

## Experience

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### Americas' Network Engineering, UUNET, a WorldCom Company, February 2000-Present

SENIOR INTERNET NETWORK ENGINEER

**Design, evaluate, and qualify networks for deployment in UUNET's backbone** for Canada, US, Central, South America, and Mexico. Engineer customized network designs and solutions for Canada, US, Central and South America. Act as liaison between engineering and operations. Deliver complete solutions to operations in the form of an execution package. Act as highest level of escalation for global multicast issues. Act as highest level of escalation for vendor and protocol issues in the Americas.

### High Speed Install, UUNET, an MCIWorldCom Company, October 1998- February 2000

INTERNET SYSTEMS ENGINEER

**Install high speed Internet circuits for UUNET and MCIWorldCom customers.** Internet circuits consist of 56 Kbs, 64 Kbs dedicated, fractional T1, DS-1, DS-3, and OC-3 using frame relay encapsulation, ATM, or Packet over SONET. Test with IEC and LEC as needed to pinpoint and resolve circuit issues. Work with customers to meet their needs. Register or modify domain names and create or transfer zone files as needed. Assist customer in configuring premise equipment. Set up static routing or BGP4 as needed. Support customers for 30 days after turning up circuit to the customer.

### Information Technology, ManorCare, April 1998-October 1998

WAN ENGINEER

**Manage the ManorCare Corporate Wide Area Network** including frame relay over 56Kbs and T1, CSU/DSU and routers. Monitor 229 remote sites on a daily basis. Use HP Open View, Cisco Works, and TyView to provide pro-active assistance, and diagnose problems with our Cisco 1000, 1600, 2500, 7500 series routes, Sync Frame Relay Access Probes, and Sync T1 Frame Relay Access Probes. Troubleshoot WAN connectivity problems, frame relay bursting issues, router configuration problems, traffic issues, and latency problems. Assist end users with networking problems. Serve as a liaison to AT&T and Bell regarding outstanding trouble tickets. Manage the installation of new sites. Work with the AT&T Implementation Manager to meet new site installation deadlines.

### Information Services, Georgetown University, September 1997-April 1998

NETWORK SUPPORT SPECIALIST

**Manage NetWare NDS objects** for the GUMC (Georgetown University Medical Center) tree [8,000 users, 11,000 NDS Objects] and Georgetown (Main Campus) tree [19,000 users, 22,000 NDS Objects]. Troubleshoot user trustees, and rights, as well as the other NDS objects such as groups, printers, queues, print servers and volumes. Provide administrative support for GroupWise users in three domains and 25 post offices. Plan for migration of Novell NetWare 3.12 servers into the NDS tree. Reengineer login scripts for users as necessary for migration to the NDS tree.

**Manage all personal computer problems** for Georgetown main campus staff. Ensure that user issues are resolved in a timely, and satisfactory manner. Provide second level hotline support for workstations with emphasis on network connectivity and network applications support. Engineer, manage, and complete projects in order to provide a more useful computing environment.

### Office of Information Technology, The American University, May 1996-September 1997

LAN ANALYST

**Manage the backbone** including multi-mode fiber optics (FDDI & 10Base FL), 100base T, 10Base T, and 10Base 2. This includes planning for future growth, assessing current traffic trends, redefining current topology, LAN design, the overseeing of wiring work, the installation and configuration of new equipment (routers, concentrators, and repeaters), as well as troubleshooting.

**Provide primary 24 hour emergency support for the entire network** (Approx. 3-4,000 nodes, 125 subnets, 19 routers, 4 FDDI rings, 5 T1s). Serve as secondary router configuration expert (primary while during off peak hours) for the university's Cisco AGS+ and 2500 series routers and its Alantec 3000 and 7000 series routers. Install, configure, and troubleshoot Bay 2800 series, 3000 series, and 5000 series concentrators. Provide assistance with emergency upgrades to the 12 Novell NetWare 4.1 and 4.11 servers.

**Manage the NET-RES project.** This project is a university wide drive to connect students to the campus wide LAN. In order to most effectively serve the students who wished to be connected to the campus network from their dorms, I conceived and deployed a comprehensive program. This includes publication of the informational material both in print and on the world wide web, creation of documentation as both a self guide and for those who are hired to work as NET-RES installers, creation and teaching of a short course on how to configure workstations and troubleshoot common problems to the NET-RES staff, and oversee the hiring and the day to day performance of the personnel. In addition, I was responsible for monitoring the current status of the project, deal with particularly troublesome computers, and deal with particularly troublesome students and parents.

**Provide third level hotline services.** This includes supporting and troubleshooting the 3,000 university owned workstations (MAC, Windows 3.1x, Windows 95) and troubleshooting internal wiring problems (100base T, 10Base T, 10Base 2). Provide secondary administration to the university's 14,000 user objects, their trustees, and rights, as well as the other NDS objects such as groups, printers, queues, print servers and volumes.

## Education

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### The American University, Washington, DC,

B.A. International Studies and Philosophy, The School of International Service and The College of Arts and Sciences, May 1996

B.A. Environmental Studies, The College of Arts and Sciences, May 1996

## Achievements and Activities

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Juniper Networks Certified Internet Professional (JNCIP-M)

Microsoft Certified Professional (MCP)

FCC licensed amateur radio operator: Technician Plus

Experience w/ HP Openview, Ciscoworks, Naviscore, Cascade TyView

Strong knowledge of OSI layers 1 - 3

Vint Cerf Achievement Award for South American Network Design



## UUNET Network Engineering Projects

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- **Global Edge Policy Redesign**

Re-engineered and re-designed pre-existing Cisco and Juniper edge policies. Provided new functionality for products sold in the US. Standardized global BGP communities. Provided additional functionality for ease of security. Optimized and simplified Cisco and Juniper customer and peer policies.

- **Enhanced Visibility into Routing Information**

Assisted in designing a comprehensive system to monitor, display, and trend BGP and IS-IS routing information. Provided and tested functionality requirements in regard to IS-IS trace information, IS-IS show commands, BGP debug information and BGP show commands.

- **Route Aggregation**

Assisted with the route aggregation design. Crafted configuration and policy to regionalize route information without affecting current forwarding topology.

- **South America Network Design**

Designed a robust and redundant network in multiple cities in South America as determined by marketing and sales forecasts. Network design is based on a three level hierarchy (access, regional, transit core). Network consists of multiple regions, each in their own BGP confederation and fully meshed through a transit confederation. MPLS is used for traffic engineering on the transit network. The regional and transit networks are comprised of Juniper routers running POS with PPP encapsulation. The access network is comprised of Cisco routers with POS up-links. Customers run frame relay encapsulation over fraction E1 to STM-16. This project included designing the network from the ground up, as well as working with Operations, and high level management to provide a comprehensive solution.

- **Embratel – UUNET South America Network Integration**

Work with Embratel through multiple levels of integration with both the UUNET North American network and the UUNET South American Network. Make an assessment of network readiness to support UUNET products. Make recommendations to Embratel to make the network more scaleable, reliable, and more easily managed.

- **Avantel – UUNET Mexico Network Integration**

Work with Avantel through multiple levels of integration with both the UUNET North American network and the UUNET South American Network.

- **UUCast / MBONE migration**

UUNET is committed to providing premiere multicast solutions to its customers. In the past UUNET has provided two separate networks, UUCast, which is a UUNET internal network, and MBONE, which is connected to the global MBONE. The UUCast network is used for reliable, scalable, and dependable multicast transport between UUNET UUCast customers only (this includes the entire UUNET dial up network). The MBONE network is an “experimental” network that is connected to the global MBONE. Currently to source traffic both to the global MBONE and the reliable UUCast network, a customer must source traffic twice. By merging the two networks UUNET is able to offer a single network which is reliable, scalable, and dependable for access to the internal UUCast customers as well as access to the “experimental” global MBONE.

- **Scalable Private Multicast Peering**

Worked with vendors to provide for MBGP and MSDP filtering on BGP community. Designed multicast private peer interconnect over GRE tunnel and native multicast over POS or ATM interconnect. Designed and tested multicast peering policy. Assisted certification team to certify multicast configuration on JunOS 5.3. Provided assistance with Peering and Legal departments to create an experimental multicast peering policy. Worked with operations to deploy multicast peering.

- **America On-Line Optimization Plan**

Provided network designs for optimization of the AOL UUNET interconnect. Adjusted policy to insulate AOL edge device from IGP and iBGP instability.

- **Juniper M20 Qualification as a Multicast Router**

Tested multicast functionality of the Juniper M20 router. Worked with the test and certification group to certify Juniper hardware and JunOS to support multicast in the live UUNET network.

- **Distributed Director Design**

Assisted with the design of a specialized load distribution mechanism for a particularly large web hosting customer.

- **UUCast / MBONE Operational Support**

Act as highest point of escalation for multicast issues. Provide router configurations for new installations.

- **South American Network Operational Support**

Act as highest point of escalation for all technical issues with South America.

## UUNET High Speed Install Projects

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- **WorldCom Frame Relay Reterm Project**

After determining that there was a traffic imbalance on the eight WorldCom frame relay entrances, the decision was made to rehome customers in order to redistribute the load. Since the frame entrances were added over time, many customers could be redesigned to a closer entrance. Each customer was examined by circuit end location, and number of frame relay switch hop counts. Based on this information roughly one quarter of all WorldCom frame relay customers were rehomed. This was completed in the off hours as to not affect customer traffic.

- **DLCI project**

After the dissolution of the WorldCom Tulsa CAST group, which was responsible for DLCI assignment and configuration of the WorldCom Frame Relay switch for all new installs, each of their functions had to be re-assigned. Since the service centers proved that they could not properly track and assign DLCIs that task was assigned to UUNET. I worked with my manager to put together a comprehensive plan to track and assign DLCIs for WorldCom Frame Relay sites. I designed and instituted the policy for how normal as well as expedited or problem sites would be processed. Additionally, I made the decision to make the router sub-interface match the DLCI since UUNET now controls both the provisioning of the sub-interface, and the DLCI assignment. This required that all 2500 WorldCom frame relay customer be retermed so that there would not be legacy sites that do not have matching sub-interfaces and DLCIs.

- **Database Integrity Project**

While working on the DLCI project I determined that the database which tracks customer router sub-interfaces was only thirty percent accurate. This was further impacted when some engineers updated the router to make the DLCI and sub-interface match, but failed to up date the tracking database. I worked quickly to resolve this issue, often working extra hours or on weekends to bring the database up to date. I also made myself available to or Corporate Network Support group who experienced much difficulty when a site went down and the database was not correctly up dated. In those cases I assisted in troubleshooting, and also up dated the database on the spot. Furthermore I attended meetings about the router database inconsistencies and took on the responsibility for all WorldCom sites that were inconsistent in the router database. This included responding to reports that listed inconsistencies, tracking down the status of the circuit, and fixing the database accordingly.

- **Digital Circuits Class**

I designed the course curriculum, power point presentation, and hand outs for the Digital Circuits class which I taught bi-weekly. Digital Circuits is a three hour class which covers the following: Types of circuits UUNET sells, UUNET equipment and responsibility, the telco circuit and telco equipment, testing to loops, digital encoding, electrical signaling on the line, clocking, AMI, B8ZS, framing, superframe, extended superframe, test patterns, and using Naviscore.

- **Expedited Circuits**

I was often assigned circuits that required a 24 hour turn around time. These sites required someone to hand hold the order at every step along the way to be completed by the deadline. This included contacting the service center and having them fax the paperwork over to UUNET. Provisioning the circuit to the appropriate router and interface, working with WorldCom provisioning to get the circuit designed from the local carrier handoff point to the UUNET handoff point, Working with the WorldCom install tech to make cross connects in DACS (and turn-up LMI for WorldCom frame relay customers), configuring the routers at the UUNET and customer location, and finally testing and turning up the circuit the customer before the deadline.

- **High Profile Sites**

I was often assigned high profile sites that required additional support such as the NASDAQ, drugstore.com, or City Telecom Hong Kong. These sites often had non-standard BGP configurations requiring an additional level of throughput or redundancy. This also included sites that may require special care that is not of a technical nature, such as customers that were unhappy with the level of service they are receiving.

## ManorCare Projects

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- **Turn-up new sites**

Installed 56 Kbs frame relay circuits for over 22 locations. Coordinated the installation of the frame relay circuit, the on premises wiring, and configuration of CSU/DSU and router. Worked with users on sight to physically install equipment. Worked with AT&T high speed service center to turn up circuits.

- **Pro-active Monitoring**

Researched and installed software to successfully implement pro-active monitoring. Utilized PingSim and Apache to publish web pages that dynamically list the status of the Ethernet port of each router at every WAN site every seven and a half minutes. Updated notes on the page by hand as information became available. This complemented the Sync Performance Manager which polled the CSU/DSU every fourteen minutes, and HP Open View which pinged the serial port of the router every half hour.

## Georgetown University Projects

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- **Secure Genetics Network**

Designed a secure network consisting of UNIX workstations (Solaris 4.0) and Macintosh workstations. The secure network is used to store chromosome images that are captured and manipulated on each of the proprietary microscope-workstation systems. The resolution included overcoming conflicts at the file system level, network protocol level, and application level. Furthermore, the network contained sensitive information which required proper security.

- **Access 2000**

After a turnover of Marriot employees, it was determined that I should administrate the A2 Server (Novell NetWare 3.12) and the Access 2000 program which resides on it. This program interfaces with all Marriot Food Service cash registers. It is responsible for transaction processing for all POS including Meal Plan utilization, Munch Money, and cash transactions. The project required an assessment of the current configuration and current problems. The systems was then re-engineered to provide stable support.

- **Medicine Server Migration**

Plan for the migration of users from the Medicine Server (Novell Netware 3.12) into the NDS tree.

- **Net-Res Project**

The Net-Res project was a university wide drive to connect all residents who owned a computer to the campus LAN. In past years this project remained unorganized. Students and dorm installers were both frustrated with the project. Once it became obvious that the project would lie on my shoulders I chose to make weeks worth of organization and preparation. This included creating and disseminating all of the information about the Net-Res project. This covered everything from our procedure, to what was supported, to how one would complete a self install, to what the exact steps were to complete a request. Most of this information was printed and made available at the front desks of each residence hall, as well as the Office of Information Technology front desk, and the more frequently used computer labs. All of this information was available on the World Wide Web. In addition I composed a web page using Perl to take a students Novell NetWare User ID and password, pass it along to another server which would verify the student's identity. Using an ODBC connection to a database running on another server, it would then check our call database to see if that person had a Net-Res call already open. If there was an open call, it would simply display the relevant information. If there was not an open call, it would open one automatically. In addition to blanketing the university community with information, I also hand pick a staff of ten Net-Res installers. These installers were trained by me, and often gave advice while I supervised them through the course of the installations. Because of this level of organization, as well as the abundance of information about the Net-Res procedure, this project was a success. Over all there were very few complaints. Within the first two weeks of school, over one thousand installs were completed. This was well beyond the two hundred-fifty calls that had been completed by the end of the second week of classes last Fall.

- **Convert half of Anderson lab from 10Base 2 to 10Base T**

Anderson Lab was one of the few remaining subnets that had a 10Base 2 network. This was often troublesome due to the inferior quality of the coaxial cable, and the propensity of students to break the coaxial circuit. Anderson Lab is one of the largest computer labs on campus with close to 200 computers, however, due to that fact that it was so frequently used, it was difficult to schedule the time to uninstall the coaxial cable and replace it with twisted pair. Finally a week was chosen, and plans were carefully made. After performing a sight evaluation I determined where the 109 data drops should be located, where additional punch-down block should be installed, and what hardware should be put into place. I decided to add an additional Bay 3000 concentrator with an advanced and basic network management module. This allowed me to split the back plane and thereby quadrupling the traffic throughput of Anderson Lab. This plan was submitted to Telecommunications, who completes all wiring work on campus. After building the concentrator, configuring both the concentrator, and the new router ports, a week of diagnostics was performed. Once I was assured that everything was working, we began to smoothly make the switch. The coaxial cable has been left running redundantly, and was soon after removed.

- **Meyers fiber optic relocation**

The task of this project was to manage the relocation of the Meyers fiber vault which contains 240 multi-mode fibers and 120 single-mode fibers. I provided advice as to what the ramifications would be and how it could possibly affect the nine academic building that connect to the fiber vault. As recommended, the fiber vault was relocated without disconnecting the fibers.

- **Design and install Clark LAN**

Clark Hall, which houses the Computer Science and Information Systems Department and the Math Department, was one of the first buildings to be placed on the campus network. Their setup was a simple one, 10Base FL runs to the second floor computer lab. Here a fiber repeater converts it to coaxial cable which snakes through the building. Like Anderson Lab, time had come to convert them to twisted pair. This, however, was more challenging since the building is shared by two separate departments. I wanted the subnets to logically mirror the departmental division of this building. A third segment was added to support 100Base T. This was further complicated by the fact that both departments had UNIX machines which preferred to be on the same subnet due to the amount of broadcast packets sent between them. The decision was to have one subnet for CSIS, a second subnet for the Math Department, and a third subnet which would support all Fast Ethernet connections as well as all Ethernet connects for the UNIX machines. In addition to the usual request to Telecommunication asking to place twisted pair lines for the 74 drops, I needed to consider the logical layout and design of the concentrator. In order to support 100Base T as well as future growth, I decided to use the Bay 5000 concentrator. Additionally, new fiber optics had to be pulled within the building to support these new subnets. As discussed with Alan Ford, the MS Computer Lab Manager, the transition to twisted pair is a rolling conversion which was completed without issue.

- **Troubleshoot DHCP error**

This project was to determine the reason why the UNIX based DHCP server could not assign an IP address to Windows 95 clients. Using NetXRay, I performed packet capture and decode to determine the source of the DHCP error. This demonstrated that the exchange from the DHCP server to the DHCP client consistently had a bad CRC. It was later determined that the version of the software running on the router was old, and had a know problem with generating CRC errors when redirecting DHCP packets.

- **Troubleshoot Hamaliton LAN problems**

This project was to determine why users of the Hamaliton LAN were getting disconnected from the network. It appeared this was some how related to usage. Using the Netscout Probe, I determined that there was a jabbering network interface card. I then proceeded to track down the source of the jabbering by using the Netscout software's expert visualizer. This graphed in real time the number of errors each device on the network was producing. By correlating this with when the jabbering occurred, I determined the MAC address of the jabbering NIC. The computer was then tracked down through the management of the concentrator. The MAC address was then correlated to a port on the concentrator, which then led directly to the computer that was producing the jabbers.

- **Manage Federal Hall LAN re-installation**

Federal Hall recently underwent a renovation. This included gutting the existing wiring. In addition to replacing that wiring, Network Services also decided to make two data ports in each room active instead of only one. The number of data drops, which were now doubled, was then augmented by the installation of a new computer lab and computer study room. It was determined that the old plan was not adequate. The existing Bay 3000 concentrator could not support that many connections. The decision was made to order a Bay 5000 concentrator, which was subsequently built and configured. In addition, a four inch conduit had to be run from the computer lab to the wiring closet one floor up. This allowed Telecommunications to run the necessary twisted pair wiring and place data drops where they were requested. This project was managed right down to the deadline. Difficulties of working with many different departments, as well, as the UPS strike, and politics all had to be overcome.

- **Web based documentation of LAN Topology**

Since the creator of the network, Tom Southall left, there have been many gaps of knowledge. One such gap was the lack of understanding of how the network was designed. It became my task to understand how the fiber backbone was run and which routers served what departments. After becoming a topology expert, I wanted to document this information. I saw the World Wide Web as the perfect medium. I set up a password protected web server on a Windows NT server to host my pages. Then using Java Script and HTML, I created wire frame images. When the ports of these images were highlighted, a text box would produce information such as the IP address of the port and what hardware was on the other side. When you clicked on the port it would take you to a page that shows a wire frame image of the associated hardware as well as some important notes about the location and function of the device.

- **Dunblane fiber optics installation**

The Dunblane building has been recently re-built after a fire. I supervised the installation of a six pair multi-mode fiber optic cable to connect Dunblane to the Tenley Alantec 3000 router. In addition, I over saw the installation of the concentrator and ensured the building was operational before the staff was expected to move in.

- **Design and install Hurst Math Lab LAN**

A new lab was created on campus. In order to connect this lab to the network, a new pair of fiber needed to be lighted. With the proper fiber patch cables, the fiber optics connection was brought into the wiring closet in the basement. Telecommunications was then commissioned to install a piece of coaxial cable between the fiber repeater in the basement and the Bay 3000 concentrator. The concentrator was built, and both the concentrator and router were configured. Once the wiring work was completed, it was simply a matter of installing the network cards, and connecting the 45 computers to the data jacks.

- **Financial Aid fiber optics installation**

This project was designed to eliminate problems that stemmed from three locations trying to access an imaging server that contained scanned images of important financial aid documents. By installing a direct connection between these buildings, we could curtail the amount of traffic carried over the centrally located backbone, and instead route traffic that pertained to these three financial aid buildings over this direct connection. A Net-Flex dual Ethernet card was installed in the server, which was configured to the subnets of the other two financial aid buildings. Fiber had to then be pulled from those buildings to the location of the server. Once the conduits were located, and the decision about how the fiber was to be run, general contractors were called in to do the fiber pull and termination. The proper fiber cross-connects as well as fiber repeaters were installed, and IPX/SPX traffic was routed away from the existing backbone to this direct building-to-building connection.