

# Ericsson view of Convergence



# Convergence Concept

# Convergence

Means a lot of different things to different people

- Industry Convergence
  - Telecom / IS/IT / Media/Broadcasting
- Network Convergence
  - Common session control network
  - Common service network
- Service Convergence
  - Seamless multi-media services over different access
- Device Convergence
  - Terminals operating over different accesses
  - Multimedia terminals
- One Company approach
  - One brand
  - One customer interface
  - Bundled offerings
- Common network & operation & processes

# Convergence Definition

## Ericsson View

Traditionally, the term fixed-mobile convergence (FMC) has been used by the telecom industry when discussing the integration of wireline and wireless technologies. But it is not just about this particular kind of convergence, it is also about convergence between media, datacom and telecommunication industries. Convergence is considered from three viewpoints:

### **User service convergence;**

where there are common user service delivery capabilities with access and device awareness. This means that a multitude of services (person to person, person to content and content to person) can be provided to the same user over different access networks and to different devices.

### **Device convergence;**

common devices supporting several access types, such as CDMA2000, WCDMA, GSM, fixed broadband and WLAN. Device convergence allows multiple applications to be run, reusing the same functions for identification and authentication. Furthermore, the mobile device supports more and more functions in addition to telephony, e.g. Camera, TV/Video and email.

### **Network convergence;**

this implies consolidation of the network to provide different user services, with telecom-grade quality of service, over several access types with an emphasis on operator cost efficiency and support to user service convergence.



**User  
Services**



**Convenience &  
Ease of Use**

**Devices**



**Always Best  
Connected**

**Network**



**Reliability &  
Security**

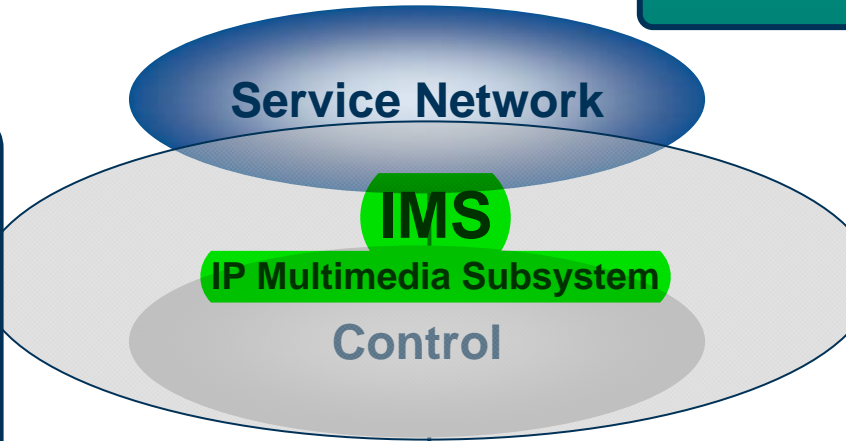
# Supporting Systems

# Why **IMS**

## Network perspective

Access to Application Servers  
and Service Creation

- Shared functions:
- Charging
  - Presence
  - Directory
  - Group & List functions
  - Provisioning
  - Media handling
  - Session control
  - O&M

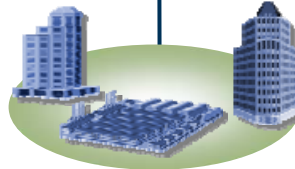


Shared competence  
Shared O&M staff  
Shared Infrastructure

Gateways and Service Nodes



**Residential**



**Enterprise**



**Mobile**

**Shared CAPEX and OPEX provides a better business case for each application**

# Definitions



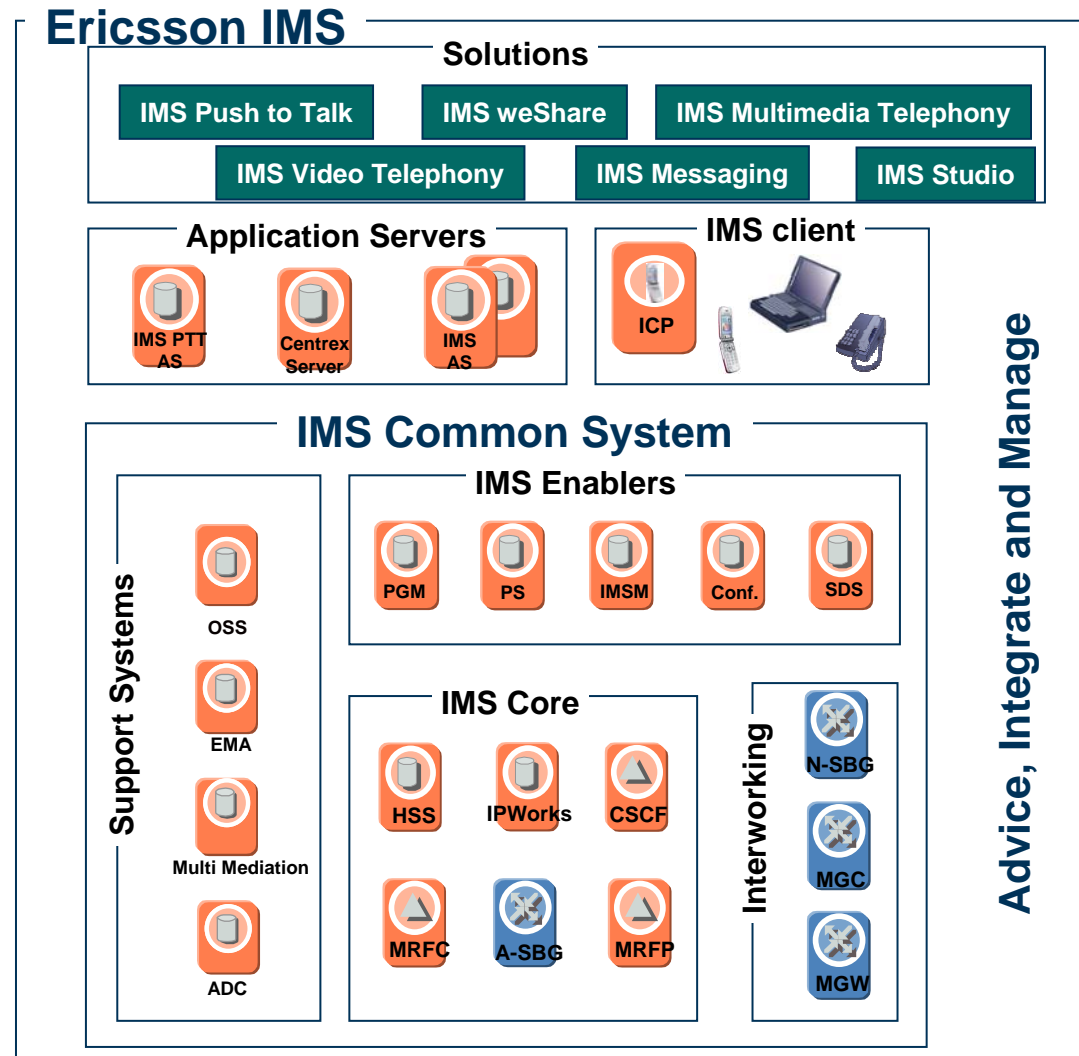
- **Ericsson IMS Common System** is based on the IP Multimedia Subsystem (IMS) as defined by 3GPP/3GPP2.
- **Ericsson Instant Talk (EIT)** is the push to talk solution that complies with Push to talk over Cellular (PoC) – built on IMS Common System
- **weShare** is a family name for combinational services (CS+PS) – built on built on IMS Common System
- **Ericsson IMS Multimedia Telephony** – IP softswitch delivering multimedia telephony and IP Centrex functionality in fixed network – built on IMS Common System

	Standard name	Standard org.	Ericsson solution
Multimedia system	IMS	3GPP/3GPP2	IMS Common System
Push to talk	PoC	PoC ->OMA	EIT
Combinational services	IMS (work item)	3GPP	weShare
IP Softswitch	IMS/NGN	3GPP/ETSI-TISPAN	IMS Multimedia Telephony



# IMS Overview

- IMS is a horizontal architecture for offering IP Multimedia Applications
- IMS is defined in 3GPP/3GPP2 standard, Embraced in TISPAN
- The IMS architecture is based on the SIP-protocol for call-control in all IP-networks
- IMS supports different accesses, such as:
  - WCDMA, GPRS,
  - CDMA2000,
  - Wire-line Broadband
  - WLAN
  - WiMAX
  - Cable

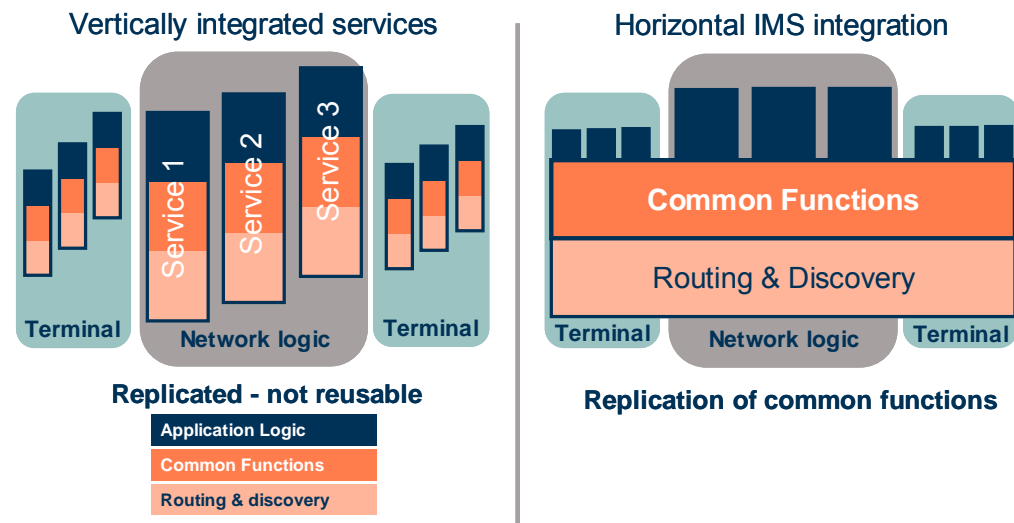


Advice, Integrate and Manage

*Ericsson implementation*

# Horizontal efficiency

- One common core network for efficiency
- Fast service introduction
- Independent of access – but work needs to be done on application level.



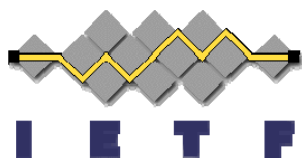


# IMS/NGN as a Basis for Convergent Solutions

# What is IMS?



**SIP**



- **IMS** stands for **IP Multimedia Subsystem**
- IMS is a **network for multimedia sessions and services** defined by 3GPP
- IMS is **using SIP** - Session Initiation Protocol from IETF - Internet Engineering Task Force as the main control protocol
- IMS is one of the key parts of the evolution of the mobile and wire-line communication



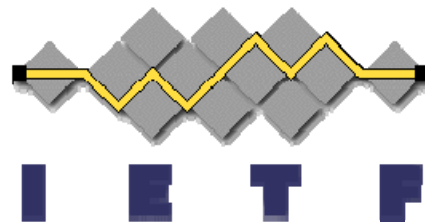
# IMS – A standardized enabler

It took 7 years to make IMS what it is:

- 3GPP R99 December 1999
- R5 June 2002
- R6 March 2005
- R7 March 2007
- R8 Under progress



**SIP**



**IMS does not standardize specific services, it standardizes the enablers**

# Standardized IMS applications

- Standard setup and implementation
- Work end-to-end between operators, networks and devices
- Known for scalability, availability, performance and interconnect ability
- Appeals to mass market

## IMS services being standardized:

- Presence
- IP Telephony
- Video
- File sharing
- Push-to-talk over Cellular (PoC)
- Instant Messaging (IM)
- Multimedia Ringback\*
- IPTV\*

\* = to be standardized soon



# Non-standardized applications

- Rapidly leverage market trends
- Flexible and fast TTM
- TTM and interoperability realized through CoSe\*
- Offered within local operator or globally
- No standard today, but perhaps in the future

## Provided by:

- Independent application developers
- Telecom vendor
- In house innovation by operator



\* = IMS Communication Services

# IMS is here

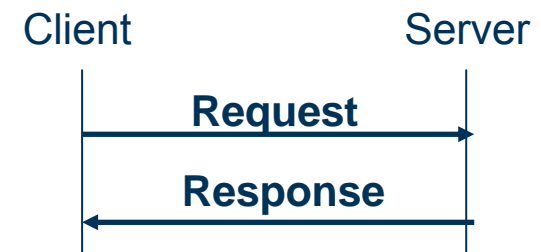
- IMS experience since 2000
- First Trials 2002
- Commercial traffic running on Ericsson IMS today
- 36 commercial IMS system launches
- Extensive demo and trial activities





# SIP Basics (1)

- The Session Initiation Protocol (SIP) is a text based client-server protocol for peer-to-peer communication.
- The design base was HTTP and SMTP
- SIP is used to establish, modify and terminate IP multimedia sessions.
- SIP is able to establish a broad range of IP multimedia sessions:
  - Voice and/or video
  - Gaming
  - Presence and Instant Messaging
- SIP messages are either requests or responses.
- SIP messages carries zero or more “bodies”.
- The Ses initiation
- SIP runs
  - UDF



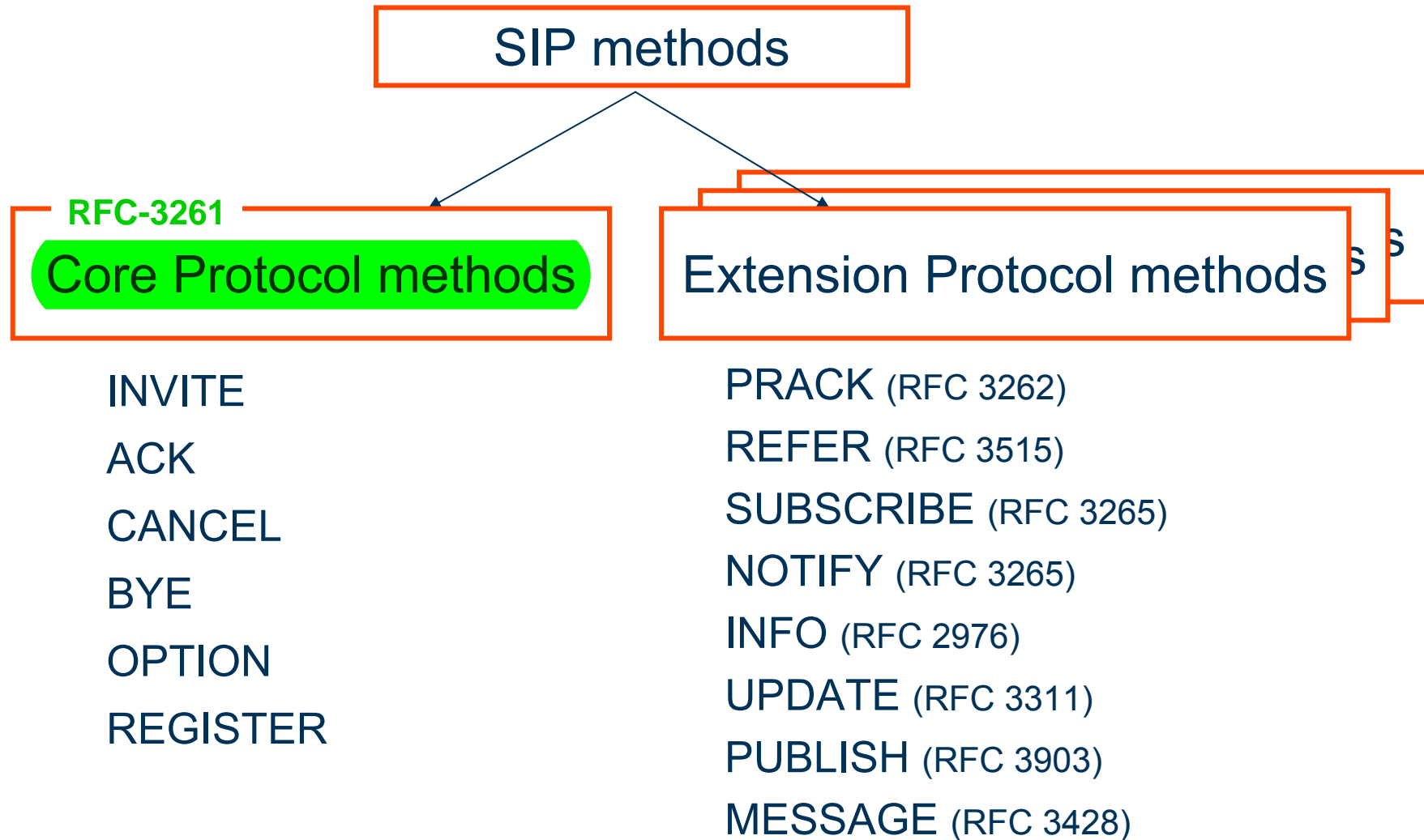
## SIP is not:

- transport protocol
- QoS reservation protocol
- gateway control protocol

# SIP basics (2)

- SIP provides the following functionality:
  - User location
  - User availability
  - User capabilities
  - Session set-up
  - Session management
- SIP does not provide services
  - But it enables the system to provide services and service enablers such as PoC, Presence, Instant Messaging and Multimedia conferencing

# SIP methods

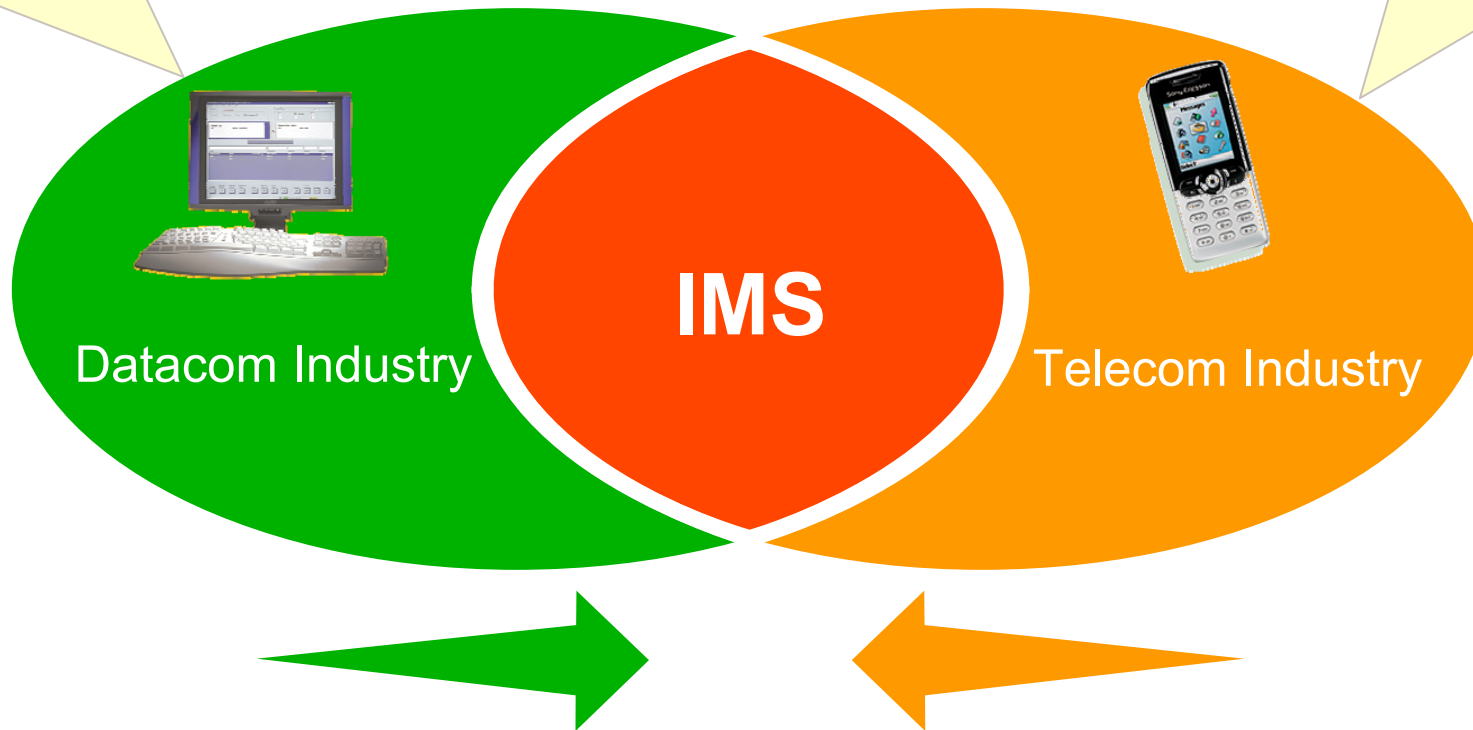


# The core of IMS

Combining the best of two worlds

Open, flexible service development ability of the Datacom industry

Performance and scalability characteristics of the Telecom Industry Solutions

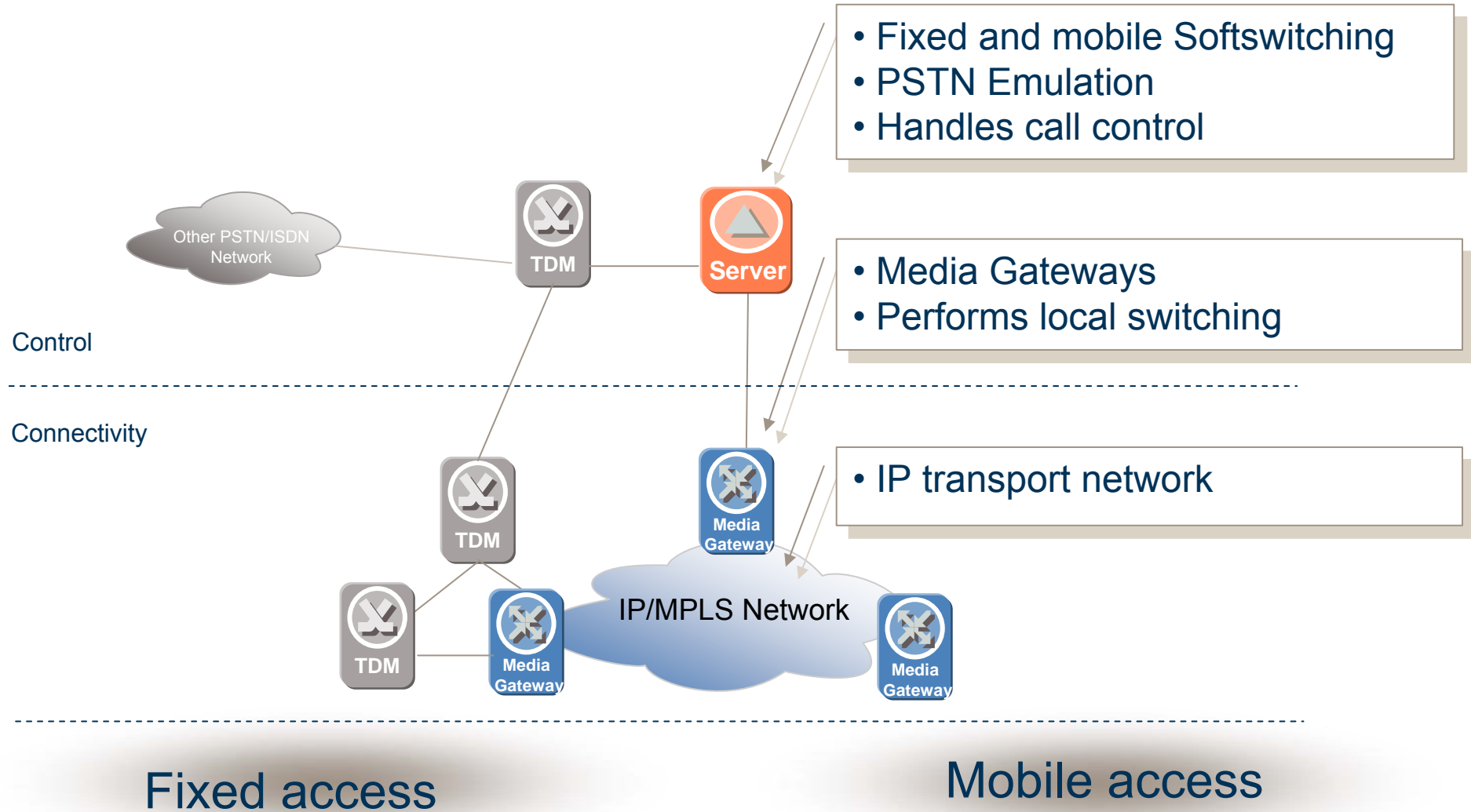
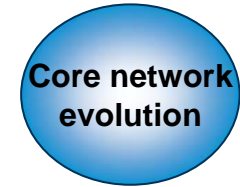


Standardized, end-2-end services that are interoperability tested



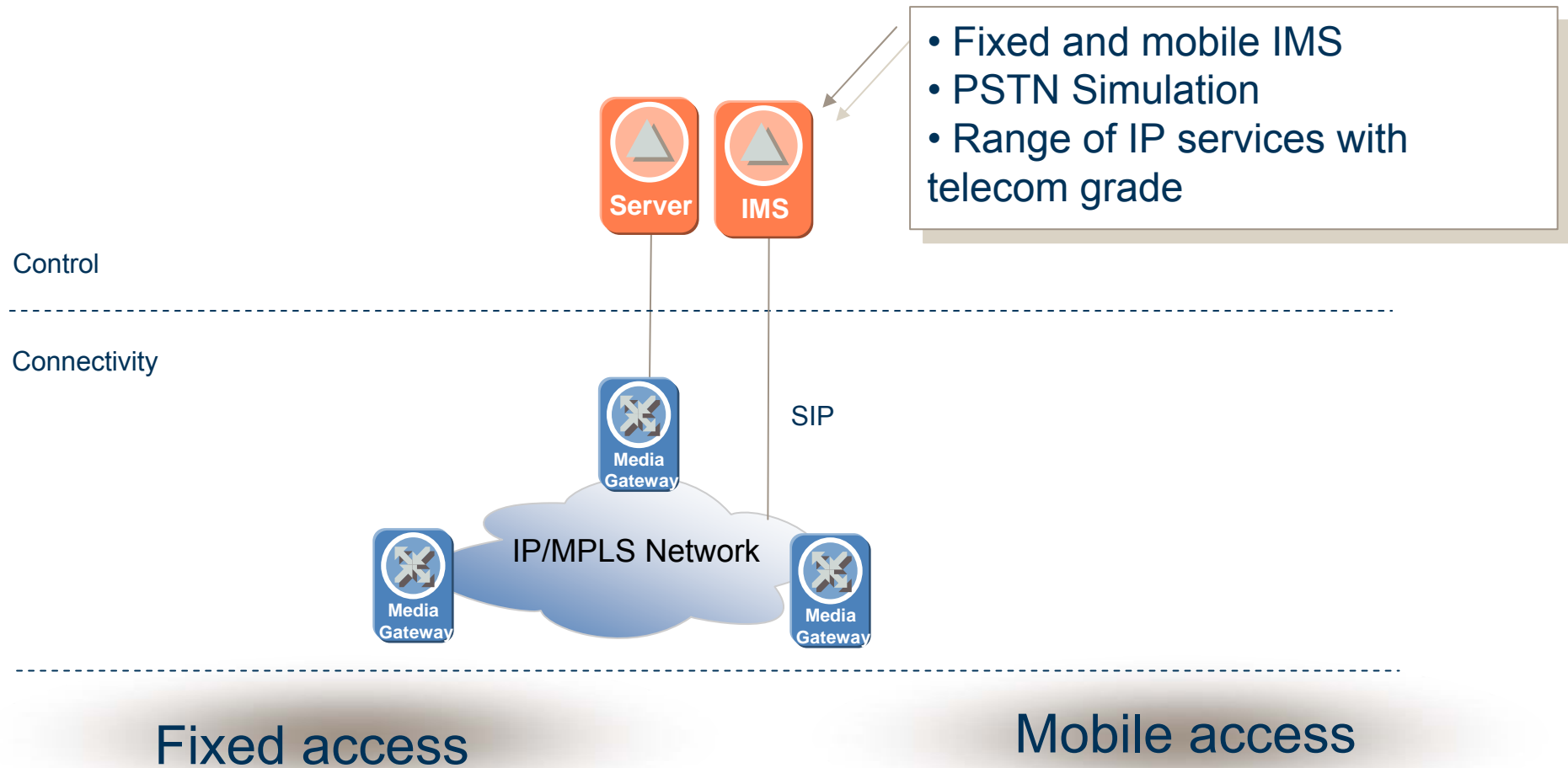
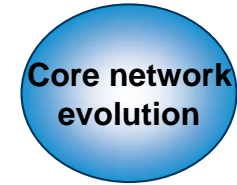
# Introducing softswitching

Reduced costs, voice emulation



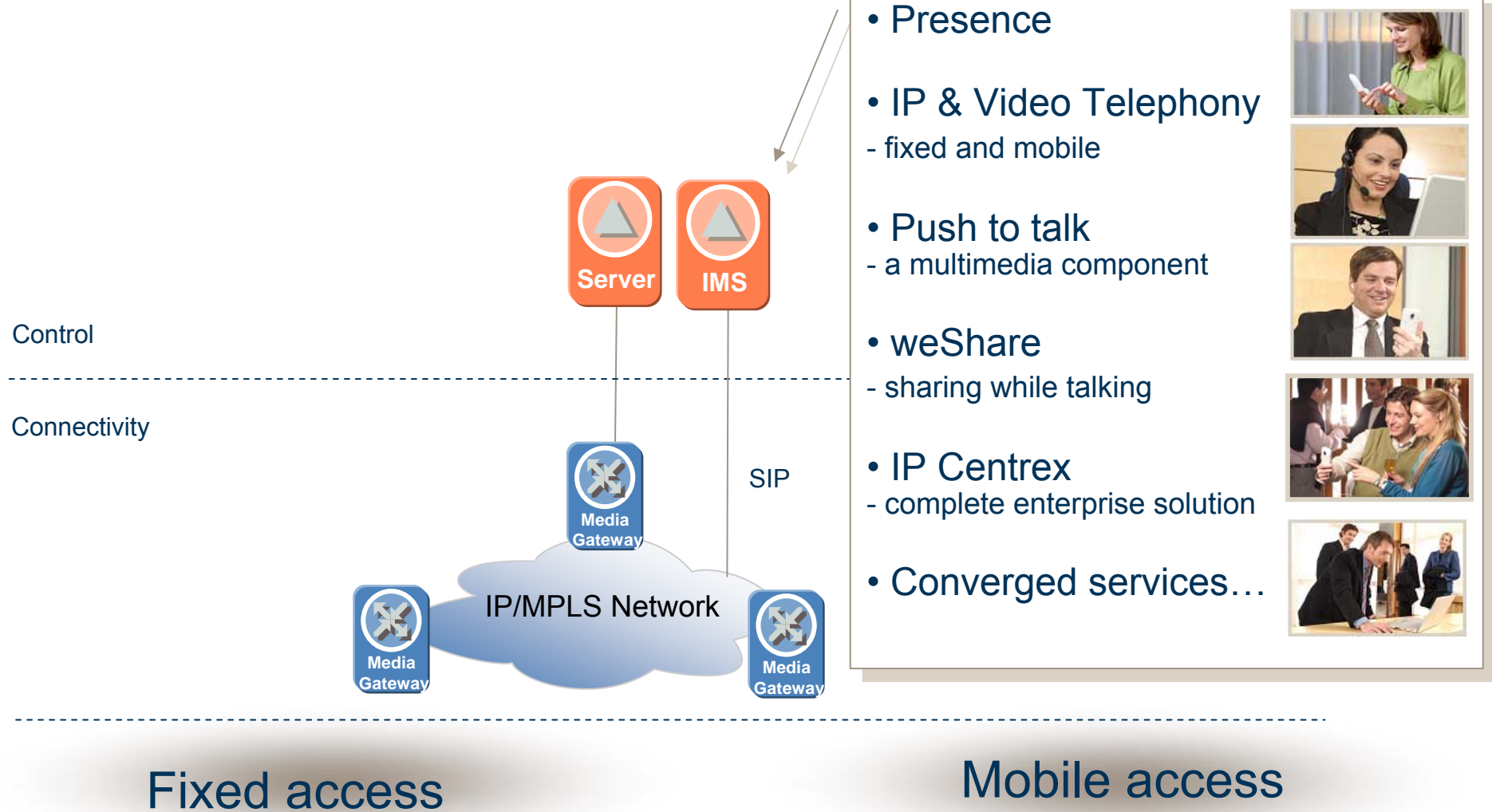
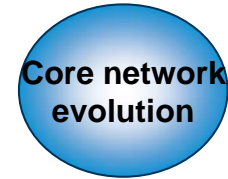
# Introducing IMS

Increased revenues, voice simulation



# Introducing IMS

Increased revenues, voice simulation

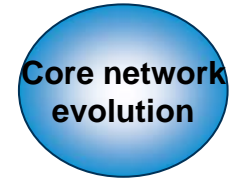


- Presence
- IP & Video Telephony
  - fixed and mobile
- Push to talk
  - a multimedia component
- weShare
  - sharing while talking
- IP Centrex
  - complete enterprise solution
- Converged services...



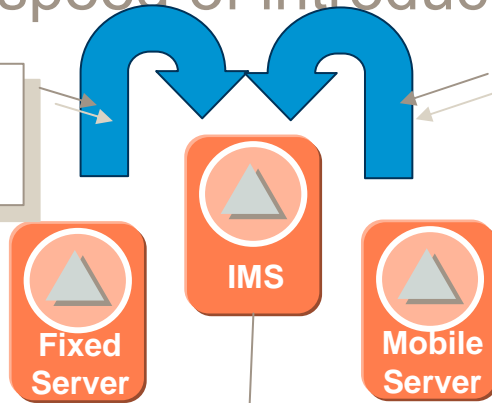
# Future of converged all-IP

Cost optimization and speed of introduction



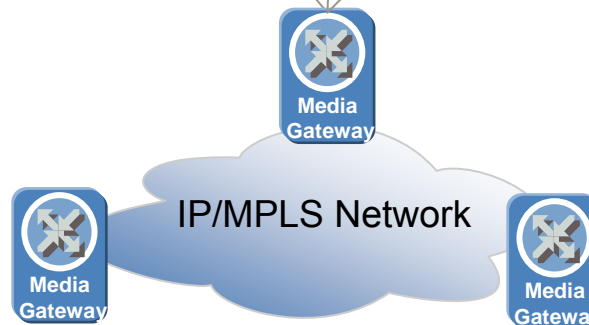
• Subscriber migration enabled by IP Telephony

• Subscriber migration enabled by IP Telephony



Control

Connectivity



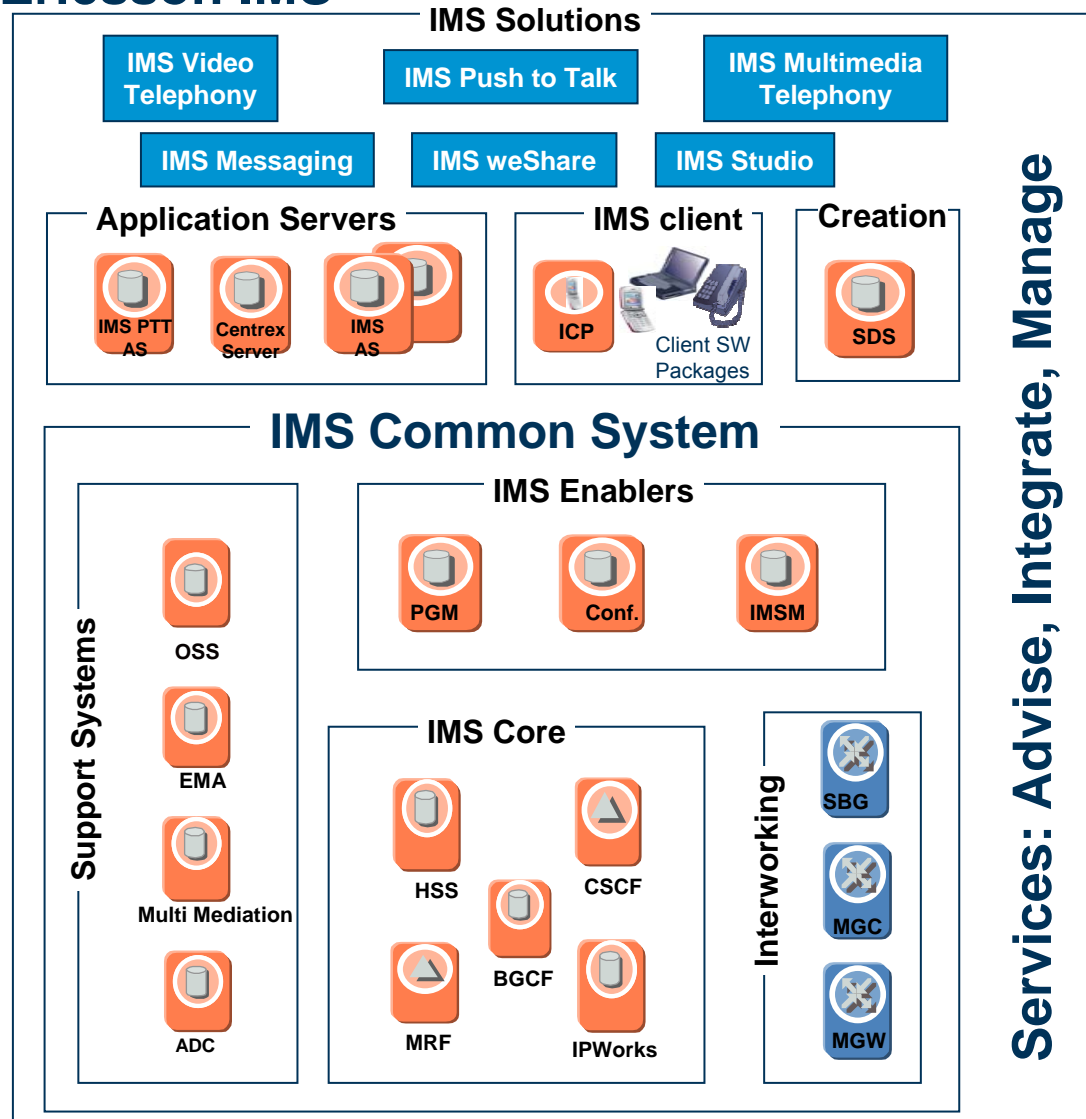
Fixed access

Mobile access



# IMS Overview **Ericsson IMS**

- IMS is a horizontal architecture for offering IP Multimedia Applications
- IMS is defined in 3GPP/3GPP2 standard, Embraced in TISPAN
- The IMS architecture is based on the SIP-protocol for call-control in all IP-networks
- IMS supports different accesses, such as:
  - WCDMA, GPRS,
  - CDMA2000,
  - Wire-line Broadband
  - WLAN.

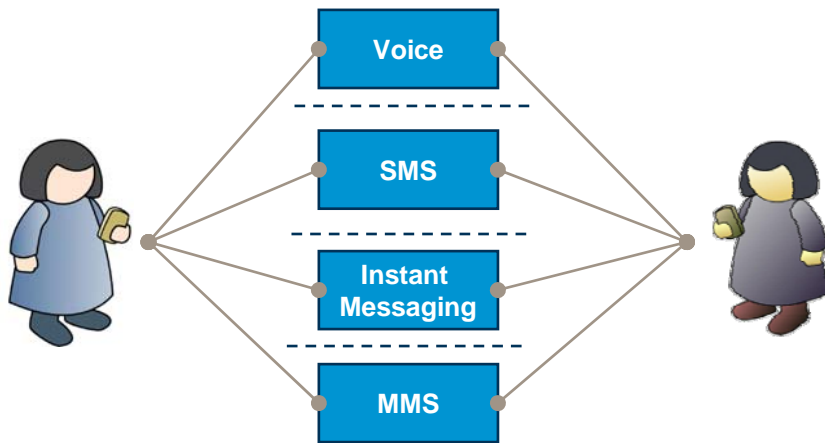


*Ericsson implementation*

# End-user perspective

## A “New Communication Style”

### Pre-IMS Communication



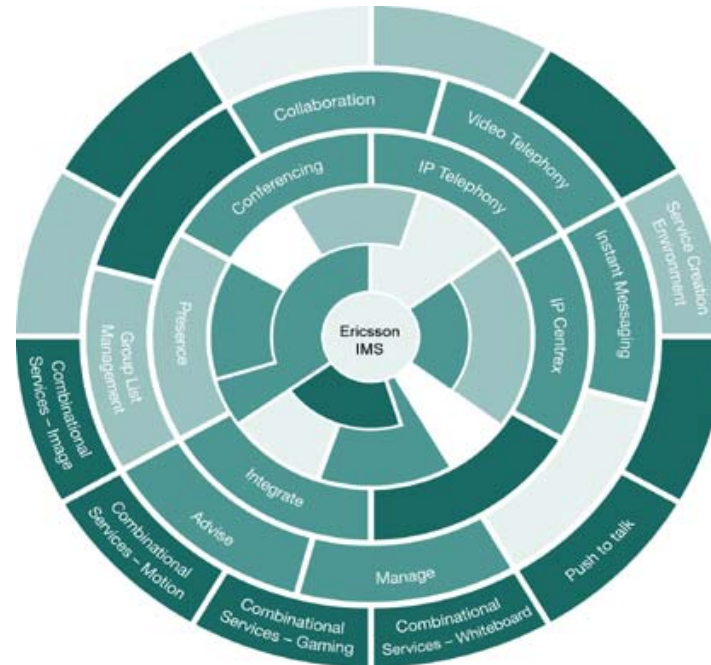
- 1) Decide on communication mode/media
- 2) Create content
- 3) Send/call the chosen person
- 4) Disconnect and reconnect if changing media

### IMS Communication



- 1) See who is available beforehand (presence)
- 2) See which mode/media to use
- 3) Contact and create content
- 4) Change media in real time

# Ericsson IMS Offerings



IMS Studio

IMS Multimedia Telephony

IMS weShare

IMS Push to Talk

IMS Common system



# Ericsson IMS Push to Talk



- Mobile, half-duplex voice communication
  - Quick (no ringing) and simple call-setup
  - Same device as traditional voice calls
  - One-to-one and group calls
- Targets both business users and consumers market
- Compliant with the only multi-vendor specification – PoC\*
- For standard GPRS/EDGE/WCDMA and CDMA2000 networks
- Feature-rich: includes presence, dynamic groups, do-not-disturb

# Ericsson IMS weShare



## weShare Image

Send a picture during an ongoing conversation



## weShare Motion

Send a live video during an ongoing conversation



## weShare Media File

Send pre-stored information during an ongoing conversation, i.e. picture, e-mail, video clip, film



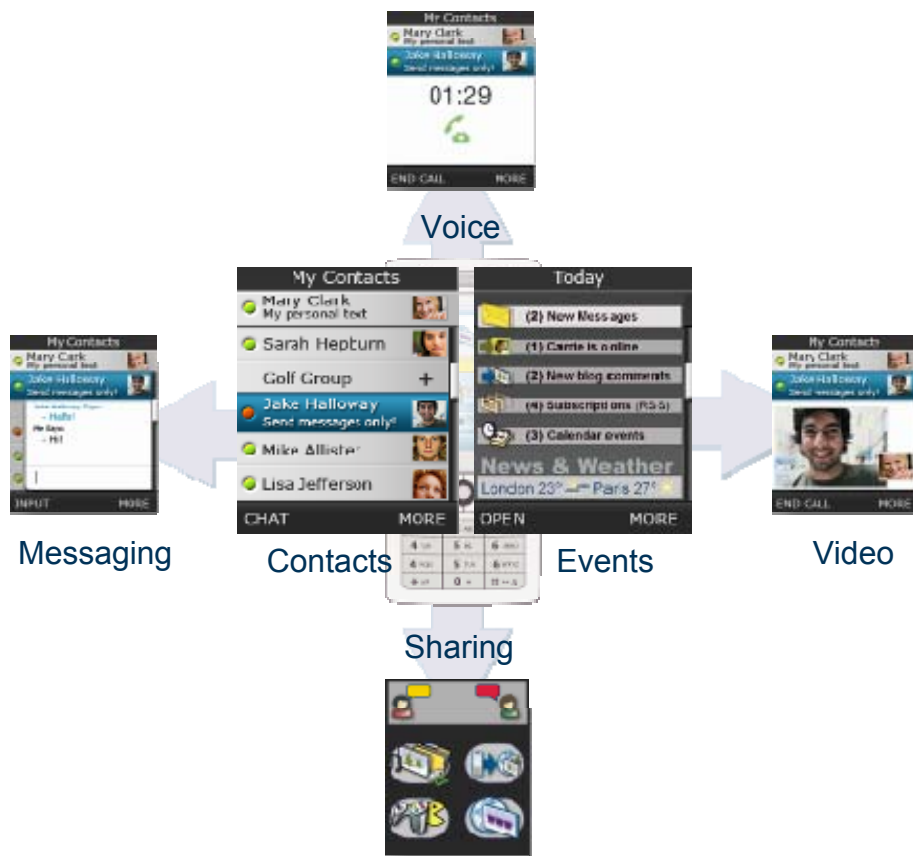
## weShare Whiteboard

Share a whiteboard session during an ongoing

Future application: weShare Game, weShare Music, weShare Web etc.

# Rich Communication Suite, RCS

## Person Centric Communication and Personal Community



- **Centered around your Address Book**
  - Rich Presence
  - Active Addressbook
- **Enriched communication experience**
  - Integrated communication
  - More value to existing services
  - Chat
- **Entertainment**
  - File sending: video, music, pictures
  - Multiparty Gaming
- **Multiple clients**
  - Mobile Phones
  - Web

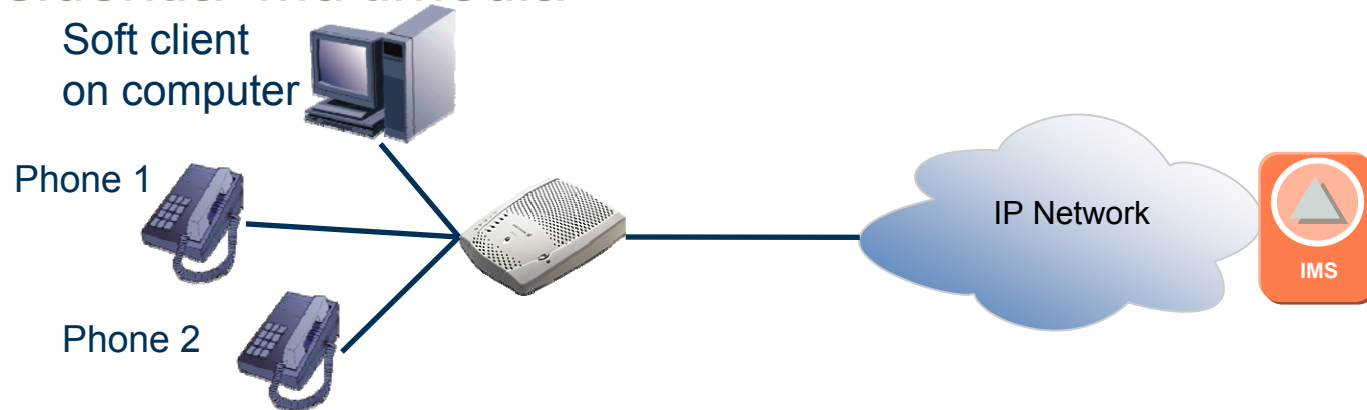
W760





# Ericsson IMS Multimedia Telephony

## - Residential Multimedia



- User either a soft client or
- PSTN phone via IAD (Integrated Access Device)
- First or second line replacement
- Several phone lines with different phone numbers
- Video call
- Instant messaging
- Presence
- Buddy lists

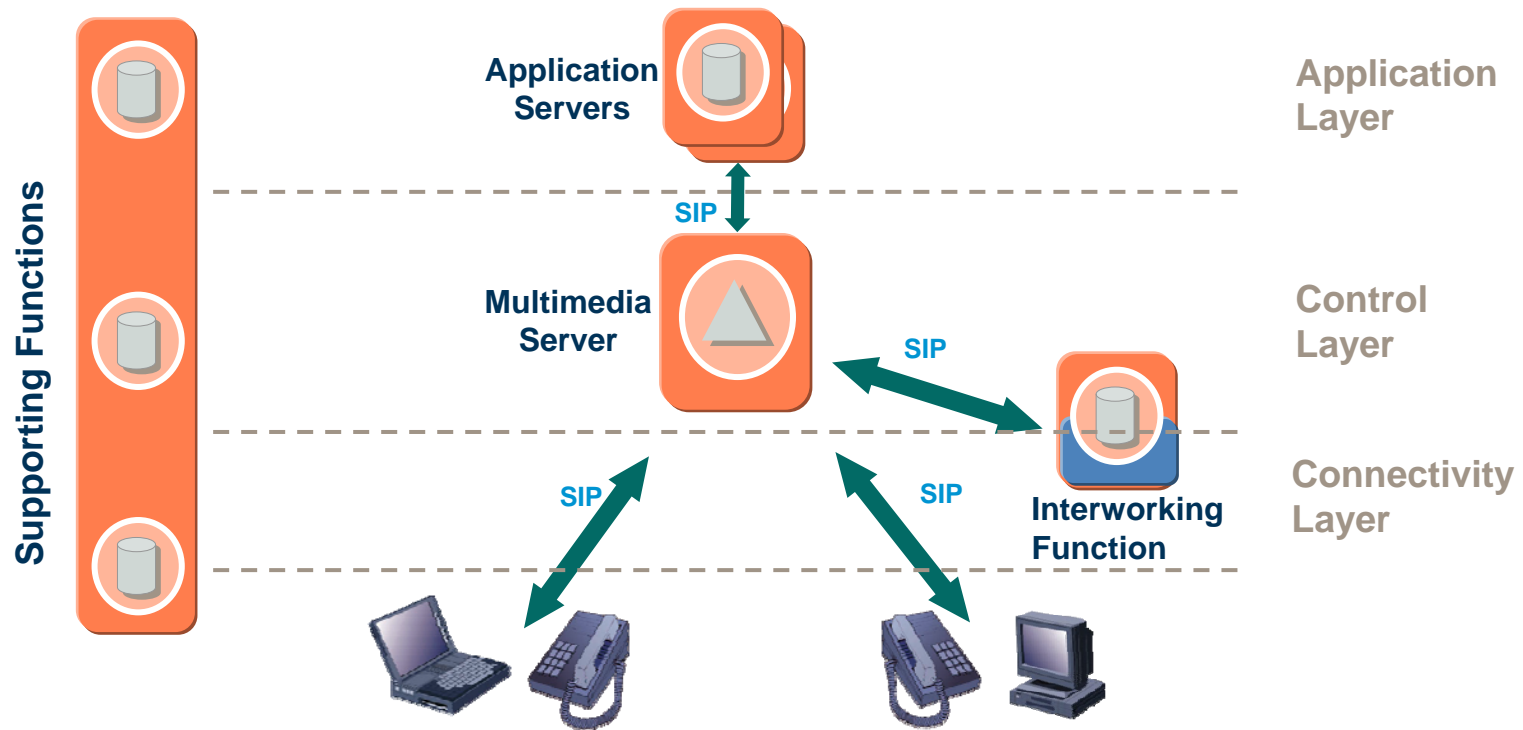
# IMS Multimedia Telephony

Architecture and Nodes



**TAKING YOU FORWARD**

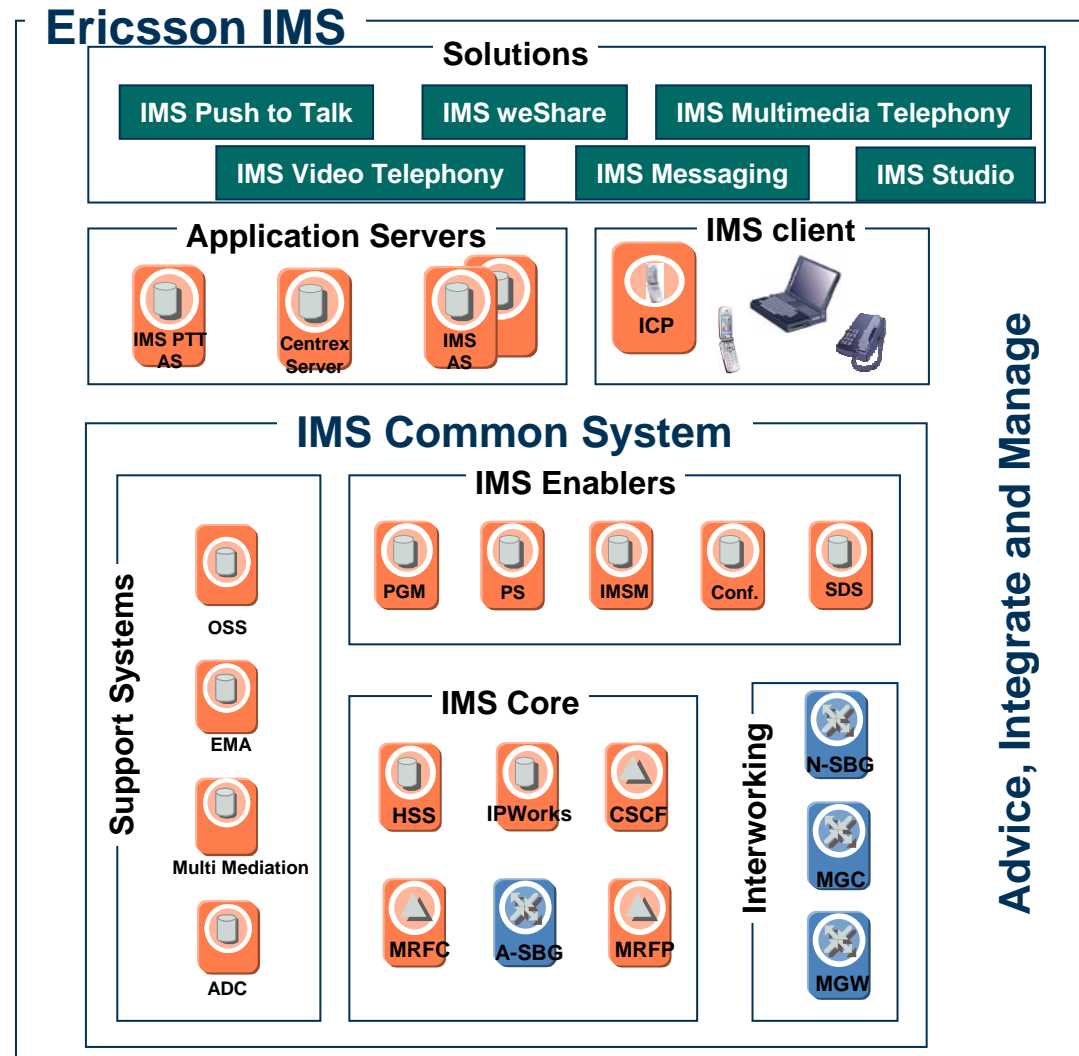
# Solution Overview



Ericsson ensures quality with IMS unique technology

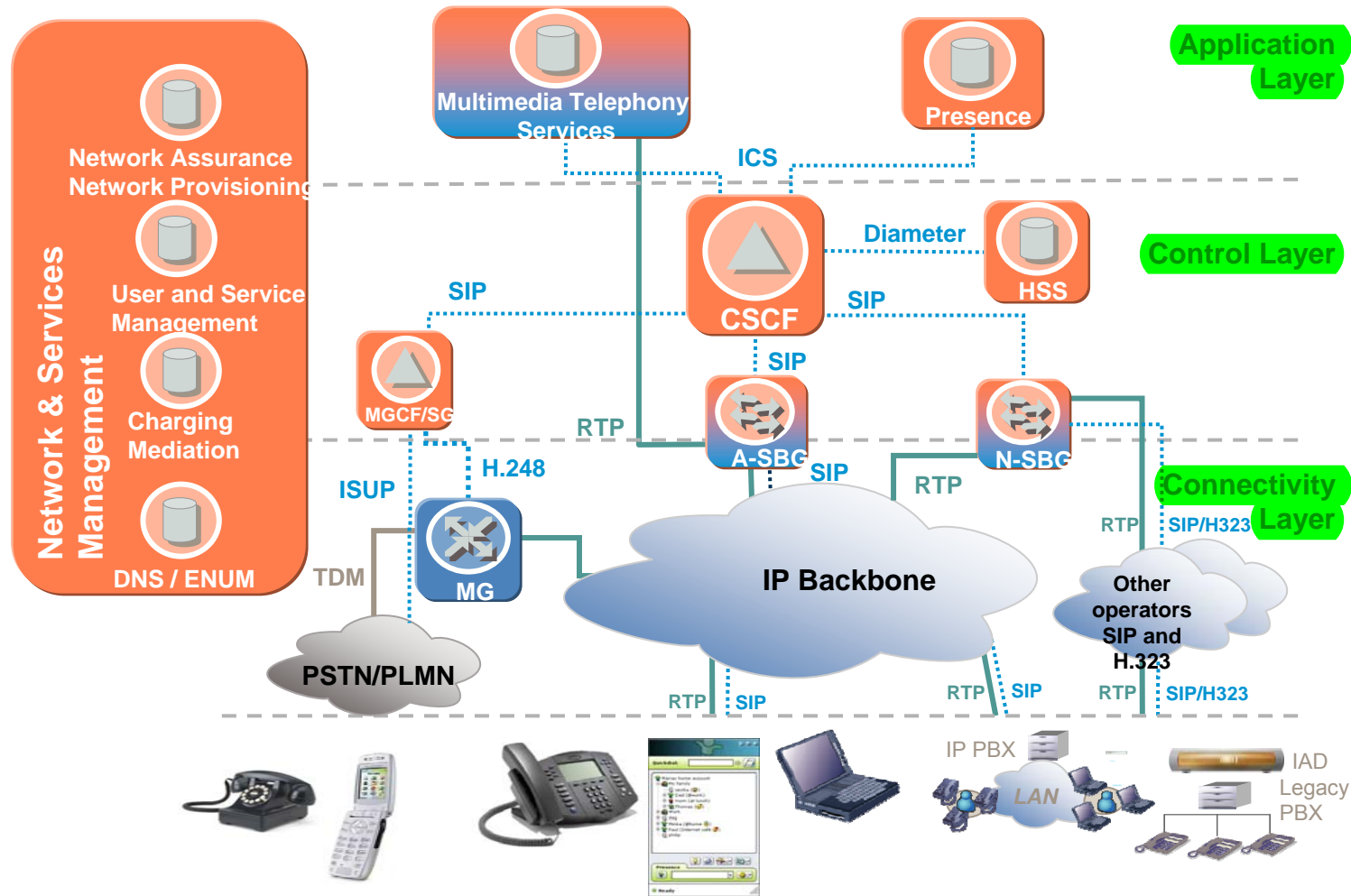
# IMS Overview

- IMS is a horizontal architecture for offering IP Multimedia services
- IMS is defined in 3GPP/3GPP2 standard, Embraced in TISPAN
- The IMS architecture is SIP-based for call-control in all IP-networks
- IMS supports different accesses



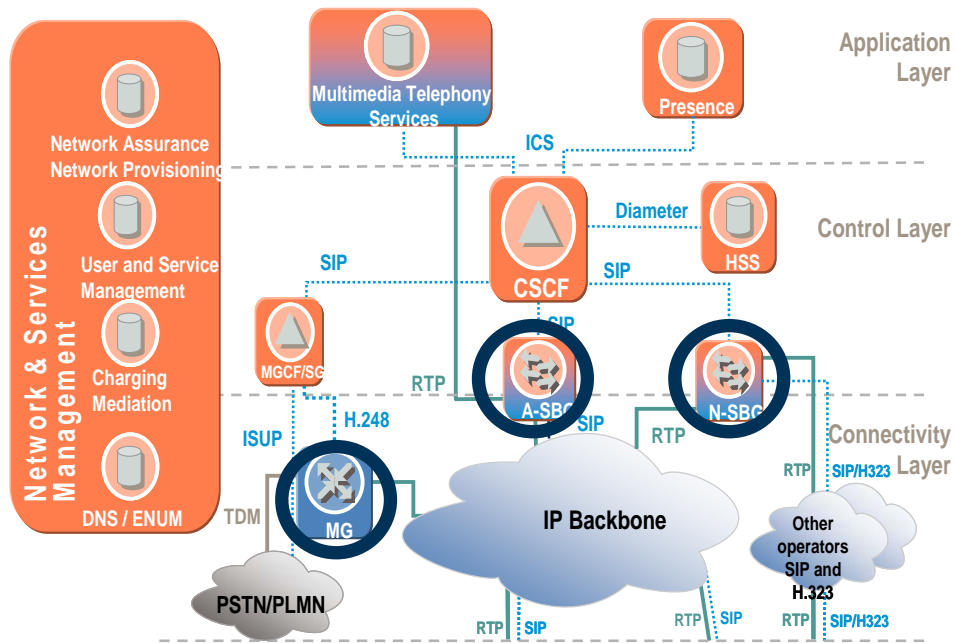
*Ericsson implementation*

# IMS Multimedia Telephony solution overview



<b>Multimedia Telephony Services</b> IP centrix and Residential services	<b>CSCF</b> Call Session Control Function	<b>A-SBG</b> Access Session Border Gateway
<b>Presence</b> Presence Server	<b>HSS</b> Home Subscriber Server	<b>N-SBG</b> Network Session Border Gateway
	<b>MGCF</b> Media Gateway Control Function	
	<b>SG</b> Signalling Gateway	
	<b>MG</b> Media Gateway	

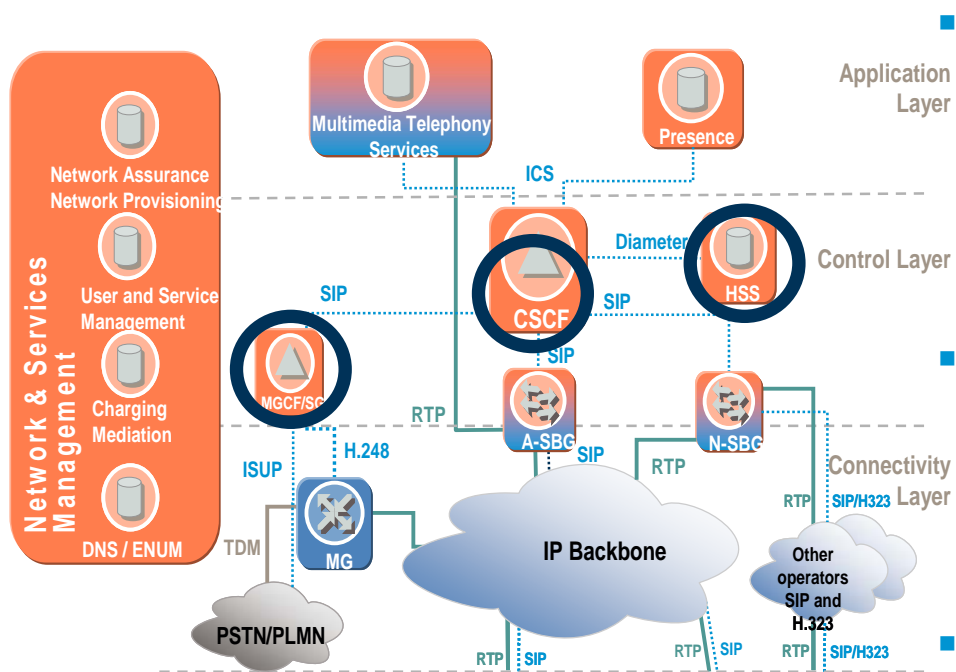
# Connectivity Layer



- Access Session Border Gateway (A-SBG)
  - User-to-Network Interface (UNI)
  - Interfacing SIP and IP network
- Network Session Border Gateway (N-SBG)
  - Network-to-network interface (NNI)
  - Handles inter-domain inter-working between SIP networks and SIP or H.323 networks
- MGW – Media Gateway for break out calls to PSTN

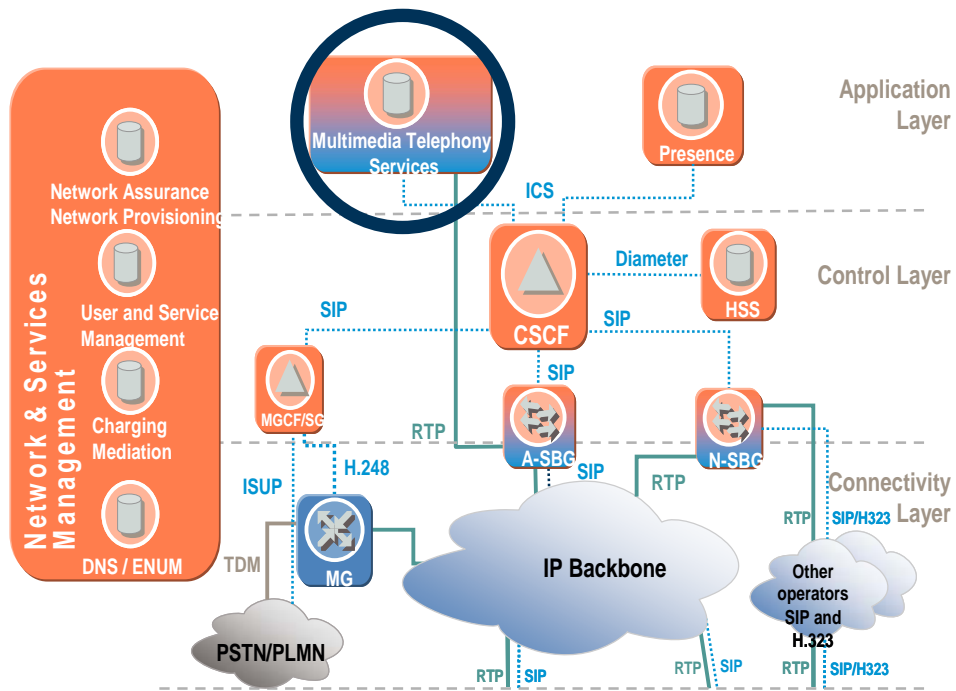


# Control Layer



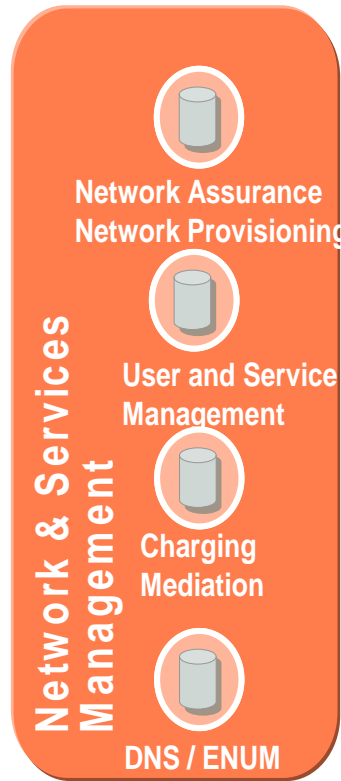
- **Call Session Control Function (CSCF)**
  - Referred to in standard as a SIP server
  - Core node handles session establishment, modification and release of IP multimedia sessions
- **Home Subscriber Server (HSS)**
  - Evolution of the Home Location Register (HLR) and Authentication Centre (AUC)
  - Stores the Service Profile
- **Media Gateway Control Function (MGCF)**
  - Gateway between SIP and ISUP. Controls the MG.

# Application Layer



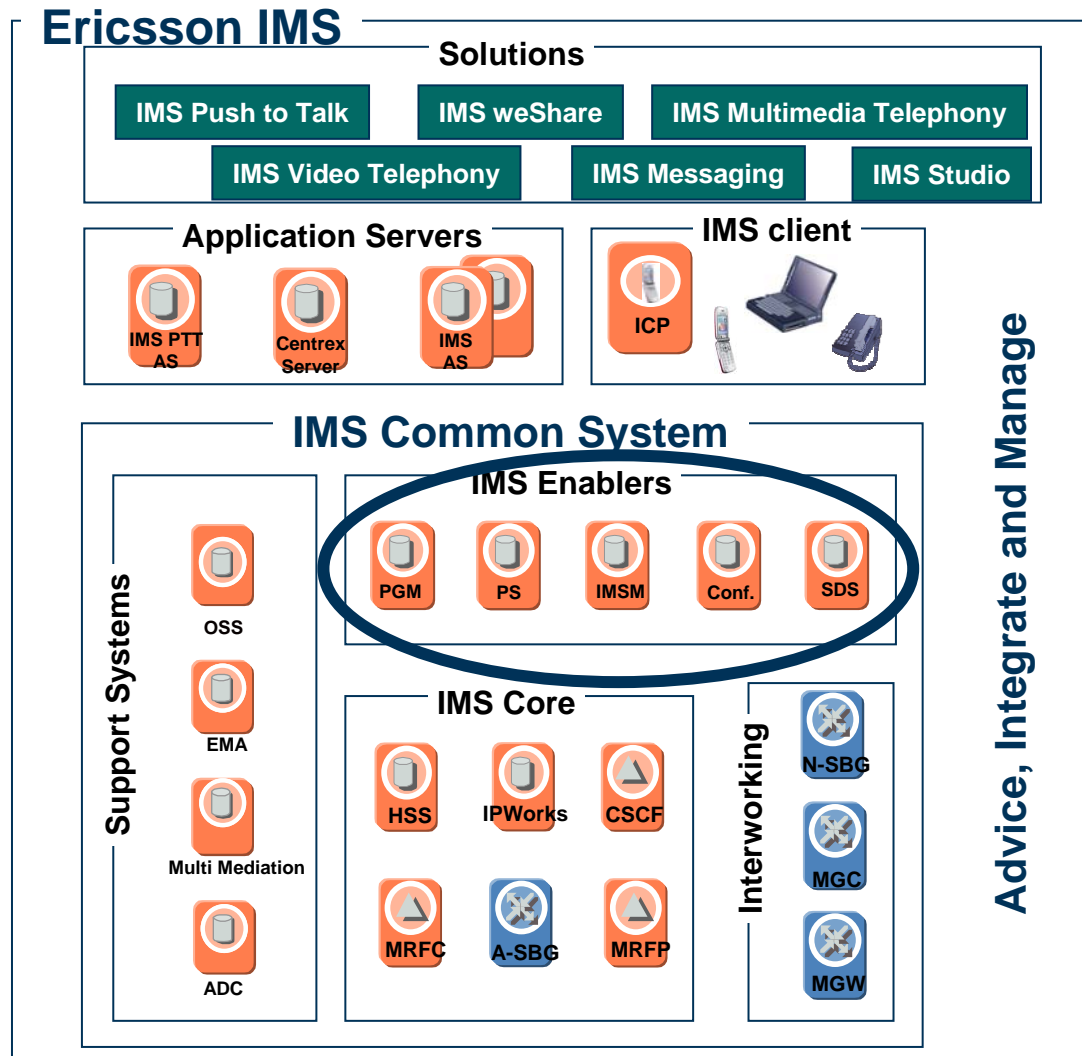
- Multimedia Telephony Services
  - Centrex Services Application Server (CS-AS)
    - Provides personal and group services
    - Integrated web server, database and service engine
  - Centrex Services Conference Server (CS-CS)
    - Media resource handling including booking and set up of multi-party conferencing
  - Media Server (CS-MS)
    - Provides media resources
    - IVR, service announcements and DTMF interaction
- Presence Server (PS)
  - Collect, manage and distribute user and service status information in real-time
  - Presence status such as mood, current situation and location

# Network and service management



- Network Assurance/Network Provisioning
  - MN-OSS use as centralized management
  - Fault, Configuration, Performance and Security administration
- User and Service Management
  - Provisioning services for IP Centrex and Residential subscribers
  - Self-administration and provisioning for IP Centrex and Residential users
- Charging Mediation
  - Collects charging information from the individual nodes
  - Processes CDRs that is forwarded to external billing systems
- DNS/ENUM servers
  - Translation between public identifiers of the user
  - Alphanumeric name to IP address translation

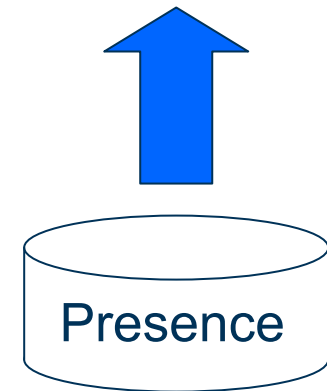
# IMS and Service Enablers



# What is Presence?

- Presence can be used to enhance applications
- For each user presence attributes can be defined, e.g.
  - Availability
  - Location
  - Mood
  - Maintenance status of a machine
  - Terminal and capability
- Presence data is stored in a presence server
- Presence data is updated manually by the user and/or automatically by the network or applications in the network

Applications e.g. PTT, voice, IM etc.

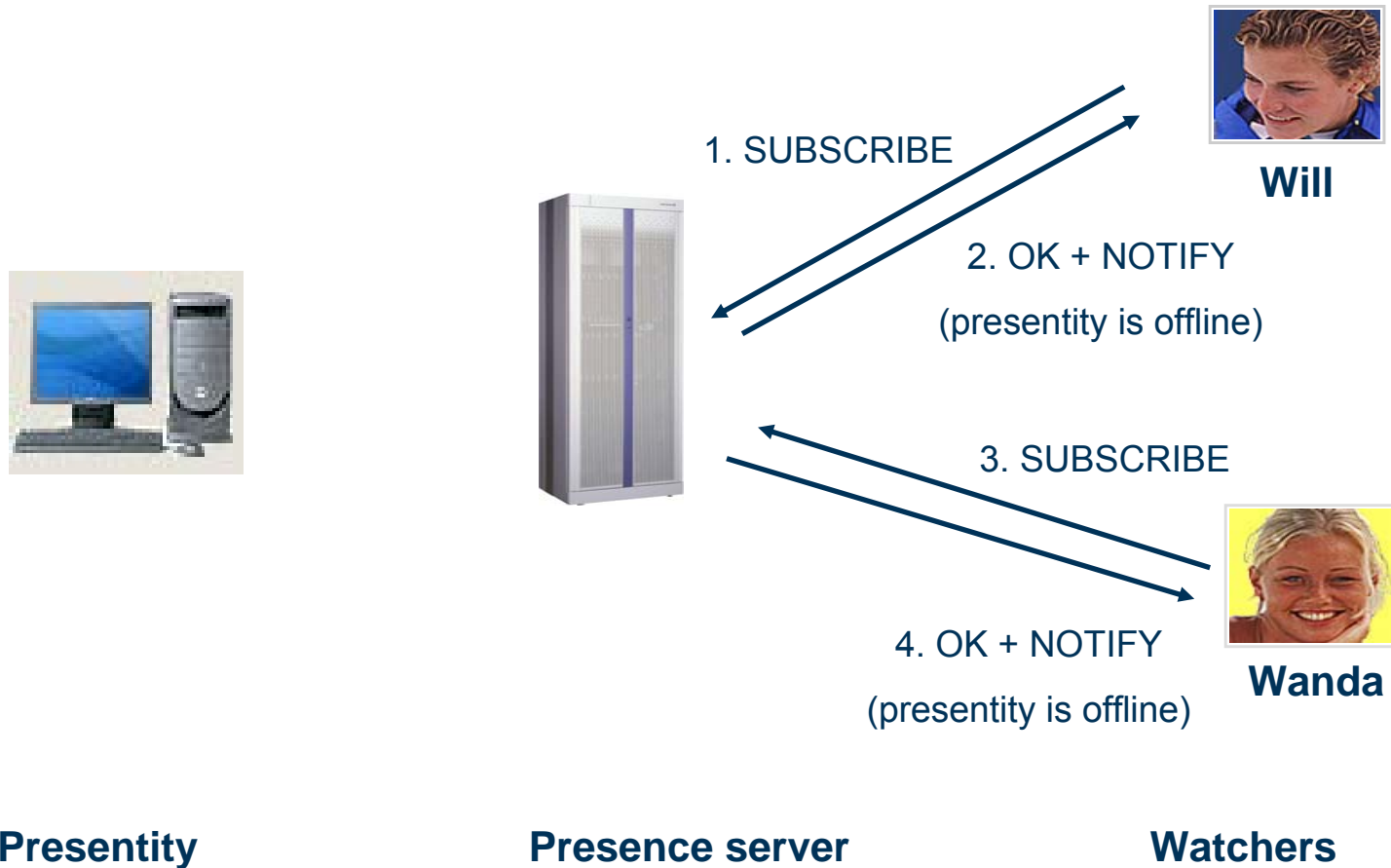


*Not Available*

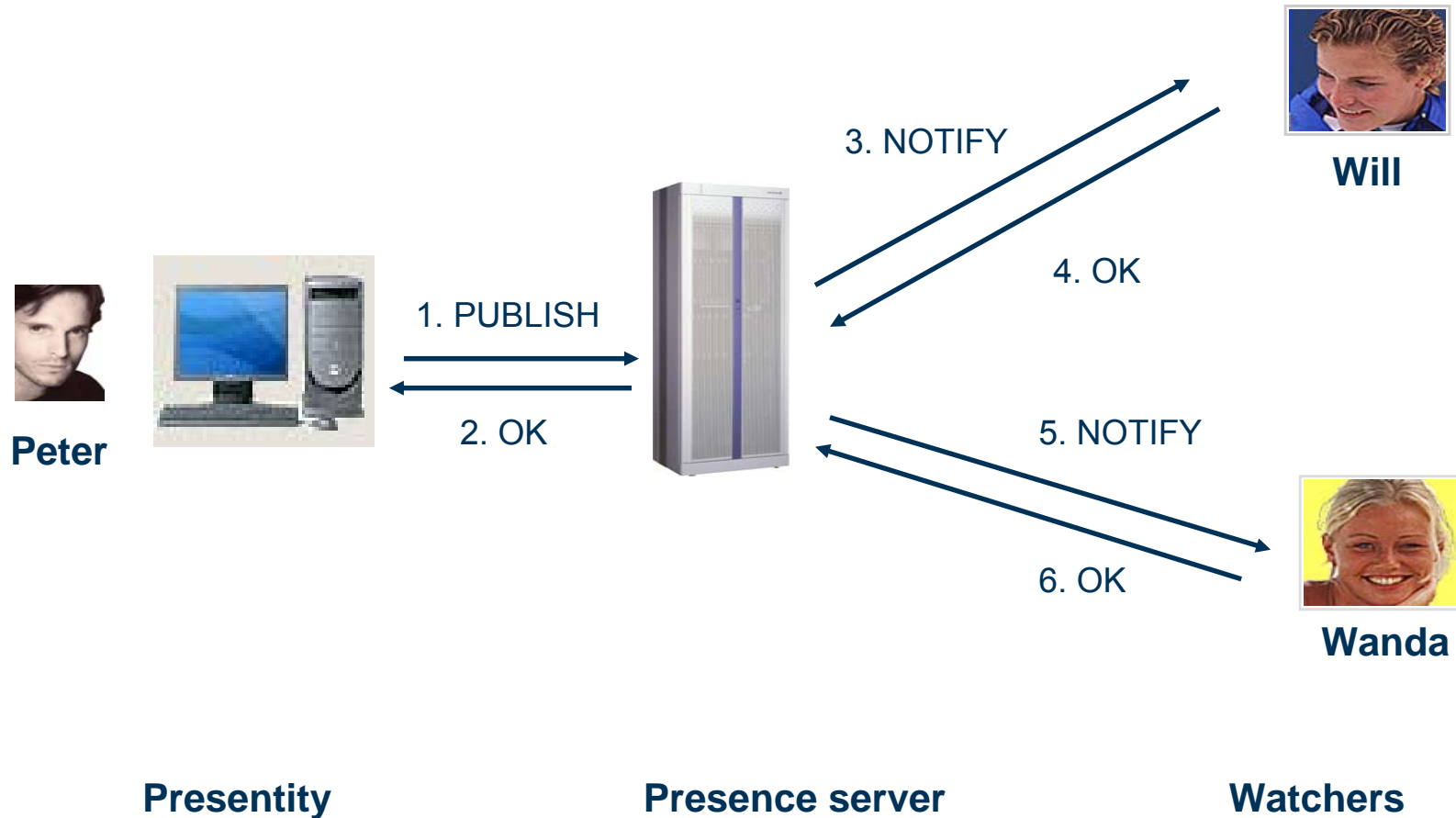


*Available*

# Presence: Overview of operation

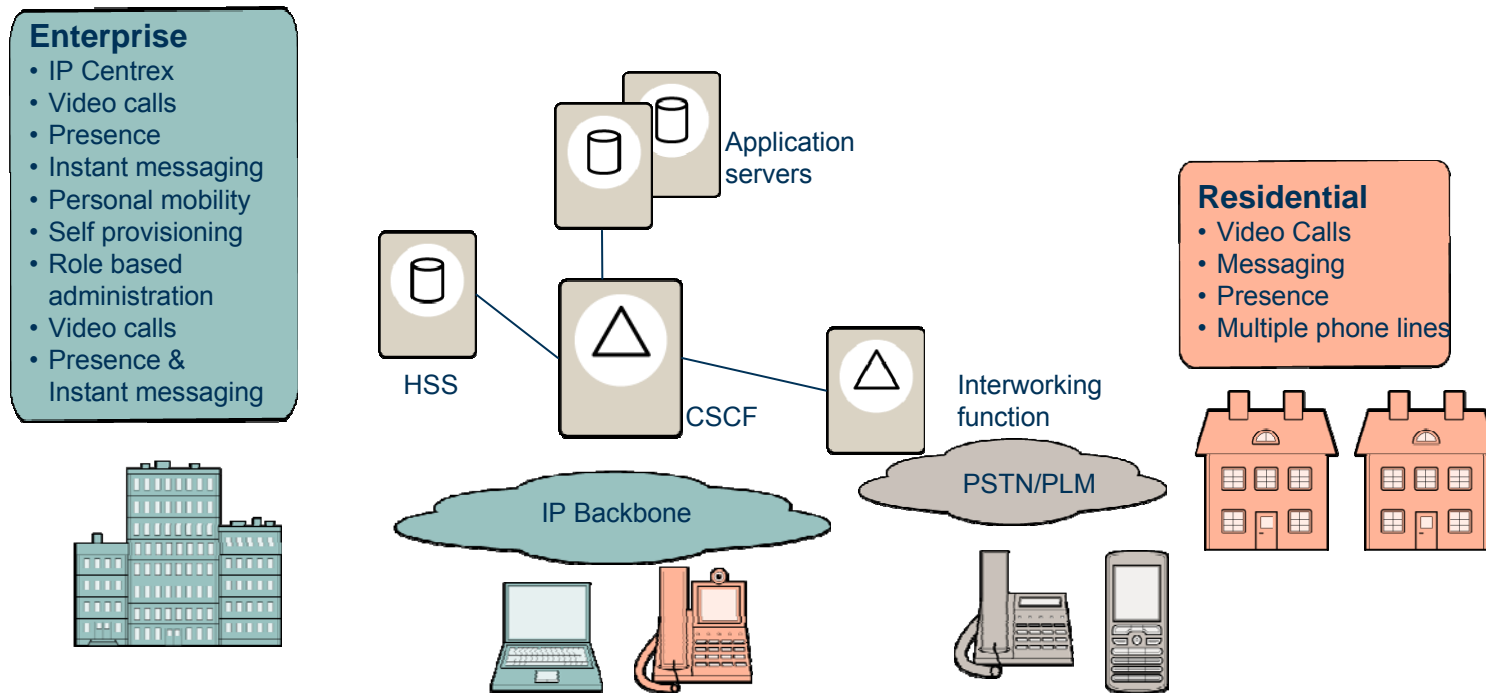


# Presence: Overview of operation





# Service Overview



Kick-start towards IMS with IP Centrex and Residential services.

# Features

- Call Functions
- Portal Dial-in
- Conferencing
- Messaging services
- Voice, video mail
- E-mail
- Call Centre support
- Auto Attendant
- VPN
- Personalization
- Business Trunking



# Features in IMS Multimedia Telephony

## Personal Services

- Anonymous Call Rejection
- Auto Callback
- **Automatic Hold/Retrieve**
- Blind Call Transfer
- **Busy Lamp Field**
- Call Forwarding Always
- Call Forwarding Busy
- Call Forwarding No Answer
- Call Forwarding Remote Access
- Call Forwarding Selective
- Call Return
- Call Screening by Digit Patterns
- Call Transfer with 3-Way Consultation
- Call Transfer with 3<sup>rd</sup> Party consultation
- Consultation Hold
- Call Waiting
- Calling Line ID Blocking
- Calling Line ID Blocking Per Call
- Calling Line ID Blocking Override
- Calling Line ID Delivery
  - Internal / external
- Calling Line ID Delivery per call
- Calling Party Category
- **Custom Ringback User**

- Cancel Call Waiting
- Cancel Call Waiting per Call
- Call Hold
- Direct Inward/Outward Dialing
- **Diversion Inhibitor**
- Distinctive Alert/Ringing
- Do Not Disturb
- Extension Dialing
- Flash Call Waiting
- **FAC service Chaining**
- **Intercom**
- **Music On Hold User**
- Last Number Redial
- Personalized Name Recording
- Priority Alert/Ringing
- Phone Status Monitoring
- Remote Office
- Ring Splash
- Selective Call Acceptance
- Selective Call Rejection
- Simultaneous Ring – Personal
- Sequential Ringing
- Speed Dial
- Three-Way calling
- Voice Portal
- Video Add-on
- **Web Portal Call Logs**

## Group Services

- Account Codes
- Attendant Console
- Authorization Codes
- Auto Attendant
- Barge in Exempt
- Call Intercept
- Call Park
- Call Pick-Up
- Calling Group ID Delivery
- Calling Plan Forwarded/Transferred
- Calling Plan – Incoming
- Calling Plan – Outgoing
- Conferencing
- Enhanced Outgoing Calling Plan
- Configurable Extension Dialing
- Configurable Feature Codes
- Configurable Feature Codes Prefix
- Configurable Time Zones
- **Custom Ringback Group**
- **Department Admin Layer**
- Directed Call Park
- Directed Call Pickup with Barge in
- Hunt Groups
- Instant Conferencing
- **Instant Group Call**
- Loudspeaker Paging
- Music on Hold
- Resource Inventory reporting
- Series Completion
- Simultaneous Ring – Group
- PBX Dialing Transparency
- Voice VPN
- Voice Portal

## Messaging Services

- Voice Mailbox Integration
- Voice Message Call back
- Voice Messaging Personal
- Voice Messaging Notification
- Voice Messaging to e-mail
- Voice Message Waiting Indication
- Outgoing Message Waiting Indication
- Third Party Voicemail MWI
- Voicemail configuration

## Call Attendant Services

- Attendant Console
- Auto Attendant
- Dial by extension
- Dial by name
- Record greetings remotely
- Night Service
- Transfer to operator

## Call Manager

- Express Call Manager
- Personal Web Portal
- Group Web Portal
- Phone lists
  - Group
  - Personal
  - Call Log
- Printable Group Directory
- **miPA and miRECEPTION**

## Multimedia Services

- Video Telephony
- Presence
- Buddy Lists
- Emoticons (smileys)
- Instant Messaging

## Regulatory Services

- Legal Intercept
- Emergency Call
- Malicious Call Tracing
- Local Number Portability
- Operator Initiated Call Barring
- Charging mediation

## Service Provider and Enterprise Services

- **Business Trunking**
- **Call Processing Policies**
- **Configurable Default FAC**
- **Large Enterprise Support**

## Call Distribution

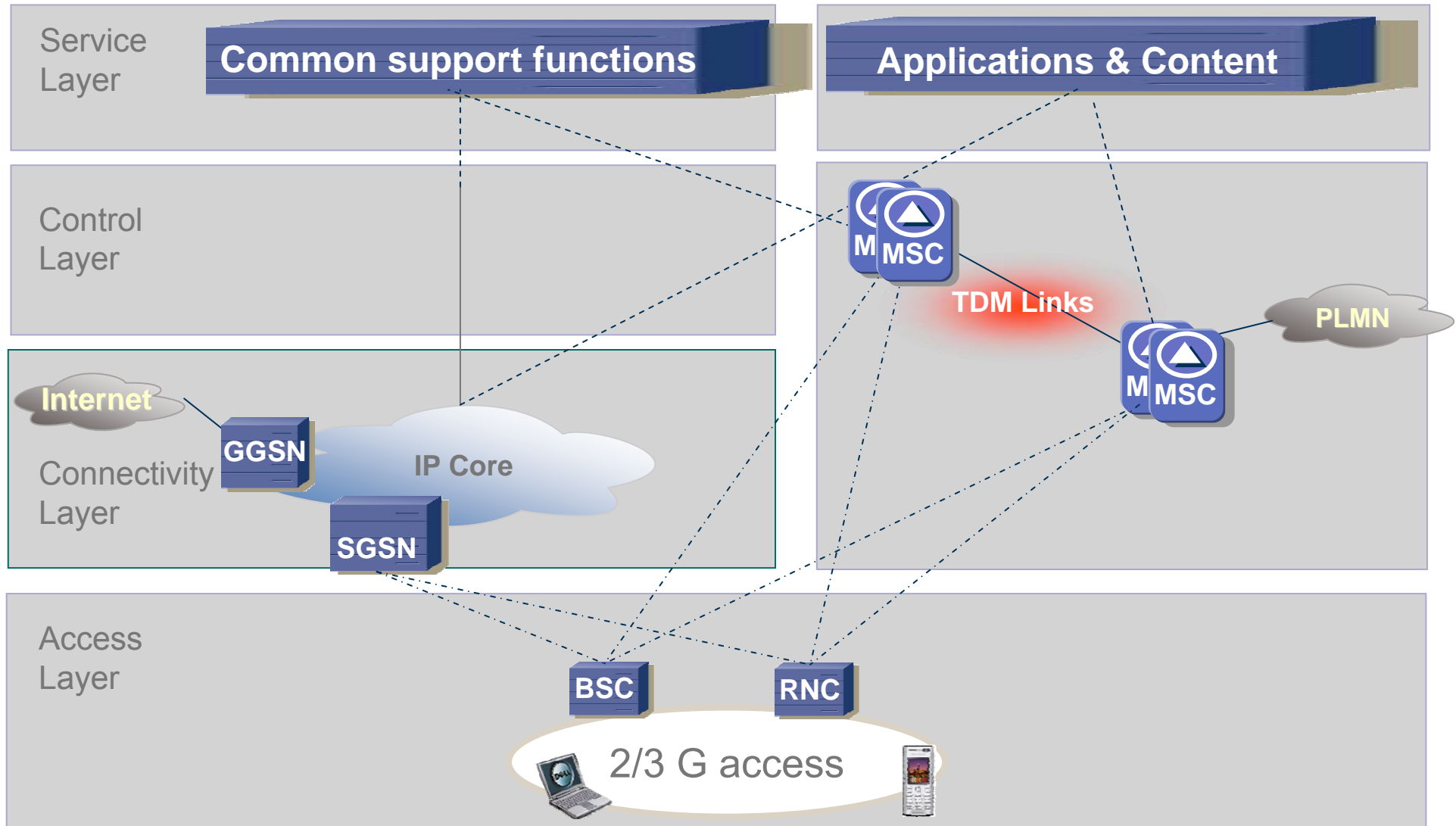
- Call Queuing Multiple policies
- Music on hold Overflow
- Night Service Statistics

## Directory Services

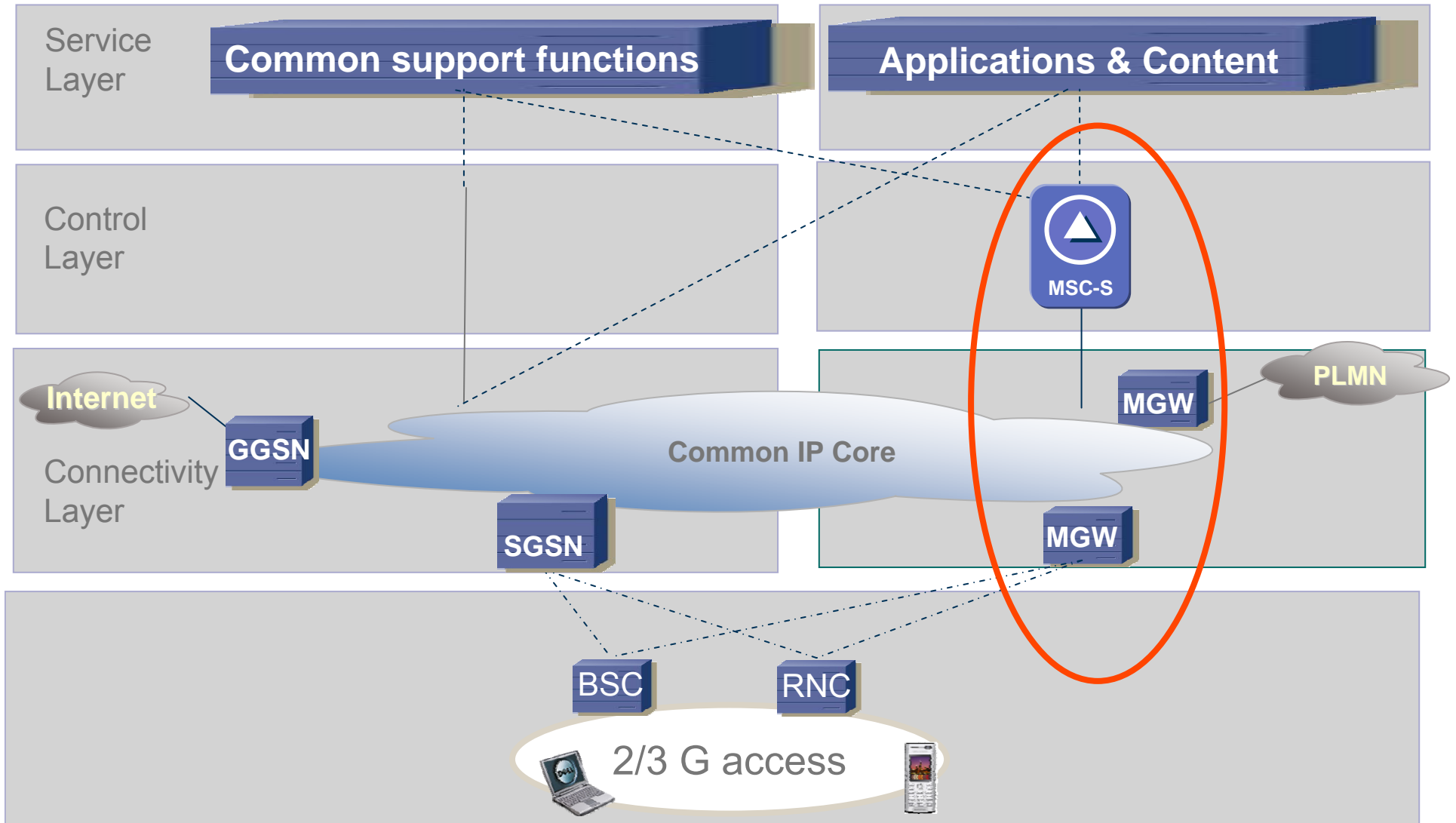
- LDAP Directory Integration
- Outlook Integration

# IMS in Mobile Networks

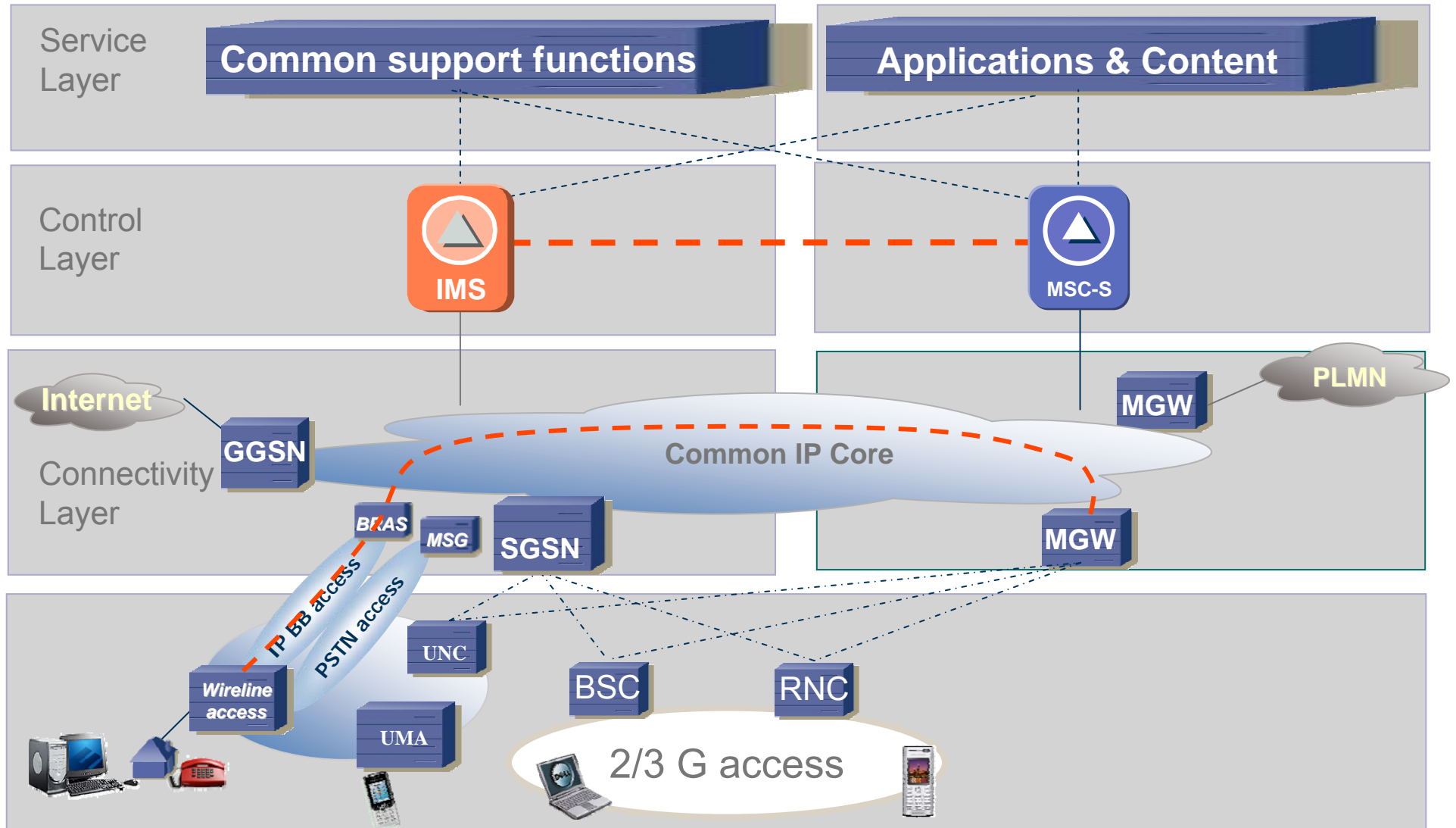
# Starting Point



# Deployment of MSS

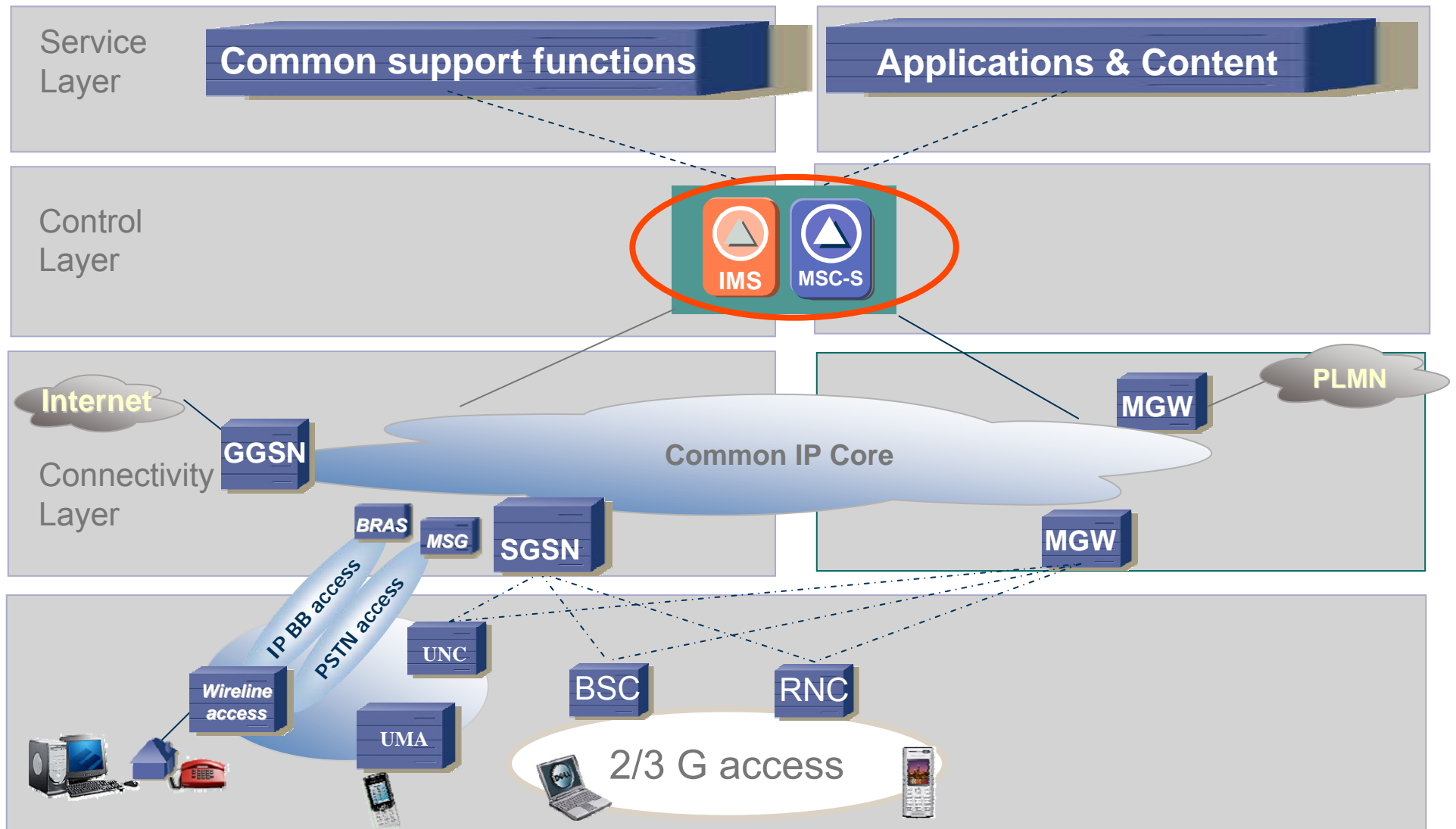


# MSS & IMS Interworking

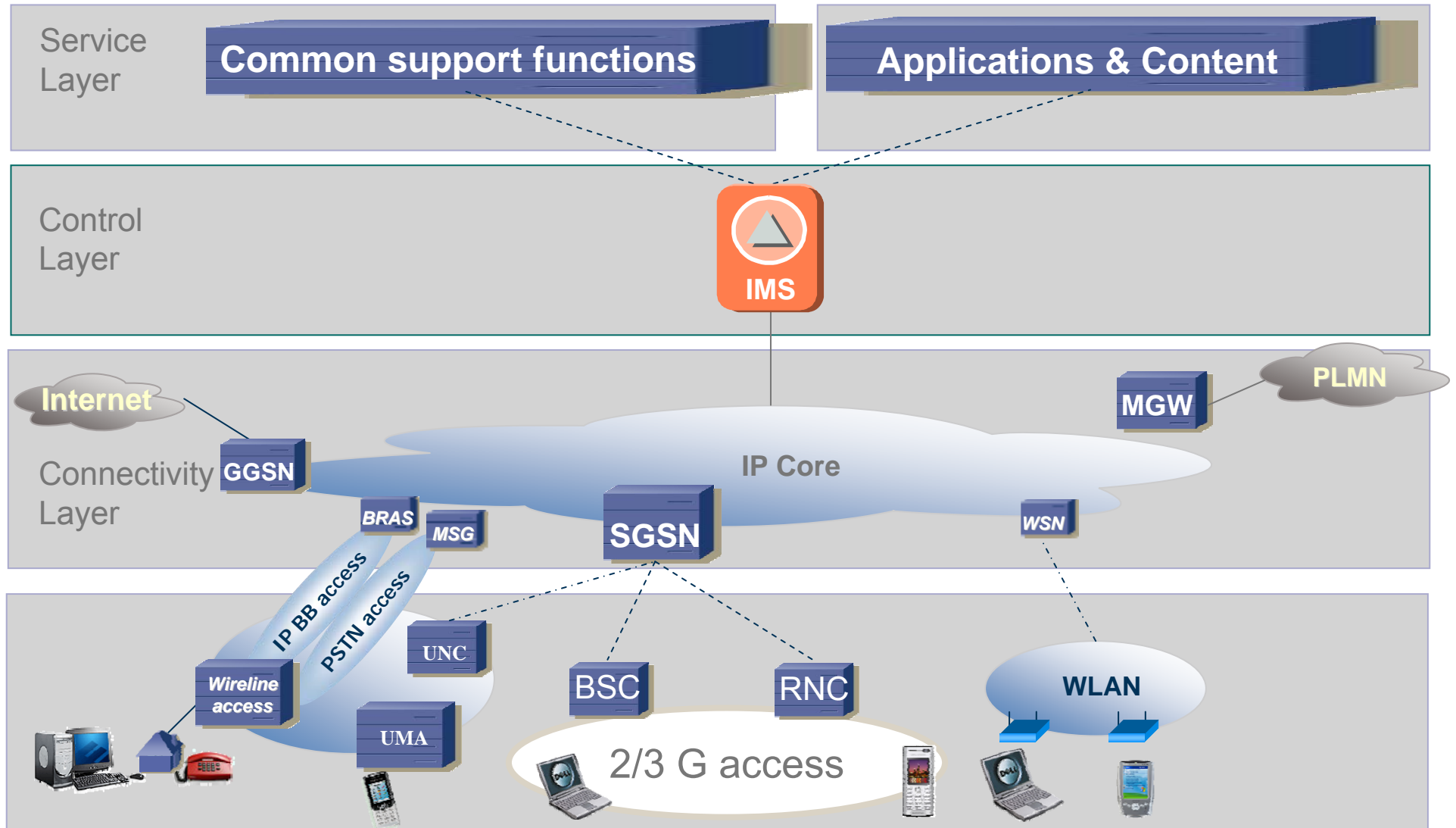




# MSS & IMS on one platform

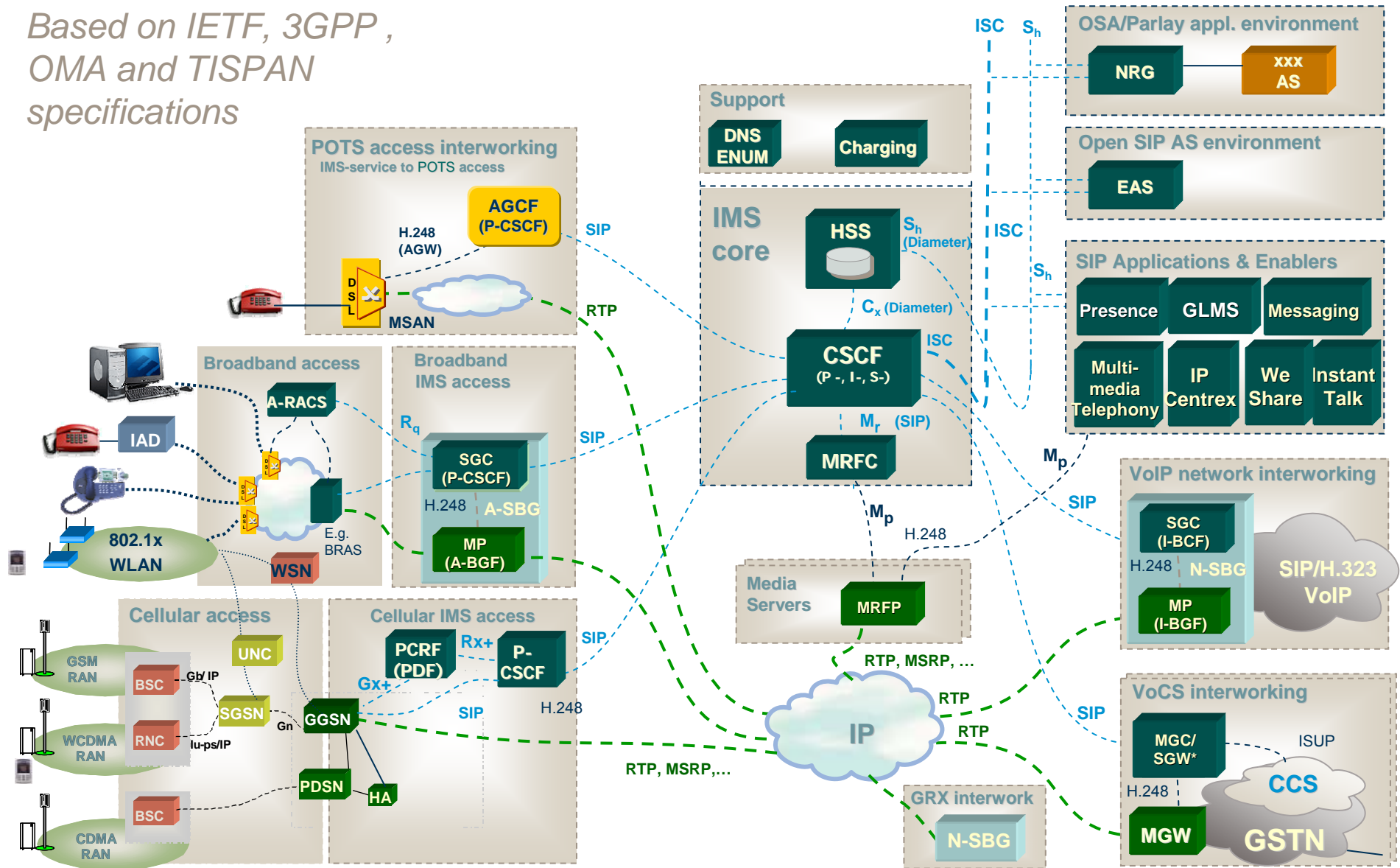


# One converged network



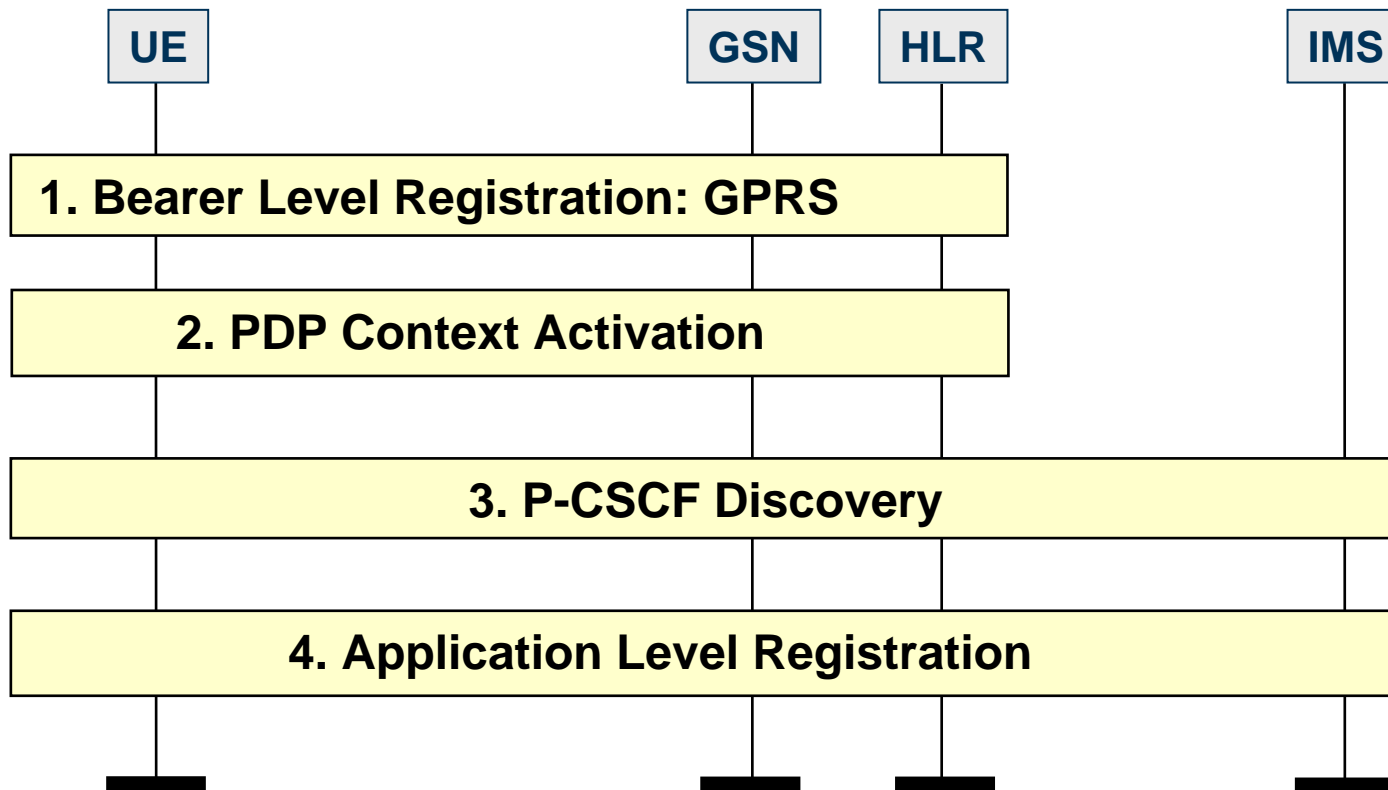
# Ericsson IMS mid term architecture

Based on IETF, 3GPP, OMA and TISPAN specifications

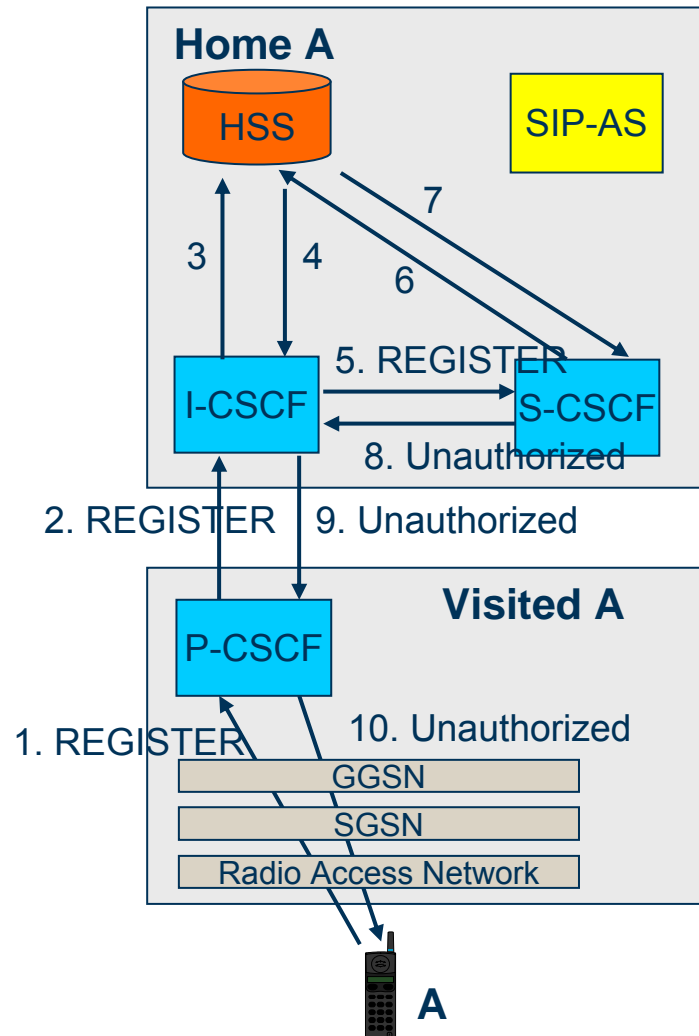


# Call Flows

# Registration to the network



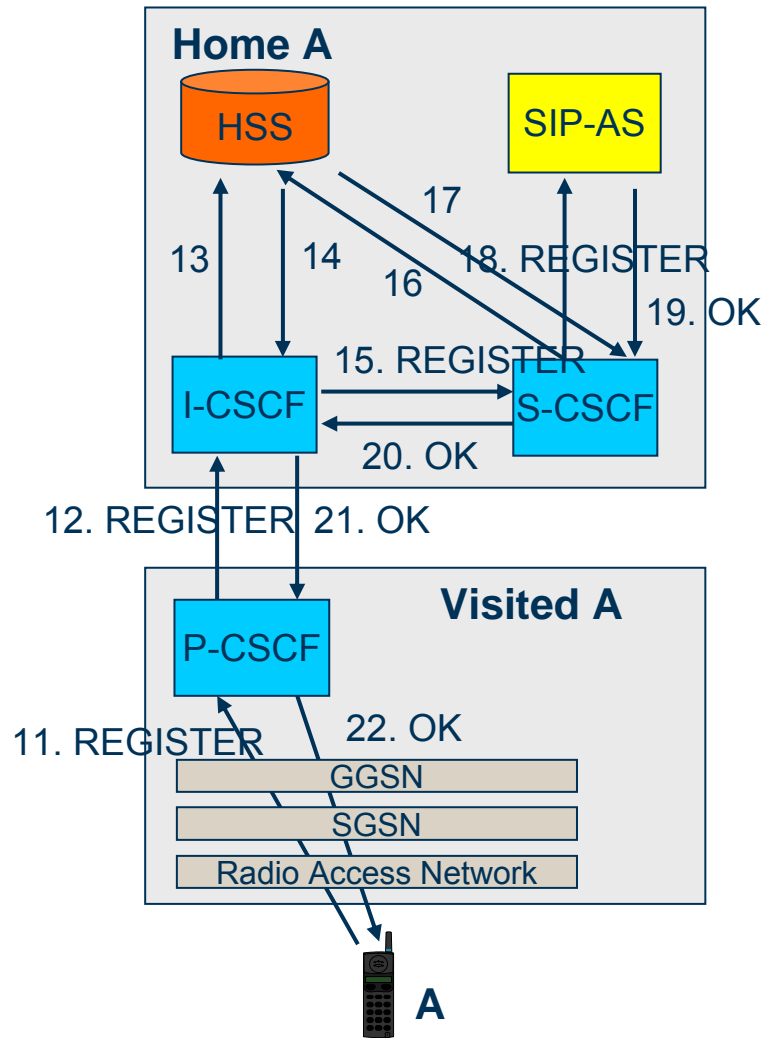
# Application level Registration (I)



**Subscriber**

*A UE initiates a SIP Registration including his public user ID and his private user ID*

# Application level Registration (II)

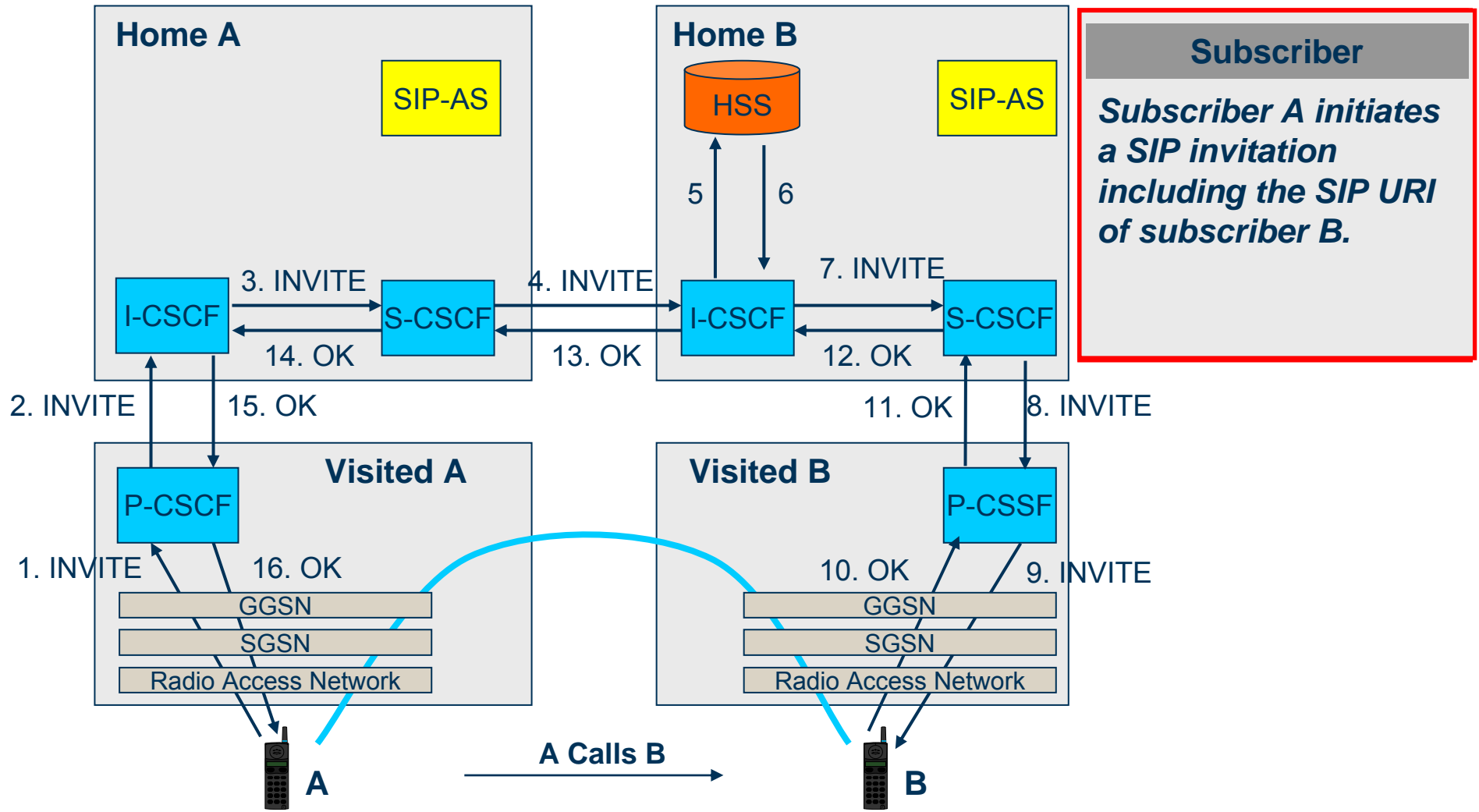


## Subscriber

*The UE calculates the credentials and re-initiates the SIP Registration.*

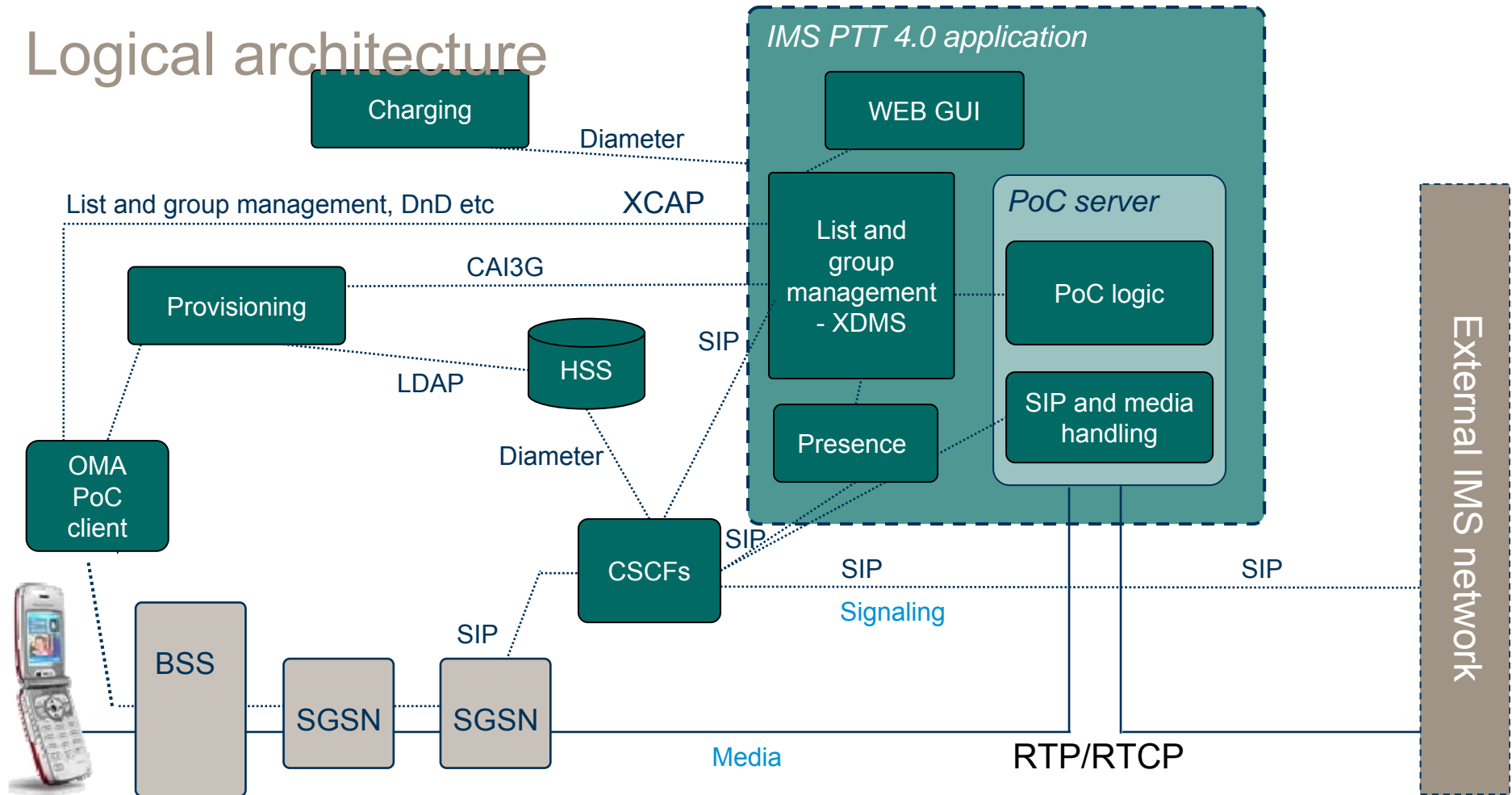


# Session Establishment

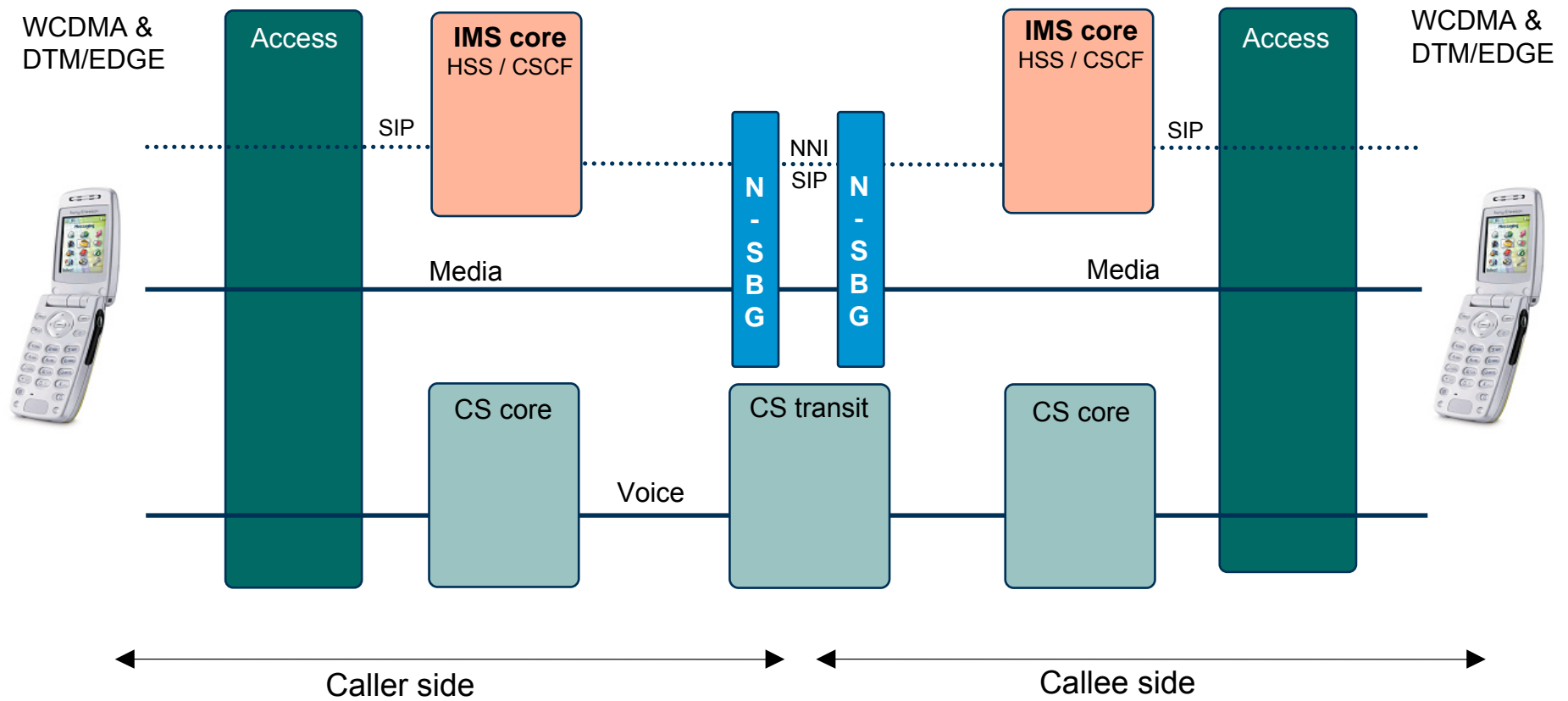


# Ericsson IMS Push to Talk solution

## Logical architecture

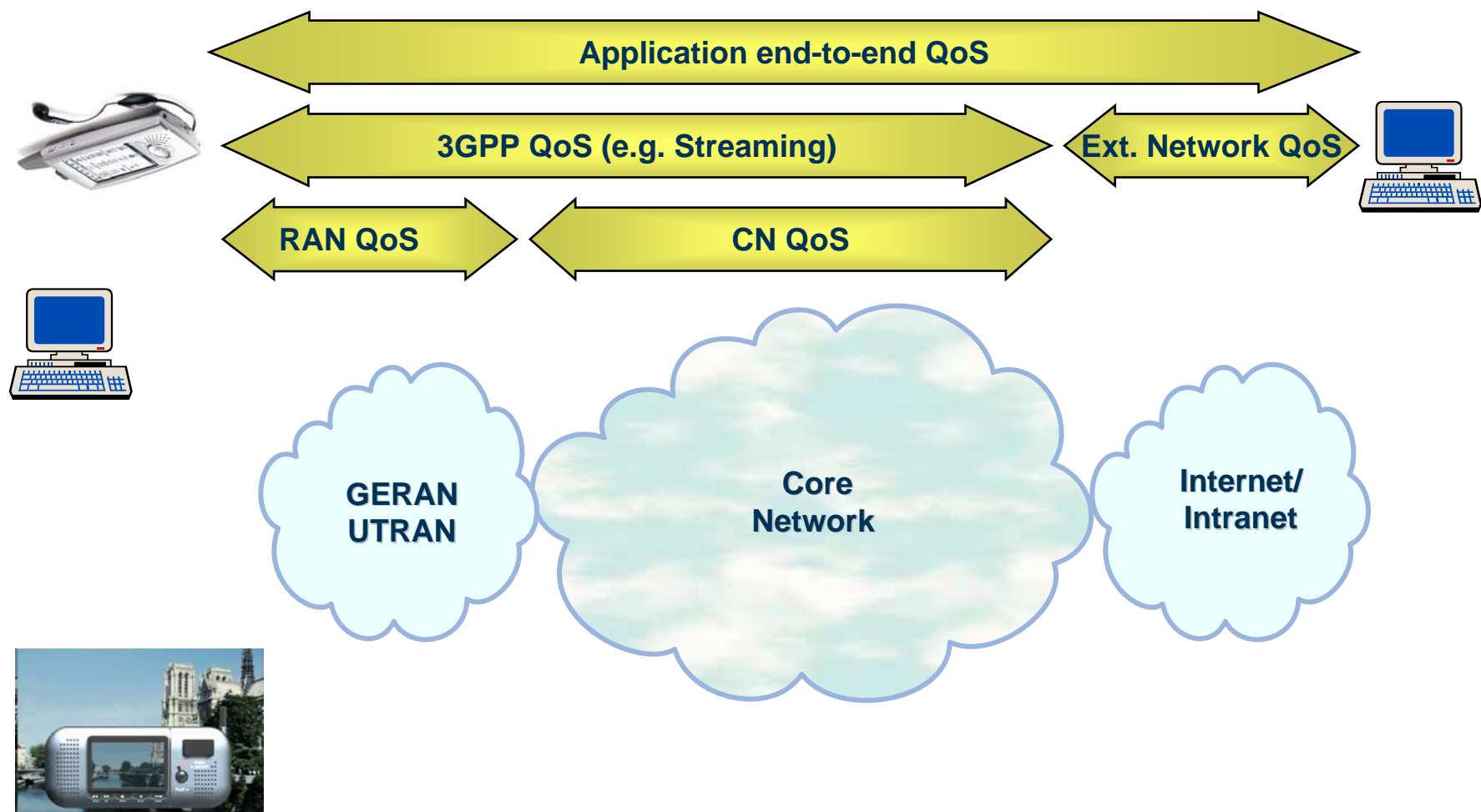


# weShare architecture

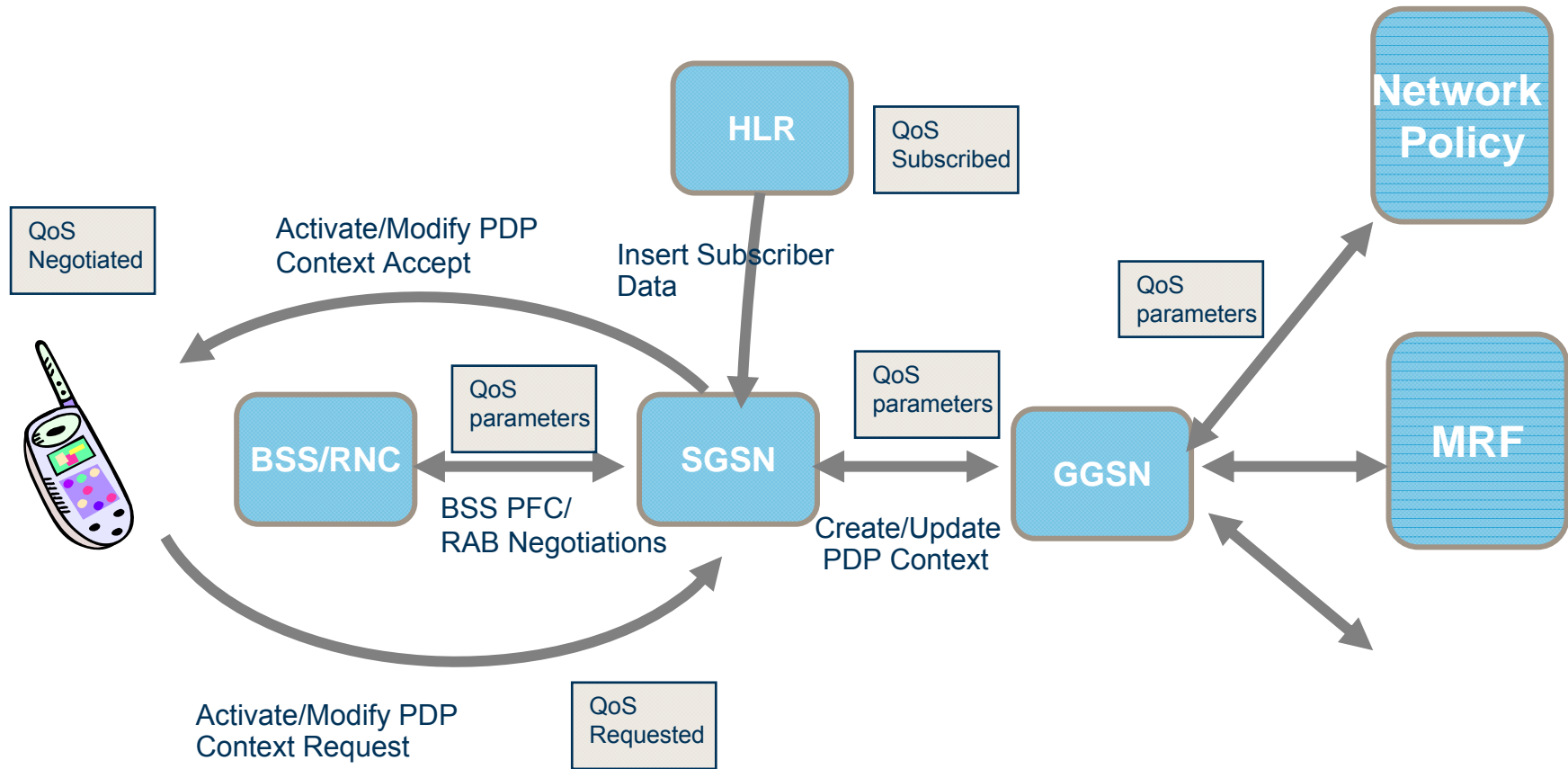


# IMS and QoS

# E2E QoS on Different Levels



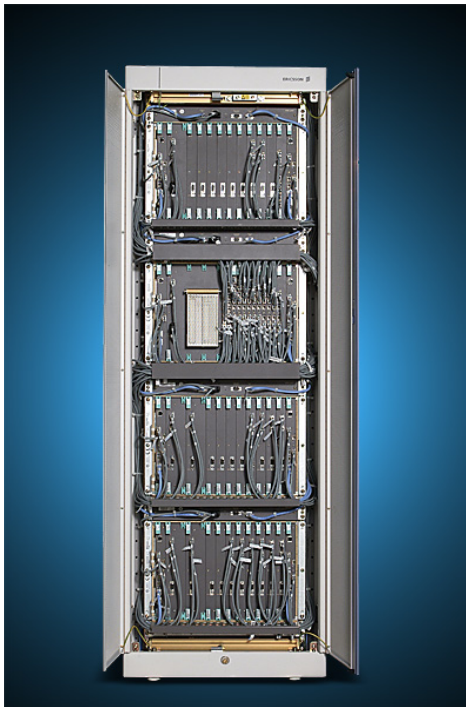
# QoS Basics – PDP Context Activation/Modification



# IMS platforms

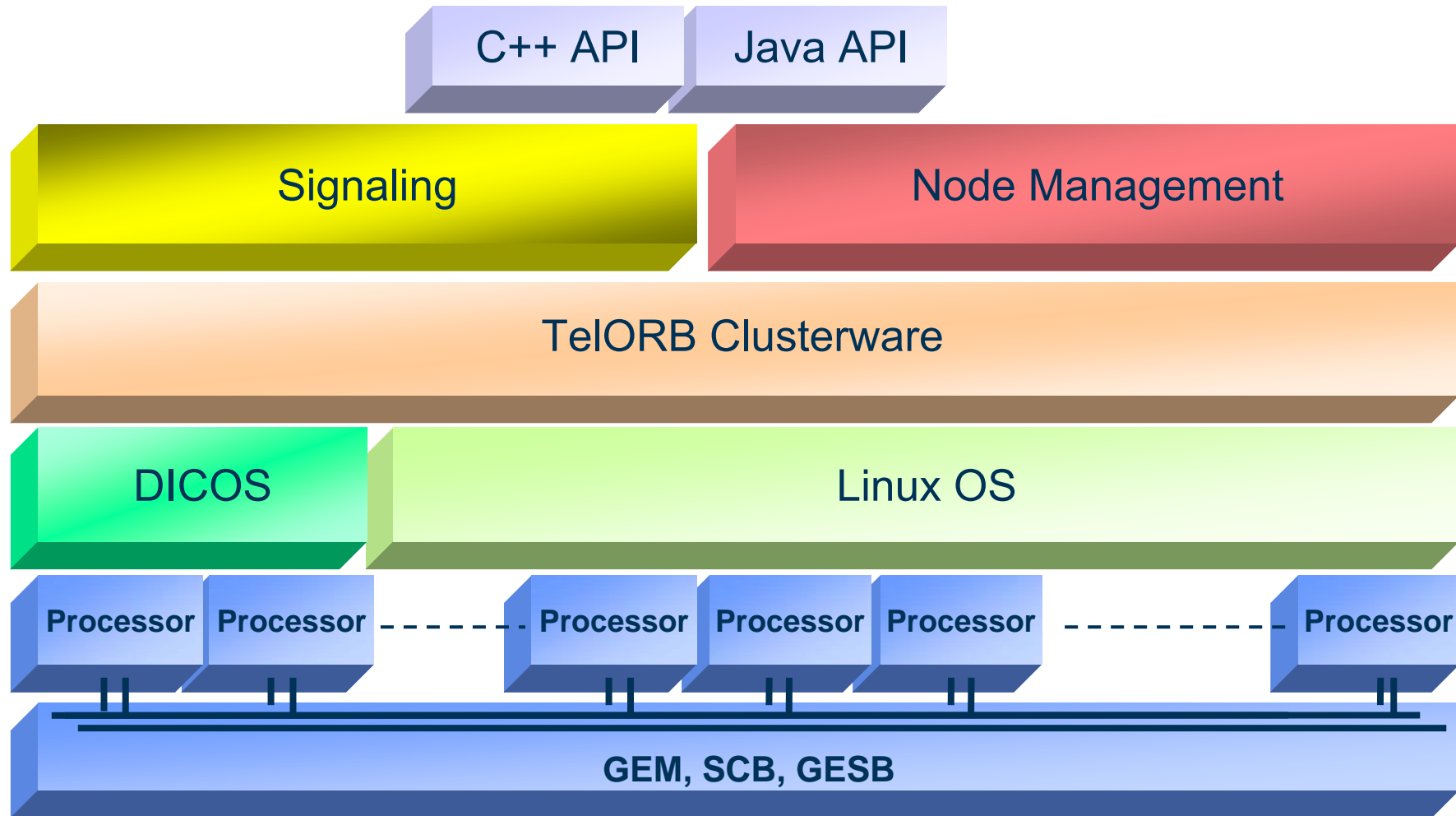


# IMS Platforms

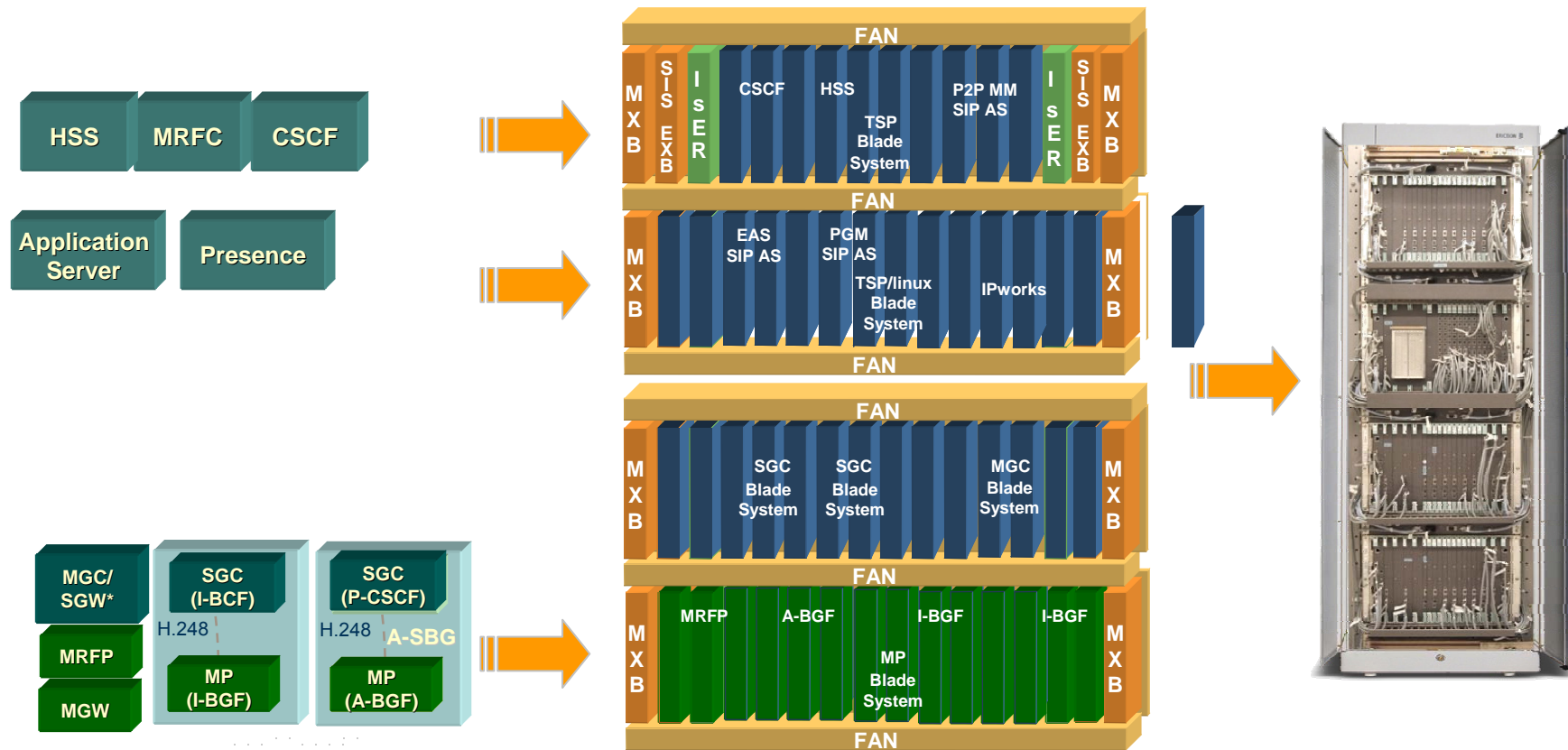


- The IMS Core including CSCF, MRF, and HSS are based on Ericsson Telecom Server Platform – TSP
- Blade technology (Integrated Site architecture) will be introduced for SBG (IMS R4) and MGCF/MGW, MRF

# TSP Architecture



# IMS implementation architecture (IMS R5)



... provides for an IMS network in a box

**ERICSSON** 

**TAKING YOU FORWARD**