

Internship Experience: Cisco Networking

Kristin Albert

Professors Bodnovich and Duda

Advanced Internship: CSIS 4893

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Acknowledgments

Most importantly, I would like to take this opportunity to thank Timothy Salus, my Internship Advisor, for giving me an exceptional opportunity to gain experience in the field of Cisco Networking. I have learned a great deal of networking knowledge and valuable experience during the last few months of my internship. Also, I would like to thank those who assisted in obtaining research articles: Raymond Albert and Mario Rossi. Lastly, I would like to thank my faculty internship advisors, Professors Bodnovich and Duda.

Introduction

Without a doubt, my Cisco networking experience with private networking consultant,

Timothy Salus, has been an extraordinary learning experience. Currently, Timothy Salus, a network engineer/consultant, is contracting for a major corporation, Bayer AG. He is employed as an IT specialist in the networking department of Bayer AG's Pittsburg, Pennsylvania corporate office for polymers, plastics and industrial chemicals division. My internship advisor is responsible for Local Area Network (LAN) design, and Wide Area Network (WAN) design. He has allowed me to assist in the new design implementation.

Company Description:

Bayer Aktiengesellschaft, more commonly known as Bayer AG, is a stock corporation that operates under the laws of the Federal Republic of Germany. Bayer AG was founded in 1951, but can be traced back to 1863, when Friedrich Bayer and Johann Friedrich Weskott discovered aspirin. Then, in 1925, the original Bayer Company merged with five other chemical and pharmaceutical companies in Germany, forming the I.G. Farbenindustrie AG, or I.G. Farben. Once World War II devastated Germany, the Allied High Commission created by the United States, United Kingdom, Soviet Union, and France took over I.G. Farben. Finally, the total assets were divided among 12 new companies, including the Bayer AG of today. According to www.bayer.com,

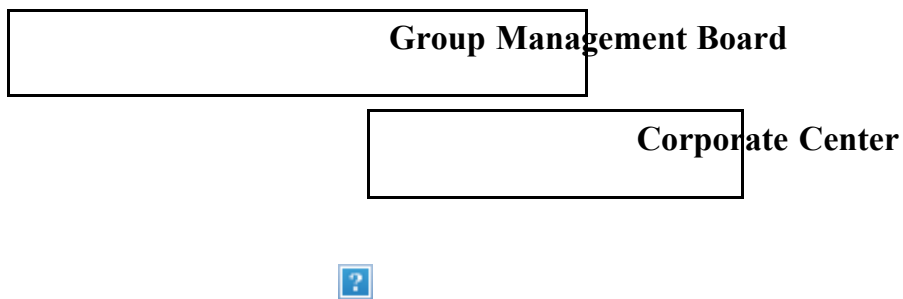
“In 1992 Bayer AG's U.S. subsidiaries Mobay Corporation, Miles Inc., and Agfa Corporation merged with the management holding company Bayer USA Inc. to form a new operating company, Miles Inc. In April 1995 Miles Inc. changed its name to the current form, Bayer Corporation.” (12)

Bayer has a number of different business areas: healthcare, crop science, polymers, and chemicals. There are also subgroups in Bayer: business services, technology services, and industry services. Bayer HealthCare includes pharmaceuticals and diagnostics, animal health,

biological products, and consumer care. Bayer’s health care business area employs an estimated 34,000 employees across the world. Next, Bayer CropScience is another important area of the company. Bayer’s crop science business area has more than 20,000 employees and branch offices in over 122 countries. Also, Bayer polymers contribute to the company’s profits, being that it is one of the world’s largest polymer companies. The polymer section employs roughly 23,000 employees. In addition, Bayer’s chemicals employ 14,300 employees and are considered one of the leaders in chemical sales. After that, Bayer’s business services, such as logistics, law and patents, and finance and accounting, is an “international supplier of administrative and business services that unites under one roof the entire service chain – from advice on solving problems through to operational realization and subsequent maintenance.” (25) This area of Bayer employs about 8,000 employees. Lastly, Bayer’s industrial services section employs around 7,000 employees. The industrial services business area is currently used by the four main business sections of Bayer (health care, crop science, polymers, and chemicals) and also by 25% of other manufacturing companies (25).

Organization Chart

The organizational structure is as follows:



Bayer headquarters are located in Leverkusen, Germany, but is represented in 350 companies. In

addition, Bayer employs 122,000 people in Europe, North America, and the Far East. Bayer AG is managed by a group of four individuals:

Werner Wenning	Chairman
Richard Pott	Strategy and Human Resources
Klaus Kuhn	Finance
Udo Oels	Innovation, Technology, and Environment

In the Corporate Center, there is someone in charge of the: Corporate Office, communications, investor relations, corporate auditing, international human resources and organization, human resources in Germany, corporate development, laws and patents, finance, group accounting and controlling, governmental and product affairs, and regional coordination. In addition, Bayer operates by the following mission statement:

“Bayer is a diversified, international chemicals and health care group. We offer our customers a wide variety of products and services in areas ranging from pharmaceuticals and crop protection to plastics and specialty chemicals.

Bayer is research-based and aims for technological leadership in its core activities. Our goals are to steadily increase corporate value and generate a high value added for the benefit of our stockholders, our employees and the community in every country in which we operate.

We believe that our technical and commercial expertise involves a responsibility to work for the common good and contribute to sustainable development. Bayer: Success through expertise with responsibility.”

Position Description

Responsibilities for this networking internship included:

- Independent development and design of a Local Area Network (LAN) and research of Wide Area Network (WAN) design
- Security implementation through the usage of access-control lists (ACL's) and proper

firewall placement

- Construction of an IP addressing scheme: private and public
- Configurations of routers and VLAN's
- Routing protocol research and implementation
- Networking equipment placement
- Diagnose and troubleshoot networking problems

Discussion

Internship Experiences:

Instead of working in an internship where I may be doing one job repeatedly with other peoples' input and insight, I have participated in an array of unique activities and learning experiences one-on-one with my employer and also on my own. The main objective of my internship was to create a highly functional, security enforced, multisegmented LAN design for 400 users. I successfully completed this objective by implementing stronger security by creating access-control lists on the routers, firewalls, and VLAN's for the switches. In addition, a private addressing scheme was designed in the "internal" network and a public addressing scheme on the "external" boundary of the network. I created the following IP addressing scheme for the LAN:

- Full access to the achieved through NAT
- Class A addressing scheme:
 - IP address: 10.0.0.0
 - Subnet mask: 255.255.254.0
 - Broadcast address: 10.0.1.255
 - Max hosts: 510
 - 15 subnet bits

A large portion of my time was spent researching LAN design, Enhanced Gateway Routing Protocol (EIGRP), which is a Cisco proprietary routing protocol, and WAN design principles. For

instance, I researched the different transport media before deciding that Frame Relay was the best overall decision. Indeed, I gained additional knowledge by researching the Internet, especially www.cisco.com. I found out that you do not stop learning outside of the classroom. IT employees often have to research topics relevant to their field.

Currently, Mr. Salus is working with me to redesign the current WAN implementation. There are a myriad of problems that need to be addressed, such as congestion issues, availability troubles, and inappropriate security implementation. This up close look at WAN design will provide me the opportunity to see how to implement a technologically advanced computer network. Due to the complexity of this project and lack of time, I will only be assisting with certain aspects of the design process. Although I will not be involved in key decisions involving the WAN design, I will definitely walk away with a new insight and increased understanding of how a major corporation develops its large, complex network.

HW, SW, Interpersonal

Being that I was more involved in the design aspect of the LAN and WAN development, I was limited to the amount of work I performed on the networking equipment, such as Cisco routers and switches. Although I only performed limited work on the equipment, I did access a variety of different networking equipment: Cisco routers, switches, hubs, and modems. In creating my logical LAN design, I focused specifically on switch placement, hub layout, and router implementation. The usage of access-control lists on the routers, VLAN implementation on the switches, and proper firewall placement addressed the security concerns. Mr. Salus and I recreated router configurations in order to meet the needs of all users, and for it to operate efficiently.

Additionally, I learned how to successfully create LAN topologies by using Microsoft Visio. Visio is a software program that diagrams the network so it can be presented in a professional manner. I became proficient in using this popular software program in order to create these

commonly used network diagrams. Furthermore, Mr. Salus allowed me listen in on conference calls that take place between him and team members. For instance, there was a problem with the assignment of addresses for another design he was working on. Because the company needed more than what another team allocated, his team had to fix the problem. I learned how much you depend on your team members to complete their tasks properly and in a timely fashion. Also, I realized that a small mistake could cost a large company thousands of dollars. Lastly, I used Yahoo Instant Messenger and a Logitech ClickSmart Web cam to communicate over the Internet. This was the first time using video conferencing hardware and software, so it was a fun educational experience. It is fascinating that you can communicate efficiently and effectively even when you are thousands of miles apart.

YSU/CIS Background

I am currently a senior at Youngstown State University, and will graduate this May 2003, with a BSAS in Information Technology. Next semester, I plan on obtaining a Web site development internship to gain experience in the field of Web Design. I have successfully completed the Cisco CCNA semesters 1-4. I plan on obtaining my CCNA certification this January 2003. Also, I have focused my YSU education on digital imaging and Web related classes in order to learn how to use applications such as Adobe Photoshop/ImageReady, Macromedia Director, Macromedia Flash MX, and Macromedia Dreamweaver MX. Once I graduate, I plan on becoming either a Network Engineer, or Web Designer.

Conclusion

Undeniably, this internship definitely has taught me to make decisions independently, autonomously, and productively, without having to rely on someone else for answers, solutions, and assistance. When first beginning my internship this fall, I was extremely nervous and unsure of myself because I had no networking experience. Now, I have more confidence and an increased understanding of network design issues. I have learned to work independently, meet deadlines, and deal with key networking issues.

Work Schedule:

Vork Week	Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Total
8/25/2003			4					4
9/1/2003			8		8			16
9/8/2003		8	8		8			24
9/15/2003			9		7	4		20
9/22/2003		6	8		6			20
9/29/2003	6	8	8		8		6	24
10/6/2003								20
10/13/2003		8			8			20
10/20/2003		8			4			12
10/27/2003		8		4	8			20
11/3/2003		8	8		8			24
11/10/2003		8	8		8			24
11/17/2003		8	8		8			24
11/24/2003		8	8		8			24
12/1/2003		8	8		8			24
12/8/2003								0
Total:								300

554 CHURCHILL RD. #12
 PHONE (330) 233-0945 • E-MAIL KRISTIN651@EXCITE.COM

KRISTIN M. ALBERT

OBJECTIVE

Gain valuable experience in the field of Cisco networking by obtaining an internship with a successful company this fall, 2003.

WORK EXPERIENCE

2002 - present Youngstown State University Youngstown, OH
Computer Lab Technician

- Supervise 35 nodes in a computer lab at the campus library 20 hours a week
- Troubleshoot a variety of hardware and networking problems
- Assist students, staff, and alumni with software such as the Microsoft Office Suite, Corel WordPerfect Suite, Windows Notepad and WordPad, Telnet, Internet Explorer, Netscape Navigator, Macromedia Dreamweaver MX, Adobe Photoshop/ImageReady 7.0, and Easy CD Creator
- Responsible for opening and closing the lab 3 days a week
- Maintain the stations by periodically ghosting the PC's and conducting Windows updates

2000-2002 Express for Men Niles, OH
Sales Associate

- Top sales associate consecutively since employment
- Exceptional at completing customer service, merchandising, and register responsibilities
- Assisted in opening and closing the store
- Organized seasonal floor moves

1999-2001 Ham n More Youngstown, OH
Sales Associate

Summer 1999 Youngstown State University Youngstown, OH
Computer Lab Assistant

1998-1999 Youngstown State University Youngstown, OH
Assistant to the Dean of College of Health and Human Services

1997-1999 Jeans West Niles, OH
Store Manager

1997-1999 Victoria's Secret
Sales Associate

Niles, OH

EDUCATION

1998 - present Youngstown State University Youngstown, OH
BSAS/Information Technology

1. Fluent with a variety of software programs: Adobe Photoshop 6.0 and 7.0 and Illustrator 11.0, Macromedia Dreamweaver MX, Flash MX, and Director 8.5, Inspiration 7.0, Microsoft Office Suite, Corel WordPerfect Suite, Telnet, Adobe Acrobat, Internet Explorer, and Netscape Navigator
2. Educational emphasis on Cisco networking and web design
3. Knowledge of C++, Perl, and basic Java Script
4. Familiar with both Windows and Linux Red Hat operating systems
5. In-depth insight of computer systems and additional hardware such as printers, scanners, video, and networking equipment
6. Understanding of web server configuration and maintenance

REFERENCES

Available upon request

AWARDS RECEIVED

Deans List recipient consistently for the last four semesters

Work Cited

Investor Relations: Annual Report. Bayer AG. 2 Nov. 2003.

<http://www.investor.bayer.com>

