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Delta Air Lines Cancels 2,100 Flights Due to Power Outage September 2016

On August 8, 2016, a fire in Delta Air Line's data center took down all of its computer operations, causing it to cancel 2,100 flights over three days. The company estimates that the outage cost it about \$150 million USD.



Delta Air Lines

Delta Air Lines is the oldest airline still operating in the United States. With headquarters in Atlanta, Georgia, the airline and its affiliates operate over 5,400 flights daily to 334 destinations in 64 countries on six continents. Delta is the world's largest airline in terms of scheduled passengers and the second largest in terms of revenue.

Over the past three years, Delta has spent hundreds of millions of dollars (USD) on IT upgrades and new IT systems. It spent \$150 million on IT upgrades in 2015 alone.

The Delta Data Center Fire

On Monday morning, August 8, 2016, at 2:30 AM EST, a fire erupted in the power control room of Delta's data center at its Atlanta headquarters. The fire was the result of a routine scheduled switch for testing purposes to the backup generator. The fire caused a transformer to fail, killing one of the two power feeds to the data center.

Power is brought into Delta's data center from two separate utilities through opposite sides of the building to prevent power from being accidentally cut with a back hoe. Each server in the data center has redundant power supplies, and each power supply is supposed to be plugged into different power strips. However, 300 of Delta's 7,000 servers in the data center were not linked to an alternate power source.

Those servers that were powered only by the failed power source went down. Many of them could not fail over to their backups, which were also down due to being unpowered. Servers that did have a power backup (or were powered by the surviving feed) could not communicate with the servers that failed. This took down Delta's entire system. Gone were passenger check in facilities, baggage facilities, websites, kiosks, airport displays, and myriads of other critical applications.

500 servers had to be rebooted. It wasn't until 8:30 AM, six hours later, that the Delta systems were once again operational.

Delta's CEO, Ed Bastian, took full responsibility for the failure.

Delta Flights are Cancelled or Delayed

Airlines cancel flights for safety reasons when they cannot get access to important computerized information such as passenger counts, checked baggage, or fueling records. This is the situation Delta found itself in following the fire. It had no choice but to cancel flights or seriously delay other flights. Adding to the problem was that the cancellation or delay of some flights left flight crews and airplanes out of position to carry on Delta's normal schedule of flights.

Delays of flights were further exacerbated by the fact that manual procedures had to be put in place. For instance, Delta's reservation and passenger service systems are built on a 52-year old legacy system called Deltamatic. This old green-screen legacy application had been outfitted with a modern GUI interface. When this system came back online, only the old Deltamatic green-screen interface was operational. Agents who could not use this old interface (most of them) had to resort to manually checking in passengers and handwriting boarding passes.

Delta cancelled 2,100 flights over a span of three days. It cancelled 1,000 flights on Monday, the day of the fire. It cancelled 800 more flights on Tuesday and 300 on Wednesday. An additional 2,400 flights were delayed. Thousands of passengers slept on the airport floors waiting for their flights.

Though the ground stop was lifted at 8:40 AM on Monday, cancellations and delays continued. By 1:30 PM, only 1,700 of Delta's scheduled 6,000 flights were in operation.

The Cost to Delta

The system outage is estimated to have cost Delta \$150 million USD. It had to issue refunds to passengers whose flights were cancelled or significantly delayed. It offered \$200 vouchers to travelers delayed by more than three hours or who were grounded due to cancellations. It waved change fees and put thousands of travelers up in hotels. It turned to its fleet of private jets to get some of its highest-level customers to their destinations.

The cost of this outage was extraordinarily high. The average cost of a data center outage, according to the Ponemon Institute, is about \$730,000. This highlights the fact that airlines have a lot more at stake when designing and managing critical IT infrastructure than other data center operators.

Summary

Airlines face difficult challenges with their IT systems. They depend upon these systems for all of their functions, including flight scheduling, passenger check-in and services, baggage handling, fueling, airport video displays, and many others. However, most of these systems are based on legacy systems installed years ago. Upgrading these systems is a complex task since none of these functions can be taken offline – even for a very short maintenance window.

Nevertheless, airlines must deal with the fact that failures are not exceptions. They are normal. When a server, a data store, or a network component fails, their systems must be able to immediately and reliably fail over to a backup component. Otherwise, the result is cancellations or delays and millions of dollars in costs.

Acknowledgements

Information for this article was taken from the following sources:

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Delta Warns of Chaos After Power Outage, Worldwide System Failure, *NBC News*; August 8, 2016.

Data center disaster disrupts Delta Air Lines, *ARS Technica*; August 8, 2016.

How a computer problem can shut down an airline like Delta, *CBC*; August 9, 2016.