



Intelligent operations for a 5G era



Steffen Roehn
Chairman
TM Forum

“ TM Forum has recently made an extremely challenging but very credible shift to become the driving force for all members concerning digital leadership and transformation: that matches my vision and belief in progress through effective collaboration very well. ”

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Our industry is transforming

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SECTION 1

Intelligent operations for a 5G era

I strongly believe that the next decade will be one of opportunity for the telecoms industry – for those who can move fast enough. Seizing the 5G era opportunity, as established industries race to digitize, demands a revolution in telecoms companies' operating model – transforming time-to-market from years to days; simplifying and automating across the business; revolutionizing IT and embracing agile ways of working and partnering.

TM Forum is a not-for-profit industry association with a 30-year heritage in bringing together the people behind the tools and processes that have underpinned growth of the telecoms industry. Our 850 member companies generate US\$2 trillion in revenue and serve five billion customers across 180 countries. Members collaborate with each other through the Forum to create open solutions to shared problems and that collaboration is reaching new levels as the pace of change accelerates.

TM Forum's Open Digital Framework is created through the continuous expert collaboration of our global membership and is introduced on page 18 of this guide. The framework provides the blueprint for service providers to deliver intelligent operations fit for the 5G era. It enables a step-change in business agility, operating cost and customer centricity by revolutionizing the operating model of service providers and their technology partners. This living framework combines the tools, knowledge and essential standards needed to transform legacy ways of working, processes and underlying IT systems in a single framework, to enable zero-touch interoperability and ecosystem partnering.

I hope you enjoy reading this pocket guide to the Forum and learning more about how we are helping our members to seize 5G era opportunities.



Nik Willetts, *President and CEO, TM Forum*



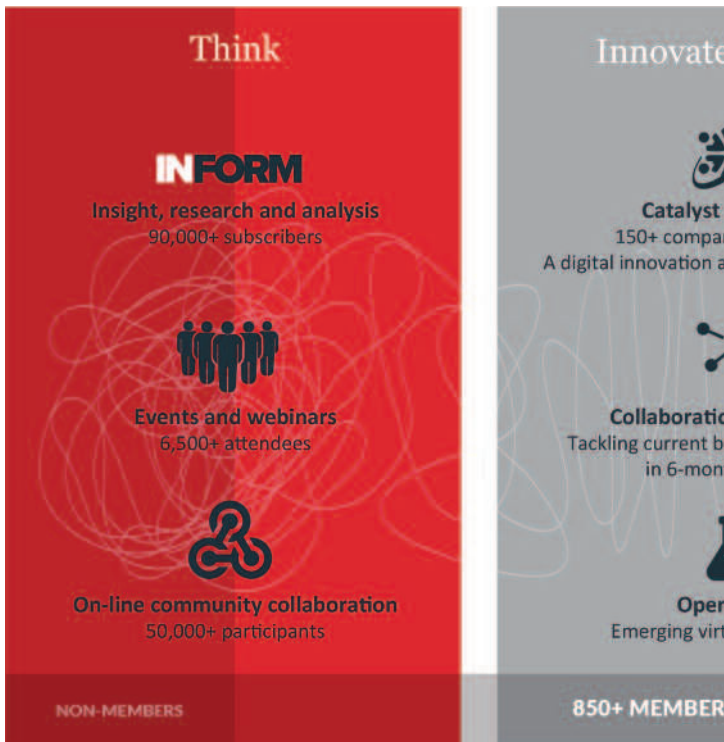
Harmeen Mehta

Global CIO
Bharti Airtel

“ Digital leadership starts with a thought and ends with an innovative act; it is when technology is the means to disrupt the conventional way of doing things to create a brilliant customer experience! This is exactly what we are trying to do at TM Forum: to take genuine business problems, solve them with disruptive thinking and build a maturity model around it so that the industry can benchmark itself. ”

SECTION 2

We give our members TIME...



e & Make



program

panies engaged
and R&D marketplace



on programs

business challenges
with sprints



labs

actual test-beds

S WORLDWIDE

Execute



Open Digital Framework

150,000+ downloads annually. Helps businesses
improve their agility by migrating IT and
operations into cloud-native environments



Training, conformance and certification

12,000 trained from 300+ companies
towards 5G readiness



Benchmarking, leadership and awards

Guiding and benchmarking
digital transformation journeys

NON-MEMBERS

SECTION 3

THINK | Research & Media

TM Forum develops research throughout the year, delivering research reports, webinars and case studies.

We access senior executives both within communications service providers (CSPs) and their technology partners, surveying them on the issues that matter, benchmarking their progress on digital transformation, providing a unique position that allows us to build industry-wide views.

We focus on the issues that matter:

The themes that genuinely interest and challenge communication service providers - rather than topics that have gained publicity:

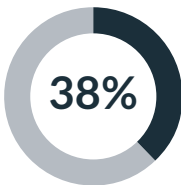
- Digital transformation
- Network operations
- AI and data
- Digital customer
- Cloud native IT
- Procurement

Inform: Your content hub

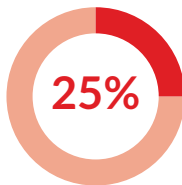


90,000+

Subscribers to Inform newsletters



CSPs



Director & above

“

The quality of [TM Forum's reports] is outstanding and has helped to push my understanding. TM Forum's Inform is my 'go to' for the latest research and is quite frankly, a lifesaver!"

David Gale,
Enterprise Solution Architect
Vodafone

“

We are very pleased with all aspects of this project. Good communications, reasonable fee structure, quality editing and production, and good distribution."

Thomas Russo,
Director Business Development
Spirent Communications



Visit inform.tmforum.org

SECTION 4

THINK | Events

Our Digital Transformation event series brings together the global Communication Service Provider and telecoms supplier communities in engaging and innovative events that help to accelerate the pace of digital transformation. These are festivals of telecommunications, with inspiring conference content, expos, Catalyst proof-of-concept projects and demonstrations, networking opportunities throughout, campfires and much more.

The events experience

- **Join 4500+**

of your peers at events across the globe to help drive digital transformation.

- **Be inspired by 400+**

speakers sharing real-life case studies

- **Visit expos**

showcasing the latest in technology to help you on your digital transformation journey

- **See 50+**

proof-of-concept Catalyst projects demonstrate innovative solutions

Visit: tmforum.org

Global event series 2019-2020



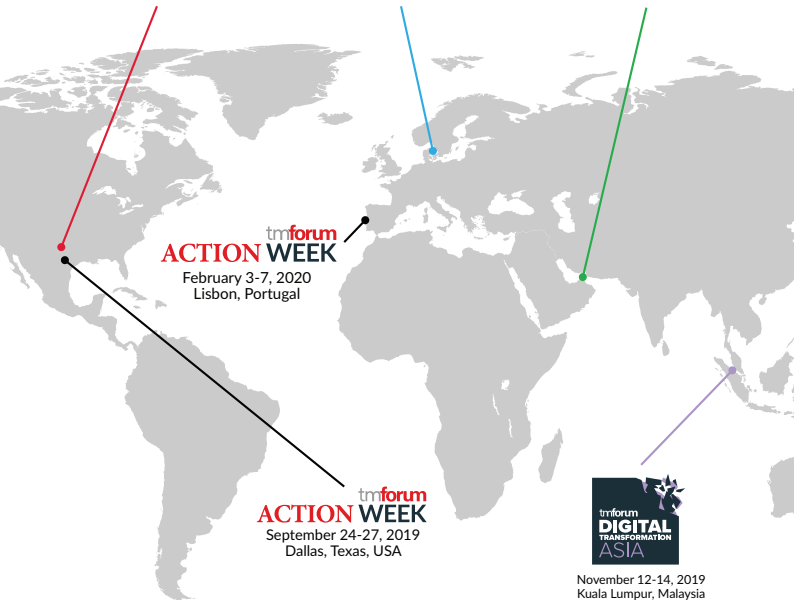
September 23, 2019
Dallas, Texas, USA



June 16-18, 2020
Copenhagen, Denmark



January 20-21, 2020
Dubai, UAE



Sponsorship and exhibit inquiries: eventsponsorship@tmforum.org
Attendance inquiries: register@tmforum.org

tmforum.org/events

SECTION 5

THINK | Community

Join our community

As a global member association for digital business we know how valuable it is to network and collaborate with other like-minded professionals. Now more than ever, as we are all grappling with a changing marketplace, complex business transformations and new platform-based business models, the ability to collaborate with peers is essential.

By joining our new communities, we hope you will find the topics that interest you, pose questions, participate in discussions, solve problems and share resources that will help others, as well as gain valuable knowledge from other seasoned professionals.



Join over 50,000
of your peers across many
different community discussions



Explore topics
including AI & Data; Customer
Experience; Digital Ecosystems;
IoT and Open APIs

Join us – engage.tmforum.org



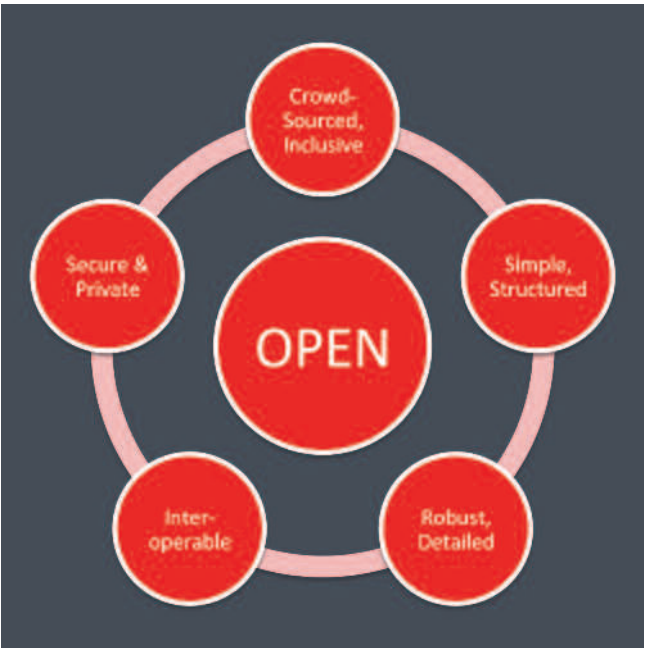
Peter Leukert
Global CIO
Deutsche Telekom

“ Life is for sharing – that is what Deutsche Telekom stands for. TM Forum is a great place for sharing ideas, experiences, vision and perspectives. The digital future holds great opportunities and risks for telcos. The Forum can make a contribution to shape a positive future for the industry and its customers. ”

SECTION 6

INNOVATE & MAKE | Collaborative R&D

We at TM Forum believe that collaboration has been, and always will be, the most powerful way to transform our global industry. We forge strong, diverse teams of inspiring industry experts from leading organizations to conceive OPEN requirements and design practical solutions.



Our collaborative R&D is structured into four programs:

The Digital Maturity program

helps our members define what 'digital transformation' means for them and provides practical tools and solutions that helps them deliver their own digital vision and improve their skills through leveraging of TM Forum and Member assets.

The IT & Network Transformation program

is building an Open Digital Architecture which sets a new vision for operational and business support systems, and a standard for the design of open digital platforms. Its ambition is to deliver a model-driven and data-driven architecture that relies on metadata, microservices and includes a clear set of normalized Open APIs. The Open Digital Architecture offers an industry-agreed blueprint, language and set of key design principles to follow. It provides pragmatic pathways from maintaining monolithic, legacy software solutions, towards managing nimble, cloud-native capabilities that can be orchestrated using AI.

The Insights & Intelligence program

is bringing members together to realize the potential of AI in the telecommunications industry through a standard-implementation approach to speed up development and reduce the cost of harnessing this powerful technology. Understanding and measuring the impact of AI, coordinating AI developments and leveraging AI learnings across business and operational domains will all impact directly on the effectiveness and value of AI solutions which will in turn help the industry to embrace an automated future.

The Digital Ecosystems program

is designed to empower members, to allow them to capitalize on the digital revolution and integrate value ecosystems. We help identify and seize business opportunities as well as develop practical assets enabling a structured, scalable approach to commercializing new services.

SECTION 7

INNOVATE & MAKE | Catalysts

Some of the companies helping to create a telecoms innovation marketplace:



TM Forum Catalysts:

- Rapid fire, member-driven, proof-of-concept projects
- Connect ecosystems (CSPs, integrators, vendors, enterprises)
- Create innovative solutions to new industry challenges
- Validate, and contribute back to, TM Forum best practices & standards
- Present showcase demonstrations at TM Forum events

Forming

Select an industry challenge and create a team to work together

Storming

Collaborate as a team to develop a solution

Norming

Showcase proof-of-concept solution at TM Forum events

Performing

Take the solution to market

1-2
months

2-3
months

1
month

Ongoing

FACT: Catalyst projects connect service providers, suppliers & enterprises to solve common challenges

FACT: Speed up your R&D process by up to 5 times

FACT: Over 1000 companies have taken part in Catalyst projects

FACT: Vodafone draws on TM Forum Catalyst project for UK 5G trials

Join a Catalyst: tmforum.org/catalyst

SECTION 8

EXECUTE | Open Digital Framework

TM Forum's Open Digital Framework provides the blueprint for service providers to deliver intelligent operations fit for the 5G era. The framework enables a step-change in business agility, operating cost and customer centricity by revolutionizing the operating model of service providers and their technology partners. Created through continuous

Where you are

CSP domain

Operations
(processes & people)

BSS

OSS

Network (asset)

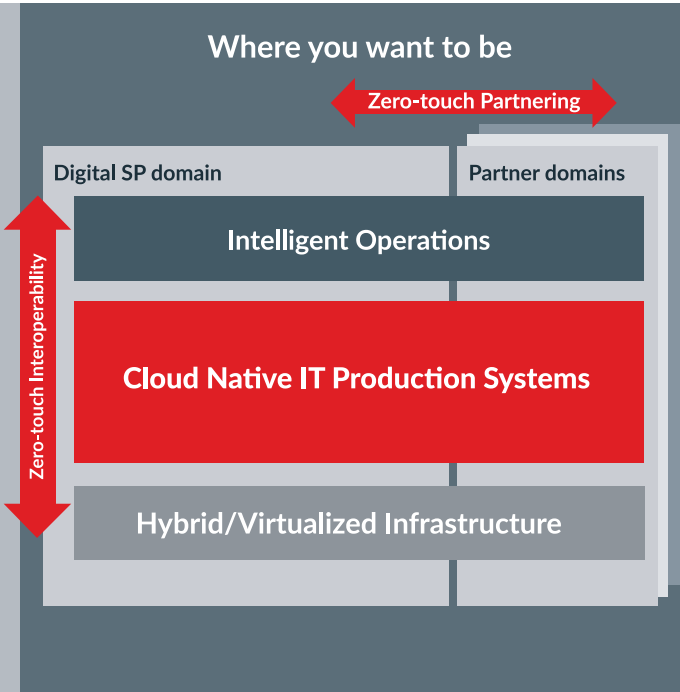
What's your transformation method?

Optimize

Re-engineer

Abstract

global expert collaboration, this living framework combines the tools, knowledge and essential standards needed to transform legacy ways of working, processes and underlying IT systems in a single framework, to enable zero-touch interoperability and ecosystem partnering.



SECTION 8

The components of the Open members during

Open Digital Framework



Digital Framework help our three key phases



Evaluation

- **Maturity Models and Readiness Checks** to help you baseline your digital capabilities
- **Business Use Cases** to help innovate your business models
- **Market Dynamics** to understand your positioning vs the competition



Execution

- **Business Capability Map**, a common language for IT and Business
- **Open Digital Architecture** for cloud-native IT
- **Open APIs** for zero-touch integration
- **Governance, Security & Privacy** by design
- **Data, Analytics & AI** driven intelligent operations
- **Frameworkx** foundation libraries – the DNA of a Digital Service Provider

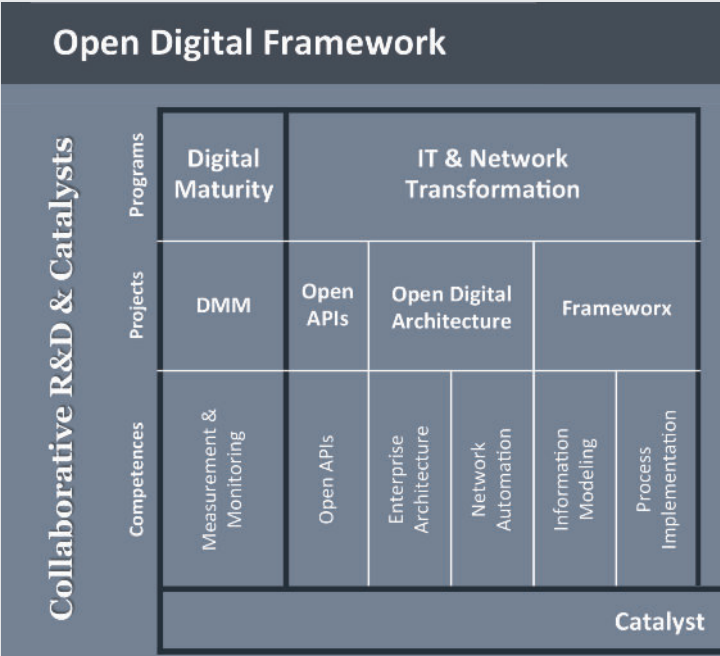


Experience

- **Transformation Guides** to help you get started on your journey
- **Best Practices** to help avoid pitfalls
- **Case Studies** to learn from others

SECTION 8

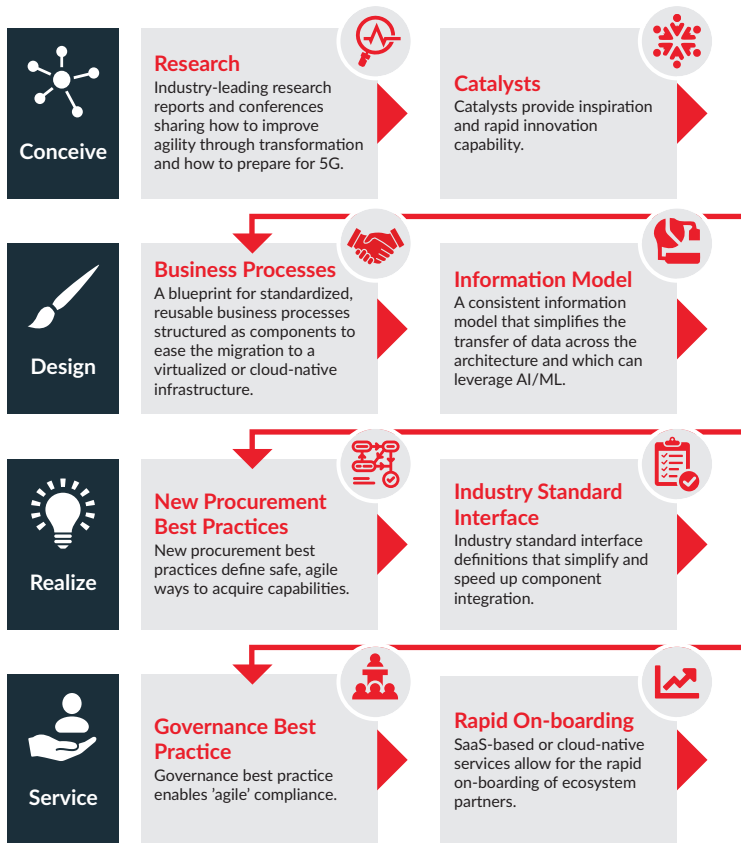
TM Forum's collaboration programs are building the Open Digital Framework



Our members set the priorities for our work and contribute to the collaborative projects that build the thought leadership, guide books, best practices and standards that shape the future for digital business in any industry. Come join one of our collaborative projects today.

Insights & Intelligence			Digital Ecosystems			
CEM	AI	Data Mgt	Digital Ecosystem Management			Smart City
Customer Experience Management	AI Implementation & Management	Data Management	Business Architecture	Business Assurance	Digital Ecosystem Monetization	IoT Management
Program						

How TM Forum helps members



improve business & IT agility

Development & Education

Business Agility Development & Education programs following the industry endorsed 70:20:10 methodology.



ODA + APIs

ODA + APIs provide the common language, metrics, processes, data and information requirements which are cloud ready.



Open Digital Lab

Open Digital Lab facilities to enable rapid innovation.



Transformation Guides

Transformation Guides with Patterns for the rapid implementation of new, automated 5G enabled services.



Marketplace

A marketplace for reusable software components.



AI-driven customer service operations

Patterns for AI-driven customer service operations can be leveraged for efficient, Service-Centric IT.



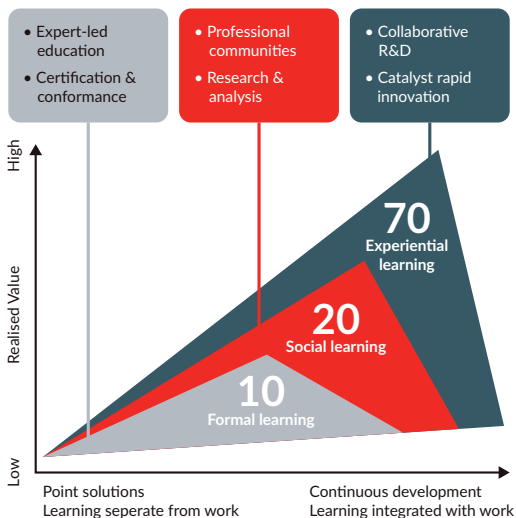
SECTION 9

EXECUTE | Career development

Official TM Forum Training and Certification programs help you educate your teams to address the cultural and skills gap caused by a shortage of digital talent.

We offer a 70:20:10 holistic approach:

- This starts with formal learning to create a foundation of knowledge and skills. Training courses and certification paths offer an executive education program to deliver the knowledge employees need to start using the standards and best practices that have been developed by TM Forum members over years of industry collaboration.
- Then we offer extensive TM Forum resources for social and experiential learning through our collaboration projects, communities, research and analysis and events.





GET
AHEAD **FULL**
OF KNOWLEDGE

Develop a digital workforce in your organization

Contact us to upskill your team tmforum.org/training

“



I found my TM Forum training experience extremely valuable. It helps me provide the appropriate guidance to my API teams at TELUS in our digital transformation efforts to simplify and scale data interchanges throughout the organization.”

Andrew Kumar,

*Lead / Group Product Manager, Digital Platforms,
TELUS*

SECTION 10

EXECUTE | Leadership & awards

Digital Leadership

The Digital Leadership Network is designed to bring together the global community of digital transformation leaders to share ideas and expertise on successful business transformation and growth journeys. It is tailored to the needs of CXOs and digital leaders, helping them to share experience and knowledge; the network plugs TM Forum's executive-level members into a unique set of relationships and resources.

TM Forum's Excellence Awards

TM Forum's Excellence Awards recognize the world's leading companies for their innovative achievements spanning digital transformation, business and IT agility, customer centricity, cross-industry partnering and collaboration, and product and service innovation.

2019 Highlights



110

Completed entries



14

Award winners



46%

Service Providers



54%

Suppliers



50

Companies
shortlisted



23

Countries entered



Digital leadership firstly requires a clear idea of the business issues; next an understanding of how modern technologies - such as cloud, big data, AI etc - can help fix these business issues. Lastly, the possibility for experimentation of ideas and implementations is crucial. TM Forum helps the industry to share knowledge and practical experiences in each of these areas.”

Jian Fan,

Group Big Data Chief Scientist,
China Unicom



What does digital leadership mean to you?

To meet more digital business leaders and read about their transformation journeys, visit:

tmforum.org/face-digital-leadership

SECTION 11

Glossary

(AI): Artificial intelligence (AI) is the development of computer systems capable of performing tasks that normally require human intelligence; this includes visual perception (such as is required for self-driving cars), speech recognition, decision-making, and translation between languages.

API: a set of functions, protocols and procedures that allow the creation of applications which interact with the features or data of external software components. Although the term API has been around for years, at the moment there is a major trend towards connecting ecosystem partners with REST APIs. Check out the TM Forum Open APIs and see how widely they are being adopted as a standard.

Blockchain: is a continuously growing list of records, called blocks, which are linked and secured using cryptography. A blockchain can serve as an open, distributed ledger that can record transactions between two parties efficiently and in a verifiable and permanent way. By design, blockchains are inherently resistant to modification of the data. Check out TM Forum's work on exploring use cases for blockchain relevant to our members.

CEM: Customer experience management (CEM) is the collection of processes a company uses to track, oversee and organize every interaction between a customer and the organization throughout the customer lifecycle. This is an area that has grown enormously in recent years and with its customers getting ever more sophisticated, its importance is not going away.

DevOps: DevOps (development and operations) is a term used to describe an operating philosophy where development teams and operations teams collaborate and communicate much more closely and small incremental changes are regularly applied to systems. It looks like DevOps will be key to the agile operation of the future, check out the TM Forum member work on this in the Agile Operations toolkit.

DSP: Digital Service Provider (DSP) is a company that provides an outlet to distribute media or services in a virtualized environment. Traditional examples are iTunes and Amazon, but as communications becomes just one component of an end to end service, most communication service providers are transitioning to becoming broader digital service providers. That journey is at the heart of this pocket guide.

E2E: End to End (E2E), is a term used to refer to the consideration of the entire service. Up until recently it meant considering all domains of a service provider (like the core and access networks), but today it is being used more and more to mean a service across domains and across different ecosystem partners as well. Check out the Forum's work in end to end management and monetization in an IoE context.

IoE: The Internet of Everything (IoE) is a broad term that refers to devices and consumer products connected to the Internet and outfitted with expanded digital features. It is a philosophy in which technology's future is comprised of many different types of appliances, devices and items connected to the global Internet. Check out the Forum's work on how we manage, monetize and build trust across this complex world.

Frameworkx: TM Forum Frameworkx is a suite of best practices and standards that provides a common vocabulary and the blueprint for effective, efficient business operations. It enables you to assess and optimize performance using a proven, service-oriented approach to operations and integration. The practical tools available in Frameworkx help improve end-to-end management of services across complex, multi-partner environments.

NetOps: NetOps (network and operations) network changes are made in a small number of large, infrequent, upgrades in significant contrast to DevOps methods where changes are small and frequent. Although many see NetOps methods as the 'old way', we must recognise that they have helped us build a multi trillion dollar industry, and so migration in a thoughtful way is important. Check out the Forum's work in this area in the Agile Operations Toolkit.

NFV: Network functions virtualization (NFV) is an initiative to virtualize the network services that are now being carried out by proprietary, dedicated hardware appliances. If successful, NFV will decouple the software service from the hardware and decrease the amount of proprietary hardware that's needed to launch and operate network services. NFV brings with it enormous flexibility, but with flexibility comes complexity which must be managed. Check out the Forum's work on realising the business benefits of NFV in our ZOOM project and in our Agile OSS and Agile Operations toolkits.

Omnichannel: Omnichannel uses a variety of channels during a customer's experience including research before a purchase. Such channels include stores, online stores/website, mobile stores, mobile app stores, telephone sales and any other method of transacting with a customer. Understanding this new way of interacting with customers will be critical to business success going forward. Check out the Forum's publications and workshops in this area.

Open Digital Framework: Open Digital Framework provides the blueprint for service providers to deliver intelligent operations fit for the 5G era. The framework enables a step-change in business agility, operating cost and customer centricity by revolutionizing the operating model of service providers and their technology partners. Created through continuous global expert collaboration, this living framework combines the tools, knowledge and essential standards needed to transform legacy ways of working, processes and underlying IT systems in a single framework, to enable zero-touch interoperability and ecosystem partnering.

Orchestration: The arrangement, sequencing and automated implementation of tasks, rules and policies to coordinate logical and physical resources to meet a customer or on-demand request to create, modify or remove network or service resources. It is fundamental to the architecture of the OSS of the future, but quite a mis-understood concept. Check out the TM Forum's guides in the Agile OSS toolkit.

REST based API: REST (Representational State Transfer) relies on a stateless, client-server, cacheable communications protocol -- and in virtually all cases, the HTTP protocol is used. REST is an architecture style for designing networked applications. See the entry on APIs to understand the importance of this area.

VNF: A virtual implementation of an Network Function that can be deployed on a Network Function Virtualisation Infrastructure (NFVI). Managing VNFs is something that the TM Forum ZOOM project has been studying for some years. An area of particular interest at the moment is how an DSP can select, procure and then automatically onboard new VNFs into their infrastructure. Check out the TM Forum Enabling Digital Marketplaces catalyst for the latest developments in this area.

SECTION 12

Why become a TM Forum member?

- | | |
|---|--|
| 1. Access and download best practices, toolkits & standards | 5. Onsite or online training discounts |
| 2. Participate in Collaboration projects that are helping to shape the industry | 6. Company Conformance Certification |
| 3. Participate in innovative proof-of-concept Catalyst projects | 7. Access exclusive research reports |
| 4. Member discounts for TM Forum events | 8. Participate in industry awards |

These are just a few of the benefits of membership. Contact us to discuss how TM Forum can help your company to digitally transform in a 5G world.

To learn more, please visit: tmforum.org/membership



TM Forum membership offers MTN Group and its operating companies the resources required to accelerate our digital transformation initiatives. From digitizing BSS and OSS, to Open APIs and microservices, network modernization and cloud strategies – we are able to collaborate with peers across industries to shape the digital future, adopt best practices and deliver delightful experiences and products to our customers.”

Oluseye Farodoye,
Senior Manager API Services, MTN Group

AIS AMERICA MOVIL AT&T AXIATA BATELCO BHARTI
AIRTEL BT CENTURYLINK CHARTER CHINA MOBILE
CHINA TELECOM CHINA UNICO CHUNGHWA
TELECOM CK HUTCHISON DEUTSCHE TELEKOM DU
FAR EASTONE GLOBE TELECOM KDDI KPN LG
UPLUS LIBERTY GLOBAL MEGAFON MTN MTS NTT

Join 200+ communication service providers...

OOREDOO ORANGE OTE PCCW PLDT PROXIMUS
ROGERS ROSTELECOM SAUDI TELECOM SHAW
COMMUNICATIONS SINGTEL SPARK NEW ZEALAND
STARHUB SWISSCOM TATA COMMUNICATIONS
TELEFONICA TELENOR TELIA COMPANY TELKOM
INDONESIA TELKOM SA TELSTRA TELUS TIM TM
TURK TELEKOM VERIZON VODAFONE WINDSTREAM

tmforum.org/membership



Clara van Staden
*Principal Software
Engineer*
Globetom

“ TM Forum helps me in my role as a Principal Software Engineer to focus on solving business problems rather than technical problems by providing tried and tested standards for me to use. This saves me time and gives me confidence that I am implementing a solution that has been vetted by the top players in the industry. ”



TM Forum helps us in identifying best practices and also bringing leading-edge thought to our internal discussions. It is very relevant as we are able to exchange experiences with other CSPs around the challenges that we have.”

Andre Kriger,
Chief Information Officer of Vivo,
Telefónica Brazil

