Wireless Data in Businesses

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Content

Wireless Data Definition

History
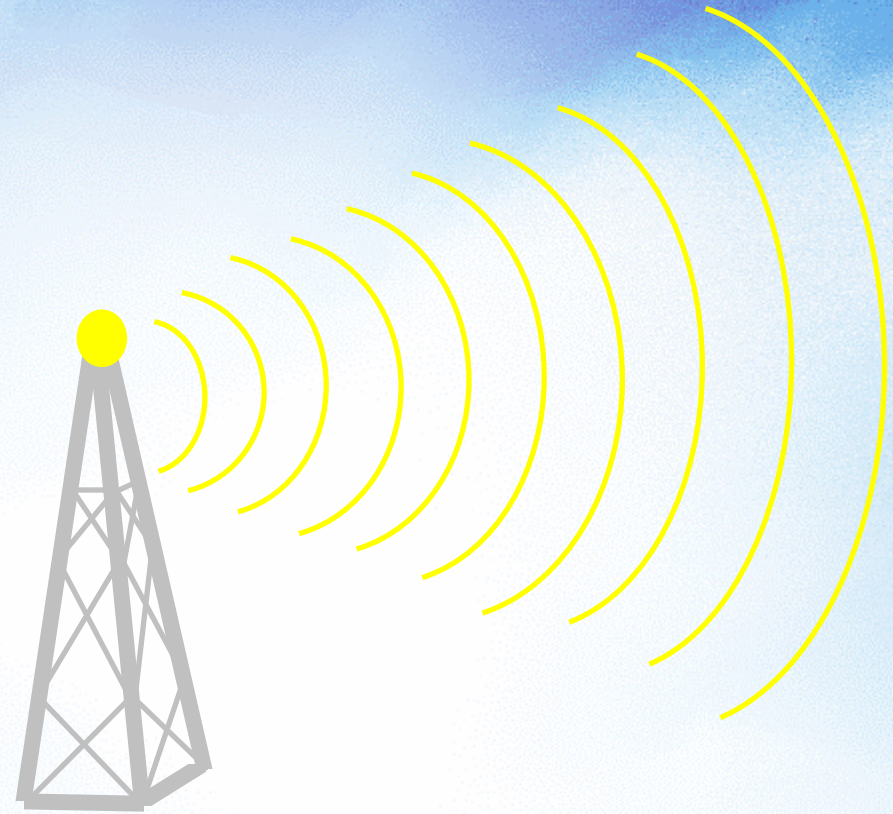
Next Decade

Wireless Data Business Segments

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Definition

Wireless Data Definition

- Data over wireless link

- Two-way communication

- Commercial, "public" service

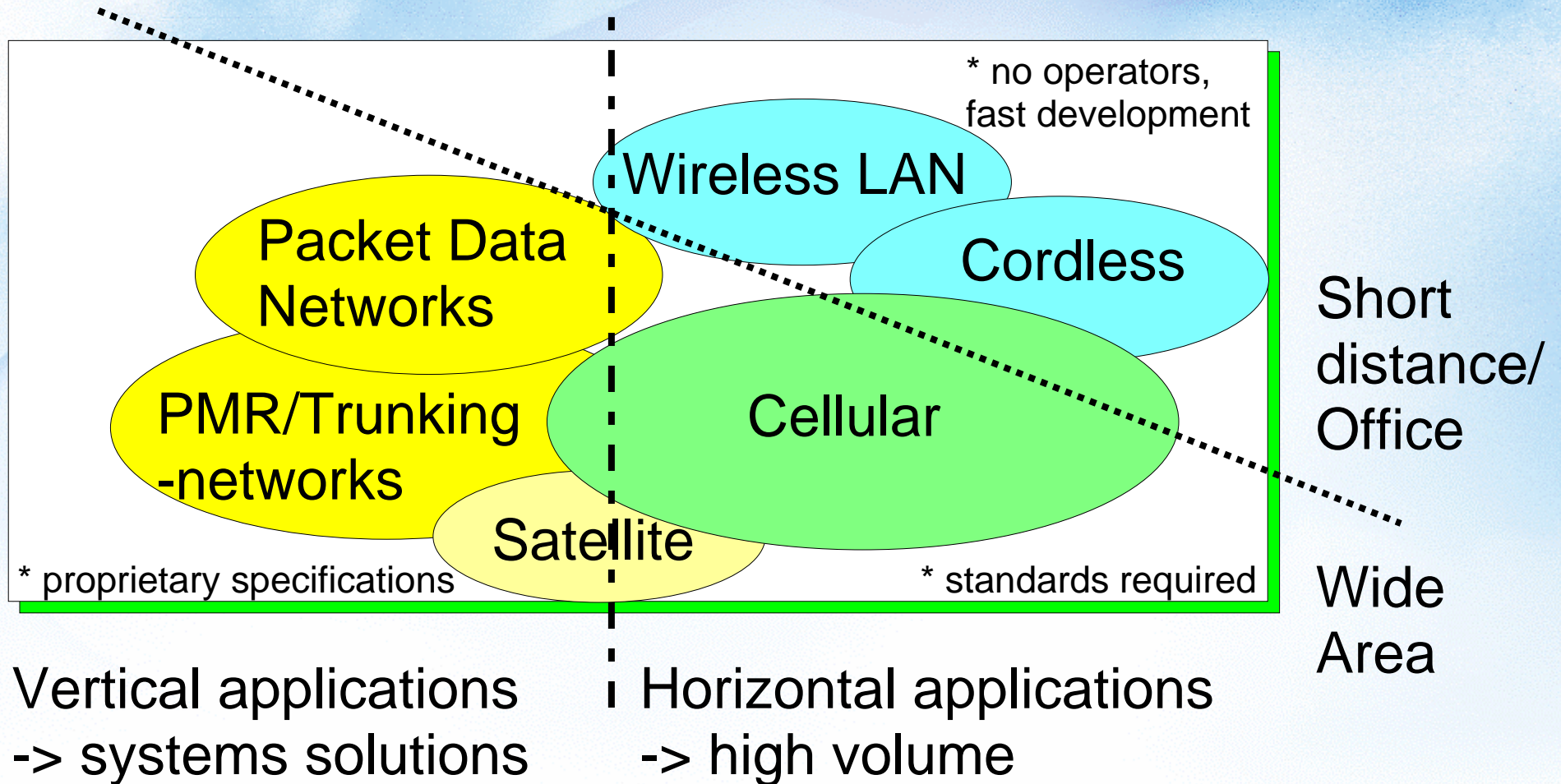- Individual users

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Not Included

- One-way paging, analog cellular

- Text TV or any other broadcasting

- GPS

- Citizen band radios

- Transmission like -backbone services

- Microwave radio links

- Hybrid systems - data on demand over broadcasting:

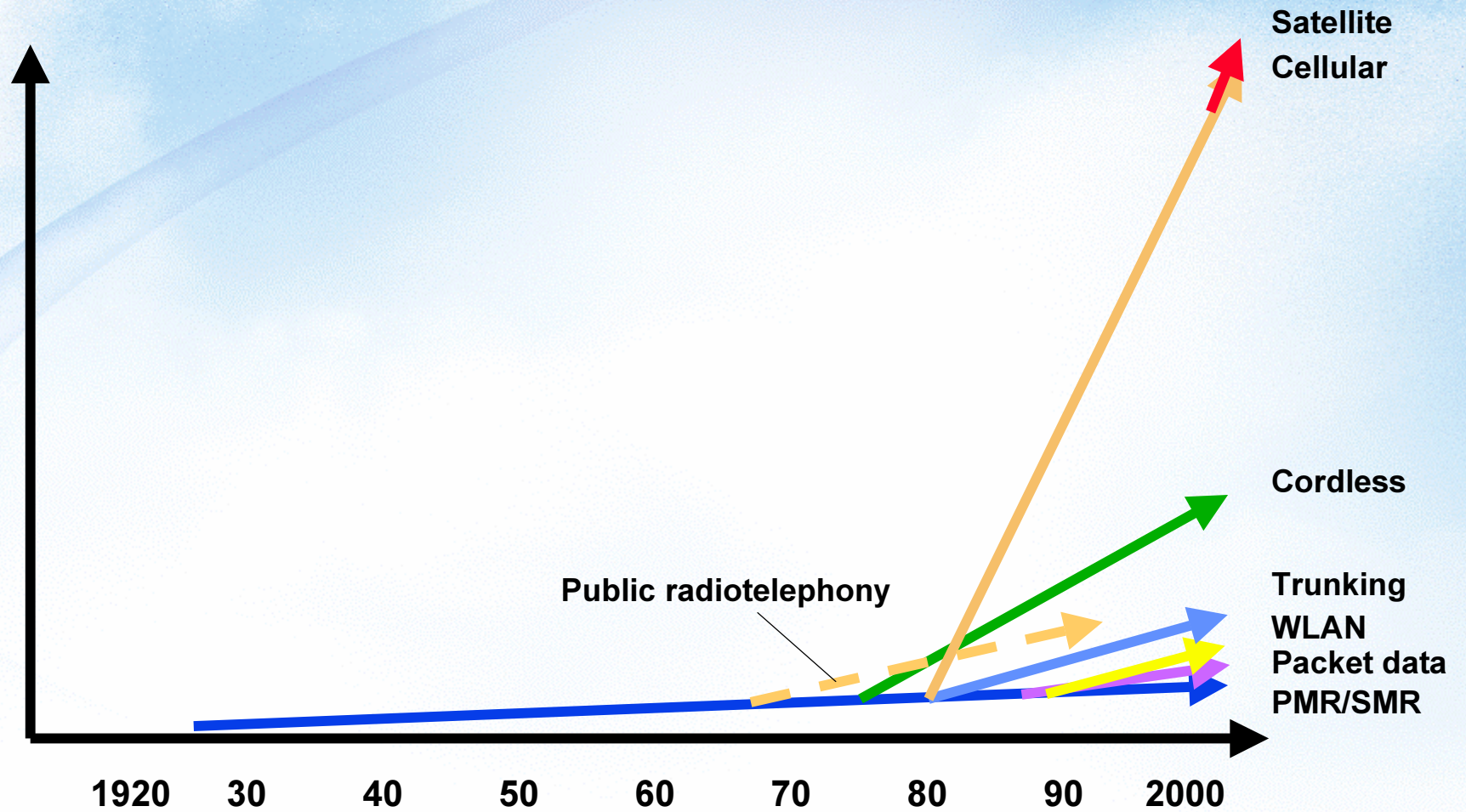 - Internet over DAB, GSM as control channel

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Two-Way Wireless Data

* no operators, fast development

Wireless LAN

Cordless

Packet Data Networks

PMR/Trunking -networks

Cellular

Satellite

Short distance/ Office

* proprietary specifications

* standards required

Wide Area

Vertical applications -> systems solutions

Horizontal applications -> high volume

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History

History of Radiotelephony

Satellite
Cellular

Cordless

Trunking
WLAN
Packet data
PMR/SMR

Public radiotelephony

1920   30   40   50   60   70   80   90   2000

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Public packet data

- Idea
  - Cellular is for voice but not supporting data
  - Data must be mobile

- Systems:
  - Mobitex (Ericsson)
  - Ardis (Motorola)
  - CDPD (IBM, AT&T)

- Network
  - Wide area networks like in cellular
  - Data only services, packet communication
  - Data rate up to 20 kbps, shared channel

- Terminal
  - Own radio
  - Modular and integrated products

Total failure:
- wrong timing
   - number of mobile computers
   - Internet "only" in universities
   - e-mail not in wide use
- technology in principle OK

=> market was not ready!

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First 15 Years of Cellular

Growth of Cellular Industry

Mobile voice communication for everybody

1981   1996   2001   2005

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Wireless Data

Adding mobile non-voice communication for everybody

Part of the cellular/ wireless evolution, where services are available in public networks known for consumers

1981 **1996** **2001** **2005**

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Wide Product Range

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1) Products with Nokia UI: 9000, 8110i
2) Products with PC industry spec.: Card Phone, Data Suite

Wireless Data for the Next Decade

- Satellite Wireless Data - a niche market

- Two-way paging - cellular messaging is the winner

- Cordless - "old technology and paradigm"

- PMR/Trunking - in front of digitalization, will follow the digital cellular
  - Potential for "vertical" wireless data applications

- Cellular - the volume leader in wireless business and moving towards higher data rates, up to 2 Mbps
  - =>Extremely good platform for certain segments of wireless data business

- WLAN - the technology leader with innovation and development
  - => Opportunity for new business development

- Short distance radios - Bluetooth, focused on personal connectivity

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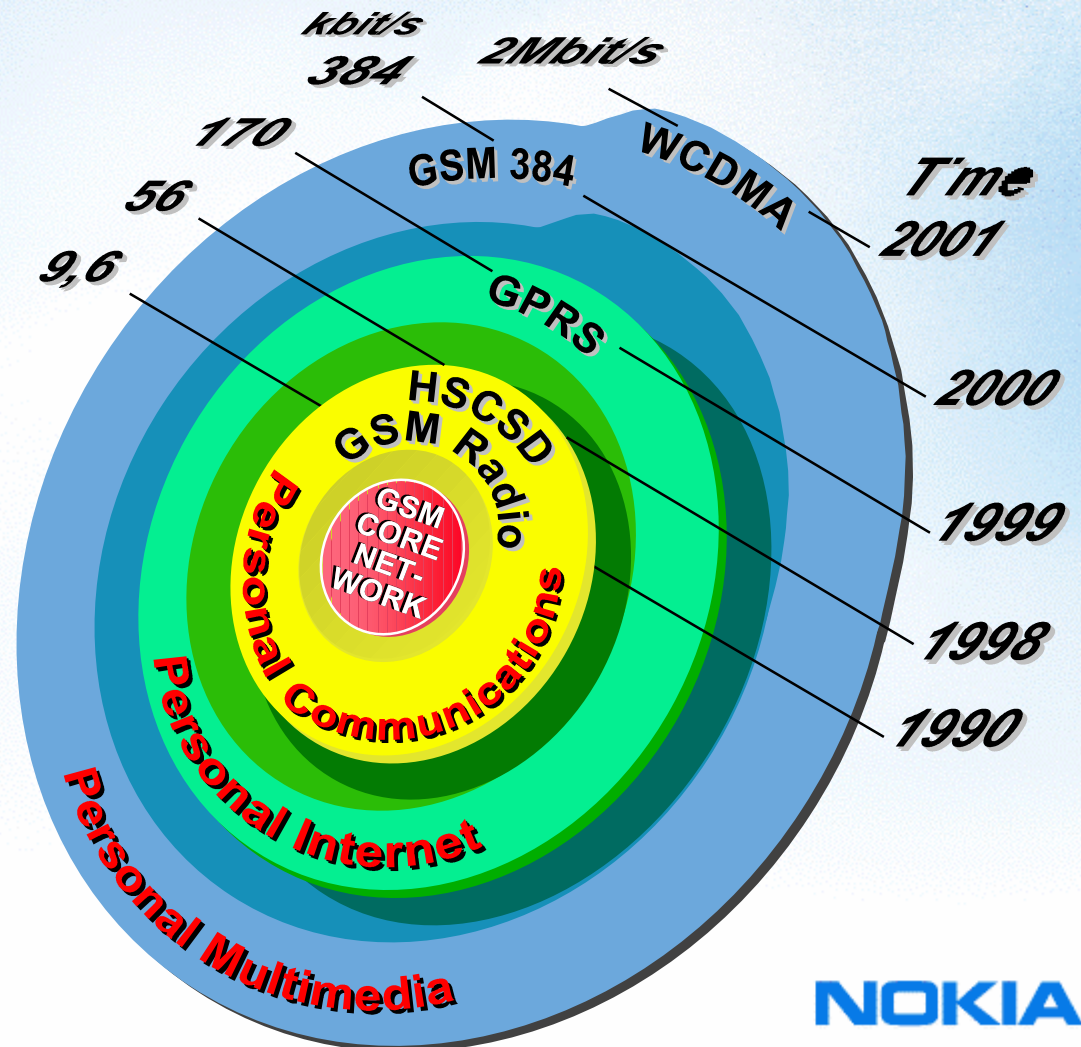
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Next Decade

Evolution towards personal multimedia

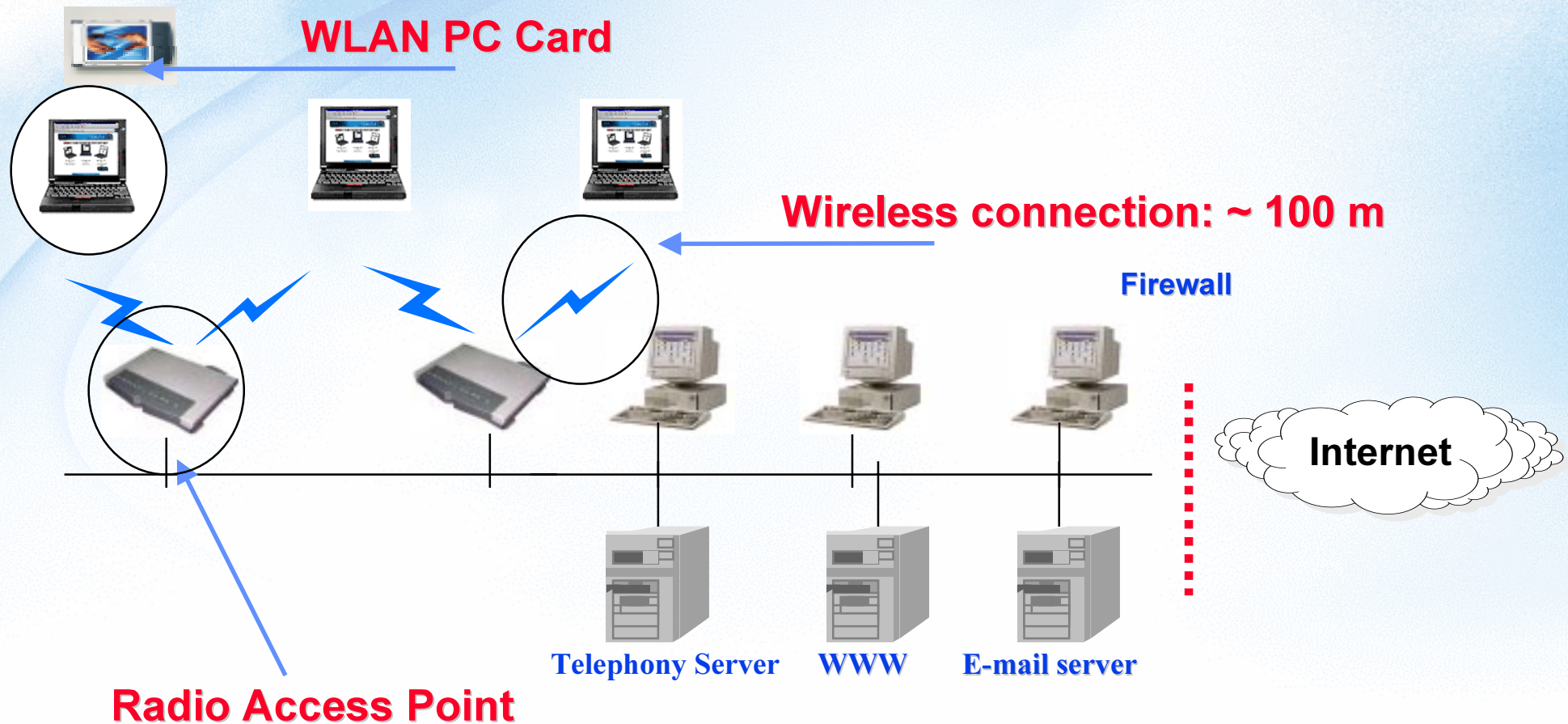**The 3rd generation standardization is driven by the vision of the future wireless data needs**

3G Mobile

- Videotelephony
- Infotainment
- Media
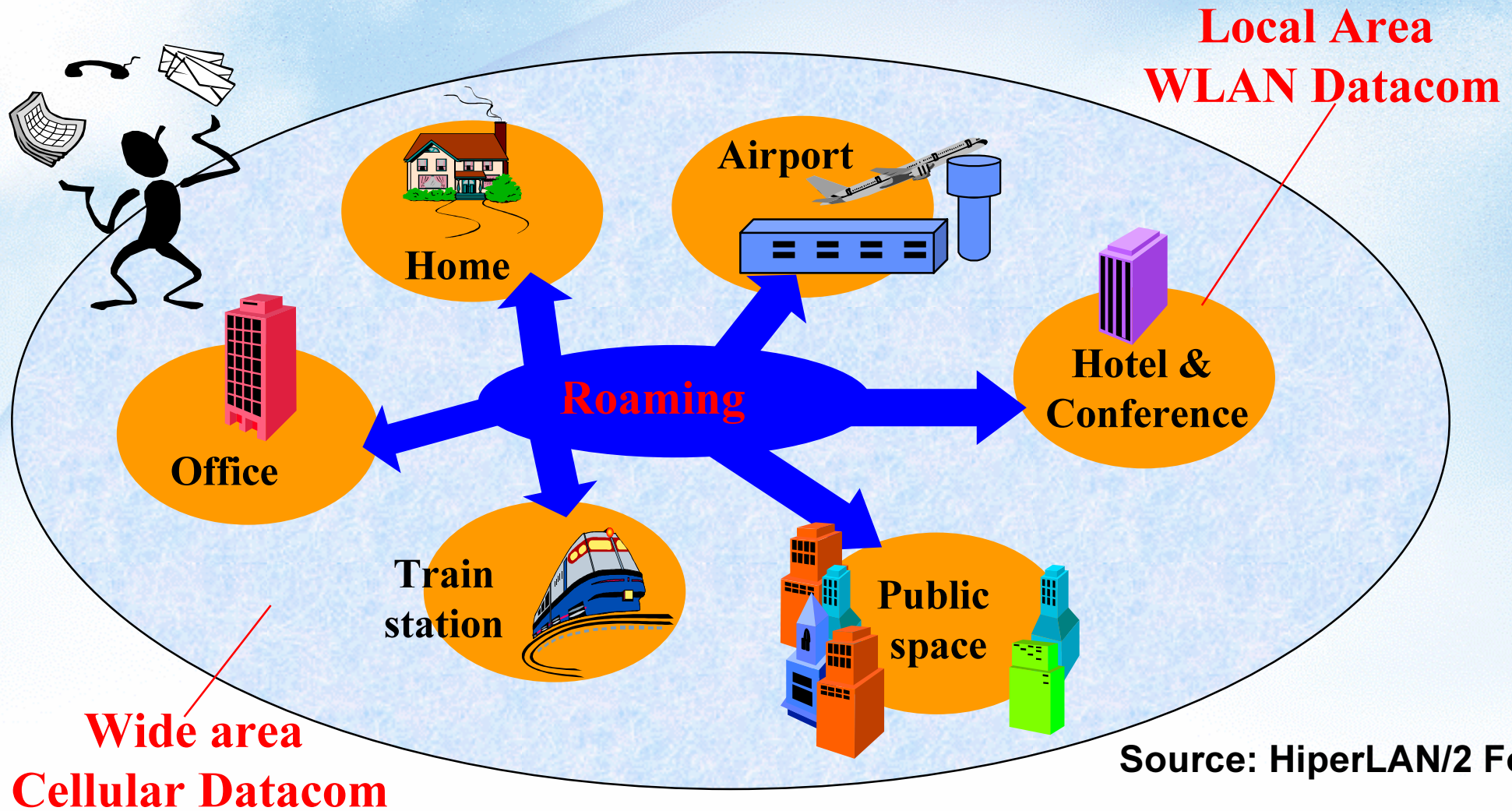- Inter/intranet

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What is required for WLAN connection

- **WLAN (Wireless Local Area Network) is an extension to existing local area network using radio technology**

WLAN PC Card

Wireless connection: ~ 100 m

Firewall

Internet

Telephony Server   **WWW**   **E-mail server**

Radio Access Point

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HiperLAN/2 - The Vision

Local Area WLAN Datacom

Home

Airport

Hotel & Conference

Roaming

Office

Train station

Public space

Wide area Cellular Datacom

Source: HiperLAN/2 Forum

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Bluetooth and Connectivity

Phone

PDA
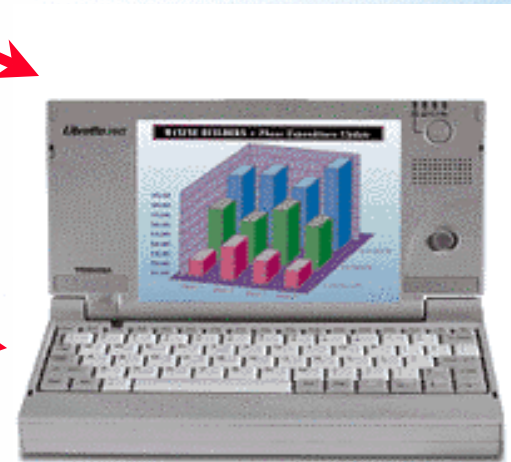
PC

Personal area network:
voice and data supported!

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Wireless Goes Everywhere

Three horizontal layers of wireless networks with different performance, tariff structures, business dynamics and <u>roles</u>

regional/global cellular

global WLAN

global LPRF *(BlueTooth)*

Wide area

Access zone

Personal zone

**Various wireless access methods are complementing each others**

Segmented intelligent multiaccess terminals:
- speech and messaging
- "multimedia"

Customers want: total mobility with seamless scaleable services and optimized cost structures
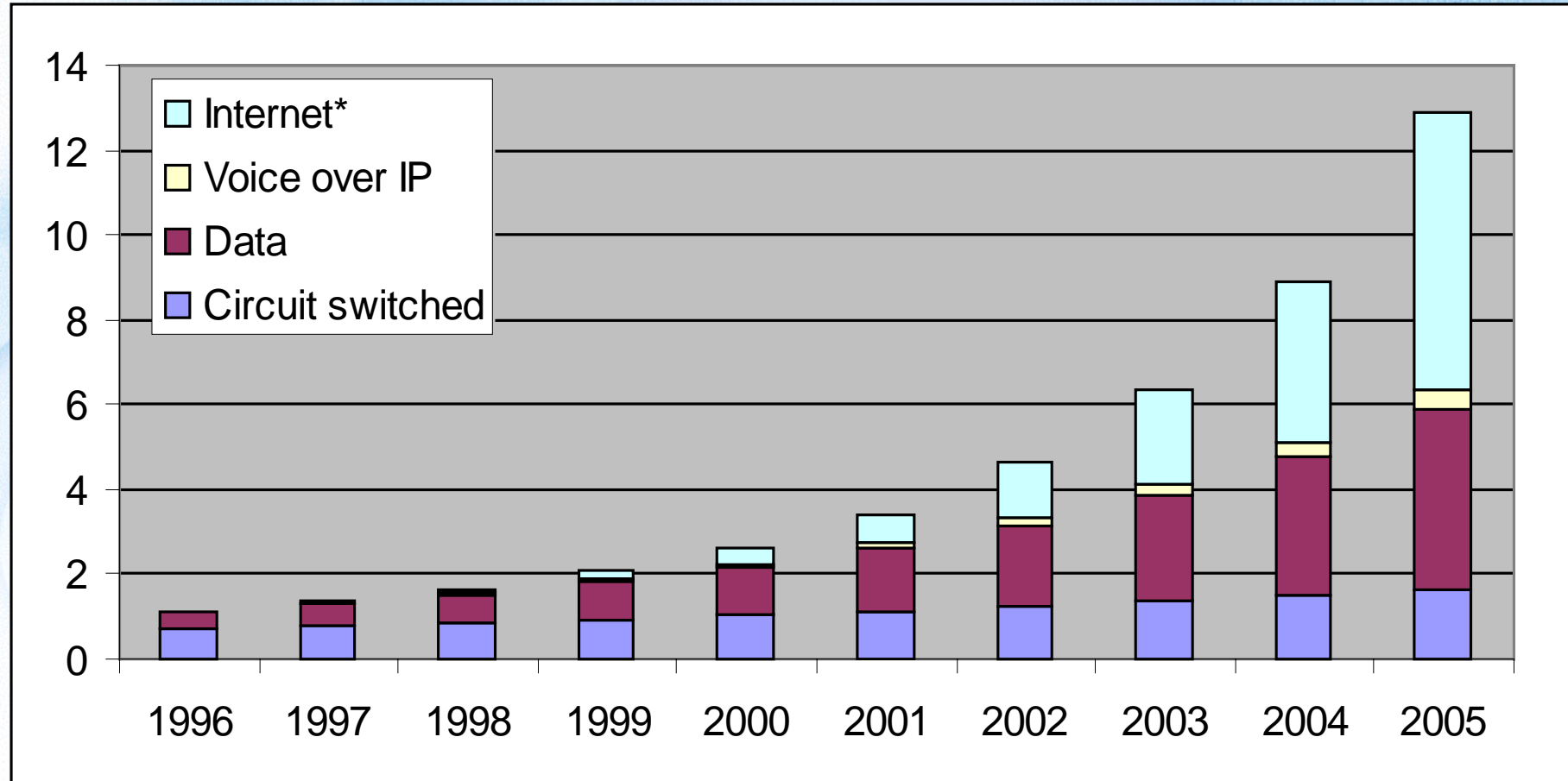
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Two Major Trends in Wireless Industry

1) From circuit switched to packet switched

IP Communication

GPRS   **EDGE**   **3G**   **WLAN**
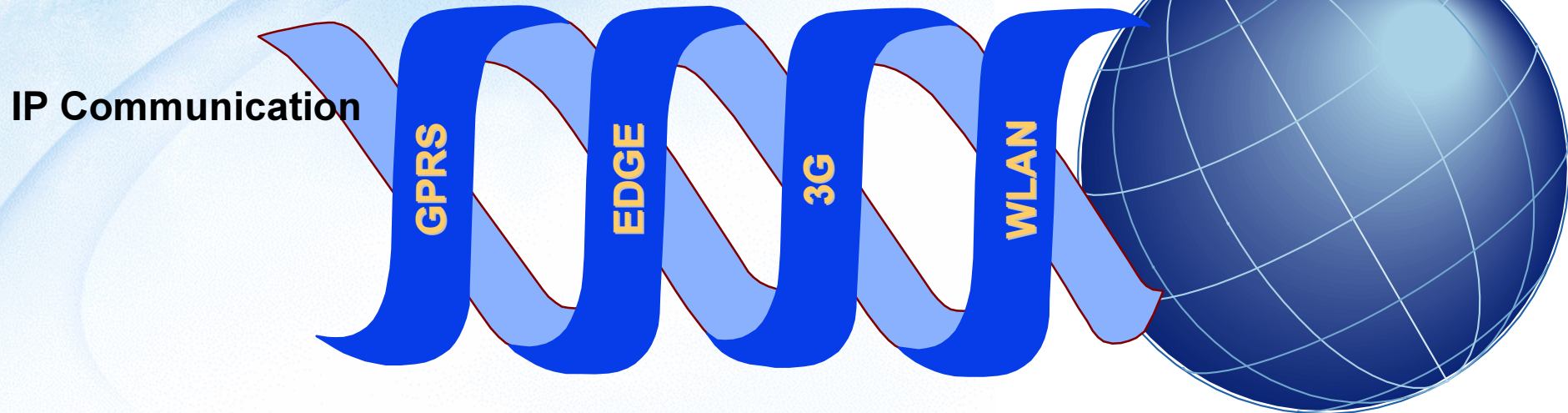
2) Higher data rates over radio

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U.S.-originated traffic loads of carriers based in the United States

Terabytes/day (in thousands)

Legend:
- Internet*
- Voice over IP
- Data
- Circuit switched

X-axis: 1996, 1997, 1998, 1999, 2000, 2001, 2002, 2003, 2004, 2005

Y-axis: 0, 2, 4, 6, 8, 10, 12, 14

* Also includes peered traffic originated internationally

Source: Renaissance Analysis
(reverse engineered from Red Herring)

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Future of Wireless Data is bright but...

- The playing field is completely different than in the past

- Rules will partly come from the computing world - however, wireless is the volume driver

- Voice and data will converge into a wireless IP communication
  - Data will eclipse the voice

- Complexity will increase

- Multimode - a dream but still a mess of standards

- New service players are needed

- Segmentation of applications

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Business segments

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Segments

Content

Applications

Terminals

Networks

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Wireless Networks Under Transition

BT

3G

WLAN

GSM

Content and Applications

Servers

IP Network

EDGE

GPRS

Media Gateways

PSTN

ATM

Cable

GSM

For the fast development wireless industry will accept "the open computing model"

=> Pure IP

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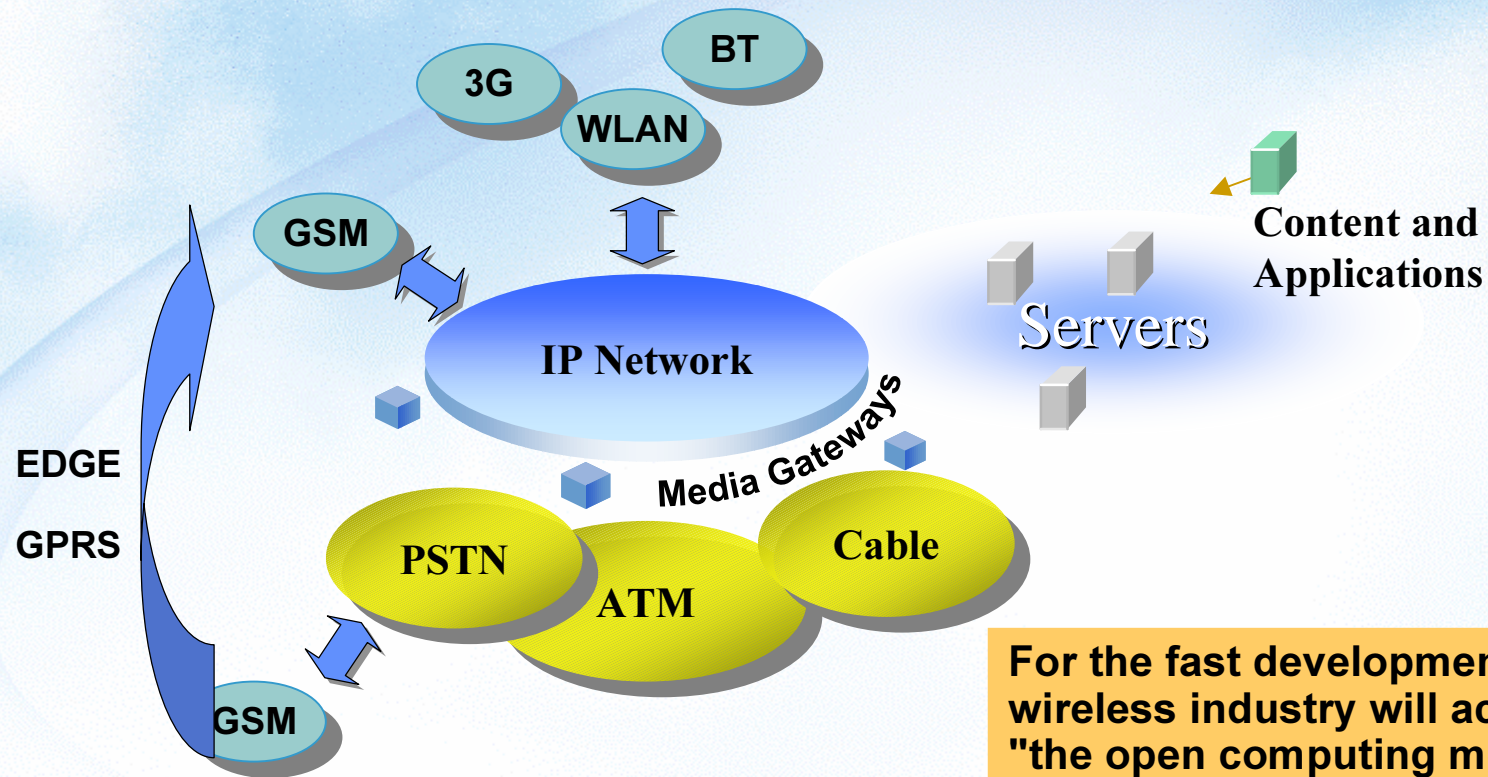
WD Shaping Terminals

Modular concepts

New segments, image messaging

Integrated products

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WAP: Platform for New Applications

E-Commerce

Product Inventory

Remote Calendar/Contact Sync

Internet   **Infotainment**

Corporate Intranet

Localized services

E-Mail

WWW
MMM
MOBILE MEDIA MODE

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WAP Servers for Various Applications

Desktop PC

Application Server

Database

WEB Server

Nokia WAP Server

SMS or Data Call

Corporate network

Operator network

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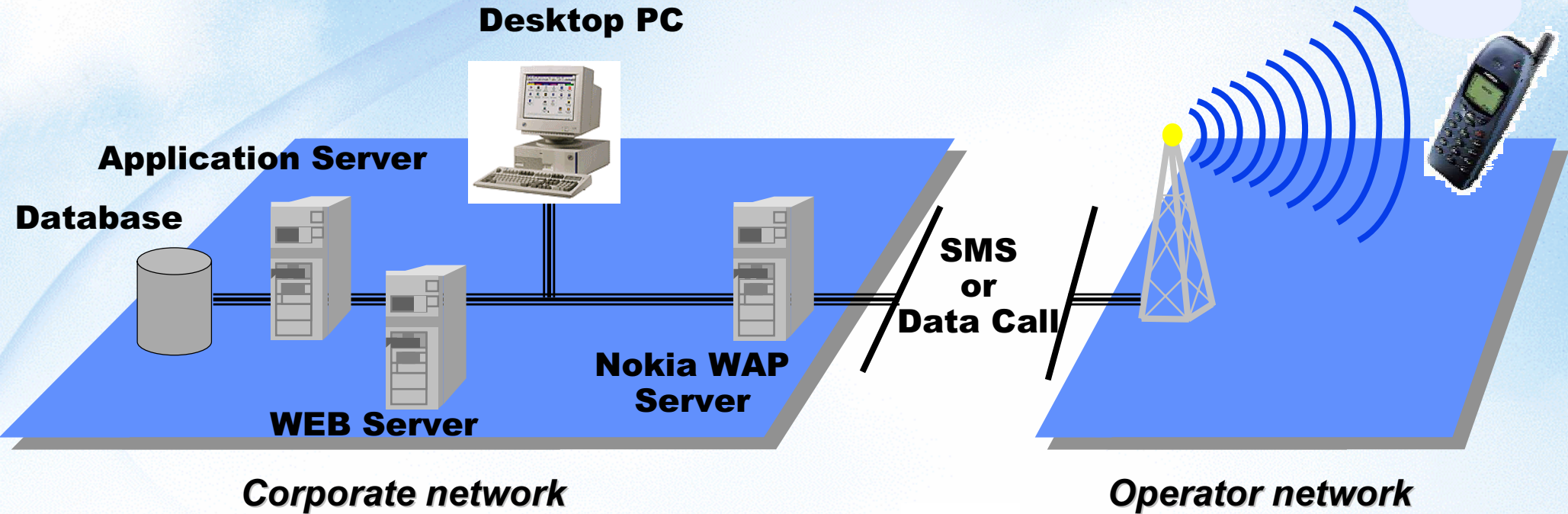
Application Segments

- Horizontal
  - e-mail, messaging
  - Internet/Intranet access
  - banking
  - telefax

- Vertical
  - courier, transportation
  - taxi
  - real estate, insurance
  - sales applications, inventory management
  - remote control, alerts

Downloading new applications over the wireless links

=> new business segment

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Content

- Personal communication:
  - With fast access to Internet, e-mail, photo albums, video cameras etc. we can start to share more and more => communication and presentations are "converging"
  - Communication content is created, used once and disposed of, recording is an additional task today => autostore of communication for potential future need
  - Transaction logs: calls, messages
  - e-mail, calendar, e-commerce
  - personalized services, mobile agents
- Mobile content:
  - news, weather, sport results, finance
  - location based services/content, intelligent search
  - timetables with changes, catalogues
  - entertainment, games, e-lottery
  - advertisement
  - reduces Internet content
  - mobile portals

Independence of time and location

Customized for mobile users

Personalized services, the biggest segment

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Conclusion

Wireless industry is in the beginning of a new phase, where voice is a commodity and wireless data, in various ways, is the value adding element in products, applications and services

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