Charter: Extensibility Working Group

The OpenFlow™ switch protocol is a crucial element of the SDN architecture. SDN is still evolving rapidly, as people develop more SDN products and those get deployed. The roadmap of the OpenFlow switch protocol is periodically redefined to take best advantage of the latest innovation and to best promote its adoption.

This document details the roadmap of the OpenFlow switch protocol for 2013 and what key contributions will be developed by the Extensibility Working Group. As such, it constitutes the new charter for Extensibility, and applies through the approval of version 1.5 or January 2014—whichever comes first. At that point, a new charter will be required for the WG to continue.

HISTORY

Version 1.0 of the switch protocol is still the most deployed version, despite having been released three years ago. It is simple to implement, and has a great set of source code and tools.

Version 1.1 of the protocol introduced a new pipeline model, but this broke backward compatibility. Since then, the Extensibility WG has worked very hard to bridge the distance between the protocol and actual implementations and deployments, and it released versions 1.2 and 1.3 to close the gap. The newer version of the protocol includes many features of existing deployments (such as OXM, IPv6, multi-controller support, rate-limiters, tunnels as logical ports). Feedback from implementers helped correct a lot of problems and ambiguities in the protocol, and made it easier to implement.

In spring 2012, the ONF Board decided to pause the specification of new features. The WG took this opportunity to consolidate existing protocol versions, releasing versions 1.0.1 and 1.3.1 that clarify and fix, respectively, 1.0 and 1.3.0.

By fall 2012, the four main software implementations of the OpenFlow Standard have a version that supports 1.3, and can be considered to have caught up with the current state of the OpenFlow switch specification.

GOALS

The main goal of the OpenFlow switch protocol is to be a flexible framework that enables a remote entity to control packet forwarding in a network device. An important goal of the Extensibility WG is to address the needs of OpenFlow deployments.

The OpenFlow switch protocol tries to address all kinds of network devices and network applications. This creates a tension as those devices and applications have different needs. Addressing both hardware and software devices is particularly problematic. Hardware devices have slow and expensive deployment, and value stability. Software devices are cheap and rapid to deploy, and value rapid innovation and a large feature set.

A new goal for the Extensibility WG is to prototype every new feature added to the protocol. A process has been created for prototyping. This is a new task that increases the workload and therefore adds a lot of uncertainty in the schedule. This new process may cause the WG to miss the dates put forward in this roadmap.
EXTENSIBILITY WG ROADMAP FOR 2013

These are the things the Extensibility WG will work on:

- OpenFlow 1.3.X: long term support
- ONF extensions for 1.3.X: new features
- OpenFlow 1.4: extensibility, incremental improvements
- OpenFlow 1.0.X: no further work.

OPENFLOW 1.3.X

The ONF Board decided that version 1.3.X should be a stable version that hardware vendors should target. To help this, the Extensibility WG will provide long-term support for this protocol version.

New versions of 1.3.X may be released as needed, including only clarification and obvious bug fixes – no new features. The first release would be 1.3.2, following up 1.3.1. The criteria for changes will be very strict, and the WG will try its best to avoid any hardware changes.

The release schedule will be based on the feedback from implementation and deployment. When enough changes are identified, a new version will be released. Currently there is not enough material to warrant a new release.

ONF EXTENSIONS FOR 1.3.X

The OpenFlow protocol has a built-in mechanism for extensions. Specific experimenter extension APIs are provided in the protocol so that third parties can add new features to the protocol without making any changes to the base protocol, and without losing protocol interoperability. For example, one can define new messages, match fields, or actions. A namespace is provided so that any ONF member can define private extensions. ONF encourages its members to define private extensions.

In addition, the Extensibility WG has defined a process to specify and publish ONF Extensions for 1.3.X. The ONF Extensions will be independent pieces of specification adding new features to the OpenFlow Standard through the existing OpenFlow Standard experimenter extension mechanism. Those features will be validated through the standard review process of the Extensibility WG, including prototyping. ONF will conduct the final approval of these ONF Extensions and the IPR verification through the usual process.

ONF Extensions will be released as bundles every three months. Each bundle will contain the set of ONF Extensions approved by the ONF for that quarter and will contain unrelated extensions. The first set of Extensions is planned to be published around April 2013.

OPENFLOW 1.4.0 & 1.5.0

The Extensibility WG will work on new versions of the OpenFlow switch specification. As with previous releases, the new versions will include incremental changes and new features. The first release would be 1.4.0, based on 1.3.0, followed by 1.5.0.

The focus of the new switch specification versions is to improve the extensibility API of the base specification, so that a greater set of extensions are possible. The new versions will also include changes to the protocol that cannot be done as extensions, mostly changes to functionality already part of the specification. Those changes will be validated through the standard review process of the Extensibility WG, including prototyping.
The new versions of the switch specification will also contain new features. Those new features will be added via merging a set of previously approved ONF extensions into the core protocol. Merging those extensions has many benefits. It allows other extensions to build on top of those merged features, and it allows more precise specification of feature interactions.

Version 1.4 is planned to be released around June 2013. Initial thinking is that version 1.5 could be released 6 months after version 1.4.

**OPENFLOW 1.0.X**

OpenFlow 1.0.X will no longer be supported by the Extensibility WG. The reason is that there are very few issues reported and most implementers are currently focused on version 1.3. ONF is encouraging implementation of versions 1.3 and beyond.

No new errata of 1.0 will be created, so the final version will remain 1.0.1.