

## Yrityksen tietotekniikka ratkaisut v.2002

Terveysthuollon ATK-päivät 1998

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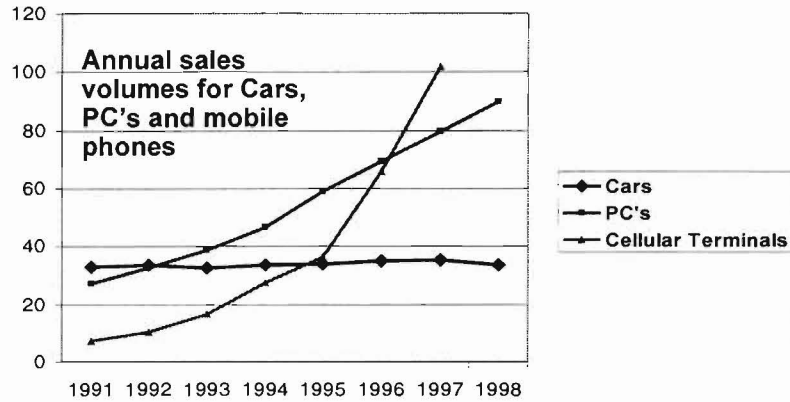
## Yrityksen tietotekniikka ratkaisut v.2002

- Keskeiset muutostrendit
  - Mobility Anything, Anywhere, Anytime
  - (Mobile) Internet
  - (Mobile) Multimedia
  - Wide Area Wideband coverage boosts Wireless LAN
  - ...
- => Visio
  - 3rd generation cellular unleashes Wireless Information Society



## The Mobile Phone Market Is Growing Fast

Million units

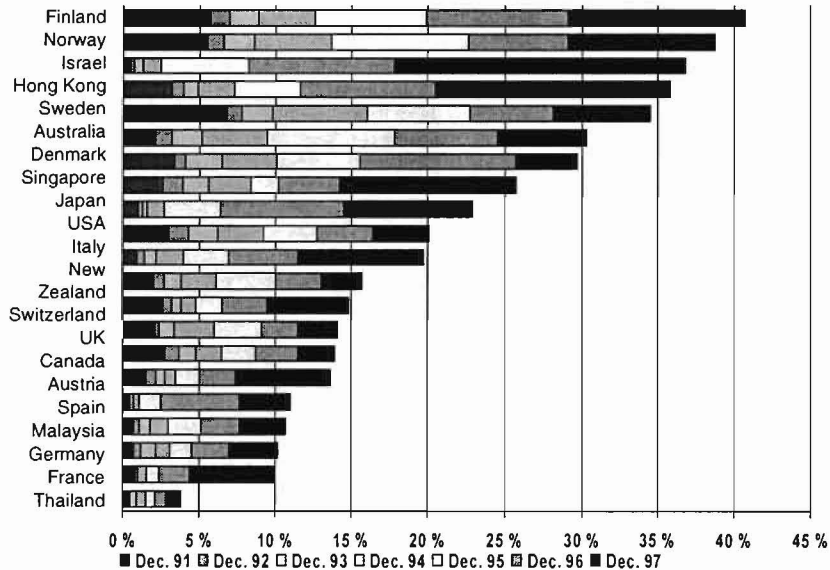


Sources: IDC, DataQuest, EIU

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## Global Cellular Phone Penetration 1991 - 1997



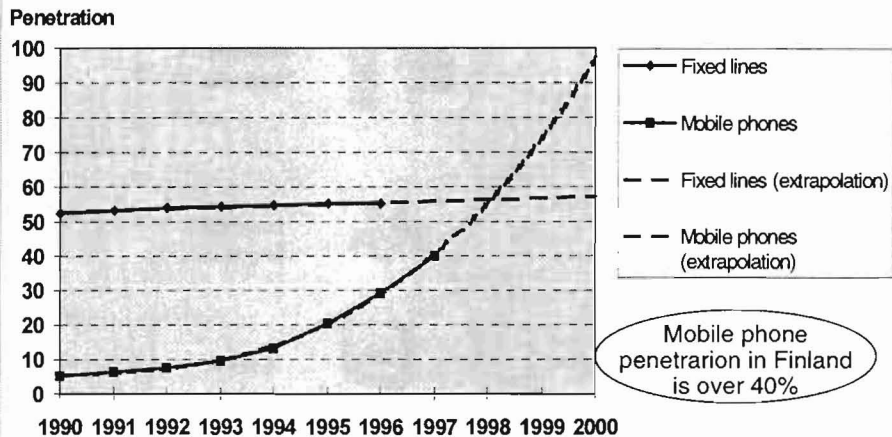
Source: World Bank; EMC, Preliminary estimates

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# Wireless Will Catch Up Wireline

Wireless and Wireline phones in Finland 1990-1997



Source: Finnish Ministry of Transportation

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## No boundaries

- The environment can no longer be divided by time or place
- Type of service is decisive
- Citizens of the information society want to be connected all the time, but wired only occasionally



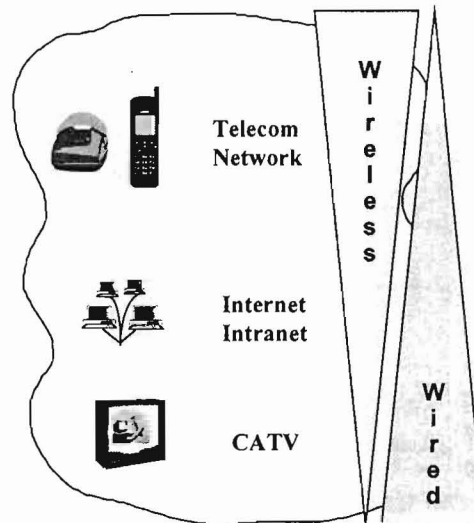
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## Increasing inter-operability

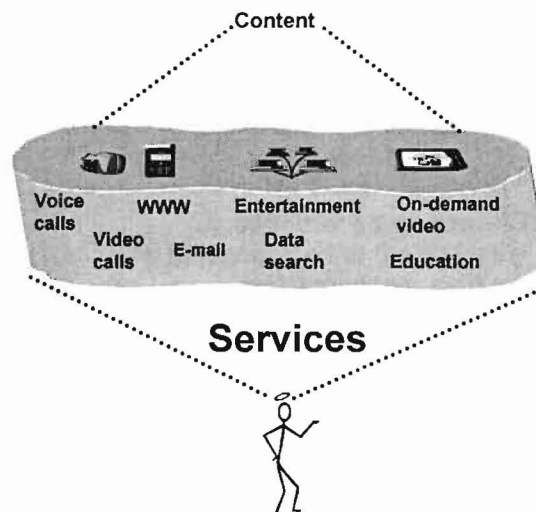
- Drivers:

- *Digitalisation*
- *Liberalisation*
- *Simplicity*
- *Mobility*



## Customers care about services

- Scalable services
- Services can be segmented based on type of usage and data rate required



## Anything, anywhere, anytime

Mobile phone subscriber

Radio listener

WWW surfer

TV watcher

Information service user

Multimedia customer

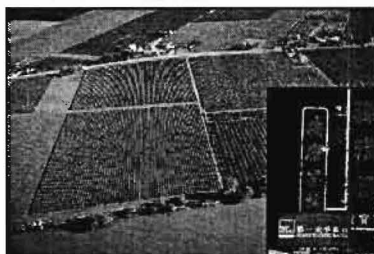
Pager user



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## Third generation services



64 - 144 kbits/s  
Rural outdoor



384 kbits/s Urban  
outdoor

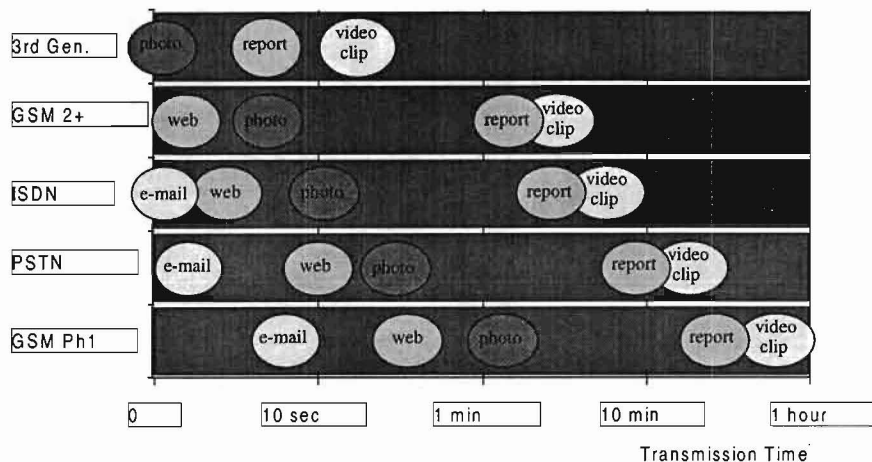
2 Mbits/s Indoor,  
low range outdoor



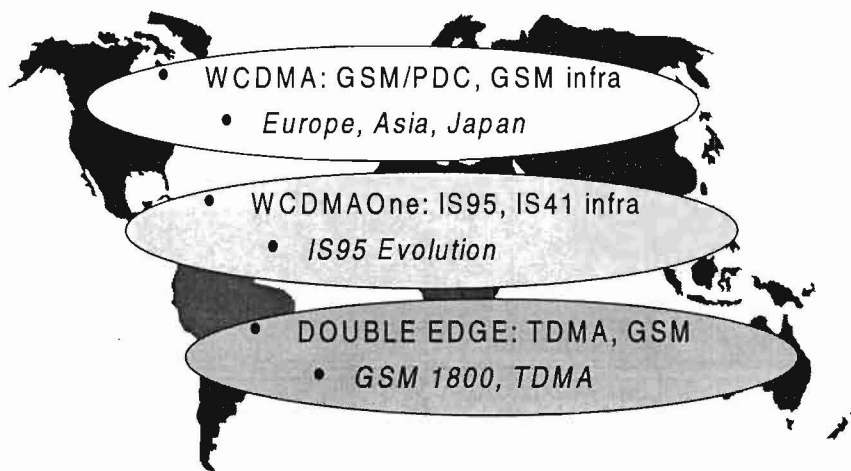
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## Relative performance of various services

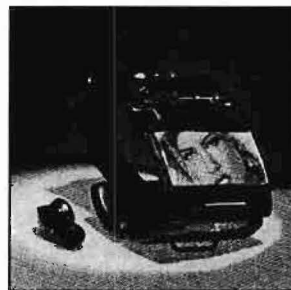


## Three different approaches



## Video of acceptable quality

- HSCSD makes GSM technically video capable
- 28.8 kbit/s enough for low motion video phone
  - ~ 20 kbit/s for H.263 video
  - ~ 5.3/6.3 kbit/s for G.723.1 audio
  - ~ 2 kbit/s for control
- Picture quality depends on the amount of movement
- "Acceptable quality" achieved:
  - *Simple heads-and-shoulders scene. H.263 from 10 kbps, with Nokia's MobiVideo from 5 kbps*
  - *Stable scene, some movement. E.g. corridor with people (20,12)*
  - *Hand-held camera, lot of movement (50, 25)*



## Speech recognition

- Convenience and legislation drive voice dialing
- Speaker independent, isolated word, small vocabulary systems are mature for use in cellular applications
- Integration of speech UI to value-added mobile services during 1998-2000
- Close-to-natural communication with machines in specific applications after 2000
- Speech access to information services
- Voice browser



## Internet is all around

- IPSEC is becoming the de facto standard for encryption and authentication in the Internet
- Personal mobility agent in network selects the terminal at which customer can best be reached
- Quality of Service is needed to make business, to support new applications, and to satisfy demanding users
- Mobility (Wireless Application Protocol) will give added value to many Internet-based applications
- Wireless business communications could give new boost to Internet
- Wide area wideband coverage will give added value to Wireless LANs



## Web Phone

- SW:**
- Operating system
  - HW (display)
- drivers**
- Cellular SW (L1-L3)
  - Speech coding
  - Hands free
  - Voice recognition
  - Video (DE) coding
  - TCP/IP
  - IrDA protocol
  - JAVA
  - User interface
  - PDA
  - Applications



SW content  
will increase



## Then comes MPEG-7 for multimedia browsing

- Standardisation of MPEG-7 multimedia content description interface to be completed by 2000
- Could be used to make queries with for example

**MUSIC** - play a few notes on a keyboard and get in return a list of musical pieces

**GRAPHICS** - draw a few lines on a screen and get in return a set of images

**VOICE** - using a voice excerpt of a singer's voice and getting a list of records or video clips



## Today's 2G Terminal Technology

RF  
BASEBAND  
RADIO CHANNEL  
SPEECH CODING  
CONTROL PROCESSOR  
MEMORY SIZE  
DISPLAY

PCB  
MECHANICS  
ANTENNA  
BATTERY  
PACKAGING

Discrete and/or ASIC  
CMOS 3V  
30 MIPS  
3-30 MIPS  
8-16 bits, 10 MHz  
4 Mbits  
LCD b&w  
(Dot matrix or graphic)  
Multi layer, traditional  
Inject mold plastics  
External (helix or whip)  
NiMH or Lithium-Ion  
SMD



Half of the terminal is  
SW today

## 3G Terminal 2002

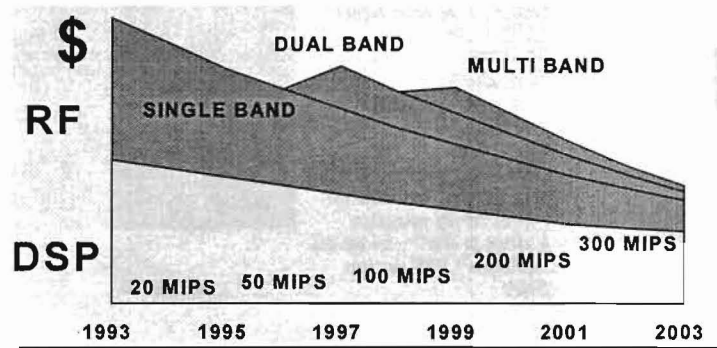
RF	1-3 ASICs	CMOS 1V
BB	1-2 ASICs	BiCMOS
RADIO CHANNEL	200 MIPS	
SPEECH CODING	30 MIPS	
VOICE CONTROL	50 MIPS	
VIDEO CODING	100 MIPS	
CONTROL PROCESSOR	16-32 bits 50 MHz	
MEMORY SIZE	64 Mbits	
DISPLAY	Color (LCD or active), graphic	
PCB	Multilayer, buried vias, laser holes, new materials	
MECHANICS	Diverse materials	
PACKAGING TECHNOLOGY	$\mu$ BGA, MCM, Flip Chip	
BATTERY	Lithium-Ion or Lithium polymer	



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## Steps towards SW Radio



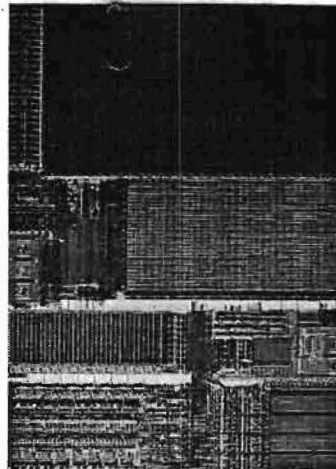
Optimized single band radios  
 Optimized dual/triple band radios  
 Generic platform for SW radio

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## Development of microelectronics

- Today you can buy 1000 transistors for the price of one paper clip
- In year 2002, you can buy 10 000
- Processing power goes up and power consumption down



Many promising technologies are expected to be ready for market applications by 2002

- 3rd generation mobile systems
- Voice-based media browsing
- Advanced wireless multimedia
- Interoperable Wireless LAN networks
- Security, mobility and QoS in the Internet
- Sophisticated SW for navigating in knowledge
- 10 times more processing power and memory

**BIG BANG!**

