The WiBACK™ Technology in a Nutshell

WiBACK™ is a self-managed backhaul technology. Its key features include easy-to-deploy COTS equipment, auto-configuration and adaptive E2E QoS-provisioning. These "Plug & Play" characteristics are the main differentiator between WiBACK™ and alternative solutions. Hence, WiBACK™ requires significantly less technical skills and expertise to set up and operate a network, a decisive advantage in areas where skilled labor is often not available.

High reliability is another advantage. WiBACK™ forms redundant topologies such as 'rings' and actively uses them to increase the overall network capacity or to provide backup connectivity in case of link or node failures.

WiBACK™ provides carrier-grade service quality for voice, video, and data transmissions over large distances using low-cost wireless technology. WiBACK™ backhaul networks form larger multi-hop topologies (up to 100 nodes) based on heterogeneous P2P/P2MP technologies such as Wi-Fi, Fiber, mmWave, etc. – essentially anything that can transmit packets from a source to a destination – as long as the destination can identify the source, Figure 1.

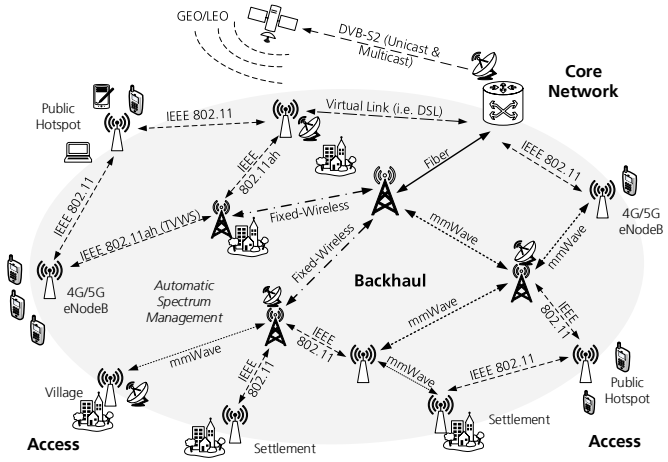

Figure 1- WiBACK™ manages heterogeneous P2P or P2MP technologies to form redundant multi-hop topologies.

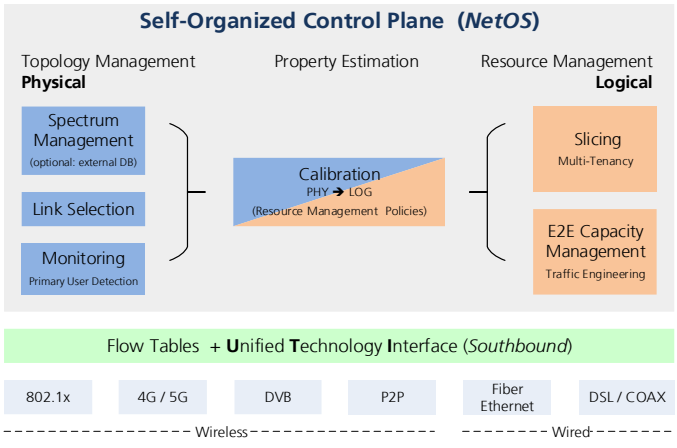

Figure 2- WiBACK™ functional blocks handle physical and logical resource management using the UTI and Flow/MPLS tables.

WiBACK™ follows a centralized (SDN-like) approach regarding spectrum allocation (incl. primary user detection (DFS/*TVWS*)) and physical topology forming while minimizing internal and external interferences. To manage heterogeneous radios, WiBACK defines a Unified Technology Interface (UTI) which provides a set of primitives such as (UTI_GetProperties, UTI_NeighborScan, UTI_CreateCell, UTI_JoinCell, UTI_LinkAllocateResources, UTI_SetRegulatory, etc.) which must be implemented for each technology and also ensures future extensibility.

On top of such (dynamically adapting) topologies, WiBACK™ performs E2E capacity allocation on an aggregate level. These E2E aggregates, which may be AES-encrypted, are implemented via a light-weight MPLS core and WiBACK™'s own Technology Independent Monitoring (TIM) layer (similar to PWE3) and provide transparent Ethernet connectivity (MTU 1500 or jumbo frames up to 2254 bytes incl. VLANs). WiBACK™ dynamically adapts capacity overbooking and ingress shaping to varying link conditions and can also support infrastructure sharing via multi-tenancy or network slicing to fully separate resources allocated to different operators or users, Figure 2.

The core self-x logic is implemented at the WiBACK™ controller (can be virtualized). Each outdoor node mainly implements a QoS-aware MPLS-switching engine incl. an extensive monitoring subsystem. WiBACK™ nodes are managed by an automated bootstrap procedure, which handles the initial connection to network as well as failovers. Broken nodes can easily be replaced by simply exchanging the hardware – no manual configuration is required. WiBACK™ networks can easily be extended by deploying additional nodes in the designated areas.

WiBACK™ supports all typical Access technologies (LTE, Wi-Fi, etc.) and can use integrated Wi-Fi radios as APs.

To serve as an enabler, WiBACK™ is designed to reduce CAPEX and especially the OPEX to a minimum. Based on carefully selected, cost-effective COTS components (incl. 5y MTBF LiFePo battery) and dedicated software, it is characterized by a very low energy footprint and self-managed, autonomous operation. This allows for solar-powered operations and minimizes the need for trained personnel in the field, which is often absent in rural areas.

A Bill of Material (BoM) with assembly instructions is available on request to enable local manufacturing at local cost structures while fostering human capacity building and local ecosystems or novel funding / business models.