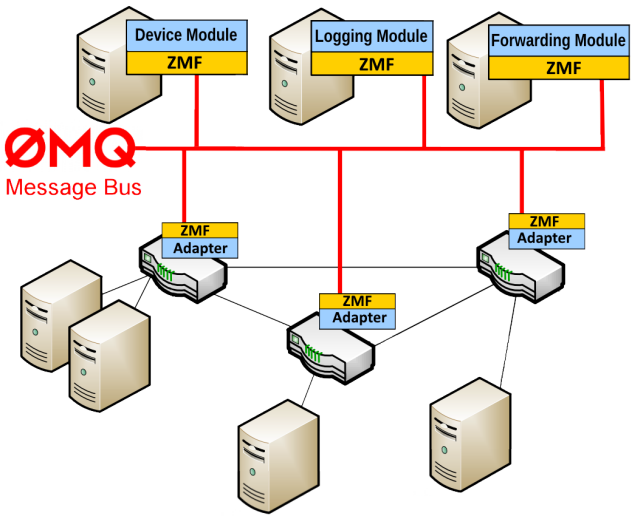
ZeroSDN Controller

Zero Software Defined Networking (ZeroSDN) is a distributed SDN controller. It consists of multiple independent modules that are connected by a messaging middleware, ZMQ[1]. Currently, ZeroSDN supports OpenFlow version 1.0 und 1.3. ZeroSDN is Open Source and licenced under the *Apache License Version 2.0*.



Why yet another SDN-Controller?

We felt that many controllers are either too monolithic, too hard to understand, or not scalable enough. This is why we created a controller which does not have these limitations.

Highly modularized, distributed design

Rather than using a monolithic design, ZeroSDN encapsulates controller functions into modules communicating through the ZeroMQ high-perfomance messaging library. These modules can run on a single host or can be distributed between several hosts. Modules can also be added to or removed from a running controller easily.

Lightweight

ZeroSDN can run on hosts spanning a large performance range including a simple Raspberry Pi, cloud servers, or even on a switch itself.

Language independent

Out of the box, ZeroSDN supports modules implemented in Java or C++. However, since ZeroSDN utilizes ZeroMQ as messaging library *(which supports many more languages!)* support for other languages can be added to ZeroSDN easily.

Extensive documentation

We made sure to document all functionality thoroughly to facilitate the usage and extension of ZeroSDN.

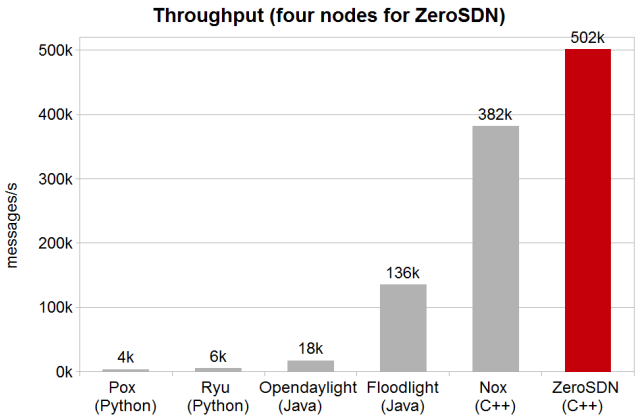
Flexible Event Filtering

ZeroSDN uses the publish/subscribe paradigm to filter events. We designed a hierarchical pub/sub schema making it easy for modules to receive just the events that are relevant for the module. Thanks to ZeroMQ, events can be filtered at high speed. Here is a simplified example for Packet-In messages from switches:

A module subscribed to IPv4 packets will not receive ARP packets, but will receive both UDP and TCP packets.

High performance

The distributed design of ZeroSDN based on the high-performance messaging library ZeroMQ helps it to scale well with the number of hosts[2]:



Contact Us

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ZeroSDN was developed by 13 students during a software engineering project at the Distributed Systems department[3], University of Stuttgart, Germany.

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1: http://zeromq.org

2: https://github.com/andi-bigswitch/oflops/tree/master/cbench (Tested using Cbench. 16 Switches, throughput mode)

3: https://www.ipvs.uni-stuttgart.de/abteilungen/vs?_locale=en