AC 2007-1013: KATRINA – AN INTERNSHIP OPPORTUNITY

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Katrina - An Internship Opportunity

Abstract

Hurricane Katrina has been identified as one of the costliest and deadliest natural disasters in recent United States (U.S.) history. On August 29, 2005 the Gulf Coast from southeastern Louisiana to the panhandle of northern Florida devastatingly changed in less than 24 hours. The most significant damage occurred along the Mississippi coast. The resulting storm surge caused catastrophic damage to commercial and residential dwellings, electrical and gas utilities, water and sewer utilities, highway infrastructures as well as telecommunications infrastructures.

The lack of any communications proved to be a desperate need for everyone. In response to this need, a volunteer organization known as RadioResponse.org was developed. In addition to volunteers, telecommunication companies donated many different types of equipment to support the effort. Initially, the organization was staffed by communication specialists from around the country to design, build, and deploy a Wireless Internet Service Provider (WISP) network in the most severely impacted area, Hancock County, Mississippi. Once the WISP was established, the volunteers left the area, but a continuing need occurred to maintain and expand the WISP network. A request from the Hancock County civil defense for technical support allowed students at a local university's Information Technology program to fulfill the program's internship requirements as well as provide a greatly needed public service.

It is anticipated that the information presented in this paper evidences the importance of inter-agency collaboration. Furthermore, this paper provides a perspective on the implementation of an internship program and suggests modifications to the internship requirements to respond to catastrophic events in local areas. Therefore, the content of this paper could be used as an educational experience for students and professionals that are trying to integrate internship experiences into an undergraduate curriculum.

Overview of the Unprecedented Storm

Hurricane Katrina stormed onto the Mississippi Gulf Coast on August 29, 2005 causing severe damage across all of south Mississippi and portions of Alabama and Louisiana. While most people associate Hurricane Katrina with the decimation of New Orleans, the city was not destroyed by a direct hit from Hurricane Katrina; instead, the city was impacted by high water from Lake Pontchartrain breaking the levees that surround the city. Katrina made its way on shore in the early morning hours at the twin coastal cities of Waveland and Bay St. Louis, Mississippi. It lashed the shores with winds and waves for more than 6 hours. At an overpass of Interstate-10, more than 6 miles inland, waterlines reached 20 feet above sea level. In the Gulfport, Mississippi harbor, containers from moored ships road the crest of waves and slammed into everything in their path. The off-shore casinos of Biloxi which once resided just a few feet over the gulf were deposited in the middle of nearby thoroughfares.

After the storm, governors, congressional delegations, FEMA and The President were assailed for their failure to respond to the needs of citizens in the affected areas. FEMA was, and still is,

singled out for its poor performance. The citizens of south Mississippi were without food and water for several days because FEMA staging areas were located in other states.

Public services were nearly non-existent immediately after the storm. Mississippi public service infrastructure south of Interstate 20 (over 150 miles inland) was disrupted for an extended period of time. As shown in Figure 1, approximately one-third of the Mississippi network was down after Katrina's landfall which was significantly higher than any other state impacted by Katrina.

The loss of electric power to a major petroleum distribution pipeline, over 100 miles inland, resulted in a national gasoline shortage for the eastern United States. The gasoline shortage remained for several weeks after the storm until supplies were restored to normal levels. The combination of Hurricanes Katrina and Rita, a few weeks later, damaged over 70% of offshore petroleum services which created a major price increase to fuel oils and natural gas supplies. It would be over 15 months before prices returned to pre-Katrina levels.

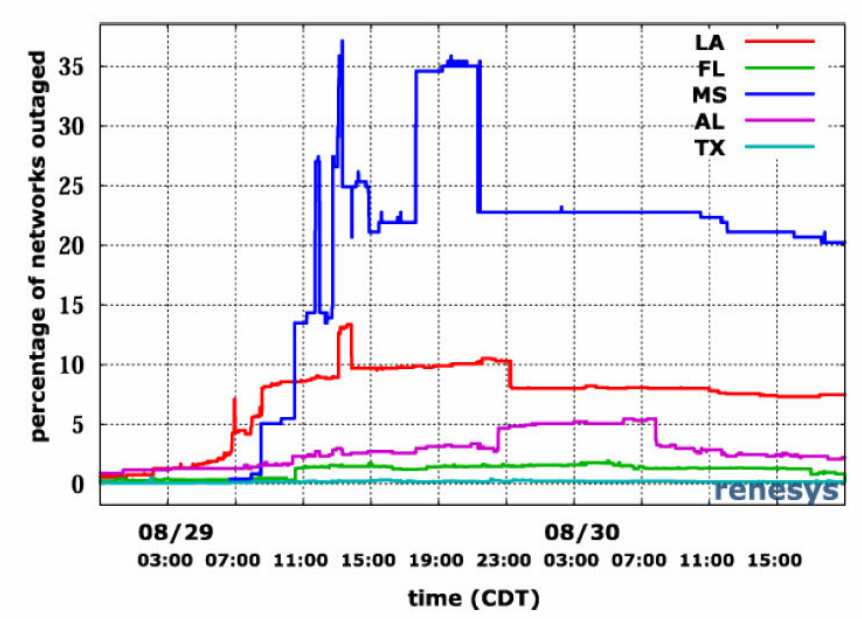


Figure 1. Percentage of Network Outage after Katrina's Landfall[1]

Response to the Affected Area

From across the U. S. volunteers traveled to affected areas such as Waveland and Bay St. Louis, Mississippi and recognized the numerous critical needs such as communication services. As volunteers arrived in the Waveland and Bay St. Louis area, they began setting up camps in any open area such as ballparks, campgrounds or parking lots. Volunteers assisted with debris clean up, repairs, social services and soup kitchens. These volunteers needed to contact their families and host organizations. Residents needed to contact FEMA for assistance with their losses. FEMA requested that residents contact the agency through their website by completing an online application. This notification process was necessary because FEMA 800 telephone numbers

were overloaded. Unfortunately, FEMA failed to realize that affected areas had no communications services to complete an online application.

One of the volunteers that arrived in the Waveland and Bay St. Louis area was a Wireless Internet Service Provider (WISP) from Rayville, Louisiana. This person established an Internet support organization called RadioResponse.org. RadioResponse.org focused on relieving the communication blackout in Waveland and Bay St. Louis. RadioResponse.org contacted the Wireless Internet Service Providers Association (WISPA) and other professionals about installing a WISP in the Waveland and Bay St. Louis area.[2] Many different companies responded to the request with hardware, software, and personnel. Companies such as Cisco, Tranzeo, Trango, and many others provided hardware and software. More importantly, MCI provided a free Internet Backbone.

Wireless experts from around the country arrived to help build the network in Waveland and Bay St. Louis. The network signal began at the MCI office in Gulfport and was "fed" to a distribution tower managed by a local utility, Mississippi Power Company. The signal was then directed to the city water tower in Bay St. Louis. From the water tower the signal was distributed to tree tops, tents, buildings and other water towers. It is important to highlight that in the affected area, anything that could be used to complete a communications link was evaluated. The wireless experts wanted to complete the project as quickly as possible so that some order could be re-established.

As the local backbone network developed, the plan was to add a subscriber network that provided Voice over IP (VoIP) phone services and computer workstation sites for residents and volunteers to utilize. Subscriber locations included churches, cafes, a FEMA trailer park, a micro brewery, a sewage treatment plant, and most volunteer tent cities. Within many of these sites, local LAN networks were created so that workstation, printers, and VoIP phones could be connected.

Internship Opportunity

As the communications backbone developed, wireless experts would leave after spending a short time, 1-2 weeks, in the affected area. Other wireless experts would arrive, but in all circumstances, their time was limited. Local civil defense authorities realized that other personnel would be required to maintain and expand the established communications backbone. The request for assistance reached the Information Technology (IT) program of a local university.

The IT program requires a capstone experience for all graduates. The capstone experience can either be a design project or an industry internship. The industry internship was created in response to the information technology students' needs for hands-on experience. This internship program allows students to become knowledgeable of the components and processes in the industry. These experiences provide a way for students to understand the corporate environment, to make immediate contributions to the organization and reduce training time in the initial year of employment. Students have the opportunity to apply their expertise and to develop new ones in preparation to enter the workforce. Table 1 provides a sample of common work assignments

that students could experience during an internship. The internship program is organized around two components: (1) Internship application and (2) Internship.

Networking
Desktop Support
Routing and Switching
Web Animations
Network Design
Network Administration
Server Administration
Programming
Java
C & C++
Visual Basic
HTML
ASP/SQL
PHP/MySQL

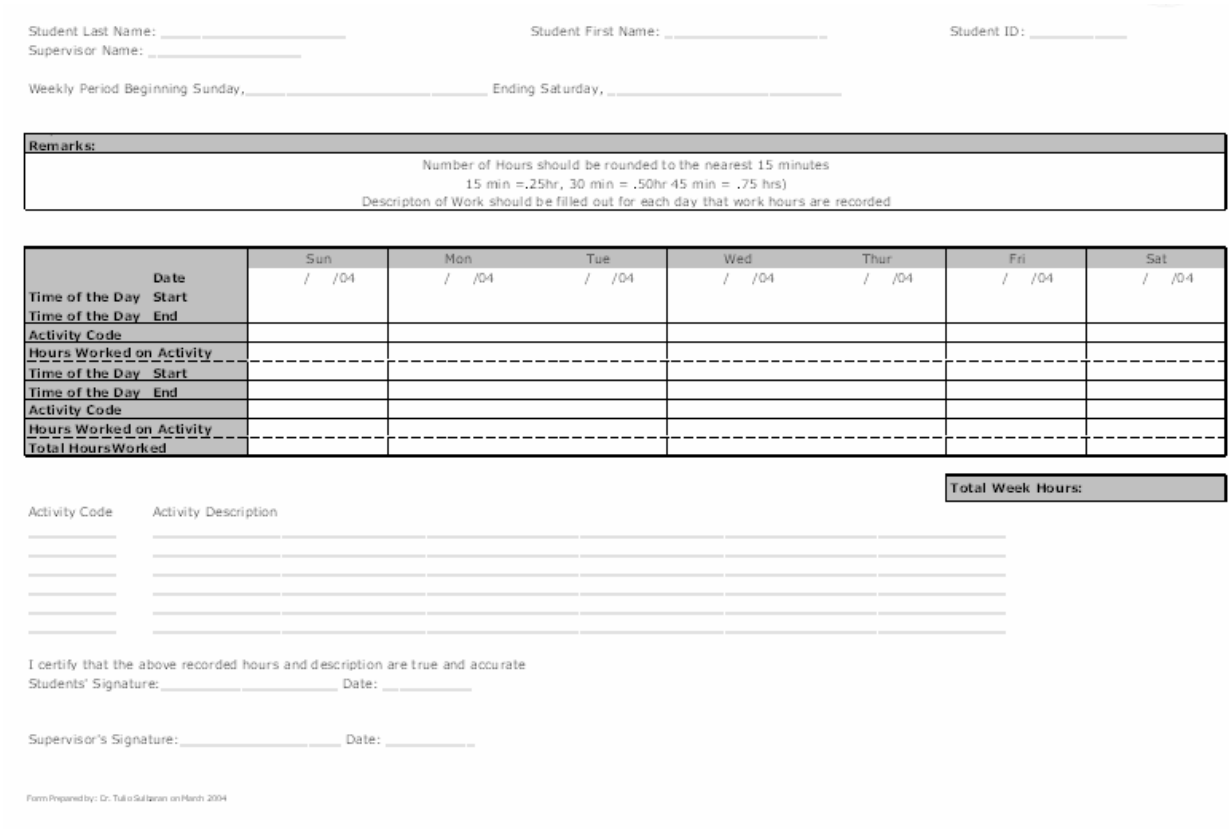
Table 1. Common areas of Information Technology Student Work

1- Internship Application
During the application for the internship position, the student is requested to submit by e-mail the following information:

1- Detailed technical strengths
2- Detailed technical areas of improvement
3- Description of their possible contribution to host organization
4- Schedule of available hours

Based on the information provided by the student, the faculty responsible for the internship analyzes the potential contribution of the student to the organization, and the potential benefit to the student. Based on the potential benefit to the student and host organization, the faculty will determine if the internship application will be approved for academic credit.

2- Internship
An internship usually begins with the student establishing a work schedule for the semester and obtaining the host company's regulations/policies and expectations. Internship students are expected to log a minimum of 300 clock hours during the semester. The student work schedule is mainly based on the student's availability and company needs. The student is responsible for completing a weekly timesheet shown in Figure 2. This timesheet not only tracks the hours completed, but it also permits tracking of activities performed. A student is allowed to work extra-hours (without prior approval) based upon host company deadlines. It is envisioned that this type of hands-on experience will allow the students to gain some insight into the information technology profession.[4] At the end of the internship, students must prepare a 5000 word paper describing their internship followed by a formal presentation about their internship to the IT program faculty.



Student Last Name: _____ Student First Name: _____ Student ID: _____
Supervisor Name: _____

Weekly Period Beginning Sunday,_____ Ending Saturday, _____

Remarks:
Number of Hours should be rounded to the nearest 15 minutes 15 min =.25hr, 30 min = .50hr 45 min = .75 hrs) Descripton of Work should be filled out for each day that work hours are recorded

	Sun	Mon	Tue	Wed	Thur	Fri	Sat
Date	/ /04	/ /04	/ /04	/ /04	/ /04	/ /04	/ /04
Time of the Day Start							
Time of the Day End							
Activity Code							
Hours Worked on Activity							
Time of the Day Start							
Time of the Day End							
Activity Code							
Hours Worked on Activity							
Total HoursWorked							

Total Week Hours:

Activity Code Activity Description

I certify that the above recorded hours and description are true and accurate
Students' Signature:_____ Date: _____

Supervisor's Signature:_____ Date: _____

Form Prepared by: Dr. Tulio Sulbaran on March 2004

Figure 2. Internship Timesheet

Modification of the Internship Program

IT program faculty determined that the industry internship could be modified to allow students to satisfy the capstone experience. Under normal conditions, students enrolled in the internship are required to have an onsite supervisor to monitor their activity. Because of the lack of local experts, students that would assist with the communications backbone would operate without onsite supervision. One RadioResponse.org member agreed to serve as the 'student' onsite supervisor; however, he could only visit the affected area occasionally. He was able to provide remote technical support as problems arose.

Initially, the only modification to the traditional internship was the exception of the onsite supervisor, all other course requirements such as: 300 clock hours of approved work, maintaining a log of daily activities, submitting a 5000 word paper describing their internship and making a formal presentation about their internship to the IT faculty were retained. One additional modification was approved by IT program faculty to support an interested student, Intern 1. This additional modification required waiving the completion of the 300 clock hours in one semester.

Intern 1 expressed interest in the modified internship opportunity; however, he could only work weekends because of last semester graduation requirements at the local university. Even though

Intern 1 had a strong networking background, he did not realize that the experience would be a life changing enterprise. Upon completing classes each Friday, Intern 1 would make the 90 mile drive to the impacted area. For the next four months, the only support he received was a place to sleep and food. With coursework in LAN/WAN networks, Intern 1 had to learn on the job about "true" wireless networks. The remaining wireless volunteers knew that Intern 1 was a rookie, but they treated him as a regular member of the support team. Often their work continued well into the night. This rapid exposure to the construction and configuration process allowed Intern 1 to learn the network very quickly.

Most wireless volunteers had left the Waveland and Bay St. Louis by October 2005. As the wireless volunteers left so did the first-hand knowledge of the communications backbone. Eventually, the only expert available to Intern 1 was the 'student' onsite supervisor located in Rayville, Louisiana. Ultimately, Intern 1 became responsible for maintaining the entire network. This included the backbone from MCI and all local LANs with workstations, printers, VoIP phones, routers, switches, and radios. Intern 1 not only kept the network up, but he exceeded everyone's expectations.

Internship Continued

In December 2006, Intern 1 delivered his formal presentation. What was expected to be about 10 minute, presentation captivated those present for over 30 minutes. The experiences he described awed everyone. It was difficult to believe what he had accomplished! Members of the IT program faculty decided this service did not need to end because of his graduation. After meetings with Intern 1 and the student 'onsite' supervisor, the IT program faculty established another internship to continue this valuable work.

The new intern, Intern 2, was also a graduating senior. Intern 2 was excited about becoming involved. He talked with the previous intern and studied the notes, diagrams, and a Wiki created for network developers to communicate. Since Intern 2 was not there as the network was developed, he had to rely on the student 'onsite' supervisor when the reference notes didn't supply all the answers. These calls were often at night and usually on weekends. Intern 2 worked very hard to learn the network and be helpful to the people that depended on him. By January 2006 when he began, most of his clients were volunteers and volunteer organizations. What these two networking interns accomplished is very noteworthy indeed. They made a difference, not just to themselves, but for the people of the stricken Waveland and Bay St. Louis area.

Concluding Remarks

The RadioResponse.org website is a BLOG.[5] It contains a running log of events and notes. It provides very interesting reading about how the communications backbone unfolded. Below is an excerpt from the BLOG that may give a flavor to the activities of the project. The story as told only relays a fraction of the events that occurred. Both interns are left with wonderful stories to tell of their experiences building a support network for the people of Waveland and Bay St. Louis, Mississippi.

> Intern 1's Last Weekend: "… I heard that Morrel has gone down again … As soon as I got there … they have cut my wire again. … they have cut it to the point of no repair …suggested that we run the wire through the air to avoid any more confrontations with the backhoes … they will not be bringing semi trucks through [again]… After we got it working … To my surprise, they have moved the computers … The rest of the day was spent setting the computer lab back up …"[6]

It is difficult for anyone to understand the long term impact of any natural disaster; however, in January, 2007 over 70,000 Mississippi residents remained in FEMA housing with over 32,000 housed in FEMA trailers. Home loans must continue to be paid for vacant lots, or individuals will lose them. Many individuals are facing bankruptcy. Housing insurance, if available, increased 90-300 percent for Mississippi coastal residents. Many home insurance claims were not allowed because individuals did not have flood coverage. With no local tax base in the affected area, city employees were not paid. The majority of volunteers were provided by private nonprofit groups or religious organizations.

Interns of the IT program are requested to include a statement of lessons learned from their internship in their report. Likewise, the authors have some observations and new insights from this project. Specifically, one cannot truly understand what a student is capable of achieving from a classroom situation. We seldom can see the human spirit. Sometimes we hear of students' successes after graduation and wonder, "Were they really capable of accomplishing that?" It is the authors' belief that when a challenge is presented and a desire is invoked unexpected results can be attained.

Acknowledgements

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