

Service Delivery & Deployment Design Patterns

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Abstract

In today's rapidly expanding and highly competitive telecom market, the goal of every service provider is to create and bring to market new, highly adaptive and compelling services which will increase revenue and differentiate them from the competition.

Role that telecommunications play in the lives of users is expanding "beyond voice" to new multimedia services that allow people to do more than just speak to each other: i.e., to utilize sound, text and video in their interactions. Users also want to get access to services such as news, sport, games and music from any place and at any time, on any device, paving way for content and media providers to use telecom networks as an additional distribution channel.

As a result, today's telecom networks are fast evolving to deliver multimedia services. Traditional voice services are being replaced with multimedia services which is putting lot of pressure on the transport or delivery network.

Services are getting decoupled from the underlying network infrastructure delivering those services leading to a true service oriented architecture and subscriber-centric approach to service delivery.

While networks are evolving to deliver services in a more efficient way, the service creation and deployment environment is also fast changing in order to launch new services rapidly and cost effectively, ensuring low costs for new deployments while getting the maximum value out of currently installed infrastructures.

As operators are expanding their offerings to include content and application providers outside the traditional operator domain, they need service and content delivery infrastructures that support evolving business models, service interfaces that support the needs of "non telecoms" IT-oriented developers and service providers, while providing carrier-grade quality to users.

This paper attempts to bring few patterns that are fundamental to the design of evolving service networks.

Language Map

Figure 1 shows how various patterns work together to define service delivery and deployment in a service network.

Patterns 1 and 2 suggest how services are delivered in network. Patterns 3 suggest how services are developed and deployed in the network.

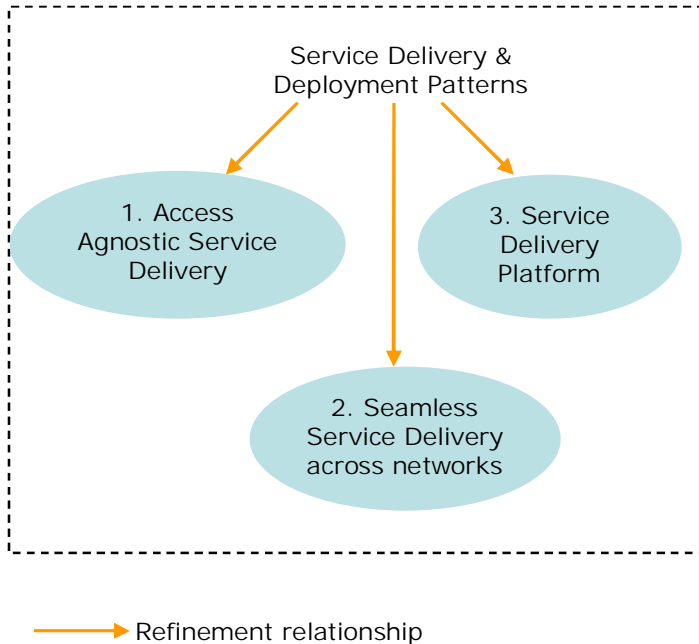


Figure 1

Glossary

IMS	IP Multimedia System
P-CSCF	Proxy - Call Session Control Function
S-CSCF	Serving - Call Session Control Function
WLAN	Wireless Local Area Network
MGW	Media Gateway

Pattern 1: Access agnostic Service Delivery

Context:

Networks that allows end user to use services anytime, anywhere while on the move, at home or office and from any device

Problem:

An end user would like to use their service anytime, anywhere while on the move, at home or office and from any device. He should be able to access the same service through the best access mode available. For e.g. while he is at home or office, he would like to use WLAN or Fixed Line to access the service on his laptop, however while he is on the move, he would like to use his mobile phone to use the same service.

Different services have different requirements. Some services demand high bandwidths, while some demand low latency. Therefore it should be possible to deliver the same service to the end user irrespective of the characteristics of the access technology and mode of transport chosen by the end user.

Solution:

Service Networks should be built on architectures that treat all forms of access as equals. This can be ensured by layered division of networks into transport/connectivity, control and service layers, whereby service layer decouples itself from the underlying network layers that support all forms of access technologies whether fixed, mobile or other wireless technologies.

The layered architecture comprises of following layers

1. Connectivity Layer or Transport Layer comprises of switches and routers and provides the mechanism for transporting voice, data and multimedia information. It includes the backbone transport as well as the access network.
2. Control layer comprises of network control servers for managing call or session set-up, modification and release.
3. Application/Service layer comprises application and content servers to execute value-added services for the user.

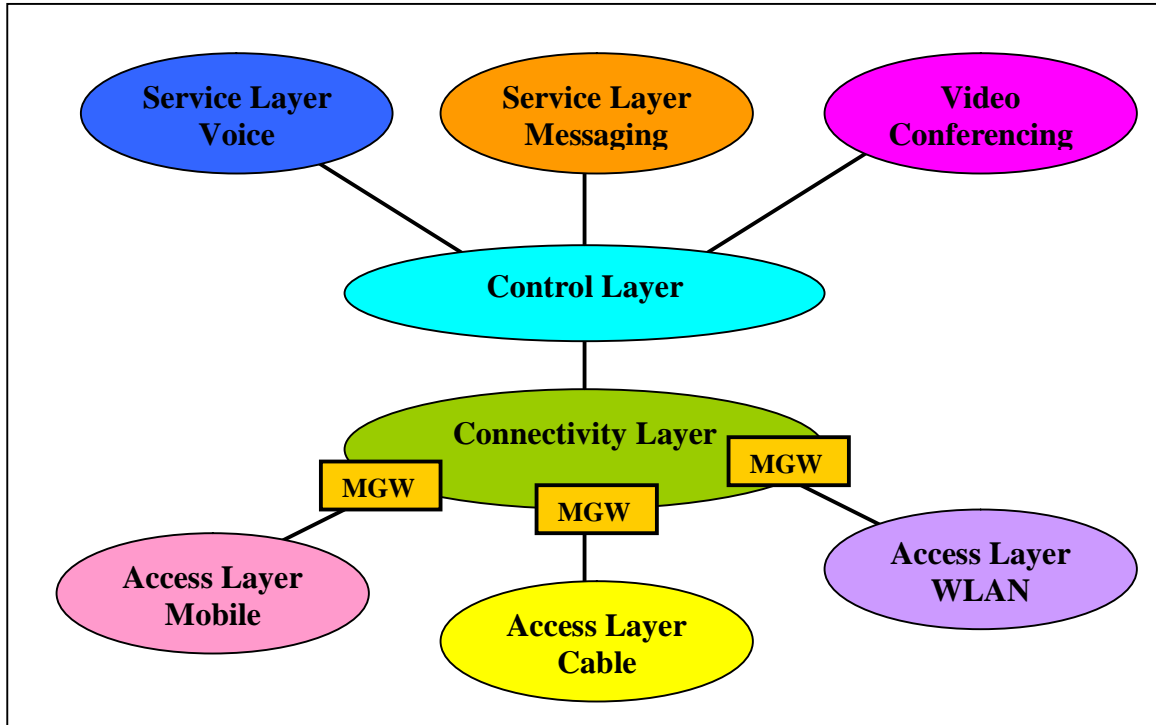


Figure 2

A common connectivity and control layer for all access types and service applications ensures that the services can be delivered irrespective of the access type.

The decoupling of the service layer from the access/connectivity layer ensures that the service applications remain totally transparent to the complexity of how the service is getting accessed through the connectivity layer.

Additionally by having an access aware common control and connectivity layer, it ensures that the delivered service is adapted to the characteristics and capabilities of the currently selected device and its access network by the user. For e.g. Access networks such as mobile, cable, WLAN may require a core network adaptation, due to transport or protocol incompatibilities, in the form of elements called media gateways (MGW).

Pattern 2: Seamless Service Delivery across networks

Context:

Networks that provide seamless services to end users, regardless of their current location and network

Problem:

Roaming end user connected to a visited network uses the services provided by the visited network operator, who may not provide the same set of services as offered by home operator. Therefore end user is at loss of using his personalized services while roaming in other networks.

Solution:

The networks can be classified as Home or Visited. From a subscriber perspective, the network of an operator with whom the subscriber is registered for his personalized services, is referred to as Home network, while the network of an operator where the subscriber does not have any registration relationship and where the subscriber is temporarily roaming, is referred to as Visited network.

All personalized services of an end user should reside in one network, the home network. Visited network only provides access and connectivity to the home network for accessing the service. Visited network should provide a proxy function which would serve as a contact point for the end user for accessing his personalized services. The proxy function contacts the serving function residing in end users home network for accessing the actual service. Proxy function should be capable of identifying the end-user's home network in order to connect to the serving function to setup the service session.

For e.g. Session control, a key feature of IMS, resides in the home network. The Serving CSCF (S-CSCF) function is located in the Home network and is responsible for performing the call session control services. Proxy CSCF (P-CSCF) function is located in the Visited network and is responsible for forwarding the session requests to the Serving CSCF in the Home network. This means that the home operator is in full control of providing subscribed services as well as protecting end-users. Moreover, by focusing service execution on the home network, operators who want to deploy new services need not wait for roaming partners to add similar services.

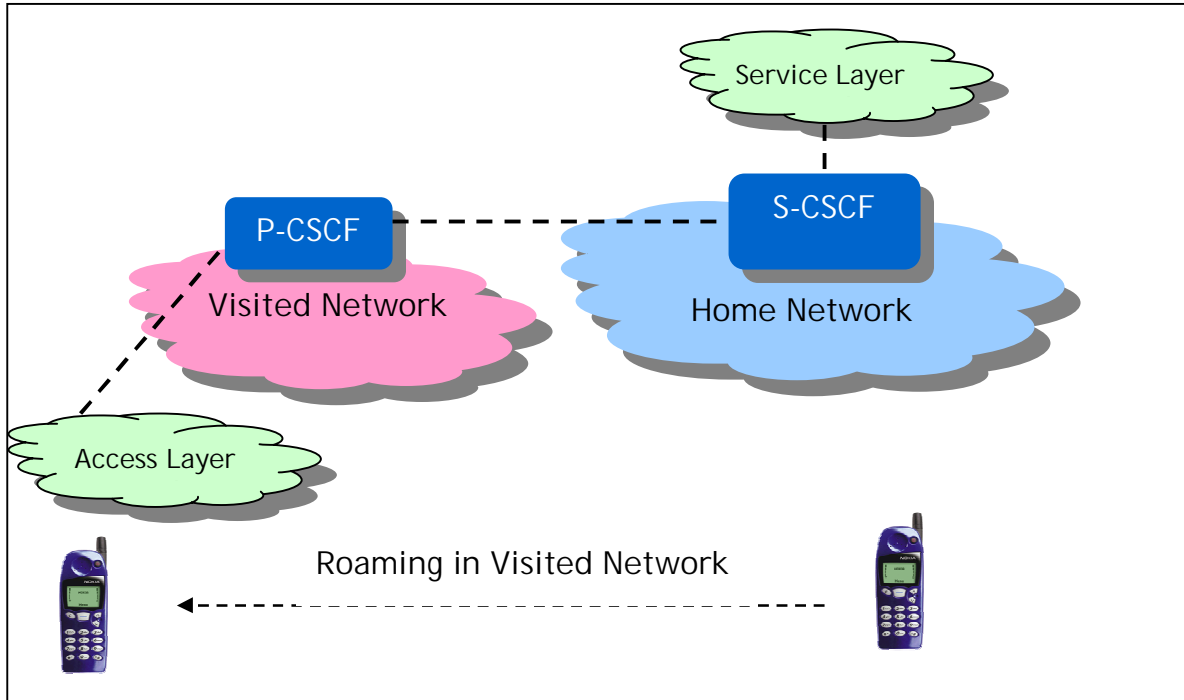


Figure 3

Pattern 3: Service Delivery Platform

Context:

In today's highly competitive telecom market, where operators are fast losing revenue due to commoditizing of the traditional voice services, operators turn to new and innovative services in order to improve their competitiveness.

Problem:

Services need to be developed, deployed rapidly and managed efficiently. For new service introduction, service providers are dependent on the content managers and application developers to bring new content and applications to its user; however integration of the third party content and applications into service provider's business process as well as the network needs to be simple and efficient, for a faster time to market.

Solution:

Service Providers should deploy Service delivery platforms that provide a more efficient way to create, launch, integrate and manage new services for their end users.

Service Delivery Platform is an open, standards-based framework that helps service providers to create, deploy and deliver new services and applications faster, simpler and at low cost. It provides a service creation environment, service execution environment and an abstraction layer where the complexity of underlying communication network is hidden from the application developers.

Traditionally, services are delivered as vertical 'stovepipe' implementations with each service having its own service specific functionality for charging, provisioning and management. Such deployments involving replicated structures of functionality across the network are very costly and complex to build and maintain.

With the introduction of Service Delivery Platforms, many Service Control functions can be reused for faster service creation and delivery, defining a horizontal architecture where service enablers and common functions can be reused by multiple applications.

A Service Delivery Platform helps to standardize all the service interfaces for a service provider, creating a horizontal platform from which they can provision, control and bill for all the value-added services they provide, whether the services are created by third-party application developers or by the service providers themselves. SDP links a service provider's back end business processes (e.g. provisioning, ordering, billing and customer care) with front-end applications and the underlying network service elements.

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