Aviation Data Symposium
15–16 November 2017
Miami, USA
Airfreight Data

Thank you to our Sponsor

accelya
Welcome
Jean-Christophe Rossand
Product Manager, Cargo IS
IATA
Looking into the Future: The SAS Cargo Story

Leif Rasmussen
President and CEO
SAS Cargo Group A/S
LOOKING INTO THE FUTURE: 
THE SAS CARGO STORY 

AVIATION DATA SYMPOSIUM 

November 15th, 2017 

Leif Rasmussen 
President and CEO, SAS Cargo Group A/S 

SAS Cargo
LOOKING BACK, TWO YEARS AGO
THE WORLD AROUND US IS CHANGING EXPONENTIALLY

Change

Disruptive opportunity

Time

Air Freight

Technological development
WE HUMAN BEINGS HAVE A HARD TIME UNDERSTANDING EXPONENTIAL GROWTH
Moore’s Law:
EVERY TWO YEARS PERFORMANCE IS DOUBLED AND PRICE IS HALVED

Source: Gordon Moore, Intel.com
HOW DID YOU GO BANKRUPT?

TWO WAYS:
GRADUALLY,
THEN SUDDENLY.

Source: Ernest Hemingway, The Sun Also Rises
OTHER INDUSTRIES HAVE EXPERIENCED MAJOR DISRUPTION

Other Industries

- Movies and Television
  - Netflix
- Hospitality
  - AirBnB
- Taxi and transportation
  - Uber
- Photography
  - Instagram
- Music
  - Apple

Air Freight

- eAWB
- CargoIQ
- CEIV Pharma
I WONDER HOW THE WORLD AROUND US PERCEIVES THE AIR FREIGHT INDUSTRY
IN TIMES OF CHANGE, ONE KEY TO SUCCESS REMAINS CONSTANT:

UNDERSTAND WHAT YOUR CUSTOMERS WANT
THE EXPECTATIONS OF CUSTOMERS TODAY

- Personalized
- On demand
- Purpose driven
- Mobility
- Convenience
KEY SUCCESS FACTORS FOR OUR INDUSTRY

- Transparent price comparison
- Flawless transactions
- Access across all platforms
- Automation of processes
- 24/7 access
- Hyper-customized
SO WHY HAVEN’T WE SEIZED THESE OPPORTUNITIES?
TODAY, THE INDUSTRY EXPERIENCES A MULTITUDE OF CHALLENGES

- Inaccurate weight/volume
- Incorrect pallet size
- Off loads
- Screening & rescreening
- Invoicing errors

Incorrect /missing shipment details
- Late submission
- Incorrect /missing documents
- Varying customer experience

Shipper Forwarder Customs Handling Carrier Handling Broker Customs Consignee
IT IS CERTAINLY NOT EASY BEING A CUSTOMER

Each stakeholder focuses on self
– at best the next link

We have no shared focus on the end customer

The value chain is fragmented and bureaucratic
BUT THERE ARE STILL CHALLENGES
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<th>Data Item</th>
<th>Purchase Order</th>
<th>Invoice</th>
<th>Packing List</th>
<th>Certificate of Origin</th>
<th>House Waybill</th>
<th>Air Waybill</th>
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Source: IATA

DATA IS RE-TYPED UP TO 97 TIMES IN ORDER TO COMPLETE AN AIR FREIGHT SHIPMENT 97 POSSIBILITIES FOR POTENTIAL ERRORS
IT IS CERTAINLY NOT EASY BEING A CUSTOMER

ACTUALLY, IT HAS BEEN THE SAME WAY FOR OVER 40 YEARS

We have no shared focus on the end customer

The value chain is fragmented and bureaucratic
THE QUESTION IS
DO WE WAIT
OR DO WE ACT?
THE COMPETITION WILL COME FROM OUTSIDE OUR INDUSTRY
"NOW EVERY COMPANY IS A SOFTWARE COMPANY"

Source: Forbes

THE COMPETITION WILL COME FROM OUTSIDE OUR INDUSTRY
WHAT KIND OF COMPANY IS TESLA?
OR A SOFTWARE COMPANY?
WHAT KIND OF COMPANY IS AMAZON?
OR A SOFTWARE COMPANY?
WHAT KIND OF COMPANY DO YOU WANT TO BE?
AT SAS CARGO,
WE ASK OURSELVES SOME
TOUGH
QUESTIONS
How can we adopt the on-demand customer-centric experience?

How can we make the customer experience much more convenient?

How can we make our services much more mobile and available for our customers?

How can we use big data to make our services more tailored to the individual customer needs?

How will it impact our...?
MAKE A BOOKING AND GET INSTANT CONFIRMATION IN ONLY 84 SECONDS
SAVE UP TO 90 %
OF A NORMAL BOOKING TIME
IN OUR HOME MARKET SCANDINAVIA, WE GET 80% OF OUR BOOKINGS THROUGH OUR PORTAL AND GLOBALLY THE NUMBER IS 60%
COMING SOON…

NEW SAS CARGO BOOKING PORTAL
OUR NEW BOOKING PORTAL WITH DOCUMENT MANAGEMENT IMPROVES THE VALUE CHAIN BY AUTOMATING DOCUMENTATION

You avoid retyping

Data consistency across all documents
LOOKING AT IT FROM A BIGGER PERSPECTIVE
GLOBAL TRADE IS ONLY GOING TO INCREASE

THE QUESTION IS,

HOW CAN AIR FREIGHT REMAIN RELEVANT?
WE MUST
CHALLENGE OURSELVES
How robust is your business model, organization and customer relations to disruption?

What information about your customers would you like to have – and how would you get them?

Does your board have the necessary competences to avoid disruption and secure the funds needed?

How do you utilize the technological convergence? Big data, machine learning, prediction etc.

If you were to start from scratch, would you build the same business model?
IT’S GREAT TO SEE OUR TRADE ASSOCIATION TAKES AN AERIAL VIEW OF OUR INDUSTRY

A POWERFUL NEXT STEP COULD BE TO CREATE A WHITE PAPER ON THE IMPLICATIONS FOR OUR INDUSTRY, INCLUDING RECOMMENDATIONS ON RELEVANT TOOLS TO APPLY
WE MUST CHALLENGE OURSELVES
Data– The Raw Material of the 21st Century Also in Airfreight?

Jochen Goettelman
CIO
Lufthansa Cargo AG
Data – The Raw Material of the 21st Century also in Air Freight?

IATA Airline Data Symposium
Miami Beach, November 15th/16th, 2017
Dr. Jochen Göttelmann
| 1 | A data-inspired view on the airfreight industry |
| 2 | Technology is driving the digitalization of the air freight supply chain |
| 3 | Some use cases of Lufthansa Cargo |
| 4 | The “logistic data cloud” |
| 5 | Lufthansa Cargo’s approach for strategic data management |
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Digitalization in air freight: Lagging decades behind passenger services

GDS

OTAs

eTIX

Traditional booking channels

Limited transparency on rates and capacity

Air Waybill

Digitalization of air freight will speed up – and the change will never be as slow as today.
Logistics, transportation and supply chain is getting one of the most attractive industries for startup investments.
Spotlight: eAWB and eFreight

The eAWB is much more than just the digitization of some paper. Electronic documents are the enabler for efficiency and quality improvements.
Spotlight: eAWB and eFreight

BUT – why does the further rollout seem to get stalled? Is the industry focus getting somewhere else?

Data – The Raw Material of the 21st Century also in Air Freight?
Spotlight: CargoXML

Despite of all achievements, the industries still struggles with …

… complex and partially redundant and superfluous message descriptions

… ambiguous and interpretable descriptions

… inconsistencies in descriptions, auto checks, conditions across different messaging

… misalignment between XSD structure and description

… lack of staff and priority at airlines, forwarders and IT providers

Is CargoXML and eFreight still sufficient? Or will they be outpaced?
Data are key to improve the current business and to prepare for disruptions

**Theme 1:** Digitization to **improve customer experience and increase efficiency** of traditional airfreight supply chain
- Fundamental structure of traditional airfreight supply chain has not changed for several decades
- Overall degree of digitization is rather low and is increased step by step (in a quite isolated way / redundantly)

**Theme 2:** Digitization to **drive and prepare for fundamental disruptions** in airfreight supply chain
- Shippers’ needs are in the focus and shape the design of future supply chains
- Digitization is a necessary precondition for significant changes of traditional supply chain structures

New digital-driven disruptions
- Booking Platforms
- Logistics Data Cloud
- …
e-Cargo is at the center of our effort to shape the future of air freight

- Delink information and physical freight
- Boost efficiency through fully digitized processes
- Enhance coordination through connectivity
- Unlock new business potentials
- Increase employer attractiveness

We only can win together. Those who ignore, will loose. Those who join, will contribute to shape the future of air freight.
Technology is driving IT organizations to work with many speeds

Current technology drivers don’t wait for our standards.

- Analytics
  - Distributed and unstructured data

- APIs
  - Individual syntax and semantics

- Platforms
  - New business models based on community data

- IoT
  - Extreme data volumes
  - Real-time

- Connectivity
  - Intermodal end-2-end data exchange

- Cloud & mobile
  - Access anywhere, anytime

To avoid the risk of getting outpaced and to participate in the chances of disruption, a data strategy must cope with both highest quality standards and the increasing speed of the industry.
AGENDA

1. A data-inspired view on the airfreight industry
2. Technology is driving the digitalization of the air freight supply chain
3. Some uses cases of Lufthansa Cargo
4. The “logistic data cloud”
5. Lufthansa Cargo’s approach for strategic data management
eTracking: IoT, APIs and mobile for more transparency

- **Analytics**
- **APIs**
- **Platforms**
- **IoT**
- **Connectivity**
- **Cloud & mobile**

### Mobile tracking devices
- Use of active trackers
- Easy-to-deal-with

### Tracking web module
- Proactive information across whole process
- Automated availability information at import

### Tracking app
- Access anywhere, anytime
- Notifications via push messages

### Add-on product
- Increased door-2-door visibility
- Full transparency of complete supply chain
Big data for fuel efficiency: Ops monitor and efficiency gap (OMEGA)

TARGET: Reduction of specific CO2 emissions by 25% until 2020

A flight FRA – JFK uses 64 tons trip fuel on March 10th. Why does the same flight need 68 tons two days later?
Big data supports various stakeholders

- 20,000 data sets per flight: 80 parameters recorded every 2 seconds from heterogeneous sources: Weather conditions, flight information, flight schedule and punctuality, load data, flight plans, inflight sensor data, …
- A complex query language and various filter options enable the analysis of all relevant flight phases

Finding gaps, measuring potential

- Analysis of the difference between planned and actual routes to identify frequent shortcuts
- Measurement of concrete initiatives such as Reduced Engine Taxi In (RETI)
- Statistics of historic flights support the fuel decision making process
### From classical BI to analytics: Some use cases

<table>
<thead>
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<th>Short Term Marketing</th>
<th>Weights and Measures</th>
<th>Revenue Overview</th>
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<tr>
<td>Increased efficiency and higher customer satisfaction through targeted and automated offer of free capacity</td>
<td>Optimization of weight and volume deviation detection through profiling</td>
<td>Reduced number of unprofitable flights based on flight revenue prediction and simulation</td>
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<th>eAWB Data Quality</th>
<th>Show-up Forecast</th>
<th>Spot Hit Ratio</th>
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<tbody>
<tr>
<td>Improved data quality thus accelerating the eAWB roll-out by automating error analysis</td>
<td>Optimization of overbooking, based on show-up forecast, limiting disruptions</td>
<td>Improved spot hit ratio by prediction of loss due to rate quotations</td>
</tr>
</tbody>
</table>

Data – The Raw Material of the 21st Century also in Air Freight?
From classical BI to analytics: Key success factors and learnings

1. Don’t think you already have the right skills in your traditional BI team.
2. Learn to accept fuzziness. Don’t try to explain every single record.
3. Good ideas don’t easily transform into good results. Accept to fail often.
4. Build your Analytics use cases on the right tools. Cloud first.
5. There are much less unstructured data than expected. SQL remains king.
A data-inspired view on the airfreight industry

Technology is driving the digitalization of the air freight supply chain

Some use cases of Lufthansa Cargo

The “logistic data cloud”

Lufthansa Cargo’s approach for strategic data management
The Logistics Data Cloud ("One Record"): A vision beyond eFreight

TODAY: Isolated data flow and system connection across the supply chain, characterized by

- Low level of shipment status transparency for all members of the supply chain
- High messaging complexity, fragmented data, and lack of interface standardization resulting in low data quality and low data consistency
- Limited pre-processing of data before shipment arrival (e.g. for customs authorities)
- Misunderstanding and inaccuracy as data are handed over across several participants in the supply chain
The Logistics Data Cloud ("One Record"): A vision beyond eFreight

**TOMORROW:** Integrated information flow via a “logistics data cloud” with the benefits:

- High data quality and consistency along the complete supply chain
- Efficiency by elimination of many process steps between numerous interfaces
- Increased speed by real-time and early data availability for all participants
- High potential for preprocessing (e.g. for customs authorities) and improved steering possibilities
AGENDA

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Weaknesses in the data environment call for strategic data management

1. Inconsistent master data across multiple systems.

   A central master data management system as “golden source”.

2. Unclear terminology of “same” data across different processes.

   A clear, single and editorially managed corporate wide data glossary.

3. Unexpected and unclear side effects with data exchange.

   Data governance and lifecycle management, quality standards and access rights.

4. High efforts for external data interfaces.

   “e”-Initiatives and APIs.
Example: Booking data without data lifecycle management

**PROBLEM:** Booking data used for flight planning are not in sync with data received by agent or GHA FWBs and GHA Messages.

**CONSEQUENCE:** Incorrect calculation of capacity consumption and missing of important handling information, leading to transport plan violations, loss of revenue and incorrect invoicing.
Example: Booking data with data lifecycle management

THE VISION: “Versioning” of records instead multiple inconsistent copies allow better business rules and more consistent information along the entire process chain.
The Lufthansa Cargo cookbook for strategic data management

Data Management
- LCAG
- Business Glossary
- LCAG BO Model
- Lifecycle Management
- MDM
- Quality
- Security
- Privacy
- Governance
- Roles
- Processes
- Metric Framework
- Master data API
- Specific data API (capacity, booking, quotation)
- DWH modernization
- Processes and workflows
- Governance
- Metrics and measurement
- Lifecycle management
- Master data maintenance

Phase 1: Enabling
- Business Glossary
- BO Model
- Quality Criteria
- Privacy constraints
- Roles and rights

Phase 2: Implementation
- Master data API
- Specific data API (capacity, booking, quotation)
- DWH modernization
- Processes and workflows

Phase 3: Validation
- Governance
- Metrics and measurement
- Lifecycle management
- Master data maintenance

Data – The Raw Material of the 21st Century also in Air Freight?
Thank you.
More Holistic Approach to Data Usage and Modelling

Damien Zaru
Manager APCS Products
IATA
Aviation Data Symposium

Miami, United States

15 November, 2017
A Holistic Approach to Data Usage and Modelling

by Damien ZARU
Manager, IATA APCS Consulting
## Introduction – Damien Zaru, Manager, APCS Consulting, IATA

**Damien Zaru**  
Engagement Manager, Airport, Passenger, Cargo and Security Consulting, IATA

<table>
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| Executive Master in Management  |
| MSc. in Business Administration  |

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### Selection of work experience

- **For an Australian International Airport**: Air Cargo Development Strategy
- **For Cambodia Airports**: Cargo strategic market study
- **For Tokyo-Narita Int’l Airport**: Cargo Traffic Forecast as part of a Facility Planning and Zoning Development Strategy
- **For Dubai Al-Maktoum International Airport (DWC)**: Air Cargo Development Strategic study
- **For Aeroporti di Roma (AdR)**: Strategic market study and long term traffic forecast of the Rome airports system
- **For Airports of Thailand (AoT)**, strategic development study for BKK and DMK
- **For Airport Operators, due diligence traffic assessments**:  
  - **Japan**: KIX, ITM, FUK, UKB and TAK  
  - **France**: LYS, NCE and TLS  
  - **Brazil**: GRU, GIG, BSB, CNF and VCP
- **For Vancouver Airport Authority (VAA)**: long-term traffic forecast
“Data is only as powerful as the analysis that you make of it”
The reasons for forecasting airport activity > What is airport activity forecast useful for?

Estimate the nature, magnitude and timing of future needs for equipment, facilities, manpower, funding…

Activity forecasting purposes and forecasting horizons

- Budgeting
- Business planning
- Non-capacity investment
- Strategic analysis
- User charges regulation
- Capacity investment planning
- Airport acquisition / long-term concession

1 yr 5 yrs 20 yrs 50 yrs
The keys to a diligent traffic forecast

1. Data

2. Methodology

3. Analytic work
1. Reliable data is the foundation of a quality forecasting study

### Main Data Sources

**Socio-Economic Data**
- IHS Global Insight
- Oxford Economics
- EIU

**Air Traffic Statistics**
- CargoIS
- AirportIS
- SRS Analyzer
- Statistics Bureau/Office
- Customs Authority
- ACI
- Albatross

**Interviews**
- Airport
- Airlines
- GSA
- FF

**Trade data**
- Statistics Bureau/Office
- Trade Department
- Worldbank
- OCDE
2. Robust and proven methodology

Cargo Traffic is projected using a dual approach that combines a top-down and a bottom-up projection:

- **The top-down projection**: demand-based projection derived from historical regression analysis against suitable drivers ①
- **The bottom-up projection**: short-term forecast based on airlines market capacity ③

Changes in the airport environment are estimated and added / subtracted to the baseline ②

Base case = baseline + adjustments ④

Source: IATA methodology
Finding the best statistical regression-based model incorporating the most relevant independent (causal) variables to explain the historical traffic evolution

Illustration > The case of an international Australian airport > International Air Cargo Imports

Int’l Air Cargo OD Imports actual and modeled traffic
1985 to 2015 – index 100 in 1985

- Best fit: Air cargo OD import expressed as a log function of AUS GDP and US/AUD FX rate
- R-square: 0.99
- Coefficient of the Australian real GDP has a positive sign, as expected
- Coefficient of the FX rate has a positive sign as well, evidencing the positive relationship existing between imports and FX rate (imports increase as AUD gets stronger)
- P-values confirm these drivers are independent and statistically significant

Source: CargoIS, BITRE, Global Insight, IATA Analysis
3. Solid analytic work to apply the methodology

Step 2: Adjustment factors > a key component of a forecasting study

The future changes in the airport environment.... What differentiates the past from the future!

Regulation

- Air Service Agreements
- Trade Agreements

- Economy and Trade
- Industrial Production
- Trade-weighted Exchange rate
- E-commerce

- Competition from regional airports
- Competition from global hubs

Airport competitors

- Airlines Strategies
- Integrators

Substitution

- Modal shift (sea containerization)

Source: IATA methodology
Illustration > Analysis of the competition from regional airports (1/2)

Traffic Leakage Analysis - Exports

A leakage analysis aims at mapping traffic currently escaping its catchment area

Illustration > Analysis of the Exports originating from Queensland

Mapping of Queensland Exports by Airport of departure, FY 2014/2015

<table>
<thead>
<tr>
<th>Airport</th>
<th>Tonnes</th>
<th>% of Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Brisbane</td>
<td>56,123</td>
<td>81%</td>
</tr>
<tr>
<td>Cairns</td>
<td>3,027</td>
<td>4%</td>
</tr>
<tr>
<td>Sydney</td>
<td>7,919</td>
<td>11%</td>
</tr>
<tr>
<td>Melbourne</td>
<td>1,255</td>
<td>2%</td>
</tr>
<tr>
<td>others</td>
<td>762</td>
<td>1%</td>
</tr>
<tr>
<td>Total</td>
<td>69,086</td>
<td>100%</td>
</tr>
</tbody>
</table>

69,086 tonnes produced in QSL and exported by air

Top 3 Destinations

<table>
<thead>
<tr>
<th>Destination</th>
<th>Exported Tonnes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hong Kong</td>
<td>2,131</td>
</tr>
<tr>
<td>Papua New Guinea</td>
<td>450</td>
</tr>
<tr>
<td>Japan</td>
<td>203</td>
</tr>
<tr>
<td>Singapore</td>
<td>13,410</td>
</tr>
<tr>
<td>China (excl. HK, TW &amp; Macau)</td>
<td>10,300</td>
</tr>
<tr>
<td>New Zealand</td>
<td>8,800</td>
</tr>
</tbody>
</table>

Top 3 Destinations

<table>
<thead>
<tr>
<th>Destination</th>
<th>Exported Tonnes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hong Kong</td>
<td>1527</td>
</tr>
<tr>
<td>United Arab Emirates</td>
<td>1323</td>
</tr>
<tr>
<td>Singapore</td>
<td>1160</td>
</tr>
<tr>
<td>Brunei Darussalam</td>
<td>307</td>
</tr>
<tr>
<td>Qatar</td>
<td>198</td>
</tr>
<tr>
<td>Singapore</td>
<td>138</td>
</tr>
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</table>

Source: ABS, CargoIS, IATA Analysis
### Illustration > Analysis of the competition from regional airports (2/2)

#### Traffic Leakage Analysis - Exports

Illustration > Analysis of the Exports originating from Queensland > focus on Sydney Airport

**Mapping of Queensland Exports from ****Sydney Airport, FY 2014/2015**

<table>
<thead>
<tr>
<th>Destinations</th>
<th>Total Exports in tonnes</th>
<th>Top exports</th>
<th>Volume</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>19.3%</strong> Hong Kong</td>
<td>1527</td>
<td>Edible fruit and nuts; peel of citrus fruit or melons</td>
<td>685</td>
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<tr>
<td></td>
<td></td>
<td>Special transactions not classified according to kind</td>
<td>630</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Edible vegetables and certain roots and tubers</td>
<td>147</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Meat and edible meat offal in tonnes</td>
<td>28</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Live animals</td>
<td>11</td>
</tr>
<tr>
<td><strong>16.7%</strong> United Arab Emirates</td>
<td>1323</td>
<td>Special transactions not classified according to kind</td>
<td>704</td>
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<tr>
<td></td>
<td></td>
<td>Edible fruit and nuts; peel of citrus fruit or melons</td>
<td>437</td>
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<td></td>
<td></td>
<td>Edible vegetables and certain roots and tubers</td>
<td>115</td>
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<tr>
<td></td>
<td></td>
<td>Live animals</td>
<td>35</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Meat and edible meat offal</td>
<td>17</td>
</tr>
<tr>
<td><strong>14.6%</strong> Singapore</td>
<td>1160</td>
<td>Edible vegetables and certain roots and tubers</td>
<td>464</td>
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<tr>
<td></td>
<td></td>
<td>Edible fruit and nuts; peel of citrus fruit or melons</td>
<td>440</td>
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<tr>
<td></td>
<td></td>
<td>Special transactions not classified according to kind</td>
<td>244</td>
</tr>
<tr>
<td><strong>6.2%</strong> Qatar</td>
<td>490</td>
<td>Special transactions not classified according to kind</td>
<td>438</td>
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<tr>
<td></td>
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<td>Edible fruit and nuts; peel of citrus fruit or melons</td>
<td>41</td>
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<tr>
<td></td>
<td></td>
<td>Edible vegetables and certain roots and tubers</td>
<td>12</td>
</tr>
<tr>
<td><strong>6.0%</strong> United States of America</td>
<td>478</td>
<td>Fish and crustaceans, molluscs and other aquatic invertebrates</td>
<td>107</td>
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<td>Meat and edible meat offal</td>
<td>67</td>
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<tr>
<td></td>
<td></td>
<td>Headgear and parts thereof</td>
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<tr>
<td><strong>37.1%</strong> Others</td>
<td>2941</td>
<td>Edible fruit and nuts; peel of citrus fruit or melons</td>
<td>403</td>
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<td>Special transactions not classified according to kind</td>
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<td>Edible vegetables and certain roots and tubers</td>
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<td>Meat and edible meat offal</td>
<td>209</td>
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<tr>
<td></td>
<td></td>
<td>Vehicles other than railway or tramway rolling-stock, and parts and</td>
<td>161</td>
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</tbody>
</table>

QSL = 69,086 tonnes

**Source:** ABS, CargoIS, SRS Analyzer, IATA Analysis
How is this analysis strategically used as part of the forecasting study?

- Quantify the potential traffic Upside/Downside
  - Comes as an adjustment to the baseline forecast
  - Consider the probability of recapturing/losing traffic

- Understand the reasons for traffic leakage
  - Connectivity
  - Lack of specialized facilities
  - ...

- Identify strategic actions to recapture the lost traffic
  - Enhance connectivity > Air Service Development (ASD)
Illustration > Sydney vs. Brisbane: connectivity analysis

**SYD vs. BNE: Top 3 leaked exports destination connectivity status**
In weekly flights from BNE vs. SYD, FY 2014/2015

<table>
<thead>
<tr>
<th>Destination Country</th>
<th># weekly flights from BNE</th>
<th># weekly flights from SYD</th>
<th>Aircraft</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hong Kong</td>
<td>14</td>
<td>25</td>
<td>A330-300</td>
</tr>
<tr>
<td>Hong Kong</td>
<td>0</td>
<td>5</td>
<td>B747-400</td>
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<tr>
<td>Hong Kong</td>
<td>0</td>
<td>3</td>
<td>B777-300ER</td>
</tr>
<tr>
<td>Hong Kong</td>
<td>0</td>
<td>2</td>
<td>A380-800</td>
</tr>
<tr>
<td><strong>Weekly PAX flights</strong></td>
<td><strong>14</strong></td>
<td><strong>35</strong></td>
<td></td>
</tr>
<tr>
<td>Freighter flights</td>
<td></td>
<td></td>
<td>Emirates - B777-200F</td>
</tr>
<tr>
<td>Freighter flights</td>
<td></td>
<td></td>
<td>Cathay - Boeing 747-8F</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Destination Country</th>
<th># weekly flights from BNE</th>
<th># weekly flights from SYD</th>
<th>Aircraft</th>
</tr>
</thead>
<tbody>
<tr>
<td>Singapore</td>
<td>34</td>
<td>13</td>
<td>A330/200/300</td>
</tr>
<tr>
<td>Singapore</td>
<td>7</td>
<td>31</td>
<td>B777-200/200ER/300ER</td>
</tr>
<tr>
<td>Singapore</td>
<td>0</td>
<td>7</td>
<td>A380-800</td>
</tr>
<tr>
<td>Singapore</td>
<td>0</td>
<td>1</td>
<td>B787-9</td>
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<tr>
<td>Singapore</td>
<td>0</td>
<td>1</td>
<td>B747-400</td>
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<tr>
<td><strong>Weekly PAX flights</strong></td>
<td><strong>42</strong></td>
<td><strong>54</strong></td>
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</table>

<table>
<thead>
<tr>
<th>Destination Country</th>
<th># weekly flights from BNE</th>
<th># weekly flights from SYD</th>
<th>Aircraft</th>
</tr>
</thead>
<tbody>
<tr>
<td>United Arab Emirates</td>
<td>7</td>
<td>21</td>
<td>A380-800</td>
</tr>
<tr>
<td>United Arab Emirates</td>
<td>0</td>
<td>9</td>
<td>B777-300ER</td>
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<tr>
<td>United Arab Emirates</td>
<td>0</td>
<td>4</td>
<td>A340-600</td>
</tr>
<tr>
<td><strong>Weekly PAX flights</strong></td>
<td><strong>7</strong></td>
<td><strong>35</strong></td>
<td></td>
</tr>
</tbody>
</table>

- **To HKG**: 2.5 more services was offered on a weekly basis (35 vs. 14 weekly flights), complemented by more voluminous aircraft
- **5 weekly freighter services from SYD (vs. none from BNE)**
- **To Singapore**: more belly cargo capacity offered on a weekly basis in 2014/2015, through a combination of higher frequencies and bigger cargo volume aircraft
- **Same conclusion towards UAE (DXB) where 5 times more services were offered from SYD on a weekly basis**

Source: SRS Analyzer, IATA Analysis
3. Solid analytic work to apply the methodology

Step 4: Baseline + Adjustment Factors = Base Case

Baseline Forecast

Adjustment Factors

Source: IATA methodology
Conclusion

- Reliable and quality data is key….
  - Not a single source > consider multiple sets of information
  - Reconcile the various sources

- …but is not enough!
  - A solid analysis framework is required (Methodology)

- The application of the methodology requires some solid analytical skills…
  … combined to a deep market knowledge!
Thank you for your attention!

Damien ZARU
Manager, IATA APCS Consulting
E-mail: zarud@iata.org
📞 +1 -514-449-3721
Networking Coffee Break
Thank you to our Sponsor

INFARE
Data Lakes, Disruptions and Predictive Algorithms

Erez Agmoni
Regional Head, Supply Chain Development
Damco
Data lakes, disruptions and predictive algorithms

Dr. Erez Agmoni – Regional Head of Supply Chain Development – Americas
erez.agmoni@damco.com
+1(973) 437 6219
Imagine a world that...

- you can accurately predict and improve your load factor 60-90 days in advance
### Air freight market detail - August 2017

<table>
<thead>
<tr>
<th></th>
<th>World share $^1$</th>
<th>August 2017 (% year-on-year)</th>
<th>% year-to-date</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>FTK</td>
<td>AFTK</td>
<td>FLF (%)$^2$</td>
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<tr>
<td></td>
<td></td>
<td></td>
<td>FLF (level)$^3$</td>
</tr>
<tr>
<td>TOTAL MARKET</td>
<td>100.0%</td>
<td>12.1%</td>
<td>4.7%</td>
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<td>Africa</td>
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<td>Asia Pacific</td>
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</table>

### International

<table>
<thead>
<tr>
<th></th>
<th>World share $^1$</th>
<th>August 2017 (% year-on-year)</th>
<th>% year-to-date</th>
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<tr>
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<td>AFTK</td>
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<td>FLF (level)$^3$</td>
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$^1$% of industry FTKs in 2016  
$^2$Year-on-year change in load factor  
$^3$Load factor level

Source: IATA’s Airfreight market analysis – August 2017
Imagine a world that...

- ...you can accurately predict and improve your load factor 60-90 days in advance

- ...you know where demand is about to grow so you can plan deployment of the fleet pro-actively
Today we only predict based on large electronics' due dates (Apple as example)
Imagine a world that...

- ...you can accurately predict and improve your load factor 60-90 days in advance
- ...you know where demand is about to grow so you can plan deployment of the fleet pro-actively
- ...you can plan smartly, well in advance, based on actual consumer behavior’s information
Vs...

Last minute decisions in a very fluctuated market

Who else is doing a good job in planning? Pax, hotels, etc.
Imagine a world that...

- you can accurately predict and improve your load factor 60-90 days in advance
- you know where demand is about to grow so you can plan deployment of the fleet pro-actively
- you can plan smartly well in advance based on actual consumer behavior’s information
- you are able to give your customers real-time information about the condition of their cargo using IoT
Vs...
Can we actually achieve all this?
RIP 2008
100% penetration
What about AWB?

After all C2K started in 1997
Source: IATA’s e-AWB international monthly report August 2017
What about visibility?
What is DAMCO doing to stay ahead?
DAMCO – Who Are We?

With our combined transport and logistics businesses, we provide the world’s largest integrated network of ships, containers, terminals, port infrastructure, and logistics specialists.

Providing simple solutions to our customer’s complex supply chain needs

Elevating the customer experience through digital innovation

Extending the industry’s most effective and efficient delivery network to every market in the world

Global integrator of container logistics - connecting and simplifying the global supply chain
DAMCO at a Glance

Damco is at the forefront of developing innovative supply chain solutions. To achieve this, we are pioneering the use of digital technology to connect and simplify many supply chains globally. We are experts in the field of complex, rapidly changing markets such as fashion, retail, chemical, FMCG and technology, fusing our global network and depth of expertise with innovations to enable our customers to stay ahead.
The Data Lake is capable of accepting and utilizing any kind of data.
Data Lake
Boundary-less data store for valuable internal and external data, as structured and unstructured static files.
Integration and ingestion
Integrate and ingest all Damco system data into the data lake.

Work in process allowing it to feed data, analytics and intelligence back into the landscape.
Digital Platform

Streaming Analytics
Capability for streaming data into the platform and apply analytics and intelligence real-time.

(GPS vessel locations, newsfeeds, events, etc.)
Analytics and Cortana Intelligence
Key differentiating capability for analytics, business intelligence, cognitive intelligence and machine learning.

Solving internal and external business problems with descriptive, diagnostic, predictive or even prescriptive analytics and insights.
Online Analytical Processing
Capability for multidimensional analysis, complex calculations and sophisticated data modeling.
Online Transactional Processing and Storage
Capability for transactional data processing, data storage and file storage.
Services

Capability for (micro-) services and serverless application ecosystem.

Technology agnostic with containerization (Docker) or as a Service (Service Fabric, Web/API apps, Azure Functions, etc.)
Visualization
Frontend applications – With database or without database
ability for lean, low code, rapid application development of web based and mobile applications.
API Manager
Capability for API management (availability still pending).

Create an API ecosystem around Damco insights and Intelligence (through Damco API library / marketplace).
Power BI
Capability for internal dashboards and self-service Business Intelligence.

Customer facing capability has to be determined.
The Brain
Capability for orchestrating business processes and transactions over the whole Damco landscape. Seamlessly integrated with all platform capabilities.
Security capability for all layers. From user access management and encryption to row-level database security.
Data Catalog
Catalogue of all data assets and data definitions on the platform.
What Are We Working On?
Maersk, Damco and IBM analyzed the shipment of avocados from Mombasa to Rotterdam
We followed the shipment from Mombasa to Rotterdam and tracked the actors, people and information exchanges. The findings illustrated the complexity and costs inherent in today’s global supply chain.
Blockchain PoC

**TODAY**
- Inconsistent information across organizational boundaries and “blind spots” throughout the supply chain hinder the efficient flow of goods
- Complex, cumbersome, and costly peer-to-peer messaging
- Manual, time-consuming, paper-based processes; high air courier expense and delays
- Risk assessments often lack sufficient information; clearance processes subject to fraud
- The administrative cost of handling a container shipment is comparable to the cost of the actual physical transport

**TOMORROW**
- Instant, secure access to end-to-end supply chain information; single source of the truth
- Assurance of the authenticity and immutability of digital documents; trusted cross-organizational workflows
- Better risk assessments and fewer unnecessary interventions
- Far lower administrative expenses and elimination of costs to move physical paper across international borders
- Estimated global savings from more efficient sharing of information: $27 billion
Forecasting & Lead Time Improvement PoC

- **Vendor to Origin Port**
  - \( \mu = 6.37 \)
  - \( \sigma = 3.11 \)
  - \( \text{CoV} = 0.48 \)

- **Origin Port to Destination Port**
  - \( \mu = 14.23 \)
  - \( \sigma = 1.41 \)
  - \( \text{CoV} = 0.01 \)

- **Destination Port to Final DC**
  - \( \mu = 8.18 \)
  - \( \sigma = 1.67 \)
  - \( \text{CoV} = 0.20 \)

- **Lead Time in days**
  - \( \mu \) = Average Lead Time
  - \( \sigma \) = Variance in Lead Time
  - \( \text{CoV} \) = Co-efficient of Variation in Lead Time

- **Graphs**:
  - Booking Arrivals: Under-utilization likely, Average Booking Arrivals, Over-capacity likely, Actuals over time.
  - Lead time distribution across different stages.
Disruption & Live Visibility App

More than end-to-end visibility; see what is happening where and know how your cargo is affected.
Disruption & Visibility App – The Business Challenges

Timeliness of information
We live in a world where natural and man-made global events are impacting supply chains and overall freight movement. We need to know what it is happening and react fast.

Lack of Visibility
The lack of visibility in disruptions to supply chain and its mapping to impacted shipments, which creates late reaction and brings inefficiency to the supply chain. Moreover, not able to know where shipments are at any point in time in transit.

Quality of Information
Many things happening at the same time, impossible to follow different source for events, which makes impossible to know whether all those global events are impacting supply chains and/or overall freight.
The financial woes of one of the world’s biggest shipping lines have left as much as $14 billion worth of cargo stranded at sea. 

Source: The Wall Street Journal

Typhoon Halong in Southeast Asia capped the list, causing a 41-week disruption at a cost of more than $10 billion.

Source: CIPS

81% of companies suffered at least 1 disruption during 2014.

Source: Supply Chain Resilience 2014, BCI & Zurich
More Numbers

- The cost of West Coast port strike in 2016 is $7 billion on commerce. *Source: CNBC*

- 76% of global companies reported Supply Chain Disruptions within the last 12 months. *Source: MH&L*

- 40% of manufacturers surveyed said their businesses were impacted by a supply chain disruption in the last 12 months. *Source: Elementum News*

- $1M in lost revenue per day of delay for Intel. *Source: Intel*

- Average losses of $1.25m per organization during the previous 12 months as a result of supply chain disruptions. *Source: Business Continuity Institute*
What does Live Visibility bring?

| Mapping global disruptions to shipments in real time and providing visibility on impacted cargo. |
| Strong data management and data quality management to provide near real-time visibility. |
| Visualized live cargo and disruption details on the same map. |
| Live GPS tracking; near real-time visibility of your cargo. |
| Complete shipment visibility for any given SKU with milestone visibility in near real time. |
| Visibility on inventory; how many container and PO booked, in Origin and in Transit. |

*More than end-to-end cargo visibility; see what it is happening where and know how your cargo is affected.*
Live Visibility Provides You

**Live Vessel GPS Tracking**

- View details

**Quick Look to Impacted Cargos**

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<tr>
<th>Purchase Order</th>
<th>CS number</th>
<th>ETD</th>
<th>ETA</th>
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**Global end-to-end visibility; SKU Level**

- Analyze
- Control alerts
- Manage data

**Disruptions: see what it is happening around the world**
## Disrupted and Delayed – Full Details

### Container Details
- **Container number**: MRQUS16294
- **Origin country**: VIETNAM
- **Destination country**: UNITED STATES
- **Origin city**: VUNG TAU
- **Destination city**: SEATTLE
- **ETD**: 2017-03-01
- **ETA**: 2017-03-28
- **Status**: Delivered
- **At risk**: Yes
- **Delayed**: Yes

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How Does It Work?

- Live GPS Tracking
- Carrier Cargo Status Updates
- Multiple RSS source; News & Weather Channels
- Transactional shipment data
- Local Knowledge (People)
- Data Storage (Data Lake)
- Live Visibility Application
What Else is Coming?
Tech showcase 1: Virtual inspection (DDSI Drone)

WHAT IS IT?

• A Virtual reality experience to show a DDSI warehouse location from a 360 degree perspective.
• The actual experience will be:
  • The customer gets a short explanation
  • The customer puts the VR headset on and the presenter starts the experience.

• Rationale: This allows the customer to see the DDSI facility as if he were there for real! This saves him time and gives him/her a very good impression of our facilities! Damco’s sales organisation can use this to showcase it to a lot of customers whenever they travel.
Tech showcase 2: Digital Assistant (Cortana)

WHAT IS IT?

• Using Cortana on your PC, you don’t need to use your keyboard anymore. You can just ask the computer e.g. which containers will arrive by tomorrow at this facility. This saves a lot of time searching for the right information!

• The actual experience will be:
  • There will be a laptop with the assistant installed on it.
  • After a brief introduction the Damco employee will ask cortana a few questions.
  • After this, the customer will have a change to try it out.

• Rationale: Nowadays, the keyboard and the mouse are our main tools in the office, but what if we can free up our hands? You can save a lot of time!
Tech showcase 3: SCM Simulator

WHAT IS IT?

• Equipped with killer graphics, this solution is where the game industry and logistics meet! It is a solution which using stunning graphics to visualise a customers supply chain and allows for all kinds of simulations (what if....).

• The actual experience will be:
  • The Damco representative will explain the solution and what we are trying to achieve
  • The Damco representative will then demonstrate the actual prototype
  • As this is a prototype we are explicitly seeking for customer input. We can use post its or some digital way of capturing their ideas and suggestions. The customer should be able to influence our development path.

• Rationale: Can be found here, but we really want to make a big jump in visualizing supply chains. This is great for analyzing them and bringing SCM back into the board room!
Tech showcase 4: Augmented Reality

WHAT IS IT?

• Tech showcase to demonstrate the capabilities of AR.
• The actual experience will be:
  • Representative will do a brief introduction and demonstration
  • The customer will then get the opportunity to try the Microsoft Hololens
• Rationale: AR can greatly improve the productivity of the workforce. Sometimes up to 35%! It saves a lot of time as people do not have to walk to their station but get all relevant information projected on the wearable they are using (e.g. Hololens or Google glass).
Tech showcase 5: IoT

WHAT IS IT?

• Tech showcase to demonstrate the capabilities of IOT and sensors.
• The actual experience will be:
  • Representative will do a brief introduction and demonstration (e.g. showing the use of heat and motion sensors)
Can We Cooperate?
Thank you

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www.damco.com
Air Cargo in a Digital World - A Data Centric Approach

James Fernandez
EVP, Commercial, Cargo and Logistics
Accelya
Air Cargo in a digital world – a data centric approach

James Fernandez
Executive Vice President, Commercial, Cargo and Logistics
Connecting an interdependent community

Intuitive, Interoperable, and Digital Solutions for the Modern Air Cargo Supply Chain
The digitised ecosystem evolves...

- 100% Digitization
- Massive Data Management
- Realtime Compliance & Disruption Management
- Connected Cargo & Assets
- Real-time & Proactive alerting
- Dynamic Performance Management
- Data Sufficiency
- Data Utility

IATA ADS – November 2017
Modular by design

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<td>Logistics control tower that meters &amp; monitors service quality &amp; hub steering</td>
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<td>System that optimizes the use of facilities, rolling stock &amp; workforce</td>
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Accelya Data Analytics Platform

- 3rd Party systems
- Accelya SkyChain
- In-house systems

IATA ADS – November 2017
Data Sufficiency + Data Relevance = Enhanced Decisions

AWB O&D
EVENT/DEMAND DATA
INCENTIVES
ANCILLARIES
META SEARCH
TOTAL COSTS
TRUE REVENUE
LOOK VS BOOK
COMPETITIVE RATES
AWB O&D
INCENTIVES
CUSTOMER INSIGHTS

LOW VARIANCE
HIGH

BUSINESS RULES
ANALYTICS

LOW REVENUE HIGH
Forecast & Optimize: Auto
Forecast & Optimize: Review

IATA ADS – November 2017
A lot of moving parts but ... 

- Data Sufficiency
- Data Utility
- Reliability
- Usability & User Experience

Use case focus - “jobs to be done”
simple.
Thank you for your time
From Where to When: The Natural Next Step in Air Cargo

Ariaen Zimmerman
Head of CargoIQ
IATA
From ‘Where’ to ‘When’

Ariaen Zimmerman
Executive Director, Cargo iQ
Miami, 15 November 2017
**CDMP: Cargo iQ Data Management Platform**

**Airline IT System**

Reports

Different data

**Forwarder IT System**

Reports

Different data

---

**Airline IT System**

Airline CDMP*

constant data exchange

**Forwarder IT System**

Forwarder CDMP*

Identical data and reports

Reports

**Without Cargo iQ**

**With Cargo iQ**

Identical data and reports

Reports

* CDMP: Cargo iQ Data Management Platform
10 million annual
Airport to airport shipments

6 million annual
Door to door shipments

SMART DATA
Easy and customized access to your performance data in comparison to the Industry

AUDIT
SGS audits our members on quality

MASTER OPERATING PLAN
Maps the process to transport air cargo consignments from shipper to final consignee

Unique route map for every shipment with clear milestones and reliable monitoring
10 million annual

Airport to airport shipments

82 members from across the industry

Unique route maps and reliable monitoring

SMART DATA
Easy and customized access to your performance data in comparison to the Industry

AUDIT
SGS audits our members on quality

SMART OPERATING PLAN
Maps the process to transport air cargo consignments from shipper to final consignee

82 members from across the industry
Remember how we did that in the old days?

Back in the days, remember those days?

You'd bring your shipments to a port and at one moment it would be released at the other side. A boat would take a lifetime and no alternative…

People used aircraft because it was faster and paid heavily. People knew their cargo would be quicker than a boat and that was fine.

Those days are gone.
Cargo iQ Route Map

- PICK UP
- RECEIVED
- EXPORT
- WAREHOUSE
- DEPARTED
- EXPORT
- HUB
- ELECTRONIC
- FREIGHT
- WAYBILL
- FREIGHT
- ON HAND
- READY
- FOR
- CARRIAGE
- DEPARTED
- ARRIVED
- RECEIVED
- CARGO
- FROM FLIGHT
- NOTIFIED
- FOR
- DELIVERY
- DELIVERED
- DESTINATION
- AIRPORT
- RECEIVED
- IMPORT HUB
- DEPARTED
- IMPORT HUB
- RECEIVED
- IMPORT
- WAREHOUSE
- OUT FOR
- DELIVERY
- THIRD
- PARTY
- NOTIFICATION
- PROOF
- OF
- DELIVERY
Cargo iQ Agreed Milestones

Reflect Specific Events in Shipment Planning
LAT to NFD (Carrier Commitment)
Process Reliability aim: exceed 98%

min 99.66%  min 99.66%  min 99.66%  min 99.66%  min 99.66%
Process Time Analyzed

After 225 minutes 99.66% of shipments have been processed.

Data analyzed on a lane / station / provider/product combination.

Shipments grouped by time needed to process.

Arrival Processing Times (GHA import) grouped by 10 minutes intervals
Predictive Analytics.

Time needed for Process Reliability of 98%: 18.6 hours

- FOH > LAT
- LAT > DEP
- DEP > ARR
- ARR > RCF
- RCF > NFD
- NFD > DLV
- RCF > AWR

Series 1:
- 388 min
- 240 min
- 418 min
- 225 min
- 39 min

Series 2:
- 0 3 16 69 198 367 450 395 288 195 121 63 28 9 2 1 0

Series 3:
- 0 50 100 150 200 250 300 350 400 450 500

Series 4:
- 0.0% 20.0% 40.0% 60.0% 80.0% 100.0%
Predictive Analytics.

Process Reliability based on current planned process timings: 99.5%

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Predictive Analytics.
Route A: 80% reliable in 18 hours, 99% in 46 hours
Route C: 80% reliable in 16 hours, 99% in 52 hours
Route E: 80% reliable in 24 hours, 99% in 50 hours
Route B: 80% reliable in 17 hours, 99% in 44 hours
Route D: 80% reliable in 18 hours, 99% in 43 hours
Route F: 80% reliable in 26 hours, 99% in 73 hours
Step 1: 84% reliable in 36 hours, 99% in 72 hours
Step 2: 90% reliable in 36 hours, 99% in 72 hours
Step 3: 88% reliable in 36 hours, 99% in 72 hours
Step 4: 89% reliable in 36 hours, 99% in 72 hours
Step 5: 90% reliable in 36 hours, 99% in 72 hours
Step 8: 99% reliable in 36 hours, 99% in 72 hours
Step 9: 100% reliable in 36 hours, 100% in 72 hours

24h: 80%
72h: 99%
STUDIES HAVE SHOWN THAT ACCURATE NUMBERS AREN'T ANY MORE USEFUL THAN THE ONES YOU MAKE UP.

HOW MANY STUDIES SHOWED THAT?

EIGHTY-SEVEN.
So ...
Contact Information

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Closing Remarks

Jean-Christophe Rossand
Product Manager, Cargo IS
IATA
Networking Dinner
Join us tonight!
19:45 – 23:00
Plenary Session Room