



Cloud Solutions

WWW.GETCLOUD.COM

White Paper ¹

Health Care Disaster Communications

Recent events have underscored the importance of disaster recovery plans and communications. It has also made clear the need for a much broader scope than these plans have historically encompassed. This leaves the needs hospitals and the medical community, a foundational pillar to the treatment and well being of society, ever greater to function and plan for a multitude of disaster and continuity items.

What Key DR Items are Facing Hospitals?

- Flood
- Fire
- Storms (Hurricane, Tornados, etc)
- Earthquakes, mudslide, other land movements
- Auto or Airline crash
- Pandemic

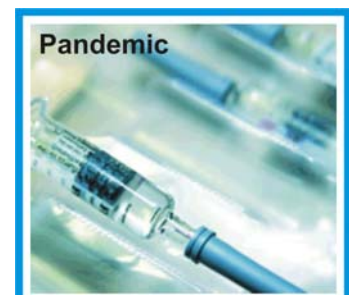
Problem

In almost all case communication and data can be effected in whole or in part thus leaving command and control significantly reduced and rebuilding severely hampered.

- All communications can be lost in a disaster
 - Disconnected operations are the rule not the exception
 - You cannot start recovery without communication
- FEMA
- In a pandemic medical facilities may need to be quarantined or use offsite facilities

CMRS

"We will need to learn from this event and work together to improve the reliability, survivability, and security of our nation's telecommunications networks," FCC Chairman Kevin Martin and Commissioner Michael Copps said in a joint statement.



"Health experts say that hospitals are likely to have the toughest time keeping up. Every hospital would run out of beds"

Katrina is the third major communications disruption in this country in recent years, following the terrorist attacks of Sept. 11, 2001 and the Northeast blackout of 2003.

U.S. Health and Human Services Secretary Michael Leavitt said he's trying to get people to prepare for a pandemic without panicking them. Some have asked him if the government is raising the alarm unnecessarily.

"Is this Y2K all over again? Is this the little boy who cried wolf?" Leavitt said. "I hope so, but if history is any guide, pandemics happen."

Leavitt told dozens of officials at a state summit on planning for a pandemic that no one knows if the deadly bird flu will spark the next pandemic, but something will. He said of the three pandemics in the last century, two were moderate and one was the devastating Spanish flu outbreak in 1918.

"There is no reason to believe the 21st century will be any different than the century before," he said.

Pandemic Predictions

If the avian flu does morph into a pandemic, a report issued with the National Disaster Medical System stated:

- Up to 200 million person will be infected
- Between 40 million and 100 million persons will become clinically ill
- It would take 6 months to make a vaccine and would only cover 25%
- Between 18 and 45 million persons will require outpatient care
- Between 300,000 and 800,000 will be hospitalized
- Between 88,000 and 300,000 will die



Hospitals should be prepared to provide services in potentially unknown locations. Ideally this would mean having access to all the key software and communication systems available in the hospital. Cloud Solutions provides this access.

A pandemic could leave IT operations short of staff, especially if schools are closed or the federal government imposes quarantines. If hospitals are running multiple shifts and an IT worker or others ones becomes infected you could lose an entire shift

Communities and Hospitals should plan for a potential disruption of up to six weeks, the approximate length of the avian flu's expected first wave, said Robert Gleeson, a doctor and medical director at The Northwestern Mutual Life Insurance Co. in Milwaukee. If the flu does spread worldwide, where do we put all the people, safe, treatable, and quarantined. Health experts say that hospitals are likely to have the toughest time keeping up. Every hospital would run out of beds. At Stanford University Medical Center, emergency planners said they could use dorms on the university campus -- where classes would likely be canceled and students sent home -- or nearby hotels as clinics for flu patients. In Santa Clara County many public buildings have been designated as remote sites to care for those in need. "Initially, you

determine how you can surge within your own institution by increasing patient capacity and decreasing your patient load. And then you look beyond your four walls to developing influenza care facilities," said Eric Weiss, chair of the hospital's disaster preparedness committee.

This isn't Hurricane Katrina, where it's just in Louisiana, or the Northridge earthquake, where it's just in Los Angeles. It's everywhere at the same time," said George Rutherford, director of the Institute for Global Health in San Francisco.

In a worst-case scenario, Rutherford said, a pandemic would mimic any other natural disaster, only with a protracted time of suffering and recovery.

Katrina Example

East Jefferson General Hospital (EJGH) – New Orleans

When the storm roared through New Orleans and its surrounding parishes that afternoon, EJGH was, on one hand, fortunate. It did not flood, and the building and its contents remained intact. On the other hand, the area's external infrastructure was essentially destroyed: High winds and widespread flooding from breached levees soon cut off all electric power, telephones, city water and major roads. Food supplies and essential services, including police security, were severely compromised. The hospital was left an island, stranded by water on all sides (which literally lapped at its rear entrance), alone and effectively cut off from the rest of the world for more than a week.

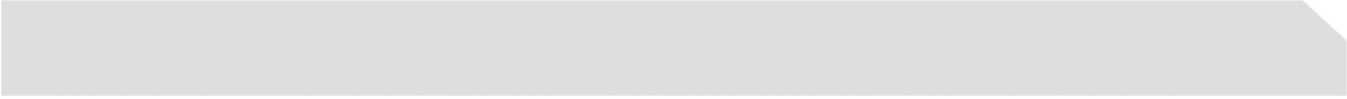
As might be expected, EJGH maintained an IT disaster recovery plan and however, the extraordinary breadth and duration of the Katrina disaster rendered much of the plan irrelevant. As an example, the plan detailed a hot site arrangement with SunGard, whereby weekly systems backup tapes are held in a local vault to be available at any time for transport to a SunGard facility in New Jersey. Twenty-four hours before Katrina hit, mandated evacuations forced the local vault's staff to leave the city, eliminating access to the backup tapes. Even if IT staff could have accessed the backups, flooded highways removed any possibility of travel.

During or shortly after the storm, the following pivotal events occurred:

- EJGH lost commercial power;
- EJGH lost two of 15 backup generators. The resulting loss of air conditioning caused wiring closets to heat up to 150 degrees, and IT had to shut down the hospital's network;
- Bell South's Primary CO went down;
- Bell South's Jefferson Parish CO generator ran out of diesel fuel;
- Cox Cable, EJGH's high-speed Internet supplier, went down.

New Critical Functions Emerge

Under these extreme conditions, it quickly became clear that basics were now EJGH's first priority. The facility had become more of a shelter than a hospital, requiring special security measures (eventually provided by the National Guard and other military personnel), food rationing, provision and tracking of



needed prescription medicines to employees stranded without them. Community members and hospital staff who had taken refuge there had to live in the hospital for a week without knowing how long the siege would last; many remained even longer, camped out in corridors and empty patient rooms. Not surprisingly, the single most important IT function quickly changed from internal systems management to communications

Locating Employees and Ensuring Safety

Secondary to ensuring the flow of information, processing payroll and posting charges soon became critical. The IT staff focused on payroll as soon as it became likely that the crisis could be lengthy. Evacuation of most EJGH employees was generating high living expenses, and many people anticipated heavy home repair costs upon their return to the area. IT, the payroll department and the hospital's bank devised a way to move money into each employee's account using the Internet. They developed a "Net check" approach which did not include payroll deductions but represented the amount paid to each employee during the last pay period.

Similarly, hospital management soon realized that the length of time systems would be unavailable threatened to create a large, unmanageable backlog of charges. Locating lost ones and families also became a priority as well as a control issue.

Power-up for a New Day

EJGH did not flood; hardware and software systems were generally undamaged. Once the staff was able to locate a generator mechanic mid-week after the storm, work began to return servers and systems to the first floor IT Department. Power was rationed and air conditioning turned on only for short periods, to save fuel. The IT staff began systems power-up by Friday, after commercial power and battery backups were restored, but soon discovered that nine mainframe disks needed repair. Fortunately, an IBM service person was able to access the hospital and make the repairs by Saturday.

Through a combination of intense effort and a certain amount of good fortune, EJGH was able to get its systems back up and running on Sunday, September 4th, only one week after the storm began. Despite the massive destruction that still encircled EJGH and the continued lack of many public utilities, East Jefferson General Hospital was again in a position to provide care to injured Katrina survivors and emergency workers.

Challenge

Voice, data, and video are at the core of today's connected world. The communications revolution has brought high level connectivity to the public bringing on demand information and news. The advantage of the connectivity is that information is easy to share directly or on mass, in voice written or full media form. The unfortunate side effect of on demand information is a reliance on just-in-time delivery. In the event that core infrastructure goes down it is very difficult to transport the same messages to the same audience. During Katrina there was no way to relay information to those who were stranded. There was no central command that had connectivity to all volunteers and disaster recovery organizations. There was no mass communication delivery system. Most of the information relayed to the world outside of the disaster area came from news media and not from those coordinating the relief effort. Ideally there should have been a system in place that would be able to survive a disaster, provide connectivity to the

outside world for response organizations and citizens, and connect a variety of groups to one or more central command centers.



central command centers.

There are many different systems that are capable of providing some of the necessary communications. A complete communication system should be able to scale for voice or telephony, internet, remote network connectivity, support video and applications, land to mobile radio (LMR), and integrate in a variety of deployment scenarios. Individual satellite phones can cover the voice needs but lack all other aspects.

During Katrina the satellite phones became saturated as a result of their

non-direct transmission and reception usage. Normal satellite systems use pinpoint focus towards an exact satellite as to avoid in air interference and increase bandwidth capacity. Individual satellite phones are more unidirectional which causes saturation of the signal in air. They cannot support multiple units in use in a small area such as the same state. This renders them useless during a disaster in which multiple groups rely on Individual satellite phones.

A long standing communication system utilizes radio frequency such as HAM radio or other long range radio systems. They are effective for their cost and simplicity. They do suffer problems in transmitting in limited available channels and during unknown atmospheric conditions. They also lack connections to the outside world and the valuable information available from the IP based internet. HAM radios are considered outdated for large scale recovery even though they are still used by some organizations as their current recovery option.

Small aperture satellite systems can provide the internet connectivity and are easy to obtain. The problem is that they were not engineered to fully support communications beyond internet traffic. There is also a lack of coordination between the systems available and other equipment needed to provide a full range communications. The most common usage of the small aperture satellite is on-vehicle deployment for command vehicles. Satellite does provide the best option for connectivity to the world but has not been developed to support the more powerful applications used in fixed infrastructure systems.

Many organizations rely on offsite redundancy. This does provide the security for applications and data storage but it does not solve onsite communications problems. In normal operation a mirrored location can provide the necessary failover to continue normal operations. During a disaster if the primary site goes down and must be restored the secondary location can only provide support for applications and data. The primary site will still require a redundant non-landline based connectivity system. Businesses often choose offsite redundancy but do not have the secondary communications system in place. Government organizations such as 911 facilities most often support a failover to an alternate location but do not have a system for restoring communications for their own facility or as in Katrina the area was so wide that failover site were also afflicted.

Disaster communications on a whole is a crucial piece in recovery. Being able to overcome the challenges presented by budgetary constraints in a market with little support for the current and future needs is often difficult. Many cities and counties have formed plans to communicate but must try and put together multiple pieces to have a system. There is no support for a custom design and no guarantee that it will work with other systems. Maintenance and support are more difficult to obtain, service guarantees do not exist, and bills from multiple vendors can be difficult to track and budget for.

Solution

The CLOUD product line from Cloud Solutions brings together the best in communications technologies to provide a mobile, scalable, inexpensive as an end to end solution. With this system it is now possible to provide redundant networking systems for recovery. The system scales from four to two hundred and forty users with a range of customizable options. Unlike other options on the market "Remote CLOUD" is an interoperable framework that supports a variety of IP based systems. It also operates with the public switched telephone network and LMR systems Cloud Solutions is the one stop answer with full service level agreements and single point of billing to increase product security and ease of purchase. Cloud Solutions delivers an all inclusive disaster recovery solution.

The system combines telephony, LMR support, wireless networking, server based applications, security, internet connectivity, and power generation into one system. This is accomplished by the use of multiple available deployments; the standard deployment being through four or more ruggedized transport cases. A complete system for twelve phone users and up to twenty-four data users can be deployed in ten to twenty minutes by two people. The system can also integrate into fixed locations, small or large vehicles, command vehicles, trailers, or through custom deployments such as parachute ready cases.

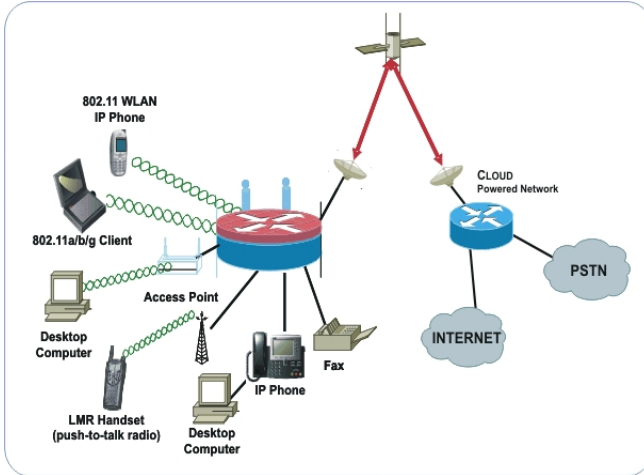
INTEROPERABLE COMMUNICATIONS



Cloud Solutions has chosen satellite for a data transport due to its portability and reliability. The satellite network is redundant and scalable. Unlike the Individual satellite phone system which runs into over saturation problems, the satellite systems utilized by Cloud Solutions are pinpoint self-aligning and can support thousands of simultaneous clients. The number of personnel deployed to Katrina would not have utilized even ten percent of the available capacity for the defined usage area. In the event that additional bandwidth is required in an area users can quickly increase bandwidth in the array of the

additional twenty-eight satellites available. The system supports bandwidth for every hospital, state, city, county, fire department, police department, school, and federal agency with plenty of available room for businesses.

Latency is a known issue with satellite based systems which can cause VPN tunnels to collapse within a few minutes to a few hours. The issue is that VPN tunnels require consistency in their timing and often timeout. Cloud Solutions data networks recognize and coordinate the timing of VPN streams to ensure that there is no tunnel collapse. This can eliminate operational headaches associated with running remote systems over VPN.



Cloud Solutions data networks recognize and coordinate the timing of VPN streams to ensure that there is no tunnel collapse. This can eliminate operational headaches associated with running remote systems over VPN.

Voice over IP has gained popularity with the increase of available bandwidth and improved technology. It is necessary to utilize VoIP to supply voice connectivity to users over satellite. The issue with running voice over satellite has been latency, quality of service, and bandwidth. Some systems utilize IP PBX systems to provide voice services which can be costly and difficult to obtain quality. IP PBX relies on third party data equipment to ensure that there is priority for voice traffic and the

data equipment relies on the satellite link to support voice. Three different systems that are not designed for maximum interoperability can cause significant problems. Cloud Solutions uses open standards based VoIP through SIP that is one hundred percent IP based; there is no use of any PBX system. Because all the call processing is IP based at all times it is possible to provide quality of services throughout the call cycle. The data network which is optimized to support VPN is also optimized to support voice. This is done by controlling quality from the point of the call through the processing, transport, and delivery through satellite. Cloud Solutions integrates and optimizes the entire system to support from one to ninety-six simultaneous voice calls.

For redundancy in networks the Cloud Solutions system supports existing IP PBX, PBX, and VoIP systems. Utilizing the Cloud system it is possible to provide voice redundancy and data redundancy through one product. Until now it has not been possible to provide this level on non-terrestrial backup for connectivity without great expense or considerable trial and error.

Summary

The Cloud Solution line of products with its portability and easy of use allow for communication any place and anywhere. In the hospital setting for off site or triage areas the tents city or quarantined buildings are immediately connected to the outside world or securely back to the facility of your choice. The ability to be non terrestrial, the satellite based system securely and effectively allows for ease of communication. If disaster strikes as we saw, the Cloud Solution has the ability to continue functional operations and has the platforms to meet the needs of the organization with ease of operation.

Corporate Headquarters
Cloud Solutions
2680 Bishop Dr #125
San Ramon, CA 94583 USA
www.getcloud.com
Tel: 888-291-9367
Fax: 925-806-0800

