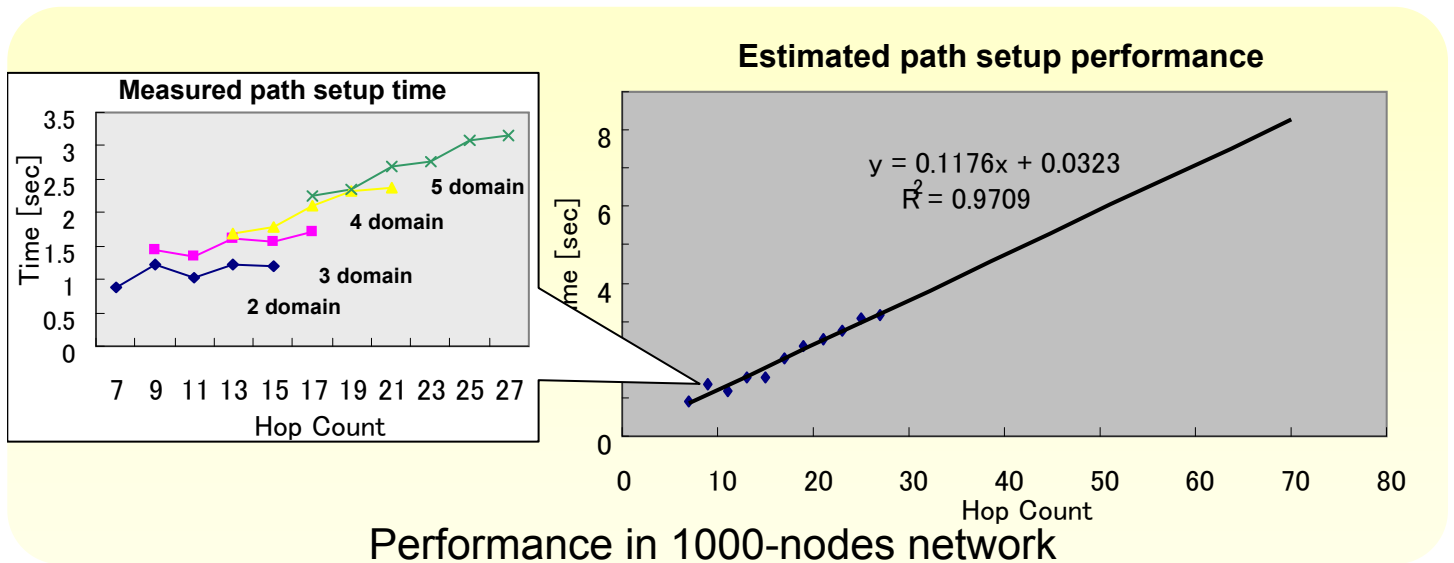
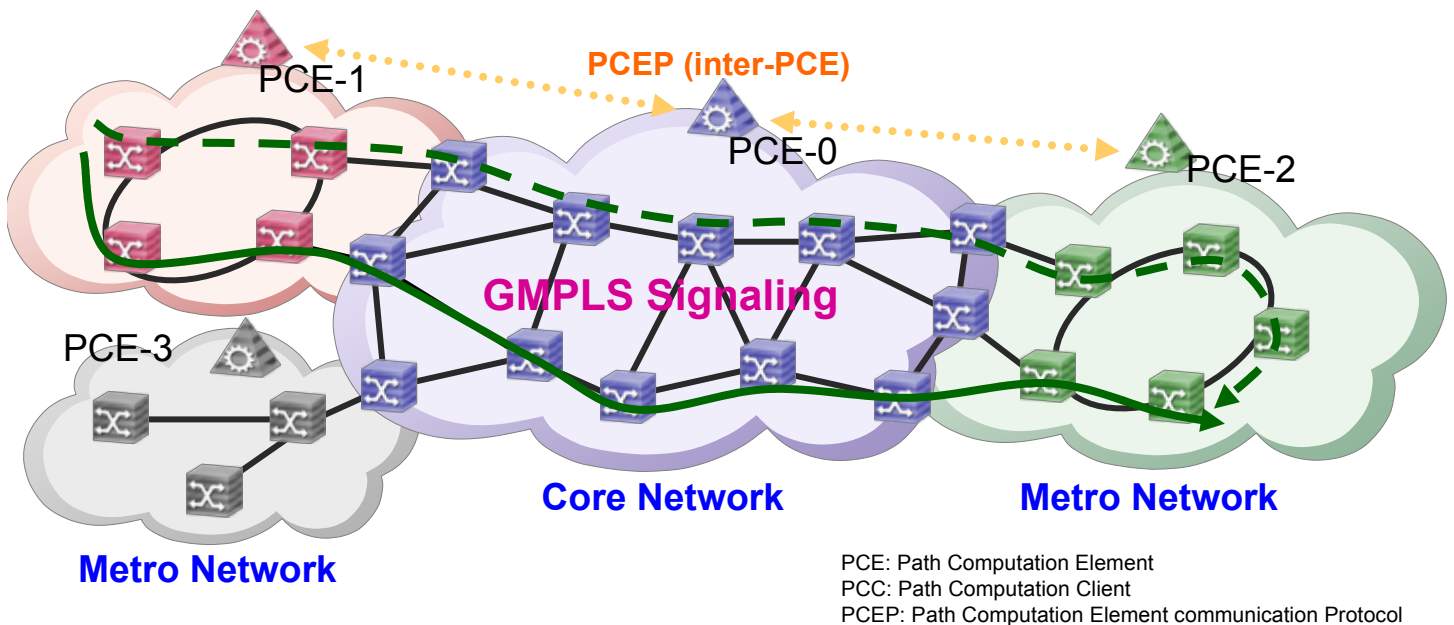


Dynamic multi-domain network control

Enables flexible and low-cost transport network operation

System features

- Scalable control architecture beyond 1000-nodes
- Inter-domain routing using PCEs w/ or w/o confidentiality
- Path computation optimized for multi-domain network
- End-to-end rapid path provisioning using GMPLS



Performance in 1000-nodes network



This work was partly supported by National institute of Information and Communications of Technology Japan.

Ultra-High Speed MAC Technology for 100Gbps LAN

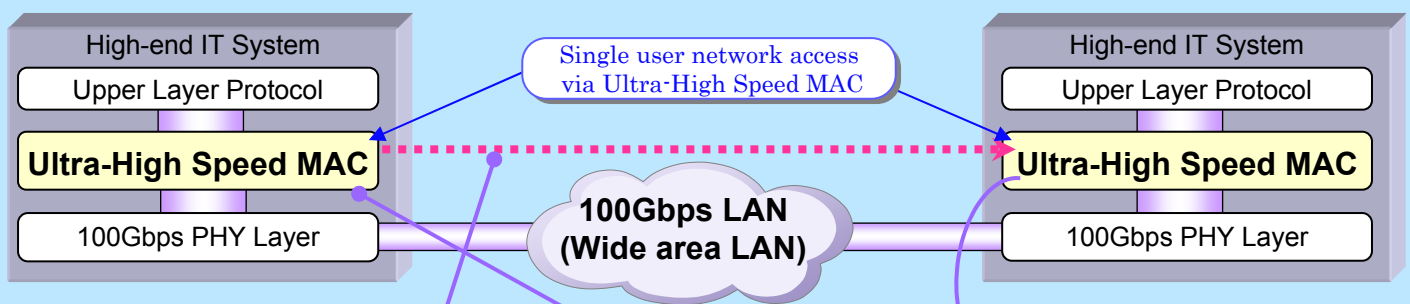
Background / Requirements

- High-end application (File transfer, 4K cinema) and Data Center require 100G link bandwidth
- A new MAC processing technology is necessary for effective use of 100Gbps link bandwidth

Highlighted Features

- Proposal of new MAC which enables frame retransmission, and Mega-MAC frame processing
 - ◆ Frame retransmission improves TCP throughput from 19G to 98G (1MB frame, 1,000km)
 - ◆ MAC frame length expansion from 1.5kB to 1MB(Maximum)
 - 1) Easily applicable to higher bit rate.
 - 2) Better MAC throughput due to reduced overhead
- Proposal of "Ultra-High Speed MAC" NIC architecture and core technology
 - ◆ Technology : 1) Buffer-less CRC-32 calculator , 2) direct memory access retransmission
 - ◆ 100Gbps FPGA Board for NIC prototype

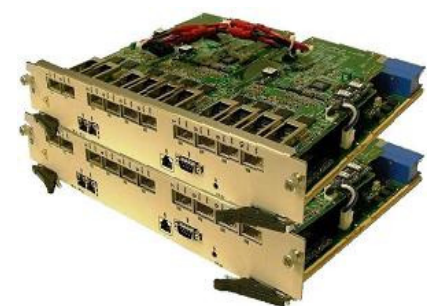
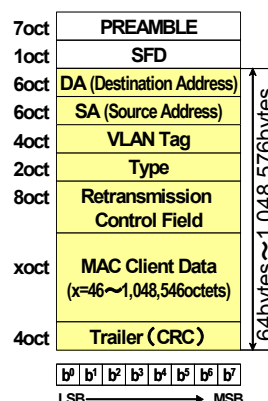
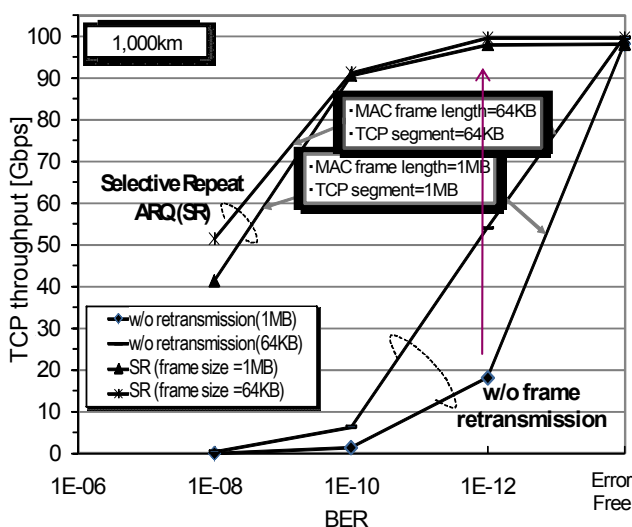
(* NIC : Network Interface Card)



MAC frame retransmission (Selective Repeat ARQ)

Mega-MAC frame

Core technology and NIC architecture



100Gbps FPGA Board for NIC prototype system



This work was partly supported by National institute of Information and Communications of Technology Japan. 本研究の一部は、情報通信研究機構(NICT)「λアクセス技術の研究開発」プロジェクトの成果です。

OIF Worldwide Interoperability Demo

EVPL over MPLS-TP

OIF: Optical Internetworking Forum, EVPL: Ethernet Virtual Private Line
MPLS-TP: Multi-Protocol Label Switching Transport Profile

OIF Worldwide Interoperability Demonstration

- Global test network based on seven carrier facilities
China Telecom, Deutsche Telekom, France Telecom, KDDI, NTT, Telecom Italia, Verizon

Demo Highlights

- Data plane interworking
 - MPLS-TP, PBB-TE and Ethernet switches
 - SONET/SDH and OTN cross-connects
- Control plane interworking
 - OIF UNI 2.0 application to NG transport networks, e.g. MPLS-TP
 - UNI2.0/E-NNI2.0 for EVPL over SONET/SDH services
 - Multi-domain service recovery

EVPL over MPLS-TP testing

NEC is the leading vendor demonstrating UNI-N capability.

- Point-to-point Ethernet services using MPLS-TP Pseudowires
- UNI 2.0 signaling for dynamic setup and teardown of the services
- Multi-vendor control plane and data plane interoperability

