

CASE STUDY

New High Capacity 100 Gb/s Network for Hong Kong



CUSTOMER NAME

HUTCHISON GLOBAL
COMMUNICATIONS
LIMITED

CHALLENGE

- Major upgrade of primary network in Hong Kong
- Need to maximise flexibility and capacity
- Need for a cost effective and speedy implementation
- Need for low latency for banks and data centres

SOLUTION

- Innovative network design that was an alternative to the initial proposals from other vendors
- The Infinera TM-Series optical networking platform
- Transport Network Manager (TNM)

RESULTS

- Dramatic capacity increase with 10 Gb/s, 40 Gb/s, 100 Gb/s over the same network infrastructure
- Increased level of control
- Trouble free networking infrastructure
- Significantly lower power consumption
- Ultra-low latency



Hutchison Global Communications Limited

(HGC) is a fixed-line operator for one of the most dynamic business, banking and financial communities in the world – Hong Kong.

HGC is ideally positioned to meet the needs of both commercial and public sector customers in Hong Kong and abroad, as well as Hong Kong residential customers.

HGC also provides wholesale services on a one-stop-shop basis to support mobile network operators, international carriers, multi-national corporations, internet content providers and global application service providers.

In order to best serve the increasing demand for high capacity bandwidth, HGC needed to build a world-class telecommunications infrastructure to provide on-going reliable high-speed services and support its financial, corporate trading customers and international carriers.

To meet the increasing demands of its customers, HGC's new network needed to be a highly efficient, flexible and scalable optical network with low latency.



Hong Kong Island, Part of the Region that HGC's New Network Had to Cover.

Geographic Challenges As Well As Power and Apac Constraints

HGC's new network had to cover the entire region, including the Hong Kong Island, Kowloon and the New Territories, comprising 1100 km² and a population in excess of 7 million.

The network would need to interconnect a large number of customer premises, such as major banks and other locations including data centres and international submarine cable landing stations.

At the same time, it had to meet the requirements of low power utilisation and offer compact nodes at all locations to save on both energy and space.

Hong Kong Island, part of the region that HGC's new network had to cover.

HGC undertook an intensive search across a broad range of companies and technologies to find the most appropriate network vendor to meet the demanding needs of its customer base.

"Our goal is to provide our customers with the best quality, high-speed services through our extensive fibre network."

***—Byron Chiang, Technology
Director, Hutchison Global
Communications Limited***

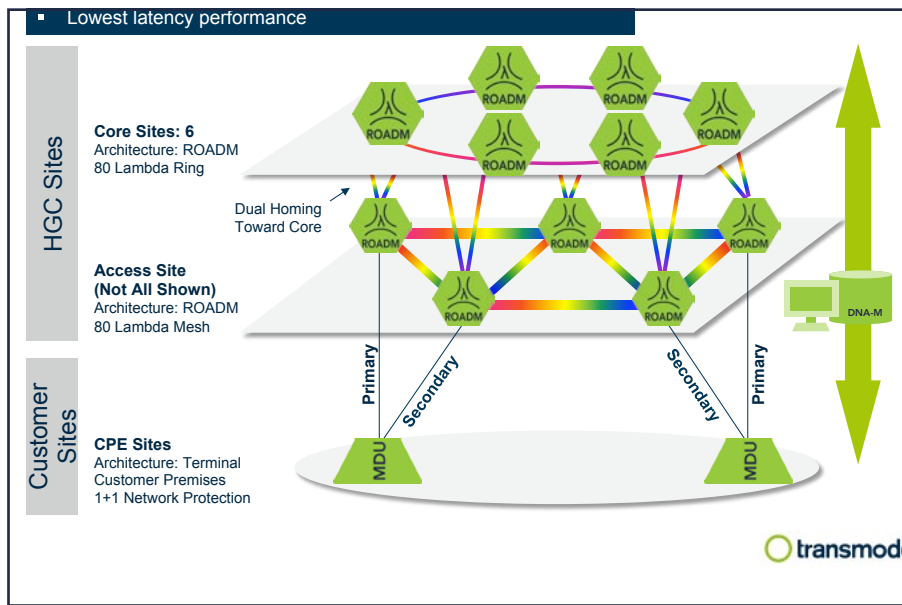


Fig 1. The Infinera Optical Network Offered to HGC.

locations including enterprise customers, data centres and international cable landing locations. This traffic is delivered to multiple access sites with each CPE connecting to separate primary and secondary access nodes to provide 1+1 protection options to all traffic.

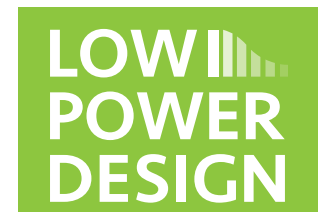
The access nodes are in turn connected to a very high capacity six-node core ring that transverses the region. Each access node is again dual-homed to two core nodes to provide protection options.

After evaluating the network design and traffic forecasts, Infinera proposed a flexible optical networking solution, with additional ROADMs to create an all-optical design.

This approach had a number of differences from the alternative solutions that needed detailed evaluation by HGC.

Consequenses and Benefits with the All-optic Design

Firstly, the design offered great economic advantages due to lowered equipment, power and space costs, leading to additional operational expenditure (OPEX) savings.



The Proposed Infinera Network Offered Significant Benefits in Terms of Lower Power Costs.

The Infinera Consultative Design Approach

It was during this evaluation process that HGC made contact with Infinera, and discovered the company's consultative approach for design of new networks.

In this process, Infinera took into consideration all of HGC's current and likely future needs and looked at the entire network with the likely requirements of HGC's customers in mind.

Infinera suggested a new approach – a Flexible Optical Networking solution that would boost capacity and reach, while expanding HGC's service options. This reconfigurable optical add-drop multiplexer (ROADM)-based Layer 1 solution was attractive to HGC

because it reduced the capital expenditure of alternative solutions and gave strong technical differentiation, such as low latency capabilities, and Infinera was invited to demonstrate its concept.

Design Option Considerations

Being a regional network required to handle vast traffic volumes, the network in Hong Kong posed considerable challenges. The traffic levels that had to be carried by the network dictated that the network had to be very resilient. The new design also needed to be highly flexible to support the various traffic flows across the network.

The Network Topology

The network collects traffic from a large number of customer premises equipment (CPE) end



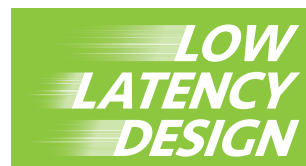
"When we looked at implementing our Hong Kong high-capacity core network for 100 Gb/s, Infinera proposed a radically different solution that provided us with remarkable power savings over other proposed architectures. This significantly reduces the running costs of our network."

***— Byron Chiang, Technology Director,
Hutchison Global Communications Limited (HGC)***

This network design avoided deploying large electronic cross-connects, meaning the network does not have traffic grooming functionality. But the overall economics are better so that a partially full all-optical wavelength is more economical than any alternative.

Also the growth rates in the network ensured that these wavelengths would not stay partially full for long and would fill up within a short period of time.

To address protection/restoration capabilities, Infinera had to ensure that the all-optical design included protection options for all traffic types, from all nodes.



Infinera Low Latency Design Added Value to HGC.

Besides the original high-speed core node ring, the new all-optical design added a mesh based network at the lower access node level, as shown in Figure 1 on page 2. This combination of both ring and mesh architectures ensured the lowest possible path length between customer nodes. It also ensured the lowest possible latency through the all-optical design and low latency transponders.

The network is fully supported by the Infinera Transport Network Manager (TNM), the Transport Planning Tool (TPT) and the ecosystem partner Network Mining's capacity management/planning software.

Simplified Customer Access

To ensure customers can be connected quickly and simply, Infinera worked with HGC to define simplified common access kits including the Infinera TG-Series passive wavelength division multiplexing (WDM) filters for simplified patching. These access kits are stocked locally to ensure fast delivery to site and quick customer turn-up and shorter time-to-revenue.

Successful Proof of Concept

The network team at HGC was very thorough in its vendor evaluation process, especially so with those final shortlisted companies. Being one of these companies, Infinera had to prove the viability of its equipment and architecture, and that using "big fat pipes" was the most sensible way of accommodating the communications traffic patterns in Hong Kong.

Infinera was given four weeks to demonstrate that its network design would maximize the capacity of HGC's network, as well as match the company's need for a cost-effective, quick-to-implement and easily scalable solution.

As early as day one of the four-week trial period, there was evidence that the Infinera concept would be an effective way of building a network because the equipment was shown to work on all optical links.

Based on the TM-Series, the Infinera solution supports up to 80 wavelengths carrying up to 100 Gb/s per wavelength. It therefore achieves a high level of flexibility with various amplifiers, ROADM and tunable transponder options, allowing for protected 2.5 Gb/s, 10 Gb/s, 40 Gb/s, and 100 Gb/s transport connections over the same network.

After rounds of rigorous testing, evaluation and careful consideration, HGC selected the Infinera TM-Series together with the Infinera TNM multi-layer management suite because of its flexibility and ease of installation and use.

HGC will also utilise the Infinera Transport Planning Tool to plan on-going network and capacity expansion.

Cost, Footprint and Latency – Key Values

Cost: Together with the cost-savings in capital expenditure, HGC is also benefitting from the on-going operational cost-savings in terms of low power usage and space.



The Reception of the Core Network Innovation of the Year Award.

Footprint: Particularly important on the densely-populated island of Hong Kong is the small footprint of the Infinera equipment in the high rise buildings where space is at a premium. The above-average card density of the TM-Series equipment means a greater number of potential interfaces is achievable in confined spaces.

Latency: The low latency is ideal for new and existing customers, especially those in the financial sector.

Network Management: Enlighten helps HGC carry out day-to-day activities associated with managing its transport network and services.

Award Winning Project

In December 2013, the project was awarded the Core Network Innovation of the Year award at the Telecom Asia's Readers' Choice & Innovation Awards.* The award was presented at an awards dinner in Singapore and

recognised the innovation and the hard work by both HGC and Infinera to quickly deploy this innovative network.

Conclusion

Infinera has provided HGC with a highly sophisticated, yet elegantly simple, high capacity network and has enabled HGC to easily add new services as it grows.

The design has delivered great performance advantages to the HGC network with enhanced performance in areas such as low latency and overall economics, enabling HGC to better address a broader customer base in Hong Kong.

Overall, this network has provided considerable capital expenditures (CAPEX) and operational expenditures (OPEX) advantages for HGC while simplifying network operations and new customer additions.

About Infinera

Infinera (NASDAQ: INFN) provides Intelligent Transport Networks, enabling carriers, cloud operators, governments and enterprises to scale network bandwidth, accelerate service innovation and simplify optical network operations. Infinera's end-to-end packet-optical portfolio is designed for long-haul, subsea, datacenter interconnect and metro applications. Infinera's unique large scale photonic integrated circuits enable innovative optical networking solutions for the most demanding networks. To learn more about Infinera visit www.infinera.com, follow us on [@Infinera](https://twitter.com/Infinera) and read our latest blog posts at blog.infinera.com.

About Hutchison Global Communications Limited

Hutchison Global Communications Limited (HGC) owns one of the largest fibre-to-the-building telecommunications networks in Hong Kong. Since establishment in 1995, it has been fully committed to building its own optical-fibre network infrastructure and introducing advanced facilities.

Coupled with its four cross-border routes integrated with all three of mainland China's tier-one telecommunications operators and world-class international network, HGC provides a comprehensive range of fixed-line telecommunications services locally and overseas.

HGC is a subsidiary of Hutchison Telecommunications Hong Kong Holdings Limited (HTHKH, Stock Code: 215). HTHKH is a leading integrated telecommunications service operator, offering mobile and fixed-line services to local and international customers.

For more information on HGC, please visit www.hgc.com.hk.