World Class Standards

Evolving the GSM System

IMS and SAE/LTE

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GSM…younger than ever

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GSM after 20 years: Different, but still the same

- Much of the original GSM technology has been or is being replaced
  - Radio: GSM/GPRS -> WCDMA, HSPA, LTE
  - Mobility: 24.008 and MAP -> SAE
  - Services: CS voice, supplementary services and CAMEL -> IMS based services
- But driving concepts have remained
  - The GSM family is a system, not just a bunch of protocols
  - Strong standards produce a well populated ecosystem

Success Brings New Challenges

- Less Homogeneous Set of Players in 3GPP
  - Operators with Differing Business Models
  - Vendors with Differing Backgrounds
- Heavier Legacy support penalty
- Bigger IPR target
- Greater Push for Access Independence in Core
- More Advanced Services are Expected

Finding the Right Balance

Sweet Spot

- **Manageable Complexity**
- **Manageable Interoperability**
- **Good Ecosystem**

Too Few Options — Too Many Options

- **Simple/Inflexible**
- **Heavily Optimized**
- **Fits Few Operator's Needs**

- **Complex/Expensive**
- **Interoperability Difficult**
- **Market Fragmentation**

Not One Balance, But Three

Services	IMS (IP Multimedia Subsystem)
Mobility	SAE (System Architecture Evolution)
Radio	LTE (Long Term Evolution)

IMS – Status

- IMS is an environment for deploying Services
- IMS originally envisioned as a way to utilize expected bandwidth
- IMS is access and IP transport independent
- IMS now the basis of multimedia telephony
- 3GPP committed to a single IMS specifications
- Several workshops held to promote reuse of IMS in various industries
  - April 3-4, 2002 (Toronto, Canada) – 3GPP2 to reuse IMS
  - March 30-31, 2005 (Washington, DC) – TISPAN to base NGN R1 on IMS
  - Sept 28-29, 2006 (Palm Springs, California) – Cablelabs to use IMS
- Discussions ongoing on
  - Including IMS related activities in 3GPP (Common IMS)
  - Opening up the IMS requirements process
- GOAL: Ensure there is a single set of IMS Specifications

IMS - Challenges

- Avoid IMS Fragmentation – Engage all Industries in IMS specification
- IMS Applications – Ensure ease of developing 3rd party IMS applications
- IMS and IMS Application Interoperability – Test Specifications Needed

SAE – Status

- Upgraded core network needed for LTE
- Requirements
  - Improvement in latency, capacity, throughput, cost/bit
  - Simplification of the core network
  - Optimization for IP traffic and services
  - Support roaming and service continuity to non-3GPP access technologies
- Differing views
  - Optimized for LTE/3GPP Family vs More access independent
  - Centralized vs Distributed Functionality
- Study Phase slow to complete
  - Workable Compromise finally achieved
  - Normative work finally started

SAE – Challenges

- Meet LTE Timelines
- Maintain the System Concept
- Avoid Market Fragmentation
- Provide a transition path for other technologies to LTE

LTE – Status

- Drivers
  - Improvements in spectral efficiency, user throughput, latency, cost/bit
  - Simplification of the radio network
  - Efficient support of packet based services: MBMS, IMS, etc.
- Minimum performance targets met
- Normative Work Progressing Well
- Early versions of LTE concept demonstrated at 3GSM Congress

LTE – Challenges

- Meet the minimum performance goals
- Meet the timelines
- Keep device complexity low and battery life long
- Additional performance enhancements can always be specified later

Conclusions

- How to Continue the GSM Success
  - Continue to specify “Systems”
  - Produce Quality Technical Standards
  - Make the hard compromises necessary to avoid market fragmentation
  - Embrace the reality of more diverse business models and interests