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**SECTION 272200**

(REV. 03/27/2019-TAB)

PART 1 - GENERAL

1.01 SUMMARY *(Designer to provide a detailed project summary)*

A. Provide the Data Communication Hardware components and interfaces to be implemented and utilized in the Houston Airport System network to support present and future communications systems requirements.

1.02 REFERENCES

A. The publications listed below form a part of this specification. The publications are referred to in the text by basic designation only.

B. Specific reference in specifications to codes, rules, regulations, standards, manufacturer's instructions, or requirements of regulatory agencies shall mean the latest printed edition of each in effect at the date of contract unless the document is shown dated.

C. Related Work:
1. Section 270553: Identification and Labeling of Communication Infrastructure
2. Section 271100 Communication Cabinets and Equipment Rooms
3. Section 271300: Backbone and Riser Media Infrastructure
4. Section 271500: Horizontal Media Infrastructure
5. Section 270528: Interior Communication Pathways
6. Section 270543: Exterior Communication Pathways
7. Section 270526: Telecommunications Grounding and Bonding
8. Section 272100: Data Communication Network Equipment

D. Conflicts.
1. Between referenced requirements: Comply with the one establishing the more stringent requirements.
2. Between referenced requirements and contract documents: Comply with the one establishing the more stringent requirements.

E. References:
1. National Electrical Manufacturers Association (NEMA)
2. American Society for Testing Materials (ASTM)
3. National Electric Code (NEC)
4. Institute of Electrical and Electronic Engineers (IEEE)
5. UL Testing Bulletin

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6. American National Standards Institute (ANSI) X3T9.5 Requirements for UTP at 100 Mbps

1.03 DEFINITIONS

A. *ANSI* – American National Standards Institute

B. *ATM* – Asynchronous Transfer Mode

C. *EIA* – Electronics Industries Alliance

D. *Gbps* – Gigabits per second

E. *IEEE* – Institute of Electrical and Electronic Engineers

F. *ISO* – International Organization for Standardization

G. *Mbps* – Megabits Per Second

H. *Multi-path* – The possible multiple routes of a single source of RF energy due to reflection, refraction, or diffraction.

I. *NEC* – National Electrical Code

*J.* *NEMA* – National Electrical Manufacturing Association

K. *SNMP* – Simple Network Management Protocol

L. *TIA* – Telecommunications Industry Association

M. *TR* – Telecommunications Room

N. *UL* – Underwriter's Laboratories

O. *VoIP* – Voice over Internet Protocol

1.04 DESIGN AND PERFORMANCE STANDARDS

A. Standards supported should include, but be not limited to, IEEE 802.3, IEEE 802.3u, 100BaseTX, 1000BaseT, 1000BaseTX, 1000BaseFX, Ethernet MIB (RFC 1643), SNMP MIB II (RFC 1213).

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1.05 SUBMITTALS

A. Qualifications: Demonstrate compliance with requirements of Paragraph 1.07.A below.

B. Submit Technical Implementation Plan in accordance with 2.06 below.

C. Submit manufacturer's technical data for each product provided.

D. Submit technical and operations manuals. Manuals shall describe function, operation, and programmable parameters for each device to be installed. Manuals shall include required maintenance to be performed.
   1. Manuals shall describe function, operation, and programmable parameters for each card and port for each device to be installed. Manuals shall include required maintenance to be performed.
   2. Manuals shall be suitable for the training of future personnel by the City, and for use as a reference by currently employed personnel in performing work assignments.

E. As-built documentation. Notes shall be kept during initial installation and shall be made a permanent part of the installation manual pages as required.

F. For each active device installed, provide a printed configuration including a printout of the device as displayed on the network management system. Printed configuration parameters for each port on the device shall accompany the written report.

G. Other information in support of the design, fabrication, and installation of the LAN system.

H. An implementation schedule listing dates for Data Network Equipment installations for approval by the City Engineer. The dates of LAN equipment installations shall be in accordance with dates for installation of the various special systems and users. It is incumbent upon the Data Network Equipment implementers to include the dates for special system and user installs into the schedule.

I. Include spares list to be approved by HAS IT Project Manager for approval.

1.06 CONTRACTOR'S DUTIES

A. Perform all work, coordination, systems integration, engineering design, and testing, and shall provide all products required in order to ensure a fully operative system and proper installation of equipment. System operability and proper installation shall be verified via completion of the acceptance test plan.

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B. Coordinate all installation activities and details with the Houston Airport Systems' Information Technology (HAS IT) Representative. The HAS IT Representative shall be responsible for approving the final configuration of all equipment supplied as part of this specification.

C. Provide all system documentation and submittals.

D. Provide warranty and maintenance support as specified.

E. Provide all calculations and/or analysis to support design and engineering decisions as specified in Submittals.

F. Provide and pay for all labor, materials, and equipment. Pay required sales, gross receipts, and other taxes.

G. Secure and pay for plan check fees, permits, licenses, and all additional fees necessary for execution of Work as applicable for the project.

H. Give required notices.

I. Comply with all codes, ordinances, regulations, and other legal requirements of public authorities that bear on performance of Work.

1.07 QUALITY ASSURANCE

A. Contractor Qualifications:
   1. The contractor must be certified by the manufacturer of the products to be installed adhere to the engineering, installation and testing procedures, and utilize the authorized manufacturer components and distribution channels in provisioning this Project.
   2. All members of the installation team must be certified by the manufacturer(s) as having completed the necessary training to complete their part of the installation.
   3. Contractor shall provide five references for projects of approved equivalent scope, type and complexity of work completed within the last five years.

B. Equipment and materials supplied shall be a standard product of manufacturers regularly engaged in the manufacture and installation of information backbone technologies and shall be the manufacturer's latest standard design. Items of the same classification shall be identical. This requirement includes equipment, modules, assemblies, parts, and components. Electrically powered equipment shall be UL approved. Electronic equipment shall meet the requirements of CFR 47 Part 15.

C. All hardware, software, firmware, and/or operating system requirements given are the minimum requirements. The Contractor's product shall meet or exceed these

requirements. The product selected shall meet the operational, functional, and performance requirements specified herein. Additionally, due to the rapid advancement and antiquation of technology related products, the supplied product shall be the "contemporary technical equivalent" of that specified. "Contemporary technical equivalent" shall be based on a comparison of technology at the time of publication of specification to the technology at the time of the first product submittal. Final product approval is at the sole discretion of the City.

1.08 MAINTENANCE AND SUPPORT

A. Provide the manufacturer's standard maintenance and support services for all hardware and software associated with this system at no additional charge for a period of not less than three years. It will be the responsibility of the HAS IT Representative to provide the operational maintenance and support of the installed system. Coordination through the City Engineer and the HAS IT Representative shall be required by the installation contractor to ensure that all documentation for the manufacturer's maintenance and support programs are in place.

B. All lead technicians performing installation shall have a minimum of two years experience on the proposed system and be manufacturer certified on all hardware/software applications.

1.09 EXTENDED WARRANTY

A. Provide the manufacturer's warranty for all equipment installed at no additional charge for a period of not less than three years. The warranty shall ensure that the installed equipment will conform to its description and any applicable specifications, and shall be of good quality for the known purpose for which it is intended. The warranty shall allow for replacement or repair at the discretion of the City Engineer and shall include all upgrades for firmware and/or operating systems.

B. Software License
   1. Required software licenses shall be identified and supplied by the Contractor. Licenses shall be "Site Licenses" which shall cover all equipment installed now or in the future.
   2. All software licenses and warranties shall be registered in the name of Houston Airport System.

1.10 PROCUREMENT

***(These Guidelines are basic minimum criteria to be met in preparing the final specifications for this section, which is the responsibility of the Designer/Contractor/Installation Team.)***

A. Procure equipment specified in this document as dictated by the timeline in Appendix B in order to make sure that the technology is acquired in a timely fashion, but not outdated by the installation date.

B. Submit a copy of Appendix B "Technology Implementation Schedule" as a part of the equipment submittals required elsewhere in this document. The Contractor shall complete the columns headed "Quantity", "Procurement Lead Time", "Start Date or Dependent", and "Installation Duration".

C. The "Procurement Lead Time" shall be expressed in days or weeks, and shall include time required for the contractor's personnel to order and receive the material. Substantiation may be required.

D. "Start Date or Dependent" and "Installation Duration" should be an accurate estimate based upon known facts in the project. Substantiation may be required.

E. The Contractor shall not purchase any materials requiring submittals until the City Engineer approves the submittal for that material and the Technology Implementation Schedule.

F. The Contractor shall not purchase any materials requiring submittals until the date established by the City Engineer as the Purchasing Authorized Date. The Purchasing Authorized Date will be reflected in the "Purch Auth" column of Appendix B as a part of the Submittal Review process.

G. All products shall be purchased within 6 months of installation as to ensure contemporary technical equivalency.

## PART 2 - PRODUCTS

### 2.01 EQUIPMENT MANUFACTURERS

A. Severs: Unless otherwise specified, furnish products manufactured by Dell. Substitutions for specified Dell components are NOT permitted.

B. Desktop, Laptop computers: Unless otherwise specified, furnish products manufactured by Dell. Substitutions for specified Dell components are NOT permitted.

C. Network printers: Unless otherwise specified, furnish products manufactured by HP. Substitutions for specified HP components are NOT permitted.

D. Uninterruptible Power Supply (UPS): Eaton or submitted and approved equivalent.

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E. Cabinets/Racks and cabling infrastructure: Reference Specification 271100 and 271300.

2.02 GENERAL DATA NETWORK HARDWARE REQUIREMENTS

A. All the data network hardware shall utilize HAS infrastructure located throughout the premises areas as provided in Section 271300.

B. All data network hardware shall support full-duplex connectivity on links of minimum 1000Base-TX.

C. All network equipment shall be Virtual Local Area Network (VLAN) compatible based on both port and MAC addresses. VLAN assignments shall be configurable from a centralized administrative console.

D. All active data network hardware devices shall include all software as required for interconnectivity. All active devices shall have fully functional software platform as specified by the contract documents.

2.03 DATA NETWORK HARDWARE REQUIREMENTS

A. All blade server equipment shall be rack mountable in standard 19-inch racks. Contractor is responsible for providing fans, shelves, drawers, special power wiring, ground connections, and adapters of any kind necessary to accommodate the system installation, operation, testing, or maintenance. Contractor shall provide the appropriate factory or custom rack mount adapters for all equipment installed in the equipment rack, whether specifically itemized or not. <u>All servers must be approved by HAS IT inspector and HAS server team before purchase can be approved.</u> Listed is the minimum blade server requirements:

Below is the Blade Server Chassis:

| **GROUP: 1** | | Quantity |
|---|---|---|
| | | |
| **Base Unit:** | **Blade Server Enclosure, No Blades, M1000E, PowerEdge (223-3244)** | **1** |
| **Service:** | **Mission Critical Package: 4-Hour 7x24 On-Site Service with Emergency Dispatch, 4 Year Extended (981-5204)** | **1** |
| **Service:** | **ProSupport : 7x24 HW / SW Tech Support and Assistance , 5 Year (981-5394)** | **1** |
| **Service:** | **Mission Critical Package: 4-Hour 7x24 On-Site Service with Emergency Dispatch, Initial Year (985-3800)** | **1** |
| **Service:** | **Dell Hardware Limited Warranty Plus On Site Service Extended Year(s) (989-0728)** | **1** |
| **Service:** | **Dell Hardware Limited Warranty Plus On Site Service Initial Year (989-0747)** | **1** |
| **Service:** | **MISSION CRITICAL PACKAGE: Enhanced Services, 5 Year (989-0807)** | **1** |
| **Service:** | **Thank you choosing Dell ProSupport. For tech support, visit http://support.dell.com/ProSupport or call 1-800-9 (989-3439)** | **1** |
| **Installation:** | **Dell PowerEdge M1000e Implementation Service (934-5409)** | **1** |
| | **Proactive Maintenance Service Declined (926-2979)** | **1** |
| **Misc:** | **Redundant Power Supplies (3+3 2700W), High Efficiency, M1000E Blade Chassis (331-0824)** | **1** |

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| | | |
|---|---|---|
| | **Redundant Chassis Management Controller, PowerEdge M1000E (311-7787)** | **1** |
| | **Flex Address Plus Enabled (342-1668)** | **1** |
| | **No Operating System Media Kit (420-1908)** | **1** |
| | **Dell OpenManage CD Kit for PowerEdge M1000E Blade Server Chassis (310-9694)** | **1** |
| | **CMC Extended Storage Card (342-2666)** | **1** |
| | **Users Guide, PowerEdge M-Series Blades (330-4117)** | **1** |
| | **Redundant Ethernet Switch Configuration (311-8060)** | **1** |
| | **Redundant Fibre Channel Switchor Access Gateway Configuration (311-8062)** | **1** |
| | **Redundant Ethernet Switch Configuration (311-8060)** | **1** |
| | **Rack Chassis w/Rapid Rails forDell, HPQ or other Square HoleRacks (310-9689)** | **1** |
| | **Avocent Integrated KVM Analog Switch Module, PowerEdge M1000E Chassis (430-2628)** | **1** |
| | **PDU,24A,208V,(4)C19,0U/1U,with L6-30P 3.7m attached input cord (330-6418)** | **2** |
| | **Power Cords, QTY3, 2FT C19/C20 for M1000E Server Blade Chassis (330-0146)** | **3** |
| | **Serial I/O Management Cable, for Ethernet Blade Switches (310-9696)** | **1** |
| | **User Guide, PowerEdge M I/O Aggregator (331-8303)** | **1** |
| | **Blade Blanking Panel for PowerEdge M1000E Blade Server Chassis (310-9709)** | **16** |
| | | |
| **GROUP: 2** | | |
| | **Description** | |
| | **PowerEdge M I/O Aggregator, Redundant Configuration, Factory Installed in M1000e (225-3610)** | **4** |
| | **Mission Critical Package: 4-Hour 7x24 On-Site Service with Emergency Dispatch, Initial Year (968-5418)** | **4** |
| | **Mission Critical Package: 4-Hour 7x24 On-Site Service with Emergency Dispatch, 4 Year Extended (968-5562)** | **4** |
| | **ProSupport: 7x24 HW / SW Tech Support and Assistance, 5 Year (968-5566)** | **4** |
| | **Dell Hardware Limited Warranty Plus On Site Service Initial Year (968-5638)** | **4** |
| | **MISSION CRITICAL PACKAGE: Enhanced Services, 5 Year (968-5641)** | **4** |
| | **Dell Hardware Limited Warranty Plus On Site Service Extended Year (968-5650)** | **4** |
| | **SW Support,PE M I/O Aggregator,90 Day (968-5662)** | **4** |
| | **Dell ProSupport. For tech support, visit http://support.dell.com/ProSupport or call 1-800-945-3355 (989-3439)** | **4** |
| | **On-Site Installation Declined (900-9997)** | **4** |
| | **Declined Remote Consulting Service (973-2426)** | **4** |
| | | |
| **GROUP: 3** | | |
| | **Description** | |
| | **Brocade M6505 FC16 Switch, 24 ports with 4x 16GB SFPs, Redundant Config, FI (225-4194)** | **2** |
| | **Dell Hardware Limited Warranty Initial Year (969-9323)** | **2** |
| | **Dell Hardware Limited Warranty Extended Year(s) (969-9324)** | **2** |
| | **Info SW Warranty,90 Day (969-9327)** | **2** |
| | **Mission Critical Package: 4-Hour 7x24 On-Site Service with Emergency Dispatch, Initial Year (969-9350)** | **2** |
| | **Mission Critical Package: 4-Hour 7x24 On-Site Service with Emergency Dispatch, 4 Year Extended (969-9353)** | **2** |
| | **ProSupport: 7x24 HW / SW Tech Support and Assistance, 5 Year (969-9382)** | **2** |
| | **MISSION CRITICAL PACKAGE: Enhanced Services, 5 Year (969-9388)** | **2** |
| | **Dell ProSupport. For tech support, visit http://support.dell.com/ProSupport or call 1-800-945-3355 (989-3439)** | **2** |
| | **On-Site Installation Declined (900-9997)** | **2** |
| | **Declined Remote Consulting Service (973-2426)** | **2** |
| | | |

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Below is the Blade Server that goes in the Chassis:

**PowerEdge M630 for M1000e**

**SYSTEM COMPONENTS**

**Description**

**PowerEdge M630 for M1000e**
**SYSTEM COMPONENTS**
**PowerEdge M630 for M1000e Qty 1**
**PowerEdge M630 Blade Server, No TPM, No Operating System**
**Number: 4 PE_M630_1372**

**Module Description Show Details**
**PowerEdge M630 PowerEdge M630 Blade Server, No TPM**
**Operating System No Operating System**
**Network Daughter Card for Fabric A Broadcom 57810-k Dual port 10Gb KR Blade Network Daughter Card**

**I/O Card for Fabric B QLogic QME2662 16Gbps Fibre Channel I/O Mezz Card**

**I/O Card for Fabric C Broadcom 57810-k Dual port 10Gb KR CNA Mezz Card for M-Series Blades**

**OS Media Kits No Operating System Media Kit**
**Hardware Support Services ProSupport Plus: 5 Year Next Business Day On-site Service**

**Proactive Systems Management Dell Proactive Systems Management - Declined**

**Installation Services No Installation**
**Proactive Maintenance Maintenance Declined**
**Remote Consulting Service Declined Remote Consulting Service**
**Shipping Information US No Canada Ship Charge**
**Shipping Shipping Material, Individual Blade, PE M630**
**Embedded Systems Management iDRAC8 Enterprise, integrated Dell Remote Access Controller, Enterprise**

**Chassis Configuration 2.5" Backplane with up to 2 Hard Drives and PERC RAID Controller**

**Cooling Standard Cooling**
**Power Management BIOS Settings Performance BIOS Setting**
**RAID Configuration RAID 1 for H330/H730/H730P (2 HDDs, SAS/SATA/SSD**
**RAID Controller H330 Controller**
**Processor Intel® Xeon® E5-2660 v3 2.6GHz,25M Cache,9.60GT/s QPI,Turbo,HT,10C/20T (105W) Max Mem 2133MHz**

**Additional ProcessorUpgrade to Two Intel® Xeon® E5-2660 v3 2.6GHz,25M Cache,9.60GT/s QPI,Turbo,HT,10C/20T (105W)**

**Memory Capacity (16) 16GB RDIMM, 2133MT/s, Dual Rank, x4 Data Width**
**Memory DIMM Type and Speed 2133MT/s RDIMMs**
**Memory Configuration Type Performance Optimized**
**Hard Drives (2) 300GB 15K RPM SAS 6Gbps 2.5in Hot-plug Hard Drive**

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**System Documentation** **Electronic System Documentation and OpenManage DVD Kit for M630**

**Internal SD Module No Internal SD Module**
**Processor Thermal Configuration 2 CPU up to 135W**
**Each Blade server requires the following licensing**
**VMware vSphere 5.5 Enterprise Plus per CPU socket**
**VMware vSphere 5.5 production support for 5 years per CPU socket**
**VMware vCenter Standard with 5 years production support maybe required**
**Windows Server 2012 R2 Datacenter per CPU Socket**
**Veeam Availability Suite v8 Enterprise plus per CPU socket**
**Veeam Availability Suite v8 Enterprise plus Maintenance for 5 years**
**1x Bit9 License per guest server instance**

Chassis server:

**Description**

**PowerEdge R710**

**SYSTEM COMPONENTS**

**PowerEdge R710** 1
Chassis for Up to Eight 2.5-Inch Hard Drives, Windows Server® 2008, Standard x64 Edition,Includes 5 CALs

**Catalog Number: 84 W1481**

| Module | Description | Product Code | Sku | Id |
|---|---|---|---|---|
| **PowerEdge R710** | Chassis for Up to Eight 2.5-Inch Hard Drives | R7108 | [224-4845] | 1 |
| **Operating System** | Windows Server® 2008, Standard x64 Edition,Includes 5 CALs | WS8XSE | [420-8354] | 11 |
| **SHIP** | PowerEdge R710 Shipping | SHIPGRP | [330-4124] | 2 |
| **Memory** | 16GB Memory (8x2GB), 1066MHz Dual Ranked UDIMMs for 2 Processors, Adv ECC | 16GUD1P | [317-0233] | 3 |
| **Feature Upgrades for Embedded NIC Ports** | Dual Two-Port Embedded Broadcom® NetXtreme II 5709 Gigabit Ethernet NIC | OBNIC | [430-1764] | 5 |
| **Processor** | Intel® Xeon® E5530, 2.4Ghz, 8M Cache, 5.86 GT/s QPI, Turbo, HT | E5530 | [317-1205] | 6 |
| **Additional Processor** | Intel® Xeon® E5530, 2.4Ghz, 8M Cache, 5.86 GT/s QPI, Turbo, HT | 2E5530 | [317-1213][317-1217] | 7 |
| **1st Hard Drive** | HD Multi-Select | HDMULTI | [341-4158] | 8 |
| **Primary Controller** | PERC 6/i SAS RAID Controller, 2x4 Connectors, | P6IX8 | [341-8712] | 9 |

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| | | | | |
|---|---|---|---|---|
| | Internal, PCIe,256MB Cache,x8 | | | |
| **BIOS Setting** | Performance BIOS Setting | HPBIOS | [330-3492] | 10 |
| **Embedded Management** | iDRAC6 Enterprise with vflash 1GB SD Card | IDRENVF | [341-8737][467-8648] | 14 |
| **Internal Optical Drive** | DVD ROM, SATA, Internal | DVD | [313-7541] | 16 |
| **Bezel** | Bezel | BEZEL | [313-7517] | 17 |
| **Riser Card** | Riser with 2 PCIe x8 + 2 PCIe x4 Slot | PCIEX8 | [320-7886] | 18 |
| **System Documentation** | Electronic System Documentation and OpenManage DVD Kit | EDOCS | [330-3485] | 21 |
| **Hard Drive Configuration** | RAID 5 for PERC 6/i Controller | MSR5 | [341-8700] | 27 |
| **Rails** | Sliding Ready Rails Without Cable Management Arm | RRNOCMA | [330-3478] | 28 |
| **Hardware Support Services** | 3 Year ProSupport for IT and Mission Critical 4HR 7x24 Onsite Pack | U3IPME4 | [989-3439][992-8162][992-8352][993-2200][993-8447][993-8458][993-8518] | 29 |
| **Installation Services** | No Installation | NOINSTL | [900-9997] | 32 |
| **Power Supply** | Energy Smart Power Supply, Redundant, 570W | RDPSUES | [330-3474] | 36 |
| **Power Cords** | No Additional Power Cords | NOPWRCD | [310-9057] | 38 |
| **Power Cords** | 2x C13 to C14, PDU Style, 12 AMP, 2 Ft., Power Cords for Redundant PSUs | 212A2F | [330-3150][330-3150] | 106 |
| **Hard Drives** | (6) 300GB 10K RPM Serial-Attach SCSI 2.5" Hot Plug Hard Drive | 300A102 | [341-9158][341-9158][341-9158][341-9158][341-9158][341-9158] | 1209 |

Storage Area Network Switch:

| | |
|---|---|
| Base Unit: | PowerConnect 8024, 24 10 GbE SFP+ Ports, Four Combo Ports (224-6406) |

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| | |
|---|---|
| Service: | Dell Hardware Limited Warranty Extended Year (903-1598) |
| Service: | Dell Hardware Warranty, Initial Year (903-2167) |
| Service: | Pro Support for IT: Next Business Day Onsite Service After Problem Diagnosis, 4 Year Extended (903-2464) |
| Service: | Pro Support for IT: Next Business Day Onsite Service After Problem Diagnosis, Initial Year (903-4910) |
| Service: | ProSupport for IT: 7x24 HW / SW Tech Support and Assistance for Certified IT Staff, 5 Year (903-2504) |
| Service: | Thank you choosing Dell ProSupport. For tech support, visit http://support.dell.com/ProSupport or call 1-800-9 (989-3439) |
| Installation: | On-Site Installation Declined (900-9997) |

Storage Options:

| | |
|---|---|
| Base Unit: | Dell EqualLogic PS6010X, 10Gbe, Mainstream Performance 10K SAS Drives (224-7572) |
| Processor: | 16 X 600GB 10k SAS DUAL CONTROLLER (313-9171) |
| Factory Installed Software: | Asynchronous Replication (468-7110) |
| Software Disk Two: | Snaps/Clones with integration for MS SQL, Exchange, Hyper V and VMware (468-7155) |
| Feature | SAN HQ multi group monitoring software (468-7156) |
| Service: | Non-Mission Critical: 4-Hour 7x24 On-site Service After Problem Diagnosis, 4 Year Extended (906-1904) |
| Service: | ProSupport for IT: 7x24 HW / SW Tech Support and Assistance for Certified IT Staff, 5 Year (906-2194) |
| Service: | Dell Hardware Limited Warranty Extended Year (907-5708) |
| Service: | EqualLogic Advanced Software Warranty and Service,7x24 Access,5 Year (907-5758) |
| Service: | Dell Hardware Limited Warranty Initial Year (907-5787) |
| Service: | Non-Mission Critical: 4-Hour 7x24 On-site Service After Problem Diagnosis, Initial Year (908-7230) |
| Service: | Thank you choosing Dell ProSupport. For tech support, visit http://support.dell.com/ProSupport or call 1-800-9 (989-3439) |
| Installation: | Onsite INSTALLATION and CONFIGURATION of 1 PS system with up to 2 attached hosts (990-0688) |
| Support: | Proactive Maintenance Service, EQL, 1 Event per yr, 1 yr (926-2989 |

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| | |
|---|---|
| Base Unit: | Dell EqualLogic PS6510E, 10Gbe, High capacity, High density, 7.2K SATA Drives (224-7570) |
| Processor: | 48 X 1TB SATA DUAL CONTROLLER (342-0365) |
| Service: | Pro Support for IT: Next Business Day Onsite Service After Problem Diagnosis, 4 Year Extended (906-0554) |
| Service: | ProSupport for IT: 7x24 HW / SW Tech Support and Assistance for Certified IT Staff, 5 Year (906-0604) |
| Service: | Dell Hardware Limited Warranty Extended Year (907-4828) |
| Service: | EqualLogic Advanced Software Warranty and Service,7x24 Access,5 Year (907-4878) |
| Service: | Dell Hardware Limited Warranty Initial Year (907-5027) |
| Service: | Pro Support for IT: Next Business Day Onsite Service After Problem Diagnosis, Initial Year (908-5910) |
| Service: | Thank you choosing Dell ProSupport. For tech support, visit http://support.dell.com/ProSupport or call 1-800-9 (989-3439) |
| Installation: | Onsite INSTALLATION and CONFIGURATION of 1 PS system with up to 2 attached hosts (990-0688) |
| Support: | Proactive Maintenance Service, EQL, 1 Event per yr, 5 yr (926-3029) |

| | |
|---|---|
| Base Unit: | Dell EqualLogic PS6510E, 10Gbe, High capacity, High density, 7.2K SATA Drives (224-7570) |
| Processor: | 96 TB capacity, 48 X 2TB 7200rpm SATA hard drives, Dual Controllers (342-0364) |
| Service: | Non-Mission Critical: 4-Hour 7x24 On-site Service After Problem Diagnosis, 4 Year Extended (906-0314) |
| Service: | ProSupport for IT: 7x24 HW / SW Tech Support and Assistance for Certified IT Staff, 5 Year (906-0604) |
| Service: | Dell Hardware Limited Warranty Extended Year (907-4828) |
| Service: | EqualLogic Advanced Software Warranty and Service,7x24 Access,5 Year (907-4878) |
| Service: | Dell Hardware Limited Warranty Initial Year (907-5027) |
| Service: | Non-Mission Critical: 4-Hour 7x24 On-site Service After Problem Diagnosis, Initial Year (908-5670) |
| Service: | Thank you choosing Dell ProSupport. For tech support, visit http://support.dell.com/ProSupport or call 1-800-9 (989-3439) |
| Installation: | Onsite INSTALLATION and CONFIGURATION of 1 PS system with up to 2 attached hosts (990-0688) |
| Support: | Proactive Maintenance Service, EQL, 1 Event per yr, 1 yr (926-2989) |

***(These Guidelines are basic minimum criteria to be met in preparing the final specifications for this section, which is the responsibility of the Designer/Contractor/Installation Team.)***

The processor specified above is mandatory. VI 3.5's advanced features require the same processor to function.

Each Blade server requires the following licensing
vShpere 4.1
VS4 ENT 1PROC MAX 6 CORESPROC VS4-ENT-C per CPU (2 per blade)
vShpere 4.1 Maintenance
PROD SUP SUB VSPHERE ENT 1PROC 3YR VS4-ENT-3P-SSS-C per CPU (2 per blade)
Windows Server 2008 R2 DC per CPU (2 per blade)
Veeam backup and replication v5.0 Pro per CPU (2 per Blade)

B. Desktop PC, printer, scanners, and other related items shall following current HAS standards (see link below):
   1. https://connect.houstonairports.us/technology/Pages/ITSpecs.aspx

C. Fiber and Copper Patch Cords – Adequately sized fiber and copper patch cords shall be provided for each installed device under Section 271300, "Communications Media Infrastructure."

PART 3 - EXECUTION

3.01 INSTALLATION

A. Install components in accordance with contract drawings, manufacturer's instructions and approved submittal data.

B. System installation and construction methods shall conform to the requirements of the Federal Communications Commission.

C. The Contractor shall install all system components including furnished equipment, and appurtenances in accordance with the manufacturer's instructions, and adjustments required for a complete and operable system.

D. Grounding shall be installed as necessary to preclude ground loops, noise, and surges from adversely affecting system operation.

***(These Guidelines are basic minimum criteria to be met in preparing the final specifications for this section, which is the responsibility of the Designer/Contractor/Installation Team.)***

E. The HAS IT Representative shall perform final configuration of the network equipment. This includes, but is not limited to: software configuration, IP addressing etc. Installation contractor shall ensure that the proper documentation is provided to assist in the final system configuration.

3.02 PRODUCT HANDLING

A. The Contractor shall be responsible for any and all loss or damage in the shipment and delivery of all material until transfer of title to the City.

3.03 HARDWARE INSTALLATION

A. The Contractor shall obtain written permission from the City Engineer before proceeding with any work which requires cutting into or through any part of the building structures such as, but not limited to, girders, beams, concrete, carpeted or tiled floors, partitions or ceilings. The Contractor shall also consult with the City Engineer before cutting into or through any part of the building structures where fireproofing or moisture proofing could be impaired.

B. The Contractor shall take all steps necessary to ensure that all public areas remain clear or are properly marked during installation or maintenance.

C. The Contractor shall also develop a Cable Plant interconnectivity chart showing all fiber and copper patch panels for each piece of equipment associated with the installation.

D. The contractor shall place materials only in those locations that have been previously approved. The City Engineer shall approve any other locations, in writing.

3.04 SYSTEM STARTUP

A. The Contractor shall not apply power to the system until after:
   1. System and components have been installed and inspected in accordance with the manufacturer's installation instructions.
   2. A visual inspection of the system components has been conducted to ensure that defective equipment items have not been installed and that there are no loose connections.
   3. System wiring has been tested and verified as correctly connected as indicated.
   4. All system grounding and transient protection systems have been verified as properly installed and connected, as indicated.
   5. The City Engineer and the HAS IT Representative have approved the installation.

B. Satisfaction of the above requirements shall not relieve the contractor of responsibility for incorrect installations, defective equipment items, or collateral damage as a result of contractor’s deficient work/defective equipment.

***(These Guidelines are basic minimum criteria to be met in preparing the final specifications for this section, which is the responsibility of the Designer/Contractor/Installation Team.)***

3.05 ACCEPTANCE TESTING

A. The contractor shall develop and execute an onsite acceptance-testing program.

B. The plan shall address all requirements identified in this specification and test all contractor supplied cabling and hardware components. The plan shall follow accepted industry testing practices and have a method of independent verification described.

C. Any specified item that does not satisfy the requirements of this specification shall be replaced, upgraded, or added by the contractor as necessary to correct the noted deficiencies. After correction of a noted deficiency, re-testing shall be performed to verify the effectiveness of the corrective action.

END OF SECTION

***(These Guidelines are basic minimum criteria to be met in preparing the final specifications for this section, which is the responsibility of the Designer/Contractor/Installation Team.)***

## APPENDIX A

Hardware Schedule (EXAMPLE)

| Item | Qty |
|---|---|
| | |
| **ROOM 11611** | |
| Server | 3 |
| Standard Laptop | 6 |
| | |
| **ROOM 11715** | |
| High-End Workstation | 1 |
| Standard desktop | 2 |
| | |
| **ROOM 11908** | |
| Standard desktop | 10 |
| Color Printer | 1 |
| | |
| **ROOM 12015** | |
| Standard desktop | 1 |
| Black/White Printer | 2 |
| | |
| **ROOM 11812** | |
| High-End Laptop | 2 |
| Standard laptop | 4 |
| | |
| **ROOM 12606** | |
| Black/White Printer | 1 |
| Color Printer | 1 |
| | |
| **MDF** | |
| High-End Workstation | 2 |
| Server | 5 |
| | |
| | |

***(NOTE TO DESIGNER/SPECIFIER: These Guidelines are basic minimum criteria to be met in preparing the final specifications for this section, which is the responsibility of the Designer.)***

## APPENDIX B

## TECHNOLOGY IMPLEMENTATION SCHEDULE (EXAMPLE)

| | (from Designer) | | (Contractor Submittal) | | | | (Submittal Response) | | |
|---|---|---|---|---|---|---|---|---|---|
| | Product Description | Spec. Ref. | Qty. | Procurement Lead Time | Start Date or Dependent | Installation Duration | Submittal Approved | Purch. Auth. | Remarks |
| 1 | Standard Desktop | 2.03B | | | | | | | |
| 2 | Server | 2.03.A | | | | | | | |
| 3 | Standard Laptop | 2.04.D | | | | | | | |
| 4 | High-End Work Station | 2.04.C | | | | | | | |
| 5 | Black/White Printer | 2.04.F | | | | | | | |
| 6 | High-End Laptop | 2.04.E | | | | | | | |
| 7 | Color printer | 2.04.G | | | | | | | |
| | | | | | | | | | |
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