

CWRUnet Task Force

From A Student Perspective

*An analysis and criticism of the current status of
Case Western Reserve University's campus
network.*



Residence House Association
Undergraduate Student Government

The CWRUnet Task Force came about as the result of collaboration between the CWRU Residence Hall Association (RHA) and the Undergraduate Student Government (USG), two organizations that represent the concerns and interests of students on and off the CWRU campus. There has always been some dissatisfaction with some elements of Information Services' policy, but the conditions have only recently become favorable for a unified effort to present with *one voice* the student perspective on the situation.

Abstract

The purpose of this document is to present a unified viewpoint, from the students' perspective, of the current status of Case Western Reserve University's campus communications network. Currently, the campus network (CWRUnet) seems to be having difficulty meeting students' needs. Considering the reliance this University and its curriculum have on CWRUnet, frequent crashes, poor customer service, and minimal end-user input are problems that need to be corrected. If left unchecked, these problems will invalidate the network's place at Case Western Reserve University. The purpose of this committee, and more importantly this document, is therefore to act as a force of change, helping the administration provide the necessary services in a successful manner, while adequately meeting the students' needs.

Why CWRUnet?

This is one of the first questions that the Administration needs to ask when considering CWRUnet. Sometimes, it is easy to lose sight of long-term goals, or even an essential thing such as purpose. The engineers, technicians, and managers who created CWRUnet back in 1988 wanted the most technologically advanced campus network in the country. In many ways, they succeeded.

Today, the Administration's goals for CWRUnet are no longer seem so clear. Currently, many students, faculty, and staff are bewildered by the Administration's apparent goals for CWRUnet. What services should CWRUnet be providing? Connectivity? Information? Service? Just as the world, and more specifically networking, has changed over these nine odd years, so must the Administration's strategies.

There are many reasons why Case Western Reserve University needs CWRUnet. Many professors enjoy the flexibility that this campus-wide network provides. The network allows them to better distribute information to their class, and facilitates many different channels of teacher/student interaction. As a result, students in many different disciplines, require some form of network access in order perform well.

Secondly, CWRU prides itself on its reputation. The foundation of that reputation is the strength of its curriculum, and its history of innovation. CWRUnet is an integral part of this reputation. Through CWRUnet, the University has set the standard in wiring infrastructure among universities. CWRUnet provides over 8,000 *Multimode Fiber Optic* connections, something no other university in America offers. Designing CWRUnet this way, from the ground up, was truly visionary. CWRUnet also adds to the University's prestige. Many students are proud of the level of connectivity that they receive at CWRU, as compared to their friends at other universities. Consequently, CWRUnet is an important selling point to potential students.

CWRUnet, and the Internet in general, are incredible communication tools, yet much of this potential remains untapped. For example, through the Internet, professors at other universities give “*distance lectures*”, in which students scattered all over the globe participate just as if they were in a normal lecture hall. This ease of communication also enhances the ability for groundbreaking research to be conducted. Researchers at Universities from around the world can easily exchange information and cooperatively work on groundbreaking research. Consequently, outside communication is an essential function of the network. Electronic communication allows contact to be established with family, friends, and colleagues. Its relative low cost and speed combine to form a truly useful form of communication.

Finally, given the prevalence of advanced networks in today’s workplace, CWRUnet forms a necessary, strong foundation in our education. Without it, the young workforce that CWRU so diligently prepares will lack basic knowledge necessary in order to be effective. Consequently, CWRUnet, or more importantly, the experience that it provides, is necessary to fulfill one of this university’s most basic missions, the education of its students.

What services should be provided?

In order for CWRUnet to be the cutting-edge network that it is supposed to be, it must accurately provide a number of services. Among these, reliable access to the network must be paramount. What good is a multi-million dollar network if no one can use it? Once reliable transport is established, Information Services needs to provide useful content. In fact, it is our finding that in general, users tend to care less about the mechanism that carries their data and more about what their data means, and what it can do for them.

Therefore, the network should be built with reliability in mind, so that mission-critical applications can be accomplished effectively. In this context, mission-critical means any application required by a student, faculty, or staff member to do their job. The best way to achieve this goal is through emphasizing fault-tolerant, redundant designs. This means shifting the design goals of CWRUnet from simplicity and visionary towards reliability and robustness.

Two types of access should be offered: on and off-campus. To provide both, especially off-campus access, flexible access needs to be a priority. Unfortunately, wide-area network (WAN) technology isn’t exactly equivalent to local-area network (LAN) technology, so it is inevitable that some disparity will exist. However, in the interest of fairness, this disparity should be minimized whenever possible. For this reason, computer labs like Smith, the Plain Dealer Electronic Learning Center (PDELC), and CAEL remain necessary to augment commuter students access to the network.

Once the physical connection to the network has been created, on-line content needs to become central to CWRU’s Information Services strategy. It would be somewhat of a misnomer for the Department of Information Services not to prize the delivery of information. First, a reliable repository of information, or server space should be provided. Sample applications include, but are not limited to the following: student information,

course information/registration, and departmental information. These and other services greatly simplify and enhance the lives of both current and prospective students. Furthermore, with the rising costs of software, it is imperative that the university provides reliable access to necessary software applications. Consequently, the Software Library, as maintained by Library Information Technologies, must continue to be enhanced. It is necessary that Information Services provide viable content on CWRUnet, in order to make the electronic learning environment a reality.

Next, in order to facilitate the use of the network and content combination, some manner of technical support must be provided. In general, three types of technical support should be provided: instructional, interactive, and non-interactive. The Kelvin Smith Library help-sessions and first-year student network orientations are examples of such instructional services. Non-interactive services include web-based support and the *CWRUnet in a Nutshell* user manual. Finally, interactive support like the Help Desk and CSIS is phone-based, customer representative style help.

Like every other complex entity, CWRUnet must be properly documented and end-users should be privy to this technical information. This allows curious members of the CWRU community to learn more about the network, elevating the knowledge of all concerned. Furthermore, informed parties will be better able to understand difficulties, and will pose more intelligent questions. Although only a select group of people might be interested in this technical data, it should still be valued as a great educational opportunity. Finally, more paths of communication between CWRUnet Services and the CWRU community need to be established. This is the only way that future rifts between the administration and CWRU community can be avoided. Further, this is also the best way to ensure that CWRUnet lives up to its expectations.

Hopefully, this was an effective summary of our perceptions of the mission statement for Information Services. Although many parts of it may be obvious, these mission objectives cannot be stressed enough. It is very easy for an organization to lose sight of its goals. Consequently, there have been times in Information Services history where its direction seemed to lack focus. From this document, we hope that Information Services will rethink their goals, and then strive to achieve them.

How does CWRUnet live up to what should be provided?

The purpose of this section is to assess the current status of CWRUnet – how we see that the Department's goals are, or are not, being met.

In the spring of 1996, the Administration announced what was hyped as the “*Next Big Thing*” in CWRUnet technology – a broad, aggressive push towards *Asynchronous Transfer Mode* (ATM) technology. One of the design goals of CWRUnet was to build a cutting-edge network, and keep it that way. Nine years ago, Ethernet technology represented the forefront of computer networking. Forecasting on the future, Information Services recently decided that ATM would be the new standard in networking technology, supplanting Ethernet. Consequently, aggressive plans were made to both convert the current CWRUnet infrastructure to ATM, and make sure that all future growth of CWRUnet was ATM-based.

Before implementation, ATM was billed as a “*faster, next-generation network*,” something that would return the University to the cutting-edge of technology and keep it there for awhile. As it stands now, 31 ATM switches and 640 ATM-attached hosts later, CWRUnet’s new topology has barely achieved one goal, and is currently missing the other. First off, performance gains have been severely limited. One reason for the underwhelming performance of ATM is due to the fact that the bulk of its traffic must pass through an emulation layer, *LAN Emulation* (LANE). ATM technology is natively connection-based, and under LANE, is forced to behave like a typical connectionless LAN. This is necessary in order to keep current network applications functioning, and to facilitate communication with Ethernet-connected hosts. This gives rise to another contributor to poor performance – the fact that most ATM cells need to undergo a conversion to Ethernet frames, thus imposing severe latency penalties. Finally, CWRUnet’s overall performance is impacted by stability and congestion issues inherent to ATM technology.

In terms of “*next-generation*” networking, it can be argued that ATM will not become the next big transport mechanism for end users. Corporations, Universities, etc. are currently sticking with Ethernet and its next-generation derivatives. This quote, from the recent “*PC of the Future*” issue of *PC Magazine*, emphasizes this point:

“Fast Ethernet rolled over competitors and emerged as the favorite way to link file servers, databases, and Web servers into local networks. ...Fast Ethernet is now a core technology that will power networks far a decade to come.” (Frank J. Derfler, Jr., March 25 1997, PC Magazine)

It seems as if the rest of the world is sticking with enhanced Ethernet technology. However, CWRU’s investment in ATM can be validated if ATM-specific applications are developed. Currently, there aren’t any ATM-specific applications running on CWRUnet, and it doesn’t appear as if there are any planned for the future.

On the whole, CWRUnet’s Ethernet segment has remained fairly stable. Due to its large size and bridged nature, however, it is still hampered by some performance problems. Some Ethernet switches have been installed recently, improving the situation somewhat. However, broadcast storms are still problematic. Also, with the advent of ATM, CWRUnet’s backbone has been changed from very reliable, proven *Fiber Distributed Data Interface* (FDDI) technology, to *Switched Ethernet*, and now to ATM. Consequently, large-scale ATM crashes can wreak havoc with all of CWRUnet, as opposed to just squashing the aforementioned 640 ATM-attached nodes.

Alongside the migration to ATM, the CWRUnet *Access Servers* also experienced a migration from the *Serial Line Internet Protocol* (SLIP) to the *Point-to-Point Protocol* (PPP). First and foremost, it should be noted that this was definitely a smart decision. PPP is currently the industry standard for providing remote access to networks. Thus, considering how advanced CWRUnet’s LAN topology is, this upgrade was necessary for its dial-up links to keep pace.

The new dial-in method, PPP, has several advantages over the older SLIP-based system. Firstly, PPP is a far more robust protocol, able to support a number of protocol

layers (IPCP, IPXCP, NetBIOS, etc.) through one common network layer. Also, PPP has many strong security and end-user authentication schemes. Most importantly, PPP is currently the industry standard, and looks to be the basis for the remote access platform of the future. Consequently, it is likely that future improvements in remote network access technology will occur on the PPP platform. Therefore, by moving to the PPP remote access platform now, Information Services has built a solid foundation for the future. Unfortunately, this move has been met with some resistance among the CWRU community.

Aside from the usual problems accompanied by any change, there were several “outstanding” difficulties that have troubled the bulk of dial-in community. The use of remote access is on the rise, as more and more students decide to both live off campus, and try to do their work from home. It should be obvious, then, that utilization of the remote access servers has been increasing, a trend that is likely to continue. Unfortunately, the number of available lines, or *ports* decreased in the transition from SLIP to PPP. Consequently, the new PPP pool wasn’t able to support as many simultaneous users as the old pool, causing one common complaint: horrific busy signals that deny access to the network.

Alongside with the port contention issues, the dial-in portion of CWRUnet has also faced some other reliability challenges. All remote access users must be authenticated in order to login. Currently, CNS is using TACACS-style authorization, which basically means that there is one machine that must be asked whether or not somebody can login, for every user on the system. Whenever this machine goes down, *all* remote access users are effectively locked out of the system. Along with this point of failure, the current access server platform chosen for PPP seems to have some disagreeable modems. Remote access users frequently report modems that randomly drop their connection, or connect at low speeds (<19200 baud).

Concurrently, CWRUnet dial-in seems to be somewhat inflexible, in terms of services offered. For example, CNS/LIT doesn’t seem to officially support the use of network software (*software library*) via a PPP connection. This isn’t to say that the PPP link can’t actually perform this task, rather it hasn’t either been tested or it has just been ignored. Admittedly, running IPX applications over a modem link is rather arduous (read: slow), but it can be done, given enough patience on the part of the user. And adventurous users have been able to get these and other protocols to work over the university-supplied PPP link. It would be nice if these would officially supported, and more applications were provided via the dial-in link. In doing so, the large disparity between on-campus and off-campus service could be significantly narrowed. Consequently, there is plenty of room for CWRU’s remote network access service to improve, and given how useful and viable it is, improve it must.

On the plus side of things, earlier problems with off campus connectivity (extremely high load on single outbound T1) have recently been remedied by the addition of 4 other T1’s, bringing the total up to 5. Additionally, a 155Mbit, OC-3c link into the Internet has been promised, but not delivered at the time of this writing. Fortunately, this

isn't a very large issue - 155Mbits of bandwidth is far greater than most WAN links that make up the internet, and thus this new link would probably tend to be underutilized.

Now we move onto the historically thorny issue of Service and Support for network users. There are currently two methods of getting Service/Support: the Service Desk, and the newsgroup, *cwru.net.general*. The newsgroup is useful in that it appeals to a small niche of students who are knowledgeable enough to both get on the network in the first place, and to ask appropriate questions. As it stands currently, this form of communication between staff and students works pretty well. However, since the newsgroup caters to such a small portion the community, the other option, the Help Desk, must pick up the slack.

In general, the CNS Help Desk has been oriented to the end-all of Service/Support at CWRU. General hardware problems along with network software problems are directed to this service. As a result, the Help Desk seems to be overwhelmed. Typical experiences with the staff behind the Help Desk are usually less than pleasing. More often than not, the staff is rude, condescending, or unresponsive. Phone calls frequently go answered, and if a message is left, the call is rarely returned. A number of users are frustrated and angered by this level of service.

Fortunately, there are other ways in which students can get help with CWRUnet issues. For example, a rudimentary form of *Computer Based Training* exists on the university web page. There are sample tutorials in place dealing with hooking up the fiber optic cables, connecting to CWRUnet, obtaining a personal CWRUnet ID, etc. This content may or may not be effective because besides being hard to find and little known, one needs a working computer in order to see it!

Other support options provided that seem to work well, include the Kelvin Smith Library Help Sessions, and the CWRUnet in a Nutshell tutorial. When used these are very nice additions to the Service and Support portfolio. Unfortunately, not very many people fully utilize these services. Also, some of the material (especially in the Nutshell manual) may be outdated.

Finally, there seem to be some disparities between the way that the administration treats access to internal information. The CWRU community seems to be left in the dark regarding network issues, whenever possible. There are no diagrams of network topology, no documentation on the composition of CWRUnet, etc. In fact, there is also very little interaction between students and CNS staff in general. The newsgroup, *cwru.net.general*, is still the only source of network information/interaction. Aside from Mr. Gumpf's monthly ATM status updates, there isn't even a regular source of network information on the newsgroup! It is pretty obvious that strong ties between CNS and the community need to be fostered.

How can CNS meet these expectations?

The CWRUnet access servers are swamped. Fortunately, the administration has a new plan in order to fix things: the recently publicized multi-tiered service scheme. The issue of remote students, faculty, and staff paying for a normally free service is very

complex, and must be handled carefully. It cannot be stressed enough that the administration needs to establish a better rapport with the students. Through this link, they would be able to more fully explain their position, and be able to better accept feedback and constructive criticism. This must be imperative so that any plan enacted can achieve a broad base of support from the community.

First off, many of the issues surrounding dial-in access to CWRUnet haven't been made clear by the Administration. For example, no hard data has been released concerning the utilization of the current dial-in pool, projected budget for remote access equipment, etc. Also, nothing has been published regarding what type of research Information Services did regarding alternatives to the current remote access system, and their decision process was also never revealed. There are many ways to charge users for dial-up access, yet it seems like this current plan was chosen out of convenience. Let's take a moment to summarize the plan in question:

Pool 1 - No charge. 1 hour session time limit
Pool 2 - \$4/month. 2 hour session time limit
Pool 3 - \$6/month. 4 hour session time limit
Pool 4 - \$8/month. 8.75 hour session time limit
(note: time limits will be enforced)

Pool 1 - the current 92 modems
Pool 2 - minimum 1 modem per 10 subscribers
Pool 3 - minimum 1 modem per 8 subscribers
Pool 4 - minimum 1 modem per 4 subscribers

[Jeff Gumpf, cwru.net.general, 3 Mar 1997 19:35:15 GMT]

So far, this is the extent of the information that has been presented to the CWRU community and many questions remain unanswered. There has been little mention of how revenues will be collected, how much equipment they plan to buy, how people can sign up, the time frame for implementation, etc. Thus, we can conclude that either the full details of this plan remain hidden, or haven't yet been formed.

The current plan, as we have been given to understand it, seems to be born of convenience, and doesn't seem very well thought out. Any plan for revamping CWRUnet's remote access service must strive to be easy to access, reliable, fast, and easy to use. Ease of implementation shouldn't be a key factor. This plan is convenient because it is fairly simple to implement, requiring no major changes to the TACACS authorization servers. Billing is simply assessed according to what service the subscriber signs up for, and the University already has such a billing infrastructure in place. This plan doesn't seem well thought out, because it appears as if its implications haven't been carefully considered. By separating out the heavy users from the less demanding users, the normal bell curve distribution that defines port utilization will be disrupted. It may be, that all of the heavy users will pay the monthly fee for a low *user to port* ratio, and then spend long hours connected – locking out all of their similarly paying brethren. Furthermore, this plan only addresses the problem of inadequate *user to port ratios*, neglecting all of the other problems with CWRUnet's access servers.

There are many other ways to implement a fee-based dial-in service. One such example is currently being implemented at the University of Minnesota (<http://www.nts.umn.edu/services/modembilling.html>). Basically, Minnesota is in the process of implementing a pay-as-you-go scheme. In essence, the first 30 hours of connect time a month are free. From then on, users must pay an hourly rate in order to connect to the network. Online usage and billing is freely available to users. The system also gives warnings, and if so configured, blocks access when the 30-hour limit is reached (so that users don't "accidentally" incur charges).

To summarize, the ability to remotely access CWRUnet is one of the most vital services that the University provides, considering that the majority of the student population lives off campus. Furthermore, recent changes to the remote access functionality of CWRUnet have been both good and bad. It was a good move for Information Services to provide PPP rather than SLIP-based access. However, it was a bad move to shrink the number of ports available to the users. Consequently, Information Services needs to placate their user base, and implementing a multi-tiered payment scheme in order to lower the *user to port* ratio isn't going to do it. Information Services needs to re-examine the current situation, and try and accomplish several things. Firstly, the current PPP dial-in pool should be expanded, at no cost to the user. If the necessary expansion cannot be accomplished within the given budget constraints, then an alternative method must be fully researched. However, as we have seen, before going ahead with any plan it is imperative that Information Services seek as much input from the CWRU community as possible – in order to help the plan become a success.

We have already evaluated the current status of the ATM-based portion of CWRUnet, it has been received in a less than stellar light. The current ATM infrastructure hasn't been met with wild admiration from the CWRU community. However, with so much money already invested in ATM technology, it is impossible to turn back. Therefore, this section deals with the current plans for the expansion of ATM on CWRUnet.

Careful consideration must be taken regarding the expansion of the ATM network. When ATM was first implemented, it was so rife with problems that it was more or less unusable for an entire semester. This lack of usability could have been avoided if some better planning had been done. For example, one of the first problems encountered were the horrifically overcrowded Emulated LANs (ELANs). If an ATM load generator had been utilized, enough traffic could have been generated on the ATM network to adequately simulate expected usage, thus predicting the overcrowding problem. Thus, from the example of first semester, it is apparent that a great amount of foresight and planning needs to be given to expansion of the network. Hopefully, some performance testing can be done, to determine in advance how an additional 800 new ATM-attached hosts will impact the network. In this scenario, it should then be possible to eliminate points of failure in advance. Consequently, an exemplary level of service could be provided to incoming freshman right from the start. However, it must be stressed that simple foresight cannot eliminate all future problems. For example, another fault of the ATM network first semester was an insidious bug in the Edge Switching code between the campus ATM switches and Ethernet hubs. Therefore, if at all possible, the expansion of the ATM network should be retarded, until the ramifications of *edge switching* and

general traffic management are more understood. This would be a great cost saver. Currently, ATM technology is rather expensive, but the price is coming down. Waiting even another 6 months could save the university hundreds of thousands of dollars. Furthermore, slowing the growth of the experimental arm of CWRUnet would give the engineers much more flexibility in dealing with unforeseen problems as they crop up. Also, since fewer students would be on the experimental network, fewer people would be adversely affected by such problems.

However, in the event that expansion of the ATM network *cannot* be limited, steps must be taken to ensure reliability. One way to increase the robustness of the ATM network involves implementing the LANE 2.0 standard as soon as it becomes available. This upgrade to the current LANE standard adds many additional stability and reliability features. For example, under LANE 2.0 it is possible to maintain backup *LAN Emulation Servers* (LES) on the network, eliminating a possible point of failure. Providing ATM-attached servers would also enhance robustness. The benefits would be twofold. First, failure of the Edge Switch wouldn't necessarily cause ATM-attached hosts to be separated from their data. Secondly, ATM-attached hosts would be able to reap some of the benefits of ATM technology, by transferring data at increased speeds.

Alongside the reliability issues, CWRUnet's ATM branch is also having some problems reaching its "*next generation*" network goal. In order for ATM to be considered a truly ground-breaking, next generation network, important new ways of using the network, that rely on key ATM technologies, must be implemented. As currently implemented, an ATM connection into CWRUnet isn't much different from an Ethernet connection. Most people do the same things with their ATM connection that they did with their Ethernet one (TCP/IP, IPX, etc.), only in some cases they're doing it a little bit faster. And as we've previously mentioned: most people judge networks, and computers in general, not by how they're made, but by what they do. Thus, Information Services needs to explore new and groundbreaking applications, and their potential effects on education.

ATM technology holds the promise to enable several new forms of communication, thus creating many different educational opportunities. This is great, considering the fact that CWRU is a university, and one of the university's primary goals is the education of its students. The fact that ATM can guarantee both bandwidth and data delivery, along with its low latency, enable many applications in the area of real-time voice/video delivery. Complete lectures could be given over CWRUnet, broadcast to the computer of every student in the class. And with real-time MPEG2 compression and decompression, these lectures can even be interactive. Other areas to explore include, but are not limited to: Voice/Video over IP, Multicast, "Server Push" technology, and Videoconferencing. In more detail, Voice/Video over IP consists of using standard TCP and UDP packets to transfer real-time audio and or video over the network. This has advantages over previous technologies in that it can work over any transport mechanism that supports TCP/IP. Multicast technology is simply a mechanism that allows one host to transmit the same data to multiple hosts. In essence, this allows group applications, in which many people participate in a common environment. Server push technology represents the latest trend in the evolution of the *World Wide Web*. Basically, instead of clients actively seeking data on the network, they simply subscribe to "channels". These

channels then dump information directly to the end user, much like a television. Any one of these technologies might become the “*next big thing*” in computing.

With the search for new applications, many great educational and research opportunities would be created. There are many among the general student community who aren't knowledgeable about computer networking, and ATM specifically. Yet these technologies are intertwined with the future of computing. Therefore, any experience that students can gain from CWRUnet should be considered beneficial. Moreover, many of the aforementioned technologies are still in their infancy, and much research has yet to be done. This is another great opportunity for the CWRU community. In fact, for a university that thrives on leading research, it shouldn't be too hard to truly enter the forefront in another fundamental technology of the future: computer networking.

Other areas of research exist within standards groups, such as the ATM Forum, and within advanced networking projects, such as the *Internet 2* consortium. Although it should be noted that CWRU is on the list of universities lending support to this project, as of yet, it doesn't appear as if any real work has been done on the part of Information Services. Judging by the early documentation provided at the *Internet 2* website, it appears as if the latest incarnation of CWRUnet puts the University in a unique position. All of the ATM technology that has been installed should allow the University to leap to the forefront of this project, if Information Services were so inclined. There are many other areas of research that Information Services should consider participating in, such as the *vBNS*, and research projects with the *National Laboratory for Applied Network Research (NLANR)*.

The methods with which Information Services attempts to both provide service and support for CWRUnet seem to be fundamentally sound. Unfortunately, one in particular gets bogged down in implementation: the CWRUnet Help Desk. The short falls of this service have already been noted, but unfortunately, the possible solutions seem murky. Firstly, the problems with the Help Desk could be boiled down to a simple staffing issue. It could be entirely possible that the current staff cannot deal with the volume of calls that they receive on a daily basis. If this is the case, then it should simply be a matter of re-apportioning funds in order to obtain proper staffing. However, these problems might be caused by a simple lack of focus – the mission goals for the Help Desk may not emphasize courtesy and respect of customers.

Information Services seems to be addressing this apparent shortfall in management style, with their plans to “*revamp*” the Help Desk for the 1997-1998 school year. Current plans call for Digital Media Services (DMS, formerly Library Information Technologies) to take control of the service desk. It will be moved to the new Kelvin Smith Library, and they are actively seeking a full-time support engineer. If properly carried out, these changes could fix the perceived shortcomings of the CWRUnet Help Desk.

The issues surrounding network reliability have been an ongoing theme throughout this document. It should be obvious that mission-critical servers, and more importantly, the services they provide, need to be available when needed. Therefore, it seems obvious that these vital servers should be run on stable, robust hardware platforms, and should

have viable backups whenever possible. Many of the changes discussed can be implemented simply by changing management strategy. Transport, or the physical media on which data is moved, should be de-emphasized. Content services should be the main focus of CWRUnet. Quite simply, this means that the administration needs to recognize the fact that the CWRU community simply wants to get their work done, regardless of the “*leading edge*” manner in which their bits get there.

Conclusion

The Task Force was created with the goal of presenting what we see as the primary student concerns about the current CWRUnet set-up. We have endeavored to pinpoint some problems and make some suggestions toward viable solutions. In essence, CWRUnet is a wonderful thing, and it has potential to be the pioneering project that the University has always intended it to be. However, there are lingering issues surrounding the implementation of the network that cause troubles of the sort seen with the beginning of the ATM system and with the switchover to PPP. At present, it appears to the students that the Department of Information Services is very focused on making sure that CWRUnet has the latest technology available, without necessarily looking at the short-term practicality of this goal.

In 1988, it was more than understandable that CWRUnet would go through a growing and maturation period – Internet technology was very new at the time, and a network such as CWRUnet was on the forefront of the technology at the time. In the past nine years, CWRUnet has become an invaluable resource for all parts of the University community, and has become integrated into the core of the University. As the backbone of the University’s information storehouse, CWRUnet is quite simply too valuable to be experimented with lightly. While the goal of maintaining CWRU’s position as a front-runner in networking is admirable, the Administration needs to be careful regarding the impact of new technology on the existing system. New technologies may require more testing and preparation before being integrated into the very complex system that is CWRUnet.

The Task Force has done its best to present the student body’s concerns about CWRUnet as it now stands. We recognize, however, that some of our information may be wrong, and that our conclusions about certain elements of Information Services’ policies and strategies may be off base. However, we have been working with the information at hand – and information about CWRUnet is in short supply, as noted earlier. If we’re wrong, we strongly encourage a response from Information Services. In fact, that is one of the goals of this project: to open a dialogue between the students and the Administration on how CWRUnet is managed. Our strongest recommendation would be for a permanent committee to be created through which students would have more access to get their views expressed as well as to get direct information about what is going on with the network. The Task Force, as well as the Residence Hall Association and the Undergraduate Student Government are more than happy to facilitate such a committee. We eagerly await a response, and hope that this effort fulfills its purpose.

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