the Availability Digest

www.availabilitydigest.com
@availabilitydig

911 Systems Are Failing Too Often

May 2016

It should be obvious without saying that U.S. 911 services are among the most mission-critical of all computer applications. “911” is the nationwide U.S. emergency number that will immediately get the caller to assistance. If a 911 service fails, lives and property are put at risk. A crisis call for an ambulance, to police, or to a fire department may go unanswered or be seriously delayed.

Yet a simple Google search of “911 failures” yields pages of references to 911 system failures across the country. In some cases, the failure is the result of inadequate backup systems. In others, it is a consequence of the failure of an otherwise adequate backup system.

In this article, we describe some of the recent 911 system failures.

Erie County, New York

Buffalo, New York, is the anchor of Erie County. Erie County had just spent tens of millions of dollars on upgrading its 911 system. Yet on March 30, 2016, the system went out of service for three and a half hours, beginning at 3 am.

The problem wasn’t noticed until a dispatcher realized that calls were not coming in. This was a half hour after the actual fault had occurred. Dispatchers went to a secondary location to which calls were supposed to be routed if the primary location failed. However, emergency calls were not being diverted to this location. Fortunately, since it was off hours, not many calls were expected. Dispatchers had no idea how many calls were lost, though some calls were eventually answered.

The problem turned out to be a malfunctioning air conditioner and a failure of its backup. A service technician was dispatched to the site and found that the temperature in the computer room had risen to 120° Fahrenheit. A warning system that was supposed to broadcast an alarm hadn’t worked, and the backup air conditioner did not turn on. Circuit breakers had tripped to protect the computing equipment.

To make matters worse, the repair man hit an emergency kill switch for power, thinking it was an air conditioner reset button. Now the entire facility was without power. This shut down every emergency response terminal in the public safety building and rendered the phone systems and push-to-talk systems useless. Dispatchers resorted to their cell phones for communications. An electrician had to be called in to reset the power.

In the event of an outage of the main call center, emergency calls were supposed to be diverted to four other backup centers. However, one of these centers was flooded with calls. Another center received only two calls. The other two centers received no calls. When staff tried to establish a backup call center at one of the idle sites, the system failed to recognize the new site. The result was long waits for callers to get a responder. On one test, the phone rang thirty times before it was answered.

When the air conditioning system was fixed, the 911 systems were rebooted in a particular order. The system came back online at 7:30 am.

During the three-and-a-half hour outage, about forty emergency calls were answered, including one suicide of a woman who jumped off an eight-story parking ramp.

Erie County periodically tests its 911 backup procedures, and these had always worked. However, a power outage was never simulated.

Verizon is responsible for ensuring that 911 calls be answered in the event of a primary system shutdown. Erie County has begun an investigation into Verizon's facilities to determine why calls weren't diverted during the outage.

Las Vegas, Nevada

On Tuesday, February 2, 2016, the city of Las Vegas suffered a six-hour breakdown in its 911 emergency response system. The outage affected not only its 911 system but its 311 police and fire information systems.

Emergency calls were answered from about 3:30 pm until 10 pm by dispatchers in neighboring North Las Vegas. Las Vegas police were sent to neighboring cities to help handle the volume. Nevertheless, many emergency calls experienced delays. Non-emergency calls were not accepted.

The Las Vegas 911 center typically receives hundreds of calls an hour. This interruption was considered to be a critical infrastructure failure. Las Vegas had recently spent $2.3 million upgrading its 911 system after a similar glitch occurred in June 2015, leaving about 400 callers with busy signals.

The system administrators have no idea how the outage happened. After the system was restored and was back online, any data that would have provided answers about the outage had been deleted.

However, Las Vegas is now planning several improvements to its system as a result of this outage:

- Enhanced system to give real-time notice of any developing problems.
- Restricting access to the server room and the network to lessen any chances of tampering.
- Installing locks on all equipment cabinets.
- Putting strict protocols in place for vendors entering or working inside.
- Prohibiting the connection of PDAs, thumb drives, or outside devices to the computers.
- Installing additional equipment that will improve operations at critical times to increase the speed at which calls can be sent to alternative call centers.
- Installing backup phone lines at the main communication center.
- Setting up an off-site call center that will support the main call center.

Pinellas County, Florida

Pinellas County in Florida is home to St. Petersburg and Clearwater. On February 17, 2016, at around 10am, the county's 911 system suddenly failed. The outage was caused by a "routine" software upgrade by the county's network provider.

The 911 system was down for more than five hours before the network provider could restore it to service. During this time, all medical and police dispatch calls were diverted to the St. Petersburg Police Department. The Police Department then rerouted calls to each appropriate law enforcement agency. Additional county personnel were pressed into service to aid with the call volume.

During the outage, police handled 684 calls. 397 of them were emergency calls.

Rerouting of calls through the St Petersburg communication center is part of the county's emergency contingency plan.

Cleveland, Ohio

Nearly 500,000 people in Cleveland, Ohio, were left without 911 service for several minutes during the early morning hours of Thursday, March 3, 2016. AT&T had announced that it planned maintenance on telephone lines between midnight and 5 am that might affect 911 services. It then revised its statement to indicate that there would be no impact to 911 services.

However, 911 services suffered an outage from 2:17 am to 2:38 am. Twelve calls went unanswered. When service was restored, dispatchers were able to call everyone back. None of the calls had been emergency calls.

Washington, D.C.

On Saturday, April 2, 2016, high winds in the Washington, D.C. area caused several power outages. Power to the D.C. 911 call center was knocked out at 11:25 pm. Apparently, a power spike caused the backup generator to fail. The 911 call center was down.

911 services were relocated to a backup site. No 911 calls were delayed or impacted. However, 311 police dispatch calls were down for two hours

The power outages also took down Internet services. First responders turned to radios for communication.

Power was finally restored to the 911 call center the next day.

CenturyLink Fined

Olympia, Washington, suffered a six-hour 911 outage in April 2014. CenturyLink is the provider of 911 services for the state's seven million residents.

Recently, state regulators fined CenturyLink $2.85 million for the outage. Furthermore, the company must regularly report to the Utilities and Transportation Commission on 911 circuit reliability and a transition to a more advanced 911 system.

Lessons Learned

As with all mission-critical systems, 911 systems must provide a backup facility so that operations can continue in the event of a primary system failure. Equally important, the backup facility should be periodically tested to ensure that it is operational.

As is clear in many of the incidents described above, backup failures were communication-oriented. The backup sites functioned properly, but 911 calls did not get properly rerouted. It appears that backup testing did not always thoroughly test the communication side of things. This is perhaps because communications and communication rerouting are the responsibility of a telephone company such as Verizon or CenturyLink, and getting these companies to commit to a backup test might be a problem.

Nevertheless, as seen above, it is imperative that all phases of the backup plan be exercised periodically and thoroughly.

Acknowledgements

Information for this article was taken from the following sources:

Las Vegas 911 dispatch system restored after 6-hour outage, *Las Vegas Now*; February 3, 2016.
Metro says upgrades are coming after 911 and 311 system outage, *News 31*; February 16, 2016.
Software issue causes outage with Pinellas County's 911 system, *Sun Coast News*; February 17, 2016.
Pinellas County 911 System Up And Running, *Patch*; February 17, 2016.
State regulators fine CenturyLink $2.85 million for 911 outage, *Fox*; February 22, 2016.
Cleveland suburban 911 outage blamed on phone maintenance, *Cleveland.com*; March 4, 2016.
911 services restored in Erie County after widespread outage, *WIVB*; March 30, 2016.
911 System Done in by a Malfunctioning Air Conditioner, *Emergency Management*; March 31, 2016.
DC 911 Call Center Power Outage Reveals Backup Generator Problem, *NBC*; April 4, 2016.
Series of human, technological failures result in 911 outage, *Lancaster Bee*; April 14, 2016.
Erie County officials seek answers after 911 failure, *Buffalo News*; May 16, 2016.