



# Open Networking and IPoDWDM in Production: Use cases from European Networks

ITNOG10

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# AGENDA

- What is IPoDWDM?
- Telecom Infra Project (TIP) and MANTRA Project
- Innovative Optical and Wireless Network (IOWN) Forum with Telefonica
- Exatel national IPoDWDM Network

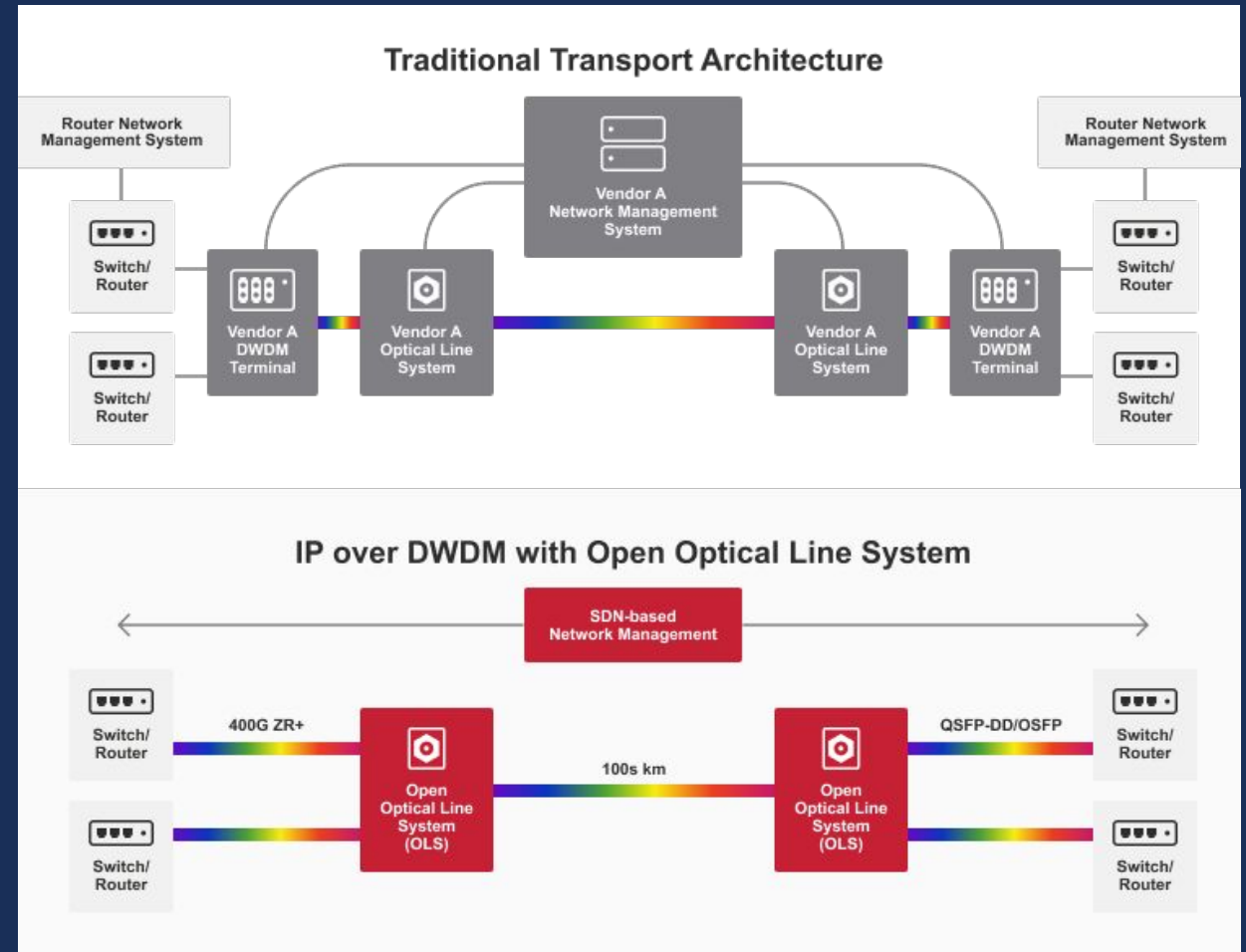
# What is IPoDWDM Technology?

IP over DWDM (IPoDWDM) is a technology used in telecommunications networks to integrate IP routers and network switches into the optical transport network (OTN). A true IPoDWDM solution is only implemented if the IP routers and switches support ITU-T G.709. This allows IP devices to monitor the optical path and implement transport functionality such as forward error correction (FEC) according to ITU-T G.709/Y.1331 or the Super-FEC functionality defined in ITU-T G.975.1.

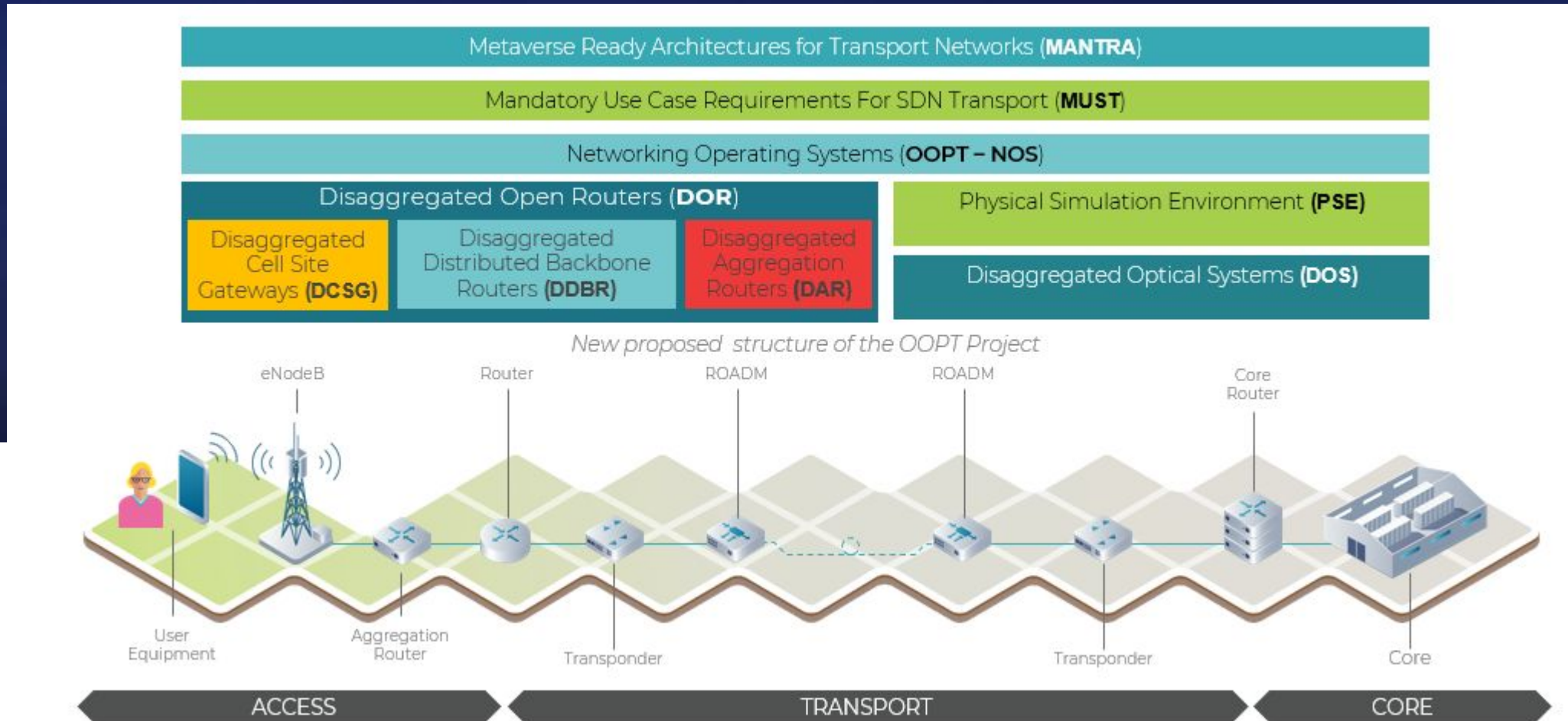
Benefits: This approach saves network components such as enclosures, processors, and interface cards, thus reducing power consumption, operating expenses (OPEX), and capital expenditures (CAPEX). It also simplifies the network by eliminating the SDH/SONET intermediary layer.

## Multivendors

A DWDM network can be implemented using technologies from different manufacturers for the IP devices, provided that they support the transmission of foreign wavelengths specified in ITU-T G.698.2.



# Telecom Infra Project (TIP)



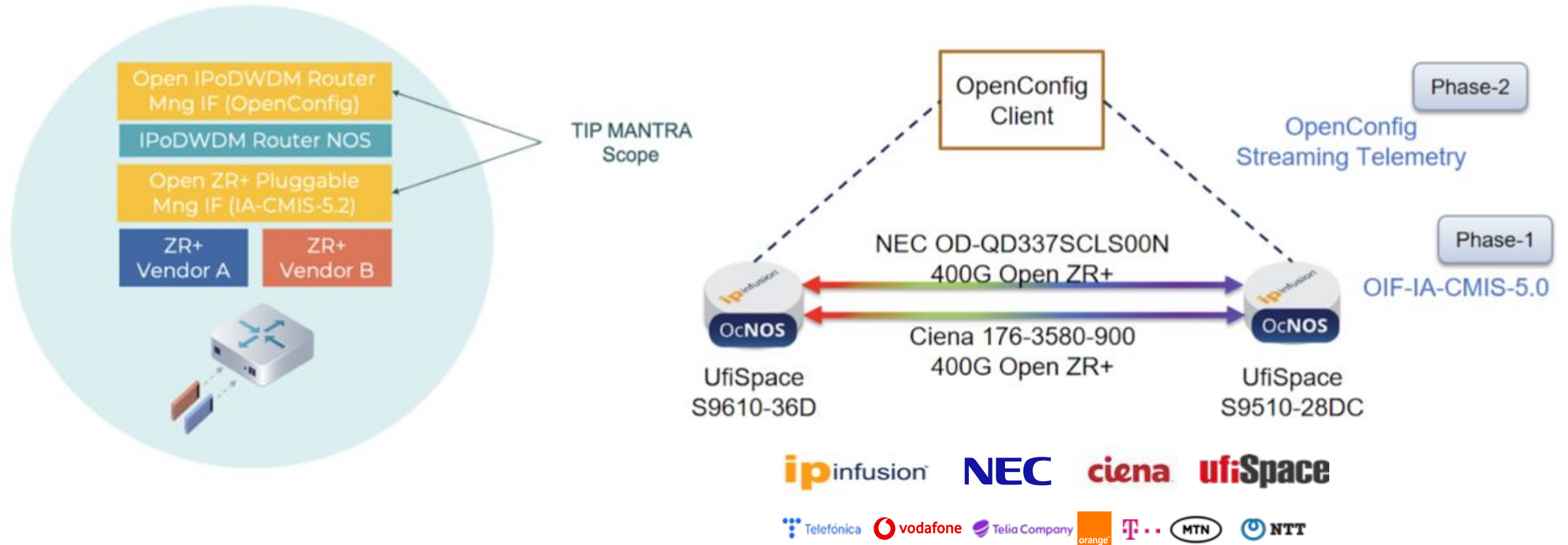
The Telecom Infra Project (TIP) is a global network of leading organizations working together to revolutionize the development and deployment of telecommunications infrastructure. Our mission is to fundamentally transform global connectivity through innovation and the accelerated adoption of next-generation telecommunications technologies.

Since our founding in 2016, TIP has rapidly grown into a dynamic network with hundreds of members, including service providers, technology manufacturers, systems integrators, startups, and universities. Together, we are pushing boundaries, driving high-quality connectivity, and reshaping the telecommunications industry.

# TIP Metaverse Ready Architectures for Transport Networks

## MANTRA Group IPoDWDM POC (2024)

OcNOS® 400G ZR+ enabled switches deliver Open Networking Alternative for IPoDWDM Networks



**Phase 1:** CMIS interoperability between OcNOS on UfiSpace hardware and the Ciena Open ZR+ configurable optical module in the C-band was demonstrated.

**Phase 2:** Phase 1 was extended to NetConf OpenConfig data models, and the streaming telemetry capabilities of data retrieved from the Ciena and NEC Open ZR+ configurable optical modules in the C-band were demonstrated.

[https://cdn.mediavalet.com/usva/telecominfraproject/QQhtPYmJVkm88JiJ5xGULA/eg\\_gHL\\_g2kGxGDHQisAs3A/Original/TIP\\_OOPT\\_MANTRA\\_IPoDWDM\\_PoC\\_Results\\_readout\\_whitepaper\\_v.1.0.pdf](https://cdn.mediavalet.com/usva/telecominfraproject/QQhtPYmJVkm88JiJ5xGULA/eg_gHL_g2kGxGDHQisAs3A/Original/TIP_OOPT_MANTRA_IPoDWDM_PoC_Results_readout_whitepaper_v.1.0.pdf)

# TIP MUST IPoDWDM Interoperability Event (2025)

## Venue: Telefonica Lab

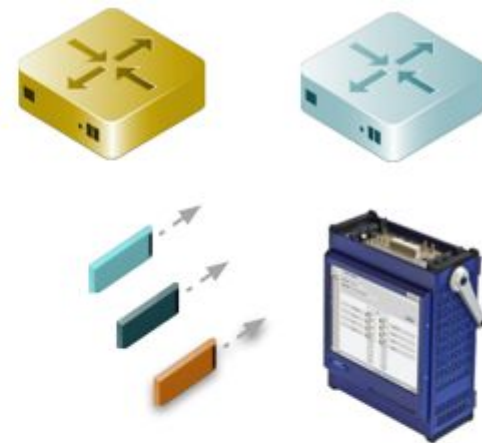
Router vendors: **ip**infusion **ufiSpace** **NOKIA**

Coherent Pluggables transceiver vendors: **NEC** **ciena** smartoptics

Test and measurement equipment vendor: **VIAMI**  
VIAMI Solutions

Host operator:  **Telefónica**

Observer operators:  **Telia Company**  **vodafone**    **MTN**  **NTT**



# IOWN Network Solutions (400G)



**IOWN**  
GLOBAL FORUM



**Edge-core**  
NETWORKS

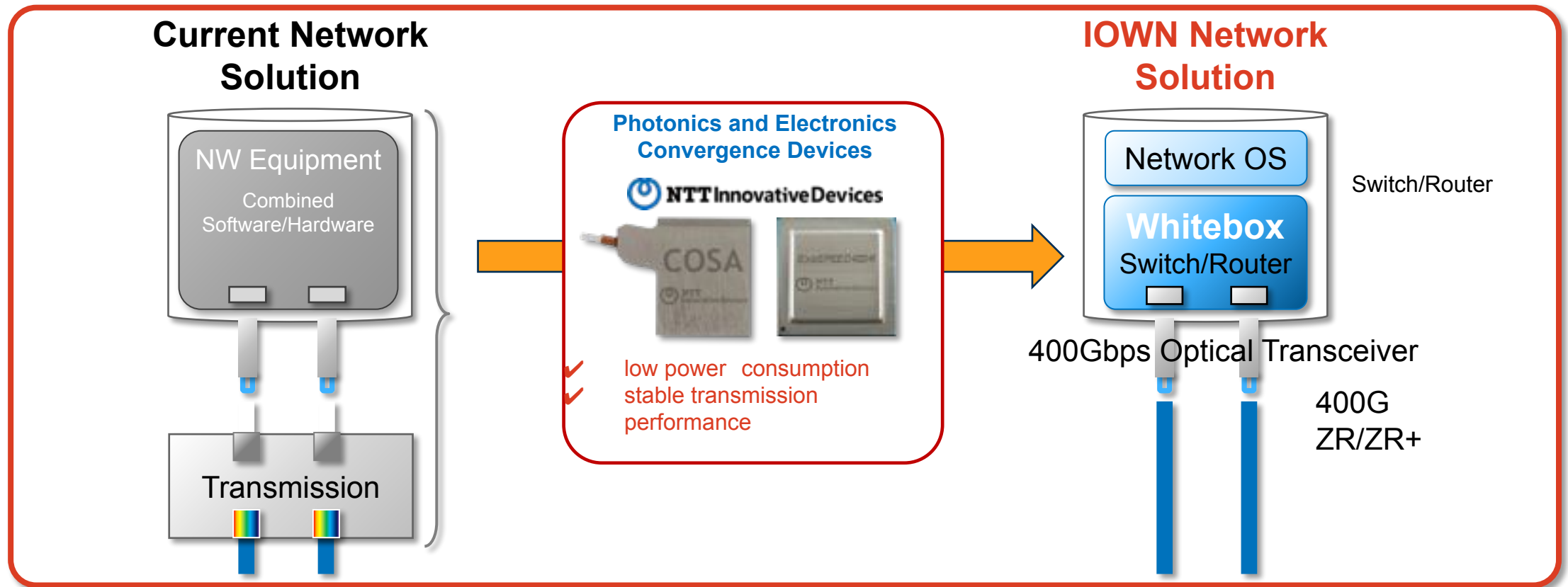


**ufiSpace** **FUJITSU** **ip**infusion™  
**NEC**

# IOWN Network Solution (400G)

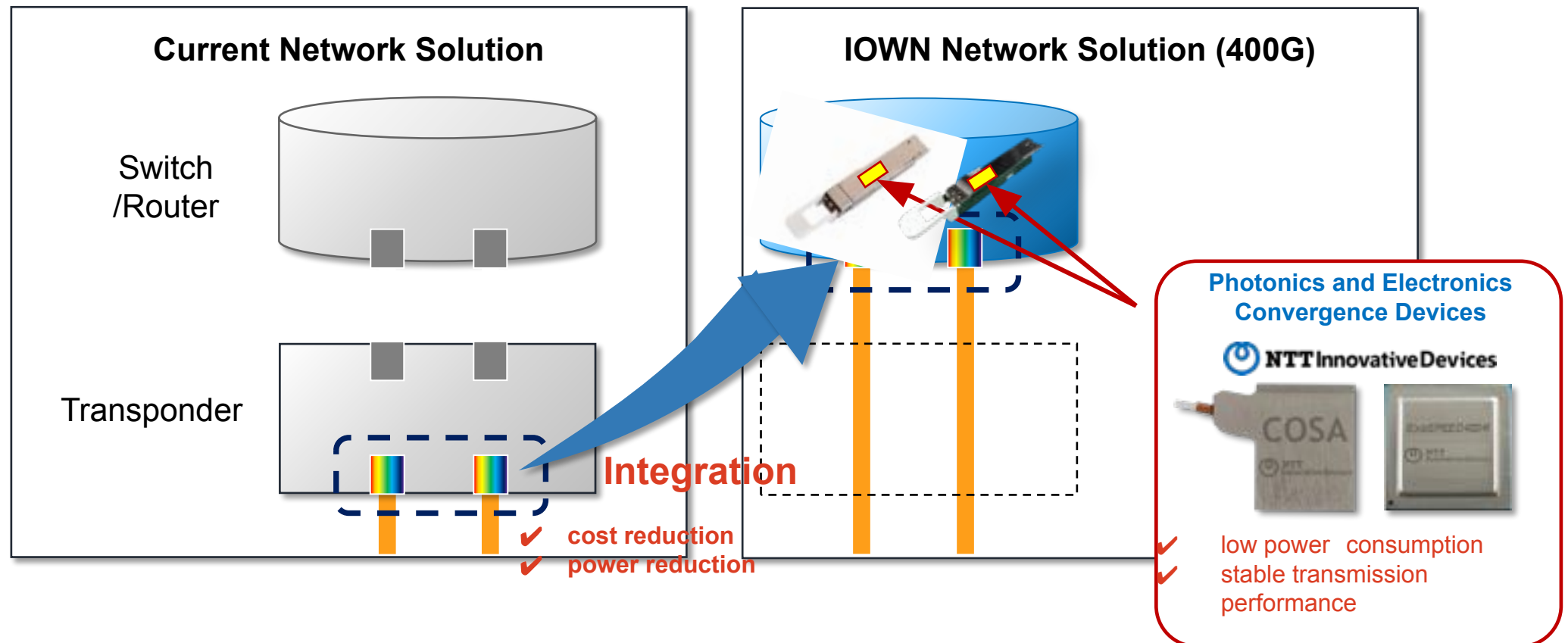
## 400G IPoDWDM powered by IOWN silicon photonics WhiteBox device

Low cost, low power consumption solution by open IOWN eco-system

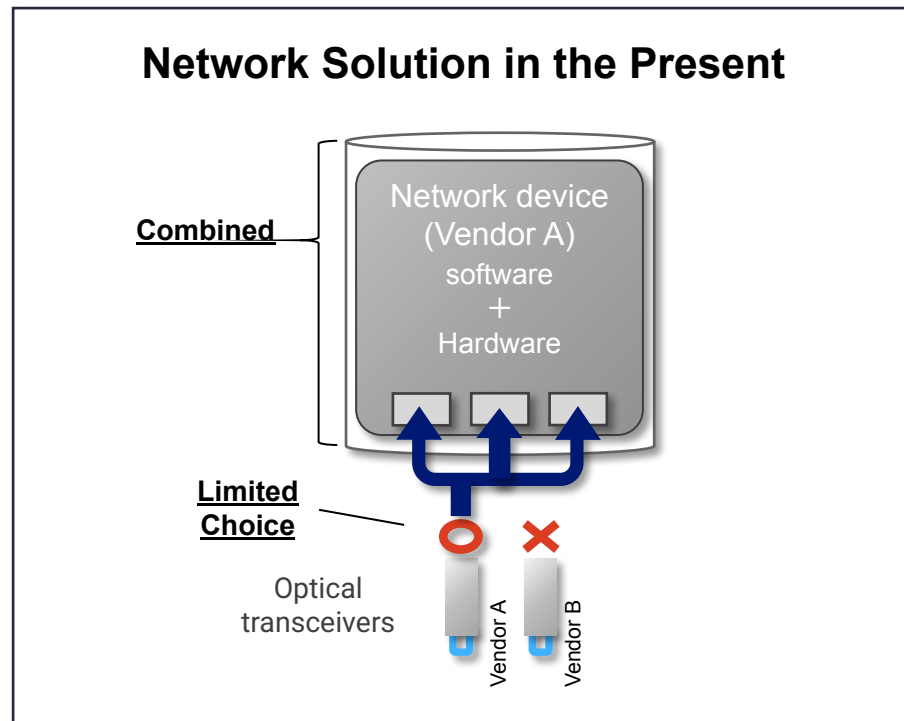


# #1 Integration of Transponder & Switch/Router

By combining the transponder & Switch/Router into “SwitchPonder” by silicon photonics, **it reduces cost 50%, power consumption 40%**

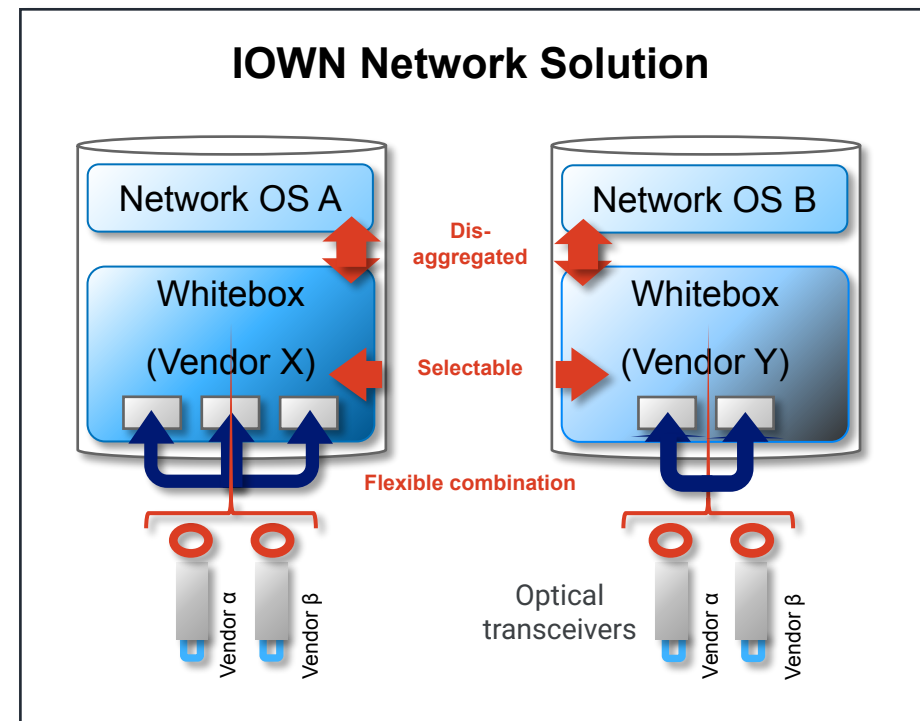


## #2 Freedom of choice : NOS, Whitebox, Transceiver



- ✓ Combined software and hardware
- ✓ Limited choice of optical transceivers

**High costs due to vendor lock-in**



- ✓ Disaggregated software and hardware
- ✓ Flexible combination of optical transceiver

**Cost optimization by flexible combination according to use case /purpose**

# #3 IOWN Technologies/Products Eco-System

## 9 Partners and more...

Network OS



White Box  
Switch/Router



400G  
Optical transceivers

Photonics and  
Electronics  
Convergence Devices





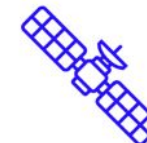
A leading Polish operator with a **global reach**, **680 interconnect points**, since 1993



The one of largest **fiber-optic networks** in Poland - over 23 000km, since 2004



Advanced **Cybersecurity services** including **SOC** & own DDoS Protection Solution – TAMA since 2019



SatCom including own **Teleport** with **7 modern satellite antennas**, since 2020

2025

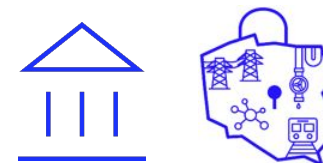
1993



Ranked as the **6th biggest Polish IT company**, **Over 550 of employees** and growing



**Integrated services, R&D and business flexibilities** is our DNA



**Public sector & Critical infrastructure projects for large Customers & Government** are our domain

# EXATEL

# Status 2026



**Edgecore Networks AS5916-54XKS**  
Qumran MX / 800G  
(48x 1G/10G + 6x 40G/100G)



## DRIVE NETS

ufiSpace



**UFISPACE S9710-76D**  
Jericho 2c+ / 14,4T  
(36x 400GE / 100GE)



**Edgecore Networks AS7946-30XB**  
Qumran 2c / 2,4T  
(4x 10/25G + 22x 40/100G + 4x 400G)



ufiSpace

## ipinfusion™

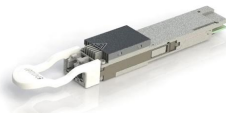
**UFISPACE S9510-28DC**  
Qumran 2a / 800G  
(24x 1/10/25G + 2x 40/100G + 2x 400G)



ufiSpace

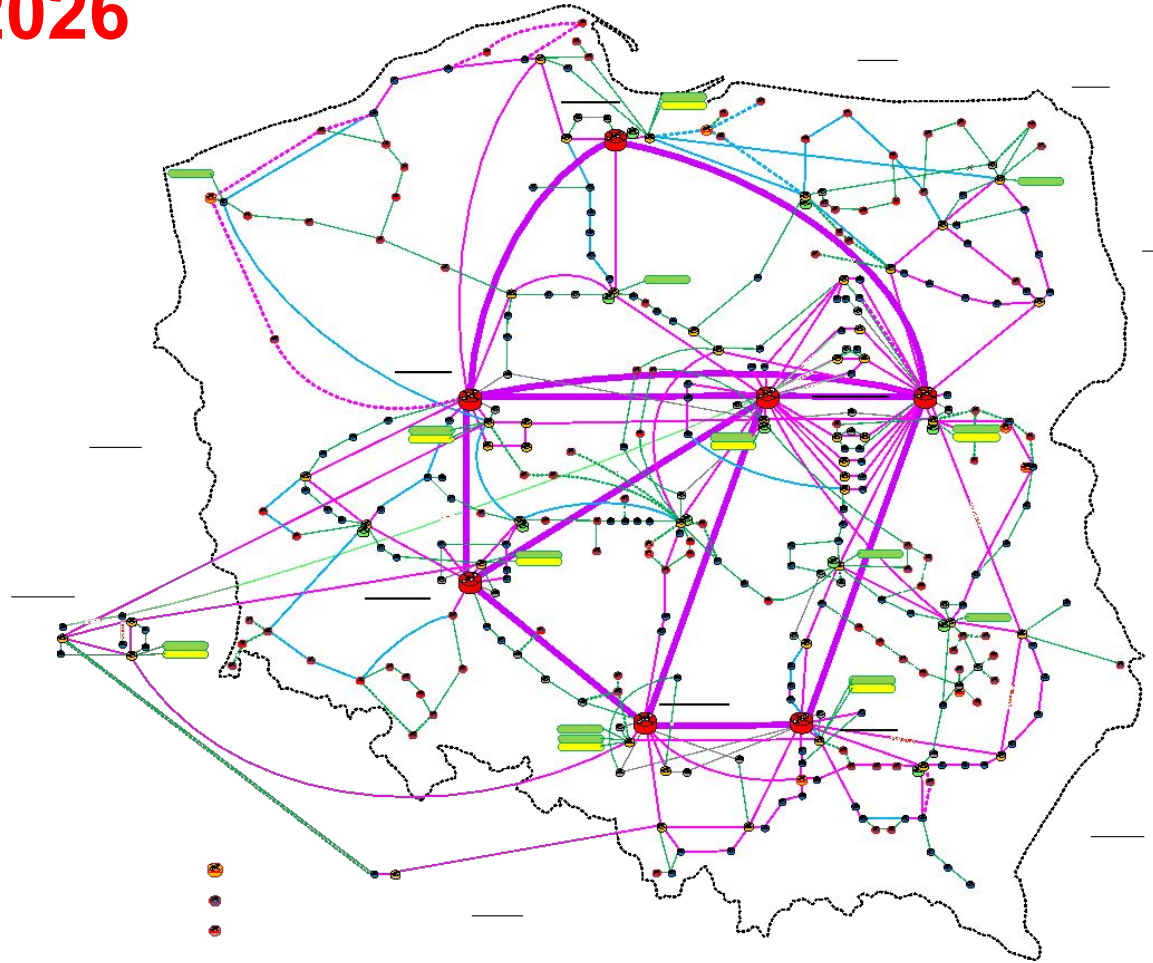
**Edgecore Networks AGR560 (AS9947-36XKB)**  
Jericho 2c+ / 7,2T  
(24x 40/100G + 12x 400G)

**UFISPACE S9620-32E**  
Qumran 3d / 28T  
(36x 800G)

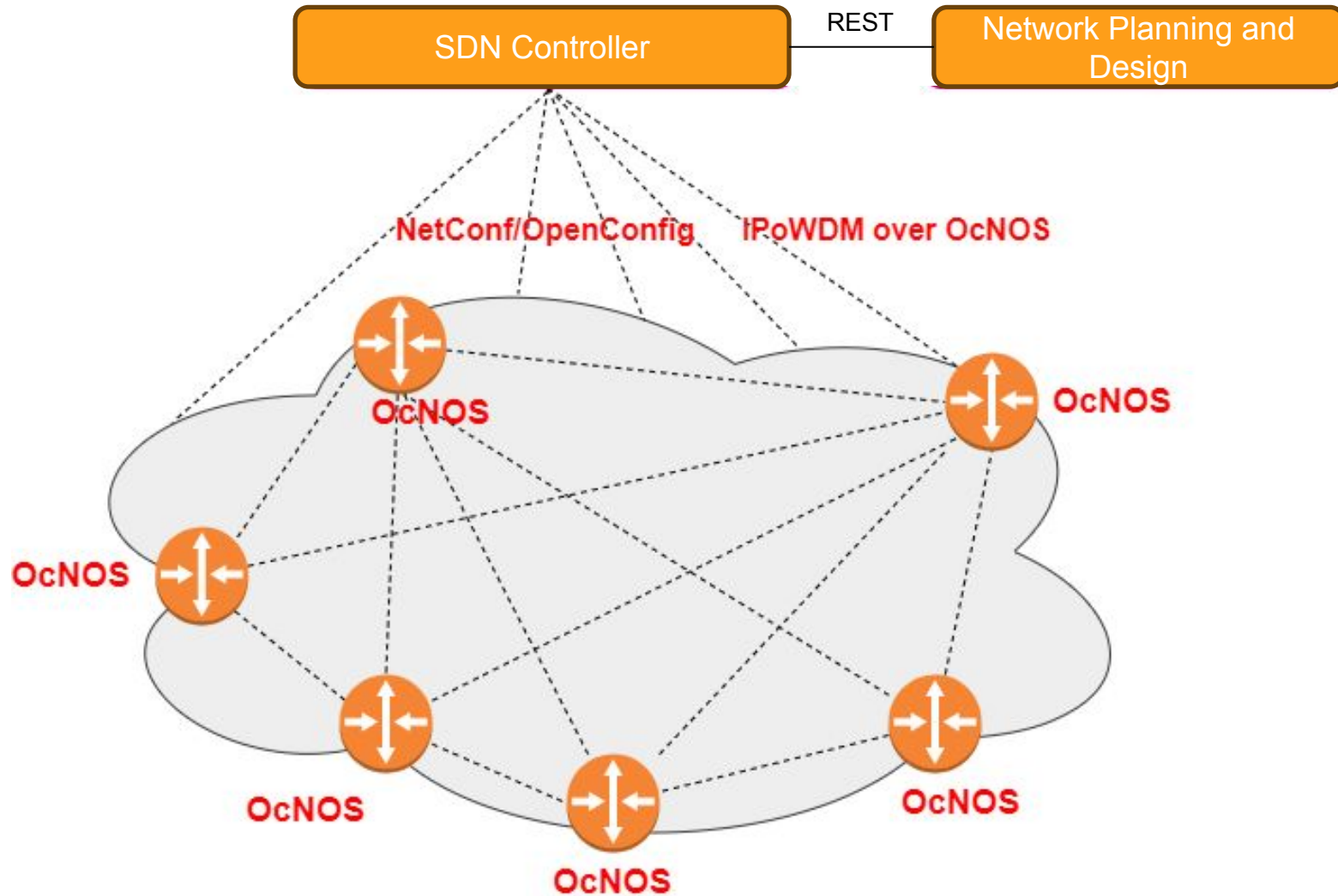


ciena

QSFP-DD 800G OPEN ZR+



# Integration with 3<sup>rd</sup> Party SDN Controller



**ip**infusion™

THANK YOU

[WWW.IPINFUSION.COM](http://WWW.IPINFUSION.COM)