Global Standardization Activities

TeleManagement Forum (TM Forum) Activity Update and Report on TM Forum Management World 2012

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Abstract

NTT COMWARE is focusing on enterprise architecture (EA) as a way to optimize business and operating systems, and we are particularly interested in the work and standards of the TeleManagement Forum (TM Forum) in supporting an EA tailored for telecom operators. This article provides an overview of current TM Forum activities and reports on TM Forum Management World (TMW) 2012, TM Forum's main conference that was held in Dublin, Ireland, May 22–24, 2012.

1. Overview of TM Forum

The TeleManagement Forum (TM Forum) [1]–[3] is a global non-profit industry association that seeks to vitalize the telecommunications industry by creating services based on collaboration and standards to achieve and support telecommunication system network management.
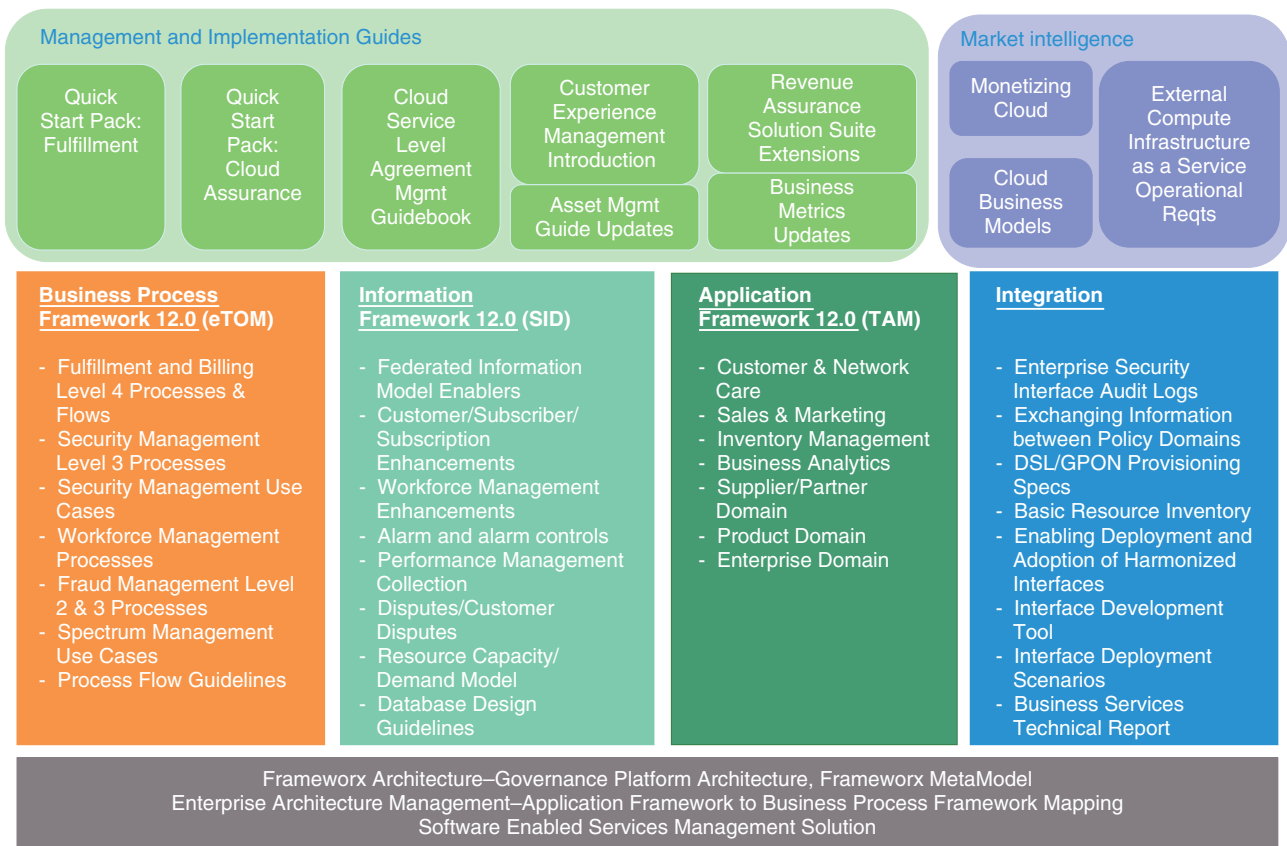
In today's *digital world* characterized by extraordinary diversification of smartphones and other digital devices, rapid globalization of markets, and relative ease with which service providers can enter into niche areas, the TM Forum provides information and support to help its members create and deliver profitable *digital services* such as eHealth systems, smart grids, and cloud computing. The TM Forum helps telecom service providers develop and deploy revenue-assured digital services by offering them the enterprise architecture (EA) called *Frameworx*, which consists of a suite of best practices, standards (called frameworks), and interfaces that support optimized business operations and systems. The Forum also provides wide-ranging technical support—business benchmarking, system building support, next-generation fixed-mobile integration management, and more—as well as close collaboration with other industry standardization organizations.

2. TM Forum standards

2.1 Frameworx

Frameworx defines an EA framework tailored for telecom service providers and includes all reference model processes, information, and application frameworks required to build a robust EA, as well as standardized interfaces and other details needed to implement the EA (**Fig. 1**).

The central portion of Fig. 1 shows the Business Process, Information, Application, and Integration frameworks that are the core of Frameworx. For example, the Business Process Framework (eTOM = enhanced Telecom Operation Map) is employed as a reference model when analyzing business processes or considering business architectures. Similarly, the Information Framework (SID = Shared Information and Data) is used when considering information models and data architectures, and the Application Framework (TAM = Telecom Application Map) is used when considering application configurations and application architectures. Finally, the Integration Framework includes interface provisions, support for various technologies, and other elements necessary for implementation, and is used as a basis for considering the technology architecture. The Multi-Technology Network Management (MTNM) and Multi-Technology Operations System Interface (MTOSI), which is defined as the interface between the Element

Management and Implementation Guides

| Quick Start Pack: Fulfillment | Quick Start Pack: Cloud Assurance | Cloud Service Level Agreement Mgmt Guidebook | Customer Experience Management Introduction | Revenue Assurance Solution Suite Extensions |
| | | | Asset Mgmt Guide Updates | Business Metrics Updates |

Market intelligence

| Monetizing Cloud | External Compute Infrastructure as a Service Operational Reqts |
| Cloud Business Models | |

Business Process Framework 12.0 (eTOM)

- Fulfillment and Billing Level 4 Processes & Flows
- Security Management Level 3 Processes
- Security Management Use Cases
- Workforce Management Processes
- Fraud Management Level 2 & 3 Processes
- Spectrum Management Use Cases
- Process Flow Guidelines

Information Framework 12.0 (SID)

- Federated Information Model Enablers
- Customer/Subscriber/ Subscription Enhancements
- Workforce Management Enhancements
- Alarm and alarm controls
- Performance Management Collection
- Disputes/Customer Disputes
- Resource Capacity/ Demand Model
- Database Design Guidelines

Application Framework 12.0 (TAM)

- Customer & Network Care
- Sales & Marketing
- Inventory Management
- Business Analytics
- Supplier/Partner Domain
- Product Domain
- Enterprise Domain

Integration

- Enterprise Security Interface Audit Logs
- Exchanging Information between Policy Domains
- DSL/GPON Provisioning Specs
- Basic Resource Inventory
- Enabling Deployment and Adoption of Harmonized Interfaces
- Interface Development Tool
- Interface Deployment Scenarios
- Business Services Technical Report

Frameworx Architecture–Governance Platform Architecture, Frameworx MetaModel
Enterprise Architecture Management–Application Framework to Business Process Framework Mapping
Software Enabled Services Management Solution

Source: "TM Forum Frameworx Feature List 12"
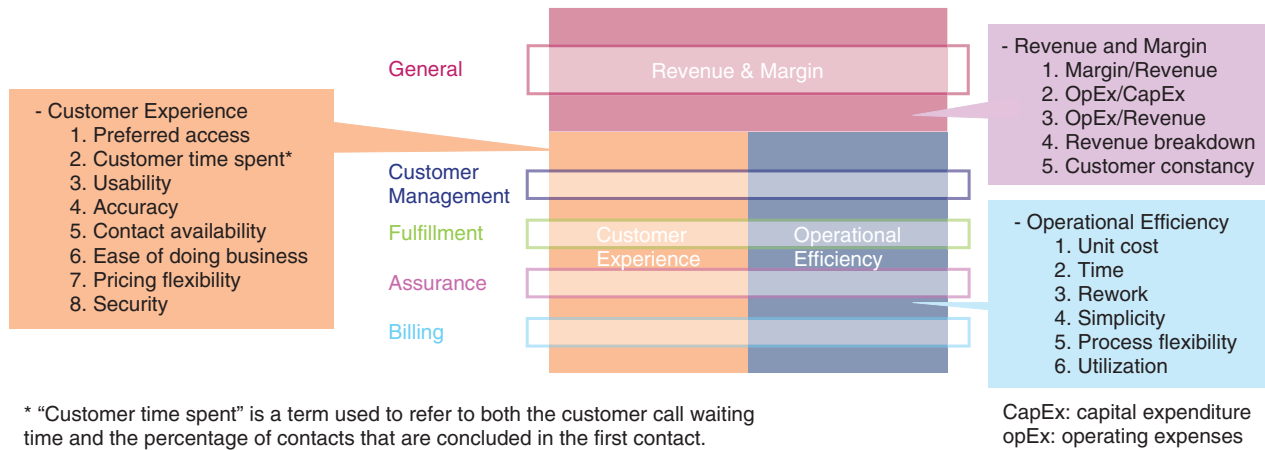(http://www.tmforum.org/FeatureList120/10826/home.html)

Fig. 1. Frameworx 12.0 overview.

Management System (EMS) and the Network Management System (NMS), currently forms part of the definition of the Integration Framework, and is part of the TM Forum Integration Program (TIP). The scope of the TIP project includes the following tasks:

(1) Define Shared Interface Infrastructure (SII):
- Identify protocol-neutral interface patterns including meta-model and common model definitions.
- Identify Web Service specification models (XSD/WSDL) (XML (extensible markup language) Schema Documentation/Web Services Description Language).
- Provide auto-generation and support for documentation, Reference Implementations (RIs), and Compliance Test Kits (CTKs).
(2) Expand and maintain MTNM, MTOSI, OSS/J (operations support system through Java), etc. that define TM Forum interfaces.

(3) Manage interface-related tasks for the entire TM Forum.
(4) Define new integration interface specifications based on the Web Service/XML-based management interface JOSIF (Joint Open Source Interface Framework), and migrate the existing interface.
(5) Other:
- Formalize interface concept, profiling.
- Align interface with eTOM, SID, TAM, and SII.

While there have been no studies of MTNM/ MTOSI per se, carrier Ethernet, GPON (gigabit-capable passive optical network) management, and MPLS-TP (multi-protocol label switching transport profile) management profiles have been examined as part of the TIP project. Results have been incorporated into MTOSI, and MTOSI 3.0 is scheduled for release in May 2013.

The upper left portion of Fig. 1 shows the

- Customer Experience
    1. Preferred access
    2. Customer time spent*
    3. Usability
    4. Accuracy
    5. Contact availability
    6. Ease of doing business
    7. Pricing flexibility
    8. Security

General — Revenue & Margin

Customer Management

Fulfillment — Customer Experience — Operational Efficiency

Assurance

Billing

- Revenue and Margin
    1. Margin/Revenue
    2. OpEx/CapEx
    3. OpEx/Revenue
    4. Revenue breakdown
    5. Customer constancy

- Operational Efficiency
    1. Unit cost
    2. Time
    3. Rework
    4. Simplicity
    5. Process flexibility
    6. Utilization

* "Customer time spent" is a term used to refer to both the customer call waiting time and the percentage of contacts that are concluded in the first contact.

CapEx: capital expenditure
opEx: operating expenses

Source: TMF BM1001 "Business Performance Metrics Development Guide"

Fig. 2.   Structure of Business Metrics.

Management and Implementation Guidelines that have been defined. This includes a suite of guidelines called Quick Start Packs (QSPs) tailored for discrete operations such as Fulfillment, Cloud Assurance, and Cloud Service Level Agreements. Also included are an Asset Management Guide, an Introduction to Customer Experience Management, and Revenue Assurance Guidelines. The Quick Start Packs offer a way of quickly rolling out cloud-related and other new services without having to master the entire Frameworx suite.

The upper right portion of Fig. 1 shows Cloud and New Services, which are standardized elements providing models and software-enabled services that permit cloud services to be rolled out quickly and efficiently.

Study teams have been set up to investigate each Frameworx technology, and these teams leverage telephone conferencing for user-friendly operations and services. New findings are incorporated into biannual releases of Frameworx that are numbered 1x.0 in the spring and 1x.5 in the fall or winter.

2.2   Business benchmarking

TM Forum's Business Benchmarking program provides telecom service providers with a report assessing their relative business efficiency and performance against other carriers. The assessment compares business performance across a variety of metrics spanning revenue and margin, customer experience, and operational efficiency and also measures profitability, cost-effectiveness, and customer satisfaction. It

should provide a fairly clear-cut estimate of a carrier's operational efficiency. An example of a typical business matrix is shown in **Fig. 2**.

Benchmarking programs cover a wide range of metrics tailored to each carrier's needs from business expansion to operational units, and can be used to assess billing, operation costs, or specific service offerings (broadband, mobile, etc.) of the company. Because benchmarking is based on standardized business matrices that are time-tested and organized, they should lead to a marked improvement in monitoring and analyzing business operations in real time.

2.3   System building support and design tools

TM Forum holds regular events such as TM Forum Management World (TMW) conferences and training seminars, and in July 2012 conducted an Action Week event where all the project teams came together for discussions and a special tool development workshop. It was here that they introduced the development environment combining open-source Eclipse with the open-source plugin TigerStripe, which opened the path to model-driven development specifically for telecom service providers and auto-generation interface coding in WSDL format. By adopting this approach, France Telecom/Orange reported they were able to slash development time compared to using a UML (unified modeling language)/XML editor alone.

In addition to the Eclipse environment, good headway is being made in developing modeling and

mapping tools for business processes and information frameworks that will enable smooth implementation of TM Forum technology-based development. Along with standardization of guidelines such as the Quick Start Packs, this initiative will bring services and businesses closer to implementation and is thus considered very important for the TM Forum.

2.4 Next-generation fixed-mobile network integration management

TM Forum is moving forward with an efficient scheme for managing fixed-mobile networks, primarily at the request of European carriers. Discussions are currently underway in collaboration with the Third Generation Partnership Project (3GPP) on a fault management case study for fixed-mobile convergence (FMC) that addresses integrated management of fault alarms and development of a new model that would simplify fault isolation.

Integrated management of fixed-mobile networks will become increasingly important in Japan as well, and we would like to pursue an investigation of FMC that also includes collaboration with the 3GPP.

2.5 Collaboration with other standards organizations

Because TM Forum's sphere of interest encompasses management of telecom system networks, the Forum has had a liaison relationship with ITU-T SG2 (formerly SG4) and has proposed recommendations for network management. More recently, joint meetings have been held more frequently between various standards organizations across different areas such as the joint collaborative sessions with the 3GPP regarding fixed-mobile networks. In Japan, there is a move to strengthen ties between the TM Forum and the Technical Committee on Information and Communication Management (ICM) [4] as manifested in a special lecture delivered by the TM Forum at APNOMS (Asia-Pacific Network Operations and Management) 2012 that will be reciprocated at an upcoming TMW conference with a lecture given by ICM.

3. TM Forum Management World 2012

The TMW conference is a combined event held several times a year where technical reports and case studies are presented, and new products are exhibited and demonstrated. The most recent conference, the biggest ever, was TM Forum Management World 2012 held in Dublin, Ireland in May 2012. We report here some of the highlights of the Conference.

3.1 Carrier initiatives

We introduce here several TM Forum standardization initiatives instigated by Deutsche Telekom (DT), Polish Telecom, NTT Communications, and other carriers at the conference. DT has built Next Generation Service and Resource Lifecycle Management as an OSS reference architecture for its own group companies by expanding upon TM Forum technology with the idea of creating a better To-Be architecture aimed at more efficient operations. DT highlights a number of advantages of Frameworx technology:

- If you start with an existing standard as a reference, there is no need to build your standard from scratch, which greatly reduces development costs.
- Guaranteed integrity (completeness)
- Quick and easy communication
- Improved architecture sustainability
- Commercial off-the-shelf (COTS) ready-to-use OSS
- Freedom to select the vendor of choice
  DT also identifies several disadvantages:
- Diminishes self-reliance in developing own solutions.
- Slower pace of standardization
- Greater ambiguity of standards descriptions
- Current standards lack UML and other descriptive languages.

Not having to develop a standard from scratch is a clear advantage for carriers, but there are also some disadvantages that must be taken into account: the slower pace of standardization and the mismatch between standards and the company's businesses. TM Forum will probably move to accommodate requests from DT and other carriers by making improvements that help implement standards that are more closely aligned to current company operations.

3.2 Frameworx 12.0

Frameworx 12.0 was released last year timed to coincide with the conference. Key changes mostly came in the form of additional language in the following sections.

(1) Detailed Business Process Framework (eTOM)

The Business Process Framework consists of levels that form a hierarchy, with each level encapsulating a group of processes at the next level of detail: Level-0 defines a very general business domain, but each successive level defines more detailed processes. Level-1 is the process group and Level-2 is the core process,

but representation of actual business processes comes with Level-3 process (task) and Level-4 process (step) granularity. The latest 2012 release includes definitions of close to 800 new (mostly Level-4) processes. Additionally, process elements have been merged into the model, thus making process flow definition much more detailed. This more detailed analysis of business processes can be attributed to the importance of having more efficient operations and rapid deployment of new services.

(2) Expansion of the Information Framework (SID)

The biggest change to the SID section was the addition of the entity *capacity*. This defines the ability of a network to provide bandwidth or some other metric as an information framework, product, service, or resource, which are all defined in terms of *capacity*. For example, if companies apply the concept of *capacity* when implementing a cloud-based service, they may find that managing integrated service *capacity* in a multi-cloud environment is very useful for supporting cloud interoperability and load distribution.

(3) Other additions, extension, and future plans

Some additional or more detailed provisions were made to the Application Framework of Frameworx 2012, especially relating to the bill calculation process, payment management, and other aspects of billing operations. In addition, the Integration Framework was also slightly revised: the description of the integration interface was made more explicit to harmonize and integrate more smoothly with overall interface specifications. *Fulfillment and resolution of cloud service problems* provisions were added to the service deployment Quick Start Pack guidelines mentioned earlier, and Frameworx as a whole was substantially updated from the aspects of analysis of upper process business processes to implementation.

We can anticipate additional changes with the next release that will accommodate analysis and fine-tuning of new requirements associated with providing and operating smart grids, eHealth, M2M (machine-to-machine and machine-to-management), and other digital services.

3.3 Significantly greater Asian presence

Asian participation was far more conspicuous at TMW 2012 than at previous conferences, with representatives from Malaysia Telecom and Vietnam Telecom introducing their recent initiatives. Huawei in particular was well represented; the Chinese telecommunications company exhibited its products and services, sponsored one of the presentations, and provided one of the Chairs of the conference. Even the sponsors of the conference showed a marked shift away from the past dominance of the U.S., Europe, and Japan toward more inclusive participation of China, India, and other Asian powers, and we can expect to see more conferences held in Asia in the years ahead.

3.4 Executive Committee Meeting

Separate and distinct from the various technology study teams, the Executive Committee Meeting is a forum to consider the future direction of TM Forum policies and initiatives. In addition to a face-to-face meeting, which is held at the same time as the TMW conference, regular monthly videoconferences are held to discuss the overall business direction, technology trends and investigation policies, the roadmap ahead, and other matters.

The NTT Group is represented on the Forum by Atsushi Kitai, Executive Manager, Head of the Research and Development Department, Core Technology, Quality Management and Engineering Division, NTT COMWARE and he is well positioned to keep track of TM Forum policies and also to keep the Forum updated on the status and direction of NTT Group research.

4. Future development

In addition to providing rapid roll out and efficient management of new services in continuously evolving markets, the TM Forum seeks to stimulate the telecom industry by studying and developing wide-ranging industry standards that assure revenues and improve business opportunities. We will continue to focus attention on TM Forum initiatives, keep tabs on the state of technology and industry trends, and continue to share knowledge with the NTT Group as a whole.

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He received the B.E. and M.E. degrees in information engineering from Tohoku University, Miyagi, in 1991 and 1993, respectively. He joined NTT Network Information Systems Laboratories in 1993 and engaged in research and inspections of projects related to network operations. He moved to NTT COMWARE in 1997 and worked on a Java development method and the selection of in-house-recommended development tools/software, etc. Later, his work included SS7 control technologies from the Java interface, research and applicability evaluation of biometric authentication techniques, and research on NGN standardization and monitoring of NGN network control standardization trends. He has held his present position since 2008.

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He received the B.E. and M.E. degrees from Osaka University in 1982 and 1984, respectively. He has held various management positions in his 28 years with the NTT Group and has studied technologies including operations systems architectures and infrastructure software for ICT systems such as transaction processing monitors and core open source software suites. He is an Executive Committee member and a Technical Strategy Subcommittee member of TeleManagement Forum (TMForum).