

# **Focus on Airline reservation system, GDS, RM**

**Advanced Information Systems and Business  
Analytics for Air Transportation**

M.Sc. Air Transport Management

May16-21, 2016











# Background

Airlines need to process manifold information

<b>Route information</b>	Destinations served by an airline
<b>Aircraft information</b>	Information on the aircrafts used by an airline
<b>Schedule information</b>	Information on when the flights operated by an airline are scheduled to run
<b>Fare information</b>	Flight prices
<b>Reservation information</b>	Passenger tickets and cargo reservations



# Background

- 1)  had to go to  to buy  .
- 2)  contacted  and requested a specific flight on a specific time and date.
- 3) Fares were the same on each flight with each airline (pre-1978).
- 4) Reservations staff retrieved an index-card for that specific flight from revolving tray.
- 5)  's query answered based on retrieval.
- 6)  issued  and collected  from .



# Brief history



In 1950  introduced the first electronic reservations system, **Magnetronic Reservisor**.













In 1964 American Airlines and IBM developed the first computerized reservation system (CRS) that would allow real-time access to all its data across all its offices and travel agents: **Sabre** or **Semi-Automated Business Research Environment**.

Initially, it was used only internally and agents still had to call.

The first non-North American CRS, **aMADEUS**, was developed jointly by Air France, Lufthansa, Iberia and SAS in 1987.

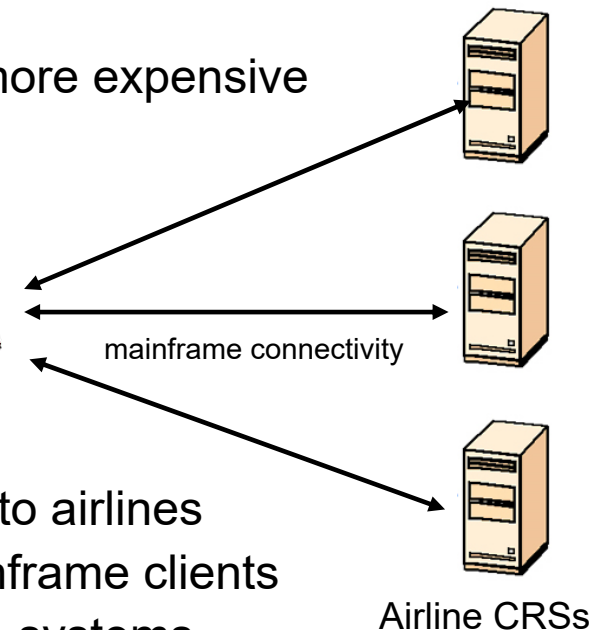
# CRS Overview

-  Storing and retrieving information and conducting air travel transactions
-  Originally designed and operated by airlines, later extended and used by Travel Agencies
-  Single travel providers store their reservations
-  CRSs contain:
  -  Airline flight schedules
  -  Availability information
  -  Fare tariffs
  -  Passenger reservations, ticketing and cancellations/refund records
-  An airline's distribution works within their own reservation system, as well as pushing out information to the GDS
-  Airlines also manage direct distribution channels where consumers make their reservations directly with the airline (call centre, Internet)

# Growing Pains of CRSs

✈️ CRSs simplified the task of maintaining airline data, but new challenges arose:

- ✈️ Increasing passenger traffic required larger and more expensive computer systems
- ⇒ High cost for (smaller) airlines



✈️ CRSs were airline specific

- ⇒ Travel agencies required individual connections to airlines
- ⇒ Travel agents had to be trained on different mainframe clients
- ⇒ Inability to perform direct searches across airline systems
- ⇒ Combining airline inventories was a tedious process because inventory searches and reservations had to be performed in individual airline CRSs separately

# From CRS to GDS

- ✈️ Need to host data for more than one airline for more efficiency for growing airline industry
- ✈️ CRSs transformed from being single airline reservation systems to multi airline Global Distribution Systems (GDSs)
- ✈️ GDSs share data to increase efficiency



Mainframe/TCP-IP connectivity

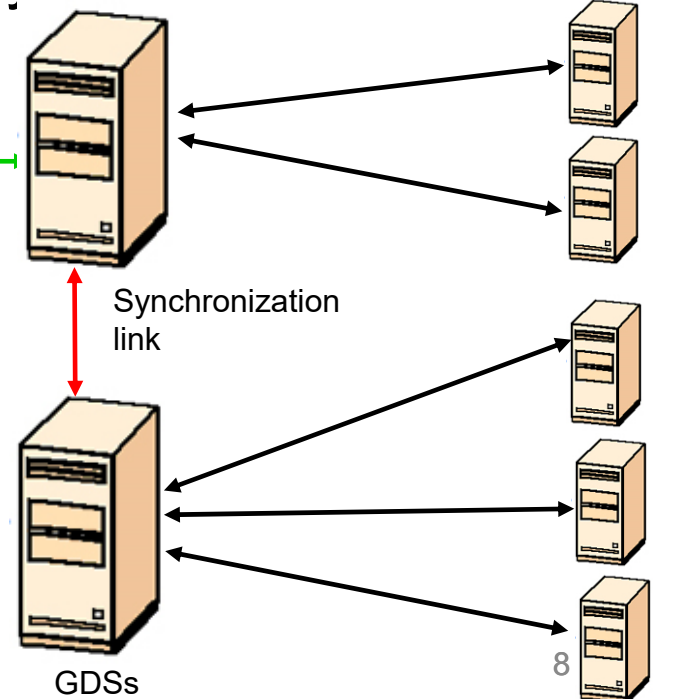
AMADEUS vista

Single Neutral availability Tuesday 14 February 05

\*\* AMADEUS AVAILABILITY - AN \*\* QOP PADDINGTON RAIL OB 39 TU 14 FEB 0000

Flight	Dep	Time	Arr	Time	T	Dur	S	Typ	P	Classes
SN 5397	BRU	17:10	LHR	17:25		320				Y9 V4
98 9253	LHR	18:10	QOP	18:33	2:23					Y9
BA 397	BRU	17:10	LHR	17:25		321				J9 C9 D9 I9 Y9 B9 H9 K9 M9 R9 V9 N9 L9 S9 Q9 O9
98 9253	LHR	18:10	QOP	18:33	2:23					Y9
BA 393	BRU	12:20	LHR	12:40		319				J9 C9 D9 I9 Y9 B9 H9 K9 M9 R9 V9 N9 L9 S9 Q9 O9
98 9234	LHR	13:25	QOP	13:48	2:28					P9 Y9
SN 5393	BRU	12:20	LHR	12:40		320				J4 C4 D4 I4 M4 L4 H4 K4 R4 T4 B4 W4 V4
98 9234	LHR	13:25	QOP	13:48	2:28					P9 Y9
SN 5403	BRU	13:50	LHR	14:05		319				J4 C4 D4 I4 M4 L4 H4 K4 R4 T4 B4 W4 V4

140r Seats 1 Passenger





# From CRS to GDS

Lower cost distribution

Current

Alternative ("hybrid")  
Distribution System  
mechanisms (providing web-  
based visibility while "pulling  
inventory" from the GDS, e.g.  
Travelocity, Expedia, Opodo)

Future

IATA's  
NDC

2006 GDS contracts expire

2005 Alternative GDS emerge,  
low-cost carriers

2004 GDS deregulation

2003 Growth of web-only (non-GDS) content

2001 Increasing growth of web fares; airlines begin diverting GDS

1990's Internet emerges as direct consumer channel; GDS struggle for market shares





1980's CRS become GDS

1970's Travel agents use CRS







1960's Airlines create CRS

Higher cost distribution







# Advantages of a GDS

-  Simplified access to most airlines through one interface
-  Ability to connect to multiple airlines either through legacy mainframe clients or PC based clients
-  Less maintenance and up-keep overhead
-  Ability to combine airline inventories

# How GDSs have evolved

-  Since airlines' CRSs were mainframe-based, GDSs were mainframe-based as well
-  Over time, GDSs offered direct connectivity over the internet to non-mainframe clients such as PCs
-  GDSs also lease hosting space (hardware, software and connectivity) to airlines which do not want to create and host their own CRSs
-  GDSs now interconnect
  - Travel agencies
  - Airlines
  - Hotels
  - Rent a car companies
  - Railways
  - Other travel-related companies.
-  Business Intelligence
-  GDS can very quickly process travel transactions in huge volumes

# Major GDSs

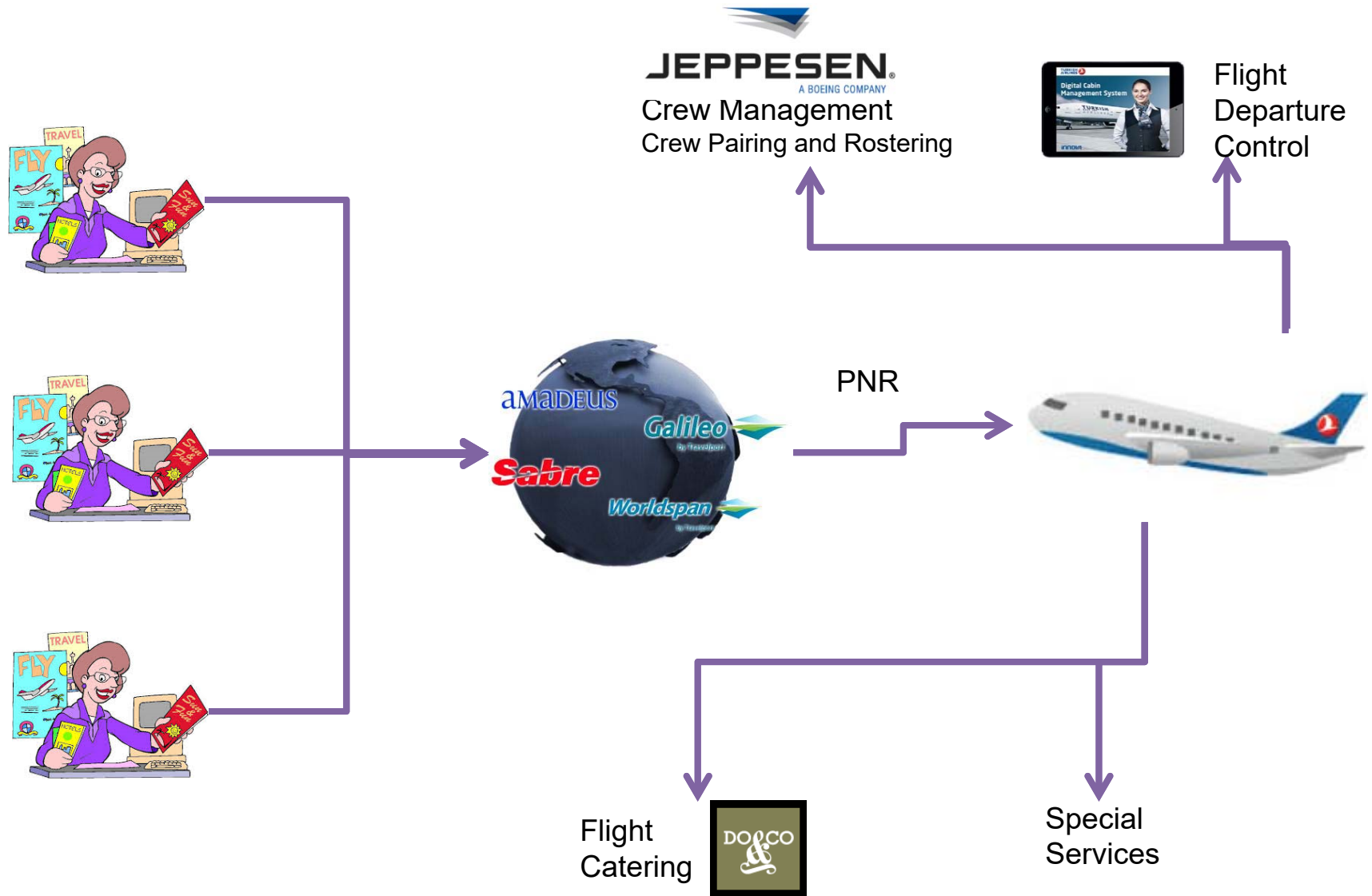
-  **amADEUS** (1987)
-  by Air France, Iberia, Lufthansa, SAS, Turkish Airlines
  -  Based in Madrid, Spain
  -  Largest booking share in Europe
  -  Third largest booking share in the world
  -  Used by [www.ebookers.com](http://www.ebookers.com), [www.expedia.co.uk](http://www.expedia.co.uk) and [www.opodo.com](http://www.opodo.com)

-   **Worldspan** (1990)  
by Travelport
-  by Delta Airlines, Northwest Airlines, and defunct Transworld Airlines
  -  Merged with Galileo in 2006
  -  Used by [www.orbitz.com](http://www.orbitz.com), [www.hotwire.com](http://www.hotwire.com), [www.priceline.com](http://www.priceline.com)

-  **Sabre** (1964)
-  by American Airlines and IBM
  -  Based in Southlake, Texas, USA
  -  Largest booking share in the world
  -  Used by [www.expedia.com](http://www.expedia.com), [www.travelocity.com](http://www.travelocity.com)

-   **Galileo** (1993)  
by Travelport
-  by Aer Lingus, Air Canada, Alitalia, British Airways, KLM, Swissair, TAP, US Airways and other air lines
  -  11 major North American and European airlines
  -  Based in Atlanta, Georgia, USA
  -  Second largest booking share in the world
  -  Used by [www.cheaptickets.com](http://www.cheaptickets.com), [www.ebookers.com](http://www.ebookers.com)

# Ticket Issuance Process








# Passenger Name Record (PNR)

- ✈ Active travel reservation in a GDS
- ✈ PNR contains the information such as:
  - ✈ Name of the passenger
  - ✈ Gender
  - ✈ Contact details
  - ✈ Ticketing details
  - ✈ Itinerary segments
  - ✈ Additional (optional) details:
    - ✈ Fare details
    - ✈ Payment methods
    - ✈ Other personal info (age, email)
    - ✈ Preferences: seat, meal
    - ✈ Frequent Flyer .etc.





- ✈ Each GDS stores vast databases of PNRs with past and present reservations.
- ⇒ Every PNR that is created in GDSs has associated historical information.

# Passenger Name Record (PNR)

-  The historical information of the PNR and any Additions, Cancellations, Deletions that are subsequently made to it.
-  The GDS System updates PNR history at each End of Transaction entry.
-  Although PNRs were originally introduced for air travel, they are now also being used for bookings of hotels, car rental, railways, etc.
-  PNR is an alphanumeric code, typically 6 characters in length
  -  Ex: RMT33W, KZVGX5, IIRCYC





# Other core members

## **International Air Traffic Association (IATA)**

-  Trade association for the airlines
-  Support many areas of aviation activity and help formulate industry policy on critical aviation issues




## **Societe Internationale de Telecommunications Aeronautiques (SITA)**

-  Airport operations
-  Baggage operations
-  Cargo operations
-  Passenger operations





## **Official Airline Guide (OAG)**

-  Large airline schedules database which holds future and historical flight details for more than 1,000 airlines and over 4,000 airports



## **Airline Tariff Publishing Company (ATPCO)**

-  Publishes latest airfares for more than 500 airlines multiple times per day.
-  Airline CRS/GDS, Sabre, Amadeus, Online Travel agencies (Expedia, Travelocity) are prime users







# INFORMATION SYSTEMS AT THE CENTER OF ONGOING TENSIONS

# How do GDSs make money?



## Booking fee

- About \$4.50 per segment
- Cancellation fees



## Traffic fees (per inquiry)



## Agencies' subscriptions

- Minus bonuses for productivity



## Sales of MIDT

- Professors' budget is often insufficient...



## Hosting inventory for airlines





## Advertising

# Bypassing the GDS

-  Airlines pay GDSs for
  - Traffic
  - Bookings
-  To bypass, Airlines create own internet channels:
  - **ORBITZ** in USA
    - (Continental, Delta, NW, United, AA)
  -  **opodo** in Europe
    - (BA, AF, Alitalia, Iberia, KLM, LH, Aer Lingus, Austria, Finnair)
  - Internet-based, no need for GDS
-  GDSs pay kick-backs to agencies
-  Do airlines lower fares?

# Information Technology

-  The Internet gives rise to new business models:
- Opaque channels:
    - Name-your-own-price: Priceline
    - Reverse auction: Hotwire
    - Intended to clear inventory via market segmentation
  - Virtual agencies: Expedia

-  More decisions:
- Which GDS to use?
  - What inventory to offer through which GDS?
  - Which fares to offer in each GDS?

# Level of Connectivity



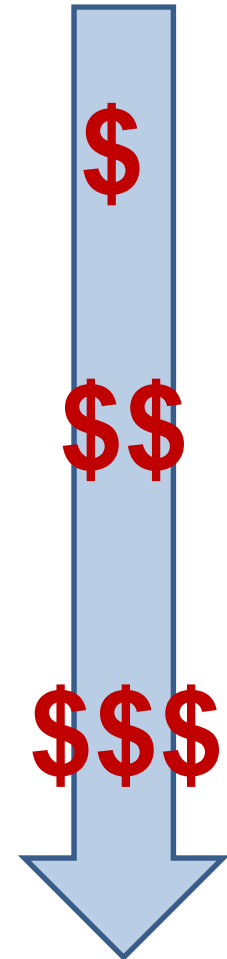
Seat confirmed after transaction is closed



Seat allocated at **end** of transaction



Seat allocated **during** transaction



# GDS alternatives: GNEs

✈️ Global New Entrants (or Alternative Content Access Platforms):

- Farelogix
- G2 Switchworks (now Travelport)
- ITA Software (now Google)

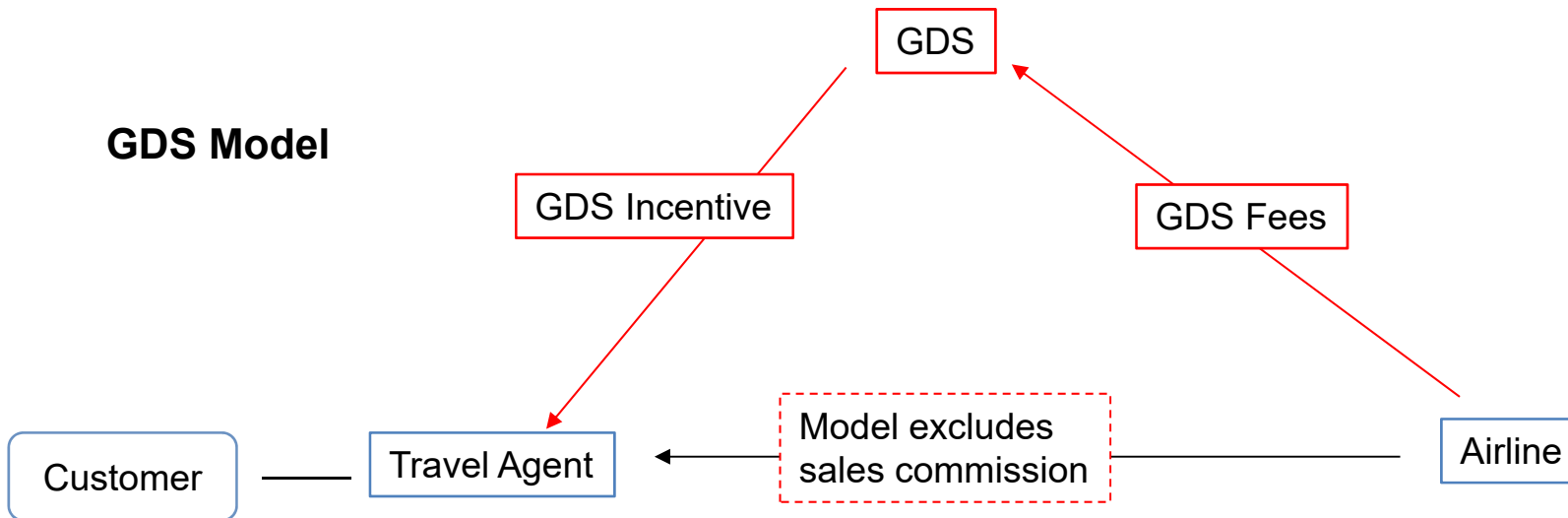
The screenshot displays the G2Agent web application interface. At the top, there's a navigation bar with links like 'quick lookup', 'Search Location', and 'Home'. Below this is a main menu with tabs: 'AIR SEARCH', 'BOOKINGS/TICKETS', 'PROFILES', 'REPORTS', and 'ADMIN'. The central area is divided into several sections:

- Quick Search:** Includes fields for 'From' and 'To' with dropdown menus, and radio buttons for 'Availability Search' and 'Low Fare Search'. A 'Traveler Type' dropdown is set to 'Adult'. A 'search' button is at the bottom.
- G2 Agent Information:** Contains a 'Question of the Day' section with a multiple-choice question about date format preferences (DDMMYY, MM/DD, DDMM, DDMMYY, or Other). It also features a 'Tip of the Day' section with advice on using single low fare searches and radius searches.
- Agent Info:** A sidebar on the right showing statistics: 'Today's Profile' (Created Today: 15, To Be Ticketed Today: 12, Ticketed Today: 3) and 'Yesterday's Profile' (Created Yesterday: 10, Ticketed Yesterday: 8).

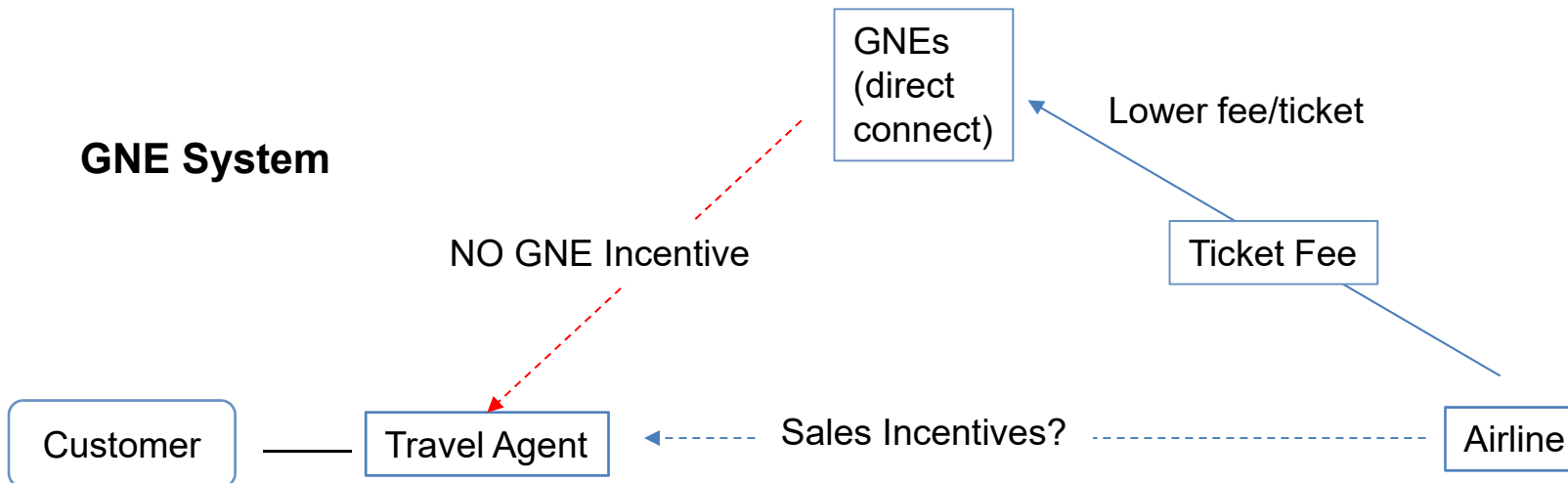
At the bottom, there's a 'G2 Agent Information' section with a message about training events and a link to 'G2 Agent'.

# Cash flows for GDS and GNEs systems






## GDS Model



## GNE System









# Barriers for GNE's




-  Agencies rely heavily on GDS kick-backs since airlines capped/cut commissions
-  Switching costs for agencies (equipment, training, back-office integration) can remain a barrier for GNEs
-  However: United Airlines (Star Alliance member) considers paying agencies \$5 bonus for each booking made through a GNE
-  No car and hotel
-  Limited worldwide coverage







# Chances for GNE's

-  Can make distribution more competitive (breaking oligopoly of GDS')
-  Direct link to airline inventory
-  Need for airlines to cut costs (distribution costs 20% of total costs, the only costs that are controlled most easily)
-  Star Alliance consider GNEs (they spend \$2billion on GDS fees/year)
-  Agencies get access to all fares (public- and web-fares)
-  Desktop no longer controlled by GDS

# Preferred Booking Channels

-  Airlines have now the right to decide whether they want to be present in a GDS and also have the option to decide the level of participation (making a selection of all available fares, schedules, and inventory)
- ⇒ Preferred- or Competitive Booking Channels
-  Using a preferred- or competitive booking channels airlines pay less to a GDS
-  July 2006: Major US Airlines will start charging users (agencies and corporate clients) a booking fee of \$3.50/segment if they are booked through non-preferred booking channels


# Why Preferred Booking Channels?

-  Airlines maintain control of distribution model
-  Reduction of GDS fees
-  Shift of cost of GDS-distribution from supplier to subscriber:
-  Agencies have to pay the airline a surcharge when a ticket is booked through GDS

# GDS' response

 Opt-in programs to protect from paying booking fee, which vary by the subscription fee:

- Option 1: full content, no segment fee
- Option 2: full content, segment fee
- Standard: regular content, service fee

 Raising fees: in Nov. 2010 Travelport informed AA that it raises the booking fee in many international POS

- AA has responded by imposing a premium to offset this fee increase
- In Dec. 2010 AA excludes Orbitz! (AA is one of its founding parents)
  - Due to failed negotiations over “direct connect”

# Direct Connect



- ✈️ Orbitz was first up to renew distribution contract
  - AA demanded Orbitz uses Direct Connect (contracted by Farelogix)
- ✈️ Expedia was next
  - Sided with Orbitz and voluntarily pulled AA flights!
  - Sabre (who provides airfares to Orbitz) followed and removed AA from results (Jan. 2011)
- ✈️ Can AA afford to be on its own?

# Online search

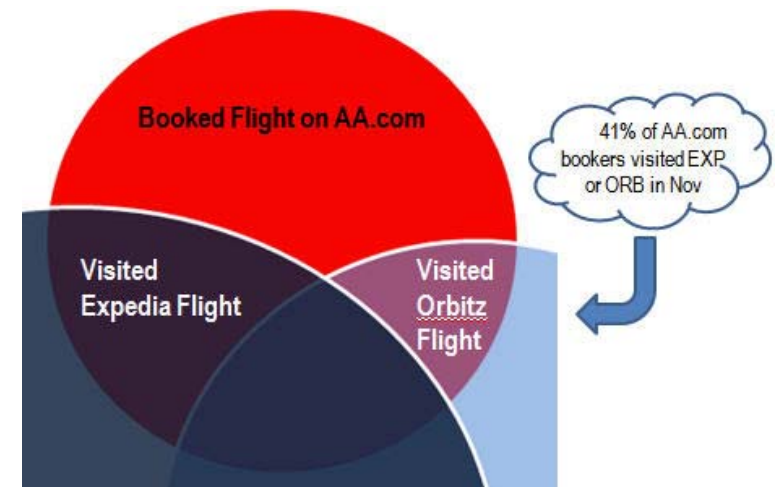


According to Amadeus:

- “Travel search is exploding. The look-to-book ratio is **1,000 to one**. A few years ago it was 10 to one. [But] direct sales are becoming re-intermediated – **70%** of airline.com traffic comes through intermediaries.
- “What you thought were direct sales are, in fact, indirect sales and the cost of sale in this channel is growing. With some OTAs, airlines pay **\$88 per booking**.”

# The dynamics of search

- ✈️ Even when consumers end up purchasing at AA.com, many of them visit OTAs first
- Cross-shopping data from 2010:
    - 41% of AA website shoppers visited Expedia/Orbitz
    - 70% of Expedia/Orbitz shoppers did not visit Kayak
  - Can AA lock itself out from millions of potential passengers?



- ✈️ Priceline – a competitor – announced its Direct Connect with AA (Jan. 2011), noting it has been operational since Q4 2010.
- ✈️ In April 2011 Expedia agreed to Direct Connect
  - Hybrid model: using GDS aggregation technology
- ✈️ In April 2011 AA sued Travelport and Orbitz saying they made its fares look higher than they were to consumers

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 ☐ Flight + Hotel + Car
 ☐ Hotel + Car

☐ Hotel
 ☐ Car
 ☐ Cruise
 ☐ Activities

☒ Roundtrip
 ☐ One way
 ☐ Multiple destinations

☐ My dates are flexible (popular US routes only)

Leaving from: 
 Going to:

Departing:  Time: 
 Returning:  Time:

Adults (19-64): 
 Seniors (65+): 
 Children (0-18):

Additional search options (airline, class, nonstop)

**BEST PRICE GUARANTEE**

**SEARCH FOR FLIGHTS ▶**



- ✈️ Similarly, US sued Sabre accusing the firm for monopoly and unfair practices
  - US cannot offer fares on its websites that are not available through Sabre
- ✈️ In June courts orders AA fares to return to Orbitz
  - Just one day after AA's video "A Whole World is Missing:"...
- ✈️ March 2013, the firms resolved their dispute

**JUDGE CEDARBAUM**

UNITED STATES DISTRICT COURT  
SOUTHERN DISTRICT OF NEW YORK

**11 CV 2725**

US AIRWAYS, INC.,

Plaintiff,

-against-

SABRE HOLDINGS CORPORATION;  
SABRE INC.;  
SABRE TRAVEL INTERNATIONAL LIMITED.

Defendants.

Civil Action No. \_\_\_\_\_

**REDACTED COMPLAINT**

Jury Trial Demanded

RECEIVED

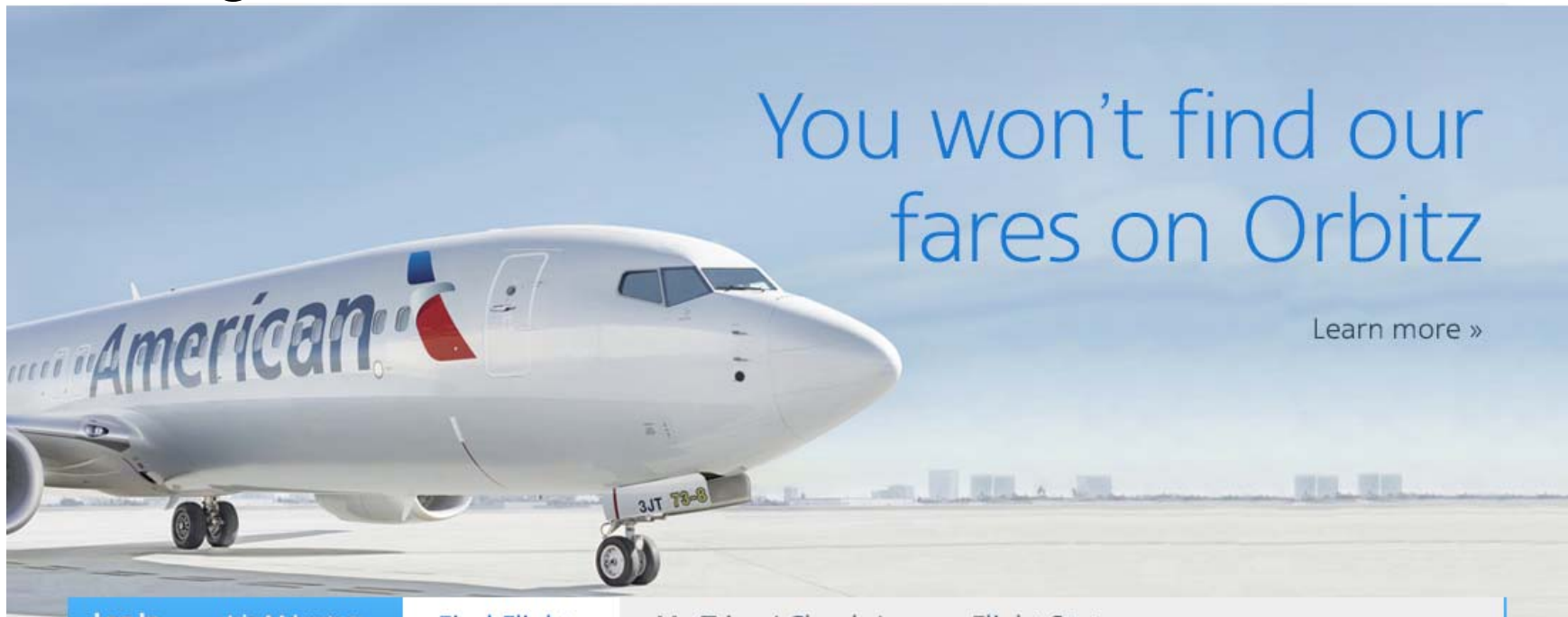
APR 21 2011


U.S.D.C. S.D. N.Y.

CASHIERS

# And all over again...




 August 2014:



 But an agreement was reached a few days later...

# Recent developments




-  Starting September 2015, Lufthansa started levying a €16 surcharge on all GDS reservations (LH, Austrian, Swiss and Brussels)
-  According to LH, it was paying a “three-digit million €” fee, although this pays for services that are “primarily used by other partner sites in the value chain” (i.e, OTAs)
-  What is the direct cost of distribution?
  - LH states it is about € 2
  - Amadeus:

“The Euro 2 direct distribution cost seems to be significantly understated. We do not know how LHG has reached this number but we believe the technology and internal costs to LHG alone for direct distribution are above Euro 2.

Furthermore, this figure seems to omit the substantial cost of online traffic acquisition, commonly understood in the industry to be Euro 15-Euro 20 per ticket. Therefore, it seems LHG is driven by reasons other than cost.”

# Recent developments



 Amadeus (shares dropped 5%!) charged back arguing this will reduce transparency and that the extra IT costs will ultimately be passed on to the traveller

 2015 Q4 reveals neutral effect:

- Less revenues from outside home market
- Compensated by surcharge revenue and ancillary revenues via the direct channel

 So far no other airlines is following suit, but considering.

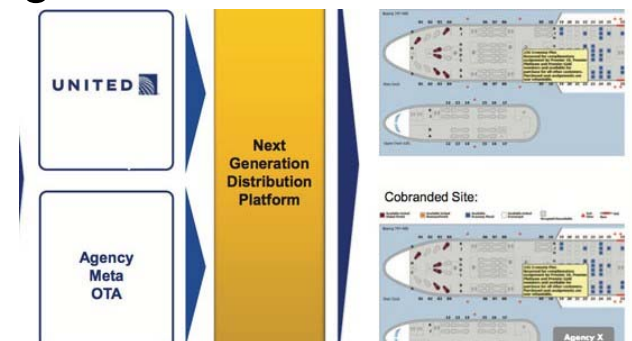
 In March 2016 Lufthansa Group filed a lawsuit against Sabre after the GDS company informed the airline group that it believes Lufthansa is in breach of contract.

**Sabre**

# Final thoughts

- ✈️ OTAs only show lowest fare, no ancillary products.
- ✈️ Travel agencies now want to have a piece of the cake:
  - “Consumers have that fundamental right to know the upfront cost of their entire trip and not be surprised at the airport by extra fees charged by the airlines”
  - “If consumers can see a fee but not purchase it, they really haven’t solved a problem [...] We think airlines are actually leaving cash on the table by not pursuing all these distribution channels.”
- ✈️ Airlines suffered when comparison websites facilitated price matching. Careful in introducing ancillary services
  - UA experiments with Amadeus

UNITED	San Francisco SFO 2:30pm UNITED 304	→	New York JFK 11:05pm Nonstop	5h 35m	Roundtrip from \$336 per person includes tax and fees
	Show Flight Details		Seat Preview	Baggage Fee Information	SELECT
USA AIRWAYS	San Francisco SFO 2:30pm	→	New York JFK 11:05pm US Airways 6881 operated by UNITED	Nonstop 5h 35m	Roundtrip from \$336 per person includes tax and fees
	Show Flight Details		Baggage Fee Information		SELECT
american	San Francisco SFO 3:10pm Virgin America 26	→	New York JFK 11:45pm Nonstop	5h 35m	Roundtrip from \$336 per person includes tax and fees
	Show Flight Details		Baggage Fee Information		SELECT
Delta	San Francisco SFO 11:30am Delta 1940	→	New York JFK 8:10pm Nonstop	5h 40m	Roundtrip from \$336 per person includes tax and fees
	Show Flight Details		Seat Preview	Baggage Fee Information	SELECT
american	San Francisco SFO 8:00am Virgin America 1930 Virgin America 406	→	New York JFK 7:00pm Los Angeles 1 Stop 8h 0m		Roundtrip from \$347 per person includes tax and fees
	Show Flight Details		Baggage Fee Information		SELECT



Source: <http://www.businessweek.com/>

# One more thought

✈ Mistakes happen and they can be (very) expensive.

Round trip One way Multi-city

New York (all airports) LAX Los Angeles





Fri, February 7 Mon, February 10

Stops Price Airline Times More

**New York – Los Angeles Friday, February 7**

Sort by Price + best

Best flights [Learn more](#)


\$25 round trip		6:15 pm – 9:42 pm Delta	6h 27m JFK-LAX	Nonstop
\$25 round trip		8:15 pm – 11:40 pm Delta	6h 25m JFK-LAX	Nonstop
\$42 round trip		7:00 am – 10:35 am Delta	6h 35m JFK-LAX	Nonstop
		9:00 am – 12:33 pm	6h 33m JFK-LAX	Nonstop


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[www.delta.com/](http://www.delta.com)  
Book Your Flight To LAX  
With Delta Air Lines®!

[Hotels in Los Angeles](http://www.google.com/hotels)  
[www.google.com/hotels](http://www.google.com/hotels)  
Feb 7–10, prices per night

 **Super 8 Los Ang**  
\$90 · 2-star hotel  
3.5 ★★★★★

 **L'Ermitage Bev**  
\$361 · 5-star hotel  
4.5 ★★★★★

 **Luxe Sunset**  
\$194 · 4-star hotel  
4.5 ★★★★★

# Brief history of fare glitches

Airline	When?	The Glitch	Holy Deal	Honoured?
United Airlines	2007	Missing '0's	\$1062 (not \$10,620)-- Los Angeles to New Zealand in Business Class	Yes
United Airlines	Jul-12	Purchased at a Discount, but Full Price Dislayed	\$43--New York to Hong Kong	No
United Airlines	Sep-13	\$0 Fare, Only Charged Taxes & Fees	\$10--Washington to Hawaii	Yes
United Airlines	Oct-13	MileagePlus Account Tricked into Thinking Customer has Enough Miles for Award	\$49--New York to Dublin	No
United Airlines	Nov-13	Widerøe Booking Site Drops YQ (fuel surcharge)	\$250--New York to Milan	Yes
Aer Lingus	2009	Fare Mistake	\$7--Across Europe in Business Class	No
British Airways	2009	Tried to Lower Fares by \$40	\$550--US to Mumbai	No*
American Airlines	2010	Dropped a '0'	\$1100--US to Australia in First Class	No
Korean Airlines	2011	Dropped a '0'	\$500--US to Seoul	No
Delta Airlines	Dec-13	Price Tweak Gone Awry	\$7--US to Hawaii	Yes

# IATA'S NEW DISTRIBUTION CAPABILITY (NDC)



# Travel agents



Have limited access

	8:55p - 11:15a +1 Icelandair	10h 20m EWR - LGW	1 stop 1h 40m in KEF	\$705.90 roundtrip
	<a href="#">Show Flight Details</a>	Average flight (6.7 out of 10)		<a href="#">Select</a>
	12:05a - 11:00a US Airways	6h 55m JFK - LHR	Nonstop	\$766.20 roundtrip
	<a href="#">Show Flight Details</a>	Excellent flight (7.8 out of 10)		<a href="#">Select</a>
	6:40p - 9:25a +1 US Airways	10h 45m LGA - LHR	1 stop 2h 24m in PHL	\$770.70 roundtrip
	<a href="#">Show Flight Details</a>	US Airways 3981 operated by US Airways Express-Air Wisconsin		<a href="#">Select</a>
	10:00p - 8:45a +1 British Airways	6h 45m JFK - LHR	Nonstop	\$817.40 roundtrip
	<a href="#">Show Flight Details</a>	Excellent flight (7.5 out of 10)		<a href="#">Select</a>
	10:00p - 8:45a +1 Finnair	6h 45m JFK - LHR	Nonstop	\$817.40 roundtrip
	<a href="#">Show Flight Details</a>	Finnair 5472 operated by British Airways		<a href="#">Select</a>

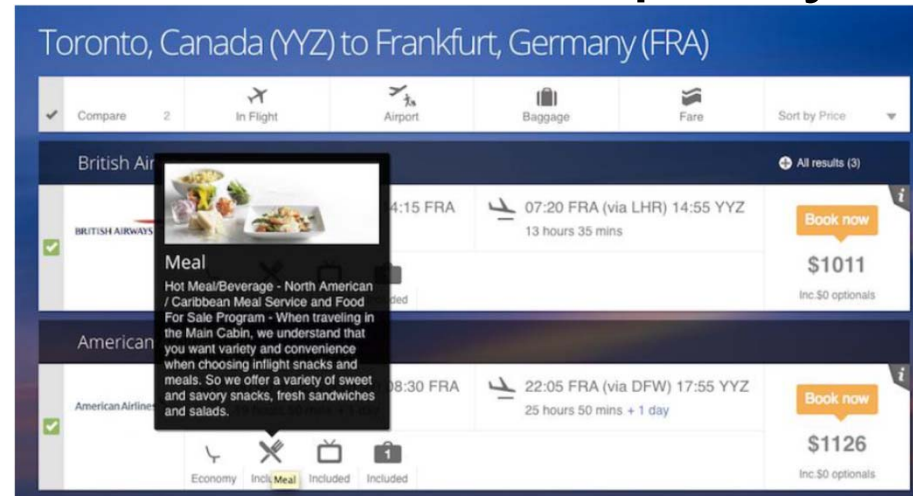


Cannot see entire airline's offerings



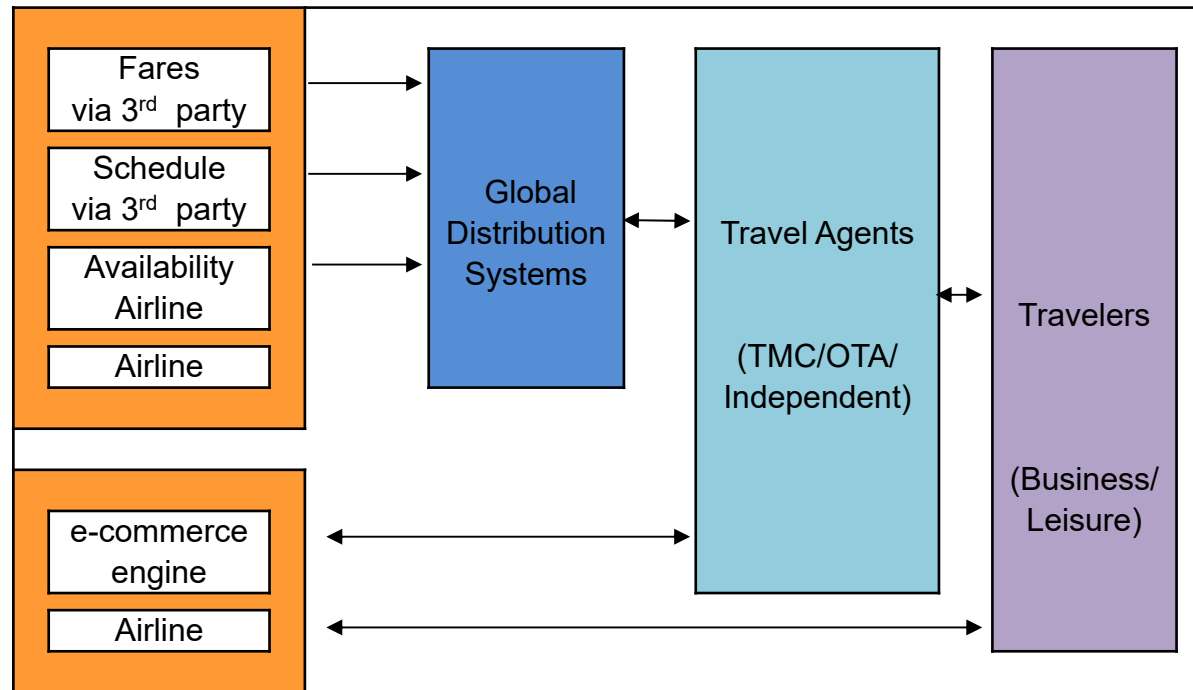
# Idea

✈️ Let agents have same capacity as websites

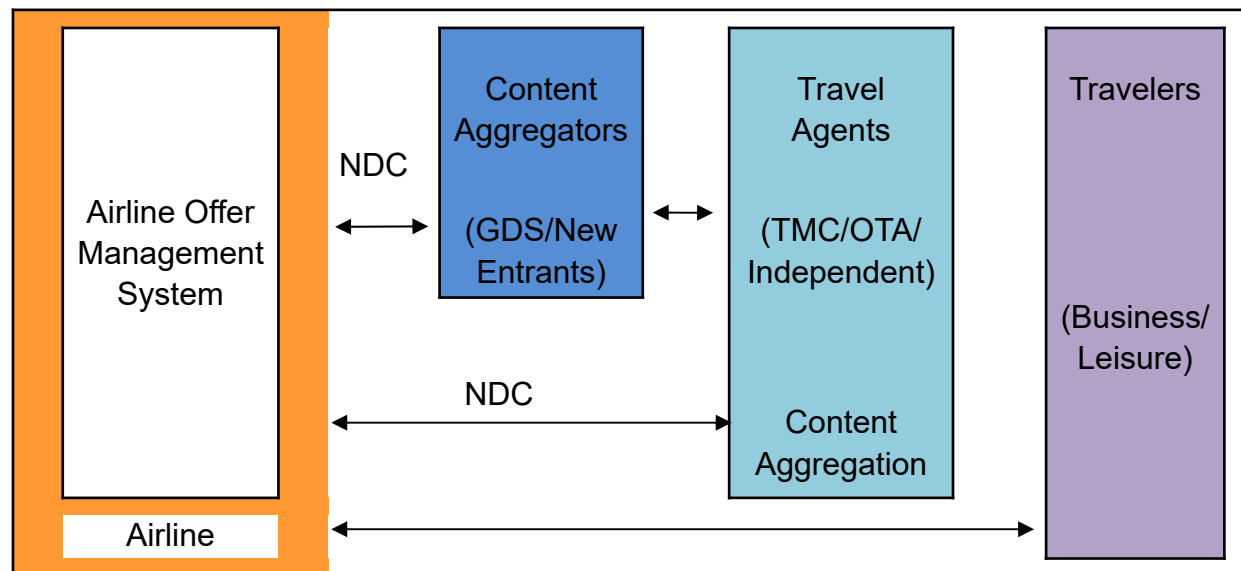


✈️ The NDC standard will enhance the capability of communications between airlines and travel agents, and will be open to any third party, intermediary, IT provider or non-IATA member, to implement and use.

Now:








NDC:




# Benefits








Airline IT Providers	Resellers	Corporate Buyers (incl. CBT)	Travelers
<b>Product Differentiation</b> <ul style="list-style-type: none"> <li>- Distribute the entirety of the airline's product portfolio, including ancillaries and promotional fares</li> <li>- Expand the amount of information available on each product: attributes, facilities, policies etc.</li> <li>- Offer value-added products and services when applicable</li> </ul>	<b>Access to full &amp; Rich Content</b> <ul style="list-style-type: none"> <li>- Access to the entirety of the airline's product portfolio, including ancillaries and promotional fares</li> <li>- Improved merchandising</li> </ul>	<b>Access to full &amp; Rich Content</b> <ul style="list-style-type: none"> <li>- View all air transport options and relevant fares available</li> </ul>	<b>Access to full &amp; Rich Content</b> <p>Benefit from all air transport options and relevant fares available</p>
<b>New Products faster to Market</b>	<b>Real Time Price Update</b> <ul style="list-style-type: none"> <li>- Work with real-time pricing, product and policies information, under rich format</li> </ul>	<b>Gain greater Span of control</b>	<b>Transparent Shopping Experience</b> <ul style="list-style-type: none"> <li>- Select the most appealing travel option, based on product quality, service level, schedule and price or what it is they value</li> </ul>
<b>Personalization Opportunities</b> <ul style="list-style-type: none"> <li>- Provide personalized service if passengers choose to be recognized</li> </ul>	<b>Personalization &amp; Tailored Opportunities</b> <ul style="list-style-type: none"> <li>- Provide personalized/tailored service based on customers' full travel history and preferences, if they choose to be recognized</li> </ul>	<b>Personalization &amp; Tailored Opportunities</b> <ul style="list-style-type: none"> <li>- Provide personalized/tailored service based on customers' full travel history and preferences, if they choose to be recognized</li> </ul>	<b>Personalization Opportunities</b> <ul style="list-style-type: none"> <li>- Option to receive personalized offers from preferred resellers based on their travel preferences, if they choose</li> </ul>
	<b>Cost &amp; Time Optimization</b>	<b>Comprehensive Reporting</b>	<b>Cost and time Optimization</b>
	<b>True Product Sourcing Comparison (*)</b> <ul style="list-style-type: none"> <li>- Deliver improved comparison shopping to customers, based on product and service rather than price only</li> </ul>	<b>Policy-based Shopping</b> <ul style="list-style-type: none"> <li>- Greater transparency on products and ancillaries that are available to travelers</li> </ul>	
(*) In an airline this would be referred to as True Comparison Shopping			

# Fundamentals

-  XML-based standards
-  Airlines respond to shopping requests from travel agents
-  Order process
  - Airlines fulfill reservation transactions, create booking records, issue documents and send confirmations
-  Enable comparison shopping
-  So agents decide which airlines to contact, shopping requests are sent to airlines, offer responses are consolidated and presented to travellers.

From **CDG** To **JFK** Depart **18 Jun** Return **02 Jul**   Update 

### Paris, France (CDG) to New York, United States (JFK)

Compare	In Flight	Airport	Baggage	Fare	Sort by Price
	13:05 – 14:15 HR-111 7 hours 10 mins	  	First Bag Second Bag Sports Equipment	<b>€736</b> Inc €0 optional	
	10:15 – 11:25 CH-451 7 hours 10 mins	  		<b>€787</b> Inc €0 optional	
Some airlines do not provide us with detailed information about their offer. Please visit the airline's site for full details of what is included.					
	13:05 – 14:15 AT-123 7 hours 10 mins	  		<b>€787</b> Inc €0 optional	

Customers can search for and display flights using all the features they care about

Price includes all fees plus desired options

Payment Method

Airport Baggage Fare Sort by Price

Customers know exactly what to expect with expanded information including images and video

Shared €15 €60 €100

## Search and share

Share your personal information with the following airlines:

- ☒ Jet Aether
- ☒ Athena Air
- ☒ Cloud Chronos
- ☒ Demeter Air
- ☒ Fly Apollo
- ☒ Jet Hera
- ☒ Hermes Gold
- ☒ Hypnos Air
- ☒ Sky Pontus
- ☒ Zeus Airways



Customers know exactly what they are getting – right down to airlines

Some airlines do not provide us with detailed information about their offer. Please visit the airline's site for full details of what is included.

Compatible with non-NDC systems, so customers see all flights available

Airlines can add ancillaries quickly.

Customers know exactly what to expect with expanded information including images and video

€787

€1,056

€1,168

Confirm

# Adoption



Airlines:

2015



2014



2013







Other stakeholders

Airline IT Providers	Airlines	Filing Agencies	GDS & Aggregators	Resellers	Travelers
<p>PSS: Amadeus, Sabre, Mercator, SITA, Navitaire, Unisys...</p> <p>Merchandising &amp; IBE: Datalex, Farelogix, OpenJaw, JR Technologies...</p> <p>Faring tools: Google/ITA, Vavant...</p> <p>Yield tools: PROS ...</p>	<p>Network airlines</p> <p>Low-cost carriers</p>	<p>Fares: ATPCO, SITA...</p> <p>Schedule: OAG, Innovata...</p> <p>Airline Profiles: ATPCO, OAG...</p>	<p>GDS: Amadeus, Travelport, Sabre, Abacus, TravelSky...</p> <p>Aggregators: Farelogix, JR Technologies...</p>	<p>OTA: Expedia, Odigeo...</p> <p>TMC: American Express, Carlson Wagonlit, HRG...</p> <p>Metasearch engines: FareCompare, Skyscanner, Kayak, Wego, Google Flight Search...</p>	<p>Corporate Buyers</p> <p>Business travelers</p> <p>Leisure travelers</p>

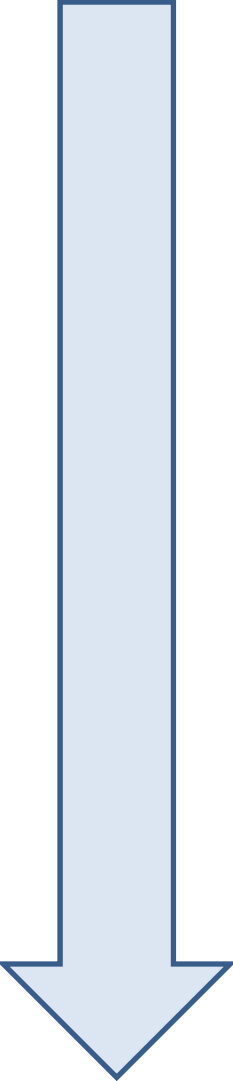






# AIRLINES' REVENUE MANAGEMENT











# Fundamentals of RM

-  **Fixed inventory** or capacity that is expensive or impossible to store
-  Inventory/capacity **committed** to a customer before all demand is known
-  Different **customer segments** exist
  - firm can differentiate and price-discriminate among customers
-  **Same unit** of inventory or capacity can satisfy different customer segments

# RM timeline

- 
-  Capacity control
  -  Leg-based RM
  -  Network: O&D RM
  -  Margin: Pricing management
  -  Choice-based RM
  -  Ancillary revenues

# Lessons learned

-  Customers tolerate –but do not support –RM logic and practices
-  Current RM software has a limited functional scope (air fare) and does not work with CRM
-  Most ancillary products are perceived as punitive tactics
  - Checked bag fee, seat selection fee to avoid middle seat, entertainment fee.
-  Branded fare products are a representation of the conventional fare rules
-  Fare levels are not fully related to the cost of delivering the service, but more to time
-  Overall, the RM logic is not communicated, or not communicated well
-  Fundamentally, RM is suboptimal because it is imposed
-  Strategic opportunity for RM is in democratizing value creation in collaboration with customers

# CRM and RM

- ✈ Limited evidence of true loyalty
  - May be driven by external factors

## ✈ Trends:

### CRM

- From FFP => CRM => CEM
- Profiling, analytics
- Deep segmentation
- Touch point integration
- Choice-based offering

### RM

- Simplification of pricing
- Value-based offering
- À la carte
- Unbundling
- Subscription-based

## ✈ Objectives:

- Facilitating life-time loyalty for repeat business and revenue growth




- Optimize revenues for maximized profitability

## ✈ Conflicts:

- Focus on individuals
- Focus on long-term



- Focus on market segments
- Transactional-level focus

# Some Trends

-  **Fare families**
  - Clustering of fares
-  **Unbundling**
  - Lowest fares + add-ons
-  **Democratization**
  - Premium amenities available to all at a cost

Low fares, 5 clear options

Canada

Cabin	Tango	Tango Plus	Latitude	Executive Class Lowest	Executive Class Flexible
<p>Air Canada flights feature personal, touch-screen television screens at every seat, with hundreds of hours of entertainment</p> <p>?</p>	<p><b>Economy Class</b> Enjoy more comfort and entertainment in Economy Class, with in-seat television &amp; power at every seat <a href="#">Learn more</a></p> 			<p><b>Executive Class</b> Experience personalised service, enhanced comfort &amp; seat-back entertainment in Executive Class <a href="#">Learn more</a></p> 	

# Some trends

✈ Mobile apps

✈ Watch apps



Skyscanner - All Flights  
Skyscanner Ltd



Cheap Flights - Find Cheap Flights  
Cheapflights



Flights  
Any.Travel



KAYAK Flights, Hotels  
KAYAK.com



Orbitz - Flight Deals  
orbitz.com

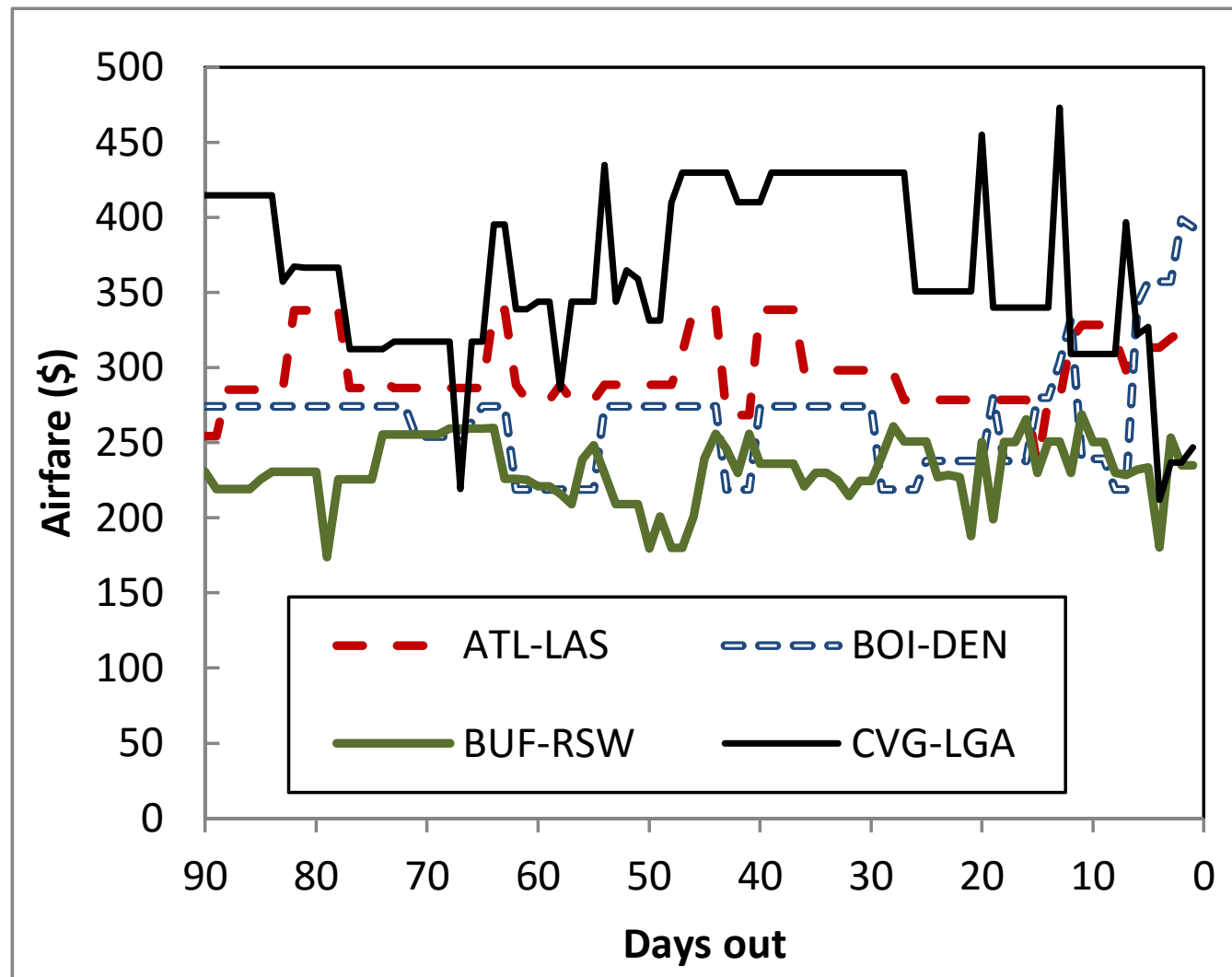


FREE





★★★★★



# Prices fluctuate: When to buy?



# DSS for passengers?

-  Given the volatile nature of prices, consumers would like to know whether they should purchase right now or wait.
-  How should they do that?
  - What if price goes up?
  - What if prices goes down?
-  In order to make the decision, need to derive probabilities and account for magnitude of changes (see theory in next slides)
-  Problem: consumers need knowledge and information. Probably they lack both.



# RM and price volatility

✈ Assume class  $j$  is the lowest available fare at time  $t$ :

- The fare class closes if  $c_t - \sum_{i=1}^n s_{i,t} < y_{j-1,t-1}$  and price goes up

$$\underbrace{c_t - \sum_{i=1}^n s_{i,t}}_{\text{next capacity}} < \underbrace{y_{j-1,t-1}}_{\text{protection of higher class}}$$

Diagram illustrating the condition for fare class closure. The expression  $c_t - \sum_{i=1}^n s_{i,t}$  is shown, with  $c_t$  circled in red and labeled "capacity", and  $\sum_{i=1}^n s_{i,t}$  circled in purple and labeled "sales". A green bracket underneath the entire expression is labeled "next capacity". The expression is compared to  $y_{j-1,t-1}$ , which is circled in green and labeled "protection of higher class".

- A lower fare class reopens if  $c_t - \sum_{i=1}^n s_{i,t} > y_{j,t-1}$  and price goes down

$$\underbrace{c_t - \sum_{i=1}^n s_{i,t}}_{\text{next capacity}} > \underbrace{y_{j,t-1}}_{\text{protection of lower class}}$$

Diagram illustrating the condition for a lower fare class to reopen. The expression  $c_t - \sum_{i=1}^n s_{i,t}$  is shown, with a green bracket underneath the entire expression labeled "next capacity". The expression is compared to  $y_{j,t-1}$ , which is circled in green and labeled "protection of lower class".

# RM and price volatility: Example

Why 19? This is the 0.6 fractile of the joint distribution of Class 1 is  $N(17.5, 5.87)$

		period		
		3	2	1
Class 1 : \$500	distribution	$N(1,1)$	$N(7.5, 4.69)$	$N(9, 3.38)$
	Protection level	19	18	10
Class 2: \$200	distribution	$N(5,5)$	$N(5,5)$	$N(5,5)$
	Protection level	39	32	18
Class 3: \$100	distribution	$N(9, 3.38)$	$N(7.5, 4.69)$	$N(1,1)$

Adopted from Anderson and Wilson (2003)

Starting seating capacity is  $C_3=50$

$C_3 > y_{2,3}$  so Class 3 is open and cheapest fare available is \$100

# RM and price volatility: Example

		period		
		3	2	1
Class 1 : \$500	distribution	N(1,1)	N(7.5,4.69)	N(9,3.38)
	Protection level	19	18	10
Class 2: \$200	distribution	N(5,5)	N(5,5)	N(5,5)
	Protection level	39	32	18
Class 3: \$100	distribution	N(9,3.38)	N(7.5,4.69)	N(1,1)

Adopted from Anderson and Wilson (2003)

Now assume 8 customers buy Class 2 and 11 customers buy Class 3.

$C_2 = 31 < y_{2,2}$  so Class 3 is closed and cheapest fare available is \$200. Prices spike up


If period 2 demand is less than  $31 - 18 = 13$ , Class 3 reopens.

# Wait-or-buy

 In order to make the decision, need to consider probabilities:

- The probability that class 3 reopens at the end of period 2 is  $Pr(d_{1,2}+d_{2,2}) < 31-18=0.53$
- Expected saving of \$53
- The probability that class 2 closes is  $Pr(s_{1,2}+s_{2,2}) > 31-10=0.11$ .
- Expected loss of \$32

 Hence: wait.

 Problem: consumers need knowledge and information. Probably they lack both.

# Farecast: Internet + Big Data/Analytics

- "Big Data": Decision support websites:
  - Farecast (later Bing, now defunct) and recently Kayak
- Based on Etzioni et al.'s (2003; patent) prediction process
- Using databases (past airfares) it employed inference techniques to predict movement of lowest available airfare
- Received wide media attention
  - E.g.: PC World's 20 Most Innovative Products, Popular Science's "Best of What's New for 2006", a TIME Magazine's 50 Coolest Websites, "Best Trip Planning Tools" by Business Week

STOPS

<input checked="" type="checkbox"/> Non-stop	\$337	New York, NY (JFK) to Los Angeles, CA (LAX)	
<input checked="" type="checkbox"/> 1	\$348	Mon, 10/10 - Mon, 10/17 · 1 adult · Economy · <a href="#">Change search</a>	
<input checked="" type="checkbox"/> 2+	\$418		

PRICE PREDICTOR

**Tip: Wait**

Fares dropping \$31

Confidence: 62%

[Details & fare history](#)

FARE HISTORY

### Fare Prediction and Fare History – Know When to Buy

We predict where fares are going and show where they've been—now for more than 75 home airports (indicated in green within the search form). Our free airfare predictions are 74.5% accurate. Read more about the third party audit of our accuracy in our recent [press release](#).

#### Fare Prediction

A Fare Prediction shows if the lowest fare is rising or dropping over the next seven days for the specific dates and cities searched. Each prediction includes the following elements:

1. **Arrow:** An indication of whether the lowest fare is rising, dropping, or staying the same.
2. **Confidence:** A percentage based on our track record for similar predictions for the market searched.
3. **Average Fare Change:** An amount reflecting the average fare change recorded when similar predictions were correct for the market.
4. **Buying Tip:** Our recommendation based on the prediction information.



#### Fare History

Fare History charts the lowest fare observed each day for your trip, up to 90 days ago. In other words, it's as if you would have searched for your trip every day and plotted the lowest fare actually available. To provide the airfare history, we have made more than 175 billion, and counting, airfare observations based on real pricing and availability.



[go back to your search](#) 

### 7-day low fare prediction

#### Tip: Wait

There is a high likelihood of at least one major price drop within the next 7 days. Note: Price drops are sporadic and 50% of them do not last longer than 48 hours. Consider your risk tolerance.

#### If We Are Right:



**Lowest fares will Drop \$22 - \$72 | 62% confidence**

#### If We Are Wrong:



**Lowest fares will Rise \$18 - \$43 | 8% confidence**



**Lowest fares will Stay within \$15 | 30% confidence**

Confidence numbers are based on our track record for predictions in this and similar markets.

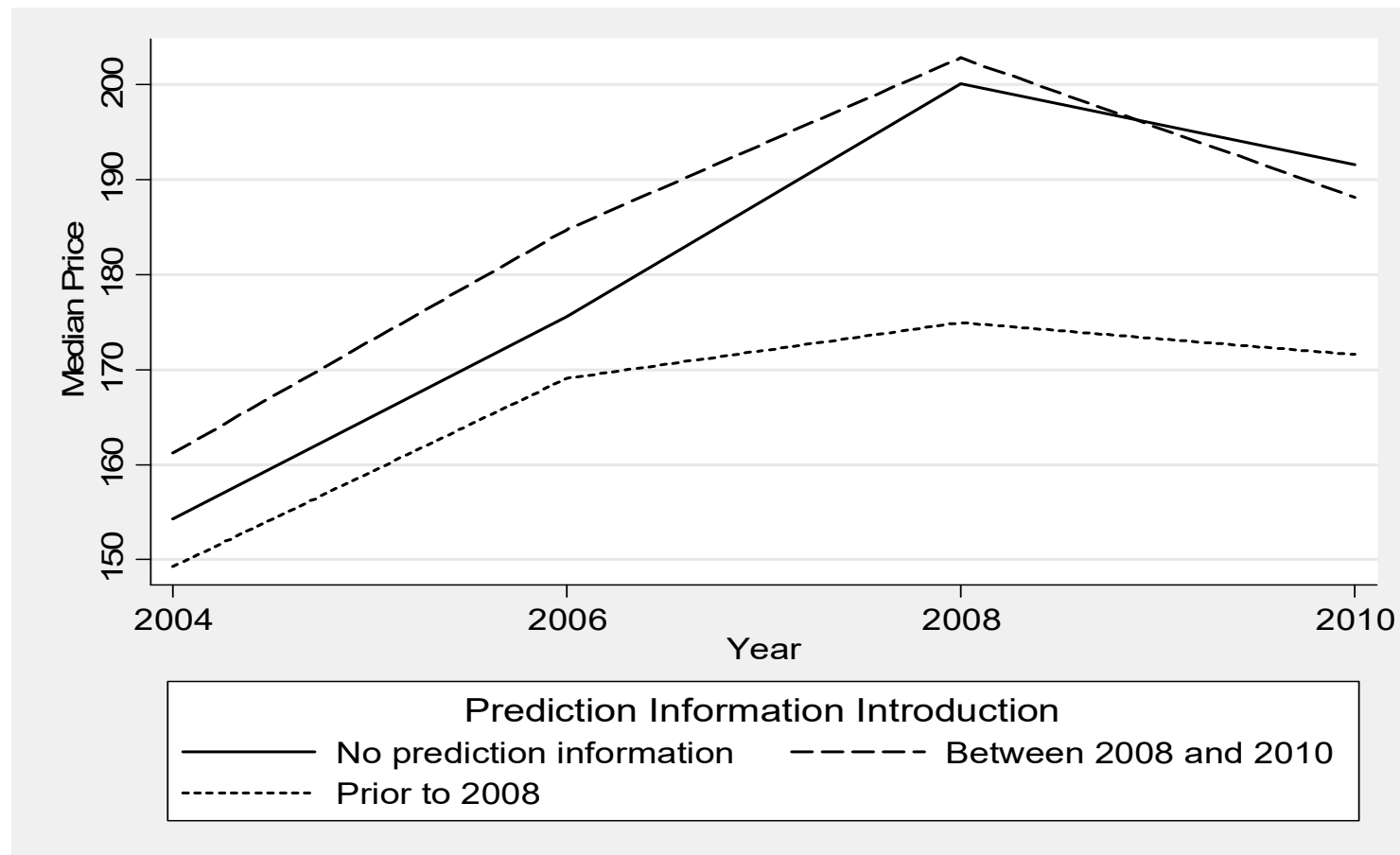
### daily low fare history



**Fare History** charts the lowest fare observed each day for your trip. In other words, it's as if you would have searched for this trip every day and plotted the lowest fare actually available.

To provide the airfare history, we have made more than 175 billion, and counting, airfare observations based on real pricing and availability. Learn more by visiting [Our Technology and Data](#).

# Any impact?



✈ Empirical estimations suggest an impact of 4-6%!



# Flexible dates: DSS for passengers

	Return ▶		
Leave	Fri Mar 21	Sat Mar 22	Sun Mar 23
Fri Mar 14	<b>LOWEST</b> \$200 Nonstop	<b>LOWEST</b> \$200 Nonstop	<b>LOWEST</b> \$200 Nonstop
Sat Mar 15	\$242 Nonstop	\$242 Nonstop	\$242 Nonstop
Sun Mar 16	\$315 Nonstop	\$315 Nonstop	\$315 Nonstop

Delta

	Returning: Wed, Mar 19	Returning: Thu, Mar 20	Returning: Fri, Mar 21	Returning: Sat, Mar 22	Returning: Sun, Mar 23	Returning: Mon, Mar 24	Returning: Tue, Mar 25
Leaving: Wed, Mar 12	From \$351 1 Stops	From \$374 1 Stops	From \$469 1 Stops	From \$466 1 Stops	From \$459 1 Stops	From \$374 1 Stops	From \$426 1 Stops
Leaving: Thu, Mar 13	From \$299 1 Stops	From \$321 1 Stops	From \$416 1 Stops	From \$414 1 Stops	From \$406 1 Stops	From \$321 1 Stops	From \$374 1 Stops
Leaving: Fri, Mar 14	From \$334 1 Stops	From \$356 1 Stops	From \$451 1 Stops	From \$449 1 Stops	From \$441 1 Stops	From \$356 1 Stops	From \$389 1 Stops
Leaving: Sat, Mar 15	From \$334 1 Stops	From \$356 1 Stops	From \$451 1 Stops	From \$449 1 Stops	From \$441 1 Stops	From \$356 1 Stops	From \$389 1 Stops
Leaving: Sun, Mar 16	From \$384 1 Stops	From \$406 1 Stops	From \$501 1 Stops	From \$499 1 Stops	From \$491 1 Stops	From \$406 1 Stops	From \$439 1 Stops
Leaving: Mon, Mar 17	From \$296 1 Stops	From \$319 1 Stops	From \$414 1 Stops	From \$411 1 Stops	From \$404 1 Stops	From \$319 1 Stops	From \$351 1 Stops
Leaving: Tue, Mar 18	From \$276 1 Stops	From \$299 1 Stops	From \$394 1 Stops	From \$391 1 Stops	From \$384 1 Stops	From \$299 1 Stops	From \$331 1 Stops

Northwest





# Decision support systems

- ✈ Can help users overcome their cognitive limitations and thus extend their bounds of rationality
- ✈ The design restricts decision makers to certain decision processes that are embedded into the system
- ✈ Users will employ a decision strategy that is often a function of the amount of effort required
  - Maximize decision quality
  - Minimize effort
- ✈ Hence, effort required while using the tool for decision tasks should be given much attention



# Flexible Dates

-  Concentration of information on a single page reduces decision effort:
  - It reduces cognitive effort
    - Fewer tasks (mouse movements, keyboard, scrolling)
  - It reduces the time required for search
    - Response time during web navigation takes away from the time that can be devoted to the actual decision task
    - Fewer interruptions to the decision process
    - There is a negative relationship between performance evaluations and web-induced delays (which are common in flight search queries)
  - It enables easier integration of information
    - Less effort in keeping track of information, reduced memory invested
-  Offer flexibility?
  - this may divert consumers from expensive flights into cheaper ones...

# Why offer flexibility?

 Competitive advantage

 Market pressure

 Consider the following (1):

- Demand for low-priced tickets increases
- Demand for high-priced tickets decreases
- Hence, as more travel date combinations are displayed, the lower is the variance of the lowest prices across dates

 Consider the following (2):

- Without flexible dates search, demand may be lost
- Demand for low-priced tickets increases
- No change in demand for high-priced tickets decreases
- Hence, as more travel date combinations are displayed, the higher is the average fare

 However, there might be some long term implications.

# **APPENDIX**

## **GDS SCREENSHOTS; NDC**

# User Interface

- ✈ Start: Dumb Terminals (Workstation)
- ✈ Now: Intelligent Terminals (=PC)
  - ✈ Expert Mode (e.g. Focalpoint Galileo)
  - ✈ GUI (e.g. Viewpoint Galileo, Amadeus Vista)



# CRS availability display screenshot

The screenshot shows a terminal window titled "ETG - eTGTerminal" with a menu bar (File, Edit, View, Options, Help) and a toolbar. The main display area shows flight availability data for LHR to JFK. The data is organized into columns: Day/Date, Origin, Destination, Flight Number, Time, Airline, Class, and Status. The status column includes codes like "G\*GAL", "QX#744\*C", "VO#AB6\*C", "SSC\*C", "QC#747\*C", "V7#777\*C", "MA#744 B", "QX#747\*C", and "763 C". The terminal also shows a command prompt ">A\*" and a status bar at the bottom with "Ready" and "Connected" indicators.

```

TUE 25DEC01 LONDON /NEW YORK 25/0000 25/2359 G*GAL
1 LHR JFK 0850 1145 BA 117 FX JX DX WX YX HX MX VX NX QX#744*C
2 LHR JFK 1000 1255 AA 101 F7 J7 D7 Y7 B7 H0 K0 M0 Q0 VO#AB6*C
3 LHR JFK 1030 0925 BA 1 RX AX SSC*C
4 LHR JFK 1055 1400 BA 175 F9 J9 D9 W9 Y9 H9 M9 VC NC QC#747*C
5 LHR JFK 1200 1440 AA 105 F7 J7 D7 Y7 B7 H7 K7 M7 Q7 V7#777*C
6 LHR JFK 1315 1555 AI 101 FA JA CA DA WA YA AA BA HA MA#744 B
7 LHR JFK 1330 1630 BA 177 FX JX DX WX YX HX MX VX NX QX#747*C
8 LHR JFK 1345 1650 @TG5700 FA CA YR BR MR HR QR VR 763 C
>A*
>
  
```

Ready Connected



# Sabre Red Workspace

Sabre® Red™ Workspace - Sabre Travel Network

File Edit View Tools Window Help Contact Us

Favorites Tools Community Admin

Graphical View New Sabre Area Full Split Page 1 2 3 4 5 6 Red App Centre google LotusNotes

Area D Area F Area E X Area A Area B Format Finder Area C

**\*ZMYDOR «**  
**ZMYDOR**  
 1. 1VENGOPALAN/URUMBANVELUKUTTYMR  
 1 WY3908T 12SEP 4 SLLMCT HK1 2145 2320 /DCWY\*JXWLAK /E  
 2 WY 225T 13SEP 5 MCTCOK HK1 0120 0630 /DCWY\*JXWLAK /E  
 3 WY 226T 20OCT 7 COKMCT HK1 0730 0935 /DCWY\*JXWLAK /E  
 4 WY 907T 20OCT 7 MCTSLI HK1 1450 1625 /DCWY\*JXWLAK /E  
**TKT/TIME LIMIT**  
 1. T-27MAY-W742\*AMS  
**PHONES**  
 1. MCT24575814-A  
 PASSENGER EMAIL DATA EXISTS \*PE TO DISPLAY ALL  
 INVOICED  
**PRICE QUOTE RECORD EXISTS**  
**AA FACTS**  
 1. SSR ADTK 1S ADTK WITHIN 60 DAYS OR WL XXL BY 26JUL13 0859OM  
**GENERAL FACTS**  
 1. OSI YY NTT 24575814 REF MOHAMMED  
 2. OSI YY SBG 24578721 REF BENNOY  
 3. OSI YY PAX CTCM 00986 99372623  
 4. OSI YY PAX LCL CTCM 0091 04802790465/9544361525  
**REMARKS**  
 1. XXTAW/  
**ACCOUNTING DATA**  
 1. WYY4746269971/ .000/ 145.000/ 69.200/ONE/CA 1.1VENGO  
 PALAN URUMBANVELUKUTTYMR/1/F/EY

# Fare display screenshot

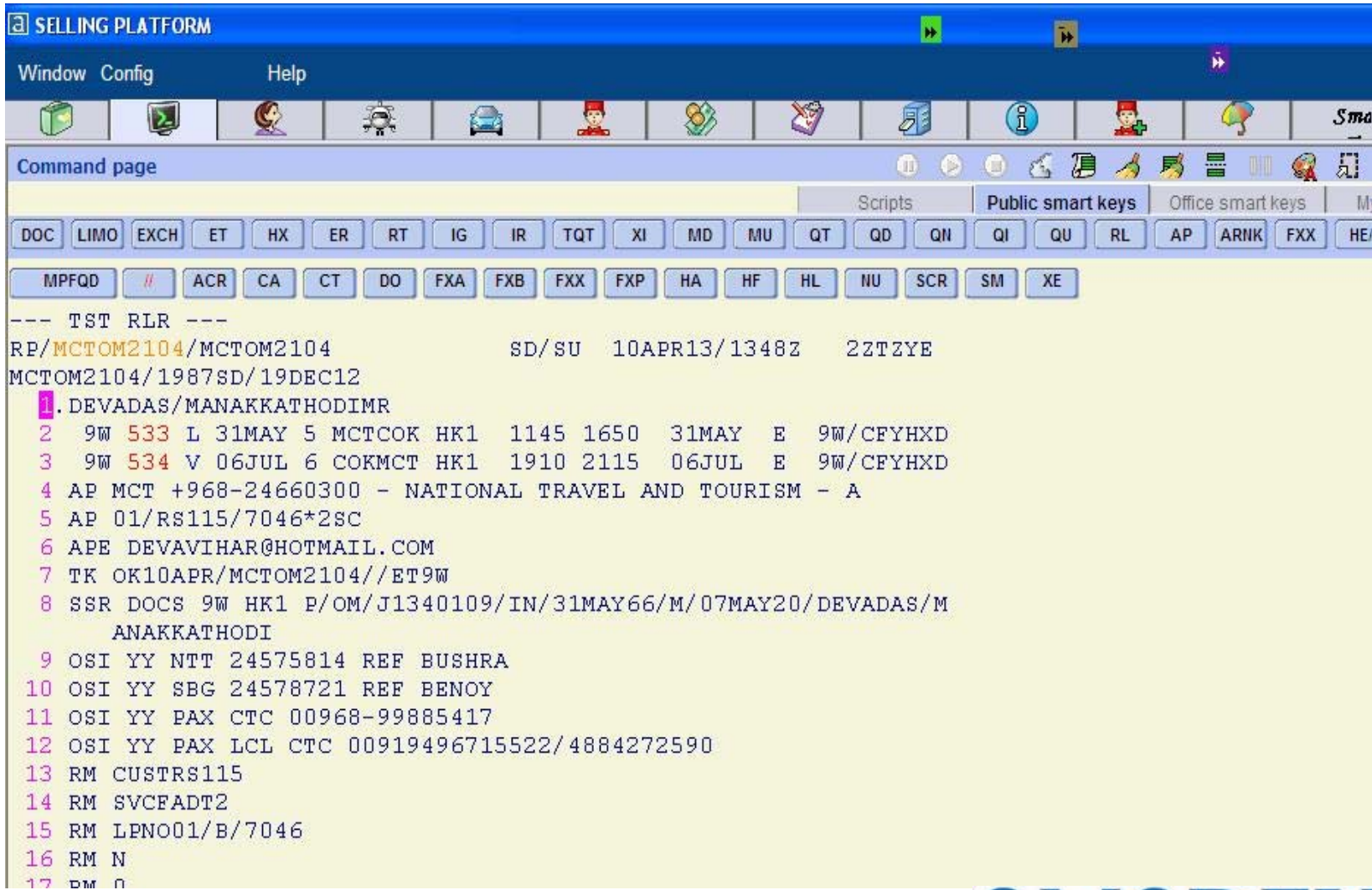
Window 1

FARES LAST UPDATED 18OCT 0629  
>FDEISEA27OCT/BD  
EDI-SEA SAT-27OCT07 BD  
MPM 6142 AT  
PUBLIC FARES

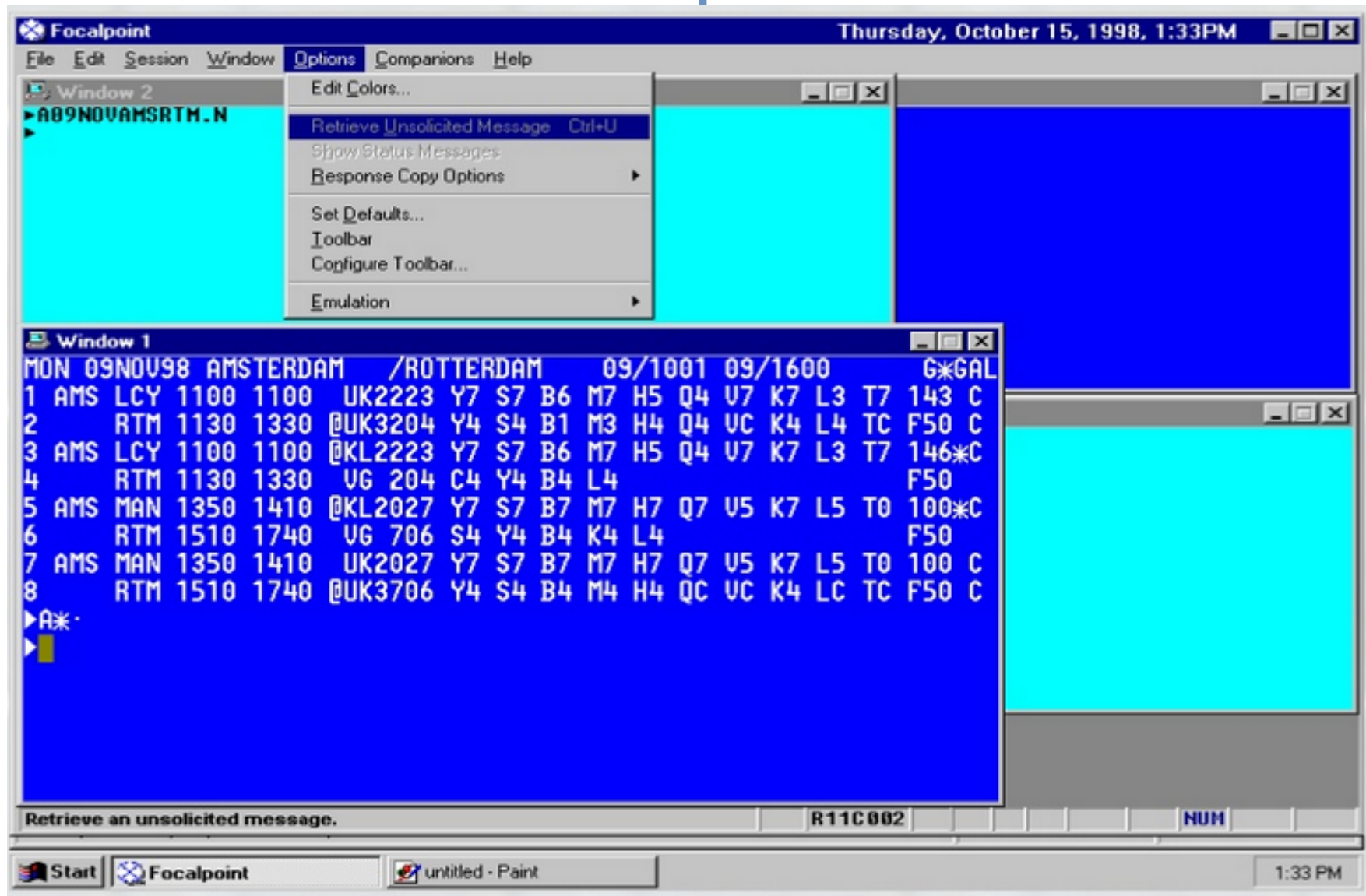
	CX	FARE GBP	FARE BASIS	C	AP	MIN/ MAX	SEASONS.....	MR	GI	DT
1	BD	306.00R	WHXUSBD1	W	+	SU/12M	26SEP7-31OCT7	R	AT	D
2	BD	306.00R	WHXUSBD1	W	+	SU/12M	26SEP7-31OCT7	R	AT	D
3	BD	336.00R	WHWUSBD1	W	+	SU/12M	26SEP7-31OCT7	R	AT	D
4	BD	336.00R	WHWUSBD1	W	+	SU/12M	26SEP7-31OCT7	R	AT	D
5	BD	452.00R	VHXUSBD	V	+	SU/12M	26SEP7-31OCT7	R	AT	D
6	BD	482.00R	VHWUSBD	V	+	SU/12M	26SEP7-31OCT7	R	AT	D

)>

# Amadeus Selling Platform



# Galileo Expert mode





# Amadeus Vista (GUI-Mode)

Amadeus Vista - Microsoft Internet Explorer

AMADEUS vista

Availability Timetable Flight information Other segments

Single Neutral availability Tuesday 01 March 05

\*\* AMADEUS AVAILABILITY - AN \*\* NCE NICE.FR 34 TU 01MAR 0000

Flight	Dep	Time	Arr	Time	T	Dur	S	Typ	P	Classes
LH 3183	SVO	14:35	FRA	16:00				319		C9 D9 Z9 Y9 B9 M9 H9 G9 V9 W9
LH 4138	FRA	16:50	NCE	18:20		5:45		321		C9 D9 Z9 Y9 B9 M9 H9 G9 V9 W9 S9
ST 7547	DME	12:30	MUC	13:40				100		Y9
SK 3281	MUC	15:05	NCE	16:30		6:00		CR7		C4 D4 J4 Y4 S4 B4 E4 M4 H4 O4 V4 W4
ST 7547	DME	12:30	MUC	13:40				100		Y9
LH 4154	MUC	15:05	NCE	16:30		6:00		CR7		C9 D9 Z9 Y9 B9 M9 H9 G9 V9 W9 S9
LX 1325	DME	07:10	ZRH	08:50				320		J9 C9 D9 B9 Y9 B9 H9 K9 M9 L9 V9 S9 N9 Q9 O9 W9 R9
LX 562	ZRH	10:05	NCE	11:20		6:10		AR1		J9 C9 D9 B9 Y9 B9 H9 K9 M9 L9 V9 S9 N9 Q9 O9 W9 R9
LX 1327	DME	17:30	ZRH	19:10				320		J9 C9 D9 B9 Y9 B9 H9 K9 M9 L9 V9 S9 N9 Q9 O9 W9 R9

1 1/2 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31

Nbr Seats: 1 Passenger

Send Set with options Modify input

PNR

A B C D E F

Office: MDNR22932

December 2004  
S M T W T F S  
1 2 3 4  
5 6 7 8 9 10 11  
12 13 14 15 16 17 18  
19 20 21 22 23 24 25  
26 27 28 29 30 31

January 2005  
S M T W T F S  
1  
2 3 4 5 6 7 8  
9 10 11 12 13 14 15  
16 17 18 19 20 21 22  
23 24 25 26 27 28 29  
30 31

February 2005  
S M T W T F S  
1 2 3 4 5  
6 7 8 9 10 11 12  
13 14 15 16 17 18 19  
20 21 22 23 24 25 26  
27 28

March 2005  
S M T W T F S  
1 2 3 4 5  
6 7 8 9 10 11 12  
13 14 15 16 17 18 19  
20 21 22 23 24 25 26  
27 28 29 30 31

April 2005  
S M T W T F S  
1 2  
3 4 5 6 7 8 9  
10 11 12 13 14 15 16

# Galileo GUI-Mode

The screenshot displays the Galileo GUI-Mode interface. A 'Fare Display Request' dialog box is open, showing search criteria and selected options.

**Basic Tab:**

- Departure City:
- Arrival City:
- Inland Date: 13-3-00
- Address:
  - 1:
  - 2:
  - 3:
- Other Options:
  - Ticketing Date:
  - ☐ Validated - Return Date:
  - Note: Validated fares are only available for North American cities.
  - ☒ One Way
  - ☒ Round Trip
  - ☐ Historical Fares
  - ☐ Long Display
  - ☐ High to Low

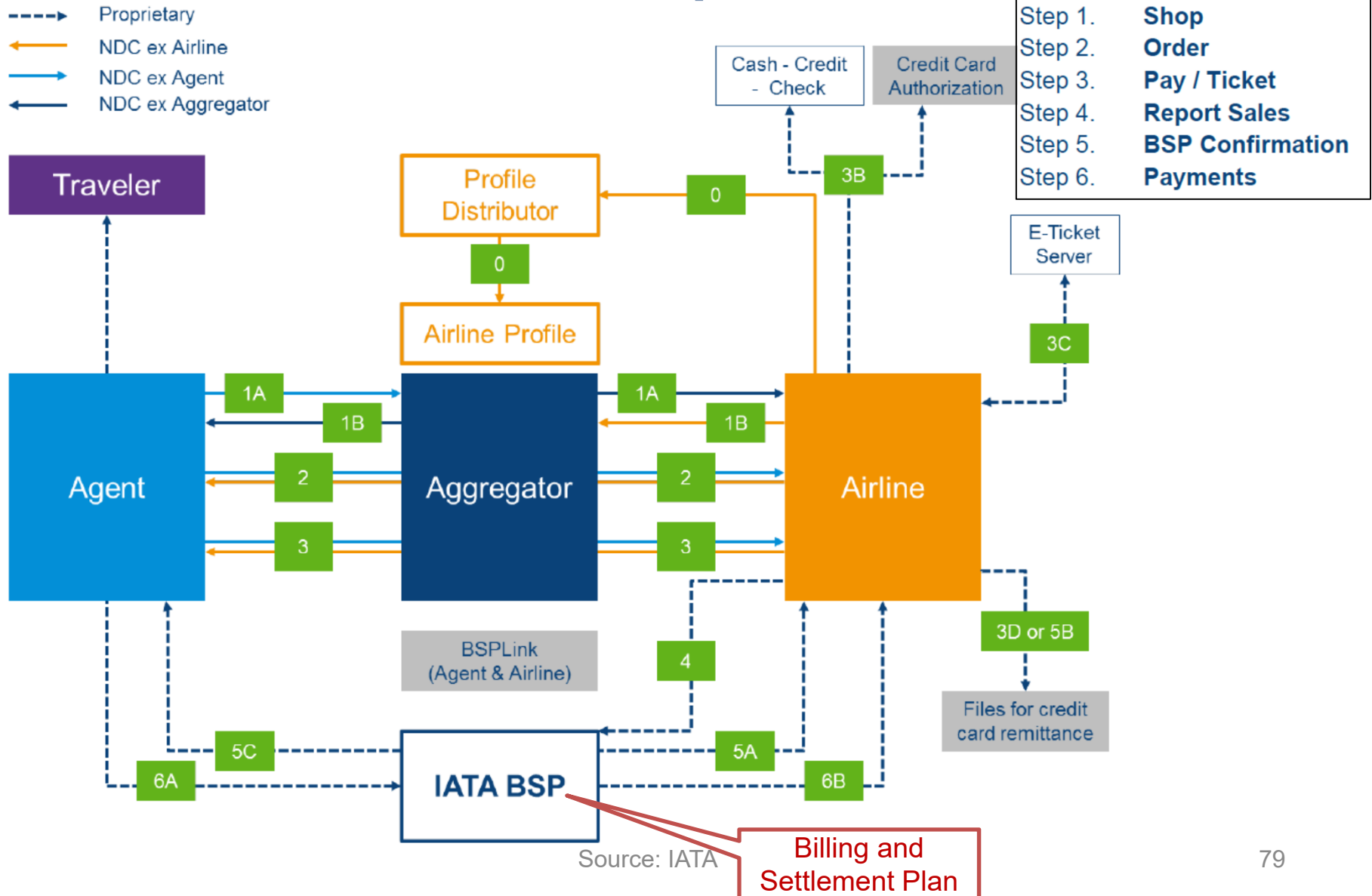
**Selected Options:**

- From: AMS - Schiphol Arpt
- Date: Monday 13 March 2000
- Direction: One Way
- Direction: Round Trip
- Exclude Tax: yes
- Use Private Fares: yes
- Private: 7K60

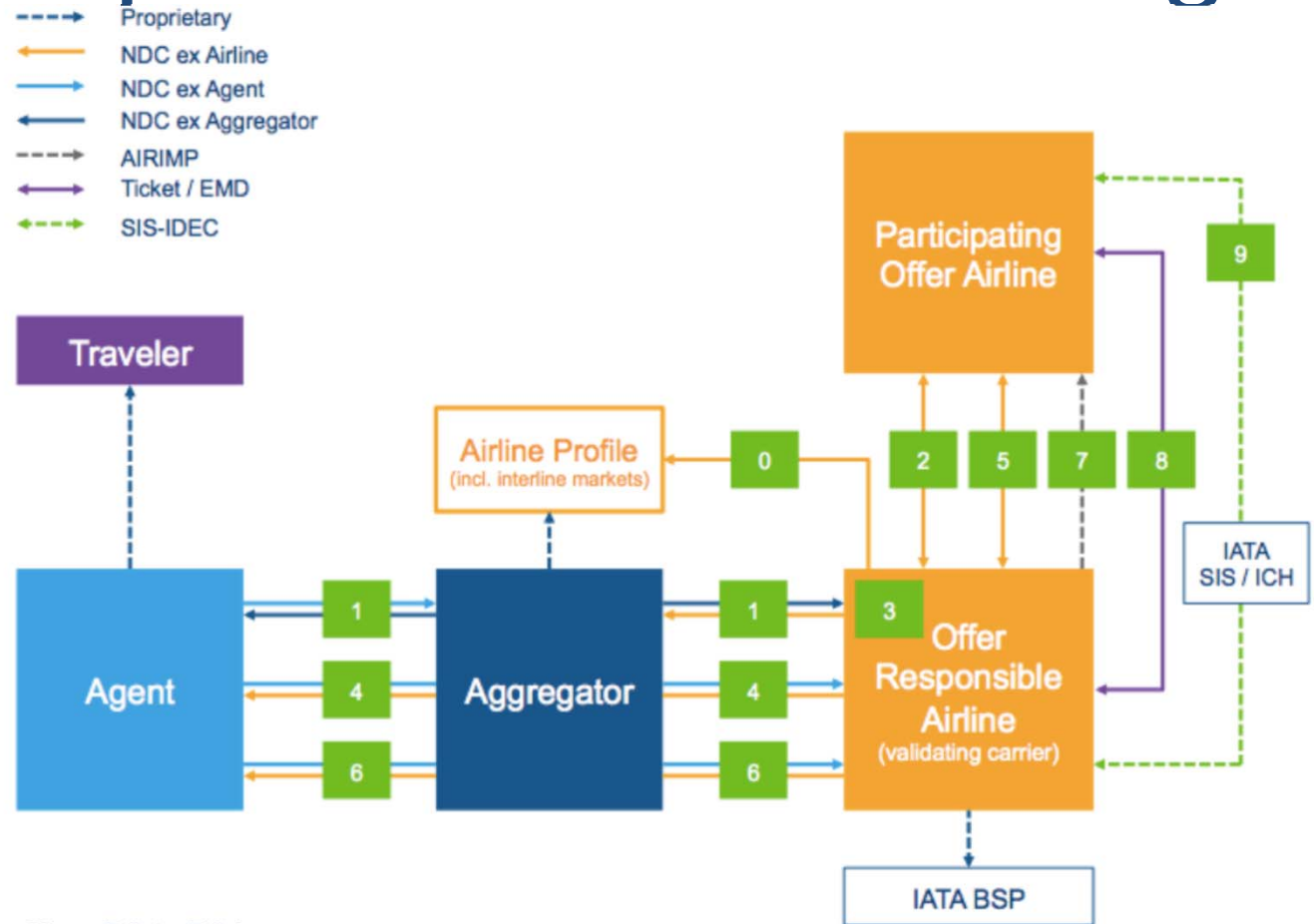
**Buttons:** Search, Cancel

**Footer:** Specify the departure city for the display

# NDC: The full process



# NDC: The process for interlining



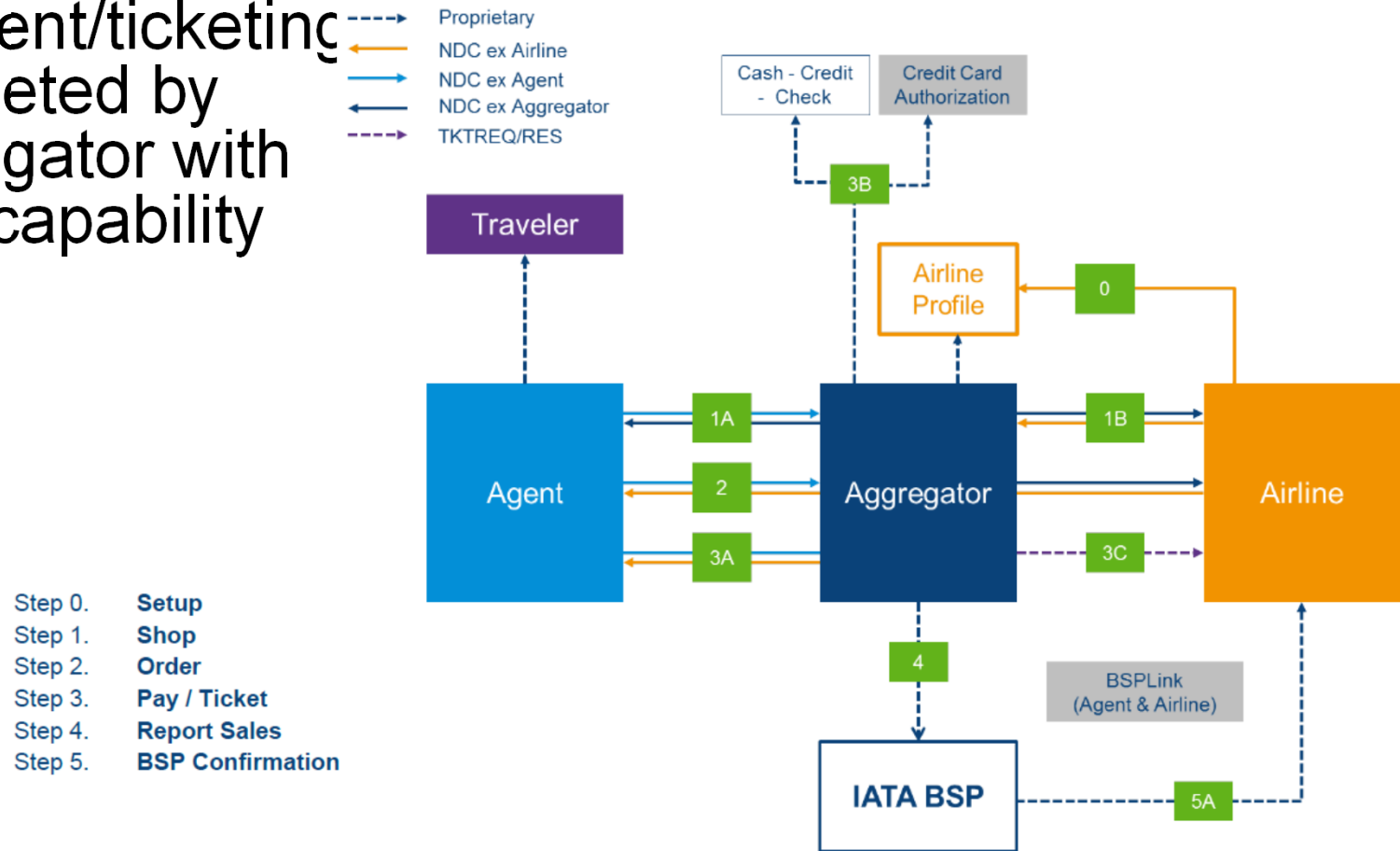
- Step 0. **Setup**
- Step 1. **Shop with ORA**
- Step 2. **ORA relays complementary Shop RQ to POA**
- Step 3. **ORA consolidates POA RS into its Aggregator RS**
- Step 4. **Agent sends Order RQ to ORA**
- Step 5. **ORA accepts POA's offer with Order RQ and confirms interline order with Agent**
- Step 6. **Ticketing & payments all with ORA as validating carrier (incl. BSP reporting & settlement)**



# NDC process for 'shopping'

✈️ Airline uses NDC for shopping and ordering

✈️ Payment/ticketing completed by Aggregator with GDS capability



Source: IATA