DevOps World

Jenkins World

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Featured Speaker

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Automating Jenkins (re)installation: some thoughts, tips, and tricks

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Automating Jenkins (re)installation:
some thoughts, tips, and tricks

Presentation available at: https://jmMeessen.github.io/slides/jw-eu-2019

Hello !!

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Fish Sticks
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SOURCE NATURELLE DE
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Fish Sticks
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Who are you?

What is configuration Management?

Pet versus Cattle

Automation, automation, automation!

- Reduces toil and frees precious time
- Repeatable
- Best emergency/repair tool
- Best way to avoid any malicious modification

In Source Control

- Visibility
- Peer review
- History
- Versioned ⇒ Revertable

Why should CI/CD systems be handled as a Pet ?

Automation objectives

- **Provision** (bootstrap) new CI/CD cluster
  - efficiently
  - repeatably
  - consistantly
- **Update** the system
  - ex: add a new master, change a setting, add a plugin

Automation objectives

- Peer-review mechanism for configuration changes
  - Keeps the audit/compliance team happy
- Easily manage very large CI/CD cluster
- Properly document the system
- support CI/CD power users
  - behind the scene warranty for creativity

Configuration Management philosophies

Golden Image

- in the early days
  - a lot of work to maintain
  - messy
  - "one size fits nobody"

Configuration Scripting

- Scripts solved a lot of these problems
  - added
    - readability
    - versioning
- At first ad hoc (bash) scripting
- then Chef, Puppet, Ansible, etc.

Golden Image revisited

- Docker/Containers
  - Golden Image new momentum
  - very short start time
    - image definition description files (dockerfiles)
    - particularly adapted to the Cloud scheduler (ex K8S)

But no silver bullet

- reality lies between
  - generalization (general purpose images)
  - need for fine grained customizations to adapt to the local constrains

Jenkins configuration vectors

Direct file System manipulation

- classical way to configure a system
- copying/updating files on the file system (JENKINS_HOME)
- Typical Ansible modules.
  - copy
  - template
  - lineinfile
  - xml

File system vector: Pro

- easy/natural for tools like Ansible

File system vector: Con

- lot of reverse engineering required
- stability of these undocumented configuration is not guaranteed.
  - particularly plugins configuration

Command Line Interfaces

- two types
  - REST API
  - Jenkins CLI

REST API

- using HTTP requests to GET, PUT, POST and DELETE data.

```
curl -X POST "<jekinsURL>/testProject/build" --user jmm:<password|token>
```

REST API - CSRF protection

- be aware of CSRF protection (should be on, isn't it?)
  - session highjacking
  - requires a token or "crumb" when using password
  - not required when using an API Token

REST API

- To learn more:
  - https://wiki.jenkins.io/display/JENKINS/Remote+access+API
  - https://wiki.jenkins.io/display/JENKINS/Authenticating+scripted+clients

Jenkins CLI

- Traditional way, via the `jenkins-cli.jar`
- To list the very functions list (dependant of installed plugin):
  - view it in "Manage Jenkins → Jenkins CLI"
  - or simply use "help" CLI command.

Jenkins CLI - Classic

```
java -jar jenkins-cli.jar -http -s $JENKINS_URL -auth $USERNAME:$API_token command ...
```

Much better:

```
java -jar jenkins-cli.jar -http -s $JENKINS_URL -auth @FILE command ...
```

Jenkins CLI - SSH

- A simple SSH can also be used.
- Requires to enable the build-in SSH server and assign a port
  - watch your firewalls and reverse proxy

```
ssh -l jmm -i ~/.ssh/id_rsa -p 10200 my-jenkins-server help
```

Jenkins CLI - More details

- https://jenkins.io/doc/book/managing/cli/

Summary

- Rich set of API
- Easy to use in Ansible for example
- Initial user and credential is a tough problem to solve
  - SSH authentication can be automated
- CLI does a better job at controlling parameter
- CLI makes blocking calls
- CLI commands are better documented
- Parsing results is tricky

Recommendation

- Use CLI
- Use CLI with SSH if you can (networking)
- Consider executing commands from target host.

Groovy Scripts

- Richest way to configure Jenkins
  - Taps into Jenkins native language
- Need developer skills
- Documentation not easy to find
  - See this *Knowledge Base article* on how to access the javadocs
- Make them indempotent !

How to use Groovy Script

- via the script console
- at startup, as init-script
  - placed in `$JENKINS_HOME/init.groovy.d/`
  - executed in lexical order
- via the CLI

Groovy Scripts from the CLI

```
cat my_script.groovy | {{ CLI_command }} groovy =
```

Docker Container

- Can automate the configuration of some parts
  - ex: pre-loading plugins
- But does not solve all the problems
- a little out of the scope of this presentation

Jenkins Configuration as Code

- First developped and tested in OSS realm
- Implementation on CloudBees product is ongoing
- Declarative method, yaml based
- Loaded on reboot or with a CLI command

JCasC Example (LDAP cfg)

```
jenkins:
  securityRealm:
    ldap:
      configurations:
      - inhibitInferRootDN: false
        managerDN: "uid=idm,ou=Administrators,dc=example,dc=com"
        managerPasswordSecret: "{{ ldap_admin_passw }}"
        rootDN: "dc=example,dc=com"
        server: "ldap://{{ full_agent_docker_dns_name }}:389"
    disableMailAddressResolver: false
    disableRolePrefixing: true
    groupIdStrategy: "caseInsensitive"
    userIdStrategy: "caseInsensitive"
```

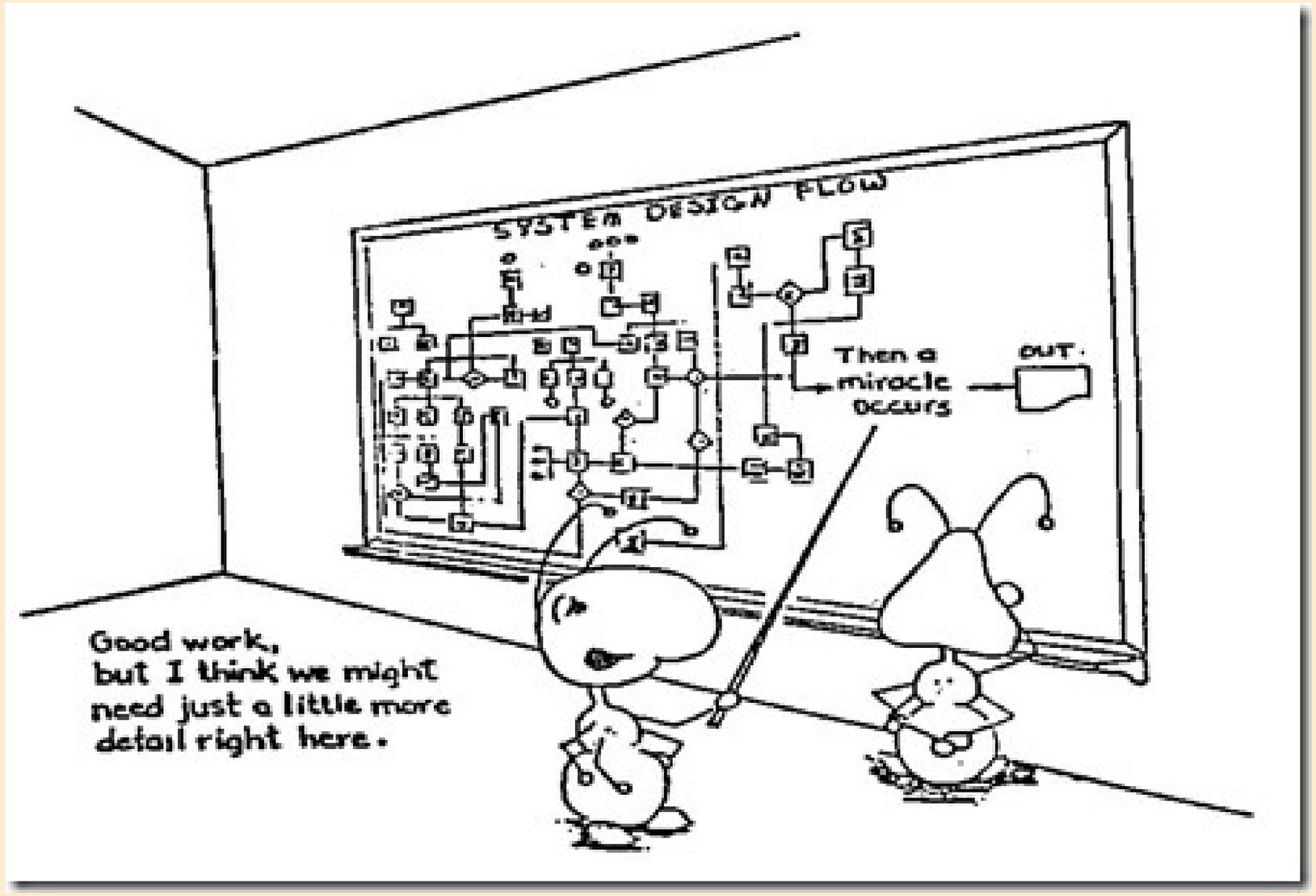
JCasC Example (JNLP agent)

```
jenkins:
  nodes:
  - permanent:
      labelString: "jnlp"
      mode: NORMAL
      name: "jnlp-agent"
      remoteFS: "/home/jenkins"
      launcher:
        jnlp:
          workDirSettings:
            disabled: true
      nodeDescription: "Agent that initiates its own connection to Jenkins"
      retentionStrategy: "always"
numExecutors: 0
```

Current Status

- In technical preview
  - Masters configuration work
  - CloudBees functionality in the works
  - Waiting for RBAC support
- Centralized CasC management from CJOC

And in Real Life?



- No easy way to solve bootstrapping problem
- Very often requiers manual operations
- Poorly documented / tooled
- Practice is still historical layers
- Not fit for the volatile K8S world

But Cloudbees is actively working on it

Bootstrap strategy

- see example on **https://github.com/jmMeessen/captains_aws_cjp**

1. Install jenkins configuration file (startup option)
    1. JAVA_ARGS → `-Djenkins.install.runSetupWizard=false`
2. Proceed with installation via package manager (`apt-get`)
3. Create `init.groovy.d` directory
4. Replace the instanceID with know one (`secret.key`)

Bootstrap strategy (cont.)

1. Add "init groovy scripts" in directory
    1. Initial security settings
    2. License loading script
    3. Set-URL, JNLP, and SSHD Port configuration scripts
    4. Create Cfg-Management user, generate key and load public key
2. Restart CJOC to activate scripts
3. Use CLI to install plugins
4. Use CLI to execute groovy to create Client Master

Bootstrap strategy (cont.)

1. Configure Client Master in same principle
    1. Add to JAVA_ARGS the connection info
    2. Configure security and initial users via init scripts
    3. Install default plugins
2. Configure Configuration as Code
3. Copy definition in adequate directory
4. Use CLI to force the load of configuration

Thank You !

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jmMeessen

Slides: https://jmMeessen.github.io/slides/jw-eu-2019

Source on : https://github.com/jmMeessen/slides/tree/jw-eu-2019