Business Continuity/Disaster Recovery Planning and Hurricane Katrina:
How It *Really* Worked

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In the beginning . . .

- Hurricane Betsy – September 1965
  - Last major hurricane to hit New Orleans prior to Katrina
  - Category 3 Hurricane (Winds 125 mph)
  - First billion dollar hurricane
  - Flooding in Lower Ninth Ward and St. Bernard Parish but levees held in New Orleans.

BC/DRP Challenges

- Most disaster recovery plans were 40 years old.
- Most individuals who had dealt with problems caused by Betsy were retired or dead.
- Most infrastructure considered necessary for modern healthcare did not exist in 1965.

BC/DRP Challenges (cont.)

- Budgets remained static or had been reduced for the past several years.
- Low incidence of occurrence caused disaster recovery expenses to be considered a low priority.
- Little in the way of resources for redundant systems.

LSU Health Sciences Center

- Two Universities- N.O. and Shreveport
- Ten Charity Hospitals statewide.
- 20,000 Employees
- $1.6 billion budget

LSUHSC-NO

- Six schools
  - Medicine
  - Dentistry
  - Allied Health
  - Nursing
  - Public Health
  - Graduate
- 5000 Employees
- 2000 Students

LSUHSC Health Care Services Division

Eight Hospitals and Clinics

1,054 Staffed Beds/1,556 Licensed Beds

Louisiana Population Served

Approximately 733,911

Medical and Clinical Education

- 1,217 Medical Residents and Fellows
- 3,887 Nurses and Allied Health Professionals

Number of Inpatients
- 47,351 medical/surgery admissions
- 5,260 psychiatric admissions
- 217,869 medical/surgery inpatient days
- 63,062 psychiatric inpatient days
- 4,807 births

Number of Outpatients
- 917,815 clinic visits
- 388,206 emergency visits

LSUHSC-NO Office of Computer Services

- Provides Administrative Information Systems to 10 hospitals and 2 academic campuses
- Provides Clinical Systems to 8 hospitals
- Metrics
  - 9,044 Computers
  - 465 Servers
  - 4,497 Helpdesk calls per month
  - 11,518 users
  - 168 Staff (post Katrina, down about a third)
  - $16.7M Annual Expenditures

Original BC/DR Plan

- Divide IT staff into two teams:
  - Remote Operations Team (ROT)
  - Preparation And Recovery Team (PART)
- ROT evacuates while PART does physical preparations.
- Upon arriving at muster site, ROT assumes operations from PART and PART evacuates.
- After storm passes, PART returns as assumes operations and then ROT returns.

Original BC/DR Plan (cont.)

- Use sister campus in Shreveport as muster point for ROT.

Issues Requiring Plan Revision

- In 2001 a new ERP system was installed to handle HR, Payroll, Financials, Student Registration and Grant management for both the New Orleans and Shreveport Health Sciences Centers and the ten charity hospitals. Hardware was installed in New Orleans but not duplicated in Shreveport.

- Federal and State regulations required more formal disaster planning.

- EPA limited amount of diesel that could be stored for the generator to a three day supply.

- New state safety regulations forbid allowing anyone to ride out a Category 3 storm or greater in the data center due to the large amount glass used in its construction.

Desktop Excercise

On June 10th, 2005, Tropical Storm Ariel formed in the Western Caribbean just southeast of the Yucatan Peninsula. Moving north-northwest at approximately six mph the storm steadily gathers strength and enters the Gulf of Mexico as a Category 2 hurricane on June 12. An unusually warm May has made conditions in the Gulf ripe for strengthening. Ariel continued on more-or-less a north-northwest track bearing down on New Orleans. By the afternoon of the 13th Ariel reaches Category 4. Officials in New Orleans and the surrounding areas order mandatory evacuations twelve hours ahead of schedule due to the rapidly increasing power and size of the storm.

At LSUHSC-NO, preparations are coming along smoothly. The ROT has evacuated to Shreveport with essential recovery data. PART team has moved computers to a safe location and completed physical preparations. The ROT team has assumed remote operational control of the Computer Center.

Ariel makes landfall at the mouth of the Mississippi at 9:13 pm June 16th, as a Category 5 hurricane with maximum sustained winds of 160 mph and a pressure of 888 mb. New Orleans is hit by the western edge of the eyewall. The storm changes to a more westerly course and hits Hammond and Baton Rouge as a weak Category 4.

Desktop Exercise (cont.)

The ROT loses connection around 1 AM on the 17th. Hospitals lose patient management, lab, pharmacy, and radiology systems about the same time and switch to downtime procedures.

The storm makes a jog to the north and hits Alexandria and Ruston before dropping to a tropical storm. New Orleans suffered mainly wind and rain damage having endured the full force of the hurricane's winds from the east, north and west but was spared most of the flooding. The Mississippi Gulf Coast took the brunt of the storm surge pulverizing the shipyards, and resort areas.

On the morning of the 17th the governors of both Mississippi and Louisiana declare their states disaster areas. On the 19th, essential personnel are allowed to return. The PART returns to assess the situation.

Desktop Exercise (cont.)

The RCB has sustained considerable damage. Above the fourth floor, most of the glass is missing or damaged. The windows above the atrium are completely gone exposing that area to the elements. Windows in the machine room are also missing. Furthermore, the water from the atrium has leaked under the raised floor and water blown in through broken windows on the 8th floor has leaked through the ceiling onto the electronics, damaging the mainframe and many of the servers. Water also got into the electrical conduit. Physical Plant estimates that is will take six months to make the building habitable again.

Machines that were shut down and wrapped in plastic in preparation of the storm survived intact and are operational. This represents approximately 35% of the servers and 55% of the workstations.

The good news is that connectivity will be restored in 48 hours and power is available on the rest of the campus. What do you do next?

The New Plan

- **Emphasized Command and Control**
  - Communications
    - Blackberries (PINs, Push To Talk)
    - Dedicated channel 700MHz radio
    - Satellite Phones
    - Text Messaging
    - Web
    - Email
- **Backups**
- **Remote Operation and Use of Computing Infrastructure**
- **Build New Data Center**

The New Plan

- **Pre-Disaster Decisions**
  - How do you order equipment w/o the automated purchasing system?
  - How do you reroute data circuits in the context of massive public infrastructure failure?
  - How do you run payroll w/o the automated payroll system?
  - What hardware will be needed for a new data center?
  - Laptops vs. Workstations
  - Develop kits with all needed information and supplies

The New Plan (cont.)

- Prioritize Applications into three levels
  - Tier 1
    - Communications
      - Web
      - Email
      - Blackberries
  - Tier 2
    - Clinical
   - ERP
  - Tier 3
    - Everything Else

The New Plan

- Disaster Security
  - Switch from LAN based to WAN based
  - Thin Client
  - Possession of Backups Maintained

The New Plan

- **Drawbacks**
  - Identify Funding
  - Locate suitable site
  - Downtime while data center is rebuilt

The New Plan

- Put into operation April 1st, 2005.
- Hurricanes Cindy and Dennis provided excellent opportunities for testing and refinement.
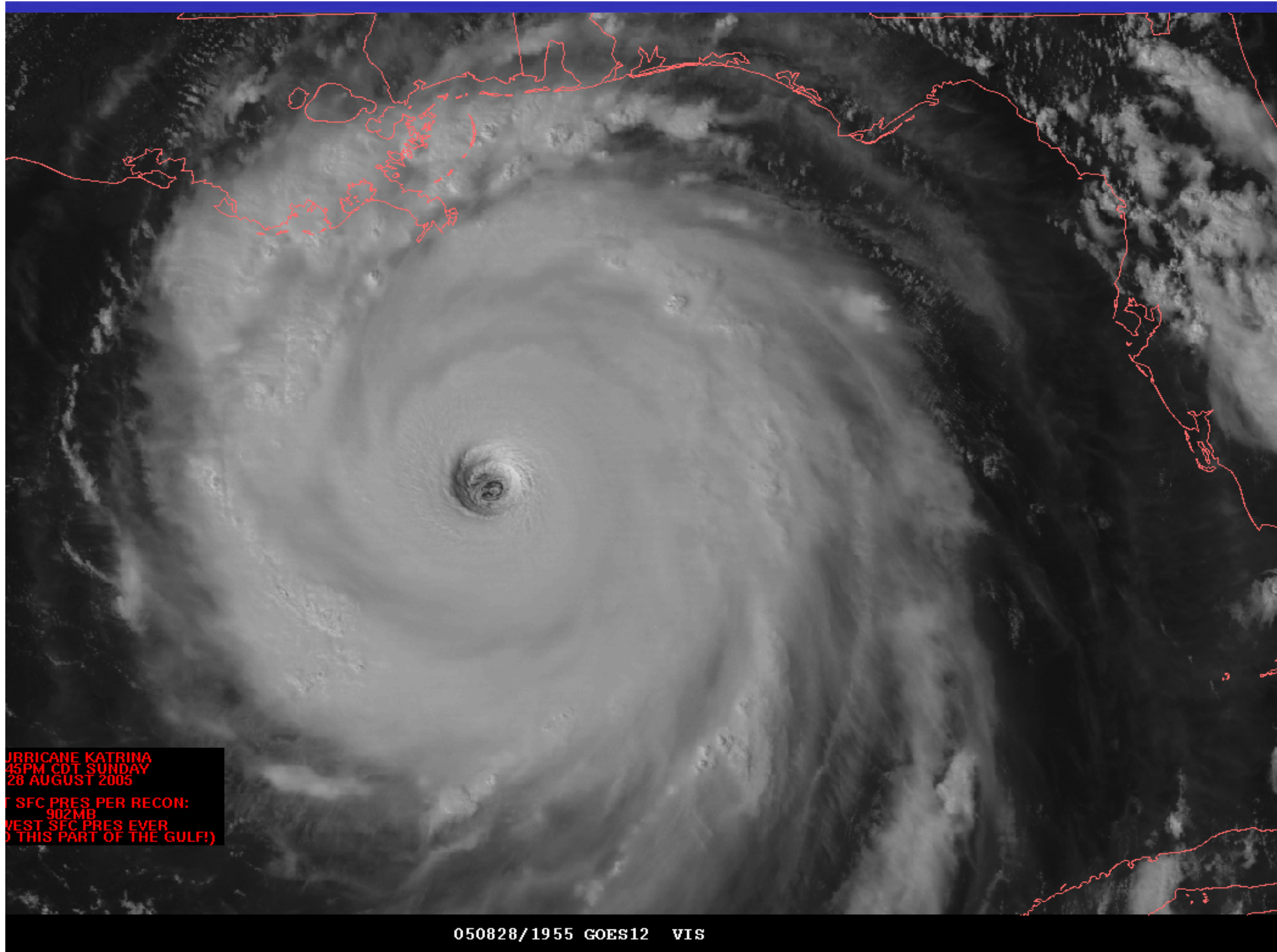
HURRICANE KATRINA
45PM CDT SUNDAY
28 AUGUST 2005

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Preparation Phase

- Payroll Processing is Accelerated.
- Backups completed and loaded into kits.
- Hotel Reservations made for Remote Operations Team (ROT) in Shreveport.
- ROT loads up recovery kits and backups and heads for Shreveport.
- Remaining staff complete preparations, turn operations over to ROT and evacuate.

10-30 FT. SURGE

Landfall 2, LA/MS BORDER
125 MPH WINDS...CATEGORY 3...10 AM CDT

Click on 🌀 for Before/After Images

Hurricane Katrina Approximate Track
Monday August 29, 2005

Landfall 1, PLAQUEMINES PARISH LOUISIANA
140 MPH WINDS...CATEGORY 4...610 AM CDT

20 mi
20 km

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When the Worst Happened

- Within hours of levee failures the order to implement rebuild process was issued.
- Within an hour after that, the State Office of Information Technology had identified three sites to rebuild computer center.
- The Department of Public Safety was chosen and the State Office of Telecommunications Management begins rerouting circuits.

When the Worst Happened

- Emergency website established at data center of sister campus in Shreveport to provide:
  - Blackberry PINs.
  - Employee and student check-in.
- Emergency email system put in place until data center could be rebuilt.

When the Worst Happened

- Equipment list developed from documentation in about six hours and order placed.

- Vendor initially has trouble comprehending the reason for the purchase and assigning priority because we are so early. LSUHSC and vendor work through night validating order and equipment begins to ship the following day.

When the Worst Happened

- State contract used and additional large system discounts are applied. This eventually saves LSUHSC much grief when we learn after-the-fact that FEMA expects some form of competitive process for procurement. (Purchase of equipment vis-à-vis leasing challenged.)

- Vendor sends 12 volunteers to help rebuild. They have no lodging and sleep on the floor.

Katrina Impact

- 1464 Deaths
- 135 Still Missing
- 1.3 million people displaced
- 81,000 businesses damaged or destroyed
- $7.4 billion in economic cost
- 204,500 homes damaged or destroyed

What Worked

- Payroll for 20,000 employees was completed on August 31.
- No data was lost
- Communications among key staff members was maintained.
- Data Center was rebuilt in five days. Systems turned over to users in 10 days. First post-Katrina payroll run in 14 days (on time!).

Lessons Learned

- Housing
- Maintaining FDA Certification
- Premium Support Service Options vs. "Premium" Consultants
- Don't Work Around the Clock (16 hr days)
- Virtualize the hardware
- Maintain possession of your backups.
- Be prepared to address lots of ad hoc issues.
- Wireless networks don't work.
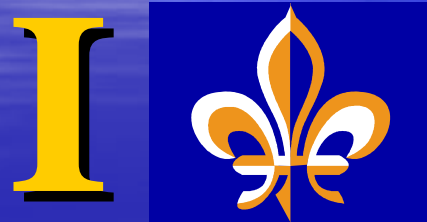- Telephones and cell phones don't work.

Lessons Learned

- Get FEMA training prior to the disaster to understand what the Federal government can contribute.
- Document, Document, Document.
  - The auditors will show up afterwards to shoot the survivors.
  - No plan is perfect. The documentation helps with process improvement.
- Be prepared that Preservation of Life activities will take priority over all other activities and can affect command and control communications.

Key Points

- Communications
- Make as many decisions beforehand as possible.
- Use desktop exercises.
- Remember that certain infrastructure may not be available during an emergency and prepare for such contingencies.
- Forge relationships between IT and Compliance.
- Be flexible. Even with the most careful planning the unexpected WILL happen.

Coming Back