



Collaboration on Implementing an All-IP Mobile Network

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Outline

- Mobile Operators Roadmap to IP?
- SIP and Rich Call
- Business Case
- mmO₂-Nokia Collaboration
- Conclusions

mmO₂ High Level Roadmap

GPRS

- **Optimise current GSM / GPRS implementations today**
New services & applications being launched with GPRS

3G R3

- **Launch 3G networks starting in 2002**
 - New revenues due to large number of new services & applications
 - Cost reduction due to use of ATM technologies, replacing TDM

3G R4

3G R5

3G R6

- **All-IP networks in “evolution” phases, starting in 2004**
 - Significant number of new services & applications based on real time IP, such as mobile multimedia over IP
 - Significant cost reductions due to use of IP technologies all over the networks

All roads lead to IP !

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Major Paradigm Shifts

- **Wireless world and IP World are converging**
 - Move to All-IP mobile networks
 - Significant changes to everything, from devices to IT systems
- **We want to go up the value chain and offer mobile multimedia services**
 - No more voice-only or bit-pipe scenarios
 - Finding the compelling applications and retaining the value are major challenges
- **Regional / Global networks and services**
 - Voice roaming was easy!
 - How about location-based, personalised m-commerce service offered on a pan-European basis!

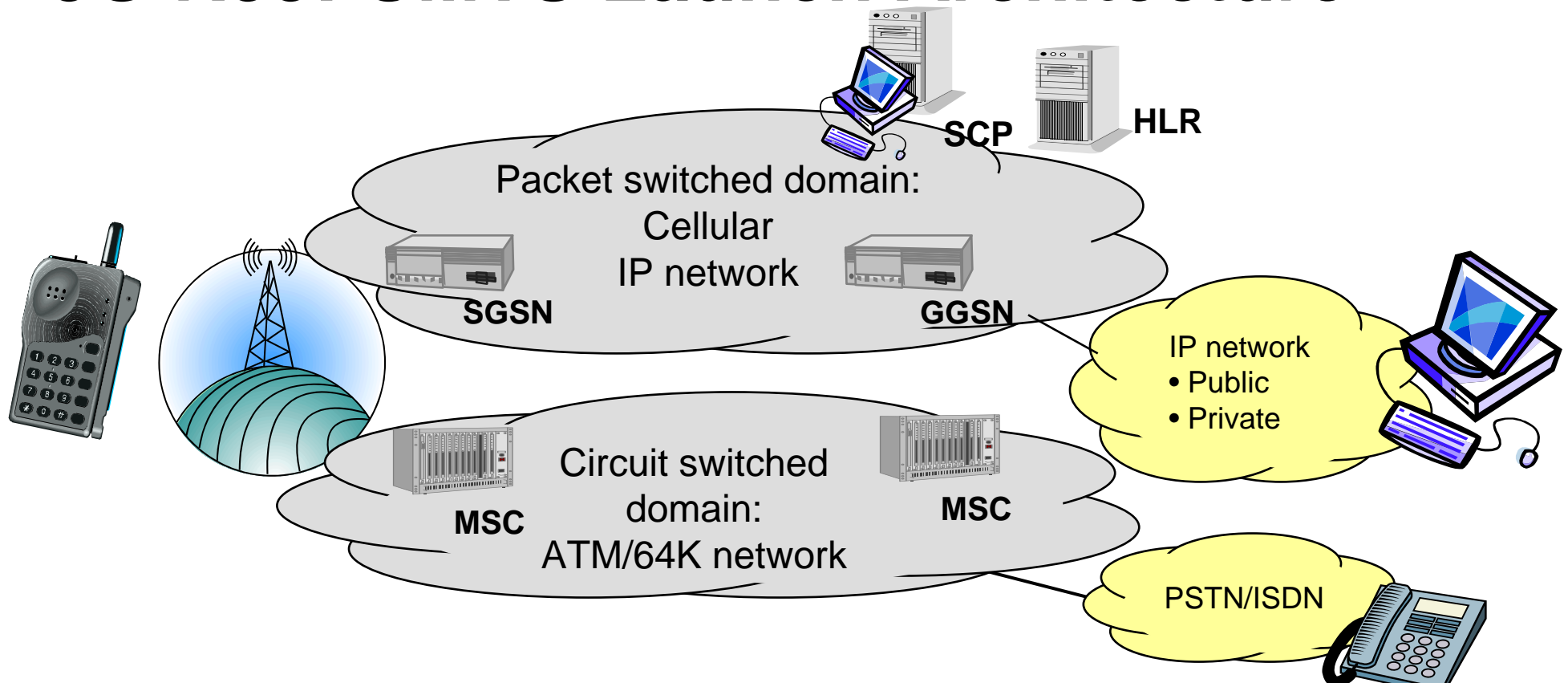
More Revolution than Evolution

Why do we need IP?

- **Deliver high-value, high-margin mobile multimedia services**
 - IP is the protocol of choice for application developers
- **Faster time to market for new services**
 - tap into internet innovation life cycle
- **Major cost reduction**
 - use IP technology widely to replace expensive circuit switch infrastructure

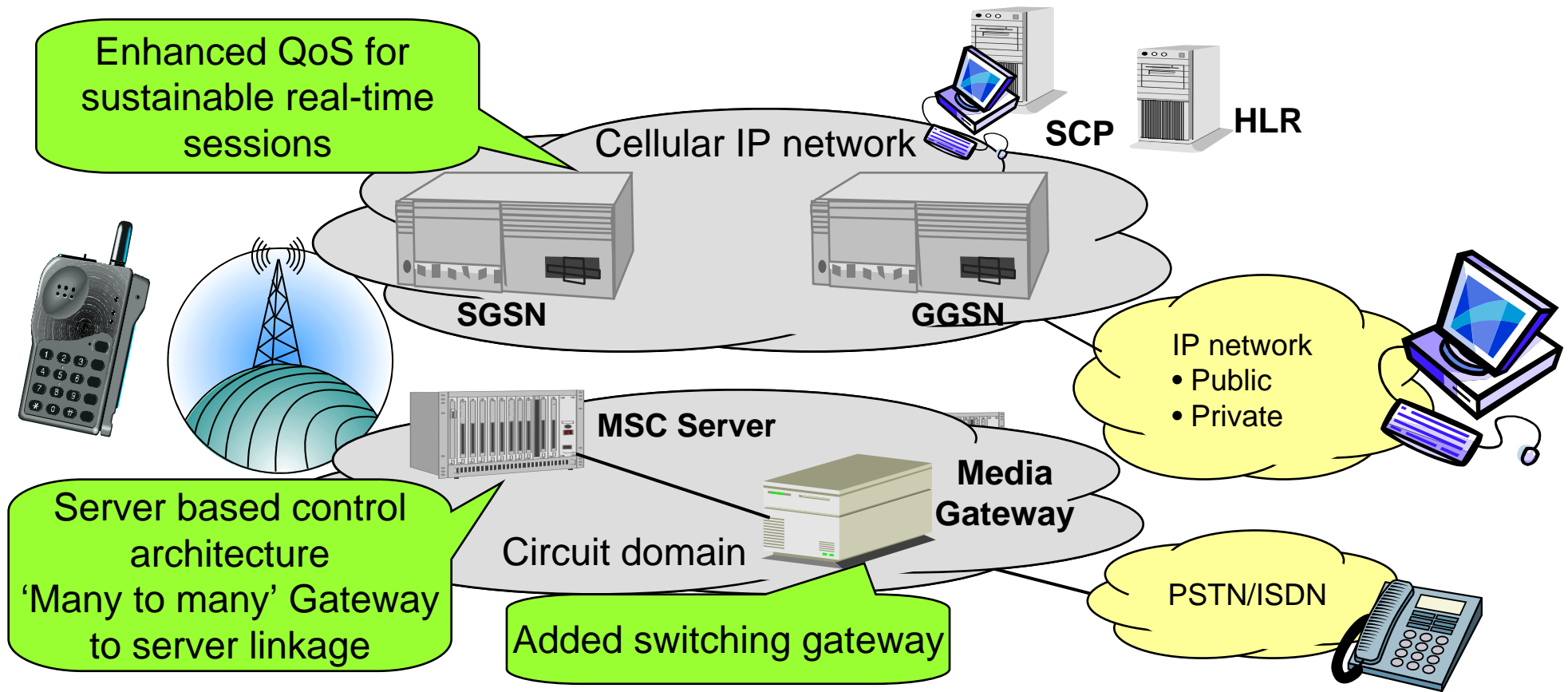
**Ride on Innovation Cycle up
and Cost Curve down**

3G R99: UMTS Launch Architecture



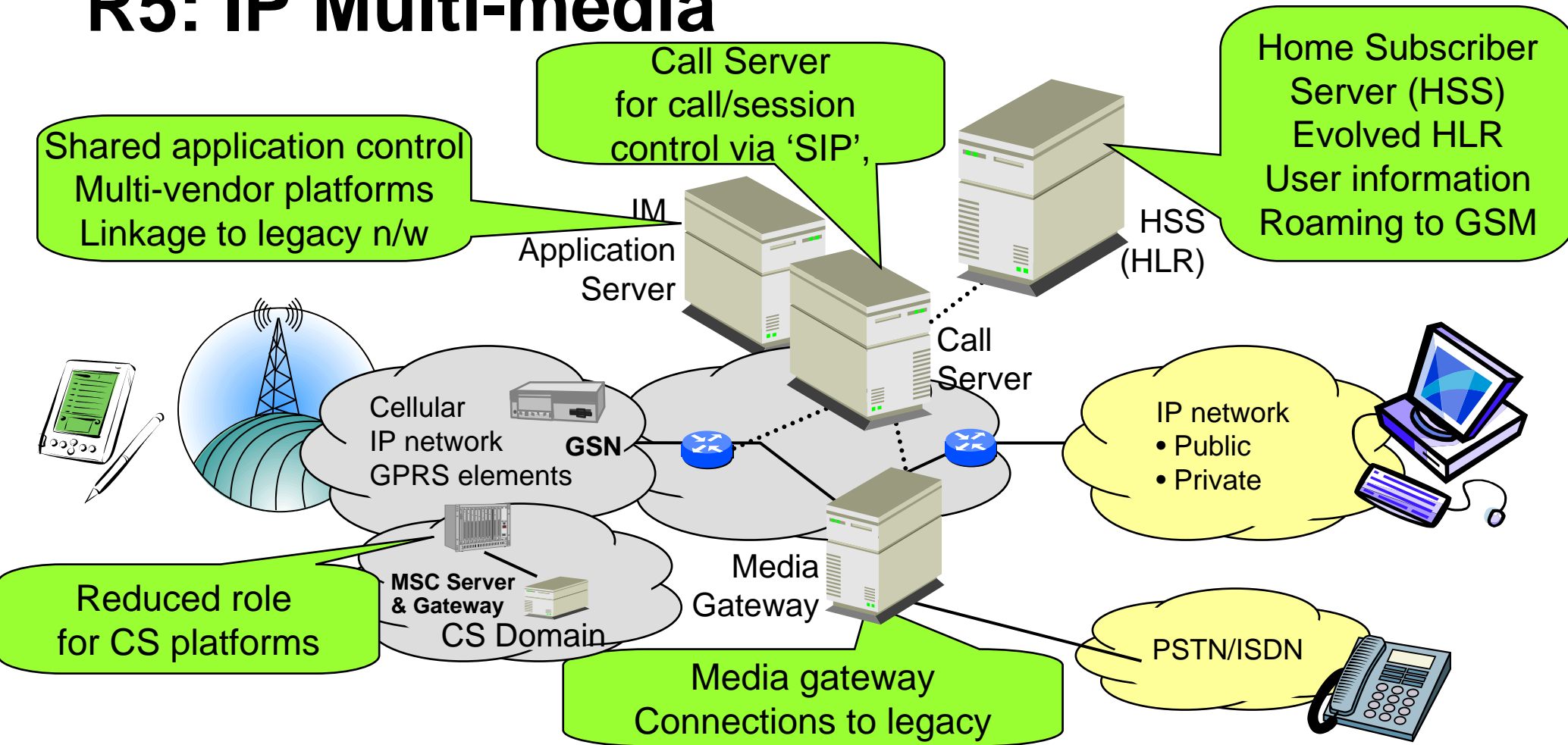
- Standards complete and corrections tailing off
- Equipment coming on-stream,
- Leverages GSM core: technology and roaming, reduced launch risk
- Handset availability still an issue

R4: Enhanced UMTS Architecture



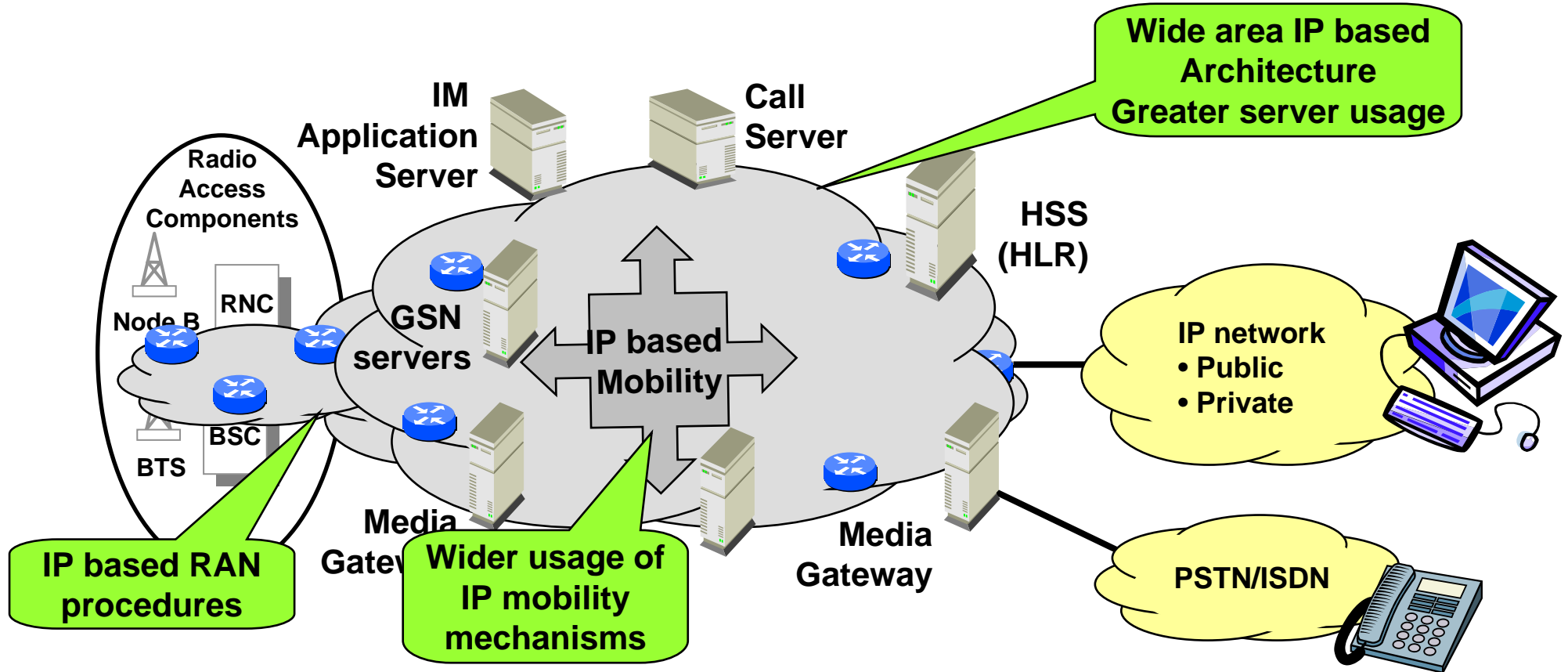
- Major enhancements to PS; some enhancements to CS
- On many vendors current roadmap or offering
- Potential launch platform depending on timeframe

R5: IP Multi-media

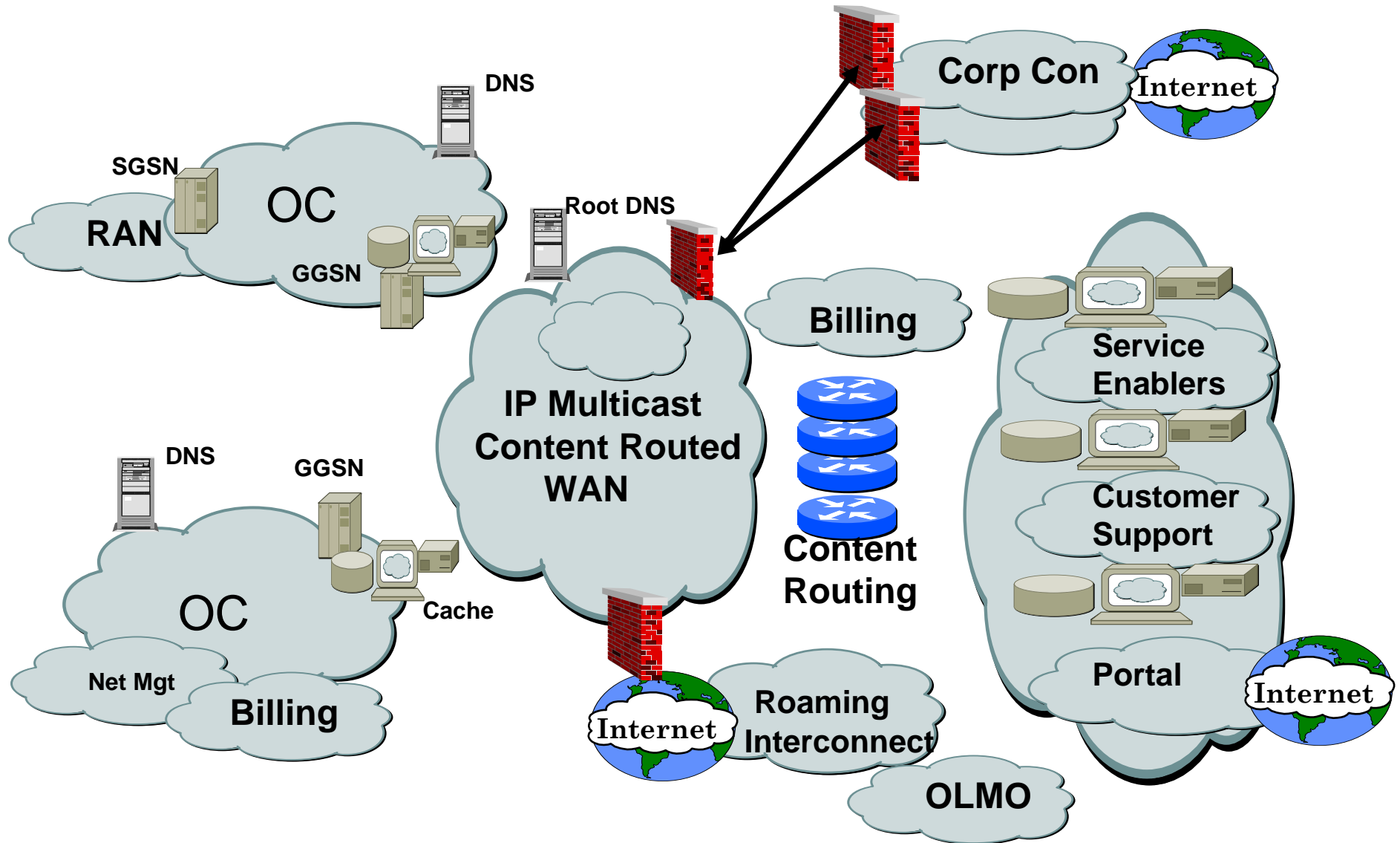


- Supports real time Multi-media IP applications
- Major change to infrastructure
- Significant cost savings & revenue increase

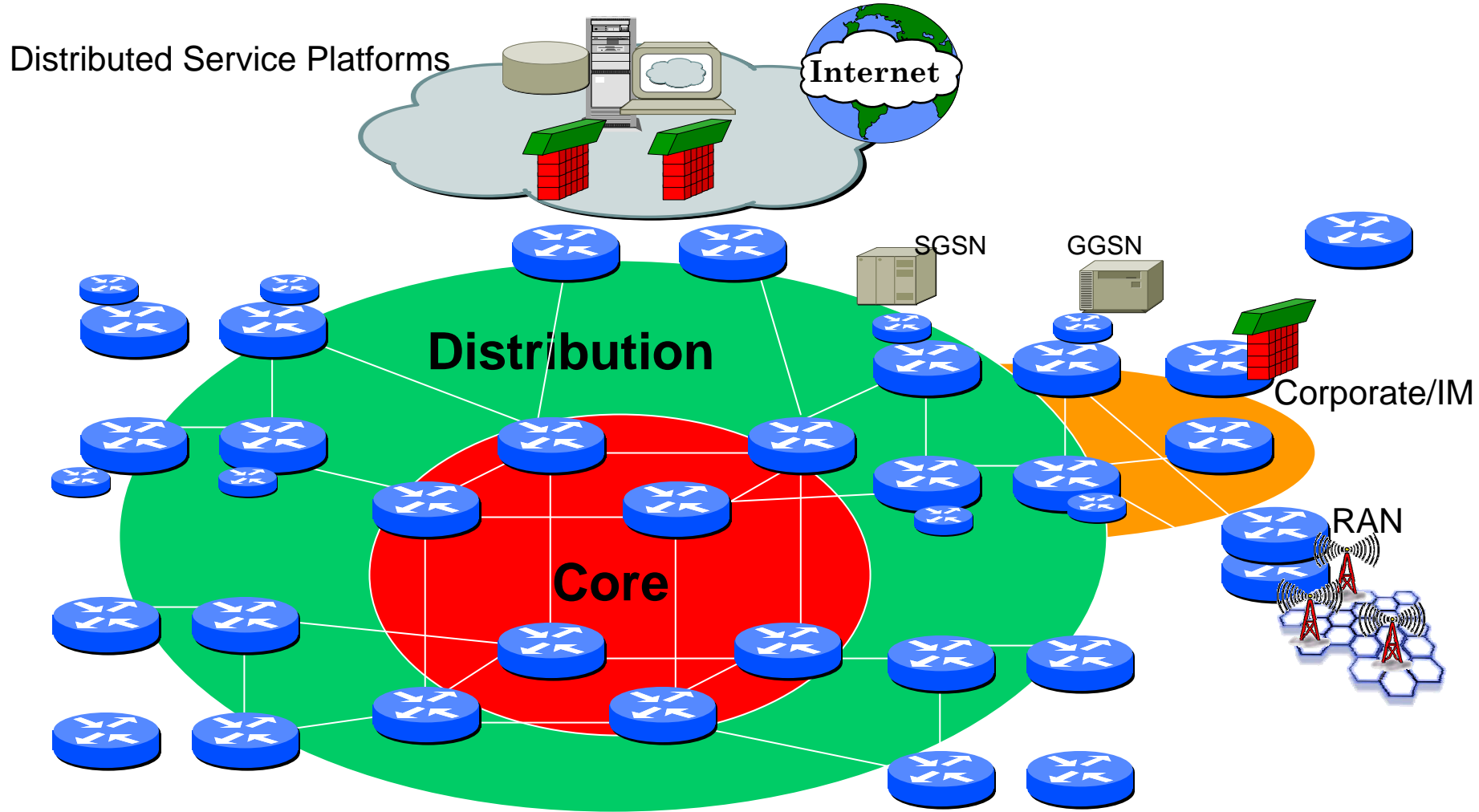
Target Core Network Architecture



IP Transport Architecture



IP Transport Architecture



Major Technology Challenges for All-IP Mobile Networks

- **IP Quality of Service**
- **IPv4 and IPv6**
- **Efficiency over the air (IP header compression)**
- **IP Security**
- **IP Charging**
- **End-to-End Service management**



SIP and Rich Call

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Session Initiation and Control

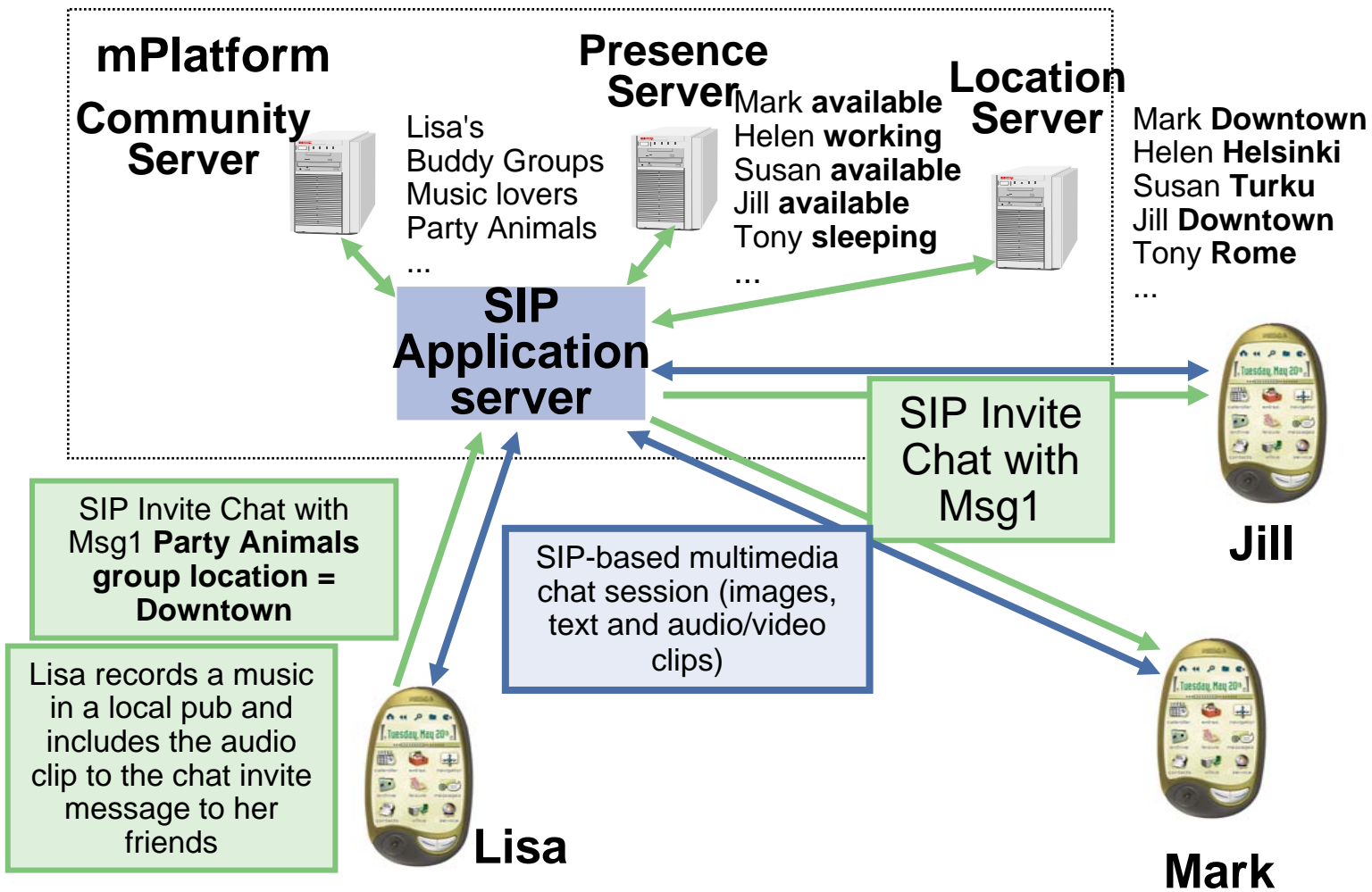


- Easy creation of services;
Services will be created with Internet-based protocols, enabling fast launches and massive 3rd party service creation
- Parties can set up **dynamically** one or more media streams, involving different applications
voice, text chat, video
Whiteboard
- Caller can include additional information in the session set-up
- Ease of use increases usage

Multimedia Chat service

Multimedia Chat

SIP



Multimedia Chat service

Business benefits:

- revenue generated by all the participants
- one session can generate many different charging actions (e.g. checking of location and presence of people)
- Users are hooked up to service generating a lot of traffic in relatively small portions
- can be run as a background session



Fastest time to *margin* market in 3G

All-IP Core Network Business Case

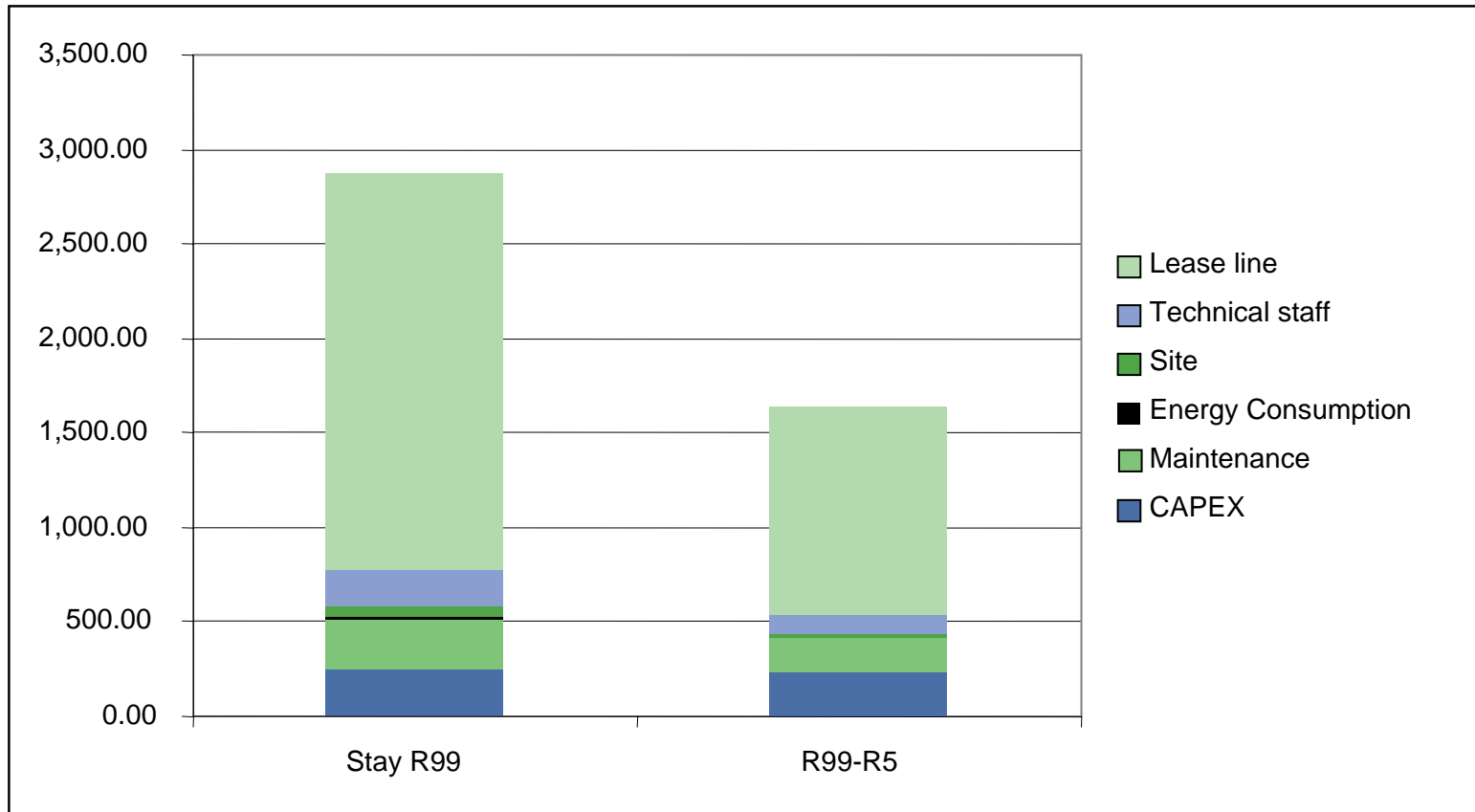
Business Case

- How much does this mean in money?
- Two scenarios are compared for a hypothetical GSM operator:
 - 1) launch and stay with R99
 - 2) evolve via R99 to R5
- Assumptions:
 - WACC (Weighted Average Cost of Capital): 12%
 - All core network transmission are leased lines
 - Studied period: 2000-2011
 - Subscriber Numbers :

	Pre-op	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011
3GGP Operator	4,899	7,376	8,499	9,199	9,499	9,501	9,500	9,500	9,500	9,502	9,501	9,502	9,500

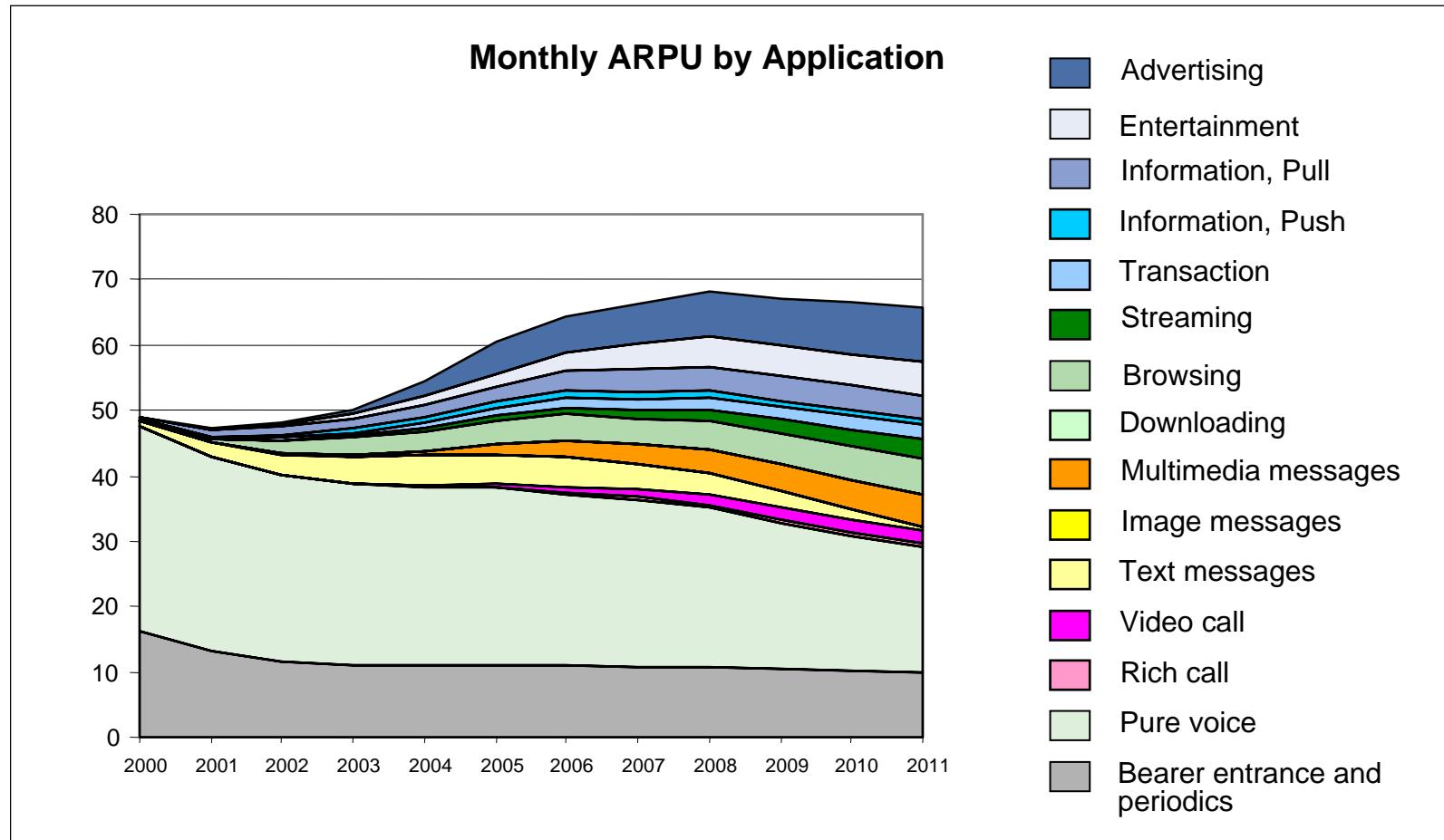
Cost Effect of Evolution to All IP Core(R5)

Total Cost of Ownership (Million €)



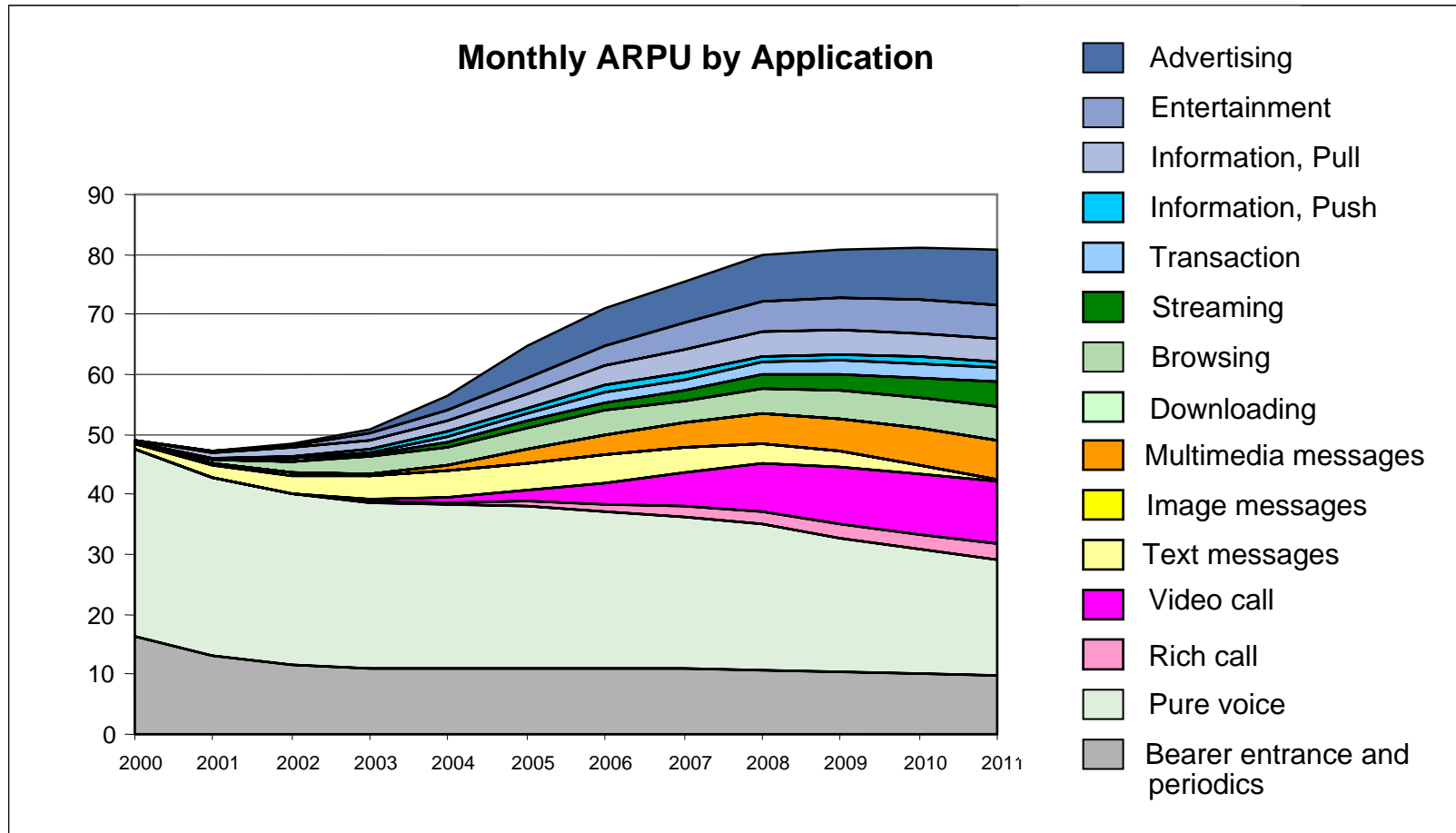
- Cost of Ownership is 43% lower with the All IP Core than CS Core.
- Saving up to 1231 Million € (NPV 1012 Million €) for the studied period.

Revenue and Margin of Stay with R99



If the operator just stays with R99 the price erosion will eventually cut the ARPU

Revenue and Margin of Evolution to All IP Core (R99-R5)



All-IP core increases revenue with new services and increased usage of the existing ones.



mmO₂-Nokia All-IP Collaboration

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Phases of the Collaboration

- Phase 1, 2Q/01
 - Concept verification
 - Basic technologies (SIP, IPv6, header compression etc.)
 - Service examples, Rich-calls
- Phase 2, 1-2Q/02
 - Service creation and Application Programming Interfaces
 - Business case evaluation
- Phase 3, 4Q/02 (partially still open)
 - Commercial equipment, pre-commercial software

Objectives of the Phase 1

- This phase 1 experimental system is build to help Nokia and BT Wireless exploring the benefits of an All-IP mobile Multimedia end-to-end network solution for 3G services based on SIP, IPv6 and Header Compression
- The experimental system demonstrates proof of concept for Business & Technology proposition
- The experimental system helps to examine potential hurdles to new rich services and how they can be eliminated, based on the latest 3GPP International Standards

Phase 1

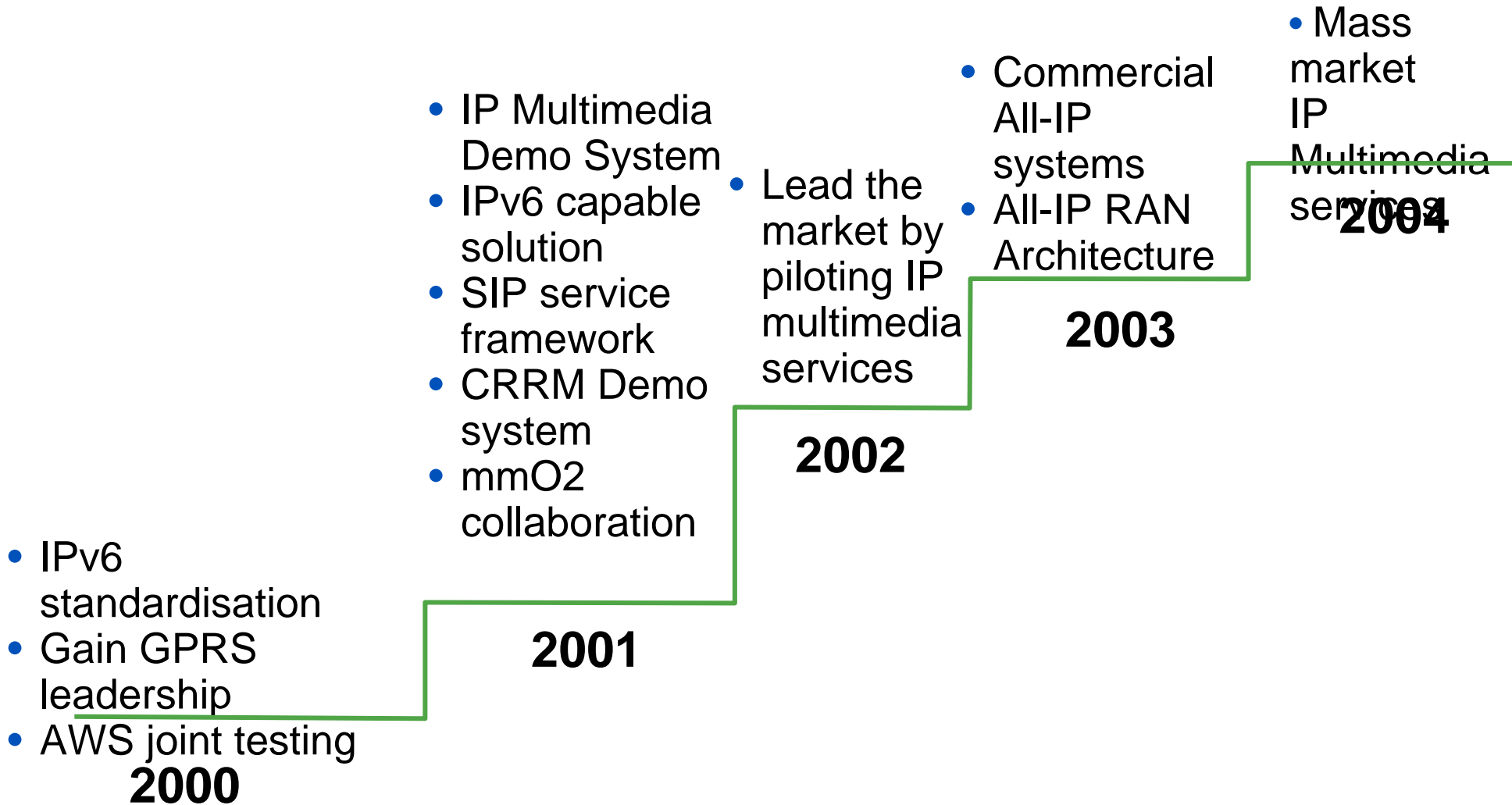
Main Functionality

- Mobile Originated and Mobile Terminated IP Telephony calls
- Voice calls from/to PSTN
- IP Telephony, Streaming and Web browsing applications
- SIP based Call (session) Control
- IPv6 support in MS to network interface
- QoS support
- Supplementary services
- IPv4/IPv6 Header Compression

Objectives of the Phase 2

- Implement the infrastructure to as near standards as possible
- Categorise applications into:
 - 1) migration from existing domain (e.g. call forwarding) and
 - 2) new enabled types (e.g. click-to-dial)
- Map new enabled applications on the pilot system for physical problem solving.
- Clarify and identify APIs required
- Feed to business cases and Standards activities.

Nokia Milestones to All-IP Mass Market



Conclusions

- Speed of development in IP world much faster than we are used to
- All-IP core network brings substantial benefits to operators :
 - 1) new revenue
 - 2) cost savings
- mmO₂ and Nokia are collaborating to get experience in technology and services.