Mobile Operator's Data Business Logic

Pekka Keskiivari

Sonera Mobile Communications

Telecommunications Forum -99

22.9.1999

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A Short History of Mobile Data

A Short History of Mobile Data - 1980's

Analogue ARP and NMT networks could be used for slow wireless data transfer

Very slow speeds (300-1200 bits/s) and low reliability

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A Short History of Mobile Data - early 1990's

Private/dedicated radio systems such as Mobitex and Mobinet Data
- Suitable for low volume, bursty packet data transfer
- Main appications in vertical applications (logistics, taxis etc)

LANGATTOMAN DATALII-
KENTEEN ENNUSTETAAN
KASVAVAN LÄHIVUOSINA
RÄJÄHDYSMÄISESTI.
GSM-VERKON OHELLA
TARJOLLA ON TELEN YL-
LÄPITÄMÄ MOBITEX-
VERKKO. SE SOPII LÄ-
HINNÄ PALJON AJONEU-
VOJA KÄYTTÄVIEN YRI-
TYSTEN TARPEISIIN.

A Short History of Mobile Data - early 1990's

DMS standard for improved NMT data transfer
- Specification designed at Telecom Finland
- Utilizes the NMT signalling mechanism for data transfer

Benefon Beta ja DMS-modeemi.
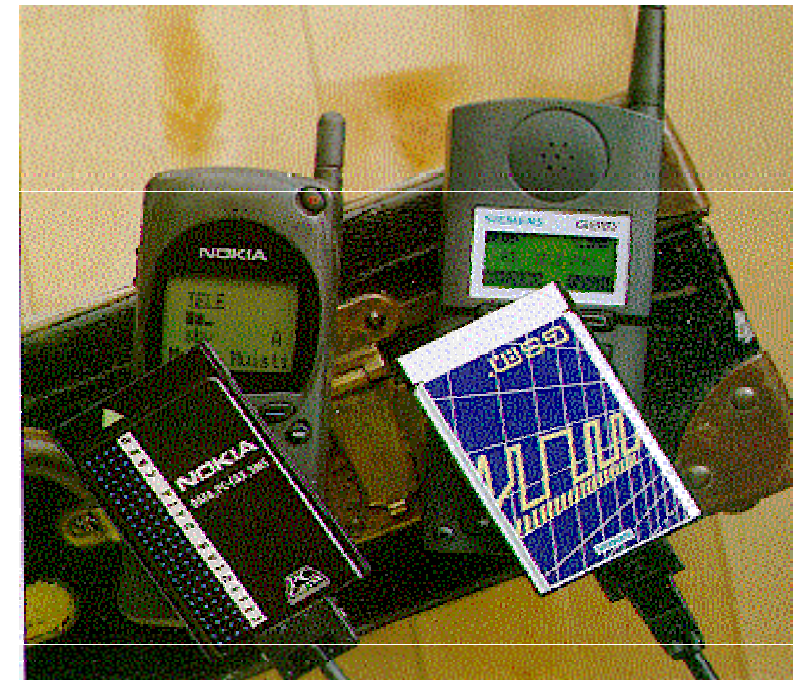Liikkuva toimisto,
joka mahtuu taskuun.

A Short History of Mobile Data - Mid-1990's

GSM Data in 1992
- Circuit switched connection, speed 9600 bits/s

Short Message Service - SMS in 1994
- Store-and-forward messaging service, 160 char messages

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Only five years ago...

Mobile data was defined from the corporate user's point of view
- Accessing corporate applications and databases
- Sending and receiving telefaxes
- Wireless data was tightly connected to computing equipment, e.g. laptops

Potential cost savings & performance improvements were put forward as main motives for mobile data

Although the possibility for consumer mass market in mobile data was recognized, practically nobody tried to address it

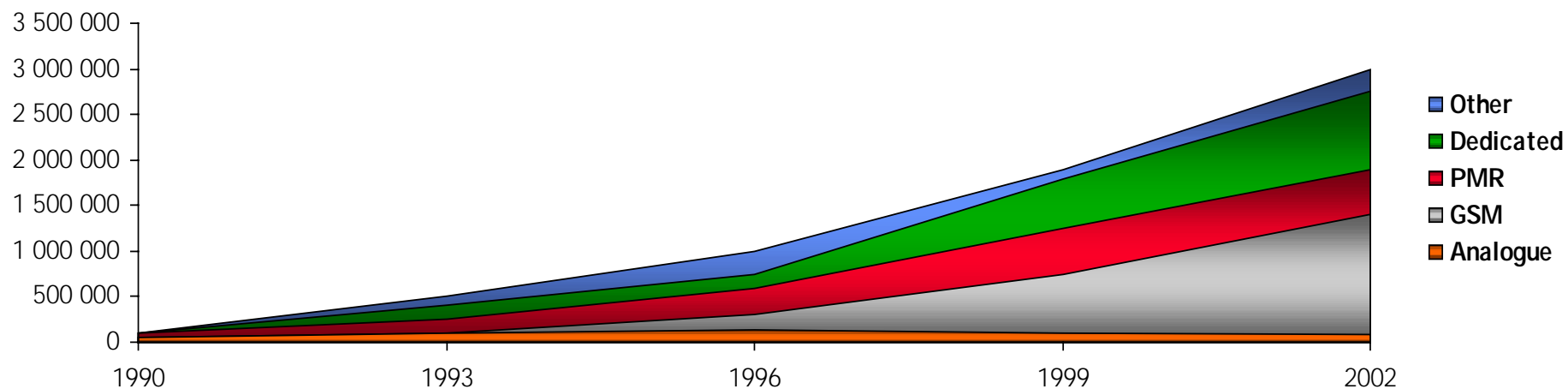Performance, speed and reliability of the data service were the main concerns
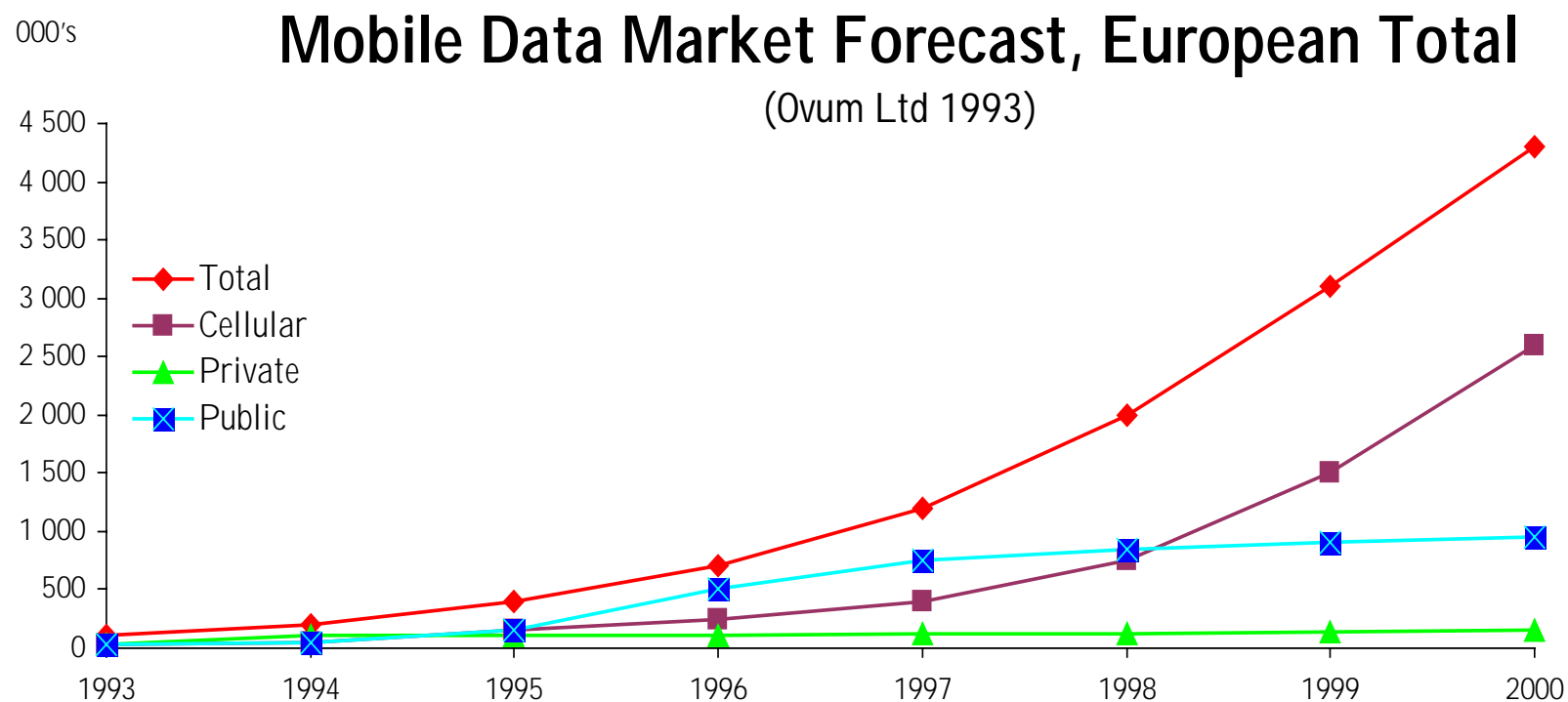
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Commercial accomplishments
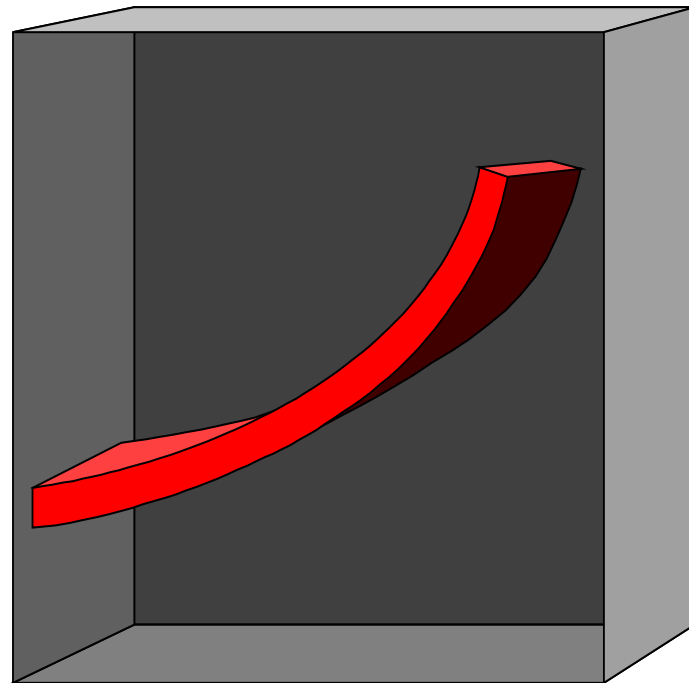
Hopes for mobile data have been high for long

European Mobile Data Forecast by Bearer Technology
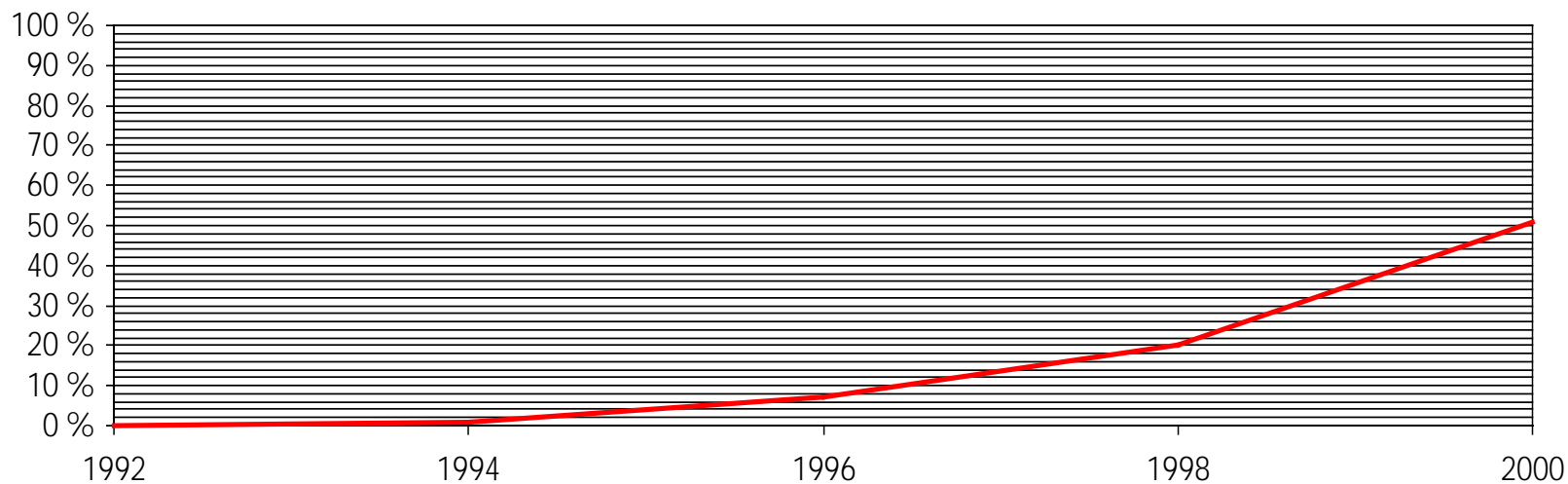### (Schema, 1996)

Subscriber Base

Legend:
- Other
- Dedicated
- PMR
- GSM
- Analogue

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Hopes for mobile data have been high for long

000's

Mobile Data Market Forecast, European Total
(Ovum Ltd 1993)

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Hopes for mobile data have been high for long

Data Usage (% of Voice-only Volume)
(Sendit AB 1992)

Mobile data in Finland

GSM Data has been available from the early days of GSM operation

- Users are practically all business users or vertical applications
- The number of data subscribers has been around 4 % of total subscriber base

SMS was launched by Telecom Finland in September 1994

- SMS was adopted first by consumer customers and is still to reach its potential in the business market
- SMS service became a standard feature of the subscription in 1997

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Conclusions about mobile data so far
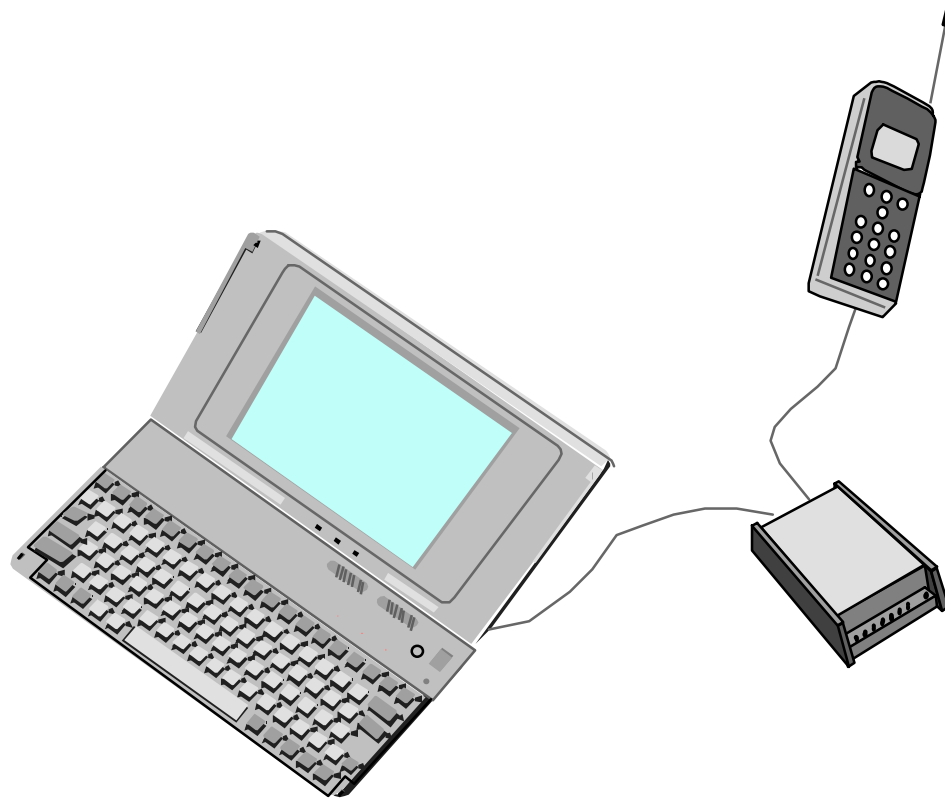
A lot of hope — little results

Lesson 1....

There was an attempt to match mobile data with fixed data

- E.g. 9600 bits/s for GSM Data was perfectly adequate at the time it was conceived
- In 1996-1997 when the GSM Data service reached stability it was already out-of-date

...mobile data will always be behind fixed data

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A lot of hope — little results

Lesson 2....

Attempt to develop mobile-only services

- Operators developed software and services specially for mobile data users
- User requirements and environment changed very fast making it very difficult and expensive to provide and maintain support
- Even for special needs, user prefer common solutions

...mobile data applications are based on main stream technologies

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A lot of hope — little results

Lesson 3...

Wirelessness and mobility were taken as the main drivers
- Everybody concentrated on providing the technology and services: networks, terminals and mobile data services
- Actual applications were left to the implementing party or user
- The best and only successes have been dedicated solutions that were application driven (e.g. taxis, logistics support etc)

...applications are the key in mobile data

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Services and Applications instead of Voice and Data

Puhelinluettelo
Uutiset
Talous
Sää
Urheilu
Matkustus
Rahapelit
Viihde
Doris
Services in English
Saldotiedustelu

Muut WAP palvelut
Muut palvelulinkit

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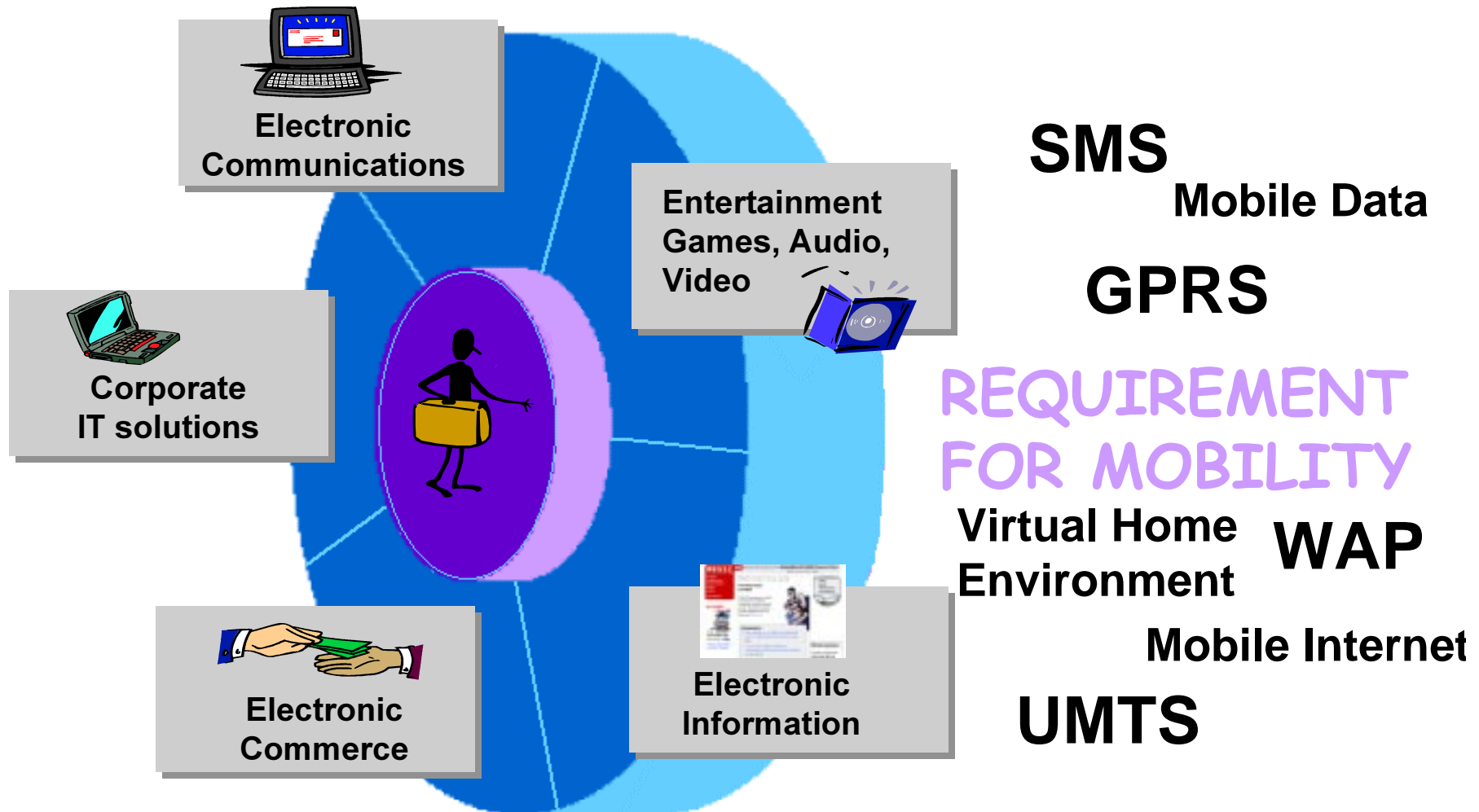# Services and Applications instead of Voice and Data

During the last few years, the mind set on mobile data has gone through a radical change

- Circuit switched mobile data will never be appropriate for most applications
- All non-voice services in mobile networks are mobile data
- SMS is currently the most popular data service
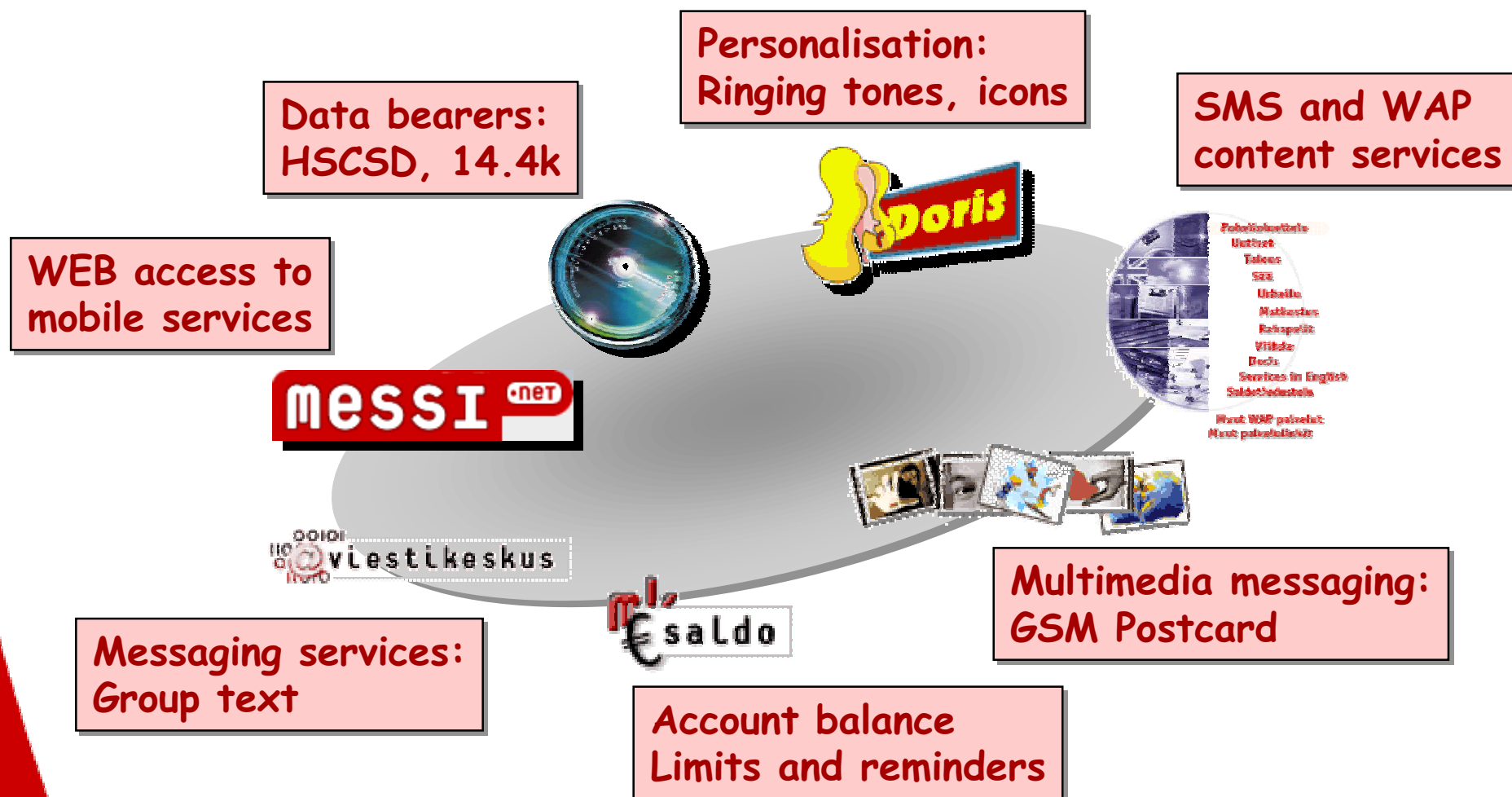- Applications, simplicity and usability drive the development

Mobile data connection is not just a slow wireless connection
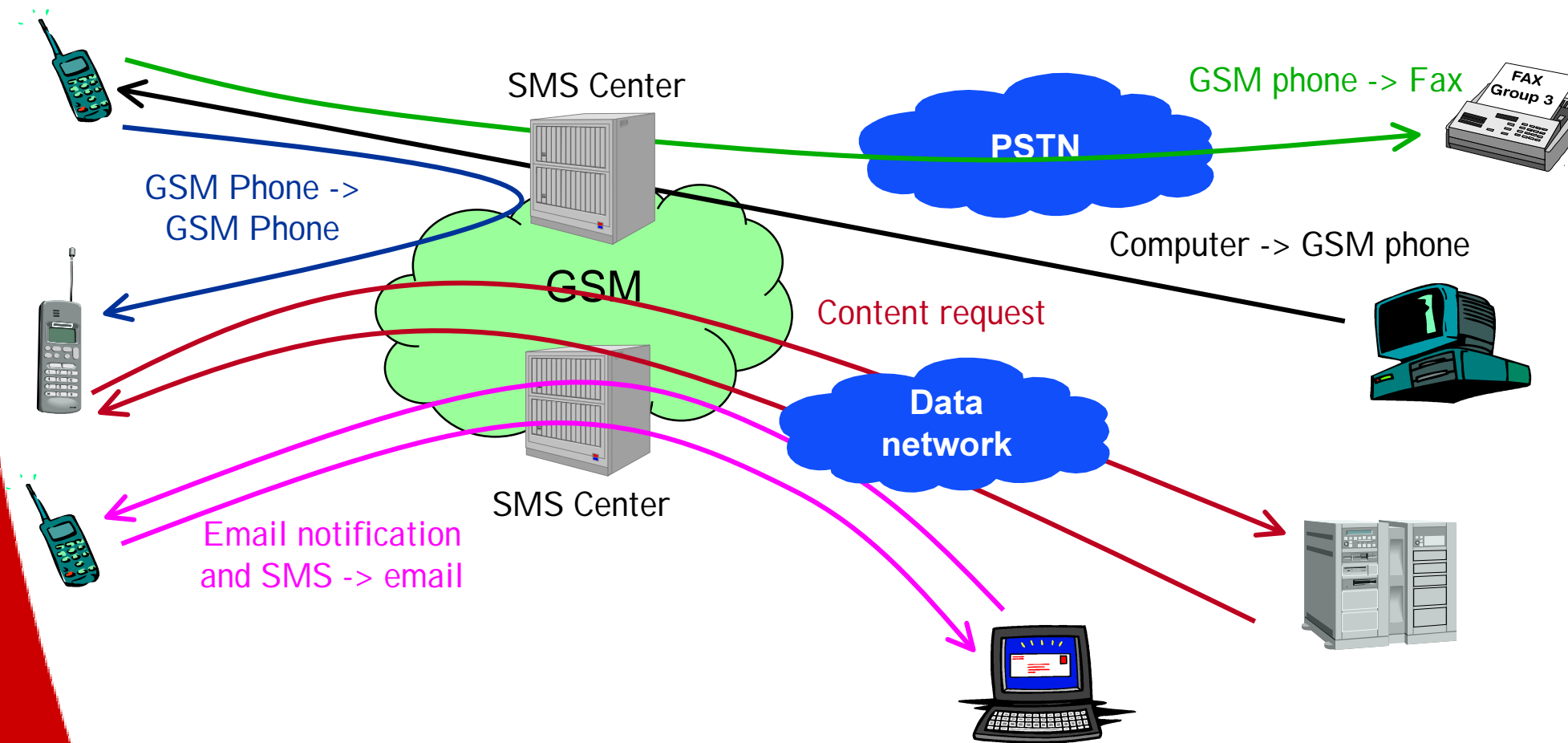
- **It is a totally new environment!**

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Continuing digitalisation of the world as a driver for mobile applications
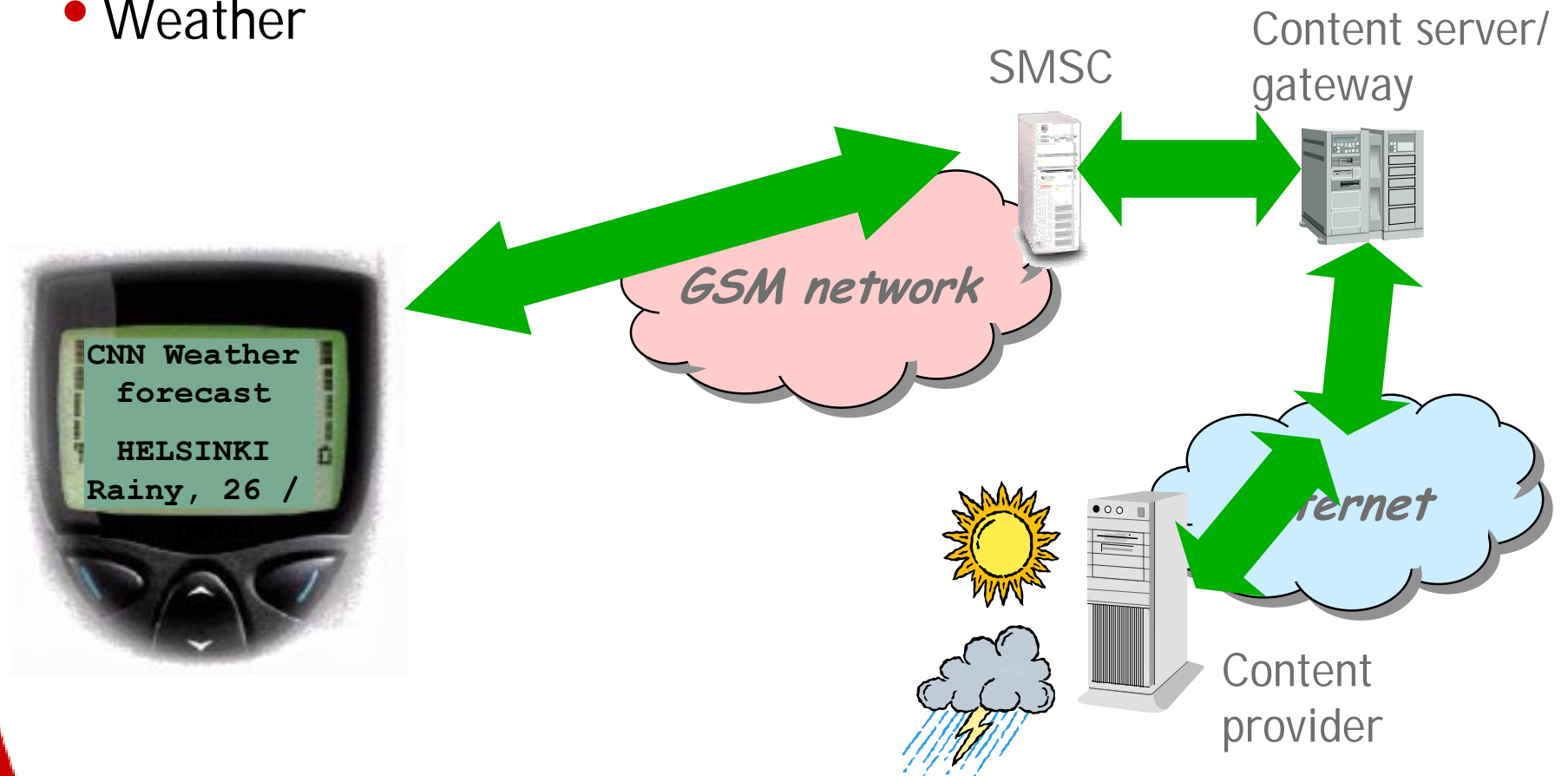

Electronic Communications

Corporate IT solutions

Entertainment Games, Audio, Video

Electronic Commerce

Electronic Information

SMS

Mobile Data

GPRS

REQUIREMENT FOR MOBILITY

Virtual Home Environment

WAP

Mobile Internet

UMTS

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Mobile data services and applications

Personalisation:
Ringing tones, icons

Data bearers:
HSCSD, 14.4k

SMS and WAP
content services

WEB access to
mobile services

Doris

messi •net

viestikeskus

saldo

Messaging services:
Group text

Multimedia messaging:
GSM Postcard

Account balance
Limits and reminders

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Basic SMS technology and applications

SMS Center

GSM phone -> Fax

FAX Group 3

PSTN

GSM Phone -> GSM Phone

Computer -> GSM phone

GSM

Content request

SMS Center

Data network

Email notification and SMS -> email

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SMS and WAP based content services

An example of a typical SMS content service:

- Weather

SMSC

Content server/
gateway

GSM network

CNN Weather
forecast

HELSINKI
Rainy, 26 /

Internet

Content
provider

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Service Examples

Veikkaus

- Results for lottery and betting

Weather Service Finland

- 450 towns in Finland, about 400 places abroad

Kauppalehti

- Stock and finance information

Telefinder

- Number enquiries for GSM or NMT numbers

  `TF Keskiivari Pekka Sonera`

- Subscriber of telephone number

  `TF 091234567`

GSM Postcard
Pick from a selection of printed postcards

From SMS

From web

Cards are written
and mailed

Costs 8,90 FIM/ postcard

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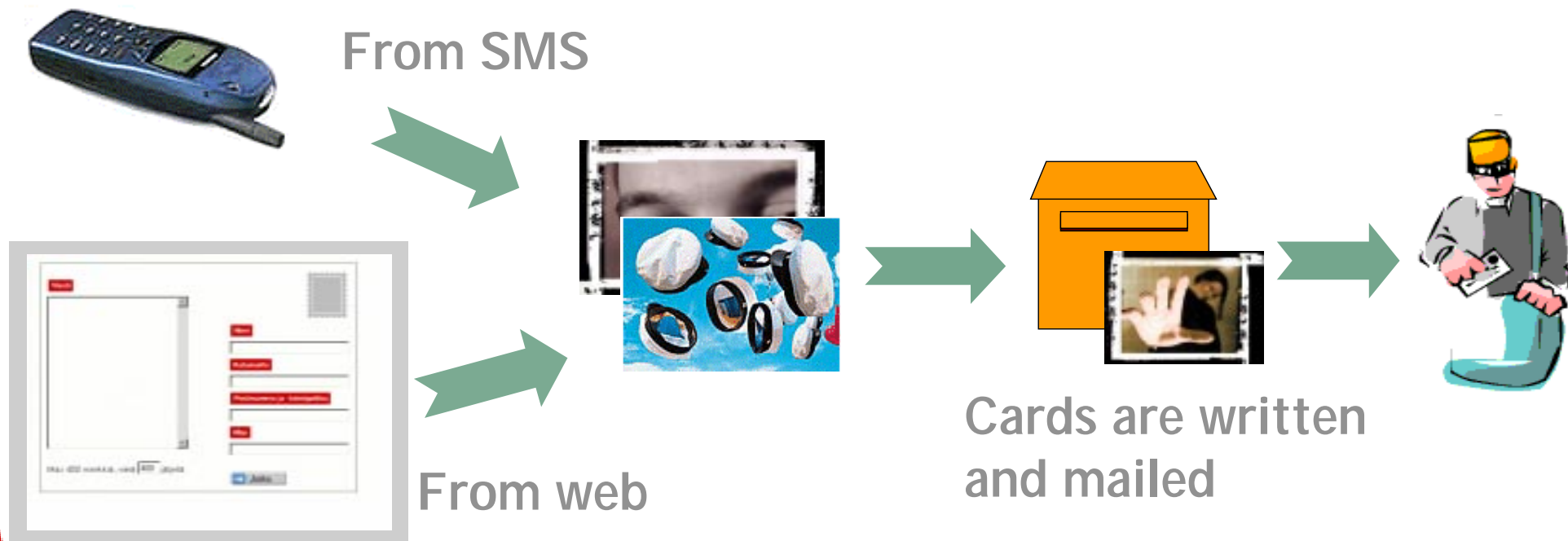
GSM Postcard
Send your own picture

IR transfer
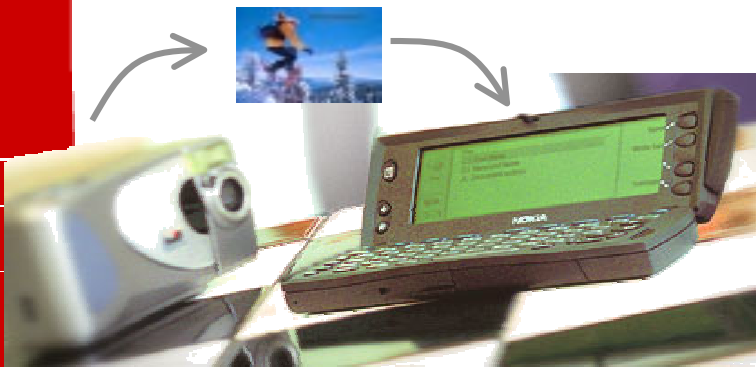
From a wireless
device (e.g. Nokia 9110)

From web
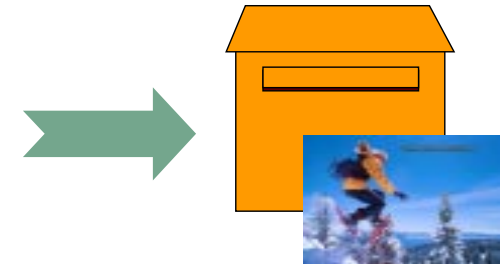
Cards are printed,
written and mailed

Costs 8,90 FIM/ postcard

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Doris -
Ringtones and call group icons

You can download new ringingtones straight to your mobile phone over the air, using the Short Message Service.

Targeted at all mobile phone users equipped with suitable devices (Nokia Smart Messaging)

Offers a large variety of new individual ringing tones specially designed for mobile phones, resembling well known tunes.

Helps the user to personalise her phone and to stand out from the rest of the crowd.

It's FUN.

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Doris ringtones service

Downloading tunes with SMS messages

Send "DORIS BOND" to number 400, where "bond" stands for the name of the tune. Receive the tune in an Smart SMS

New tunes available everyweek

Possible to listen to tunes on the internet
  (http://www.messi.net/messitsi/doris)

Costs 2,99 FIM/ query

Copyright issues taken care of (Teosto)

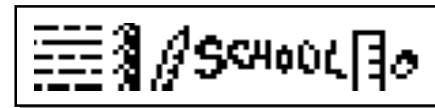# Doris call group icon service

Downloading icons with SMS messages

Send "IKONI ELVIS" to number 400, where "elvis" stands for the name of the icon. Receive the icon in an Smart SMS, then assign to a call group

It's possible to view all available icons on the internet
  (http://www.messi.net)

Costs 2,99 FIM/ query

Sonera logo available as graphical operator logo
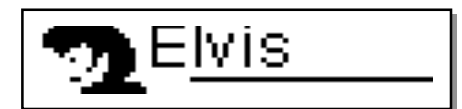
The www.messi.net brings the Sonera GSM subscription into the Internet. With the help of Messi, the users of Sonera's mobile phone services can both manage and personalize their customer relationship. Messi is also an access to communications, electronic commerce, news, and future services.

messi .net

viestikeskus
└ **GSM Teksti**

Lähetä viesti yksittäiseen gsm-numeroon tai ryhmälle. Ryhmiä saat pidettyä yllä GSM Ryhmätekstillä. Hinnan näet kunkin lähetyksen yhteydessä ja se veloitetaan matkapuhelinlaskullasi.

Kirjoita viesti alla olevaan kenttään

160

Gsm-numero (0,99 mk/l

Tai valitse ryhmä:

Lähetä

m e s s i t s i

DORIS   VIESTIKESKUS
SALDO   INFOPALVELUT

GSM Postikortti
GSM Teksti
GSM Ryhmäteksti

?

Etusivulle

Sulje messitsi

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The short message features in Messi include both sending of SMS's and maintaining of recipient list for group SMS, which can be used for sending by both GSM phones and Messi.

Messi gives an easy way to control the information services. The users decide the time of delivery and the duration of the push services, which e.g. could include daily domestic news for overseas holiday or weather forecasts for golfing weekends.

The First WAP Operator

Sonera is the first telecommunications operator in the world to launch information services intended for WAP (Wireless Application Protocol) compliant mobile phones in August 1999.

Sonera's WAP service is a vendor-independent WAP solution

By utilizing the features of messi.net, the customer can also personalize the WAP menu

Services are initially based on the SMS content offering
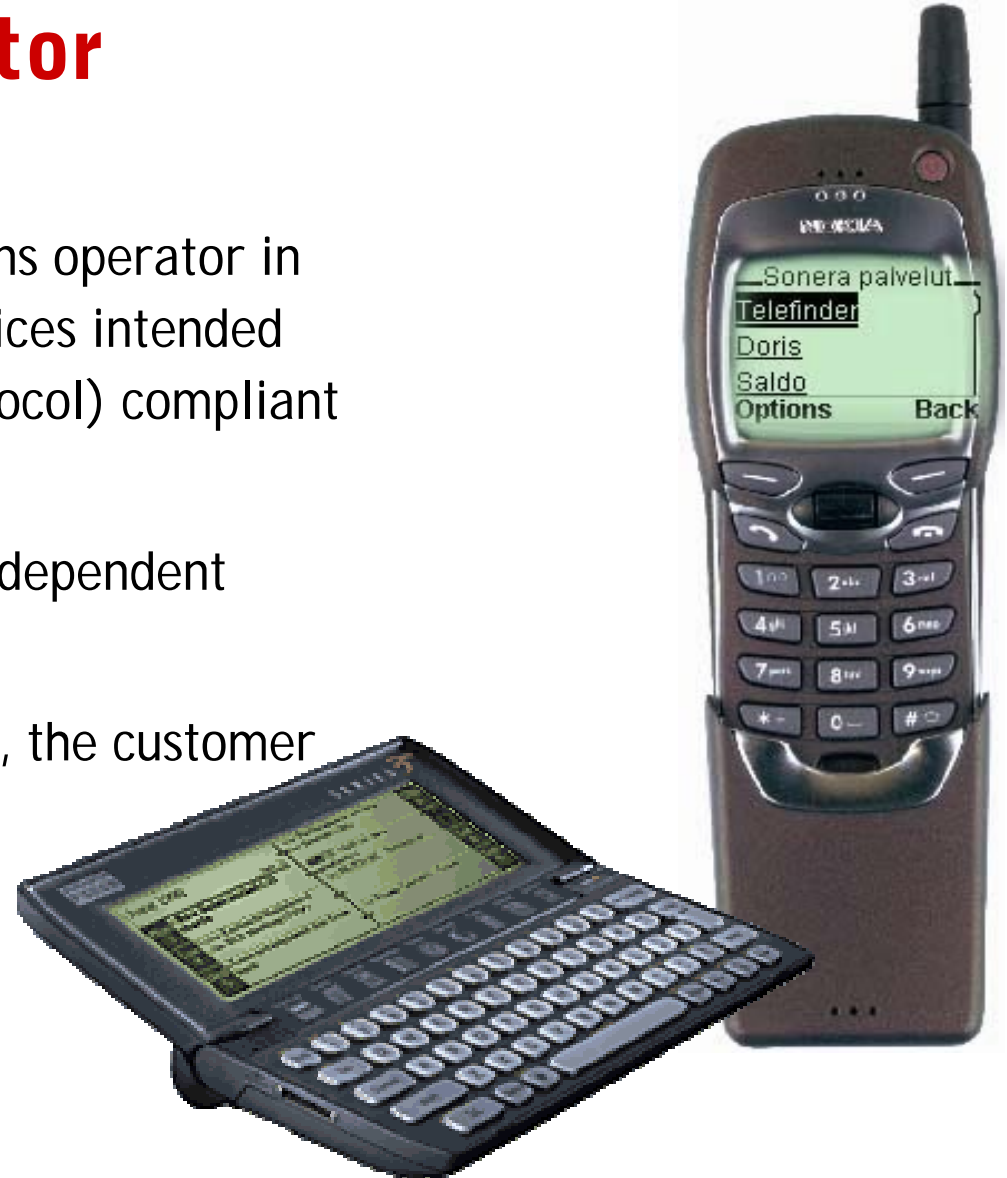
Wap services

Home page http://wap.sonera.net

Sms settings

- Server number **+358405202000**
- Service number **14-w-a-p**

Data settings

- Number **+358209-w-a-p**
- IP -address 195.156.25.4
- User ID wap
- Password wap

Sonera WAP services -
Your personal WAP home page

Service vision

Sonera Mobile Communications services

Transaction billing

"Full service"

Intranet access

Other industry value chains utilizing telecoms

Transact Provider

Content Provider

Independent service offering mainly based on media earnings logic

Content Provider

GSM

WWW Internet

Mobile access

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Service offering

Doris

Personalised service package for customer, edited by Sonera

Service logic, authorisation, billing, service management

UMTS

WWW

Corporate networks

Corporate intranet access

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Network-independent Internet Service Business

Sonera Plaza

ellit

kauppakeskus Ostella

eOME

kaista

Stadion

VIINITUPA

Telefinder

Sonera Plaza's terminal-independent content services
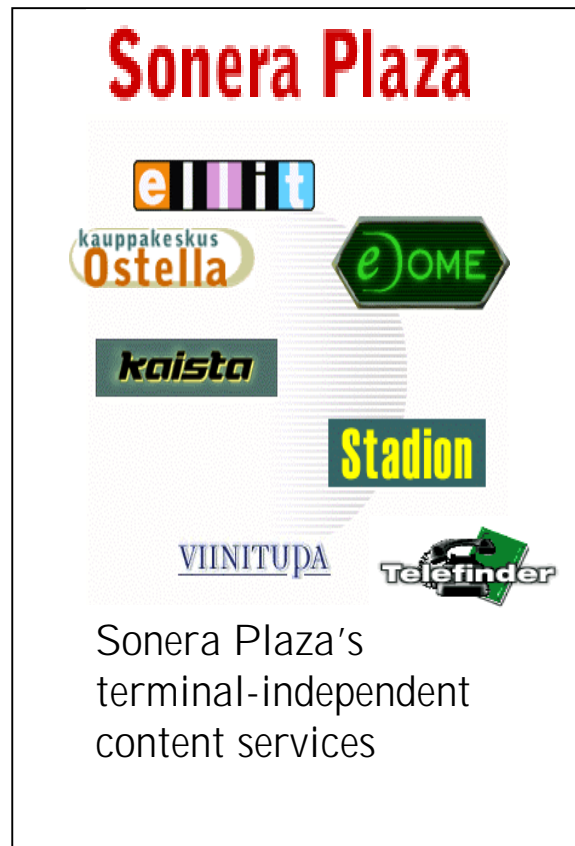
Interactive services of digital TV

Sonera Plaza Digital TV channel
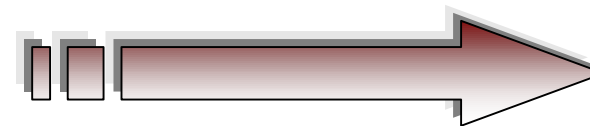
Media services for SMS/WAP-based mobile phones

Sonera Plaza Mobile portal

Internet-based services for PC and Internet TV customers

Sonera Plaza Internet portal

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i-mode from NTT DoCoMo

With i-mode, subscribers can:

- Reserve airline and concert tickets, check their bank balances or transfer money, etc.

- As i-mode is based on a packet-data (9600bps) transmission system, subscribers will be charged according to the volume of data transmitted, not the time spent on line.

- Access the Internet directly from their i-mode-compatible cellular phone.

- Send and receive e-mail

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i-mode services

Operator provides a full package

Content provider agreements negotiated by the operator

According to NTT DoCoMo, over 200 content providers have already signed up for i-mode

Over 1,5 milloin customers have subscribed since February 1999!

See http://www.nttdocomo.com/ser.htm

Customers

i-mode

NTT DoCoMo

Content providers
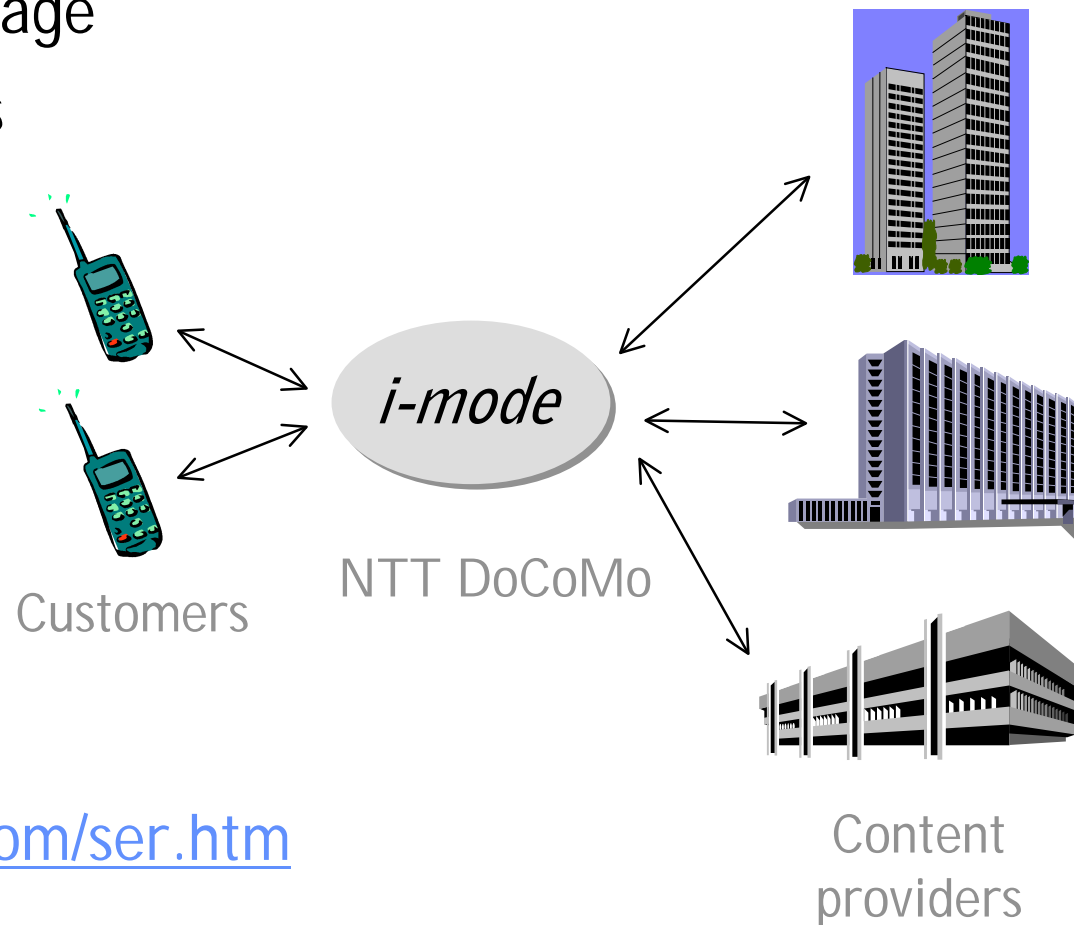
Possible business models

The traditional telephony model
- Earning logic is based on the premium-rate telephony's "pay-per-view" model
- Operator intensive, easy on small CPs
- Transaction based billing
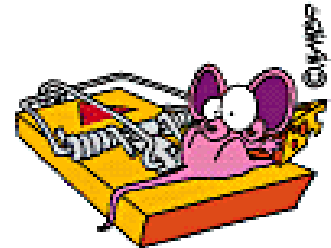
The traditional internet model
- Earning logic is based in monthly fees and/or advertising
- Operator's role is smaller, CP's role is greater
- Operator must bill <u>somebody</u> at least for the traffic

How does a hybrid of the two work?

Other alternatives?

Billing issues

Business model has big impact on billing complexity
- Really cool applications are usually impossible to bill
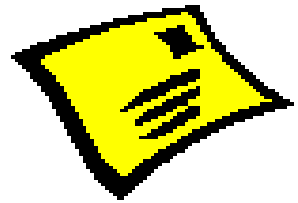
The premium-rate telephony model seems to work
- However, platforms seldom support premium-rate (SMS)
- Lots of improvisation required to make working solutions

New technologies such as WAP bring huge challenges to billing

General guideline is to start simple, compromise on fine detail and concentrate on quality and reliability

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Who owns the customer?

The entity that bills the subscriber?
- Operators traditionally have control through billing
- Billing is still a major obstacle for most players

Sonera has adopted a dual role…

i. Sonera's service package is run and marketed by Sonera
- Sonera handles content aggregation and billing

ii. CPs can have their own services and market them independently
- Sonera provides services for billing on behalf of the content provider on a "pay-per-view" basis
- CP's are free to use any other type of earning logic if applicable

Issues in customer care

A new type of service requires new type of CC
- Shift from telephony CC towards Internet CC
- Or will it be vice versa?

CPs need to have a helpdesk for their own services
- Few have experience of handling real big masses
- Running a CC or helpdesk is very expensive

New simpler user interfaces like WAP will help, but also bring new challenges
- The number of different user interfaces keeps growing

Technological development

Development steps in mobile networks

1992

1997

1999

2000-
2001

2002-
2003

NMT

GSM

GSM_1800

HSCSD

GPRS

UMTS

- Improved voice quality, caller id display etc
- Data and fax service and text messages (SMS)

- New frequency band => more network capacity

- Faster data transfer

- Packet based data transfer

- New radio network and frequency band => more capacity
- Faster and more versatile data services

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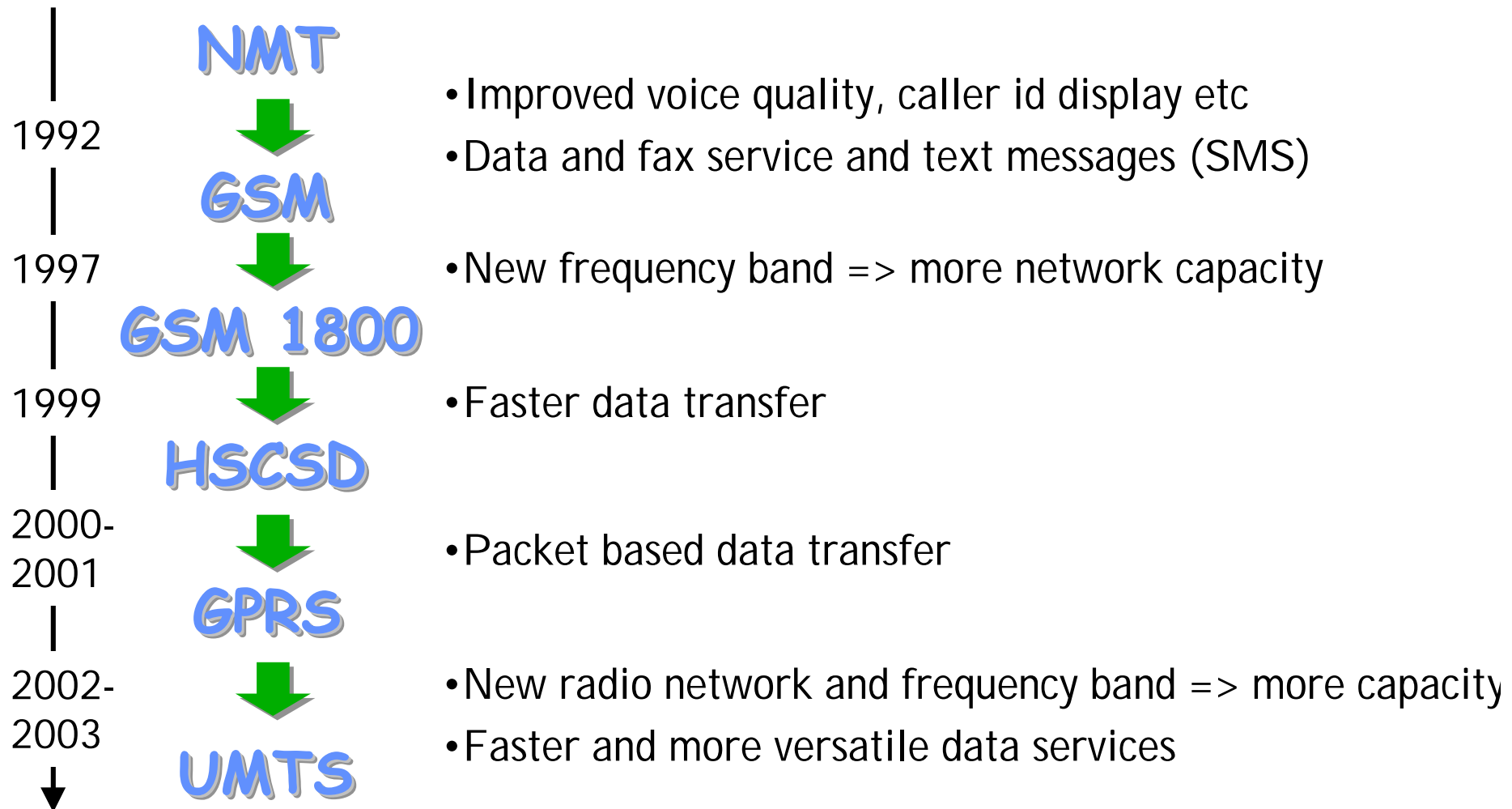
Mobile Evolution
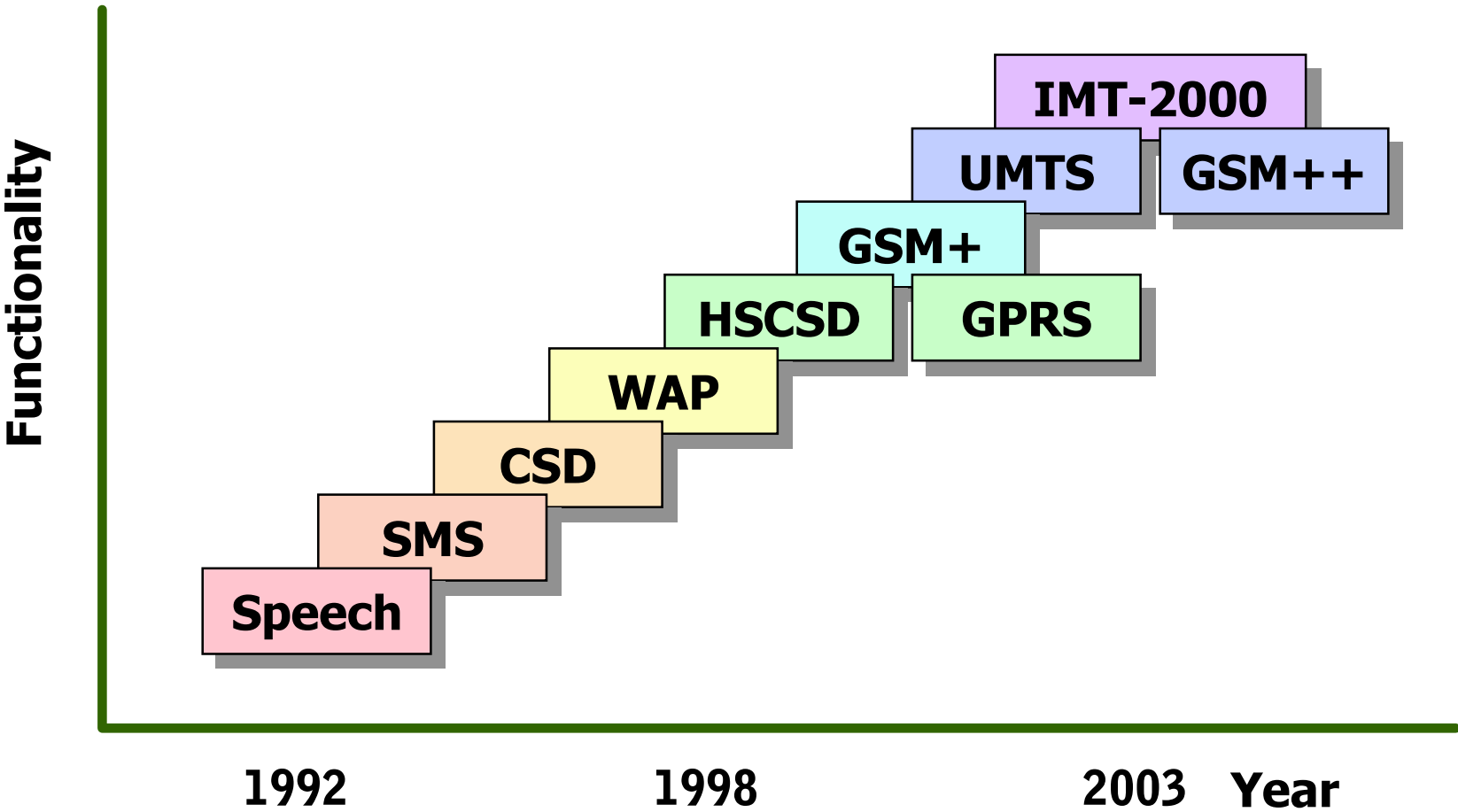
Roadmap for Mobile Data speeds

30 sec

Connection time

Terminal development!

Up to 2 M

384 k

115 k

Transfer speed (bits/s)

14.4 - 57.6 k

0 sec

9.6 k

1998 Basic GSM   HiSpeed Data   GPRS   EDGE   UMTS 2002

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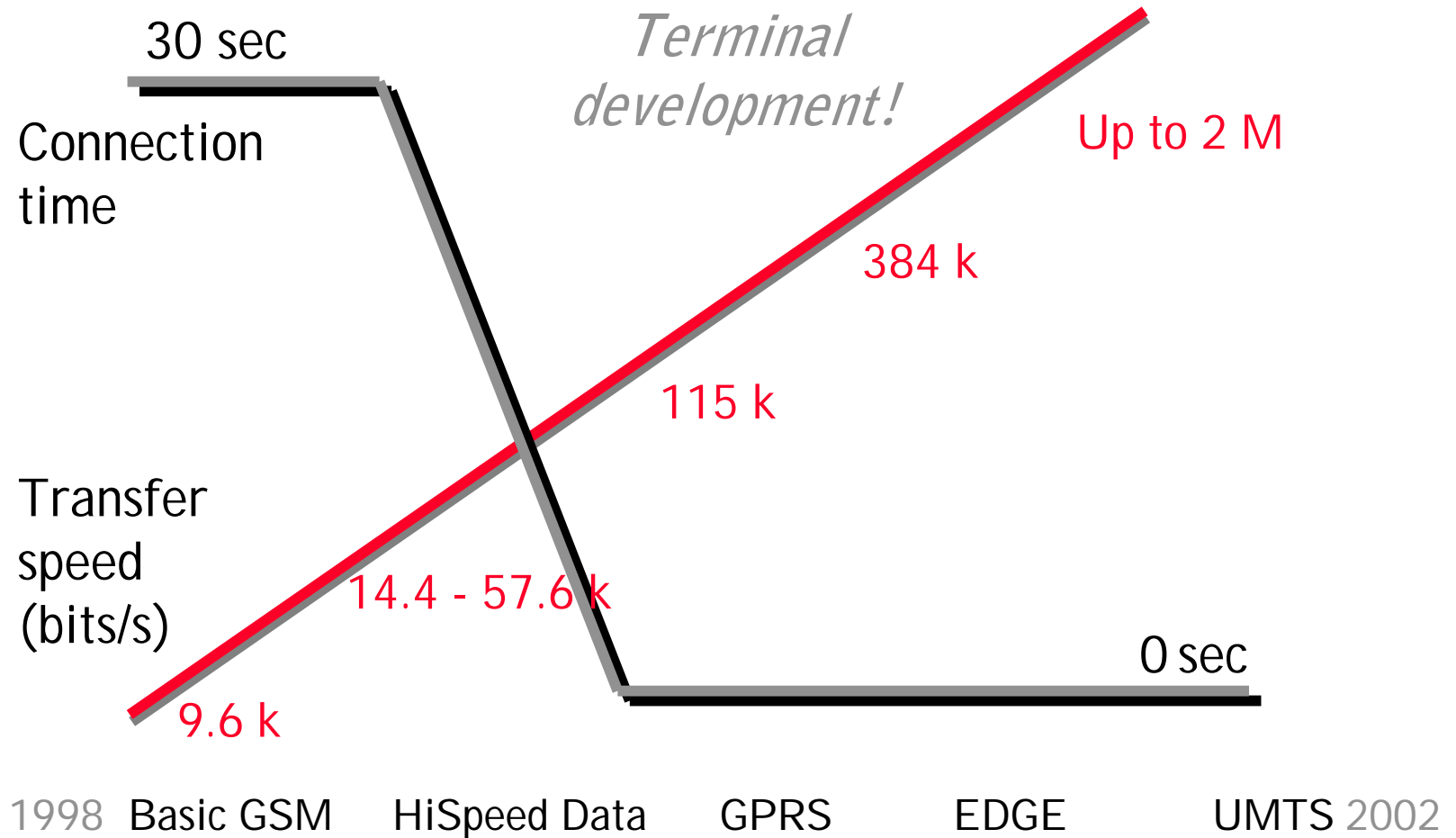
HSCSD - High Speed Circuit Switched Data

HSCSD is an upgrade of the current GSM Data service, that speeds up data transfer from the current 9,6 kbit/s speed by a factor of 3-4 (30-40 kbit/s). Theoretical speeds are even higher (up to approx. 100 kbit/s)

GPRS - General Packet Radio Service

GPRS is an upgrade of the current GSM network that enables packet based data transfer between the GSM terminal and an external packet network such as the internet. Maximum data speeds in GPRS correspond to those currently available in ISDN network.

GPRS Overview

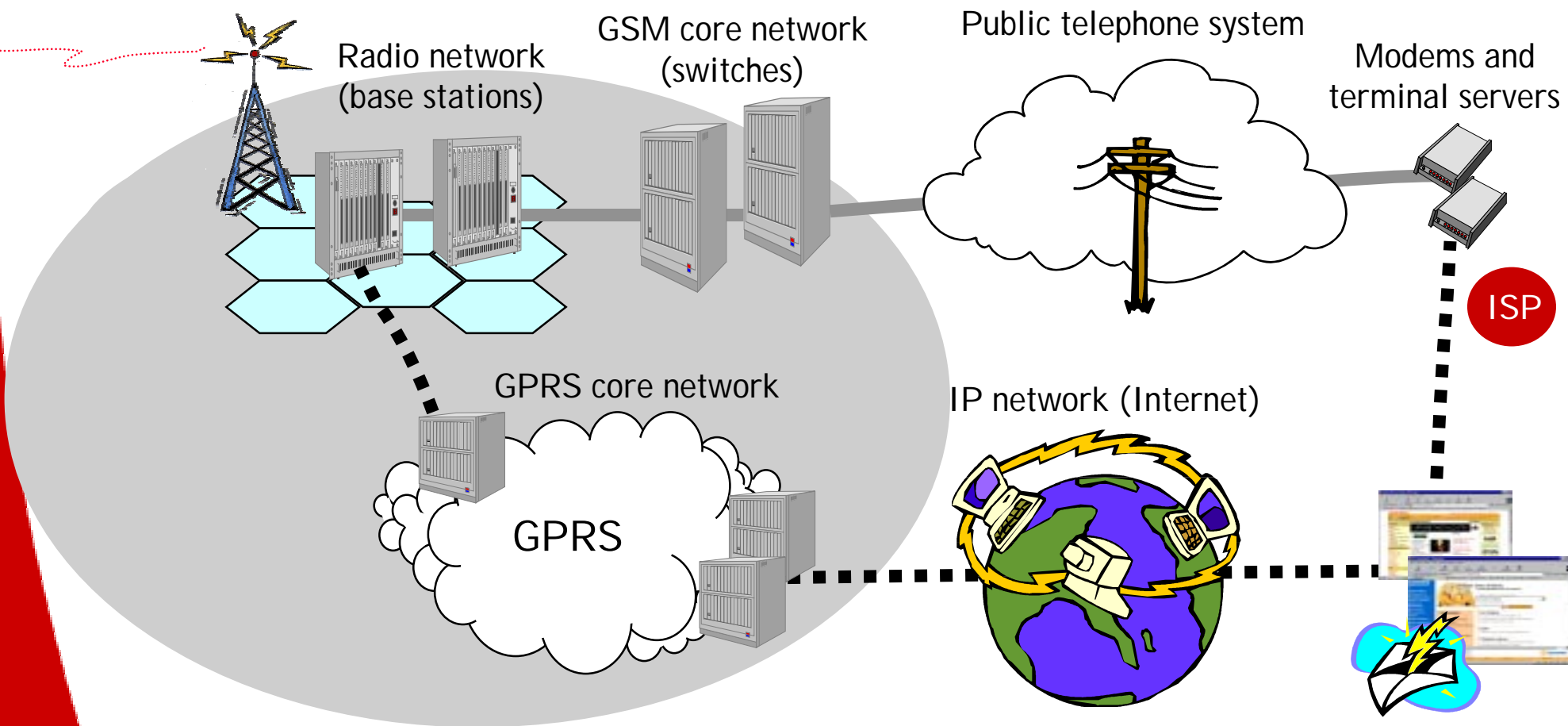GPRS uses packet switched resource allocation
- Resource allocated only when data is to be sent/received

Flexible channel allocation
- One to eight time slots, in first phase up-to four
- Available resources shared by active users
- Up and down link channels reserved separately
- GPRS can utilise the time slots that are not reserved by circuit switched GSM services (i.e. voice or data calls)

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GPRS network architecture

Radio network
(base stations)

GSM core network
(switches)

Public telephone system

Modems and
terminal servers

GPRS core network

GPRS

IP network (Internet)

ISP

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Roll out of GPRS

Rolling out GPRS is a challenge to the operators since the implementation differs significantly from the traditional GSM network technology

- core network
- terminals
- connections to external networks
- services

Sonera's strengths in this are existing competence in data networks and media communications

GPRS rollout and launch is scheduled for years 2000-2001

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Impact of GPRS

GPRS will be a tremendous step in GSM based mobile data
- Enables new types of services as a result of the "always connected" packet data connection

GPRS as a basic service is very different from traditional teleservices and this will have an effect for all parties
- Additional complexities but also more degrees of freedom to the billing of services
- Is regulating IP based services possible or practical?
- Open interfaces means open markets, i.e. more competition!
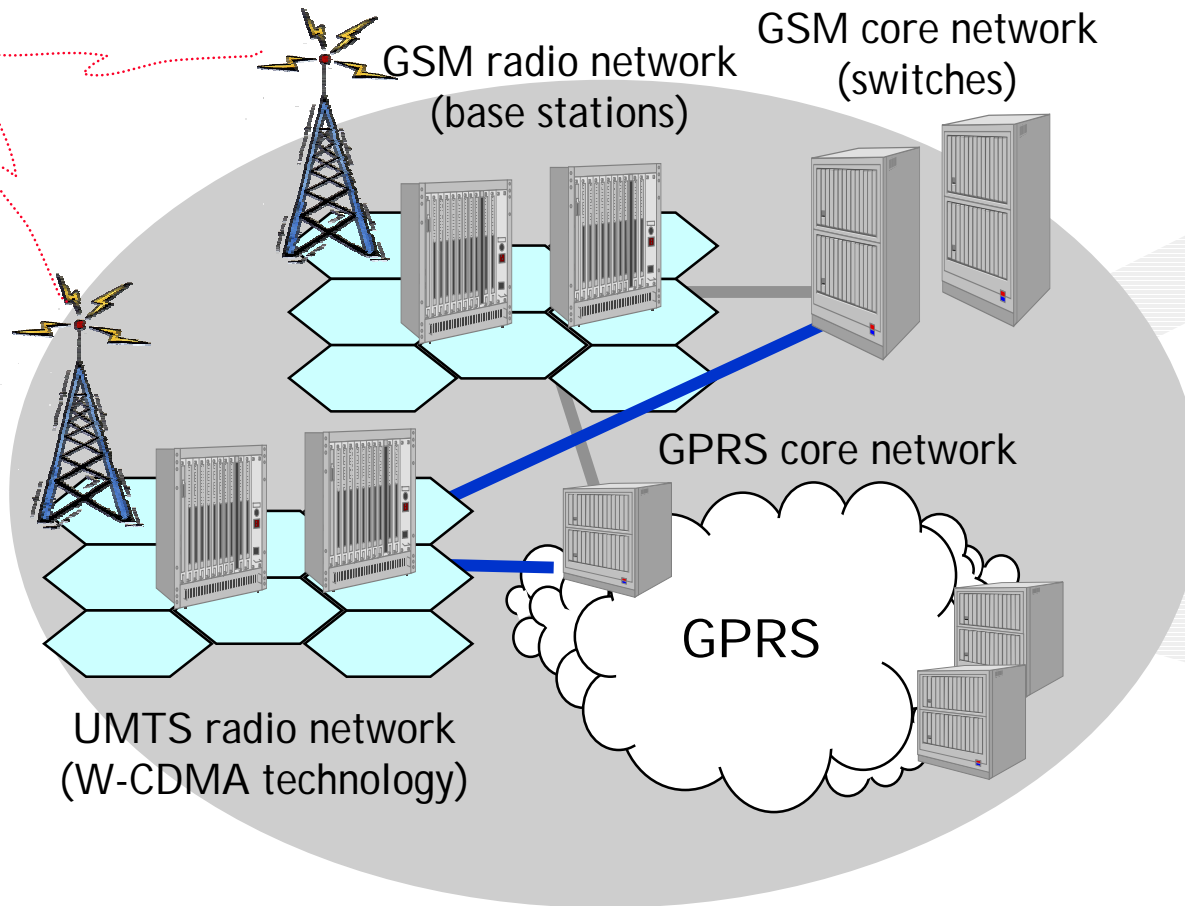 … but also more opportunities for all players

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UMTS -
Universal Mobile Telecommunications System

UMTS is new mobile network standard that has been designed for distributing innovative multimedia services that require high speed data transfer. UMTS builds on the GSM ja GPRS network infrastructure and the new W-CDMA radio access technology.
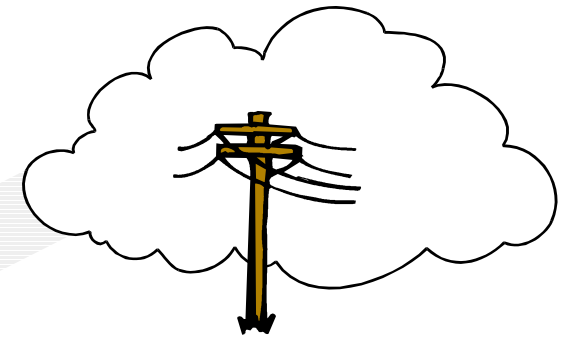
First phase of UMTS network

Dual-mode terminal

GSM radio network (base stations)

GSM core network (switches)

Public telephone system

GPRS core network

GPRS

UMTS radio network (W-CDMA technology)

IP network (Internet)

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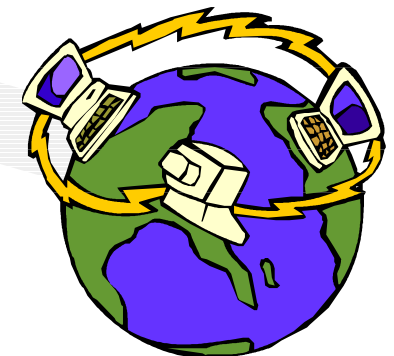
UMTS

Data Speeds

- 144 kbit/s 'normal' transfer speed
  - Outdoors, countryside

- 384 kbit/s 'normal' transfer speed
  - Urban environment — multimedia...

- 2 Mbit/s
  - Works in practice only in buildings and "pico" cells

Changing roles
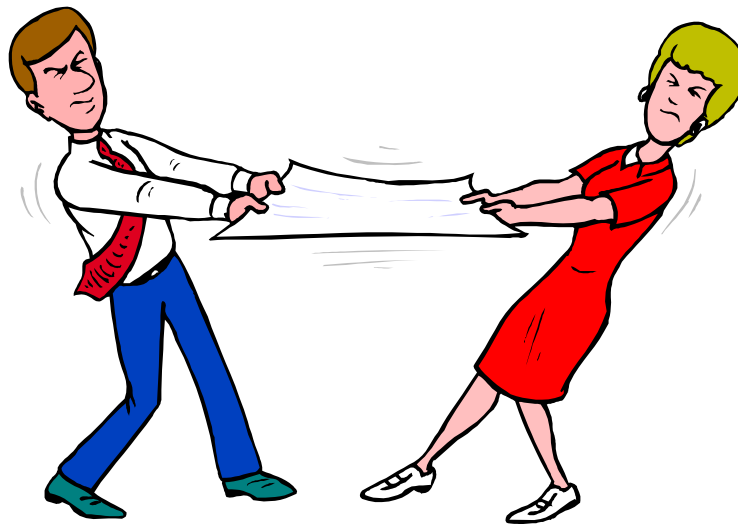
Convergence in industry
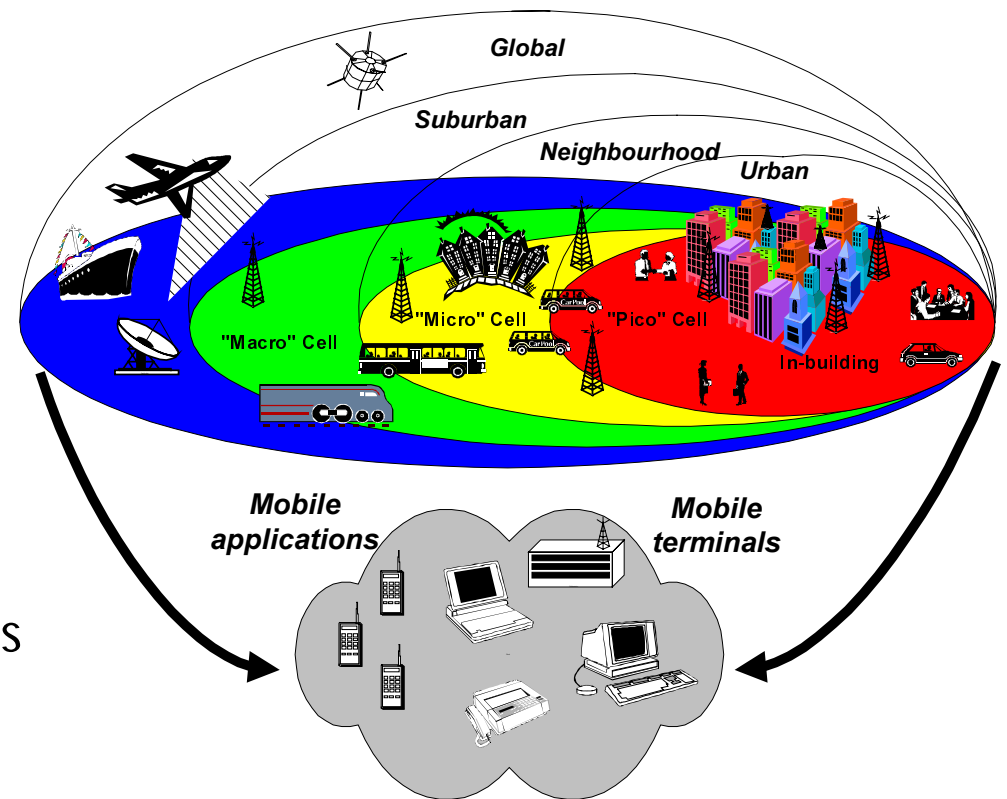
Telecommunications
World

IT
World

Media
World

Mobile & Fixed
Digital
Network
Infrastructure

Network
Intelligence

Broadcasting

On-Line
Interactive
Services

Client Server

Advanced Chips

Open Standards

Distributed
Systems

Content
off-Line

Contents
Digitalization:
- Info
- Movies
- News
Entertainment

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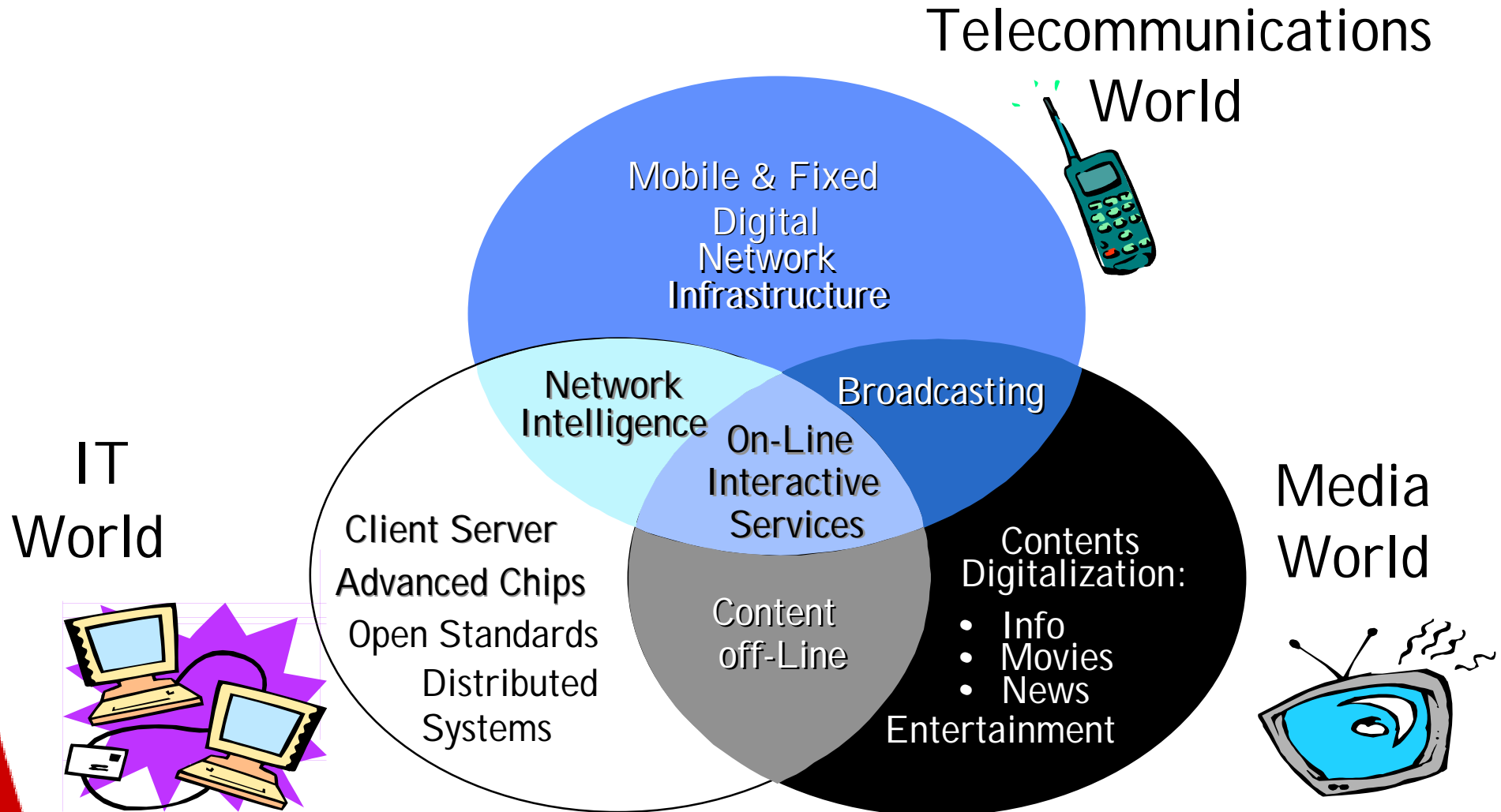
Convergence towards mobile

More and more needs can be satisfied by your mobile phone

More and more reasons to carry your mobile always with you

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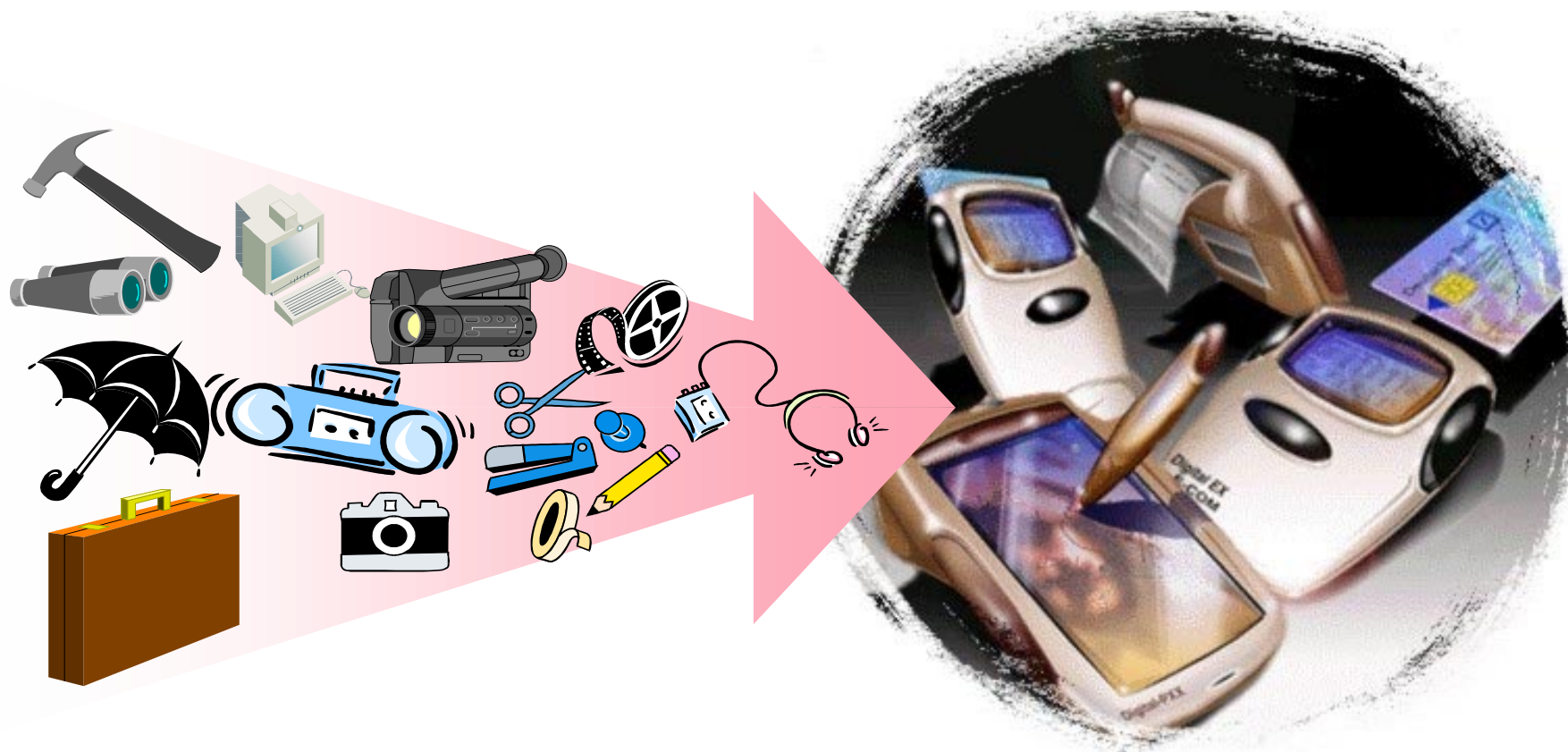# Changing roles in effect

In most cases the operator can no longer be indifferent and neutral towards content

- Customers associate the mobile operator with the services and content therein, thus it is difficult to remain neutral
- Therefore it is sensible to take an active role

As content and applications take a major role, operators must refocus and separate their efforts on networks and services

- Parting of the roles of service and network operator
- Where do the traditional teleservices belong, network or service layer?

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Disruption always attracts participants

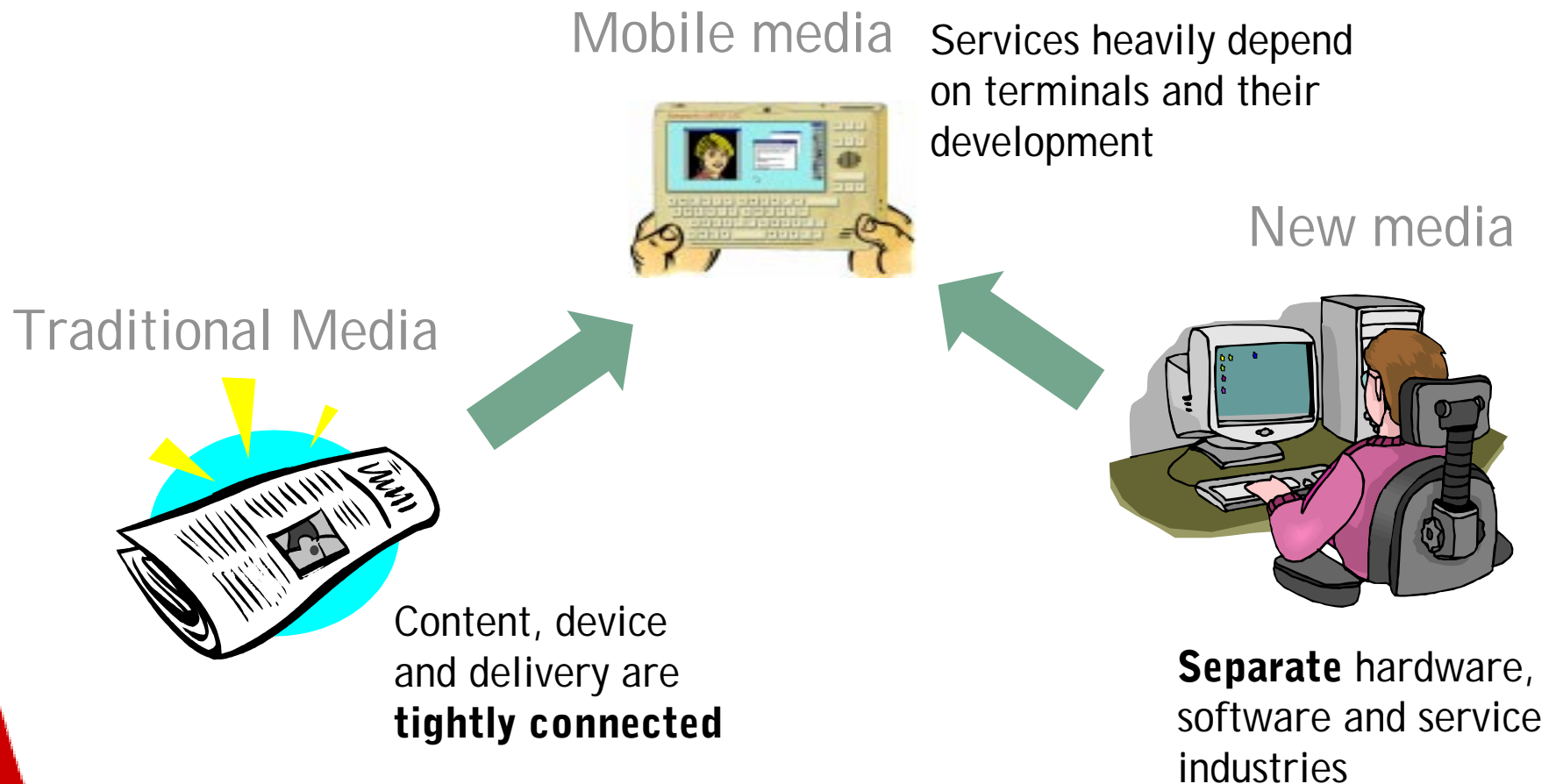In these early phases of convergence the new business is still very much undiscovered country

- Operators are seeking new areas to grow in
- Content people want to expand towards service provider business
- Equipment industry sees growth and new markets
- Industries and value chains outside the traditional telecommunications domain enter the business

Everybody is trying to find the best and most profitable roles…

New type of equipment business is forming

Mobile media

Services heavily depend on terminals and their development

New media

Traditional Media

Content, device and delivery are **tightly connected**

Separate hardware, software and service industries

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Conclusions

Conclusions

5 years ago mobile data stood for a slow and unreliable wireless data connection with an interesting future as a tool for improving efficiency and providing cost savings in businesses

Today it stands for a revolution in telecommunications with far reaching effects on everybody's lifes and potentially creates totally new industries

While technological development still plays a major role, focus has shifted from technology to applications and services

The mobile data market is beginning to take shape and many parties want to participate in developing the market to best suit their view

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How to best develop the market

The best and fastest route to long-term success of this new industry is to make sure everybody can participate and try to make their share of the money

The best practises and dominant designs will be selected by a process of customer choices and commercial competition

- Operators should actively advance multiple strategies in offering services
- Creating sensible service offering models with business logics acceptable to all involved parties is the key

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Sonera - Smart Partner

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Make things click.