EU OFELIA Project Started

OFELIA is a collaborative project within the European Commission's FP7 ICT Work Programme that started in October 2010 and will run until September 2013.

The project will set-up an experimental facility based on OpenFlow technology that allows researchers to not only experiment "on" a test network but to control the network itself precisely and dynamically.

Connected Islands for Multi-layer, Multi-technology Network Experimentation

Five interconnected islands based on OpenFlow infrastructure will be created to allow experimentation on multi-layer and multi -technology networks. The facility will extend all the way from standard Ethernet to optical and wireless transmission and it will also include an emulation wall containing 100 nodes for scalability tests. OFELIA is to provide an experimentation space which allows for flexible integration of test and production traffic by isolating the traffic domains inside the OpenFlow enabled network equipment. This allows for providing realistic test scenarios and for seamless deployment of successfully tested technology.

Open Calls to Invite Experimenters

The OFELIA project will invite experimenters in Europe to bring their use cases and scenarios and to use the OFELIA test facility. Two open calls will be published offering experimenters additional funding from the OFELIA project for conducting their experiments. The first call will be published in Spring 2011.

The OFELIA OpenFlow islands are

- Berlin (TUB) – partial replacement of existing campus network with OF-switches
- Gent (IBBT) – central hub, large-scale emulation
- Zürich (ETH) – connection to OneLab and GENI
- Barcelona (i2CAT) – L2 (NEC) switches and Optical equipment (ROADM ring)
- Essex (UEssex) – national hub for UK optical community; L2 (Extreme) switches, FPGA testbed

Summer School and Workshops

Planning has started for a summer school to take place in 2011 in cooperation with the EU CHANGE project. Details about the workshops will be published soon.

Ofelia is planning to co-organize 2 international workshops on future Internet technologies and research roadmaps during the project runtime: in 2011 and in 2012. Details about the workshops will be published soon.

OpenFlow Islands Control Framework Setup

The OFELIA OpenFlow federation architecture will have its own European identity. Nevertheless, when a federation of testbeds is to be established, interoperability with other testbeds is the primary target. Therefore the project will start with modules developed for the US-based GENI (Global Environment for Network Innovations), but at a later stage extend those by, e.g., support for multiple layers and heterogeneous technologies. The automation of managing resources across interconnected OpenFlow networks is another topic of the project.

In terms of the testbed control framework, it has been decided that the control framework will follow the Slice-based Federation Architecture. In the first deployment of the control framework, where islands will operate isolated from each other, each island will have at least two aggregate managers: one that manages the network of openflow-enabled devices, and another one that manages the virtualization-enabled servers.

A tool called Expedient will be the testbed control framework front-end for both island managers and researchers; the former will use Expedient to assign resources to projects, while the latter will use Expedient to configure, start and stop their slices. The Expedient tool is an ongoing effort lead by a development team at Stanford University that agreed on a joint effort to continue the development of Expedient and its customization for the OFELIA testbed.

Possible Use Cases to be Supported by the OpenFlow Facility

The requirements study and analysis for use cases on the OFELIA experimental facility is ongoing. The following list shows some examples of use cases under discussion:

- Performance testing of a programmable flow processing platform, containing processing modules (IP router, IDS, Firewall) on a wide area network setup using OFELIA architecture.
- Reliability and scalability testing of Openflow enabled networks. Testing methodologies for implementing High performance Datacenters and Access/Aggeration networks using Openflow.
- Energy aware virtual machine (VM) migration between distributed Datacenters, to measure the time and performance of VM migration on Openflow enabled networks using OFELIA architecture.
- UHD (4k, 8k) video transmission over OpenFlow networks to analyse the network performance based on Media aware control applications to be used for the Olympics 2012 demos and games.
- Evaluate and test the functionality of tools and software developed for virtual network control plane and virtualisation mechanisms of layer 2 and layer 1 networks using OFELIA architecture.