

DESENVOLVIMENTO PARA DISPOSITIVOS MÓVEIS

PROF^a. M.Sc. JULIANA H Q BENACCHIO



Links importantes

<http://www.android.com/>

- Site oficial de toda a documentação, downloads e informações sobre a plataforma.

<http://developer.android.com/>

- Site oficial com todas as informações necessárias para o desenvolvimento de aplicações para Android.

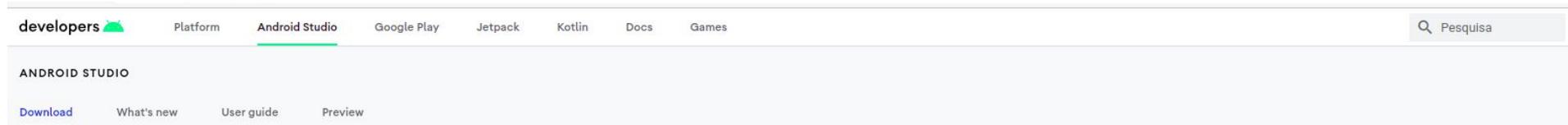


Configuração do Ambiente de Desenvolvimento

- O **Android Studio** oferece tudo que você precisa para iniciar o desenvolvimento de aplicativos para o Android, incluindo o **Android Studio IDE** e as ferramentas do **Android SDK**.
- O Android SDK é o software utilizado para desenvolver aplicações no Android, que tem um emulador para simular o dispositivo, ferramentas utilitárias e uma API completa para a linguagem JAVA.



Configuração do Ambiente de Desenvolvimento



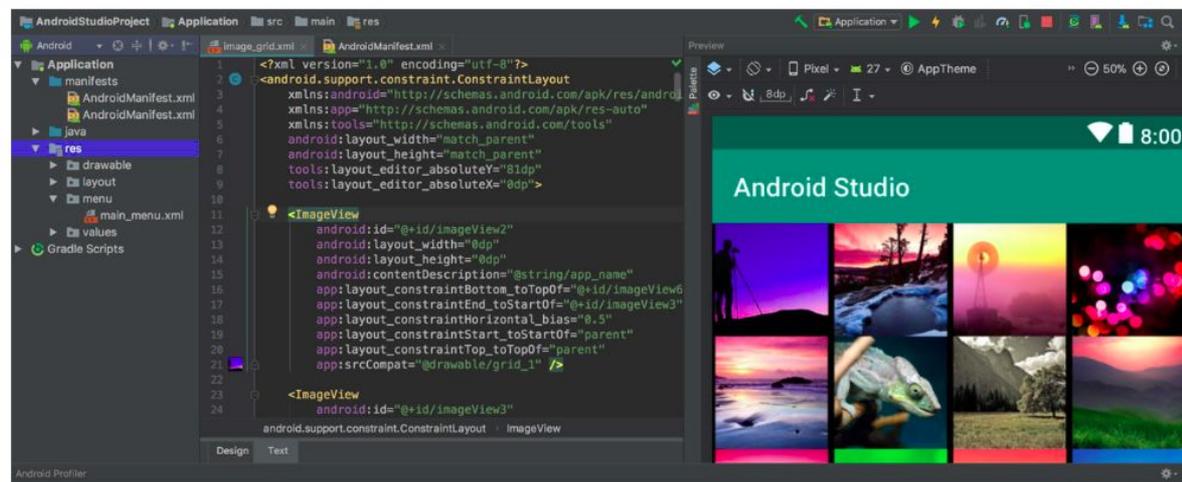
Android Studio provides the fastest tools for building apps on every type of Android device.

[Download Android Studio](#)

Android Studio Bumblebee | 2021.1.1 Patch 3 for Linux 64-bit (904 MiB)

[Download options](#)

[Release notes](#)



Configuração do Ambiente de Desenvolvimento

- É possível instalar somente o SDK, mas a recomendação é baixar o Android Studio que já contém o SDK.
- O Android Studio pode ser encontrado no endereço: <http://developer.android.com/studio>
- Antes de configurar o Android Studio, certifique-se de ter instalado o JDK (somente o JRE não é suficiente).



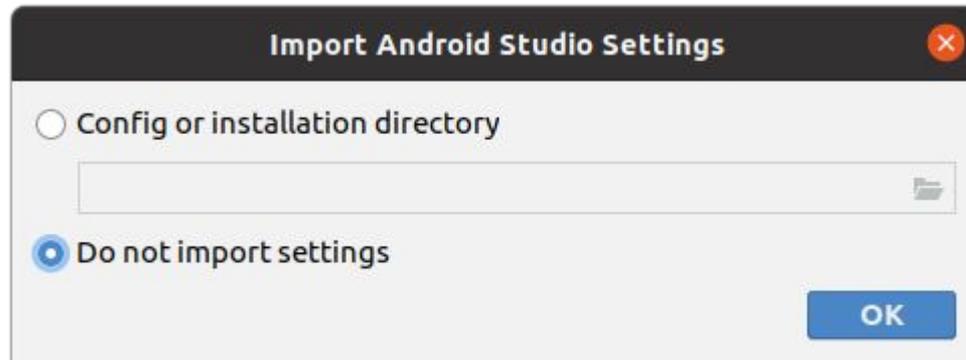
Configuração do Ambiente de Desenvolvimento

- Para instalar a ferramenta no Windows e Mac OS, basta clicar duas vezes em cima do arquivo para iniciar a instalação.
- No caso do Linux, descompacte o arquivo de download `android-studio-XXX-linux.tar.gz`. No Terminal, vá até a pasta descompactada `android-studio` e depois a pasta `bin`. Execute o *script* chamado `studio.sh`.

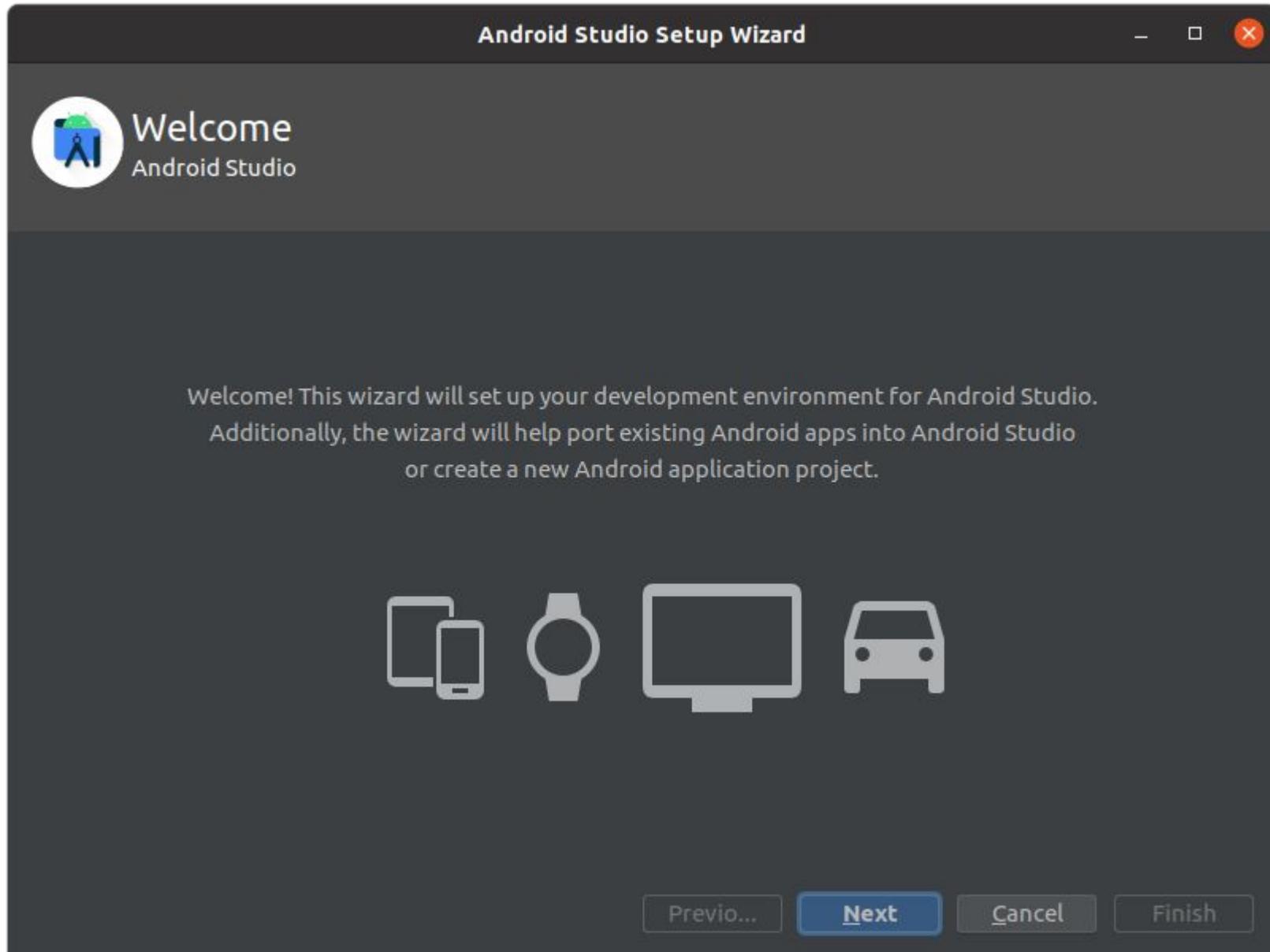


Configuração do Ambiente de Desenvolvimento

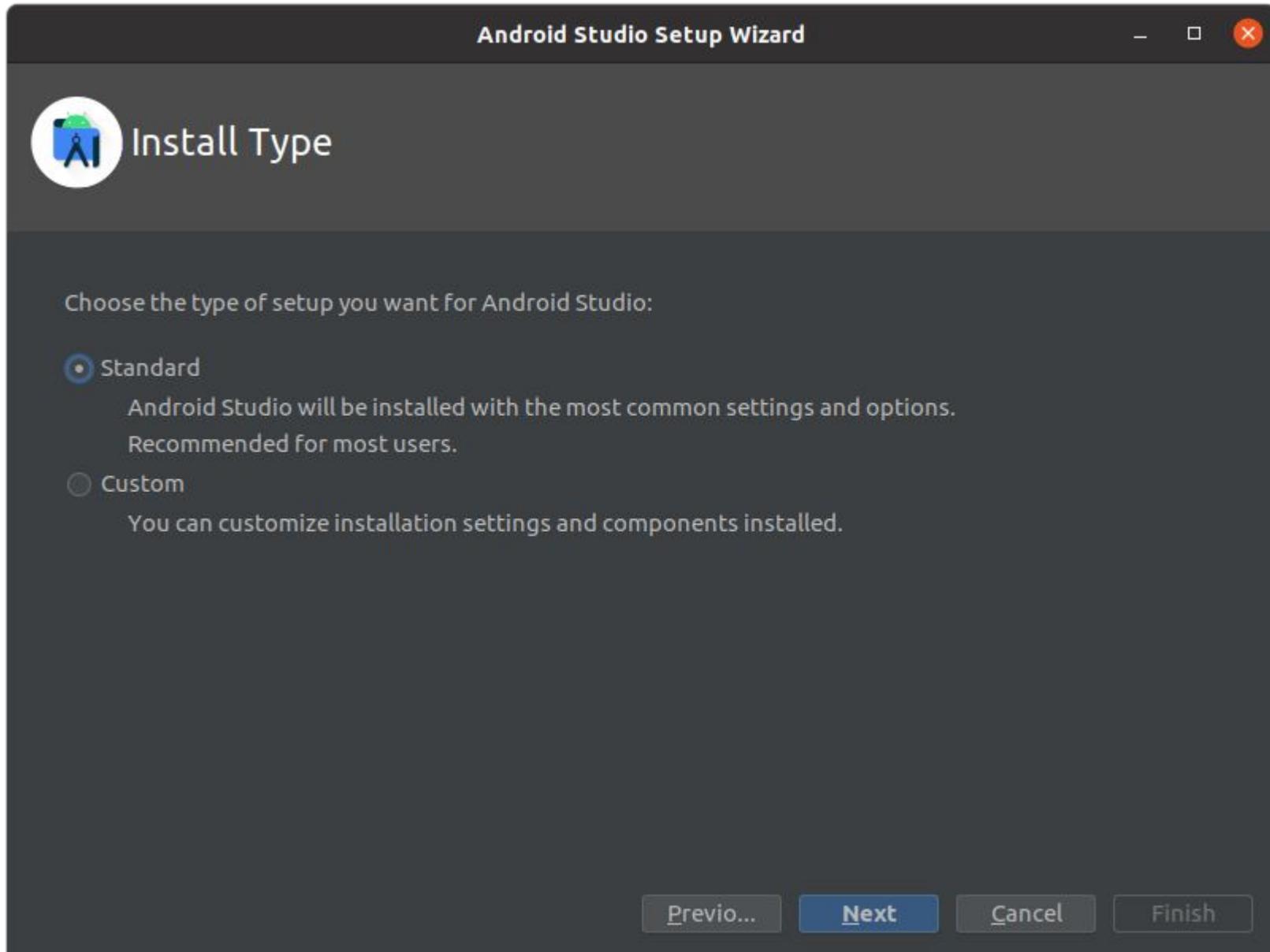
- Durante a instalação defina a pasta na qual o Android Studio e o Android SDK serão instalados. No *wizard* de instalação uma das telas será para você confirmar a importação de configurações antigas.



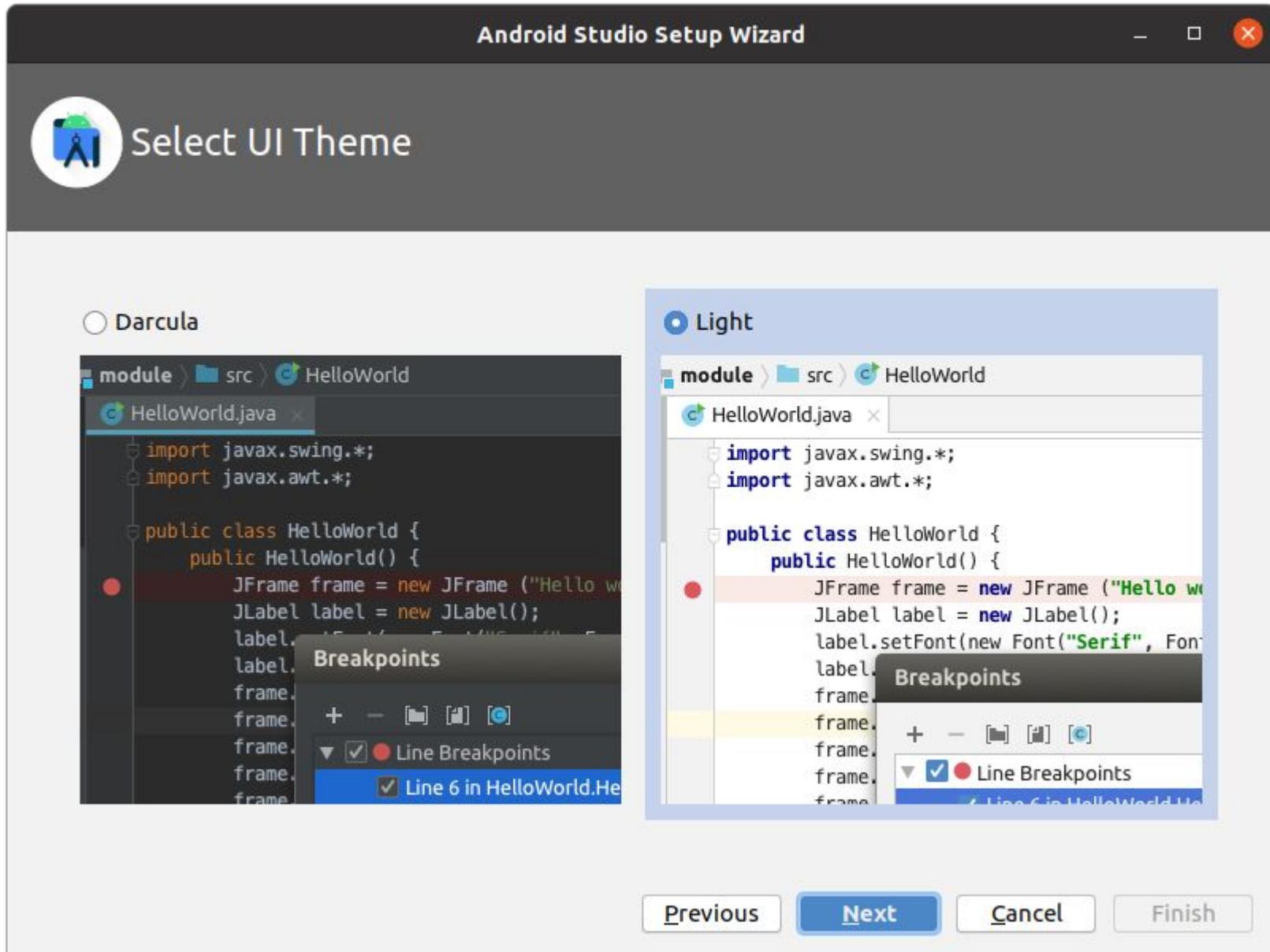
Configuração do Ambiente de Desenvolvimento



Configuração do Ambiente de Desenvolvimento



Configuração do Ambiente de Desenvolvimento





Verify Settings

If you want to review or change any of your installation settings, click Previous.

Current Settings:

Setup Type:

Standard

SDK Folder:

/home/professor/Android/Sdk

JDK Location:

/home/professor/Downloads/android-studio-2021.1.1.23-linux/android-studio/jre

Total Download Size:

443 MB

SDK Components to Download:

Android Emulator	264 MB
Android SDK Build-Tools 32	52,4 MB
Android SDK Build-Tools 32.1-rc1	54,7 MB
Android SDK Platform 32	63 MB
Android SDK Platform-Tools	7,1 MB
SDK Patch Applier v4	1,74 MB

[Previous](#)[Next](#)[Cancel](#)[Finish](#)



License Agreement

Read and agree to the licenses for the components which will be installed

Licenses

android-sdk-license

- Android SDK Platform 32
- Android SDK Build-Tools
- Android SDK Platform-Tools
- SDK Patch Applier v4
- Android Emulator

android-sdk-preview-license

- Android SDK Build-Tools

To get started with the Android SDK Preview, you must agree to the following terms and conditions. As described below, please note that this is a preview version of the Android SDK, subject to change, that you use at your own risk. The Android SDK Preview is not a stable release, and may contain errors and defects that can result in serious damage to your computer systems, devices and data.

This is the Android SDK Preview License Agreement (the "License Agreement").

1. Introduction

1.1 The Android SDK Preview (referred to in the License Agreement as the "Preview" and specifically including the Android system files, packaged APIs, and Preview library files, if and when they are made available) is licensed to you subject to the terms of the License Agreement. The License Agreement forms a legally binding contract between you and Google in relation to your use of the Preview.

1.2 "Android" means the Android software stack for devices, as made available under the Android Open Source Project, which is located at the following URL: <http://source.android.com/>, as updated from time to time.

1.3 "Google" means Google Inc., a Delaware corporation with principal place of business at 1600 Amphitheatre Parkway, Mountain View, CA 94043, United States.

Decline Accept

Previous

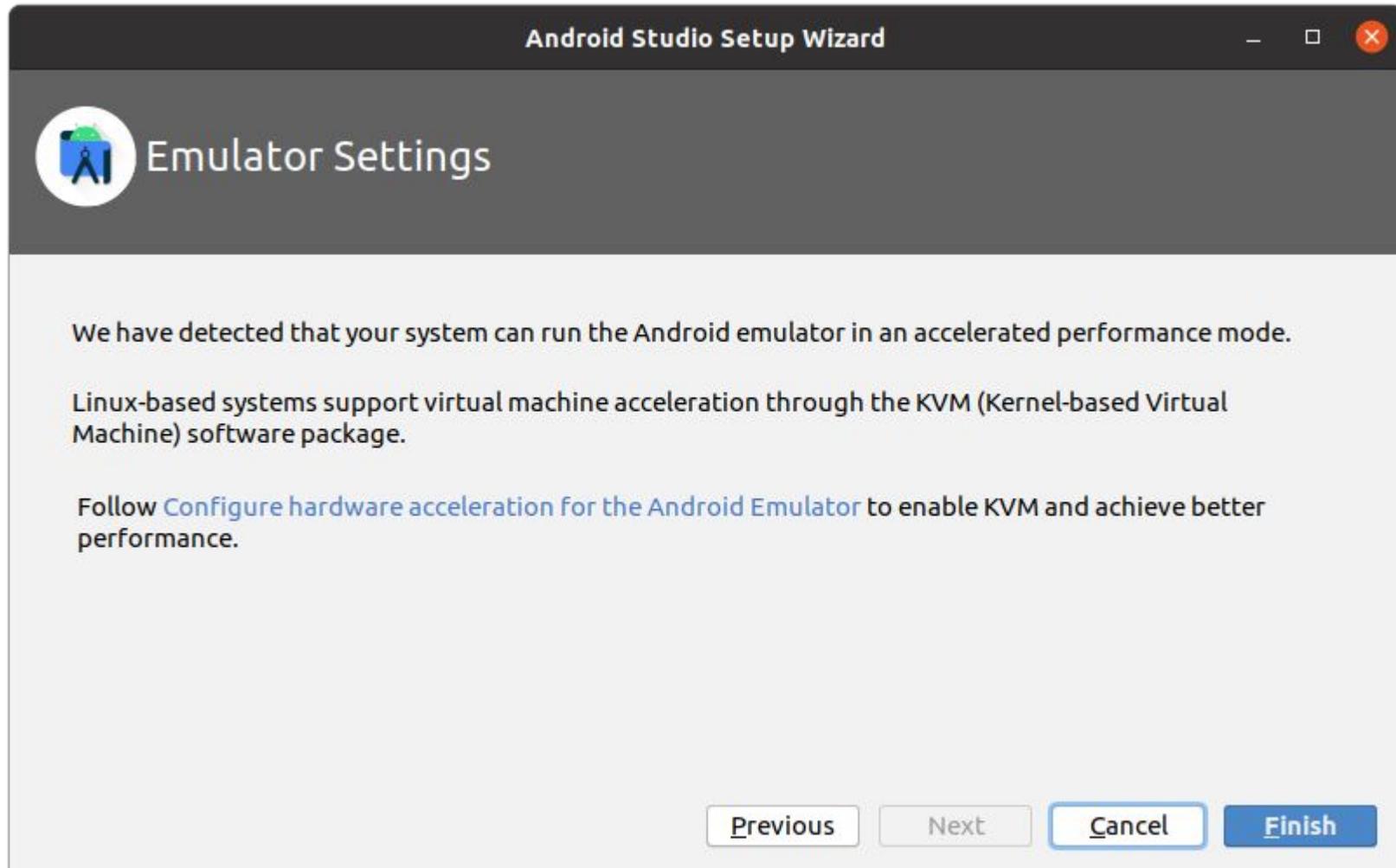
Next

Cancel

Finish



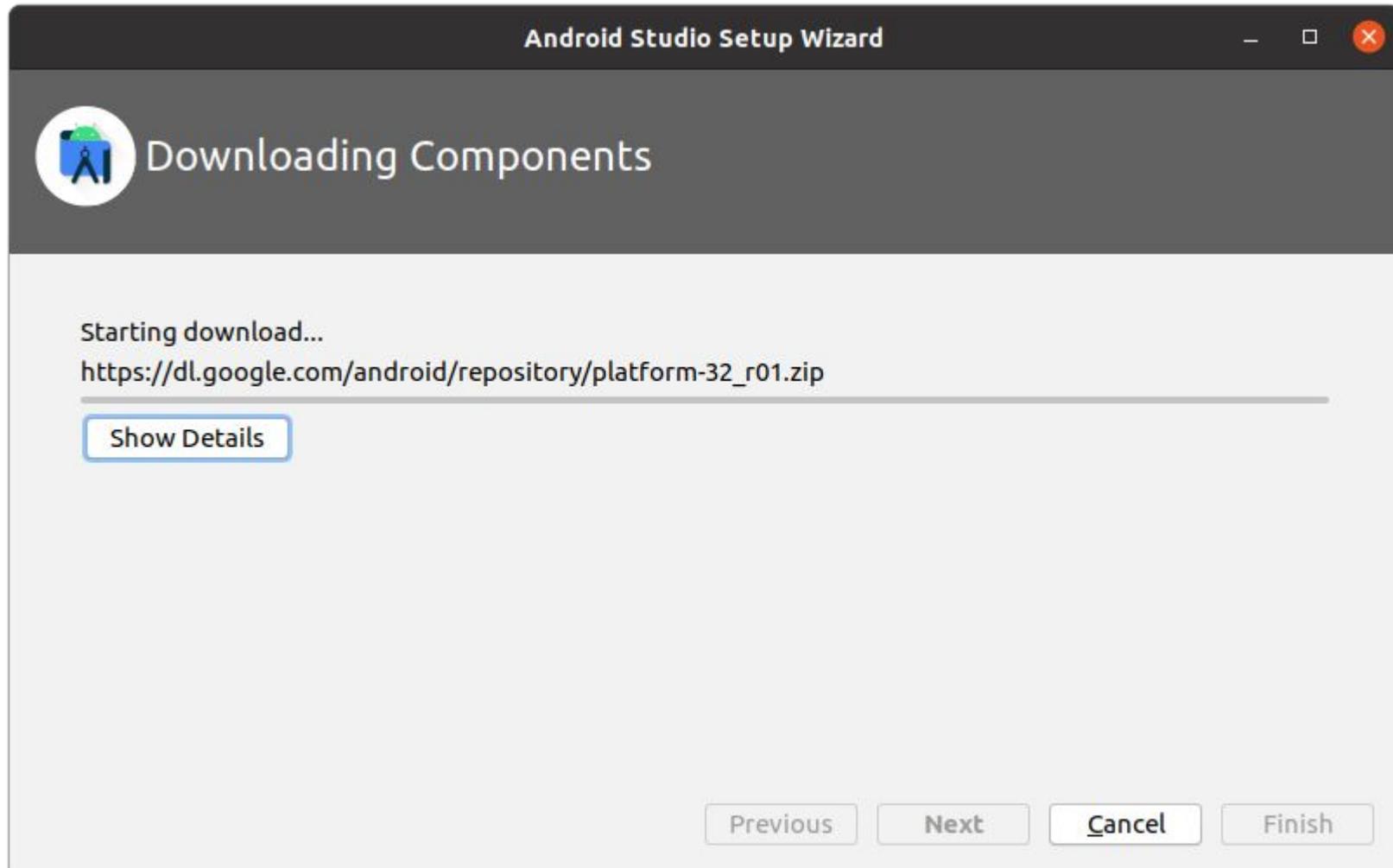
Configuração do Ambiente de Desenvolvimento



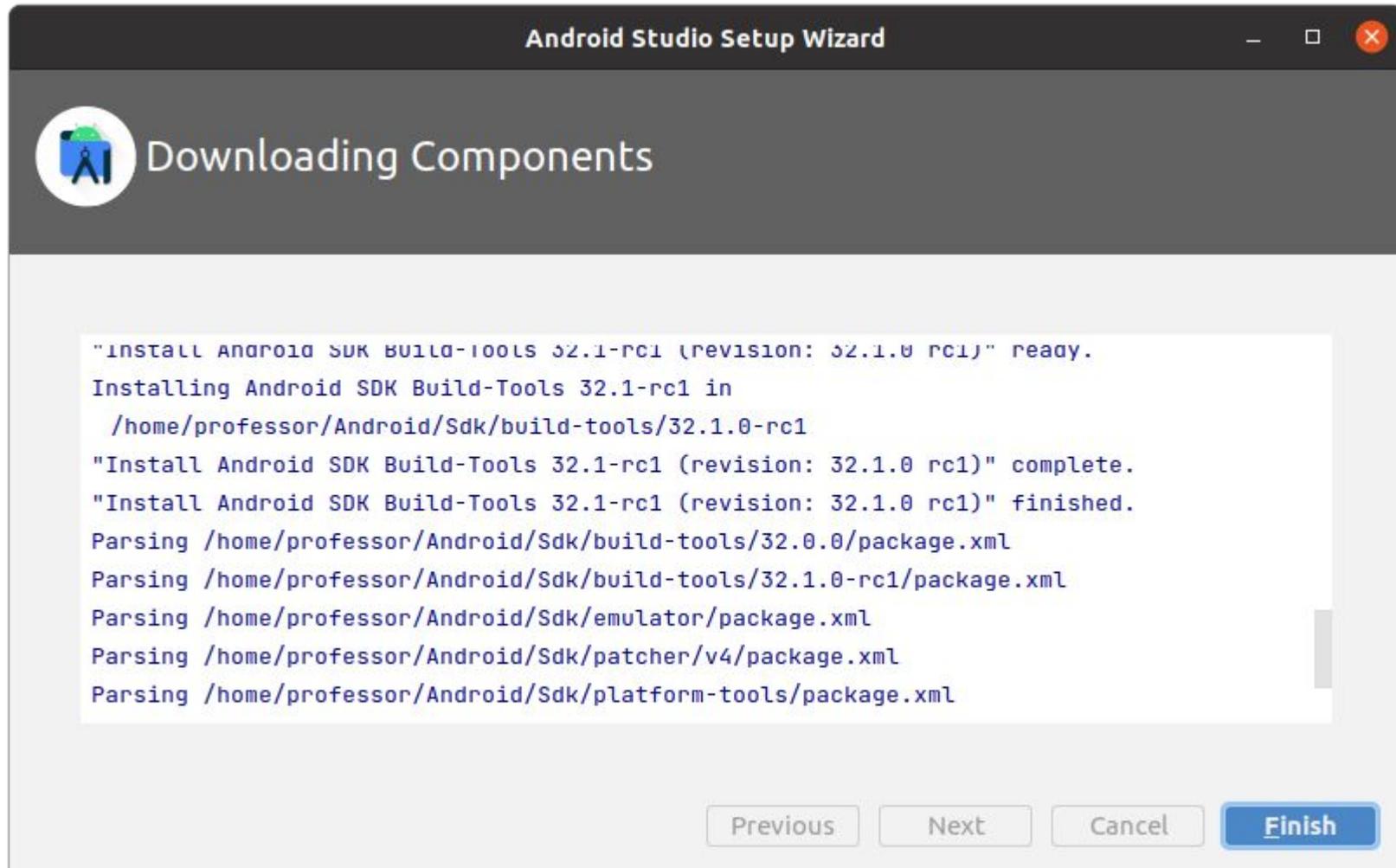
<https://developer.android.com/studio/run/emulator-acceleration>



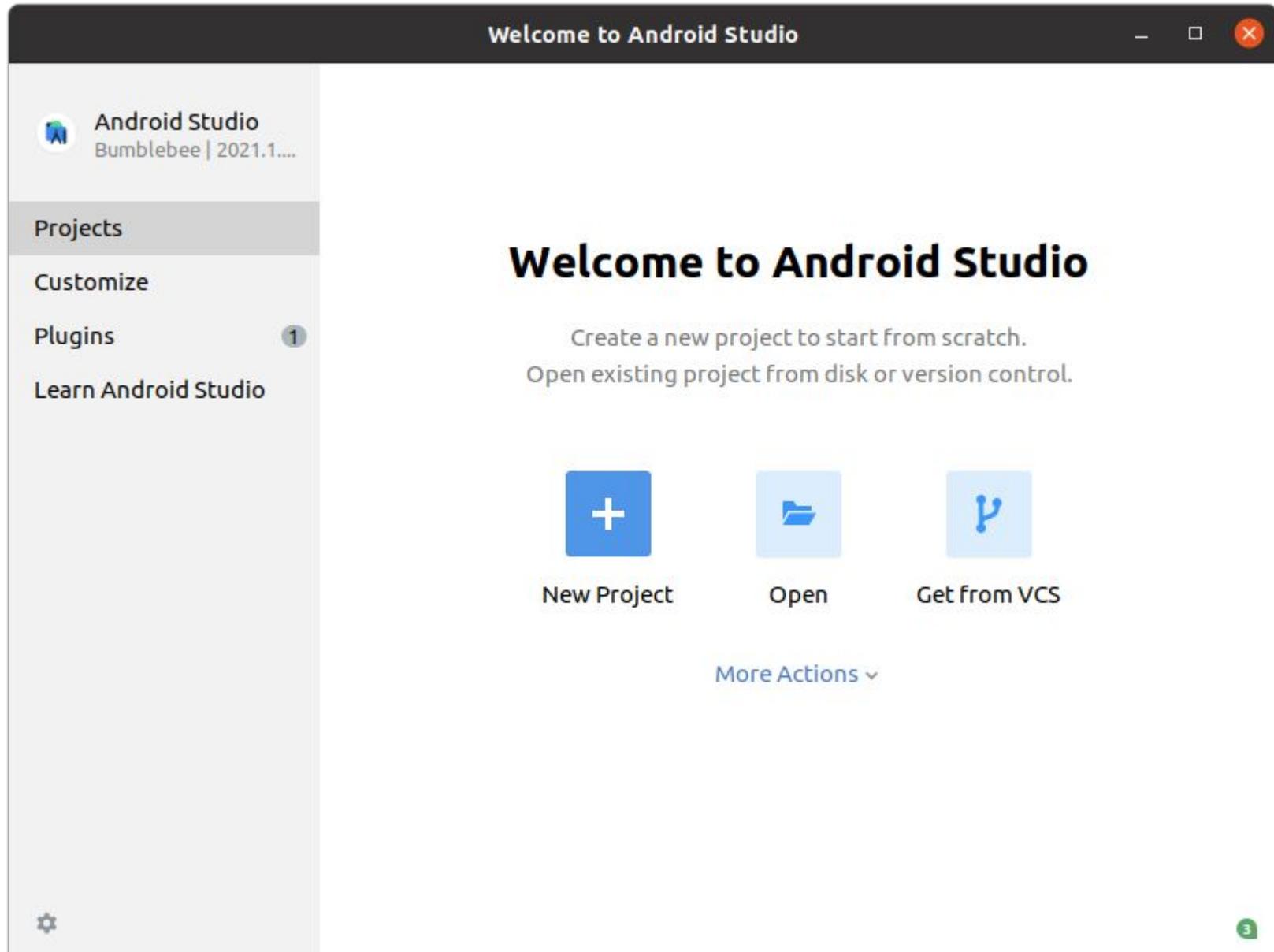
Configuração do Ambiente de Desenvolvimento



Configuração do Ambiente de Desenvolvimento



Configuração do Ambiente de Desenvolvimento



Android API Levels

- Para desenvolver uma aplicação em Android, é preciso compreender o gerenciamento de mudanças na API.
- Também é importante entender o identificador de nível (*level*) da API e do papel que desempenha na garantia de compatibilidade da aplicação com dispositivos em que ela pode ser instalada.



Android API Levels

Plataforma	API	Nome
Android 1.0	1	-
Android 1.1	2	-
Android 1.5	3	Cupcake
Android 1.6	4	Donut
Android 2.0	5	Eclair
Android 2.0.1	6	
Android 2.1.x	7	
Android 2.2.x	8	Froyo
Android 2.3, 2.3.1, 2.3.2	9	Gingerbread
Android 2.3.3, 2.3.4	10	
Android 3.0.x	11	Honeycomb
Android 3.1.x	12	
Android 3.2	13	
Android 4.0, 4.0.1, 4.0.2	14	Ice Cream Sandwich
Android 4.0.3, 4.0.4	15	
Android 4.1, 4.1.1	16	Jelly Bean

Plataforma	API	Nome
Android 4.2	17	
Android 4.3	18	
Android 4.4	19	KitKat
Android 4.4W	20	
Android 5.0, 5.0.1	21	Lollipop
Android 5.1, 5.1.1	22	
Android 6.0, 6.0.1	23	Marshmallow
Android 7.0	24	Nougat
Android 7.1	25	
Android 8.0	26	Oreo
Android 8.1	27	
Android 9	28	Pie
Android 10	29	
Android 11	30	
Android 12	31	
Android 12L	32	



Android API Levels

- A cada versão do Android é lançada uma nova versão do SDK de desenvolvimento e com cada nova versão, novas possibilidades e *features* podem ser implementadas.
- Por exemplo, o pacote de compatibilidade para uso de ***Fragments*** em versões antigas de Android funciona somente em versões de API igual ou superiores a 4.



Android API Levels

- Junto com um novo SDK também é lançado uma nova versão do SDK de APIs do Google para Android.
- São APIs para acesso aos serviços do Google.
- Um recurso importante dessas APIs é a biblioteca externa Maps, que fornece uma API para que aplicativos Android possam ter acesso ao Google Maps.



Android API Levels

New Project

Empty Activity

Creates a new empty activity

Name

Package name

Save location

Language

Minimum SDK

i Your app will run on < 1% of devices.
[Help me choose](#)

Use legacy android.support libraries [?](#)
Using legacy android.support libraries will prevent you from using the latest Play Services and Jetpack libraries



Android API Levels

Android Platform/API Version Distribution

ANDROID PLATFORM VERSION	API LEVEL	CUMULATIVE DISTRIBUTION
4.1 Jelly Bean	16	
4.2 Jelly Bean	17	99,8%
4.3 Jelly Bean	18	99,5%
4.4 KitKat	19	99,4%
5.0 Lollipop	21	98,0%
5.1 Lollipop	22	97,3%
6.0 Marshmallow	23	94,1%
7.0 Nougat	24	89,0%
7.1 Nougat	25	85,6%
8.0 Oreo	26	82,7%
8.1 Oreo	27	78,7%
9.0 Pie	28	69,0%
10. Q	29	50,8%
11. R	30	24,3%

The minimum SDK version determines the lowest level of Android that your app will run on.

You typically want to target as many users as possible, so you would ideally want to support everyone – with a minimum SDK version of 1. However, that has some disadvantages, such as lack of features, and very few people use devices that old anymore.

Your choice of minimum SDK level should be a tradeoff between the distribution of users you wish to target and the features that your application will need.

Click each Android Version/API level for more information.

OK Cancel



Android API Levels

New Project

Empty Activity

Creates a new empty activity

Name

Package name

Save location

Language

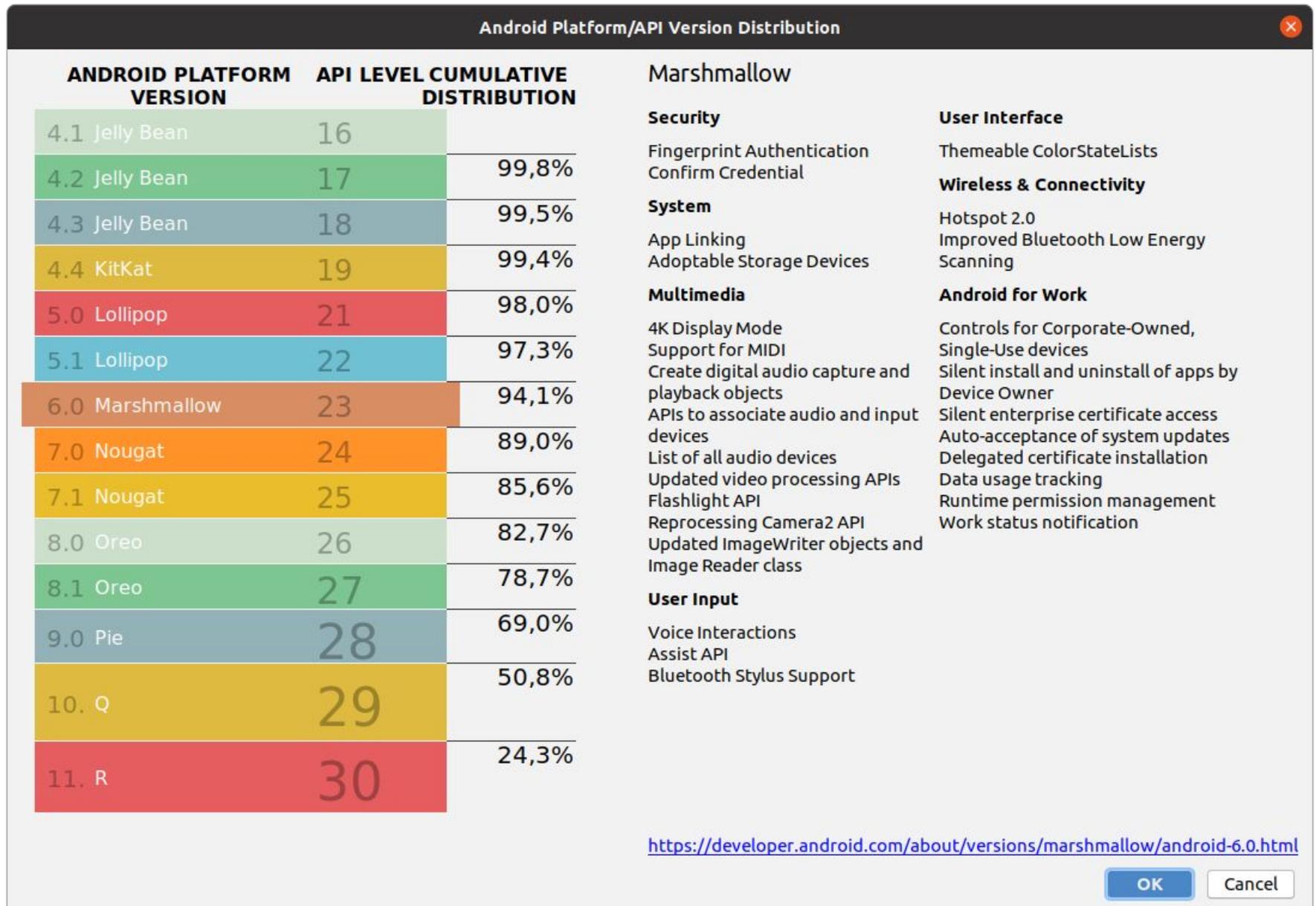
Minimum SDK

i Your app will run on approximately **94,1%** of devices.
[Help me choose](#)

Use legacy android.support libraries [?](#)
Using legacy android.support libraries will prevent you from using the latest Play Services and Jetpack libraries



Android API Levels



Compatibilidade de Versões

- Android Compatibility Program
 - <http://source.android.com/compatibility>
 - Todos os fabricantes que criam dispositivos com Android devem suportar a API completa
- Quando novas versões da plataforma são lançadas, a compatibilidade com versões anteriores é mantida
 - Isto garante que aplicações continuarão compilando

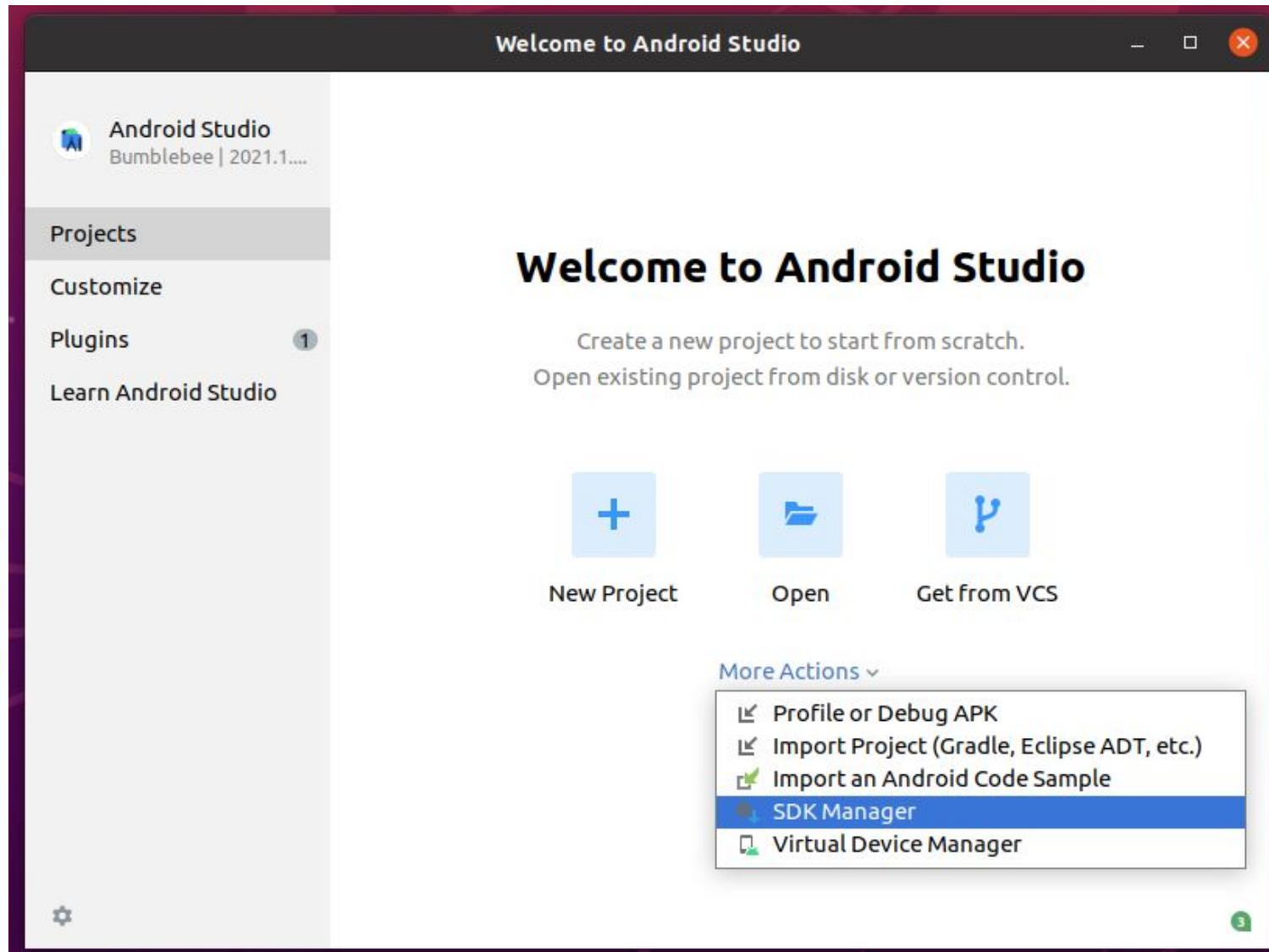


SDK Manager

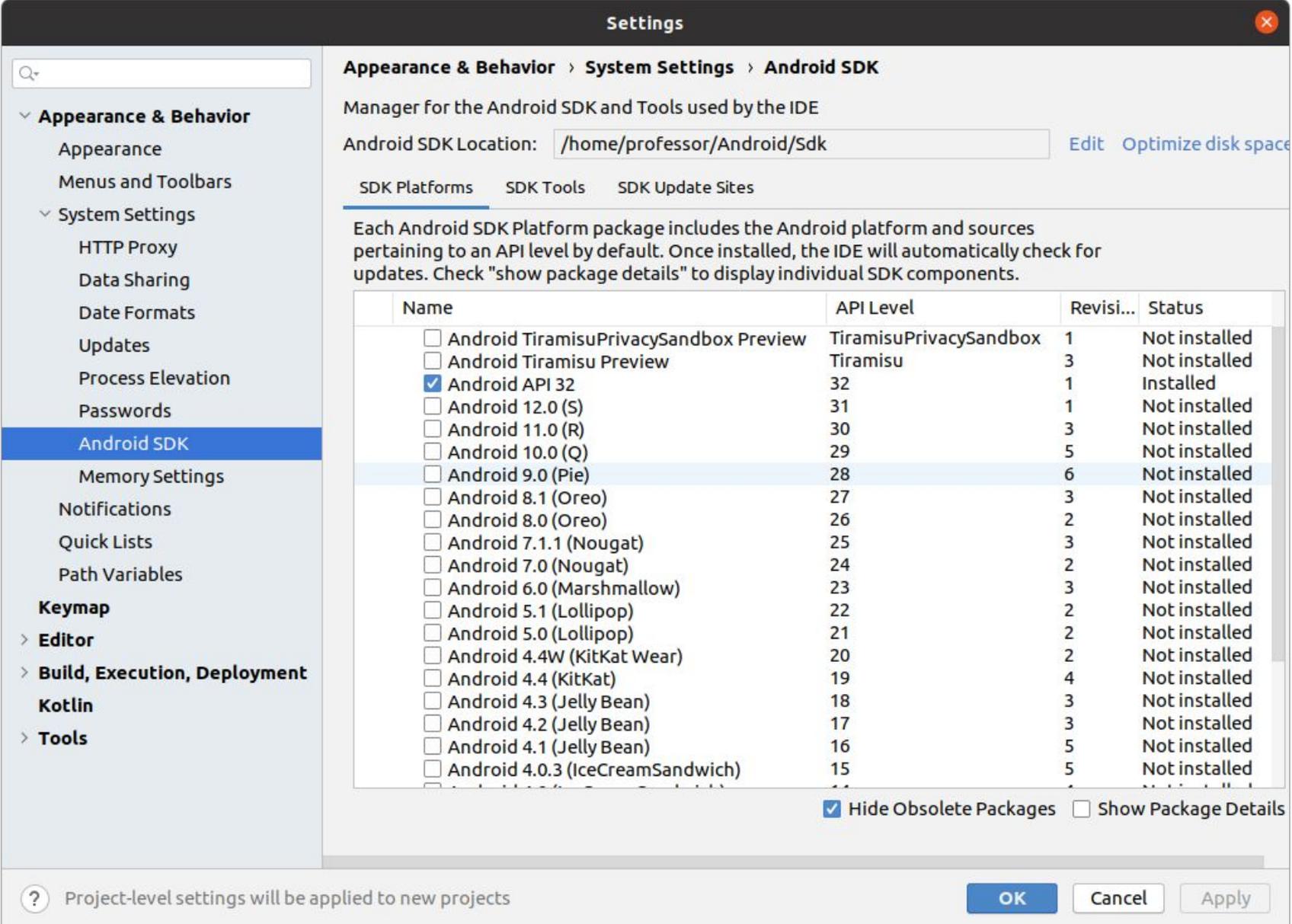
- Para iniciar o desenvolvimento, é necessário baixar as plataformas do Android, com o objetivo de criar os emuladores para cada versão do sistema operacional.
- Para isso utilizamos o SDK Manager, onde podemos baixar todas as plataformas do Android e suas respectivas documentações, o driver USB do Google para conectar um dispositivo na USB, as bibliotecas de compatibilidade, o acelerador HAXM, etc.



Configurando o SDK Manager



Configurando o SDK Manager



The screenshot shows the 'Settings' dialog in Android Studio, specifically the 'Android SDK' section under 'System Settings'. The 'Android SDK Location' is set to '/home/professor/Android/Sdk'. The 'SDK Platforms' tab is selected, showing a list of Android SDK platforms. The 'Android API 32' platform is checked and marked as 'Installed'. Other platforms are marked as 'Not installed'. The 'Hide Obsolete Packages' checkbox is checked, and 'Show Package Details' is unchecked. The 'OK' button is highlighted.

Settings

Appearance & Behavior > System Settings > Android SDK

Manager for the Android SDK and Tools used by the IDE

Android SDK Location: [Edit](#) [Optimize disk space](#)

SDK Platforms SDK Tools SDK Update Sites

Each Android SDK Platform package includes the Android platform and sources pertaining to an API level by default. Once installed, the IDE will automatically check for updates. Check "show package details" to display individual SDK components.

Name	API Level	Revisi...	Status
<input type="checkbox"/> Android TiramisuPrivacySandbox Preview	TiramisuPrivacySandbox	1	Not installed
<input type="checkbox"/> Android Tiramisu Preview	Tiramisu	3	Not installed
<input checked="" type="checkbox"/> Android API 32	32	1	Installed
<input type="checkbox"/> Android 12.0 (S)	31	1	Not installed
<input type="checkbox"/> Android 11.0 (R)	30	3	Not installed
<input type="checkbox"/> Android 10.0 (Q)	29	5	Not installed
<input type="checkbox"/> Android 9.0 (Pie)	28	6	Not installed
<input type="checkbox"/> Android 8.1 (Oreo)	27	3	Not installed
<input type="checkbox"/> Android 8.0 (Oreo)	26	2	Not installed
<input type="checkbox"/> Android 7.1.1 (Nougat)	25	3	Not installed
<input type="checkbox"/> Android 7.0 (Nougat)	24	2	Not installed
<input type="checkbox"/> Android 6.0 (Marshmallow)	23	3	Not installed
<input type="checkbox"/> Android 5.1 (Lollipop)	22	2	Not installed
<input type="checkbox"/> Android 5.0 (Lollipop)	21	2	Not installed
<input type="checkbox"/> Android 4.4W (KitKat Wear)	20	2	Not installed
<input type="checkbox"/> Android 4.4 (KitKat)	19	4	Not installed
<input type="checkbox"/> Android 4.3 (Jelly Bean)	18	3	Not installed
<input type="checkbox"/> Android 4.2 (Jelly Bean)	17	3	Not installed
<input type="checkbox"/> Android 4.1 (Jelly Bean)	16	5	Not installed
<input type="checkbox"/> Android 4.0.3 (IceCreamSandwich)	15	5	Not installed

Hide Obsolete Packages Show Package Details

? Project-level settings will be applied to new projects

OK Cancel Apply



SDK Manager

- É sempre importante manter os três itens atualizados, que são referentes ao *SDK Tools*, pois isso influencia diretamente na compilação do código.
 - Android SDK Tools
 - Android SDK Platform-tools
 - Android SDK Build-tools



Emulador

- O emulador do Android é famoso por sua lentidão. Uma alternativa é instalar emuladores de terceiros, como o Genymotion <https://www.genymotion.com>
- Para o emulador do Android funcionar mais rápido, você pode configurá-lo para aproveitar a aceleração de hardware, usando uma combinação de opções de configuração, imagens específicas do sistema Android e drivers de hardware.



Emulador

- Muitas CPUs modernas fornecem extensões para executar máquinas virtuais de forma mais eficiente.
- Aproveitando essas extensões, o emulador pode melhorar significativamente a velocidade de execução.



- Antes de tentar utilizar este tipo de aceleração, você deve primeiro determinar se a CPU suporta uma das seguintes extensões de tecnologias de virtualização :
 - Tecnologia de Virtualização da Intel (VT, VT-x, vmx)
 - AMD Virtualization (AMD-V, SVM) com suporte apenas para Linux

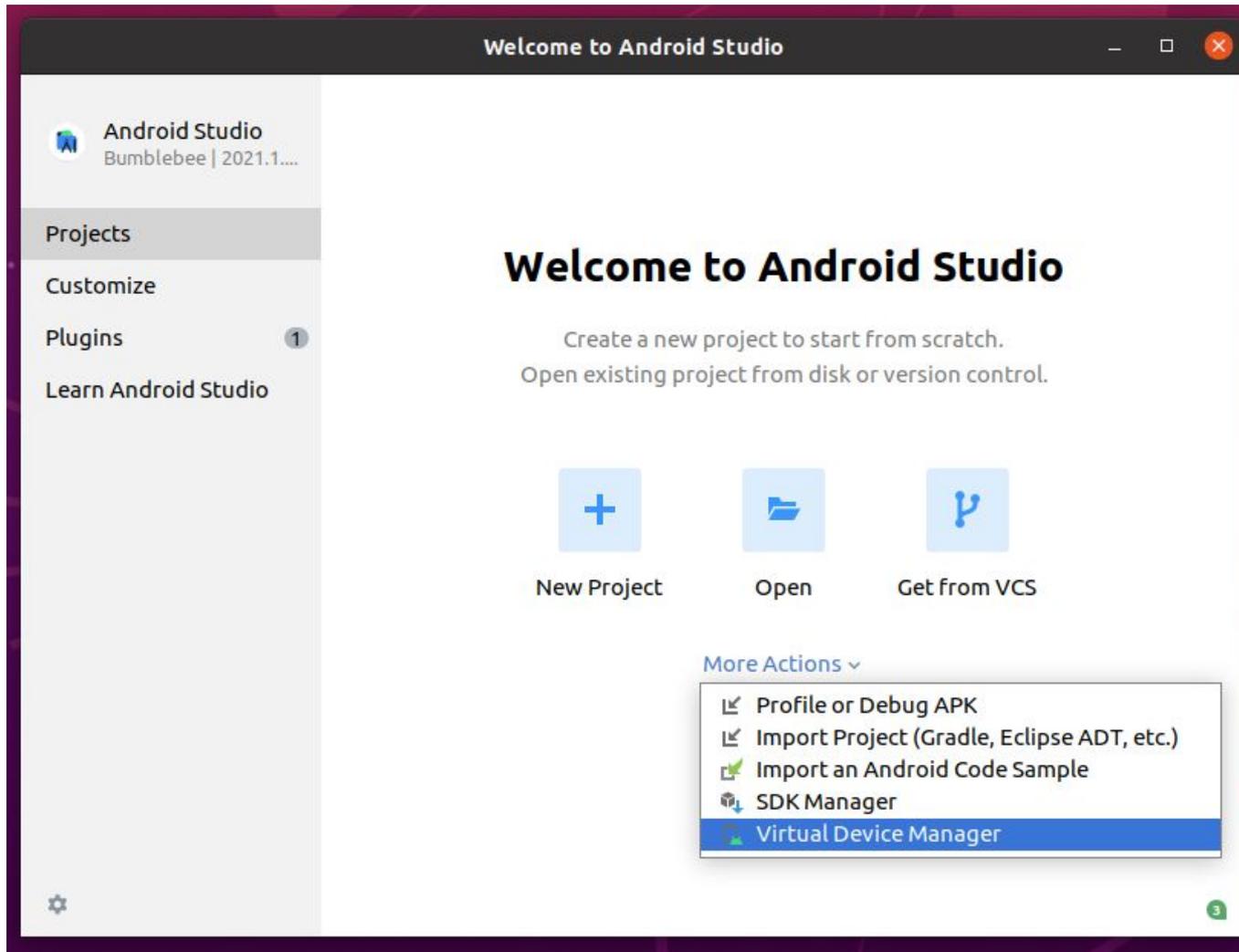


Emulador

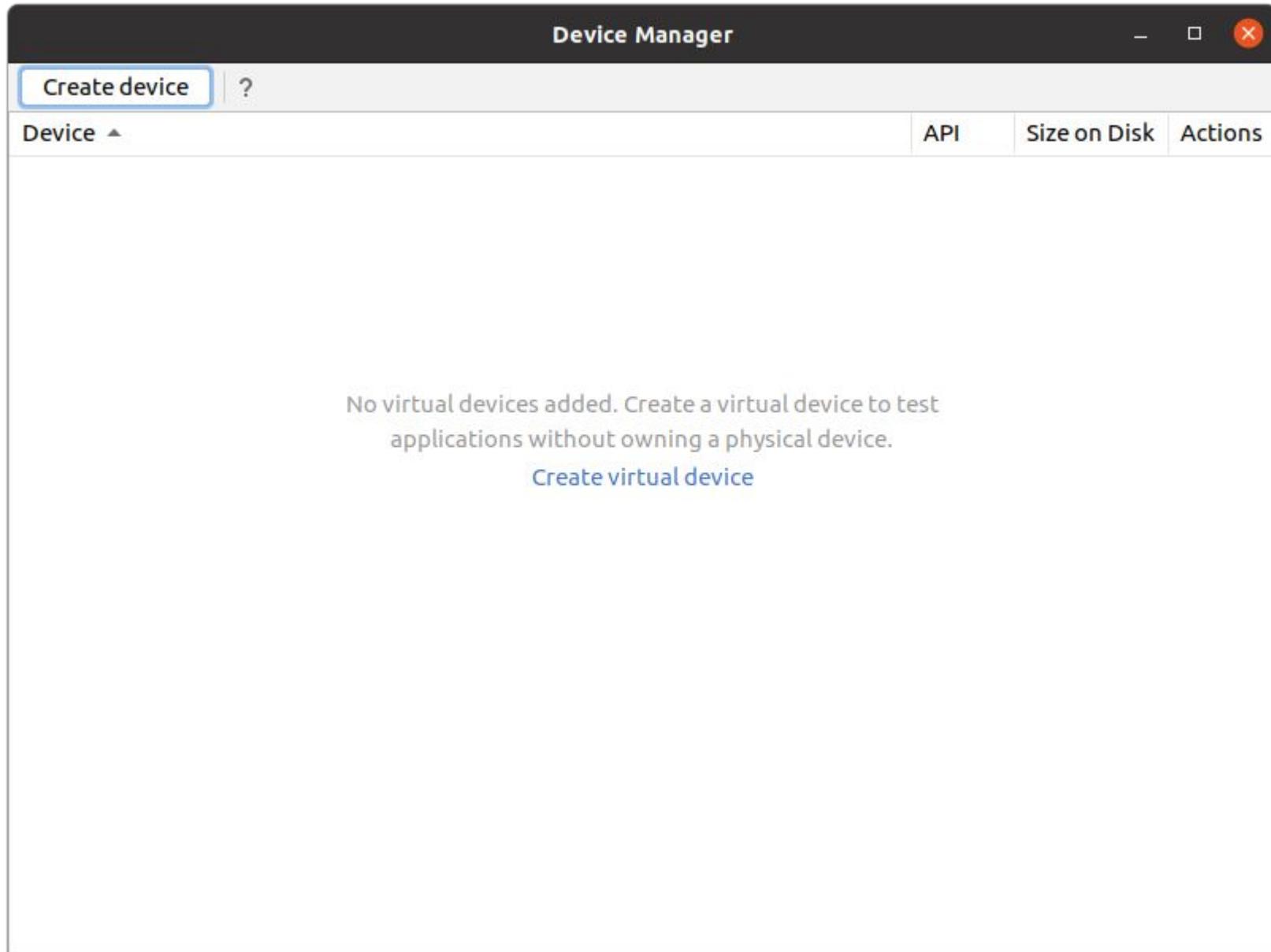
- Acelerador para o emulador: Intel Hardware Accelerated Execution Manager (HAXM).
- O Intel HAXM pode ser baixado pelo SDK Manager e tem suporte para os principais SO.
- O HAXM é compatível com processadores Intel e suporta virtualização com Intel VT-x



Emulador



Emulador



Emulador

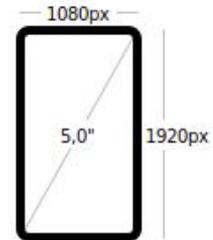
Virtual Device Configuration

Select Hardware

Choose a device definition

Category	Name	Play Sto...	Size	Resolut...	Density
TV	Pixel XL		5,5"	1440x...	560dpi
Phone	Pixel 5		6,0"	1080x...	440dpi
Wear OS	Pixel 4a		5,8"	1080x...	440dpi
Tablet	Pixel 4 XL		6,3"	1440x...	560dpi
Automot...	Pixel 4	▶	5,7"	1080x...	440dpi
	Pixel 3a XL		6,0"	1080x...	400dpi
	Pixel 3a	▶	5,6"	1080x...	440dpi

Pixel 2



Size: large
Ratio: long
Density: 420dpi

Buttons: New Hardware Profile, Import Hardware Profiles, Clone Device...

Bottom navigation: Previous, Next, Cancel, Finish



Emulador

Virtual Device Configuration

System Image

Select a system image

Recommended x86 Images Other Images

Release Name	API Level	ABI	Target
Tiramisu Privacy Sandbox Download	Tiramisu Privacy	x86_64	Android API Tiramisu Pr...
Tiramisu Download	Tiramisu	x86_64	Android API Tiramisu (G...
API 32 Download	32	x86_64	Android API 32 (Google P...
S Download	31	x86_64	Android 12.0 (Google Pl...
R Download	30	x86	Android 11.0 (Google Pl...
Q Download	29	x86	Android 10.0 (Google Pl...
Pie Download	28	x86	Android 9.0 (Google Pla...
Oreo Download	27	x86	Android 8.1 (Google Pla...
Oreo Download	26	x86	Android 8.0 (Google Pla...

API Level
30

Android
11.0

Google Inc.

System Image
x86

We recommend these Google Play images because this device is compatible with Google Play.

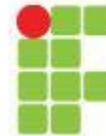
Questions on API level?
See the [API level distribution chart](#)

! A system image must be selected to continue.

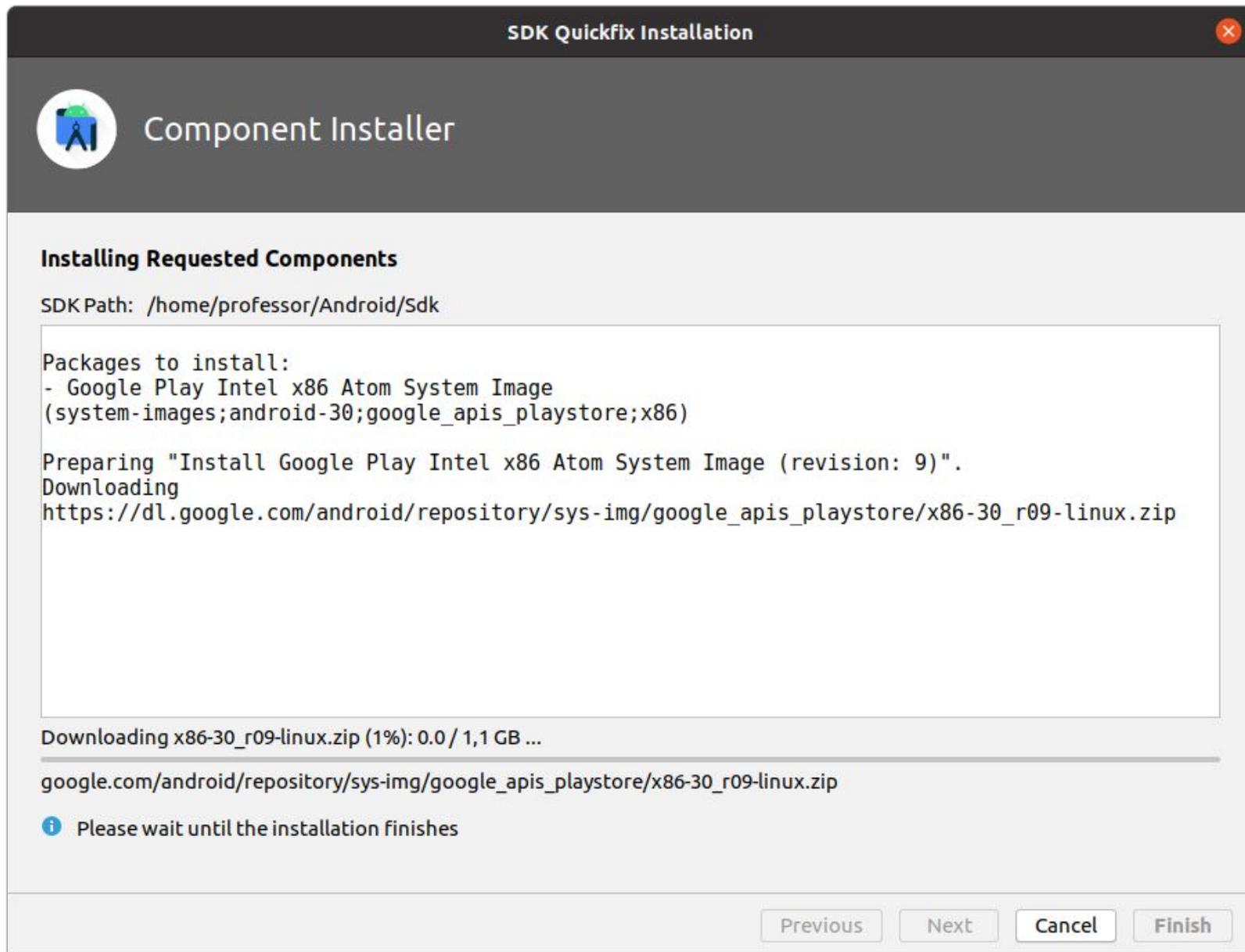
Previous Next Cancel Finish



Emulador



INSTITUTO FEDERAL
PARANÁ



Emulador

Virtual Device Configuration

Android Virtual Device (AVD)

Verify Configuration

AVD Name

 Pixel 2	5.0 1080x1920 xxhdpi	<input type="button" value="Change..."/>
 R	Android 11.0 x86	<input type="button" value="Change..."/>

Startup orientation

Portrait Landscape

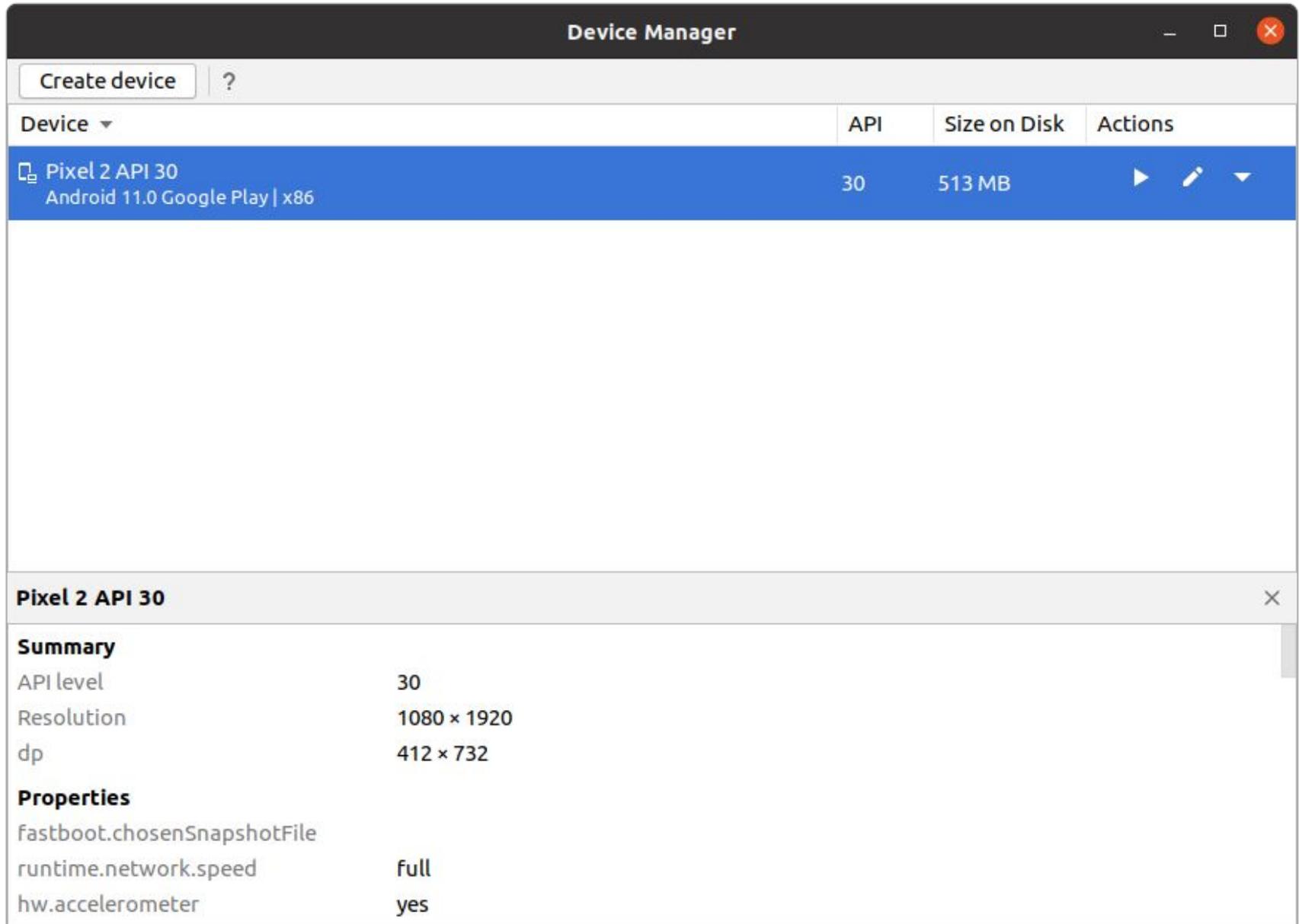
Emulated Performance Graphics:

AVD Name

The name of this AVD.



Emulador



The screenshot shows the 'Device Manager' window in Android Studio. At the top, there is a 'Create device' button and a help icon. Below this is a table listing virtual devices. One device is listed: 'Pixel 2 API 30' with API level 30 and a size of 513 MB. The device is highlighted in blue. Below the table, the details for the selected device are shown, including a 'Summary' section with API level, resolution, and density, and a 'Properties' section with system settings.

Device	API	Size on Disk	Actions
Pixel 2 API 30 Android 11.0 Google Play x86	30	513 MB	▶ ✎ ▾

Pixel 2 API 30

Summary

API level	30
Resolution	1080 × 1920
dp	412 × 732

Properties

fastboot.chosenSnapshotFile	
runtime.network.speed	full
hw.accelerometer	yes



Emulador

