IPv6 IN FIXED AND MOBILE NETWORKS

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IPv6 as the world catalysts

- Common & More Flexible Service bundling

- Millions of different peering options and levels of quality

- Flexible way of accessing and distributing content

- New revenue opportunities

- Dynamics of new IP Multicasting

- IP streaming to dispersed audiences

Evolution of a „IP World"

- **Migration from circuit switched applications to wireless internet**
  - —Terminals need IP addresses
  - —Multimedia applications
- **Convergence of wireless and wireline services**
  - —Common infrastructure/services
- **Higher bandwidths available**
  - —Greater need for differing QoS
  - —Possible to tolerate more signalling
- **Switch from call-oriented to always connected model**

- **Desire for push services**

Subscriptions worldwide (millions)
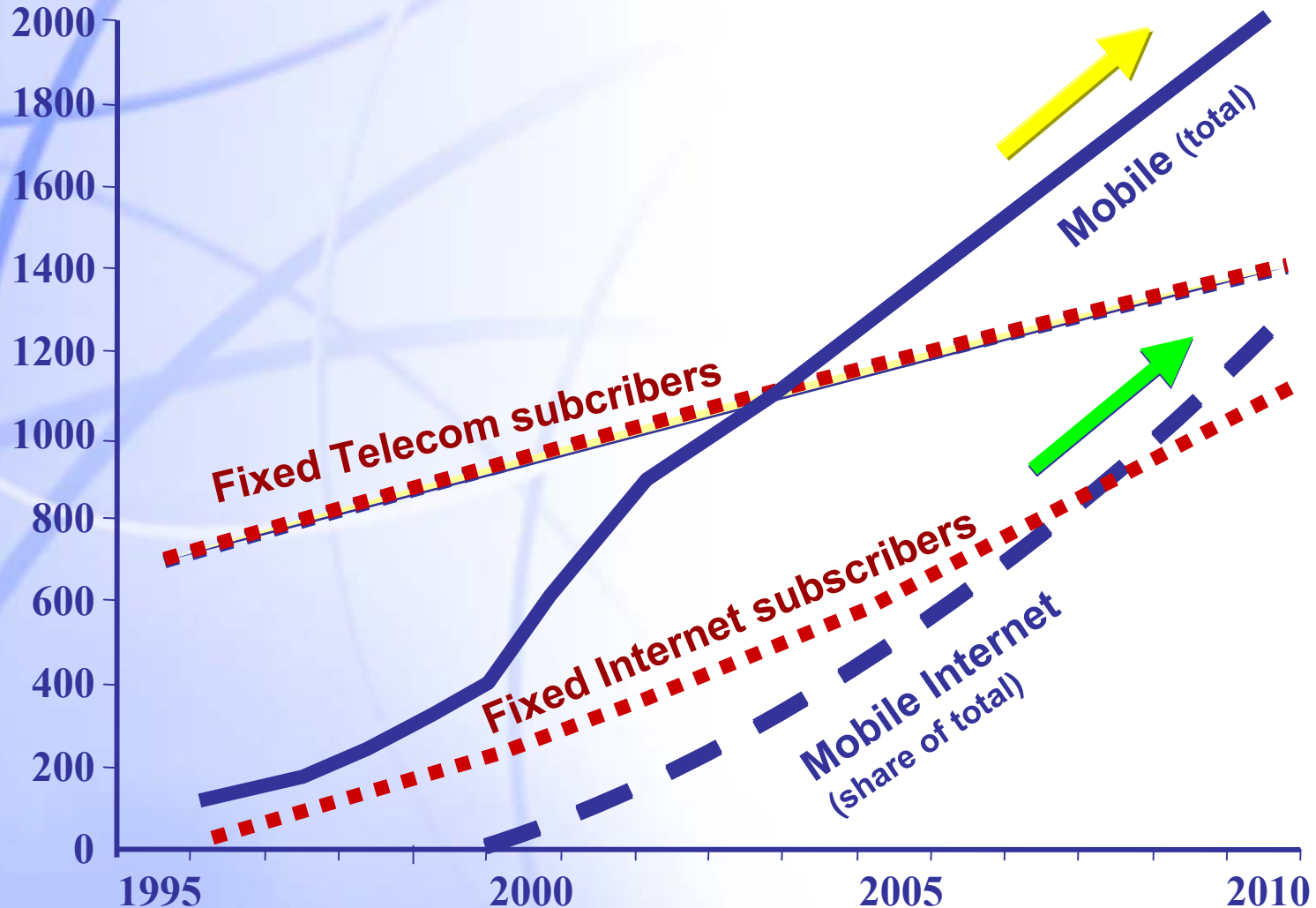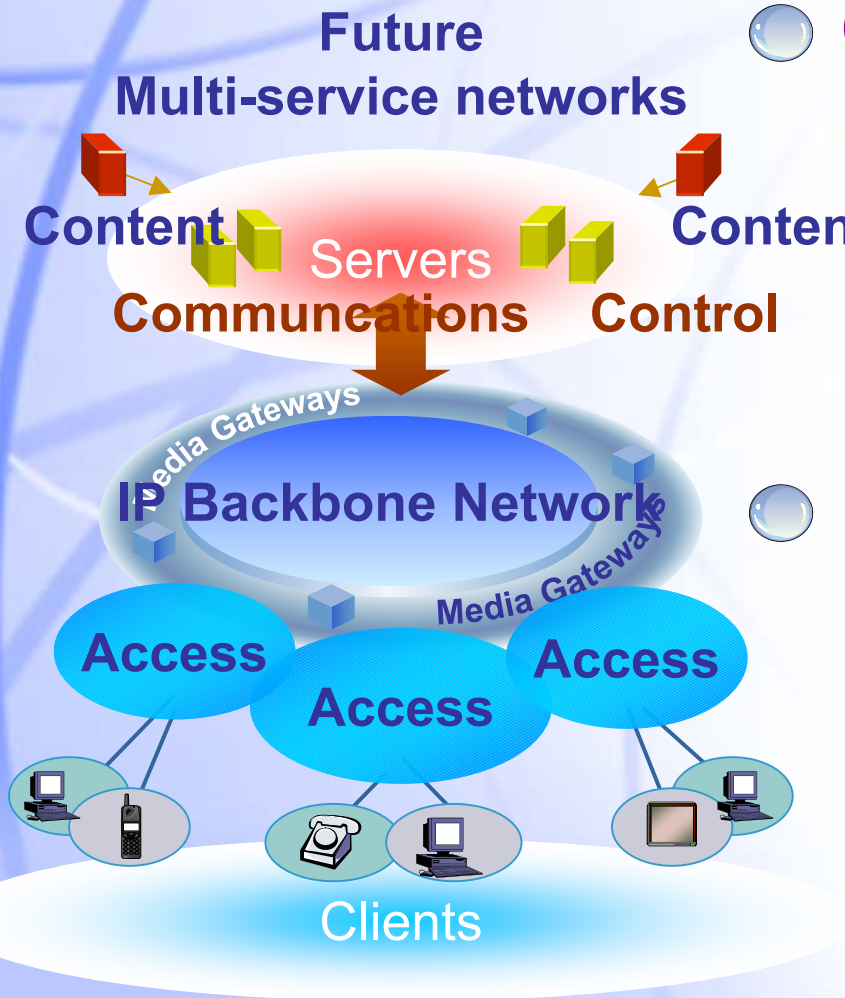
Benefits of IPv6

For end users / companies

- Autoconfiguration management:
- Embedded encryption support and authentication
- Embedded mobility
- Embedded multicasting
- Internet Provider selection
- Efficient packet processing in routers
- Real-time support
- Protocol extensions for proprietary solutions

For ISPs / Operators

- Autoconfiguration Management
- Efficient address allocation
- Improved multicast management
- Renumbering possible
- Efficient network route aggregation
- Efficient router packet processing
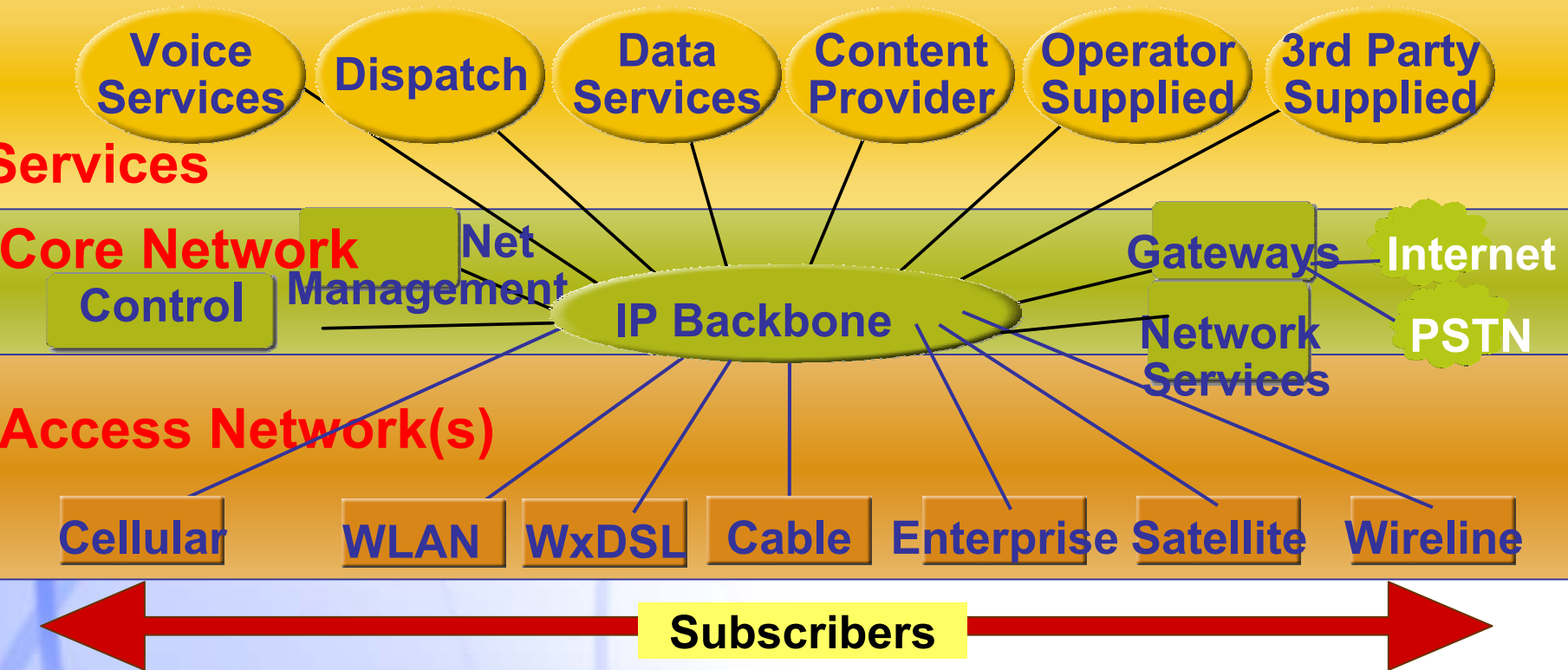- Real-time support

MAJOR NETWORK CHANGE

Future
Multi-service networks

Content — Servers — Content

Communications Control

Media Gateways

IP Backbone Network

Media Gateways

Access   Access   Access

Clients

○ **Circuit Switched**

—older technology

—voice focus, low latency

—POTS, ISDN

○ **Packet Switched**

—new, data focused
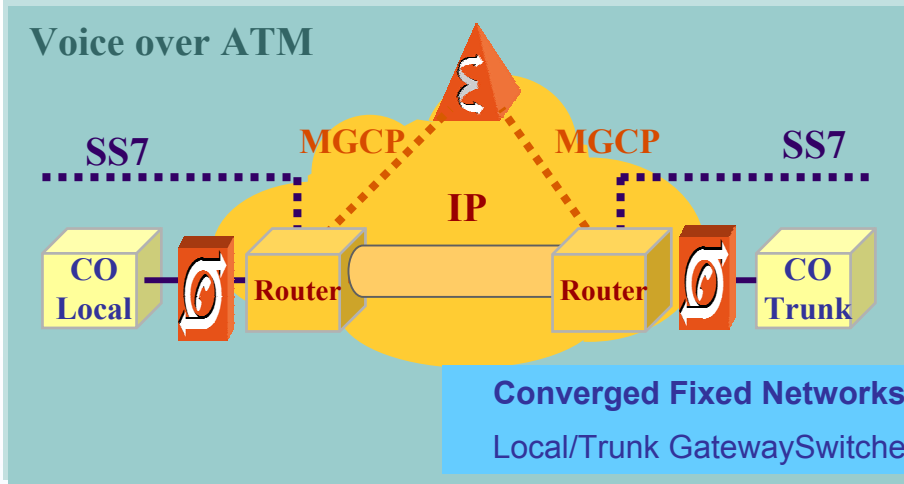
—the future

—Ethernet, IP, ATM

IP Unifies NETWORKS

Services

- Voice Services
- Dispatch
- Data Services
- Content Provider
- Operator Supplied
- 3rd Party Supplied

Core Network

- Control
- Net Management
- IP Backbone
- Gateways
- Network Services
- Internet
- PSTN

Access Network(s)

- Cellular
- WLAN
- WxDSL
- Cable
- Enterprise
- Satellite
- Wireline

Subscribers
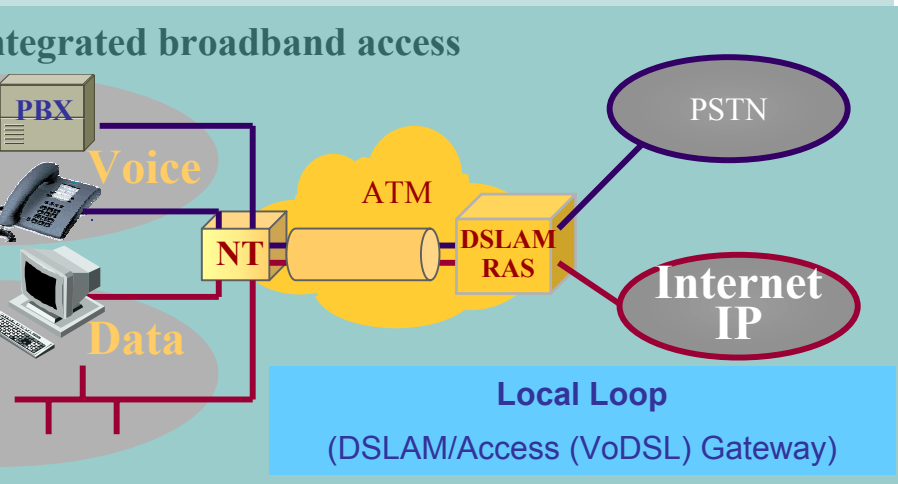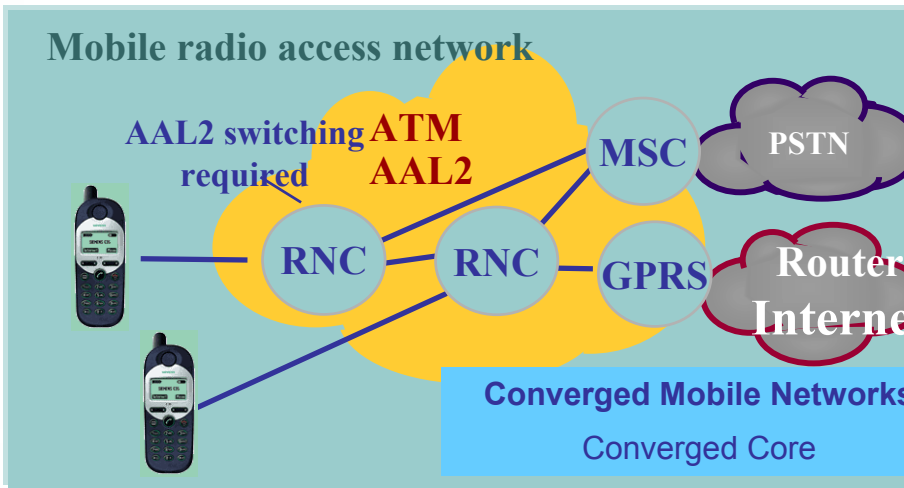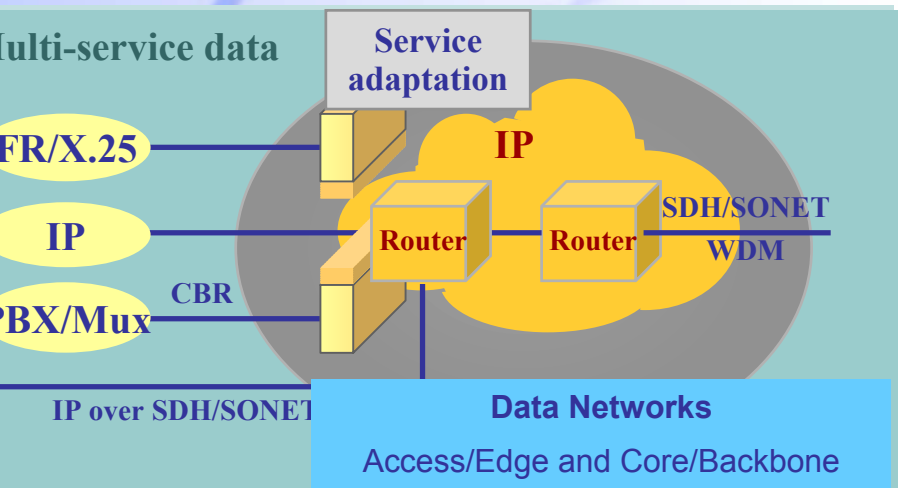
- Unified Network Architecture
- Common Services
- Packet IP Backbone
- Supports all Access Technologies

IP & ATM AS BASIS FOR MANY NETWORKS

Multi-service data

Service adaptation

FR/X.25

IP

PBX/Mux

IP

Router — Router

SDH/SONET WDM

CBR

IP over SDH/SONET

Data Networks

Access/Edge and Core/Backbone

Mobile radio access network

AAL2 switching required **ATM AAL2**

MSC — PSTN

RNC — RNC — GPRS — **Router Internet**

Converged Mobile Networks

Converged Core

Integrated broadband access

PBX

Voice

Data

NT

ATM

DSLAM RAS

PSTN

Internet IP

Local Loop

(DSLAM/Access (VoDSL) Gateway)

Voice over ATM

SS7 **MGCP** **MGCP** **SS7**

IP

CO Local — Router — Router — **CO Trunk**

Converged Fixed Networks

Local/Trunk GatewaySwitches

FRAGMENTED Backbone - for Enhanced Services

Today: Best-effort IP backbone
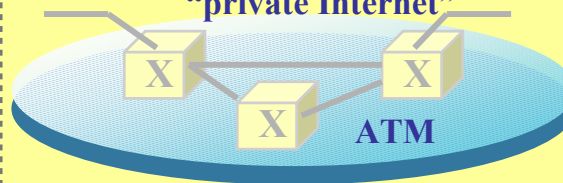
Router

FR, ATM, SDH

Focus: Enhanced services

CoS/DiffServ enhanced router/IP-switches (overlay)

FR, ATM SDH
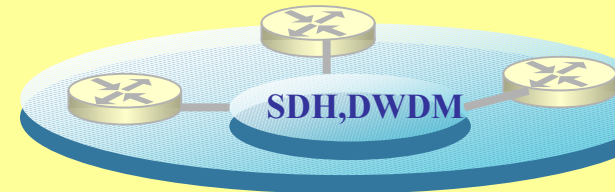
National/regional ISPs

Enhanced IP over ATM (MPLS) with SLAs, Voice, QoS-VPNs, ... "private Internet"

X X X

ATM

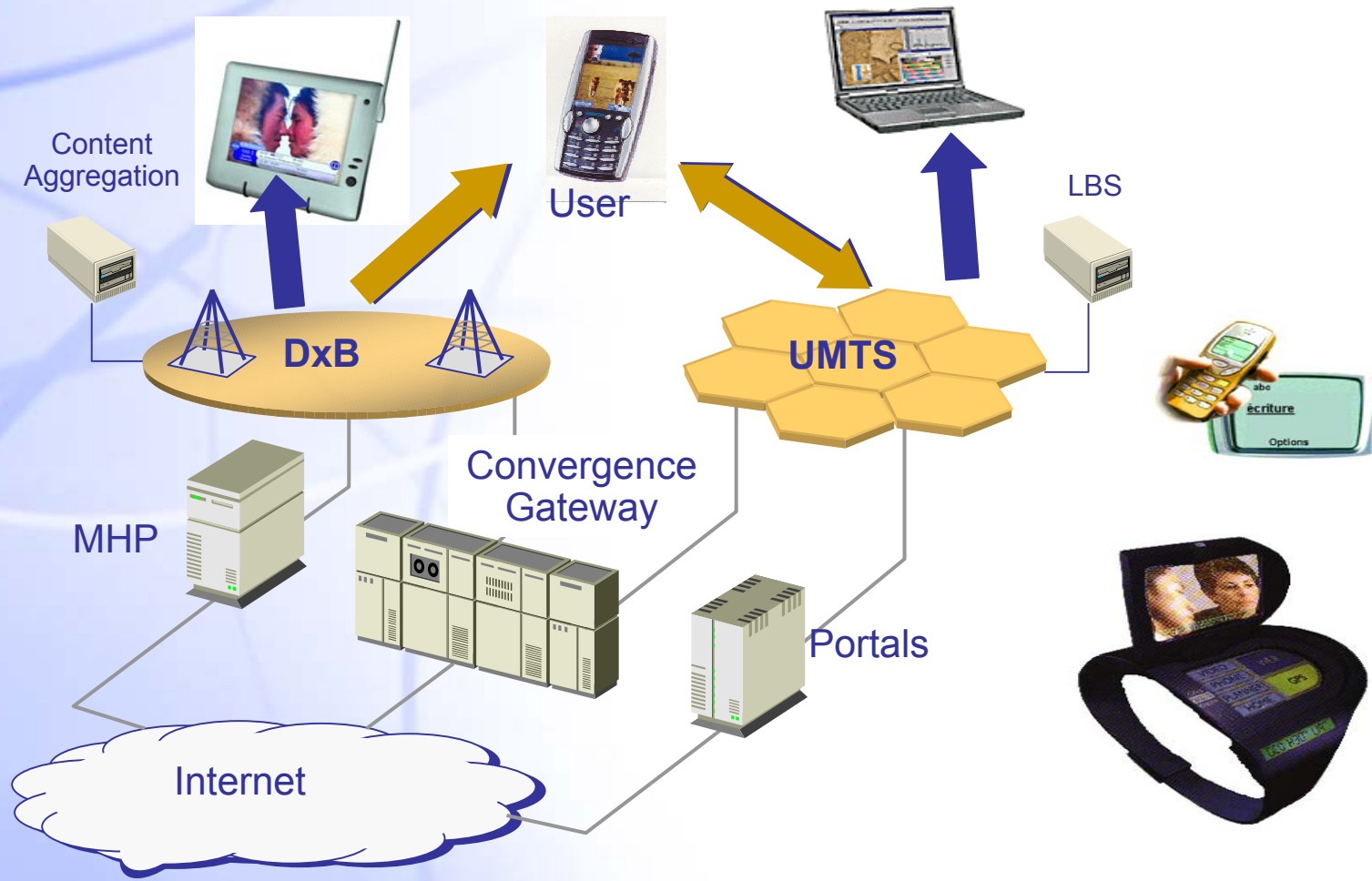PTTs

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Focus: Higher bandwidth

Gigabit/Terabit IP-switches

SDH,DWDM

Public Internet backbone + newly emerging carriers

Tomorrow: QoS/CoS-capable Gigabit/Terabit router/IP switches

Service Level Convergence

Content Aggregation

User

LBS

DxB

UMTS

MHP

Convergence Gateway

Portals

Internet

Network Operators need

- Higher revenue from new, SIP-based multi-media applications

- IP Transport: Reduced cost of ownership of converged IP backbone
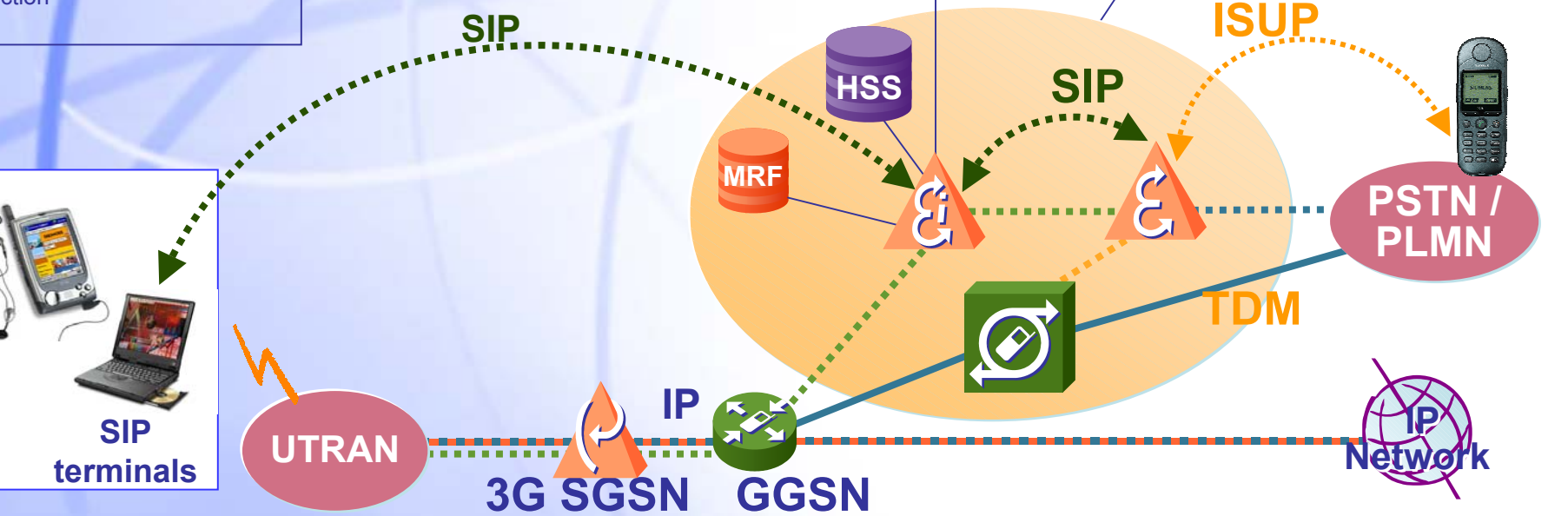
Major architectural change

- Session Initiation Protocol (SIP) Control and Dynamic QoS negotiation

- IMS (IP Multimedia Subsystem)-IPv6 Only

- IPv4/IPv6 Backbone

- IPv6 for security Issues
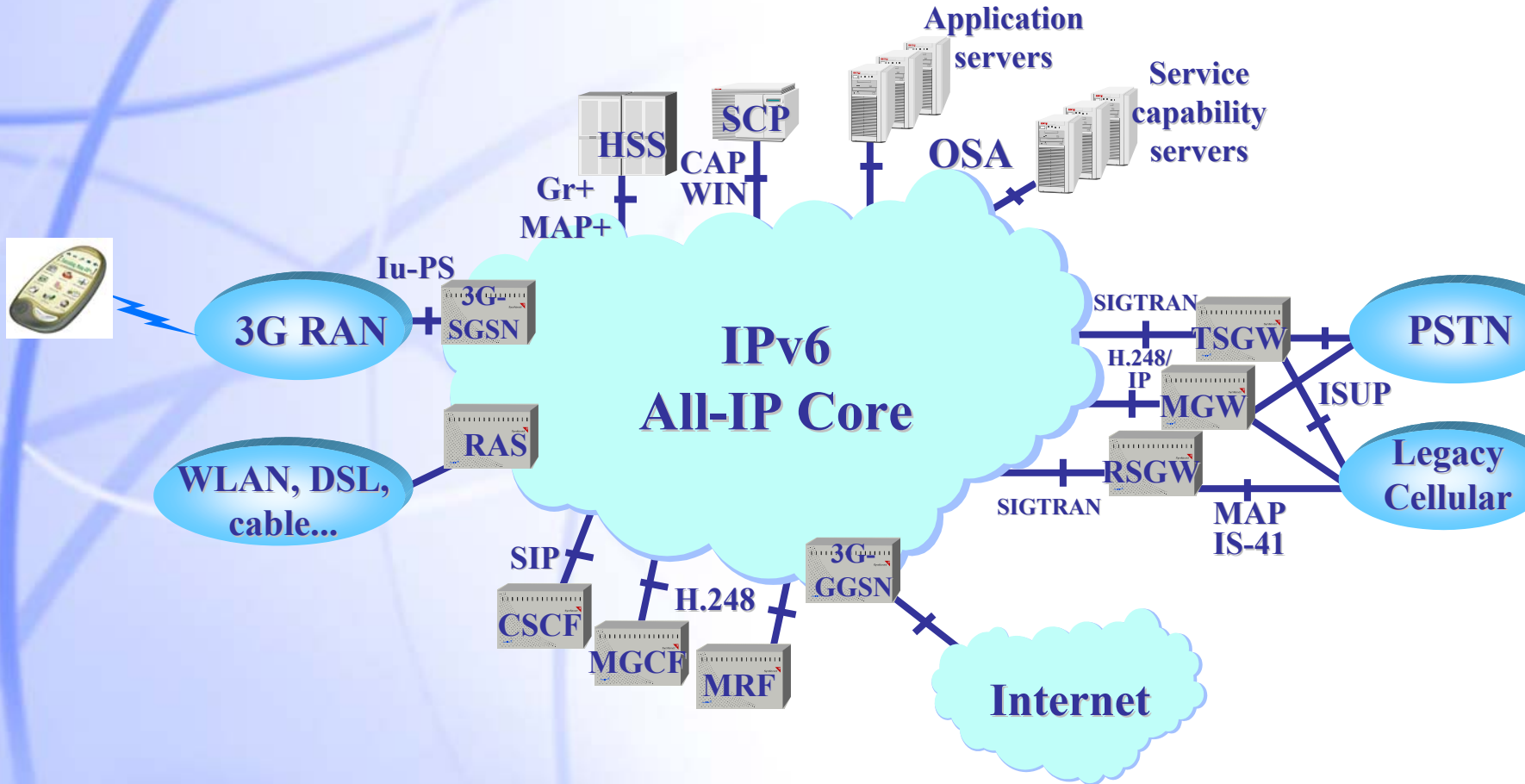
IMS- The IPv6 Platform

IMS offers a promising platform for innovative multimedia services

IMS further enables combined voice-data services

S=home subscriber server

RF=Multimedia resource
ction

Applications

Enabling Services

Payment
Prepaid
Rating
Location, Presence,
...

SIP

ISUP

HSS

SIP

MRF

PSTN /
PLMN

TDM

SIP
terminals

UTRAN

3G SGSN

IP

GGSN

IP
Network

All-IP System Architecture

CSCF	**Call State Control Function**	
HSS	**Home Subscriber Server**	
MGCF	**Media Gateway Control Function**	
MGW	**Media Gateway**	

MRF	**Multimedia Resource Function**
RAS	**Remote Access Server (DSLAM, head end…)**
RSGW	**Roaming Signaling Gateway**
TSGW	**Transport Signaling Gate**

Different Mobile Technologies

- **Pico Level - Bluetooth, IR**
- **Link Level - Access Network like Cellular (GSM, EDGE, WCDMA) , 802.11(b)**
- **Network Level - MobileIP, GTP**
- **Application Level - SIP, H.323 Mobility,**
- **Dynamic DNS**
- **Common denominator is IP**
  — Then security, mobility and QoS should also be solved at the network layer by IPv6

ON GOING WORK

- Multimedia will stress LAN design, but issues are identifiable and fixable

- Much work remains, progress will be steady towards integrated audio, video, data over LAN and WAN with network transparency

- ISDN (H.320) and IP (H.323) will coexist for several years

- Implement prudently, remember QoS

Thank you for your attention!!