

# The Next Stage for ICT Interoperability



Global NaaS Event  
By MEF



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Console Connect,  
Chief Executive Officer



October 2023

# The next stage for ICT interoperability

Marc Halbfinger



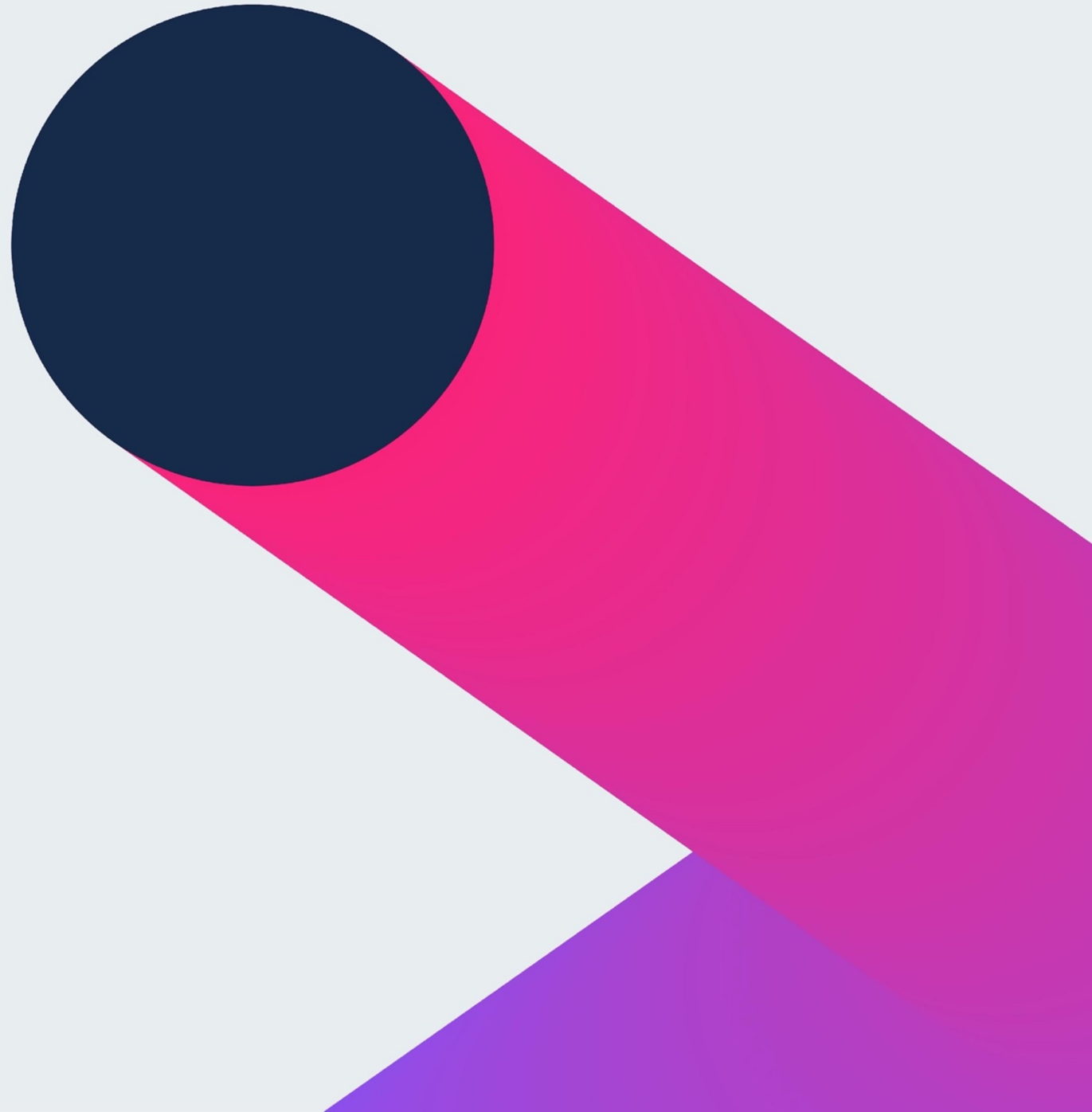
# Our Cooperation with MEF





Past Keynotes

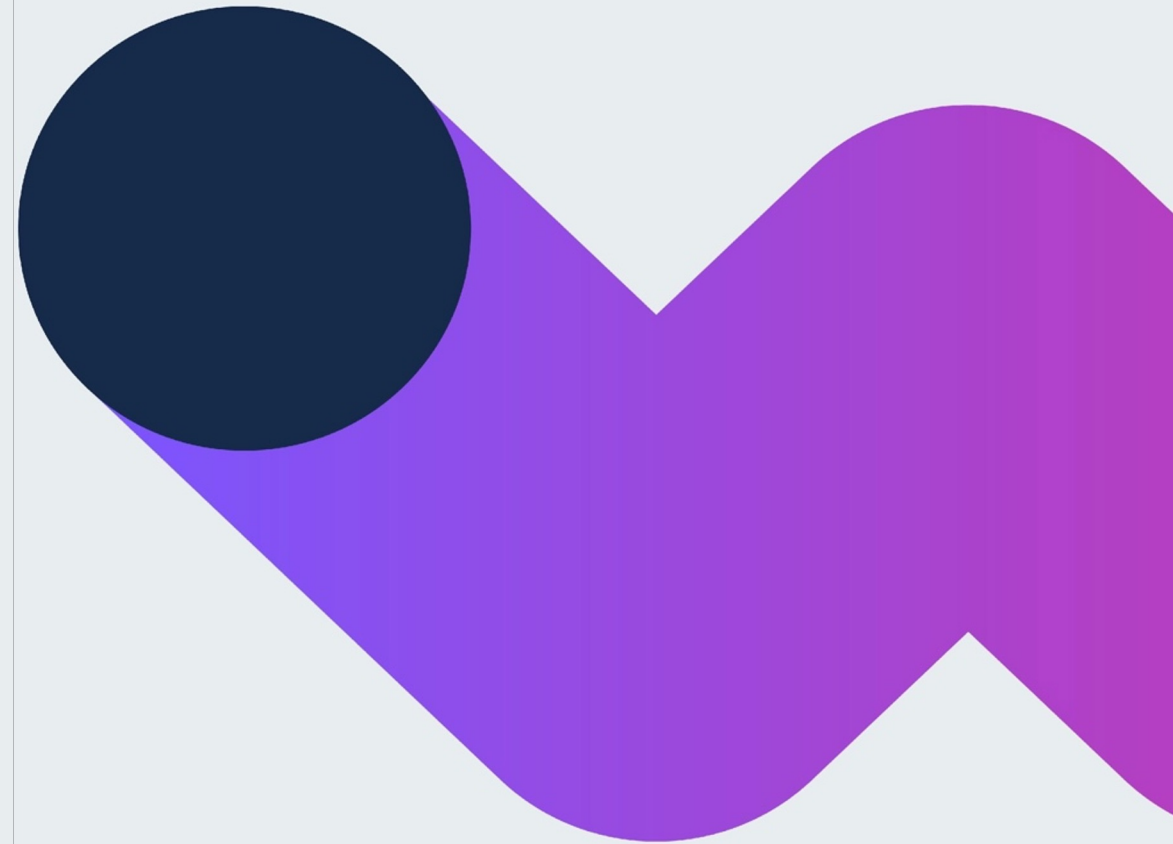
# Retrospective



# Key Takeaways

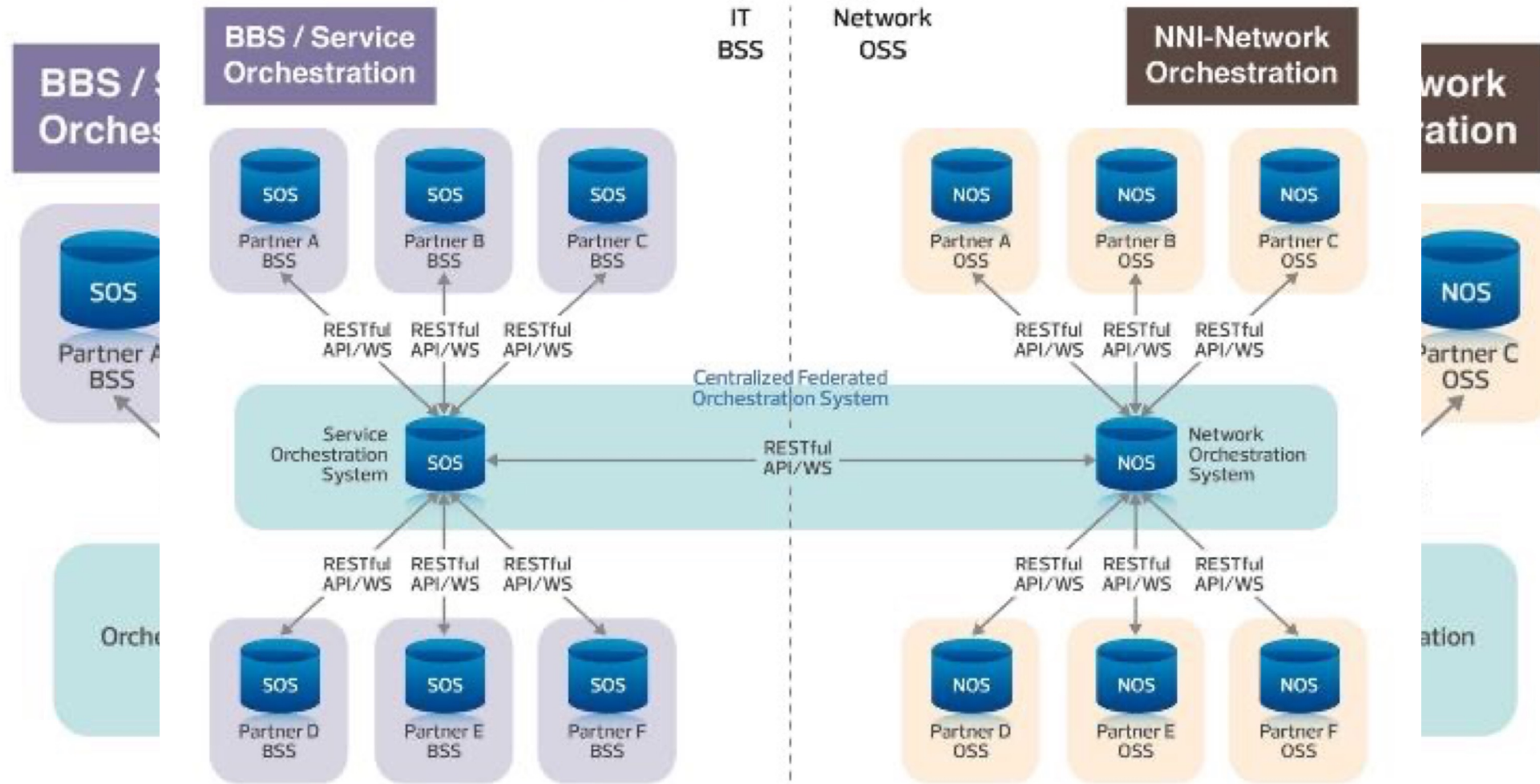
## 2014

- As critical applications moved into the cloud, new challenges emerged to ensure QoS, Availability, Security and Privacy
- Operational Challenges - Delivering Agile Services with “swivel chair” operations
- Single Operator Automation - Service Orchestration for BSS and Network Orchestration for OSS
- The solution proposed at the time - Multi-service provider automation to create a “federation” of Cloud and Network providers



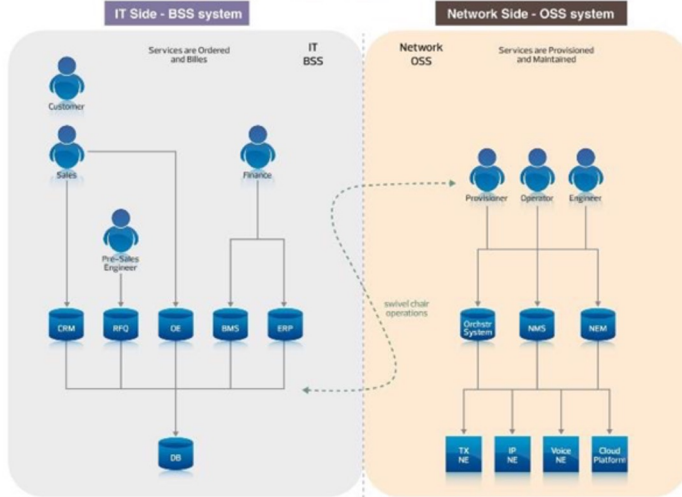
# eBonding, Orchestration & Federation

## eBonding and Orchestration Federation Functional Overview

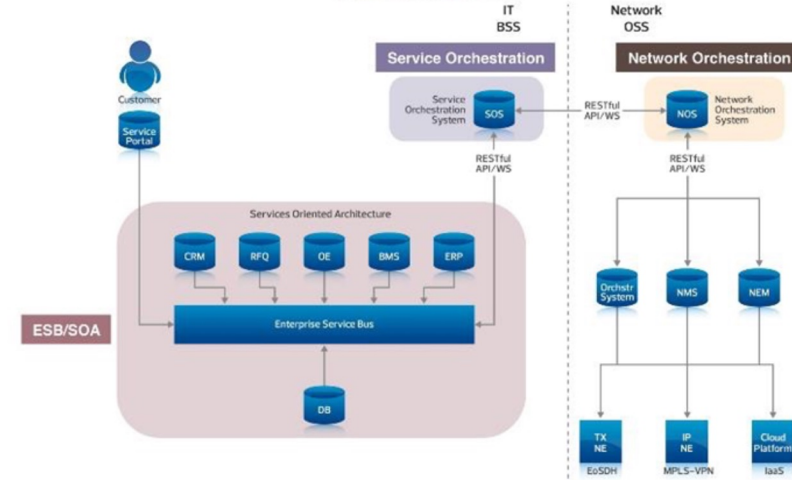


# eBonding, Orchestration & Federation

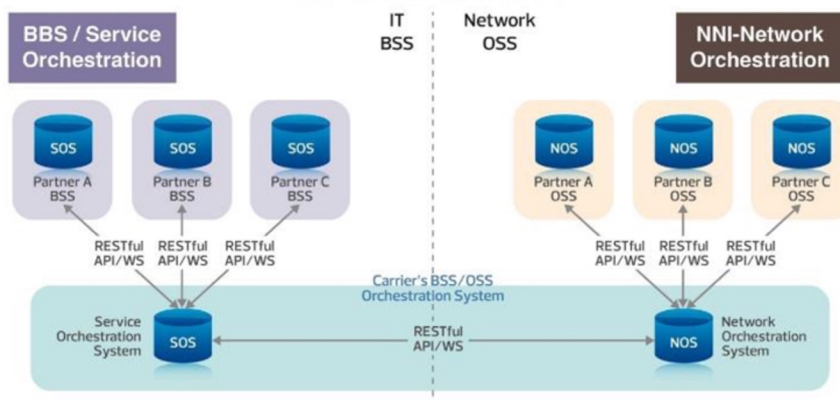
Traditional Carrier BSS/OSS Functional Overview



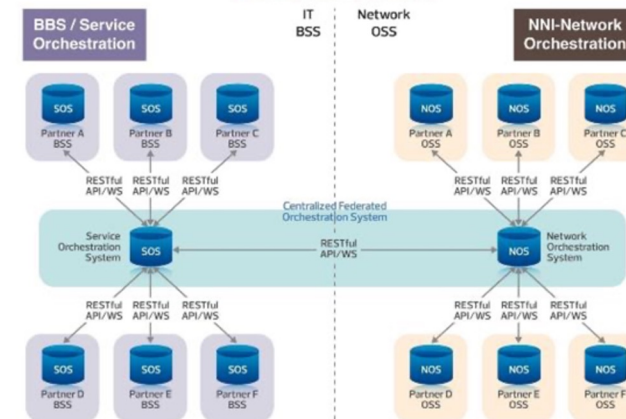
"Next Step" Single Carrier Self-Provisioning Functional Overview



eBonding and Orchestration Bonding Functional Overview



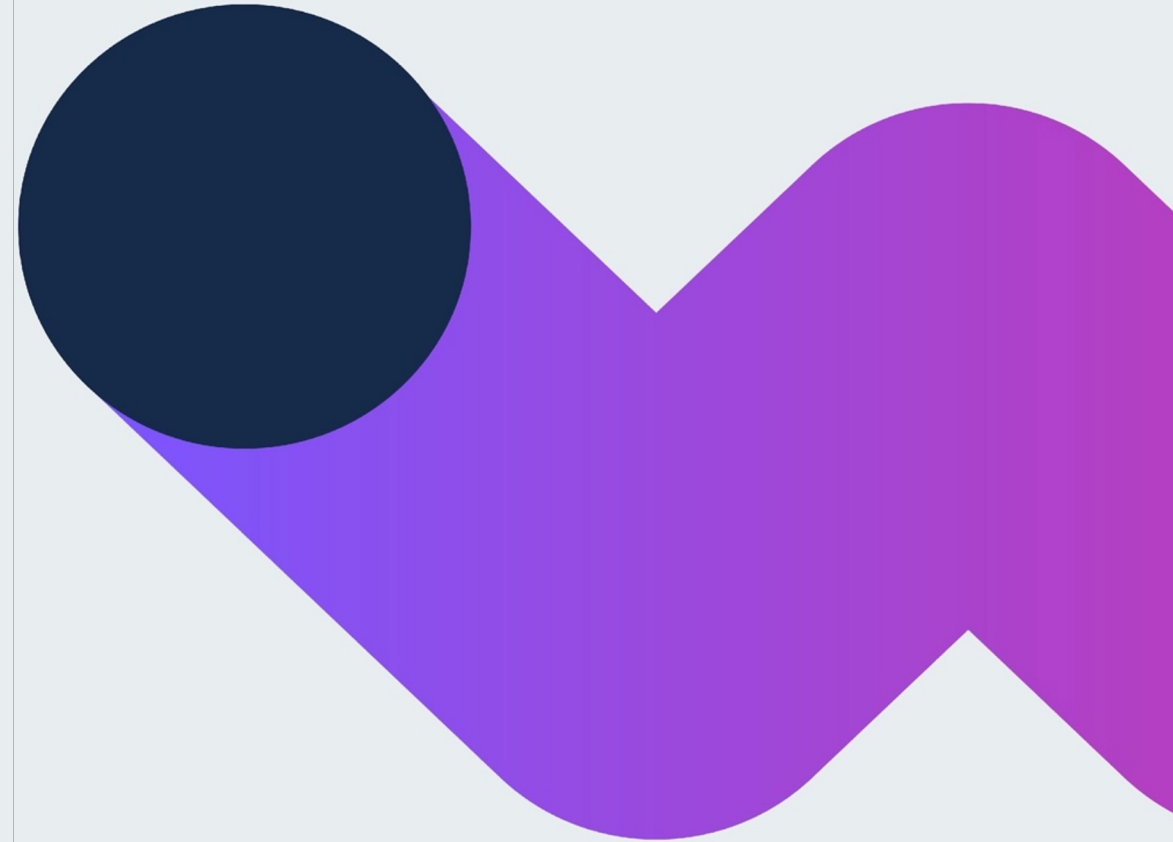
eBonding and Orchestration Federation Functional Overview



# Key Takeaways

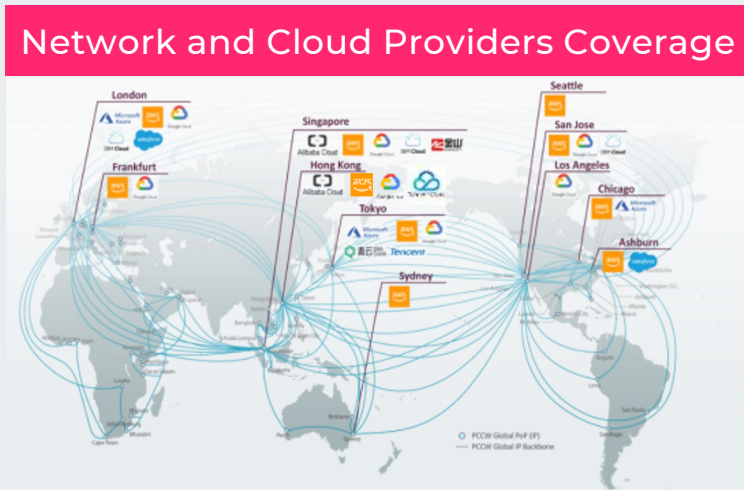
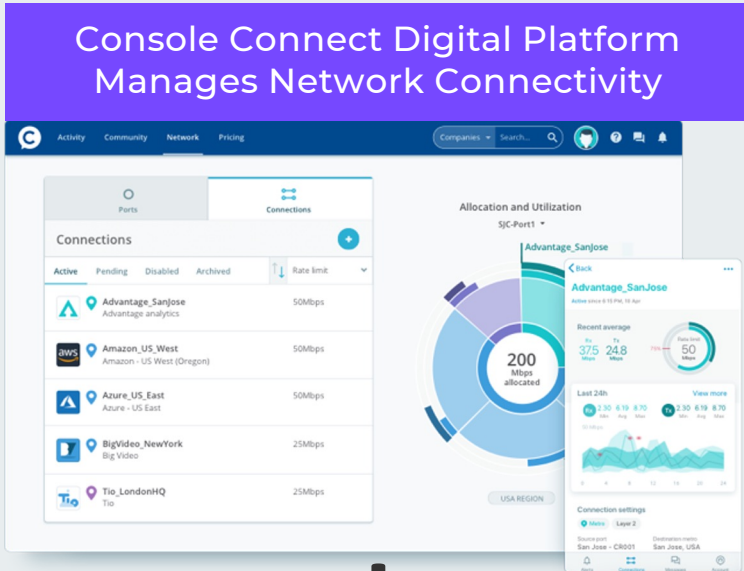
## 2019

- Console Connect was developing a Digital Platform with a Software Defined Fabric
- Enabled customers to manage their network in real-time via a web-based Console, integrate network & applications directly via API
- We suggested a Common information model to setup a Federation of commercial frameworks
- Non-linear growth opportunity existed then and now - By creating an ICT ecosystem with integrated capabilities & unified framework of Operational and Commercial settlements

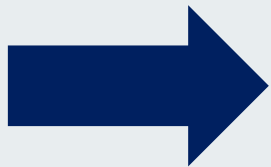




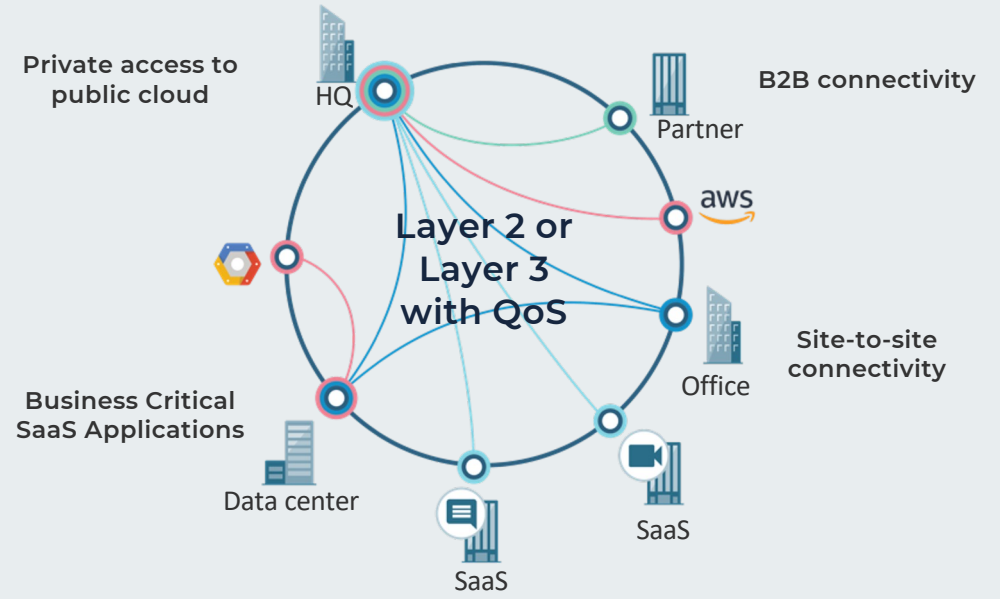
# Digital Platform with software defined fabric



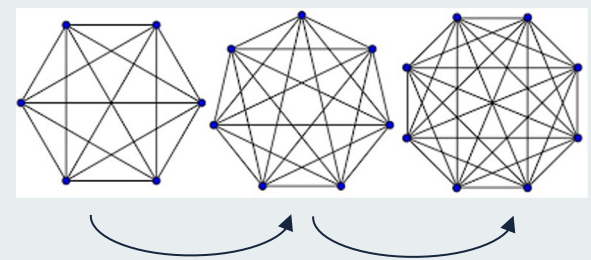
Strong underlying network with Platform capability drives non-linear growth



Automate Any-to-Any Connectivity for Enterprises



Network Effect Non-linear Growth



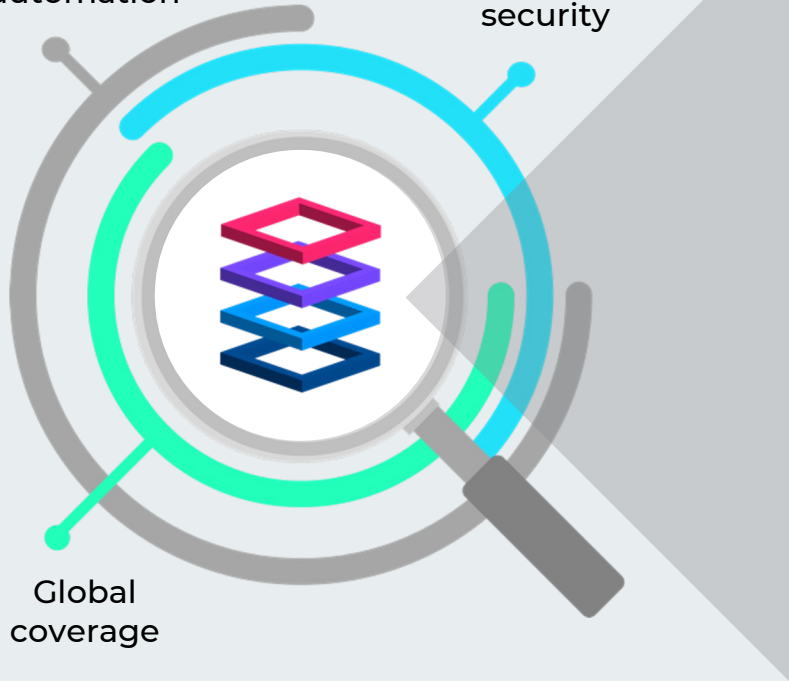
The simpler, smarter way to connect

# Capability behind the lens

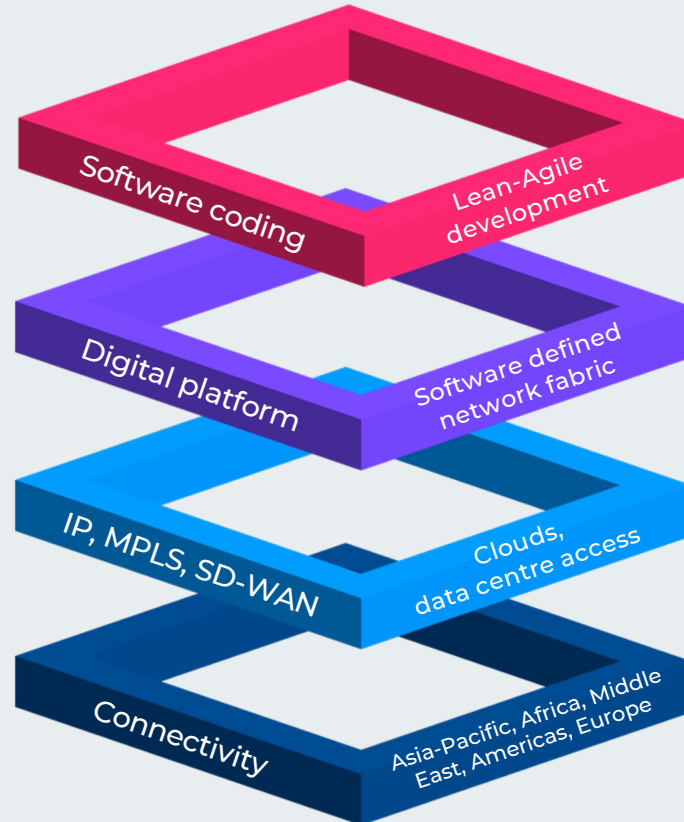
## Digital Automated Innovation

Service automation

Speed & security



## Fully integrated technology stack



## Software to digitize core network

UX, service flexibility



Service automation



## Physical core network assets

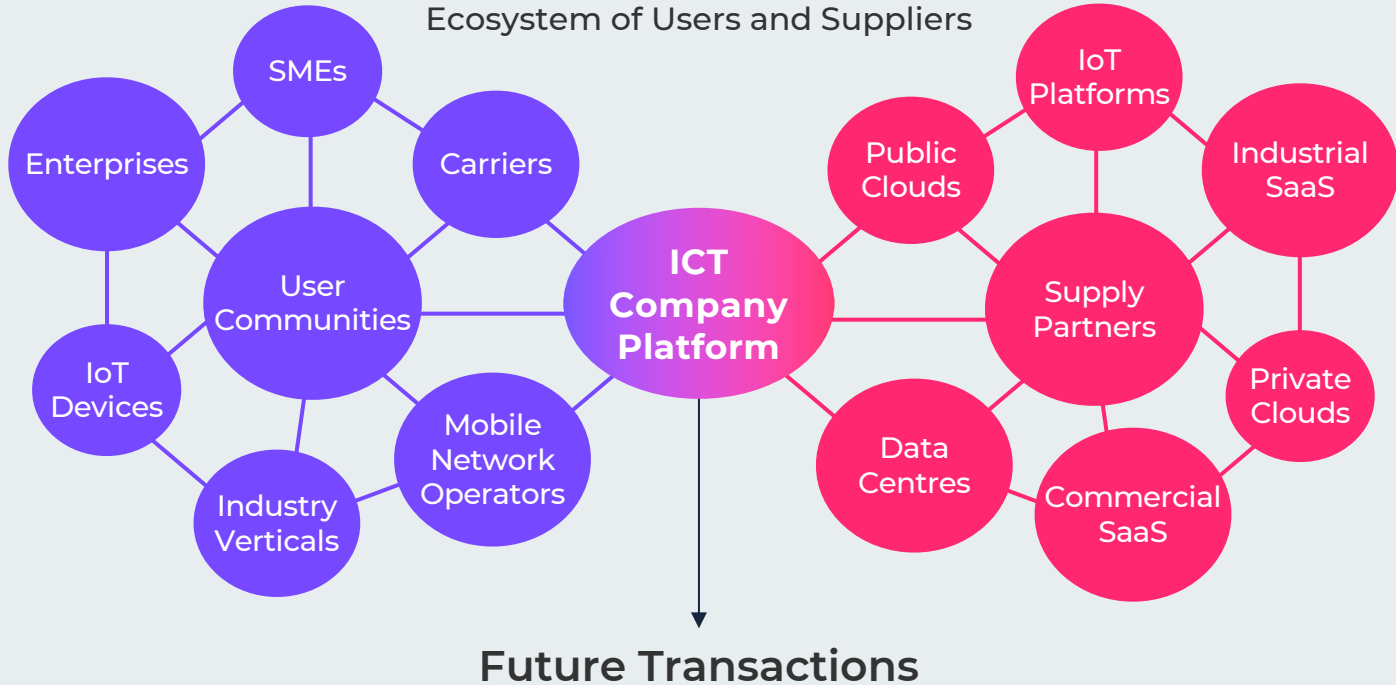
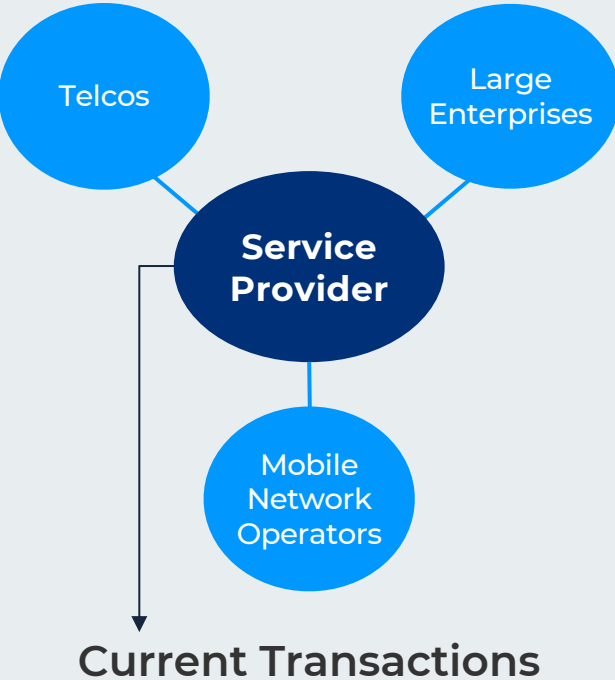
Secured coverage of Cloud IaaS, SaaS



Scalable global network capacity



# The opportunity



**Linear process & growth**

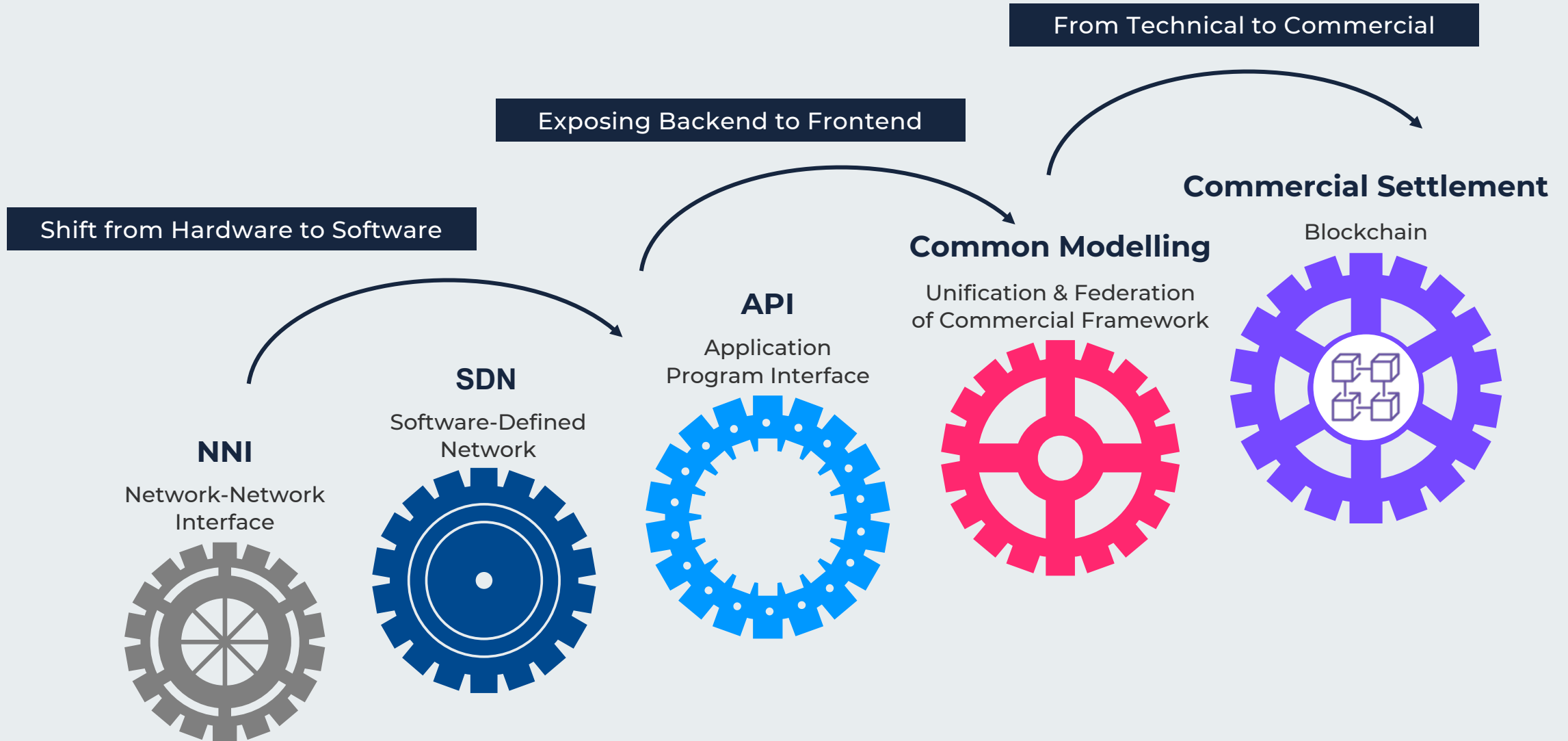
- Weeks to deliver
- \$



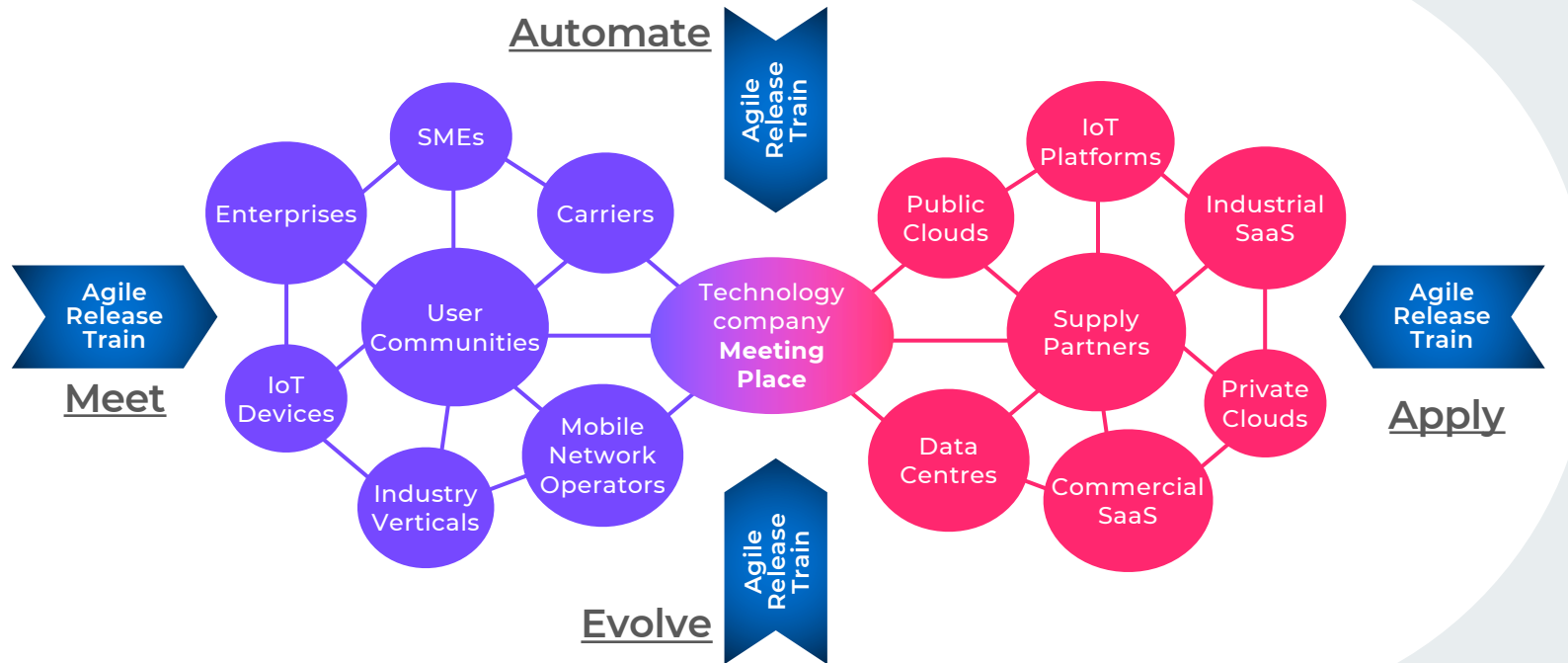
**Non-linear growth opportunity in ICT Ecosystem**

- Seconds to deliver
- \$\$\$\$\$\$

# Requirements for Interoperability



# So, what did we do?



- We reorganized under a SAFe Agile Framework
- Promoted Network & Software Engineering teams to work together in ARTs
- Created Go-to-market Value Streams using:
  - Evolve
  - Automate
  - Meet & Apply



# Key Takeaway in past year

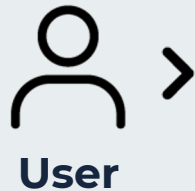
## GLF - Tomorrow's Telco

ITW Global Leaders Forum (GLF)'s future network framework - 2022

- The connectivity industry is **undergoing a significant transformation** due to:
  - Mass 5G Adoption & Digital Enterprise
  - Cloud as Standard
  - IoT, Web 3.0, Metaverse
  - AI and Quantum are next
- **Future network requirements** for next-gen use-cases include:
  - low latency
  - high capacity
  - secure & trusted
  - consistent quality of service
  - adaptable and globally standard
- **Collaboration is crucial** in delivering future network requirements as no one network provider will have its own **end-to-end infrastructure**
- The industry must **evolve toward more programmable, on-demand and interoperable networks**
- GLF lists - 7 Key Requirements & 4 Key Capabilities that need to be developed



## Next generation networks







### Requirements

- 01  Capacity on demand
- 02  Real-time inventory
- 03  Route diverse selection
- 04  Usage-based pricing
- 05  QoS-level guarantee
- 06  App-Driven dynamic capacity management
- 07  Automated trusted business processes

+

### Capabilities

- 08  **End-to-End Security**  
Solution natively secure and adaptable to dynamic risks to network.
- 09  **Cloud-native**  
Solutions based on cloud architecture that enable scalability and customizability.
- 10  **Real-time interoperability**  
Compatible with client demands on a network-agnostic basis.
- 11  **Network Agnostic**  
Delivery of service to end user with different network infrastructure and consistent QoS.

### Key Takeaways:

1. To deliver the end-to-end multi-network of tomorrow's telco, GLF believes there are seven requirements and four new capabilities that need to be developed
2. These requirements and developments need to be available across network providers so they can be available consistently

## Requirement/Capability

## Where does the industry need to collaborate?

01		<b>Capacity on demand</b>	Interconnect & settlement model for capacity on-demand	<b>Yes</b> (Industry Collaboration Required)
02		<b>Real-time inventory</b>	Industry standard approach for exposing inventory	<b>Yes</b>
03		<b>Route diverse selection</b>	Promote increase in infrastructure route diversity	<b>Yes</b>
04		<b>Usage-based pricing</b>	Development of usage-based pricing and settlement model	<b>Yes</b> (Industry Collaboration Required)
05		<b>QoS-level guarantee</b>	Industry standard approach for QoS for different service levels	<b>Yes</b>
06		<b>App-Driven dynamic capacity management</b>	Agreement on uniform dynamic capacity management service & settlement approach	<b>Yes</b> (Industry Collaboration Required)
07		<b>Automated trusted business processes</b>	Leveraging distributed ledger technology to ensure secure & trusted data flows	<b>Yes</b> (Industry Collaboration Required)
08		<b>End-to-End Security</b>	Development of minimum security standards	<b>Yes</b> (ongoing work)
09		<b>Cloud-native</b>	Standards to build interoperable cloud-based solutions for the network	<b>Yes</b> (Control Layer)
10		<b>Real-time interoperability</b>	Operational rules for automated interoperability of multiple networks	<b>Yes</b> (ongoing work)
11		<b>Network Agnostic</b>	QoS standards for constant experience using multiple delivery infrastructures	<b>Yes</b> (ongoing work)





A look at the present...

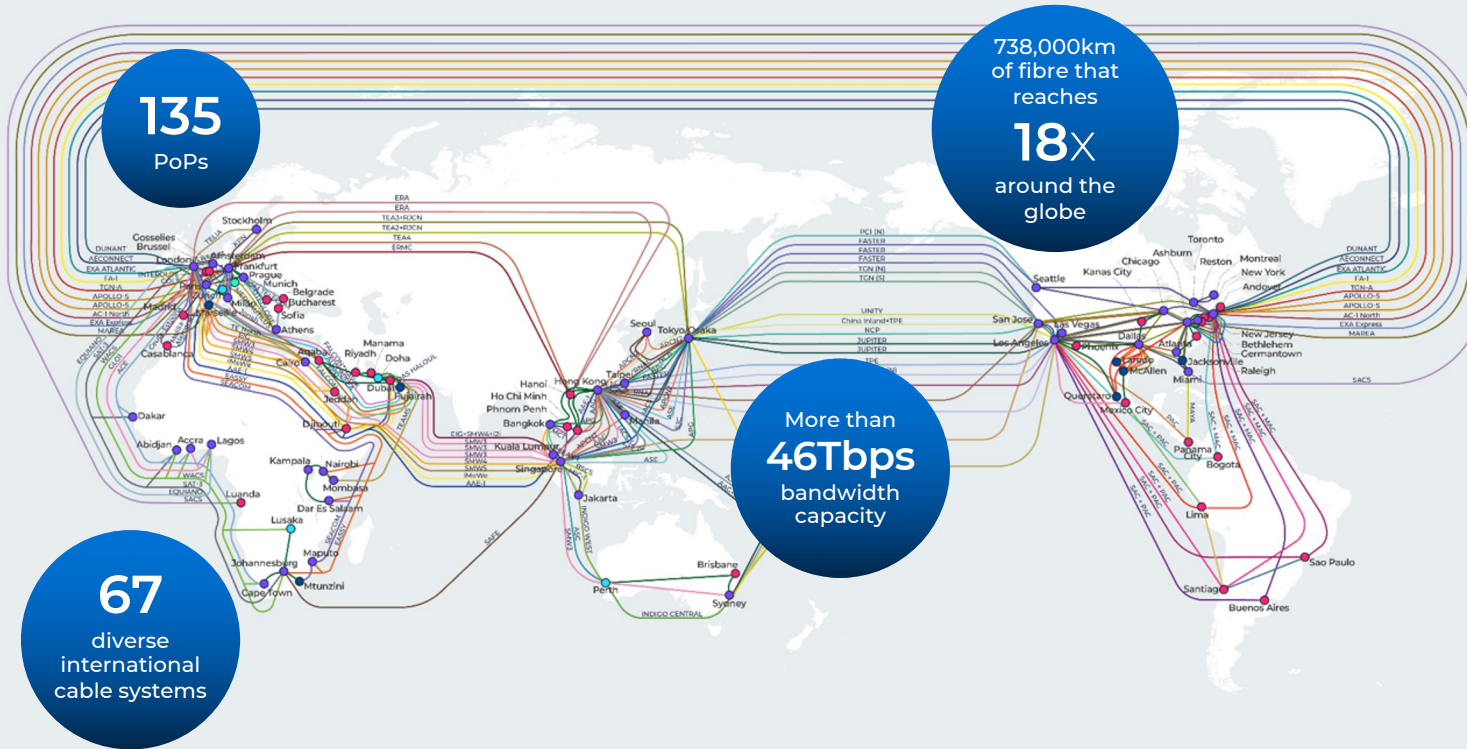
# Console Connect NaaS Platform

How network service providers can benefit from utilizing  
Console Connect NaaS APIs.

# PCCW Global



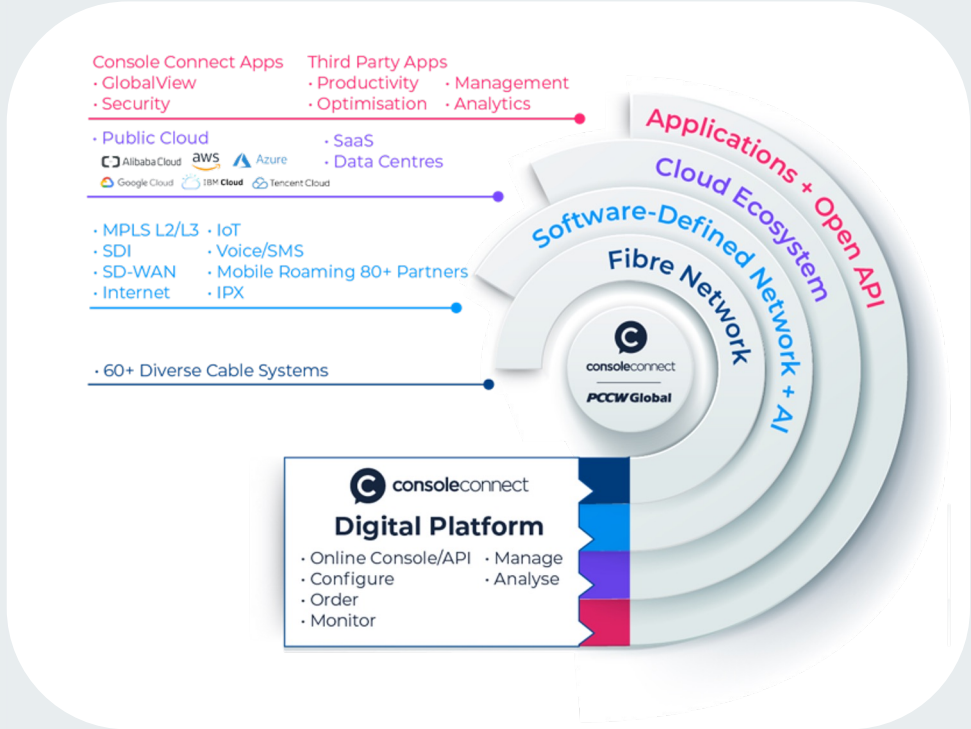
Our global, resilient, high-capacity optical network.



Automated switching and routing across the PCCW Global network

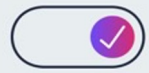
Fully integrated with partner ecosystem

In-house development team driving innovation in: Open APIs



## Use Cases

# Integrate Console Connect NaaS services via API



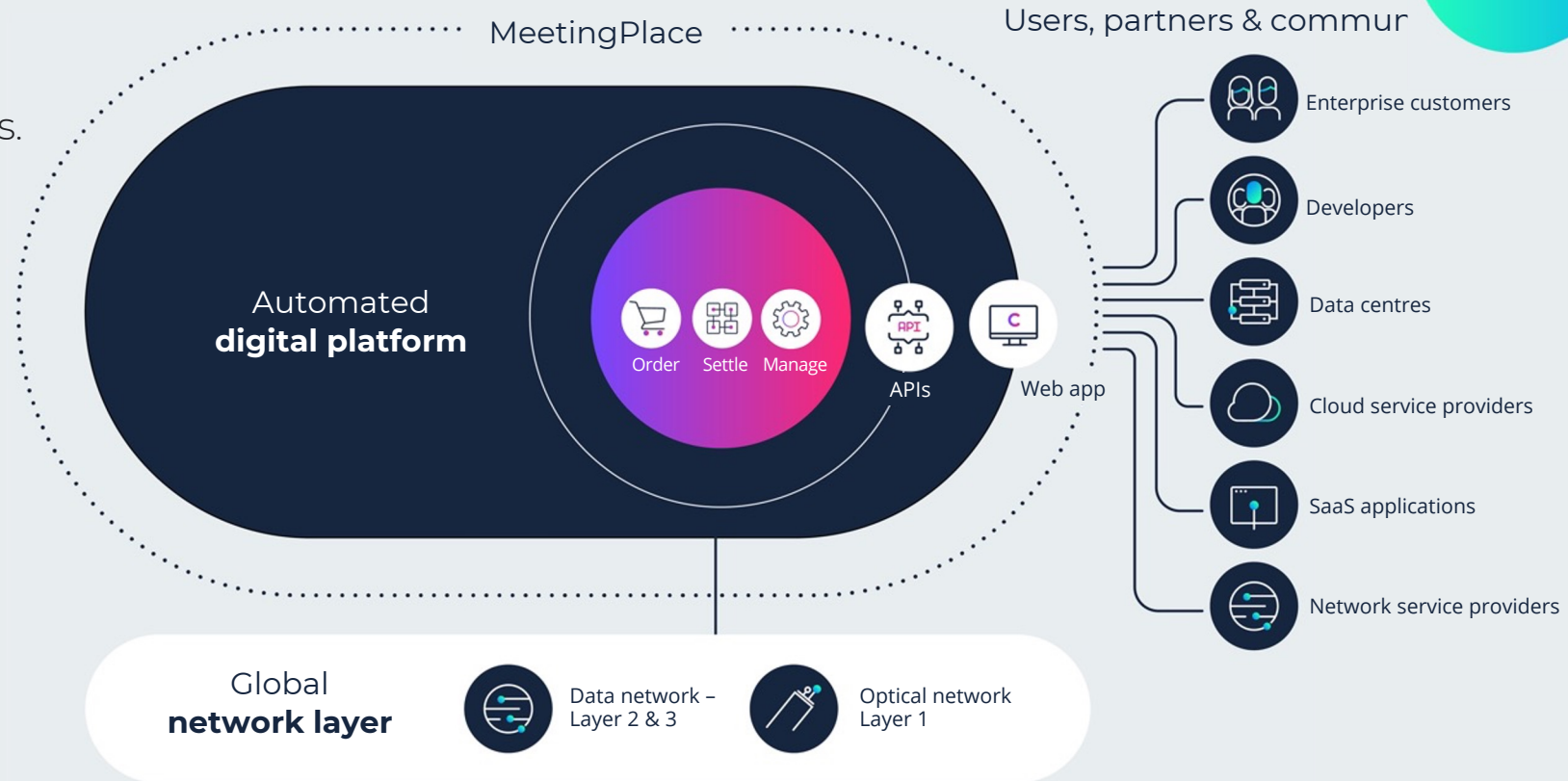
Console Connect NaaS APIs enable developers to automate network connectivity across different providers.



The openAPI ecosystem abstracts the complexity & rate of change in cloud provider API endpoints.

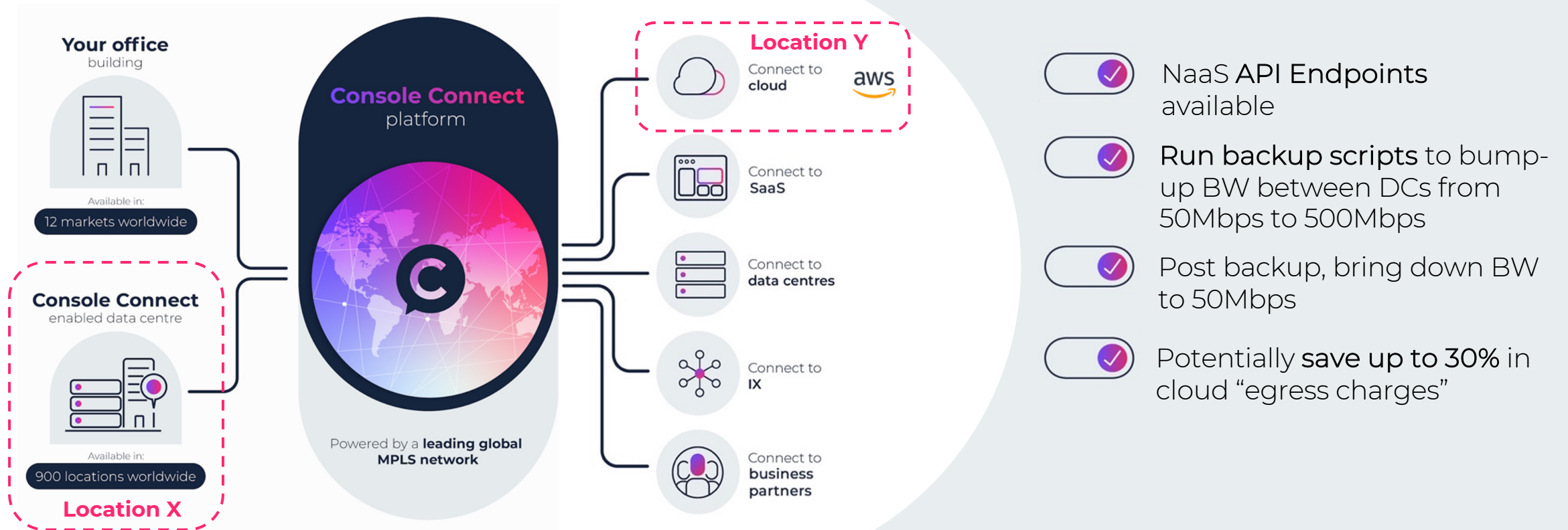


Hence, developers can deploy services more quickly via single points of access to the world's largest software-defined connectivity platform.

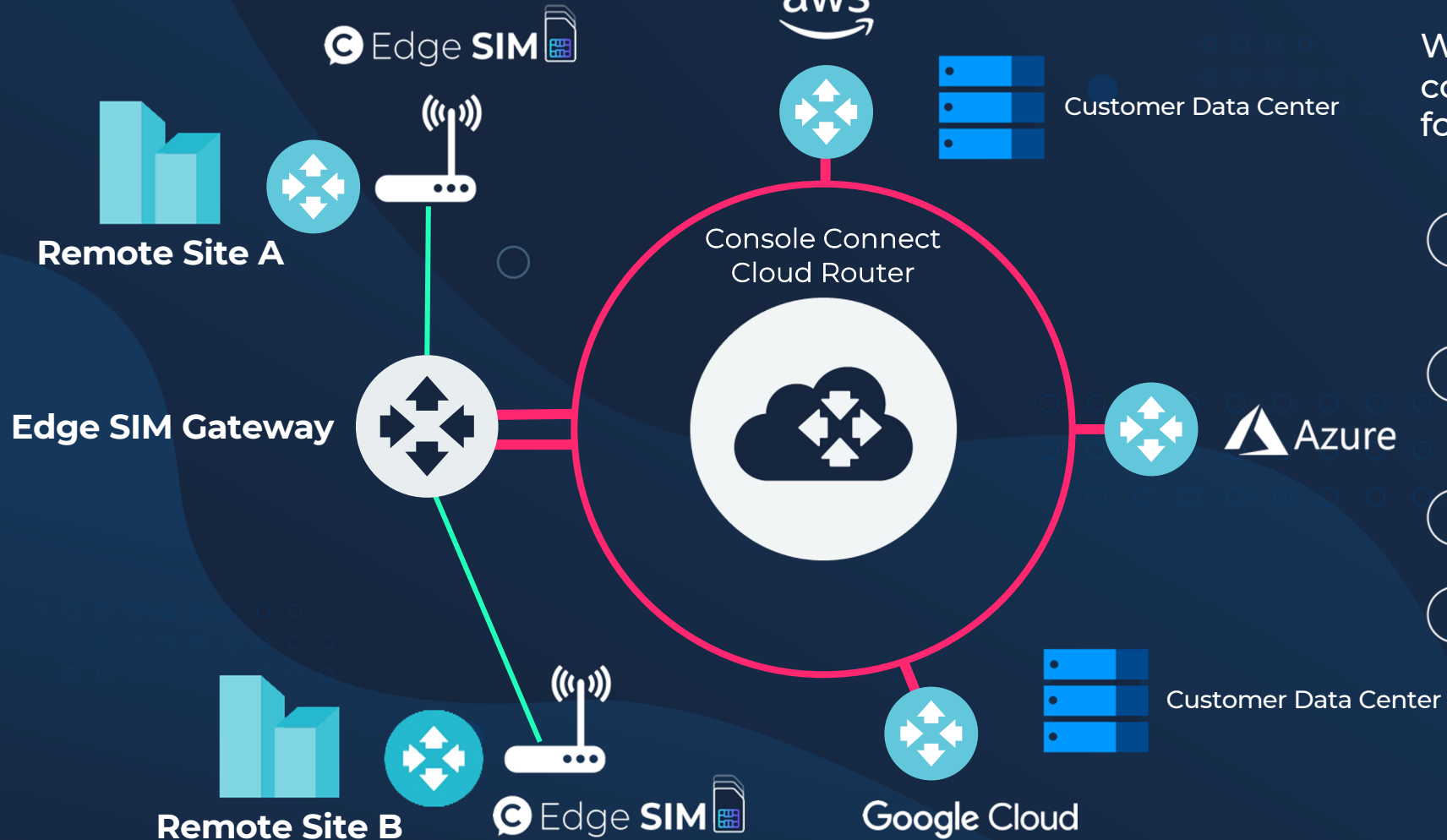


## Use Cases #1 - NaaS APIs

# API driven SDI – Fabric: Run a cloud backup



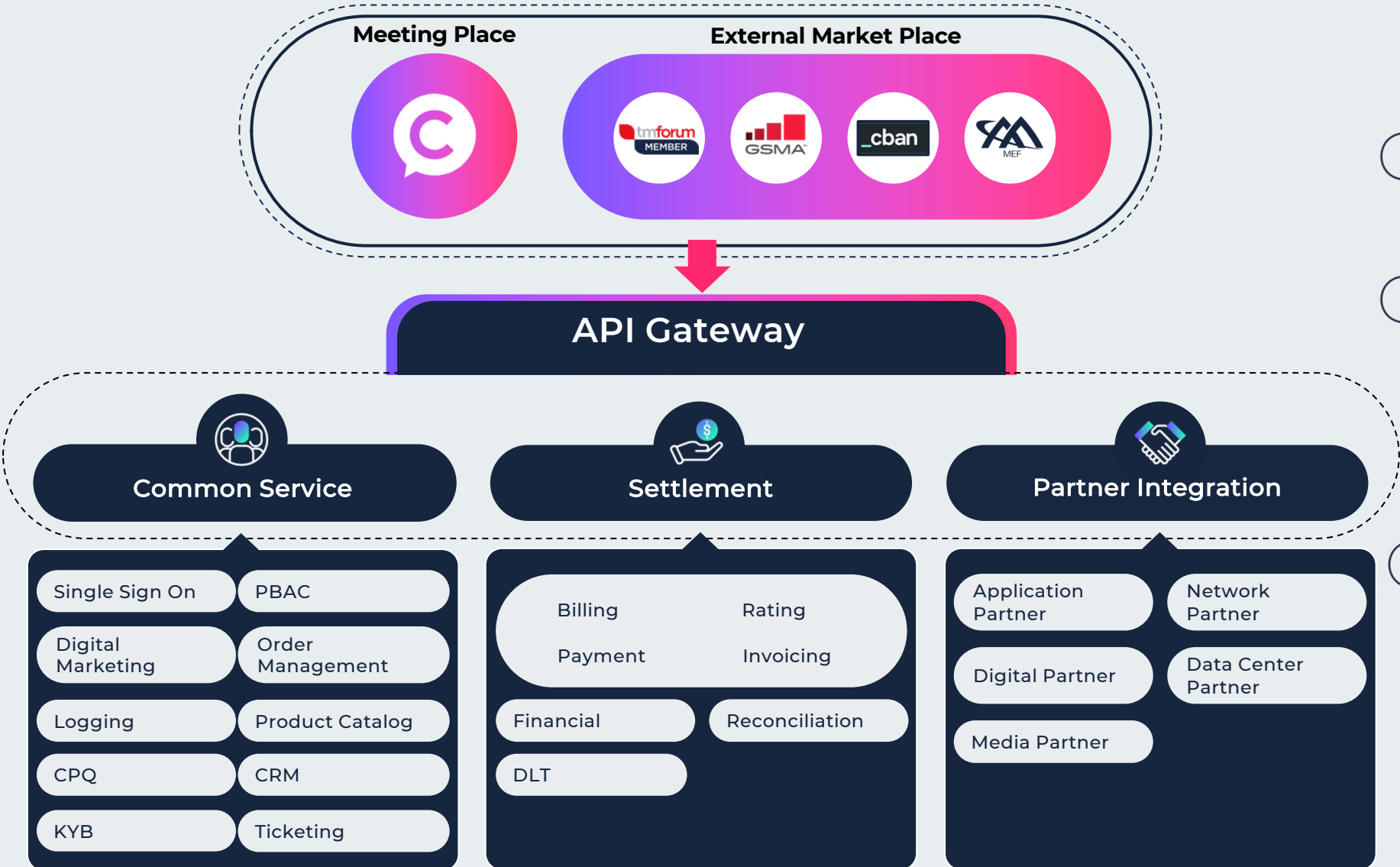
# Edge SIM Integration



World's first private, global connectivity for devices & cloud for IoT projects.

- Private connectivity from Device -> Mobile Operator -> Application
- Fully automated provisioning in minutes
- No exposure to the internet
- Ability to route traffic to nearest Edge Cloud for IoT workloads

# API Component Map



Console Connect platform is **tightly integrated** with APIs

We invite developer communities to come join and **write to our APIs to automate** real-time ordering, provisioning, Inventory and Billing

This will allow each party to **publish** its own catalogues of value more widely.

Next Steps

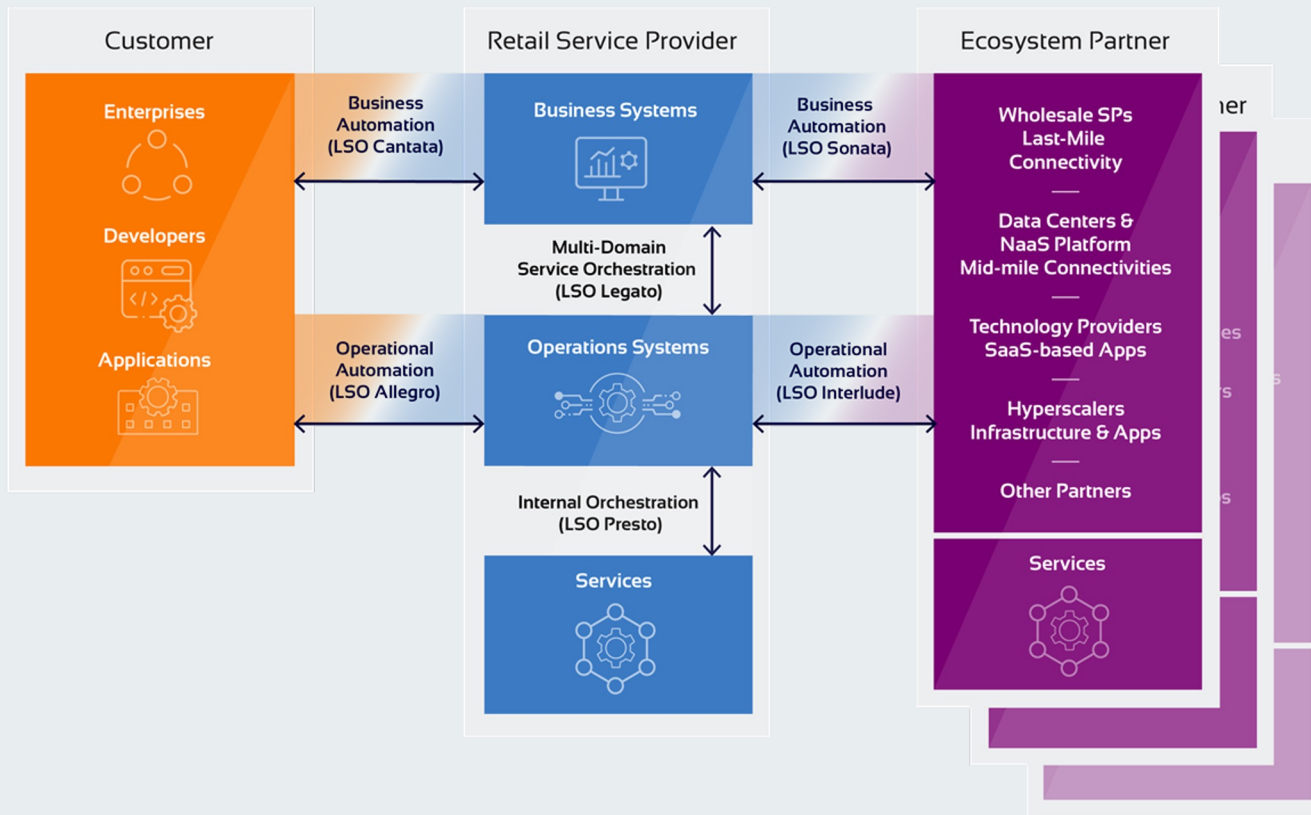
# Automated Commercial Settlements & DAO

Addressing key challenges faced within an interconnected world of ICT ecosystem



# MEF LSO Framework

For end-2-end orchestration of a MEF defined service



MEF defined (and endorsed) Product & Service Schema Payloads



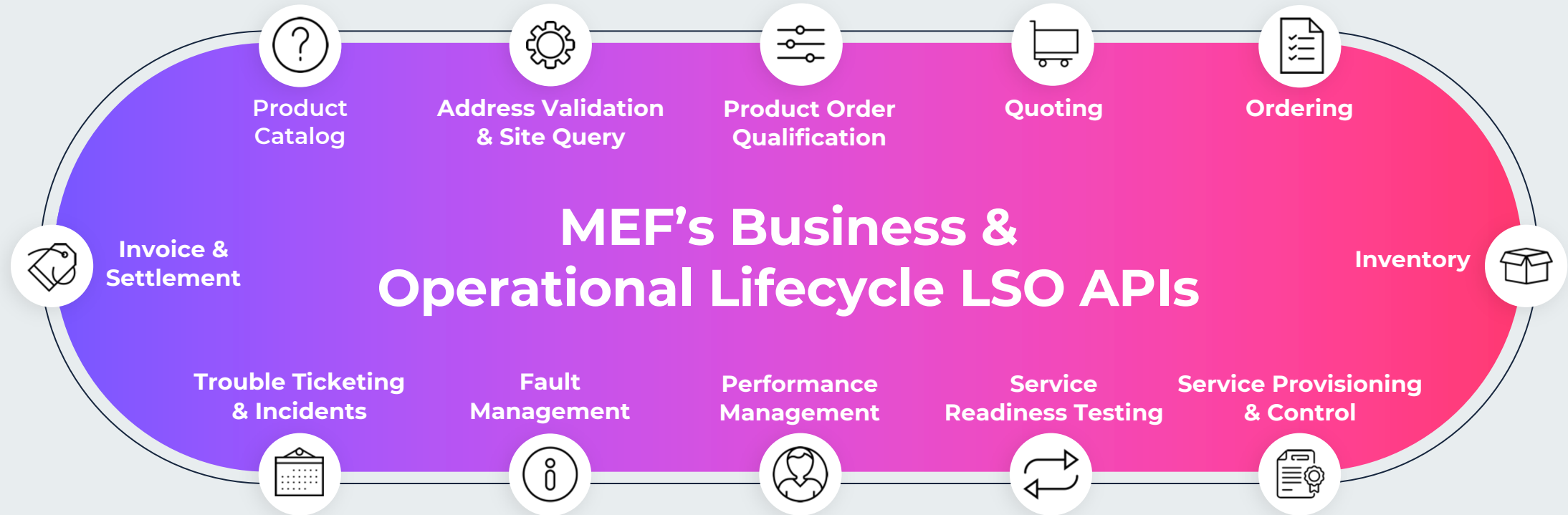
## MEF standard 55.1 [LSO Framework]

Describes a Reference Architecture and Framework for the orchestration of a MEF service lifecycle



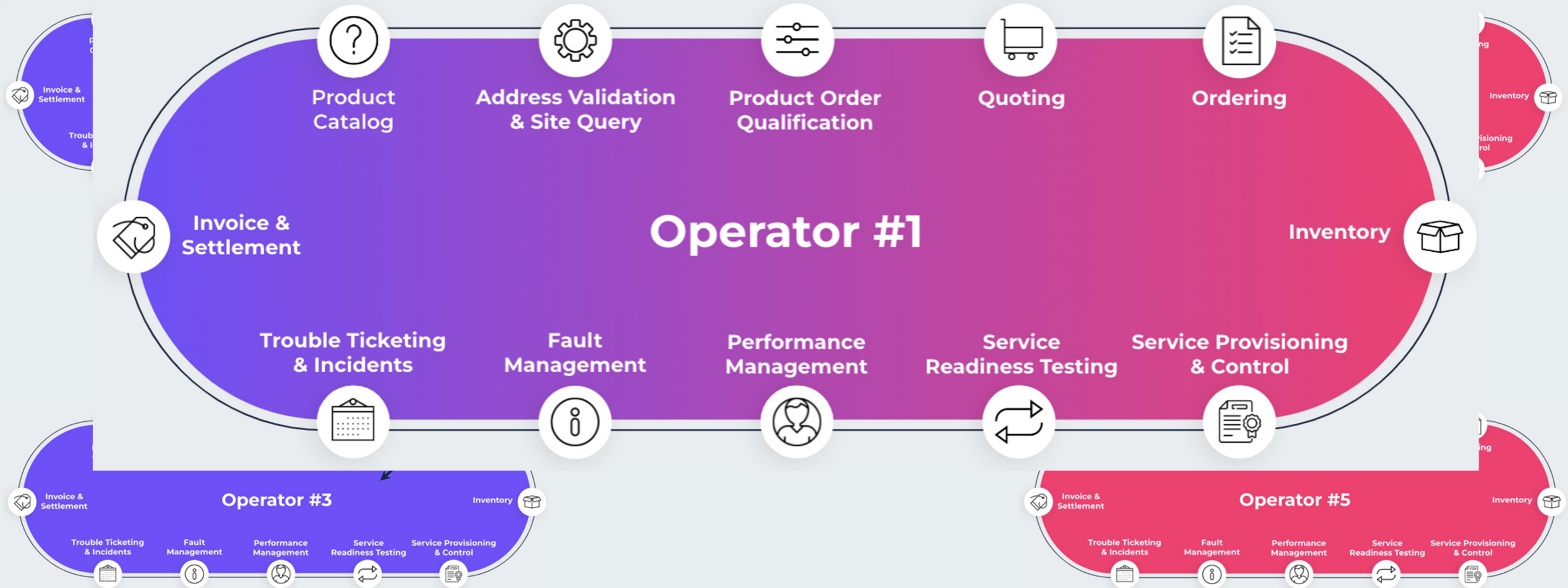
# MEF's LSO APIs

Lifecycle of Business and Operational Standardized APIs



# Reality check - Every CSP has its own OSS/BSS Stack!

Leads to a complex mesh of manual financial settlement transactions



# The challenge

Automated commercial settlement among ICT ecosystem partners still remains a challenge!

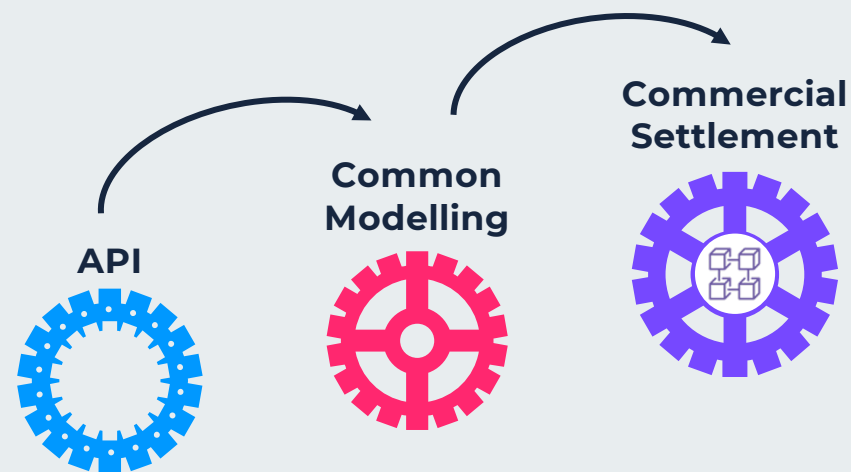
Each operator has independent systems designed one at a time

Each operator in a transaction keeps their own separate records

Each operator is using their own proprietary data model

Leads to increased manual effort across all parties & Manual Settlement

This requires a common industry modelling



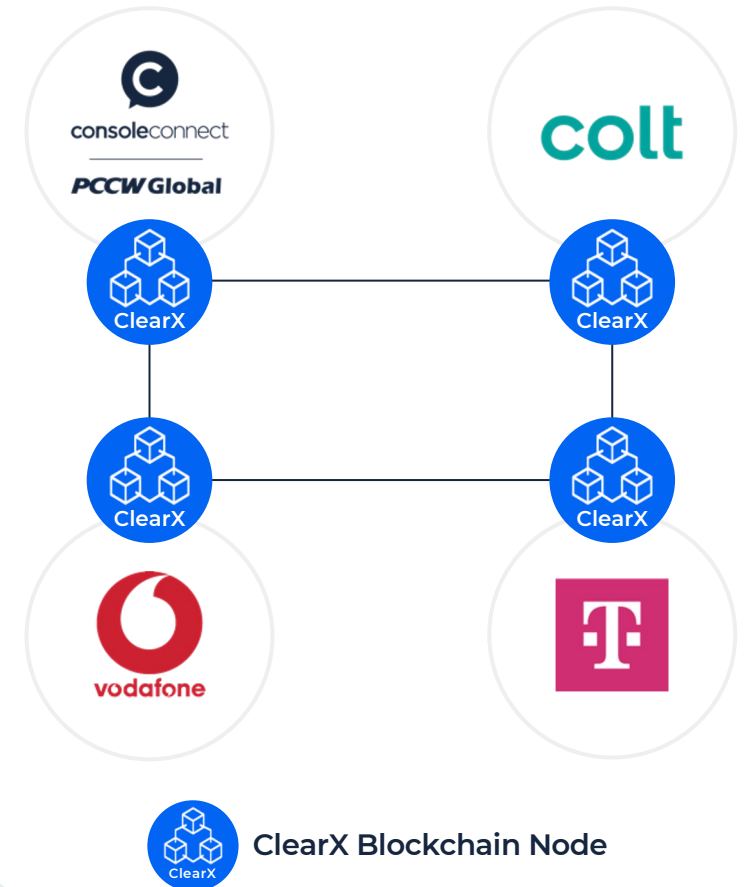
# Data on Demand

Production work under a CUG

ConsoleConnect, Vodafone, Deutsche Telekom & Colt using ClearX's blockchain are pioneering a collaborative innovation:

- To establish a fully digitalized quote-to-cash service delivery process
- Ensures real-time synchronized product inventory between the partners and precise settlement using a blockchain.
- Leveraging generative AI to formulate smart contracts to enforce commercial agreements among participating carriers
- Open to collaborate with all MEF and other industry bodies (GSMA, ETSI, CBAN, etc.) to drive standardization and adoption

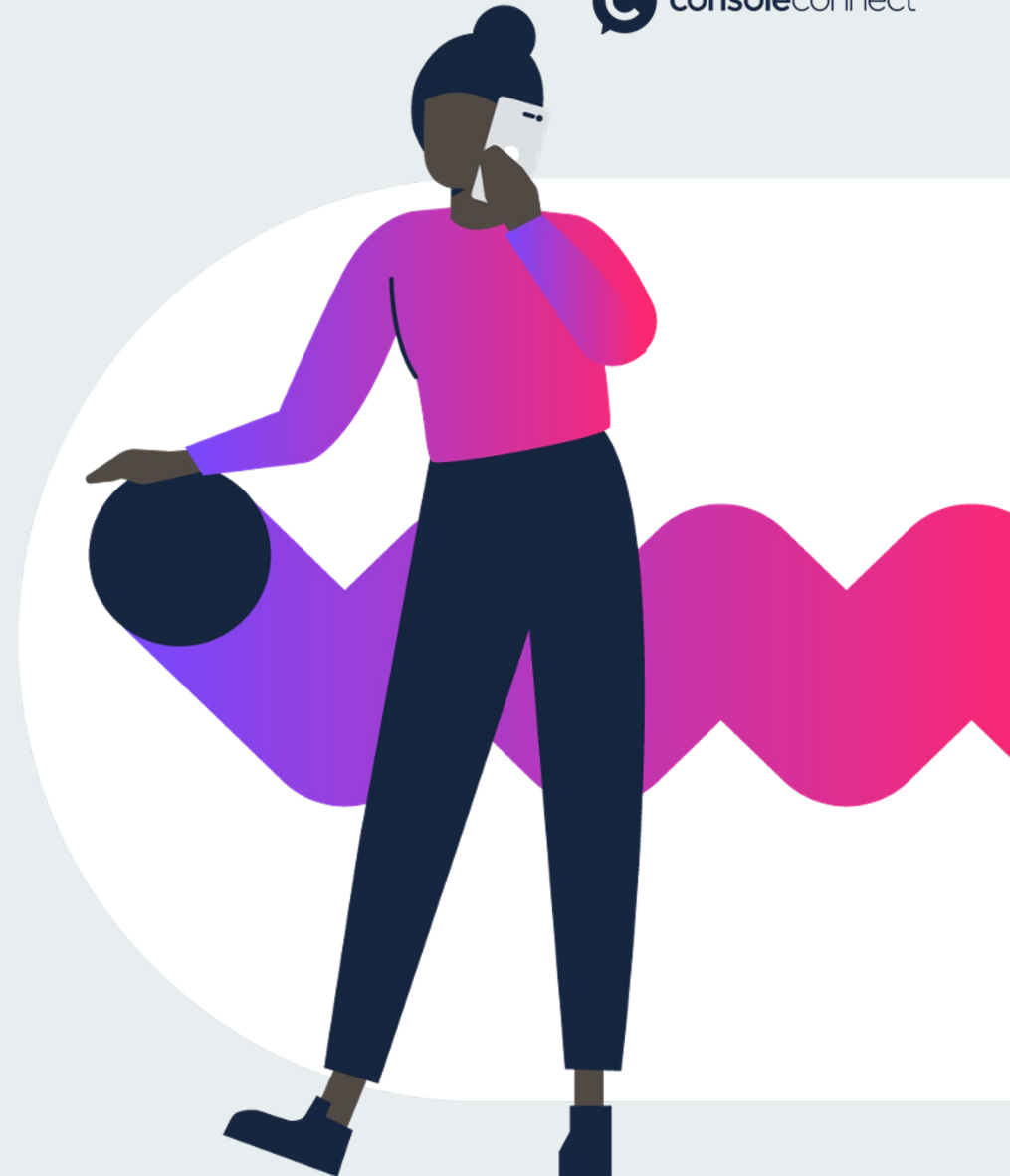
## Current Network Setup



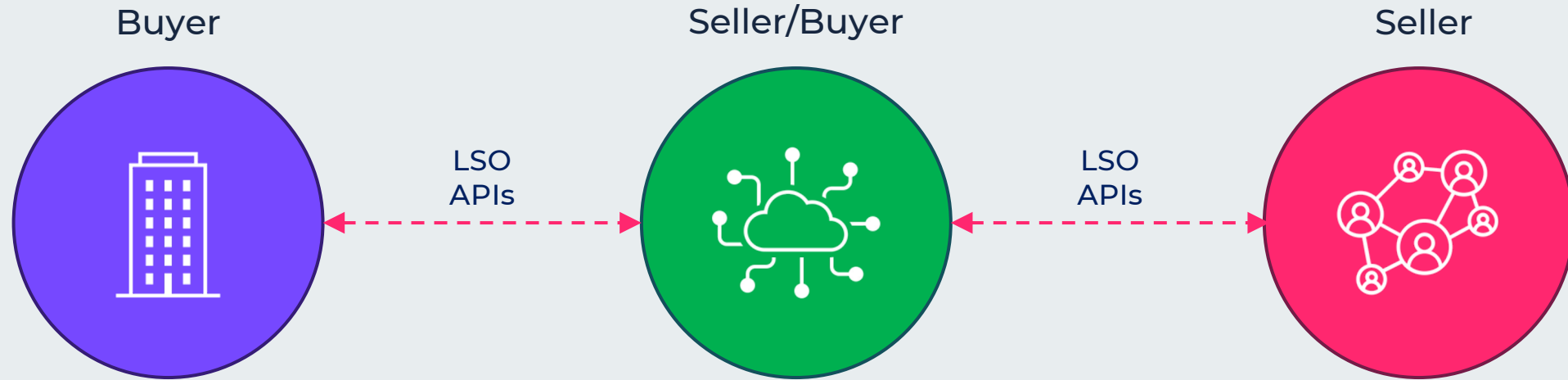
# A road forward: Decentralized Autonomous Organisation (DAO)

A set of entities coordinating automated business among each other by using mutually agreed:

- Business rules, conditions and processes captured in software via "smart contracts"
- DLT infrastructure
- identity management service
- Digital information flows (APIs, DLT blocks)
- Tokenomics



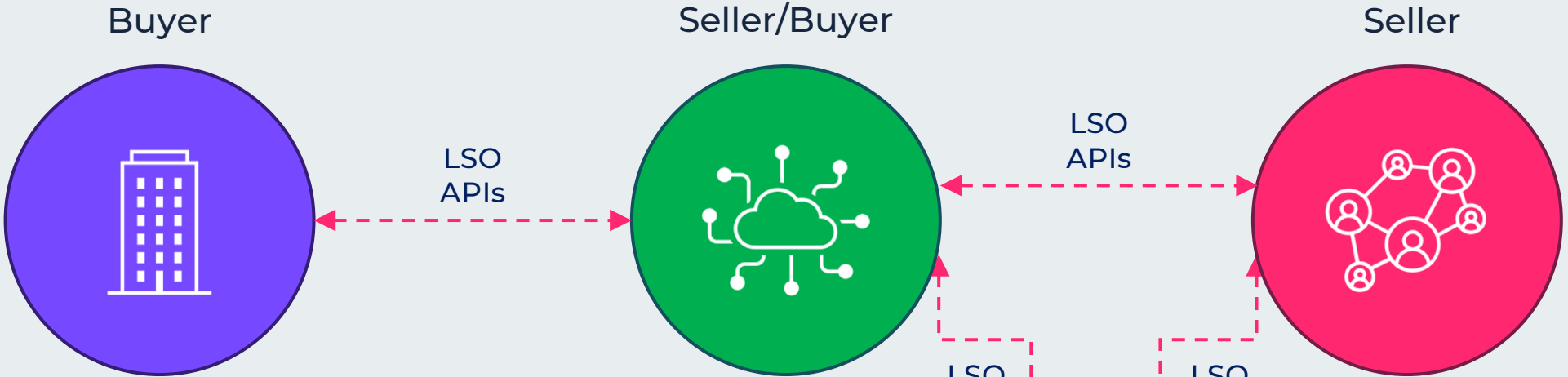
# Automated ICT interoperability



- LSO API's enable standardized business and operational information flow between buyers and sellers via standardized machine to machine interfaces.
- We also need to ensure consistency of the information calculated and stored within the systems of each buyer and seller.
- inconsistency can challenge supply chains (e.g., in the billing and settlement part of the life-cycle)

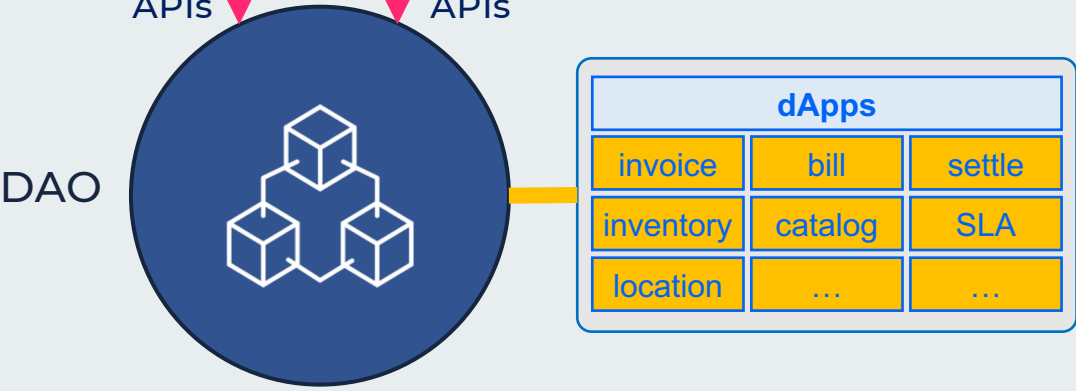
# Automated ICT interoperability

## Why a DAO?

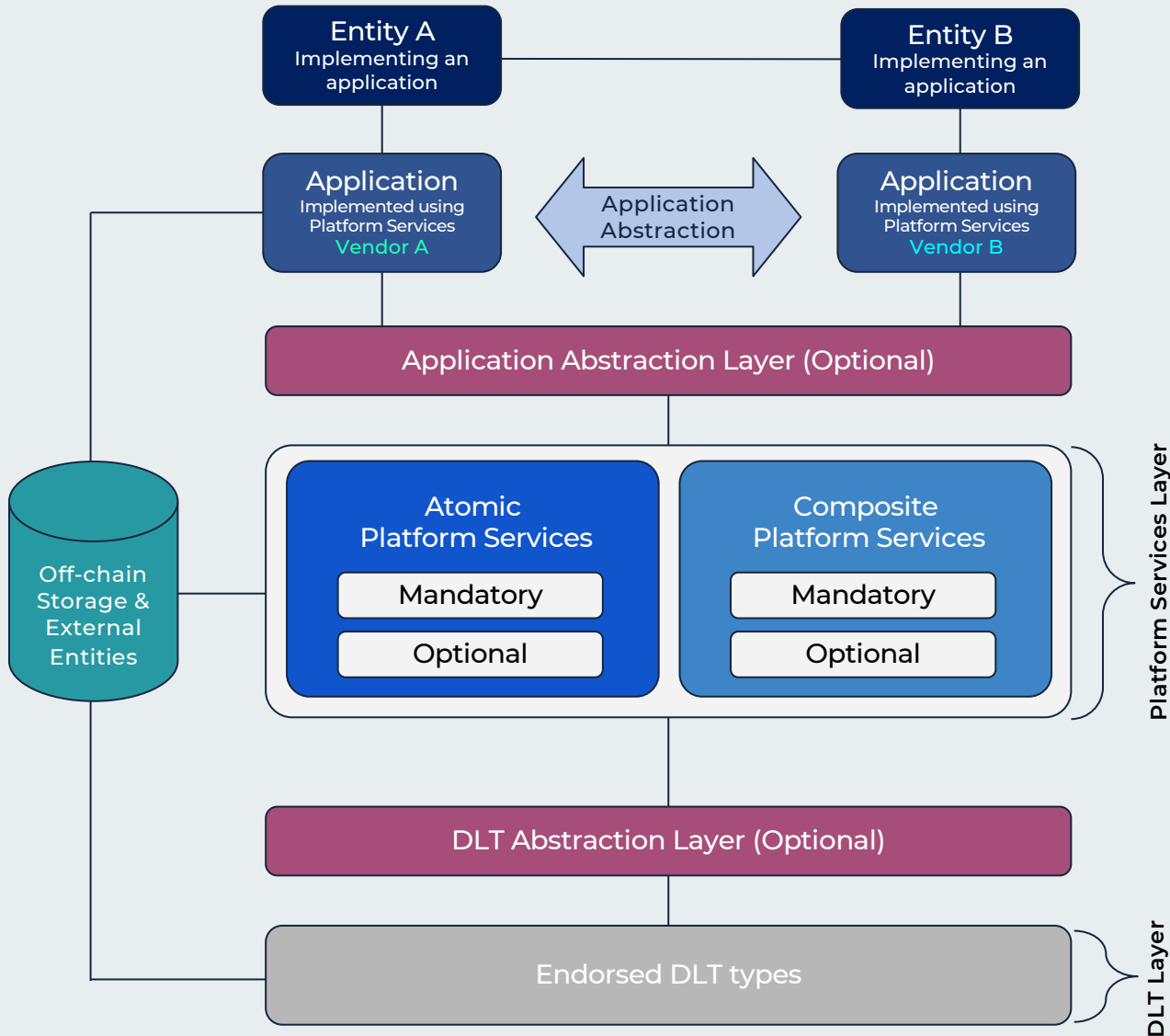


## DAO

- DAO works together with the LSO business and operational lifecycle, guaranteeing information stored within is immutable and non-repudiable.
- Buyers and sellers:
  - Use LSO APIs to interface with the DAO.
  - Need distribute applications [dApps] to manage the blockchain
  - Use smart contracts ("if-then-else" statements) that implement the terms and conditions of a bilateral MSA between the parties



# Reference Architecture



ETSI reference architecture defines shared services, chains, standardized terminology, and interoperable protocols.

- Enables interoperability between different OSS/BSS systems, facilitating serviceability between different ICT service providers
- Provides a structure for an interoperable, multi-DLT settlement environment
- Is open source and publicly available



# The DAO for ICT Interoperability

The ICT community can come together to offer a common place for establishment of an industry-wide DAO. **MEF can play a key role!**



## Extensible Architectural & Business Services

Discovery

Storage

Orchestration

Inventory, etc..

## DAO

Identity

Assurance

Trustless, Secure, Decentralized, Open Source ..

## Interoperable DLT Chains

Ethereum

Orbs Chain

Corda Chain

More...

The DAO allows for new industry use-cases to be easily introduced and supported in a structured manner without changing common parts.

- Fraud Detection and Mitigation
- Data on Demand
- Mobile Roaming Settlement
- Security
- Service Level Agreements
- IoT
- More.....

# Summary

- **Come write to Console Connect NaaS API's:** With a fully orchestrated, automated, and software-defined Network Fabric, Digital Platform and Open APIs, Console Connect provides an On-Demand experience for ICT Partners.
- **DAO:** We envision a digital marketplace (with open APIs) & automated commercial settlement. A DAO would provide the ICT community considerable opportunity to monetize infrastructure and applications, and would empower the MEF members developer communities to embed and leverage end-to-end secure and on-demand services and applications.
- **Call for collaboration:** We call upon the ICT ecosystem, via MEF, (including - Fixed and Mobile connectivity, Cloud, DC, IX, Security, SaaS providers) to further collaborate and work in establishing common information modeling with industry standard commercial frameworks to expose, consume & monetize services.



# Thank you

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Global NaaS Event  
By MEF