

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

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# What I'll talk about

- Conventional wisdom on OpenFlow
- Good News / Bad News
- Expectations Management
- How can you engage?
- Brocade's activity



# 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 new things.
    - 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. 1.0 and 1.1 don’t enable all that much just yet
  - Really, it’s the idea of OF that enables things
    - Historically, networking SW was controlled by (and funded by) HW vendors.
    - Soft switches alter the equation somewhat: e.g. OpenVSwitch
    - OF changes the rules on COTS hardware, too (for vendors that support it)
    - Software innovation operates on different model: expect explosive innovation



# Good News / Bad News

More 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



# 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”)
  - ONF is pushing to get OF 1.2, 1.3 and 1.4 out within 12 mo
    - Adding: v6, config, topo discovery, certification, capability negotiation, more
- More advanced missing stuff will slowly make it into OF
  - Need to build foundation, get “soak time”, prioritize, wrangle

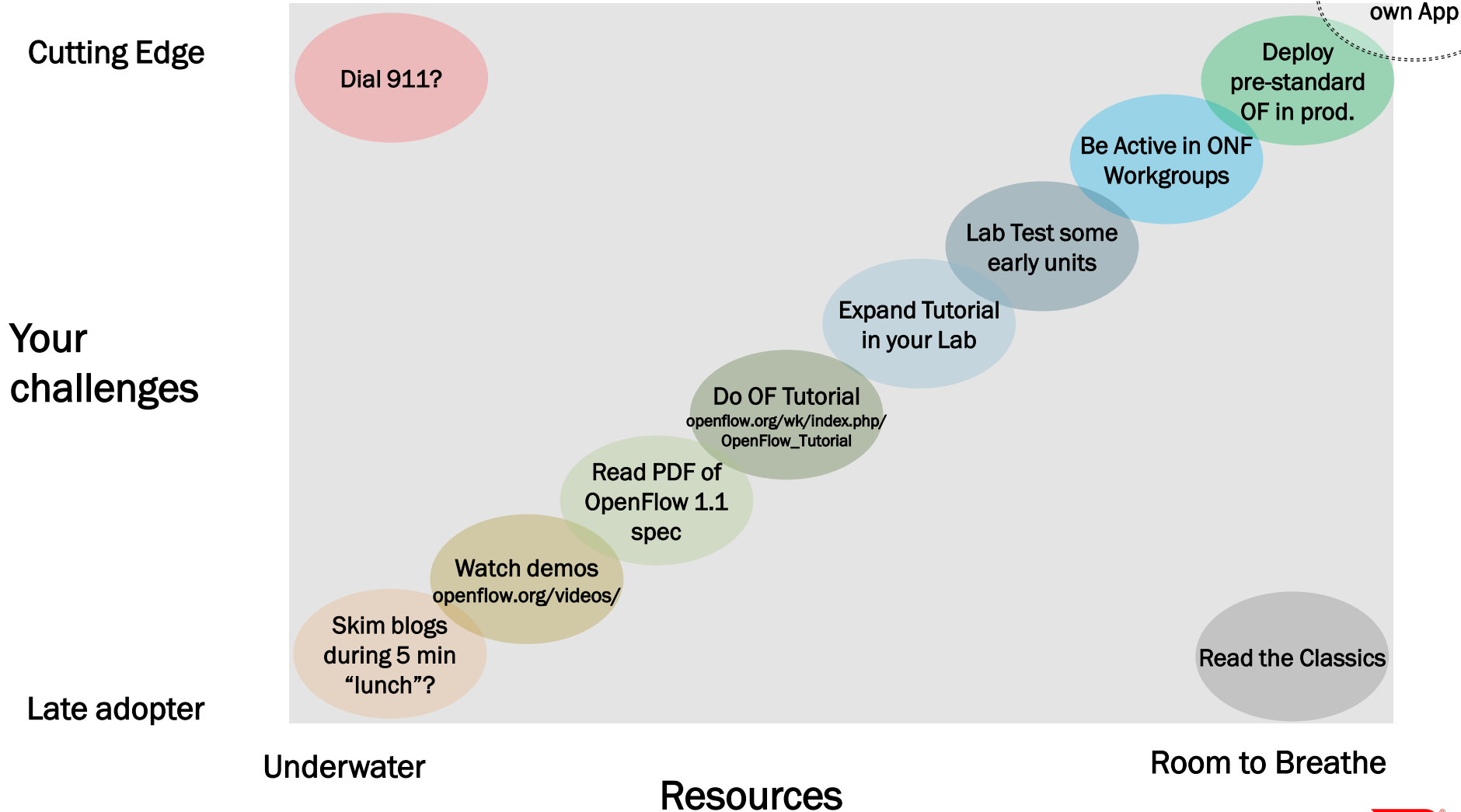


# Expectations Management, 10,000 foot view

- In the near term, expect:
  - Prior to certification, interoperability is uncertain
    - Switch & app/controller providers (vendors or buyers) will partner/co-support
  - It's early days, you may not find the app your looking for
    - Maybe OpenFlow will be guiding vendor choice more than product choice
  - Most switch vendors will add OF rather than create new boxes
    - Low early volume won't support "OF-only" box, so means more work, not less
- Medium term:
  - More interoperability in basic applications (whatever those are)
  - But even with certification, extensions → frequent partnering
  - Vendors will (continue to) focus on applications or market segments
- Long term:
  - Interoperability will increase, partnering will decline
  - Consolidation will give many vendors broad coverage

# How can you engage?

Depends on who you are



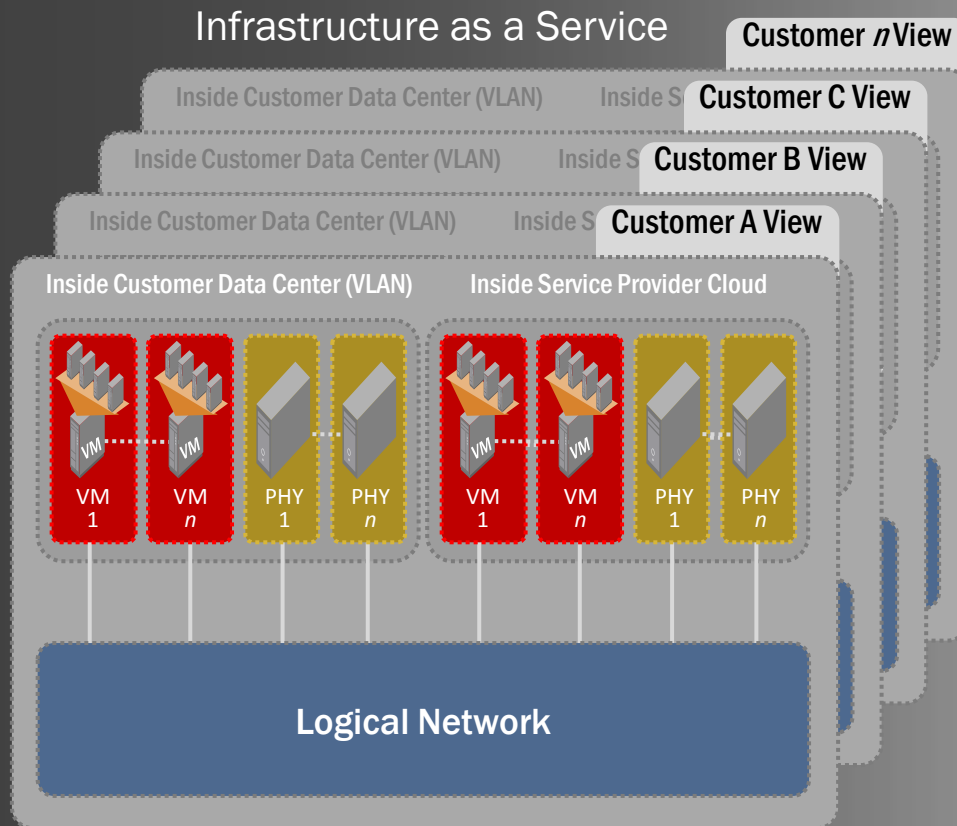
# Brocade's Activity

- Brocade first endorsed OpenFlow in June of last year.
- Last year we began engineering work with OF
- We joined ONF as founding member
- We've been working actively on the ONF standards work
- In June, we committed to adding OpenFlow capabilities to our Service Provider product line
- Last week, demoed OF on one of our products at ONS
- And we're actually doing some low profile marketing...



# OpenFlow / Software Defined Networking

Focus: Networking and Services for Hyper-scale Data Centers



## Focused Applications

- Hyper-scale data center mgmt
  - Scale and automation
- Network virtualization
  - Automation
- Flow management
  - Automation
- Enable Network Apps
  - Innovation