Service delivery platforms (SDP) are operator solutions that provide a unified middle ground for the optimized exchange of services between users, operators, and service and content providers.

The authors describe different perspectives on SDPs and the business and technical influences that drive their evolution. They also introduce common features and technology. Instead of trying to cover every angle, the authors focus on two of an SDP’s most important roles: the management and sales of service offerings.

Introduction and perspectives

Technical advances and the alignment of market forces and competitive environments have given service delivery platforms renewed relevance and currency as a middle-ground solution for enabling the optimized exchange of services across different networks and devices and between users, operators, and service and content providers.

Two of an SDP’s most important roles are to manage and sell services (Figure 1). They may be used to package network capabilities and services into offerings that operators bundle with attractive discounts and promote in campaigns. They may also be used to track service usage in order to identify opportunities for improvement and additional sales. To succeed in these roles, service delivery platforms support:

• store front, such as portals, where consumers may discover and consume operator offerings; and
• supply-chain elements, such as partner portals and business-to-business (B2B) gateways, where external content and services can connect to operator business processes and network channels.

Service delivery platforms do not create and deliver services – that is the business of standardized network enablers, devices, and related service-delivery infrastructures for telephony, short message service (SMS), multimedia messaging service (MMS), wireless application protocol (WAP), broadband internet, and emerging IP Multimedia Subsystem-based (IMS) services.

For the SDP manage-and-sell proposition to succeed, operators must ensure effective interplay between business processes and delivery mechanisms. This interplay includes monitoring the performance of the overall service offering and the ability of operators and their partners to quickly create attractive new offerings. To this end, SDPs support strong yet flexible integration with operator systems, such as business support systems (BSS), operations support systems (OSS) and customer relationship management (CRM) systems. In practice, however, the border between these systems and SDPs is beginning to blur as the BSS, OSS and CRM systems themselves evolve to support a greater level of real-time interaction with users and partners who demand live access to information and self-service functions.

Ericsson’s SDP solution – which consists of service offerings, business solutions, common functions, enablers, and professional services – delivers on the manage-and-sell promise while catering for the delivery of emerging top-line revenue-generating services, such as mobile TV and IPTV. It also includes the enablers and service-creation and execution features that are necessary for delivering true end-to-end solutions.

Operator perspective

From an operator viewpoint, SDPs embody an organized technical and business strategy for offering, managing, controlling, and optimizing service offerings to paying custom- ers. They flexibly integrate existing operator systems and assets into a cohesive whole and play an enabling role by opening up network capabilities and self-service features to developers and partners.

Operator SDP strategies typically span multiple parts of their systems and business-process environments. So by working with broad SDP strategies and implementations, operators can gain efficiencies at managing and selling what they already have, and improve at creating and bringing new offerings to market.

User perspective

Users also reap the benefits of well thought-out SDP implementations because they can more easily:

• find and make sense of service offerings;
• subscribe to and consume services across different networks and devices; and
• understand promotions, discounts and bills.

Service delivery platforms help flatten the administrative and technical hurdles that stand between users and services. This, in turn, contributes to increased service uptake, usage, customer satisfaction and retention.

Service and content provider perspective

A successful SDP implementation makes it easier for service and content providers to participate in the service-exchange ecosystem and to promote, sell, monitor, and safely receive payment via operator channels. The SDP supply-chain-management features enable service and content providers:

• to sign up as operator partners;
• to discover network and service capabilities;
• to understand promotions, discounts and bills.

Terms and abbreviations

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<thead>
<tr>
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<tr>
<td>3GPP Third Generation Partnership</td>
<td>MMS Multimedia messaging service</td>
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<tr>
<td>B2B Business to business</td>
<td>NMS Network management system</td>
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<tr>
<td>BPEL Business process execution</td>
<td>OMA Open Mobile Alliance</td>
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<tr>
<td>language</td>
<td>OSS Operations support system</td>
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<tr>
<td>BSS Base station subsystem</td>
<td>QoS Quality of service</td>
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<tr>
<td>CRM Customer relationship management</td>
<td>RDBMS Relational database management system</td>
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<tr>
<td>ESB Enterprise service bus</td>
<td>SDP Service delivery platform</td>
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<tr>
<td>GUI Graphical user interface</td>
<td>SIP Session initiation protocol</td>
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<tr>
<td>IM Instant messaging</td>
<td>SLA Service level agreement</td>
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<tr>
<td>IMS IP Multimedia Subsystem</td>
<td>SMS Short message service</td>
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<tr>
<td>IN Intelligent network</td>
<td>SOA Service-oriented architecture</td>
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<tr>
<td>IP Internet protocol</td>
<td>SOAP Simple object access protocol</td>
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<tr>
<td>KPI Key performance indicator</td>
<td>WAP Wireless application protocol</td>
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• to establish and enforce service level agreements (SLA);
• to register and define services;
• to measure the performance and uptake of services; and
• to enable settlement procedures.

**Developer perspective**

In the context of SDPs, developers are mainly interested in integration tasks and the implementation and orchestration of business processes and important customer channels, such as portals. A further area of interest – the development of applications that may be used for creating the value-added services – is beyond the scope of this article.

**Integration**

Service delivery platforms quickly and flexibly permit the introduction of new and existing systems into the manage-and-sell framework of operator SDP business processes. Take for instance the integration of network enablers or the mediation and synchronization features that facilitate interworking with BSS, OSS, and other systems.

**Business processes**

Developers create and maintain business processes (such as order management) and the logic that caters for the management and sales of services. Because business processes tend to evolve over time, they are generally orchestrated using

• a process description language, such as the business process execution language (BPEL); and
• business rules executed in rule engines, to further enhance flexibility.

**Special applications**

Special applications can be called on to augment standard SDP manage-and-sell features. They might become necessary, for example, to accommodate specialized campaigns or promotions, or to expose services through different channels and portals.

**Making it happen**

The road toward achieving the full potential of service delivery platforms must be traveled like any other road – by taking one well-executed step at a time, ideally according to a time-tested plan-do-measure-improve cycle and within an environment of real operator SDP initiatives.

Many of the problems that SDP efforts aim to resolve have been around for some time. In some instances, solutions to these problems have been found and implemented. What is new today is the level of unification being attempted within operator SDP initiatives. These initiatives are being driven by business strategies, such as triple play, and technical developments, such as network convergence.

**Service offerings, differentiation, time-to-market and efficiency**

Faced with declining revenues from classical person-to-person communication services, such as voice and SMS, operators are increasingly turning to value-added services and triple-play strategies to bolster and evolve their businesses. The idea is that by offering a larger set of services they can reach a broader market and thereby increase revenues.

SDPs must thus accommodate evolving business models by achieving a clear separation of business processes from service delivery technologies. They must also provide a firm grip on underlying information and data models. Furthermore, they must enable operators to rapidly launch and manage services while making maximum reuse of network and system assets. For example, where triple-play is concerned, an operator might want to employ an SDP to integrate voice and presence in buddy lists during a sports event delivered via IPTV, mobile TV, or both.

**Reflecting the business environment**

Emerging service providers, such as Google, MSN, Skype, and Yahoo! are setting new benchmarks for service delivery. Apart from achieving similar levels of dynamic service delivery, SDPs should enable operators to leverage their key assets, such as location, presence, reachability, and quality-of-service capabilities, in order to spice up their offerings to these emerging service providers.

**Content and media-based services**

The huge popularity and commercial success of music and ring-tone download services, video-clip services, and combinations of these services, has created a unique set of forces that influence the evolution of service delivery platforms. Therefore, SDPs must today be able
• to add content assets to operator service offerings;
• to manage transcoding, adaptation, and digital rights management (DRM); and
• to provide business intelligence, in order to show content owners how their content is performing in operator channels.

Third parties and third-party services
To have a sufficiently broad service offering, operators must partner with specialized service providers. Therefore, SDPs cater for service provider requirements for self-service, connection, security, delivery, settlement, and business intelligence. That is, they have been designed to serve in a world where the majority of value-added services are hosted outside operator environments.

Service convergence
Many operators plan to deliver the same services over multiple networks. TV is one example of a service that clearly shows how different implementations (mobile TV and IPTV service, for instance) can have distinct commonalities on the service or application layer – users must be able to discover and subscribe to the services, and operators must be able to promote, authorize, meter, and charge for them. At the same time, the same service requires special features and distinct measures on different access and core networks. In certain cases, an operator might want to cross-promote usage on the mobile network with usage on the fixed network. Here, the SDP should enable the converged parts of the service offering: in particular, packaging, promotion and consumption.

Industry maturity and expertise
Over time, the industry has learned what matters within the functional and qualitative scope of SDPs:
• flexible support of key operator business processes (the manage-and-sell lifecycle of users, partners, service capabilities, services, content, products, packages, and so on); and
• integration and collaboration – the business-process support framework must integrate existing data sources and seamlessly collaborate with existing value-added service-delivery control functions. The framework must also preserve the near-real-time characteristics of these functions.

A useful set of architectural paradigms and technologies that support them have already proven their mettle in enterprise environments. Examples include the service-oriented architecture (SOA), web services, orchestration engines, BPEL, and enterprise service bus (ESB) environments. Today, these are seen as ideal and viable vehicles for software stacks in SDP environments.

Increasing service network complexity
New technologies are constantly being introduced to enable new types of services, for example IPTV and the output of standards initiatives, such as the enabler releases from the Open Mobile Alliance (OMA) and the Third Generation Partnership Project (3GPP) releases of IMS. In the meantime, current platforms remain in place to support strong revenue-generating services, such as SMS-based value-added services, ring-back ring-tone services, intelligent network-based (IN) services, and so on. Service delivery platforms may thus be seen as a thick or thin unifying layer that can span across disparate technologies
• to help streamline administrative processes;
• to monitor the performance of offerings;
• to facilitate manage-and-sell capabilities for developers; and
• to give users and partners a unified service offering.

Network convergence and IMS
On the network convergence front, technologies such as the session initiation protocol (SIP) and IMS are leading the way toward an ever-capable all-IP control layer where person-to-person and value-added services can be created on standardized network interfaces and delivered over a variety of access networks (fixed or wireless). The value proposition for SDP initiatives greatly appreciates when the initiatives are combined with

![Figure 2 SDP features and components.](image-url)
a standardized network core that supports
the creation and delivery of fixed and wire-
less services, for example, when SDP imple-
mentations for the unified management and
sales of service offerings are combined with a
unified, standardized architecture for service
creation and delivery.

Increasing device capability and
diversity
Devices are becoming increasingly more
powerful and, as a result, user perception of
devices is changing. Moreover, market forces
are blurring the lines between contemporary
mobile phones, smartphones, and the latest
crop of portable music and video players. To
today, more and more users see their devices as
personal gadgets that can be
• extended with software, such as games and
  instant messaging (IM) clients;
• filled with downloaded media; and
• used for capturing and producing their
  own content in Web 2.0-type scenarios.
In addition, technical advances, such as those
enabled by IMS, have given rise to new kinds
of communication services on top of a stan-
dardized all-IP network without specific per-
service additions to the network itself. These
developments put even greater expectations
on service delivery platforms. Where quality
of service is concerned, device management
and awareness are becoming an ever im-
portant part of satisfying user expectations.
Content offerings, for instance, should be fil-
tered to hide content that a particular device
cannot handle.

Finally, we see that the rise of rich media
clients has had an impact on and is chang-
ing the role of portals. Likewise, elements of
applications are finding their way into de-
vices much the way that implementations of
valued-added services have migrated into
content and service provider systems.

Horizontal structures
Today, pieces of useful functionality (ne-
cessary in services but embedded in various
vertically structured service-delivery solu-
tions) are being factored out into separate stand-alone features. This way, common
functions (for instance, rating, credit control,
and provisioning) can be reused across all
services. Modern SDP architectures serve as a
catalyst for compartmentalizing features into
interoperable, orchestratable features from
which new services and systems can draw, via
composition, to create higher-order features as
dictated by the needs of the business.

Inside SDPs
SDPs come into their own when they are inte-
grated with operator networks and enterprise
and legacy systems to serve users, partners
and developers. To begin with, vendors and
integrators must have strong SDP concepts,
arborcure, components and solutions. SDP
vendors and integrators must also be capable
of combining these ingredients with profes-
sional services that tailor their offerings to
benefit the business and technical goals of
their customers (Figure 2).

In the past, service delivery platforms were
seen as highly made-to-order environments
created through relatively large design and
systems-integration efforts. Today, by con-
trast, more mature designs and better fit have
greatly reduced the magnitude of design and
systems-integration efforts per SDP imple-
mentation. Service delivery platforms are at
present still not available as complete off-the-
shelf product and platform offerings, but the
increasing extent to which standard vendor
and integrator offerings cover typical SDP re-
quirements has greatly reduced the need for
bespoke work.

SDP portals
SDP portals are key channels that enable
user and partner self-service. Operators can
also use them to promote service offerings
and to manage and monitor performance and
workflow participation.

End-user portal function
The end-user portal gives end users a set
of typically necessary self-service functions
(Figure 3). In addition, it gives operators a
key channel for publishing and promoting
service offerings. The SDP end-user portal,
which provides the self-service, publication,
and promotion features associated with the
applicable business process implementations
in SDP, is typically a multichannel portal
that serves web, WAP, SMS, and rich-client
channels.
Partner portal function
The partner portal gives partners a set of typically necessary self-provisioning functions. It also gives operators a key channel for publishing and promoting network capability. In general, partner portals are solely web portals.

Operator portal function
The operator portal provides a CMO dashboard environment and gives SDP administrators a set of features that enables them to access, control, and configure key aspects of SDP business processes and to monitor and manage SDP operations. The portal enables operator personnel
• to participate in SDP business processes via workflows;
• to monitor the performance of service offerings; and
• to prepare and view business intelligence reports.

Portal framework function
The portal framework provides a set of basic capabilities that facilitate the creation of portals.

SDP B2B support
The SDP B2B support features expose service capabilities to partners (Figure 4). Application code in partner environments can make use of these service capabilities, for example, by calling on web services, such as Parlay-X (specified by the Parlay group) across the internet. The SDP B2B support features may also be used to channel user requests to partner applications.

Simply put, the SDP B2B support features ensure that interactions between partner applications, operator network capabilities and users are authenticated, authorized, secure, and reliable. Besides supporting traffic, the B2B support features enable partner federation, by providing a focal point for such things as on-subscription notification, user redirect-to-partner, and federated single sign-on (SSO), as specified by the Liberty Alliance Project (LAP).

SDP manage-and-sell applications
SDPs unify numerous features that are geared to help operators manage and sell services. In some instances, however, these basic features are insufficient, in which case extensions (SDP manage-and-sell applications) must be added. For example, if an operator wants to develop a special graphical look and feel to help promote a new service offering (think World Cup soccer package) via the end-user portal, then it can create a portal extension application that
• exposes itself using the portlet functionality of the end-user portal (portal framework); and
• exploits core SDP functionality via the core SDP capability interfaces.

Typical SDPs facilitate the creation of manage-and-sell applications by providing standard protocols with which applications can interact with presentation-tier capabilities, business data, and network capabilities without being bound to choice of platform or tools.

Core SDP capabilities
The core SDP capabilities are a set of technical interfaces exposed, for instance, using simple object access protocol (SOAP) technology, by the business process orchestration function (Figure 5). In essence, one can see these interfaces as entry points into the common business processes and business logic that are realized in SDP. These capabilities are typically integrated into other, more general, business processes, such as those that originate in the BSS domain.

Capabilities that support SDP functions outside the core (for example, applications, portal frameworks, and so on), are grouped into categories, such as data access and manipulation, network capability invocation, and control capability invocation. A portal, for instance, might want to create a user subscription to a product by invoking one of the core capability interfaces. Similarly, a CRM system could use a core capability interface to temporarily block a given user or partner from accessing one or more value-added services. SDPs can even create new core capabilities via integration, orchestration, and the exposure of existing (or newfound) capabilities.

![Figure 4: Business-to-business (B2B) support.](image-url)
SDP business-process implementations

The SDP business-process implementations provide an environment for defining, executing, and exposing key business processes and the business logic functions on which they rely (Figure 6). The implementations center on service-oriented architecture (SOA) principles and are built on top of SOA middleware technologies, such as orchestration engines, enterprise service bus, rule engines, and so on. They support user, operator, partner, and administrator actions in the system, generally via a framework that covers information and data modeling, workflow and automation support, and implementations of key business processes that support life-cycle management for, among other things, network capabilities, services, content, packages, users, and partners.

SDP business data

The business data function includes an information and data model that provides shared-data definitions for SDP. The model defines all objects so that SDP can

- manage players and integration with surrounding systems; and
- support the operation of SDP business process implementations and the data needs of service delivery control functions.

SDP management and monitoring

The SDP management and monitoring function enables SDP to manage and monitor service levels, generate reports, and provide integration with network management systems (NMS). It also configures and manages the performance of SDP components. For a defined key performance indicator (KPI), for example, it can aggregate data from a variety of sources and via a variety of interface technologies and protocols. Based on this data, it can then trigger appropriate actions.

SDP service delivery control

The SDP service delivery control function assists in the delivery of the value-added services that are managed and sold using SDP. Delivery control may include things such as user and partner authentication, authorization, credit control, and SLA enforcement.

Where features in the service delivery control function have already been implemented in existing operator systems, the SDP service delivery control function serves as a mediator; otherwise, the SDP implements these control functions itself. The service delivery control function also monitors events during service delivery, and triggers relevant processes in the business orchestration function to enhance relationships with users.

SDP integration and mediation facilities

The SDP business integration and data mediation facilities function provides a set of management interfaces to systems outside SDP. Typical examples are data synchronization interfaces to decoupled portals, and activation and provisioning interfaces to applications, enablers, and partners. The business process implementations generally support or drive these interfaces.

SDP integrates with other systems to provide unified activation, content and services, and data synchronization with BSS and CRM. The SDP integration and mediation facilities provide a connector framework and the con-

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**Figure 5 Core SDP capabilities.**

- Data access and manipulation
- Network capability invocation
- Control capability invocation
- Other capabilities composed as needed
nectors that are typically needed to support integration with popular systems. Routing and transformation features contribute to form a base for flexible data mediation.

The SDP business process implementations make use of the SDP integration and mediation facilities; for example, an SDP business process that supports a user subscription to an IPTV-based service might activate user data in an IPTV server solution and increase bandwidth and the QoS entitlement for the user in broadband network infrastructure. Moreover, if the operator wants to cross-promote services in the fixed and mobile networks, it can automatically create a temporary subscription to its mobile TV service and send an SMS or MMS to the user with instructions for downloading a mobile TV client with a look and feel (GUI) which is similar to that of the operator’s set-top box.

**Conclusion**

SDPs are coming into their own as key instruments for enabling and streamlining the operator service offerings with a focus on key areas of management and sales. Market forces and technological developments are respectively driving and enabling modern SDP initiatives to deliver improvements to operators, users, and content and service providers across various devices and networks.

Ericsson is working with its customers worldwide to help them define and implement SDP initiatives and projects. The experiences Ericsson gains from these efforts are continuously fed back into the company’s base of products, components, and best practices, to ensure that Ericsson is well positioned to support its customers in this key area going forward.