

**Network Infrastructure and Services
Advisory Subcommittee Meeting Notes
November 28, 2016**

Please note that slides are attached and may be referenced in the minutes.

Introduction of ITEE and CCS: William Dougherty, Executive Director of NI&S, welcomed those attending the meeting. Because of some internal IT shift of duties and departmental changes, two other IT departments are joining NI&S as members of the advisory subcommittee. They are Information Technology Experience and Engagement (ITEE), led by Claire Gilbert with Joyce Landreth as Deputy Executive Director; and Collaborative Computing Solutions (CCS), led by Marc DeBonis, with their IT Manager, Chris Shively, in attendance today. William introduced Claire Gilbert and Chris Shively. Claire spoke to the development and purpose of ITEE and the areas they service. ITEE includes User Engagement, Experience Design and Improvement, and Communications and Relationship Management. ITEE is also the primary development and support organization for the Service Now trouble ticketing system.

Chris Shively summarized the service areas encompassed under Collaborative Computing Support. These include the VT Email Service (both Google and MS Exchange Online), VT Office 365, Active Directory (AD) and AD Federated Services, Cloud Service Consulting and Brokering, and Virtual Machine Environments (VME) and VME Research Environments.

Review of NI&S Mission, Role, and Responsibilities: William provided an overview of the Department of Network Infrastructure and Services and its service offerings. NI&S is currently in the process of updating its Mission Statement. The department manages data and voice networks and the computing infrastructure and storage for most of IT, although a few IT departments and various IT campus department entities run their own computing and storage infrastructure. Current and future trends will see much of the infrastructure going to the cloud. University public safety initiatives led by NI&S include VT ALERTS including the desktop alerts client and campus signs in classrooms. A new effort is underway to provide campus alerts through the annunciator panels in the fire alarm system where the speaker delivers an audio message.

Projects in Progress: NI&S is currently engaged in a number of projects and brief reports on their status were provided to the committee as indicated. Also, please refer to the slides for specific information.

Building Aggregation Router Upgrade. There are six different routers on campus, and the ones that have been in service since 2005 are being replaced. Their replacement will improve reliability, stability, and security of the network, and will greatly increase capacity from 720GB/second to 9.6TB/second--a 1200% increase in capacity. Recent disruptions have been indirectly or directly related to this effort. The equipment is slowly being converted over. A building status was provided. Owens and Shanks have been completed and Cassell in progress. Burruss will be next. Hillcrest is still on the list and AISB will be completed last. The map (see slides) shows how everything is redundantly connected on the campus network and also that we now have dual paths out to commodity networks. With the diligent work of Jeff Crowder, dual paths now go

south to Atlanta as well as to Ashburn. There is interconnectivity between each of the switch centers providing reinforcement if a leg or two of the routing arrangements is lost.

Wireless Device Registration Pilot. This registration pilot was initiated because of commodity devices such as Blue Ray players and game consoles which cannot interact with Eduroam or the guest system which require authentication input. The pilot is only in residence halls and is not intended for standard laptops and smart phones being used on Eduroam. A tentative date of fall 2017 has been set for campus-wide availability, but a great deal of work still must be done, including software development, before a date can be set for widespread use.

WiFi Enhancements. There have been significant WiFi enhancements across campus. We now have over 7,000 access points, most of which support the latest WiFi protocol (802.11ac). Upgrades are in progress which include wiring to support the latest protocol. Wireless controllers will be added to keep traffic local for management of the authentication stream. Matt Serr indicated there have been some facilities issues in working on the project (getting to the rooms, etc.), and March 2017 is the anticipated completion date. He also provided the status on specific buildings. The Unified Communications (UC) funding supporting this must be spent by May of 2018.

VT Alerts. An annunciator channel is now being supported in seven buildings including Ambler Johnston, one of largest residence halls. The new classroom building came on line that way. William recently presented the project to the Commission on University Support (CUS) and even though the new classroom building is a showcase, there was feedback that teaching faculty were disappointed with the presence of annunciator panels instead of classroom signs. This has presented an issue with since the signs serve as a calendar and a clock. Because phones may need to be put away for exams, there is no central clock to alert of the time during exam completion. Both professors and students are raising this concern. This could be remedied with an inexpensive clock in classrooms. Further discussion on alarm system issues continued.

Troublesome Issues: Wireless Disconnects. A recent issue is the occurrence of wireless disconnects, particularly at the beginning of the semester. Users may not be able to log in and there may be dropped connections. While NI&S has been able to reduce and stabilize this, it has not been resolved. William explained some reasons for the log-in problems and attempts to resolve them, and a technical discussion followed with Dr. Jeff Reed providing his expertise on subject. NI&S is continuing to work with the vendor to ameliorate the problem as much as possible to handle the competition for resources by many users. While there have been fewer issues lately, NI&S will not consider this resolved until these events no longer occur.

The wireless disconnects are related to the log-in issue; the log-in problem often occurs after a disconnect. Steve Lee again discussed some possible reasons for these occurrences with Dr. Reed providing further expertise. Topics included priority schemes within the spectrum, radar systems nearby, other channels, and alarms. DFS stands for Dynamic Frequency Selection and is one issue included in the discussion. Steve Lee explained the graph in the handout. (802.11ac Channel Allocation).

Update on Remote Access Service/VPN: Those using VPN or remote access service will soon also receive IPv6 support allowing more addresses to be deployed. The

number of IPv4 address are limited. Brian Jones is a member of ARIN (American Registry for Internet Numbers), and represents Virginia Tech. He provided some registry related information and he and William discussed the limitations and anticipated improvements in the future. DUO 2-factor authentication will be implemented with VPN in the near future, tentatively scheduled for March of 2017. NI&S is working closely with departments in IT implementing the 2-factor authentication to assure users are well informed and that the feature is consistent with user needs. At some point in the future, 2-factor authentication will become a requirement; Joe Hutson suggested it would be wise to not implement this until after the academic year ends in May.

The group discussed the version of VPN and Kimberley Homer clarified some of the details and addressed the progress on this. Problems, accounts and various passwords were discussed. The protection of passwords is essential. William made notes on issues brought forward to pass on as work continues with password security. Mike Moyer and Kimberley emphasized the need for balance between security and usability.

Al Cooper brought up security issues with other equipment such as printers; network segmentation will accomplish some of this. Further discussion continued on related security issues.

Update on Unified Communications: Details and the current status were provided on the significant work which has been done on Unified Communications. The project encompassed a great deal of activity, much of which was done behind the scenes. New phones included additional features which involved switch replacement. Cable upgrades in the buildings allowed the realization of improvements and user benefits. The remaining four buildings are now scheduled for the cable upgrades and Matt provided specific information. All of this work is being completed with the initial UC project funding.

Another part of the UC project is a Data Center Network upgrade. William provided the background on this and reported on its progress, including the cloud infrastructure initiative. Available funding for the upgrade must be spent by May of 2018. Because of the cloud initiative, equipment has not been purchased for the data center as cloud use will help determine equipment needs and requirements. Pilot proof of concept projects also are in progress for which purchases should be made this fiscal year.

A report was given on the new version of Avaya Communicator, the UC soft client. The soft client supports popular operating systems on laptops and smart phones and since it is currently being tested, William encouraged interested parties to test and adopt it early so we can report back to Avaya on the benefits and drawbacks.

UC services are being expanded to additional remote offices such as Kentland Farms and Blackstone AREC which will result in those services functioning as if the remote locations are on campus (e.g. 5-digit dialing, leveraging of soft client features). Remote locations now must depend on multiple service providers, so standardization across the Commonwealth will be beneficial.

William provided an overall summary of the UC project. Since 2010 everything has been replaced from the ground up for the new UC system...fiber, cabling, copper, switches and routers, for example. The project ends in 2018 when funding runs out, and at that time, the technology refreshment cycle of 5-8 years will have already begun. NI&S is

working with the Budget Office to develop a refreshment cycle funding method. Many more approaches to voice service exist now than when Virginia Tech's UC project research began. More cloud services may be used in the future, understanding that telephone devices will likely be required by certain users for the near future. Any new system will need to integrate users' utilization of portable phones. With the technology movement and refreshment cycle changes, NI&S will be able to selectively see and target areas in need of improvement.

William thanked members for their time and effort. Questions that arise at any time may be directed to him at william@vt.edu.