



SDI

Initiatives on Optical Networks

SFI² - Slicing Future Internet Infrastructures

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- **What**

- Virtualizable and programmable physical infrastructure
 - composed of an Overlay SDN network and an nationwide Distributed Edge Cloud
- Infrastructure orchestration platform
 - integrate open solutions for automation and orchestration

- **Why**

- evolution of RNP's existing applications and services to the hybrid cloud paradigm

- **Overlay SDN**

- 10G SDN whitebox
 - Based on low cost x86 HW and open software

- **Edge Cloud**

- High performance servers
 - Expansible to support up to 100Gbps disk to disk file transfers



Whitebox



SuperServer 5019D-FN8TP

Baremetal



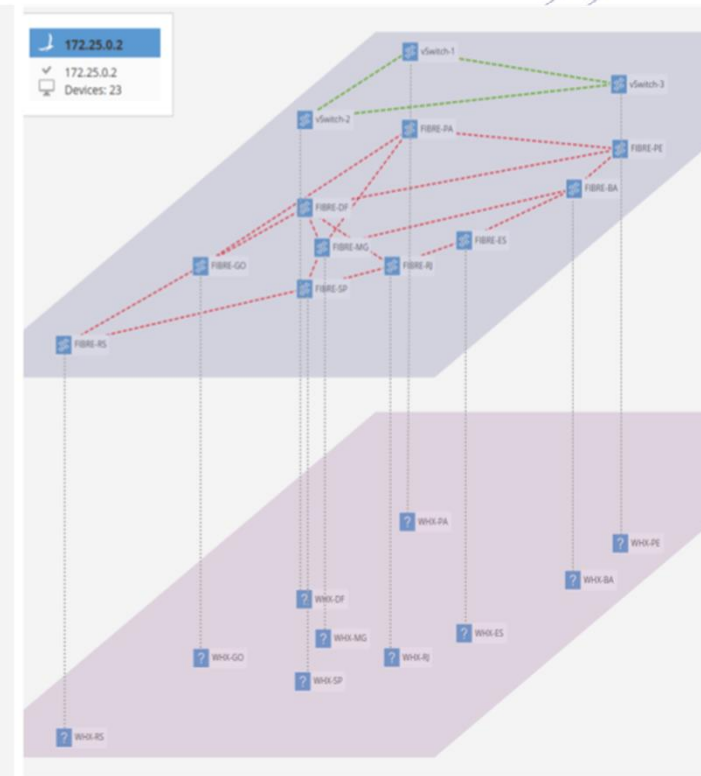
SuperServer 1029U-E1CRT

- **Overlay SDN**

- multi-tenant virtual WAN with guaranteed bandwidth and tunneling to remote sites

- **Edge Cloud**

- VMs, Containers and Baremetal

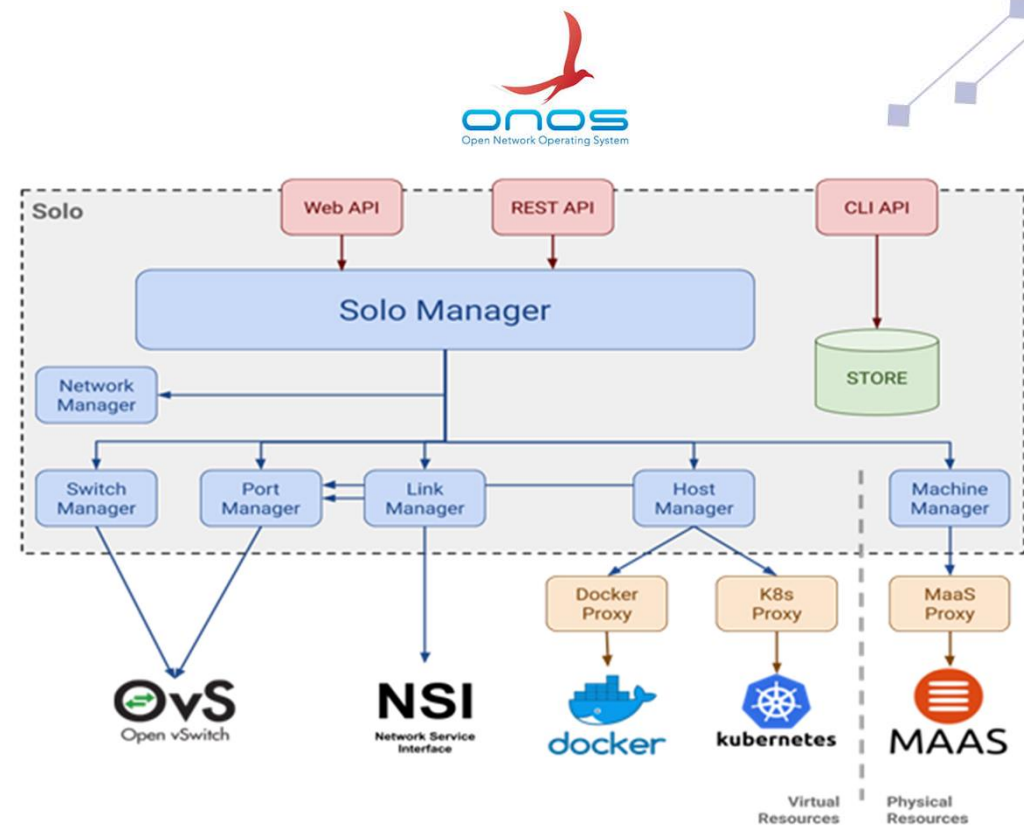


- **Integrates existing orchestrators**

- through a web interface, CLI and Rest APIs
 - Virtual networks: Open vSwitch, NSI
 - Containers: Docker e Kubernetes
 - Baremetal, VMs: MAAS

- **Reuse of ONOS SDN controller as framework**

- developed for 1 ½ year with 2 FTEs
- using agile methodologies
- 50.000 lines of code

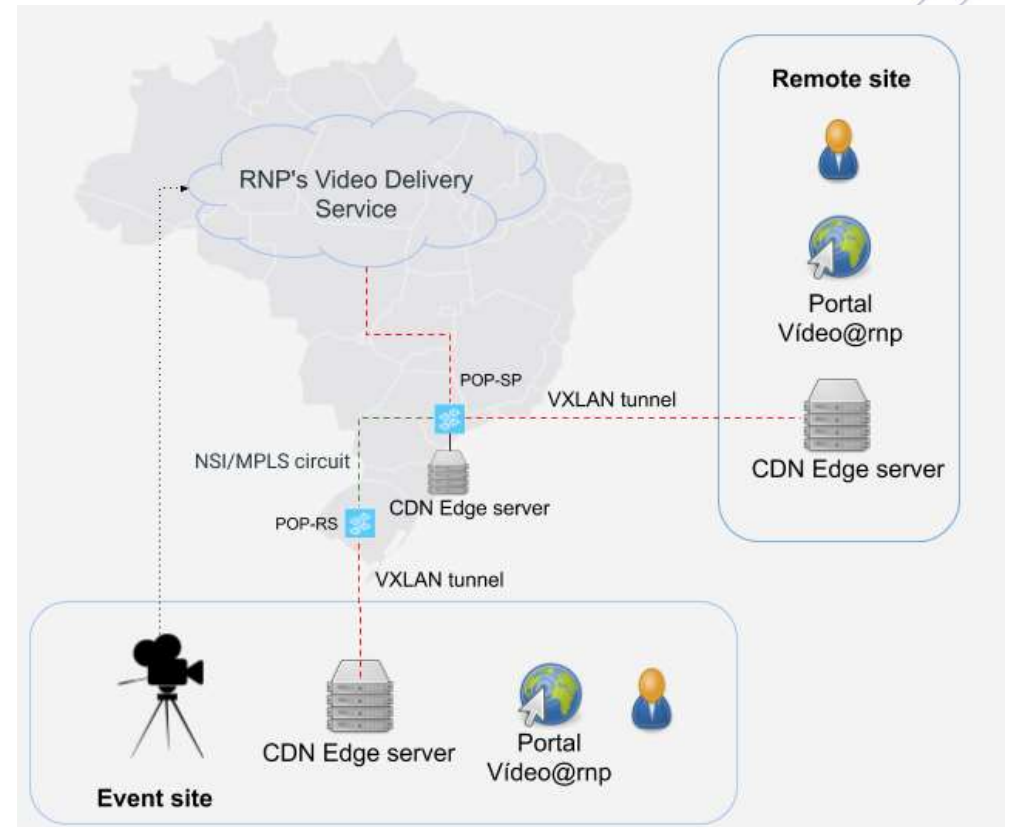


• Scope

- Extend the service control network to remote sites
 - Using SDN, NSI and VXLAN
- On demand deployment of CDN Edge servers
 - Instantiated on the nearest PoP to the user
 - Automatic discovery/registration (via Consul)


• Benefits

- Optimization of resources usage and location
- Seamless integration to existing infrastructure

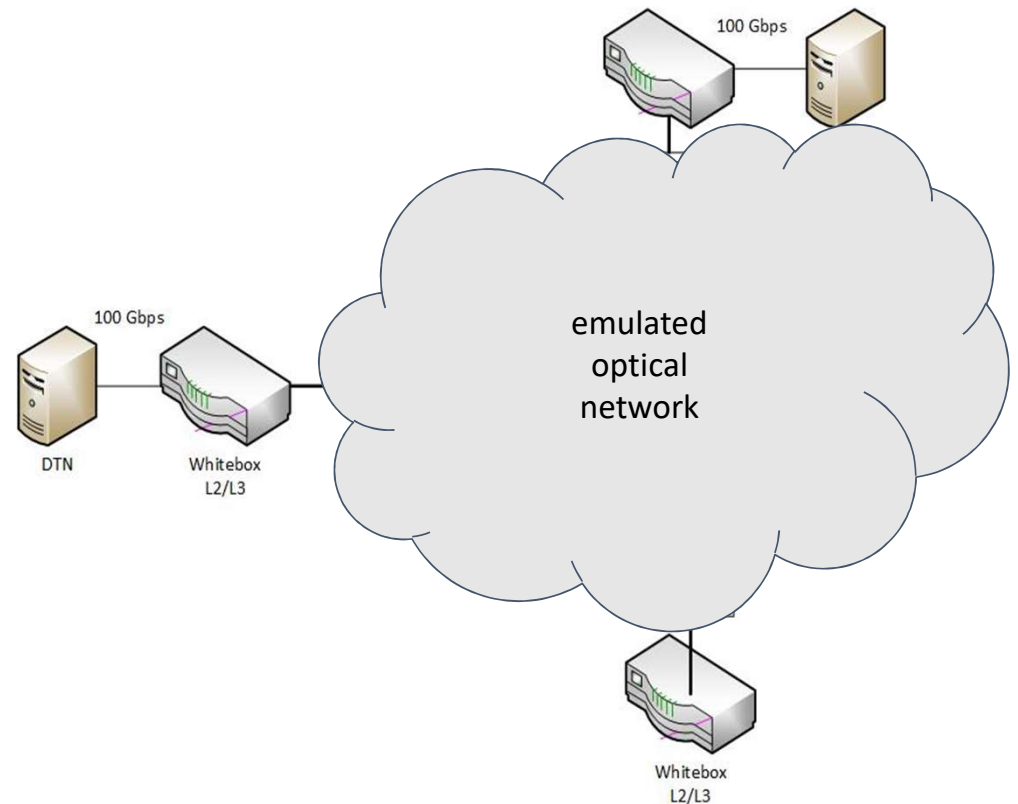


- **provide IT infra as cloud for advanced services and integrated to the public cloud**
- **promote the evolution of PoP's networking services to NFV**
- **offer IaaS, PaaS and SaaS based on open and commercial ecosystems as part of RNP's Innovation Platform to Research Groups and Startups**

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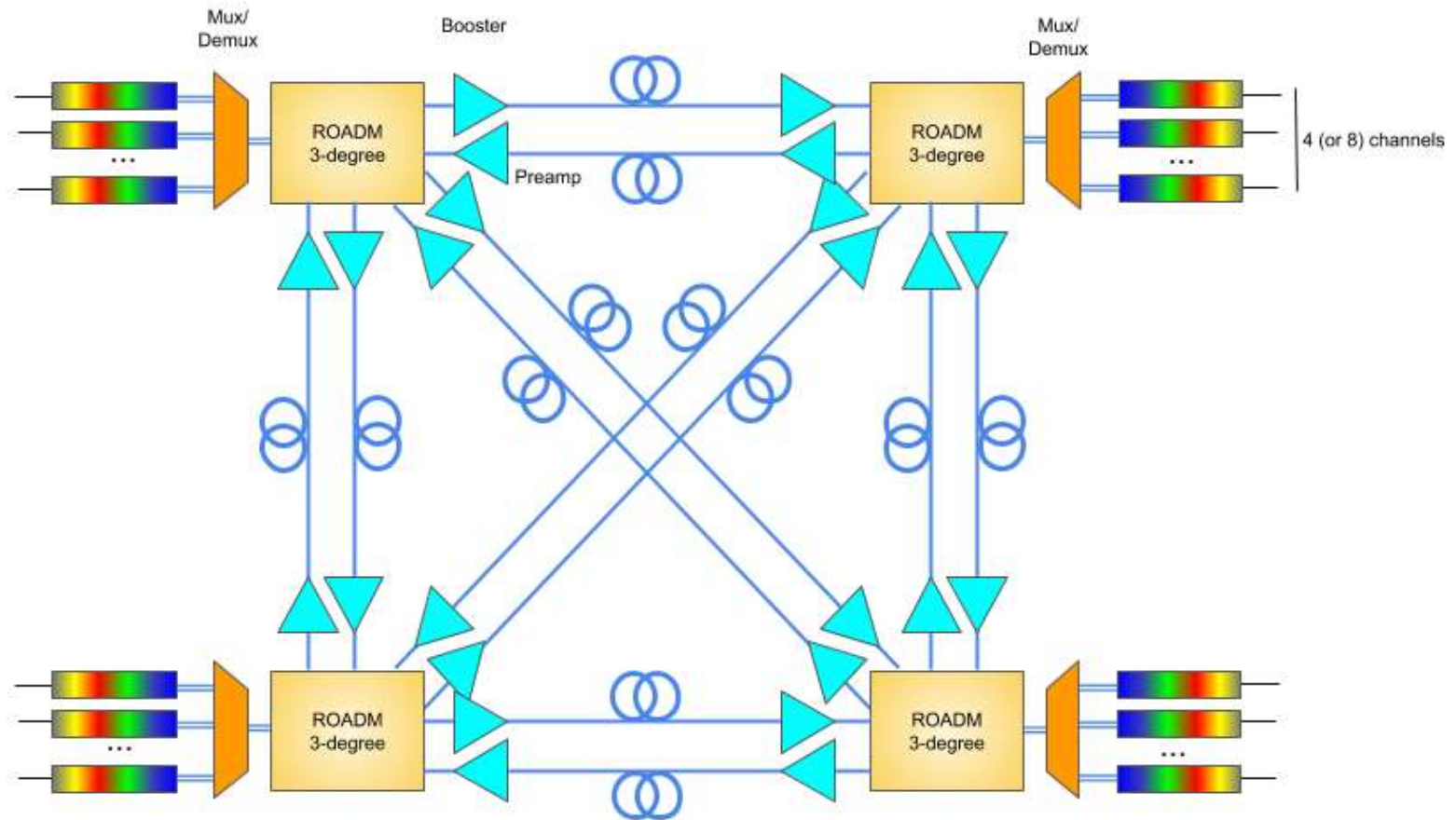
- **R&D project funded by Huawei**  HUAWEI
- **1-year project**
- **main objectives**
 - build an optical networking testbed for remote experimentation with
 - reliable disk-to-disk transfers at 100 Gbps or more
 - optical SDN
 - build an SDN Multilayer solution for integrated control of L2/L3 SDN switches and emulated optical devices
 - build a system for the orchestration of large data transfers in an automatized and elastic transport network

- **L1: gridless CDC ROADMs**
 - based on OSN 9800 from Huawei
 - emulation
- **L2/L3: SDN switches**
 - Juniper/P4Runtime
 - whitebox 100G
 - OVS: Open vSwitch
 - DPDK: Fast Packet Processor
- **100G DTN Nodes**
 - Science DMZ initiative



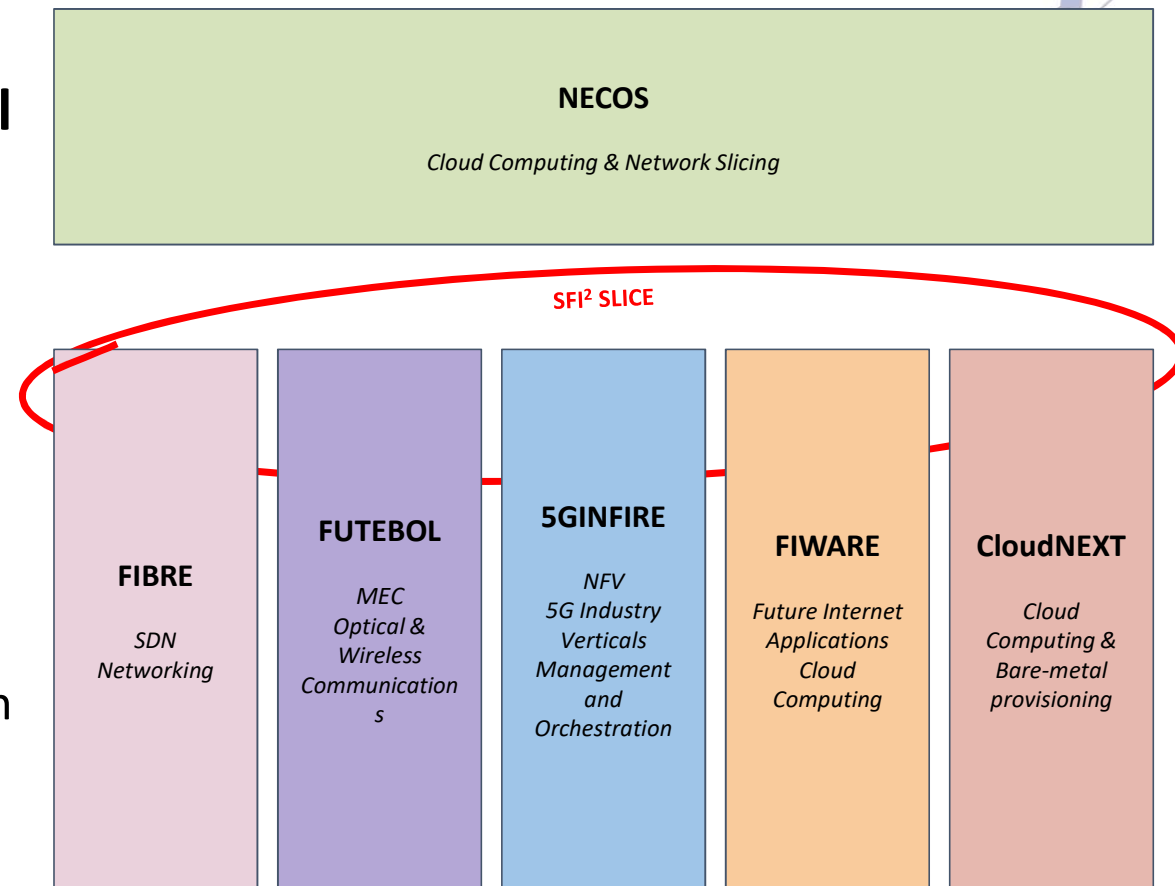
- **proposal in collaboration with CPqD**
- **3 years project**
- **objectives:**
 - deploy and operate an EON testbed with open and disaggregated optical devices
 - foster the research and development of intelligent software for the control and management of optical networks involving optical SDN and SDN multilayer
- **partners**
 - PadTec
 - TIP Brazil

4-nodes testbed



- **multi-vendor**
 - Lumentum, ADVA, EdgeCore, Fujitsu, Ekinops, XenOpt, others
- **to be deployed in the field**
 - metro network
 - backbone
- **flexible enough to allow different kind of experimentations**

- two years project
- integration of distinct experimental facilities deployed across several administrative domains using a standard slice definition
- SFI² aims
 - providing a single multi-domain and slice-based provisioning solution among these testbed infrastructures.
 - simplifying the creation of complex services with a minimum configuration effort based on intelligent orchestration of multi-domain slices





Thank you

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