Cyber security @ Lufthansa CODE

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Lufthansa Group CIO

Confidential

Lufthansa Group at a glance

130,000
Employees from
140 Countries

30
Take-offs worldwide per minute
with our IT-support (LSY)

4,600+
Aircraft under contract
(LHT)

28+
Million
Registered customers

2 Mio.
Tons of **freight**
last year(LCAG)

343
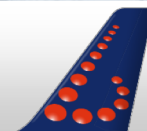International **Destinations**
(Airline Group)

700+
Million
Meals
last year (LSG)

728
Aircraft in LHG Fleet
(2017)

130+ Million

Key figures and positioning of Lufthansa Group Information Management

Lufthansa Group IT Facts & Figures

5,000
IT EMPLOYEES ~4%

1.3 BN €
TOTAL IT COST

2,000
IT SUPPLIERS

2.7%
IT COST/ REVENUE

6.50 €
IT COST/ PASSENGER
NETWORK-AIRLINES

Technology & Trends

Real-Time Intelligence · Cloud · Drones · Agile · Blockchain · Virtual Reality · Design Thinking · RPA · Robotics · Gesture control · 3DPrinter · One ID · IoT · B2B,B2C · Cyber Security · DevO · Artificial Intelligence · Machine Learning · NDC · Data Analytics · Biometrics · OneO · Wearable · Interaction Design · API · Mobile Wallet · Image Recognition · Big Data

Covered

Focus Topics Benchmark[1]

Top 200 Airline CIOs

Apps for Mobile Services (90%)

Cyber Security (89%)
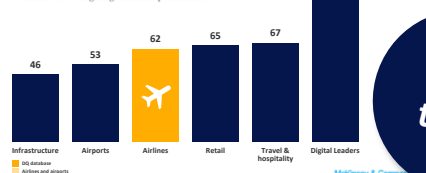
Cloud Services (80%)

Data Centers (70%)

Business Intelligence (62%)

Projects Underway

Digital Leader Industry[2]

Overall, airlines are ~40% behind Digital Leaders' level of digital maturity

Distribution of DQ™ scores
% variance vs. average Digital Leader performance

Lufthansa Group Digital Quotient Results 1Q 2017
Digital/McKinsey

Infrastructure	Airports	Airlines	Retail	Travel & hospitality	Digital Leaders
46	53	62	65	67	100

DQ database
Airlines and airports

McKinsey & Compan

Way to Go

Digital Maturity[3]

Digital Experience Level (high/low)

Number of Digital Services (rudimentary, basic, state-of-the-art, advanced)

Front-runner

Source: 1 According to SITA Air Transport IT Insights 2018; 2 McKinsey 2017 Digital Quotient; 3 HM/D in-house research with wr&co. and TU Graz

Therefore Cyber Security plays a crucial role for Lufthansa´s transformation into the digital world

1

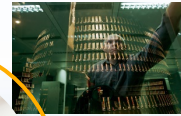### Heterogeneity in group business models

- Cyber threats are omnipresent

- Members of LH Group have different needs

LH Technik

LH Cargo

LH Group

LSG

2

Heterogeneous and manifold IT infrastructure

- Cloud and connectivity require new capabilities

- Legacy systems remain critical for operations

3

Vision to become the world's most digital airline

- Digital technology creates a new experience but also new attack vectors

5 STAR AIRLINE
SKYTRAX

Lufthansa Group re-adapted the CISO organization focusing on a strict implementation of a security by design approach

IT - STRATEGY

IT - GOVERNANCE

IT - INFRASTRUCTURE

IT - SECURITY

CISO with <u>broad mandate </u>to ensure that the transformation is secure by design

- Take responsibility for broad sections of the IT
- Realign organization
- Strengthen contacts and influence within the enterprise

Modernization leads to additional security challenges to be mastered by significant improvements of current cyber security capabilities

Our Goal: A Cyber-Resilient Organization

Key elements of LH cyber resiliency program

Technical Security Baseline
Ensure systematically testing of applications and implementation of IT security patches

Cyber Defense
Test and train incident response for attacks; Define Cyber Defense Center architecture

Usability, simplification and culture
Increase user awareness through trainings; Standardize and simplify of existing policies

Security by design
Enhance security without reducing usability; Align IT Transformation & Security Strategy

Cloud Migration
Building a scalable, secure and appropriate foundation for future cloud applications

Enablers: Organization | Governance | Partnering

Thank you for your attention!