

IP and Mobility ("Internet on Air")

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Contents

- *What is happening in the mobile world ?*
- *How should today's 2G investments be protected ?
Evolution or Revolution?*
- *"Internet-mobility" or "Mobile-Internet"?*
- *How will IP be introduced into UMTS/IMT-2000 ?*
- *And beyond UMTS/IMT-2000 ?*

What is happening in the mobile world ?

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The Internet goes mobile



- 1999: SMS generates 10% revenue of an operator
- Early 2000: WAP deployed in most of the networks
- End 2000: GPRS starts commercial service
- Focus on Business User Segment at the beginning
- 2001: GPRS will push SMS and WAP to mass market
- 2002: UMTS will integrate voice/data/video services

The 3rd Internet Wave: Mobile Operators of today will be the largest ISP/ASP's of tomorrow



PC



CABLE



PHONE

<ul style="list-style-type: none"> ● 1998 PC Installed Base: 298 Million ● 2003 Estimated PC Installed Base: <div style="border: 1px solid black; padding: 5px; text-align: center; font-size: 1.2em;">550 Million</div>	<ul style="list-style-type: none"> ● 1998 Cable Installed Base: 199 Million ● 2003 Est. Cable Installed Base: <div style="border: 1px solid black; padding: 5px; text-align: center; font-size: 1.2em;">260 Million</div>	<ul style="list-style-type: none"> ● 1998 Global Subscriber Base: 290 Million ● 2003 Est. Global Subscriber Base: <div style="border: 1px solid black; padding: 5px; text-align: center; font-size: 1.2em;">1 Billion</div>
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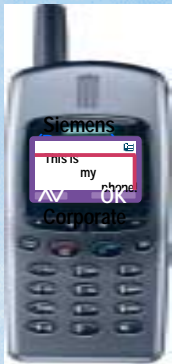
Sources: CSFB, Dataquest

Dedicated terminals will drive additional penetration



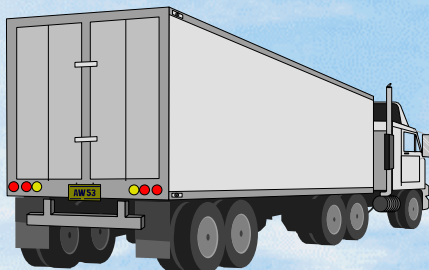
Mobile computing equipment

- Heavy nomadic users with high bandwidth demand
- WWW, Internet/Intranet access, unified multimedia messaging



Mobile Smart Phone

- Highly mobile users with moderate bandwidth demand
- WAP, Java, info services, Location dependant services, payment, ...



Data only Terminal

- occasional transfer
- Fleet Management, Telematic, Telemetric, ...

What is happening in the mobile world ?

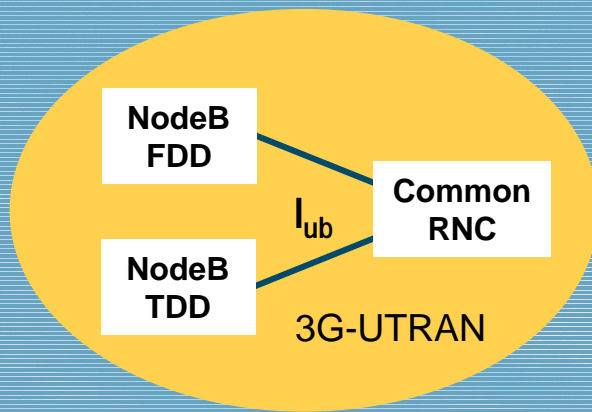
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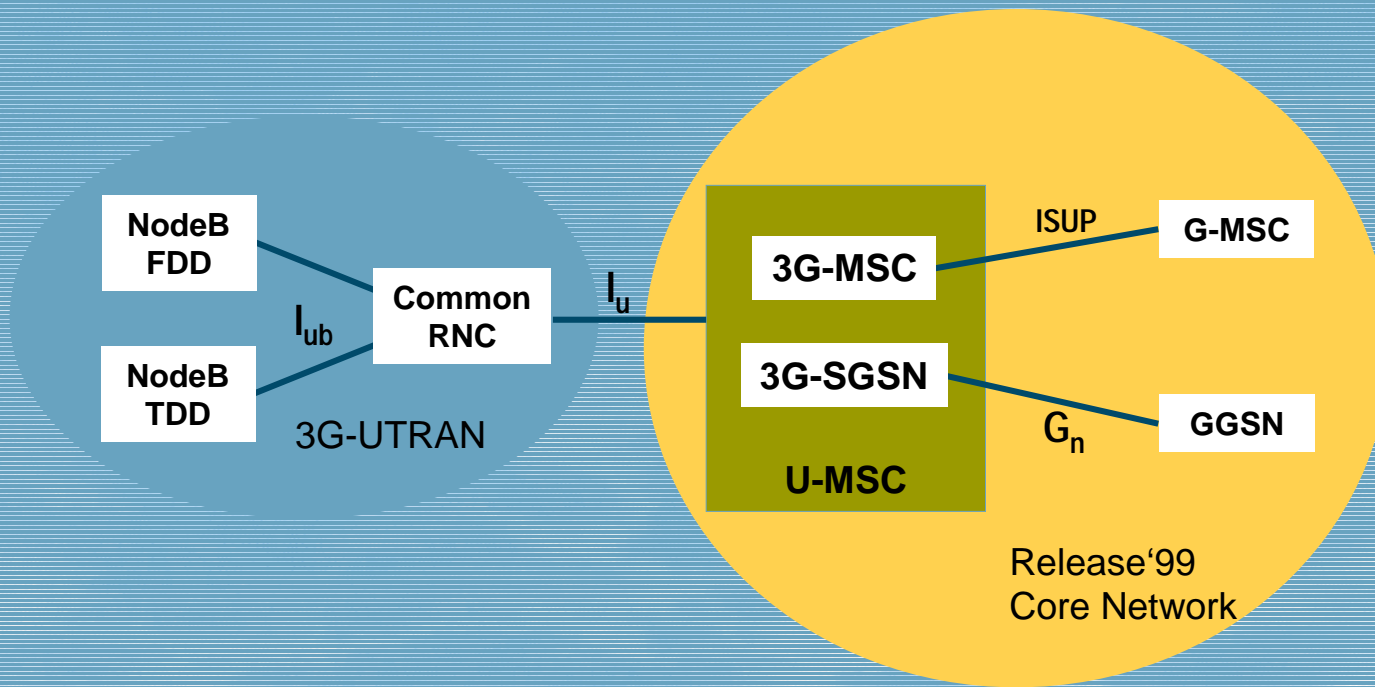
Evolving Proven GSM Network Infrastructure Products to 3G Supports Mix&Match Architecture and Investment Protection



The same RNC supports both FDD and TDD Node B multiply and simultaneously

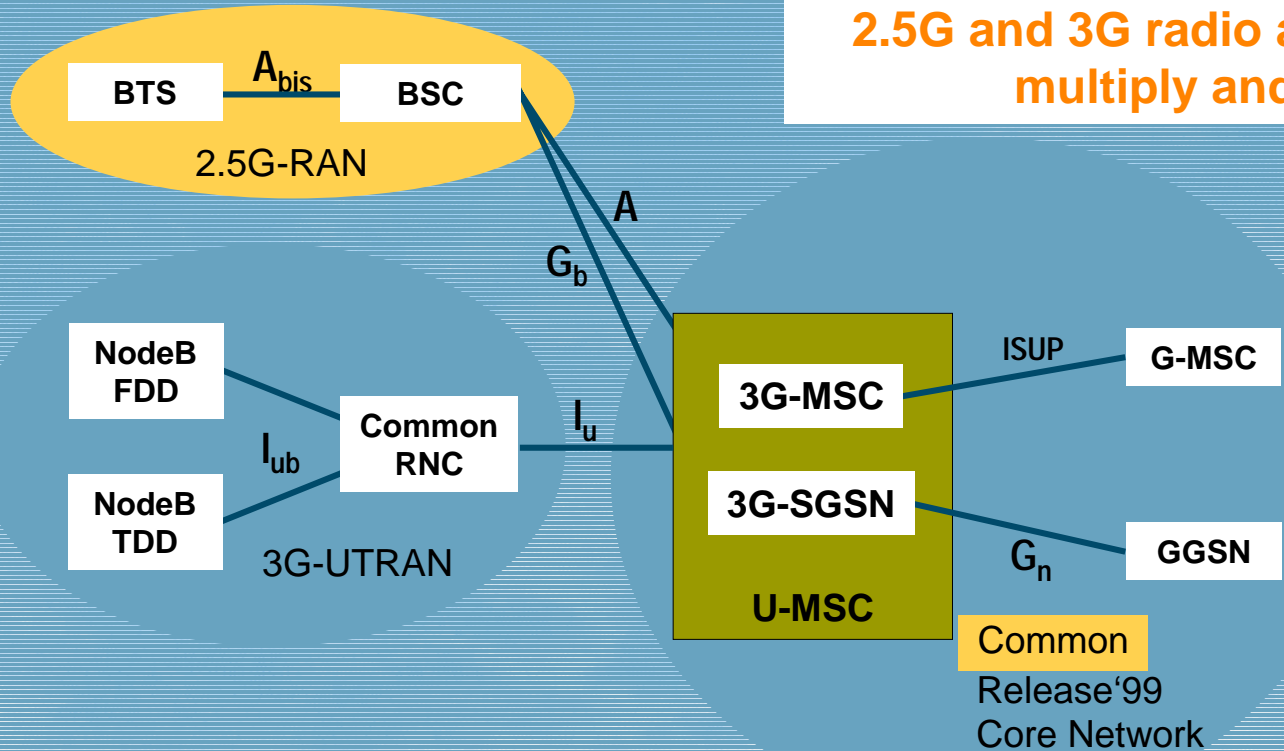
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The UMTS Core network is based on GSM and carries both circuit switched and packet oriented traffic

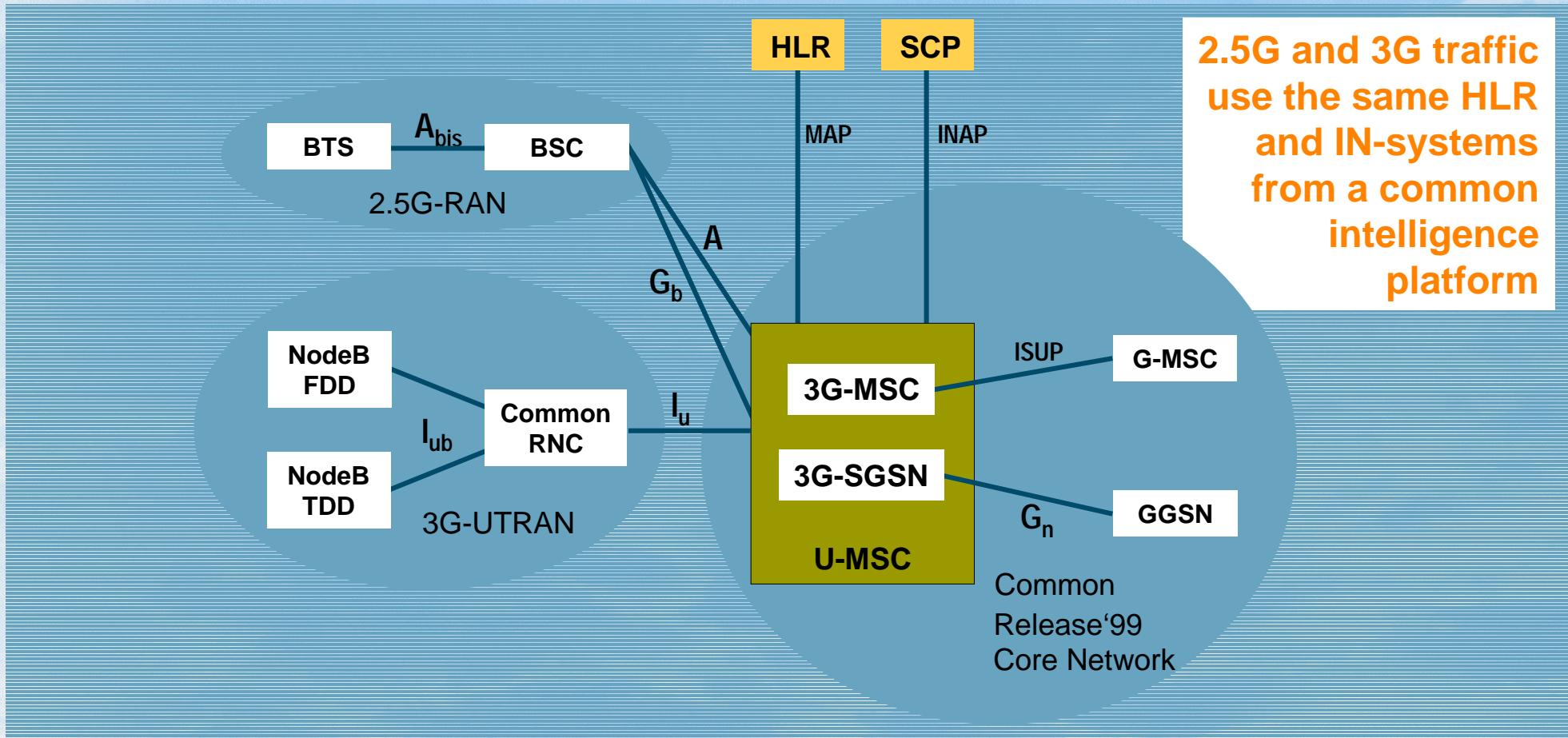


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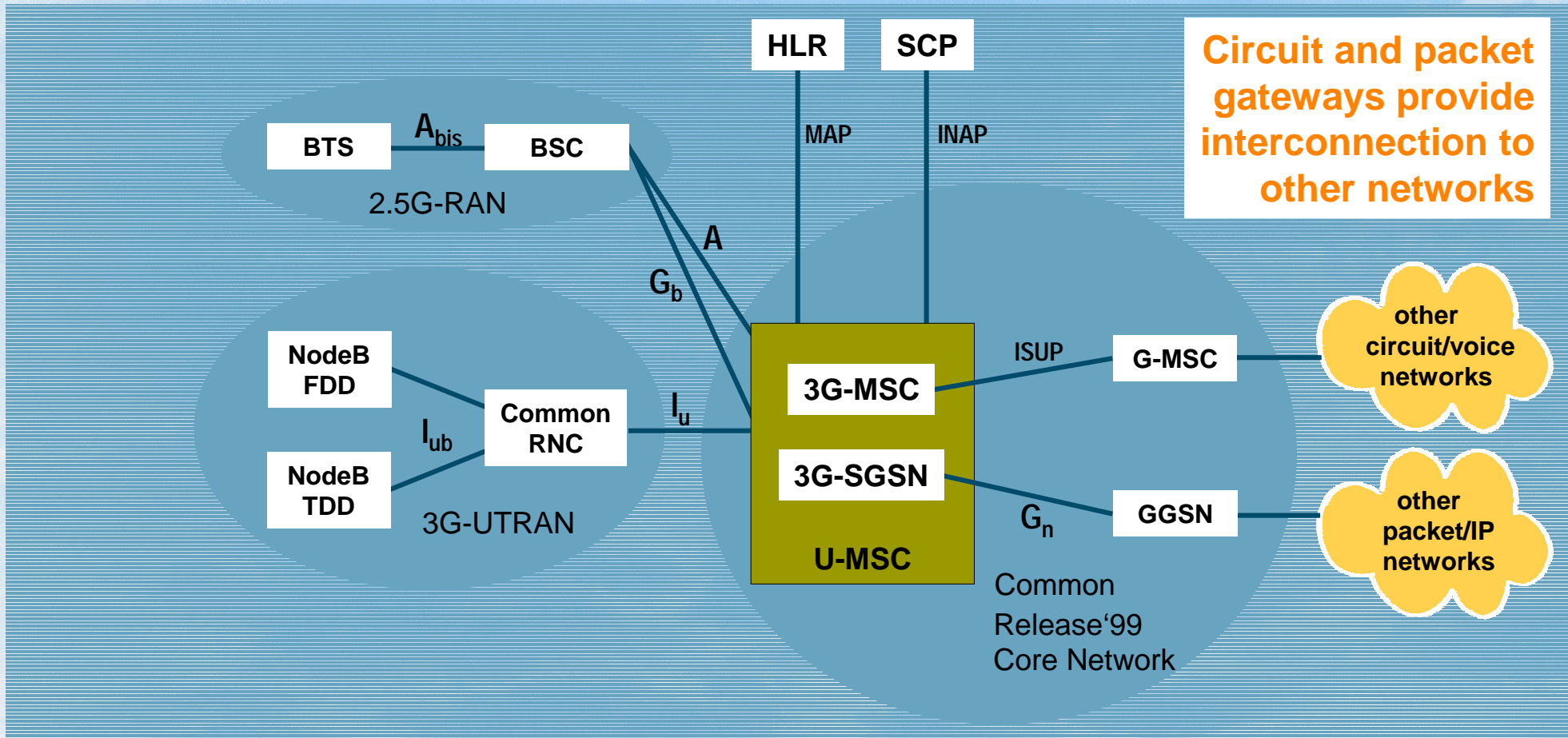
The same U-MSC node supports both 2.5G and 3G radio access networks multiply and simultaneously



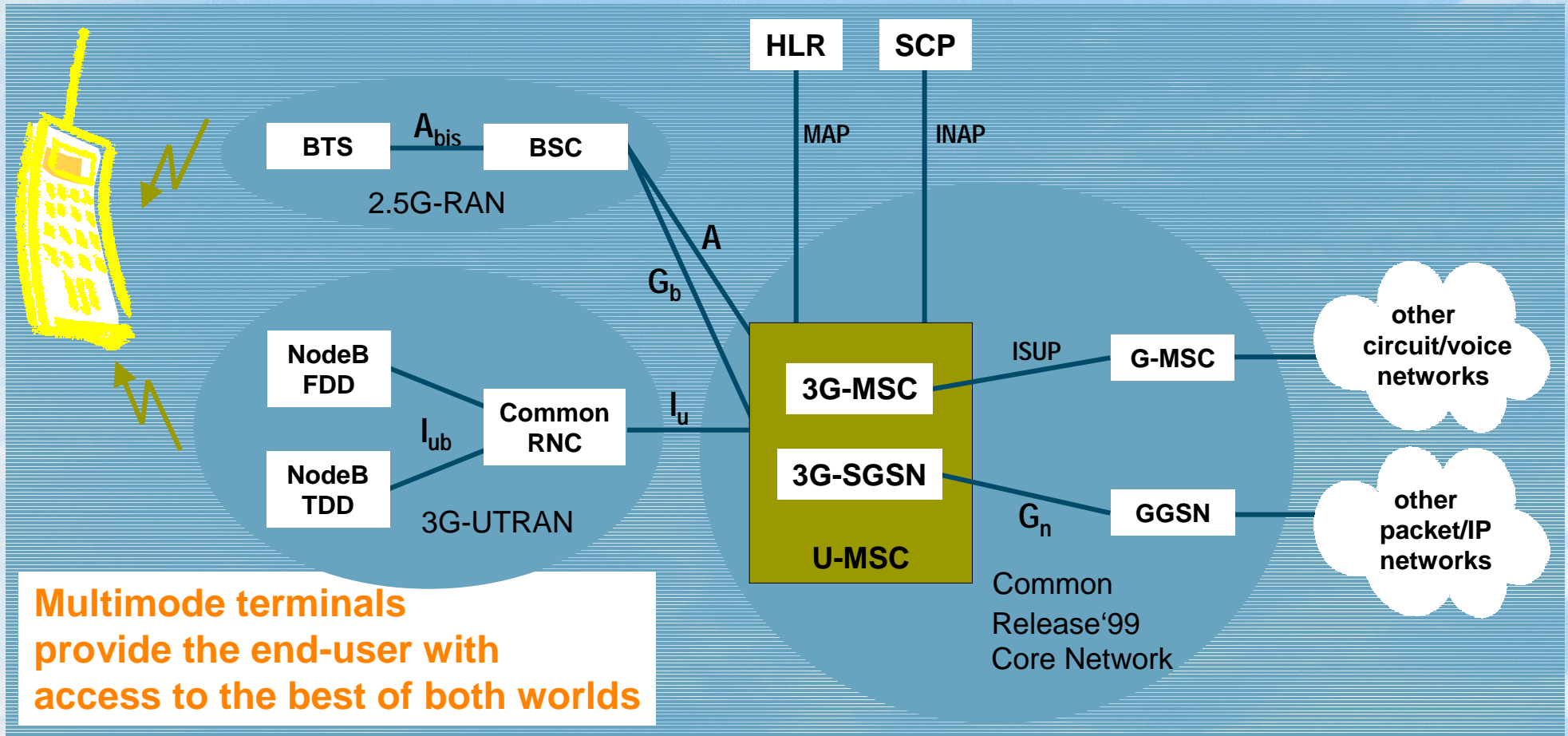
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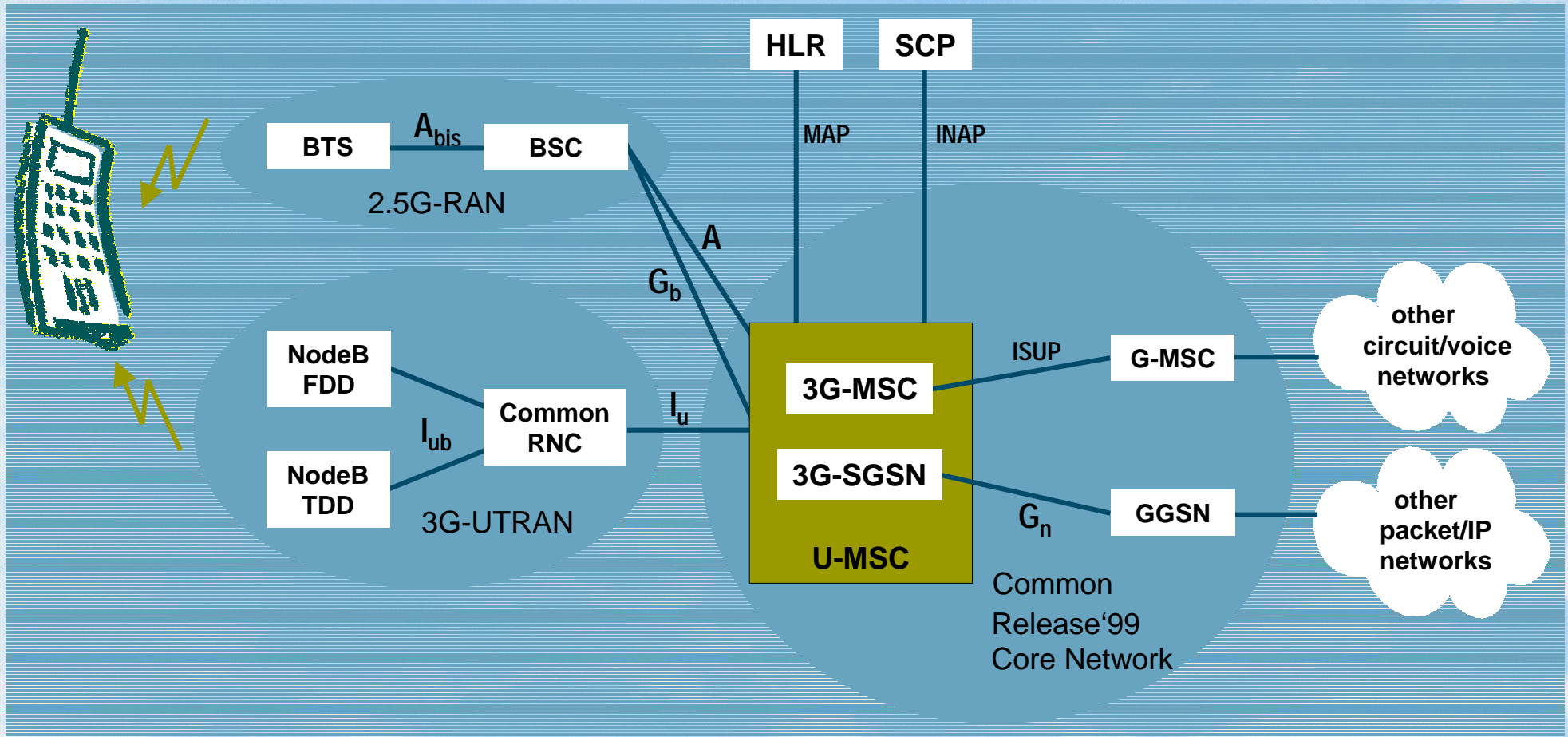
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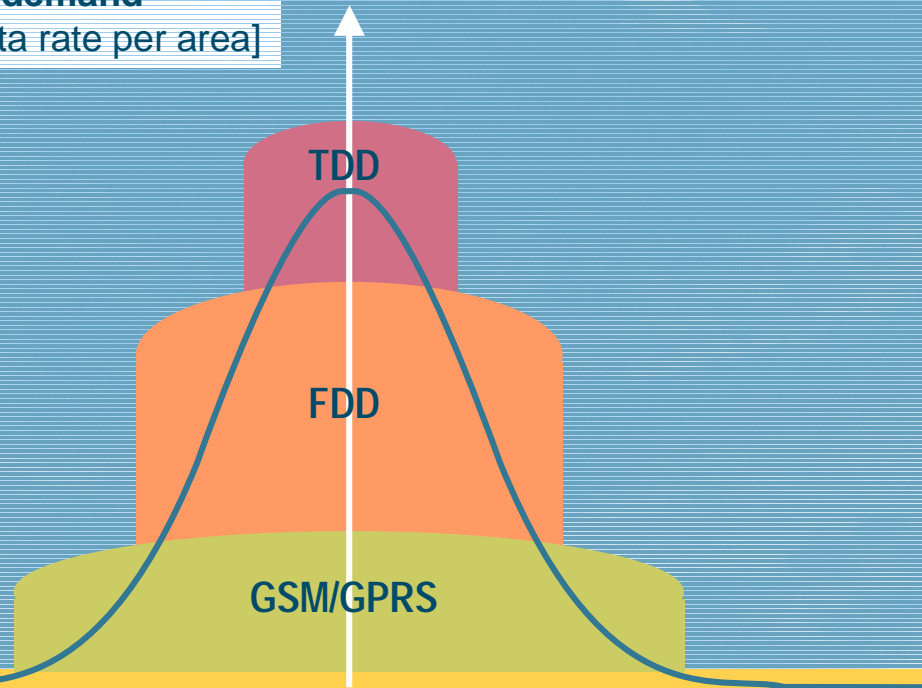


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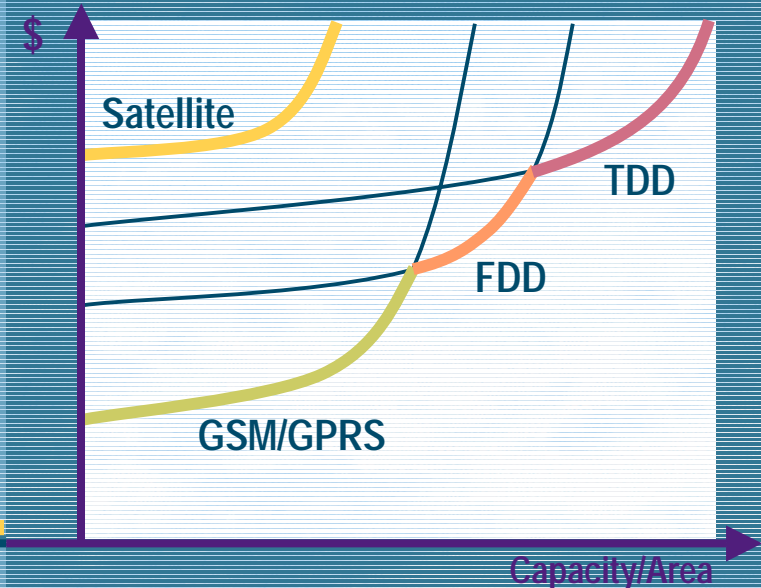
UMTS Provides a Smooth Evolution Path from GSM Through a Set of Complementary, Interoperable Standards

Bandwidth demand
[average data rate per area]



Knowing which cost curve to ride helps to achieve effective coverage

Cumulative Build-Out Cost



(not drawn to scale)

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Internet-on-Air

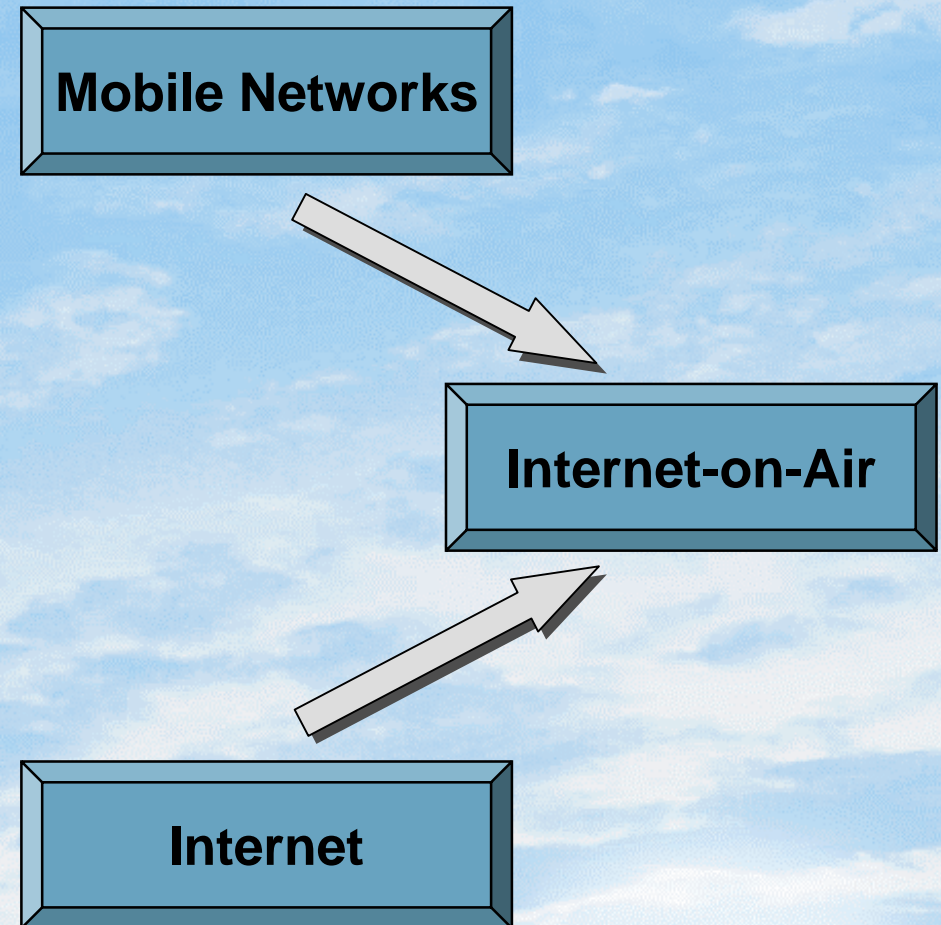
The Evolution Target of Mobile Networks and Internet

Evolution Path of Mobile Networks:

- Use IP transport in the backbone.
- Transport voice & data over IP.
- Push IP into the RAN.
- Terminate IP in the mobile host.

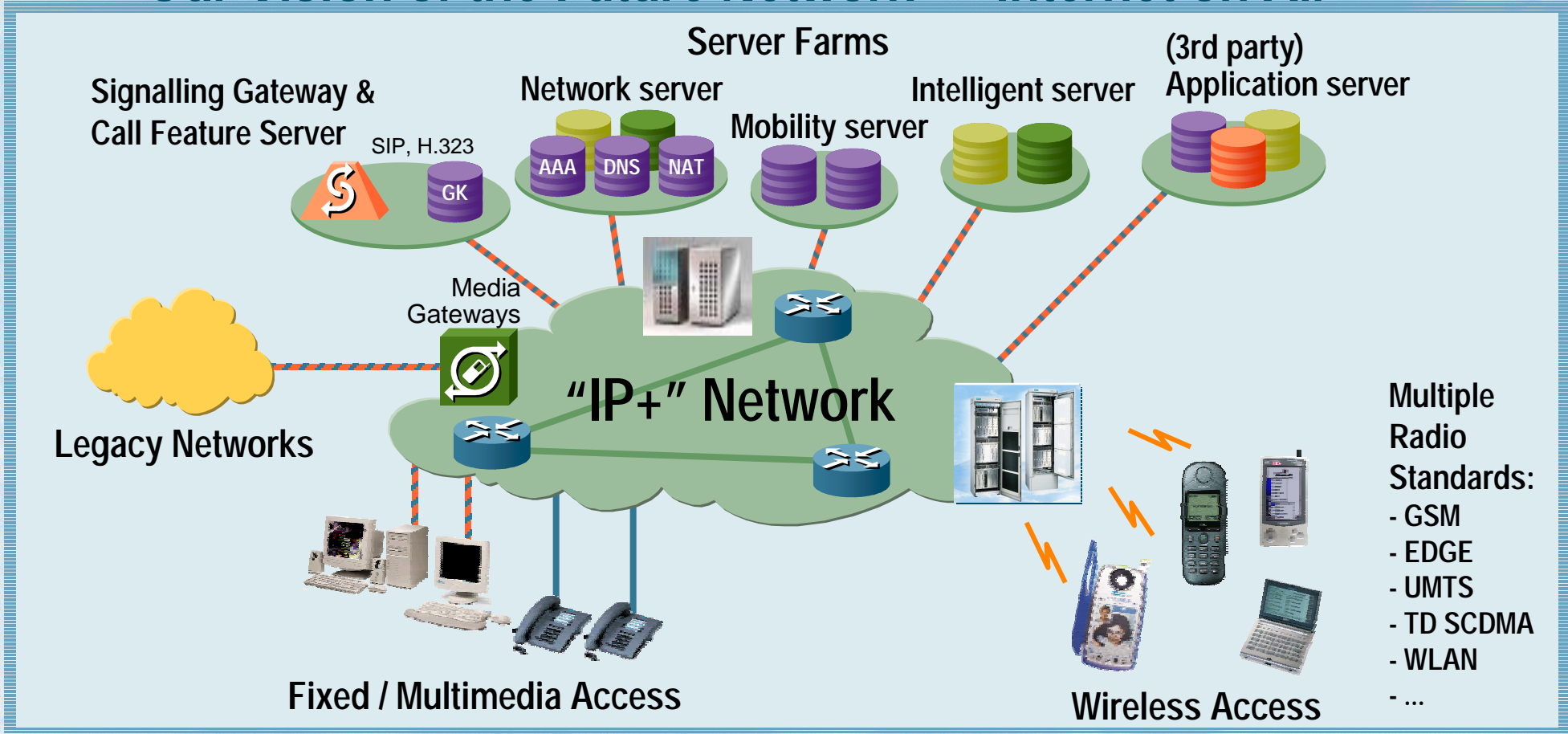
Evolution Path of the Internet:

- Enable wireless access.
- Support user & terminal mobility.
- Go beyond "Best Effort".
- Provide Security and AAA.



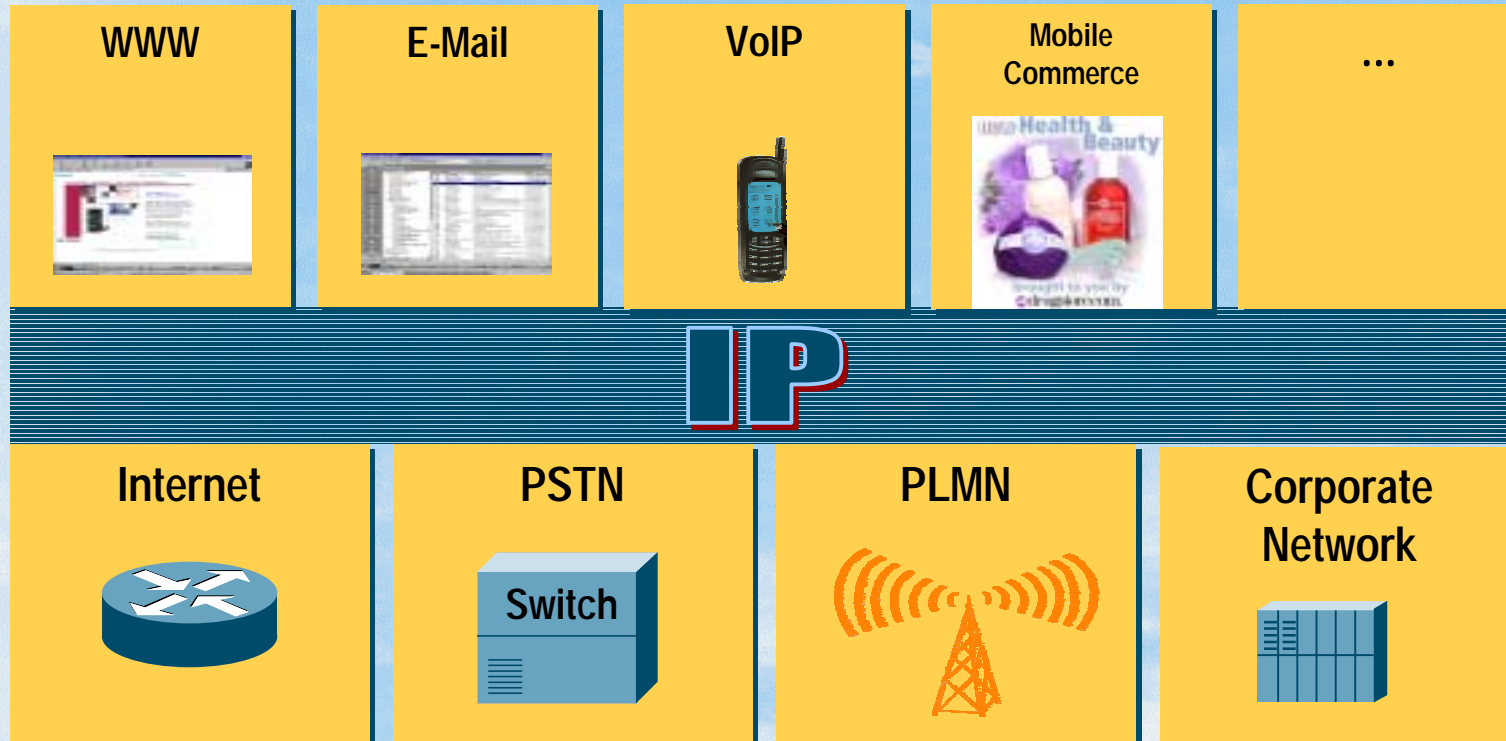
3G goes IP:

Our Vision of the Future Network – Internet on Air



IP – the Unifier

Hides the Network Infrastructure from the Applications



Anything over IP
IP facilitates usage of applications across network boundaries (write once - use many times)

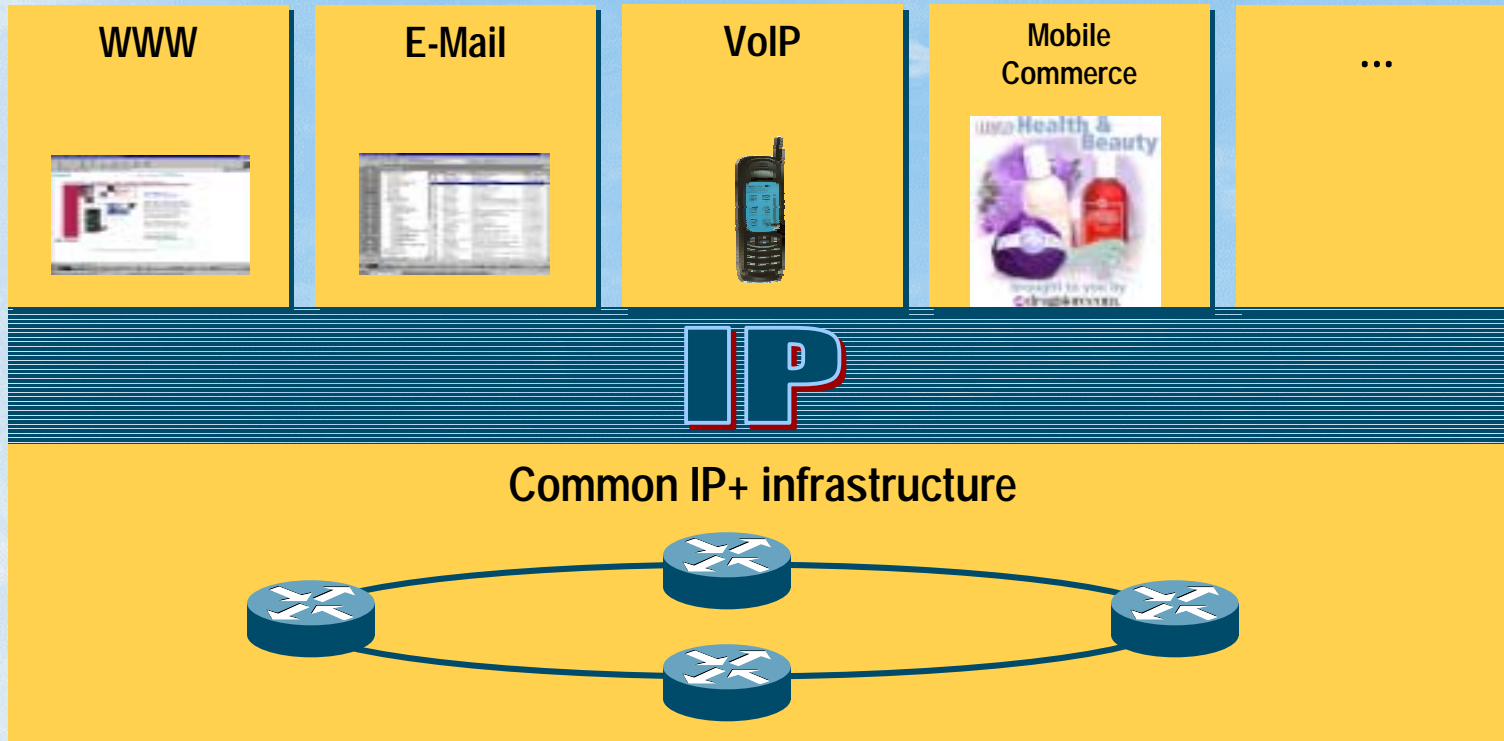
IP over Anything
A common IP layer harmonises networks and provides internetworking over different network technologies



Unified provisioning of IP applications

IP – the Unifier

Opens the Door to a Unified IP Infrastructure



Interworking
with non-IP networks
via media gateways
or mediation devices



**Reduction of complexity and cost
due to unified IP infrastructure**

Characteristics of the IoA Network

- End-to-End IP, Internet compliant (IETF, W3C, DMTF).
 - Enhancements where necessary to enable mobility. Design is based on IPv6.
- Support end-to-end multi-media communication over heterogeneous networks.
- Use TCP/IP as a common framework for multimedia communication.
- Enable global mobility.
- Access over many different networks (wireless & wireline).
- Interworking with existing (legacy) networks.
- Provisions for allocation and management of network resources.
- Voice is only one possible application, although an important benchmark.

Clear split between transport network and applications.

Mobile Wireless Internet Forum – MWIF:

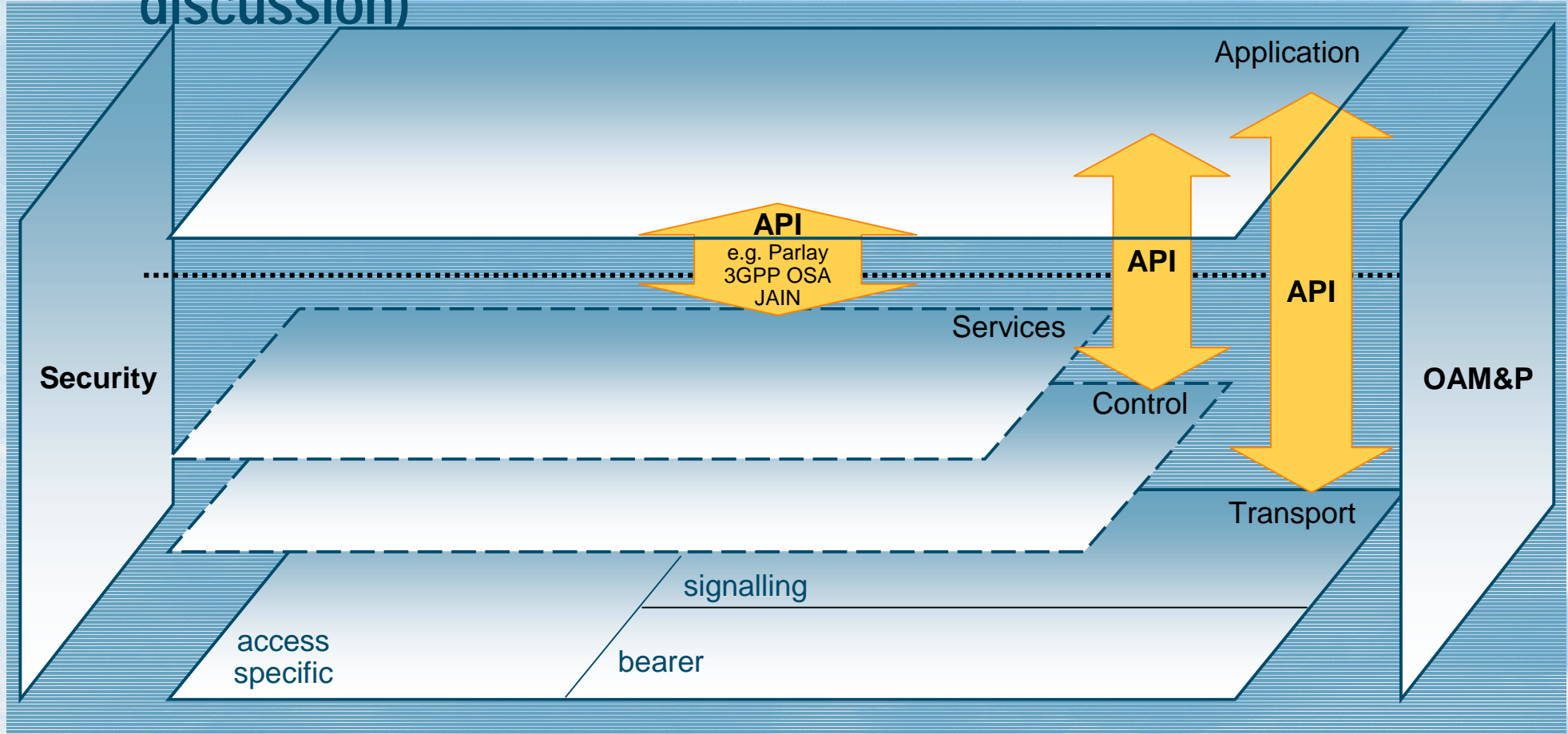
MWIF Mission Statement:

Drive an open internet-based architecture that:
enables seamless integration of mobile telephony
and IP-based services (voice, data, video, web, etc.)
for the mobile wireless networks

and

is independent of the Air Interface

Mobile Wireless Internet Forum – MWIF: Layered Functional Architecture (proposal under discussion)



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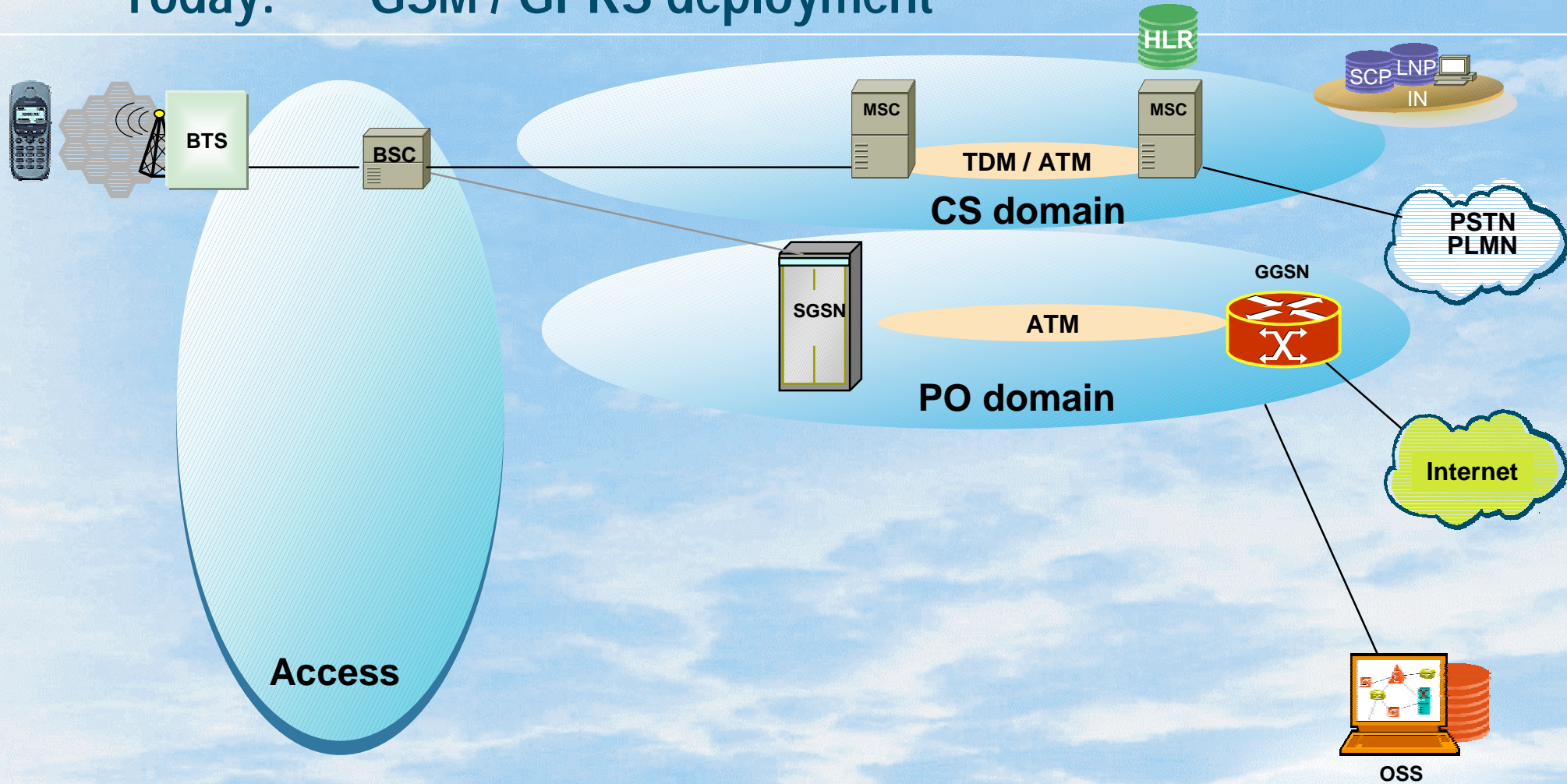
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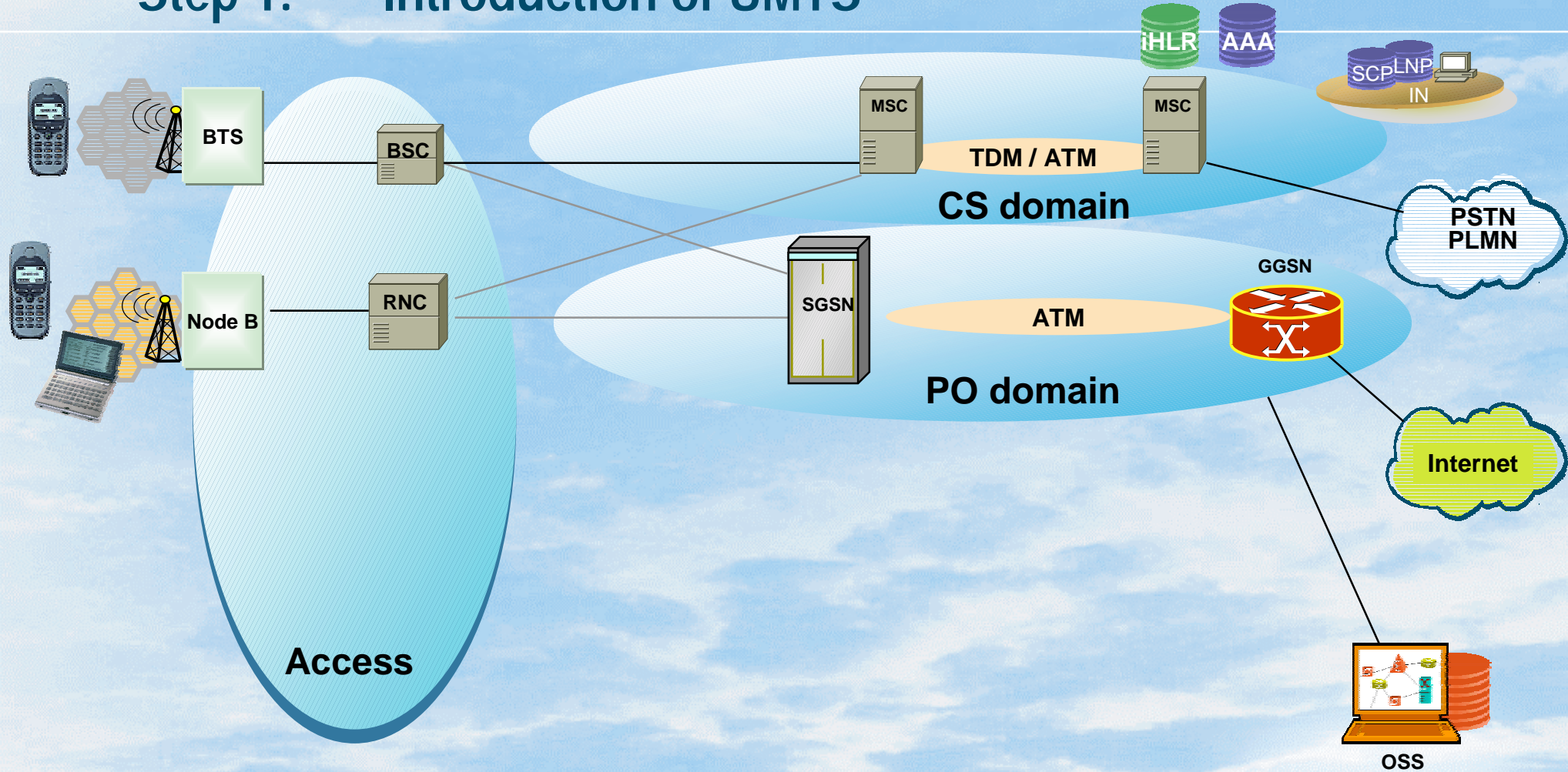
Network Evolution

Today: GSM / GPRS deployment

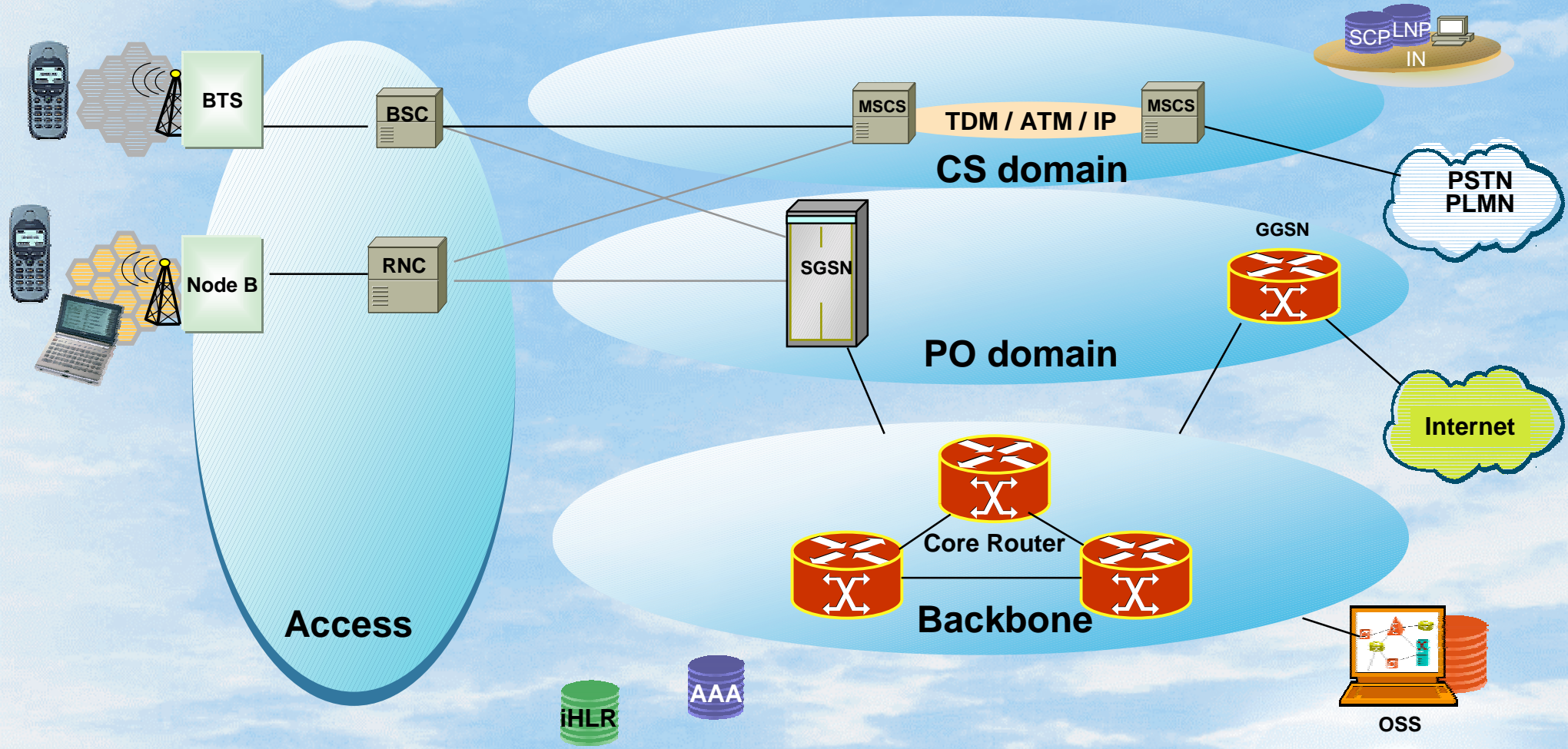


Network Evolution

Step 1: Introduction of UMTS

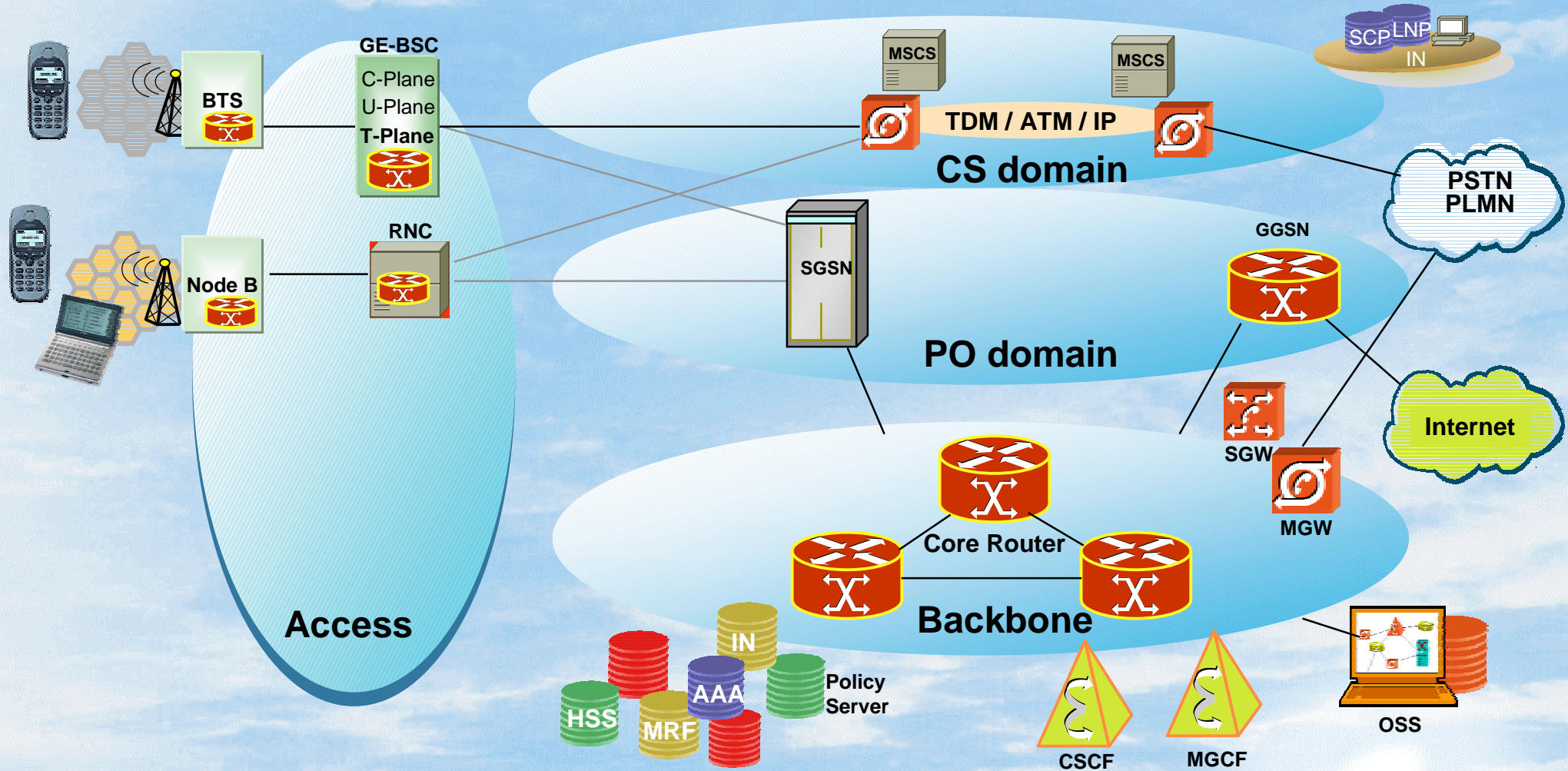


Network Evolution step2: Introduction of IP backbone



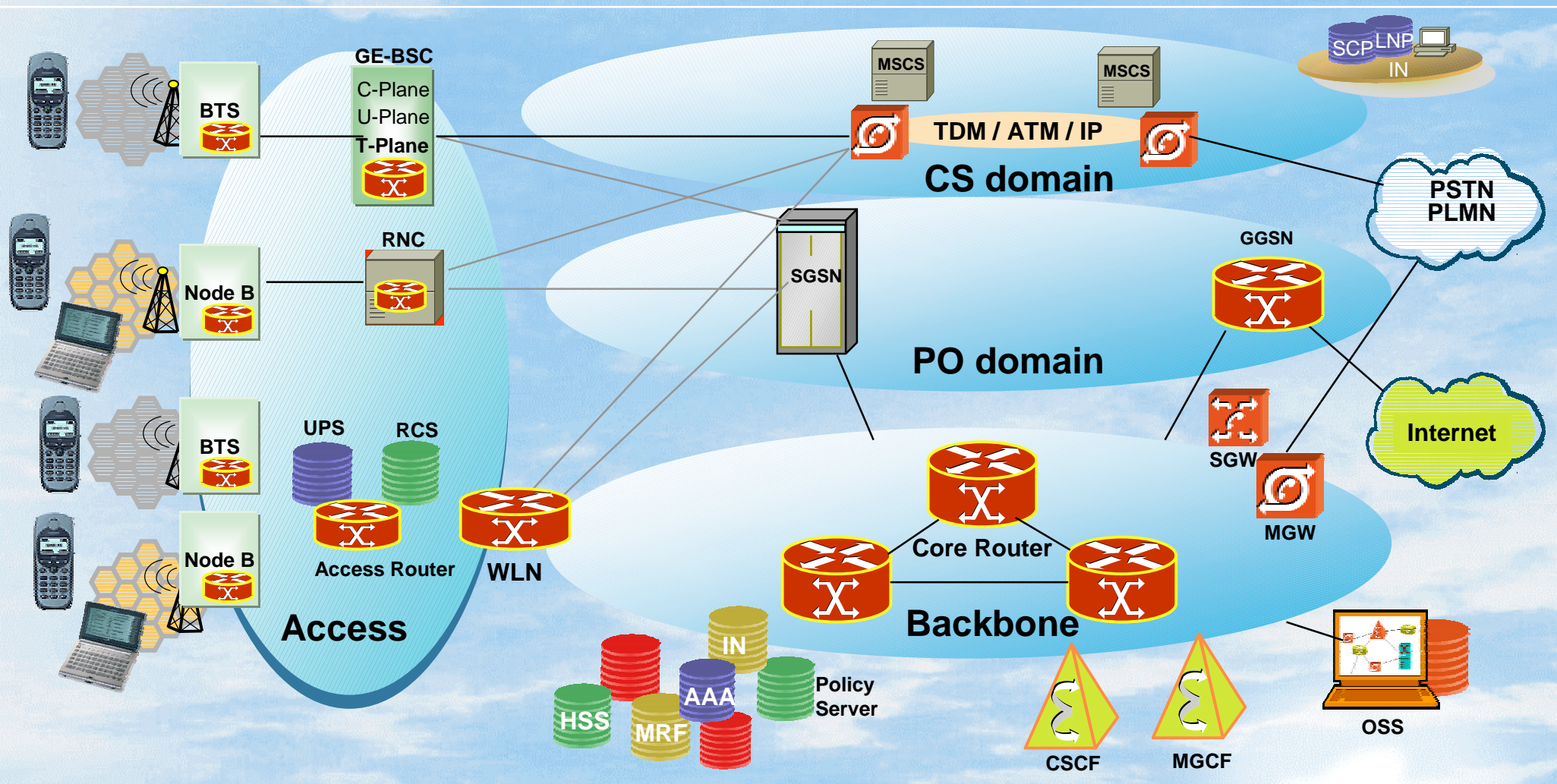
Network Evolution

Step 3: IP in the Radio Access



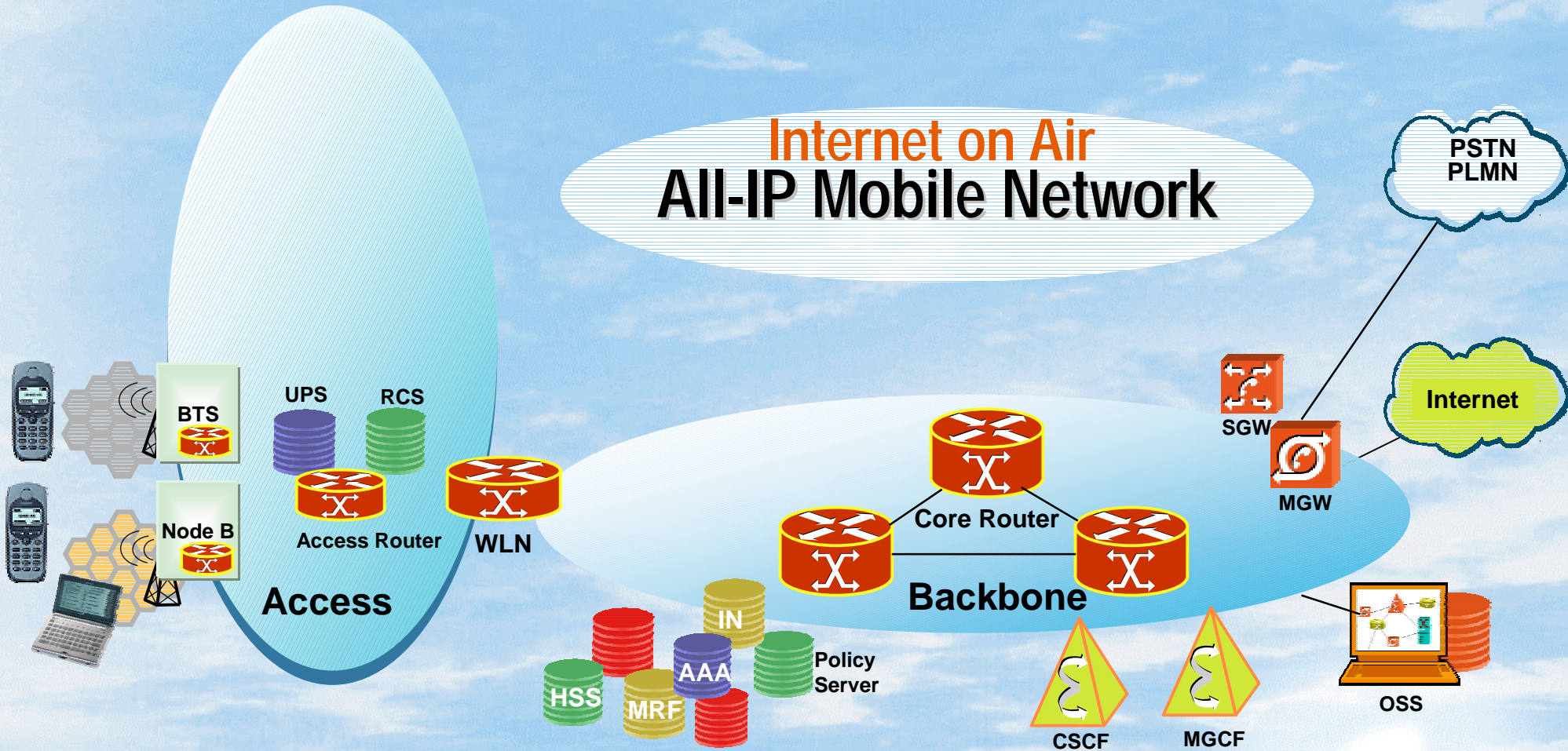
Network Evolution

Step 4: IP-based Radio Access Solution

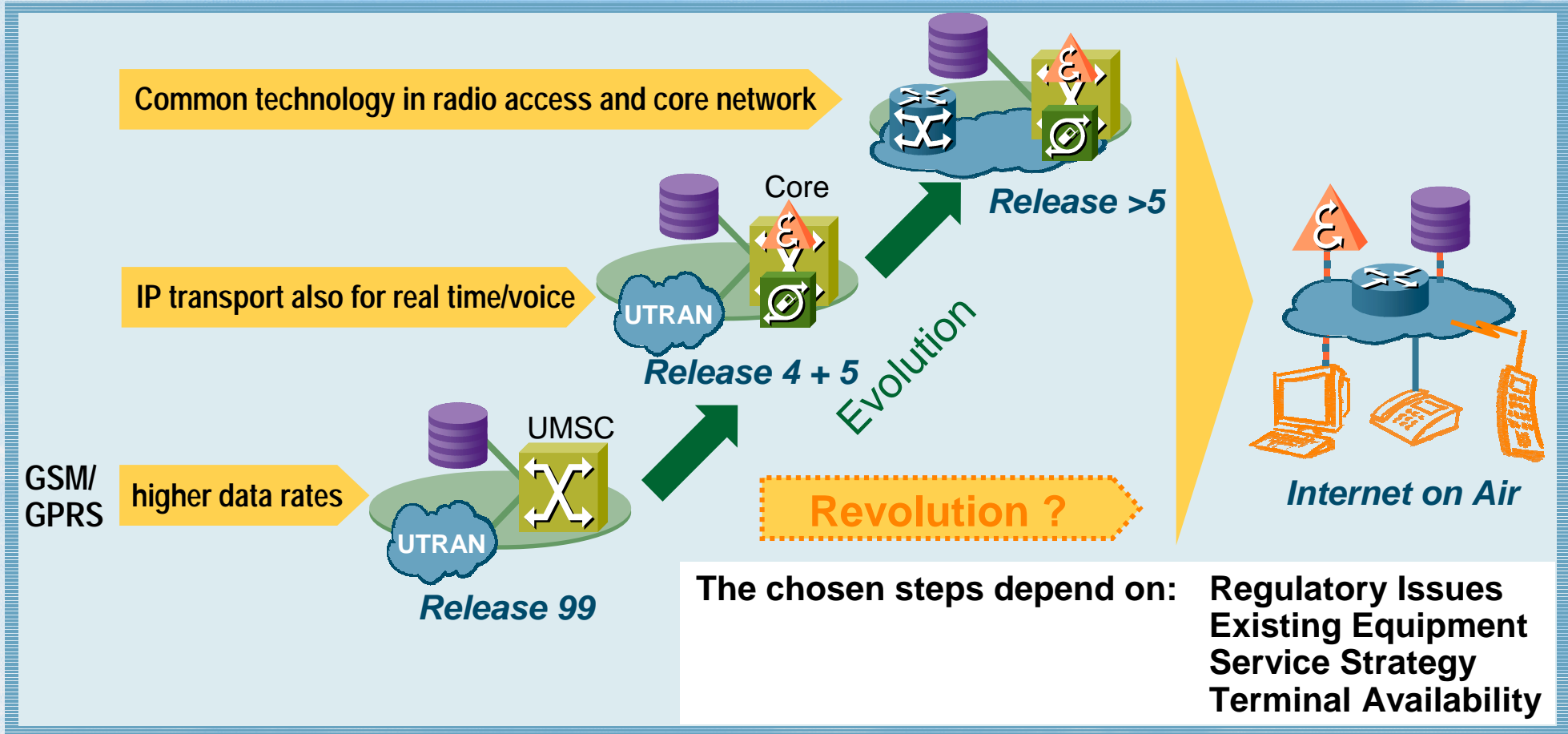


Network Evolution

Step 5: End-to-End IP



The Options: "All Roads Lead to Rome" – The Operator has the Choice which one to Take



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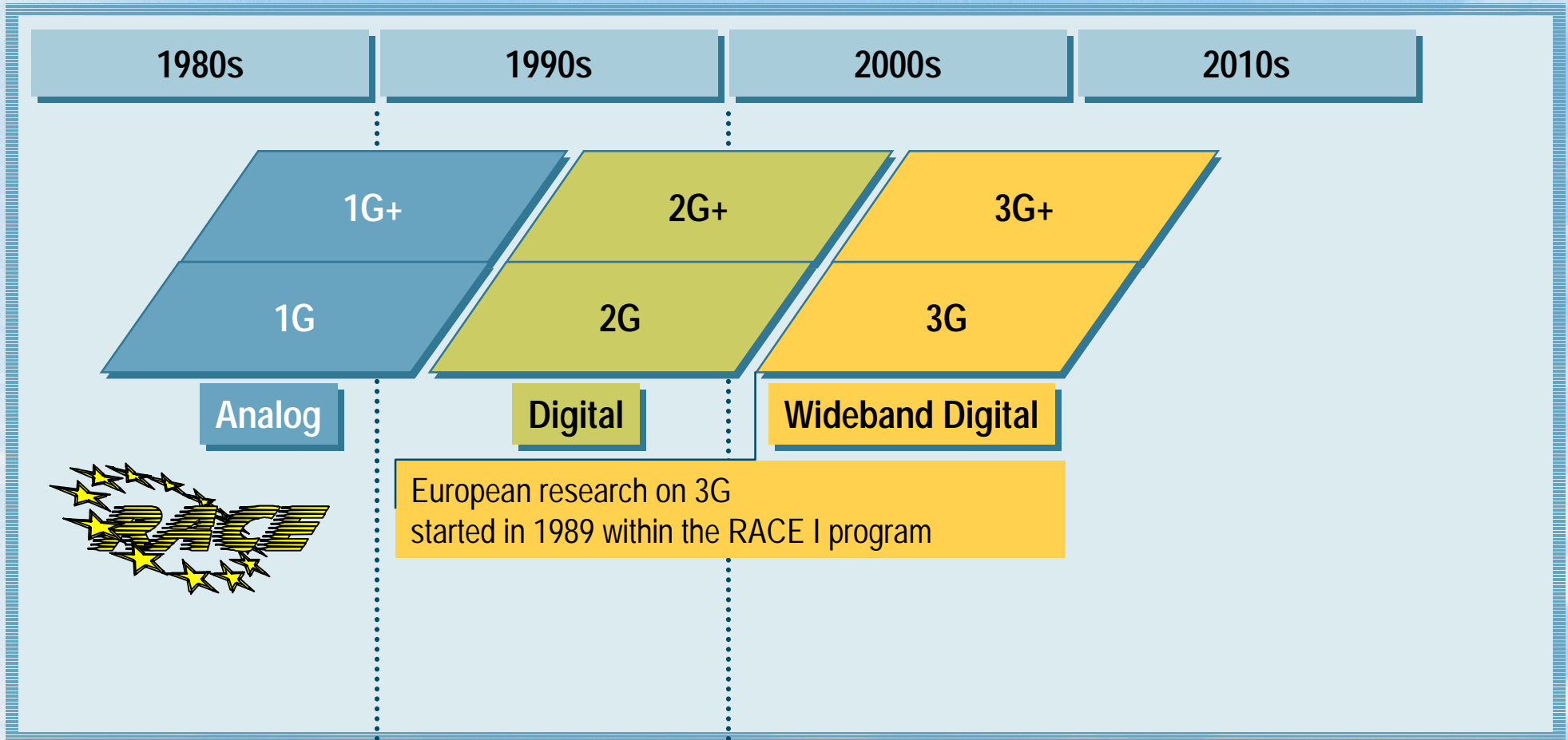
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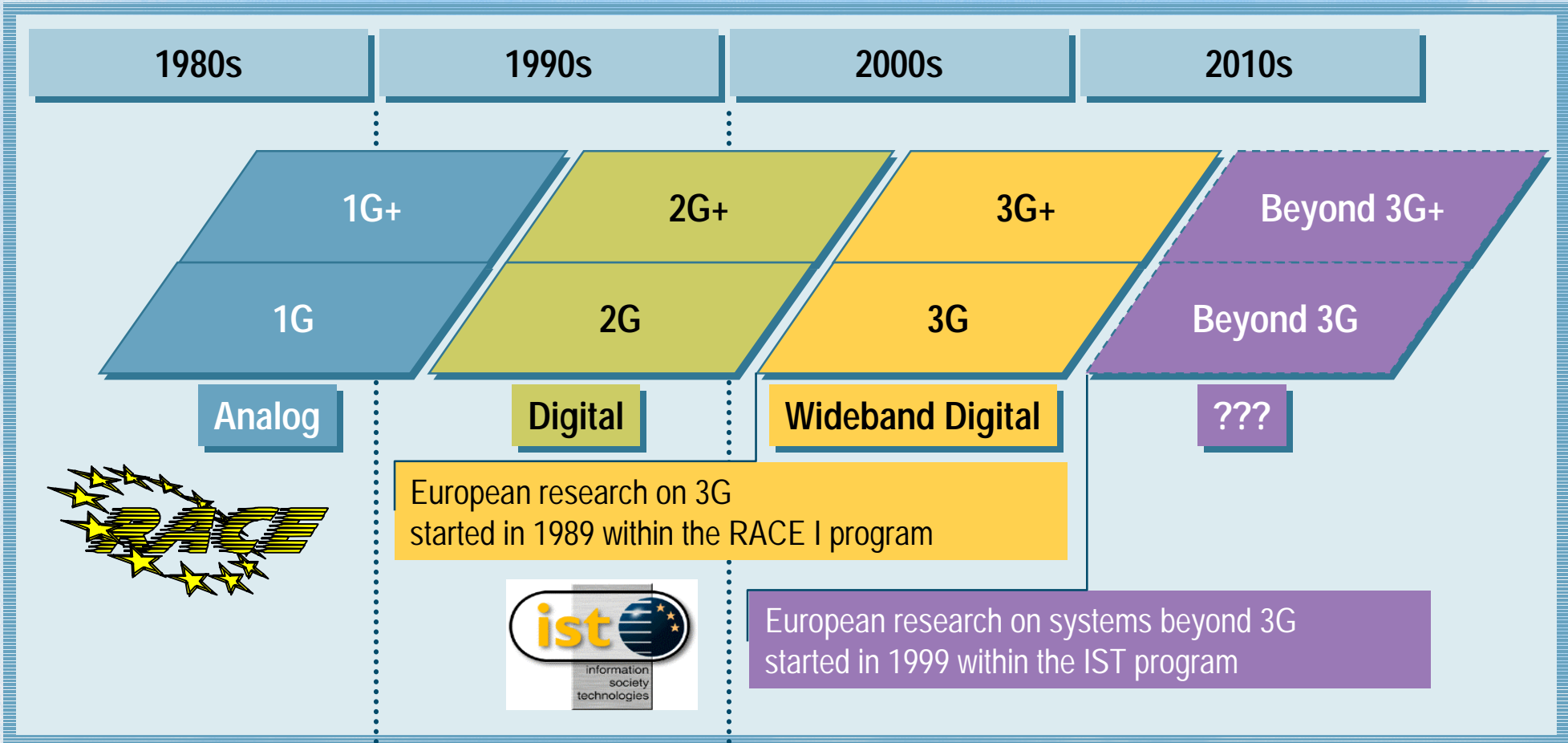
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Evolution of Mobile Communication Systems



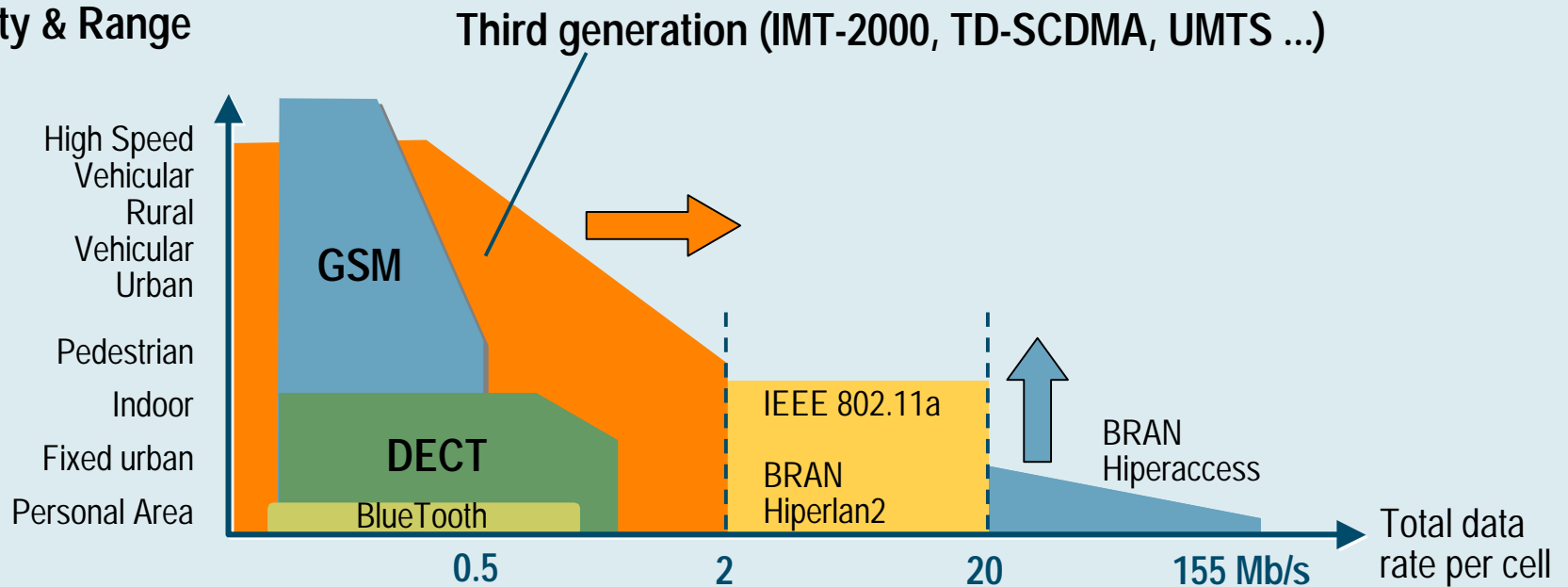
Evolution of Mobile Communication Systems TAKES TIME



A Complete Portfolio of Specialized Radio Solutions is Required

- Mobile radio access networks are designed to meet certain maximum requirements for grade of mobility and range
- WLAN are designed for high data rates, low ranges and generally low mobility

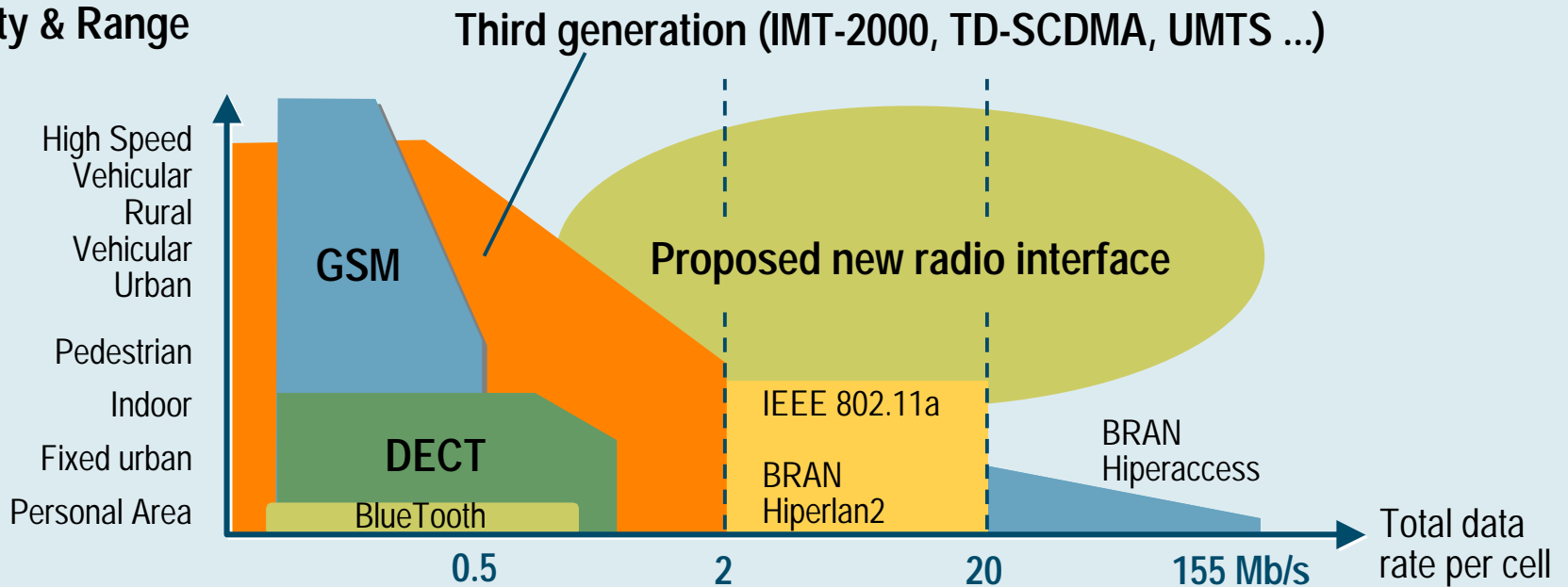
Mobility & Range



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Mobility & Range



Smooth evolution from GSM to 3G and beyond

THANK YOU !

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