

DevOps at Sonatype

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1 DevOps at Sonatype

Lessons Learned from Using Repository Managers and Software Supply Chain Tools

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- Community Advocate, Author & Trainer

Brian Fox - [@brian_fox](#)

- VP of Product Management

Sonatype - [@sonatype](#) - www.sonatype.com

2 What Are You Learning Today?

What worked? What caused problems?

→ Apply our lessons to your own situation

3 What does Sonatype actually do?

Manages and develops:

- Nexus Repository Manager
- Nexus IQ Server
- Nexus IQ Data Services component intelligence
- Central Repository (aka Maven Central)
- OSSRH and related Forges
- Related documentation, websites, blogs, videos,...

4 Software Component Warehouse

Nexus Repository Manager

- 70% market share
 - > 50K server installations
 - Nexus 3 - distinct new codebase
 - Nexus OSS: Maven2, npm, RubyGems, NuGet, Docker, ...
 - Commercial: Component Information, Staging, Smart Proxy, User Token, ...
-

5 Software Supply Chain Automation

Nexus Lifecycle, Nexus Suite, Nexus Firewall

- Nexus IQ Server
- Integrations with Jenkins, Hudson, Bamboo
- Eclipse IDE/M2e Plugin
- SonarQube integration

All of this is backed by...

6 Nexus IQ Data Services

Curated and managed data and services for:

- Age
- Popularity
- Security vulnerabilities
- License analysis data (observed and declared)
- Multiple component formats

7 Central Repository (aka Maven Central)

- Largest Maven2 format repository
- High performance, global CDN
- > 17 billion download in 2014
- > 1 million GAV coordinates
- Default in Maven2 and others

And the components come from...

8 OSSRH and Forges

Input funnel for Central Repository

- OSSRH - large deployment of Nexus Repository Manager
 - Apache, JBoss, ... - secondary Nexus instances
 - Community support - onboarding and documentation
-

9 More OSSRH and Central Stats

- currently about 100k projects total
- approx 3000 new projects each month (GA)
- thats 10 - 30 project verified and onbarded per day
- approx 30.000 new releases each month (GAV)

10 Who Helps at Sonatype

- Internationally distributed
- Multiple-time zones
- Remote work the rule, not exception

images/nexus-team-timezones.png

11 Teams

- Numerous smaller teams
- Different focus of teams
- Cross-team members

12 Process

- Scrum framework
- Kanban inspired
- Backlog refinement
- Regular meetings

images/usual-process.png

13 Communication

- Good old phone and VOIP
 - Atlassian HipChat
 - Google Hangouts
 - join.me
 - PagerDuty
-

14 SCM

- GitHub - public and private
- Atlassian Stash - private only

15 Track and Plan

- Atlassian JIRA
- Aha
- Trello
- Basecamp
- Salesforce

16 Tools Lesson

- Different people use different tools
- Overlap is inevitable
- Tools come and go - be agile

17 Continuous Integration

- Atlassian Bamboo
- Feature branch builds

18 Build

- Apache Maven
- Grunt and NPM for client side
- Bash Scripts

19 Maven Tips and Tricks

- Maven wrapper
 - Follow best practices
 - Organizations POM
 - Enforcer
 - Avoid forking third party libraries
 - But do it cleanly when necessary
-

20 Project Complexity

Find balance for

- Number vs Size of projects
- Multi-module vs multiple projects
- Consider Release Cycle

Tip

Example Nexus OSS and Pro

21 Develop

- Feature branches
 - with CI
 - short lived
- IDE
 - Eclipse IDE
 - IntelliJ IDEA
- Lots of OSX, some Windows & Linux

22 Test

Unit, functional and manual

- Junit
- Geb
- Spock

23 Document

- Atlassian Confluence
 - Google Docs
 - AsciiDoc
 - Pelican
-

24 Continuously Build

- Atlassian Bamboo
- > 100 build plans
- Elastics Bamboo - EC2 instances
- Feature branch builds increases number
- Automated functional test suite runs
- Automated release
- Documentation builds and deployments

25 Bamboo Tips

- Resource project (link to video maybe)
- Fresh Maven repo for each build off Nexus
- Build plan notifications into HipChat channels
- Links to GitHub and JIRA

26 More Bamboo Tips

- Share repo and other outputs as build artifacts
- Static documentation = usable artifact
- Limited number of standard Amazon Machine Images (AMI)
- Include standard tools
- Build artifacts stored on Amazon Elastic Block Storage (EBS)
- Base build plan with tool configuration\

27 Build Plan Commonalities

All builds plans:

- Common configuration from base plan - used as shared artifact, managed in git repo
 - Global variables - defaults that allow overrides
 - *build* task - compile and test code.
 - *release* task - publish to Nexus and tag in git
 - bundle test artifacts
 - Main vs features branches - different config
 - Branch builds auto-created
-

Repository manager

- component source for consumers
- component target for producers

images/producers-consumers.png

28 Co-Locate For Performance

Continuous integration is consumer and producer.

Best practice:

- Get it close together
- And sync to another repository if needed.

images/nexus-bamboo-rso.png

29 Validate

- SonarQube - integrated in Bamboo and GitHub
- License check with Maven plugin
- No merges without build passing and code review
- Component policy with Nexus Lifecycle

30 Release

- Workflow and notification with Nexus staging
- Including validation with Nexus Lifecycle
 - Security checks
 - License checks
 - ?? anything else, maybe component age
- Usage of release build number - 2.11.4-01
- Same release stuff on OSSRH

images/nexus-bamboo-staging.png

31 Manage Components

Nexus Repository Manager and Nexus Lifecycle Nexus Repository Manager * SNAPSHOT versions of master are deployed to Nexus * feature branch versions are not deployed * master = integration branch * within build cluster * also used by developers * target for deployments * proxy * host * staging * Thousands of users and projects on OSSRH * smart proxy to Nexus outside cluster

32 Black and White Listing

Wont work .. tbd

33 Golden Repository

wont work

34 Nexus Lifecycle

- Visualize risk through rule-based automation
- Streamlines component selection with real time data

35 Starting Off

- Define risks we care about (internal, external, customer used)
- Open source contributions change out policy (since we contribute it makes sense to use bleeding edge)
- Understand our process and tooling
- limit overhead in our build automation

36 Nexus IQ Server Deployment

images/nexus-iq-server-integration.png

37 Policy

images/sonatype-policy.png

38 Resulting Report

images/nexus-clm-report.png

39 Nexus Lifecycle Lessons

- Surprise how many components are used - so many!
 - Blocking a release for policy violations
 - is a big stick
 - but it works
-

Expect some cleanup of old issues

Socialize the resolution/enforcement process

Low noise and fast results increases usage, adoption

Automate and let the tooling do work (I already have a day job!)

Be responsive (That is my day job!)

40 Perimeter Protection

is Nexus Firewall. Can help

41 Deploy

Ops team:

- RPMs
- Docker images

42 Support

The support team consists of engineers.

- Write lots of automation and other code
- Atlassian JIRA
- ZenDesk

43 Operations

- SaaS is used whenever possible
- Kanban process
- iDoneThis

Tip

Our Nexus instances vary from hundreds of GB to terabytes of non-proxied context.

44 Operations - Service Management

Nexus as component warehouse with Ansible

images/service-management.png

45 Community

- Actively work with vendors
- Including open source projects
- Help upstream to help yourself
 - Report issues
 - Release testing
 - Contributions

46 Next?

- Join the [Nexus community](#)
- Star using Nexus OSS
- Try Nexus Repository Manager
- Try Nexus Lifecycle
- Come to our booth

47 The End

Questions, Remarks & Discussion

Tip

Slides and examples at <http://sonatype.github.io/nexus-presentations/> or email manfred@sonatype.com

i. and we are hiring!

48 Resources

- [sonatype.com](#)
 - [Nexus community](#)
 - [Central Repository](#) and [documentation](#)
 - [Youtube channel](#)
 - [Inside Engineering](#) - blog post
 - [Inside Engineering](#) - videos
 - [Nexus Tips from the Trenches](#) video series
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