

Openness – the road to success

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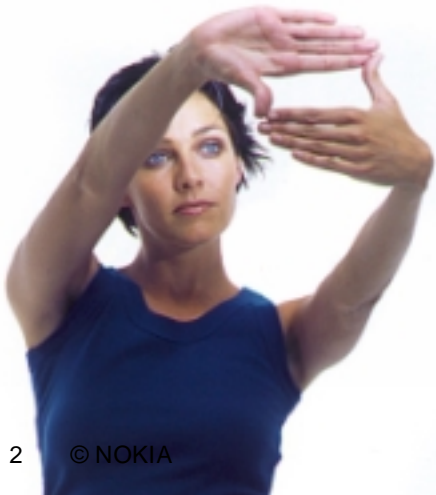
Director, System marketing

Nokia Networks



Openness – the road to success

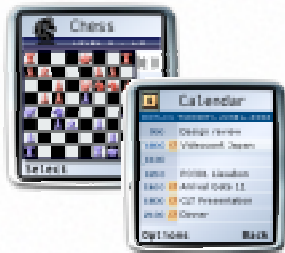
- Early signs of success with MMS
- The mobile industry challenge
 - Diversity of services
 - Cost of service delivery
- Initiatives to drive openness



Next generation mobile services are here today

TODAY

Smart Messaging and Java applications



MMS basic (image, text, audio)



6-12 months service implementations

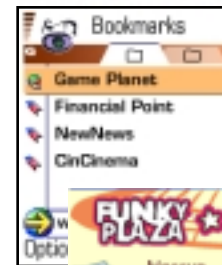
Advanced content services

- video services
- mobile DRM



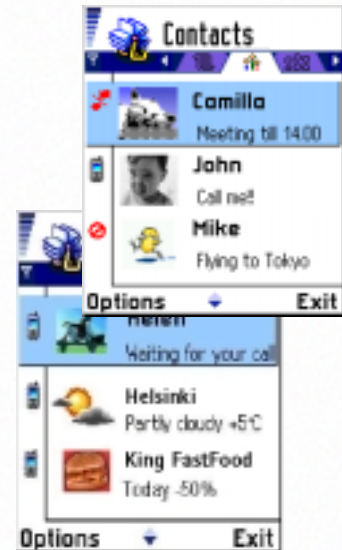
Rich Browsing

- xHTML content



Presence-enhanced services

- phonebook
- applications



Early signs of success: Multimedia messaging

Vodafone UK
Over 90,000
live! users

O2 UK
80,000
MMS users

Orange had over
100,000 MMS
customers
including SPV
subscribers in UK

Sonera, FI:
30,000 MMS
users in
November

T-Mobile has
sold 200,000
MMS phones in
Germany end
2002

Over 200,000 MMS
sent per week in
Vodafone network
in Germany

Over 380,000
Vodafone live!
customers across
Europe end 2002.

Also T-Mobile has
sold 380,000
picture phones
throughout
Europe
by end 2002

Vodafone,
IT
60,000 MMS
users

Over 1 million
MMses were
sent over
T-Mobile's
network
in December

Some
100,000 of
Swisscom
customers
own MMS
phone and
60% are
regular
MMS
service
users

In Italy
700,000 mms sent
Xmas and New Year
Period

Vodafone
Greece:
90,000 MMS sent
in first two
months

**Over 1 million MMS
users in Europe 2002**

**China Mobile sold
1 million MMS phones
by end 2002**

NTT DoCoMo announced January 14 that it had sold over 5m camera-equipped handsets since the June 2002 launch of its i-shot service

In Singapore number of the MMS subscribers increased from 2000 in Oct to 20,000 in Dec

In India BPL's MMS traffic is about 4 MMS per subscriber per month

MMS user Data ARPU of Hong Kong CSL's is over double to basic GSM user

End 2002 -public sources

**More than 100
operators launched
MMS services globally
by end 2002!**

Interoperability is essential to mass-market MMS

National MMS interconnections:

Day of launch	Country	Operator	Operator	Operator	Operator
		MMSC vend.	MMSC vend.	MMSC vend.	MMSC vend.
07.10.2002	Germany	D2 Vodafone Ericsson	T-Mobile Ericsson		
01.02.2003	Germany	E-Plus	T-Mobile Ericsson	O2 Nokia	Note: E-Plus with O2 and E-Plus with T-Mobile
22.10.2002	Hong Kong	CSL Nokia	New World Mobility Nokia	SUNDAY Nokia	
22.10.2002	Hong Kong	Hutchison Ericsson	SmarTone Ericsson	Peoples Telephone Ericsson	
25.11.2002	Finland	Sonera Nokia	Radolinja Tecnomen	20.12.2002: DNA Tecnomen	30.1.2003: Telia Nokia
28.11.2002	Singapore	M1 Nokia	Starhub Nokia	Singtel CMG	
09.12.2002	Italy	Wind Nokia	Vodafone Omnitel Ericsson		
09.12.2002	Australia	Optus Nokia	Vodafone Ericsson		
19.12.2002	Spain	Telefonica Nokia	Amena Ericsson	Vodafone Ericsson	
27.01.2003	UK	O2 Nokia	Orange Nokia	T-Mobile Nokia	

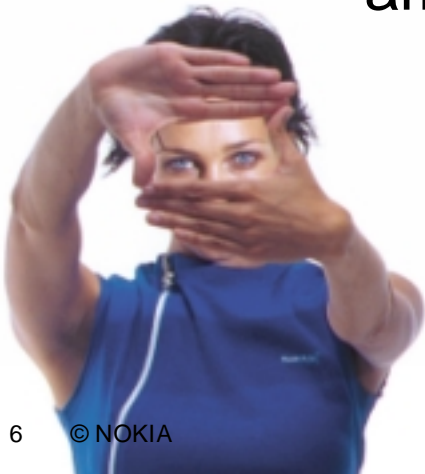
- Interoperability is a major issue for mass-market adoption
- Technology is there, operators are active in making business agreements

STEPS to be taken:

- Open and optimize your own service
- Ensure extensive GPRS roaming to enable your subscribers to use MMS abroad
- Enable national interconnection
- Prepare international MMS interconnection

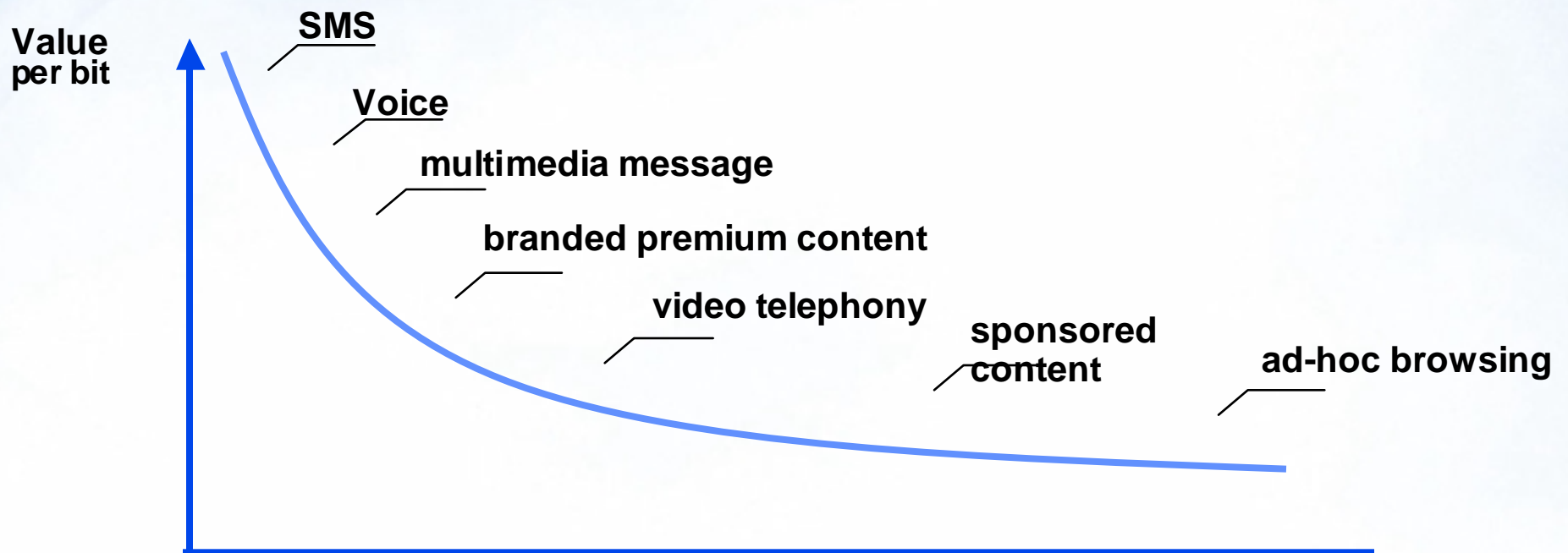
The mobile industry challenge

- Despite clear signs of success, challenges remain
- Advanced mobile services: Cost, set-up effort, ease-of-use, understandable charging
- Wireless voice: Total cost of ownership to affordable level in emerging markets

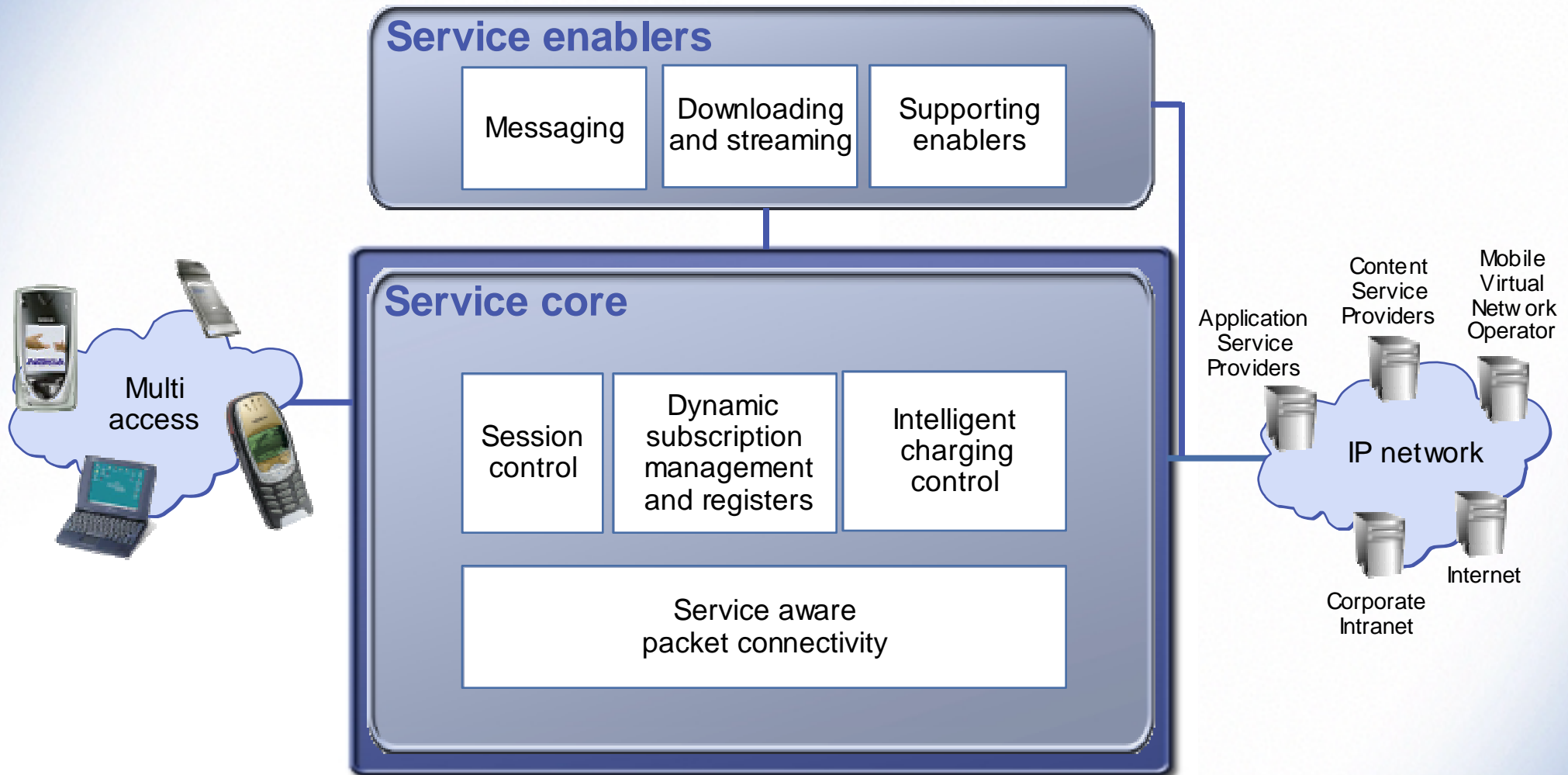


Two key requirements for the Mobile Network Infrastructure evolution

1. Enabling a diversity of advanced services
2. Lowering the cost of service delivery

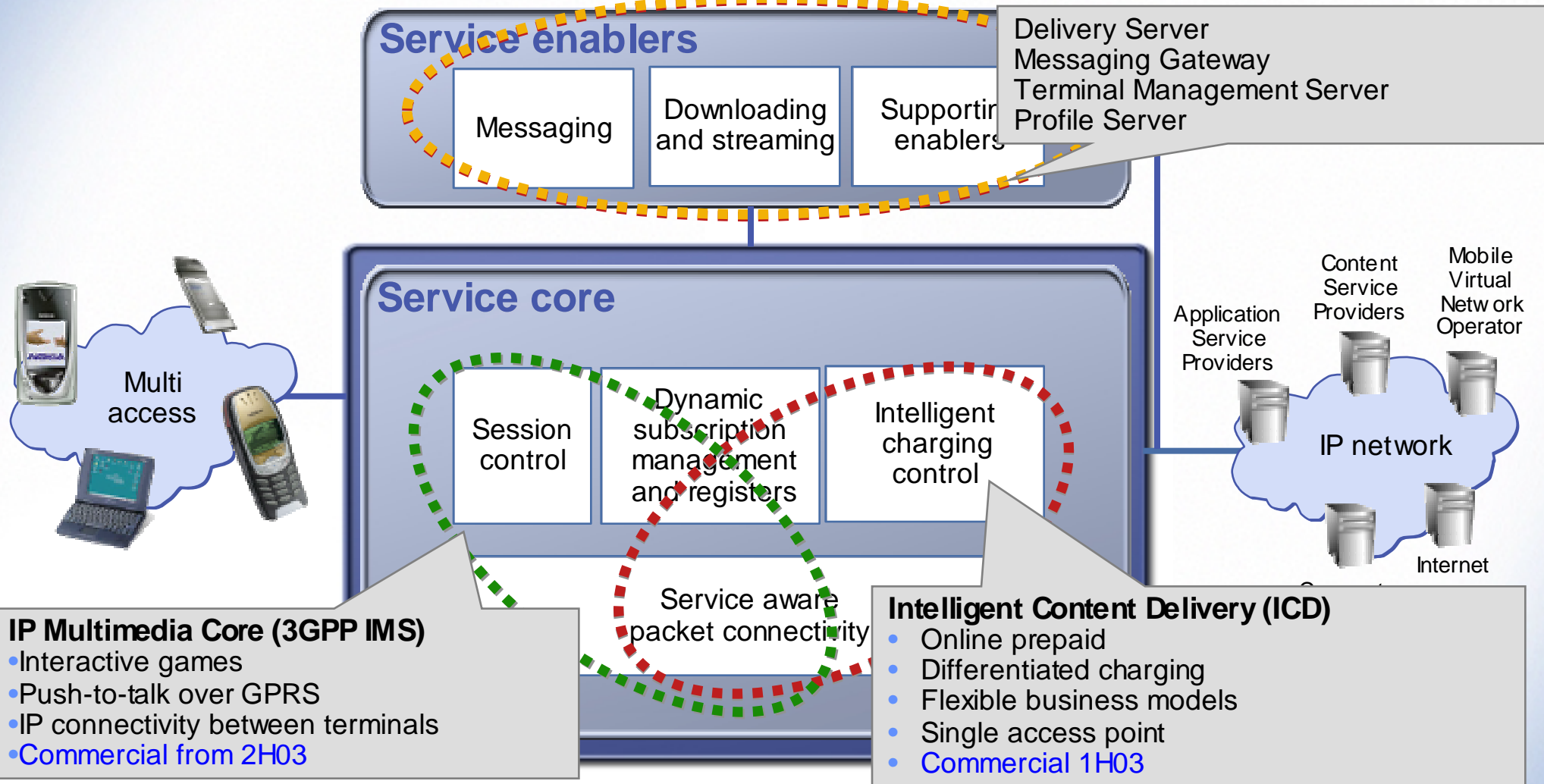


Service aware multi-access network is needed for managing advanced mobile services



Nokia Intelligent Edge

Enable widest service portfolio and flexible business model



IP Multimedia Core (3GPP IMS)

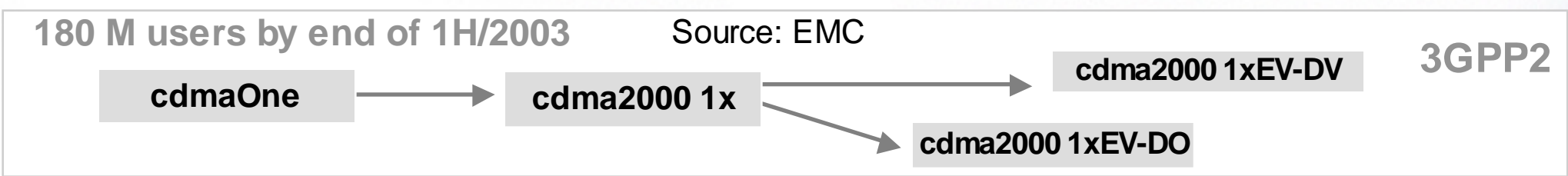
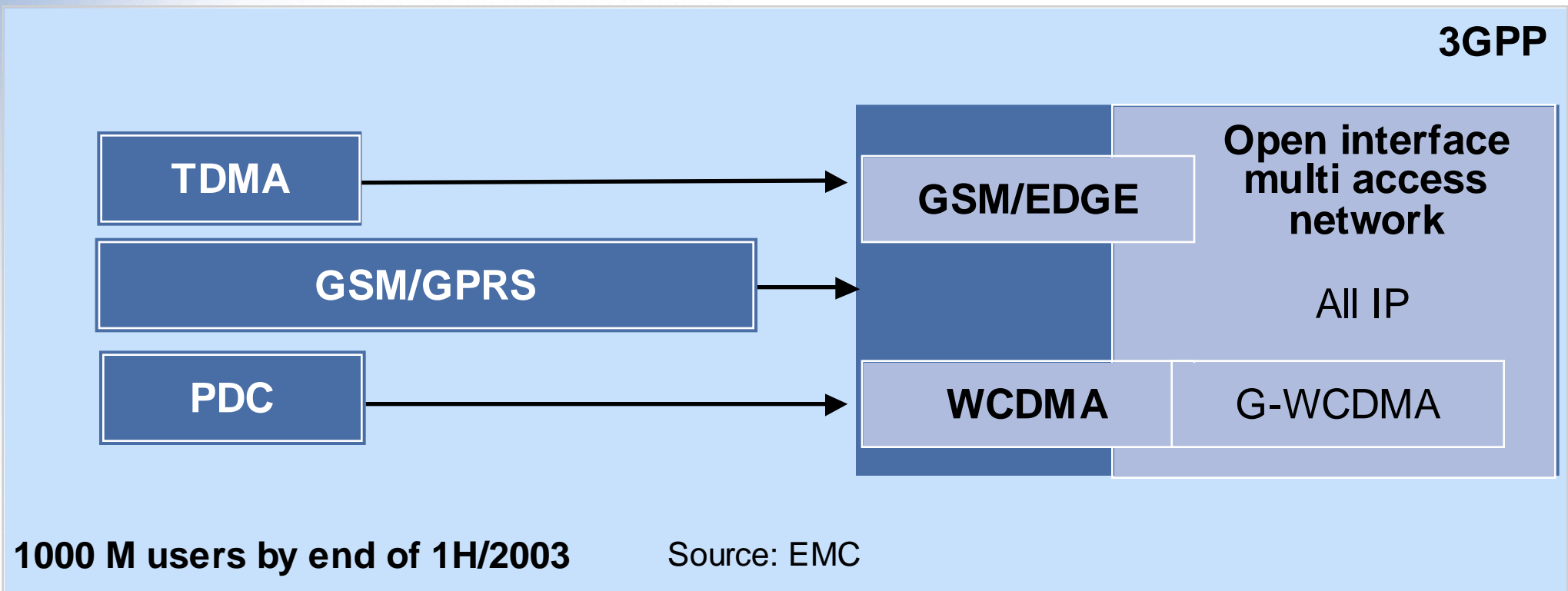
- Interactive games
- Push-to-talk over GPRS
- IP connectivity between terminals
- Commercial from 2H03

Intelligent Content Delivery (ICD)

- Online prepaid
- Differentiated charging
- Flexible business models
- Single access point
- Commercial 1H03

Service uptake drives network evolution

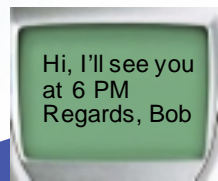
Global service delivery with GSM and WCDMA



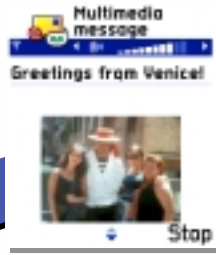
Capacity needs are increasing

Faster and more affordable means to deliver richer content required

Messaging



Basic text messaging
21 SMS á <0.2 kB
0% more traffic



Multimedia messaging
19 photo MMS á 40 kB
+ 10 video MMS á 100 kB
10% more traffic



SMS content
1-10 kB

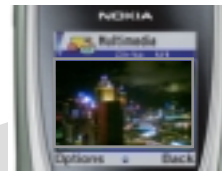


Images, graphics, MIDI ringtones
5-40 kB

30 images->
7% more traffic



Java Midlets
10-60 kB



Audio/video clips
50-200 kB

20 clips ->
22% more traffic



Symbian applications
50-300 kB



Audio/video streaming,
typical bandwidth
up to 384 kbps
15 minutes at 64 kbps ->
39% more traffic

Traffic increase calculated relative to
200 minutes of voice (18.3 MB)

Sources:

Ovum, April 2002, EMC Cellular Forecasts, Nokia

Advantages of EDGE and WCDMA

From the services planning perspective

EDGE: Seamless coverage and capacity extension for 3G services

- **Streaming** – 64 kbps enables basic video or high-quality audio streaming
- **High-quality video/audio clips** – expedited delivery
- **WWW browsing** and **corporate data access**
- **Enhancing existing services** through faster response times



WCDMA: highest bandwidth and mass-market capacity

- **Multitasking** – simultaneous voice and data for e.g. mobile meetings
- **Mobile video telephony** – in-built network support for H.324M
- **High-quality streaming** – up to 384 kbps enables high-quality video
- **High-speed www browsing** and **corporate data access**
- **Enhancing existing services** through faster response times



GSM/EDGE and WCDMA form a single multiradio network for seamless service delivery

Steady progress in 3G rollout

WCDMA

- More than 90% of the over 100 license holders building or planning networks
- Nokia is a leading WCDMA 3G solution provider with early market deployment of 3G applications
- 45 WCDMA 3G system trials in 26 countries. More than 20 WCDMA 3G rollouts ongoing in 13 countries
- 6 other network suppliers tested against Nokia Network, 8 terminals tested against Nokia Networks

EDGE

- GSM/EDGE hardware is delivered to 27 customers in 18 countries
- More than 50% of 2H/2002 deliveries with GSM/EDGE hardware.

- **1/2003: 47 operators forecasting deliveries with GSM/EDGE HW**
- **EGPRS trials planned with 14 operators during 1H 2003**
- **Nokia end-to-end solution ready 2Q 2003**



Initiatives to drive openness

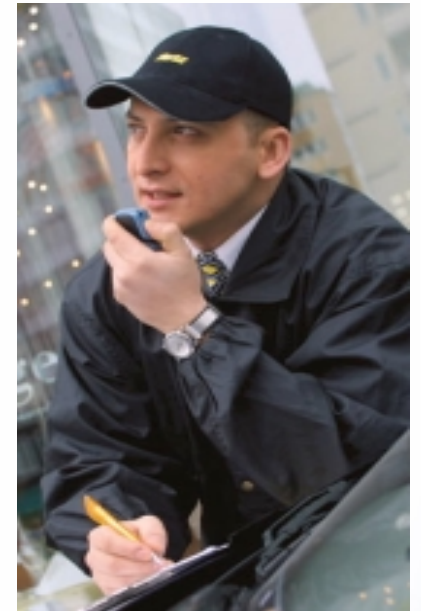


Introducing push-to-talk over GPRS

Nokia, Ericsson and Siemens join forces to promote open standard for push-to-talk over GPRS



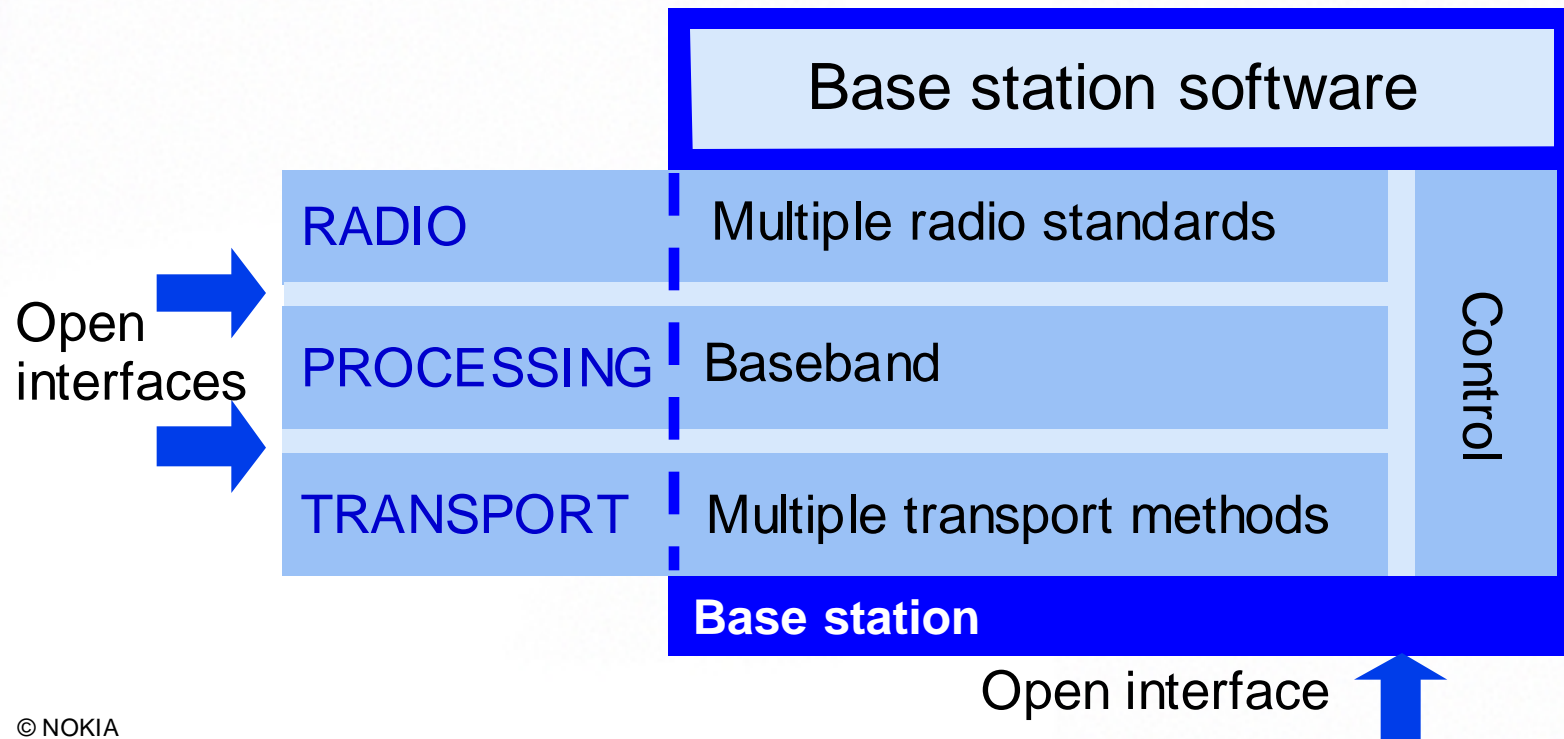
- Connect directly
- One-to-one or one-to-group
- Business and consumer users
- Voice over IP
- Open specification for other manufacturers



From proprietary to openness

Update: Open Base Station Architecture Initiative (OBSAI)

- Standardises interfaces within future base stations
- Founded in 09/02, now over 25 members
- Architecture and interface specifications by 2H/03
- Nokia to make and sell OBSAI compliant modules



From proprietary to openness

Update: Open Carrier Grade Server

- Nokia FlexiServer - leading implementation of Service Availability Forum and OSDL Linux Working Group compliant platform
- Nokia now opens up FlexiServer hardware requirements for all industry players
- Nokia enables cost-efficient mobile service creation



Openness – the road to success

- Major growth potential in mobile services is ahead
- Open, non-proprietary network architecture is the only way
- Nokia Intelligent Edge gives operators greater control over revenues: launching IP Multimedia Core and Intelligent Content Delivery
- Nokia, Ericsson and Siemens: open standard for push to talk
 - Over 25 members in Open Base Station Architecture Initiative
 - Steady progress in EDGE/WCDMA rollout



Additional material

Nokia GSM/EDGE hardware deliveries - during 2002 -

