Network System Implementation

for the Marconi Law Firm, LLC.

Orlando, Florida

Michael Kohronas

IT Solutions

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# **Project Scope**

We are initiating this project with Marconi Law as we feel we can help Mr. Marconi continue growth and profitability by upgrading and expanding his computer network. Dan Marconi is patent lawyer who found Marconi Law Firm in 2006. Mr. Marconi started off small with one administrative assistant, a two-room office with two computers and a printer. Since then, he has added 8 more employees. He had to lease two additional office spaces to accommodate the number of employees. All 3 office spaces were on different floors. Which affected Productivity. His leasing officer just offered him a 4000 sq/ft office space on one floor. Mr. Marconi wants to centralize all operations in one location to operate more efficiently and effectively. He also wants to invest in a new computer network system for his entire office with future expansion capability.

The key objectives of this project for Marconi law are: produce a high level LAN including researching, pricing, identifying, and defining hardware and software specifications, and provide a network diagram of the LAN project. Also, we will be implementing a basic sever setup and configuration. I will configure various operating systems. Then I will finalize a detailed network diagram by labelling the computers, VoIP phones, router, server, switch, printer, WAPs, Smart TV, and conference phone. I will also perform user account setup and testing. Then I will format the project in a high quality professional manner and submit the project.

The Project deliverables are as followed –

Hardware: 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.

Software: Windows Server 2019, 10 Windows 10 Pro Edition

The items that are not included but will be required for your computer network will be: 10 Mouse, Firewall, and 10 Headsets. Keyboards and HDMI cables wouldn’t be required for this project as we will be getting laptops. Although, headsets would be useful to have to isolate everyone’s audio.

The main project restraint is I am on the only employee now. Although, the size of this project is manageable by me. Task will have to get completed one at a time. Other constraints are some products are going up in price. Although, they are still in our budget. These constraints are the main two we are facing right now.

In this project I have 5 key success factors. Keeping up to this will ensure the project’s completion in a timely manner. First Diligent planning, I am a very organized and planned out person so everything with be planned out in advanced. You will know what is happening before its happening. There will also be strong communication during the project. I will keep Mr. Marconi in the loop with everything that is happening on our side. My project goals will be clear. Mr. Marconi will know exactly what we are looking to accomplish and when. Staying under budget is a top priority of mine as well. I have allocated extra funds in case there is anything additional needed. This project will also be done at the highest quality without cutting any corners. This project will be done properly and on time.

This project will take 5 weeks to complete. The cost of the project will be $39,515.52.

# **Network Objectives**

* Growth – This computer network will allow for growth within your computer.
* Collaboration – A conference room with a smart tv to better demonstrate ideas.
* Efficiency – With new technology communicating and working online would be faster.

# **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 | - |
| Total Range | 10.0.0.255 | - |

|  |  |  |
| --- | --- | --- |
| **Node** | **Hardware Name** | **Static IP address** |
| 1 | Marconi Computer | 10.10.119.101 |
| 2 | Jones Computer | 10.10.119.102 |
| 3 | Stark Computer | 10.10.119.103 |
| 4 | Drums Computer | 10.10.119.104 |
| 5 | Shoemaker Computer | 10.10.119.105 |
| 6 | Brooks Computer | 10.10.119.106 |
| 7 | Long Computer | 10.10.119.107 |
| 8 | Adams Computer | 10.10.119.108 |
| 9 | Smith Computer | 10.10.119.109 |
| 10 | Schultz Computer | 10.10.119.110 |
| 11 | Marconi VoIP Phone | 10.10.119.201 |
| 12 | Jones VoIP Phone | 10.10.119.202 |
| 13 | Stark VoIP Phone | 10.10.119.203 |
| 14 | Drums VoIP Phone | 10.10.119.204 |
| 15 | Shoemaker VoIP Phone | 10.10.119.205 |
| 16 | Brooks VoIP Phone | 10.10.119.206 |
| 17 | Long VoIP Phone | 10.10.119.207 |
| 18 | Adams VoIP Phone | 10.10.119.208 |
| 19 | Smith VoIP Phone | 10.10.119.209 |
| 20 | Schultz VoIP Phone | 10.10.119.210 |
| 21 | Router | 10.10.119.1 |
| 22 | Server | 10.10.119.3 |
| 23 | Switch | 10.10.119.7 |
| 24 | WAP 1 | 10.10.119.9 |
| 25 | WAP 2 | 10.10.119.11 |
| 26 | Printer | 10.10.119.150 |
| 27 | Smart TV | 10.10.119.151 |
| 28 | Conference Phone | 10.10.119.152 |

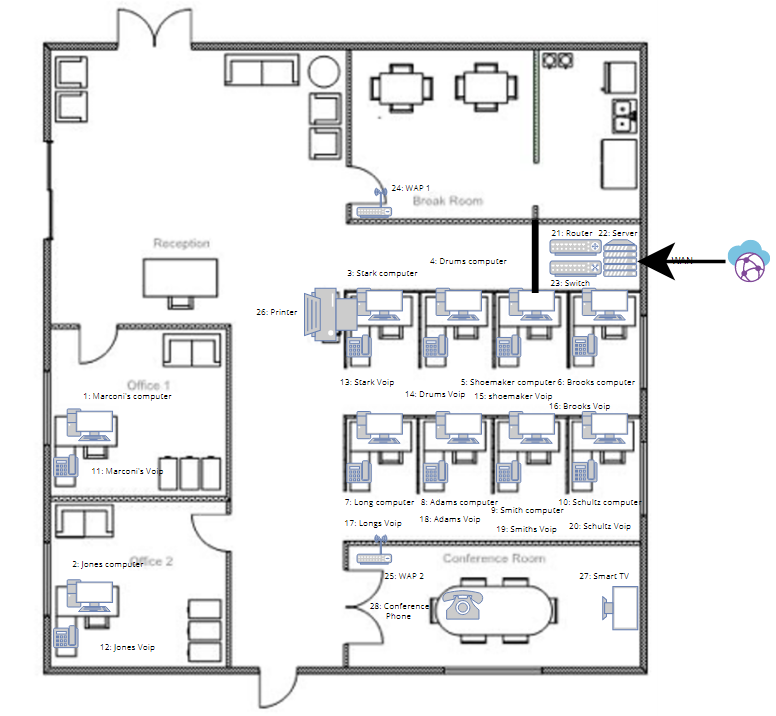
# **Network Configuration Process**

|  |  |
| --- | --- |
| 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: Click on **Tools > Computer Management** > **User**  Step 5: Right click on W**hite Space**, Choose **New User**  Step 6: Enter user information and password.  Step 7: Uncheck the box to change user password.  Step 8: Click **Create**  Step 9: Repeat **Steps** **6 – 8** until there is an account for everyone.  Step 10: Click **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: Click on **Tools > Computer Management** > **Groups**  Step 5: Right click on W**hite Space**, Choose **New Group**  Step 6: Enter group name and description.  Step 7: Add User to group and type their username and click **Check Names** (Put Mr. Marconi in all groups)  Step 8: Click **Create**  Step 9: Repeat **Steps** **6 – 8** until all groups are created.  Step 10: Click **Close** |
|  |  |
| Folders and Permissions | Setup and Configuration Process |
| Attorneys  Accounting  Administrative | Create Folders  Step 1: Launch **Windows Server 2019** VM  Step 2: Log into server using admin password  Step 3: Click on the **File Explorer** and go to the **C: Drive**  Step 4: Create the 3 Share folders in the **C: Drive**  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 > Computer Management** > **Shared Folders > Shares**  Step 5: Right click on W**hite Space**, Choose **New Share**  Step 6: Find Folder Path > Browse  Step 7: Next  Step 8 Type in a Description  Step 9: Next  Step 10: Customize Permissions > Remove Everyone  Step 11: Click Add > Pick the group > Allow Read & Change  Step 12: Finish  Step 13: Repeat **Steps** **6 – 12** until all groups are created. |

# **User Logins and Passwords**

|  |  |  |  |
| --- | --- | --- | --- |
| **Employee Name** | **Employee Title** | **Login ID** | **Password** |
| Dan Marconi | President/Attorney | dmarconi | Fullsail1! |
| Phil Jones | Attorney | pjones | Fullsail1! |
| Karen Stark | Attorney | kstark | Fullsail1! |
| Evelyn Schultz | Administrative | eschultz | Fullsail1! |
| Bill Shoemaker | Attorney | bshoemaker | Fullsail1! |
| Mike Drums | Attorney | mdrums | Fullsail1! |
| Lisa Brooks | Attorney | lbrooks | Fullsail1! |
| Terry Long | Attorney | tlong | Fullsail1! |
| Samuel Adams | Attorney | sadams | Fullsail1! |
| Brian Smith | Accountant | bsmith | Fullsail1! |

# **Network Topology Diagram with Node Numbers**



# **Capital and Operating Costs**

|  |  |  |  |
| --- | --- | --- | --- |
| Hardware and Software | Per Unit Cost | Quantity | Total Cost |
| Laptops | 759.99 | 10 | 7,599.9 |
| Router | 299.99 | 1 | 299.99 |
| Server | 1 | 1 | 3,861.99 |
| Switch | 1 | 1 | 2,236.00 |
| Server Hard Drives | 1 | 1 | 1,497.99 |
| VoIP Phones | 288.99 | 10 | 2,889.9 |
| Conference Phone | 1,265.99 | 1 | 1,265.99 |
| WAPs | 129.99 | 2 | 259.98 |
| Printer | 549.99 | 1 | 549.99 |
| Smart TV | 1,199.99 | 1 | 1,199.99 |
| Windows Server 2019 | 803.99 | 1 | 803.99 |
| Windows 10 Pro | 204.99 | 1 | 2,049.9 |
| Labor (@ $75/hour) | $75 | 40 hrs | $3,000 |
| Annual ongoing network maintenance and support | $12,000 | 1 yr | $12,000 |
| GRAND TOTAL | **-** | **-** | **$39,515.52** |

# **Hardware and Software Specification Tables**

**Laptops**

|  |  |
| --- | --- |
| Brand/Manufacturer | [Microsoft](https://www.cdw.com/product/microsoft-surface-laptop-4-13.5-ryzen-5-4680u-16-gb-ram-256-gb-ssd/7160584?pfm=srh) |
| Product Line | Microsoft Surface |
| Model | Laptop 4 |
| Processor/Clock Speed | AMD Ryzen 5 468u / 2.2GHz |
| Memory/Speed | 16gb |
| Hard Drive/Capacity | 256 GB |
| Display/Size/Resolution | 13.5” |
| Networking | 802.11a/b/g/n/ac/ax |
| Operating System | Windows |
| Cache | L3 cache 8 megabytes |
| OS | Windows 10 |

**Server**

|  |  |
| --- | --- |
| Brand/Manufacturer | [Supermicro](https://www.cdw.com/product/supermicro-superstorage-server-6029p-e1cr12h-rack-mountable-no-cpu-0/5384843?pfm=srh) |
| Product Line | Supermicro SuperStorage Server |
| Model | 6029P-E1CR12H |
| Hard Drive/Capacity | No hard drive / 0 |
| Processor | No CPU |
| Memory/Speed | 16gb available |
| Storage Controller | Broadcom SAS3109 / RAID |
| Monitor | No Display |
| Ethernet | 2 x 10 Gigabit Ethernet |
| Operating System | No operating system |
| Networking | 10 gigabyte ethernet, fast ethernet, gigabyte ethernet |
| Expansion Bays | 12 total / 12 free |
| Expansion Slots | 16 total / 16 free |

**Server Hard Drives**

|  |  |
| --- | --- |
| Brand/Manufacturer | [HPE](https://www.cdw.com/product/hpe-midline-helium-hard-drive-12-tb-sas-12gb-s/6424444?pfm=srh) |
| Product Line | HPE |
| Storage Type | Midline Helium |
| Hard Drive Type | Hot-swap hard drive |
| Form Factor | 3.5” |
| Interface | 1 x SAS 12 Gb/s |
| Capacity | 12TB |
| Data Transfer Rate (DTR) | 1.2GBps |

**Router**

|  |  |
| --- | --- |
| Brand/Manufacturer | [NETGEAR](https://www.cdw.com/product/netgear-nighthawk-rax50-wireless-router-802.11a-b-g-n-ac-ax-desktop/6180768) |
| Product Line | NETGEAR Nighthawk |
| Model | RAX50 |
| RAM | 512mb |
| Flash Memory | 256mb |
| WAN Ports Qty | 1 |
| Integrated Switch | 4 port |
| Data Link Protocol | 802.11ax, Ethernet, Fast Ethernet, Gigabit Ethernet, IEEE 802.11a/ac/b/g/n |
| Network/Transfer Protocol | Dynamic Host Configuration Protocol (DCHP) |

**Switch**

|  |  |
| --- | --- |
| Brand/Manufacturer | [SonicWALL](https://www.cdw.com/product/sonicwall-switch-sws14-48fpoe-switch-52-ports-managed-rack-mountabl/6105717?pfm=srh) |
| Product Line | Sonic Wall Switch |
| Model | SWS14-48FPOE |
| RAM | 512mb |
| Flash Memory | 128mb |
| Ports Qty\* | 52 ports |

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

**Printer**

|  |  |
| --- | --- |
| Brand/Manufacturer | [HP](https://www.cdw.com/product/hp-color-laserjet-pro-mfp-m283fdw-multifunction-printer-color/5965080?pfm=srh) |
| Product Line | HP Color LaserJet Pro |
| Model | MFP M283fdw |
| Duty Capacity | 40,000 pages |
| Printing Output Type | Color |
| RAM | 256mb |
| Hard Drive | 256mb |
| Connectivity | Gigabit LAN, USB 2.0, USB host, Wi-Fi(n) |

**Wireless Access Points (WAPs)**

|  |  |
| --- | --- |
| Brand/Manufacturer | [NETGEAR](https://www.cdw.com/product/netgear-insight-wax610-wireless-access-point-wi-fi-6/6192335?pfm=srh) |
| Product Line | NETGEAR Insight |
| Model | WAX610 |
| Antenna | Internal |
| Networking | 2.4 GHz, 5 GHz |
| Interface | 1 x 1/2.5GBase-T (PoE+) – RJ-45 |
| Power | PoE+ |

**Smart TV**

|  |  |
| --- | --- |
| Brand/Manufacturer | [Samsung](https://www.cdw.com/product/samsung-qn70q60baf-q60b-series-70-class-69.5-viewable-led-backlit-lcd/7056642) |
| Model | QN70Q60BAF |
| Series | Q60B Series |
| Video Interface | HDMI |
| HDMI Ports Qty | 3 |
| Diagonal Size | 70” |
| Resolution | 3840 x 2160 |
| Output Power | 20 watt |
| Speaker System | 2 channel |
| USB Ports Qty | 2 |
| Wi-Fi Protocol | 802.11ac |

**Conference Phone**

|  |  |
| --- | --- |
| Brand/Manufacturer | [Cisco](https://www.cdw.com/product/cisco-ip-conference-phone-8832-conference-voip-phone/4876330?pfm=srh) |
| Product Line | Cisco IP Conference Phone |
| Model | 8832 |
| Type | LCD Display |
| Speakerphone | Yes |
| Features | Class 4 PoE |
| Phone connections | USB |

**Server Software**

|  |  |
| --- | --- |
| Brand/Manufacturer | [Microsoft](https://www.cdw.com/product/microsoft-windows-server-2019-standard-license-16-cores/5406068?pfm=srh) |
| Product Line | Microsoft Windows |
| Version | Windows Server 2019 Standard |

**Client Software**

|  |  |
| --- | --- |
| Brand/Manufacturer | [Microsoft](https://www.newegg.com/microsoft-windows-10-pro-32-bit-64-bit/p/N82E16832397687?Description=windows%2010%20pro&cm_re=windows_10%20pro-_-32-397-687-_-Product&quicklink=true) |
| Product Line | Microsoft Windows |
| Version | Windows 10 Pro |

**VoIP Phones**

|  |  |
| --- | --- |
| Brand/Manufacturer | [Cisco](https://www.cdw.com/product/cisco-7841-voip-phone/3179195?pfm=srh) |
| Product Line | Cisco IP Phone |
| Model | 7841 |
| Type | LCD Display |
| Speakerphone | Yes |
| Features | Lightweight Directory Access Protocol |
| IP Address Assignment | DHCP, Static |
| Voice Codecs | G.711a/u, G.722, G.729ab, iLBC |
| Network Protocols | Cisco Discovery Protocol, SRTP |
| PoE Support | No |

# **Timesheets**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Milestone** | **Activity Description (be descriptive)** | **Start Time** | **End Time** | **Total Activity Time** | **Activity**  **Date** |
| Milestone 1 | I reviewed the “Marconi Law Business Case Study” and the project report word doc. Then did some research on Hardware and Software. | 3:00pm | 4:00pm | 1 Hour | 4/7/23 |
| Milestone 1 | I started looking for hardware and software with the budget in mind. After finding the hardware and software I liked I reviewed the budget and saw I was in budget. | 1:00pm | 3:00pm | 3 Hours | 4/8/23 |
| Milestone 1 | I filled in the hardware and software details in the word doc. Then I filled in my Timesheets, Status Report, and milestones. | 1:30pm | 4:00pm | 2 Hours 30 Mins | 4/9/23 |
|  |  |  |  |  |  |
| Milestone 2 | Created the virtual Machines for the assignment. | 3:00pm | 4:00pm | 1 Hour | 4/15/23 |
| Milestone 2 | I completed the project scope and Network Objective. | 1:00pm | 3:00pm | 3 Hours | 4/16/23 |
| Milestone 2 | Completed the Network Objectives and IP Network Design Table. In addition to completing the timesheets, status reports, and milestones. | 1:30pm | 4:00pm | 2 Hours 30 Mins | 4/17/23 |
|  |  |  |  |  |  |
| Milestone 3 | Created all Users, Groups, and Shares. | 3:00pm | 4:00pm | 1 Hour | 4/21/23 |
| Milestone 3 | I did Quality control and verified that the shares worked properly. | 1:00pm | 3:00pm | 3 Hours | 4/22/23 |
| Milestone 3 | I came back and finished my timesheets and status report and turned in the video and word doc. | 1:30pm | 4:00pm | 2 Hours 30 Mins | 4/23/23 |
|  |  |  |  |  |  |
| Milestone 4 | Created PowerPoint presentation and Notes | 3:00pm | 4:00pm | 1 Hour | 4/28/23 |
| Milestone 4 | Presented the PowerPoint to Mr. Maroni | 1:00pm | 3:00pm | 3 Hours | 4/29/23 |
| Milestone 4 | Review Project Report Doc and finish the time sheets and such. | 1:30pm | 4:00pm | 2 Hours 30 Mins | 4/30/23 |
|  |  |  |  |  |  |
| **TOTAL HOURS** | **25 Hours** |  |  |  |  |
|  |  |  |  |  |  |

# **Status Reports**

***Accomplished this week***

|  |
| --- |
| Milestone 1: Reviewed the project |
| Milestone 1: Researched and found hardware and software for the project |
| Milestone 1: Filled in details for the hardware and software I chose for the project. |
| Milestone 1: Started the project report |
|  |
| Milestone 2: Created Virtual Machines |
| Milestone 2: Completed Project Scope, Network Objectives, IP Network Design, and Network topology with node numbers. |
| Milestone 2: Completed the project report. |
|  |
| Milestone 3: Created Users, Groups, and Shares |
| Milestone 3: Performed quality control to make sure that the groups and shares worked properly. |
| Milestone 3: Completed the timesheets and status report. |
|  |
| Milestone 4: Made PowerPoint and Notes |
| Milestone 4: Presented to Mr. Marconi |
| Milestone 4: Finished Project report doc |

Milestones 1, 2, and 3

Enter **at least three activities** that you are planning for next week. Add in more lines to the table as needed. See the Documentation section for information on what we are planning to do in class for the upcoming milestone.

***Planned for next week***

|  |
| --- |
| Coming up for milestone 2: Project Scope |
| Coming up for milestone 2: Network Objectives |
| Coming up for milestone 2: IP Network Design Table |
| Coming up for milestone 2: Update network diagram |
|  |
| Coming up for milestone 3: Network Configuration Process |
| Coming up for milestone 3: Create User Logins and Passwords |
| Coming up for milestone 3: Complete project reports. |
|  |
| Coming up for milestone 4: Create a powerpoint for the project. |
| Coming up for milestone 4: Create a pitch for the project. |
| Coming up for milestone 4: Perform the pitch |

Milestones 1, 2, 3, and 4

Ensure that you complete the questions in the *Comments* table so I know what issues, problems, concerns, etc. you may have run into. I use this information to provide feedback and to help you learn. If you did not run into problems, then tell me so. Otherwise, this section is considered incomplete.

***Comments for each milestone***

|  |
| --- |
| *Milestone 1:*  What problems did you run into?  How did you fix them?  Is there anything that you did not complete that you now have to push off into the next milestone?  I noticed that I am $20,000 under budget. Is that okay? Or am I looking to get as close as possible to the budget? |
| *Milestone 2:*  What problems did you run into?  How did you fix them?  Is there anything that you did not complete that you now have to push off into the next milestone?  Any other comments?  I didn’t run into any issues this week. Everything went smoothly. |
| *Milestone 3:*  What problems did you run into?  How did you fix them?  Is there anything that you did not complete that you now have to push off into the next milestone?  Any other comments?  I did not run into any issues and everything went smoothly. |
| *Milestone 4:*  What problems did you run into?  How did you fix them?  Is there anything that you did not complete that you now have to push off into the next milestone?  Any other comments?  Everything went smoothly |