

Open Calls

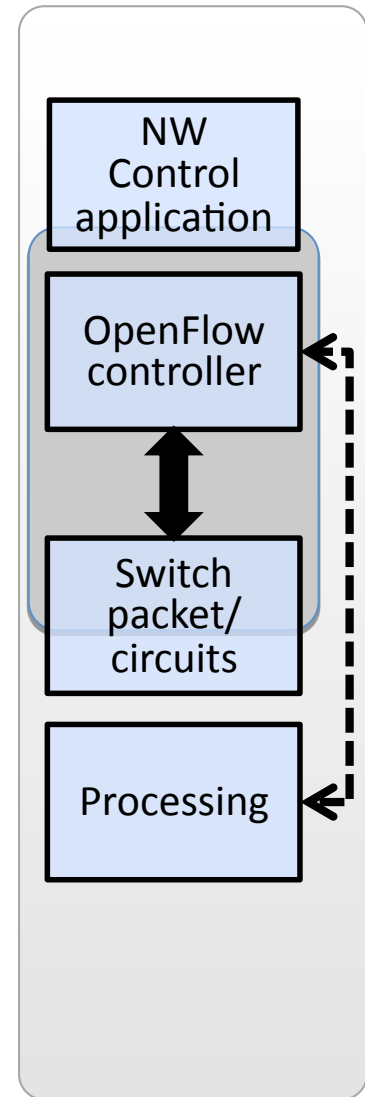
Ofelia Project

What is OpenFlow

- OpenFlow is a standardized interface between switch controller and hardware.
 - Plus some protocol that transports the frames over ssl/tcp
 - Allows flexible control down to individual flows
 - Is protocol agnostic, programmable, scalable
 - Allows deployment & test of new controllers & control apps
- OpenFlow testbeds are underway in the US (GENI) & Japan

Advances beyond state of the art. Priorities w.r.t. scientific challenges.

- OF extensions needed for multi-layer, multi-domain
 - Any domain or layer borders require flow processing; Interface between controller and processing plug-ins needs to be developed & tested
 - Extend filter format description to generic labels (CarrierEther, IPv6, opt. circuits, so-called OF v2.0 (?))
 - non-IP experiments such as content-based addressing
- Multi-domain OpenFlow requires controller/controller communication



Federation of five islands

- Three years project, started Oct 2010
- 5 OpenFlow-enabled islands at academic institutions:
 - Berlin (TUB) – partial replacement of existing campus network with OF-switches
 - Gent (IBBT) – central hub, large-scale emulation
 - Zürich (ETH) – connection to OneLab and GpENI
 - Barcelona (i2CAT) – experience with facility projects (IaaS, DRAGON)
 - Essex (UEssex) – national hub for UK optical community; L2 (Extreme) switches, FPGA testbed
- NEC provides homogeneous L2 hardware platform (OF-enabled Ethernet switches)
- ADVA as major vendor of optical access and data center equipment
- Different external vendors (Juniper, Extreme)
- Explore extensions of OpenFlow towards wireless and optical transmission

Partners with complementary technological strengths and user groups from five countries with strong research communities in networking.



| partner | I2 | I1/ontire | I2 | Wireless | emulation | Control SW | processing | US connections | MM source |
|---------|----|-----------|----|----------|-----------|------------|------------|----------------|-----------|
| iBBT | X | | | | X | | X | | X |
| TUB | X | | | X | | | | | |
| I2cat | X | | X | | | X | | | |
| UEssex | X | X | | | | X | X | | X |
| ETH | X | | | | | | | X | |

Additional partners and European manufacturers will be involved through Open Calls

OFELIA - Operation and extension of the facility.

From isolated islands to centralized resource management — two phases of open calls.

Timeframe of project phases

Operation of the individual islands, one partner per island has the lead

- Phase i: OF controllers and switches in place, first local experiments concluded
- Phase ii: Connect islands and extend OF experimentation to wireless and optics
- Phase iii: Automate resource assignment and provide connections to other FIRE and non-European research facilities

Gradual expansion of early operative facility

Open Calls to extend facility & consortium will be published after M6 & M18

- Total budget €830,000 max. 200 K€ funding per experiment

Promotion/ implementation of open calls

Open Calls will be promoted through www.fp7-ofelia.eu and

- FIRE Station
- Standard communication channels (mailing lists, IEEE ComMag)
- Industry fora: Metro Ethernet Forum, Optical Internetworking Forum, Open Grid Forum

i: Create islands on L2

ii: Connect islands and extend to wireless/optics

iii: Ressource assignment automization and connection to other facilities

▲ M6

▲ M18

What will be available for experimentation?

- Single islands only
 - Interconnected by OpenVPN tunnels (best effort)
 - IBBT virtual wall + 4 regular (NEC-based) islands
 - Expedient, Aggregate Manager, Flowvisor, NOX
 - SFA-based reservation and access
- Islands are autonomous, but authenticate users against single database (local replicas)
- Slicing based on MAC addresses,
 - Ethertype, VLAN, IP address, ports are available for experimentation

What proposals for extensions does OFELIA expect from the Open Calls?

- Extension of the facility regarding
 - Geographical reach
 - Federation with other SFA-used facilities
 - Resource description
 - Measurement and evaluation
 - Support software for openness
 - Network applications
 - Addressing schemes, (CCN, IPv6)
 - Experimental extensions of OpenFlow interface
 - Multilayer extensions and optical transport networks
 - Extension towards separate Processing interface
 - Extension to NOX (for public use)

Thank You.

