

**College of Information
Apalachee Ridge Learning Center
Network Support**

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Executive Summary

Apalachee Ridge Learning Center has an important commitment to the community and to its board of directors. This commitment is to provide the children and young adults of the surrounding community the tools and opportunities needed to succeed in today's technology based world. The IT project we are proposing is aligned with this mission. This project will enhance the learning environment which will in turn help the learning center maintain its commitment to the community.

To enhance the learning environment, we first need to stabilize the network to decrease downtime. By organizing the server closet and implementing a cable management system, we will reduce downtime and facilitate troubleshooting. The network documentation will help administrators create new accounts and set permissions. The documentation will also be helpful to future IT specialists. It will help them understand how the network is setup and will help in troubleshooting as well. Providing a central location for network storage will be a great tool for the center as well. It will allow the center to maintain and store all of the documents in one single location. All of these tasks are geared towards improving the learning centers influence on the community.

ARLC is a nonprofit organization which depends on funds from outside sources. The funds donated to the center need to be spent wisely. Funds spent to improving the center's facilities help them become more successful. This project will enhance the reliability and functionality of the learning environment which will help the center grow and become a bigger influence on the community.

Business Case

Apalachee Ridge Learning Center is hosted by The Community Neighborhood Renaissance Partnership and Apalachee Ridge Estates Neighborhood Association. The Learning Center was introduced in September 2002. A single family home in the Apalachee Ridge Estates Community was renovated to accommodate computers and a high speed internet connection. The center was built to provide after school activities and tutoring for children from ages 8 through 17. The center not only provides basic computer literacy for those who need it, but it also provides the opportunity for children to learn advanced techniques needed to succeed in web development, digital music, photography and video production. Technical computer skills will prove to be valuable assets in continuing education, and playing the job market.

Apalachee Ridge Learning Center is supported by funds, expertise and volunteers from their Partnership Board of Directors and many friends within the community. Members of the Partnership Board include: City of Tallahassee, Leon County Government, Leon County Schools, The United Way of the Big Bend, Florida A&M University, Tallahassee Community College, AmSouth Bank, Bank of America, Capital City Bank, The North Florida Fannie Mae Partnership Office, Apalachee Ridge Neighborhood Association and Providence Neighborhood Association.

Due to the limited and unreliable nature of its funding, the center is concerned that it is spending funds donated to the center on activities and services that improve the community and its youth. With this project, we will enhance the learning environment by providing shared network storage, cable management, network documentation and a reorganized server room. The shared network storage will provide the Learning Center with a central

location for storing files, including the large multimedia files which students produce when participating in the Digital Media Summer Camp. It will help manage the files used for projects within the center and will allow the center to backup all of these files from a central location. Storing these on the server would not be ideal because it would bog down the network. The cable management and reorganized server room will help stabilize the network and expedite troubleshooting which will increase uptime and reduce the need for technical support services. This project will enhance the learning environment, which will in turn improve the center's positive effects on the community.

Specifications and Requirements

- A. Shared Network Attached Storage Device
 - This is the hardware needed to install a NAS and to configure a mirrored backup drive.
 - a. Network-enabled 300-500GB external hard drive (NAS)
 - b. Second drive for mirroring

- B. Server Room Organization
 - These are the items needed to install a wall mounted patch panel and shelving in the server closet.
 - a. 4 x 4 sheet of plywood
 - b. Grey fire-retardant paint
 - c. 4" wood screws
 - d. Power drill and screw bits
 - e. Wall mounted patch panel
 - f. Mounting screws for both switches
 - g. Crimping tool
 - h. Punch down tool
 - i. Cable tester
 - j. RJ45 connectors
 - k. Shelving

- C. Replace Modem
 - If the modem was leased from Comcast, there is a chance that they will replace it with a more recent model.
 - a. Get in touch with Comcast to get a replacement

Project Objectives

To ensure that Apalachee Ridge Learning Center's network keeps running properly, a few improvements need to be made. First and foremost, a patch panel needs to be added to the server room. Currently all the wire from the wall jacks in the building are plugged directly into "hanging" switches, i.e. switches that are dangling by the wires that were plugged into them. This is a bad setup because if the input Ethernet cable was severed or yanked out, all the ports on the switch to go down. Thus means that half their network would be down until the cable is fixed. Our objective is to get funding for a 48-port wall mount patch panel. From there we will mount the panel on a new fire retardant piece of wood attached to the wall. This will not only create more space in the server room, but it will keep the switches and cables from being stepped on or pulled unplugged by students on accident. Preventing these problems will allow the network to be more stable. We will

consider this objective as 'preventative maintenance'. We estimate this objective should be completed by Wednesday, 27 June 2007 if not sooner.

Our next objective will be to properly document the network using a simplistic diagram. This diagram will be a maintenance measure, so that after our group finishes the project, then other IT students can come into the ARLC environment with a good diagram to start work immediately. This is important because it reduces the learning curve for the next team of students, and will save time. This also reduces duplicated effort. It is a simple task that only needs to be completed once, and can be updated if needed later. This objective will be completed Thursday, 5 July 2007.

After the network is running smoothly and documented, help files need to be created. These help files need to be easy to follow for the average technical user and without gaps or missing information. The help files will include, adding a new user to active directory, deleting a user from active directory, grant/suspend/disable permissions, and any other procedures that we determine are necessary for smooth functioning of the ARLC network. It is very important for these help files to be in a common file format, such as a simple web page, a PDF document, or both. Terrance McNeil, the supervisor of ARLC needs to have these tutorials available to him from the network as there will not always be IT students around to help him perform these routines. This objective will be completed by Wednesday, 11 July 2007.

Finally, there is a need to link the current network to the media center. Right now, they are separate. To fix the problem a file sharing server needs to be selected. The new NAS will need to have plenty storage space to handle large media files, and room to expand. The group has proposed a 300GB and a 500GB unit. Because the media production camp developed by ARLC is so popular and important to the kids, it is crucial to make the information system around the media production as hefty as possible. Once ARLC has more space then archives can be created for all media created at ARLC. If the proposal for a NAS is accepted, installation will commence as soon as possible. This task will be completed on Friday, 27 July 2007.

Critical Success Factors

Reduce the points of failure on the network by installing and configuring a patch panel. The new patch panel will save space and more importantly, will better protect the hard-wired connections from the server to client machines than the current 'hanging' installation. We will measure this objective after the summer class at ARLC begins to use the closet. If no cables are disconnected or switches knocked around, then the objective would be considered successfully completed.

Improving physical cable management is our second critical success factor. After the first objective is completed, new computers should be able to be added to the switch with ease. Currently there are many more drops than needed. All drops in the building are run to the server room, they are just not connected. We can measure this success factor by having an ARLC member simply use an ordinary patch cable and connect from the new patch panel to a switch port. If this can be completed properly, then our objective will be a success.

Because this project is only a semester long, it will be a critical success factor that documentation be developed of the actual network. This will ensure that the next group for next semester can start work promptly. Our way to measure this factor will be to have a

simple test. We could have one of the students in the project class come look over the network with our new diagram and make sure that they can understand and utilize it.

There is a need at ARLC for clear tutorials. Terrance needs to be able to complete simple tasks such as, adding users, deleting users, and editing permissions. It is critical that these tutorials have no gaps, i.e. the user of the tutorial needs to be guided 100% of the way and that they are readily available. The tutorials need to be one convenient location and in a common file format. This factor will be measured by Terrance's ability to use the tutorials.

Our final critical success factor is having the current media production room connected to a file server. All the multimedia files need to be centralized on a single drive. The workstations on the network are going to need access to this new drive. If the new products are purchased and installed, a critical success factor is that all workstations can access a community drive versus using flash drives and CDs to move data.

Constraints and Risks

The proposed improvement to the ARLC network and server room has several constraints that could limit the success of the project. The primary constraint is the approval of the project cost proposal to purchase the supplies needed to organize the server room and the network attached storage device. Time is another constraint that must be managed carefully. Since ARLC is an after school program, the network can't be worked on between the hours of 2pm-5pm Monday through Friday and will also depend on the availability of Terrance during after hours and weekends to allow access to work on organizing the server room. A proposal was recently submitted to ARLC for approval by the governing board. The proposal must be approved, purchase supplies and successfully implemented by the end of July in order for the project to be considered a success.

The project does face many risks in undertaking the reorganizing the current network infrastructure. The installation of the patch panel must be started and completed on the weekend in order to prevent interruption of service for the users of the ARLC network. If this process can't be completed between the end of business on Friday and the start of business on Monday, the users of the network will be disrupted.

The project is dependent on the approval of the project cost proposal for the purchase of the supplies needed to organize the server room. If the proposal is not approved, then at least purchase of the patch panel and the mounting bracket for the patch panel to accomplish the task of organizing wiring problem in the server room. Once the cabling is organized then the network can be diagramed and documented accordingly. The purchase of the network attached storage device is also dependent on the proposal being approved.

Assumptions

The anticipated benefits and risk that are assumed for the ARLC project are listed below.

1. Approval of the project proposal
 - a. If the proposal is accepted, we will then be able to start working on the ARLC improvements.

- b. If the proposal is rejected, we will need to reanalyze the resources available for the project.
2. Availability of team members and Terrance during after hours.
 - a. The network will not be available for maintenance between 2PM and 5PM.
 - b. Scheduling Terrance's time to allow access to the site.
3. Changing the wiring of the network by installing a patch panel.
 - a. This could severely impact the computers on the network if something went wrong.
 - b. Organizing the wires, installing a patch panel and mounting the switches on the wall will prevent accidental damage to the network.

Proposed Solution

When we first analyzed the ARLC network we noticed several problems with the server room. There was about 10 ft of cat5 cabling for about 40 network drops running from the ceiling to the switches that were sitting on the floor. Since this was the only locked room on the premises, any valuable equipment was being stored in the server room and was cluttering the floor. The solution we proposed was to organize the network wiring, install a patch panel and install shelving. Currently there is no documentation of the network or any supporting documents for adding a new user to active directory, deleting a user from active directory, grant/suspend/disable permissions, and troubleshooting the server. To solve this problem documentation will be created to help Terrance manage the network and the server's functions. Currently the media production files that are created by the students in the after school program are only stored on the local PC and are not backed up. To solve this problem we have proposed to install a network attached storage device with RAID 1 functionality. The device we have selected is the HP Media Vault external hard drive network storage solution with an additional hard drive to enable RAID 1 functionality to have the data mirrored to second drive.

Work Breakdown Schedule

Our group meetings will be held every week on Tuesdays for approximately thirty minutes. Meetings with our sponsor will commence once a week as well. Most sponsor meetings will be on Wednesdays. In this meeting we will discuss mainly progress, and also work through possible problems.

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Objective 1: Clean up the Main Distribution Facility.

- A proposal meeting will need to take place in order to get approved for these items: 110 Patch panel (48-port), RJ45 connectors (100 count), 4' x 4' piece of wood painted with gray fire retardant paint, screws, cable raceways, and a few feet of cat5 cable.
- Once the products are purchased the group will build a plan of attack for the objective. We will need to plan to work for a long period of time when no one is using the network. Once the plan has been written, work can begin.

- First the two switches will be unplugged from all cat5 cables. We will then need to install our gray fire retardant mounting piece of wood to the wall. The wood can be secured to the wall using screws.
- Once the wood is installed our new 110 patch (wall mount) needs to be secured. The wall mount will screw down to the gray wood. Once the mount is secure then the patch panel is designed to snap in.
- Next the cable will be attached to the wall using mounting strips and then excess cable needs to be cut off. When the cable is cut, 2 group members will start to make patch cables. The other group member will start to punch down all the cat5 cables onto the patch panel.
- Ideally there will need to be about 48 patch cables made. After the cables are made, and other cables punched down, it is time to mount the switches.
- The switches are flat and will mount flat on the gray mounting board. Once they are mounted up, the new patch cables will connect from the patch panel to the switches.
- In the process it will be important to make sure that we are observing the proper labels on all cables.
- Once all cables are mounted to the patch panel and switch we can secure the wires permanently. Testing will then take place to make sure that all host machines in the facility are able to communicate.

Objective 2: Network Diagram and Documentation

- We need to develop a Visio diagram of the network. The network is not terribly complicated and the diagram should be simple.
- The first task will be dedicated to document where the Internet comes into the building. From there the cables run to a wireless router, the Internet is split to a server and two switches.
- Visio will allow us to document all of the connections and boxes.
- Along with the diagram the need to create a word document that describes where the wires are ran into the building and other information such as configurations.

Objective 3: Network Tutorial Development

- The project sponsor is essentially the network administrator for the organization. It is very important for him to have clear tutorials to help him with everyday common tasks.
- To develop a list of tutorials, a meeting with Terrance (the project sponsor) needs to take place. We will need to sit down and ask him his normal functions on the network and develop other tasks he would like to know how to do.
- At this point we know a few simple tasks. The first one is adding users to the active directory. The steps for creating the tutorial are as follows:
 - Our documentation will be in HTML format. A template will be built to use for each tutorial. Our tutorials will help guide the users with many screen shots.
 - First, all of the steps will need to be developed on paper. Once the steps are made, then we will need to test the tutorials on people outside our group.
 - Once all the problems are fixed, then the HTML can be created adding in the screenshots.
- Finally, Terrance will use the tutorials to make sure that he can follow the steps.

Objective 4: Network Access Server

- Just the same with the patch panel task, our group needs to produce a proposal plan for the NAS. This plan will have two options. The first option is for a 500 GB NAS and the second option, is a 300 GB NAS.

- If the NAS gets approved then a plan will be developed to install and configure the new machine. Once again the network will need to be out of service in order to complete the work. This down time will probably take about 2-3 hours.
 - When an appropriate time is available, the NAS will be installed and configured. Once the NAS is operational, all the host machines will need to be mapped to the NAS. This might involve accessing each host individually, if we cannot get the file server to work properly.
 - If all the computers can see the NAS including the media center computer, we need to devise a plan for transferring the data from the media center to the NAS.
- If the money is available our group would love to start another objective that would entail getting appropriate backup drives for hard drive failure. Ultimately we are going for a RAID5 system.

Microsoft Project WBS

<http://2006.ispace.ci.fsu.edu/~bkv04/ARLC/ARLCv3.html>

<http://2006.ispace.ci.fsu.edu/~bkv04/ARLC/ARLCv3.mpp>

<http://2006.ispace.ci.fsu.edu/~bkv04/ARLC/ARLCv3.gif>

Summary Cost/Resource Estimate

MDF Organization Cost

To stabilize the network, the server room needs to be organized. Currently all the wiring for the building runs into a closet and plugs directly into switches which are laying on the floor. A 48-port wall mount patch panel would help organize the cables. To keep the cables off of the floor we will mount the panel on a fire retardant piece of $\frac{3}{4}$ " plywood attached to the wall. To complete this task, we will need to create new patch cables from the extra cable we cut off. To make the patch cables, we will need at least 80 RJ45 connectors. These patch cables will allow us to wire the patch panel to the switches. The group will have to make between 35-40 new patch cables. Since the server closet also doubles as a locked storage room, we will need to install shelving to provide room for equipment.

Network Storage Cost

There is a need to link the computers in the media center with the network to share files over the network. To allow users to access saved media across a network, a NAS needs to be installed. The NAS (**N**etwork **A**ttached **S**torage) will need to be large enough handle media files and provide room for future growth. With a NAS installed, users can have access to the network storage from any computer on the network. This will also ease the process of backing up all of the saved documents for the center as well. In our proposal, we will also include a second drive for the NAS. This second drive can be setup to mirror the main drive. This is an easy solution to back up all of the information for the center. This will insure that if one drive fails, nothing will be lost. We have proposed a 300GB and a 500GB unit. We suggest the 500GB option, but if funding will not allow for this option, the 300GB should be sufficient.

Labor Cost

For labor cost, we charge \$25 per hour per person working on the task. Since this is a non-profit organization, there will be no charge for labor. The MDF reorganization demands a total of 74 hours among all three members of our group. This involves the time taken purchasing, planning and the installation of equipment to complete the task. Network diagramming will take 24 hours between 2 members of our group. This involves tracing all cables coming to and from the MDF. We will document the network by drawing a diagram as well as labeling all of the cables. The help tutorials will need 37 hours between all 3 members of our group. This will involve the time taken to build and test the tutorials. The tutorials will be beneficial to administrators who would like to change security permissions or setup a new user account. The installation of a NAS will take 122 hours. This time will be spent by all three members of our group. This time will involve the time taken to research, purchase, plan and install the NAS unit. These labor hours are all estimates. The time taken for each task can vary more or less.

Equipment Cost

| Item | Project | Cost |
|----------------------------|--------------------------|----------|
| 48 port patch panel | Server Room Organization | \$149.00 |
| mounting bracket for panel | Server Room Organization | \$32.00 |
| RJ45 connectors (100) | Server Room Organization | \$25.00 |
| Shelving | Server Room Organization | \$65.97 |
| | Subtotal | \$271.97 |
| | Tax | \$20.398 |
| | Total | \$292.37 |

Option 1

| | | |
|--|-----------------------|----------|
| NAS Network-enabled storage 500GB | Network Storage 500GB | \$396.43 |
| Second drive for NAS for mirroring 500GB | Network Storage 500GB | \$165.92 |
| | Subtotal | \$562.35 |
| | Tax | \$42.176 |
| | Total | \$604.53 |

Option2

| | | |
|--|-----------------------|----------|
| NAS Network-enabled storage 300GB | Network Storage 300GB | \$299.98 |
| Second drive for NAS for mirroring 300GB | Network Storage 300GB | \$93.95 |
| | Subtotal | \$393.93 |
| | Tax | \$29.545 |
| | Total | \$423.47 |

Monitoring and Control

The ARLC project will be monitored and tracked weekly by updating the work breakdown schedule with the percent complete and actual times of the objectives. Given the nature of change request the process must be closely monitored, controlled and documented until the deadline for change request. The deadline will be Sunday July 1, 2007. The following Tuesday an agreement will be signed denoting the closure of change request period. The project sponsor will receive a final copy of the project plan to review and sign off on before the agreement can be signed. It is important to close the change request period in order to prevent any negative consequences to the scope of the project to ensure that the proposed project time frame will be completed on time. The project will be monitored by achieving the critical success factors within the proposed time frame in the work breakdown schedule for each objective. If an objective is not successful by the designated completion date, the objective will be reanalyzed. A solution will be proposed to resolve the conflict before the project closeout.

Project Communication Plan

| Recipient(s) | Communication Type | Delivery Method | Producer/Coordinator | Due/Frequency |
|--------------|---|---|--|---|
| Team | Meeting, before class to discuss overall project status | Group Meeting | Valentine, Bryan | Every Tuesday, 15 Min before class at 10:45AM |
| Team | Weekly Status Report on overall project | Email link to blog, include additional commentary as needed | Valentine, Bryan Team Assignment: Weekly Rotation | Saturday 8:00PM |
| Team | Draft of Project Plan and Presentation Materials | Email latest draft(s) of materials to team with track changes enabled | Valentine, Bryan Team Assignment: Weekly Rotation | Saturday 10:00PM |

Project Stakeholders:

| Name and Position | Organization | Email | Phone | Schedule |
|-----------------------------------|--------------|--|--------------|--|
| Castano, Jonathan Lead Contact | FSU | JPC05@fsu.edu | 850.445.5643 | MTRF – after 5:30pm W – after 11:00am |

| | | | | |
|---------------------------------------|-----|--|--------------|---|
| | | | | SS – anytime |
| Davenport, William, Technical Lead | FSU | WRD06@fsu.edu | 850.294.7420 | Schedule: SMWFS – anytime TR – after 1:00pm till 3:30pm; after 6:00pm |
| Valentine, Bryan, Coordinator | FSU | BKV04@fsu.edu | 904.651.9688 | MWF – after 4:30pm TR – after 5:00pm SS – anytime |