TOMORROW starts here.
Application Centric Infrastructure (ACI) Software Development Lifecycle (SDLC)

Nathan Sowatskey and Akshat Sharma, Network Programming Technical Marketing Engineers
Agenda

• The Situation Today
• What Are We Doing About It?
• The SDLC in Detail
• Easing the Transition
• What Does This Do For You?
• Resources Online and at Cisco Live
The Situation Today
Existing technologies

- Java, C, Python, REST, Chef, Puppet, OpenStack …

Existing use cases, deployment models and processes

- Automated DC provisioning, server based systems, continuous integration …

Existing operations, developer and QA roles

- IT operations, business application and infrastructure developers, development test …
New technologies and APIs

- onePK, APIC, Controllers, NetConf/Yang, OpenFlow …

New use cases and deployment models

- Dynamic traffic engineering, integrated VLAN configuration, apps integrated with routers and switches …

New roles and audiences

- Network operations, network programmability developers/designers/engineer …
Network is stable, performant and available to applications running over the network

Little experience of programming, automation, dynamic services or continuous integration

Constantly update with automated and dynamic service deploy, setup and tear down

Continuous integration for service delivery
What Are Doing About It?
Combined technologies

- Java, C, Python, REST, Chef, Puppet, OpenStack, onePK, APIC, Controllers, NetConf/Yang, OpenFlow …

Combined use cases, deployment models and processes

- Automated DC provisioning, dynamic traffic engineering, integrated with routers and switches and continuous integration ….

Combined operations, developer and QA roles

- IT and network operations, business application and infrastructure developers, development test, Network Programmability Developers/Designers/Engineer …
Network Programming Software Development Lifecycle (SDLC)

Best Practice + Virtualisation + Automation = Ease of use, Speed and Scale

**Shared Best Practice**

- Shared best practice for design, development, tooling, test and deployment techniques

**Virtualisation**

- Virtual network tooling to design and create high fidelity networks for development and test

**Automation**

- Automated tools and techniques to support continuous integration
Virtual Internet Routing Laboratory (VIRL) and VMMaestro – No CCIE Required

A multi-purpose extensible network virtualization and simulation platform

- Create highly-accurate models of real-world/future networks
- Leverage ‘real’ network operating systems - build synced, not emulated
- Scale from 10’s to 100’s of virtual network and server devices
- Integrate virtual networks and appliances into physical lab networks
- Drag-and-drop network topology creation with AutoNetKit
Continuous Integration for Network Programming

Gerrit
- Manage commits and the code review cycle
- Front-end to Git
- Manages verify and merge builds with automated tests and static analysis

Git
- Distributed Source code repository
- Commit early and often

Jenkins
- Automates build and test
- Monitors Git and receives messages from Gerrit
- Uses Maven, make, scripts

VIRL and VMMaestro
- Virtual Networks
- A clone of the production environment
- Used for distinct unit tests for verify and system tests for merge

Sonarqube
- Unified dashboard for build status and history

Jira
- Issue manager integrated with lifecycle tools

Nexus
- Maven repository manager
- Distributes deliverables as they are successfully built
Develop with enhanced tools and IDEs in café of choice.

- Eclipse
- Git
- Gerrit
- Jenkins
- JIRA
- Nexus
- SonarQube
- VIRL

Artefacts from Nexus used in development

Develop and test against CML virtual networks on platform of choice

Automated unit and system integration tests run against CML virtual networks

Built Maven artefacts deployed to Nexus and used in build

Back end systems

Gerrit to manage Git

Git for SCM and collaboration

Jenkins monitors Git and builds automatically

Jenkins for managing features and issues

Automated static analysis and test coverage reports exported to Sonar for consolidated reporting

Jira for managing features and issues

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Easing the Transition
DevOps is a change in Mindset!
Is it too soon?...or are we not seeing it yet?

I know my Network. But programming is not my forte.

I can code. But my Networking knowledge limits me.

I can’t let you guys deploy these apps on my network!

Sub-Par Code

Code with low fidelity

Lack of Trust!

Network Engineers

Developers

Network Admins / Net-Ops
Can we help tie them together? – We need an enabler!

- An Easy to use, automated environment to code in
- A platform to leverage the ecosystem and refactor existing apps

- A Complete continuous integration suite to test my apps
- A simulation environment to ensure high fidelity on deployment

- Test results that can be trusted in the real world
- Packaging tools for code deployment
Introducing the DevOps VM and associated services

- EEM
- PnP
- onePK
- Controller
- Continuous integration at your doorstep
- The Power of Cisco Modelling labs to model real life networks
- Integration of Cisco’s Partner Ecosystem
- All Network Programmability tools and technologies under one roof
- Continuous integration at your doorstep
- Integration of Cisco’s Partner Ecosystem

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Bringing it all together

Business Need → Application Development

Deployment

Test Results on Simulated Environments
A sneak peak 😊 - Try it out the DevOps lab at the Devnet Zone at Cisco Live!
What Does This Do For You?
Bringing Network Programming Closer to the Business

- Level of Abstraction, feature set
- Sophistication of Tools and SDK

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<th>Skill Set of Engineer/Developer</th>
<th>Networking</th>
<th>Capacity</th>
<th>Business Knowledge</th>
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<td>Current Status</td>
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<td>Target Goal</td>
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Resources
Cisco Developer Resources

- onePK - http://www.onepkdeveloper.com
- ODL - http://www.opendaylight.org/
- APIC-DC
  - GitHub - https://github.com/datacenter/nexus9000
Cisco Live SDN and Network Programming Resources

- Monday, May 19, 8:00-9:30 - **BRKOPT-2102** - Software Innovations and Control Plane Evolution in the new SDN Transport Architectures - Loukas Paraschis
- Monday May 19, 9:00-09:30 - DevNet Presentation - onePK: The Swiss Army Knife of Developer Tools - Nathan Sowatskey
- Monday, May 19, 10:00-12:00 - **BRKRST-2117** - The Hitchhiker's Guide to onePK - Shelly Cadora
- Monday, May 19, 12:00-12:30 – DevNet Presentation - Enabling DevOps in an SDN World – Akshat Sharma
- Monday, May 19, 13:00-15:00 - **BRKSDN-1014** - Introduction to Software-Defined Networking (SDN) and Network Programmability - Jason Davis
- Monday, May 19, 13:00-15::00 - **BRKNMS-3021** - Advanced Cisco IOS Device Instrumentation - Joe Clarke
Cisco Live SDN and Network Programming Resources

- Tuesday, May 20, 8:00-9:30 - BRKSDN-2777 - Open Network Environment (ONE) Software Development Lifecycle (SDLC) - Nathan Sowatskey
- Tuesday, May 20, 12:30-14:30 - BRKRST-2051 - SDN – From Concepts To Reality - Frank Brockners
- Wednesday, May 21, 8:00-17:00 - LTRNMS-3601 – Advanced Network Programming and Automation - Joe Clarke, Nathan Sowatskey, Bruno Klauser, Jason Pfeifer
- Thursday, May 22, 8:00-10:00 - BRKSPG-2722-SDN deployment in ASR9000 - Joel Roberts, Robert Piasecki
- Thursday, May 22, 12:30-14:00 - BRKCRS-3090 - Implementing Network Programming and Automation - Bruno Klauser
- Thursday, May 22, 14:30-16::00 - BRKCDN-2303 - DevOps in Programmable Network Environment - Faisal Hasan, Azeem Suleman
Putting it all Together
ACI SDLC - Putting it all Together

- A combined and unified development framework for DevOps over the entire IT stack
- A single set of tools, techniques and technologies for all actors in the DevOps arena
- Brings the best of lessons learnt in IT services and development to the (new) world of network programming
- Provides a common basis for different domains to work together to benefit the business
- Uplift skills and capabilities for network engineers and operators to add greater value to the IT stack
Common Questions

- **When can we have it?**
  - The initial DevOps evaluation version will be available shortly from [https://developer.cisco.com/site/networking/one/sdlc/](https://developer.cisco.com/site/networking/one/sdlc/)
  - Contact sdlc-feedback@cisco.com

- **How does this relate to, for example, Chef and Puppet?**
  - All of this is about end-to-end automation. Chef and Puppet development can be automated in this framework also.

- **Is this Cisco only?**
  - The VRL technology is based on Ubuntu and OpenStack and can manage VMs in general. Other VM form factors can work in VRL too.

- **Will there be a hosted version?**
  - The Cisco DevNet Sandbox will also be providing similar capabilities to announced soon
Thank you.