

IT Disaster Recovery Near the World Trade Center

Following the September 11 terrorist attacks on the World Trade Center, nearby Pace University faced emergency conditions in implementing a disaster recovery plan

By **Frank J. Monaco**

"A great plan, vigorously executed, is better than a poor or incomplete plan, vigorously executed, and much better than a great plan, poorly executed, and much, much better than a poor or incomplete plan, poorly executed."

—Anonymous U.S. Army Proverb

Business continuity planning, disaster recovery, and the Army concept "continuity of operations planning" have been on my mind for the past four years as I transitioned from the U.S. Army to the civilian world of higher education. Although my job responsibilities stayed much the same, acting as chief information officer for the United States Military Academy at West Point, New York, wasn't exactly the same as being CIO at Pace University in New York City.

Charged with providing information technology services to more than 14,000 students and 2,500 staff and faculty, I was worried that at Pace we only had one of everything important. Sure, we backed up our systems and took the tapes off site on a regular basis. Still, whenever an outage occurred — especially a server crash or disruption of a backbone internal network or the Internet — students, faculty, staff, alumni, and the public were immediately affected, and teaching and learning were interrupted.

Pace University's Division of Information Technology (DoIT) began tak-

ing steps about two years ago to minimize IT disruptions. Specifically, DoIT formed a committee to do something about these concerns, while interfacing with the university's effort to build a comprehensive business continuity plan for areas other than IT. We consolidated mission-critical servers (including our Web pages, student information system, human resource system, financial system, e-mail system, library, and courseware systems) into a protected environment having a fire suppression system, an uninterruptible power supply with generator backup, and all-hours human oversight. We started to cluster our open systems mission-critical servers to get redundancy. We contracted for redundant backbone links. We occupied a single building on our Briarcliff Manor, New York, Westchester County Campus, making it Pace University's Information Technology Facility. We purchased a disaster recovery template document from the Gartner Group and began the process of implementing the numerous suggestions and checklists contained therein. Sadly, the tragic events of September 11, 2001 interfered with the completion of our (and the university's) disaster recovery planning. Without warning, we faced the emergency implementation of what plans we did have in response to the appalling destruction in our city.

Figure 1

Verizon Facility Servicing Most of Downtown Manhattan



Courtesy Verizon. Used with permission from www.verizon.com.

Disaster Up Close and Personal

Pace University lost 4 students working in the World Trade Center (WTC) buildings and more than 19 alumni. The Pace University World Trade Institute (WTI) occupied the entire 55th floor of #1 World Trade. Thankfully and miraculously, our WTI staff and students got out before the building collapsed.

Pace University's main New York City campus is less than three blocks

from the WTC site, across the street from City Hall Park, making it the closest major university to the WTC. New Yorkers call this area “downtown.” We also have locations in “midtown” Manhattan and Westchester County: the Law School and Graduate Center in White Plains, New York; the main undergraduate campus in Pleasantville; and back-office operations and dorms, including IT, in Briarcliff Manor, which is about 40 miles from the downtown campus. At the time of the attacks, I was attending a meeting in midtown Manhattan that might well have been scheduled for the WTC location.

As part of the larger university response to this crisis, our president and executive council set up an emergency command center at our midtown campus and immediately dispatched our executive vice president for finance and administration to our downtown campus. Our main campus played an immediate role as well, when the debris cloud from the devastating WTC collapse traveled down the back streets, forcing people toward our main campus buildings. There they were assisted by our security professionals. The New York Police Department, Emergency Services, Port Authority Police, New York Fire Department, and National Guard set up triage, and later, staging areas, in our front lobby. We eventually had to evacuate the downtown New York City campus sites and dorms, sending students and staff to our Westchester locations.

Infrastructure Destroyed

The Verizon facility at 140 West Street, possibly the largest and most complex telecommunications facility in the world, was severely damaged by the destruction of World Trade Center Building #7. Although not directly targeted, the building suffered massive collateral damage. (See Figure 1.) Circuits (more than 300,000 voice grade and 3,500,000 data grade) and equipment began to fail the evening of the 11th, and power eventually went out in the entire area.

At midnight on the 11th, I was amazed when I finally walked outside

Figure 2
Verizon Technicians Repairing Cable at 140 West Street Facility Damaged by WTC Building #7 Collapse



Courtesy Verizon. Used with permission from www.verizon.com.

our midtown location near Fifth Avenue en route to Grand Central Station. The city seemed deserted. I saw no people or moving vehicles in one of the all-hours busiest intersections in the world. In addition, United States Air Force fighter jets were flying combat air patrol high overhead. I will never forget that moment.

Early on the morning of the 12th, our Internet connectivity failed due to the Verizon facility's damage — debris, soot, fire, and water had finally taken their toll. (See Figures 2 and 3.) Our internal network connecting all the campus sites (except for the destroyed WTC location) somehow survived. We used fiber distributed data interface (FDDI) for the backbone network. However, our Internet service provider (Applied Theory) stopped working because it rode Verizon on both primary and alternate routes. We were off the Internet! We also lost phone service to Manhattan, including cell phones for a short time because of antenna destruction and cell overuse.

Picking up the Pieces

Our chief technology officer literally picked up our mission-critical external servers and moved them to a disaster recovery site (Xand.Com, in Hawthorne, New York). Our Domain Name

Figure 3
Temporary Cable Runs Bypassing WTC Areas



Courtesy Verizon. Used with permission from www.verizon.com.

Service (DNS) administrator contacted the Internic (which handles DNS changes) and re-hosted our mission-critical external systems there. These systems stayed there for about one week. It took 24 hours for the new IP addresses to propagate, but once done, our Web pages and e-mail came back up on the Internet again.

Figure 4

Red-Amber-Green IT Status Report Sample

Pace University		As Of: 10/16/01 4:07 PM
World Trade Center Tragedy September 11, 2001		
Telecommunication and Management Information System Resources Status		
Resource	Status	Remarks
Cable TV - 135 Williams Street	RED	1-2 Weeks ETR - West Street Problems
Data T-1 - Murray Street (SOE)	RED	DoIT removing all equipment from Murray Street location
Dorm Phones, 135 Williams Street	AMBER	Extremely limited incoming/outgoing service now available. 1 week remaining Estimated Time to Repair (ETR) - PaeTec T-1 circuits "residential priority" for repair in West Street Verizon Facility - cell phones issued to student life
Dial Tone - Some PNY Phones	AMBER	Report remaining issues/problems to #DOIT on a case by case basis
Voice Mail - PNY	GREEN	Full operation of voice mail now available. Additional interruptions may occur as work continues in West Street Central Office.
CENTREX MIDTOWN	AMBER	1 Week ETR - Centrex T-1 through 37th Street Dial Central Office (DCO) to West Street DCO for "346" Dial Tone - trying to get new (non-CENTREX) numbers to forward to; Extension 1700 (Main Number) works but is intermittent; dial tone to other extensions returning; voice mail works like 1 PP Voice Mail
Video Conferencing System - 1 PP	AMBER	No ETR - Verizon Problem - Implemented vBrick usage as temporary solution.
Dorm Phones, Maria's Tower	AMBER	1 Week Remaining ETR - PaeTec T-1 circuits "residential priority" for repair in West Street Verizon Facility - cell phones issued to student life - Able to call/receive calls via special tie line circuits (212-346-XXXX); student Life has details
Data T1s to 135 Williams Street (Pace Dorm)	RED	10/4: Single T-1 Down, Service call placed with Verizon. 1 of 2 T-1's in building available. All building traffic re-routed to use the operational T-1
CENTREX 156 Williams	GREEN	Report Further Problems to #DOIT, doit@pace.edu
Conduit between 1PP and 41 Park Row	GREEN	Since Verizon won't be able to provide direct service to 41 Park Row for a few months, we are investigating REPLACING the conduit and cables between 1 PP and 41 Park Row.
Dorm Phones, Westchester	GREEN	
FDDI/LAN 1 PP and 41 PARK ROW	GREEN	
High Speed Internet Access IN/OUT	GREEN	
External Web Presence	GREEN	
Internal Web, CourseInfo, And Email	GREEN	
Cable TV - Maria's Tower	GREEN	
CENTREX Westchester	GREEN	
CENTREX 1 PP and 41 Park Row	GREEN	
CENTREX WTI Line Forwarding	GREEN	
FDDI/LAN Westchester	GREEN	
FDDI/LAN Midtown Center	GREEN	
FDDI/LAN to 156 Williams	GREEN	
Internet Email OUT	GREEN	
Internet Email INBOUND	GREEN	
Dial Ups Westchester	GREEN	
Dial Ups New York City	GREEN	
Cell Phones/Pagers Westchester	GREEN	
Cell Phones/Pagers New York City	GREEN	
EM Systems Park Row and 1 PP	GREEN	
Library Systems - Westchester	GREEN	
Library Systems - New York City	GREEN	
Computer Resource Centers New York	GREEN	
Computer Resource Centers Westchester	GREEN	
Copy Center 41 Park Row	GREEN	
Video Conferencing System - Westchester	GREEN	Can't connect to 1 PP except via VBRICK
Video Conferencing System - Midtown	GREEN	Can't connect to 1 PP except via VBRICK
Lan Fax System (fax.pace.edu)	GREEN	
vBrick - BRC/1PP	GREEN	
ISIS	GREEN	
ADVANTAGE	GREEN	
INTEGRAL	GREEN	
DOIT MISSION CRITICAL SERVERS	GREEN	
KEY:		
ETR	Estimated Time to Repair	
GREEN	Normal	
AMBER	Limited functionality and/or reliability	
RED	No functionality	

It was extremely important to have Internet connection again because our downtown phones weren't working either, meaning parents, students, and the public couldn't contact our Manhattan campus sites. Because our Internet link to the disaster recovery site also wasn't functional, our CTO devised an ingenious scheme to use dial-up networking to relay e-mail back and forth to our internal network. Once the Internet returned, we moved services from the disaster site back to our IT facility in Briarcliff Manor.

Believe it or not, we then got hit with the W32/Nimda@MM virus. Apparently, during our Internet outage, our virus signature files weren't automatically updated. When the Internet came back up, infected e-mails had already arrived before the virus signature file updates. (Remember, we were relaying e-mail from the disaster recovery site.)

We spent the first day back on the Internet cleaning up that mess.

Once we were allowed to reoccupy our main New York City campus, we obtained additional cell phones and published a previously well-guarded cell phone list of the university administrators. We also used instant messaging, LAN fax, and e-mail to communicate with the NYC campus for almost 10 days, until we got land-line phones back.

During the university president's daily crisis briefings, we actually used my old Army Readiness report formats to keep our staff and customers advised of our systems' recovery. In the sample report shown in Figure 4, Red = No Functionality; Amber = Limited Functionality; Green = Normal Functionality; and ETR = Estimated Time to Repair. This approach worked extremely well, as — in my experi-

ence, anyway — informed customers are happy customers.

I should stress that restoring IT affected by the events of September 11 was only a very small part of the tremendous effort exerted by our president, executive staff, administrative staff, faculty, and students as we all started the long process of returning to some semblance of normalcy at Pace University. Our team came together for everything from conveying students on deserted downtown New York City streets to our Westchester campus sites, to installing multiple megawatt generators, printing and "snail" mailing thousands of letters, cleaning offices, and finding space and equipment for displaced staff and students. I am happy that IT — and all the hard-working people in DoIT — have and will continue to play an important role in this process.

Lessons Learned

As a result of the immediate consequences for Pace University of the September 11 attacks on the WTC, we got a first-hand look at what a university needs to recover from a disaster. The lessons we learned cover a wide range of topics, some totally unexpected.

- Have smart, energetic people working for you, especially your CTO and telecommunications director. At Pace University, these individuals were directly responsible for the vigorous execution of our less than great plan.
- Make certain that your ISP has diverse routing. That is, the primary and alternate routes should not go through the same phone company's dial central office or major Internet point of presence facilities.
- Identify a disaster recovery (or application hosting) site completely independent of your campus sites, with multiple ISPs. Rent at least one rack there. Develop a good relationship with the people who work there.
- Ensure that this disaster recovery site hosts either your primary or secondary external DNS.
- Have a good relationship with your wireless cell phone service providers. We received free AT&T cell phones and service while our land lines were down, for example.
- Have strategic systems equipped with dial-up networking access. Also, have a few notebook computers with nonuniversity ISP access for loaners (say, 5 to 10 machines).
- Make certain that you have cable or satellite (preferred) TV access in all public gathering areas and potential crisis meeting places.
- Maintain an accurate cell-phone directory with university (and nonuniversity) owned cell phones.
- If your Internet link goes down, ensure that you obtain and distribute virus signature updates using dial-up networking before the Internet returns.
- Maintain alternate (that is, home) e-mail addresses for students, faculty, and staff. Also, prepare a well-advertised, nonuniversity hosted Web site

(such as Yahoo Newsgroups) to get the word out in the event of a catastrophic Web page outage.

- Be ready to extract snail-mail rosters from your data warehouse for all conceivable university constituencies (for example, parents of Pace University's New York City dorm students....)
- Have toll-free numbers you can immediately "call forward" (with in-house staff) to telephone banks for university hot lines. We used a bank of 11 phones, staffed at all hours for the first two weeks of the crisis.
- Be able to publish these toll-free numbers quickly via various media and the Web for wide distribution and access by interested parties.
- Be ready to staff the emergency phone lines heavily and nonstop during the first days following the crisis. The Pace University emer-

gency information number received thousands of calls, handled by university staff and faculty who volunteered to serve as hot line operators.

For the September 11 disaster, I believe that we had in place an IT disaster recovery plan somewhere between *great* and *poor* or *incomplete*. Nevertheless, we did execute the plan *vigorously*, with notable success. I trust we will complete our disaster recovery plan and have a *great* plan ready, *vigorously* executed next time. Of course, we hope that there won't be a next time, for any reason. Meanwhile, we continue to pray for the victims and the country as we go about the business of educating our students at Pace University. *e*

Frank Monaco (cio@pace.edu) is the chief information officer at Pace University in New York.



Call for Proposals
EDUCAUSE 2002

**Juggling Opportunities in
Collaborative Environments**

ATLANTA, GEORGIA
OCTOBER 1-4, 2002

Call for PRECONFERENCE SEMINAR PROPOSALS
Deadline: DECEMBER 31, 2001

Call for Proposals
Deadline: JANUARY 18, 2002

www.educause.edu/conference/e2002

