



OPENFLOW: WHAT'S REAL, WHAT'S VIRTUAL?

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What I'll talk about

- 
- Good News / Bad News
 - Conventional wisdom on OpenFlow
 - Expectations Management
 - Quick review of OpenFlow 1.0, 1.1 and 1.2
 - How to engage?

Good News / Bad News

Double-edged stuff

SDN gives you the power to do whatever you want

- Tons of flexibility, but also enough rope to hang yourself
 - Conclusion: Better know what you're doing

The number of interesting SDN applications are huge

- Lots of energy behind it, but not well aligned, many interests
 - It'll take some time for consensus to form

The Compute Stack can serve as a model for Networking

- A familiar framework can help, but the analogy ain't perfect
 - We can see the value in a stack, but recognize where the differences are
 - E.g. Networking lacks de facto standard HW and OS, runs on many boxes

Conventional wisdom on OpenFlow

- Shenker: “OpenFlow doesn’t let you do anything ... [new]”
 - Really?!?
 - Often omitted: “[But] it gives you a programmatic interface...”
 - If you’re an indie SW developer, OF might let you do things you couldn’t before
 - If you’re a network operator who can code, OF might let you do new things.
 - If you’re a switch developer, OF doesn’t enable anything new.
- OpenFlow enables all kinds of possibilities
 - Sort of. 1.x doesn’t enable all that much just yet
 - Really, it’s the idea of OF (or SDN) that enables things
 - Historically, networking SW was controlled by (and funded by) HW vendors.
 - Soft switches alter the equation somewhat: e.g. OpenVSwitch
 - OF can change the rules on off-the-shelf HW, too...eventually
 - Software innovation operates on different model: expect explosive innovation

Expectations Management, 100 foot view

Some apparent contradictions are due to different time context

- OpenFlow 1.0 and even 1.1 are pretty limited
 - Missing: IPv6, HA, configuration, topology discovery, etc, etc
 - Those cool demos? Many are pre-standard or extension-based
- Some cool stuff will come in *foreseeable* future
 - Possibly even within your planning horizon (“it depends”)
 - OF 1.2 is almost out, 1.3 & 1.4 coming in ~8 months
 - Adding: IPv6, config, topology, certification, capability negotiation, more
- Advanced desired stuff will steadily be added to OF
 - “Soak time” needed, prioritize, wrangle, correct missteps

Expectations Management, 10,000 foot view

- In the near term, expect:
 - Prior to certification, interop will be iffy → look for partnering
 - Maybe no killer app at first? → OF can be vendor/product tie-breaker
 - Mostly old boxes will add OF → OF adds work instead of reducing
- Medium term:
 - Better interop in basic applications (whatever those are)
 - Even with basic cert, partnering will continue on advanced apps
 - Continued vendor focus on specific apps or market segments
- Long term:
 - Interop much stronger, partnering will shift to joint marketing
 - Consolidation may give many vendors broad app coverage



Quick Review: OpenFlow 1.0

Release December 31, 2009

- OpenFlow 1.0 was great start, some gaps
 - Treated switch intelligence as a single big table,
 - Not hard for existing hardware to support (subset of common capability)
 - Tricky to achieve complex functionality
 - Many features (IPv6, multicast, etc) not defined
 - But left room for extensions
- Result:
 - Some hardware vendors implemented 1.0
 - Extensions frequently used to develop interesting apps
 - Strong interest in developing 1.1

Quick Review: OpenFlow 1.1

Release in February 28, 2011 (14 months after 1.0)

- OF 1.1 added Good Stuff: Multicast! Multiple tables!
 - But IPv6 features and some other still missing
 - Multiple tables are powerful, but added “go to Table X”
 - Easy for controller to exceed hardware switch capability
 - “go to” makes it tricky for switch hardware to know “intent”
- ONF formed in March, 2011.
 - Some sense that 1.2 might come quickly ...?
- Upshot: Spotty adoption of 1.1
 - ongoing focus on 1.0 with a “wait-and-see” attitude on 1.2

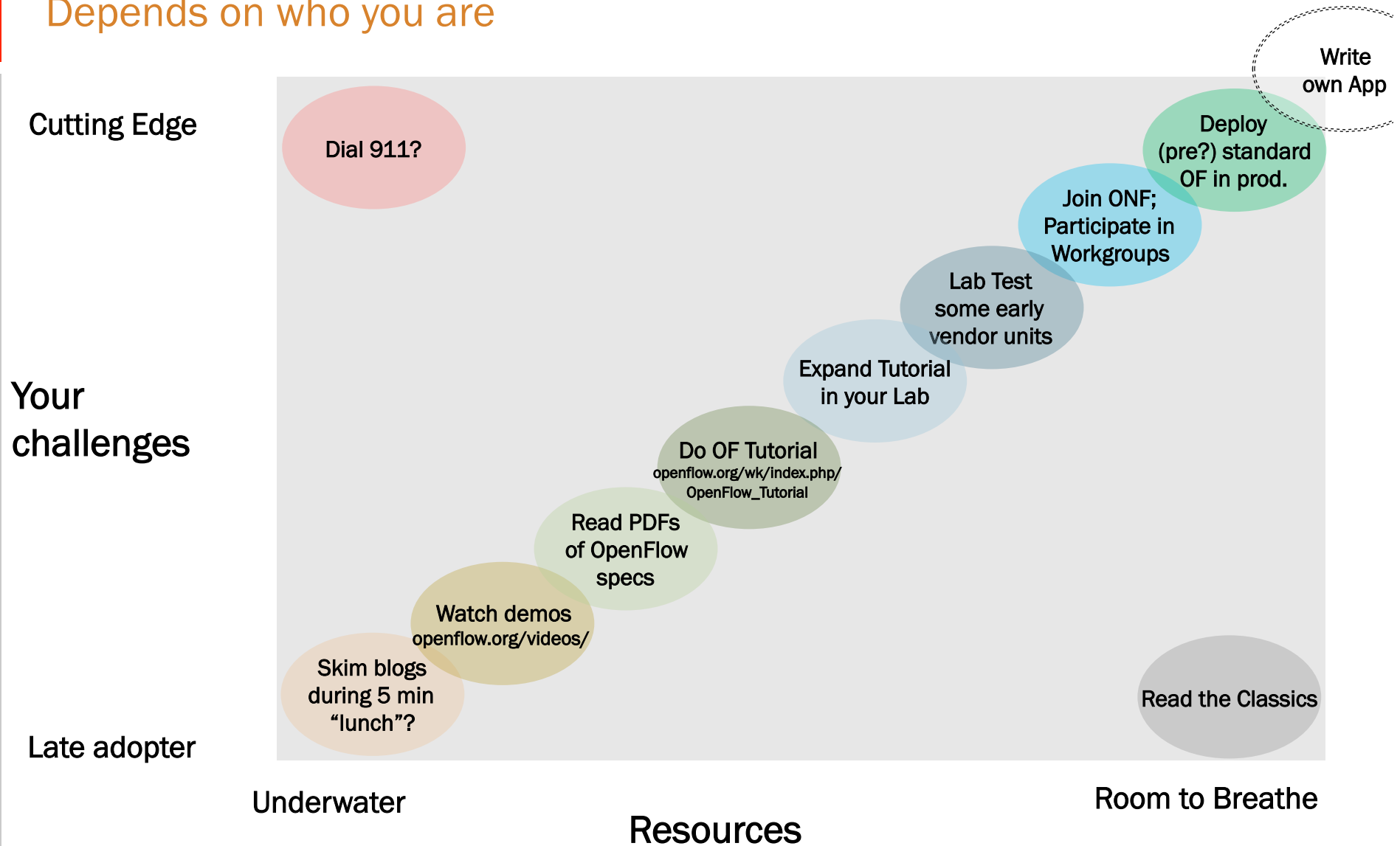
Quick Review: OpenFlow 1.2

Release for member review in Dec 8, 2011 (9 months after 1.1)

- ONF brought expanded participation
 - Clamor for pet features, plus “extensibility” and “modularity”
 - New workgroups: testing, configuration, hybrid
- OpenFlow 1.2 added many things
 - Many new features, including some v6, etc
 - Other features missed the (deliberately aggressive) deadline
- Result
 - Many process issues sorted out, great position for 1.3 (April?)
 - Config, test/interop WGs charging ahead, hybrid WG formed
 - Recognition of spotty 1.1 (1.2?) HW adoption slow to emerge
 - Openflow-future group (my area!) now on the trail of a great solution

How can you engage?

Depends on who you are





Questions?

