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Hazards and Hurricanes: Hallmarks of IT Readiness, Response, and Recovery

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Overview

The pessimist complains about the wind; the optimist expects it to change; the realist adjusts the sails.

—William Arthur Ward

Asteroids...cyber attacks...earthquakes...fires...floods...hurricanes...mudslides...murders...nuclear meltdowns...pandemics...pathogens...power failures...terrorist attacks...tornadoes...

Are campuses and information technology (IT) prepared?

Believe it or not, this research bulletin is not about disasters. Rather, we are taking a page from the Louisiana State University (LSU) response to Hurricane Gustav in September 2008 to illustrate the fortitude of an institution that has built a campus environment based on a culture of safety, security, and trust—especially in times of crisis. The bulletin also illustrates the power of planning, openness, communication, teamwork, training, attention to detail, focus, practice, and leadership. And it underscores that in times of high winds, complaints and unrealistic expectations are far less helpful than the willingness to definitively adjust the sails.

Hurricane Gustav hit Baton Rouge on Labor Day, Monday, September 1, 2008, one week after fall semester classes had begun. Interestingly, as soon as it became clear that the path of Gustav would spare New Orleans from devastation similar to the horrific aftermath of Hurricane Katrina in 2005, the media seemed to turn its attention away from the storm. On the heels of the Democratic National Convention in Denver a week earlier, the Republican National Convention was in full swing in Minneapolis-Saint Paul. The political landscape was very active. As a result, there has been relatively little media coverage of Gustav, which is estimated to be the fourth most destructive hurricane in U.S. history and the most destructive in Baton Rouge history.

Because it was Labor Day, LSU classes were not in session. Long before the effects of the storm could be fully assessed, LSU leaders decided to extend the Labor Day holiday through Tuesday, September 2. (At 9:00 p.m. on September 2, LSU announced that the campus would remain closed through Friday, September 5.) Leaders did not then know that damage to the city would be so extensive that even 10 days after the storm hit, 45% of the city of Baton Rouge would remain without power.

This bulletin is based on an EDUCAUSE Center for Applied Research (ECAR) interview with LSU Deputy CIO and Executive Director of User Support and Student IT Enablement Melody Childs. When LSU's vice chancellor for information technology and CIO was out of town during Hurricane Gustav, Childs led the central IT department efforts for the institution. ECAR is most grateful that Childs took time to talk with us during the busy period immediately following the storm.

Highlights of Hazards and Hurricanes

ECAR: *When and how did LSU begin preparing for Hurricane Gustav?*

Melody Childs: There are really two answers to this question. In a very real sense, LSU started preparing for Gustav immediately after Hurricanes Katrina and Rita in 2005. During Katrina, LSU unexpectedly became the primary medical triage center and shelter for Louisiana citizens impacted by Katrina. Soon after Katrina and Rita, LSU established an Emergency Operations Center (EOC) that could be quickly activated and staffed 24 x 7 in the event of an emergency. The EOC established a set of protocols and procedures to guide emergency response and related activities. As at many other universities, the April 2007 tragedy at Virginia Tech further strengthened our resolve to be both more proactive and responsive in the face of any sort of crisis that might impact the campus community. We adopted additional forms of communication including text messaging and established more redundancy in existing communications infrastructure. Over 24,000 individuals are currently enrolled in our emergency text messaging program.

In the specific case of Hurricane Gustav, as soon as it became clear that Gustav was headed for Louisiana, the EOC was activated and many well-documented procedures were set into motion. The EOC formally began monitoring the storm on Wednesday, August 27, and we posted messages reminding the campus community to consult LSU's campus safety and health resources website¹ for our hurricane preparation checklist and hurricane response plan. As early as Thursday, August 28, IT staff began installing emergency telephones, voicemail, data, and wireless connectivity in the athletic assembly and field house, which were to be used as a medical special-needs shelter. Patients were evacuated from south Louisiana parishes well in advance of the storm. By the time the hurricane actually hit Baton Rouge, over 800 patients, along with social workers and a full complement of medical personnel, were safely housed in campus facilities with ample food, water, emergency power, and multiple modes of communications capabilities. Of course, little did we know then that Baton Rouge would be among the cities hardest hit by the hurricane.

ECAR: *Common challenges for creating a safe campus and well-executed responses to emergencies often relate to finding ways to establish openness and break down "siloed" responsibilities across campus. Given its experience with past hurricanes including Katrina, how would you assess LSU's success with breaking down silos?*

Childs: Happily, there seems to be an emergency-response frame of mind that kicks in when disaster strikes. It's almost as if people begin focusing very acutely on the highest imperatives—protecting our students, saving lives, taking care of people with special needs, safeguarding property, and making decisions for the common good. In terms of priorities, our first concern is for the welfare of our students, so when city power goes out, for example, the campus ensures that emergency power is first provided to campus residences and then to research labs that house animals. We always focus our efforts on the institution's ultimate goal: to return to a state of normalcy, including the resumption of classes in session. We are well aware that the best support we can offer

our community is to give them a way to return to “normal life.” Over the years we have developed superb working relationships across schools and departments, and people who might disagree during “normal” times simply work together seamlessly during an emergency. We learn a great deal during times of emergency—mostly about how much we can rely on one another, and about how much we really do trust one another to do the right thing.

ECAR: *It is clear that the administrative units of LSU are focusing heavy attention on emergency preparedness. Are there any parallel activities on the academic side?*

Childs: Most definitely—yes. Bruce Sharky, a landscape architecture professor at LSU, focuses his research on natural systems to reduce storm impact, such as marsh areas, wetlands, and breakwater systems. With the approach of the third anniversary of Hurricanes Katrina and Rita, Professor Sharky took 15 of his students to the Netherlands to study how the Dutch deal with flooding and storm surges caused by wind. The Dutch are well known for innovative systems that can help counteract the impact of storm surges, which are, in fact, one of the major devastating results of some hurricanes.²

LSU Students Visit the Netherlands for Flood Control Education, August 2008



Photo courtesy of Bruce Sharky; used with permission.

ECAR: *Many colleges and universities have, or have plans to establish, an EOC. Can you describe how the EOC at LSU is organized and what services it performs?*

Childs: Organizationally, the EOC comprises members representing a broad spectrum of the university: representatives from facility services, finance and administrative services, the campus police department, university relations, risk management, student life, dean of students office, and the chancellor's office all sit on the EOC. Additionally, two members from central computing—our chief information security officer and our disaster recovery planning officer—round out membership of the EOC.

The EOC coordinates the campus-wide responses to emergency situations. Although the EOC is a virtual organization when there are no emergencies, it does meet on a regular basis to review and update procedures and to reinforce internal communications channels. When a natural disaster occurs or when a crisis can be anticipated, the EOC can be activated by the chancellor, by the EOC core committee, or at the request of the state Department of Social Services, with whom LSU has a Memorandum of Understanding. Once activated, the EOC occupies a physical location that is the central command and control unit of the institution during an emergency. It is staffed 24 x 7, and it is equipped with food, water, cots, supplies, and redundant communication systems that enable the EOC to communicate with the campus community as well as local, state, and federal government agencies. The EOC collects and analyzes information and makes strategic and operational decisions to protect life, property, and the continuity of university services. It also disseminates those decisions within and outside the institution, coordinates and facilitates emergency operations, and implements and updates the institution's emergency principles and procedures. In very specific terms, it is the focal point for all inquiries and decisions related to life and safety issues and campus operations. During Gustav, for example, the EOC coordinated with the parish Emergency Operations Center, local and state police, the state Departments of Health and Hospitals and Social Services, the Governor's Office of Homeland Security and Emergency Preparedness, and many federal agencies including Homeland Security, FEMA, and the National Guard.

ECAR: *With respect to disasters and hazards, in many ways the worst-case scenario is the easiest to plan for, since smaller emergencies are more difficult to imagine and responses are more ambiguous. How would you characterize the best and the worst impacts of Gustav?*

Childs: The best result of Gustav was that we were able to keep students safe and shielded from harm and preserve the lives of those evacuated here with special medical needs. Compared to that wonderful result, the worst impacts of the storm pale. It's important to note that as devastating as they can be, hurricanes can be forecast, and although the path the hurricane ultimately takes may be uncertain, those forecasts do give us time to get ready. This, of course, is not the case with many other kinds of hazards and disasters. Even when we don't know precisely when or where a hurricane will hit or how powerful it will be, we have enough warning to do the critical things needed to mitigate a worst-case scenario.

From an IT perspective, of course, our worst nightmare is the loss of electrical power, regardless of how that occurs—damaged transmission and power lines, flood, or destruction of the data center. During this storm we lost primary power to the data center early on and we transparently transferred the data center to secondary generator power. In anticipation of the loss of power, we had already made multiple backups of enterprise data and transported those data sets to our hot site and secure off-site storage. We had also suspended all update transactions to our enterprise systems—a decision made jointly with the data stewards. However, when we experienced a secondary failure that deprived us of emergency power, our chillers overflowed, the data center flooded, and we had a very challenging situation to deal with. Total loss of power to the data center was a problem for many reasons, not the least of which was that we had equipped the EOC with IP [Internet protocol] phones that ceased to work as soon as the data center lost power. Of course there were other kinds of phones in the EOC as well, but cell service was intermittent and land lines were scarce. Needless to say, we will revisit this model! Because we have procedures in place to run our top priority services (web, e-mail, course management system, and so forth) from alternate platforms, we were able to continue to provide our most critical services throughout the storm.

ECAR: *What situations did you have to contend with that were truly unexpected?*

Childs: With no power in the city because wind and uprooted trees had compromised major transmission stations and power lines, the city imposed a curfew that meant that no one could be on the streets from sundown to sunup. This limited our ability to respond to emergencies that occurred after dark. We also had to wrestle with issues related to staff availability. For Baton Rouge, the property damage caused by Gustav is greater than damage caused by any other hurricane in history. When staff members must contend with severe property damage to their homes and vehicles, caring for children who have no school to go to, or family members who need immediate assistance, it's particularly hard to prioritize providing IT services.

ECAR: *Given your long and successful career in higher education IT, it is clear that you are an accomplished IT leader. Did you find yourself relying on skills other than your professional skills during Gustav?*

Childs: Yes, I did. It might sound strange, but since I was without power in my own home for eight days, I found that I could survive quite well by relying on my outdoor skills and equipment. I simply put my camping gear on my porch, and I was able to not only remain relatively comfortable, but I also cooked Cajun-inspired breakfasts and provided hot coffee for my neighbors. At work, I drew upon many of my parenting skills to help us all keep things in perspective and function as a team. That said, the teamwork was amazing: the effort, willingness, selflessness, and cooperation of virtually everyone at LSU was unparalleled.

ECAR: *What did you personally learn from Gustav?*

Childs: I learned that the foundation on which IT prepares for disasters actually works. We have formal processes that mirror how we approach information security: performing asset inventories and risk assessments, establishing layers of defense, and determining

how many of those layers we can afford to operationalize. Then we establish protocols that are applied within our IT organization as well as protocols that involve agreements with other units, agencies, and individuals. Often these protocols are based on handshakes, and they look more like reciprocal services than formal agreements. Just as the institution has agreements with its banks about handling payroll processing in an emergency, IT has agreements with our physical facilities department to prioritize our generators when the lights go out. Of course, as in any disaster, the real story is about how people respond. During Gustav the response from the campus community, and from the students in particular, was outstanding. We set up a volunteer website and helpline. Over 1,600 volunteers responded—most of them students—saying they wanted to help out. Many did one-on-one care with the medical and special-needs patients. Students spent long nights in the medical special-needs shelter reassuring the elderly and the infirm. They held hands and listened to stories. They also went with licensed medical aids to help transport people from helicopters to wheelchairs. LSU also set up a food center that was largely operated by students. This center served three meals a day to about 5,000 people. While many students chose to go home during the storm, a remarkable number stayed on campus to help out.

ECAR: *Which communication channels were most reliable during the storm?*

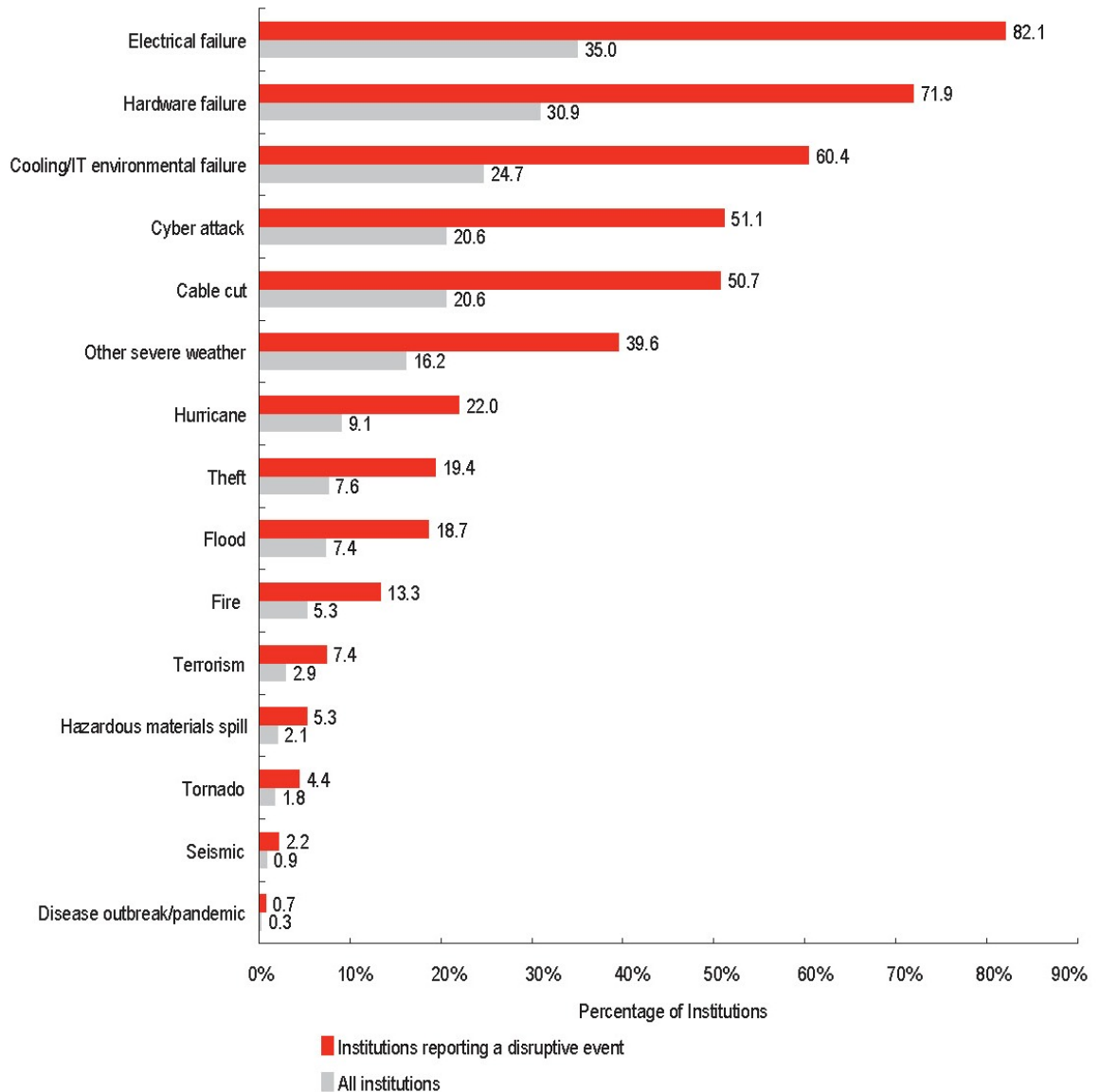
Childs: We relied most heavily on broadcast e-mail, the LSU website, the LSU emergency hotline, IP phones, landline telephones, mobile phones, and local radio and television news. We also started a blog to keep a record of important messages and developments. For internal communications among emergency workers at the university, including IT staff, we relied heavily on portable two-way radios—walkie-talkies. The website carried everything from messages from the chancellor to contact information for all the hurricane centers, police, fire department, and emergency agencies, as well as links to frequently asked questions, updates on the academic calendar, and even information about rescheduled sports events. During an emergency, we know that we need to use multiple communication channels to reach people, since people will access whichever channel is most available to them. We learned early on that short message service [SMS] for text messaging to mobile devices can easily get overloaded when the number of recipients is large, so we try to rely on systems that have proven to be more robust. We continue to work on broadening our spectrum of communication channels. It is also likely that the impact of this hurricane on our communications infrastructure will be to raise the visibility of the need for even more redundant and backup power.

What It Means to Higher Education

ECAR: *In 2007, ECAR published a major study, Shelter from the Storm: IT and Business Continuity in Higher Education.³ Informed by survey responses from 340 chief information officers and 247 business officers in higher education, the study examines higher education's readiness to function through and recover from major disruptions. It focuses on the ability of IT units to support the continuity of their institutions and identifies practices associated with good business continuity outcomes.*

Among its many important findings, the study analyzed data to compile the frequency of events that trigger a central IT emergency response. As Figure 1 illustrates, the event that most frequently triggers a response from central IT, among all institutions, is electrical failure. The numbers in Figure 1 are expressed both as a percentage of those who reported experiencing disruptions and as a percentage of the total base of 340 CIO survey respondents. Clearly, LSU's experiences during Hurricane Gustav parallel the findings of this study.

Figure 1. Events Triggering Central IT Emergency Response, 2002–2006



Melody, congratulations to you, your IT staff, the helpful volunteers, and all of LSU for your enormous efforts to provide service continuity and shelter from Hurricane Gustav as well as other storms you have weathered. While we all hope that such awful events are behind us, we also know that we must be prepared for more. In light of your experience,

what would you like to share with your higher education colleagues in terms of the five most important things to keep in mind in times of emergency?

Childs: This is difficult to answer, because specific hazards and emergencies have different characteristics. We tend to know when hurricanes threaten us because they can be forecast days in advance. Once the rain starts, we know things will be getting worse. But when a crisis has no warning, such as a terrorist or cyber attack or a mudslide, you have to respond immediately. Keeping all of these variables in mind, I would say that the five highest imperatives are:

1. Keep things simple. In times of stress, it is important to have simple rules to follow.
2. Make sure that the institution's decision makers can do their jobs. Equip a command center (and backup location) with robust, reliable technologies, including *old* technologies such as two-way radios and rotary-dial phones.
3. Make arrangements for redundant and failover web, DNS, e-mail, and telephony services to be delivered from an off-site location in case they cannot be delivered from campus. Consider the use of services available in "the cloud." Formalize reciprocal arrangements with other institutions. Document and frequently test procedures for switching to these off-site servers and services, and—using these documents—train all appropriate personnel.
4. Encourage IT staff to focus on the institution's primary goals, and use common sense to achieve them. The best ways to do this are by feeling empowered to make decisions in the absence of a higher authority, and by communicating thoroughly, frequently, and appropriately.
5. Nurture the humans, and pay attention to what really matters. Arrange for food, water, and sleep breaks for everyone who is dealing with the crisis. Make sure that medical and psychological services are available to staff members as needed.

Key Questions to Ask

- What are the five highest imperatives for our institution during a hazard?
- How do we communicate those highest imperatives to our faculty, staff, and students?
- What structures are in place to ensure that everything possible is done, in a coordinated way, to meet our highest imperatives?
- What are our procedures for declaring a campus emergency?
- How well are we prepared to endure a campus emergency that might last up to two weeks? One month?

Where to Learn More

- Balakrishnan, Suresh, Robert Sapp, Eric Spangler, and Donald Z. Spicer. “Changing Ideas of Campus Disaster Recovery: Designing Resiliency into Systems” (Research Bulletin, Issue 20). Boulder, CO: EDUCAUSE Center for Applied Research, 2007, available from <http://www.educause.edu/ecar>.
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Endnotes

1. Louisiana State University campus safety and health resources website, <http://www.lsu.edu/safety/>.
2. Ashley Berthelot, “Preparing for the 10,000-Year Storm: LSU Students Visit Netherlands for Flood Control Education,” *LSU News*, August 22, 2008, [http://appl003.lsu.edu/unv002.nsf/\(NoteID\)/EBC6076D545F6A00862574AD004F61D1](http://appl003.lsu.edu/unv002.nsf/(NoteID)/EBC6076D545F6A00862574AD004F61D1).
3. Ronald Yanosky, *Shelter from the Storm: IT and Business Continuity in Higher Education* (Research Study, Vol. 2) (Boulder, CO: EDUCAUSE Center for Applied Research, 2007), available from <http://www.educause.edu/ecar>.

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