Unmasking the Jenkins DSL

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#jenkinsconf

About me

TODO(mattmoor): get a life

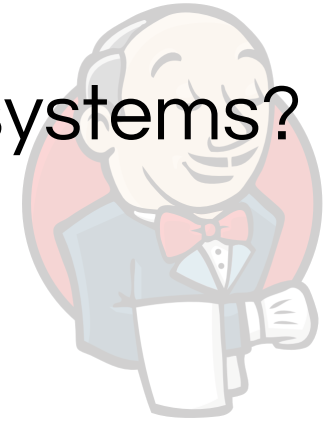
Outline

1. DSL Background
2. DSL Deep Dive
3. DSL Examples
4. Multi-Branch Support

Definition: What the heck is a DSL?!?!?

DSL stands for Domain-Specific Language.

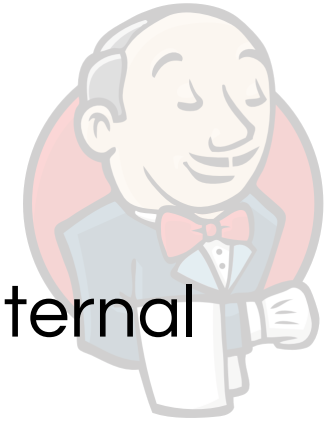
> *"A domain-specific language (DSL) is a computer language specialized to a particular application domain"*
>
> -- source: http://en.wikipedia.org/wiki/Domain-specific_language



Motivation: Why use a DSL with CI / CD systems?

- Version history for your configuration
- Portability
- Most Important: version your configuration ***with*** your code.

Google <3 DSLs



- Single biggest complaint from Google-internal Jenkins users

- For Google's own internal CI/CD systems, ***everything*** uses a DSL

Why...?

Background: Jenkins DSLs (a sampling)

- Job DSL plugin
- Groovy plugin
- Build Flow plugin
- Literate Build plugin
- Jenkins Job builder

- More in the works
  - Workflow plugin
  - Travis YML plugin

First a thanks...

The pitfalls

Jenkins = plugins

- Other DSL plugins typically fall into one of two categories:
  1. The DSL plugin developer adds awareness of plugin X (or vice versa)
  2. The user is required to have plugin-developer level knowledge

Example: Job DSL plugin

Release Notes

- 1.25 (unreleased)
  - Dropped support for Java 5, Java 6 or later is required at runtime
  - Support for Rake Plugin
  - Support for Lockable Resources Plugin
  - Support for vSphere Cloud Plugin
  - Added option to add classpath entries for Job DSL runs
  - Added localBranch option for Git SCM
  - Added method to read a file from any job's workspace
  - Fixed workspace cleanup external delete command (JENKINS-24231)
  - Fixed Build Timeout Plugin no activity timeout (JENKINS-24258)
- 1.24 (July 05 2014)
  - Support for Build Name Setter Plugin
  - Support for RunDeck Plugin
  - Support for ClearCase Plugin
  - Support for Keychains and Provisioning Profiles Plugin
  - Support for xUnit Plugin
  - Support for Batch Task Plugin
  - Support for Matrix Projects
  - Extend support for Build Timeout
  - Added option for treating job names relative to the seed job
  - Added pruneBranches option for Git SCM
  - Fixed ClassCastException when removing folder (JENKINS-23289)
  - Fixed GerritContext not honoring default settings (JENKINS-23318)
  - Moved PerforcePasswordEncryptor to javaposse.jobdsl.dsl.helpers.scm package
  - Support for Exclusion Plugin
- 1.23 (May 23 2014)

… can this keep up with the community?

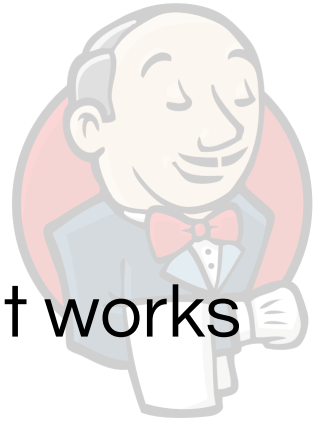
source:
https://github.com/jenkinsci/job-dsl-plugin/blob/master/docs/Home.md

The goals

- Work with other plugins out of the box
  - Avoid baked in knowledge of plugins
  - Avoid becoming a de facto dependency

- Make adoption trivial

What if...



...there is *already* a standard language that works with *all* plugins?

What if it exposed exactly the right inputs for each plugin as the Jenkins UI?

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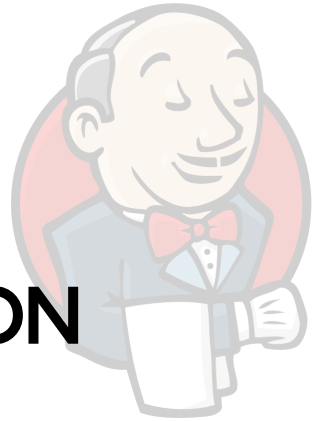
High-Level: How it works



- Jenkins form data is submitted as JSON
- Check the JSON in
- Profit!

Structured Form Submission

https://wiki.jenkins-ci.org/display/JENKINS/Structured+Form+Submission

What is structured form submission?

Structured form submission is a form submission where the data model is a JSON object tree, not a map. This is done by having a client compute the JSON representation at the form submission time, and send that to the server as a hidden text field (

Structure is determined by several factors. First, the name of the form field becomes the JSON property name. For compatibility reasons, a name can have any "abc.def." kind of prefix, and the prefix portion will be ignored. So for example, in the simple
the JSON result on the right.

```
<form>
  <input type="text" name="my.name"/>
  <input type="checkbox" name="my.optin"/> Send me e-mails
</form>
```

```
{ name: "Kohsuke'
```

Any intermediate tag can have the 'name' attribute, and that would group the descendants into an intermediate object. Consider the following example:

```
<form>
  <div name="first">
    <input type="text" name="my.name"/>
    <input type="checkbox" name="my.optin"/> Send me e-mails
  </div>
  <div name="second">
    <input type="text" name="my.name"/>
    <input type="checkbox" name="my.optin"/> Send me e-mails
  </div>
  ...
  <div>
    <input type="password" name="my.password" />
  </div>
</form>
```

```
{
  first: { name: "Kohsuke
  second: { name: "Jesse",
  password:"secret"
}
```

```
{
  person: [
    { name: "Kohsuke", optin: true },
    { name: "Jesse", optin: false }
  ],
  password:"secret"
}
```

If there are multiple elements with the same name, their values are aggregated into an array. Consider the following example:

```
<form>
  <div name="person">
    <input type="text" name="my.name"/>
    <input type="checkbox" name="my.optin"/> Send me e-mails
  </div>
  <div name="person">
    <input type="text" name="my.name"/>
    <input type="checkbox" name="my.optin"/> Send me e-mails
  </div>
  ...
  <div>
    <input type="password" name="my.password" />
  </div>
</form>
```

```
{
  person: [
    { name: "Kohsuke", optin: true },
    { name: "Jesse", optin: false }
  ],
  password:"secret"
}
```

source: https://wiki.jenkins-ci.org/display/JENKINS/Structured+Form+Submission

Structured Form Submission + Jenkins


```
...
"builder": [
    {
        "kind": "hudson.tasks.Shell",
        "command": "echo hello",
        ...
    },
    {
        "kind": "hudson.tasks.Maven",
        "targets": "clean package",
        ...
    },
    {
        "kind": "hudson.tasks.Shell",
        "command": "echo world",
        ...
    }
],
...
```

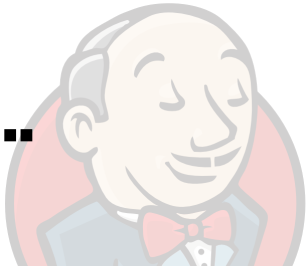
*This is the DSL for Jenkins the community has **already** defined.*

… but JSON

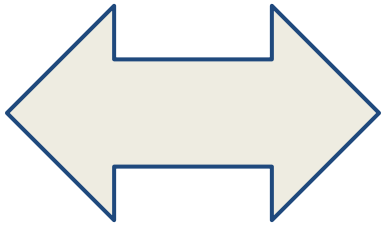
JSON syntax is a subset of YAML version 1.2, which was promulgated with the express purpose of bringing YAML "into compliance with JSON as an official subset".
-- http://en.wikipedia.org/wiki/YAML#JSON

… in English: JSON ⇔ YAML is easy!

Structured Form Submission... *as YAML...*



```yaml
person:
- name: Kohsuke
  optin: true
- name: Jesse
  optin: false
password: secret
```



```
{
  person: [
    { name: "Kohsuke", optin: true },
    { name: "Jesse", optin: false }
  ],
  password:"secret"
}
```

See for yourself:
http://jsontoyaml.com/
http://yamltojson.com/

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Example: a simple Job


```
builder:
   kind: hudson.tasks.Shell
   command: echo Hello World
```

demo: 1

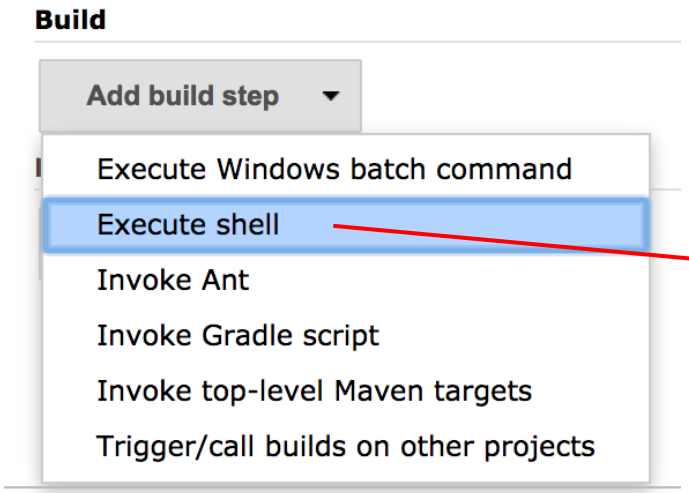
but.i.am.not.a.jenkins.Developer

This *works*, but it is not *easy*:

```
builder:
   kind: hudson.tasks.Shell
   command: echo Hello World
```

Syntactic Sugar: `!by-name`

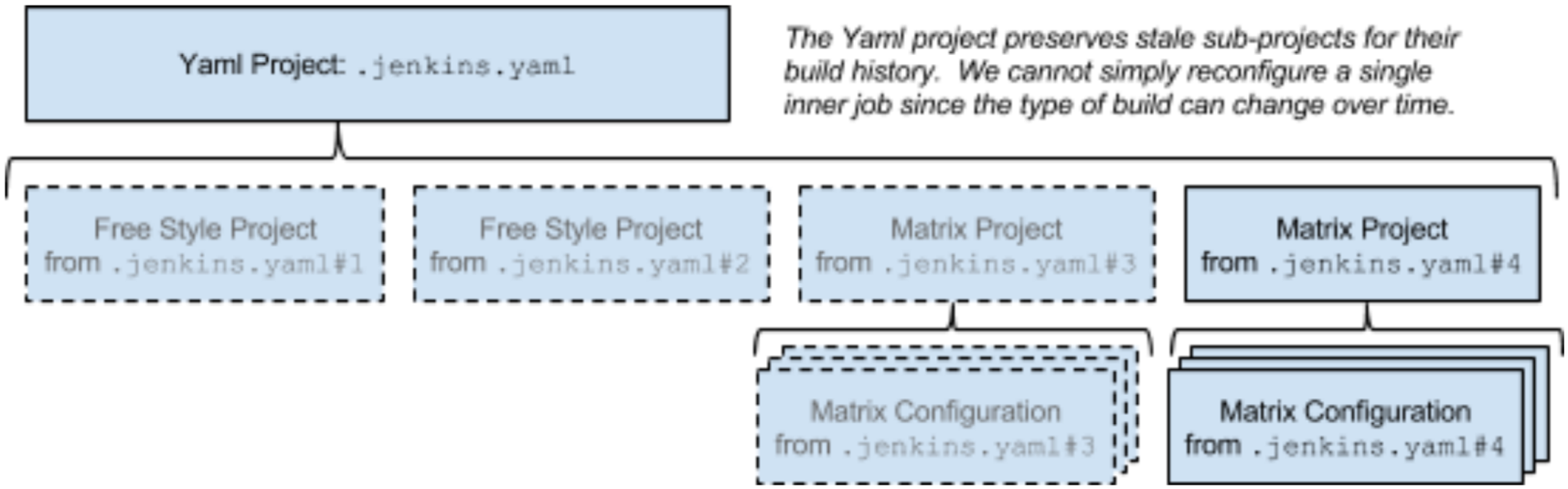
We allow the use of plugin names instead, e.g.:




```
builder:
  kind: !by-name Execute shell
  command: echo Hello World
```

```
demo: [2, 3]
```

Project Version History



More samples....

jenkinsci / yaml-project-plugin
forked from mattmoor/yaml-project-plugin

Unwatch 201 Star 0 For

branch: master yaml-project-plugin / samples / +

This branch is 7 commits ahead of mattmoor:master Pull Request Compare

Initial public commit to yaml-project-plugin for Jenkins. ...

mattmoor authored 21 days ago latest commit 3daf04a726

..

google-cloud-storage	Initial public commit to yaml-project-plugin for Jenkins.	21 days ago
hello-world	Initial public commit to yaml-project-plugin for Jenkins.	21 days ago
long-shell	Initial public commit to yaml-project-plugin for Jenkins.	21 days ago
matrix	Initial public commit to yaml-project-plugin for Jenkins.	21 days ago
maven-analysis	Initial public commit to yaml-project-plugin for Jenkins.	21 days ago
maven-site	Initial public commit to yaml-project-plugin for Jenkins.	21 days ago
maven	Initial public commit to yaml-project-plugin for Jenkins.	21 days ago

see: https://github.com/jenkinsci/yaml-project-plugin/tree/master/samples

Quick Recap

- Create jobs the way you are used to
- Convert to YAML Project
- … upgrade to Multi-Branch Yaml Project

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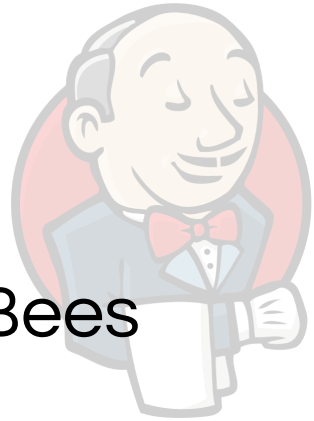
A survey...

Who uses Git / Hg?

Who uses branches? (feature, bug, release)

Multi-Branch Projects



- Offshoot of Literate Build work by CloudBees
- *Personally*, the coolest demo last JUC...

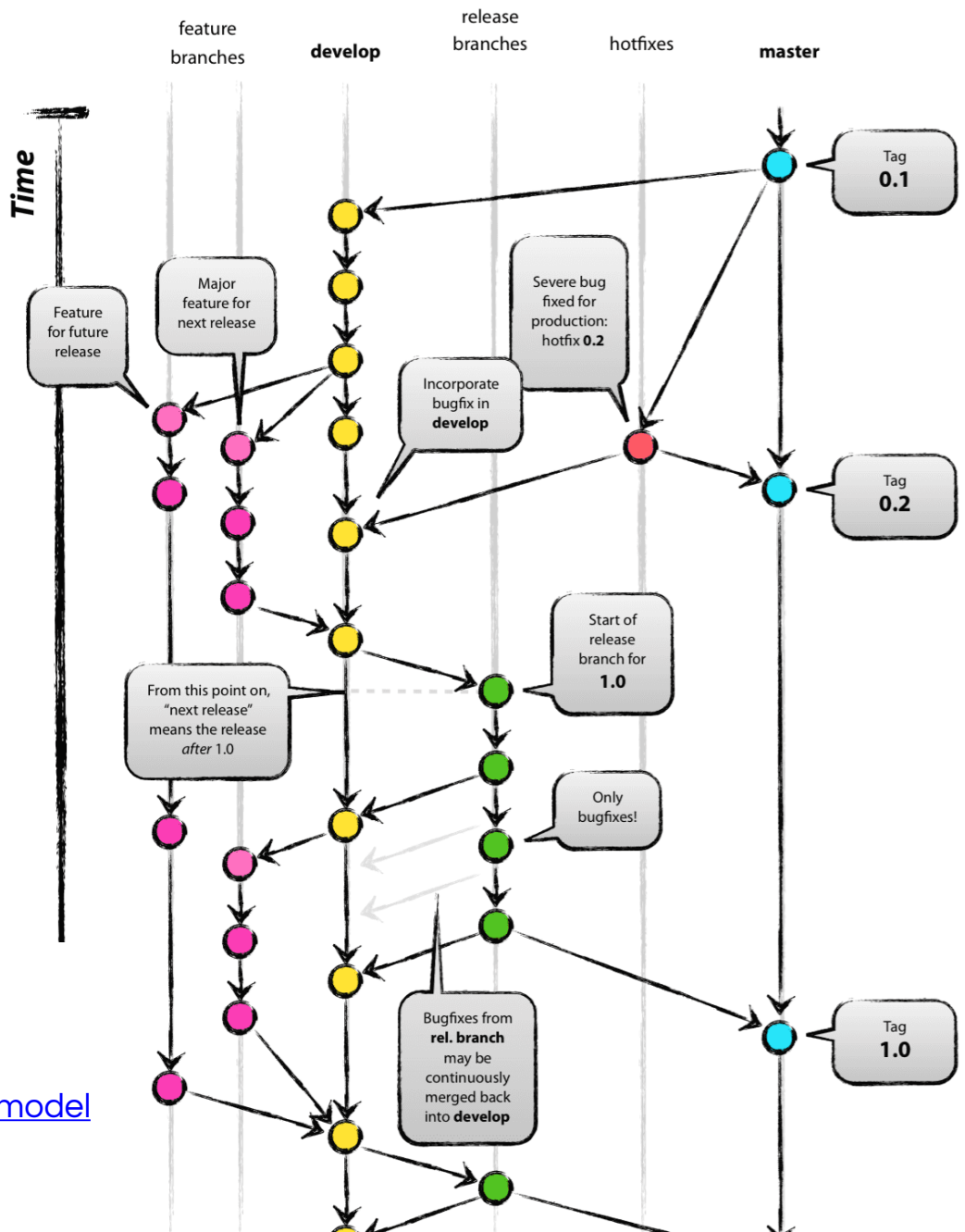
Our team's Jenkins setup

- Feature/Developer branches with heavy testing
  - Master branch is always a fast-forward

- Previously: common configuration for all branches
  - No way to stage breaking changes
  - Hard to replicate jobs on new server.

- Now: config versioned with code
  - Job config is staged with code
  - All the CI server knows: where to get code + name of DSL file

Example: "git flow"



Author: Vincent Driessen

Source:

http://nvie.com/posts/a-succesful-git-branching-model

demo: 4

Advanced Multi-Branch

Use branch filters and multiple DSL files, e.g.

- `features/*  => .features.yaml`
- `master  => .master.yaml`
- `releases/*  => .releases.yaml`

NOTE: needs git plugin version 2.3-beta-1 or later

Open Issues / Call for PRs

Displaying issues 1 to 14 of 14 matching issues.

T	Key	Summary
	JENKINS-25096	Improve the experience with "stapler-class-bag" style submissions
	JENKINS-25094	Branches with names of the form 'foo/bar' don't work properly
	JENKINS-25095	Make the same-node and workspace-sharing logic work properly
	JENKINS-25097	Implement a real (sound) JSON scrubber
	JENKINS-25093	YamlProjectFactory should allow parameterizing projects
	JENKINS-25098	Consider Project/Build Discarding
	JENKINS-25099	Single SCM Source doesn't properly capture revision
	JENKINS-25101	Move Restriction to work as a Branch Property
	JENKINS-25100	Find a way to improve our flyweights' presentation in the build queue
	JENKINS-25102	Make YamlDecorator use a SaveableListener to be more general
	JENKINS-25103	Support direct entry of YAML
	JENKINS-25104	Add support for YAML BuildStep
	JENKINS-25105	Add support for YAML Publisher
	JENKINS-25107	Allow child jobs to be directly triggered

Displaying issues 1 to 14 of 14 matching issues.

See Jenkins project's JIRA component 'yaml-project'

Stay tuned...

… we have more coming.

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Learn More

Wiki Page:

https://wiki.jenkins-ci.org/display/JENKINS/YAML+Project+Plugin

Try it out:

http://jenkins-ci.org/content/experimental-plugins-update-center

PR's welcome.

Questions?

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