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Introduction to the Airport Business

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Airport Planning and Management

Module 01

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Outline

A. Airport Activities and Services

B. Characteristics of Demand

C. Characteristics of Supply

D. Who is the Airport Customer?

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Airport Activities and Services



Airport Infrastructure

Airport infrastructure consists of:

- Runways
- Taxiways
- Apron Space
- Terminals
  - Cargo & pax
- Ground Transport
  - Roads/parking for autos
  - Transit (bus, rail, ferry)
- Support Facilities
  - Caterers, fuellers
- Emergency Services
  - Police, fire (airside/landside)
- Utilities

Airport Land

Airports are typically the largest single land mass in the urban region

- Vancouver Airport:
  - 6% of the land area of Vancouver/Richmond/Delta
  - Land value would be roughly us$6bn
- Typically airports are provide land at no cost or substantially reduced cost
  - US provides land access to airports at no cost
  - SYD sold for a$5.5bn, land value was likely $4b
    - But based on urban value, land was likely worth $10bn
- Most airports pay zero or reduced land tax
  - No tax at land transfer
  - No annual land tax (property tax)

Airport Ground Transport

- **Often airport has single largest auto parking capacity in the urban region**
  - Vancouver (population = 2mn):
    - 700,000 parking spaces
    - 300,000 at churches
    - 170,000 at airport
- **Airport requires high capacity highway access**
- **Larger airports require urban rail access**
  - Major objective is to remove employees from road network

What Services and Facilities do Airports Provide?

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- **Can divide into three main categories**
  - Operations
    - Terminal Air Traffic Control, meteorological services, communications, police and security, fire and ambulance, runway and building maintenance
      - In North America and Australia/NZ ATC is provided by a national ANSP
        - Air navigation service provider
      - Elsewhere airport operator is usually responsible for approach/departure control
  - Traffic-handling
    - Ramp handling (aircraft from gates to takeoff)
    - Aircraft parking
    - Passengers, cargo, baggage (processes from/through terminal to aircraft)

What Services and Facilities do Airports Provide? – Cont.

- Commercial services
  - In terminal
    - Food, retail, personal services
    - Before and after security
    - Large portion of food/services is to airport employees
  - Land development
    Hotels, conference services, business parks
    - Airport City concepts
    - Excellent example is AMS (Schiphol Airport)
    - Cargo processing / logistics centers
    - Foreign trade zones
  - Traffic processing
    - Many airports provide ground handling services (airside and in terminal)

Other Services

- **Airports play a pivotal role within its region**
  - Studies show airport connectivity is a strong driver of regional economic development
    - Airports have a catalytic effect on overall economy
    - Increase productivity of other economic sectors
  - Airports are a major generator of employment
    Connect the transportation systems (ground with air)
  - Air access is often the only connection to isolated regions (i.e., islands, remote areas)

Other Services – Cont.

- **There are negative impacts:**
  - Pollution and other environmental issues
  - Noise (specifically to those living close to the airport)
  - Airports are often the target for carbon impacts caused by airline flights

Airside vs. Landside Activities

- **Airside**
  - Any part of the airport under restricted access
    (e.g., runways, taxiways, baggage handling areas, etc.)
- **Landside**
  - Public areas of the airport
    e.g., terminals (open public areas), parking, ground access, etc.)
- **The "dividing line" for the two spaces is commonly considered either security or passport control**

Aeronautical vs. Non-Aeronautical

- **Aeronautical activities**
  - Runway and airside system
  - Terminal facilities used to process passengers
    - Facilities used by airlines (gates, check-in facilities) to process pax
  - Costs of these facilities are covered by Aeronautical fees
    - Landing fees, terminal fees, passenger facility charges

Aeronautical vs. Non-Aeronautical

- **Non-aeronautical (non-aviation)**
  - Commercial spaces
  - Includes space rented by airlines
    - Business lounges, office space
  - Each user of these facilities pays a charge for service
    - Restaurant leases space and pays a monthly fee
      - Minimum monthly guarantee (MAG)
      - Plus percent of gross sales above a threshold
  - Land rents
    - including airline operating bases)

Aeronautical vs. Non-Aeronautical

- **One of largest sources of non-aeronautical revenue for airports is auto parking**

- **Land rents typically are modest contribution**

Relationship with other Industry Partners

- **Air Navigation**
  - This will vary depending on the country
  - Either a service provided by a private company, a government agency or the airport itself
    - UK:
      - NATS operates en route,
        - but also contracts with some individual airports for approach/departure/terminal control
      - SERCO: private company that contracts with individual airports for approach/departure/terminal control

Relationship with other Industry Partners

- **Slot Control**
  - Often largest carrier manages slots
  - But some countries require independent commercial slot control company
    - Airport Coordination Ltd.
    - Airport Coordination Canada Ltd.
  - Some airports now do slot management
    - Vancouver

Relationship with other Industry Partners

- **Airlines**
  - Customer of airport
  - Business relationships
    - Rent space from airport for offices, lounges
    - Rent land for maintenance and operations bases
    - Terminal ownership at some airports
      - JFK Terminal 3 is owned by consortium of airlines
      - In Australia/NZ, domestic terminals were owned / developed by airlines
        - After airport privatization, airports sought to purchase and operate these facilities
  - Ground handling
    - Airlines may be allowed by airport to self handle
    - Airlines may contract with some airports for GHS
    - Airlines may compete with airport (and others) to supply ground handling services to others

Relationship with other Industry Partners – Cont.

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- **Government**
  - Governments need space in airport for their operations
    - Customs, immigration, agricultural inspection
    - Policing and other security services
  - In many cases, airports required to provide space at no charge
    - Airports may impose fee on airlines for this space
  - Government is regulator
    - Safety regulation, licensing of airport/aerodrome
    - Economic regulation
  - Government is often the landlord
    - Few airports own their land fee simple
    - Government require up to date master plan for use of its land
    - And government may need to approve any land rental by airports

Relationship with other Industry Partners – Cont.

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- **ICAO**
  - Recommends safety and other regulations,
  - Environment policy recommendations,
  - etc.)

- **ACI**
  - Airports Council International
  - industry association

Use of Third Party Suppliers

- **Examples of services that are outsourced:**
  - Baggage handling
  - Car parking
  - Cleaning
  - Fueling
  -

- **This will vary by airport**
  - Regulations on what can be outsourced
  - Governments may mandate specific suppliers

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Main Characteristics of Demand



Derived Demand

- **Demand for transport is a derived demand**
  - Derived from the demand to do other things
    - E.g., business meetings, visit family, go on holidays
    - No reason to travel = no demand for airport product

- **For marketing, many airports will partner with airlines or local tourism organizations**
  - Brand knowledge strength
  - Focus on increasing travel demand

Relationship with Airline Demand

- **Airports are reliant on airlines providing service**
  - If airlines do not provide service, there will be no demand for the airport product
  - Airports do not have control over provision of service to their location (and catchment area)
    - Marketing to airlines is important!

Relationship with Airline Demand – Cont.

- **Liberalization and deregulation has allowed for different airline models**
  - Airports can cater their product to specific airline models
    - E.g., LCCs are commonly used by leisure passengers
      - Not as interested in lounges, but airport retail/F&B options
  - Airlines prefer to have few or no competitors at an airport
    - But competition drives lower price which increases traffic
    - Different airline business models cater to different market segments
      - Can increase total travel

Air Cargo

- **Demand for air cargo will be heavily influenced by cost and location**
  - The largest portion of cargo customers are very price sensitive,
  - and substitutes are usually available
    - Truck to another airport
    - Truck origin to destination

Air Cargo

- **Factors that cargo operators choice of airport**
  - Availability of night operations
  - Availability of specialized cargo handling equipment
    - E.g., main deck cargo loader
  - Freight forwarders choice
    - FF playing increasingly important role in cargo system
    - By consolidating cargo (from many markets)
      The decide which airports will have high volume cargo traffic
  - Road access
  - Availability of Customs clearance
    - And hours of operation, speed of processing

Air Cargo – Cont.

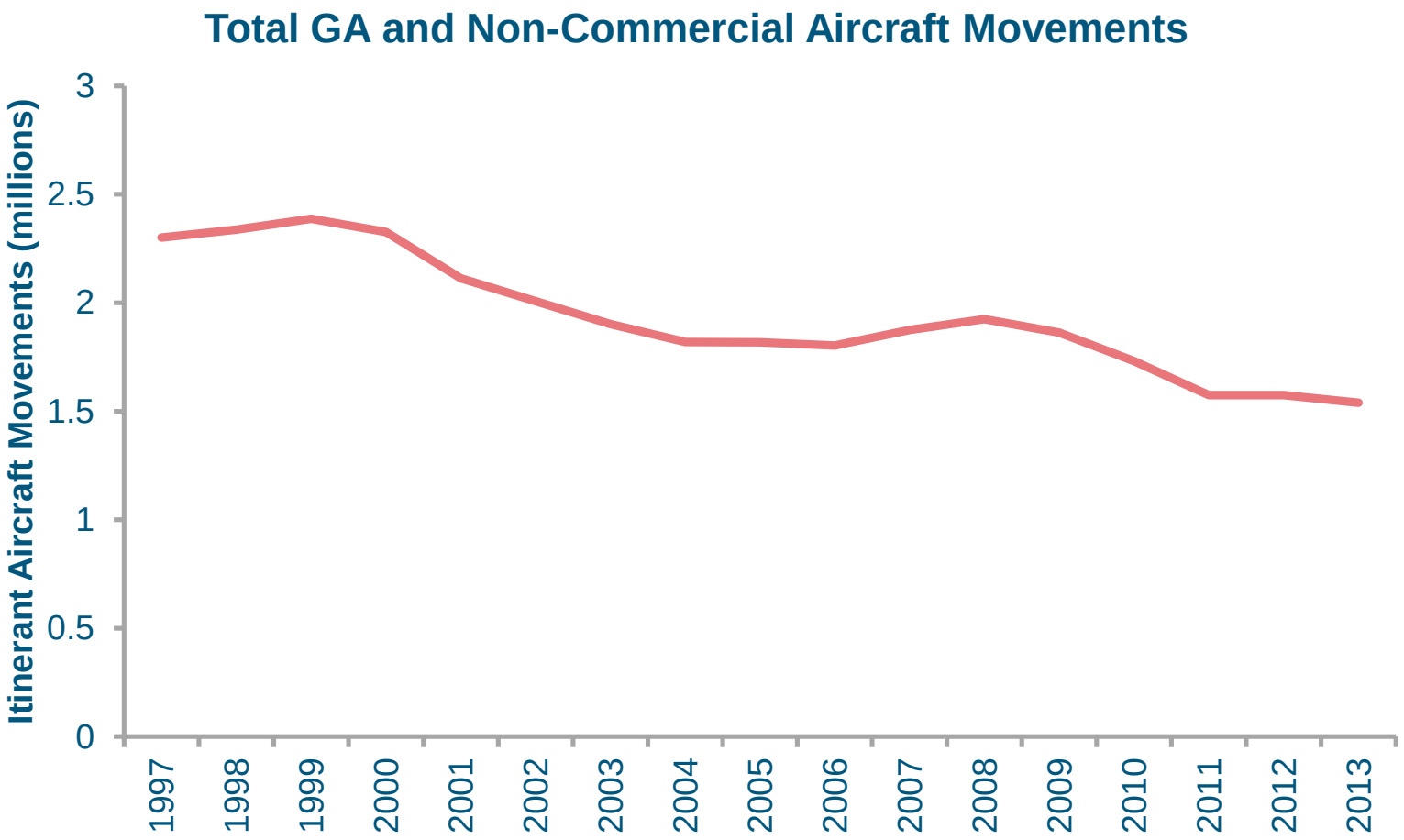
- **Current and future outlook for the economy will affect demand**
  - Lower demand during economic downturns
- **Environmental factors**
- **Bilateral ASAs and other Government policy**
  - Integrator cargo operations depend on 5th/7th freedom rights
    - FedEx operates MEM-CDG-DXB-PVG-HKG-DXB

Other Demand

- **General Aviation (GA)**
  - Some airports that are purely GA
    - Usually smaller airports
    - But busiest GA airport in US (Van Nuys CA – near LA) has almost as many movements as ATL (Busiest commercial airport in the world)
  - Important GA trend
    - Declining piston operations
      But growing turbine operations
    - China has almost no specialized GA airports
      - Limiting growth of this sector

Total GA Movements

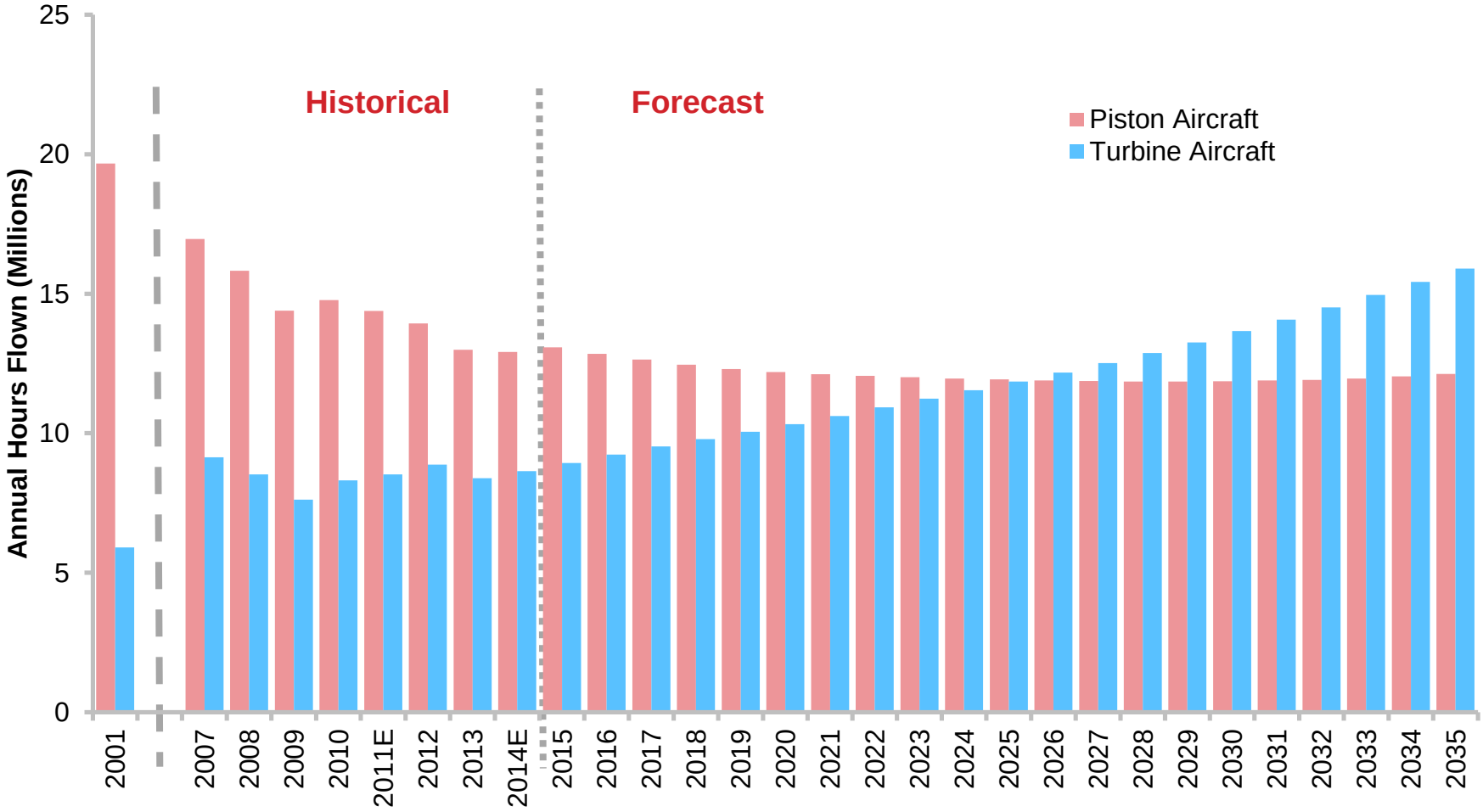
Canada: 1997 - 2013



Sources: Statistics Canada Tables 401-0029, 401-0036, and 401-0037.

GA and Air Taxi Aircraft Hours Flown

United States: 2001-2014 & 2015-2035 Forecast



Source: FAA Aerospace Forecast FY 2015-2035

Other Demand

- **General Aviation (GA)**
  - Some commercial airports have substantial GA activity
    - Important access into remote regions
    - But can increase airport congestion
    - Helicopters can sometimes utilize airspace not needed for fixed wing operation
  - Medevac operations are GA
  - GA use during response to natural and other disasters

Other Demand

- **Military**
  - Some airports are joint commercial and military
    - Busan Korea
      - #2 airport in Korea
      - 10mn pax/year
      - Military uses roughly 1/3 of capacity
    - New Beijing airport will be joint civilian/military field

Movement Demand

- **Terminal system key demand measure is pax**
  - Often broken into domestic vs. international
    - Intl pax has longer dwell time, requires more space for customs etc.
- **Runway system key demand measure: movements**
  - Movements affected by:
    - Aircraft size
    - Load factor
    - Seats in the aircraft
  - Example: Vancouver pax traffic doubled
    - But movements decreased

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Main Characteristics of Supply



Lumpy Nature of Airside Capacity

- **Airside capacity generally cannot be increased gradually**
  - An airline can deploy larger aircraft to increase capacity on a route (A321 for an A320)
  - But an airport may need to add a new runway
    - There are some things that can be done to increase capacity of one runways
    - But in general capacity increase requires a whole new runway

Terminal vs. Airside Services – Cont.

- **Airside supply (capacity) can be constrained by:**
  - Aircraft mix
    - Mixing light and heavy aircraft reduces capacity
  - Aircraft noise
    - Washington Reagan (DCA) limits the number of operations per hour to reduce noise impact
    - SYD has had periods where flights must shift between runways to reduce noise impacts
  - Political constraint
    - Toronto (YYZ) has capacity cap imposed by minister Even though the airport could handle more aircraft
  - Safety standards
    - Nations differ in the required separation between flights

Terminal Services

- **Terminal services can be constrained**
  - Capacity of the terminal
    - Some CDG boarding lounges too small for handling larger a/c
  - Processing capacity of critical systems
    - Customs hall limits
    - Fire Marshall can impose limits
    - Capacity of key processing points (e.g., security clearance)
  - New facilitation processes can reduce terminal capacity
    - Rescreening of pax and carryon baggage for US flights
      - Requires space, staff
    - 100% bag screening implemented in US using space in ticketing and check-in area

Short Term Supply Response

- **Short Term:**
  - Building additional infrastructure costly and will take time
  - Some airports can increase capacity if certain restrictions are removed
    - I.e., night restrictions
  - Peak-time pricing adjustments
  - Traffic distribution regulations
    - Discourage business or non-passenger aircraft from congested runways

Long Term Supply Response

- **Long Term:**
  - Build new infrastructure (runways, terminals, etc.)
  - Funding and land (space) can be an impediment

High Sunk Costs

- **Terminal or airside expansion is a significant cost**

- **To build a new runway, for example**
  - Calgary International Airport
    - Recently opened new runway
    - 3 years for construction
    - $620 million budget
  - Seattle-Tacoma airport
    - Environmental process for independent runway took 20 years

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Who is the Airport Customer



Passengers

- **There are two main types of travelers**
  - Business
  - Leisure
    - Vacation travelers
    - VFR (Visiting family and relatives)-ose traveling for school

Passengers – Cont.

- **In 2014, IATA estimates there were more than 3 billion air passengers worldwide**
- **Passengers determine the demand at the airport**
  - They will also drive additional demand for other airport services (besides flying) depending on the type of passenger

Top Airports by Passengers in 2013

Airport Code	City	Passengers (E/D) (Millions)
ATL	Atlanta, United States	94.4
PEK	Beijing, China	83.7
LHR	London, Great Britain	72.4
HND	Tokyo, Japan	68.9
ORD	Chicago, United States	66.8
LAX	Los Angeles, United States	66.7
DXB	Dubai, United Arab Emirates	66.4
CDG	Paris, France	62.1
DFW	Dallas/Fort Worth, United States	60.5
CGK	Jakarta, Indonesia	60.1

Source: ACI, 2013 Passenger Traffic

Airlines

- **Airlines are integral to the viability of an airport**
- **Can be viewed as THE customer to an airport**
- **If an airline does not provide service, the airport will not have business**
  - Airports will work to attract new airline service, either via different airlines or additional services from current airlines

Airlines – Cont.

- **Some airlines will focus on only certain types of airports (i.e., LCCs using secondary airports)**
  - Lower aeronautical charges at secondary airports to attract airlines
  - Faster taxiing times increase aircraft productivity
    - Especially for short haul

Top Airlines by Passengers Carried - 2013

Airline	Home Country	Alliance Membership	Scheduled Passengers Carried (Millions)
Delta Air Lines	United States	SkyTeam	121
Southwest Airlines	United States	N/A	115
China Southern Airlines	China	SkyTeam	92
United Airlines	United States	Star Alliance	90
American Airlines	United States	oneworld	87
Ryanair	Ireland	N/A	81
Lufthansa	Germany	Star Alliance	63
China Eastern Airlines	China	SkyTeam	63
easyJet	Great Britain	N/A	58
US Airways	United States	Star Alliance*	57

* US Airways was a member of the Star Alliance in 2013, prior to its merger with American Airlines
Note: Total Scheduled passengers (domestic and international)
Source: IATA, Scheduled Passengers Carried, 58th WATS

Cargo

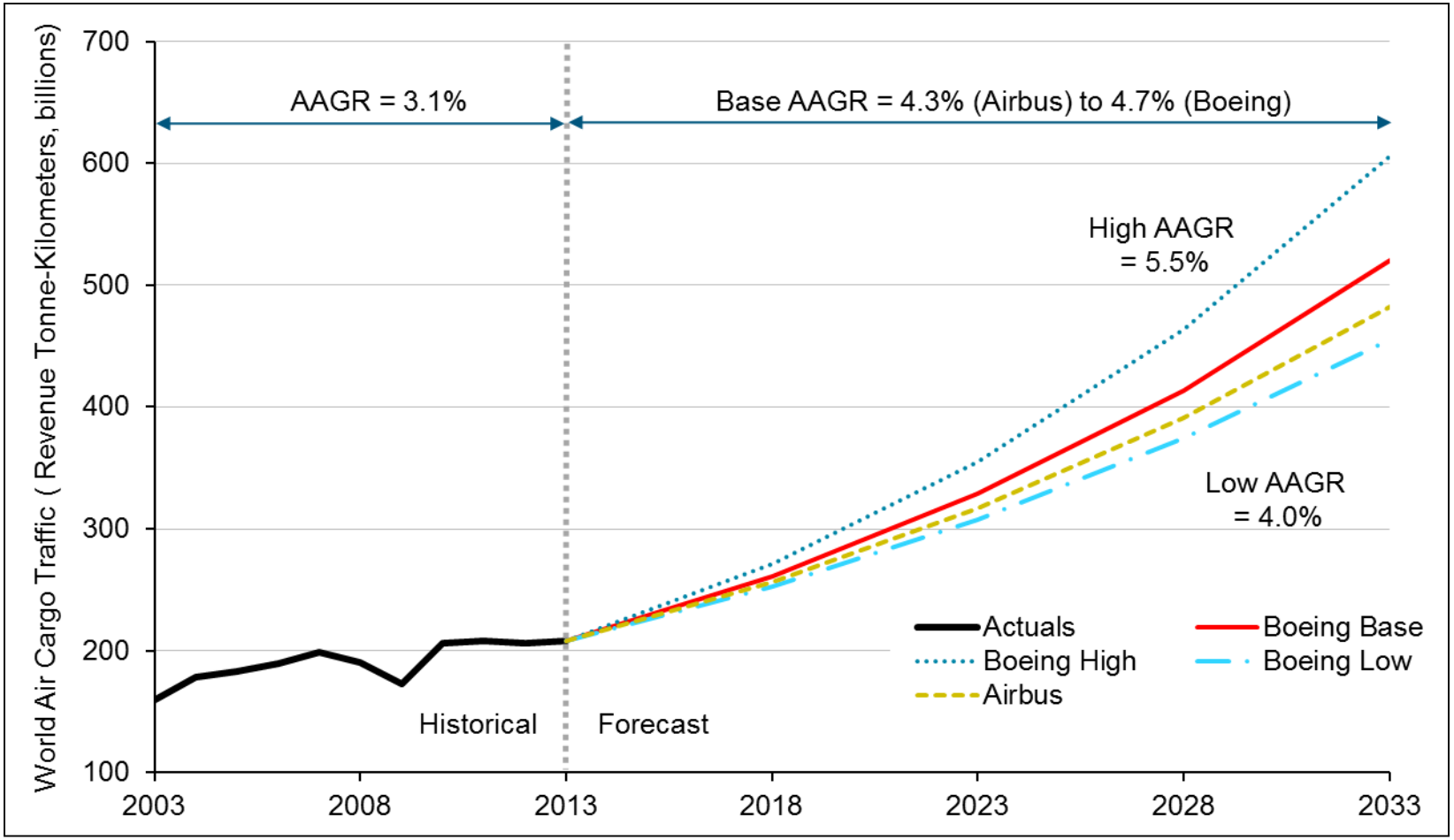
- **Cargo is generally price sensitive**
- **Unlike passengers, time of day is not as important**
- **Most freight forwarders will actually prefer night flights**
  - Moving away from peak-hour congestion
- **Geography and catchment area are important**
- **Access to road infrastructure is also a determining factor**

Top Airlines by FTK- 2013

Airline	Type	Scheduled Freight Tonne-Kilometres (Billions)
FedEx	Integrator	16.1
UPS Airlines	Integrator	10.6
Emirates	Combination Carrier	10.5
Cathay Pacific Airlines	Combination Carrier	8.2
Korean Air Lines	Combination Carrier	7.7
Lufthansa	Combination Carrier	7.2
Singapore Airlines	Combination Carrier	6.2
Cargolux	All-Cargo Carrier	5.2
Qatar Airways	Combination Carrier	5.0
China Airlines	Combination Carrier	4.8

Note: Total Scheduled Freight Tonnes (domestic and international)
Source: IATA, Scheduled Freight Tonne - Kilometers, 58th WATS

Forecasted Air Cargo Growth



Source: Boeing, World Air Cargo Forecast, 2014-2015
Airbus Global Market Forecast 2014-2033

General Aviation

- **Will use FBO services for business and corporate purposes**
  - Provide demand for other airport customers
- **At large, busy airports, GA can be an issue**
  - Congested airspace (ATC)
  - Ground space
  - Airports may use higher charges to dissuade GA
    - Move to the smaller airports instead
- **Smaller airports may market towards GA**

General Aviation - Statistics

- **In the United States:**
  - In 2013, there were over 33 million GA landings across the country
  - And over an estimated 22 million hours flown

- **In the United Kingdom**
  - In 2013, there were close to 700,000 GA (non-commercial) movements across the country

Source: Federal Aviation Administration,
General Aviation and Part 135 Activity Surveys - CY 2013;
UK Civil Aviation Authority, UK Airport Statistics

Land Tenants

- **Airport Related**
  - Fixed Base Operators
  - Fueling Stations
  - Maintenance
  - Intermodal transfer stations

Land Tenants – Cont.

- **Airport Support**
  - "Business parks"
    - Consulting agencies
    - Travel agents
    - Freight Forwarding

Maintenance, Repair and Overhaul (MROs)

- **Provide various services for aircraft**
  - Airframe maintenance
  - Electronics
  - Reconfiguration
  - Inspection
  - Etc.
- **Potential tool when marketing an airport to specific airlines**
  - If the MRO has capabilities for an airline's aircraft type

Other Customers

- **Many different stakeholders**
- **Depending on the airport, some customers will not actually fly during their trip to the airport**
  - Examples:
    - Aviation enthusiasts
    - "Greeters" (those picking up or dropping off passengers)

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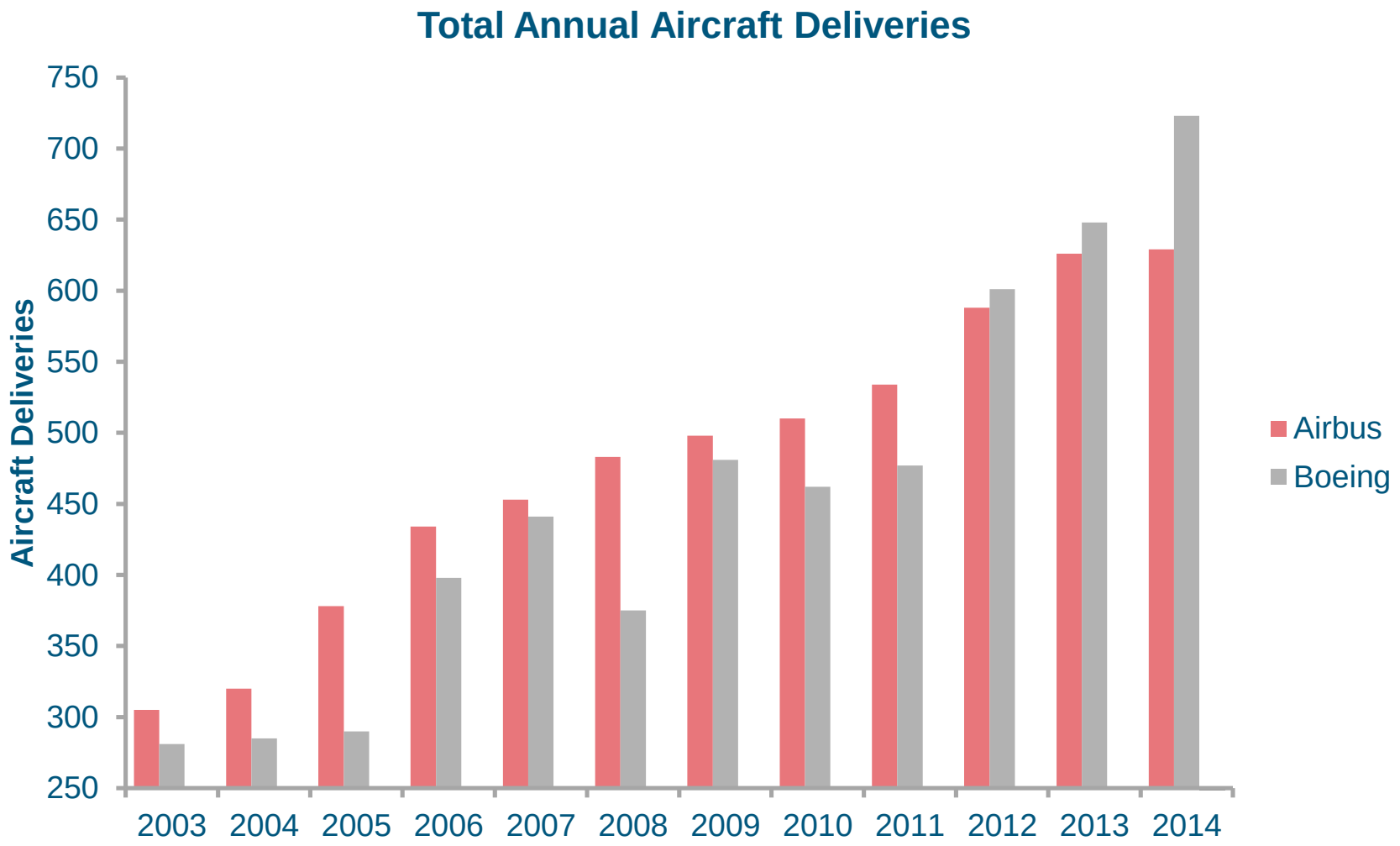
Some Trends



Aircraft Deliveries

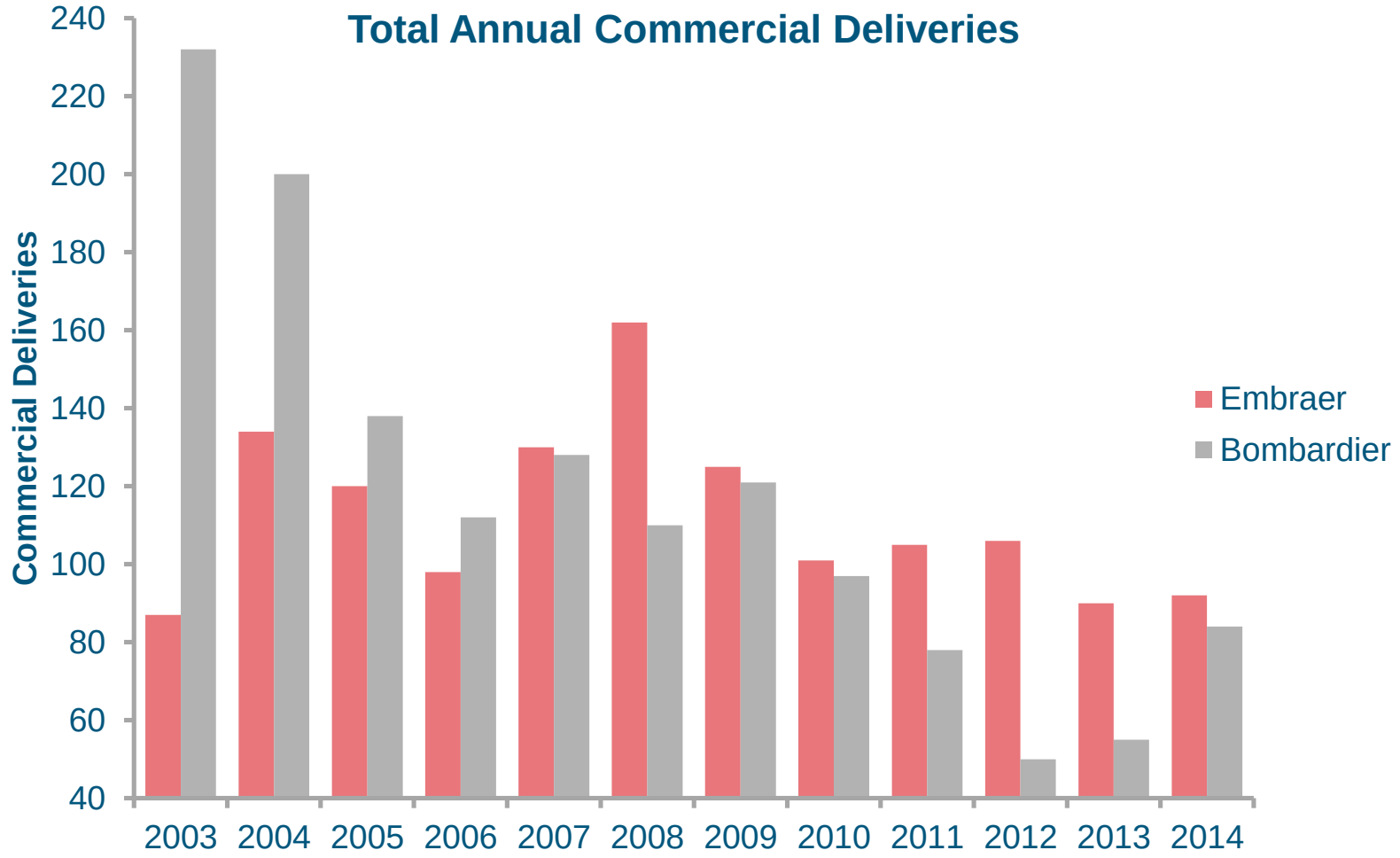
Boeing & Airbus



Source: Boeing and Airbus Delivery Reports

Aircraft Deliveries

Bombardier & Embraer



Source: Bombardier and Embraer Delivery Reports and Press Releases

Aircraft Orders

Airbus, Boeing, Embraer

Note: Estimates of orders as of January 6, 2015

Source: Diio Mi Fleet Current Summary

Regional Aircraft Developments

Phase out of small aircraft

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- 33-55 seat turboprops are **ageing**
  - Bombardier Dash-8/100 (35 seats): 26 year average age
  - Dash-8/300 (55 seats): 18 years
  - ATR-42: 20 years
- Regional jets also **ageing**
  - CRJ-200: 15 years
  - ERJ-135: 14 years
  - ERJ-145: 14 years
- Economics of 55 seat RJ problematic with high fuel price

Regional Aircraft Developments

Phase out of small aircraft

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- Within 3 – 10 years:
  - Aircraft will reach maximum cycles
  - Cost of rebuild not economic
- Bombardier has no 35-55 seat aircraft in production
  - CRJ 55 seat not in production
- ATR has ATR-42/500/600 in production
  - But orders much less than replacement needs
- Carrier “solutions”:
  - Phase out 33-55 seat aircraft
  - Buy low cycle used aircraft

Regional Aircraft Developments

Phase out of small aircraft

Example: Air Canada

- With the addition of **(23)** Q400 aircraft, AC to gradually replace **(34)** Dash 8-100 and **(25)** CRJ200
- AC plans to refurbish Dash 8-300 aircraft, but Dash 8-100 aircraft likely to be retired
- The transition towards larger gauge aircraft puts thinner markets at risk of reduced service

Developments in Airline Strategy

Re-banking

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- **Airlines un-banked many hubs in the early 2000s to cut costs but many airlines have begun to re-bank**
- **Though more expensive, banked schedules allow for shortened connection times as well as improved directional flows**
- **American Airlines began re-banking its hubs at Dallas/Ft. Worth, Miami and Chicago O'Hare last year**
- **United Airlines has re-banked its Denver and Houston hubs and will begin re-banking its Chicago O`Hare hub this month**

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Airports are Businesses



Airports Have Transitioned into Businesses

- **Originally**
  - Most airport originated as government facilities
  - Airports were built and operated as public utilities
  - Financing was often part of government capital and operating budgets
    - In Canada and Australia, debt was never used
    - In US tax incentives for local governments to finance airports using debt
- **Today**

Airports Have Transitioned into Businesses

- **Today**
  - A number of important airports have been privatized
    - They issue equity capital
    - They earn returns on their investments
  - These airports operate as businesses
  - Other government and not-for-profit airports have adopted business orientations
    - Business cases for investments, even aeronautical investments
    - Focus on marketing – develop traffic to increase revenue
    - Maximum development of non-aeronautical (commercial) revenues

Large Airports are Big Businesses

- **Heathrow Airport**
  - Annual revenue: us$5billion
  - Annual profit: us$700 million

Revenue Sources

- **Example Airport**
  - Aeronautical revenues 55%
    - Landing fees 35%
    - Terminal fees 30%
  - Non aeronautical revenues 45%
    - Auto parking 20%
    - Terminal concessions 10%
    - Rental cars, taxi, … 5%
    - Land rental 5%

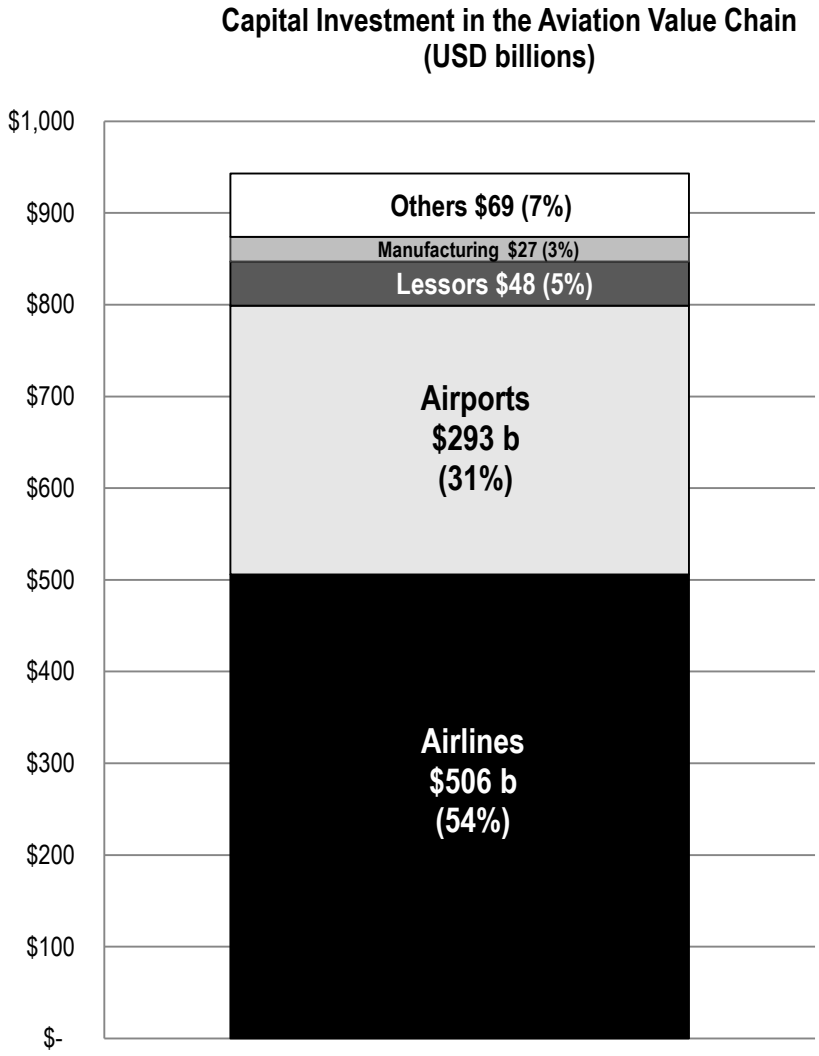
Revenue Sources

- **Revenue makeup varies by region**
  - In Europe & Asia
    - Auto parking less important
    - Terminal concession revenues more important

Capital Programs

- **Major new airport: us$10b**
- **New runway: us$1b**
- **Major new terminal: us$2-3b**

Airports Require Large Capital Investments



Financing

- **Substantial differences among airports**
  - Privatized airports have access to paid in equity capital
  - Government and not-for-profit airports
    - No access to paid in equity
    - May have retained earnings
      - Although some airports must pay any profits out as dividends to government
        - E.g. Taipei International
      - Retained earnings only build gradually
  - US and Canada have Passenger Facilitation Fees
    - Airport improvement fees in Canada
    - These are fees collected to finance capital projects

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