Agile Business & IT Program

June 2016 Update

Market Context

THE NEW DIGITAL BUSINESS REALITY

Amazon can provision a service every 11 seconds	**WhatsApp with 55 employees adds roughly 1 million users daily**	**giffgaff crowdsources customer service and has high NPS**
10,000X	**1,000X**	**100X**
CSP takes 3-6 months to stand up a service	**CSP with 38,000 employees adds less than 5,000 customers daily**	**CSP has thousands of customer service reps and low NPS**

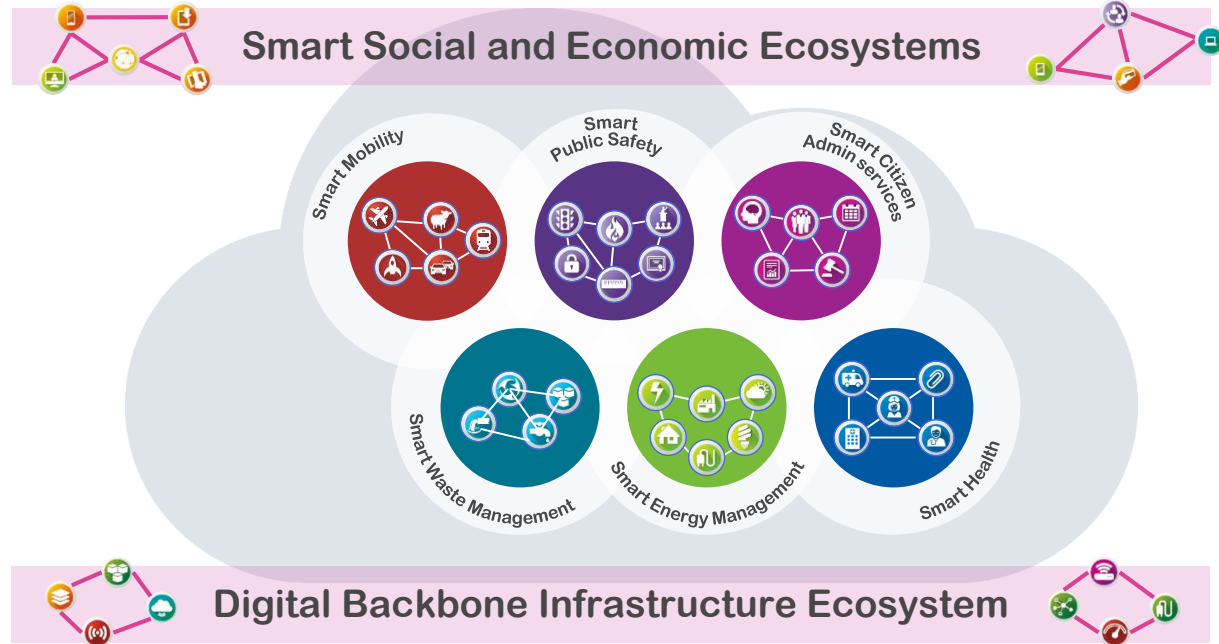## Non-traditional approaches are much more efficient

DRAMATIC SHIFTS ARE REQUIRED TO COMPETE IN THE DIGITAL WORLD

Smart Social and Economic Ecosystems

Smart Mobility

Smart Public Safety

Smart Citizen Admin services

Smart Waste Management

Smart Energy Management

Smart Health

Digital Backbone Infrastructure Ecosystem
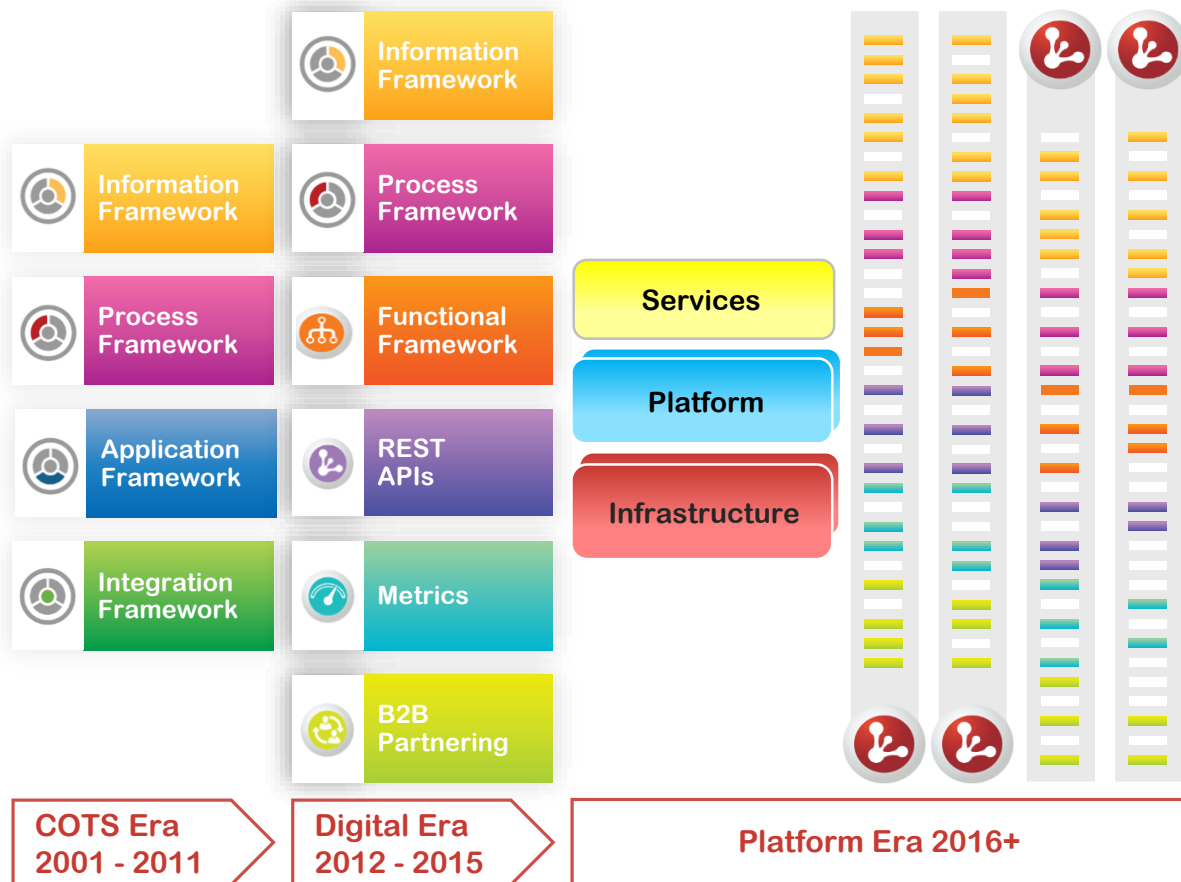
Massive scaling:
10x / 100x / 1,000x

Faster & more agile:
10 x 10 x 10
On-demand, shared talent

A world of interconnected ecosystems presents opportunities for all
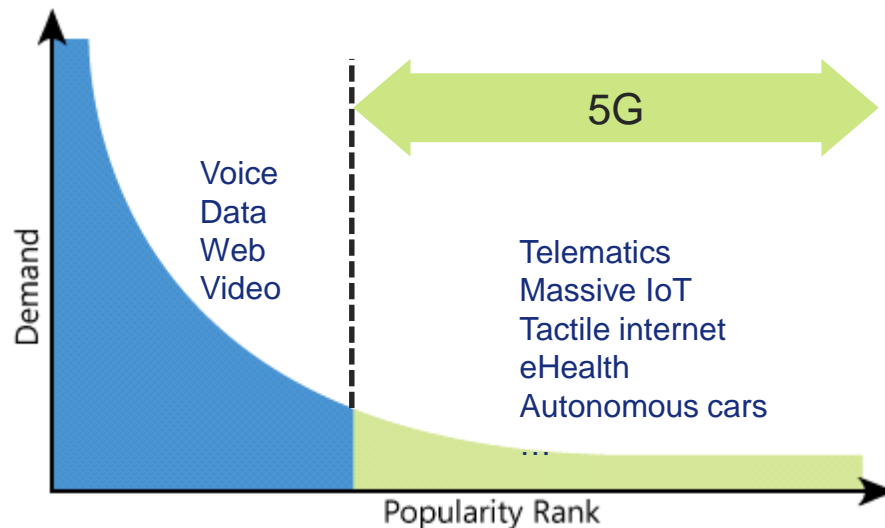
TRANSFORMATION TO A PLATFORM BUSINESS

Providing the blueprint for success through member-driven collaboration

Information Framework

Information Framework
Process Framework

Process Framework
Functional Framework

Application Framework
REST APIs

Integration Framework
Metrics

B2B Partnering

Services
Platform
Infrastructure

COTS Era 2001 - 2011
Digital Era 2012 - 2015
Platform Era 2016+

Multiple virtual networks carried on a single physical infrastructure

Source: Ericsson

Demand

Voice
Data
Web
Video

5G

Telematics
Massive IoT
Tactile internet
eHealth
Autonomous cars
...

Popularity Rank

5G will widen the scope of connectivity, enabling businesses not well served by current technology

TM Forum Agile Programs

Three Pillars of Digital Transformation

How do I simplify / accelerate partering in the digital world?

- ✓ *Internet of Everything Mgmt.*
- ✓ *Rapid Partnering & Scaling*
- ✓ *B2B2x Best Practice Guidance*
- ✓ *Innovation Incubator*

Open Digital / IoE (inter-organization)
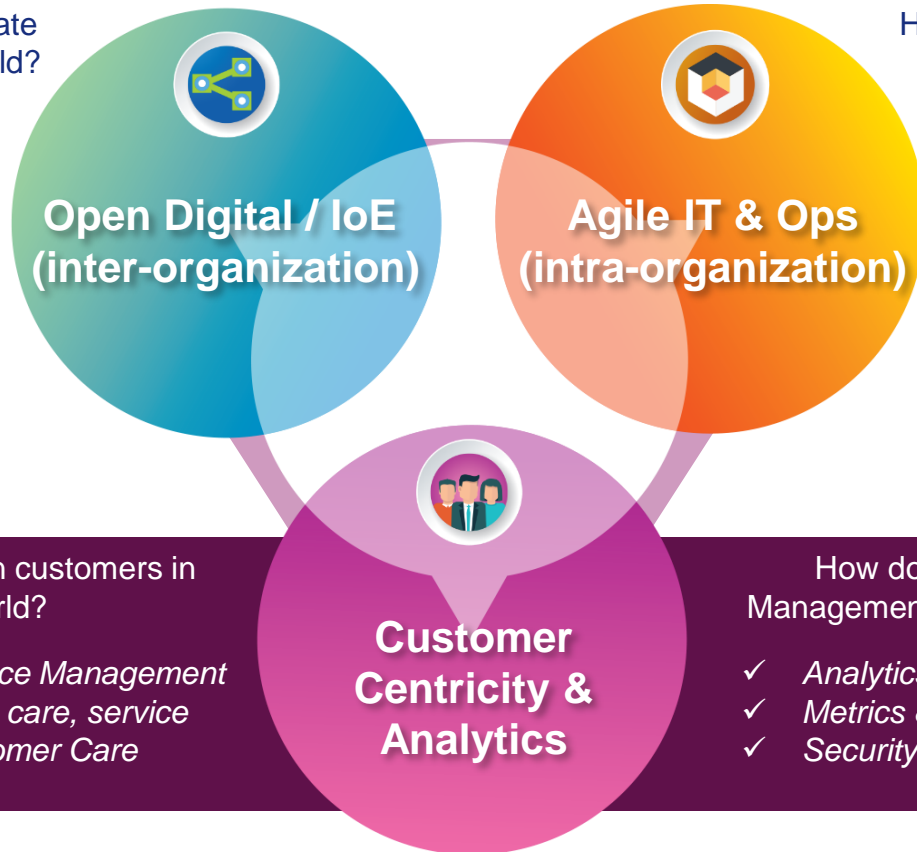
How do I transform my business to be fit for the digital world?

- ✓ *Agile IT & Hybrid Management*
- ✓ *Zero-touch Operations Orchestration & Management (ZOOM)*
- ✓ *DevOps; Procurement*
- ✓ *Continuous Business Transformation*

Agile IT & Ops (intra-organization)

Customer Centricity & Analytics

How do I gain and retain customers in the digital world?

- ✓ *Customer Experience Management*
- ✓ *Omnichannel retail, care, service*
- ✓ *Cognitive / AI Customer Care*

How do I provide Revenue Management, Security and Privacy?

- ✓ *Analytics*
- ✓ *Metrics & SLAs*
- ✓ *Security & Privacy*

TM Forum Agile Business and IT Program

Technology Change

Marketplace Forces

Internal Transformation to an effective digital ecosystem player
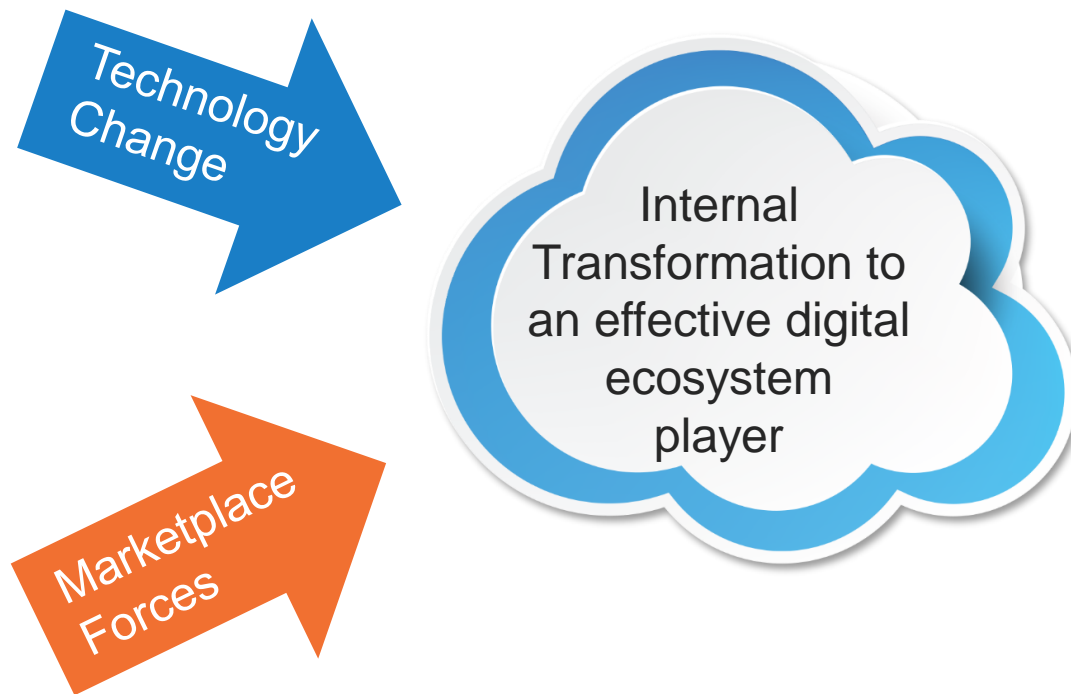
Business and Process Transformation
- Ready to play a role in an ecosystem
- Agile processes
- Embracing constant change

IT Transformation
- From static integration to dynamic orchestration
- From monolithic applications to platform services
- From telco paradigms to hybrid management

Focus on customers and services, not network infrastructure

Agile working, frequent incremental changes incorporated using a DevOps approach

Future Operations Center

Extensive liaisons with ecosystem partners both as providers and channels

Automation driven by data analytics and policies to reduce cycle time and cost
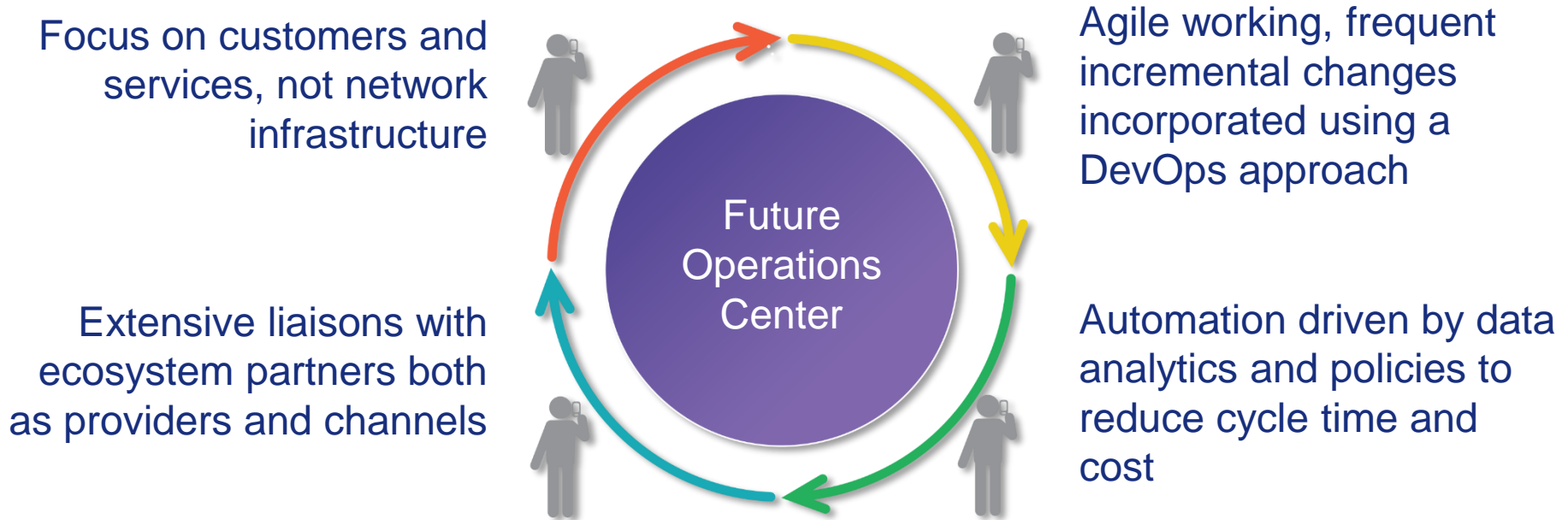
End-to-end operations of a digital services platform

Operational and Business IT Evolved

Current State

Traditional systems are a static integration of thousands of applications. As new appliances are added new integrations are needed.

Users

OSS
Integration

Network Appliances

Change Agents

Agile – able to accommodate constant change and support DevOps

Part of an ecosystem - services are provided by partners or owned or rented

Managing virtual and legacy functions seamlessly

Componentised – Service components are granular and so are the supporting services

Secure and private – multiple separate slices

Highly automated – processes are increasingly zero touch

Future State

The future will be based on supporting platform services exposed by each component. New services will be dynamically added with their associated support service.

Self Service Dominates

Services

PaaS

IaaS

Catalog

Performance

Billing

Analytics

Building the Digital Operations Center of the Future

The Agile Business & IT Program helps service providers and enterprises continuously optimize their IT and operations to deliver the speed and flexibility needed to succeed in the digital world – dramatically reducing costs, risks, and time-to-market.

Digital Operations Center of the Future
Enabling the transition to an agile virtualized world

Managing Hybrid Networks
Extending proven assets of today to encompass virtualization

IT Transformation
Enabling the IT transformation to the support services of tomorrow

Related and joint work streams in ZOOM and Core Frameworx projects

APIs
Bridging the value fabric

100+ leading companies involved including:

accenture Alcatel-Lucent amdocs at&t ciena 中国移动 China Mobile

CISCO COMARCH COMVERSE COX Deloitte. Deutsche Telekom

ERICSSON etiya hp HUAWEI IBM intel

Microsoft NEC NetCracker ORACLE orange SIGMA sigma-systems.com

Sprint Symantec TATA TELECOM ITALIA Telefónica TELE KOM AUS TRIA

telenor TeliaSonera TEOCO verizon WIPRO ZTE中兴

- **10 Catalysts** at TM Forum Live! 2014 & 2015; **15+ for 2016**
- **130,000 subscribers** to our Agile Business & IT newsletter

The Agile Business & IT Roadmap

	Planning **Reports and guides**	**Implementation** **Engineering detail**	**Future** **Research**
IT	• Frameworx enhancements • Architecture principals • Technical reports	• Industry standard network resource information model • APIs for virtual networks • Service Orchestration reference architecture	• Fine grained component architectures • Intent based policy automation
Business Process	• Procurement transformation • Operational readiness • Agile product lifecycles	• Evolved process models for hybrid IT / telco management • VNF packaging for procurement and operations	• Towards a true DevOps paradigm • Managing intent based policy automation

TM Forum collaborative development is matched to our members' transformation journey

Current State

The business opportunities of the future are not best served by today's network operations models

Strategy, Planning

Fulfillment, Assurance Billing

Product Management

Service Management

Resource Management

Systems
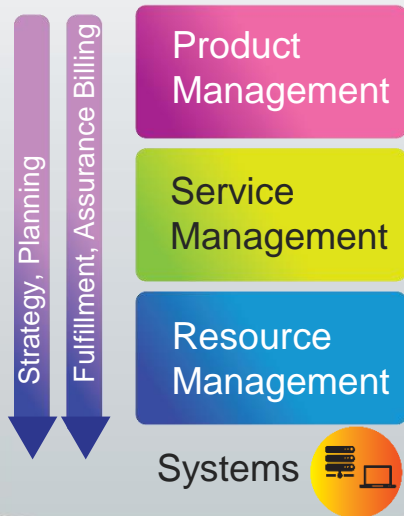
TM Forum Workstreams

- Key operational principles of the future
- Evolved process and model definitions (eTOM) to support
  - Agile Product Lifecycle management
  - Federated product and service catalogs
  - Policy based management
- Procurement models for complete enabled Virtual functions
- Business to Business partnering guides

Future State

A future operations center will require a complete business transformation to an agile partnership model supporting constant change

Future Operations Center

- Agile NaaS Leveraging LSO, SDN and NFV

- Delivering Open Cloud Eco-Systems for The Digital SME

- Future State: Virtualizing Carrier Operations

- Maximizing Profitablity with NFV Orchestration

- NFV Ecosystem Enabler: a well-enabled VNF package

- NFV/SDN – A fresh approach to the business of Business Data Services

CURRENT CATALYSTS

Analytics Big Data Repository (ABDR)

Gadi Solotorevsky from Amdocs outlines how this Catalyst is about enabling innovation in 'big data.' It is about creating 'data lakes' of information and putting a structure on top of them that will enable all parties wanting to use this new data standard for testing new ideas quickly. Supporting article here. View presentation here.

Champions: China Mobile, Cox Communications, Orange, Telekom Malaysia
Participants: SAP, Amdocs, Infosys, Apptium, DigitalRoute

Big data openness for application development ecosystem

The objective of this Catalyst is to build an open platform to help service providers get value from their data. Applejuan Li from Huawei explains how the data is passed through this openness platform and be made available for developing apps that will benefit customers as well as increase the business value to the service providers in a secure environment. Supporting article here. View presentation here.

Champion: China Mobile
Participants: Huawei, Viavi, Infosys, Guavus, Highjet, EBIstrategy

APPEX Omnichannel

The objective of this catalyst is to create a solution framework to build use cases in an agile and rapid time-to-market manner. Tim Morgan from Huawei outlines how this is being in a business architecture led approach. Supporting article here. View presentation here.

Champion: Vodafone
Participants: Huawei, ESRI, MACCSA, IBM, Sigma, NTS

Machine Learning Optimizing Omnichannel

This Catalyst addresses a future environment where service providers are provider multiple services in the global domain. Prof. Paul

Omnishop

Serving the customer across many channels and enabling the buying experience across multiple channels. Rigas Parathyras for Liberty Global explains that from the customer point of

New Business Models with Mobile Sponsored Data

Mustafa Oyumi from Salesforce talks about the demands customers are making for things to be easier to do - for simplicity. Even with the

5843003

https://www.tmforum.org/collaboration/catalyst-program/current-catalysts/

tmforum

Updates to the existing Application Framework to support NFV, building on extensive existing work

- IG1130 (IG1130 Future TAM Impacts by SDN/NFV)
- IG1117 "OSS/BSS Futures
- IG1118 "OSS/BSS Futures: Preparing the Future Mode of Operations"

Frameworx Exploratory Report

TAM Impacts by SDN/NFV: Detailed Analysis and Implementation

IG1130A
Release 16.0.0
May 2016

| Latest Update: Frameworx Release 16 | Member Evaluation |
| Version 1.0.7 | IPR Mode: RAND |

©TM Forum 2016. All Rights Reserved.

Hybrid Management

tmforum

Current State

Adoption of NFV is a vital first step on the road to but is not efficiently supported by today's management systems.
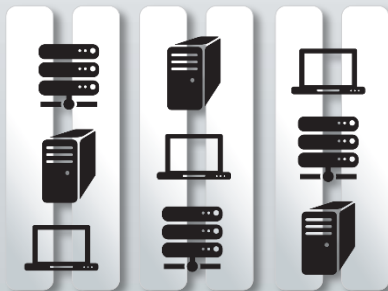
TM Forum Workstreams

- Industry standard NFV Information models for interoperability
- Consistent standardised APIs
- An overarching service orchestration reference architecture
- A reference architecture for a Hybrid Network Platform as a Service (end to end NFV management)

Future State

A digital service provider will require a new standards based hybrid orchestration based solution, delivered cost effectively.

SDN Apps | Open Stk | ...
SDN Controller | Virtualization Management
Legacy NMS

Physical Network | **Virtualized Network**

Hybrid NFV/SDN Catalysts
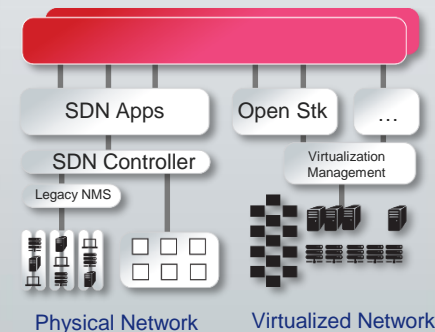
- Agile NaaS Leveraging LSO, SDN and NFV

- API Simulator

- Building Model-Driven Service Orchestration via an FMO Architecture

- Delivering Open Cloud Eco-Systems for The Digital SME

- Future State: Virtualizing Carrier Operations

- Maximizing Profitablity with NFV Orchestration

- OpenMano resource and service orchestration

CURRENT CATALYSTS

Analytics Big Data Repository (ABDR)

Gadi Solotorevsky from Amdocs outlines how this Catalyst is about enabling innovation in 'big data.' It is about creating 'data lakes' of information and putting a structure on top of them that will enable all parties wanting to use this new data standard for testing new ideas quickly. Supporting article here.
View presentation here.

Champions: China Mobile, Cox Communications, Orange, Telekom Malaysia
Participants: SAP, Amdocs, Infosys, Apptium, DigitalRoute

Big data openness for application development ecosystem

The objective of this Catalyst is to build an open platform to help service providers get value from their data. Applejuan Li from Huawei explains how the data is passed through this openness platform and be made available for developing apps that will benefit customers as well as increase the business value to the service providers in a secure environment. Supporting article here.
View presentation here.

Champion: China Mobile
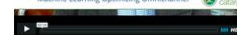*Participants*: Huawei, Viavi, Infosys, Guavus, Highjet, EBIstrategy

APPEX Omnichannel

The objective of this catalyst is to create a solution framework to build use cases in an agile and rapid time-to-market manner. Tim Morgan from Huawei outlines how this is being in a business architecture led approach.
Supporting article here.
View presentation here.

Champion: Vodafone
Participants: Huawei, ESRI, MACCSA, IBM, Sigma, NTS

Machine Learning Optimizing Omnichannel

This Catalyst addresses a future environment where service providers are provider multiple services in the global domain. Prof. Paul
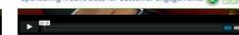
Omnishop

Serving the customer across many channels and enabling the buying experience across multiple channels. Rigas Parathyras for Liberty Global explains that from the customer point of
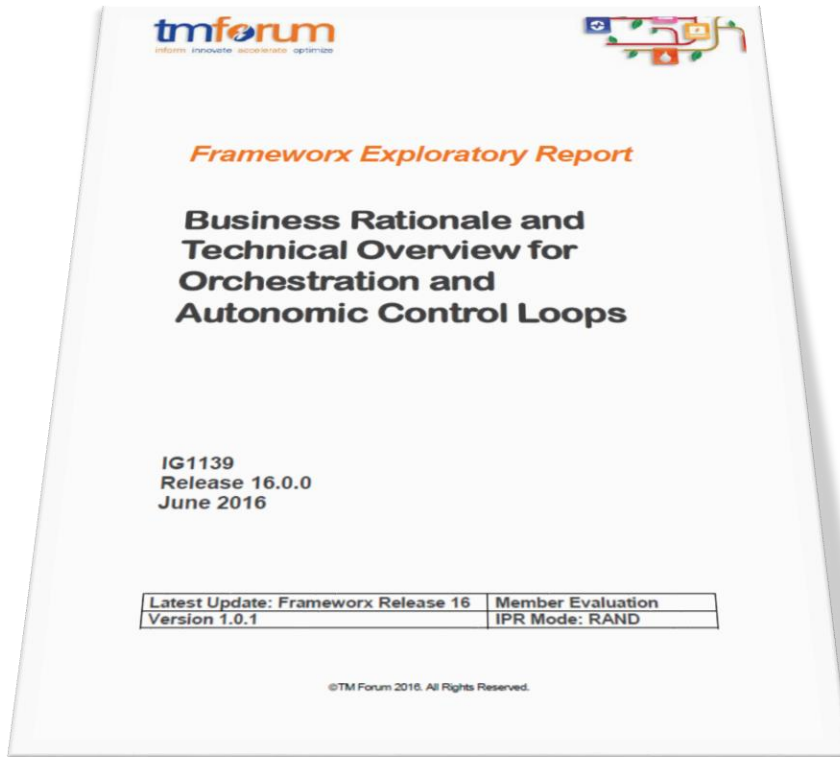
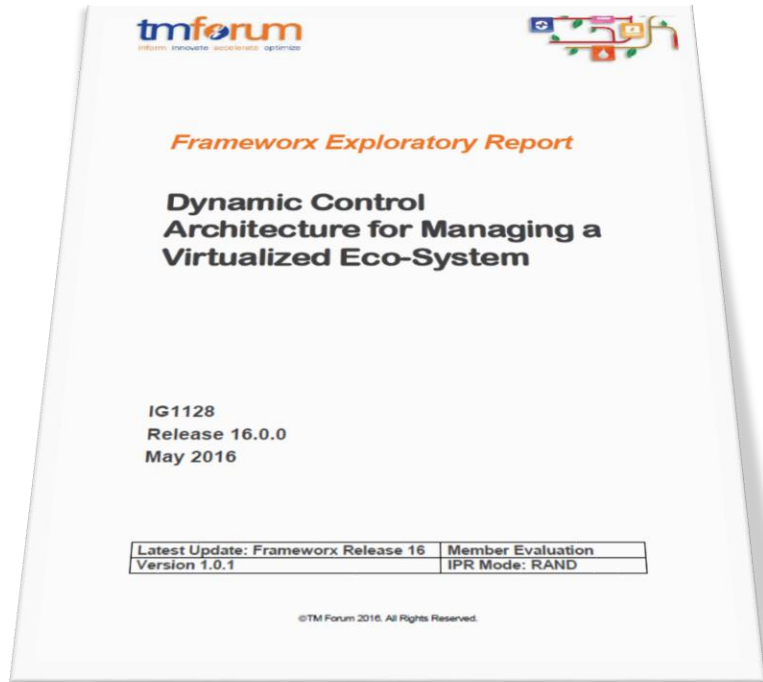**New Business Models with Mobile Sponsored Data**

Mustafa Oyumi from Salesforce talks about the demands customers are making for things to be easier to do - for simplicity. Even with the

5843003

https://www.tmforum.org/collaboration/catalyst-program/current-catalysts/

Specific Deliverables

- Information Framework extensions to support a hybrid Network which defines four concepts fundamental to modelling NFV-based systems

  - VirtualResource

  - NetworkFunction

  - NetworkService

  - Graph

- Material is currently being reviewed and further refined to align with existing model

- Will form the basis multi-SDO common model work

tmf⊘rum

Current State

A "traditional" OSS is an integration of thousands of applications into a system. Adding each new appliance requires fresh integration.

Users

OSS
Integration

Network Appliances

TM Forum Workstreams

- Reference architecture with well defined platform services
- Future Mode of Operations (FMO) architecture requirements & principals
  - FMO component APIs & interfaces
  - Management-Control Continuum (MCC) components, architecture and lifecycles
- Intent based policy automation assets
  - Policy information models

Future State

A future OSS will be based on supporting platform services exposed by each component platform by APIs. New services will be automatically added.

Self Service Dominates

Services

PaaS

IaaS

Catalog

Performance

Billing

Analytics

IT Transformation

- API Simulator

- Building Model-Driven Service Orchestration via an FMO Architecture

- E2E Orchestration for advanced IoT services

- Future State: Virtualizing Carrier Operations

- NFV Ecosystem Enabler: a well-enabled VNF package

- NFV/SDN – A fresh approach to the business of Business Data Services

- OpenMano resource and service orchestration

CURRENT CATALYSTS

Analytics Big Data Repository (ABDR)

Gadi Solotorevsky from Amdocs outlines how this Catalyst is about enabling innovation in 'big data.' It is about creating 'data lakes' of information and putting a structure on top of them that will enable all parties wanting to use this new data standard for testing new ideas quickly. Supporting article here. View presentation here.

Champions: China Mobile, Cox Communications, Orange, Telekom Malaysia
Participants: SAP, Amdocs, Infosys, Apptium, DigitalRoute

Big data openness for application development ecosystem

The objective of this Catalyst is to build an open platform to help service providers get value from their data. Applejuan Li from Huawei explains how the data is passed through this openness platform and be made available for developing apps that will benefit customers as well as increase the business value to the service providers in a secure environment. Supporting article here. View presentation here.

Champion: China Mobile
Participants: Huawei, Viavi, Infosys, Guavus, Highjet, EBIstrategy

APPEX Omnichannel

The objective of this catalyst is to create a solution framework to build use cases in an agile and rapid time-to-market manner. Tim Morgan from Huawei outlines how this is being in a business architecture led approach. Supporting article here. View presentation here.

Champion: Vodafone
Participants: Huawei, ESRI, MACCSA, IBM, Sigma, NTS

Machine Learning Optimizing Omnichannel

This Catalyst addresses a future environment where service providers are provider multiple services in the global domain. Prof. Paul

Omnishop

Serving the customer across many channels and enabling the buying experience across multiple channels. Rigas Parathyras for Liberty Global explains that from the customer point of

New Business Models with Mobile Sponsored Data

Mustafa Oyumi from Salesforce talks about the demands customers are making for things to be easier to do - for simplicity. Even with the

5843003

https://www.tmforum.org/collaboration/catalyst-program/current-catalysts/

Frameworx Exploratory Report

Business Rationale and Technical Overview for Orchestration and Autonomic Control Loops

IG1139
Release 16.0.0
June 2016

Latest Update: Frameworx Release 16	Member Evaluation
Version 1.0.1	IPR Mode: RAND

©TM Forum 2016. All Rights Reserved.

End to End multi level orchestration

- Proposes an architecture based on orchestration accomplished through a federation of domains and autonomic control loops.

- Very much a first iteration and additional participants are welcome

Frameworx Exploratory Report

Dynamic Control Architecture for Managing a Virtualized Eco-System

IG1128
Release 16.0.0
May 2016

| Latest Update: Frameworx Release 16 | Member Evaluation |
| Version 1.0.1 | IPR Mode: RAND |

©TM Forum 2016. All Rights Reserved.

Closed Loop control architecture

- Presents some practical closed-loop use cases as presented in TM Forum catalysts during 2015.

- The main concepts used by these catalysts are analyzed as a step forward to achieving a more dynamic control-loop architecture.

Connecting Everything Together via APIs

The TM Forum API portal provides a complete set of developer resources to rapidly implement management interfaces using standardised REST interfaces covering:

- Trouble Ticket
- Customer Management
- Product Catalog Management
- Product Inventory Management
- Product Ordering
- Billing Management
- Party Management
- SLA Management
- Usage Management
- Performance Management

At TM Forum Live! 2016, TM Forum announced that nine of the world's leading service providers – Axiata, Bharti Airtel, BT, China Mobile, China Unicom, NTT-Group, Orange, Telefónica and Vodafone – have officially adopted TM Forum's suite of Open APIs for digital service management.

https://www.tmforum.org/open-apis/

- Extending the portfolio

  - Address Management API

  - Appointment API

  - Agreement API

  - Onboarding API

- Assets to support rapid adoption

  - TR258 Mapping MEF LSO to TMF APIs:

  - GB990 API Data Model and Information Framework Mapping Guide Book

  - Crowdsourcing template to allow easier contributions
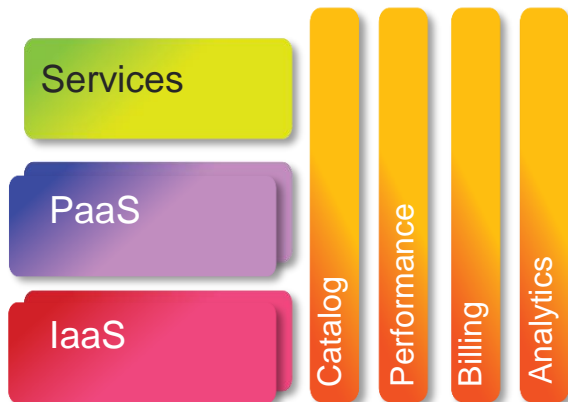
In a 5G world, digital services providers will be platform-based businesses operating as part of an ecosystem.

Operational and business management will be through dynamic orchestration of platform services across ecosystem partners.

Platform components will become finer grained and more generic and abstract with business logic moving to the policies that drive orchestration.

Automation will dominate, driven by intent-based policies using data analytics across a wide range of business and technical sources.

Change will be the only constant

Services
PaaS
IaaS

Catalog
Performance
Billing
Analytics

5G Catalysts

- Maximizing Profitability with NFV Orchestration

- Building Model-Driven Service Orchestration via an FMO Architecture

CURRENT CATALYSTS

Analytics Big Data Repository (ABDR)

Gadi Solotorevsky from Amdocs outlines how this Catalyst is about enabling innovation in 'big data.' It is about creating 'data lakes' of information and putting a structure on top of them that will enable all parties wanting to use this new data standard for testing new ideas quickly. Supporting article here. View presentation here.

Champions: China Mobile, Cox Communications, Orange, Telekom Malaysia
Participants: SAP, Amdocs, Infosys, Apptium, DigitalRoute

Big data openness for application development ecosystem

The objective of this Catalyst is to build an open platform to help service providers get value from their data. Applejuan Li from Huawei explains how the data is passed through this openness platform and be made available for developing apps that will benefit customers as well as increase the business value to the service providers in a secure environment. Supporting article here. View presentation here.

Champion: China Mobile
Participants: Huawei, Viavi, Infosys, Guavus, Highjet, EBIstrategy

APPEX Omnichannel

The objective of this catalyst is to create a solution framework to build use cases in an agile and rapid time-to-market manner. Tim Morgan from Huawei outlines how this is being in a business architecture led approach. Supporting article here. View presentation here.

Champion: Vodafone
Participants: Huawei, ESRI, MACCSA, IBM, Sigma, NTS

Machine Learning Optimizing Omnichannel

This Catalyst addresses a future environment where service providers are provider multiple services in the global domain. Prof. Paul

Omnishop

Serving the customer across many channels and enabling the buying experience across multiple channels. Rigas Parathyras for Liberty Global explains that from the customer point of

New Business Models with Mobile Sponsored Data

Mustafa Oyumi from Salesforce talks about the demands customers are making for things to be easier to do - for simplicity. Even with the

5843003

https://www.tmforum.org/collaboration/catalyst-program/current-catalysts/

Agile Business and IT

H2 2016 priorities

Operations Centre of the Future

A vision for the operations centre of the future driving
    Evolution of the process models to support the vision
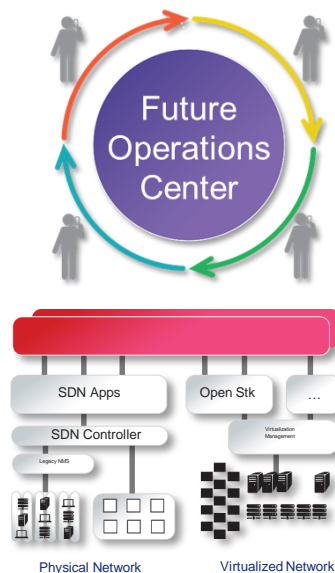   Evolution of the application to a functional model
Packaging procuring and lifecycle management on virtual functions

Hybrid NFV Management

Practical assets for large scale multi vendor deployment
    An industry common Information model
    A complete reference model for Hybrid network platform as a Service

IT transformation

Reference Model for an end to end orchestration architecture
Creating key frameworks for future architectures
    Microservices architecture principles
   Automation principles

Action Week Vancouver (July 11-15) is an exclusive opportunity to join forces with like-minded individuals within the TM Forum members' community to work hand-in-hand with industry experts committed to addressing those challenges delivering real results with specific outcomes.

3 Reasons to attend

1. Opportunity to network with your peers in a workshop, friendly, environment

2. Be inspired by keynotes, proof-of-concept Catalysts, and more!

3. Take home specific ideas and strategies that can be applied to your own business to reduce costs, accelerate innovation, improve efficiency, and foster growth

actionweek.tmforum.org

Learn how others put it into practice
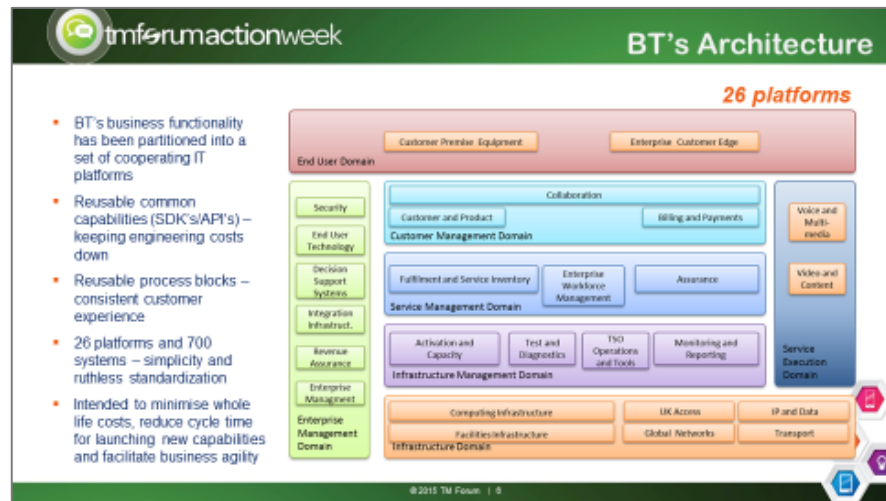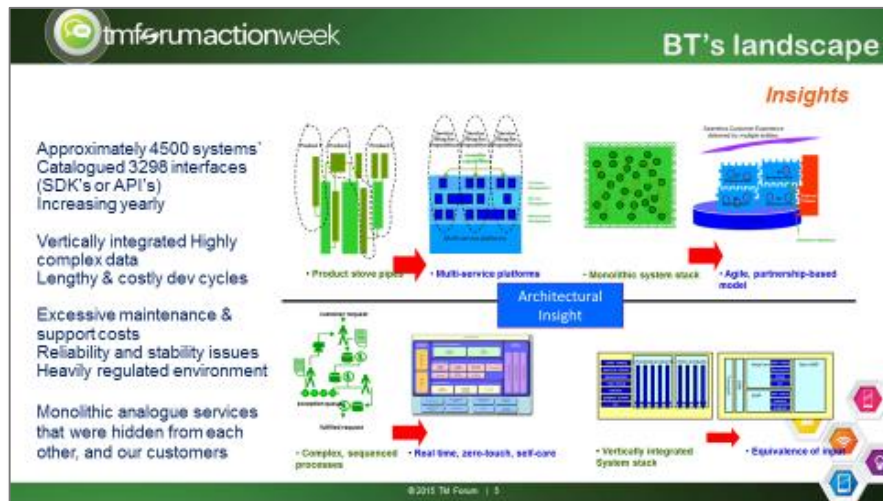
At a TM Forum Action Week 2016 in Lisbon, BT showed how by adopting these principles they have:

- Reduced 4,500 systems to 26 platforms and 700 systems
- Reduced news service introduction from 8 months to mere hours in some cases

TAW Agile Agenda at a Glance

tmforum

MON	AM	Opening Session				Hackathon
	PM	Zoom 16.5 Introduction & Overview			Frameworx	
TUE	AM	Hybrid Network Platform-aaS - Cross Zoom team session			Frameworx	Hackathon
	PM	Hybrid Network Platform-aaS	CNWRM	Procurement & auto-on-boarding		
WED	AM	Platform Session				
	PM	Op-Centre of the Future - Vision	CNWRM	Catalysts / Zoom / C&B	Frameworx	API
THUR	AM	Orchestration (IG1139 v2)	Common Network Resource Model	Operations Centre of the Future - Frameworx	Frameworx	API
	PM					
FRI	AM	Individual Team Overflow / Wrap-up				

These are exciting times for digital services, especially the established communications service providers

The TM Forum Agile Business and IT program is working on both business and technical aspects of the changes needed thrive in this new reality, creating real assets

Get involved
actionweek.tmforum.org
www.tmforum.org/training-certification