

# Open Cloud Connect

Cloud Services Architecture, SDN, NFV, and  
Management

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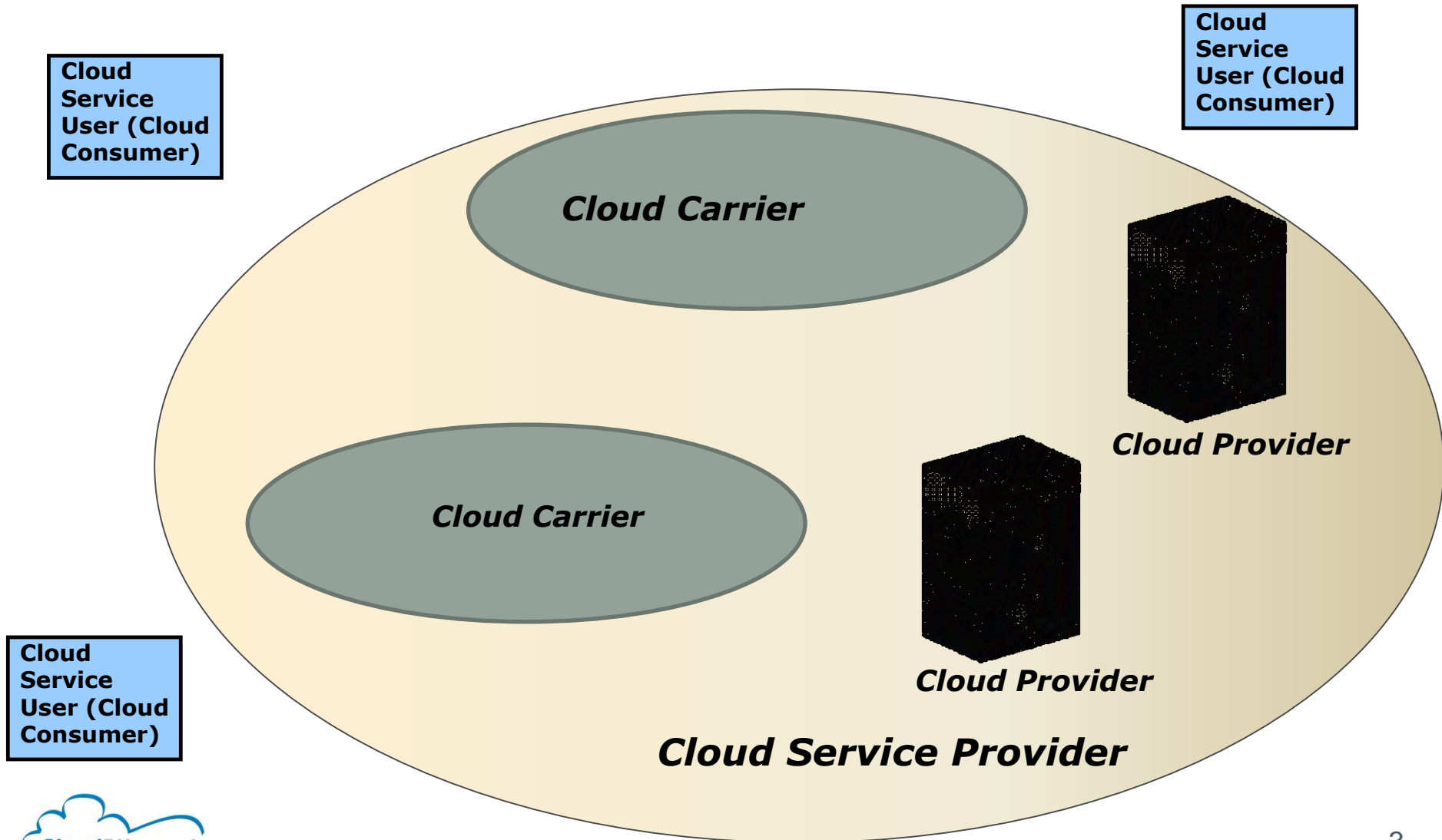
*Mehmet Toy, Ph.D*  
*Comcast*  
*January, 2016*  
*CL ETSI NFV Meeting*



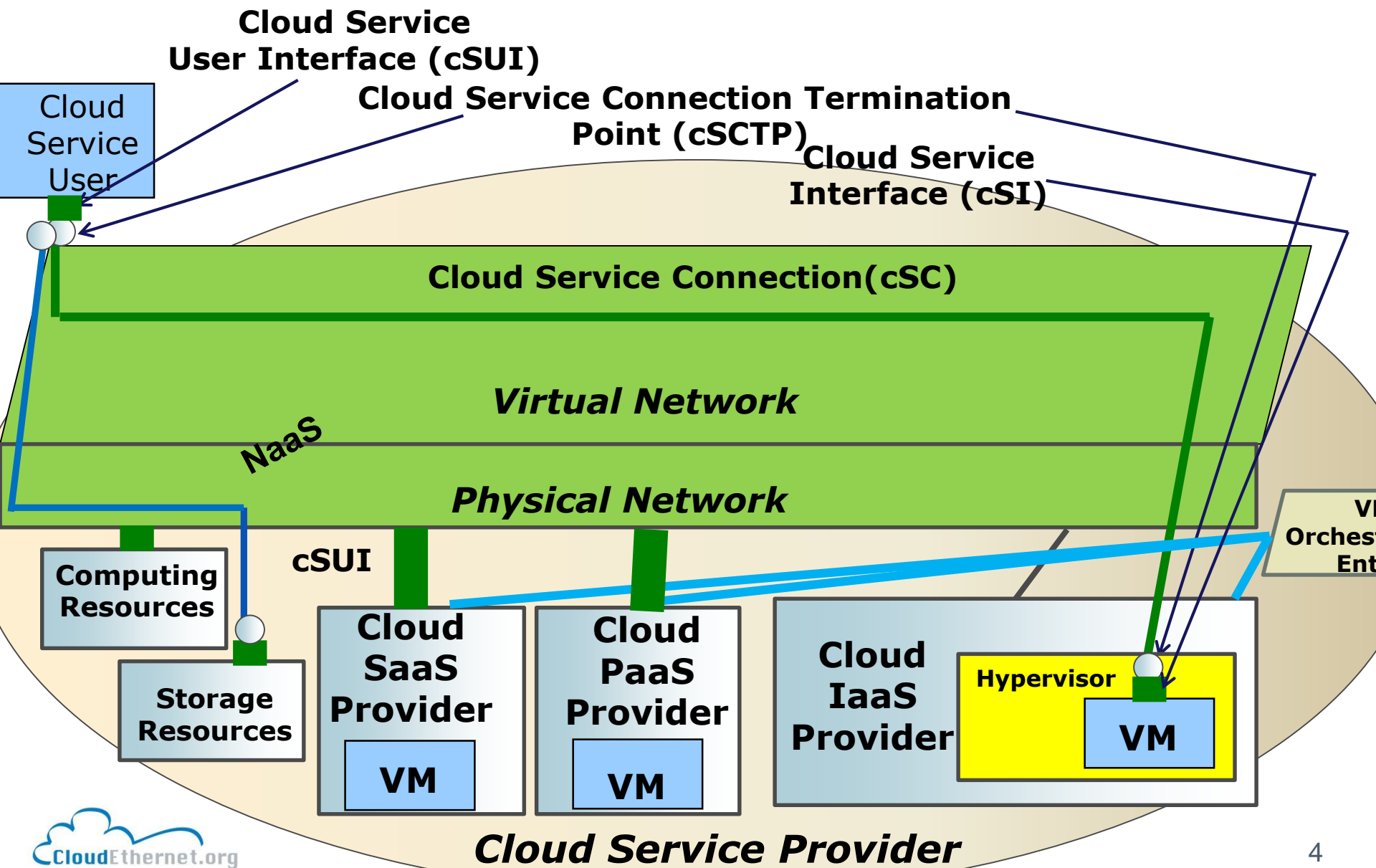
# Outline

- **Cloud Service Actors**
- **Cloud Service Architectures: Interfaces and Connections**
- **OCC vs ETSI NFV Architectures**
- **Mapping Between OCC and NFV Interfaces**
- **Cloud Services Management Architecture**

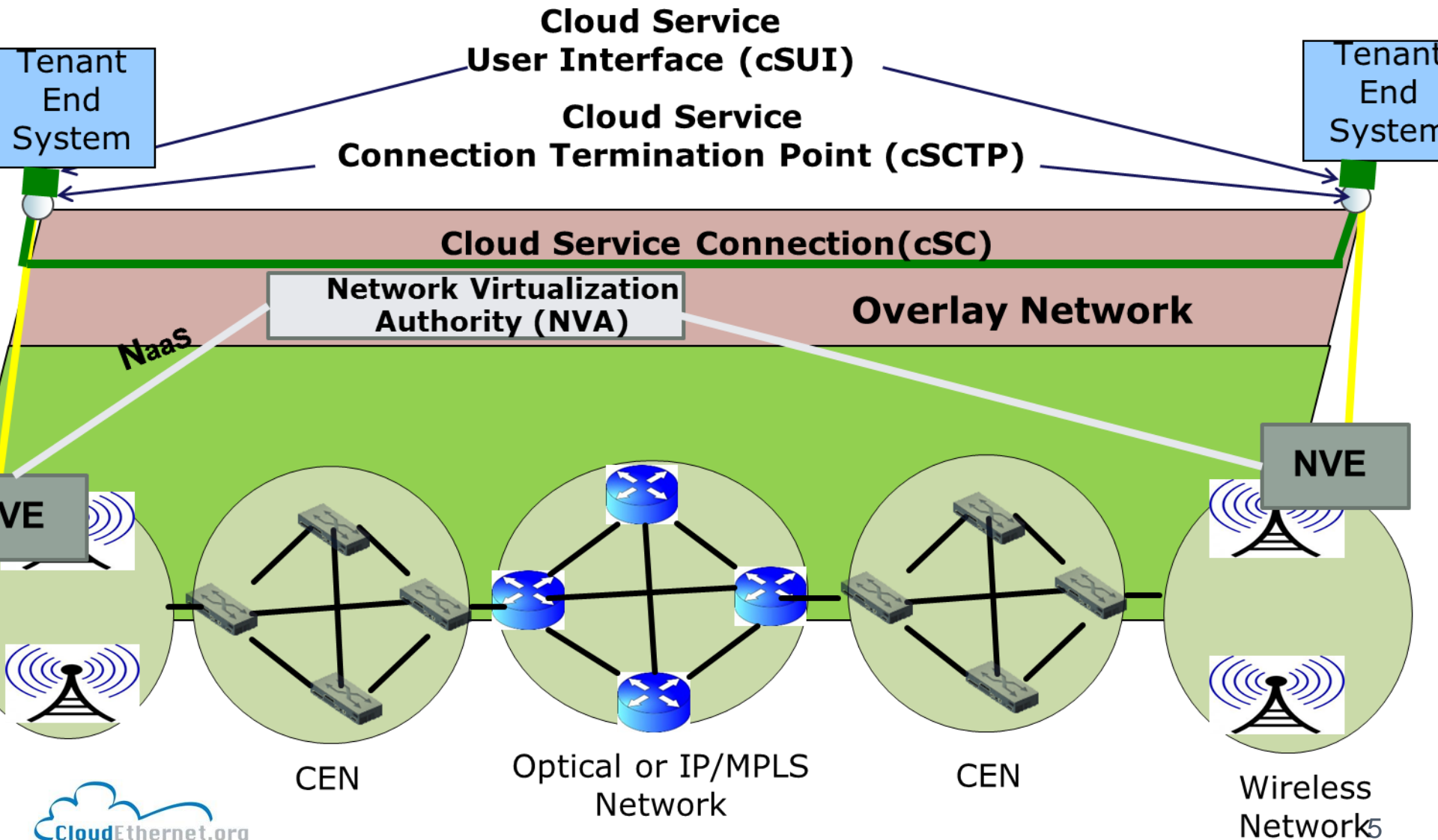
# Cloud Service Actors



# Architecture for Cloud Services by one Operator

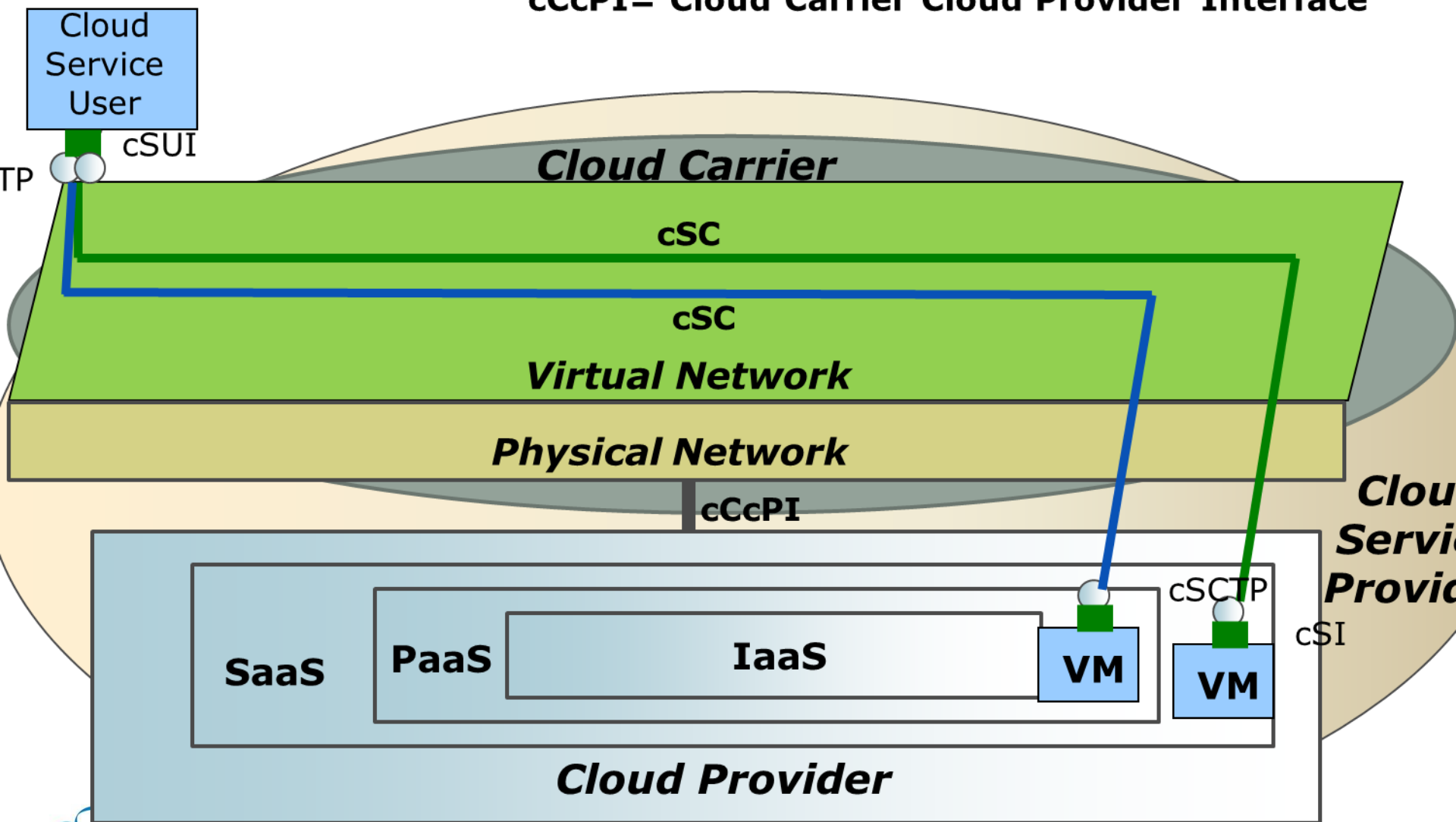


# Cloud Services over Overlay Networks

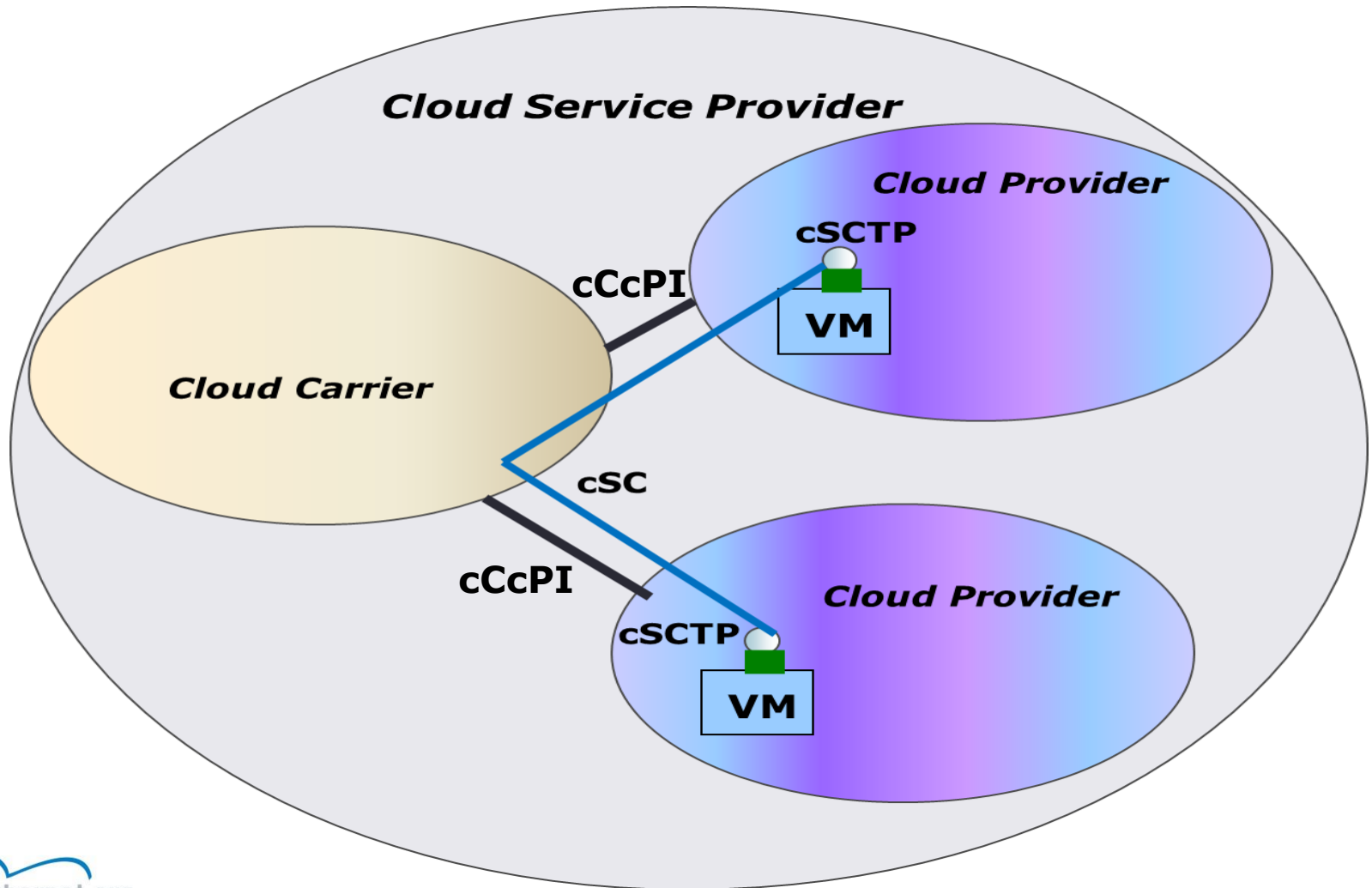


# Architecture for Cloud Services by Two Operators

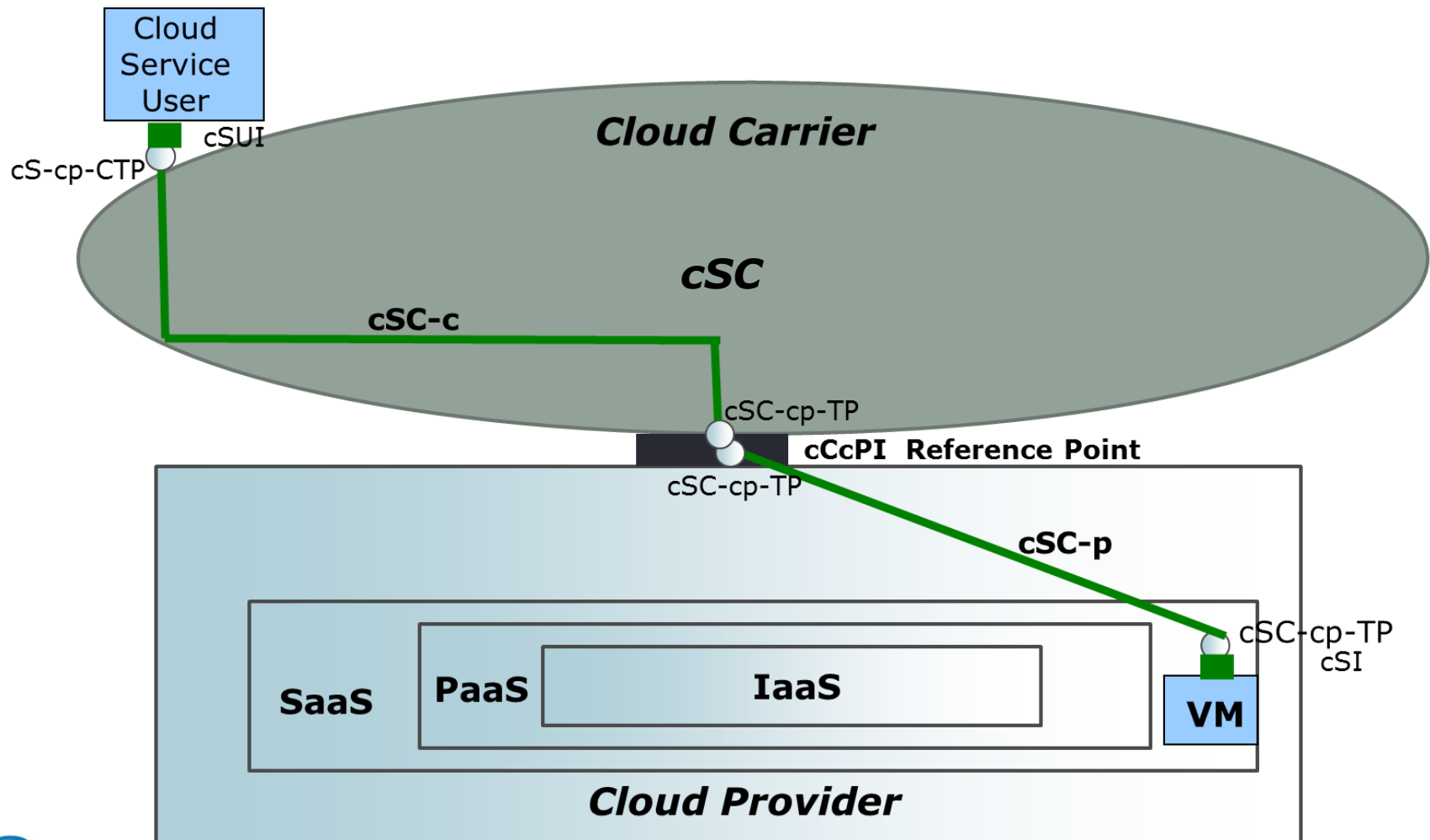
cCcPI= Cloud Carrier Cloud Provider Interface



# Cloud Services Between Cloud Providers



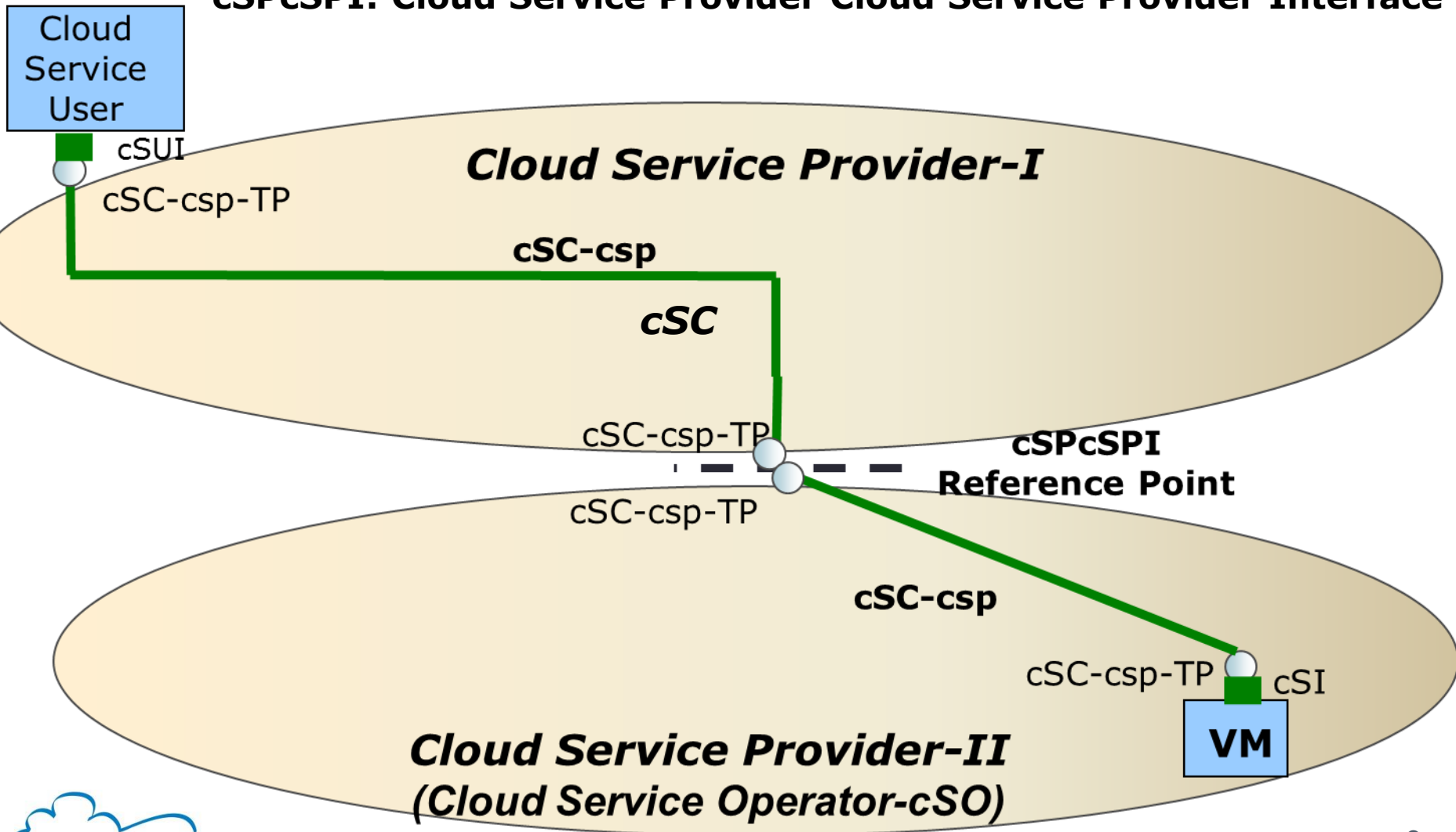
# Segments of cSC Crossing cC and cP



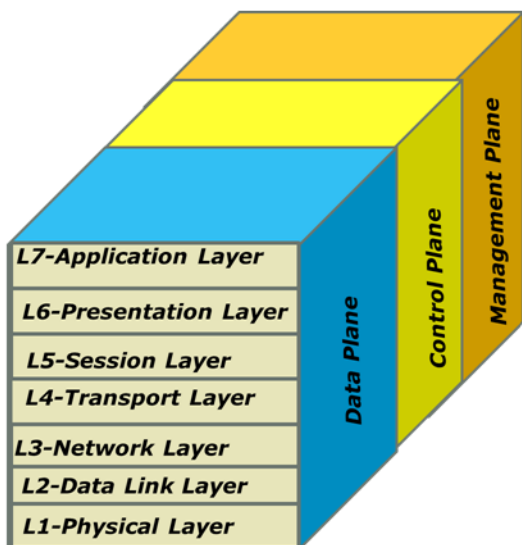


# Cloud Services by Two cSPs

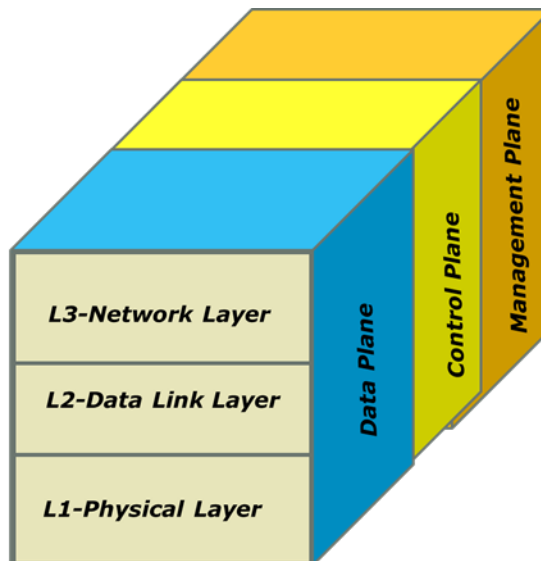
**cSPcSPI: Cloud Service Provider Cloud Service Provider Interface**



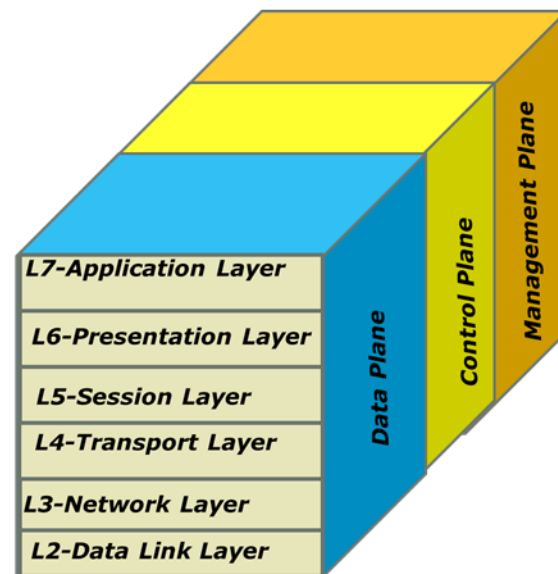
# Interfaces



cSUI

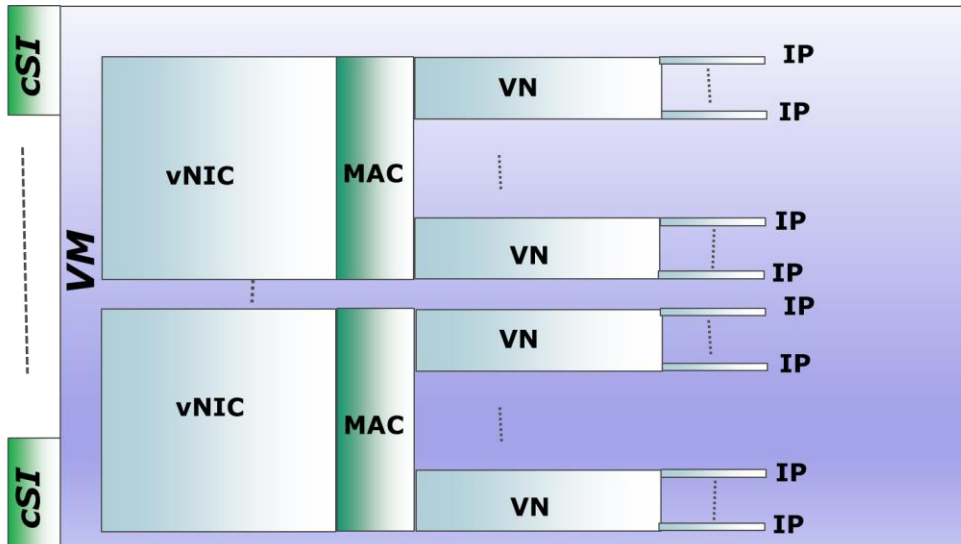
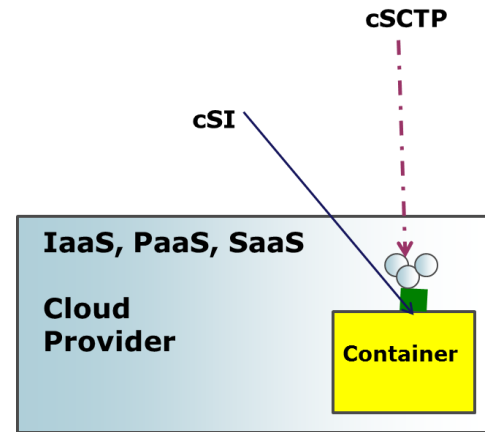
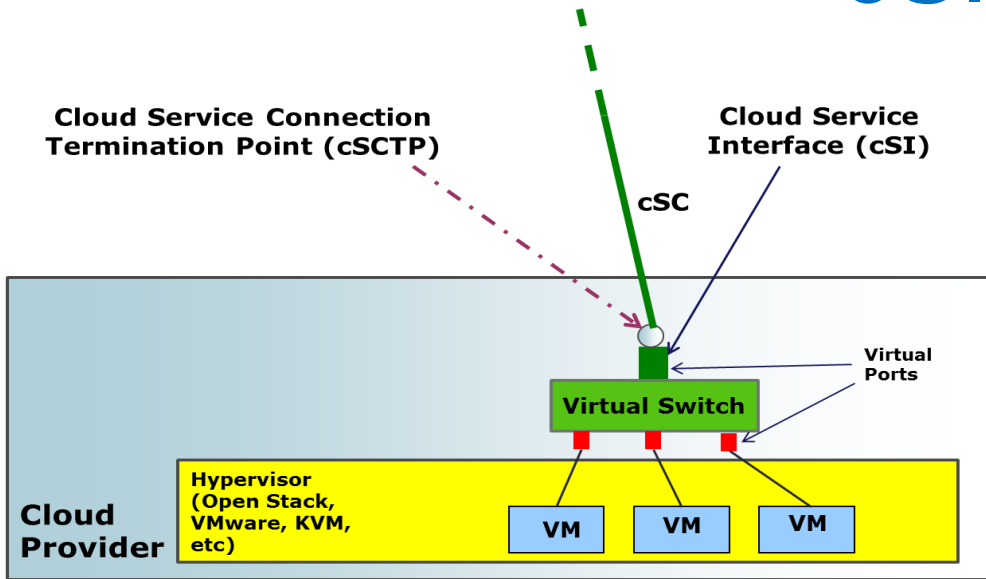


cSPcSPI  
Or  
cCcPI

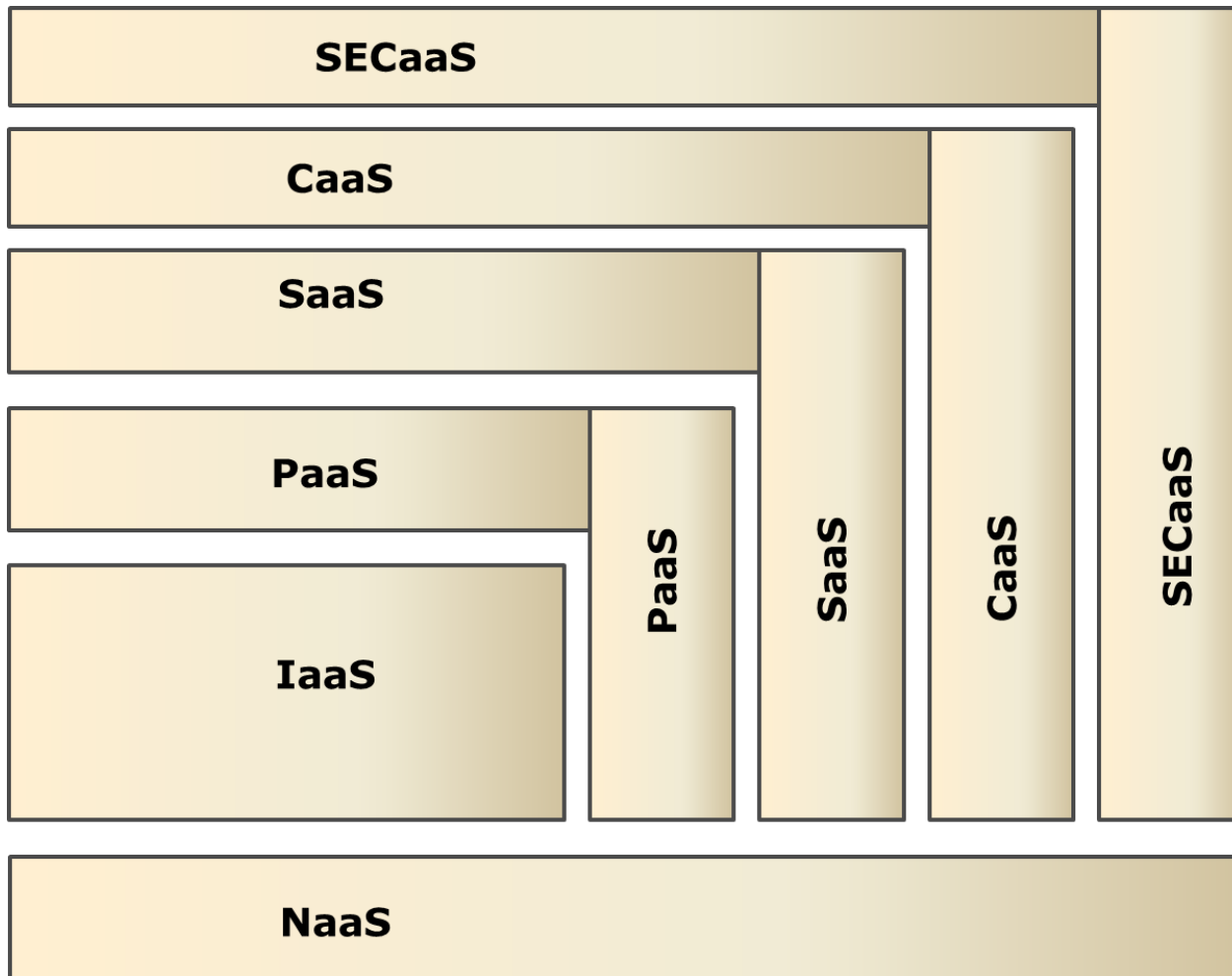


cSI

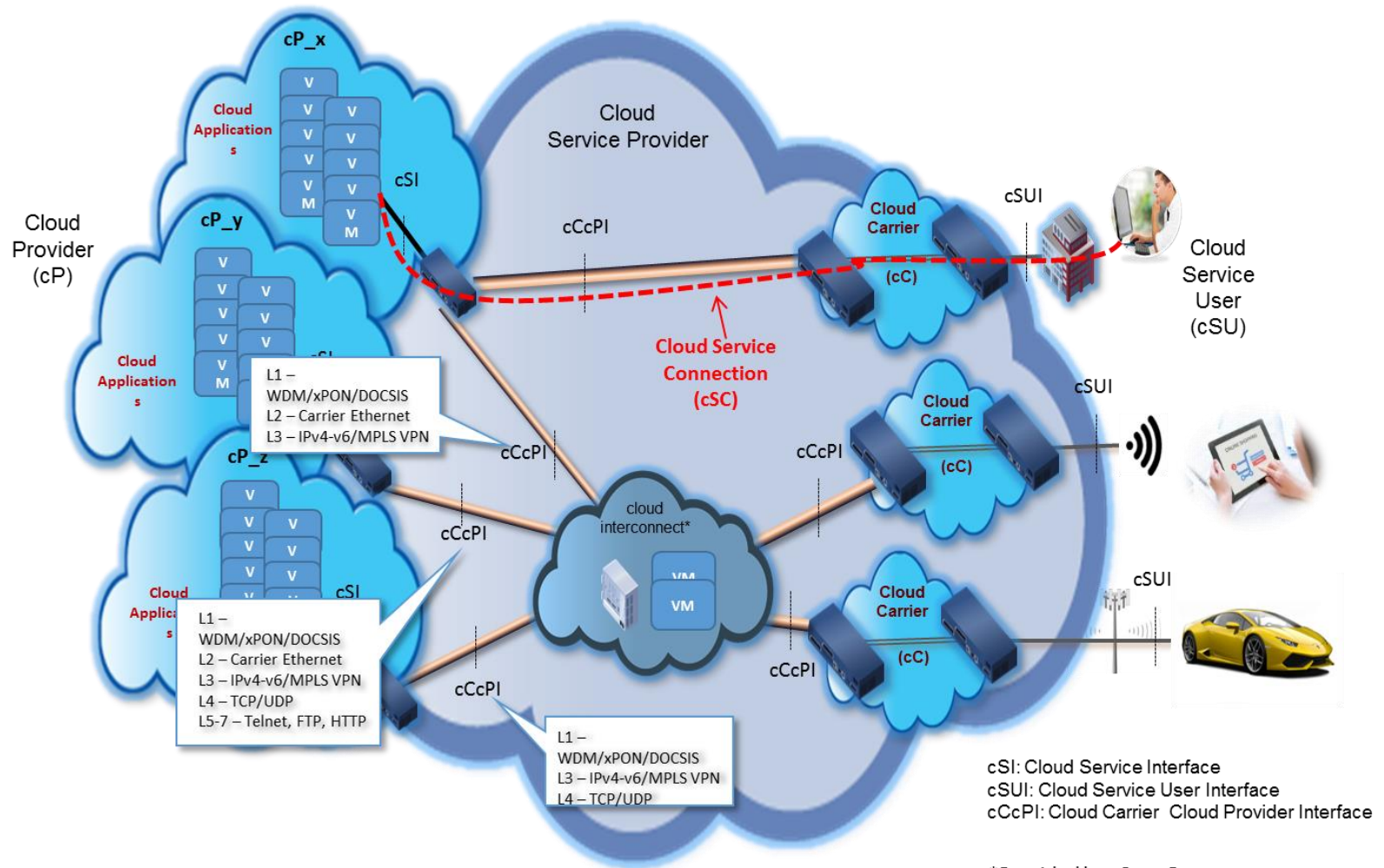
# cSI



# Cloud Services

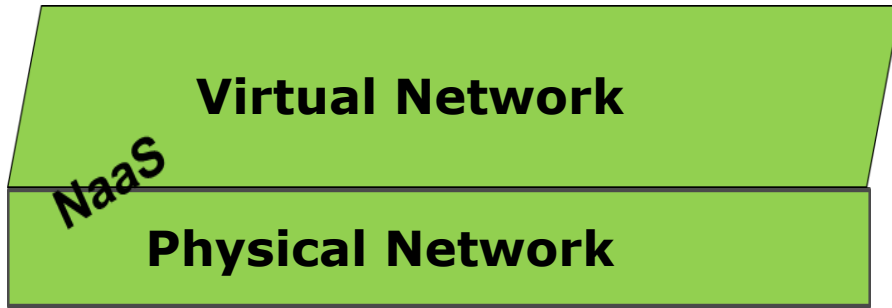


# Interconnectivity Services



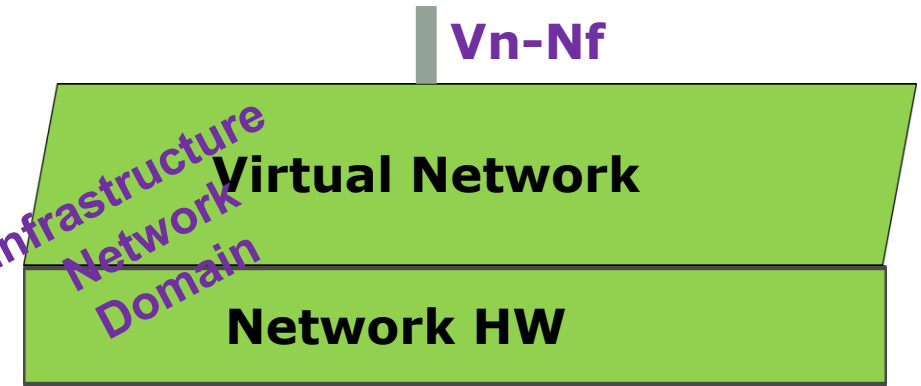
# OCC vs ETSI NFV Architectures

## OCC Architecture



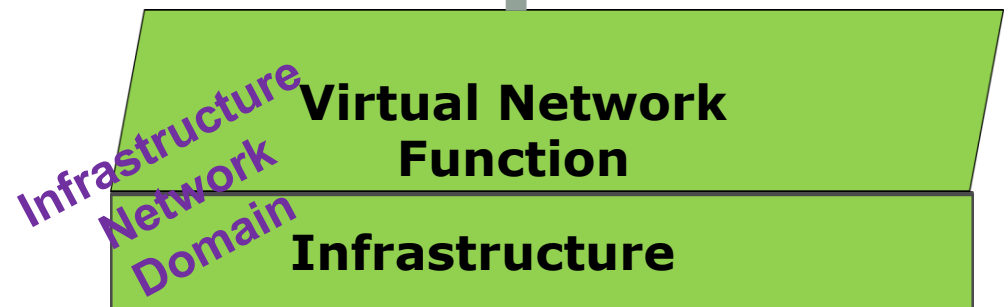
cCcPI  
Or  
cSUI  
Or  
cSPcSPI

## VNF Architecture

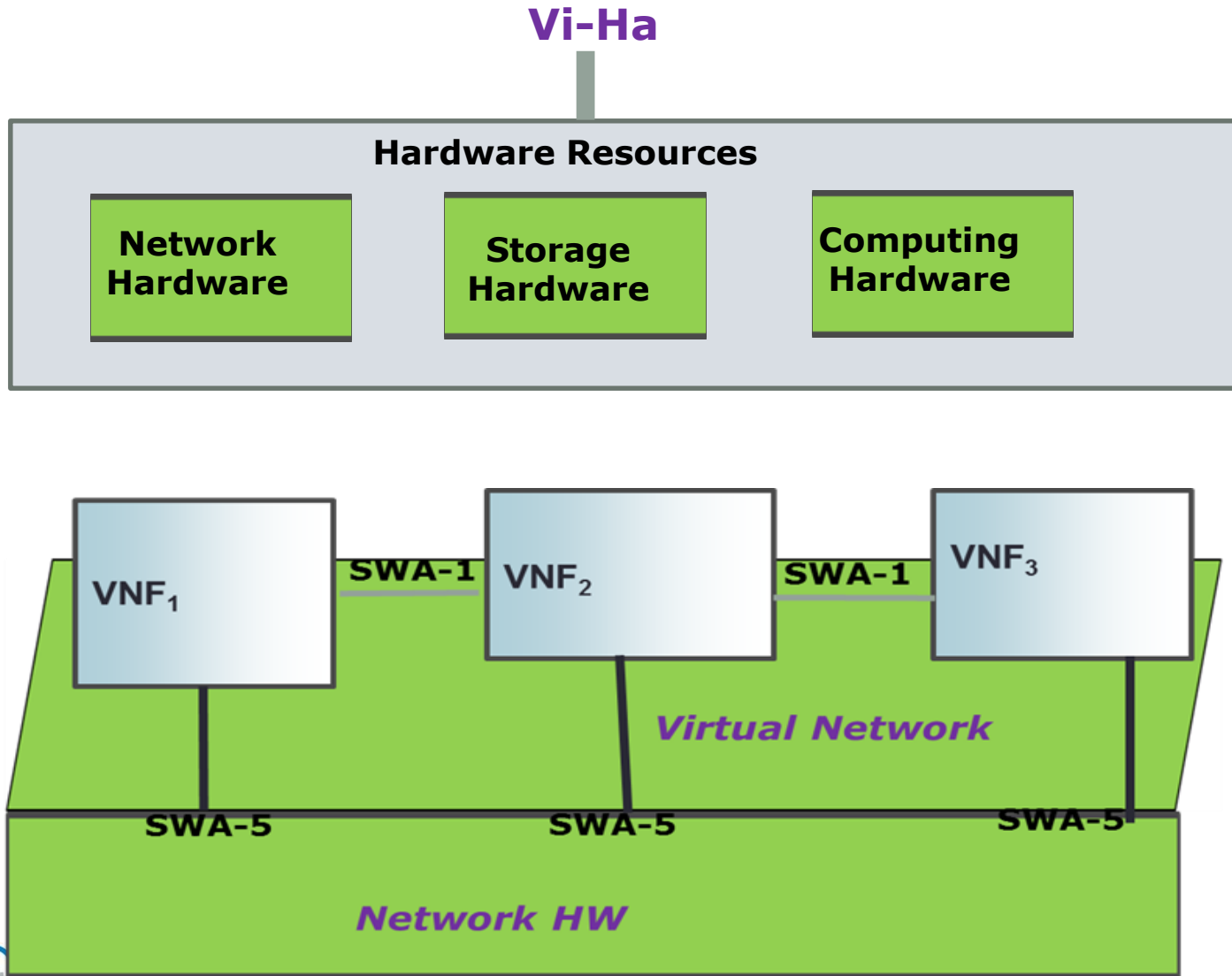


(Vn-Nf)/VN interface supporting E-Line or E-LAN

or  
Vn-Nf

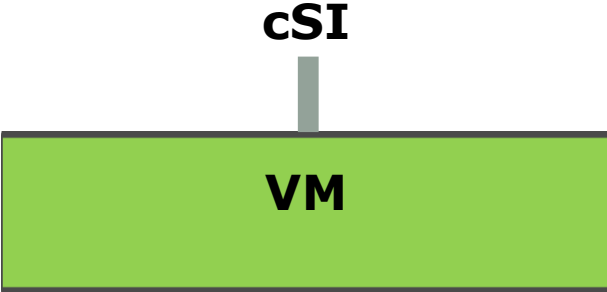


# ETSI NFV Bare Metal Server and VNF Interfaces



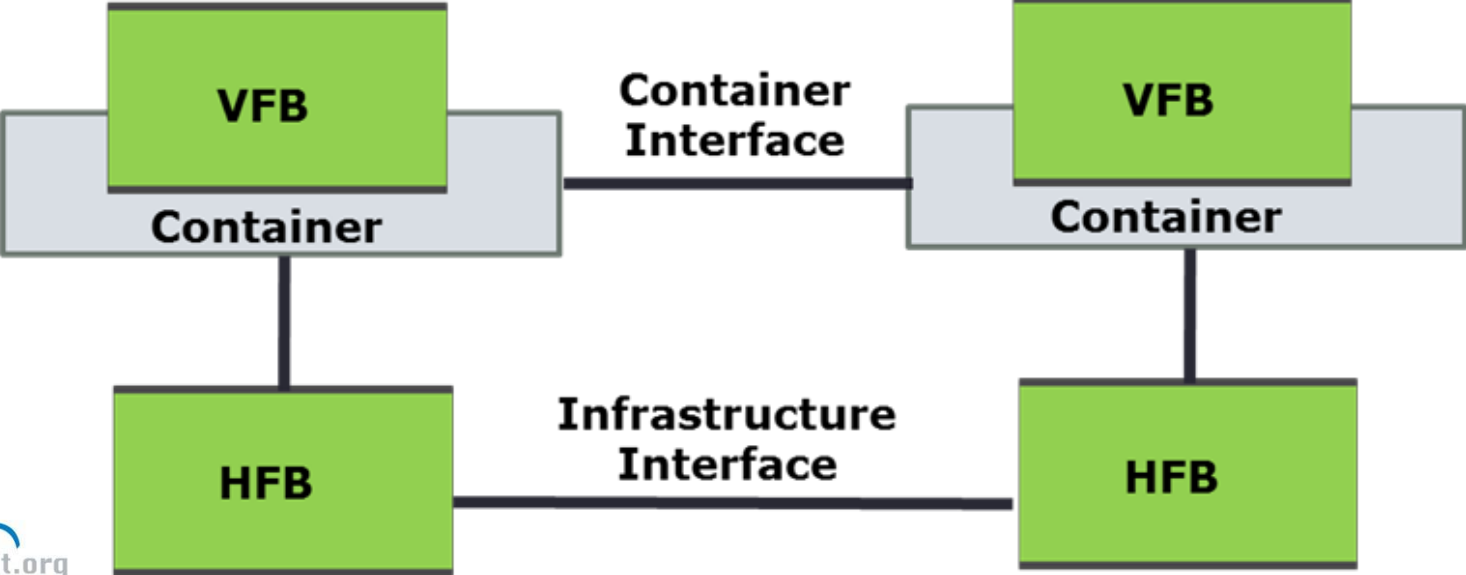
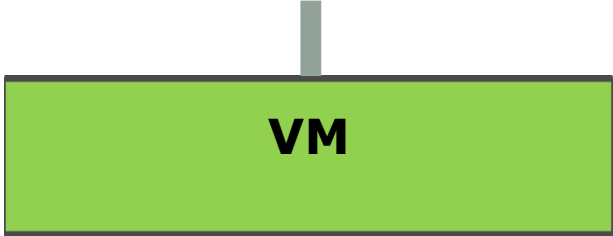
# VM Interfaces

## OCC Architecture



## VNF Architecture

(Vn-Nf)/VM  
Or  
Vn-Nf-VM

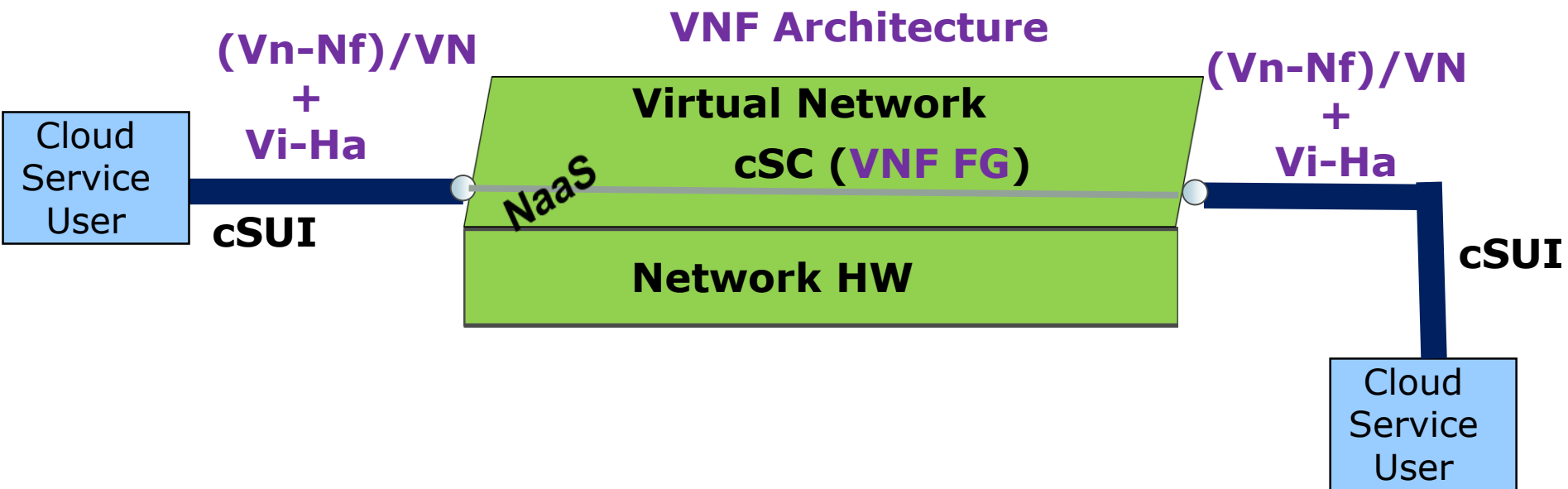




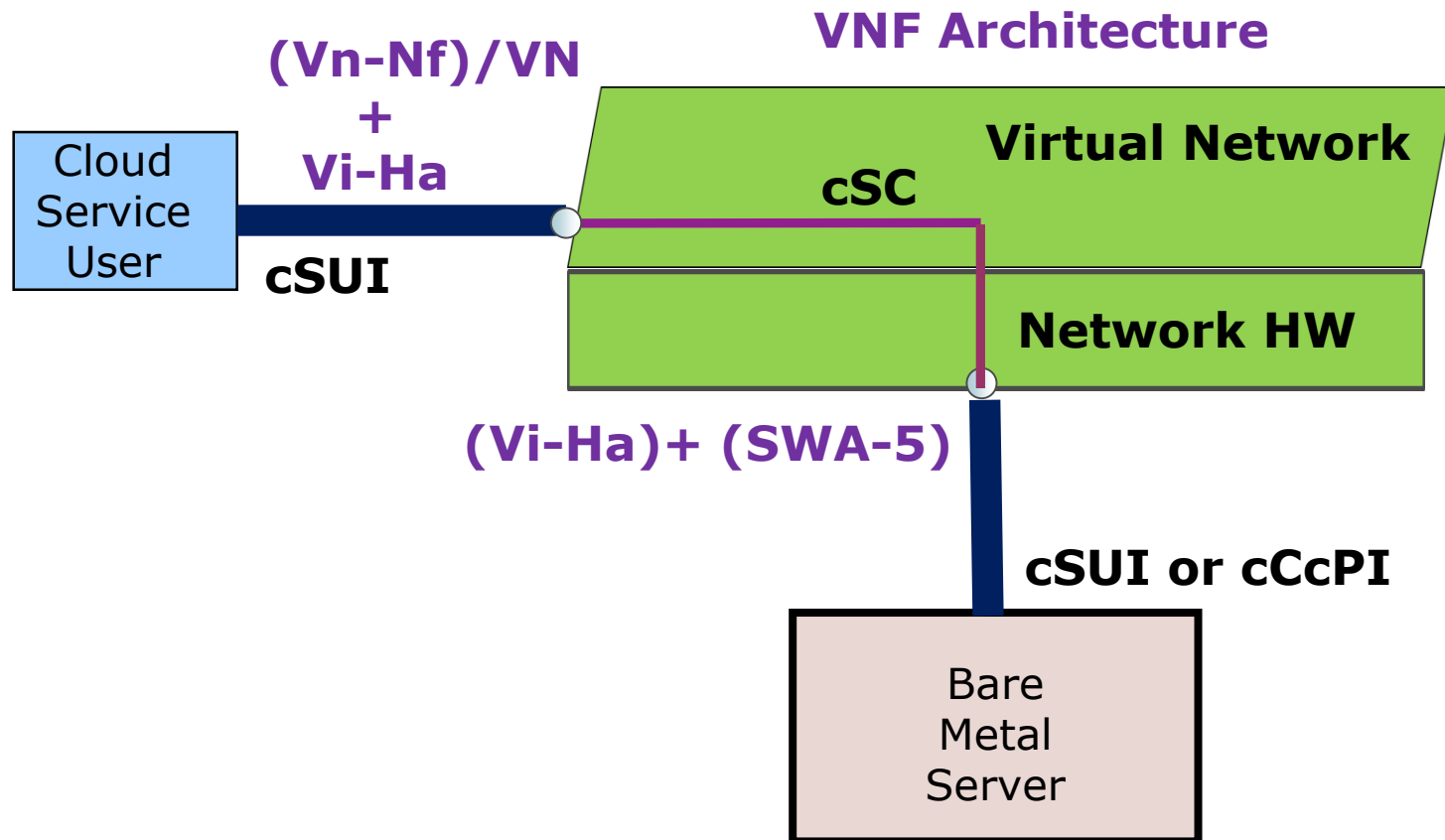
# Mapping of OCC and NFV Interfaces

Architectural Construct	ETSI NFV Construct	OCC Construct
User Interface	(Vi-Ha)+(Vn-Nf)/VN	cSUI
VM Interface	(Vn-Nf)/VM	cSI
Container Interface	Container Interface	cSI
SWA-1	Software Architecture-1	cSI
Cloud Carrier-Cloud Provider Interface		cCcPI
Cloud Service Provider-Cloud Service Provider Interface		cSPcSPI
Connection between Users or between a User and VM or between VMs	VNF Forwarding Graph	cSC
Connection Termination Point		cSCTP

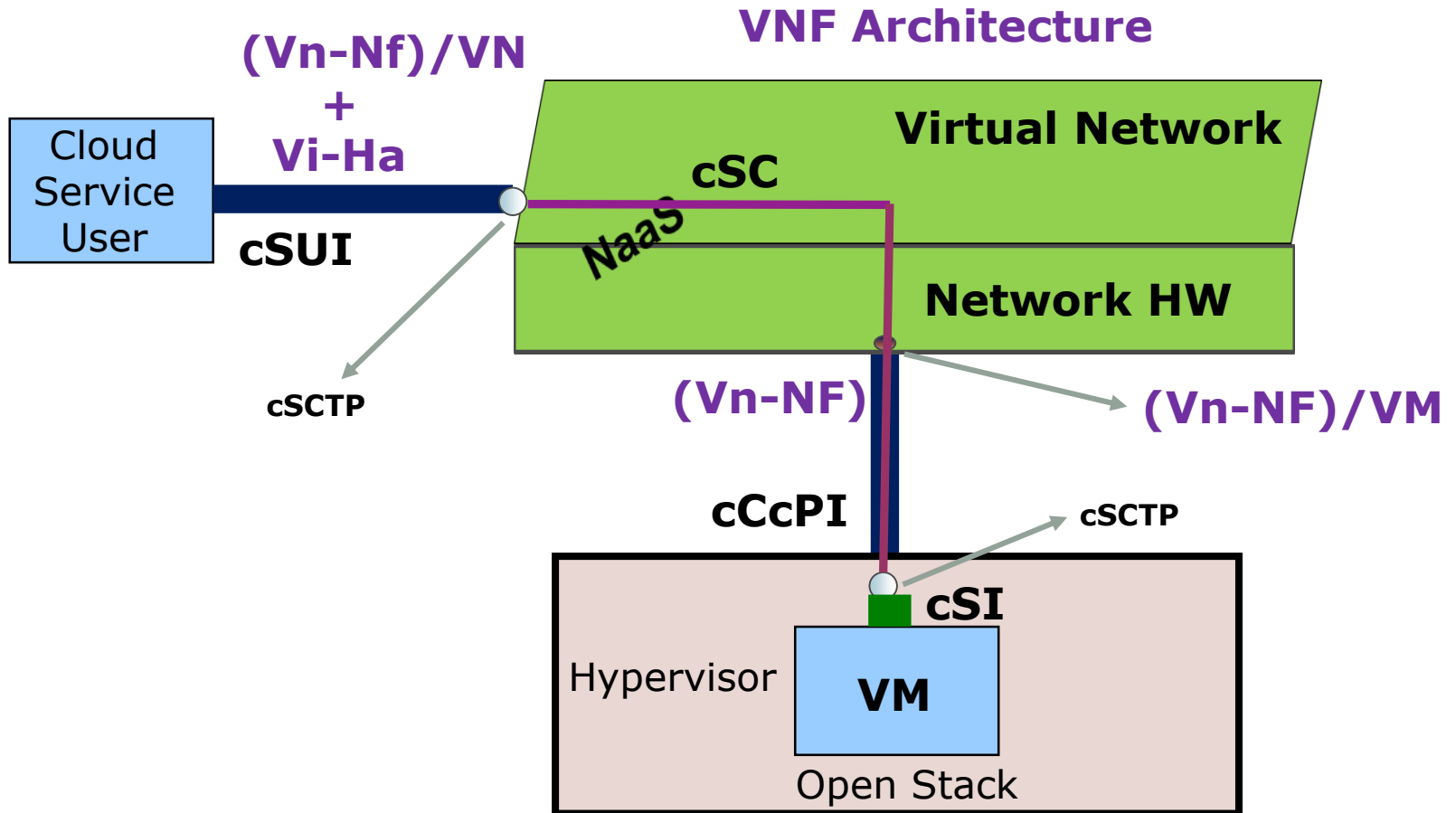
# NaaS with VNF Interfaces



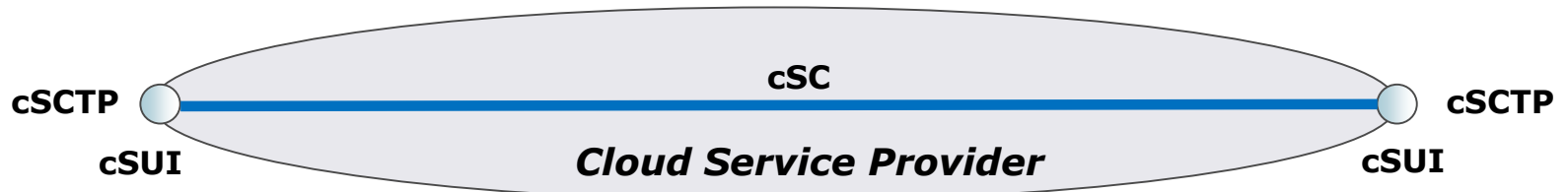
# NaaS with Bare Metal Server Interface



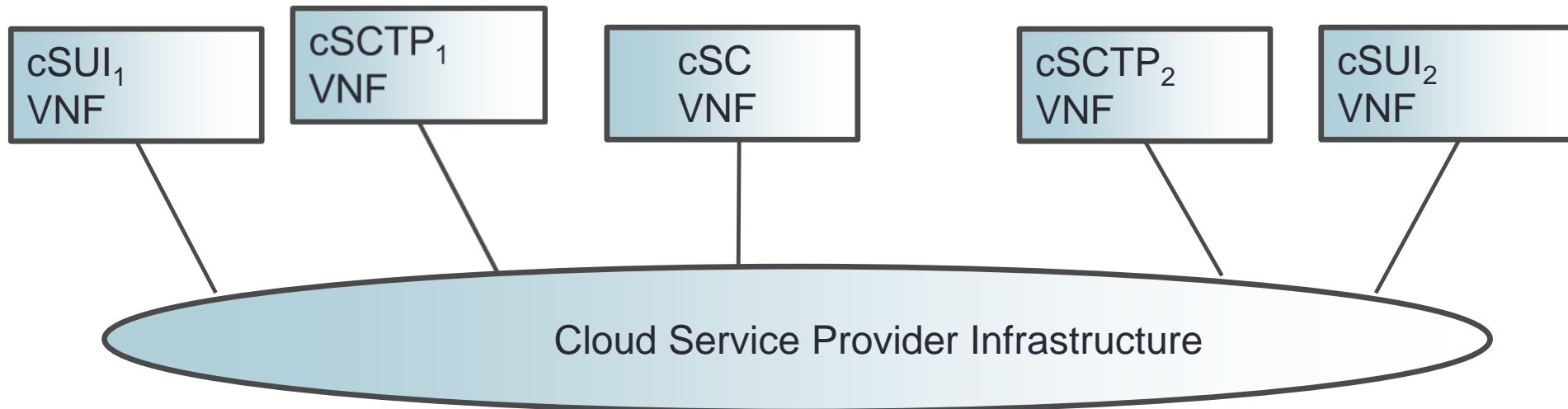
# VM Interface



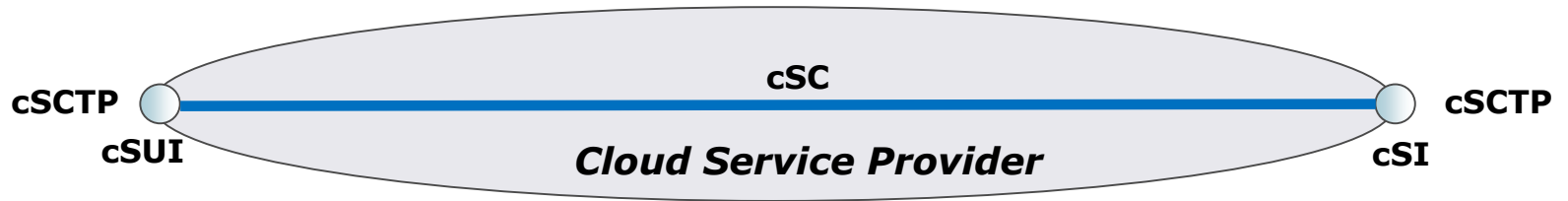
# Virtualized cSC between Two cSUs



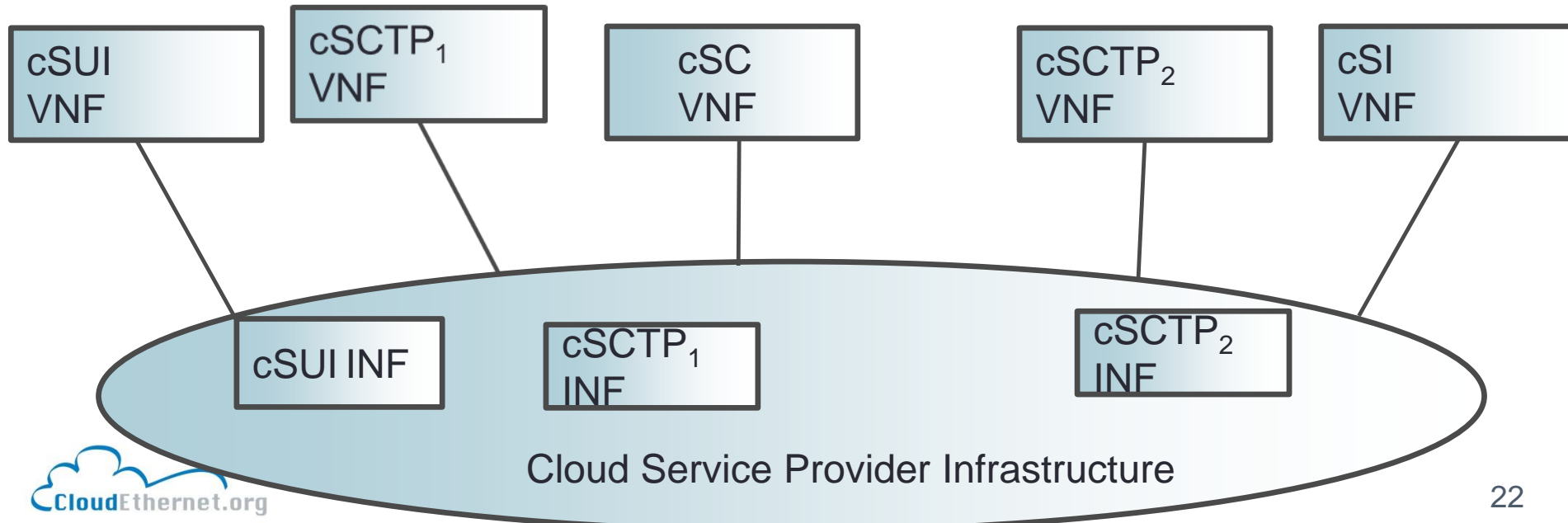
## Virtualized Implementation



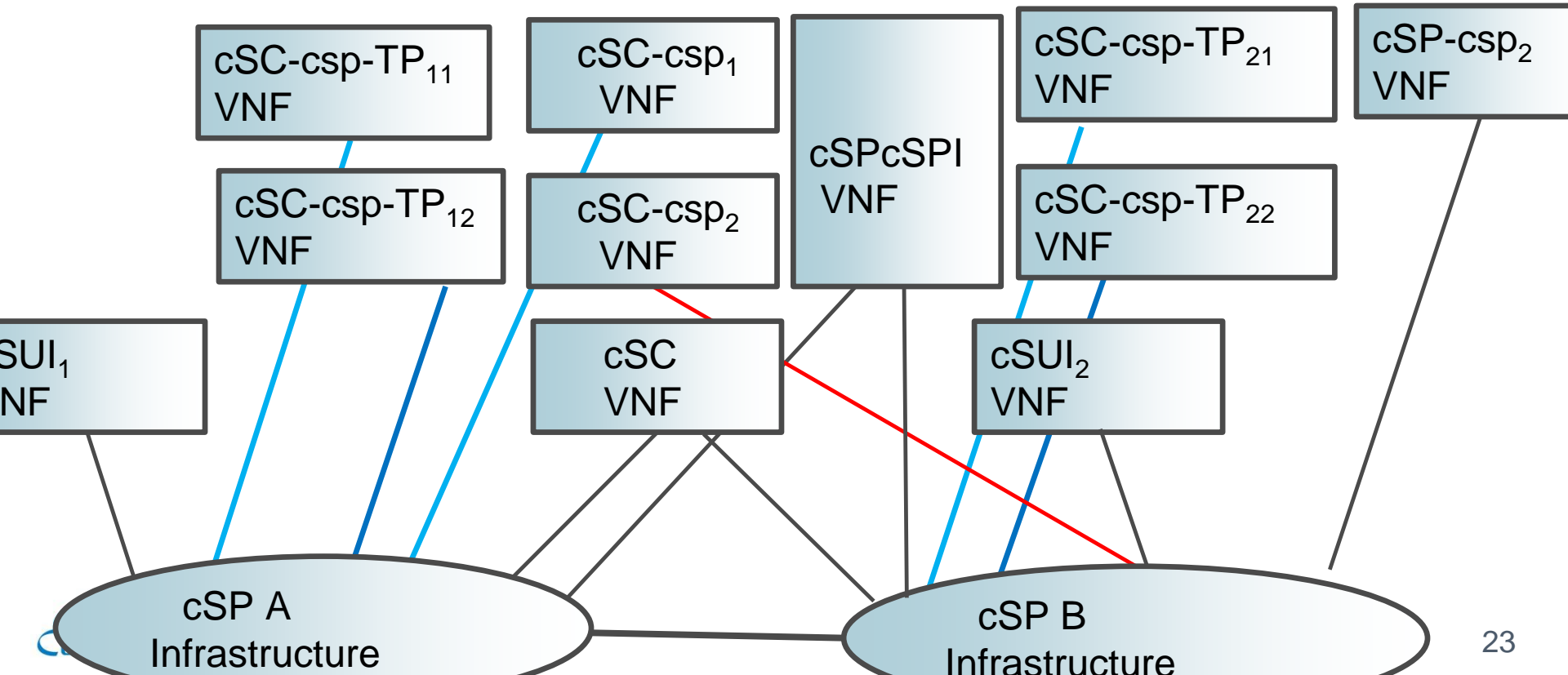
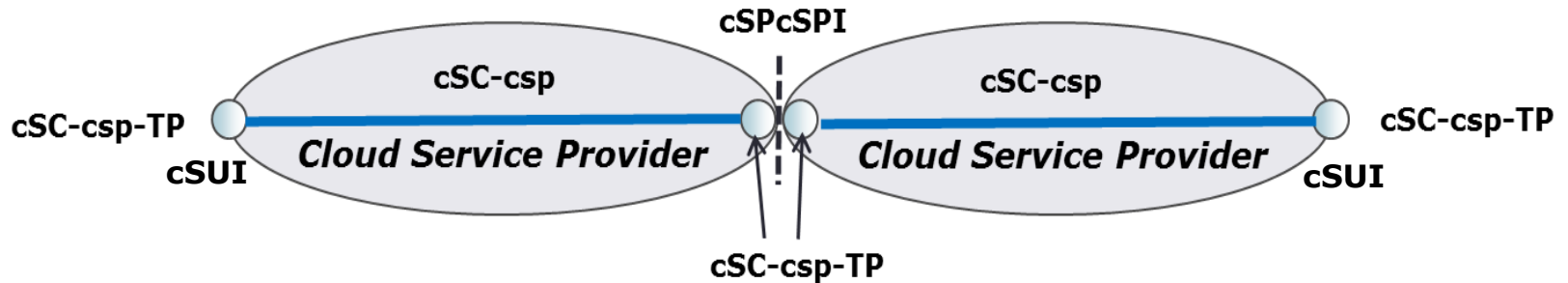
# Virtualized cSC between cSUI and cSI



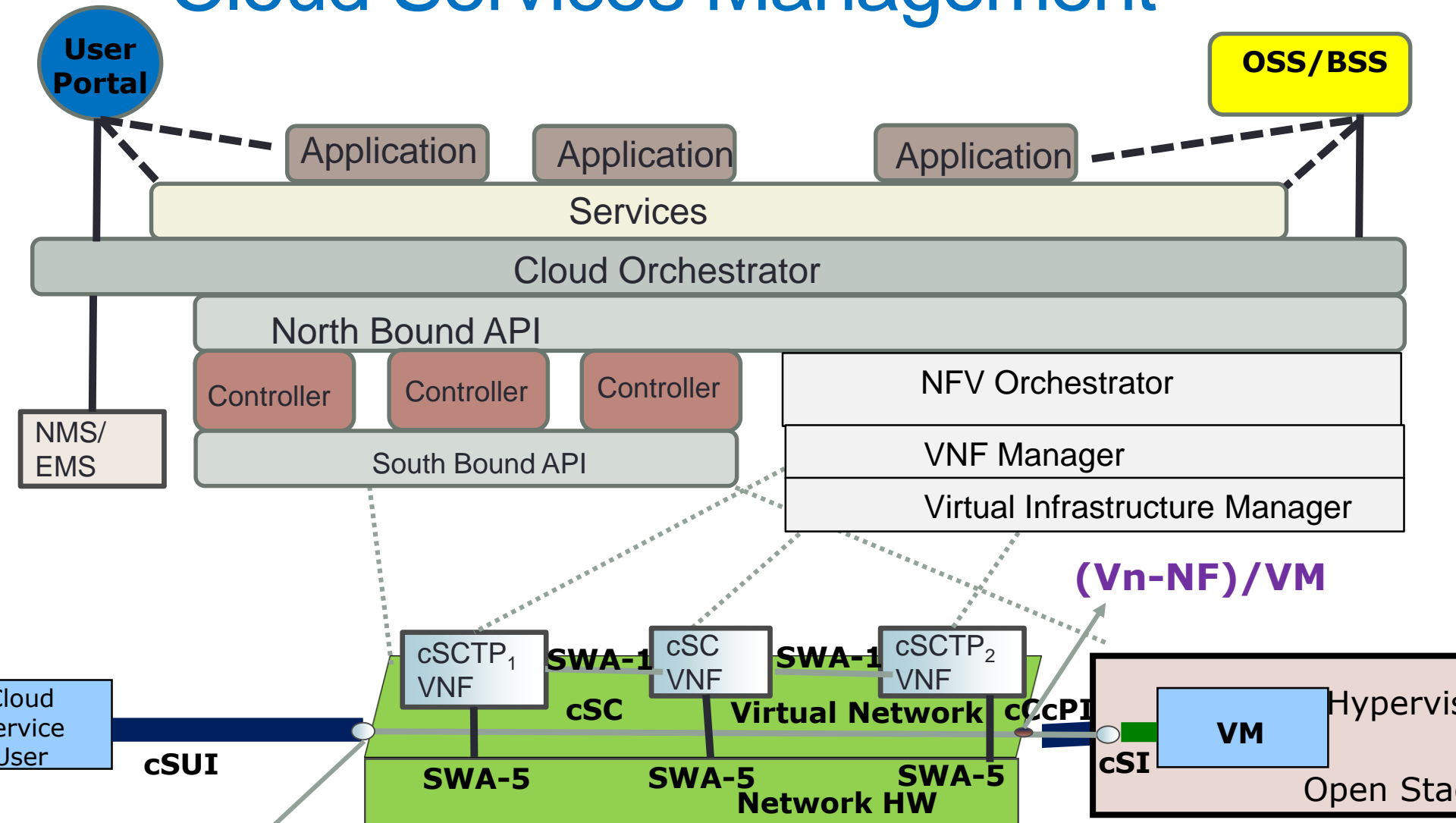
## Virtualized Implementation



# Virtualized cSC Crossing Two cSPs



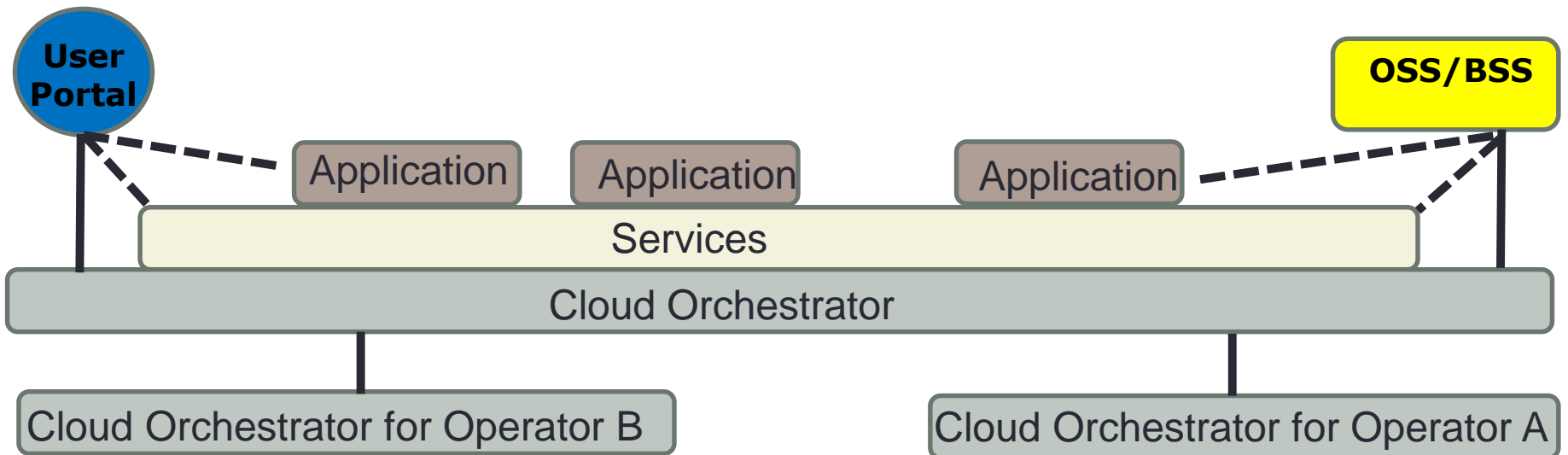
# Cloud Services Management



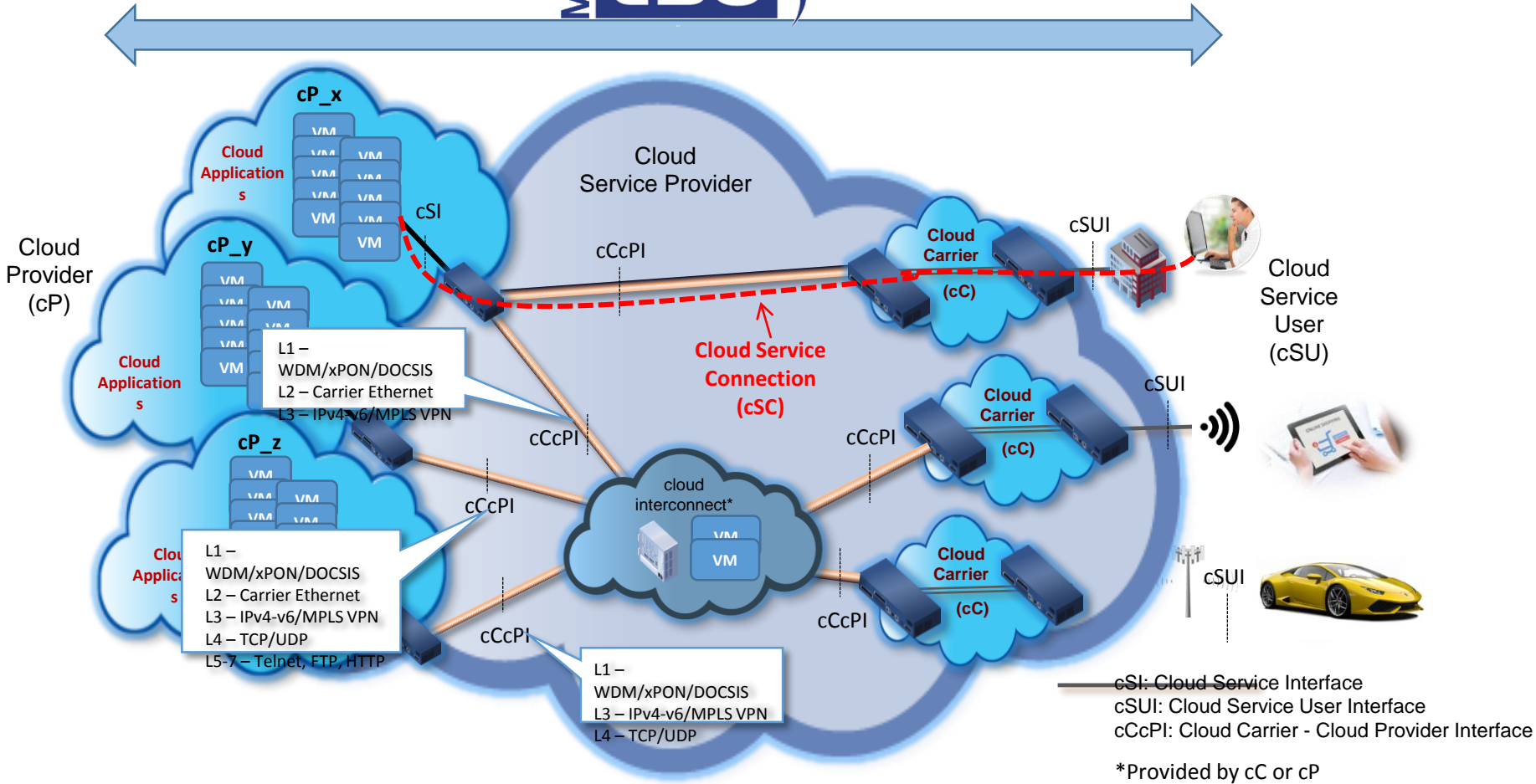
(Vn-Nf)/VN + Vi-Ha



# Cloud Services Management with Multiple Operators



# LSO for Cloud Services



# What is Next?

- **Development of Implementation Agreements for Interfaces and Connections**
- **Development of Implementation Agreements for Services**
- **Development of Implementation Agreements for OAM and Service OAM**
- **Development of Testing and Certification Guidelines for Services**
- **Development of APIs and YANG Models**
- **Development of Life Cycle Service Orchestration for Cloud Services**
- **Collaborating with other SDOs for implementation, and API and YANG model development**

**Thank You!**

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