

Taking Control of Auto Layout in Xcode 5

Session 406

Kevin Cathey

Interface Builder Engineer

Tony Ricciardi

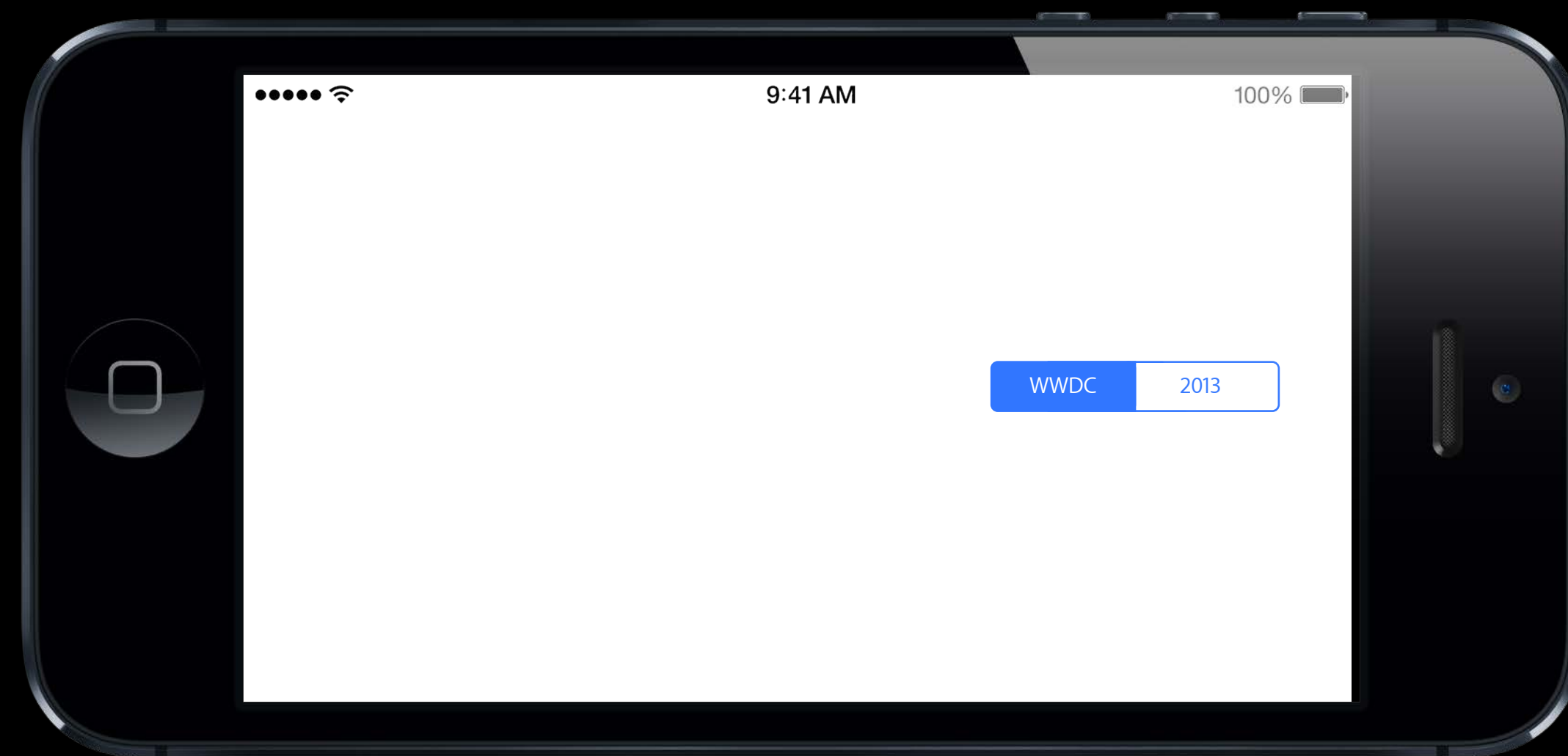
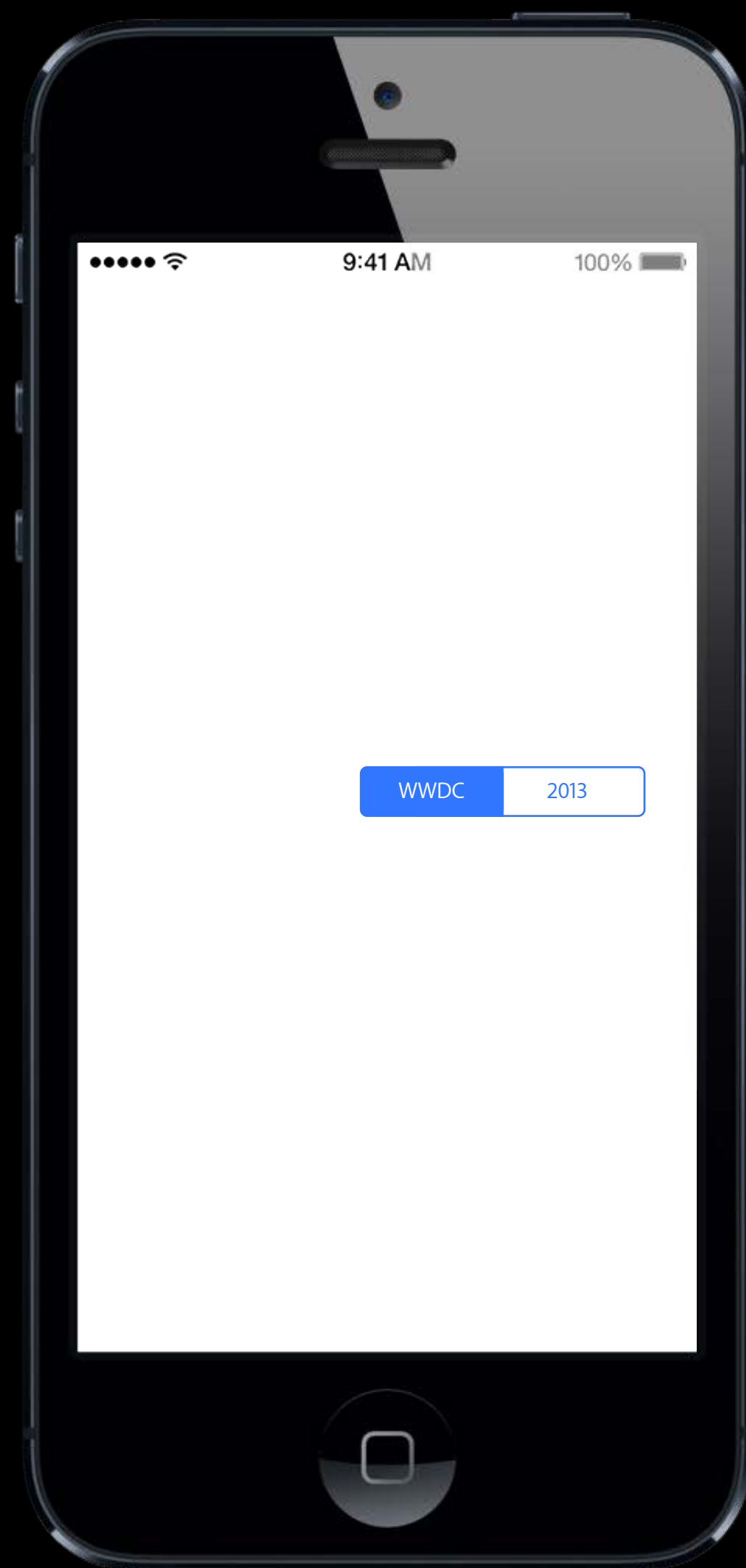
Interface Builder Engineer

These are confidential sessions—please refrain from streaming, blogging, or taking pictures

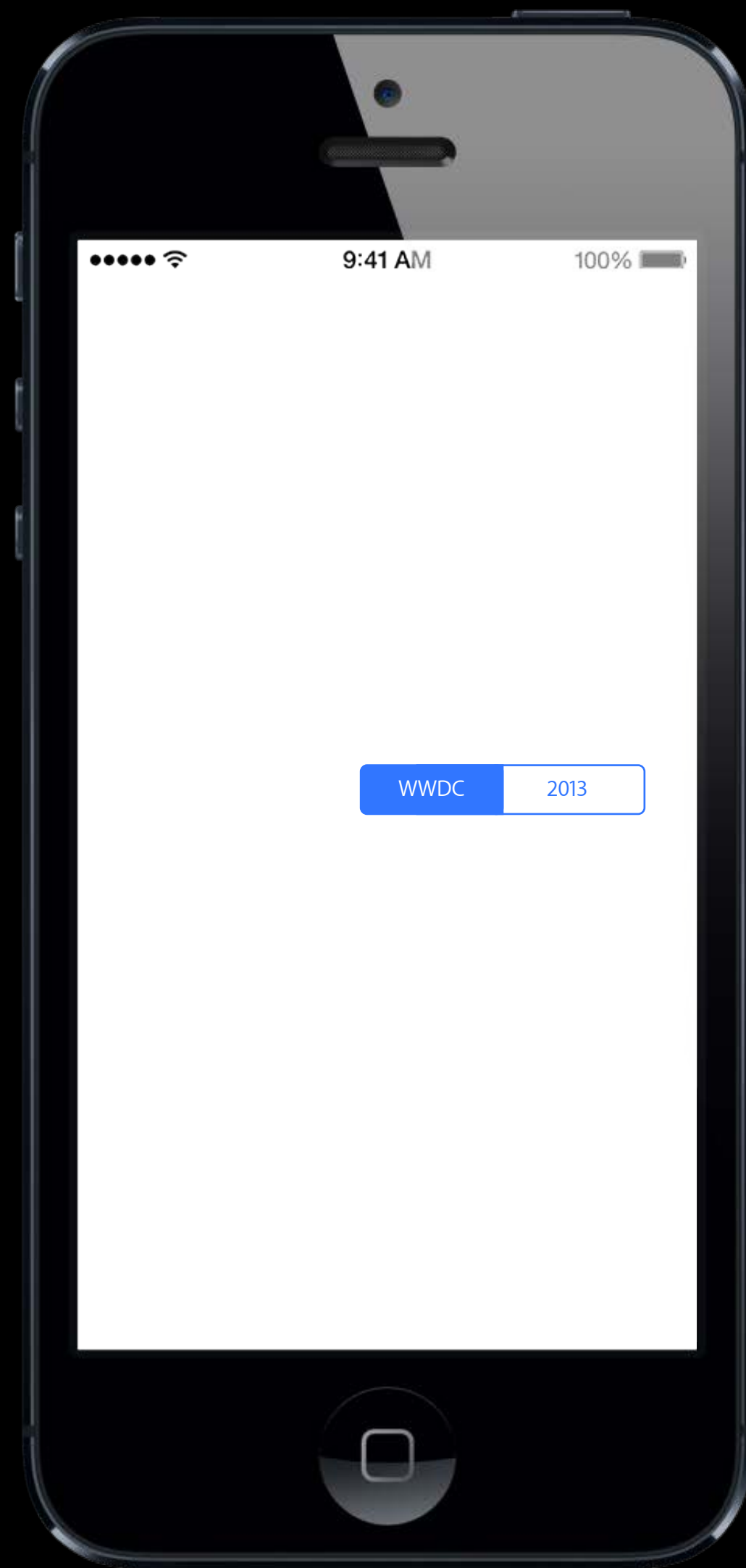
What is Auto Layout?

**Auto Layout is a Constraint-Based,
Descriptive Layout System**

What Is Auto Layout?

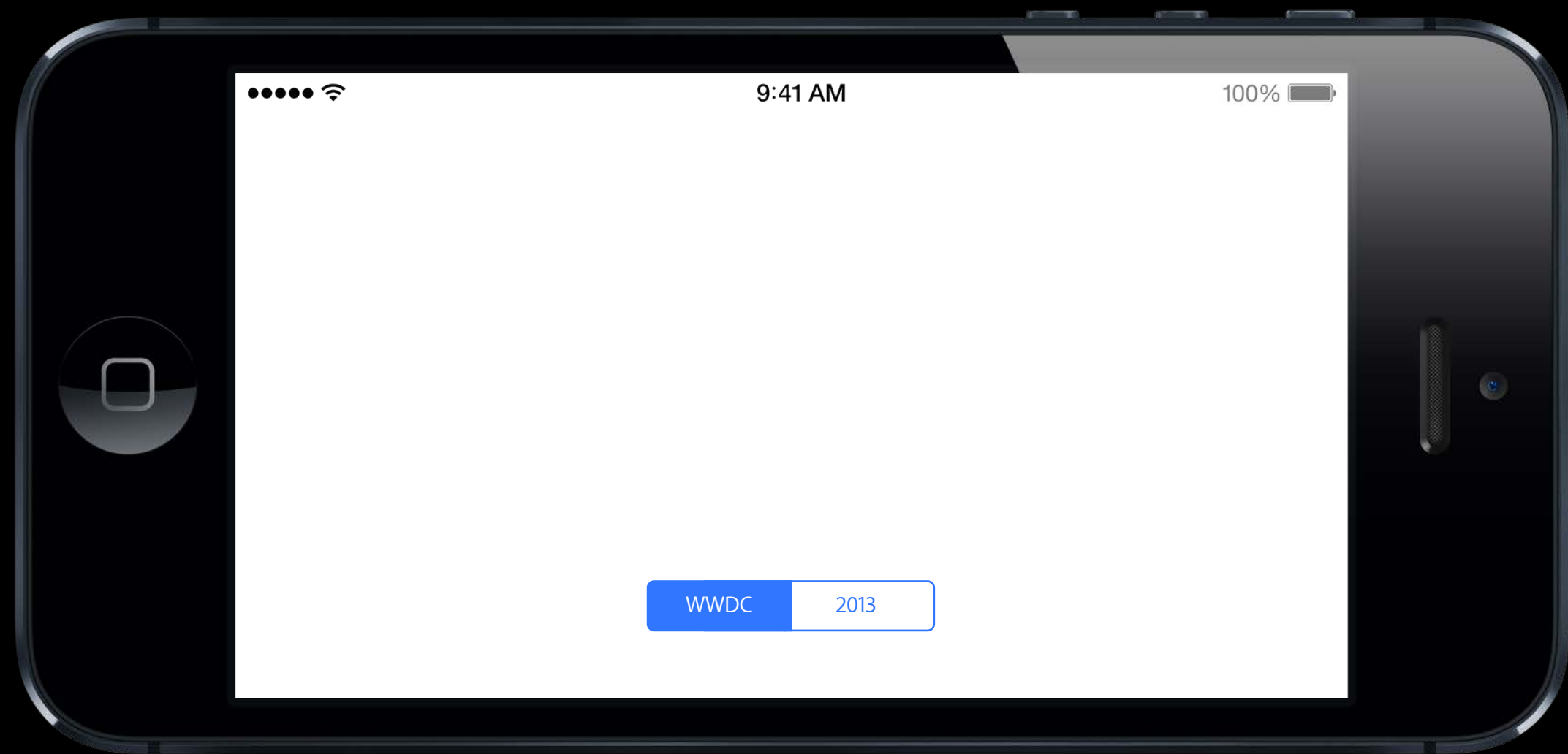


Hard-Coded Layout



- Control's frame origin is (139, 270)

Hard-Coded Layout



- Control's frame origin is (139, 270)

Hard-Coded Layout



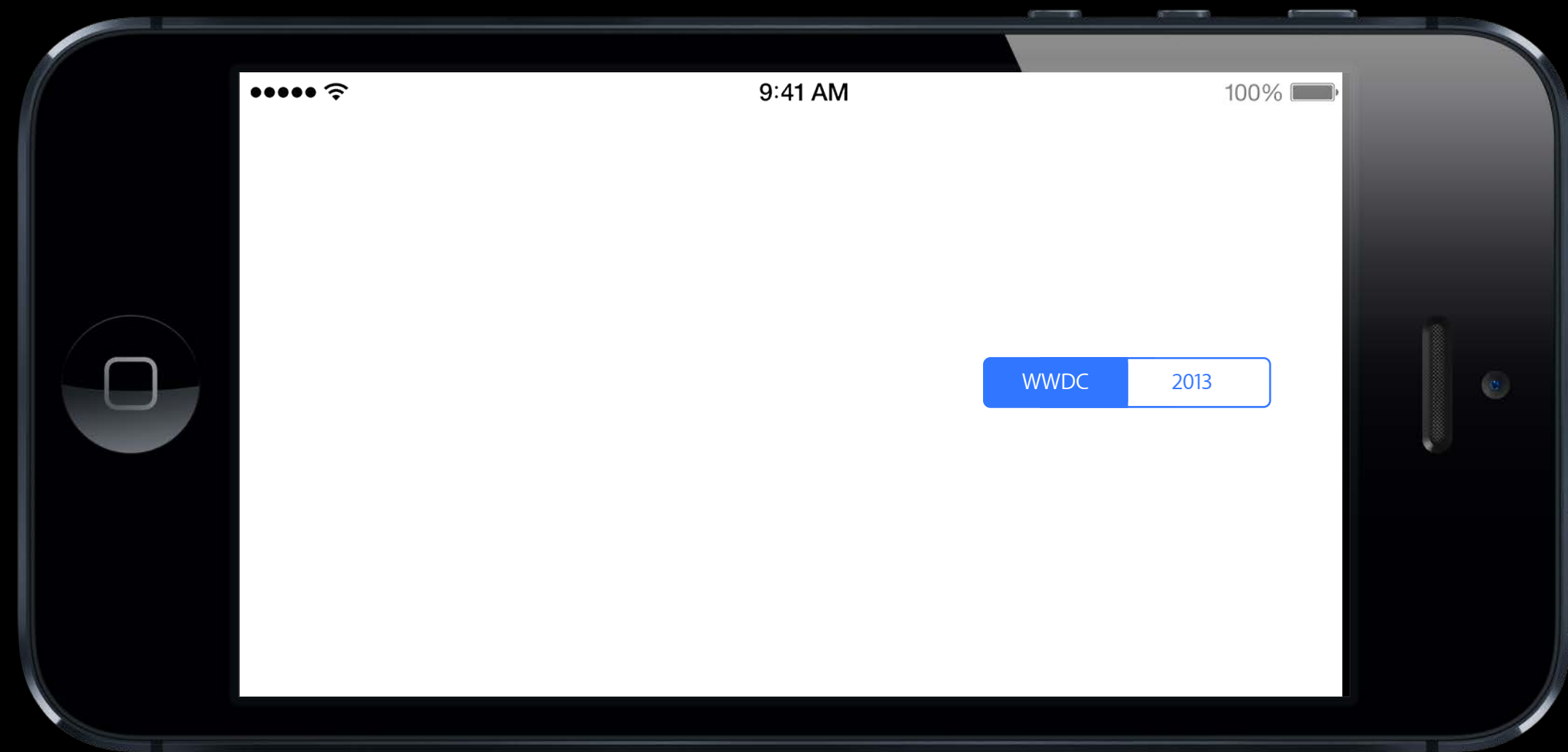
- Control's frame origin is (139, 270)

Auto Layout



- Control's frame origin is (139, 270)

Auto Layout

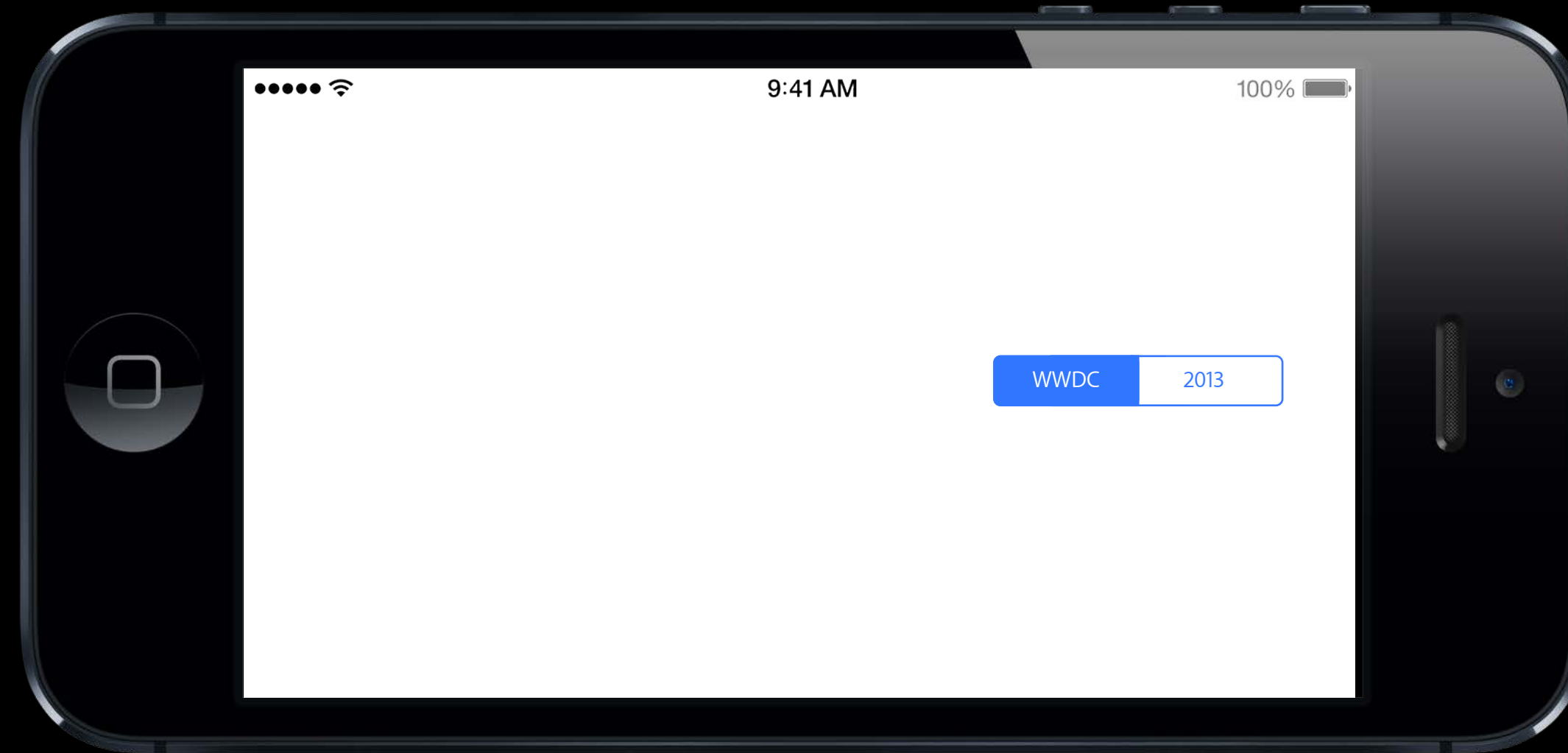


- Control is centered vertically in its superview
- Control is a fixed distance from the right of the superview



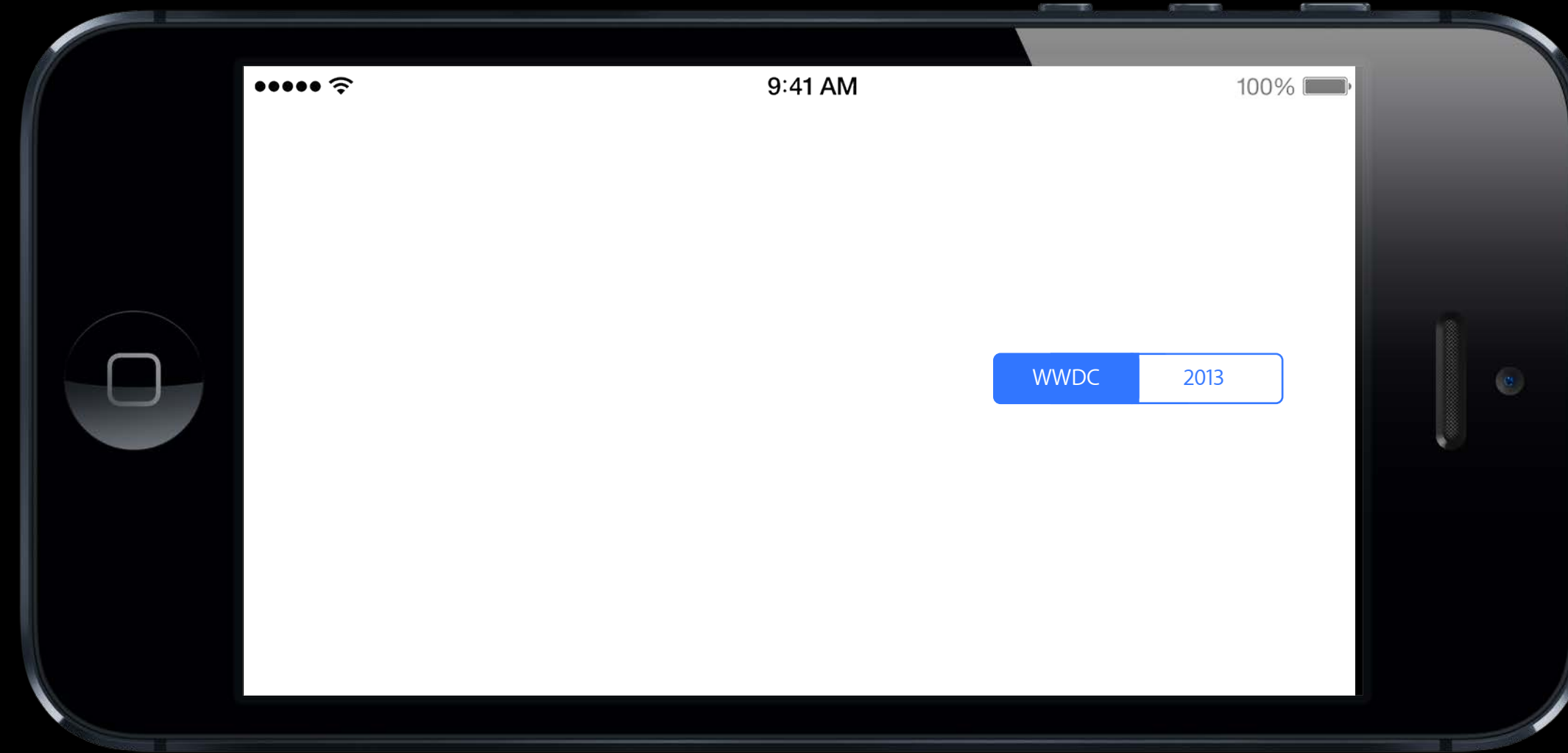
- Control's frame origin is (139, 270)

Auto Layout



- Control is centered vertically in its superview
- Control is a fixed distance from the right of the superview

Auto Layout



- `Control.centerY = Superview.centerY`
- `Control.right = Superview.right - <padding>`

Auto Layout is a constraint-based, descriptive layout system

Describe the layout with constraints, and frames are calculated automatically.

Why Auto Layout?

Why Auto Layout?

- **Relational:** Codifying the relative way we describe interfaces

Why Auto Layout?

- **Relational:** Codifying the relative way we describe interfaces
- **Dynamism:** Improved responsiveness to changes in the application

Why Auto Layout?

- **Relational:** Codifying the relative way we describe interfaces
- **Dynamism:** Improved responsiveness to changes in the application
 - **Metrics:** iOS 6 to iOS 7, screen sizes, and rotation

Why Auto Layout?

- **Relational:** Codifying the relative way we describe interfaces
- **Dynamism:** Improved responsiveness to changes in the application
 - **Metrics:** iOS 6 to iOS 7, screen sizes, and rotation
 - **Content:** Localization

Why Auto Layout?

- **Relational:** Codifying the relative way we describe interfaces
- **Dynamism:** Improved responsiveness to changes in the application
 - **Metrics:** iOS 6 to iOS 7, screen sizes, and rotation
 - **Content:** Localization
- **Expressiveness:** Can specify powerful relationships between views

Adopting Auto Layout

Adopting Auto Layout

- Update Interface Builder documents
 - Enable Auto Layout
 - Add constraints

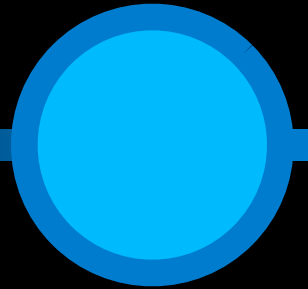
Adopting Auto Layout

- Update Interface Builder documents
 - Enable Auto Layout
 - Add constraints
- When adding subviews in code
 - Add or update constraints instead of calling `-setFrame:`
 - Disable `translatesAutoresizingMaskIntoConstraints`

More Information on Auto Layout

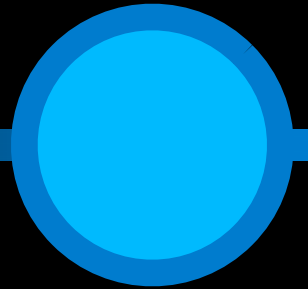
Previous WWDC sessions on Auto Layout

Introduction to Auto Layout for iOS and OS X	WWDC 2012	
Best Practices for Mastering Auto Layout	WWDC 2012	
Auto Layout by Example	WWDC 2012	

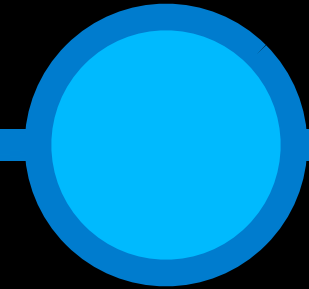


2011



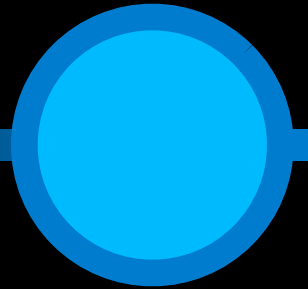


2011

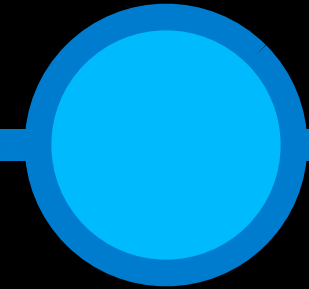


2012

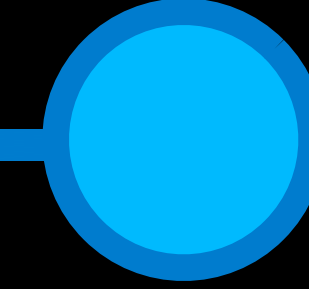




2011



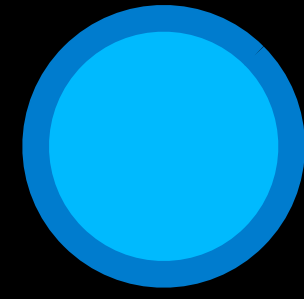
2012



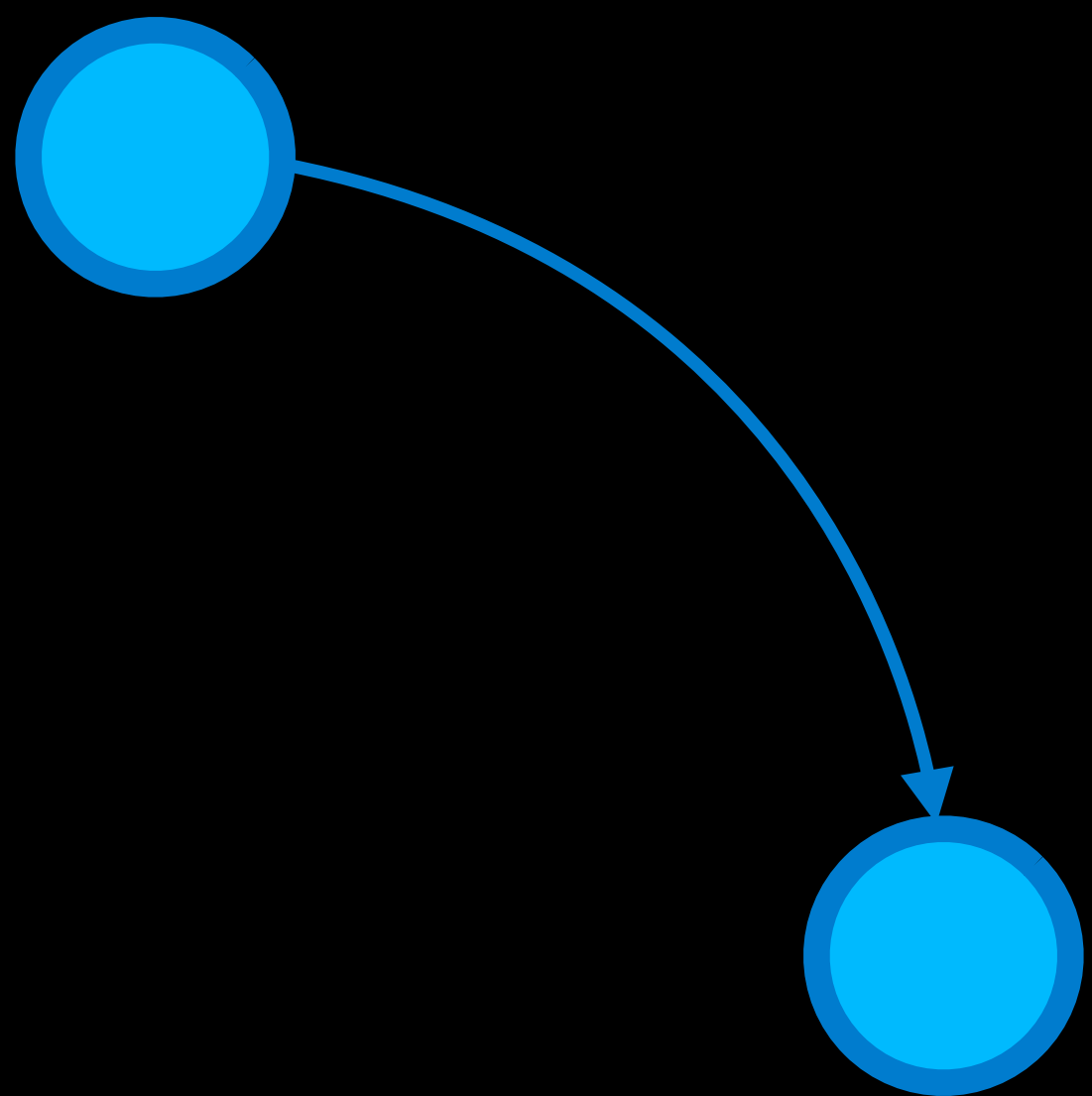
2013



Initial Layout

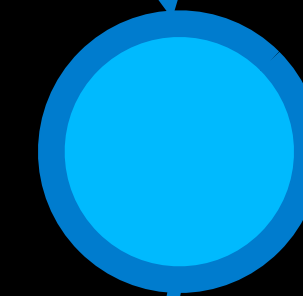
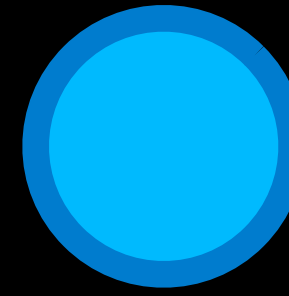


Initial Layout

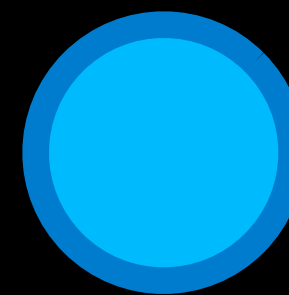


Add Constraints

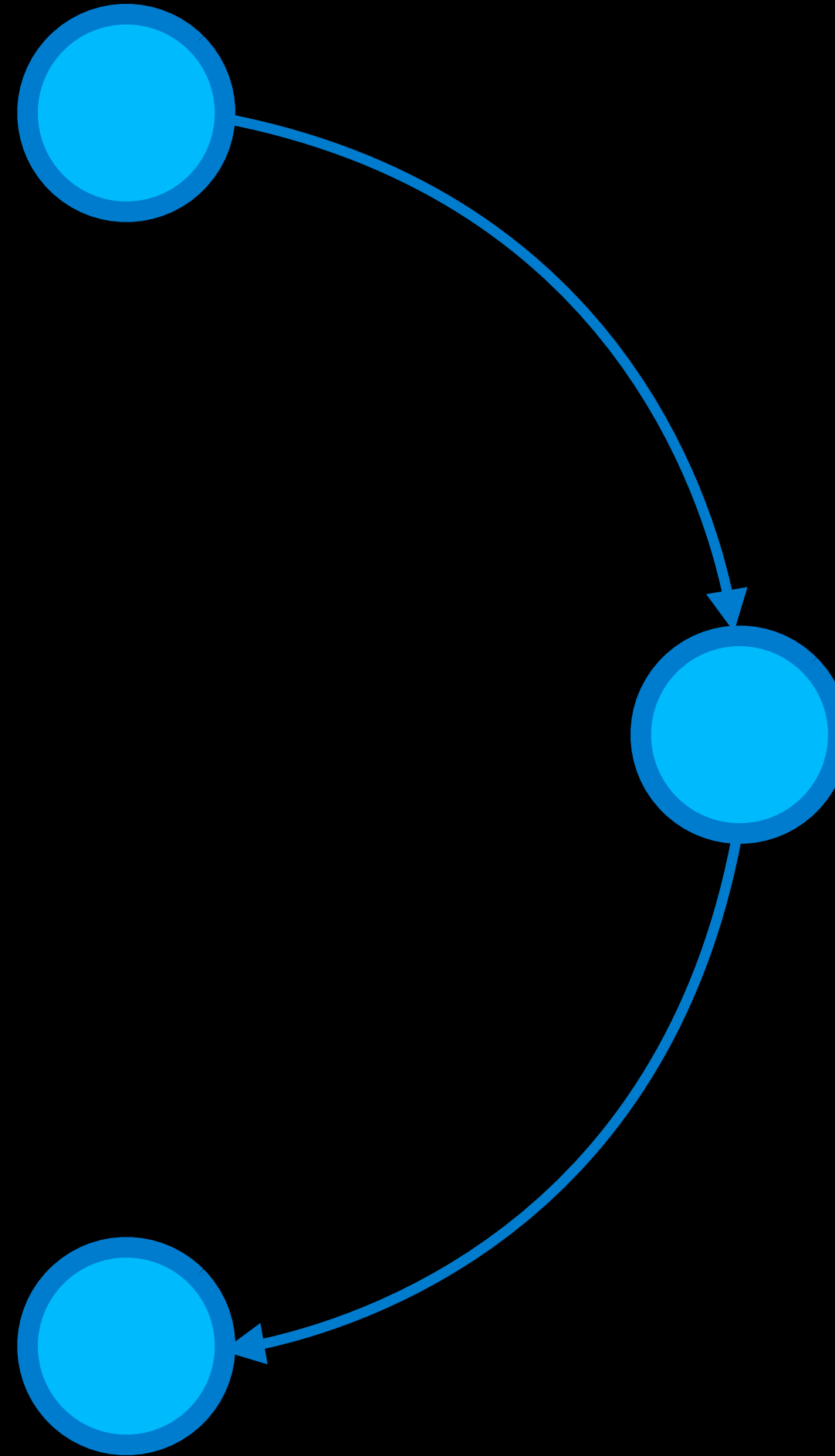
Initial Layout

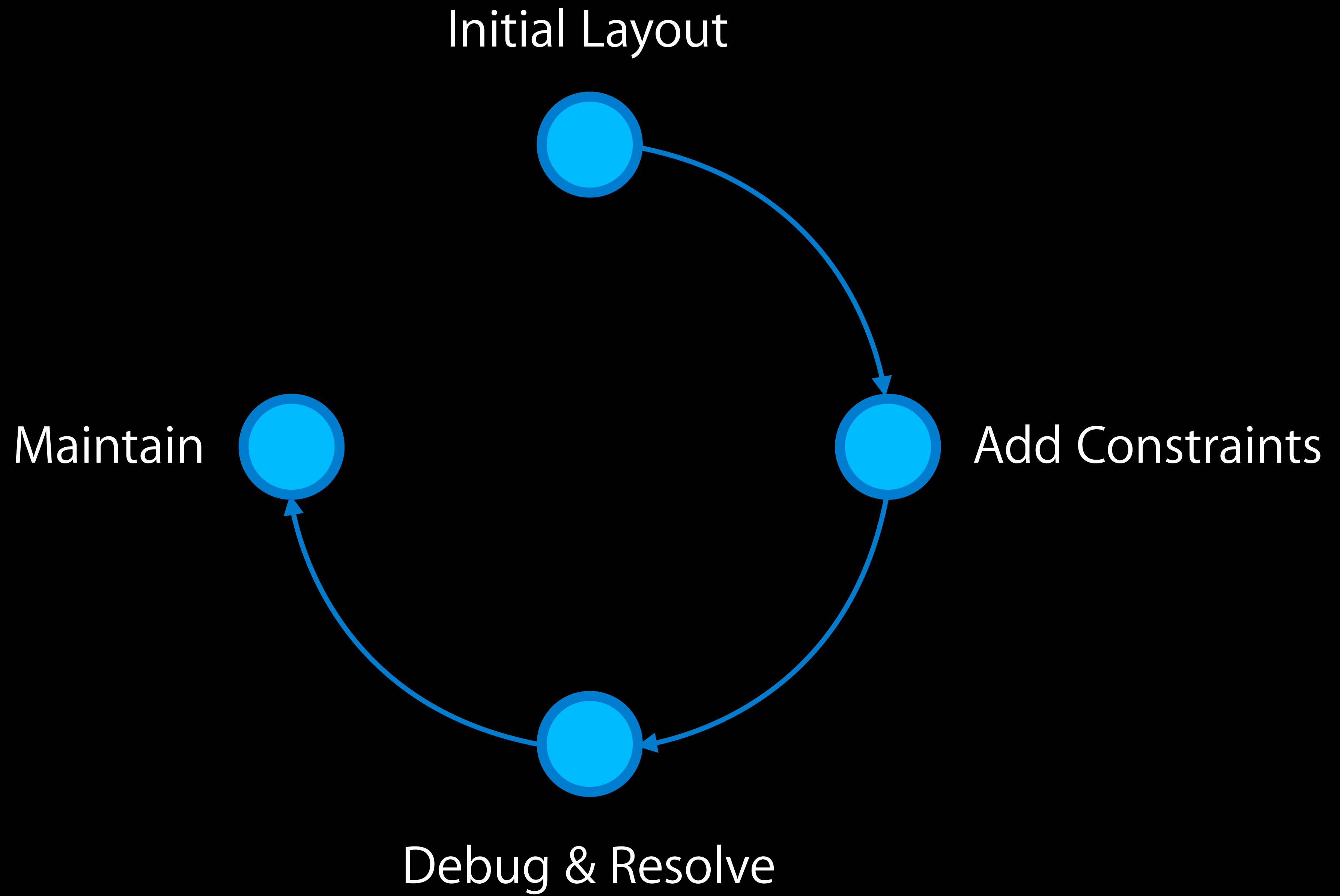


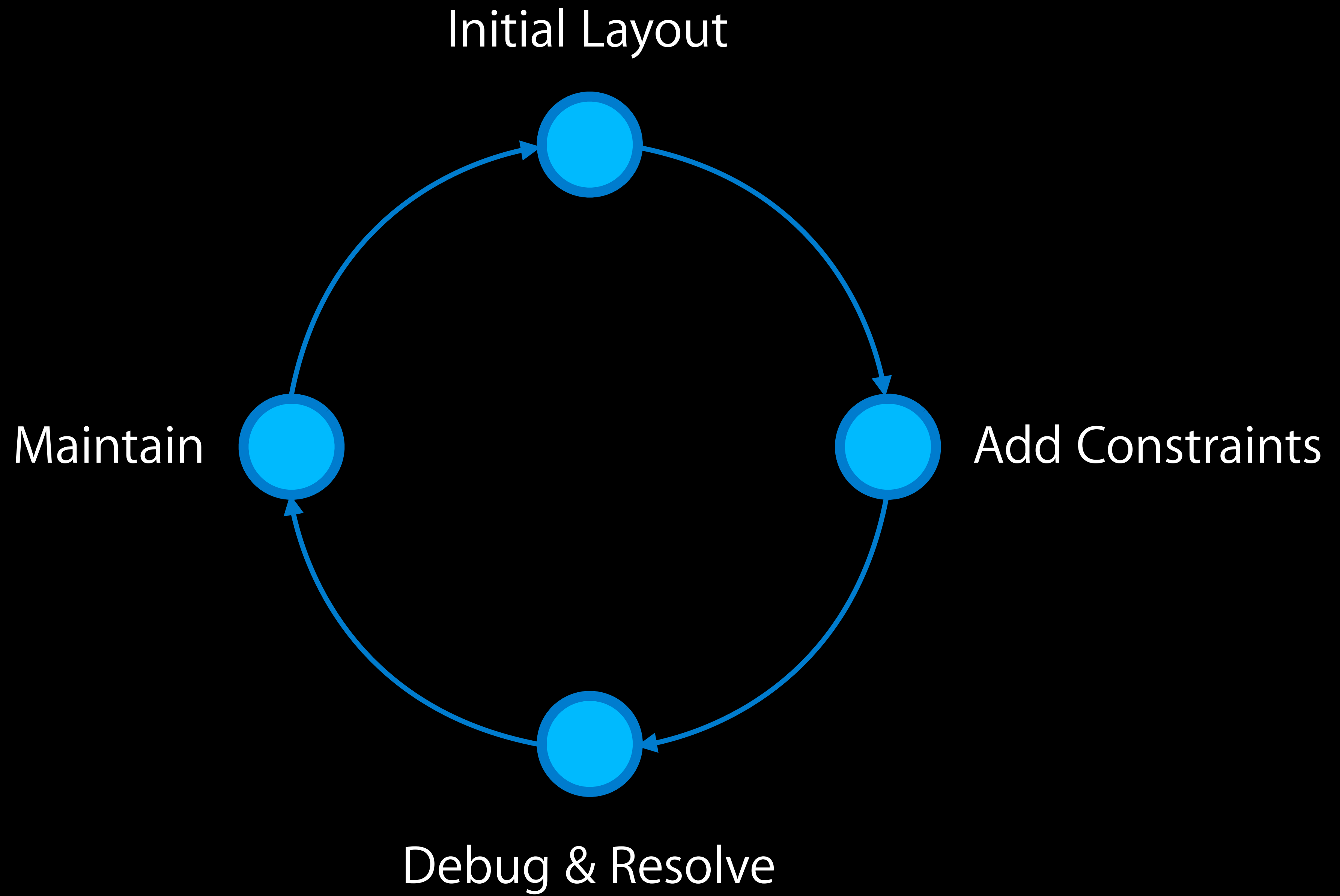
Add Constraints

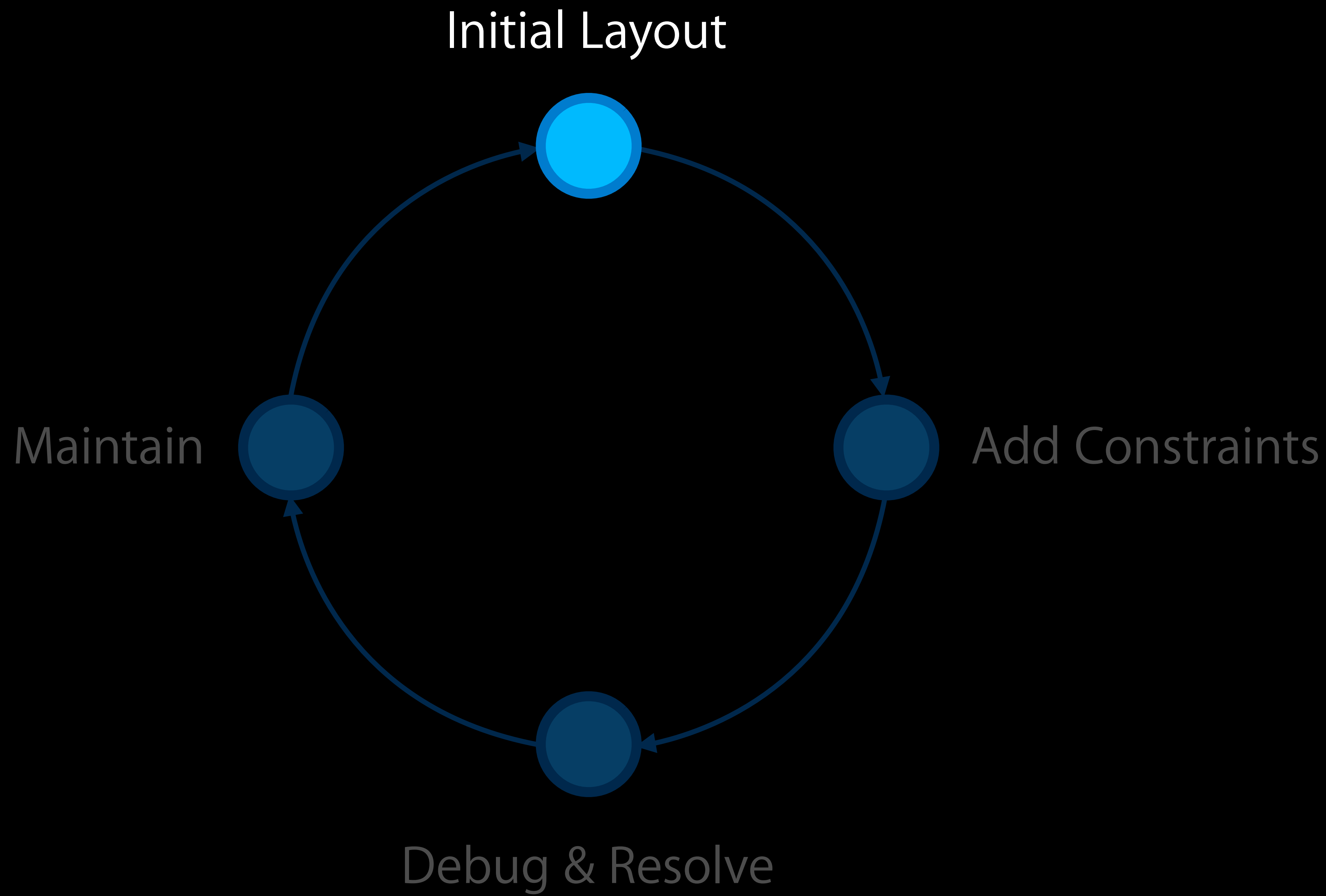


Debug & Resolve









Initial Layout

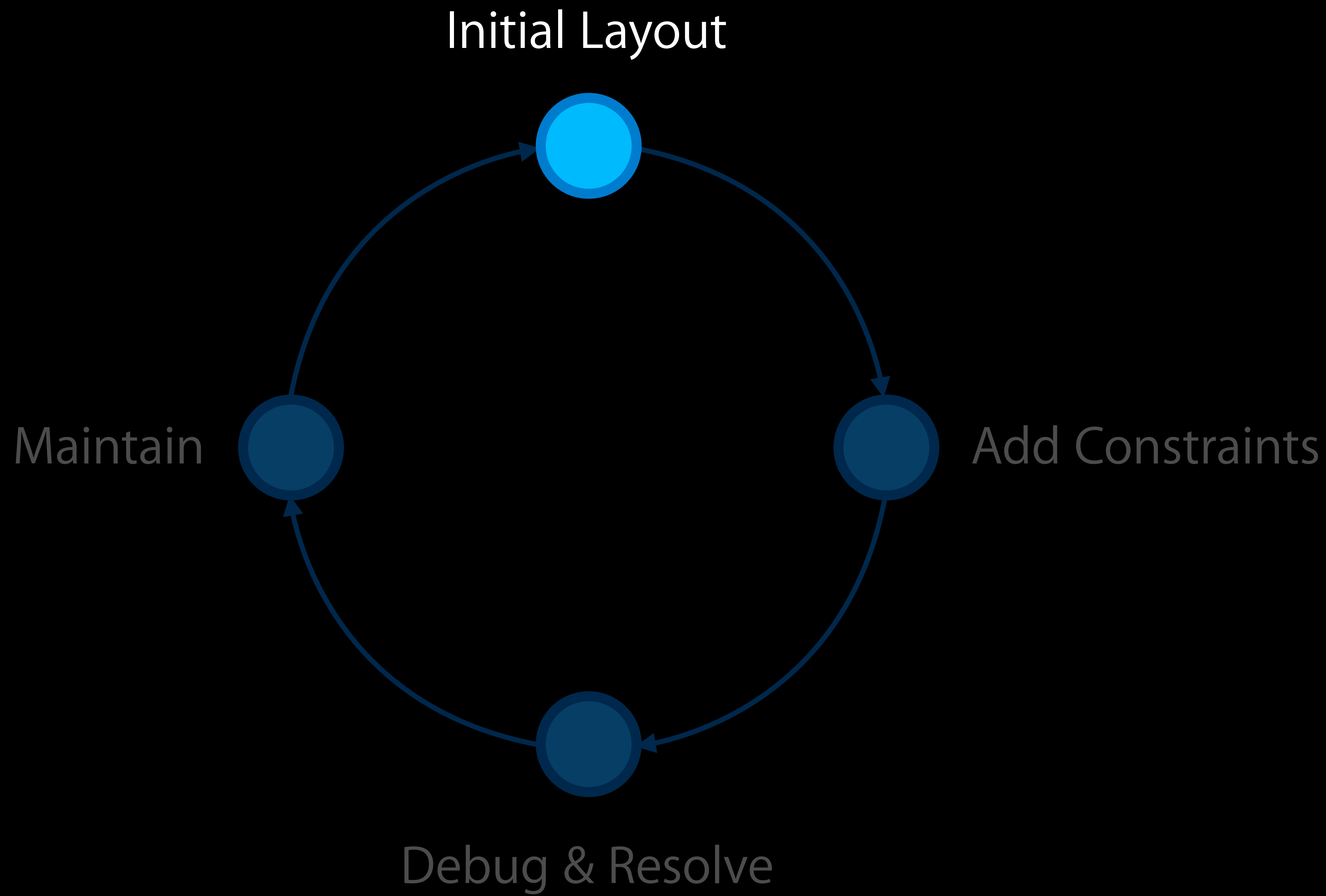
- First adding views, positioning, and resizing

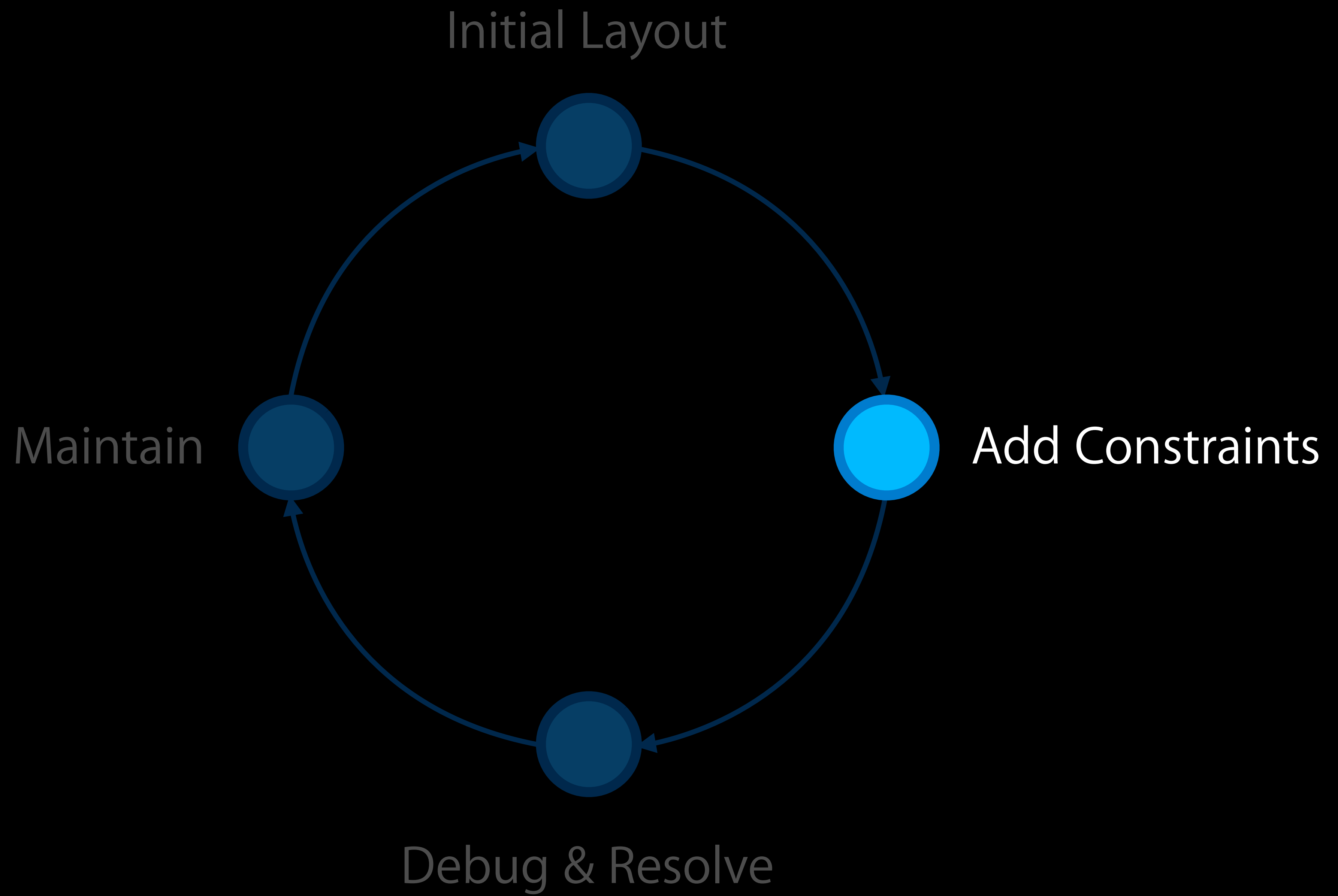
Initial Layout

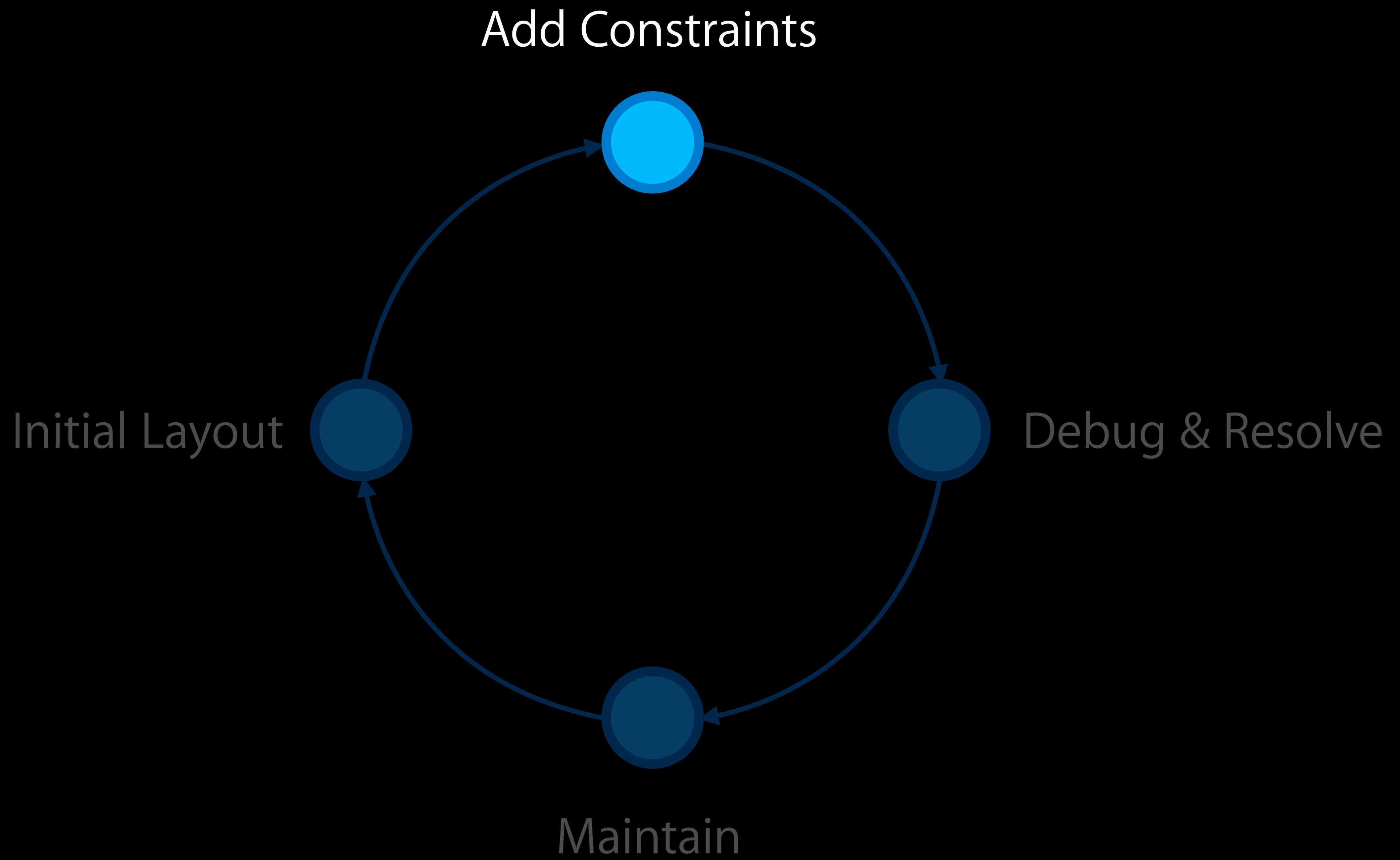
- First adding views, positioning, and resizing
- Add constraints when you are ready

Initial Layout

- First adding views, positioning, and resizing
- Add constraints when you are ready
- Fixed position and size







Demo

Adding constraints

Initial Layout

- First adding views, positioning, and resizing
- Add constraints when you are ready
- Fixed position and size

Adding Constraints

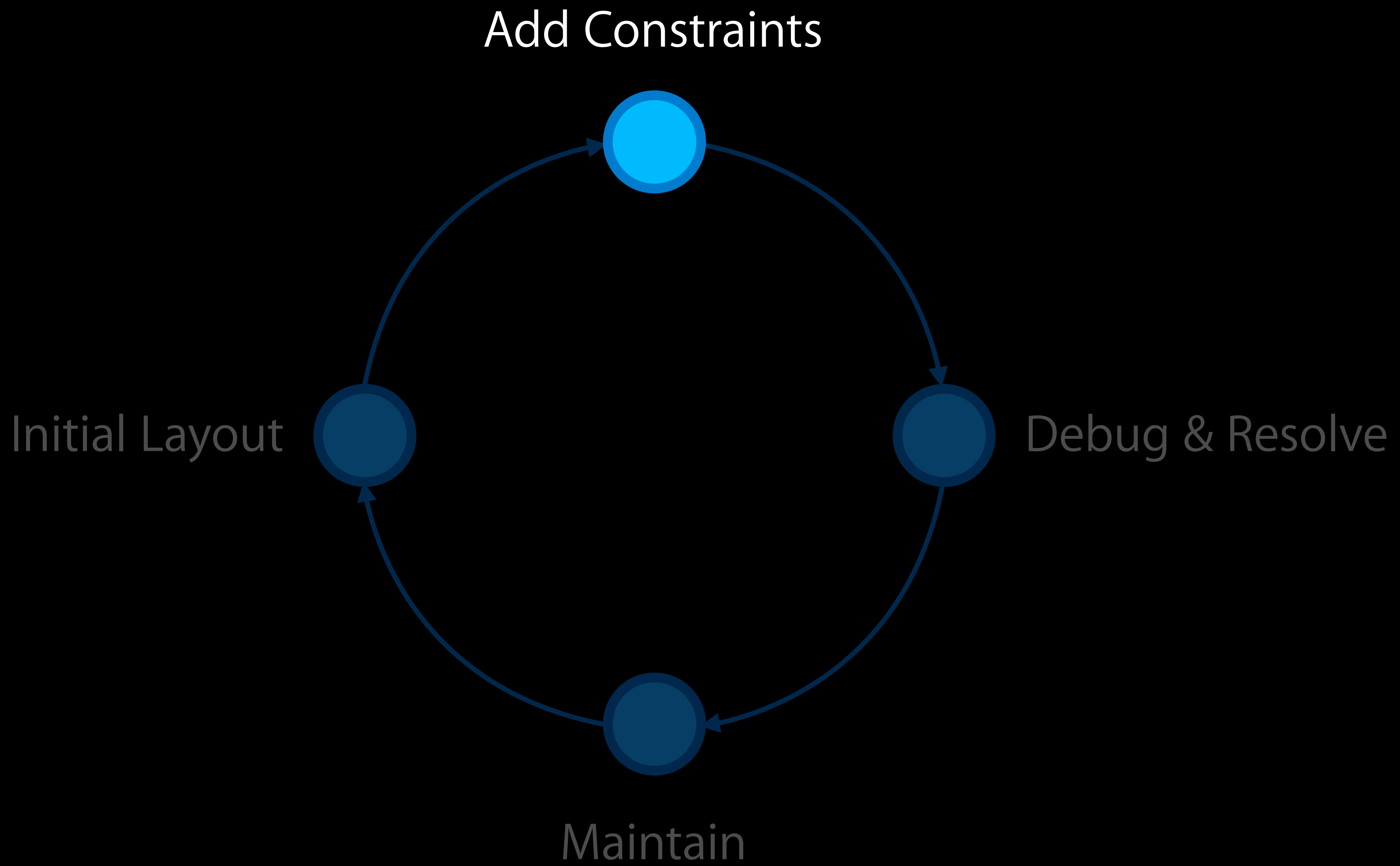
- Direct manipulation: Control drag between views

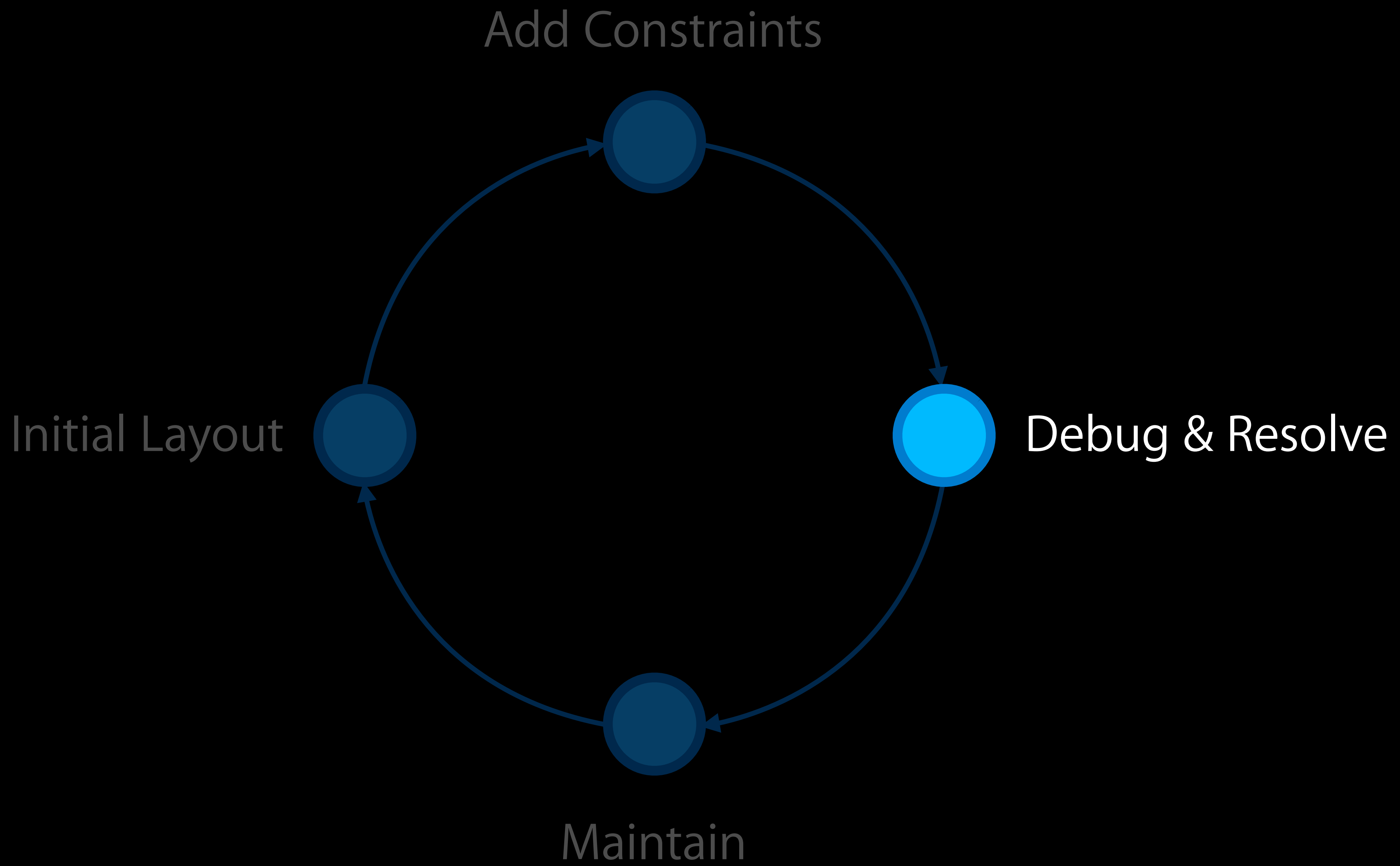
Adding Constraints

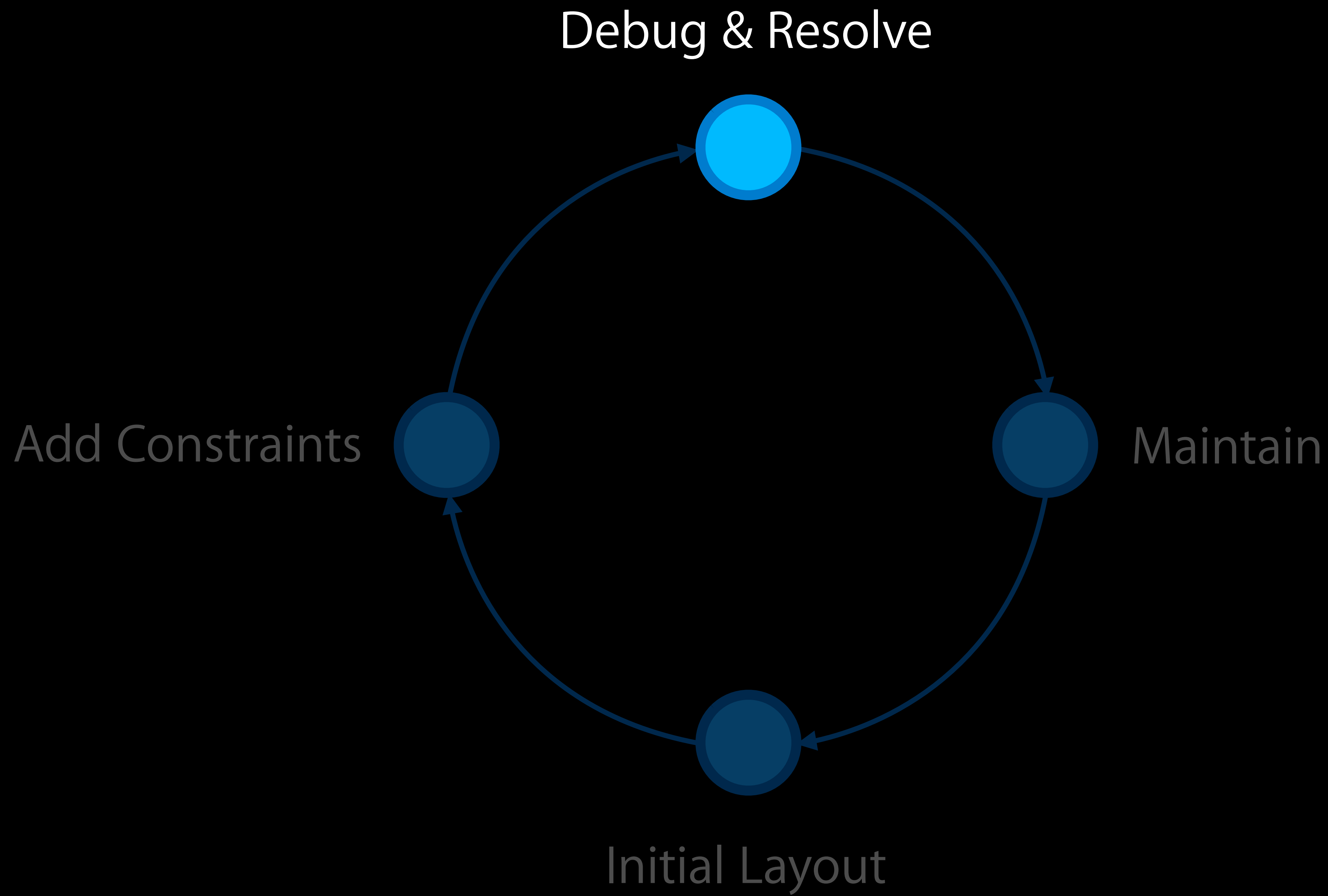
- Direct manipulation: Control drag between views
- Auto Layout resolving menu

Adding Constraints

- Direct manipulation: Control drag between views
- Auto Layout resolving menu
- Constraint addition popovers







Intermediate States



Intermediate States



Intermediate States



Intermediate States

Intermediate States

- **Ambiguous Frames:** Not enough information

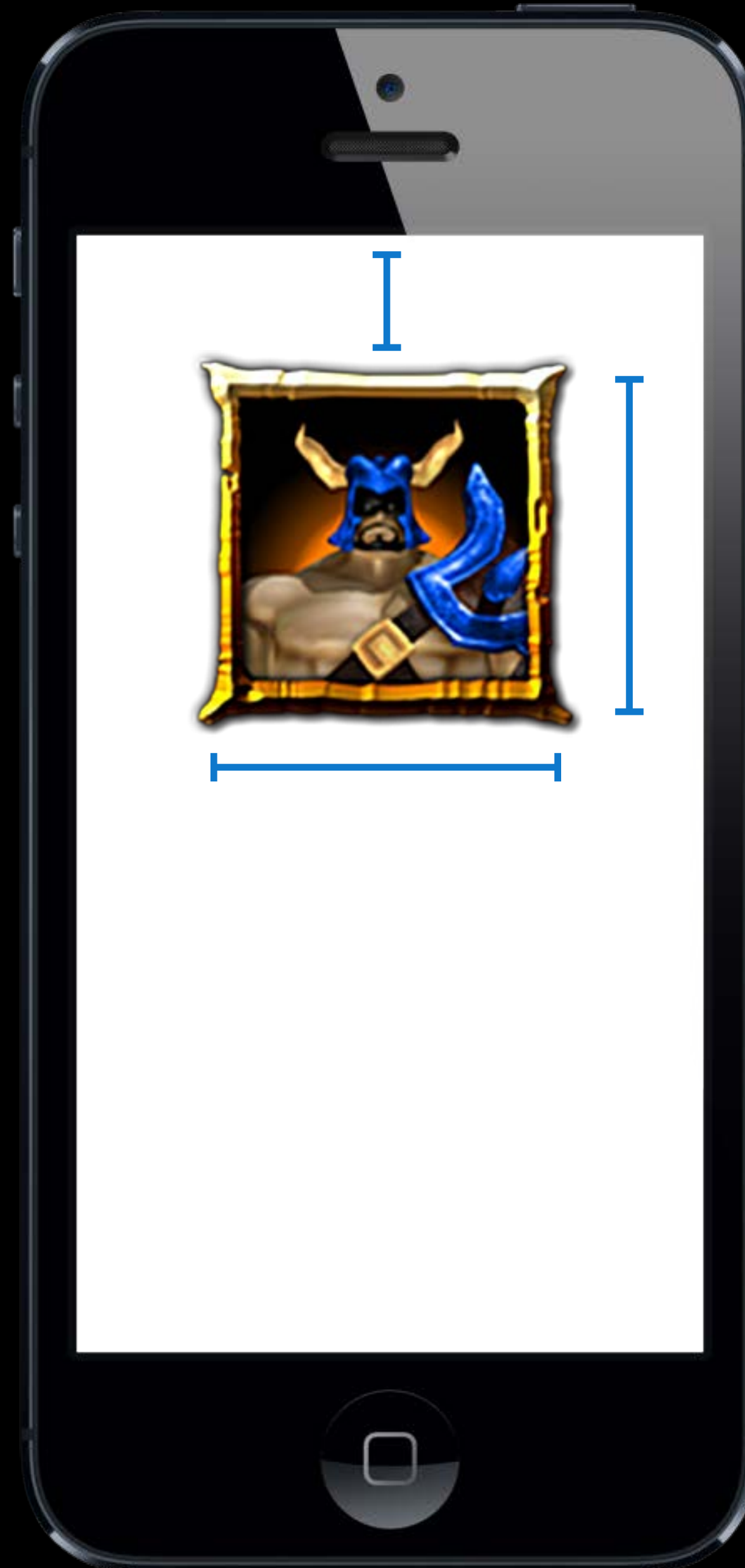
Intermediate States

- **Ambiguous Frames:** Not enough information
- **Conflicting Constraints:** Too much information

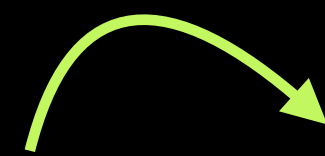
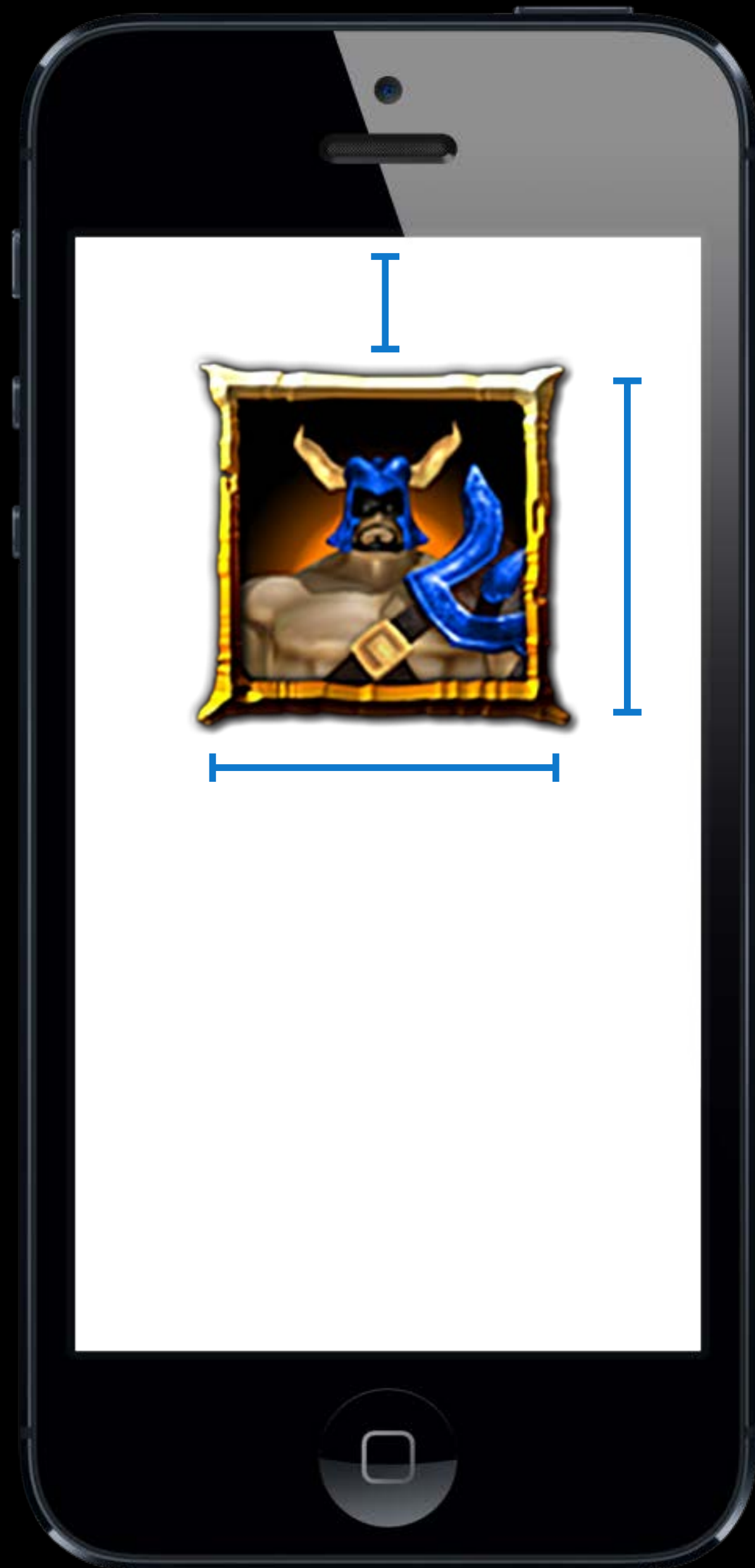
Intermediate States

- **Ambiguous Frames:** Not enough information
- **Conflicting Constraints:** Too much information
- **Misplaced Views:** Mismatched position or size

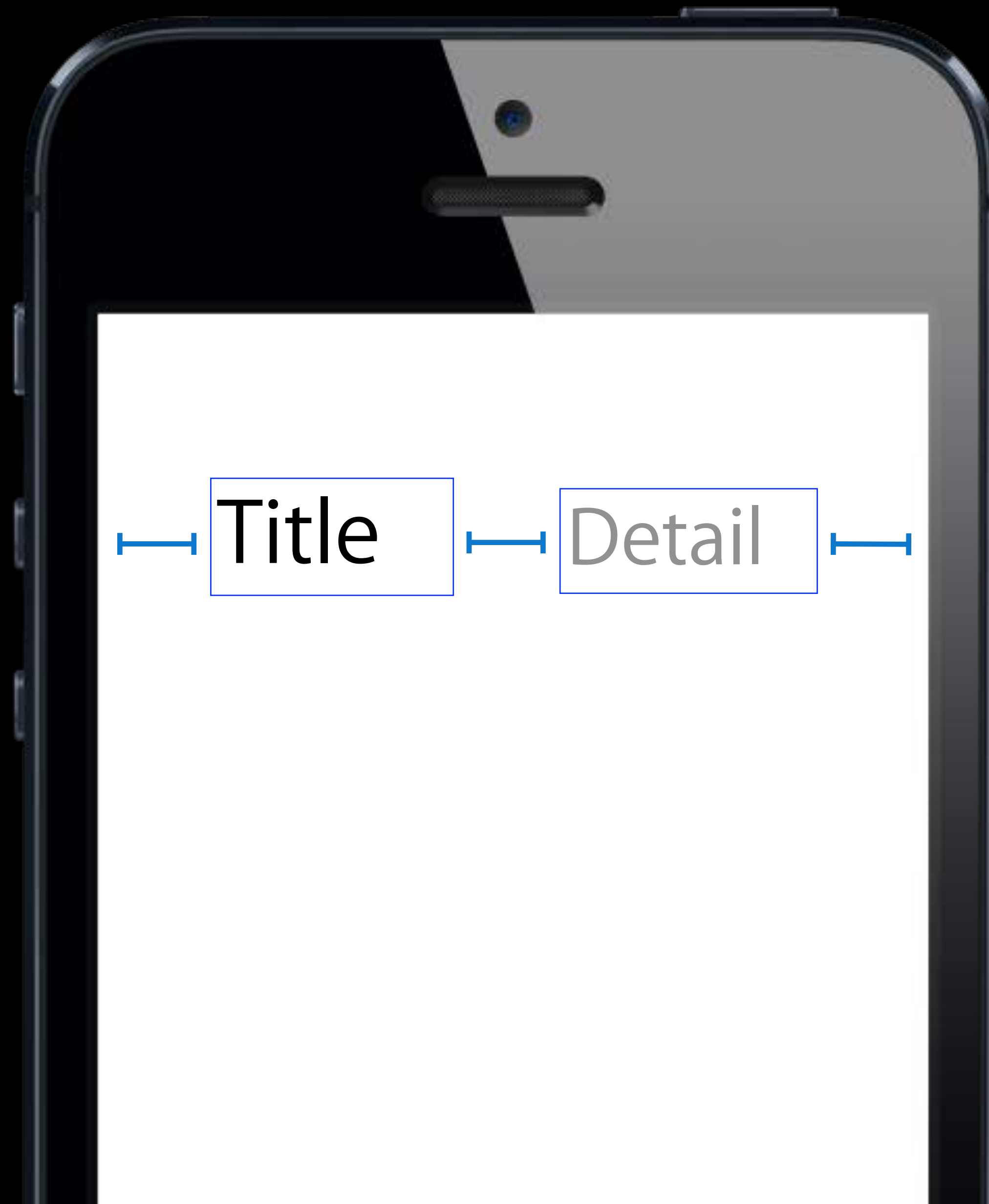
Ambiguous Frames



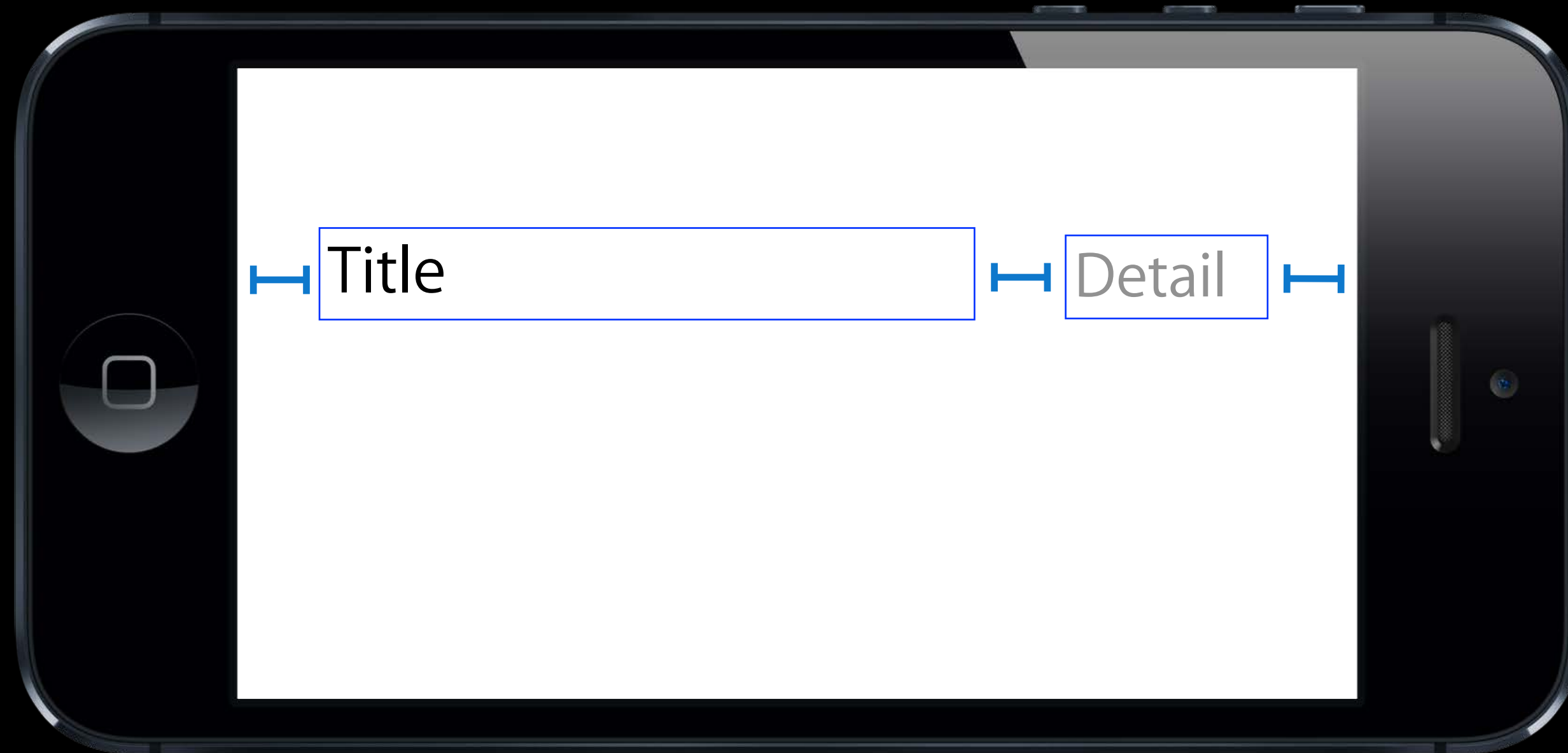
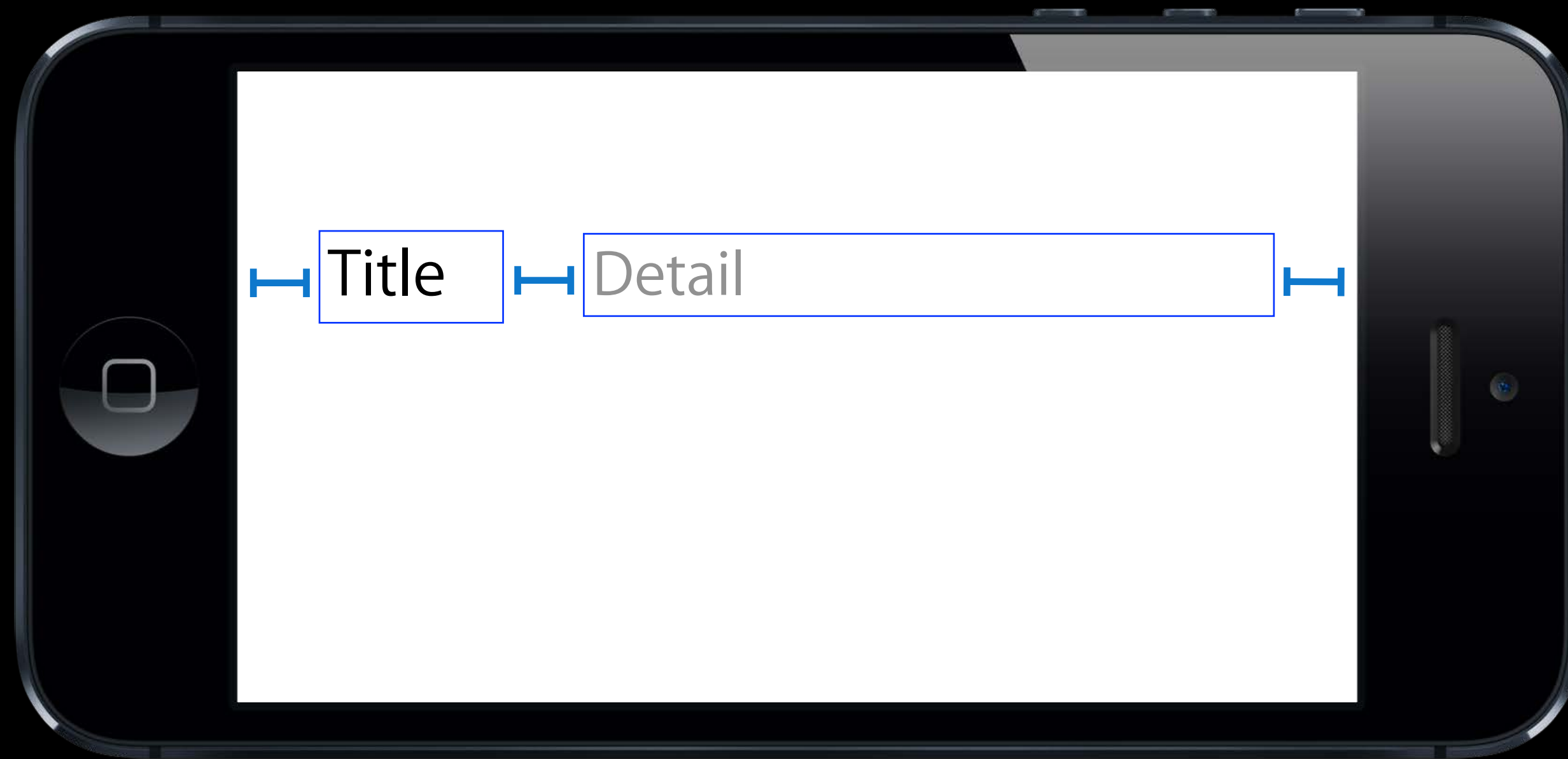
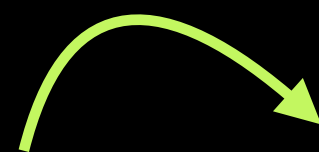
Ambiguous Frames



Ambiguous Frames



Ambiguous Frames



Conflicting Constraints



Conflicting Constraints



Conflicting Constraints



Misplaced Views



Misplaced Views



Demo

Debugging

Debugging

Debugging

- Canvas decorations

Debugging

- Canvas decorations
- Xcode Issues Navigator

Debugging

- Canvas decorations
- Xcode Issues Navigator
- Quick fixes via the canvas resolving menu

Debugging

- Canvas decorations
- Xcode Issues Navigator
- Quick fixes via the canvas resolving menu
- Detailed help using the outline view

Compatibility

Compatibility

- Deployable to previous versions of OS X and iOS

Compatibility

- Deployable to previous versions of OS X and iOS
- Features requiring Xcode 5
 - iOS 7 support
 - New Auto Layout workflows
 - Readable and diffable XIBs

More Information





Dave DeLong

App Frameworks and Developer Tools Evangelist
delong@apple.com

Apple Developer Forums

<http://devforums.apple.com>

Related Sessions

Introduction to Auto Layout for iOS and OS X	WWDC 2012	
Best Practices for Mastering Auto Layout	WWDC 2012	
Auto Layout by Example	WWDC 2012	
Interface Builder Core Concepts	Nob Hill Wednesday 9:00AM	

Related Labs

Interface Builder & Auto Layout	Tools Lab A/B Wednesday 2:00PM	
Interface Builder	Tools Lab B Thursday 9:00AM	
Interface Builder	Tools Lab B Friday 9:00AM	

 WWDC2013