

# IP and Mobility ("Internet on Air")

**Kiritkumar P. Lathia**

**Chartered Engineer, Fellow I.E.E.**

**VP – Standards & Fora  
Siemens Mobile Communications S.p.A.  
Italy**

**ITU-T SSG Vice Chairman**



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- *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 ?*



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# The Internet Goes Mobile





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

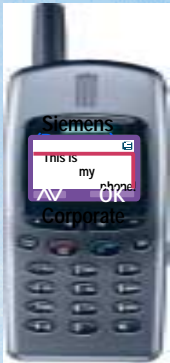


# Dedicated terminals will drive additional penetration



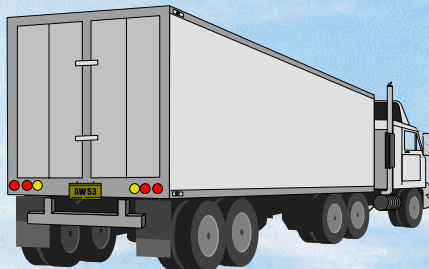
## Mobile computing equipment

- 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 ?*

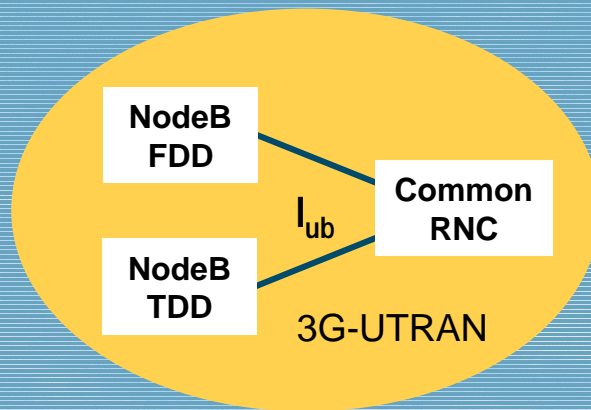
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# Evolving Proven GSM Network Infrastructure Products To 3G Supports Mix & Match Architecture And Investment Protection

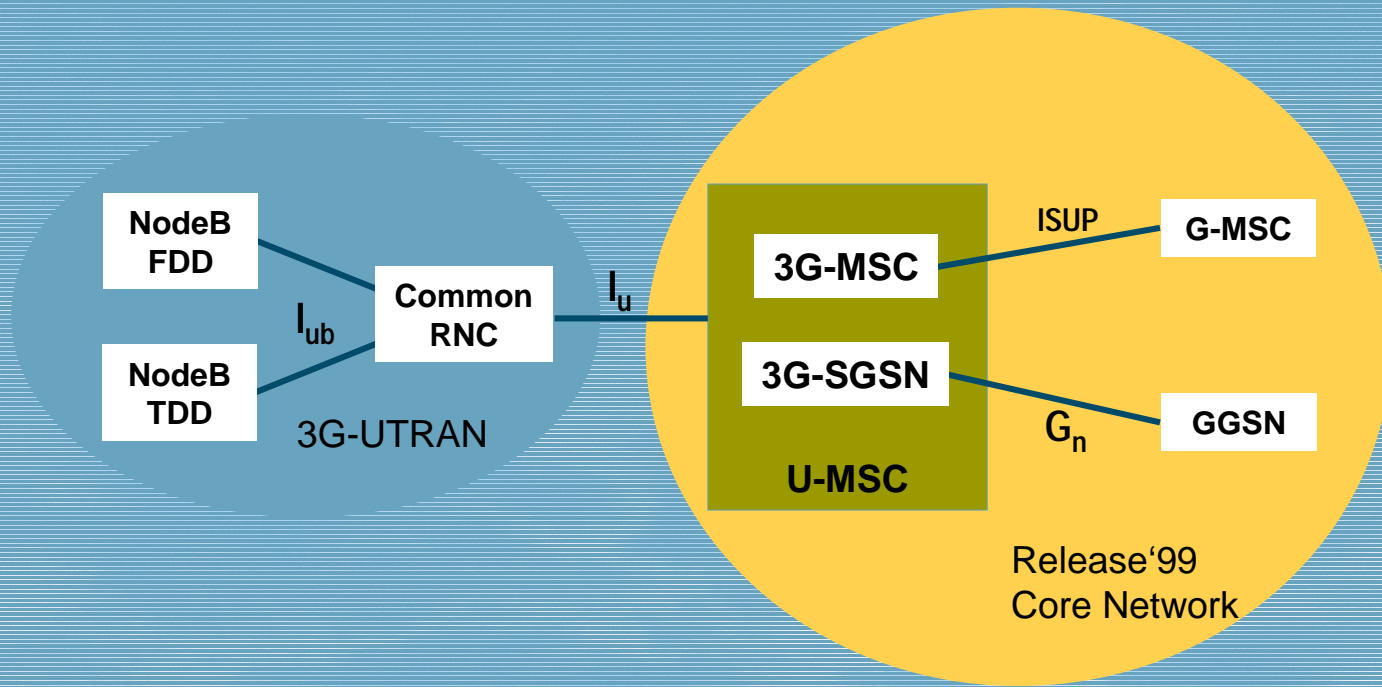


**The same RNC supports both FDD and TDD Node B multiply and simultaneously**



# Evolving Proven GSM Network Infrastructure Products To 3G Supports Mix & Match Architecture And Investment Protection

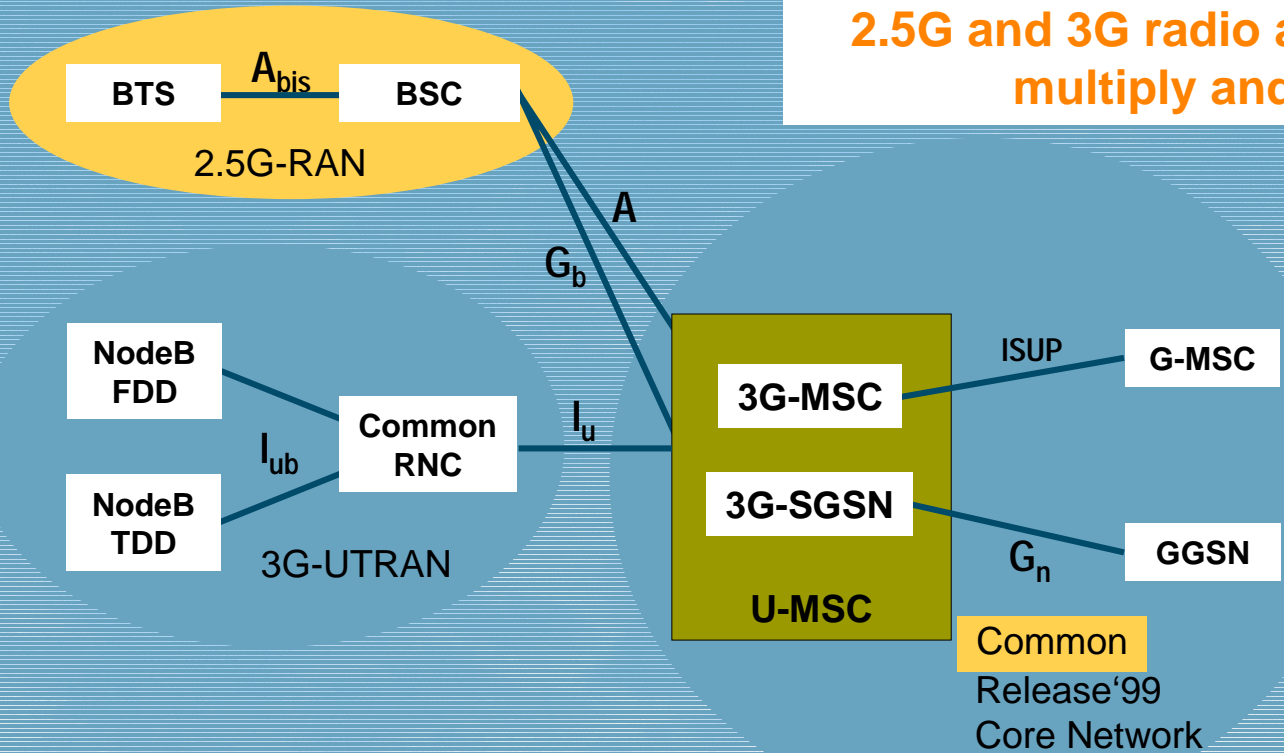
The UMTS Core network is based on GSM and carries both circuit switched and packet oriented traffic





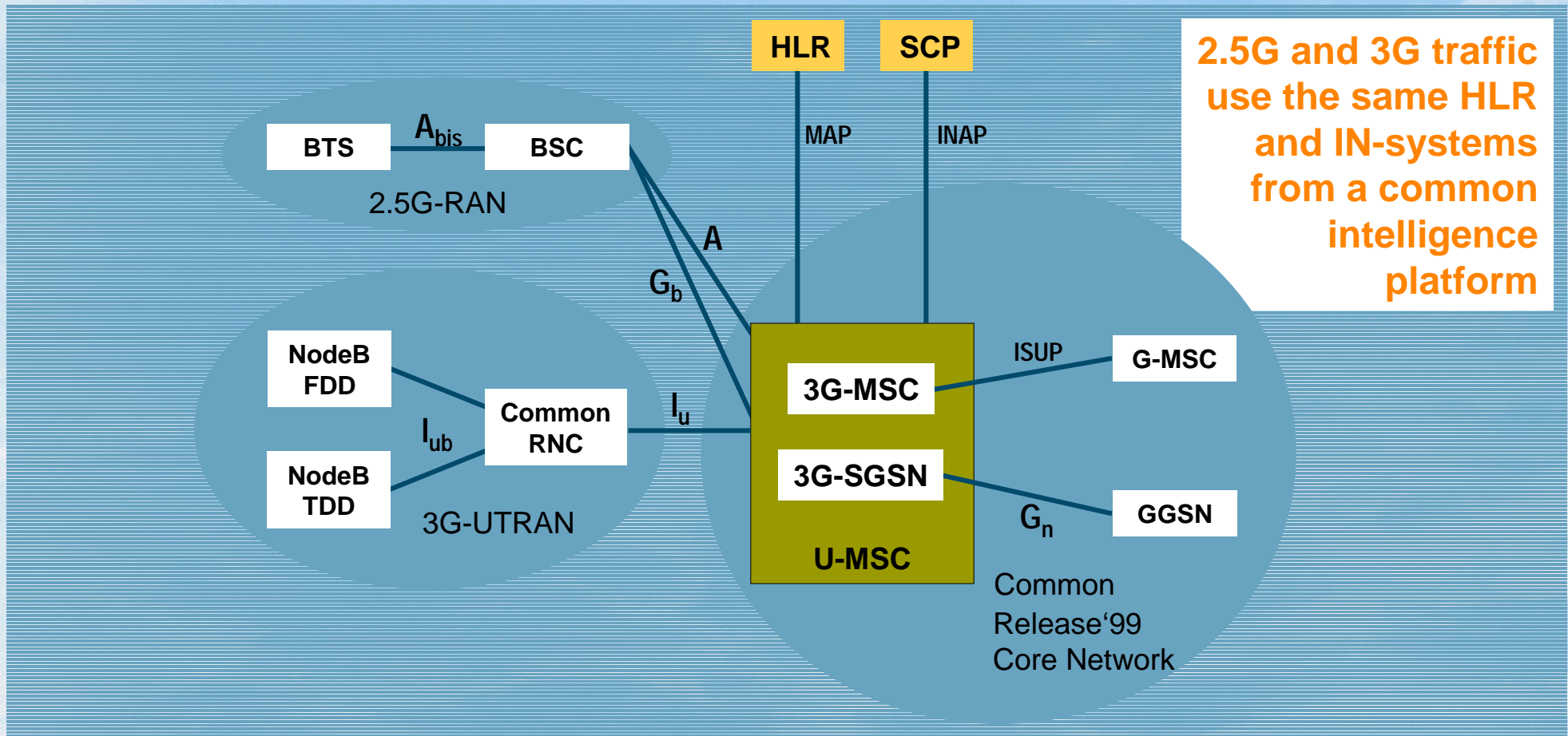
# Evolving Proven GSM Network Infrastructure Products To 3G Supports Mix & Match Architecture And Investment Protection

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



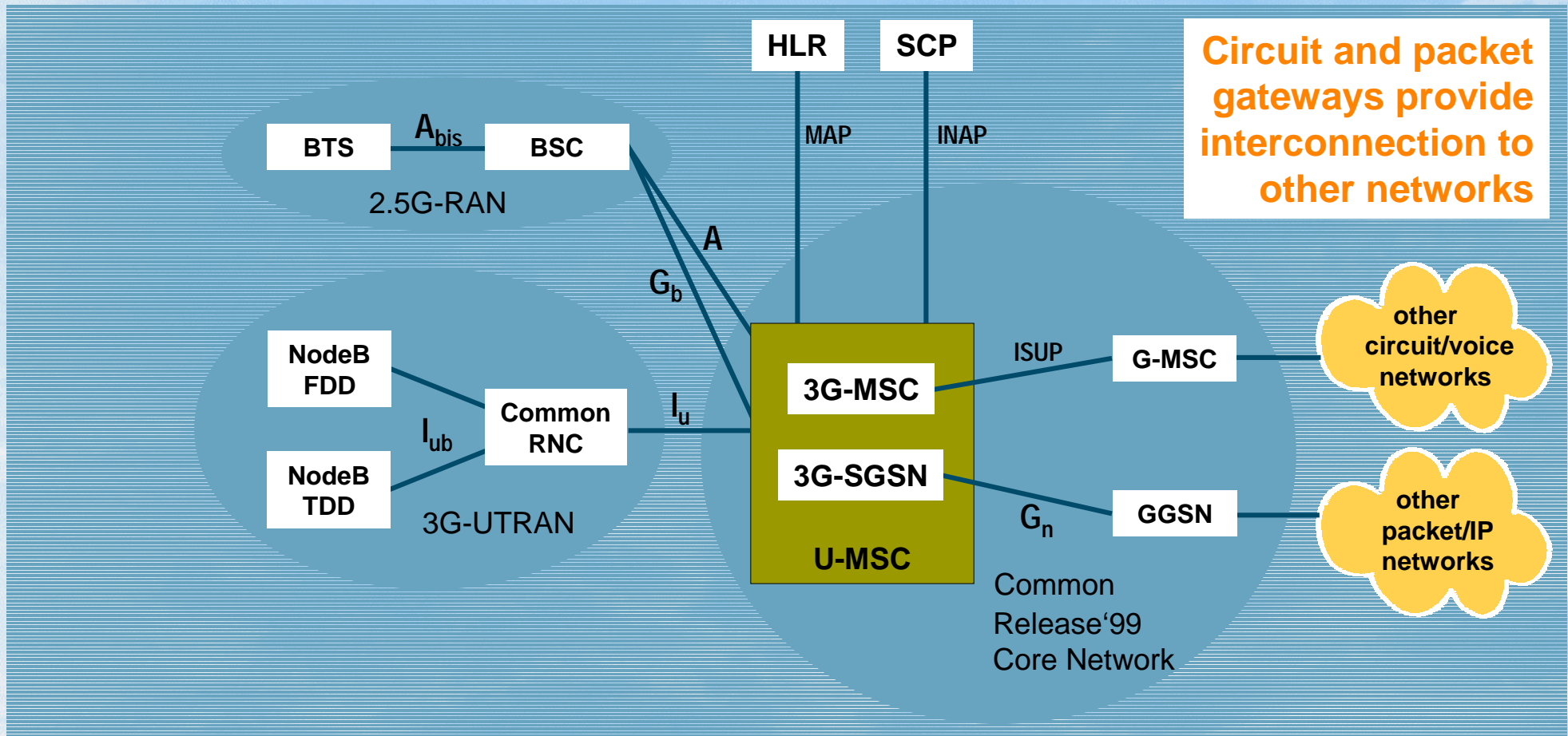


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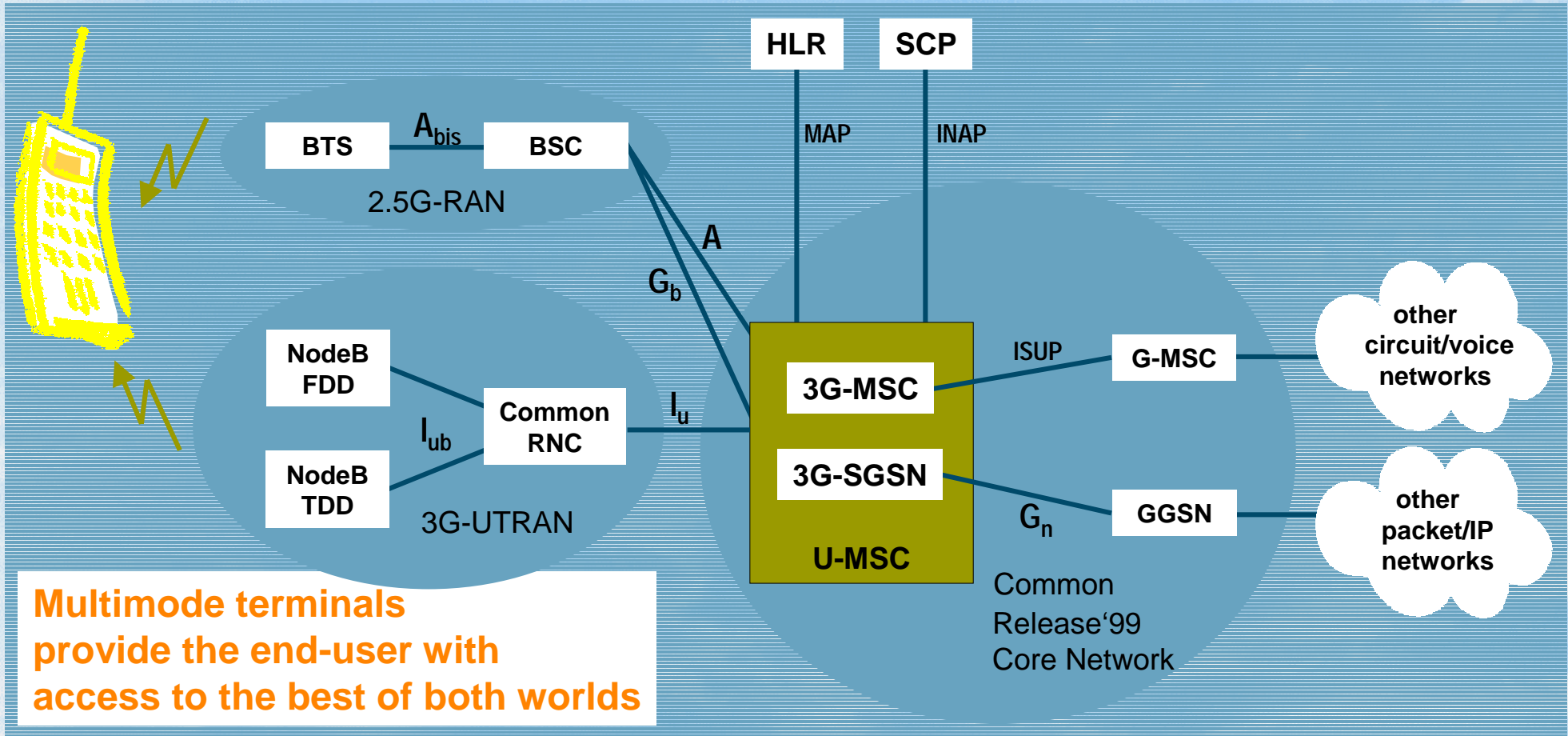




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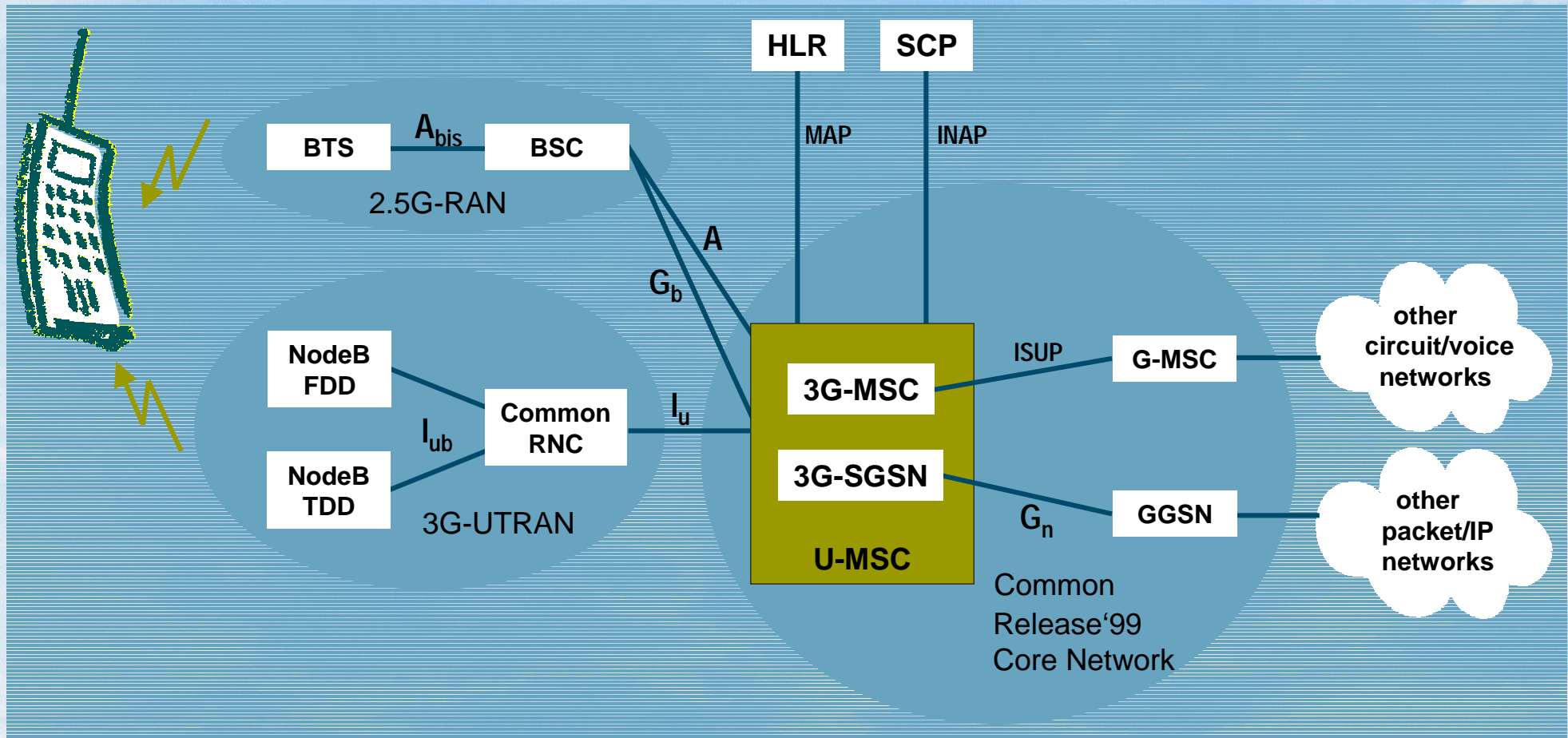


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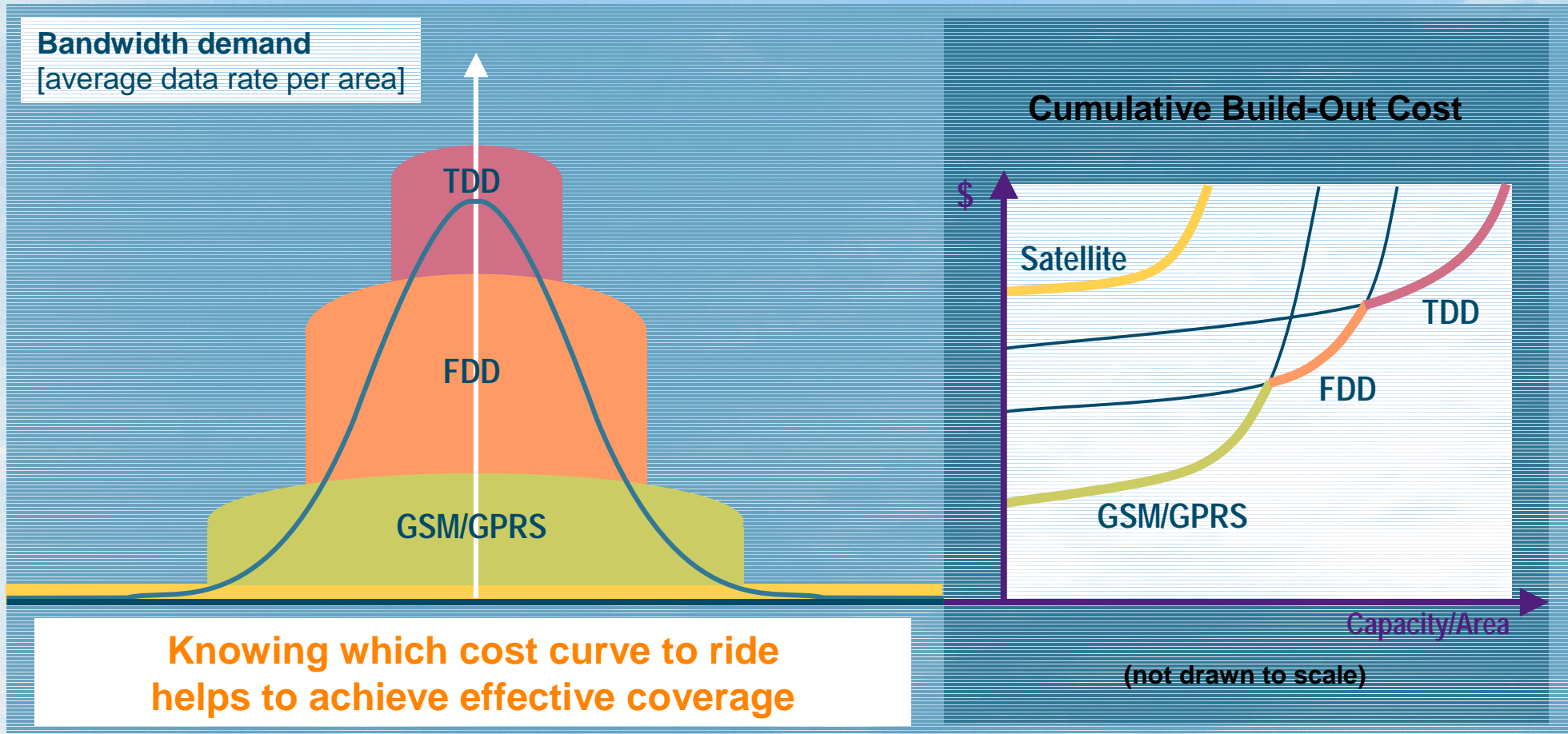




# Evolving Proven GSM Network Infrastructure Products To 3G Supports Mix & Match Architecture And Investment Protection



# UMTS Provides A Smooth Evolution Path From GSM Through A Set Of Complementary, Interoperable Standards





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# Internet-on-Air

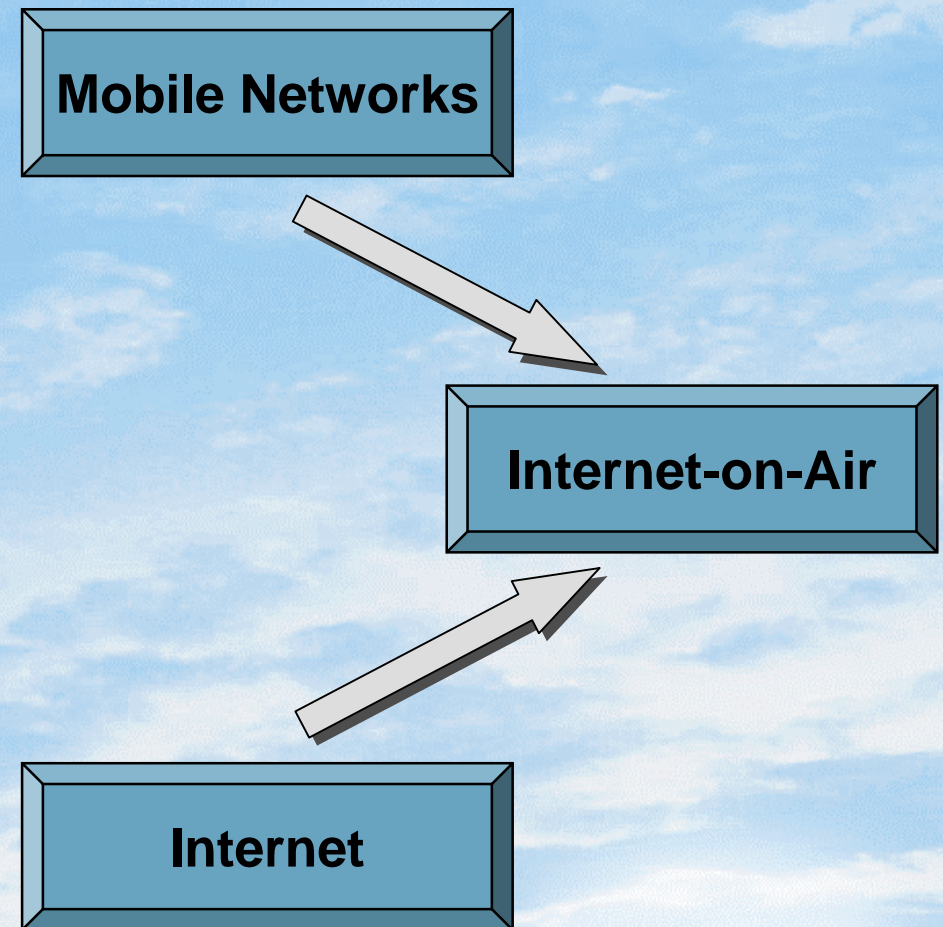
## The Evolution Target of Mobile Networks and Internet

### 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.

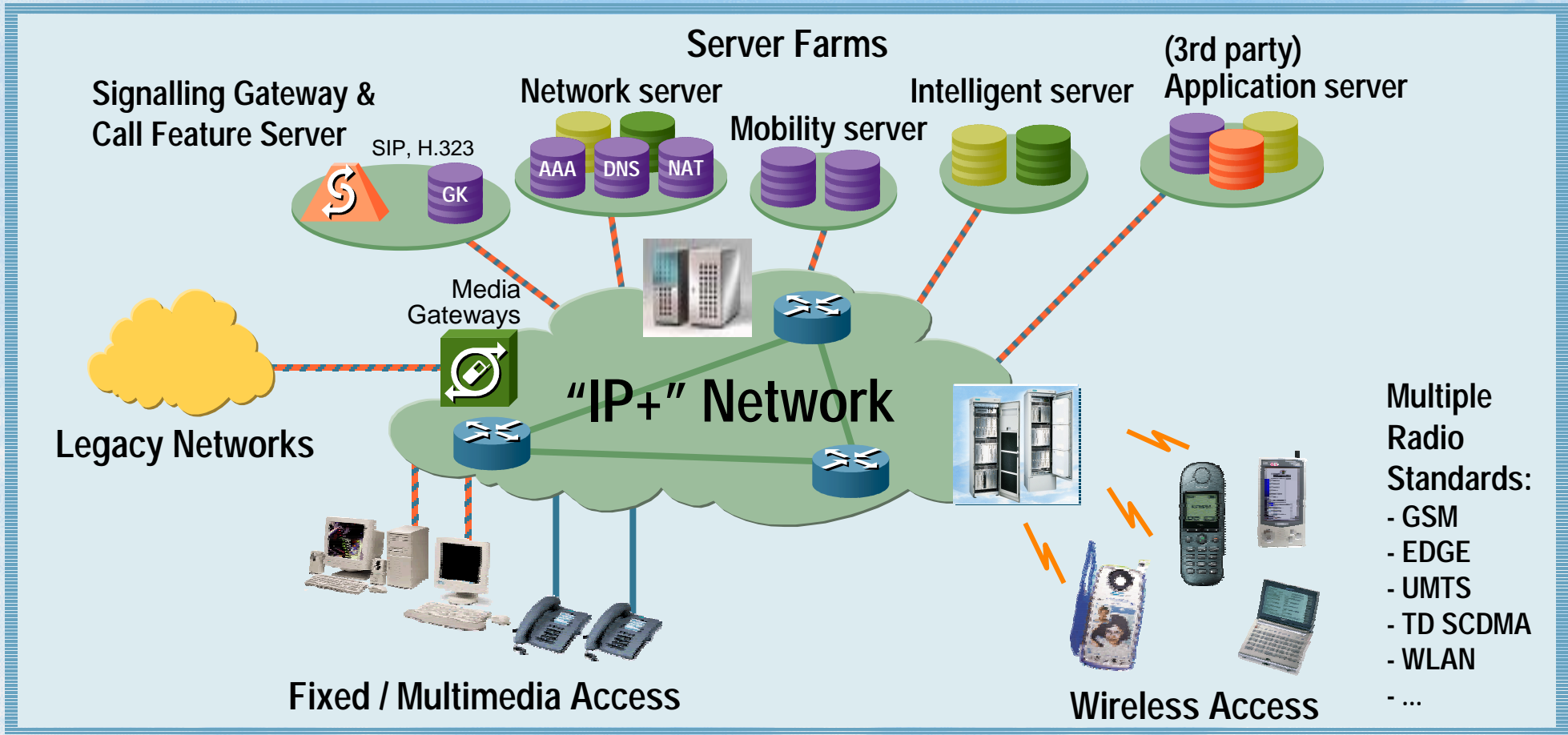
### Evolution Path of the Internet:

- ≡ Enable WI-FI wireless access.
- ≡ Support user & terminal mobility.
- ≡ Go beyond “Best Effort”.
- ≡ Provide Security and AAA.

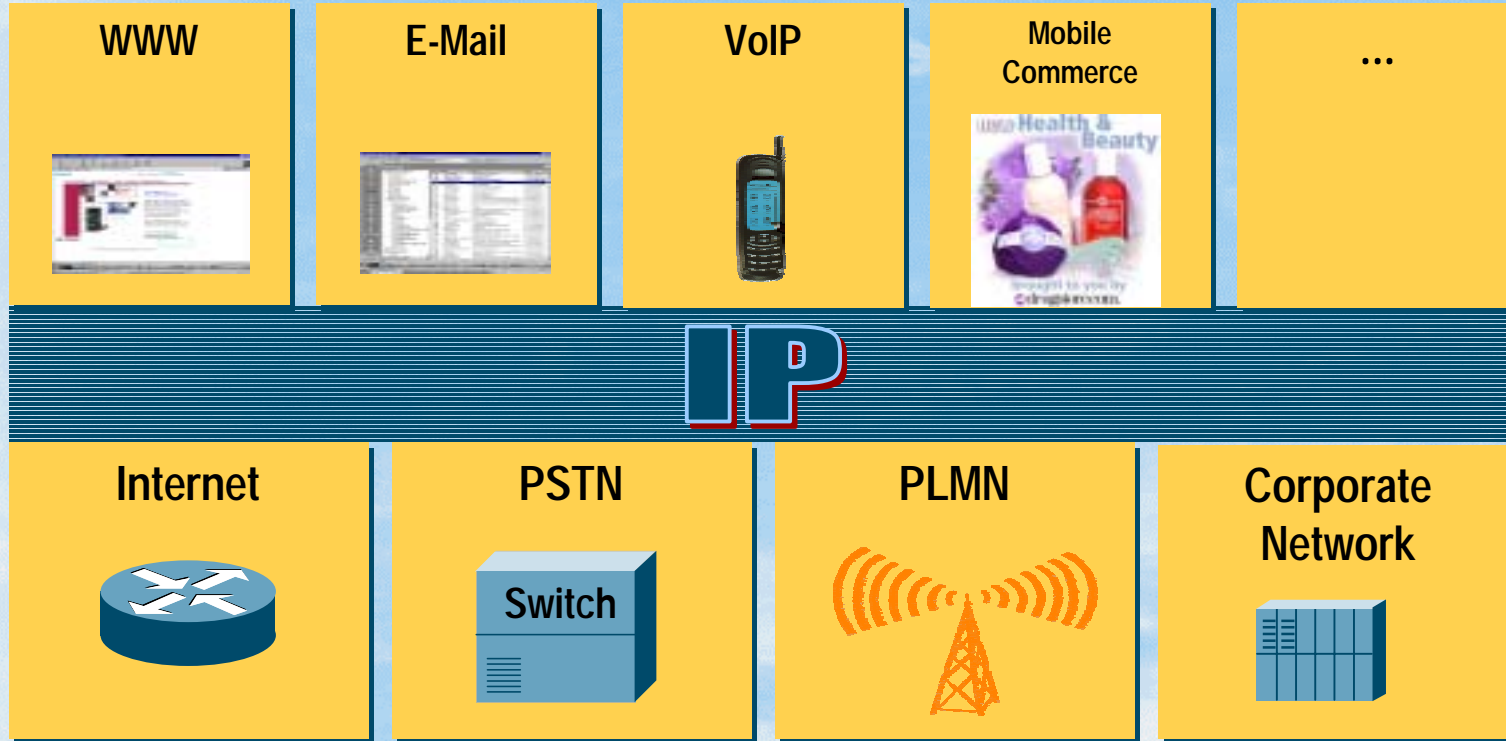




# 3G goes IP: Our Vision of the Future Network – Internet on Air



# 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)

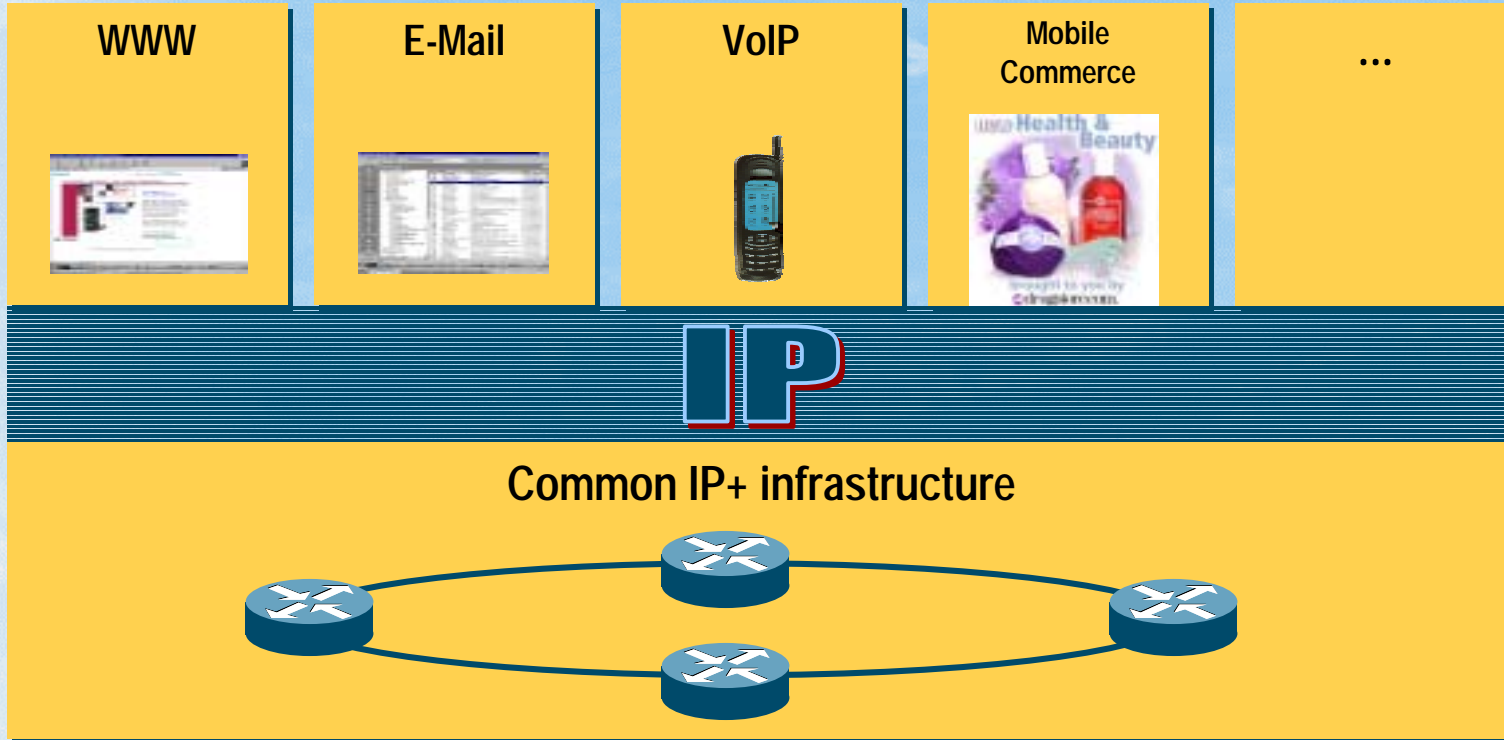
**IP over Anything**  
A common IP layer harmonises networks and provides internetworking over different network technologies

**→ 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 & wire line)
- 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:

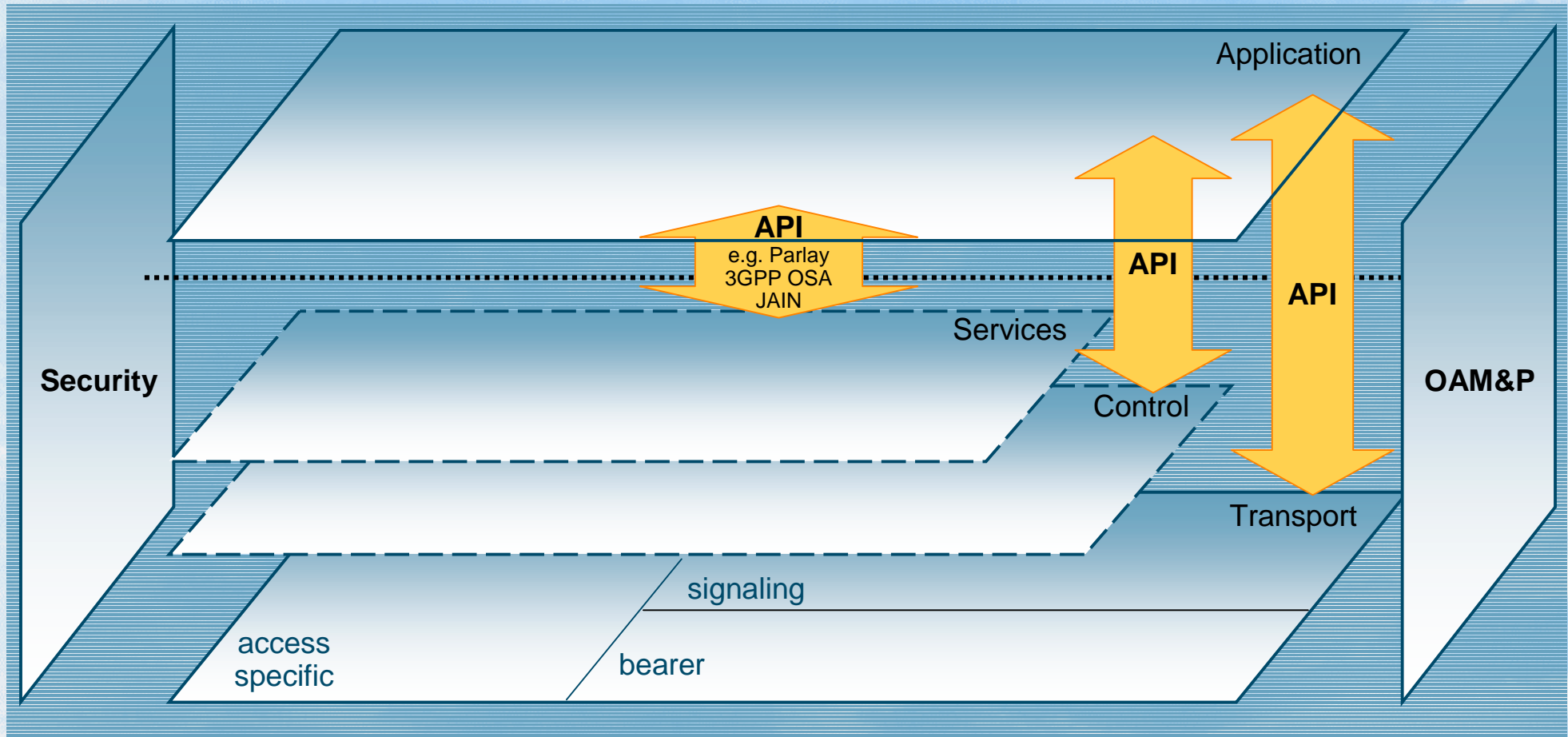
## MWIF Mission Statement:

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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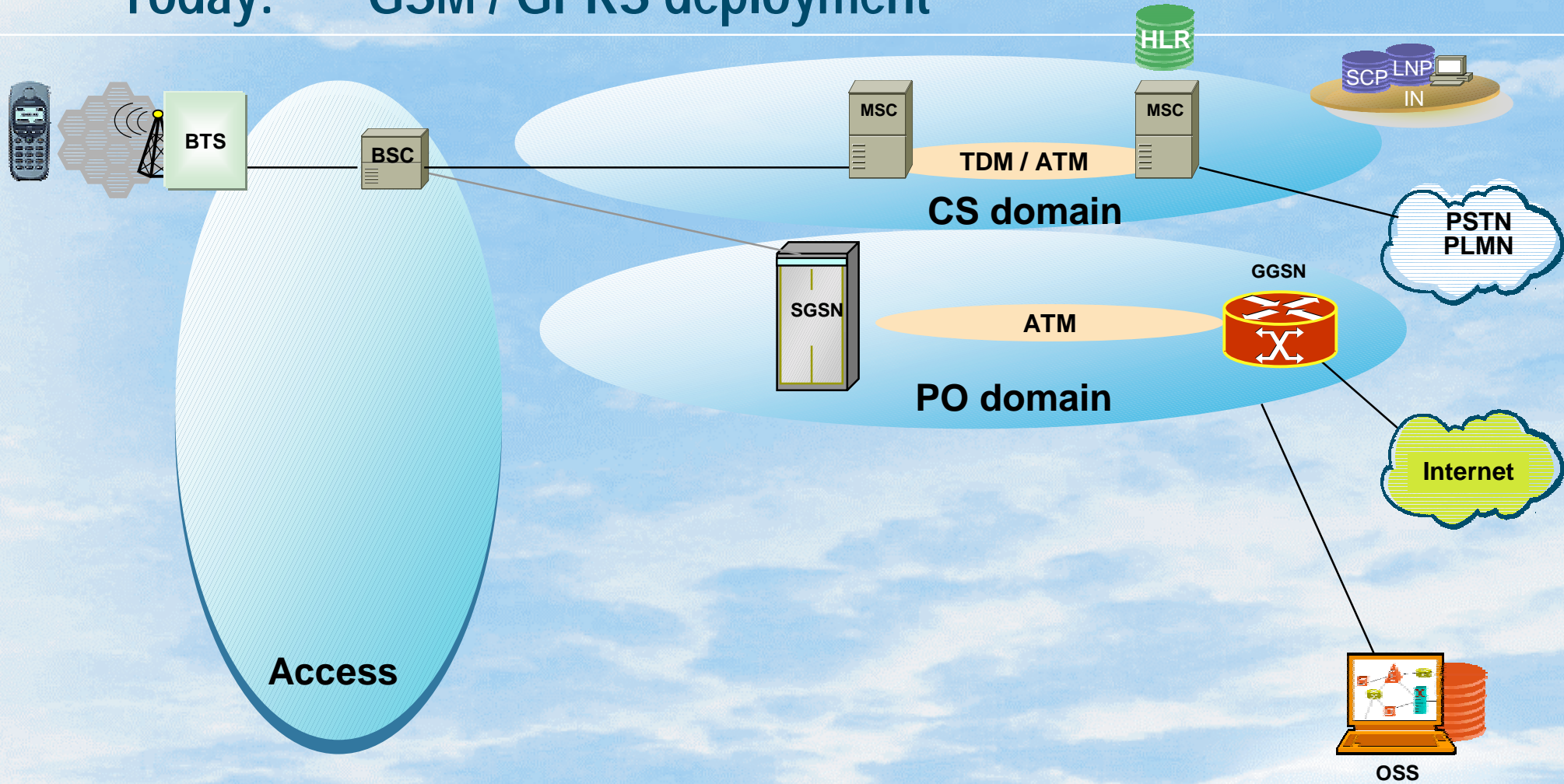
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# Network Evolution

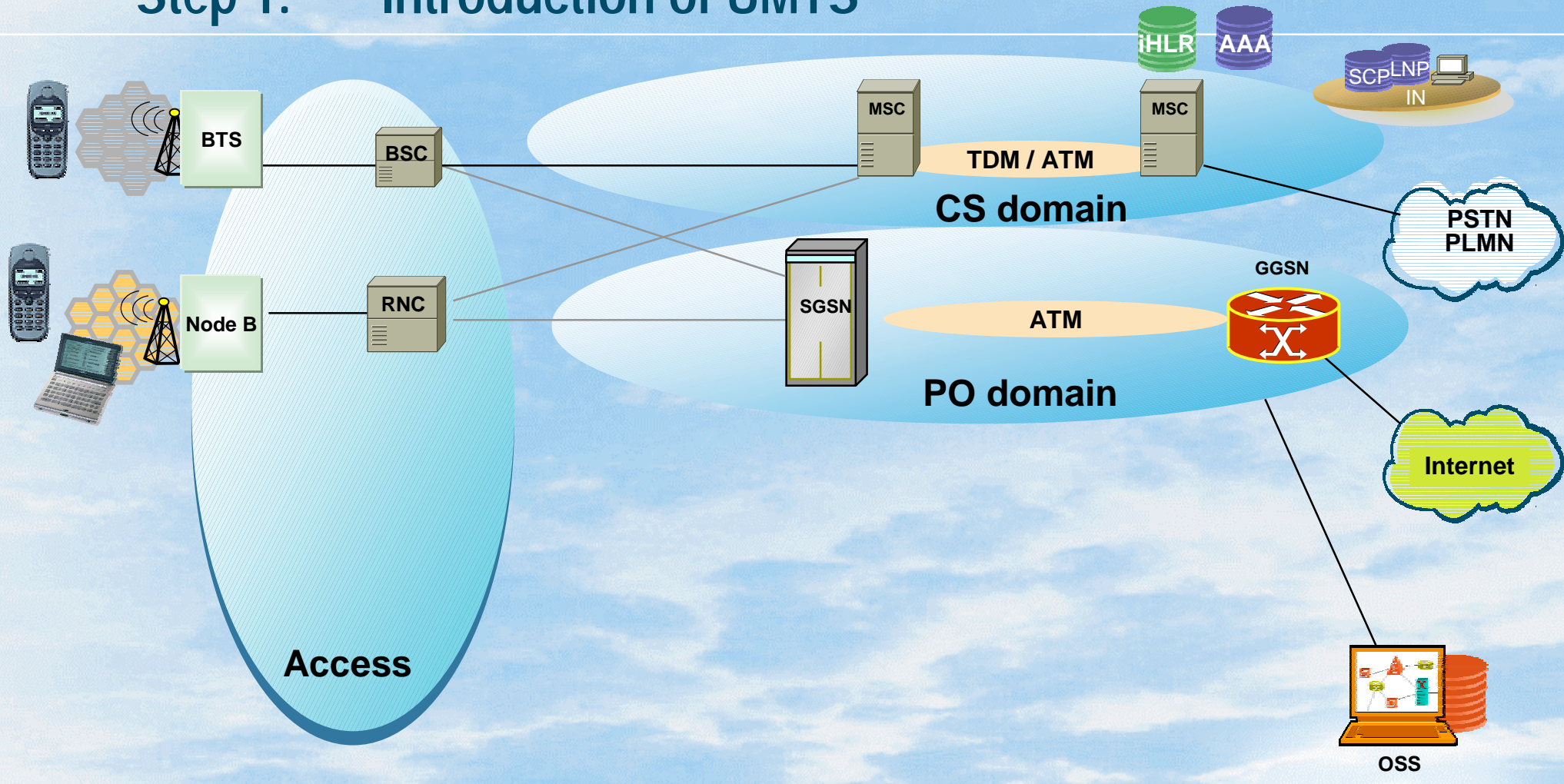
## Today: GSM / GPRS deployment





# Network Evolution

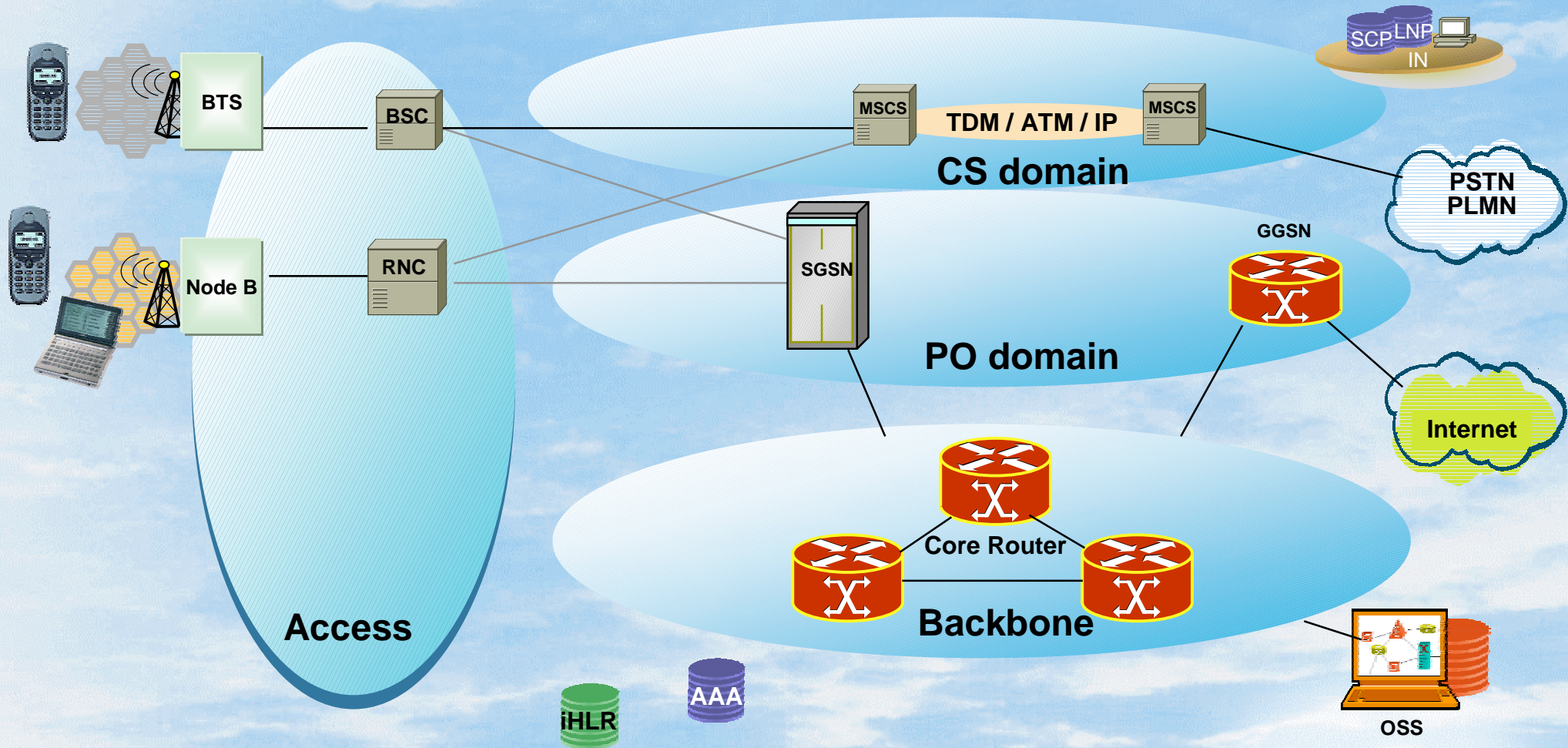
## Step 1: Introduction of UMTS





# Network Evolution

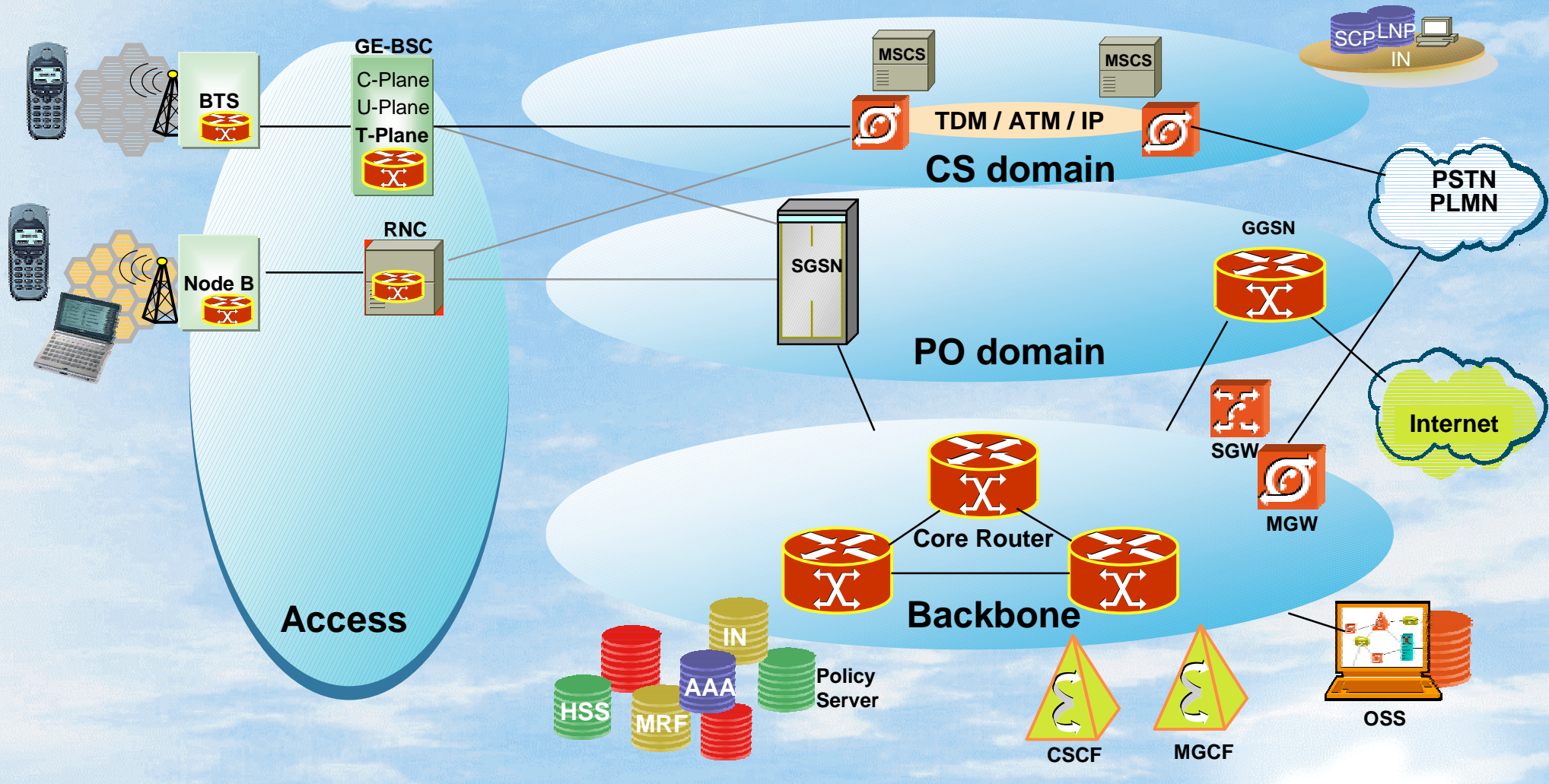
## Step2: Introduction of IP backbone





# Network Evolution

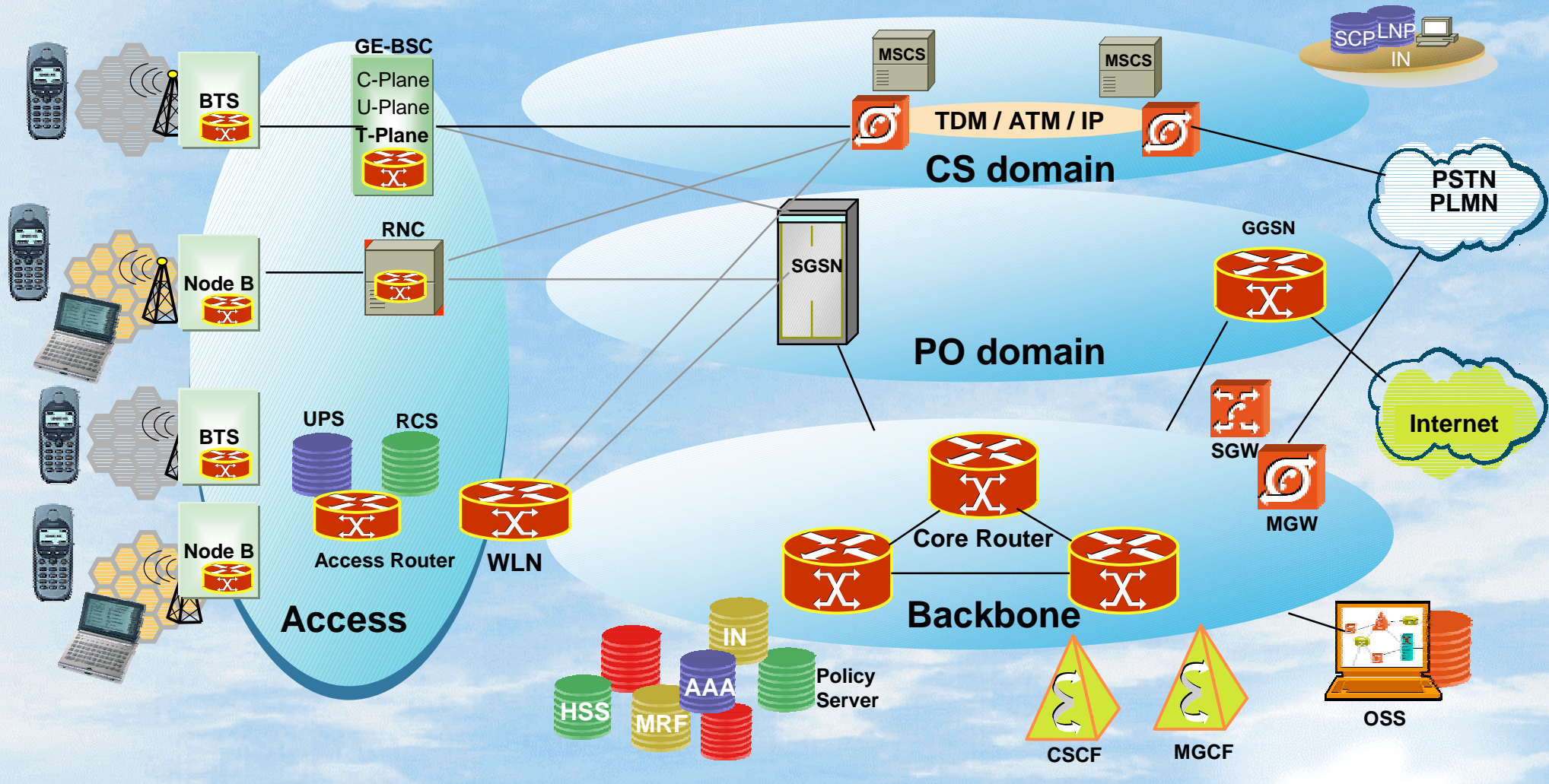
## Step 3: IP in the Radio Access





# Network Evolution

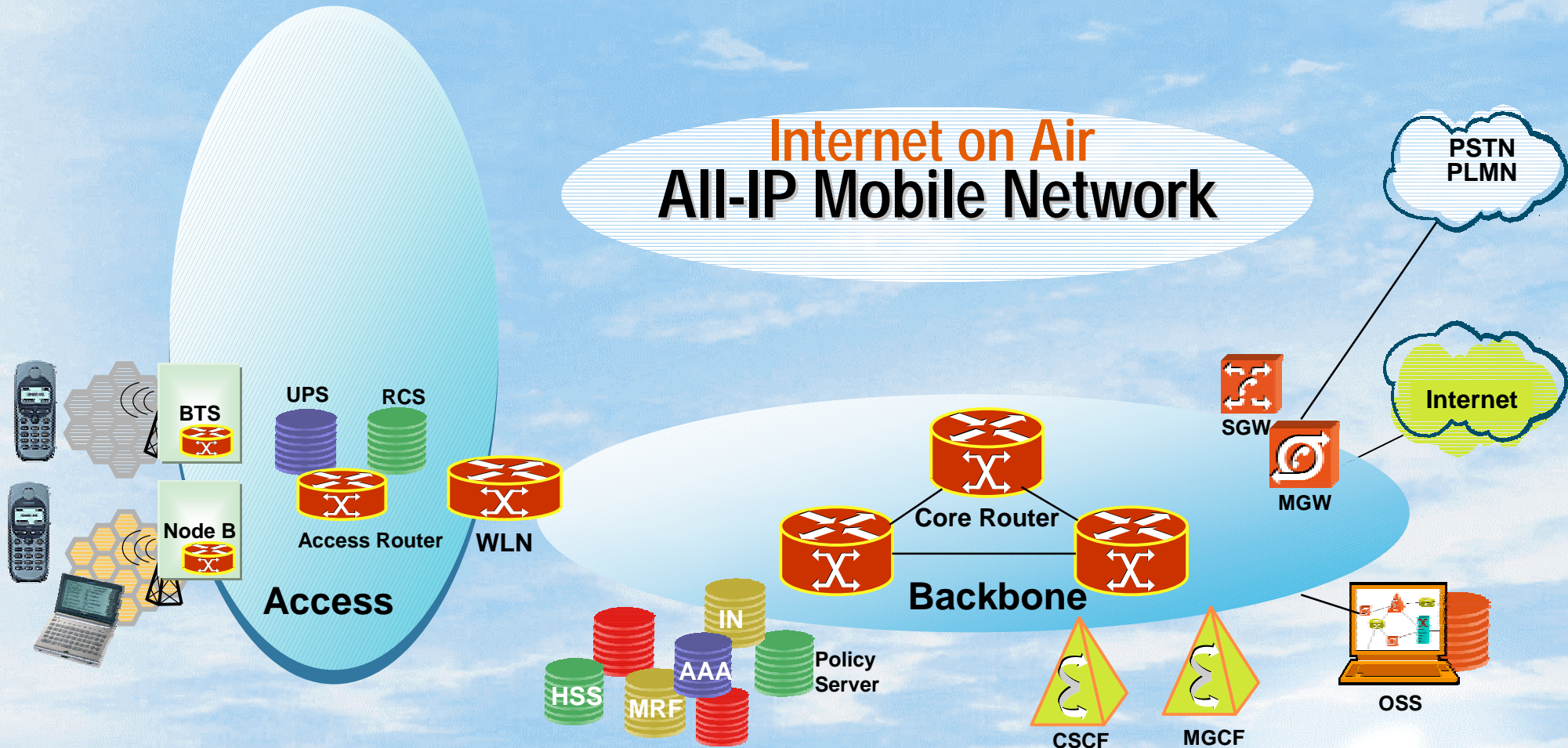
## Step 4: IP-based Radio Access Solution





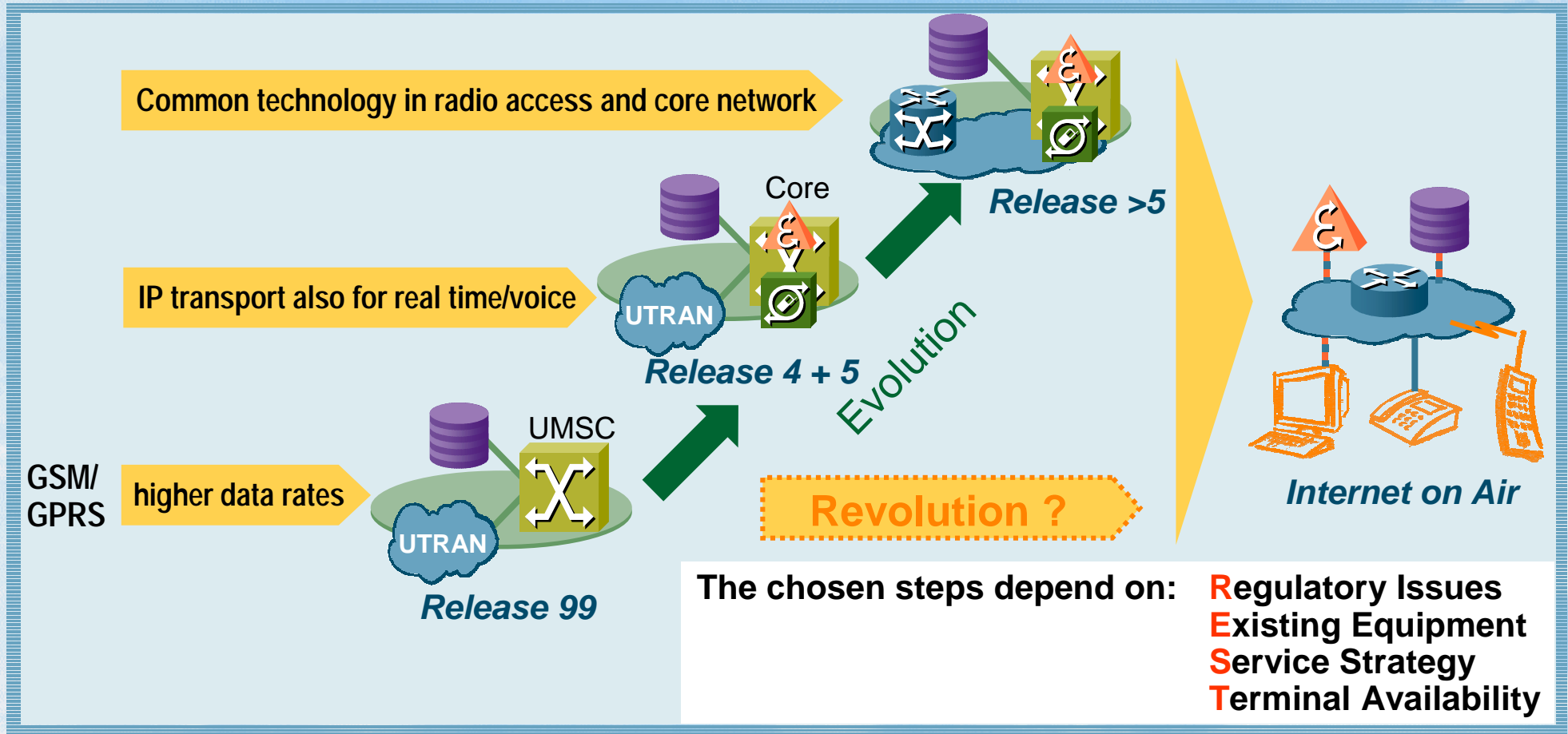
# Network Evolution

## 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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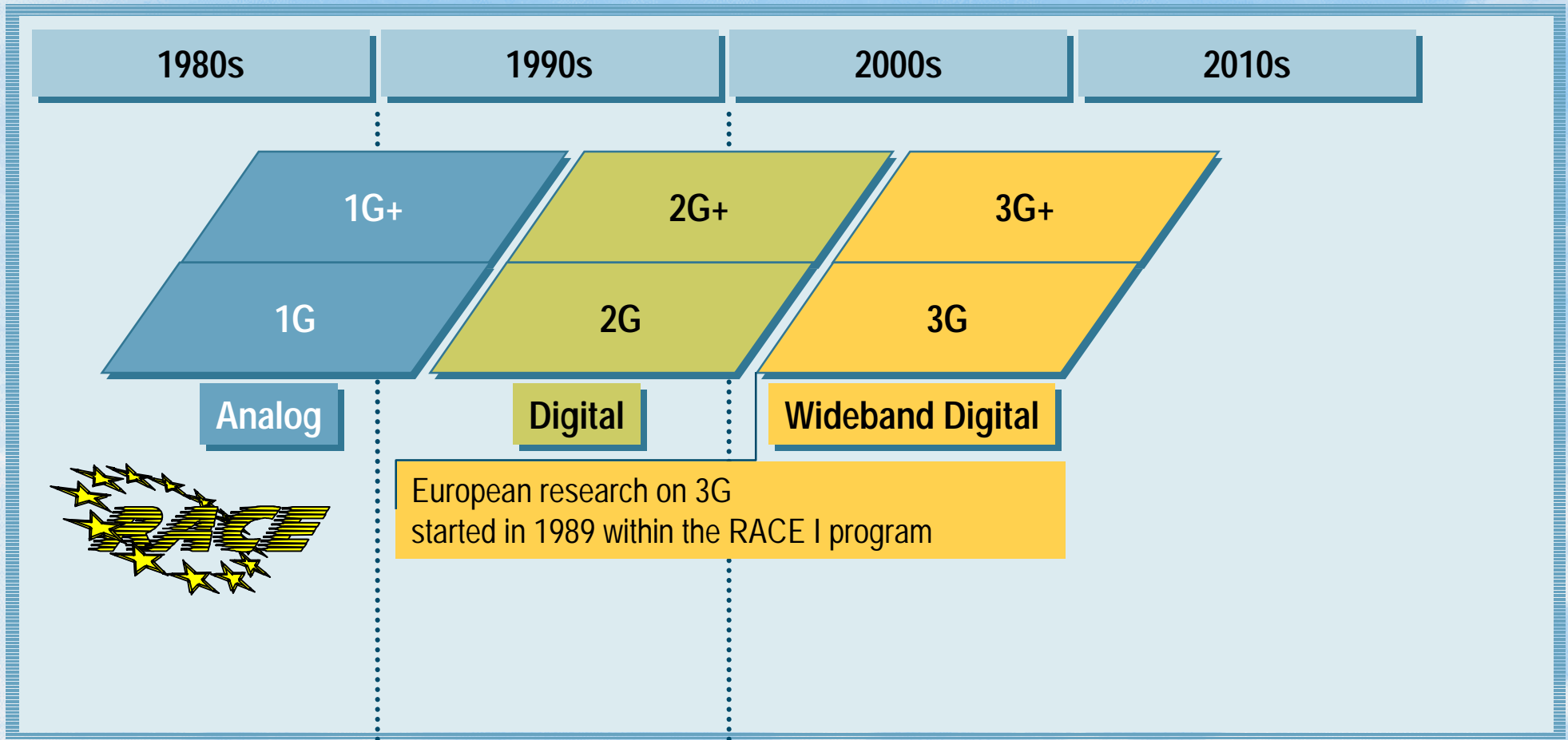
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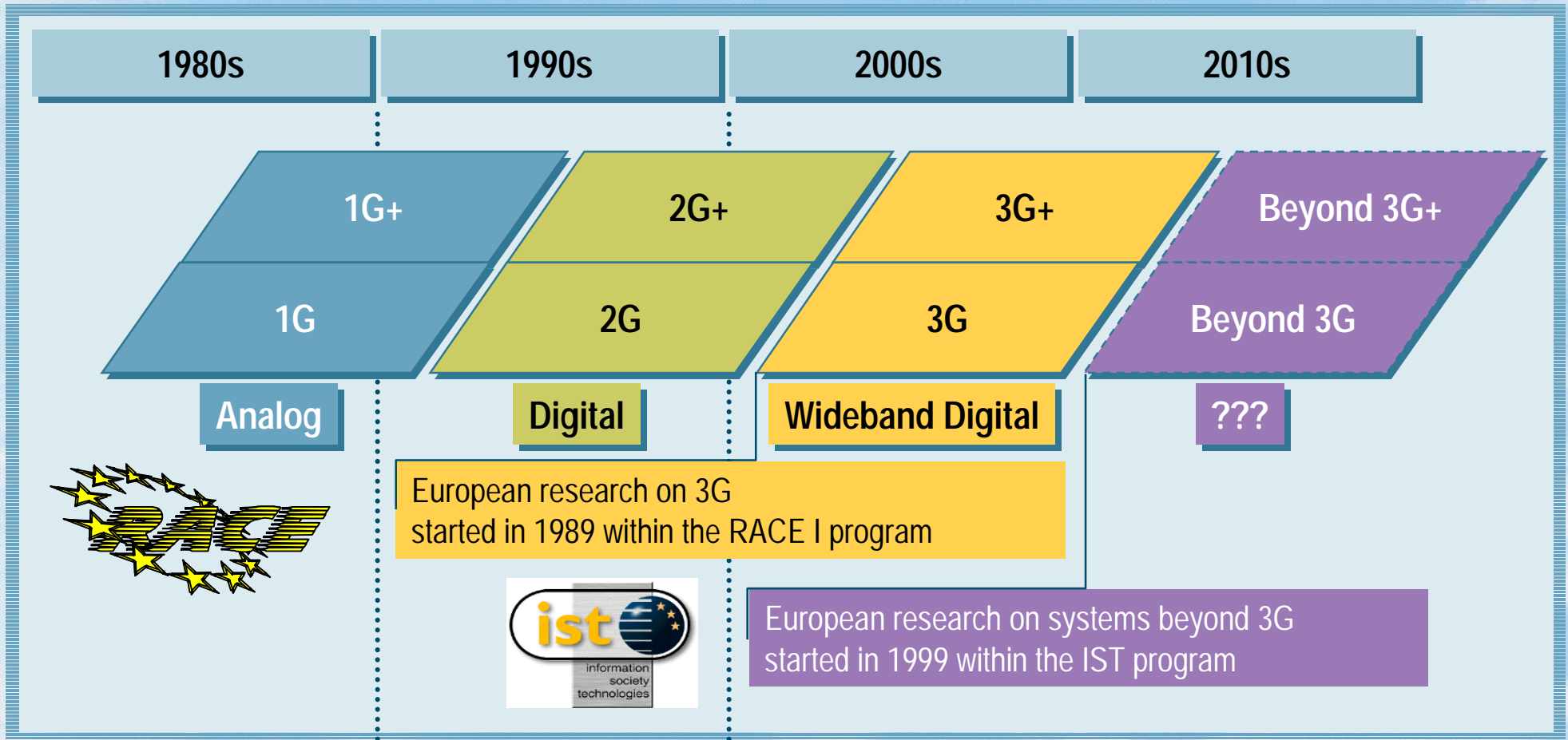
***And beyond UMTS/IMT-2000 ?***

# Evolution Of Mobile Communication Systems





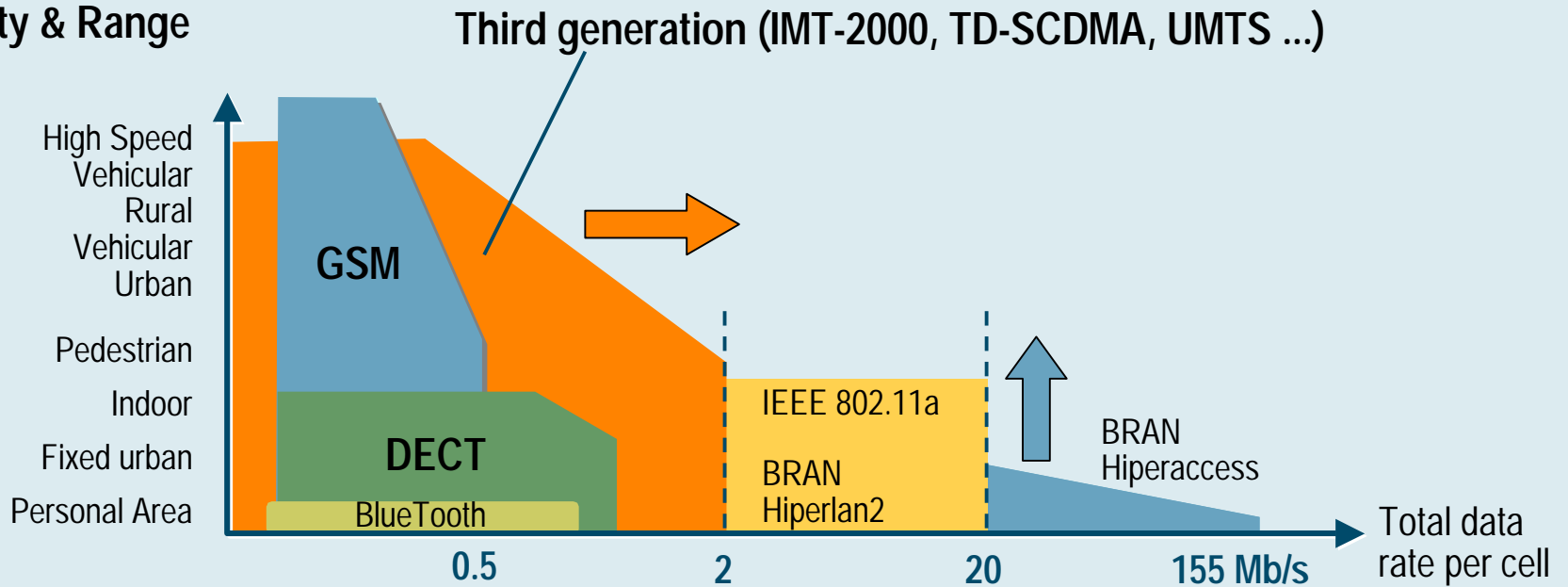
# Evolution Of Mobile Communication Systems TAKES TIME



# 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

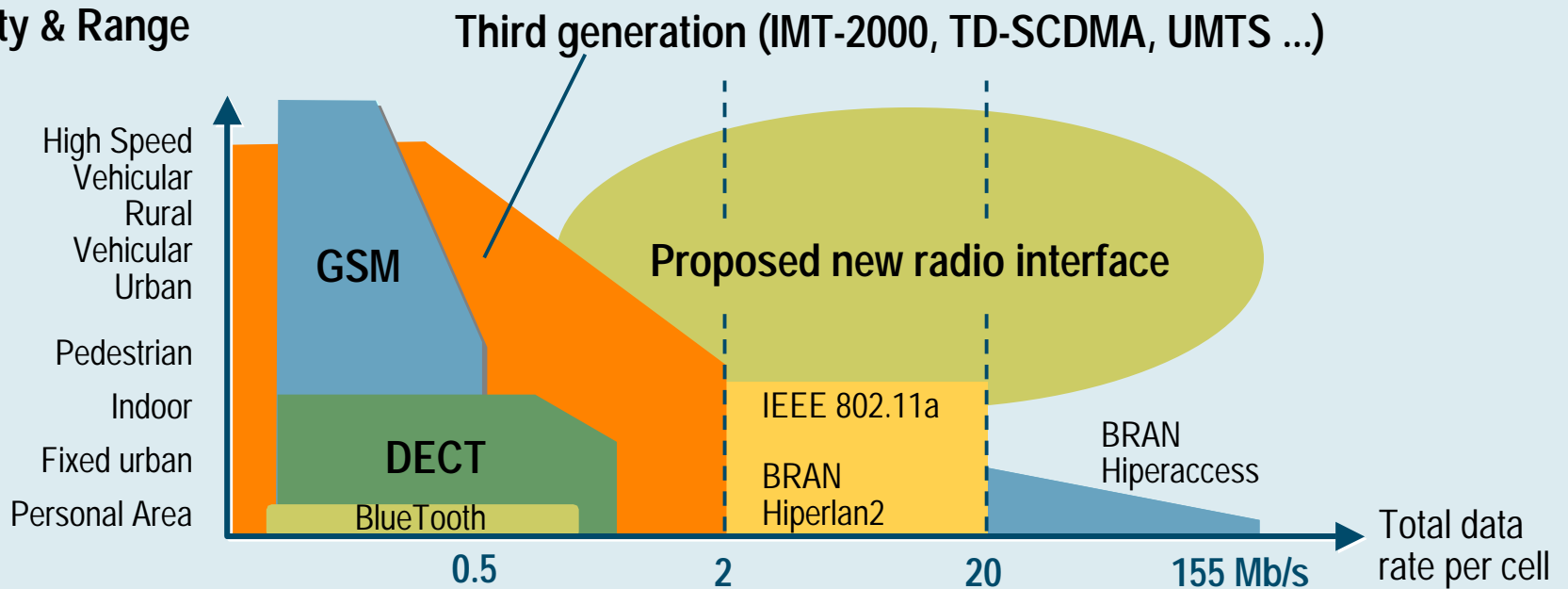




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## Mobility & Range



# *Smooth evolution from GSM to 3G and beyond*

***THANK YOU !***

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