Peering Asia 2.0

Journey Stepping Toward Peering World and Cloud Gateway

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Vice President, Production and Service Development
SUNeVision Holding Ltd.
Oct 2018

About SUNeVision

Strong Financial Background

Owner-Operator Model

Endorsed by the Best

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Largest Carrier-Neutral Data Centre Service Provider in Hong Kong

18
Years+
Proven Record

5
Data Centres

1.5
Million
ft² GFA

1st High-tier Greenfield
Data Centre In Tsung Kwan O

New Land
Acquired In Tsuen Wan

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Internet Data Centre – Connecting the World

200+

Telcos, ISP,
Cloud Providers

12,000+

Cross-connect

Covering Major

BELT AND ROAD

Countries

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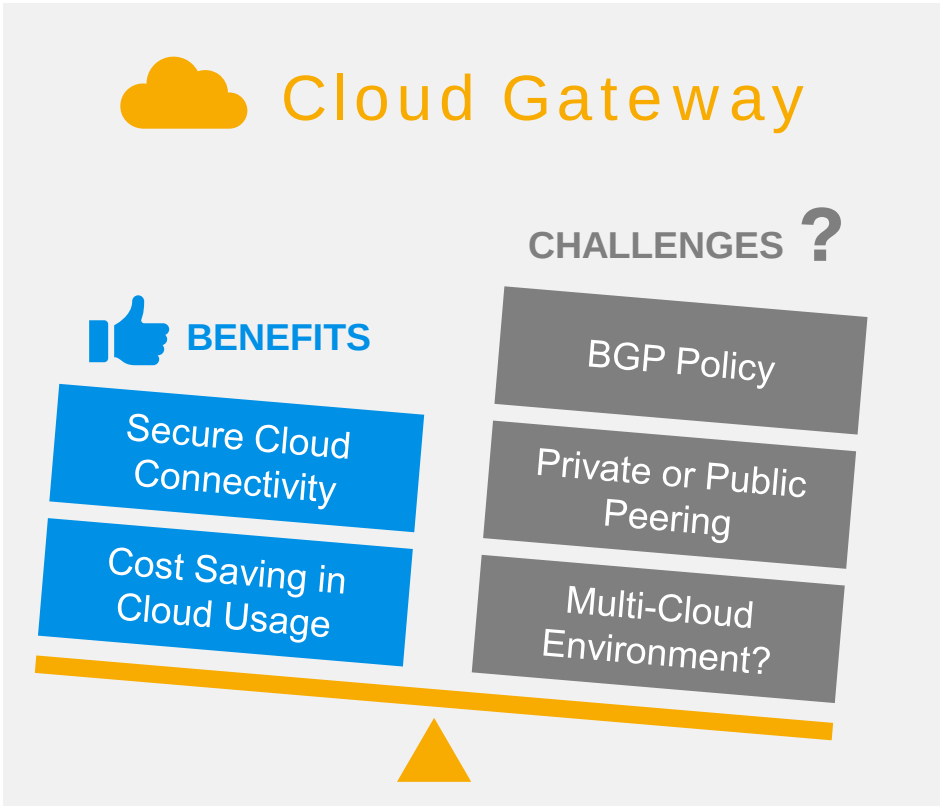
Peering World & Cloud Gateway by ISP / OTT?



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What's happening in an Internet Data Centre?

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Journey to Peering World

WAN Link Mainly by Paid IP Transit	Small Portion of Traffic through Free Peering	IP Gravity Growth	WAN Link Mainly by Free Peering and CDN
Completely IP Transit Buyer • Expensive bandwidth • No room for traffic growth • Poor customer experience	**Amateur Peering Player** • Where is our traffic going? • How much traffic in place? • Overseas PoP for Far-End peering?	**Peering Challenger** • Costly backbone • Multi-home traffic? • Quality Assurance (Bandwidth consuming & latency sensitive traffic)?	**IP Transit Seller or CDN Owner** • Peering policy (Restricted, Selective, Open)

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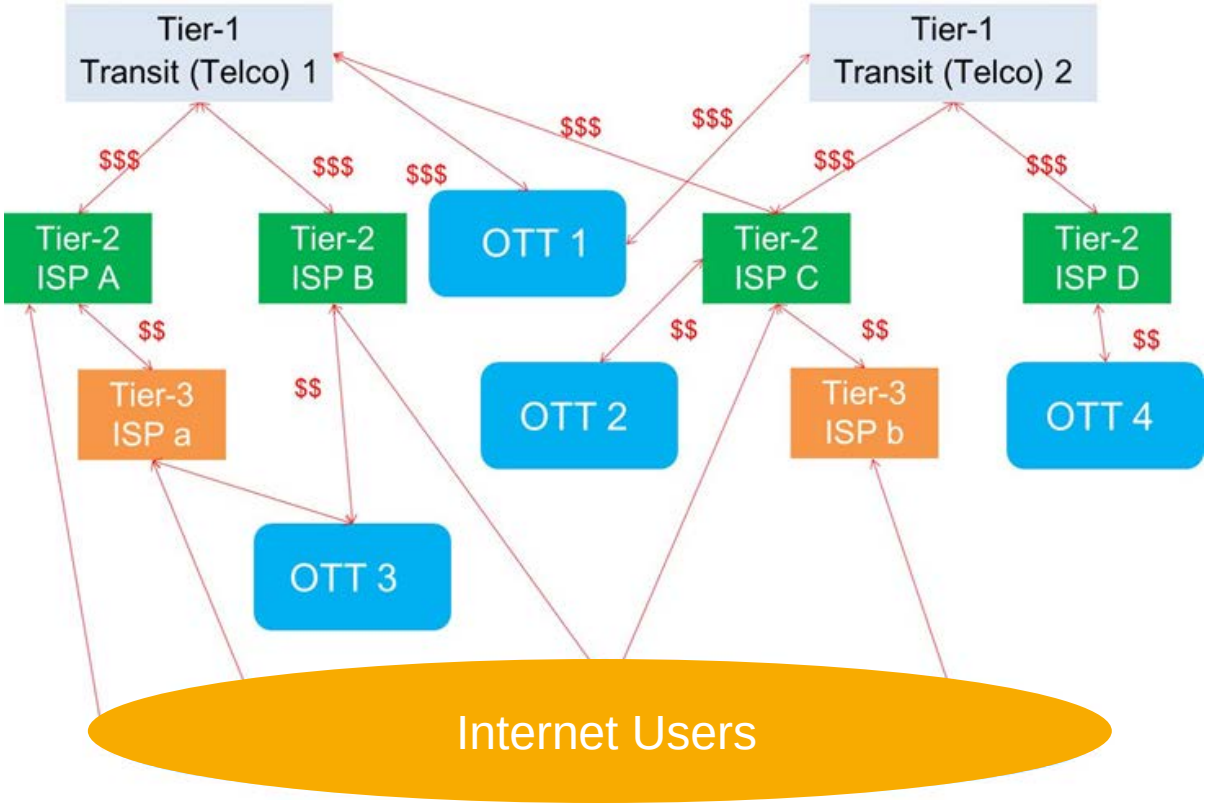
Internet without Peering in the Past

WAN Link mainly by Paid IP Transit

Completely IP Transit Buyer

- Expensive bandwidth
- No room for traffic growth
- Poor customer experience



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Incentives & Motivations for Peering

Lower Transit Costs

IP Transit MRC (Asia Market)	USD / Mbps
Mainland China (South)	>100
Mainland China (North)	>60
Taiwan	>20
Intra-Asia Pacific	>10
US / Europe	>5

Lower Latency, Better Performance

Asia - US	SE Asia / North Asia - HK
RTD >200ms	RTD >40ms

Burstable Traffic Capability

Volatile traffic pattern of

Video /
Cloud /
Patch Download

Marketing Benefits / Further CDN Collaboration

- OTT / ISP Marketing Promotion (e.g. Video-on-Demand collaborations)
- Edge Node / CDN Collaborations

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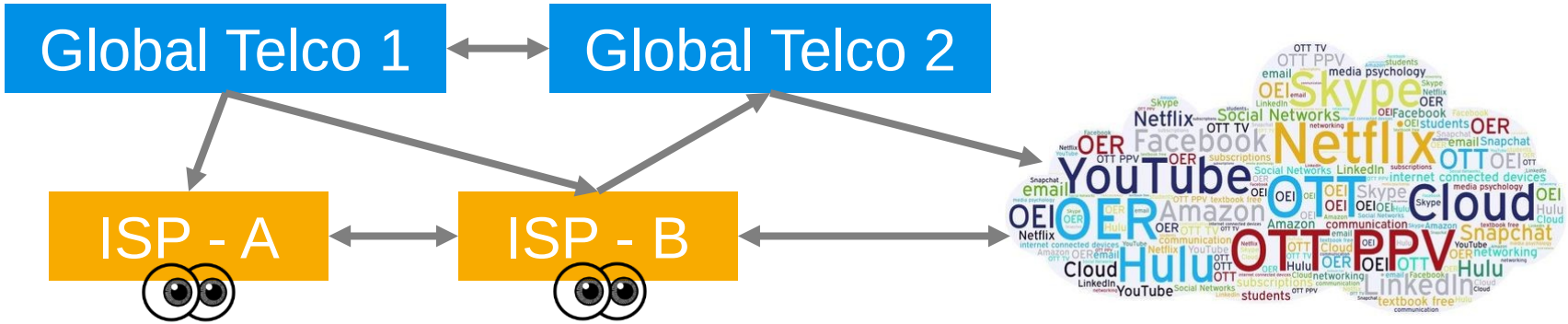
Journey to Peering World



Traffic Kept Growing

High-bandwidth Consuming Applications

- Cost Increase
- Performance Degrade

ISP - ISP

Peering Consideration

- Balanced In/Out Traffic
- Local / Remote Peering Or Mid-point Peering

ISP - OTT

Peering Consideration

- OTT Popularity
- Hit Ratio
- Bandwidth Consuming Or Latency Sensitive

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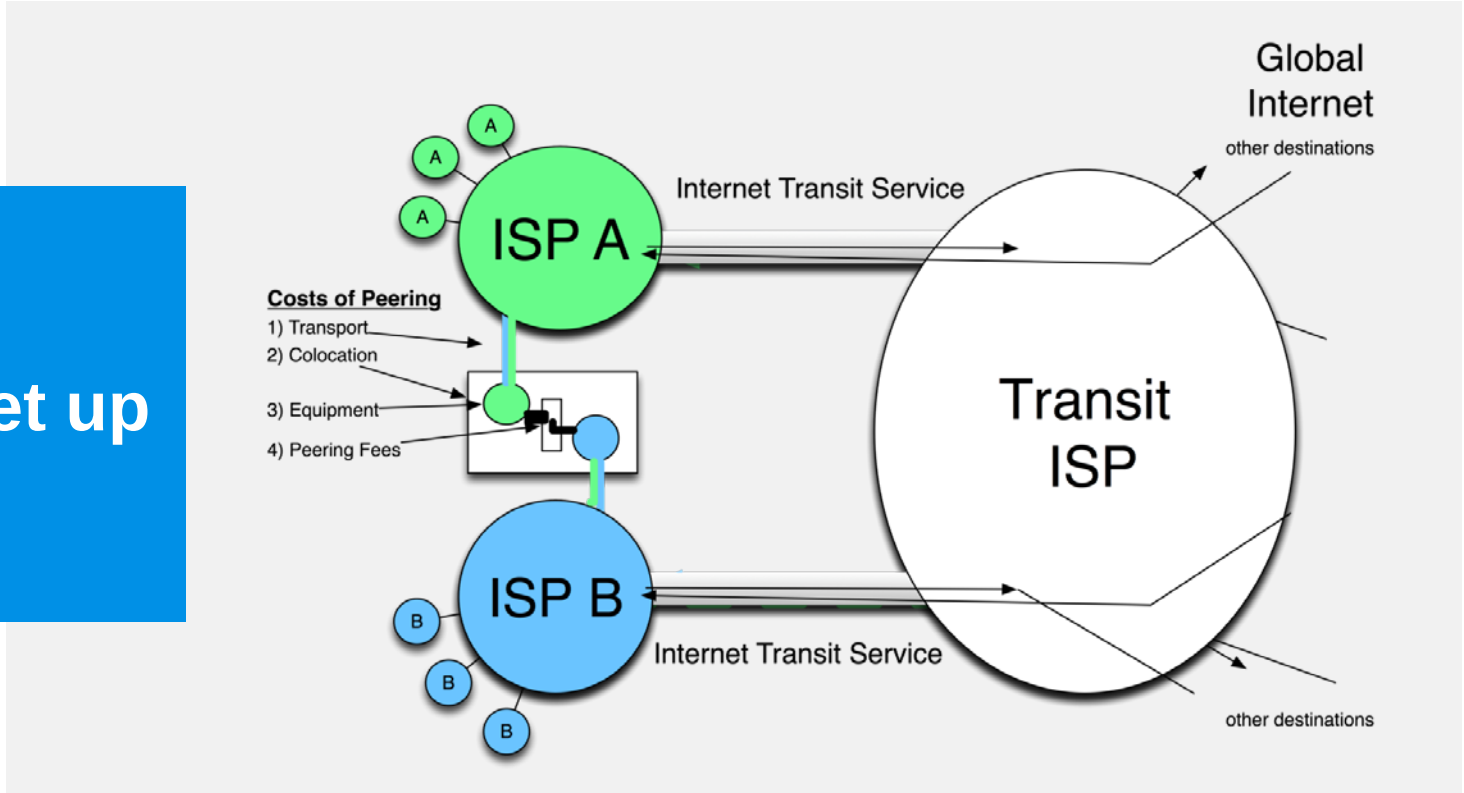
Journey to Peering World

PoP Set up



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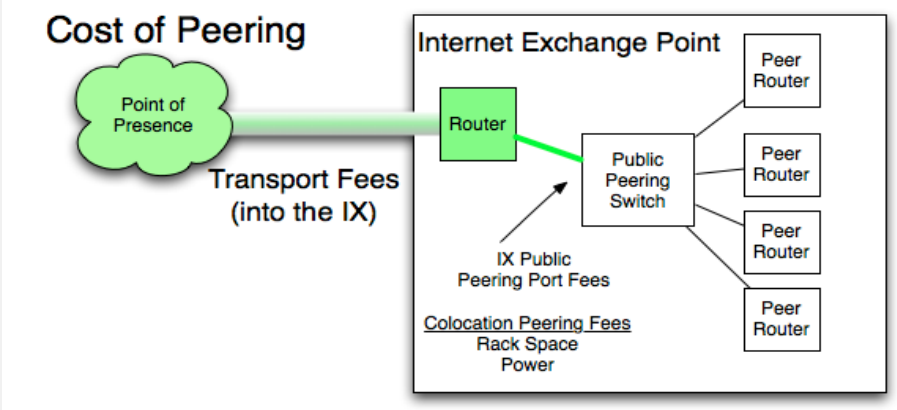
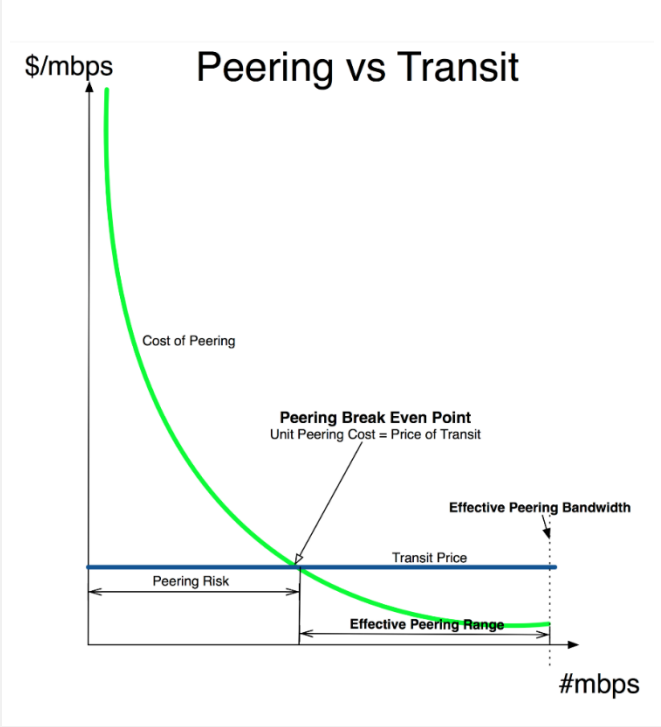
Considerations before Peering





Peering is NOT FREE

1. Transport Fees
2. Colocation Fees
3. Routing Equipment
4. Peering Fees (Port, membership, etc.)

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Journey to Peering World – Peering Locator

Peering Start up

- Unknown Traffic / Quality Information
- Difficult decision to change from Transit to Peering

Traffic Ramp Up

Peering Scale up

- Traffic / Quality Information well understood
- Decision between Public and Private Peering

PUBLIC PEERING

TRANSITION

PRIVATE PEERING

- To manage peering session in a more flexible way
- To enjoy the Aggregation Benefits
- To determine / stimulate the volume of peering traffic to minimize the peering risk

- Traffic growth made it financially justified
- Better Network monitoring and Traffic Management for trouble-shooting
- Higher Availability and Reliability

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IP Gravity Growth

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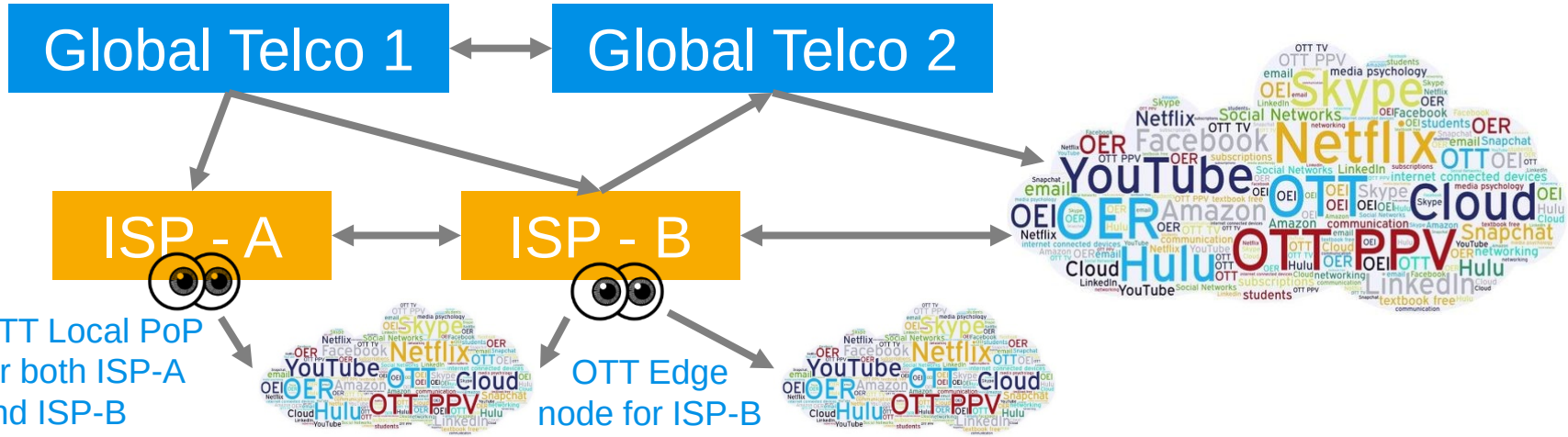

IP Gravity due to Better Customers' Experience

1. Backbone Cost Increase
2. Backbone Resilience Needs
3. Complexity in Traffic Management
   - Multi-Home issue (Paid Transit Versus Peering Link)
   - Multiple VLAN during Peering Upgrade

Possible Solutions

- Local PoP for CDN Set Up
- Traffic Separation (By User Group or By Applications)

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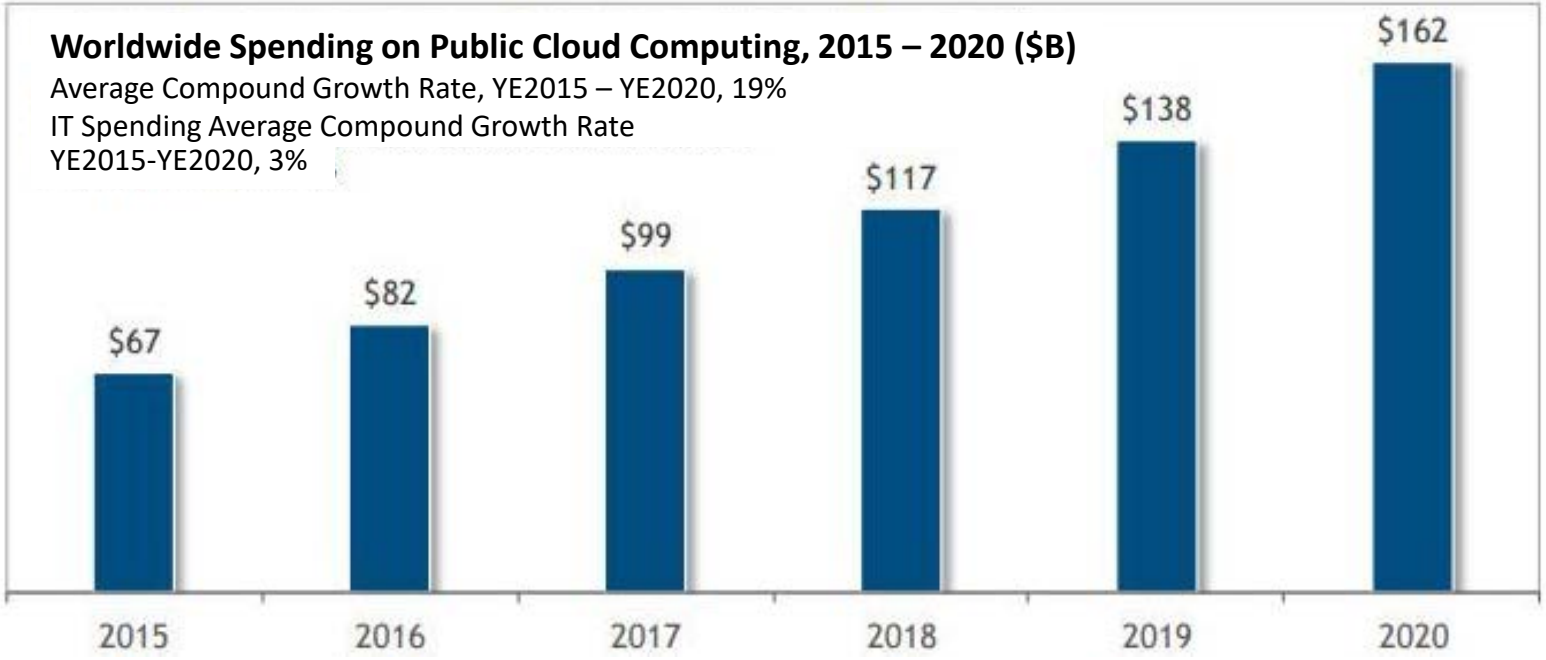
Explosive growth in Cloud Adoption

for Digital Transformation

The Rapid Growth of Cloud Computing, 2015 - 2020



Source:
IDC, 2016

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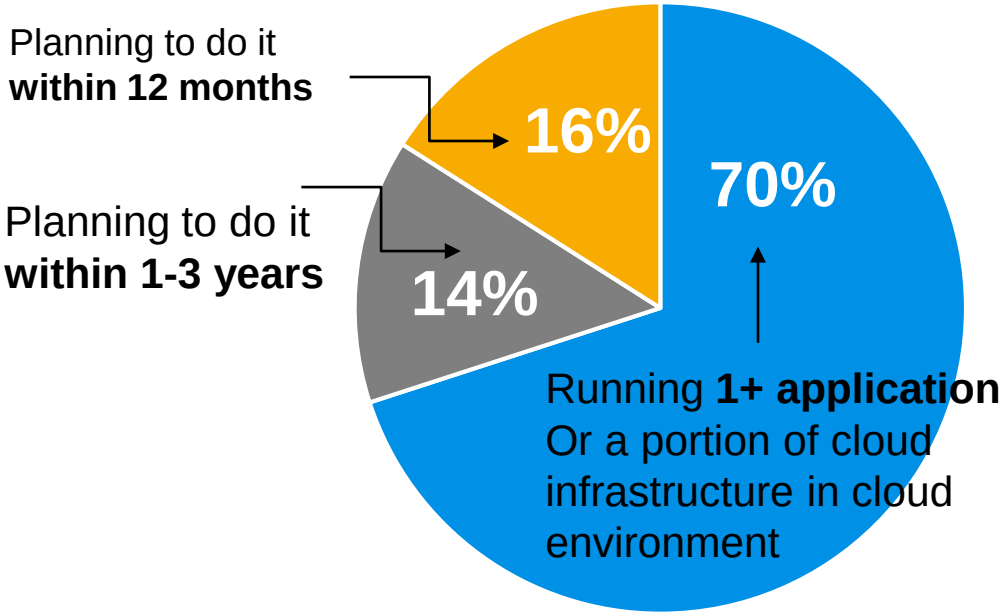
Cloud Adoption comparison between US & Asia

What are your organization's cloud deployment plan?



In the US

- Almost all Enterprises have cloud deployment strategy
- Significant number of the enterprises are running their applications on cloud environment

Sample of 925 IT executives in the US
Source: IDG, 2016

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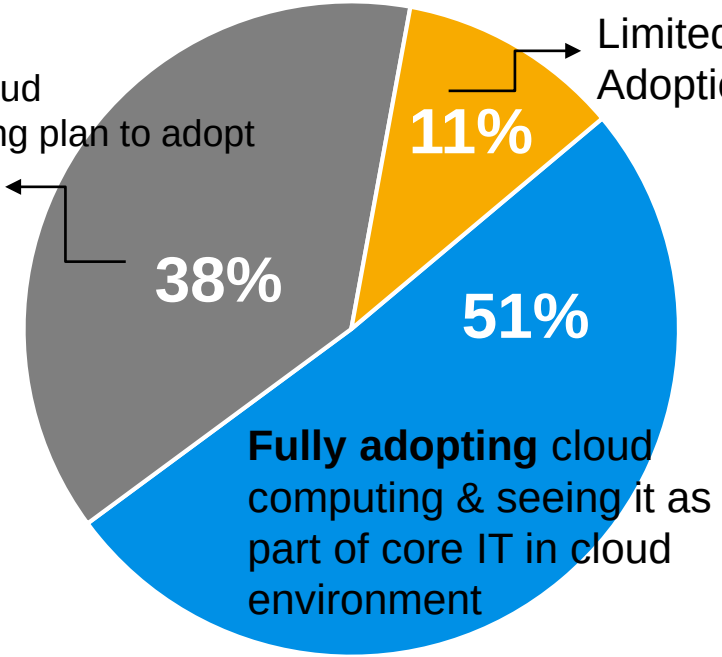

Sample of 65 IT executives in the HK & SG
Source: Workday & ServiceNow, 2016

In Asia

- Much slower adoption
- Quite a portion of enterprises have no plan to adopt cloud

Cloud adoption in Asia is lagging behind US

What is the hurdle?

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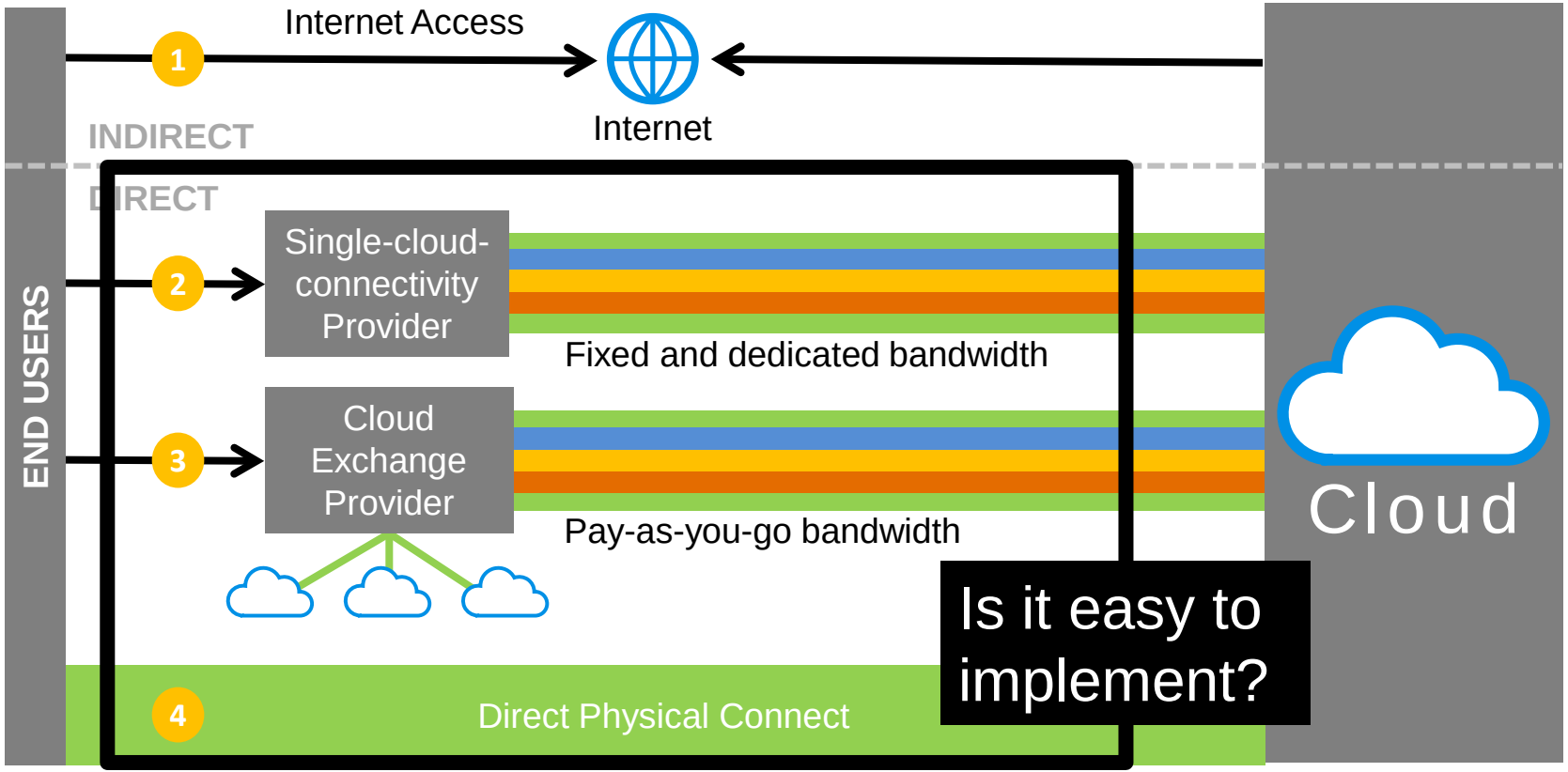
Journey to Cloud Gateway



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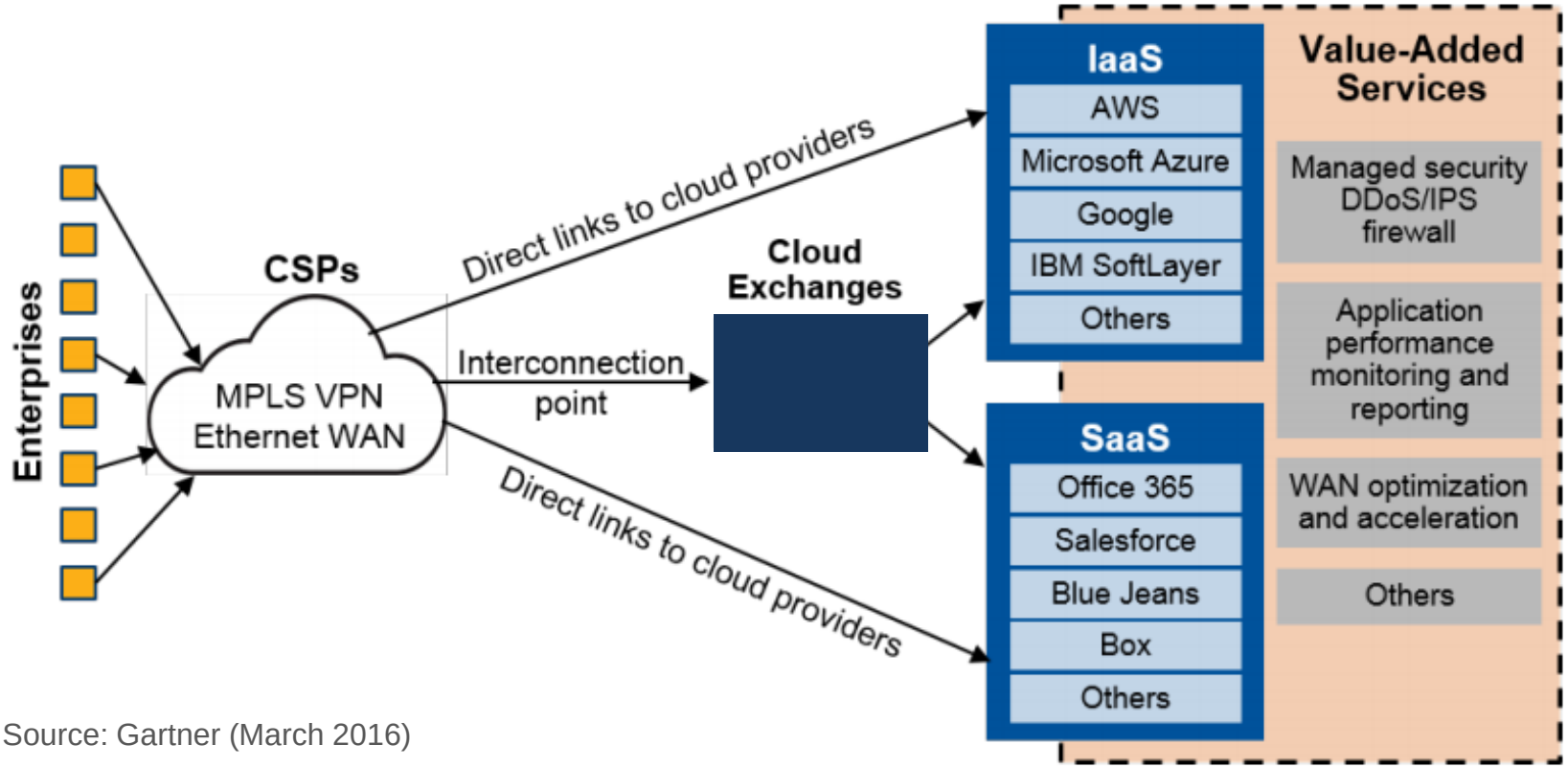
Typical Direct Cloud Connect Approach



Source: Gartner (March 2016)

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Journey to Cloud Gateway

for ISP support to End-Customers

On-premise Deployment	Minimal Cloud Adoption	Partial Migration to Cloud	Hybrid Cloud Deployment
Traditional MPLS Deployment	**Connectivity over Internet to Cloud**	**Single Cloud Gateway or Multiple Cloud**	**Single Cloud Gateway or Multiple Cloud**
• Independent Server Farm deployment by Customers • Backbone for connecting Customers' Sites • Network service is clearly demarcated	• Network performance Assurance • Bandwidth enough to Cloud Service Providers? • Private / Public Peering to the Cloud?	• Long Migration Period • Single / Multiple VPC connections • Customers' Own Peering Policy • IP Address allocations / Handling	• Traffic Routing Control among Multiple Cloud • Total Solution Support by ISP • System / Network Integration Works

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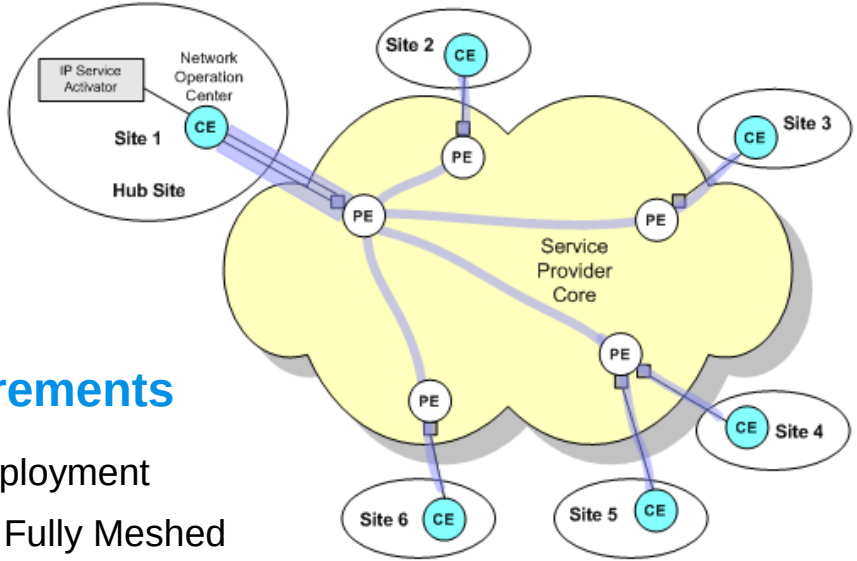
Typical Enterprise Network Deployment

On-premise Deployment

Traditional MPLS Deployment

- Independent Server Farm deployment by Customers
- Backbone for connecting Customers' Sites
- Network service is clearly demarcated



Network Requirements

- VPLS / MPLS Deployment
- Spoke-and-Hub / Fully Meshed
- Highly scalable and Class-Of-Service expected
- Point-to-Point / Point-to-Multi-point Connection
- Clear Demarcation between Network and Server Farm

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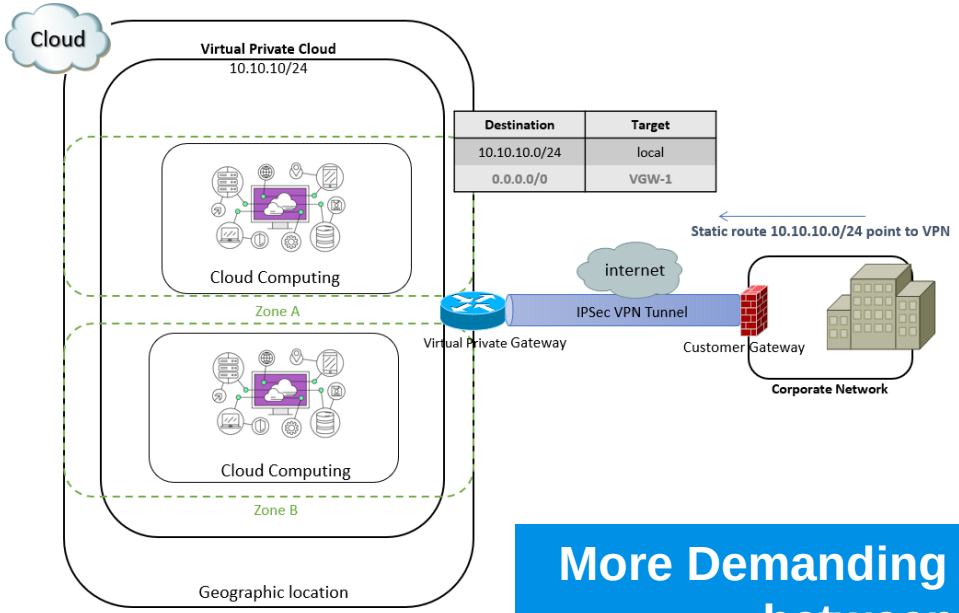
Connectivity at Cloud service

(VPN over Internet Access)



- Network / Server Farm is still independent with each other.
- Does the ISP have sufficient / resilient Peering link with the cloud service provider?
- What if something goes wrong in between ISP and the cloud service provider?
- Customers should have their own Peering Policy, somehow any trouble will be attributed to ISP.

More Demanding in turning up Peering / NNI Link between ISP and Cloud Players

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Journey to Cloud Gateway

for ISP support to End-Customers

On-premise Deployment | Minimal Cloud Adoption | **Partial Migration to Cloud** | Hybrid Cloud Deployment

Traditional MPLS Deployment

- Independent Server Farm deployment by Customers
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- Network service is clearly demarcated

Connectivity over Internet to Cloud

- Network performance Assurance
- Bandwidth enough to Cloud Service Providers?
- Private / Public Peering to the Cloud?

Single Cloud Gateway or Multiple Cloud

- Long Migration Period
- Single / Multiple VPC connections
- Customers' Own Peering Policy
- IP Address allocations / Handling

Single Cloud Gateway or Multiple Cloud

- Traffic Routing Control among Multiple Cloud
- Total Solution Support by ISP
- System / Network Integration Works

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Dominant Deployment Model

Hybrid Cloud + Colocation

Driving Force for Hybrid Cloud + Colocation

- Long Migration Period due to Technology Refreshment Cycle, i.e. Stringent Connectivity Requirement, e.g. Latency, Packet Loss, etc.
- Full migration to cloud is not acceptable, because sensitive / privacy data **MUST** be kept on-premise.
- Ordinance / Regulatory compliance for data kept locally.

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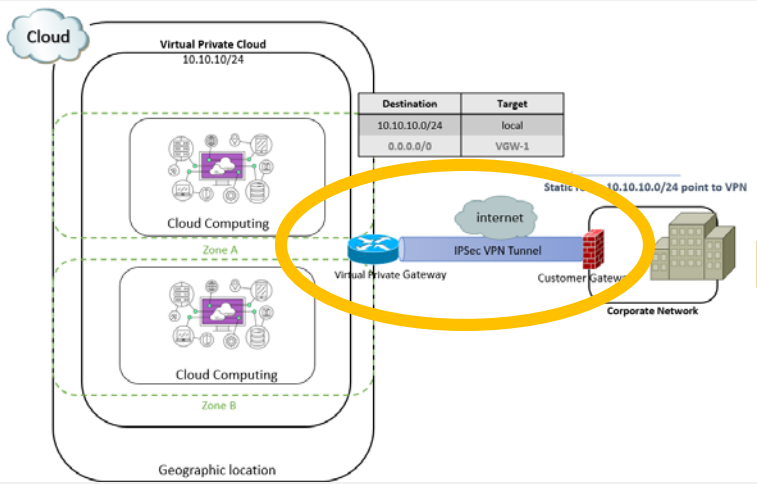
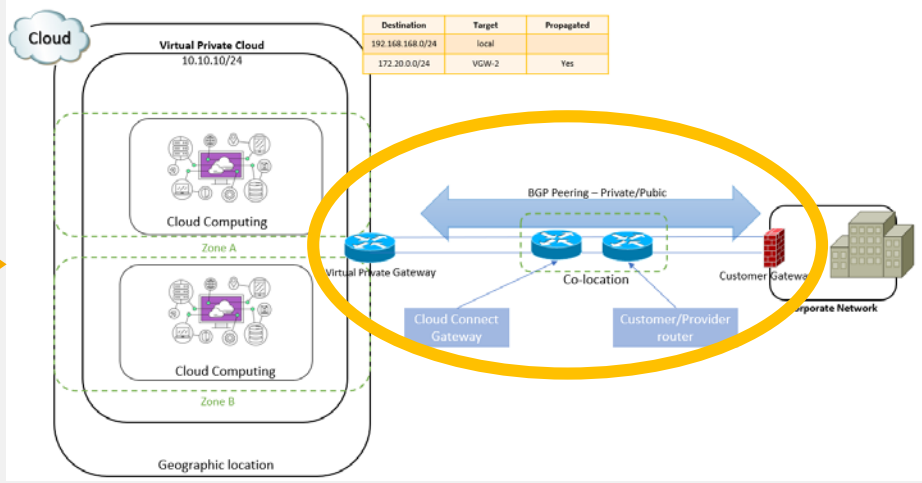
Connectivity at Cloud Service

VPN Transform into Dedicated Connection



Site-to-site VPN

- End-Customers forms VPN tunnel over Internet.
- Speed and Latency requirement is stringent



Dedicated Connection

- End-Customers requires Direct / Dedicated Connection to Cloud.
- Total solution on End-to-End Connectivity, including the failover design, expected.

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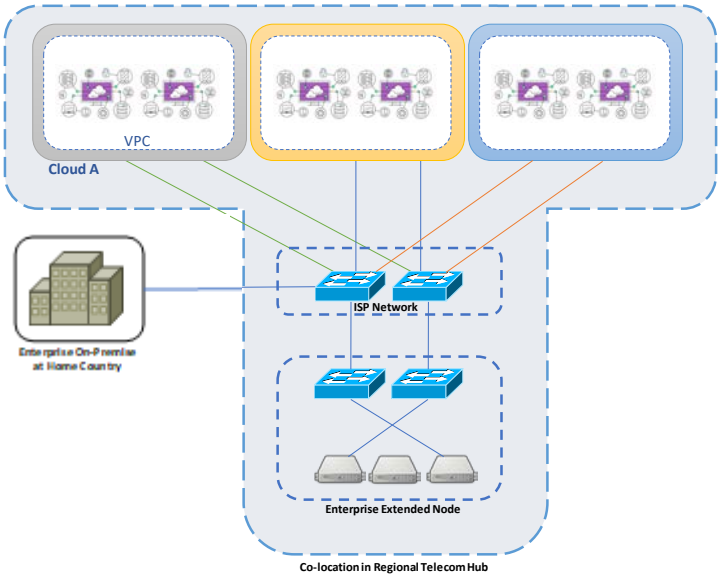
How can a Regional ISP survive from this model?

Hybrid Cloud + Colocation + Long-haul Connectivity



Typical Use Case By Regional ISP

- More Secure and Reliable Cloud Connections **[From Home Country]**
- Economy Solution for Multi-Cloud Connectivity **[Cost savings in Long-haul Connectivity]**

Value Proposition

- Connectivity Provider
- 1-Stop-Solution at 2 Cloud across geo-locations
- Multiple Cloud Connectivity

Areas to be covered by ISP

1. **Enterprise On-Premise Connections**
   To support transacting requirement between On-premise node to Cloud
2. **Cross-Regional VPC Peering**
   To support transacting application or large set of computing data in between two Virtual Cloud Networks

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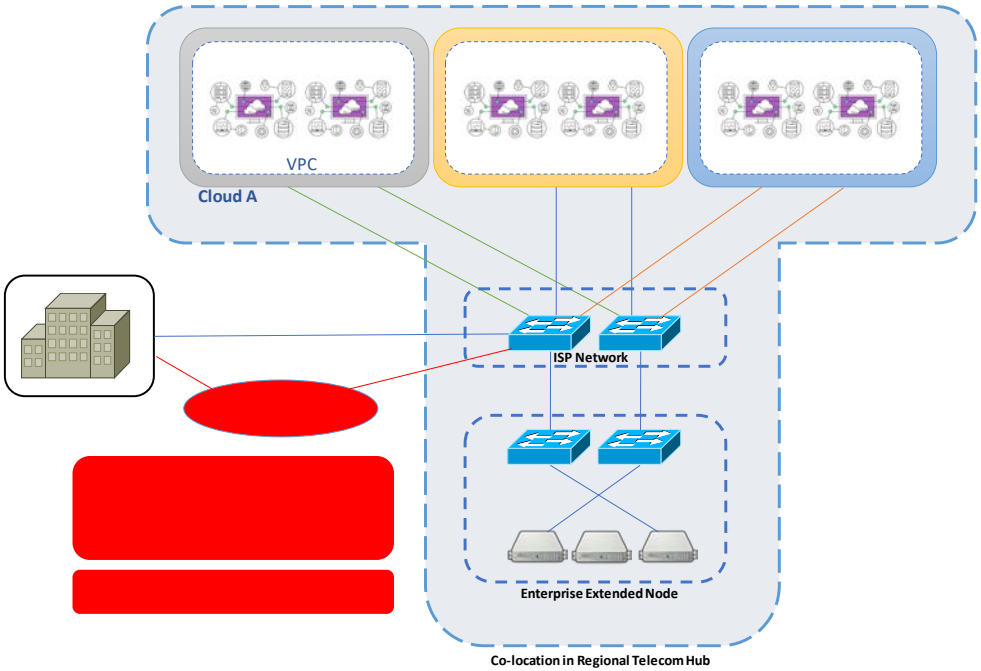
How can a Regional ISP survive from this model?

Hybrid Cloud + Colocation + Long-haul Connectivity



Areas to be covered by ISP

- **Enterprise On-Premise Connections**
  To support transacting requirement between On-premise node to Cloud

Colocation Site for Enterprise Node

- Latency sensitive and high usage workloads can be accommodated
- Less expensive and More Robustness Cross-border Solution

- Less Expensive DIA Service is enough
- More Robustness Solution

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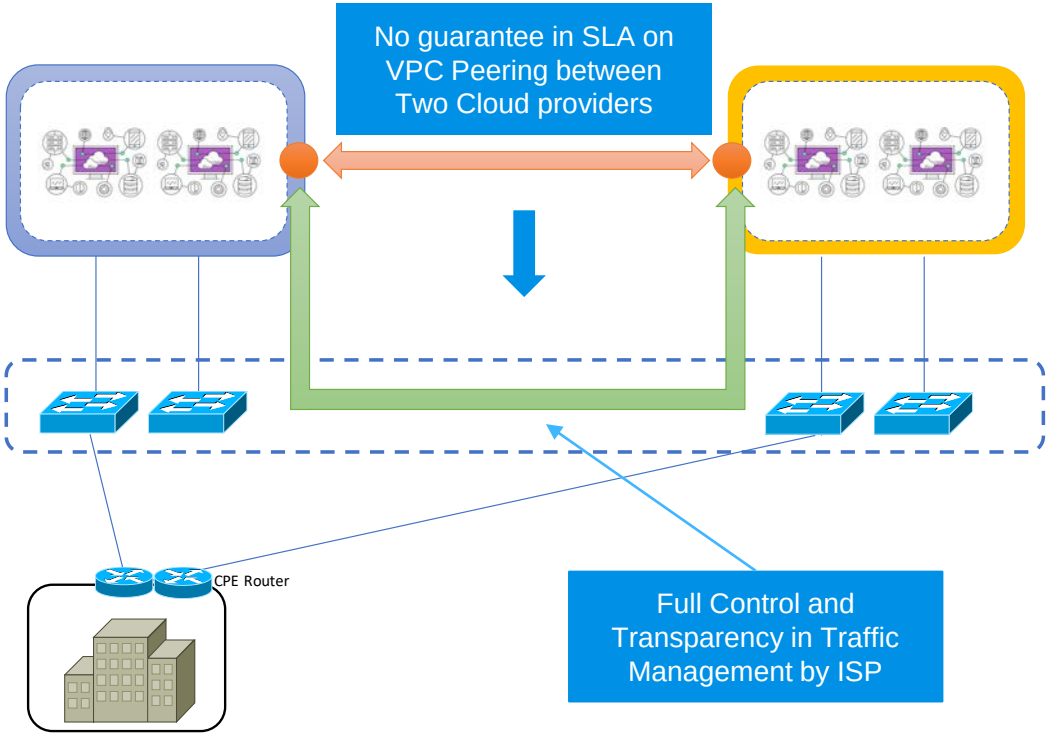

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- **Cross-Regional VPC Peering**
  To support transacting application or large set of computing data in between two Virtual Cloud Networks

VPC Peering within ISP Own Network

- PoP at Regional Hubs
- Backbone deployed from Home Country to Regional Hubs

- Full Control in Network Path and Performance
- Transparency to End-Customers

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Internet Data Centre is the Key

Support Journey To Peering World And Cloud Gateway

Internet Data Centre

Shopping Mall

Capacity Sales & Purchase

Club House

Internet Peering

Utilities Company

Cloud Service Access

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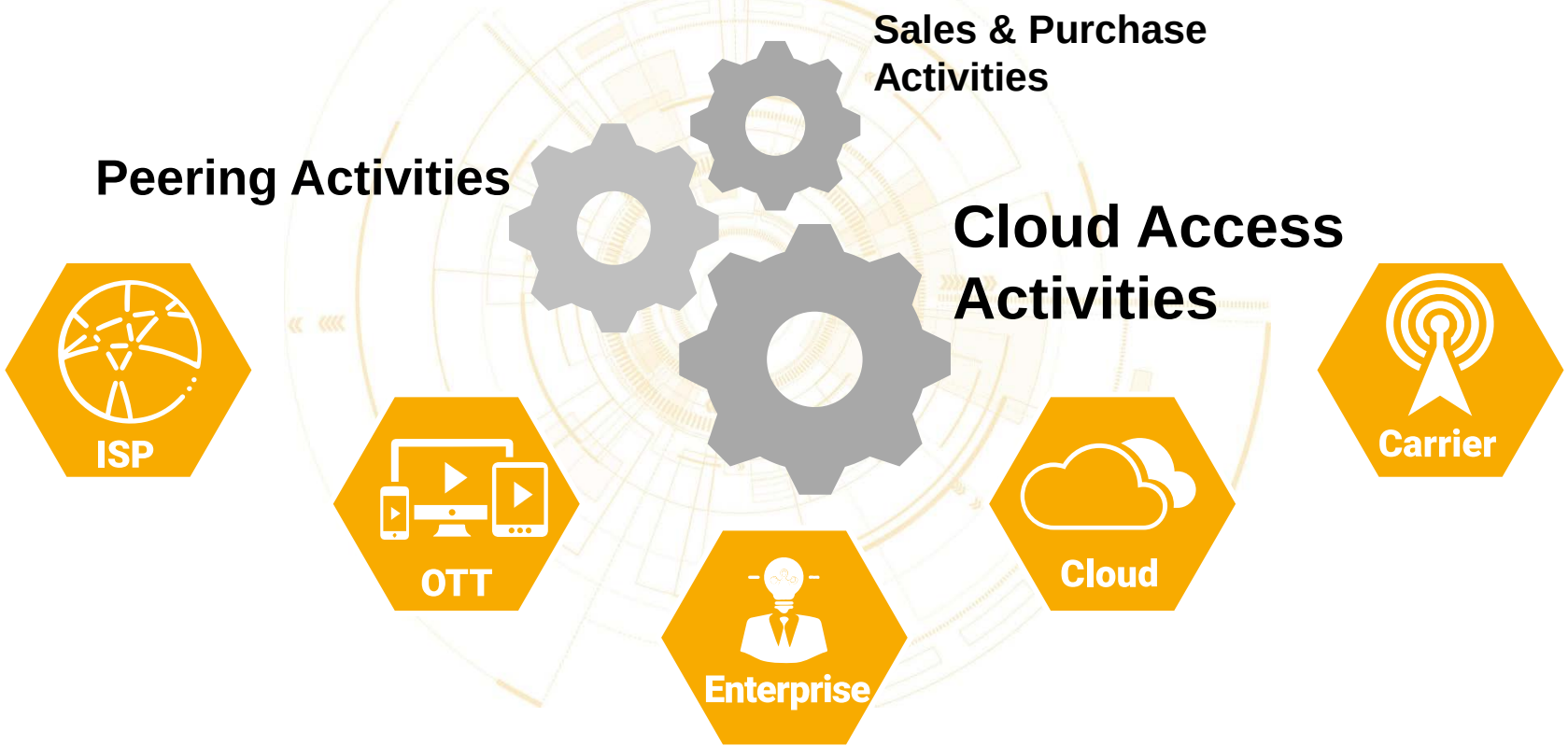
Internet Data Centre Ecosystem



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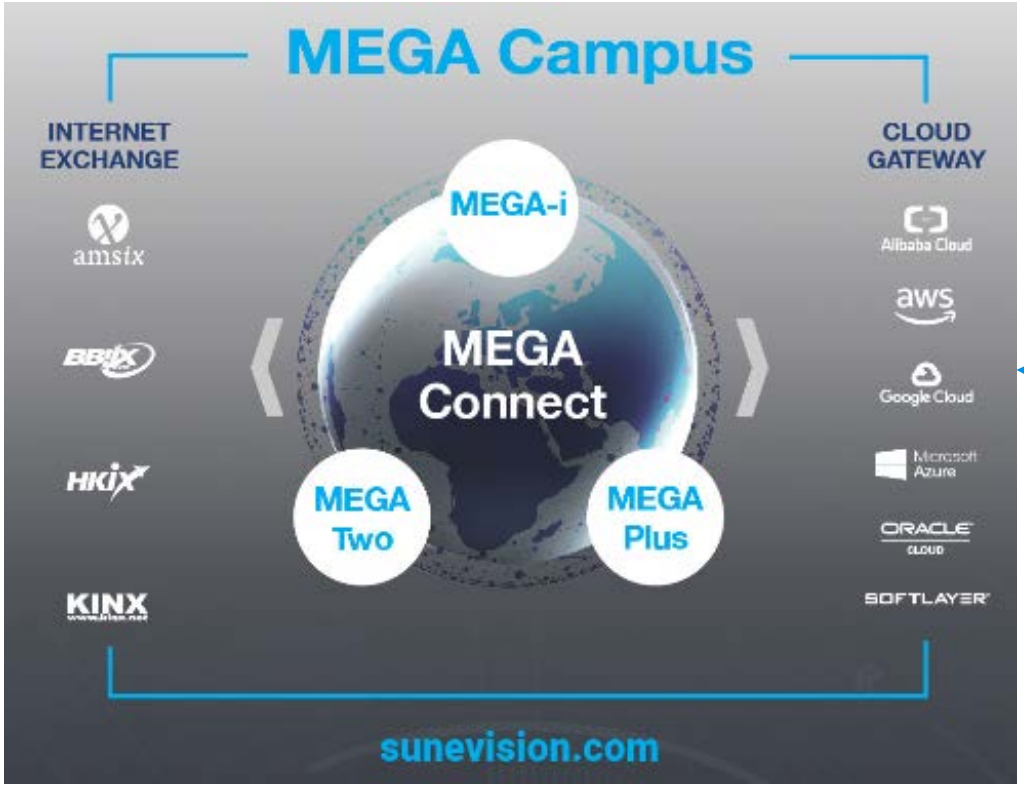
Typical Deployment Model

Hybrid Cloud + Colocation



PoP

Multiple Connections Supported by MEGA Connect

- Multi Cloud Vendors
- Direct Connect
- Connecting With Major ISPs / Upstream Carriers
- Connect To iAIX

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Journey is Challenging, but Benefits Worth to Proceed

PEERING

- Transform from to IP Transit / CDN Seller
- Use **Online Tools** to Locate Peering Partners
- Leverage **Network Density Hub**

CLOUD PEERING

- Overcome **Geographical Hurdles** in Asia Pacific
- Embrace **Uses Case** in Colo / Hybrid Cloud

COLOCATION

HIGH NETWORK DENSITY

CAN DEFINITELY HELP


【道德經】老子
千里之行，始於足下。
Morality - Laozi
“A thousand mile journey begins with the first step”

Thank You!

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