Open standards and Open-APIs in Vodafone's Digital Transformation

Lester Thomas
Paul Blake
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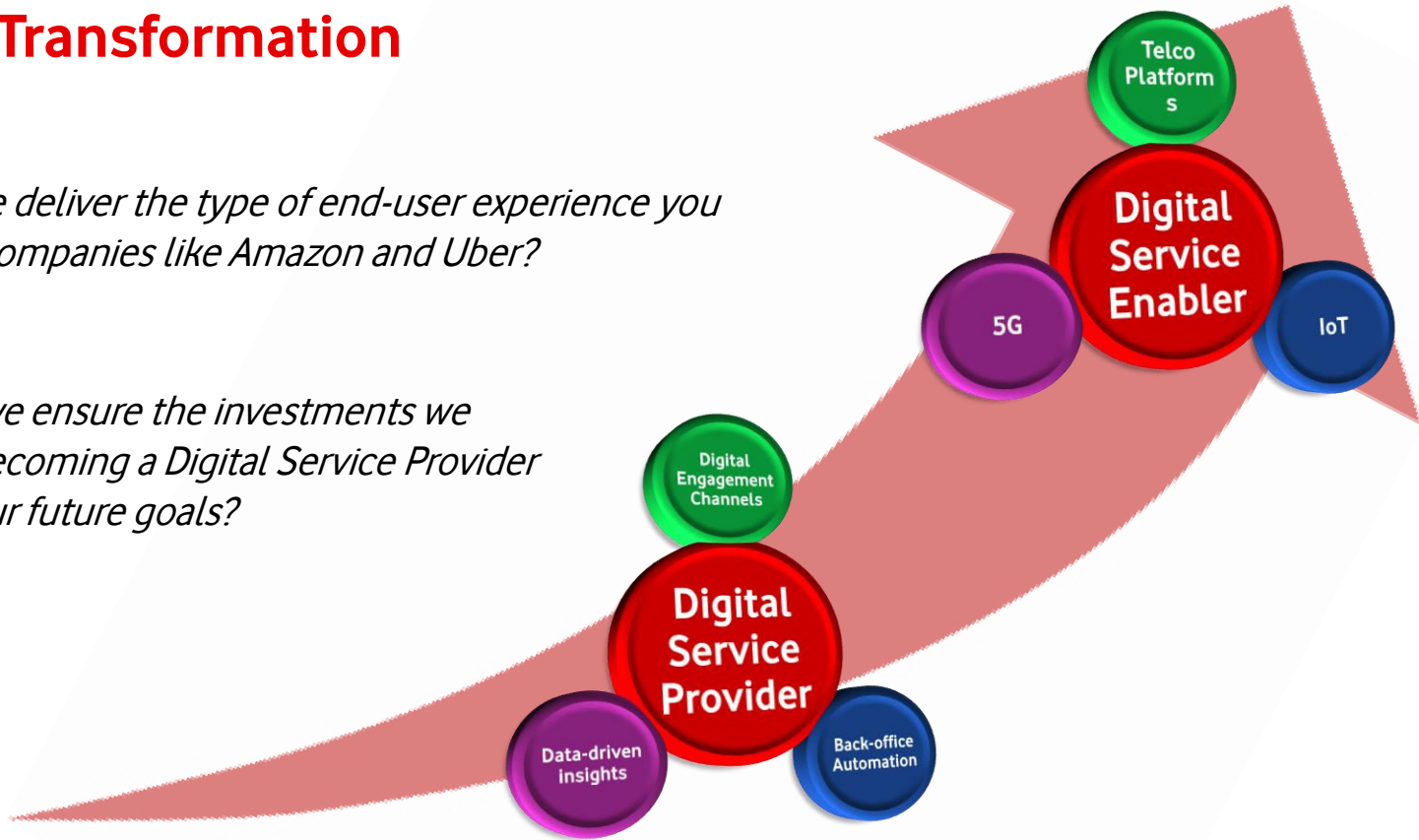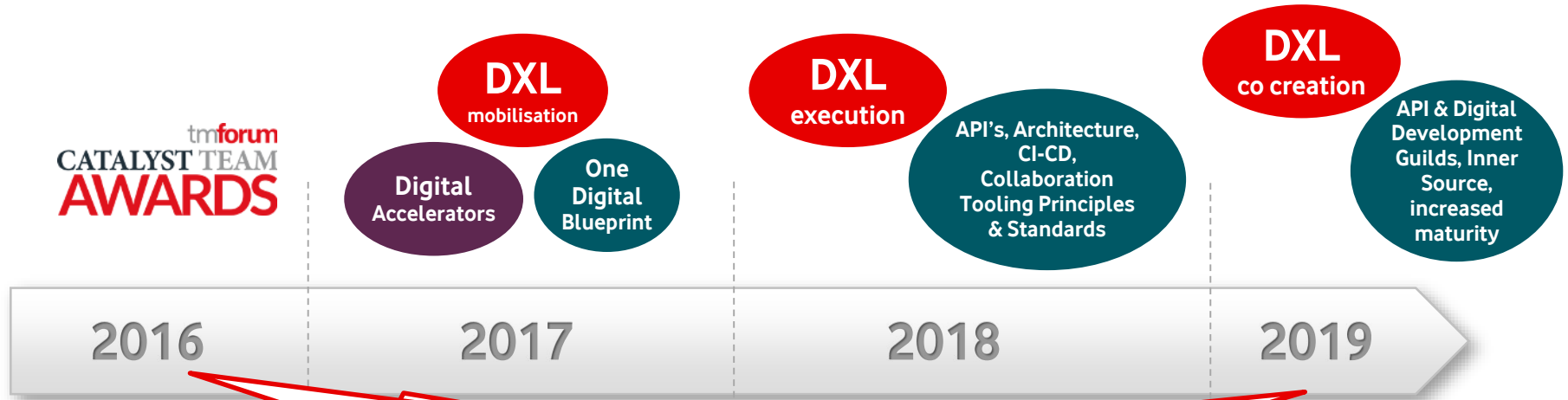
Digital Vodafone

Digital Transformation

How do we deliver the type of end-user experience you get from companies like Amazon and Uber?

How can we ensure the investments we make in becoming a Digital Service Provider support our future goals?

Telco Platforms

Digital Service Enabler

5G

IoT

Digital Engagement Channels

Digital Service Provider

Data-driven insights

Back-office Automation

Vodafone Digital Transformation Journey

DXL mobilisation

DXL execution

DXL co creation

Digital Accelerators

One Digital Blueprint

API's, Architecture, CI-CD, Collaboration Tooling Principles & Standards

API & Digital Development Guilds, Inner Source, increased maturity

tmforum CATALYST TEAM AWARDS
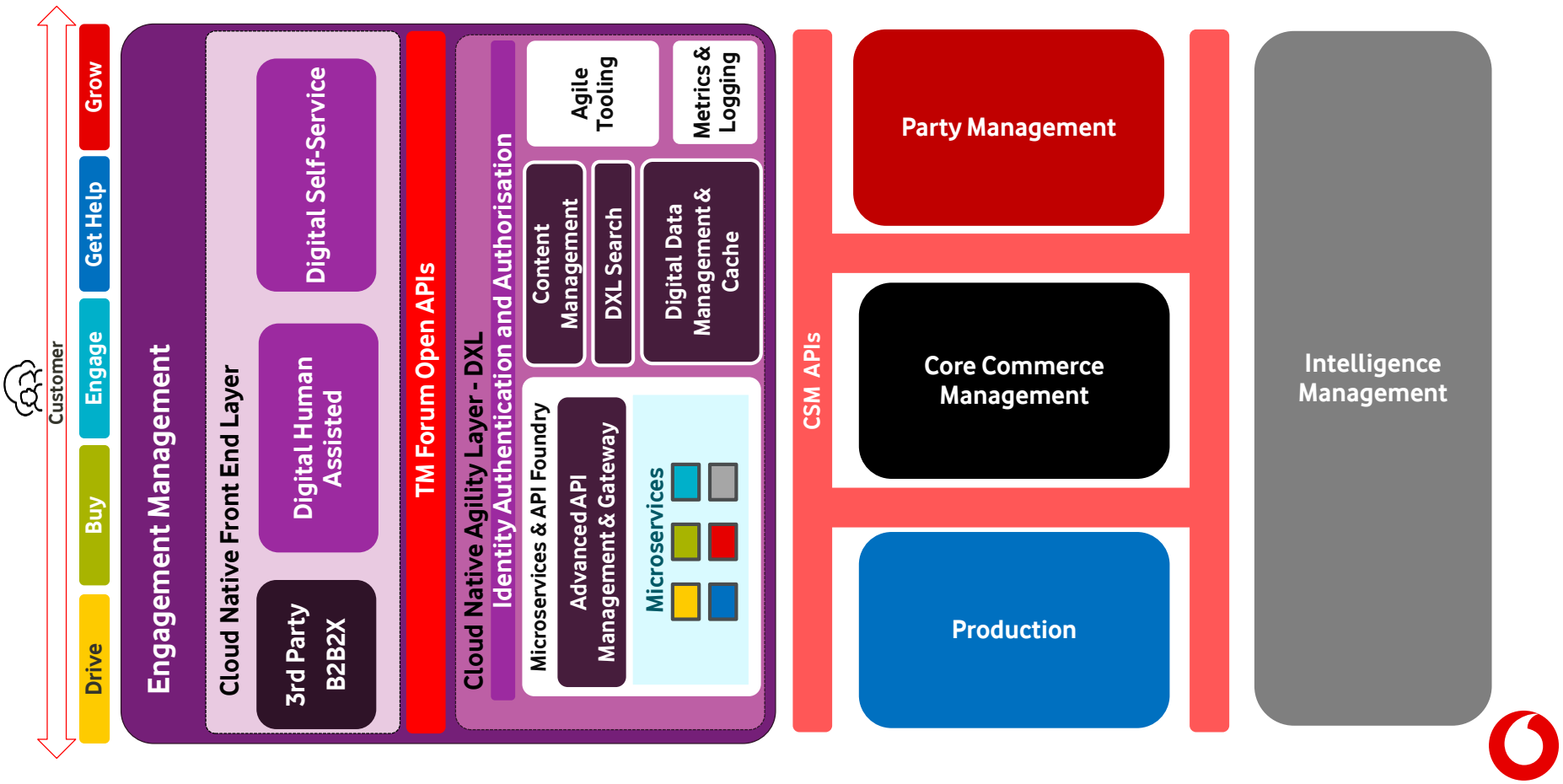
2016 **2017** **2018** **2019**

Appex Omnichannel Catalyst : Adaptive, Predictive & Personalised Experienced eXellence.
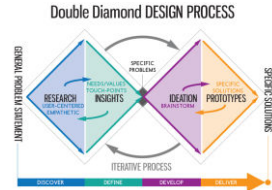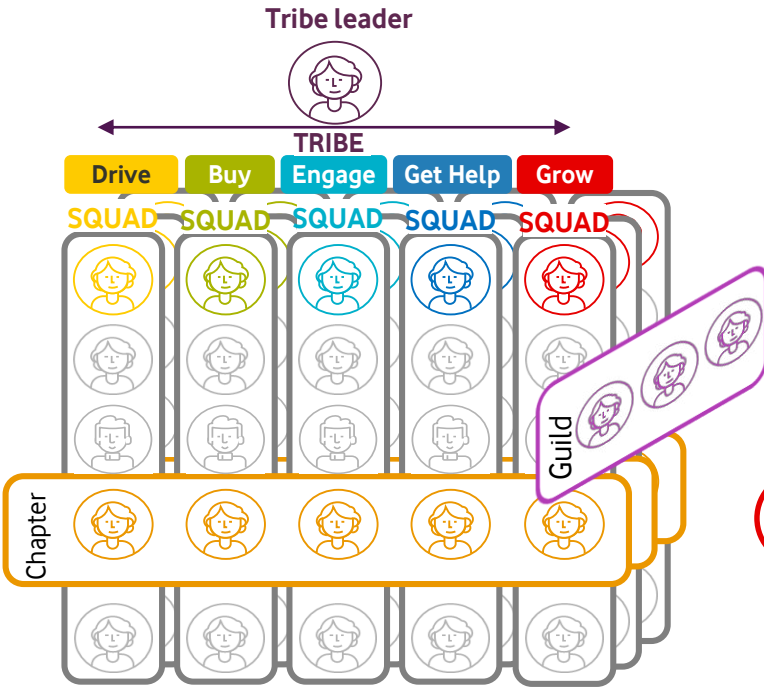Winner! TM Forum Live! 2017: Outstanding Performance in the Catalyst Program

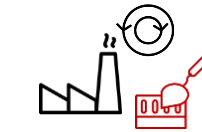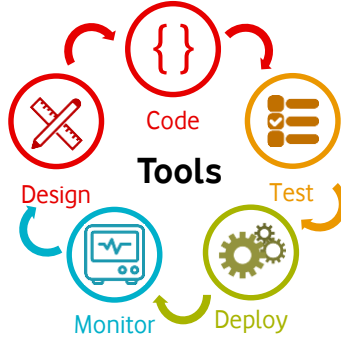# Future Architecture | Vodafone Digital Architecture Mapping to ODA

Customer

Grow · Get Help · Engage · Buy · Drive

Engagement Management

Cloud Native Front End Layer

- Digital Self-Service
- Digital Human Assisted
- 3rd Party B2B2X

TM Forum Open APIs

Cloud Native Agility Layer - DXL

Identity Authentication and Authorisation

- Agile Tooling
- Metrics & Logging
- Content Management
- DXL Search
- Digital Data Management & Cache

Microservices & API Foundry

- Advanced API Management & Gateway
- Microservices

CSM APIs

Party Management

Core Commerce Management

Production

Intelligence Management

C2 General

A Digital Accelerator in Each Market

Tribe leader

TRIBE

Drive	Buy	Engage	Get Help	Grow
SQUAD	SQUAD	SQUAD	SQUAD	SQUAD

Guild

Chapter

Double Diamond DESIGN PROCESS

RESEARCH — INSIGHTS — IDEATION — PROTOTYPES

DISCOVER — DEFINE — DEVELOP — DELIVER

Design Thinking

Agile Methods

Design
Code
Test
Tools
Monitor
Deploy

Iteratively Building Digital Capabilities to Local Priorities

Engagement Management

Cloud Native Front End Layer

3rd Party B2B2X

Digital Human Assisted

Digital Self-Service

TMF Open APIs

Cloud Native Agility Layer - DXL

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Content Management

DXL Search

Digital Data Management & Cache

Agile Tooling

Metrics & Logging

Microservices

Customer

Grow / Get Help / Engage / Buy / Drive

People in Agile Formation	Using	Building Digital Capabilities

5

DevOps Tooling

1. **Co-creation of Agile design assets** and scrum backlog

9. **Production ready code,** ready to be shared

4. **Automated quality assurance** and code analysis

Test failures

8. **Live monitoring of production environments**

7. **Automated deployment** to Production

6. **Execution of end to end testing** in production and production-like environments

slack
JIRA
Confluence

Agile Planning & Collaboration Tools

GitHub Enterprise

GitHub Enterprise
Atlassian
Bitbucket

Software Change & Configuration Management

Collaboration Environment

Jenkins
JFrog Artifactory
maven Nexus

Build Automation

JUnit
sonarqube
SAST   SCA

Unit Test and Static Code Analysis

kubernetes
Terraform
docker
AWS ECS
Vault
ANSIBLE
Istio
clair

Release Automation

Prometheus
ICINGA
splunk> kibana

Monitoring Tools

Platform as a Service

Production

Test

Production Path

Test Path

APACHE
JMeter™
Se
appium
DAST
ZAPROXY

Test Automation Tools (SIT/ Performance / Security)

3. **Automated central build and integration** of the entire application

2. **Code creation, version control, modification** and life cycle **management** of software assets

Test failures

Two Guilds and One Co-Creation Community to drive inner-source behaviours, global standards and speed

Drive Inner Source

MyVodafone App & DXL Co-Creation Community

Scope: Group Technology & EU Cluster Markets

Drive Standards & Speed

API Architecture Guild

Methods & Tools

Empowered People, Agile Process Open source style governance

Blueprints, Reference Implementations

Digital Development Guild

Scope: **All** Markets, Platforms and Group Functions

API Guild| Collect, Guide, Manage, Standardize

Collaboration

Governance

- **Lightweight governance** process (open source style)
- **Governance Team is made up of a SPOC to from each Local Market Team**
- Experts will pass through **TMForum API Certification program**
- Increased people technical career path
- Drive **collaboration** and **re-use** between local markets

Efficiency

Manage

- Manage and approve **Vodafone extensions** to TMForum openAPIs
- Manage the Vodafone MVP Journey APIs
- Monitor TMForum "schemafication" impact
- Guidelines for TMForum extensions
- Guidelines for DxL Journey APIs
- Contribute back to TMForum standard
- Monitor APIs usage and compliance

Transparency

Catalog

- Repository for all local market APIs
- Federated Governance
- Community review of APIs
- **Tools & Conformance Testing Kits**
- Dashboard for Transparency of **Conformance and Testing Results**
- Governance community and support for APIs selection, extensions and mappings

API Guild | Considerations

Re-use

Manage, control & submit back the Vodafone extensions to TMForum openAPI's

TMForum Extensions

Guidelines

Provide guidelines and guidance

Manage and control the DxL Journey API's creation, ensuring collaboration and re-use

Journey API's

DxL API's

Schema Process

Manage the impact of the TMForum "Schemafication" process on DxL development making sure there is a high degree of consistency between APIs -shifting from all inline definitions to a externalized standard JSON Schemes

Review and approval of changes that impact multiple teams and/or systems

Life Cycle Mgmt.

KPI's & Monitoring

Create KPI's to quantify value and metrics that Vodafone can use to measure progress and alignment to strategy

Faster roll-outs

Train the trainers
Open API Training, Certification & Conformance

tmforum

"TM Forum Open APIs provide a complete framework for supporting our Digital Transformation, providing a common data model and internet standard API schemas, together with tools, methodologies and most importantly, training and certification. " –**Steve Garley**, Vodafone University
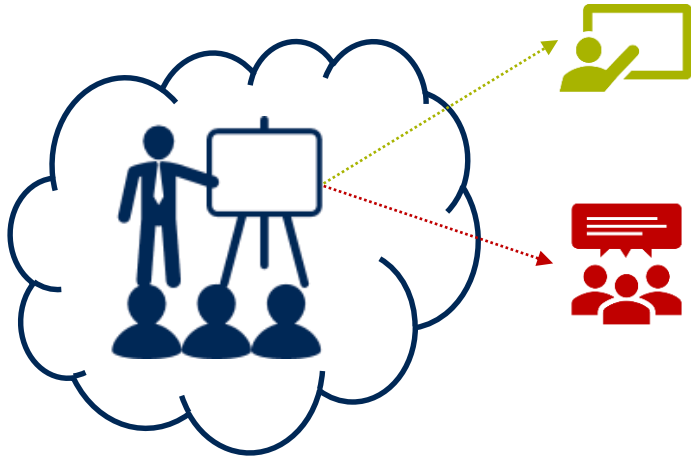
Train experts from each local market to become TMForum OpenAPI certified

- TMForum Open API Developer certification
- TMForum Information Framework (SID) certification

The local experts will:

- play the leading role in educating the local market functions in API design, extensions & compliance to the standards accelerating digital transformation
- be part of the Federated Governance
- advising and reviewing the contributions from other local markets
- manage the governance artefacts and repositories
- publish all the Vodafone extensions back to TMForum OpenAPI

Automated API Compliance Engine | Architecture

Open Source Style API Guild Governance Team Collaborate and automate via Slack Enterprise Grid

Integrated Chat-Ops & Testing Automation

LM 1 LM ... LM n GT

API Guild

slack

enterprise grid

Automated API Test Engine product platform

CP&S

Executive Dashboard

OmniChannel Test Engine

Automated Static schema and implementation tests

Automated Testing

Triggers Static Schema Conformance Testing

Shared Source Code Repository

TSSC

GitHub Enterprise

Local Market Automatically Uploads API Specifications and Test Scripts using simple Automation to enable continuous testing

{ }

Local Market Team

CP&S

Local API Gateway

Local Market DXL

Local Git Repo

CI/CD

Apigee API Gateway

Dev Portal Swagger Hub

DxL Reference Implementation

Simplified

API Compliance - What it looks like

Static Check

Takes place before the API is deployed

- The API Designer gets the chance to test if his API is compliant with different standards
- Two type of results categories: RuleBased and InDepth.
  - Rule-based: will highlight which rule has been breached and where
  - InDepth: will provide more details using the delta format for differences

```
{
    "ruleId": "delete-param",
    "message": "/partyAccount (get) - Param fields deleted",
    "path": "/partyAccount",
    "method": "get",
    "param": "fields"
}
```


Dynamic Check

It requires a run-time environment, API is deployed

- Example use cases are embedded in API swagger
- Dynamic tests and μService mocks are generated and deployed in build pipeline
- Dynamic tests executed in build pipeline
- Dynamic tests verify positive and negative scenarios

MyVodafone App & DXL Co-Creation Community
| Inner Source Co-creation model to deliver a platform

1 Platform Framework

- Enable plug + play feature
- Select features & compile app
- Deploy / Adapt if required to local DXL
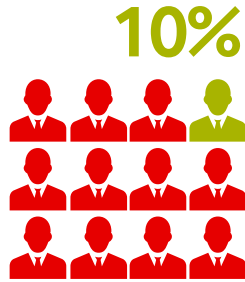- Deploy / Adapt if required to local DXL
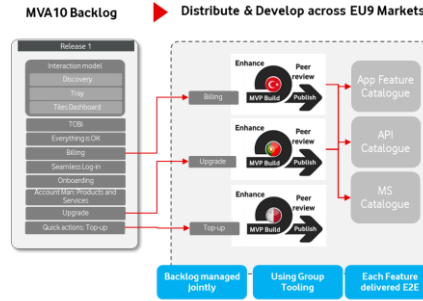- Markets support CSM OR Map local to CSM
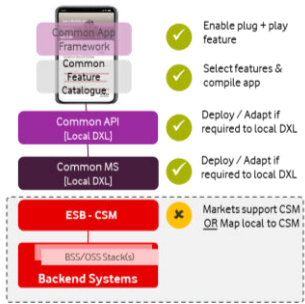
- ❑ DxL structure
- ❑ Common App
- ❑ Micro-services and APIs
- ❑ Consistent journeys
- ❑ Rules & standards to ensure transferability

2 Collaboration

10%

- ❑ Markets contribute 10% of existing resources for co-dev
- ❑ Tooling & Guilds

3 Federated development

MVA10 Backlog   ▶ Distribute & Develop across EU9 Markets

- ❑ Distributed E2E tasks to achieve working codes in modular catalogues
- ❑ Features, APIs and micro services are available for any other channels

4 App releases
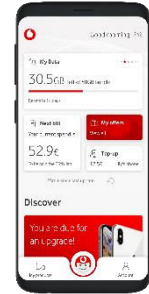
- ❑ App is distributed in releases
- ❑ Markets can locally adapt within releases (No big bang)
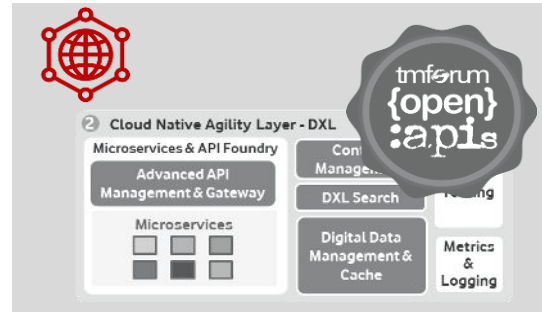- ❑ Business owns the features and manages the releases

Summary

Commercial & Technology Architecture alignment on CX Journeys, Features

API Guild driving API Standardisation to TMForum OpenAPI

Inner-Source Approach to collaboration and governance

Collaboration with the Telco Community to drive the industry forward.