

White Paper



Business Integration Architecture for Next generation OSS (NGOSS)

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Summary

The existing BSS/OSS systems are inadequate in satisfying the requirements of automating business processes, flexibly responding to new requirements of next generation services, and easing the process of introduction of new services. Communication Service Providers are moving from existing OSS to NGOSS through BSS/OSS Modernization and Consolidation. While the issues of Operational Support System/Business Support System (OSS/BSS) modernization and consolidation are important, the integration problems in achieving them are numerous. They present themselves at various layers of the technology architecture and involve different parts of the company. Infosys presents a layered approach Service Oriented Architecture (SoA) based business integration through Enterprise Application Integration (EAI).

1.1 Overview

Increased revenue, competition and customer retention are the three important reasons for service providers to embrace next-generation (NG) services to facilitate bundling of the NG services on a single high-speed transport pipe (e.g. DSL). The challenge is how to implement a strategy to meet competitive pressure and transform the network, back office and organization for better integration. Service providers have made massive investments in billing, provisioning, network management and various mission-critical applications. This will help move existing customers to new generation services such as DSL, VoIP, IPTV, etc.

The telecom industry has entered a recovery phase now after a two-year dismal performance as the service providers are now shifting their focus from cost reduction to revenue generation. For this, they need to introduce services for increased return on investment and also need applications to support services that are easy to integrate with existing networks and back-office Operational Support System/Business Support System (OSS/BSS). To support the Next Generation Operational Support System (NGOSS) initiative, most service providers are considering two significant trends:

1. BSS/OSS Modernization

The business and IT function of large telecommunication (telecom) carriers are now deliberating about back-office modernization due to:

- Stopgap fixes made to the system during the telecom downtrend resolved the problems momentarily, but left a plethora of unconnected systems that were a stumbling block in the roll out of new revenue generating services
- Rising maintenance cost of older systems forced the service providers to evaluate benefits of the new OSS purchases as opposed to system upgrades
- Convergence of services and the ability to take advantage of the low cost of operating IP networks also drove the modernization movement

2. BSS/OSS Consolidation

Modernization is required to deploy new revenue generating services and to increase the Average Revenue per User (ARPU). However, consolidation provides internal rationalization to achieve operational efficiencies and enable telecommunication companies (telcos) to increase customer satisfaction. The need to simplify the network architecture and BSS/OSS systems is also a critical success factor.

While the OSS/BSS modernization and consolidation issues are important, there are numerous integration problems. To address this, Infosys offers a layered approach, a Service Oriented Architecture (SOA) based business integration through enterprise application integration (EAI).

1.2 Main Drivers

We believe that the main drivers for a large telcos' business integration, to achieve operational efficiency and customer intimacy, include:

- Integration across multiple COTS products and internal systems
- Future-proofing a solution in terms of:
 - Business functionality and evolution based on best practices of layered enterprise – Functional, Business Processes and Data
 - Continuous evolution of integration to make it more service-oriented, customerfocused and achieve greater flexibility
- Leveraging existing investment in technology such as EAI infrastructure and COTS applications
- Linking business processes with system workflows and data entities (such as product attributes/ definitions) across multiple BSS/OSS systems
- Enabling faster time to implement the solutions and new services operationally

1.3 Infosys Approach

The existing BSS/OSS systems are inadequate in addressing the requirements of automating business processes, flexibly responding to new requirements of next generation services and easing the process of introduction of new services. The two critical aspects to implement NGOSS are:

Business Process Management: Business process management involves coordination and management of actions of diverse human actors and OSS systems through efficient use of information available across various systems.

Business Integration: Business integration provides OSS/BSS and other telecom enterprise endpoints for applications and data to be available as business services to be orchestrated into a business process with little/negligible programming requirement.

At Infosys, we believe that the NGOSS based on SOA can handle the above mentioned aspects – Business Process Management and their Business Integration within systems. The suggested approach integrates multiple COTS applications, legacy systems (e.g. CRIS) and that of a service provider's partners across the Internet to offer an integrated process execution environment. Adoption of service-oriented integration (an adoption of SOA principles for integration) has become a key requirement for any successful implementation of business integration. Service-focused integration provides a managed, flexible, reusable and enterprise-wide business service function by modeling the architecture elements into various layers of abstracted software services.

The Infosys approach to the business-integration architecture is based on the following principles:

- Adopt layered SOA for business integration:
 - Common service-oriented run time environment with distributive integration using enterprise-service bus
 - Layered integration architecture into multiple stacks of services that can be delivered using enterprise-service bus
 - Follow the basic service oriented architectural principles for each layer such as loosely coupled, re-usable and sharable, abstracted/ opaque and secured
- Use service-oriented integration pattern for maximum re-usability:
 - Leverage existing application and infrastructure
 - Increase in interoperability between disparate integration technologies

1.3.1 Layers of service in Business Integration Architecture

SOA integration means logical partitions of the overall integration architecture into multiple stacks of services to be implemented independently. The diagram below (Figure 1) provides the service layers in business integration architecture:

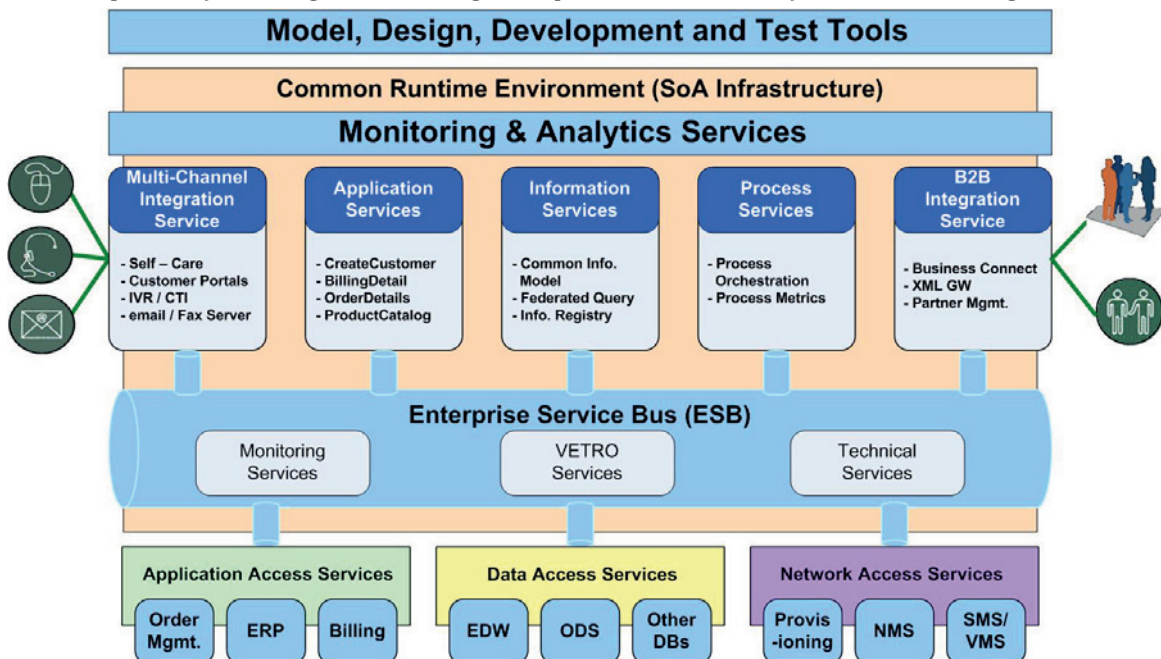


Figure 1: Service Layers in Business Integration

The key services in the business-integration architecture, as proposed by Infosys, are:

- **Access Service**

This service layer enables application, technology and database abstraction, so that complex accessing logic is hidden from other service layers. This is a foundation service layer for any business integration solution, which exposes application functionalities and data as a reusable service conforming to the SOA principles. The three types of access services are:

Application Access Service – This service layer exposes application level functionalities as a reusable service between BSS to BSS and BSS to OSS integration. This layer is enabled using disparate technology such as web service, integration servers, adapters, etc.

Data Access Service – This service layer exposes application data services as a reusable reference data service. This is done via direct interaction with application data and provides federated query.

Network Access Service – This service layer exposes provisioning layer as a re-usable service from OSS to OSS Integration. This integration service emphasizes the need for high performance, stateless process flows and distributed design.

- **Enterprise Service Bus**

This layer forms the backbone of any service-based business integration that offers basic infrastructure for service assembly, service creation, service registry and protocol support. This layer provides basic services including:

Monitoring Service – This layer provides component and message monitoring services required for operational support of solution based on business integration.

VETRO Service – This layer provides independent layer to Validate, Enrich, Transform, Route and Operate (VETRO) services. This layer intelligently transforms and secures message content to meet the requirements of each service endpoint.

Technical Service – This layer provides common services layer required for implementation of any service such as exception handling, logging, security, faulttolerance, auditing and tracing.

- **Business Integration Services**

This layer is the core of any service-based business integration solution that offers services ranging from the application/ information specific to composite services. Services exposed in this layer forms the basis of NGOSS solution:

Information Service – This service provides a common view of enterprise entity (or Common Information Model) within the integration infrastructure and enables true decoupling of data from application.

Application Service – This service encapsulates application business functionality and data with standardized interfaces for the application specific services to be analyzed and used in business.

Business Process Service – This layer implements the well-defined units of business functionality as services to form the building blocks of complex business processes. The key consideration of this service layer is granularity of service. This service layer provides following services to the overall scheme of Business Integration

- Application service orchestration to expose business service pertaining to a unique business service, which forms a part of complex business service
- Creation of complex business service by orchestrating specific business service for enhancing customer experience as part of NGOSS initiative

- **Multi-Channel Integration Services** – This service layer manages the integration of various delivery channels with core Business Integration services via front-end & backend integration

- **B2B Integration Service** – This provides the basic service required for implementing any B2B transaction as part of any business process. This service layer ensures B2B transaction non-repudiation, B2B partner management and multiple B2B protocol support for seamless integration

4. Monitoring & Analytic service

This layer tracks the events and activities that are generated from execution of business processes to ensure continuous improvement.

1.4 Business Integration for legacy application

Considerable investments have always been made on legacy applications over a period of time. It is difficult to get the business case approved just for re-writing these applications based on the service-oriented integration pattern. Hence, service-oriented integration of legacy application has become one of the most important aspects of enterprise application integration ROI.

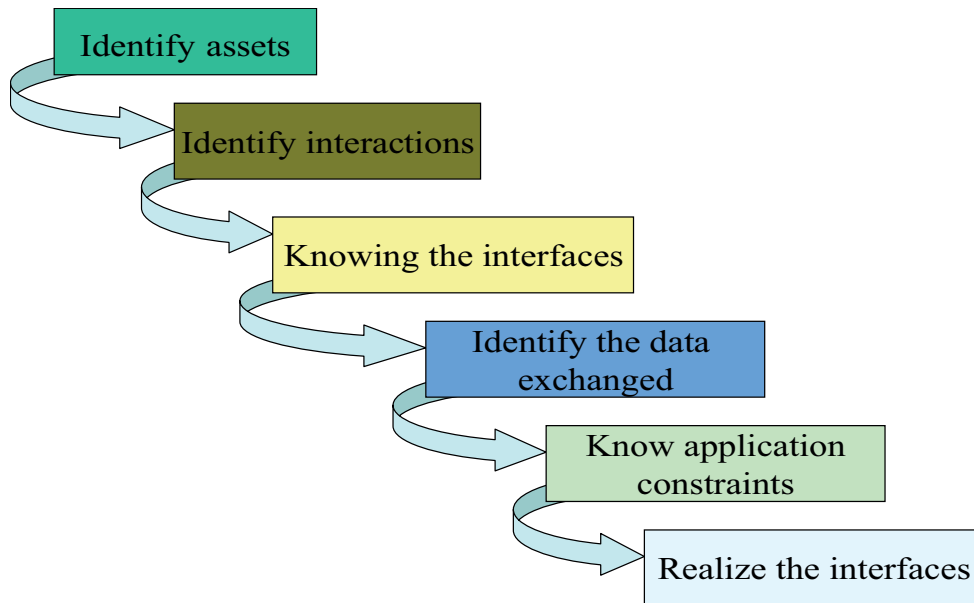


Figure 2: Methodology for SOA enablement of legacy application

The methodology (Figure 2) for SOA enablement of legacy application is:

- The first step for service-oriented integration of legacy application is to identify the legacy assets which will help re-use legacy systems effectively
- Then, we need to identify the interactions with other systems and data sources since not all legacy applications can be opened as web services
- Having identified the interactions, we then need to recognize the contract which makes such interactions possible. This is done by knowing the interfaces. This helps us to identify the interfaces provided both by the system and the external system for coupling
- It is critical to know the data being exchanged, hence, identify the data exchanged. We need to then identify the amount of data transferred and the frequency in which data gets transferred. This also helps in identifying the amount of load to be placed on the new system
- It is also imperative to know the application restraints such as some applications that can handle the data validation independently as against others that are database dependent
- Finally, realizing the interfaces can be achieved using legacy revitalization tools

1.5 Sample Execution Scenario

Let us consider the case of a business process for service provisioning. Service providers should be able to modify processes, for example, when new policies are introduced or new service offerings are made. The existing process should be enhanced with next generation high-speed internet services (e.g. DSL Services) to perform service-feasibility check, provisioning request to a partner service provider and setting up an SLA to monitor the quality of service. The modified process flow with business integration (Figure 3) adds the following steps to the existing process:

- Verify service feasibility with the service configuration system
- Check if sufficient network capacity is available to provision the service
- Intimate the customer if service is not feasible
- Send provision request to the partner service providers system
- Update service data and SLA information with the SLA management system

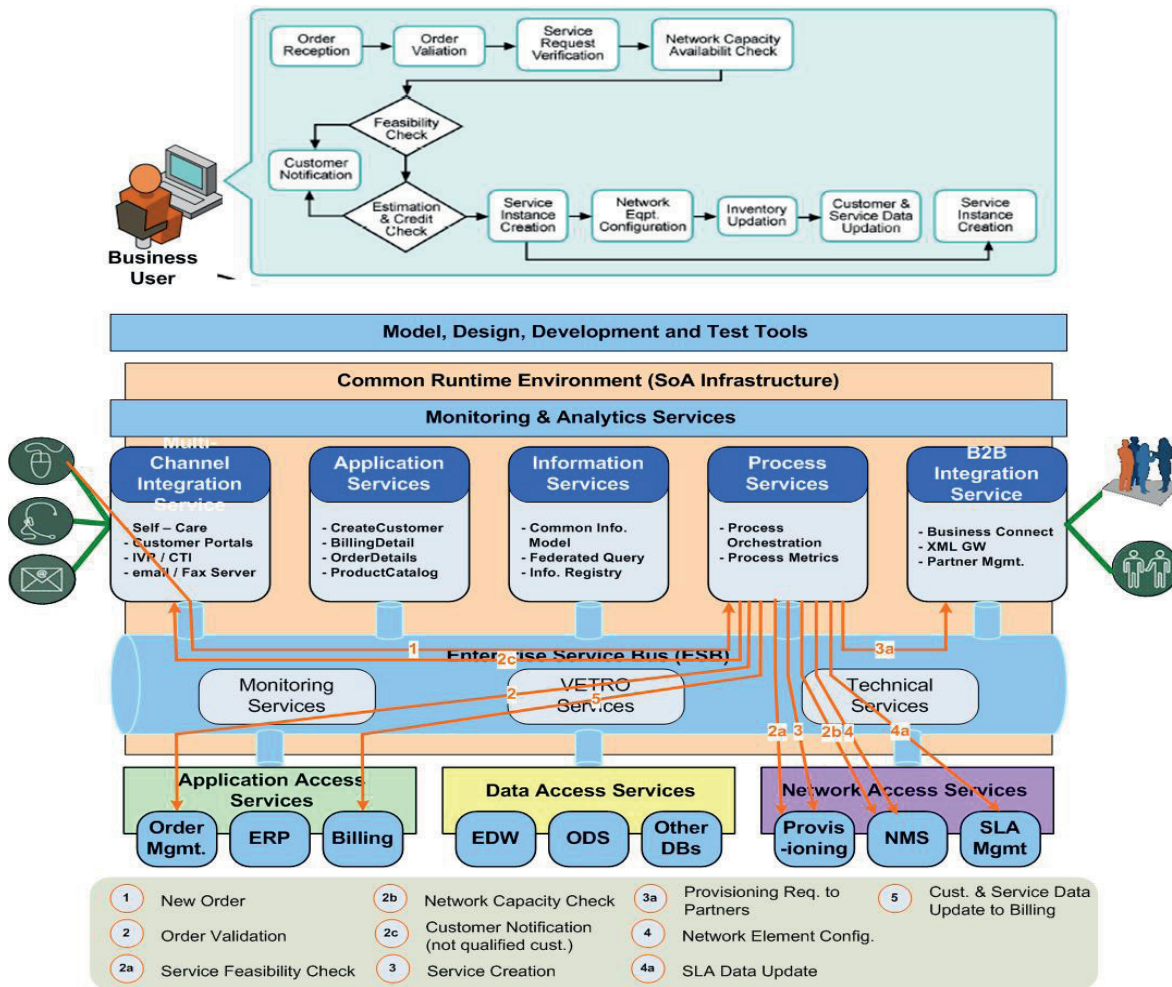


Figure 3: Sample Scenario of Business integration

Thus, without a business-integration infrastructure, service providers will have to modify the backend systems to implement these modifications in the existing processes. Since a service provider deals with several processes that involve various back-end systems, this is clearly unmanageable. With the “process services”, however, all the process changes are centralized to enable better control over process changes. When process changes or new processes demand interaction with the new back-end systems and partner service provider systems as in this case, integration is made easy through business-integration infrastructure. Figure 3 illustrates how the modified process is implemented using the “Business Integration Infrastructure” that involves some back-end systems, including that of the partner service provider.

About the Authors:

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