

FUTURE INTERNET TESTBEDS EXPERIMENTATION BETWEEN BRAZIL AND EUROPE Pilot Use Case n.3 Bandwidth on Demand (BoD) through OpenFlow and GMPLS

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Underlying components

The use-case exploits the flexibility of the **OpenFlow** (OF) and the potentiality of the **FlowVisor**, the **F-PCE** and **OSCARS** components in order to implement an open and generalized Bandwidth on Demand (BoD) service for the OF-enabled devices in the FIBRE infrastructure.

OpenFlow is an open standard interface for remotely controlling the forwarding tables in network switches, routers, and access points. The protocol enables researchers to create more secure default-off networks, wireless networks with smooth handoffs, scalable data center networks, host mobility, etc.

F-PCE is a GMPLS Flow-aware Path Computation Element (PCE), based on the IETF PCE architecture (RFC 4655), used to compute the end-to-end paths inside networks composed of OpenFlow-enabled packet switches and optical devices.

FlowVisor is a special purpose OpenFlow controller that acts as a transparent proxy between OpenFlow switches and multiple OpenFlow controllers, creating "slices" of network resources and delegating control of each slice to a different controller.

OSCARS (On-Demand Secure Circuits and Advance Reservation System) is a software system developed by ESnet, to schedule circuit creation and resource reservation with bandwidth, time and VLAN constraints on high-speed science networks. [http://www.es.net/services/oscars/]

How it works

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An experimenter uses FIBRE's **OCF** (Ofelia Control Framework) to allocate a physical "slice" of OpenFlow resources and virtual machines which can be provided by different FIBRE islands.

An **SDN controller**, based on the NOX OpenFlow framework and enhanced with new components, is able to abstract the physical slice details and to provide high level services, such as topology discovery, path computation and flow-entry creation to the upper layers (i.e. OSCARS).







Architecture Overview



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