



OPEN NETWORKING
FOUNDATION



SDN: Who's investing in what?

Dan Pitt, Executive Director
www.opennetworking.org

- Operators
- Vendors
- ONF

Operators



- Telcos
 - Public & hybrid clouds
 - NFV (& 3rd-party VNFs)
 - DevOps & IT
 - Training
- OTTs
 - White box, bare metal
 - Monitoring, TE
- Enterprises
 - Automation
 - Security

Seamless Roaming, WiFi Offload

A network diagram showing a mobile phone connected to a base station, which is connected to a core network. The core network includes a server and a database. The diagram illustrates the concept of seamless roaming and WiFi offload.

Mobile Networks

Service Creation, Chaining

A diagram illustrating Network Functions Virtualization (NFV). It shows a network architecture with components like RAN, Core Network, and Cloud. The Cloud is connected to the Internet, which includes services like Flickr, YouTube, and Netflix. The diagram shows how services are created and chained through the network.

NFV

Virtualization, Monitoring, Analytics

A diagram illustrating Network as a Service (NaaS). It shows a network architecture with components like RAN, Core Network, and Cloud. The Cloud is connected to the Internet, which includes services like Flickr, YouTube, and Netflix. The diagram shows how services are created and chained through the network.

Network as a Service

Multi-Layer, Multi-Tenant

A diagram illustrating Cloud Networking. It shows a multi-layer, multi-tenant architecture. The diagram includes components like Customer's Cloud, Amazon Web Services Cloud, and Customer's Network. The diagram shows how services are created and chained through the network.

Cloud Networking

Vendors



- Semi-proprietary switching & routing
- Packet-optical integration
- Virtualization
- Open source projects (see next slide)

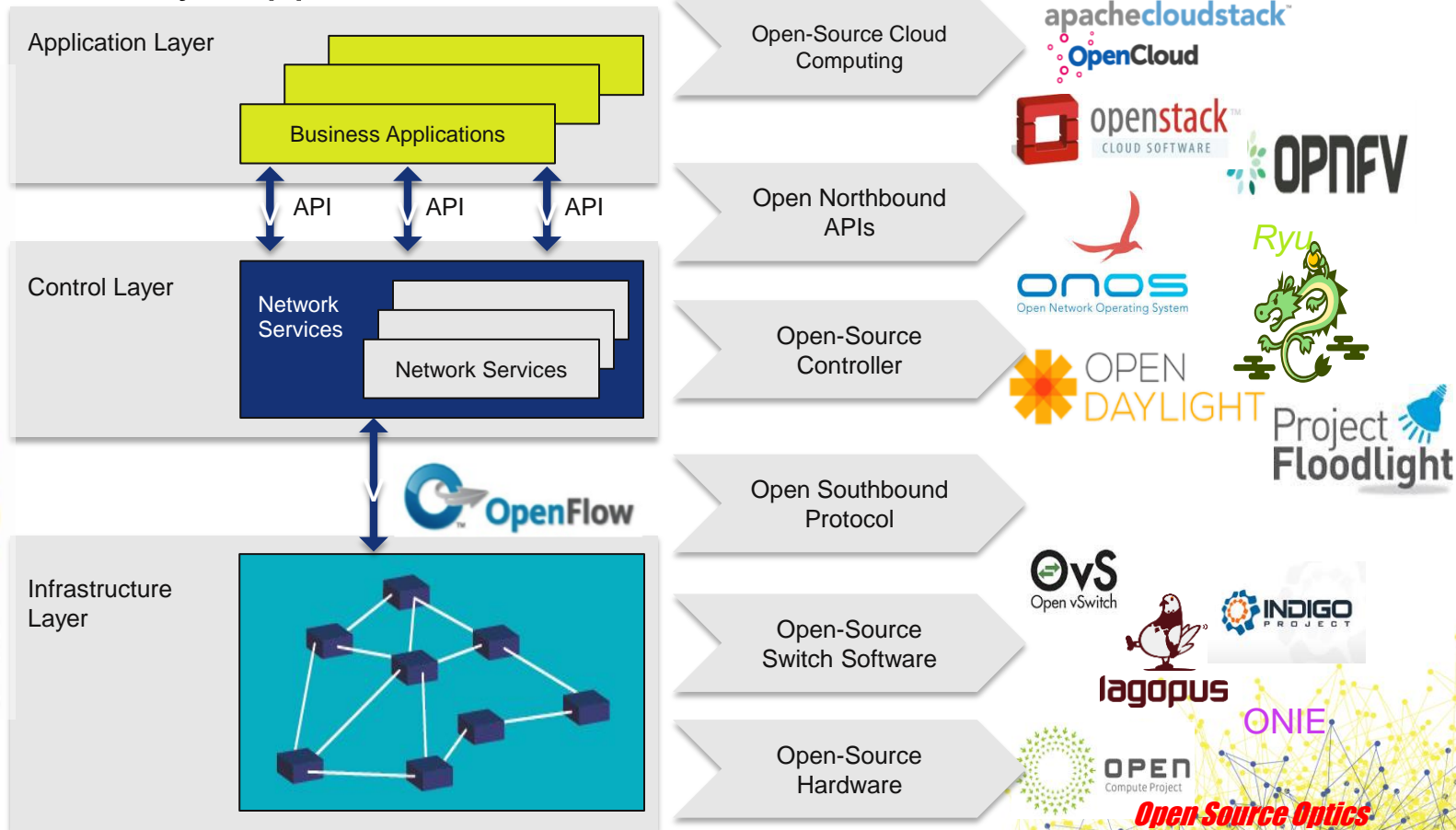
- Hardware OpenFlow
 - Merchant silicon ASICs, Flexible match-action ASICs, NPUs, FPGAs
 - Open chipset SDKs/HALs
 - Broadcom OF-DPA
 - OCP's SAI
 - Packet programming
 - Protocol-oblivious forwarding
 - TTPs
 - Pipeline compilers



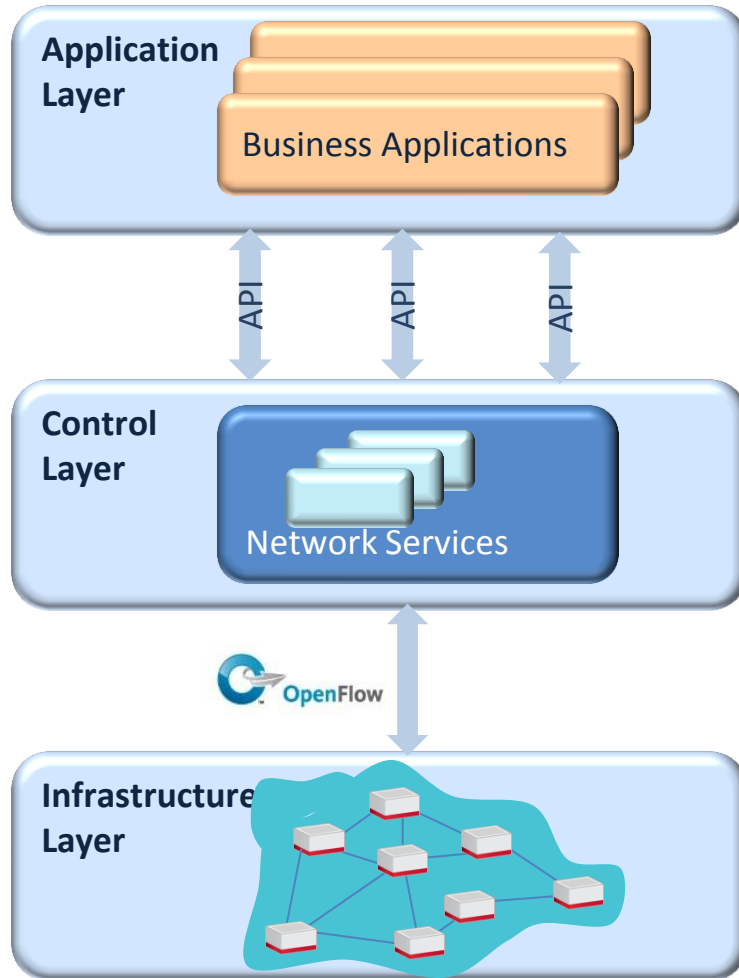
Open Source: the other OTT



- Better than duplication or monopoly when no vendor differentiation needed
- Fast, efficient, better quality, more secure
- Best if community supported



After open source, what's left?

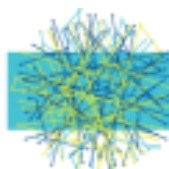
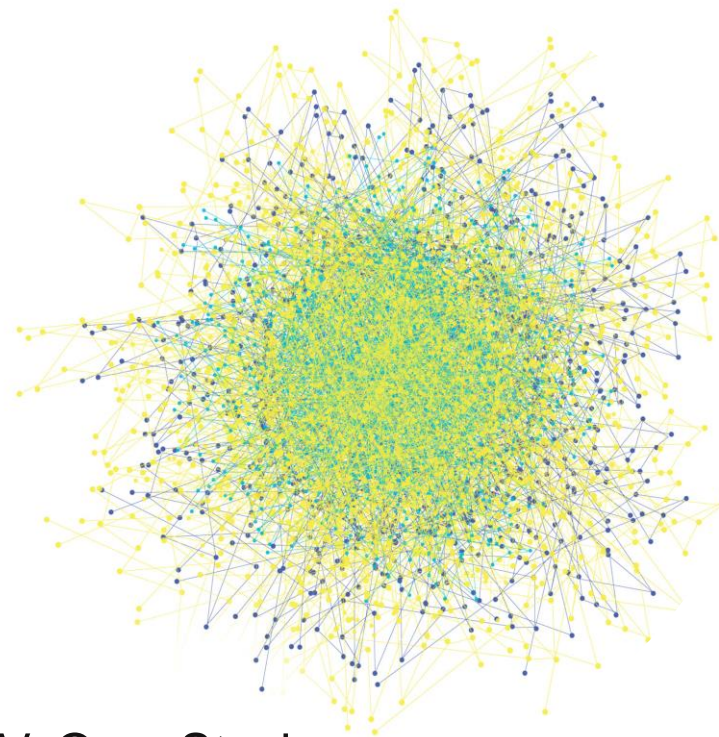


- New services!
- RT monitoring, analytics, platforms, business optimiz.
- Disaggregation of OSS/BSS

- Security, policy, routing, topology
- Automation, orchestration, inventory
- Pipeline compiling

- Chips: DPI in ASICs, FMA-ASICs, NPUs, FPGAs, CPUs!
- Optics: packet/optical integration, MEMS switching

- Architecture
 - NBIs, service chaining
 - Migration, carrier-grade
- OpenFlow
 - Optical, wireless, DC
 - Interoperability, portability
- Open Source
 - Most projects
 - Selective integration
 - Community: ONOS, ODL, OCP, OPNFV, OpenStack
 - OpenSourceSDN.org



OPEN SOURCE SDN