3G/ HSPA Networks

Operator Services opportunities, concerns solutions and strategies

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3G/HSPA Networks and Mobile Broadband

Changing the industry - just like mobile telephony once did

Adding new revenue streams on existing networks

The market drivers for mobile broadband

- **Laptop sales exceeds desktop**
- **The mobile user behaviour is already here**
- **Mobile Broadband services can complement and increase your ARPU**
  - **Adding a new service**
  - **Converged networks**
- **Competes with fixed, in markets with low fixed broadband penetration**
- **The Broadband market is growing fast - Mobile Broadband is a way to take part in that growth**

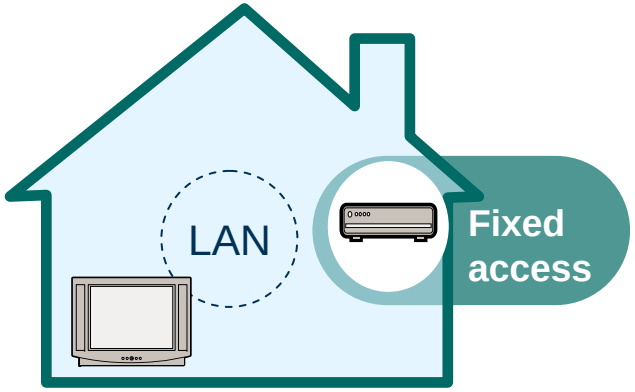
Full Service Broadband

Broadband services to a screen of your choice

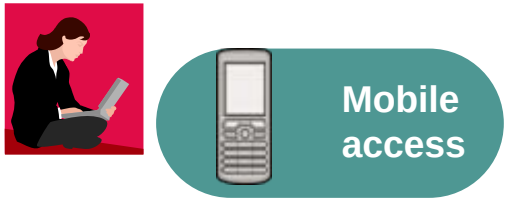
Transforming the Network

Location and device independence

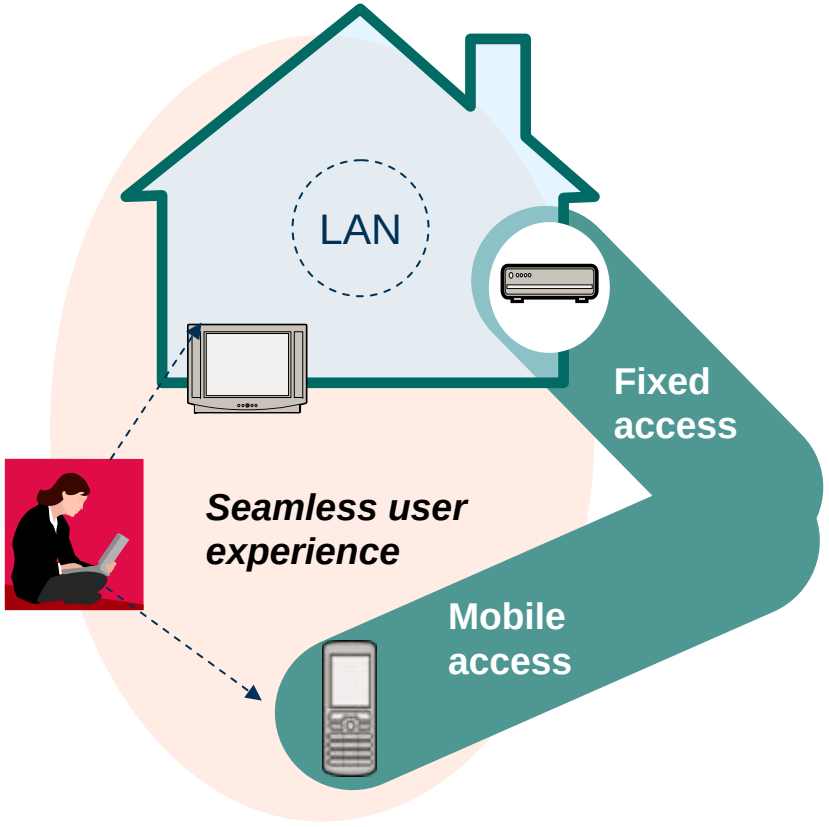
Fixed broadband (Fixed Wireless Access)
- Connects a port, not devices
- Connects to a location



Mobile broadband
- Serving individual devices/users



Full service broadband
- Location and device independence
- Reach anything/anyone, any time and any place
- Serving individuals **and** locations



HSPA with Ericsson

Definitions - Wireless broadband

Mobile Broadband (MBB)

- *Connecting a device*
- *Handhelds, USB dongles, laptops*
- *Mobility*

Fixed Wireless Access (FWA)

- *Connecting a place*
- *Shared by many devices/users*
- *Wireless residential gateway*
- *No/limited mobility*

3G/HSPA:
- The leading wireless broadband technology
- Available now for 800 million mobile users!

Ericsson:
- The leading HSPA network supplier

109 Ericsson HSPA networks

In commercial operation

2005

World's first:

- AT&T-USA

2006

- Mobilkom-Austria
- 3-Italy
- Partner-Israel
- Swisscom-Switzerland
- Mobiltel-Bulgaria
- Vodafone-Germany
- MTN-South Africa
- Vodafone-Portugal
- Optimus-Portugal
- TMN-Portugal
- EMT-Estonia
- Vipnet-Croatia
- Elisa-Finland
- Vodafone-Romania
- T-Mobile-Hungary
- TIM-Italy
- Al Jawal-Saudi Arabia
- Cellcom-Israel
- Smartone-Hong Kong
- Cosmote-Greece
- Bite-Lithuania
- Vodafone-UK
- Amena-Spain
- Mobily-Saudi Arabia
- One-Austria
- Vodafone-Spain
- Elisa-Estonia
- Vodafone-Netherlands
- Movistar-Spain
- Bite-Latvia
- Dialog-Sri Lanka
- T-Mobil-Slovak Republic
- NTT DoCoMo-Japan
- Excelcomindo-Indonesia
- Maxis-Malaysia
- Far East Tone-Taiwan
- PTC-Poland
- Softbank Mobile-Japan
- Telstra-Australia
- KPN-Netherlands
- Wataniya-Kuwait
- Polkomtel-Poland
- AT&T-Puerto Rico
- Rogers-Canada
- 3-Sweden
- 3-Australia
- 3-Denmark
- Satelindo-Indonesia
- Sunrise-Switzerland
- Entel PCS-Chile
- Mobitel-Slovenia
- Telekom Srbija-Serbia

2007

- DNA-Finland
- Telenor-Serbia
- eMobile-Japan
- Tele2-Sweden
- Telkomsel-Indonesia
- Pannon-Hungary
- Méditel-Morocco
- TeliaSonera-Finland
- TDC Mobil-Denmark
- Personal-Argentina
- Etisalat Misr-Egypt
- SingTel-Singapore
- Vodafone-Egypt
- TeliaSonera-Sweden
- CTM-Macau
- Promonte-Montenegro
- T-Mobil-Montenegro
- Movistar-Mexico
- Movistar-Argentina
- Movistar-Uruguay
- O_2-Ireland
- m:tel-Montenegro
- Unitel-Angola
- Siminn-Iceland
- TeleNor-Norway
- Indosat-Indonesia
- Wind-Italy
- Claro-Brazil
- Bouygues-France
- Telemig Celular-Brazil
- Batelco-Bahrain
- Nawras-Oman
- MTN-Nigeria
- Tango-Luxembourg

2008

- Claro-El Salvador
- Telcel-Mexico
- Claro-Honduras
- Nucleo-Paraguay
- TIM-Brazil
- Brasil Telecom-Brazil
- T-Mobile-USA
- Bhutan Telecom-Bhutan
- DST-Brunei
- CYTA-Cyprus
- U-Mobile-Malaysia
- MTS-Russia
- Geocell-Georgia
- Yoigo-Spain
- Vimpelcom-Russia
- Vivo-Brazil
- Syriatel-Syria
- Moldcell-Moldova
- Mascom-Botswana
- Claro-Dominican R.
- Claro-Nicaragua
- Claro-Puerto Rico

Source: Ericsson, October, 2008

The busines opportunity and concerns

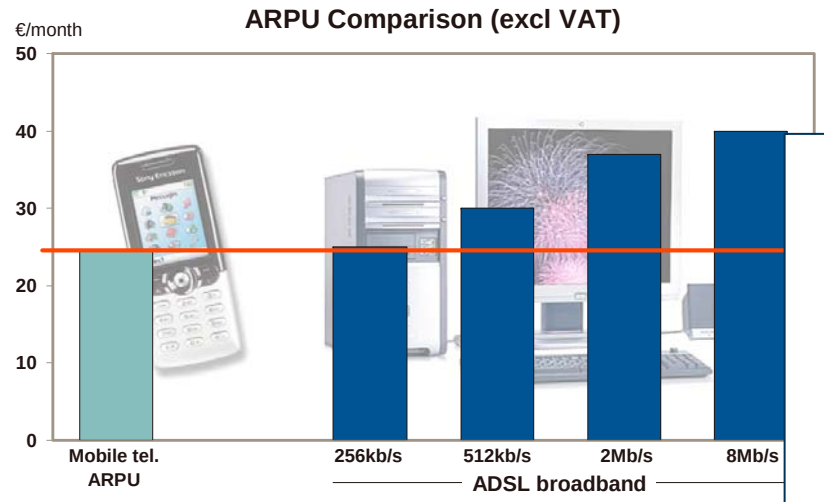
Established end-user behavior

Internet Access is going Wireless and Mobile

Mobile Broadband

A Healthy ARPU increase

Mobile Broadband doubles ARPU

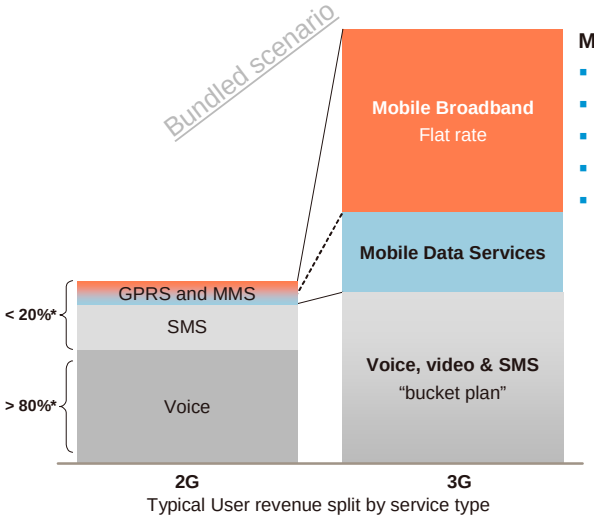


Source: Merril Lynch, Global Wireless Matrix Q104. Nordic incumbent operators web site.

Commercial in confidence 23 2007-06-20

Revenue structure

Broadband services are high quality revenues



Mobile Broadband –

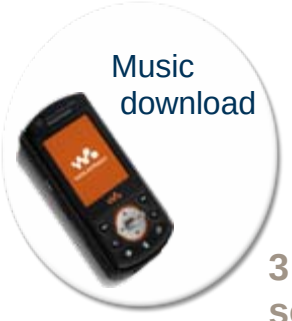
- Significant share of revenues
- Proven mass market appeal
- Permanent revenue stream
- Simple business model
- Mobility premium available

* Advanced markets, Analysys Research 2003

Commercial in confidence 24 2007-06-20 ERICSSON

Customers want higher speed – NOW!

Mobile Broadband speed based on HSPA vs. basic 3G



3 Mb song

1 min ⟺ 8 sec

10 times more parallell users

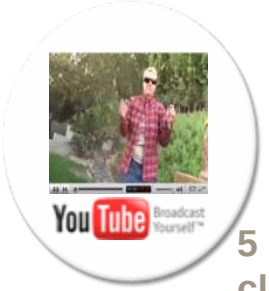
Post new blog

37 sec ⟺ 2,5 sec

Email ppt

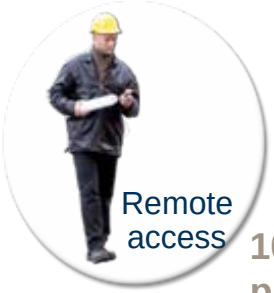
4 min ⟺ 28 sec

6 sec ⟺ 1 sec



5 mb video clip

2 min ⟺ 14 sec



10 mb ppt

4 min ⟺ 28 sec

3G >100msec latency
MBB <50 msec latency

Operator experiences

Key effects

- “Data subs penetration 0.3 to 3% in five (5) months”
- “HSDPA Cards grows faster than fixed subscriptions”
- “Data download in six (6) months is 3 times more”
- “Data ARPU increased significantly”
- “Non-SMS Data ARPU up 74% year-on-year.”

Different types of Mobile Broadband segments

Laptop mobility seekers

Broadband performance everywhere, both indoor and outdoor

Fixed Wireless Broadband

Very cost efficient - ADSL/WiMAX alternative

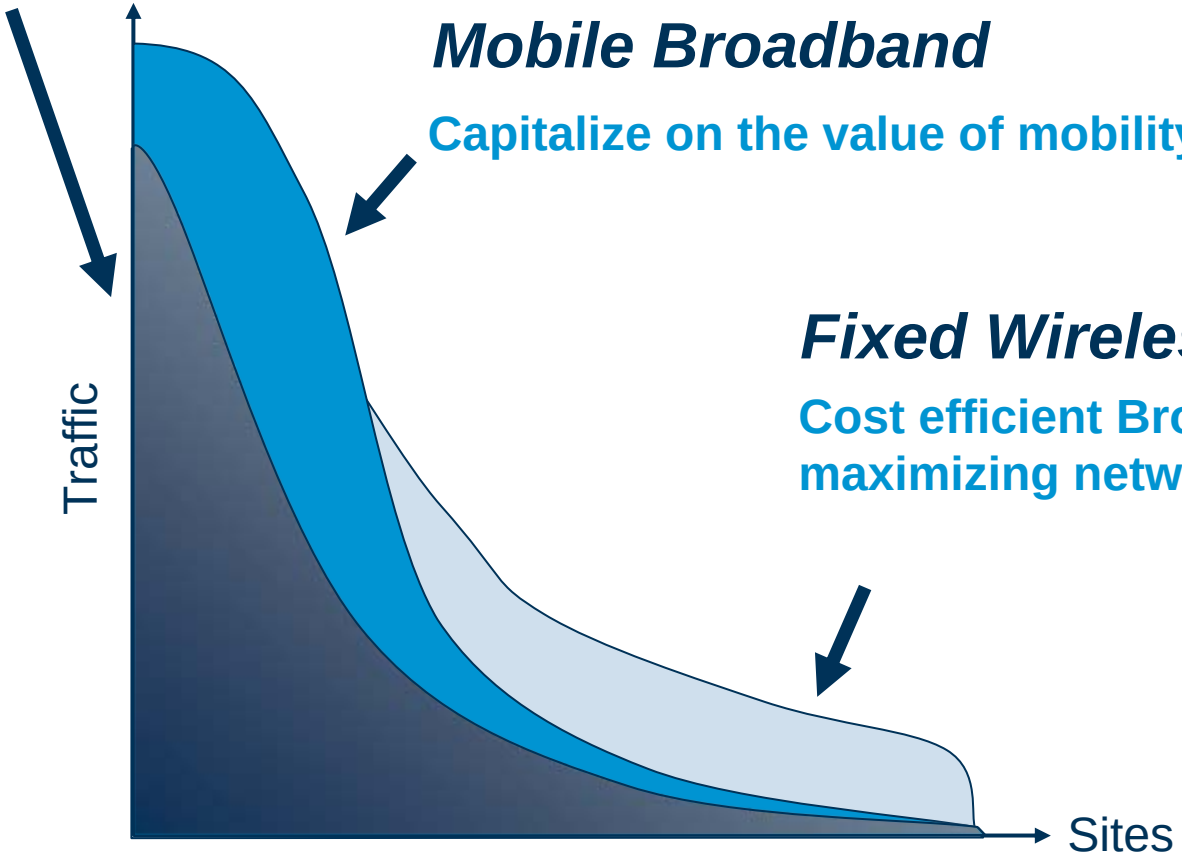
Address new business opportunities

Mobile Media

Capitalize on NW & Handset capabilities

Mobile Broadband

Capitalize on the value of mobility



Fixed Wireless Broadband

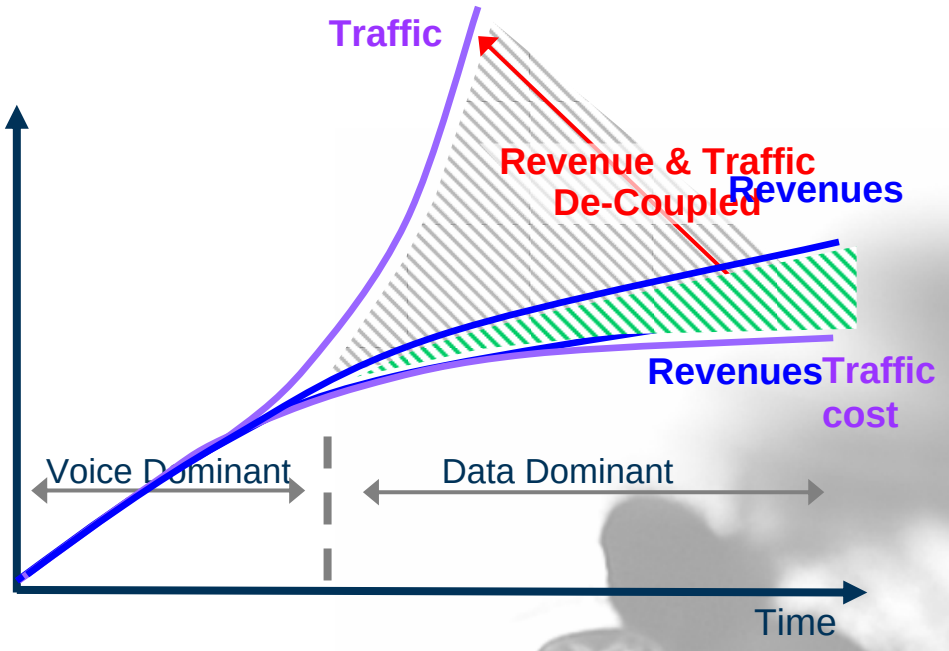
Cost efficient Broadband by maximizing network utilisation

HSPA Business Case issues

A Mobile Broadband show stopper?

Solutions:

- Self built RAN transport
- Gradual introduction of IP and Ethernet in RAN
- Superior coverage and capacity
- New, innovative but easy and unique services that can be added to the bitpipe
- Customer focused and well planned build out



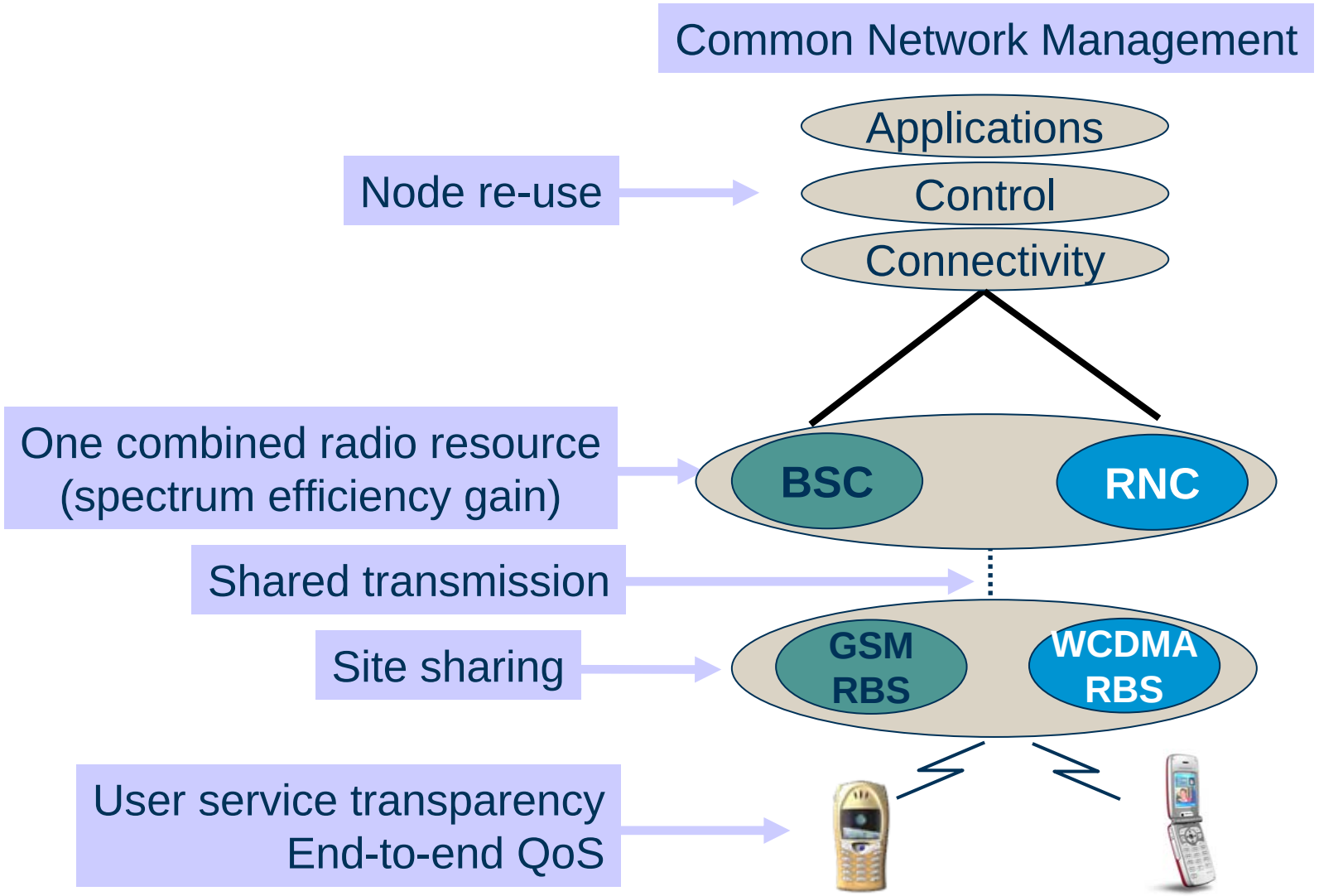
Source: Light Reading

How to do things better / different?

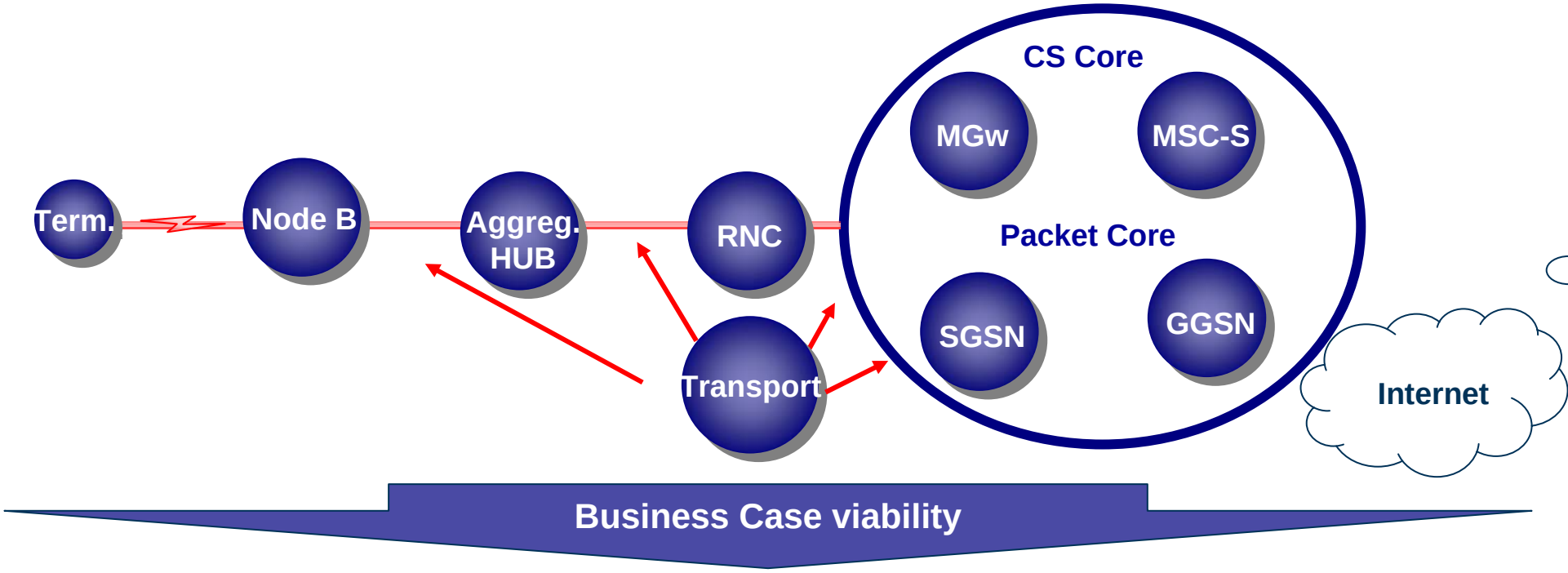
How does technology support the business case
with respect to :
coverage, capacity, transmission and core

Main benefits of 3GSM

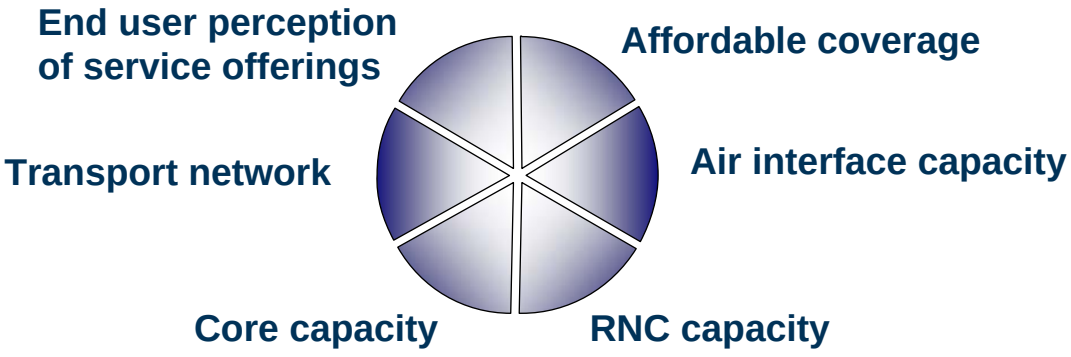
– The Ericsson Seamless Network – ONE CORE



3G High Level Architeture



Business Case viability



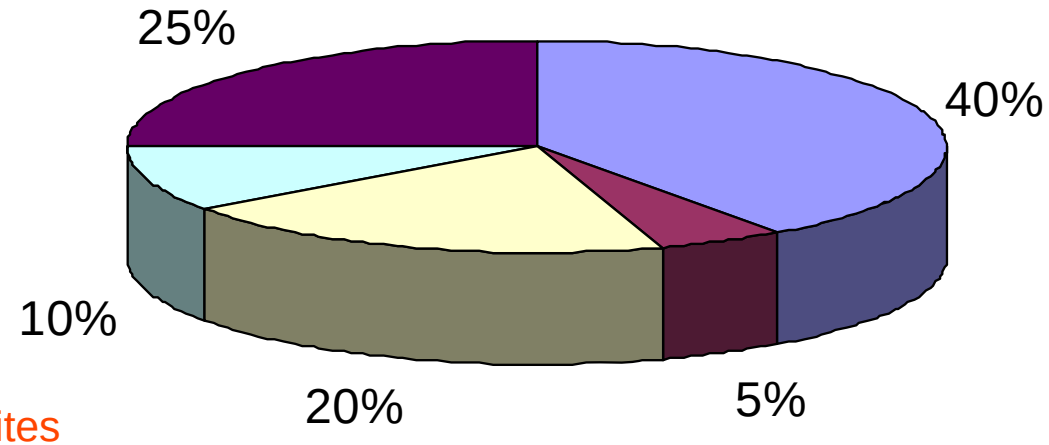
RAN OPEX Structure

Site dependency

Affordable coverage

O&M
Number of sites

SITE RENTAL
Number of sites



POWER
Number of sites

TRANSMISSION
Traffic & number of sites

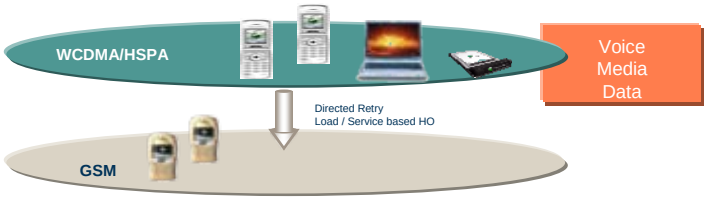
SPARES, SUPPORT& TRAINING
Number of sites

Site count is main driver for OPEX!

Superior deployment capabilities

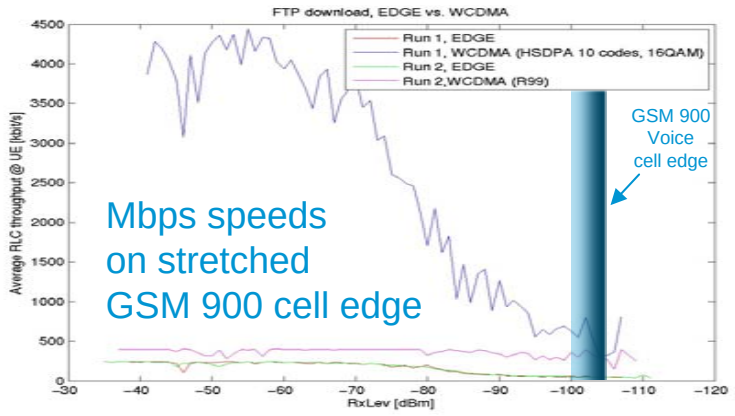
Cost efficient coverage

– GSM co-existence
– HSPA on R99 carrier

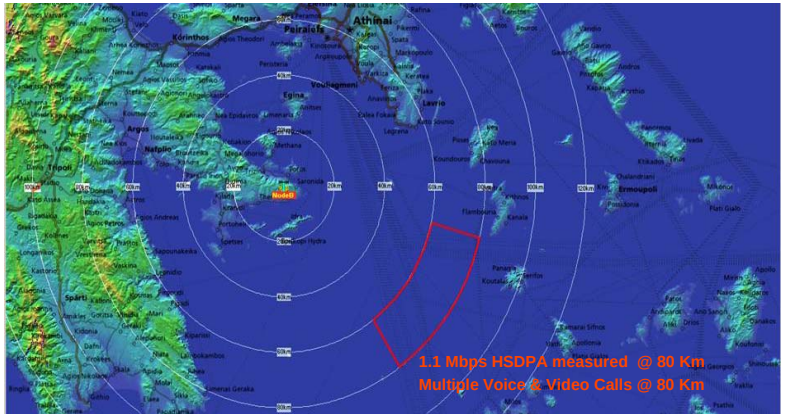


Innovative sites

HSPA 800 on GSM 1900 grid



Extended Range solutions

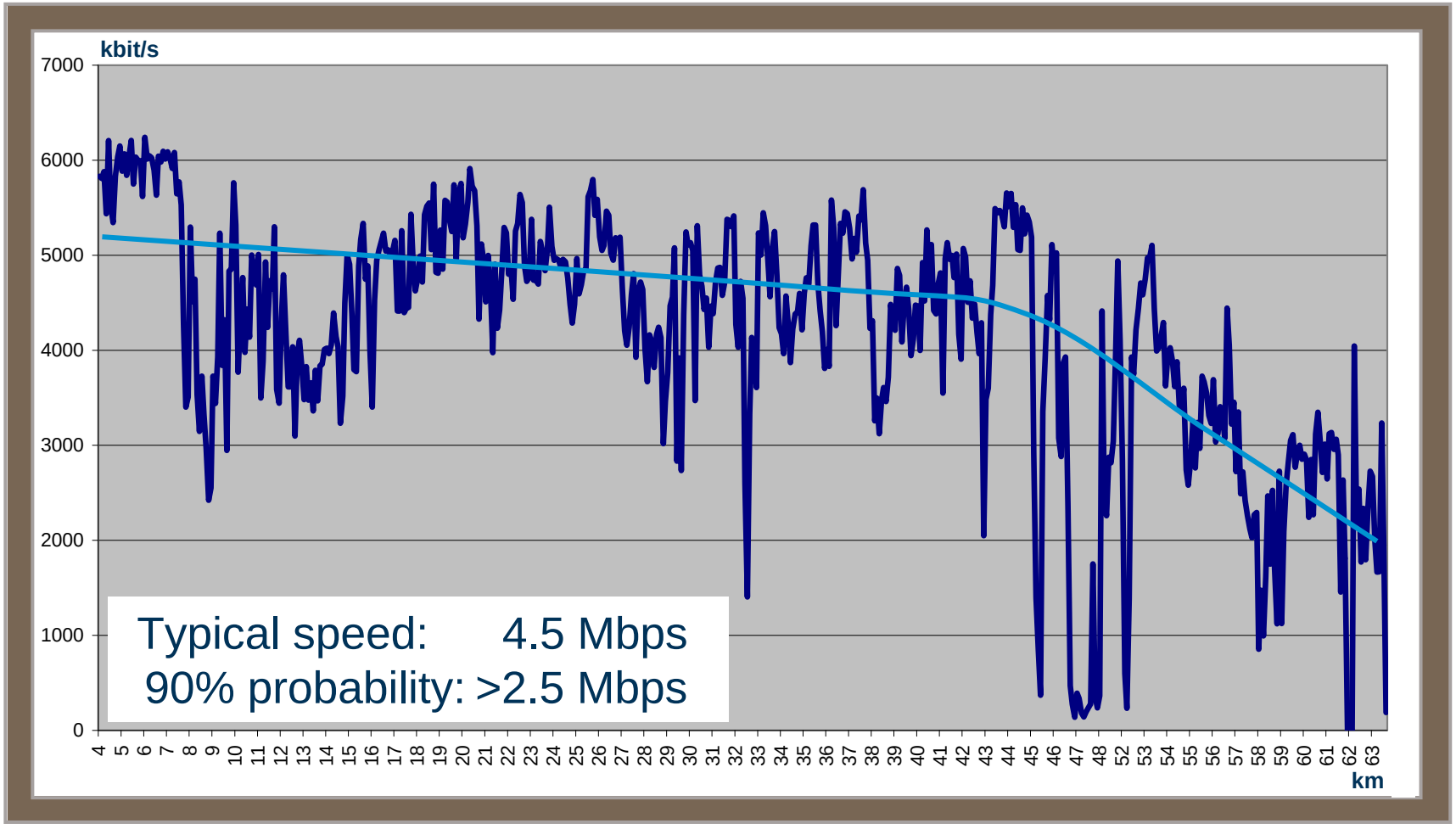


Unique Ericsson solutions – Lowest Total Cost of Ownership

HSPA 7.2 Mbps & Extended Range

Drive testing in Australia

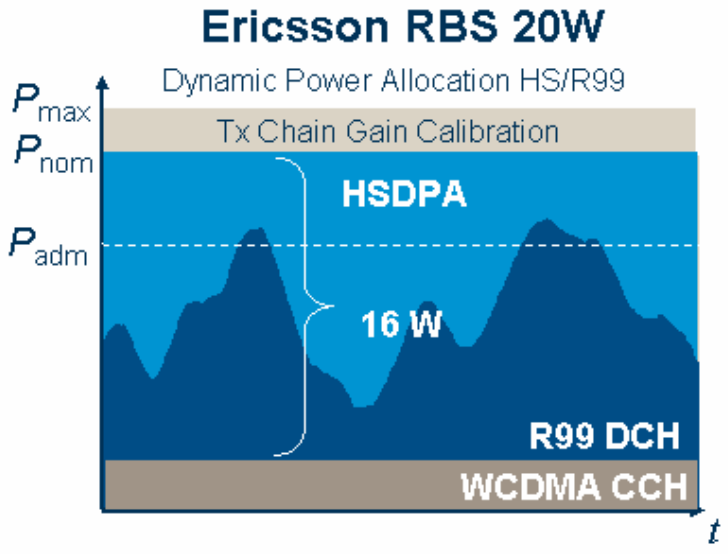
Air interface Capacity

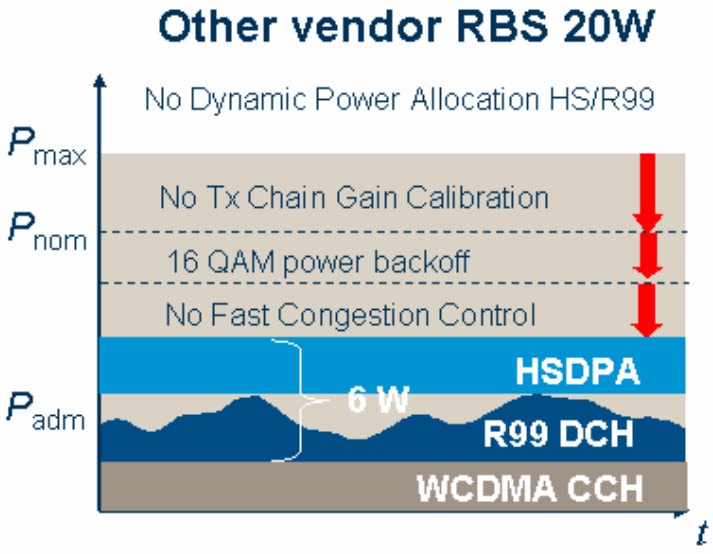


Higher Speed – Longer Range

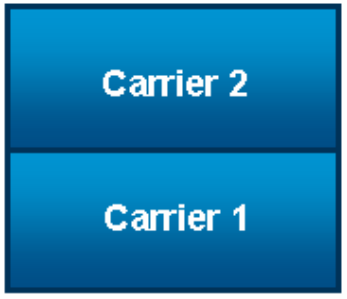
Dynamic Power Allocation

Affordable Coverage
&
Air interface capacity





50-150% higher capacity
per cell-carrier with unique RBS features



Ericsson RBS

Other vendor RBS

Dynamic Power Allocation – Maximizes carrier utilization

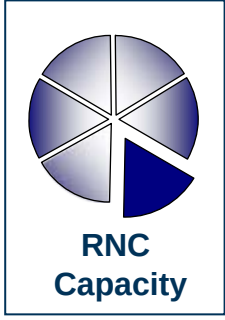
Evolution of WCDMA/HSPA

Increased air interface capacity

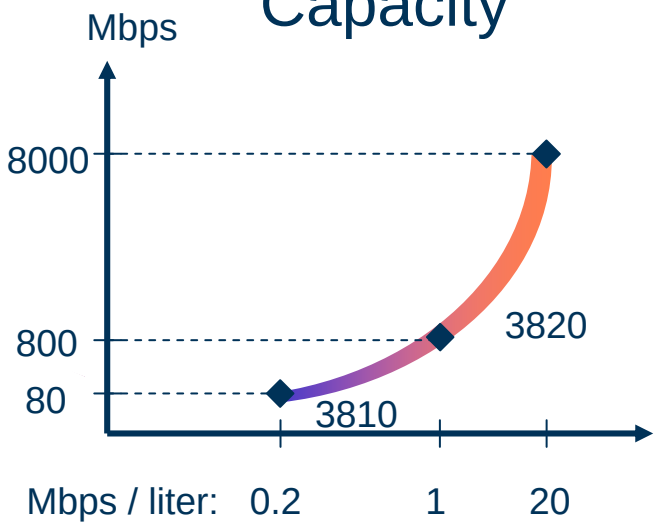
	2004	2005	2006/2007	2008	2009	
	WCDMA	HSDPA	HSPA MBMS	HSPA Evolved	HSPA Evolved	LTE 20 MHz*
DL Mbps	0.384	3.6	14	28	42	100
UL Mbps	0.064	0.384	1.4	5.8	12	50
Latency (ms)	~150	~75	~50	~25	~25	~10

*target bit rates

RNC evolution



- Increased capacity for any need
- Flexible dimensioning
  - Independent scaling, user and control planes
  - Optimized offering for broadband, media and voice
- Evolving the product
  - Same platform
  - Same hardware family
  - Same software and functionality



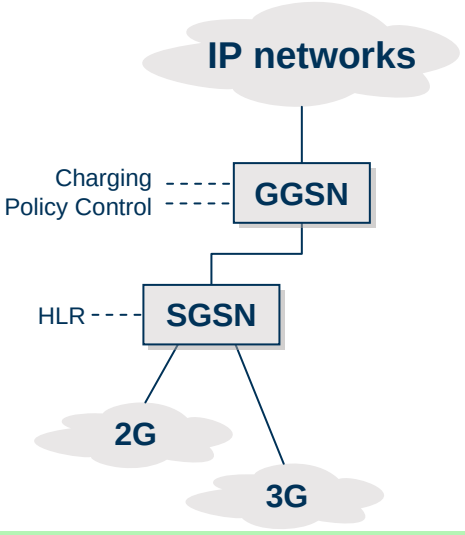
RNC for next decade radio networks

Core Industry Dynamics

Mobile IP Edge Evolution Steps

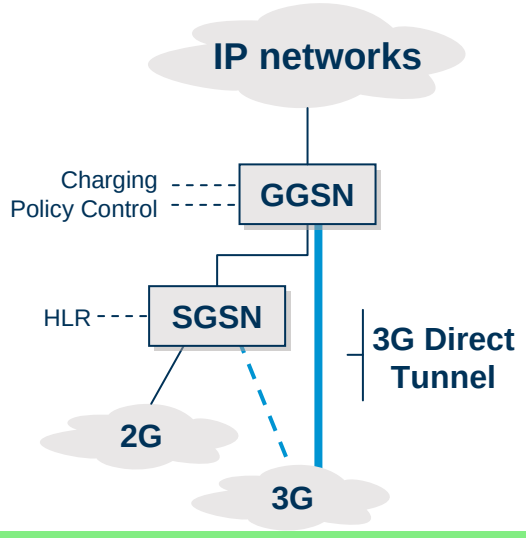
Core Capacity

2005-2006



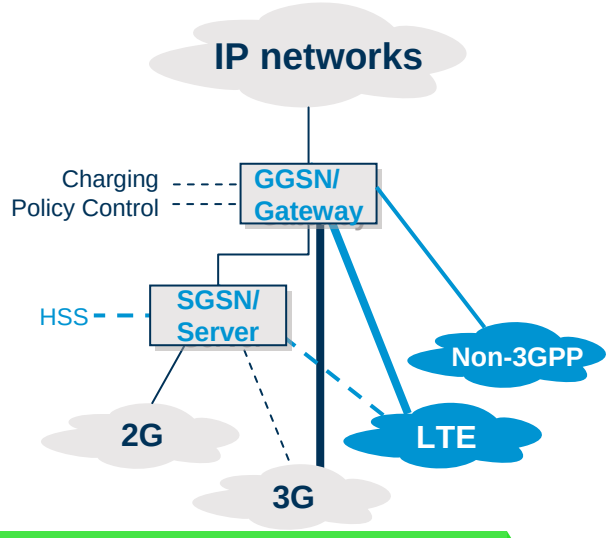
Mobile Broadband Introduction

2007-



Mobile Broadband Optimization

2009-



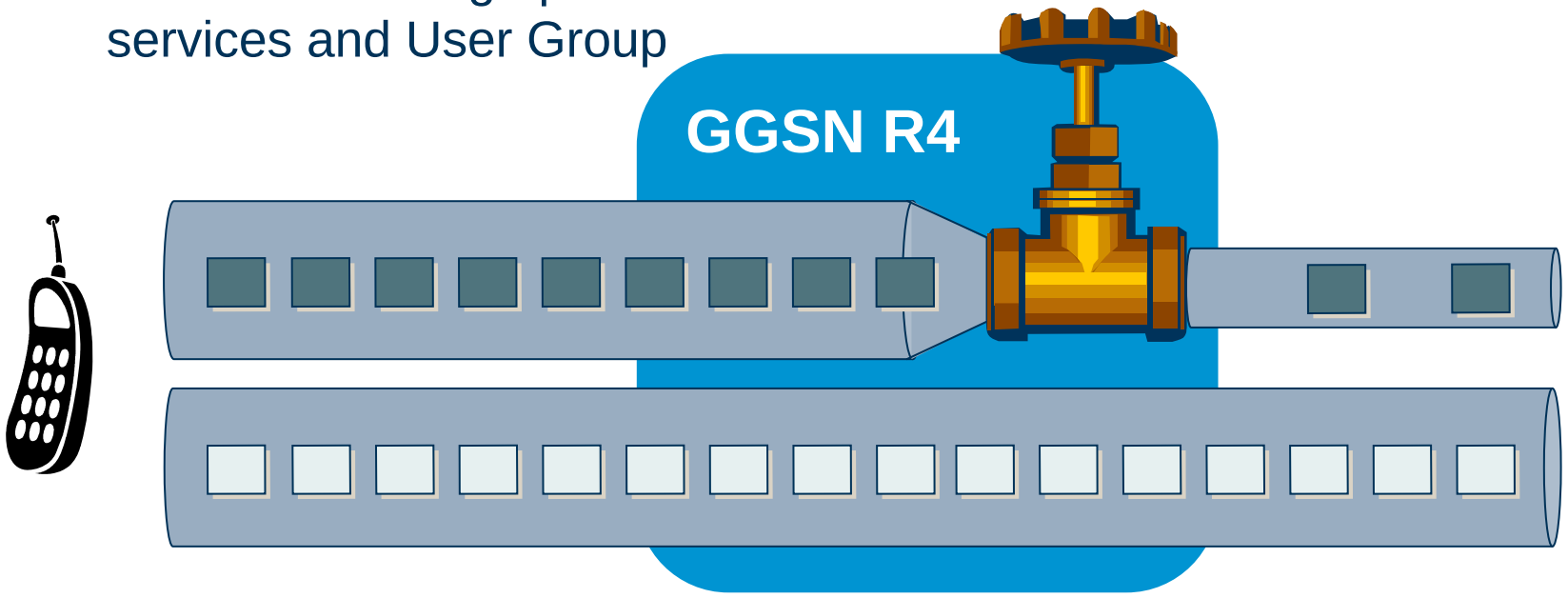
SW upgrade to SAE

Packet Core evolution for optimized HSPA operation

Service Aware Bandwidth Management

Core Functionality

- Uplink and downlink policing of individual flows
  - Police some flows to lower bandwidth than allowed for the PDP context
  - Controlled through policies in GGSN based on accessed services and User Group

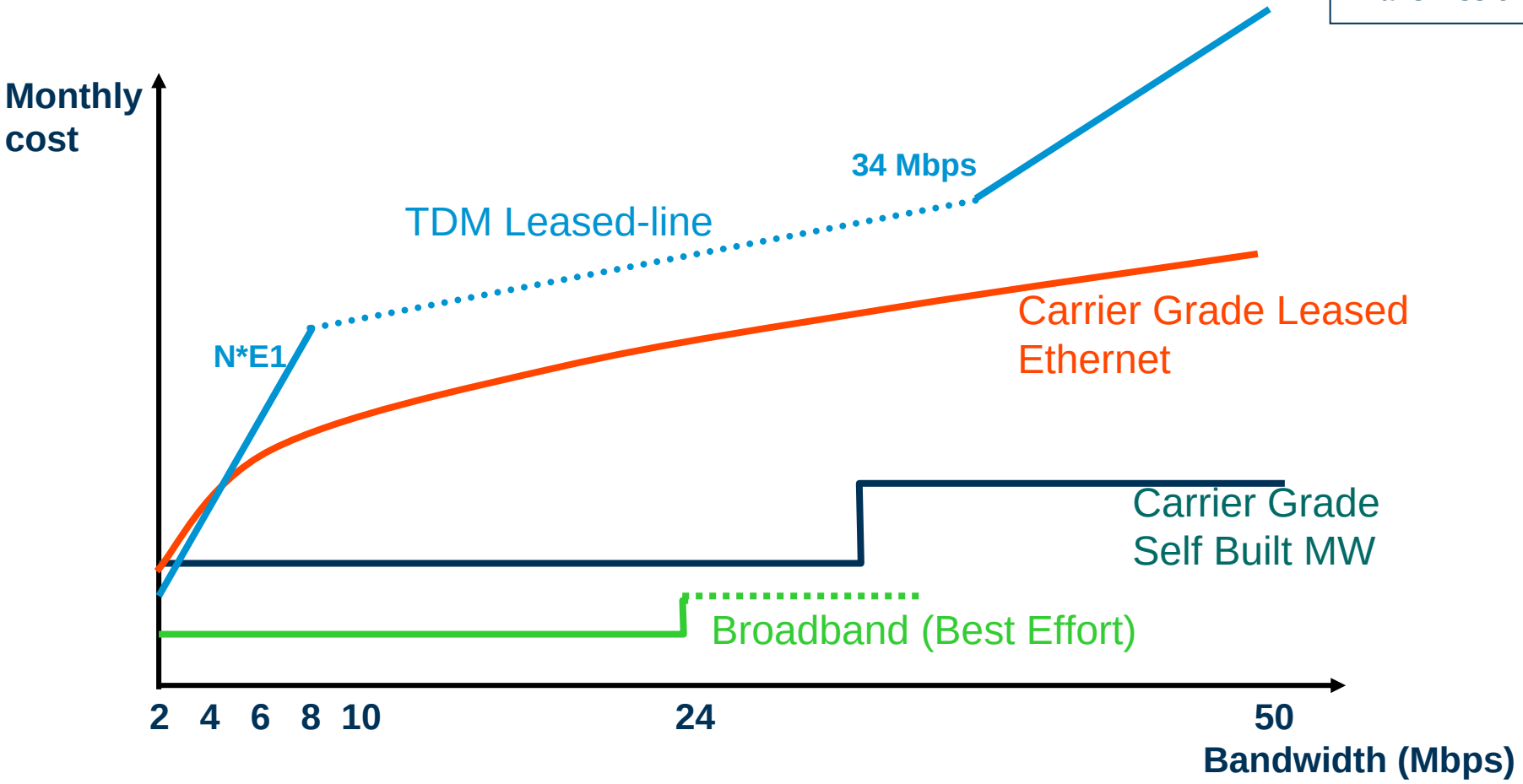


Service Aware Charging & Control

RAN backhaul cost comparison

How much is needed?

Transmission



New opportunities for cost efficient high capacity transport

RBS transport Features

Transmission

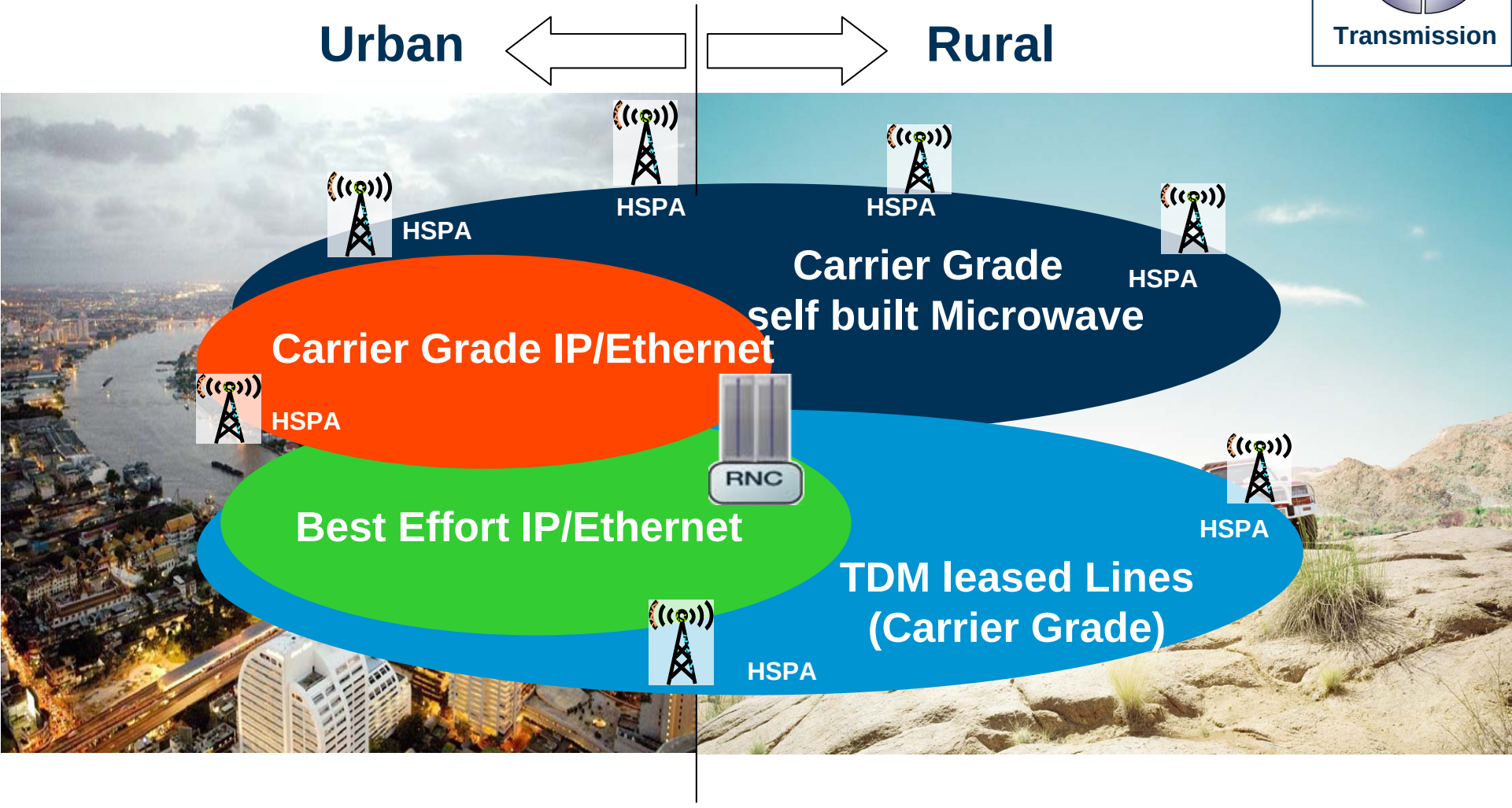
- **Dual transport: TDM (E1/T1)+ BE IP (xDSL)**
  - ATM/IP Dual stack (P6 FP)
  - HSPA data off load on low cost Best Effort xDSL IP/Ethernet
- **Ethernet**
  - Native 10/100/1000 Ethernet Board (P6)
  - Pseudo Wire Board (today)
- **ATM (E1) transport**
  - Efficient and unique built-in capability for NW aggregation
- **Strong support for cost effective MW NW**

3206

Functions for low cost high capacity RAN transport

Positioning of RAN backhaul options

Transmission



Ericsson supports all RAN transport solutions

How to grab the opportunity!

Entry strategies

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The revolution is happening now

mobilkom austria

A1

Examples:

1200MB/month Euro 49,00

3 X-Series

- Handsets Pre-loaded
- Applications from top-tier Internet players
- Easy access to web-based services

Optimus

kanguru

Examples:

2GB/month Euro 29,90

6GB/month Euro 39,90

cingular raising the bar

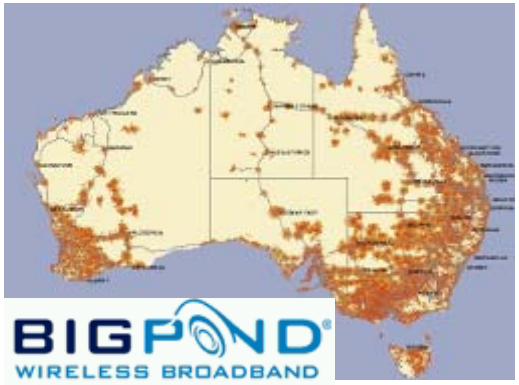
Cingular

First in the world

Examples:

Unlimited USD 59,99

Telstra BigPond



And many more…

3 Italia, ENTEL, Telefónica, swisscom, vodafone, MTN, tmn

Etc, etc …

Operator Experiences
Conclusions

- One Core and good transmission NW planning
- First mover advantage
- Simple price plans
- Attractive services – MM and data
- Data pricing in line with fixed
- Captures broadband market share from fixed BB competitor.

Conclusions

- HSPA is available and cost effective for GByte access
- HSPA is capable of mass market wireless broadband

- Ericsson is the prime supplier of HSPA
- Ericsson offers a first mover advantage

- Wireless and mobile broadband will change our lives

– Internet at your convenience!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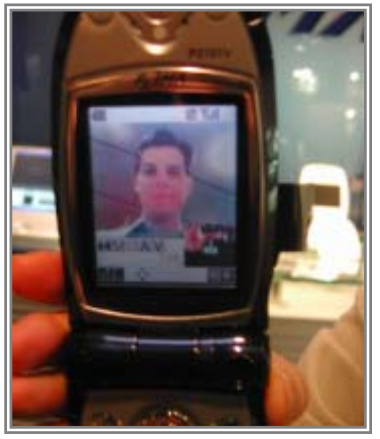
QuicLINK™

a 3G network in a box

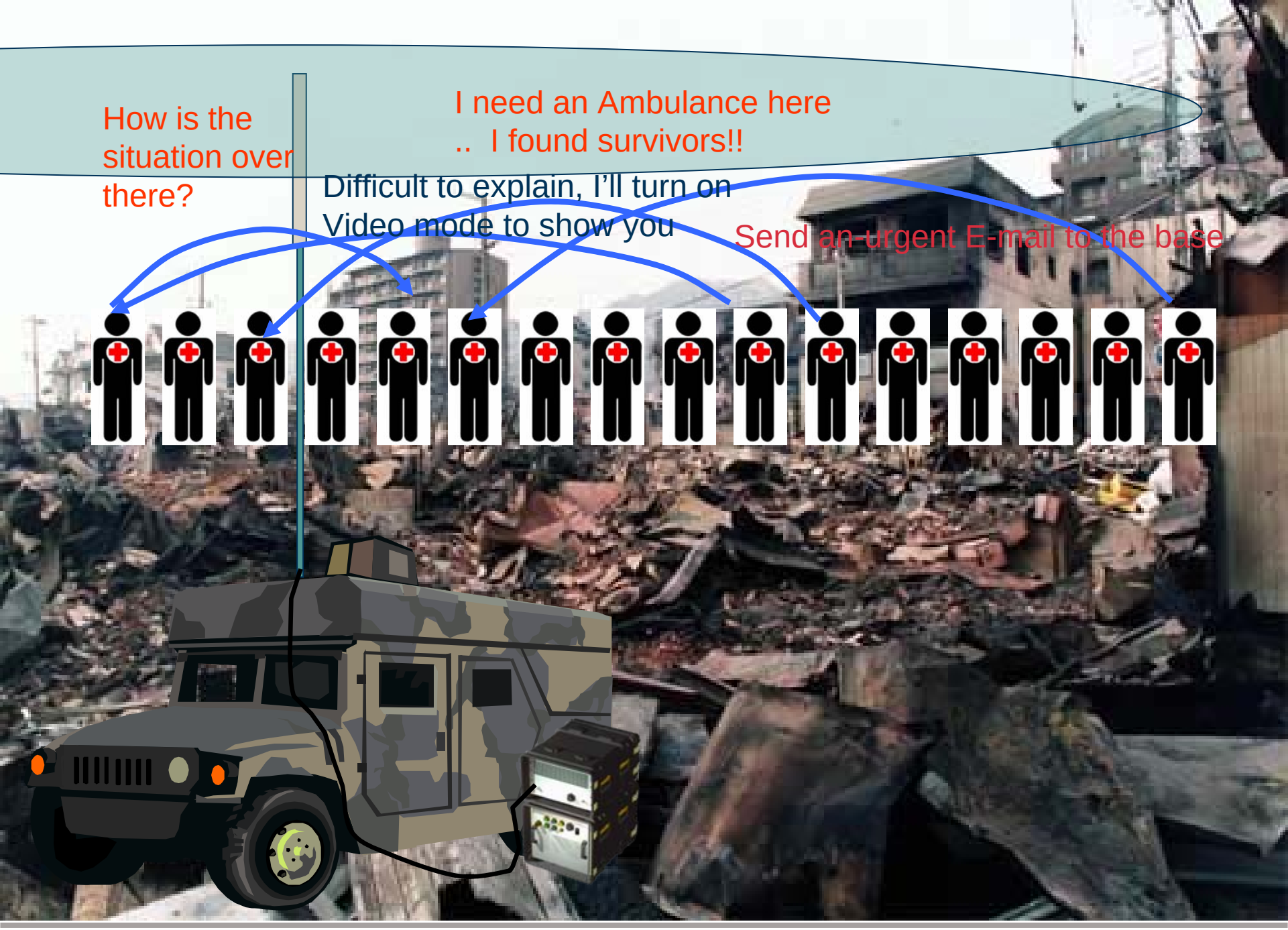
ERICSSON

QuicLINK is…

- Complete 3rd Generation (3G) WCDMA network in a box
  - Provides *wireless broadband* – high speed data, video and voice
  - Uses commercial RF spectrum & terminals
- Compact and lightweight
  - Rack-mount or Portable packages
- Easy to configure and operate
  - Time to configure: 30 minutes
  - Operational within 5-7 minutes
- Various modes of operation
  - Standalone - no other nodes required
  - PSTN and/or WAN connected (optional)
  - Community - build a community of QuicLINK systems to expand the coverage area (optional)



QuicLINK™ In places to assist Recovering Communications


How is the situation over there?
I need an Ambulance here .. I found survivors!!
Difficult to explain, I'll turn on Video mode to show you
Send an-urgent E-mail to the base

Wireless broadband communication

Data, video and voice

Maximum packet data rate:	R2.1: 384 kbps uplink / downlink *R2.1 / 1 planned: HSPA 7.2-14 Mbps peak*
Number of attached packet data users:	500
Number of simultaneous packet data connections (64 kbps):	7
Number of simultaneous voice calls (AM	70
Busy Hour Call Attempts:	2100
Subscriber database size :	50 000

384 kbps is:
- 7x faster 56 kbps GPRS
- 1.6x faster than 236 kbps EDGE

HSPA is up to:
- 250x faster than GPRS
- 60x faster than EDGE