The cross-functional simplified BSS of the future

The telecommunications industry is characterized by its rapid rate of change, which creates new business opportunities. The Business Support System (BSS) is becoming the focal point for success, helping enterprises attract and retain customers and create attractive services in a constantly evolving market.

**Business Support Systems**

The microeconomic model of the late Herbert A. Simon (1978 Nobel prizewinner in Economic Sciences) states that the BSS is the “connection point” between external relations (customers, partners and suppliers) and an enterprise’s products and services. In turn, products and services must be associated with their constituent resources, such as network infrastructure, service applications, contents and factories. Simon’s reasoning states that it is crucial for organizations to control and maintain their business information.

**History and developments**

Twenty years ago, the telecommunications industry was much simpler: it was essentially one service, one business model, one type of customer – the subscriber – and no complex value network. This scenario has changed dramatically. Today, an enterprise must provide a wide range of services to many different customer types, using multiple business models and complex value networks. This environment of many customers and multiple business models creates business opportunities that can be turned into revenue, provided that the complexity can be managed.

In parallel with the growth in the industry, the BSS has also developed, albeit in a less controlled manner. Many present BSSs are multi-vendor and multi-generational, comprising several parallel silo-like systems. The time has come to reengineer the BSS to overcome these inherent problems, allowing the industry to develop innovative business models.

What is a BSS?

The microeconomic model of the late Herbert A. Simon states that the BSS is the “connection point” between external relations (customers, partners and suppliers) and an enterprise’s products and services. In turn, products and services must be associated with their constituent resources, such as network infrastructure, service applications, contents and factories. Simon’s reasoning states that it is crucial for organizations to control and maintain their business information.

**Figure 1** shows how business information and processes are managed and how the BSS puts control back into the hands of the enterprise through:

1. Ownership and management of asset life cycles;
2. Encompassing design and implementation of business models; and
3. Interaction with networks and service applications infrastructure, as shown in **Figure 2**.

**Business first, technology second**

Every business is unique, with a unique environment and consequently a unique BSS. The BSS is defined from the enterprise’s full, cross-functional business perspective and provides strategic, tactical and operational support. A BSS enables the enterprise to gain control over its business, through measurements and analysis feedback loops that deliver a 360-degree view of all assets. This level of transparency is crucial for organizations to control and maintain their business information.

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**BOX A Terms and abbreviations**

<table>
<thead>
<tr>
<th>Acronym</th>
<th>Definition</th>
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<tbody>
<tr>
<td>BSS</td>
<td>Business Support System</td>
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<tr>
<td>B2B</td>
<td>Business to business</td>
</tr>
<tr>
<td>BPMN 2.0</td>
<td>Business Process Modeling Notation</td>
</tr>
<tr>
<td>CORA</td>
<td>Common Reference Architecture</td>
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<tr>
<td>eTOM</td>
<td>Enhanced Telecom Operations Map</td>
</tr>
<tr>
<td>M2M</td>
<td>Machine to machine</td>
</tr>
<tr>
<td>SOA</td>
<td>Service Oriented Architecture</td>
</tr>
<tr>
<td>SBVR</td>
<td>Semantics of Business Vocabulary and Rules</td>
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<tr>
<td>TCO</td>
<td>Total cost of ownership</td>
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<tr>
<td>TOGAF</td>
<td>The Open Group Architecture Framework</td>
</tr>
<tr>
<td>TMF</td>
<td>TM Forum (TM previously Telecom Management)</td>
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<tr>
<td>TTC</td>
<td>Time to consumer</td>
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Managing assets

The fundamental task of the BSS is accurate and synchronized control and sharing of business assets across the organization. Controlled management of offerings and external relations is also essential. Information is shared and controlled by the BSS through well-defined information ownership, one common information model and one set of shared data.

The BSS supports the operation of multiple business models and the ability to act in different business roles. For example, an enterprise may act in several value chain roles, such as service provider, supplier or intermediary, or it may run double-sided business models.

BSS Characteristics

The BSS handles the full life cycle for many enterprise assets, including creation, design, implementation, deployment, operation, analysis, update/improvement and termination. The duration of different business assets varies greatly, as does the volume of information handled. The life cycle of a business model, for example, is measured in years, whereas events from networks are measured in milliseconds. Similarly, data volumes can range from just a couple of bytes up to several petabytes.

The BSS delivers competitive time to market (TTM), time to consumer (TTC) and business agility to pursue new business models on demand, with complex B2B value networks, and low total cost of ownership (TCO). The BSS is built for continuous evolution of business models, putting the enterprise in the driver’s seat, deciding the way forward.

The BSS scales in multiple directions and independently. For example, the number of customers may grow while the number of products remains constant or vice versa.

Given the emerging multinational nature of the telecommunication industry, the BSS supports business in multiple regions, enabling local adaptation and enforcing corporate standards where necessary.

Designing and operating the business
of any enterprise requires the coordination of several processes, people and applications. Application support is becoming automated. The BSS adapts to ways of working and facilitates operational excellence, such as process support, user-BSS interaction and systems in combination.

The BSS supports value-chain management by connecting, controlling and analyzing business partners on a relationship level, a commercial level and a delivery level. Ericsson’s customers are searching for support to help them move from today’s BSS silos to BSS maturity. Ericsson’s BSS Architecture supports BSS transformations with an arbitrary functional starting point to fit a multi-vendor environment.

**BSS Architectural Framework**

Ericsson’s approach to this very complex area is the BSS Architectural Framework, which provides a common foundation for all stakeholder perspectives and can be described from the following three points of view:

- BSS Logical Architecture;
- BSS Realization Architecture; and
- BSS Libraries.

**BSS Logical Architecture**

The BSS Logical Architecture, shown in Figure 3, provides structure, terminology, principles and tools to bring business and technical stakeholders together by focusing on abstract and logical aspects of the BSS. It contains a range of architectural models, structures and views that form an architectural platform. It provides the ability to illustrate and discuss organizational issues in a coherent as-is and to-be manner, for example:

- **how to implement a major network transformation** while maintaining 24/7 service performance;
- **how to describe all steps of a BSS implementation** from plan to operation; and
- **asset and business model construction and life cycle management**.

BSS Logical Architecture may be used at different levels of abstraction, from overviews of process models to tangible and detailed workflows, covering a variety of activities, such as automated processing, manual tasks and user interactions. Essentially, the logical architecture describes the what and some of the why, not the how.

Ericsson’s preferred choice of architecture modeling language for the BSS Logical Architecture is ArchiMate®. This language is an open standard for enterprise architecture modeling produced by The Open Group. It has its origins in TOGAF but provides a more lightweight approach; we have found this to fit the need to be able to discuss relevant matters without going overboard in tool-related details.

One of the main functions of the BSS Logical Architecture is to provide structure for a BSS, and this achieved through separating external and internal aspects. Internal aspects are further divided into business, applications and infrastructure.

A key property of this model is the interconnection of these levels through service layers resulting in loose coupling and isolation between the layers.

At this point, it should be noted that most models tend to describe only the rather static view of a BSS in operation. We have found it necessary to add another dimension: the evolution phases to accommodate for the design, implementation, operation and termination of BSS functionality; in other words, BSS evolution to improve business agility.

**BSS Studio**

Architectures and models are only as useful as the tools available to manage them. Ericsson’s approach is to externalize processes, rules, events, business objects and the information from applications. These exposed facets are referred to as enterprise entities. This abstraction allows us to describe the BSS applications much more clearly in terms of pure functionality, and allows applications to expose a well defined set of services to the business layer.

To make full use of the enterprise entity concept, Ericsson has created the BSS Studio, Figure 4, a complete environment for enterprise-entity life cycle management, governance, analytics, publication, simulation, verification, performance and commissioning and decommissioning for BSS production. The studio is intended for an enterprise’s business users. Enterprise entities include:

- **actors** – companies, functions and individuals;
- **roles** – customer, supplier and service provider;
- **services** – sales and contracting;
- **processes** – business processes, as defined by TMF eTOM;
- **objects** – products, orders, contracts and accounts; and
- **rules** – decision-making processes.

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The cross-functional simplified BSS of the future are modeled in BPMN 2.0 and rules in SBVR.

Figure 4 The externalization of Enterprise Entities and the BSS Studio.

- Traditional BSS app
  - Rules
  - Processes
  - Events

- Objects and data
  - Traditional BSS application with unique and secluded entities

- BSS studio
  - Enterprise business information model
  - Business object
  - Business rule
  - Business process
  - Business event

- Application model
- Application service

Figure 5 An order-handling process. The notation shown here is conceptual; processes are modeled in BPMN 2.0 and rules in SBVR.

- Receive purchase order
- Send purchase order reception ack.
- Send purchase order delivered

- External
  - Purchase order

- Required entities
  - Order handling
  - Customer handling
  - Product offering

- Event and process
  - PO reception
  - Create customer order
  - Check customer order
  - Activate customer order
  - Activate services
  - Activate resources
  - Activate billing
  - Archive customer order

- Application tasks
  - Customer order
  - Customer order

As an example, Figure 5 shows how an order-handling process could be built.

The Enterprise Information/Data Model

Is the common and shared information framework for an organization. It is divided into a set of models, each belonging to a specific layer of the logical architecture described above, resulting in tailored information and data sub-models for business purposes, application use, and for optimal storage.

Much of the information in the enterprise business information model is also Master Data, in other words, the essential structural information and data of the Enterprise. Master Data management services are exposed to the enterprise at Business Level in the BSS Studio.

BSS Realization Architecture

The Realization Architecture, Figure 6, consists of basic infrastructure building blocks and components, whose purpose is to serve as a common foundation for the implementation and integration of BSS components and solutions.

The goal is to visualize the realization in terms of technology layers and their functionality. Both the Business and Application layers from the BSS Logical Architecture can be naturally mapped onto the BSS Realization Architecture; coupling is most direct for the Infrastructure layer. Our preferred model for the BSS Realization Architecture is CORA, which is a vendor-agnostic N-tier architecture.

The CORA model describes elements with their interactions to fit the different architecture styles, such as N-tier, service-oriented and resource-oriented architectures. It is a general-purpose model, not only used in the BSS domain, and therefore some of the terms have counterparts in the Logical Architecture, however the context normally resolves such overlaps.

The Channel access layer provides client-specific software to enable access to information systems. This layer is accessible for all actor groups, whether internal or external.

The Presentation layer provides presentation-specific software for displaying information to the user and handling user-initiated events.

The Composition layer provides...
composition-specific software, clustered in Orchestrated and Composed elements.

The Integration layer provides support for Synchronous Communication, Asynchronous Communication and Common elements.

The Application layer provides application-specific functionality; essentially, this is where the real work gets done. The layer is clustered into Entity, Task and Utility applications.

Finally, the Data layer provides support for Mediation (data access, aggregation, cleansing, transformation) and Data Storage elements.

Controlling the whole stack are two governing entities:

- **Business Governance** provides functionality to maintain full control of all business specifics in the BSS environment, covering all Enterprise Entities that are either in production or under construction;
- **Security and compliance** handles authority, authentication, behavioral compliance and audits;
- **IT Governance** manages IT assets down to the individual application component and/or service; and
- **SOA governance** is explicitly included.

The BSS Realization Architecture is a standard IT architecture taking advantage of standard and well-proven technologies. Essential BSS additions are made to support enterprise governance and business architecture. This gives robust technical qualities and predictable costs.

### BSS Libraries

Ericsson BSS Libraries provide a platform for the enterprise unique parts of a BSS. These libraries include, for example, a set of templates for the Business layer, as well as best practices. The libraries further cover base implementations of Enterprise Entities, Enterprise Business Information Model and Application Services. All libraries are built, maintained and evolved using the BSS Studio. Consequently, the BSS Libraries provide the flexibility to build the right solution for the enterprise, and the stable experience base that captures knowledge built in previous projects.

### Summary and conclusions

The BSS Architecture puts business control into the hands of the operator, limiting dependence on system vendors and integrators. The Ericsson BSS Architecture gives the operator the power to design and manage its own BSS, from present to future business models, from people-oriented processes to details of assets. At the same time, it supports asset-centric and information-centric viewpoints, providing full traceability from concept to implementation. Finally, the Ericsson BSS Architecture directly supports an enterprise’s way of working, enabling future growth in multiple dimensions. Ericsson firmly believes that this is essential for the telco operator of the future to achieve the operational excellence necessary for market success.
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