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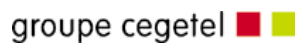
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# NMS at a Glance

- **Communications technologies & solutions**
  - ◆ OEM products and carrier solutions
  - ◆ Mobility and convergence
- **Founded in 1983; public in 1994**
- **2005 revenues \$109.5 million**
- **425 employees**

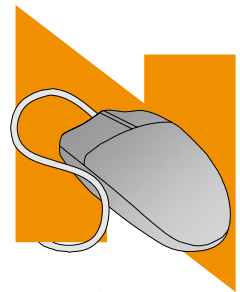


● Product Development      ● Sales & SE Support      ● Channel Partner's Headquarters



# IMS: What an Application Developer Needs to Know

**Brough Turner**  
**Vice President and Chief Technical Officer**  
**February 20, 2007**



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# Tomorrow's Communications Network



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## ■ One core network with “any access”



- ◆ Based on IP

- ◆ Wireline and wireless transparency

- ◆ Standardized signaling based on extensions to IETF standards

## ■ Access and bandwidth will become commodities, services are the differentiator

- ◆ Per-session control to support per-application quality of service (QoS) guarantees and per-application billing

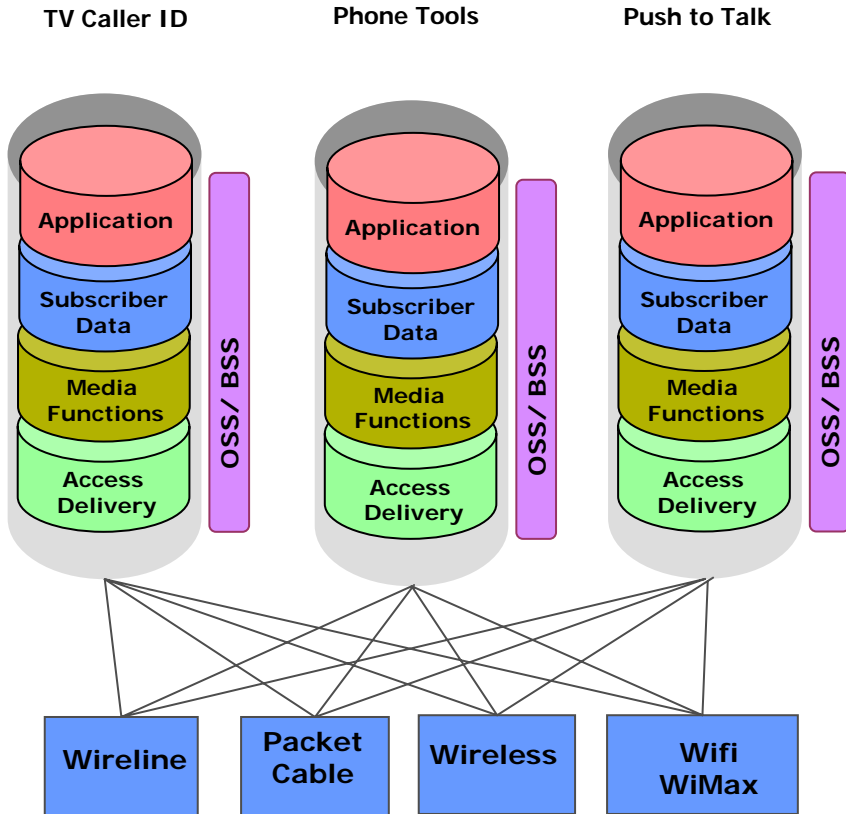
## ■ Voice is just application

- ◆ “Easily” integrated with other applications...

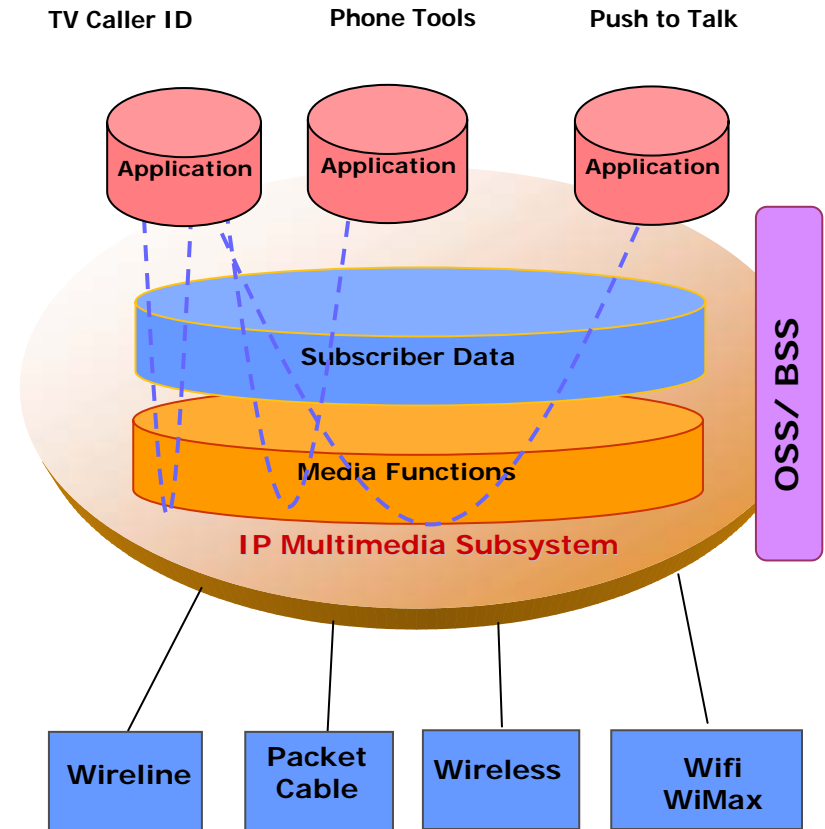


# IMS Story: Convergence

## Traditional Services



## IMS Services



Source: Team Analysis, Lucent



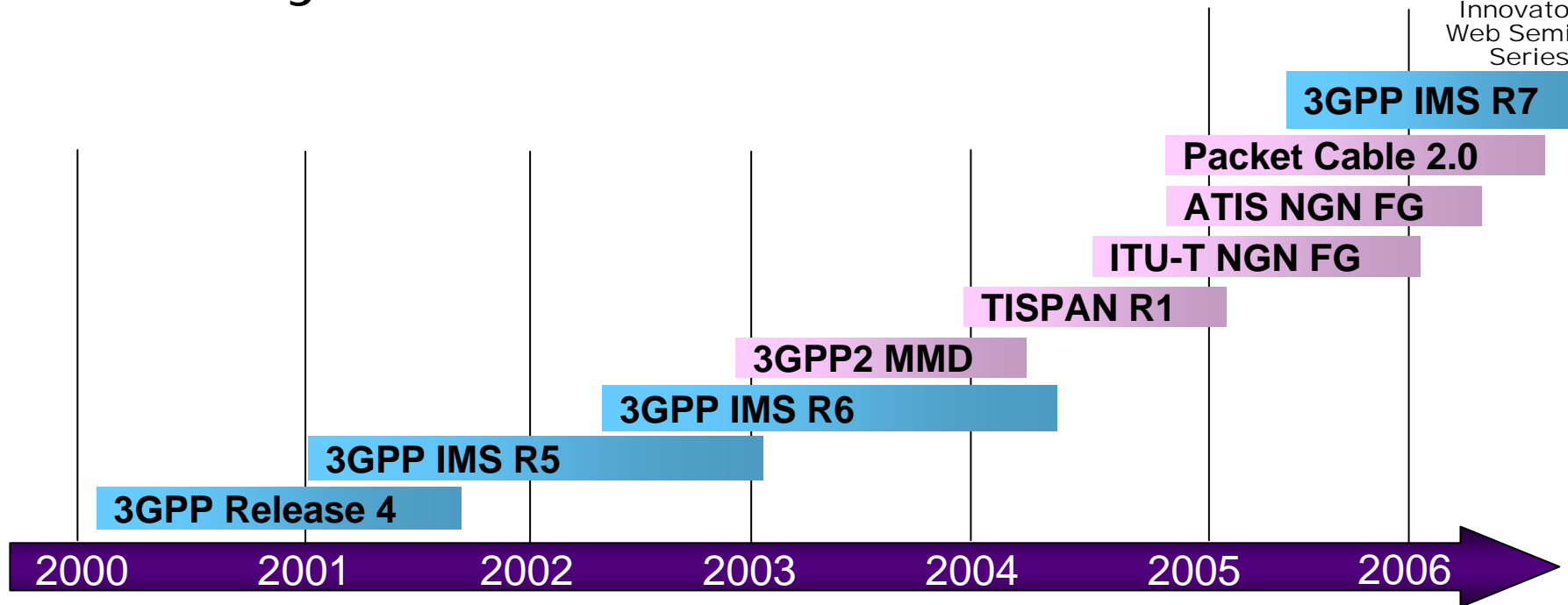
# IMS Value Proposition

## *Business Challenges and Strategies*

- **Maintain current revenue streams**
  - ◆ **Controlled migration**
  - ◆ **Future proofing to protect technology investments**
- **Generate new revenue**
  - ◆ **Deliver a differentiated portfolio of value-added services**
  - ◆ **Disruptive technology drives innovation; adoption unpredictable**
- **Rapidly develop and deploy new services**
  - ◆ **Partnering to deliver new standards-based technology**
- **Reduce capital spending**
  - ◆ **Converge all services on common infrastructure**
  - ◆ **Focus very limited resources on core competencies**
- **Service transparency — networks and access devices**



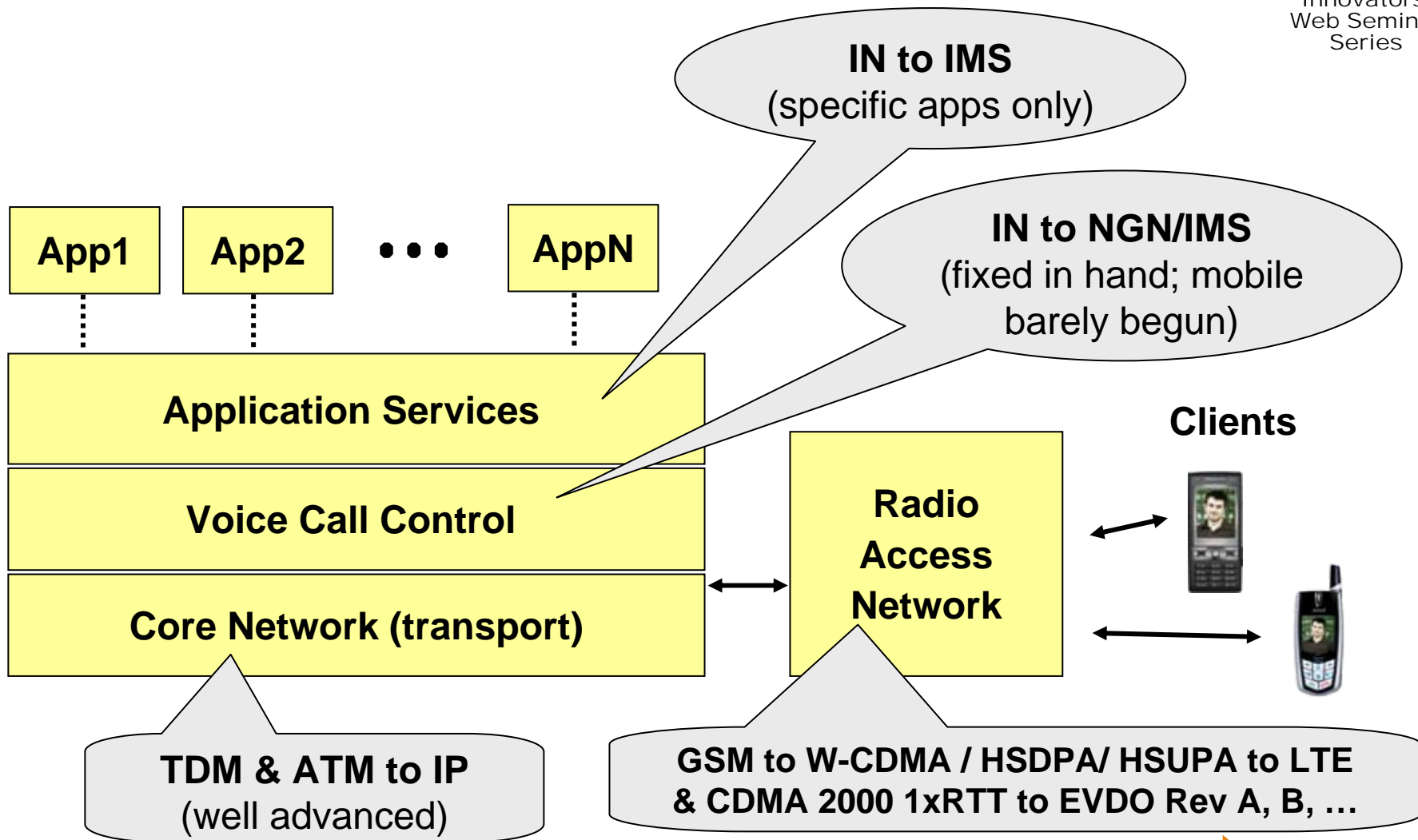
# History of IMS and NGN



- 3GPP R4 — Softswitch control for circuit switched 3GSM / W-CDMA networks
- 3GPP R5 — first introduction of SIP-based IMS
- 3GPP R6 — adds features and support for IMS over WLAN
- 3GPP R7 — adds broadband / wireline access capabilities
- 3GPP2 — defined CDMA2000 multi-media domain (MMD) based on 3GPP IMS R5
- TISPAN — evolves NGN architecture for fixed networks to be based on 3GPP IMS
- ITU-T NGN Focus Group — venue to make TISPAN NGN a global spec
- ATIS NGN Focus Group — formally collaborating with ETSI as of April 2005
- PacketCable Release 2.0 — aligning with portions of 3GPP



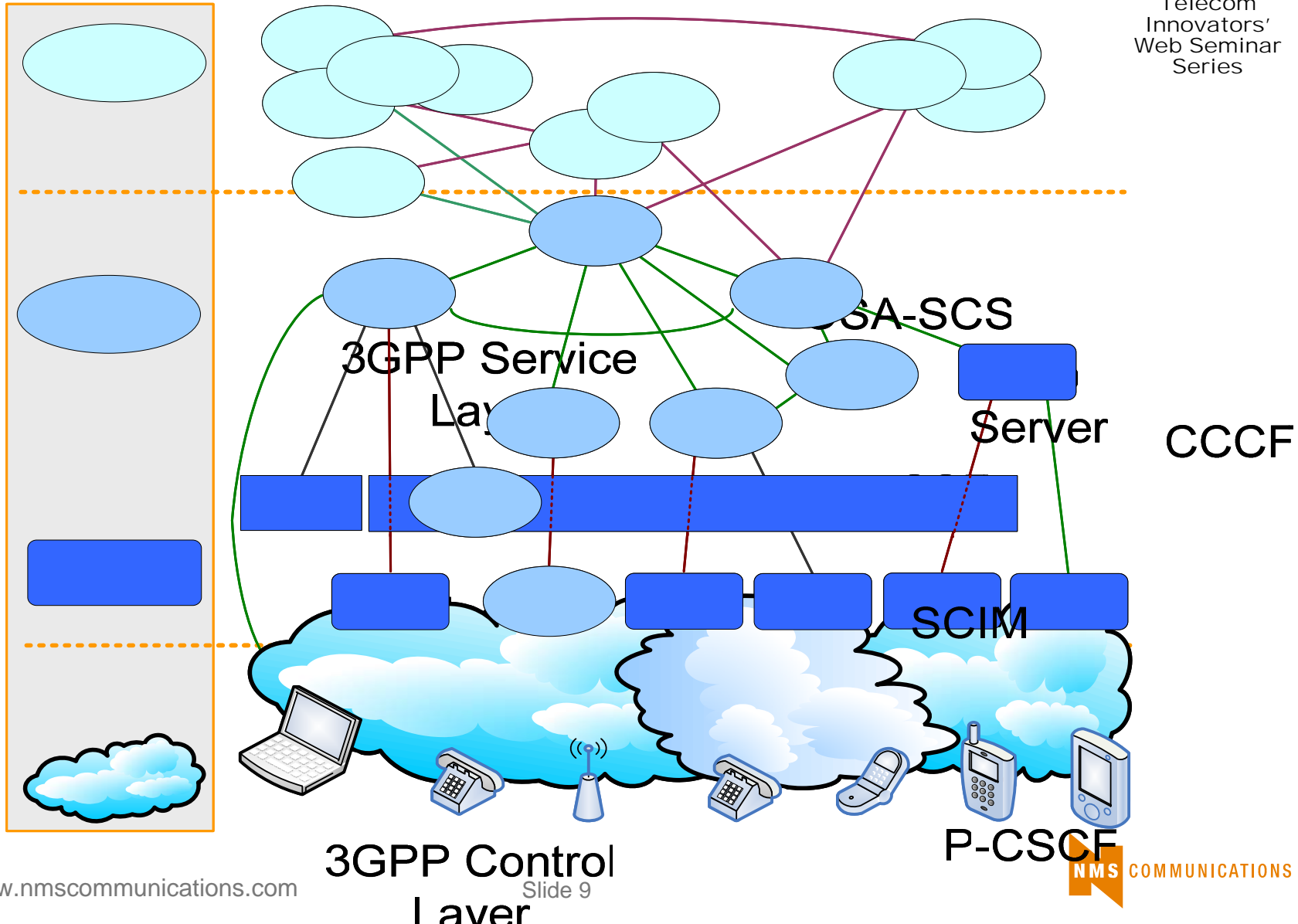
# Mobile Technology Overview



# 3GPP R7/TISPAN IMS Architecture



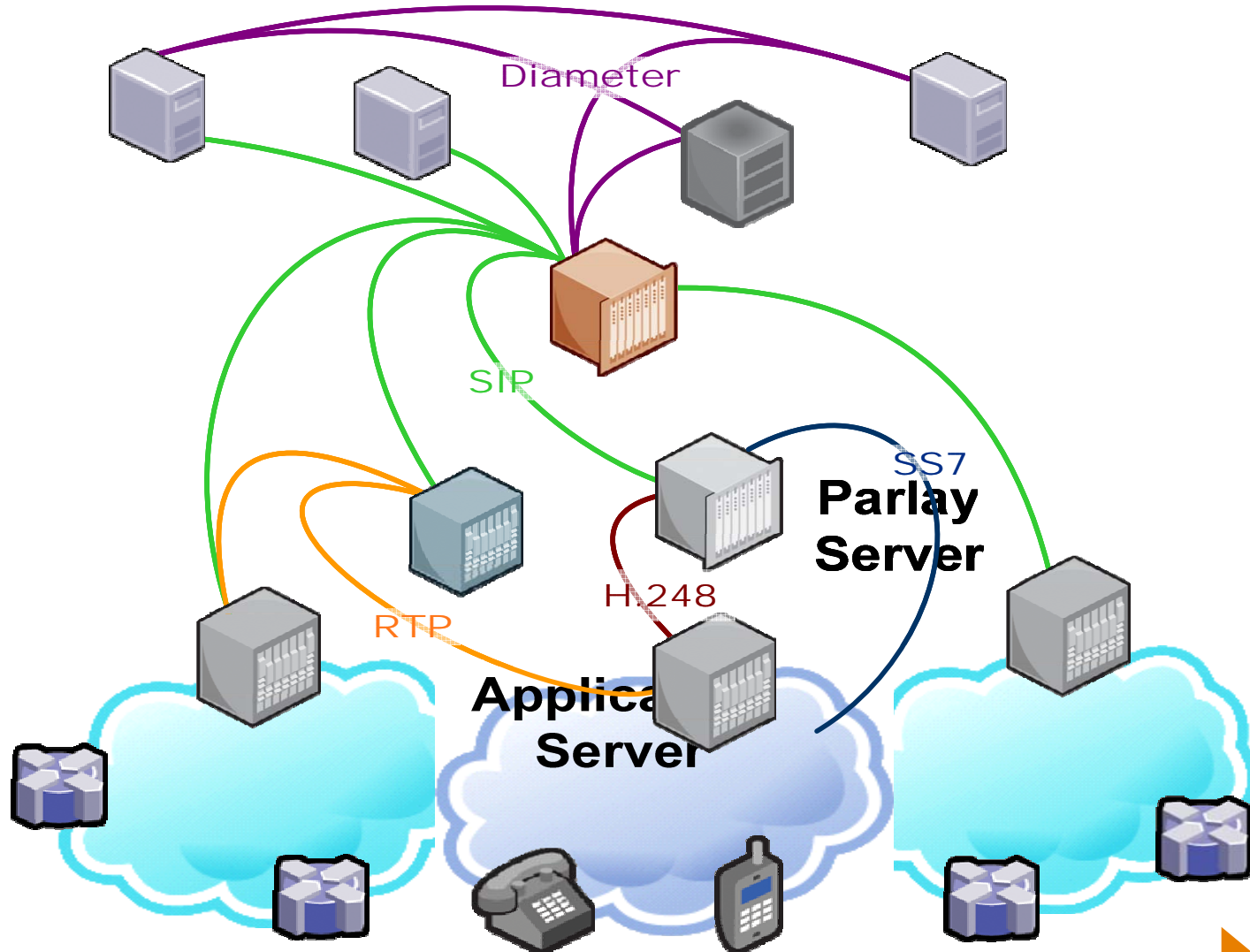
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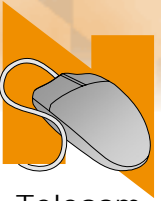


# Simplified Real-World Implementation



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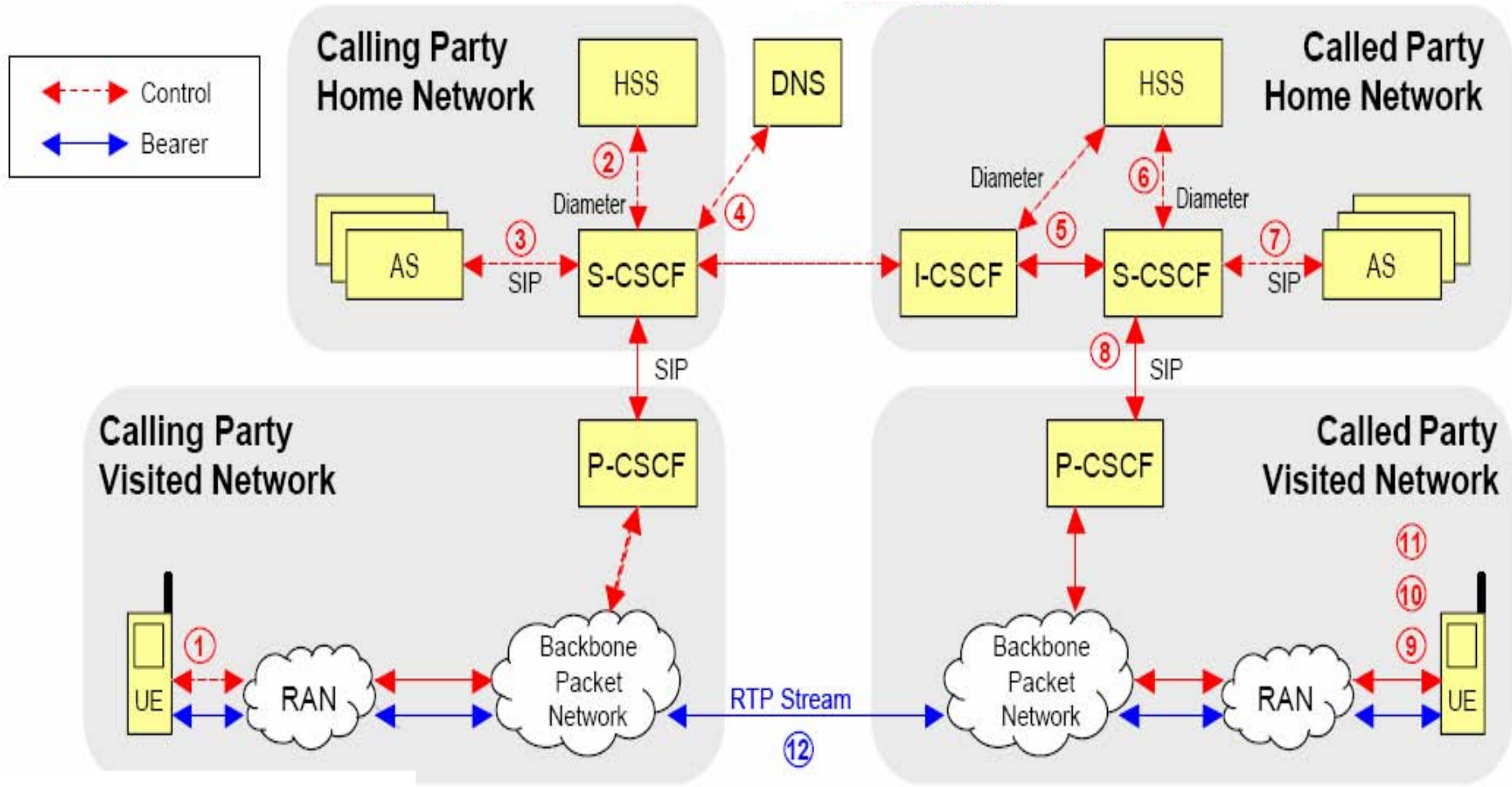


# NGN / IMS Service Layer Today

- **NGN networks based on “softswitch” controlling media gateways**
  - ◆ Widely deployed in tandem networks
  - ◆ Being deployed in fixed telephony access networks
  
- **IMS networks use a Call Session Control Function (CSCF) and SIP signaling (extended)**
  
- **SIP infrastructure (CSCF or otherwise) already deployed by major mobile operators**



# IMS Session (i.e. Call) Control





# Only for New Applications!

- **Most major mobile operators have deployed a SIP infrastructure of some sort**
  - ◆ **CSCFs per strict IMS or otherwise**
  - ◆ **In use for new applications like Push to Talk (PTT)**
- **Fixed operators moving to softswitches for conventional voice, but...**
- **Mobile voice calls still use circuit switching**



# Long Term Parallels: IN & IMS

## Intelligent Network (IN) — IP Multimedia System (IMS)

- Free operators from equipment provider lock-in
- Separate applications from basic call control
- Open protocols and APIs for applications

## Intelligent Network Application Successes

- FreePhone, Mobile (HLR), Pre-paid, Voice mail, ...
- 10 year summary:
  - ◆ A few applications, very widely deployed



# IMS Applications Today (& Next 3 Years)

## ■ **Push-to-Talk**

- ◆ **Being deployed today, performance improving**

## ■ **Add video during voice call, a.k.a. video sharing**

- ◆ **“See what I see” most common use of 3G video calling**
- ◆ **Video sharing awaits spread of appropriate handsets**

## ■ **Instant messaging**

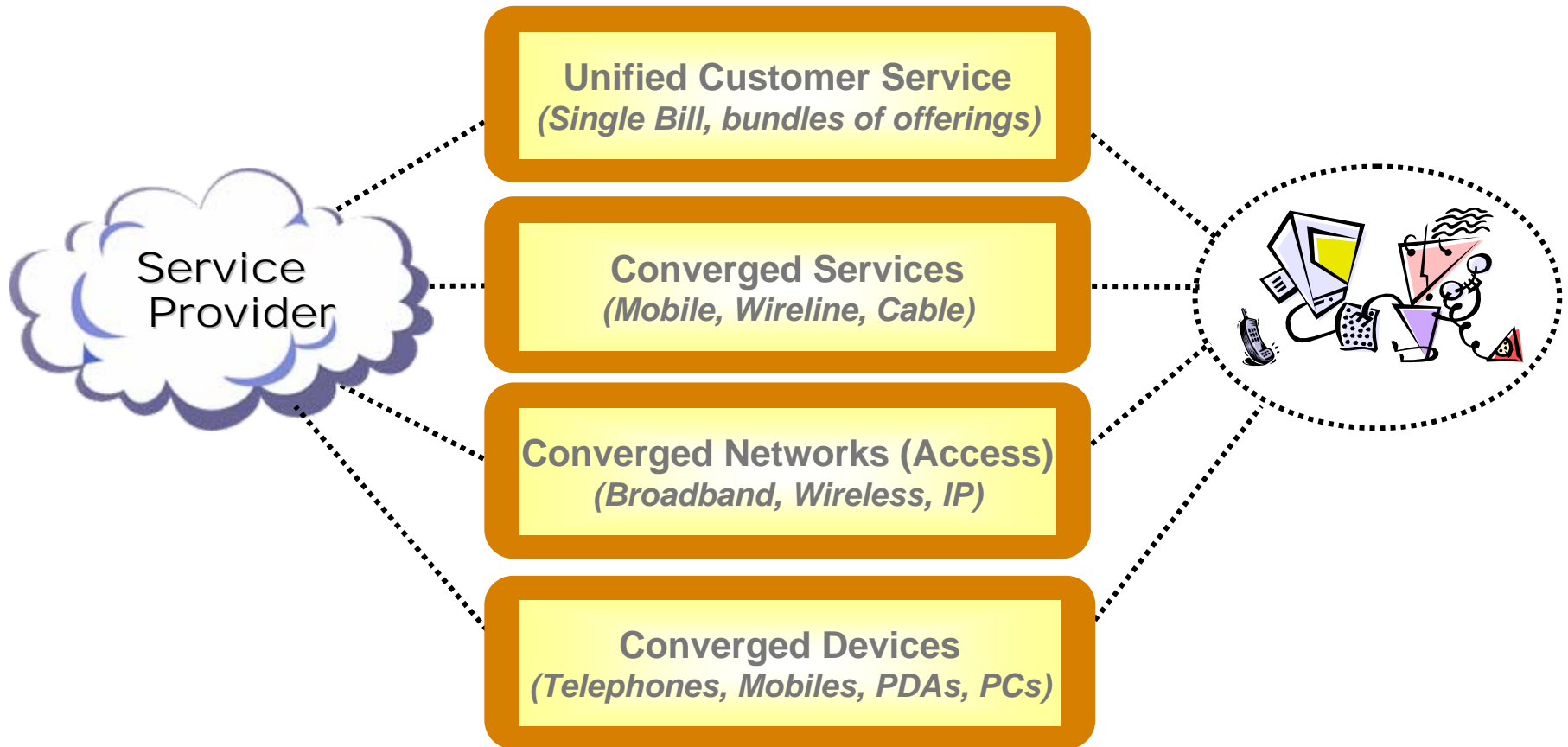
- ◆ **Mobile initiated communities? or AOL, Yahoo, MSN & QQ?**

## ■ **Fixed-mobile convergence (FMC)**

- ◆ **Is there a business model? Most likely in enterprises first**



# IMS Premise





# IMS Business Justification

- **Convergence (to IP) saves money**
- **Access to new (IP-based) applications provides new sources of revenue**
- **Per session control (of IP sessions) allows differential billing on a per-application basis**



# IMS Services Infrastructure

- **Basic capabilities to support applications**
  - ◆ Hierarchy of CSCFs: P-CSCF, S-CSCF, I-CSCF
  - ◆ Home Subscriber Server (HSS) – extends & replaces HLR
  - ◆ Services Capability Interaction Manager (SCIM)
  - ◆ Media Resource Function (MRF)
  
- **Typically supplied by major Equipment Providers**
  - ◆ Major operators buy package deals
  - ◆ Ericsson, Nokia-Siemens, Huawei, Alcatel-Lucent, ...



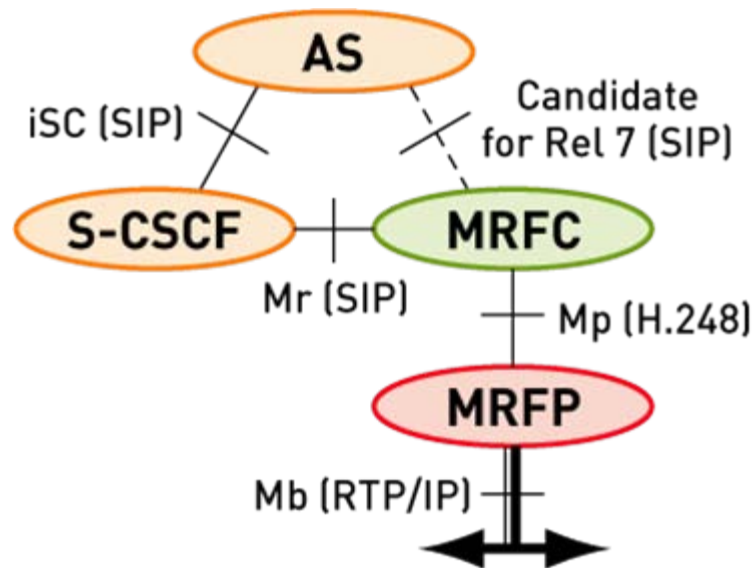
# IMS Application & Database Servers

- **Primary application servers part of IMS network package**
  - ◆ Ericsson – BEA WebLogic SIP Server (WLSS)
  - ◆ Nokia – Ubiquity SIP Application Server (SIP A/S)
  - ◆ Standard interfaces; vendor specific added capabilities
  
- **Primary database is Home Subscriber Server (HSS)**
  - ◆ Extensible to support application data – in theory
  - ◆ Standard interfaces; vendor specific added capabilities



# Media in IMS Applications

- In IMS model, applications invoke MRF for media



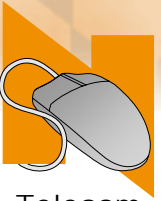


# Practical Deployments

## *Likely to be different*

- **Generic MRF is announcement server; additional media capabilities available, but expensive**
- **Media resources scale with application, i.e. must deploy additional ports with each application**
- **Applications require specialized media capabilities, e.g. 3G-324M video, wideband audio conferencing**
  
- **Media resources likely to be sold with applications**
  - ◆ **Application vendor follows specs – offers to use existing MRF, but ends up selling application-specific MRF**



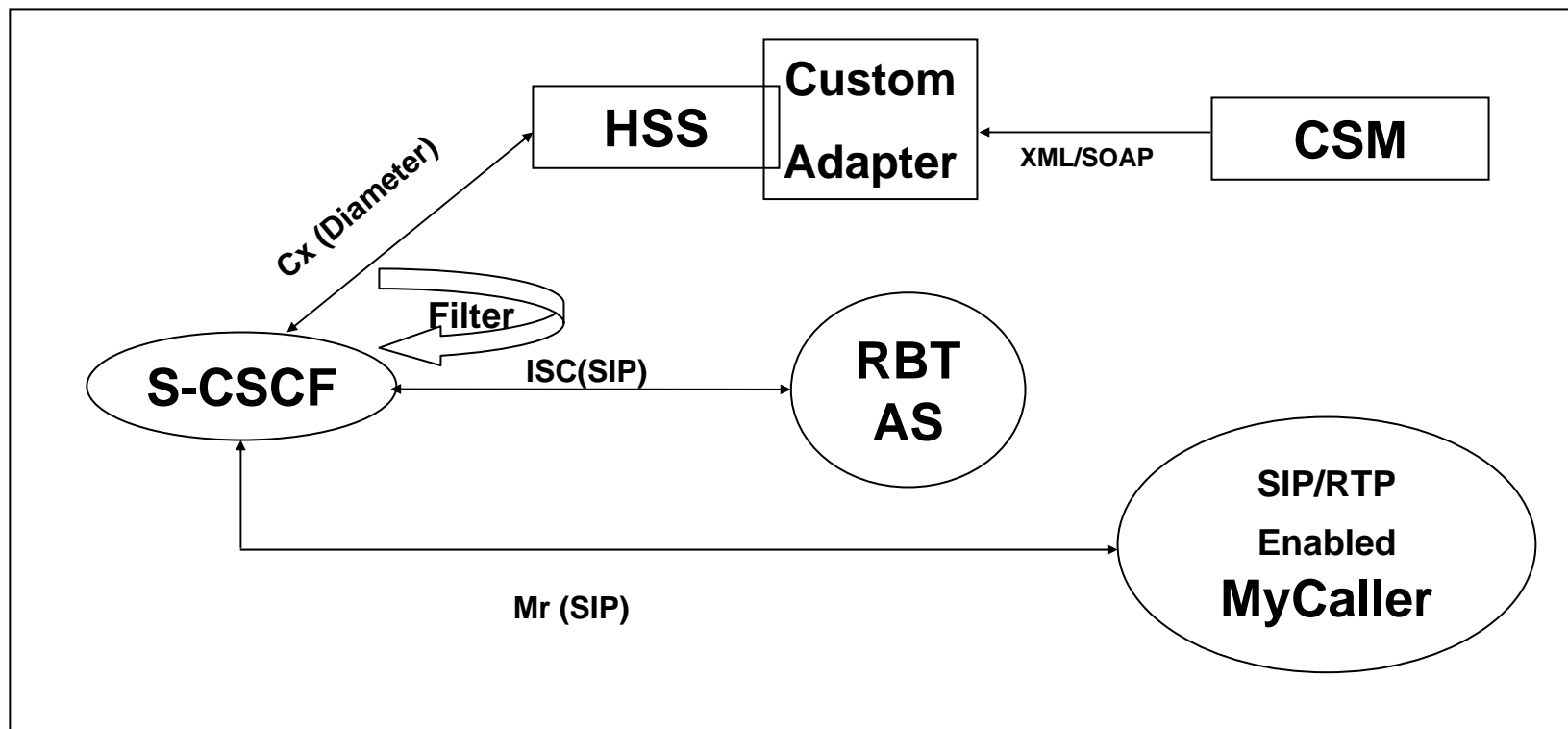


# Application Migration Example

- **MyCaller – Leading ringback tone solution**
  - ◆ **Deployed in 25+ mobile operator networks**
  - ◆ **Current deployments mostly via Intelligent Network (IN)**
  
- **IMS migration in two stages**
  - ◆ **IMS-enabled MyCaller**
    - **Works with both IMS and “pre-IMS” SIP infrastructure**
    - **Consistence with a variety of “IMS” configurations**
  - ◆ **Native IMS MyCaller**
    - **Leverage standard IMS network elements wherever possible**

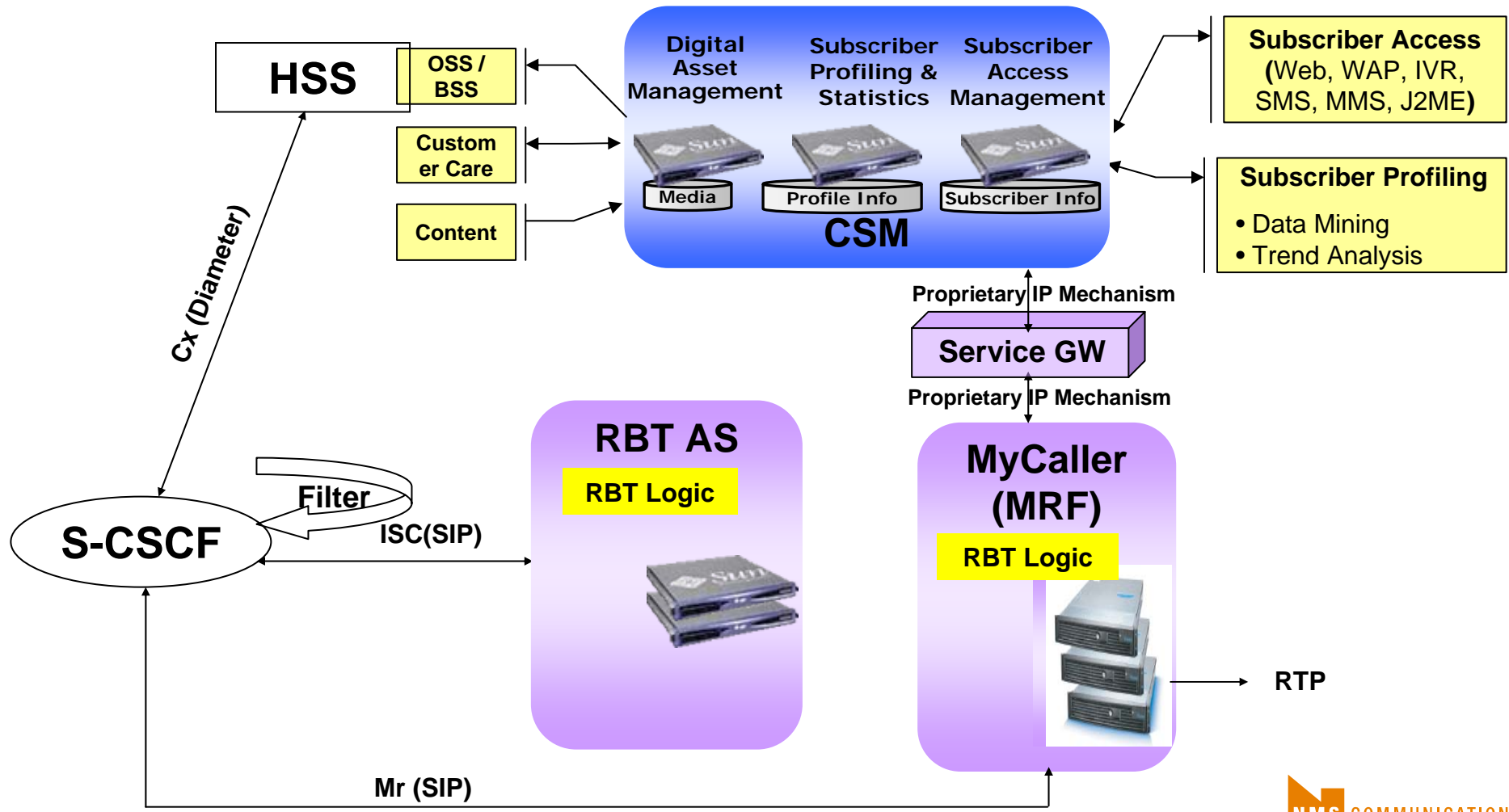


# IMS-enabled MyCaller – N/W View





# IMS-enabled MyCaller - Component View



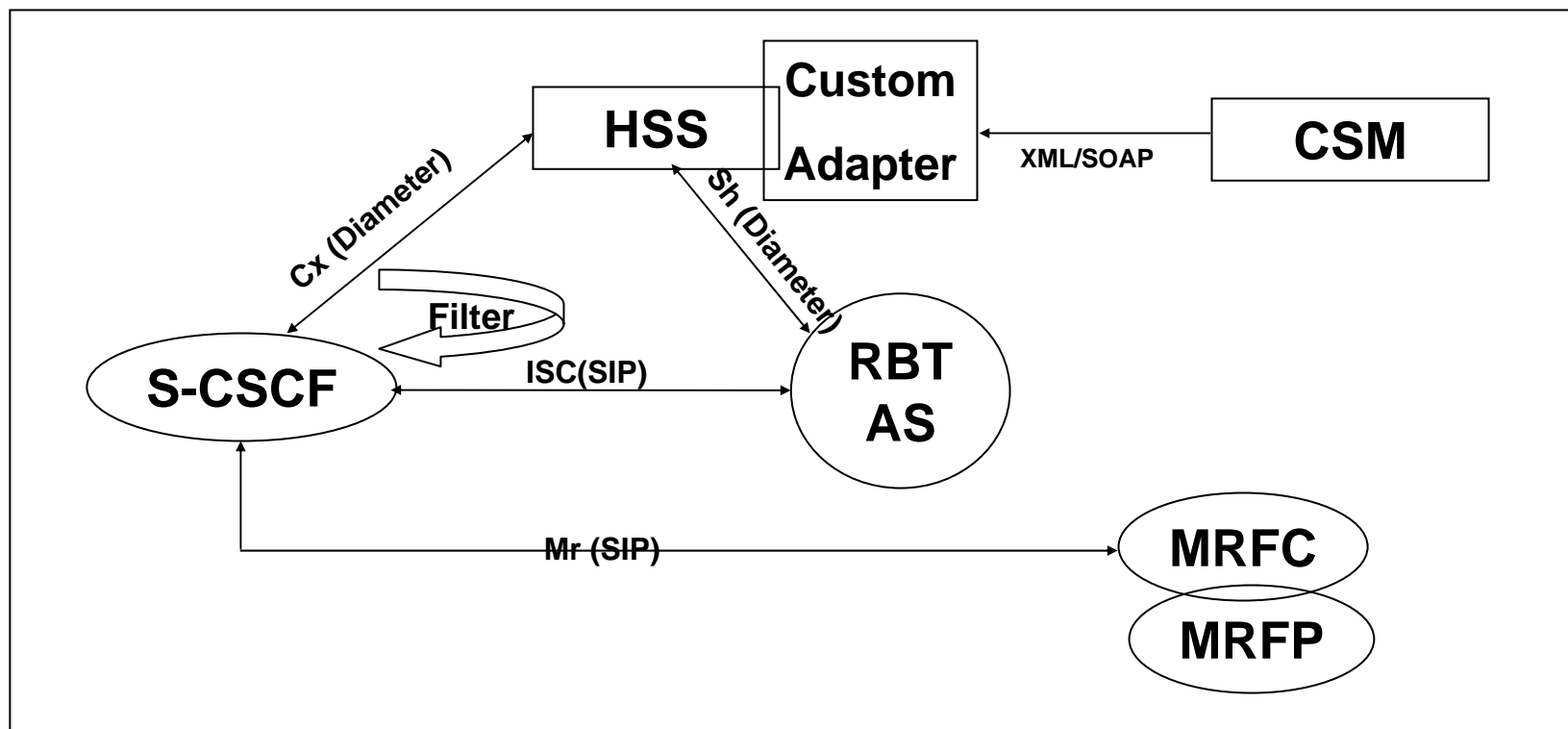


# IMS-enabled MyCaller – Components

- **Network Application Server (e.g. BEA WLSS)**
  - ◆ B2BUA; Resilience and Redundancy
- **RBT Application Server**
  - ◆ Partial RBT Logic – connection routing (select MRF)
- **MyCaller Intelligent peripheral (primarily as MRF)**
  - ◆ Partial RBT Logic – subscriber preferences & music database
  - ◆ SIP UA Server functionality; RTP Interface
- **MyCaller CSM**
  - ◆ Provides XML/SOAP interface for HSS Provisioning and Billing through custom adapter

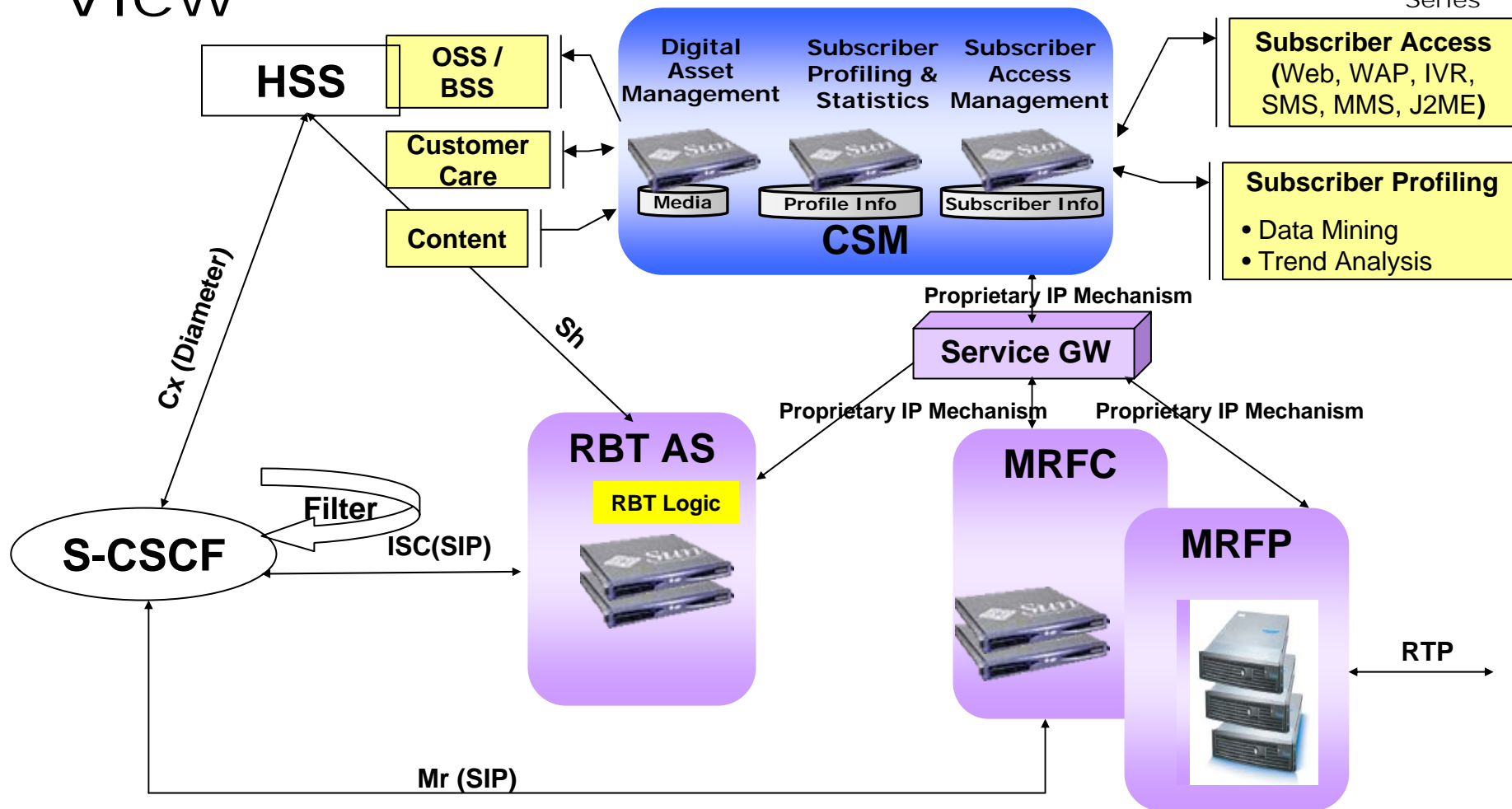


# IMS Native MyCaller - N/W View





# IMS Native MyCaller - Component View





# IMS Native MyCaller – Components

## ■ MyCaller CSM

- ◆ Provides XML/SOAP interface for HSS Provisioning and Billing through custom adapter

## ■ Application Server

- ◆ MyCaller Subscriber Server functions
- ◆ Forward INVITE to MRFC with selected content file to play

## ■ MRFC – Media Resource Broker for AS

- ◆ Identifies which set of MRFPs have the needed content

## ■ MRFP

- ◆ Media Player with appropriate content replica to meet < 50 ms incremental post dial delay timing



# Simplicity Needed!

- **IMS specs**
  - ◆ Exceed 1,500 documents
  - ◆ More than 60 network elements and interfaces
- **User interface of IMS terminals is too complex**
- **Useful applications “touch” multiple elements**
  - ◆ Example: ringback tone implementation
- **SIP “standard” — oh yes!**
  - ◆ 98+ extensions to RFC 3261

*Complexity  
slows down  
adoption!*



# IMS – Key Development Areas

- **Charging functions** —new billing mechanisms for IMS sessions in various situations
- **Generic User Profiles (GUP)** — extension of HSS concept
- **OSS/BSS integration** — IMS standard interfaces to OSS/BSS
- **Service Capability Interaction Manager (SCIM)** — controlling and integrating legacy services
- **Voice Call Continuity Function (VCCF)** — IMS approach to FMC
- **TISPAN extensions** — integrating IMS QoS and admission control for fixed environments



# IMS Status

- **Questioning is over**
  - ◆ **70% of the service providers believe that IMS is important or essential to their business**
- **Trials underway**
  - ◆ **35 major operators with IMS trials underway**
- **Building on experience**
  - ◆ **30% of the talks at VON Fall 2006 were about IMS experiences**
  - ◆ **Areas of further work have been identified**



# IMS Application Summary

## ■ Call or session control

- ◆ Default is application server defined by network provider
- ◆ Augment with application-specific AS for complex apps
- ◆ Likely deploy specific equipment per application

## ■ Data storage

- ◆ HSS for subscriber data and session data
- ◆ Typically augmented with application-specific databases

## ■ Media

- ◆ Leverage network MRF for simple announcements
- ◆ Provide application-specific MRFs for significant media



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# Questions?

**PDF version will be posted today**

**Recorded version will be posted tomorrow**



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# Upcoming Events

## ■ Spring VON

- ◆ March 20 – 22
- ◆ San Jose, CA
- ◆ Booth #1019
- ◆ Meeting request
  - Contact [janice\\_manning@nmss.com](mailto:janice_manning@nmss.com)

## ■ Webinar: VoiceXML

- ◆ March 27 — Maggie Smith & Dan Kozin



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