Louisiana State University and A&M College: Optimizing Text Messaging and Other Emergency Notification Systems

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The mission of the EDUCAUSE Center for Applied Research is to foster better decision making by conducting and disseminating research and analysis about the role and implications of information technology in higher education. ECAR will systematically address many of the challenges brought more sharply into focus by information technologies.

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Preface

The EDUCAUSE Center for Applied Research (ECAR) produces research to promote effective decisions regarding the selection, development, deployment, management, socialization, and use of information technologies in higher education. ECAR research includes

- research bulletins—short summary analyses of key information technology (IT) issues;
- research studies—in-depth applied research on complex and consequential technologies and practices;
- case studies—institution-specific reports designed to exemplify important themes, trends, and experiences in the management of IT investments and activities; and
- roadmaps—designed to help senior executives quickly grasp the core of important technology issues.

As part of its 2009 research agenda, ECAR recently published a study, Spreading the Word: Messaging and Communications in Higher Education, written by Mark C. Sheehan with Judith A. Pirani. The study examines current practices and future directions related to EDUCAUSE members’ use of e-mail, telephony, mobile communications, and crisis communications.

Literature Review

A literature review helped identify and clarify issues, suggest hypotheses for testing, and provide supportive secondary evidence. Besides examining articles and studies from journalistic, academic, and IT practitioner sources, we consulted with practicing CIOs experienced in messaging and communication issues to develop study objectives and survey questions.

Online Survey

We designed and administered a web-based survey that was distributed to institutional representatives (mostly senior IT leaders) at 1,694 EDUCAUSE member institutions in July 2008. We received 371 responses (a 20.7% response rate).

Interviews

We conducted follow-up telephone interviews with 37 senior IT leaders from a mix of institutions to gain deeper insights into findings from the quantitative analysis and to capture additional ideas and viewpoints.

Case Studies

ECAR researchers conducted this in-depth case study to complement the core study. We assume readers of this case study will also read the primary study, which provides a general
context for the individual case study findings. Louisiana State University and A&M College (LSU) found itself at the forefront of emergency notification as a result of several high-profile and far-reaching incidents beginning in 2005. We undertook this case study to examine how LSU developed and refined emergency notification systems (ENS) accordingly, most notably its text messaging service. ECAR owes a debt of gratitude for their time and insights to Azim Ashraf, Manager, Incident Response; John Borne, Director, IS Architecture; Melody Childs, Deputy Chief Information Officer (CIO) and Executive Director of User Support and Student IT Enablement; Cynthia (Cindy) Hadden, Deputy CIO and Executive Director of University Information Services; Eric Monday, Associate Vice Chancellor for Finance and Administrative Services and Interim Vice Chancellor for Student Life; D’Ann Morris, Executive Assistant to the Chancellor and Interim Director of Emergency Operations; Brian Nichols, Chief IT Security and Policy Officer; Frank O’Quinn, Deputy Policy and IT Disaster Recovery Officer; Ric Simmons, Deputy CIO and Executive Director of Networking and Infrastructure; Sheri Thompson, IT Planning and Communications Officer; and Brian Voss, Vice Chancellor for Information Technology and CIO.

A companion ECAR research bulletin provides additional insight into this topic. “Hazards and Hurricanes: Hallmarks of IT Readiness, Response, and Recovery” offers a firsthand account of the ITS experiences during Hurricane Gustav in September 2008.

Introduction

Recent natural disasters and current events have pushed emergency preparedness and emergency notification to the forefront of many institutions’ agendas. Inevitably, many colleges and universities have instituted emergency management and ENS to safeguard and to provide direction to the institution and the community during a crisis.

Few institutions have used these resources in as many real-time situations as LSU. During the aftermath of Hurricane Katrina in late August–September 2005, LSU faced complex emergency response and communications challenges upon the activation of the university’s Pete Maravich Assembly Center (PMAC) and the Carl Maddox Field House as a single 800-bed acute-care medical center. A campus shooting tragedy in which two students were killed in December 2007 tested LSU’s emergency procedures and communications during an unexpected situation. Finally, Hurricane Gustav in September 2008 caused $11.6 million in damage on the LSU campus, testing LSU’s emergency response and communications efforts not only during a week without electrical power but also while supporting the PMAC’s and the Field House’s reactivation as an emergency medical center.

From these experiences, LSU has built a top-notch emergency management, communications, and response organization. It has defined strategies, procedures, and operations; constructed a dedicated emergency operations center (EOC); and assembled a repertoire of ENS to inform campus and community. Participants spent a great deal of time in understanding the various contexts of their environment, the potential threats, the management, student and faculty cultures, the physical context of the campus, and the contexts of infrastructure expertise. LSU is working toward the application of the most useful communication technology in each of these contexts. Those involved have made useful discoveries that can apply generally to other institutions, especially in regard to text messaging emergency notification.

After the tragic shooting at Virginia Polytechnic Institute and State University (Virginia Tech), many institutions—including LSU—adopted text messaging as an emergency notification protocol to reach their
in institutional population, especially their students, many of whom are avid text messaging users. According to The ECAR Study of Undergraduate Students and Information Technology, 2008, three-fourths of the student respondents use text messaging. Many institutions, including LSU, contracted with third-party vendors to manage their text messaging services and felt at ease with this solution. LSU, however, encountered poor performance during an actual emergency and discovered that a text messaging ENS requires more local, hands-on management.

At this point, LSU’s ITS group became more actively involved with the management of the university’s text messaging ENS. The organization implemented several strategies to diagnose the protocol’s inherent problems in regard to emergency notification and to restore university confidence in the service. The main takeaway from LSU’s experiences with text messaging is that “it is one tool and it is not foolproof,” states John Borne, director, IS architecture. “As an institution, you have to understand how text messaging works. Then you have to test it to discover where the bottlenecks are and correct those individual elements.” This case study reviews LSU’s emergency notification strategies and details ITS’s efforts to optimize the university’s text messaging ENS.

**LSU Background**

The Louisiana General Assembly founded LSU in 1853. Today, the university is a land grant and a sea grant institution comprising 13 colleges and schools: College of Agriculture, College of Art & Design, College of Arts & Sciences, College of Basic Sciences, E. J. Ourso College of Business, School of the Coast and Environment, College of Education, College of Engineering, School of Library and Information Science, Manship School of Mass Communication, College of Music and Dramatic Arts, School of Social Work, and School of Veterinary Medicine. LSU enrolls more than 30,000 students and employs approximately 1,300 full-time faculty members and 3,000 staff members. Each year, LSU conducts more than 2,500 sponsored research projects funded by more than $140 million in external grants from the National Science Foundation, the National Institutes of Health, NASA, the National Endowment for the Humanities, and many other federal, state, and private granting agencies.

Brian Voss, vice chancellor for IT and CIO, leads LSU’s ITS area. Voss reports directly to Astrid Merget, executive vice chancellor and provost, and serves as a member of Chancellor Michael Martin’s executive cabinet. ITS employs approximately 170 full-time staff members and about the same number of part-time student workers; it is organized into six divisions:

- Office of the Vice Chancellor for Information Technology, including centralized functions for human resources and finance, security and policy, communications and planning, faculty liaison, and emerging technology assessment;
- LOUIS, the Louisiana Library Network, serving a consortium of state public and private academic libraries;
- Networking and Infrastructure, which manages LSU’s voice, data, and video communication solutions;
- Research IT Enablement, which provides high-performance computing resources;
- University Information Systems, which develops and maintains LSU’s enterprise academic, research, and administrative systems; and
- User Support and Student IT Enablement, which focuses on user services—classroom technology, computer labs, training, and department support.
The ITS role in LSU’s emergency management and response activities has evolved over time. Initially, ITS did not participate in the managerial or strategic aspects of LSU’s emergency management and response activities. But as LSU gained experience in emergency operations, the need for ITS’s integral involvement became more apparent, most notably after the poor performance of the university’s text messaging ENS during a crisis. Today, ITS has a seat on the EOC Core Committee, and ITS staff serve in the EOC upon activation during a crisis.

**LSU’s Emergency Management and Response Organization**

For background, this section provides an overview of LSU’s emergency management and response organization. As with any institution, LSU’s first priority lies with the care and safety of its students, faculty, and staff during an emergency situation. During hurricanes and other major disasters, LSU fulfills another role as a special needs medical evacuation center for the state of Louisiana. This special circumstance factors heavily in the university’s emergency communications and response strategies. “There is a boundary between the essential services for LSU, the university, and the services we provide to the community and the state,” states Melody Childs, deputy CIO and executive director of User Support and Student IT Enablement. “It impacts our strategic planning and the EOC’s development.”

Both roles came into play during Hurricane Katrina in 2005. Interestingly, Voss recalls an institutional sigh of relief when it became apparent that the LSU campus had survived Katrina without major physical damage. But no one was prepared for the hurricane’s aftermath. When New Orleans’s levees were breached, the state activated LSU’s PMAC and the Carl Maddox Field House to care for injured people from the surrounding areas.

As the extent of Katrina’s disaster grew, so did the university’s involvement, triaging and treating more than 6,000 patients and housing several hundred rescue workers and volunteers. “As the role of the campus started to expand in tandem with the growing medical needs, we had all these entities flowing around the campus,” recalls Voss. “At the time, the whole concept of an EOC was nonexistent at LSU. We had no idea how to handle it. We did it ad hoc, a response to the moment.”

Fortunately LSU’s then-Chancellor Sean O’Keefe had a wealth of emergency response experience, having served in the White House during the September 11, 2001, attacks and as director of NASA during the space shuttle Columbia disaster. He recognized the need for a central point of operation and contact, so university leaders established an ad hoc EOC to manage the immediate crisis during Katrina. Following that emergency, O’Keefe called for the creation of an emergency plan and oversight committee as well as a formal EOC to enable LSU to respond to future emergencies in an organized fashion. The LSU community responded to the chancellor’s request by building the emergency management and response organization described in this section.

First, LSU formed an EOC Core Committee in 2006, comprising representatives from various LSU critical service and maintenance entities around the campus: the Office of the Chancellor, the Office of Finance and Administrative Services, the Office of Public Affairs, the Office of Public Safety, and the Division of Student Life. Though a member of the EOC since its inception, ITS joined the EOC Core Committee in January 2008, with Brian Nichols, chief IT security and policy officer, serving as ITS representative. The director of emergency operations chairs the committee, which meets monthly to manage LSU’s emergency operations: emergency policies and procedures and their impacts, and
emergency training and preparedness, as well as the review of actions following any EOC activation. The committee acts independently and reports directly to the chancellor. The EOC Core Committee develops emergency models, plans, and procedures for review by the chancellor’s Executive Committee. D’Ann Morris, executive assistant to the chancellor and interim director of emergency operations, provides a direct link between the EOC Core Committee and LSU senior administration.

Next, the EOC Core Committee created a permanent 24 x 7 EOC by converting a classroom in LSU’s public safety building to coordinate activities associated with any emergency. It is activated as needed by an event or an approaching event. This facility is in a secured environment and is equipped with communication, computation, and display capabilities to make emergency event response coordination and management simple and easy to use. It became operational in June 2006.

With the EOC in place, the EOC Core Committee recruited university members to staff it. Personnel are divided into two teams—the Purple Team and the Gold Team—that staff the EOC in 12-hour shifts during an emergency activation. The EOC Core Committee refined its Incident Command System structure over the years to reflect changing LSU requirements and lessons learned from EOC activations. For instance, the committee added an ITS liaison position, because the committee felt that “it is vital to maintain communications during the incident,” states Frank O’Quinn, deputy policy and IT disaster recovery officer. It added two public information officers on each team to handle the extensive media demands, rather than following the standard recommendation of one. Hurricane Katrina demonstrated the need for procurement to support the university’s and medical facilities’ activities, so the EOC Core Committee staffs the finance positions with individuals from purchasing and procurement. Representatives from the public safety and the facilities areas round out each EOC team.

**Emergency Notification Systems**

In tandem with its emergency management organization, LSU built a multiprotocol ENS. The university relies on five levels of communication protocols during an EOC activation:

- broadcast e-mail to all students, faculty, and staff members who possess a registered LSU e-mail account;
- media relations (for example, television, radio, and print);
- text messages via the LSU e!txt service to those who opted to receive them;
- automated voicemail to campus telephones; and
- postings on the LSU website.

The EOC Core Committee’s philosophy is to increase the number of communications protocols used whenever it makes sense, because there is no panacea—no single best way to reach everyone. “The goal is to get in touch with as many people as we can by using various communications means,” states Voss. “We decided we needed a whole spectrum of communication options. It was an early realization on the part of our senior administration, due in part to my role [of explaining] to them how these technologies work—and don’t work, that led to a philosophy of coordinated emergency notification. There needs to be a central point of broadcasting, but we need multiple channels of communications.” Consequently, all of LSU’s emergency communications are handled at the EOC. The public relations EOC liaison “pulls the trigger” on the emergency notification; the ITS liaison enables it.

The EOC has preemptively created ready-made messages appropriate for the crisis scenarios that LSU is likely to face: hurricanes, fires, and so forth. “Text messaging is limited to 160 characters, so the messages cannot be
Emergency Notification Systems at LSU

Managing LSU’s e!txt Text Messaging Service

Most of LSU’s emergency communication protocols have been in place for several years, but one exception is text messaging. As with many institutions, LSU contracted a third-party emergency text messaging notification system vendor in 2007 in response to human disasters at other higher education institutions. LSU has deployed the text messaging system, called e!txt, several times in emergency and in test situations. LSU’s experience with text messaging points to the protocol’s underlying complexities and the need for IT’s involvement in the system’s management. Initially, ITS was not involved with the procurement, administration, or management of LSU’s text messaging system. “At the time, text messaging seemed to be straightforward,” states Voss. “When creating the EOC in 2006, the emergency operations director at the time selected LSU’s emergency notification vendor, clearTXT, and managed the text messaging system himself. ITS had little involvement because its operation looked so clear-cut.”

As reported recently in an EDUCAUSE Quarterly article, “In most cases, students and staff register to participate in the system by giving the university their cell phone numbers. The emergency text messaging application converts the numbers to e-mail addresses and then applies standard bulk e-mailing techniques to send out a large body of SMS [text] messages as quickly as possible.” LSU’s experience was no different, with the EOC collecting the contact information of those who opted in to the e!txt messaging notification service. Unfortunately, at the time, EOC members did not grasp the importance of verifying that each person’s contact information was set properly to work with a vendor’s system. Consequently, the e!txt system performed poorly during its first real-time emergency broadcast during LSU’s campus shooting tragedy in December 2007, because of the incorrect settings. Only 200 of the approximate 5,000 e!txt subscribers received a message. The media picked up on this and reported extensively about e!txt’s poor performance during the incident.

Consequently, LSU instituted some changes. The LSU senior administration requested that ITS manage the e!txt ENS, and ITS joined the EOC Core Committee, too. ITS undertook a number of steps to restore confidence in the e!txt service, the first being Voss’s appointment of Borne as the e!txt system administrator to provide management, oversight, and accountability and to manage the relationship and communications with the technology vendor.

Understanding the Text Messaging Transmission Chain

Next, Borne and other ITS staff members conducted considerable research and analysis with vendors, carriers, peer institutions, and others to understand the actual text message transmission process and to troubleshoot...
the reasons behind the e!txt’s unsatisfactory performance. “What we learned over time is how complex text messaging is,” states Voss. “It is not as simple as choosing the vendor and entering contact information. We learned that the EOC and ITS did not understand all the pieces.”

Indeed, as Nichols describes, “After we looked at how a text messaging system works, a bunch of light bulbs went off.” ITS’s research identified several weak links in the transmission chain that could potentially hinder message receipt:

- **Lack of control**: An institution can claim a 100% send rate, referencing its success at sending out 100% of its text messages to a service provider. “But once the message leaves the provider, the institution has almost no control over it,” states Borne. “The message has to pass through several more stages, and it can hang up in any one of those stages.” Figure 1 provides a cursory schematic of the text messaging transmission process to illustrate his point.

- **Scalability**: It is one thing to send a single quick message; the message flow rate through the text messaging transmission process is almost instantaneous for a single message. It is another thing altogether to send tens of thousands of text messages simultaneously. “Messages take time to flow through all the elements, and to reach all the subscribers in a timely fashion is impacted by the total number of subscribers.” An ENS vendor can transmit tens of thousands of messages in five or six minutes, but then the messages themselves can get stuck in the remaining stops in the transmission chain, stretching out delivery times. Sending several different text messages within a short period of time—a potential occurrence during an unforeseen emergency—compounds the problem. Word-of-mouth—message recipients then texting their peers—further adds to the logjam. The network gets clobbered, and the undelivered messages begin to pile up.

- **Cell network capacity**: Another potential delivery obstacle lies with the local cell carriers, who presently have a text messaging throughput limitation that can materially affect the timely delivery of emergency messages. “There is a choke point at every cell carrier tower, as each has a typical throughput of about 10 messages per second,” states Borne. “Text messaging will operate pretty well if it is a small school sending a couple of thousand messages located near one or two cell towers. But a bigger institution with a larger list of subscribers, or adjacent institutions issuing simultaneous messages in the case of a community-wide emergency, translates into more messages and a longer receipt time.” As a result, LSU has increased the number of cellular antennae serving the campus.

Using cell phone voice messages in addition to text messaging as an emergency notification protocol magnifies the problem further because “you are trying to drink from the same trough,” continues Borne. “The carrier is trying to reach cell phone customers and send
a text message. An institution must pick one communications protocol over the other or use them serially. Otherwise, you are tapping the same source to some degree.” Because of this congestion potential, LSU chose not to send emergency voice messages through cell carriers that would compete with text message throughput and further exacerbate delay.

**Using Testing as a Means for Educating**

Now that ITS understood the inherent problems of text messaging, the organization wanted to conduct a full-scale test of the system on behalf of the EOC on January 18, 2008, under full media scrutiny. ITS used this opportunity to restore confidence in the system and to educate the public about the true performance and capabilities of text messaging. Voss and others briefed the press about the infrastructural stresses of sending out several thousand text messages simultaneously. “When we discussed our expectations for the January 2008 test, the media was quite stunned with our goal to ensure that all e!txt service subscribers received a message within 20 minutes,” states Voss. “The reporters’ expectations were based on their instantaneous experiences with text messaging. It was not until we explained how text messaging worked that their expectations became more realistic.”

When scheduling a test, ITS broadcasts to the campus up to a month beforehand an e-mail announcing the date and time of the test. The campus newspaper and sometimes the local media announce the test, too. During the week of the test, ITS broadcasts an e-mail reminder several times to e!txt subscribers. When testing, the bolded word “TEST” bounds the text message to confirm its test status.

On the basis of its research, ITS delineated specific success parameters for the test: “clearTXT time to process [all text messages] of under 20 minutes, 95% of non-failing messages delivered in two hours or less, undelivered messages totaling less than 10% [of] all elements of the system, and self-reported data from users showing less than 10% of messages not received.”6 At the time of the test, the e!txt notification service had 13,657 subscribers from the LSU community. Working with clearTXT, ITS was able to monitor the flow of the text messages through the various transmission stages. To promote transparency and accountability, ITS published a report describing the test’s performance for all parameters; it is publicly available on the LSU e!txt web page (see http://www.lsu.edu/its/etxt/ETXTTEST.pdf). “In the view of the chief information officer, the test was a complete success, as data and analysis shows that all four measures were met or exceeded.”7 Table 1 summarizes the test’s performance.

ITS has continued its educational activities, building a web page (http://www.lsu.edu/etxt) to provide educational material about text messaging and to report on LSU’s tests of its text messaging system.

**Boosting e!txt Service Subscriber Rates**

e!txt’s effectiveness is enhanced by the service’s ability to notify a critical mass of the LSU community during an emergency situation. With this in mind, ITS has continued to recruit subscribers to the e!txt system. As noted earlier, LSU’s e!txt service had 5,000 subscribers at the time of the campus shooting tragedy in December 2007. The shooting incident created more awareness of this service, but even after that, Voss reports that only half of the LSU community was signed up, despite numerous publicity campaigns.

So ITS decided to take a more forceful approach, creating a means to confront users with their opt-in or opt-out decision concerning the e!txt service: The code that reminds users periodically to change their
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Table 1. January 18, 2008, Emergency Text Messaging Test Performance

<table>
<thead>
<tr>
<th>Success Parameter</th>
<th>Actual Performance</th>
<th>Verification</th>
</tr>
</thead>
<tbody>
<tr>
<td>clearTXT dispatch messages in under 20 minutes</td>
<td>Messages dispatched in 16 minutes, 47 seconds—a flow rate of 900 messages/minute</td>
<td>clearTXT report</td>
</tr>
<tr>
<td>95% of non-failing messages delivered in two hours or less</td>
<td>All non-failing messages delivered in less than 20 minutes,</td>
<td>Random spot-checking, ITS staff were aware of transmission order of messages, and the last user received message in two minutes.</td>
</tr>
<tr>
<td>Undelivered messages totaling less than 10% for all elements of the system</td>
<td>95.04% success rate</td>
<td>clearTXT reported 18 messages rejected by the aggregator. Aggregator’s feedback from the carrier reports 677 messages failed due to user issues (bad number, wrong carrier).</td>
</tr>
<tr>
<td>Self-reported data from users showing less than 10% of messages not received</td>
<td>1.6% of e!txt subscribers self-report problems</td>
<td>The total number of e!txt subscribers who, after 72 hours, self-reported problems on a publicized web-based mechanism.</td>
</tr>
</tbody>
</table>


LSU system password was modified by ITS to create a similar reminder for the e!txt service. When a new user, or an ongoing user after six months, logs in to the LSU system and inputs his or her credentials, a pop-up window appears about that user’s ENS status. The system queries the database, and if the user already participates, the message thanks the user for signing up and asks if the current contact information is correct. If the user does not participate, he or she is directed to click on a link to opt in and to provide relevant information or to click on a different link stating that he or she has declined to participate.

Voss reports that this strategy has increased the enrollment percentage to about 80–85% of the total LSU community, which translates into about 25,000 participants. (Voss notes that not everyone has a cell phone.) ITS also maintains a list of those who have opted out so that it can verify a person’s status if someone complains about not receiving a message. “Some universities require people to opt in,” states Voss. “We feel our method falls just short of that, but it makes people consciously aware of whether or not they’ve signed up. Even if a person has opted in, the mere act of making them face that choice periodically is good. We stay in their face. Marketing/communications efforts have value in promoting penetration, but its impact is not like jumping on their desktop and grabbing them by the necktie.”

Importance of Keeping Contact Information Current

In September 2008, clearTXT exited the test messaging market, forcing LSU to find a new vendor to take over its e!txt service on October 1, 2008. ITS evaluated several vendors and during its investigation found that most providers offer similar technical capabilities—for example, multisite and multiple transmission capabilities. But they found two differentiators in their search. The first is that the user friendliness and functionality of the vendors’ websites vary. The second is the vendor’s responsiveness. ITS
believes that this second factor is particularly important because, as Borne notes, “There will be problems, even if you test regularly. You want to get someone to assist you in a hurry.” LSU selected FirstCall, a vendor that provides text messaging capabilities to other state institutions in Louisiana, to replace clearTXT. “On the back end, there are not many differences between competitors,” states Nichols. “So we opted to be on the same system as the rest of the state and to support a local business.” ITS reports FirstCall to be very responsive thus far.

Borne also notes that the vendor transition from clearTXT to FirstCall was trouble-free. “The main issue was timing it to coincide with a slower period in the university calendar to minimize impact. The migration was easy to do, almost like a flip of a switch, and the switching costs are low. I would recommend to people that they not be afraid to move providers if they need to.”

With a new vendor in place, ITS felt is was prudent to run another test of the e!txt service. So on September 26, 2008, ITS tested the FirstCall system. The e!txt subscriber base had grown by 85% since the January 2008 test, to 25,105 people. The test’s success factors were modified on the basis of past testing performance and the growth of the subscriber base. “The expectations included FirstCall’s time to process of under 20 minutes, 95% of non-failing messages delivered in 39 minutes or less ... undelivered messages totaling less than 5% for all elements of the system, and self-reported data from users showing less than 5% of messages not received.”

As Table 2 illustrates, the second test identified another weak link in the text messaging transmission process—the message recipient. Approximately 10% of the messages failed to be delivered. The primary reasons were not technology related but user related: undeliverable (payment past due or no text messaging plan on device), subscriber phone number blacklisted due to loss or theft, missing or wrong destination number, and message expired (phone turned off or unreachable).

“During each test, we learn something new,” states Borne. “Our failure rate for the second test was double that of the first test.

| Table 2. September 26, 2008, Emergency Text Messaging Test Performance |
|---------------------------------|-----------------|-----------------|
| Success Parameter               | Actual Performance | Verification |
| FirstCall dispatches messages in under 20 minutes | Messages dispatched in 12 minutes, 06 seconds—a flow rate of 2,092 messages/minute | FirstCall report |
| 95% of non-failing messages delivered in 39 minutes or less | All non-failing messages delivered in less than 20 minutes | Random spot-checking |
| Undelivered messages totaling less than 5% for all elements of the system | 90.06% success rate | FirstCall reported 168 messages rejected by the aggregator. Aggregator’s feedback from the carrier reports 2,343 messages failed due to user issues (bad number, wrong carrier). |
| Self-reported data from users showing less than 10% of messages not received | 1.7% of e!txt subscribers self-report problems | The total number of e!txt subscribers who, after 72 hours, self-reported problems on a publicized web-based mechanism |

In this test, we learned about the habits of people and their interest of keeping their info up-to-date. After an incident, the number of subscribers rises, and the number of people who update their information rises, too. During a lull, people let their information ‘get stale’ until the next incident happens.” ITS concludes in its report that the September test points to the “need for better communication with our community and a better understanding on their part about how their use of their personal devices impacts the success of this system” (see http://www.lsu.edu/its/etxt/LSUETXTFall08%20Test.pdf). To address this need, ITS contacted groups or individuals who experienced a failure due to stale information, to either correct their contact information or to unsubscribe from the system. In addition, it plans to launch a marketing campaign to educate e!txt subscribers about the importance of updating their contact information.

Policy and Procedure Issues

A final text messaging–related issue that LSU wrestles with is when to use the e!txt system. “I have tried to pass on to the EOC that we should text message only in the event of quick notification, when people have to respond and do something immediately,” states Voss. “You cannot use this for general information or people will tire of it and unsubscribe, or even start to view the messages as ‘crying wolf.’” Morris agrees. She recalls 15 years ago when special permission was required to send a broadcast e-mail to the LSU community. “But through the years, it has opened up and people may receive two or three broadcast e-mails each day for campus activities, like a pancake breakfast. People may not read them immediately or may even delete them without reading them first. We don’t want to water down text messaging’s impact.” For example, the Friday before Hurricane Gustav’s arrival in September 2008, LSU’s senior administration decided to cancel classes on the following Monday. It was decided not to text message the LSU community “because here is a piece of information that we will be sharing on Friday morning that will not impact the LSU community until Monday,” continues Voss. Yet as noted in the following section, administrators have to be flexible, bending activation policies in response to the emergency at hand.

Then and Now: e!txt Emerges as a Vital ENS

During Hurricane Gustav, LSU relied on e!txt extensively, and as opposed to its poor performance during the tragic campus shooting, the service emerged as a critical communications link throughout the emergency event. During the weeklong Hurricane Gustav crisis, the EOC sent out informational updates via text messages as widespread power outages rendered other, traditional communications protocols—radio, TV, Internet access, landline phones—inoperable in many areas. “In some places, text messaging was the only lifeline for people to learn about the state of the university,” states Voss. “Afterward, no one complained about the university’s extensive use of text messaging during the crisis. In this case, more extensive use was a good thing.”

The main takeaway from LSU’s experiences with text messaging is that to ensure a 90–95% success rate, Voss recommends “(a) really understanding how text messaging works and not looking at it as a black box, (b) testing and thoroughly understanding what does not work, (c) fixing it and testing it again, and (d) testing periodically—not just when you purchase the system.”

ENS Future Plans

LSU views the emergency notification system as one of continued refinement. In that vein, several actions are under way.

First, the EOC Core Committee is on constant lookout for new emergency notification protocols in support of LSU’s multimodal
strategy. For example, during Hurricane Gustav, LSU’s student government created a sixth protocol, a daily one-page newsletter distributed throughout the campus and nearby off-campus housing to communicate with those in the community without power, cell phone access, and/or Internet access. During the campus shooting tragedy, police officers went door to door to notify the LSU community about the event. Another alternative under consideration is a pop-up desktop alert solution on computers across the campus. Evaluation is under way in regard to compatibility with current applications, its delivery flow rate and success rate, and who should receive a desktop alert (for example, an administrator or his or her assistant). Another potential emergency notification protocol is a pop-up feature on LSU’s Moodle learning management system to alert faculty members and students. Finally, the EOC Core Committee is evaluating Geographic Information System–controlled voice dialing, which would enable the EOC to segment notification by phone location. Effective use would require enhancements to LSU’s telephone network, because the system is limited to phones with a voice mailbox, something not every LSU phone line possesses currently. Using more communication channels gets the information rolling, stimulating word-of-mouth around the campus. “It might take 20 minutes for all our text messages to clear through the system for delivery,” states Voss, “but I can guarantee that the people who got a message in the first two or three minutes are conveying the information to everyone around them.”

Second is to enhance emergency notification effectiveness by developing a better understanding of the contexts in which students are contacted: classrooms, labs, common areas, library, and the like. The goals are to document the contexts and to try associating a communication technology or protocol with each of those contexts. For example, in a classroom, students’ cell phones may be off and the building itself may obstruct the cell phone signals, so a pop-up message broadcast on computers located in the computer labs and multimedia classrooms might be appropriate. Broadcast-enabled fire alarms would reach disabled students more directly. But these protocols are obviously ineffective for students sitting outside on the LSU Parade Ground. “You have to define a context for every situation where students, faculty, and staff exist on and off campus and then assign a technology or approach to each one,” said Borne. “Then you work to implement those solutions. We have not done a full study yet, but we have tried to understand the high points.”

Third, campus-wide education about EOC activities and ENS is a priority. ITS continues to educate the LSU campus about the importance of keeping up-to-date contact information for the e!txt messaging service. LSU holds safety forums involving the LSU police, student health center, and EOC across campus to educate people about emergency preparedness.

Finally, discussions are under way for LSU police department personnel to use text messaging in a limited fashion to communicate with each other during any campus incident. “We don’t want them text messaging for non–life-safety issues, but there are several benefits if the police officers text message each other on a daily basis,” states Borne. “They get trained, and the technology is tested on a regular basis. We test the text messaging system every semester, but consistent use would identify any technical issues that may creep up.”

**ENS Impacts**

LSU’s experiences with emergency notification have impacted the university on three different levels.

- **At the institution level:** Perhaps the most significant impact of the failure of e!txt during the tragic campus
shooting is that it spurred ITS’s accession as a strategic partner in LSU’s emergency management operations. To fulfill this role, ITS is present at the emergency management policy and practice decision-making tables, and members have leadership roles in emergency event activities. ITS takes a proactive role in establishing the emergency communication and response technology direction and manages all emergency communication systems.

- **Within the EOC**: LSU’s emergency management organization finds that as it refines its emergency notification capabilities, it streamlines and focuses LSU’s external response during a crisis, creating a single voice. “In an activation, you see consistent and important communications from the EOC about LSU’s activities, responsibilities, and priorities and how we are achieving them,” states Eric Monday, associate vice chancellor for finance and administrative services. “We looked at ways to communicate that message and show the value of the effort.”

- **Within ITS**: ITS applies its experiences with e!txt to all of its emergency notification protocols, continually enhancing and maintaining LSU’s capacity to communicate during an emergency situation. For example, the area strives to avoid a backlog of e-mail account changes, so that all registered e-mail accounts can receive an emergency notification message. It rigorously tests and maintains the e!txt service. “We provide support to the website and all the broadcast groups that allow us to communicate with the community at large,” states Cynthia (Cindy) Hadden, deputy CIO and executive director of university information services. “Our role is to ensure that everything is up to date and ready to go at all times.”

**Lessons Learned**

LSU’s experiences in emergency management, communications, and response offer numerous lessons that can apply broadly.

*Emergency management and response is an institutional initiative, not an IT initiative.*

Voss believes that “at most institutions, the CIO is not able to drive this alone. He or she can agitate, support activities, and educate senior administration about the IT-related pieces, but an institutional leader needs to lead emergency management, communications, and response to provide that broad, organizational view and leadership.” As executive assistant to the chancellor and interim emergency operations director, Morris provides a bridge between the operational and strategic components of LSU’s emergency management and response activities.

Voss believes an institution needs an EOC to focus attention on the following emergency crisis areas: developing proper policies, creating a chain of command, and ensuring that procedures are very well understood. “Even though emergency notification relies on technology, the fundamental issues are not technology oriented,” says Voss. “When a problem occurs, the temptation is to focus on the technology piece because it is often the final element in the process and appears to be the easiest one to fix. But in the hierarchy of crisis communications, technology is on the lowest rung.”

*Process and procedures need to be augmented by flexibility.*

Though LSU has created numerous emergency notification protocols, the EOC team members are flexible enough to adapt them as situations require and then apply the lessons learned to the next activation. The student government created the daily one-page newsletters for distribution around campus and surrounding areas during Hurricane Gustav. Now the EOC plans to add this to its arsenal.
of emergency notification protocols. As Voss states, “You can’t have a cookbook for all disasters; everything changes. We know we are going to uncover things the next time that we did not see this time. What we do in the emergency management and response is a continual process of evaluation, reevaluation, and improvement in an effort to respond in a better fashion to a wide range of potential situations.”

Use your own resources and expertise.

One of the basic principles taught in EOC training is “to understand and to use existing resources,” states Monday. LSU learned this lesson outright after the e!txt system’s unsatisfactory performance in a real-time situation. “The EOC Core Committee realized that we did not have the appropriate level of technical expertise,” continues Monday. “We identified the institutional experts—ITS—and transferred the management of the text messaging system and any other technological solutions in emergency management and response to them. You need to use your experts at hand.”

Conclusion

As a large, public, land-grant institution, LSU is embedded in the education, research, and wellness services of its community. Its campus is situated in an environment where hurricanes and potential toxic emissions from refinery operations or rail and river transports are threats to its function and the wellness of its members. As you have read, the institution’s emergency notification methods result from a learning process of both inquiry and experience, creating a portfolio of tools that have been selected and developed to meet communications requirements.

As LSU gained experience, the need for ITS’s integral involvement became more apparent, especially after the unsatisfactory performance of its text messaging service during the tragic campus shooting in December 2007. To ensure this involvement, ITS is present at the emergency management policy and practice decision-making tables, and members have leadership roles in emergency event activities. It takes a proactive role in establishing emergency communication and response technology direction and manages all emergency communication systems.

As LSU has learned from its e!txt service failure, “It is critical for ITS to be at the table, from strategic, information sharing, and hands-on perspectives,” states Morris. Today, ITS fulfills that role to the high satisfaction of the LSU community.

Endnotes

6. Ibid., 2.
7. Ibid., 2.
Citation for This Work