



SP Network as a Service(NaaS)に 対するCiscoの取り組み

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自己紹介

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- 役職：Systems Architect
- Service provider様向けのPre-sales SE職
- Interop Tokyo ShowNet NOC team member



Network as a Service (NaaS)とは?

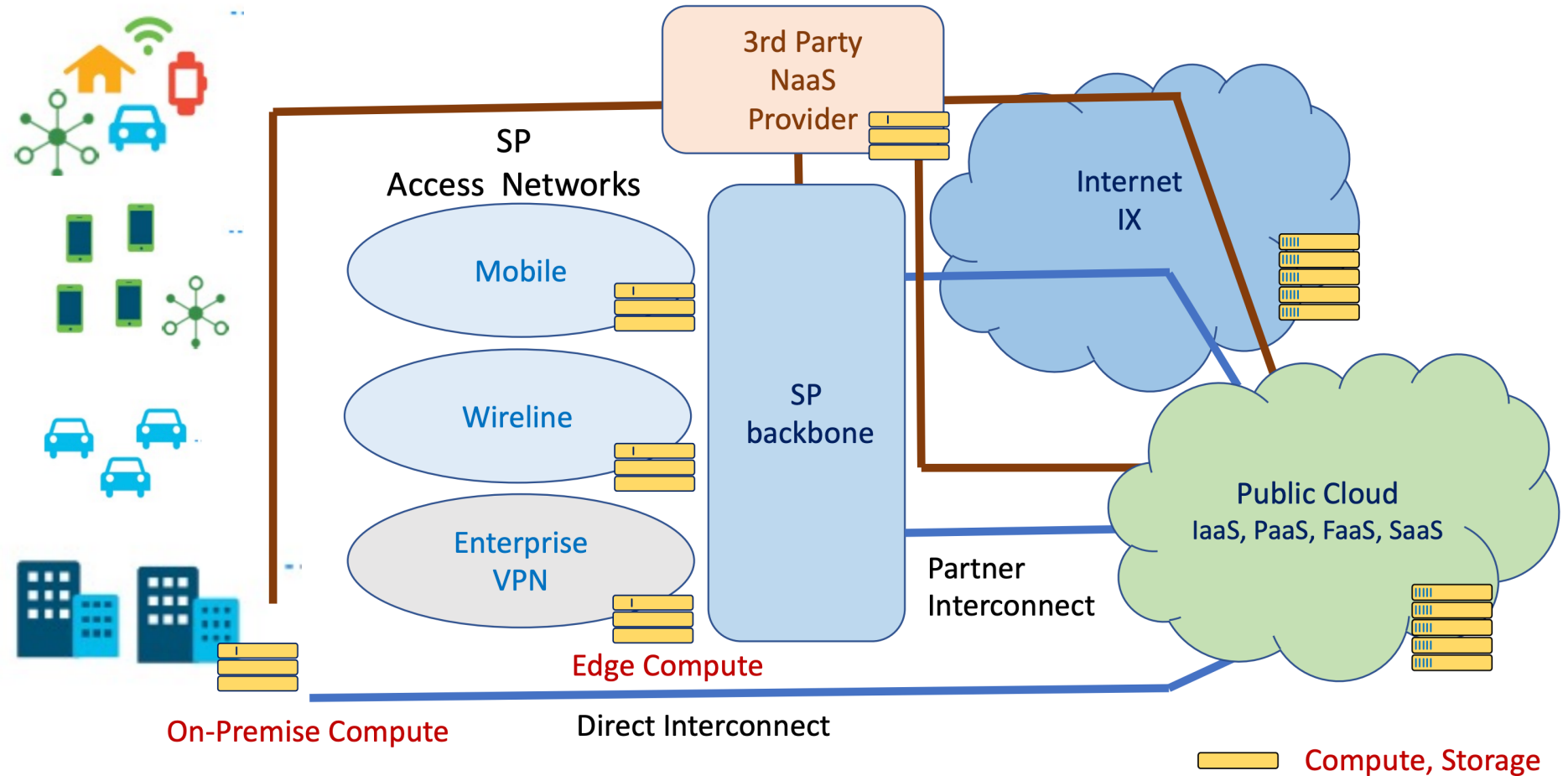
- Network as a Service (NaaS)はSoftware-Defined Networking (SDN)、プログラマブルネットワークワーキング、APIベースのオペレーションをWANサービス、トランスポート、ハイブリッドクラウド、マルチクラウド、Private Network Interconnect、インターネットエクスチェンジポイントにもたらす
- 歴史的な定義としては、ネットワーク・トランスポート接続のためのサービスの記述を含むNaaSの基本的な概念に焦点を当てていた
- NaaSはまた、ネットワークとコンピューティングリソースを統合された全体として考慮することによるリソース割り当ての最適化も含む
- クラウド・コンピューティングの出現により、NaaSはクラウド外の作業員間（古典的なエンタープライズWANアーキテクチャの更新）だけでなく、プライベート（多くの場合マルチテナント）データセンター施設（MTDC）およびパブリッククラウドサービスプロバイダー（CSP）にある企業リソース間のトランスポートとなり、成長する「クラウドファースト」エンタープライズアーキテクチャにおけるこれらすべての相互接続を含む

ちょっと抽象的すぎて難しい。。。

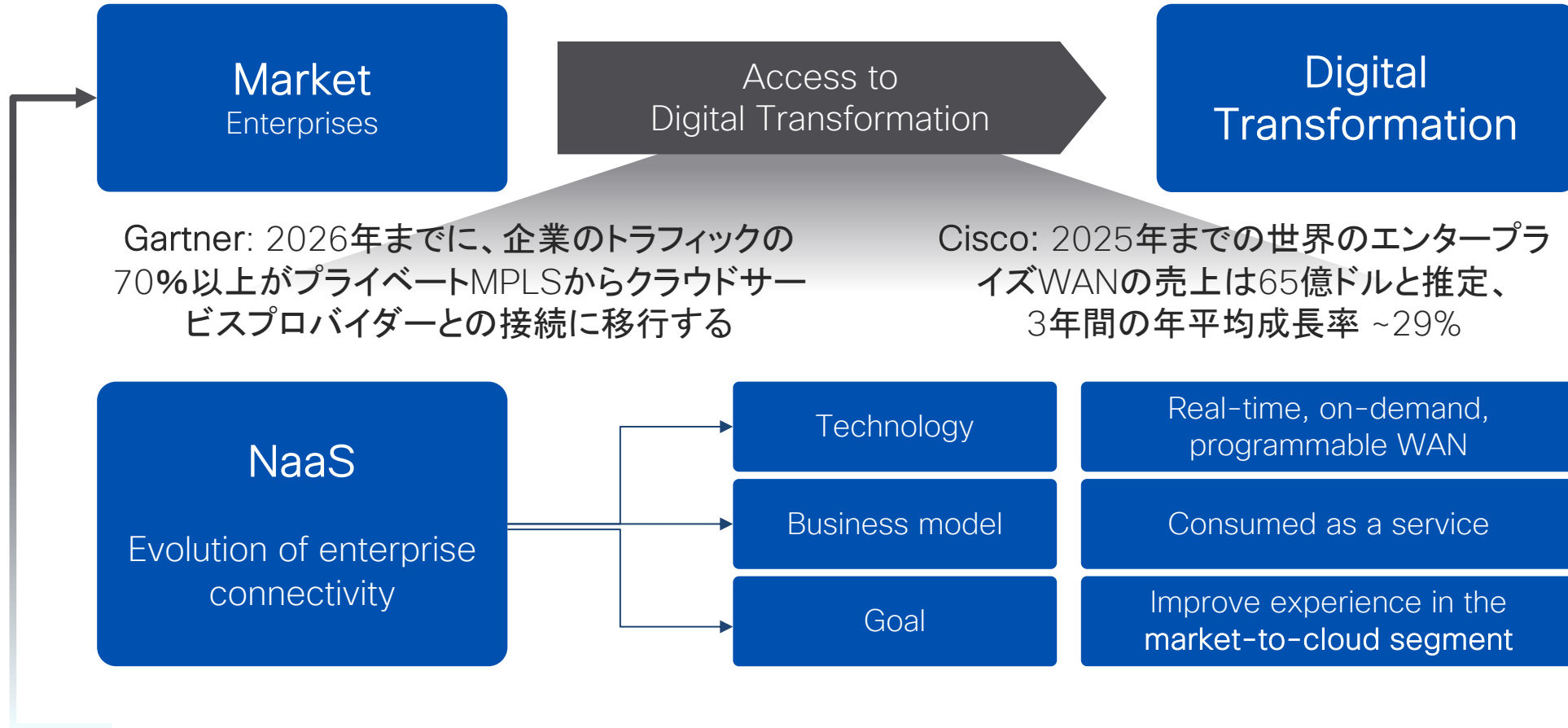
https://en.wikipedia.org/wiki/Network_as_a_service

<https://www.janog.gr.jp/meeting/janog48/wp-content/uploads/2021/05/janog48-naas-Kohno-01.pdf>

Network as a Service (NaaS) モデル

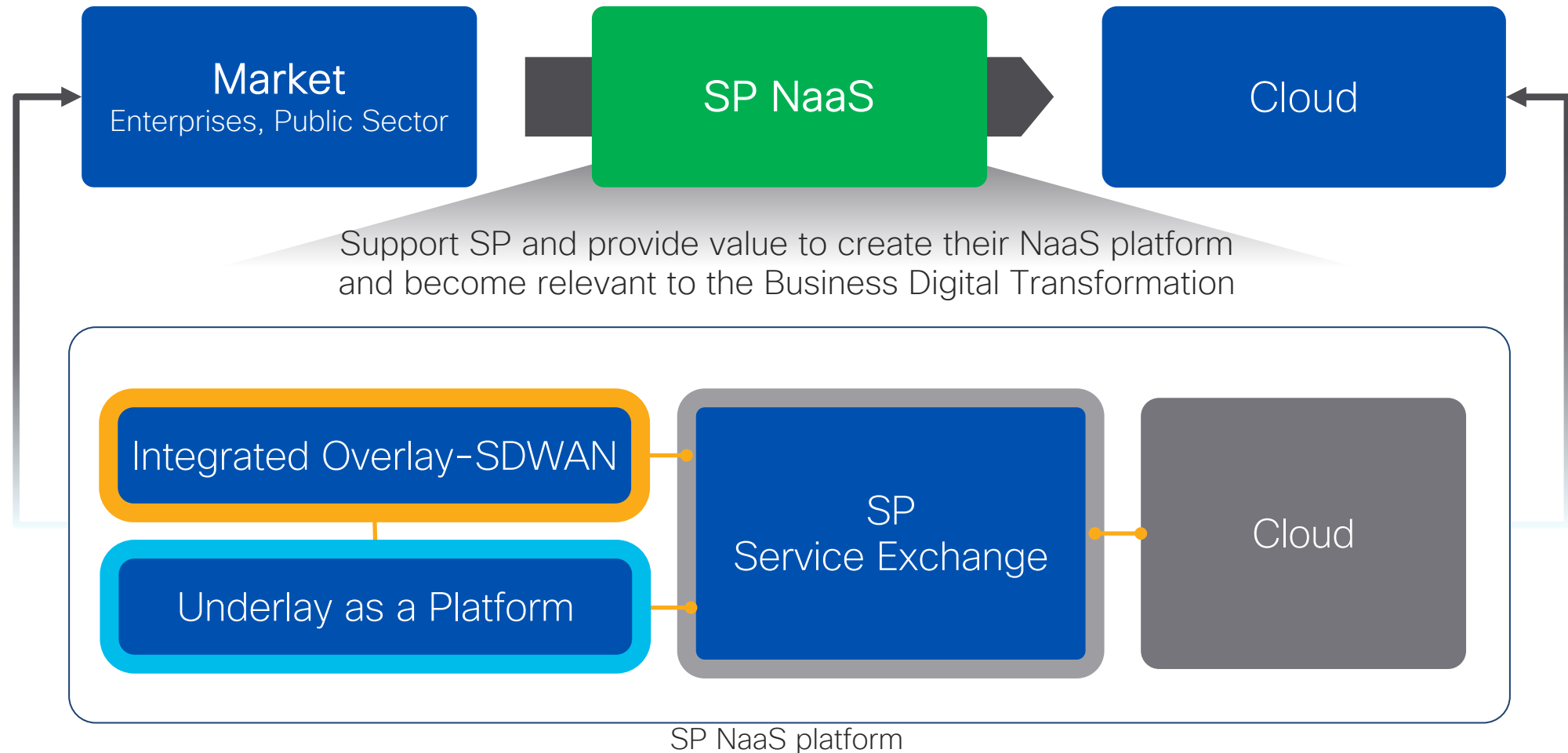


Network as a Service (NaaS) for Business

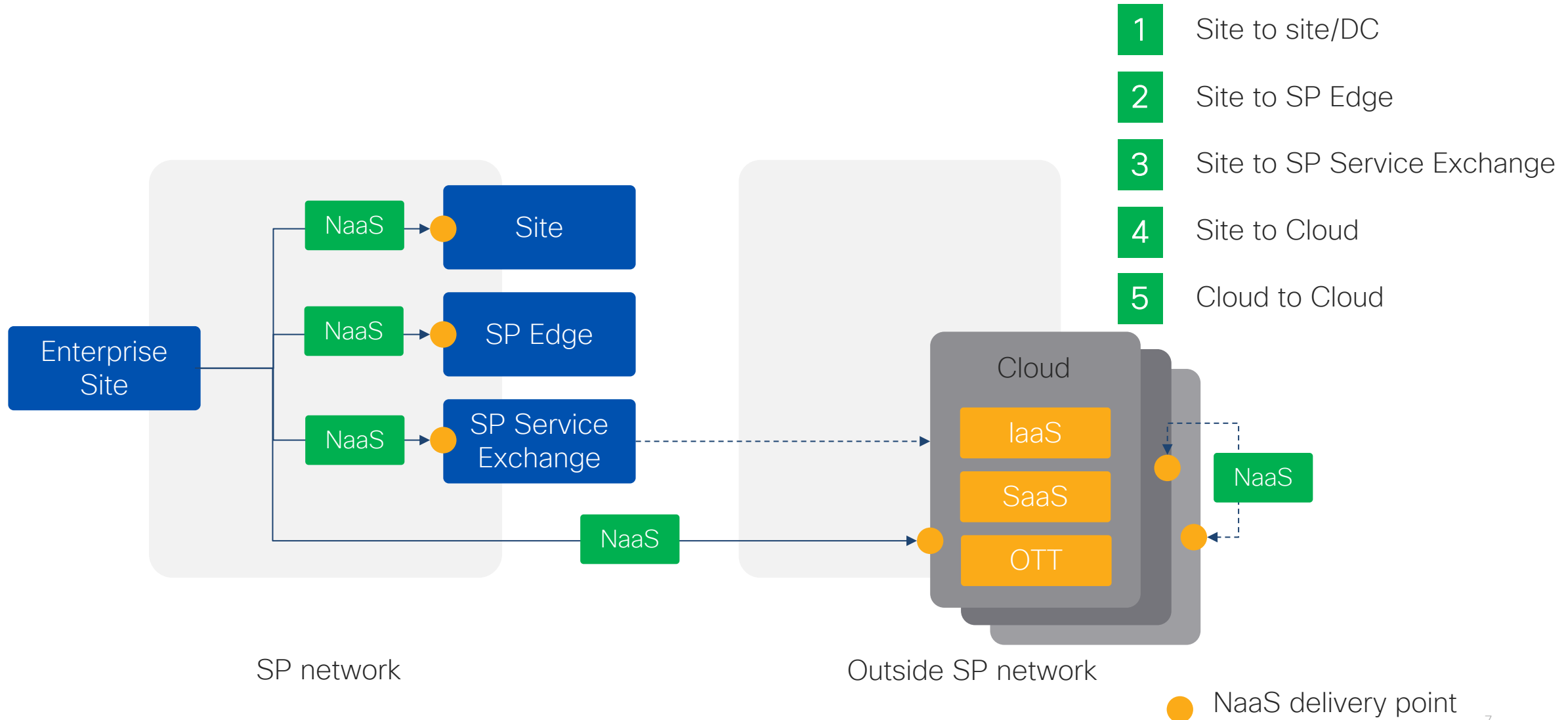


SP Network as a Service (NaaS) for Business

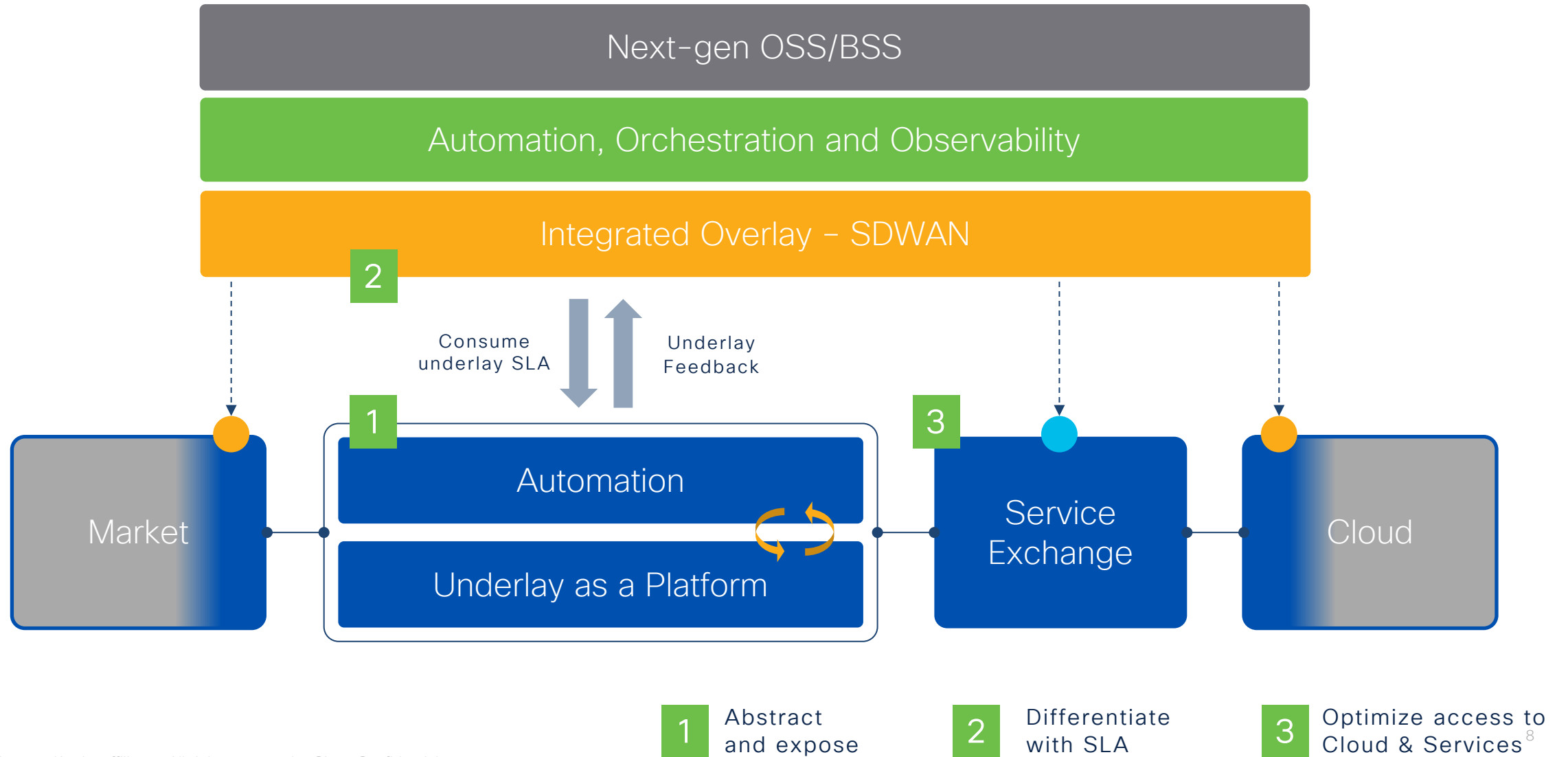
Three key components offering SP differentiation – based on ongoing projects



SP NaaS use-cases



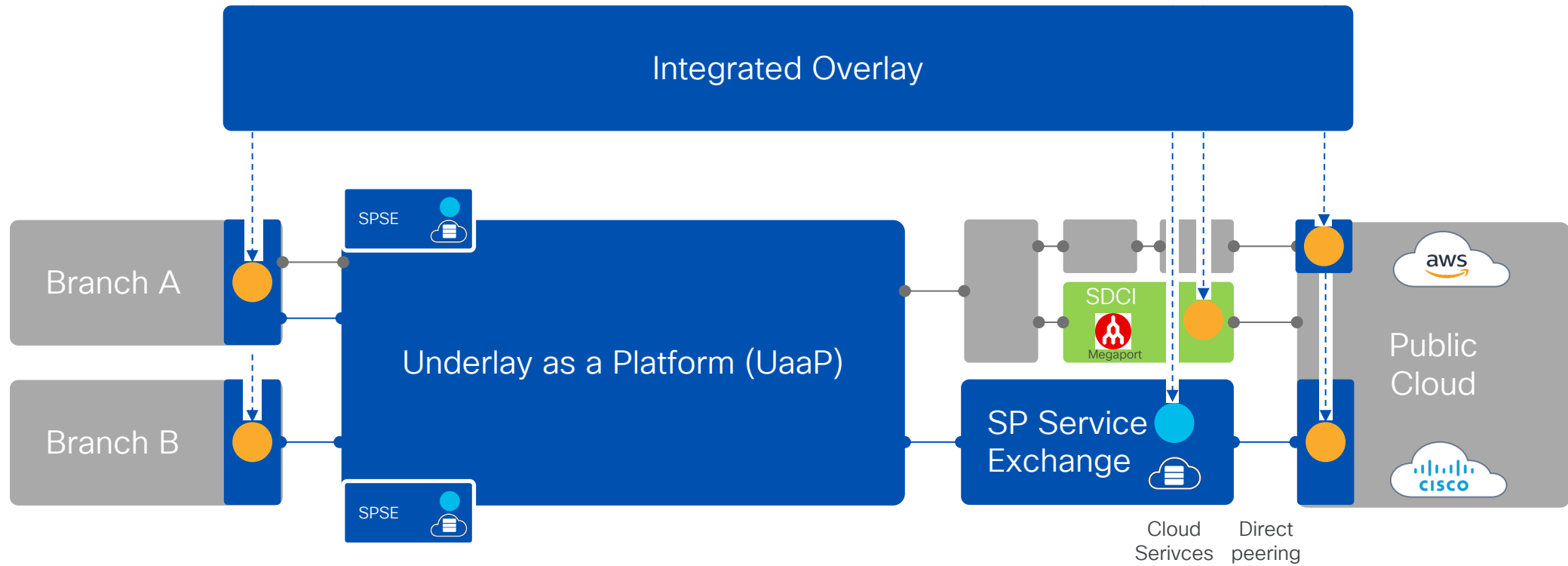
SP NaaS Framework and Differentiation



SP NaaS Service Buildout

SP managed, end-to-end service offering

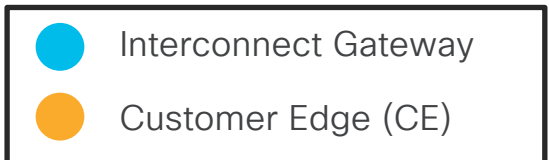
SP NaaS for Business



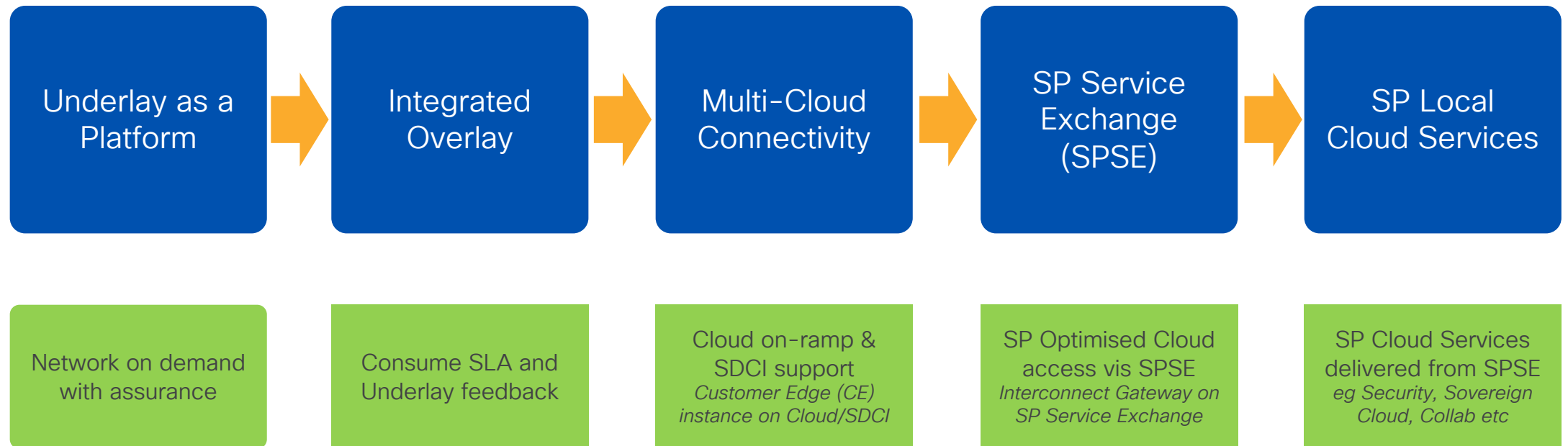
SDCI – Software Defined Cloud Interconnect



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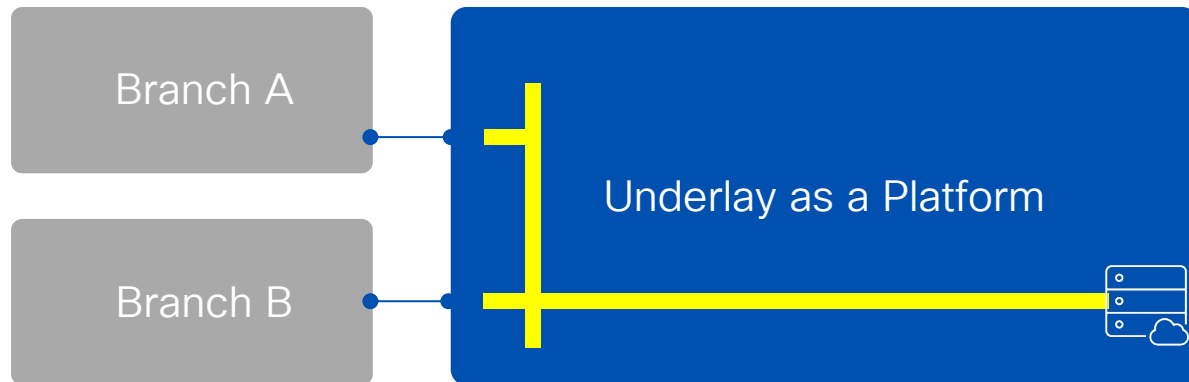


Service Flow



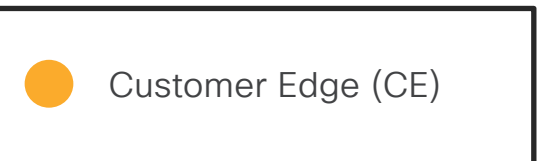
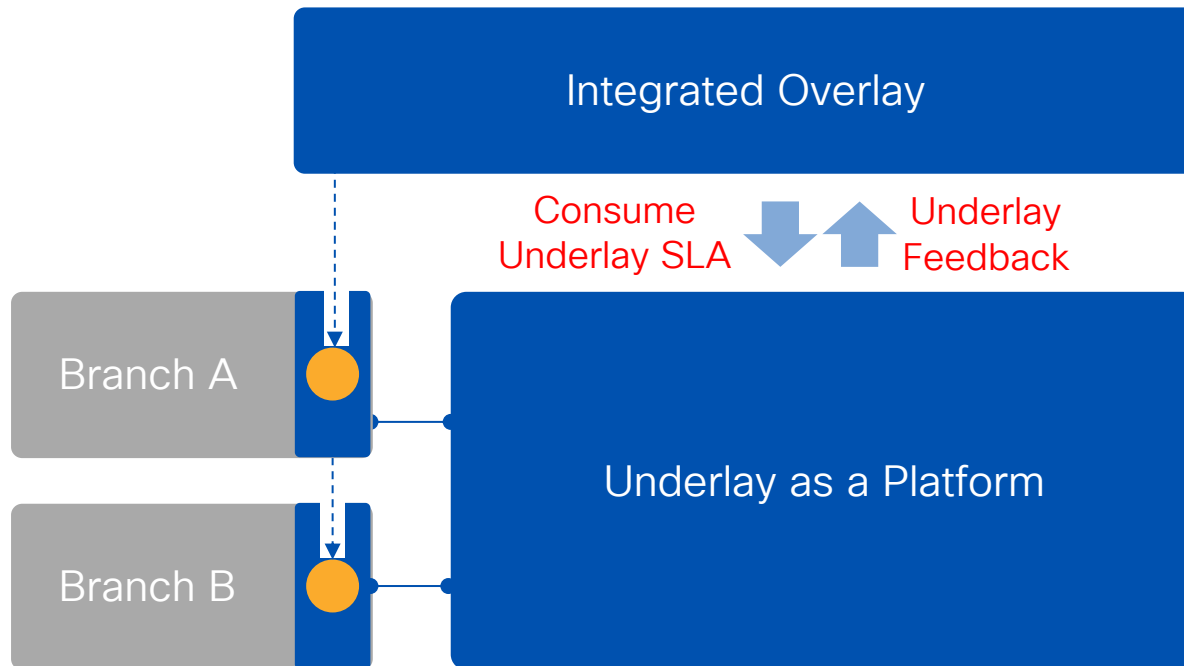
Underlay as a Platform (UaaP)

Network (L3VPN) on demand with assurance and Infrastructural Functions



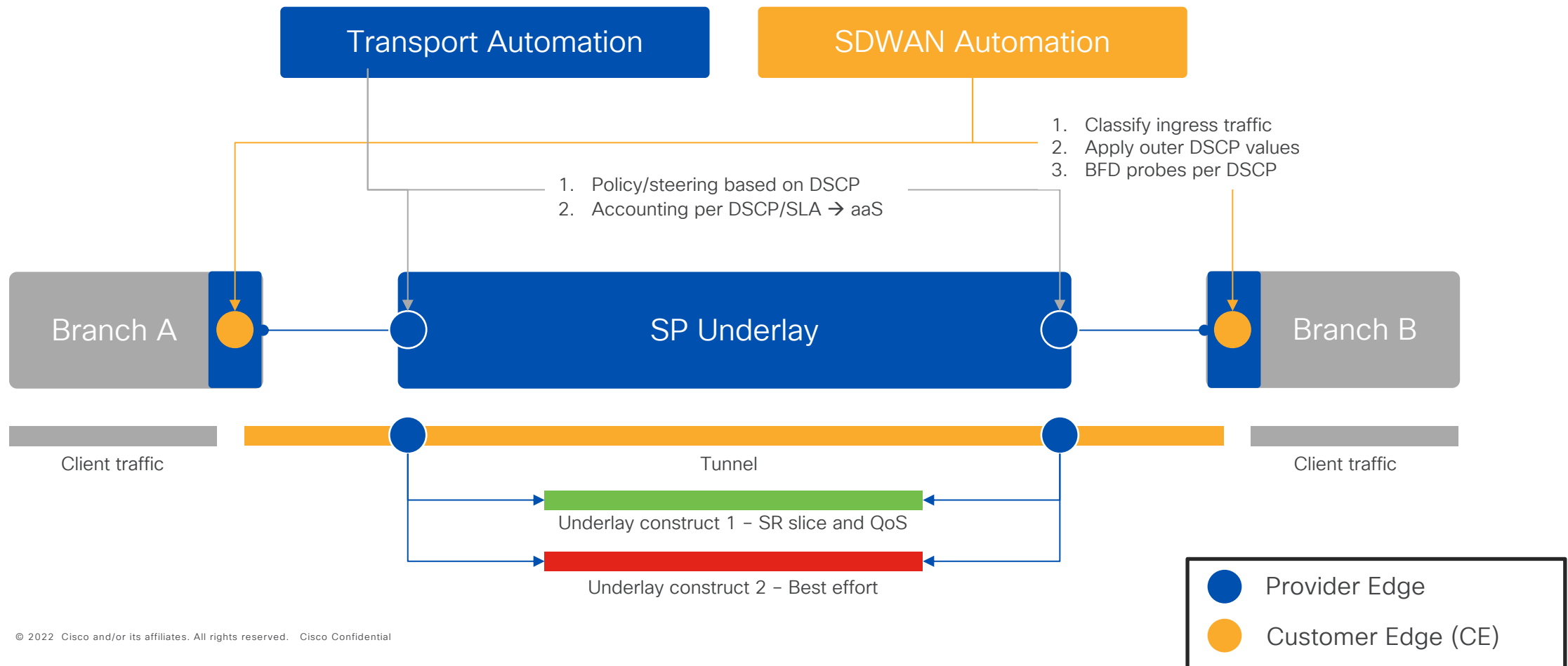
Integrated Overlay (IO)

Consume the Underlay SLA and underlay feedback loop



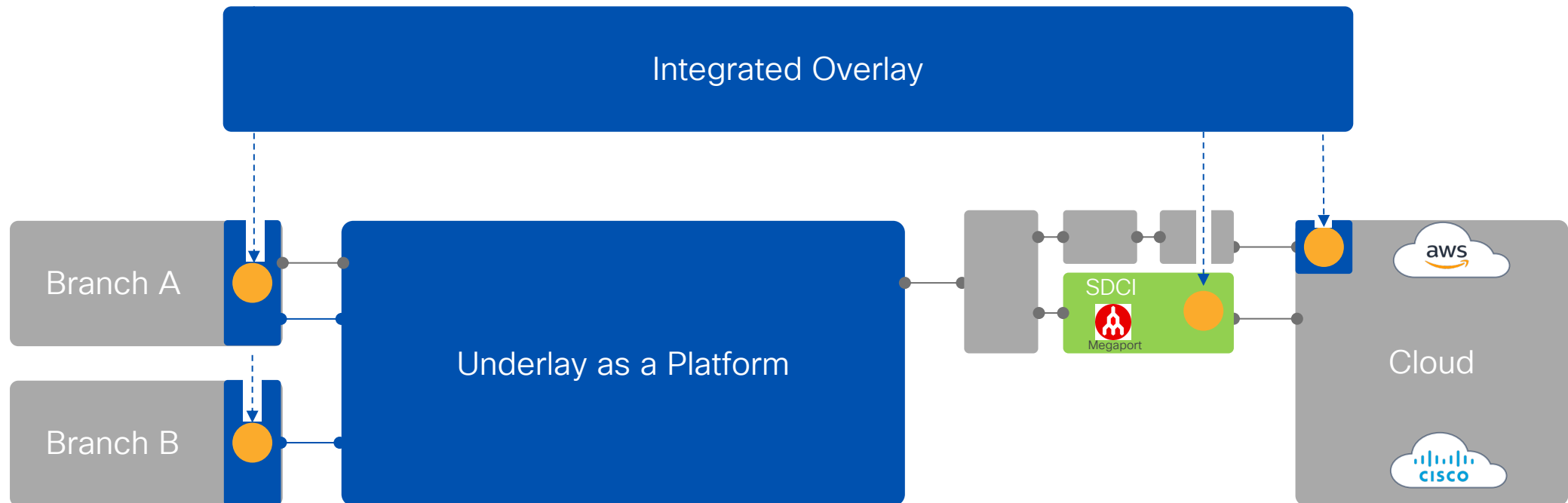
Integrated Overlay (IO): Consume Underlay SLA

Overlay to Underlay Premium Services mapping



Multi-Cloud Connectivity

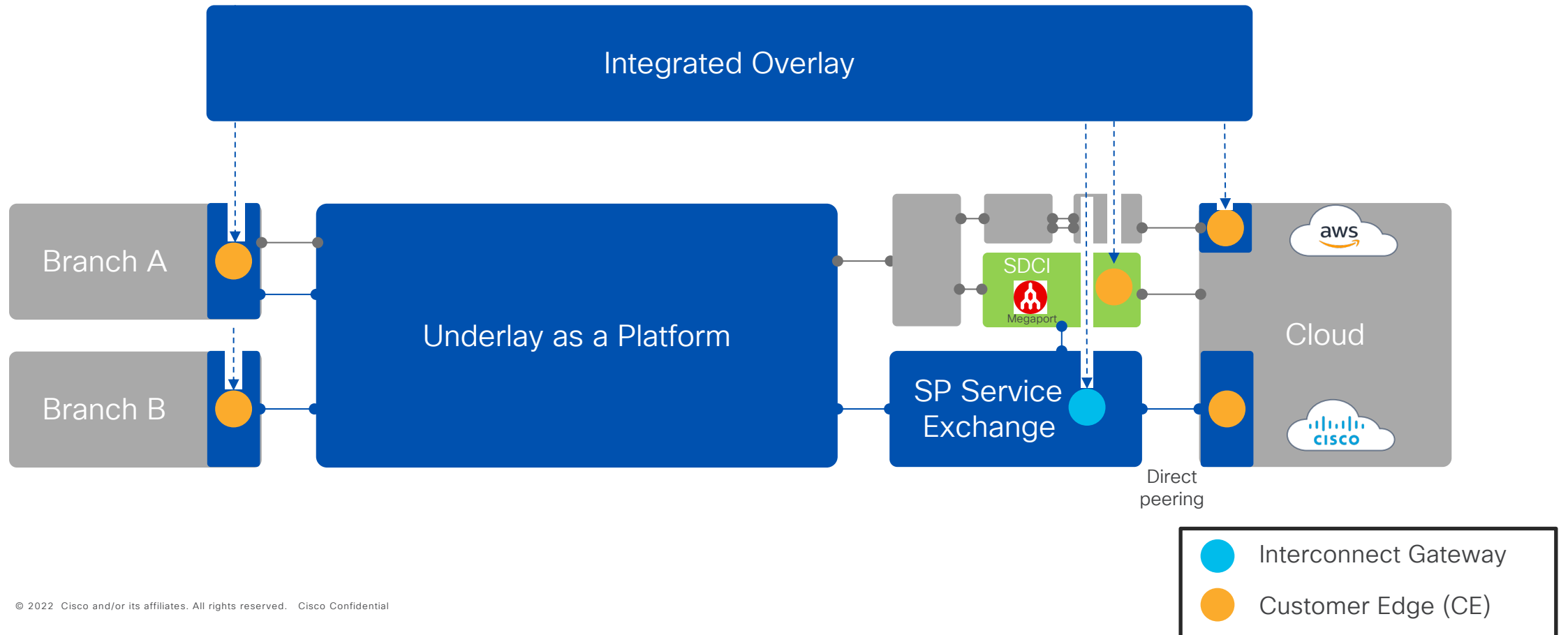
Multi-Cloud connectivity with Cloud and SDCI on-ramp



- Interconnect Gateway
- Customer Edge (CE)

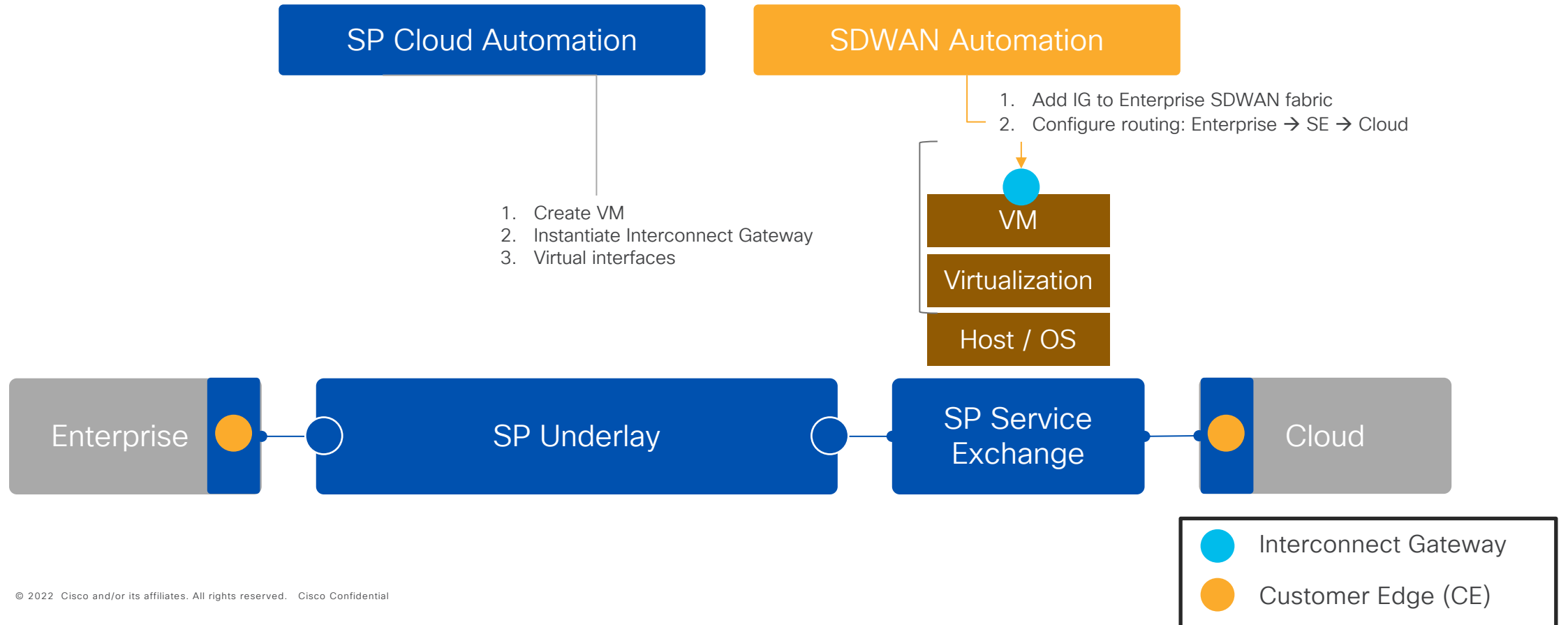
SP Service Exchange

Optimised Cloud Access with SP middle-mile optimization



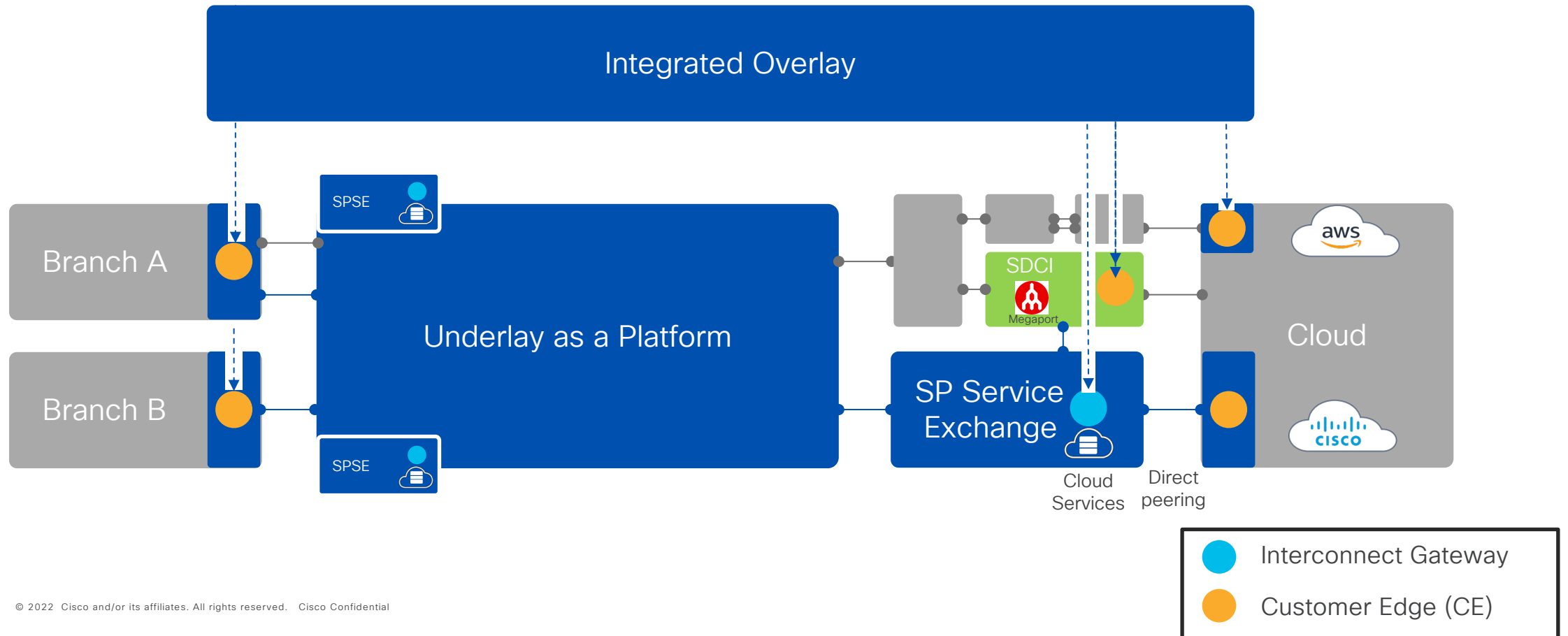
Service Exchange: Optimised Cloud Access

Interconnect Gateway instantiation @ Service Exchange



SP Local Cloud Services

SP Cloud Services (eg Security, Content) delivered from the SPSE

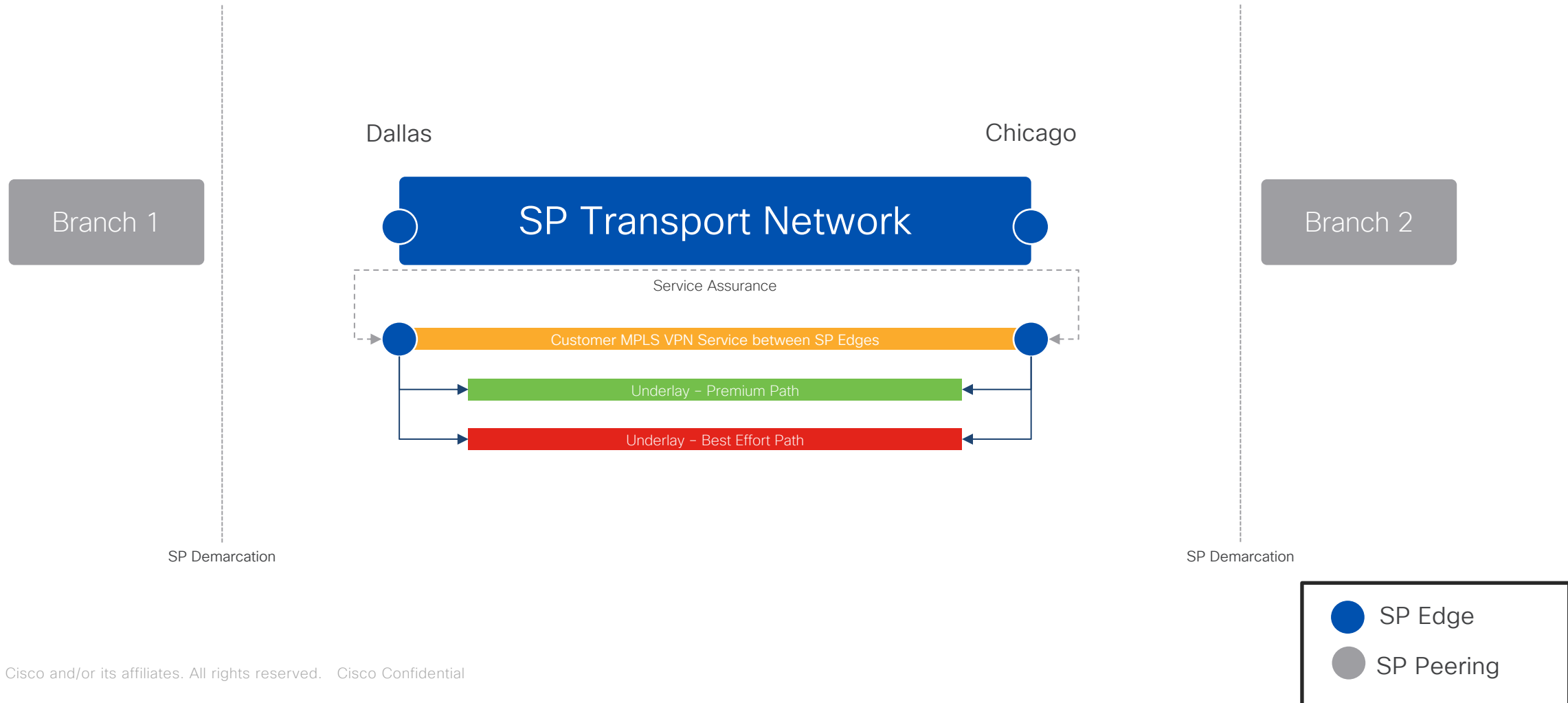


NaaS Components – Lab Setup

Modular, Open Framework with Inter-Domain open API's

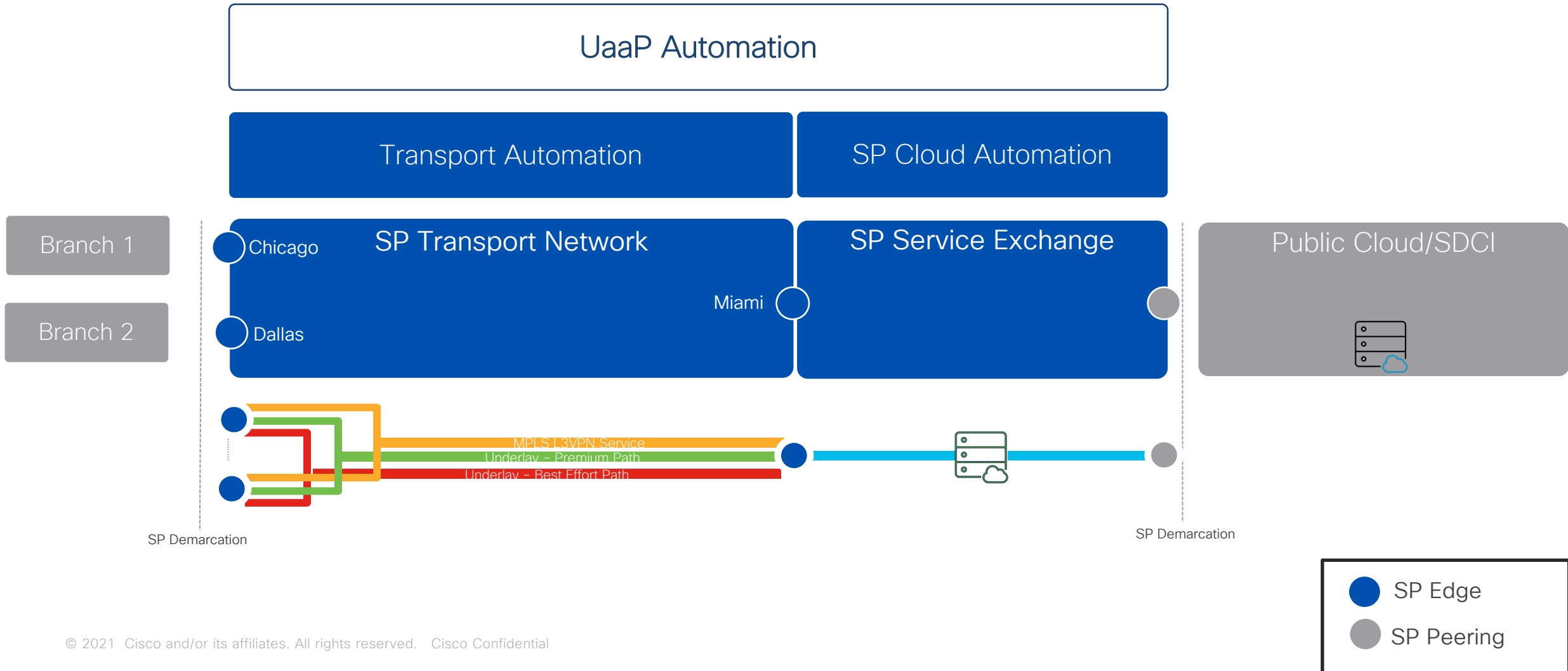
UaaP: Network on demand with Assurance

Initially, basic L3VPN Transport service

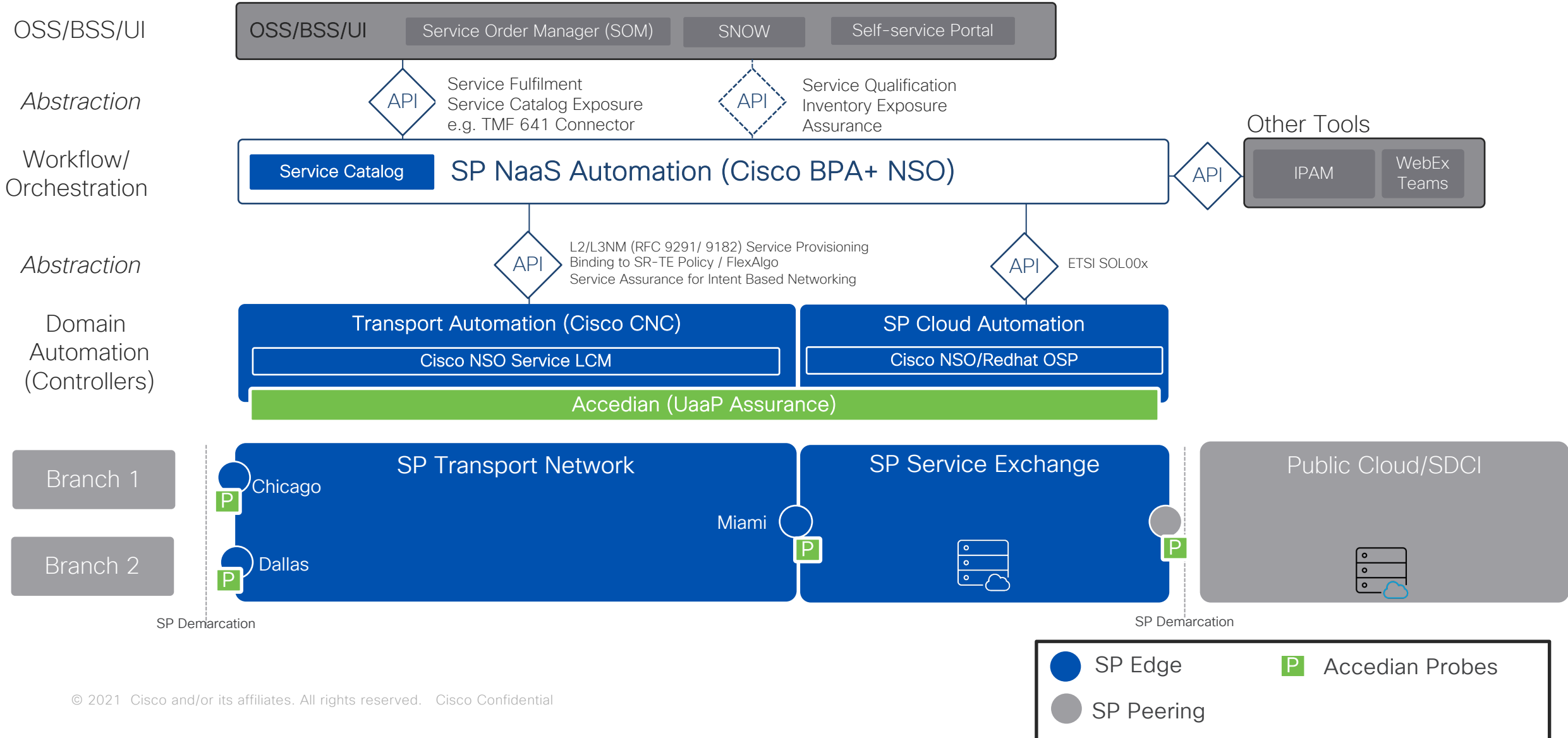


UaaP: Including Infrastructural Network Functions

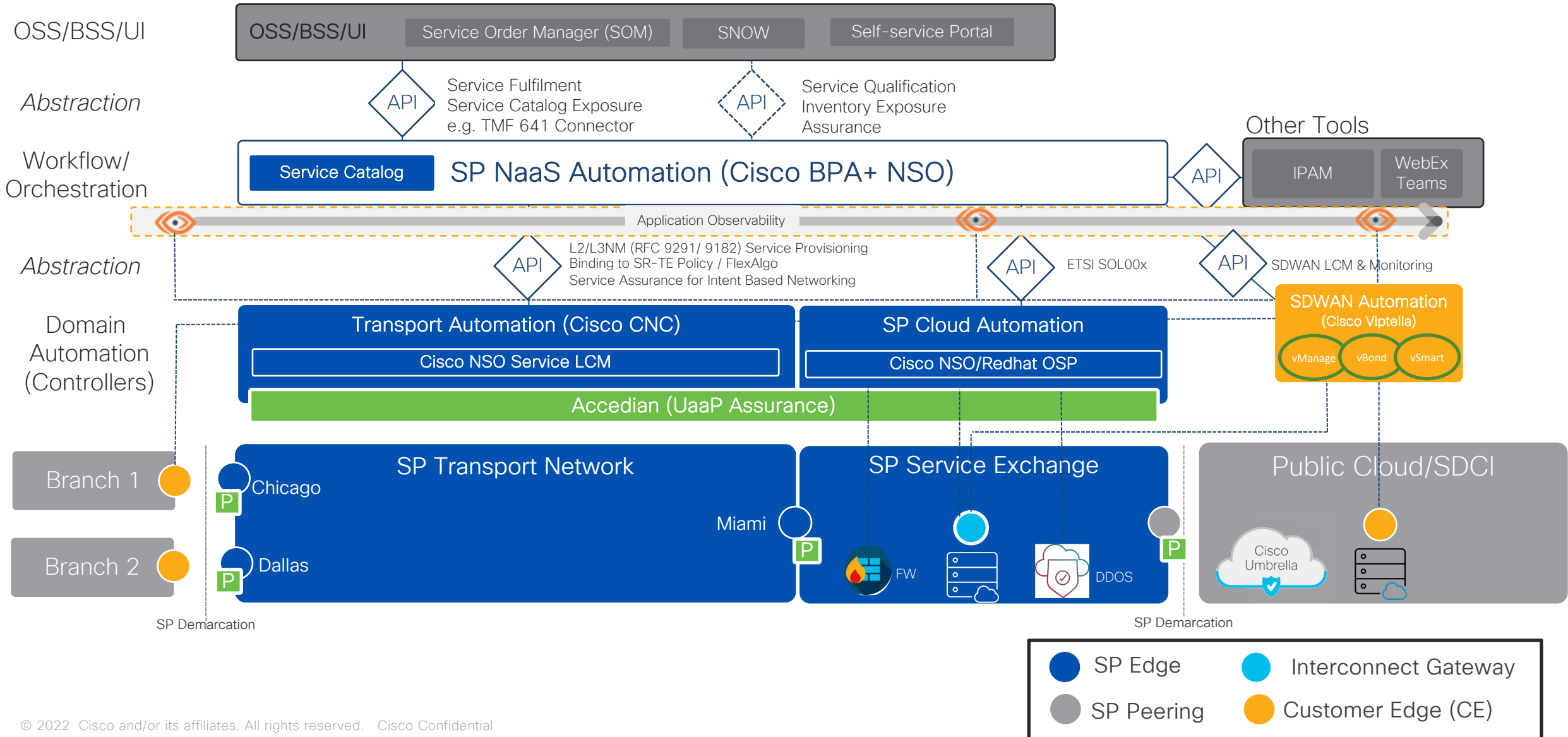
DC and Virtualisation stack in the SP Service Exchange



Full Stack: Underlay as a Platform

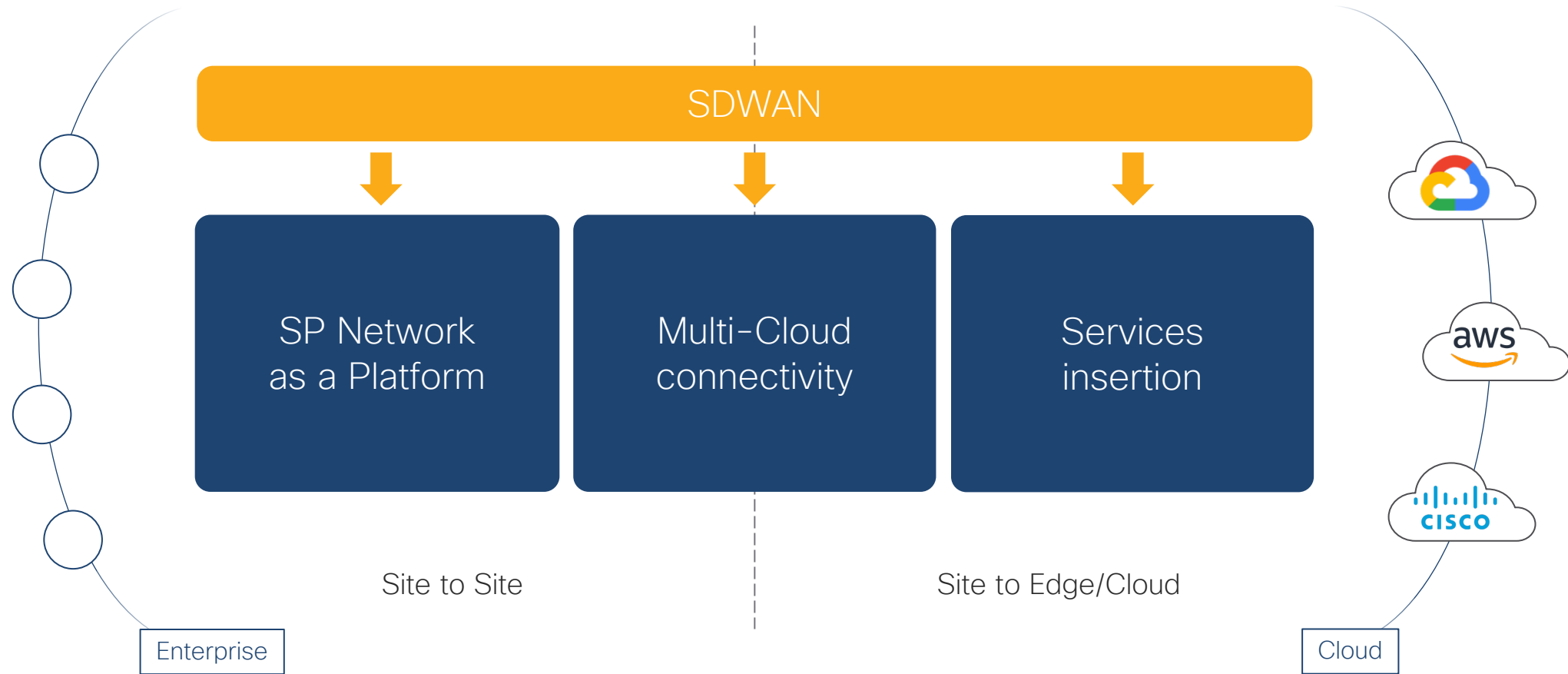


Inc. IO, MC Connectivity, SPSE, Cloud Services

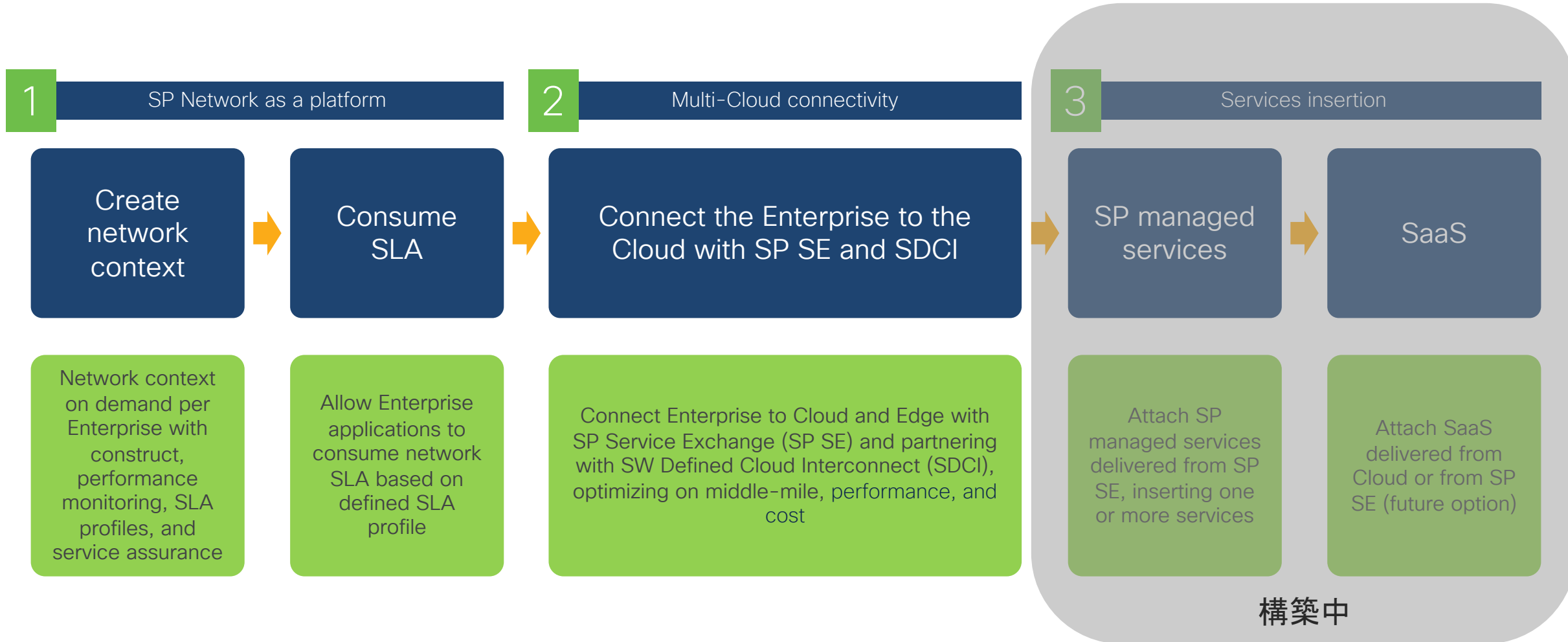


Demo

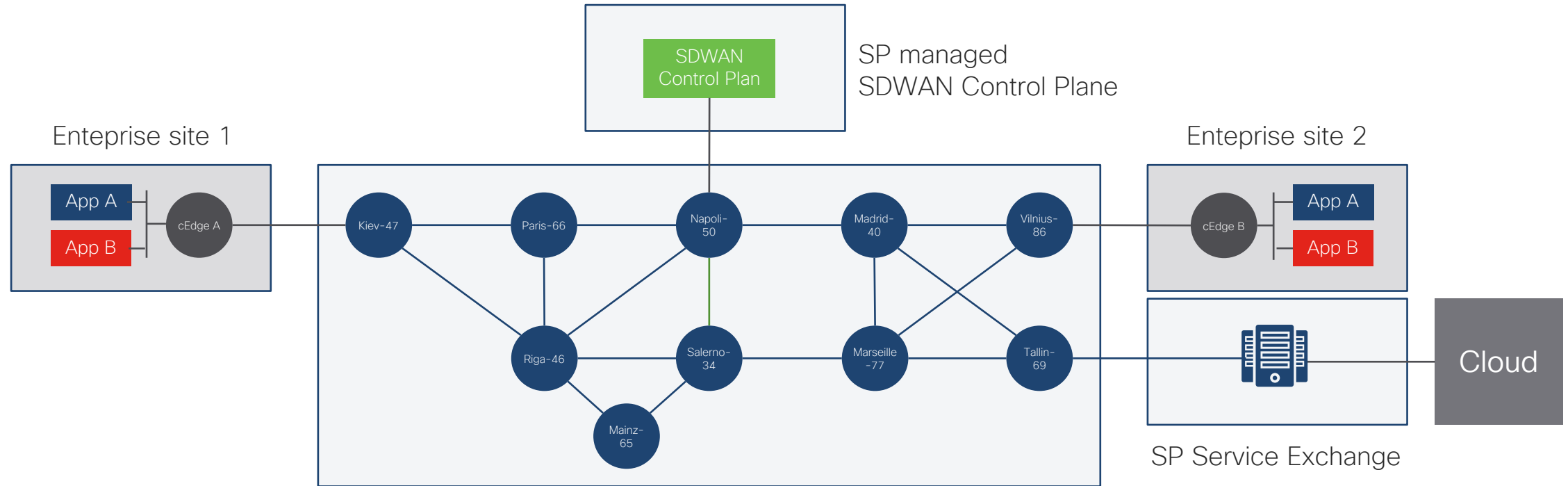
Demo use cases






Demo flow

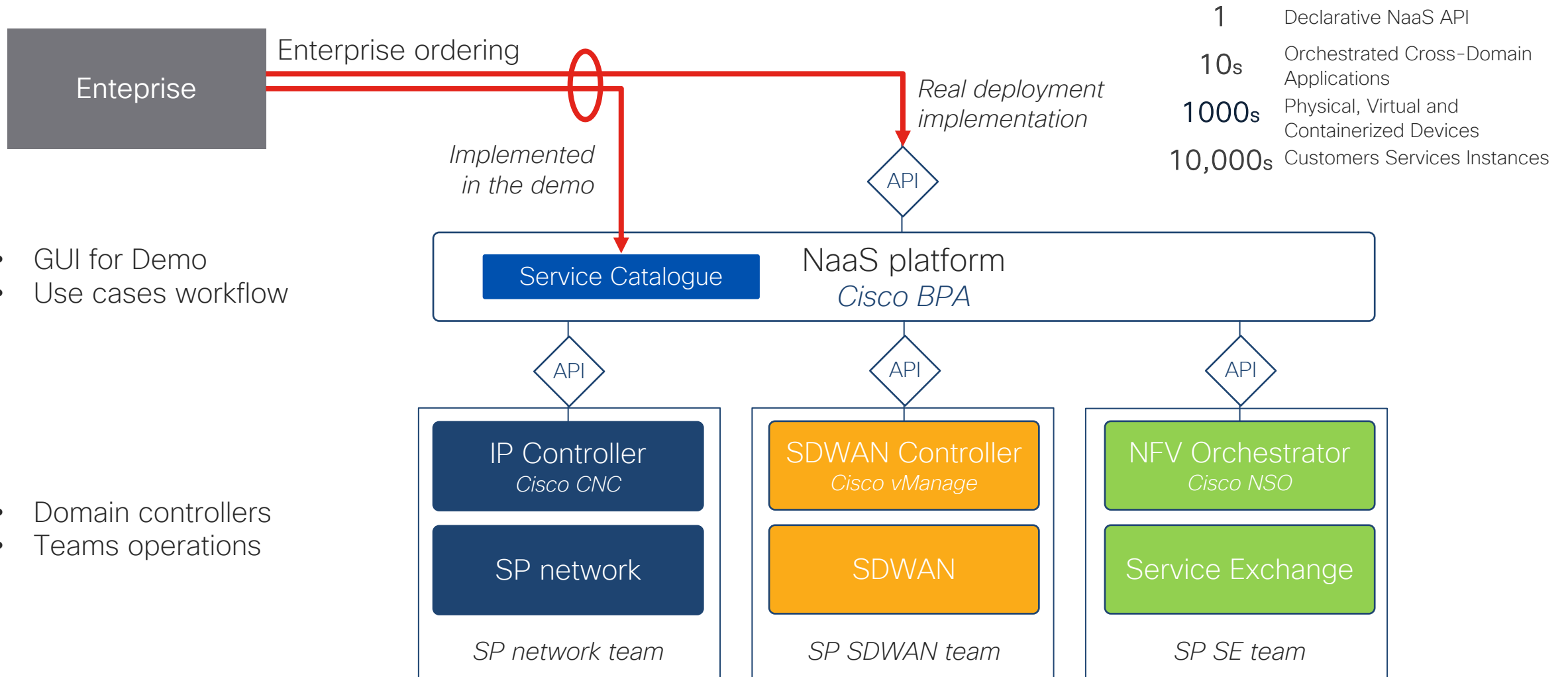


Demo layout



-  Network node
-  SDWAN node
-  Cloud infrastructure

Demo SW stack

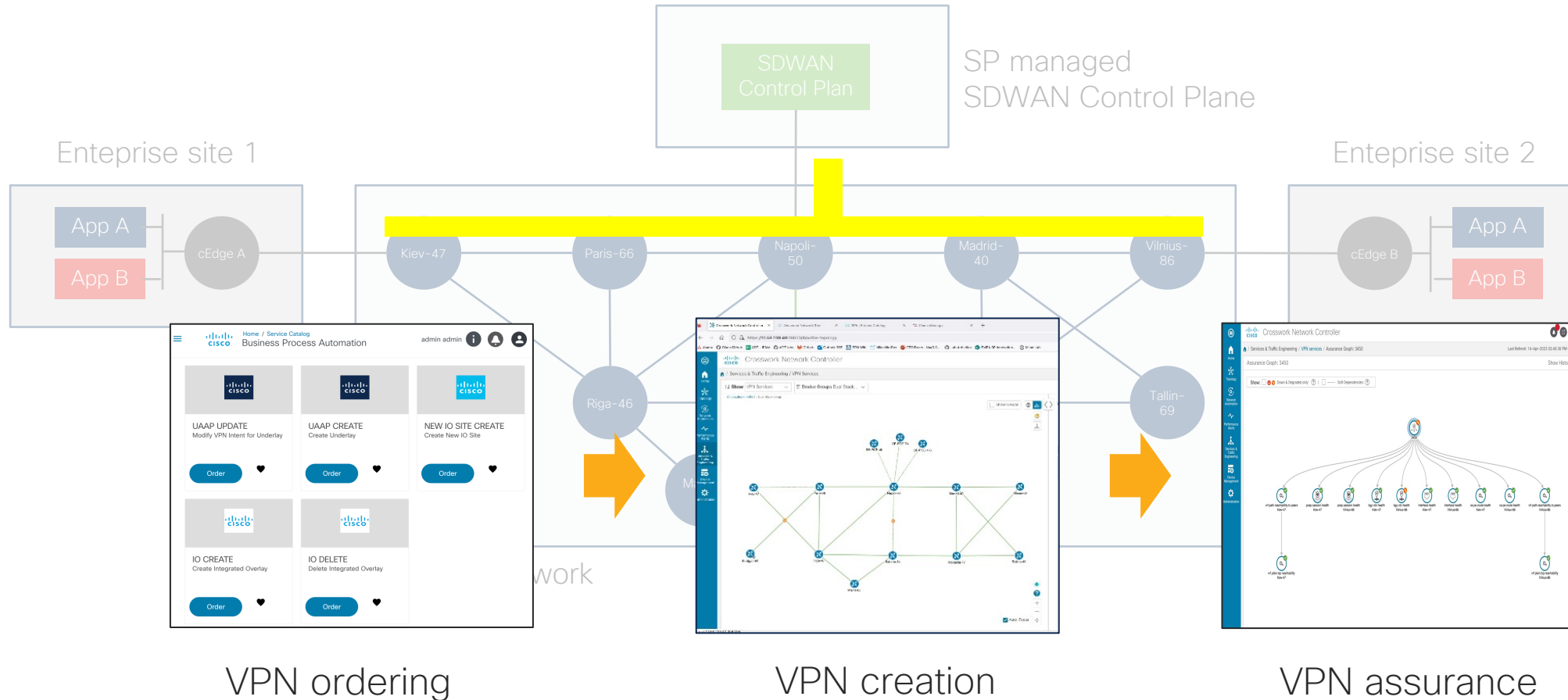


- GUI for Demo
- Use cases workflow

- Domain controllers
- Teams operations

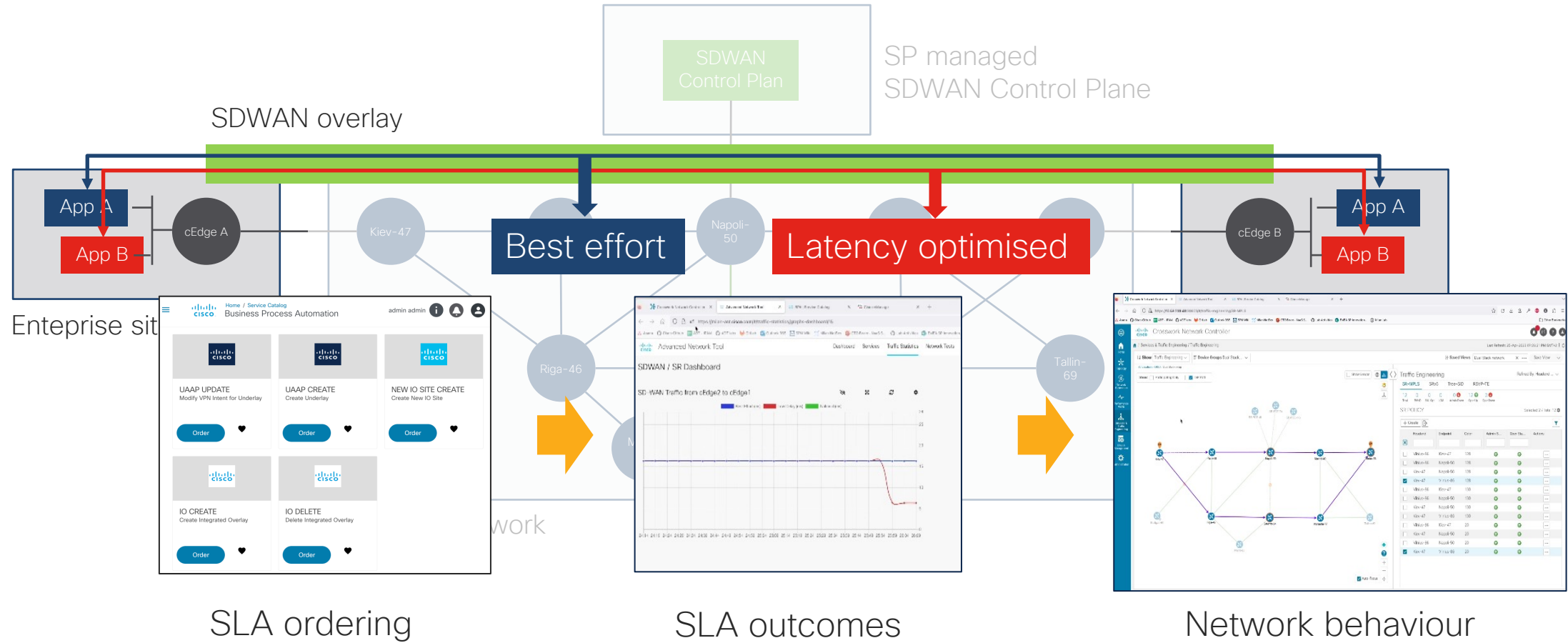
SP Network on demand

Underlay as a Platform (UaaP)



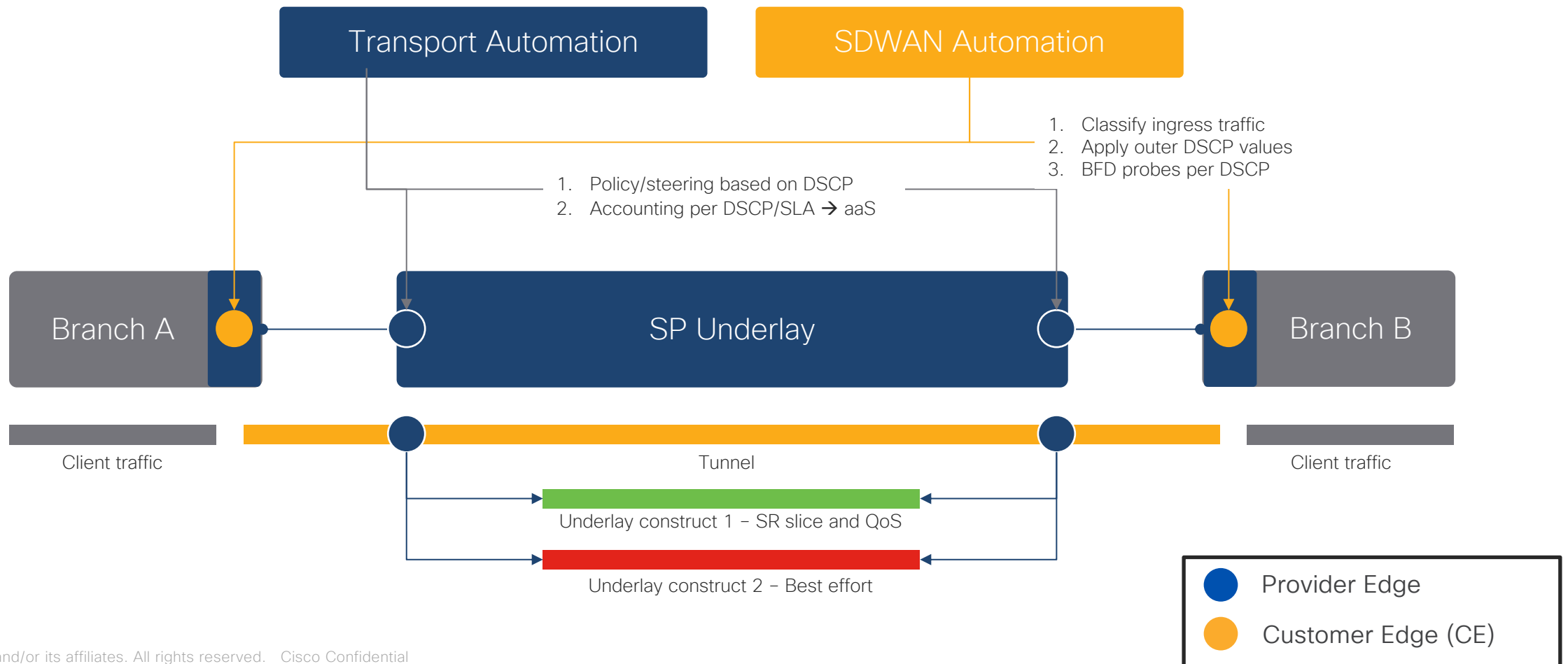
SP Network SLA on demand

Integrated Overlay



Integrated Overlay (IO): Consume Underlay SLA

Overlay to Underlay Premium Services mapping



SDWAN / SR Dashboard



SD-WAN Traffic from cEdge2 to cEdge1

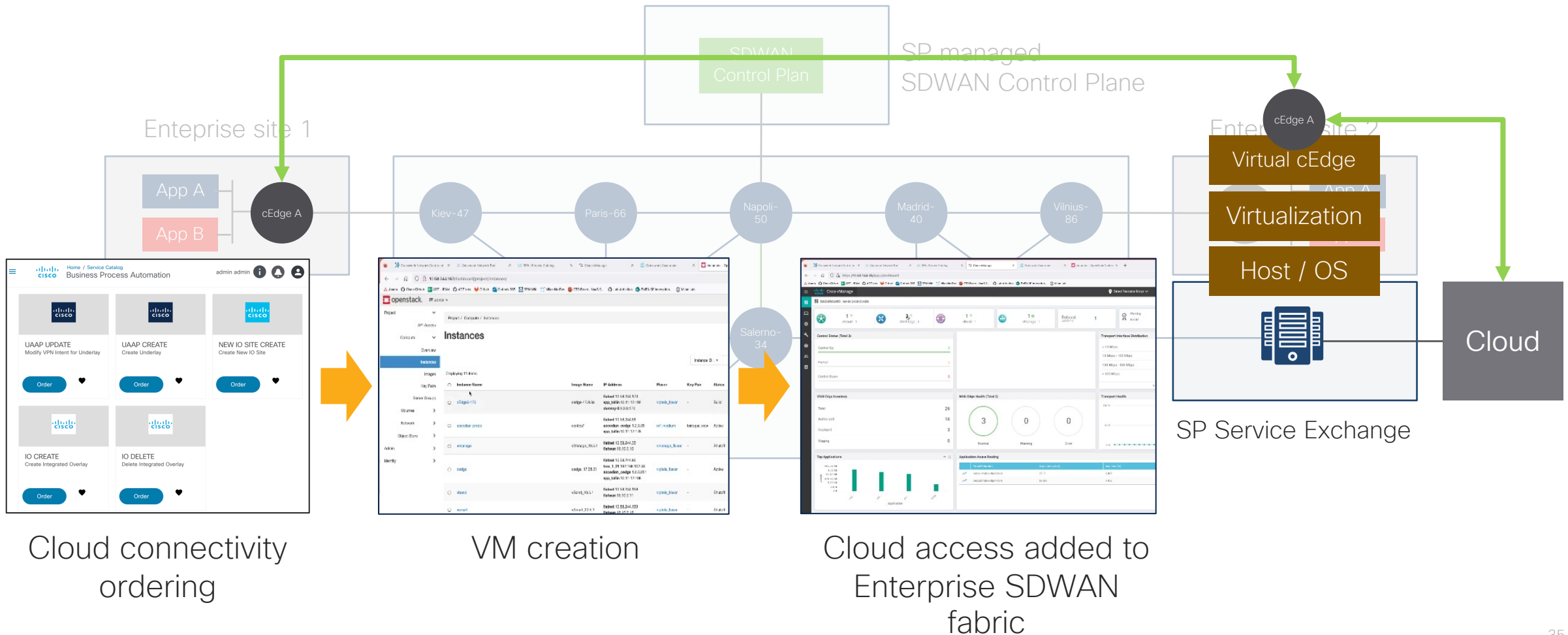


Best Effort (ms) | Low Delay (ms) | National (ms)



Connect to cloud on demand

Service Exchange (SE)



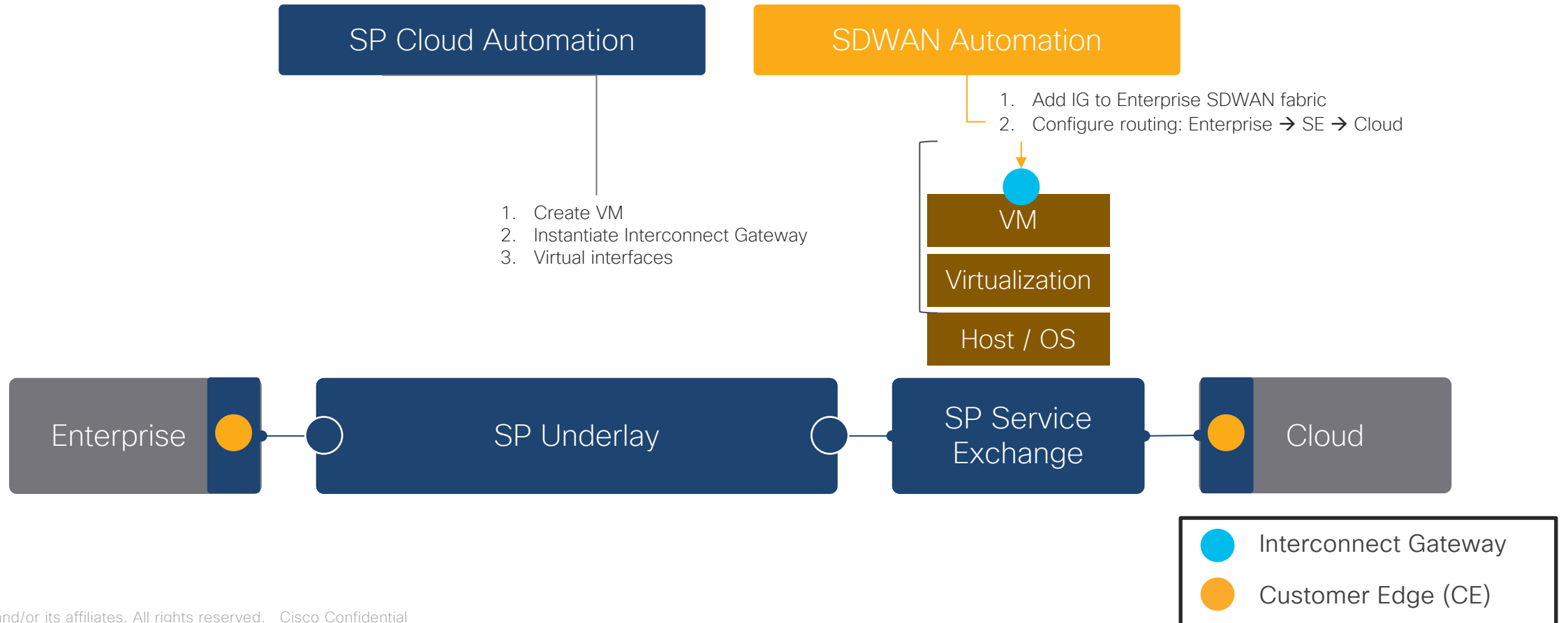
Cloud connectivity ordering

VM creation

Cloud access added to Enterprise SDWAN fabric

Service Exchange: Optimised Cloud Access

Interconnect Gateway instantiation @ Service Exchange



DASHBOARD | MAIN DASHBOARD

1 ↑
vSmart - 1

2 ↑
WAN Edge - 2

1 ↑
vBond - 1

1 ✓
vManage - 1

Reboot
Last 24 hrs

1

Warning: 0
Invalid: 0

Total Devices: 29
Licensed Devices: 0

Control Status (Total 3)

Control Up	3
Partial	0
Control Down	0

Site Health (Total 2)

Full WAN Connectivity	2 sites
Partial WAN Connectivity	0 sites
No WAN Connectivity	0 sites

Transport Interface Distribution

< 10 Mbps	6
10 Mbps - 100 Mbps	0
100 Mbps - 500 Mbps	0
> 500 Mbps	0

[View Percent Utilization](#)

WAN Edge Inventory

Total	26
Authorized	16
Deployed	2
Staging	0

WAN Edge Health (Total 2)

2

Normal

0

Warning

0

Error

Transport Health

Type: By Loss

Top Applications

Application	Usage
sta...	931.32 GB
sta...	9.31 GB
un...	95.37 MB
icmp	976.56 KB

Application-Aware Routing

Type: By Loss

	Tunnel Endpoints	Avg. Latency (ms)	Avg. Loss (%)	Avg. Jitter (ms)
↗	cedge1:mpls-cedge2:mpls	29.01	0.465	2.998
↗	cedge2:mpls-cedge1:mpls	29.486	0.442	2.503

Driving Complexity with Simplicity

Home / Service Catalog
Business Process Automation

admin admin

UAAP UPDATE
Modify VPN Intent for Underlay

IO CREATE
Create Integrated Overlay

IO Create

customer

ikea +1

ikea

vpn-intents (default: Best Effort)

UnSelect All

Search

Low Latency

High Bandwidth

monitoring

sites

Add List

Kiev

Vilnius

Cisco SD-WAN

Select Resource Group

Configuration · Policies

Localized Policy > Add Policy

Create Groups of Interest

Configure Forwarding Classes/QoS

Configure Access Control Lists

Activate SD-WAN Application Marking

Class	Queue	Reference Count	Updated By
CS6	6	0	admin
BEST-EFFORT	3	3	admin
BIZ-DATA	2	3	admin
VOICE	0	1	admin
VIDEO	1	2	admin

Traffic Engineering / Traffic Engineering

Show Traffic Engineering

Device Groups Dual Stack

Associate VPN with TE Intent

Madrid-44

Vilnius-86

Salerno-34

Riga-46

Kiev-47

Mainz-65

Napoli-50

Service Details

Name 3450

Provisioning Success

Transport Configuration

Configured Data

```

    },
    "vpn-policies",
    "export-pol",
    },
    "custom-templ",
    {
      "name": "CT",
      "variable": [
        {
          "name": "DSCP",
          "value": "10"
        },
        {
          "name": "FORWARDCLASS",
          "value": "1"
        },
        {
          "name": "INTERFACE",
          "value": "0/0/0/8.362"
        }
      ]
    }
  
```

Service Intent based Assurance

Assurance Graph: 3450

Network diagram showing various health checks and reachability tests for VPN services across different sites.

SP Network as a Service (NaaS)



- NaaSは市場の需要はあるが抽象的な概念であり多くの表現がされている
- Service Providerのようなプラットフォームを持つ事業者が提供するサービスについて説明
- オープンAPI上に構築された抽象化されたモジュラーなクロスドメインのフレームワークが必要
- NaaSの可能性をフルに発揮するには、組織とサイロの変革が必要
- It is a journey with constant evolution as the customer and market requirement evolve



The bridge to possible