Web Services Ubiquity in the Travel & Tourism Industry

W3C Seminar
Paris - March 6, 1996

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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

1987
- Start of operations in Europe
- Amadeus created by Air France, Iberia, Lufthansa and SAS

1992
- 1st booking made 7 Jan 1992

1996
- Total bookings reach 265 million

1999
- Amadeus goes public: Initial Public Offering (€ 3.4 billion market valuation)

2000
- e-Travel business unit created.

2001
- Tours division launched.

2002
- World's no. 1 in TA bookings
- Total bookings reach 395 million

2003
- Amadeus goes private: Leveraged Buy Out (€ 4.37 billion market valuation)

2004
- Acquisition of OPODO online travel portal. Hotels division created.

2005
- Amadeus goes public: Initial Public Offering

2009
- Amadeus goes private: Leveraged Buy Out
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
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…
### 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'
  UNT+6+1'
  UNZ+1+091331300005C1'

- XML? SOAP?

- Interactive EDIFACT!

- 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
# Flight

## Flight Search Results

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

### Departing Flight:
- **Sydney (SYD), NS to Melbourne (MEL), VI**
- **Departing Date:** Saturday, March 25, 2006

<table>
<thead>
<tr>
<th>From</th>
<th>To</th>
<th>Flight</th>
<th>Duration</th>
<th>Restricted</th>
<th>Fully Flexible</th>
<th>Business</th>
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</thead>
<tbody>
<tr>
<td>9:00 AM Sydney</td>
<td>10:30 AM Melbourne</td>
<td>Qantas Airways 419 E</td>
<td>1h30min</td>
<td>168.96</td>
<td>262.36</td>
<td>411.36</td>
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<td>09:15 Sydney Kingsford Smith</td>
<td>10:45 Melbourne Airport</td>
<td>Virgin Blue 0826</td>
<td>1h30min</td>
<td>135.00</td>
<td>205.00</td>
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<tr>
<td>10:00 AM Sydney</td>
<td>11:30 AM Melbourne</td>
<td>Qantas Airways 423 E</td>
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<td>168.96</td>
<td>262.36</td>
<td>411.96</td>
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<tr>
<td>10:30 AM Sydney</td>
<td>12:00 PM Melbourne</td>
<td>Qantas Airways 425 E</td>
<td>1h30min</td>
<td>151.26</td>
<td>262.36</td>
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### Returning Flight:
- **Melbourne (MEL), VI to Sydney (SYD), NS**
- **Departing Date:** Saturday, March 25, 2006

<table>
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<th>From</th>
<th>To</th>
<th>Flight</th>
<th>Duration</th>
<th>Restricted</th>
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<td>10:35 Melbourne Kingsford Smith</td>
<td>Virgin Blue 0820</td>
<td>1h20min</td>
<td>115.00</td>
<td>205.00</td>
<td>265.00</td>
</tr>
</tbody>
</table>
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

- 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 be 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.