



Motivation – Challenges – Goals
Approach – Partners
Open Issues / Next Steps



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Motivation

- Nov 2008: GRA Workshop
- Many emerging regions require very large radio networks to provide Internet and voice services
- Existing technology is very expensive (Motorola, Cisco) or does not scale for large areas (OLSR, Batman, Freifunk)
- Energy supply and maintenance are additional challenges in many regions
- **Communication Infrastructure can be the key to Rural Development**



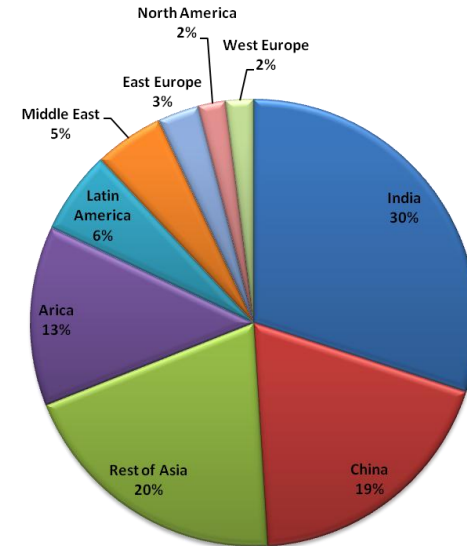


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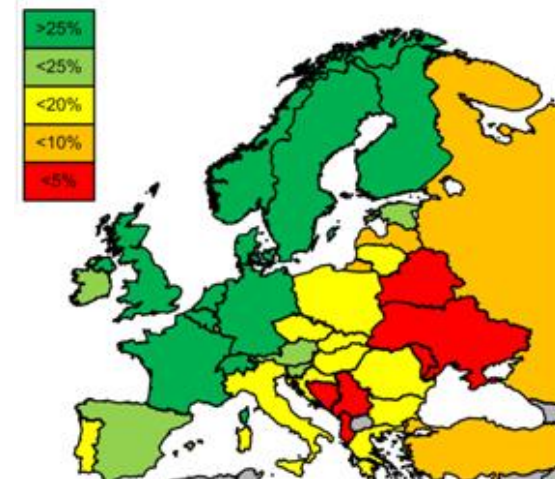
Motivation

- Market prospects are huge in emerging regions
- Africa: double-digit growth in mobile communication
- Similar challenges in Europe: Serbia, Russia, Bulgaria, Romania, Croatia and Germany
- Similar challenges throughout the world: Australia, Brasil, Syria,...

It can be a win-win situation for all



Wireless Subscriber Growth in 2009



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Challenges

- Lack of (stable) energy supply
- Low population density
- Huge distances
- Lack of CAPEX and OPEX
- Lack of technical expertise
- Harsh environment

Bevölkerungsdichte			
Land	Mio Einw.	qkm	Einw/qkm
Ägypten	79	1002000	79
China	1314	9572419	137
Deutschland	82	356910	230
Finnland	5	338130	15
Griechenland	11	131990	83
Kenia	35	580367	60
DR Kongo	63	2344885	27
Niederlande	16	37330	429
Russland	143	17074500	8
Sambia	12	752614	16
Türkei	70	779452	90

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Goals

- **Possibility:** Technology for carrier-grade low-cost wide-area wireless-communication exist on the market
- **Blue Prints:** 3-5 areas show what is possible
- **Sustainability:** Business concepts for community networks and for incumbants have been tested (blue-print / best practice)
- **Local:** Training concepts exist and are offered in many African countries
- **Relevance:** E-learning is a successful service provided in rural areas



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Approach

- Summer 2009: Small installation in rural Zambia (to learn!)
- Existing components wherever possible (re-use of EU CARMEN results)
- Stepwise development
- Continuous extension of test infrastructure
- Test and evaluation
- Development of a business model (sustainability!)
- Creation of a national and international community
- **Training; Transfer of Competences**

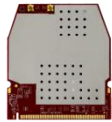


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NET4DC Hardware



Routerboard: 300 MHz,
64 MB, 3 MiniPCI, 10-28
V, 5 W, € 100



700 MHz WLAN
MiniPCI, € 100



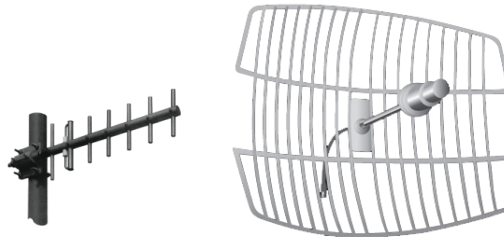
Case for outdoor
deployment, € 50



Bullet WLAN station
with PoE, € 70



saxnet WLAN-Router for
outdoor usage, € 2000



antennas: bone (€ 20),
grid(€ 40), panel(€ 100)



OpenBTS GSM
basestation, € 2.500

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NET4DC Software

- OS: Linux (basiert)
- Radio: WLAN 700 MHz, 2.4 GHz, 5.4 GHz
- Basis: SENF (Scalable and Extendable Network Framework)

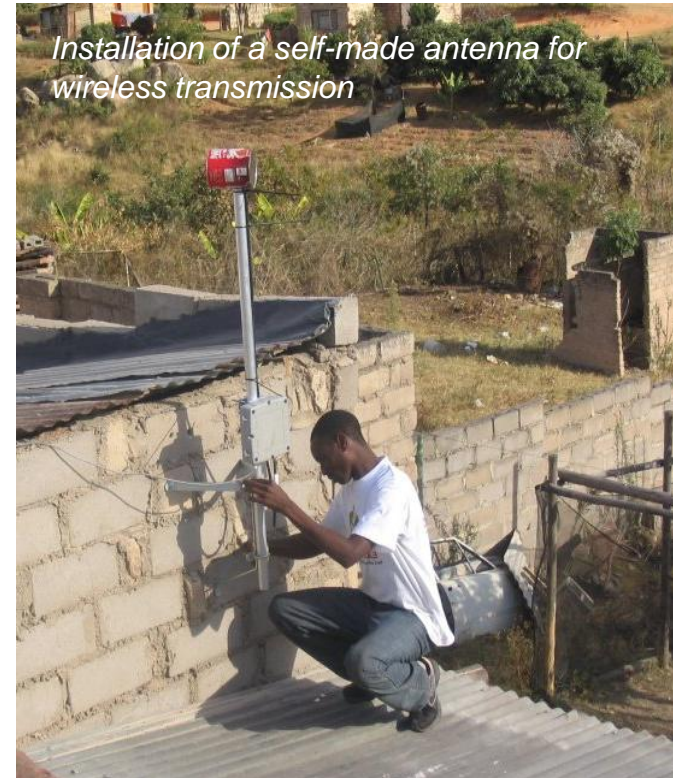
- Routing: IP/MPLS/IEEE 802.21
- Topology discovery, path set-up
- QoS: MPLS (Sprache (RTP) / Daten)

- Energie: Solar
- GSM-VoIP (Asterisk)

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Open Issues / Next Steps

- Technical development (ongoing, 2-3 years)
- Blueprints for technical solution (Macha?)
- User requirements – YOUR requirements?
 - NGO Workshop in Q1 2011
- Sustainable business concepts, in particular for community-based approaches
- Political support – Communication Infrastructure as a German Lighthouse Project?
- Adapted application scenarios



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