Integrated Service Fulfillment

Next Generation Service Delivery Platform
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Introduction

The telecommunication industry has undergone a great shift from voice centric services towards much more dynamic, convergent services based on IP protocol. The driving force in this revolution has been the introduction of mobile services and a prevalence of the Internet, thus resulting in a change in customer needs. Customer needs can no longer be satisfied by simple services bound to one specific technology. On the contrary, customers expect great flexibility and a complete solution which can deliver end-user services over different technologies. This means that in order to be profitable, telecommunication operators need to transform from simple network access providers to services aggregators, where network access is a vehicle for delivering content centric services.

This trend resulted in the emergence of new types of services, such as IPTV, Video on Demand and VoIP, which can be implemented either via Mobile or fixed (including FTTx) internet broadband access. Moreover, clients demand highly customizable service packages with appropriate QoS. On the one hand, a high customer demand for new types of services can be a great source of revenue, but on the other hand, it presents a big challenge for telecommunication operators in the area of service fulfillment.

As the services to be delivered to end users are no longer simple services bound to a single technology, old methods for service fulfillment cease to work. Traditional OSS systems were organized in silos built vertically over technology-centric services. This architecture is considerably challenged by the demand for convergent services. Old systems were designed to maximize efficiency through leveraging tight coupling between technology and services delivered by this technology. This resulted in these systems being developed as isolated silos without assuming any of the horizontal integration required by convergent services delivered in the value chain model. First attempts to build service delivery systems for convergent services were realized by very costly integration of existing silos oriented OSS systems. Following this, efforts were focused on mitigating the integration problem by leveraging integration platforms based on the ESB concept. But still, the results measured regarding cost and time to market for delivering new services are not satisfactory. This is due to that fact that developing adapters to ESB is still a costly task, and wrapping vertical silos can only provide a horizontal service layer imitation.

The answer to the integration problems associated with delivering convergent services is leveraging Next Generation Service Delivery Platform (NGSDP) - a new generation of OSS systems in the field of Service Fulfillment. The main goal for this type of system is cost effectiveness and reduced time to market for delivering highly customizable bundles of convergent services. System architecture is tuned for delivering services which are aggregations of convergent services rather than monolithic services. The support for multiple play scenarios and delivering services in a value chain is a native functionality of this type of system.

The picture below illustrates how horizontal integration is a native characteristic of the NGOSS, while for silo-based architecture it is a high cost task which must break through old architectural boundaries.
Service Delivery as a Service Assembly Process

The main premise of the NGSDP is that a service is not a monolithic service but a bundle of convergent services. This assumption forces a shift from vertical silos to the horizontal architecture, with the service layer acting as the basis for the service delivery process. The service layer is composed of fine-grained service components which act as reusable building blocks. Any customer service is defined as composing of service components. Different customer services may reuse service components in different constellations, providing great flexibility in creating new and differentiated client services. The essential element of NGSDP is the notion of the service delivery process as an assembly process. This means that once a new type of customer service is defined, it is ready to be delivered via a generic service assembly process, which uses fine-grained reusable service components available on the service layer as building blocks. This idea is depicted below (Figure 2). The architecture ensures reduced time to market and a significant reduction in integration costs.
Reduced Time to Market

The introduction of IP based convergent services caused a revolution in customer needs. They are no longer satisfied with monolithic services bound to a single technology. On the contrary, customers demand highly customized service bundles which are content rather than technology centric. Moreover, customers expect that service offerings rapidly adapt to the changing demands. It is now commonplace that a customer updates their demand as quickly as a new concept appears on the market. Because of strong competition, a customer can instantaneously switch to a Service Provider who more cheaply and quickly delivers new services, without bothering with underlying network technology. This means that having an OSS system that can significantly reduce new service 'time to market' is essential for competitive advantage.

NGSDP is all about reducing time to market and costs of introducing new services. The NGSDP architecture is tuned for a scenario in which a Product Manager can quickly prepare new service offerings by assembling the existing fine-grained service components. This is achieved using architecture based on a service layer and a notion of service delivery as an assembly process. The introduction of a new service is as simple as combining existing building blocks and preparing a bundle. Once a new service is prepared, it is ready to be delivered by the generic service assembly process. This means that a new service offering can be prepared with zero code writing, which not only drastically reduces time to market, but also costs.

The benefit of reduced time to market is not limited to introduction of new service bundle variations. The key premise of NGSDP is extendibility of the service layer. This means that emerging new technologies, delivering novel convergent services, can be plugged into the service layer without the need to rebuild the OSS system. Once new service components have been added to the service layer, they instantly become available to the Product Manager for building a new service offering. New customer services are ready for delivery by the service assembly process. In other words, integration of new service components is reduced to the problem of plugging-in fine grained components into the service layer, which significantly reduces cost of integration.

Reduced Integration Costs

Historically, integration has always been a tough task in the OSS field. The need for a time and money-effective integration solution has become even more critical for telecommunication operators following the emergence of convergent services. Customers demand new services which are not monolithic solutions, but bundles of services, and their implementation requires integration of different technologies, delivered in a value chain. This means the participation of many partners, including content providers. This makes having a platform which facilitates integration a necessity to survive within this very competitive environment.

For many years, integration has meant writing a proprietary code which was neither fast nor cost effective. A step forward was employing systems based on the ESB concept, reducing costs but still not sufficiently effective. This is mostly due to the fact that the ESB concept required writing adapters for monolithic systems. This method resembles fighting with symptoms rather than eliminating the cause of a disease. The effective method requires a new approach, where old OSS systems constructed according to the vertical silos concept are replaced with NGSDP.

The NGSDP is designed according to the horizontal architecture, with an essential role for the service layer, which is composed of fine-grained reusable components. This is the main differentiation from older systems, which could expose only coarse-grained services, thus, were difficult to reuse.
Moreover, old systems tightly coupled service management with services which were tied to a network technology. In contrast, NGSDP exploits fine-grained components which expose standard API, allowing the placement of the service management functionality above the service components layer. The materialization of this concept is the generic service assembly process, which is an essential part of NGSDP for service delivery implementation.

This reduces the integration problem to plugging-in fine-grain components into the service layer. This idea is depicted in the Figure 3. Once the integrated service components are available on the service layer, they are ready to be used by Product Managers for constructing new client service offerings.

The task of ‘plugging in’ service components is much easier to that of integrating old systems based on the vertical silos architecture. This is mostly due to the NGSDP architecture, which assumes fine-granularity of components with industry based standard API. Even in the case that the components to be integrated are not compliant with industry standard API the task of writing adapters is much smaller to that of writing adapters for coarse-grain monolithic systems. When the components to be integrated are already based on industry standard API (promoted by TM Forum and NGOSS initiative) the integration problem is even further reduced.

Value Chain Service Delivery

The emergence of convergent services and a shift from monolithic services to content centric services bundles means that telecommunication operators need to alter the orientation of their business more towards service aggregation rather than merely profitable network access provisioning. Having a platform which has native support for delivering services in multiple scenarios can act as a great competitive advantage.

NGSDP, with its new generation architecture conceived to change service delivery into a service assembly process, is a perfect fit for an OSS system which needs to effectively support multiple play business scenarios. Each partners offering is managed as a service component within the service layer which is available for service offering bundling. As the service layer of NGSDP is designed to be extendable, each new partners offering can be quickly plugged into the service layer. This means that integration with new partners systems is a standard process built into the concept of the service layer. Once a new service partner’s offering is incorporated into the service layer it is instantly available for
service offer bundling. A Product Manager prepares a customer service by picking the most suitable service components available on the service layer, and decides which partner’s service offerings are bundled into the customer service. Once a service bundle is defined by the Product Manager it is ready to be delivered to the customer. The service delivery is implemented by the NGSDP assembly process, which orchestrates creation of individual service components that constitute a customer service. This means that NGSDP provides central control over individual partner’s offerings throughout the service delivery process. This is an essential feature for smooth implementation of value chain-based customer offerings, as service aggregators need to control the delivery of third party components. This idea is depicted below:

![Figure 4. Value chain implemented on NGSDP](image)

All the characteristics depicted highlight how NGSDP has native inbuilt support for multiple service offers, significantly reducing time-to-market and integration costs.

**Comarch Next Generation Service Delivery Platform**

Comarch NGSDP is an aspect of the Comarch OSS Suite, which is built according to the TM Forum NGOSS concept. The main elements of Comarch NGSDP are the service layer and the service assembly process.

**Comarch Service Layer**

In Comarch NGSDP, the service layer is built upon the Comarch Service Inventory. The Comarch Service Inventory exploits the service modeling concept based on the SID model promoted by the TM Forum. This means that the service layer, which is a foundation of NGSDP platform, is based on an industry standard. Service components available on the service layer are managed according to the SID Model, which organizes service components into Customer Facing Services (CFS) and Resource Facing Services (RFS). The definition of a new customer service created by a Product Manager is modeled as a new CFS and RFS specification, as defined in SID. The new CFS-RFS specification augmented by metadata and policy specifications becomes a novel recipe for the service assembly process, and, thus, the new customer service is ready for service delivery. In other words, the Comarch service layer provides a service catalog which contains the recipes for all customer offerings.
Founding the service layer on the industry standard, the SID model makes integration of new partner’s services much easier and the idea of integration via ‘plug-able’ service components a reality. When a partner’s offerings are described as appropriate RFS or CFS specifications augmented by metadata and policy specifications, they can be smoothly incorporated into the service layer. This is achieved because RFS and CFS specifications play a role of an industry based model for describing a partner’s ‘plugged-in’ service offering. The basic CFS, RFS specifications are augmented by additional meta-model and policy specifications which describe the management interface of a service component and provide additional information required by the assembly process. Once RFS and/or CFS specifications with the metadata and policy specifications are added to the service layer, the partner’s offerings become building blocks for customer offerings. This mechanism provides an integration hub which is compliant with the standard model (SID). In other words, the Comarch service layer can play the role of a federated service inventory, providing a common layer for partners’ service offerings. Together with the assembly process, this means a platform for collaboration within value chain offerings. This idea is depicted below:

Implementing the service layer over the Comarch Service Inventory has additional benefits. When delivering a customer service, the service delivery process is accompanied by creating instances of appropriate CFS and RFS. This means that customer service is not only delivered to a customer, but is also described within the Comarch Service Inventory. Having an inventory of delivered services makes these services manageable and provides a foundation for full service lifecycle support. As Comarch Service Inventory is also a foundation of Comarch Next Generation Service Assurance, this grants the ability to close the loop of Service Fulfillment and Service Assurance.
Comarch Service Assembly Process

Within Comarch NGSDP, the service assembly process that implements service delivery is built upon the Comarch OSS Process Management, which is a part of the Comarch OSS Suite. The main concept of the Comarch Service Assembly Process is that the service delivery process is not hard coded per service offering, but is a generic process which assembles services according to a recipe stored within the CFS-RFS specifications defined in the service layer. This means that customer services’ are not managed as monolithic services with a proprietary service delivery mechanism, but are built from reusable service components. This approach means leveraging the main concept of SOA, which assumes constructing services from reusable fine-grained service components, rather than implementing monolithic services using proprietary mechanisms. The reusable components are defined in the service layer. As described in the Comarch Service Layer, the scenario which captures this idea is as follows:

- A Product Manager using marketing requirements conceives a new type of customer service.
- The new service is built as a bundle of reusable service components. The new service is described by CFS-RFS specifications augmented by additional metadata and policy specifications which together form a recipe for the service delivery process.
- Once the new service is defined it is ready to be delivered to the customer.
- When a customer requests the new service, it is delivered via the assembly process.
- Once the service is delivered, it is defined within the Comarch Service Inventory, enabling it to be easily managed. This includes service assurance management of the newly created service, which can be implemented using the Comarch Next Generation Service Assurance product.

Figure 6. Closing the loop: service delivery & service assurance
The basic service delivery process outlined above is perfect for illustrating the main concept of the service delivery as the service assembly process. However in scenarios more true to real life, the service delivery process need not only take into account newly ordered services but also the existing customer services. This is because the most common scenario is when a user updates his existing subscription. In such a scenario, the series delivery process analyzes existing customer services and confronts them with the newly ordered services. This analysis results in the optimal delivery scenario which attempts to reuse the existing customer service building blocks to support the new ones yet also must decide which service components are compatible and which one needs to be upgraded or deallocated. All this analysis is done based on CFS-RFS specifications and augmenting metadata with accompanying policy specifications. Examples of such specifications for which the delivery process chooses the optimal delivery path are: declaration of service dependency, service compatibility and declaration of which RFS Specifications describe technical alternative implementations of CFS Specifications.

The described intelligence of the service assembly process guarantees efficient service delivery by reusing existing service building blocks and avoiding deallocating and then reallocating service components. Moreover, this strategy assures minimal impact on the existing customer services which a user wishes to retain.

Conclusions

NGSDP is a new class of OSS system that has the primary role of reducing time to market and integration costs associated with the introduction of new service offerings. This is achieved through completely different system architecture. Unlike old OSS systems, which exploited architecture using the vertical silos concept, the new format employs horizontal architecture with an essential role for the service layer. The premise is that a customer service is a bundle of reusable fine-grained service components. This assumption is a perfect fit for the new generation, which is no longer monolithic services bound to a single technology, but on the contrary, are bundles of content-centric convergent services, including IPTV, Video on Demand and VoIP. The concept of the service layer is accompanied by the service assembly process notion, which is a generic service delivery process. According to this concept, service delivery is implemented by assembling reusable service building blocks available on the service layer. This approach guarantees reduced time to market for new services, offering both using a new variation of service bundles and a new type of building block. The latter is possible because the service layer is conceived as an extendable layer. The integration problem is reduced to the issue of adding new, fine-grained service components, saving cost and effort. Once a new service component is available on the service layer, it is ready to be used as a building block for constructing new service offerings. This concept is augmented by exploiting industry standards. Comarch NGSDP leverages the TM Forum SID model with the core model of Customer Facing Services and Resource Facing Services for managing service building blocks available on the platform. Employing standard API based on OSS/J makes third party delivered service components really pluginable modules, which can smoothly extend the service layer, and, thus, a customer service offering. This makes the NGSDP the perfect platform for delivering multiple play services.

All these NGSDP features provide such benefits as reduced time to market and costs, which are extremely important within the very competitive environment that telecommunication operators must now operate.