SC18 Network Research Exhibition: Demonstration Preliminary Abstract

Trident: Unified SDN Programming Framework with Automatic Updates

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Abstract

Data-intensive collaborative data sciences can benefit substantially from software-defined networking (SDN) and network functions (NF). Unified SDN programming, which integrates states of network functions into SDN control plane programming, brings these two technologies together. However, integrating asynchronous, continuously changing states of network functions into SDN can introduce basic complexities: (1) how to naturally integrate network function state into SDN programming; (2) how to flexibly construct consistent, correlated routes to utilize network function state; and (3) how to handle dynamicity of unified SDN programming. We design Trident, the first unified SDN programming framework that introduces programming primitives including stream attributes, route algebra and live variables to remove these complexities.

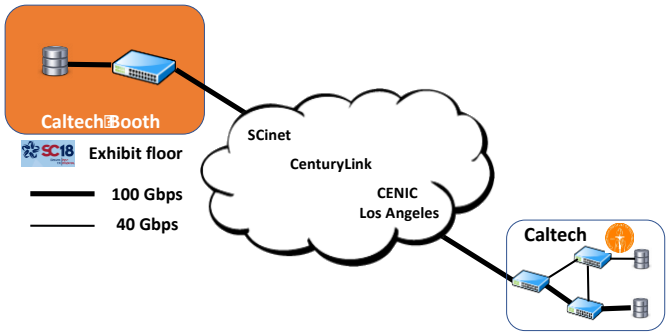
Goals

The demonstration of Trident programming framework contains following aspects:

- We demonstrate the capability of the Trident programming framework to integrate NF and SDN. Specifically, we program the network with a simple SDN *onPacket* program with the ability to read the high-level information of a stream, such as URI, and decide the route based on these information. By integrating the network control in an SDN controller and the flow inspection in a network function, this program showcases how powerful the Trident framework is.
- We demonstrate the capability of the Trident programming framework to handle the dynamicity, such as link failures. In such cases, Trident re-computes the route automatically without requiring a network operator to manually handle such dynamicity, e.g., implementing an *onDataChangeListener* function.

Resources

The demonstration will use one DTN and one switch in the Caltech booth at SC18 exhibit floor. These devices will be connected to the Caltech SDN testbed located at Pasadena, California, via a 100 Gbps WAN circuit, provided by SCinet, CenturyLink and CENIC Los Angeles. In the SDN testbed, three switches and two DTNs will be used.



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