Intermittent JIRA startup failures? Check your old plugins for com.atlassian.upm.plugin-license-storage-plugin

JIRA Upgrades are bread and butter work for us. Over the last few months (Jan-April 2017) we've experienced problems upgrading various companies to JIRA 7.3.x. JIRA's plugin system intermittently (say, 50% of the time) fails to load:

JIRA Startup Failed

The following plugins are required by JIRA, but have not been started:

- JIRA Projects Plugin (com.atlassian.jira.jira-projects-plugin)
- Atlassian Navigation Links Plugin (com.atlassian.plugins.atlassian-nav-links-plugin)
- Atlassian JIRA - Plugins - Project Config Plugin (com.atlassian.jira.jira-project-config-plugin)
- Applinks - Plugin - Core (com.atlassian.applinks.applinks-plugin)
- Atlassian OAuth Service Provider Plugin (com.atlassian.oauth.serviceprovider)
- Embedded Gadgets Plugin (com.atlassian.gadgets.embedded)
- Gadget Directory Plugin (com.atlassian.gadgets.directory)
- Atlassian JIRA - Plugins - Gadgets Plugin (com.atlassian.jira.gadgets)
- Atlassian JIRA - Plugins - Global Issue Navigator (com.atlassian.jira.jira-issue-nav-plugin)
- Atlassian JIRA - Plugins - Quick Edit Plugin (com.atlassian.jira.jira-quick-edit-plugin)
- Atlassian REST - Module Types (com.atlassian.plugins.rest.atlassian-rest-module)
- Atlassian JIRA - Plugins - REST Plugin (com.atlassian.jira.rest)
- Opensocial Plugin (com.atlassian.gadgets.opensocial)
- Gadget Dashboard Plugin (com.atlassian.gadgets.dashboard)

In the JIRA logs, near the top we find:

```
2017-04-12 20:51:17,450 ThreadPoolAsyncTaskExecutor::Thread 6 ERROR [c.a.p.osgi.factory.OsgiPlugin] Unable to
start the plugin container for plugin 'com.atlassian.upm.plugin-license-storage-plugin'
```

followed by dozens of plugins complaining about missing licensing-related dependencies.

```
2017-04-12 20:51:17,450 ThreadPoolAsyncTaskExecutor::Thread 6 ERROR      [c.a.p.osgi.factory.OsgiPlugin] Unable
to start the plugin container for plugin 'com.atlassian.upm.plugin-license-storage-plugin'
org.springframework.beans.factory.UnsatisfiedDependencyException: Error creating bean with name
'licenseReceiptValidator' defined in URL [bundle://166.0:0/META-INF/spring/atlassian-plugins-components.xml]:
Unsatisfied dependency expressed through constructor argument with index 0 of type [com.atlassian.upm.license.
internal.PluginLicenseRepository]: : Error creating bean with name 'pluginLicenseRepository' defined in URL
[bundle://166.0:0/META-INF/spring/atlassian-plugins-components.xml]: Unsatisfied dependency expressed through
constructor argument with index 0 of type [com.atlassian.upm.license.internal.HostLicenseProvider]: : Error
creating bean with name 'jiraHostLicenseProvider' defined in URL [bundle://166.0:0/META-INF/spring/atlassian-
plugins-components.xml]: Unsatisfied dependency expressed through constructor argument with index 1 of type
[com.atlassian.upm.license.internal.LicenseManagerProvider]: : Error creating bean with name
'licenseManagerProvider' defined in URL [bundle://166.0:0/META-INF/spring/atlassian-plugins-components.xml]:
Instantiation of bean failed; nested exception is org.springframework.beans.BeanInstantiationException: Failed
to instantiate [com.atlassian.upm.license.internal.impl.LicenseManagerProviderImpl]: Constructor threw
exception; nested exception is java.lang.NoSuchMethodError: com.google.common.collect.ImmutableSet.of([Ljava
/lang/Object;)Lcom/google/common/collect/ImmutableSet;; nested exception is org.springframework.beans.factory.
BeanCreationException: Error creating bean with name 'licenseManagerProvider' defined in URL [bundle://166.0:0
```

```
/META-INF/spring/atlassian-plugins-components.xml]: Instantiation of bean failed; nested exception is org.
springframework.beans.BeanInstantiationException: Failed to instantiate [com.atlassian.upm.license.internal.
impl.LicenseManagerProviderImpl]: Constructor threw exception; nested exception is java.lang.NoSuchMethodError:
com.google.common.collect.ImmutableSet.of([Ljava/lang/Object;)Lcom/google/common/collect/ImmutableSet;; nested
exception is org.springframework.beans.factory.UnsatisfiedDependencyException: Error creating bean with name
'jiraHostLicenseProvider' defined in URL [bundle://166.0:0/META-INF/spring/atlassian-plugins-components.xml]:
Unsatisfied dependency expressed through constructor argument with index 1 of type [com.atlassian.upm.license.
internal.LicenseManagerProvider]: : Error creating bean with name 'licenseManagerProvider' defined in URL
[bundle://166.0:0/META-INF/spring/atlassian-plugins-components.xml]: Instantiation of bean failed; nested
exception is org.springframework.beans.BeanInstantiationException: Failed to instantiate [com.atlassian.upm.
license.internal.impl.LicenseManagerProviderImpl]: Constructor threw exception; nested exception is java.lang.
NoSuchMethodError: com.google.common.collect.ImmutableSet.of([Ljava/lang/Object;)Lcom/google/common/collect
/ImmutableSet;; nested exception is org.springframework.beans.factory.BeanCreationException: Error creating
bean with name 'licenseManagerProvider' defined in URL [bundle://166.0:0/META-INF/spring/atlassian-plugins-
components.xml]: Instantiation of bean failed; nested exception is org.springframework.beans.
BeanInstantiationException: Failed to instantiate [com.atlassian.upm.license.internal.impl.
LicenseManagerProviderImpl]: Constructor threw exception; nested exception is java.lang.NoSuchMethodError: com.
google.common.collect.ImmutableSet.of([Ljava/lang/Object;)Lcom/google/common/collect/ImmutableSet;; nested
exception is org.springframework.beans.factory.UnsatisfiedDependencyException: Error creating bean with name
'pluginLicenseRepository' defined in URL [bundle://166.0:0/META-INF/spring/atlassian-plugins-components.xml]:
Unsatisfied dependency expressed through constructor argument with index 0 of type [com.atlassian.upm.license.
internal.HostLicenseProvider]: : Error creating bean with name 'jiraHostLicenseProvider' defined in URL
[bundle://166.0:0/META-INF/spring/atlassian-plugins-components.xml]: Unsatisfied dependency expressed through
constructor argument with index 1 of type [com.atlassian.upm.license.internal.LicenseManagerProvider]: : Error
creating bean with name 'licenseManagerProvider' defined in URL [bundle://166.0:0/META-INF/spring/atlassian-
plugins-components.xml]: Instantiation of bean failed; nested exception is org.springframework.beans.
BeanInstantiationException: Failed to instantiate [com.atlassian.upm.license.internal.impl.
LicenseManagerProviderImpl]: Constructor threw exception; nested exception is java.lang.NoSuchMethodError: com.
google.common.collect.ImmutableSet.of([Ljava/lang/Object;)Lcom/google/common/collect/ImmutableSet;; nested
exception is org.springframework.beans.factory.BeanCreationException: Error creating bean with name
'licenseManagerProvider' defined in URL [bundle://166.0:0/META-INF/spring/atlassian-plugins-components.xml]:
Instantiation of bean failed; nested exception is org.springframework.beans.BeanInstantiationException: Failed
to instantiate [com.atlassian.upm.license.internal.impl.LicenseManagerProviderImpl]: Constructor threw
exception; nested exception is java.lang.NoSuchMethodError: com.google.common.collect.ImmutableSet.of([Ljava
/lang/Object;)Lcom/google/common/collect/ImmutableSet;; nested exception is org.springframework.beans.factory.
UnsatisfiedDependencyException: Error creating bean with name 'jiraHostLicenseProvider' defined in URL
[bundle://166.0:0/META-INF/spring/atlassian-plugins-components.xml]: Unsatisfied dependency expressed through
constructor argument with index 1 of type [com.atlassian.upm.license.internal.LicenseManagerProvider]: : Error
creating bean with name 'licenseManagerProvider' defined in URL [bundle://166.0:0/META-INF/spring/atlassian-
plugins-components.xml]: Instantiation of bean failed; nested exception is org.springframework.beans.
BeanInstantiationException: Failed to instantiate [com.atlassian.upm.license.internal.impl.
LicenseManagerProviderImpl]: Constructor threw exception; nested exception is java.lang.NoSuchMethodError: com.
google.common.collect.ImmutableSet.of([Ljava/lang/Object;)Lcom/google/common/collect/ImmutableSet;; nested
exception is org.springframework.beans.factory.BeanCreationException: Error creating bean with name
'licenseManagerProvider' defined in URL [bundle://166.0:0/META-INF/spring/atlassian-plugins-components.xml]:
Instantiation of bean failed; nested exception is org.springframework.beans.BeanInstantiationException: Failed
to instantiate [com.atlassian.upm.license.internal.impl.LicenseManagerProviderImpl]: Constructor threw
exception; nested exception is java.lang.NoSuchMethodError: com.google.common.collect.ImmutableSet.of([Ljava
/lang/Object;)Lcom/google/common/collect/ImmutableSet;
        at org.springframework.beans.factory.support.ConstructorResolver.createArgumentArray
(ConstructorResolver.java:749)
        at org.springframework.beans.factory.support.ConstructorResolver.autowireConstructor
(ConstructorResolver.java:185)
        at org.springframework.beans.factory.support.AbstractAutowireCapableBeanFactory.autowireConstructor
(AbstractAutowireCapableBeanFactory.java:1139)
```

What's going on?

The culprit is this jar:

$JIRAHOME/plugins/installed-plugins/plugin-license-storage-plugin-2.13.3.jar

(or plugin-license-storage-plugin-2.12.jar or other low versions).

Plugin key	`com.atlassian.upm.plugin-license-storage-plugin`
Plugin name	Atlassian Universal Plugin Manager - Plugin License Storage plugin

This plugin is very obsolete, and is no longer compatible with JIRA's API.

How does it get there in the first place? Say that back when we ran JIRA 6.4.9, we installed the Dynamic Forms plugin, version 1.7.11:

| > **1.7.11** | JIRA Server 6.0.3 - 6.4.14 | 2015-03-31 | Compatibility |

The Dynamic Forms 1.7.11 depended on the Plugin License Storage jar, and bundles it in the .obr file. After installing, our `installed-plugins` directory would have two jars:

```
dynamic-forms-1.7.11.jar
plugin-license-storage-plugin-2.12.jar
```

Then later, we clicked 'Update' to upgrade Dynamic Forms to 1.8.9, which does not depend on 'Plugin License Storage' any more. What jars do we now have?

```
dynamic-forms-1.8.9.jar
plugin-license-storage-plugin-2.12.jar
```

Oops. The plugin upgraded, but left its old dependency there. The jar then sits like a time bomb, harmless up till the point where JIRA's API changes enough, or other plugins are installed that interact with it.

The problem of plugins leaving their obsolete dependencies is fairly well-known. I frequently see plugins called **RB - Filtering**, **RB - Support** etc, which are obsolete dependencies. The problem with `plugin-license-storage-plugin-*.jar` is that it is marked as a 'system' plugin, so never appears in the list of user-installed plugins.

What's the fix?

Obviously, if you run JIRA 7.x, check your `/var/atlassian/application-data/jira/plugins/installed-plugins` directory for `plugin-license-storage-plugin-*.jar`.

But there is a broader problem here that Atlassian need to address. Upgrading a plugin should not leave its unused dependencies lying about. When you click 'Install' in the UPM, the plugin `.obr` file is downloaded, and all dependent jars are just dumped into plugins/installed-plugins. The interdepdency information (from `obr.xml`) is lost, meaning there's no possibility later of the plugin system noticing "hey, nobody depends on this jar any more, let's delete it".

Until Atlassian fix this (ha), the only sure way to avoid dangling plugin dependencies is to delete all your plugins, then install them again.