Wireless Mesh Networks

Driving the next generation

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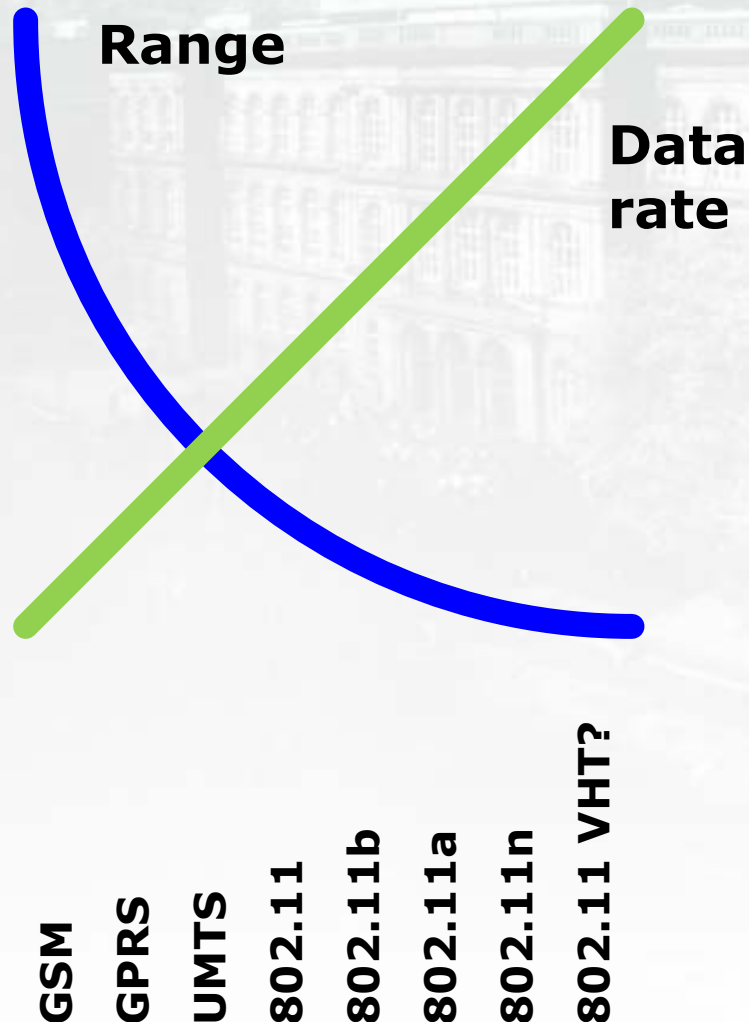
2008-01-25, Garmisch-Partenkirchen

- **The Internet**
  - A network of autonomous networks
  - Evolved from interconnecting wired networks
  - Today's business without the Internet?

- **Wireless networks**
  - Single hop connectivity
  - Lonely islands that depend on wires
  - Pre-mature?
  - A real thread for the wires?

→ Wireless networks are in an early stage

Trivia: Data rate is never sufficient

Range

Data rate

GSM   GPRS   UMTS   802.11   802.11b   802.11a   802.11n   802.11 VHT?

- High speed sells
  - Over-provisioning is 802.11's business
    - No need for complex QoS etc.
  - 802.11 Very High Throughput (VHT) Study Group started
    - >1Gb/s target
- But range?
- Mesh trades throughput vs. coverage → The solution?
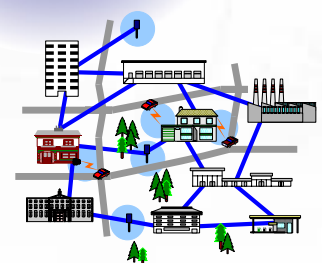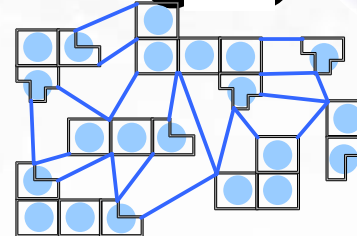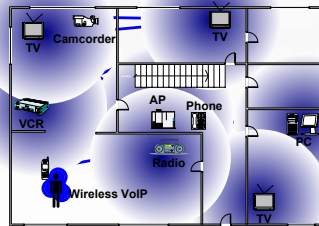
Did the Municipal Networks Market fail?
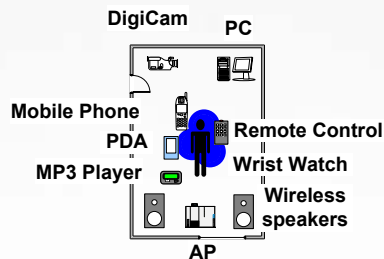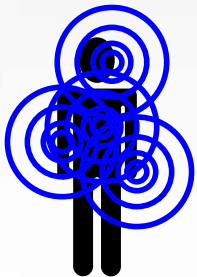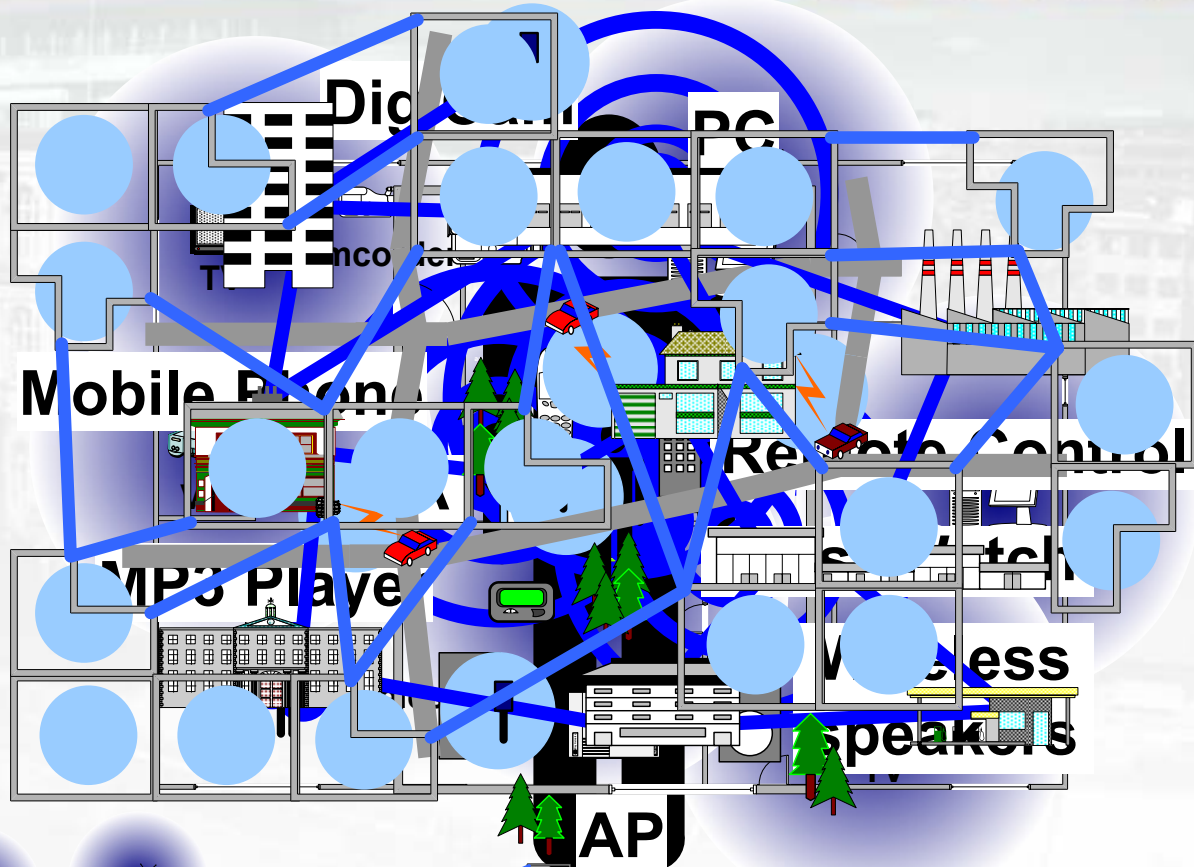
- **There is no such thing as a free lunch**
  - In the end, someone has to pay
    - A business based on advertisements?
    - Free wireless = More tourists?
  - The business plans do not fit

- **Mesh technology just works**
  - New markets develop new requirements
    - Vendors will adopt products

- **Mesh follows Wi-Fi trends**
  - Today's CE market exceeds "traditional" WLAN markets
  - Home market key for future mesh

- Wanted
  - Connectivity
    - From wherever
    - To whatever is in range
  - Auto detection
  - Don't care about technology
  - Don't care about topology

- Unwanted
  - Wires
  - Deployment
    - Cost & Efforts
  - Need for administration
    - Security
    - Maintenance
  - Inflexibility

Ubiquitous Mesh Networks

- WPAN, 802.15.5
  - Body
  - Single room
- WLAN, 802.11s
  - Apartment
  - Office
  - Campus
  - Street
- WMAN, 802.16
  - City

Research topics – Next generation mesh

- One Laptop per Child (OLPC)
  - Aka 100$ laptop
  - 1st 802.11s implementation
    - Pre-1.0 draft

- Additional radios too expensive
  - Efficiency enhancements needed
  - The current MAC limits 802.11s
- Open80211s
  - Open source implementation for Linux mac80211 stack
    - A platform for experiments
- 802.16j
  - Relay topology fits better into the WiMAX world
  - Will supersede 802.16 mesh

- Mesh Networking capability
  - Will become an inherent part of any wireless standard
- Mesh is a necessity for further market growth
  - Enables ubiquitous communication
  - New markets will drive the development
- Current solution are far too inefficient
  - As long as bandwidth is cheap, nothing will change
  - Multi-transceiver solution do not provide a general solution

Thank you for your attention!

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