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Airline Outages Continue to Ground Travelers

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Airline IT system outages continue to lead to long check-in lines, flight cancellations, and passengers stuck in airports. It seems that no airline is immune. When you arrive at the airport in plenty of time, there is no guarantee that you will be on your way according to schedule. The failure of any one of a number of systems can ground your flight.

What Do Airline IT Systems Do?

Airline systems provide a myriad of functions:

- They know you – your name, credit-card information, your destination, your return trip.
- They maintain and operate the airline's reservation system and passenger name records.
- They work with databases that manage airline revenue.
- They determine how many seats to sell at what fares on each flight.
- They track passenger bags.
- They crosscheck that passengers with checked bags have in fact boarded their flights.
- They talk to government databases to ensure that no passengers are on a No-Fly list.
- They monitor the status of each airplane (at the gate, pushed away, in the air, landed).

If any one of these systems fails, the airline can't operate. And these systems fail all too regularly, as demonstrated in the following examples.

Delta Airlines

In August 2016, a fire in Delta Airline's Atlanta operations center took down all of its computer operations. The Delta computers needed to book passengers and fly its jets were down for nearly five hours. Delta had to cancel over 1,000 flights that day and a total of 2,100 flights over three days as planes and pilots were repositioned. 2,400 flights were delayed for at least six hours. According to Delta, the bill in costs and lost revenue for the outage exceeded USD $150 million.

The fire was the result of a routine scheduled switch to a backup generator for testing purposes. The fire was in the automatic power transfer switch and killed one of the two power feeds to the data center. Though redundant power was brought in from two separate utilities, 300 of Delta's 7,000 servers were not plugged into the alternate power source.

Many backup systems were also not plugged into the alternate power source. Thus, failed servers could not fail over to their backups, which were also down.

The failed servers caused Delta's entire IT system to collapse. It took six hours to get the system rebooted and back online.

In January 2017, a major problem in Delta's IT systems again resulted in travel chaos and angry customers. The outage started about 6:30 PM ET on Sunday, January 30th. A nationwide ground stop for all Delta flights was announced and remained in place for two and a half hours. Flights did not return to normal until midnight.

This was the second time in less than six months that the airline suffered a major IT system problem. Delta cancelled 170 flights on that Sunday and another 110 on Monday.

Delta's website and mobile apps also went down, adding to the frustrations of its customers.

United Airlines

In 2015, computer problems delayed United Airlines' flights worldwide.

In the summer of 2016, a malfunctioning router prevented the carrier from ticketing passengers and dispatching crews.

In October 2016, United had to delay flights after it experienced issues with its weight-reporting system.

About a week prior to Delta's January 2017 outage, United began having issues with its Aircraft Communications Addressing and Reporting System (ACARS). These problems caused it to ground all of its domestic flights. ACARS is a digital datalink used for transmission of short messages between the aircraft and ground stations.

Southwest Airlines

In July, 2016, a router failure grounded Southwest Airlines for four days. 2,300 flights were cancelled. The outage caused a loss of at least USD $177 million to Southwest's passenger revenue.

British Airways

British Airways was hit with its own computer problems in September 2016, just a month after the fire that took down Delta's operations. A power outage at its hub near Heathrow Airport caused a worldwide outage of British Airways systems. The result was cancellations and delays throughout the day.

Among the systems that were impacted were British Airways' check-in systems at Atlanta, Chicago, and Boston. Check-in lines grew long as handwritten boarding cards had to be issued.

American Airlines

In September 2015, American Airlines suffered connectivity issues and had to suspend several flights.

JetBlue

In January 2016, JetBlue lost power at its data center, forcing it to suspend operations for several hours.

In May 2016, JetBlue computer issues forced passengers to be checked in manually, delaying the boarding process.

What Are the Problems?

The airline industry still limps along on a core of old technology. It has to deal with an aging and complex infrastructure. Airline systems were developed decades ago when flights were fewer and passenger options simpler. Many of the systems assumed a maintenance window at night. As airlines merged and new features were added, the systems had to start performing round-the-clock. They could no longer be brought down for upgrades and patches.

The complexity of the airline systems is the real problem. Many systems are layered on top of one another, each with a different configuration:

- Reservations
- Passenger check-in
- Aircraft assignment
- Flight-crew scheduling
- Airport gate assignment
- Air-traffic flow management

just to name a few. Every little piece must work, or the system falls apart.

Improvements are now multi-year, multi-million dollar investments.

What Can the Airlines Do?

What could the airlines have done to prevent these crises? The answer is effective redundancy. For example, Southwest did not have a backup router to take over when its router failed.

Travel disruptions due to IT failures have become all too common. This is a prime example of what happens when mission-critical systems fail and backup systems do not kick in. Delta's disastrous outage due to the fire in its data center reveals the faulty nature of many of the airline's disaster recovery configurations. The data center did not survive the fire simply because many of the servers were powered by the wrong power feed.

Companies should thoroughly evaluate their disaster recovery plans and build redundancy in where it is needed. Backup systems should be periodically checked via a forced failover during slow periods to ensure that they are working. In fact, a good plan is to switch over to the backup systems periodically (say once per quarter) and run on the backup systems until the next switchover test.

Automated checkup systems should be installed to detect problems before they become an outage, and failover to backup systems should be automated as much as possible. There is just too much chance for a fat-finger human error to disrupt a failover.

The airlines should ensure that redundant workloads can be handled by a single system (server, router, network, etc.) in the event of a system failure. Redundant systems should be used in an active/active configuration (i.e., load sharing) to make sure that they are all working.

Summary

System faults do occur. There is nothing we can do to avoid them. What we can do is to make sure that we can recover from them. This means that all critical systems must have redundant backup systems that can take over in the event of a primary system failure.

Disaster recovery sites should be geographically dispersed to prevent them from being affected by a common disaster. Comprehensive monitoring infrastructure should be installed to oversee servers, storage, networks, and applications so that problem areas can be quickly spotted. Failovers should be automated as much as possible to eliminate human intervention. Failovers should be practiced periodically to ensure that backups are working and that failover procedures are proper and are understood.

With proper redundancy and failover procedures, the frequency of airline IT system outages can be stemmed.

Acknowledgements

Information for this article came from the following sources:

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