NETWORK ASSESSMENT

Holden R III School District

This document provides a technical assessment of the Network infrastructure at the Holden School District. In addition this document will provide recommendations based on the analysis of those findings.

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3/24/2016

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Network Assessment

Holden R III School District

On March 24th David Kessler from MOREnet Network Consulting performed a network assessment of the Holden R III School District. The purpose of this assessment was to review the current state of the network and infrastructure.

The Holden R III campus is comprised of five buildings. We reviewed two of the schools, and the wireless placements for the athletic fields. This gave us a good overview of the current state of the network for the Holden school district.

Overall the school network infrastructure, wiring and switching, is in great shape with a few areas for improvements. There are some equipment racks that lack a secure area for wiring. Some of these areas are shared space where staff other than the IT department can access. It is preferred to place these racks in restricted areas or secured with locking enclosures where space is limited.

Below are the details of our findings and the recommendations from the assessments.
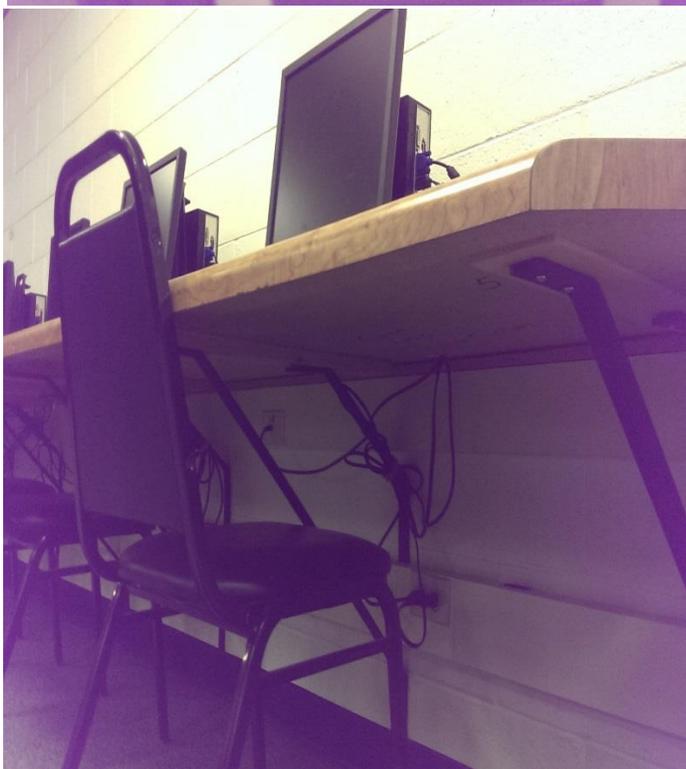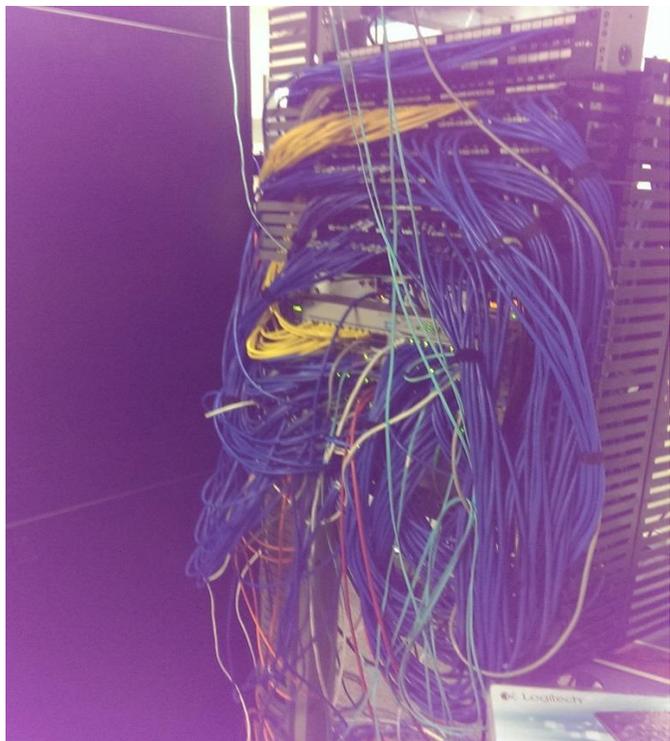
Infrastructure Findings

The Holden R III network infrastructure is in relatively good shape but there is just a little room for improvement which will be outlined in the following sections.

The wiring is a combination of Cat 5e and Cat 6 cable, terminated correctly in rack mounted punch down blocks and network termination outlets in the classrooms. Racks in the Main Distribution Frames (MDF) is secured from the public behind a locked door or secured in a locked cabinet. Some of the Intermediate Distribution Racks are mounted on walls in classrooms and not secured from the public. The classroom network drops are terminated in outlets, the cable drops are secured in raceway or behind the wall.

Overall the data center is in great shape and is located in a secure area. The data center has an air-conditioning unit, an uninterruptible power systems that is capable of powering all devices for nearly two hours if power is lost. The core switching is takes place here and most of the buildings are connected with 10Gbps fiber links.

A few minor issues were found in the cable racks and cabinets. Not all of the patch panels and network drops had cable management leaving some of the connectors unsupported. The district utilizes HP fully managed switches throughout the district and has upgraded to Aqua colored 50 micron fiber supporting the 10gig fiber uplinks.

Servers and Storage Area Network in the Data Center. All secured in racks and in a restricted area.

Infrastructure Recommendations

Cleanup of the wiring closets is recommended. Cable management is recommended to ensure a robust and reliable infrastructure and extend the life of the network ports and cables. Begin moving IDFs (Intermediate Distribution Frame) to a secured rack with proper power and ventilation.

- Add horizontal wire management to the network racks to better manage the patch cables, both copper and fiber, and extend the life of your infrastructure connections.
- Upgrade IDF cabinets in public spaces so that they can be properly secured or move the switches to IDF locations outside of those public spaces.
- Continue labeling patch panels as new network drops are added.
- Add Vertical wire management to manage fiber and Ethernet patch cables.
- No other recommendations.

Logical Network Findings

The district is a routed network with multiple subnets and VLANs. The buildings are interconnected via a 10Gbps fiber network that is managed by the district and Midwest Computech. The districts network is secured with a Sophos firewall and the internet content is filtered via the same Sophos appliance. The IT staff maintains a network document containing VLAN identification and logical addresses as well as information on all of the network equipment. Passwords are kept on a secure tool so administrative access can be obtained in the event of a disaster. Midwest monitors equipment for any anomalies or outages.

The district has a plan to replace the current firewall with a newer model, and they stay on top of the networking equipment by replacing items that have met End of Sale or End of Life.

Logical Network Recommendations
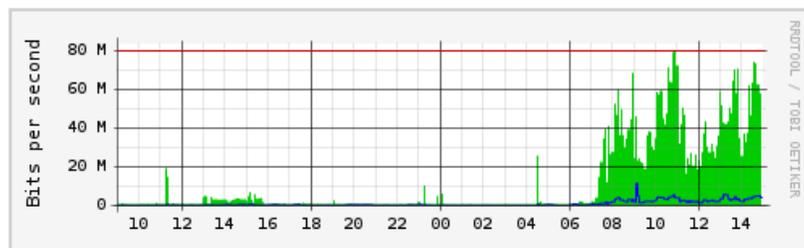
None at this time.

Network Traffic Findings

The District has an 80Mbps Internet connection. Usage is 90%peak daily usage as indicated by this graph below. The district is reaching capacity and should see occasional slowdowns on the network.

System: Holden R-III   **Max Speed:** 80000 Kbits/Sec

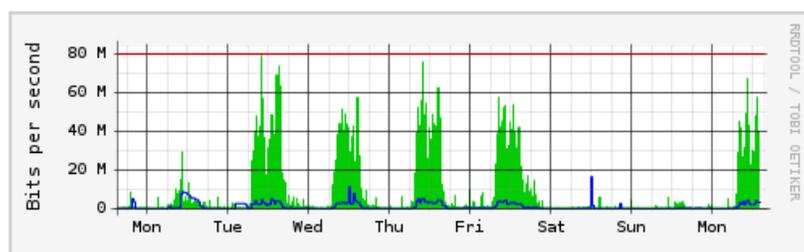The statistics were last updated **Monday, 04 April 14:55:42 CDT**

Daily Graph

Max In: 79.1M (98.9%) Average In: 11.0M (13.8%) Current In: 57.6M (72.0%)
Max Out: 11.4M (14.2%) Average Out: 901.9k (1.1%) Current Out: 4126.6k (5.2%)

Weekly Graph

Max In: 78.7M (98.4%) Average In: 10.5M (13.1%) Current In: 39.8M (49.7%)
Max Out: 16.5M (20.7%) Average Out: 1163.7k (1.5%) Current Out: 3304.9k (4.1%)

Network Traffic Recommendations

- MOREnet normally recommends beginning upgrade planning when the maximum average in reaches 80% or higher.
- The Aerohive wireless expansion will also impact your network bandwidth usage when adding the additional devices.
- For Chromebook, Google recommends 0.2Meg to 0.5Meg bandwidth per user for Chromebooks. https://support.google.com/chrome/a/answer/3339263?hl=en

- No other recommendations at this time.

Wireless Network Findings

The district currently utilizes Aerohive access point's with cloud based controllers for wireless coverage throughout the buildings. The access points are all Aerohive121 Access Points that connect to a wireless controller located in the cloud. Currently the access points are deployed to provide basic coverage for the schools with plans for additional

AP's ordered and installed this summer. With the additional AP's the district should have deployed an access point per instructional area providing seamless coverage for teacher/student instruction.

Wireless Network Recommendations

- Complete the full deployment of Access points in all classrooms.
- Request a Wireless Assessment from Midwest Computech or from MOREnet to help tune the wireless after completing the installation.
- Consider placing the AP390 access points in the larger meeting areas to increase capacity.
- Prepare for 802.11ac Wave 2. The district has adequate coverage and having 10Gbps between all switches should make them ready to upgrade access points to 802.11ac Wave 2.

Network Documentation Findings

The IT department has been working on getting all building's networks documented. The campus as a whole is already done, and a work in progress as things change. As buildings get renewed they are being documented, but currently there are still a few that lack adequate documentation.

- Equipment was labeled, however not all network drops and jacks were labeled.
- The campus network is documented and kept up to date.
- The building networks are mostly documented and will be updated when rewired.
- The IP addresses are documented well.
- Network policies and AUPs are organized in one place.
- Critical passwords are stored using password managing software.

Network Documentation Recommendations

- Continue to update documenting all new wiring changes as they occur when buildings are being rewired.
- No other recommendations at this time.

Server Findings

The servers are all located in the main data center. They are in a secure area with adequate power and cooling. They are located in secure racks as well and are organized nicely. The Microsoft Active Directory is current and running Windows 2012. They manage a Microsoft Exchange server, and the email is filtered through a Sophos appliance.

Most of the servers are less than 5 years old and the network switches are three years old. The Technology department maintains the backup of district data storing it locally and in the cloud. It helps immensely with recovery if something were to go wrong. There currently is not a policy in place for renewing older technology.

Server Recommendations

- Consider having a replacement policy included in the technology plan for the district so that funding sources can be planed and secured to keep things running smoothly. It is essential in the current times to have technology running and available as instructional activities have migrated to online sources.

Security and Disaster Recovery Findings

The district uses strong passwords and works with due diligence to keep the network and its users informed and secure.

Backup of critical data is being performed and replicated to the cloud to maintain two copies of the data

Security and Disaster Recovery Recommendations

- Continue with security education of your users. MOREnet offers topics like Good Security Practices and issues like Using Secure Passwords, and How to Recognize Phishing Emails.
- Consider a password policy that is enforced district wide for complex passwords that require a new password at least on an annual basis.

Hardware Findings

The school uses physical desktops, laptops, Ipads and Chromebooks. There is not replacement schedule, but most of the devices are newer and less than three years old. Students are using laptops that run Windows, which will better prepare them in the future as most businesses are also running Windows operating system.

Hardware Recommendations

- Consider implementing a replacement cycle for network and computer equipment. This will help in the annual budget planning to have a technology line item.

Support Personnel Findings

The district has a total of 2 technical staff that work onsite. The staff that I met with was very accommodating and all had knowledge on every question that we asked. He seem to work well with Midwest Computech and definitely has the district's technology plans headed in the right direction. He has attended and hosted training and conferences as needed and shares any knowledge that they gain with district staff members. The district utilizes Midwest Computech for large jobs and occasionally for special projects. When consultants are used, the Technology Director makes sure to shadow them, so that he can learn from the installation of the equipment and best practices for management of the new installation.

Support Personnel Recommendations

As more devices are added to the network, additional technical staff and training will be required to support the additional work load needed for maintenance and repair of the mobile devices. Additional resources will be needed to maintain, monitor, and support the future technologies.

Continue the ongoing training of staff. MOREnet offers free training to members. Google and other courses are available for continuing education credit.

PRIORITIZED NETWORK AND INFRASTRUCTURE OBJECTIVES

Immediate Action Items

- Complete the deployment of Aerohive AP's in every classroom.
- Consider placing the 390 model AP in the larger assemble areas for more coverage.
- Schedule a wireless assessment after all AP's are installed to help tune your wireless network.

Secondary Priority Action Items

- Wiring
    - o Clean up the district wiring infrastructure using wire management, and document all new changes. Below are a few examples of wiring racks and wire management. Upgrade new wiring to CAT 6.

Additional Resources

Take advantage of the free resources that MOREnet offers as part of membership. This includes technical support, network consulting, security and technical training. Our technical trainers can also travel onsite, for the cost of travel expenses. To view the training schedule, go to: http://www.cvent.com/Events/Calendar/Calendar.aspx

MOREnet Services

We are listening to our members and offering a range of services designed to save you time and costs with the great MOREnet support you have come to depend on. New service offerings in Backup Services and Virtual Server Hosting are now available from MOREnet, your trusted partner in Educational Internet Services. Visit these service offerings at the following link https://www.more.net/services/categories