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Packaging Java Applications

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JavaOne ORACLE

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Packager Agenda

1. Where we were <= 8u40
2. Current State = 8u60
3. Future >= 9

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Name Change

- JavaFXPackager is now just JavaPackager
  - Still Packages JavaFX Apps
  - Still Packages Java Swing Apps
  - Still Packages AWT Apps
  - Still Packages SWT Apps
  - Still Packages JNLP Apps
- Use JavaPackager

8u20 API

- Configured through Map<String, ? super Object>
- Introduces BundlerParamInfo
- Bundlers can be called independently
- Provide centralized Bundlers object
  - Registers Default Bundlers
  - Registers Bundlers found via META-INF/services
  - Developers can manually register bundlers

Tooling support

- CLI uses new APIs
- JDK Bundled Ant integration uses new APIs
- Maven JavaFX plugin upgraded to use new APIs
  - Use latest 8.1.x version
- Gradle JavaFX plugin upgraded to use new APIs
  - Use latest 8.1.x version

8u40 features

- Native launcher re-write
- Command Line Arguments Defaults
- File Associations
- Multiple Launchers
- UserJVMArguments API
- Mac JRE support
- Packages Daemons and Services

App Data

- Mac

  ```
  ~/Library/Application Support/[app.preferences.id]/
  packager/jvmuserargs.cfg
  ```

- Windows

  ```
  C:\Users\[username]\AppData\Roaming\[app.preferences.id]
  \packager\jvmuserargs.cfg
  ```

- Linux

  ```
  ~/.local/[app.preferences.id]/packager/jvmuserargs.cfg
  ```

Bundlers

- To list the bundlers that are available:
  `javapackager -help bundlers`
- To list the preferred set of bundler arguments for a particular bundler:
  `javapackager -help <bundler-id>`
- Example 1: `javapackager -help bundlers`

```
dmg - DMG Installer - INSTALLER
mac.appStore - Mac App Store Ready Bundler - INSTALLER
mac.app - Mac Application Image - IMAGE
pkg - PKG Installer - INSTALLER
```

- Example 2: `javapackager -help mac.app`

Bundler Arguments - How to specify in Ant

- Use the new fx:bundleArgument element (child to fx:deploy)

```
<fx:deploy verbose="true" outdir="awesomeApp" nativeBundles="image">

  <fx:application name="AwesomeApp" mainApp="awesome.app.Main"
                  version='1.0.42'/>

  <fx:resources id="appRes">
    <fx:fileset dir="build/jars" includes="awesomeApp.jar Util.jar"/>
  </fx:resources>

  <fx:info vendor="JavaOneDemo" title="Awesome!!1!!" category='SomeCategory'
           email='awesomeApp@example.com'/>

  <fx:bundleArgument arg="mac.CFBundleIdentifier"
                     value="Awesome Developer"/>
</fx:deploy>
```

Mac AppStore Bundler Tip

- We suggest setting mac.CFBundleVersion

```
<fx:deploy verbose="true" outdir="awesomeApp" nativeBundles="image">
…
  <fx:bundleArgument arg="mac.CFBundleVersion"
                     value="Awesome Developer”/>
</fx:deploy>
```

Service / Daemon Bundlers

- Installs your program as a service/daemon
  - Headless operations - no GUI
- Mac - PKG installer only
  - Installed into **launchctl**
- Windows - EXE and MSI Installers
  - Installed as a Service
- Linux - DEB and RPM Installers
  - Installed in **init.d**

Service / Daemon Installers

- CLI
  - new '**-daemon**' flag
- Ant
  - new '**daemon**' boolean attribute on '**fx:application**'
- Gradle and Maven
  - Use Bundler Arguments to setup

Service / Daemon Bundler Arguments

serviceHint	- Boolean	- Install as a service/daemon Default is false
runAtStartup	- Boolean	- Start service on system startup? Default is false, require manual start
startOnInstall	- Boolean	- Start service after package install? Default is false, require manual start
stopOnUninstall	- Boolean	- Stop service when removing package? Default is true, stop running service when removing package

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Tour of Bundlers

- Disk Image Bundlers
  - Mac .app
  - Windows
  - Linux
- Installer Bundlers
  - Mac - DMG, PKG, and Mac App Store Ready PKG
  - Windows - Wix Toolset .msi and InnoSetup .exe
  - Linux - Debian .deb and RPM .rpm
- JNLP Bundler NEW!

Mac AppStore Submission Issues

- 8u60 WebKit links with Apple's "private" APIs

```
ubrk_getRuleStatus
ubrk_setUText
ucnv_getCanonicalName
ucnv_reset
ucol_strcollIter
```

- APIs are for the text system ICU (www.icu-project.org) that reside in the QtWebKit library
- Fix the problem
  - JIRA: https://bugs.openjdk.java.net/browse/JDK-8138652

Mac AppStore Submission Issues

- Workaround Fix is scheduled for next year
- Automatically strips /lib/libjfxwebkit.dylib for bundled JRE
- JIRA: https://bugs.openjdk.java.net/browse/JDK-8138650
- Webrev: http://cr.openjdk.java.net/~shemnon/8138650/webrev.00/
- Changeset: http://hg.openjdk.java.net/openjfx/8u-dev/rt/rev/761213753af4

Mac AppStore Submission Issues

- Workarounds:
  - Remove /lib/libjfxwebkit.dylib from the JRE you are going to bundle

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JDK 9

These features are very tentative

- Module support (Project Jigsaw)
- JEP 275: https://bugs.openjdk.java.net/browse/JDK-8080531
- webrev: http://cr.openjdk.java.net/~shemnon/8080531/webrev.04
- Repository: http://hg.openjdk.java.net/openjfx/sandbox-9-jake/rt
- Changeset: http://hg.openjdk.java.net/openjfx/sandbox-9-jake/rt/rev/4dc807c092f6

JDK 9 Modules

- java.activation
- java.annotations.common
- java.base
- java.compact1
- java.compact2
- java.compact3
- java.compiler
- java.corba
- java.datatransfer
- java.desktop
- java.instrument
- java.logging
- java.management
- java.naming
- java.prefs
- java.rmi
- java.scripting
- java.se
- java.security.jgss
- java.security.sasl
- java.smartcardio
- java.sql
- java.sql.rowset
- java.transaction
- java.xml.bind
- java.xml.crypto
- java.xml
- java.xml.ws
- javafx.base
- javafx.controls
- javafx.fxml
- javafx.graphics
- javafx.media
- javafx.swing
- javafx.web
- jdk.accessibility
- jdk.attach
- jdk.charsets
- jdk.compiler
- jdk.crypto.ec
- jdk.crypto.pkcs11
- jdk.deploy
- jdk.deploy.osx
- jdk.hotspot.agent
- jdk.httpserver
- jdk.internal.le
- jdk.internal.opt
- jdk.jartool
- jdk.javadoc
- jdk.javaws
- jdk.jcmd
- jdk.jconsole
- jdk.jdeps
- jdk.jdi
- jdk.jdwp.agent
- jdk.jfr
- jdk.jlink
- jdk.jvmstat
- jdk.localedata
- jdk.management.cmm
- jdk.management
- jdk.management.resource
- jdk.naming.dns
- jdk.naming.rmi
- jdk.pack200
- jdk.packager
- jdk.packager.services
- jdk.plugin.dom
- jdk.plugin
- jdk.policytool
- jdk.rmic
- jdk.scripting.nashorn
- jdk.scripting.nashorn.shell
- jdk.sctp
- jdk.security.auth
- jdk.security.jgss
- jdk.snmp
- jdk.xml.bind
- jdk.xml.dom
- jdk.xml.ws
- jdk.zipfs

JDK 9 Tools

- jlink
- jmod
- jdeps

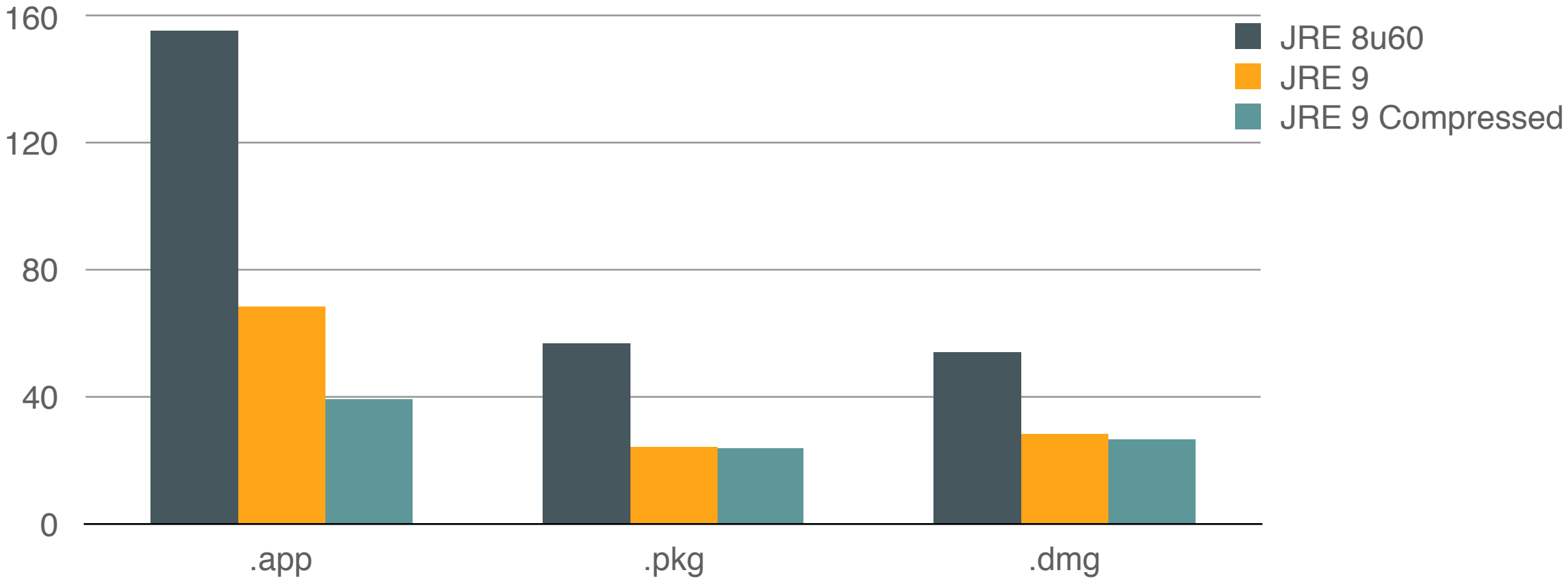
jlink Compression

```
0: Constant strings sharing, 30% size reduction, negligeable startup impact
1: ZIP compression, around 50%+ size reduction, small startup impact
2: ZIP+Constant strings sharing, 55%+ size reduction, small startup impact

By default, all resources are compressed. You can express the set of
Additional Options:  --compress-resources-level <0|1|2> --compress-
```

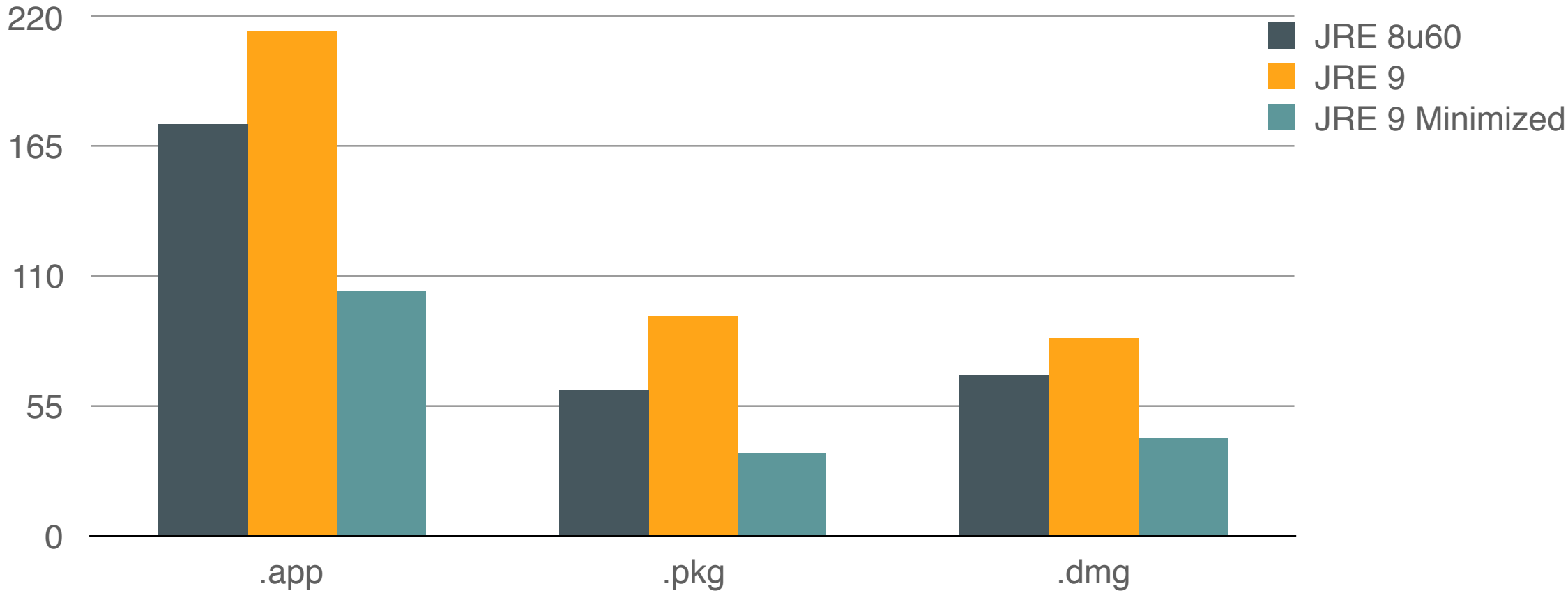
Up to **59%** App Size Reduction!

The Module Advantage



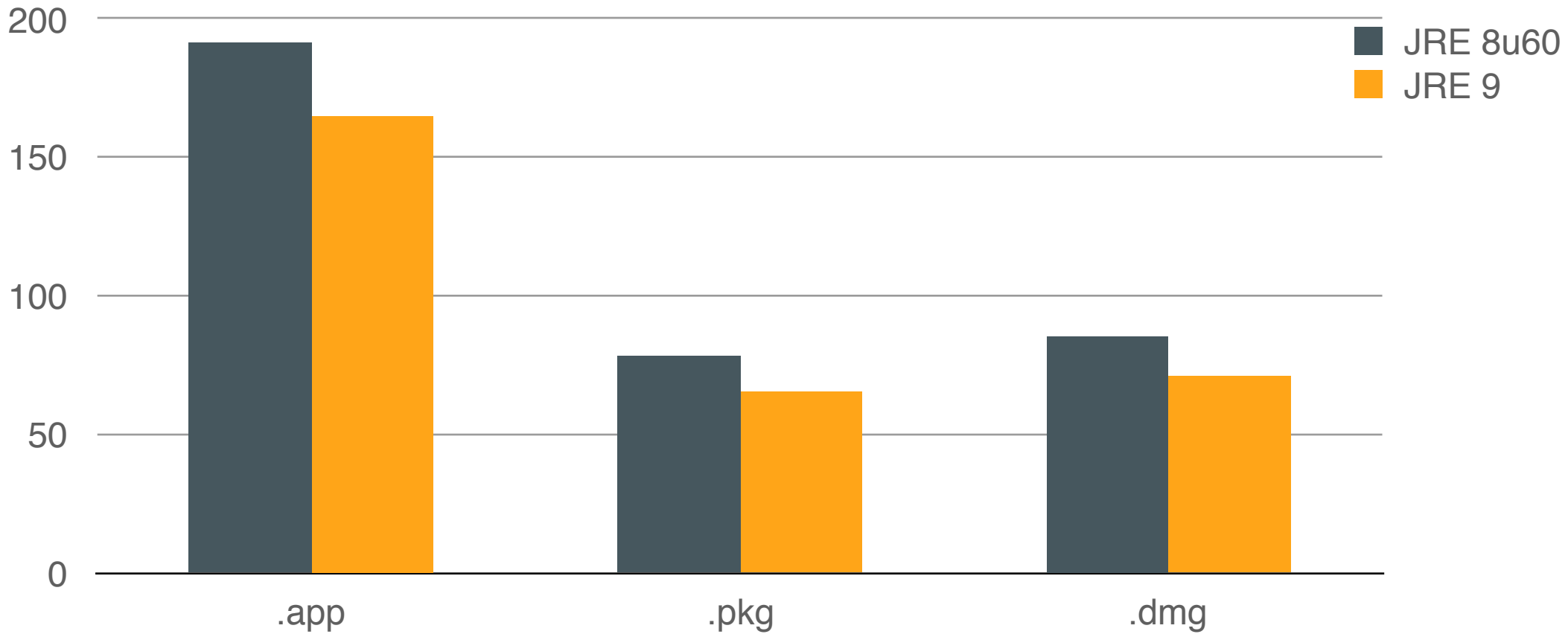
Example is a Hello World Swing App. Your App may vary.

The Module Advantage

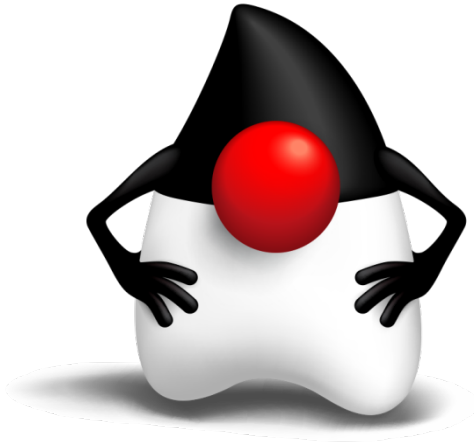


Example is a Hello World JavaFX App (not compressed). Your App may vary.

The Module Advantage



Example is Ensemble JavaFX App. Your App may vary.



Demo

Windows App Store - Major Roadblocks

- The Windows app store only accepts WinRT apps
- Apps that link against many of the traditional Windows APIs are banned (GDI, GDI+, etc)
- http://blogs.msdn.com/b/win8devsupport/archive/2012/12/20/porting-desktop-apps-to-windows-store-apps.aspx

Future Features Under Consideration*

These features are very tentative

- JDK 9 Module support
- ~~Auto Memory Configuration~~
- Windows Authenticode Signing
- Make Packaging Simpler
- Jigsaw Integration (Generate small, modular JRE)
- Auto Update (for when you don't have an App Store)
- Single Instance

* Subject to change

Future Features Under Consideration Continued…

These features are very tentative

- Re-writing Windows Executable MetaData
- Native Java Splash Screen Support
- Java Packager UI
- More Platform Fidelity Support
- Convert high resolution icon to platform icon
- General purpose install time and first run app capabilities
- Any Audience Requests?

Jigsaw Links

- http://openjdk.java.net/projects/jigsaw/
- http://openjdk.java.net/projects/jigsaw/quick-start

Mailing Lists:

openjfx-dev@openjdk.java.net

http://mail.openjdk.java.net/mailman/listinfo/openjfx-dev

Bug Reporting:

https://javafx-jira.kenai.com

Blog

https://blogs.oracle.com/talkingjavadeployment/

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