Network Technology Evolution

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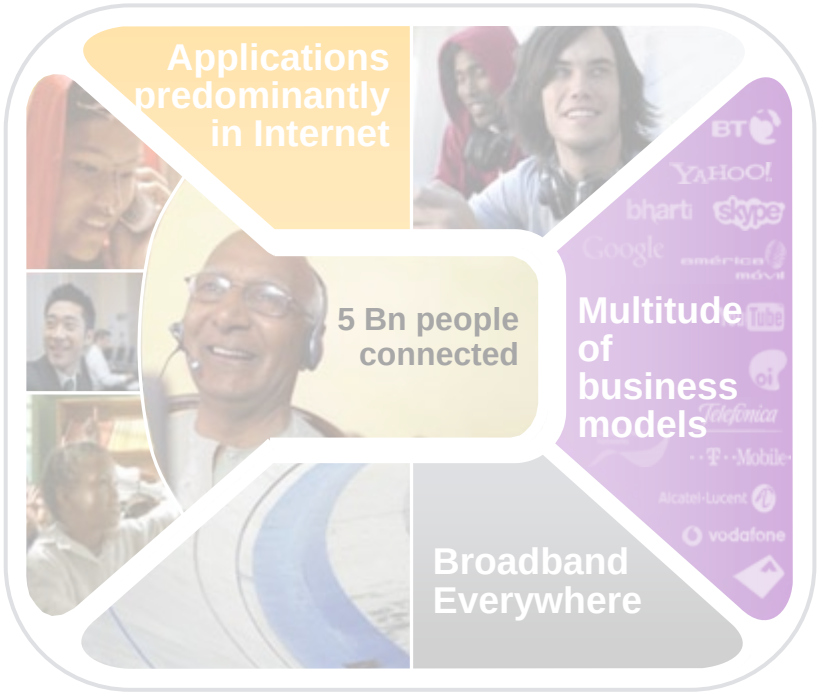
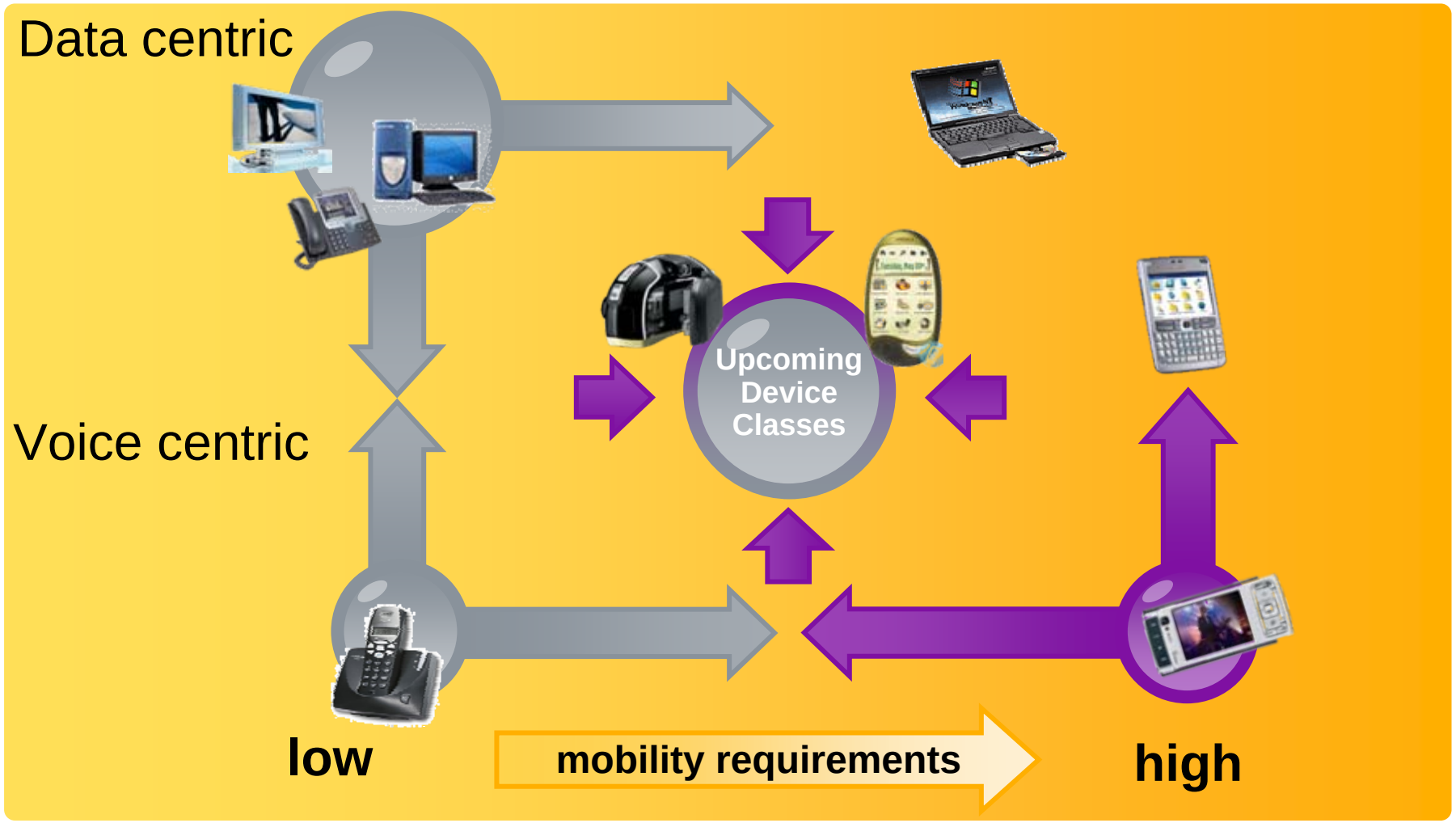
Agenda



- Trends & drivers
- Technology strategy & network vision
- Research examples
- Conclusion

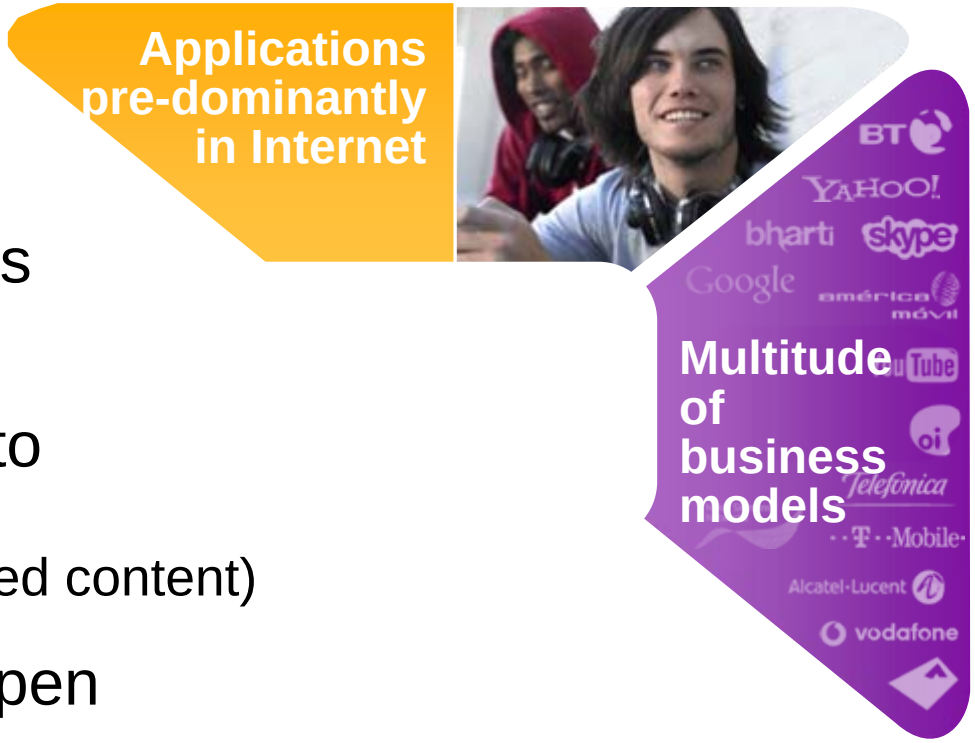
End user's My-Services-Anywhere experience

- Connection & Premium content and Communities have value



Internet Driving Changes for Network Operators

- Huge ecosystem driving introduction of new services and business models
- From commodity services to personalized services
  (e.g. communities, user generated content)
- From ‘walled gardens’ to open business systems
- Separation between connectivity and application subscription & business

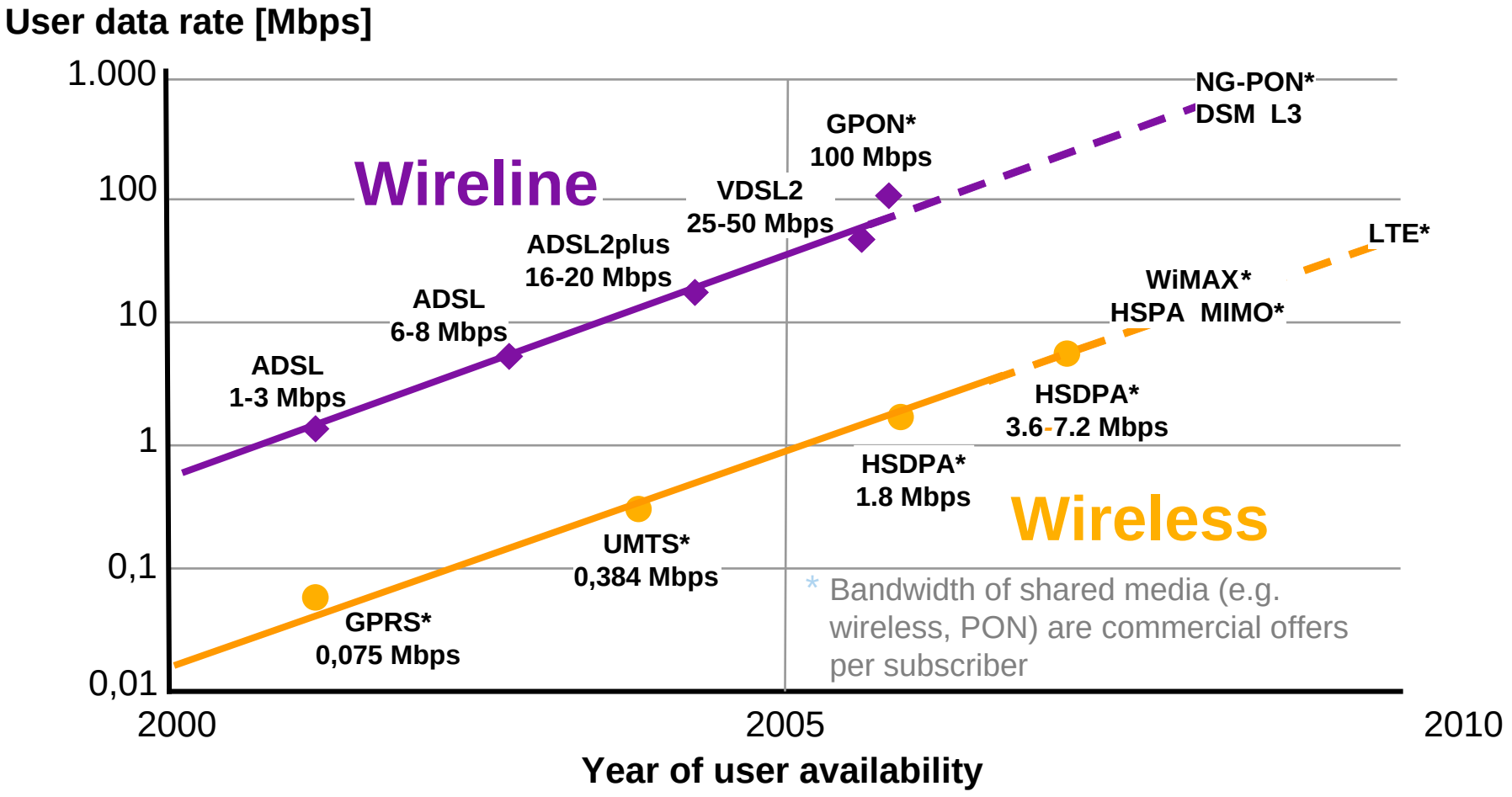


More and more connections and network capacity needed

- Majority of all people connected and communicating
- New markets driving growth (China & APAC)
- Penetration of fixed and wireless broadband access growing fast
- Usage of bandwidth hungry applications increasing => 100 fold traffic 2015.*

* Nokia Siemens Networks Estimate

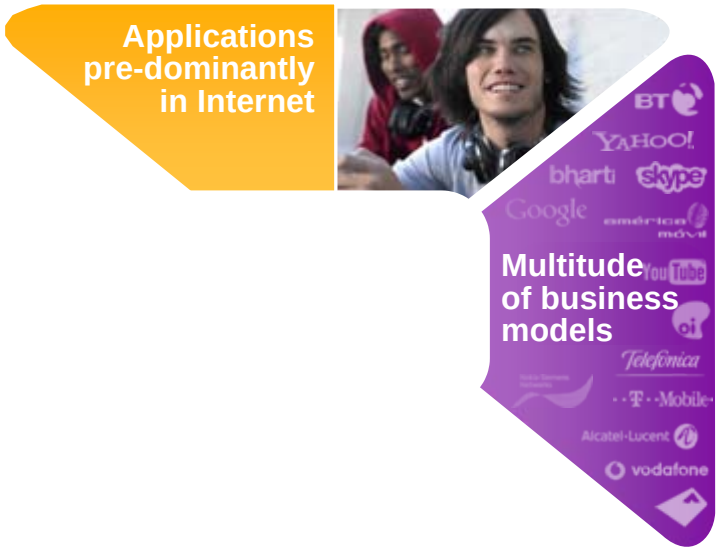
Wireline broadband provides technology for highest bandwidth needs

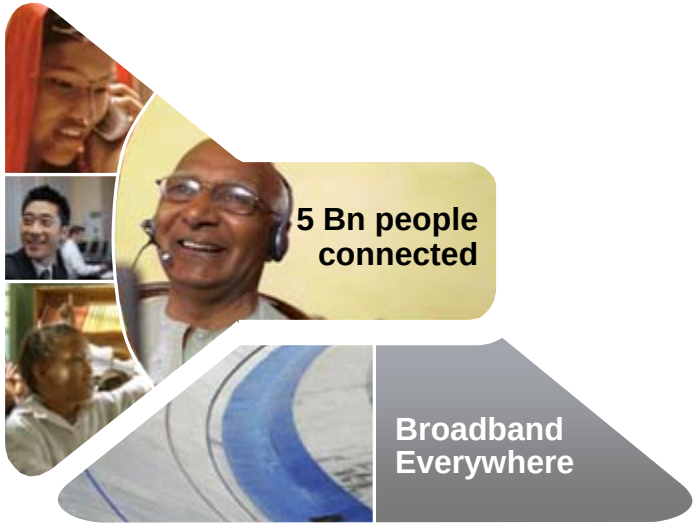


Two opportunities emerging for operators

Applications
Digital distribution & services

- Fierce competition
- 3rd party revenue models
- Flexibility key





Connectivity
With a few key applications

- Anywhere, anytime connectivity
- Capital intensive, high entry barrier
- Scale and lowest cost per bit key

Key operator business drivers for network evolution

Applications

1. New business by value added services
   … independent of the network
2. Telco and IT convergence
   … for easy and faster use of new applications
3. Management effort reduction
   … despite increasing network complexity

Connectivity

4. Performance improvements
   … in terms of bitrate, coverage, QoS, security
5. Cost optimization in access, transport and core … despite of higher capacity

Key Technologies

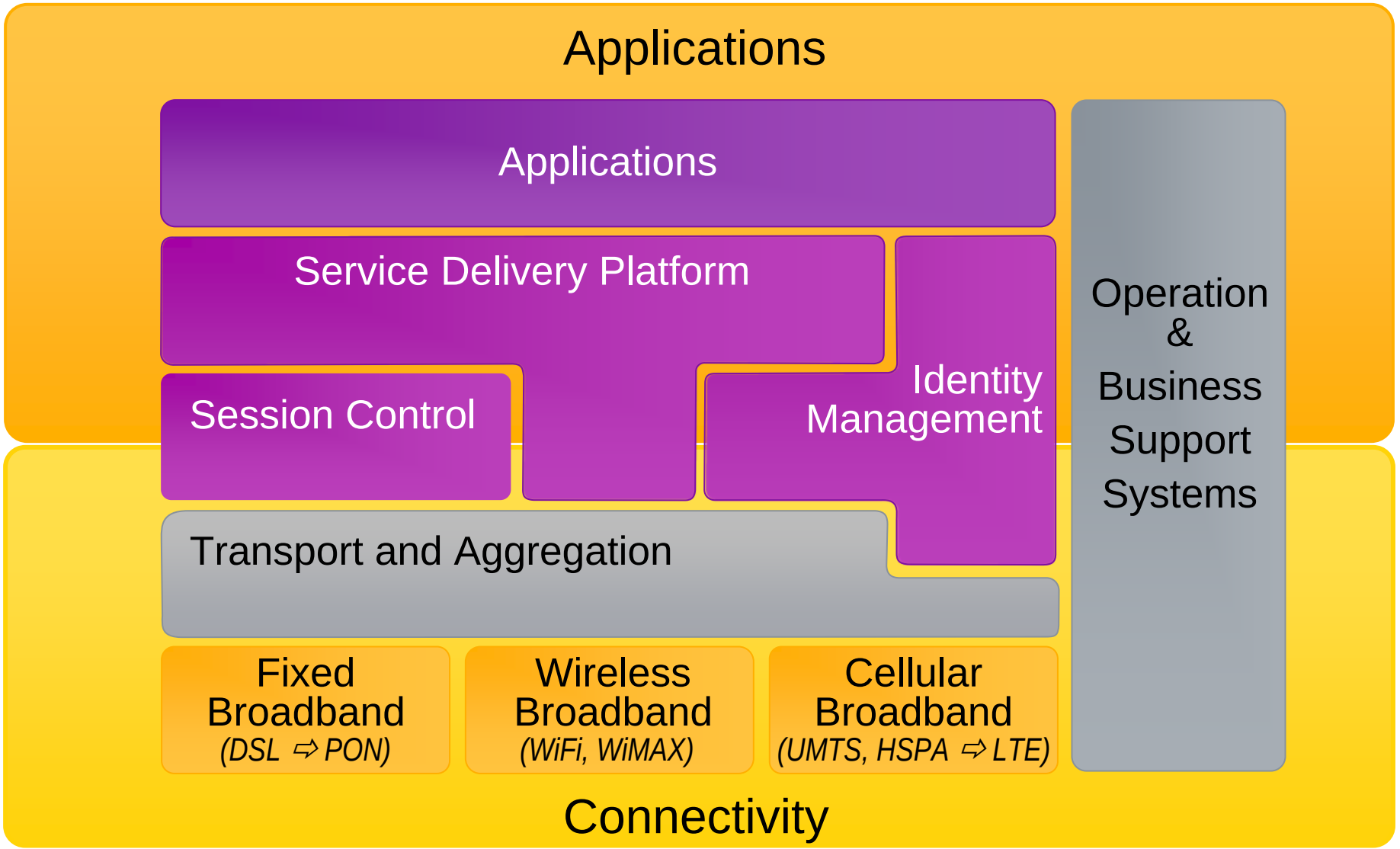
1. IMS as an hub for applications
   … access independent application deployment
2. Network independent identity management
   … one database for all services

Applications

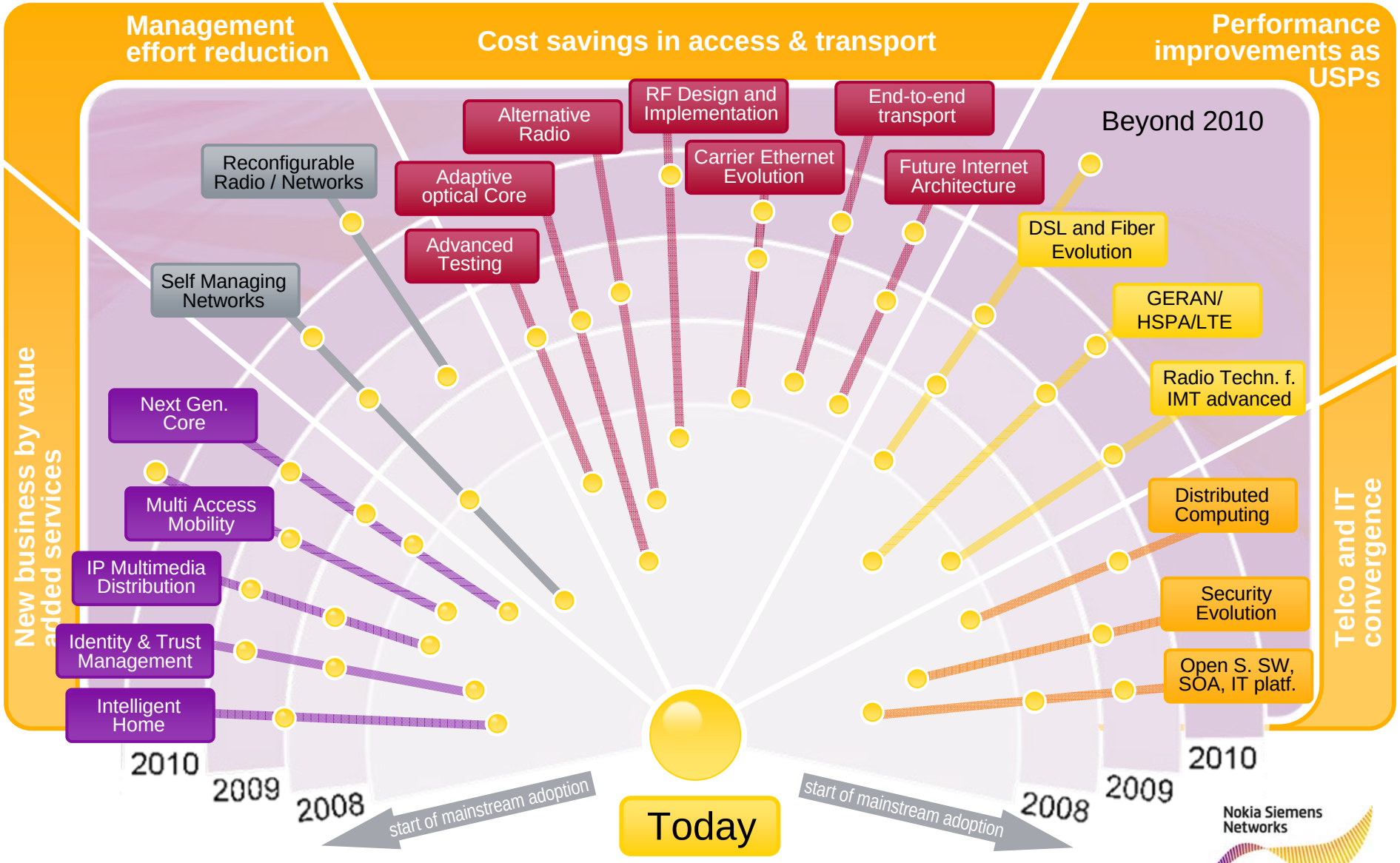
3. Of the shelf HW and modular SW components
   … Simplifying functional network evolution
4. IP mobility beyond cellular voice
   … for “my service anywhere”
5. Optics and Carrier Ethernet
   … Speeding up and simplifying access and aggregation
6. Boosting broadband access everywhere
   - xDSL to xPON … for ‘unlimited’ fixed access
   - HSxPA to LTE .... the most effective 2G/3G evolution
   - WiMAX most effective for operators without 3G spectrum
   - WiMAX & LTE access for CDMA migration

Connectivity

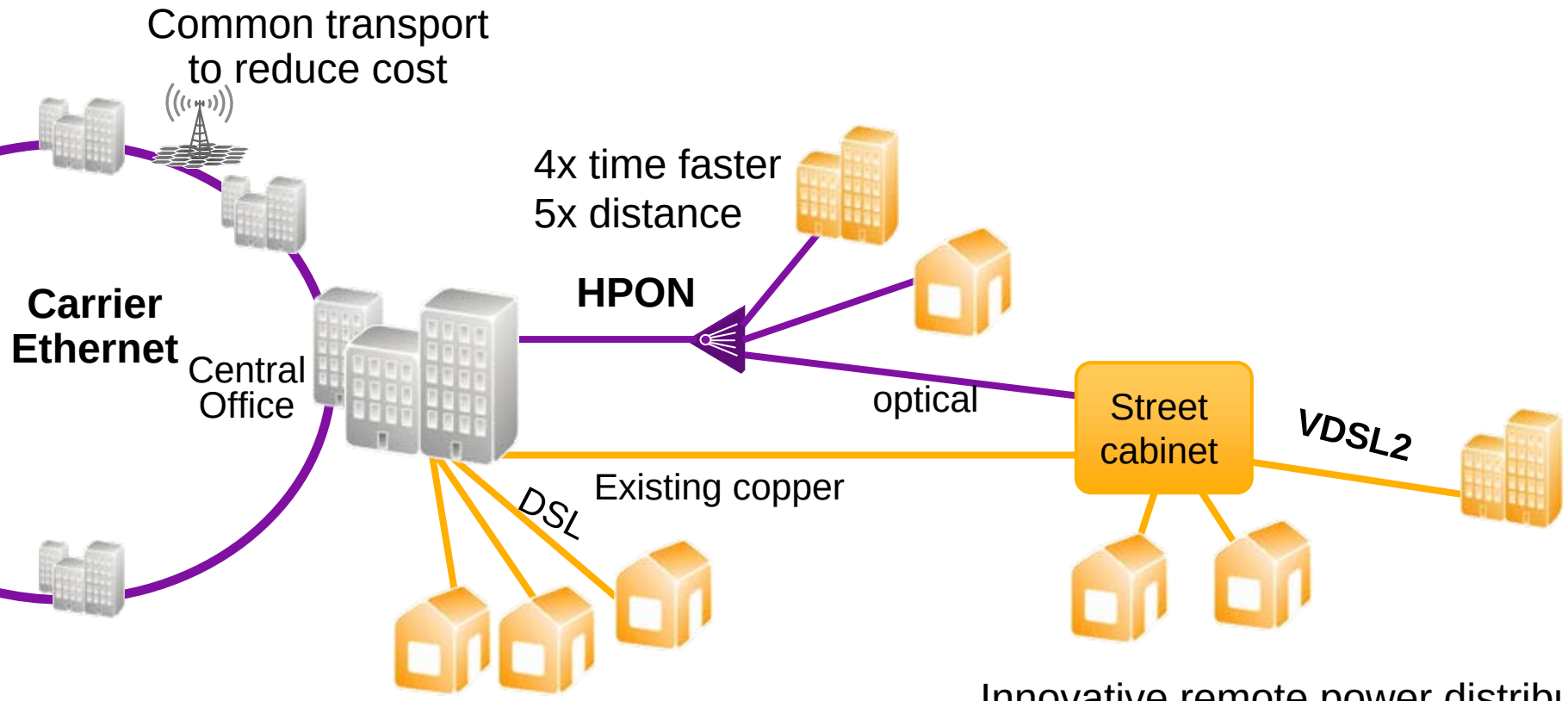
Operator aligned Network Architecture Vision embraces Business Differentiation



Technology radar – over 100 research projects
- addressing operator business drivers & our R&D cost



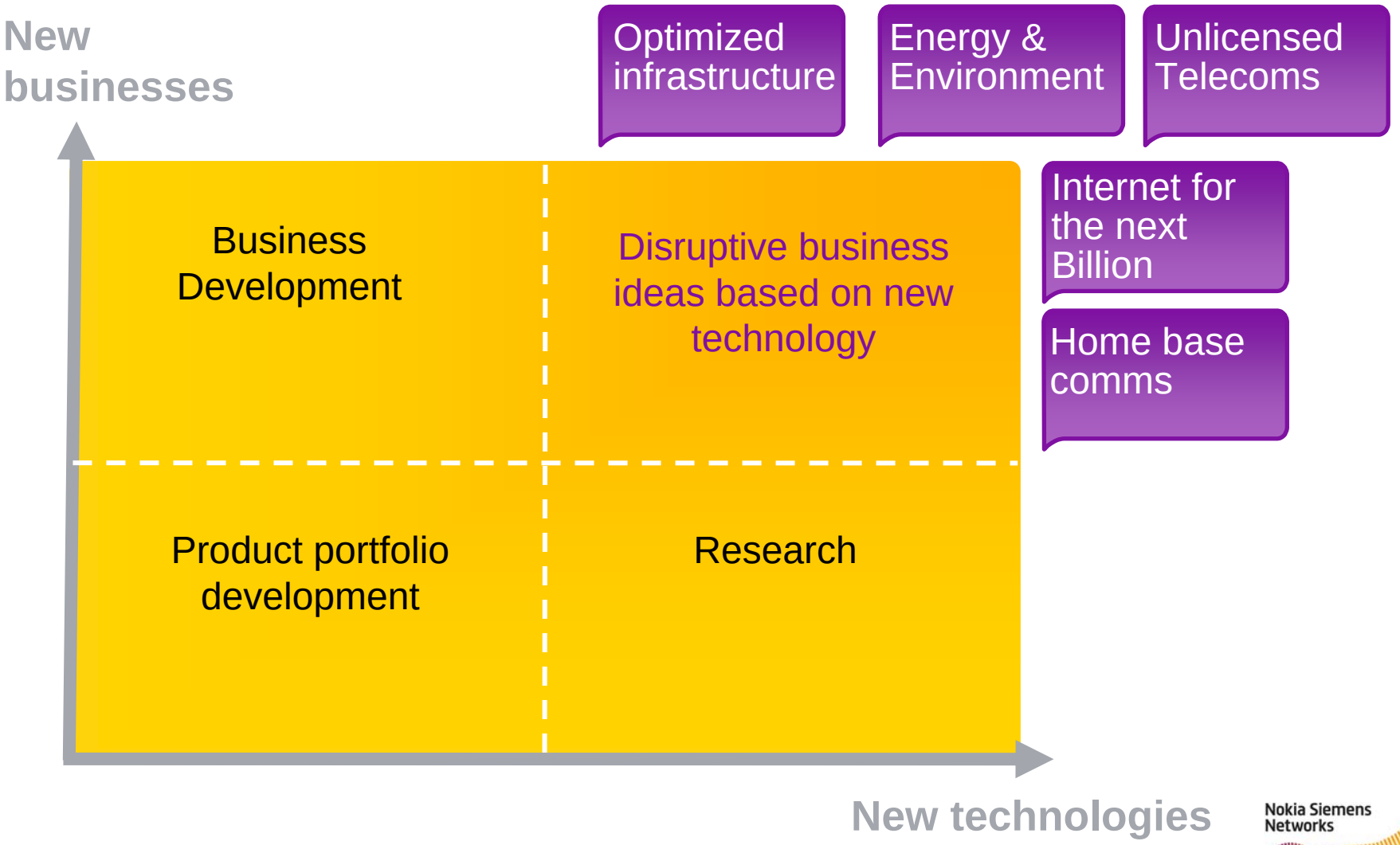
Examples how we ensure technology leadership
- xDSL and Fiber evolution research



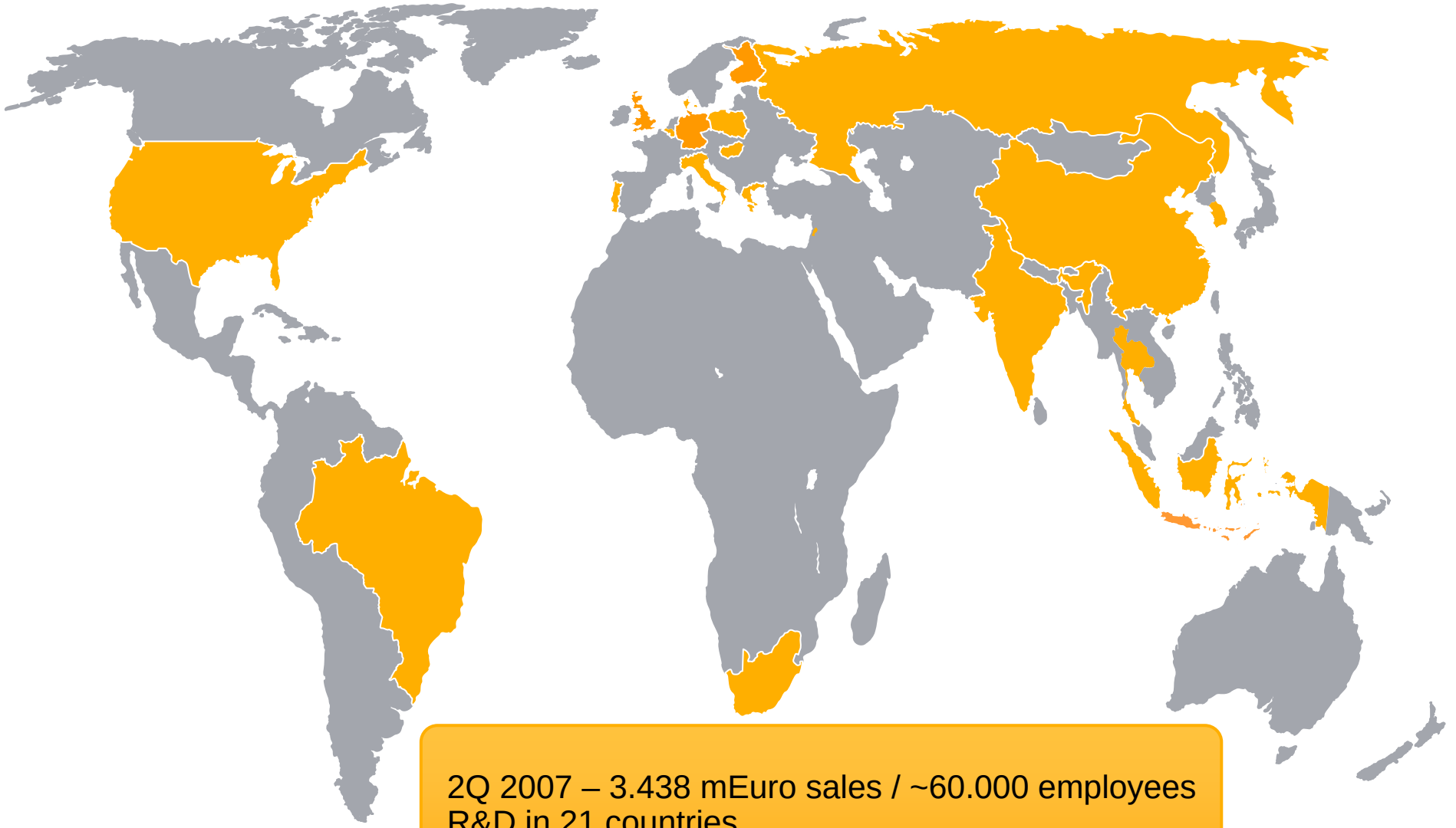
Lower DSL power consumption (OPEX)
Double data rate or reach (Revenue)

Innovative remote power distribution
Reduction of IMPEX & OPEX.

How do we challenge our research & development?
- prepare our customer for the future



Nokia Siemens Networks Research & Development



2Q 2007 – 3.438 mEuro sales / ~60.000 employees
R&D in 21 countries
R&D employees: ~17,000

Nokia Siemens Networks Research summary

NSN employees

Nokia Siemens Networks

Innovations

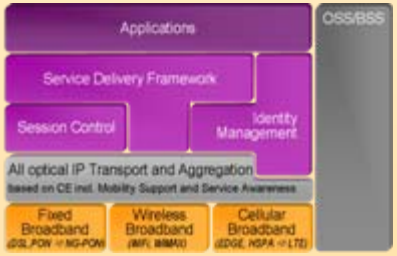
NOKIA

End users / operators needs

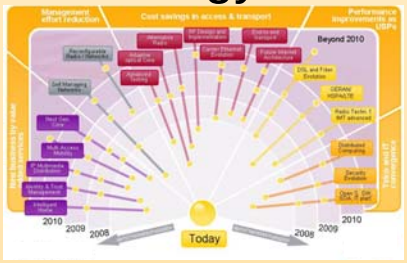
Nokia Siemens Networks

Business strategy

Network Architecture Vision



Technology Radar



Ensure Nokia Siemens Networks has world leading technology capabilities

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