



# Operators HSPA Experience and Path Towards LTE

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ITU-D Regional Forum, Chisinau  
24-26th August 2009





# Topics

- HSPA deployment experience
- Actual data transfer speeds experienced by user
- Services on HSPA
- Experience with WLAN / WiMAX deployment
- HSPA+
- LTE and 4G



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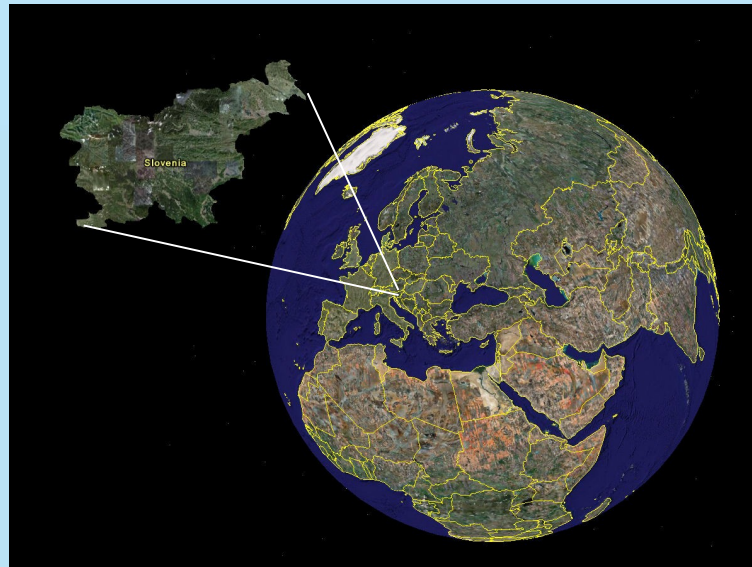


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# Introducing Mobitel



- Largest mobile operator in Slovenia
- Founded in 1991
- Owned by Telekom Slovenije – main fixed telecommunications operator in Slovenia
- Slovenia has been a member of the European Union since 2004, currency: €



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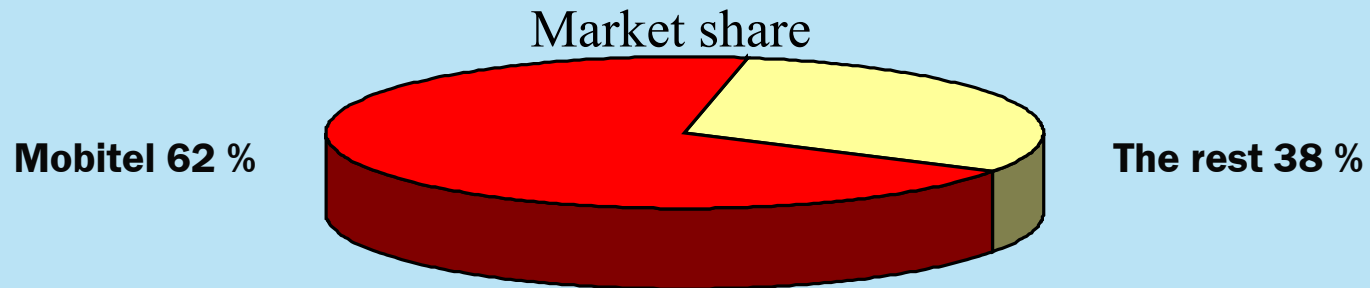
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# UMTS (WCDMA)

- UMTS licence acquired in 2001 (for 15 years)
- TDD 1900 MHz-1905MHz
- FDD 1965 MHz – 1980 MHz, 2155 MHz – 2170 MHz
- Mobitel introduced UMTS network in Slovenia in December 2003



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# HSPA

- 70 % of Mobitel's network was upgraded to HSDPA 3.6 by March 2007
- By April 2008 Mobitel's WCDMA (UMTS) network was completely upgraded to HSDPA 7.2 and HSUPA 1.4
- Different quotas for monthly downloads. Also unlimited monthly downloads are available. No torrent filtering.
- 73.6 % of population covered by HSPA

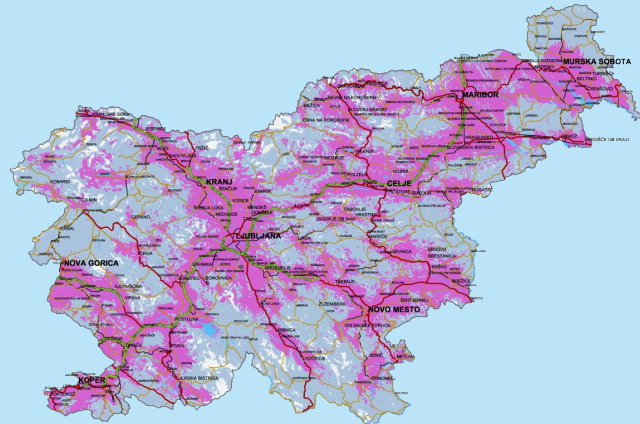


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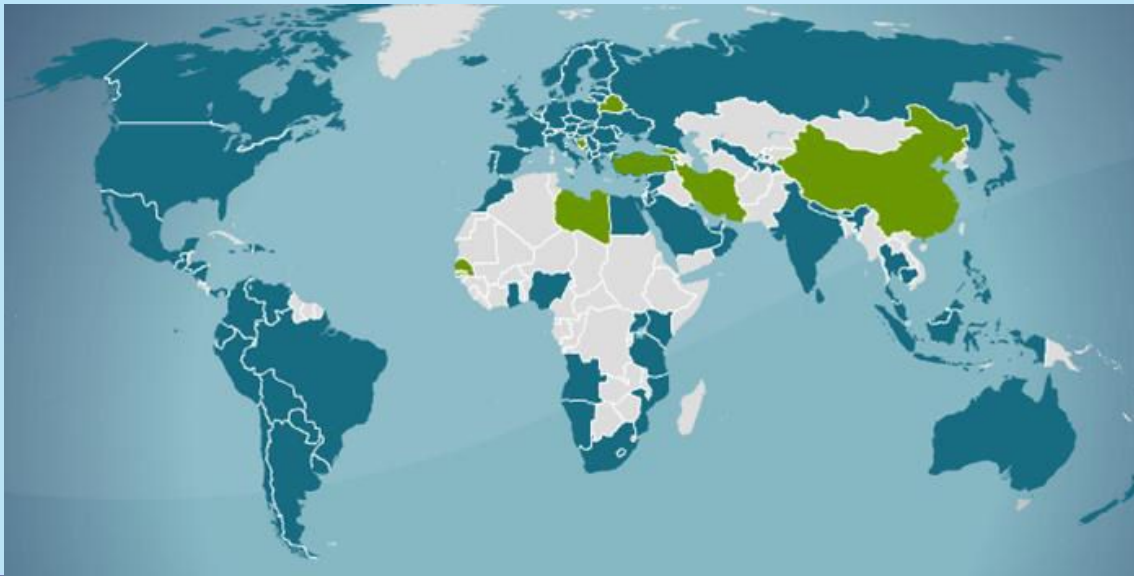


# HSPA Coverage



**Slovenia**  
74 % of population

-  UMTS/HSPA coverage
-  HSPA commercial launch
-  HSPA deployment



**World**  
274 operators in  
115 countries

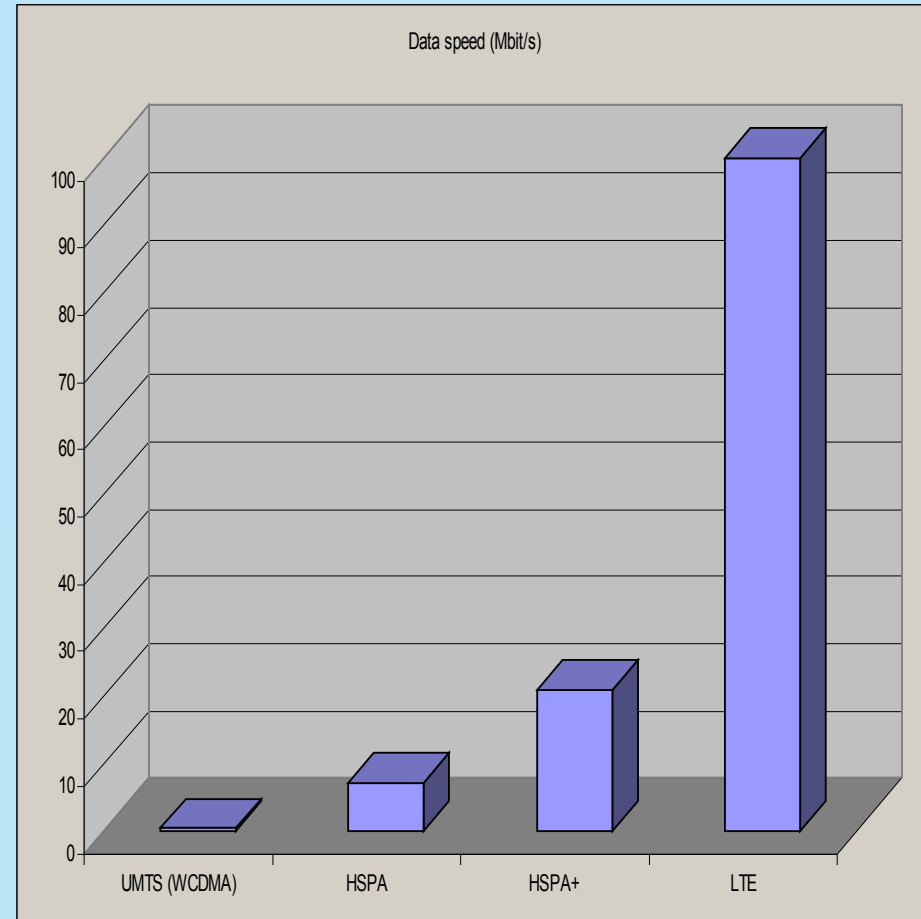
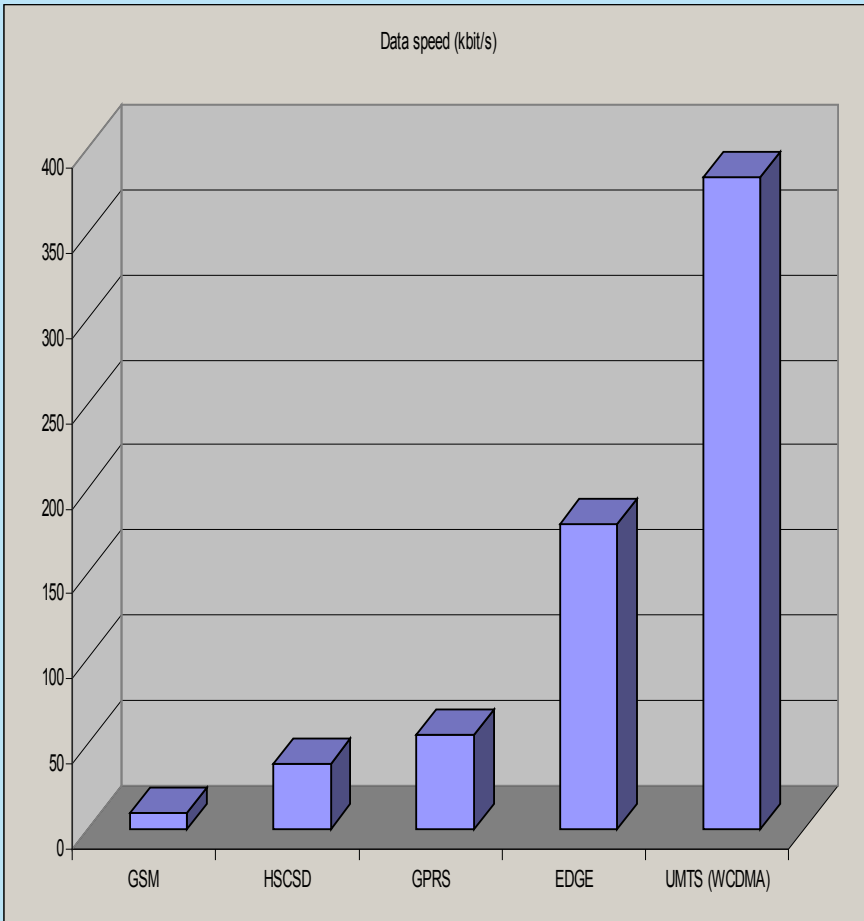


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# Data Speed Increase

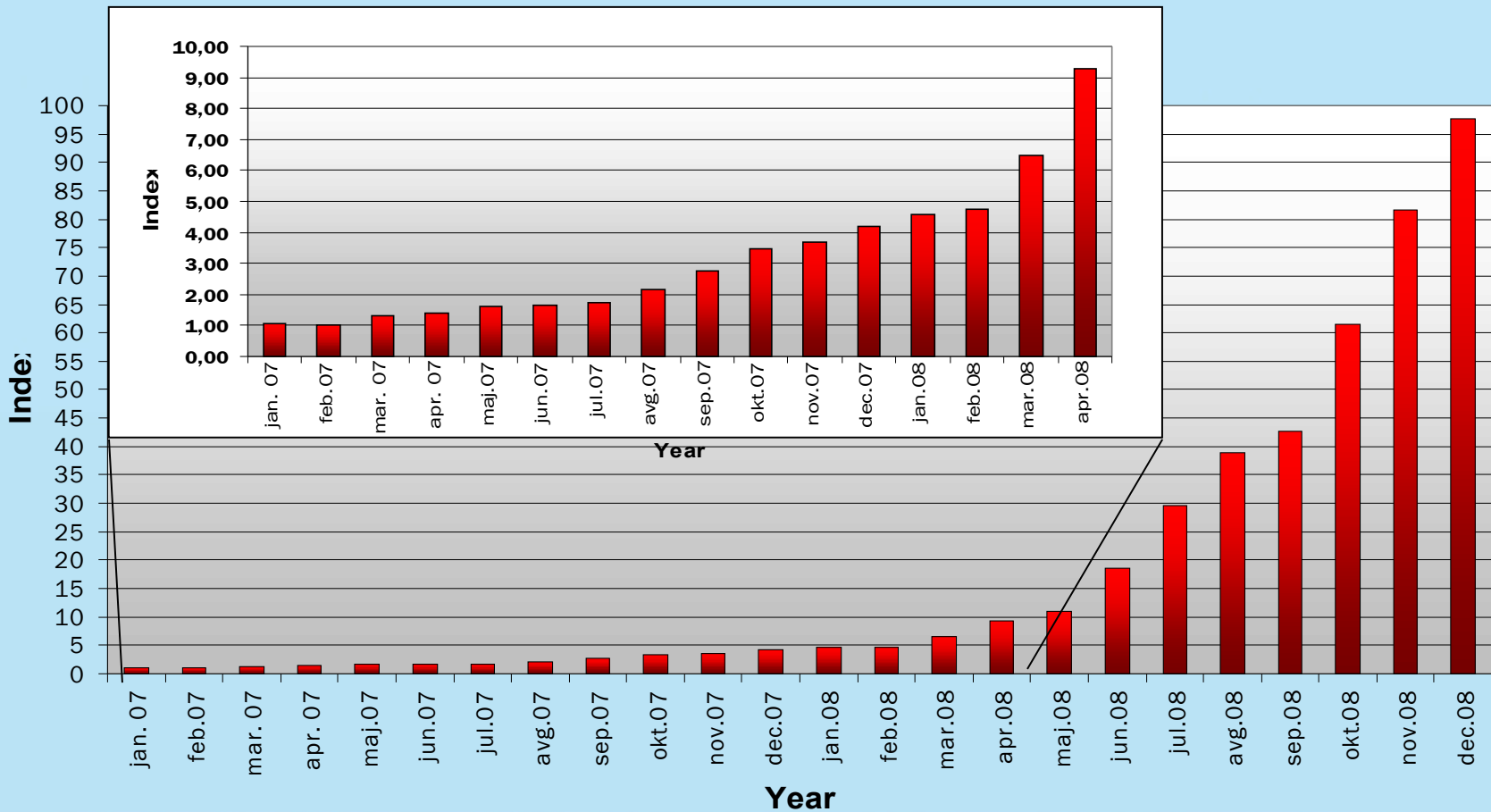


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# Explosion of Data Transfer in Mobitel Network



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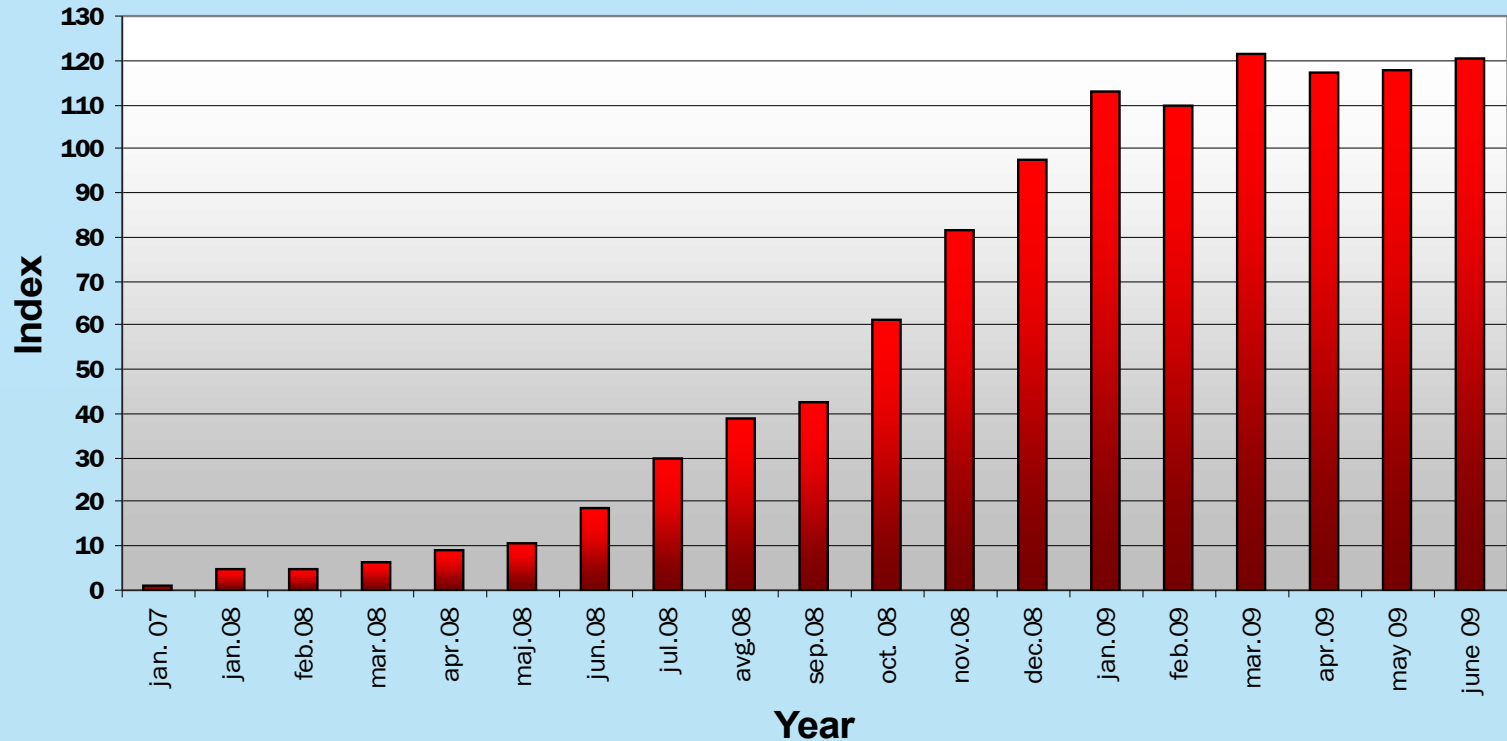
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# Stabilization of Data Transfer



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# Meeting customer demand and expectations



## Customers demand:

- Higher data speeds UL/DL
- Large volumes of data transfer
- Lower prices
- Bundled services like triple/quadplay
- Seamless wireless communication between different multimedia devices



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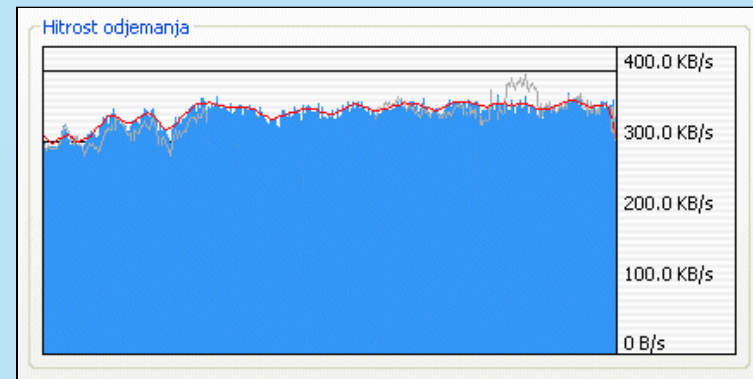
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# HSPA 3.6 Mbit/s

Right after launch you could easily achieve 2.5 Mbit/s on DL  
Quick upgrade to 7.2 Mbit/s



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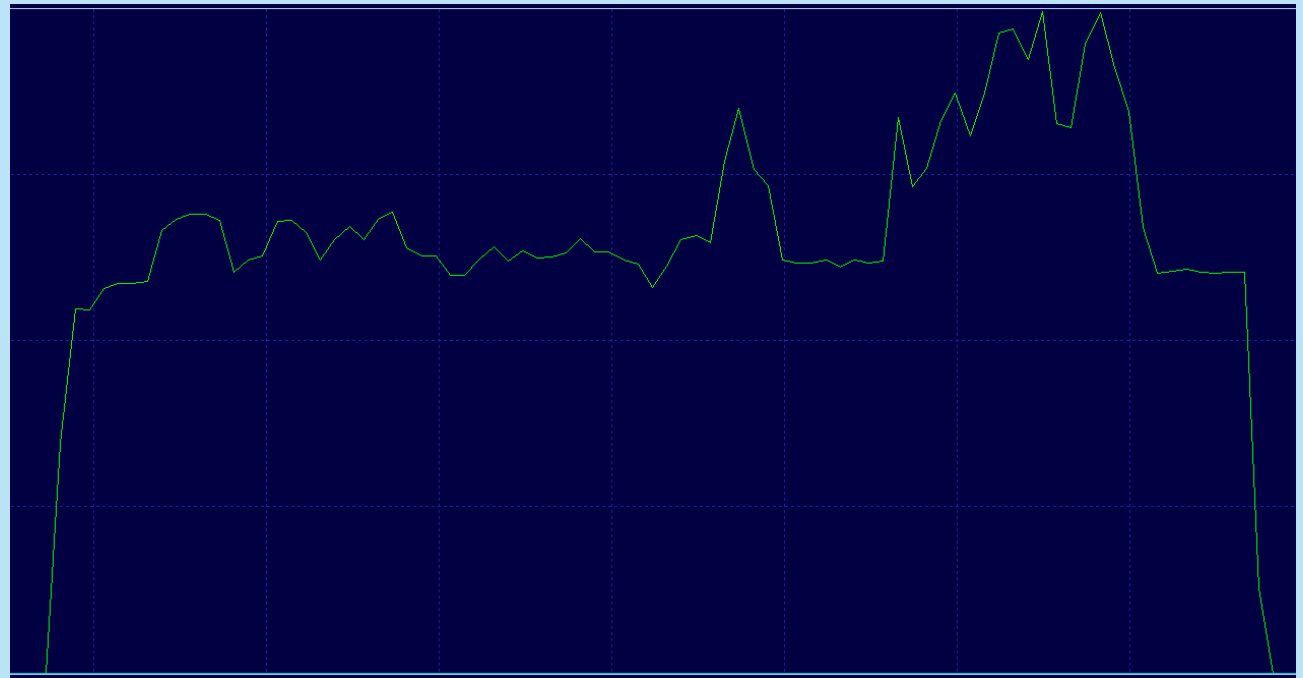


# HSPA 7.2 Mbit/s

After launch speeds were around 6 Mbit/s, later with more users:

Peak at 2.9 Mbit/s →

Average at 1.7 Mbit/s →



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# Increased number of users on 7.2 Mbit/s HSPA network

- Data speed drops
- More base stations can solve this problem
- Increased backhaul data transfer rates are needed
- Several months after launch measured data speed dropped to 1.6 – 3.2 Mbit/s per indoor user (beware of too much hype)
- Outdoor antenna can improve signal quality



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# Mobile TV



- Works through WCDMA/HSPA network
- Streaming solution – not DVB-H
- Monthly subscription 4.99 EUR
- EPG included
- SMS reminder



	SLO1
	SLO2
	POP TV
	Kanal A
	Šport TV1
	Šport TV2
	Info TV
	Čarli TV
	Golica TV
	Cartoon Network
	TV Pika



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# Improvements in Mobile TV



HSPA provides:

- Higher video resolution
- Less visual artefacts which are result of high compression
- Higher frame rate
- Less loading time to fill video buffer

## GPRS



## UMTS (WCDMA)



## HSPA

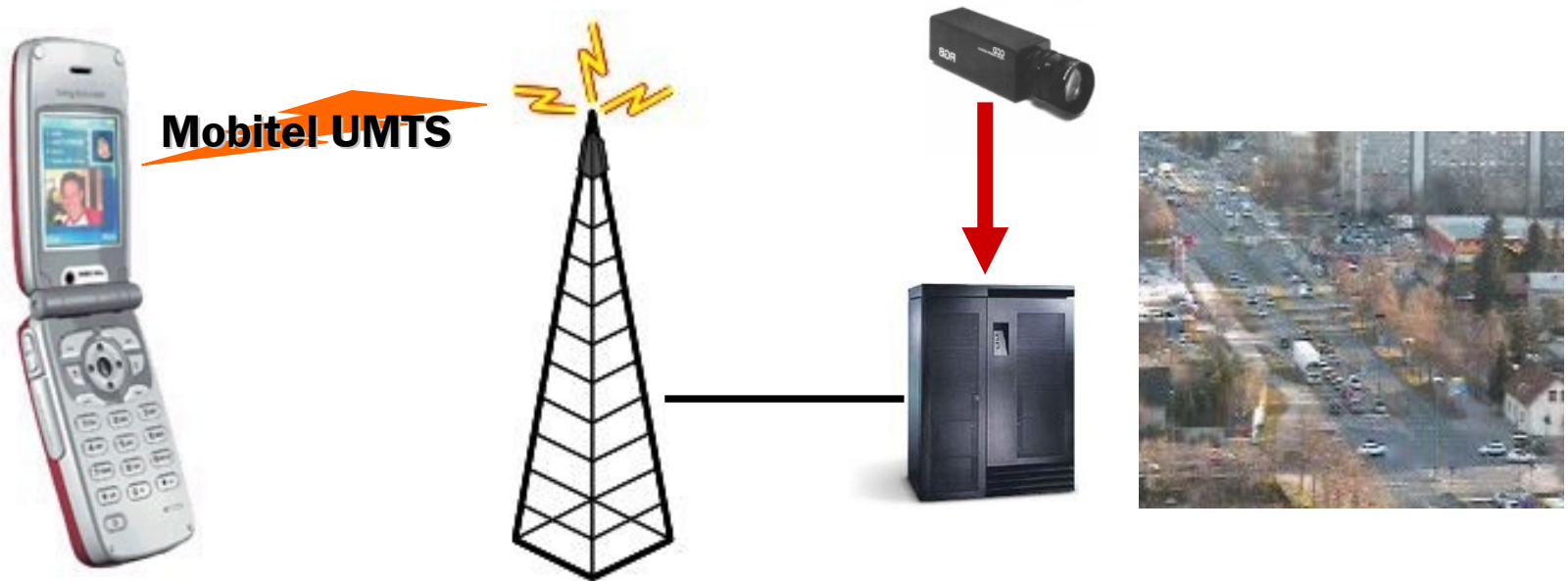


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# Traffic Surveillance Through Mobile Phone



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# WLAN

- Mobitel complements HSPA with WLAN network
- 67 locations WLAN in Slovenia
- 5 most attended locations:  
Ljubljana – Hotel Union, Ljubljana - Jože Pučnik Airport, Kranjska gora - Hotel Lek, Ljubljana – City Park, Portorož – Hoteli Palace
- WLAN roaming at more than thousand locations in 36 countries of the world
- This service is commercially not as successful as expected – without government funding



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# WiMAX



- Standard IEEE 802.16 (16e has the possibility of roaming)
- WiMAX complements HSPA offer
- Used for fixed wireless connections for customers of Telekom Slovenije
- Telekom Slovenije obtained WiMAX licence in 2006
- First commercial connections in March 2008



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# WiMAX



- Project is run by Mobitel
- 3.4 – 3.6 GHz with the possibility to extend to 3.8 GHz
- Best results between 6 and 10 km from base station
- DL speed 20 Mbit/s per sector, 1 Mbit/s per user, if LOS
- Project is currently on hold



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# Future expectations: HSPA, HSPA +



## In the near future we expect:

- DL 14.4 Mbit/s HSPA
- HSPA+: DL 21 Mbit/s, UL 5.76 Mbit/s
- First HSPA+ network in Australia (Telstra – February 2009) – 21 Mbit/s
- Austria – HSPA+ in Mobilkom 23.3.2009
- Later up to 42 Mbit/s DL



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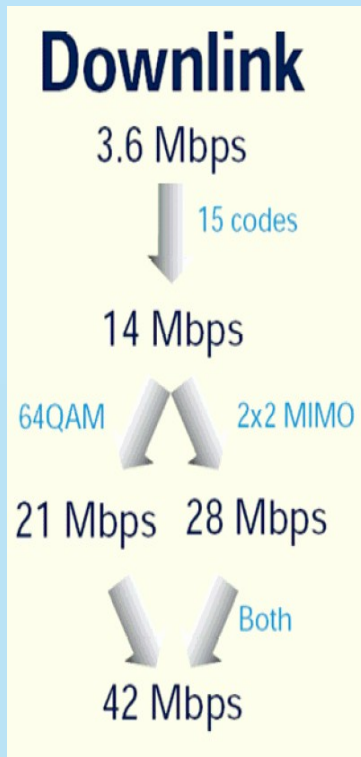
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# HSPA+ deployments



Operator	Country	Deployment date
Telstra	Australia	Feb 2009
mobilkom austria	Austria	March 2009
CSL (Telstra)	Hong Kong	March 2009
Vodafone	Portugal	June 2009
Vodafone	Greece	July 2009
TIM	Italy	July 2009
Optimus (Sonaecom)	Portugal	July 2009
StarHub	Singapore	July 2009
Turkcell	Turkey	August 2009



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# Future Development Towards LTE



- Increased spectrum efficiency
- Optimal cell size of 5 km, 30 km sizes with reasonable performance, and up to 100 km cell sizes supported with acceptable performance
- Theoretical peak DL speeds up to 326.4 Mbit/s
- Theoretical peak UL speeds up to 86.4 Mbit/s
- LTE-Advanced as software upgrade can reach speeds up to 1 Gbit/s
- Sub 5ms latency for small IP packets



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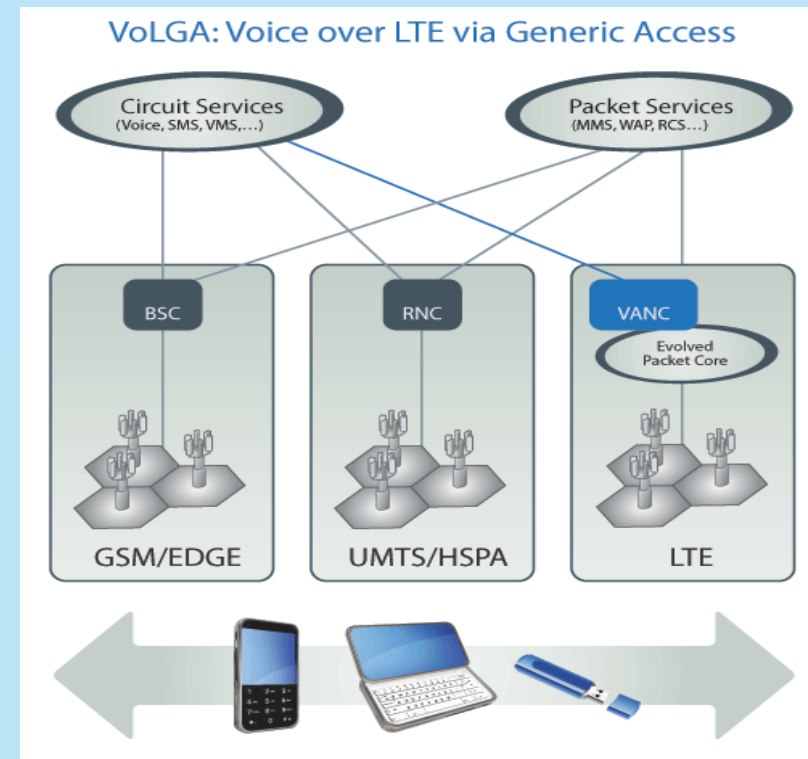




# VoLGA initiative



- LTE does not support circuit switched services like voice and SMS!
- LTE is data only
- VoLGA = Voice over LTE via Generic Access
- Based on existing 3GPP GAN standard
- Extension of GSM and UMTS over LTE



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Country	Operator	Anticipated LTE service launch
USA	Verizon	2010
USA	MetroPCS	2010
USA	CenturyTel	2010
Sweden	TeliaSonera	2010
Norway	TeliaSonera	2010
Japan	NTT DoCoMo	2010
Japan	KDDI	2010
Canada	Rogers Wireless	2010
Canada	Telus	2010
Canada	Bell Canada	2010
USA	Aircell	2011
USA	Cox	2011
USA	AT&T Mobility	2011
Ireland	Hutchison 3	2011
Germany	T-Mobile	2011
France	Orange	2011
China	China Mobile	2011
China	China Telecom	2011-2
New Zealand	Telecom NZ	2011-2
South Korea	SK Telecom	Not known
South Korea	KTF	Not known
Philippines	Piltel	Not known
Italy	Telecom Italia	Not known
Hong Kong	SmarTone-Vodafone	Not known
Australia	Telstra	Not known
Various	Vodafone	Not known

- NTT DoCoMo plans LTE deployment of LTE in 2009, but will probably postpone it until 2010. Similar plans for end of 2009 has Verizon Wireless.
- Motorola tests LTE in UK in 2.6 GHz band. Plans products for 700 MHz and 2.6 GHz. They made first LTE data call.
- First LTE terminals are expected in 2010



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# LTE and 4G

- LTE is 3.9G - not 4G. LTE-Advanced will be 4G.
- 4G falls under IMT-Advanced.
- Objectives of 4G:
  - Data rate of 1 Gbit/s - while client and station are in relatively fixed positions
  - Data rate of 100 Mbit/s while the client physically moves at high speeds relative to the station
  - A data rate of at least 100 Mbit/s between any two points in the world
  - Smooth handoff across heterogeneous networks. Seamless connectivity and global roaming across multiple networks
  - A spectrally efficient system
  - High network capacity: more simultaneous users per cell
  - High quality of service for next generation multimedia support (real time audio, high speed data, HDTV video content, mobile TV, etc)
  - Interoperability with existing wireless standards, and
  - An all IP, packet switched network



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Thank you!

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