Mobile Networks Migration to NGN

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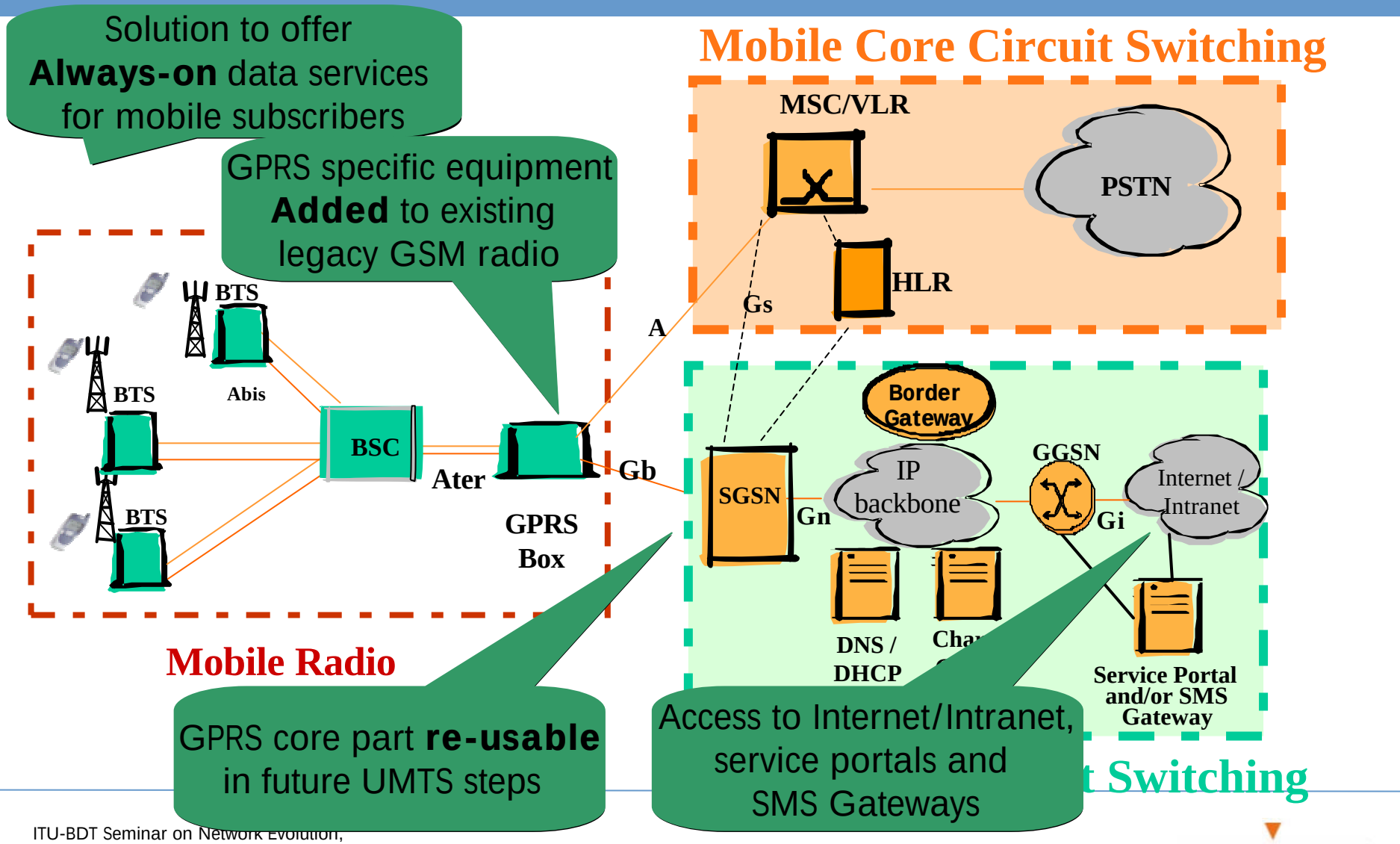
Why a Next Generation Network for Mobile Networks ?

- Same drivers as for fixed access networks
  - Technological evolution
  - Demand for new services
- Same constraints apply as for the fixed networks
  - Continuity of services offered to end-users
  - Inter-working between new and old technologies
  - Cost control of the migration process - even more critical !
- Mobile networks specific issues
  - Migration driven by 3G mobile radio access technology (UMTS)
  - Heavy standardization effort for mobile migration (3GPP)
  - Focus on openness towards 3rd party providers for new services

GSM based networks evolution

- 2G: GSM is the leading technology
  - 777.6 Million subscribers by end Nov.02 (GSM Association)
    - 70% of installed base world-wide
  - Growth opportunities in many countries
- 2.5G: GPRS is a key transition technology
  - Mass market launch already began in 2002
  - Upgrade with existing GSM (2G) radio access or enhanced GSM (EDGE technology) access
- 3G: UMTS
  - Enhanced capability radio access but…
  - Essentially new services
    - Multimedia Communication, Enhanced Messaging, Location based Services, Online gaming…
    - Optimised voice services over packet transport

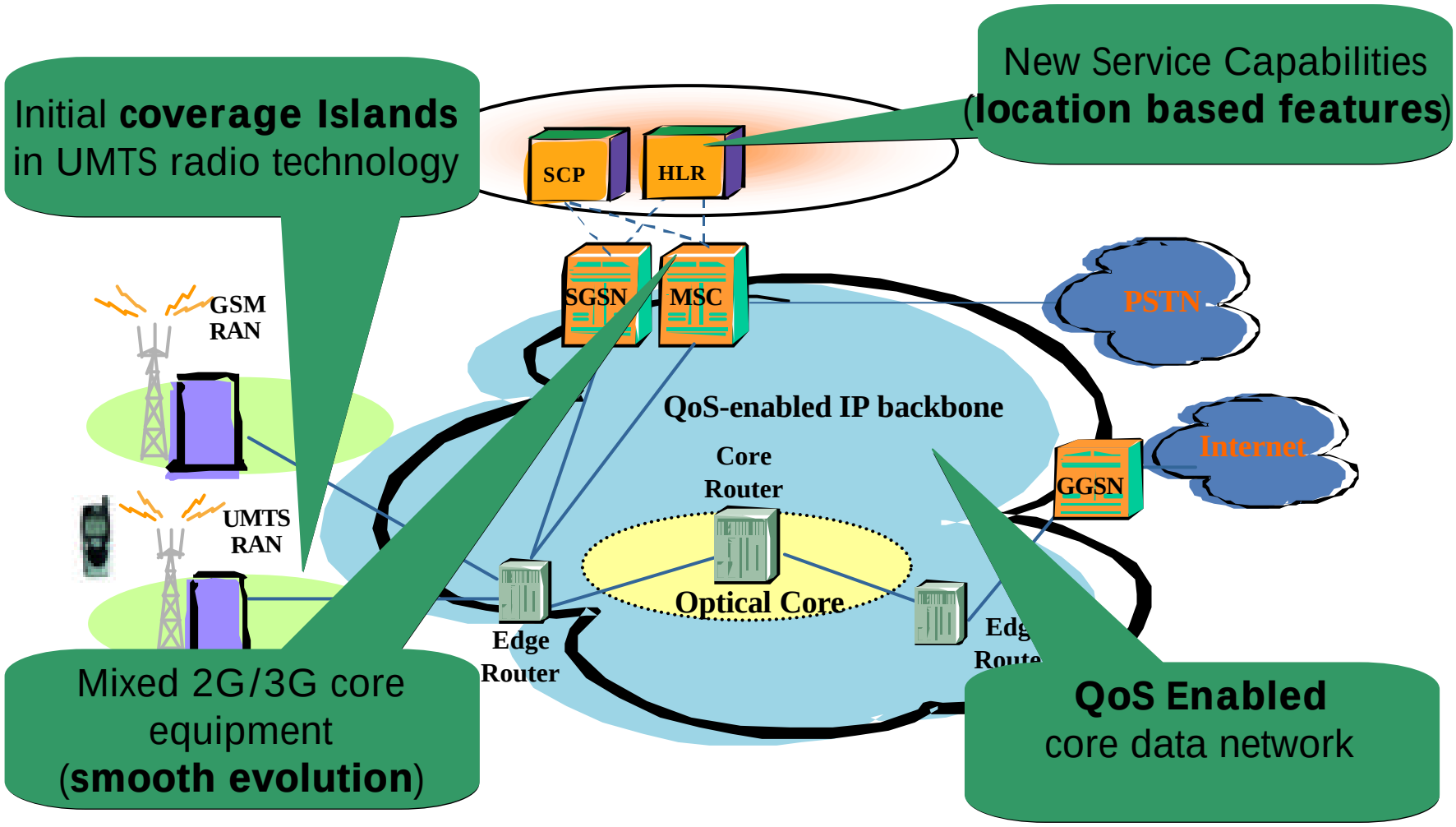
Introduction of GPRS Packet Services



Introduction of GPRS Packet Services

- General Packet Radio Service (GPRS) introduced as a solution for offering an always-on access mode to data services for mobiles
  - Optimized use of the scarce radio resource
    - Share the bandwidth for data services between users of a given radio coverage zone (cell)
    - Radio resources are not monopolized during idle periods
- No modification of the existing radio and core infrastructure for voice services
  - GPRS adaptation equipment added to existing radio infrastructure
  - GPRS specific core infrastructure re-usable in further evolution steps
- GPRS service platform
  - Offers access to Internet/Intranet data networks and to service portals (first step towards future UMTS services)
  - Optimize provision of 2G data services like Short Messages (SMS)

Introduction of UMTS Radio Access Networks



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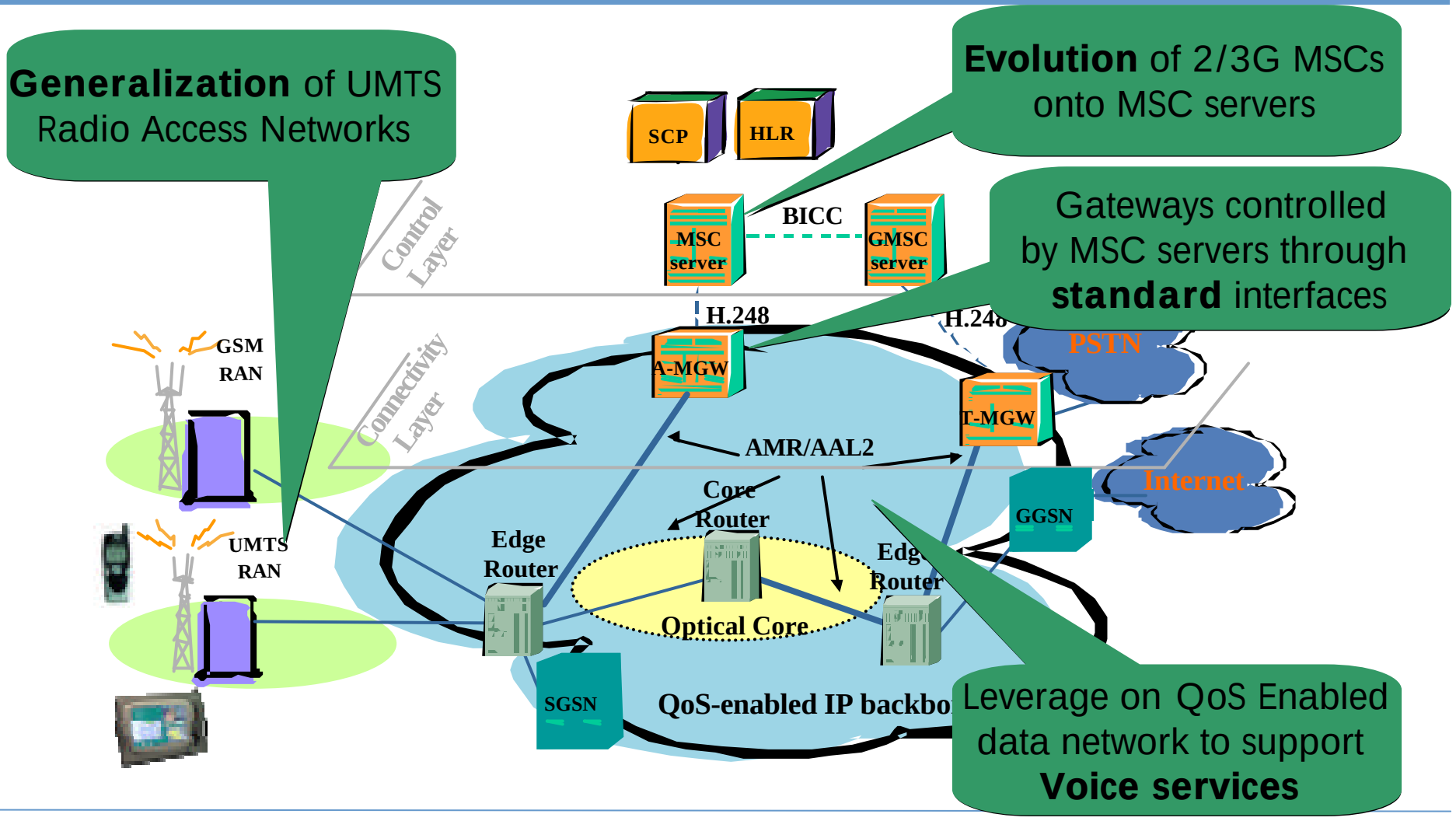
Introduction of UMTS Radio Access Networks

- Initial introduction of 3G UMTS radio access network (UTRAN) as coverage islands
  - Rest of the network coverage kept with legacy GSM 2G/2.5G radio
- Combined 2G/3G HLR, MSC, SGSN and GGSN network equipment support both types of access (Alcatel's approach)
  - Smooth upgrade of early 2G equipment
- Backbone data network introduced with QoS features
  - Edge router concentrates ATM streams coming from UTRAN
    - Front-end for both packet and circuit streams
    - Evolves into an access gateway in future evolution steps
  - Core router switches IP traffic with MPLS/DiffServ support
- New service capabilities with location based service support
  - Enhanced intelligent network interfaces for mobiles towards SCP

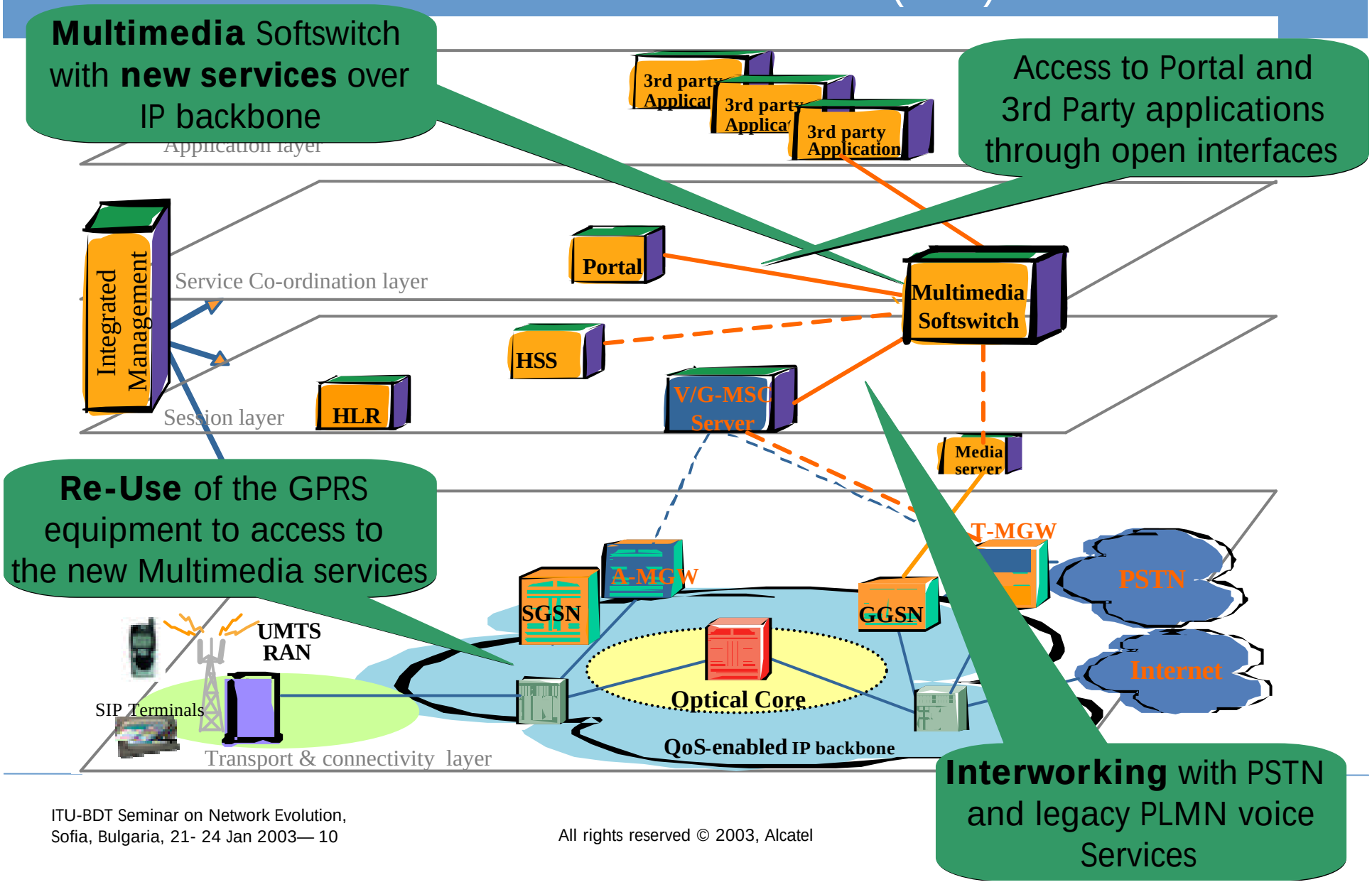
NGN in Circuit Switching Domain



NGN in Circuit Switching Domain

- Generalization of UTRAN access
  - Voice coming in packet mode (ATM/AAL2) from the access network
- Leverage on the QoS-enabled IP backbone to support voice services in NGN way
  - Keep voice in original packet mode for mobile-mobile calls
    - Avoid unnecessary and quality decreasing encoding/decoding
  - Evolution of 2G/3G integrated MSCs into MSC servers (Alcatel's approach)
  - Use of the H.248 open interface to control Media gateways
- Media gateways for Access and Trunking functionality
  - Based on the same platform as the Edge Router
  - Mediation device for voice applications over ATM/AAL2

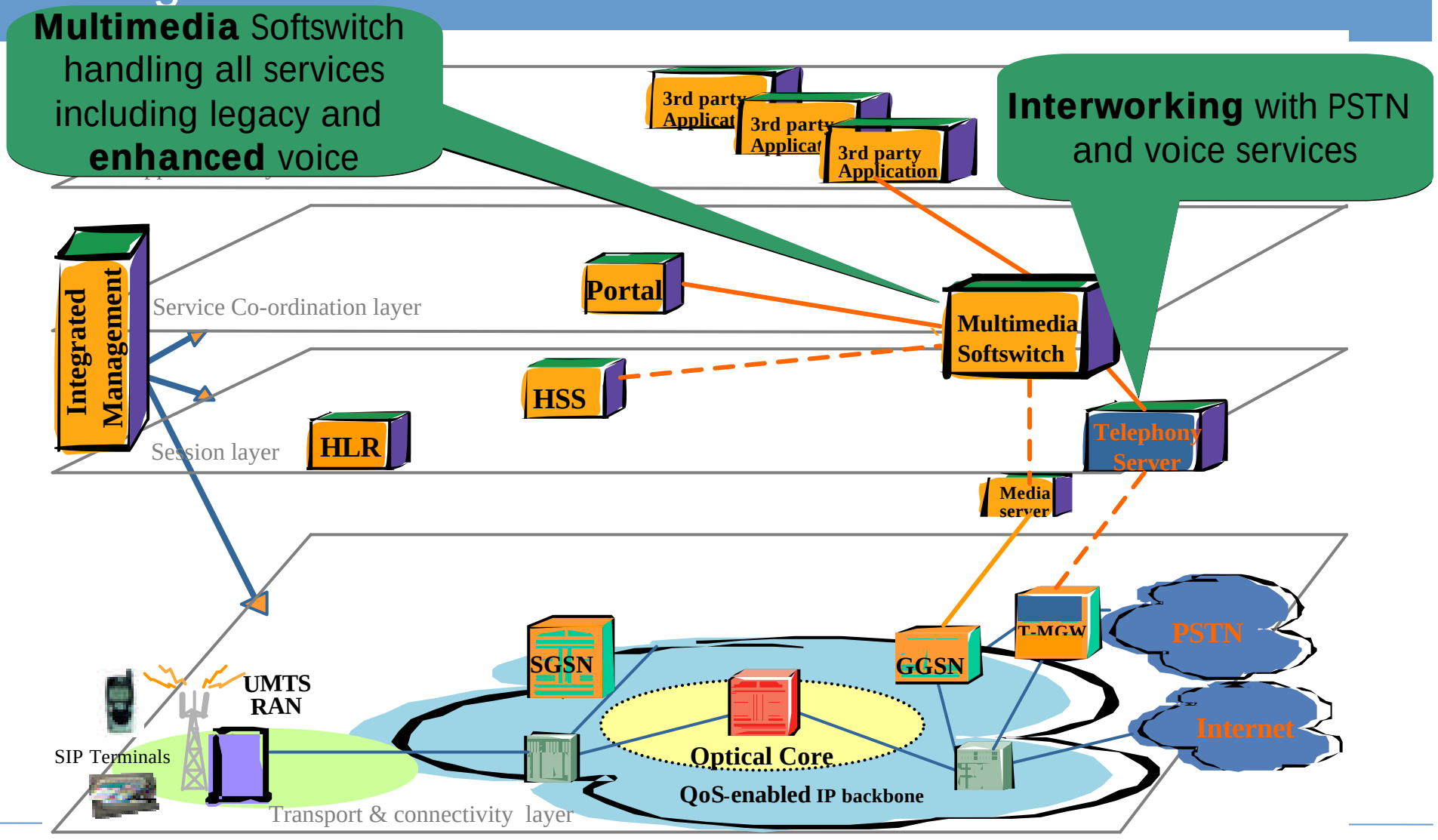
Introduction of IP Multimedia Service (IMS) architecture



Introduction of IP Multimedia Services (IMS)

- IMS is the operator solution to differentiate from commodity-priced best-effort data services
  - Offering end-to-end Quality of service
  - Network operator as the broker of added-value services
    - Services can be offered by 3rd party service providers
  - New business model unlocking new revenue sources
- Multimedia Softswitch providing new services
  - Re-use of the currently deployed packet switched IP backbone and network equipment (SGSN and GGSN)
  - New NGN signaling with new type of end-user terminals
    - SIP protocol with proper extensions to ensure end-to-end QoS per service invocation
  - Open interfaces towards 3rd party service provider
  - Inter-working with voice services through interface with MSC Server

Target All-IP Multimedia Architecture



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Target All-IP Multimedia Architecture

- Real growth phase of IP Multimedia Services
  - Technology matures and legacy networks begin to die out
  - Widespread user acceptance of enriched and innovative services
- Migration of the traffic from the circuit switched domain into the packet switched domain
  - Leverage on the capabilities of a unified data transport network
  - Partial re-use of media gateways previously introduced to support IP Multimedia trunking functionality
- Possible advantages
  - Unified services around multimedia (e.g., premium Voice over Packet with 16Khz and higher sampling)
  - Rationalization of investment and maintenance effort
  - Network wide solution providing on demand, guaranteed QoS

Conclusions

- Migration of mobile networks to NGN will likely be driven by the enhanced capability of 3G UMTS access networks
  - Standardization process more elaborated as for fixed networks case
- Speed of this migration will depend on widespread acceptance and appropriation of new services by end-users
  - But also on the maturity of the newly introduced technologies
- Challenges to all actors
  - Network equipment vendors: provide cost-effective solutions based on a smooth network migration
  - Network operators: master the roll-out of new technologies in a controlled and cost effective way
  - Service designers: develop attractive services needed by the largest end-user community (not technophile gadgets)

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Thank You !
Questions ?