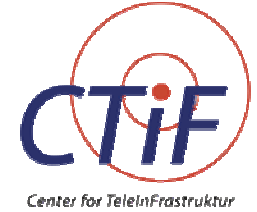


The Unpredictable Future: Personal Networks Paving the Way Towards 4G

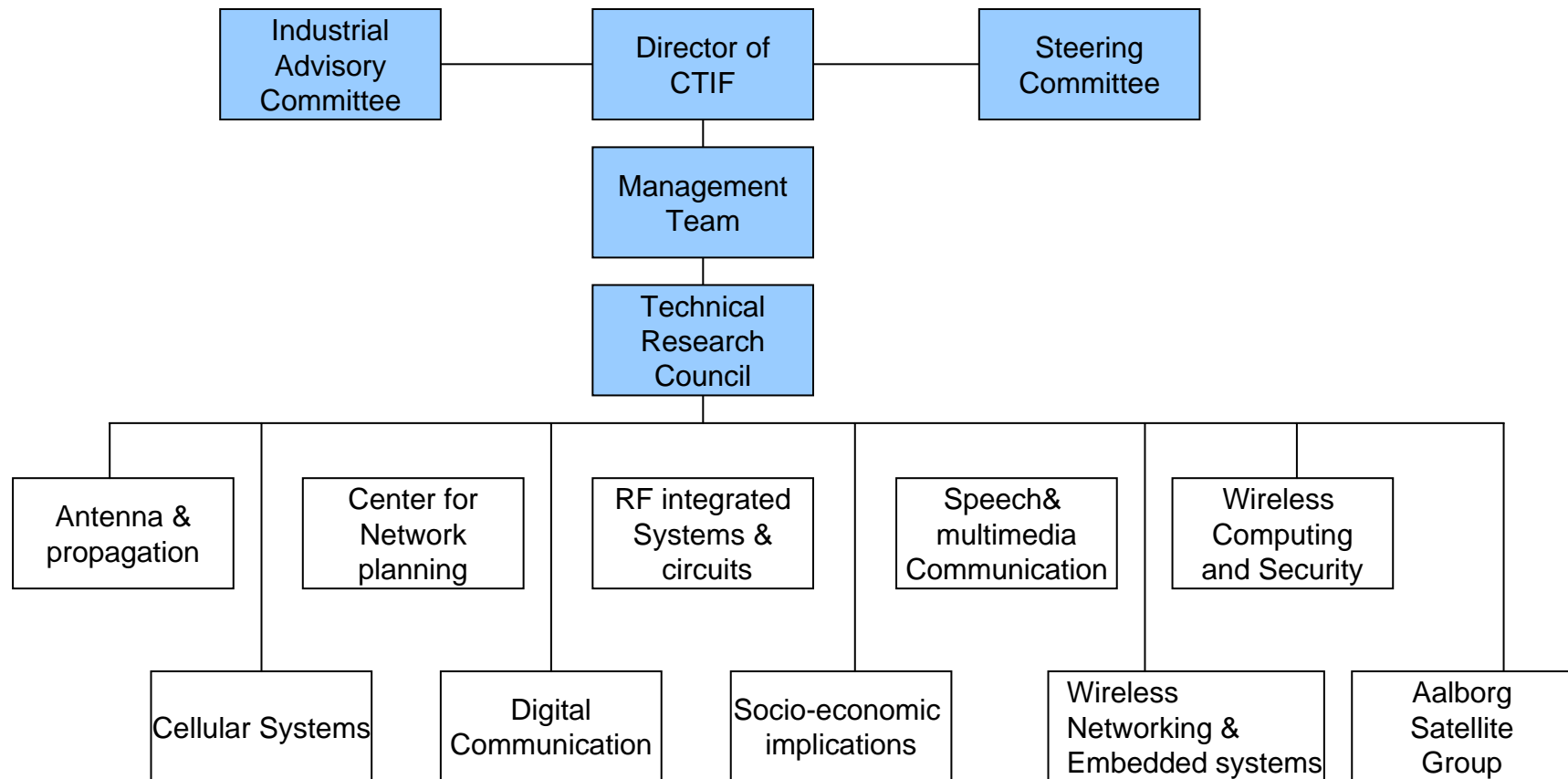
Juha Saarnio
Head of Industrial Initiatives
Nokia

Center for TeleInfrastruktur (CTIF) and Activities



- **A research center at Aalborg University with more than 130 employees organised in 10 research groups conducting research at the highest international level to enhance the technological development within modern wireless communication technologies and teleinfrastructures.**
- **CTIF has strong relations to industry for doing research and developing new types of networks, devices and services.**
- **Our vision is to produce a knowledge base to meet the increasing need for reliable and fast access to broadband and connected services, to everyone, anywhere at anytime.**
- **Our mission is to carry out research in wireless and network-based communication at the highest international level to promote the technological development within the domain, as well as to teach scientists and engineers within our field of expertise.**
- **Visit : <http://www.ctif.aau.dk>**

CTIF Organization

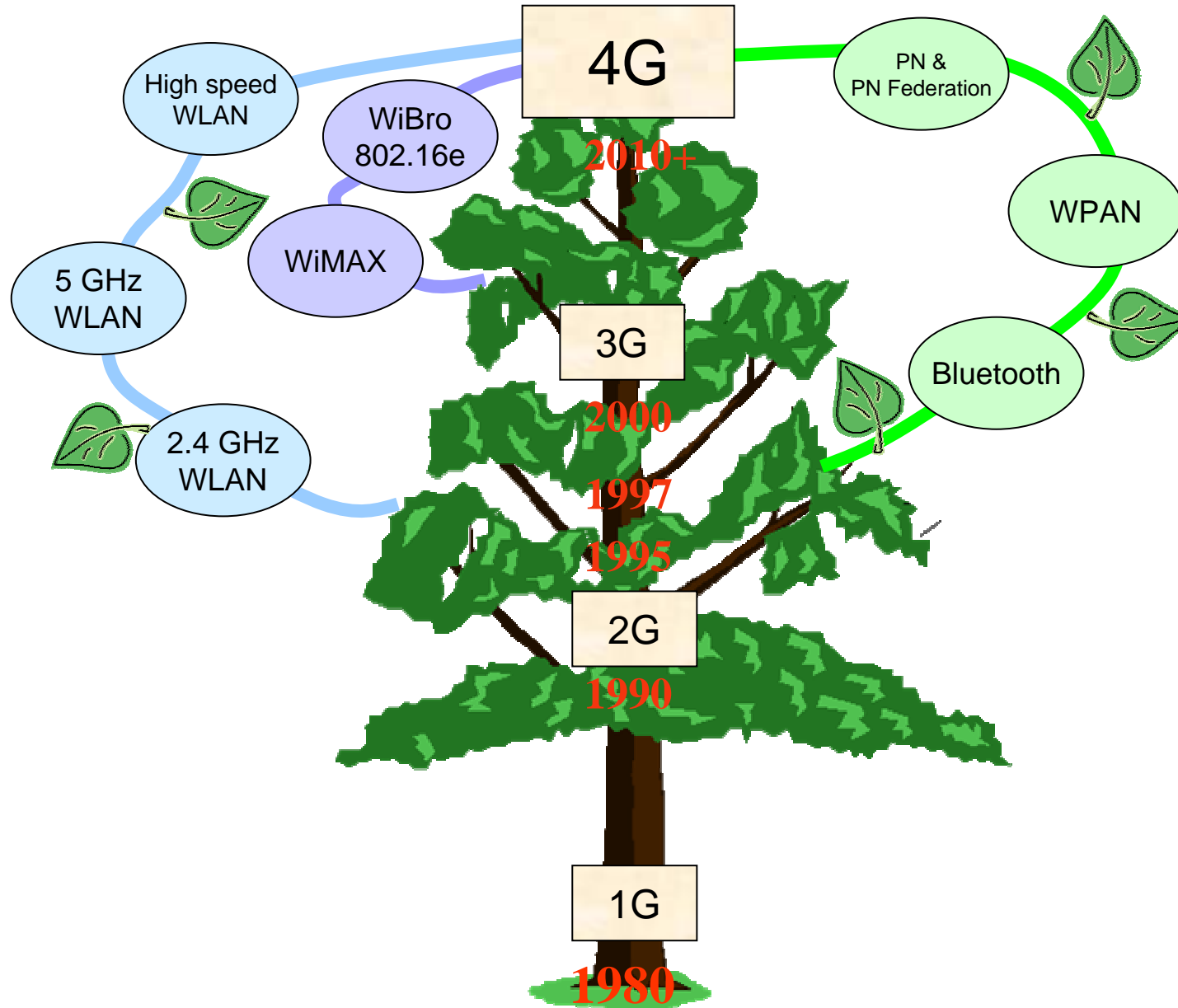


PN paving the way towards 4G

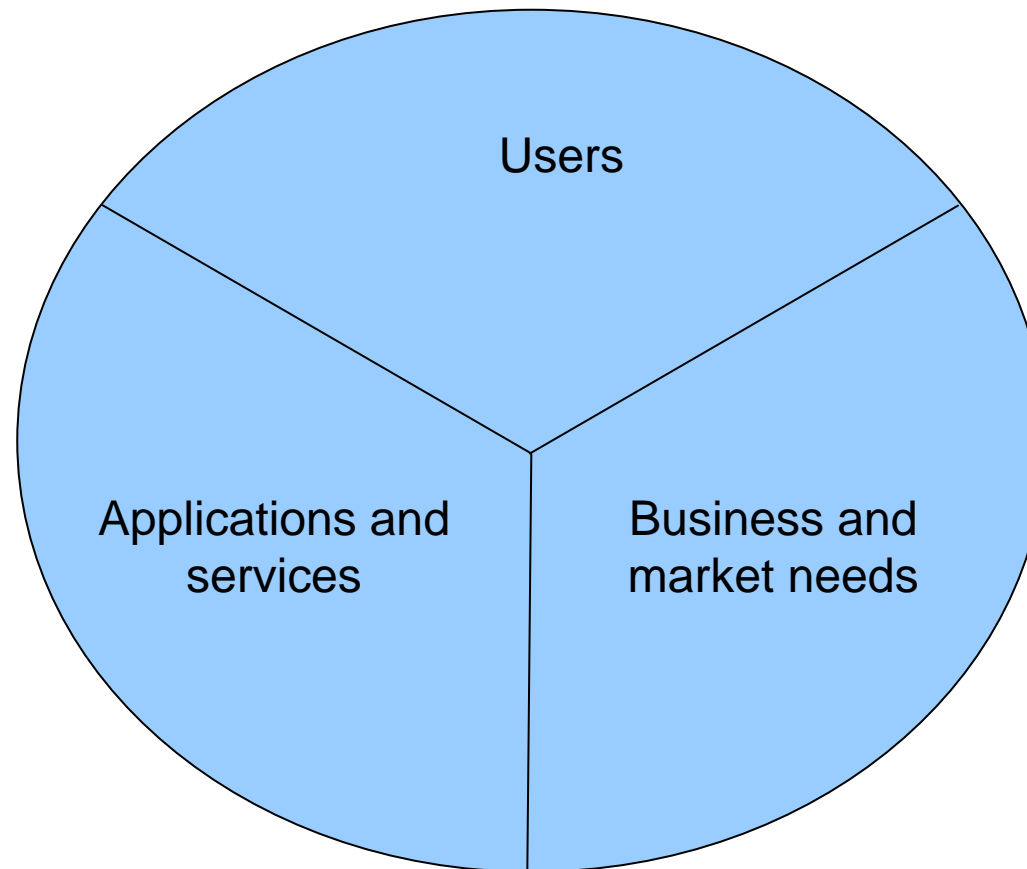
4G is defined as an evolutionary and revolutionary new fully IP-based integrated system of systems and network of networks achieved after convergence of wired and wireless networks as well as that of, e.g., computers, consumer electronics, and communication technology, that will be capable to provide 100 Mbps and 1 Gbps, respectively in outdoor and indoor environments, with demand-driven end-to-end QoS and high security, offering any kind of services at any time as per user requirements, anywhere with seamless interoperability, always on, at an affordable cost, with one billing and fully **personalised**

Any network, any device, with relevant content and context in a secure and trustworthy manner

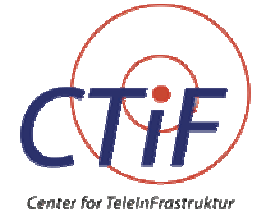
Wireless communication systems genealogy



Major Elements in Today's Technological Environment



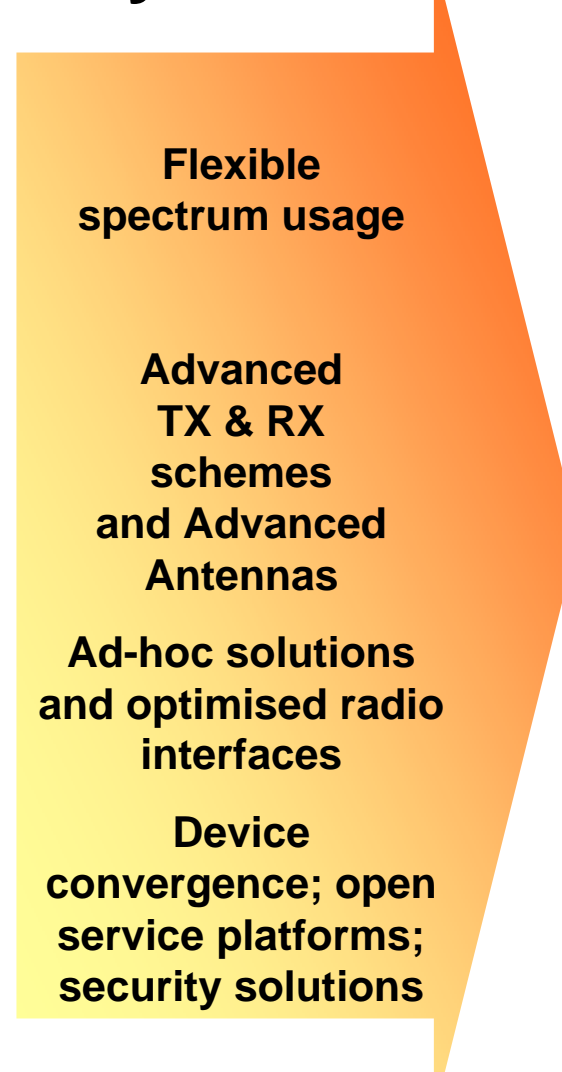
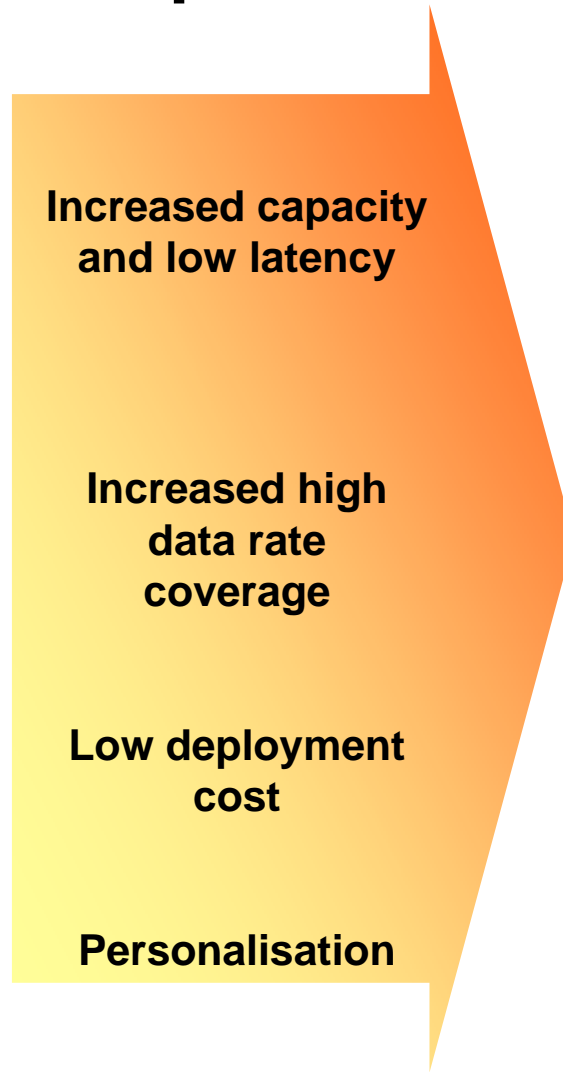
Evolution of Requirements for Mobile Technology



New requirements

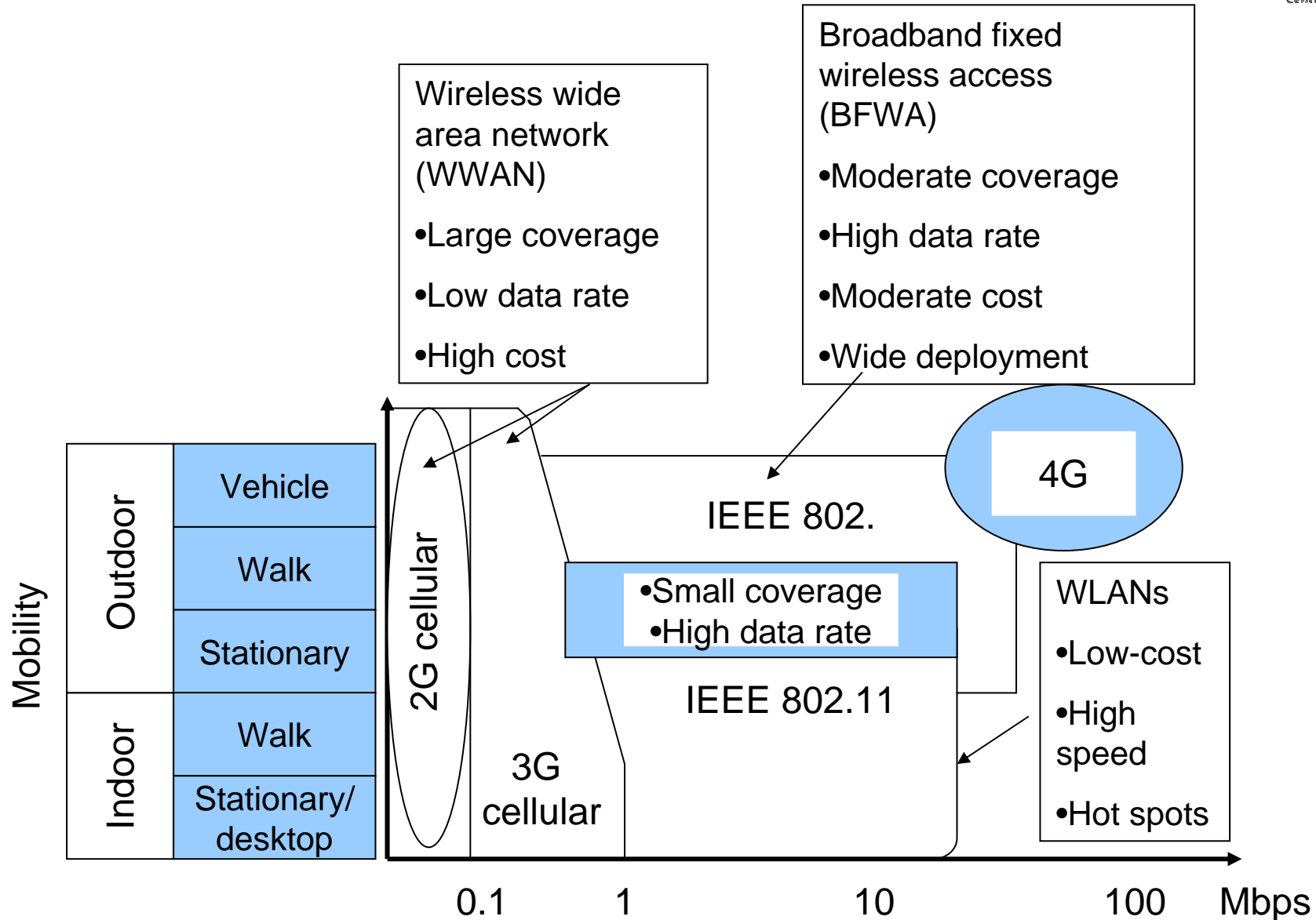
Key solutions

Traditional wireless

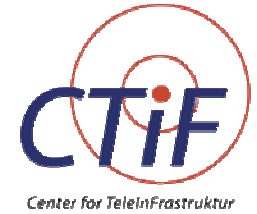


Adaptive system

Solutions for Wireless Communications



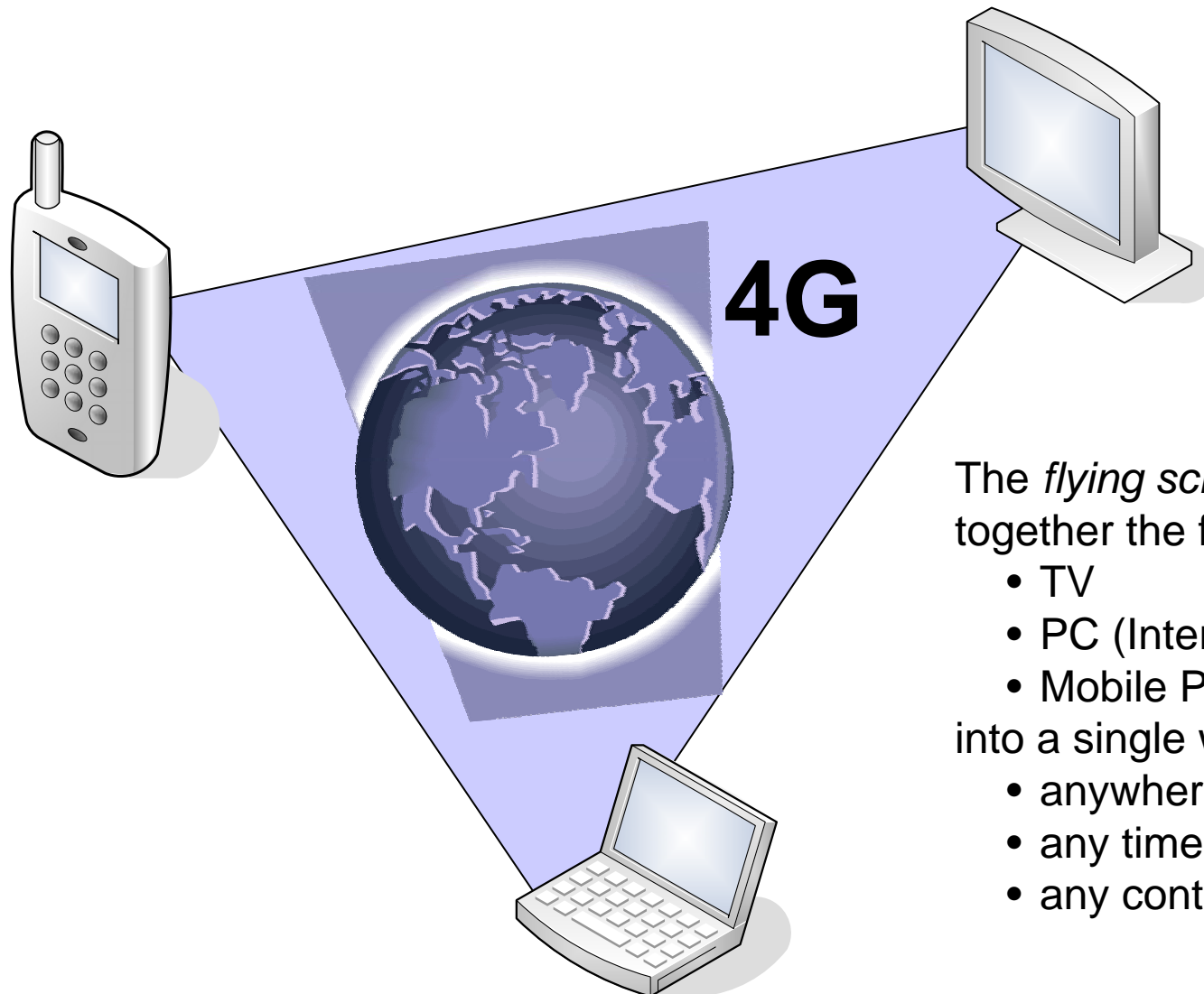
Differences in Wireless Standards



- Coverage
- Data-rate
- Services
- MAC protocols
- QoS methods
- Network architecture
- Mobility solutions
- Security methods: Authentication, key-management, encryption schemes etc.

Each technology was built for a different purpose

Device Convergence



The *flying screen* concept brings together the familiar screens of

- TV
- PC (Internet)
- Mobile Phone

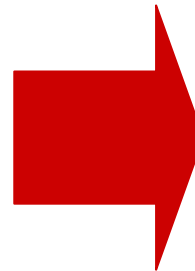
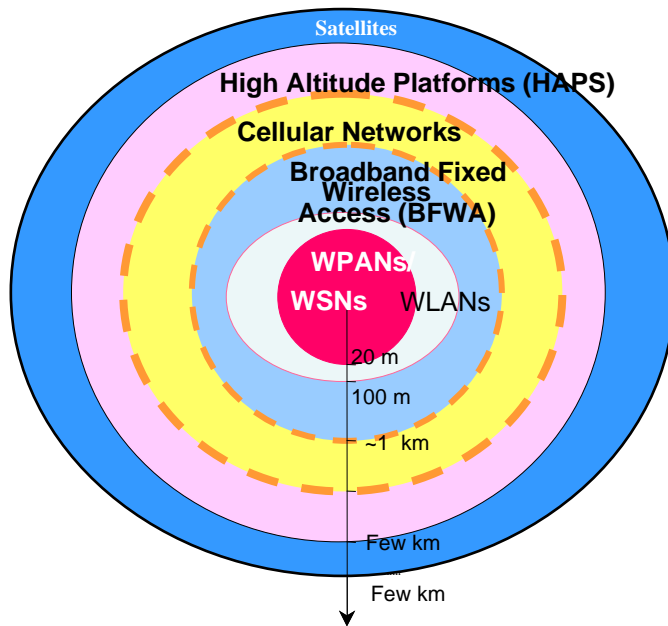
into a single wireless device

- anywhere
- any time
- any content

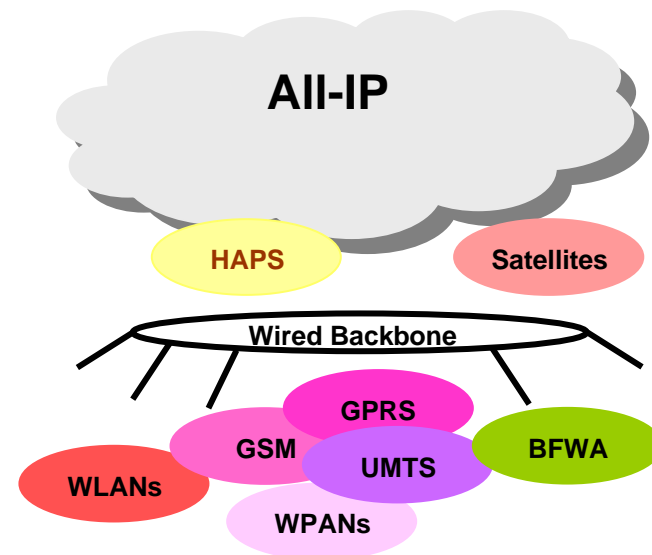
Networks Convergence

Definition of a heterogeneous network: A network connecting computers and other devices with different operating systems and protocols

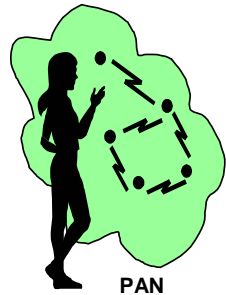
Overview of heterogeneous networks



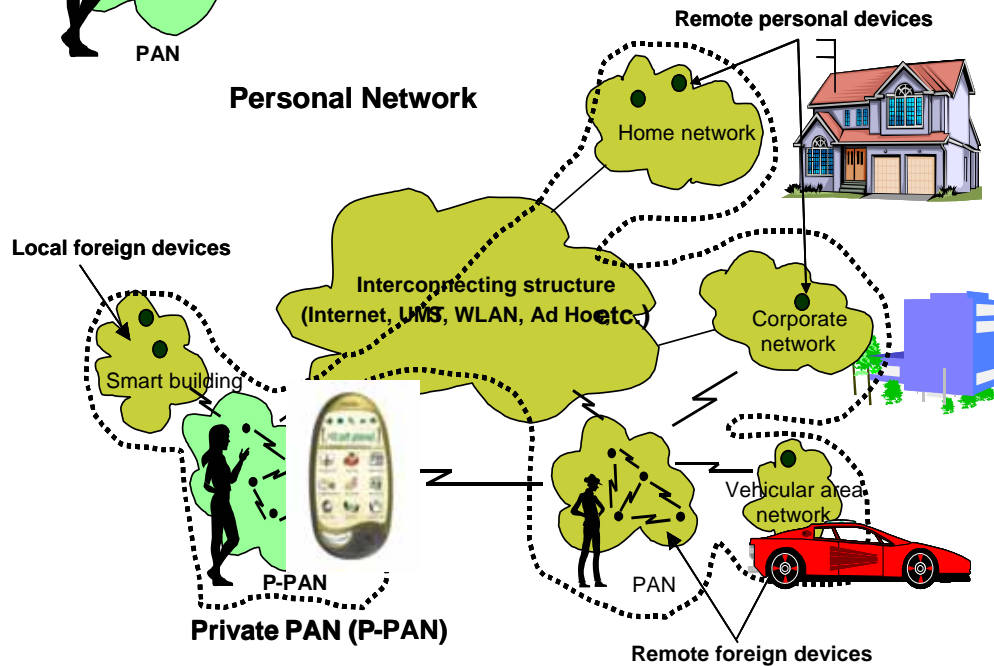
4G
fully IP-based integrated system
of systems and network of networks



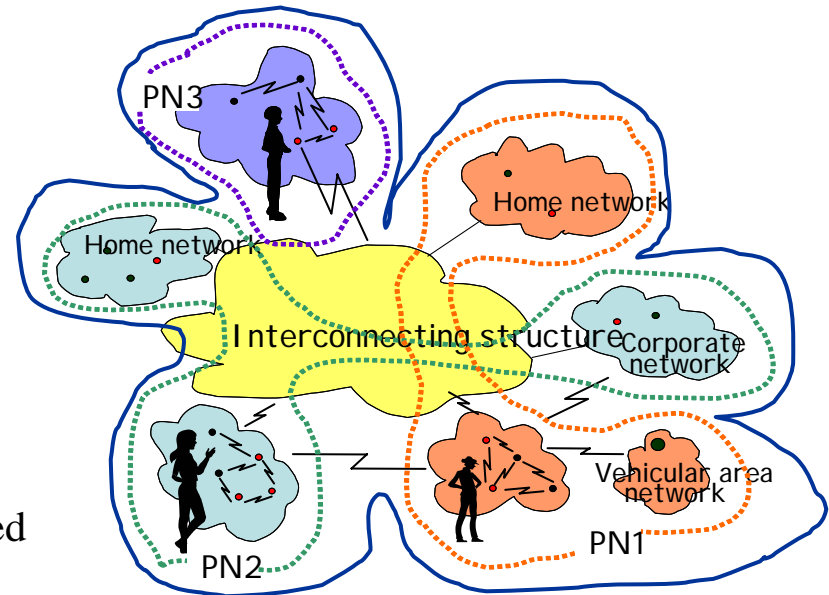
PAN, PN and PN Federation



Personal Area Network (PAN):
Grouping of devices within close vicinity of the user

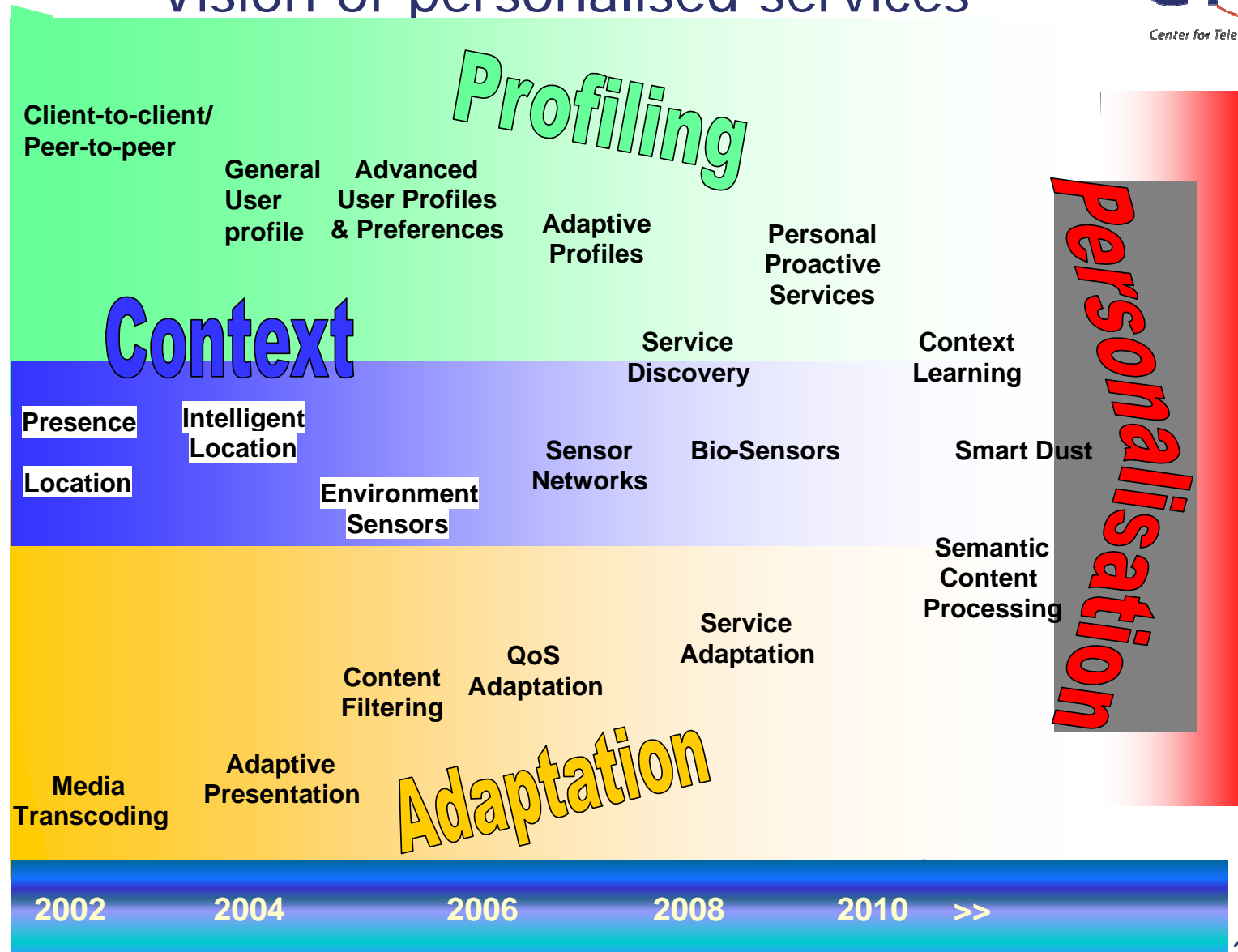


Personal Networks (PN):
System approach to Personal Networks satisfying users' needs



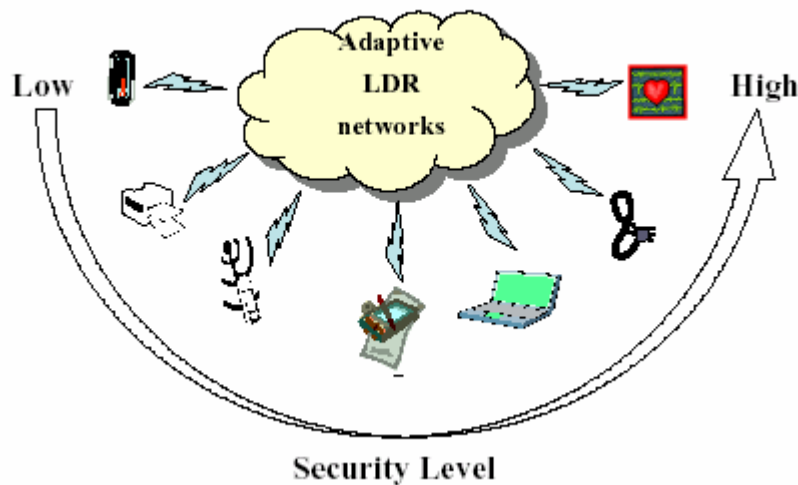
Introducing PN Federation:
Grouping of PNs with the objective of achieving a specific common goal, incl. temporary ad-hoc groupings, e.g. Distributed Work.

Vision of personalised services



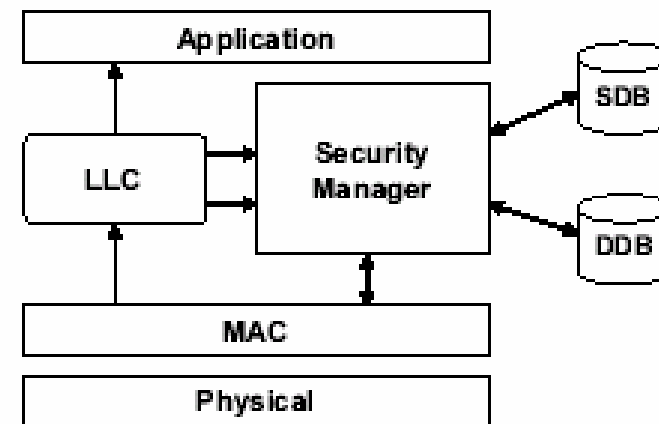
Adaptive Security for Low Data Rate Networks

1. Service-aware security architecture



2. Security level management

- Security manager:** An LDR network must adapt itself to the security requirements of heterogeneous services and devices
- Service Database (SDB):** information about security requirement of a set of supported services
- Device Database (DDB):** information about devices that aim at using provided by the network



MAGNET application scenarios

- Smart@home
 - MAGNET.Care
 - Nomadic@work
- } Continued in MAGNET Beyond
- Selected for user requirements analysis and prototyping

Personalisation

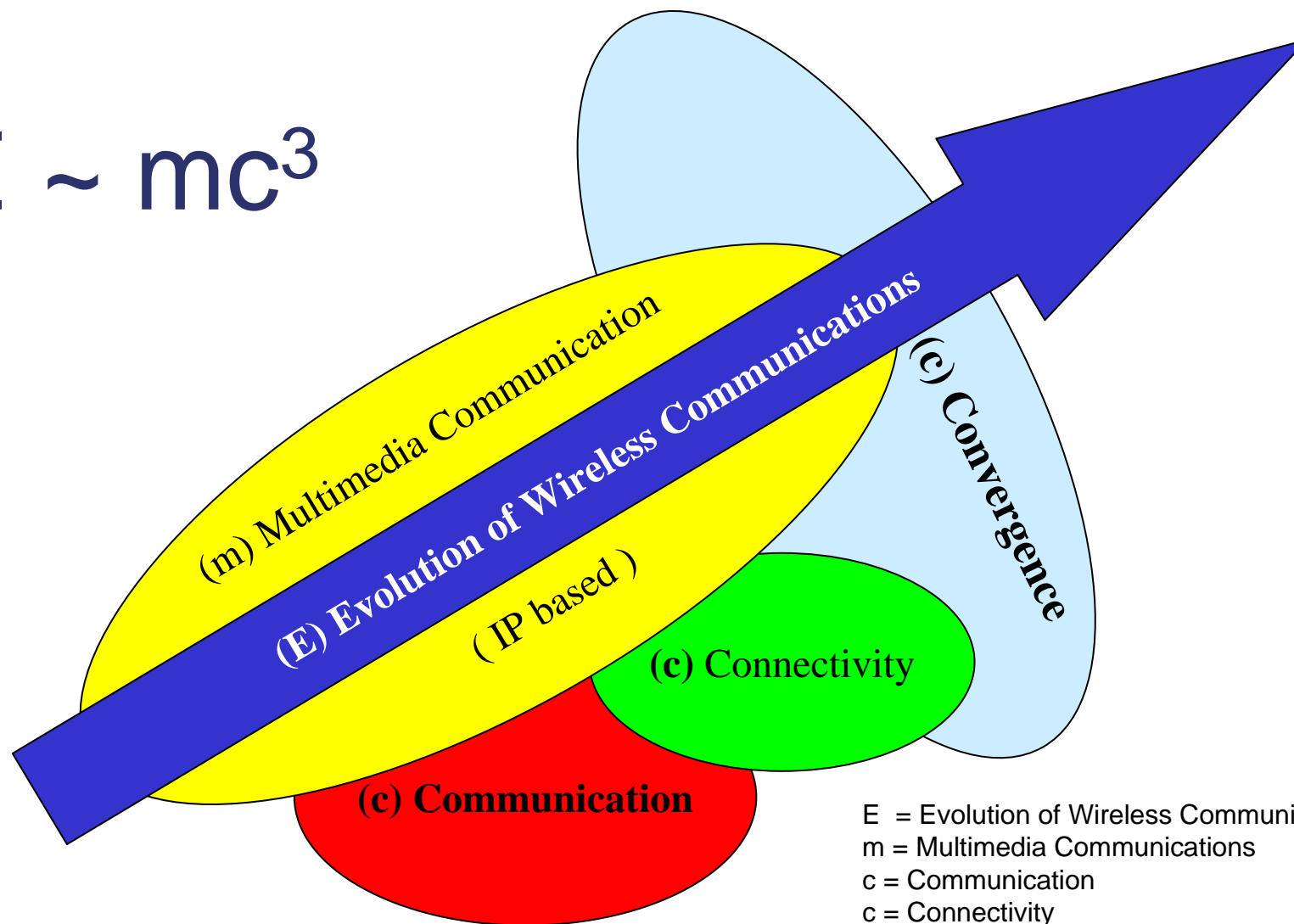
B3G is defined as the integration of existing systems to interwork with each other and with a new interface.

Pers stands for Personalisation and this topic is under research in MAGNET (My personal Adaptive Global NET) project

$$B3G + Pers \triangleq 4G$$

Communication, Connectivity, Convergence

$$E \sim mc^3$$



E = Evolution of Wireless Communications
m = Multimedia Communications
c = Communication
c = Connectivity
c = Convergence