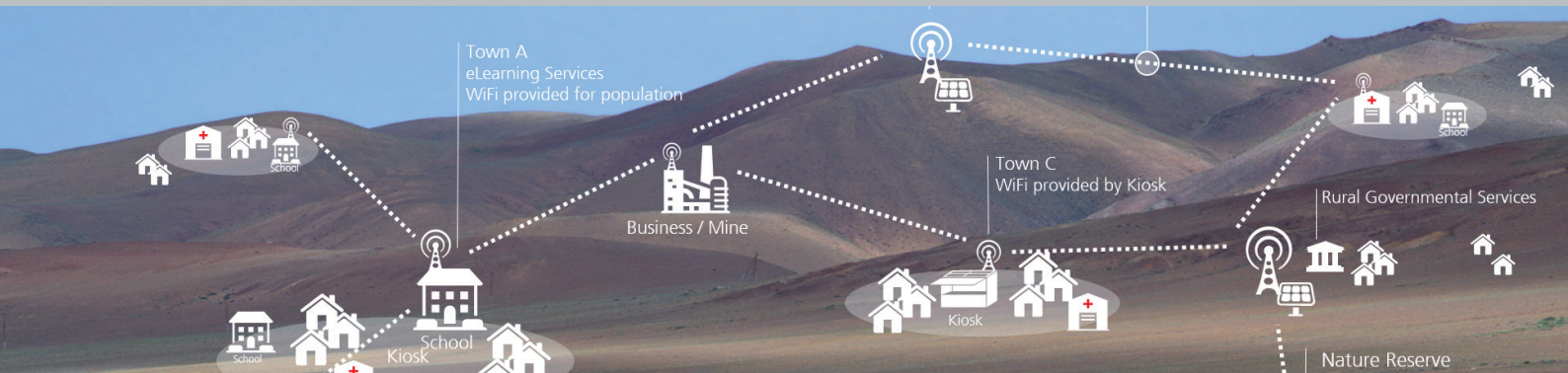




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WiBACK

WIBACK-SYSTEM

WIBACK SOFTWARE REL. 4

At a Glance

A typical WiBACK Network consists of only two types of electronic equipment, thus keeping the system simple. A network requires one Network Controller located at the root of the network and the WiBACK nodes which forward traffic and provide connectivity at their location.

Developed by Fraunhofer, the WiBACK technology offers a flexible, self-managing and cost-efficient solution to provide carrier-grade wireless back-haul coverage.

WiBACK Components

WiBACK is designed to deliver services providing a high quality of experience. It efficiently bridges the gap between end-users and provider core networks. Sophisticated algorithms dynamically manage the entire backhaul network with respect to topology planning and load distribution. Compared to traditional fixed wireless operator back-haul technologies, the key WiBACK features lead to significantly lower setup (CAPEX) and especially operational costs (OPEX).

Key Features

- Plug & Play directional radio technology delivering low-cost broadband connectivity
- Network intelligence for self-configuration, optimization and healing
- Modular software design allowing use of standard (COTS) hardware
- Technology abstraction to support heterogeneous technologies (e.g. IEEE802.11, micro-wave, satellite, fiber)
- Web based network visualization and monitoring
- Seamless integration to existing network setup
- Solar powered nodes
- Provides carrier-grade services (e.g. QoS-enforcement, overbooking, etc.)
- Supports multi-tenancy to allow multiple operators to share the same physical network resources
- Establishes ring-topologies to increase redundancy or capacity

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For Everyone. Everywhere

Cost Efficient

High Performance

Pug & Play System



- ✓ Auto Configuration
- ✓ Non-Expert Setup/Operation
- ✓ 10 Hops up to 200 km Range

Low CAPEX / OPEX



- ✓ Little Manual Maintenance
- ✓ Low Power (Solar-ready)
- ✓ Off-the-shelf Hardware

Proven Concepts



- ✓ Reliability & Quick Recovery
- ✓ Carrier-Grade QoS, SLAs
- ✓ VoIP, HD-Video, Data, ...

Utilizing WiBACK – Connect the Unconnected

Everywhere

People in low income regions are still often denied the many benefits of broadband access, creating a digital divide. Directional radio systems allow to efficiently connect rural areas, reaching the local population, institutions and businesses.

Connect

Hospitals, schools, cellphone-towers, factories, government-buildings, sensors (security cameras, emergency sensors) and others.

By Everyone

WiBACK significantly reduces the complexity and effort needed to set up and run such a network! No skilled labor or specific technological expertise is required. Therefore actors apart from the big operators are enabled to tackle this problem directly and to bring broadband Internet to where it is needed.

Connected by

Municipalities, organizations, companies, hospitals, schools, local operators, local population – allowing them to take matters into their own hands instead of being reliant on the big operators and their schedules and business cases.

WiBACK Facts

Management Capabilities

- | | |
|-----------------|---|
| Self Management | Network is set up automatically, running within minutes after hardware is powered. No expertise required from users; auto adaption of frequencies, paths, bandwidths. |
| Self Healing | Fast re-routing along fallback-links and self-configuration of links. |
| Maintenance | Monitoring and auto-alerting, simple replacement of parts or extension of network (only plug-in of new node required). |

Quality of Services

- | | |
|-------------------------|---|
| Routing, Capacity Mgmt. | Transparent ethernet bridging incl. VLAN trunking and MPLS-based traffic engineering. |
| Network Slicing | Based on data type, traffic path and security levels (multi-tenancy). |
| Monitoring | Alerts and statistics via web or external tools (e.g. SNMP). |

Cost Efficiency / Flexibility

- | | |
|----------------|---|
| Hardware | Utilization of commercial off the shelf (COTS) hardware. Local assembly possible (BoM available), low energy footprint (solar-ready), only two main components (controller + WiBACK nodes). |
| Physical Layer | Wireless links in unlicensed (WiFi) and licensed spectrum (e.g. TVWS, public safety bands); can integrate wireline infrastructure into network. |

Technical Capabilities (using IEEE 802.11ac radios)

- | | |
|-----------|--------------------|
| Bandwidth | < 400 Mbps |
| Latency | < 2 ms (per link) |
| Distances | < 20 km (per link) |

Enable Crucial Services

Services

High speed connectivity, health services (e.g. general information, consultation of doctors via video conference, order/check availability of medicine), education, governmental services (ID, administration), communication (email, VoIP services), and many more at significantly lower costs than via mobile networks.

Access

Directly at a specific organization's site, or via any access solution (cellular or commercial off the shelf access points) in a simple plug and play mode.



WiBACK Controller available as Mini-PC, virtualized entity and rack-mounted (1U).



Outdoor WiBACK node (available with 2, 3 and 4 Antennas, see data sheets).