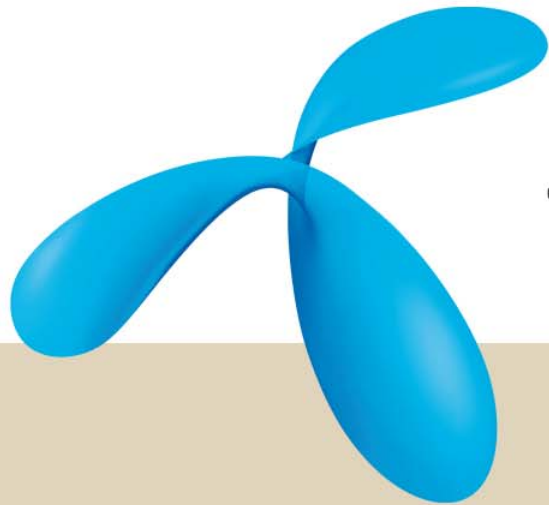




The 6th international Workshop on Wearable Micro
and Nano Technologies for Personalized Health

24-26 June 2009. Oslo, Norway.



telenor

Our dreams are the future

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Head Telenor Research & Innovation

1 July CEO Telenor Objects (www.telenorobjects.com)

Agenda

- Telenor's mobile reach
- Trends
- Shift to new value-chains
- Conclusions



Telenor can reach 1.8 billion people

(currently 166 M human customers)



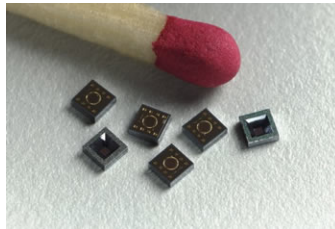
- India
- Pakistan
- Bangladesh
- Russia
- Ukraine
- Thailand
- Malaysia
- Norway
- Sweden
- Denmark
- Hungary
- Serbia
- Montenegro

- **World's sixth largest mobile operator**
- **40,000 employees**
- **35% phone penetration**
- **Up to 40 base stations a day**
- **Up to 100,000 new customers in a day**

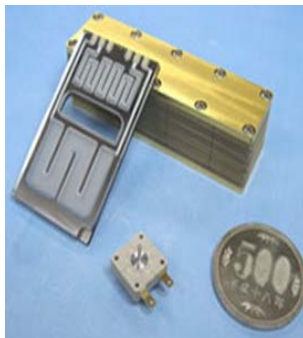


Trends

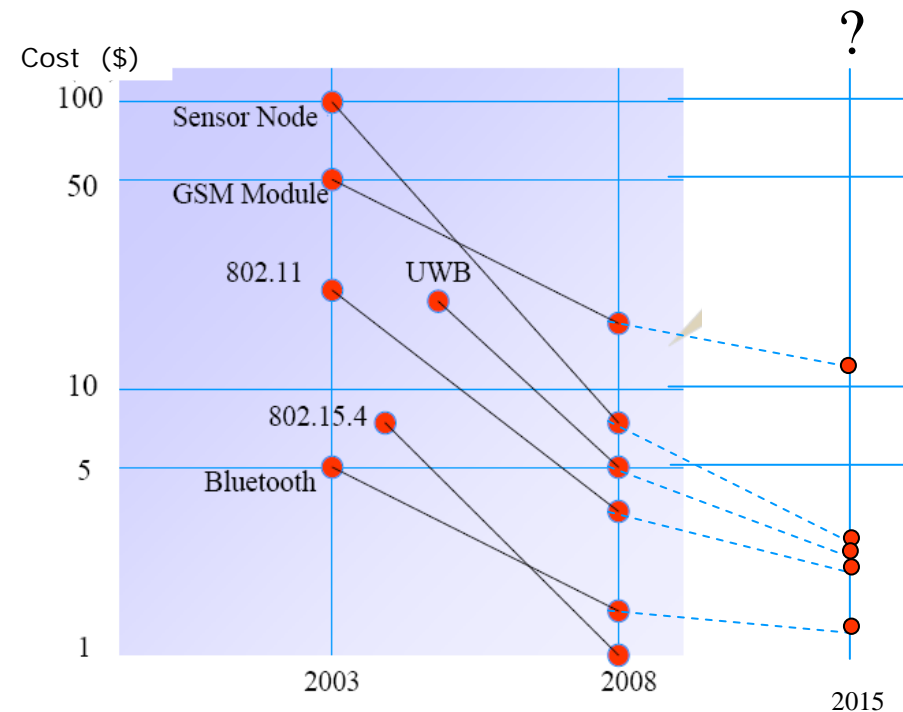
- Short range communications costs towards zero
- Significant power improvements
- Most processors will be on net in the future
- Cellphones ideal as relay stations



Tiny MEMS (Micro ElectroMechanic Systems) exist as temperature sensors, gyroscopes, microphones etc



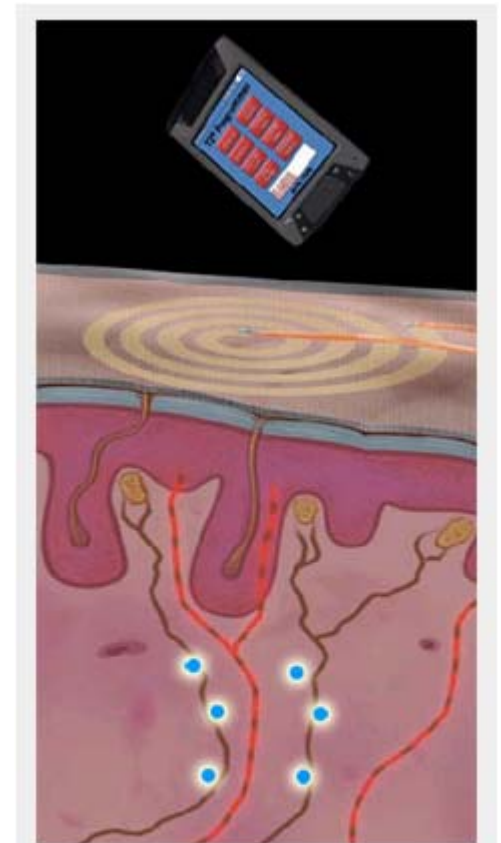
Microenergy sources



Estimated price fall per node,
Source: Gartner (2003, 2008)

Tiny implants for treating chronic pain

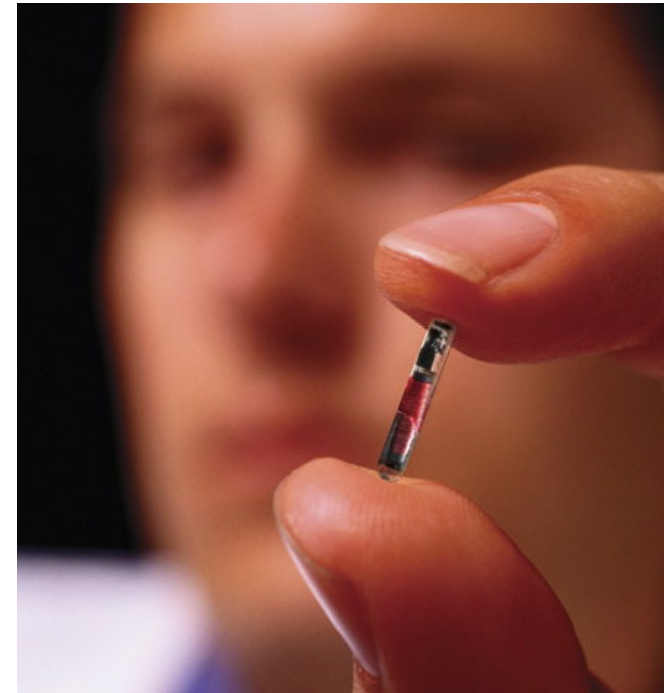
- The main limitation of any electronic device small enough to be injected into the body is that it must receive enough power to operate its circuitry and provide the required stimulation parameters
- RFID technology allows neural stimulators to get really small
- Near Field Communications (NFC) phones here this autumn



Pain relief: Scientists at MicroTransponder are developing a novel neuro stimulator to treat chronic pain. Small electrodes (blue circles) are injected near the spinal cord, and a PDA controls an external coil on the surface of the skin, powering the electrodes.
Credit: MicroTransponder

Edible microchip

- Tiny edible chips will replace the organizer, tracking when patients take their pills (or don't) and monitoring the effects of the drugs they're taking
- The chips send a signal to an external patch that monitors vital parameters such as heart rate, temperature, state of wakefulness or body angle.
- The data is then sent to an online repository or a cellphone for the physician and the patient to track



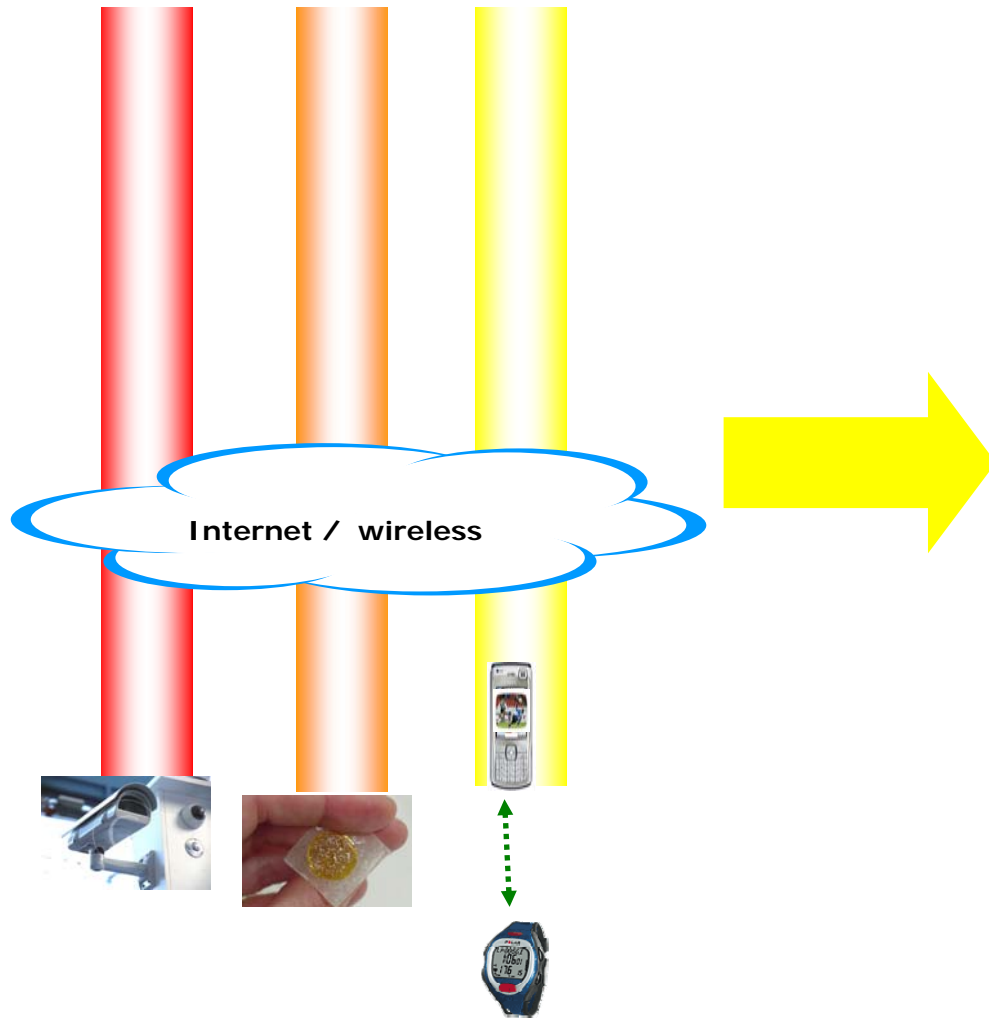
Smart bandage

- Outpatient monitoring
- Collect and transmit a surprising array of data
 - a single peel-and-stick sensor
 - Activity levels
 - Heart rate
 - Perspiration
 - Body position
 - Blood pressure

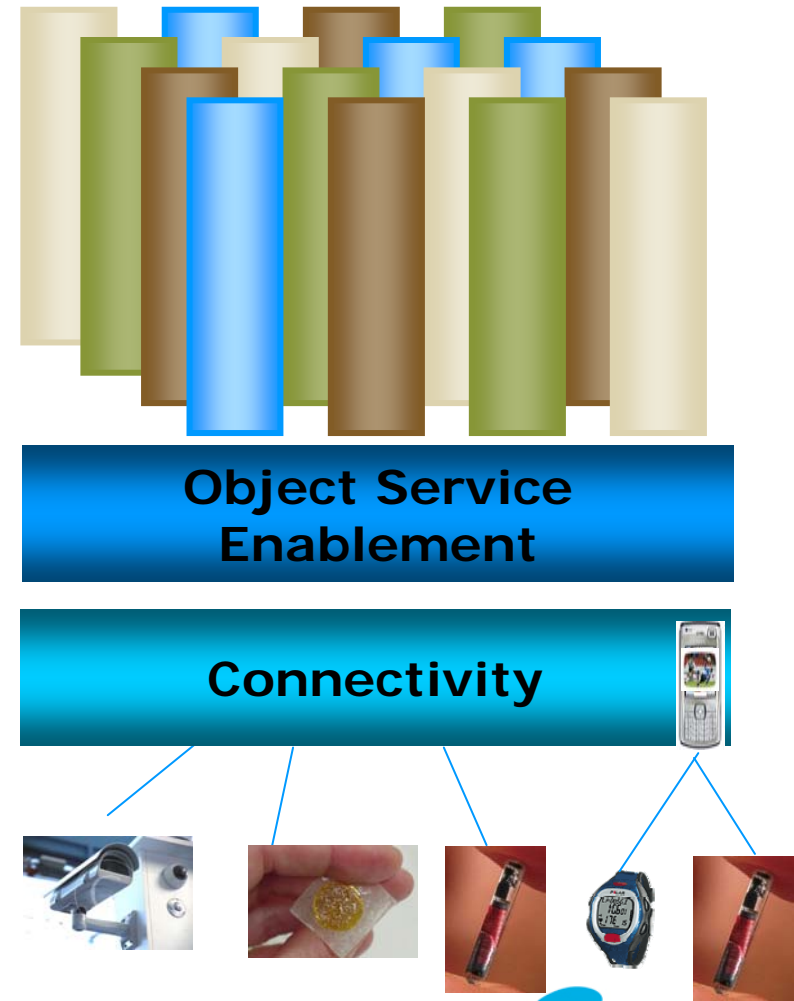


Shift to new layered value chains

Solutions as vertical silos



Applications flourishing



Object Service Enabler Functions

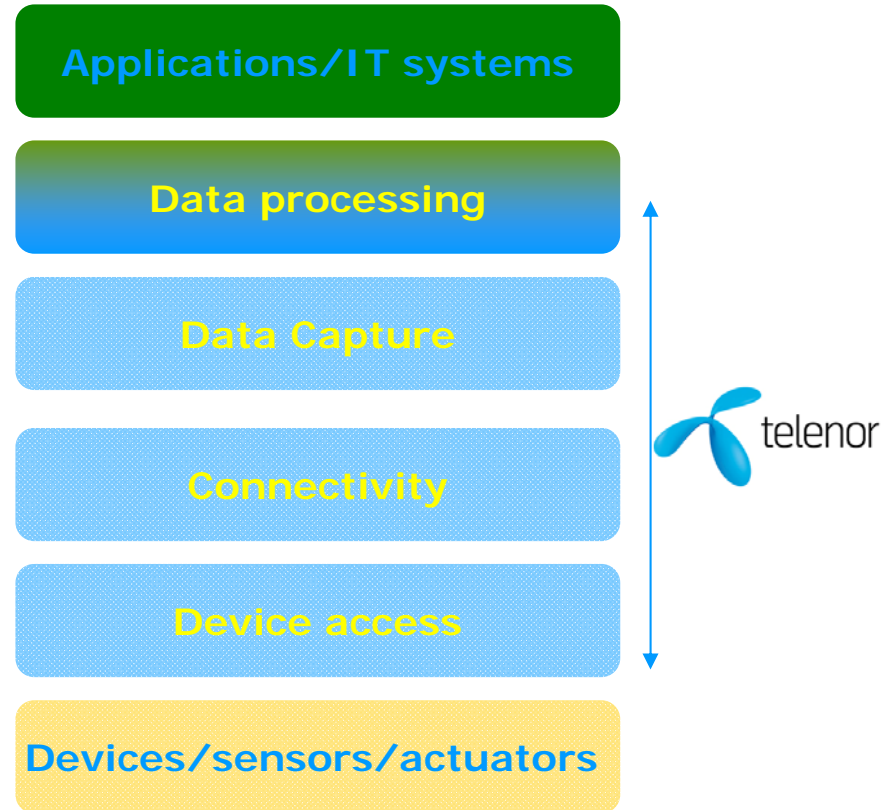
Functionality

- Managed connectivity
- Device and gateway interfacing
- Data capture, handling and storage
- Information exchange and routing
- Alarm handling
- Device management
- Service management
- Solution monitoring/reporting
- Object access brokerage
- Interconnection with other OSEFs
- Interfacing to business systems

Telcos well positioned to provide service

- Trusted managed service
- Reliable infrastructure
- Effective billing systems
- Easy device interfaces
- Easy application interface
- Trusted data roaming

- **Future network effects beyond comprehension**



Customers like self-service



Conclusions

- On and in-body devices coming of age
- Towards proactive health monitoring
- New Object Service Enabler infrastructure
 - Fast to solutions
 - Cost effective
 - Safe sharing of sensor data
- Ready for self-service in health

