

Android ist anders

Android Dependency Management

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Agenda



- ***Build & Dependency-Management***
 - *Motivation*
 - *Fallbeispiel*
 - *Android*
 - *Android-Bibliotheken*
 - *Bibliotheken einbinden*
 - *IDEs*

Build Management

- Organisieren des Build-Prozesses:
 - Code-Kompilierung
 - Einbinden von Bibliotheken
- Build Management Tools
 - Automatisierung des Build-Prozesses
 - Maven, Ant, Buildr, ...

Dependency Management

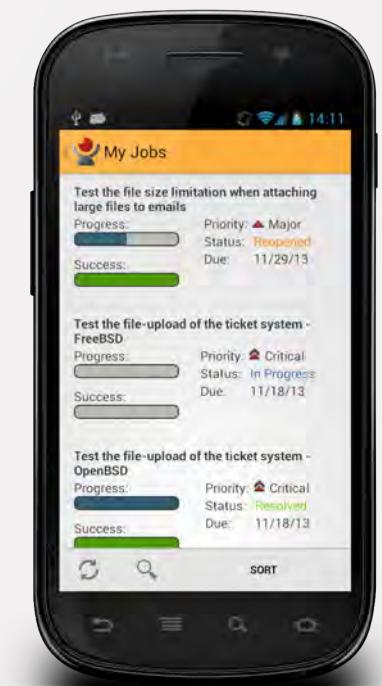
- Einbinden von Bibliotheken organisieren
 - Welche Version binde ich ein?
 - Transitive Abhangigkeiten
 - Mehrfach eingebundene Bibliotheken
- Dependency Management Tools
 - Maven, Gradle, Ivy, ...

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- 
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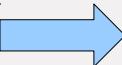
Klaros-Testmanagement Mobile Edition

The screenshot shows the 'Maintain Jobs' page of the Klaros Testmanagement system. The interface includes a top navigation bar with links for Define, Plan, Execute, Evaluate, and Configure, along with user information for 'Felix Mustermann (Administrator)'. Below this is a search bar and a 'verit informationssysteme' logo. On the left, a sidebar lists 'Jobs from Test Cases', 'Jobs from Test Suites', and 'Jobs by User'. The main area displays a table titled 'Maintain Jobs' with columns: ID, Summary, Priority, Status, Progress, Success, Due, Assigned, Arrange, and Action. The table lists 11 entries, each detailing a test job with its status, priority (Major or Critical), and assigned user (Erika Mustermann). The 'Action' column contains icons for viewing, editing, and deleting each job.

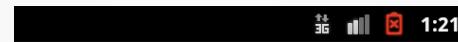


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Beispielanwendung



Android 2.2

Available System memory:

270368768 bytes

Refresh

Beispielanwendung



Bibliotheken einbinden →

1) ActionBarSherlock



2) Support Library



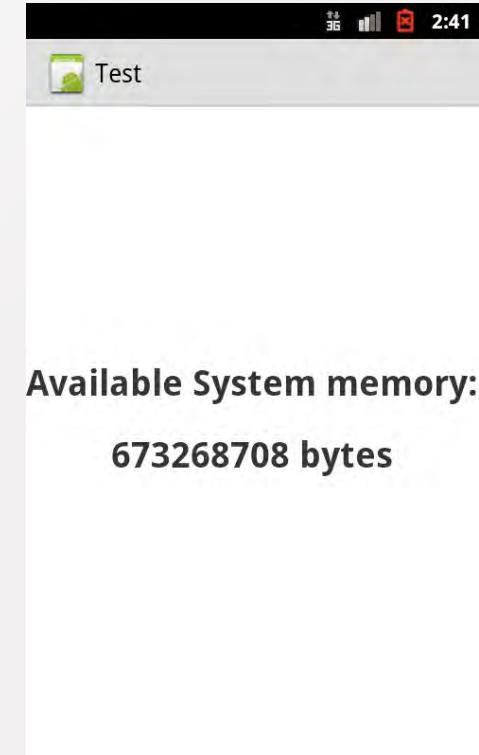
Available System memory:

270368768 bytes

Beispielanwendung

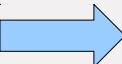


Refresh →



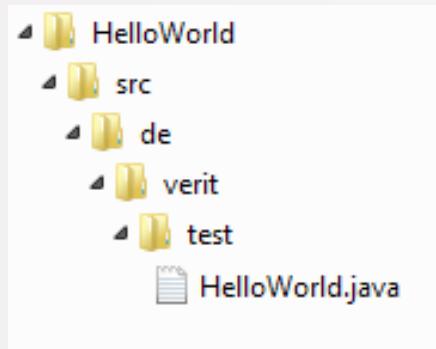
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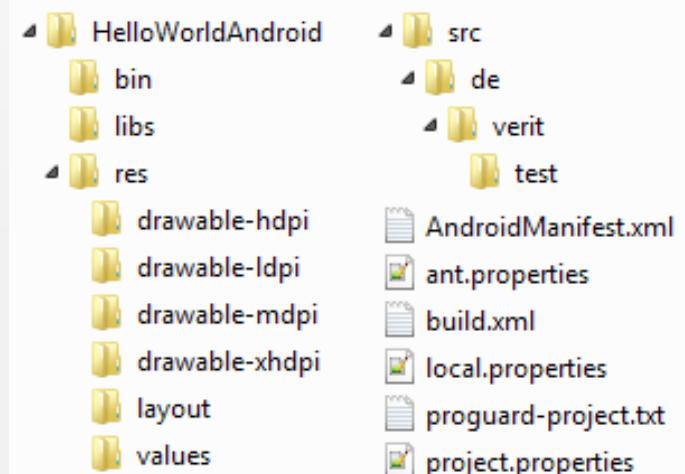


Hello World

Java



Android



Bibliotheken

- Java
 - Class-Dateien
 - jar
- Maven, Gradle, Ant, ...
- Android
 - Class-Dateien, Ressourcen
 - jar, apklib, aar, Library Project
- Tools
 - Maven, Gradle, Ant, ...
 - **Android-Plugins**

Agenda

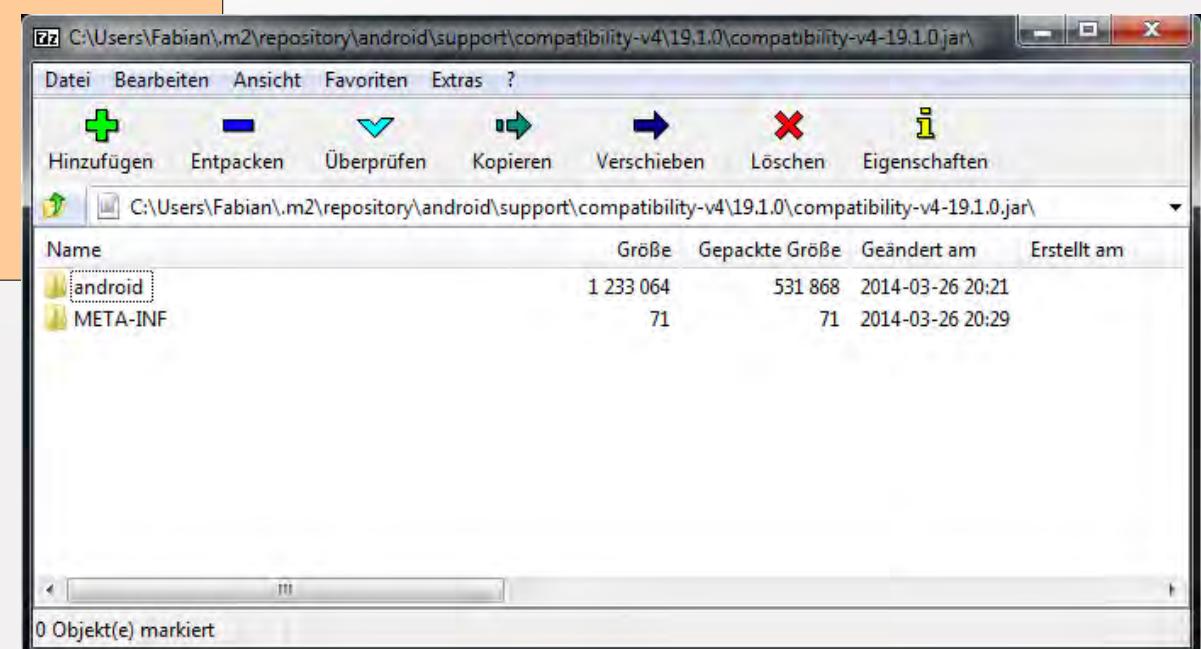
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Android-Bibliotheken

Android-Bibliotheken

jar

- class files



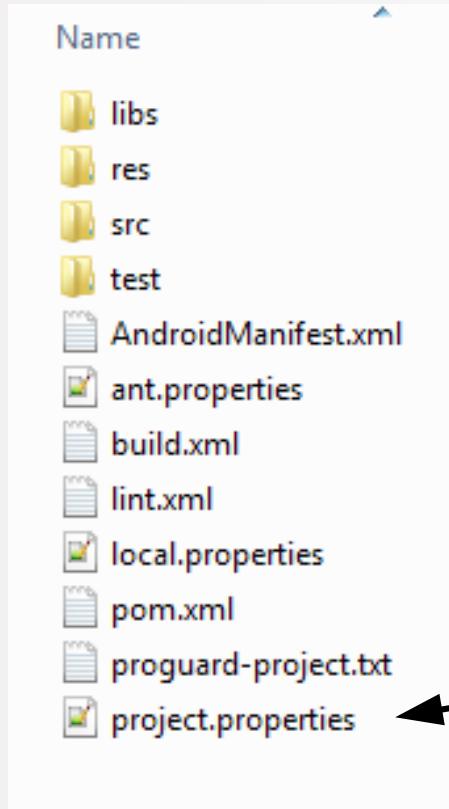
Android-Bibliotheken

jar

- class files

Library Project

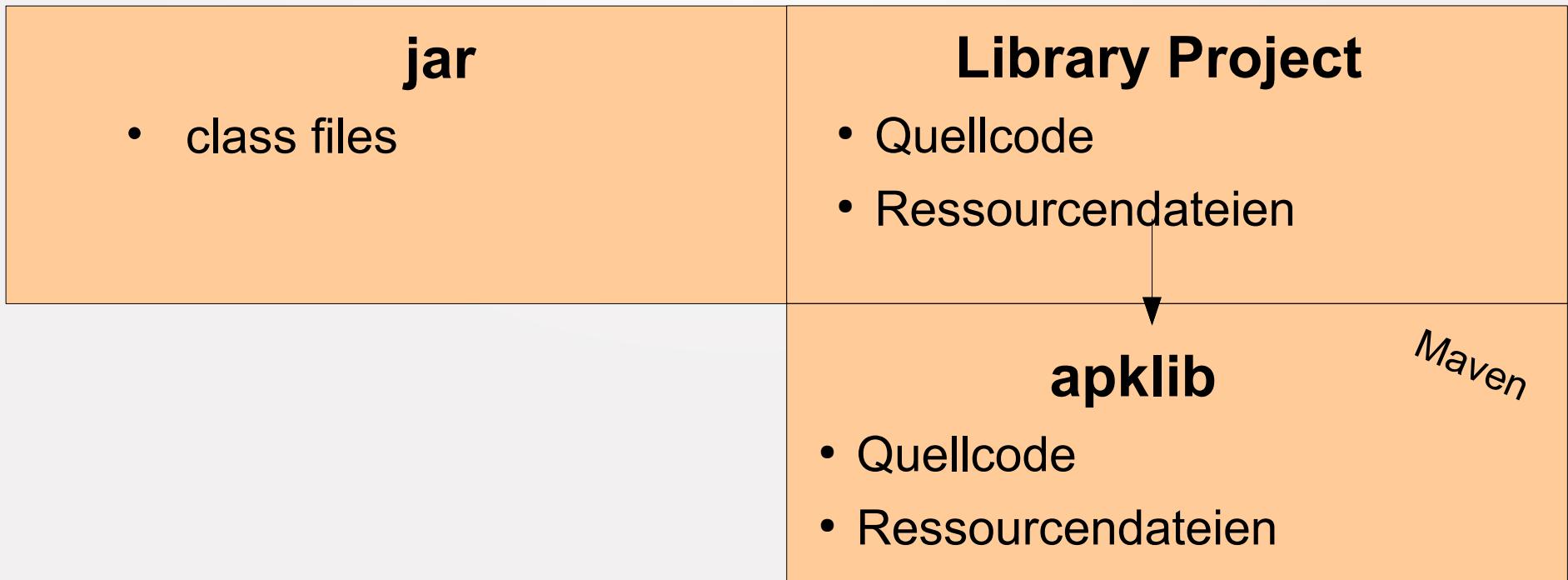
- Quellcode
- Ressourcendateien



Library Project

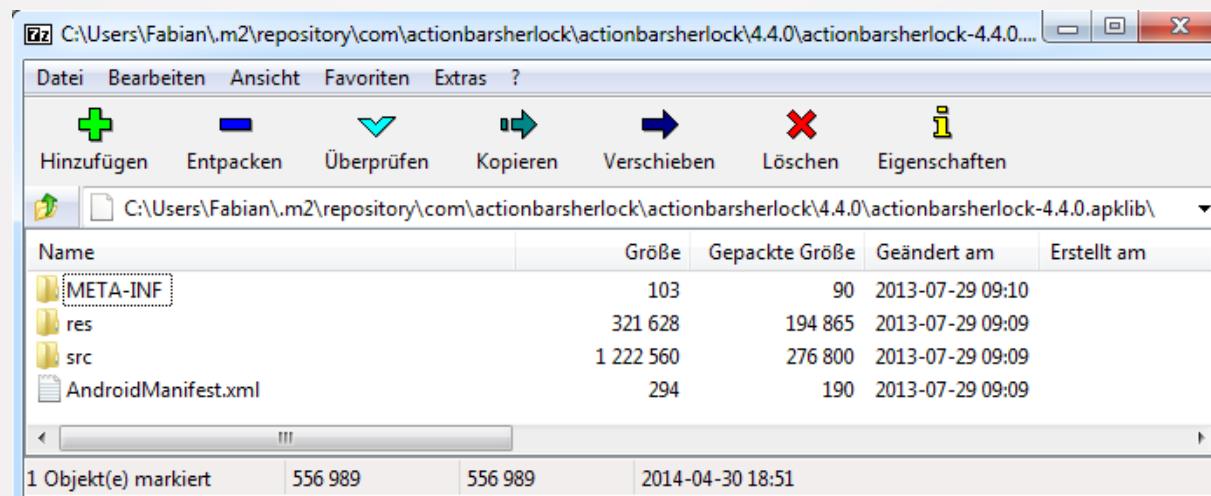
- Quellcode
- Ressourcendateien
- Standard Android Projekt
- Einziger Unterschied:
project.properties enthält den Eintrag:
 - android.library=true

Android-Bibliotheken



apklib

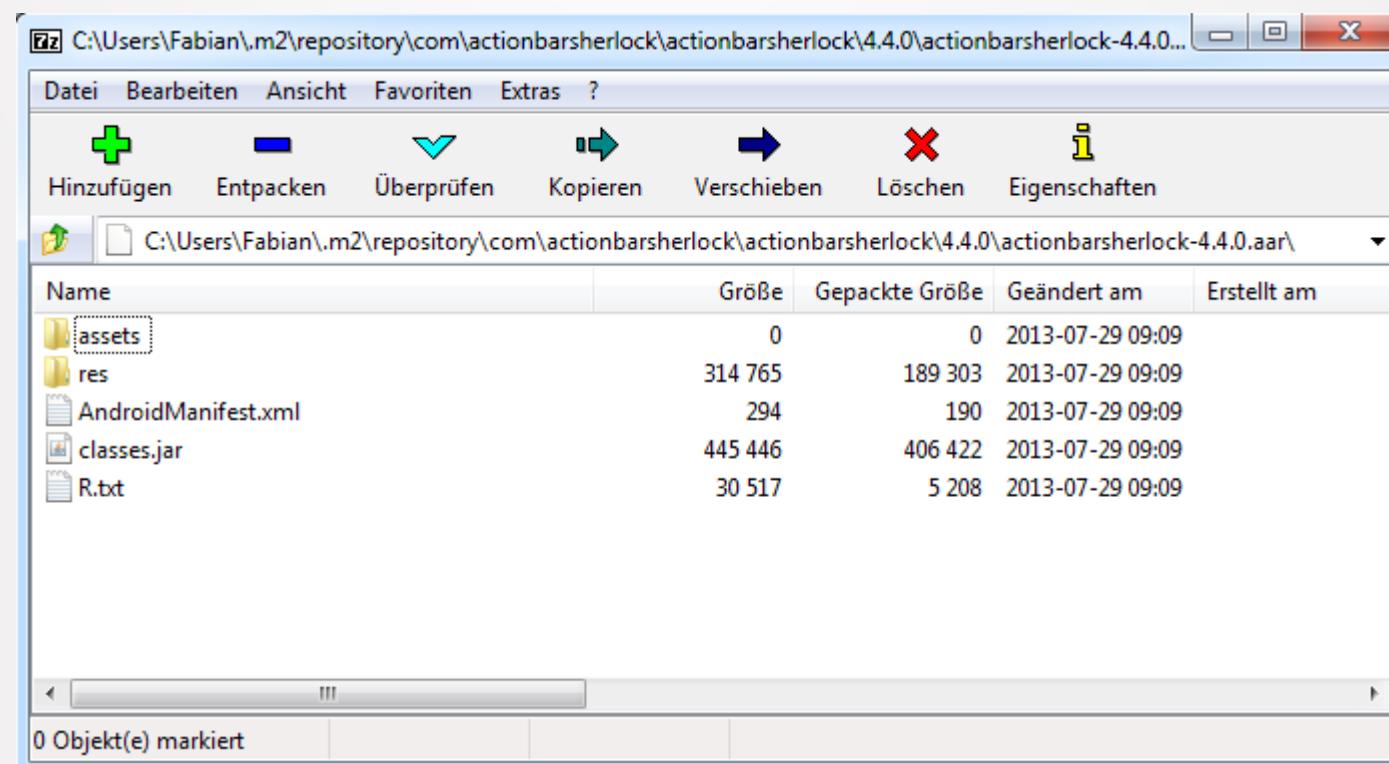
- Quellcode
- Ressourcendateien
- Herkunft: maven-android-plugin



Android-Bibliotheken

jar <ul style="list-style-type: none">• class files	Library Project <ul style="list-style-type: none">• Quellcode• Ressourcendateien
<i>Gradle</i> aar (Android Archive) <ul style="list-style-type: none">• class files• Ressourcendateien	<i>Maven</i> apklib <ul style="list-style-type: none">• Quellcode• Ressourcendateien

aar



Android-Bibliotheken



- Maven-Repositories
- Projektseiten
- SDK-Manager
- SDK-Repositories

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Kommandozeile & Ant

	Library-Project	jar	aar	apklib
Ant				
maven				
Gradle				





Library Project einbinden

<http://actionbarsherlock.com/>

Library
Project

Ant

libs	Dateiordner
res	Dateiordner
src	Dateiordner
test	Dateiordner
AndroidManifest.xml	XML-Datei
build.gradle	GRADLE-Datei
lint.xml	XML-Datei
pom.xml	XML-Datei
project.properties	PROPERTIES-Datei
README.md	MD-Datei

android update project -path .

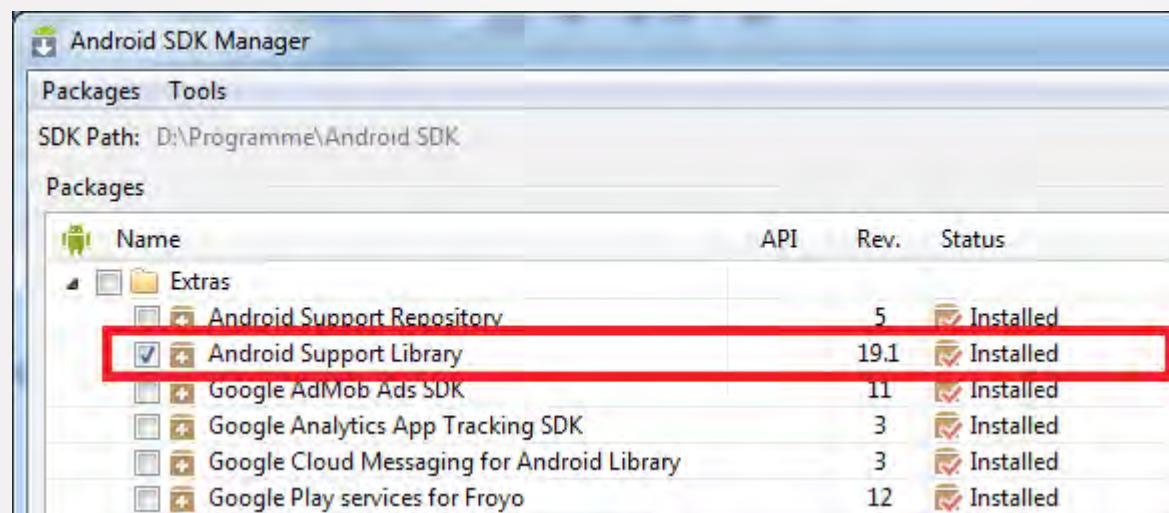
android update project
--target 14 --path <path to
the project> --library
..ActionBarSherlock

jar einbinden

jar

Ant

- v4 support library
 - v4 support library r19.1.0 → SwipeRefreshLayout



jar

Ant

Build-Fehler

```
[echo] -----
[echo] Resolving Dependencies for Test...
[dependency] Ordered libraries:
[dependency] D:\actionbarsherlock\ActionBarSherlock
[dependency]
[dependency]
[dependency] Found 2 versions of android-support-v4.jar in the dependency list,
[dependency] but not all the versions are identical (check is based on SHA-1 only at this time).
[dependency] All versions of the libraries must be the same at this time.
[dependency] Versions found are:
[dependency] Path: D:\actionbarsherlock\ActionBarSherlock\libs\android-support-v4.jar
[dependency]   Length: 246921
[dependency]   SHA-1: 787594919738b7cc806f2870ac9a59d98754a458
[dependency] Path: D:\Test\libs\android-support-v4.jar
[dependency]   Length: 648327
[dependency]   SHA-1: ded9acc6a9792b8f1afc470f0c9cd36d178914cd
BUILD FAILED
D:\Programme\Android\SDK\tools\ant\build.xml:577: Jar mismatch! Fix your dependencies

Total time: 1 second
D:\Test>_
```

jar

Ant

Ursache??

Android SDK Manager

Packages Tools

SDK Path: D:\Programme\Android SDK

Packages

Name	API	Rev.	Status
Extras			
Android Support Repository	5	Installed	
Android Support Library	19.1	Installed	
Google AdMob Ads SDK	11	Installed	
Google Analytics App Tracking SDK	3	Installed	
Google Cloud Messaging for Android Library	3	Installed	
Google Play services for Froyo	12	Installed	
Google Play services	16	Installed	
Google Repository	7	Installed	
Google Play APK Expansion Library	3	Installed	
Google Play Billing Library	5	Installed	
Google Play Licensing Library	2	Installed	
Google USB Driver	9	Installed	



Android Support Library
Version 6

apklib

Ant

apklib einbinden

Maven

apklib

- Quellcode
- Ressourcendateien

1) unzip

2) Für Ant vorbereiten

Library-Project

- Quellcode
- Ressourcendateien

(Ant unterstützt keine apklibs)

aar

Ant

aar einbinden

aar (Android Archive)

- class files
- Ressourcendateien Gradle

1) unzip

- 2) Klassen einbinden
- 3) Für Ant vorbereiten

Library Project

- Quellcode
- Ressourcendateien

(Ant unterstützt keine aars)

aar

Ant

aar – Klassen einbinden

actionbarsherlock.aar (entpackt)



Kommandozeile / Maven

Maven

Library- Project	jar	aar	apklib
Ant	+	+	o
maven			o
Gradle			



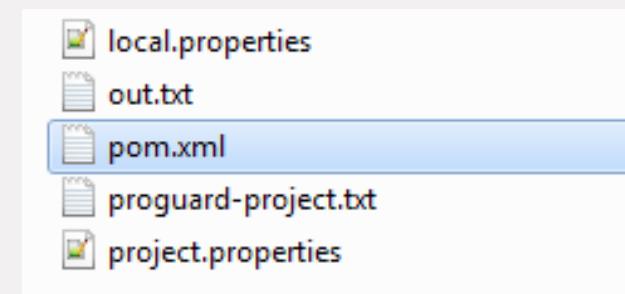
jar, apklib, aar

maven

jar / apklib / aar

...

```
<dependencies>
    <dependency>
        <groupId>com.actionbarsherlock</groupId>
        <artifactId>actionbarsherlock</artifactId>
        <version>4.4.0</version>
        <type>apklib</type>
    </dependency>
    ...
</dependencies>
```

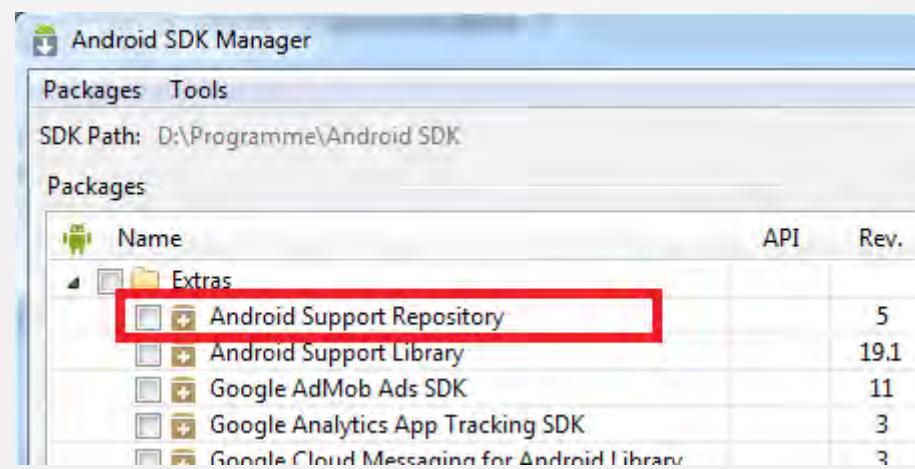


jar

maven

support-v4

```
<dependency>
    <groupId>com.google.android</groupId>
    <artifactId>support-v4</artifactId>
    <version>r6</version>
</dependency>
```



jar, aar

maven

maven-android-sdk-deployer

- Kopiert Bibliotheken aus dem **Support Repository** in das **lokale Repository (.m2)**

```
<dependency>
    <groupId>com.android.support</groupId>
    <artifactId>support-v4</artifactId>
    <version>19.1.0</version>
    <scope>compile</scope>
</dependency>
```

<https://github.com/mosabua/maven-android-sdk-deployer>

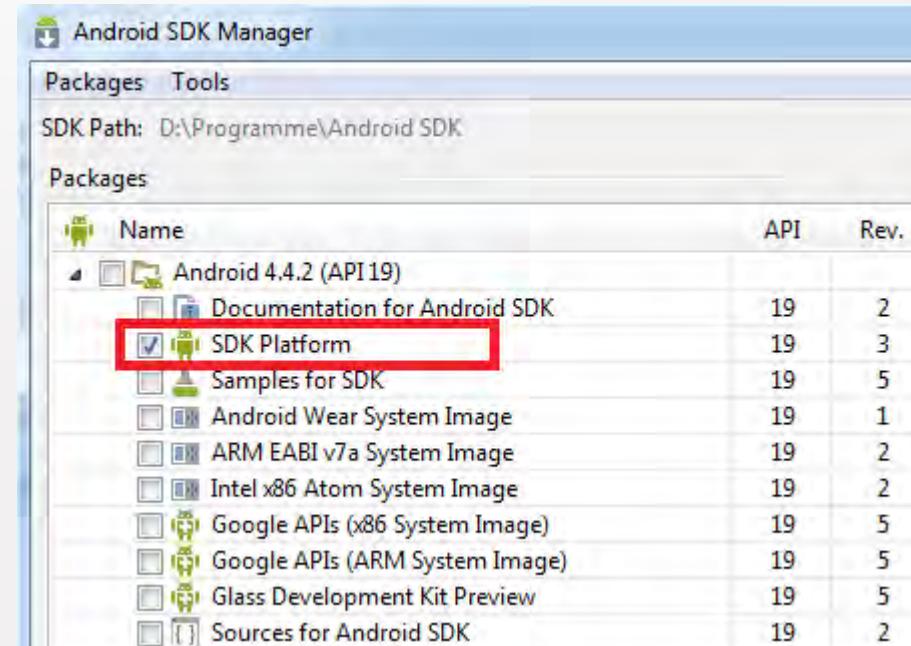
jar

maven

SwipeRefreshLayout

MavenCentral: Android 4.1.1.4

SDK Manager: Android 4.4.2



Name	API	Rev.
Android 4.4.2 (API 19)		
Documentation for Android SDK	19	2
<input checked="" type="checkbox"/> SDK Platform	19	3
Samples for SDK	19	5
Android Wear System Image	19	1
ARM EABI v7a System Image	19	2
Intel x86 Atom System Image	19	2
Google APIs (x86 System Image)	19	5
Google APIs (ARM System Image)	19	5
Glass Development Kit Preview	19	5
Sources for Android SDK	19	2

Library Projects einbinden

Library Project

maven

Library Project

- Quellcode
- Ressourcendateien

zip →

apklib

- Quellcode
- Ressourcendateien

<https://code.google.com/p/maven-android-plugin/wiki/ApkLib>

Kommandozeile / Gradle

Gradle

Library- Project	jar	aar	apklib
Ant	+	+	o
maven	o	+	+
Gradle			



jar

Gradle

Einbinden von jars



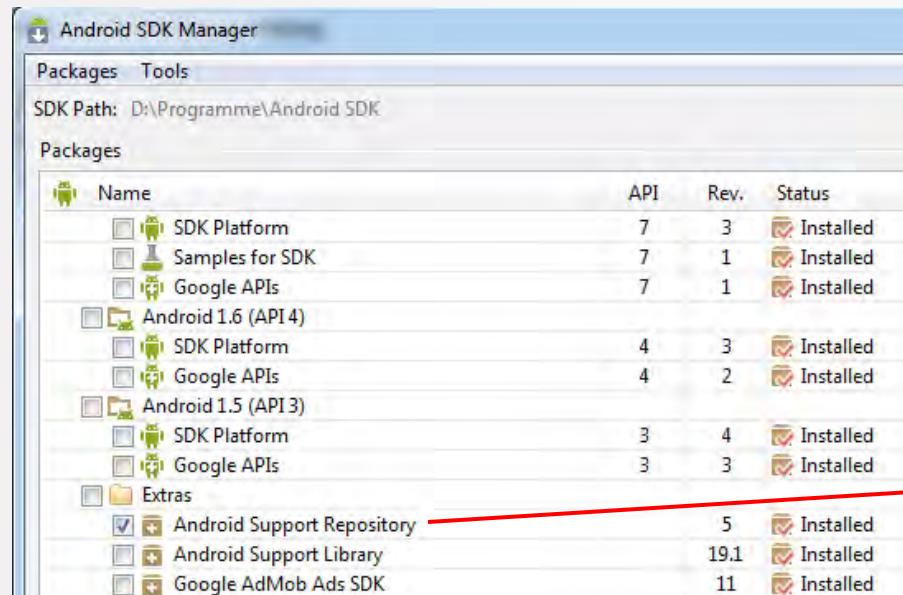
```
dependencies {  
    compile files('libs/android-support-v4.jar')  
}
```

```
dependencies {  
    compile 'com.android.support:support-v4:19.1.0'  
}
```

jar

Gradle

Einbinden von jars (aus einem Repository)



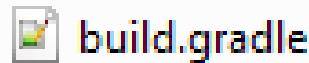
Wird von Gradle erkannt!

<https://plus.google.com/+AndroidDevelopers/posts/4YhpN6p9icf>

aar

Gradle

Einbinden von aars I



```
repositories {  
    mavenCentral()  
}  
  
dependencies {  
    compile 'com.actionbarsherlock:actionbarsherlock:4.4.0@aar'  
}
```

aar

Gradle

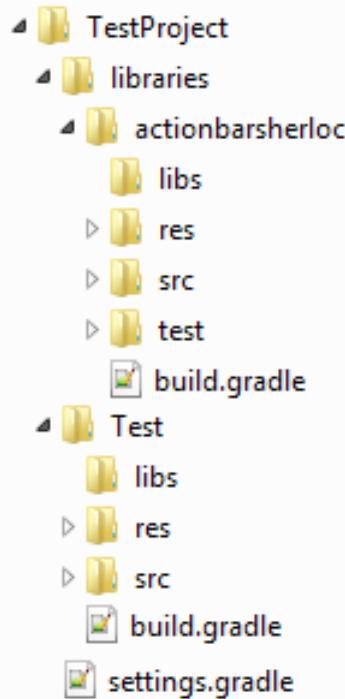
Einbinden von aars II

```
[D:\TestSwipeGradle\AndroidManifest.xml:1, D:\TestSwipeGradle\build\exploded-aar\com.actionbarsherlock\actionbarsherlock\4.4.0\AndroidManifest.xml:2] Main manifest has <uses-sdk android:targetSdkVersion='1'> but library uses targetSdkVersion='17'
```

- **minSdkVersion**
 - Älteste unterstützte Android-Version
- **targetSdkVersion**
 - Zielplattform

Library Project
Gradle

Multi project setup (Library-Projects)



:libraries:actionbarsherlock

:Test

```
dependencies {  
    compile project(':libraries:actionbarsherlock')  
}
```

<http://tools.android.com/tech-docs/new-build-system/user-guide#TOC-Dependencies-Android-Libraries-and-Multi-project-setup>

apklib

Gradle

apklibs einbinden

- Android **Maven** plugin

apklib

- Quellcode
- Ressourcendateien

aar (Android Archive)

- class files
- Ressourcendateien

https://github.com/carrot-garden/android_maven-android-plugin-samples/blob/master/libraryprojects/aar-from-apklib/pom.xml

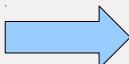
Kommandozeile

Fazit

	Library-Project	jar	aar	apklib
Ant	+	+	o	o
maven	o	+	+	+
Gradle	+	+	+	o

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maven, Gradle

Eclipse

Eclipse

Android:

- **Eclipse ADT Plugin**

Maven:

- **Maven Eclipse Plugin**
- **Android for Maven Eclipse connector (m2e-android)**

Gradle:

- **Gradle IDE Pack , Nodeclipse/Enide Gradle for Eclipse**

Netbeans

- Voraussetzungen:
 - **NBAndroid** (<http://nbandroid.org/wiki/index.php/Installation>)

maven

Netbeans

Netbeans – Maven

- Maven Plugin wird mitgeliefert
- Keine Unterstützung von apklibs:

https://netbeans.org/bugzilla/show_bug.cgi?id=220446

Description
⚠ package com.actionbarsherlock.app does not exist
⚠ method does not override or implement a method from a supertype
⚠ cannot find symbol symbol: variable super location: class de.verit.test.Test
⚠ package R does not exist
⚠ package R does not exist
⚠ incompatible types: de.verit.test.Test cannot be converted to android.support.v4.widgetSwipeRefreshLayout.OnRefreshListener
⚠ package R does not exist
⚠ cannot find symbol symbol: variable ACTIVITY_SERVICE location: class de.verit.test.Test
Error: 8 (in Test)

Gradle

Netbeans

Netbeans – Gradle

Voraussetzung:

- **Gradle Support Plugin**
 - <http://plugins.netbeans.org/plugin/44510/gradle-support>

ABER:

- Android-Gradle-Kompatibilität des **NBAndroid-Plugins** kostenpflichtig! (<http://nbandroid.org/wiki/index.php/Subscriptions>)

IntelliJ (Community Edition)

Inklusive Gradle, Android, Maven Plugins

- Import von Gradle, Maven und Eclipse-Projekten
- Nahtlose Gradle-Unterstützung
- Maven-Android Unterstützung inkl. aar, apklib
- Einbinden von Library-Projekten

Android Studio

- Basiert auf IntelliJ
- Nur für Android-Entwicklung ausgelegt
- „*Early Access Preview*“ (Alpha)

Fazit

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 - ***Tipps & Tricks***



Java 7

- Android SDK Tools, Revision 22.6 (March 2014)

`minSdkVersion = 8`

 `try-with-resources: minSdkVersion = 19`

<http://developer.android.com/tools/sdk/tools-notes.html>

Android API Levels

Plattform Version	API Level	Version Code	Android Target ID
Android 4.4	19	KITKAT	18
Android 4.3	18	JELLY_BEAN_MR2	17
Android 4.2, 4.2.2	17	JELLY_BEAN_MR1	16
Android 4.1, 4.1.1	16	JELLY_BEAN	15
...

<http://developer.android.com/guide/topics/manifest/uses-sdk-element.html#ApiLevels>