

Information Technology
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Abstract

The Information Technology (IT) team, one of eleven teams this summer, can be seen as the infrastructure of DEVELOP. The team provides the computer resources required to complete daily projects. As well as providing technical support, one of the objectives includes installing hardware for the new gigabit internal network. This network will increase the speed and decrease the time it takes to transfer files from one computer to another; as well as, aid in sharing information and ideas from one team to another.

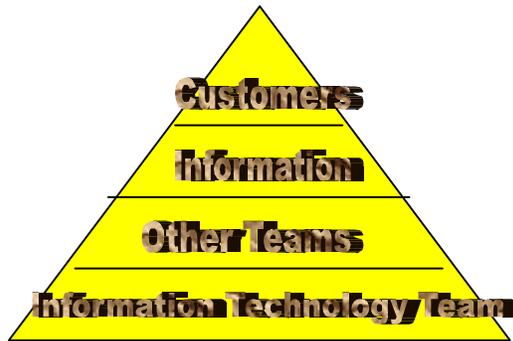
The IT team has built and installed eleven new computers to better assist teams throughout DEVELOP. These computers provide faster service, thus making it easier to obtain, implement, and further project research. In addition, a server will be installed for the entire internal network, which will provide floating profiles.

Another project of the IT team is Computers for Schools. With this project, students collect and refurbish government excess computers, and deliver computer labs to Title 1 and Empowerment Zone schools. These are schools in which 50% or more of their students receive free or reduced price lunches. To date, over 500 computers have been delivered to 23 labs in 8 states.

One other task that the IT team is currently working is an IT instructional web page. Since DEVELOP uses a vast amount of software and hardware, the IT team decided to create a web page that will give instructions on how to build and install all hardware and software that the IT team uses. The website will include step-by-step instructions along with pictures to guide students. This will be very convenient for future students and IT members.

The Information Technology team is a vital resource to DEVELOP, and is fundamental to the operation and success of the DEVELOP program.

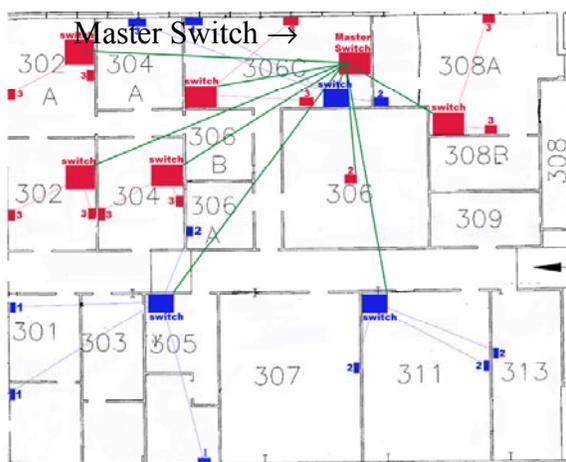
DEVELOP is a student run, student led program. Students construct practical applications of NASA Earth Science measurements and predictions that address local policy issues. They work with state, local and tribal governments, industry, non-profit organizations, and Federal agencies in order to attract long-term technology and education benefits to the community. DEVELOP encourages applications from high school through graduate level students with strong interest in science, technology and policy.



This summer, DEVELOP consisted of 11 teams. These teams researched community issues from Virginia Homeland Security to Oklahoma Disaster Management. The Information Technology (IT) team can be seen as the infrastructure for DEVELOP. The Team's goal is to provide DEVELOP with the necessary computer resources needed to complete their projects.

One of the IT team projects was the Gigabit Internal Network. The network was linked through a server machine. The server was a custom built computer, run using Windows 2000 Server, with over 300 gigabits of hard drive and will be used to organize data and to provide floating profiles. The server only has a certain number of clients that can be connected to it at a time. Through the external drive, which will be explained later, one will be about to link up to the server, but he or she usually forgets to disconnect from it. If too many people leave their computer hooked up to the server, then it will reject any additional users from linked to it. Unfortunately, there are more computers at DEVELOP than the server can hold. To solve this problem, the team internally networked the server via a switch. A switch is a device that opens a path when being used, and closes that path once it is not in use. It will control the amount of users linked up to the server.

To utilize the network, the team first had to setup the server machine. After setting up the server, the team had to install a master gigabit switch and additional



switches in almost every room. The switches were connected to the master switch by CAT6 Ethernet wires assembled by the team. The layout of DEVELOP's Internal Network is shown to the left. The red boxes and numbers represent 1.0Gbps and the blue boxes and numbers represent 100bps. There are three purposes of the Internal Network: 1) to have an organized, centralized file structure; 2) to have individual floating profiles; and 3) to have a faster, more efficient file transfer network.

NASA's satellites are used at DEVELOP to collect and gather information for research projects. One problem that DEVELOP teams experienced was that most of the teams used the same satellite data or information but were unable to determine what

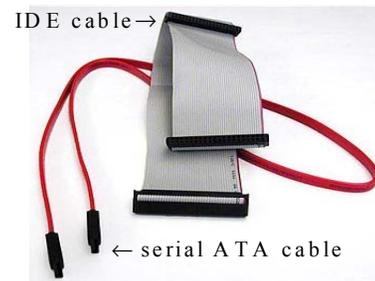
information had already been acquired. The IT team created a server to solve this problem. Each team is connected to the server and has his or her own folder. All teams access various contents of the other team's folders through this server. There will also be a public data folder available through the server, wherein data can be organized by type. For example, if one team gathers information from an ASOS satellite, and another team needs the same data, the teams can share the ASOS data folder to see what information the other teams have gathered. The IT team believes that the organized data folder on the server will help every team to collaborate and work together as a whole, thereby reducing redundancy of effort.

The IT team will provide each DEVELOP student with a private profile. This profile will contain the student's login name and password, and a place to store their personal system settings. There will be a dynamic amount of memory allocated to each student for his or her profile. These profiles will be stored on the server and distributed on the internal network. The profiles will be categorized into three user groups: students, managers and IT administration. All categories will have certain permissions and restrictions based on their user needs. This will make the network more secure against system changes.

Additionally, the internal network will also make transferring files much faster. A 500-megabit file that once took about 20 minutes to transfer from one computer to another can now be transferred in about 20 seconds. This will make the teamwork more efficient, and students will not have to wait for long periods of time for file transfers. The internal network will also relieve the clutter on the LaRC's external network and speed up DEVELOP's Internet connection.

DEVELOP was able to purchase 11 Antec computer systems. The IT team then built these computers from a bare bone assembly. With a bare bone assembly, only the motherboard and RAM was installed. Because of this, the IT team had the advantage of installing hard drives, CD-ROM and DVD-ROM drives, video cards and network cards. Installing the hardware on the computers was very useful in helping first-year IT members learn about the interior of computers.

An advantage that the new computers have over the older computers is the fact that they were build using serial ATA cables instead of IDE cables. Serial ATA cables are scalable and will allow future enhancements to the computing platform. The cables are also compatible with today's general users, are simple to route and install and are an upgrade from IDE cables.

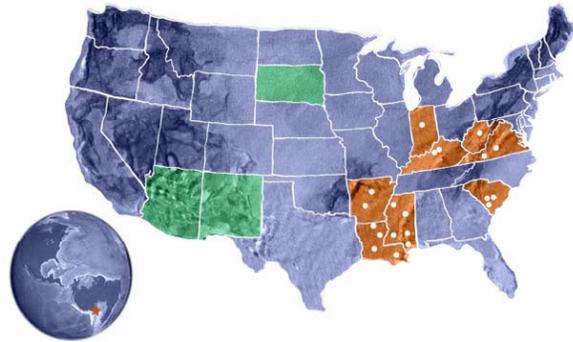


One other task that the IT team is currently working is an IT instructional web page. Since DEVELOP uses a vast amount of software and hardware, the IT team decided to create a web page that will give instruction on how to build and install all hardware and software that the IT team uses. This will be very convenient for future IT members. The website will include step-by-step instructions along with pictures to guide students. It will be categorized by the name of the software or the type of the hardware. Students can click on any category they need and then read instructions on building or installing simply by clicking on to it.

An on-going project at DEVELOP is repairing and fixing computers. Whether a printer is jammed or a PC is malfunctioning, the IT team makes sure that each computer device is functioning properly. Because the team is comprised of student technicians, trial and error testing is the most used skill for identifying the problems with faulty computers. As far as the computers being used, the IT team makes sure that each computer is running at moderate, if not high, speed. The team also receives excess government computers from NASA's warehouse to repair and distribute to the DEVELOP teams. Every computer and item is tested and made useable by the IT team.

The network and individual computer security at LaRC was a primary concern for the IT team. The team installs Symantec Antivirus Corporate Edition to ensure security of each computer. This software is able to scan files and drives, and detect and repair any virus that a computer may have. The software is automatically updated through the external server. The fewer viruses there are, the more effectively students will be able to work.

Another project of the IT team is Computers For School. Computers for School is an on-going DEVELOP project in which excess government computers are collected, repaired and distributed to Title 1 and Empowerment Zone schools. These are schools that have more than 50% of the student population are eligible to receive free or reduced price lunches. As shown by the graph to the right, the team has delivered over 500 computers to 23 labs in 8 states, and 1 international country.



In the future, the IT team plans to upgrade and improve technology throughout DEVELOP. This will include the continuation the enhancement of the internal network by organizing the wires and adding more drops, if necessary, to each room. In addition, another server will be implemented, running Window 2003 Server, which will be used for storing the floating profiles. Fall 2004 is when the Windows 2003 Server plans to be fully executed. The IT team will also continue to construct the IT instructional website. The website will be as simple and understandable as possible. Moreover, they will continue providing technical support to all computers. In order to make these computers more compatible, the IT team will update all software when needed, as well as, install up-to-date hardware and software.

The IT team worked extremely hard and put in extra effort on all of their projects. Teamwork was one of the team's many strengths. This team put together ideas to create new ways to help and improve DEVELOP. They collaborated on outlining the IT website to make it more understandable to future students and IT members. They also worked together to assist DEVELOP with necessary technical support. The IT team believes that learning is more fundamental when working together as a team.

Michelle Chesson
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Project Summary

My summer at DEVELOP has been extremely worthwhile. The supervisors and directors were very understanding and always available. They made the DEVELOP environment very comfortable to work in. When working at DEVELOP, you really understand the definition of teamwork. Moreover, although we were separated into different teams, we still worked together as one large team. In all actuality, we were more than a team - we were a family. Working on the IT team was very exciting and beneficial. My team manager, Mr. Brian Link, was extremely helpful when it came to teaching me about the ins and outs of IT. He explained things to me in an uncomplicated manner, thus making it easier for me to work more effectively.

I came into the IT team knowing very little, but learned a vast amount of expedient information over the summer. I felt like a giant sponge, soaking up any information that I could get. I learned everything from making Ethernet and telephone cable cords to setting up an internal network. The most useful information that I gained knowledge of and that I feel I will need to know for my major at Old Dominion University, is setting up a PC. While setting up the new computers, I learned almost everything about the internal hardware, including the purposes for each device installed. Information that I learned previously in school enabled me to better understand things while working on the IT team. PC's consist of components that I used and learned about at school and this ranged from circuit boards to chips. For example, the motherboard in a PC is equipped with resistors, transmitters, capacitors, and inductors. I learned in some of my engineering classes about these electronics. Based on my summer experience, I will have a better understanding of things that I am being taught at school. Because I have experienced this internship, I can take elective courses that are related to my field and do so with more confidence.

On the IT team, we always work together to complete tasks. For instance, while completing inventory, we came together and decided that we should assign ourselves different rooms. After doing inventory of our assigned rooms, we report to one of our other members so that the information can be stored in our inventory database. Another task that we worked together on was the internal network. We all worked together in making the Ethernet cable cords and installing the drop boxes and hooking up the network. This was a very electrifying learning experience that I will always remember.

The most exciting thing about this internship was working hands-on. In some technological courses at school, students learn by lecture. However, when working hands-on, you are able to perform the task physically, which enhances you mentally. When I thought about an intern, the first thing that came to mind was paper work. I thought I was going to be in an office performing secretarial functions. Now, I have a completely different insight on interns. This program has really helped to prepare me for the future. I always had an idea of what I hoped to achieve in the future. Now I am certain about my career choice.

The weekly lectures that we attended were also very interesting. We learned about some of NASA's goal relevant to future technology and space missions. Mr. Dennis M.

Bushnell gave the most interesting lecture. He talked about how technology will take over the future by the year 2025. He spoke of how future technology will do such things as grow plants themselves. I was able to attend a Graduate School Seminar that encouraged students to continue their education into graduate school. The speakers addressed many programs that NASA and other organizations funded such as the Graduate Student Researchers Program (GSRP) and the Harriet G. Jenkins Pre-doctoral Fellowship Program.

Working through LARSS and DEVELOP, was an experience that I felt honored to have been a participant, and I would recommend it to all science, engineering, mathematics and management students. You learn not only things pertaining to your major, but you are exposed to many exciting things related to other fields of study. If given this opportunity again, I would accept it wholeheartedly.