

Is the Sun setting over the airline reservations mainframe?

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In May of 1897 in response to hearing that his obituary had been published in the New York Journal Mark Twain sent a telegram to the newspaper in which he said "The report of my death was an exaggeration". There are many today who believe that same response could apply to claims that the mainframe as part of the airline reservation landscape is dead or at least on its death bed. In an attempt to respond, like Twain to this diagnosis, I have looked at how the patient is doing.

Usually when you start an obituary you talk about where the subject was born and their life to date. This usually helps the reader understand the importance of that life and why their passing is of note. Well a lot has already been written about the beginnings of airline computer reservations systems (CRS). This includes the claims and counter claims as to whether the first system was the Reservec system built by Ferranti for Trans-Canada Airlines (the forerunner to Air Canada) or the more famous SABRE system built by IBM for American Airlines. Whichever is true the fact is that the mainframe powered CRS is now over 40 years old.

During this period these machines have lead the world in computer transaction processing, have grown in functionality, created global communications networks, become progressively quicker, stored masses of data and have become the heart of all airlines operations. In truth history, not just the commercial airline community, will remember them as one of the milestones in the growth of Information Technology.

However, like the swan, what you see on the surface often does not reflect what is going on beneath the water. In the case of the CRS there was a constant battle to keep pace with airline growth and the increasingly complex business models and business relationships that went with that. Long before "Just in Time" stock management or electronic trading was commonplace these systems were handling thousands of sales transactions per second from their computer terminals, with other airlines and later, via Global Distribution Systems (GDS), sales by travel agents.

This was all done with what today would seem antiquated computer infrastructures and complex labour intensive programming languages, such as Assembler and Cobol, together with very basic testing tools. The code, often described today as 'spaghetti' was difficult to maintain and adding functionality could be time consuming. The fact remains though that these systems not only did the job well they were exceptionally reliable. A tribute to the skills of those IT professionals and the value of evolutionary development.

So when did their lifespan begin to be questioned? There is no doubt that the triple whammy of terrorism, economic decline and SARS that hit the industry at the beginning of this century, not the availability of new technology itself, was the catalyst. When an industry collectively loses \$36bn during 2001-2004¹ you know that every element of business will be scrutinised to drive out cost and better prepare for future uncertainties. The move though from mainframes had always been considered a huge risk; a fact born out by studies such as the EU funded Airman Project². Factors though, such as their age, the growing scarcity of experienced staff and cheaper, more efficient technology was putting the matter back on the airline CIOs agenda.

¹ Source: IATA

² The project was funded under the EU Esprit initiative in 1996

Now it was a risk that had to be given serious consideration.

In writing this article I looked for evidence as to when both the industry and the existing mainstream IT suppliers started to talk about initiatives to move from mainframes and legacy programming towards modern system architectures.

There are of course a lot of examples of companies who never used mainframes preferring to offer 'open system' based solutions, mainly to the Low Cost Carrier sector in the 1990s. These companies, in particular HP OpenSkies (now Navitaire), have given impetus to the debate and of course they, never having had the mainframe issue to deal with, have criticised the mainframe based CRS with impunity. They however are starting to move into the world of the legacy network carrier as the Low Cost Carrier model starts to hybridise and they are forced to address product weaknesses such as interlining, GDS distribution and eTicketing, all strengths of the old mainframe CRS. Previously we talked about the move by Air Canada to replace its mainframe with an open systems solution developed by ITA Software³. The news is that this experiment has seemingly stopped, once again showing how hard replacing mainframes is.

Of considerable interest must be what the two main mainframe and application suppliers in this area, IBM and Unisys, are doing. IBM continues to enhance its mainframes to be smaller, faster and able to run a wide range of operating systems whilst promoting the advantages they can deliver over architectures such as clustered servers. They have not publicly given their view on what will happen to the airline CRS. My view though is that there must be concern in their Travel and Transportation division that a widespread move to open systems by airlines, CRS vendors and the GDS would give the likes of HP and Sun Microsystems the opportunity to supplant them.

Unisys on the other hand have been very public in that they believe in the demise of the mainframe for airline CRS. So much so that they have been promoting their open systems based solution AirCore; albeit to date they have seen both SITA and Lufthansa Systems abandon projects to implement their own versions of this platform. Whether AirCore survives or not is debatable given its set backs but having started Unisys will no doubt continue down the open systems route. The question though will that be with or without a place for the mainframe?

SITA, a provider of hosted airline CRS services since 1974, recently announced a new project aimed at the development of its new Passenger Reservation System using open systems⁴.

Describing this as the "final installment of SITA's Horizon portfolio of passenger management solutions" and following its cutover of its customers to their new open systems based Airfare pricing system. Francesco Violante, CEO at SITA said "There will be no disruptive 'big bang' replacement of systems, but a series of innovational waves which will enhance and extend the functionality of existing systems with next generation, value added services". He then added "The end result will be the retirement of today's mainframe technology following a well-managed migration to new applications. New technology adoption will be carefully phased to accelerate the delivery of business value while minimizing risk and ensuring continuity of operation".

³ Air Canada announced the move to the ITA Software RES product on the 13th September 2006

⁴ SITA Press Release dated 22 October 2007

The clear message here is that SITA is committed to a move to open systems and away from the mainframe but believes that despite market pressures this needs to be carefully planned. There is a risk for them as they will face some cynicism after their Unisys AirCore experience but that experience and that gained from the pricing system migration, has prepared probably prepared them well. The next two years will see how successful they have been.

As yet there have been no public announcements from EDS and Lufthansa Systems, the other two players offering hosted services. Lufthansa Systems is obviously still smarting from its recently abandoned project with Unisys and seems focused on developing the areas of its business where it is a recognised leader. This might mean abandoning the Passenger Management products, in particular Multi-host; especially given the move of Lufthansa to Amadeus. Maybe under the new leadership at Lufthansa Systems that will eventually happen?

In the case of EDS I had wondered what was happening there. They had shown their ability to develop open systems based applications but seemed yet to decide what they would do with SHARES and Atraxis, its two separate airline CRS. In a conversation though with Bill Spilman, Director of EDS Transportation Portfolio, things became much clearer. They have a strategy to move towards open systems focused on a Service Orientated Architecture (SOA), this enables them to develop new applications using new technology (they seem wedded to Microsoft .net and other MS products) but keep the existing mainframe technology in place for some time utilising the data sharing capability inherent in SOA. In fact their existing project for developing new reservation systems to replace their TPF based SHARES and Atraxis systems will take between 5-7 years to complete.

The recent acquisition of EDS by HP has now added a further dimension to the equation and at the time of writing it is not clear what impact this will have. After all HP dipped its toes in the airline reservations arena when it acquired OpenSkies and then sold it soon afterwards. Still the recent news about a deal with Sabre (see below) may mean this time there is a bigger game being played.

That brings us to the three GDS companies that now all offer airlines outsourced CRS services.

Sabre claims that it started to look seriously at this issue as early as 1994 and a quote from Craig Murphy, who inherited the project when he joined the company in 1996 as CTO, supports this. "We knew that for our evolution, revolution and existence, we had to continue to push our technology further".

Later he would go on to say that the growth in consumer access and massive price competition fuelled by the Internet was impacting their mainframes because of the huge look to book ratios. The decision was taken to move pricing transactions off the mainframes and into a UNIX server based environment. The project started in 2000 with a proof of concept running on the Compaq Himalaya Non-stop platform, chosen because they were looking for an architecture that "offered the same reliance as the mainframes but at a fraction of the cost".

In September 2001 Sabre went public with what it was doing saying "*that over the next several years, it will move its airline registration database system to Compaq Computer Corp.'s NonStop Himalaya servers at a cost of \$100 million*". The initial scope though was centered on moving their Air Travel Shopping Engine (ATSE) and Low-Fare Look up applications off one of their mainframes; although this was heralded as the start of a process to move all applications

In October 2002 Sabre announced that they had moved to a hybrid architecture running on non-stop computers running UNIX and pc servers running Linux, MySQL and written in C++ and Java. They were open in describing both the benefits and the issues, not least that the systems were at that stage not as reliable as their mainframes. In fact the actual migration of applications started in the spring of 2003 with the migration completed by late 2004 / early 2005. What was omitted in a lot of the articles written at the time though was the fact that the new architecture was only handling domestic US enquiries with International pricing still running on a mainframe.

Since then some other applications e.g. their hotels, customer and ticketing databases, have been migrated. However I have not been able to establish for certain if International Pricing is finally operational on the new platform. More importantly no dates have been given for moving other applications, in particular their key reservations and departure control applications. In an article in the Sabre Ascend magazine, Bill Glover who is the Chief Architect for Sabre Airline Solutions said that they currently believe that a 'Hybrid' solution provides the "best balance of flexibility and stability".

It looked as if Sabre was also trying to shift emphasis. On the 8th September 2008 they announced that they that would be launching over a 3 year period the SabreSonic Customer Sales and Services (CSS) solution. They called this "first real intersection of customer-focused solutions and revenue generation in every distribution channel." Technically CSS is to be based on "modern service-oriented architecture principles" resulting in "an open-standards-based environment"

What was not known though was that their primary customer American Airlines was to decide to replace Sabre. On 26th August American announced it would be working with HP to develop a "next generation Passenger Services System (PSS) called Jetstream". "Jetstream will take over many of the functions that AMR currently runs on Sabre".

Monte Ford, American's CIO, Jetstream will allow AMR to "meet the customer where the customer wants to be met." Among the applications that Jetstream will run are Reservations, DCS, Scheduling, Pricing and Revenue Management.

The irony of all this of course is that HP own EDS and EDS run the Sabre data centre under a long term contract; they are a competitor of Sabre and were on the short-list of two for the American contract. The only conclusion is that that the only reason HP got this contract was EDS. As to what role, if any, Sabre will have in this ...watch this space!

Across in Atlanta things were happening at Worldspan. Having been acquired by Travelport they are now considered to be the Airline IT services provider within the group so their opinion is valuable, in particular as they operate CRS for Delta Airlines and Northwest Airlines.

The story here though is much clearer. They have developed a new non-mainframe pricing shopper application running on PC servers which they seem very happy with. They however made the decision in October 2006⁵ to purchase 6 new IBM z9 EC mainframes.

Indeed when asked for their views Sue Powers, their CIO and SVP of Product Solutions, told me "*The industry has been saying for years, "The dinosaurs are extinct and so should be the mainframe!" We at Travelport do not disagree if the reference is to the costly mainframes being used in the wrong manner. The new technology and open systems platforms do sometimes provide lower cost of ownership for most*

⁵ Quoted in an article in Computerworld 31st Oct 2006

applications, including those which provide airlines the capabilities to handle their customers, from reservations through boarding and landing at their final destination. However, Travelport and our hosted airlines have determined a fact based/intellectual approach that has a much better success rate. We have chosen many applications to move off the mainframes and onto an open system, and have been very successful with these. We provide high levels of customer service and it comes at a lower cost overall. We have also chosen not to move several applications off the mainframe due to their high volume and high I/O requirements. Last seat availability has always posed a problem, although possible to resolve, but when you add the capability for an executive assistant to change reservations while the boss is in the air on the first leg of a week's trip, it gets very costly. The new zTPF mainframe operating system has many of the advantages of the new technology/open systems, such as toolsets and development languages. We will continue to evaluate each project and its requirements and make fact based decisions as to how to improve our cost/value/service relationships".

Things have been quiet though more recently and although there might be life in the old dog it has yet to develop a business of any consequence in the airline PSS arena.

Amadeus though, as the youngest GDS, is very public in stating their view that the mainframe era is nearing its end. José Antonio Tazón, President and CEO was quoted in August 2007 as saying *"By 2010, we will have completely decommissioned our legacy transaction protocol framework technology and will be running 100% on next generation open systems*

I found this strange given their quoted views on the subject; after all they are the only GDS declaring not only full migration but dates. It is therefore worth looking at what they have done so far to see if there is anything to indicate their caution.

Amadeus signaled their decision to switch from being just a GDS to being an IT Services company in 2000 when they signed contracts with British Airways and Qantas to build their 'Next Generation Customer Management Solution. Before this they had, since 1992, provided their reservations system to airlines as so called 'System Users'. In reality this was based on the functionality developed originally in the 1970s for the IBM mainframe based System One which had been acquired and subsequently enhanced by Amadeus. It was also only originally used by their parent airlines Air France, Iberia, Lufthansa and SAS and later offered to others when it could be proved that the separation of the Reservations and Inventory functions, usually tightly coupled in a CRS system, would work with only just a few issues.

The offering re-branded as Altéa in 2004 was to be delivered in three phases within the Altéa Suite. The first was the rebranding of the reservations system as Altéa Sell, a new Inventory system called Altéa Plan and a new Departure Control System (DCS) called Altéa Fly. By their own admission staff from both Qantas and British Airways, were heavily involved in the development process bringing with them their application experience, albeit in a mainframe environment.

What was not clear though was the exact platform these new systems were going to be delivered on. The first inkling was when Amadeus launched a new pricing system in February 2003 called Master Pricer. This used HP Servers running Linux and written in C++ and although unconfirmed this is likely to be the platform to be used across the Altéa range. Indeed the recent announcement of their new hotel reservations system based on the Optims system, acquired by Amadeus in 2005, is also uses Linux so at least there is some inkling of consistency in choice of operating system.

So how far have Amadeus got with the plans.

In September 2004 Qantas cut-over to Altéa Plan, followed by Finnair in 2005 and British Airways, a year later than originally planned, in late 2006. Amadeus claimed that they have 34 airlines⁶ currently using this product.

The situation with Altéa Fly has been more traumatic for Amadeus. It has been renamed as Altéa Departure Control and split into sub brands Flight (load control) and Customer Management (Check in, boarding and baggage management). Although for people who understand DCS systems this can be a logical decision it was almost certainly in this case caused by missed development targets and not by product re-positioning. Due originally to be delivered in full by 2005 it has now finally been deployed at Qantas and Finnair. In the meantime the British Airways mainframe based DCS system is being used by Amadeus Altéa Departure Control customers.

Amadeus though remain positive in their marketing claiming on their web site that in 2007 only "20% of their current Altéa Customer Management Solution is running under TPF⁷ license". If this is the case then the 20% relates to the core airline reservations application, now called Altéa Reservations, which has, according to their timescales, to be delivered and airlines migrated to by 2010.

Is this going to happen? It looks not. When British Airways recently announced their contract extension with Amadeus they also said that they will not migrate completely to Altéa until 2012 tends. This is an IT project after all.

Although convinced that Amadeus will complete its objective eventually, given their propensity to throw money at problems, the delays they have experienced so far will make its customers and prospective customers very wary of any dates given. May be that was a factor in American Airlines rejecting Amadeus as a supplier for its new PSS system and United stalling its plans to migrate to Amadeus (they blamed the recession).

So far from being dead I suspect the Amadeus mainframes in Erding⁸, although on life support, will be around a lot longer than Sr. Tazón has predicted. Maybe David Jones, the new boss at Amadeus, will be more circumspect in his predictions in the future.

Is the sun about to set then?

Having started the article by telling you about the mistakenly reported death of Mark Twain it seems only right to finish the story. Mark Twain eventually died in 1910 of heart failure, outliving his wife and two daughters⁹. This was 13 years after his announced death. So will the same time lapse from announcement to demise apply to the mainframe? Although I am sure that traditional mainframes, as well as operating systems such as TPF, will become museum items soon enough it is probably too soon to write their obituary yet. They still may also outlive some of their offspring as well.

⁶ This number includes airlines that are either subsidiaries of larger airlines or were hosted on those airlines systems originally

⁷ TPF is the IBM Transaction Processing Facility operating system

⁸ Erding in Bavaria, Germany is where the Amadeus Data centre is located

⁹ Twain accurately predicted his own death as coinciding with the return of Halley's Comet which had last been seen on his birthday in 1835.

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