Innovative migration solution that ensured safety of over 100 million passengers.

Mindtree
Welcome to possible

Client Background

World's leading specialists in air transport communications and information technology (IT).

Opportunity

Application development and maintenance

Overview

Our client, one of the world's leading specialists in air transport communications and information technology (IT), decided to migrate its mainframe based flight planning environment to open systems. Mindtree was required to arrive at the best-in-class solution for a mission-critical flight operations and planning system, while ensuring zero impact on the customer's business and the user interface.

Business challenge

Broadly, the challenges revolved around the client's scale of operations, legacy software, strict timelines and the mandate to reduce TCO:

Scale and Criticality of operations

- **The migration involved mission-critical applications used by the passenger and travel solutions business unit, to be used for processing an average of 15, 000 flight plans every day.**
- System needed to have 99.8% availability and a minimum response time for flight plan calculations (which are typically CPU intensive)
- Stringent requirements for flight plan accuracy were also placed for safety reasons
- Solution also had to have disaster recovery, backup and maintainability mechanisms in place and fall within the existing business continuity plans of the customer.

Legacy software

- The mainframe inventories consisted of 2.5 Millions of lines of code, comprising FORTRAN, GENER/OL, PL/1, Assembler, VSAM, JCL, REXX and CLIST.
- More than 40% of the code in languages like GENER/OL and Assembly had to be rewritten in Solaris. Indeed, this is one of the most uncommon skills available in the market.

Timelines and TCO

- The complexity of the technology stack added significant uncertainty to estimation and scheduling ofthe program.
- The total cost of ownership over three years was required to be less than current anticipated TCO.

Our solution

Our strong technical team at Mindtree helped in identifying and implementing a robust and efficient solution for this migration in four phases: Portfolio assessment, Implementation strategy, Design and Verification, and Real-time migration.

Portfolio assessment

Mindtree first conducted a portfolio assessment exercise to understand the existing environment and the customer's objectives.

- **Source Code Assessment:** A detailed assessment of all IBM CICS and batch applications, BMS maps, VSAM files and application integration points. FORTRAN, PL/1, C/C++ and Assembler-based source code was thoroughly cataloged and rationalized.
- **Platform Assessment:** Infrastructure and operational aspects were reviewed to understand the target platform size, performance, and availability levels
- **Technology Options:** All possible technology options, along with their merits and de-merits, were presented as a deliverable of the PA exercise.

Implementation strategy

Instead of the risky and time consuming re-write of the entire application, Mindtree recommended re-hosting the application on a Sun Solaris platform using Clerity's UniKix suite of tools. Such mainframe re-hosting minimizes change and maximizes the reusability of existing components. Applications that could not be re-hosted were then rewritten. Techniques like Lift and Shift, Re-engineering and Re-facade were used where required.

Design and Verification

In this phase, we prepared detailed migration, testing and production cutover plans. The project stakeholders then reviewed the required resource levels, project scope, key milestones and relevant business requirements of these plans. Obsolete components were decommissioned before the actual migration took place.

Real-time migration

Once the Solaris environment was set up, the application was migrated. Separate production, backup, and Quality Assurance (QA) environments were established to maintain the same level of operation standards and accountability as the previous mainframe. Mindtree also conducted a thorough testing procedure for the new application. A flight plan comparison tool was used to measure calculations performed on the re-hosted system versus the mainframe. Functional, Endurance, Disaster recovery, and End-user acceptance tests were performed.

The client is now well-positioned to address Service Level Agreements (SLAs) for the next seven years.

FAT (Factory Acceptance Test), SAT (System Acceptance Test), PAT (Provisional Acceptance Test) and OAT (Operational Acceptance Test) were also conducted as a part of the comprehensive testing program.

Business impact

Mindtree's rigorous planning and approach for parallel run **resulted in a smooth cutover of 180+ airlines without a single fallback**. Specific ways in which the migration has benefited the customer are:

- **Cost Savings:** Compared to alternatives like complete application rewrite and commercial off-the-shelf (COTS) implementation, migration was more cost-effective in eliminating legacy code.
- **Time Savings:** Build cycle time for the full application has fallen from several hours on the mainframe to just a few minutes on open systems. The development team can now update an application and experience the impact of code changes in real-time.
- **Future Growth Opportunities:** The lively new deployment platform is better suited for the computationally-intensive flight planning system than theold system. It can handle a greater number of simultaneous flight plans. The client is now well- positioned to address Service Level Agreements (SLAs) for the next seven years.