THE CONVERGENT SERVICE LAYER IS THE FUTURE »

Next Generation Intelligent Networks

In the next years, networks will gradually evolve from circuit-switched, SS7-based architecture to packet-switched, IMS-based architecture. This transition will take several years, if not more than a decade. During the transition period, services will have to be provided to both types of networks.

There are two principal service layer strategies during the transition. One strategy is a segmented approach where a parallel service infrastructure is implemented on both networks. The other strategy is a convergent approach where the same service infrastructure is used to provide services to both types of networks.

This paper presents Atos Origin's convergent service layer approach. The same infrastructure provides the same services to both legacy and IMS network domains and the features and capabilities of both network domains may be used in the implementation of the services. The existing core network infrastructure investment is fully leveraged and can be used to provide functionally rich FMS and FMC deployments.

Contents:

White Paper

Atos Origin NGIN
A strategy for your transition to IMS

THE CONVERGENT SERVICE LAYER IS THE FUTURE

OVERVIEW

In yesterday's network, services were provided to subscribers with IN (Intelligent Networks) connected to PSTN and 2G/3G PLMN networks (collectively called Circuit Switched, or CS). Service deployment was rather slow due to proprietary IN implementations and the availability of relatively few suppliers. In tomorrow's network, services will be provided to subscribers using a so-called Service Layer connected to IMS (IP Multimedia Subsystem) and other PS (Packet Switched) networks. Service deployment will be faster due to standardization and the availability of more suppliers due to the IP-oriented network architecture. However, a migration from CS networks to PS networks will not happen overnight, but rather will take at best several years if not decades to migrate fully all subscribers to the new technology.

Therefore, in today's evolving transitional networks, services must be provided by a convergent service layer that provides the same services to subscribers whether they connect to a CS or PS network and, even more, a subscriber should be able to use any kind of device at any time transparently independent of the access or switching technology.

In order for a Service Provider to get started on the transition to an IMS network architecture, the evolution must provide benefits in terms of improved financials such as cost reduction, revenue generation, and increasing subscriber count. The key factors necessary to provide such benefits are:

- Services can be accessed from either the CS or PS network without maintaining two parallel service layer infrastructures
- Convergent network adaptation supporting hybrid networks allowing a smooth transition of IN services while the network is evolved
- Rich suite of off-the-shelf services for both residential and Enterprise segments that provide a new revenue stream, attracting new subscribers as well as increasing usage of by existing subscribers
- The ability to respond to market demands by deploying new services rapidly

When we speak about convergence, we have to differentiate several types of convergence: service, commercial, and network.

With service convergence, the user experience will be the same independent of the device type used. Mobile, fixed, and IP phones will behave similarly. For example, a convergent service layer means:

- Group services such friends/family, hunting groups, group pick-up, automatic call distribution, etc, support all device types simultaneously
- The same profiles for call restrictions and other supplementary services (call forwarding, call holding, call waiting, etc.) apply to all device types
- A subscriber with several devices has only one voice mailbox
- Rich services such as Ring-back tones/videos, distinctive ringing, and other personalization features
- Location and presence information about all devices is available
- Multi-service orchestration ensures the correct application of all of the services a user may contract
- All services are provided by the service layer with no need for customer premises equipment such as PABX's

Commercial convergence means the availability of

- Multiple-play Bundling for Fixed+Internet+TV+Mobile
- Special call-type ratings such as Fixed numbers for mobiles, Home or Office Zone types of services, special tariffs for members of group services, and Prepaid-Postpaid convergence

Network convergence means

- The same service layer infrastructure is connected to both the CS and PS networks and enables devices connecting from either network to be part of the same services
- The service layer supports both SS7 and Sigtran on the CS networks
- CRM, personalisation, provisioning, and billing convergence
- Multi-Service provisioning orchestration

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Chris Dulya is responsible for developing international telecom business opportunities, principally in network applications and values added services. Recently, Chris has been concentrating on the evolution of telecoms networks to IP, and the impact of Next Generation Network technology on the application space. Chris has also worked on the European roaming market, defining new services and products that have been successful.

Finally, a truly convergent platform must have the ability to support the various possible business models that Service Providers need to offer.

- FMS (Fixed-Mobile Substitution) – In an FMS model, mobile operators replace PABX extensions with mobile subscriptions and provide PABX features over the mobile network. In this way, an operator gets additional mobile income from the replacement of fixed lines by mobile subscriptions.
- FMC (Fixed-Mobile Convergence) – Also known as a total communication provider model, in an FMC model, fixed lines are replaced by IP phones and the IP and mobile extensions are integrated seamlessly. PABX features are delivered by the service layer in a mixed mobile, PSTN, and IP environment. In this way, an operator provides new convergent services at a competitive price.
- FMI (Fixed-Mobile Integration) – Also known as business trunking, in an FMI model, the CS/PS PABX's are integrated by connecting them over the IMS network. The service layer is responsible for implementing legal obligations such as emergency calls and lawful intercept. In this way, an operator can integrate the PABX extensions of the Enterprise with the mobile extensions while allowing the Enterprise to amortize current infrastructure.
- IP/Broadband based residential services – In this model, operators can offer a VoIP/DSL service with the same functionality as the traditional PSTN service. In this way, mobile and fixed operators can enter a new market.

The first three services are oriented towards business subscribers while the last one is oriented towards the residential market.

ENTREPRISE VALUE PROPOSITION

The NGIN provides services from the telecom operator network that would normally be provided by customer premises equipment. This allows services to be provided in a convergent way to mobiles, fixed and IP phones. Therefore, for the Enterprise, there is a reduction of CapEx because no premises equipment is needed. The CapEx and OpEx are paid within the tariff plan of the Enterprise.

For the operator, new high ARPU Enterprise subscribers can be captured. A mobile operator gains fixed line business while a mobile and fixed operator can become a total communications provider.

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NETWORK EVOLUTION

In the next years, the network will evolve from a pure CS architecture through a transitional period until the full IMS packet switched architecture is realized. This transition will last at best several years, if not more than a decade, or may never be fully realized. During the transition period, services will have to be provided to devices that attach from either network. There are two principal service layer strategies during the transition.

One strategy is a segmented approach where a parallel infrastructure is implemented on both networks. The other strategy is a convergent approach where the same infrastructure connects to both networks.

SEGMENTED SERVICE LAYER

In a segmented model, the IN SCP's and IMS Application Servers are maintained separately. Eventually, the IN infrastructure will be decommissioned but there will be a period of several years of overlap. A parallel investment must be made and maintained in order to provide the same services on both networks. In addition, a SIP Application Server with no interfaces to the CS network is unable to reuse the existing core network investment and is inadequate for FMS and FMC deployments.

Let us discuss the disadvantages of such a segregated approach.

First and foremost, a parallel investment must be made and maintained in order to provide the same services on both networks. In addition, a SIP Application Server with no interfaces to the CS network is unable to reuse the existing core network investment and is inadequate for FMS and FMC deployments.

The lack of interaction with the CS core network has many technical deficiencies:

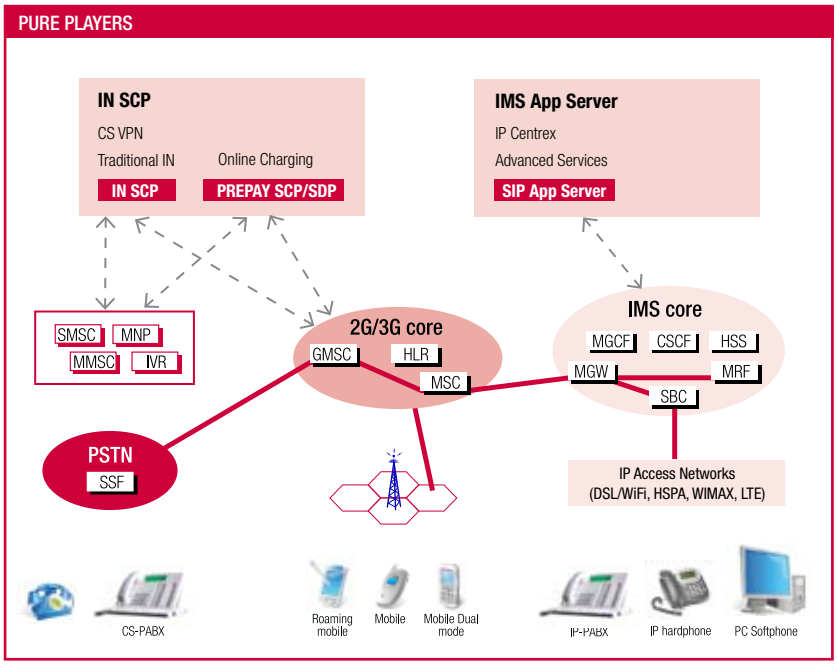
- Service consistency will require
  - Dual/parallel development, deployment, and operation of all services
  - Parallel provisioning and replication of subscriber data
  - Synchronization of supplementary services settings (call forwardings, etc.) on different network elements
- The lack of connection across the network boundary, and hence there will be
  - No dual mode phones
  - No integration of mobile and IP subscription
  - No unique voice mailbox
  - No messaging inter-working

In addition, there are technical deficiencies unique to the SIP application server which will have to be solved in the long run:

- Inefficient roaming management
- Lack of location information
- No access to subscriber data in HLR over CS network
- Multi-ringing limitations
- Features oriented to mobiles like Home Zone, Least Cost Routing and Free Divert to Voicemail cannot be implemented
- Interactions with IN services like Dual-Line and Multi-SIM can not be solved

With a convergent service layer, all of these deficiencies can be overcome and used as advantages.

In the following diagram, we depict a transitional CS/IMS hybrid network where the IN services and IMS services are maintained on separate service platforms.



CONVERGENT SERVICE LAYER

In a convergent model, a single service layer connects to both the CS and IMS networks. The same infrastructure provides the same services to both network domains and the features and capabilities of both network domains may be used in the implementation of the services. A convergent service layer has none of the deficiencies of the segmented approach, and furthermore provides several advantages. No parallel investment is necessary, but rather only one service layer needs to be maintained.

The existing core network infrastructure investment is fully leveraged and can be used to provide functionally rich FMS and FMC deployments.

A convergent service layer has none of the deficiencies of the segmented approach, and furthermore provides several advantages. No parallel investment is necessary, but rather only one service layer needs to be maintained. The existing core network infrastructure investment is fully leveraged and can be used to provide functionally rich FMS and FMC deployments.

The connection with the CS core network has many technical advantages:

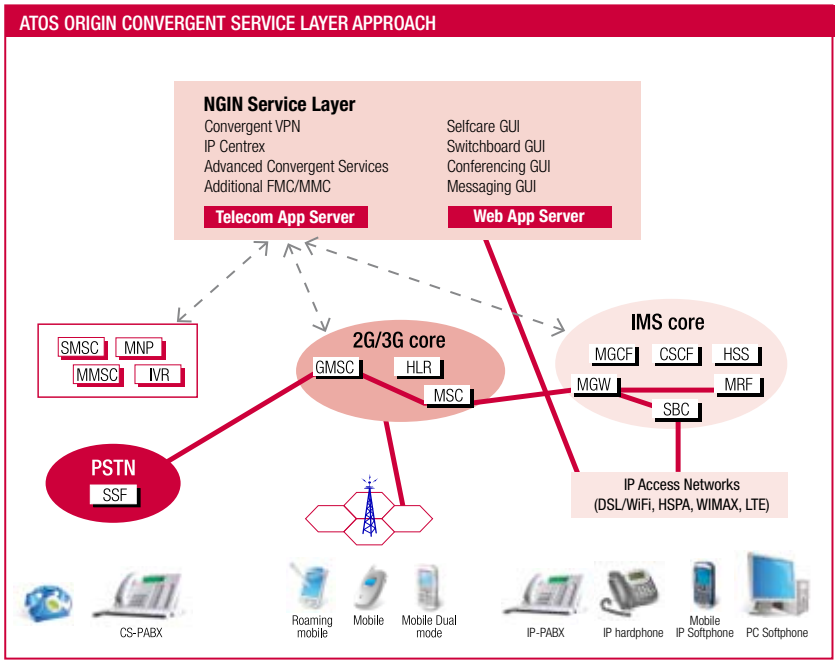
- Service consistency is provided because there is no dual provisioning or replication of subscriber data, and other configuration parameters such as the supplementary services settings (call forwardings, etc.) are retrieved directly from the source (the HLR).

- The connection across the network boundary allows
  - Dual mode phones
  - Integration of mobile and IP subscription
  - Unique voice mailbox
  - Messaging inter-working

- Services for devices connecting from the IMS network we gain
  - Efficient roaming management
  - Location information
  - Access to subscriber data in HLR over CS network
  - Multi-ringing abilities
  - Interactions with IN services like Dual-Line and Multi-SIM are possible

In the following diagram, we depict a transitional hybrid CS/IMS network where the IN services and IMS services are provided by a convergent platform.

ATOS ORIGIN CONVERGENT SERVICE LAYER APPROACH



"A convergent service layer has none of the deficiencies of the segmented approach, and furthermore provides several advantages."

For the end users, the benefits of a convergent approach are:

END USERS CAN HAVE THIS	INSTEAD OF THIS
FMC services	Fixed-only" or "Mobile-only" services
Multimedia telecom services for every service	Voice only
Multiple device support while taking into account device-specific features	Different services per device type
Payment method independent services	Prepaid-only or Postpaid-only subscribers
Private and Business service awareness for the same user	Different devices, subscriptions, services, and carriers for the same user
Group, social, collaboration, interactive, feature-rich services	Anonymous, point2point, unidirectional services

A Service Provider will enjoy:

SERVICE PROVIDERS CAN HAVE THIS	INSTEAD OF THIS
Same services over hybrid networks	"CS only" or "IMS only" services
Open standards multi-vendor platforms and services	Proprietary, single-vendor implementations
Multi-market platform adaptable for Corporate, SME, SOHO and Residential segments	Dedicated platforms for business and residential segments
Open, online IT integration for BSS and OSS	Proprietary offline IT integration
Telecom & Web service/application layer integration	"Telecom-only" and "Web2.0-only" approaches

SMOOTH TRANSITION FOR "IN" EVOLUTION

Sooner or later many operators will be facing the end-of-life of their current IN platforms. By adopting a convergent service layer approach, the migration of the IN services of the CS network is facilitated. The transition of the IN services can be divided into a few main approaches:

1. Operators with an IMS network deployed or with short term plans for deployment

2. Operators with plans to deploy an IMS network in the medium to long term

In the first case, when an IMS network is in place or will be in the short term, then the IN evolution strategy will consist of deploying a convergent platform along side the existing IN infrastructure. New convergent services will be implemented and offered to the subscribers, speeding up the IMS pay-off and generating more income. Eventually, when the legacy IN infrastructure is amortized, the pure IN services will be implemented on the convergent platform and subscribers will be migrated over.

In the second case, the operator has medium or long terms plans for an IMS network while the current IN infrastructure is due for a major upgrade or replacement. In this case, the operator should select a convergent service layer platform for the IN replacement. The pure IN services will be implemented on the convergent platform and then the subscribers will be migrated. In this way, when the IMS network is deployed, the service layer is prepared for the immediate of convergent services. In fact, with this strategy, the business case for the IMS deployment will be more attractive and the operator may be able to justify an earlier deployment.

"By adopting a convergent service layer approach, the migration of the IN services of the CS network is facilitated."

ATOS ORIGIN´S NGIN SOLUTION

ATOS ORIGIN'S NGIN PORTFOLIO

Atos Origin NGIN solutions enable telecom operators to become total communications providers, offering convergent voice and data services to mobile, fixed, and SIP devices for enterprise and residential markets. Our Next Generation Intelligent Network platform enables the development of truly convergent services that include voice, messaging, presence, location, real-time charging and other features.

Atos Origin NGIN services make the transition to IMS worthwhile. With our NGIN services, the investments into IMS pay off sooner because the operators are able to offer attractive new services to their subscribers using the features and capabilities of IMS while continuing to use the 2G/3G infrastructure already in place.

The NGIN services can be bundled together into different solutions. Some of the solutions delivered so far are:

- IP Centrex
  VPN, Virtual Call Center, Ring Back When Free, Incoming Call Display, Call Barring, Manager Assistant, Absence Reason, Do Not Disturb, Hunt Group, Call Queuing, Switchboard Operator
- Convergent Virtual Private Network and Convergent Centrex
  VPN, Virtual Call Center, Ring Back When Free, Incoming Call Display, Call Barring, Manager Assistant, Absence Reason, Do Not Disturb, Hunt Group, Call Queuing, Switchboard Operator, Auto-Attendant, Private Number Plan, Diverse Extension types, Preferential, Charging, Dialling Options, Restrictions Management, Favourite Number, Partner VPN, Home Rerouting, Free Divert to Voicemail
- Enterprise Services
  VPN, Group Pick-up, Hunting Group, Call Queuing, Switchboard Operator, Auto Attendant, Work Zone, Audio Conferencing
- Residential Services
  VoIP, Friends and Family, Home Zone, Missed Call Advisor, Ring Back When Free, Absence Reason, Free Divert to Voicemail
- Convergence
  Dual Mode Devices, Softphone Integration, MultiSIM, Prepaid/Postpaid Convergence
- Common Enablers
  PC Tools Bars, Common Address Book, Features Codes

ATOS ORIGIN'S NGIN EXPERIENCE

Atos Origin has been deploying successful NGIN projects across Europe since 2004. To date, we count with four reference sites, all in tier-1 European operators.

Our customers have used the NGIN to build products for:

- Residential and Enterprise market segments
- Mobile and/or fixed offerings
- Convergent offerings using FMS or FMC approaches
  In some cases their offering began with one or a few services and was built up over time to include a wide range of services packaged into various products for the subscribers. In other cases, a comprehensive offering was deployed from the beginning. In all cases the NGIN was adaptable to needs of the operators and the evolution of their offerings.

More information on Atos Origin NGIN:

- Issues 12, 13 and 14 of Atos Origin's Telcolberia magazine
- http://ngin.es.atosorigin.com
- Atos Origin NGIN brochures: NGIN Services, NGIN Virtual Call Center
- Yankee Group Research Note: The Role of System Integrator in Deployment of IMS Service Layer.

Or contact us at:
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About Atos Origin

Atos Origin is one of the world's leading international information technology services companies. Its business is turning client vision into results through the application of consulting, systems integration and managed operations. The company's annual revenues total more than 5.8 billion euro and it employs over 50,000 people in 40 countries.

Atos Origin is the Worldwide Information Technology Partner for the Olympic Games and has a client base of international blue-chip companies across all sectors. Atos Origin is listed on the Paris Eurolist Market and trades as Atos Origin, Atos Worldline and Atos Consulting.

Atos Origin's Next Generation Networks Engineering Center serves the telecommunications market since 1998. Atos Origin's engineers are experts on both telecom and IT software development and systems integration, having in-depth knowledge and years of experience working with Intelligent Networks, SS7, SIP, IMS, and JAIN/SLEE technology.

The Engineering Center provides support to global Telecommunications operators in the creation and roll-out of fixed-mobile convergent Enterprise services. To date, Atos Origin products are deployed and live in several operators around Europe.

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ATOS ORIGIN NGIN
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