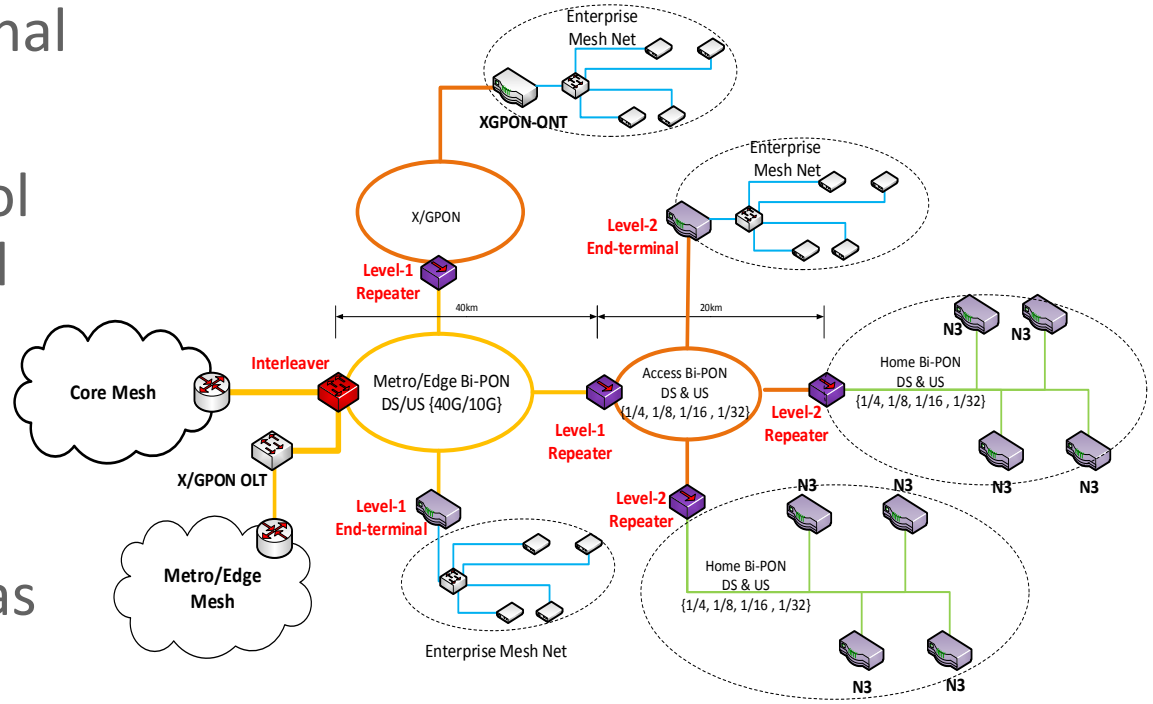
Cascaded Bit-Interleaving Passive Optical Network

(Cascaded) Bit-Interleaving Passive Optical Network

CHALLENGE AND BREAKTHROUGHS

- Today power consumption is directly proportional to its maximum line rate and loading
- Bit-interleaving passive optical network protocol (Bi-PON) and cascaded bit-interleaving protocol (CBI-PON) organize information in a clever way
- Unwanted data can be dropped early during processing
- Protocol processing operates at the same rate as user data is consumed.

From Bi-PON to CBI-PON



Novel Concept of "Power Consumption Follows User Traffic Load" in a Multi-Stage Network

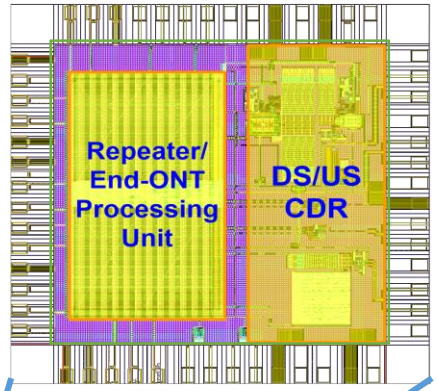
(Cascaded) Bit-Interleaving Passive Optical Network

KEY ACCOMPLISHMENT AND RESULTS

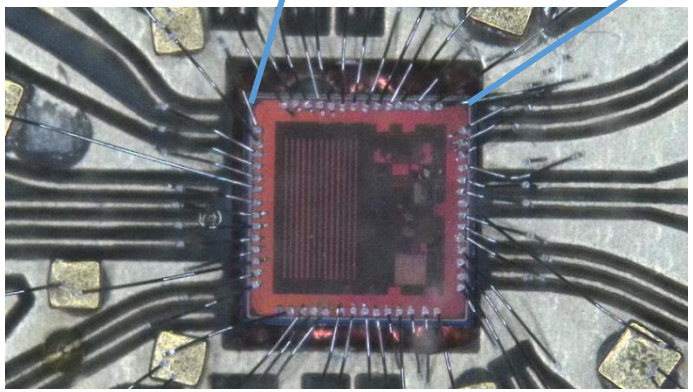
- Developed new scheduling and transmission protocols
- Power consumption measured on a preliminary custom-built ASIC prototype

CBI Repeater per ONU	Conventional aggregation switch per ONU	Power reduction
24 mW	121 mW	~5 x
CBI ONU (including Lev2-Repeater and 2xLev3 devices)	**Conventional ONU**	**Power reduction**
417mW	1863 mW	~4.5 x

GreenTouch™



A Dual-mode CBI end-ONT/Repeater ASIC (CABINET)



~5x Reduction Of Energy Consumption Enabled by CBI-PON at Repeater Node

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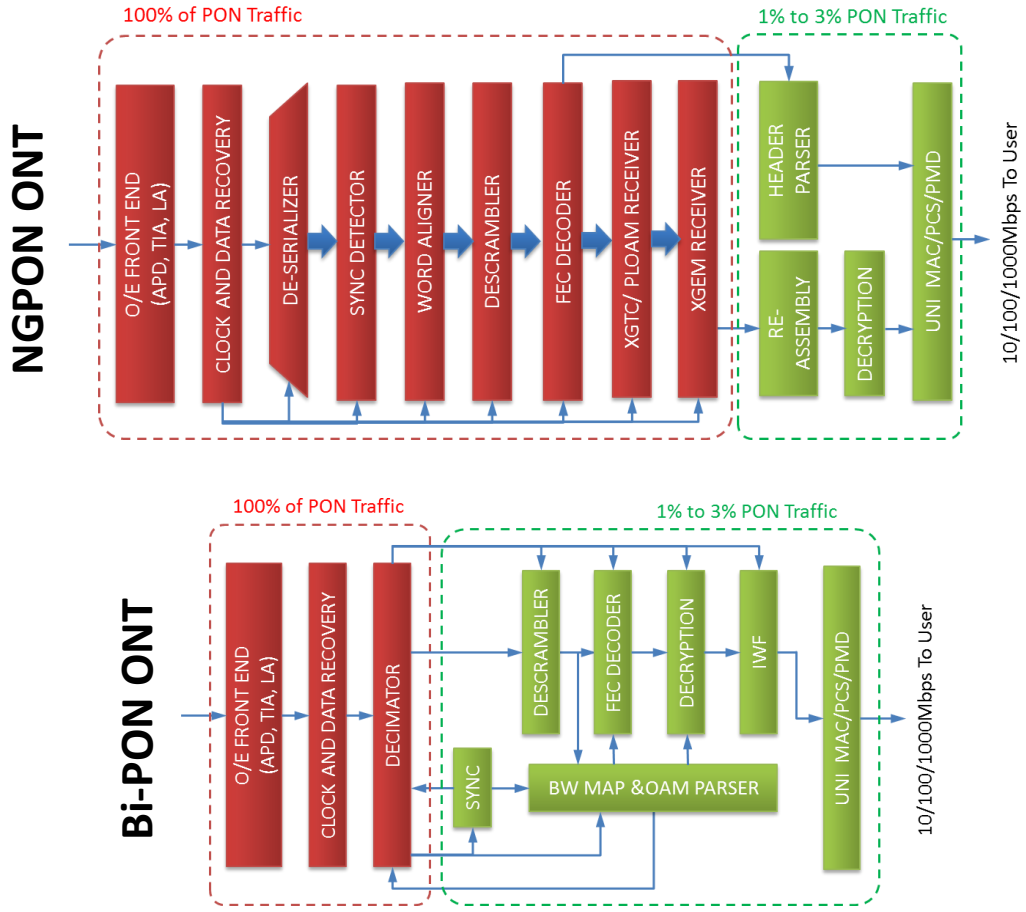
DEMO DESCRIPTION

- Demonstrate a single stage bit-interleaving passive optical network (Bi-PON) with live video traffic
- Real-time power consumption measurement of two Bi-PON ONT implementations, one in FPGA and one in ASIC
- Comparison to a conventional 10Gb/s NGPON ONT
- >30x dynamic power saving in protocol processing with our proof-of-concept implementation



Validates Power Follows Load with ~30x Reduction in Dynamic Power Consumption