

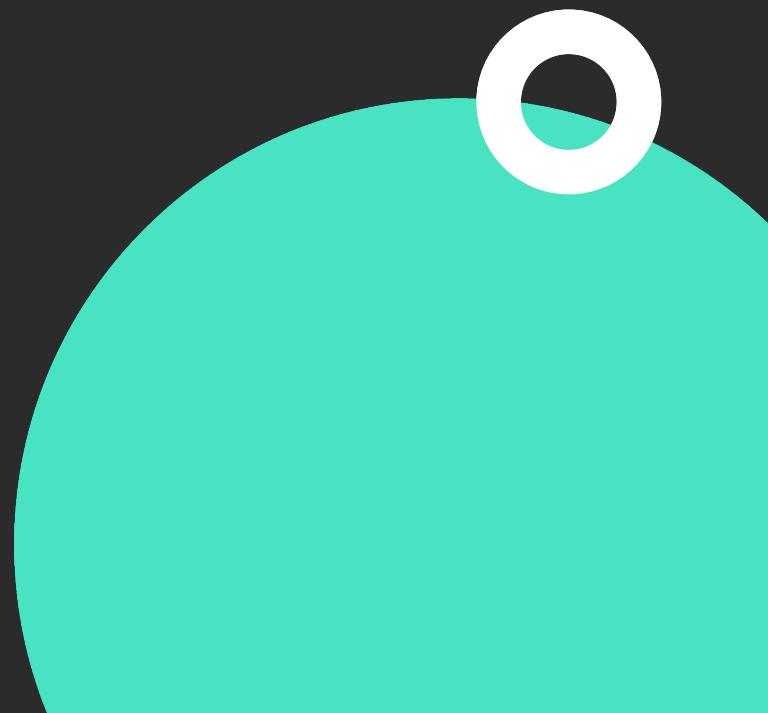


Android Audio and Video: Getting Started



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Course Overview



Course Overview

- Media App Anatomy and Behavior
- Latest Android Media APIs
- Supported Media Formats and Devices
- Playing Streams and Files (Audio & Video)
- Managing Playback (Play, Pause, Seek...)
- Listening to Player Events
- Sync UI and Player
- Background Audio Playback
- Handling Orientation Changes





Course Requirements



Course Requirements

- Android Development
- Kotlin
- Jetpack Compose UI
- Jetpack Compose Side-Effects
- MVVM Architecture





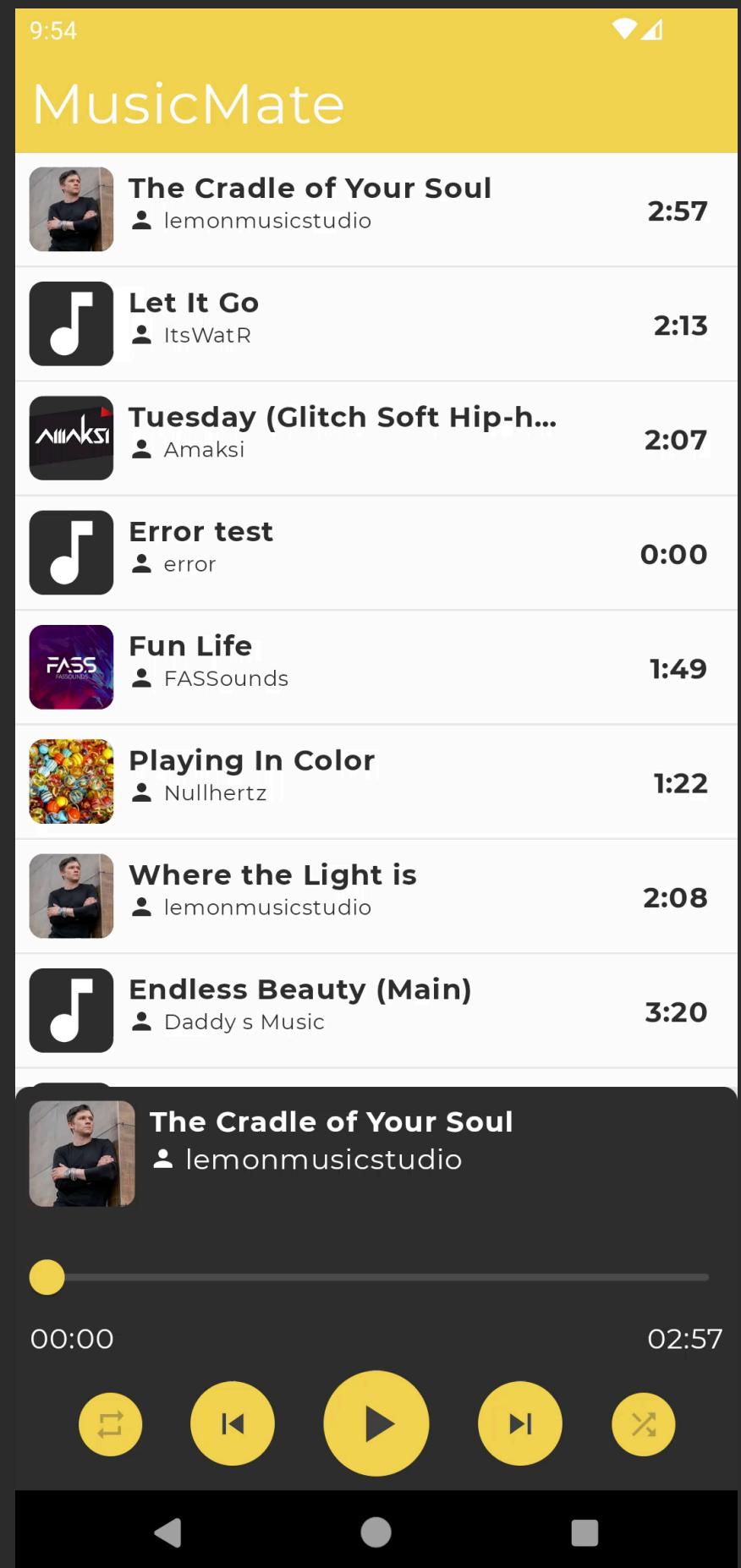
Course Projects



Course Projects

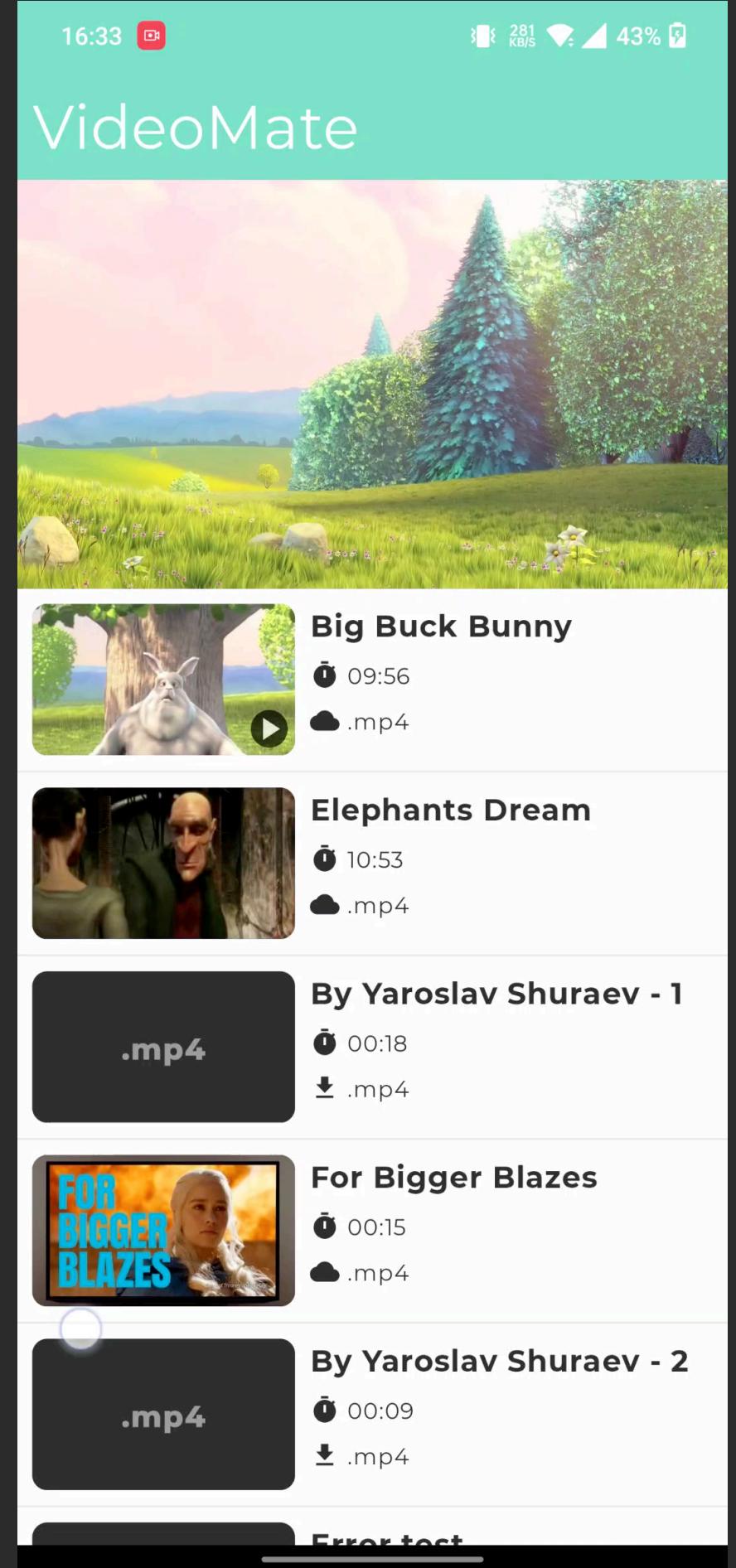
- MusicMate
 - Music Player
 - Controls
 - Playlist
 - Background Playback
 - Media Control Notification

- Main Goals
 - Learn to play and control media
 - Listen & handle playback events
 - Background Playback



Course Projects

- VideoMate
 - Video Player
 - Playlist
 - Animated Video Size Change
 - Seamless Orientation Change
- Main Goals
 - Learn to play videos
 - Handle orientation changes
 - React to video size changes





Media App Anatomy

Up Next



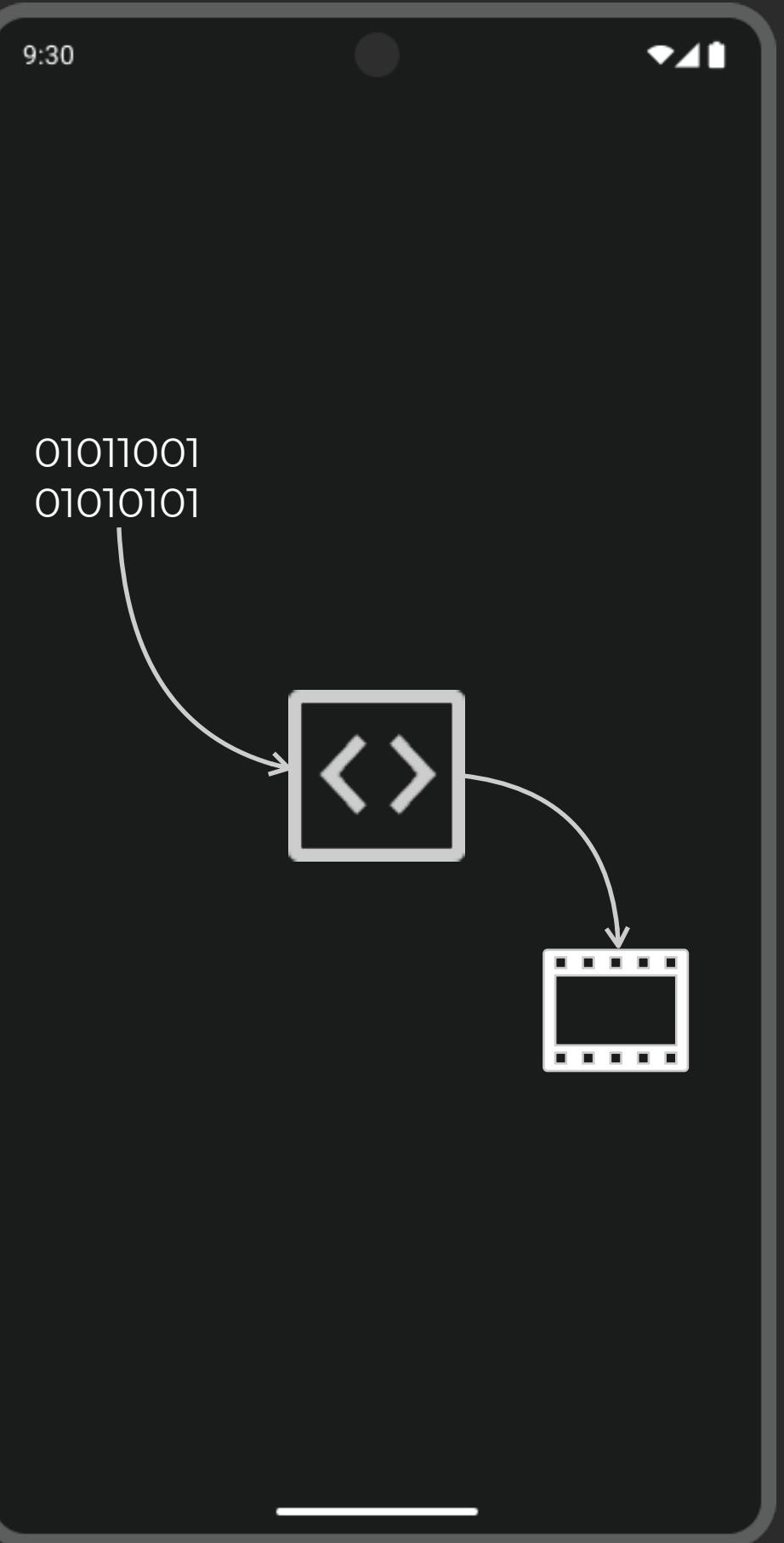


Media App Anatomy



Media App Anatomy

- Media Player
 - Play content
 - Handle media actions
 - Broadcast playback events



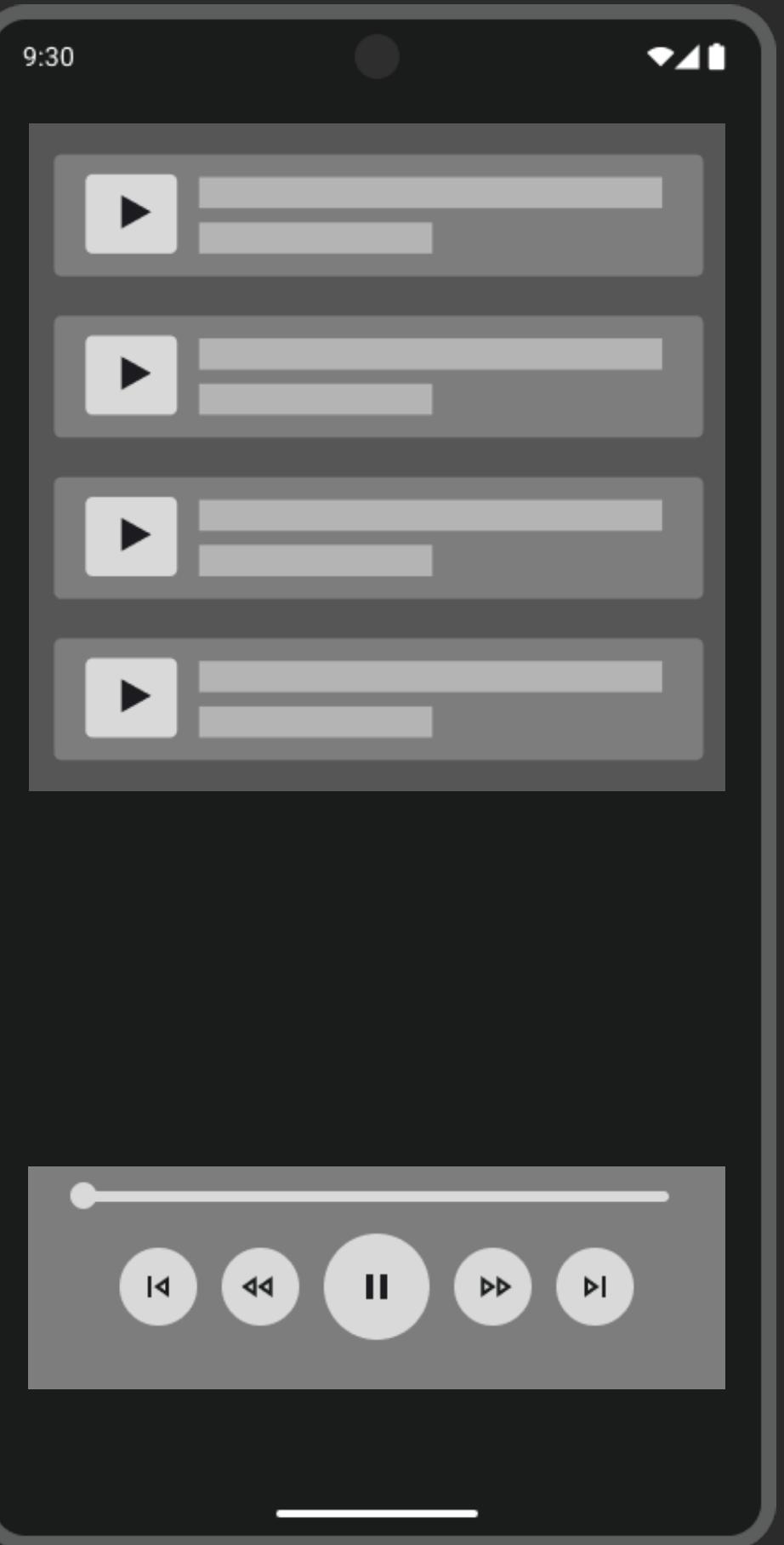
Media App Anatomy

- Media Player
 - Play content
 - Handle media actions
 - Broadcast playback events
- Audio or Video Content



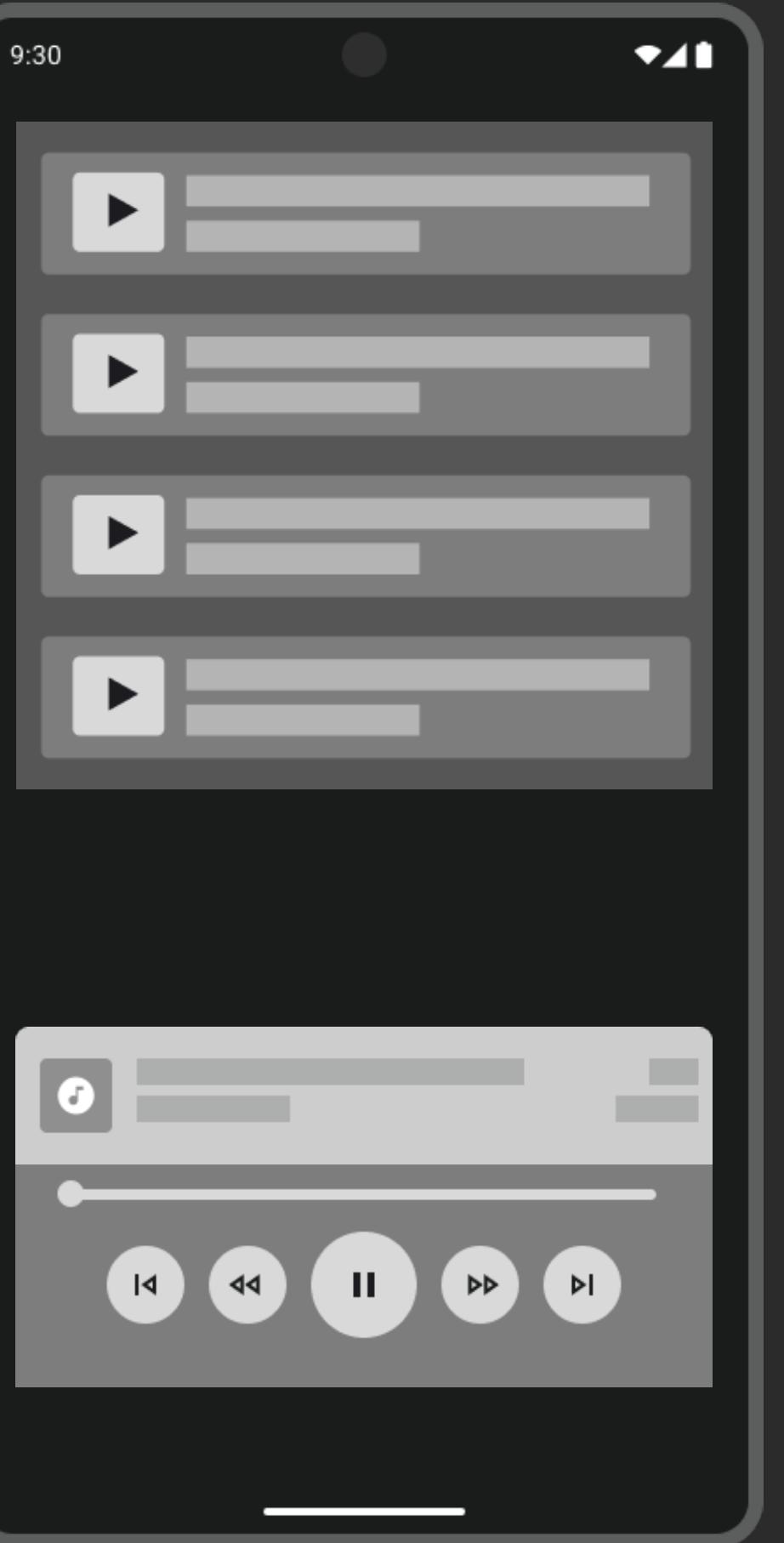
Media App Anatomy

- Media Player
 - Play content
 - Handle media actions
 - Broadcast playback events
- Audio or Video Content
- Media Controls



Media App Anatomy

- Media Player
 - Play content
 - Handle media actions
 - Broadcast playback events
- Audio or Video Content
- Media Controls
- Current Media Metadata



Media App Anatomy

- Media Player
 - Play content
 - Handle media actions
 - Broadcast playback events
- Audio or Video Content
- Media Controls
- Current Media Metadata
- Video App





Media App Challenges

Up Next





Media App Challenges



Media App Challenges

- What makes a good app?
 - Content
 - Fast
 - Responsive
 - Intuitive
 - Friendly UI



Media App Challenges

- Quick load time



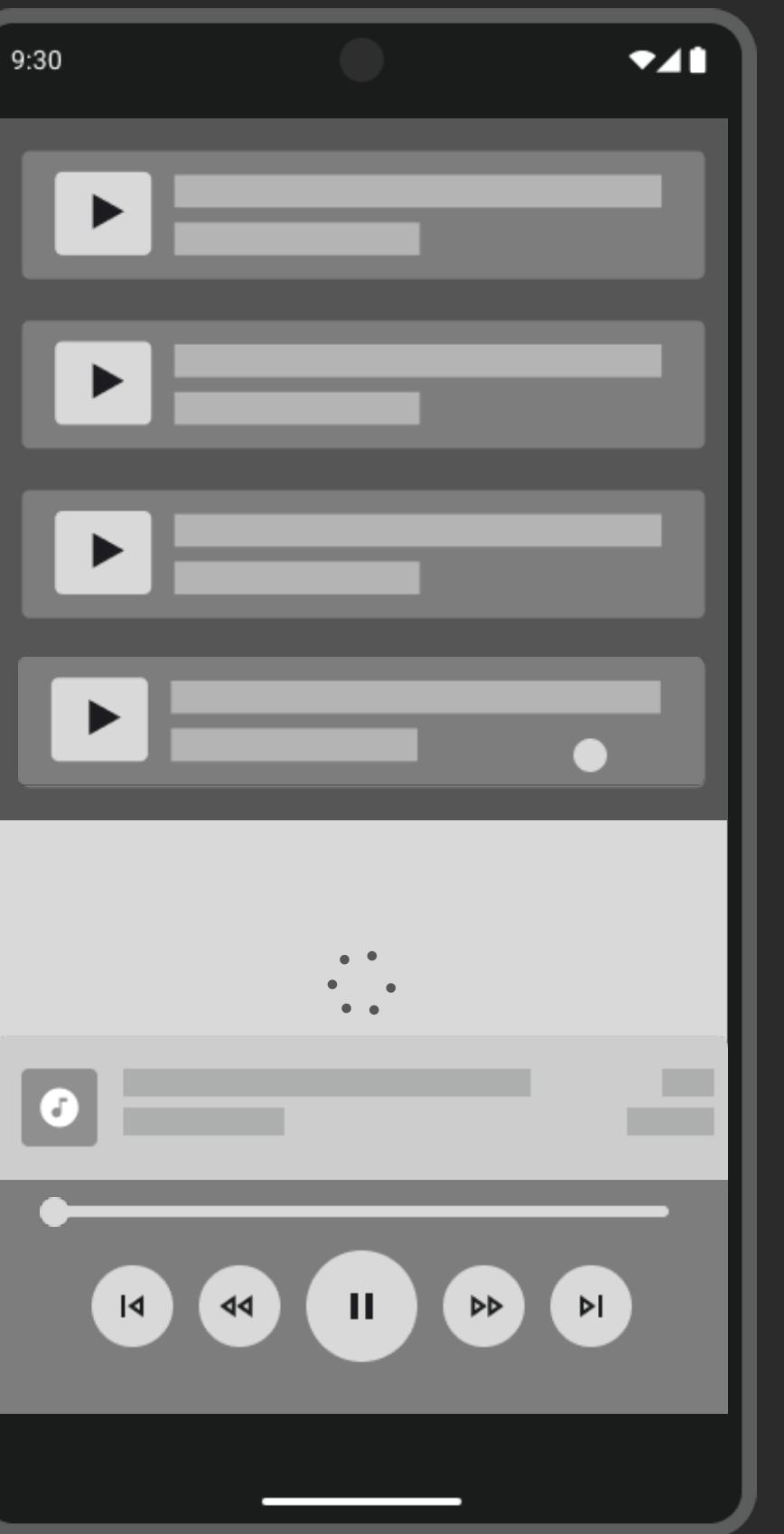
Media App Challenges

- Quick load time



Media App Challenges

- Quick load time
- Quick feedback



Media App Challenges

- Quick load time
- Quick feedback



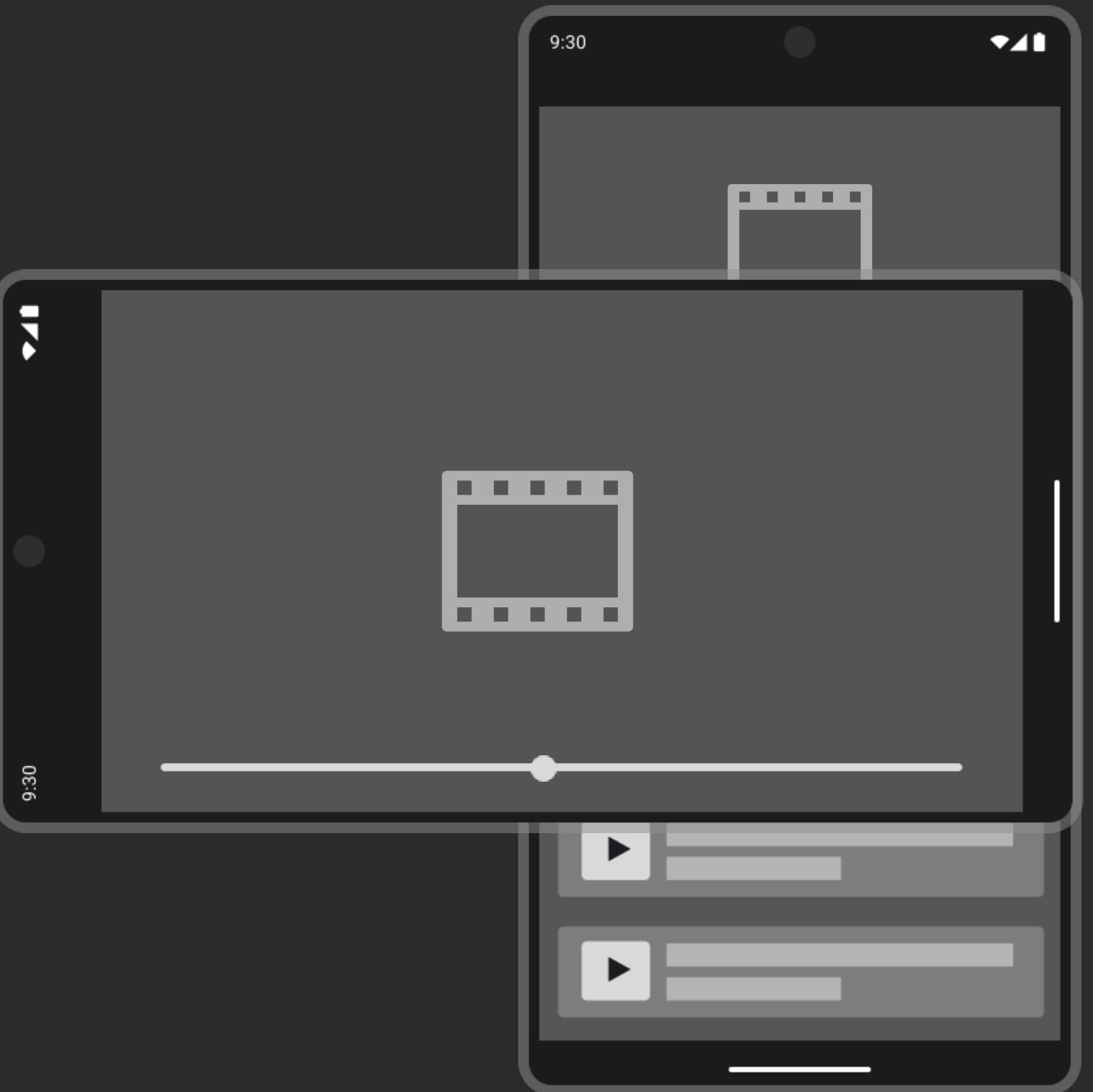
Media App Challenges

- Quick load time
- Quick feedback
- Configuration changes



Media App Challenges

- Quick load time
- Quick feedback
- Configuration changes



Media App Challenges

- Quick load time
- Quick feedback
- Configuration changes

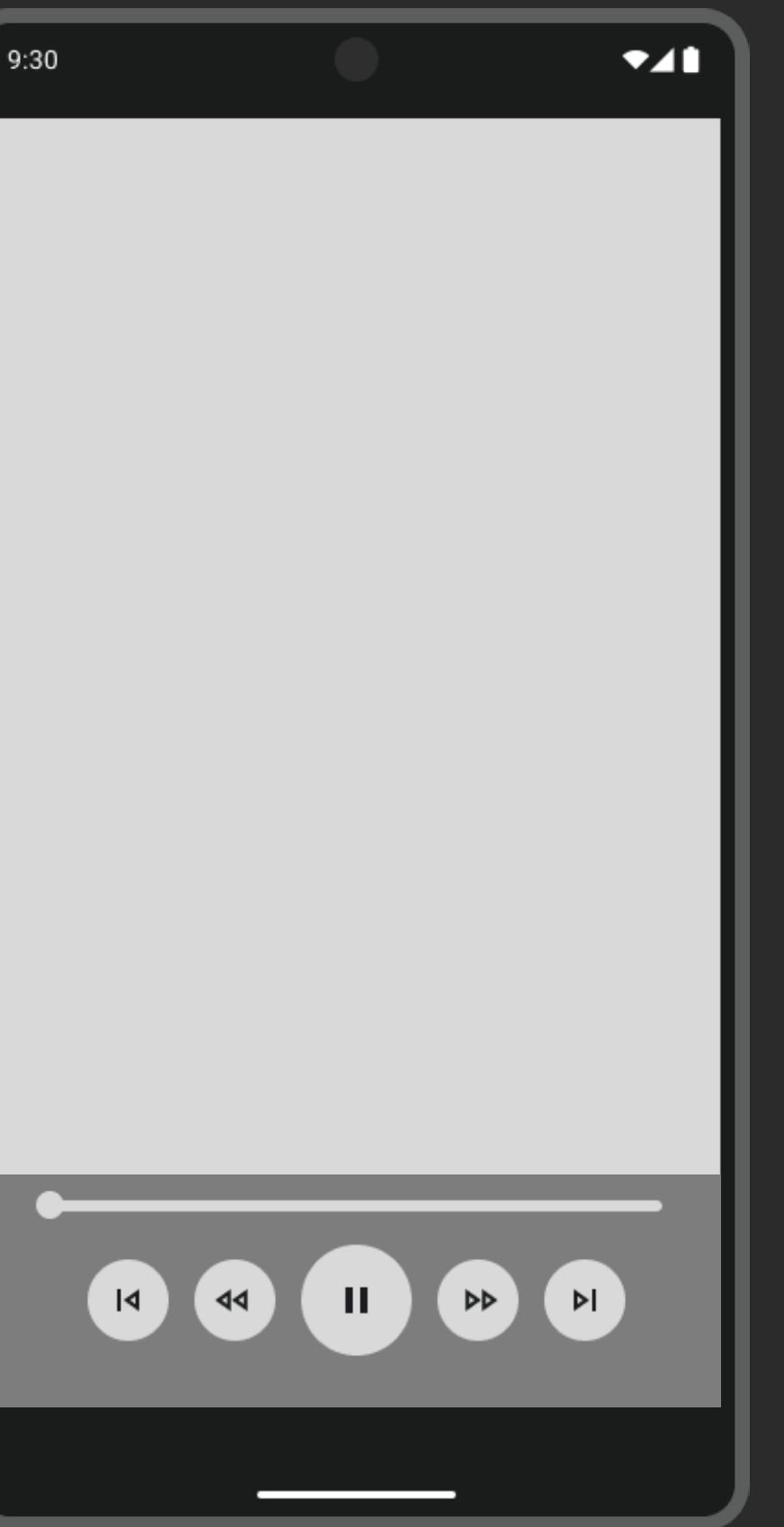


```
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    android:configChanges="orientation|smallestScreenSize|screenSize"  
    android:exported="true"  
    android:label="@string/app_name"  
    android:theme="@style/Theme.VideoMate">
```



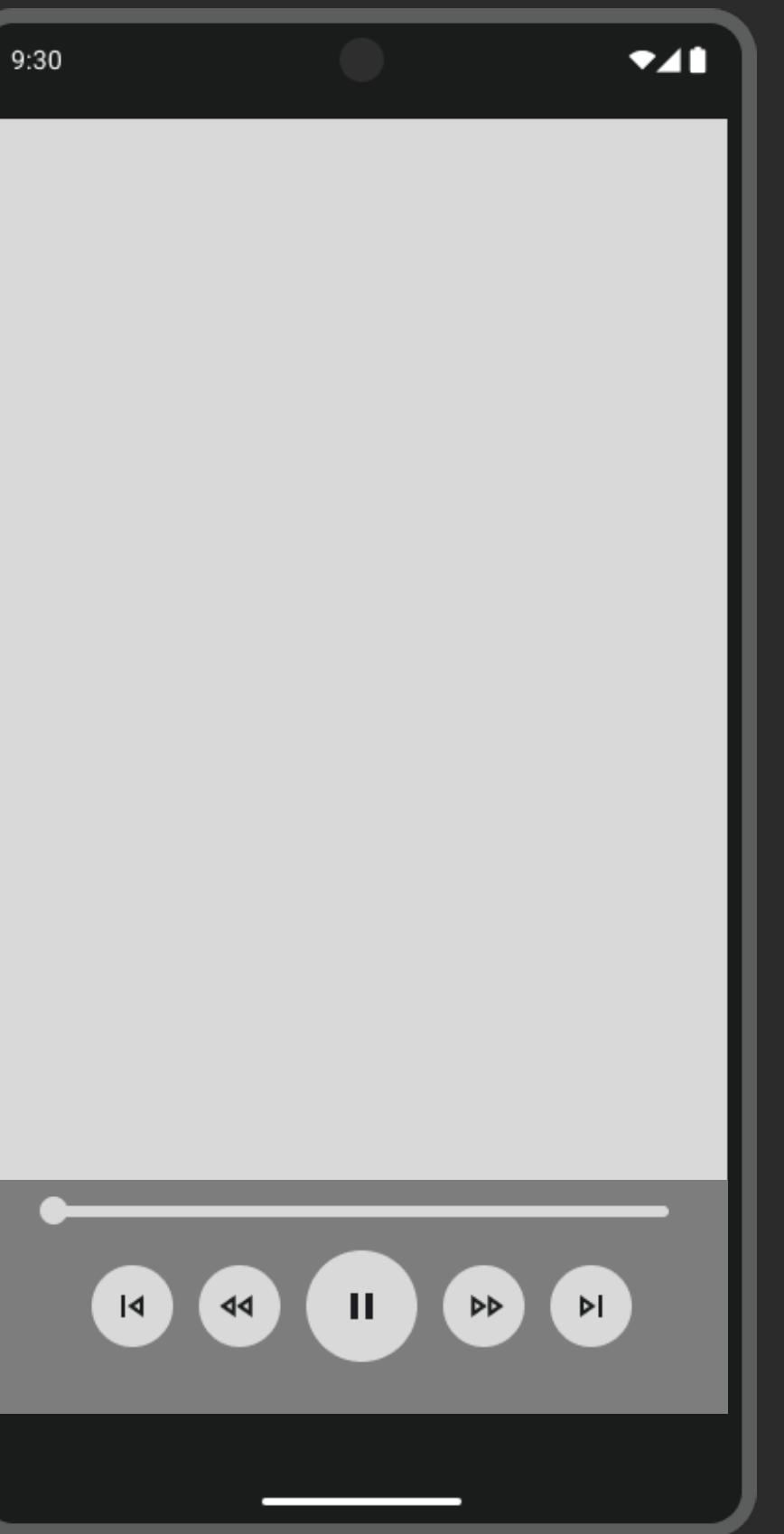
Media App Challenges

- Quick load time
- Quick feedback
- Configuration changes
- Clear actions



Media App Challenges

- Quick load time
- Quick feedback
- Configuration changes
- Clear actions



Media App Challenges

- Quick load time
- Quick feedback
- Configuration changes
- Clear actions



Media App Challenges

- Quick load time
- Quick feedback
- Configuration changes
- Clear actions
- Easy-to-find content
- Convenient
 - Playback pauses when:
 - Phone call received, earbuds or Bluetooth headset disconnected
 - Another foreground app playing content
 - Alert when streaming over metered network
 - Allow different qualities to be played (e.g., HD and SD)





Media App Challenges



Summary

- Main course topics
- Course projects: MusicMate and VideoMate
- Media app's basic structure
- Challenges and behaviors





The Media3 API

Up Next



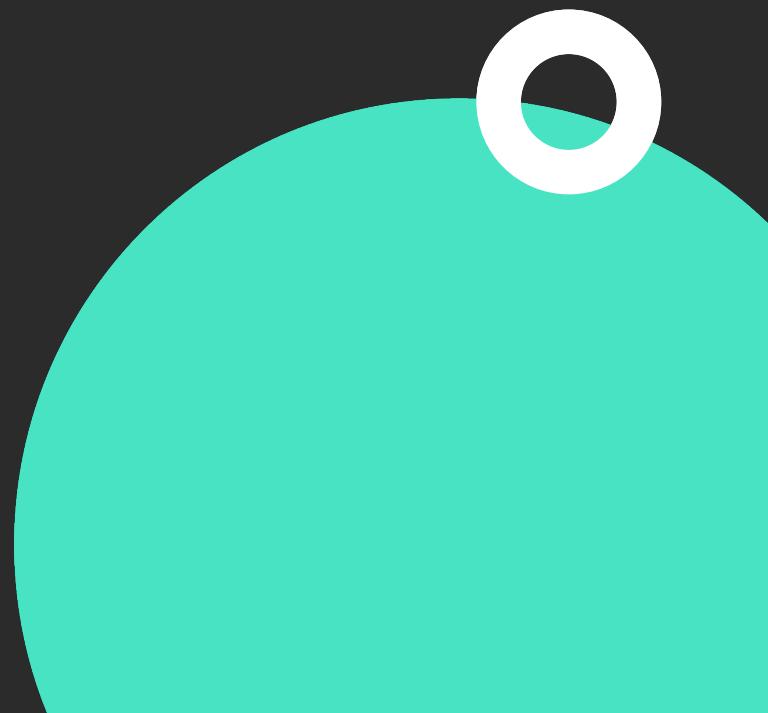
Jetpack Media3 API



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Section Overview

- Jetpack Media3 API
- ExoPlayer
- Player, MediaSession, and MediaController
- Recap





Introduction to Media3 API

Up Next



Jetpack Media3 API



Jetpack Media3 API

- What is Media3?
- Why does it exist?
- What it solves?



What is Media3?

- Central place for media APIs



Media 3



What is Media3?

- Central place for media APIs
- Media Controls UI
- Adaptive & live playback
- Media data extraction
- Media editing
 - Transcoding
 - Trimming
 - Cropping
 - Effects



Jetpack Media3 API

- What is Media3?
- Why does it exist?
- What it solves?



Why does it exist?

- Media2, ExoPlayer
 - Redundant implementations for the same problems
 - Both provide different UI components
 - Both provide different MediaSession APIs
 - Which one should I choose?
- Single source
- API Improvements
- Less breaking changes
- Easier implementations



Jetpack Media3 API

- What is Media3?
- Why does it exist?
- What it solves?



What it solves?

- Standardized implementations
- Simpler code
- Improved and consistent API design
- More out-of-the-box implementations



Jetpack Media3 API

- What is Media3?
- Why does it exist?
- What it solves?





ExoPlayer

Up Next

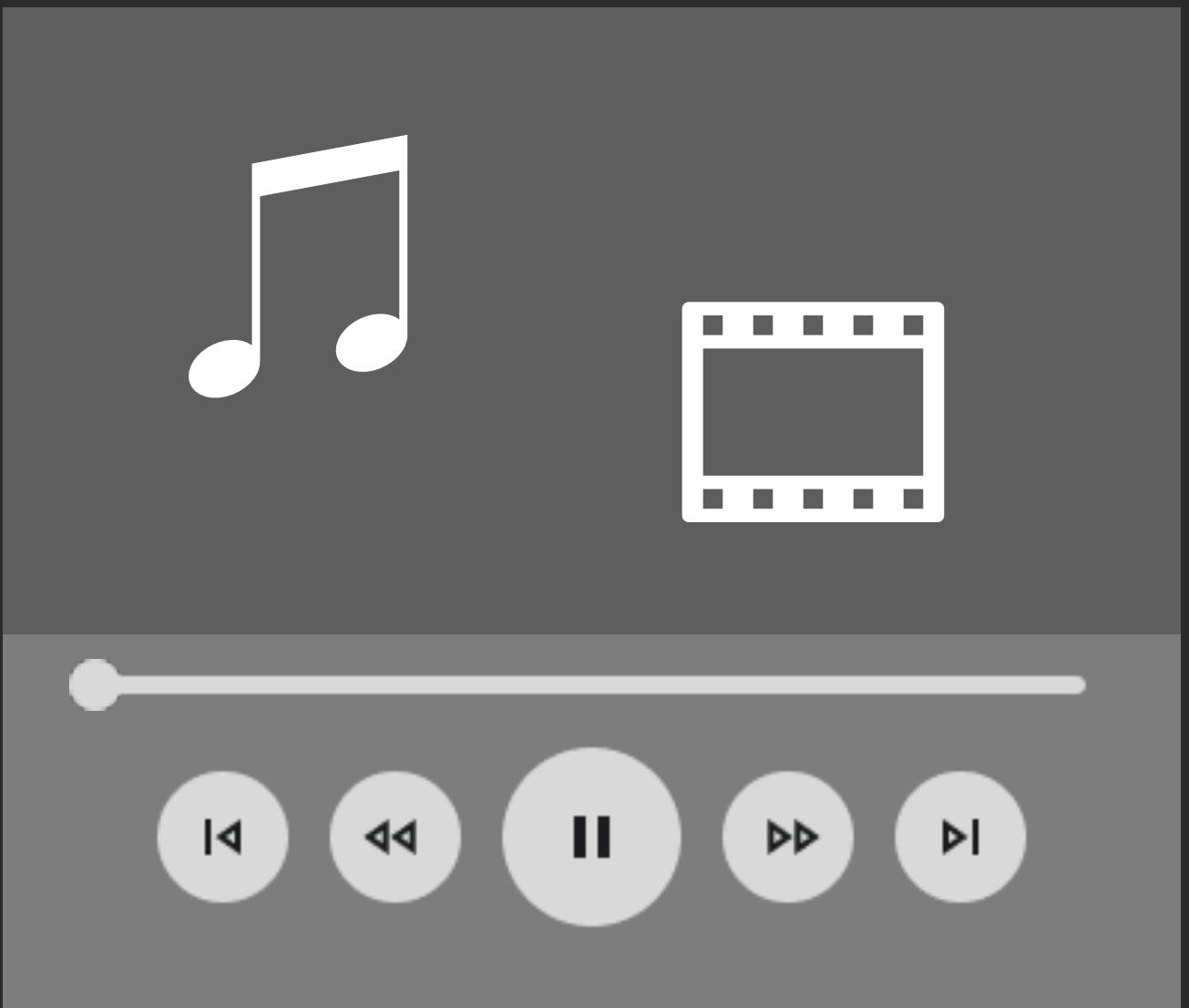


ExoPlayer



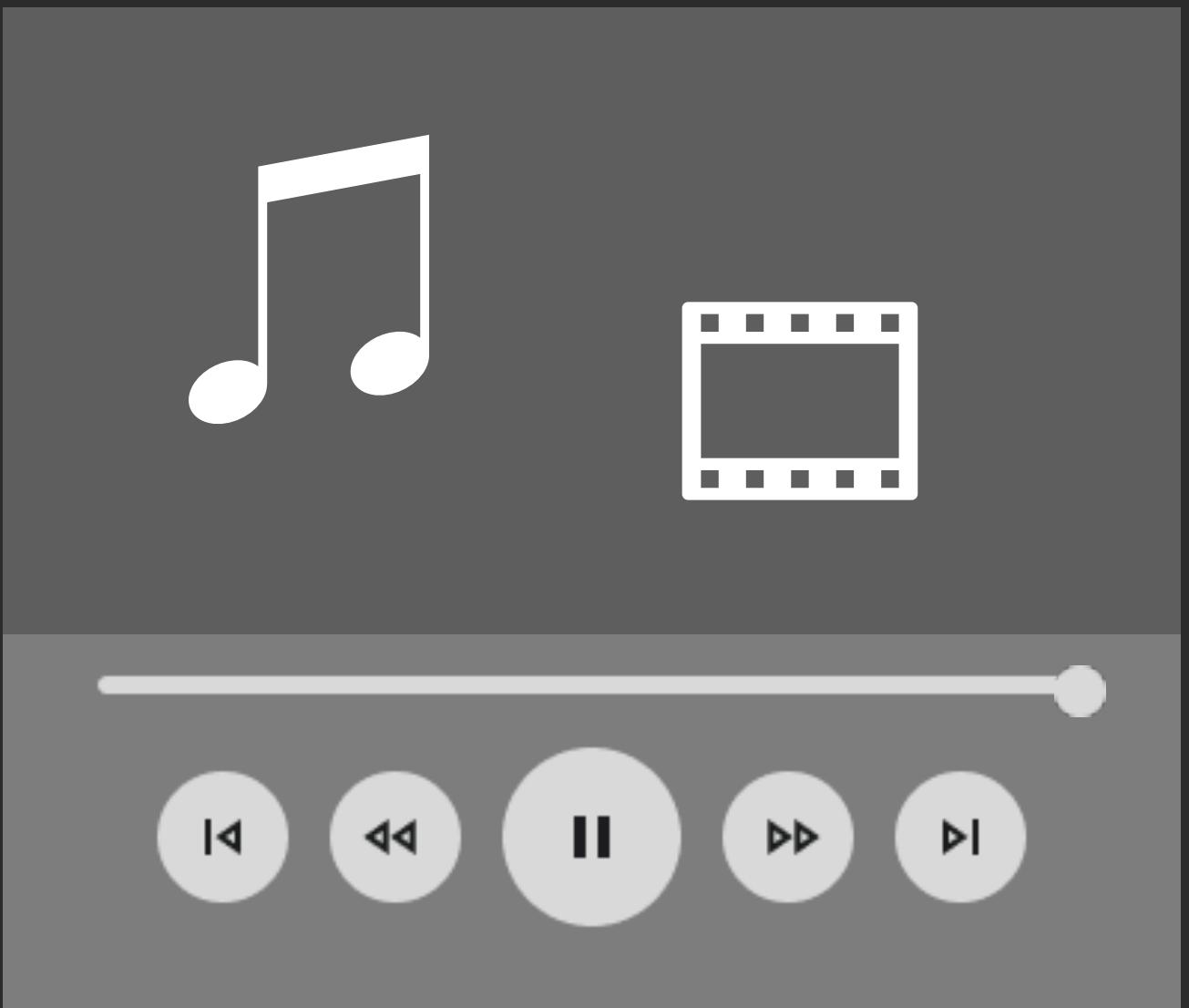
ExoPlayer

- Media Player
 - Adaptive streaming
 - Ads playback
 - Media download & offline playback
 - Live streaming
 - Playlists



ExoPlayer

- Media Player
 - Adaptive streaming
 - Ads playback
 - Media download & offline playback
 - Live streaming
 - Playlists
- Supported Formats



ExoPlayer

- Media Player
 - Adaptive streaming
 - Ads playback
 - Media download & offline playback
 - Live streaming
 - Playlists
- Supported Formats

Video	Audio
MP4	MP3
FMP4	M4A
WebM	WAV
.	.
.	.
.	.



ExoPlayer

- Media Player
 - Adaptive streaming
 - Ads playback
 - Media download & offline playback
 - Live streaming
 - Playlists
- Supported Formats
- Supported Devices
 - Android ≥ 4.1 (API 16)





Media3 API

Up Next



Media3 API



Media3 API

- Player
- MediaSession
- MediaController



Player

- Interface
 - Play
 - Pause
 - Seek
 - Playback state
 - Current position
 - Add/Remove listeners

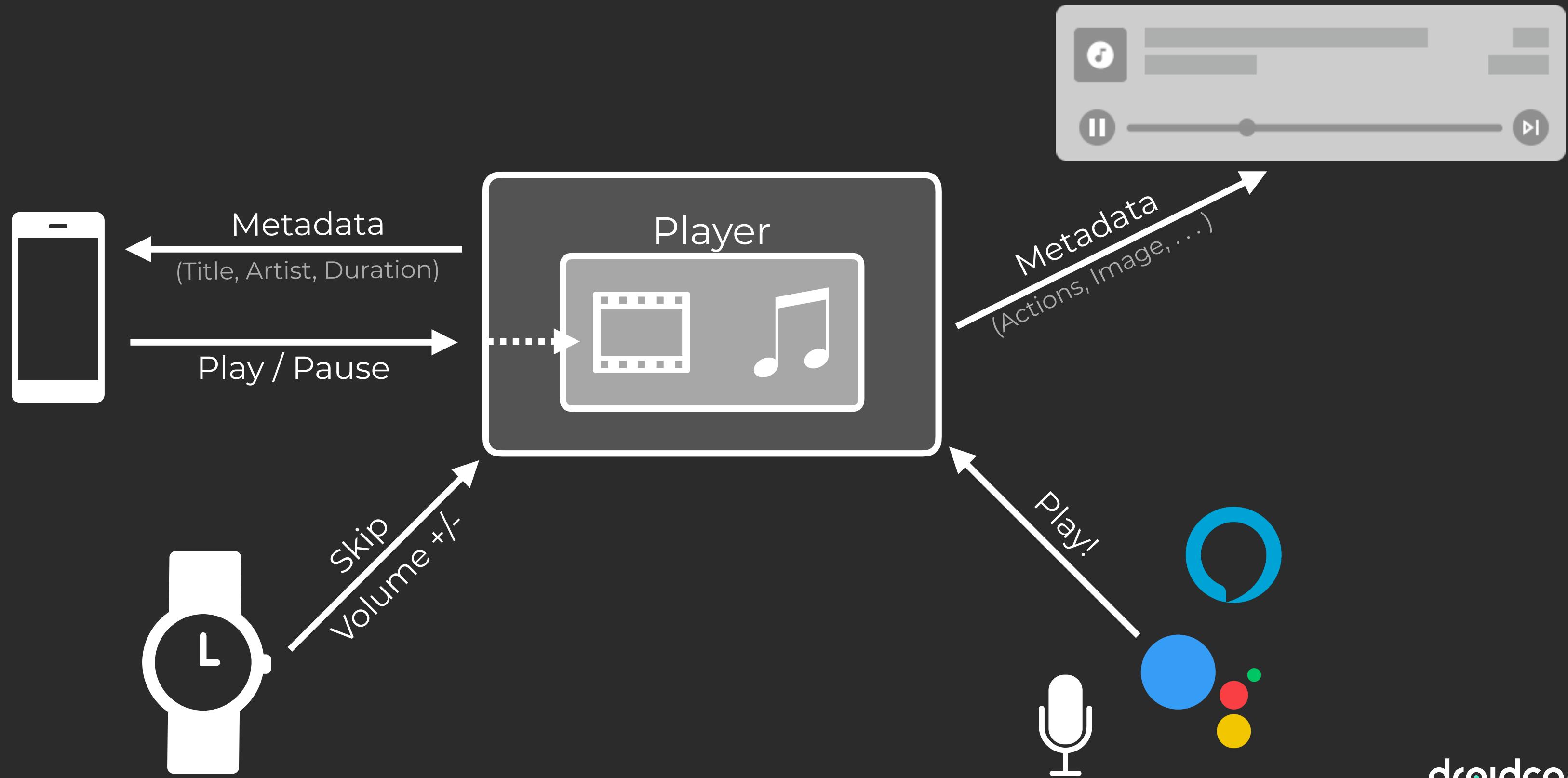


Media3 API

- Player
- MediaSession
- MediaController



MediaSession



Media3 API

- Player
- MediaSession
- MediaController

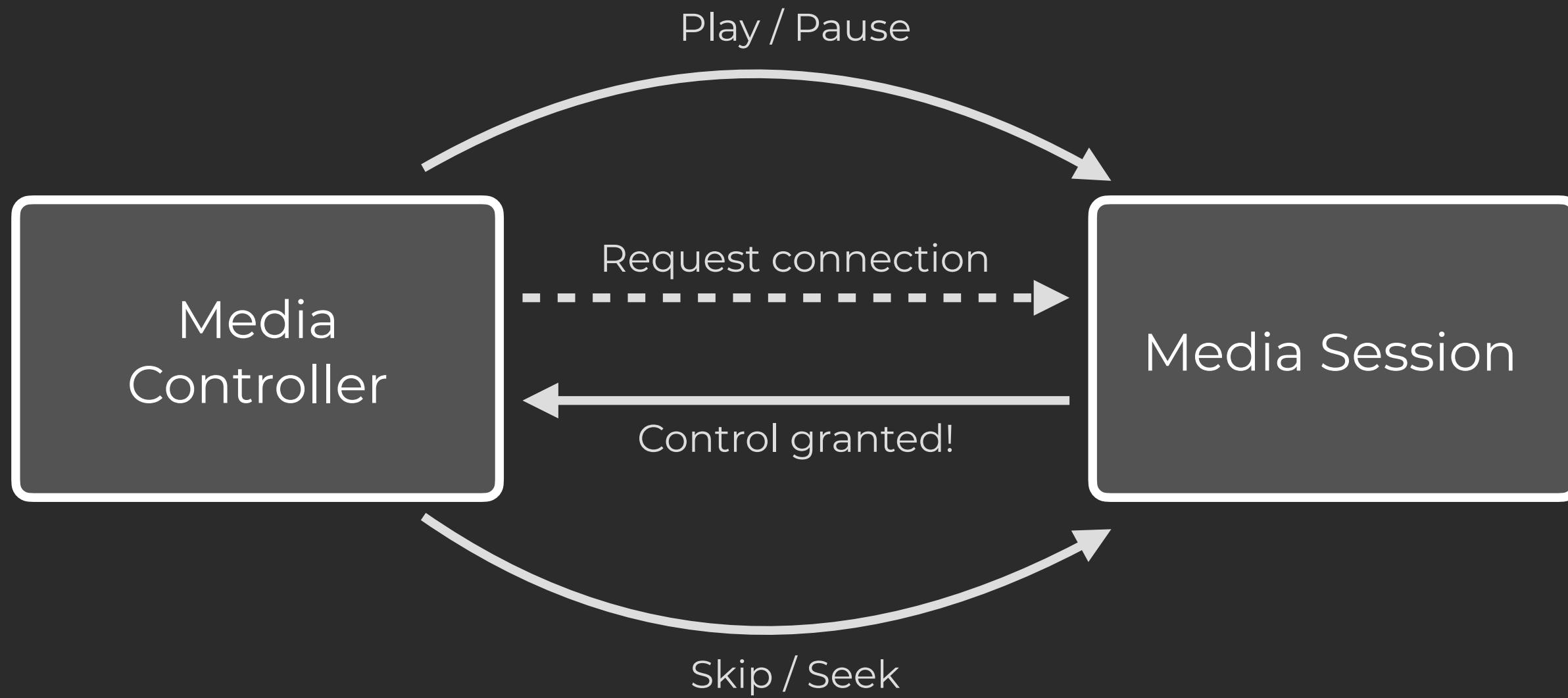


MediaController

Media Session



MediaController



Media3 API

- Player
- MediaSession
- MediaController



Media3 API



Summary

- Getting familiar with Media3
 - What is
 - Why it exists
 - What it solves
- Introduction to ExoPlayer
 - Supported formats and devices
- Player
- MediaSession
- MediaController





Building a Music Player

Up Next



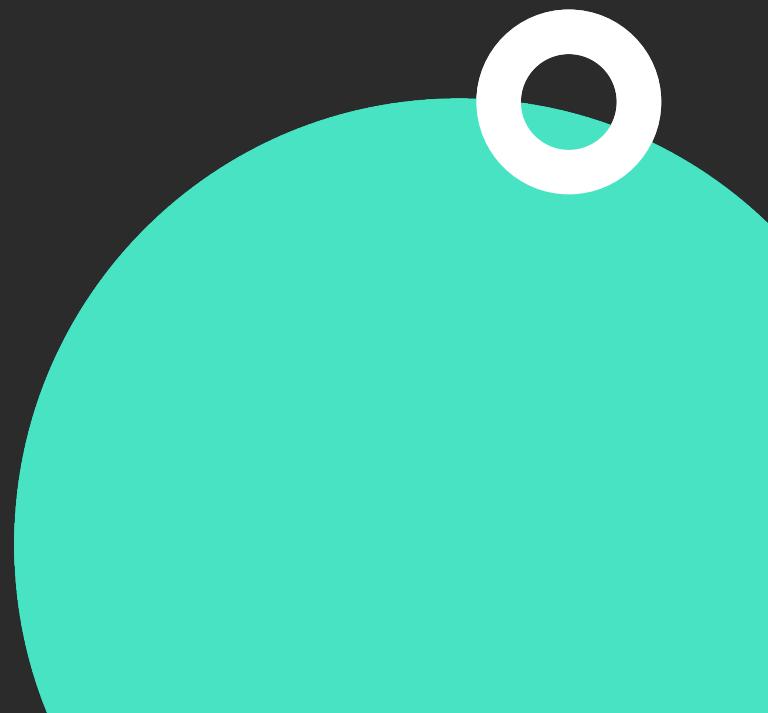


Building a Music Player



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Section Overview

- MusicMate: Starter project walkthrough
- Player and MediaSession creation
- Creating MediaItems and Playlists
- Playing the song list





MusicMate: Starter Project Walkthrough

Up Next



MusicMate: Starter Project Walkthrough



Setting Up the Player & MediaSession

Up Next



Setting Up the Player & MediaSession





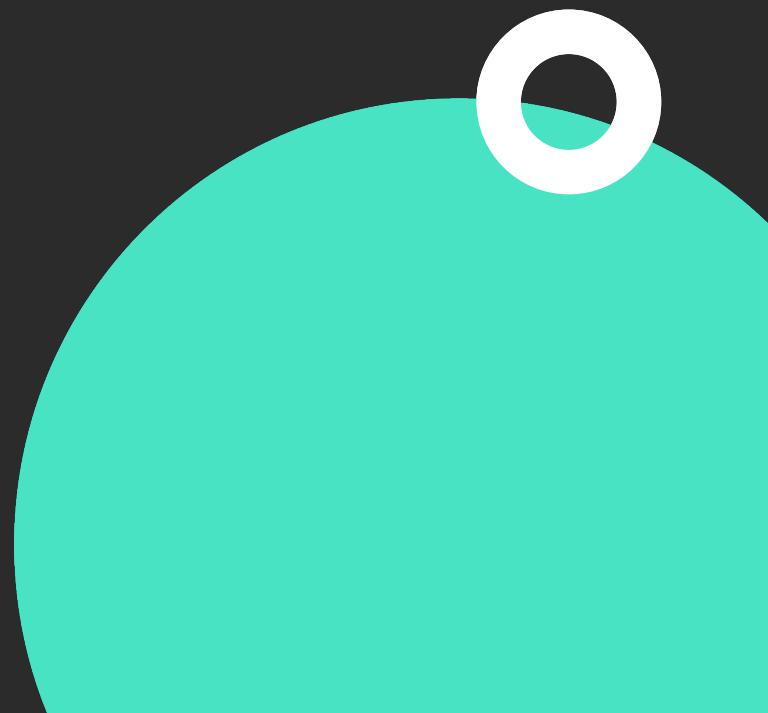
MediaItems and Playlists

Up Next





MediaItems and Playlists



MediaItem

- Describe your media content
- Contains all the media metadata
 - Title
 - Artist
 - Image
 - Genre...
- Contains the media configuration
 - Id
 - File or Stream URL
 - Ads
 - DRM (Digital Rights Management)



Playlist

- List of Medialtems
- Improves media preparation time
- Can be easily managed
 - Add
 - Replace
 - Move
 - Clear
- Repeat and Shuffle mode

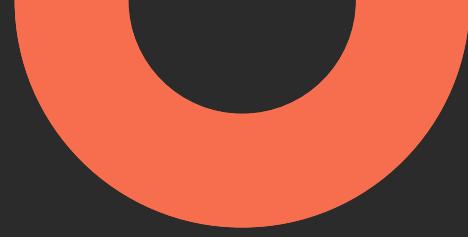




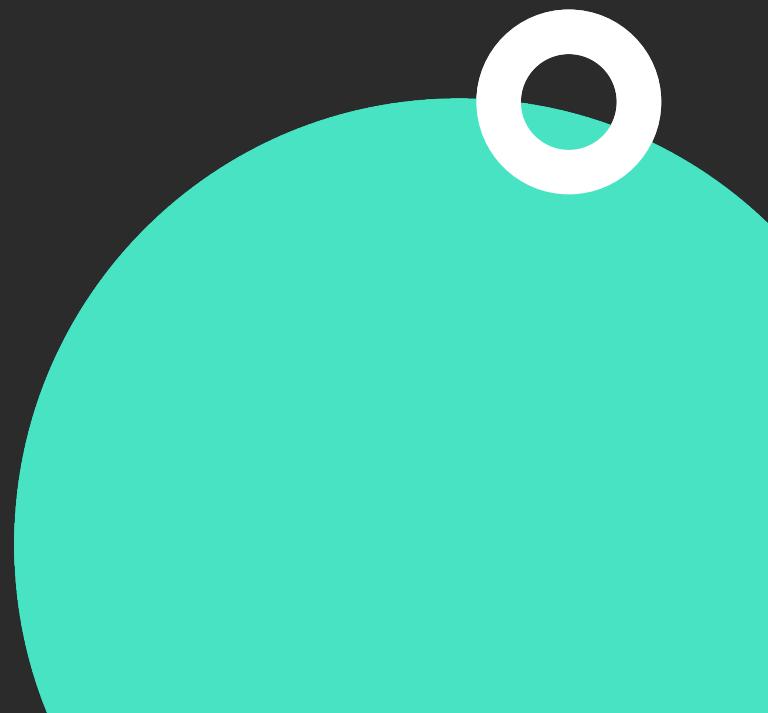
Playing the MediaItems

Up Next





Playing the MediaItems



Summary

- MusicMate: Starter project walkthrough
- Creating and Configuring ExoPlayer and MediaSession
- Creating MediaItems and Playlists
- Playing the first song





Building a Music Player - Part 2

Up Next



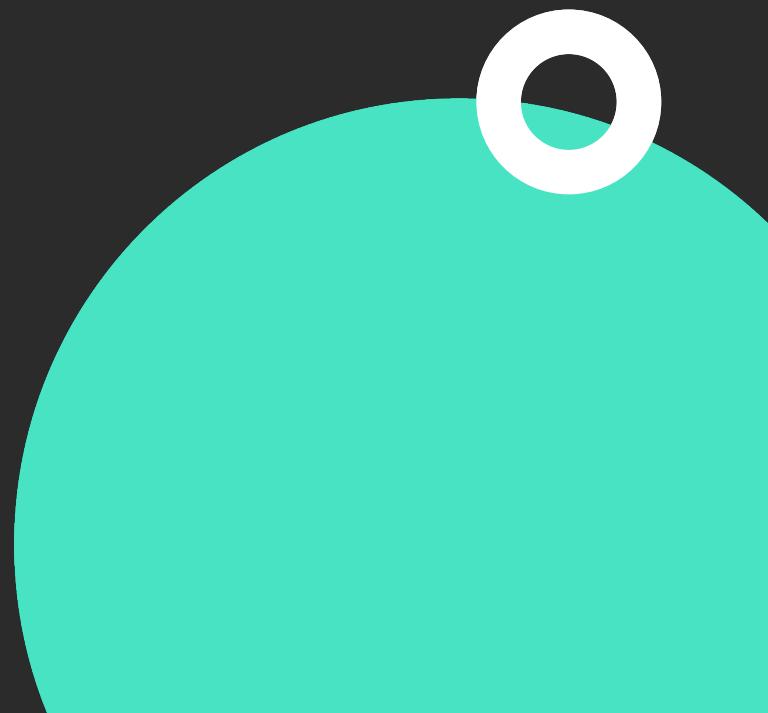
Building a Music Player - Part 2



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Section Overview

- Playback events
 - Event flow
 - Meaning
- Listening to playback events
- Implementing playback controls
- Syncing the player and UI
- Code challenge I





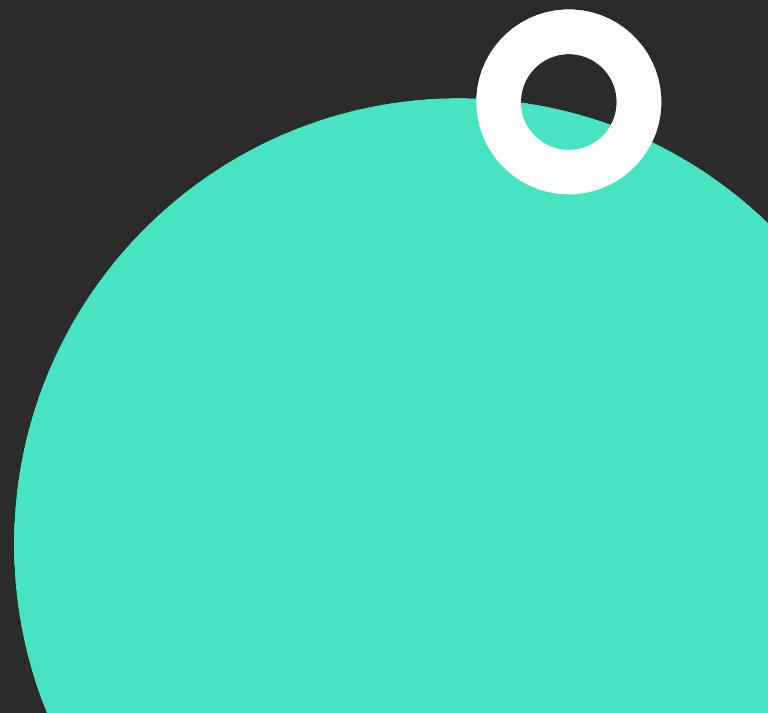
Exploring Playback Events

Up Next

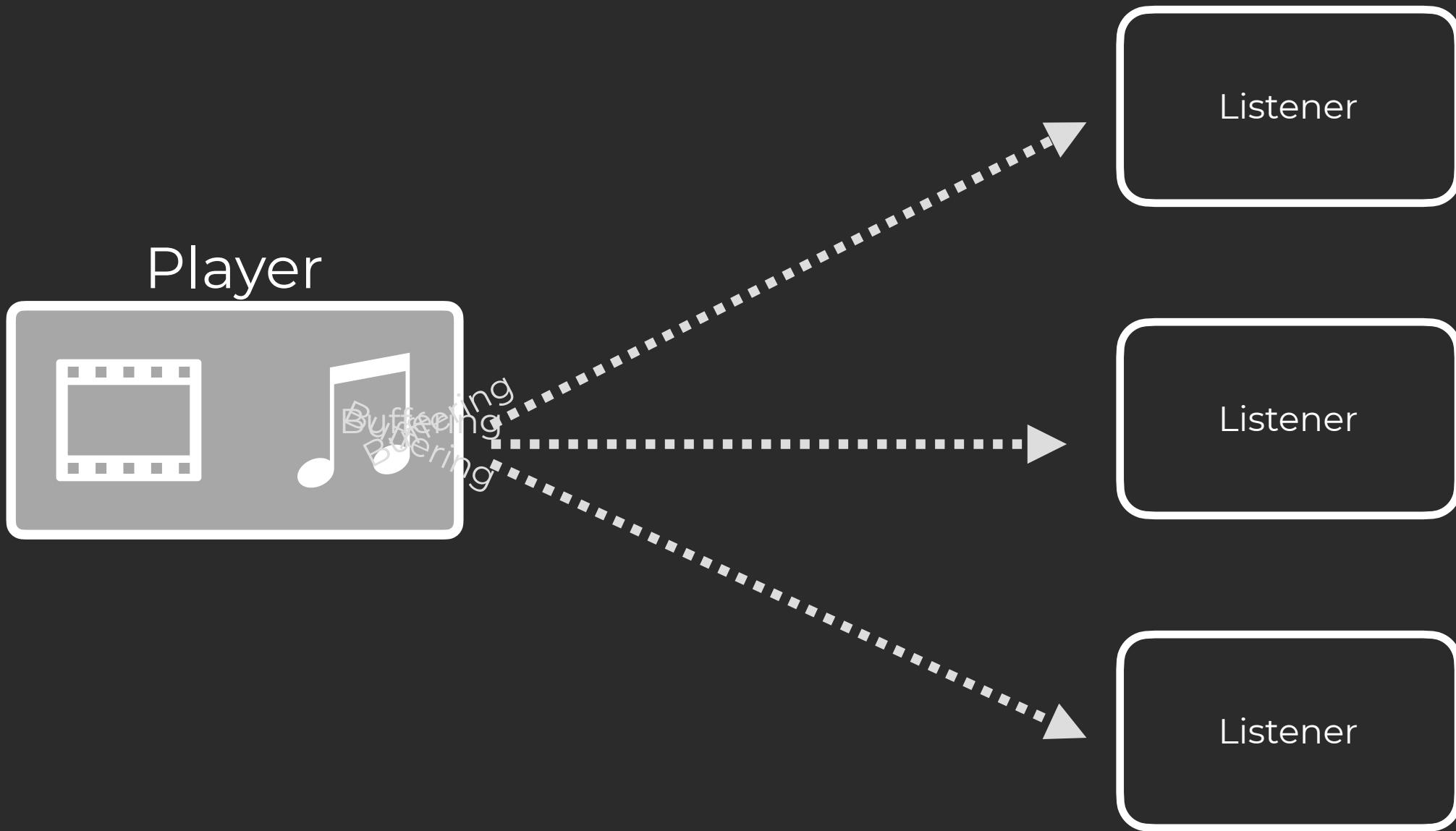




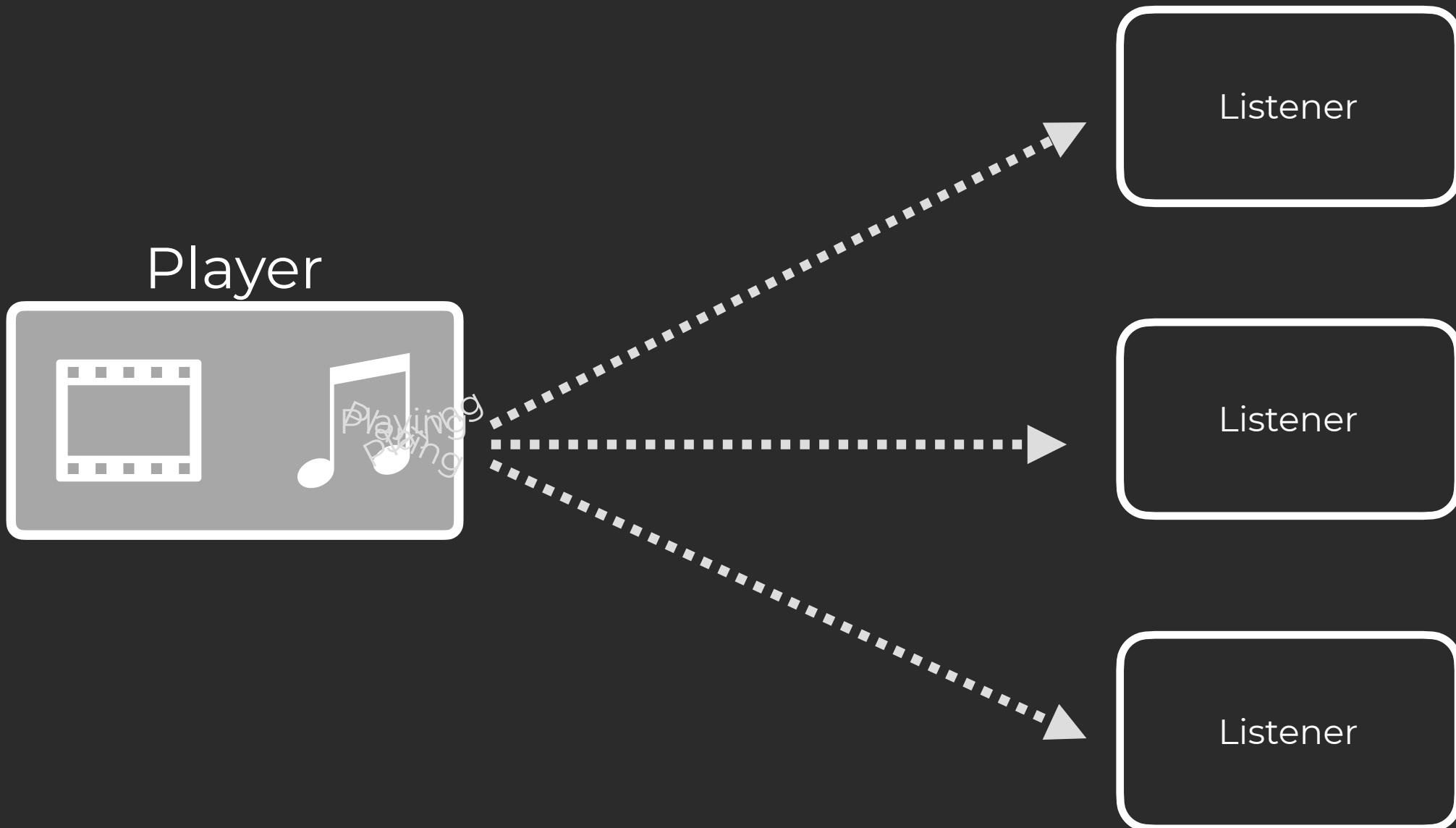
Exploring Playback Events



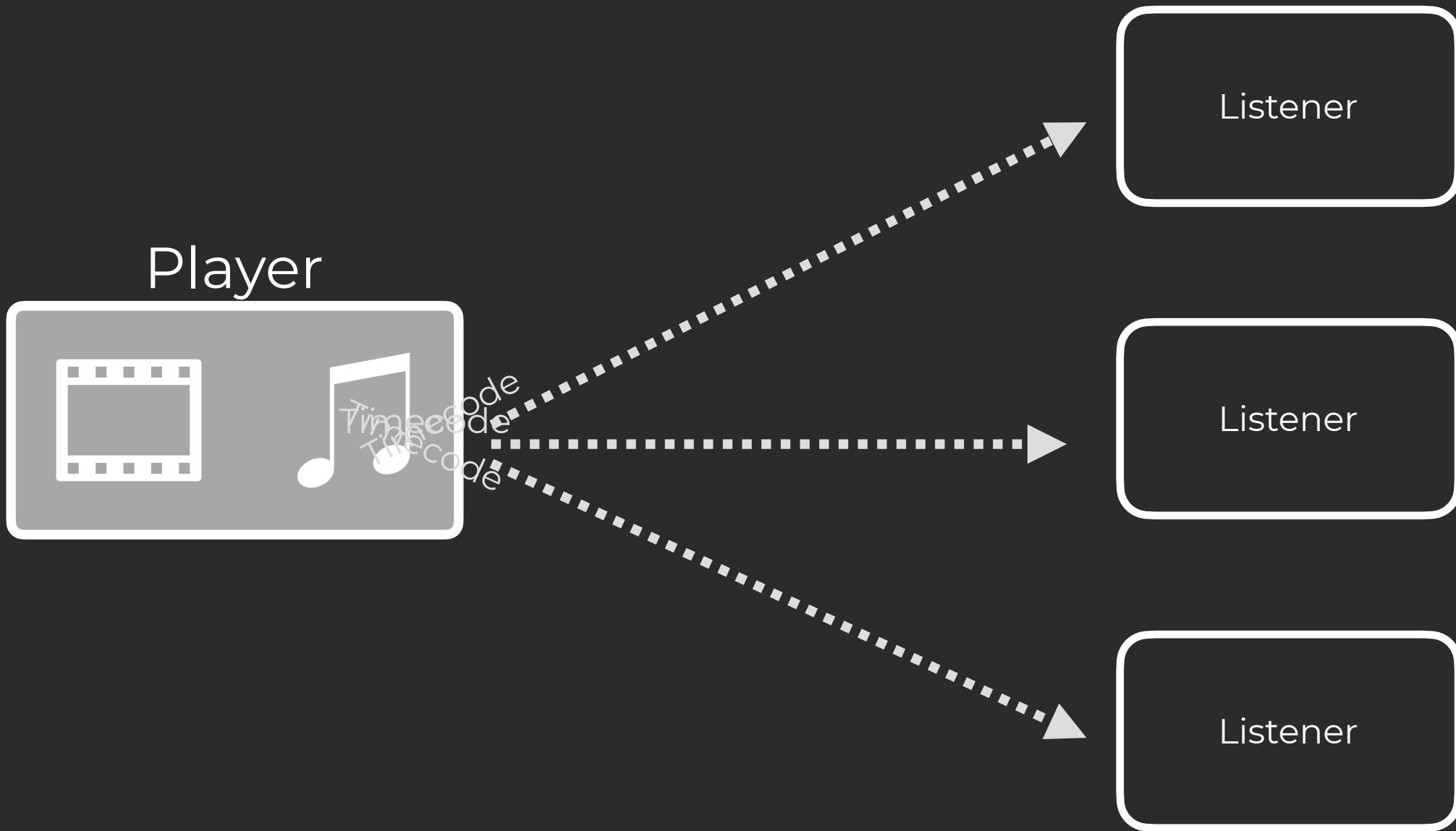
Exploring Playback Events



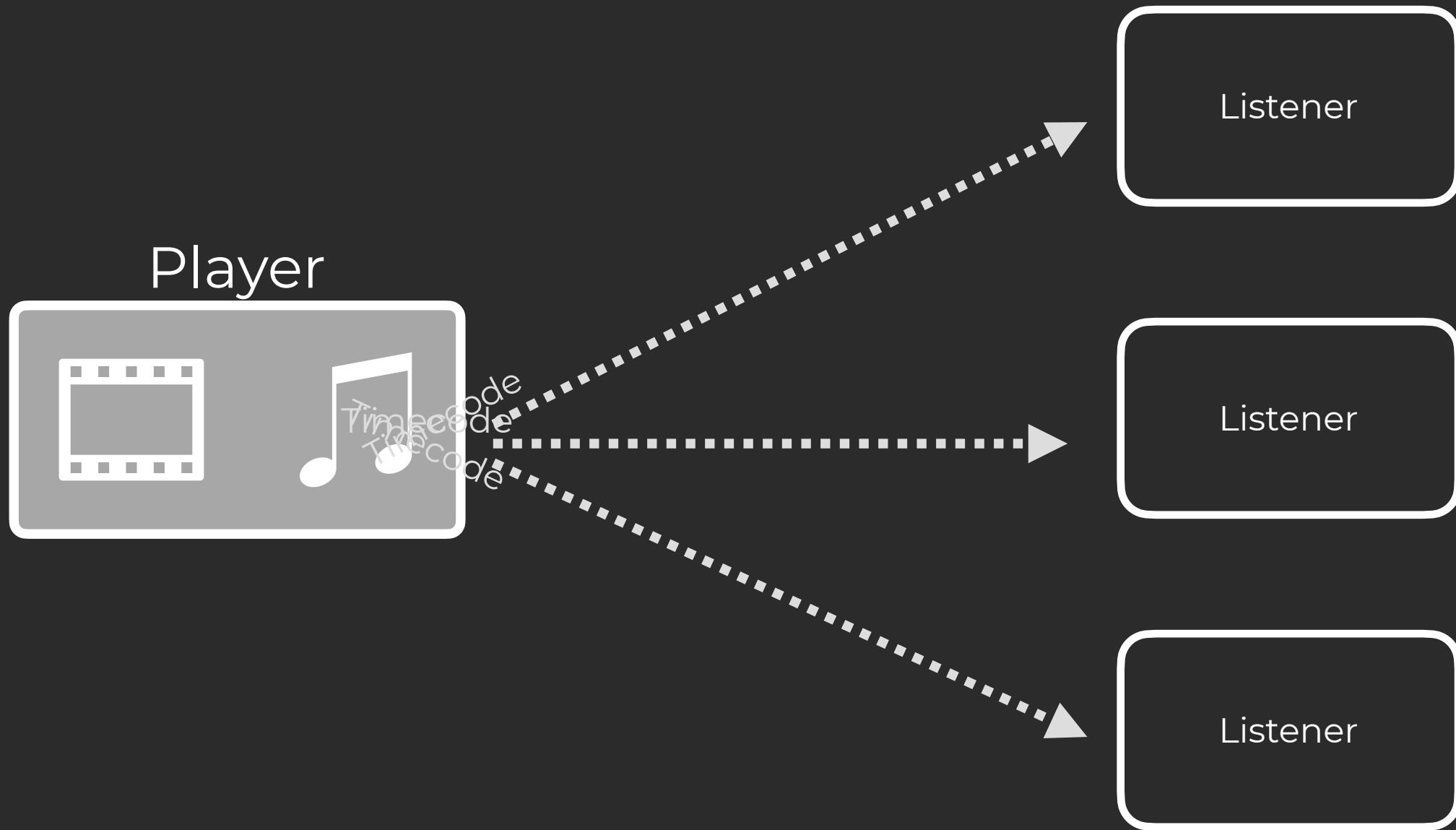
Exploring Playback Events



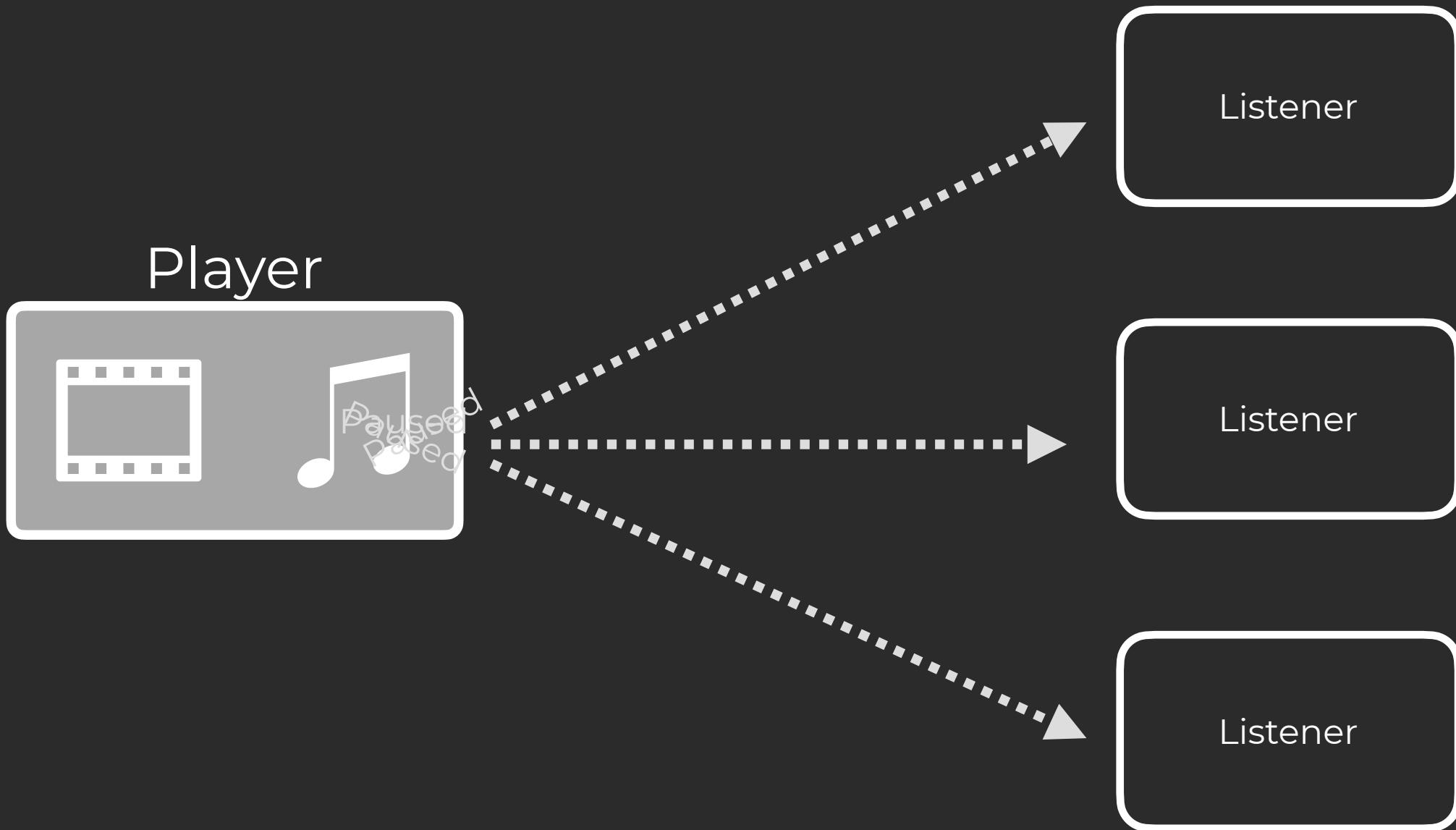
Exploring Playback Events



Exploring Playback Events



Exploring Playback Events





Listening to Playback Events

Up Next



Listening to Playback Events





Implementing Playback Controls

Up Next



Implementing Playback Controls





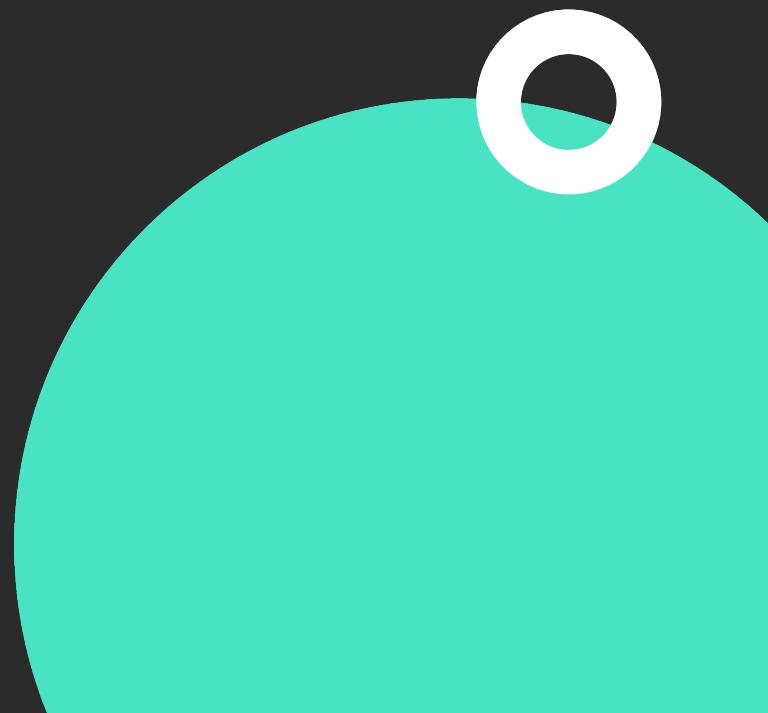
Syncing the Player and UI

Up Next





Syncing the Player and UI





MusicMate: Code Challenge

Up Next



MusicMate: Code Challenge



Summary

- Player event emission
- How to listen to player events
- Controlling playback
- Updating the UI based on player state
- Code Challenge I





Background Playback

Up Next



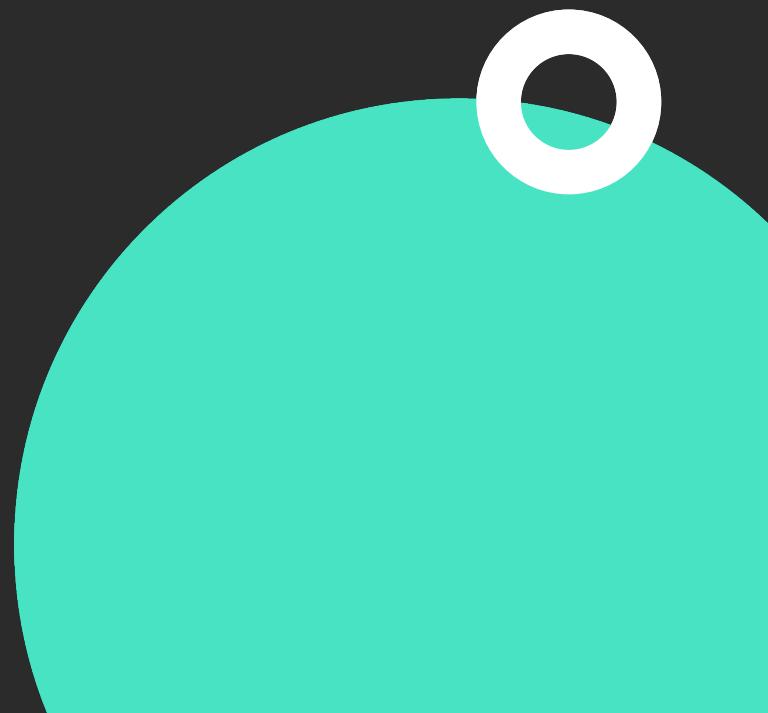


Background Playback



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Section Overview

- MusicMate: Code challenge solution
- The MediaSessionService
- Connecting a MediaController





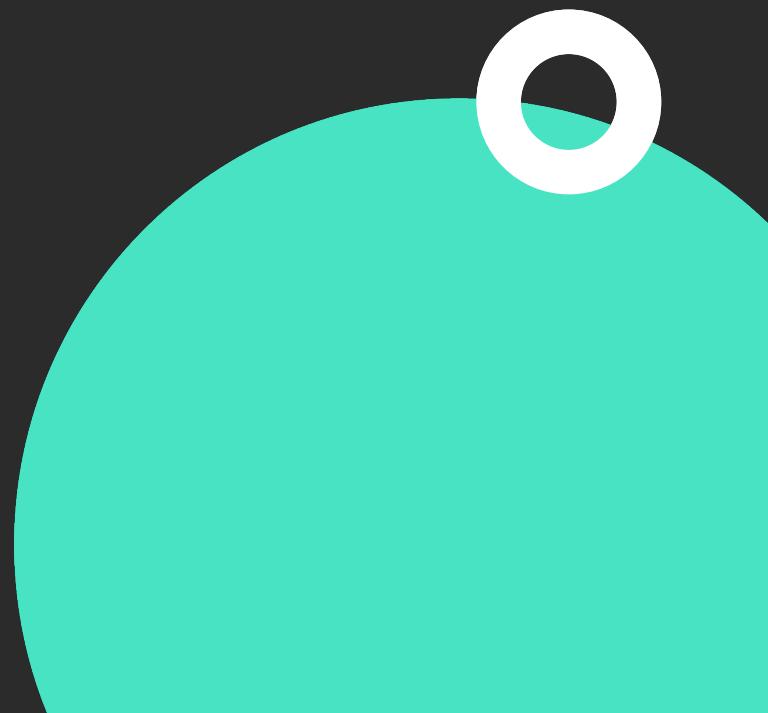
Code Challenge I Solution

Up Next





Code Challenge I Solution





The MediaSessionService

Up Next



The MediaSessionService



MediaSessionService

- Why using a service
- Service x App lifecycle





Connecting a MediaController

Up Next



Connecting a MediaController



Connecting a MediaController

-
- ViewModel x Player link broken





Fixing the Playback

Up Next



Fixing the Playback



Summary

- MusicMate: Code challenge solution
 - Playlist repeat and shuffle modes
- MediaSessionService
 - Keep the Session alive
 - Out-of-the-box implementation
- MediaController
 - Connecting with the MediaSession





Building a Video Player

Up Next



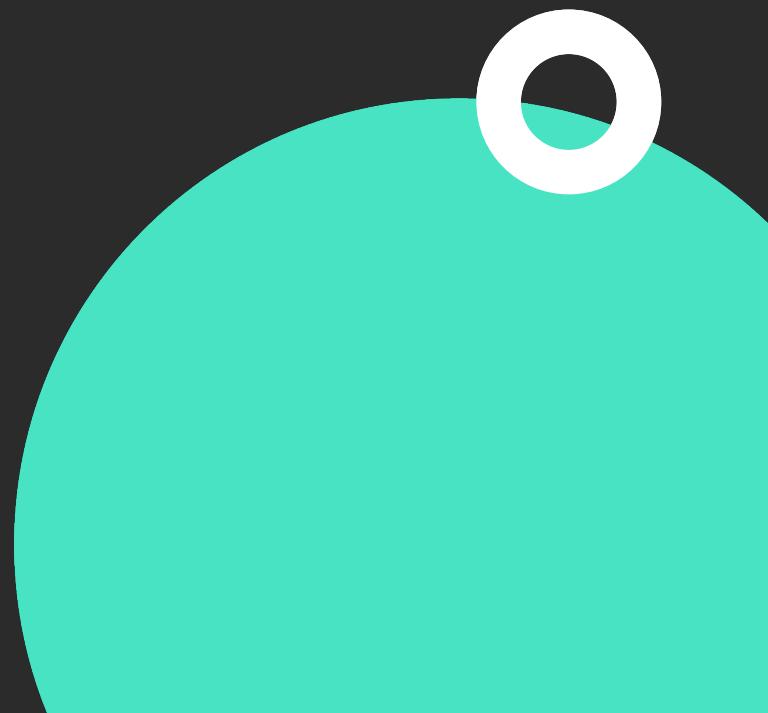


Building a Video Player



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Section Overview

- VideoMate: Starter project walkthrough
- Expected behaviors of a video app
- Displaying the video
- Handling lifecycle events
- Keeping the screen on





VideoMate: Starter Project Walkthrough

Up Next



VideoMate: Starter Project Walkthrough



Expected Behaviors of a Video App

Up Next



Expected Behaviors of a Video App



Expected Behaviors of a Video App

- What happen when/after:
 - The app is backgrounded
 - Will the content pause or enter PiP mode?
 - Device is rotated
 - Special landscape layout or fullscreen video?
 - Long period without user interaction
 - Screen will fade or keep on?
 - User leaves then come back to the app
 - Content will play from where it stopped?
 - ...





Displaying the Video

Up Next



Displaying the Video



Displaying the Video

- SurfaceView





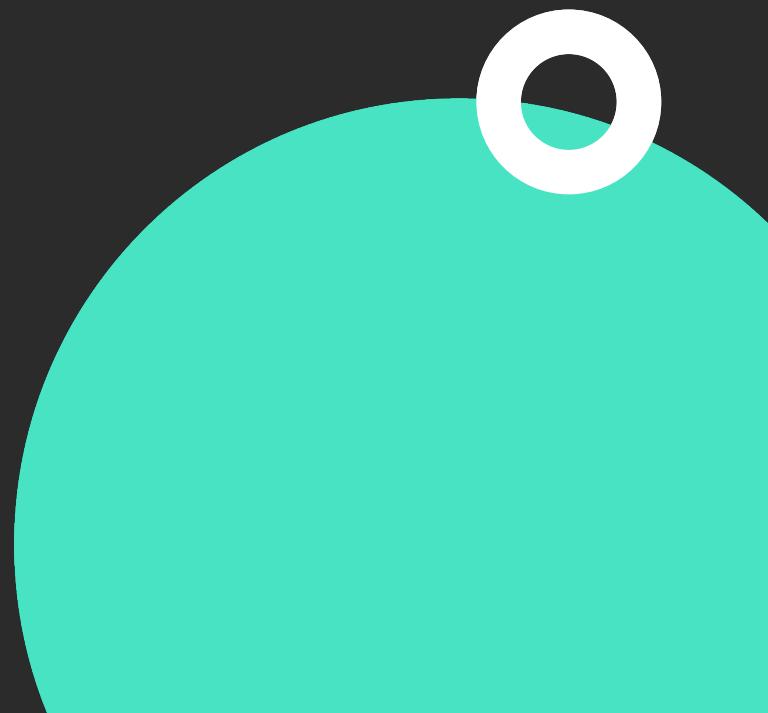
Handling Lifecycle Events

Up Next





Handling Lifecycle Events



Handling Lifecycle Events

- Initializing/Releasing the player
 - DisposableEffect
 - Saving device resources
- Orientation changes
 - Activity recreation
 - Overriding configuration changes



Summary

- VideoMate: Starter app walkthrough
- Behavioral decisions on a video app
- Rendering the video
 - SurfaceView
- Handling lifecycle and configuration changes
- Keeping the screen on





VideoMate Code Challenges

Up Next





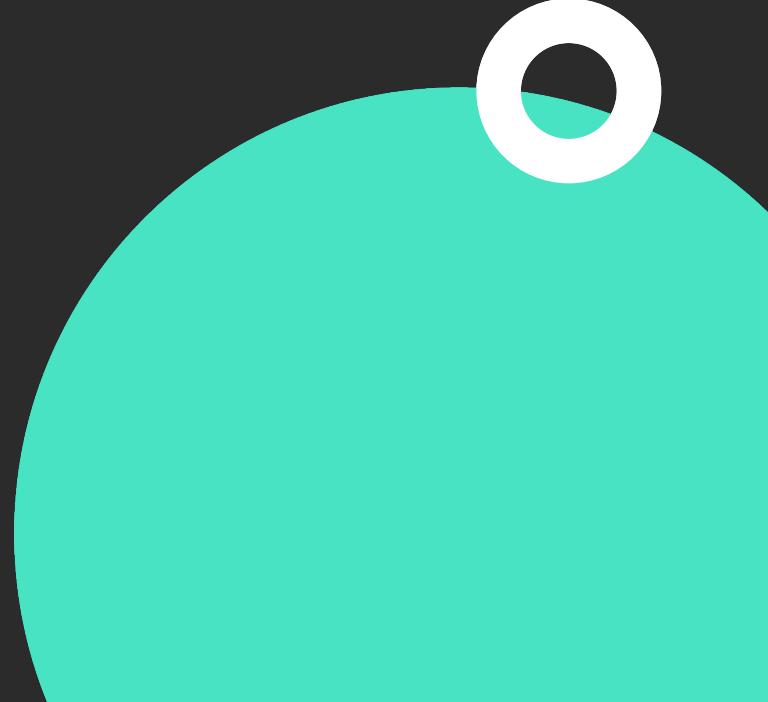
Building a Video Player - Code Challenges



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Section Overview

- VideoMate Code Challenges:
 - Playback speed
 - Vertical videos





VideoMate Code Challenge I: Playback Speed

Up Next



VideoMate Code Challenge I: Playback Speed





VideoMate Code Challenge I: Solution

Up Next



VideoMate Code Challenge I: Solution





VideoMate Code Challenge II: Vertical Videos

Up Next



VideoMate Code Challenge II: Vertical Videos





VideoMate Code Challenge II: Solution

Up Next



VideoMate Code Challenge II: Solution



Summary

- VideoMate Code Challenge solutions
 - Playback speed
 - Vertical videos

