

The background of the slide features a blue diagonal band. To the left, a grayscale image shows a person in a suit holding a glowing globe with data charts overlaid. To the right, a grayscale image shows a hand pointing at a glowing globe with data charts overlaid.

SDN Orchestration

Rethink the importance of
LifeCycle Service Orchestration &
Middle Mile Demand in SP

Innovating On-Demand Global Cloud Connectivity

BILLY FUNG
Presentation for TWNOG 4.0

Company Intro



DCConnect digitizes, automates and orchestrates the Cloud and DC Ecosystem, aims to provide a multi-region programmable network solution in Emerging Countries by connecting different API enabled partners and Customers.

- | | |
|-------------|--|
| 2018 Oct + | DCConnect CTO <ul style="list-style-type: none">- BSS/OSS or BOSS (SDN Portal) R&D- Network Planning- Product |
| 2014 – 2018 | Hong Kong AS9381 Wharf T&T / WTT International Product Manager <ul style="list-style-type: none">- International Network Planning- Peering Ratio increased to 65% from 10% in 4 years.- L1, SDH NNI, L2 E-NNI, L3 MPLS NNI- Voice E1 Interconnect, S7 routing |
| 2007 – 2013 | Hong Kong Diyixian / DYXnet 第一線, Data Center Operation Supervisor <ul style="list-style-type: none">- Field ops & Data Centre operation- L2/L3 MPLS VPN, L4 IPsec VPN, |
| 2000 – 2017 | Self-employed, Domain Name Biz, network design for SMB |

Telecom Asia Awards 2019

- Most Innovative NFV/SDN Implementation



- Being awarded in **22nd Telecom Asia Awards 2019**
- Innovative Category **“Most Innovative NFV/SDN Implementation”**
- Top 3 Finalist from over 10 SDN participants taking part in the competition in 2019 Q1



MEF19 Proof-of-Concept Award - MEF3.0 Service Automated Commerce Implementation



POC: Automated Inter-Carrier Performance Ratings Using Alliance Blockchain On-Demand + Agility + Service Performance



2-way API integration in SDN market & API economy



2018

<https://www.fiercetelecom.com/telecom/epsilon-dconnect-deliver-sdn-based-inter-carrier-orchestration>



FierceTelecom

AI TELECOM TECH PLATFORMS

Telecom

Epsilon, DCCONNECT deliver on SDN-based intercarrier orchestration

by Mike Robuck | Jun 28, 2018 1:33pm

Epsilon and China's DCCONNECT have teamed up on two-way, intercarrier network orchestration across each other's networks.

While there have been other demonstrations of intercarrier SDN network orchestration, Epsilon and DCCONNECT plan to commercially deploy their integration in the third quarter of this year.

Two-way, SDN-based intercarrier orchestration would let service providers automate the provisioning of wholesale services across partner networks. With intercarrier orchestration, service providers would be able to reach across the globe to serve large enterprise customers, such as financial institutions, with on demand, dynamic network applications and services.



2019

<https://www.capacitymedia.com/articles/3824248/pccw-global-dconnect-ink-sdi-partnership>

PCCW Global



PCCW Global, DCCONNECT ink SDI partnership

19 September 2019 | Jason McGee-Abe



PCCW Global and DCCONNECT have entered into a technology collaboration, enabling Console Connect and DCCONNECT customers to seamlessly leverage network services from either service provider.

"The interconnect collaboration with DCCONNECT allows our customers to access more data centres directly from our platform," said Michael Glynn, global vice president of digital automated innovation at PCCW Global (pictured), who **took up the reins in April 2019**.

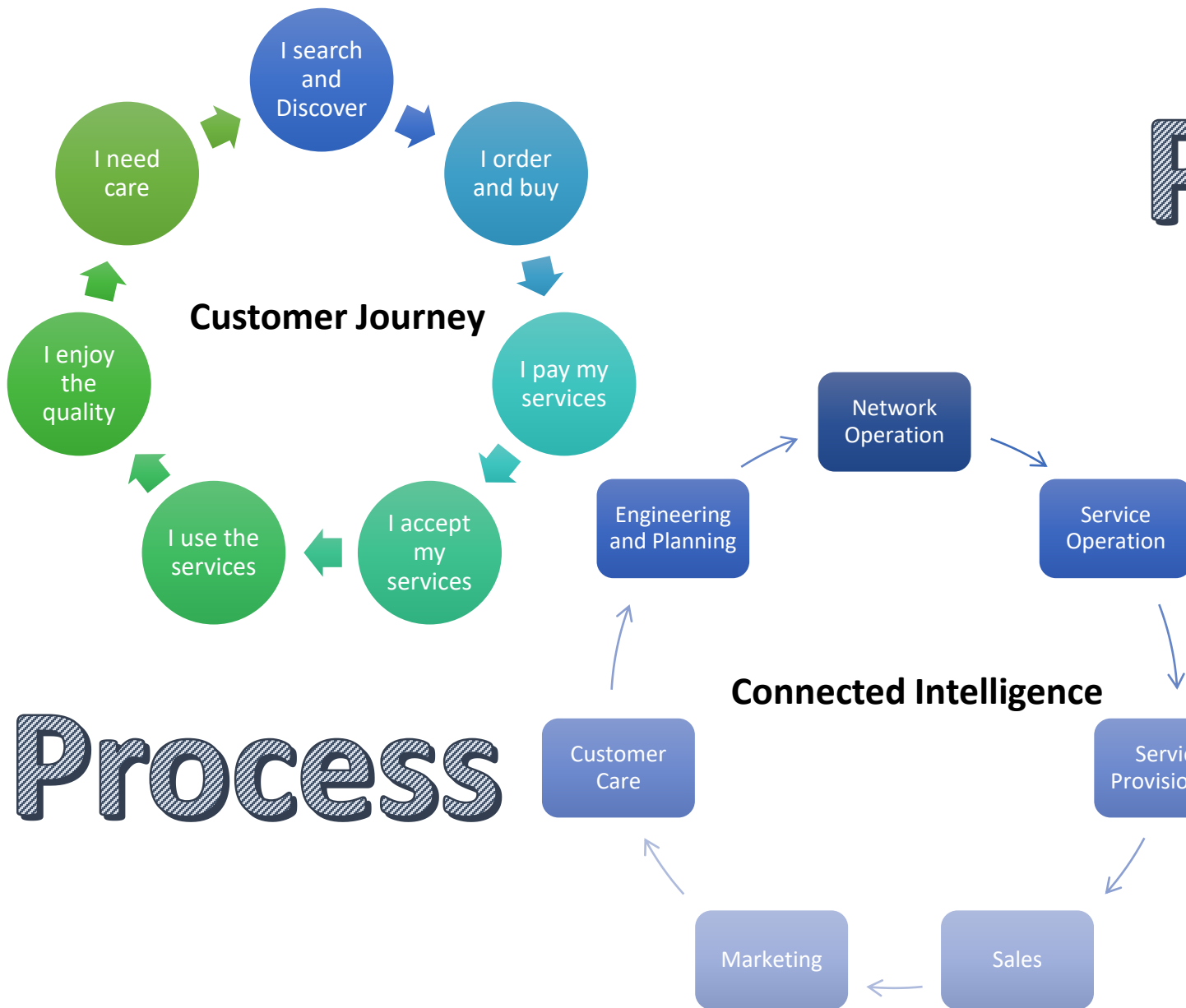
"We are building one of the largest SDN wholesale ecosystems worldwide for carriers, network providers, and other SDN providers, enabling them to access our extensive redundant global backbone on-demand, while extending their coverage and service offering to support their own customer needs, by interconnecting into our platform at any of our on-net data centres."

Customers of DCCONNECT, which is a leading APAC on-demand connectivity, data centre and cloud provider, will attain on-demand access to PCCW Global's extensive international network footprint.

Processes and Middle Mile Process Time



Process Time



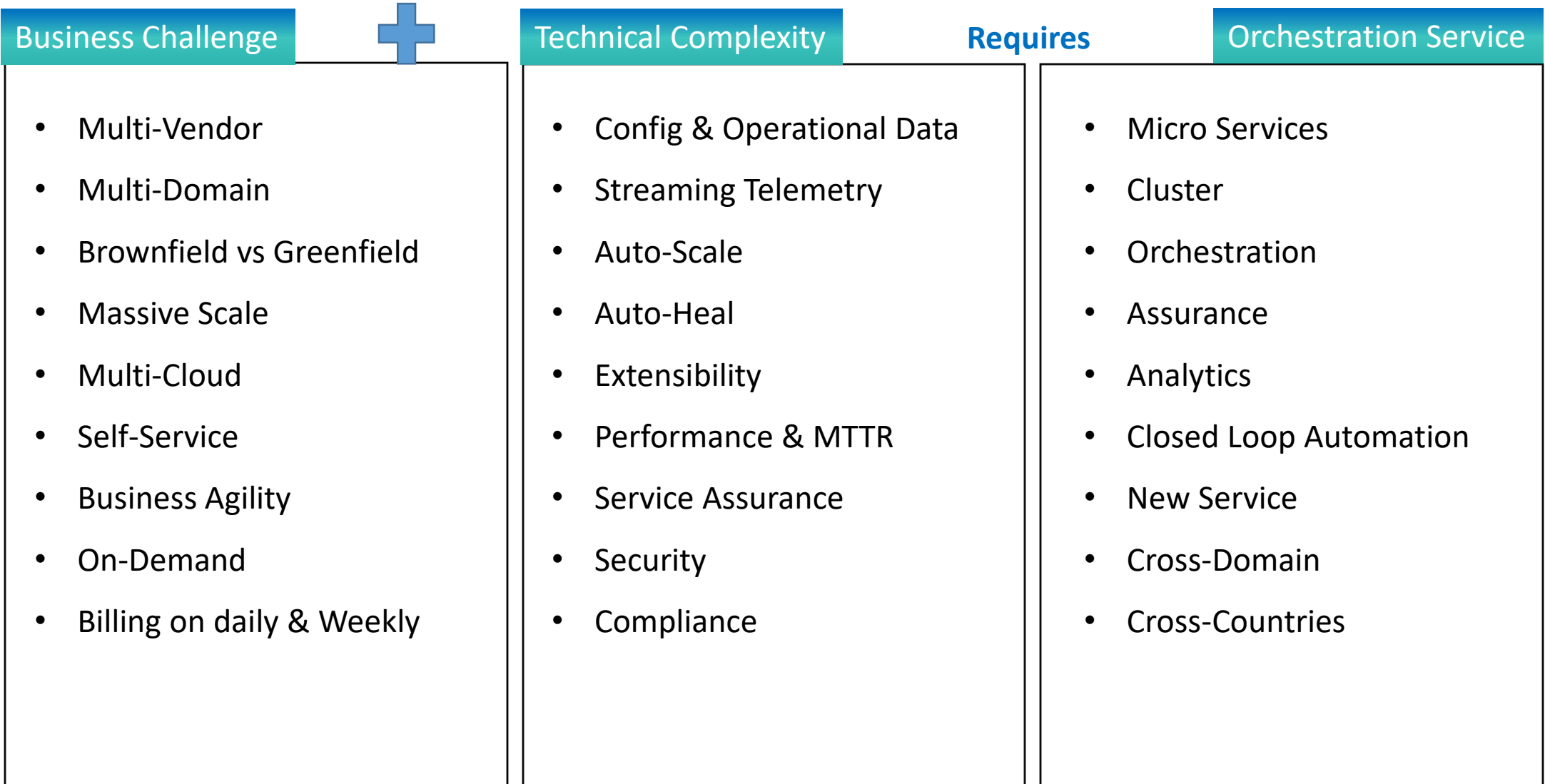
Traditional Telco

21+ Days

SDN Enabled Provider

<10 Minutes

Re-think the importance of LSO and Middle-mile Demand in a Service Provider Network



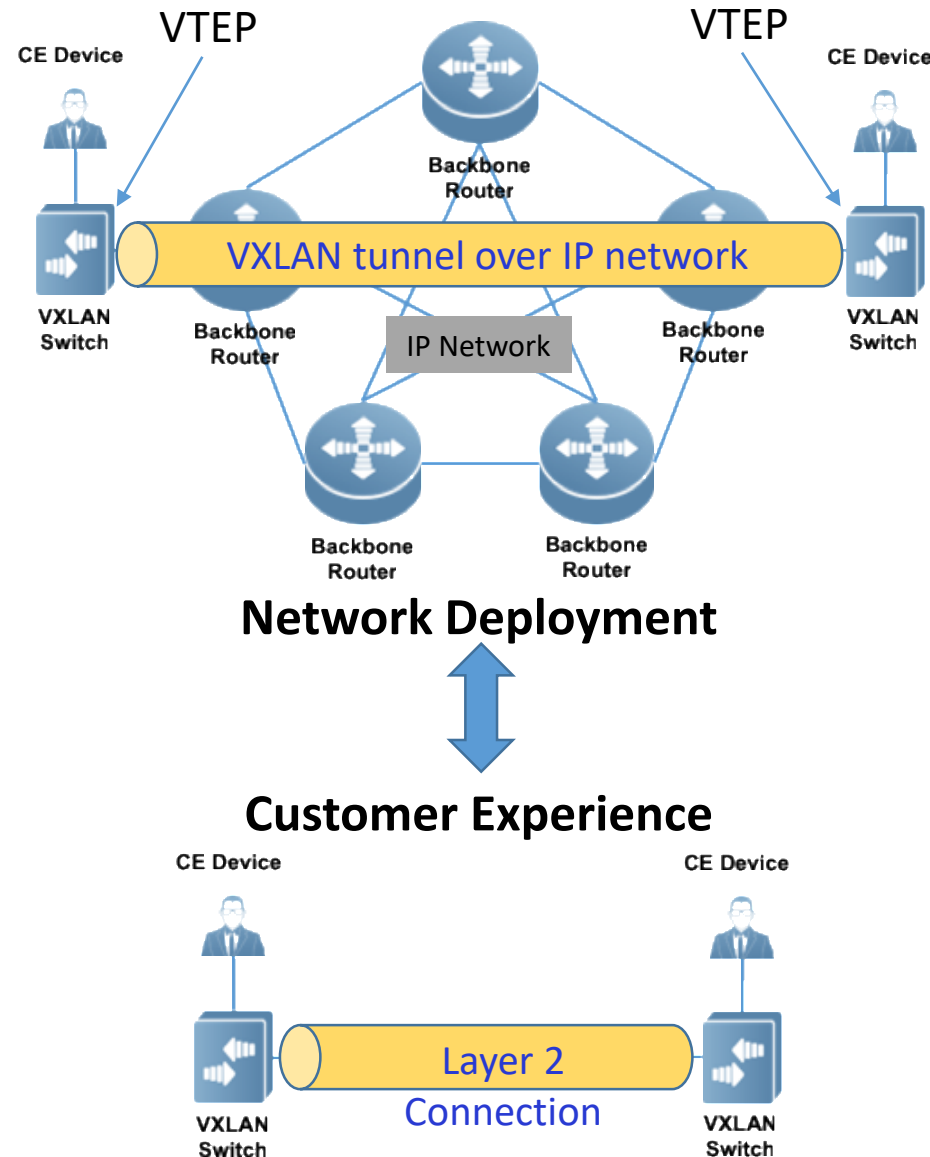
Middle-mile Become Overlay Connectivity



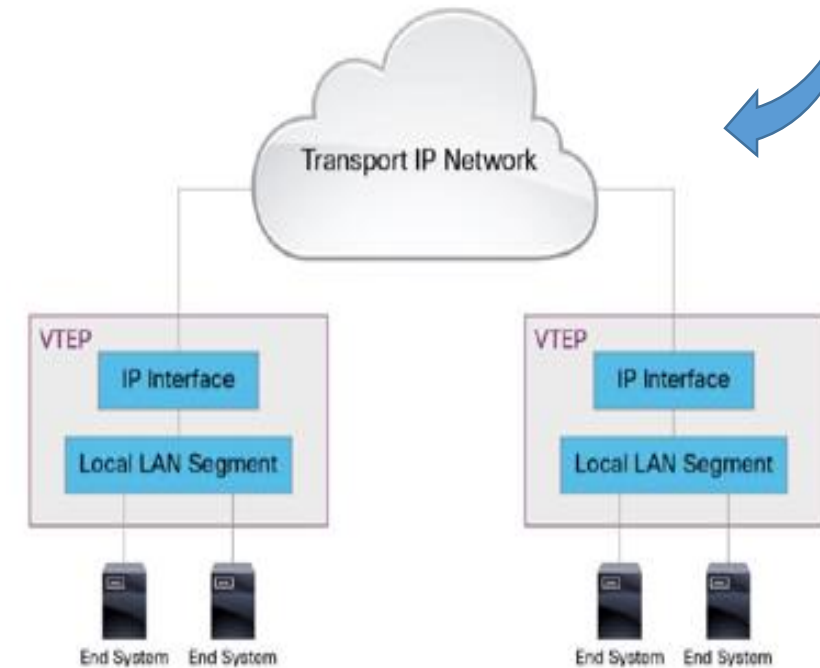
Benefits of VXLAN

✓ VXLAN supports **16,000,000 VNIs** (24-bit) vs Traditional network supports 4,096 VLANs (12-bit)

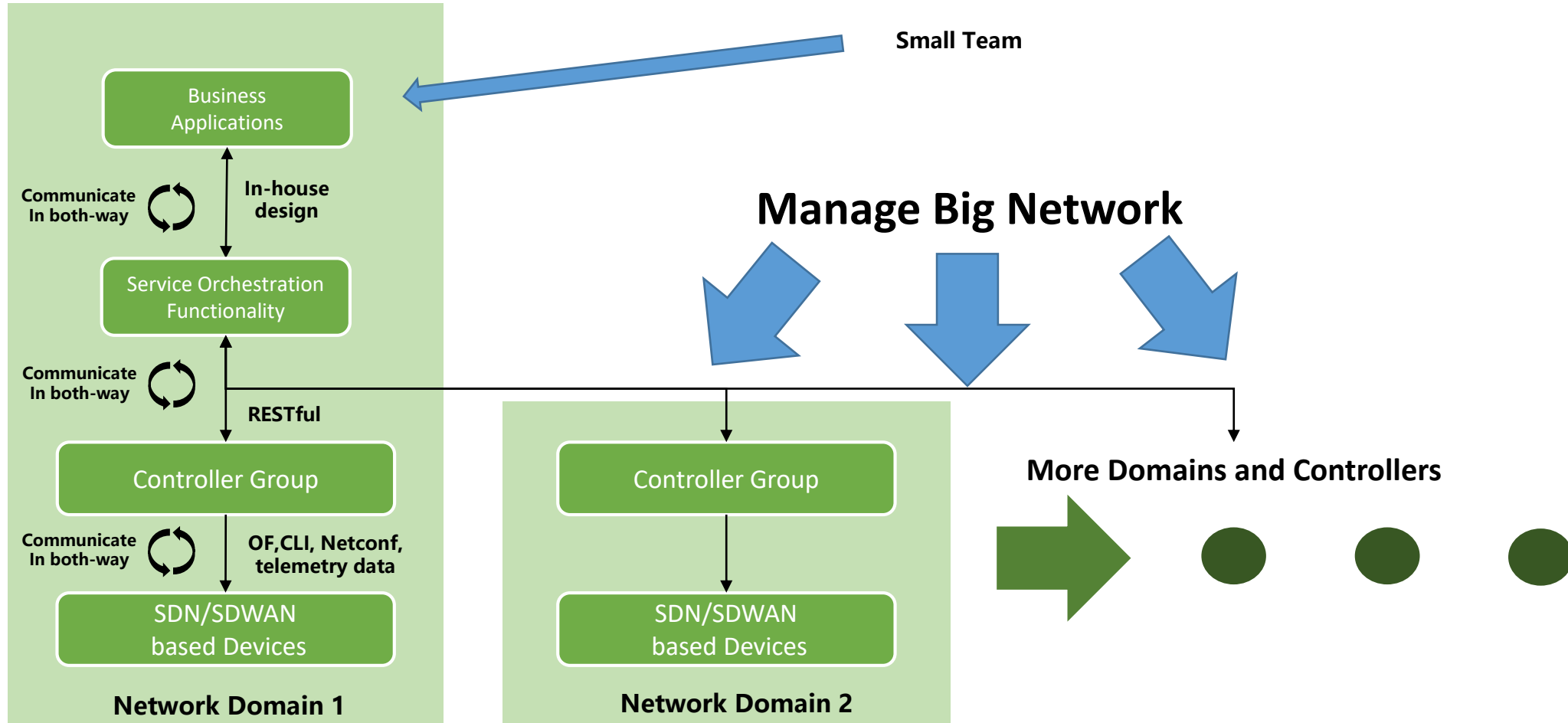
✓ VXLAN allow **Layer2** to be extended anywhere in an IP network



Underlay Design
BGP EVPN / MPLS-TE



Multi-domains and Multi-controllers under B/OSS



MEF LSO Sonata API Standard & Development



Inter-carrier
Automation

with



Sonata define the management reference point supporting the management and operations interactions (e.g. serviceability, ordering, billing, trouble ticketing, etc between two network providers

LSO Sonata APIs enable frictionless inter-carrier business operations.

Introducing LSO Sonata

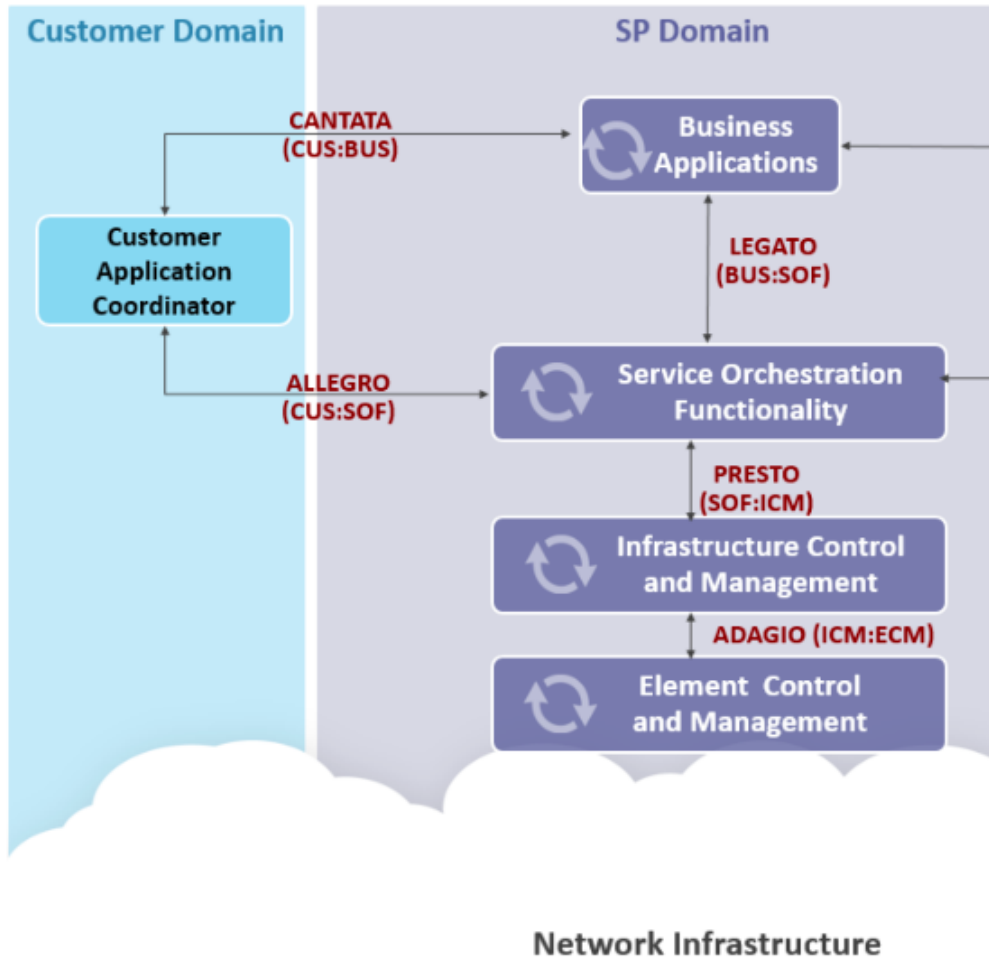
A set of APIs based on the
LSO Reference Architecture for
Serviceability | Ordering | Quoting
Billing assurance | Testing
Change management | Address Validation

LSO Sonata Architecture	API released
<ul style="list-style-type: none">• Product Inventory• Serviceability• Quote• Order• Contract and Billing• Invoice• Trouble Ticket	<ul style="list-style-type: none">• Product Inventory• Serviceability• Quote• Order

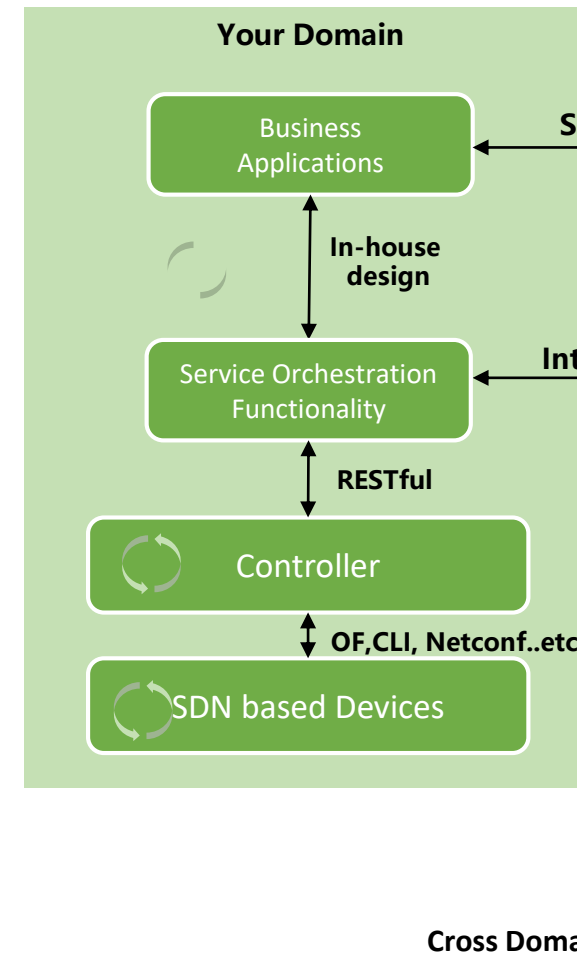
MEF LSO Sonata API Standard & Development



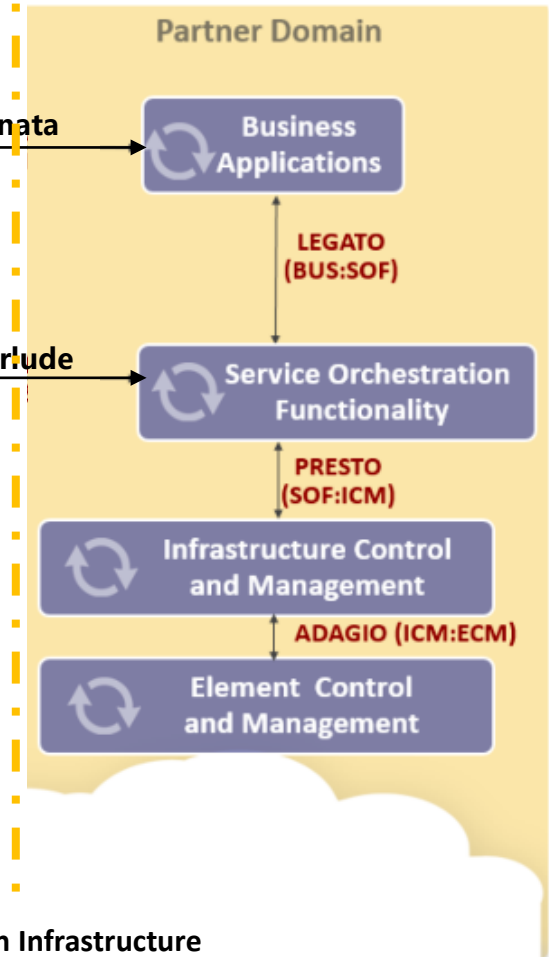
Client End



Your Company

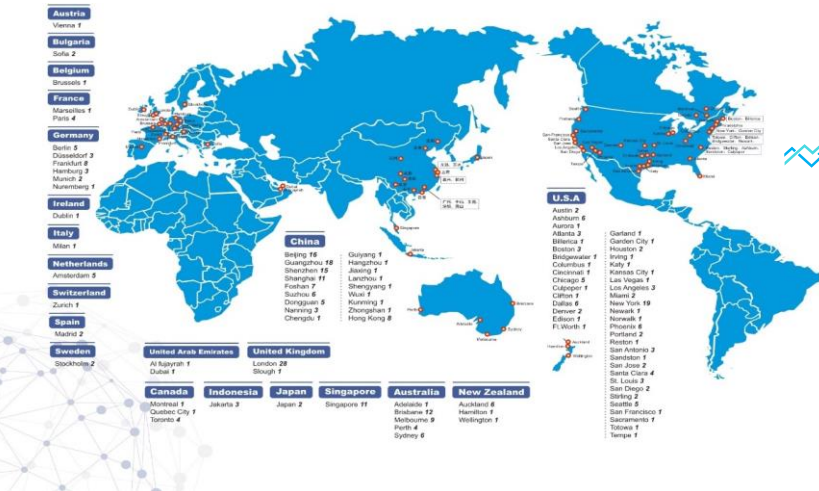


Carriers Partner



Cross Domain Infrastructure

Resource Pools with LSO Sonata



Search by Supplier, Data Centre, Address

Organizations use Sonata API to capture Service Partner's product information with geographical information.

Node

Coverage Search

Showing records 1 to 10 out of 134 records (Searched 1,945 records in total)

DConnect

Supplier	Name	Code	Description	Status	Supplier Status
[REDACTED]	[REDACTED]	[REDACTED]	168, YEUNG UK ROAD, TSUEN WAN, Hong Kong, Hong Kong, NA	On-demand	EXISTING
[REDACTED]	[REDACTED]	[REDACTED]	17/F Global Gateway, 168 Yeung Uk Road, Hong Kong, Hong Kong	On-demand	EXISTING
[REDACTED]	[REDACTED]	[REDACTED]	17/F Global Gateway, Hong Kong	On-demand	EXISTING
[REDACTED]	[REDACTED]	[REDACTED]	17/F, Global Gateway (hong Kong), 168 Yeung Uk Road, Tsuen Wan, Hong Kong	On-demand	EXISTING
[REDACTED]	[REDACTED]	[REDACTED]	17/F Global Gateway, 168 Yeung Uk Road, Tsuen Wan, NT, Hong Kong	On-net	EXISTING



API library

🔍 Search...

Introduction > **DCConnect SDN DCI API (2.0.0)**

Authentication > Download OpenAPI specification: [Download](#)

Requests and Responses > API Support Team: api.support@dconnectglobal.com

API Scenarios >

Cloud Connections >

Price Plans >

SDN Path >

[Documentation Powered by ReDoc](#)

Introduction >

Authentication >

Requests and Responses >

API Scenarios >

Terminate Service

SDN Port Price Plans >

Sdn Port Service Management ▾

GET listSdnPortSi

POST addSdnPortSi

getAvailableNodes

List assigned SDN Ports which are available for ordering

AUTHORIZATIONS: [OAuth2](#)

PATH PARAMETERS

accountNo required	string White Labeler Account Number
ecId required	integer <int64> End Customer ID
platformId required	integer <int64> Platform ID

HEADER PARAMETERS

API Scenarios >

Terminate Service

SDN Port Price Plans >

Sdn Port Service Management ▾

GET listSdnPortSi

POST addSdnPortSi

GET getAvailableNodes

DEL terminateSdnPortSi

HEADER PARAMETERS

→ Authorization string
OAuth2 token. Bearer *token*

REQUEST BODY SCHEMA: application/json

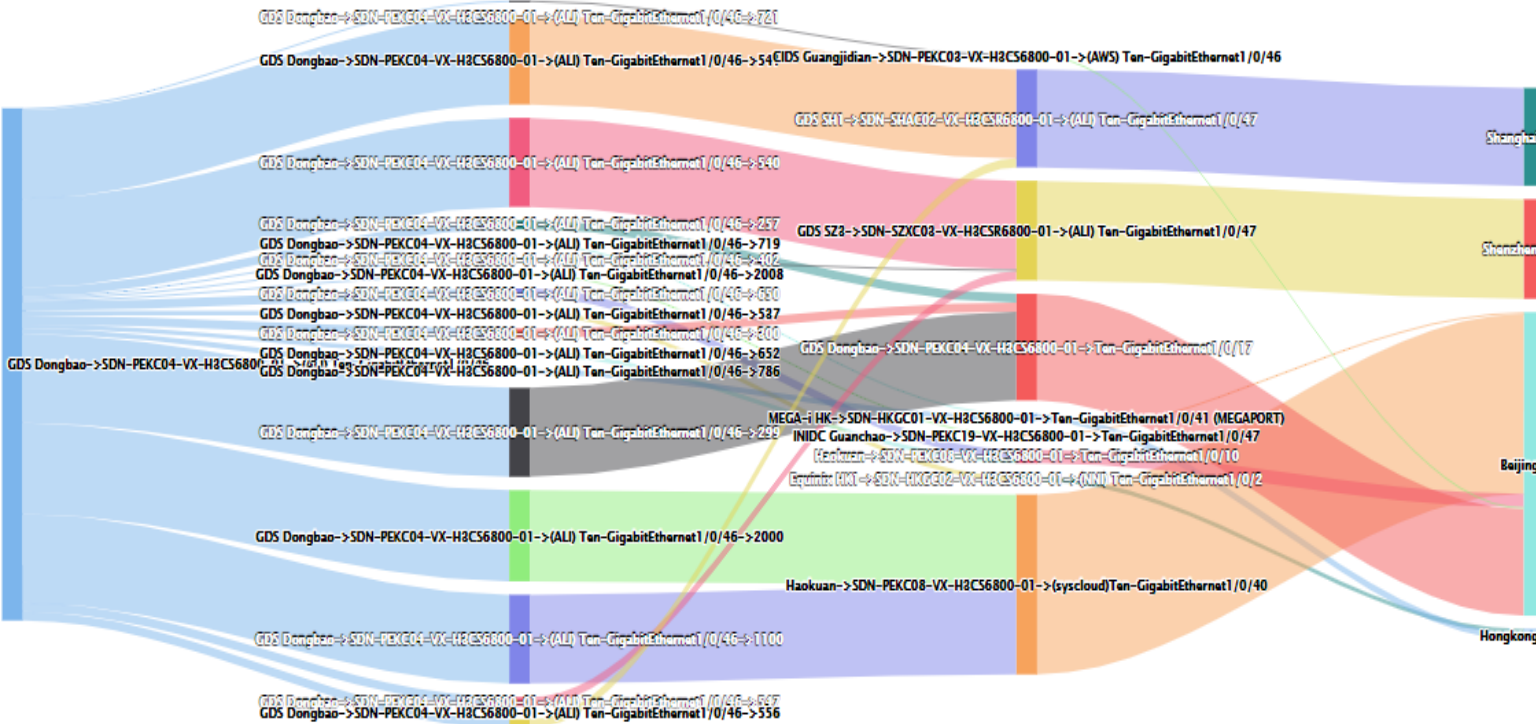
├─ name string
Service name

├─ description string
Service description

├─ dataOptions > object (AddSdnPortSiDataOptions)

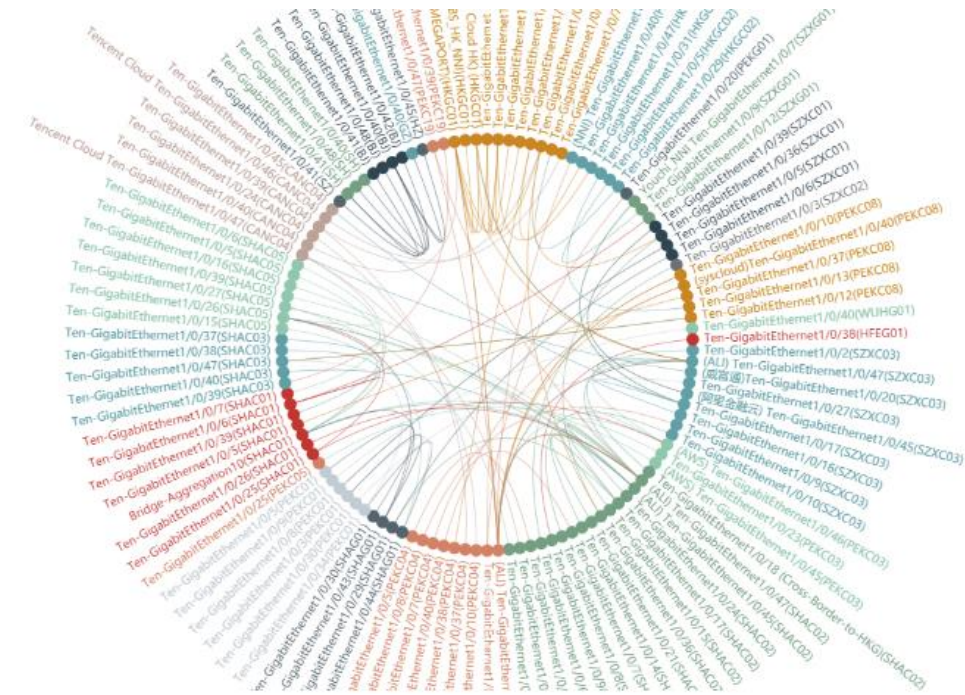
└─ changedOptions object (AddSdnPortSiChangedOptions)

Flowchart



Highcharts.com

Connection Map



API Economy : API and LAS First Strategy



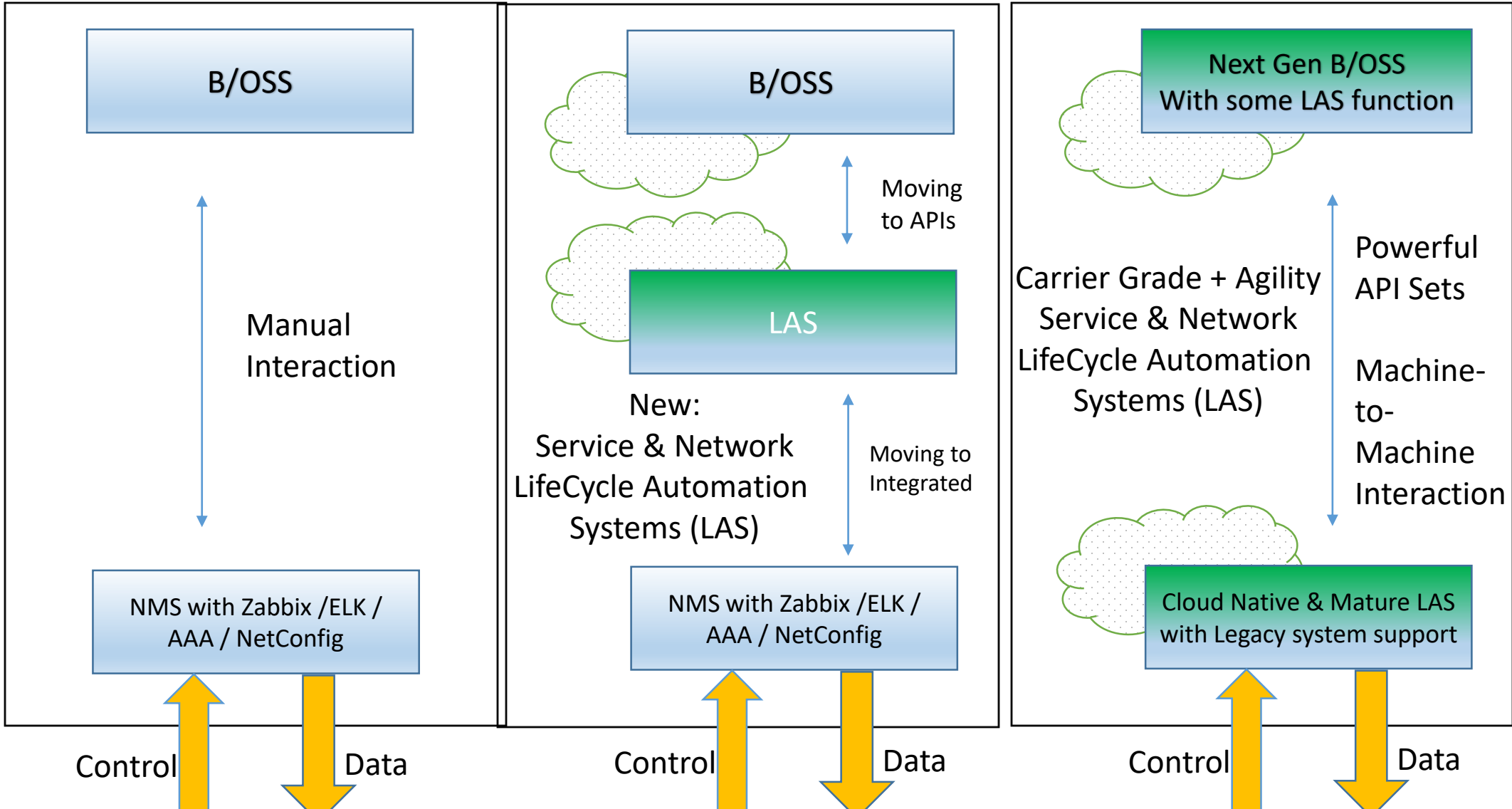
Static Management



2017-2019 Adopting Software Automation



2020: Pool Model
Telco API Economy with Engagement



How to build a Good SDN Platform?

Build a Software Team

Strict Access Rights

Platform Open APIs

Automatic NetOps

SecOps

Big Data

Smart
Contract

Self Service

Network
Recovery



**Cloud Based
Orchestration
System**

Distributed Controllers
Controller Less Design

Black Box?

White Box

Real Time
Provision

Find a Good Software House

Neutral and Support Multiple hardware vendors



- **13 hardware vendors** are officially supported (More to come)
- Features based on **ASIC Chipset** (High-End/Low-End) for different level of design and deployment
- Facilitate feasible vendors picking based on **commercial agreement** and supply chain for specific **deployment region**



Broad diversity of DCI scenarios supported by Open NOS



- ✓ Support **16 DCI scenarios**
- ✓ All scenarios based on **MEF Carrier Ethernet standard**
- ✓ Support **Service Instance** to allow any VLANs assigned by customers at any ports (No limitation on VLAN differentiation)

Scenarios of A-to-Z end Combination			
Access Port	0	Untagged	A
Trunk Port	1	S-Tag	B
QinQ Port	2	Translated S-Tag	C

Supported
 Not Applicable / Not Supported

E-Access & E-Transit are supported		Z End(s)					
		Access Port (Untagged)	Access Port (S-Tag)	Trunk Port (S-Tag)	Trunk Port (Translated S-Tag)	QinQ Trunk Port (S-Tag)	QinQ Trunk Port (Translated S-Tag)
A End	Access Port (Untagged)	00AA	00AB	01AB	01AC	02AB	02AC
	Access Port (S-Tag)	00BA	00BB	01BB	01BC	02BB	02BC
	Trunk Port (S-Tag)	10BA	10BB	11BB	11BC	12BB	12BC
	Trunk Port (Translated S-Tag)	10CA	10CB	11CB	11CC	12CB	12CC
	QinQ Trunk Port (S-Tag)	20BA	20BB	21BB	21BC	22BB	22BC
	QinQ Trunk Port (Translated S-Tag)	20CA	20CB	21CB	21CC	22CB	22CC

BILLY FUNG

Email: billy.fung@dconnectglobal.com



LinkedIn

A LinkedIn profile card for Billy Fung. It features a circular profile picture of a man in a suit, the name "Billy Fung", and the title "CTO, DConnect Global Ltd.". Below the text is a blue QR code for connecting via LinkedIn.

Billy Fung
CTO, DConnect Global Ltd.

WeChat

A WeChat profile card for Billy Fung. It shows a profile picture of a person with a bun, the name "Billy Fung" with a verified badge, and the location "葵青區, 香港". Below the profile information is a black and white QR code for adding him on WeChat.

Billy Fung
葵青區, 香港

掃描上面的QR Code，加我WeChat。

LINE

A large black and white QR code for connecting via LINE. A small green speech bubble with the word "LINE" is overlaid on the center of the QR code.

對方僅需使用LINE的行動條碼掃描器，並對準本行動條碼，即可將您加入好友名單內。

THANK YOU 多謝指教