

The loosely coupled IT structure with "CA API Gateway" and "CA DevTest Solutions" significantly reduces testing workloads

Intuitive, Easy-to-understand Design Also Enhances Convenience

Domestic Flight Reservation System Renovation Project Promotes a High Productivity IT Environment



ANA Inspiration of JAPAN

A STAR ALLIANCE MEMBER 

USER PROFILE

Business Type : Air Transport
Company Name : All Nippon Airways Co., Ltd
No. of Employees : 12,859 (as of 31 March, 2016)

BUSINESS

For airlines companies, the use of technology is a key element driving business success. To meet the growing needs and satisfaction of customers, IT infrastructures and environments must enable flexible and fast application development; a long-term goal of ANA. The Internet reservation system for domestic flights that was rebuilt in September 2016 furthered the airline's efforts in this area.

CHALLENGE

Conventional application development involves the cumbersome production of interfaces to link peripheral systems. The time and cost of such development presented a great challenge to ANA. To address this challenge, the airline needed an organized, loosely coupled IT structure. Testing workloads were another issue. To improve quality, the company increased application development speed by improving testing efficiency.

SOLUTION

ANA introduced "CA API Gateway," a product that functions as the core for internal system coordination, to create a platform that enables linkage with other systems via an API by following simple rules. The company also introduced "CA DevTest Solutions," a product that simulates system operation and supports testing automation and efficiency improvement to build an environment that enables both frontend and backend simulation.

BENEFIT

CA API Gateway has significantly advanced the provision of a loosely coupled IT structure for ANA's domestic flight business, creating an environment that allows for the flexible adding and modifying of applications. Meanwhile, CA DevTest Solutions has sharply reduced test workloads. These two CA Technologies products greatly contribute to improved productivity in application development for ANA.

Business

Promoting flexible, quick creation of an IT environment for frontend mission-critical systems

In the lead up to the 2020 Tokyo Olympic Games and Paralympic Games, the ANA Group has developed an aggressive growth strategy. While strengthening its businesses such as international flights, cargo, and low cost carriers (LCC), the group is aiming to also further advance its position in the profitable domestic flight business. As part of this, ANA updated its Internet reservation system for domestic flights in September 2016.

The rapid increase use of the Internet for flight bookings has quickly shifted the sales of air tickets to the online ticket counter. With the number of bookings being made from smartphones and other mobile devices increasing dramatically, the need for IT to be able to support this growth was vital.

Creating an IT platform to respond to this changing environment is a major challenge for the ANA Group. ANA Systems Co., Ltd. is at the forefront of this challenge. ANA Systems was established in 2013 by the merger of ANA Communications Co., Ltd. and ANA Information Systems Planning Co., Ltd. The company has overall responsibility for IT, from development to operation and maintenance of the group's diverse information systems.

IT is key to competitiveness in the airline industry. Airline companies around the world invest significantly in IT resources and are continually innovating to use IT more effectively to support business outcomes. Assuming this heavy responsibility, ANA Systems has been working to create an IT environment that enables flexible, fast system development based on medium- to long-term plans.

The mission-critical system for domestic flights, which underwent a full-scale renovation in 2013, is one example of such efforts. This large project replaced the passenger system on the mainframe that had been used for 25 years with an open system. This was followed by the development of the Internet reservation system for domestic flights. While the passenger system is the core of the backend, the Internet reservation system is an important point of contact with customers on the frontend.

Challenge



Mr. Atsushi Suzuki
Manager, Web Systems
Development Department
ANA Systems Co., Ltd.

Transforming tightly coupled systems into loosely coupled systems; increasing efficiency in the test phase, which had been dependent on human effort

ANA's Internet reservation system for domestic flights is widely used by consumers and companies. The website can be accessed from computers, smartphones, feature phones, and various other devices. The reservation site for computer users is "ANA SKY WEB," while the one for smartphone and feature phone users is "ANA SKY MOBILE."

The website that was rebuilt in this renovation project has an intuitive design that also improves user convenience. However, the project was not merely a cosmetic effort to make the website more attractive. Mr. Atsushi Suzuki, Manager of the Web Systems Development Department at ANA Systems who served as project manager of the construction project for the Internet reservation system for domestic flights, explains: "It was more a reconditioning project as we did not include many new business requirements in the system renovation project. Instead, we focused on creating a platform that allows us to develop highly productive applications into the future."

If there are too many items to connect to or other items that are affected when a new application is added or modified, the development or test workload will increase. This issue associated with tightly coupled systems is often observed in legacy systems.



Mr Masaki Nishizawa
Chief Expert, Web Systems
Development Department
ANA Systems Co., Ltd.

By transforming tightly coupled systems into loosely coupled systems and reorganizing them, productivity during new development can be improved. More specifically, the resulting architecture enables you to replace or modify systems as easily as inserting or removing a cartridge. By adjusting the architecture in this way, the productivity of system development and operation improves. This is a common theme between the passenger system project and the Internet reservation system for domestic flights.

Improved testing efficiency was also an important project theme. In general, test workloads account for around 50% of total IT project workloads. In ANA's case, according to Mr Suzuki, it previously accounted for around 40% of the total workload.

Mr Yuta Arai, Senior Expert of the Web Systems Development Department at ANA Systems who was primarily responsible for testing and performance evaluation during the project, said, "Previously, we did testing manually. We had to perform the same test at the same quality. However, it was not easy to ensure stable test quality manually. Also, this resulted in a significant workload because we conducted a massive number of tests that were dependent on human effort."

To address these issues, ANA adopted "CA API Gateway" and "CA DevTest Solutions" from CA Technologies. CA API Gateway simplifies application collaboration and helps advance loosely coupled architecture on a system-wide basis. Meanwhile, CA DevTest Solutions is a tool for automating and improving testing efficiency.

Solution

API as the core of internal system coordination; a tool that automates and improves testing efficiency

The requirement definition phase in the renovation project for the Internet reservation system for domestic flights commenced in July 2014. After development work began in January 2015, the new website went live in September 2016. The two products from CA Technologies introduced during this period were used to restructure the system and improving testing efficiency.

Mr Suzuki explained: "We introduced two CA Technologies products simultaneously. This is not because the products were sold as a pair. Rather, we evaluated competitive products in each of the two areas, and decided to use CA API Gateway and CA DevTest Solutions. We chose these products because they were the most appropriate for our use cases."

CA API Gateway is used by many companies around the world as it is highly rated for its performance, flexibility and security. It also has a proven track record with airlines globally, which also enhanced ANA's sense of security.

Although API gateways often attract attention for their function as points of coordination with external data sources, they also often play an essential role in connecting internal systems. The CA API Gateway is used for both external and internal purposes at ANA.

In this project, ANA introduced CA API Gateway for internal purposes. Previously, ANA used different rules for system coordination depending on each system. This practice required individual protocols to be observed per system, which incurred significant workloads in interface development. The open passenger system launched in 2013 is the first step toward departing from tightly coupled systems and shifting toward loosely coupled systems. Then, when CA API Gateway was introduced as part of the Internet reservation system for domestic flights, the preparation of a loosely coupled architecture advanced greatly.



Mr Yuta Arai
Senior Expert, Web Systems
Development Department
ANA Systems Co., Ltd.

"Using CA DevTest Solutions improves testing quality because more tests can be performed than when done manually. The effect of improved testing efficiency is remarkable. We probably could not have operated the system according to our schedule without CA DevTest Solutions."

Mr Atsushi Suzuki
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"To connect to the API, you just need to follow the interface rules. To add a new application, simply following the rules enables diverse applications to be coordinated via the API," explained Mr Masaki Nishizawa, Chief Expert of the Web Systems Development Department at ANA Systems who was responsible for the API along with other parts of the project. The Internet reservation system for domestic flights accessed by users is connected to multiple systems, such as the backend passenger system and mileage program management system, via the CA API Gateway. Thus, CA API Gateway is the intersection through which diverse types of data pass.

Meanwhile, CA DevTest Solutions is a tool that supports both simulation of backend systems and testing automation and efficiency improvement. A typical example of testing using this tool is performance verification, which checks how many transactions can be processed by the Internet reservation system for domestic flights. Mr Suzuki said, "It took more than six months to merely conduct performance verification."

According to Mr Suzuki, before releasing "Tabiwari", one of ANA's popular Value Fares, the company repeatedly implemented the cycle of "testing, result evaluation, and program modification", carefully tuning the system due to the huge amount of traffic on the website they anticipated after the product's launch.

A simulator that places a load on the frontend and another simulator for checking how the backend system operates when it receives said load are often offered as separate products. CA DevTest Solutions is a product that features both functions, thereby allowing users to efficiently perform simulation with better usability than separately offered products.

Benefit

"Introduction of CA API Gateway significantly reduces the workloads involved in development and operations for system coordination and improves new application quality. The product is also expected to provide a point of contact with external systems in the future."

Mr Masaki Nishizawa
Chief Expert, Web Systems
Development Department
ANA Systems Co., Ltd.

Significantly reducing testing workloads; the API as a point of contact with external systems

By releasing the Internet reservation system for domestic flights, ANA took a huge step forward in improving application development productivity. Of the two products from CA Technologies, the effects of CA DevTest Solutions are more easily demonstrated.

Mr Arai explained: "Testing workloads, which previously accounted for 40% of all project workloads, were cut to about 20%. Now, if you schedule an application test to run at midnight, you can get the result in the morning. Based on this result, you can modify the program and test it the following midnight. We repeated this cycle many times in a short period of time." Mr Suzuki added: "Using CA DevTest Solutions improves testing quality because more tests can be performed than when done manually. The effect of improved testing efficiency is remarkable. We probably could not have operated the system according to our schedule without CA DevTest Solutions."

There were also huge benefits for regression testing, which is performed to check whether there are any defects in the items to connect to after making a change to the program. Mr Arai explained: "Each time we release a new application, we test thousands of patterns one after another to verify the program. Previously, such regression testing was done manually. After introducing CA DevTest Solutions, this task is almost entirely automated. Use of the product has eliminated the cost of several dozen man-days that previously were required just for regression testing."

CA API Gateway also significantly contributes to architectural "reconditioning." The product significantly reduces the workloads involved in development and operations for system coordination. The product is also expected to raise the quality of new applications. ANA intends for the product to serve as a point of contact with external systems in the future.

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Mr Nishizawa explained: "As of now, we have yet to release the Internet reservation service API outside the company. However, since overseas airlines are headed in that direction, I think ANA Group will consider this as well."

Although ANA introduced CA API Gateway for internal coordination, in the future it may also play the role of point of contact with external systems.

For example, imagine a case whereby hotels accept reservation requests on their websites and the websites in turn are connected to ANA's reservation system via APIs. Users could then purchase air tickets without needing to visit ANA's website. Perhaps such a day may come soon.



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All Nippon Airways Co., Ltd.

- **Head Office:** Shiodome City Center, 1-5-2 Higashi-Shimbashi, Minato-ku, Tokyo, 105-7140, Japan
- **Established:** December 1952
- **Paid-in Capital:** 25 billion yen
- **Business:** Scheduled and nonscheduled air transportation businesses, business utilizing aircraft, and related ancillary services
- **URL** <http://www.ana.co.jp/>

ANA Systems Co., Ltd.

- **Head Office:** 6-7-56 Higashikojiya, Ota-ku, Tokyo, 144-0033, Japan
- **Established:** April 2013
- **Paid-in Capital:** 80 million yen
- **Business:** Design, development, maintenance, and operations of information processing systems and communication systems, etc
- **URL** <http://www.anasystems.co.jp/>



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