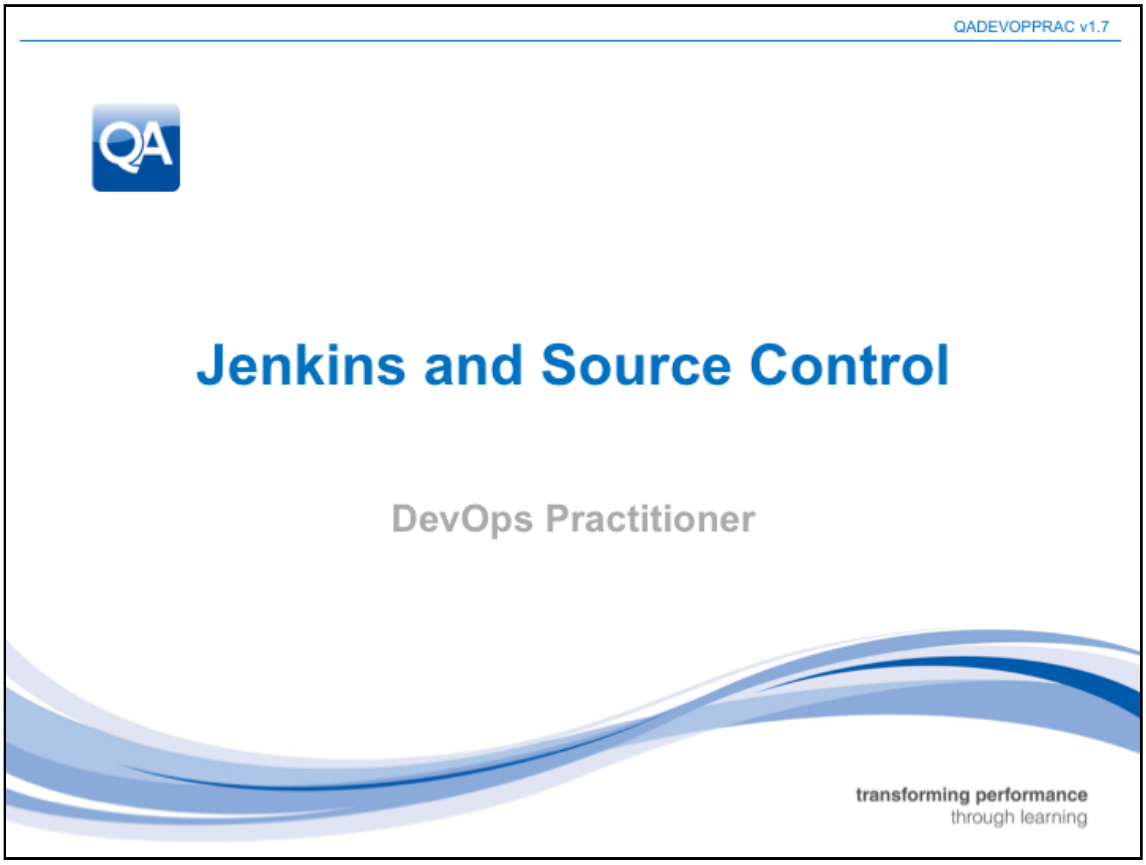

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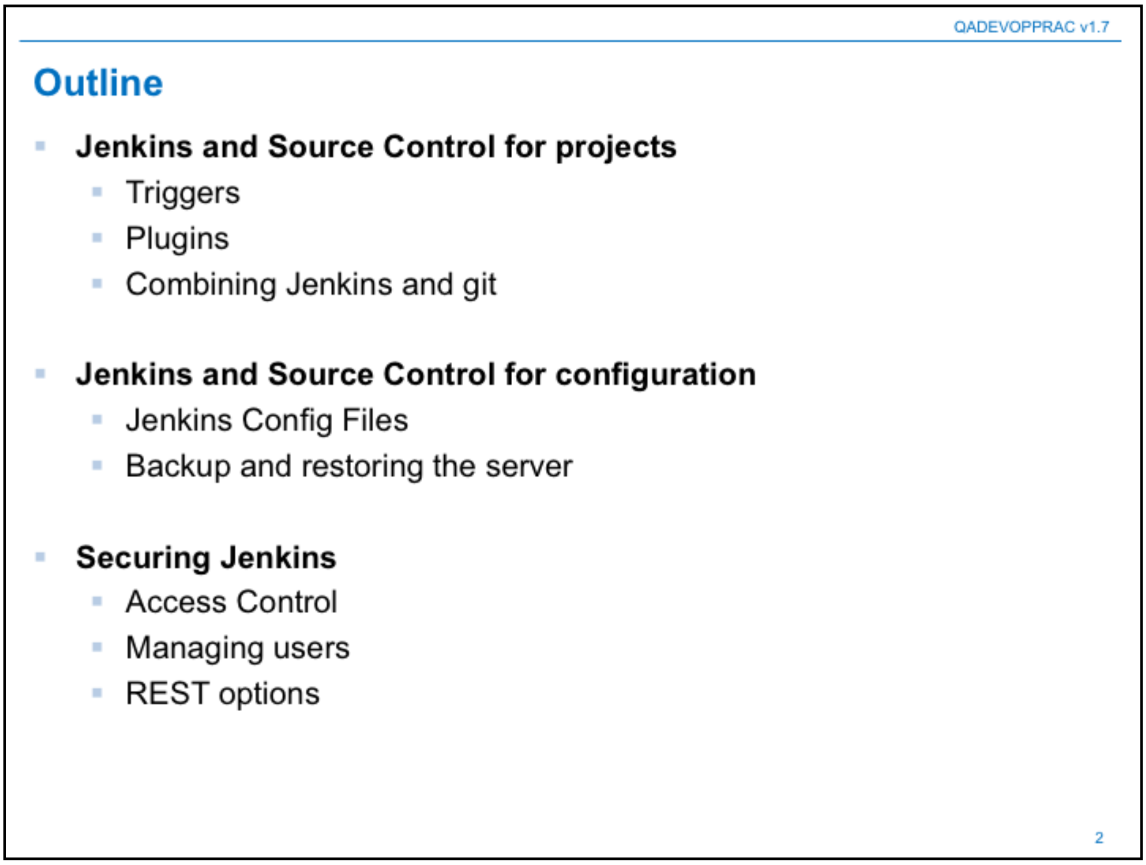
Jenkins and Source Control

DevOps Practitioner

transforming performance
through learning

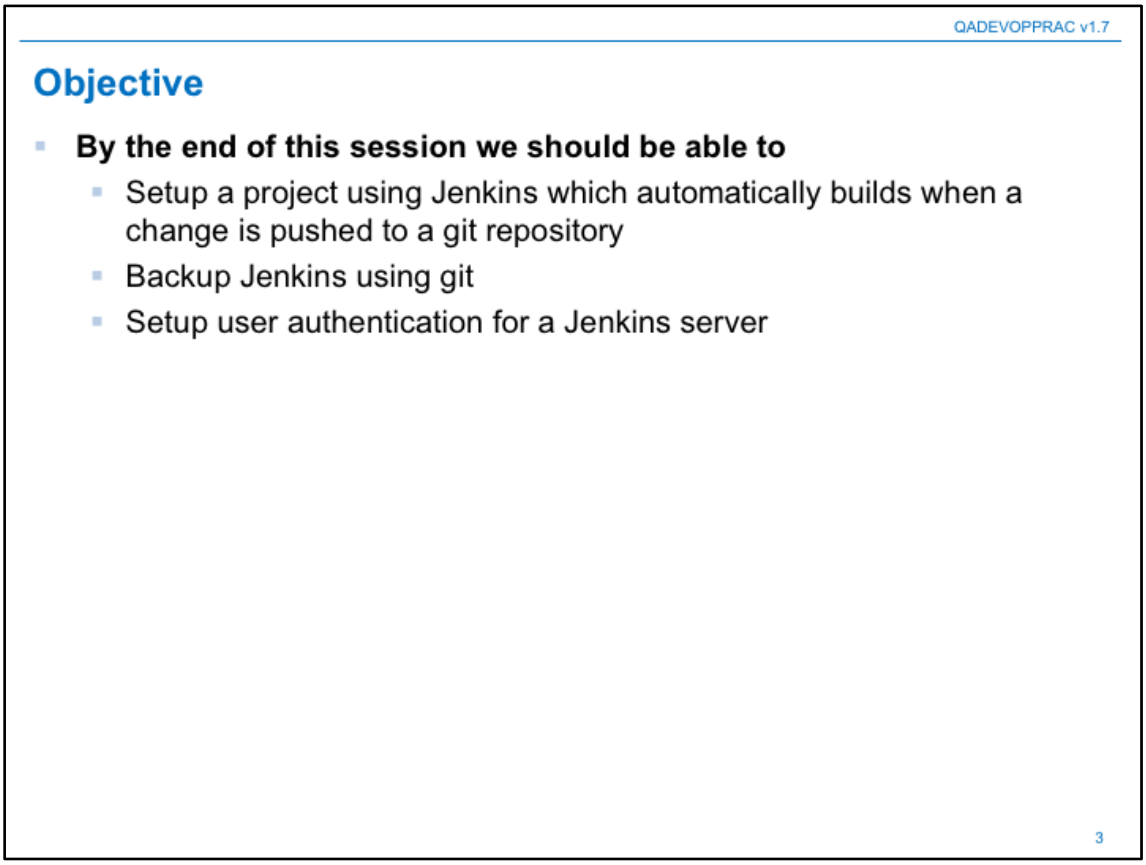


Outline

- **Jenkins and Source Control for projects**
  - Triggers
  - Plugins
  - Combining Jenkins and git

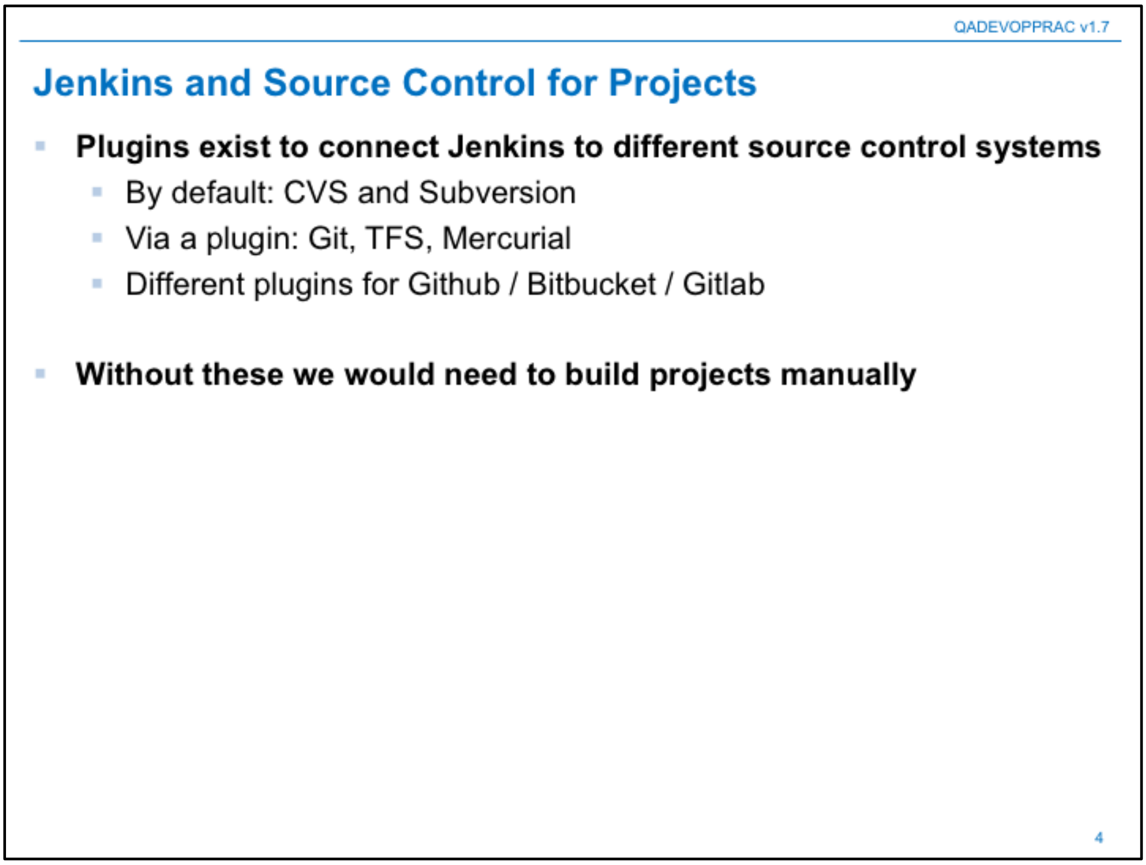
- **Jenkins and Source Control for configuration**
  - Jenkins Config Files
  - Backup and restoring the server

- **Securing Jenkins**
  - Access Control
  - Managing users
  - REST options



Objective

- **By the end of this session we should be able to**
  - Setup a project using Jenkins which automatically builds when a change is pushed to a git repository
  - Backup Jenkins using git
  - Setup user authentication for a Jenkins server



Jenkins and Source Control for Projects

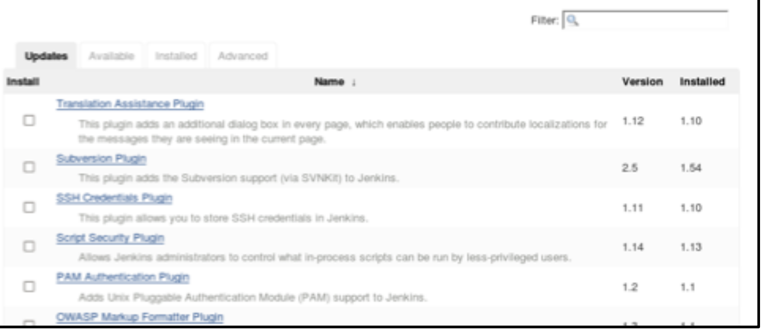
- **Plugins exist to connect Jenkins to different source control systems**
  - By default: CVS and Subversion
  - Via a plugin: Git, TFS, Mercurial
  - Different plugins for Github / Bitbucket / Gitlab
- **Without these we would need to build projects manually**

Installing the Git Plugin – if you've not done it already!

- **Via the GUI**
  - Click the "Manage Jenkins" link - http://localhost:8080/manage
  - "Manage plugins" link - http://localhost:8080/pluginManager/
  - Can update current plugins or search for new ones

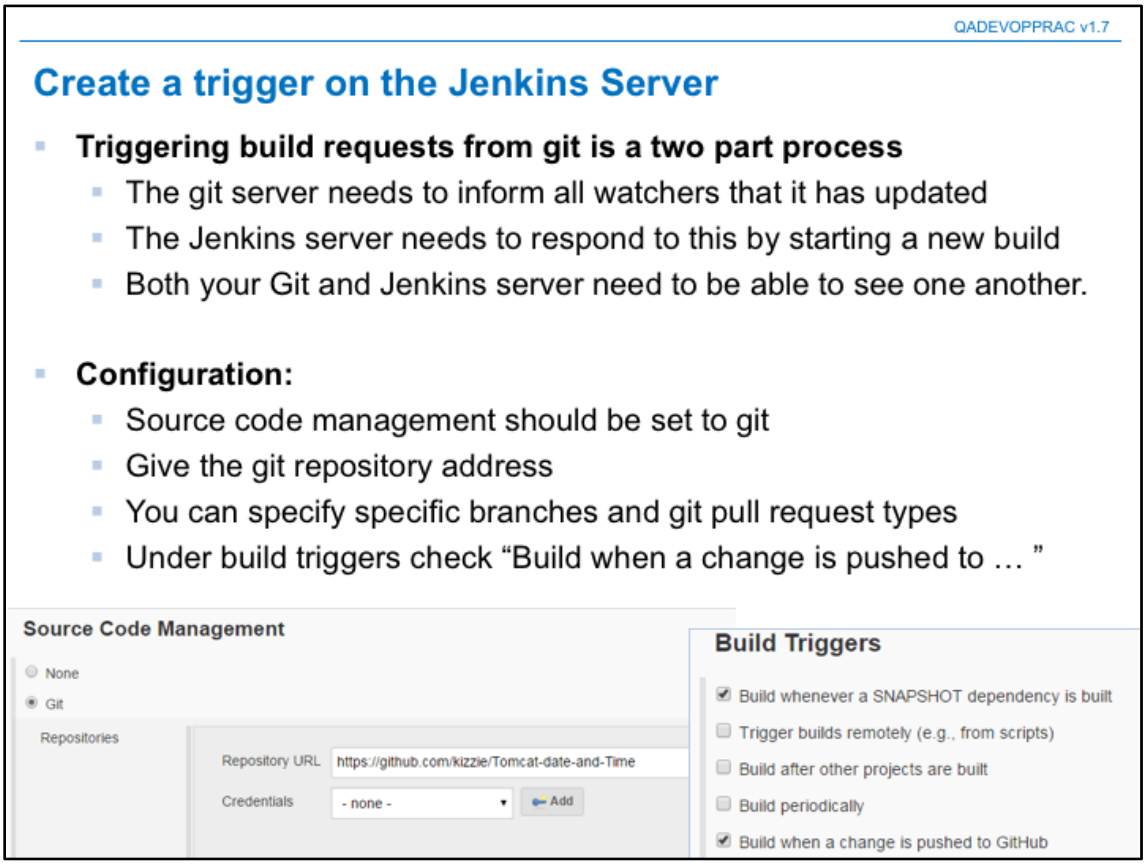
- **Go to the "Available" tab**
  - Search for the plugin required
  - For github: "GitHub Plugin"
  - For bitbucket: "BitBucket Plugin"

- **Most plugins can be installed without restarting the server**



Install	Name ↓	Version	Installed
□	Translation Assistance Plugin This plugin adds an additional dialog box in every page, which enables people to contribute localizations for the messages they are seeing in the current page.	1.12	1.10
□	Subversion Plugin This plugin adds the Subversion support (via SVNKit) to Jenkins.	2.5	1.54
□	SSH Credentials Plugin This plugin allows you to store SSH credentials in Jenkins.	1.11	1.10
□	Script Security Plugin Allows Jenkins administrators to control what in-process scripts can be run by less-privileged users.	1.14	1.13
□	PAM Authentication Plugin Adds Unix Pluggable Authentication Module (PAM) support to Jenkins.	1.2	1.1
□	OWASP Markup Formatter Plugin		

http://devops.com/2015/01/15/15-must-jenkins-plugins-increase-productivity/



Create a trigger on the Jenkins Server

- **Triggering build requests from git is a two part process**
  - The git server needs to inform all watchers that it has updated
  - The Jenkins server needs to respond to this by starting a new build
  - Both your Git and Jenkins server need to be able to see one another.
- **Configuration:**
  - Source code management should be set to git
  - Give the git repository address
  - You can specify specific branches and git pull request types
  - Under build triggers check “Build when a change is pushed to … ”

Source Code Management

○ None
● Git

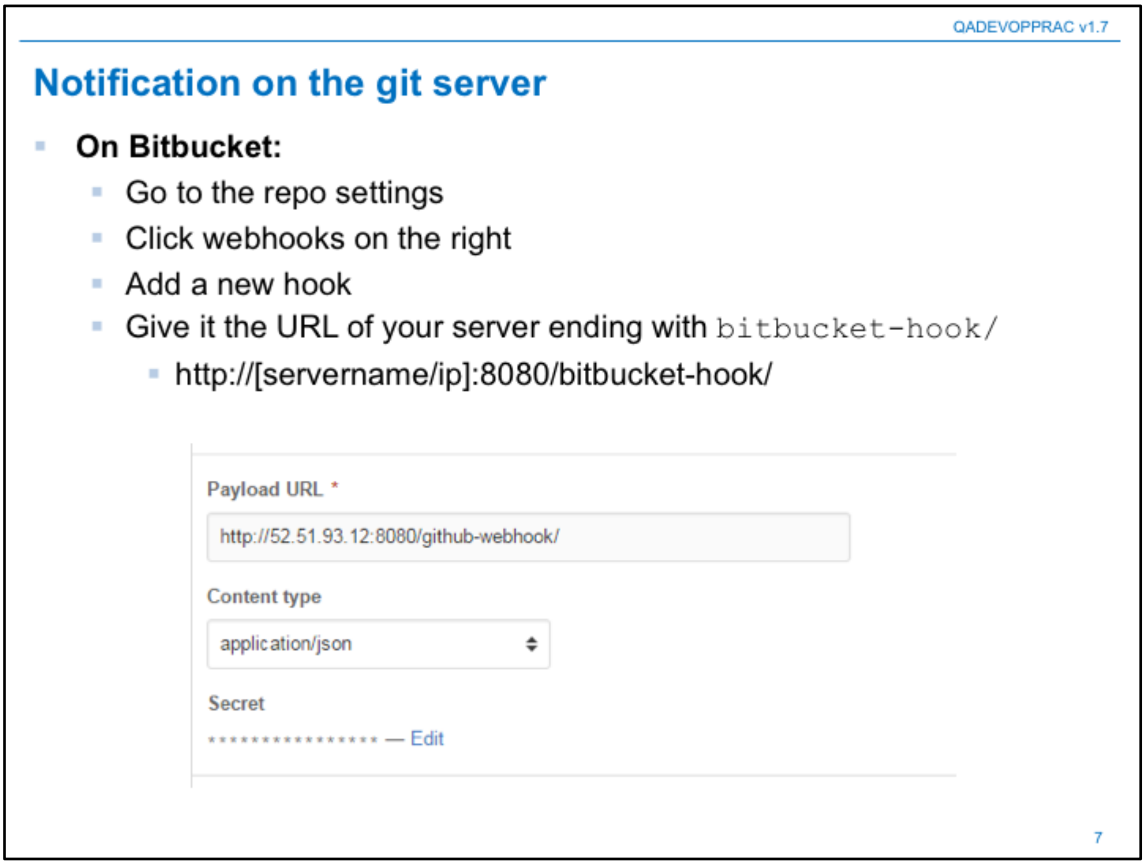
Repositories

Repository URL: https://github.com/kizzie/Tomcat-date-and-Time

Credentials: - none -

Build Triggers

☑ Build whenever a SNAPSHOT dependency is built
☐ Trigger builds remotely (e.g., from scripts)
☐ Build after other projects are built
☐ Build periodically
☑ Build when a change is pushed to GitHub



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Notification on the git server

- **On Bitbucket:**
  - Go to the repo settings
  - Click webhooks on the right
  - Add a new hook
  - Give it the URL of your server ending with `bitbucket-hook/`
    - http://[servername/ip]:8080/bitbucket-hook/

Payload URL *

http://52.51.93.12:8080/github-webhook/

Content type

application/json

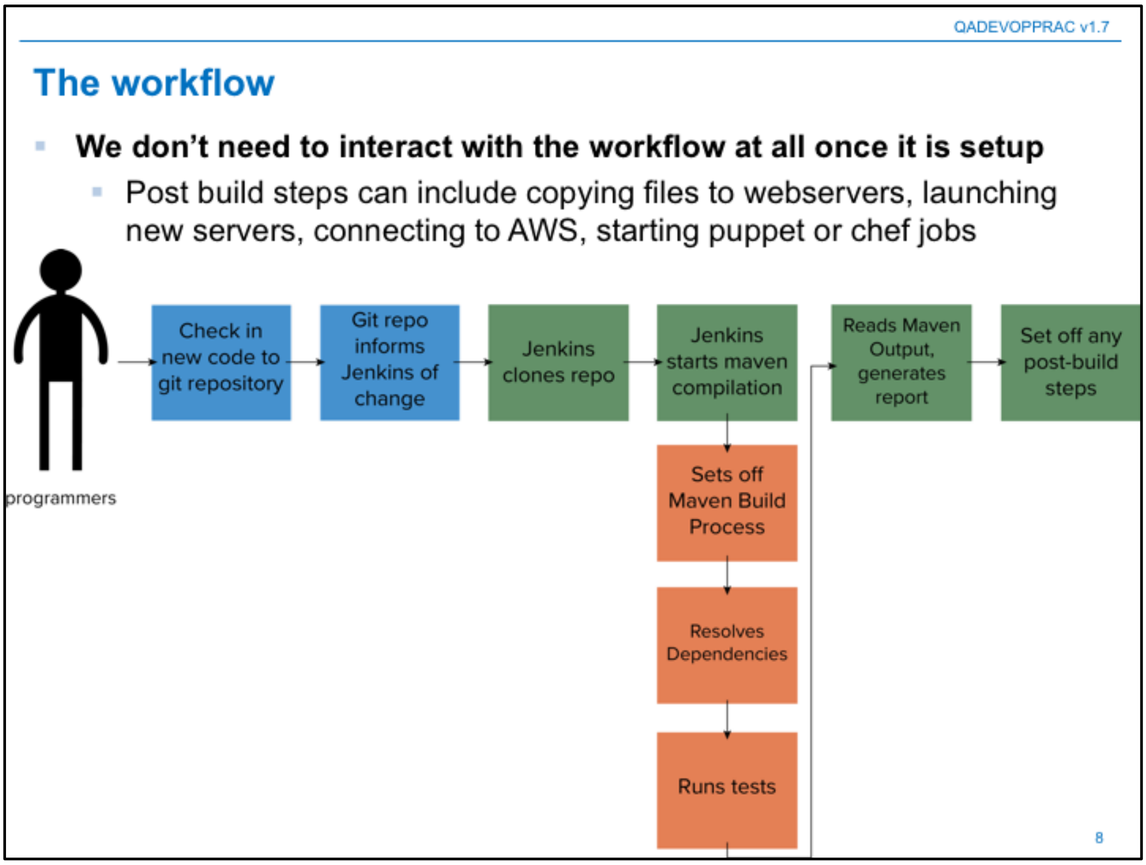
Secret

**************** — Edit

7

https://confluence.atlassian.com/display/BITBUCKET/Manage+Bitbucket+hooks

For github use: github-webhook/
http://[servername/ip]:8080/github-webhook/



The workflow

- **We don’t need to interact with the workflow at all once it is setup**
  - Post build steps can include copying files to webservers, launching new servers, connecting to AWS, starting puppet or chef jobs

programmers

Check in new code to git repository

Git repo informs Jenkins of change

Jenkins clones repo

Jenkins starts maven compilation

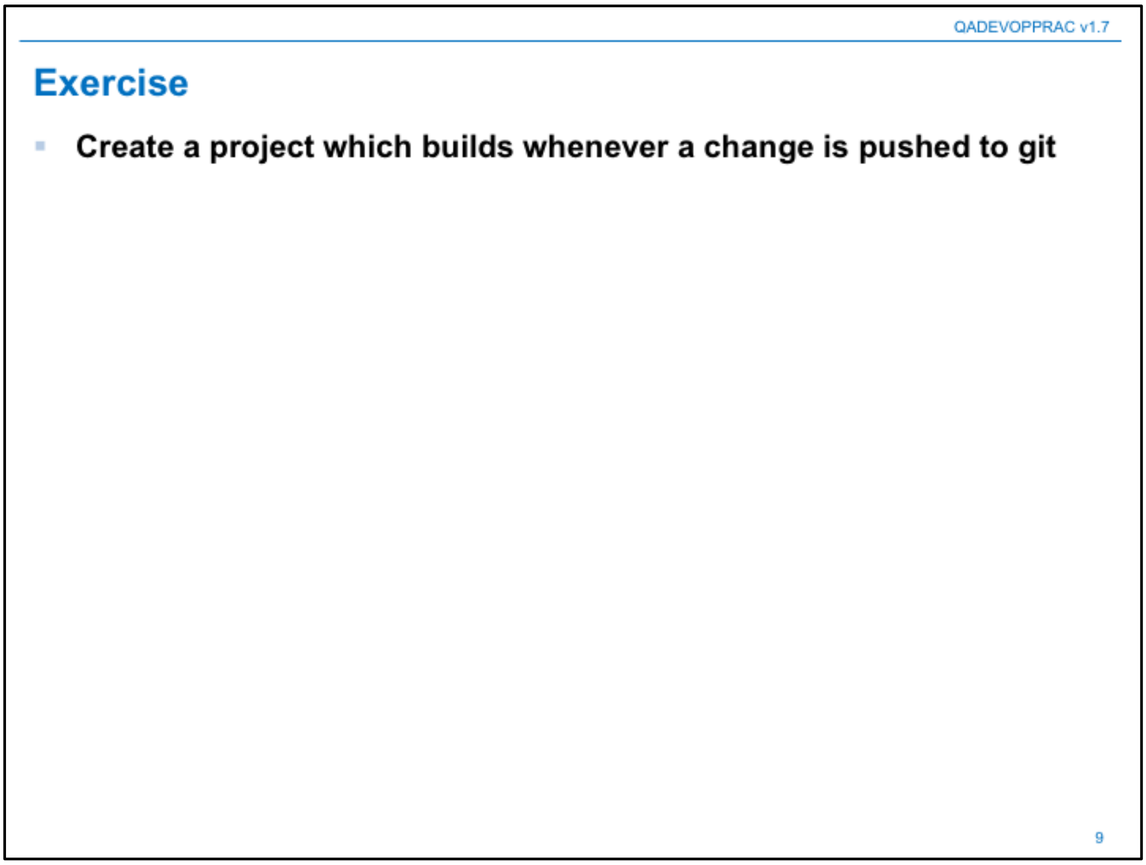
Sets off Maven Build Process

Resolves Dependencies

Runs tests

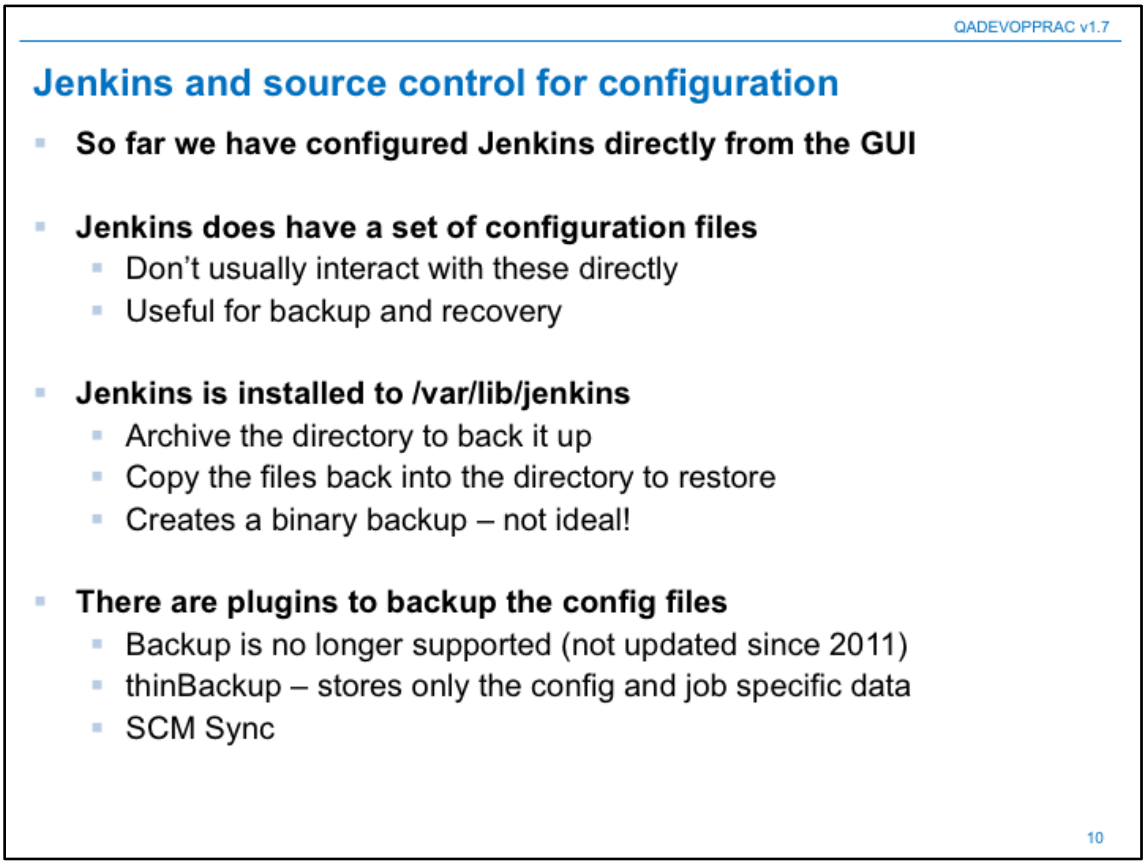
Reads Maven Output, generates report

Set off any post-build steps



Exercise

- **Create a project which builds whenever a change is pushed to git**



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Jenkins and source control for configuration

- **So far we have configured Jenkins directly from the GUI**

- **Jenkins does have a set of configuration files**
  - Don’t usually interact with these directly
  - Useful for backup and recovery

- **Jenkins is installed to /var/lib/jenkins**
  - Archive the directory to back it up
  - Copy the files back into the directory to restore
  - Creates a binary backup – not ideal!

- **There are plugins to backup the config files**
  - Backup is no longer supported (not updated since 2011)
  - thinBackup – stores only the config and job specific data
  - SCM Sync

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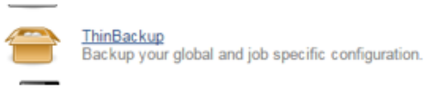
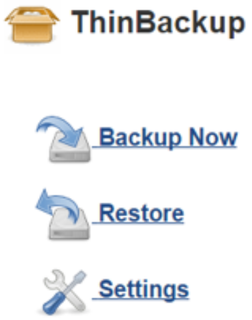
Automating backup - thinBackup

- **Install the thinBackup plugin**
  - This gives you a new option on the management screen



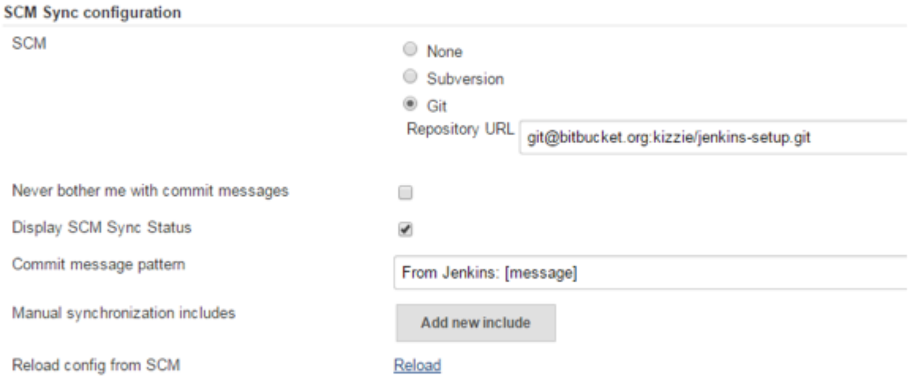
ThinBackup
Backup your global and job specific configuration.

- **Backup now will generate a set of files which you can store in source control**
  - Need to set the backup directory via the settings
  - You can schedule automatic backups
  - Restore will configure the server
- **Create a cron job to commit the changes to git after the backup has run**



Automating Backup – SCM Sync Configuration Plugin

- **Install the plugin**
  - Adds options under Manage Jenkins -> Configure System



SCM Sync configuration

SCM: ○ None ○ Subversion ● Git

Repository URL: git@bitbucket.org:kizzie/jenkins-setup.git

Never bother me with commit messages □

Display SCM Sync Status ☑

Commit message pattern: From Jenkins: [message]

Manual synchronization includes

Reload config from SCM

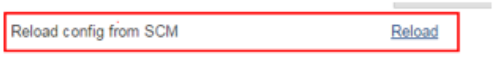
- **Setup a git repository and link it to SCM**
  - Need to create a SSH key to login – it won't accept passwords
  - (We'll do this in the exercise!)

https://cburgmer.wordpress.com/2013/01/02/tracking-configuration-changes-in-jenkins/

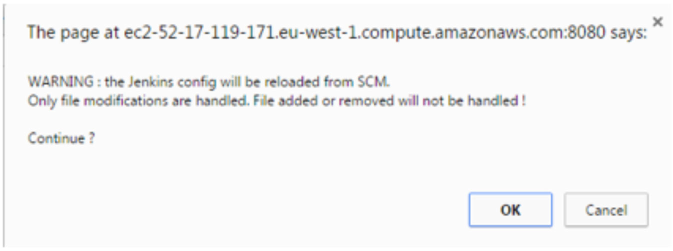
Automating setup

- **We can install everything from a single script to get a server up and running**

- **Reload from SCM if setup correctly**
  - The backup can store jobs, built projects, user settings and



Reload config from SCM



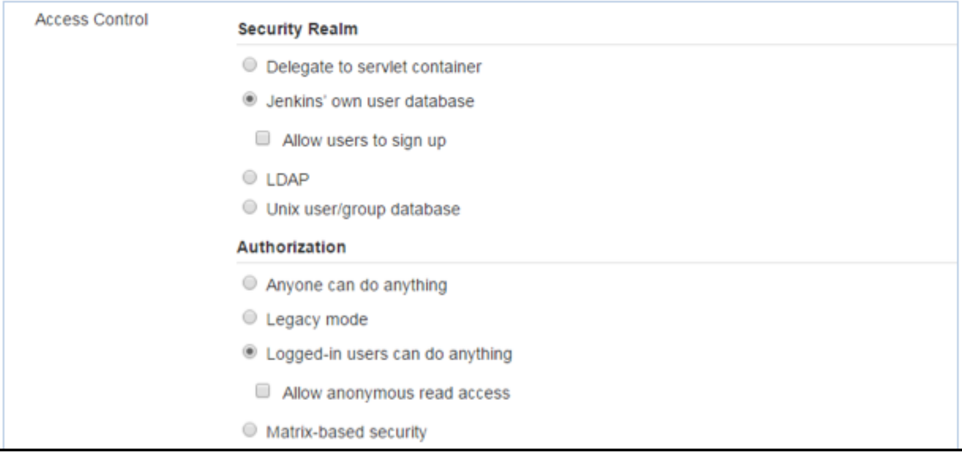
The page at ec2-52-17-119-171.eu-west-1.compute.amazonaws.com:8080 says:

WARNING : the Jenkins config will be reloaded from SCM.
Only file modifications are handled. File added or removed will not be handled !

Continue ?

Securing Jenkins

- **Security is enabled by default in Jenkins 2.0**
  - Originally, Jenkins would allow anyone to create and build jobs
- **You want to restrict who can trigger new builds and setup new jobs on your server**
  - Otherwise random people on the internet will be able to use your build server!



Access Control

Security Realm

○ Delegate to servlet container

● Jenkins' own user database

□ Allow users to sign up

○ LDAP

○ Unix user/group database

Authorization

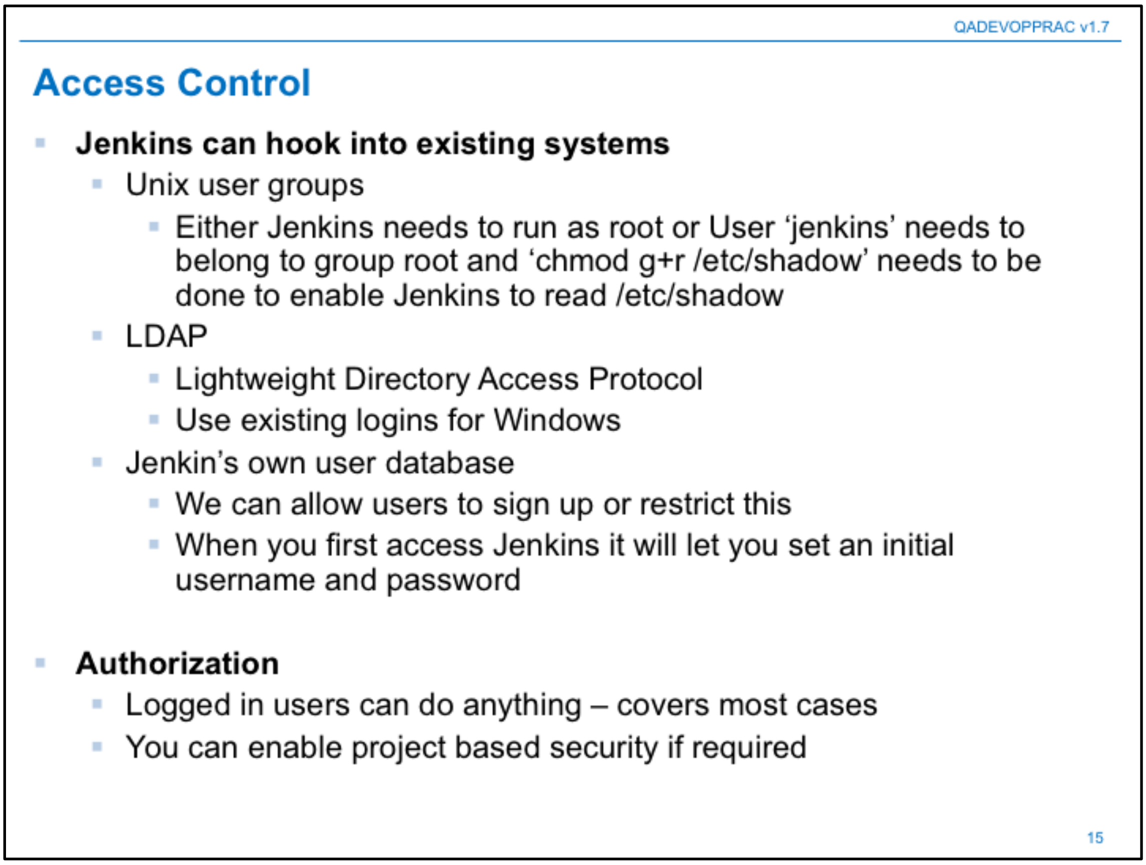
○ Anyone can do anything

○ Legacy mode

● Logged-in users can do anything

□ Allow anonymous read access

○ Matrix-based security



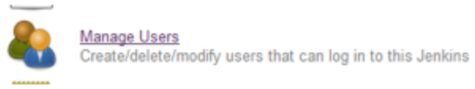
Access Control

- **Jenkins can hook into existing systems**
  - Unix user groups
    - Either Jenkins needs to run as root or User ‘jenkins’ needs to belong to group root and ‘chmod g+r /etc/shadow’ needs to be done to enable Jenkins to read /etc/shadow
  - LDAP
    - Lightweight Directory Access Protocol
    - Use existing logins for Windows
  - Jenkin’s own user database
    - We can allow users to sign up or restrict this
    - When you first access Jenkins it will let you set an initial username and password

- **Authorization**
  - Logged in users can do anything – covers most cases
  - You can enable project based security if required

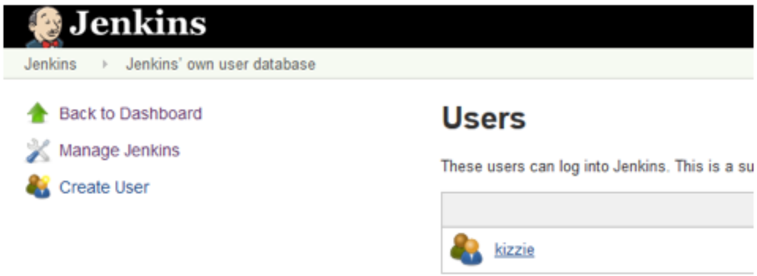
Manage Users

- Now we can add users manually from the Manage Jenkins menu



Manage Users

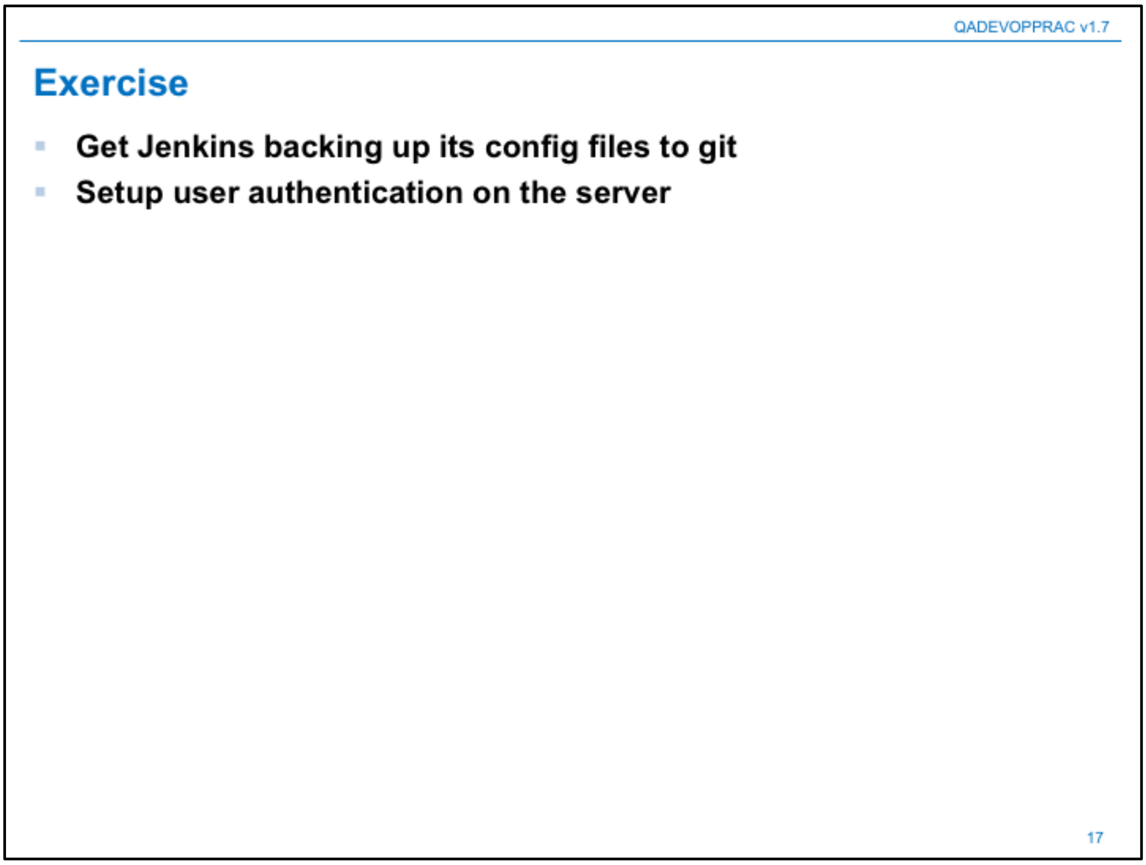
Create/delete/modify users that can log in to this Jenkins



Users

These users can log into Jenkins. This is a su

kizzie



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Exercise

- Get Jenkins backing up its config files to git
- Setup user authentication on the server

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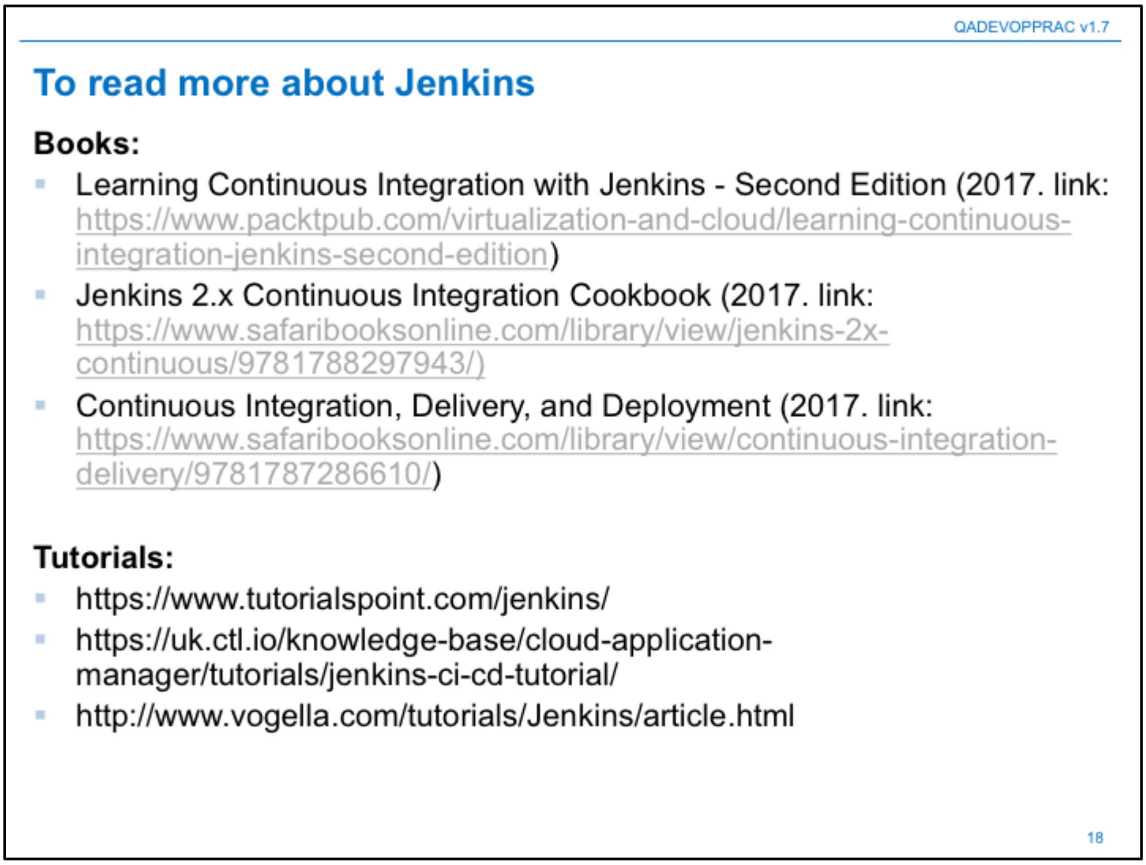


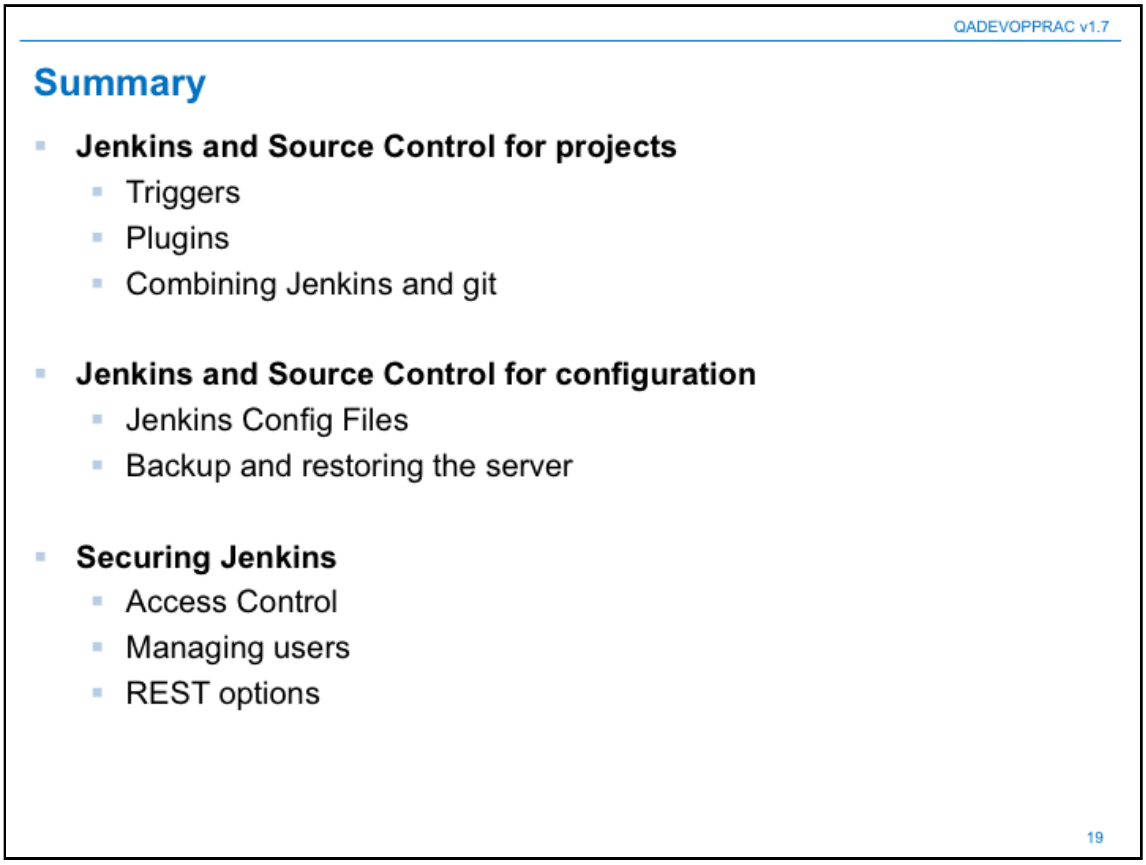
To read more about Jenkins

Books:

- Learning Continuous Integration with Jenkins - Second Edition (2017. link: https://www.packtpub.com/virtualization-and-cloud/learning-continuous-integration-jenkins-second-edition)
- Jenkins 2.x Continuous Integration Cookbook (2017. link: https://www.safaribooksonline.com/library/view/jenkins-2x-continuous/9781788297943/)
- Continuous Integration, Delivery, and Deployment (2017. link: https://www.safaribooksonline.com/library/view/continuous-integration-delivery/9781787286610/)

Tutorials:

- https://www.tutorialspoint.com/jenkins/
- https://uk.ctl.io/knowledge-base/cloud-application-manager/tutorials/jenkins-ci-cd-tutorial/
- http://www.vogella.com/tutorials/Jenkins/article.html



Summary

- **Jenkins and Source Control for projects**
  - Triggers
  - Plugins
  - Combining Jenkins and git
- **Jenkins and Source Control for configuration**
  - Jenkins Config Files
  - Backup and restoring the server
- **Securing Jenkins**
  - Access Control
  - Managing users
  - REST options

https://jenkinsapi.readthedocs.org/en/latest/