

Setup of a CoP “Testing & QA”

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**Digital Hangar
Target Vision**

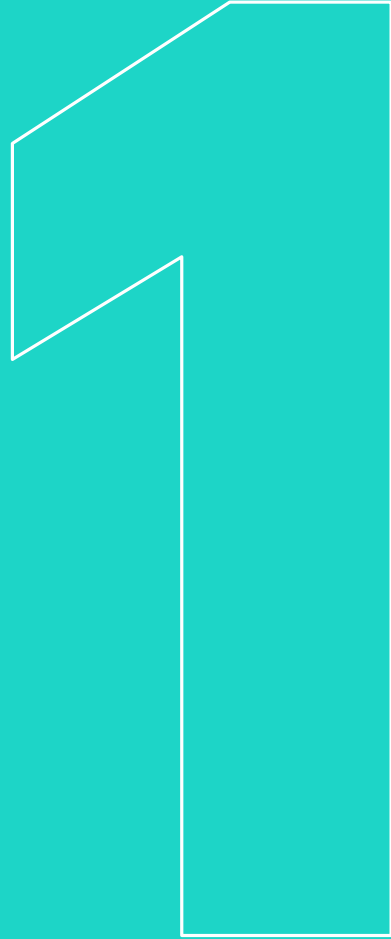
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Introduction



Introduction



Susanne Kunkel
Lufthansa Group
Head of Test & Quality Management

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- Part of the LH Group since 1998
- Joined IT in 2005
- Managed testing activities at Miles & More GmbH since 2014
- Managed Test & Quality on Group level since 2018



Florian Fieber
TestSolutions GmbH
Chief Process Officer

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- Software Testing Consultant & Trainer
- Focus on Test Management & Test Process Management
- Lead CoP “Testing & QA” / Digital Hangar

Digital Hangar Target Vision



The Hangar will fundamentally change the approach to digital delivery for all airlines and the Lufthansa Group



Project-Focused



Individual Manufacturing

Project teams working on dedicated projects instead of products and with dedicated funding



Today's agile teams



Technology-focused Development

Siloed agile teams working on specific technology (e.g., AirEM, booking)

Target picture



Digital Hangar



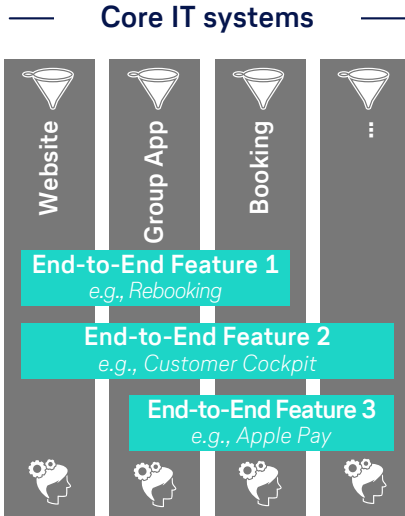
Agile Development Factory

Customer oriented, end-to-end enabled, and cross-functional teams developing new products and services on platforms

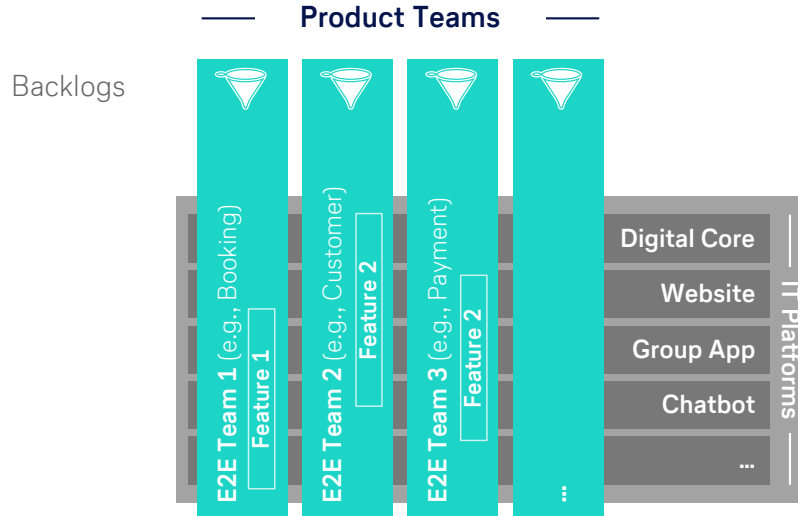
Interdisciplinary teams & flexible setup is key for Hangar



PREVIOUS SITUATION

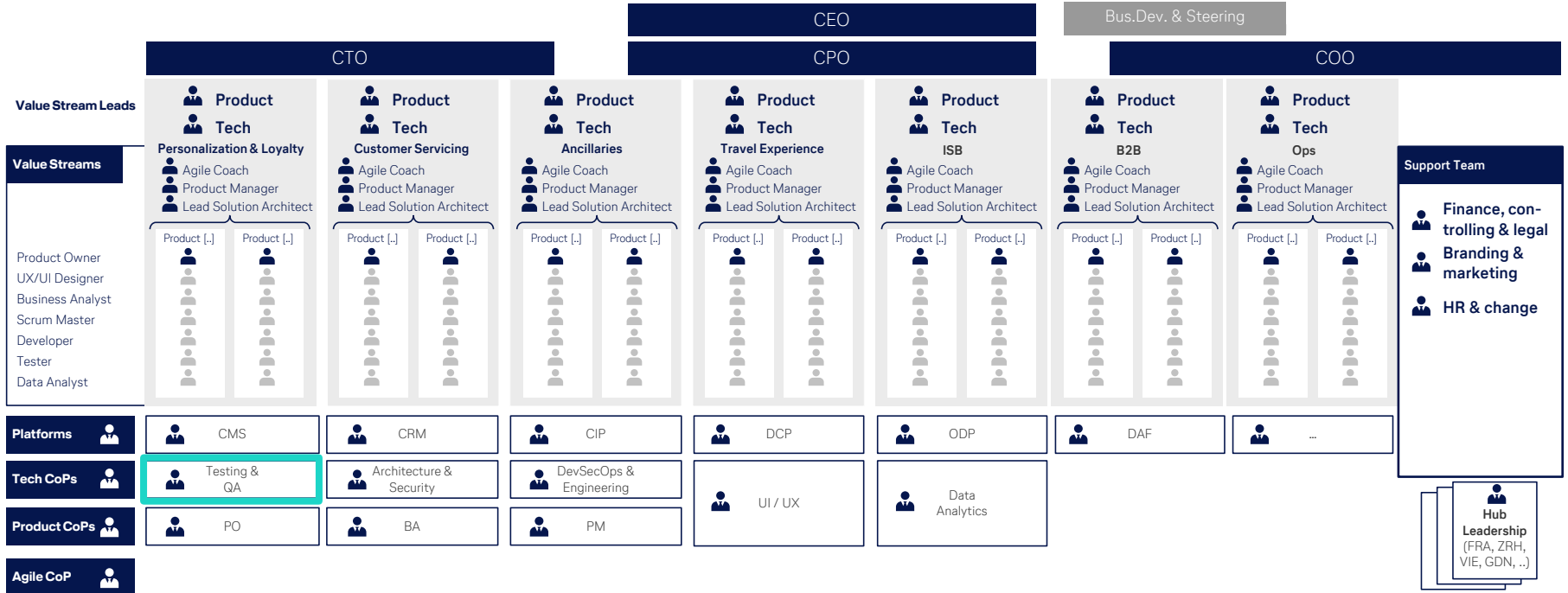


DIGITAL HANGAR VISION



New working model results in **autonomous teams** with **full product responsibility**

Detailed view: We will work in end-to-end product teams supported by CoP and platform teams



Supporting the Digital Hangar Target Vision

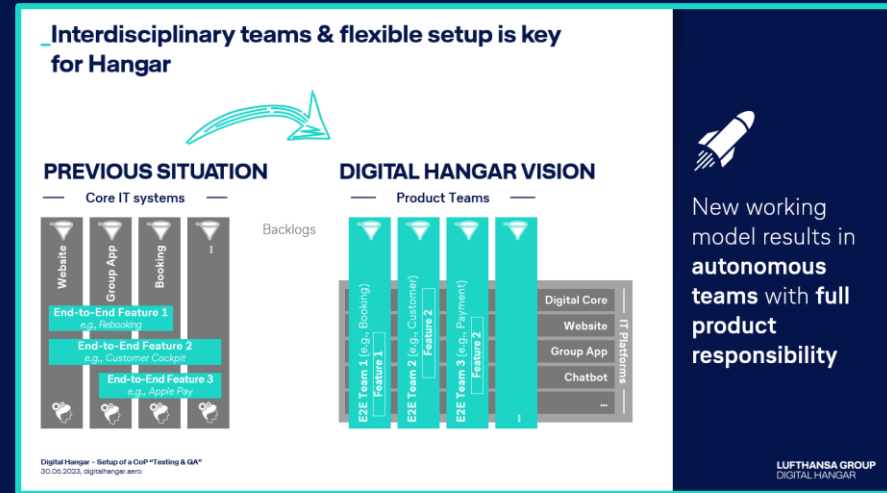
The highest impact of the Digital Hangar approach to digital delivery on testing is the new working model with **product teams that have full E2E responsibility**.

By changing the way features are developed and tested, **the way to test and responsibility for testing** in general and E2E testing in particular **must also transform**.

Product teams will also have **full E2E quality responsibility**.

Therefore, testing in the Digital Hangar must be

- **effective** and ensure an adequate E2E quality.
- **efficient** and **provide fast feedback** on E2E quality.



Setup of the CoP



Our Mission

1

Community of Practice

Create and shape a vivid and inclusive Community of Practice Testing & QA for everyone interested in testing inside and outside of the Digital Hangar.

2

Testing Guideline

Develop and maintain a Testing Guideline to ensure alignment of all testing activities in the Digital Hangar.

3

E2E Testing

Build and supervise an E2E Test Team for regression testing of E2E business processes and cross cutting testing activities.

4

Testing Resources

Support product teams in the identification, selection and onboarding of testing resources with the help of the testfactory.

Community of Practice: Active and Vivid Collaboration and Exchange

Our CoP is a **vibrant community** of all people in the Digital Hangar **who are actively testing or are interested in testing**, e.g.

- Product team **testers**
- Value stream **test managers**
- Testers from current projects and ARTs
- **Other stakeholders** (e.g. value stream tech leads)

We meet weekly and exchange ideas and experience on relevant and various test topics.

Various **initiatives have been started by the community** (e.g. pushing test environment management).

QA Automation Process & Tools – ADC B2

Tools: Protractor, Selenium, etc.

Lufthansa Flight History

LUFTHANSA GROUP DIGITAL HANGAR

IBIZA IS IN The Hangar

AirEM – Azure VM setup
17-Nov-2022

Path to production

Goals:

- Understand how a feature goes from idea to production
- Have a shared understanding of our workflow and our release process
- Increases understanding of every role in the team tasks in the process

IDEA → DESIGN → APPROVAL → ENGINEER → TEST → DEPLOY → RELEASE

LX automation framework and journey

September 2022

Bijoy Sonar
Chris Ramsby
Saptarsi Khan
Barun Hazra

Lufthansa Group | Austrian | Lufthansa | SWISS

Testing Guideline: Alignment of all Testing Activities

The purpose of the Testing Guideline is to **shape a common understanding** of the **principles**, the **objectives** and **key activities** of testing and quality assurance in the Digital Hangar.

With help of the guideline, we want to **align all testing activities** with a common set of principles, methods, processes and tools and give answers to the following questions:

Key principles of testing:

- **Build-in E2E quality**
- **Shift left testing**
- **Take responsibility for E2E quality**
- **Automate for continuous delivery**

Why do we test?

In alignment with the Digital Hangar's vision the goals for testing are:

- 💡 Testing must be effective and ensure an adequate E2E quality
- 💡 Testing must be efficient and provide fast feedback on E2E quality

To achieve these goals, all testing activities should be aligned with the following key principles:

- ★ Build-in E2E quality
- ★ Test as early as possible
- ★ The whole team is responsible for quality
- ★ Automate for continuous integration
- ★ Use complementary test types

What do we test?

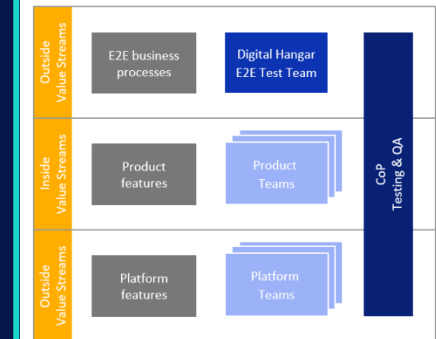
Test objects are

1. The features developed by on or more product teams.
2. E2E business processes.



Who is involved?

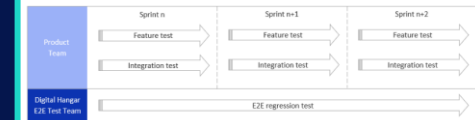
The testing activities are distributed among the following teams:



How do we test?

Testing is performed on the following test levels:

- Feature test
- Integration test
- Acceptance test
- E2E regression test



Testing Guideline: Facilitating Implementation in the Value Streams

Testing in the product teams

- Product teams are cross-functional and have full E2E responsibility.
- Testing is crucial for every product team.
- There are no test manager in the product teams.

Closing the gap between CoP and product teams

- In every value stream a test manager facilitates testing.

From Theory to Practice – Implementing the Guideline

Product team assessments

- To **support the implementation** of the testing guideline and to help new teams with the setup, we started an **assessment**.
- The assessment **provides information about the degree of implementation** of the testing guideline in the product teams and helps to **identify potential for improvement**.
- The assessment should be **carried out regularly** and thus support the further implementation of the guideline.

Testing guideline assessment Q1 2023

Angelegt von Fieber, Florian (LH); zuletzt geändert vor Kurzem

Overview

Scope	<ul style="list-style-type: none"> VS Ancillaries VS Customer Service VS Profile, Personalization & Loyalty
Remarks	Joint walkthrough and discussion of assessment results by @Das, Shubhrajyoti (TCS) @Fieber, Florian (LH) @Sridhara, Murali (TS) @Kunkel, Susanne (LH) @Murugan, Abinaya (LH) @Rajendran, Chandrasekaran (TS) on 07.02.2023 and 14.02.2023
General findings	<ul style="list-style-type: none"> Non-functional testing (e.g. load and performance, security, accessibility) is not yet sufficiently taken into account in many teams, the focus is more on functional testing. Not all teams define acceptance criteria for their features. General acceptance criteria are missing in general, especially non-functional acceptance criteria (also for features) STAGE environment should be used for integration testing rather than using QA environment There are different test management tools in place (Azure, ALM, and trackSpace) which are not fully integrated yet. The ratio of testing to development resources is quite low in some product teams (below 30%). Product teams are facing heavy test environment downtimes.

Summary

Value Stream	Product team	Total rating
VS Ancillaries	ASR	★★★★
VS Ancillaries	Yilu - Marketplace	★★★★
VS Ancillaries	Upgrade, Plus upgrade	TBD
VS Ancillaries	Meals	TBD

Overview

Scope	VS Profile, Personalization and Loyalty
Responsible	@Rajendran, Chandrasekaran (TS)
Date	10.03.2023
General findings	<ul style="list-style-type: none"> E2E testing is being taken care for 4 teams at the moment but remaining product teams are yet to focus on E2E testing NET should also be considered for all the product teams

Product team [Travel Insights]

Total rating	★★★★ (4/5)
Product team details	The Product displays the customer travel history over past 10 years. There are two entry points; one from the Profile page and another from the “My past flights” from the Username pop-up. There are three sections in the page viz. Flight Log, Flight Map, Filters.
General findings	<ul style="list-style-type: none"> STAGE env should be used for INTEGRATION testing

Area	Checkpoint	Rating	Remarks	Measures
Goals and key principles	The product team takes the E2E responsibility for product quality.	★★★★★	Test cases are written from E2E perspective already by covering backend system as well	
Test levels	The product team assesses the quality of each feature based on the feature's acceptance criteria.	★★★★★	Though the feature/functional testing is successful, still the styling issues were observed	Would be nice if such styling issues are also taken care during feature level testing
Test levels	The product team integrates each feature sufficiently and assesses the quality based on the feature's integration criteria.	★★★	Integration testing is not being carried out on STAGE env but still integration testing is being performed on UAT(QA) env.	STAGE environment should be used for integration testing in future
Governance and reporting	The product team documents and communicates all test results quality adequately.	★★★★★		
Test types	The product team performs all relevant functional and non-functional (e.g. load & performance, security, accessibility) test types.	★★★	Product team perform functional and E2E testing and on need basis WCAG testing also being performed	NEE) need to check with product team that whether they want to perform load, performance, security testing for their products being developed.
Teams and roles	The product team has all the necessary testing skills.	★★★★★		
Teams and roles	The product team has sufficient resources for testing activities.	★★★★★		

E2E Test Team: Supporting overarching Testing Activities

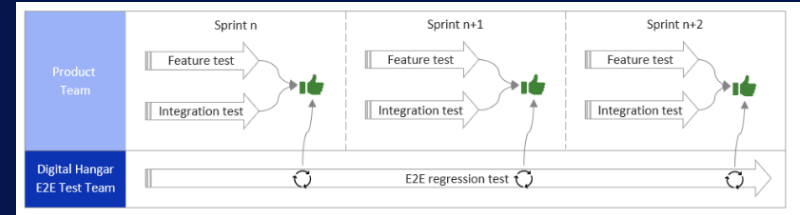
E2E business process testing

- Quality assurance of critical E2E business processes (cross value streams).
- Continuous E2E regression testing.

Service team for overarching testing activities

- Test environment management
- Test data management
- Test tool strategy
- Load and performance testing
- Accessibility testing
- Security testing

The E2E test team performs regression tests of the Digital Hangar E2E business processes and it may also facilitate product teams with testing expertise.



Staffing of the test resources is provided by the LH Group-wide Test Factory

290+
FTE in
Test Factory



Service Delivery from currently

3

Offshore
Locations



Service delivery spread across 3 resource models



Competitive
Rates

82/18

current Offshore/Onsite ratio

8

Business
Units

satisfied Test Factory users
within the Lufthansa Group



2 preferred
providers

TATA
CONSULTANCY
SERVICES

TestSolutions

Lessons Learned



Lessons Learned

We are not on the green field

- The value streams and product teams have **very different levels of maturity**. Some actually **start from scratch**, others are **based on processes, methods and tools that have been established for years**. When implementing, we must support all maturity levels and take into account the **different speeds**.
- When increasing the speed and shift left testing, we are always **bound to existing processes and infrastructures**. The existing infrastructure (e.g. test environments) is not designed for the Digital Hangar.

Testing is only as good as the general development process

- **Quality expectations** have to come from the value streams and the product teams, the teams have to have **real E2E responsibility** and live it out.
- Quality must be **built in from the start and affects all disciplines**, not just testing.

Lessons Learned

Testing is not an island, it has many dependencies

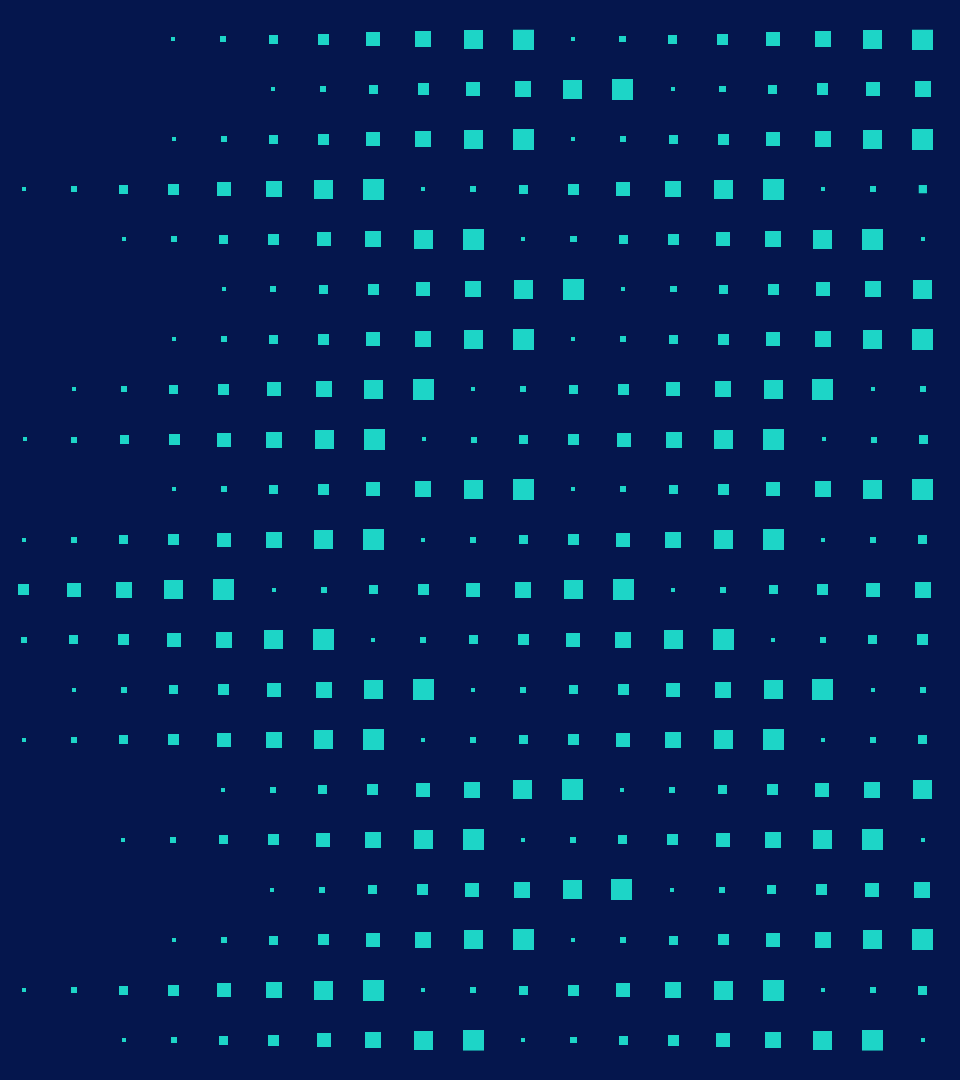
- Dependencies on **legacy** systems, infrastructure and processes (especially **test environments**).
- Dependencies on the **general acceptance of quality and testing** in the value streams and product teams.
- Dependencies on the results and the speed of **other disciplines** and CoPs.

Talk, talk, talk

- Regular **exchange and alignment** with **stakeholders outside** of CoP Testing & QA (e.g. other CoPs, value stream leads, organizations outside of the Digital Hangar).
- Foster **responsibility for E2E product quality** (especially **non-functional requirements**).

**Thank you
for your
attention**

LUFTHANSA GROUP
DIGITAL HANGAR



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