Android Application Deployment

Week 9

Presented By: Jagaran Maharjan

What is Android Application Deployment?

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The process of preparing and distributing your Android application to users via the Google Play Store or other channels.

What platforms are used to distribute Android applications?

What platforms are used to distribute Android applications?

- Google Play Console

What is Google Play Console?

What is Google Play Console?

- An official web-based platform by Google for Android developers.
- Allows you to publish, monitor, manage, and analyze Android apps on the Google Play Store.
- URL: https://play.google.com/console

Developer Account Requirements

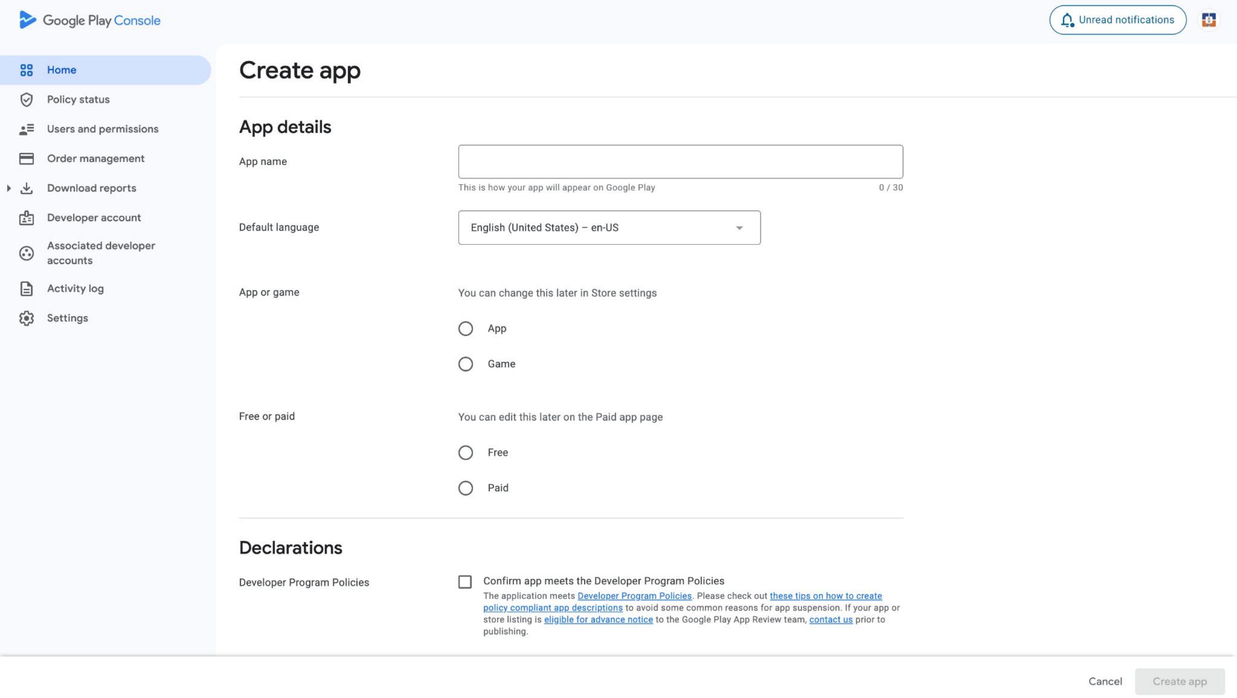
- One-time registration fee: $25 USD
- Requires a Google Account
- Must provide:
  - Developer name
  - Email address
  - Phone number
  - Website (if applicable)

Key Features and Functional Areas

- App Release & Management
- Store Listing Management
- Policy Compliance
- Android App Bundles (.aab)

App Release & Management

- Create app: New app entry with default language, app name, etc.



Create app

App details

App name

This is how your app will appear on Google Play 0 / 30

Default language: English (United States) – en-US

App or game

You can change this later in Store settings

○ App

○ Game

Free or paid

You can edit this later on the Paid app page

○ Free

○ Paid

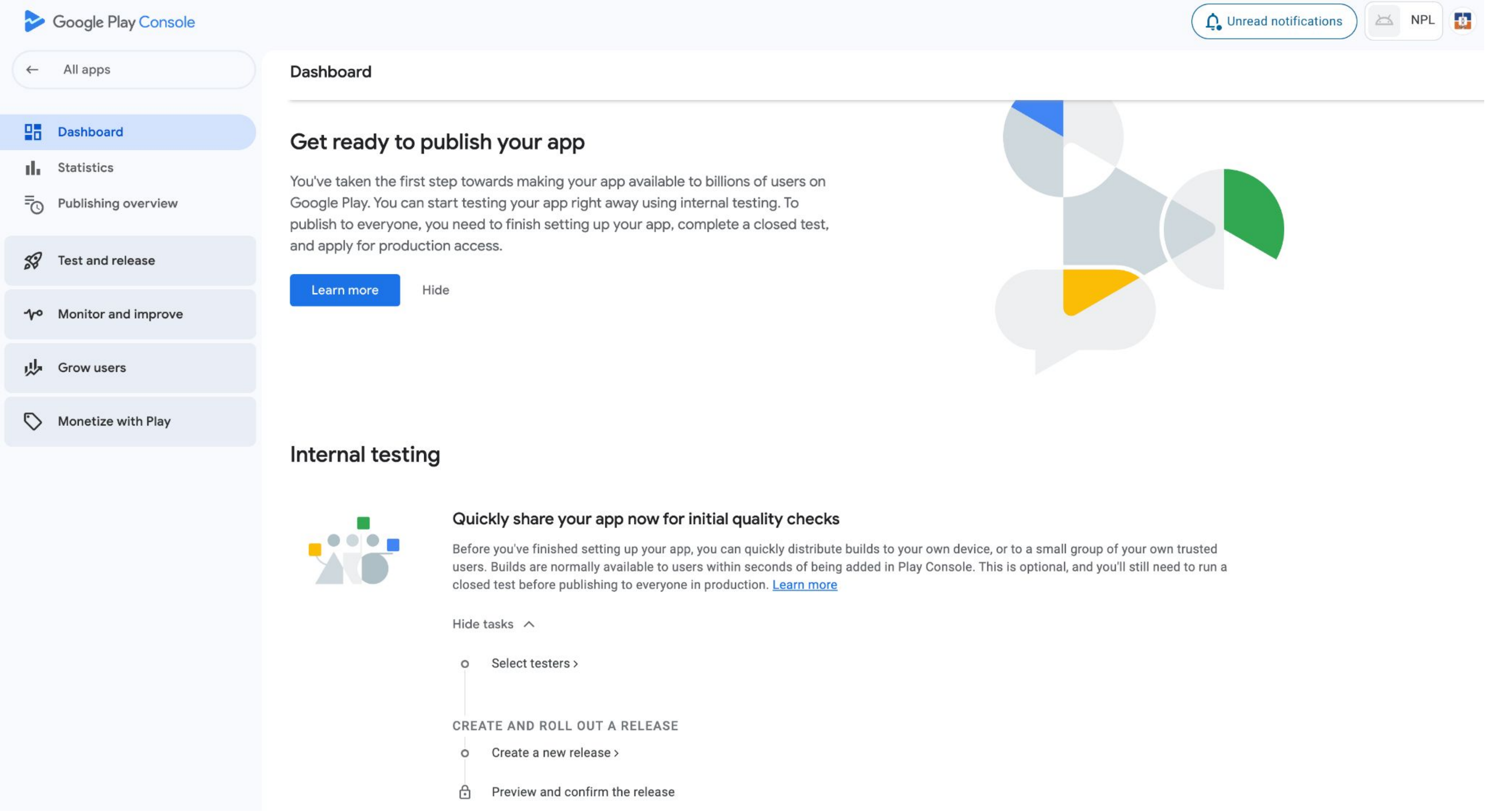
Declarations

Developer Program Policies

□ Confirm app meets the Developer Program Policies

The application meets Developer Program Policies. Please check out these tips on how to create policy compliant app descriptions to avoid some common reasons for app suspension. If your app or store listing is eligible for advance notice to the Google Play App Review team, contact us prior to publishing.

Cancel Create app



Dashboard

Get ready to publish your app

You've taken the first step towards making your app available to billions of users on Google Play. You can start testing your app right away using internal testing. To publish to everyone, you need to finish setting up your app, complete a closed test, and apply for production access.

Internal testing

Quickly share your app now for initial quality checks

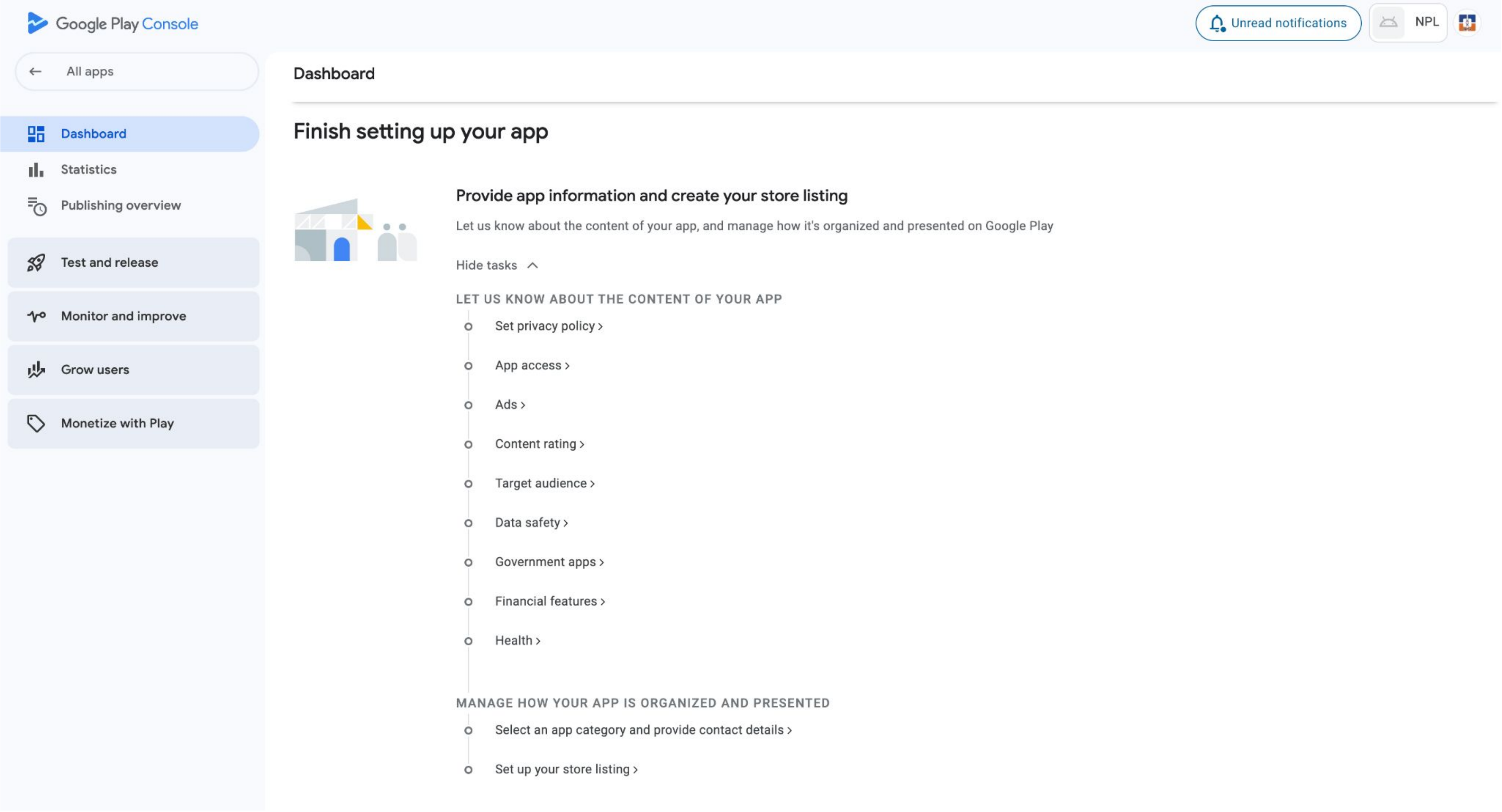
Before you've finished setting up your app, you can quickly distribute builds to your own device, or to a small group of your own trusted users. Builds are normally available to users within seconds of being added in Play Console. This is optional, and you'll still need to run a closed test before publishing to everyone in production. Learn more

○ Select testers ›

CREATE AND ROLL OUT A RELEASE

○ Create a new release ›

🔒 Preview and confirm the release



Dashboard

Finish setting up your app

Provide app information and create your store listing

Let us know about the content of your app, and manage how it's organized and presented on Google Play

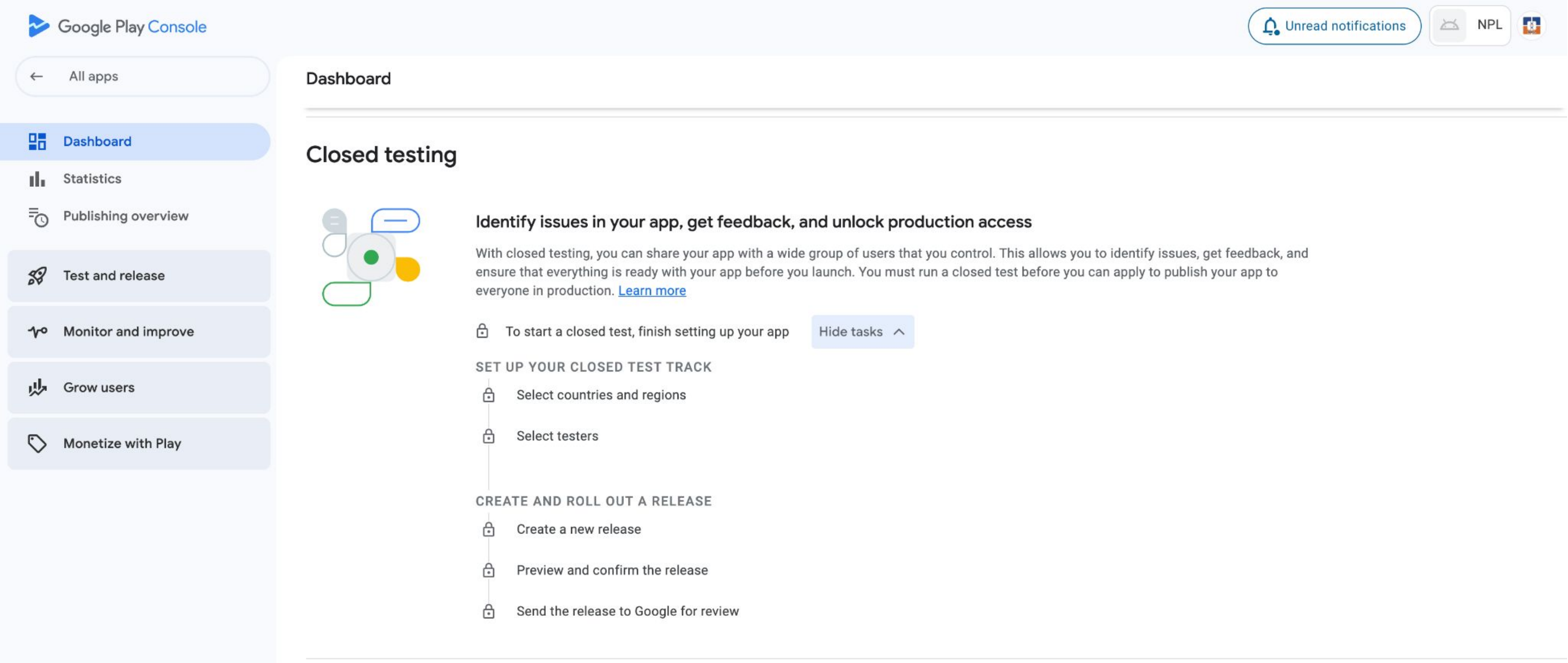
Hide tasks

LET US KNOW ABOUT THE CONTENT OF YOUR APP

- Set privacy policy ›
- App access ›
- Ads ›
- Content rating ›
- Target audience ›
- Data safety ›
- Government apps ›
- Financial features ›
- Health ›

MANAGE HOW YOUR APP IS ORGANIZED AND PRESENTED

- Select an app category and provide contact details ›
- Set up your store listing ›



Dashboard

Closed testing

Identify issues in your app, get feedback, and unlock production access

With closed testing, you can share your app with a wide group of users that you control. This allows you to identify issues, get feedback, and ensure that everything is ready with your app before you launch. You must run a closed test before you can apply to publish your app to everyone in production. Learn more

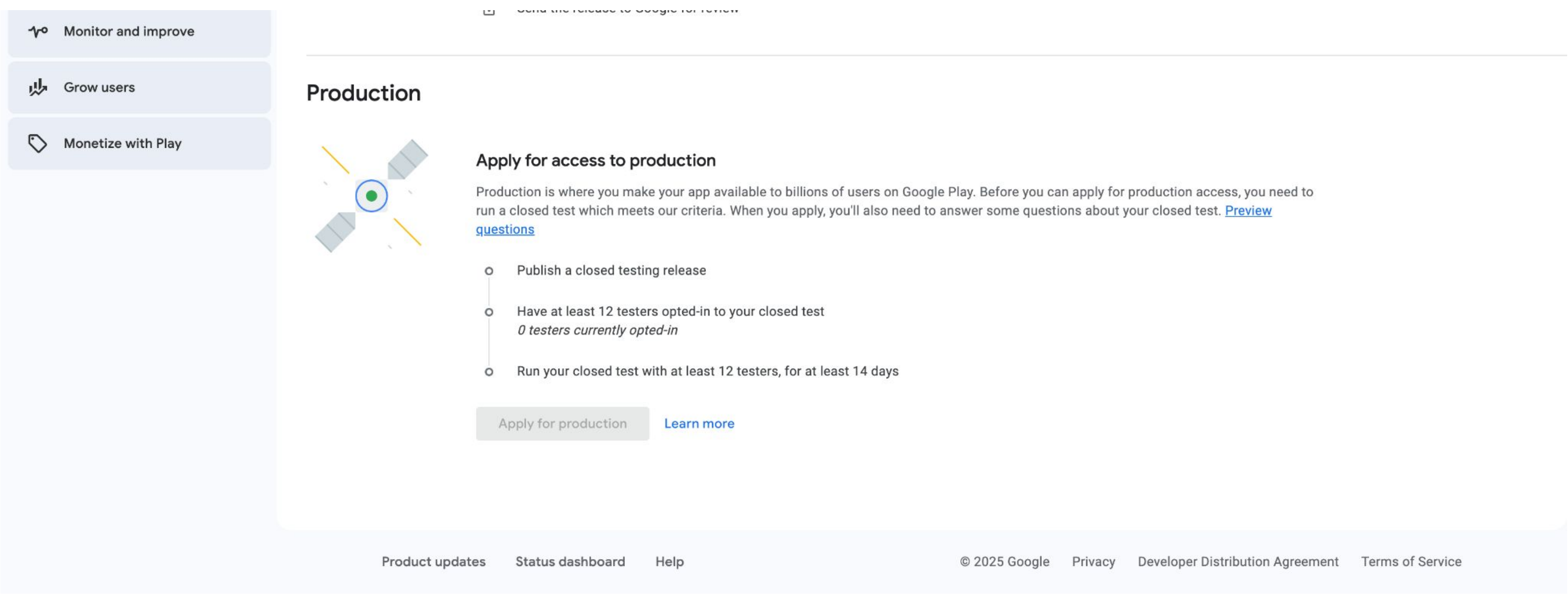
To start a closed test, finish setting up your app

SET UP YOUR CLOSED TEST TRACK

- Select countries and regions
- Select testers

CREATE AND ROLL OUT A RELEASE

- Create a new release
- Preview and confirm the release
- Send the release to Google for review



Send the release to Google for review

Production

Apply for access to production

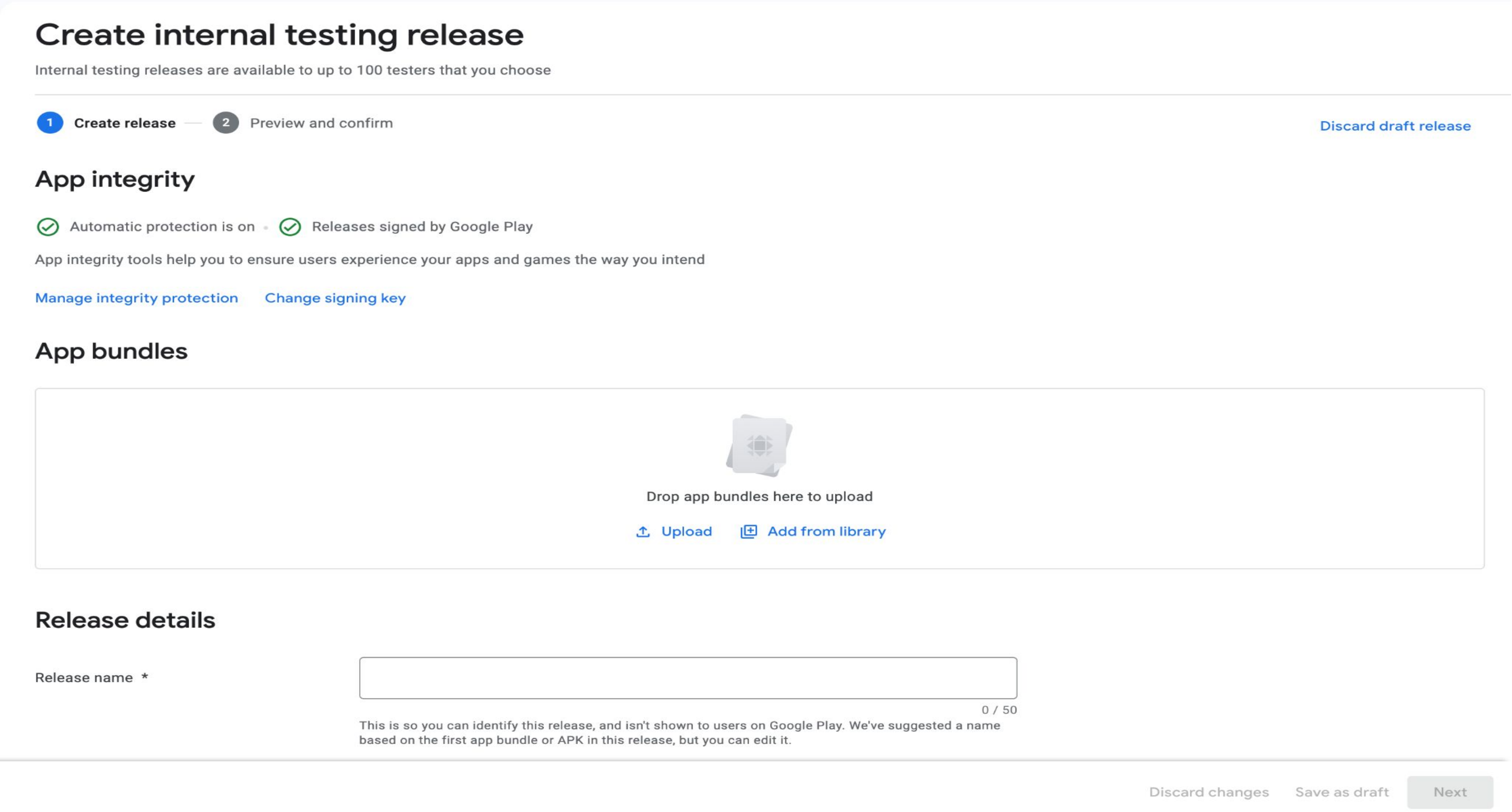
Production is where you make your app available to billions of users on Google Play. Before you can apply for production access, you need to run a closed test which meets our criteria. When you apply, you'll also need to answer some questions about your closed test. [Preview questions]

○ Publish a closed testing release

○ Have at least 12 testers opted-in to your closed test
0 testers currently opted-in

○ Run your closed test with at least 12 testers, for at least 14 days

- Once all the information are filled up then, upload your aab file to play console



Create internal testing release

Internal testing releases are available to up to 100 testers that you choose

1 Create release — 2 Preview and confirm
Discard draft release

App integrity

✓ Automatic protection is on • ✓ Releases signed by Google Play

App integrity tools help you to ensure users experience your apps and games the way you intend

Manage integrity protection
Change signing key

App bundles

Drop app bundles here to upload

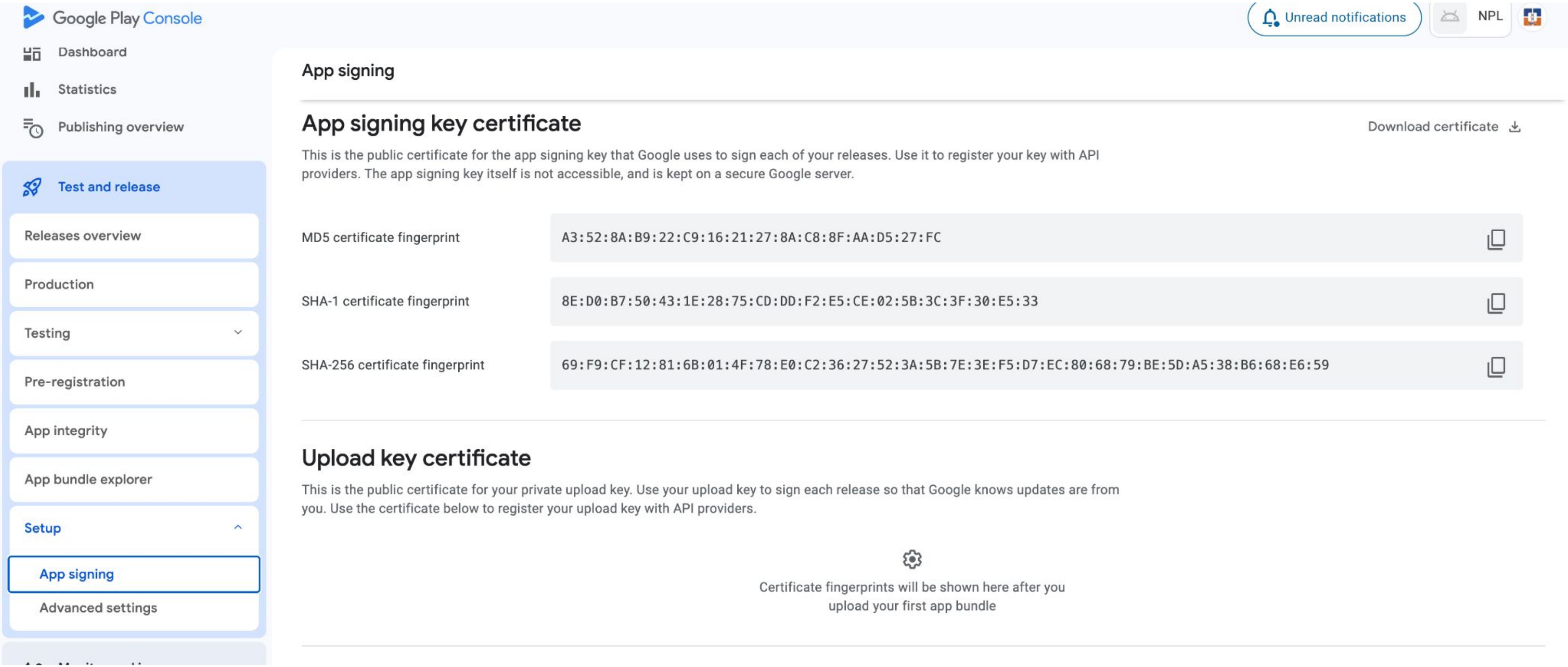
Release details

Release name *

0 / 50

This is so you can identify this release, and isn't shown to users on Google Play. We've suggested a name based on the first app bundle or APK in this release, but you can edit it.

- Once your 1st appbundle is uploaded, then your app key certificate will be present here



App signing

App signing key certificate

Download certificate

This is the public certificate for the app signing key that Google uses to sign each of your releases. Use it to register your key with API providers. The app signing key itself is not accessible, and is kept on a secure Google server.

MD5 certificate fingerprint	A3:52:8A:B9:22:C9:16:21:27:8A:C8:8F:AA:D5:27:FC
SHA-1 certificate fingerprint	8E:D0:B7:50:43:1E:28:75:CD:DD:F2:E5:CE:02:5B:3C:3F:30:E5:33
SHA-256 certificate fingerprint	69:F9:CF:12:81:6B:01:4F:78:E0:C2:36:27:52:3A:5B:7E:3E:F5:D7:EC:80:68:79:BE:5D:A5:38:B6:68:E6:59

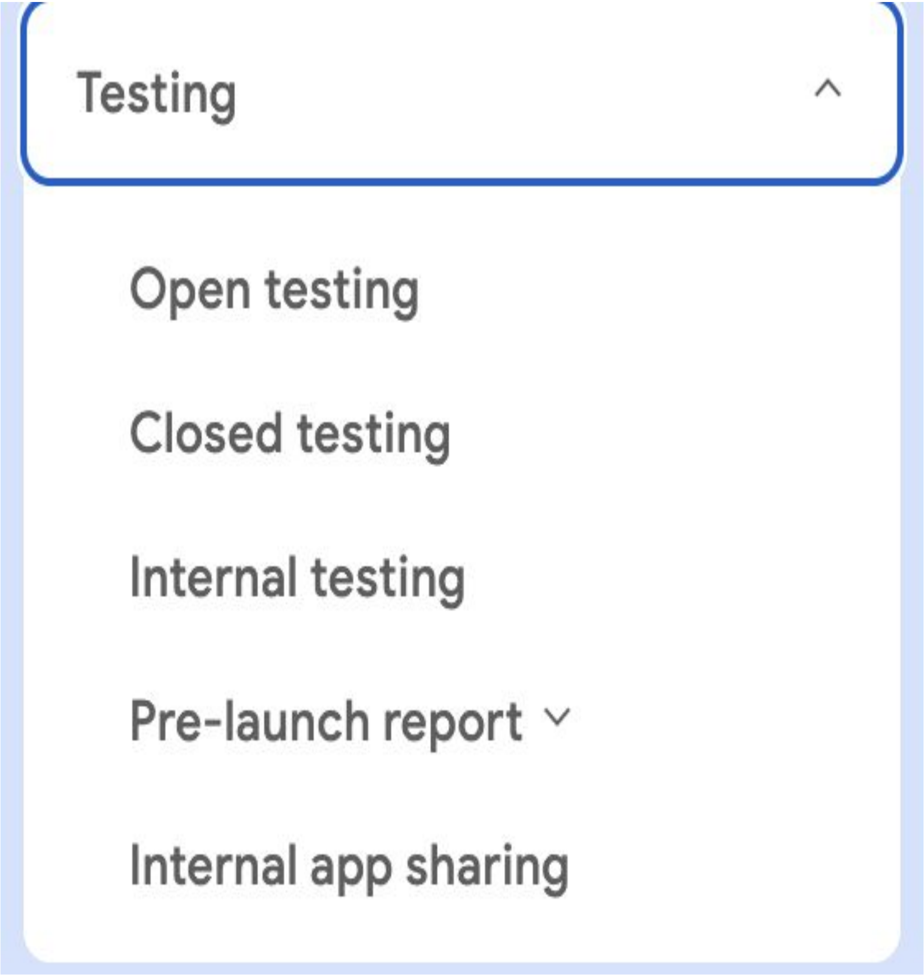
Upload key certificate

This is the public certificate for your private upload key. Use your upload key to sign each release so that Google knows updates are from you. Use the certificate below to register your upload key with API providers.

Certificate fingerprints will be shown here after you upload your first app bundle

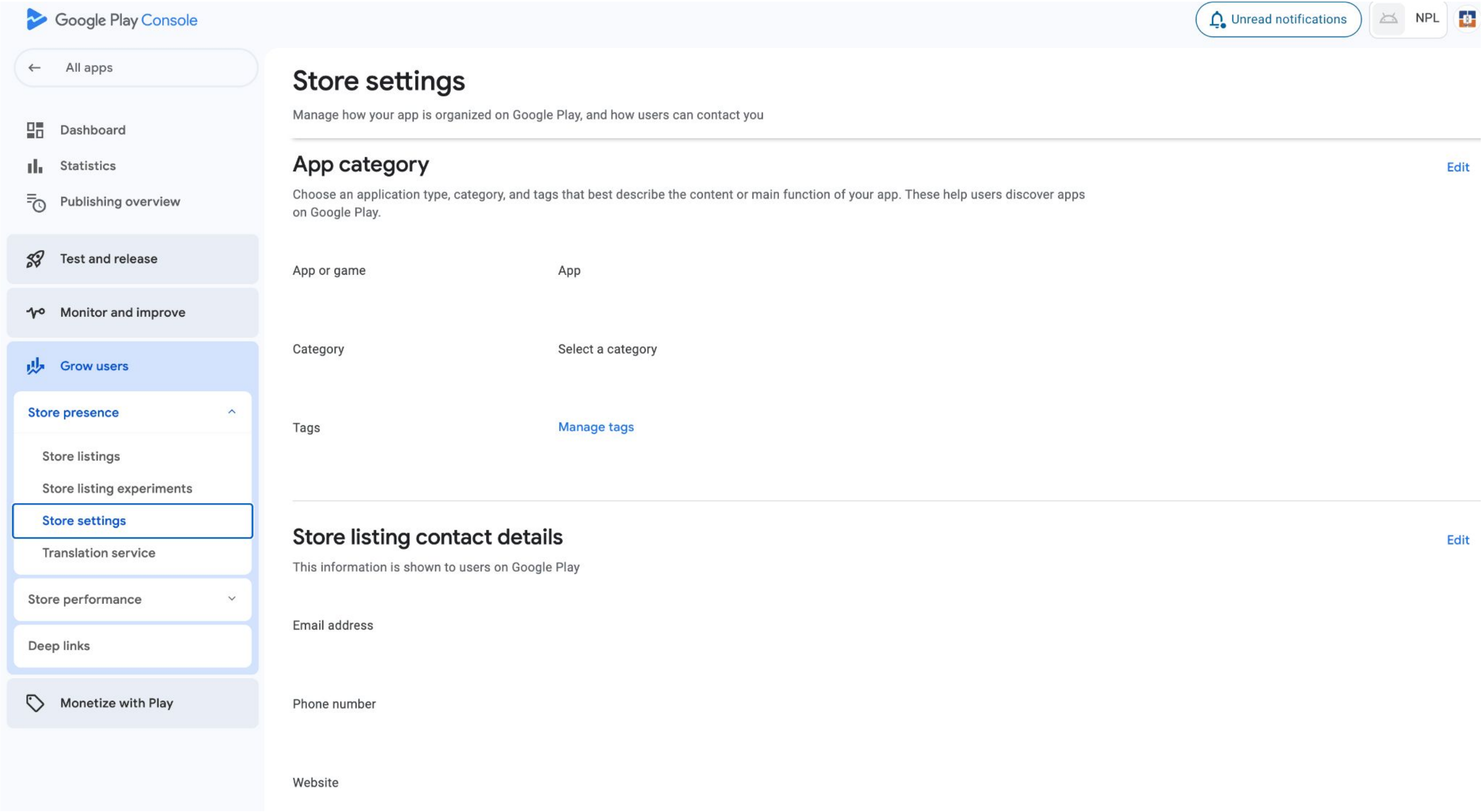
Release Tracks

- **Internal Testing:** Up to 100 testers
- **Closed Testing:** Selected testers/groups
- **Open Testing:** Public testers
- **Production Release:** Final public version



Store Listing

- Customize:
  - App name
  - Short/long descriptions
  - Category (App/Game & Subcategory)
  - Graphics: icon, feature image, screenshots, promo video
- Support for multiple languages



Store settings

Manage how your app is organized on Google Play, and how users can contact you

App category

Choose an application type, category, and tags that best describe the content or main function of your app. These help users discover apps on Google Play.

App or game	App
Category	Select a category
Tags	Manage tags

Store listing contact details

This information is shown to users on Google Play

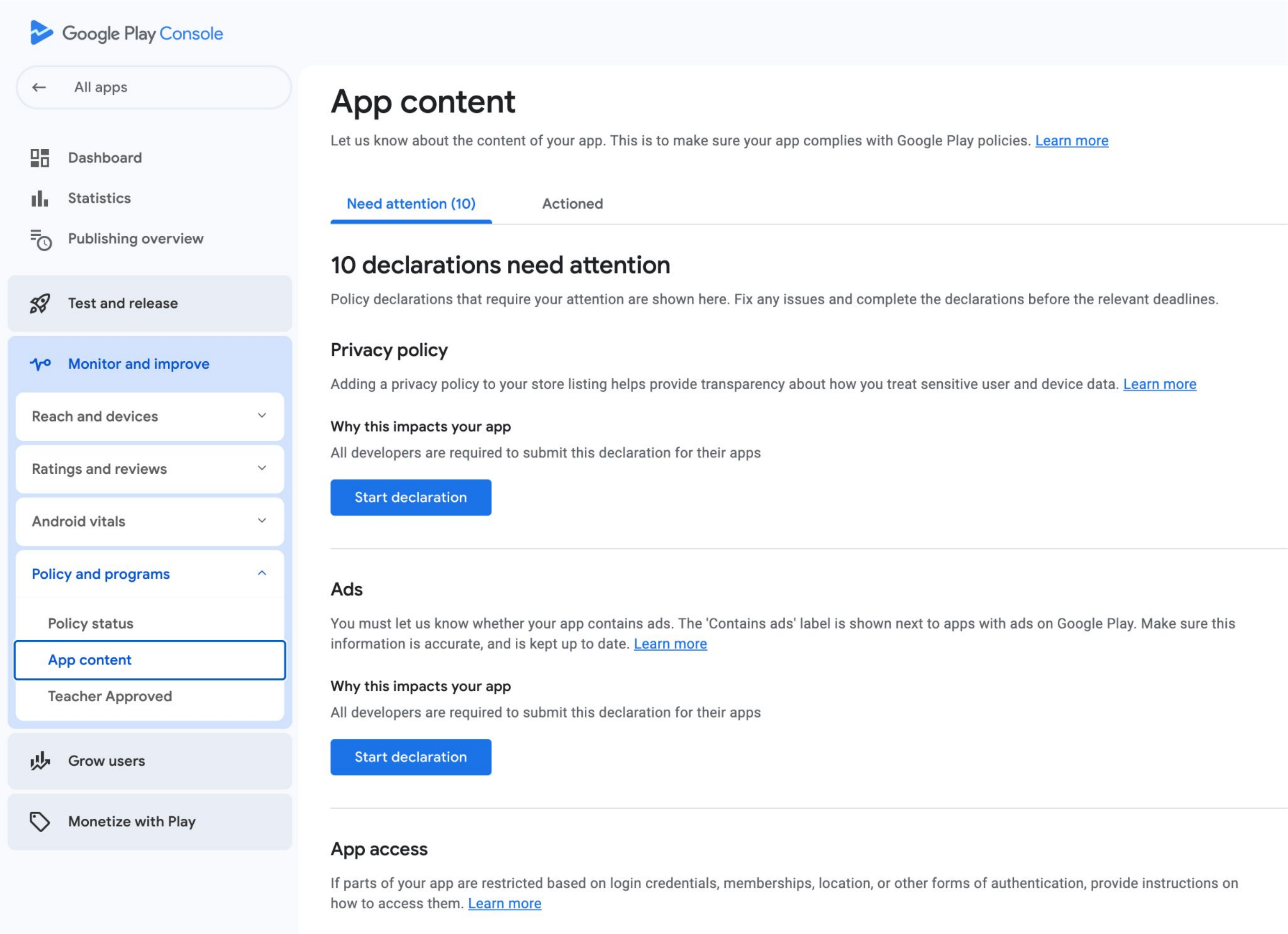
Email address

Phone number

Website

Policy Compliance

- Privacy policy URL
- App content declaration (target audience, ads, permissions)
- Sensitive permissions review (like background location, SMS, call logs)
- Data safety form (as of 2022)



App content

Let us know about the content of your app. This is to make sure your app complies with Google Play policies. Learn more

10 declarations need attention

Policy declarations that require your attention are shown here. Fix any issues and complete the declarations before the relevant deadlines.

Privacy policy

Adding a privacy policy to your store listing helps provide transparency about how you treat sensitive user and device data. Learn more

Why this impacts your app

All developers are required to submit this declaration for their apps

Ads

You must let us know whether your app contains ads. The 'Contains ads' label is shown next to apps with ads on Google Play. Make sure this information is accurate, and is kept up to date. Learn more

Why this impacts your app

All developers are required to submit this declaration for their apps

App access

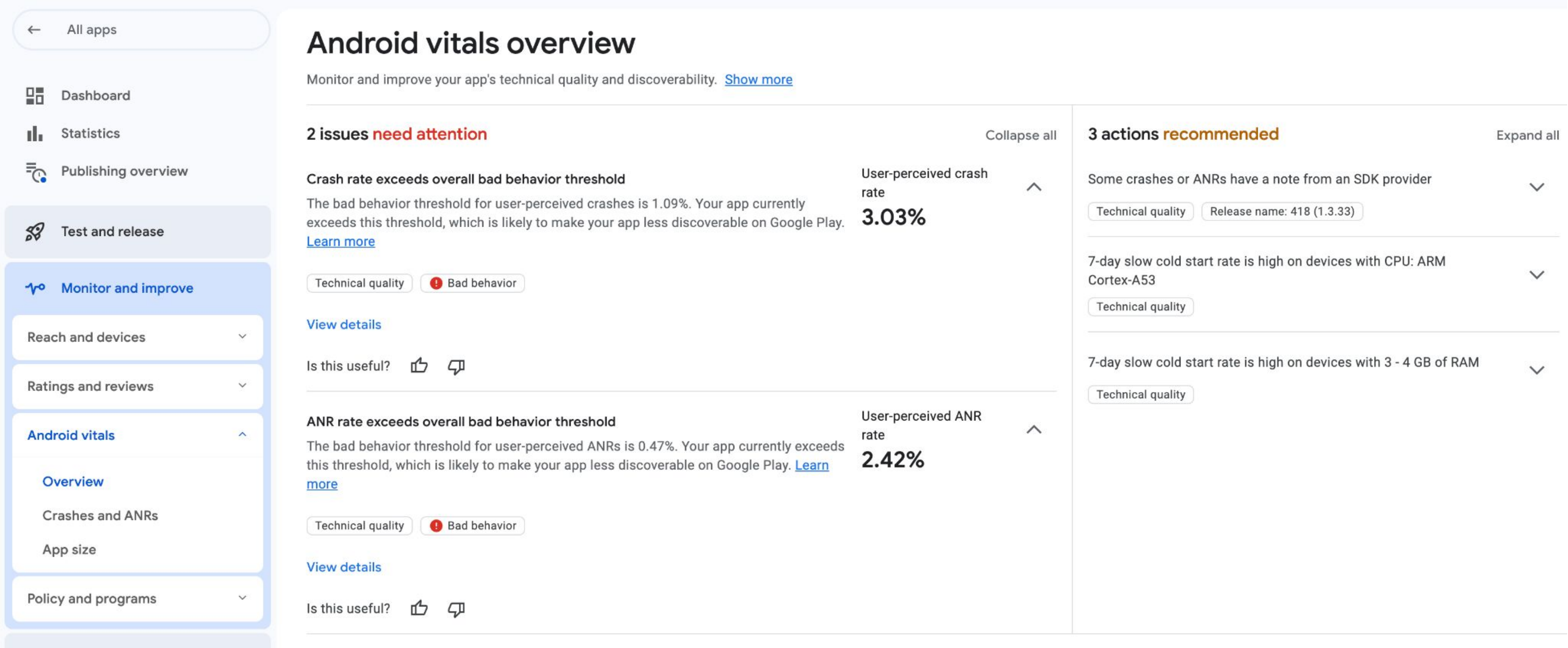
If parts of your app are restricted based on login credentials, memberships, location, or other forms of authentication, provide instructions on how to access them. Learn more

Android App Bundles

- Preferred format over .apk
- Reduces app size with dynamic delivery
- Required by Google for new apps since August 2021

Monitoring and Analytics

- **Android Vitals**
    - ANR (Application Not Responding) rates
    - Crash rates
    - App startup time
    - Battery usage & wake locks



Android vitals overview

Monitor and improve your app's technical quality and discoverability. Show more

2 issues need attention

Crash rate exceeds overall bad behavior threshold

The bad behavior threshold for user-perceived crashes is 1.09%. Your app currently exceeds this threshold, which is likely to make your app less discoverable on Google Play. Learn more

User-perceived crash rate
3.03%

Technical quality | Bad behavior

ANR rate exceeds overall bad behavior threshold

The bad behavior threshold for user-perceived ANRs is 0.47%. Your app currently exceeds this threshold, which is likely to make your app less discoverable on Google Play. Learn more

User-perceived ANR rate
2.42%

Technical quality | Bad behavior

3 actions recommended

Some crashes or ANRs have a note from an SDK provider

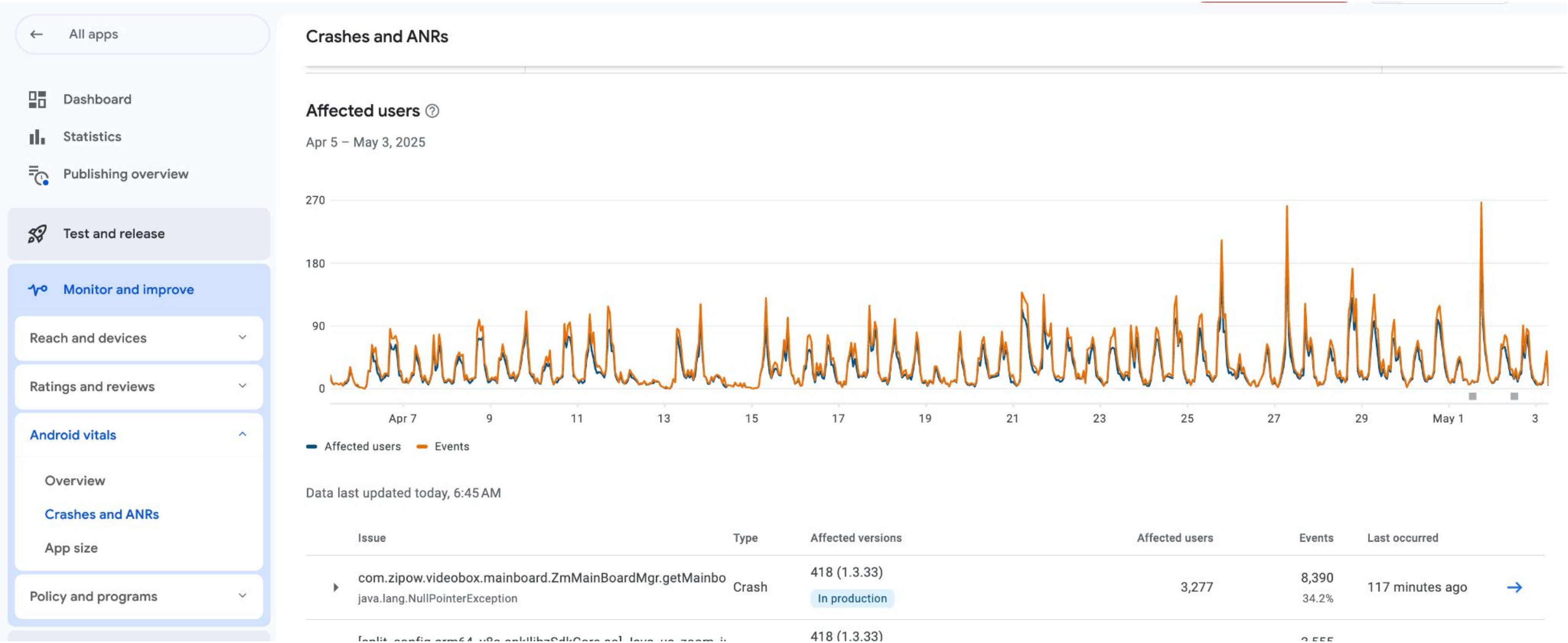
Technical quality | Release name: 418 (1.3.33)

7-day slow cold start rate is high on devices with CPU: ARM Cortex-A53

Technical quality

7-day slow cold start rate is high on devices with 3 - 4 GB of RAM

Technical quality



← All apps

Dashboard

Statistics

Publishing overview

Test and release

Monitor and improve

Reach and devices

Ratings and reviews

Android vitals

Overview

Crashes and ANRs

App size

Policy and programs

Crashes and ANRs

Affected users

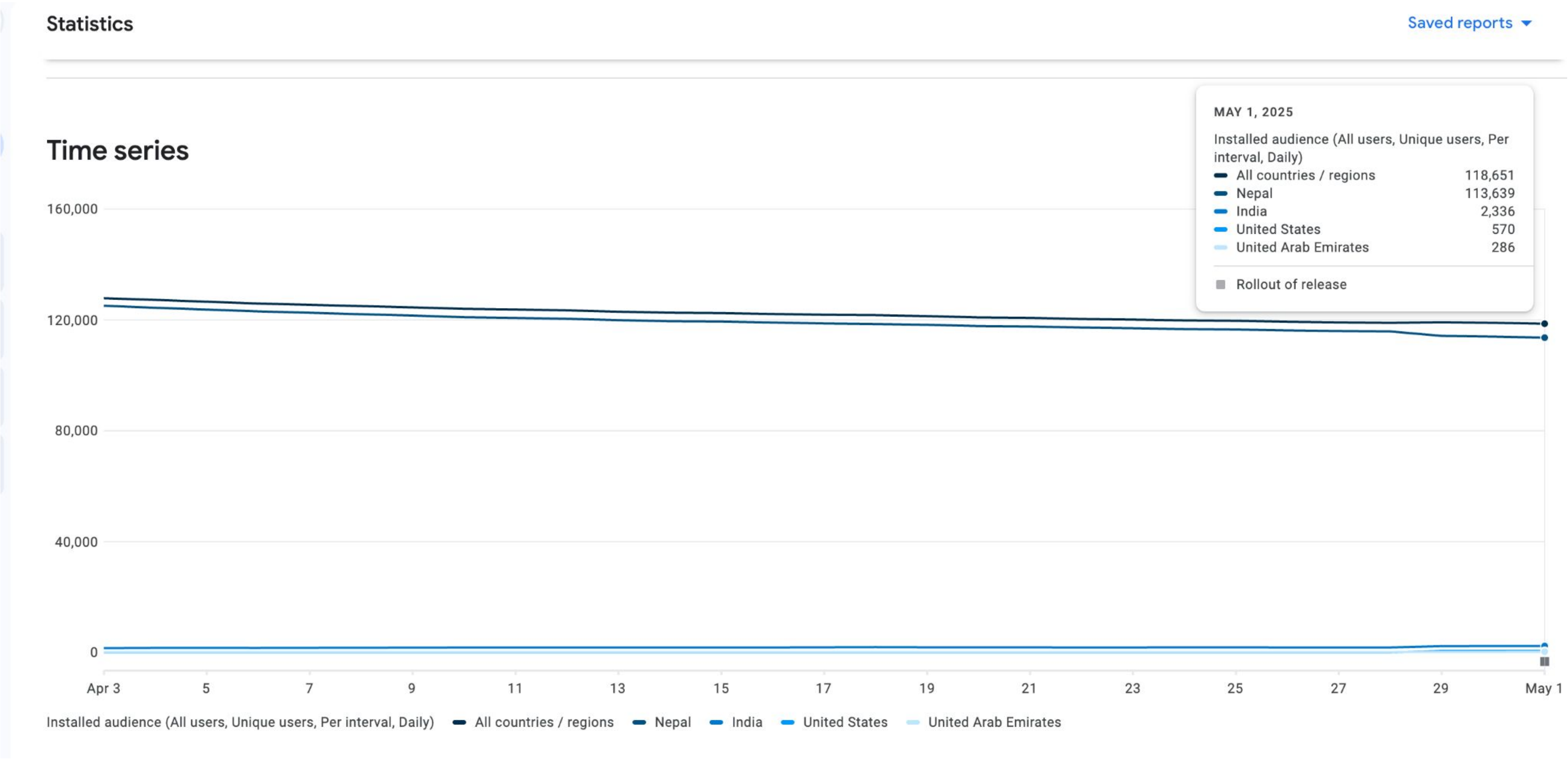
Apr 5 – May 3, 2025

Data last updated today, 6:45 AM

	Issue	Type	Affected versions	Affected users	Events	Last occurred	
▸	com.zipow.videobox.mainboard.ZmMainBoardMgr.getMainbo java.lang.NullPointerException	Crash	418 (1.3.33) In production	3,277	8,390 34.2%	117 minutes ago	→
	[split_config.arm64_v8a.apk!libzSdkCore.so] Java_us_zoom_i		418 (1.3.33)		3,555		

Monitoring and Analytics

- **Statistics**
  - Daily/weekly installs and uninstalls
  - Active users by country, device, and OS version
  - User engagement: DAU/WAU/MAU



Statistics

Time series

MAY 1, 2025

Installed audience (All users, Unique users, Per interval, Daily)

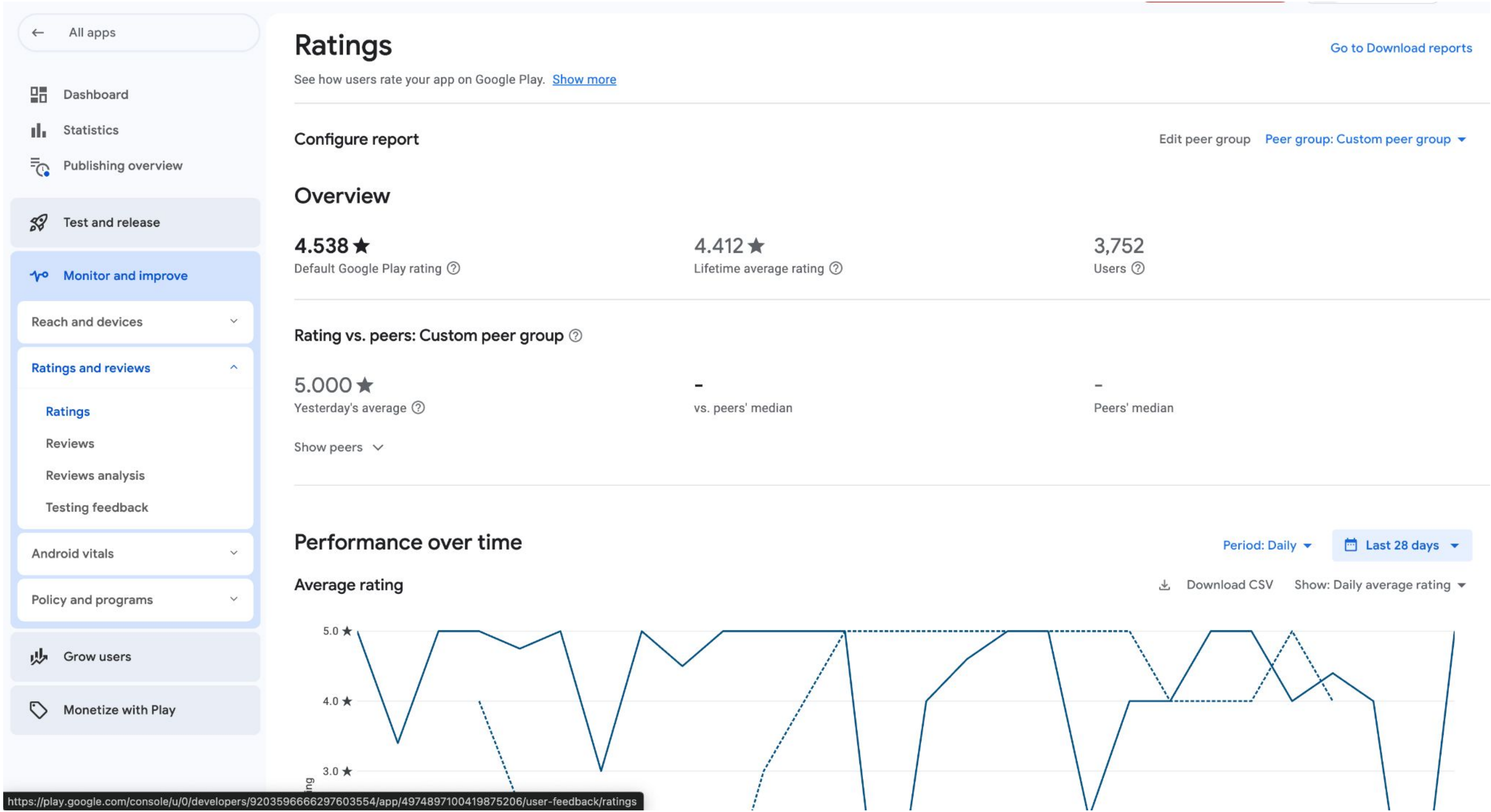
All countries / regions	118,651
Nepal	113,639
India	2,336
United States	570
United Arab Emirates	286

■ Rollout of release

Installed audience (All users, Unique users, Per interval, Daily) ▬ All countries / regions ▬ Nepal ▬ India ▬ United States ▬ United Arab Emirates

Monitoring and Analytics

- **Reviews & Ratings**
    - Read and respond to user reviews
    - Analyze trends in ratings
    - Filter reviews by language, rating, or keywords



Ratings

Go to Download reports

See how users rate your app on Google Play. Show more

Configure report

Edit peer group   Peer group: Custom peer group ▾

Overview

4.538 ★	4.412 ★	3,752
Default Google Play rating ⓘ	Lifetime average rating ⓘ	Users ⓘ

Rating vs. peers: Custom peer group ⓘ

5.000 ★	-	-
Yesterday's average ⓘ	vs. peers' median	Peers' median

Show peers ⌄

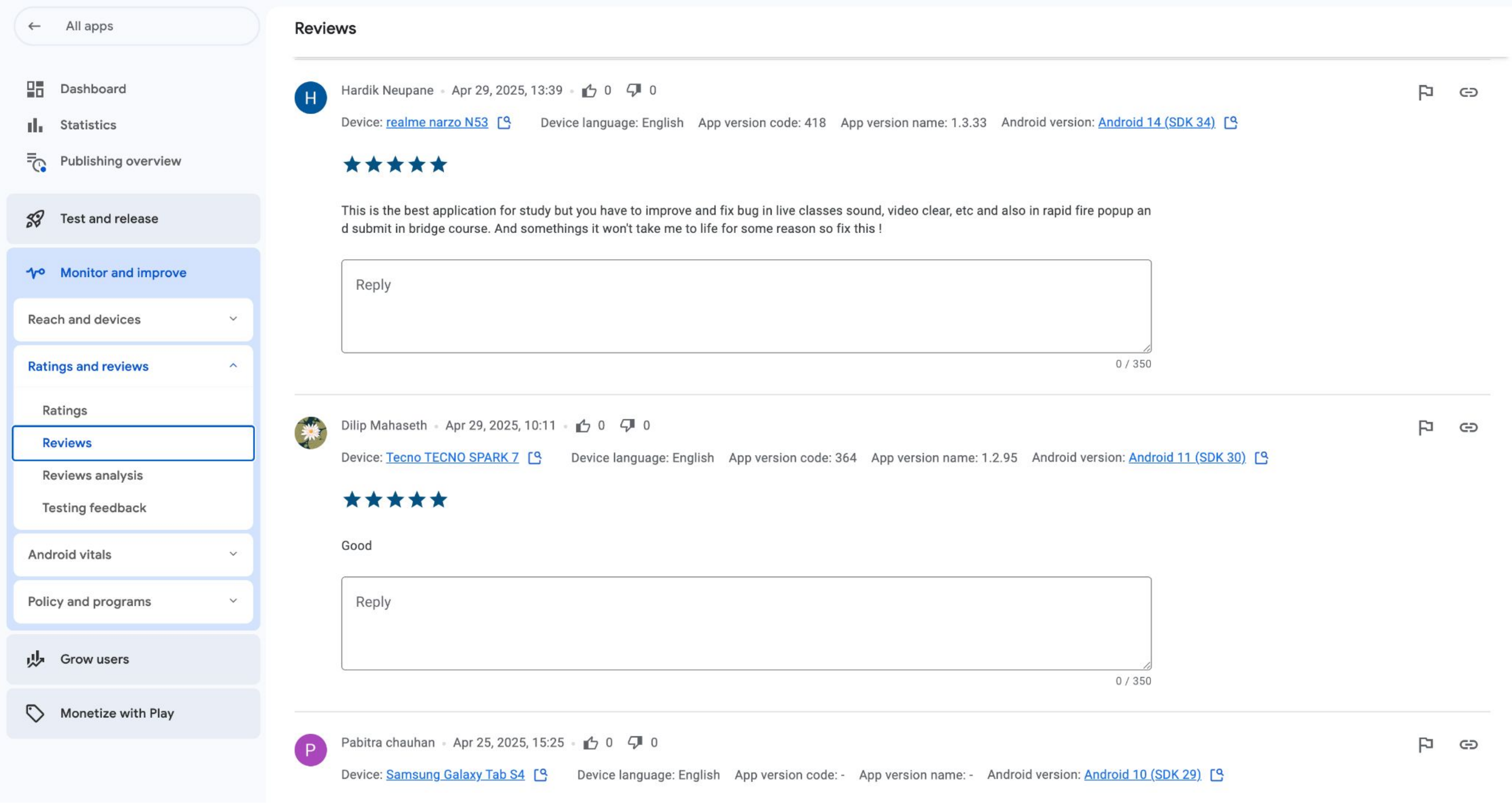
Performance over time

Period: Daily ▾   Last 28 days ▾

Average rating

Download CSV   Show: Daily average rating ▾

https://play.google.com/console/u/0/developers/9203596666297603554/app/4974897100419875206/user-feedback/ratings



Reviews

Hardik Neupane • Apr 29, 2025, 13:39 • 👍 0 👎 0

Device: realme narzo N53 | Device language: English | App version code: 418 | App version name: 1.3.33 | Android version: Android 14 (SDK 34)

★★★★★

This is the best application for study but you have to improve and fix bug in live classes sound, video clear, etc and also in rapid fire popup an d submit in bridge course. And somethings it won't take me to life for some reason so fix this !

Reply

0 / 350

Dilip Mahaseth • Apr 29, 2025, 10:11 • 👍 0 👎 0

Device: Tecno TECNO SPARK 7 | Device language: English | App version code: 364 | App version name: 1.2.95 | Android version: Android 11 (SDK 30)

★★★★★

Good

Reply

0 / 350

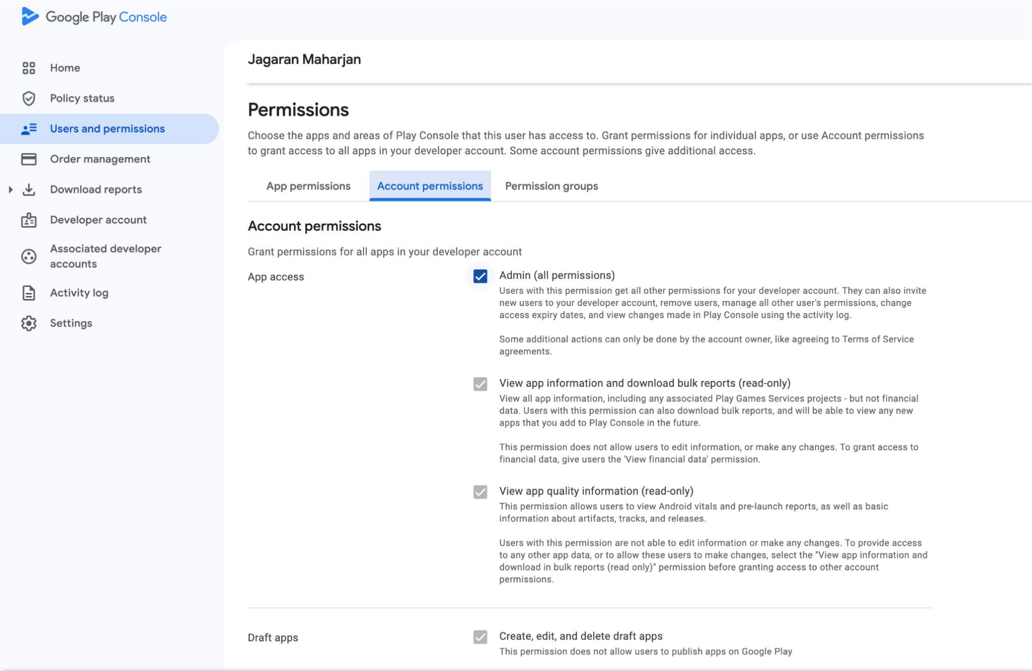
Pabitra chauhan • Apr 25, 2025, 15:25 • 👍 0 👎 0

Device: Samsung Galaxy Tab S4 | Device language: English | App version code: - | App version name: - | Android version: Android 10 (SDK 29)

User & Team Access

Invite team members with different roles:

- Admin
- Release manager
- Financial analyst
- Marketing team



Jagaran Maharjan

Permissions

Choose the apps and areas of Play Console that this user has access to. Grant permissions for individual apps, or use Account permissions to grant access to all apps in your developer account. Some account permissions give additional access.

Account permissions

Grant permissions for all apps in your developer account

App access

☑ Admin (all permissions)
Users with this permission get all other permissions for your developer account. They can also invite new users to your developer account, remove users, manage all other user's permissions, change access expiry dates, and view changes made in Play Console using the activity log.

Some additional actions can only be done by the account owner, like agreeing to Terms of Service agreements.

☑ View app information and download bulk reports (read-only)
View all app information, including any associated Play Games Services projects - but not financial data. Users with this permission can also download bulk reports, and will be able to view any new apps that you add to Play Console in the future.

This permission does not allow users to edit information, or make any changes. To grant access to financial data, give users the 'View financial data' permission.

☑ View app quality information (read-only)
This permission allows users to view Android vitals and pre-launch reports, as well as basic information about artifacts, tracks, and releases.

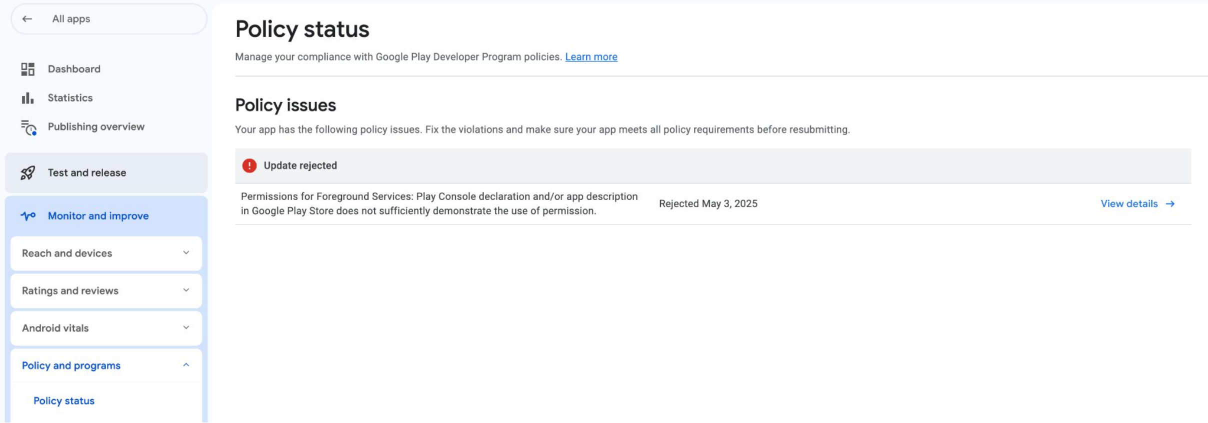
Users with this permission are not able to edit information or make any changes. To provide access to any other app data, or to allow these users to make changes, select the "View app information and download in bulk reports (read only)" permission before granting access to other account permissions.

Draft apps

☑ Create, edit, and delete draft apps
This permission does not allow users to publish apps on Google Play

Security & Policy Updates

- Alerts for policy violations or security issues
- Automatic suspension warnings
- Google Play Protect integration



Policy status

Manage your compliance with Google Play Developer Program policies. Learn more

Policy issues

Your app has the following policy issues. Fix the violations and make sure your app meets all policy requirements before resubmitting.

Update rejected

Permissions for Foreground Services: Play Console declaration and/or app description in Google Play Store does not sufficiently demonstrate the use of permission. Rejected May 3, 2025 View details →

Benefits of Google Play Console

- Centralized control panel for app lifecycle
- Insights into real-world usage
- Easy access to global distribution
- Tools to improve app quality and visibility
- First-party integration with Firebase and other Google services

Deployment Workflow

1. **Code & Build Finalization**
   - Ensure no debug logs (Log.d(), print())
   - Enable ProGuard/R8 for obfuscation
2. **App Versioning**
   - versionCode must increase with every update
   - versionName visible to users
3. **Signing the App**
   - Required for publishing
   - Use .jks (Java Keystore) or Google Play App Signing

4. Create Store Listing

- Title, description, category, contact details
- App icon, screenshots, promo video

5. Upload Bundle

- Use .aab (preferred) or .apk

6. Release Management

- Choose release track (internal, closed, open, production)

7. Rollout

- Staged rollout (e.g., 10%, 20%) to monitor early issues

Deployment Precautions

1. **Version Management**
   - Never reuse the same versionCode
   - Avoid downgrades, Play Console won’t allow them
2. **Security & Privacy**
   - Declare all sensitive permissions
   - Include a privacy policy URL
3. **Testing**
   - Use Firebase Test Lab, real devices, multiple form factors

4. Store Listing

- Be accurate and compliant with Google Play policies
- Do not mislead users (images, videos, descriptions)

5. Performance

- Optimize app size using `android:extractNativeLibs=false`
- Analyze with Android Vitals and Crashlytics

What is .jks file?

Java Keystore (JKS):

- Repository for security certificates and private keys

Used for:

- Signing APK/AAB before Play Store upload
- Verifying the identity of the developer

Importance:

- Losing the .jks means you can't update the app anymore
- It's tied to your app's identity forever

How to generate .jks file for new app?

Command:

```
keytool -genkey -v -keystore my-release-key.jks \ -keyalg RSA -keysize 2048 -validity 10000 \

-alias my-key-alias
```

Note: You will be prompted for:

- Keystore password
- Key alias
- Key password
- Distinguished Name (CN, OU, O, L, S, C)

What is the use of key.properties file?

- Stores sensitive information (like passwords and file paths) outside the codebase.
- Helps avoid hardcoding credentials inside build.gradle.
- Keeps signing configs modular, reusable, and easy to manage.
- Supports version control exclusion (by adding it to .gitignore) to prevent accidental leaks.

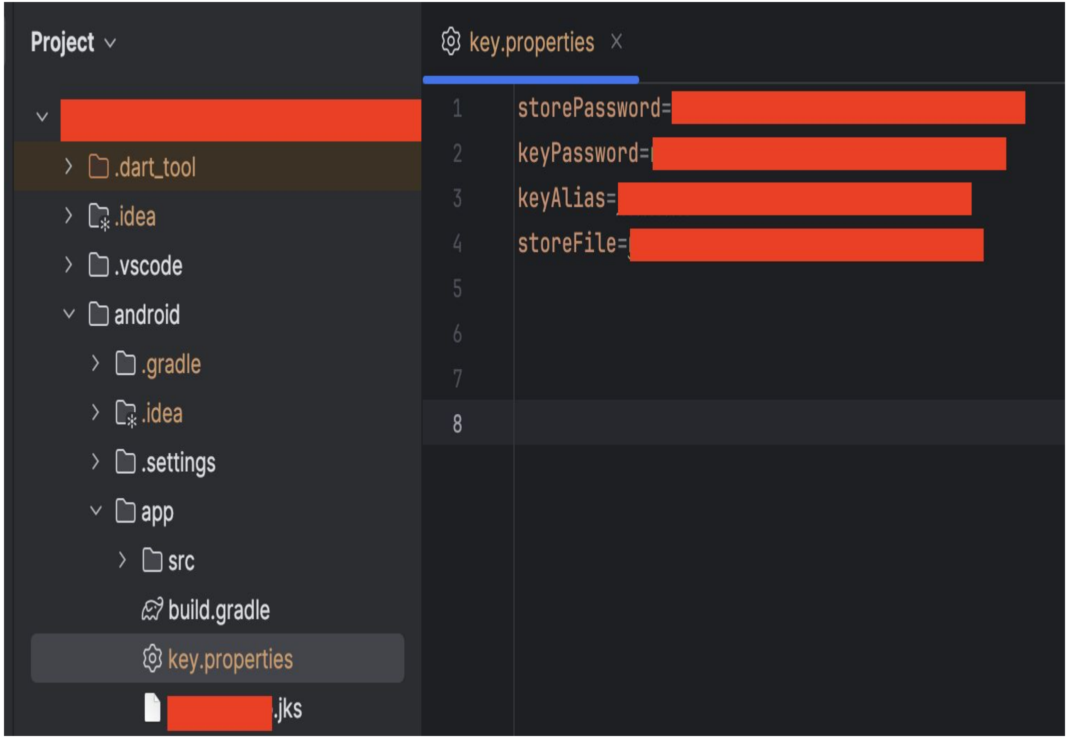
Example of key.properties file

storePassword=myStorePassword

keyPassword=myKeyPassword

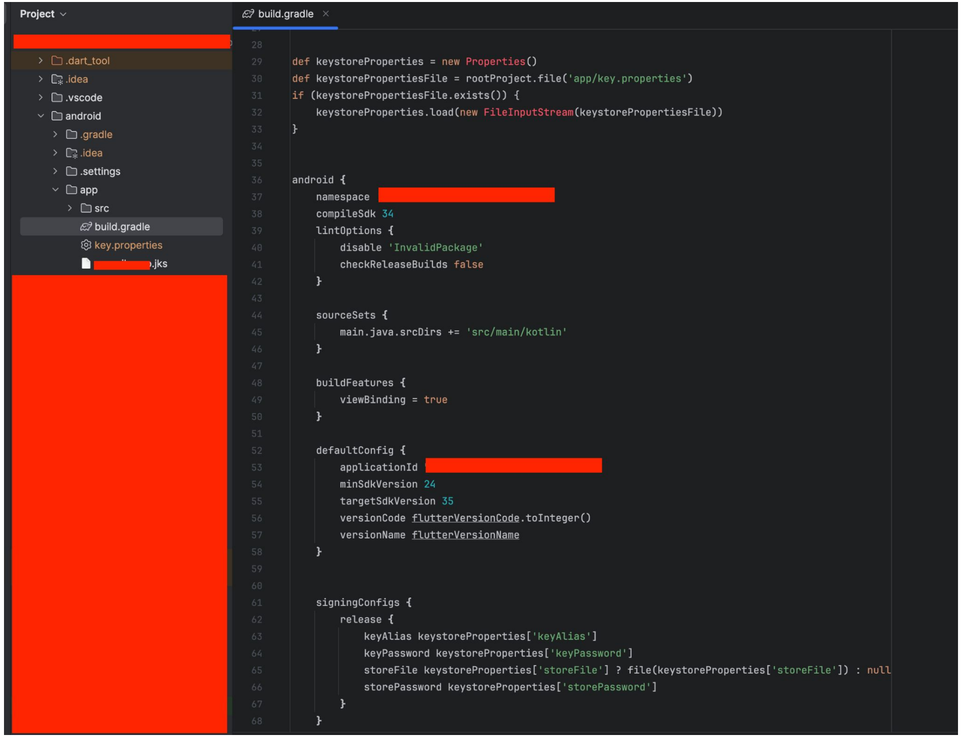
keyAlias=myKeyAlias

storeFile=/path/to/keystore.jks



```
storePassword=[redacted]
keyPassword=[redacted]
keyAlias=[redacted]
storeFile=[redacted]
```

How key.properties file used in build.gradle?



Project

[redacted]

- .dart_tool
- .idea
- .vscode
- android
  - .gradle
  - .idea
  - .settings
  - app
    - src
    - build.gradle
    - key.properties
    - [redacted].jks

[redacted]

build.gradle

```
def keystoreProperties = new Properties()
def keystorePropertiesFile = rootProject.file('app/key.properties')
if (keystorePropertiesFile.exists()) {
    keystoreProperties.load(new FileInputStream(keystorePropertiesFile))
}


android {
    namespace [redacted]
    compileSdk 34
    lintOptions {
        disable 'InvalidPackage'
        checkReleaseBuilds false
    }

    sourceSets {
        main.java.srcDirs += 'src/main/kotlin'
    }

    buildFeatures {
        viewBinding = true
    }

    defaultConfig {
        applicationId [redacted]
        minSdkVersion 24
        targetSdkVersion 35
        versionCode flutterVersionCode.toInteger()
        versionName flutterVersionName
    }


    signingConfigs {
        release {
            keyAlias keystoreProperties['keyAlias']
            keyPassword keystoreProperties['keyPassword']
            storeFile keystoreProperties['storeFile'] ? file(keystoreProperties['storeFile']) : null
            storePassword keystoreProperties['storePassword']
        }
    }
```

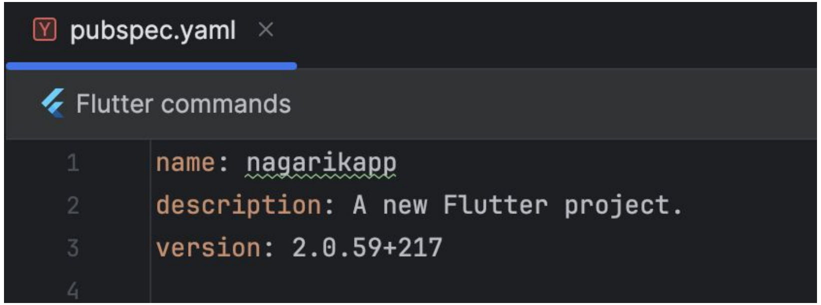
Versioning Format X.X.X.X

Android uses 2 main fields:

- versionCode (Integer, e.g., 7)
  - Mandatory and must increase on each upload
- versionName (String, e.g., 2.1.0)

x.x.x.x (major.minor.patch.build)

- **Major:** Breaking changes
- **Minor:** New features
- **Patch:** Bug fixes
- **Build:** Internal CI/CD builds or metadata



```yaml
name: nagarikapp
description: A new Flutter project.
version: 2.0.59+217

```

Best Practices

- Add key.properties to .gitignore to prevent versioning.
- Store a backup of the .jks and the key.properties in a secure vault.
- Never share key.properties or .jks files publicly.

Q&A

Any questions?

Additional Resources

Android App Deployment

https://docs.flutter.dev/deployment/android

Publish Your App

https://developer.android.com/studio/publish

Get Started With Google Play Console

https://support.google.com/googleplay/android-developer/answer/6112435?hl=en

Apply For DUNS:

https://www.dnb.com/en-us/smb/duns.html

Thank You!