



JENKINS CI
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CPH 2014



High Quality Plugins

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#jcicph

Agenda



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What is quality, actually?

How can we create high-quality plugins?

I'm Ops. Can I do anything?

A (hundred) definition of Quality



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„Conformance to **requirements**.” (Philip B. Crosby)

„Degree to which a set of inherent characteristics fulfills **requirements**.” (ISO9000)

„Products and services that meet or exceed customers' **expectations**.” (Noriaki Kano)

„**Value** to some person” (Gerald M. Weinberg)

„A combination of quantitative and qualitative **perspectives** for which each person has his or her own definition; examples [...]. In technical usage, quality can have two meanings:

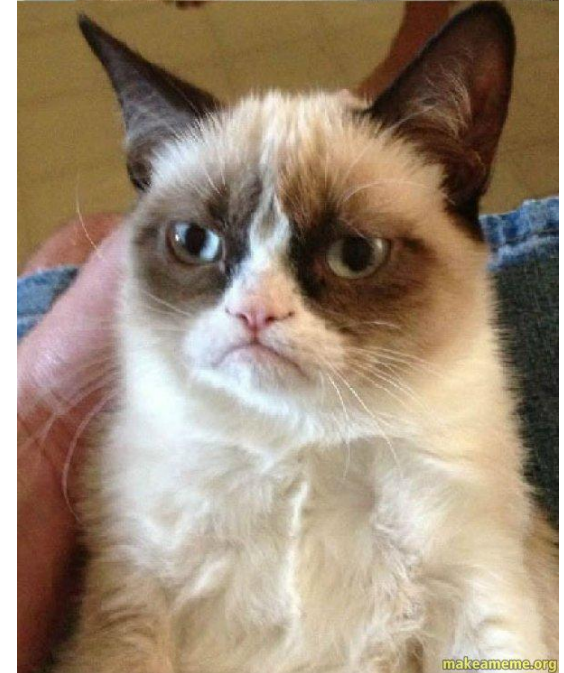
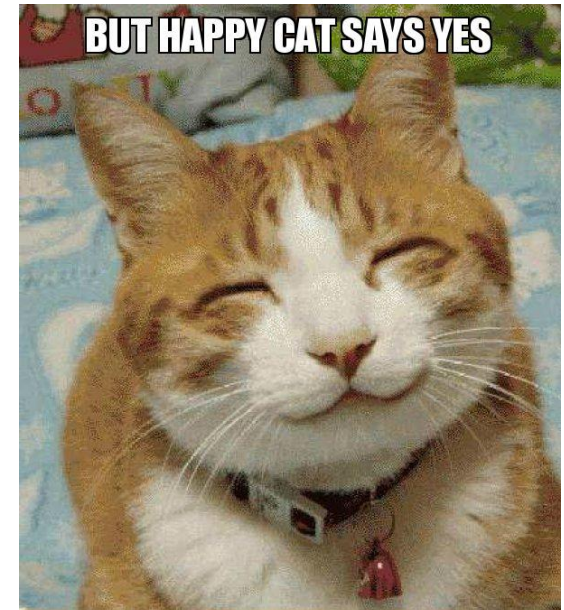
- a. The characteristics of a product or service that bear on its ability to satisfy stated or implied needs;
- b. A product or service free of deficiencies.” (American Society for Quality)

Excerpt from [http://en.wikipedia.org/wiki/Quality_\(business\)](http://en.wikipedia.org/wiki/Quality_(business))

TL;DR

Does your user feel happy?

- ☐ Yes
- ☐ No



What is a Low-Quality-Plugin?



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- Failing: Not doing what was promised ...
- Doing something else (deploy to prod instead of stage), wrong version number
- Worse: breaking other things, crashing whole system
- using a lot of resources: memory, CPU, IO
- or just hanging...
- Creating non-usable UI

Worst case: Breaking Global Config Page



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configuration

Home directory /var/folders/mk/7r46gyz52zs4wfrnv

New Job

people

Build H

Manage

redent

I Sam

Queue

1

Execu

e

ilding

Cons

Error

A problem occurred while processing the request. Please check [our bug tracker](#) to see if a similar problem has already been reported. If it is already reported, please vote and put a comment on it to let us gauge the impact of the problem. If you think this is a new issue, please file a new issue. When you file an issue, make sure to add the entire stack trace, along with the version of Jenkins and relevant plugins. [The users list](#) might be also useful in understanding what has happened.

Stack trace

```
javax.servlet.ServletException: net.sf.json.JSONException:
JSONObject["useFrench"] is not a number.
    at org.kohsuke.stapler.Stapler.tryInvoke(Stapler.java:778)
    at org.kohsuke.stapler.Stapler.invoke(Stapler.java:858)
    at org.kohsuke.stapler.Stapler.invoke(Stapler.java:631)
    at org.kohsuke.stapler.Stapler.service(Stapler.java:225)
    at javax.servlet.http.HttpServlet.service(HttpServlet.java:820)
    at
    org.mortbay.jetty.servlet.ServletHolder.handle(ServletHolder.java:511)
    at
    org.mortbay.jetty.servlet.ServletHandler$CachedChain.doFilter(ServletHandler
    .java:1221)
    at
    hudson.util.PluginServletFilter$1.doFilter(PluginServletFilter.java:96)
    at
    hudson.util.PluginServletFilter.doFilter(PluginServletFilter.java:88)
    at
    org.mortbay.jetty.servlet.ServletHandler$CachedChain.doFilter(ServletHandler
    .java:1212)
    at hudson.security.csrf.CrumbFilter.doFilter(CrumbFilter.java:48)
    at
    org.mortbay.jetty.servlet.ServletHandler$CachedChain.doFilter(ServletHandler
    .java:1212)
    at
```



Avoid “Low-Quality”

- Code defensive, robust
 - data could be wrong -> check!
- Clean Code
 - SOLID Principles, TDD
- Do code analysis
 - Findbugs, PMD, SonarQube
- Assume “hostile” environments
 - missing network, timeouts, ...

Software Craftsmanship



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Do Automated Testing

Besides Manual testing...

Create automatic test

- **Basic:** Unit testing
- **Advanced:** Acceptance testing

Also do

- **Performance** testing
- Restricted environment: e.g. `java -Jmx64m`

Simple Plugin Example




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Created with [plugin-generator](#)

- one Builder:
- Global config section:

Jenkins ► configuration



Hello World Builder

French ☒ 

Check if we should say hello in French

[se Seite zu lokalisieren.](#)

Erstelldatum dieser Seite: 24.06.2014 22:46:57

[REST API](#)

[Jenkins ver. 1.532.3](#)

Hello World Builder



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```
public class HelloWorldBuilder extends Builder {  
    public boolean perform(AbstractBuild build, Launcher launcher,  
                           BuildListener listener) {  
        // from -> global configuration of the builder  
        if (getDescriptor().getUseFrench())  
            listener.getLogger().println("Bonjour, "+name+"!");  
        else  
            listener.getLogger().println("Hello, "+name+"!");  
        return true;  
    }  
}
```

https://github.com/lowsky/high-quality-plugin/blob/master/src/main/java/org/jenkinsci/plugins/high_quality/HelloWorldBuilder.java

Unit Testing

@Test



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```
public void performPrintsHelloMessageUnitTest() {  
    AbstractBuild build = mock(AbstractBuild.class);  
    BuildListener listener = mock(BuildListener.class);  
    Launcher launcher = mock(Launcher.class);  
    ByteArrayOutputStream outputStream = new ByteArrayOutputStream(1000);  
    PrintStream logger = new PrintStream(outputStream);  
    when(listener.getLogger()).thenReturn(logger);  
    HelloWorldBuilder worldBuilderSpy = spy(worldBuilder);  
    doReturn(false).when(worldBuilderSpy).useFrench();  
    boolean performed = worldBuilderSpy.perform(build, launcher, listener);  
    verify(worldBuilderSpy).printLogMsg(false, logger);  
    assertThat("perform shall return true.", performed, is(true));  
    assertThat(outputStream.toString(), containsString(expectedMsg));  
}
```

<https://wiki.jenkins-ci.org/display/JENKINS/Unit+Test>

Basic Unit Testing - within Jenkins Env



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@Rule

```
public JenkinsRule jenkinsRule = new JenkinsRule();
```

@Test

```
public void performPrintsHelloMessageWithJut() throws Exception {  
    FreeStyleProject dummy = jenkinsRule.createFreeStyleProject("dummy");  
    dummy.getBuildersList().add(worldBuilder);  
    jenkinsRule.buildAndAssertSuccess(dummy);  
    Run lastRun = dummy._getRuns().newestValue();  
    jenkinsRule.assertLogContains(expectedMsg, lastRun);  
}
```

<https://wiki.jenkins-ci.org/display/JENKINS/Unit+Test>

UI Tests / Web Based Testing



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Built On Columnen - plugin without Java Code:

Alle	+					
S	W	Name ↓	Letzter Erfolg	Letzter Fehlschlag	Letzte Dauer	Built On
		runOnX	3,9 Sekunden - #1	Unbekannt	75 ms	Jenkins

Symbol: [S](#) [M](#) [L](#)

[Legende](#) [RSS Alle Builds](#) [RSS Nur Fehlschläge](#) [RSS Nur jeweils letzter Build](#)

Using built-in HtmlUnit support:

```
htmlPage = jenkins.getWebclient().goto("/view/all");
```

```
WebAssert.assertElementPresent(page, "Built On"); //more...
```

Acceptance Driven Testing

Acceptance Test Harness github.com/jenkinsci/acceptance-test-harness/

Announcement: jenkins-ci.org/content/acceptance-test-project-progress-report



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Navigation bar: ClickStart Apps DBs **Builds** Repositories Services Support Log in Guest user of jenkins

Breadcrumbs: Jenkins > core > acceptance-test-harness-stable

Link: [AUTO-AKTUALISIERUNG EINSCHALTEN](#)

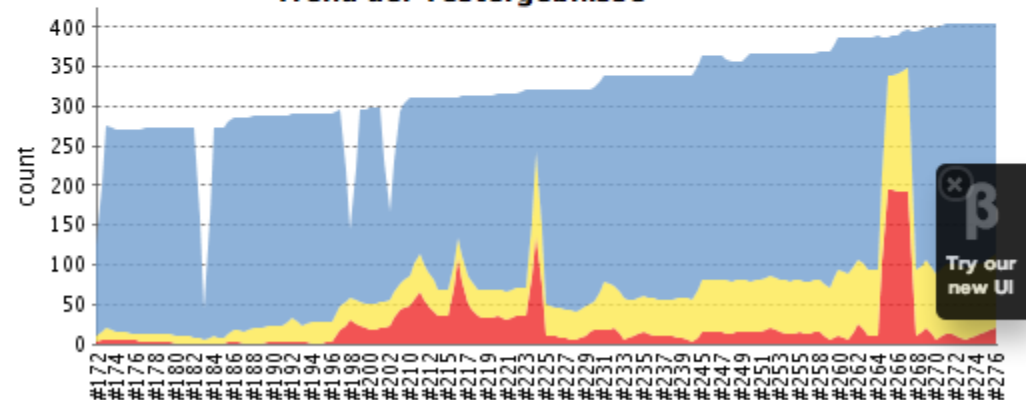
- [Zurück zur Übersicht](#)
- [Status](#)
- [Änderungen](#)
- [Arbeitsbereich](#)
- [GitHub](#)
- [Groups](#)
- [Roles](#)
- [Embeddable Build Status](#)
- [GitHub Hook Log](#)

Projekt acceptance-test-harness-stable

Project disk usage information + trend graph

Disk Usage: Workspace 0, Builds {all=842841209, locked=0}, Job directory 843647191

Trend der Testergebnisse



[\(Nur Fehlschläge anzeigen\)](#) [Vergrößern](#)

Build-Verlauf	(Trend)
#276 21.06.2014 16:11:43	3 MB
#275 21.06.2014 11:01:23	1 MB

Acceptance Driven Testing Test Harness:



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Cool Features:

- ATDD testing based on cucumber
- Many re-usable PageObjects/Areas, like
- globalConfiguration, builderSection, jobs,...
- Docker, can be used for test fixtures, git server, ...
- Support for different browsers

Already a huge Test Suite for the LTS release exists!

<< DEMO >>

The DevOps-Story



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Managing my environment...



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Never touch a running environment...

... nice idea ...

leads to an antiquated system:

- „I still have H...n in a version before the fork“
- „New plugins don't work in my old environment anymore“
- „I don't even know how many Jenkins we have setup with which plugins“

Moving to a controlled environment



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Find out, which Plugins are used:

- Click through Jenkins instances
- Analyse config.xml
- Use Script-Console (Groovy)
- Plugin Usage Plugin

MapDB API Plugin	1	Plugin: Operations Center Cloud
Maven Integration plugin	3	Plugin: Dashboard View Plugin: Jenkins Job Configuration History Plugin Plugin: Jenkins promoted builds plugin
Metrics Plugin	2	Plugin: Operations Center Client Plugin Plugin: Support Core Plugin
Monitoring	0	-
Node Iterator API Plugin	2	Plugin: CloudBees VMWare Autoscaling Plugin Plugin: Operations Center Cloud
openid	2	Jenkins Plugin: Operations Center Client Plugin
OpenID4Java API	2	Plugin: openid Plugin: Operations Center OpenID Cluster Session Extension
Operations Center Agent	1	Plugin: Operations Center Client Plugin
Operations Center Client Plugin	2	Jenkins Plugin: Operations Center Cloud

Handle updates carefully

When updating, check configuration changes

- use JobConfigHistory-Plugin
- verify system and job config



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Date ↑	System configuration	Operation
2014-06-24_04-14-29	com.cloudbees.opscenter.client.plugin.OperationsCenterRootAction (system)	Changed
2014-06-24_04-14-28	com.cloudbees.opscenter.client.plugin.OperationsCenterRootAction (system)	Changed
2014-06-24_04-14-27	com.cloudbees.opscenter.client.plugin.OperationsCenterRootAction (system)	Changed
2014-06-24_04-14-26	com.cloudbees.opscenter.client.plugin.OperationsCenterRootAction (system)	Changed
2014-06-24_04-14-25	hudson.tasks.Maven (system)	Changed

Date ↑	Operation	User	Show File	File A	File B
2014-06-24_04-14-25	Changed	anonymous	View as XML (RAW)	<input type="radio"/>	<input checked="" type="radio"/>
2014-06-24_04-02-40	Changed	anonymous	View as XML (RAW)	<input checked="" type="radio"/>	<input type="radio"/>

Show Diffs

```

1 <?xml version='1.0' encoding='UTF-8'?>
2 <hudson.tasks.Maven_-DescriptorImpl>
3   <installations/>

```

```

1 <?xml version='1.0' encoding='UTF-8'?>
2 <hudson.tasks.Maven_-DescriptorImpl>
3   <installations>
4     <hudson.tasks.Maven_-MavenInstallation>
5       <name>Default</name>
6       <properties>
7         <hudson.tools.InstallSourceProperty>
8           <installers>
9             <hudson.tasks.Maven_-MavenInstaller>
10              <id>3.2.1</id>

```



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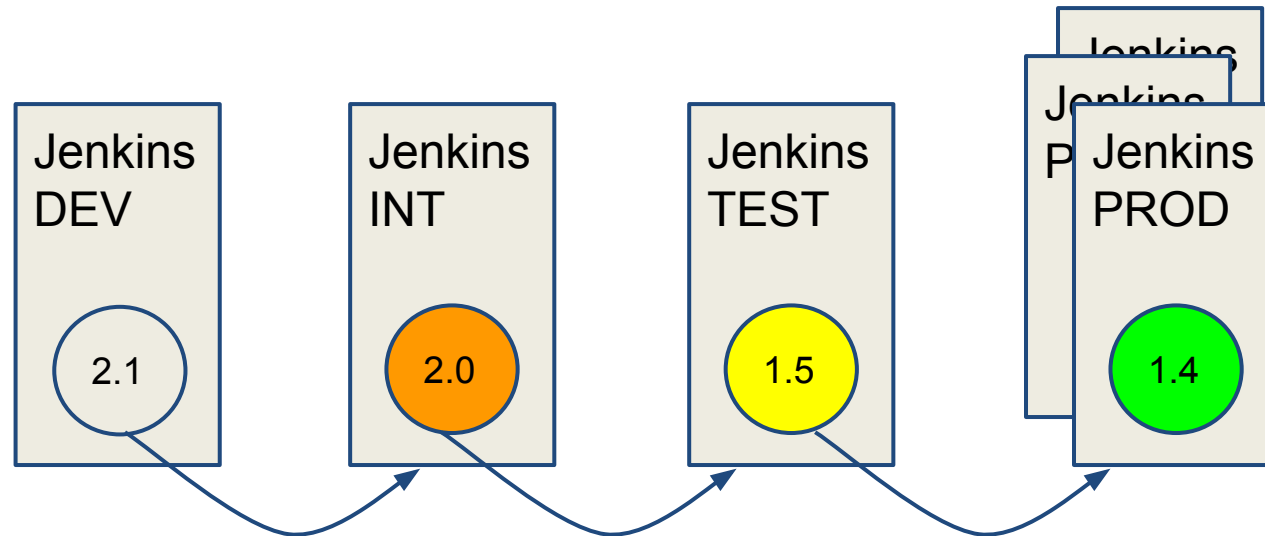
Right, yes, ...

... do Backups

Staging of Plugins



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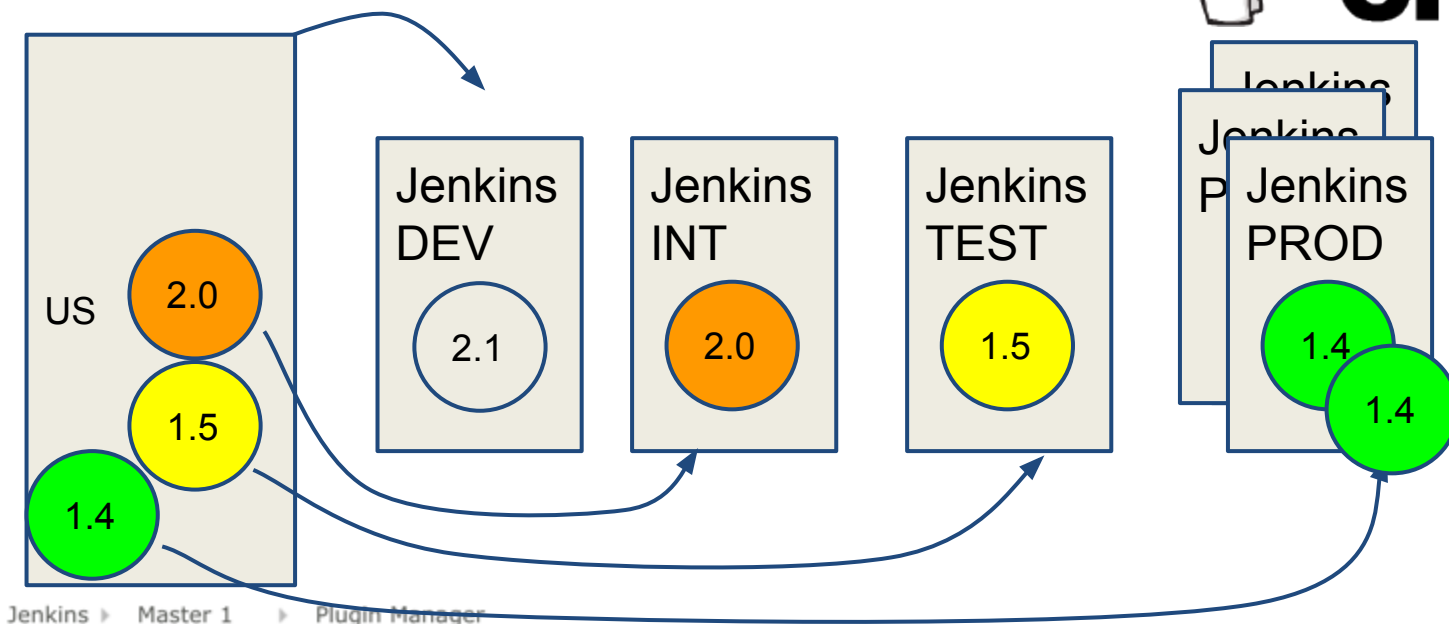


- Plugin-Versions (or Jenkins-Core-Versions) are staged
- Once a quality is reached, a plugin is installed to next stage
- Complexity increases with number of stages and different production setups

Use Custom-Update-Sites



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Jenkins > Master 1 > Plugin Manager

Update Site

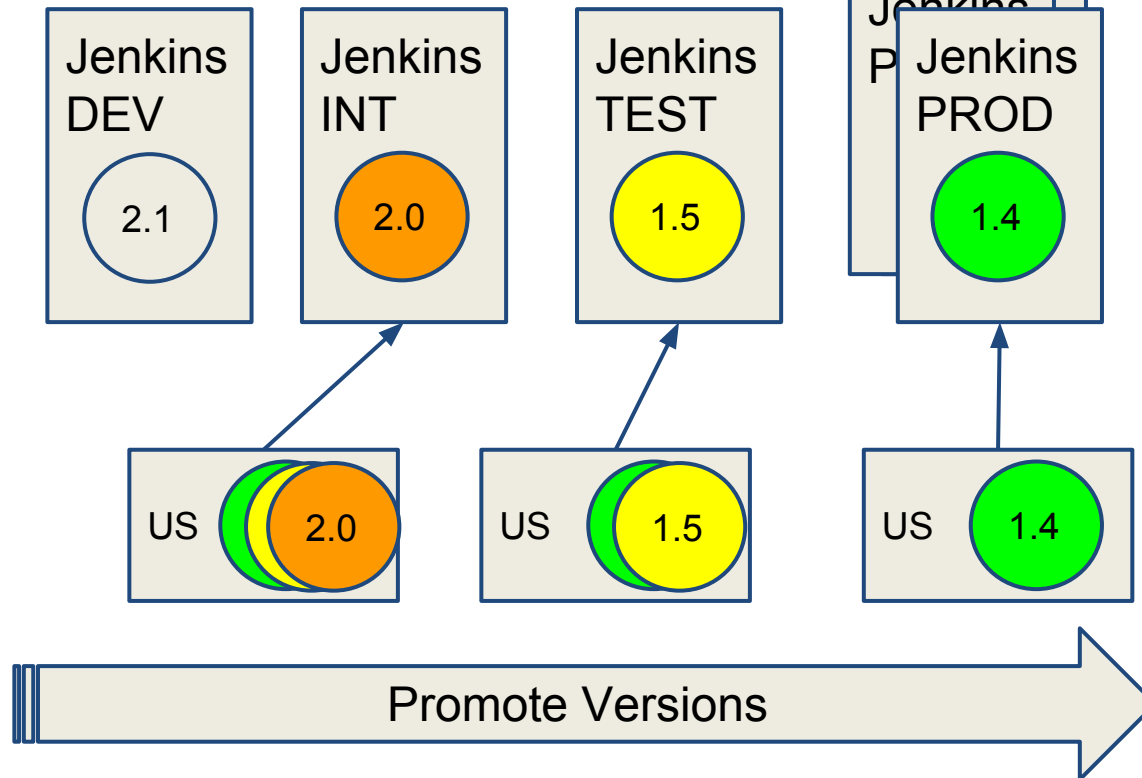
URL

Update information obtained: 2 hr 18 min ago

Use Update-Site per environment



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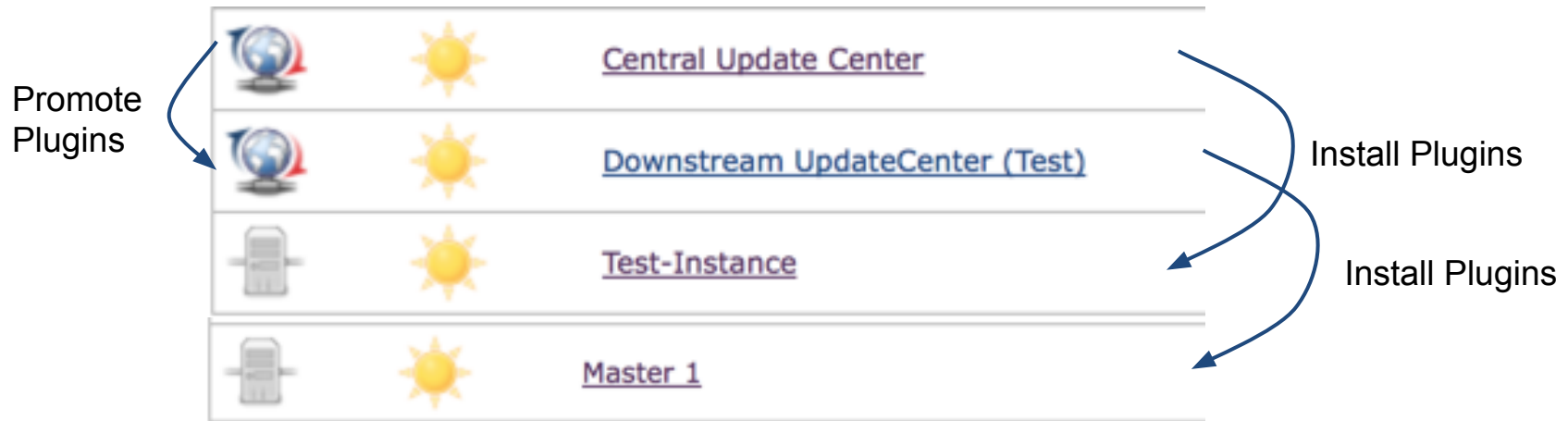
Supporting Plugins

- UpdateSites Manager Plugin
- SimpleUpdateSite Plugin

Using Update Centers



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Define Update-Strategy and Quality-Gates (e.g. LTS vs. latest) for each stage

Manage updates centrally

- Jenkins Update Center (CloudBees Enterprise Plugin)
- Jenkins Operations Center (CloudBees)

