FEDERAL AVIATION ADMINISTRATION

FAA SAVES $15 MILLION BY MIGRATING TO RED HAT ENTERPRISE LINUX

FAST FACTS	
Industry:	Government
Solution:	Software: Red Hat Enterprise Linux Hardware: HP and Dell
Benefits:	Executed a major system modernization in one-third the original scheduled time. Achieved tenfold increase in processing capacity and 30 percent more in operational efficiency. Cut IT costs by 50 percent, saving the federal government more than $15 million in datacenter operating and upgrading costs.

As the government agency responsible for regulating and overseeing all aspects of civil aviation within the United States, the Federal Aviation Administration (FAA) accomodates more than two million passengers on domestic airlines every day. With roughly 8,000 airplanes in the air at any given time, the successful execution of the FAA's mission largely depends on the highly complex Traffic Flow Management (TFM) infrastructure and its real-time Enhanced Traffic Management System (ETMS).

"The Traffic Flow Management enables us to provide the tools that air traffic managers need to deal with the tough issues they face every day," said Joshua Gustin, TFM-Modernization Program Manager.

"The Enhanced Traffic Management System integrates weather and flight data from multiple sources and presents the information in a graphical way, allowing the FAA to anticipate and balance air traffic flow across the national airspace. Getting thousands of flights to their destinations with a weather front coming in or during a special event like the Indianapolis 500 or Super Bowl exemplify some of the challenges when trying to maintain air traffic flow. Airline passengers, like you and I, just want to get from here to there. TFM and ETMS help us to fulfill more than two million passengers' expectations of timely flights each day," explained Gustin.

THE CHALLENGE

The FAA maintains a complex three-tiered system architecture for ETMS. The central processing facility, located at the Department of Transportation's Volpe Center, is responsible for the core processing and distribution of data to a number of servers and more than 700 workstations located in sites across the U.S. With over 100 sites using the FAA's system for air traffic management, including military facilities and international sites, the real-time demand for the data provided by the system is critical.

"The FAA is on the cutting edge. We're constantly enhancing and growing the system," said Gustin. "Driving down cost while being able to maintain and continue building on the system is key. At the same time, there is no room for error or down time in our computer systems."

In 2002, when the administration embarked on a technical refresh effort for ETMS, the FAA faced significant implementation time and a high price tag.

"When we first considered refreshing the entire system, we were looking at $25 million in costs and 18 months to full deployment for the hardware upgrade alone," explained Gustin.

International sites also posed a challenge for the FAA. The agency keeps a close eye on domestic flights, in addition to those originating as far out as Guam, Puerto Rico, and Chile. The agency's system also ties into London, Mexico, and Canada, allowing international sites to make use of the FAA's tools for common awareness and information exchange.

"While we planned the refresh, we also considered ways to keep the system affordable for countries internationally. However, communication equipment and hardware were very expensive, as well as the operating system rolled into the hardware. With our existing architecture, we didn't have any options that would solve all of the end-of-life issues with our time and budget constraints," said Gustin.

THE SOLUTION

In a typical technical refresh, the focus is on replacing the hardware. The software is not part of the equation.

"During the refresh in 2004 and 2005 we replaced the entire system, both hardware and software," said Gustin. The team ported 1.5 million lines of proprietary code to Linux and replaced about 1000 systems. In fact, by choosing industry standard hardware and open source software, the cost of replacing each computer dropped from $25,000 to $3,000.

Cost savings were significant, but not at the sacrifice of reliability.

> "We have to guarantee that the system will deliver the data reliably. We don't have the luxury of waiting for problems to be reported and then tweaking something. Reliability is a necessity to minimize our risk," explained Gustin. "We liked the Red Hat Enterprise model because it gives us the support we require to reduce our risk. We made the huge decision to move forward with the technical refresh on Red Hat Enterprise Linux for the entire system architecture."

The FAA first deployed Red Hat Enterprise Linux in their remote computing locations and later moved it to their Volpe processing center.

The FAA used Red Hat's onsite training during the modernization project to effectively transition their engineers to Red Hat Enterprise Linux through the Red Hat Certified Engineer (RHCE) program.

"For training, we decided that more was better, particularly with the developers. As a result, we made training for our developers and core administrators a priority, and it has really paid off," said Gustin.

BENEFITS

By migrating from a costly UNIX platform to Red Hat Enterprise Linux on their workstations, servers, and at the Volpe Center, the FAA was able to eliminate costs and ineffective systems while creating a scalable architecture that met their high-demand environment.

"We found that when we deployed Red Hat Enterprise Linux, the system ran at less than 10 percent CPU. It was much faster and more efficient. We got the power back and the ability to scale, even in regard to sheer physical space. We squeezed all of our servers into six racks, and, at the same time, increased from 700 to roughly 1000 workstations in the field, aligning all of our products on a single, open platform," explained Gustin.

Most impressively, the FAA was able to achieve these increased efficiencies at a significantly lower cost and extend the system's life long enough for the Traffic Flow Management Modernization scheduled for 2008. TFM Modernization will re-architect the entire ETMS, software and all, bringing the system to new, state-of-the-art techniques.

"By switching to Red Hat Enterprise Linux and off-the-shelf hardware, we were able to spend less than $10 million on a project that cost $25 million in 1998. Red Hat Enterprise Linux fixed our problems of reliability and scalability, and allowed us to achieve 30 percent more in operational efficiency for 50 percent less cost," noted Gustin. For Gustin, he is proud of the achievements with the FAA's technical refresh effort.

"I was in a sustainment manager position, but I'm a technical person at heart and like the challenge of solving these problems," said Gustin. "Bringing in the refresh project for under $10 million and having the added benefit of many improvements was our business case. With Red Hat Enterprise Linux, we proved we could do both for so much less."

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