

ENET Wireless Backhaul Solution

As service providers are rapidly upgrade their infrastructure, moving from 1Gbps demarcation to 10G and even 100G connections at the network edge, the cost of laying new fiber to handle the transmission is prohibitive. New, intelligent wireless capabilities are much more reasonable, as long as they do not compromise on performance.

Ethernity Networks therefore introduces its new ENET Wireless Backhaul Solution, combining the powerful ENET Flow Processor with a newly patented method for wireless bonding, and running on an FPGA appliance.

The solution offers the ability to support fragmentation, reassembly, and reordering of packets to compensate for differentiated delay as a means to connect wireless radio equipment. This bonding technology ensures optimum performance and improves the transmitted throughput by dynamically distributing data along multiple wireless links of different speeds and technologies. This allows operators to increase the maximum transmission distance and overcome interruptions or slow wireless transmission due to inclement weather.

ENET Wireless Backhaul is ideal for implementing within a 4G/5G Indoor or Outdoor Unit or within an SD-WAN deployment.

Solution Highlights

- **Wireless 1G/10G bonding:**
 - Wireless bonding within a group of ports of different link speeds
 - Dynamic adjustment of rates per port according to the actual forwarding rates
 - QoS-aware bonding scheme
 - Even distribution of all packets between group ports
 - Ensures fair access of all ports with distribution and reassembly of packet fragments
- **Programmable FPGA-based flow processor as CESR**
 - 60Gbps network capacity
 - L2 MEF 3.0
 - H-QoS
 - OAM support
 - IPv4/IPv6, MPLS and PWE
 - Link aggregation
 - Transparent bridging
 - L2/L3 VPNs
- **Seamless forwarding of IEEE 1588 and SyncE clock packets**
- **Weather-aware load balancing**
- **Ring protection**
- **AES 128/256 encryption and inline IPSec forwarding**

Key Benefits

<p>Design for 1GbE & 10GbE Wireless Supports multiple 10G and 1G wireless connections to increase backhaul bandwidth and resiliency</p>	<p>Advanced traffic distribution and QoS H-QoS aware bonding traffic management with policing and shaping schemes</p>
<p>All-weather resiliency scheme Dynamic packet distribution scheme based on detecting the actual forwarding link speeds</p>	<p>Multiple forwarding technologies FPGA-based state-of-the-art forwarding architecture for L2, L3 IPv4/IPv6, MPLS service demarcation, and SyncE/IEEE 1588</p>

The ENET Wireless Backhaul solution is currently available on Ethernity’s standalone UEP-20 (Universal Edge Platform) with 10Gbps traffic spread over 10GbE and multiple 1GbE ports, as well as on commercial off-the-shelf servers using Ethernity’s ACE-NIC FPGA SmartNICs. The solution will also run on the upcoming UEP-60 platform, which is targeted for release in Q3/2021, for bonding of 40 Gbps traffic.

Integrated Wireless Bonding

Ethernity’s patent presents a new method of fragmenting and bonding wireless data to enable the transmission of a single data flow along multiple wireless streams, while maximizing the transmission’s efficacy using network functions such as load balancing. Specifically, this enables wireless transmission over the standard network for operation within the hub-and-spoke topology and without the need for a point-to-point connection.

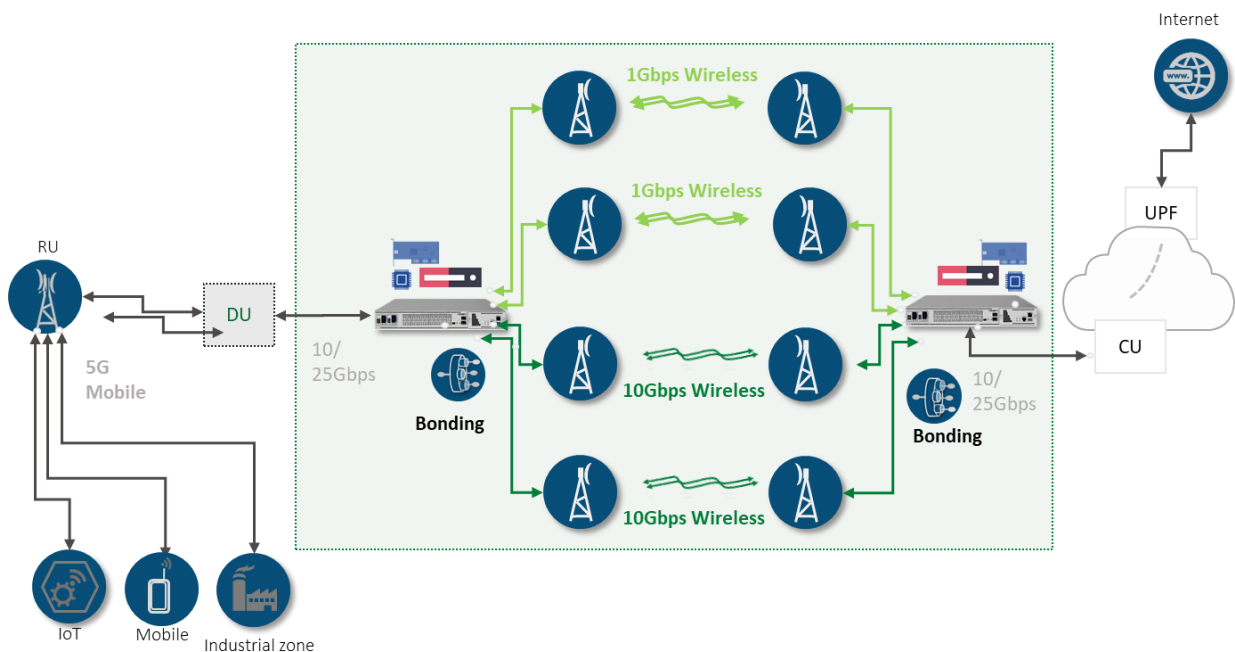


Figure 1: 1GbE/10GbE bonding

The device can be arranged with 1GbE and 10GbE ports bonding, along with the following all-weather protection:

- Bonding between multiple 1Gbps/10Gbps wireless backhaul
- Distribution of traffic between all bonding ports
- Bonding distribution per QoS
- Automatic adjustment of actual link rates
- High-end Centralized Unit (CU) can be used to support point-to-multipoint deployment

Carrier Ethernet Switch Router

Ethernity’s patented ENET Flow Processor, embedded in the FPGA on the ACE-NIC50 and UEP devices, offers comprehensive traffic management, including Carrier Ethernet Switch/Router, 3-level Hierarchical-QoS shaping, packet classification, buffering, policing, OAM/CFM, and IEEE 1588 PTP time sync.

Thanks to its ENET Flow Processor and networking software stack, the ENET Wireless Backhaul Solution can handle all control functions, while the onboard FPGA handles the data path. By combining this control capability with the 1G and 10G ports, this solution is perfectly suited to serve as an all-weather wireless backhaul appliance. Moreover, the FPGA enables full routing functionality and security as an add-on to the device, saving on both space and cost at the network edge.

Ring ERP Protection

The ENET Wireless Backhaul solution is optimized for network edge applications. It offers high performance, solid security, and nearly unlimited flexibility in its protocols. It therefore meets a critical need at the edge, where service providers must be able to do more in less space and with lower power consumption.

The ENET Wireless Backhaul Solution also supports different protection schemes, including Ethernet Ring Protection (ERP) and cascading topologies. It can include any number of 10GbE ports for failover backup.

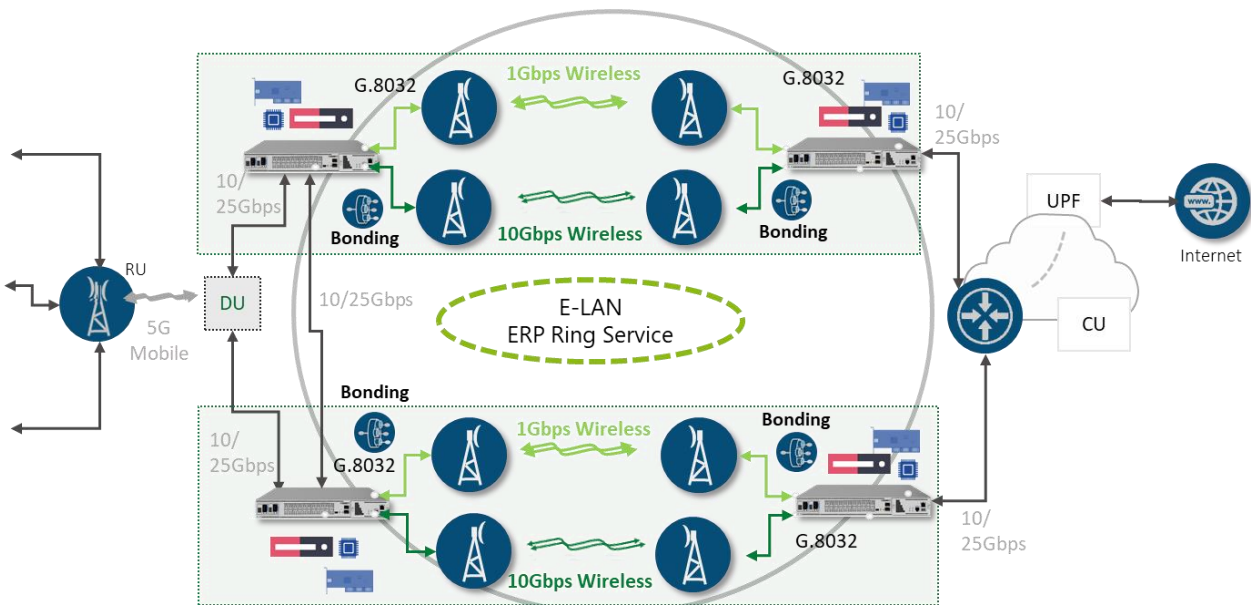


Figure 2: Ring protection wireless bonding scheme

Wireless Encryption

The ENET Wireless Backhaul solution features Ethernity’s rich networking technology packaged with site-to-site secured connectivity or aggregation of multiple virtual private networks (VPNs) in a single low-power appliance.

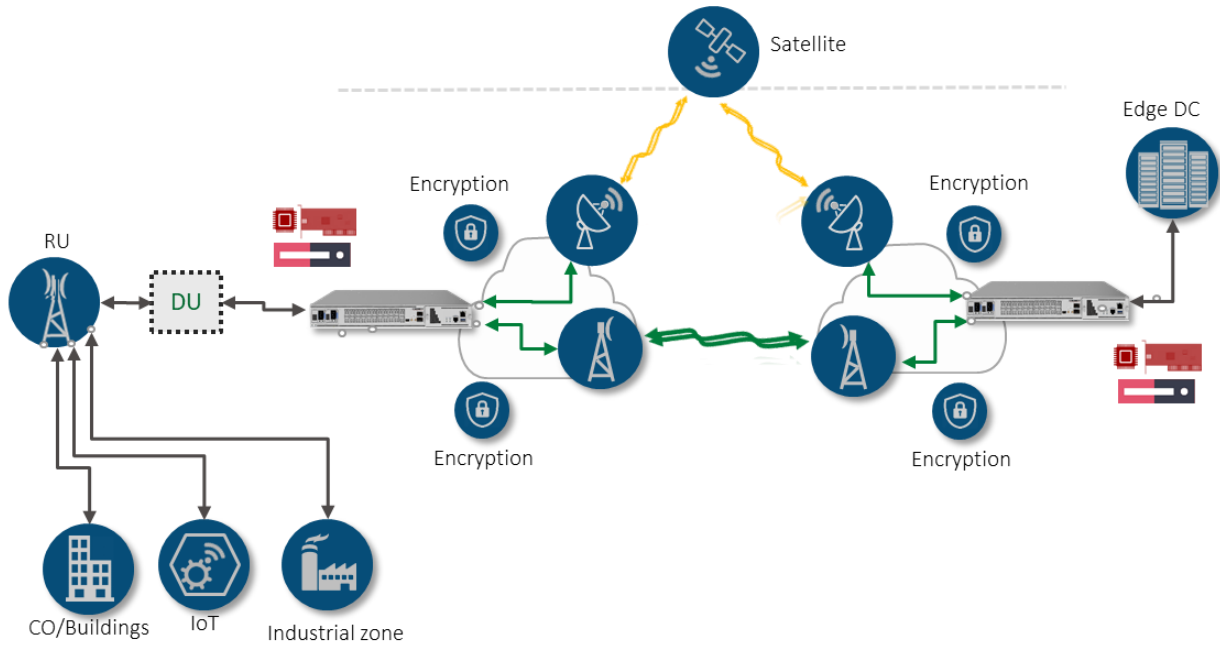


Figure 3: Wireless backhaul secure connections

The solution offers accelerated IPSec performance with inline cryptographic functions leveraging ENET’s carrier-grade pipeline to ensure a secure connection through multiple wireless links or satellite connections. There is additional support for advanced features such as packet classification and flow aggregation with encapsulation. The solution also maintains support for traditional offloads, such as inner and outer transport with end-to-end packet encryption.

Moreover, thanks to its FPGA-based programmability, the solution ensures future readiness for new security protocols and crypto algorithms.

Proposed System Configurations

1 x ACE-NIC50	2 x 10GbE/25GbE interfaces
1 x UEP-20	2 x 10GbE interfaces 8 x 1GbE interfaces
1 x UEP-60 (coming soon)	6 x 10GbE interfaces 16 x 1GbE interfaces