

IT SMARTIZATION BY Growable Optical Networks

Simon Chan - Chief Scientist

Trinity Photonics Manufacturing Co., Ltd.

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Company Profile

Prof. Hon Tsang
(Our honorary advisor)



Prof. Charles Kao
(Father of Fiber-Optics)



➤ **Trinity Photonics** is founded in 2007 with HQ in Hong Kong Science Park

❖ **Co-Founder and CTO:**

Dr. Dick Chung, *PhD in EE (Optical) @ HK PolyU*

- 17+ years R&D in Optical Fiber Systems for Communications and Sensing

❖ **Co-Founder and Chief Scientist:**

Dr. Simon Chan, *PhD in EE (Photonics) @ CUHK*

- 20+ years R&D in Photonics Network and Systems for optical communication



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➤ Strong R&D and Technical Team

- 2 PhD – Design, R&D and Manufacturing
- 4 Degree – Project Management
- 7 Degree/HD – Project and Support Team
- 8 Experts – Fiber-to-Everywhere Installation Teams

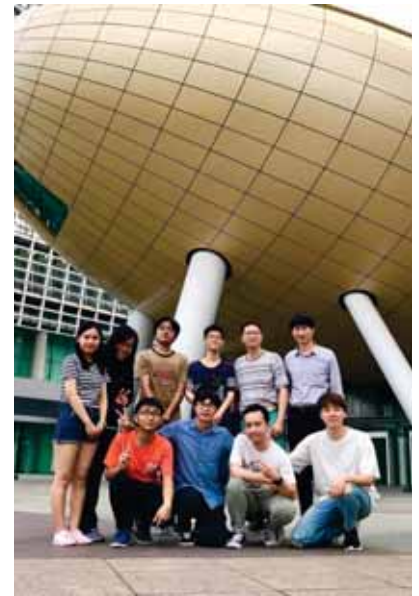
➤ Sustainable Total Solution

- Design
- Manufacturing
- Installation
- Maintenance and Support (present to future)

➤ Advanced Products and Professional Skill

- Special Fibers
- Transceivers
- Optical Network Units
- Fiber-to-Everywhere

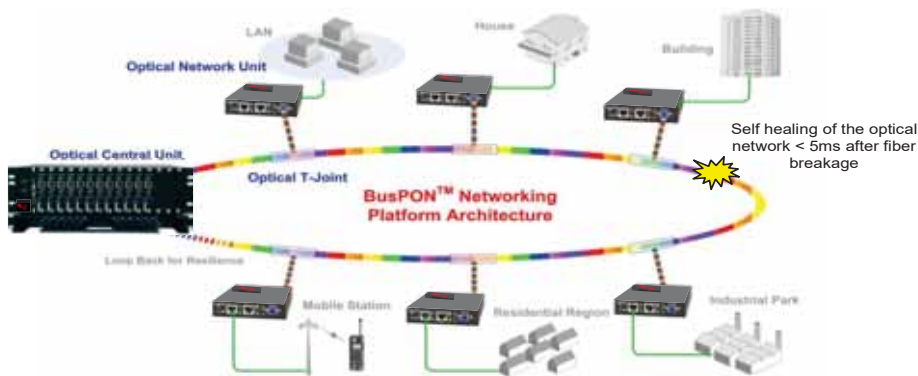
➤ Your Best IT Partner



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Innovation and Creativity: BusPON system Patents

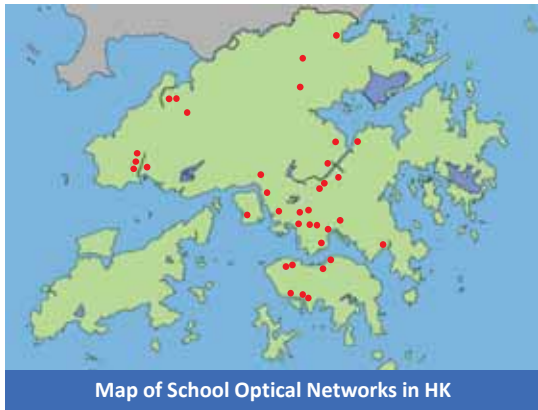


- 1st WDM Passive Optical Network deployed in **Bus topology**
- **BusPON-Metro** (for Metro and DCs) and **BusPON-Mini** (for FTTH)
- Bandwidth /node: 1 Gbps to 1 Tbps
- Growing network: Bi-directional, Upgradable and Scalable
- Can have node addition anywhere
- Multi-service by iWDM (infinite Band)
- Single fiber resilience < 5ms (demonstrated in OFC2013)
- HK and PRC Patents (exclusive right for 20 years)



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Map of School Optical Networks in HK



We provide COLOURs to Schools

- First deployed Fiber-to-Classroom
- 50+ School Optical Networks
- Growable networks by iWDM
- HD broadcast, WiFi, IoT, VR/AR
- Unlimited bandwidth for E-learning
- Fiber-to-Everywhere

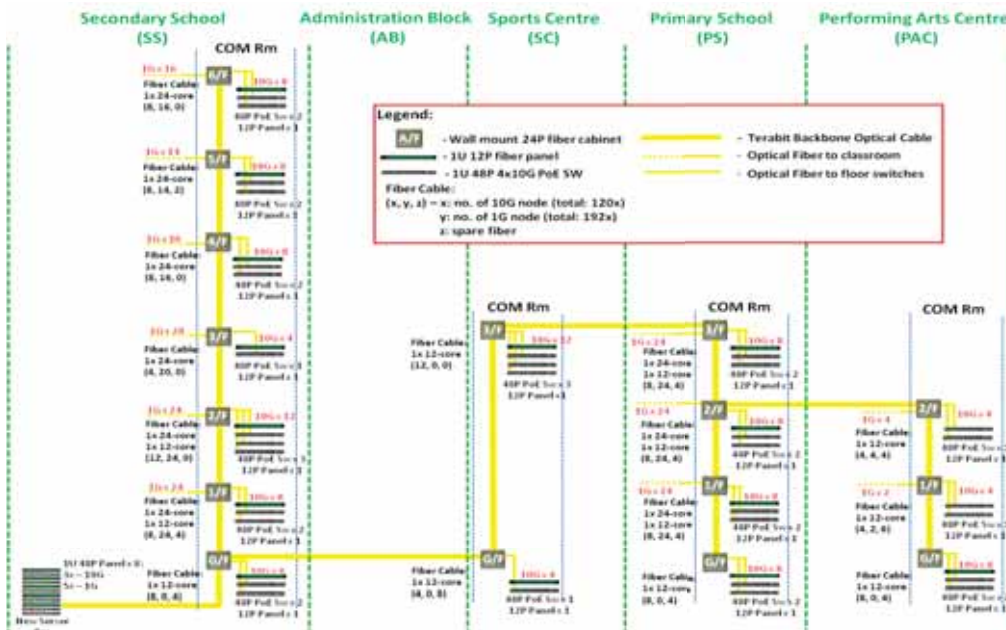


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Milestones: Growable Networks in School

The Best School Optical Networks



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Growable Network Installation: Fiber-to-Everywhere

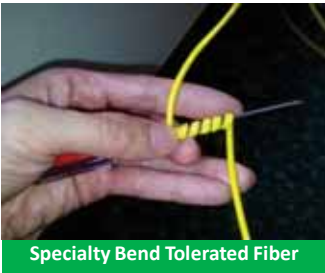


We install Optical Fiber to Everywhere

- World Class specialty fiber installation (> 120 km)
- Special installation technique for fiber in congested conduits
- Fastest and cost effective deployment
- Proprietary optical network testing for WDM-PONs
- Seamless network transition during installation
- Realized Fiber-to-Everywhere



Special Fiber installation in congested conduits



Specialty Bend Tolerated Fiber



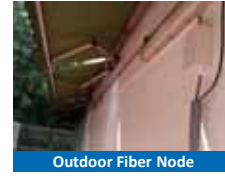
Fusion Splicing for all connections



Fiber-thru-the-Sewer



Railway Fiber Network



Outdoor Fiber Node



Fiber-under-the-Cabinet



Fiber-to-the-Desktop



Fiber-to-the-Stage



Fiber-to-WiFi AP



Fiber-to-the-Ceiling



Fiber-to-Floor



Fiber-to-the-Building

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Milestones: Growable Network in Metro Scale



We demonstrated the 1st Growable Super-highway in Hong Kong

40 to 100
Colours (services)
In 1 optical fiber

26,000+
4k videos streaming
in both directions

0.005 sec
Self-healing
After fiber breakage

50 km
Serviceable
Distance

Growable
2x total bandwidth
For ALL HK people

4x
Bandwidth faster
Facebook Link



Optical Super-highway between Chinese University of Hong Kong (CUHK) and Hong Kong Science and Technology Park (HKSTP) - 2016 December



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Milestones: Growable Network in Smart Cities



We demonstrated the 1st Growable Network for Smart Cities

- 100** Services In 1 Network
- 4 to 20** Buildings In 1 Fiber
- 20,000+** PCs and Phones
- 15 mins** Setup network For new Building
- 0.005 sec** Self-healing after breaking
- Growable** To serve whole population



Hong Kong Science Park - 2017 April

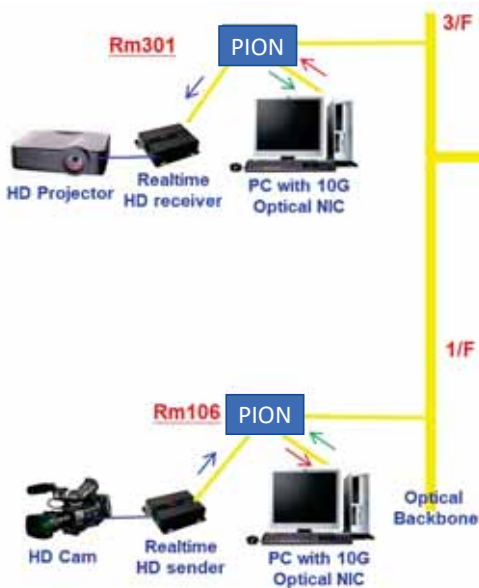
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Demonstrated Growable Realtime Network



1st demo Real-time Uncompressed Video and IP data in ONE network



Zero delay HD video delivery

- Real-time HD video and 10G IP data
- Zero latency
- Realtime 2 way surveillance
- Make road to APS (Accident Prevention System)
- Real-time Ai System required

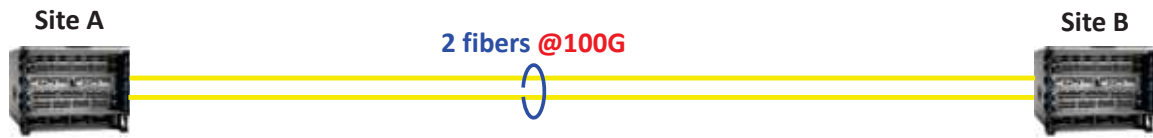


Compact size Optical MUX

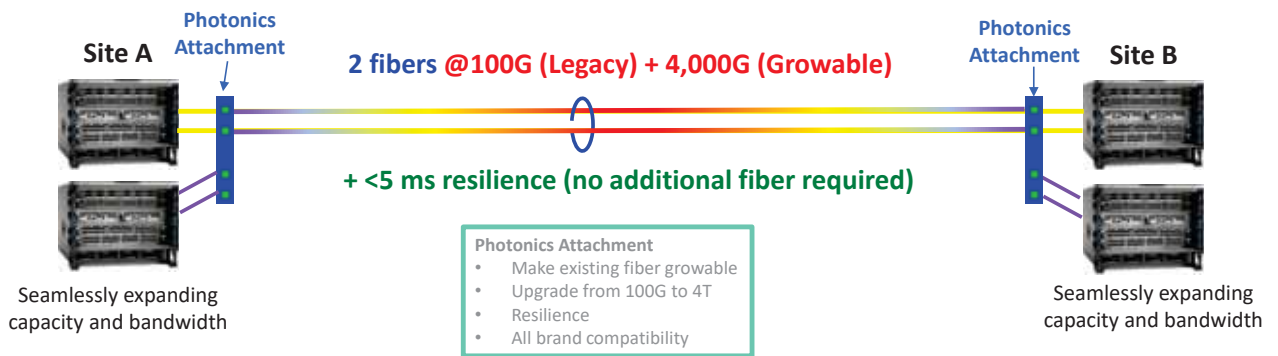
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Traditional



Smartization



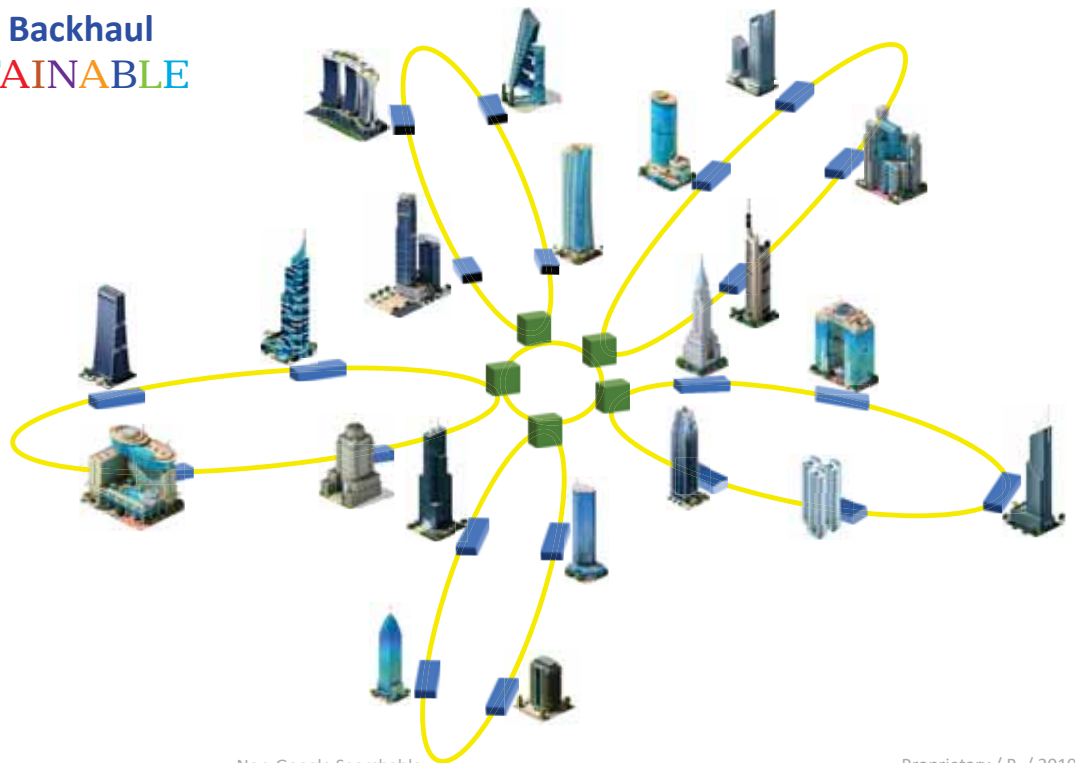
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PiON Solution – 5G, 4K IP-TV and FTTH Backhaul

We make Optical Network Backhaul **SCALABLE** and **SUSTAINABLE**

- Tbps per fiber
- Use minimum existing fibers
- 10G per 5G node
- 100G to Building
- Photonic Intelligent Flowernet
- Fastest resilience (< 5ms)
- Can support large scale 5G BTS
- Smooth 4K/8K IP broadcast
- Real-time monitor and control
- Future Bandwidth Expandable
- Fiber-to-Everywhere



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PiON Solution – Smart City Infrastructure



We make City **SMARTER** and **PEACEFUL**

- Reliable Tbps networks
- Use minimum existing fibers
- IP and Realtime signals concurrently
- 2 way realtime communication
- Photonic Intelligent Flowernet
- Fastest resilience (< 5ms)
- Can support Realtime Ai
- Direct integrate with Ai DC
- Real-time monitor and control
- Future Bandwidth Expandable
- Fiber-to-Everywhere



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Reference: News Media for “Growable Optical Network”



(1) 1st Demo of Growable Optical Network in the world
[Apple Daily \(28 Mar 2014 / HK\)](#)



(2) Growable Optical Network in School
[Tai Kung Pao \(9 May 2014 / HK\)](#)



(3) Regenerated Optical Network
[Hong Kong Economic Times \(12 Jan 2017 / HK\)](#)



(4) Unfailing Optical Network
[Singtao Daily \(12 Feb 2017 / HK\)](#)

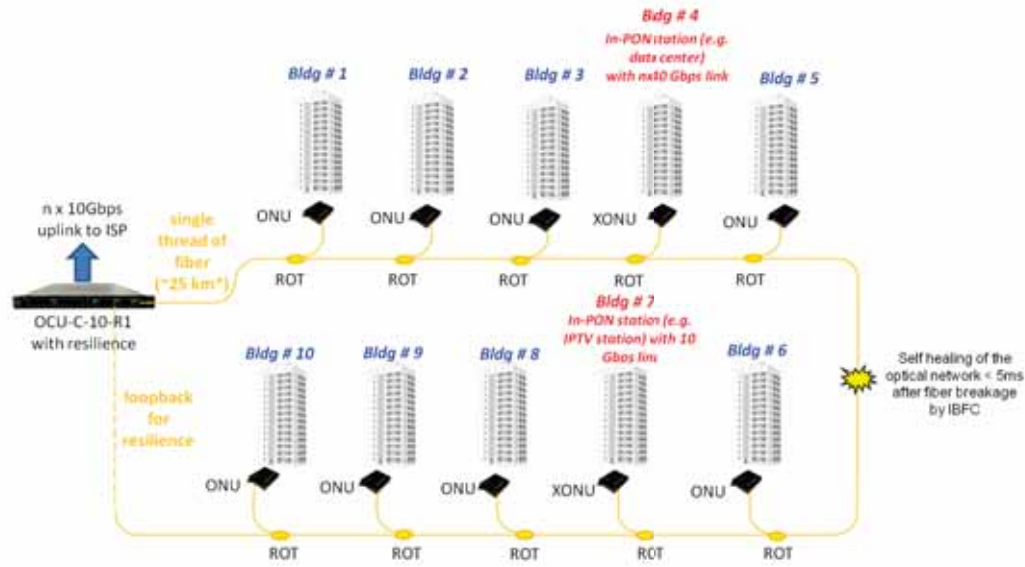


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Reference: Proposal for a WDM-ring in Silicon Valley

BusPON Metro-series



- Replace their existing from WDM ring with double ring to single ring
- Resilience <5ms (compared to existing 50ms)
- Ring to 10 building in Palo Alto
- Requested by Fiber Internet Center (CTO) – Bob Evans in 2013

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Reference: Installed Growable Optical Networks



(1) Academia (50+ schools)



(2) Others



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Our Next Step



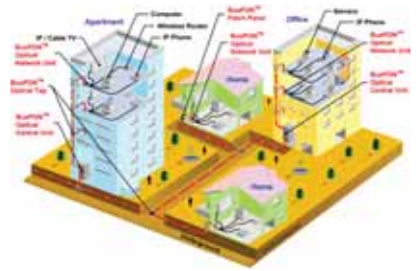
(1) 5G mobile backhaul

- Low capex
- 1 fiber for multi- Bldg
- Unlimited bandwidth
- Fast deployment
- Resilience



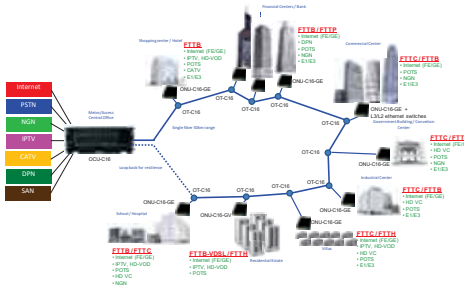
(2) FTTH Smart Home

- Low capex
- Internet, 4k and 5G
- Unlimited bandwidth
- Fast deployment



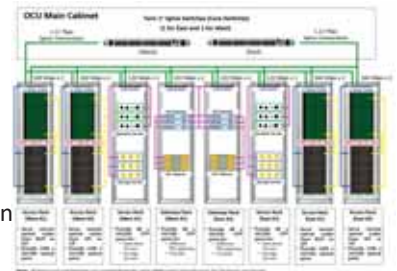
(3) Smart Cities

- Low capex
- 1 fiber for multi- Bldg
- 5G, 4k, real-time IoT
- Unlimited bandwidth
- Fast deployment
- Resilience
- In PON station



(4) Smart Data Center

- Low capex
- Scalable Core
- Unlimited bandwidth
- Fast deployment
- High Availability
- Scattered Sites connection



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Interested to LIGHT UP the World with us?

Please feel free to contact

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