

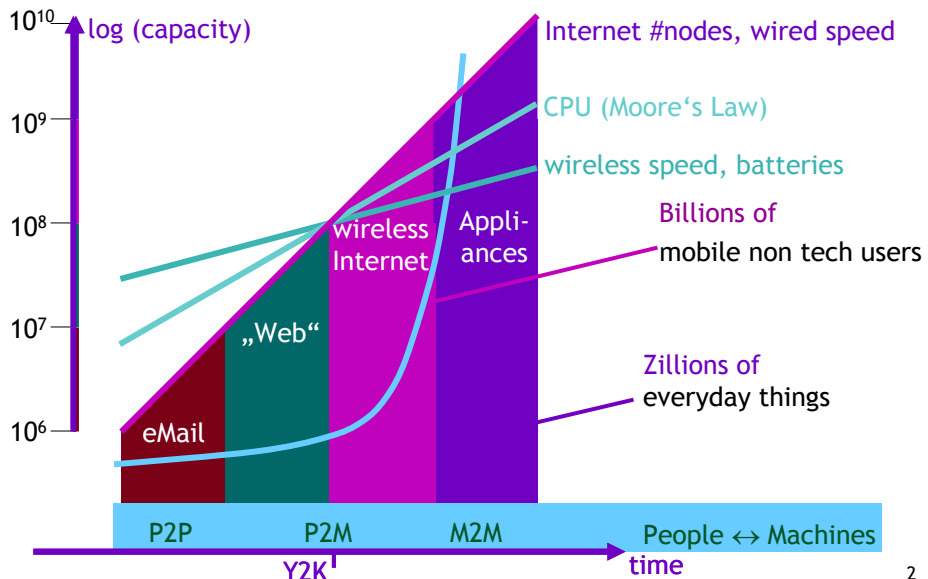
# Telecooperation

## uBiZ Area & Mundo UbiComp Infrastructure

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Prof. Dr. Max Mühlhäuser  
Telecooperation

### Context: Exponential Growth





## UC challenges: S.C.A.L.E.

### SCALABILITY

- architectures, methods, SW eng. for large scale (e.g., **event routing**)
- openness, standardization (e.g., **XMLprotocol** → ??)

### CONNECTIVITY

- ad-hoc; seamless use of networks (**discovery; overlay networks**)
- economy of locality („handheld supercomp“ vs. „always“-online)

### ADAPTABILITY

- wrt. „situation“ (**context-aware computing**: time, temp., location ...)
- wrt. user (pref's, activity&intent, devices...) / provider? (profit, ad's)

### LIABILITY

- accounting vs. security, **responsibility vs. privacy**; dependability ???
- complexity of „the made“ → „the born“ (**bionics, socionics, ...**)

### EASE-OF-USE

- for everyday devices (e.g., **multiple modalities**)
- post-desktop „digital clerk“ (e.g., **cooperation, forgetful memory**)

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## UC facts, consequences

### 1. UMTS: “forget the U”

- large spectrum of connectivity
- overlay cells

### 2. HotSpot ‘ISPs’: “forget the S”

- today: anarchy ... patchwork
- vs. 2G/3G: services!

### • Services: ... a global need!

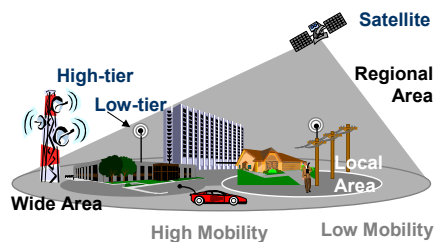
- horizontal: wire ... middle ... user-level
- vertical: novel ones (location, GIS, store / compute...)
- lateral: quality! (secure? reliable? available?)

### • User Interfaces

- Integrated virtual workspace across all devices/services
- Enhanced by context awareness, teams ...

### • No single device (compromise of everything)

→ set of coop devices that best fit task (yet: “minimal device”?)



BAN,  
PAN,  
CAN,  
...

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## MUNDO: Vertical Architecture

**ME** = Minimal Entity



- **ME:** Personally owned device
  - Digital ID for trust establishment
  - Secure trusted “one” device you always want to carry
  - e.g. Talking Assistant voice-centric terminal

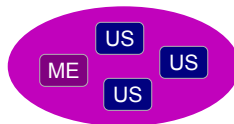
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## MUNDO: Vertical Architecture

**ME** = Minimal Entity

**US** = User aSsociable



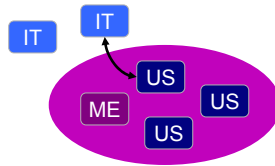
- **US:** User devices that depend on ME
  - Personalized by association, must stay in range of ME
  - e.g. Tablet (Pad/Tab), pointing device, Kiosk

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## MUNDO: Vertical Architecture

**ME** = Minimal Entity  
**US** = User aSsociable  
**IT** = smart ITem



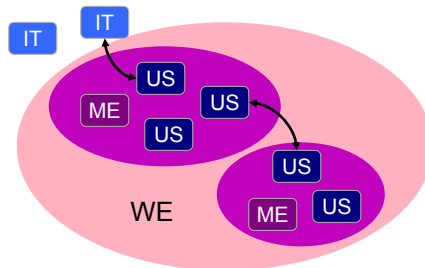
- **IT:** (smart) ITem, not ... fully associable
  - e.g., exhibit, room ctrl., ... (RFID tags etc.)

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## MUNDO: Vertical Architecture

**ME** = Minimal Entity  
**US** = User aSsociable  
**IT** = smart ITem  
**WE** = Wireless group Environment



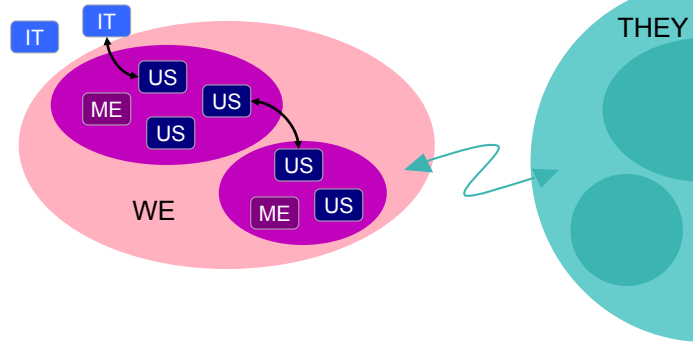
- **WE:** Ad-Hoc linking of personal environments
  - e.g. your DigiCam ↔ my storage box; need for proximity?

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## MUNDO: Vertical Architecture

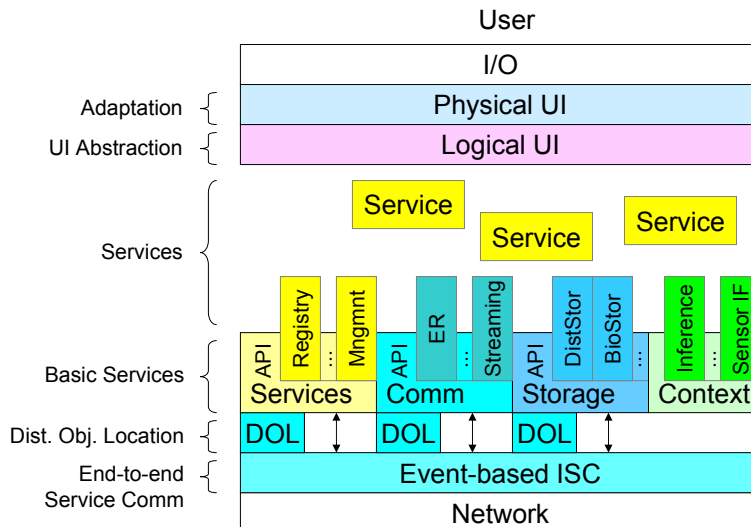
**ME** = Minimal Entity  
**US** = User aSociable  
**IT** = smart ITem  
**WE** = Wireless group Environment  
**THEY** = Telecooperative Hierarchical ovErlaY networks



- **THEY:** Infrastructure based networking
  - e.g. my ME @ gas station ↔ local restaurant ad. ?



## MUNDO: Horizontal Architecture





## MUNDO: Next Steps

### Under Development:

- **M<sub>E</sub> prototype** development
- **event routing** infrastructure as a common underlying base for push/pull and stream/connection/event communication
- **context aware service orchestration**: ctx-/fidelity centric model discover - orchestrate; migrate/regionalize, “net-boosting”
- **Multi modal UI** engineering: adaptation - abstraction - awareness
- **Extended peer2peer** infrastructure for casual-to-professional network and service provision
- **BioStore** concept for bio-analog continuous capturing & gradual forgetting of media data from “always-on” AV recording devices
- **W<sub>E</sub> adHoc networking**: iClouds spontaneous marketplace
- **W<sub>E</sub> adHoc net & UI**: post desktop computing
- **bridge to uLearn**: working on the move
- **Ubiquitous security**: design-center: M<sub>E</sub>S, association (semi-vacant).