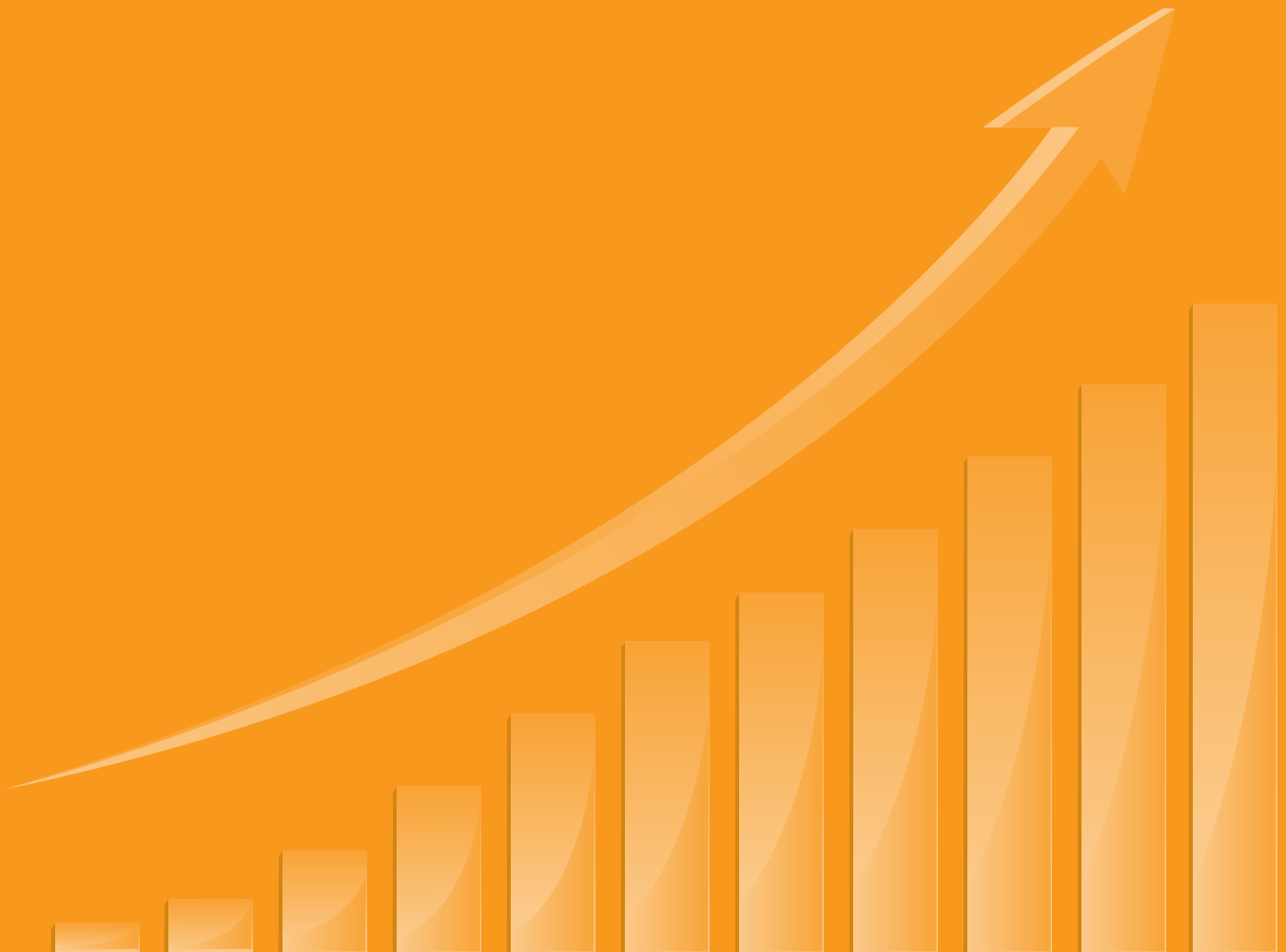


amdocs



LEADING WITH STANDARDS AND BEST PRACTICES

Amdocs helps service providers lead in their industry through adoption of standards and best practices to improve business performance and personalize customer experiences

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EXECUTIVE SUMMARY

Standards are a critical part of the service provider landscape. While business and operational support systems (BSS/OSS) take on larger, more complex roles to enable service providers to expand into new, dynamic services, content and applications, providers also know they need to deliver on the customer experience, curb costs and grow revenues. Meeting these needs can only happen if providers adopt standardized best practices for all elements of their businesses: business processes, applications, information models, service and resource management systems and interfaces.

The most influential organization that focuses on the BSS/OSS space is the TM Forum. This leading industry association is committed to improving business effectiveness and developing integrated sets of frameworks, standards and best practices – applicable to all systems used by service providers as we advance our world of convergence, connectedness and content. The Forum brings together the major players in the communications, media and entertainment industry to solve systems and operational management issues and to collaborate on developing standards and processes, interfaces, industry research and benchmarks in several areas:

- > Business Process Framework (eTOM)
- > Applications Map (TAM)
- > Information Framework (SID)
- > Interface Program (TIP) – MTOSI, IPDR and OSS/J
- > Solution Frameworks (NGOSS) Contracts
- > Benchmarking Program
- > Service Delivery Frameworks (SDF)

Amdocs is leading the industry through its promotion of standards. While we support many standards bodies (such as 3GPP and Cable Labs), this white paper focuses on our work with TM Forum.

A TM Forum member since October 1998, Amdocs has immersed itself in the development of the Forum's standards work delivering full time contributions to working groups and catalyst projects and playing a lead role in ensuring that standards apply to real world management needs in today's industry.

We support the development of these standards and their adoption into our portfolio.

1. INTRODUCTION: PUTTING STANDARDS IN THEIR PLACE

As the richness of services expands beyond voice, video and data to cover content and a range of applications, so, too, does the scope of business support systems and operational support systems (BSS/OSS) capabilities. In this new context, BSS/OSS systems must address service provider needs for better customer experiences, cost reductions, growth and monetization in order to achieve success.

Meeting these needs can only happen if service providers adopt standardized best practices for all elements of their businesses: business processes, applications, information models, service and resource management systems and interfaces. Standards and best practices go beyond helping providers achieve reduced costs and increased agility without undermining their ability to innovate. In fact, standardization enables the focus to shift away from commodities to new service creation, revenue opportunities, effective business models and improved customer experiences.

In today's environment of convergence, integration and innovation, service providers must move beyond traditional communications services and develop BSS/OSS systems that provide reusable, automated, flexible and extendable solutions. Providers need highly integrated, high-performance systems with well understood interfaces that allow for changes to information content and flow between them. Standards are the key enabler. With standards and best practices in place, they enable BSS/OSS systems to successfully address key business needs for service providers to be able to:

- > Achieve rapid time to market for value added services
- > Cater to innovative pricing and bundling models for services
- > Manage short lifecycles of services
- > Provide revenue sharing and settlement capabilities with various other partners in the ecosystem
- > Perform multi-service provisioning that interacts with various network elements, applications and content servers

- > Charge for services across any payment methods (pre/post) in real time and batch
- > Collect usage details from various upstream sources, and then correlate, aggregate, format and distribute those details to relevant downstream systems
- > Bill and account for transactions in financial ledgers, etc.

Previously separate sectors within the industry have converged – wired, wireless, cable and satellite in one dimension, enterprise and telecommunications in another, making for more complex situations. The traditional service delivery silos are being dismantled because their inflexibility is a barrier to the converged world. Today, new technology can be used to deliver whatever service is ordered and the service quality will depend on how the components are assembled and configured.

Standards and best practices play a critical role to handling these issues, allowing people, processes and systems to excel and contribute to achieving success.



2. THE ROLE OF THE TM FORUM

In the BSS/OSS space, the most influential organization is the TM Forum. As the leading industry association focused on improving business effectiveness for service providers and their suppliers worldwide, the Forum and its members work to provide practical solutions, guidance and leadership for transforming the way services are created, delivered and charged.

TM Forum provides integrated sets of frameworks covering business processes, information and data, systems integration and applications – applicable to all systems used by service providers (BSS or OSS) in order to help this new world of convergence deliver on its promise. Industry standards models, such as the ones provided by TM Forum, help to reduce complexity and support business process re-engineering activities in a coherent and coordinated way.

As a member of TM Forum since October of 1998, Amdocs has taken a leadership role in the standardization work developed within the Forum. Amdocs delivers full time contribution to working groups and catalyst projects, developing standards and ensuring they apply to real world management needs in today's converging communications, media, entertainment and IT industry.



3. TM FORUM'S EXPANDING WORK TO DELIVER STANDARDS AND BEST PRACTICES

TM Forum provides a wide range of guidance and support to help its members reduce the costs and risks associated with creating and delivering profitable services. The Forum works to develop best practices, standards, interfaces, industry research and benchmarks for the sake of improving business effectiveness and service provider success. TM Forum brings together leaders from the industry, who work on committees to develop these standards and processes, and solve systems and operational management issues.

TM Forum fosters the ongoing development of standards in several areas to meet the ever-changing needs of service providers and the industry.

3.1. TM FORUM'S FRAMEWORKS SPECIFICATIONS AND BEST PRACTICES

Business Process Framework (eTOM)

TM Forum's Business Process Framework, also known as the Enhanced Telecom Operations Map or eTOM, is the most widely used and accepted framework for business processes in the communications, media and entertainment industry. eTOM covers the full scope of business processes required by service providers. It defines business process taxonomy and the key nucleolus business process elements. By mapping processes in a language that all areas of the organization understand, the eTOM Framework enables a business-driven approach to managing processes, and helps to identify and prioritize which operational areas are most critical to business objectives. This framework is fast becoming the common business language of the industry.

Applications Map (TAM)

As the next generation of digital services pushes organizations to collaborate with more partners and greater numbers of systems, the ability to identify functional gaps become critical to purchasing and integration decisions. The framework for the Applications Map, also known as the Telecom Applications Map or TAM, gives organizations a standardized model for grouping function and data into recognizable applications or services, and provides a view to evolving areas such as online charging, billing, fulfillment and a customer service representative toolbox. By providing the structure, TAM helps service providers navigate the entire procurement process, from initial request for information, through systems comparison, to actual implementation.



Information Framework (SID)

Without standardized information models, data may require extensive transformation each time it travels through applications, requiring costly, customized integration across multiple system interfaces. Service-oriented architecture (SOA) development and related integration architectures rely heavily on a common information model and a common language for all systems affected by integration efforts. TM Forum's Information Framework (Shared Information/Data or SID) addresses these challenges with an extensive and flexible model that defines business concepts, their characteristics and relationships.

Interface Program (TIP)

With services, customers and business models changing quickly and new partners being added every day, systems and their integration points among applications must be dynamic and effective. Open, flexible interfaces are critical to connecting multiple support systems networks and data; realizing productivity gains in all stages of development, from requirements definition to design, code and test; and reducing risk across the board as processes become streamlined and repeatable. The TM Forum Interface Program, or TIP, has unified the interface specification teams to develop powerful interface standards for connecting all of these pieces – MTOSI, IPDR and OSS/J.

- > **MTOSI** – In an environment that requires cohesive interaction between many vendors, technologies and systems, the multi-technology operations systems interface (MTOSI) is the standard that makes these components stick. MTOSI addresses the need for managing diverse technologies within a single management framework. Based on a common, flexible information model of network and service objects, it provides interface specifications for defining Web services for information retrieval and notifications between OSS boundaries. MTOSI enables low cost integration, transparent interoperability, vendor agnostic solutions, and more.
- > **IPDR** – The TM Forum and the Internet Protocol Detail Record Organization (IPDR.org) joined forces in 2007 to integrate work programs and strategic directions of both organizations. IPDR became part of TM Forum's Interface Program, and the work related to IPDR is carried out by the TIP Usage Data Management Team.
- > **OSS/J** – OSS/J delivers standards-based Solutions Framework (NGOSS) interface implementations (OSS/J APIs) and design guidelines for the development of component-based OSS systems. OSS/J technologies provide the foundation for unifying legacy systems and new applications quickly and at low cost.

“BY USING OFF-THE-SHELF ARCHITECTURES, MODELS, STANDARDIZED APIS, AND INDUSTRY STANDARDS AND GUIDELINES, WE ARE ENABLING SERVICE PROVIDERS AROUND THE GLOBE TO TAKE COST AND RISK OUT OF THEIR TRANSFORMATION PROJECTS.”

MARTIN CREANER, PRESIDENT, TM FORUM

Solution Frameworks (NGOSS) Contracts

TM Forum's Solution Frameworks are all about next generation OSS (NGOSS) contracts. NGOSS Contracts are comprised of eTOM, SID and TAM, the widely adopted set of standards and best practices for transforming businesses and operations. These Solution Frameworks can deliver high return on investment (ROI) by applying them to business and technical challenges. For example: reduce operational costs through industry-proven business process optimization techniques; streamline development through reuse and risk reduction; reduce full lifecycle systems cost through standardization of interfaces; and more.

Benchmarking Program

TM Forum's Benchmarking Program team runs periodic studies used to improve business effectiveness and gain insight into operational business performance. The studies are segmented by mobile, broadband, IP, revenue management, and converged and high speed business services. The program is the only initiative that uses the Balanced Scorecard approach focusing on financial performance, customer experience and operations excellence; is a global effort representing all regions of the world while focusing solely on the communications, media and entertainment industry; is uniquely designed to cover both end-to-end and key sub-process metrics; and is structured on benchmarking best practices.

Service Delivery Frameworks (SDF)

For service providers seeking agile service delivery, TM Forum's Service Delivery Framework (SDF) defines a management framework for next generation services regardless of the software or network technologies used to implement those services. The management framework addresses the full lifecycle of services. SDF defines a reference model that consists of essential building blocks for providing a managed SDF service environment.

Amdocs has played a significant role in standardization work within the TM Forum, collaborating with its many committees, and contributing to the development and further expansion of these standards and best practices for the industry.



4. AMDOCS' STANDARDS JOURNEY AND WORK IN INDUSTRY BEST PRACTICES

Amdocs has been on a standards journey that has taken the industry from the first recognition of management systems as a critical enabler in telecommunications to 21st Century converged communications, media, entertainment and IT.

A TM Forum member since October 1998, Amdocs has immersed itself in the Forum's standards work being developed, delivering full time contributions to working groups and catalyst projects and playing a lead role in ensuring that standards apply to real world management needs in today's industry.

4.1. AMDOCS'S ROLE AND CONTRIBUTIONS

TM Forum's eTOM and Amdocs' ASOM

Amdocs is an active member of TM Forum's eTOM team, and significantly contributed to eTOM's main process Level 3 decomposition guidebook as well as eTOM's maturity and worldwide applicability.

Amdocs developed a complementary methodology, Amdocs Scenario Optimization Modeling (ASOM), which uses TM Forum's eTOM as the foundation in its products. Amdocs' ASOM expands on TM Forum's eTOM by adding further value:

- > ASOM expands to Layers 4 and 5, beyond eTOM's Level 3.
- > A set of end-to-end business process flows substantially covers service providers' planning and operations domains. This set of best practices jumpstarts the tailoring of business processes and leverages best practices accumulated by Amdocs for top tier providers.
- > Links to Amdocs' product suite helps to realize business processes into computerized, assisted process automation.
- > A standardized set of business events trigger processes which allow easy component reuse, for example, accepting orders from different channels.
- > A standardized set of business rules applies when implementing and managing processes, for example, handling different nuances between multiple lines of business.

ASOM was created by Amdocs Consulting to define a set of standards, methods and templates that would enable us to: learn and capture current end-to-end process flows; identify potential process improvement areas (issues, limitations, gaps); and design future processes via process innovation workshops.



Incorporating the eTOM Framework, ASOM combines total accountability with product and business process intimacy, repeatable global best practice templates and a holistic consulting approach to accelerate project cycle times and deliver greater value with lower risk.

The eTOM Framework is used as a tool in analyzing an organization's "as-is" processes as well as the development of new processes. While the eTOM Framework covers a service provider's enterprise environment generically speaking, a more specific "drilled-down" approach encapsulates and drives the execution of tasks through the ASOM approach. The decomposition levels of ASOM correspond to the more generic processes laid out by the eTOM Framework.

TAM

Amdocs actively cooperates with leading service providers and integrators on the TAM team to crystallize and evolve the TM Forum's Applications Map. TAM is complementary to eTOM and SID which together make up the heart of NGOSS Contracts. Amdocs has contributed to TAM evolutions and, in TAM version 3, helped with the:

- > Introduction of online charging
- > Refinements of the billing domain
- > Introduction of the customer service representative toolbox
- > Restructuring of the fulfillment vertical

We actively look to define, package and expose business services in our Amdocs applications so that they meet the TAM Framework. The Amdocs CES portfolio of solutions takes TAM functionalities and enriches them to help service providers reduce costs of standard, common, off-the-shelf (COTS) products and bring to bear lessons learned from top tier providers.

SID

Amdocs has been an active member since the early days and now co-chairs the Information Framework team. Current work includes leading the sub-team on customer/subscriber/user work and a central role in the liaison team with TISPAN and 3GPP on Subscription Management. Contributions to the SID team include:

- > Usage modeling that supports traditional static usage records (xDRs) as well as dynamic records (IPDR/SP)
- > Product domain elements
- > Billing
- > Customer/subscriber/user modeling

Amdocs CES has built the Industry Optimized Information Management Layer upon SID, and further builds with:

- > Amdocs Customer Integration Hub (CIH) – Amdocs based its central customer model on SID and will expand it in the next release for the entire BSS space (customer and product domains) as well as the service domain.
- > Amdocs Enterprise Product Catalog (EPC) – Amdocs EPC has several production implementations in which it models a full SID conformant product catalog. When installed as part of Amdocs' portfolio installation, it comes with an extended SID-based model which is pre-integrated with the Amdocs portfolio. This model extends the SID in some places, and differs from the SID in other places in order to include the full breadth of the Amdocs portfolio functionality.

Amdocs' and TM Forum's work with the common information language of SID enables service providers to realize benefits in cost, quality, timeliness and adaptability of enterprise operations; focus on value creation for their customers; and reduce integration costs by using common language between people and systems.



TIP

Amdocs is chair of the TIP steering team, instrumental in crafting the TIP roadmap. Engaged in its MTOSI, IPDR and OSS/J programs, Amdocs continues its support in their successor sub-teams within TIP.

MTOSI – Amdocs has taken an MTOSI product manager and leadership role on the Service Activation sub-team, and is bringing about essential contributions from various sub-groups:

- > Definition of key artifacts of the MTOSI Framework (e.g. naming, transaction requests, common information)
- > Definition of the bulk inventory retrieval
- > Definition of the Service Basic Information model
- > Definition of the Service Activation interface
- > Definition of the Service Inventory interface
- > Development of a simulator

Amdocs participates in the TM Forum Catalyst program to demonstrate MTOSI benefits and illustrate its applicability in efficiently resolving real use cases. We are working closely with TM Forum to help evolve NGOSSS Contracts into the new world of Web services, which aspires to higher sophistication at lower TCO. And we are working with the Forum to provide a framework in which existing OSS product core data and process strengths can be assembled to provide a complete end-to-end picture of customer to network relationships while maintaining the necessary process specialization provided by the OSS products.

IPDR – Amdocs was a charter member of IPDR.org before its acquisition by TM Forum, as a member of the board and chairing the protocol working group. Amdocs contributed to the implementation of IPDR Streaming Protocol, which is now employed by three of the four CMTS vendors, as well as a reference implementation of the IPDR Streaming Protocol to IPDR. Amdocs now chairs the Usage Data Management (UDM) team in TIP and continues to support the IPDR.

OSS/J – Amdocs has contributed to the OSS/J program through the Java Community Process (JCP), as well as through the OSS Trouble Ticket (through Clarify, a Nortel division at the time), OSS Billing Mediation, Pricing API, OSS Discovery API and Order Management APIs. We are now co-leading the TIP Ordering and Activation team which took ownership of the Ordering API and its harmonization with MTOSI SM. Amdocs is also active on the TIP Inventory team which took ownership of the OSS/J Inventory and Discovery API.

NGOSS Contracts

TM Forum's NGOSS Contracts specify the behavior of each interface, not just in terms of what Web services are offered, but also the services consumed and the service level agreements that specify how the interface performs, in terms of security, availability and so on. Amdocs has led the specification effort of NGOSS Contracts and ensures they become the natural extension of service-oriented architecture (SOA). We have contributed to developing Contracts that provide eTOM with a direct and valuable implementation in communications applications and enable management solutions to be specified with off-the-shelf, but extensible standards.

Amdocs continues to provide leadership in both Harmony Catalysts and Architecture Harmonization programs. NGOSS Contracts are a natural vehicle for harmonization in the converged world. Architecture Harmonization ensures that standards from TM Forum and other standards bodies are either converged or able to work together, and provides the program management and tooling for contracts.

MTOSI TESTIMONIES OF REALIZED BENEFITS

Many organizations have already adopted different parts of MTOSI standards in their deployed solutions and have published testimonies about the benefits they've drawn in terms of integration cost savings.

> Capital Expenditures (CAPEX) example:

For first office installation CAPEX development costs, we compared a traditional point integration approach based on a mixture of APIs with a standards-based solution based on MTOSI. Our coarse estimates showed significant savings in costs and considerable reduction in risk by using an MTOSI approach. The main benefit arose in risk reduction (i.e. meeting dates) especially the move to a contract first model which settled the choice of interface technologies early in the development; the availability of MTOSI specification that had better than 85 percent coverage of our requirements; and clear guidelines on how to extend them. Also, as all vendors were working to the same core interface, enhancement work could be shared out among the vendors. Finally, the integration problem was simplified, because all interfaces worked the same way and the same test suites could be used on all interfaces.

Benchmarking Program

Amdocs leverages the framework of TM Forum's Benchmarking Program in its consulting practice. We provide practices for business processes using the ASOM Methodology (Amdocs CES 7.5) and eTOM Framework as their cornerstones and match service providers' key performance indicators (KPIs). With the TM Forum benchmark database, Amdocs can provide comprehensive, updated and reliable numbers, giving better benchmarks to providers. KPIs mapped to the strategic business goals of the customer provide a way to measure the support that the implementation of processes will provide service providers in terms of reaching their overall business goals.

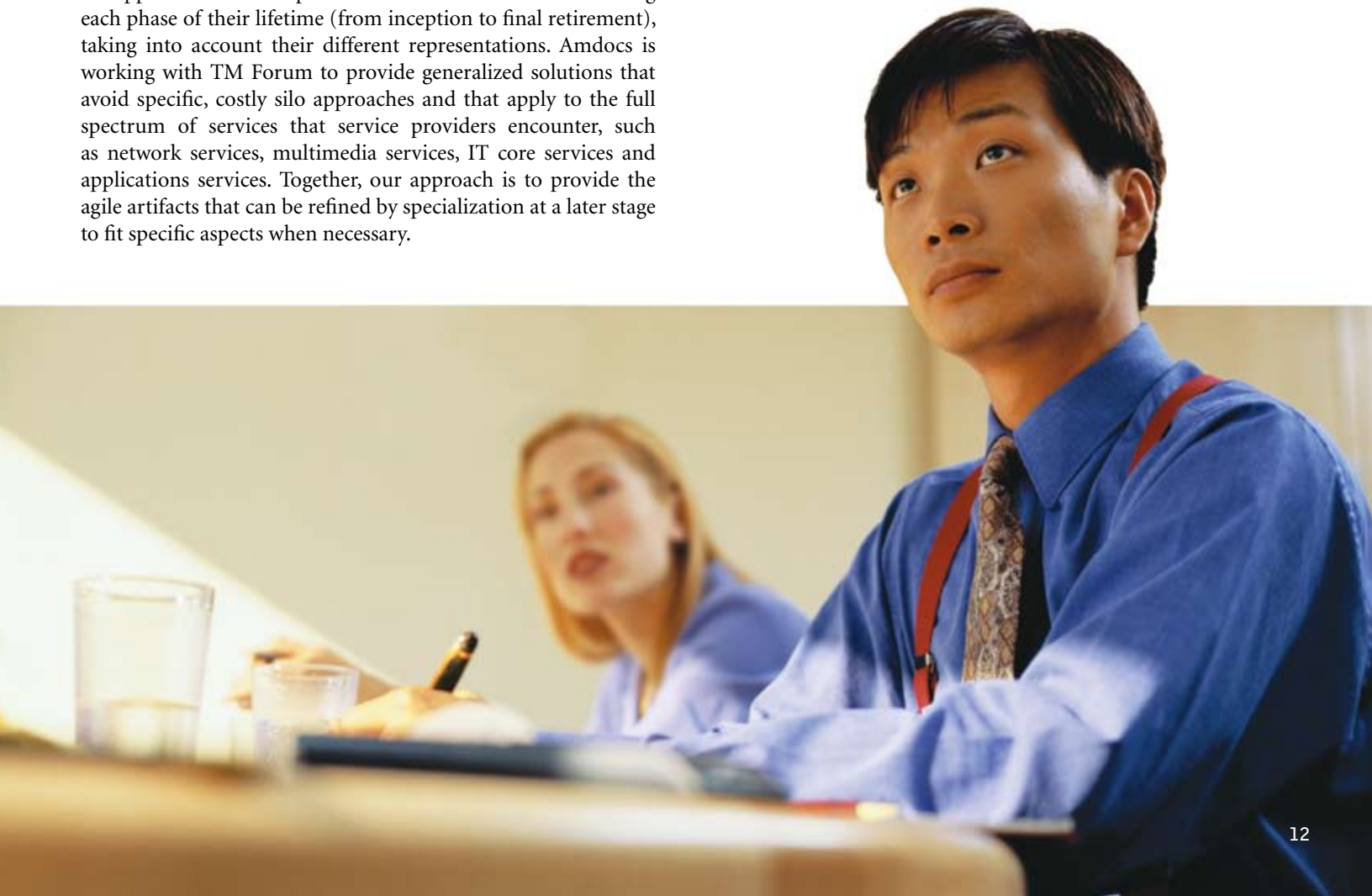
Amdocs has worked with TM Forum's Benchmarking team from its inception to develop the original metrics and framework, and continues to be directly involved in its evolution, including the review of overall program content to ensure relevance in changing economic times. We are working closely with TM Forum to upgrade the database of KPIs on all levels from customer experience to operations, and set the standard for the communications, media and entertainment industry. The end product will be a KPI measurement tool that matches all business scenarios to the different KPIs and benchmarks – to analyze aspects of the past, challenge the present and plan the future.

Service Delivery Frameworks

Amdocs has strongly engaged in the TM Forum's SDF program. The ambition of the program is to supply the essential artifacts to support the different processes used to handle services during each phase of their lifetime (from inception to final retirement), taking into account their different representations. Amdocs is working with TM Forum to provide generalized solutions that avoid specific, costly silo approaches and that apply to the full spectrum of services that service providers encounter, such as network services, multimedia services, IT core services and applications services. Together, our approach is to provide the agile artifacts that can be refined by specialization at a later stage to fit specific aspects when necessary.

When the market shifted to an SOA paradigm and a product-oriented architecture, enabling a greater level of flexibility and a faster time to market, Amdocs developed a portfolio of products rather than specific end-to-end customer solutions. Now Internet-based services are everywhere. Amdocs believes that service providers need to play an important role in this new value chain. We leverage and evolve our assets to support them, and many of our existing assets play a significant role in SDF which is a natural evolution of the service delivery platform.

Our experience in delivering solutions based on our OSS and BSS component portfolio is strongly beneficial to TM Forum's SDF team in building standards. The SDF team shares expertise with other players in the industry and addresses customer needs with the objective of building the best standards that fit the needs of the industry. Amdocs, with our experience of driving TM Forum standards, contributes to this team, influencing the work in adopting a pragmatic approach to building reference architectures and open interfaces for this complex topic.



4.2. EMBEDDING STANDARDS INTO AMDOCS CES SOLUTIONS

On one hand, taking a lead role in the development of new standards and creating open, interoperable solutions for service providers, as well as adoption, compliance and active monitoring, has impacted future development for the industry. Extrapolating from that, we have applied our involvement in TM Forum's standards and best practices to our product design, development and implementation strategy, making them an integral part of the Amdocs CES portfolio. By embedding these high standards into our own solutions, we extend their reach into service providers' domains, helping them to cut costs, enhance monetization strategies, manage risk and deliver the customer experience.

Within Amdocs CES, there are five main components to the BSS/OSS framework: smart customer and partner interaction; industry specific business process best practices; functionally rich applications; industry optimized information management; and real-time multi-network interactions.

These are just some of the ways that Amdocs has applied TM Forum standards and best practices to Amdocs CES:

- > The Applications Framework (TAM) is used as the guideline for product decomposition
- > Using Amdocs' ASOM methodology and industry experience, we refined and tailored eTOM as business process building blocks.
- > Information Framework (SID) is used as the basis for data models within and outside the suite.
- > The Integration Framework known as the NGOSS Technology Neutral Architecture, encompassing all of the TM Forum's Interface Programs (MTOSI, IPDR and OSS/J) and the Architecture Harmonization are used as a foundation for the CES portfolio architecture.

By taking advantage of the work of TM Forum and Amdocs' contributions to the Forum, as well as embedding these high standards into Amdocs' own solutions, they extend their reach into service providers' systems and domains, cutting a much surer path to navigating today's market of rich services, content and applications. These standards and best practices will continue to evolve, helping providers to cut costs, enhance monetization strategies, manage risk and deliver the customer experience.



5. CONCLUSION

Our industry is only going to grow more complex. Business and operational support systems must be sculpted to efficiently plan, deploy and operate multi-vendor networks in this challenging environment. These BSS/OSS systems require high levels of functionality, flexibility and expandability – these are key. Implementing standards and best practices enables these systems to deliver on these requirements – and in turn address service provider needs for better customer experiences, cost reductions, growth and profitability.

And when service providers, vendors and standards bodies alike work together to develop the standards and practices that improve integration, enrich software and business development, and refine network management capabilities...when they collaborate to develop common languages, and create frameworks for building and integrating components and interfaces...and when they further their contributions to improve the state of change management and deployment risks...that's when they achieve success for their organizations and customers, and advance their vision for the industry.

Amdocs is committed to working with the members of industry forums like TM Forum to jointly develop and further the standards that will be demanded for a successful journey into new services, content, applications and innovations for the future. With over 20 resources dedicated to helping TM Forum, by leading and contributing to standards work, Amdocs has a proven track record that spans over ten years of membership. Likewise, Amdocs is committed to the adoption of these standards into our Amdocs CES solutions to extend their value into our customers' businesses and operations.



ABOUT AMDOCS

Amdocs is the market leader in customer experience systems innovation, enabling world-leading service providers to deliver an integrated, innovative and *intentional customer experience*[™] at every point of service. Amdocs provides solutions that deliver customer experience excellence, combining the software, services and expertise to help its customers execute their strategies and achieve service, operational and financial excellence. A global company with revenue of \$3.16 billion in fiscal 2008, Amdocs has more than 17,000 employees and serves customers in more than 50 countries around the world.

For more information, visit Amdocs at www.amdocs.com.

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