



دېرسىچىمىزنىڭ تەدرىس پىلانىدا، ئىلىم ۋە تېخنىكا تەدرىسچىسىنىڭ ئىشلىرىنى تەشۋىش قىلىش،  
 ئۇنى تەشۋىش قىلىش.

دەرسلىك: دېرسىچىمىزنىڭ تەدرىس پىلانىدا، ئىلىم ۋە تېخنىكا تەدرىسچىسىنىڭ ئىشلىرىنى تەشۋىش قىلىش،  
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 (IUL)141-L/141/2019/585  
 (23/12/2019)

## دەرسلىك نامى

دەرسلىك نامى: دېرسىچىمىزنىڭ تەدرىس پىلانىدا، ئىلىم ۋە تېخنىكا تەدرىسچىسىنىڭ ئىشلىرىنى تەشۋىش قىلىش،  
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### 01- دەرسلىك نامى

دېرسىچىمىزنىڭ تەدرىس پىلانىدا، ئىلىم ۋە تېخنىكا تەدرىسچىسىنىڭ ئىشلىرىنى تەشۋىش قىلىش،  
 ئۇنى تەشۋىش قىلىش.

### 2 دەرسلىك نامى مۇناسىۋىتى

دەرسلىك نامى مۇناسىۋىتى: 1 | ئىلىم ۋە تېخنىكا تەدرىسچىسىنىڭ ئىشلىرىنى تەشۋىش قىلىش،  
 ئۇنى تەشۋىش قىلىش.

### 03- دەرسلىك نامى مۇناسىۋىتى

|      |  |
|------|--|
| 60 % | ئىلىم  |
| 20 % | تېخنىكا  |
| 15 % | دەرسلىك نامى مۇناسىۋىتى                          |
| 05 % | ئىلىم مۇناسىۋىتى (3%)<br>تېخنىكا مۇناسىۋىتى (2%) |

### 04- دەرسلىك نامى مۇناسىۋىتى

- دەرسلىك نامى مۇناسىۋىتى: دېرسىچىمىزنىڭ تەدرىس پىلانىدا، ئىلىم ۋە تېخنىكا تەدرىسچىسىنىڭ ئىشلىرىنى تەشۋىش قىلىش،  
 ئۇنى تەشۋىش قىلىش. (3-نۆمۇر 3-بۆلۈم)
- دەرسلىك نامى مۇناسىۋىتى: دېرسىچىمىزنىڭ تەدرىس پىلانىدا، ئىلىم ۋە تېخنىكا تەدرىسچىسىنىڭ ئىشلىرىنى تەشۋىش قىلىش،  
 ئۇنى تەشۋىش قىلىش.

### 05- دەرسلىك نامى مۇناسىۋىتى

1. دەرسلىك نامى مۇناسىۋىتى، دەرسلىك نامى مۇناسىۋىتى، دەرسلىك نامى مۇناسىۋىتى، دەرسلىك نامى مۇناسىۋىتى،  
 دەرسلىك نامى مۇناسىۋىتى.



1. جب کسی شخص کو 5 اکر دیکھو تو دسائی لکھنے سے پہلے دسائی لکھنے کے قواعد کو یاد رکھو اور پھر دسائی لکھو۔  
دسائی 1-5 اکر دیکھ کر لکھنا ہے۔ دسائی لکھنے کے قواعد کو یاد رکھو اور پھر دسائی لکھو۔

07- دسائی لکھنے کے قواعد کو یاد رکھو اور پھر دسائی لکھو۔ دسائی لکھنے کے قواعد کو یاد رکھو اور پھر دسائی لکھو۔  
دسائی لکھنے کے قواعد کو یاد رکھو اور پھر دسائی لکھو۔ دسائی لکھنے کے قواعد کو یاد رکھو اور پھر دسائی لکھو۔

دسائی لکھنے کے قواعد کو یاد رکھو اور پھر دسائی لکھو۔ دسائی لکھنے کے قواعد کو یاد رکھو اور پھر دسائی لکھو۔  
دسائی لکھنے کے قواعد کو یاد رکھو اور پھر دسائی لکھو۔ دسائی لکھنے کے قواعد کو یاد رکھو اور پھر دسائی لکھو۔  
دسائی لکھنے کے قواعد کو یاد رکھو اور پھر دسائی لکھو۔ دسائی لکھنے کے قواعد کو یاد رکھو اور پھر دسائی لکھو۔  
دسائی لکھنے کے قواعد کو یاد رکھو اور پھر دسائی لکھو۔ دسائی لکھنے کے قواعد کو یاد رکھو اور پھر دسائی لکھو۔

- ❖ ایک شخص نے 1 سوالات درست اور 4 سوالات غلط کر کے دسائی لکھی ہے۔
- ❖ دسائی لکھنے کے قواعد کو یاد رکھو اور پھر دسائی لکھو۔ دسائی لکھنے کے قواعد کو یاد رکھو اور پھر دسائی لکھو۔
- ❖ دسائی لکھنے کے قواعد کو یاد رکھو اور پھر دسائی لکھو۔ دسائی لکھنے کے قواعد کو یاد رکھو اور پھر دسائی لکھو۔  
دسائی لکھنے کے قواعد کو یاد رکھو اور پھر دسائی لکھو۔ دسائی لکھنے کے قواعد کو یاد رکھو اور پھر دسائی لکھو۔
- ❖ دسائی لکھنے کے قواعد کو یاد رکھو اور پھر دسائی لکھو۔ دسائی لکھنے کے قواعد کو یاد رکھو اور پھر دسائی لکھو۔  
دسائی لکھنے کے قواعد کو یاد رکھو اور پھر دسائی لکھو۔ دسائی لکھنے کے قواعد کو یاد رکھو اور پھر دسائی لکھو۔
- ❖ دسائی لکھنے کے قواعد کو یاد رکھو اور پھر دسائی لکھو۔ دسائی لکھنے کے قواعد کو یاد رکھو اور پھر دسائی لکھو۔  
دسائی لکھنے کے قواعد کو یاد رکھو اور پھر دسائی لکھو۔ دسائی لکھنے کے قواعد کو یاد رکھو اور پھر دسائی لکھو۔
- ❖ دسائی لکھنے کے قواعد کو یاد رکھو اور پھر دسائی لکھو۔ دسائی لکھنے کے قواعد کو یاد رکھو اور پھر دسائی لکھو۔  
دسائی لکھنے کے قواعد کو یاد رکھو اور پھر دسائی لکھو۔ دسائی لکھنے کے قواعد کو یاد رکھو اور پھر دسائی لکھو۔



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**Option one**

|                                       |   |            |
|---------------------------------------|---|------------|
| <b>Server x 2</b>                     |   | <b>QTY</b> |
| Brand                                 | Proposed Server product vender should be listed in the Gartner's magic quadrant (leaders' section) in the relevant technology field.  | 2<br>unit  |
| Form Factor                           | 2U Rack Mount   |            |
| Processor                             | Dual Intel Xeon Gold 5215   |            |
| RAM                                   | 128GB RDIMM, 2666MT/s,  |            |
| RAID Controller                       | Dedicated RAID Controller with 2GB Cache  |            |
| SSD                                   | 2 x 480GB SSD 2.5" Hot-Plug   |            |
| SD Cards                              | Dual 16GB SD Cards (for VMware Installation)  |            |
| Network                               | Dual Port 10/25GbE SFP28  |            |
| HBA 16G FC SAN                        | 2 x Single Port 16Gbps FC PCI-E Card  |            |
| Remote Management                     | Remote Management with Virtual Console and Virtual USB  |            |
| Warranty                              | Minimum 3 years Parts / 3 Years' Service  |            |
|                                       |   |            |
| <b>SAN</b>                            |   | <b>QTY</b> |
|                                       | Proposed Storage product vender should be listed in the Gartner's magic quadrant (leaders' section) in the relevant technology field. | 1<br>Unit  |
| System Cache                          | 32 GB dual controllers  |            |
| Supported Storage Protocols           | Fiber Channel, FCoE, iSCSI, NFS, CIFS   |            |
| Front-End Connectivity                | 4 x 8/16 Gbit/s Fiber Channel Ports per Controller  |            |
| Back-End Connectivity                 | 2 x SAS 12Gbps  |            |
| Disk Types Support                    | SSD, SAS, and NL-SAS  |            |
| Supported RAID Levels                 | 0, 1, 5, 6, 10, and 50  |            |
| Storage Requirement                   | 10 x 2.4TB 10K SAS and 6 x 480GB SSD SAS 2.5"   |            |
| Storage Expansion                     | Minimum 300 Drives  |            |
| Data Protection Features              | Sanap Shot,LUN Copy,Clone,Remote replication (Must Include License if Any )   |            |
| Service Protection                    | intelligent QoS control   |            |
| Storage Management and Other Features | multipathing,thin provisioning,SSD caching,storage tiering (Must Include License if Any )   |            |
| Power Supply                          | Dual Redundant  |            |
| Accessories                           | 8 x FC 16G Tranceivers , 8 x FC Patch Code MM 5M  |            |
| Warranty                              | Minimum 3 years Parts / 3 Years Service   |            |
|                                       |   |            |



|   |   |            |
|---|---|------------|
| <b>Network Switch 10G L3 Manageable x 2</b>   |   | <b>QTY</b> |
| Brand   | Proposed Network Switch product vender should be listed in the Gartner's magic quadrant in the relevant technology field.   | 2<br>UNIT  |
| Form Factor   | Rack Mount  |            |
| Features  | layer 2 and 3 switching and routing protocols with integrated IP services, quality of service, manageability and automation |            |
| Ports - Fixed or with Uplink Module   | Minimum 24 x SFP+ 10G , and 2 x QSFP28 Ports  |            |
| Power Supply  | Dual redundant  |            |
| Tranceiver 10G  | 5 x 10GbE, LR SFP+, long reach  |            |
| Tranceiver 10G Base-T   | 5 x 10G Base-T  |            |
| Breakout Cables   | 2 x QSFP+ to 4xSFP+, passive DAC  |            |
| Warranty  | Minimum 3 years Parts / 3 Years Service   |            |
| <b>Virtualization Software x 1 License</b>  |   |            |
| VMware Essential Plus Kit (3 Host 6 Processors ) with 3 Years Production Support  |   | 1          |
| <b>Installation and Setup</b>   |   |            |
| Installation and setup  | Installation of Servers, SAN and Network Switch's   |            |
| Virtualization Installation   | setup of VMware Virtual Infrastructure including vCenter and all required Setting to Run Production Environment.            |            |
| Installation Period   | Maximum 10 Days After Delivery  |            |
| Vendors must be an authorized partner for the solution(s) they propose (Manufacture Authorization Letter Required)<br>Training for two IT staff |   |            |



## Option Two

| 1. Blade Enclosure |   |         |
|--------------------|---|---------|
| #                  | Minimum Requirement   | Qty     |
| 1.1                | Form Factor: 10U  | 01 Unit |
| 1.11               | Device Bay: Should support minimum 16 half-height blade servers   |         |
| 1.12               | IO Module: Should support up to 4 redundant interconnect modules  |         |
| 1.13               | IO Module Protocols: Ethernet, Fibre Channel, InfiniBand, iSCSI, SAS should be supported  |         |
| 1.14               | Required Interconnect Module: Two (02) Converged Blade Switch   |         |
|                    | • 16 x 10Gb Ethernet downlinks to server blade NIC Adapters   |         |
|                    | • 4 SFP+ external uplink ports - 10Gb Ethernet or 2/4/8Gb auto-negotiating Fibre Channel connections                                |         |
|                    | • 2 x 10Gb shared internal cross connects for redundancy  |         |
| 1.14               | • VLAN Tagging, Pass-Thru and Link Aggregation supported on all uplinks   |         |
|                    |   |         |
| 1.15               | Required Power Modules: N+1 Redundant Hot Pluggable Power Supplies  |         |
| 1.16               | Required Cooling: Minimum four (4) hot pluggable and redundant cooling fans.  |         |
| 1.17               | Required Management Module: One (01) Enclosure Management module with dedicated LAN ports for management and built-in KVM module    |         |
| 1.18               | Required Software: Comprehensive management software for all modules on the enclosure and blade servers                             |         |
| 1.19               | Required Connectivity: Four (4) 10GbE SFP+ to SFP+ 5m Direct Attach Copper Cable required cables to connect Core Switch             |         |
| 1.2                | Installation and Configuration: Installation and configuration of the Blade Solution  |         |
|                    | • Should be installed by vendor certified engineers.  |         |
|                    | • Rack mounting and cabling   |         |
|                    | • Update all blade components to latest stable firmware   |         |
|                    | • Blade server, blade interconnect, and management module installation  |         |
|                    | • Interconnect configuration for SAN, Server and Management traffic segregation   |         |
|                    | • Link aggregation configuration for interconnect module  |         |
|                    | • Alert and logging configuration   |         |
| 1.21               | Warranty: Minimum 3-Years Warranty for Parts and Services for the Hardware including on-site support service.                       |         |
|                    | Training: On the job training on Blade Solution Administration for 2 IT Staff   |         |
|                    | Proposed Server product vender should be listed in the Gartner's magic quadrant (leaders' section) in the relevant technology field |         |
| 2. Blade Servers   |   |         |
| #                  | Minimum Requirement   | Qty     |
| 2.1                | Form Factor: Half-height Blade server   | 02 Unit |
| 2.11               | Processor: Two (02) x Intel Xeon-Silver 4114 (2.2GHz/10-core/85W)   |         |
| 2.12               | DIMM Slot: Minimum 16 DIMM Slots  |         |
| 2.13               | Memory: eight (08) x 16GB Dual Rank x4 DDR4-2666 Registered Memory Kit  |         |
| 2.14               | LOM: Dual-port 10GbE Flex-10 Flexible LOM network adapter   |         |



|                       |   |            |
|-----------------------|---|------------|
|                       | <ul style="list-style-type: none"> <li>• Up to 40Gb/s bi-directional near line rate throughput</li> <li>• Support for Tunnel Offload (NVGRE, VxLAN)</li> <li>• Jumbo Frame supported</li> <li>• Checksum &amp; Segmentation Offload</li> <li>• Network Partitioning (NPAR) and Single-Root I/O Virtualization (SR-IOV)</li> <li>• Supports accelerated iSCSI or iSCSI boot and FCoE.</li> </ul> |            |
| 2.15                  | Drive Support: Two (2) hot-plug small form factor (SFF) SAS drive bays  |            |
| 2.16                  | Storage: Required Minimum 480GB SATA 6G Read Intensive SFF, for OS installation   |            |
| 2.17                  | Installation and Configuration: Installation and configuration of the Blade Servers   |            |
|                       | • Should be installed by vendor certified engineers.  |            |
|                       | • Installation and configuration of one VMware vCenter Server   |            |
|                       | • Installation of latest VMware ESXi Server   |            |
|                       | • VMware cluster and high availability configuration and failover testing   |            |
|                       | • Existing server VM migration to blade server assistance for up to 10 VMs  |            |
|                       | • VM storage migration to new SAN storage assistance for up to 10 VMs   |            |
|                       | • Traffic segregation configuration at VMware vswitch level   |            |
|                       | • Server traffic should be configured for active active multiple paths  |            |
|                       | • Server storage traffic should be configured as per best practice for multi-pathing  |            |
| 2.18                  | Warranty: Minimum 3-Years Warranty for Parts and Services for the Hardware including on-site support service.   |            |
| 2.19                  | Training: On the job training on Blade Solution Administration for 2 IT Staff   |            |
|                       | Proposed Server product vendor should be listed in the Gartner's magic quadrant (leaders' section) in the relevant technology field   |            |
| <b>3. SAN Storage</b> |   |            |
| <b>#</b>              | <b>Minimum Requirement</b>  | <b>Qty</b> |
| 3.1                   | Controller Type: Active/Active Storage Controller supporting redundant configuration  | 01 Unit    |
|                       | • Hot-pluggable controller  |            |
|                       | • No Single Point of failure including Array Controller card, Cache memory, FAN, Power supply etc.  |            |
| 3.11                  | Controller Cache: Offered Storage Array shall be given with Minimum of 8GB cache per controller in a single unit.   |            |
|                       | • Shall have support for SSD/Flash based Cache  |            |
|                       | • Shall be supplied with minimum two (02) x 800GB SSD drive for caching.  |            |
|                       | • Cache shall be backed up in case of power failure for indefinite time either using batteries or capacitors or any other equivalent technology.  |            |
| 3.12                  | Capacity: The Storage Array shall be offered with the following configuration:  |            |
|                       | • 10 x 2.4TB 12G SAS 10K SFF (2.5in) Enterprise Hard Drive.   |            |
|                       | • 6 x 800GB 12G SAS Mixed Use Solid State Drive   |            |
| 3.13                  | Front-end Ports:  |            |
|                       | • Shall be supplied with minimum of Dual 16Gbps FC ports and Dual 10Gbps iSCSI ports per controller.  |            |



|                       |   |            |
|-----------------------|---|------------|
|                       | <ul style="list-style-type: none"> <li>Should have flexibility to use all above ports either as FC or ISCSI by replacing the requisite SFP.</li> <li>Shall provide the additional SFP accordingly</li> </ul>  |            |
| 3.14                  | <p>Disk Drive Support:</p> <ul style="list-style-type: none"> <li>SFF drives - shall support minimum 300GB, 600GB, 1.2TB, 1.8TB hot-pluggable Enterprise SFF SAS hard drives, 400GB, 800GB, 1.6TB, 3.2TB SSD along with SAS MDL 1.0TB, 2.0TB</li> <li>LFF drives - shall support minimum 2TB, 4TB, 6TB, 8TB, 10TB, 12TB drives.</li> </ul>  |            |
| 3.15                  | <p>Scalability:</p> <ul style="list-style-type: none"> <li>Shall support SFF and LFF drives with the addition of required disk enclosures.</li> <li>Shall be scalable to minimum of 190 number of drives or greater than 600TB using SFF SAS drives.</li> </ul>   |            |
| 3.16                  | RAID Support: Support Raid 0, 1, 1+0, 5 and Raid 6  |            |
| 3.17                  | Software: Comprehensive software License should be supplied for array based snapshot, array based replication, array based thin provisioning.   |            |
| 3.18                  | Data Tiering: Should support automated Sub-Lun Data tiering in real time fashion across different type of drives within a given pool like SSD, SAS, NL-SAS etc. If licensing is required, it should be included.  |            |
| 3.19                  | Multi-path: Multi-path and load balancing software shall be provided, if vendor does not support MPIO functionality of Operating system.  |            |
| 3.19                  | OS and Clustering Support: Should support industry-leading Operating System platforms including: Windows 2012 / 2016, VMware and Linux.<br>Offered Storage Shall support all above operating systems in Clustering.   |            |
| 3.2                   | Warranty: Minimum 3-Years Warranty for Parts and Services for the Hardware including on-site support service.   |            |
| 3.21                  | <p>Installation and Configuration: Should provide installation and start-up of the storage system.</p> <ul style="list-style-type: none"> <li>Should be installed by vendor certified engineers.</li> <li>Installation of the array into the rack</li> <li>Confirmation of appropriate OS patch levels and firmware versions</li> <li>Verification and update (as needed) of prerequisite array and host bus adapter (HBA) firmware versions</li> <li>Install and activate any included software license</li> <li>Deployment of the array as per industry best practice</li> <li>Configuration of multipath software instances for each installed physical host</li> <li>Creation of configuration documentation</li> </ul> |            |
| 3.22                  | Training: On the job training on SAN Administration for 2 IT Staff  |            |
|                       | Proposed Storage product vender should be listed in the Gartner's magic quadrant (leaders' section) in the relevant technology field.   |            |
| <b>4. Core Switch</b> |   |            |
| <b>#</b>              | <b>Minimum Requirement</b>  | <b>Qty</b> |
| 4.1                   | <p>Ports:</p> <ul style="list-style-type: none"> <li>24 RJ-45 autosensing 10/100/1000 ports(Duplex: 10BASE-T/100BASE-TX: half or full; 1000BASE-T)</li> <li>4 SFP+ 10GbE ports</li> </ul>   | 02 Unit    |





|      |  |
|------|--|
|      | <ul style="list-style-type: none"> <li>• 1 port expansion module slot - Supports a maximum of 6 SFP+ ports or 2 1/10GBASE-T ports or 2 40GbE ports</li> <li>• 1 dual-personality (RJ-45 or mini USB) serial console port</li> <li>• 1 RJ-45 out-of-band management port</li> </ul>   |
| 4.11 | <p>Power Supply:</p> <ul style="list-style-type: none"> <li>• 2 power supply slots</li> <li>• Dual-Redundant Power Supply required</li> </ul>  |
| 4.12 | Air flow: Front to Back  |
| 4.13 | Packet buffer size: 4 MB, 512 MB flash   |
| 4.14 | Mounts in an EIA standard 19-inch rack, mounting accessories should be provided  |
| 4.15 | <p>Performance:</p> <p>Throughput Up to 200 Mpps</p> <p>Routing/Switching capacity 280 Gbps</p> <p>Routing table: 32k entries (IPv4)</p> <p>MAC address table: 32k entries</p>   |
| 4.16 | <p>Features:</p> <ul style="list-style-type: none"> <li>• QOS</li> <li>• Broadcast control</li> <li>• Remote configuration and management via web or CLI</li> <li>• Remote monitoring (RMON)</li> <li>• Jumbo packet support</li> <li>• Hardware based ACL</li> <li>• Rapid Ring Protection Protocol</li> <li>• Spanning Tree/PVST+, MSTP, RSTP</li> <li>• Dual firmware image support</li> <li>• L2 Switching</li> <li>• Port aggregation</li> <li>• IEEE 802.1Q (4000 VLAN IDs)</li> <li>• L3 Services: ARP, DHCP, UDP Helper, Route maps, DHCP Server</li> <li>• L3 Routing: RIP, OSPF, ISIS, and BGP, Policy-based routing, Static routing</li> <li>• Security: IEEE 802.1X, ACLs, STP BPDU, STP root guard</li> </ul> |
| 4.17 | <p>Installation and Configuration: Should provide installation and configuration for core switch.</p> <ul style="list-style-type: none"> <li>• Should be installed by vendor certified engineers.</li> <li>• Rack mounting and cabling</li> <li>• Dual redundant aggregated uplink cabling from blade interconnects</li> <li>• Dual redundant SAN cabling from SAN storage</li> <li>• Blade chassis management and storage management cabling</li> <li>• SAN traffic, Server traffic and Management network traffic segregation</li> <li>• Update to latest stable firmware</li> <li>• Link failover and redundancy testing for SAN and Server traffic</li> <li>• Creation of configuration documentation</li> </ul>       |



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| 4.18                              | Warranty: Minimum 3-Years Warranty for Parts and Services for the Hardware including on-site support service.             |         |
|-----------------------------------|---|---------|
| 4.19                              | Training: On the job training on Switch Administration for 2 IT Staff   |         |
|                                   | Proposed Network Switch product vender should be listed in the Gartner's magic quadrant in the relevant technology field. |         |
| <b>5. Server Virtualization</b>   |   |         |
| #                                 | Minimum Requirement   | Qty     |
| 5.1                               | VMware vSphere Standard x 4 sockets   | 01 Unit |
|                                   | Basic Support/Subscription VMware vSphere Standard for 1 year   |         |
| 5.11                              | VMware vcenter server standard x 1  |         |
|                                   | Basic Support/Subscription VMware vcenter server standard for 1 year  |         |
| 5.12                              | Installation and Configuration:   |         |
|                                   | • Installation and configuration of one VMware vCenter Server   |         |
|                                   | • Installation of latest VMware ESXi Server   |         |
|                                   | • VMware cluster and high availability configuration and failover testing   |         |
|                                   | • Existing server VM migration  |         |
|                                   | • Traffic segregation configuration at VMware vswitch level   |         |
|                                   | • Server traffic should be configured for active active multiple paths  |         |
|                                   | • Server storage traffic should be configured as per best practice for multi-pathing                                      |         |
| • Configuration and documentation |   |         |
| 5.13                              | Training: On the job training on Switch Administration for 2 IT Staff   |         |

