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# Digital Platform Reference Architecture

July 13, 2016

 

# Rules of engagement

This is an evolution with revolutionary tendencies

It is not greenfield

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# Digital Platform Reference Architecture

July 13, 2016

# The Center for Global Enterprise

## Mission

Nonprofit, nonpartisan research organization devoted to the study of the contemporary corporation, globalization, economic trends, and their impact on society.

- Established: 2013

***Growing Global*** book launch, Columbia University, Nov 2015


## Partners

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NYU Stern
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# The platform revolution

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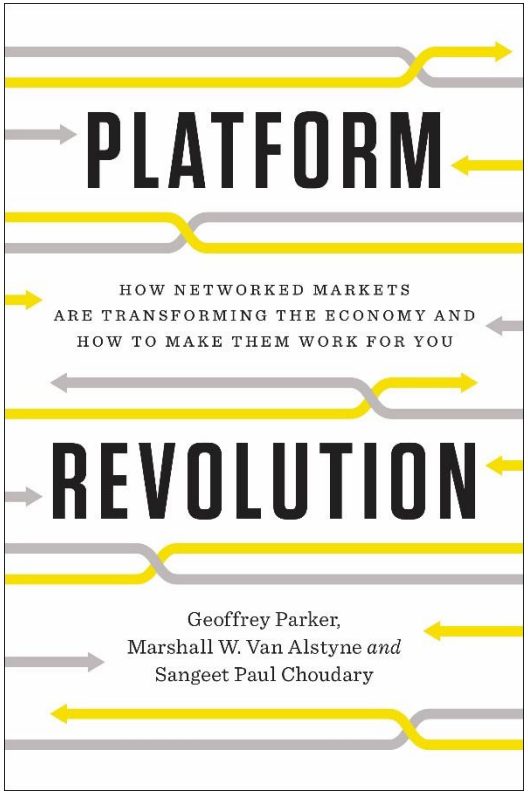
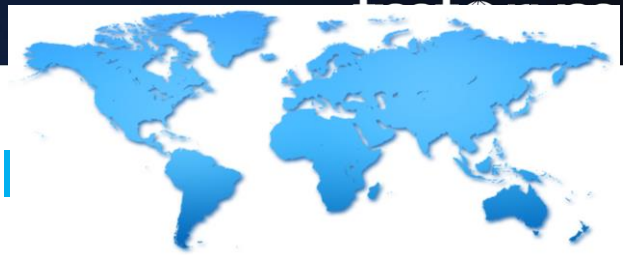
platformeconomic.s.org



# The New Multinationals



## Platforms provide basis for rapid global scale

Airbnb provides accommodation listings in more than 34,000 cities and **190 countries**. There are over 2 million listings world-wide; Paris alone has more than 28,000 listings.

Netflix has over 70 million members in over **190 countries**. Users watch more than 125 million hours of TV shows and movies per day.

LinkedIn has over 400 million members in over **200 countries**. Over 70 percent of users are outside the US. Over 100 million unique users access LlinkedIn each month.

Google Play apps and digital content: Over 1.6 million Android apps are available in **136 countries** world wide; Google Play movies available 105 countries; books available in 75 countries; music available in 62 countries.

**Sources:** About Airbnb at: https://www.airbnb.com/about/about-us; **Netflix at:** https://media.netflix.com/en/press-releases/netflix-is-now-available-around-the-world; About LinedIn at: https://press.linkedin.com/about-linkedin; https://support.google.com/googleplay/answer/2843119?hl=en

# Rise of platform economy

**$4.3 trillion** in firm market cap

**$100s of billions** in global commerce

**$1.5 million direct jobs** … millions more indirect

Reshaping ⟹

- boundaries of the firm
- innovation
- employment
- regulation/ policy

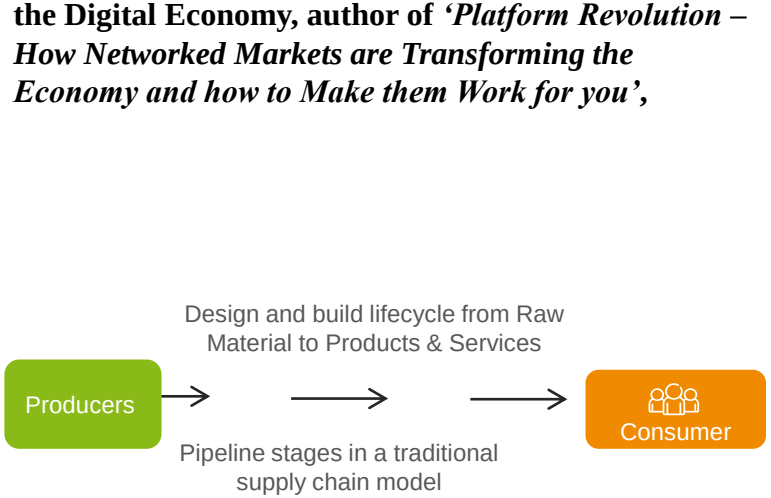
Source: P. Evans, Platform database, Center for Global Enterprise, 2015

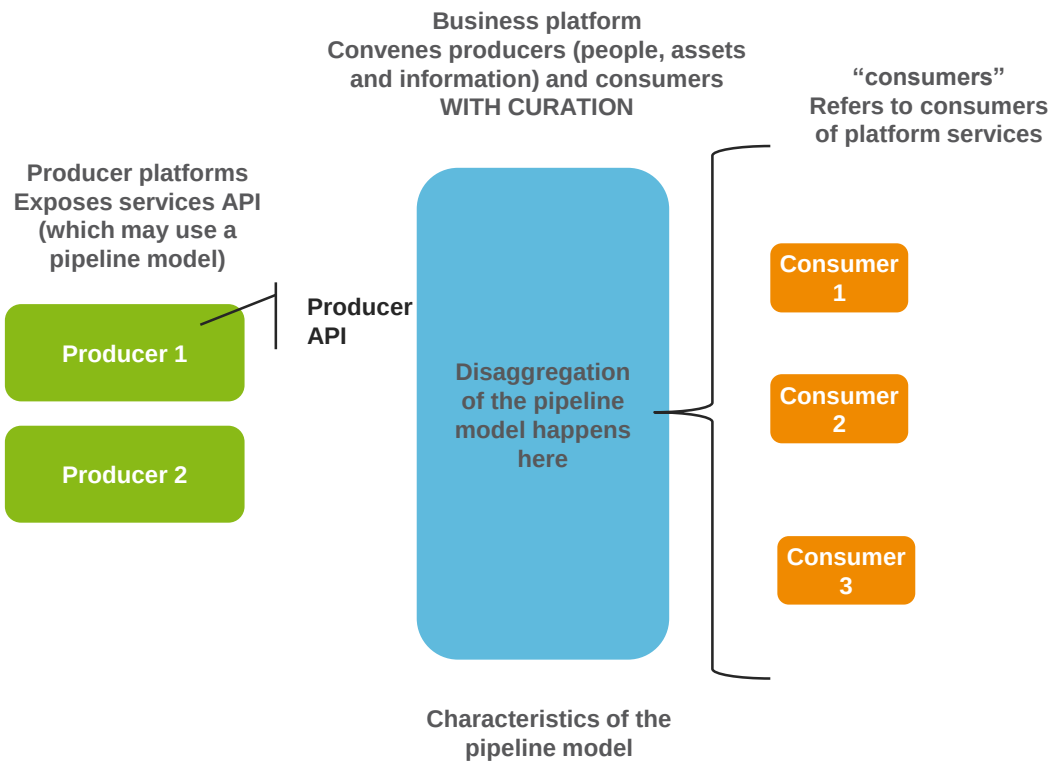
# Platform Definition

"Platform is a business based on **enabling value-creating interaction** between external producers and consumers. The platform provides an **open, participative infrastructure** for these interactions and sets governance conditions for them. The platform's overarching purpose to **consummate matches** among users and facilitate the exchange of goods, services, or social currency, thereby enabling **value creation for all participants**." (Geoffrey G. Parker)

# From Pipeline to Platform

**Professor Geoffrey Parker from MIT's Institute for the Digital Economy, author of *'Platform Revolution – How Networked Markets are Transforming the Economy and how to Make them Work for you'*,**



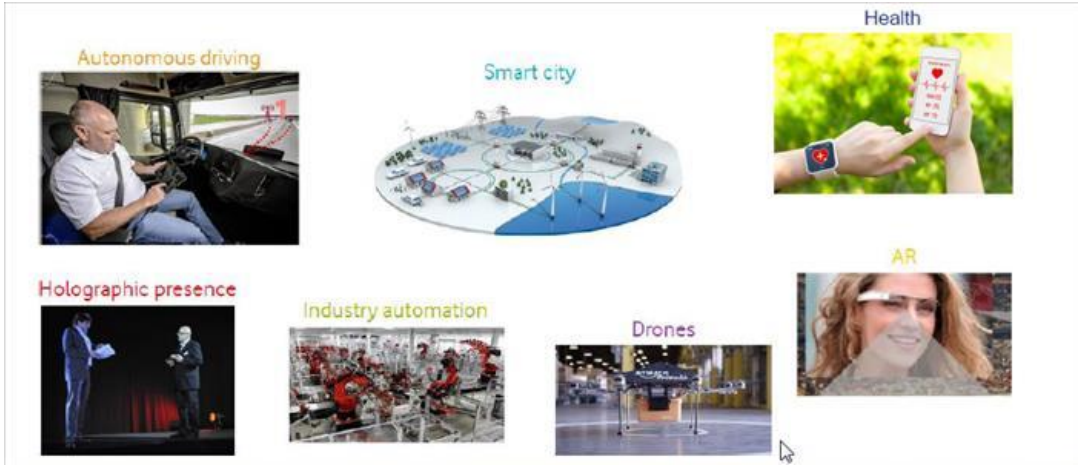

**Contrast Platforms (complex value matrix) to the traditional pipeline (linear value chain)**

**Platforms remove the gatekeepers and allow flexible business relationship to be dynamically created**
**Platforms typically don't own the assets**

# WhyTelcos should become platforms

***So different requirements in 5G will put a huge pressure on network assets***

- the price of 1kb will not be the same for all those use cases!




examples borrowed from Lester Thomas (Vodafone)

- telcos should become platforms and trade network capabilities to « user experience providers »

Our industry must be able to transform itself into a “platform enabled business” in order to remain competitive

Is traditional competition between asset incentive operators the only rule of the game ?

Assume the mindset and culture of a software “Curator”. Bringing “producers” and “consumers” together agilely.

Question: who are “producers” and “consumers” in our “communication and network business”

Assume the mindset and culture of a software company. Bringing producers and consumers together agilely.

This implies a change in the enabling technologies and systems but also to the culture, business model and governance.

# So what do we need ?

1. Asset owners need to expose their assets as a managed service

2. Service providers can Play the role of “Curator”
   - onboard “resource producers” (network as service providers)
   - allow “consumers” (user experience providers) to compose/bundle services and manage their own composite services
   - define the business models
   - organize the community, matches producers and consumers

3. An enabler platform to implement the model

- a well defined set of business capabilities to **curate, trade and operate** composite digital services
- exposed through open APIs
- a common model driven approach

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# Platform Architecture
## Why API's work for BT

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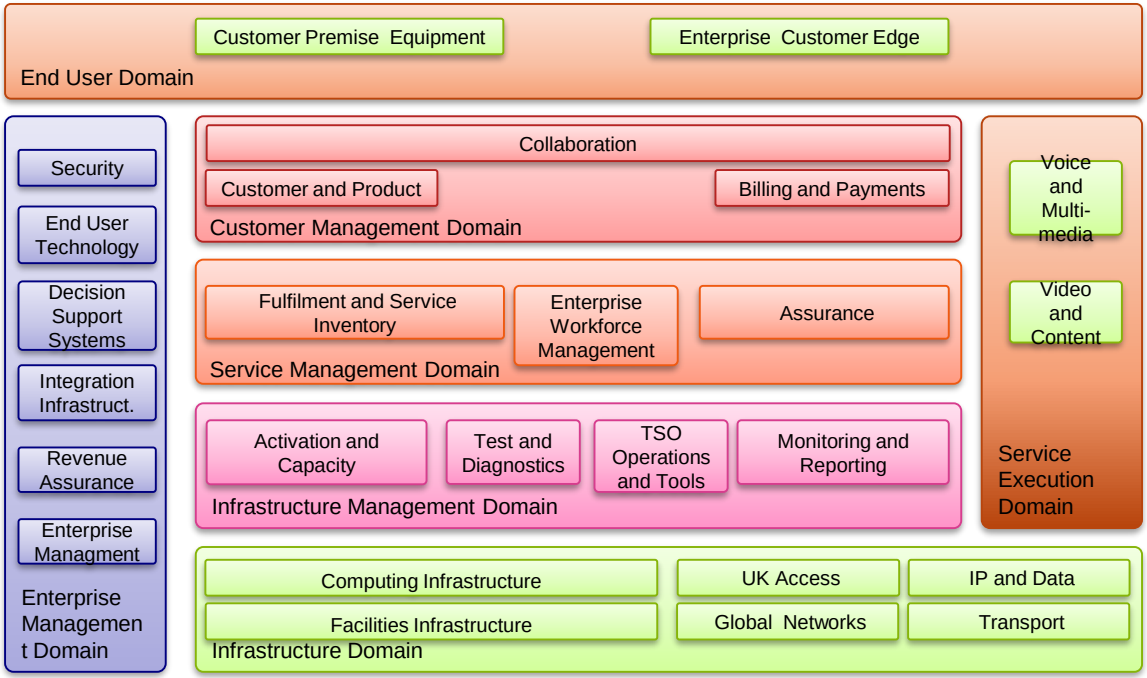
# BT's Matrix Platform Architecture




The BT IT functionality has been partitioned into a set of cooperating IT platforms

Reusable common capabilities (SDK's) – keeping engineering costs down

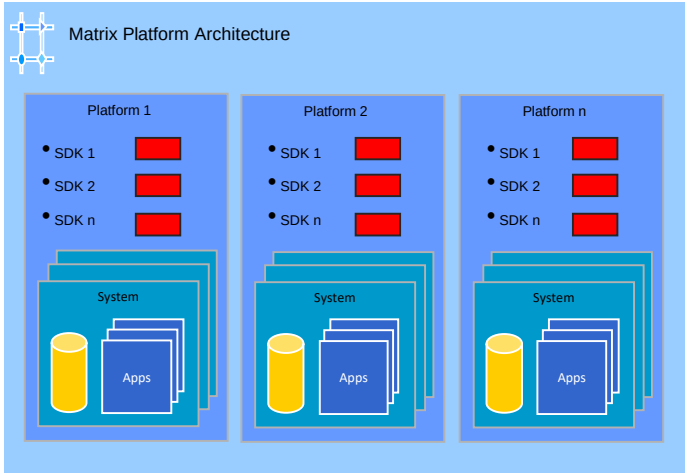
Reusable process blocks – consistent customer experience

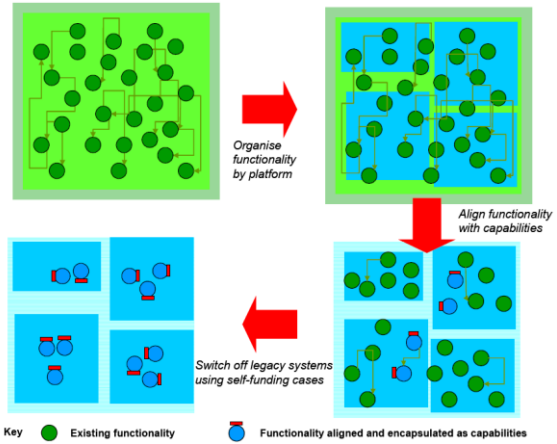
26 platforms and 700 systems – simplicity and ruthless standardization

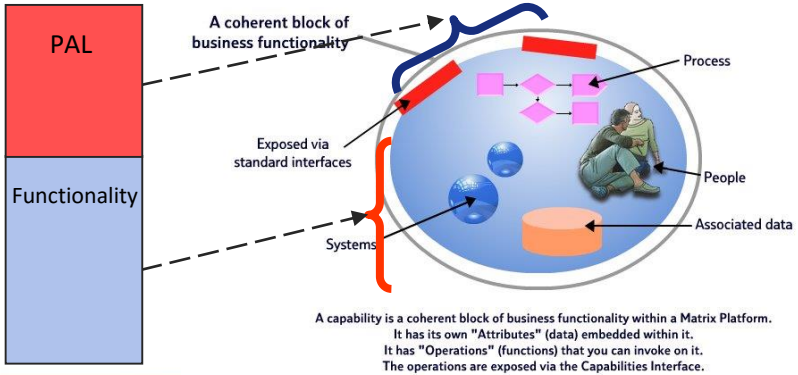
Intended to minimise whole life costs, reduce cycle time for launching new capabilities and facilitate business agility

# Platform oriented approach to the BT Architecture




## Separating the interface and the implementation across the whole system estate

- Consumers need no knowledge of the underlying systems
- One capability can have many (different) implementations
- Systems can be removed or replaced with no impact on customers

## Standard Interfaces

- Common Capability Model (CCM)

## Standard Integration

- Platform Access Layer

# A new way of working

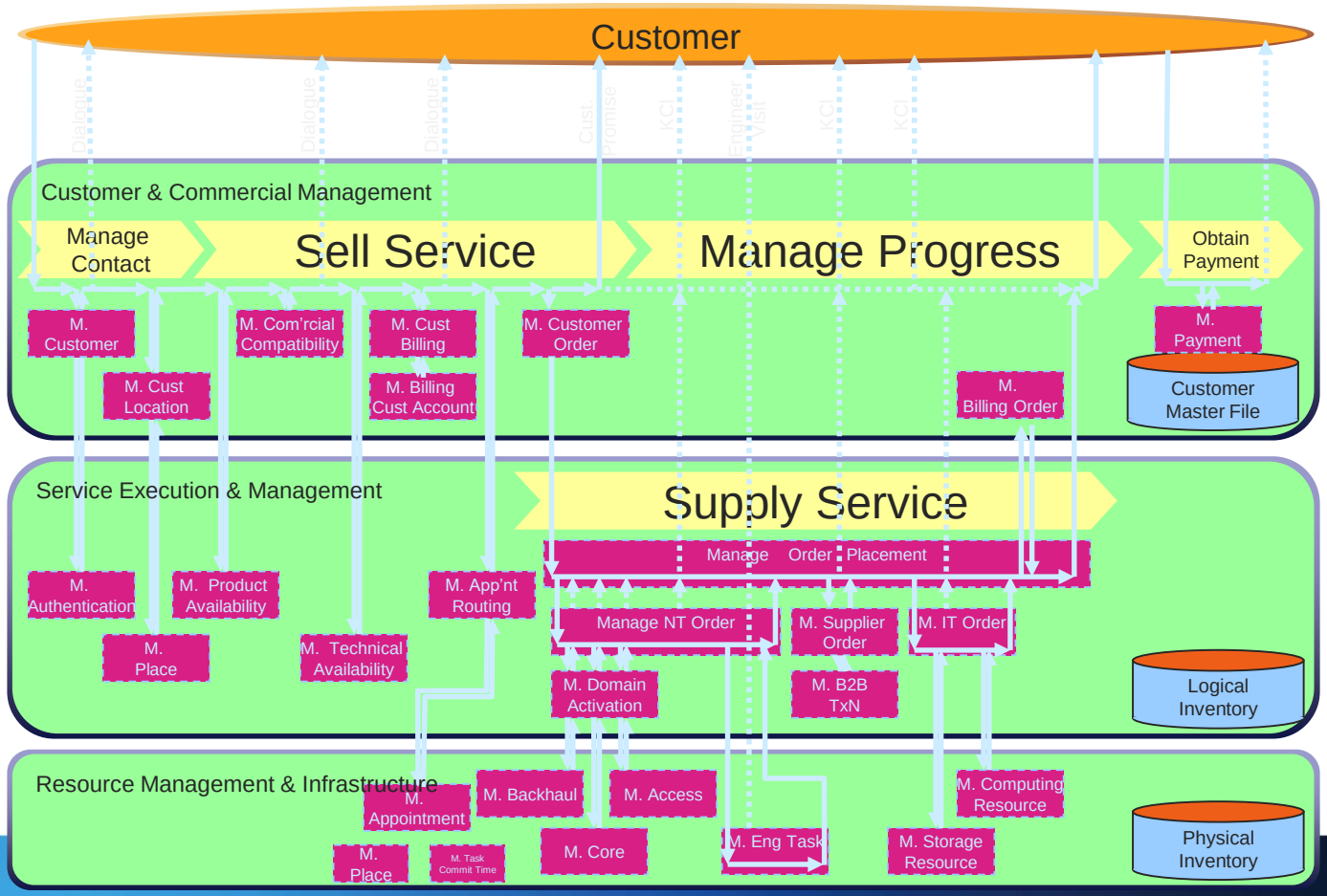
- Designs start with the intentional, predictable, repeatable business process
- Expressed in a design template that maps consistently from business process to capability
- Measured in terms of the Customers experience
  - Quantified by ‘Cycle Time’ and ‘Right First Time’ values

Using Service Oriented Architecture

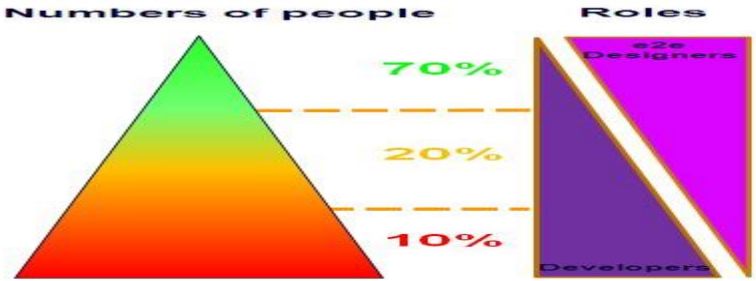
techniques and technology to deliver a

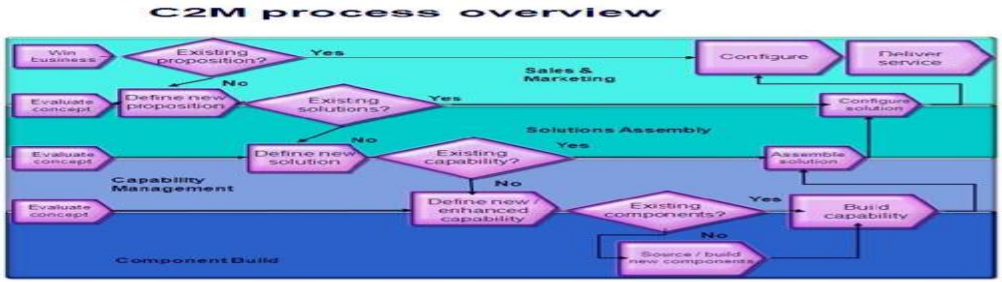
Customer Oriented Architecture

# BT segment specific L2C – Constructed in the SDK using our standard capabilities, delivering speed and a consistent, desired customer experience



# Data driven product launches




| Product Change Complexity | Description | Data/ engineering change | Example |
|---|---|---|---|
| Tier-0 | Changes to Customer CPE | Product Line | New customer device e.g. baby monitoring device, handset |
| Tier-1 | Small changes to existing products | Data, in life change | Change of product name, description etc |
| | | | Price change on existing product |
| Tier-2 | New variants of existing promotion | Data, in life change | Special offers on existing product e.g. 3 month free special offer version of existing promotion |
| Tier-3 | New bundled promotion | Data, in life change | New bundle of existing products. E.g. UEWP+BB2 Dual play |
| Tier 4 | New product/ product feature | Minor Engineering, CCP release | New product e.g. BT Vision |
| | | | New product feature e.g. top up bolt on |
| Tier 5 | New network technology | Significant engineering, CCP 2/3 releases | A new technology type (e.g. FTTC) within an existing service type. |
| Tier 6 | New product family | Major engineering CCP3/4 releases | Completely new service type and family of products around it. |

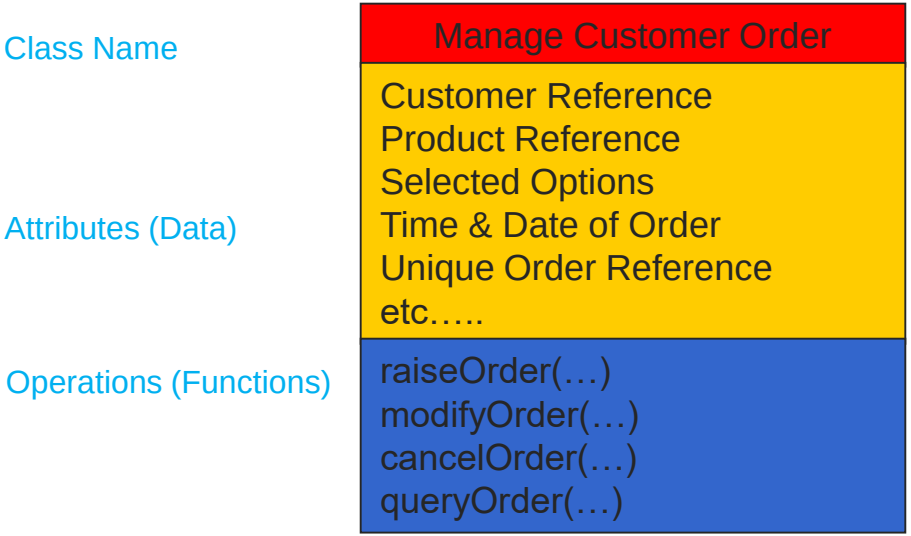
# SDK Overview (how we use capabilities)

- Through Software Development Kits (SDKs), BT is exposing the capabilities of it's network and systems as services that can be consumed by customers, partners and suppliers
- Internally we can use SDK to quickly assemble new products and services
- Self service is enabled by SDKs allowing customers to perform tasks on BT systems/processes from within their environment
- BT provides the tools in a way that are ready-to-integrate in the customer's eco system
- BT has recently started the third phase of this architecture journey and is engaging with TMF to help drive SDK as a standard way of developing software and interfaces in the industry

**SDKs are product and customer segment agnostic – examples include**

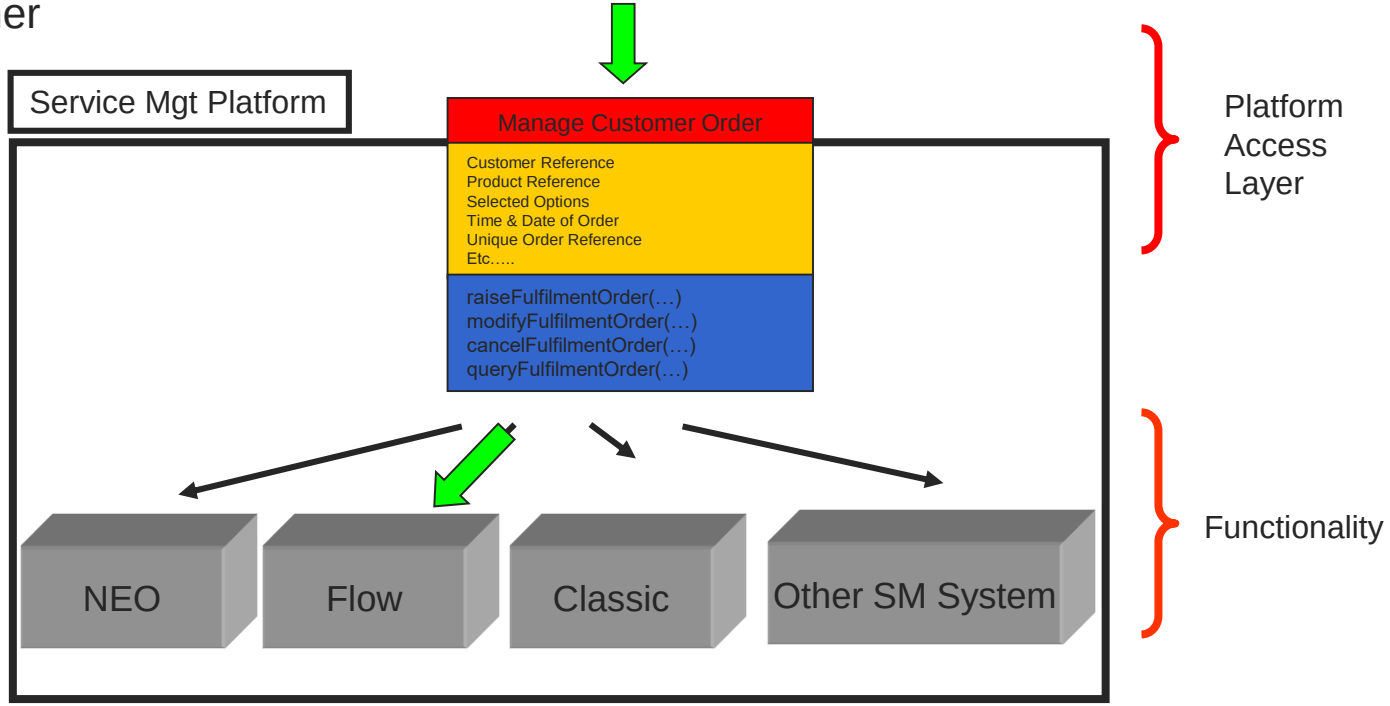
| | |
|---|---|
| Manage Order Placement | request product/service from BT |
| Manage Engineering Task | configure network, dispatch technician.... |
| Manage Incident | create and manage incidents |
| Manage Service Diagnostic | self-service testing of BT services |
| Manage Channel | update product catalogue for 3rd party services |
| Manage Cloud | provision computing infrastructure/services |

# Example SDK: MCO



# Rationalising systems

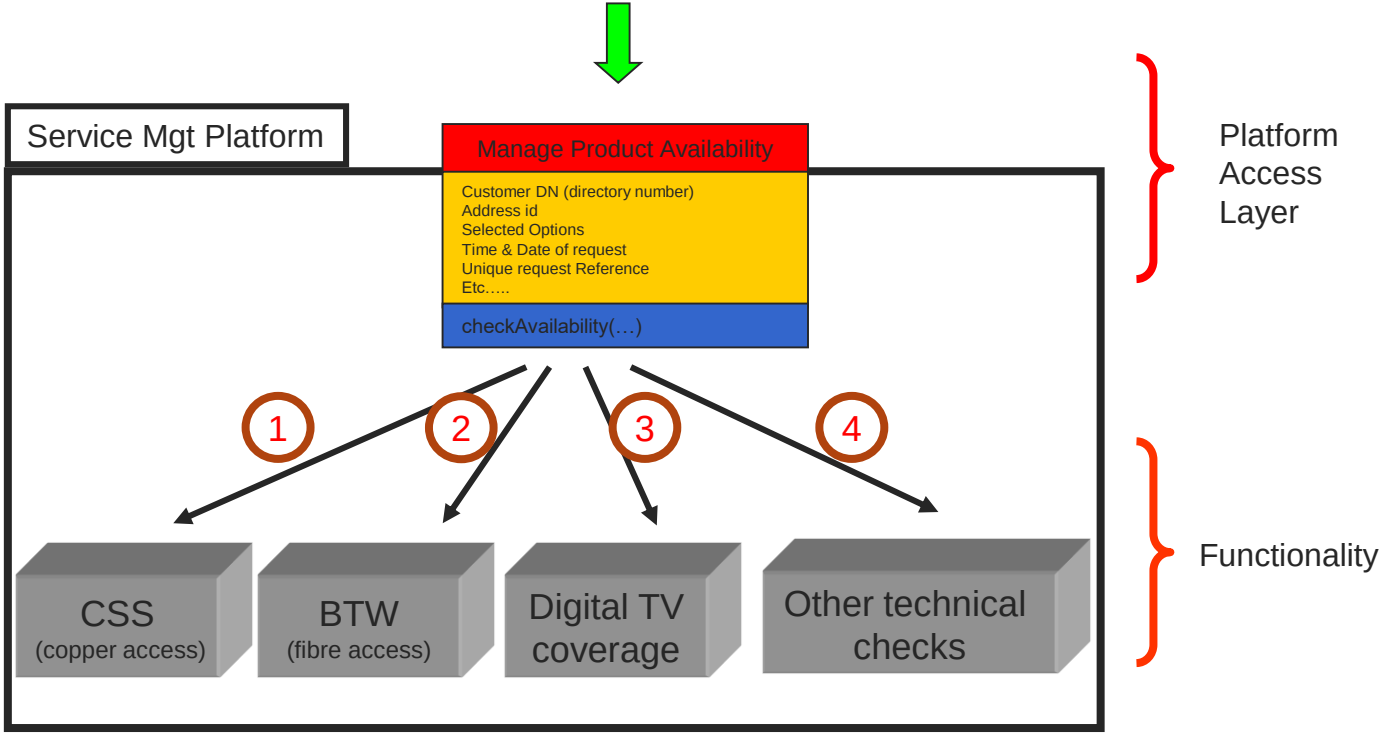
With Platform Capabilities we can perform systems rationalisation “behind the scenes” or wrap/expose legacy applications in a more flexible manner



# How far down the road (initial focus on systems)

- Established 26 Platforms
- Defined/designed ~200 core Capabilities (SDK's)
- Systems Rationalisation
  - Target is 85% reduction in current overall BT systems
  - March 2016 – baseline 1798 systems
  - We have closed the following numbers of systems to date
    - 2005/06 – 203,
    - 2006/07 – 527,
    - 2007/08 – 638,
    - 2008/09 – 323,
    - 2009/10 – 285,
    - 20010/11 – 235,
    - 2011/12 – 242
    - 2012/13 - 168 (Includes 6 large systems)
    - 2013/14 – 325
    - 2014/15 – 222
    - 2015/16 – 188
    - 2016/17 – target 180

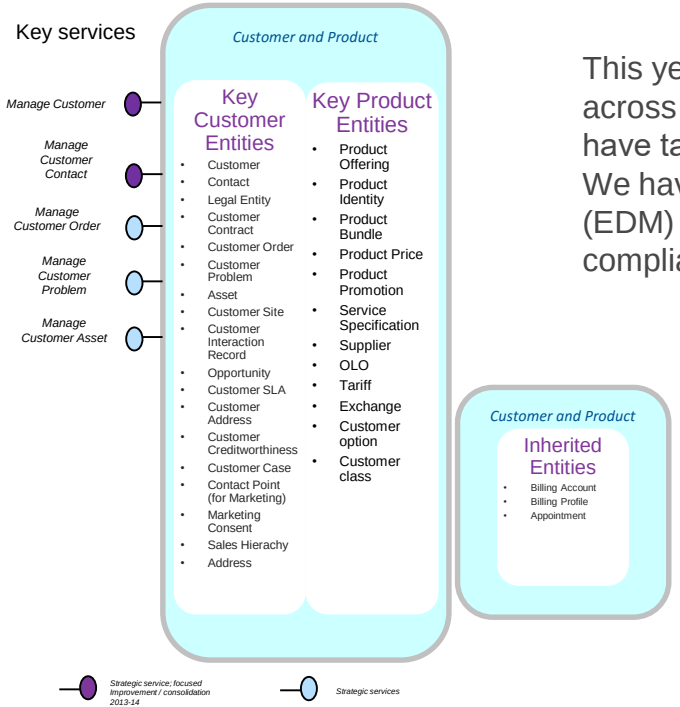
# Manage Product Availability evolution




1. Initially used to check copper pairs for availability of Broadband services
2. Added checks to include checks for fibre based services
3. Based on address, availability of digital TV services was returned
4. Could be enhanced to include mobile coverage (3G, 4G, 5G etc.)

# Measuring Service exposure and build

We then introduced the concept of different levels of SDK's (L1 through L3) and we also defined "capped" interfaces which were interfaces that could continue to be used but could not be enhanced, if you needed a change to the interface you had to build it using an SDK (L2 as a minimum).

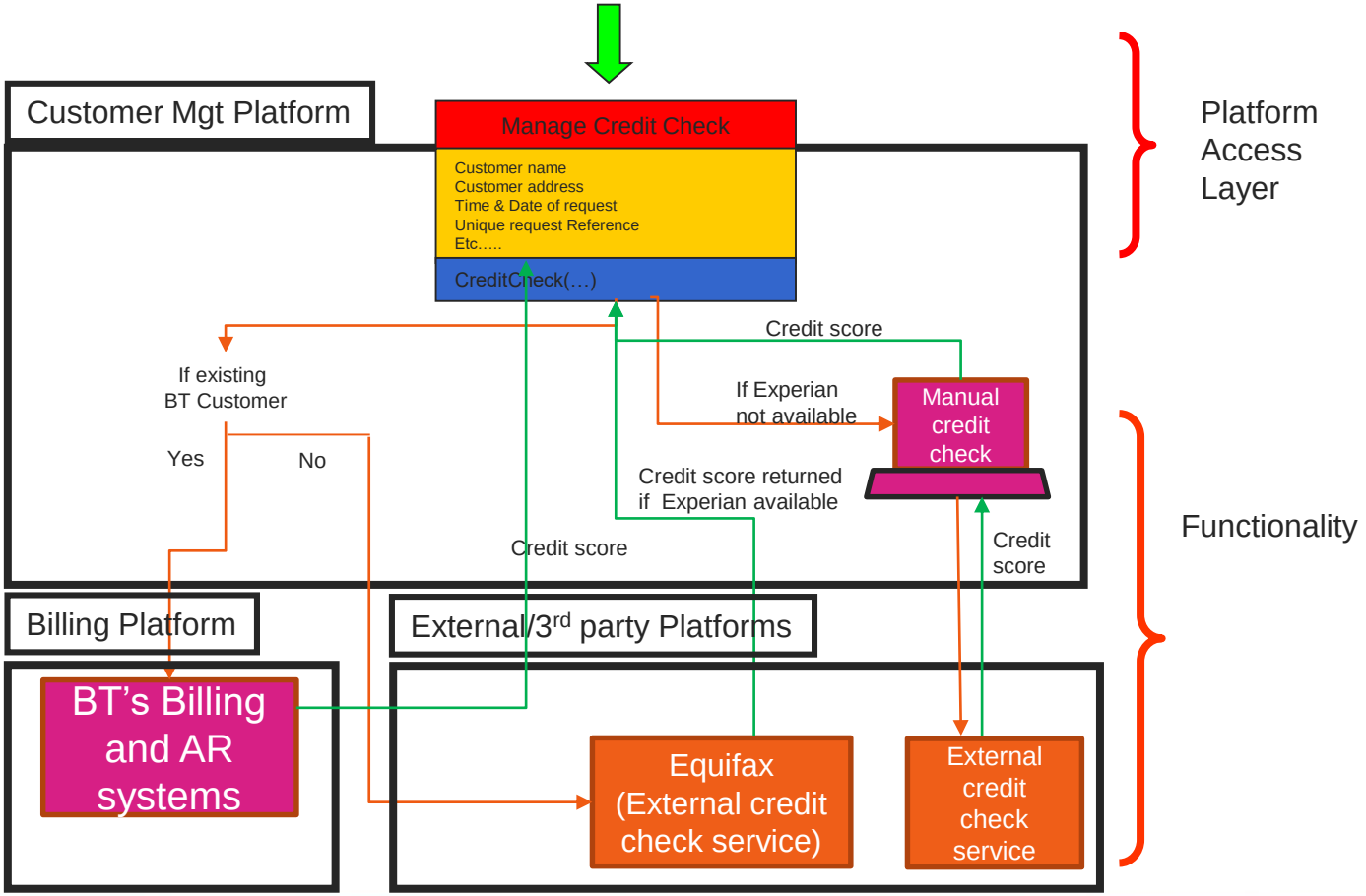



This year we have identified key software services across the architecture (but within each platform) and have targeted the platforms to build these SDK's to L3. We have also introduced an Enterprise Data Model (EDM) measure for platforms to determine how compliant they are to the overall EDM.

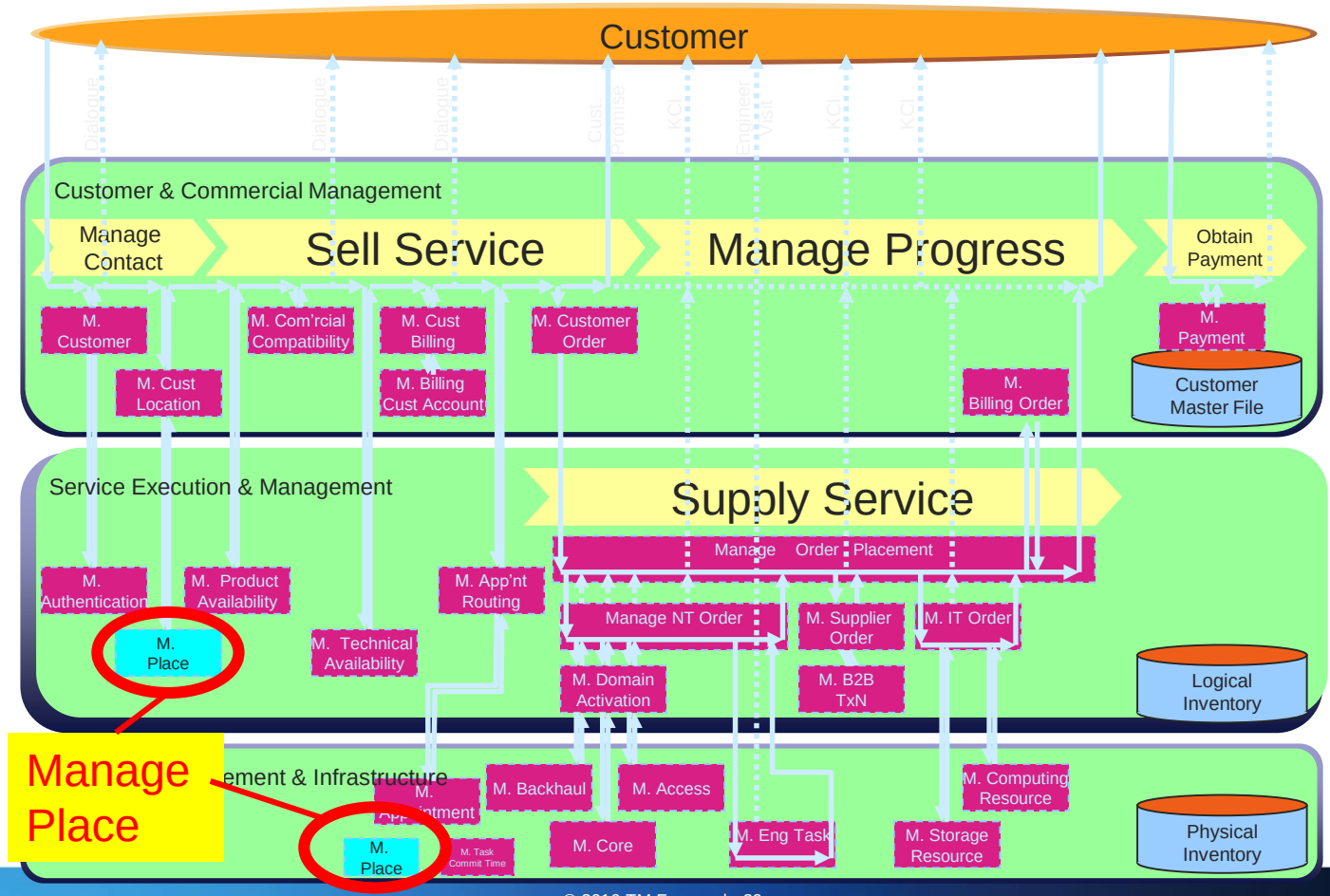
## SDK definitions

SDK L1 – Interface contract document (interface description, operations, pre and post conditions and error codes), working code, test end points, target and current systems implemented on.
SDK L2 – all above plus quality of service info and regression test results and coverage
SDK L3 – all of both above plus UML modelled standards – state model, component model, object model and sequence diagram

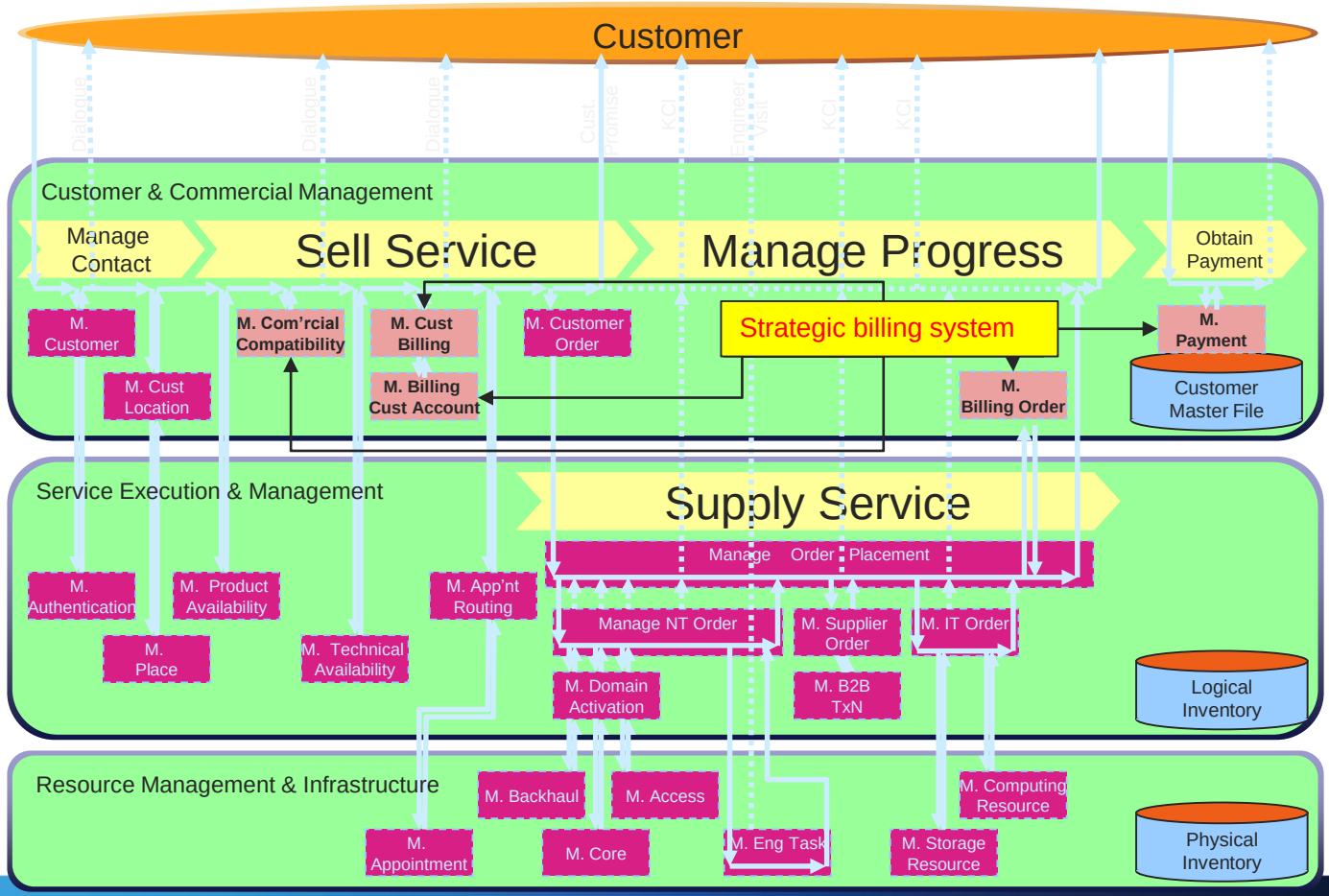
# Manage Credit Check



# BT segment specific L2C – Reusing common functions across a business process to maximise re-use of software and improve quality of service



# Replacing a legacy application (billing) using common API's designed to support our strategic architectural direction.



# Redefining the Organisation and Governance

Before:

**Organisation**

- Organisation structured around products
- Business operations instead of customer experience
- OSS stovepipe programmes
- Product silo programmes (voice / data / ip)

**Governance**

- Cost, time, quality
- No penalties for architectural deviation
- Architecture typical policeman / salesman

Now:

**Organisation**

- Organisation structured around the Architecture
- Business Initiative Programmes
- Customer Experience Programmes
- Platform Programmes
  - Matrix implemented a part of a business-wide transformation
  - Matrix is positioned as a key enabler and component of the overall business transformation

**Governance**

- Programme performance contracts built around:
  - Capability implementation targets
  - Systems rationalisation targets
  - Architectural conformance
  - Capability use and reuse measures

"Architecture enabled business transformation"

**ACF – Architectural Conformance Framework**
Introduced to ensure compliance with the architecture. All designs are assigned an ACF tag (or number) and have to get an ACF pass before they can move to development. New interfaces or systems are governed through the ACF process which has remained lightweight but effective.

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# Platform Models and APIs

Dr Lester Thomas
Group Chief IT Systems Architect
Vodafone

# Jeff Bezos mandate to Amazon circa 2002

The bullets below are from a mandate from Jeff Bezos that was sent to all Amazon technology teams circa 2002 (this from a  blog from an ex-employee from Amazon - here is the original item)

1) All teams will henceforth expose their data and functionality through service interfaces.

2) Teams must communicate with each other through these interfaces.

3) There will be no other form of inter-process communication allowed: no direct linking, no direct reads of another team's data store, no shared-memory model, no back-doors whatsoever. The only communication allowed is via service interface calls over the network.

4) It doesn't matter what technology they use. HTTP, Corba, Pubsub, custom protocols -- doesn't matter. Bezos doesn't care.

5) All service interfaces, without exception, must be designed from the ground up to be externalizable. That is to say, the team must plan and design to be able to expose the interface to developers in the outside world. No exceptions.

6) Anyone who doesn't do this will be fired.

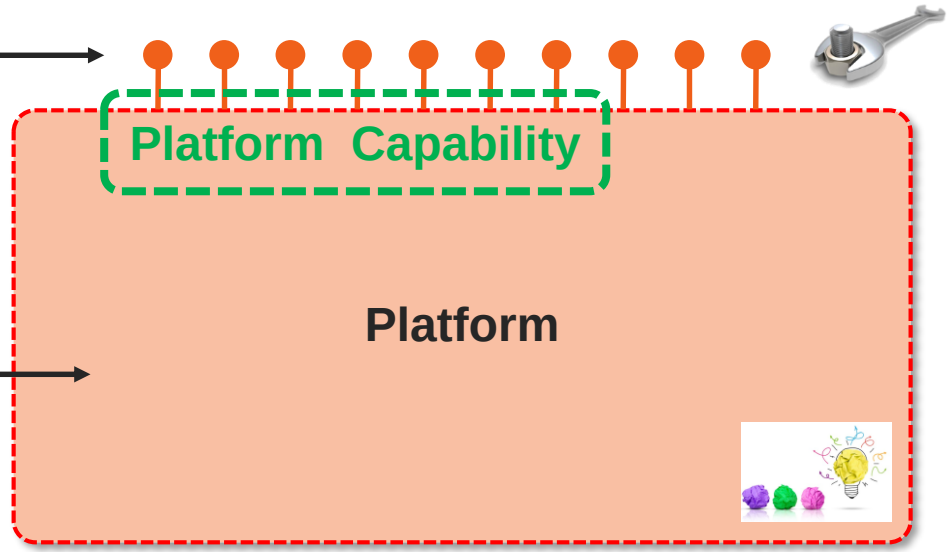
# Modular Platforms & Open APIs

## Open APIs

Industry standard data models
Cross-industry best-practice

## ‘Black-Box’ Platform

Vendor/operator specific
Innovative
Agile & flexible
DevOps model



# Platform Capabilities

We don't standardise the platforms themselves – organisations will define their own platforms scope based on their own operating model. We standardise the Open APIs and **Platform Capabilities**:

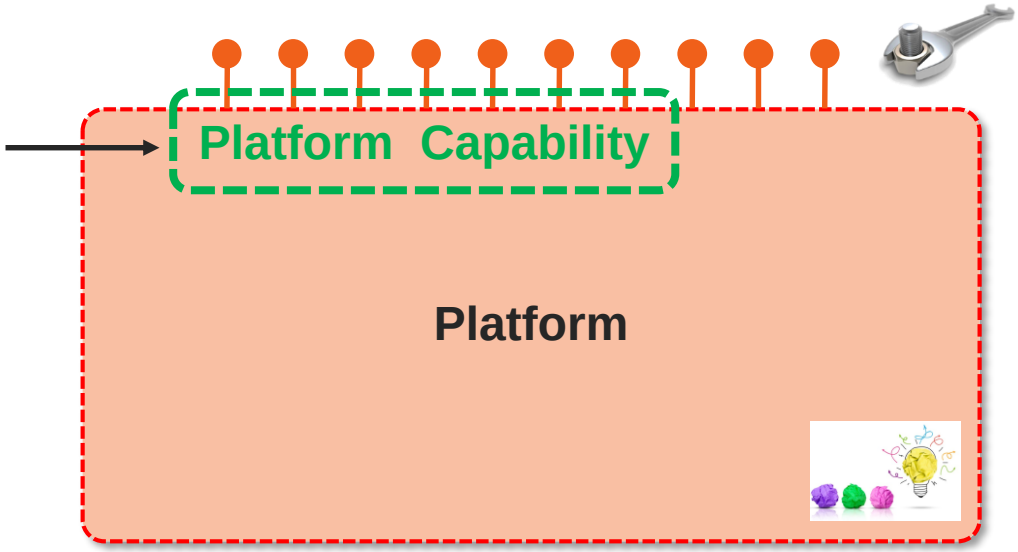
A coherent block of business functionality and operational patterns

Are exposed or published in a catalogue

The units of composition in developing a complex business service. This composition can occur within a single platform or across multiple platforms.

Encapsulations of  Attributes (data) embedded within it on which you can invoke Operations (functions) that are exposed via open APIs

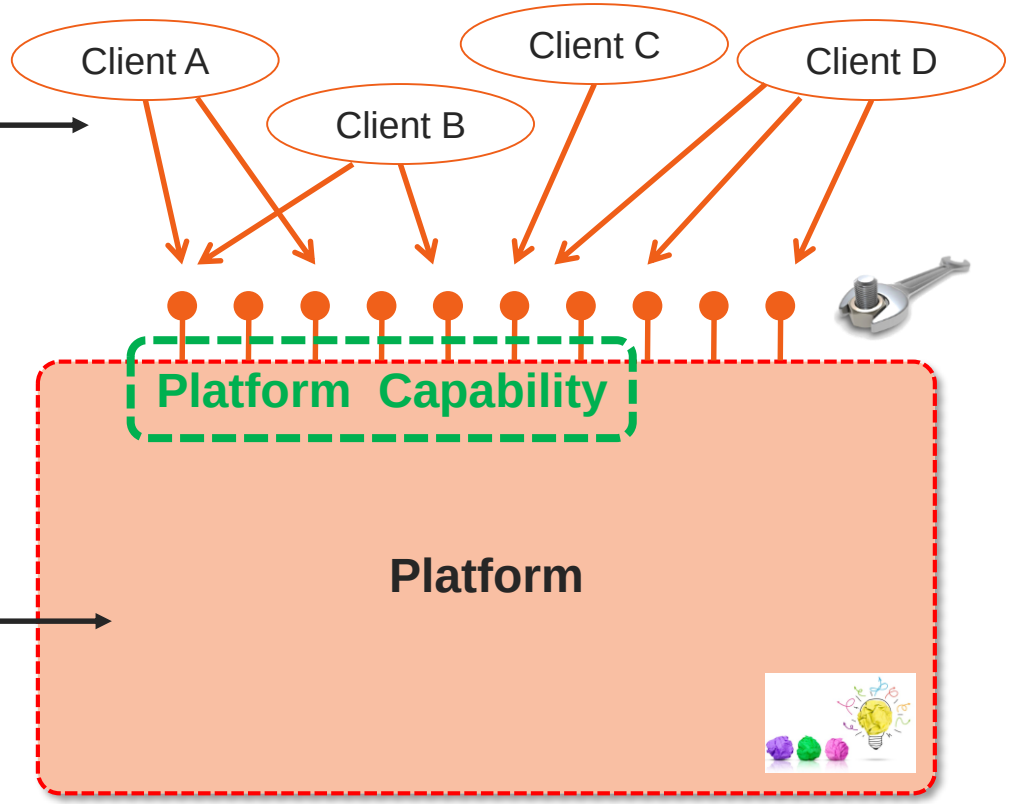
Able to host tenant applications



# Modularity through Abstraction

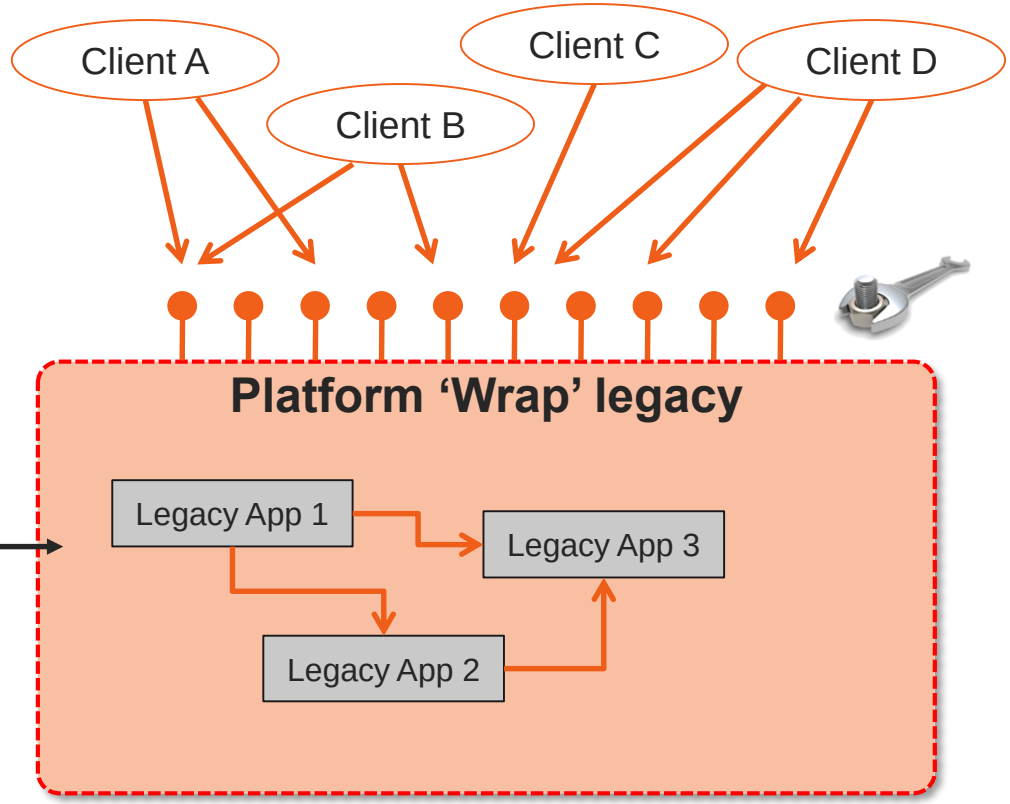
Clients don't have any understanding of the underlying implementation

Platform DevOps team can constantly change and improve the implementation without changing the API contract



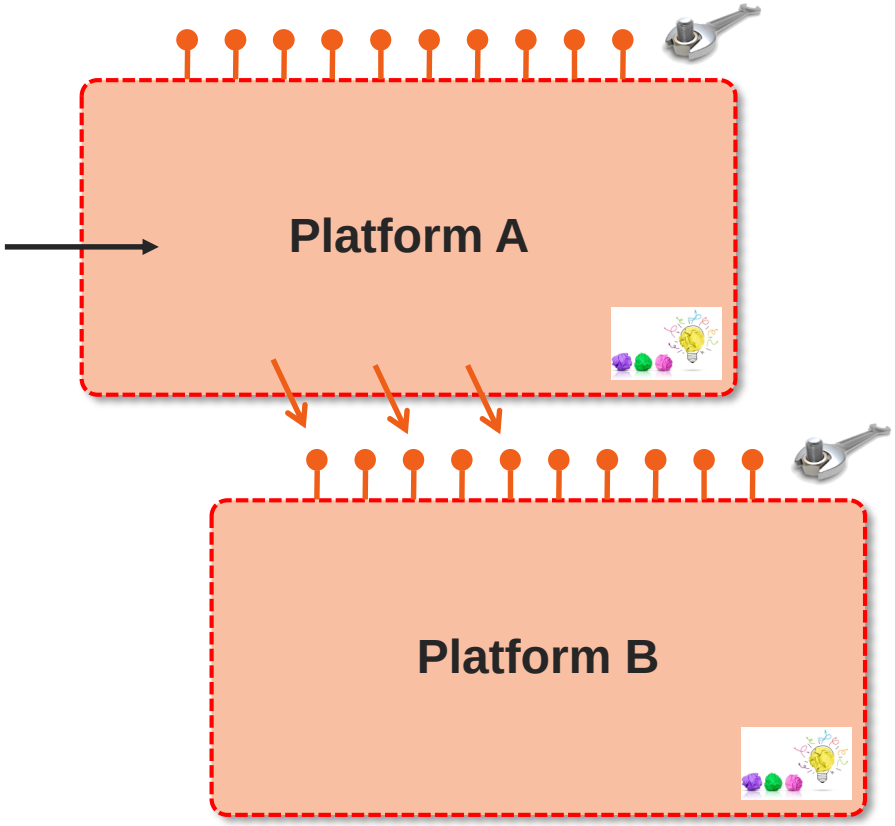
# Support for modernisation & transformation

Initial implementation may ‘wrap’ existing legacy in Open APIs

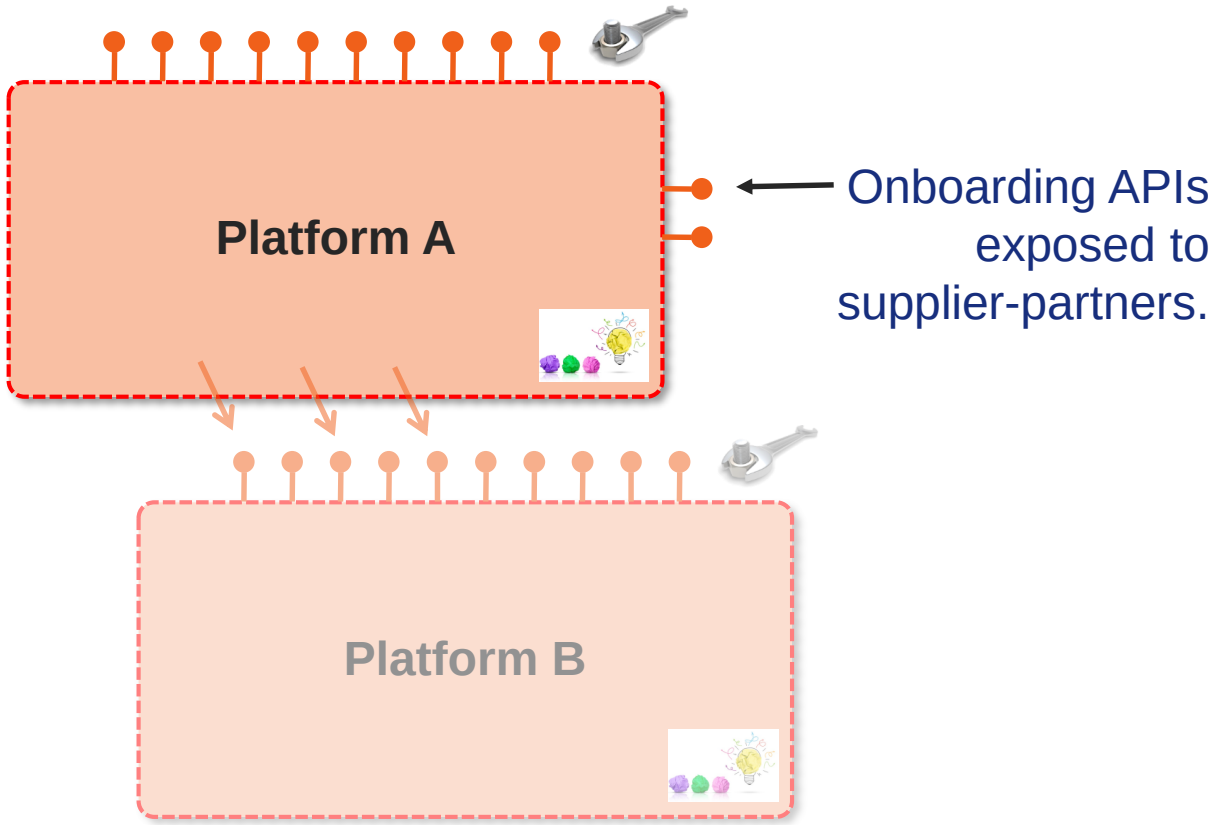


# Not a single monolithic platform

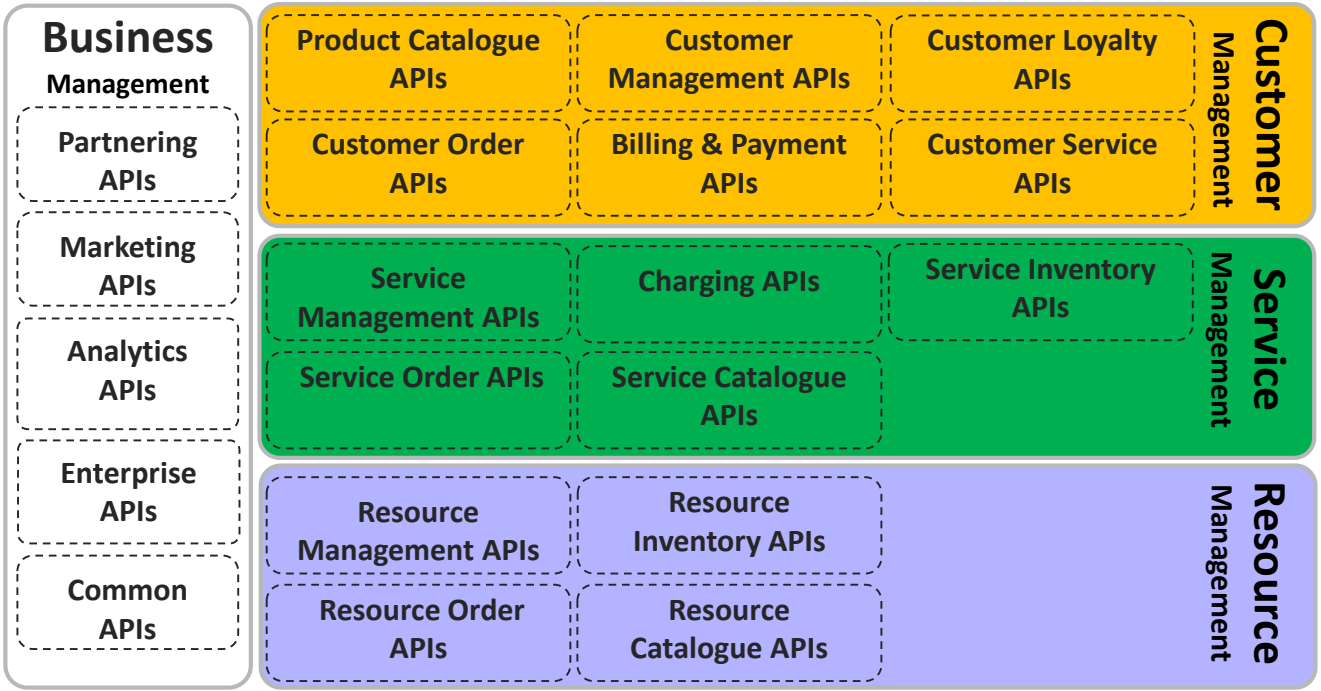
Platform A may build on the capabilities of underlying platforms



# 2 Sided business model



# Vodafone deployment view of TM Forum Open APIs



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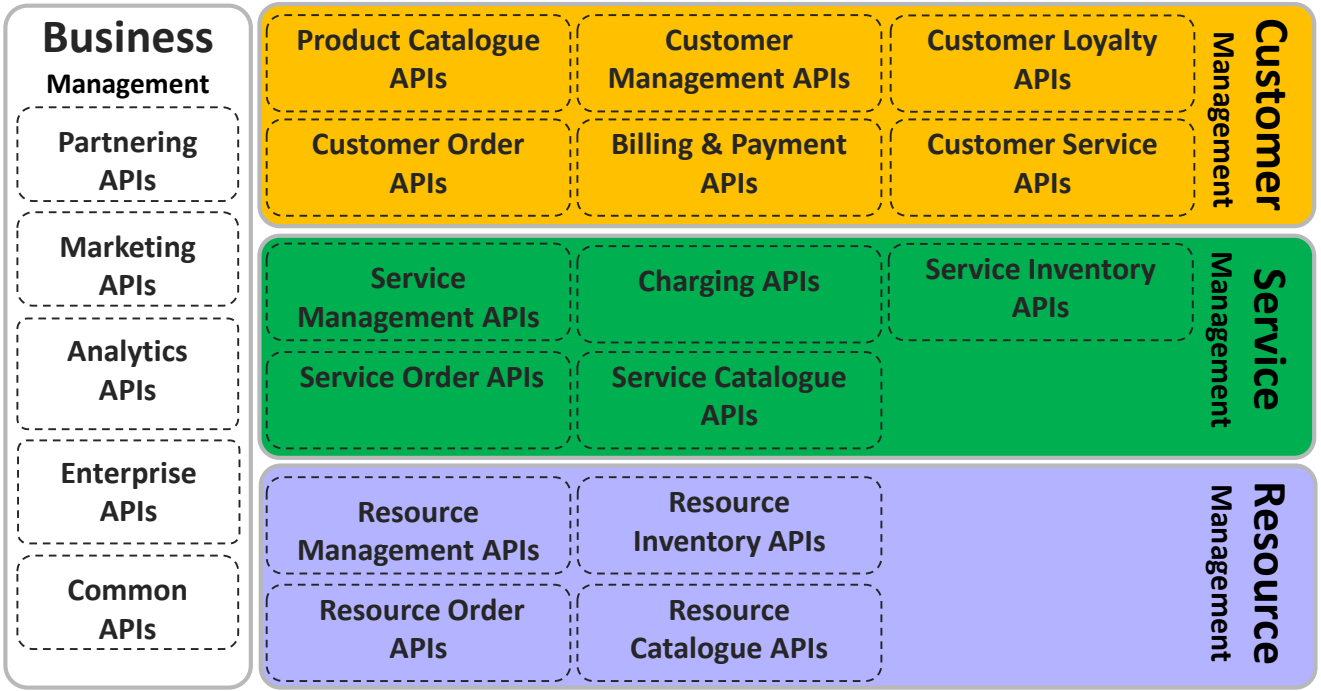
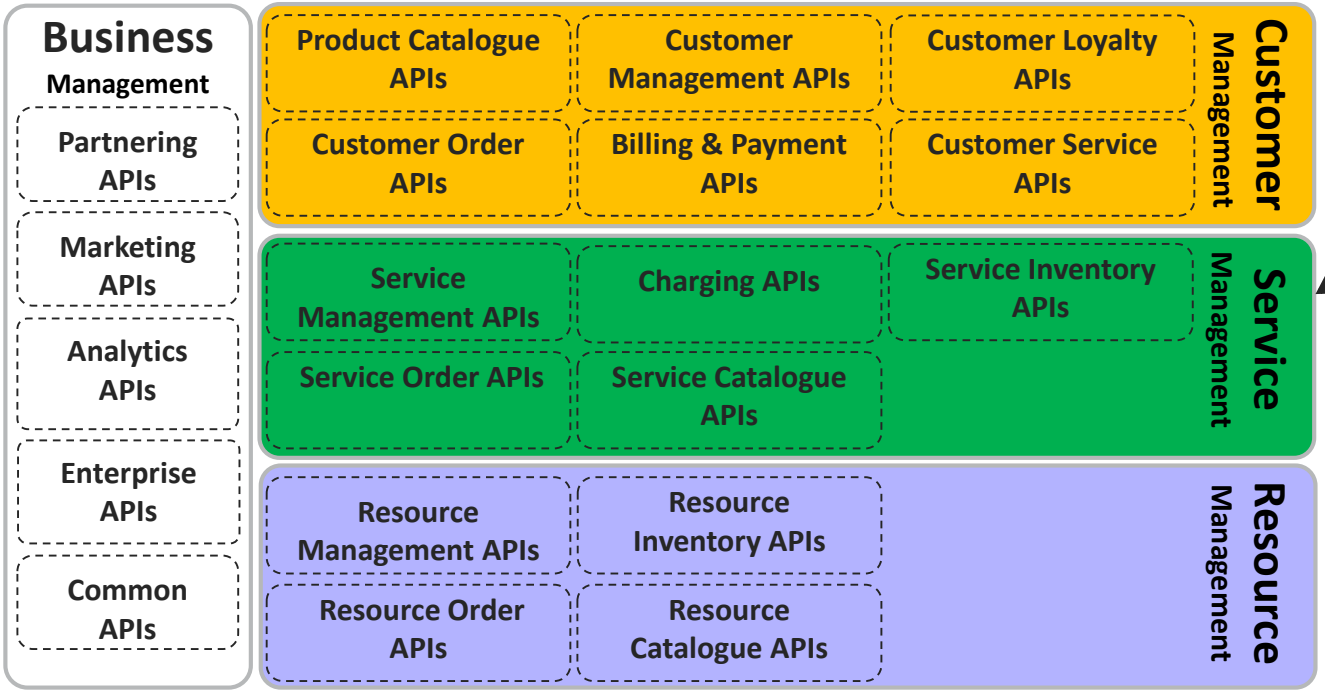



**Abstracts** the technical complexity of underlying Networks and Infrastructure.

Provides a consistent **catalogue** of Resource-Facing-Services across

- Physical Networks
- Virtualised Network Functions and
- Software-Defined Networks.

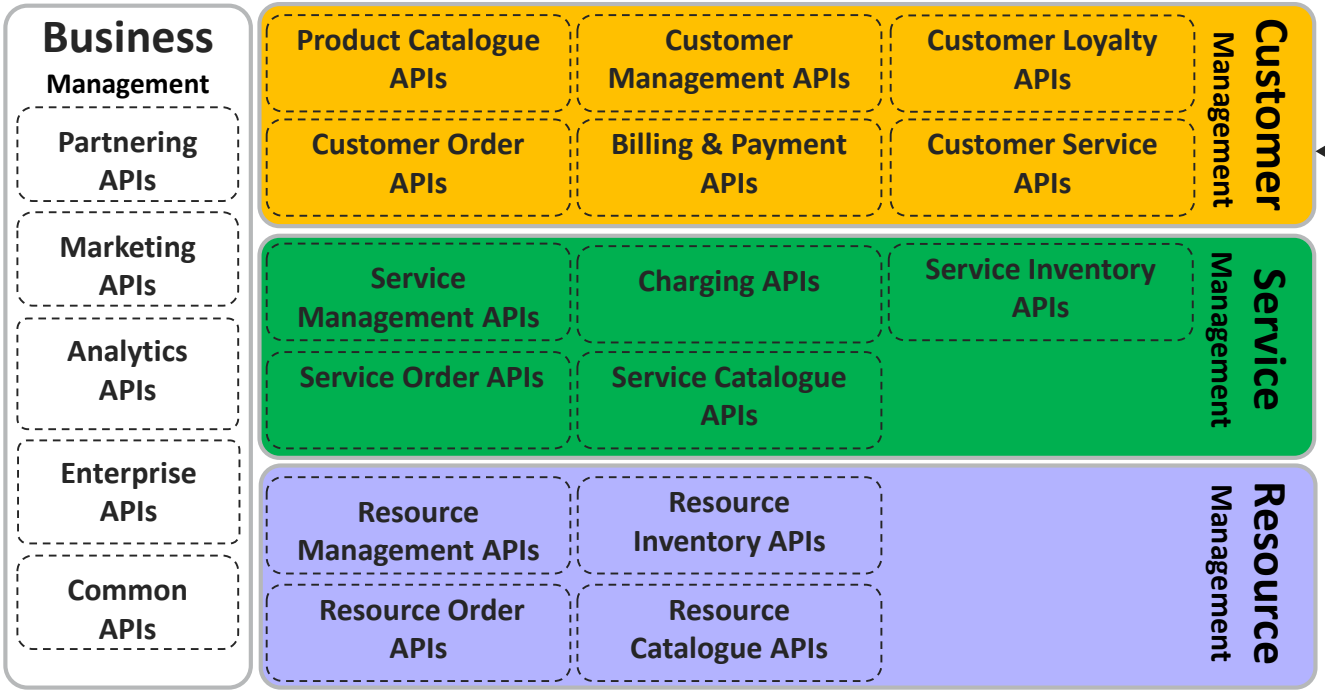
# Vodafone deployment view of TM Forum Open APIs




**Service-chains** underlying Resource-Facing-Services into a **catalogue** of Customer-Facing-Services (End-user facing services).

Manages complex orchestration of end-to-end services as well as end-to-end assurance.

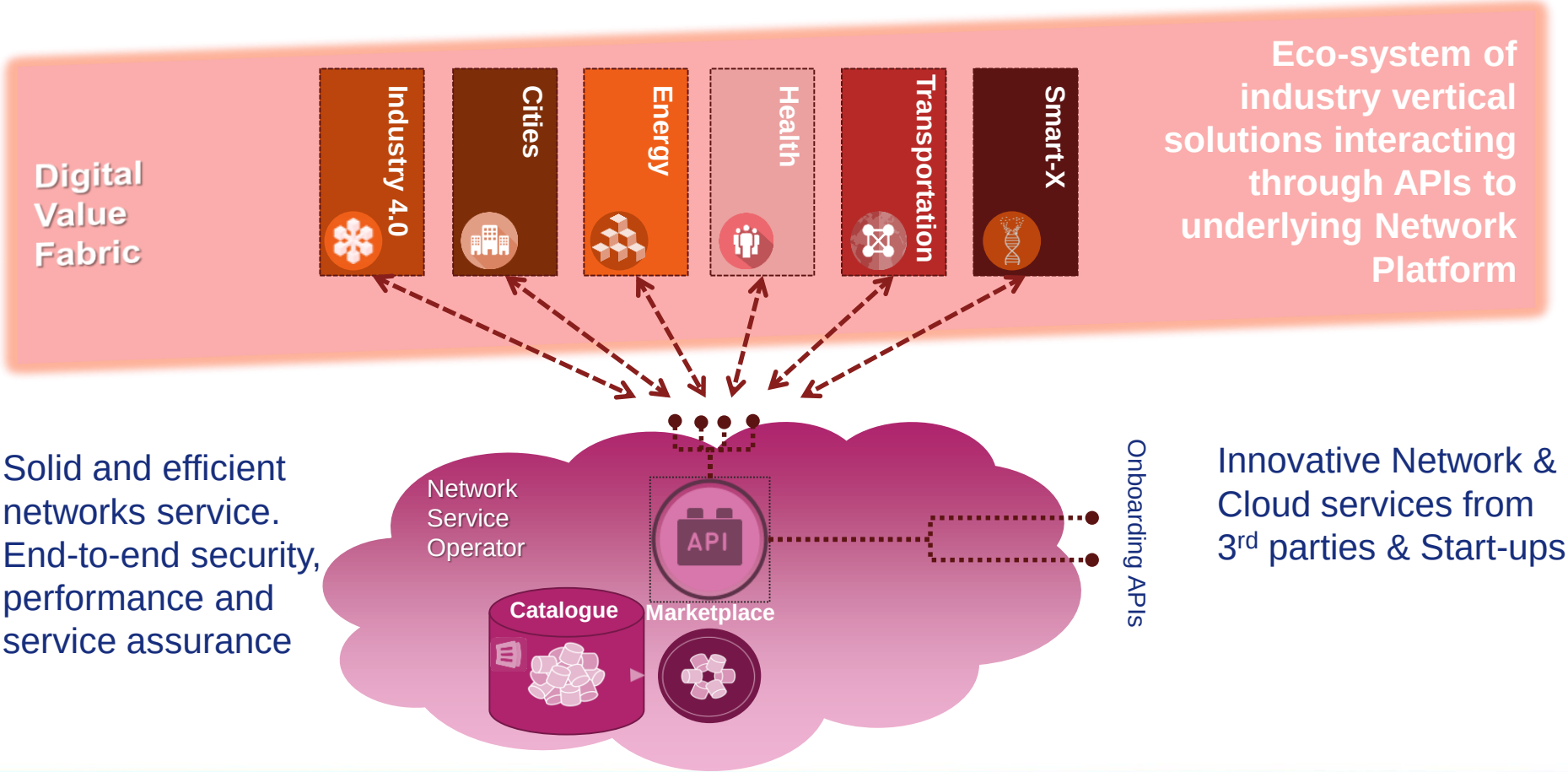
# Vodafone deployment view of TM Forum Open APIs




Manages commercial **product catalogue** and initial set-up and relationships with customers.

Supports B2B2X as well as B2B & B2C models.

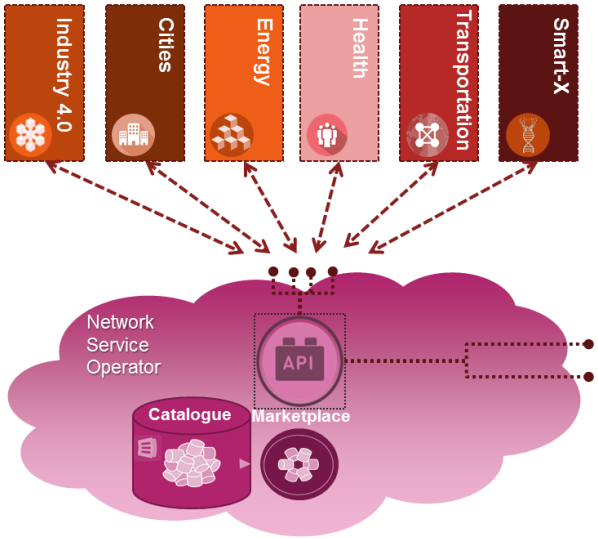
# Future Direction




Solid and efficient networks service. End-to-end security, performance and service assurance

Innovative Network & Cloud services from 3rd parties & Start-ups

# Future direction for APIs




Catalogue based

Dynamic APIs

~~Developer~~ machine-Friendly

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# Panel