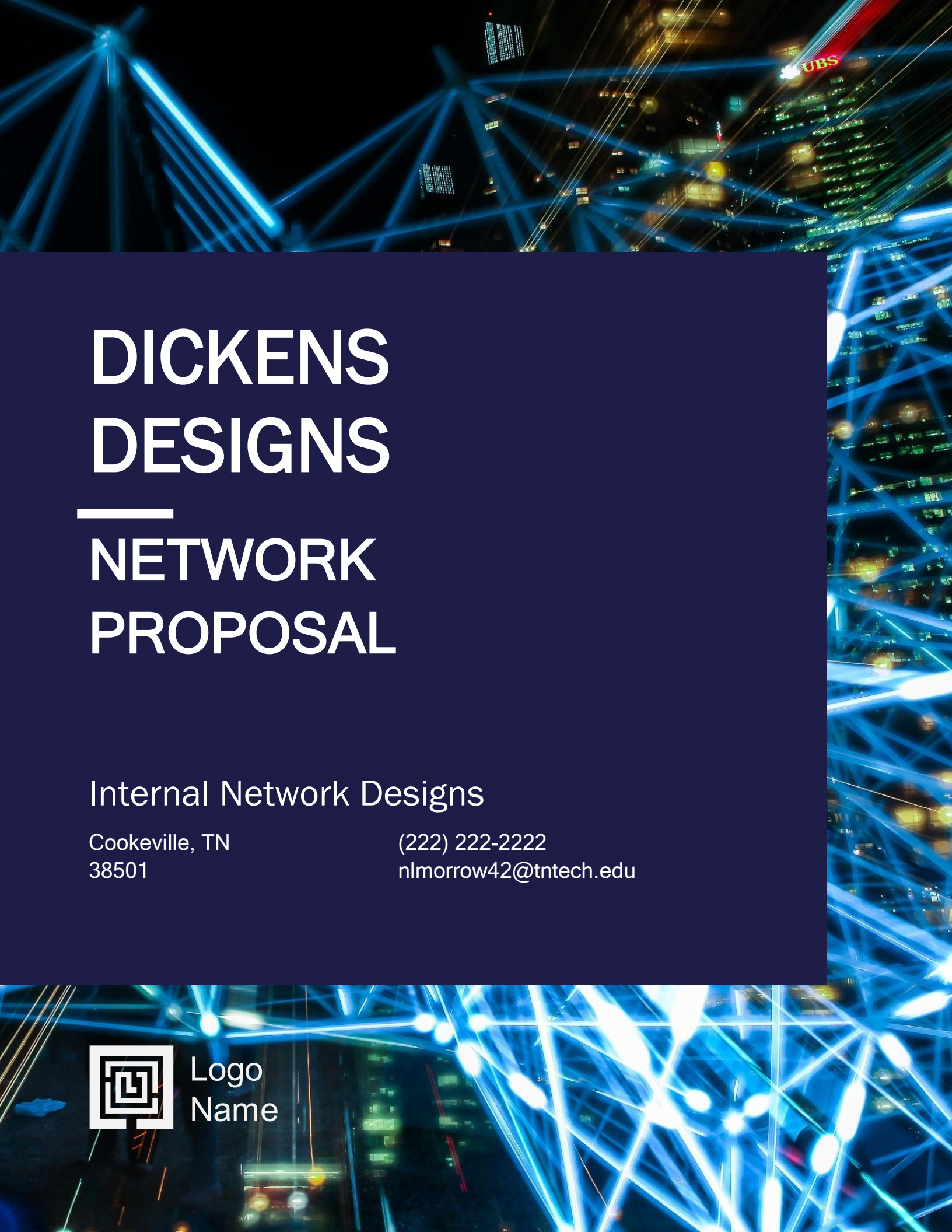

DICKENS DESIGNS

NETWORK PROPOSAL

Internal Network Designs

Cookeville, TN
38501

(222) 222-2222
nlmorrow42@tntech.edu

Logo Name

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Executive Summary

Our Mission

Prepared with the needs of Dickens Designs at the forefront, our goal is the ensure that these needs become a reality. This project has been crafted to consolidate company resources and establish unity between each of the company's branch offices while improving network security. This design will streamline the company's workflow and communication efforts and reduce unnecessarily wasted resources.

Design Highlights

This design features:

- A secure Wide Area Network connecting the corporate branch and each of the company's remote branches
- Consolidation of network functionality, including digital sign access.
- Flexibility for future additions

Budget

This network implementation can be expected to cost from $22,000 to $30,000 depending on the needs of each branch.

Projections

The network can be expected to take less than a full week to implement, and a painless transition process for company employees.

Introduction

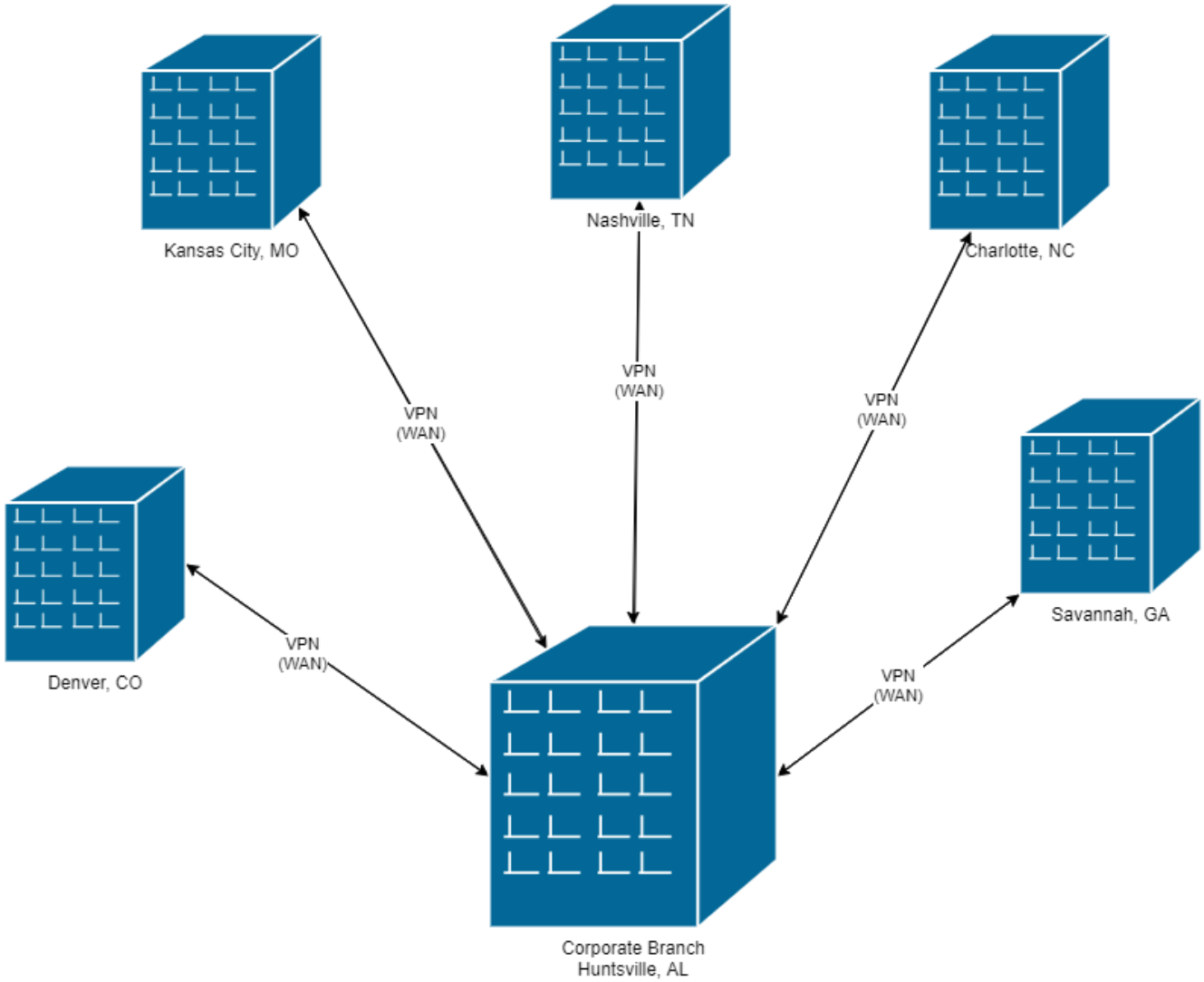
This network has been designed after careful considerations of the issues presented via the interview with Dickens Designs. This design will prioritize consolidation of the company's resources by moving functionality to the corporate branch, while remaining flexible with its current infrastructure and future additions as the company continues to expand. This will be achieved by creating a powerful corporate network with secure connectivity to each of the company's remote branches. Each of these branches will have their own internal networks with basic functionality, however, they will share resources on the corporate branch to ensure each branch is operating as a piece of a larger organization, rather than an independent company. Connectivity to the company's digital highway signs will be provisioned by the corporate network and access will be provided to authorized individuals within each of the company's branches. This design prioritizes efficiency, security, and cohesion within the company.

Design Considerations

- All the digital highway signs can be accessed using a cellular connection using the company's contracts with Verizon and AT&T. Certain offices can access certain signs; however, there exists no central point of contact for all signs.
- Each branch office has an independent Internet connectivity contract with a local Internet Service Provider.
- Each branch office has an independent Microsoft Active Directory installation essentially working as different companies.
- Communications between the branch offices and the corporate office take place over commodity Internet connections and communication platforms.
- The corporate office, at the urging of the board, desires to consolidate all accounting, human resources, and national sales in the Huntsville, AL office. This consolidation would also require centralized server and software support.

Network Design

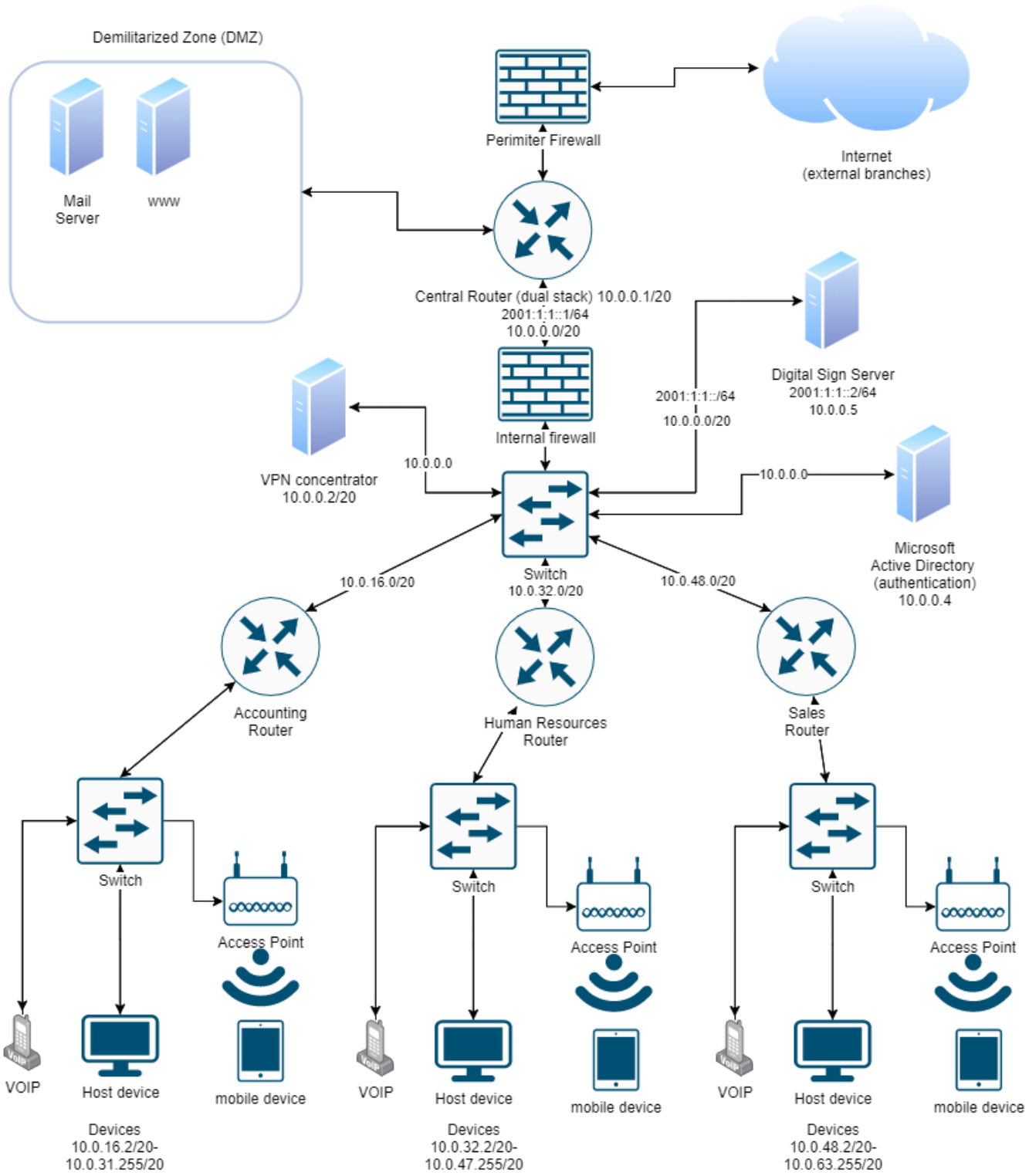
WAN



- The wan will consist of the corporate branch and the five external branches connected via a site-to-site VPN service. This will allow a secure connection between locations.

Corporate Office Network

(estimated $9,000 - $10,000)

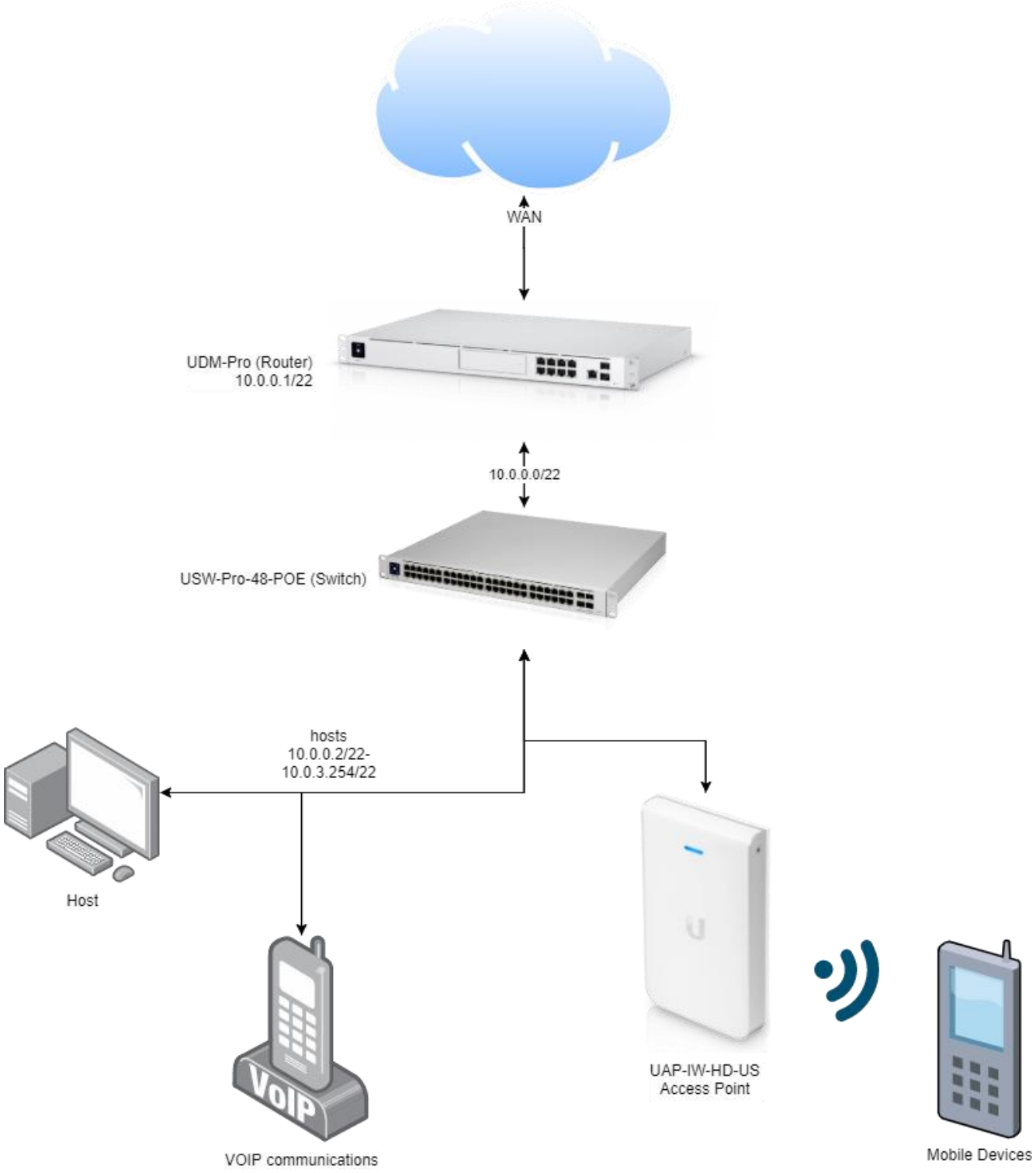


Corporate Network Design Details

- The bulk of the network infrastructure will be located at the corporate office in Huntsville AL for consolidation purposes.
- A demilitarized zone is established to provide flexibility for future expansion.
- The network will use a dual firewall design, with a perimeter firewall before a Demilitarized Zone (DMZ), and an internal firewall before entering the rest of the network to ensure optimal security.
- In order to alleviate concerns over the ipv6 nature of the cellular network, the corporate branch will use a dual stack central router, and a server dedicated to accessing the company's digital highway signs. This server will receive and redistribute requests sent from authorized users on the WAN to signs in their corresponding locations.
- A VPN concentrator will be located off the central router to facilitate a Virtual Private Network providing secure connections between branch offices.
- A Server for a centralized Active Directory will also be located off the central router to consolidate all company employees as WAN users. Alternatives to this server include using an Azure subscription as detailed later in this document. (See Cloud Services…)
- Each department of the new corporate network will receive its own router and switch, ensuring that secure data remains within its corresponding department. These routers will be configured with a CIDR of 20, allowing for around 4,000 devices per subnet, this may be altered to allow for additional devices. (See diagram…)
- Access points using Power over Ethernet (PoE) will be dispersed among each department to provide wireless connectivity. The number required may vary from office to office.
- Voice Over Internet Protocol (VOIP) telephones using Power over Ethernet (PoE) will be used to provide telephone communication to users on within the corporate office.
- OSPF will be used as the primary networking protocol over the network, with OSPFv3 covering the IPv6 portion of the network.
- As necessary, additional network switches may be used to facilitate more users.

Standard Branch Network

(estimated $2,500 - $3,000)



Standard Branch Network Details

- Standard branches will consist of a single router design, in this case we are using a *UniFi Dream Machine Pro* router (Which will be referred to as the UDMP) and a *UniFi PRO 48 PoE* switch. The UDMP is a robust solution that covers routing, firewalls, and VPN support, in addition to both intrusion detection and prevention at 3.5Gbps.
- Like the Corporate network, VOIP devices will be used for telecommunication.
- UniFi In-Wall HD access points using Power over Ethernet will be used to distribute wireless signal across each branch. These access points also contribute additional ethernet ports for flexibility in connecting more wired devices.

Communication

Communication will be covered over 3 primary methods.

Email

An email server is provided within the network designs; however, it is recommended that external services are used to cover this feature. This detailed more below in Cloud Services.

VOIP

Voice Over IP will be managed for each branch to allow telecommunication for individual users.

Slack

Slack is recommended as a communication platform for users within and between branches. This will act a secure and professional and instant messaging platform for the company's users.

Cloud Services

Alternative offsite solutions recommended for Active Directory and Mail

Azure

Microsoft Azure offers a cloud based Active Directory system, which would offload resources from the company's IT department, reducing network staring, reducing upfront costs, and potentially improving network security.

Office 365

Microsoft Office 365 includes a mail service in addition to a suite of essential programs for businesses, it is highly recommended that this service is utilized, this would remove the need for onsite mail servers.

Cellular Connectivity (digital highway signs)

Cellular connections to the digital highway signs will be provisioned by a corporate server that will redirect requests from authorized individuals at each branch to their corresponding signs.

Virtual Private Network (VPN)

A VPN will be established through the company WAN and managed from the corporate network. This will allow for secure communication between branches.

Hardware and Budget

Hardware used

Router: UniFi UDM-Pro ($379 + tax)
Switch: UniFi USW-Pro-48-POE ($1,099 + tax)
Firewall: UniFi USG ($139 + tax)
Access Points: UniFi UAP-IW-HD-US ($179 + tax)

Budget

(Pre-existing ethernet will be used, the purchase additional ethernet may be necessary.)

	Router ($410 ea.)	**Switch** ($1200 ea.)	**Firewall** ($150 ea.)	**Access Points** ($200 ea.)	**Labor** ($20/hr)	**Total**
Corporate Branch	(x4) $1,640	(x4) $4,800	(x1) $150	(x9) $1800	(x40) $800	$9,190
Standard Branches (x5)	(x1 ea.) $2,050	(x1 ea.) $6,000	N/A	(x3 ea.) $3,000	(x20 ea.) $2,000	$13,050
Overall	$3,690	$10,800	$150	$4,800	$2,800	$22,240

Conclusion

The goal of this proposal is to provide a secure centralized network design that facilitates company growth and everyday needs. This design tackles issues addressed during the initial interview in addition to providing a flexible pathway for future upgrades while maintaining security. Please contact us at your earliest convenience so that we may discuss consultation and deployment of the network.