- New wave of telecom infrastructure
    - IMS – New generation of Fixed/Mobile Convergence
    - 3G-LTE – Equipment in development
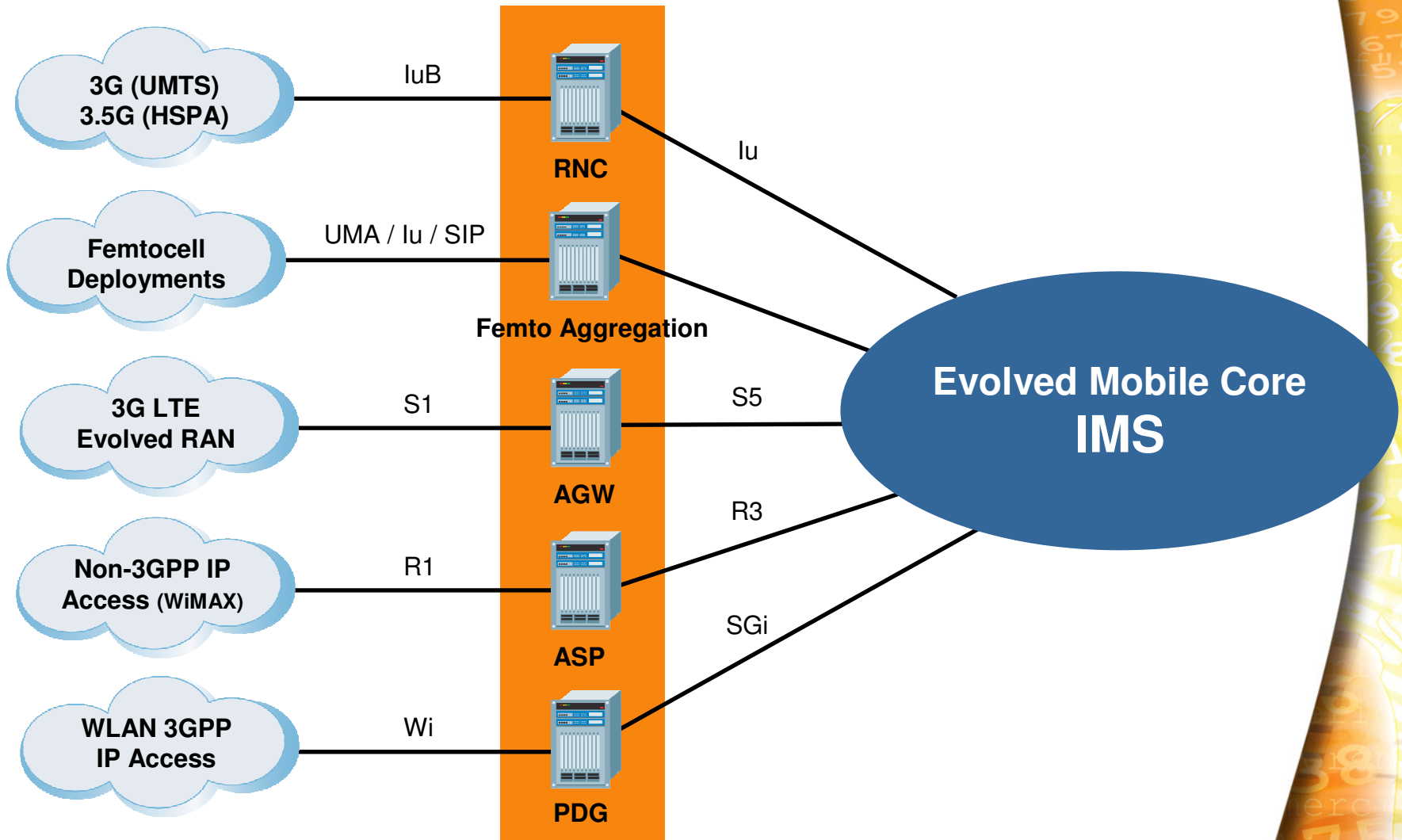   - WiMax – High bandwidth Fixed and Mobile service
    - IPTV – Highest bandwidth service ever deployed

IMS
67% CAGR

| | 05 | 06 | 07 | 08 |

CapEx

3G
33% CAGR

CapEx

IPTV
90% CAGR

Subscribers
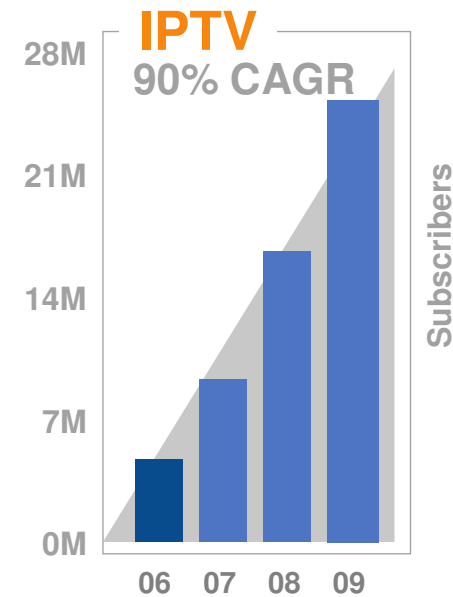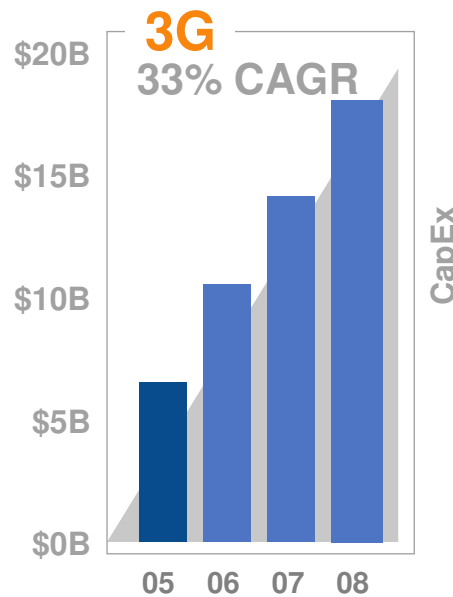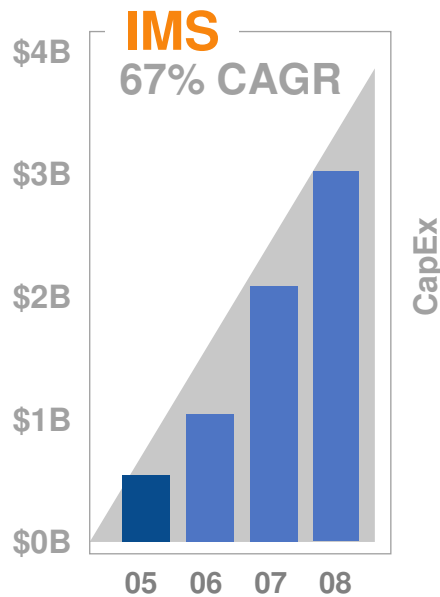
Sources: Dell'Oro, Frost & Sullivan, Gartner, In-Stat, VDC

2

Wireless – Common Architecture

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3G (UMTS) 3.5G (HSPA) — IuB — **RNC** — Iu

Femtocell Deployments — UMA / Iu / SIP — **Femto Aggregation**

3G LTE Evolved RAN — S1 — **AGW** — S5

Non-3GPP IP Access (WiMAX) — R1 — **ASP** — R3

WLAN 3GPP IP Access — Wi — **PDG** — SGi

Evolved Mobile Core
IMS

- **Quickly deliver new services**
  - Common platform framework makes it easy to trial new services
  - Integrate latest multimedia technologies & trends
  - Boost competitiveness and margins
- **Scale winners and dump losers**
  - Common infrastructure components mean no stranded investment when services ramp down
  - Leverage common equipment to add capacity for new applications instantly
- **Choice**
  - Standards: 3GPP/3GPP2 based
  - Allows the use of commercial off-the-shelf hardware
  - Enables competition and drives competitive pricing

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Application Layer
Applications can be provided
in common pools or separately

Voice	Video
Data	Content Services

Session Control Layer
IMS provides coordination or
synchronization as required

Call / Session Control

Media and End Point Layer
Flexibility of IMS core to coordinate end user
experience. Multiple access networks can be
used, supporting multiple clients and endpoints

IP / MPLS Core

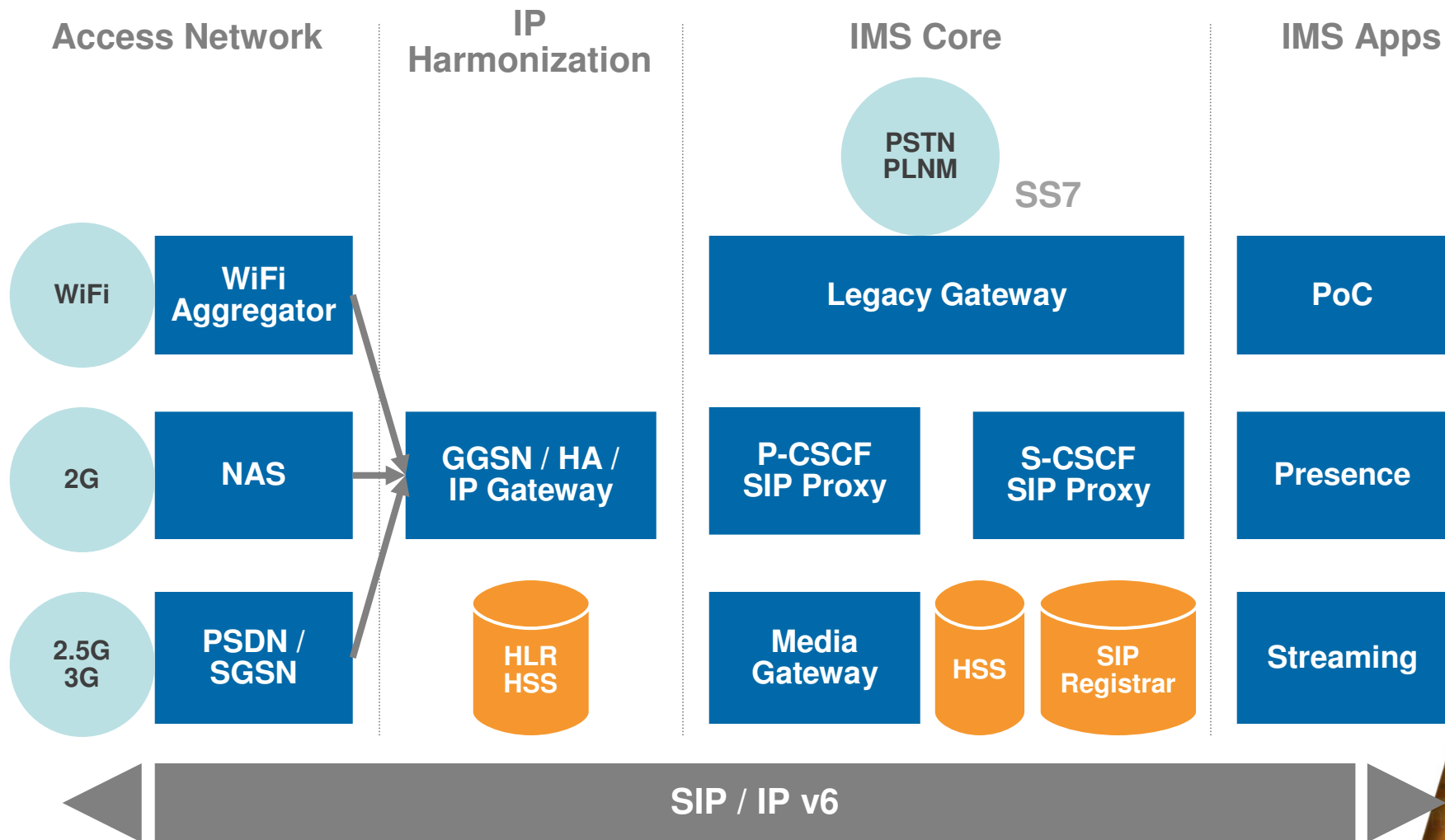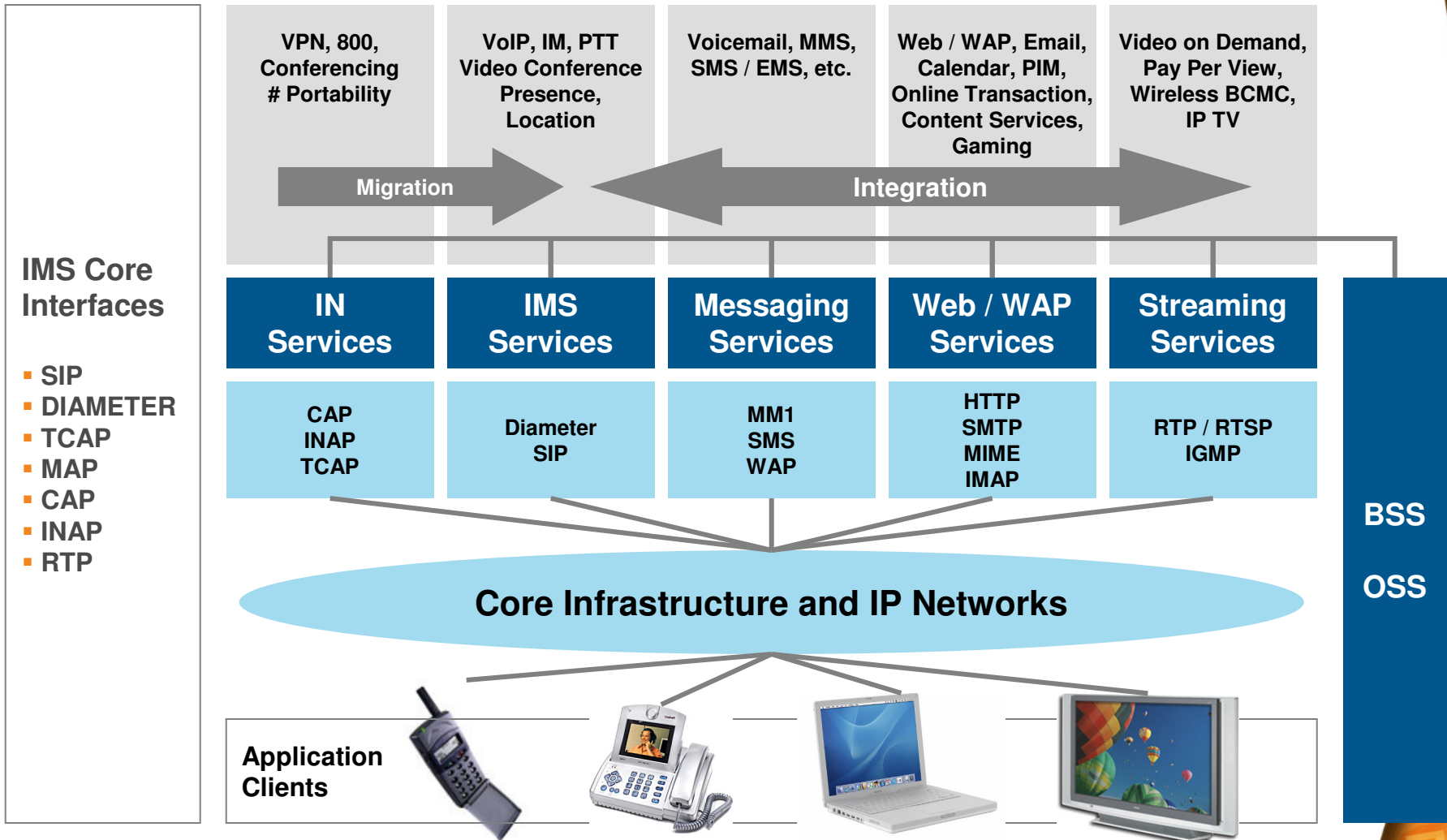| IP Multi-service	ULH / LH
SONET / SDH	Metro DWDM
3G Mobile	Data Center
Consumer	Enterprise

TEM IMS Deployments

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- Pure IMS architecture
  - Logical network elements
  - Separation of signaling and media
  - This is the architecture everyone is moving towards
- All-in-one IMS box
  - Lot of current IMS announcements are for these "pizza boxes"
  - Meets scalability requirements for trial deployments
  - Extension of current NGN products
    - SBC migrating to a IMS server
- CSCF + HSS + Existing NGN components
  - Add in a SIP Server (CSCF), modify a HLR and reuse existing NGN infrastructure
  - Step1 foray for any TEM into IMS

All enablement leads towards an application server where the "killer app" services reside for service provider revenue $ generation

7

Leverage Legacy Services

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| VPN, 800, Conferencing # Portability | VoIP, IM, PTT Video Conference Presence, Location | Voicemail, MMS, SMS / EMS, etc. | Web / WAP, Email, Calendar, PIM, Online Transaction, Content Services, Gaming | Video on Demand, Pay Per View, Wireless BCMC, IP TV |

Migration → ← Integration →

IMS Core Interfaces

- SIP
- DIAMETER
- TCAP
- MAP
- CAP
- INAP
- RTP

IN Services	IMS Services	Messaging Services	Web / WAP Services	Streaming Services
CAP INAP TCAP	Diameter SIP	MM1 SMS WAP	HTTP SMTP MIME IMAP	RTP / RTSP IGMP

Core Infrastructure and IP Networks

BSS

OSS

Application Clients

8

- Low entry level: Field trials
  - Many IMS functions per blade
  - Single chassis solution

- High end: Major subscriber base
  - Many blades per IMS function
  - Architecture will scale up to a multi-rack solution (if needed)

- Need scalable Distributed Fault Tolerant (DFT) architecture to enable roll-out from initial field trial to major subscriber uptake
  - Using the same underlying architecture
  - Deployed equipment & application reuse

IMS network security has to be protected across all external boundaries

- Inter-operator boundaries (Session Border Controllers)
  - TLS - IPsec
  - Protect privacy of billing records
  - Protect security of IMS signaling – SIP spoofing -> fraud, DoSA
  - Back-to-back User Agents

- Subscriber SIP interface (Proxy-CSCF)
  - 100,000's of subscribers each requiring a different AES-128 key
    - Requirement for dedicated Packet Processing blades

- **IMS Service Switching Function (IMS-SSF)**
  - Provides access to existing roaming services (interface to CAMEL)
  - Makes CAMEL service environment look like SIP

- **IMS-SSF can be expanded to support other network needs**
  - Bespoke IMS-SSF can be tailored to map a wide range of operator legacy services into the emerging IMS infrastructure
  - Difficult to realize full interoperability with a COTS solution
  - Need a technology partner with a wide ranging & deep understanding of relevant protocols & network element semantics

- Enables scalability & consolidation of network elements
  - No longer a need for strict individualization of network elements

- Copes with real world network demand for:
  - Content-aware traffic management
    - QoS
    - Billing
  - End-to-end security
  - Interoperability challenges
    - Seamless roaming service expectations
    - UE idiosyncratic "features" supported across the network
    - Dialogue translators between operator domains
  - Working with legacy networks

- Systemic use of common protocols
  - SIP for call control
    - Can be used to handle complex dialogues
  - DIAMETER for handling transactions
    - Primarily to provide Authentication, Authorization, and Accounting (AAA) framework
    - Also proving to be a powerful tool for Billing & WiMAX applications

- Logical partitioning into well-defined functional elements
  - With specified (common) interfaces for a cohesive solution
  - Possible to meld legacy applications into the IMS framework
    - HLR -> HSS

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Compute

Packet Processing
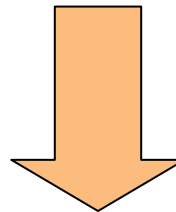
Switching

ATCA

Wireless Access Gateway

Femtocell Aggregator

eNodeB

xGSN

SGSN/GGSN

RNC

App Server

ASN/CSN

CSCF

14

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IMS offers solutions for operator requirements:

- Quick new application development
    - Increases ARPU, Decreases Churn
- Service rollouts without stranded investment
    - Decreases CapEx, Increases ROI

IMS is here to stay!

INTERNET TELEPHONY Conference & EXPO

September 16-18, 2008

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Thank you

mike.coward@ccpu.com