32	Andon Production Status Light
3.33	ISO Card Flattener
3.34	Laser Engraving Q4, 2012
3.35	ISO Magnetic Encoding
3.36	Contact Smart Card Encoding
3.37	Contactless Smart Card Encoding
3.38	HDP Film (maximum images per roll) 1500
<b>4. Security</b>	
4.1	Security Resin Erase Standard
4.2	Network Data Encryption
<b>5. Warranty</b>	
5.1	3 years Full Warranty

**TBS: To Be S**pecified in RFP. If not specified, bidder must ascertain selection or be liable for highest cost option at bid price.  
**TBS:** تعني يجب تحديدها من قبل كاتب الوثيقة. فإن لم يتم تحديدها فعلى المقاول الاستفسار عنها وإلا سيكون مسئولاً عن توريد أفضل الخيارات بالسعر المقدم في العرض

Vendors must comply with instructions ( page 6 to 18 )

على المورد الالتزام بالتعليمات في الصفحات من 6 إلى 18

## 9.9. Color Ink Jet Plotter

<b>Must be a brand name product.</b>		
<b>1. Hardware architecture</b>		
1.1	Print head	Full Color Inkjet plotter or Thermal Inkjet.
1.2	Buffer Memory	<b>TBS:</b> Minimum of Memory <b>96MB</b> . <b>TBS:</b> Minimum of H.D.D of <b>160GB</b>
1.3	Ports	Parallel or Hi-speed USB 2.0 connection
1.4	Resolution	Minimum of 1200x600 dpi resolution. Up to 2400 x 1200 optimized dpi
<b>2. Performance Requirements</b>		
2.1	Printing speed	Fast Print Speed in Color images: 40 m2/hr (440 ft <sup>2</sup> /hr) on coated media, and Best Quality printing Speed: 3 m2/hr (33 ft <sup>2</sup> /hr) on glossy media
<b>3. Features</b>		
3.1	Paper size 11" up to 44" in rolls 150 ft.	
3.2	It must be able to print on any paper (include but not limited to: Vellum, coated papers, films, Heavy coated, Satin Poster, Canvas...)	
3.3	It must have a Single sheet feeder, roll feeder, automatic cutter, and printer stand with at least two roll holders.	
3.4	Printer shall also accept freely adjustable paper sizes through a manual feed slot. Sheet feed, roll feed, automatic cutter	
3.5	Accepts Four-color ink cartridges (Cyan, magenta, black, yellow).	
3.6	Network ready "Fast Ethernet (100Base-T)",, and can be controlled by internal print server.	
3.7	Produces high quality and continuous tone photo-quality color images.	
3.8	<b>TBS: Paper size 60" in roll 300 ft.</b>	
3.9	<b>TBS: Two roll feeder.</b>	
3.10	<b>TBS: Accepts Six-color ink cartridges.</b>	
3.11	<b>TBS: It must be have a take-up reel function.</b>	

**TBS: To Be S**pecified in RFP. If not specified, bidder must ascertain selection or be liable for highest cost option at bid price.  
**TBS:** تعني يجب تحديدها من قبل كاتب الوثيقة. فإن لم يتم تحديدها فعلى المقاول الاستفسار عنها والإسكون مسئولاً عن توريد أفضل الخيارات بالسعر المقدم في العرض

Vendors must comply with instructions (page 6 to 18)

على المورد الالتزام بالتعليمات في الصفحات من 6 إلى 18

3.12	<b>TBS:</b> It must have a Minimum of 12"screen to monitor the printing operation.
3.13	220 V regulated Power Supply (with AC adapter if necessary).
<b>5. Warranty</b>	
5.1	3 years Full Warranty

#### 9.10. GIS Format Plotter

<b>Must be a brand name product.</b>		<b>Category</b>	
<b>1. Hardware architecture</b>		<b>Small GIS Format Plotter</b>	<b>Large GIS Format Plotter</b>
1.1	Print head	Print technology: Thermal Inkjet dye-based system.	Print technology: Thermal Inkjet dye based system
1.2	Buffer Memory	<b>256 MB</b> Minimum of memory requirement	<b>256 MB</b> Minimum of memory requirement Minimum of <b>40 GB</b> HDD
1.3	Ports		
1.4	Resolution	Minimum of 1200 x 600 dpi Print quality, Up to 2400 x 1200 optimized dpi	Minimum of 1200 x 600 dpi Print quality, Up to 2400 x 1200 optimized dpi
<b>2. Performance Requirements</b>		<b>Small GIS Format Plotter</b>	<b>Large GIS Format Plotter</b>
2.1	Printing speed	printing Speed: 3 m <sup>2</sup> /hr (33 ft <sup>2</sup> /hr) on glossy media	Print Speed: Fast Mode – 60 m <sup>2</sup> /hr hour Minimum of ; Photo Speed – 8 m <sup>2</sup> /hr Minimum.
<b>3. Features</b>			
3.1	Media Handling: Roll feed, Sheet feed, automatic cutter.		
3.2	Supports optional paper handling: Duplex Print Options (usually provided by third parties.)		
3.3	Minimum of Standard Media Sizes: 11" up to 42" wide sheets rolls. With : ISO, JIS, ARCH, 152 cm printing capability		
3.4	Capable of Print Length up to 300 feet.		
3.5	Custom Media Sizes: 140 x 140 to 1067 x 1897 mm sheets, 458 to 1067 mm rolls.		
3.6	Standard Printer Language Support: TIFF, JPEG, CALS/G4, GL/2, RTL. HP-GL/2, HP-RTL, HP PCL 3 GUI.		

**TBS: To Be S**pecified in RFP. If not specified, bidder must ascertain selection or be liable for highest cost option at bid price.  
**TBS:** تعني يجب تحديدها من قبل كاتب الوثيقة. فإن لم يتم تحديدها فعلى المقاول الاستفسار عنها وإلا سيكون مسئولاً عن توريد أفضل الخيارات بالسعر المقدم في العرض

**Vendors must comply with instructions ( page 6 to 18 )**

على المورد الالتزام بالتعليمات في الصفحات من 6 إلى 18

3.7	Standard Connectivity requirement: Jetdirect 620n 10/100 Base-TX print server, supporting TCP/IP (including LPR and IPP), AppleTalk, IPX/SPX protocols, Centronics parallel port, IEEE 1284-compliant Hi-Speed USB 2.0 certified, EIO Jetdirect accessory slot.
3.8	Print Drivers: Microsoft® Windows: Windows 10 or later versions with Plotter Drivers, UNIX®, LINUX: with Plotter embedded web server file submitter, AutoCAD: 2000, 2002, R 14 and higher for Windows.
3.9	220 V regulated Power Supply (with AC adapter if necessary).
<b>4. Warranty</b>	
4.1	Warranty: Three-year warranty with free, on-site, next-business-day service. Service agreements must allow for warranty period to be extended up to 5 years

## 10. Imaging Devices

- 10.1. Color Photo Image Scanner (Personal):
- 10.2. Auto-Feed Photo Image Scanner
- 10.3. Auto-Feed Document Archiving Image Scanner:
- 10.4. Medium Speed Document Archiving Image Scanner:
- 10.5. High Speed Document Archiving Image Scanner:
- 10.6. Digital ID Camera

	Must be a brand name product.	Category	
	1. Features	Digital ID Camera	Iris Camera
1.1		Resolution capable of producing photos at least 8 Mega pixels.	Must be a brand name product
1.2		USB connection to PC.	Operating Temperature: 0°C - 45°C
1.3		Flash to replicate natural daylight.	Humidity: 0% to 90%

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1.4	No moving parts	Operating Range: 26cm - 36cm
1.5	Auto focus (9 AF points(f/5.6) cross type at center) , Auto-iris, Auto white balance, and Auto exposure.	Rotation Angle: +35° /-25°
1.6	Full color spectrum. Minimum of 24 bit color.	Interface: TCP/IP
1.7	Stand and accessories for fast and easy photography by unskilled personnel.	LED Indication
1.8	Video capability to allow user to see live subject on PC monitor and capture still picture.	Capture two eyes at the same time
1.9	Standalone still picture mode.	SDK that supports Java
1.1	Includes all necessary drivers and SDK to accomplish PC capture of pictures.	False acceptance rate of 0.000009 or less
1.11	TWAIN compliant with drivers for Windows 10 or later versions.	Automatic detection of eyes
1.12	PC Powered connection or 230/400 V DC adapter. Cameras, which are fully battery dependent, are NOT acceptable.	Networking LAN connectivity: 10/100BASE-T Ethernet
1.13	Bidder MUST identify and quote for any consumables necessary for proper operation of camera, including, but not limited to specialized cleaning material.	Internal Components: 16x Zoom B/W CCD Camera, 2 IR LED
1.14	Remote Control of Camera	Power Input: 12VDC @ 2.5A MAX, +/- 10%
<b>2. Warranty</b>		

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2.1	3 years Full Warranty
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### 10.7. Bar Code Reader:

	Must be a brand name product.	Category	
		Bar Code Reader	'2-D' Bar Code Reader
1. Features			
1.1		Laser sensor.	Laser sensor.
1.2		Reads all standard 1-D barcodes including but not limited to: UPC-A, UPC-E, UPC-E1, EAN-8, EAN-13, Code 39, Code 39 Full ASCII, Trioptic Code 39, Code 93, UCC/EAN, Code 128, Codabar, I2of5, D2of5.	Reads all standard 1-D barcodes including but not limited to: UPC-A, UPC-E, UPC-E1, EAN-8, EAN-13, Code 39, Code 39 Full ASCII, Trioptic Code 39, Code 93, UCC/EAN, Code 128, Codabar, D2of5.
1.3		Must read barcodes with any rate of compression within the specified standard.	Must read barcodes with Minimum of 50% rate of compression within the specified standard.
1.4		Easy firmw are upgrade in the field.	Easy firmw are upgrade in the field.
1.5		Small and light weight.	Small and light weight.
1.6		Easy to use	Must be easy to aim: Point-and-shoot scanning.
1.7		Trigger-less operation	Trigger-less operation
1.8		Must have a fast decode capability (less than 2 seconds).	Must have a fast decode capability (less than 2 seconds for 1K of data).
1.9		Must have a wide read range of at least 2 inches to 13 inches.	Must have a wide read range of at least contact 3 inches to 13 inches.

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1.10		Wide angle reading. Field of View at least 32° horizontal / 24° vertical.	Wide angle reading. Field of View at least 32° horizontal / 24° vertical for 1-D barcode, half the range for 2-D barcode
1.11		Focal Point : High Density 6.4cm from nose of scanner Read in very dim lighting conditions.	Focal Point : High Density 6.4cm from nose of scanner Read in very dim lighting conditions.
1.12		High resolution Fuzzy Logic capability to enable reading of slightly damaged barcodes. Strong ability to recognize slightly soiled, skew ed, or otherw ise damaged bar codes.	High resolution Fuzzy Logic capability to enable reading of damaged barcodes. Strong ability to recognize slightly soiled, skew ed, or otherw ise damaged bar codes.
1.13		Rugged design.	Rugged design.
1.14		IEC529 rating IP53DW (resistant).	IEC529 rating IP53DW (resistant).
1.15		Withstands multiple five-foot (152cm) drops onto concrete; over 100 drops to a countertop.	Withstands multiple five-foot (152cm) drops onto concrete; over 100 drops to a countertop.
1.16		Sealed and protected from windblow n dust and rain.	
1.17		<b>TBS:</b> USB or keyboard w edge connection.	<b>TBS:</b> USB or keyboard w edge connection.
1.18		<b>TBS:</b> Handheld Gun Type or Omni Directional Presentation scanner with on-counter mount	Reads all standard 2-D barcodes including at least: PDF417 and DataMatrix.
1.9			Must have a visible laser aiming pattern.
1.20			Handheld Gun Type with on-counter mount
<b>2. Warranty</b>			
2.1		Warranty: Three-year warranty with free, on-site, next-business-day service. Service agreements must allow for warranty period to be extended up to 5 years	

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على المورد الالتزام بالتعليمات في الصفحات من 6 إلى 18

## 10.8. Fingerprint Scanners

Must be a brand name product.		Category		
1. Features		Single-Fingerprint Live-Scan	Standard Ten Finger Print Capture Scanner	Enhanced Ten Finger Print Capture Scanner
1.1		Supply Voltage	Meet FBI /IAFIS Image Quality Specification EFTS Appendix F (CJIS-RS0010).	Meet FBI /IAFIS Image Quality Specification EFTS Appendix F (CJIS RS0010).
1.2		Supply Current—scanning	NIST/AFIS interface	NIST/AFIS interface
1.3		Supply Current—idle mode	<b>TBS:</b> Forensic-quality (SLAP only) OR (SLAP & ROLLS) fingerprints	Forensic quality (flat & Rolls) fingerprints
1.4		Supply Current—suspend mode	Quality check with visual and audible alerts	Quality check with visual and audible alerts
1.5		Temperature, Operating	Automatic fingerprint sequencing	Automatic fingerprint sequencing
1.6		Humidity, Operating	Automatic duplicate print checking	Automatic duplicate print checking
1.7		Temperature, Storage	<b>TBS:</b> Automatic Capturing without operator action (SLAP only) OR (SLAP & ROLLS).	Auto Capture, Flex Flats, FlexRolls, wet and dry finger image capture without pretreatment of hands or device recalibration
1.8		Humidity, Storage	Water and dust protected, rugged case.	Water and dust protected, rugged case.
1.9		Scan Data	Filter and reject residuals ghost fingerprint images.	Filter and reject residuals ghost fingerprint images.

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Vendors must comply with instructions (page 6 to 18)

على المورد الالتزام بالتعليمات في الصفحات من 6 إلى 18

1.10		Top Surface	Scanner Resolution Enhanced Definition 500 ppi image capture output, with square pixels	Scanner Resolution Enhanced Definition 500 ppi image capture output, with square pixels
1.11		Interface	Scanner Dynamic Range True 8 bits/pixel = 256 gray levels	Scanner Dynamic Range True 8 bits/pixel = 256 gray levels
1.12		Weight	Interface : USB 2.0 Org Certified	Interface : USB 2.0 Org Certified
1.13		Standards Compliance	Power Source: Must obtain form USB ( Single point Interface for data and Power)	Power Source: Must obtain form USB ( Single point Interface for data and Power)
1.14		ESD	Minimum Area for Image Capture :3.2" * 3.0".	Minimum Area for Image Capture : 3.2" x 3.3" (8.13 cm x 8.38 cm)
1.15		Pixel resolution: 500dpi	Operating Temperature: 0-50 Degree C.	Operating Temperature: 0-50 Degree C.
1.16		8-bit grayscale (256 gray levels)	Humidity Range: 10-90%	Humidity Range: 10-90%
1.17		Scan capture area: 20.32 mm x 25.4 mm	Compliance with IAFIS and NIST image standard	Compliance with IAFIS and NIST image standard
1.18		Reader size: 86mm L x 53mm W x 31mm H (+/-0.5mm)	Additional standard compliance.	Additional standard compliance.
1.19		USB 2.0 (High Speed)	Support MS window s 32,64 bits.	Support MS window s 32,64 bits.
1.20			Sensor Type: Optical.	Sensor Type: Optical.
<b>2. Warranty</b>				

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Vendors must comply with instructions ( page 6 to 18 )

على المورد الالتزام بالتعليمات في الصفحات من 6 إلى 18

2.1	Warranty: Three-year warranty with free, on-site, next-business-day service. Service agreements must allow for warranty period to be extended up to 5 years
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## 10.9. Palm Print Live Scan Device

Must be a brand name product.	
1. Features	
1.1	Image Quality-Meets FBI IQS IAFIS Image Quality Specification Appendix F
1.2	Optical Scanner Interface - FireWireA IEEE 1394, OHCI compliant
1.3	Optical Scanner Dimensions - Deck W: 12.5in (32cm); H: 6.25in (16cm); D: 14in (35.5cm)
1.4	Operating Environment - Ambient temp: 40°– 95° F (5°– 35° C). Relative Humidity: 20%–80% non-condensing
1.5	Data Content - Demographics (customizable), fingerprints and photo image transmission in compliance with FBI's EFTS in ANS/NIST-CSL 1-1993 specified format
1.6	Data Protocols - SMTP / FTP / NFS / TCP/IP sockets / VPN
1.7	Active Imaging Dimensions - Roll/Slap Platen 3.2in x 2.0in (81mm x 51mm)
1.8	Rolled Print Size - Image compliant with FBI standard at 1.6in X 1.5in (41mm x 38mm)
1.9	Slap Image Size - 3.2in x 2.0in (81mm x 51mm)
1.10	Optical Resolution - Enhanced Definition 500 ppi image capture output, with square pixels
1.11	Dynamic Range - Greater than 8 bit, yielding over 256 gray scale depth
1.12	<b>TBS:</b> Additional standard compliance
2. Warranty	

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Vendors must comply with instructions (page 6 to 18)

على المورد الالتزام بالتعليمات في الصفحات من 6 إلى 18

2.1	Warranty: Three-year warranty with free, on-site, next-business-day service. Service agreements must allow for warranty period to be extended up to 5 years
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#### 10.10. Fingerprint Scanner

	Must be a brand name product.	Category	
		Fingerprint Card Scanner	Latent Fingerprint Scanners
1. Features			
1.1		Scanner type Flatbed	Resolution 1008(H) X 1018 (V) pixels.
1.2		Scanning area	Reflection reading source direct current light halogen spot light with adjustable illumination and interchangeable color filters.
1.3		Resolution - Hardware = 4800 x 4800 dpi; Optical = 4800 dpi; Enhanced = up to 999,999 enhanced dpi (Maximum dpi at which you can scan is limited by available computer memory, disk space and other system factors.)	Transmitting reading source direct current light halogen spot light filter with adjustable illumination.
1.4		Color depth - 48-bit, Gray scale 256	Scanner table size 30 cm X 30 cm.
1.5		Scan input modes - Front-panel scan, copy, transparent materials adapter (TMA)	Scanner magnification X1 / X5.
1.6		Preview speed	Scan accuracy 50 dots / mm.
1.7		Zooming - 10 to 2000% in 1% increments	Scanned object latent fingerprint (X1).
1.8		Interface - 1 USB 2.0, optional SCSI module and kit available	Scan dimension 25.4 X 25.4 mm
1.9		Recommended operating environment Temperature = 50 to 95 F (10 to 35 C); Humidity range = 15 to 85% RH	Scan area adjustment static object, hand operator.

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على المورد الالتزام بالتعليمات في الصفحات من 6 إلى 18

1.10		File formats supported - BMP, TIFF, GIF, PDF, HTML, JPEG, FlashPix (FPX), TIFF compressed, PCX, RTF, TXT, and PNG	Illumination distribution over 90%.
1.11		Power supply	220 V regulated Power Supply (with AC adapter if necessary).
<b>2. Warranty</b>			
2.1	<b>Warranty: Three-year warranty with free, on-site, next-business-day service. Service agreements must allow for warranty period to be extended up to 5 years</b>		

## 11.Storage Devices

### 11.1. Storage Area Network (SAN):

1. Architecture		Low	Mid	High
1.1	Solution must be All Flash Storage	100TB	1PB	4PB
1.2	Solution must have All Flash High-End Architecture with Multiple Active/Active Controllers			
1.3	Solution must be a dynamic All Flash storage platform providing data services, performance, efficiency, and simplicity at scale			
1.4	Solution must help improve storage performance to accelerate data access and speed process execution			
1.5	Solution must provide the highest levels of performance available in an enterprise class storage array and be future proof - with end-to-end NVMe, including industry standard NVMe based drives, NVMe based DAE, and be NVMe over Fabric ready			
1.6	Solution must support NVMe over PCIe-3 Back-End connectivity			
1.7	Solution must support both Block and File workloads in the same array with no external (extra) HW for file workload (external Gateway)			
1.8	System should support Dynamic Core Allocation feature between Front-End and Back-End Core resources to serve different workloads requirements			
1.9	Storage Controllers must interconnect and share resources (Memory, disk, host ports) across each other using the very fast, very low latency dedicated fabric interconnect (vendor to provide more details)			

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على المورد الالتزام بالتعليمات في الصفحات من 6 إلى 18



2. Scalability		Low	Mid	High
2.1	Solution must scale up to 16 Active/Active Controllers			
2.2	System Global Cache should be scalable up to 16TB			
2.3	System must support the high capacities enterprise SSD's (3.84 and 7.68TB)			
2.4	Solution must scale up to 256 FC Ports			
2.5	Solution must support Multi-Dimensional Scalable HW, both Scale-UP (adding capacity) and Scale-Out (adding controllers)			
2.6	Solution must be able to handle expected and unexpected growth easily, cost-effectively, and with minimal disruption to business activities			
2.7	Solution must scale up to 4PB of effective capacity			
3. Availability		Low	Mid	High
3.1	Solution must maximize data availability to keep business operational across the enterprise, with a goal of 99.9999% uptime			
3.2	Solution must have all redundant HW with NSPOF			
3.3	Solution must support Non-disruptive system software and Hardware upgrades			
3.4	Solution must provide the maximum High Availability, Data Integrity and Data Protection (vendor to provide more details on how to achieve this)			
4. Flexibility		Low	Mid	High
4.1	Solution must support various of Virtualized environment and Applications like Vmware, MS Hyper-V, Oracle, SAP, MS Exchange			
4.2	Solution must support mixed workload storage consolidation with consistent scale-out performance			
4.3	Solution must support mixing OS in the same array/environment			
4.4	Solution must be flexible to address a wide range of application and business needs, including both structured data (such as databases) and unstructured data (such as e-mails, documents, and video)			
5. Efficiency		Low	Mid	High
5.1				

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على المورد الالتزام بالتعليمات في الصفحات من 6 إلى 18

	Solution must provide consolidated storage to make information more sharable, increase utilization rates, and simplify management			
5.2	Solution must help implement strategies and technologies to identify current and future power needs, optimize infrastructure for greater energy efficiency, and reduce energy costs			
5.3	Solution must optimize storage, power, bandwidth, and human resources across the enterprise to increase revenue and ROI			
5.4	Solution must be complete, minimizing total cost of ownership and leveraging current investments			
5.5	Solution must support In-Line Compression for maximum Capacity Efficiency			
5.6	Solution must support In-Line De-duplication for maximum Capacity Efficiency			
5.7	Solution must fully support Thin Provisioning feature, also known as Virtual Provisioning. The Thin Provisioning feature license must be included for all proposed capacity			
<b>6. Storage Virtualization</b>		<b>Low</b>	<b>Mid</b>	<b>High</b>
6.1	Solution must fully support virtualized server environments, enabling us to do more with existing resources, reducing both costs and energy requirements			
6.2	System must support native integration with VMware environments through the use of VAAI (Vmware vStorage APIs for Array Integration), being able to assign Vmware operations like storage deployment, cloning/snap and Vmotion to the storage subsystem			
6.3	Solution must support Microsoft ODX			
6.4	Solution must easily integrates with Virtual Environments by providing management and monitoring tools (vendor to provide more details on intergration tools/elements)			
<b>7. Functionality</b>		<b>Low</b>	<b>Mid</b>	<b>High</b>
7.1	The system must be able to support Active/Active LUN configuration. LUNs must be seen and accessed by all available controllers simultaneously			
7.2	Solution must include Artificial Intelligence and Machine Learning features to support traditional as well as modern analytics-powered next generation applications with an evolving workload mix			
7.3	Solution should support the ability to eliminate backup impact on the application by removing the server from the data path and minimizing the traditional backup window providing performance of snapshots and the functionality of backups			
7.4	Must provide solution for Copy Data Management			
7.5	Solution should provide ways to reduce the amount of storage needed for backup, archiving, remote office, etc			
7.6	Solution must provide quick restore of data that is backed up or archived to meet corporate and government compliance requirements and to maximize productivity			

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7.7	Solution must support creating Snapshots with minimal capacity and Global Cache impact			
<b>8. Local and remote protection</b>		<b>Low</b>	<b>Mid</b>	<b>High</b>
8.1	Solution must support Sync and Async Remote Replication with the ability to have both Replication types running in the same time for different Applications			
8.2	Solution must support Active/Active Data Centers scenarios			
8.3	Solution must support Local Protection (Snapshot)			
8.4	Solution must achieve both recovery point objectives (defining maximum data loss) and recovery time objectives (defining maximum downtime) for various information types			
8.5	Solution should support continuous data protection (with any point-in-time recovery)			
8.6	Solution must support access of the DR image without the need to have a local copy in DR site to avoid extra cost			
8.6	Solution must support Application Consistency 95isbeh with Local and Remote Replications			
<b>9. Management</b>		<b>Low</b>	<b>Mid</b>	<b>High</b>
9.1	Solution must simplify management and reduce administrator tasks			
9.2	Storage solution shall provide GUI and CLI with Management and Monitoring capabilities			
9.3	Solution must support embedded management SW			
9.4	Management solution should provide monitoring capabilities for Historical (trending) and Real Time Performance Metrics via Intelligent reports			
<b>10. Security</b>		<b>Low</b>	<b>Mid</b>	<b>High</b>
10.1	Solution must maximize information security and minimize the risks of downtime, data loss/corruption, unauthorized access, and compliance failure			
10.2	Solution must support Data At Rest Encryption			

## 11.2. Object Storage

<b>1. Architecture</b>		<b>Low</b>	<b>Mid</b>	<b>High</b>
1.1	This configuration will deliver total of [Total Storage in PB] per site	xxPB	xxPB	xxPB

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1.2	each appliance will deliver [your capacity needed] TB replicated a cross 3 DC, with total of [your capacity needed]TB	xxPB	xxPB	xxPB
1.3	Massively scalable and easy-to-use global data repository for unstructured data with up to 16 DC's			
1.4	Usable disk capacity [your capacity needed]TB per 1 site for 2 replicas	xxPB	xxPB	xxPB
1.5	Total usable capacity for 3 DC will be [your capacity needed]TB.	xxPB	xxPB	xxPB
1.6	Support up to [number of SAS drives based on your capacity] SAS drives per appliance			
<b>2. Scalability</b>		<b>Low</b>	<b>Mid</b>	<b>High</b>
2.1	Support several geo-distributed sites with geo-replication with 100+ ms WAN latency between sites allowing integration with both existing and next-generation applications			
2.2	8 CPU Cores with minimum 2.2GHz per appliance			
2.3	Connectivity 4 x 10GbE / 4 x 25GbE per appliance			
2.4	Two controllers one for Storage and one for Compute			
<b>3. Availability</b>		<b>Low</b>	<b>Mid</b>	<b>High</b>
3.1	Total power consumption not more than 7.2KW per site for whole solution			
3.2	Redundant Power Supplies			
3.3	Redundant Multispeed fans			
3.4	Rack Space is 4U			
<b>4. Flexibility</b>		<b>Low</b>	<b>Mid</b>	<b>High</b>
4.1	Support Object access protocols: OpenStack Swift			
4.2	Supported NAS access protocols: CIFS, NFS, and File object duality			
4.3				
<b>5. Functionality</b>		<b>Low</b>	<b>Mid</b>	<b>High</b>
5.1	Support deployment options on physical or virtual servers, virtual or hardware appliances, or containers			

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5.2	The appliance support deployment in a hybrid environment that combines appliance nodes and virtual (software -based) nodes			
5.3	Support multi-tenancy for multiple storage tenant accounts to segregate the objects stored on the system by different tenants.			
5.4	Management API: system installation, system administration, tenant management, maintenance tasks, and system monitoring			
5.5	Content-aware self-healing maintains data protection even during network disruptions			
5.6	Policies can be modified and applied retroactively to existing objects			
5.7	Provide high availability of data storage and management functions, with integrated load balancing to optimize the data load across object storage appliances resources			
5.8	Support adjusts data policies			
5.9	support bucket caching			
5.10	Provide advanced system monitoring			
5.11	Support Non-disruptive upgrade and maintenance operations. Maintain access to content during upgrade, expansion, decommission, and maintenance procedures			
<b>6. Management</b>		<b>Low</b>	<b>Mid</b>	<b>High</b>
6.1	Tenant API: management of users, credentials, usage, and quotas			
6.2	Power Specification: 1350W (nominal), 1800W (peak) per appliance.			
<b>7. Security</b>		<b>Low</b>	<b>Mid</b>	<b>High</b>
7.1	Support advanced security and encryption capabilities: <ul style="list-style-type: none"> <li>• lossless compression Full Disk encryption drives</li> <li>• Transport Security Layer (TSL) 1.2 and AES 256-bit encryption</li> <li>• Secure Hash Algorithm 2 (SHA-2) and CPU-efficient integrity protection</li> </ul>			

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### 11.3. Data Block Storage

1. Architecture		Low	Mid	High
1.1	FlashArrays with Three Years highest Subscription in each site. This configuration will deliver total of 6PB of Effective Capacity per site			
1.2	Each FlashArray will deliver [your capacity needed]TB of guaranteed effective usable capacity based on 3.1x Data reduction (only Deduplication and Compression).			
1.3	Block Protocols: Fiber Channel, iSCSI, NVMe -FC and NVMe -oF			
1.4	File Protocols: NFS and SMB/CIFS			
1.5	[your capacity needed]TB (Data Pack A) and [your capacity needed]TB (Data Pack B) in the FlashArray base chassis.			
1.6	[your capacity needed]TB (Data Pack C) and [your capacity needed]TB (Data Pack D) in the NVMe expansion shelf.			
2. Scalability		Low	Mid	High
2.1	Data Reduction (Deduplication and Compression) always on without any performance impact.			
2.2	Consistent high -performance and microsecond latency. Always-modern architecture with no forklift upgrade.			
3. Availability		Low	Mid	High
3.1	Built –in Active Cluster and Data Protection & Replication			
3.2	Consistent high –performance and microsecond latency.			
3.3	Always-modern architecture with no forklift upgrade.			
3.4	24/7 support (15min SLA for SEV1, and 4hrs for HW replacement)			
3.5	Dual Active/Active storage controllers.			
3.6	Redundant Power Supplies			
3.7	Redundant Multispeed fans			
4. Flexibility		Low	Mid	High

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4.1	No single point of failure and all components are hot swappable			
4.2	Supported Protocols: FC, iSCSI, NVMe –oF(ROCE), NVMe –FC, NFS and SMB/CIFS			
<b>5. Functionality</b>		<b>Low</b>	<b>Mid</b>	<b>High</b>
5.1	4 x Non –volatile DDR -4 NVRAM			
5.2	4 x 1Gb Ethernet ports for Management (2 per Controller)			
5.3	4 x 10Gb/25Gb Ethernet ports for Replication (2 per Controller)			
5.4	4 x 10Gb/25Gb Ethernet ports for iSCSI/NAS (2 per Controller)			
5.5	12 x 32Gb FC/NVMe –FC ports (6 per Controller).			
5.6	Block Protocols: Fiber Channel, iSCSI, NVMe –FC and NVMe –oF			
<b>6. Management</b>		<b>Low</b>	<b>Mid</b>	<b>High</b>
6.1	Total power consumption 6.48KW per site.			
6.2	Evergreen Gold Support Subscription			
6.3	100% End –To –End NVMe .			
6.4	Total RACK Space is 24U per site			
6.5	Free Controllers every three			
6.6	No end of life or end of support			
6.7	Power Specification: 1620W (nominal), 1946W (peak).			
6.8	No end of life or end of support.			
6.9	24/7 support (15min SLA for SEV1, and 4hrs for HW replacement); Proposed support cover the non -return option for NVMe drives and controllers.			
<b>7. Security</b>		<b>Low</b>	<b>Mid</b>	<b>High</b>
7.1	Data Reduction (Deduplication and Compression) always on without any performance impact.			
7.2	Data Encryption always on without any performance impact.; Built -in Active Cluster and Data Protection & Replication			

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- 11.4. Backup Library  
 11.5. Backup Tape Drive

## 12. Display Devices

### 12.1. Flat Panel Displays

	Must be a brand name product.	Category	
	1. Features	Flat Panel Display – Monitors	Flat Panel Display - TVs
1.1		Must be a brand name product.	Screen Size ( ").
1.2		<b>TBS:</b> Minimum 20" LED Backlights (20 -inch viewable image size) Or bigger.	Smart TV.
1.3		Widescreen Flat Panel Display.	4K ULTRA HD LED Panel display.
1.4		<b>TBS:</b> Minimum HD 1600x900 resolution or higher at 60 Hz.	3840(w)X2160(H) resolution.
1.5		Security lock slot	16:9 Aspect Ratio.
1.6		<b>TBS:</b> Connectivity At least the following :	Support 3D.
1.7		Digital Visual Interface connectors (DVI-D).	Integrated wireless LAN.
1.8			Smart TV Apps.
1.9			Support (keyboard/Mouse) Bluetooth.

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1.10		Multiple Language Display.
1.11		Multiple Language Display.
		1. Connectivity At least the following: <ol style="list-style-type: none"> <li>1. 3 Side HDMI™ Input.</li> <li>2. USB 3.0 x 1.</li> <li>3. USB 2.0 x 2.</li> <li>4. SCART Input</li> <li>5. LAN port.</li> <li>6. Headphone Output</li> </ol>
<b>2. Warranty</b>		
2.1	3 years Base Warranty	

#### 12.2. Projectors

	Must be a brand name product.	Category	
	1. Features	Portable Data Show Projector	Ceiling Data Show Projector
1.1		True XGA 768 x 1024 Resolution	True SXGA 768 x 1024 Resolution
1.2		<b>2500</b> ANSI Lumens.	<b>3500</b> ANSI Lumens.
1.3		<b>LAMP: 220W</b> UHP.	<b>LAMP: 300W</b> UHP.
1.4		Power Zoom & Focus.	Power Zoom & Focus.

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1.5	Built in WIFI.	TFT LCD 16 million colors.
1.6	Built in USB Interface.	Multiple inputs : Data(at least two inputs) & Video(at least two inputs).
1.7	Built in card reader.	PC Compatible Remote Control
1.8	TFT LCD 16 million colors.	Unique JVD D-ILA Technology
1.9	Multiple inputs: Data (at least one input) & Video (at least two inputs).	Excellent Data & Video Picture
1.10	PC Compatible Remote Control.	Extended PC to projector cable (at least 15M).
1.11	1.2m min and max 15m distances.	Ceiling Mountable kit, with all necessary cables and parts for the installation.
1.12	Unique JVD D-ILA Technology	
1.13	Excellent Data & Video Picture	
1.14	Extended PC to projector cable (at least 15M).	
1.15	Portable. Must have small footprint, low weight no more than <b>5 LBS</b> .	
1.16	Must include carrying case whit the same brand logo.	
1.17	<b>TBS:</b> Ceiling Mountable kit, with all necessary cables and parts for the installation	
<b>2. Warranty</b>		
2.1	3 years Base Warranty	

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## 13. Power devices

### 13.1. Voltage Stabilizer

	Must be a brand name product.	Category	
1. Features		Voltage Stabilizer	Uninterrupted Power Supply (UPS)
1.1		Input Single phase voltage: 120 V, 220 V, 230 V, 240 V ( <b>Auto preferred</b> ).	Approvals: C-tick, CE, EN 50091 -1, EN 50091 -2, GOST, PCBC, VDE
1.2		Input Regulation range $\pm 15\%$ .	<b>TBS:</b> Minimum of 1000 VA.
1.3		Input Frequency 47.5 $\div$ 63 Hz.	Surge Protection.
1.4		Output Single phase voltage 120 V, 220 V, 230 V, 240 V/ Selectable 4 Output 2*110V and 2*220V	RJ-45 line protection.
1.5		Output Accuracy Better than $\pm 2\%$ .	Overload Alarm.
1.6		Output Frequency 48 $\div$ 63 Hz.	110-220 Auto switching Power Supply.
1.7		Response time 100 ms.	<b>TBS:</b> Minimum of 15 <b>minutes</b> of electrical support for any of the servers in this document.
1.8		Efficiency > 97%	Output Voltage 110v and 220v.
1.9		Permissible overload 200% for 1 minute.	Can automatically communicate with supported device (e.g. for "server shutdown").
1.10		BYPASS Type: Static.	Drivers for Windows 10 or later versions.

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1.11		Ambient operating temperature -10° C ÷ +45° C.	Must include all necessary cabling, Drivers, and documentation.
		Relative humidity Up to 95%, non-condensing.	Supports network interface card to be addressable and manageable.
		Maximum operating altitude 2400 m.a.s.l.	Must be use a latest technology
		Safety STANDARDS: IEC 62103, Electromagnetic Compatibility (EMC) EN-61000-6-4; EN-61000 6-2, Quality and Environmental management ISO 9001 and ISO 14001.	
		<b>TBS: Minimum of Output power of 2000 Watts.</b>	
		Accepts United States standard plugs (input and output).	
		Must be certified by CE mark or UL.	
<b>2. Warranty</b>			
2.1	3 years Base Warranty		

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## 14. Office Equipment

### 14.1. Copy Machine

	Must be a brand name product.	Category	
1. Features		Departmental Copy Machine	Personal Copy Machine
1.1		<b>Must be a brand name product</b>	<b>Must be a brand name product</b>
1.2		<b>TBS:</b> A4, A3 Paper size.	A4 Paper size.
1.3		Zoom Enlargement and Reduction from 50% to 200%.	Zoom Enlargement and Reduction from 70% to 140%.
1.4		20-25 copies per minute.	10-15 copies per minute.
1.5		Handles both document originals and copies	Handles both document originals and copies
1.6		Two 250-sheet paper trays.	One 200-sheet paper tray.
1.7		Auto feeder tray with at least 150 sheet capacity	220 V (50/60) Hz power source.
1.8		10 Bin sorter with stapling (50 sheet /Bin)	
1.9		Copy from both sides of the sheet	
1.10		<b>TBS:</b> 120/220V (50/60) Hz power source.	
1.11		<b>TBS: Minimum of Output power of 2000 Watts.</b>	
2. Warranty			
2.1	3 years Base Warranty		

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## 15. Data Security Hardware and Software

### 15.1. Firewall System Specifications

S.No		Category		
		Low	Mid	High
<b>1. Hardware architecture</b>				
1.1	The proposed appliance must have minimum [insert chosen category value (1)] ports from day one. The appliance must have minimum [insert chosen category value (2)] from day one. The Appliance must have minimum [insert chosen category value (3)] module from day one so the team can add QSFP as and when required. All modules, transceivers & license need to be provisioned from day one. HA, Sync & Management port must be provided separately	4x 1G/10G Copper 8x 1G/10G SFP/SFP+	12 x 1G copper RJ45 8 x 10G SFP+ 4 x 40G QSFP	4x 1G/10G Copper 16x 1G/10G SFP/SFP+ 4x 40G QSFP+
1.2	The proposed appliance must have - [insert chosen category value (1)] port for out of band management - [insert chosen category value (2)] port for HA connectivity - [insert chosen category value (3)] to sync config / session between HA pair These ports must be in addition to production ports mentioned earlier.	1 x 1G 1 x 1G 1 x 1G	1 x 1G 2 x 1G 1 x 10G	1 x 1G 2 x 1G/10G 1 x 10G
1.3	The proposed solution must have minimum 240GB SSD drive for storing operating system image, system files, system logs & network traffic logs.	240 SD	240 SSD	240 SSD
1.4	The Appliance must have minimum [insert chosen category value] GB RAM from day one	8	16	32
1.5	The appliance must have 2 x redundant power supplies from day one	2	2	2
1.6	The appliance must have hot swappable fans.	Y	Y	Y
1.7	The proposed NGFW solution architecture should have Control Plane separated from the Data Plane in the Device architecture itself, whereby Control Plane should handle Management functions like configuration, reporting and route update & Data Plane should handle Signature matching (like exploits, virus, spyware, CC#), Security processing (like apps, users, content/URL, policy	N	Y	Y

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	match, SSL decryption, app decoding etc) & Network Processing (like flow control, route lookup, MAC lookup, QoS, NAT etc).			
1.8	The administrator must be able to view report on the CPU usage for management activities and CPU usage for other activities.	Y	y	Y
<b>2. Performance Requirements</b>		<b>Low</b>	<b>Mid</b>	<b>High</b>
2.1	The proposed firewall must provide NGFW functionality from day one with its corresponding licenses	Y	Y	Y
2.2	The proposed firewall must provide minimum [insert chosen category value] of throughput with encryption (when Firewall & App Control feature enabled) with Real world HTTP traffic of 64K transaction size and not Video/JPEG based traffic (enterprise testing condition). OEM to provide publicly available document mentioning throughput with transaction size, traffic mix & feature enabled including App-ID, User-ID, Content-ID, DoS/DdoS & Logging enabled	4 Gbps	32 GBPS	60Gbps
2.3	The proposed firewall must provide [insert chosen category value (1)] with Real world HTTP traffic of 64K transaction size and not Video/JPEG based traffic (enterprise testing condition). The throughput must remain 4 Gbps even after enabling [insert chosen category value (2)] + All signature enabled + Logging enabled + Bidirectional inspection + File Blocking. OEM to provide publicly available document mentioning throughput with transaction size, traffic mix	900 Mbps	16 GBPS	32Gbps
2.4	The proposed appliance must support [insert chosen category value] with Real world HTTP applications and not based on UDP / Lab environment / ideal testing environment.	192000	Minimum 3 Million concurrent sessions	65 million
2.5	The proposed firewall must support minimum 105,000 new session per second with real world HTTP application and not based on UDP / Lab environment / Ideal testing environment			
2.6	The proposed firewall must support SSL decryption. It must support [insert chosen category value]. OEM has to provide public document as reference		minimum 3,00,000 concurrent decrypted session	

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2.7	The proposed vendor must have "Recommended" rating in NSS LABS test with min 99% Evasion block capability and min 97.5% Security Effectiveness as per 2019 NSS Labs Next Generation Firewall Test Report.	Y	Y	Y
<b>3. FW features</b>				
3.1	The proposed firewall must be a L7 – Application aware – NGFW from day one	Y	Y	Y
3.2	It must allow to create security policies based on L7 parameters such as Application, Users, File Type etc in addition to IP & Port numbers	Y	Y	Y
3.3	While creating application based policy the firewall must auto select all default port numbers without need of admin to mention it separately. Example - while allowing Active Directory as an application, firewall must auto include all relevant port numbers used for AD communications such as 135, 138, 139, 389, 445 etc	Y	Y	Y
3.4	Preferred to have informational or warning message to admin about dependent application to be included in policy to avoid application 108is behavior	Y	Y	Y
3.5	The firewall must allow user identification by integrating with AD, WIFI, NAC etc solutions. It must support minimum 500K users based environments.	Y	Y	Y
3.6	The firewall must able to identify users behind Proxy server by reading information in XFF header and perform User-ID mapping. The firewall must strip XFF information before forwarding traffic to internet for privacy reason.	Y	Y	Y
3.7	The Firewall must support Active - Passive & Active - Active deployment option with IPV4 & IPV6 with seamless failover between HA pairs. The Firewall must support Multi device clustering as well.	Y	Y	Y
3.8	The firewall must able to identify end user IP addresses even if user traffic is coming via content delivery networks by reading information in XFF header. The Firewall must allow to create security policy based on IP Address information in XFF	Packet capture can give this facility	Packet capture can give this facility	Packet capture can give this facility
3.9	The proposed firewall must support dynamic security policy to self - adjust & updated based on received IOC, change in VM environment & identification of rogue machines in the networks by integrating with VMware, NAC solution, AWS, Azure & GCP environments	Depends on the vendor	Depends on the vendor	Depends on the vendor
3.10	The firewall must allow SSL to create security policy for API Based applications & next generation Cloud Native applications	Depends on the vendor	Depends on the vendor	Depends on the vendor

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		Packet capture can give this facility	Packet capture can give this facility	Packet capture can give this facility
3.11	The fire wall must have ability to track application response to ensure easy troubleshooting in case if application is misbehaving. Example ideal response expected from web server is HTTP 200 OK, instead if web server is sending HTTP 404, Fire wall must able to track and flag it to admin			
3.12	The NGFW must have GUI based packet capture utility within its management console with capability of creating packet capture filters for Ipv4 and Ipv6 traffic and ability to define the packet and byte count limit for the capture	Y	Y	Y
3.13	The fire wall must support FQDN instead of IP address for static route next hop, policy based forwarding next hop	Y	Y	Y
3.14	The proposed solution must support Policy Based forwarding based on: - Zone - Source or Destination Address - Source or destination port - Application (not port based) - AD/LDAP user or User Group - Services or ports	Y	Y	Y
3.15	The proposed solution should support the ability to create QoS policy on a per rule basis: -by source address -by destination address -by application -by static or dynamic application groups (such as Instant Messaging or P2P groups) -by port and services	Y	Y	Y
3.16	The NGFW must provide immediate visibility into applications bypassing traditional security policy & running on non-standard ports in the environment. The Fire wall must able to provide comprehensive report with Source/Destination IP, Application name (real application name & not protocol), source & destination Zone, data transfer amount & file name transfer	Y	Y	Y
3.17	The NGFW must ingest information related to change in compute by integrating with NSX & self-adjust security policy without any human intervention	Depends on the vendor	Depends on the vendor	Depends on the vendor
3.18	The NGFW must be able to acquire User Identities from: LDAP, Captive Portal, VPN, NACs (XML or API), Syslog, Terminal Services, XFF Headers, Server Monitoring, and client probing	Y	Y	Y
3.19	The NGFW must offer full and unfettered open API Support			
3.2	The Fire wall must support multicast like IGMP, PIM-SM, unicast & broadcast protocol / features	Y	Y	Y

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4. Security features				
4.1	The fire wall must support comprehensive threat prevention security features including IPS, Antivirus, Anti Spyware, Anti Bot, DoS /DDOS ,etc. from day one	Y	Y	Y
4.2	The proposed fire wall must have integrated Intrusion Prevention Systems – IPS with ability to prevent against minimum 15,000 + vulnerability exploit attempts. The fire wall must detect & prevent minimum 12,000 + CVE exploit attempts to safeguard the environment. OEM to provide full list of IPS signatures along with CVE numbers	Y	Y	Y
4.3	The proposed fire wall must support attack recognition for ipv6 traffic the same way it does for ipv4	Y	Y	Y
4.4	The proposed solution must support different actions in the policy such as deny, drop, reset client/server	Y	Y	Y
4.5	The proposed solution must have functionality of Geo Protection to block the traffic country wise per policy and per applications as per customer requirement and shouldn't be a global parameter	Y	Y	Y
4.6	The proposed solution must have an option to create custom signatures. It should also support importing of rules automatically from other open source solutions like, SNORT or Suricata etc.	Depends on the vendor	Depends on the vendor	Depends on the vendor
4.7	The Fire wall must support ability to decrypt & inspect TLS 1.3 traffic	Y	Y	Y
4.8	The proposed fire wall must support ingesting 3 <sup>rd</sup> party IOCs such as IP Addresses, Domain Names & URLs from different sources including existing security solution such as FireEye, Trend Micro & Open source threat intel such as Talos, Spamhouse etc.	Depends on the vendor	Depends on the vendor	Depends on the vendor
4.9	The NGFW must support QoS marking and reclassification based on source/destination IP, port, protocol, user, applications, security zone etc	Y	Y	Y
4.10	The proposed vendor must have "Recommended" rating with min 99% Evasion proof capability and min 97.5% Security Effectiveness as per 2019 NSS Labs Next Generation Fire wall comparative Test Report	Y	Y	Y
4.11	The proposed fire wall should have the ability to create custom application signatures and categories directly on fire wall without the need of any third-party tool or technical support. Also the device should have capability to provide detailed information about dependent applications to securely enable an application	Y	Y	Y
4.12	All the proposed threat prevention functions like IPS/vulnerability protection, Antivirus, C&C protection etc should work in isolated air gapped environment without any need to connect with Internet	Y	Y	Y
4.13	Should have simple policy formation for dynamic action to block domain generation algorithms or sinkhole DNS queries	Y	Y	Y

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4.14	The NGFW must have ability to detect credential theft attempts			
4.15	The NGFW Anti-virus & anti Malware must be able to analyse & prevent malicious file, virus, malware, ransomware etc traversing on following protocols: HTTP, HTTPS, SMTP, SMTPS, IMAP, IMAPS, FTP, and SMB	Y	Y	Y
4.16	The NGFW must be able to support decryption of the following protocols: SSL, SSH	Y	Y	Y
<b>5. Management</b>				
5.1	The firewall must support on device management for config changes in case of emergency & non availability of centralized management	Y	Y	Y
5.2	The firewall must have CLI, SSH & HTTPS based on device management	Y	Y	Y
5.3	The firewall must have comprehensive logging, log analyzer, log correlation, search, filter, unified logs available directly on firewall or on a separate logging server	Y	Y	Y
5.4	Proposed NGFW solution should have separate control and data plane with their own resources like CPU, Memory & Storage to ensure continuous & uninterrupted access without any lag or delay to NGFW irrespective load & CPU utilization	N	Y	Y
5.5	The administrator must be able to import the NGFW configuration into the central management platform	Y	Y	Y
5.6	The proposed solution must allow single policy rule creation for application control, user based control, host profile, threat prevention, Anti-virus, file filtering, content filtering, QoS and scheduling at single place within a single rule and not at multiple locations	Y	Y	Y
5.7	Product shall support Authentication, Authorization, and Accounting (AAA) protocols and support certificate-based authentication as well as integrate with Microsoft Active Directory/ Lightweight Directory Access Protocol (AD/LDAP) and Remote Authentication Dial-In User Service (RADIUS) to associate traffic to users for multiple domains, authenticate VPN client users, etc	Y	Y	Y
5.8	The NGFW must support the ability to create custom reports directly from the WebGUI of the NGFW or reporting tool	Y	Y	Y
<b>6. Training</b>				
6.1	Technical training for 4 persons			
<b>7. Warranty</b>				
7.1	3 years 24x7 comprehensive support from OEM with maximum 2 hours of response time / 4 hour Call-to-Resolution Services & Support ever be a hardware failure replacement	Y	Y	Y
7.2	Products shall not reach end of support/life within 5 years	Y	Y	Y

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## 15.2. MPLS Firewall

	<b>Must be a brand name product.</b>	<b>Category</b>
<b>1. Hardware architecture</b>		
1.1	Proposed Firew alls must be built based on a unique Single Pass Parallel Processing (SP3) Architecture w hich enables high-throughput, low -latency netw ork security, even w hile incorporating unprecedented features and technology.	
1.2	The proposed firew alls shall have the hardened Operating System (OS), built as a firew all appliance (i.e. not on generic server hardw are), and shall handle traffic in a single pass stream-based manner w ith all features turned on. It shall be optimized for layer 7 application level content processing and have special Application-Specific Integrated Circuit (ASIC) to handle signature matching and processing in a single pass parallel processing architecture.	
<b>2. Performance Requirements</b>		
2.1	The proposed firew all should have high performance modular firew all designed for large enterprise and carrier class environments. The multi-blade chassis has hot-sw appable line cards to enable expandability as needs grow and can provide up to <b>416 Gbps</b> of throughput w hen fully loaded w ith six Netw ork Processing Cards (NPCs)	
2.2	Dedicated High Availability ports w ith dedicated 80 gigabit (w hen both HSCI ports are connected) QSFP HA ports used for HA2 (data link) and HA3 (packet forw arding) to provide full hardw are redundancy in an active/passive or active/active configurations.	
2.3	A dedicated log card handles all log processing and uses tw o pairs of drives, each pair in a RAID 1 configuration, to provide tw o terabytes of log storage.	
2.4	The Next Generation Firew alls shall have the capability of supporting <b>66 gigabit per second</b> of application firew all throughput and <b>37 gigabit per second</b> for threat prevention and modern malw are protection.	

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على المورد الالتزام بالتعليمات في الصفحات من 6 إلى 18

2.5	The proposed firew alls shall support at least <b>32,000,000</b> million concurrent sessions and at least <b>623,000</b> new sessions per second.
2.6	The proposed firew alls shall come with (8) 1Gbps or 10Gbps based on the transever. and upto (4) 40 /100 Gbps
<b>3. Features</b>	
3.1	Proposed Firew all must be recognized as leader in Gartner Enterprise Network Firew all Report for 2019, 2018, 2017,2016, 2015, 2014 and 2013 consecutively.
3.2	The proposed firew alls must have one mode of operation, and any other firew all solutions that have two, or more of operation modes like (proxy, or flow modes) are going to be disqualified.
3.3	Proposed firew alls must support all functions are working in parallel when all features are enabled including Application identification (APP-ID), User identification (User-ID) and Threat Prevention (IPS, Anti-Virus, and Anti-Spyware) and URL Filtering.
3.4	Proposed Firew all Solution must support File blocking feature to alert or block on upload and/or download any file type, this feature must be enabled without any additional license.
3.5	The proposed firew alls must support Denial of Service (DoS), fragmented packet Transmission Control Protocol (TCP) reassembly, brute force attack, "SYN cookie", "IP spoofing", and malformed packet protection.
3.6	The proposed firew all must support L2, L3 Interfaces at the same time using single virtual system
3.7	The proposed firew all must support TAP mode.
3.8	The proposed firew alls must support standards based link aggregation (IEEE 802.3ad) to achieve higher bandwidth.
3.9	The proposed firew all must support SD-WAN.
<b>4. Security</b>	

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4.1	The proposed firewalls must allow policy rule creation for application identification, user identification, threat prevention, Uniform Resource Locator (URL) filtering, traffic management Quality of Service (QoS) per policy and scheduling in a single unified rule and not in multiple data-entry locations in the management console.
4.2	The proposed solution must Support Clientless SSL VPN.
4.3	Dedicated High Availability ports to provide full hardware redundancy in an active/passive or active/active configurations.
4.4	The proposed firewall must provide malicious IP address feeds that can be used to secure our network from known malicious hosts on the Internet. The firewall must provide two feeds: - Known malicious IP addresses —Contains IP addresses that the firewall vendor has verified as malicious. - High risk IP addresses —Contains malicious IP addresses from threat advisories issued by trusted third-party organizations.
4.5	The proposed solution must support external dynamic lists for URLs, domain names and IP addresses and use these lists directly in the policy enforcement (allow/deny) without the need of committing the configuration
4.6	The proposed firewalls must be able to identify, decrypt and evaluate SSL/SSH traffic in an outbound and inbound connection.
4.7	The proposed firewalls must be able to decrypt in tap, transparent, layer 2 and layer 3 modes.
4.8	The proposed firewall must support forwarding copy of SSL Decrypted traffic to external device
4.9	The proposed firewalls must support automated signature generation for discovered malware.
<b>5. Warranty</b>	
5.1	Product, and licenses must come with 3Y Support 24x7 Platinum Support.

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### 15.3. Internet Firewall

<b>Must be a brand name product.</b>	
<b>1. Hardware architecture</b>	
1.1	Proposed Firewalls must be built based on a unique Single Pass Parallel Processing (SP3) Architecture, which enables high-throughput, low-latency network security, even while incorporating unprecedented features and technology.
1.2	The proposed firewall must support an inline ML-based engine delivered within the NGFW to prevent malicious file-based content, such as portable executable files and dangerous fileless attacks stemming from PowerShell, completely inline with no cloud analysis step.
<b>2. Performance Requirements</b>	
2.1	The Firewalls should be capable of supporting up to <b>65</b> gigabit per second of L7 application firewall throughput and <b>36</b> gigabit per second of full threat prevention throughput
2.2	The NGFW shall also support up to <b>32,000,000 (32 Million)</b> concurrent sessions and <b>600,000</b> new sessions per second.
2.3	The proposed firewalls must support horizontal scalability of performance and capacity by supporting clustering of up to 16 firewalls that perform session state synchronization. In the event of a network outage or a firewall going down, the sessions fail over to a different firewall in the cluster.
2.4	Enabling extra security features on the firewalls shall not decrease the overall performance of the device
<b>3. Features</b>	
3.1	The proposed firewalls must have one mode of operation, and any other firewall solutions that have two, or more of operation modes like (proxy, or flow modes) are going to be disqualified.
3.2	Proposed firewalls must support all functions are working in parallel when all features are enabled including Application identification (APP-ID), User identification (User-ID) and Threat Prevention (IPS, Anti-Virus, and Anti-Spyware) and URL Filtering.

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3.3	Proposed Firew all Solution must support File blocking feature to alert or block on upload and/or dow nload any file type, this feature must be enabled w ithout any additional license.
3.4	The proposed firew alls must support Denial of Service (DoS), fragmented packet Transmission Control Protocol (TCP) reassembly, brute force attack, "SYN cookie", "IP spoofing", and malformed packet protection.
3.5	The proposed firew all must support L2, L3 Interfaces at the same time using single virtual system
3.6	The proposed firew all must support TAP mode.
3.7	The proposed firew alls must support standards based link aggregation (IEEE 802.3ad) to achieve higher bandw idth.
3.8	
<b>4. Security</b>	
4.1	The proposed firew alls must allow policy rule creation for application identification, user identification, threat prevention, Uniform Resource Locator (URL) filtering, traffic management Quality of Service (QoS) per policy and scheduling in a single unified rule and not in multiple data-entry locations in the management console.
4.2	The proposed solution must Support Clientless SSL VPN.
4.3	Dedicated High Availability ports to provide full hardw are redundancy in an active/passive or active/active configurations.
4.4	The proposed firew all must provide malicious IP address feeds that can be used to secure our netw ork from know n malicious hosts on the Internet. The firew all must provide two feeds: - Know n malicious IP addresses —Contains IP addresses that the firew all vendor has verified as malicious. - High risk IP addresses —Contains malicious IP addresses from threat advisories issued by trusted third-party organizations.
4.5	The proposed solution must support external dynamic lists for URLs, domain names and IP addresses and use these lists directly in the policy enforcement (allow/deny) w ithout the need of committing the configuration
4.6	The proposed firew alls must be able to identify, decrypt and evaluate SSL/SSH traffic in an outbound and inbound connection.
4.7	The proposed firew alls must be able to decrypt in tap, transparent, layer 2 and layer 3 modes.
4.8	The proposed firew all must support forw arding copy of SSL Decrypted traffic to external device

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4.9	Proposed firew alls must support all functions are working in parallel when all features are enabled including Application identification (APP-ID), User identification (User-ID) and Threat Prevention (IPS, Anti-Virus, and Anti-Spyware) and URL Filtering.
4.1	The proposed firew alls must support automated signature generation for discovered malw are.
4.11	The proposed firew alls must support in-line control of malw are infection. and command/control traffic.
4.12	The proposed modern malw are prevention solution must support files exchanged over Web, Email, and file sharing traffic.
4.13	Global Protect VPN must be able to check the endpoint to get an inventory of how it's configured and builds a Host Information Profile (HIP) that's shared with the next-generation firew all.
4.14	The next-generation firew all must be able to use the host information profile to enforce application policies that only permit access when the endpoint is properly configured and secured.
<b>5. Warranty</b>	
5.1	Proposed Firewall must be recognized as leader in Gartner Enterprise Network Firewall Report for 2019, 2018, 2017, 2016 , 2015, 2014 and 2013 consecutively.
5.2	Product and licenses must come with 3Y Support 24x7 Platinum Support.

#### 15.4. NAC SYSTEM SPECIFICATIONS

### 16. Software Systems

#### 16.1. Server Operating System (OS) SPECIFICATIONS

<b>Approved Operating Systems at NIC</b>	
Windows Server Essentials	2019

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	Windows Server Standard	2019
	Windows Server Datacenter	2019
	RedHat Enterprise Linux	8
	IBM z/OS	2.4

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