

**Youngstown State University
Computer Science and Information Systems**

**CSIS 4893 Advanced Internship
Fall 2007**

**Internship at NorthEast Ohio Management Information Network
(NEOMIN)**

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11/9/2007

1. Acknowledgements

I would like to first give thanks to my former Director at NEOMIN, John Jaros, for believing in me and supporting my efforts to finish my college education at YSU. He helped me to achieve my goals by giving me flex-time when needed to attend classes, and was extremely supportive of applying the knowledge I gained from several classes in CIS to help us deliver improved products and services to our customers. I would also like to thank my family for being so supportive in my desire to finish school. To my kids, this meant five years worth of missed games, parent-teacher conferences, and “homework” help. My wife really picked up a huge load during my absences; as working a full-time job, raising a family, and attending college would not have been possible without her support. Finally, I would like to thank Professor Tom Bodnovich and Youngstown State University Career Services for approving the request to use my experiences at NEOMIN for Internship credits.

2. Introduction

My perspective from the many lessons, accomplishments, and issues encountered while working here at NEOMIN may differ a bit from others who have undergone a more “traditional” internship experience. I was a Network Administrator when I got hired at NEOMIN, having almost eight years of previous experience at companies such as EDS and Adelphia Cable. Employment at NEOMIN required a shift in the business practices that I was accustomed to in the private sector. There are many differences between private and public sectors: Such as management structure, profit vs. non-profit, service level requirements/expectations, project funding, and working hours. I brought to NEOMIN a very solid background with personal goals of continuous improvement, I figured everything else would take care of itself; after all, a network is a network right?

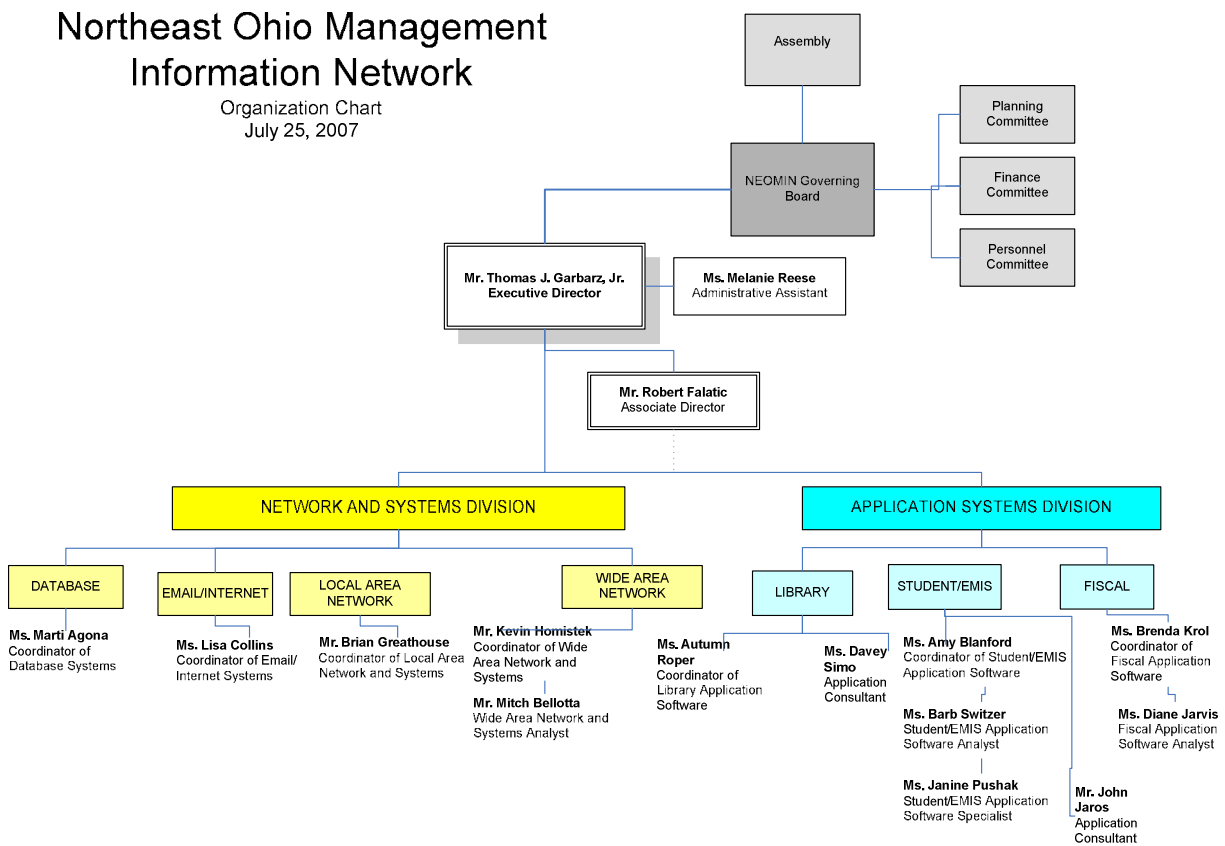
3. Company Description

NEOMIN is one of twenty-three Information Technology Centers (ITC) that is licensed by the Ohio Department of Education. NEOMIN is a member of the Ohio Educational Computer Network (OECN) providing computer services to schools in their respective geographic areas; those areas include school districts in Trumbull and Ashtabula County. Through the Management Council of the OECN, Information Technology Centers were formed to 1) provide quality cost-effective technology services and 2) ensure the consistent delivery of comprehensive educational computer services to Ohio’s K-12 schools. NEOMIN is wholly owned by its member

districts and is governed by a Board of Directors (member Superintendents.) The five core services offered by NEOMIN are:

1. Library components and support
2. Fiscal services
3. Student services
4. Network support
5. System support

4. Organizational Chart



5. Position Description

My formal job title at NEOMIN is “Coordinator of Wide Area Network and Systems.” My job goal is to “provide coordination and leadership to ensure the consistent delivery and successful operation of Wide Area Network/systems at the NorthEast Ohio Management Information Network through immediate and long-range network/system planning and development.” I coordinate wide area network application software and hardware systems upgrades, maintenance, security, licensing, installations, configurations, daily operations, and performance monitoring of the wide area network systems and converged network technologies. I serve as a

liaison between vendors, Information Technology Centers (ITC)'s, Management Council of the Ohio Educational Computer Network (MCOECN), Ohio Department of Education (ODE), and the State of Ohio relating to hardware, software, and communication matters. *Communication skills* are vital in this position; on any given day, I could be interfacing with Superintendents, Treasurers, Construction Managers, Business Managers, Teachers, Communications Vendors, and Technology Coordinators. Following is an example of the technical areas of responsibility that my position requires:

- *Cacti* network monitoring (Open-source SNMP network monitoring server)
 - Ongoing maintenance of Cacti server software, plug-in architecture and Fedora patches
 - Sensitivity to network changes: Ensure all devices are properly SNMP-walked and reflect accurate data

- *Ciscoworks* (Network management server)
 - Ongoing maintenance of Ciscoworks
 - Patches – CW and windows 2003
 - Use of DFM in our daily operations
 - Use of RME for maintenance/inventory/config archive
 - Use of other apps as needed
 - Strategies for using the product
 - HP server health

- *Packeteer* (Layer 7 application inspection appliance)
 - Upgrade system software when necessary
 - Monitor traffic tree for anomalies
 - Apply/Change/Enforce policy as needed

- *PIX/VPN* (Firewall and VPN Concentrator server)
 - Ongoing maintenance: OS upgrades as needed
 - Static map application review and approval
 - Review logs
 - Configuration changes: Projects, design changes, or troubleshooting

- 6509/8540/7204 (Cisco core switches and router)
 - Ongoing maintenance: IOS upgrades as needed
 - Review logs
 - Configuration changes: Projects, design changes, or troubleshooting

- Cache servers/Foundry switch (Caching/proxy servers and layer 4 switch)
 - Ongoing maintenance
 - Problems go to our vendor Stratacache first, usually we end up working with them to resolve

- Upgrades
- District WAN routers/switches (Cisco routers/switches)
 - Ongoing maintenance: IOS upgrades as needed
 - Configuration changes: Projects, design changes, upgrades, or troubleshooting

Areas of administrative responsibility:

- Security
 - Incident review and trace: (Time/date event correlation)
 - Cache logs
 - Packeteer logs
 - PIX logs
 - I-Trap
 - All other network device (Cisco/Allied Telesysn/FVC) logs
 - Compilation of data and report to Executive Director
- Network Documentation
 - Visio network changes
 - Ciscoworks
- Coordinate with vendors
 - Network design
 - OSFC projects
 - NEOMIN network integration
- Centurion/SmartNET contract maintenance
- Policy
 - VPN
 - Anti-virus guidelines
 - Audit
 - Internet
 - Router security
 - Server security
 - Static maps
 - Vendor access
- Customer (District) support

6. Discussion

a. Internship experiences

My experiences working at NEOMIN have greatly improved my skills as a Network Administrator and this job has really put me in control of my own future. It was extremely intimidating at first to be responsible for a network of this size – walking into a new environment is challenging to say the least, but I felt deep-down that I was still a couple of years experience shy of having the knowledge and communication skills required to manage an enterprise network. Having said that, after a couple of days on the job, I started my first project: Setting up a basic open-source network monitoring tool (There were no existing tools in place that monitored the bandwidth of our core and district devices.) I have never setup a system like this in the past either, so it was quite a challenging exercise – I downloaded MRTG ([Multi Router Traffic Grapher](#)) and installed it onto one of our web servers. I then configured a couple of our routers for SNMP version 1 and built the MRTG configuration file. After a few minutes, I had my first bandwidth graphs and a good dose of respect from my boss and peers. I spent the next couple of weeks finalizing the system and creating a web-based index of over 125 devices where the bandwidth usage could be viewed at any time. Once I presented this to the district Technology Coordinators of Trumbull and Ashtabula counties, my level of credibility and trust increased with that group as well. Lesson learned: Confidence. You have to believe that you can make a difference; do something that will stretch your comfort zone and grow your body of work. I found something that the business was in need of and delivered it and it paid off immensely!

Since those first several weeks have passed and through the present time, there have been several projects and initiatives which I have undertaken; a couple of which stand out: 1) Ciscoworks implementation and 2) NEOMIN “move” project. Ciscoworks was a significant project because our network is a Cisco network. We have over 130 managed Cisco devices, and tasks such as IOS image upgrades, configuration file archiving, password resets, and even statistical monitoring was done per device via the command line. Getting Ciscoworks installed and running enabled us to streamline our management operations and also provide for real-time device monitoring which has increased our efficiency and network uptime. The NEOMIN move project was part of a construction project by the TCTC

to build a new 44,000 square foot building to house adult training programs and the NEOMIN offices. I was part of a team to provide input on the design and operations of our new offices and data center. This involved meetings with the TCTC staff, architects, and construction manager. In order for a successful move, no details could be left out and planning for the day started almost a year in advance. The major issues we had to deal with involved making sure the vendors were prepared to transition the communication facilities to the new location. We have 6 DS-3 circuits provided by Embarq, 1 OC-3 circuit provided by AT&T, and multiple fiber pairs provided by Time Warner Cable. This had to be coordinated to bring the network down at a specified time and to bring everything back up at a specified time. We had a 72 hour window of downtime approved by our Governing Board to disconnect, move, and reconnect all of the core network devices and servers. On the first day of move we were able to meet this requirement: Network access was restored along with our key fiscal application server and available for production within the first 24 hours of the move (we met the deadline by 48 hours!) Not enough can be said about the amount of planning and preparation that went into this project, but then again, having the network up ahead of schedule speaks volumes.

b. HW, SW

NEOMIN has many different hardware and software platforms in production:

LAN:

- Windows 2003 server
 - Systems Management Server (SMS)
 - Microsoft Operations Manager (MOM)
 - Sophos Enterprise Anti-virus console
 - IBM Storserver
 - Internet Information Server (IIS)
- Windows XP clients

Application servers:

- Windows 2000 server
 - Cisco Call Manager
 - Cisco Unity Voicemail
 - PLATO online curriculum software
- VMS
 - PMDF email server
 - Fiscal applications
 - DNS
- Sun Solaris
 - eSIS

- Linux (Red Hat Enterprise & Fedora)
 - DNS
 - Cacti
 - Apache web servers
- BSD
 - Stratacore (Internet caching software)
 - SmartFilter DA (Internet content filtering software)

WAN:

- Cisco 6509 (Core L3 switch)
- Cisco 8540 (ATM switch)
- Cisco 7204 (Core router)
- Cisco 2801 (Voice gateway)
- Packeteer (Packet shaping appliance)
- I-TRAP (IDS)
- PIX (Firewalls)
- Cisco 3550 (L3 switch)
- Cisco 2950 (DMZ switch)
- Cisco 2620, 2621 (District routers)
- Cisco 2501, 2509, 2511 (District routers)
- Cisco 3750 stack (District L3 switches)
- Cisco 7206 (District router)

c. Problems, opportunities

One of my biggest problems that I often face comes as a side-effect of being a small operation: There are only 2 staff members assigned to take care of the above mentioned (networking) equipment; myself and the Network Analyst. This leaves little time to pay attention to certain “everyday” but very important tasks such as regular review of security log files, documentation of changes, and initiating new projects. There are new technologies that I want to invest my time researching, or planning projects that may not be mission critical, but important from an educational or career development perspective. In fact, it will be even more difficult in the months ahead to do these types of things as my Network Analyst is retiring as of 12/31/07. There are no immediate plans to replace him which will bring a new set of challenges to my workday. This could be an opportunity for self-improvement with my time management skills and stress management techniques. Hopefully “working smarter, not harder” will apply in this case; only time will tell.

d. YSU/CIS Background

I ended up at YSU after attending a couple of semesters at Kent State several years ago. I have always been interested in computers and networking and taking college courses really expanded my knowledge in countless different areas. I started at YSU in the summer of 2002; I have completed my Associate degree in CIS in 2005 and am now very close to finishing my Bachelor's with a Criminal Justice minor.

e. Strengths/Weaknesses

I'd say one of my biggest strengths is being an effective troubleshooter – Getting to the root of problems quickly in this business is an unbelievable asset. Other strong areas include the ability to complete projects, work in teams, and adapt very quickly to changes. I am very proud of my skill set that has developed over the years: It has given me an extremely flexible platform for continued growth and employability. After several years of gaining valuable experience, I would also say that my communication and presentation skills have improved, but this is one area that I try to improve on. For example, when presenting to a group, even though I have command of the subject matter, sometimes (I feel) it doesn't translate that well to my audience. I would also like to improve my organizational skills – Keeping my email, calendar, and desk in order!

7. Conclusion

My internship is still my full-time job, but I will continue learning and researching new technologies. Since starting at NEOMIN, I have increased my skill set competences with Cisco Internetwork Operating System (IOS) and Cisco product knowledge in all areas of network deployment; LAN and WAN; and I have gained valuable experience in troubleshooting at all layers of the OSI model. I have increased my understanding of enterprise-wide server applications and management tools to effectively administer and optimize many different platforms. I'm still excited about the career choice that I've made and I hope to be doing this job for many years to come.

Appendices

Work schedule

Week	Date	Sun	Mon	Tue	Wed	Thurs	Fri	Sat	Total Hours
1	8/26/07		8	8	8	8	8		40
2	9/2/07		8	8	8	8	8		40
3	9/9/07		8	8	8	8	8		40
4	9/16/07		8	8	8	8	8		40
5	9/23/07		8	8	8	8	8		40
6	9/30/07		8	8	8	8	8		40
7	10/7/07		8	8	8	8	8		40
8	10/14/07		8	8	8	8	8		40
9	10/21/07		8	8	8	8	8		40
10	10/28/07		8	8	8	8	8		40
11	11/4/07		8	8	8	8	8		40
12	11/11/07		8	8	8	8	8		40
13	11/18/07		8						8
14	11/25/07		8	8	8	8	8		40
15	12/2/07		8	8	8	8	8		40
	Totals								568

Kevin R. Homistek

Objective: To obtain a Network Management position where my skills and past experience can be effectively utilized within a company that will promote continuous improvement and reward career growth.

Experience:

North East Ohio Management Information Network (NEOMIN) Warren, OH 10/2002 – Present
Coordinator of Wide Area Network and Systems

- Responsible for the overall management and daily operation of Wide Area Network (WAN) services for 31 school districts and Educational Service Centers in Northeast Ohio
- Implement and maintain a large campus and Wide Area Network using integrated systems products including routers and routing systems, switches, interfaces, and modules
- LAN/WAN enterprise-class network design, network security, IP address management, IP communications, hardware/software support of numerous and varied Cisco network devices
- Practical and extensive use of network monitoring, troubleshooting and security products: CiscoWorks (LAN Management Solution 2.6), SNMP, IPSec, PIX, Packeteer, VPN, SSL
- Analyze and communicate problems/solutions to school district staff, administrators, and vendors

Adelphia Business Solutions Cleveland, OH 8/2000 – 5/2002
Network Engineer

- Administered multiple WAN sites with 100 to 50,000 plus cable-modem subscribers per site
- Engineered, deployed and configured DOCSIS cable-modem WAN equipment and networks
- Supervised, trained and provided technical support to local cable operations personnel
- Gained extensive knowledge and widespread experience with Gigabit Fiber/Fast Ethernet, networking and equipment (Attenuators, GBICs, SM/MM Fiber cabling, repeaters)
- Gained extensive experience with ATM and Frame Relay router configurations and provisioning

Electronic Data Systems Copley, OH 7/1996 – 8/2002
Sr. Systems Administrator

- Installed and configured Cisco routers and Catalyst switches. (2600, 2900 series)
- Planned, implemented and maintained multiple-domain NT 4.0 server farms, BackOffice server, SMS 2.0, Veritas backup software, disaster recovery procedures, PBX phone support
- Certified level 3 hardware, software, and LAN support technician provided connectivity solutions for a broad scope of clients and configurations – Netware and NT
- Gained extensive hardware and software experience in troubleshooting and repair of Compaq and IBM compatible computers, Macintosh computers and HP LaserJet/DeskJet printers
- Administered network infrastructure, equipment and applications per ISO9000 specifications

Education:

Youngstown State University Youngstown, OH 9/2002 – Present

- 8/20/2005: Associate degree with honors in Computer Information Systems

Specialized Training/Certifications:

- Cisco Certified Network Associate - 2/2000
- Cisco Networking Academy - CCNA and CCNP
- Packeteer packet shaper technical training
- Network Security I (Policy, Administration, and Firewalls)
- DOCSIS cable-modem training - 10/2000
- Microsoft Certified Systems Engineer - NT 4.0

References: Available on request