Data Communication and Computer Network Design Project

TITLE:

NETWORK DESIGN FOR ANTHONY'S POTATO CHIP COMPANY

Proposal by

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ABSTRACT

This project presents a comprehensive network design proposal for Anthony's Potato Chip Company, addressing critical aspects such as data types, sources, user priorities, transmission speeds, load variations, storage requirements, and reliability standards. The proposed solution aims to replace the outdated and failing current network infrastructure with a robust, scalable, and efficient network that supports daily operations and future growth. The design incorporates Cisco products for streamlined management and troubleshooting. The proposal includes a detailed analysis of the existing network, high-level and detailed etwork diagrams, equipment analysis, and software recommendations. The project also outlines the challenges faced during the design process and provides reflections on the overall experience. The proposed network design aligns with industry best practices to ensure a secure, reliable, and high-performance networking environment for Anthony's Potato Chip Company.

LIST OF ACRONYMS

LAN - Local Area Network

WAN - Wide Area Network

VPN - Virtual Private Network

ISP - Internet Service Provider

IT - Information Technology

IoT - Internet of Things

Gbps - Gigabits per second

TB - Terabytes

GHz - Gigahertz

Mbps - Megabits per second

UTP - Unshielded Twisted Pair

AI - Artificial Intelligence

HR - Human Resources

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INTRODUCTION

In the rapidly evolving landscape of modern business, a robust and efficient computer network is the backbone of organizational success. This is particularly true for companies like Anthony's Potato Chip Company, where seamless communication, data management, and accessibility play pivotal roles in day-to-day operations. This network design proposal aims to address the diverse needs of Anthony's Potato Chip Company, a company with 500 employees spread across three locations: the Headquarters Office in San Diego, the Production and Warehouse facility in Alpine, and the Sales Office in Escondido.

As we delve into the intricacies of this network design, key considerations include the types of data to be supported, the geographical distribution of users, transmission speed requirements, and the necessity for a reliable and scalable infrastructure. By meticulously analyzing the existing network, anticipating future requirements, and proposing a comprehensive solution, this network design aims to optimize the flow of information, enhance productivity, and fortify the connectivity framework that underpins Anthony's Potato Chip Company's daily operations.

The proposal encompasses various aspects, from data types and sources to the number of users, transmission speed requirements, load variation estimates, storage requirements, and existing network conditions. The detailed design includes high-level diagrams and equipment analysis, with a focus on rational choices for networking products. Furthermore, the proposal extends beyond hardware considerations to recommend additional software that fosters seamless communication and collaboration, aligning with the organization's objectives.

As we progress through the different sections of this proposal, the ultimate goal is to present a comprehensive and tailored network design solution that not only meets the current needs of Anthony's Potato Chip Company but also positions the network infrastructure to adapt and scale in the face of future technological advancements and business expansions.

PROBLEM STATEMENT

Anthony's Potato Chip Company operates within an outdated and inefficient network infrastructure, presenting numerous challenges that hinder its optimal functioning. The existing system, particularly in the Headquarters Office and the Production and Warehouse facility, is plagued by outdated technology, leading to frequent failures and compromising data integrity. The imminent expansion with the addition of a Sales Office in Escondido further exacerbates these issues, demanding a scalable and resilient network to accommodate the company's growth. Critical concerns include slow data transfer speeds, insufficient storage capacity, and a lack of network prioritization, affecting various operations, from internal communications to data management. Addressing these challenges is paramount for Anthony's Potato Chip Company to sustain its competitive edge, foster internal collaboration,

and seamlessly integrate new locations into a modernized and efficient network infrastructure.

LITERATURE REVIEW

Sr No.	Year	Reference	Technique/Domain	Describe
1	2019	University of Wisconsin-Eau Claire	Network Design Proposal	Detailed network design proposal for Anthony's Potato Chip Company, including LANs, WANs, and equipment recommendations
2	2017	FitzGerald, Dennis, & Durcikova (2017)	Data Communications and Networking	Overview of data types, transmission speed requirements, load variation estimates, storage requirements, and more
3	2018	AT&T	Business Internet	AT&T Business Internet service for connectivity
4	2018	BroadbandNow	Internet Service Providers in Alpine, CA	Overview of internet service providers in Alpine, CA
5	2018	cdw.com	Various Cisco products	Rationale for choosing Cisco products and other equipment for the network
6	2018	Rack Solutions	Blade Server vs Rack Server	Comparison of blade servers and rack servers for network infrastructure
7	2018	University of Wisconsin-Eau Claire	State Office of Education Network Design Proposal	Example of a network design proposal for educational institutions

PROJECT OVERVIEW

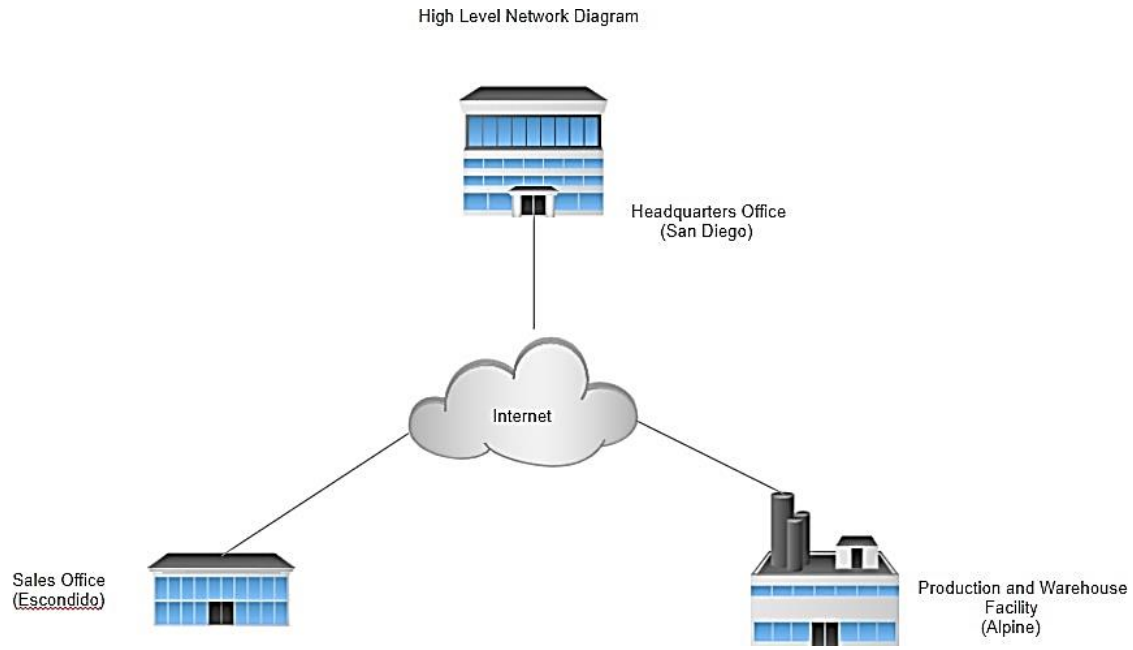

Fig :Overview

PROJECT GOAL

Project Goals	**Key Considerations**
1. **Data Support:**	- Handle various data types (reports, accounting, multimedia).
	- Support applications like Word, Excel, PowerPoint, Outlook.
2. **User Access:**	- Secure access for 500 employees across three locations.
	- Differentiate priority levels (Management, Users, Background Processes).
3. **Transmission Speed:**	- Implement scalable transmission speeds for LANs and WANs.
	- Optimal performance for internet access.
4. **Load Variation:**	- Address peak traffic during regular work hours.
	- Consider variations due to sales trends and consumer fluctuations.
5. **Storage Requirements:**	- Design servers for adequate storage (employee, customer, order data).

Project Goals	Key Considerations
	- Consider both local and network-accessible storage.
6. **Reliability:**	- Establish network reliability standards (99.9% uptime, minimal downtime).
	- Maintain a low error rate for consistent operations.
7.**Existing Network Upgrade:**	- Replace old and failing network infrastructure.
	- Introduce a modern, efficient, and scalable solution.
8. **Equipment Analysis:**	- Justify the choice of networking equipment (Cisco products, servers, routers).
	- Consider quality, warranty, and compatibility.
9.**Software Recommendations:**	- Recommend applications (Skype, PhotoShop, email) for communication and collaboration.
	- Enhance overall productivity within the company.

PROPOSED METHODLOGY

1. Comprehensive Design Framework:

- Requirements Analysis
- Traffic Estimation
- Storage Needs
- Reliability Standards
- Existing Network Evaluation

2. Technical Infrastructure:

- Cisco Equipment Utilization
- Collaboration Software Integration
- Cost Analysis and Considerations
- AT&T VPN Proposal

3. Project Execution Phases:

- Documentation and Presentation
- Implementation Planning
- Reflection for Future Improvements

PROJECT MILESTONES AND DELIVERABLES

Milestone	Task	Deliverable
1	Requirements Analysis	Data type categorization, user level definitions, and transmission speed needs documented.
2	Traffic Estimation and Design	Load variation analysis, peak traffic design, and initial network diagrams.
3	Storage Planning	Estimated server storage requirements and proposed network storage solution.
4	Reliability Standards	Defined uptime (99.9%) and error rate (0.001%) targets.
5	Existing Network Evaluation	Strengths and weaknesses assessment of the current network.
6	Network Design Proposal	High/low-level diagrams for HQ, Sales, and Production, along with LAN/WAN scalability plans.
7	Equipment and Software Recommendations	Cisco equipment selection, collaboration software recommendations, and cost analysis.
8	VPN Implementation Proposal	AT&T ISP proposal for VPN solution.
9	Documentation and Presentation	Compiled project documentation and stakeholder presentation materials.

Milestone	Task	Deliverable
10	Implementation Planning	Detailed implementation plan and testing strategy.
11	Reflection and Improvement	Documented design challenges and insights for future enhancements.

WORK DIVISION

Sr. no.	Name	Allocated Task
1	Bisma Qamar	Cisco Equipment Analysis
2	Anas Abdullah	Cisco AnyConnect VPN
3	Khuzaima Faizan	Documentation and Presentation
4	Zunaisha Noor	Network Design with Cisco

COSTING

No cost is required yet as the project is in the proposal phase. Our team will design the network on Cisco Packet Tracer as a prototype

Conclusion

The network design proposal for Anthony's Potato Chip Company offers a robust and scalable solution to replace the outdated infrastructure, meeting the organization's current needs while positioning it for future growth. The comprehensive design framework, choice of Cisco products, and inclusion of collaboration software aim to optimize data management, enhance communication, and foster internal collaboration. The proposed methodology, work division, and outlined milestones provide a structured approach for successful implementation. This tailored network design seeks to address existing challenges, ensure reliability, and create an efficient connectivity framework that aligns with the company's objectives.

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