

Mawlana Bhashani Science and Technology University

Department of Information and Communication Technology

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Course Title: Telecommunication Engineering

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Assignment Name: Controller REST API.

Assignment No: 03

Controller:

A controller is responsible for controlling the way that a user interacts with an application. A controller contains the flow control logic for an  application. A controller determines what response to send back to a user when a user makes a browser request.

REST:

Representational state transfer (REST) is a software architectural style that defines a set of constraints to be used for creating Web services. Web services that conform to the REST architectural style, called RESTful Web services, provide interoperability between computer systems on the internet.

REST, or representational State Transfer, is an architectural style for providing standards between computer systems on the web, making it easier for systems to communicate with each other. REST-compliant systems, often called RESTful systems, are characterized by how they are stateless and separate the concerns of client and server. We will go into what these terms mean and why they are beneficial characteristics for services on the Web.

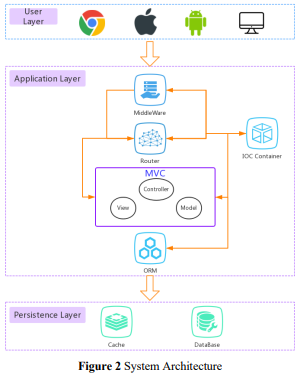
Benefits:

The web and its core protocol, HTTP, provide a stack of features:

* Suitable actions (GET, POST, PUT, DELETE, …​)
* Caching
* Redirection and forwarding
* Security (encryption and authentication)

API:

API is the acronym for Application Programming Interface, which is a software intermediary that allows two applications to talk to each other. Each time you use an app like Facebook, send an instant message, or check the weather on your phone, you're using an API.



The development of apps for mobile devices meant that organizations needed to allow users to access information through apps and not just through the Internet. Within the public sector, APIs are used to allow agencies to easily share information and also lets the public interact with government as well.

OpenFlow is still the only one wire protocol that has a reasonably good chance at becoming the de-facto open SDN southbound messaging standard. When using OpenFlow to populate tables in switches there are essentially three modes of operation:

* Reactive Flow Instantiation: When a new flow comes into the switch, the OpenFlow agent software on the switch does a lookup in the flow tables. If no match for the flow is found, the switch creates an OFP packet-in packet and sends it off to the controller for instructions. Reactive mode reacts to traffic, consults the OpenFlow controller and creates a rule in the flow table based on the instruction. This behavior was tested on previous lab.
* Proactive Flow Instantiation: Rather than reacting to a packet, an OpenFlow controller could populate the flow tables ahead of time for all traffic matches that could come into the switch. By pre-defining all of the flows and actions ahead of time in the switches flow tables, the packet-in event never occurs. The result is all packets are forwarded at line rate. Proactive OpenFlow flow tables eliminate any latency induced by consulting a controller on every flow. This behavior will be tested on this lab.
* Hybrid flow instantiation: A combination of both would allow for flexibility of reactive for particular sets a granular traffic control that while still preserving low-latency forwarding for the rest of the traffic.

Controller: REST API

* Application program interface (API) is an interface presented by software (such as a network operating system) that provides the capability to collect information from or make a change to an underlying set of resources.
* APIs in the context of SDN: In an open SDN model, a common interface discussed is the northbound interface (NBI). The NBI is the interface between software applications, such as operational support systems, and a centralized SDN controller. One of the common API technologies used at the northbound interface is the Representational State Transfer (REST) API. REST APIs use the HTTP/HTTPS protocol to execute common operations on resources represented by Uniform Resource Identifier (URI) strings. An application may use REST APIs to send an HTTP/HTTPS GET message via an SDN controller's IP address. That message would contain a URI string referencing the relevant network device and comprising an HTTP payload with a JSON header that has the proper parameters for a particular interface and statistic.
* Datapath Identifier of Openflow Switch: Each OpenFlow instance on a switch is identified by a Datapath Identifier. This is a 64 bit number determined as follows according to the OpenFlow specification: “The datapath\_id fleld uniquely identifies a datapath. The lower 48 bits are intended for the switch MAC address, while the top 16 bits are up to the implementer. An example use of the top 16 bits would be a VLAN ID to distinguish multiple virtual switch instances on a single physical switch.”.

Conclusion:

Nowadays controller rest API is an important key. Web application are connecting each other and other communication devices. They transfer data among each other. Most advantages is REST API provide a great deal of flexibility. Data is not tied to resources or methods, so REST API can handle multiple types of calls and return different data formats and even change structurally with the correct implementation of hypermedia.