FlowForwarding Warp: How is JVM running SDN Controller

presented by
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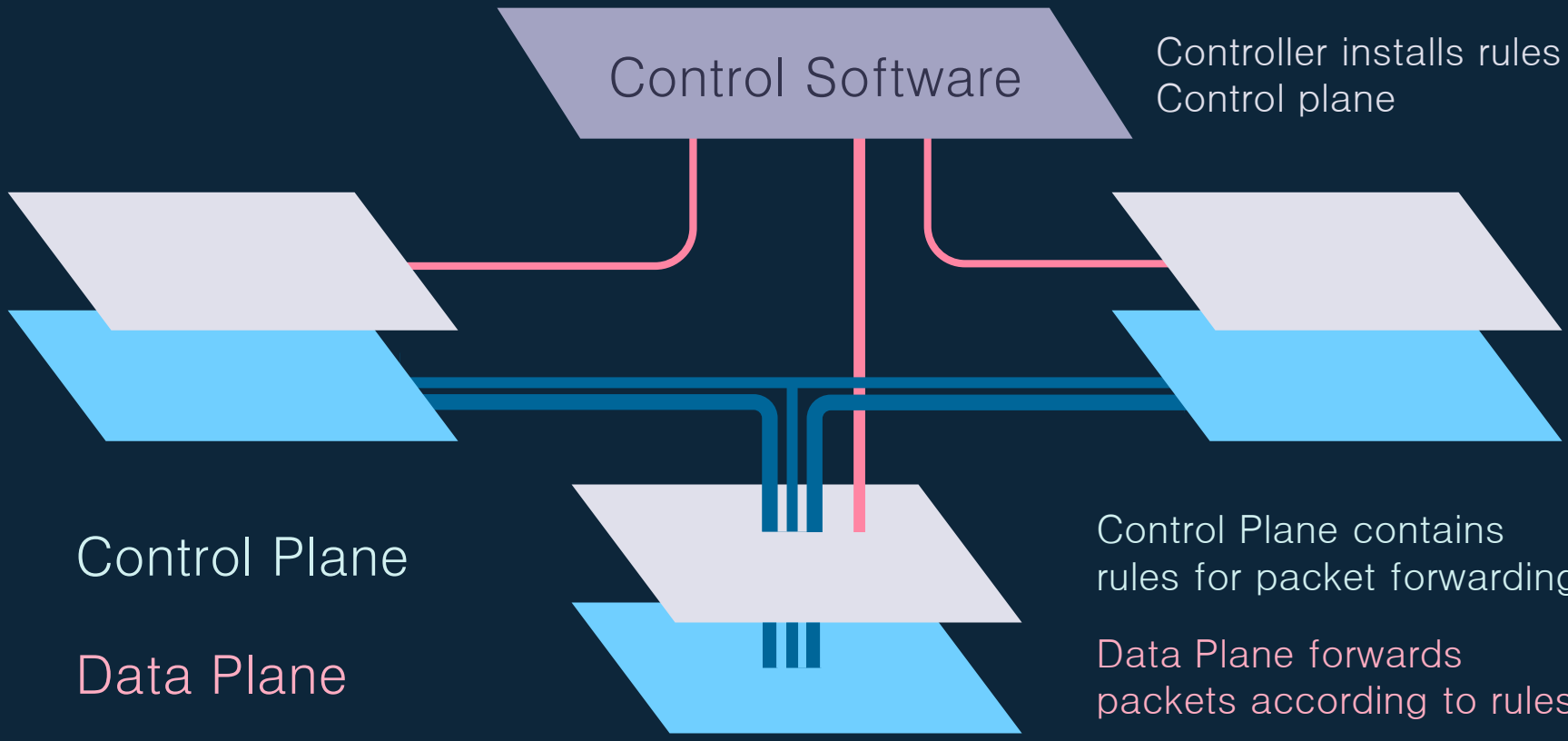
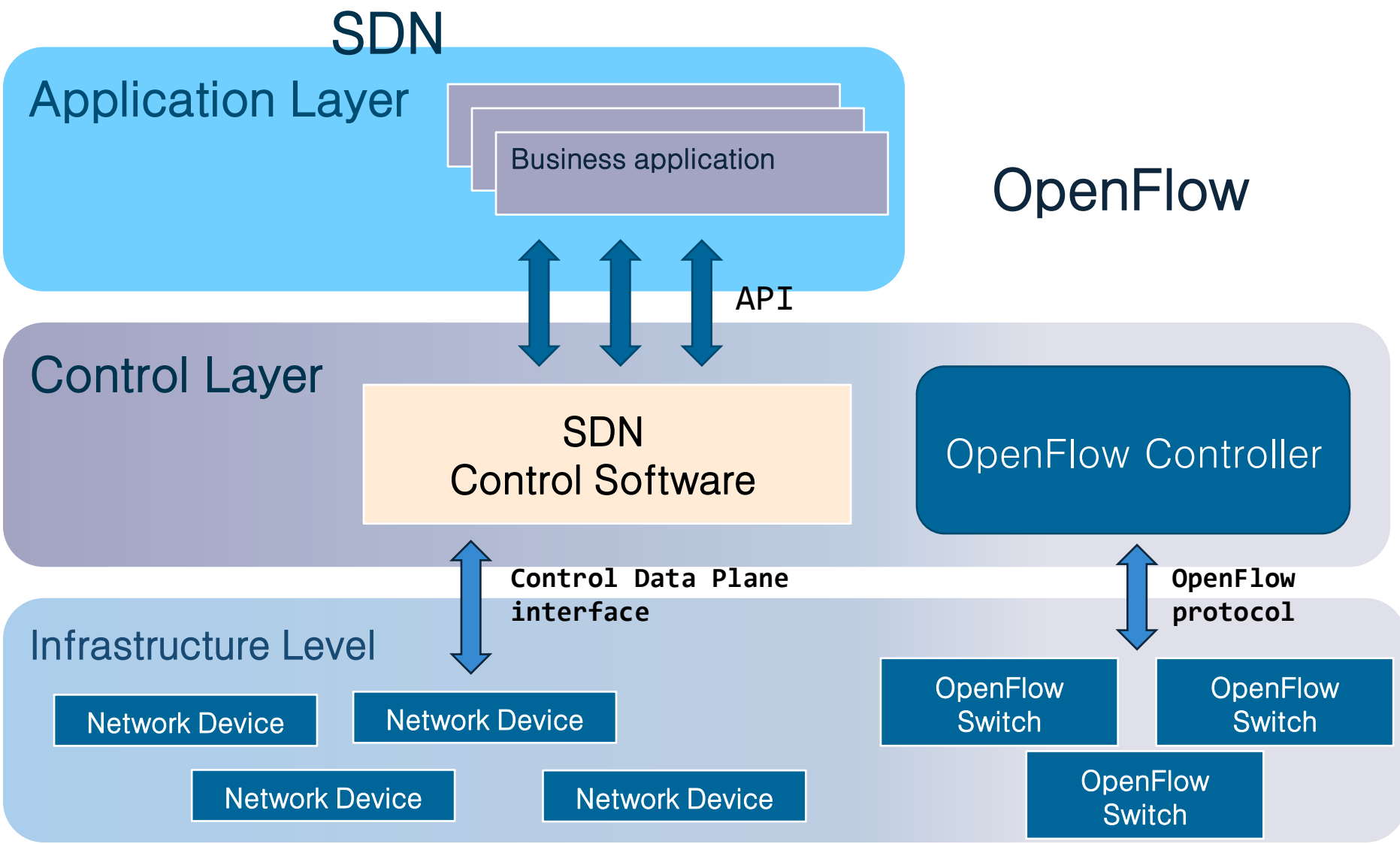
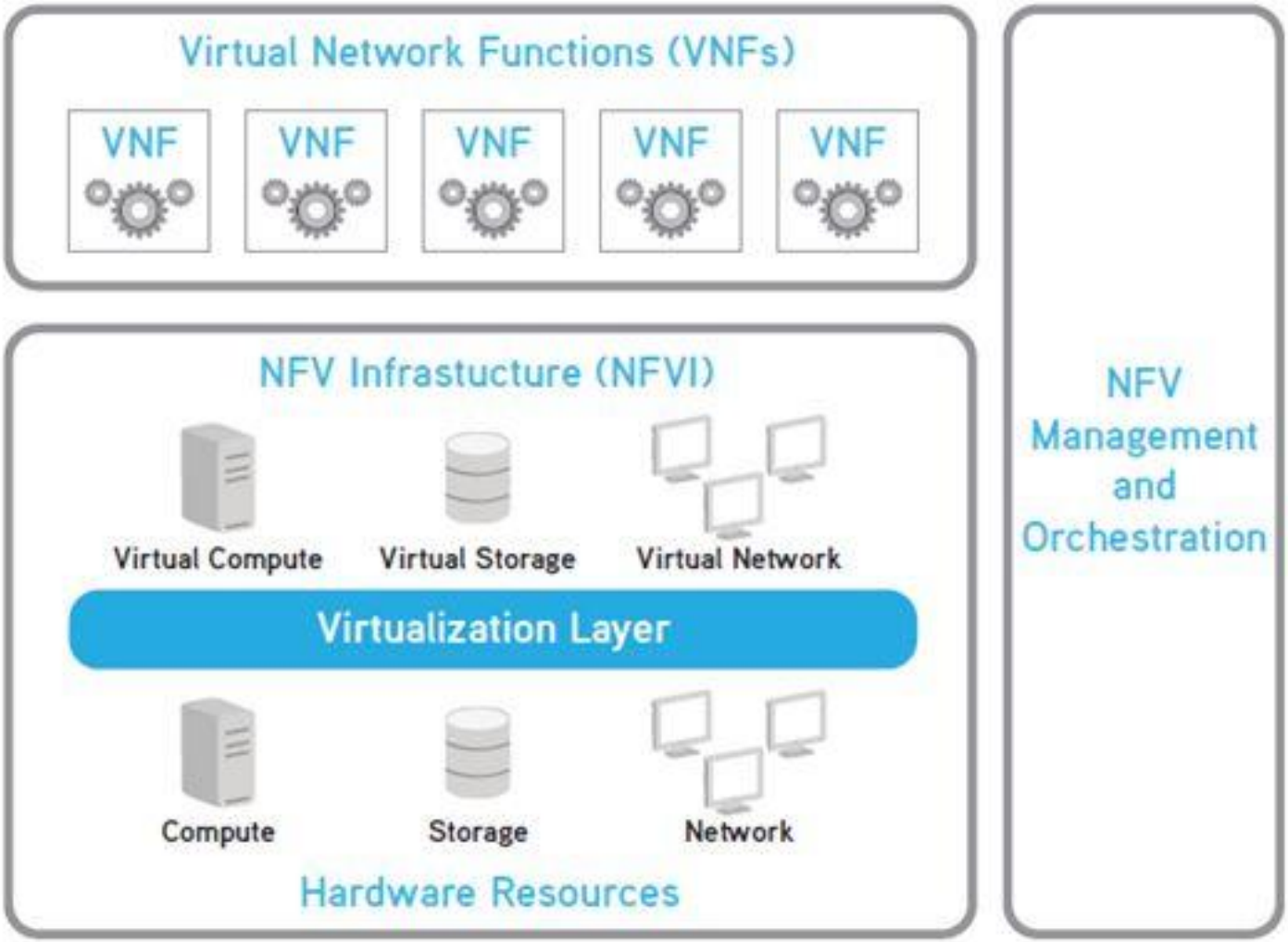
SDN: Concept


Control Software
Controller installs rules in Control plane
Control Plane
Data Plane
Control Plane contains rules for packet forwarding
Data Plane forwards packets according to rules

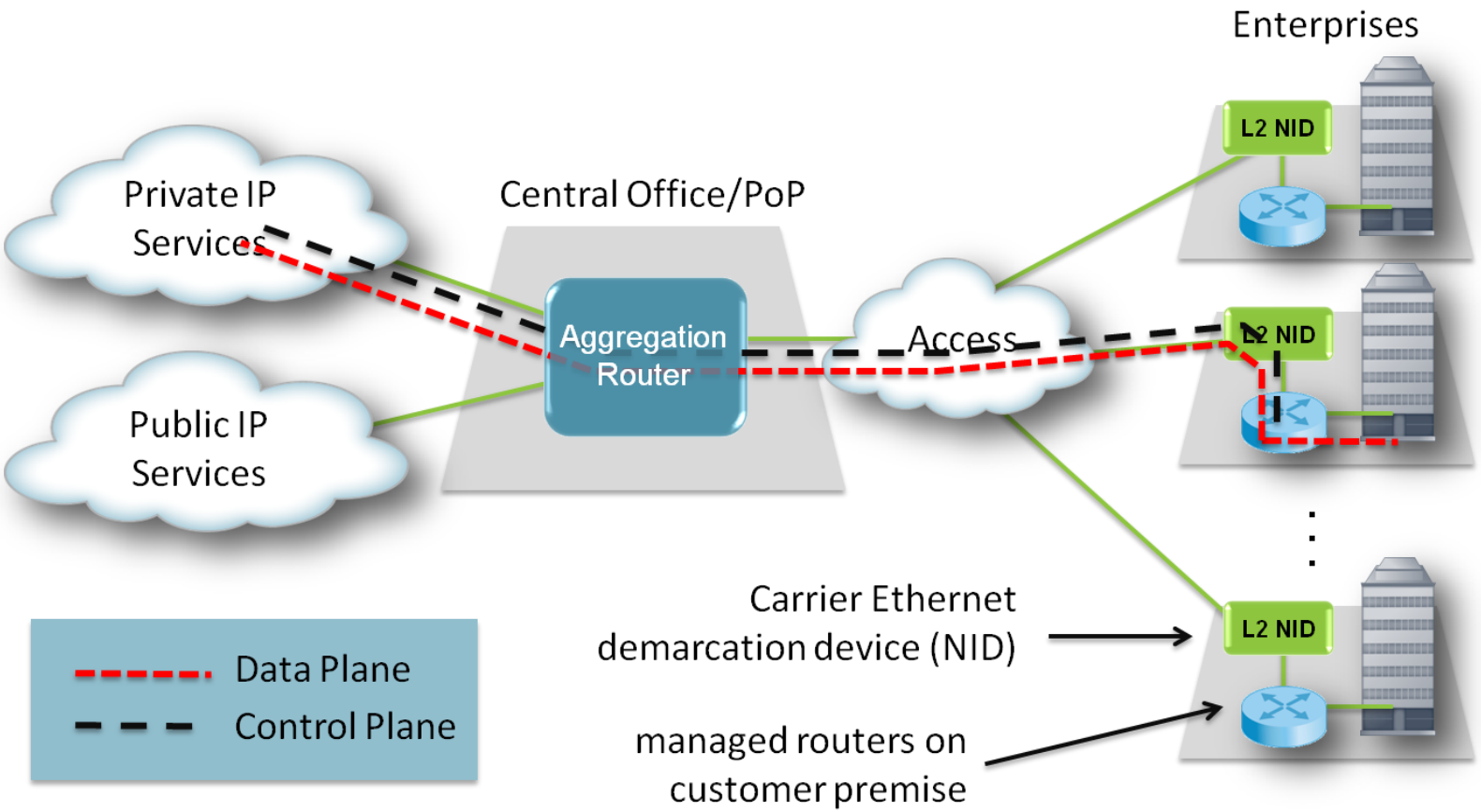
SDN: Big Picture



NFV: Customize Software



NFV and SDN


Enterprises
Private IP Services
Central Office/PoP
Aggregation Router
Access
L2 NID
L2 NID
L2 NID
Public IP Services
Carrier Ethernet demarcation device (NID)
managed routers on customer premise
Data Plane
Control Plane

SDN: Other Cases

[1] Service Insertions;

[2] Dynamic WAN rerouting;

[3] Bandwidth On Demand;

SDN Controller tomorrow

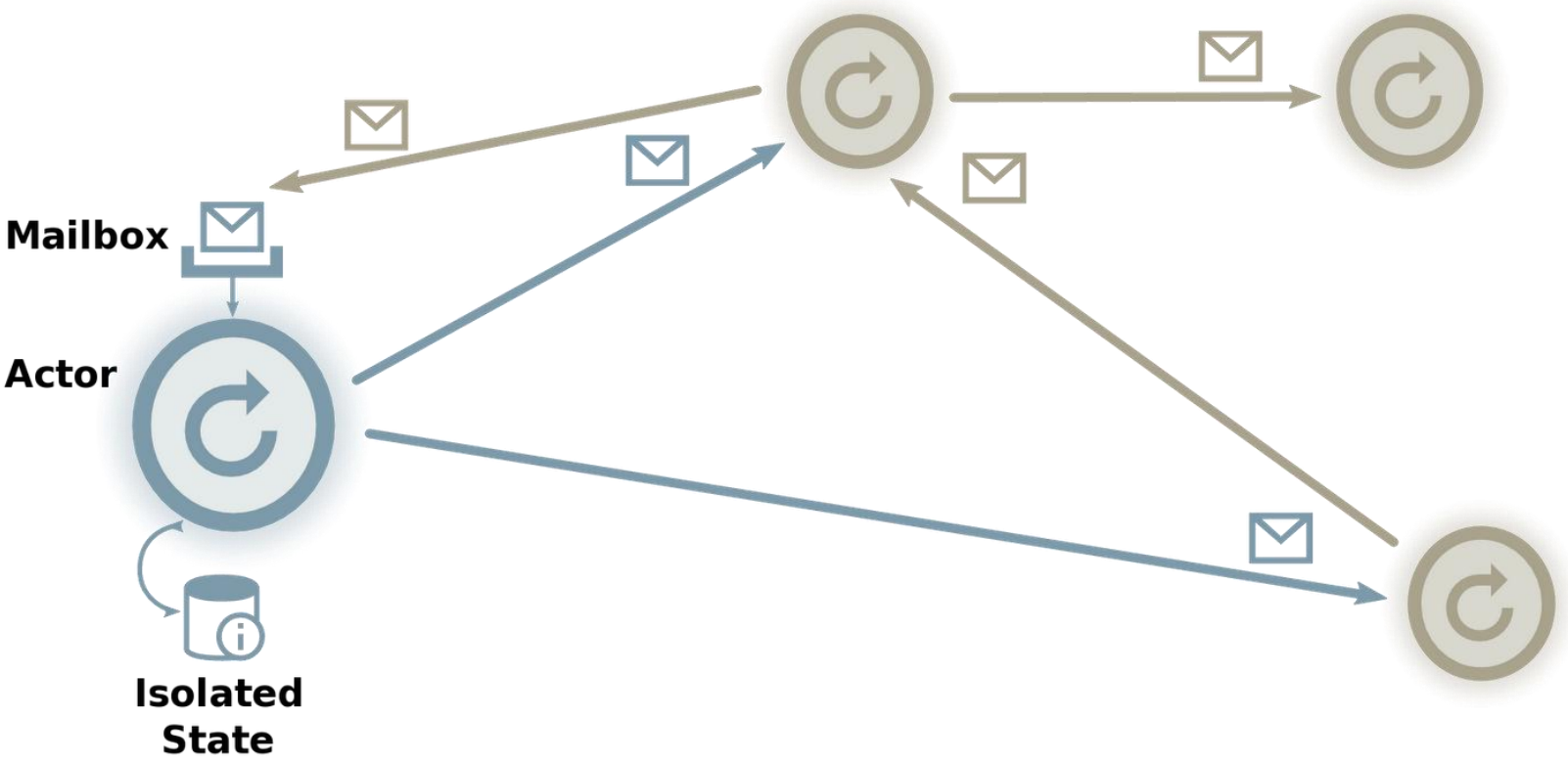
[−]**Bad**: Each Controller will handle
thousands sessions with Switches

[+]**Good**: Sessions are fully independent
Sessions are Stateless

Spawn and Let'em Crash

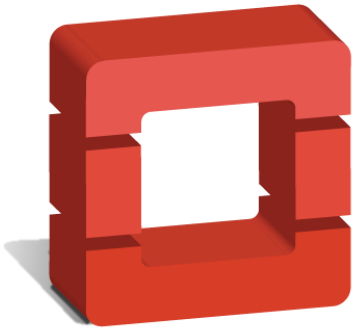
Spawn and Let’em Crash

Actors Model



Integration

OPEN
DAYLIGHT



openstack™
CLOUD SOFTWARE

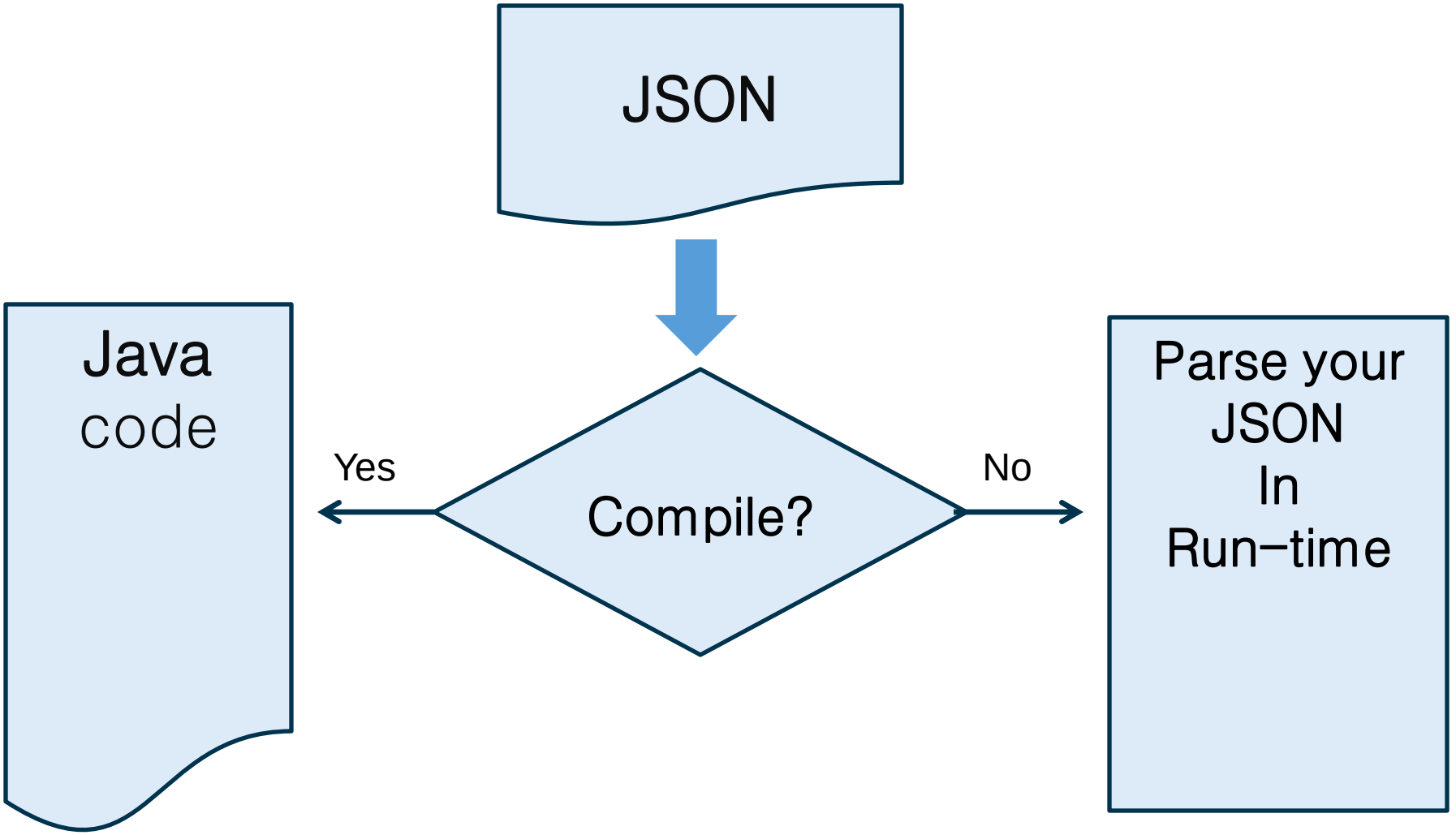
Why JVM?

[1] Easy to build Libs and API

[2] Plenty JVM-based solutions in SDN domain

[3] Akka and Avro

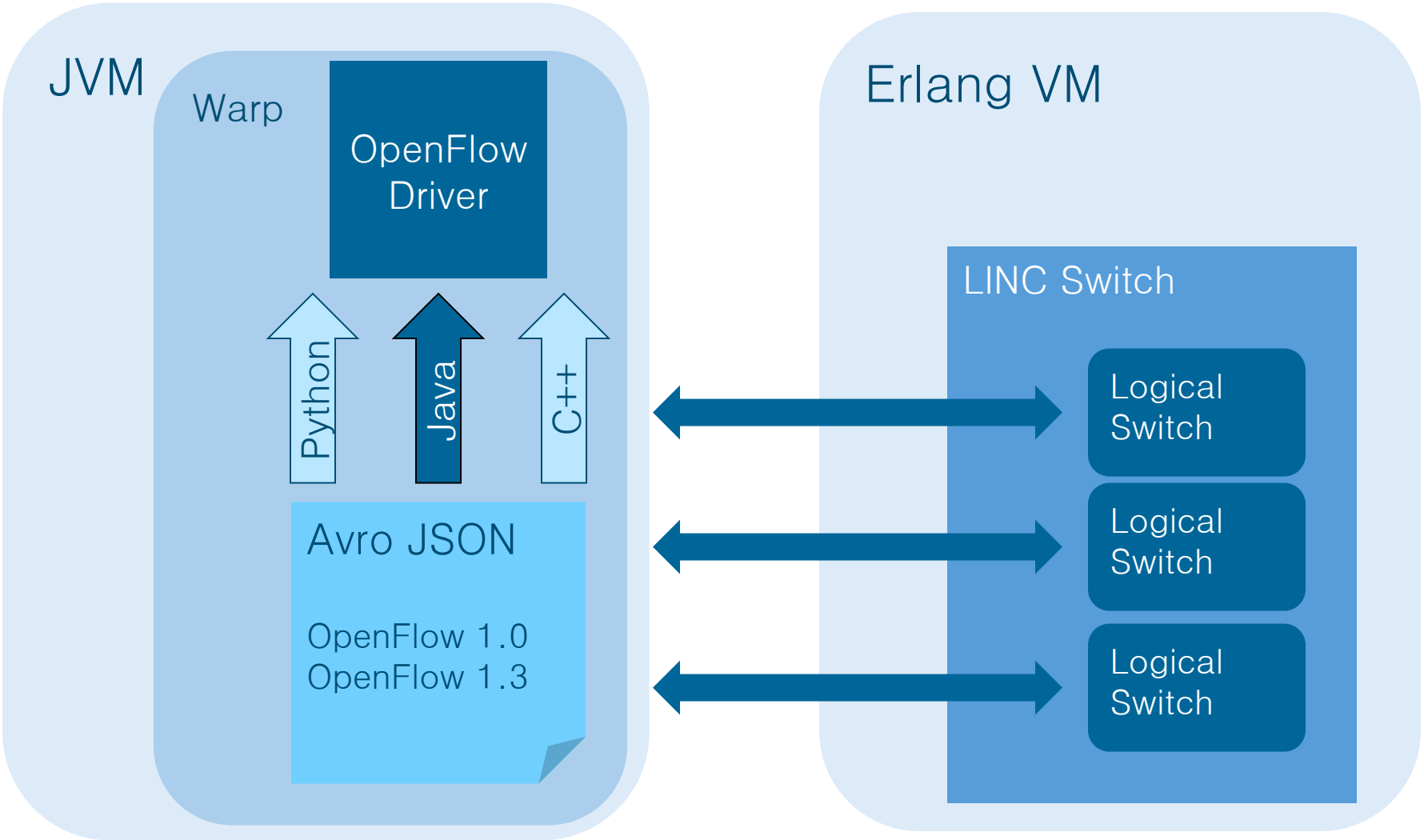
Apache Avro



Apache Features

- You can serialize Data as is, no encoding, no Metadata
- You can do it in Run-time
- Lazy initializations + Cashing makes it faster
- Java, C++ and Python API

Warp OpenFlow Driver



Akka: Erlang on JVM

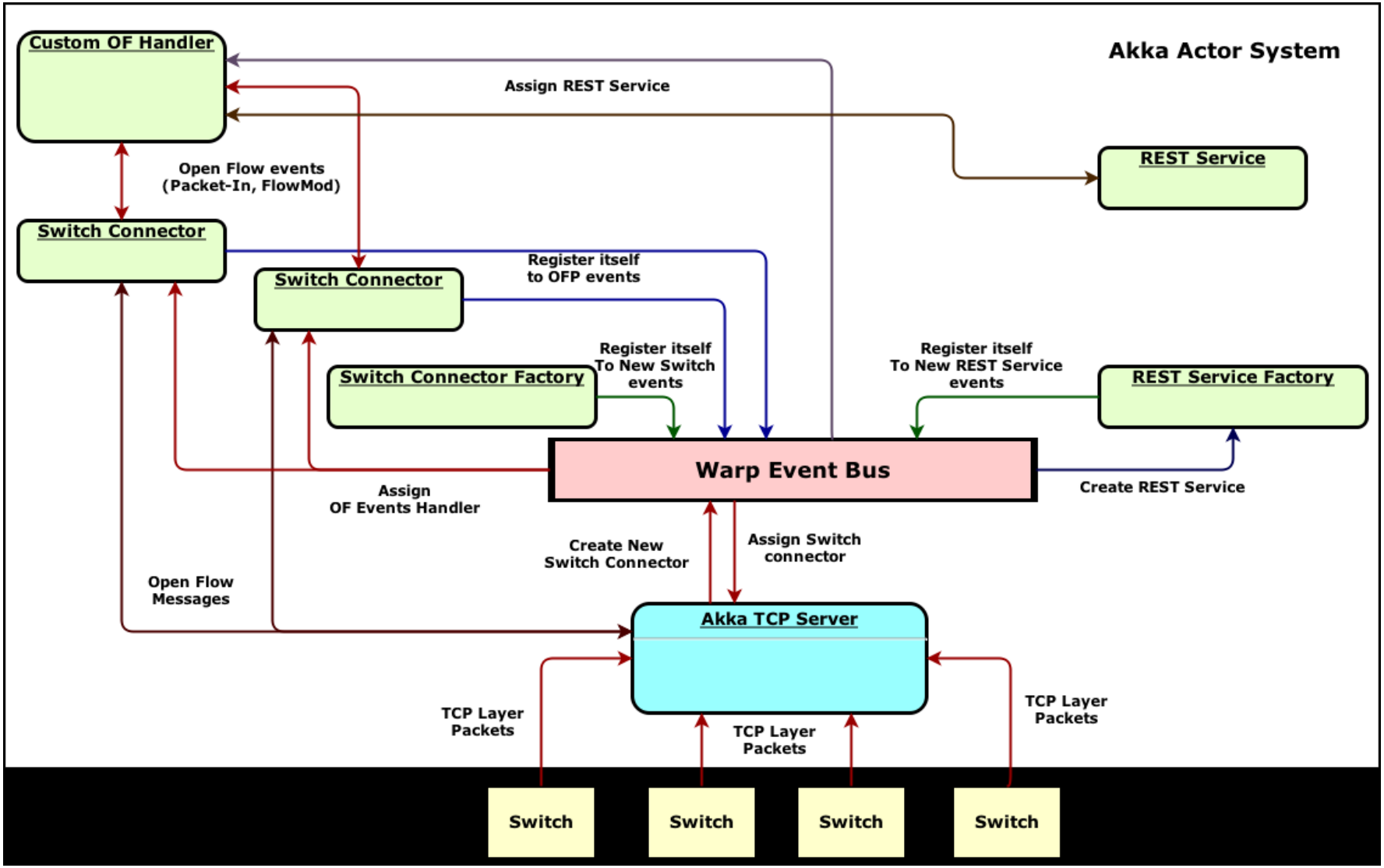
High Performance
50 million msg/sec on a single machine.

Small memory footprint
~2.5 million actors per GB of heap.

Elastic & Decentralized
Adaptive load balancing, routing, partitioning and configuration-driven remoting.

Akka: and Event Bus

How it looks like



Preliminary Testing

Environment: 3 workstations, 4 core per one

Running: 500 Logical LINC Switches
on two workstations;
1 Warp controller on the 3rd

Results: Warp holds all 500 connections
(1 hb/10 sec)
500 sessions for 15 sec
1000 OpenFlow message/minute

Team

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- https://github.com/FlowForwarding
- http://www.FlowForwarding.org

Thank you!