Network Upgrade Proposal
7/18/2019

Project Name: Network Upgrade

RFP Name: Request for Proposal - Network Upgrade

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Addressed to: The Director of Information Technology - *Trash Insurance LLC.*

Purpose of RFP:
The Purpose of this RFP is to provide Trash Insurance LLC with the information needed to determine the potential interest of a new IPv4 network. This RFP describes the constraints, requirements, and objectives of the new network as well as the means to meet the expectations of the stakeholders.

Background Information:
Jacob Huebner, the Chief Network Engineer and CEO of Huebner Hardware Inc, has been hired by a consulting firm in downtown Chicago as the Network Manager. Trash Insurance LLC's office is still using a legacy token ring network as the prior Network Manager refused to learn about updated networking standards.

The current situation of Trash Insurance LLC's office network is as follows:

- Staff of 100 employees.
- One-floor 15,000ft^2 office building with full access to power, ceiling, and basement.
- Token ring network.
- Current ISP is not renewing contract.
- Desktops are in 6 rows of 20 computers.
- Servers located in server room w/ ISP drop.
- Printers are against North (2), South, East, and West walls.
- VoIP phones w/ power bricks at each desk.

Constraints:

1. Do not exceed $75,000 budget.

Requirements:
To upgrade the organization's legacy network to modern day standards, the network manager must…

1. Define the communication methods used by the organization.
    a. Must meet current industry standards.
    b. Must support staff of 100 employees.
    c. Must determine IEEE standard networking design and protocols used. (IPv4/IPv6)
2. Determine solution to updating the current network infrastructure.
    a. Must upgrade 120 desktops, 6 servers, 5 printers, 120 VoIP phones.
    b. A new ISP contract must be made and support bandwidth of all network devices.
    c. Must replace VoIP power bricks with PoE+.
3. Determine all require network equipment needed and justify their use. (within-budget)
4. Determine at least 2 VLANs to implement and justify their use.

5. Write a professionally formatted business proposal.
6. Include a detailed Visio diagram of the office and server room layout
7. Include an Excel spreadsheet which includes all items being purchased, their individual prices, total price breakdown, and web links where each item can be found.

RFP Process:
The details of the network upgrade are described in three key deliverables:

1. Network Business Proposal.
2. Materials, Equipment, Services Breakdown.
3. Network Diagram.

The network upgrade will be operated by the network manager and their team after business hours, Saturday and Sunday, over the course of 8 weeks.

The Network Upgrade Team will:

- Plan and schedule Project.
- Install Network Hardware.
- Install Network Devices.
- Install Network Cabling.
- Configure Network Devices.
- Upgrade Legacy Network Devices.
- Connect Endpoints.
- Test, Monitor, and Baseline Network.
- Remove legacy hardware.

Statement of Work and Schedule Information:

Statement of Work (SOW)

Scope of work:
The network team must create a Network Business Proposal, Materials/Equipment/Services Breakdown, and a Network Diagram. All work must not disturb normal business operations. All network devices and hardware are to be upgraded. After completion, the network will be switched from the legacy network to the new network. Then all network endpoints must be tested to ensure connectivity. Finally, after confirmation from stakeholders, all unnecessary legacy equipment is to be removed from the premises.

Project Objectives:
Upgrade or install new network devices, test connectivity, and remove legacy hardware within 8 weeks of the start date without affecting normal business operations. Stay under $75,000 budget.

Success Criteria:

1. Network upgrade is fully upgraded within 8 weeks of the start date.
2. Business operations are not negatively affected.
3. Project is completed within $75,000 budget.

Schedule:

- Week 1

    - Plan and schedule Project.
- Week 2
    - Install Network Hardware.
- Week 3
    - Install Network Devices.
- Week 4-5
    - Install Network Cabling.
- Week 6
    - Configure Network Devices.
- Week 7
    - Upgrade Legacy Network Devices.
    - Connect Endpoints.
    - Test, Monitor, and Baseline Network.
- Week 8
    - Remove legacy hardware.

Tasks:

1. Plan and schedule Project.
    1.1. Define the communication methods used by the organization.
    1.2. Research industry standards.
    1.3. Determine IEEE standard networking design and protocols used.
    1.4. Assign Roles
    1.5. Create Schedule
2. Install Network Hardware.
    2.1. Install Racks
    2.2. Install Rack accessories
3. Install Network Devices.
    3.1. Install Data Rack devices
    3.2. Install Voice Rack devices
    3.3. Install Border Rack devices
    3.4. Install wireless APs
4. Install Network Cabling.
    4.1. Place Keystone RJ45 panels
    4.2. Run Data Cables from Cubicles to Patch Panels
    4.3. Run Voice Cables from Cubicles to Patch Panels
    4.4. Run Building Data and Voice Cables from workstations to Patch Panels
    4.5. Run Building Wireless from Aps to Patch Panels
    4.6. Run cabling in server room
5. Configure Network Devices.
    5.1. Configure Data Rack Stack
    5.2. Configure Voice Rack Stack
    5.3. Configure Border Rack devices
    5.4. Configure Server devices
    5.5. Configure Wireless APs
6. Upgrade Legacy Network Devices.

6.1. Upgrade 120 Workstation NICs
6.2. Upgrade 5 Printer NICs
6.3. Upgrade 6 Server NICs

7. Connect Endpoints.
   7.1. Connect each workstation to their Cat6 data port
   7.2. Connect each VoIP phone to their Cat6 voice port
   7.3. Connect each border router to their ISP connection
8. Test, Monitor, and Baseline Network.
   8.1. Test connectivity from each network segment to test LAN connectivity
   8.2. Test internet connectivity
   8.3. Run network management software
   8.4. Run baseline
   8.5. Run monitoring tool over week
9. Remove legacy hardware.
   9.1. Get approval from stakeholders
   9.2. Remove Token ring network
   9.3. Recycle Token ring network devices and components

Deliverables:

Project management-related deliverables:

1. Network Business Proposal.
2. Materials, Equipment, Services Breakdown.
3. Office Network Diagram – Before.
4. Office Network Diagram – After.
5. Server Room Physical Schema.
6. Server Room Logical Schema.

Project team-related deliverables:

7. Schedule.
8. Network Baseline Report.
9. Network Connectivity Checklist Report.

Payment of the Project:

All payments will be covered by Trash Insurance LLC. This includes all materials, devices, software licenses, and services. Full costs for the whole year are outlined in the Materials, Equipment, Services Breakdown Spreadsheet. Huebner Hardware Inc is not responsible for any costs not outlined in the Materials, Equipment, Services Breakdown Spreadsheet.

Products & Services Needed:

This project requires the purchase of 32 different materials and services. It totals to $74,886.59. See the Materials, Equipment, Services Breakdown Spreadsheet for more details.

Appendices:

1. **Communication methods used by the organization.**
   The main communications methods for this network are a WLAN, LAN, and VoIP network. The 802.11ac WLAN is made up of 13 PoE APs and is connected to 2 PoE switches each containing 50% of the APs. If a WLAN switch fails, the other WLAN switch will keep the network running at 50%. The wireless LAN is connected by Cat6 UTP cabling. APs are spread

out and operate on either the 1, 6, or 11 channels. The WLAN network is defined as VLAN 10. The Data LAN is cabled with Cat6 and is run to each workstation. The LAN network is defined as VLAN 20. The VoIP LAN is cabled with Cat6 and runs to each VoIP phone. This network is powered by PoE switches. A PBX manages the VoIP phone configurations. The VoIP network is defined as VLAN 30. VLAN 30 is also isolated from VLAN 10 and VLAN 20.

2. **IEEE standard networking design and protocols used. (IPv4/IPv6).**
   The network will use IPv4. Usage is estimated at 120 devices + 120 cell phones + 5 printers. The 120 VoIP phones will be segmented onto their own network. No more than 254 devices will be in use on a single network. Therefore, IPv4 /24 will suffice.

   The benefits of not using IPv6 include less expensive networking equipment, and a less complicated network address scheme.

   The network will be a Collapsed Core design. It is made of up an Access layer, and a Distribution/Core layer. The Core layer connects to a firewall, which then can pass data to the WAN or to the DMZ.

   The network is designed with redundancy as the most important principle. Every single network device included in the access, distribution, or core layers is redundant. Furthermore, they will include at least two failovers. For example, 2 UPSs connected to all rack equipment.

3. **New ISP Contract.**
   Two contracts have been preplanned and are awaiting approval.
   Primary ISP Contract: Comcast Business
   - Name: Comcast Business Class Internet 1 Gbps.
   - Speed: 1 Gbps download/ 35 Mbps upload.
   - Medium: Copper wire.
   - Cost: $316.90 / Mo.
   - Duration: 2 years.

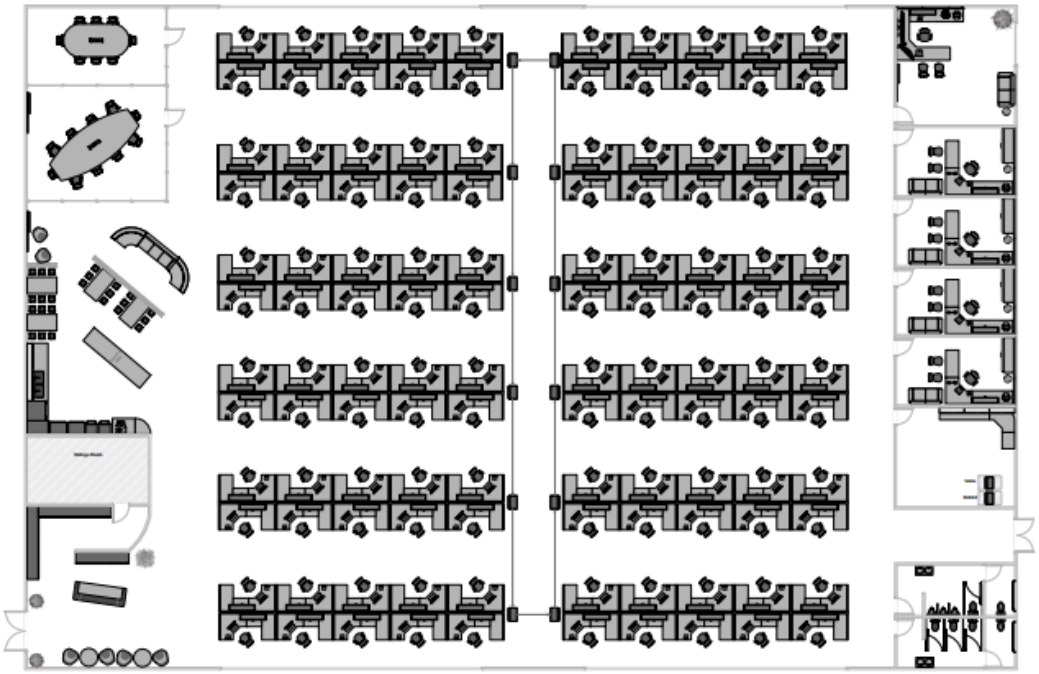
   Secondary ISP Contract: AT&T Business
   - Name: AT&T Business Fiber 1Gbps
   - Speed: 100 Mbps download
   - Medium: DSL.
   - Cost: $120 / Mo.
   - Duration: 1 year.

4. **Determine at least 2 VLANs to implement and justify their use.**
   VLAN 10 will be for wireless. VLAN 20 will be for data. VLAN 30 will be for Voice.

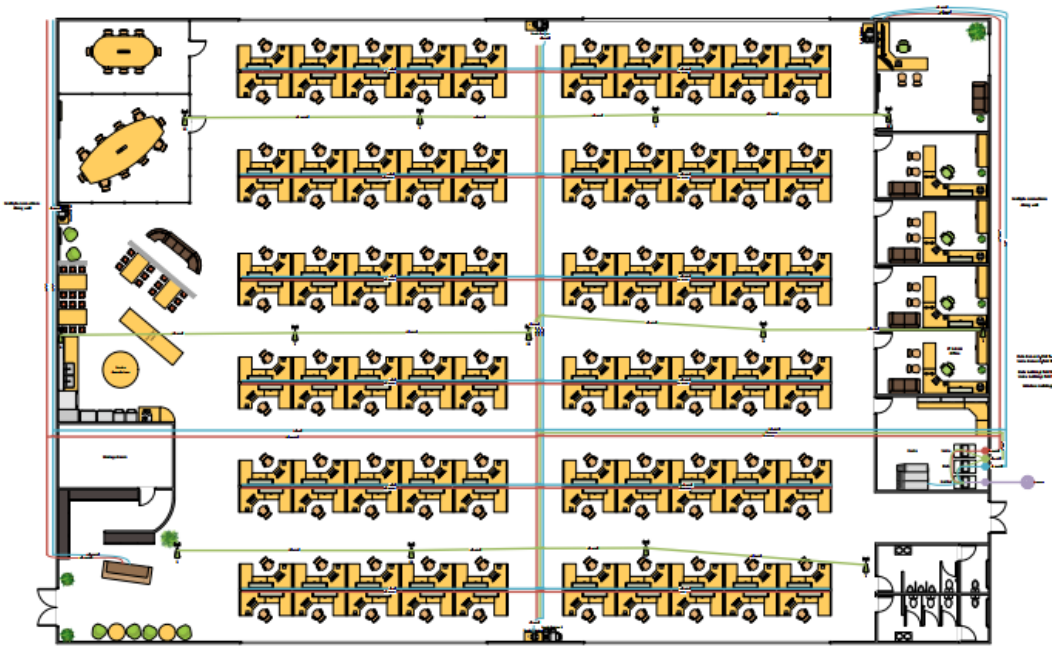
   VLAN are segmented primarily for security. VLAN 20 will be isolated to prevent inter- VLAN routing. VLAN 10 and VLAN 30 will be allowed to communicate. However, wireless traffic to the wired network will be controlled and locked down to prevent vulnerabilities. Furthermore, VLAN will allow prioritization of data communications. For example, during an ISP outage, voice data can be prioritized in order to go over the slower backup connection.

Diagrams:

1. **Office Network Diagram – Before.**

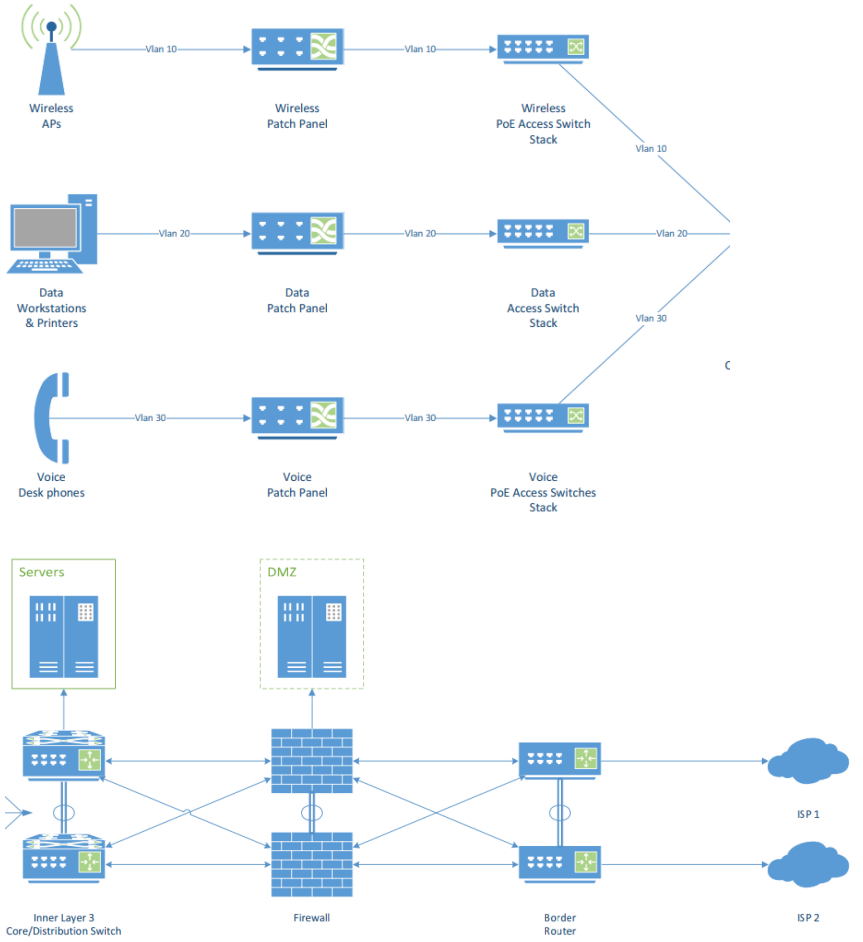


2. **Office Network Diagram – After.**

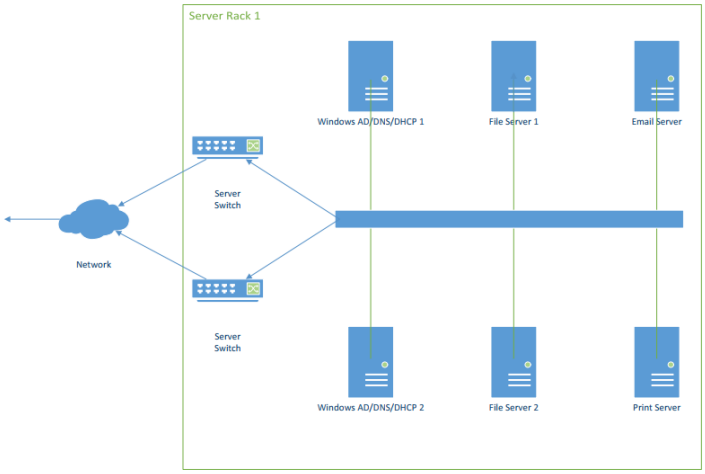


3. Server Room Physical Schema.

a. Network Schema

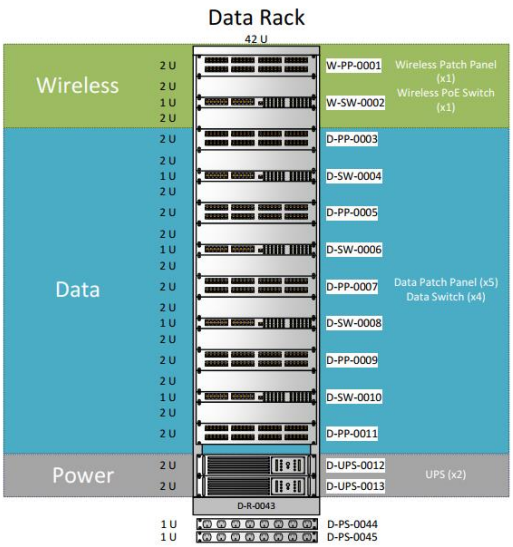


b. Server Schema

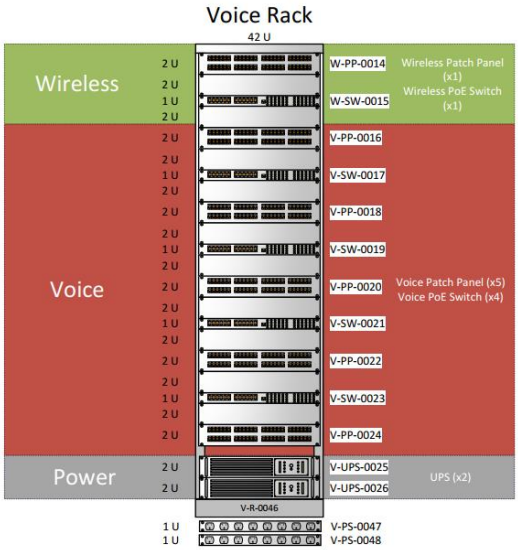


4. Server Room Logical Schema.

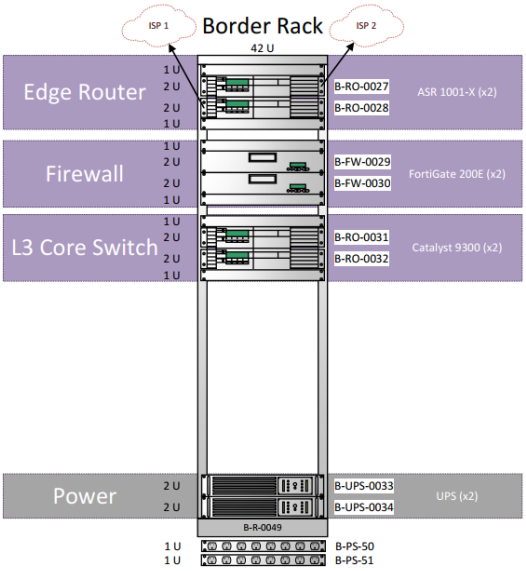
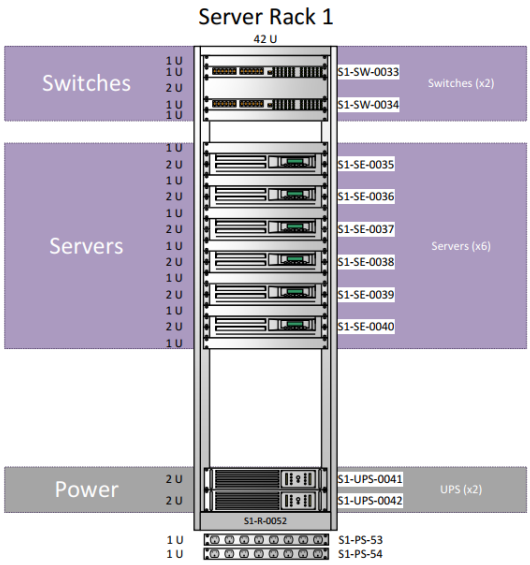
a. Data Rack



b. Voice Rack



c. Border Rack



d. Server Rack