

So You Think Your System is Reliable?

January 2008

The abundance of system failures causing major impacts overwhelms our Never Again column. Earlier this year, we published a summary of several major outages to try to catch up with the news.¹ In this article, we continue that tradition and give brief summaries of many significant system outages that occurred during the second half of 2007.

There are some interesting lessons to learn from these experiences. Of the twenty-one instances reported below, seven were due to power problems. We see this as a recurring theme. Also, another seven of the instances had to do with satellite branches – train stations, airports, and motor vehicle bureaus. It seems that we often don't extend our notions of uptime beyond the central facility.

There was one case in which a failure cost billions of dollars when Samsung's chip line went down. Then there was the VoIP provider Skype that went down for days when its network overloaded trying to handle millions of simultaneous end-user software upgrades. What about Cisco? Even an acknowledged leader in network redundancy can go down. And there was the lowly PC that kept thousands of arriving international passengers on planes for hours at the Los Angeles airport.

FiberNet's Nightmare

wvgazette.com – FiberNet is a telephone company that provides transport services and managed IP services to 24,000 customers, mostly businesses. On July 10, 2007, 11,000 of its customers suddenly lost service. The problem was traced to a failed digital crossconnect system box. All efforts to return the system box to service failed. FiberNet finally had to order and install a new system box. Service wasn't restored for two days. FiberNet is now reengineering its systems to provide redundancy and is fighting law suits brought against it as a result of the outage.

Statewide Computer Problem Shuts Down Indiana BMV

www.wthr.com – Indiana residents showing up early Saturday morning, July 14, 2007, to renew their car registrations and drivers' licenses found long lines building because the computers at all 141 Bureau of Motor Vehicle branches were not working. The problem was not in the BMV systems. The Indiana government's statewide computer had crashed due to a failed router. Fortunately, it was a Saturday; and of all the state's offices only the BMV branches were open for business. However, the problem was aggravated because this was the last day before the renewal deadline. Service was not restored until late that afternoon.

San Francisco Power Outage Takes Down Large Web Hosting Service

www.news.com – On July 25, 2007, transformer breakers at a San Francisco Pacific Gas and Electric power station unexpectedly opened, causing a power surge that cut off all electricity to a portion of the city. Power was lost to several data centers, including the San Francisco data center run by 365 Main, a large hosting company. 365 Main hosts web sites for such companies as Craig's List and Second Life. Three out of ten of 365 Main's power generators did not start

¹ [So You Think Your System is Robust?](#), *Availability Digest*, August, 2007.

because of a bug in the company's Detroit Diesel Electronic Controller, which controls the startup sequence for its generators. A major portion of its data center was down, and many of its supported web sites were offline for several hours after city power was restored while the web sites were recovered.

RAID 5 Failure Takes Web Site Out for Days

www.imaging-resource.com – Imaging Resource provides Web-based digital imaging services. On Friday, July 27, 2007, its Web server suffered a RAID 5 drive failure that took down the system. How could this happen? RAID 5 is supposed to survive any single disk failure. Well, not quite. In this case, the drive failed in such a way that it took down the SCSI bus and corrupted all the drives. No problem. The company had used a backup service provided by its ISP, but this service turned out to be highly unreliable. As a result, it wasn't until Sunday, three days later, that its site was back up and the company was once again back in business.

Radar Failure Delays Flights at Cincinnati Airport

www.wepo.com – A loss of power left the radar system at the Cincinnati/Northern Kentucky International airport down for three hours on Sunday, July 29, 2007. The problem occurred when a power supply driving the radar antenna motor failed. Though two motors, each with a separate power supply, were available, the backup motor did not kick in. The airport's air traffic controllers reverted to the long range radar available from London, Ohio, some 70 miles away. Because they could not see planes at lower altitudes with this radar, the controllers had to space aircraft further apart. Sixty-two arrival flights and twenty-eight departing flights were delayed over a half hour.

Power Outage Takes Down Samsung Chip Production Line

english.donga.com – Due to a problem at a transformer substation in early August of 2007, a power outage at a Samsung Electronics chip plant located in Yongin, China, forced the world's largest chipmaker to halt production. This was the first time ever that Samsung has had to shut down its chip production line due to a power failure. Though the plant's uninterruptible power supply started properly, the brief power outage meant that all wafers had to be removed from the production line. It took days to return to normal operation. The outage was expected to cost Samsung tens of billions of yuan (billions of dollars).

Lightening Strike Boils Water in North Jersey

www.northjersey.com – At about 9 pm Friday, August 6, 2007, a lightning strike knocked out power to United Water's Haworth water treatment facility in northern New Jersey. The company's diesel-powered backup generator immediately came to life, and water treatment continued. Lightning never strikes twice right? Wrong. Shortly afterwards, a second lightening strike fried the backup generator. The plant was left offline for twelve hours and threatened the water supply of 750,000 people. The affected customers were under a "boil water" advisory until early Monday morning, when tests found no dangerous levels of bacteria in the water.

Heat Wave Takes Out Another Water Supply

www.independentmail.com – North Jerseyans could sympathize with some South Carolinians when water pressure suddenly dropped for almost an hour in Anderson, South Carolina, on August 10, 2007. Duke Energy, which supplies power to that area, compensates companies that will use their own backup power generators when electrical demand exceeds Duke's capacity. As a result of a heat wave, Duke Energy asked Anderson Regional Joint Water System to switch to backup power at its Lake Hartwell Water Treatment Facility. Unfortunately, the backup generator failed; and the plant could not pump water. Water pressure had to be supplied by the company's water tanks. The result was 45 minutes of little or no water pressure for thousands of residents.

London Stock Exchange Glitch Sends Prices Awry

www.telegraph.co.uk – On Friday, August 10, 2007, problems with the London Stock Exchange's data feeds caused securities prices to become inaccurate. The FTSE 100 seemed to have spiked in the afternoon by 2% when it was actually down by 1.3%. The LSE had to extend its closing auction by an hour and a half to allow dealers to close their positions. Some dealers simply left for

the day with a raft of trades left unexecuted. As a result, several closing prices had to be recalculated later. This followed an LSE web crash in early August when the site could not keep up with the trading volume during a major market correction.

Custom's Glitch Strands Thousands of Passengers on Planes at LAX

www.latimes.com – An outage in a U.S. Customs Service computing system caused 17,000 inbound passengers to be held on planes for up to nine hours at Los Angeles' Tom Bradley International Terminal on August 11, 2007. An additional 16,000 outbound passengers were similarly delayed. The problem started with a malfunctioning network interface card in a desktop computer. The card provided a gateway to the Custom Service's local area network, and its failure slowed down other systems. As queues built up, the system eventually experienced a total failure. As a result of this failure, a \$15 million upgrade has been significantly sped up.

Even Cisco Can Have Outages

www.crn.com – On Wednesday, August 15, 2007, Cisco's web site went down when its San Jose, California, data center lost power due to a maintenance error. Among other service outages, this prevented Cisco solution providers from configuring Cisco systems. The failure was particularly embarrassing to Cisco since it is a leader in high-end enterprise networking, load balancing, and redundancy. Does Cisco not follow its own advice?

Users Crash Skype

www.msnbc.com – Thursday, August 16th, 2007, was just another user update day for Skype, a major VoIP Internet telephone service provider. With 220 million users, Skype has 5 to 6 million users online at any one time. On this day, Skype sent software update notices to all of its currently online users – all six million of them. The massive restart of user computers around the world within a very short timeframe caused a flood of log-in requests and overloaded Skype's network resources. The result – Skype was down from Thursday through Saturday, leaving its customers with only POTS (plain old telephone service).

Wells Fargo Online Services Down for Two Days

albuquerque.bizjournals.com – On Sunday afternoon, August 19th, 2007, Wells Fargo's online services suddenly went down due to a software glitch. Though a backup system took over, the software bug had also infected the backup system. Problems stretched across the Wells Fargo enterprise. Customers could not access ATMs, conduct wire transfers, or use their debit cards. The problems stretched into Monday until the system was finally returned to service. However, it took until Tuesday for the bank to catch up with processing. This resulted in customers seeing end-of-day Friday balances rather than current balances.

Software Bug Prevents Amtrak Ticket Sales for Two Days

online.wsj.com – A bug in newly installed software took down Amtrak's ticketing system across the country on Saturday morning, August 25, 2007. The result was that customers could not buy Amtrak tickets online or at station kiosks. The system's backup was manual – ticket agents had to write tickets out manually. This led to long lines of travelers. The problem was compounded by kiosks that did not indicate "out-of-service" and by a lack of communication from Amtrak. Ticketing services were finally restored the next day.

FAA Delays Flights due to Computer Outage

www.mercurynews.com – On Friday, September 21, 2007, the FAA had to delay all flights coming into the Los Angeles area due to a computer malfunction. Flights departing airports within an hour of this area were put on ground hold. The backup system was brought into operation 20 minutes later after the database had been transferred. The FAA touts 99.74% uptime for its systems. Do you want your life to depend on less than three 9s?

Power Outage Takes Down Online Securities Exchange

www.reuters.com – On Friday morning, October 12, 2007, a power outage at its Jersey City, New Jersey, site halted electronic trading for more than an hour at the ISE (the International Securities

Exchange). ISE is an all-electronic marketplace and the largest U.S. equity options exchange. Orders from member firms were routed to other exchanges during the outage. Some member firms temporarily moved all of their quoting to other exchanges.

Cranky Ticket Gates Shut Down Japanese Railways

asia.cnet.com – Commuters in metropolitan Tokyo faced a rude surprise on Friday, October 12, 2007. Ticket gates would not open when magnetic-striped ticket cards were inserted. Over 1,300 gate machines in 192 stations were inoperable. The problem was a log-in problem. Each morning, the gate machines log in to a central server to get a list of invalid cards. The log-in server malfunctioned, and none of the gate machines were authorized to operate. The good news – hundreds of thousands of travelers got free train rides that day.

Nevada DMV Down for Days

news.rgj.com – Motorists at branches of the Division of Motor Vehicles in Nevada circled parking lots as they waited for someone to leave and open up a parking space on Tuesday, November 13, 2007. But that hardly ever happened. The DMV computer had crashed following an upgrade that weekend. Though it would periodically come online, it would crash again. Hundreds of customers waited hours to register their cars, renew their drivers' licenses, or pay their fees. Others were sent home without being able to complete their transactions. Problems continued through Wednesday. It wasn't until Thursday that operations returned to normal.

Police and Fire Radios Crash

www.miamiherald.com – The police radio system in Broward County, Florida, went silent for two hours on November 14, 2007. The problem was caused by an electrical malfunction and was compounded when the agency's backup generator also failed. The failure not only shut down every police and fire department in the county, but it also took down neighboring communication systems in Hollywood and Fort Lauderdale. Fortunately, the county's 911 system is an independent system and was not affected. During the outage, police officers were dispatched by cell phone.

Air Canada Check-In Delayed for Hours

www.canada.com – Early Friday morning, November 16, 2007, Air Canada passengers suddenly found that they could not check in via the Internet or at the airport kiosks. A communication problem had effectively disconnected the airline's central reservation system from its computers in airports across Canada. Massive line-ups of passengers snaked through terminals as agents struggled to check in passengers manually. Air Canada was forced to cancel sixteen domestic and international flights and delay many others. The system was not restored until midday. A major complaint of passengers was that Air Canada did not keep them informed as to what was happening.

United Check-In – Déjà Vu

www.chicagotribune.com – No sooner had Air Canada's online check-in services been restored than United's failed. United passengers at airports around the U.S. found that they could not check in online or at airport kiosks for seven hours on Friday, November 30. Long lines developed at United check-in counters as agents checked them in manually. This was the second failure of United's Apollo reservation system in six months. United has since pledged to spend \$4 billion to upgrade its decades-old operations and infrastructure, including its computers.