

**Information Technology Commons
Network Working Group**

*Recommendation for:
Network (LAN) Administration
July 2004*

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Information Technology Commons Network Working Group

Recommendation for: Network (LAN) Administration

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Charge

Network Working Group charge from Kitty Bridges:

As part of the University budget situation, all units are looking for opportunities to consolidate services, as one strategy for budget reduction. An area of interest to many units is network (LAN) administration. For units with small IT budgets, most of the budget is wrapped up in funding a network admin, when the unit really needs desktop support. So, I'm interested in determining what service or services might be offered centrally to offset unit budget reductions.

I'd like to ask if the NWG might spend a little bit of time developing a "best practice" document for local area network administration. I'm wary about ITCS on its own describing a service, so I'd really like to know what the community thinks is best practice so we can scope that out in terms of cost. This best practice doc could include numbers of admins for numbers of machines, job classifications, training, response time to problems, etc.

Do you think the NWG would be interested in doing this for the community?

Overview

During our discussions regarding the role of network administration, we first defined the scope of responsibilities for this position within our community. We agreed that the Network Administrator would not be involved in desktop support or system administration. For the purposes of this document, we define system administration as generally involving the monitoring, configuration, programming and maintenance of servers. Desktop support as it pertains to this document involves the hardware and software functions of the client workstation. The Network Administrator role would work with these other separate and distinct job functions to resolve problems but would otherwise confine his/her activities to the planning, design, creation, and maintenance of the network environment from the jack faceplate to the Distribution layer switch.

As our discussions progressed, we found that we were having difficulty in creating a “Best Practice” guide that would serve as a blueprint for the community as a whole. There were concerns that this document might be interpreted as a mandatory set of practices for the University community. We suggest that the ideas discussed in this document be used as a general guide for the “Network Administration service” with individual practices adopted or rejected based on the needs and requirements of each unit. What one unit might consider a “Best Practice” or good practice others may not. For example, if one department has a 24/7-uptime requirement their “Best Practice” would be to create an environment where there is no single point of failure. However, in a department with an 8/5-uptime requirement, the cost to create these redundancies would simply not be advisable as funds could be allocated to other areas and still meet the needs of the department or college.

The attached “Professional staff daily work load analysis” documents that there are 1680 hours available during the year for one FTE when factoring in vacation, sick time, holidays, and season days. The attached “Workflow analysis” tries to capture the tasks performed by the role within a year by assigning hours to each of the tasks described in this document. You will see the time commitment during the first year is twice that of subsequent years. Adding more subnets requires a greater investment in time and limits the number of units that the role will be able to service concurrently. Based on the numbers in each of these documents we would recommend that one FTE would be capable of servicing three new units during the first year and be able to accept an additional load once the demands of the first year of service have been met.

We anticipate that the person performing the lead role (P & A grade 12) would be actively involved in the Network Working Group (NWG). As a byproduct of this involvement, the individual department or college would now have a voice at the table when networking decisions are being made that would involve the unit where none currently exists for the smaller colleges and departments.

We made a few basic assumptions when defining this role:

- Role will not be involved in system administration

- Role will not be involved in desktop support
- Role assumes the presence of an Service Level Agreement with ITCOM or another service provider
- Role will not supplant ITCOM in engineering or equipment deployment
- Role will act as a conduit between the provider of network maintenance and/or repair and the college or department(NOTE: to simplify this document and to reflect the fact that ITCOM is the provider of these types of services to much of campus, the relationship between the service provider and the college or department is attributed to ITCOM. However, the NWG acknowledges that units may receive these services by another provider and assumes that the Network Administrator would have a similar relationship with both the service provider and the department or college. In addition, it is assumed that the same care to avoid a conflict of interest would be exercised.)
- Role will be independent of ITCOM to prevent any perceived conflicts of interest when it comes to Service Level (SL) negotiations and infrastructure improvement recommendations.
- Role will be an extension of the college or department as if the position was actually domiciled in the college or department.
- Not all departments would require all services described below.
- Department or college will provide a front line IT contact person to interface with the Network Administrator.
- The Network Administrator will train the unit's IT contact person in basic network troubleshooting skills and provide him/her with a Net Tool type device to test for network connectivity.
- The Network Administrator will attend department or college planning meetings to offer input as well as keep abreast of the changing requirements of the department/college.

We recommend that the area of responsibility for this role will include the physical wiring from the jack faceplate to the terminus point at the patch panel. The labeling and wire management of the patch panel would also fall within this role and adopt the previously NWG approved wiring standards. Those areas that did not meet the NWG standards would be brought into compliance. The access layer switch would be monitored and configured by the network administrator based upon the previously determined needs of the unit in association with ITCOM under the ITCOM SL agreement. If wireless were to be deployed in the college or department, the Network Administrator would be responsible for providing first level support of the wireless access points and any wireless access authentication devices that may be deployed. Finally, the Network Administrator would be responsible for the fiber links to the distribution layer switches located in the BDF, LDF, and/or server room(s).

The Network Administrator role involves not only the technical skills normally associated with the position but also includes in equal proportions the skills sets of an analyst and manager. This person would make recommendations to the decision makers in the college/department for future network projects. These projects might include the replacement of outdated wiring, creation of networking equipment replacement cycles or switch upgrades based on data flow/capacity analysis. The role would perform the project management function as it pertains to networking issues for the college or department in renovation projects or new location additions. As the networking project manager this person would be responsible for creating the data service work orders and coordinating the activities of ITCOM and plant extension in the installation of data network. The network administrator will monitor for “reasonable and customary” charges from the various network service providers to the college/department and resolve any disputes with these vendors. This person would train a network technician/desktop support person **to be supplied by the college or department** to troubleshoot the simple network problems of patch cord failure, incorrect network information entered into the host machine and other similar problems. If the trained technician fails to resolve a network problem it would be escalated to the network administrator for resolution. The network administration position is not a frontline or first level support for network problems. These responsibilities would fall to the person trained by network administrator to perform these tasks thus freeing the “Role” for more analytical and managerial functions.

Another duty of the “Role” is to monitor the Service Level (SL) agreement performance with ITCOM if one exists. The person performing the role is to negotiate the parameters under which the SL agreement will operate and to make adjustments based upon performance under the agreement.

Some factors that should be considered include a determination as to whether there will be 24/7 coverage of electronics under the SL agreement? How long does ITCOM have to acknowledge a report of a problem? How long do they have to repair the problem and still meet the conditions of the SL agreement? Does the department or college have specific requirements that are over and above the standard boilerplate SL agreement? Who has the authority to report problems under the SL agreement or commit the department to repair costs for services performed outside of the negotiated SL agreement? Will there be a reassessment of the SL agreement based upon substantial changes to the network? What defines substantial changes to the network? Will there be an annual meeting to discuss ITCOM’s performance under the SL agreement? What are the channels for escalation if problems are not addressed in a timely manner? The network administrator must address these and other issues so that clear areas of responsibility exist between the department, network administrator, and ITCOM.

One important distinction in this position is the way it interfaces with the individual departments/colleges and ITCOM. We think of the person performing this role as part project manager, network analyst, network manager, and senior level operations support. We believe this position will function best as a separate entity from ITCOM and acting as a conduit between ITCOM and the respective college/department. While ITCOM can provide this level of service, we believe that the role needs some independence and the ability to

maintain a closer relationship with the individual department or college. To facilitate these relationships, we would require that this role/unit attend department /college staff meetings as if the person performing the role was an employee of the department or college. This part of the role is important in that the role needs to assess the requirements of the department/college to make appropriate recommendations for network improvements and create the necessary supporting infrastructure to meet the future needs of the college or department. This person would act as an information resource at these meetings ensuring that the college or department's networking interests were considered when decisions were made in regards to future IT direction of the college or department.

ITCS's User Services Campus Computing Sites or Contract Services groups would be good places to position this role. Both of these groups have experience in providing professional services to the colleges and departments. Contract services places desktop support and system administrators within the department/college on a weekly, monthly, annual or special project basis. This model is similar to what we are proposing. Campus Computing Sites has the supporting infrastructure in place, which could speed the ability to offer this service and leverage the existing infrastructure at little to minimal extra cost.

A working knowledge of the University's current infrastructure should also be considered part of the administrator's role. Knowing that a distribution layer switch has failed can save quite a bit of time when troubleshooting a department's lack of network connectivity.

The person performing this role should have a strong working knowledge of networking, as one would expect of a person performing the duties of a network administrator. The skill sets would include but not be limited to: knowledge of the TCP/IP, OSI model, CIDR, IEEE 802 specifications, Cisco Cat OS, Cisco IOS, and network design criteria. Fundamental knowledge of security issues that could impact the network is an important function of the role. Analytical and managerial skills sets are equally important to the success of this role. In some respects this role is more of a managerial role with technical operational support underpinnings. The network administrator will act as the project designer and manager representing the colleges/departments interests in all matters relating to data networking. This person will need the ability to monitor network traffic patterns to determine if changes need to be made to the network and to present a plan for change with the associated rational and costs for the proposed changes to the decision makers within the college or department.

We recommend that this role be structured with two similar but different position descriptions. The first position would be the initial hire and assume managerial responsibilities for the unit as it grows. This position would also be responsible for creating the strategic direction for the unit based on input from the unit's subscribers. The position descriptions attached to the appendix do not capture the exact nature of this role(s) yet parts of all the position descriptions from P & A grade 13 to 11 describe components of the role as envisioned by this group.

We sought out the expertise of the ITCS/HR department in an effort to determine where this position should fall within the P & A grade classification scale and they have determined that it should be a P & A grade 11 for the supervisory role and P & A grade 9 for the

network administrator role. While we value ITCS/HR's input we feel that the senior role should be assigned a P & A classification of 12 to acknowledge the additional management responsibilities and to interface with peers on an equal footing. The second role titled "Network Administrator" should be a P & A grade of 11 which corresponds to other similar positions within the University community as evidenced by the most recent LAN NETWORK ADMIN position posting for the Mental Hlth Research Institute(see appendix p. 20).

Best Practice

What follows is a generic “Best Practice” guide subject to modification after a detailed analysis of the unit’s current environment and future direction has been performed.

Documentation of the network

One of the hardest tasks to do on a consistent basis is to document the network. The task is unending yet when troubleshooting a problem the time that it takes to resolve a particular problem can be directly proportional to how well the network is documented. Knowing where a switch or machine is located can speed one’s ability to narrow the problem to its origin. Knowing which MAC address maps to which server address and what services are using which ports on the network can be invaluable when trying to trace connectivity issues.

- Configure and deploy a paging system to notify the Network Administrator of switch outages.
- Obtain copies of network drawings and verify that they are up to date
- Packet traces should be stored offline and identified by location, date, time and network segment
- Maintain records of DHCP entries – as required
- Maintain records of DNS entries – as required
- Document switches.
- Location of switch – room number and rack number
- Record switch hardware configuration information
- Record the number of ports available for expansion.
- Record software image version number
- Identify uplink connection by port
- Note IP address of switch
- Identify number of available switch ports
- Identify FQDN (fully qualified domain name) of switch if applicable
- Identity of subnet with mask that switch is servicing
- Patch cables between switch port and patch panel to be labeled at each end providing port and jack number information.
- Documentation of Jacks:
 - Each jack is labeled and includes the room number as well as the jack number.
 - Patch panel in the LDF is to match jack label convention.
 - Patch cables to be labeled at each end identifying station number and jack number
 - Type of wiring to be identified for each location (Cat 3,Cat5, Cat5e, Cat6)

Security issues

Not all the security issues that might be encountered by the Network Administrator can be detailed in a document of this size. Some of the more general practices are detailed below

and is meant to be a small general representation of the tasks that the network administrator may be called upon to perform.

- Prepare access control lists as needed to protect the network in consultation with System Administrator
- Perform port scans of networks if the need arises
- Work in tandem with the department system administrator to uncover compromised machines as needed.
- Have the ability to perform vulnerability assessments when and if the need arises.
- Secure telecom closets to protect against unauthorized access.
- Know whom you need to contact if you have a security issue before the problem arises.
- Adopt a defense in depth approach to Security in coordination with Desktop support and System administrators

Network troubleshooting

- Troubleshoot network connectivity problems using ping, traceroute, nslookup, and other tools as needed.
- Determine root cause of a problem and create action plan to prevent future problems
- Coordinate activities with system administrator where areas of responsibility overlap
- Create a network traffic baseline by recording packets for each network segment using a packet capture program (Ethereal, tcpdump or Etherpeek)
- Traces should be done at peak and non peak times
- Develop a systematic approach to troubleshooting. Don't change two variables at the same time. Change one, test, and then change another. Start at either layer one or seven of the OSI model and work up or down systematically.
- If a firewall is deployed make sure that changes are fully investigated and tested before being deployed to the operational environment. Many networking problems have cropped up after a firewall rule change.

Network Monitoring

The monitoring of a network for uptime and bandwidth utilization are key components of successful network administration and can be instrumental in helping to spot potential problems before they become large problems. These practices can also be very helpful when considering design changes to the network. Make sure that your monitoring equipment configuration information has been backed up and that the network monitors are attached to

battery backup devices. Experience teaches that sometimes one forgets to write configuration changes and power outages do occur. Being able to find the jack that maps to a specific switch port quickly can make all the difference in the world when you have to get a server back in operation as quickly as possible.

- Monitor network and end stations for uptime by using polling and trapping.
- Network monitoring interval at 60 seconds
- Monitor network for peak usage, congestion and bottlenecks
- Include the network devices in your uplink path as part of your monitoring program.
- If you notice that certain uplink interfaces are failing more that would be expected notify ITCOM of the problem and ask them to investigate.
- Create scripts to look for problems being reported by the switch, which may be indicative of future failures.
- Captures should be taken of incoming and outgoing packets as well as key devices:
 - File servers
 - Email servers
 - Web servers
 - Application servers
- Examine switch port/interface counters for abnormal error count. This proactive practice can help identify problems like duplex mismatches and bad patch cables before the problems are reported.
- Prepare scripts wherever possible to automatic routine functions.
- Develop an understanding of the network traffic going across the LAN/VLAN. Know what protocols one should expect to see so that when things change you can more readily identify the changes. Packet traces available of normal behavior that can be compared to problem behavior can help in the task of narrowing the scope of the problem.

Switch Configuration

- Use TACACS to authenticate users to switches
- Disable telnet in favor of SSH as a means of limiting remote access wherever possible.
- Disable switch ports not in use to prevent their unauthorized use
- Configure switches with private IP space as opposed to public
- Save configuration changes to switch after making revisions
- Switch passwords to be changed every 6 months
- Label switch ports describing the attached access devices.
- Create backup copies of switch configurations and store information on hard copy media (CD or Zip) monthly.

- When deploying fast workstations make sure that port fast is enabled on the Cisco switch port so that the Spanning Tree Protocol does not inhibit connections to the DHCP server.
- When deploying servers on Cisco Gigabit ports it may be necessary to manually set both sides of the link to full duplex 1000 M/bit. There have been issues with connections being dropped when the auto sense feature set is used.

When making changes to a switch, make sure that changes are written to the startup configuration file. Hours of documentation work can be lost by a power outage or unexpected reboot of the switch.

Network Administrator Position Description(s)

The following details the job responsibilities of the network administrator role(s):

Project Team leader/Network administrator (Dual role)

- Classification grade 12
- Project/unit lead
- Representative to Network Working Group
- Monitors budget expenditures
- Supervises, trains and evaluates support staff
- First level of problem escalation for issues involving staff members
- Prepares budget for unit
- Creates new policies and procedures
- Prepares periodic and special reports to management
- Design, implement, and maintain network-monitoring systems.
- Performs all the duties of network administrator detailed below

Network Administrator

- Classification grade 11
- Prepare monthly status reports to include uptime data
- Prepares weekly and monthly bandwidth usage reports
- Advise unit staff of scheduled and unscheduled outages
- Work with system administrator to define individual and joint areas of responsibility.
- Determine the networking requirements for the unit. Do they require 24/7 uptimes, 8/7, 8/5?
- Monitor network uptime and connectivity
- Resolve network connectivity issues
- UMNNet-Admin contact for compromised machine
- Attends seminars to keep abreast of industry trends

- Recommends, justifies, and deploys new networking technologies as needed by the department or college.

College/Department Service Expectations

Attending staff meetings when possible to get a better understanding of a colleges or departments needs and requirements. Upcoming projects may involve changes to the network that take time to put in place. Being included in the planning process will put the network administrator in a better position to make sure that changes occur within the timeframe desired.

Reporting problems in a timely manner and giving an ETR if one is available is critical to developing good relationships with the college or department. Preparing a summary of problems over the course of a month can help when you need to make recommendations for changes to the existing infrastructure and document the value of the service being provided to the college or department.

During the first year of service there should be quarterly reviews of the network administrator's performance to determine if the level of service being provided meets the customers needs and expectations of the college/department. Network uptime requirements should be documented and met. Status reports should be provided to the department or college on a regular basis detailing uptime and bandwidth utilization.

A well-defined problem reporting system should be agreed upon at the beginning of the service subject to revision based upon the experiences of each party. Discussions concerning problem reporting should take place during the 1st year quarterly meetings.

The response times required from the network administrator will vary from department based upon the individual department or colleges requirements. The departments/colleges requirements regarding response times regarding lack of connectivity could look something like the following:

- Network down - immediate response
- Switch down - immediate response
- Printer down - critical – 2 hours
- Printer down - non critical – 24 hours
- Station down critical – immediate
- Station down -non-critical 24 hours

If this role as defined throughout this document is to succeed it is imperative that the College or Department see the person performing the role as an integral part of the college or department's IT staff. The network administrator should be involved in staff meetings where budgeting and planning decisions are being made to offer guidance and lend expertise. As a by product of this involvement the network administrator will obtain a better understanding of the department or colleges future IT direction and will be in a better position to plan to meet the future needs of the department.

TITLE: SENIOR SYSTEM ADMINISTRATOR

GRADE: 13

BASIC FUNCTION AND RESPONSIBILITY

To lead the development, operation and maintenance of networked systems in a complex distributed computing environment; coordinate the integration of software and hardware in a multiplatform environment; and assist in resolution of network related problems.

CHARACTERISTIC DUTIES AND RESPONSIBILITIES

Lead the development, operation and maintenance of networked systems in a complex distributed computing environment.

Lead disaster recovery support.

Coordinate system security activities including development of system enhancements.

Resolve complex system hardware and software failures.

Coordinate postmaster services and assist in development of postmaster service standards.

Monitor system and device activity for performance, identification of system problems and inappropriate usage.

Coordinate system backup activities.

Install and manage system software, including integration of networking software in multiplatform environments.

Assure compliance with affirmative action and safety programs.

SUPERVISION RECEIVED

General supervision is received from a manager or designated official.

SUPERVISION EXERCISED

Functional and administrative supervision is exercised over support staff.

QUALIFICATIONS

A Bachelor's degree in computer science or an equivalent combination of education and experience is necessary.

A Master's degree in computer science is desirable.

Extensive experience in server administration in a distributed environment is necessary.

Ability to effectively communicate with customers is necessary.

Extensive knowledge of network operating systems is necessary.

Extensive knowledge of distributed computing application software is necessary.

Extensive knowledge of high level programming language is necessary.

TITLE: COORDINATOR NETWORK COMMUNICATIONS

GRADE: 12

BASIC FUNCTION AND RESPONSIBILITY

To coordinate the development, implementation, and operation of campus-wide local area network applications; assure the availability of higher level network communication services applications; and to coordinate the application activities of vendors and University groups regarding communication networks within the office of Administrative Systems.

CHARACTERISTIC DUTIES AND RESPONSIBILITIES

Coordinate the applications activities of network administration network maintenance, operations, and user service groups of attached systems.

Monitor network application activities and resolve problems of the network and transport levels, and data transfer, applications and other services.

Coordinate the applications activities of vendors and University staff regarding the planning, design and installation of additions to the network.

Participate with University staff and vendors on the determination and resolution of network operation and maintenance problems.

Coordinate the development and implementation of documentation and diagnostic procedures for the Communications Assistance Center.

Supervise, train, and evaluate the work of network communications staff.

Assure compliance with affirmative action and safety programs.

SUPERVISION RECEIVED

Direction is received from the Assistant Director of Administration Systems or other designated official.

SUPERVISION EXERCISED

Functional and administrative supervision is exercised over support staff.

QUALIFICATIONS

Bachelor's degree in electrical engineering, computer science, or related field or an equivalent combination of education and experience is necessary.

Considerable progressively responsible experience in data communications or systems programming is necessary.

Reasonable knowledge of communications networks including protocols and transport mechanisms is necessary.

TITLE: SYSTEM ADMINISTRATOR III

GRADE: 11

BASIC FUNCTION AND RESPONSIBILITY

To coordinate the development, operation and maintenance of networked systems in a distributed computing environment; coordinate the integration of software and hardware in a multi-platform environment; and assist in resolution of network related problems.

CHARACTERISTIC DUTIES AND RESPONSIBILITIES

Operate and maintain large networked systems in a distributed computing environment.
Coordinate the development of networked systems.
Coordinate disaster recovery support including failed disk recovery activity.
Resolve complex system hardware and software failures.
Provide postmaster services, such as setup of mailbox and address, maintain mailing list redistributors, and resolve returned mail issues.
Coordinate system backup activities.
Monitor system and device activity for performance, identification of system problems, and inappropriate usage.
Coordinate system security activities including password reset and controlling user access.
Install and manage system software, including integration of networking software in multiplatform environments.
Assure compliance with affirmative action and safety programs.

SUPERVISION RECEIVED

General supervision is received from a manager or other designated official.

SUPERVISION EXERCISED

Functional supervision is exercised over support staff.

QUALIFICATIONS

A Bachelor's degree in computer science or an equivalent combination of education and experience is necessary.

Extensive experience in server administration in a distributed environment is necessary.
Ability to effectively communicate with customers is necessary.
Extensive knowledge of network operating systems is necessary.
Extensive knowledge of distributed computing application software is necessary.
Extensive knowledge of high level programming language is necessary.

TITLE: LOCAL AREA NETWORK ADMINISTRATOR

GRADE: 11

BASIC FUNCTION AND RESPONSIBILITY

To coordinate the provision of administrative and technical support for a campus-wide broadband local area network including emulation of leased telephone lines, standard video applications, multiplexing of peripheral attachment, networking of professional computers, and inter-system communications between systems.

CHARACTERISTIC DUTIES AND RESPONSIBILITIES

Develop and establish procedures and data processing systems to support and maintain local area networks.

Analyze and determine security restrictions for systems in the network.

Determine user inter-systems needs and develop implementation plans.

Determine and authorize user access to systems on the network.

Coordinate the resolution of network operations and applications problems.

Provide technical assistance to users on network interface with other systems.

Coordinate the instructions of user personnel in the use of the network.

Prepare test data, schedules, and procedures for systems to be added to the network and coordinate implementation.

Review and evaluate potential applications to be offered to network users.

Prepare reports on new applications to the network, and implement the applications including user-training programs.

SUPERVISION RECEIVED

Direction is received from the Manager of Office Systems Planning or other designated official.

SUPERVISION EXERCISED

Functional supervision is exercised over professional and support staff.

QUALIFICATIONS

Bachelor's degree in data processing or business administration or an equivalent combination of education and experience is necessary.

Reasonable knowledge of computer, shared logic office systems, personal computer, and inter-systems telecommunications operations is necessary.

Reasonable progressively responsible experience in data processing and shared logic office systems, including JCL and BASIC programming is necessary.

Some experience with broadband local area networks is desirable.

Professional staff work load analysis

Information Technology Commons
Network Working Group
Network (LAN) Administration
Submitted 9 July 2004

Workflow analysis - Network Administration Position

	Normal Fixed hrs	Each Subnet	Normal Maintenance	Additional Subnet maintenance
Create backup copies of switch configurations (monthly-4 switches a subnet)	12	12	12	12
b. Restore switch configurations as needed.	1	0	1	0
e. Configure and deploy a paging system to notify of switch outages.	2	0	0	0
f. Obtain copies of network drawings and verify that they are current	1	0.25	0	0
g. Create strong switch passwords of at least 8 characters in length	1	0	0	0
h. Switch passwords to be changed every 6 months.	1	1	1	1
i. Use TACACS to authenticate users to switches	0	0	0	0
l. Train desktop support personnel in basic network troubleshooting skills	40	0	10	0
o. Monitor network for peak usage, congestion and bottlenecks. 1/2 hr day	52	26	26	26
p. Port scans of networks as needed	10	10	10	10
q. Perform vulnerability assessments when and if the need arises.	10	10	10	10
r. Work with the department system administrator to resolve problems	50	0	50	0
s. Create static DHCP entries.	30	30	0	0
u. DHCP – add, moves, and changes	26	26	26	26
x. Hostmaster - responsible for requesting DNS changes.	10	5	5	5
y. SLA agreement review and negotiation–	10	0	10	10
z. Create scripts	50	0	25	0
aa. Disable switch ports not in use to prevent their unauthorized use.	25	25	0	0
bb. Configure switches with private IP space as opposed to public	4	4	0	0
cc. Disable telnet in favor of SSH	4	4	0	0
Packet Traces -				
1. File servers	4	0	4	0
2. Email server	4	0	4	0
3. Web servers	4	4	4	0
4. Incoming packets	4	4	4	4

5. Outgoing packets	4	4	4	4
b. Determine the networking requirements for the unit.	20	0	0	0
d. Determine what measures are in place for the physical security of the switches?	4	4	0	4
g. Design network improvements to existing infrastructure in collaboration with ITCOM.	15	2	15	2
a. Attend facilities meetings involving building(s) where networks are located	12	0	12	0
b. Prepare yearly networking budget line item based on established life cycle parameters.	8	2	8	2
d. Create plant work orders for infrastructure improvements.	6	6	6	6
e. Create Data Service Requests for new equipment orders	12	12	12	12
f. Manage networking projects for the school or department	18	18	18	18
g. Monitor for reasonable and customary billing of network service charges.	2	1	1	1
j. Prepare monthly status reports to include uptime data as well as problem reports.	24	0	24	0
k. Negotiates and monitors ITCOM Service Level agreement	5	0	5	0
l. Meets yearly with ITCOM to review SLA performance	3	0	3	0
n. Documentation of switches.				
o. Documentation of Jacks				
p. Label switch ports describing the attached access devices.(avg 150 ports)	25	25	5	5
q. Clear counters and look for errors on switch ports – monthly	24	24	24	24
q. Label stations and jacks	25	25	5	5
	562	285.25	331	175

Summary % Of FTE

Unit first year costs as a percent of a FTE includes only one subnet 32%

Units first year additional cost per additional subnet 15%

Unit's maintenance costs after first year 18%

Unit's maintenance costs of additional subnet per year 9%

Blended costs for a two year agreement

Unit's blended cost 24%

Additional cost per subnet - blended 12%

To: Bill McNamee

From: Pat Smallegan

ITCS-HR

Date: May 28, 2004

Position: LAN Administrator Review

Jeff Tibbs and I reviewed the Network Administrator position descriptions on page 10 in the Network Administrator Service & Best Practices Guide.

Descriptions of seven University job titles were compared at various levels from 11 to 13. When the focus of a role is technical, adding managerial responsibilities does not on their face enhance the positions salary grade. While some of the position's responsibilities lean toward those representative of salary grade 12 classifications (i.e. budgetary, periodic reporting to management, and designing, implementing and maintaining network monitoring systems), the greater majority of the tasks are more consistent with those found in salary grade 11 classifications (i.e. project leadership, Working Group Representation, supervision and evaluation of less than fifteen staff, performance of network administrator tasks and creating new policies and procedures).

Since ITCS-HR is not the driver of setting salary grades for job classification descriptions campus wide, our overall conclusion, if asked, would be that the project/team leader role does not support a job classification higher than salary grade 11.

Cc: Dan Kjos
Jeff Tibbs

Job Posting

Job Family: Professional/Administrative
Posting No: M-038388-DD
Job Title: LOCAL AREA NETWORK ADMIN
Grade: 11
Alternate Job Title: none
Alternate Grade: none
Department: Mental Hlth Research Institute
Post Begin/End Date: 06/09/2004 // 08/09/2004
Job Code: 147800
Hours: 40.00

DUTIES:

Use software and hardware tools to monitor, diagnose and resolve difficult TCPIP network and network interface problems. Coordinate the administrative and technical support for a multi University Checkpoint based VPN. Perform upgrades and maintenance of firewall and server systems. Discover and fix security vulnerabilities for network connected systems. Configure and maintain a network Intrusion Detection System. Plan security strategies and implement user access to systems on the network. Consult with users to define needs and operational issues. Design and develop complex network solutions to address user needs. Develop detailed project plans complete with time estimates. Provide appropriate systems documentation and technical advice to support staff and users. Coordinate video conferencing equipment and applications. Assist in developing and maintaining a schedule of disaster recovery procedures. Follow new trends in network communication, develop concepts and designs for the improvement then implement network, firewall and server upgrades as needed. Evaluate hardware, software and recommend the purchase of appropriate products. Perform other duties as assigned.

DEPARTMENT QUALIFICATIONS:

The successful candidate will have exceptional knowledge of TCPIP networking and also will be a versatile Computer Generalist possessing skill and experience in many although not necessarily all of the following areas: DNS; VPN setup; Advanced Checkpoint Administration; SMB Protocol; Intrusion Detection Systems; IPSEC configuration; In depth Packet capture and interpretation; Script writing for system management; WAN Performance analysis & troubleshooting; In depth Windows system administration; Windows security; Active Directory; Linux System Administration; Troubleshooting Video Conference connections; SMS; Kerberos; SMTP; Certificates, 802.11x; IPSOS; CCNA/CCNP; MCA/MCSE; punching/validating Cat5e wiring. The candidate should also have the following personal qualities: Self Starter, Team Oriented; resourceful; Enjoy brisk pace, Enjoy diverse challenges, able to interface well with vendor technical support, willingness and ability to escalate troubleshooting gracefully; strong finisher. A Bachelor's degree in computer science or an equivalent combination of computer-related course work and experience is necessary. Considerable experience in testing, monitoring and

troubleshooting IP networks is required. Effectively communicating complex, technical concepts and information to a wide range of users is necessary. Considerable knowledge of the services and capabilities of Windows and Linux is necessary. Reasonable experience working with users to develop specifications to meet their applications needs is necessary. Some experience in coordinating the work of others is desirable.

MINIMUM QUALIFICATIONS:

Bachelor's degree in data processing or business administration or an equivalent combination of education and experience is necessary. Reasonable knowledge of computer, shared logic office systems, personal computer, and inter-systems telecommunications operations is necessary. Reasonable progressively responsible experience in data processing and shared logic office systems, including JCL and BASIC programming is necessary. Some experience with broadband local area networks is desirable.

Email Chain on Charge to Group

From: bridges@umich.edu
Subject: Re: NWG help
Date: February 19, 2004 8:06:58 AM EST
To: dankjos@umich.edu
Cc: palms@umich.edu

This is exactly what I meant when I said network admin (as separate from sys admin). So, I think the groups is interested in pursuing what I'm interested in learning about. The one gray area, of course, is the "desktop support" associated with "the network isn't working for me" kind of complaint. But, desktop support generally is out of scope for this - I agree. Thanks for checking to make sure we're on the same page.

== Kitty

On Wednesday, February 18, 2004, at 11:16 PM, Dan Kjos wrote:

Kitty,

The NWG had an opportunity to discuss this today. There is interest in pursuing this but with some caveats. The groups interest is in trying to stay with Network related issues (of which there are a bunch). Consequently, the task is perceived as centering around Network Administration and not System Administration. These tasks are often used interchangeably and often the same person is doing both.

The definition of Network Administration should include:

- DHCP
- Wiring
- IP address administration
- VLAN administration
- Network (LAN) architecture
- Network (LAN) support
- Network (LAN) UPS and configuration
- Network Backup (eg. switch/router config backup)
- Port scanning
- Other items relating directly to the network

Some things not included:

- Server Support
- Programming
- Desktop Support

Most units represented at the meeting today were very interested in looking at a centralized Network Administration offering but were not interested in relinquishing unit control for System administration nor did they view it within the purview of the NWG. However, all were sensitive to the need for keeping the system administration functions in mind.

Could comment further on the below request you made? Of interest is the comment regarding "numbers of admins for numbers of machines". The numbers of machines referred is network devices such as routers, switches, etc.?

I'm wary about ITCS on its own describing a service, so I'd really like to know what the community thinks is best practice so we can scope that out in terms of cost. This best practice doc could include numbers of admins for numbers of machines, job classifications, training, response time to problems, etc.

If the group were to pursue a "best practice" for the Net Admin as defined above, does that meet your needs or are we missing something?

Dan

On Feb 2, 2004, at 4:33 PM, Dan Kjos wrote:

I'd like to put this on the agenda for the 2/18 meeting.

Begin forwarded message:

From: Kitty Bridges <bridges@umich.edu>
Date: January 28, 2004 12:25:26 PM EST
To: dankjos@umich.edu
Subject: NWG help

Dan,

As part of the University budget situation, all units are looking for opportunities to consolidate services, as one strategy for budget reduction. An area of interest to many units is network (LAN) administration. For units with small IT budgets, most of the budget is wrapped up in funding a network admin, when the unit really needs desktop support. So, I'm interested in determining what service or services might be offered centrally to offset unit budget reductions.

I'd like to ask if the NWG might spend a little bit of time developing a "best practice" document for local area network administration. I'm wary about ITCS on its own describing a service, so I'd really like to know what the community thinks is best practice so we can scope that out in terms of cost. This best practice doc could include numbers of admins for numbers of machines, job classifications, training, response time to problems, etc.

Do you think the NWG would be interested in doing this for the community?

== Kitty