



tapharmonic

Renaissance 2014: Master Video

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Vatican Square

Anything look different?



Vatican Square

Anything look different?



Vatican Square

Anything look different?



Vatican Square

Anything look different?





AV Foundation

The logo consists of a dark grey rounded rectangle with a thin silver border. On the left side, there is a vertical gradient bar transitioning from light grey at the top to dark grey at the bottom. Overlaid on this bar are the letters "AV" in a bold, sans-serif font. The letter "A" is blue and the letter "V" is purple. To the right of this bar, the word "Foundation" is written in a large, light grey, three-dimensional sans-serif font.

AV Foundation

Overview



- Objective-C framework for advanced media processing
 - High performance, asynchronous processing
 - Hardware accelerated handling of AV media
- Available in its current form since iOS 4
 - Significant additions and enhancements iOS 6 and 7
- **Apple's focus for media apps on both iOS and Mac**

iOS Media Environment

An Embarrassment of Riches

AssetsLibrary

UIKit

MediaPlayer

AV Foundation

CoreAudio

CoreMedia

CoreVideo

CoreAnimation

Media Assets

Understanding Assets

AVAsset provides abstract representation of media resource

- ▶ Abstracts away the format and location

AVAssetTrack models the individual media streams within an asset

- ▶ Tracks are of a uniform type (video, audio, etc.)

AVAssetTrack (Video) →



AVAssetTrack (Audio) →





Media Playback

AVPlayer

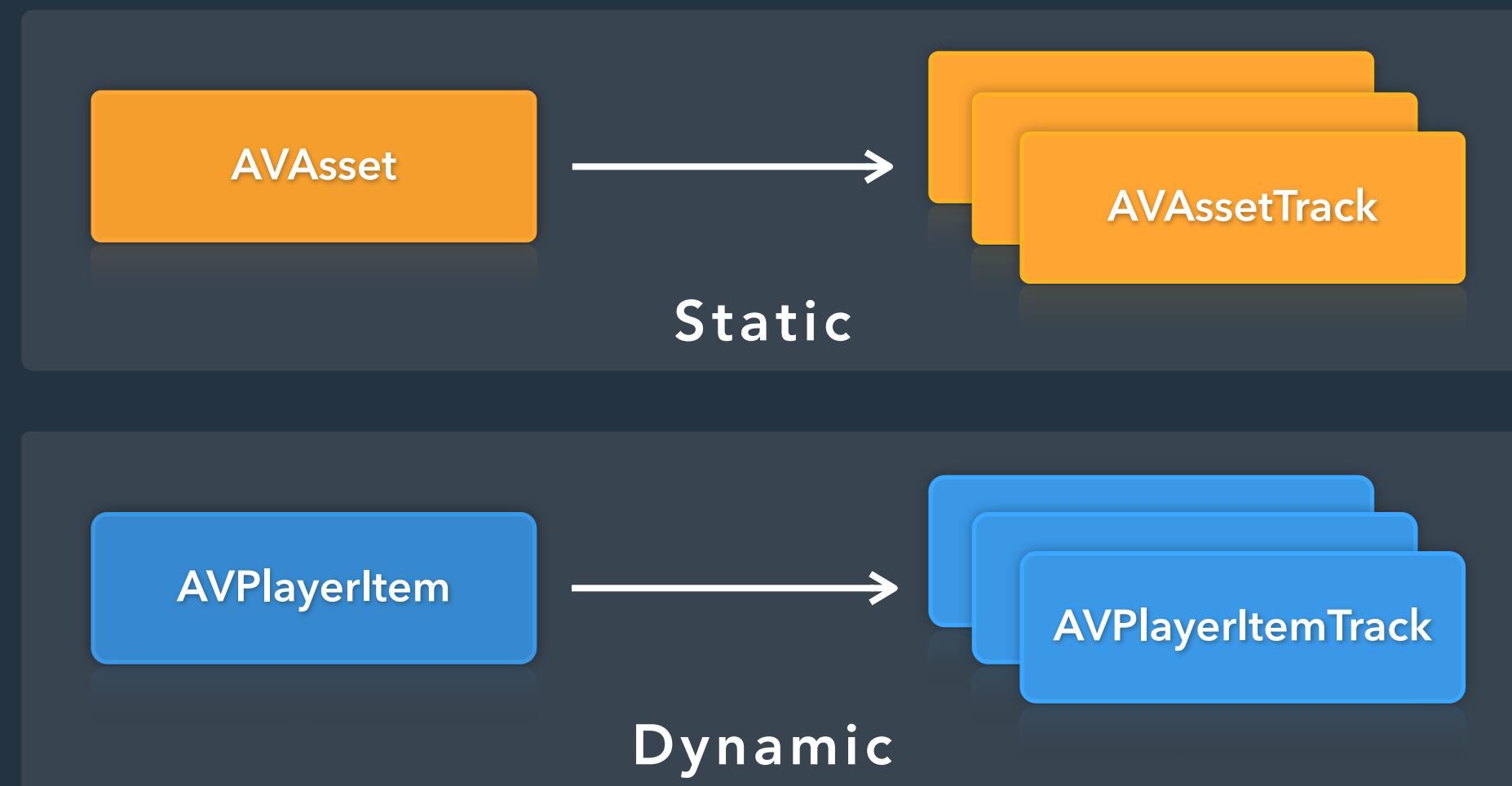
Playback Controller

- AVPlayer is a controller for managing playback
 - play
 - pause
 - seekToTime:
- Use KVO to observe playback readiness and state
 - status
- Timed Observations
 - addPeriodicTimeObserverForInterval:queue:usingBlock
 - addBoundaryTimeObserverForInterval:queue:usingBlock

Playing Media

Static vs Dynamic Models

- AV Foundation distinguishes between static and dynamic aspects of media



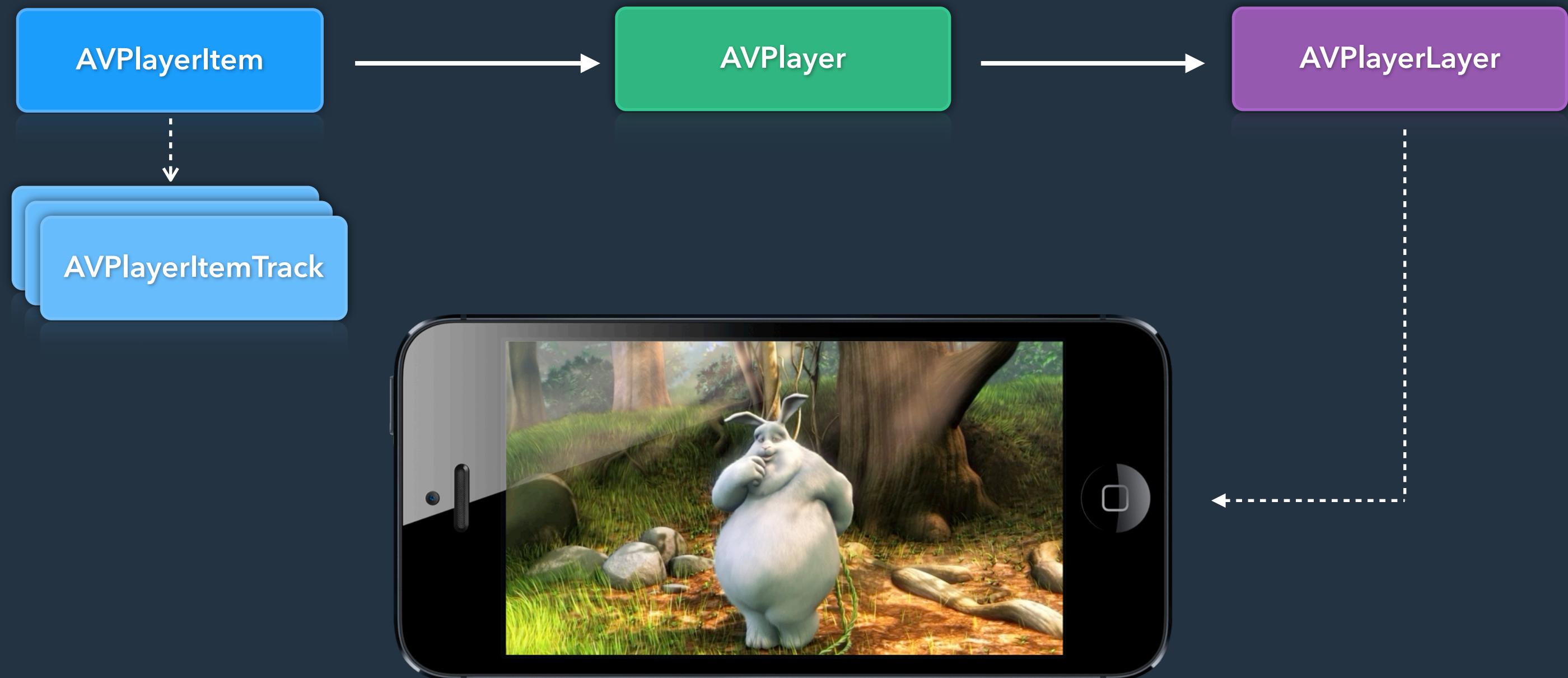
Video Playback

Playback In Action



Video Playback

Playback In Action



Demo

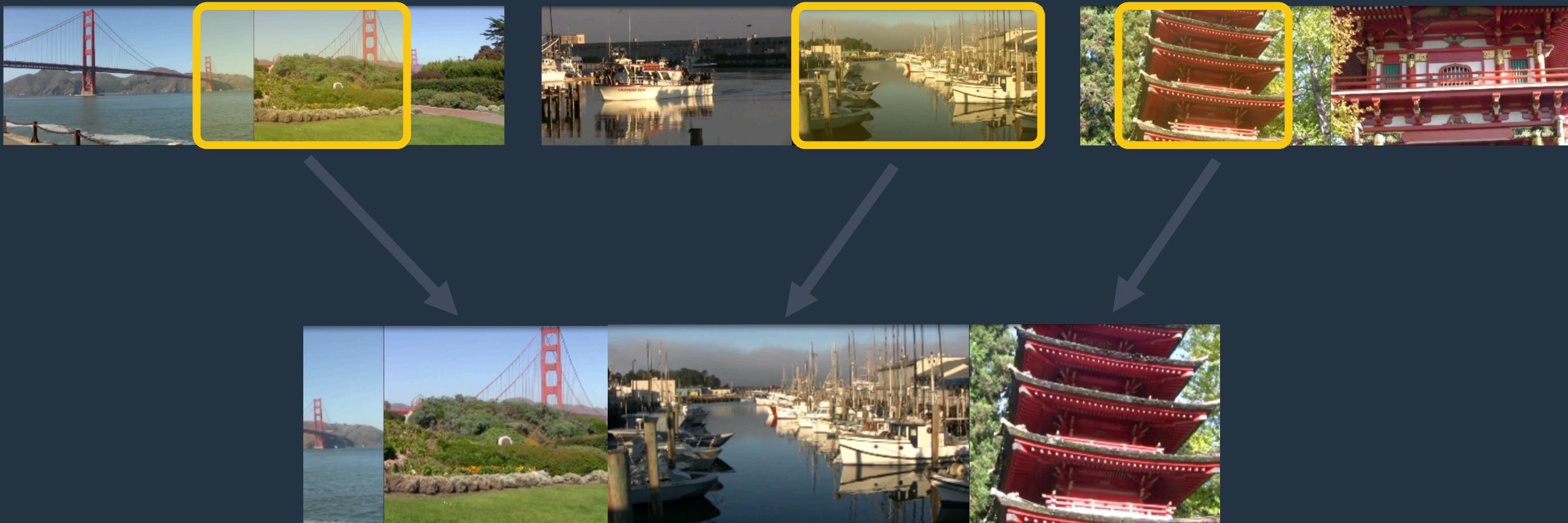


Composing Media

Composing Assets

AVComposition

- ▶ Concrete extension of AVAsset
- ▶ Composes asset segments on a timeline



Composing Assets

Tracks and Segments

```
AVMutableComposition *composition = [AVMutableComposition composition];
```

AVComposition

Composing Assets

Tracks and Segments

```
AVMutableCompositionTrack *videoTrack =  
[composition addMutableTrackWithMediaType:AVMediaTypeVideo preferredTrackID:0];
```

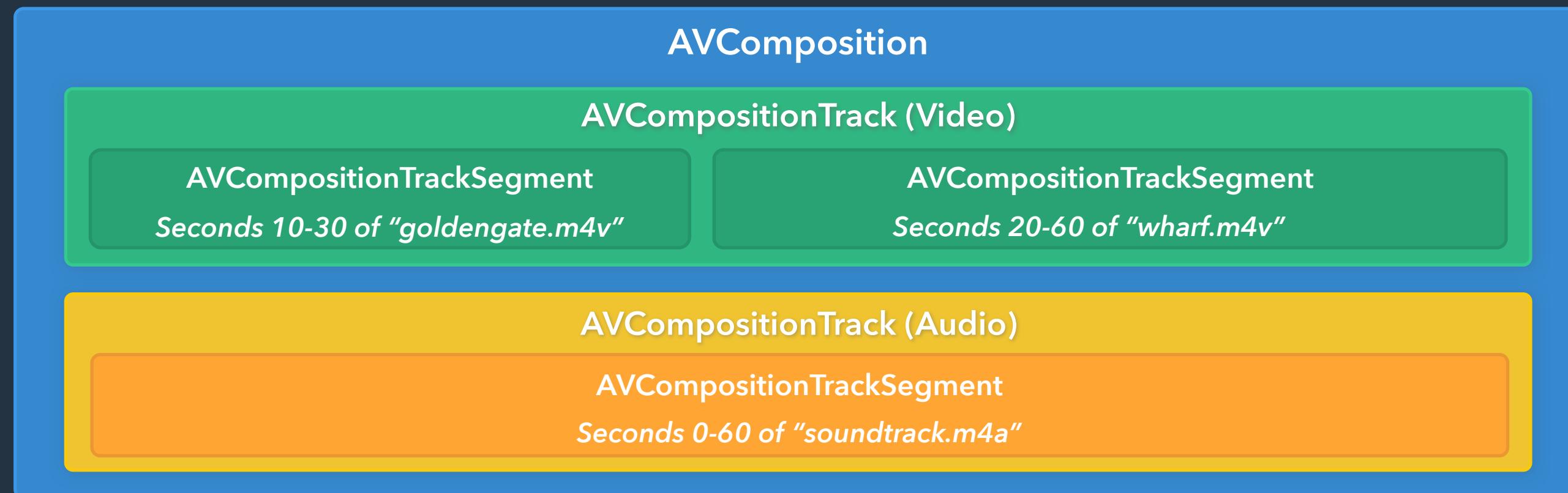
```
AVMutableCompositionTrack *audioTrack =  
[composition addMutableTrackWithMediaType:AVMediaTypeAudio preferredTrackID:1];
```



Composing Assets

Tracks and Segments

```
AVAssetTrack *srcVideoTrack1 = // source video track 1  
[videoTrack insertTimeRange:timeRange ofTrack:srcVideoTrack1 atTime:startTime error:&error];  
  
AVAssetTrack *srcVideoTrack2 = // source video track 2  
[videoTrack insertTimeRange:timeRange ofTrack:srcVideoTrack2 atTime:startTime error:&error];  
  
AVAssetTrack *srcAudioTrack = // source audio track  
[audioTrack insertTimeRange:timeRange ofTrack:srcAudioTrack atTime:startTime error:&error];
```



Demo



Mixing Audio

Audio Mixing

AVAudioMix

- Composition tracks play at their natural volume
- AVAudioMix applies track-level volume adjustments
 - Composed of AVAudioMixInputParameters
 - Parameters control individual track volume over time



Demo



Video Transitions

Video Transitions

AVVideoComposition

AVVideoComposition



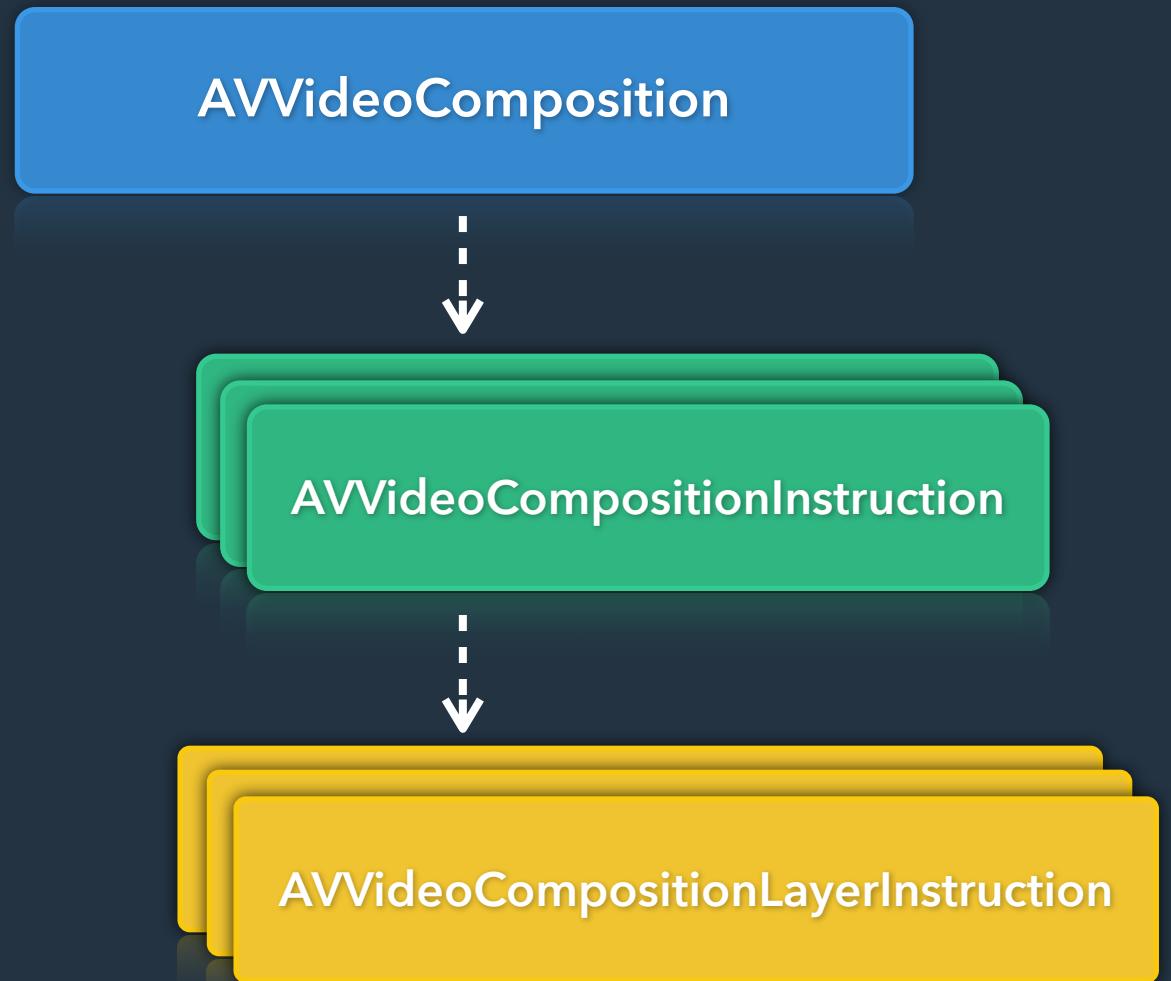
AVVideoCompositionInstruction

*Defines how two or more video tracks
are composited together*

*Configured through collection of
composition instructions describing
compositing behavior*

Video Transitions

AVVideoCompositionInstruction

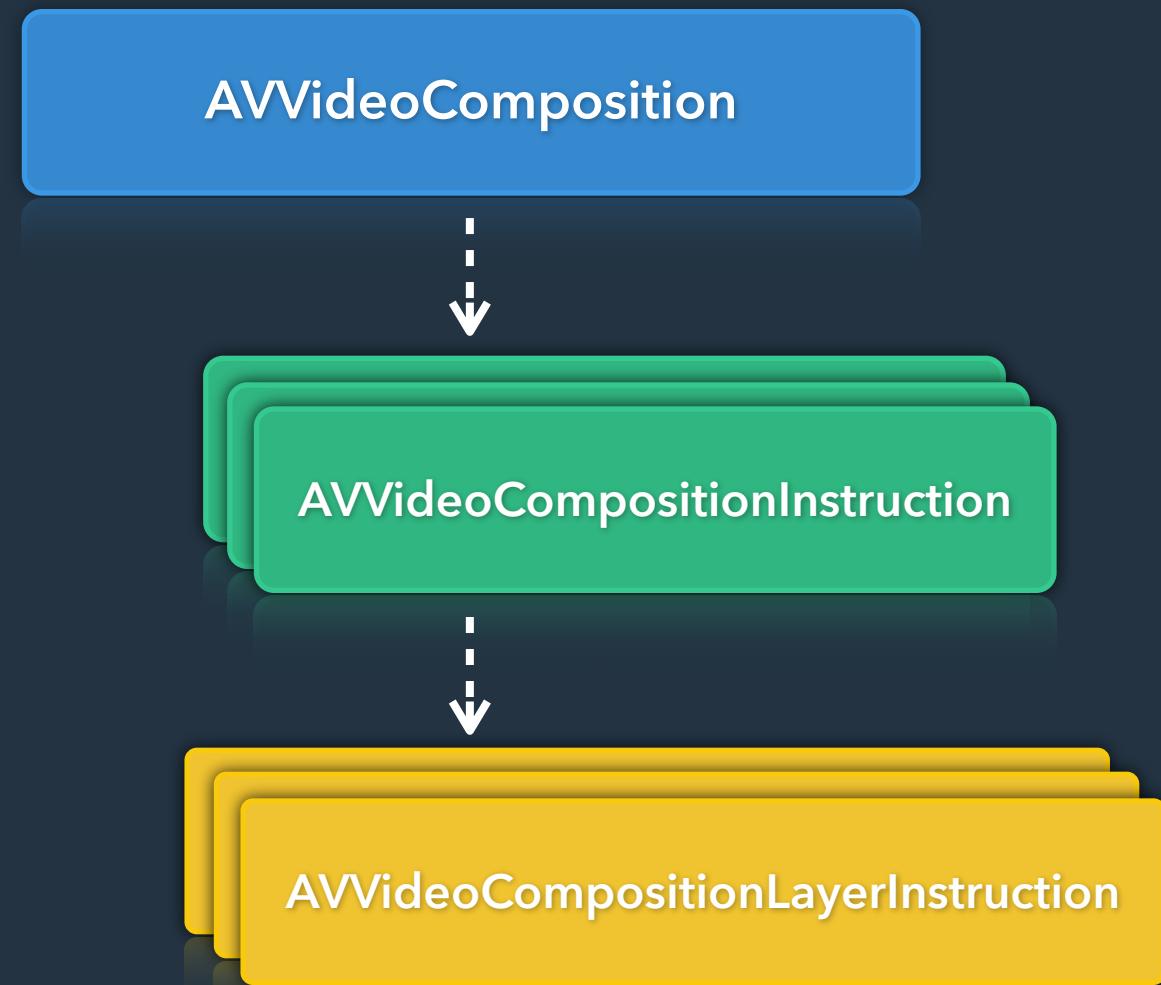


Defines the time range of compositing behavior

Composed of layer instructions describing compositing behavior

Video Transitions

AVVideoCompositionLayerInstruction



Defines the transform and opacity ramps of input layers

Transform and opacity changes modified over given time range

Demo



Layering Content

Layering Content

Core Animation

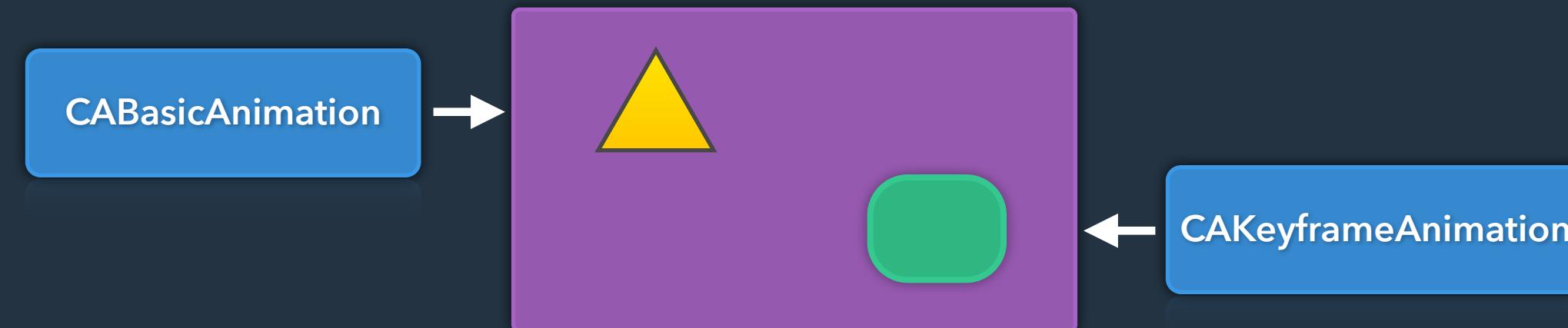


Core Animation a natural choice

- High performance, inherently time-based
- CALayer subclasses used for all video rendering

CALayer: used to layer images and text

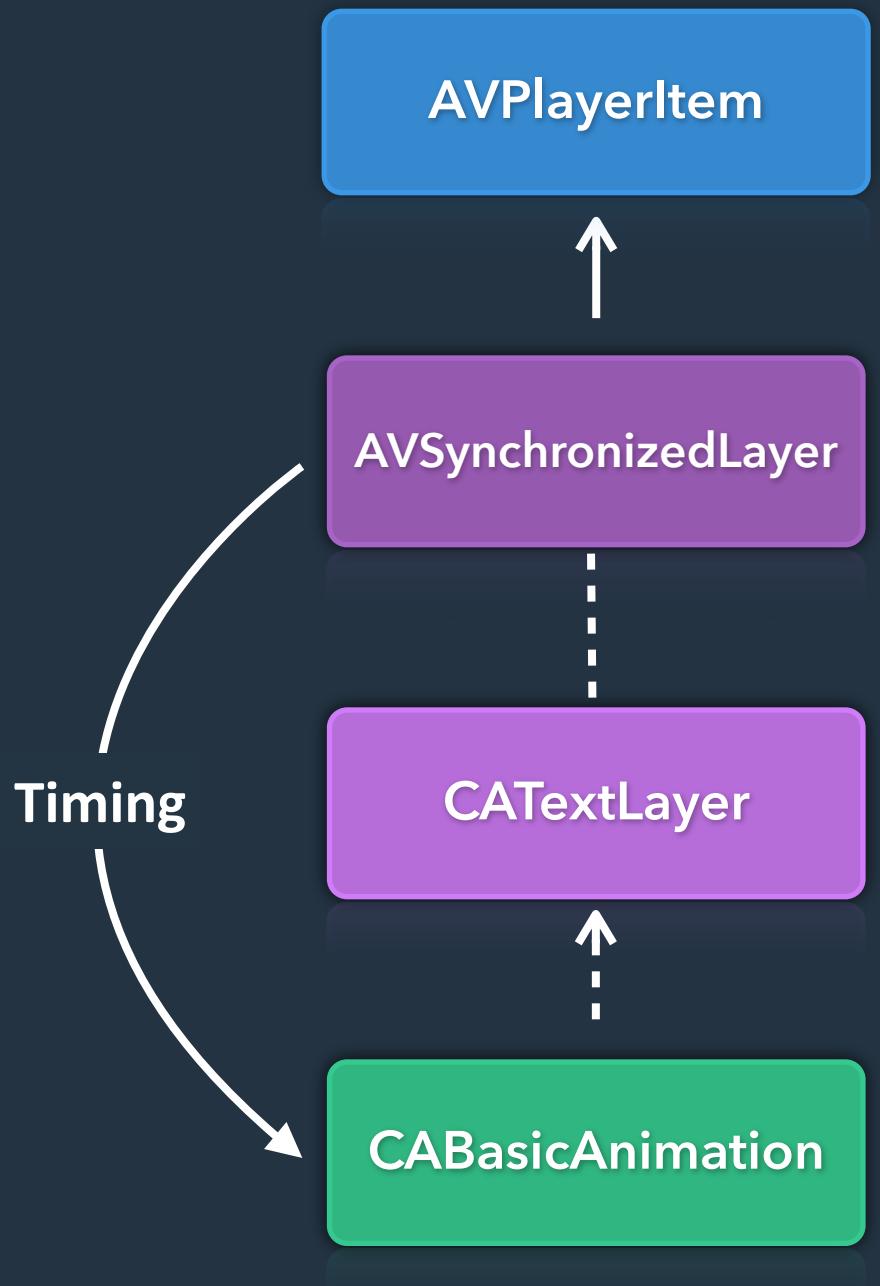
CAAnimation: used to animate layered content



Animation Timing

AVSynchronizedLayer

- Core Animation operates on host time
 - Starts at boot, marches towards infinity
- Timeline animations need to use movie time
 - Starts at time zero and runs to duration
 - Can be started, stopped, rewound, etc.
- Use AVSynchronizedLayer to use movie time
 - Confers player item timing on to its sublayer tree



Core Animation

Timeline vs Realtime Animations

- Exactly the same, almost...
 - Animations with zero beginTime won't be seen
 - Set beginTime = AVCoreAnimationBeginTimeZero
 - Animations removed by default
 - Set removedOnCompletion = NO
 - Unable to use CAAnimationGroup?

Demo

Summary

Master iOS Video with AV Foundation!

- Powerful tools for audio and video playback
 - `AVPlayer`, `AVPlayerItem`, `AVPlayerLayer`
- Powerful tools for composing/editing media:
 - `AVComposition`
 - `AVAudioMix`
 - `AVVideoComposition`
 - `AVSynchronizedLayer`
- Relatively steep learning curve, but worth the investment!

Resources

Presentation Materials

<http://www.speakerdeck.com/bobmccune/>

<https://github.com/tapharmonic/AVFoundationEditor>

Learning AV Foundation

<http://my.safaribooksonline.com/9780133563856>

Contact Info



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