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Charter: Architecture and Framework Working Group

The complexity and scale of network services have increased over time and continue to evolve. This has placed tremendous stress on existing mechanisms (which are primarily distributed protocols) to achieve service guarantees and implement new service features while maintaining operational simplicity. Hence the need to move towards a more programmatic Management, Control, and Data plane - broadly called Software-Defined Networking (SDN) - to help address these challenges. In the SDN architecture, the control and data planes are decoupled, network intelligence and state are logically centralized, and the underlying network infrastructure is abstracted from the applications. As a result, network operators gain programmability, automation, and network control, enabling them to build highly scalable, flexible networks that readily adapt to changing business needs. The mission of ONF is to help solve real world networking challenges using software-defined networks.

To help standardize SDN, the Architecture and Framework working group (WG) has been formed within ONF. The framework will define the broad set of problems that the SDN architecture needs to address. The architecture will define the functional breakdown into subcomponents that together address the broad set of problems outlined in the framework.

1. Framework document (timeline: see below)
    a. Define the broad problem(s) that need to be solved and why these need to be solved, referencing and incorporating material on use cases from the Market and Education working group.
    b. Define the requirements for the architecture (specifically in the areas of applicability, scalability, features, and fault tolerance).
    c. Define what is in scope and out of scope (such as whether OF controller-to-controller communication is in scope or out of scope).
    d. Define the terminology for SDN.

2. Architecture Document (timeline: see below)
    a. Define an architecture that solves the problems outlined in the framework document and is flexible enough to address evolving needs.
    b. It is expected that the WG would survey existing architectural options such as Onix, perform a gap analysis to determine the appropriate option, and potentially pick an existing or entirely new solution.
    c. For the solution, provide the functional breakdown into different sub-components of the architecture and their respective roles/responsibilities/interfaces with each other.
    d. Define the interface to external components where applicable (this could include a description of classes of Northbound APIs).
    e. Terminology: Define the list of terms for the architecture to serve as a common language.
    f. The architecture should partition functions into forwarding plane, control plane, management plane and potentially others (such as Transport, Services and other planes) to provide easier mapping to existing protocols where possible.
    g. The architecture should state how it would interoperate with existing networks (where applicable) - including existing routing protocols and OA&M.
    h. The architecture should articulate the common principles for Protection and Restoration in the network.
    i. The architecture should state which part of the architecture should be standardized and which parts should not (with appropriate rationale).
    j. The architecture should clearly articulate any assumptions of reachability/discovery (if any) it makes on the infrastructure and interactions with those infrastructure entities.

Note: Detailed protocol specification would be outside the purview of this WG and should be done in other new or existing WGs.

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PROCESS

A design team will be formed to accelerate the output of this WG. The process for selecting the leadership and membership of the design team will be outlined by the ONF Executive Director and the ONF Board. The goal of the design team will be to produce the framework and the architecture documents. These documents will then be reviewed by this WG. Based on the feedback from the WG, the relevant specs will be updated. It is expected that the design team produces documents at least a month before they need to be submitted to the ONF Board so they can be adequately reviewed by the WG. The design team is expected to invest significant time over the course of three months to produce initial drafts of the framework and architecture documents.

GOALS AND MILESTONES

October 2012: Submit Framework 0.5 and Architecture 0.5 documents to the ONF Board. These should include the broad problems that need to be solved, the scope of ONF, the critical terminology, and the basic architectural components we will flesh out further.

Feb 2013: Submit Framework 1.0 document to the Board.

December 2012: Submit Architecture 0.6 document to the Board, focusing on 2a., 2b., and 2e.

April 2013: Submit Architecture 0.7 document to the Board, focusing on 2.c and 2d.

July 2013: Submit Architecture 1.0 document to the Board.