Turnkey Solution for HCI, File Storage and Backup Solution

Include following software and license with 3 years 5X9 NBD support of below mentioned HCI NODES (Qty:03 Nodes) and 1 Backup Server Node

a. HCI software must contain a single console for automation, service provisioning, troubleshooting & management.

> 1. **General Requirements**
> 2. **Virtualization Management**
> 3. **Virtualization Hypervisor**
> 4. **Storage virtualization**
> 5. **Backup Server**
> 6. **Network Switches**
> 7. **Network Firewall**

1. **General Requirements:**

    a. The hyper-converged hardware servers are required to be of the same brand.
    b. The HCI computing virtualization software, storage virtualization SDS software, and network virtualization are required to be of the same brand and pre-installed on quoted servers by Principle/OEM to ensure functional reliability, compatibility, and safety.
    c. The HCI Principle should be Cloud Native Computing Foundation (CNCF) Members Gold or Platinum level to guarantee its Cloud native performance.
    d. The computing and storage software in HCI is required to be deployed on bare metal, and the hyper-converged platform can be built without installing a storage controller on the virtual machine to guarantee the best performance.
    e. The quoted brand principle must be registered with SECP in Pakistan at least for last 2 year.

2. **Virtualization Management:**

    a. Proposed Solution must provide High Availability / Redundancy for Virtualization Management Platform
    b. Proposed Solution must Support Management for Existing Virtual Machines on VMware Platform for single window management.
    c. Proposed Solution must support to create and manage local Users with Role Based Access and Permission Control.
    d. Proposed Solution must provide Web Bowser based Management Console.
    e. Proposed Solution must provide complete visibility and centralized management / control of the Virtualization Platform
    f. Proposed Solution must provide capability to scale up to minimum of 100 plus nodes or better
    g. Support use one click to analyze the usage of historical resources of virtual machine, host, and support for planning and decision-making.
    h. Support use one click to analyze invalid image files on back-end storage, and provide one-click clean and free storage space capabilities.

i. Provide P2V, V2V migration tool. It supports the industry's mainstream operating systems, public cloud platforms, and virtualization platforms. The different platforms should Include but not limited to the migration from VMware, Huawei, Hyper-V and other platforms.

j. Support resource capacity prediction service, built-in time series model, management platform to automatically realize data prediction, provide users with easy-to-use data prediction service, the service supports display the data of CPU, memory and storage capacity resource usage in real-time. Based on AI Machine learning algorithms, predict and analyze early warning time points to help users do resource expansion, cost budgets, etc., and improve business reliability. Please provide the sample as proof.

3. Virtualization Hypervisor:

a) Proposed Solution must provide a Solution that should be highly redundant providing capability for the VMs to restart on another node in case of any Node failure in the Cluster.

b) Proposed Solution must provide VM Snapshot capability to revert back to previous point in time in case a failure or system error occurs.

c) Proposed Solution must provide VM Clone capability for creating cloned instances from source VM for testing or any other purposes.

d) Proposed Solution must provide VM vMotion/live migration capability to live migrate VMs to any nodes in the Cluster without any downtime.

e) Proposed Solution must provide the capability to automatically hot-add resources including vCPUs and Memory real-time based on VM contention.

f) Proposed Solution must provide automated Resource Scheduling and Load Balancing capability for balanced performance on all nodes across the cluster.

g) Proposed Solution must provide Distributed Switch capability to configure and administer switching for the entire Cluster.

h) Proposed Solution must provide Hardware Health Check capability to Monitor CPU, Memory, Network Interface Card, Hard Drive and RAID Controller etc.

i) Provides application-level HA functions, which can automatically detect and automatically repair application failures in the virtual machine without installing an agent inside the virtual machine, including but not limited to Apache Tomcat, JDK, Apache HTTP Server, MySQL, SQL Server, Applications such as SharePoint, and support user-defined scripts for application status monitoring

4. Storage virtualization:

a) Proposed Solution must provide SSD based Read Caching and Write Buffer capability to improve the performance of the I/O.

b) Proposed Solution must provide Automated Data Rebuilding capability to restore redundancy in case of any Disk or Node Failure.

c) One node can support virtualization and 3 types of storage functions (block, file, object) at the same time. At least 3 node clusters can provide virtualization, distributed block, object, and file storage services at the same time. Among them, object and file services must be provided on the host machine, and the same brand as the self-developed hyper-convergence and cannot be provided in the form of an application running on a virtual machine.

d) File storage support protocols include: FTP, CIFS, NFS, HTTP; Provides a variety of NAS value-added service functions, including: authority management, snapshot management (WORM), shared directory management, etc.; NAS services can adopt multi-service nodes for high availability and support load balancing.

e) Object storage, compatible with S3 and other interfaces, supporting management through HTTP or cli

f) The Striped data multi copy mechanism is adopted to ensure the data reliability. The storage software divides the physical hard disk into chunks of 4MB size to save the data. The redundancy mode of RAID1 is not allowed. Independent hot spare is not needed in the storage node.

g) Supports 2~5 copies, and can be selected arbitrarily

h) Three nodes support the deployment of three copies. It is not allowed to add additional hard disks (groups), capacity, or nodes to satisfy the replication strategy. Make full use of the resources of each disk and each node.

i) Flexible requirements for redundancy strategy: A group of hard disk pools (groups) can support both 2-copy and 3-copy strategies to maximize the use of disk capacity. There is no need to use additional disk groups to carry two different strategies, which greatly reduces customer costs. In addition, support for "online" adjustment of virtual machine disk redundancy strategy greatly facilitates operation and maintenance and avoids interruption of business.

j) Data balance requirements: It is required to automatically balance the data when it is placed, and it is not allowed to delay the balance or choose another balance time and strategy. This can ensure the smooth operation of customer services, otherwise it will take up bandwidth and affect the business by finding another time to balance it.

k) Support the erasure code feature, support the erasure code protection from N + 1 to N + 4, and support the failure of any 4 nodes without data loss and system shutdown

l) Support storage QoS policy, specify service priority according to business pressure; support volume QoS, data recovery QoS, support setting data recovery policy with hard disk pool as granularity.

m) Supports disk replacement wizard, provides a graphical and wizard-based interface, supports hot-swappable replacement of hard disks, and brings more efficient maintainability

5. **Backup Server:**
   a) Proposed Solution must be fully Compatible with Compute Hypervisor
   b) Proposed Solution must provide the capability to take full / Incremental level VM Backups.
   c) Proposed Solution must provide Automated Scheduling for Backups based on Hourly, Daily, weekly etc. scheduling.
   d) Proposed Solution must support to configure Internal Virtual Storage, External SAN or NAS to be Backup repository for Storing Virtual Machine Backups.
   e) Proposed Solution must support Industry's common storage protocols such as iSCSI, FC or Network File Sharing (NFS)
   f) Proposed Solution will not be limited to specific number of VMs and will support unlimited number of VMs for future scalability.

6. **Network Switches:**
   a) Proposed solution must be along required Network Switches

7. **Network Firewall:**
   a) The proposed product shall support robust GUI configurations of both IPv4 and IPv6 firewall policies.
   b) The proposed products should have onboard SSD internal storage for storage of logs, event etc.
   c) The proposed product must be based on hardware architecture for Security features inspection (NG Firewalling, SSL/TLS inspection, IPS, Antimalware etc) in the hardware.
   d) The proposed product must be recognized as a Leader in the latest Gartner Magic Quadrant for Enterprise Network Firewalls.
   e) The proposed system shall minimally provide management access through:
      a. GUI using HTTP or HTTPs access
      b. CLI console using console port, SSHv2, telnet or from GUI console
   f) The administrator authentication shall be facilitated by a local database, PKI & remote services such as Radius, LDAP and TACACS+.
   g) The proposed product should be able to facilitate administration audits by logging detailed activities to event log - management access and also configuration changes.
   h) The proposed product shall have the ability to interconnect discrete security solutions into an integrated whole to detect, monitor, block, and remediate attacks across the entire attack surface.
   i) Administrators shall be able to configure both IPv4 and IPv6 DHCP service on an interface of the proposed product.
   j) Administrators shall be able to configure multiple loopback interfaces on the proposed product.
   k) Administrators shall be able to group interfaces, both physical and virtual, into zones that simplifies the creation of security policies.
   l) The proposed product shall support static routing and policy-based routing
   m) The proposed product shall support Open Shortest Path First (OSPF) and Border Gateway Protocol (BGP) for both IPv4 and IPv6.
   n) The proposed product must support active-passive (failover HA), active-active (load balancing HA) and Clustering.
   o) The proposed product shall support the upgrade of the firmware without interrupting communication through the cluster
   p) The proposed product shall support various QoS (quality of service) techniques, including: Traffic policing, Traffic shaping and Queuing
   q) The proposed product shall support clientless and client-based SSL Remote Access VPNs.
   r) The proposed product shall support IPsec based Remote Access VPNs.
   s) The proposed product shall support both Route based and policy-based site to site IPsec VPNs.
   t) The proposed product shall provide Secure sockets layer (SSL) content scanning and inspection abilities that allow organizations to apply antivirus scanning, application control, web/URL filtering, and IPS inspection to encrypted traffic
   u) The proposed product shall provide the ability to exempt web sites from SSL scanning by site reputation, address, category, or using a whitelist.

v) The proposed product shall support file sanitization feature where exploitable content (within PDF and Microsoft Office files) can be removed and replaced with content that is known to be safe

w) The proposed product shall support Advanced Malware Protection for proactive detection and prevention against known and unknown threats.

x) The proposed product shall provide ability to allow/monitor, block and quarantine attachments or downloads after malware detection using various technologies:
   a. Malware signature database
   b. External file analysis with integration with on-prem or cloud-based sandbox service.
   c. File checksums query using cloud-based malware database.

y) The proposed product shall be capable of blocking Botnet server communications.

z) The proposed product shall also be able to block graywares and mobile malwares.

aa) The proposed product shall support category based dynamic web filtering by querying real-time cloud-based categorization database.

bb) The proposed product shall provide ability to use local categories (that override the cloud-based database rating) and remote categories (external URL list) as part of the URL rating function.

cc) The proposed product shall detect over 4,000+ applications for Application visibility and Control.

dd) The proposed product shall support custom application detection and control.

ee) The proposed product's IPS engine shall offer:
   a. Signature based detection using real time updated database.
   b. Anomaly based detection that is based on thresholds.

ff) The proposed product's IPS database shall have over 10,000+ up-to-date signatures and should support custom IPS signatures. A signature can be selected by searching for its corresponding CVE-ID (if applicable).

gg) The proposed product shall provide the ability to apply DNS category filtering to control user access to web resources.

hh) The proposed product shall allow administrator to prevent sensitive data from leaving the network. Administrator shall be able to define sensitive data patterns, and data matching these patterns that will be blocked and/or logged when passing through the unit.

ii) The proposed product shall support virtual firewalls that divide the Firewall into two or more virtual units that function independently.

jj) The proposed system shall provide explicit web proxy capabilities for proxying IPv4 and IPv6 HTTP and HTTPS traffic. Security components such as AV scanning, web filtering, IPS, application control, DLP and SSL/SSH inspection can be applied to proxied traffic within the system itself.

kk) The proposed product shall allow configuration of virtual systems resource limiting and management.

ll) The proposed product shall support Virtual routing and forwarding (VRF).

mm) The proposed product shall support various logging facilities:
   a. Local memory
   b. Local Storage
   c. Multiple concurrent syslog servers.

1. HCI Hardware Servers Qty: 03

Servers REQUIREMENT	
PROCESSOR	2 x Intel® Xeon Gold 4316(2.3GHz/20Cores/30MB/150W) CPU or Higher
MEMORY	8x 32 GB RDIMMs or Higher
HARDDISK	2x 960GB SSD or Higher with Raid 1 for OS Installation
STORAGE	Hybrid Storage with 60:40 mix of SATA and SSD **with 20 TB usable storage**
ETHERNET	4 x 1G Copper Ports Ethernet or Higher
MULTIMODE OPTICAL TRANSCEIVER	4x 10G Ethernet Optical Ports with SFP Modules or Higher
RAID Controller/Card	RAID Card with Pass Through Supported
Power Supply	2x 1300W or better
Rack Mount Rail	Complete Rail Kit for Rack Mounting
MANAGEMENT SOFTWARE	Embedded Server Management Software as per standard requirement with all licenses
WARRANTY	3 Years 5x9 NBD warranty including replacement of parts onsite

2. Backup Server Node Qty:1

Servers REQUIREMENT	
PROCESSOR	2 x Intel® Xeon Gold 4314(2.4GHz/16Cores/24MB/135W) CPU or Higher
MEMORY	4x 32 GB RDIMMs or Higher
HARDDISK	2x 960GB SSD or Higher with Raid 1 for OS Installation
STORAGE	4x1.2TB 12G SAS 10K , 1x1.92TB SATA RI SSD
ETHERNET	4 x 1G Copper Ports Ethernet or Higher
MULTIMODE OPTICAL TRANSCEIVER	2x 10G Ethernet Optical Ports with SFP Modules or Higher
RAID Controller/Card	RAID Card with Pass Through Supported with 4G Cache
Power Supply	2x 1300W or better
Rack Mount Rail	Complete Rail Kit for Rack Mounting
MANAGEMENT SOFTWARE	Embedded Server Management Software as per standard requirement with all licenses
WARRANTY	3 Years 5x9 NBD warranty including replacement of parts onsite

	3. Main Site Network Switch Qty:2		
Main Network Switch REQUIREMENT			
General Specification	• 24 x 10G SFP+ Ports and 8 x 1/10G Uplink Ports , Switching capacity:2.56 Tbps or higher, Forwarding throughout 536 Mpps or higher, With Redundant Power Supplies (Installed 16 x 10G Multi Mode SFPs & 8 x 1G Copper SFPs) With Redundant Power Supplies • Built-in free NMS, support one-click startup and web smart management of the entire network, include FTP server configuration, global configuration, upgrade and backup, monitoring and failure replacement, network topology visualization etc.		
Layer 2 Features	• Support more than 32K MAC address tables, Mac-based, Port-based, protocol-based, and IP subnet-based VLAN assignment • STP/RSTP/MSTP/PVST+/RPVST+ • Support up to 4K active VLAN • Port-based VLAN (up to 4094 VLANs), Default VLAN, Private VLAN, QinQ and flexible QinQ, VLAN mapping		
Layer 3 Features	• Support Static route, RIP, RIPng, OSPF, Policy Routing, BGP, IS-IS		
Multicast	• IGMP snooping v1/v2/v3, MLD snooping v1/v2, Multicast VLAN replication, PIM-SM , PIM-SSM , PIM-DM		
QoS	• Flexible queue scheduling algorithms based on both port and queue, including SP, WDRR, WRR, WFQ, and SP+WRR • Eight output queues per por		
Security	• **DAI (Dynamic ARP Inspection) feature, DHCP Snooping, IP Source Guard, Control Plane Protection (CoPP), Port isolation, IP/Port/MAC binding**		
Network O&M	• Support SNMPv1/v2c/v3, Telnet, RMON, SSHv2, Web management and automatic configuration		
Warranty	• 1-Year Warranty and Must Have OEM have registered legal entity with (SECP) 0r 10+ Years Presence in Pakistan along with Local OEM Support must be present in Pakistan		

4. backup Site Network Switch Qty:1	
Backup Network Switch REQUIREMENT	
General Specification	• 16 x 10G SFP+ Ports, Switching capacity:2.56 Tbps or higher, Forwarding throughout 240 Mpps or higher, With Redundant Power Supplies (Installed 4 x 10G Multi Mode SFPs & 4 x 1G Copper SFPs and 2 x 10G Single Mode SFPs) • Built-in free NMS, support one-click startup and web smart management of the entire network, include FTP server configuration, global configuration, upgrade and backup, monitoring and failure replacement, network topology visualization etc.
Layer 2 Features	• Support more than 32K MAC address tables, Mac-based, Port-based, protocol-based, and IP subnet-based VLAN assignment • STP/RSTP/MSTP/PVST+/RPVST+ • Support up to 4K active VLAN • Port-based VLAN (up to 4094 VLANs), Default VLAN, Private VLAN, QinQ and flexible QinQ, VLAN mapping
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QoS	•Flexible queue scheduling algorithms based on both port and queue, including SP, WDRR, WRR, WFQ, and SP+WRR •Eight output queues per por
Security	• **DAI (Dynamic ARP Inspection) feature, DHCP Snooping, IP Source Guard, Control Plane Protection (CoPP), Port isolation, IP/Port/MAC binding**
Network O&M	• Support SNMPv1/v2c/v3, Telnet, RMON, SSHv2, Web management and automatic configuration
Warranty	• 1-Year Warranty and Must Have OEM have registered legal entity with (SECP) 0r 10+ Years Presence in Pakistan along with Local OEM Support must be present in Pakistan

5. Network Firewall Qty:1

Firewall REQUIREMENT	
Firewall throughput	
IPsec/SSL VPN throughput	11.5 Gbps
IPS throughput	2.6 Gbps
NGFW throughput	1.6 Gbps
Threat Protection throughput	1 Gbps
SSL inspection throughput	1 Gbps
Application Control throughput	2.2 Gbps
Concurrent TCP sessions	1.5 million
New TCP sessions/sec	56 000
Virtual Firewall/Router/Domains	10 / 10
Interfaces	Multiple GE RJ45, GE SFP and 10 GE SFP+ slots
Local Storage	1x 480 GB SSD
Licenses with 3 years OEM support	Firewall, Anti-Malware, Application Control, IPS, URL Filtering

6. Air Conditioners Qty:2

REQUIREMENT
• Free Kit & Installation • 24000 BTU • 100% Copper • 15m Long Throw • Turbo Mode • Sleep Mode • Timer • Auto Restart • Wi-Fi • Heat & Cool • A class Energy Efficiency • R410 Refrigerant **WARRANTY** Compressor: 10 Years PCB: 4 Years Evaporator / Condenser: 2 Years Parts & Service: 1 Year

Note: Changes has been highlighted in red fonts