

Web Services Ubiquity in the Travel & Tourism Industry

W3C Seminar
Paris - March 6, 1996

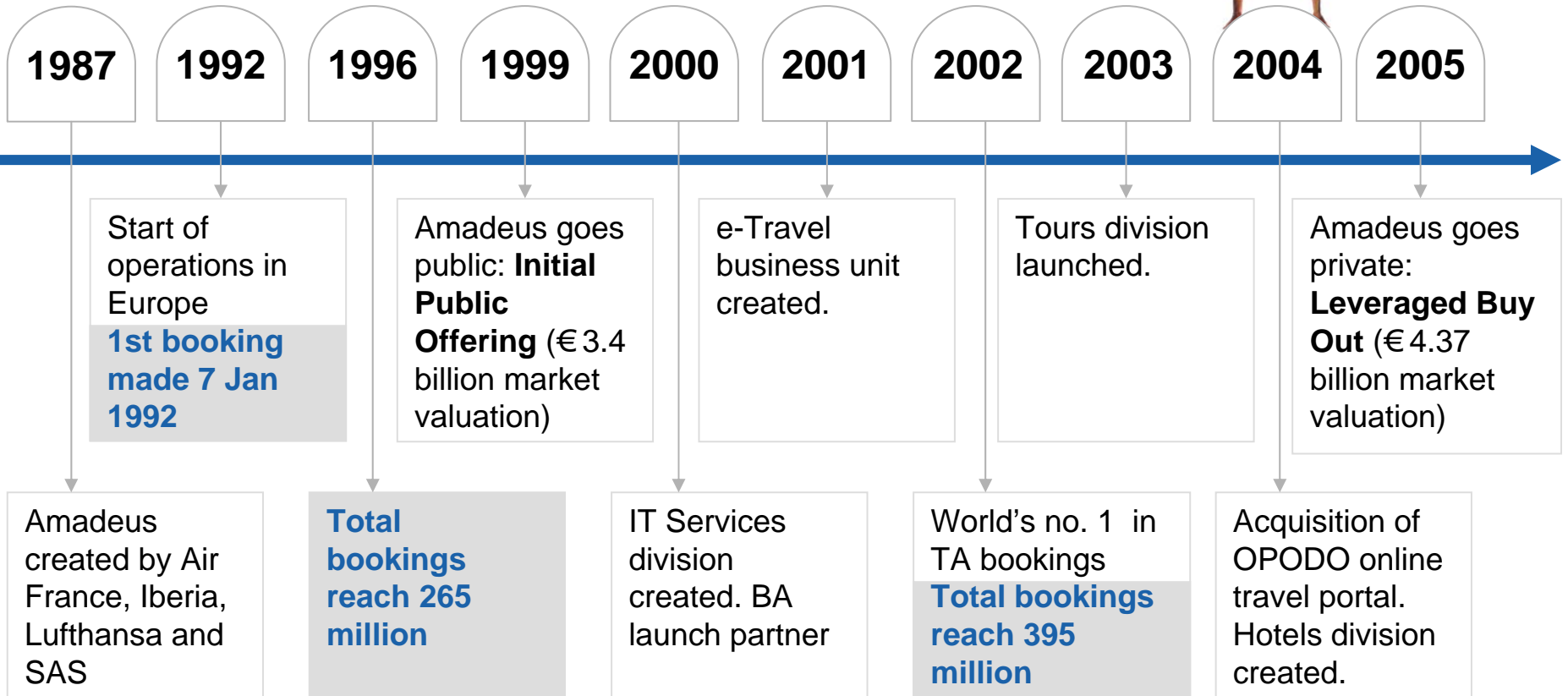
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Amadeus e-Commerce Product Development

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Agenda

- ▶ **Amadeus**
 - ▶ **Brief History**
 - ▶ **Core Offering**
- ▶ **Delivery Strategy: Software as a Service**
- ▶ **A Deeper Look At Reservation Systems**
 - ▶ **Anatomy of a Transaction**
 - ▶ **Introducing... Web Services in the 80s**
- ▶ **Web Services Today**

Our major milestones



Amadeus Today

- ▶ **6,500+ employees**
 - ▶ 2000+ in technology
 - ▶ Over 100 nationalities
 - ▶ Operating in 218 countries
- ▶ **Privately held since December '05 after successful €4.37 billion LBO**

Aiming to become the leading provider of IT solutions that enable success in the travel and tourism industry

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<p>Distribution & Content</p> <p><i>Air, Car, Hotel, Rail, etc... Content Aggregation</i></p> <p><i>Content Distribution</i></p>	<p>Sales & e-Commerce</p> <p><i>Travel Agency Automation</i></p> <p><i>e-Retail Engine for airlines & agencies</i></p> <p><i>Corporate Self Booking Tool</i></p>	<p>Business Management</p> <p><i>Eg. Airline Inventory & Departure Control Systems</i></p>	<p>Services & Consulting</p> <p><i>Eg. Amadeus Help Desk Services</i></p> <p><i>Amadeus Learning Services</i></p>
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Our customers: Airlines, Hotels, Travel agencies, Tour operators, Ground & Maritime, Corporations, Travelers

Software as a Service Top to Bottom

- ▶ **Most of our offering is delivered as a Service (SaaS), with a community approach**
 - ▶ **Our customers share the same products, on shared infrastructure, delivered to them over the wire**
 - ▶ **Solutions built and designed for mission critical environments**
- ▶ **This results into unusual system constraints, with ultra high scale real-time transaction processing**
 - ▶ **An average of 6,300 transactions per second, with daily peaks above 12,500 transactions per second**
 - ▶ **€880 million *a day* worth of air travel sold a day**
 - ▶ **Less than 180 seconds of down-time a month**

Let's Take a Closer Look...

Amadeus Screen Shot circa 1991...

AN30MARNCENYC

```
IDL:AF8702 J9 C9 D9 I9 Y9 B9 K9 /NCE 2 JFK 3 1140 1340 E0/763
          H9 T9 V9
2 AF7715 Y9 S9 B9 K2 UR A2 I9 /NCE 2 CDG2F 1625 1800 E0/320
          GR
          AF 008 P7 F3 A2 J9 C9 D9 I9 /CDG2C JFK 1 1855 1950 E0/77W
          Z9 Y9 B9 K2 GR UR
3 AF7703 Y9 S9 UR GR /NCE 2 CDG2F 1315 1450 E0/320
          AF 010 J9 C9 Y9 GR UR /CDG2C JFK 1 1555 1710 E0/343
4 ZE0157 Y9 S9 UR A2 GR /NCE 2 CDG2F 1005 1140 E0/320
          ZE0234 P8 F4 A2 J9 C9 D9 I9 /CDG2C LGA 1 1315 1405 E0/772
          Z9 Y9 GR UR
5 AF7701 Y9 S9 B9 K9 H9 T9 V9 /NCE 2 CDG2F 1005 1140 E0/320
          L9 R9 M9 Q9 GR
DL:AF8994 J9 C9 D9 I9 Y9 B9 K9 /CDG2E JFK 3 1300 1420 E0/763
          H9 T9
```

- Someone interrogated Amadeus for flights out of Nice to New-York City on March 30
- Much easier with a Web front-end such as Opodo.fr !

So What Happens Next With This Query?

- ▶ **The system will perform a “connection build” (or rely on a cached one...)**
 - ▶ **Looking for all options, all airlines, all connections, all airports in Nice, all airports in New-York**
- ▶ **The result will be a collection of itineraries,**
 - ▶ **i.e. from Nice to Frankfurt on a Lufthansa flight, and then from Frankfurt to La Guardia on another Lufthansa flight**
 - ▶ **I.e. from Nice to Charles de Gaulle on an Air France Flight, and then from CDG to JFK on a... Delta flight**
- ▶ **But we still don't know if there are any available seats on any of these flights!**
 - ▶ **The system will interrogate in real-time all airlines, for all flights, asking for available seats in economy, business, etc...**

So, How Do We Interrogate These Airlines?

► Here's the message sent to Cosmos Air:

```
UNB+IATB:1+1APPC+ZE0AV+060206:1617+091331300005C1'  
UNH+1+PAOREQ:93:2:IA+091331300005C1'  
MSG+1:46'  
ORG+1A:MUC+99999992:SWI1G2RSA+SWI+1G+T+HK:GBP:EN+A0001AAGS'  
ODI+HMO+CUU'  
TVL+300306+NCE+CDG+ZE+0157+1++P\  
TVL+300306+CDG+LGA+ZE+0234+1++P'           ► XML? SOAP?  
UNT+6+1'                                       ► Interactive EDIFACT!  
UNZ+1+091331300005C1'
```

► And here's Cosmos Air's reply:

```
UNB+IATB:1+ZE0AV+1APPC+060206:1616+9253C7FD0001+091331300005C1'  
UNH+1+PAORES:93:2:IA'  
MSG+1:47'  
ODI+HMO+CUU'  
TVL+300306+NCE+CDG+ZE+0157+1+00+P'  
PDI++Y:9+S:9+K:9+Q:9+T:9+V:9+X:9+H:9+L:9\  
TVL+300306+CDG+LGA+ZE+0234+1+00+P'  
PDI++Y:1+S:2+K:5+Q:5+T:5+V:9+X:9+H:9+L:9'  
UNT+6+1'  
UNZ+1+9253C7FD0001'
```

What About Web Services Then?

- ▶ **The entire Travel & Tourism industry has been using Interactive EDIFACT (I-EDI) for almost 20 years**
 - ▶ **Much more prevalent within the airline community, but I-EDI and related dialects can be found everywhere**
 - ▶ **Message standardization is a big thing; IATA has had a pioneering role**
- ▶ **Web Services are fundamentally so isomorphic to Interactive EDIFACT that the entire industry immediately embraced them everywhere**
 - ▶ **SOAP was first used in production at Amadeus in 1999 / 2000, along with WSDL !**
 - ▶ **It has spread like wildfire across the industry on Day 1**

A Typical Example

Amadeus e-Travel Management, a leading Corporate Self Booking Tool, in 2006



Bookings

[Home](#)[Travel Planner](#)[Travel Review](#)[Profile](#)[Admin](#)>> [Air](#)[Hotel](#)[Car](#)[Trip Summary](#)

Login Information



User: Test Test
Community: CR1573159 one way fare

Failed login attempts: 0

[Change Community](#)[Logout](#)

Mini Itinerary



Trip Summary

Flight

in progress

Modify Search



Flight

SYD to MEL

March 25

10:00 AM

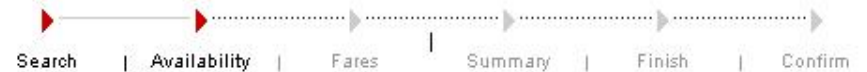
MEL to SYD

March 25

10:00 AM

Search

Flight



Flight Search Results



Sydney(SYD) Melbourne(MEL) - Round-Trip

Legend: Level of Preference **OP** Flight operated by another carrier **E** Electronic Ticketing Candidate

Departing flight: Sydney (SYD), NS to Melbourne (MEL), VI

Departing Date: Saturday, March 25, 2006

From	To	Flight	Duration	Restricted	Semi Restricted	Fully Flexible	Business
9:00 AM Sydney	10:30 AM Melbourne	Qantas Airways 419 E	1h30min	<input type="radio"/> 169.96 <input checked="" type="checkbox"/> <input checked="" type="checkbox"/> <input checked="" type="checkbox"/>	<input type="radio"/> 262.36 <input checked="" type="checkbox"/> <input checked="" type="checkbox"/> <input checked="" type="checkbox"/>	<input type="radio"/> 382.26 <input checked="" type="checkbox"/> <input checked="" type="checkbox"/> <input checked="" type="checkbox"/>	<input type="radio"/> 411.96
09:15 Sydney Kingsford Smith	10:45 Melbourne Airport	Virgin Blue 0826	1h30min	<input type="radio"/> 135.00 <input checked="" type="checkbox"/> <input checked="" type="checkbox"/>	<input type="radio"/> 205.00 <input checked="" type="checkbox"/>	<input type="radio"/> 265.00 <input checked="" type="checkbox"/>	-
10:00 AM Sydney	11:30 AM Melbourne	Qantas Airways 423 E	1h30min	<input type="radio"/> 169.96 <input checked="" type="checkbox"/> <input checked="" type="checkbox"/> <input checked="" type="checkbox"/>	<input type="radio"/> 262.36 <input checked="" type="checkbox"/> <input checked="" type="checkbox"/> <input checked="" type="checkbox"/>	<input type="radio"/> 382.26 <input checked="" type="checkbox"/> <input checked="" type="checkbox"/> <input checked="" type="checkbox"/>	<input type="radio"/> 411.96
10:30 AM Sydney	12:00 PM Melbourne	Qantas Airways 425 E	1h30min	<input type="radio"/> 151.26 <input checked="" type="checkbox"/> <input checked="" type="checkbox"/> <input checked="" type="checkbox"/>	<input type="radio"/> 262.36 <input checked="" type="checkbox"/> <input checked="" type="checkbox"/> <input checked="" type="checkbox"/>	<input type="radio"/> 382.26 <input checked="" type="checkbox"/> <input checked="" type="checkbox"/> <input checked="" type="checkbox"/>	<input type="radio"/> 411.96

Returning flight: Melbourne (MEL), VI to Sydney (SYD), NS

Departing Date: Saturday, March 25, 2006

From	To	Flight	Duration	Restricted	Semi Restricted	Fully Flexible	Business
9:00 AM Melbourne	10:20 AM Sydney	Qantas Airways 418 E	1h20min	<input type="radio"/> 129.65 <input checked="" type="checkbox"/> <input checked="" type="checkbox"/> <input checked="" type="checkbox"/>	<input type="radio"/> 264.95 <input checked="" type="checkbox"/> <input checked="" type="checkbox"/> <input checked="" type="checkbox"/>	<input type="radio"/> 384.85 <input checked="" type="checkbox"/> <input checked="" type="checkbox"/> <input checked="" type="checkbox"/>	<input type="radio"/> 414.55
09:15	10:35 Sydney Kingsford	Virgin Blue 0829	1h20min	<input type="radio"/> 115.00	<input type="radio"/> 205.00	<input type="radio"/> 265.00	-

Where Are Web Services Used?

- ▶ **Amadeus e-Travel Management *consumes* Web Services**
 - ▶ To connect to Amadeus for air, car, hotel and insurance services: Amadeus exposes 100% of its capabilities as Web Services
 - ▶ To connect to low cost carriers such as Virgin Blue
 - ▶ To connect to Rail providers
 - ▶ To gather destination content: visa information, weather information, currency, etc...
- ▶ **Amadeus e-Travel Management *exposes* Web Services**
 - ▶ For corporate portal integration purposes
 - ▶ For order taking & expense management integration (i.e. ETAP Online's Ulysse)

Web Services ~~Challenges~~ Opportunities

- ▶ **Web Services must be used wisely**
 - ▶ At 12,000 transaction per second, not sure we want Amadeus to be built as a set of “orchestrated web services” ...
 - ▶ Verbosity, even with MTOM, parsing costs, DOM memory usage and traversal can become major headaches at the high end spectrum of applications
- ▶ **Web Services must be used well**
 - ▶ Interoperability & backward compatibility of one’s implementation can be challenging
 - ▶ OK, not an architectural problem, an implementation issue, but...
- ▶ **With the explosion of Web Services, message standardization seem to have suffered**
 - ▶ Web Services are more approachable, and much more used than, say, I-EDI, with the net result that it’s increasingly difficult to get people to agree!

In Conclusion...

- ▶ **The Travel & Tourism industry, and specifically real-time reservation systems, have used message-based REQ / RES interfaces for a long time**
- ▶ **When Web Services came about, their value was quickly understood, and they were put to good use immediately**
- ▶ **Today, every actor in this industry, IT provider or not, is heavily consuming & exposing Web Services**

Thank You!