

The OpenDaylight Open Source Project

Sergio Najib Arrouibi Braojos



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About OpenDaylight

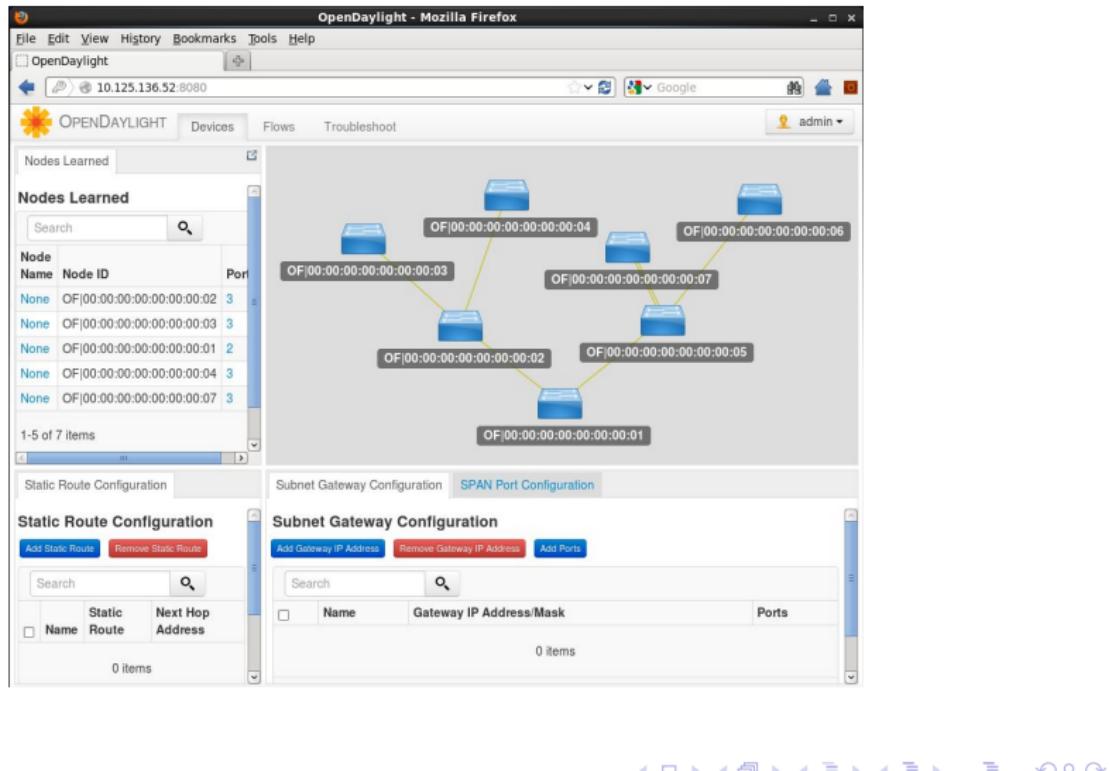
- FLOSS SDN Controller
- SDN/NFV: Next big Networking industry revolution
- Started in April 8, 2013
- Hosted by Linux Foundation
- Cisco, Ericsson, Juniper, IBM, HP, Microsoft, Red Hat, Dell, Citrix, Brocade
- Two releases: Hydrogen, Helium

About SDN

- Separate Networking Control Logic from Networking Hardware
- Homogenize Networking Resources Administration
- Opex Reduction
- Based on OpenFlow protocol
- SDN Architecture:
 - Open Standards/Vendor-Neutral
 - Directly Programmable
 - Agile
 - Centrally Managed
 - Programmatically Configured
- OpenDaylight SDN Controller: Manage network devices through OpenFlow

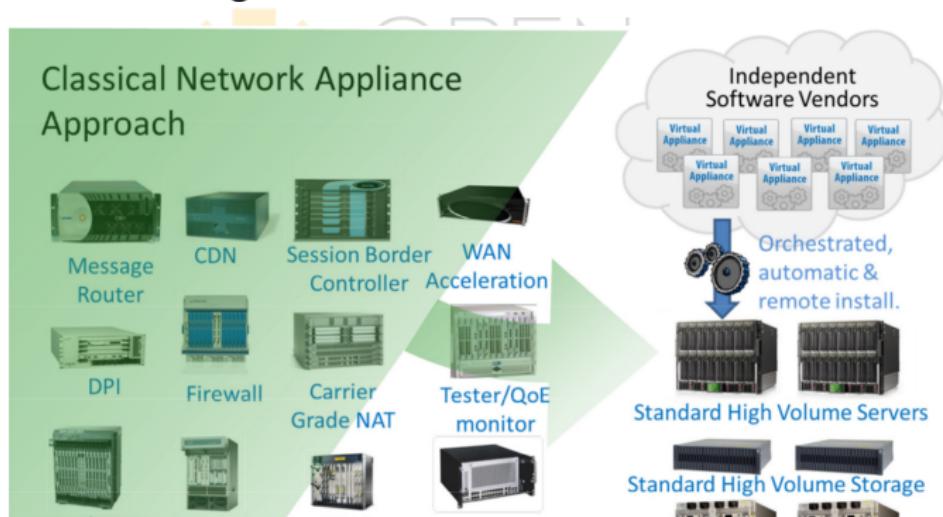


OpenDaylight: SDN Controller



About NFV

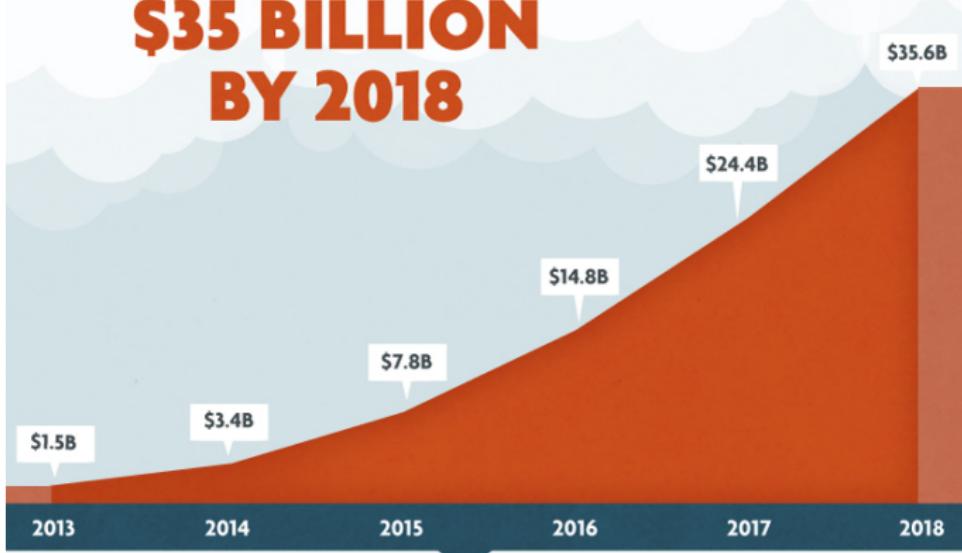
- Network Functions Virtualization (Network as Utility)
- Capex Reduction
- Hardware Homogenization: Commodity Fragmentation to:
 - Standard High Volume Servers
 - Standard High Volume Storage
 - Standard High Volume Ethernet Switches



SDN Market Estimations

HOW BIG IS THE SDN MARKET?

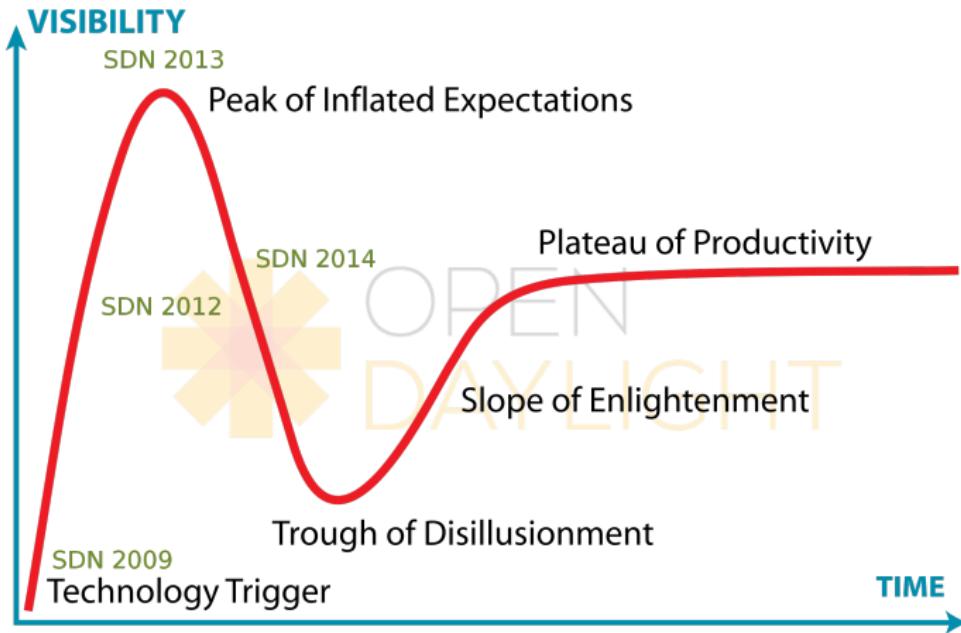
**\$35 BILLION
BY 2018**



Economic Aspects I

- Beginning of 2013:
 - Big Expectations Market
 - Big Impact on Networking Industry
- Late 2014:
 - SDN/NFV: Open Technology, but complicated to implement
 - Hardware Investment is needed
 - Downward Corrections:
 - Optimistic: \$8.0B by 2018
 - Pessimistic: \$3.6B by 2019
 - 2014: Hype Cycle: Towards Trough of Disillusionment

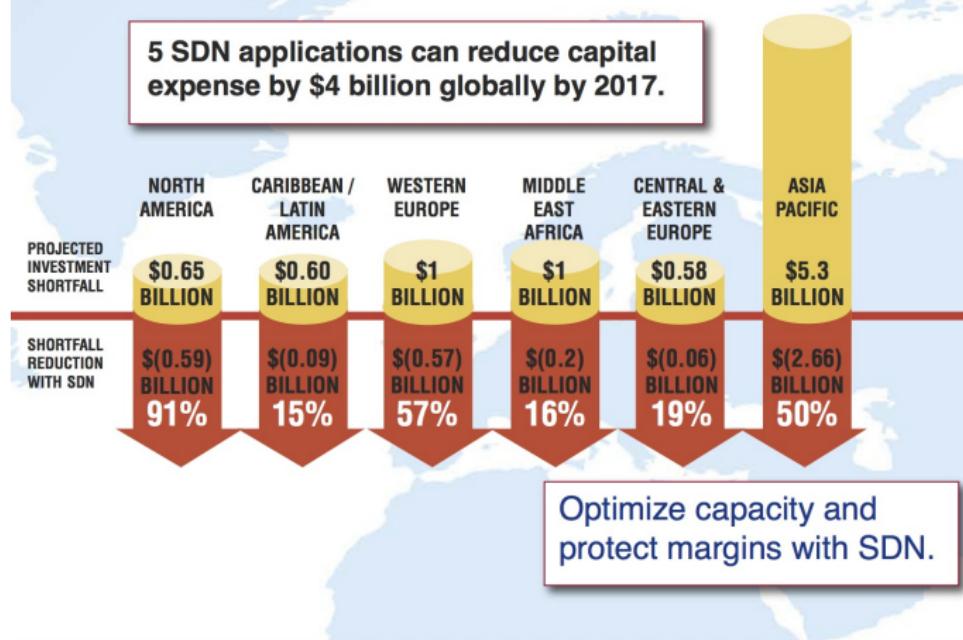
Economic Aspects II



Economic Aspects III

SDN cuts mobile backhaul CapEx

5 SDN applications can reduce capital expense by \$4 billion globally by 2017.



Economic Aspects IV

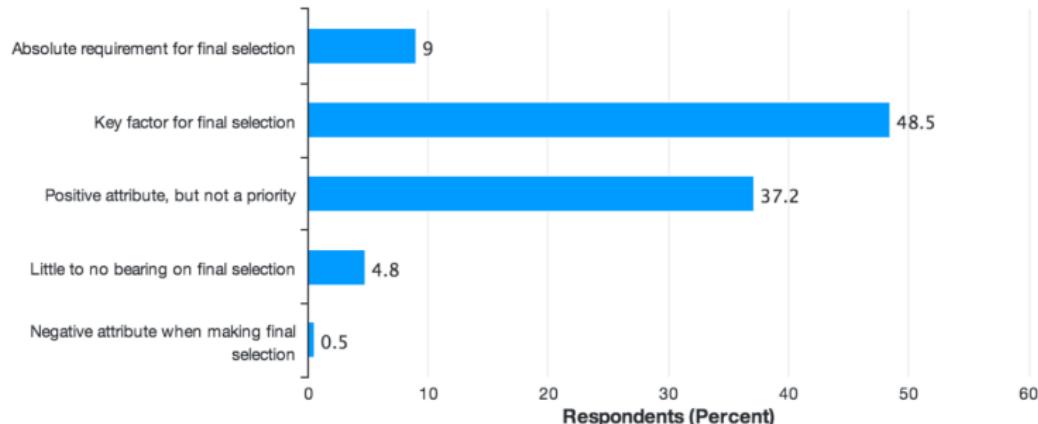
SDN cuts mobile backhaul OpEx

5 SDN applications can reduce operating expense by \$9 billion globally by 2017.



Economic Aspects V

Open source and SDN/NFV - a requirements analysis



<http://research.gigaom.com/>

GIGAOM RESEARCH

License

- EPLv1.0:
 - Open Source License, recognized by OSI and FSF
 - GPL incompatible
 - Weak Copyleft License: Distribution of object code can be done under other license agreement
 - Reasons from OpenDaylight to use EPLv1.0:
 - FLOSS
 - Java-based project
 - 3rd party libraries compatibility (Maven, OpenVSwitch, OpenFlow Java)
 - Avoid licensing fragmentation

Bylaws

- Name, Purposes, Oficces
- Members, Actions of Members
- Directors, Committees, Officers
- Notices, Indemnification
- Books and Records
- Transactions, Grants, Contracts and Loans
- General provisions
- Antitrust, Competition and Availability of Intellectual Property
- Ammendments



Governance: TSC

- Technical Steering Committee
- Define Guiding Principles (Open, Visible, Transparent, Collaborative, Ethic)
- No say in Technical issues
- Governance Evolution
- Operations (Development Process)
- Project Roles:
 - Committers
 - Project Leads
 - Contributors

Governance: Board of Directors

- Set overall project policy
- Describe aggregate scope of projects
- Drive a technical vision and direction
- Define a release guidance to TSC
- Executive Director: Neela Jacques
- Platinum Members representatives: Cisco, Citrix, Red Hat, Brocade, Ericsson, IBM, HP, ...

Communication Channels And Tools

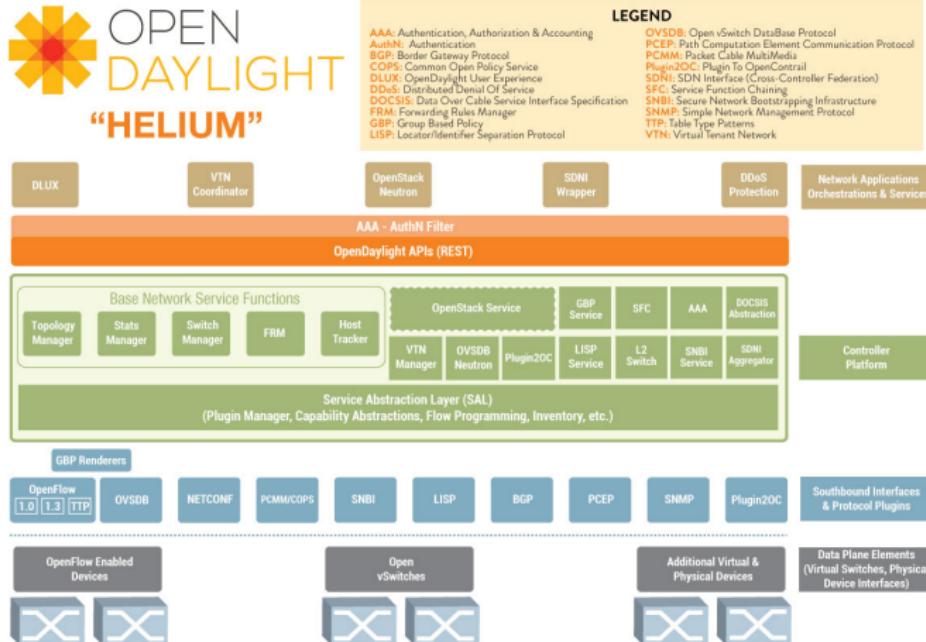
- Communication Channels:
 - Social media: Twitter, Facebook, Google+, Youtube, LinkedIn
 - IRC Channel
 - Mail Lists
 - Blogs
- Community Tools:
 - Wiki
 - Ask (Q&A)
 - Identity Server
 - Bugzilla
 - Jenkins
 - Gerrit
 - Nexus
 - Sonar



Community Building

- Main Events:
 - OpenDaylight Summit: Santa Clara, 2014. 50 speakers, 600 attendees
 - HackFests: Focus on new community members, bugfix coaching sessions
 - Developer Design Forums: Networking, future releases, ...
 - Other Events: OpenDaylight also in events such as OpenStack Summit, Paris 2014
- Community Programs and User Groups:
 - Summer Internship Program: Five student interns in Summer 2014
 - Ambassador Program: OpenDaylight experts members to extend Marketing World Wide
 - User Groups: Regional, self organized groups. Hackatons, social events, etc. Canada, Germany, for instance.

Technical Architecture

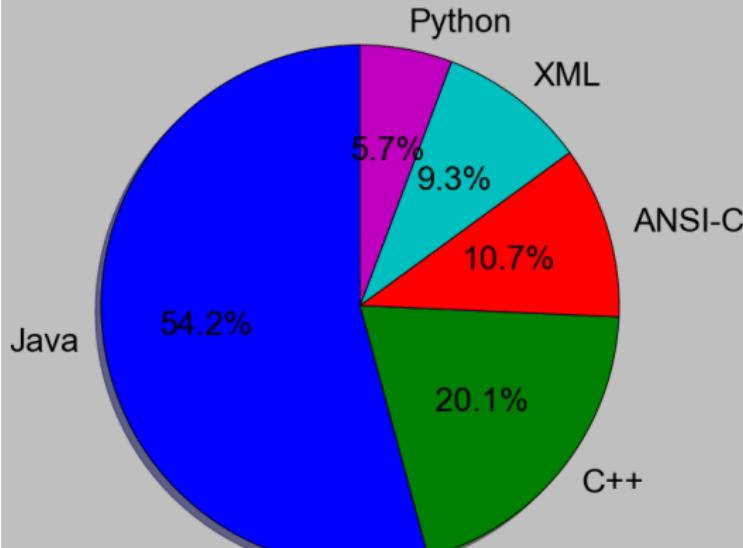


OpenDaylight Projects

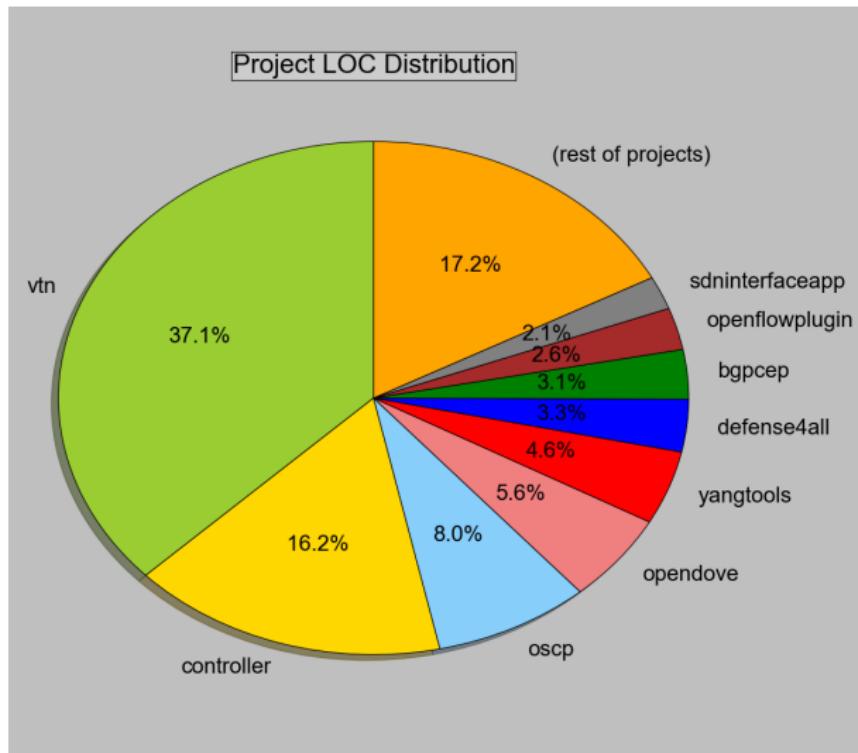
- 24 projects in OpenDaylight Helium release
- Main Project: Controller
- NorthBound APIs: VTN, OpenStack Neutron Interface, etc.
- Controller Platform: AAA, Stats, Topology, SFC, DOCSIS, OVSDB, ... (REST to NB, SAL to SB)
- SouthBound APIs and Protocols (OpenFlow, NETCONF, PCEP, LISP, PCMM/COPS, ...)

Source Code I

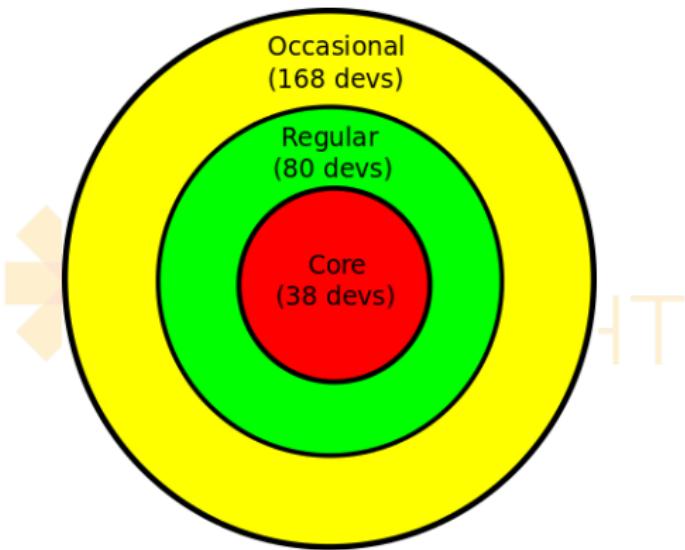
Programming Language Distribution



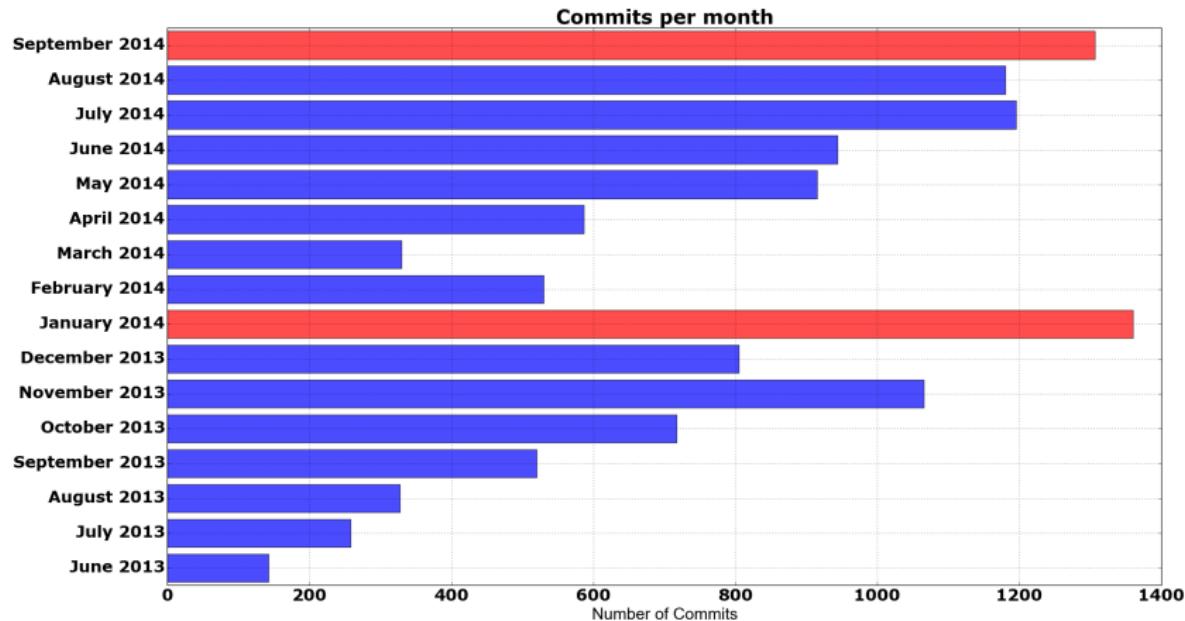
Source Code II



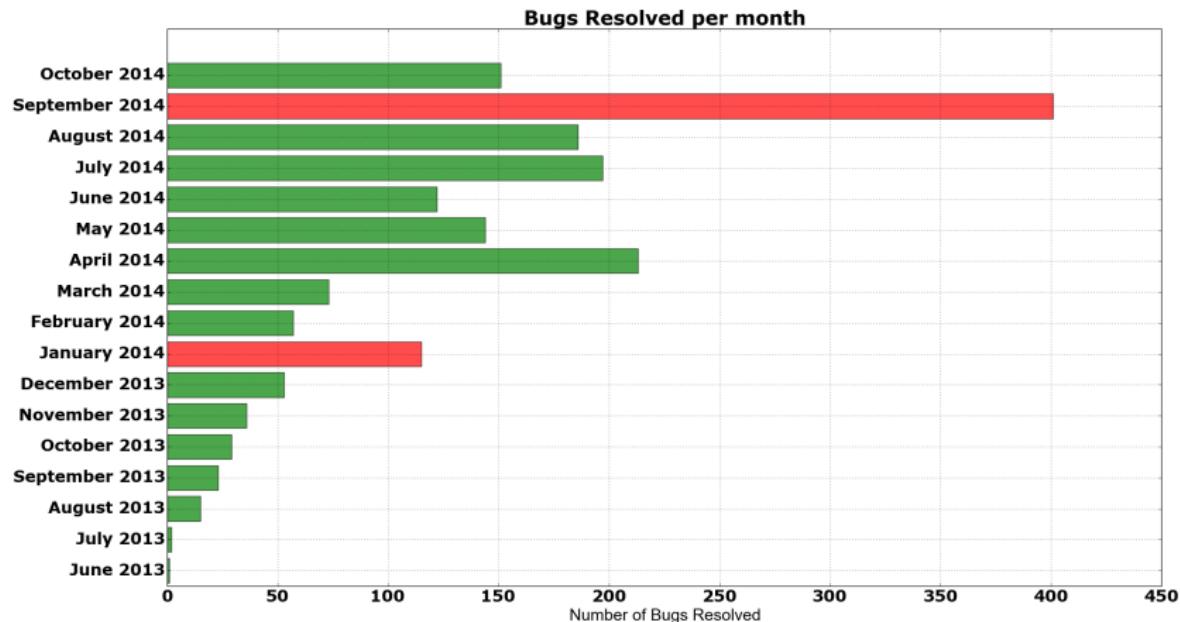
Project Evaluation I



Project Evaluation II

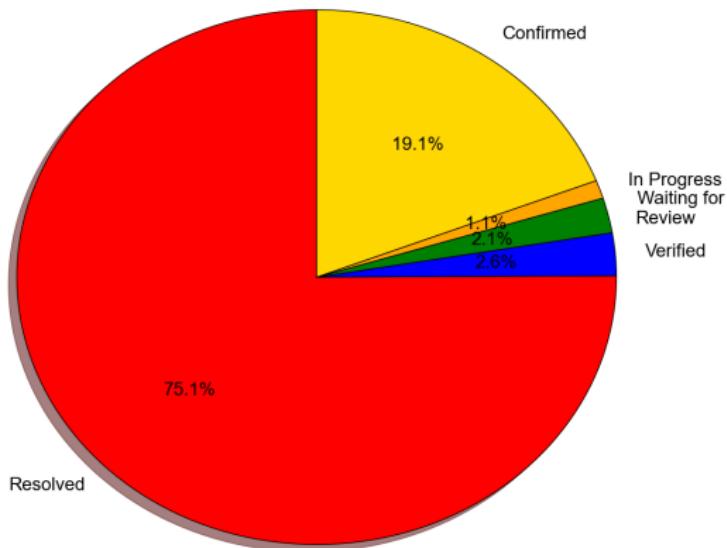


Project Evaluation III

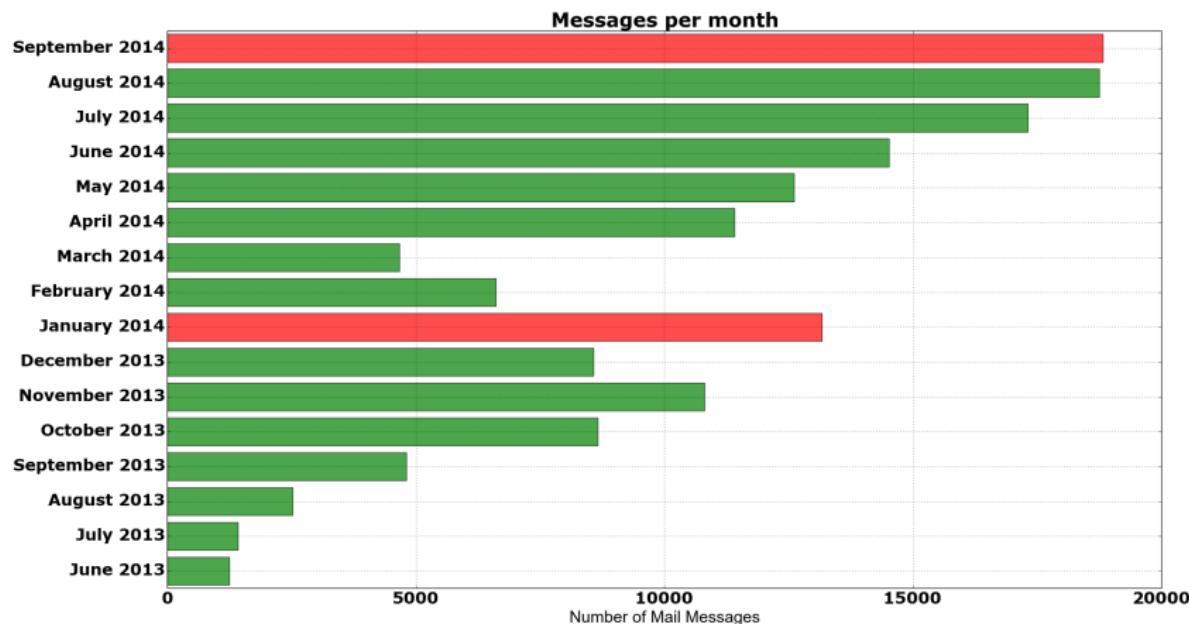


Project Evaluation IV

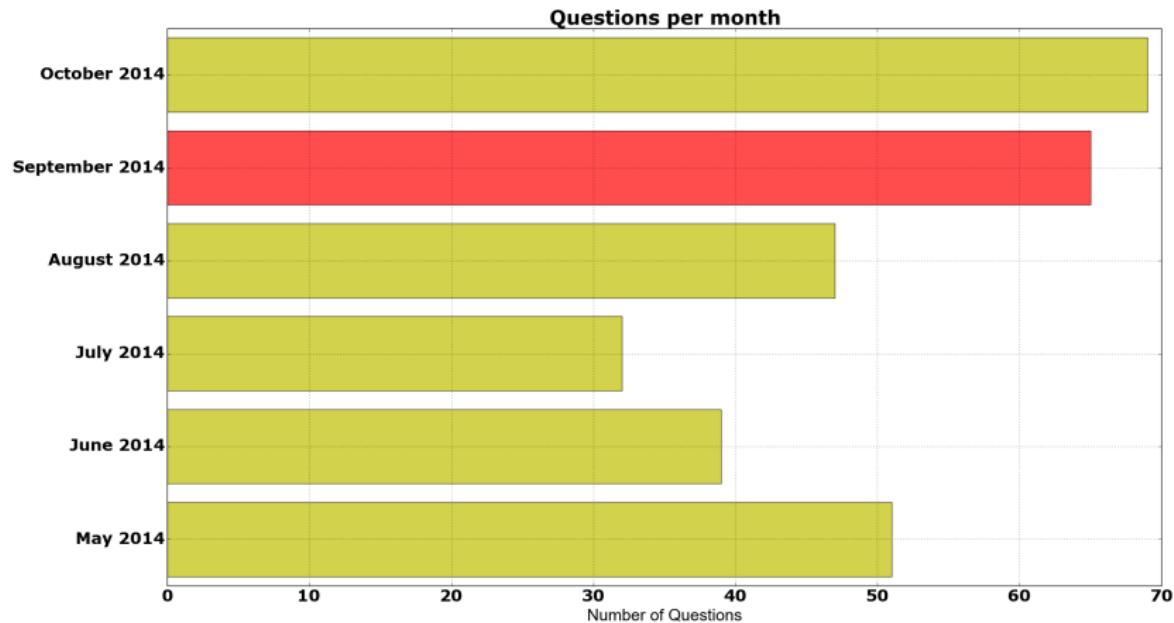
Bug Status Distribution



Project Evaluation V



Project Evaluation VI



Conclusions And Future Work

Conclusions:

- MSWL applied to a particular FLOSS project, OpenDaylight in this case
- FLOSS/Open as best option to start collaborating around incipient technologies
- FLOSS as the most desirable option by customers
- FLOSS projects: better to be evaluated

Future Work:

- Spread Any of the Knowledge in different OpenDaylight Open Source Project aspects
- Apply this study to a similar project in incipient technology (e.g.: OPNFV)