Zapp Case Study

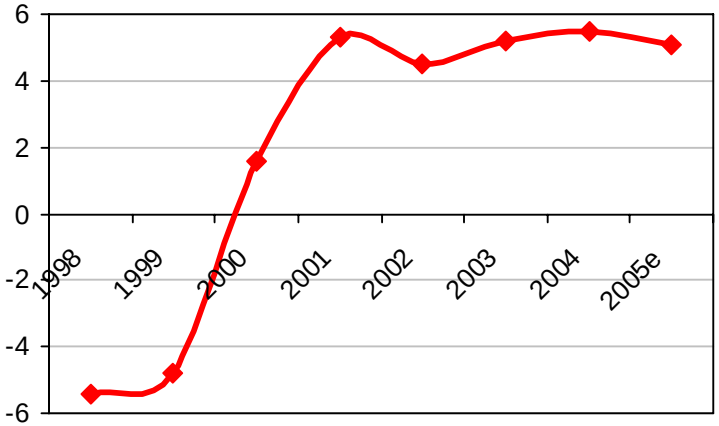
Romanian Market Outlook

Zapp
THE NEXT GENERATION NETWORK

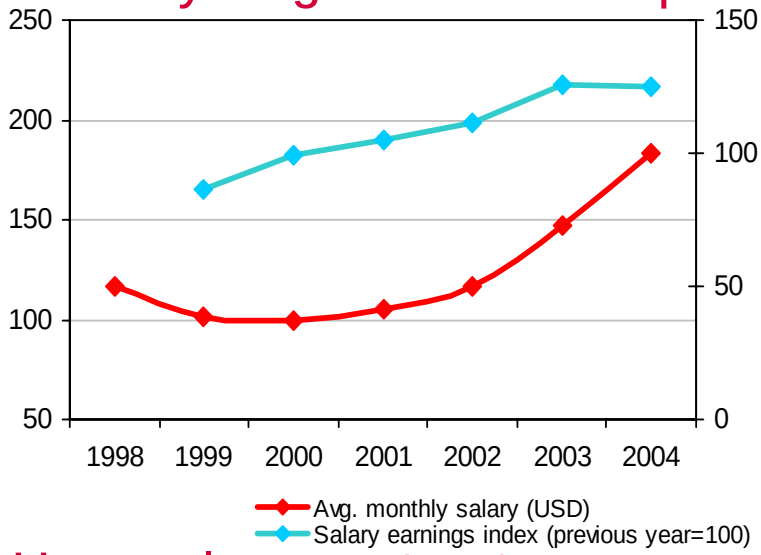
Romania: 22 mln pop / 240k km^2

Romania: Outlook

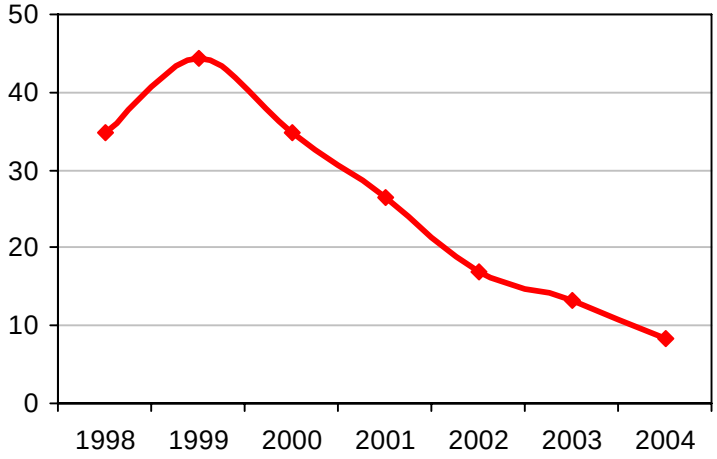
GDP



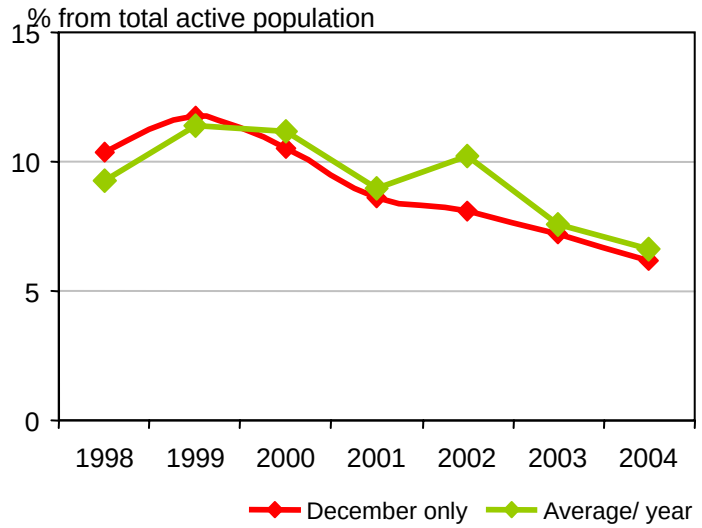
Monthly avg. income/ capita



Inflation Rate

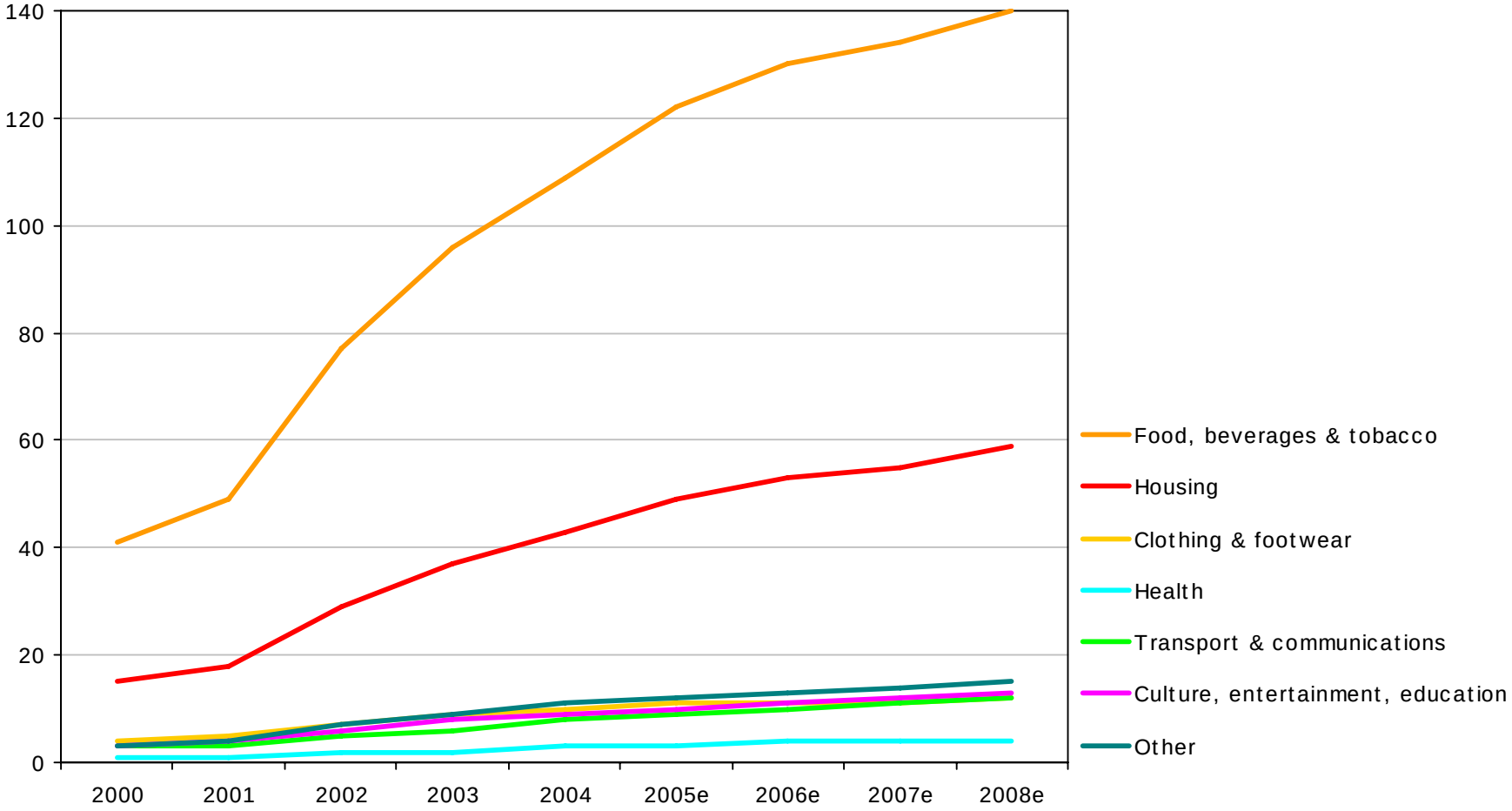


Unemployment rate



Zapp
THE NEXT GENERATION NETWORK

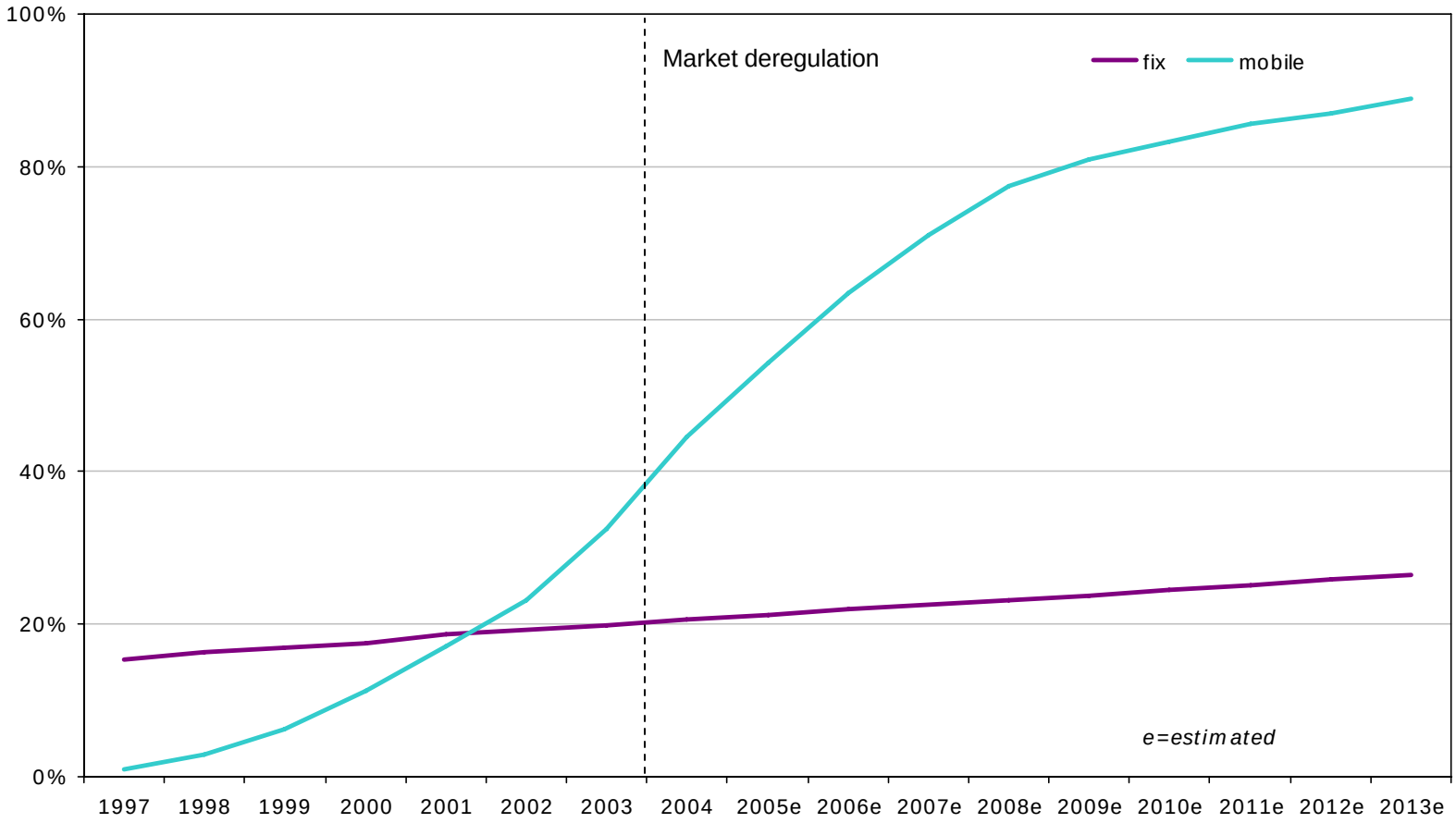
Romania: Personal Budget (USD/month)



THE NEXT GENERATION NETWORK

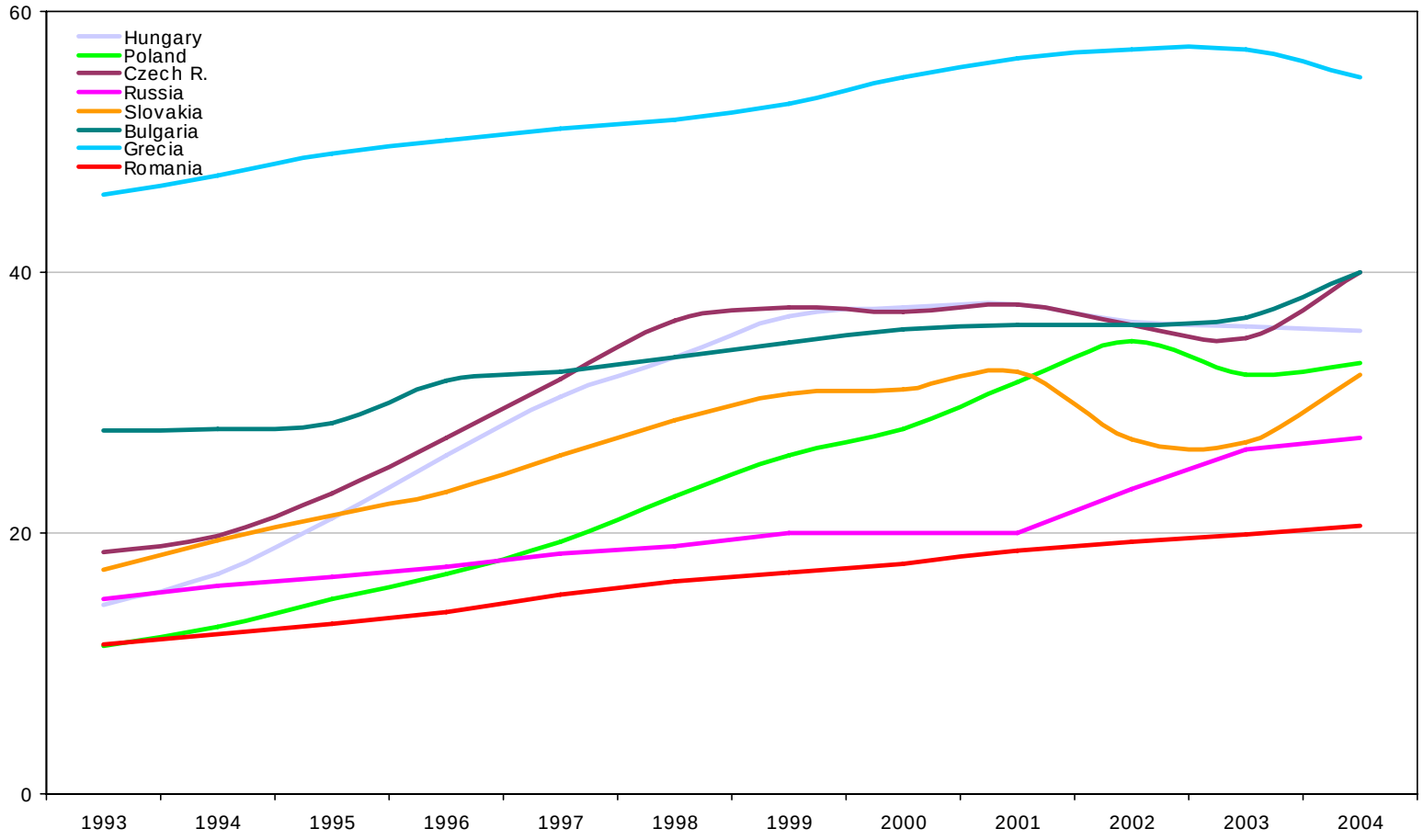
Source: UN Statistical Office; World Bank; Food and Agriculture Organisation (FAO); Euromonitor; World Health Organisation (WHO); national statistical offices; Pyramid Research; Economist Intelligence Unit estimates and forecasts.

Romania: Telecom Penetration



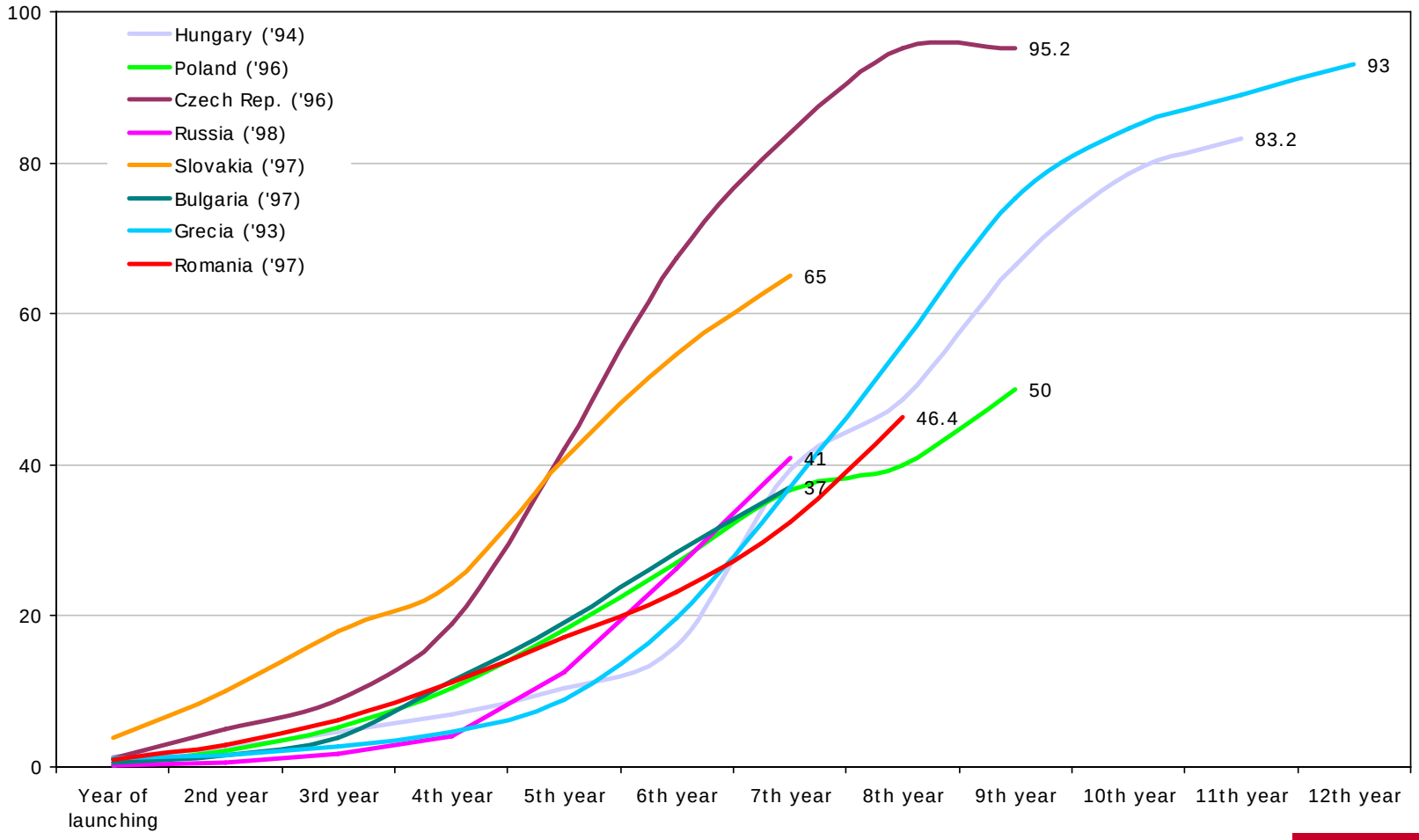
Zapp
THE NEXT GENERATION NETWORK

Romania/CEE: Fixed Penetration



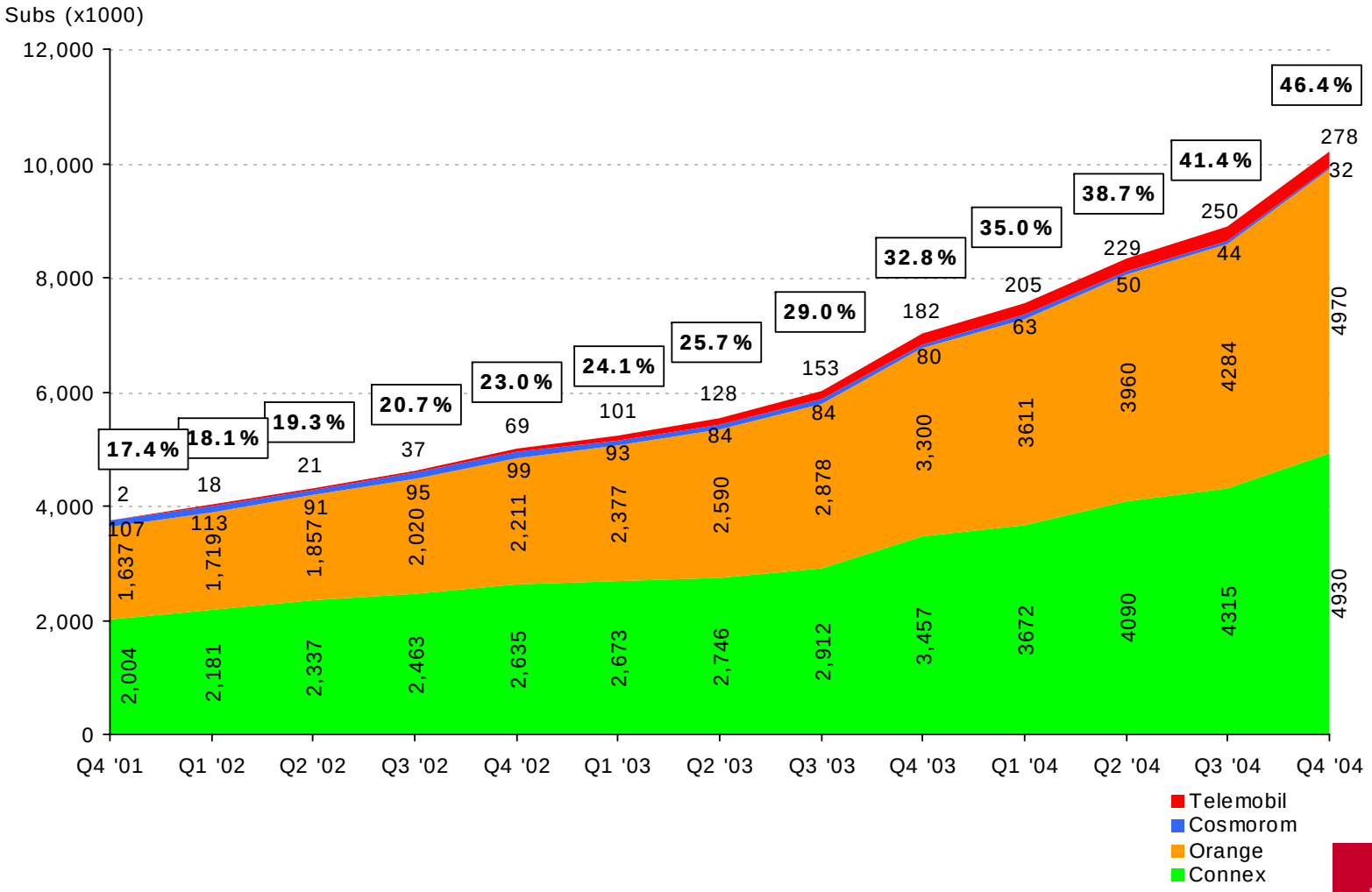
Zapp
THE NEXT GENERATION NETWORK

Romania/CEE: Mobile Penetration



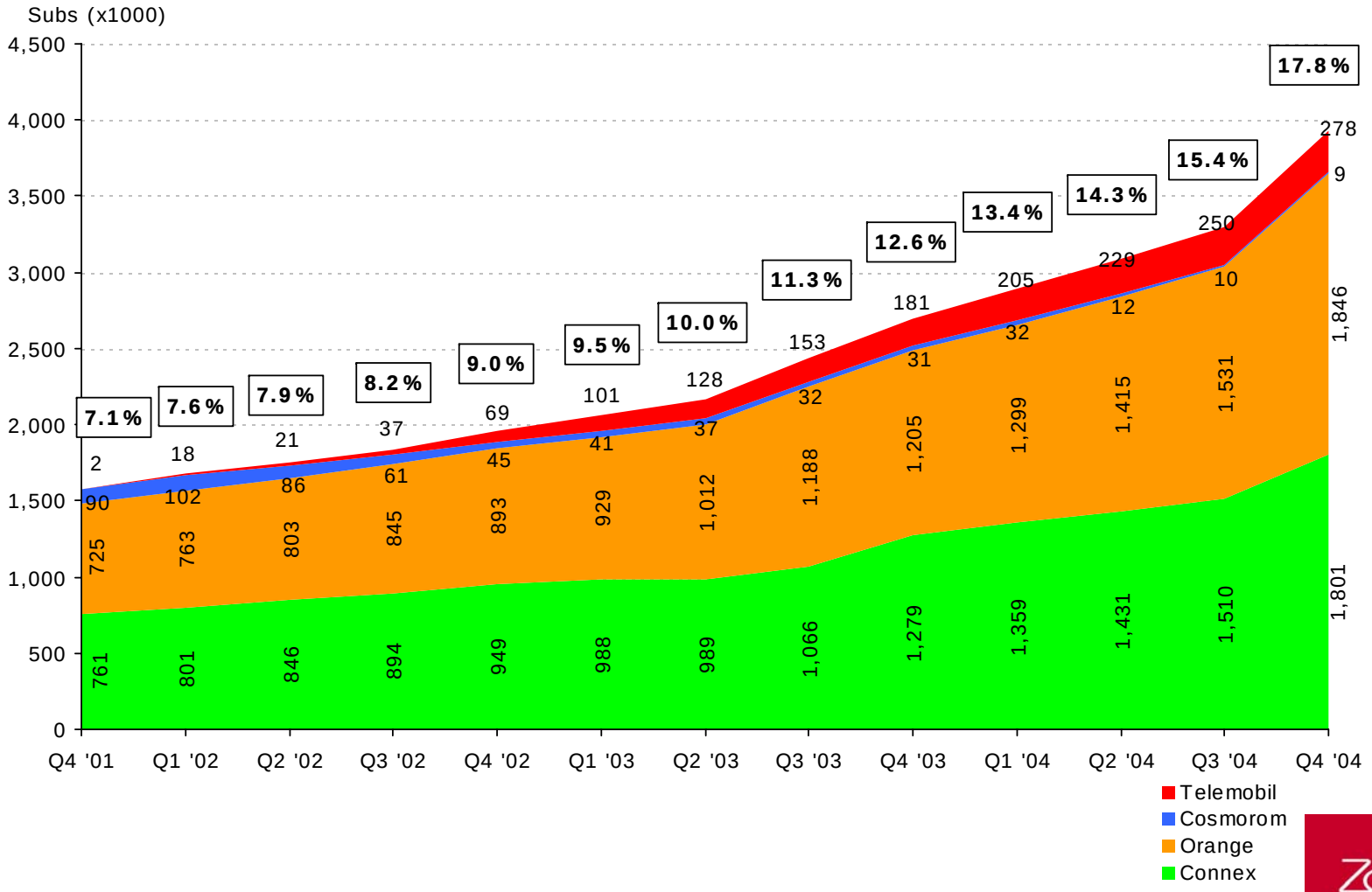
Zapp
THE NEXT GENERATION NETWORK

Romania: Overall Mobile Market



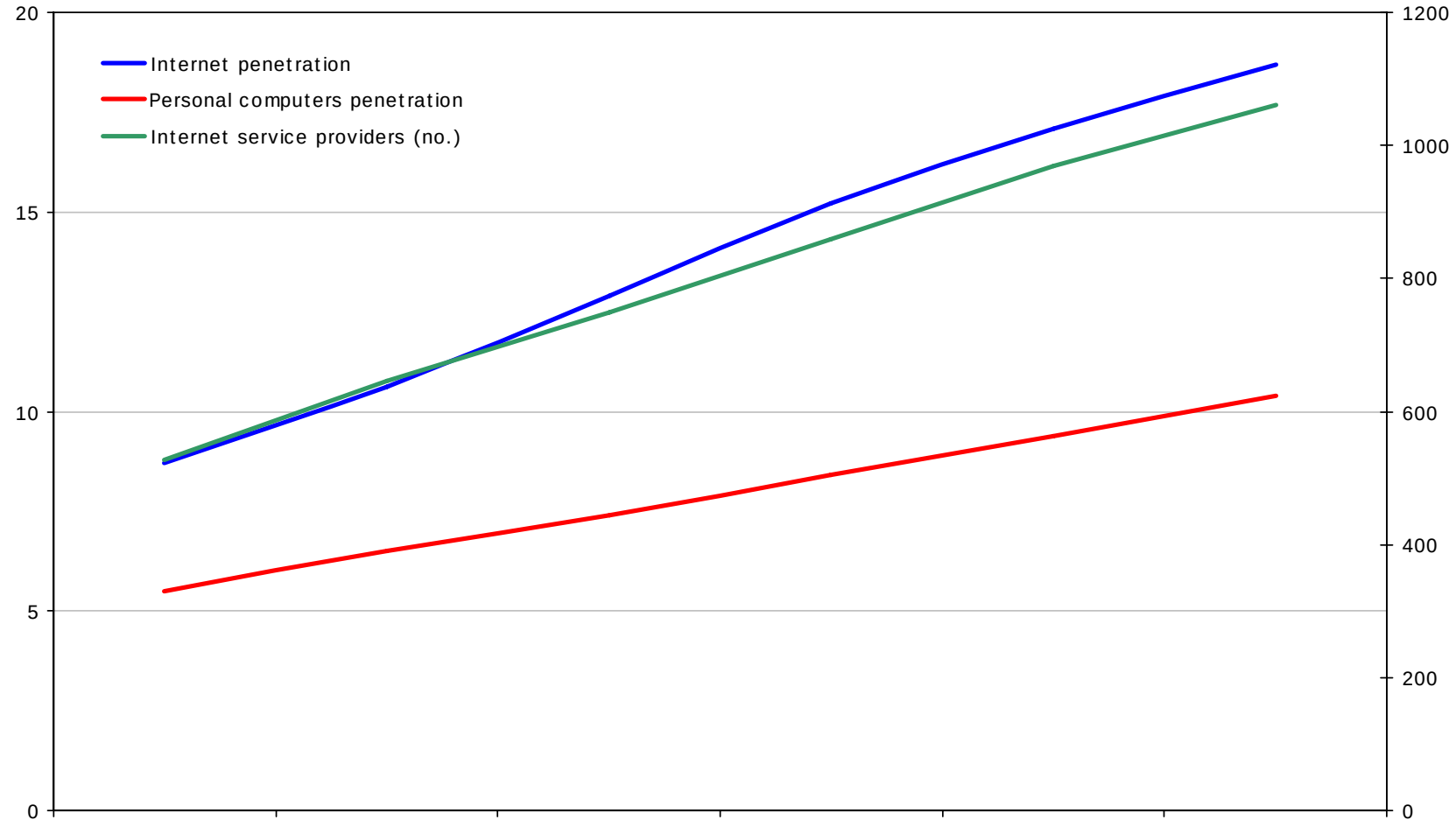
THE NEXT GENERATION NETWORK

Romania: Postpaid Mobile Market



THE NEXT GENERATION NETWORK

Romania: Internet Penetration



THE NEXT GENERATION NETWORK

Source: Romanian Authority for Communications

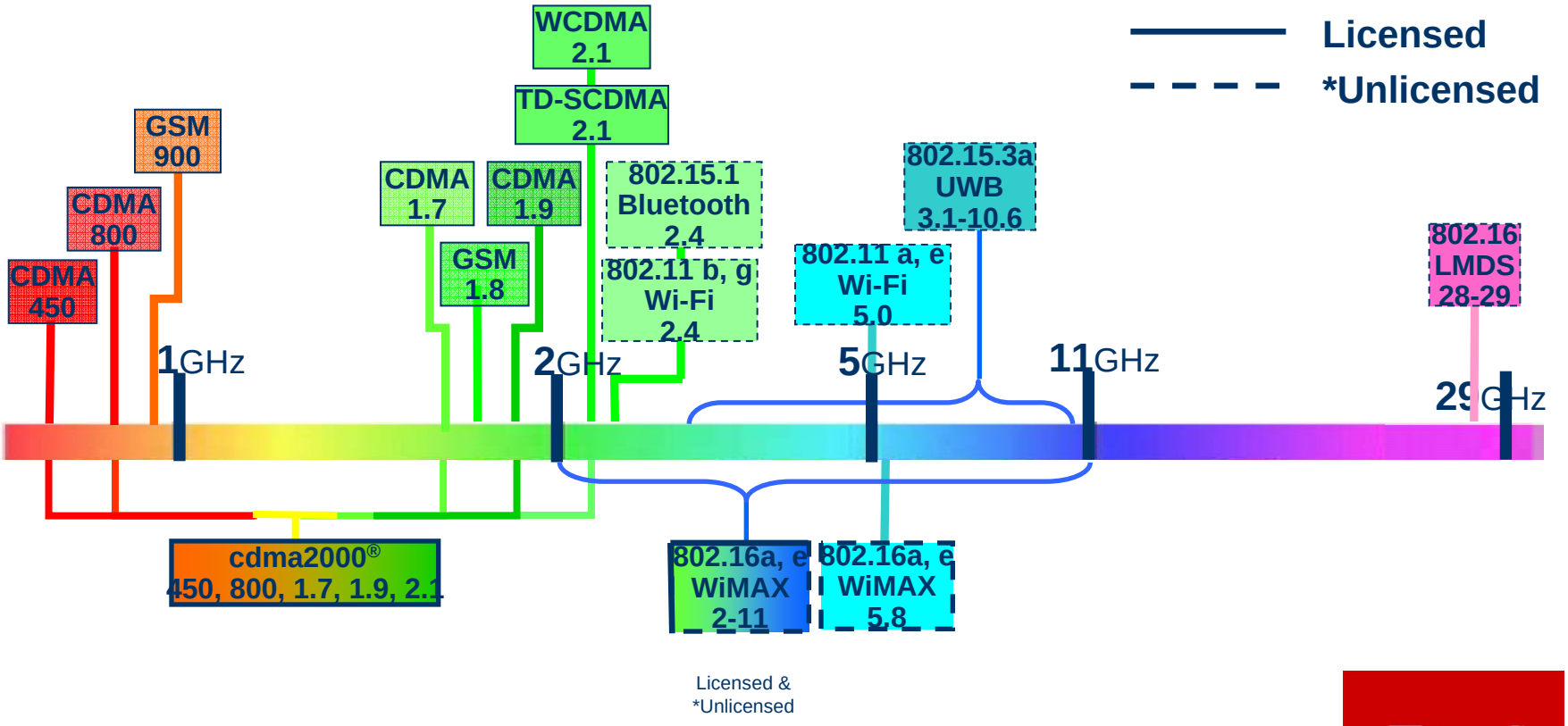
Zapp Case Study

Technology Choice

THE NEXT GENERATION NETWORK

Spectrum Allocations Criteria

Affordable coverage is key in wireless telecommunications
>> Lower frequencies are best positioned

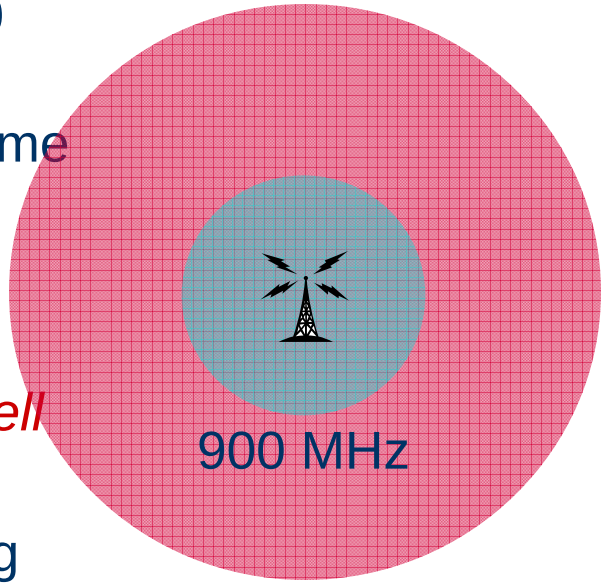


**** The use of unlicensed spectrum creates interference issues***

Zapp™
THE NEXT GENERATION NETWORK

Technical Considerations

- Based on the Free Space Loss calculations, 450 spectrum offers larger coverage footprints comparing to upper bands when using the same technology – *enabling less cell sites count in open and rural areas.*
- CDMA2000 RF capacity per MHz is higher than other technologies capacity – *enabling less cell sites count in urban areas*.
- CDMA link budget is driven by usage when using the same band – *enabling flexible data margins*
- CDMA packet based encapsulation for Voice & Data provides better system efficiency - *enabling cost effective transport and services (IP based).*
- Resulting network CAPEX and OPEX figures are the lowest in the industry – *enabling a competitive positioning for trading the service usage for buying desired market-share.*



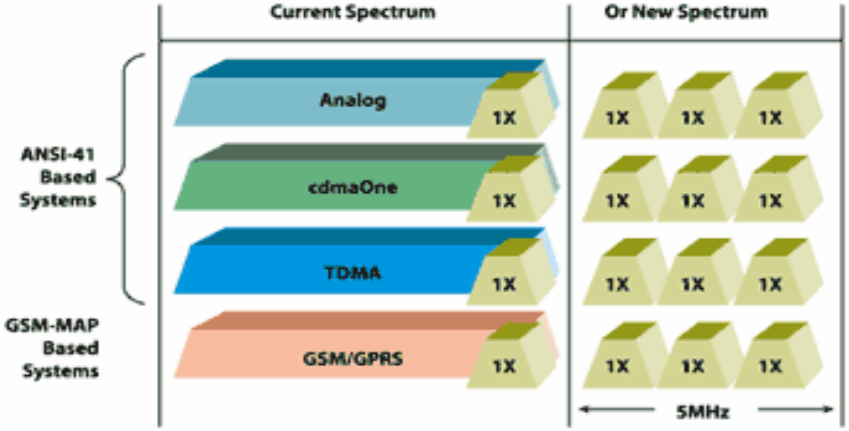
450 MHz

Zapp™
THE NEXT GENERATION NETWORK

Strategic considerations

These bands include:

- 450 MHz
- 700 MHz
- 800 MHz
- 900 MHz
- 1700 MHz
- 1800 MHz
- 1900 MHz
- 2100 MHz

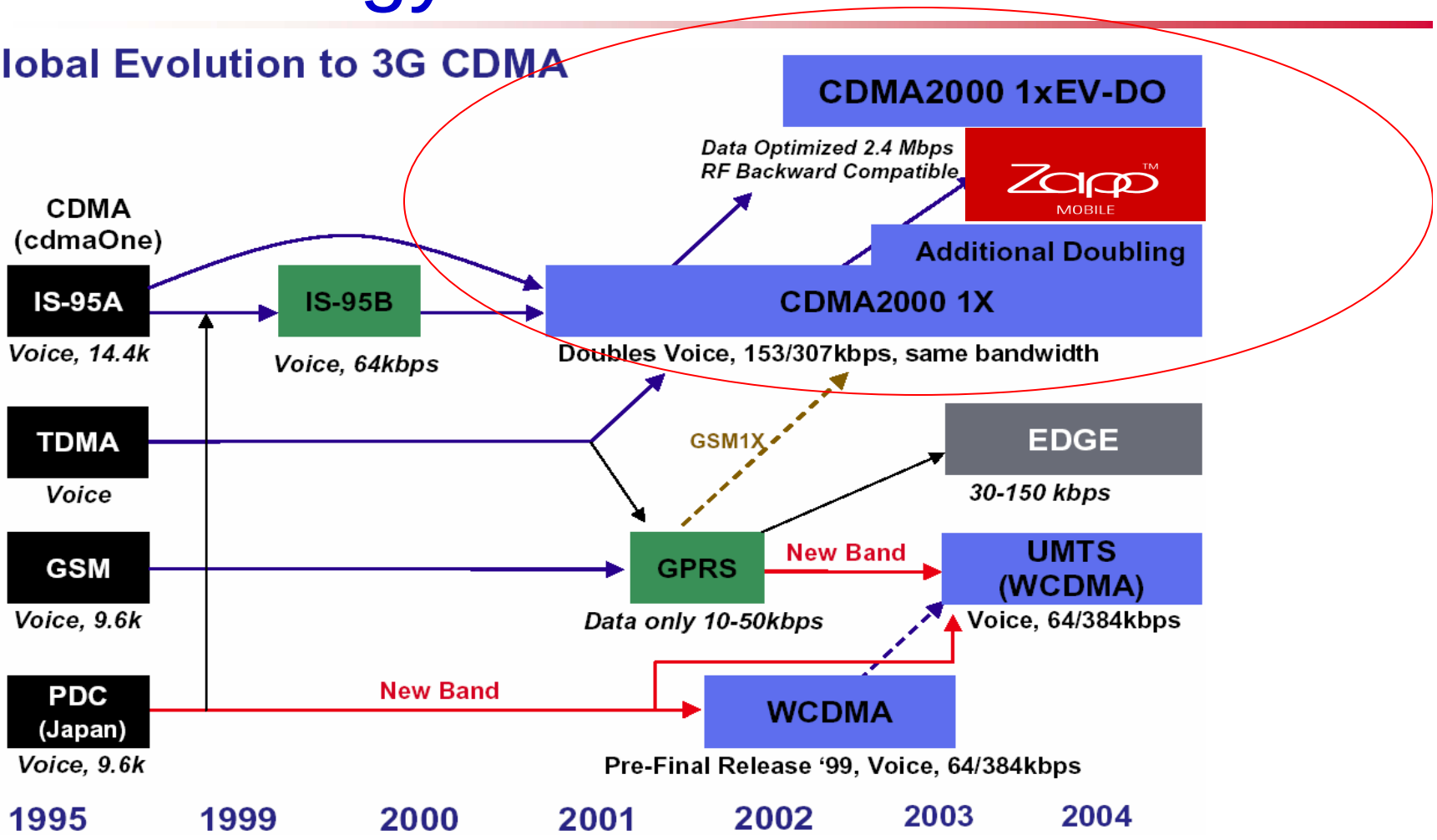


- CDMA2000 can (inter) operate across **multiple bands**
- CDMA needs only **1.8 MHz** of spectrum for the first carrier (1.25 MHz plus the guard bands) while 450 MHZ spectrum can host **up to four CDMA carriers**
- Based on its cost efficiency, CDMA2000/450 can cover and serve all the **NICHE markets** left underserved by other technologies due to their capacity and/or coverage limitations (on both mobile & fixed / voice & data markets).
- Due to the poor fixed infrastructure available in Romania, CDMA2000/450 can provide the most cost effective solution for the "**Universal Service**" initiative.
- **Broadband data** capability allows CDMA2000/450 to substitute equivalent fixed data solutions (ISDN, CATV, xDSL etc) where these are unavailable.
- Reliable always-on data capability provides an excellent platform for the next generation applications

Zapp™
THE NEXT GENERATION NETWORK

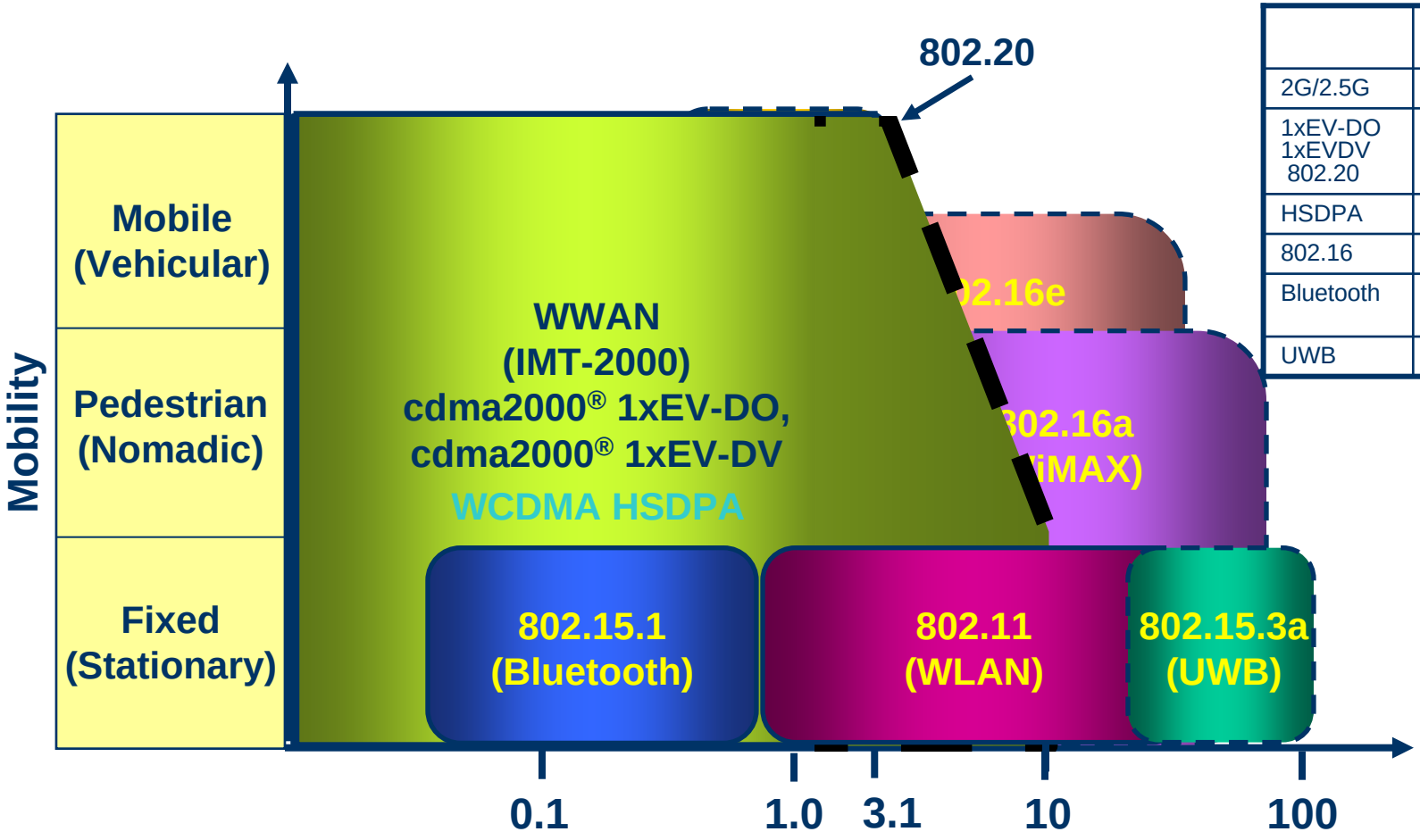
Technology Choices

Global Evolution to 3G CDMA



Zapp™
THE NEXT GENERATION NETWORK

Wireless Data Standards



Bandwidth Assumptions

	Bandwidth (MHz)
2G/2.5G	1.25
1xEV-DO 1xEVDV 802.20	1.25
HSDPA	5
802.16	20
Bluetooth	79 x 1 MHz
UWB	> 100

Source: International Telecommunications Union and WiMAX Forum

Zapp™
THE NEXT GENERATION NETWORK

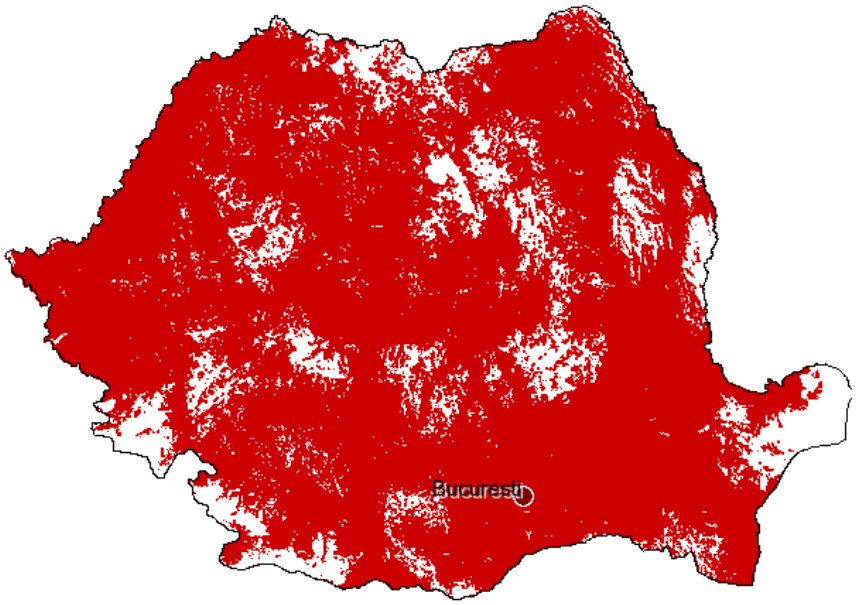
Zapp Case Study

Segmentation & Positioning

THE NEXT GENERATION NETWORK

Zapp: Overview

- **Coverage**
  - Nationwide coverage of Romania
  - 90% pop, 78% geo
- **Market Share**
  - 310,000 Subscribers
  - 250k voice / 50k data 1x / 10k data DO
  - 10% Postpaid Market Share
  - Price & HSPD as major differentiators
- **Network**
  - CDMA2000 – Band Class5/A
  - IS-41 (ANSI-41)
  - cdma2000 1x & EV-DO, Brew, PTT
  - SMS M/O, M/T
  - Wireless Internet @153.6kbps & 2.4Mbps
  - Total 580 BTS and 5 MSC
  - Outbound roaming to GSM based on plastic roaming with call-forward/call-back for the best price/convenience



Zapp®
THE NEXT GENERATION NETWORK

Zapp: Segmentation / Opportunities

Market Segments	**Count**	**Expect**	**Niches for new operators**
Corporate >200 employees	3.100	Extremely Cheap offers	***Mobile Data - postpaid*** (Competition on Voice services being obstructed by the interconnect fees)
Medium size companies 50-200 employees	7.700	CUG offers Cheaper prices than Residential	***Voice & Data - postpaid*** *(&prepaid)*
Small size companies 6-50 employees	52.400		
Home offices < 6 employees	720.000		
Residential	11.000.000	Prepaid offers	***Fixed Broadband Data - postpaid*** (Huge growth potential for Voice & Data prepaid services)

Zapp®
THE NEXT GENERATION NETWORK

Zapp: Voice Business Strategy

- Main focus on SME/SOHO segment with “no frills” strategy
- Product based on generous on-net traffic bundles to ease CUG communications and “snow-ball” growing strategy driven by the low cost per capacity and coverage
- Distribution and advertising strategy tailored for addressed segment

Profitability significantly higher than for residential (over $30 ARPU)

Zapp®
THE NEXT GENERATION NETWORK

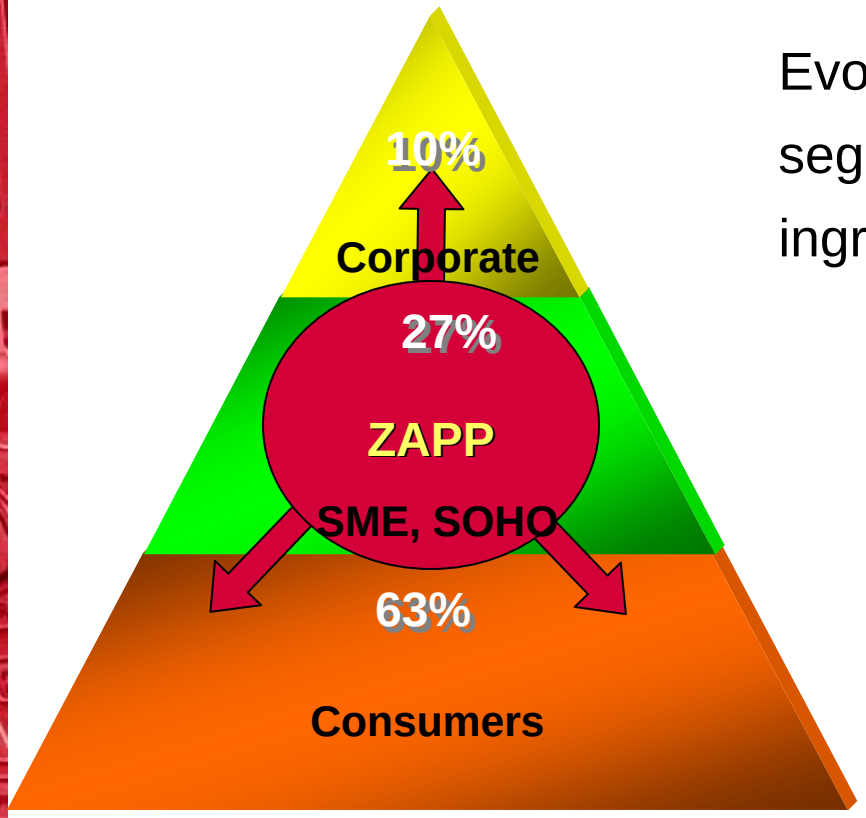
Zapp: Data Business Strategy

- Romania is characterized by virtually nonexistent mobile data market and very poor fixed internet access infrastructure
- Zapp shifted focus from mobile to fixed/portable data market and moving from data volumes charging towards connection time charging
- Positioning WLAN as “data repeater” technology for CDMA

Voice + Dial-up and Data Broadband products revenues over $40 ARPU/GM

Zapp®
THE NEXT GENERATION NETWORK

Zapp: Evolution Enablers



Zapp mainly focus on business users.

Evolution in core and adjacent segments depends on the following ingredients/timelines:

- Nation-wide coverage / 2005
- Handsets price decrease / 2006
- Critical mass achievement / 2005
- Differentiating services / permanent
- Interconnect fees decrease / 2006
- Prepaid / 2006
- Roaming / 2007

Zapp®
THE NEXT GENERATION NETWORK

Zapp Case Study

Evolution Milestones

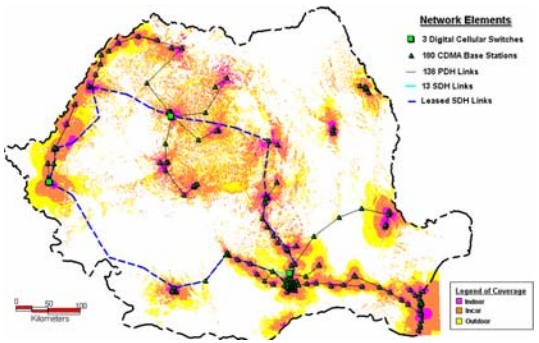
THE NEXT GENERATION NETWORK

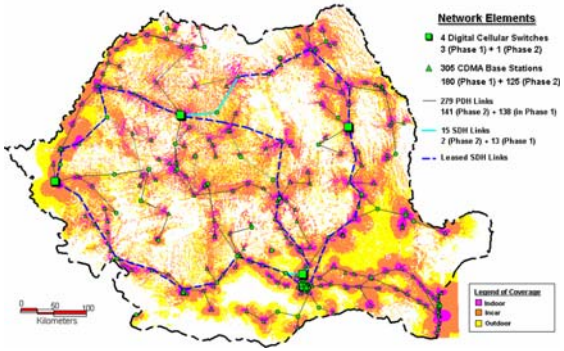
Zapp: Milestones

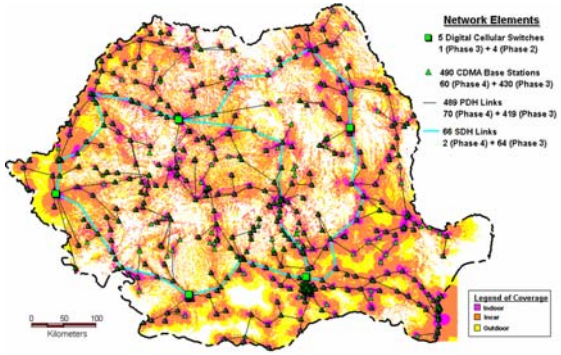
- world's first cdma2000 operator in 450 MHz band (December 2001) under Zapp Mobile brand name.
- first European operator to launch BREW-based services (April 2004) under Zapp Me brand name.
- among early adopters of the cdma2000 1x EV-DO technology (October 2004) under Zapp Internet Express brand name.
- first cdma450 operator to launch VoIP/PTT services (2005)

Zapp®
THE NEXT GENERATION NETWORK

Zapp: Network Evolution







PHASE I

- *Pop Coverage: 40%*
- *Geo Coverage: 27%*
- *60% Urban Pop (34 cities)*
- *2000 km roads*

2001/2002

PHASE II

- *Pop Coverage: 60%*
- *Geo Coverage: 55%*
- *80% Urban Pop (135 cities)*
- *4000 km roads*

2002/2003

PHASE III & IV
(including EV-DO)

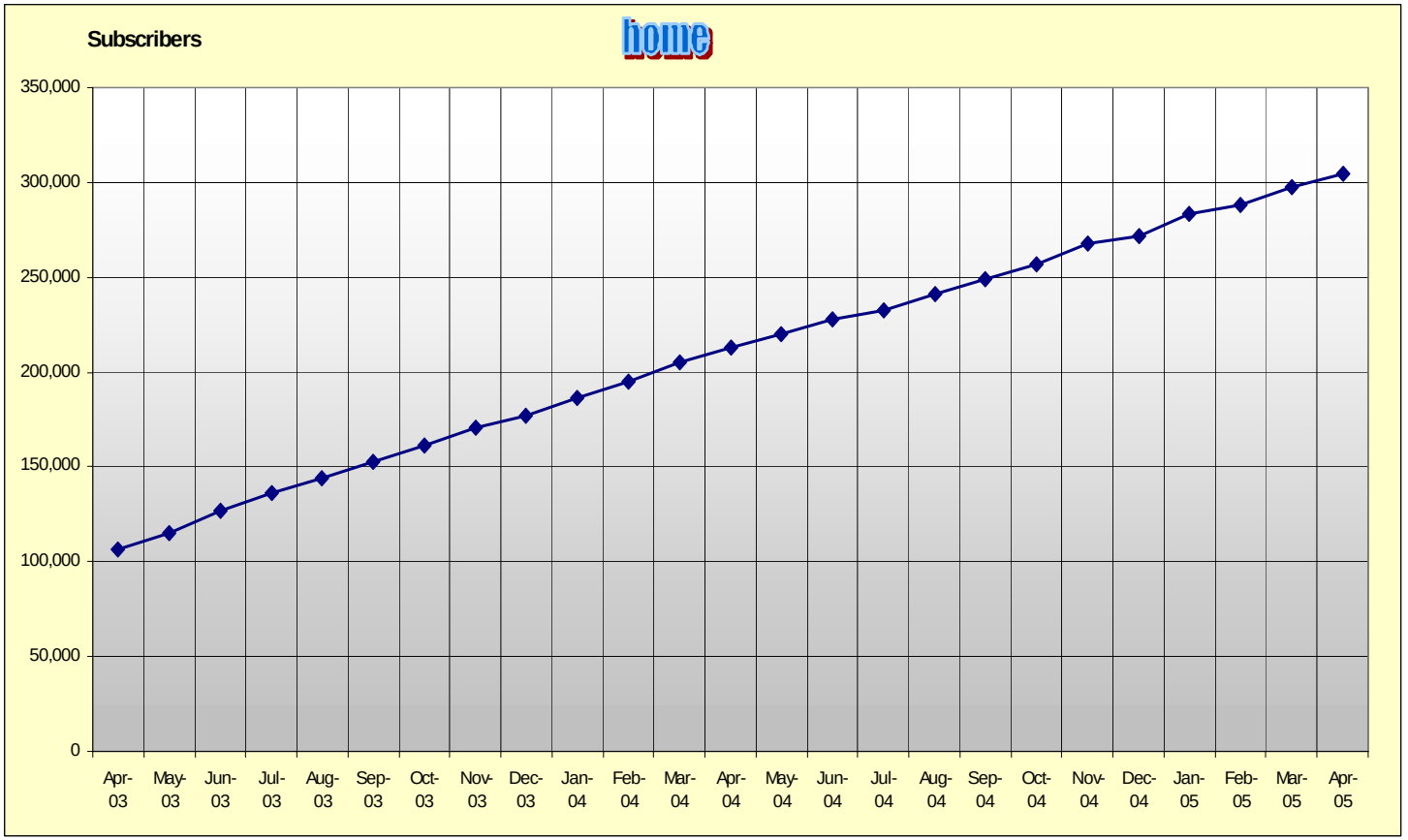
- *Pop Coverage: 90%*
- *Geo Coverage: 78%*
- *98% Urban Pop (250 cities)*
- *6300 km roads*

2004/2005

Zapp: Terminals Evolution

	Handsets	Special
High - end	 	
Medium - end		
Low-end	  	

Zapp: Subscribers



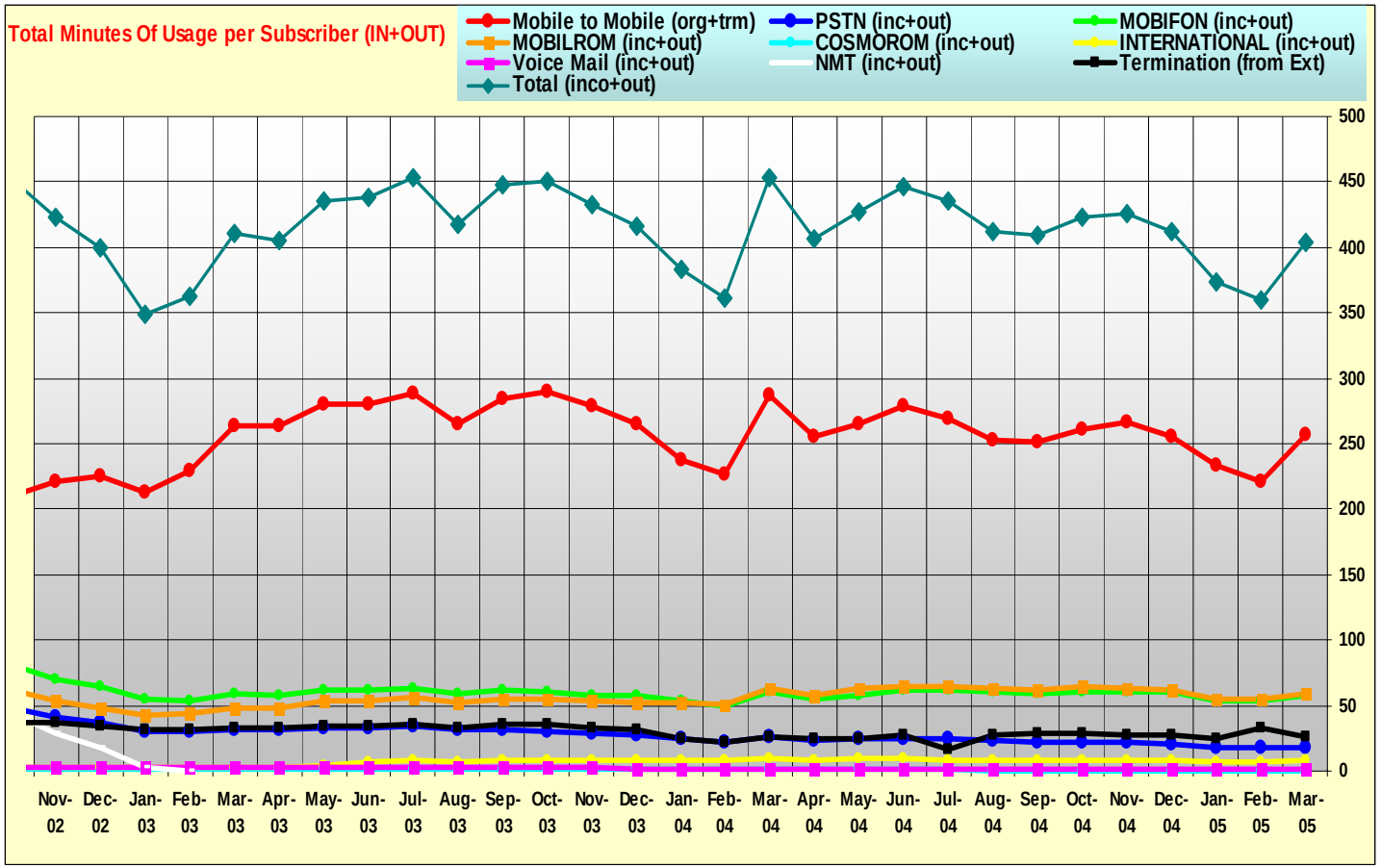
THE NEXT GENERATION NETWORK

Zapp Case Study

Usage & Performance Statistics

Zapp
THE NEXT GENERATION NETWORK

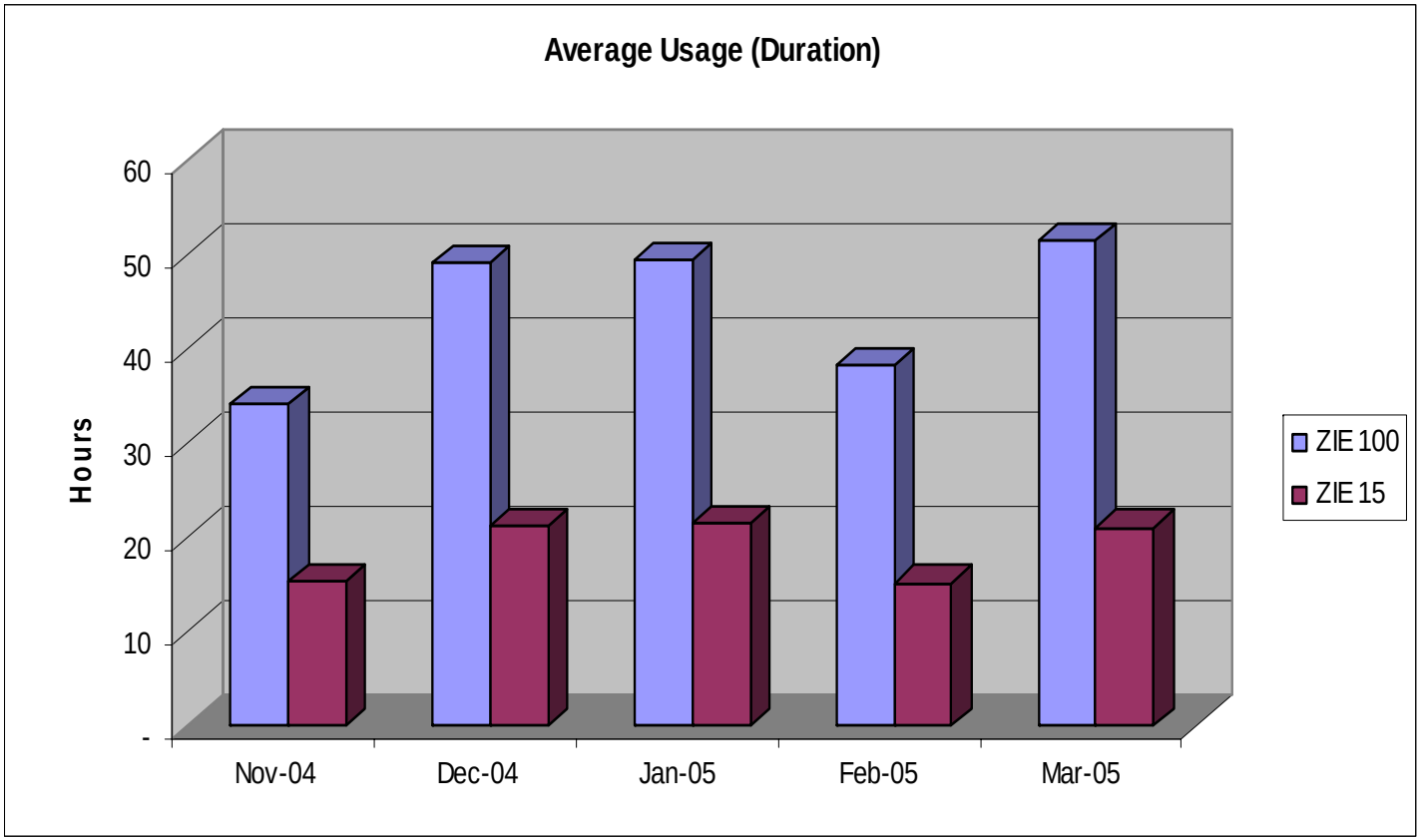
Voice: 1x Time Usage (MoU/sub)



- ***CSR > 98.5% (MO & MT)***
- ***HOSR > 99% (SHO & HHO)***
- ***DCR < 0.6% (voice)***
- ***RFER < 0.8% (voice)***

Zapp®
THE NEXT GENERATION NETWORK

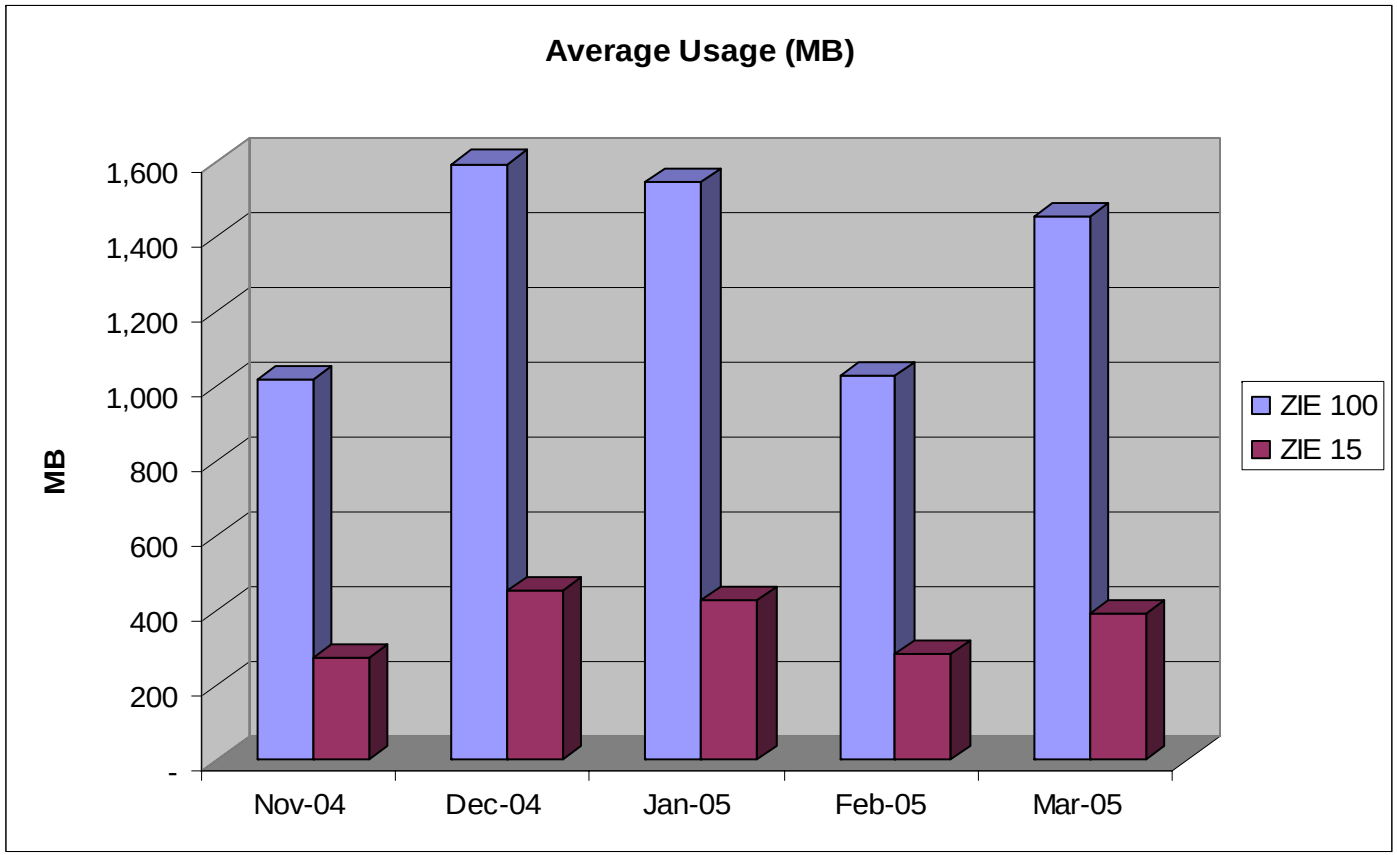
HDR: ZIE Time Usage (hours/sub)



- ***ZIE 15 costs $19 and bundles 15 hours of HDR and 1xRTT data service usage***
- ***ZIE 100 costs $39 and bundles 100 hours of HDR and 1xRTT data service usage***

Zapp®
THE NEXT GENERATION NETWORK

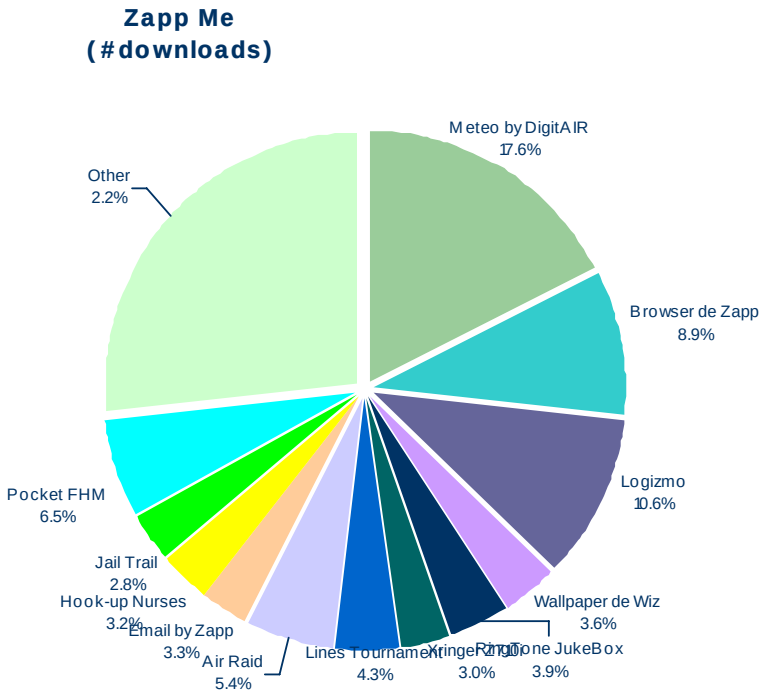
HDR: ZIE Volume Usage (MB/sub)

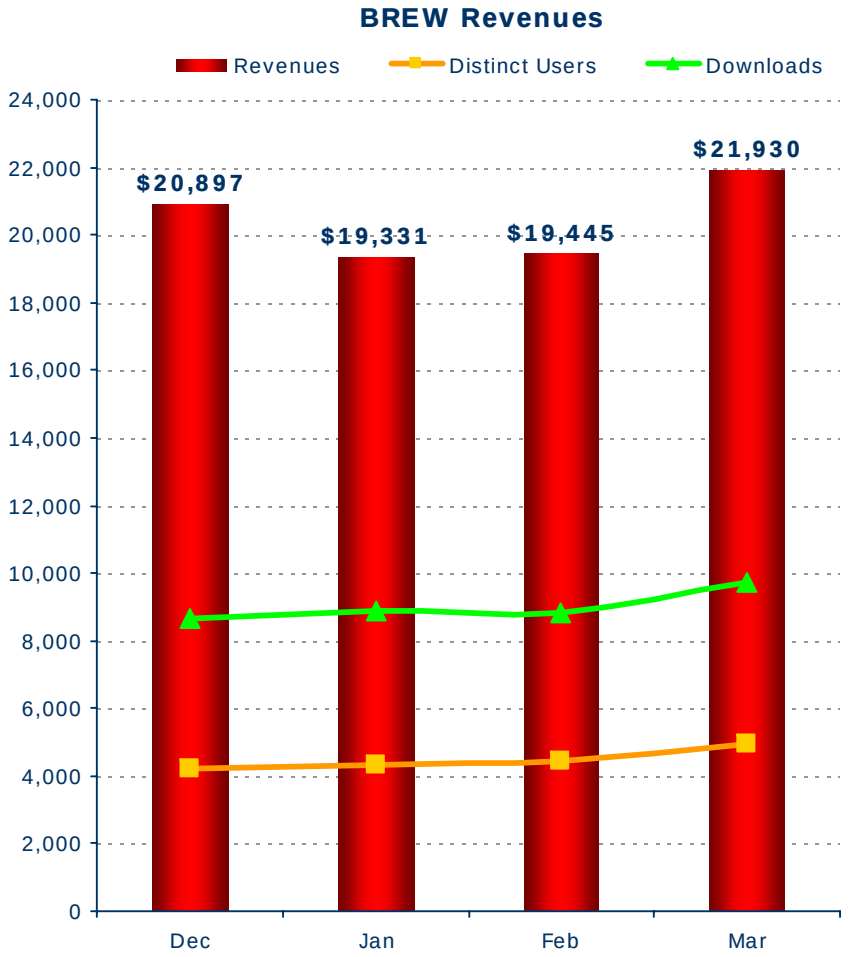


- ***More than 99% of FL packets served @ 300 kbps or higher***
- ***Throughput per active user is 80 kbps as of 5 min average aggregate***

Zapp®
THE NEXT GENERATION NETWORK

BREW: Zapp Me Download Usage





- March 2005 BREW Revenues: $21,930 ($ 4.5 ARPU)
- A total of 9,740 downloads performed by 3,355 Z710i, 641 Z510i and 939 Z720i distinct users in March 2005

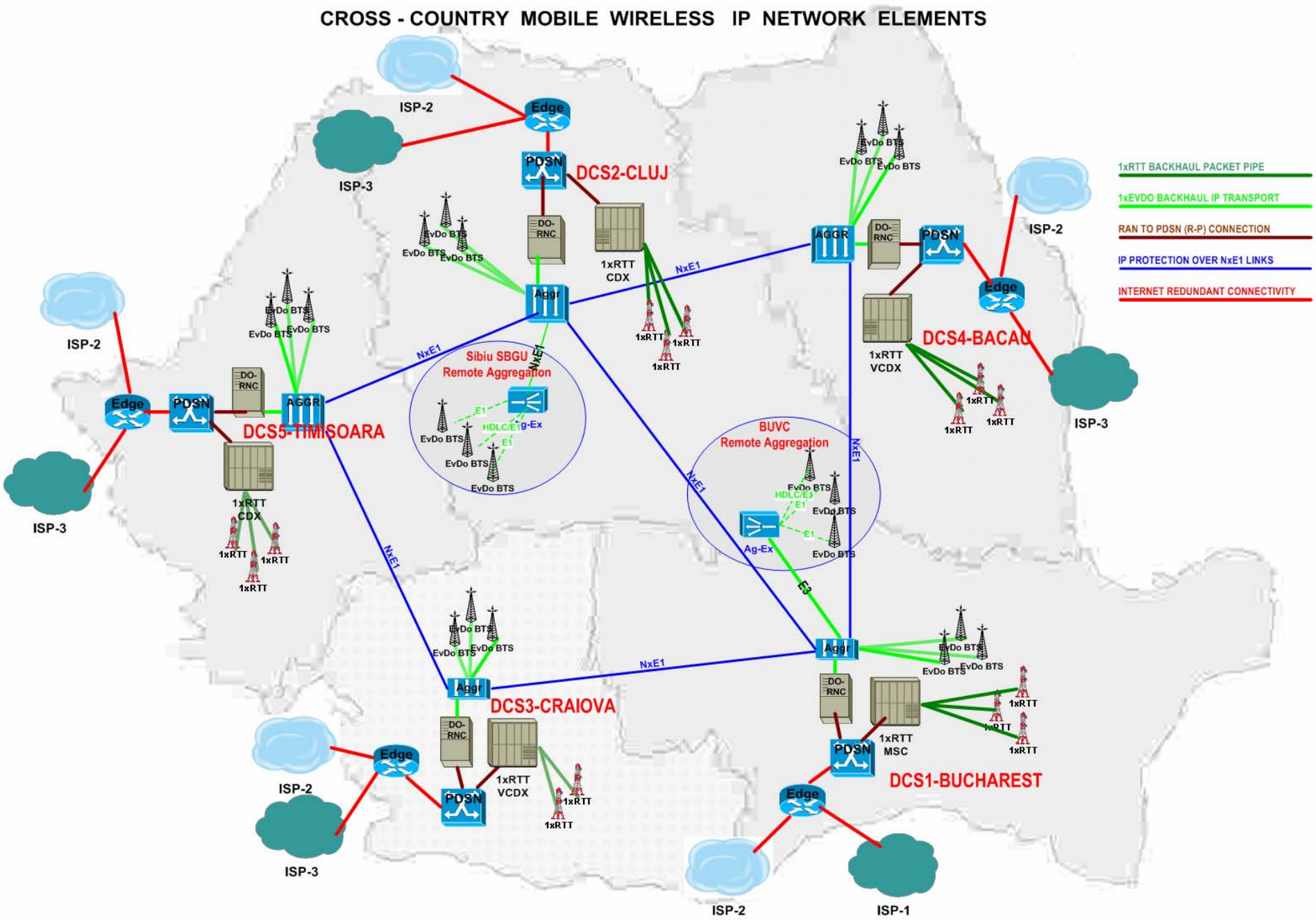
**) Source: Data Mining and Billing Departments*
***) Includes Z510i FREE Access Nov promotion*

Zapp™
THE NEXT GENERATION NETWORK

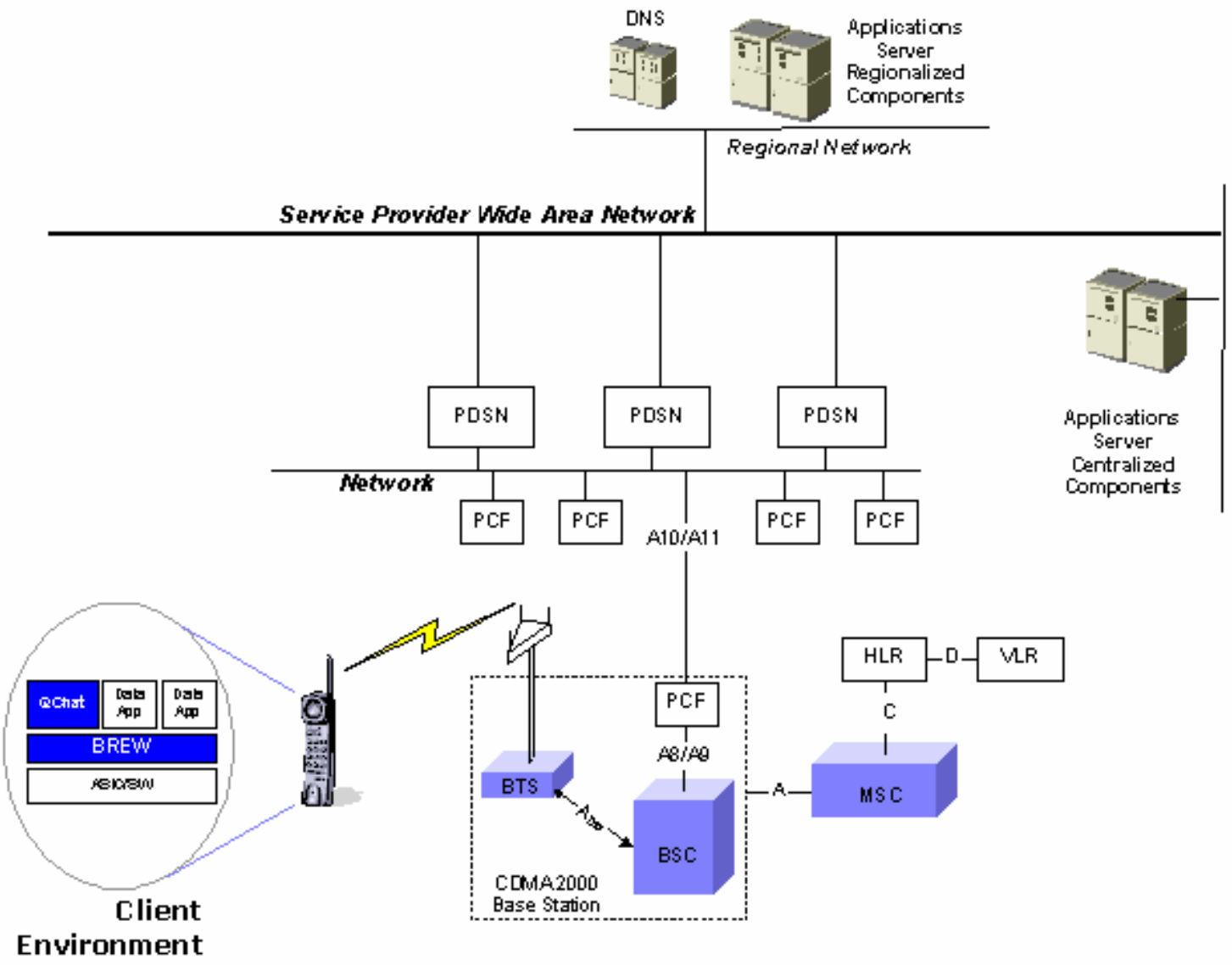
Zapp Case Study

Next Product Solutions

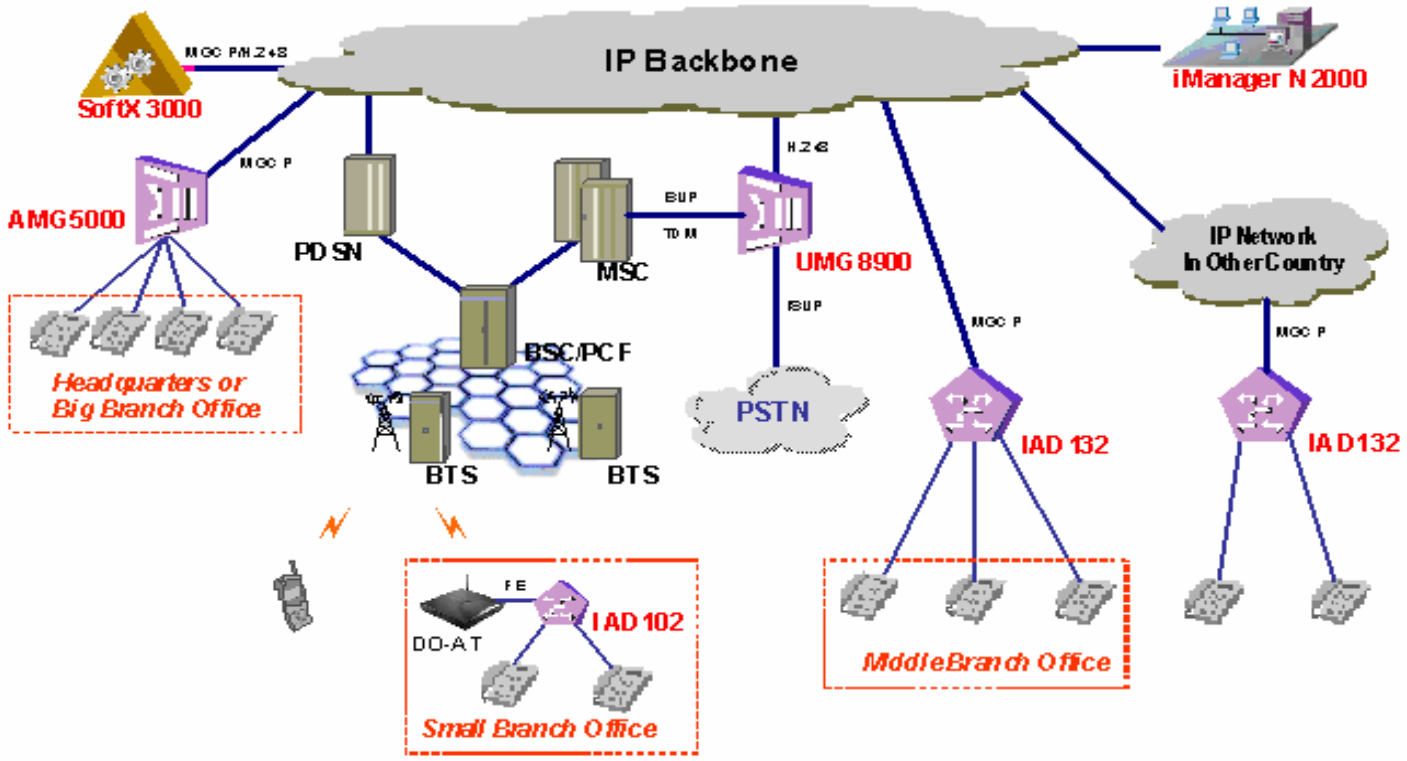
Zapp
THE NEXT GENERATION NETWORK


CROSS - COUNTRY MOBILE WIRELESS IP NETWORK ELEMENTS
1xRTT BACKHAUL PACKET PIPE
1xEVDO BACKHAUL IP TRANSPORT
RAN TO PDSN (R-P) CONNECTION
IP PROTECTION OVER NxE1 LINKS
INTERNET REDUNDANT CONNECTIVITY
DCS1-BUCHAREST
DCS2-CLUJ
DCS3-CRAIOVA
DCS4-BACAU
DCS5-TIMISOARA
Sibiu SBGU
Remote Aggregation
BUVC
Remote Aggregation
ISP-1
ISP-2
ISP-3
Edge
PDSN
AGGR
Aggr
DO-RNC
1xRTT CDX
1xRTT VCDX
1xRTT MSC
EvDo BTS
1xRTT
NxE1
E1
E3
HDLC/E1
HDLC/E3
g-Ex
Ag-Ex

BrewChat: VoIP PTT

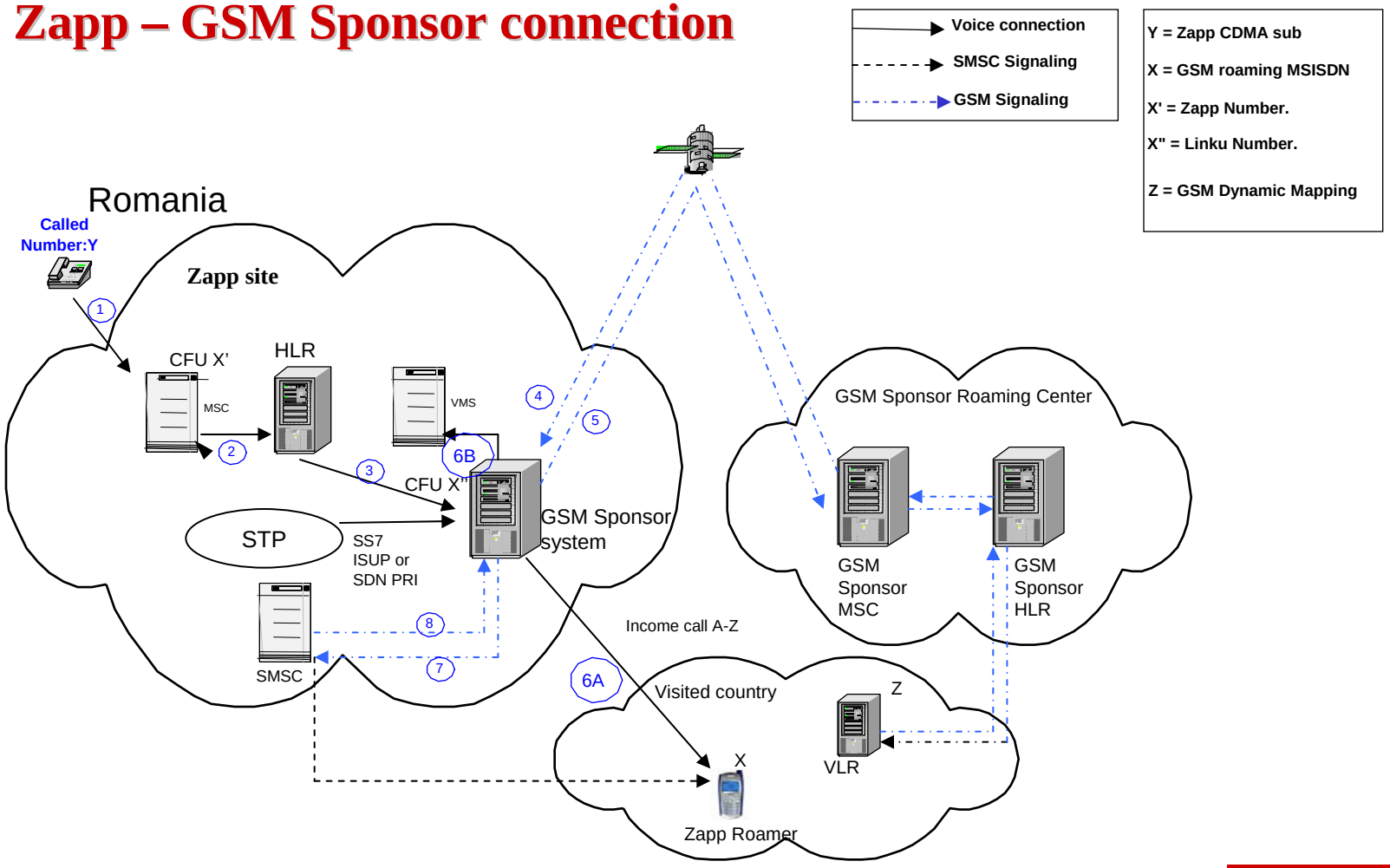


VoIP: EV-DO Connectivity

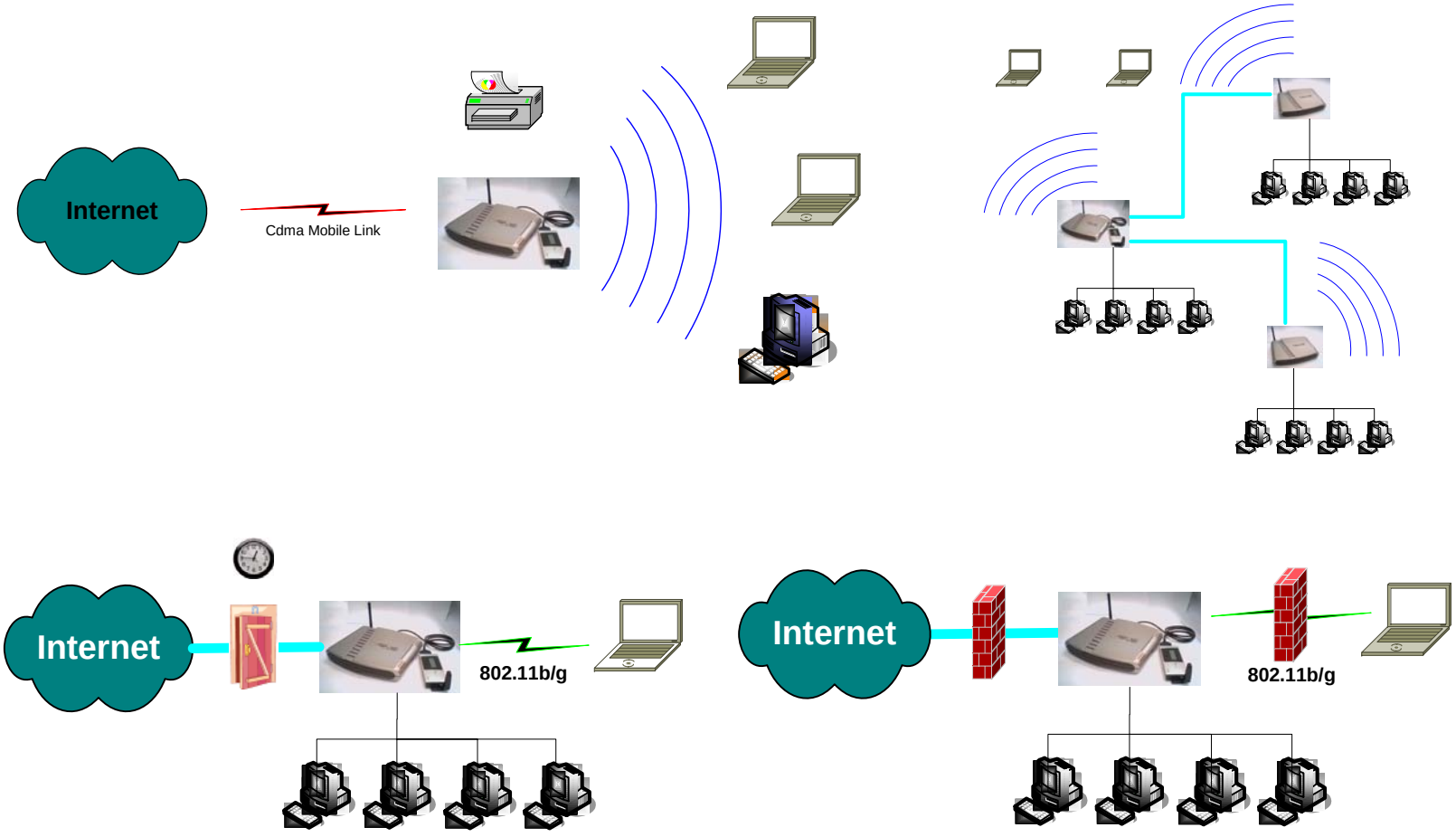


Roaming: Call-Forward/Call-Back

Zapp – GSM Sponsor connection



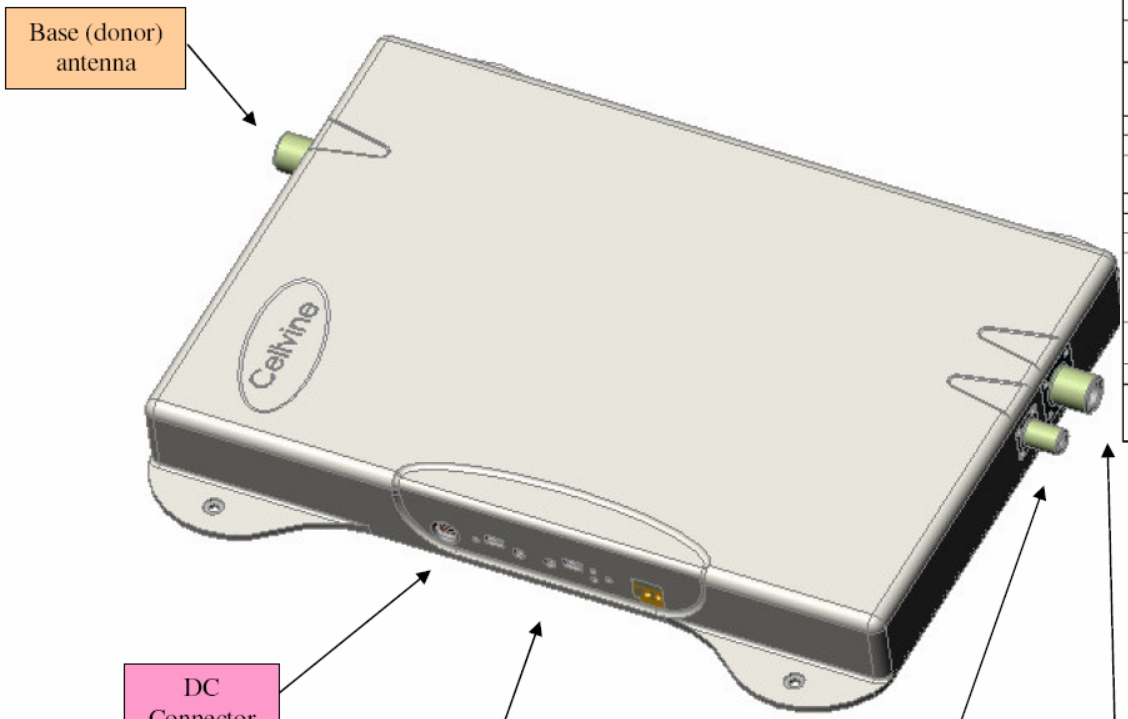
Data Repeater & Router



Low Cost in-building data coverage solution ($60/unit)
High interoperability based on USB, Ethernet & Wi-Fi interfaces (no drivers required)
Large number of applications based on Linux open source

Zapp™ MOBILE

Voice & Data Repeater (0.1 & 1W)



Parameter		Specifications
Frequency Range	Down	463.1-467.35Mhz
	Up	453.1-457.35Mhz
Output Power, P1dB	Down	+29dBm
	Up	+29dBm
OIP3	Down	+43dBm
	Up	+43dBm
System Max Gain	Down	+80dB
	Up	+80dB
Pass Band Ripple		4 dB p-p
Noise Figure		5 dB
AGC & manual Gain Ranges (Up & Down links)		25dB
AGC output level		+0..20dBm (TBD by User)
VSWR		2:1 MAX
Operating conditions		Indoor (-5 to +45C)
Indicators\controlls		1. Green Led: Power 2. Red Led: DL power Alarm 3. Orange : AGC nominal power indicator 3. Manual gain adjucment screws (UL & DL) . 4. AGC UL , AGC DL on/off switch.
Alarms		Single dry contact indicator N\C Indicates one (or more) of the following faults: DC failure\ Current Failure \Downlink power failure
Power Requirements		12VDC, 3A Max. from included power supplier
RF Connector		Base - N female Mobile – N female Mobile coupled - SMA

Low Cost in-building coverage solution

Zapp™ MOBILE