Assignment No: 02

Assignment Name: OpenFlow Switch protocols

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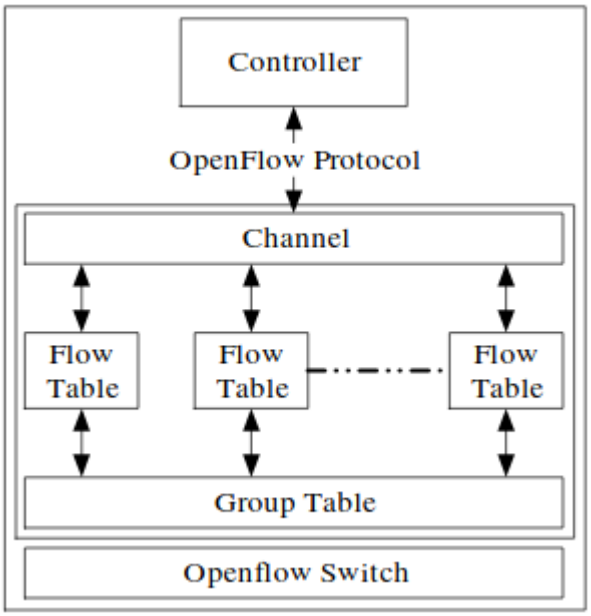
Theory:

OpenFlow is a promising and promoted protocol, available as open source for enabling SDN in real application scenario .OpenFlow normally required for the implementation of SDN scenario; it is fully supported in hardware and software. It is available for researchers, communities and industrial developers.Open Flow separates the programming of network device from underlying hardware, and offers a standardized way of delivering a centralized, programmable network that can quickly adapt to changing network requirements. It can be utilized the present software and hardware to develop new protocols for SDN scenario after development. It can also be analyzed for performance. OpenFlow becomes an important protocol of SDN that is globally commercialized with accessible routers and switches as well.

Overview of OpenFlow Design :



It is enabled between the controller and switches that maintain a table on every switch. The table contains the “match and action” entry that is essential to examine at the traffic flow. Furthermore, in the case of failure of any matching entry, the controller can be determined by the action upon that failure match entry to make a suitable decision. OpenFlow packet processing deals with various packet processing towards the Ethernet or IP. While it is implemented in its design, therefore OpenFlow packet processing can be done by hardware design.

OpenFlow Packet Processing :

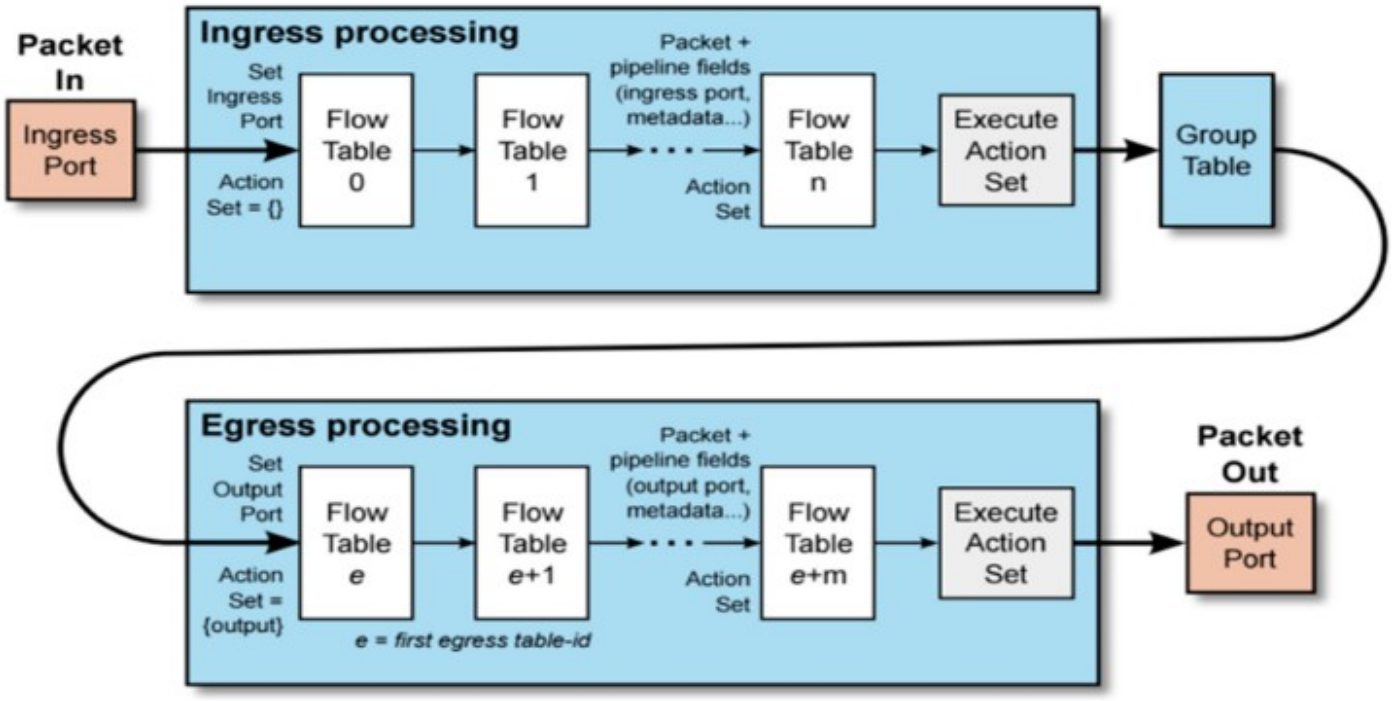


Figure shows the whole process of packet forwarding in OpenFlow. In general, the process of reaching packets tested by compared to a flow table. In the broad view, the table is contained “match and action” sequence having n terms. The unique match options, such as: in_port, dl_src, dl_dst, dl_vlan, dl_type, nw_proto, nw_src, nw_dst, tp_src, tp_dst. dl_are referred to the data link layer, nw_ is referred to the network layer, tp_ is referred to the transport layer.

The OpenFlow Protocol

Open Flow protocol defines the communication between an Open Flow controller and an Open Flow switches. This protocol is what most uniquely identifies OpenFlow technology. At its essence, the protocol consists of a set of messages that are sent from the controller to the switch and a corresponding set of messages that are sent in the opposite direction. The messages, collectively, allow the controller to program the switch so as to allow fine-grained control over the switching of user traffic. The most basic programming defines, modifies and deletes flows. The endpoints may be defined as IP address-TCP/UDP port pairs, VLAN endpoints, layer three tunnel endpoints, and input port among other things. One set of rules describes the forwarding actions that the device should take for all packets belonging to that flow. When the controller defines a flow, it is providing the switch with the information it needs to know how to treat incoming packets that match that flow. The possibilities for treatment have grown more complex as the OpenFlow protocol has evolved, but the most basic prescriptions for treatment of an incoming packet are denoted by paths A, B, and C in Fig. These three options are to forward the packet out one or more output ports, drop the packet, or pass the packet to the controller for exception handling.

The OpenFlow protocol has evolved significantly with each version of OpenFlow, so we will cover the detailed messages of the protocol in the version-specific sections that follow. The specification has evolved from development point release 0.2.0 on March 28, 2008 through release V.1.5.0, released in 2014. Numerous point releases over the intervening years have addressed problems with earlier releases and added incremental functionality. OpenFlow was viewed primarily as an experimental platform in its early years. As such, there was little concern on the part of the development community advancing this standard to provide for interoperability between releases. As OpenFlow began to see more widespread commercial deployment, backward has become an increasingly important issue. There are many features, however, that were introduced in earlier versions of OpenFlow that are no longer present in the current version. Since the goal of this chapter is to provide a roadmap to understanding OpenFlow as it exists today, we will take a hybrid approach of covering the major releases that have occurred since V.1.0. We focus on those key components of each release that became the basis for the advances in subsequent releases and do not focus on functionality in earlier releases that has been subsumed by new features in subsequent releases.

Conclusion:

Open Flow is a programmable network protocol for SDN environment, which is used for communication between Open Flow switches and controllers. Open Flow separates the programming of network device from underlying hardware, and offers a standardized way of delivering a centralized, programmable network that can quickly adapt to changing network requirements.Providing an efficient, vendor-independent approach to managing complex networks with dynamic demands, it is likely to become commonplace in large carrier networks.SDN (Software-Defined Networking) technology is generating huge interest in networking industry due to its ability to add higher agility and scalability for networks.