Network System Implementation

for the Marconi Law Firm, LLC.

Orlando, Florida

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Harrison Consultants Inc.

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# **Project Scope**

I am initiating this project for the Marconi Law firm because Mr. Marconi wants to centralize all operations in one location to operate more efficiently and effectively. He wants to take advantage of new technologies and would like to invest in a new computer network system for his entire office with future expansion capability.

We were invited to bid on the LAN installation contract with Marconi Law. LLC. The company with the most comprehensive and best bid will be tasked to setup and install a fully functional local area network system for 10 employees. Contractors must provide a comprehensive project report including a network diagram, weekly timesheets, and status reports.

The hardware and software needed for this project consist of these products: 1 router, 1 server, 1 switch, 10 computers with monitors if needed, 2 WAPs, 10 VoIP phones, 1 printer, 1 Conference Phone and 1 Smart TV for conference room, server software, and client computer software.

Anything under $50 such as average-priced mice, keyboards, adapters, cables are not required and not included in this project. Dan Marconi and his team will choose their own.

The project constraints I am facing currently are the number of employees on my team. Currently, I have 5 resumes to review for employment.

The key success factors that will define this project are agreeing on the project goals, developing clear and defined plans with assigned responsibilities and accountabilities, managing the project scope effectively, cultivate constant effective communications and making sure there is management support.

My project for the Marconi Law firm is going to cost $48,264.56. This project will take about 5 weeks to complete.

# **Network Objectives/Benefits**

* Reduce Network Complexity
* Boost Service Awareness
* Enhanced Development Capabilities

# **IP Network Design Table**

|  |  |  |
| --- | --- | --- |
| **-** | **IP Address** | **Reserved** |
| Netmask | 255.255.255.0 | - |
| First IP | 10.10.119.0 | 10.10.119.0 |
| Last IP | 10.10.119.255 | 10.10.119.255 |
| Total Host | 256 | - |

|  |  |  |
| --- | --- | --- |
| **Node** | **Hardware Name** | **Static IP address** |
| 1 | Marconi Computer | 10.10.119.100 |
| 2 | Jones Computer | 10.10.119.101 |
| 3 | Stark Computer | 10.10.119.102 |
| 4 | Drums Computer | 10.10.119.103 |
| 5 | Shoemaker Computer | 10.10.119.104 |
| 6 | Brooks Computer | 10.10.119.105 |
| 7 | Long Computer | 10.10.119.106 |
| 8 | Adams Computer | 10.10.119.107 |
| 9 | Smith Computer | 10.10.119.108 |
| 10 | Schultz Computer | 10.10.119.109 |
| 11 | Marconi VoIP Phone | 10.10.119.1 |
| 12 | Jones VoIP Phone | 10.10.119.2 |
| 13 | Stark VoIP Phone | 10.10.119.3 |
| 14 | Drums VoIP Phone | 10.10.119.4 |
| 15 | Shoemaker VoIP Phone | 10.10.119.5 |
| 16 | Brooks VoIP Phone | 10.10.119.6 |
| 17 | Long VoIP Phone | 10.10.119.7 |
| 18 | Adams VoIP Phone | 10.10.119.8 |
| 19 | Smith VoIP Phone | 10.10.119.9 |
| 20 | Schultz VoIP Phone | 10.10.119.10 |
| 21 | Router | 10.10.119.247 |
| 22 | Server | 10.10.119.248 |
| 23 | Switch | 10.10.119.249 |
| 24 | WAP 1 | 10.10.119.250 |
| 25 | WAP 2 | 10.10.119.251 |
| 26 | Printer | 10.10.119.252 |
| 27 | Smart TV | 10.10.119.253 |
| 28 | Conference Phone | 10.10.119.254 |

# **Network Configuration Process**

|  |  |
| --- | --- |
| User Accounts | Setup and Configuration Process |
| Dan Marconi  Phil Jones  Karen Stark  Evelyn Schultz  Bill Shoemaker  Mike Drums  Lisa Brooks  Terry Long  Samuel Adams  Brian Smith | Step 1: Launch **Windows Server 2019** VM  Step 2: Log into server using admin password  Step 3: Open **Server Manager** by going to **Windows Start Menu** and click on **Server Manager**  Step 4: Clicked on **Users** under **Users and Groups**  Step 5: **Right-click** on white space and choose **new user**  Step 6: Type in user name, description and password  Step 7: **Uncheck** “user must change password at next login”  Step 8: Click **Creat**e and then **Close** |
|  |  |
| Groups | Setup and Configuration Process |
| \_Attorneys  \_Accounting  \_Administrative | Step 1: Launch **Windows Server 2019** VM  Step 2: Log into server using admin password  Step 3: Open **Server Manager** by going to **Windows Start Menu** and click on **Server Manager**  Step 4: Clicked on **Group** under **Users and Groups**  Step 5: **Right-click** on the white space and choose N**ew Group**  Step 6: Type in **“\_Attorneys**” for **group name** and **description**  Step 7: **Add** all attorneys to this group by typing the user name and clicking **Check Names**  Step 8: When finished adding names, press **OK**  Step 9: **Create** two more groups for **“\_Accounting and \_Admin. Assistant”**  Step 10: **Add** designated users to their groups  Step 11: When finished adding names, press **OK** then **CLOSE** the window |
|  |  |
| Folders and Permissions | Setup and Configuration Process |
| Attorneys  Accounting  Administrative | Create Folders  Step 1: Launch **File Manager**  Step 2: Double-click on **Local C drive**  Step 3: **Right-click** on the white space and choose **New Folder**  Step 4: Create a folder and rename it “**Attorneys**”  Step 5: Create a folder and rename it “**Accountants**”  Step 6: Create a folder and rename it “**Administrative**”  Set Sharing Permissions  Step 1: Launch **Windows Server 2019** VM  Step 2: Log into server using admin password  Step 3: Open **Server Manager** by going to **Windows Start Menu** and click on **Server Manager**  Step 4: **Click** on **Tools** and choose **Computer Management**  Step 5: Click on **Shared Folders** and choose **Shares**  Step 6: **Right-click** on the white space and choose **New Share**  Step 7: **Complete** the **Wizard** by choosing **Local Disk C** in the Folder Path **Browse**  Step 8: Choose“**Accounting**” folder, select **Next**  Step 9: Keep or change the default name, select **Next**  Step 10: **Customize** the permissions by removing everyone and Adding Accountants & D. Marconi  Step 11: **Highlight** “Accountants” group and choose the permissions  Step 12: **Click** OK  Step 13: **Click Finish**  Step 14: **Create Share Folders** for **Attorneys** and **Admin. Assistant** |

# **User Logins and Passwords**

|  |  |  |  |
| --- | --- | --- | --- |
| **Employee Name** | **Employee Title** | **Login ID** | **Password** |
| Dan Marconi | President/Attorney | dmarconi | Fullsail2! |
| Phil Jones | Attorney | pjones | Fullsail3! |
| Karen Stark | Attorney | kstark | Fullsail4! |
| Evelyn Schultz | Admin. Assistant | eschultz | Fullsail5! |
| Bill Shoemaker | Attorney | bshoemaker | Fullsail6! |
| Mike Drums | Attorney | mdrums | Fullsail7! |
| Lisa Brooks | Attorney | lbrooks | Fullsail8! |
| Terry Long | Attorney | tlong | Fullsail9! |
| Samuel Adams | Attorney | sadams | Fullsail10! |
| Brian Smith | Accountant | bsmith | Fullsail11! |

# **Network Topology Diagram with Employee Names and Node Numbers**

A picture containing diagram, plan, technical drawing, floor plan

Description automatically generated

# **Capital and Operating Costs**

|  |  |  |  |
| --- | --- | --- | --- |
| Hardware and Software | Per Unit Cost | Quantity | Total Cost |
| Laptops | $1,644.03 | 10 | $16,440.30 |
| Router | $5,664.84 | 1 | $5,664.84 |
| Server | **$2,884.19** | 1 | **$2.884.19** |
| Switch | **$1,173.24** | 1 | **$1,173.24** |
| Server Hard Drives | $170.04 | 1 | $170.04 |
| VoIP Phones | **$91.19** | 10 | **$911.90** |
| Conference Phone | **$426.55** | 1 | **$426.55** |
| WAPs | **$441.74** | 2 | **$883.48** |
| Printer | **$3,989.00** | 1 | **$3,989.00** |
| Smart TV | $508.24 | 1 | **$508.24** |
| Windows Server 2019 | $109.24 | 1 | $109.24 |
| Windows 10 Pro | $103.54 | 1 | $103.54 |
| Labor (@ $75/hour) | $75 | 40 hrs | $3,000 |
| Annual ongoing network maintenance and support | $12,000 | 1 year | $12,000 |
| GRAND TOTAL | **-** | **-** | **$48,264.56** |

# **Hardware and Software Specification Tables**

**Laptops**

|  |  |
| --- | --- |
| Brand/Manufacturer | Apple |
| Product Line | Apple iMac |
| Model | With 4.5K Retina display |
| Processor/Clock Speed | M1 |
| Memory/Speed | Unified memory/16 GB |
| Hard Drive/Capacity | 256 GB |
| Embedded Security |  |
| Display/Size/Resolution | LED/24 inch/4.5K |
| Networking |  |
| Operating System | Apple macOS Ventura 13.0 |
| Cache |  |
| OS | macOS |
| Page URL | <https://www.cdw.com/product/apple-imac-with-4.5k-retina-display-all-in-one-m1-16-gb-ssd-256-gb/7283718?pfm=srh> |

**Server**

|  |  |
| --- | --- |
| Brand/Manufacturer | HPE |
| Product Line | HPE ProLiant |
| Model | DL360 Gen10 |
| Hard Drive/Capacity | None/4 GB |
| Chassis |  |
| Processor | Intel Xeon Silver |
| Memory/Speed | 2400 megahertz |
| Storage Controller | Broadcom MegaRAID MR416i-a |
| Monitor |  |
| Ethernet | 4 x Gigabit Ethernet |
| Operating System | CentOS |
| Networking |  |
| Expansion Bays |  |
| Expansion Slots |  |
| Page URL | <https://www.cdw.com/product/hpe-proliant-dl360-gen10-rack-mountable-xeon-silver-4210r-2.4-ghz-32/7162083?pfm=srh> |

**Server Hard Drives**

|  |  |
| --- | --- |
| Brand/Manufacturer | HPE |
| Product Line | HPE |
| Storage Type | Serial ATA-600 |
| Hard Drive Type | Hot-swap hard drive |
| Form Factor | 2.5” / 6.4 cm |
| Interface | 1 x SATA 6 Gb/s |
| Capacity | 240 GB |
| Data Transfer Rate (DTR) | 600 MBps |
| Page URL | <https://www.cdw.com/product/hpe-ssd-read-intensive-240-gb-sata-6gb-s/6424467> |

**Router**

|  |  |
| --- | --- |
| Brand/Manufacturer | Cisco |
| Product Line | Cisco Integrated Services Router |
| Model | 4431 |
| RAM | 4 GB |
| Flash Memory | 8 GB |
| WAN Ports Qty | 4 |
| Integrated Switch |  |
| Data Link Protocol | Ethernet, Fast Ethernet, Gigabit Ethernet |
| Network/Transfer Protocol |  |
| Page URL | <https://www.cdw.com/product/cisco-integrated-services-router-4431-router-rack-mountable/7220681?pfm=srh> |

**Switch**

|  |  |
| --- | --- |
| Brand/Manufacturer | Ubiquiti |
| Product Line | Ubiquiti UniFi Switch |
| Model | Usw-PRO\_48-POE |
| RAM |  |
| Flash Memory |  |
| Performance | Forwarding rate: 130.944 Mpps, Non-blocking bandwidth: 88 Gbps, Switching capacity: 176 Gbps |
| Capacity |  |
| Ports Qty\* | 48 |
| Page URL | <https://www.cdw.com/product/ubiquiti-unifi-switch-usw-pro-48-poe-48-port-managed/5821012?pfm=srh> |

\*Switch needs to accommodate all hardware for this LAN project.

**Printer**

|  |  |
| --- | --- |
| Brand/Manufacturer | HP |
| Product Line | HP Color LaserJet Enterprise |
| Model | MFP M681dh |
| Duty Capacity | **100000 pages** |
| Printing Output Type | Color |
| Chassis |  |
| Processor |  |
| RAM |  |
| Hard Drive | 320 GB |
| Printing System | Yes |
| Networking |  |
| Connectivity | Yes |
| Page URL | <https://www.cdw.com/product/hp-color-laserjet-enterprise-mfp-m681dh-multifunction-printer-color/4586712> |

**Wireless Access Points (WAPs)**

|  |  |
| --- | --- |
| Brand/Manufacturer | Extreme Networks |
| Product Line | Extreme Networks ExtremeWireless |
| Model | AP305C |
| Antenna | **Internal / 4** |
| Chassis |  |
| Capacity | SSIDs per radio: 8, SSIDs total: 16, Total users: 1024, Users per radio: 512 |
| Networking | Maximum data rate (2.4 GHz): 1200 Mbps, Maximum data rate (5 GHz): 574 Mbps |
| Interface | 1 x 1000Base-T (PoE) - RJ-45, 1 x USB 2.0 - Type A |
| Power | 9.98 watt |
| Page URL | <https://www.cdw.com/product/extreme-networks-extremewireless-ap305c-wireless-access-point-wi-fi-6/7061059> |

**Smart TV**

|  |  |
| --- | --- |
| Brand/Manufacturer | Vizio |
| Model | Vizio |
| Series | V-Series |
| Video Interface |  |
| HDMI Ports Qty | 3 |
| Diagonal Size | 65” |
| Resolution | 4K UHD |
| Display Format |  |
| Viewing Angle | 64.50” |
| Digital Audio Format | 1 |
| Output Power | Yes ARC |
| Speaker System | 8 watts x2 |
| USB Ports Qty | 1 (side) |
| Wi-Fi Protocol | Wi-Fi 6E Tri-Band |
| Page URL | <https://www.cdw.com/product/vizio-v-series-65-4k-smart-tv/7349267?pfm=srh> |

**Conference Phone**

|  |  |
| --- | --- |
| Brand/Manufacturer | Grandstream |
| Product Line | **Grandstream** |
| Model | **GAC2500** |
| Type | **Conference VoIP phone** |
| Dialer Locations | **Base** |
| Call Services | **Call Forwarding, Call Hold, Call Transfer, Call Waiting** |
| Speakerphone | Yes |
| Features | Touch screen |
| Phone connections | Audio line out / mini-phone 3.5 mm, USB |
| Page URL | <https://www.cdw.com/product/grandstream-gac2500-conference-voip-phone-with-bluetooth-interface-7/4159474?pfm=srh> |

**Server Software**

|  |  |
| --- | --- |
| Brand/Manufacturer | Microsoft |
| Product Line | **Microsoft Windows** |
| Version | **2019** |
| Licensing | No media/no key, Point of Sale (POS) |
| Page URL | https://www.cdw.com/product/microsoft-windows-server-2019-standard-license-2-additional-cores/5406078?pfm=srh |

**Client Software**

|  |  |
| --- | --- |
| Brand/Manufacturer | Microsoft |
| Product Line | **Windows** |
| Version | **Non-Specific** |
| Licensing | Right-To-Use license (upgrade) |
| Page URL | <https://www.cdw.com/product/windows-pro-right-to-use-license-upgrade-1-device/4568326?pfm=srh> |

**VoIP Phones**

|  |  |
| --- | --- |
| Brand/Manufacturer | Grandstream |
| Product Line | **Grandstream** |
| Model | **GXP1782** |
| Type | **VoIP phone** |
| Conference Call Capability | **5-way** |
| Call Services | **Call Forwarding, Call Hold, Call Transfer, Call Waiting, Caller ID** |
| Speakerphone | Yes |
| Additional Functions |  |
| Features | Integrated Ethernet switch |
| VoIP Protocols | SIP |
| IP Address Assignment | DHCP, PPPoE, Static |
| Voice Codecs | G.711a, G.711u, G.722, G.723, G.726, G.729ab, iLBC, Opus |
| Quality of Service | Differentiated Services (DiffServ), IEEE 802.1p, IEEE 802.1Q (VLAN), Multiprotocol Label Switching (MPLS), Type of Service (ToS) |
|  |  |
| Network Protocols | ARP, DNS, HTTP, HTTPS, ICMP, IP, Link Layer Discovery Protocol - Media Endpoint Discovery (LLDP-MED), RARP, RTCP, RTP, SRTP, TCP, TFTP, TR-069, UDP |
| PoE Support | Yes |
| Voice Features | HD Voice |
| Page URL | <https://www.cdw.com/product/grandstream-gxp1782-voip-phone-5-way-call-capability/4607869?pfm=srh> |

# **Timesheets**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Milestone** | **Activity Description (be descriptive)** | **Start Time** | **End Time** | **Total Activity Time** | **Activity**  **Date** |
| Milestone 1 | Researching Equipment | 3:00pm | 5:00pm | 2 hours | 05/04/23 |
| Milestone 1 | Pricing/Spec Equipment | 3:00pm | 5:00pm | 2 hours | 05/06/23 |
| Milestone 1 | Construct Project Report | 3:00pm | 5:00pm | 2 hours | 05/07/23 |
|  |  |  |  |  |  |
| Milestone 2 | Developed project requirements | 1:00pm | 5:00pm | 4 hours | 05/10/23 |
| Milestone 2 | Prepared project scope | 1:00pm | 5:00pm | 4 hours | 05/12/23 |
| Milestone 2 | Assigned IP addresses | 1:00pm | 5:00pm | 4 hours | 05/15/23 |
|  |  |  |  |  |  |
| Milestone 3 | Start setup and configuration process | 11:00am | 1:00pm | 2 hours | 05/16/23 |
| Milestone 3 | Continue setup and configuration process | 2:00pm | 5:00pm | 3 hours | 05/18/23 |
| Milestone 3 | Complete setup and configuration process | 1:00pm | 4:00pm | 3 hours | 05/21/23 |
|  |  |  |  |  |  |
| Milestone 4 | Solving Problems and Preventing Scope Creep | 1:00pm | 5:00pm | 4 hours | 05/22/23 |
| Milestone 4 | Researching Smart Goals and Lessons Learned | 11:00am | 3:00pm | 4 hours | 05/25/23 |
| Milestone 4 | Completed Pitch Presentation and Video recording | 2:00pm | 8:00pm | 6 hours | 05/26/23 |
|  |  |  |  |  |  |
| **TOTAL HOURS** |  |  |  | **40 hours** |  |
|  |  |  |  |  |  |

# **Status Reports**

***Accomplished this week***

|  |
| --- |
| Milestone 1: Researching Equipment |
| Milestone 1: Pricing/Spec Equipment |
| Milestone 1: Construct Project Report |
|  |
| Milestone 2: Prepared project scope |
| Milestone 2: Develop project requirements |
| Milestone 2: Assigned IP addresses to each worker |
|  |
| Milestone 3: Created user accounts for all employees |
| Milestone 3: Created groups and folders for job task |
| Milestone 3: Created shared folder and modified permissions |
|  |
| Milestone 4: Solving Problems and Preventing Scope Creep |
| Milestone 4: Researching Smart Goals, Lessons Learned, Physical &Cybersecurity |
| Milestone 4: Completed Pitch Presentation and video recording |

***Planned for next week***

|  |
| --- |
| Coming up for milestone 2: Develop project requirements |
| Coming up for milestone 2: Installing operating systems for client/server set up |
| Coming up for milestone 2: preparing project scope |
|  |
| Coming up for milestone 3: Plan IT tests |
| Coming up for milestone 3: Testing deliverables |
| Coming up for milestone 3: Address quality issues |
|  |
| Coming up for milestone 4: SMART Goals Approach |
| Coming up for milestone 4: Solving Problems |
| Coming up for milestone 4: Preventing Scope Creep |

***Comments for each milestone***

|  |
| --- |
| *Milestone 1:*  What problems did you run into? I had a little trouble trying to find items that was in stock.  How did you fix them? I kept on searching until I found the hardware that fit my plan.  Is there anything that you did not complete that you now have to push off into the next milestone? No  Any other comments? |
| *Milestone 2:*  What problems did you run into? I didn’t run into any problems.  How did you fix them? N/A  Is there anything that you did not complete that you now have to push off into the next milestone? No  Any other comments? I updated the information on the Smart TV. |
| *Milestone 3:*  What problems did you run into? Proxmox wasn’t working.  How did you fix them? I wrote down all my steps for creating the network system.  Is there anything that you did not complete that you now have to push off into the next milestone? Everything is complete until Proxmox is back up and running.  Any other comments? No |
| *Milestone 4:*  What problems did you run into? I didn’t run into any problems this time.  How did you fix them? N/A  Is there anything that you did not complete that you now have to push off into the next milestone? The set-up, configuration and testing of the network through Proxmox will be completed.  Any other comments? I had a lot of fun learning about project management! |