IEEE BROADBAND WIRELESS ACCESS WORKSHOP

Co-located with IEEE CCNC 2008

Broadband Everywhere

Thomas Michael Bohnert, Siemens CT

in cooperation with E. Estroff and K. Kohrt

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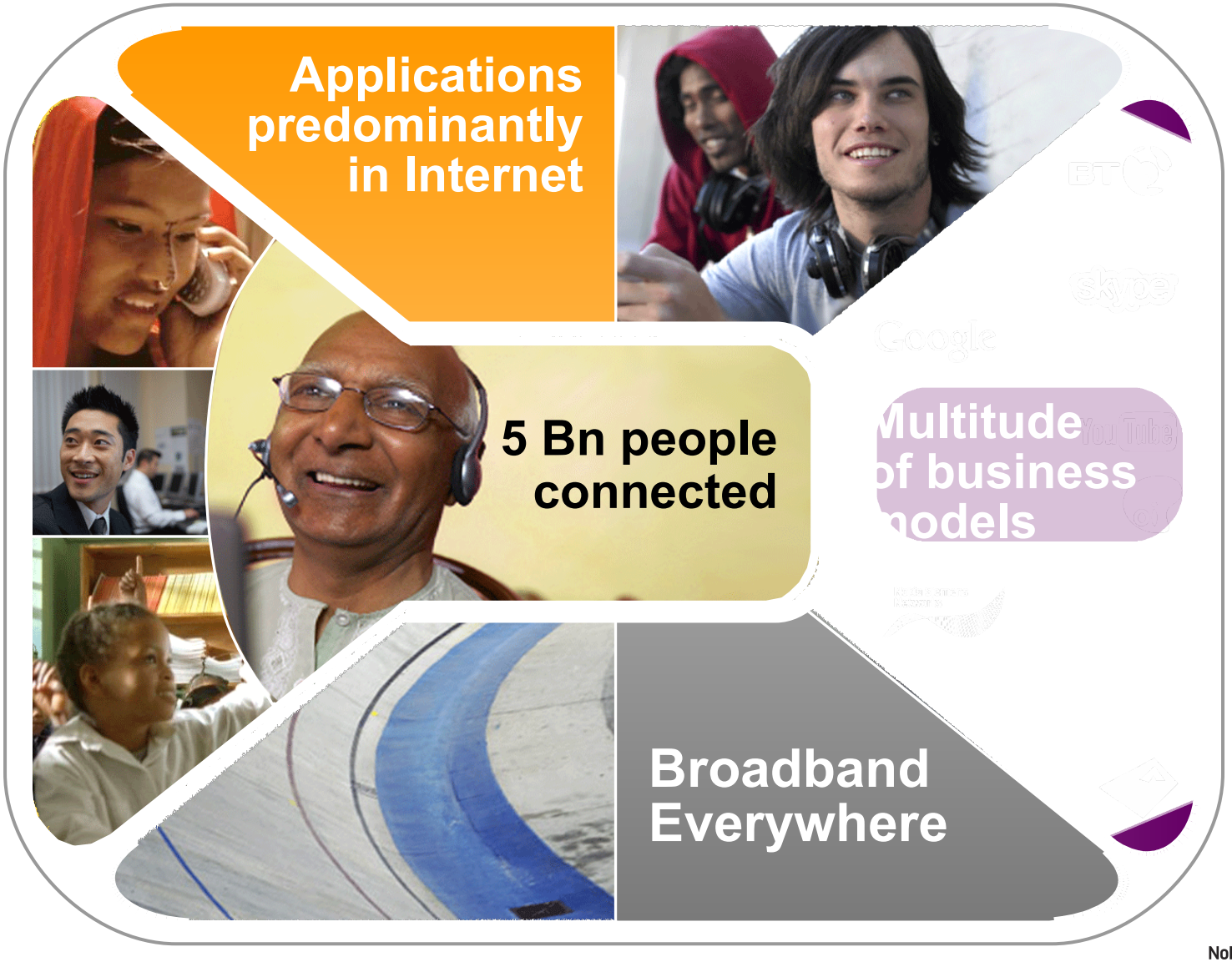
Our market vision of 2015 – the World connected



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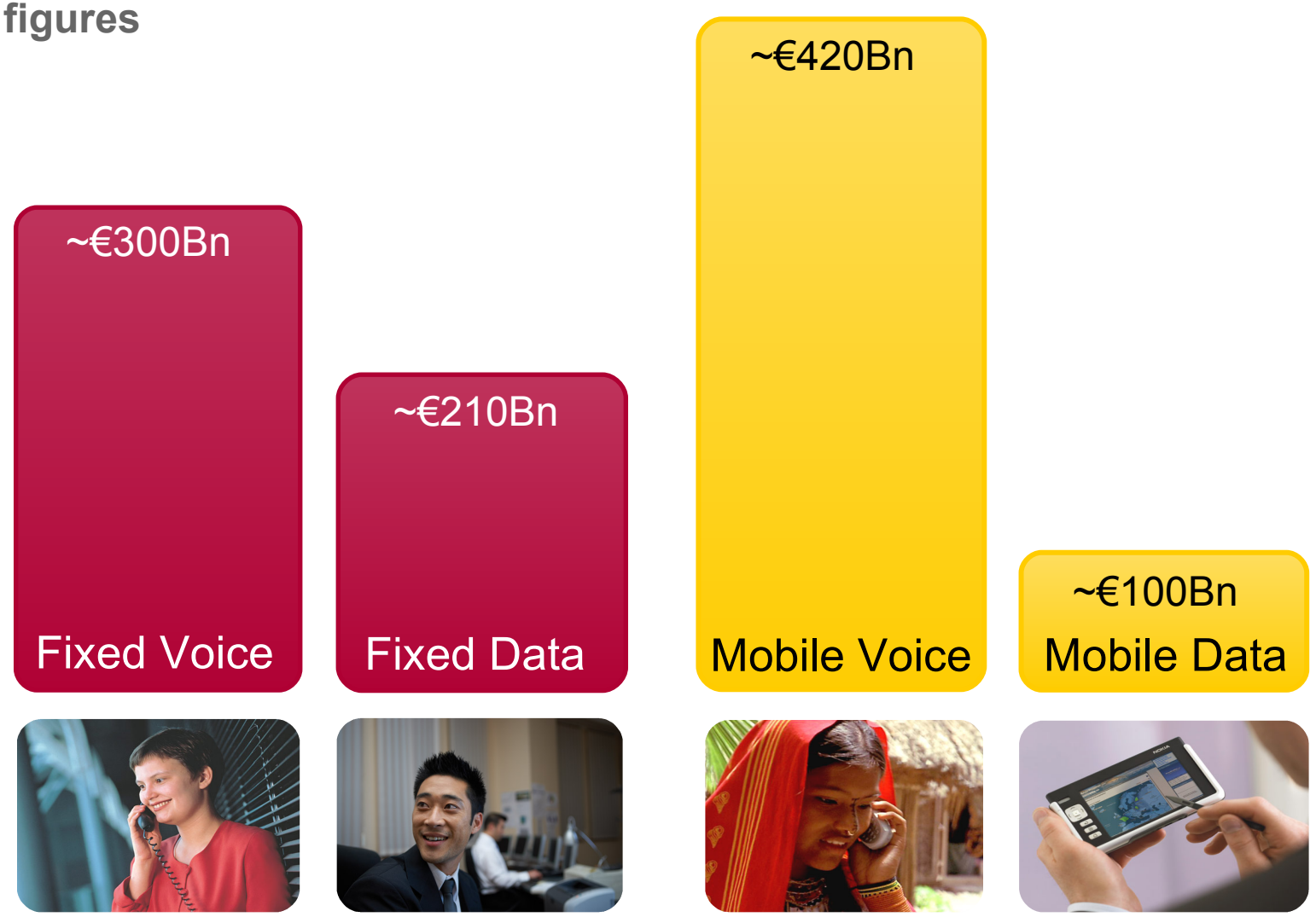
Starting point:
€1000Bn service industry built on 4 drivers…

2006* figures



Source: Nokia Siemens Networks

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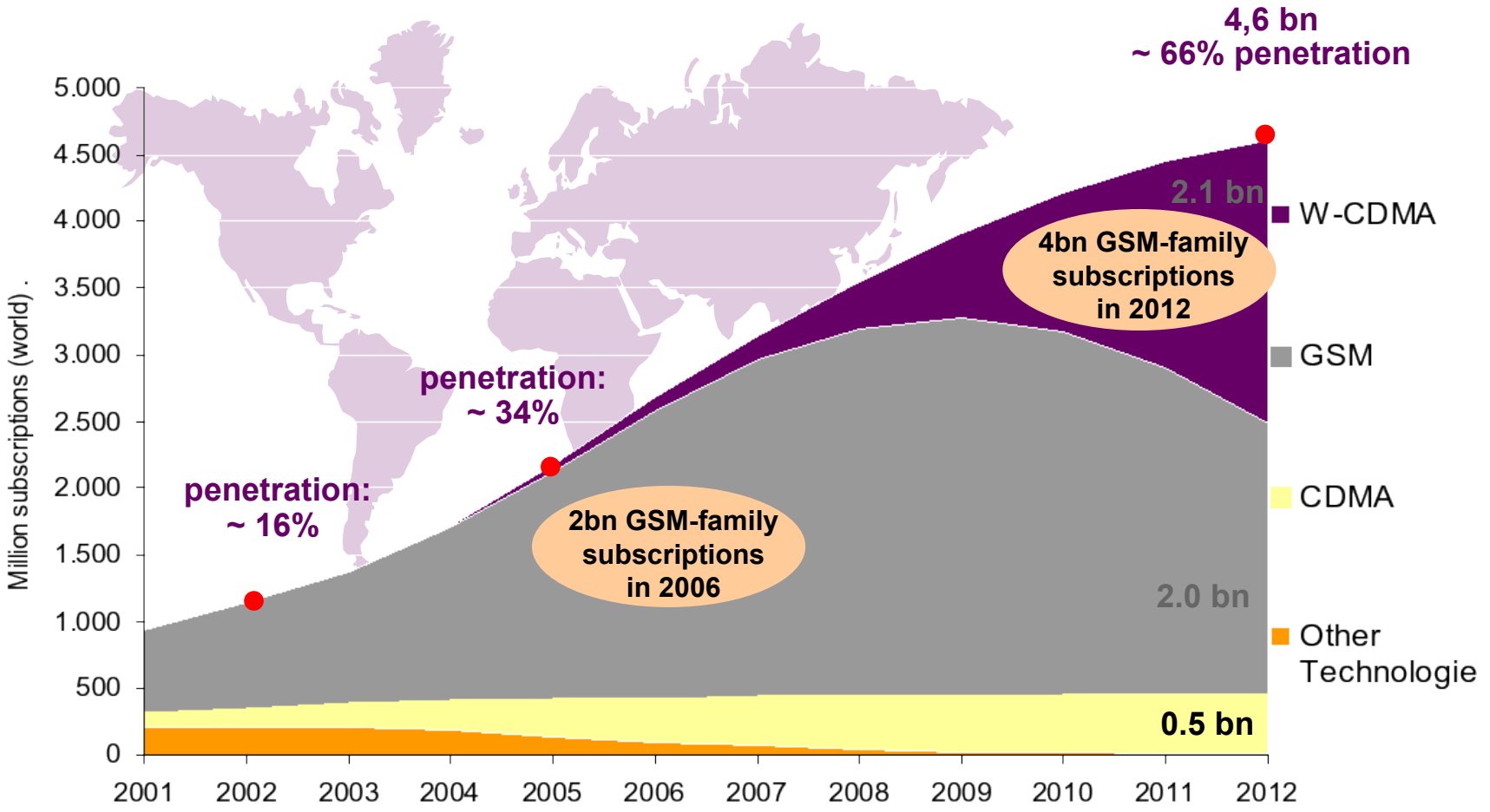
Development of Subscriptions by Technology (World)

GSM family evolved into the predominant technology of choice



Source: Com MN SM Market Assessment Status: September 2007

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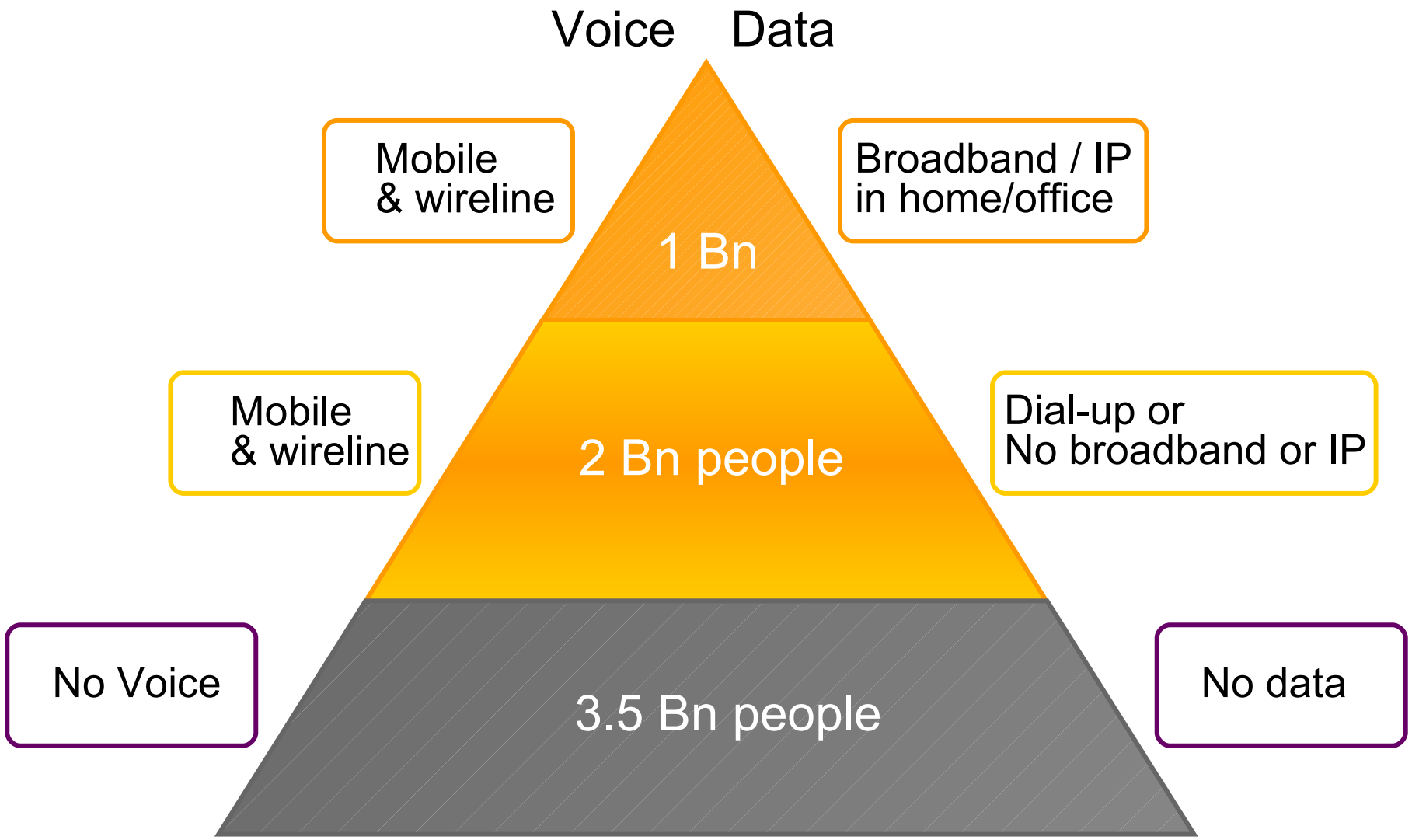
Connectivity today



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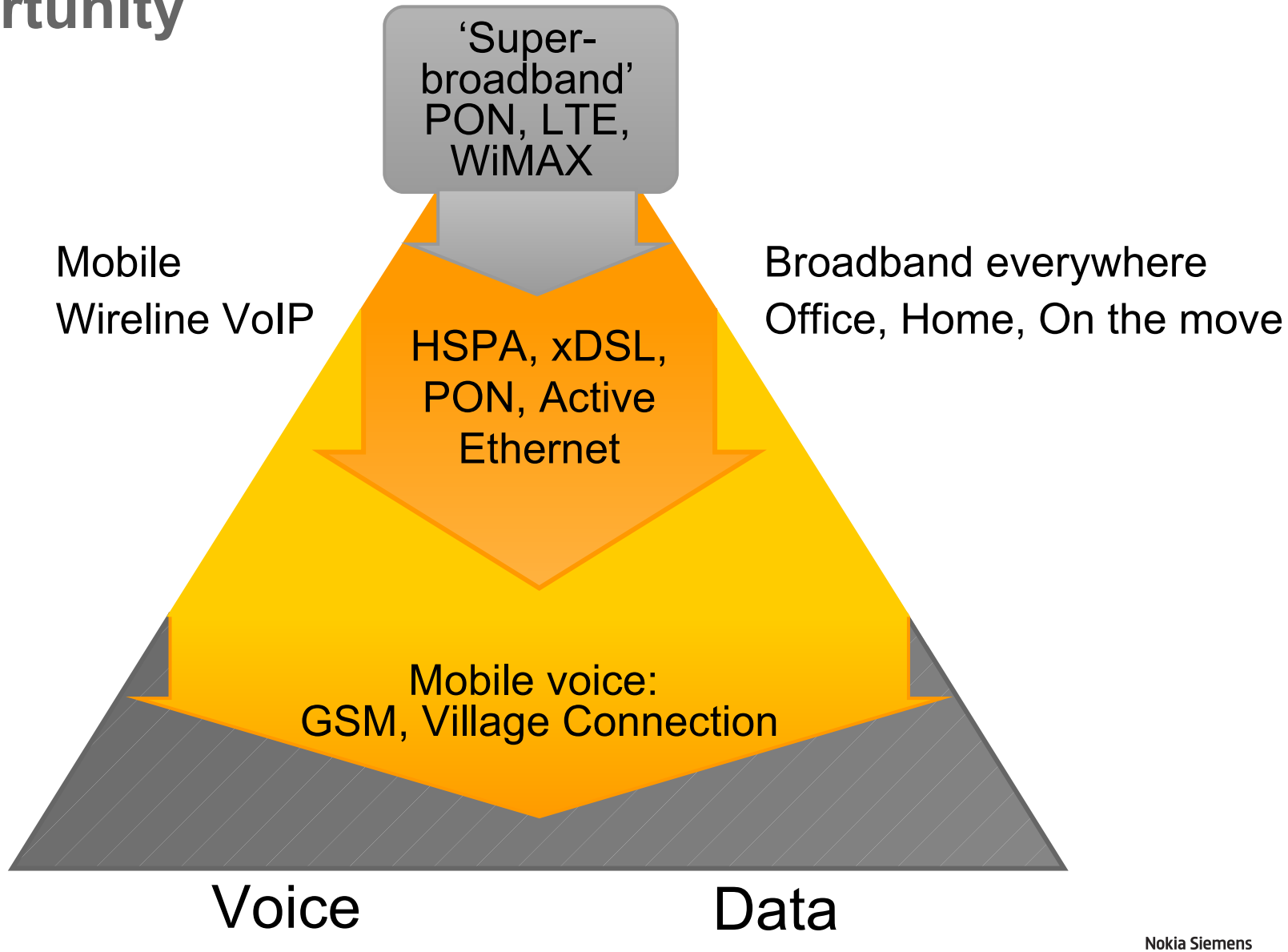
Broadband IP based services the largest growth opportunity



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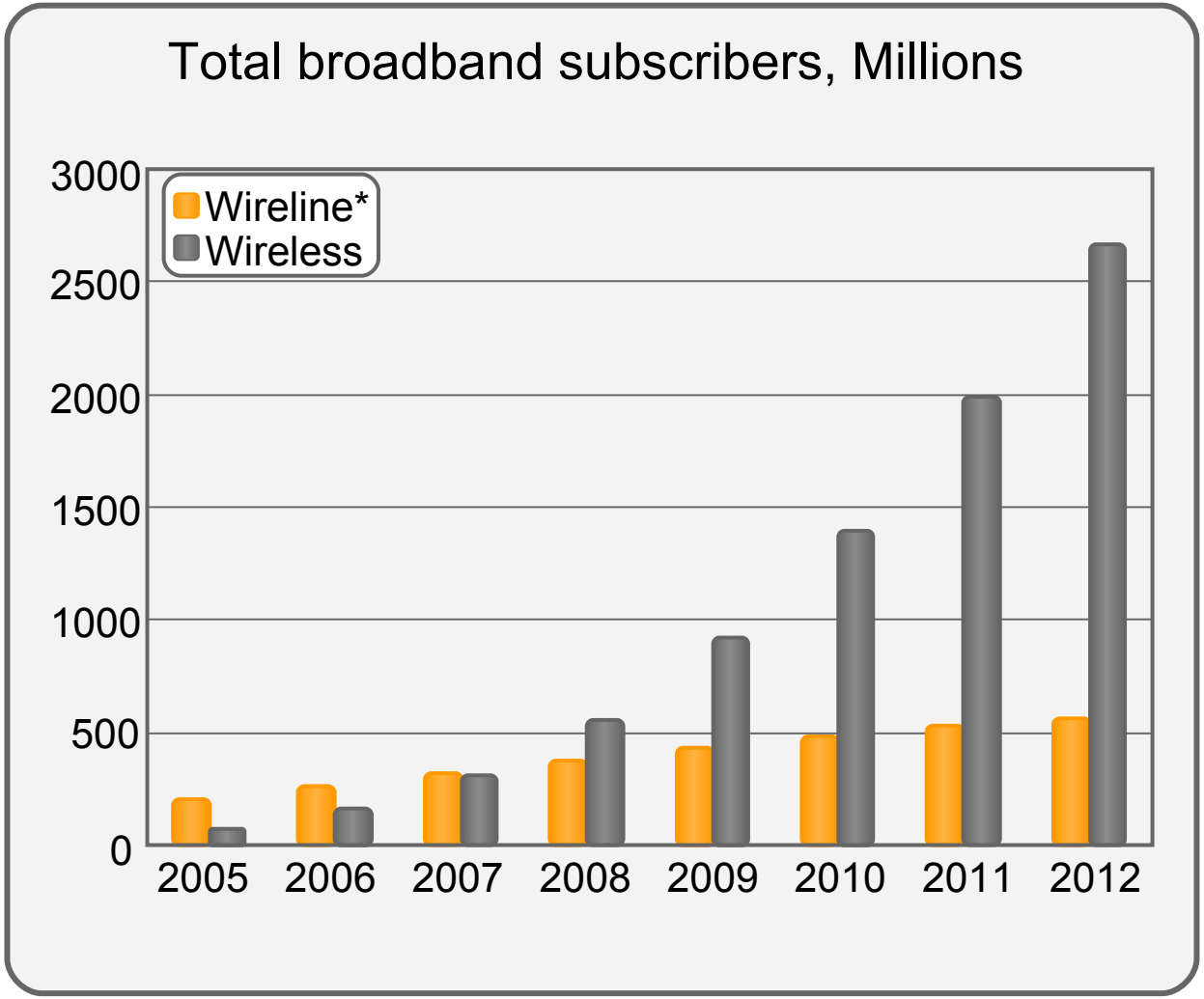
Wireless & wireline will enable broadband connections for over 3 billion people

5 billion people covered by Wireless Broadband spectrum licenses

Technology per situation
- Installed base
- Service offering
- Spectrum



*Typically 2-3 people per subscription

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Embracing the Internet – and capturing value

Any content or application

gnutella.com

skype

real

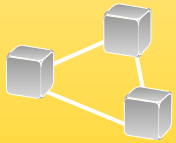
Firefox

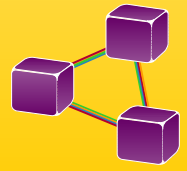
Google talk BETA

BitTorrent

Converged network

- Manage bandwidth and Quality of experience
- Manage application specific usage
- Charge per service
- Leverage identity data





Any Device

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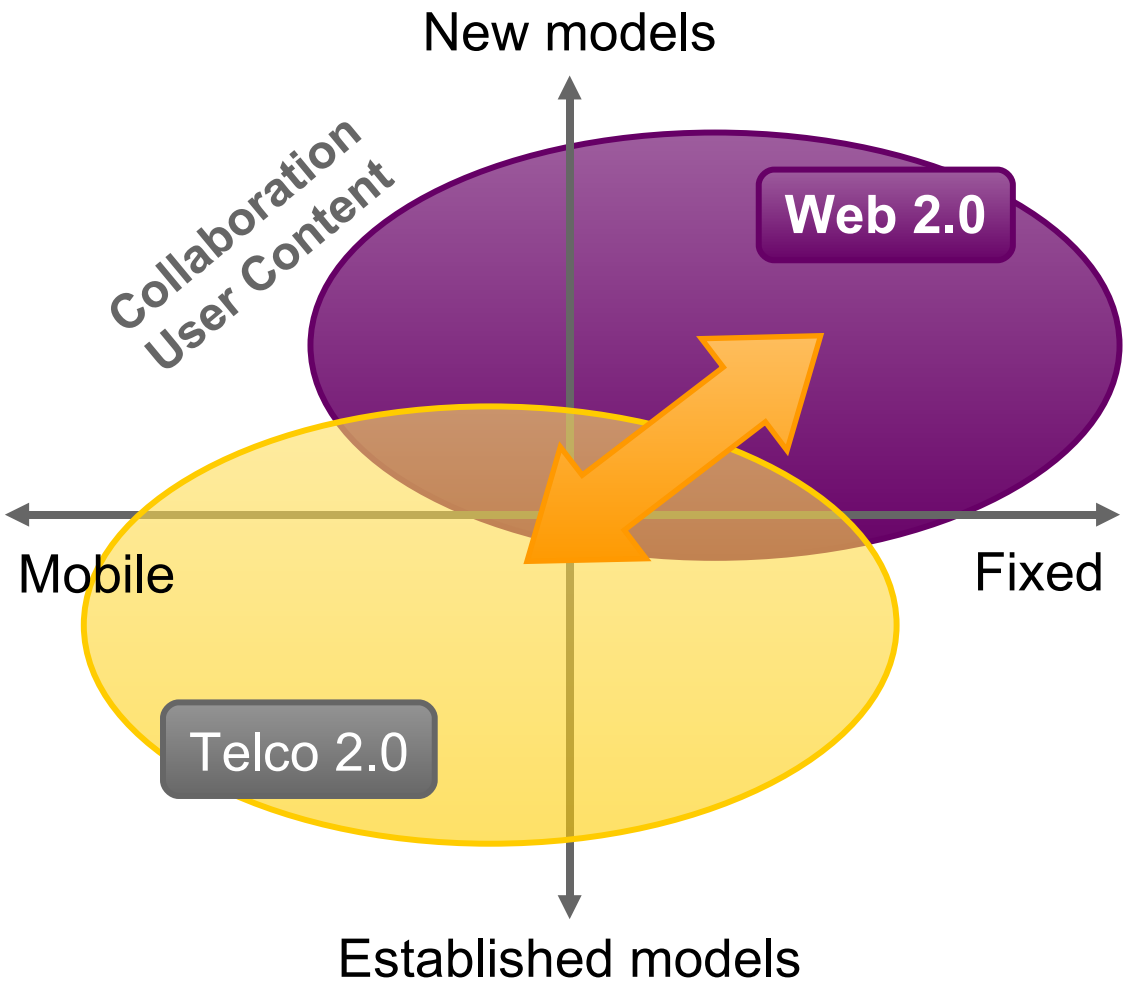
Increasing number of business model opportunities



Applications

- Variety of models
- Increasing # of players
- Personalization & mobility

Connectivity

- Fast traffic growth
- Few major players
- Lowest TCO with quality needed

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We'll face a major scaling challenge…

Key trends

- 1B => 3B broadband connected people
- Bandwidth hungry applications (Video, P2P file sharing etc.)
- New devices driving data use
- Flat-fee subscriptions

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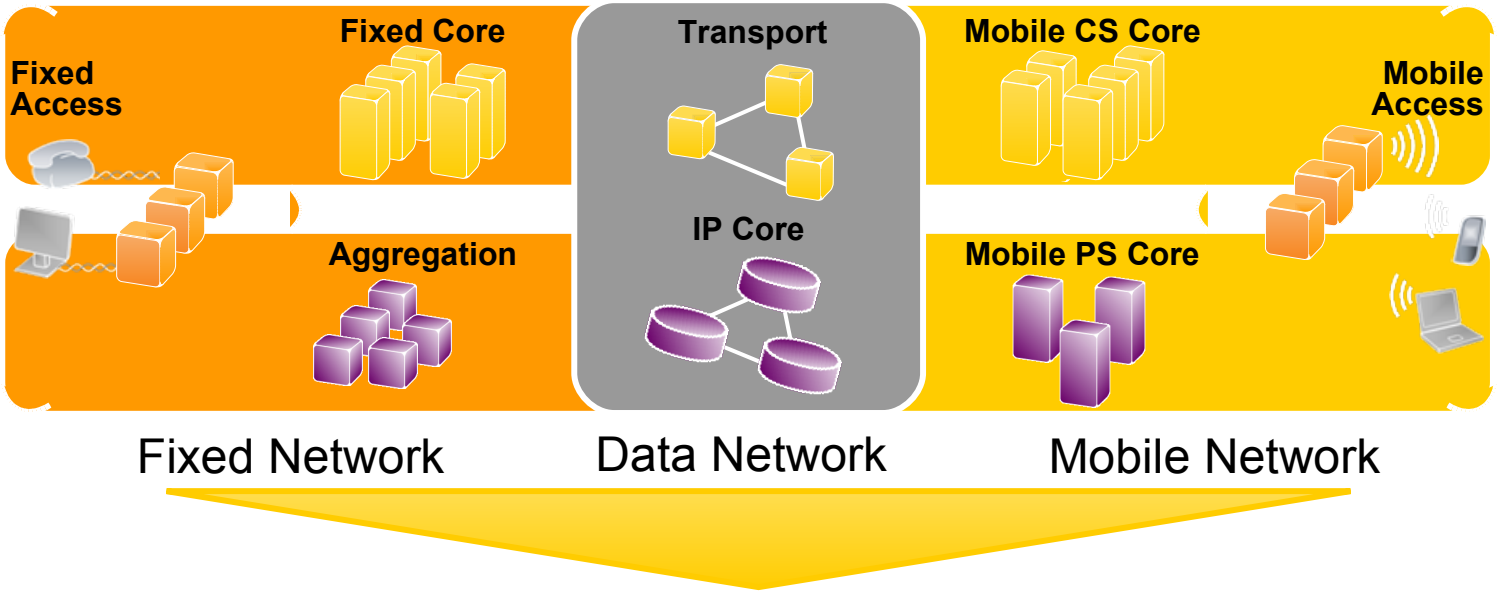
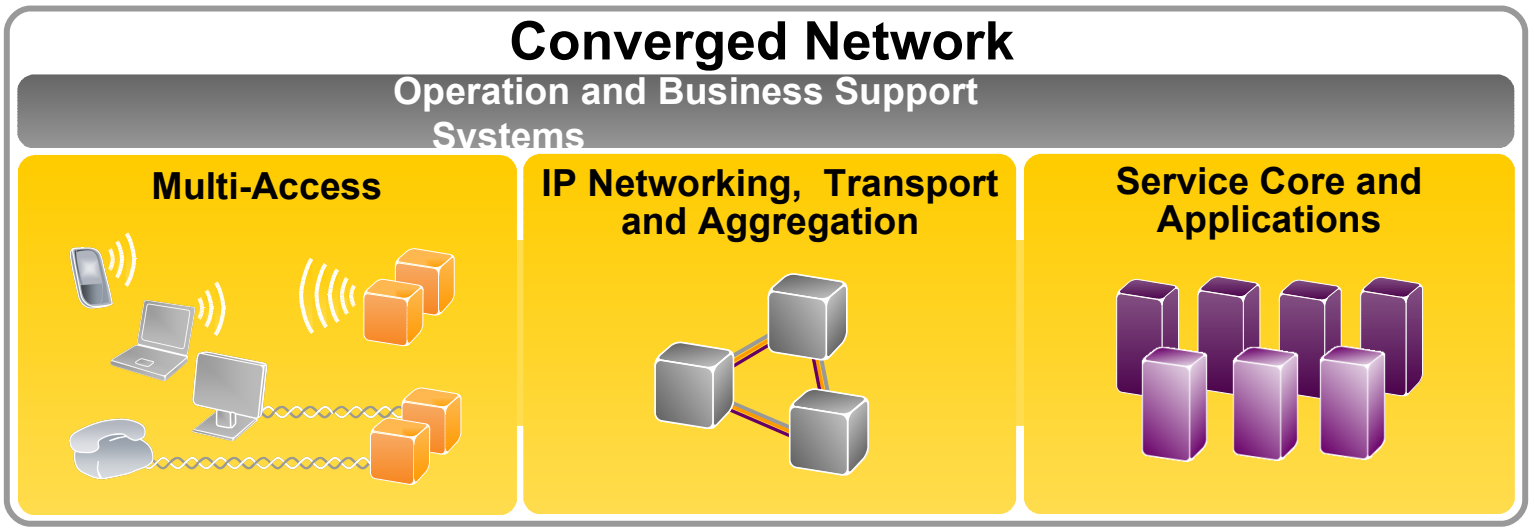
Network Transformation (1)





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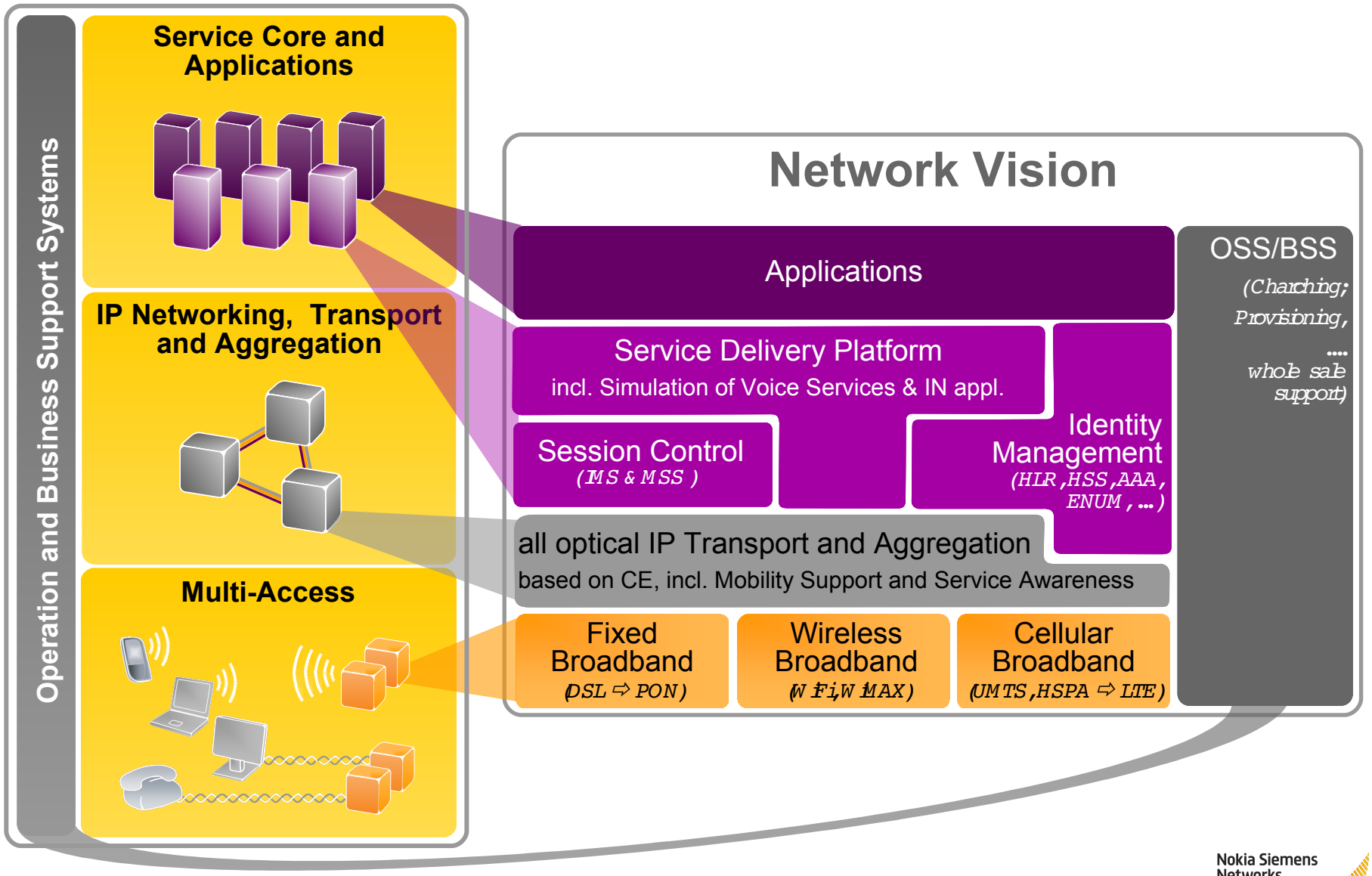
Network Transformation (2)



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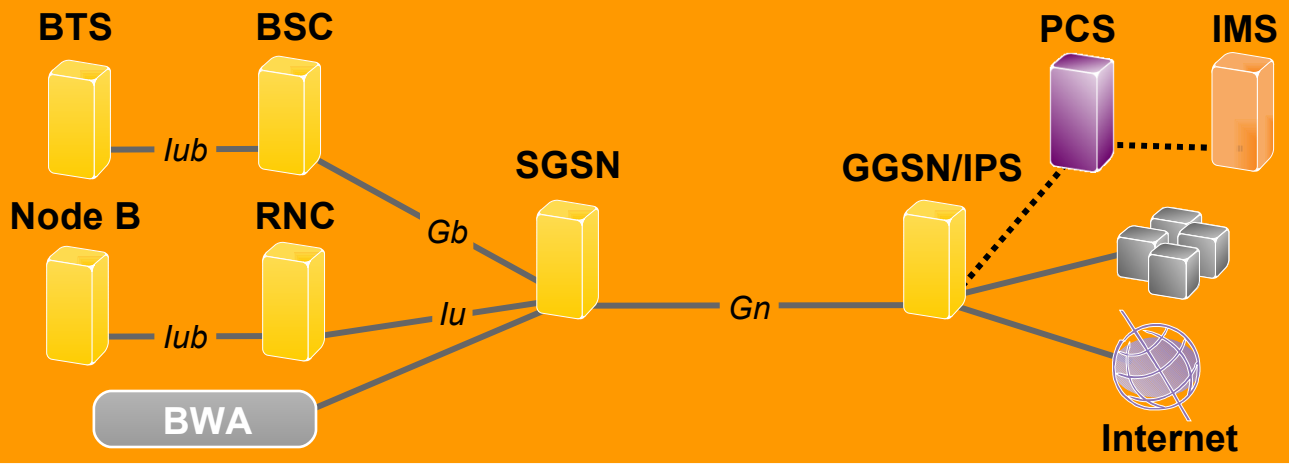
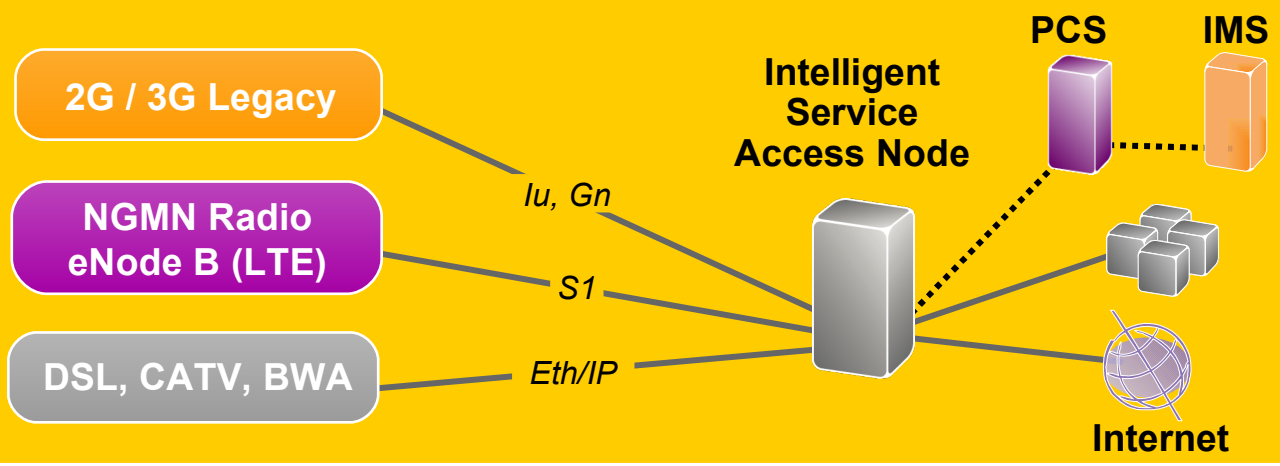
Aggregation and Transport Strategy:
IP service aware, converged flat network

Today's Solution 2006-2007



Target Solution 2010:
Support of NGMN and Legacy



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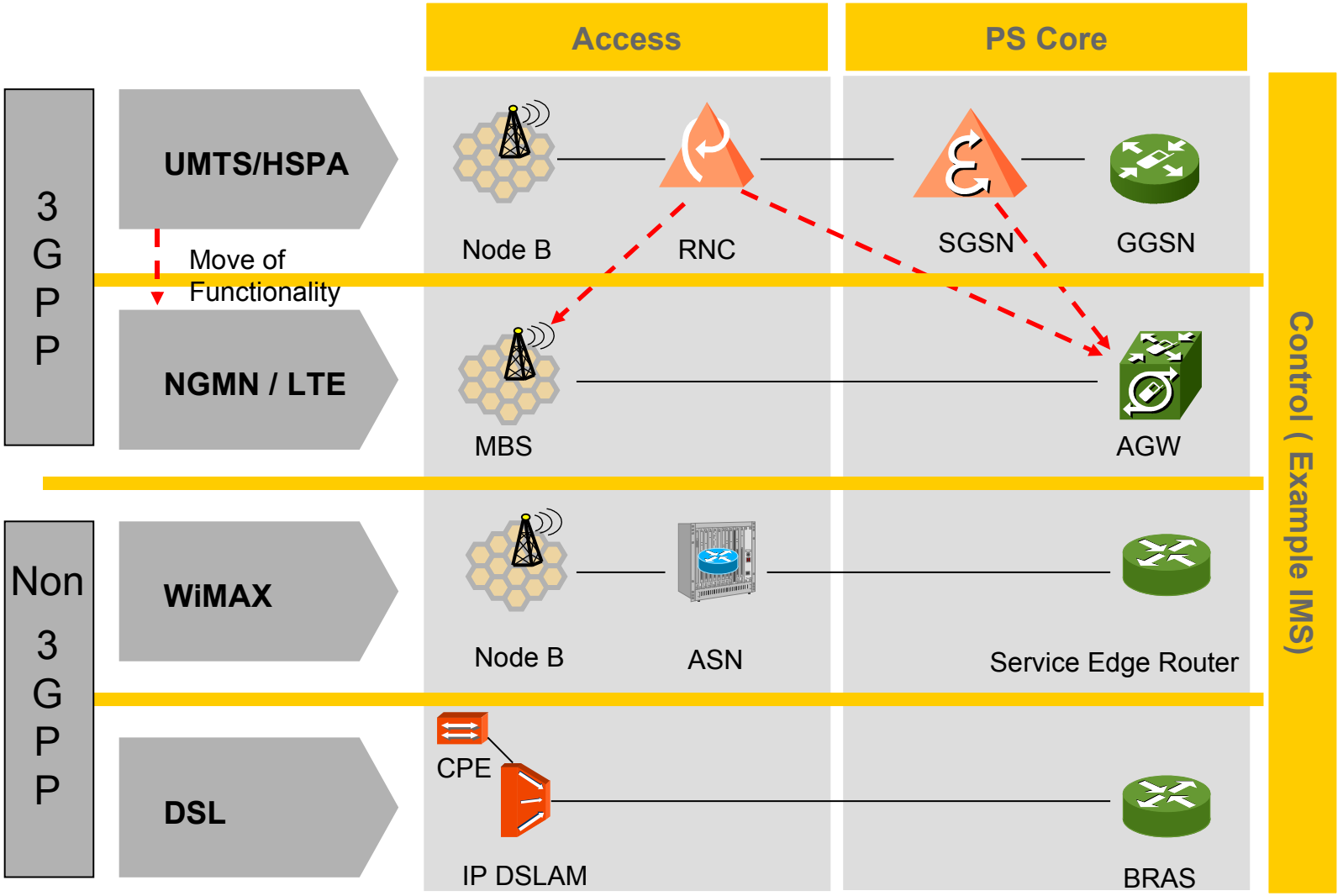
NGMN access is competitive with DSL and Cable by redistribution of Radio & Core functions



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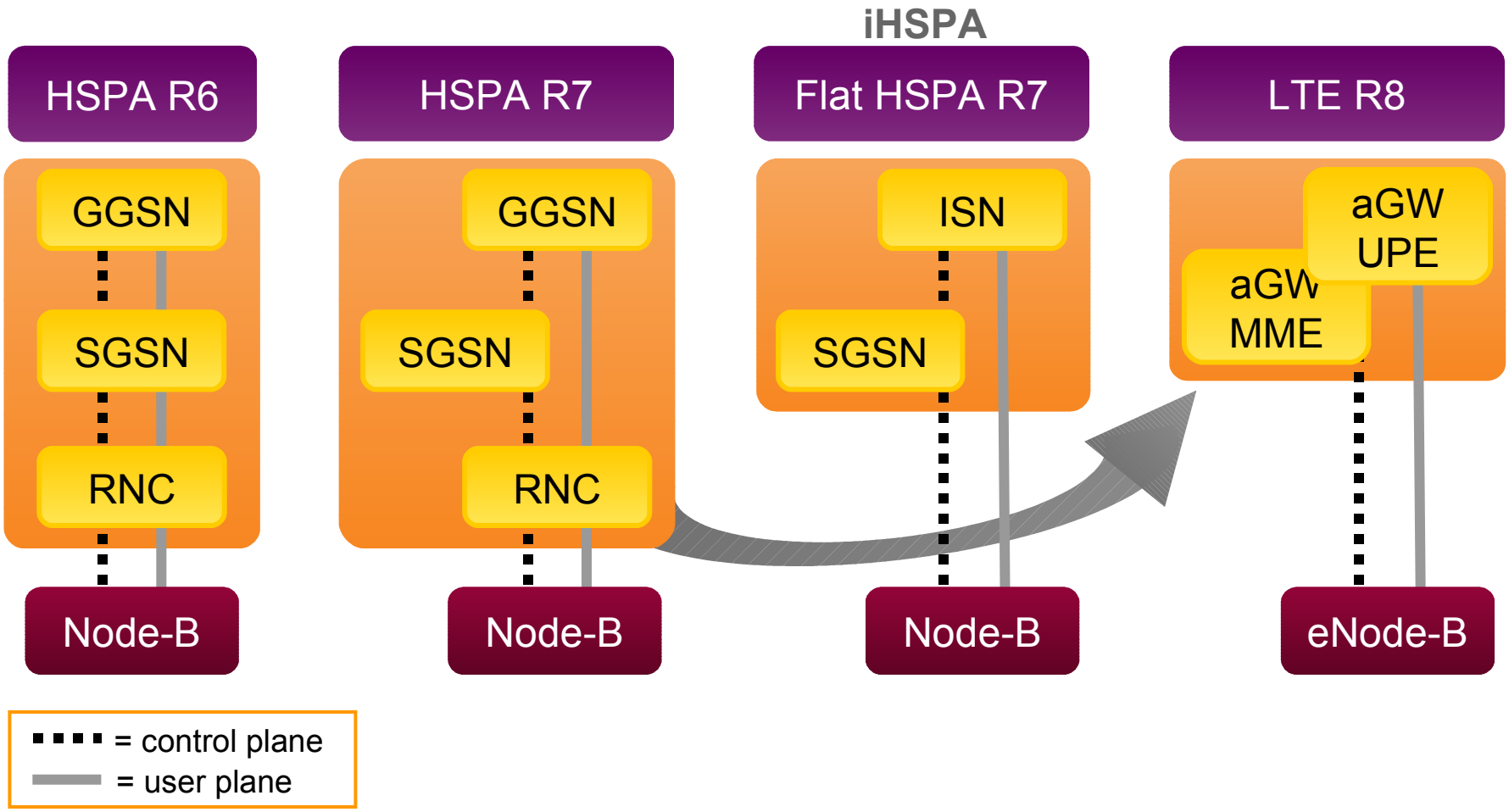
Flat Cellular Broadband Access
Evolution towards a flat Packet Core architecture (SAE)



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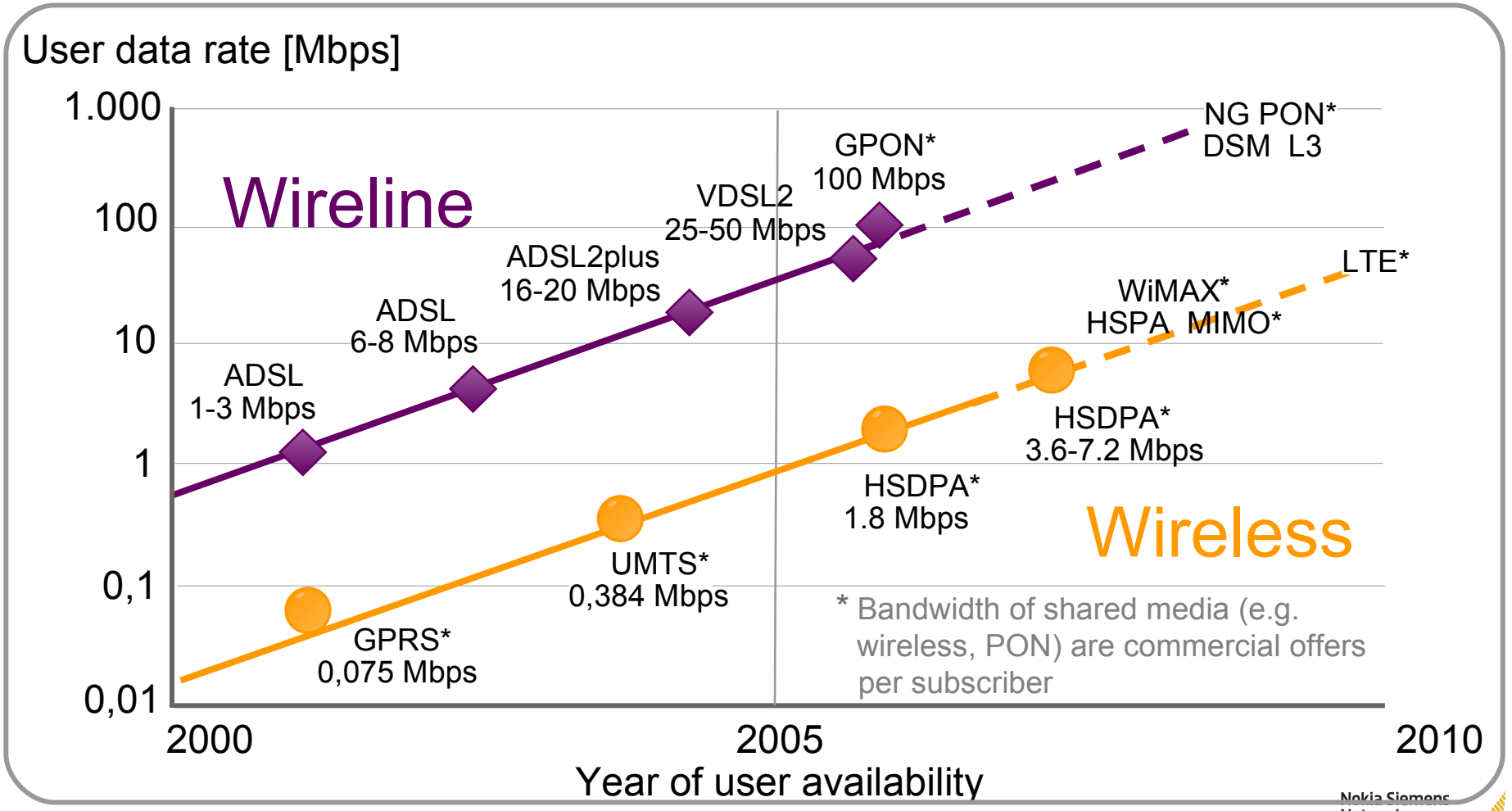
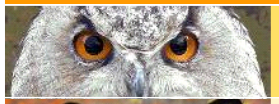
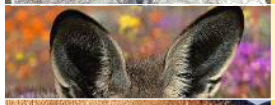
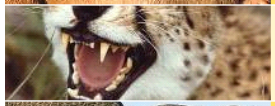
Wireline and wireless complement each other

- Wireline for highest bandwidth needs
- Wireless enables mobility and drives market growth



The first / last „mile“ (or less) will be wireless
LTE has demonstrated >>100Mbps, IMT Advanced will do 1Gbps

Technology is ready to deliver …

	Senses	Bandwidth of Receptors	Neuronal Transmission
	Eyes	200 Gbit/s	200 Mbit/s
	Ears	4 Mbit/s	2 Mbit/s
	Skin	1,5 Gbit/s	10 Mbit/s
	Tongue	150 Mbit/s	11 Mbit/s
	Nose	20 Gbit/s	30 Mbit/s
	Σ =	ca. 200 Gbit/s	ca. 250 Mbit/s

… more than you can handle

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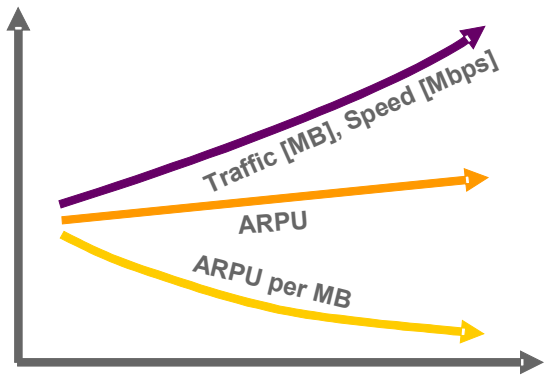
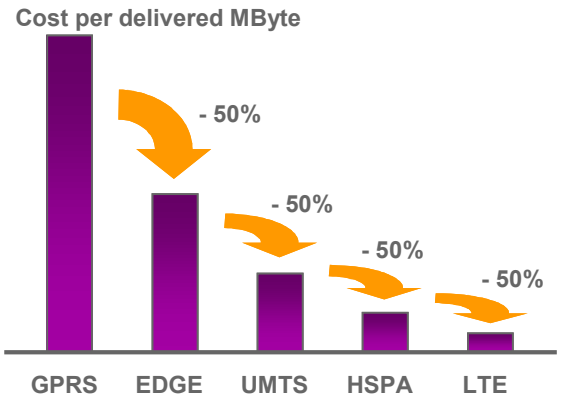
Pressure on bit cost efficiency

… despite higher capacity



- Dramatically growing traffic based on IP connectivity
- Need to provide high bit rates / capacity at low cost
  - Limited radio resources by their nature
  - Limited bandwidth over copper
- But: moderate ARPU growth achievable only



Reduce cost of delivered MB/user

- Increase network capacity
  - Use fiber optics close to the end-user
  - Increase radio spectral efficiency
- Optimize network deployment and operational cost
  - Reduce network complexity
  - Apply multiple radio access technologies
- Increasing integration level of RF-parts

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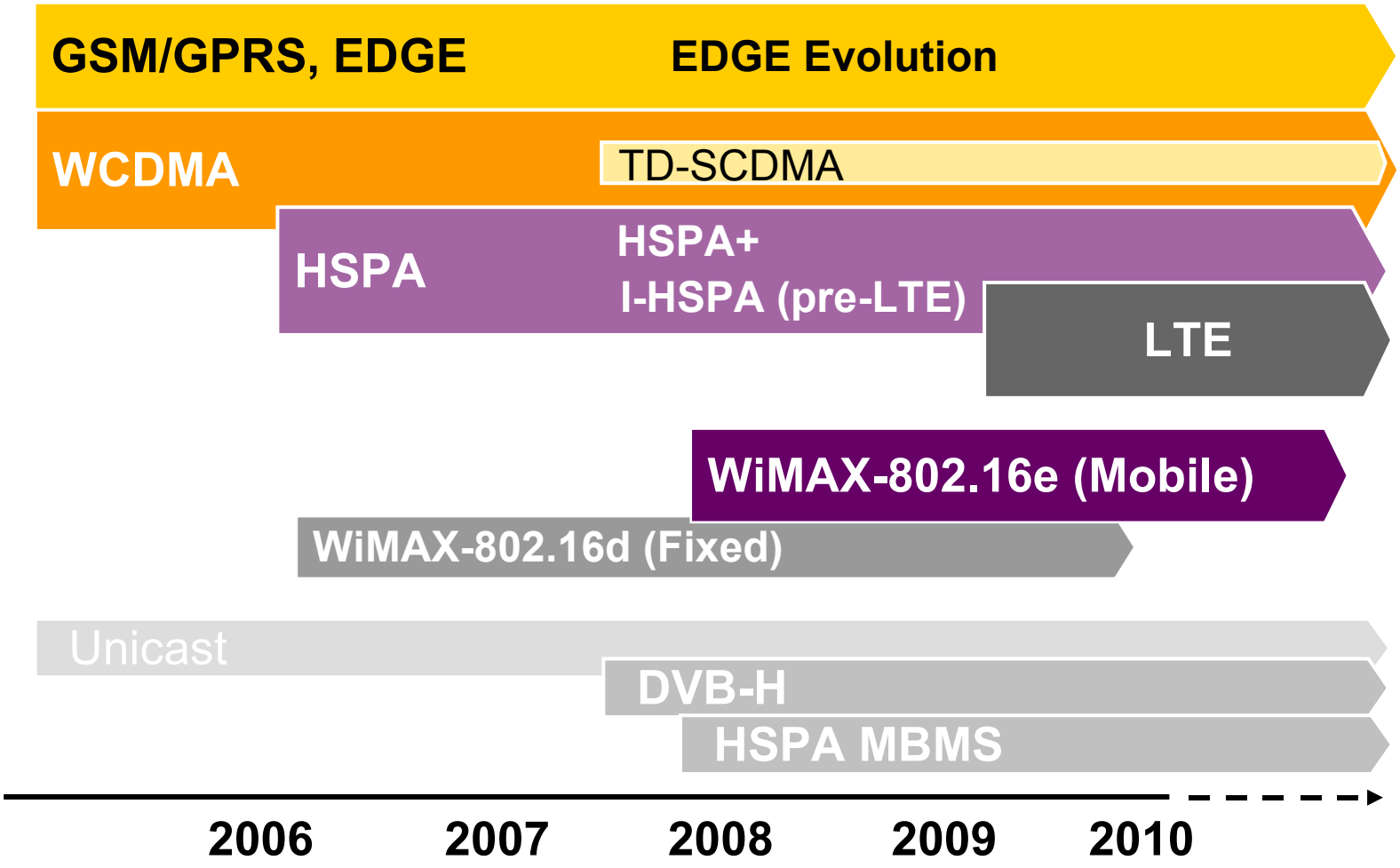
Expanding radio portfolio to address market needs



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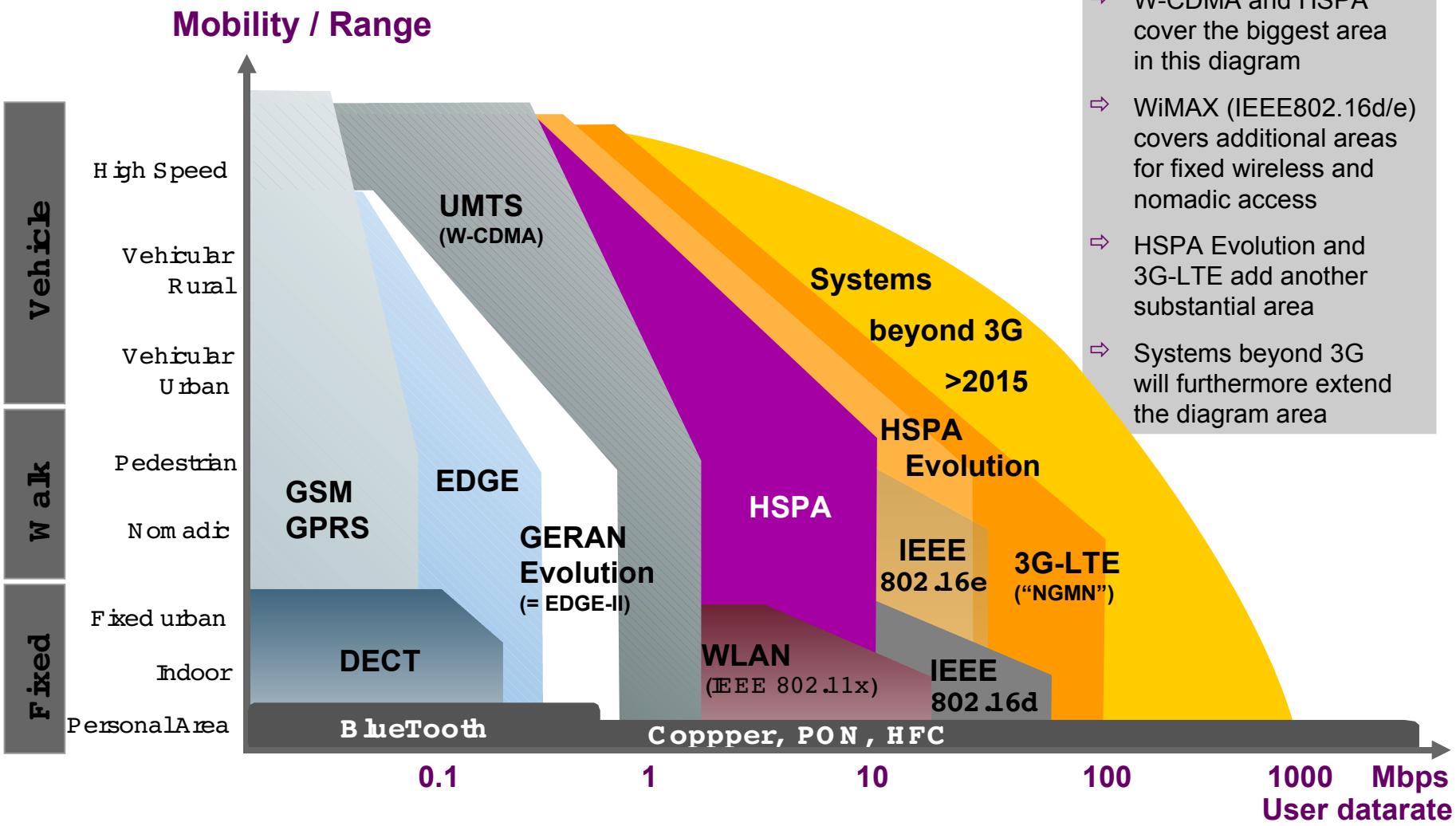
Network Vision – Access Layer

Requested mobility level selects access type



- W-CDMA and HSPA cover the biggest area in this diagram
- WiMAX (IEEE802.16d/e) covers additional areas for fixed wireless and nomadic access
- HSPA Evolution and 3G-LTE add another substantial area
- Systems beyond 3G will furthermore extend the diagram area

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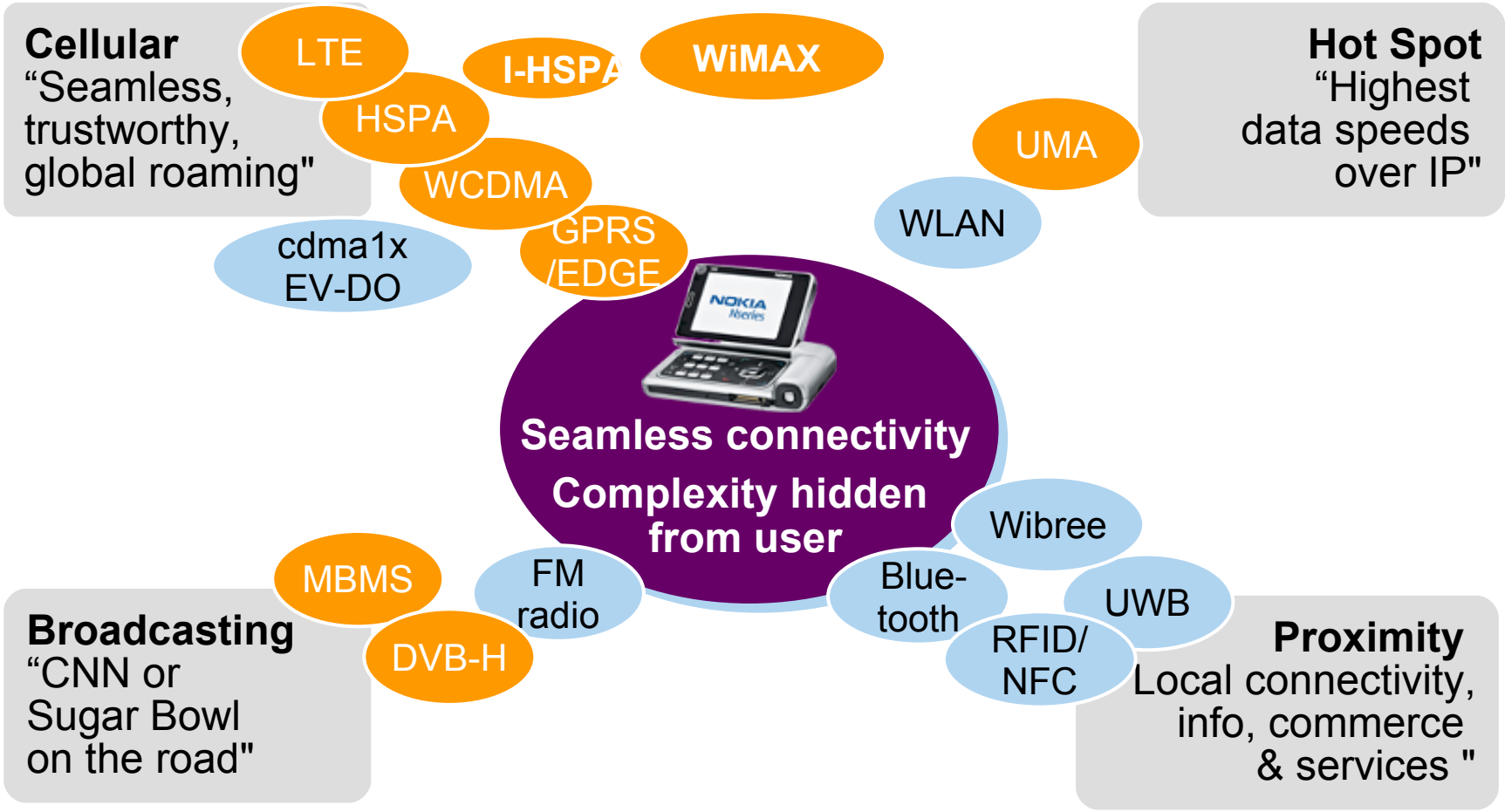
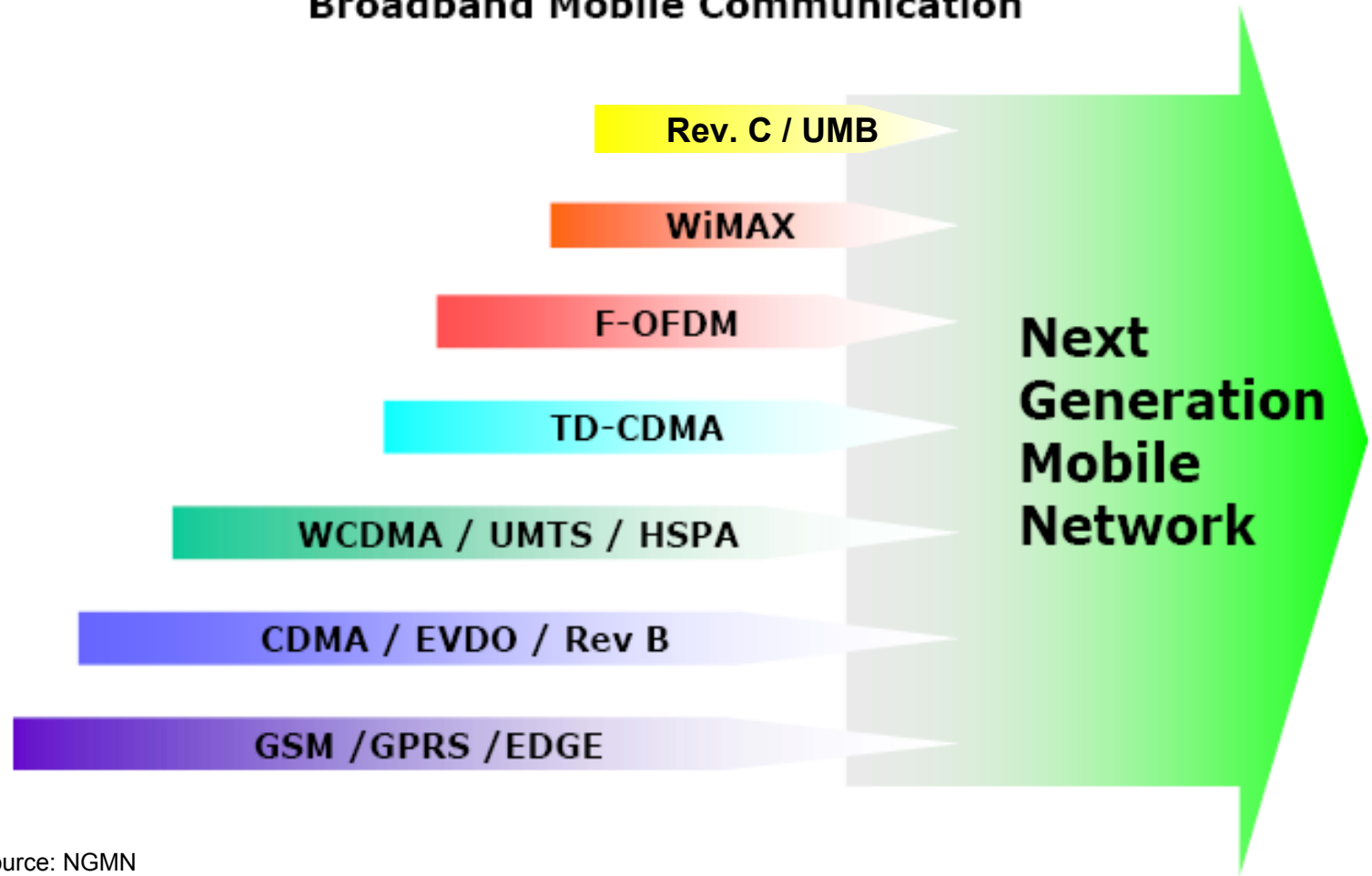
Multiradio environment

data speeds, technologies and connectivity options are multiplying



Technology Convergence

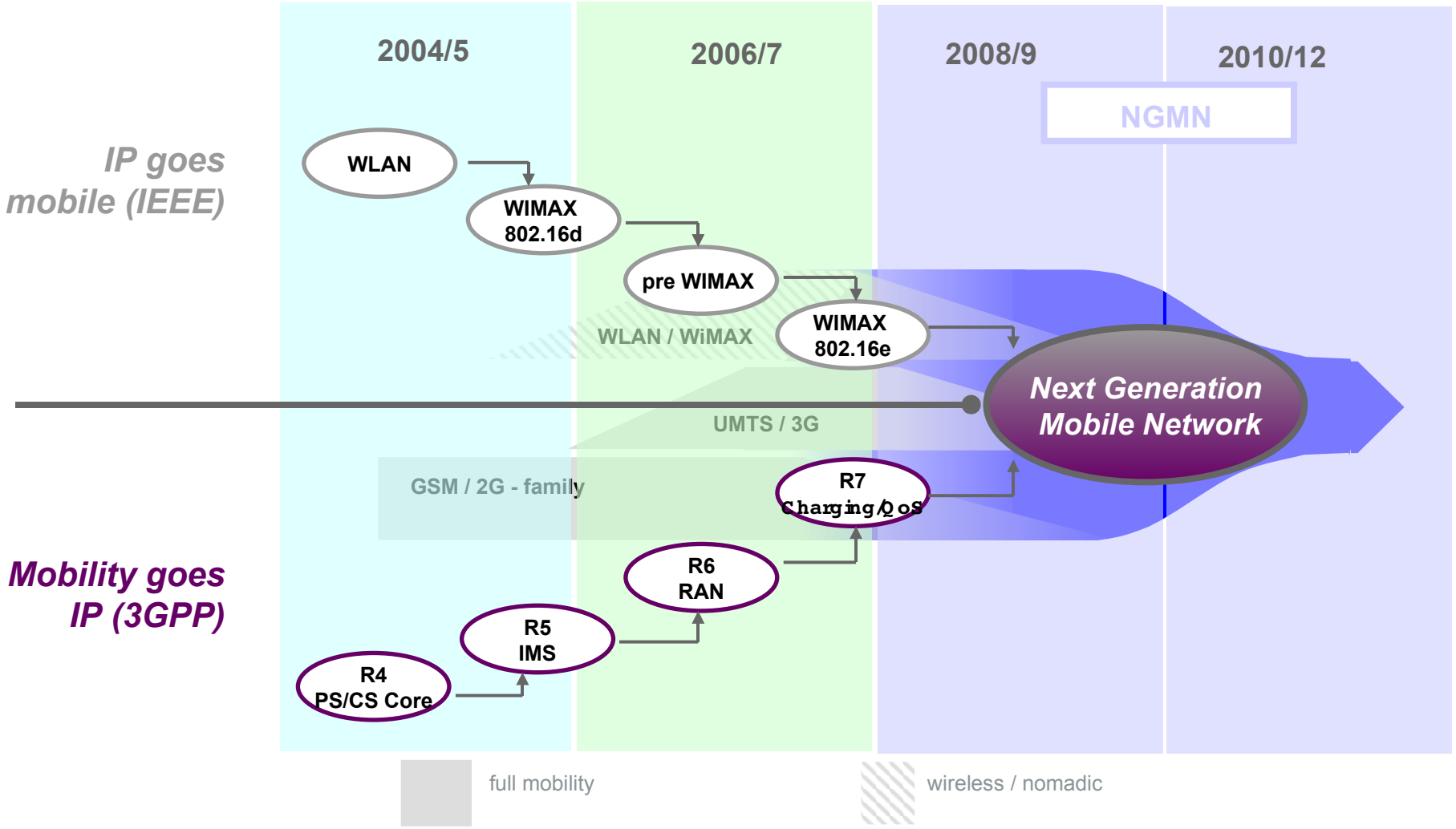
Broadband Mobile Communication



Source: NGMN

kpn orange T-Mobile vodafone Sprint NTT DoCoMo 中国移动通信 CHINA MOBILE

Complementarity > Co-existence > Convergence > ???



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Key Takeaways

- Broadband Traffic will increase globally by 100 fold before 2015
  - Both Fixed and Mobile Broadband Networks need dramatic simplification to achieve cost synergies
- Today, there is no „one size fits all“ radio technology
  - Based on spectrum allocation, WiMAX or LTE may be a solution
- Fragmentation in market make economies of scale difficult
  - Radical network simplification need to achieve cost benefits to the end user
  - Only large operators will survive
- Handset complexity will continue to decrease over time as it becomes a primary „internet connected“ device
- The user experience must be simple
  - Transitioning from a fixed to a mobile environment must be seamless

The bottleneck is no longer in technology

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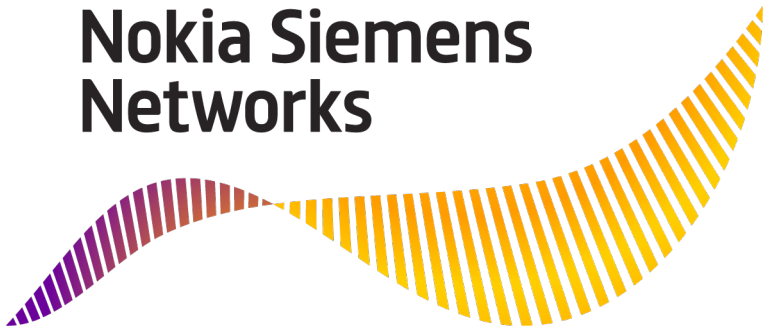

Thank you very much for your attention

klaus.kohrt@nsn.com

Great minds think alike ?
or the laws of physics are the same for everyone

name	NGMN	LTE	UMB	mobile WiMAX
"owner"	Ltd.	3GPP	3GPP2	WiMAX-Forum
target GA	2010	2010	2009	2008(+)
bands	.5 to 5 GHz	.5 to 5 GHz	.5 to 5 GHz	.5 to 5 GHz
focus	cellular	cellular	cellular	2.3, 2.5 & 3.5
carrier	scaleable 1.25 to 20	scaleable 1.25 to 20	scaleable 1.25 to 20	scaleable 1.25 to 20
mode	FDD/TDD	FDD+	FDD+	TDD+
scheme	OFDMA	OFDMA	OFDMA	OFDMA
antennas	MIMO	MIMO	MIMO	MIMO
deployment	outdoor / indoor	outdoor / indoor	outdoor / indoor	outdoor / indoor
environment	rural to dense urban	rural to dense urban	rural to dense urban	rural to dense urban

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