



Yet another ReHosting

Two hops for the venerable Sabre Frequent Flyer Manager System

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EDGEucate/ November 14, 2012

Company Background



20 Years – 4 Companies – Same System

- American Airlines (AA) – Early 1990's
 - Internal IT division used the name SABRE
 - Another division named American Airlines Decision Technologies marketed software to other airlines
- Sabre Holdings – Mid 1990's
 - The AA two divisions were merged and spun off as a separate public company
 - AA initially retained 51% share, later it divested these shares
- EDS wins outsourcing deal from Sabre Holdings – 2001
 - Sabre CEO sees little profit in running hardware, outsources all hardware and 4,000 employees to EDS
- HP buys EDS – 2008
 - Seeing IBM divest itself of PC's and move profitably into software and consulting, HP follows suit
 - Buys EDS to pump up it's offerings paying a record 13.9 Billion for the company



Hardware Background



Frequent Flyer Manager on 3 sets of Hardware

Mainframe to SUN to HP Blade

- Original implementation in 1995
 - IBM and Friends Mainframe
 - UI in 3270, initial user group was still using 3270 devices in 1995
- Second UI 1997
 - Client Server developed for call center users after 3270's were replaced with PC's
 - Call time dropped by 17%
 - Servers still on the mainframe
- Third UI 2002
 - Browser based UI deployed for new client base
 - Third party tool used to screen scrape 3270 system for Browser based GUI
 - Servers still on the mainframe
- Fourth UI 2009 as part of the rehosting project
 - Browser based, manually written JSP consuming Java proxies based on the original 3270 procedures



Software Background



Build it faster – Run it cheaper

Project began as a rewrite of an existing system

By 1991 the American Airlines AAdvantage Program had out grown it's software

- Started in 1981 as a system to print mailing labels for AA's best 100,000 customers
 - COBOL, IMS, (TP and DB) on a mainframe
- Early 1990's manual COBOL DB2 rewrite project failed
- TWA had successfully deployed an IEF based system in the late 1980's
- Airlines are notorious for using each others systems
- AA acquires a copy of the TWA system from Canadian Airlines in 1992
 - Hired IBM to see if the system will handle AA data volumes (AA is ten times larger than CA)
 - Ends up using only 60% of the data model and builds a new process model
- New system is implemented in 1995 and is still running today.
 - Mean while, AA spins off Sabre
 - Sabre gets intellectual property rights to all software ever written for AA
 - AA retains perpetual right to use the software, and may limit sales to competitors



Build it faster – Run it cheaper

- The Mainframe system costs too much to run, and is too expensive to sell
 - Sabre costs to run the system are paid in real dollars to 3rd party
 - Potential increases at contract renewal ***
 - Other 3rd party software per seat costs were also reducing profits
- Proposed Solution
 - Rehost application to Sun servers to eliminate mainframe charges.
 - Replace 3rd party screen scraper with Struts based Java GUI to eliminate per seat costs



Build it faster – Run it cheaper

Hardware Software Grid

Frequent Flyer Manager System	Original	Rehost 1	Rehost 2	Future
Hardware	Mainframe	Sun	HP Blade G5	HP Blade G8
Operating System	Z O/S	Solaris	Red Hat 4	Red Hat 5
Data Base	DB2	Oracle 10	Oracle 11	Oracle RAC
GUI	3270	JSP	JSP	JSP
CA Gen version	4.2	7.6	7.6	8.x
First Implementation	1995	2009	2010	2013



FFM System Profile

- Frequent Flyer system marketed in “software as a service” mode
 - Hosted by HP for Sabre
 - Nothing installed at user location except common PC and browser
- Currently 13 clients world wide
 - Before the current economic slowdown the system had 20 clients
 - Several lost to mergers and bankruptcies
- CA Gen Model has 1.2 million objects
 - 100 GUI server procedures
 - 13 Web Services
 - 50 Batch procedures
- Run Statistics
 - 100K online transactions daily (JSP driven GUI calling server procedures which have sub second times)
 - 200K web service calls
 - 4K batch jobs daily (driven by user input, schedules run every half hour, most complete in 1 hour or less)



Rehost 1 environments

Mainframe to Solaris

- Sun V880 Solaris with remote Oracle data base.
- Rehosting project ran from mid 2007 to mid 2009.
- Multiple airlines migrated to Sun in 2009.
- Component port methods
 - JCL- manual translation to Korn Shell Scripts
 - Sync Sort - automated translation to Cosort SCL
 - CA Gen - regenerated to C from COBOL
 - Screen scrapper GUI - replaced by STRUTS JSP
 - IMS GSAM restart – replaced by Report Composer
 - Cobol recompiled with NetCOBOL
 - ESP Schedules - manually translated to Autosys

- Performance
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Sysplex of 3 boxes
125 MIP
mainframes
Shared by 100's of
systems



SUN V880

4 x 1200 MHz UltraSPARC
III

Shared by a few systems



Rehost 2 environments

Solaris to LINUX

- HP proposal to cut Data Center costs x/24
- HP BL680 with remote Oracle data base.
- Rehosting project just 4 months 2009 to 1Q 2010.
- Multiple airlines migrated to LINUX in 2010
- Components
 - Korn Shell Scripts, Cosort SCL no changes needed
 - CA Gen regenerated to LINUX C
 - Cobol recompiled with NetCOBOL for LINUX
 - No changes for Autosys schedules
- Performance
 - GUI servers remain sub second in the TE
 - Batch main process
 - 450 TPS - Sun
 - 500 TPS - LINUX



SUN V880
4 x 1200 MHz UltraSPARC III

HP BL6800
4 Hex Core 2,4 GHz
Height 14.42 in



20.06 in

Depth :

Width: 2.03 in



The good news

- The first rehost to Solaris completed in 2009
 - Seven airlines were migrated to the Solaris environment
- The second rehost to LINUX only took four months
 - Four airlines were migrated to the new LINUX environment
- The desired cost savings were achieved and all clients are now in the LINUX environment
- The mainframe and Solaris environments have been decommissioned this year

The bad news

- The system ran in all three environments for THREE YEARS
- The outsourcing contract was renegotiated, resulting in drastically lower mainframe rates
- Sabre started charge back for Solaris and LINUX use, the charge back exceeds the old mainframe levels
- The system adopted the new HP Blade environment early, now the hardware is being phased out again



Ultimate Data Center cost cutting

The next generation of the LINUX environment uses half height blades and a reengineered network allowing up to 64 servers in the same floor space as the original V880's



Count them, yes 64
Blades

In the same floor space
as

One Sun V880



Questions?

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