Custom Transitions Using View Controllers

New capabilities, APIs and enhancements

Session 218

Bruce D. Nilo
View Controller Mechanic

Roadmap

Roadmap

- New animation tools
- Custom view controller transitions
- Interactive view controller transitions
- Canceling and coordinating transitions

Roadmap

New animation tools

Roadmap

New animation tools

- Quick review of the block based UIView animation API

Roadmap

New animation tools

- Quick review of the block based UIView animation API
- Spring animations

Roadmap

New animation tools

- Quick review of the block based UIView animation API
- Spring animations
- Key-frame animations

Roadmap

New animation tools

- Quick review of the block based UIView animation API
- Spring animations
- Key-frame animations
- UIKit Dynamics

Roadmap

Custom view controller transitions

Roadmap

Custom view controller transitions

- Which transitions can be customized?
  - Presentations and dismissals
  - UITabBarController
  - UINavigationController
  - UICollectionViewController layout-to-layout transitions

Roadmap

Custom view controller transitions

- Which transitions can be customized?
  - Presentations and dismissals
  - UITabBarController
  - UINavigationController
  - UICollectionViewController layout-to-layout transitions
- What is a transition?
  - Anatomy and generalizations

Roadmap

Custom view controller transitions

- Which transitions can be customized?
  - Presentations and dismissals
  - UITabBarController
  - UINavigationController
  - UICollectionViewController layout-to-layout transitions
- What is a transition?
  - Anatomy and generalizations
- API discussion with some examples

Roadmap

Interactive view controller transitions

Roadmap

Interactive view controller transitions

- Adding interactivity to custom transitions

Roadmap

Interactive view controller transitions

- Adding interactivity to custom transitions
- Special support for UICollectionViews
  - UICollectionViewTransitionLayout

Roadmap

Interactive view controller transitions

- Adding interactivity to custom transitions
- Special support for UICollectionViews
  - UICollectionViewTransitionLayout
- Canceling transitions

Roadmap

Interactive view controller transitions

- Adding interactivity to custom transitions
- Special support for UICollectionViews
  - UICollectionViewTransitionLayout
- Canceling transitions
- UITransitionCoordinator
  - Animating alongside transitions
  - Specifying a completion handler
    - This can be used for all UINavigationController transitions!

New UIView Animation APIs

Create compelling, custom, view controller transitions

New UIView Animation APIs

Quick review: Existing UIView block based API

New UIView Animation APIs

Quick review: Existing UIView block based API

```
+ (void) beginAnimations:context:
+ (void) commitAnimations
```

New UIView Animation APIs

Quick review: Existing UIView block based API

```
+ (void) beginAnimations:context:
+ (void) commitAnimations

+ (void)animateWithDuration:(NSTimeInterval)duration
                      delay:(NSTimeInterval)delay
                    options:(UIViewAnimationOptions)options
                 animations:(void (^)(void))animations
                 completion:(void (^)(BOOL finished))completion;
```

New UIView Animation APIs

Quick review: Relationship to core animation

```
[UIView animationWithDuration:delay:options:animations:^{

} completion: nil];
```

New UIView Animation APIs

Quick review: Relationship to core animation

```
[UIView animationWithDuration:delay:options:animations:^{
```

```
  } completion: nil];
```

New UIView Animation APIs

Quick review: Relationship to core animation

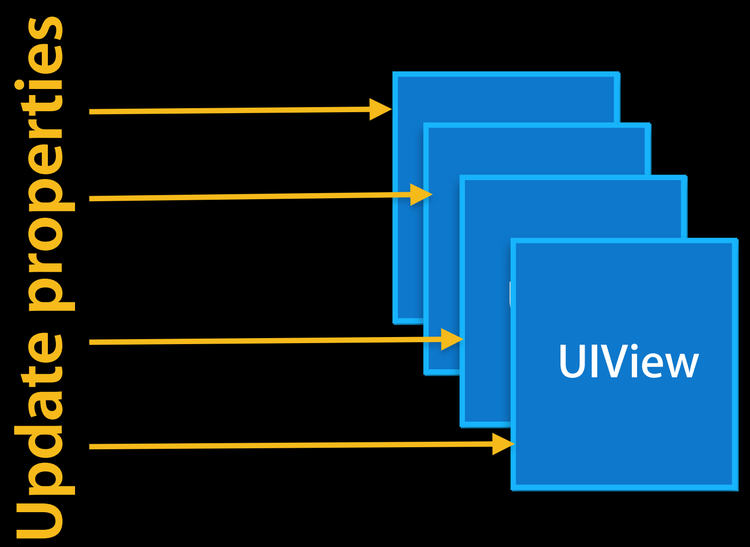
```
[UIView animationWithDuration:delay:options:animations:^{
```


```
} completion: nil];
```

New UIView Animation APIs

Quick review: Relationship to core animation

```
[UIView animationWithDuration:delay:options:animations:^{
```

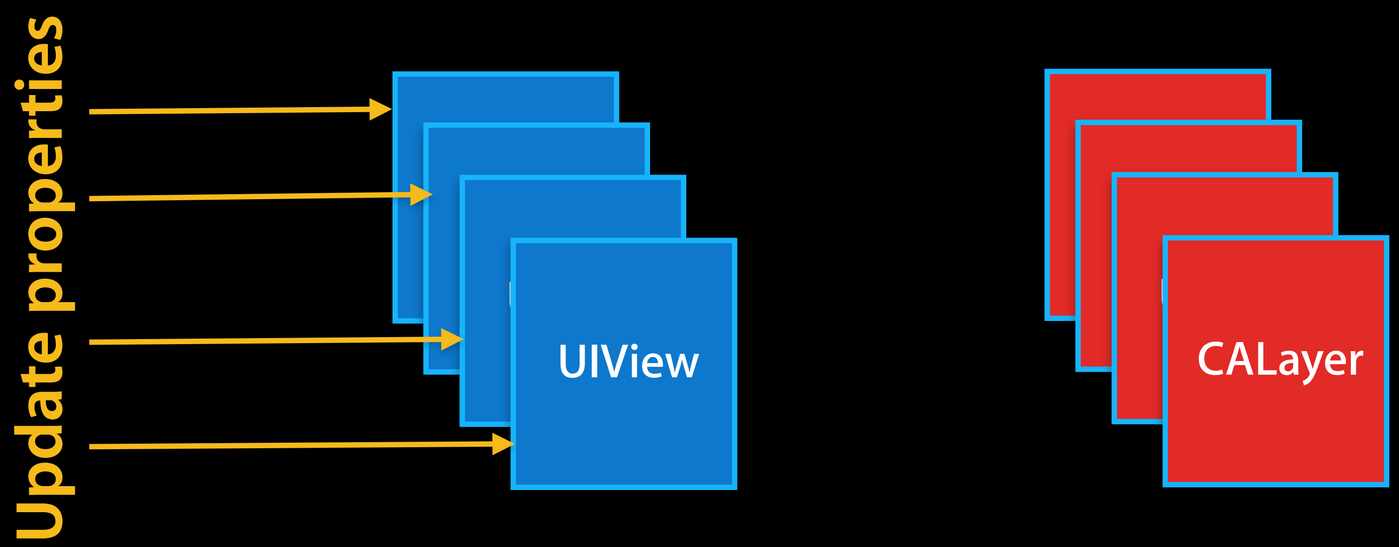



```
} completion: nil];
```

New UIView Animation APIs

Relationship to core animation

```
[UIView animationWithDuration:...animations:^{
```

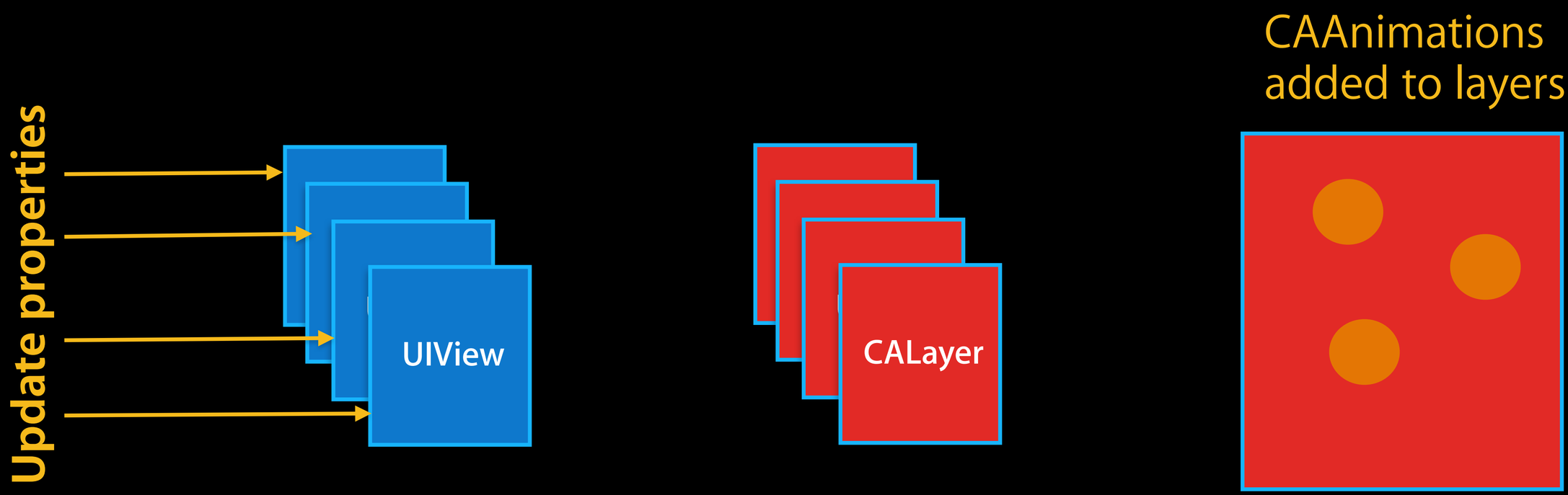



```
} completion: nil];
```

New UIView Animation APIs

Relationship to core animation

```
[UIView animationWithDuration:...animations:^{
```




```
} completion: nil];
```

New UIView Animation APIs

UIView block based API

- Disabling and enabling animations

```
+ (void)setAnimationsEnabled:(BOOL)
```

New UIView Animation APIs

UIView block based API

```
+ (void)performWithoutAnimation:(void ^(void))actions;
```

New UIView Animation APIs

UIView block based API

```
+ (void)performWithoutAnimation:(void ^(void))actions;
```

New UIView Animation APIs

Spring animations

New UIView Animation APIs

Spring animations

- Two new parameters
  - DampingRatio
    - 1.0 >= r > 0.0
  - Initial Spring Velocity
- Composes nicely with other UIView animation methods

New UIView Animation APIs

Spring animations

```
+ (void)animateWithDuration:(NSTimeInterval)duration
                      delay:(NSTimeInterval)delay
     usingSpringWithDamping:(CGFloat)dampingRatio
      initialSpringVelocity:(CGFloat)velocity
                    options:(UIViewAnimationOptions)options
                 animations:(void (^)(void))animations
                 completion:(void (^)(BOOL finished))completion;
```

New UIView Animation APIs

Spring animations

```
+ (void)animateWithDuration:(NSTimeInterval)duration
                      delay:(NSTimeInterval)delay
     usingSpringWithDamping:(CGFloat)dampingRatio
      initialSpringVelocity:(CGFloat)velocity
                    options:(UIViewAnimationOptions)options
                 animations:(void (^)(void))animations
                 completion:(void (^)(BOOL finished))completion;
```

New UIView Animation APIs

Key-frame animations

New UIView Animation APIs

Key-frame animations

- animateKeyframesWithDuration…
  - is to CAKeyframeAnimation

New UIView Animation APIs

Key-frame animations

- animateKeyframesWithDuration…
  - is to CAKeyframeAnimation
- as animateWithDuration…
  - is to CABasicAnimation

New UIView Animation APIs

Key-frame animations

- animateKeyframesWithDuration…
  - is to CAKeyframeAnimation
- as animateWithDuration…
  - is to CABasicAnimation
- Specify keyframes within the animation block
  - Options augmented to include calculation mode

New UIView Animation APIs

Key-frame animations

- animateKeyframesWithDuration…
  - is to CAKeyframeAnimation
- as animateWithDuration…
  - is to CABasicAnimation
- Specify keyframes within the animation block
  - Options augmented to include calculation mode
- Composes nicely with other UIView animation methods

New View Based Animation APIs

Key-frame animations

```
+ (void)animateKeyframesWithDuration:(NSTimeInterval)duration
                               delay:(NSTimeInterval)delay
                             options:(UIViewKeyframeAnimationOptions)options
                          animations:(void (^)(void))animations
                          completion:(void (^)(BOOL finished))completion;
```

```
+ (void)addKeyframeWithRelativeStartTime:(double)frameStartTime
                        relativeDuration:(double)frameDuration
                              animations:(void (^)(void))animations
```

New View Based Animation APIs

Key-frame animations

```
+ (void)animateKeyframesWithDuration:(NSTimeInterval)duration
                               delay:(NSTimeInterval)delay
                             options:(UIViewKeyframeAnimationOptions)options
                          animations:(void (^)(void))animations
                          completion:(void (^)(BOOL finished))completion;
```

```
+ (void)addKeyframeWithRelativeStartTime:(double)frameStartTime
                        relativeDuration:(double)frameDuration
                              animations:(void (^)(void))animations
```

New View Based Animation APIs

Key-frame animations

```
+ (void)animateKeyframesWithDuration:(NSTimeInterval)duration
                               delay:(NSTimeInterval)delay
                             options:(UIViewKeyframeAnimationOptions)options
                          animations:(void (^)(void))animations
                          completion:(void (^)(BOOL finished))completion;
```

```
+ (void)addKeyframeWithRelativeStartTime:(double)frameStartTime
                        relativeDuration:(double)frameDuration
                              animations:(void (^)(void))animations
```

New View Based Animation APIs

Key-frame animations

```
[UIView animateKeyframesWithDuration: .35
 delay: 0.0
 options:0
 animations:^{
     [UIView addKeyframe… animations: ^{…}];
     [UIView addKeyframe… animations:^{…}];
     [UIView addKeyframe… animations:^{
     [someView setPosition:…];
     // etc.
     }];
     }
completion:^(BOOL finished) {…}];
```

New View Based Animation APIs

Key-frame animations

```
[UIView animateKeyframesWithDuration: .35
 delay: 0.0
 options:0
 animations:^{
     [UIView addKeyframe… animations: ^{…}];
     [UIView addKeyframe… animations:^{…}];
     [UIView addKeyframe… animations:^{
     [someView setPosition:…];
     // etc.
     }];
     }
completion:^(BOOL finished) {…}];
```

New View Based Animation APIs

Key-frame animations

```
[UIView animateKeyframesWithDuration: .35
 delay: 0.0
 options:0
 animations:^{
     [UIView addKeyframe… animations: ^{…}];
     [UIView addKeyframe… animations:^{…}];
     [UIView addKeyframe… animations:^{
     [someView setPosition:…];
     // etc.
     }];
     }
completion:^(BOOL finished) {…}];
```

Improved and Simplified Snapshot API

UIView snapshots

Improved and Simplified Snapshot API

UIView snapshots

- Snapshot API

```
- (UIView *)[UIView snapshotView]
- (UIView *)[UIView resizableSnapshotViewFromRect:(CGRect)rect
                                    withCapInsets:(UIEdgeInsets)capInsets
```

Improved and Simplified Snapshot API

UIView snapshots

- Snapshot API

```
- (UIView *)[UIView snapshotView]
- (UIView *)[UIView resizableSnapshotViewFromRect:(CGRect)rect
                                    withCapInsets:(UIEdgeInsets)capInsets
```

- Creating snapshots from snapshots is supported

New View Based Animation APIs

UIKit Dynamics

New View Based Animation APIs

UIKit Dynamics

- Distinct from UIView animation APIs

New View Based Animation APIs

UIKit Dynamics

- Distinct from UIView animation APIs
  - Compatible with the new transitioning APIs
  - More in this afternoon's talk

Customizing Your View Controller Transitions

It’s easy to use

Custom View Controller Transitions

Which transitions can be customized?

Custom View Controller Transitions

Which transitions can be customized?

- Presentations and dismissals
  - Supported presentation styles
    - `UIModalPresentationFullScreen`
    - `UIModalPresentationCustom`

Custom View Controller Transitions

Which transitions can be customized?

- Presentations and dismissals
  - Supported presentation styles
    - `UIModalPresentationFullScreen`
    - `UIModalPresentationCustom`

The from view controller is not removed from the window hierarchy

Custom View Controller Transitions

Which transitions can be customized?

- Presentations and dismissals
  - Supported presentation styles
    - `UIModalPresentationFullScreen`
    - `UIModalPresentationCustom`

The from view controller is not removed from the window hierarchy

```
UIViewController *vc = …;
id <UIViewControllerTransitioningDelegate> transitioningDelegate;
vc.modalPresentationStyle = UIModalPresentationCustom;
[vc setTransitioningDelegate: transitioningDelegate];
[self presentViewController:vc animated: YES completion: nil];
```

Custom View Controller Transitions

Which transitions can be customized?

- Presentations and dismissals
  - Supported presentation styles
    - `UIModalPresentationFullScreen`
    - `UIModalPresentationCustom`

```
The from view controller is not removed from the window hierarchy

UIViewController *vc = …;
id <UIViewControllerTransitioningDelegate> transitioningDelegate;
vc.modalPresentationStyle = UIModalPresentationCustom;
[vc setTransitioningDelegate: transitioningDelegate];
[self presentViewController:vc animated: YES completion: nil];
```

Custom View Controller Transitions

Which transitions can be customized?

Custom View Controller Transitions

Which transitions can be customized?

- UITabBarController

```
setSelectedViewController:(UIViewController *)vc;
setSelectedIndex:(NSUInteger)idx;
```

Custom View Controller Transitions

Which transitions can be customized?

- UITabBarController

```
setSelectedViewController:(UIViewController *)vc;
setSelectedIndex:(NSUInteger)idx;
```

```
NSUInteger secondTab = 1;
self.delegate = tabBarControllerDelegate;
[self setSelectedIndex:secondTab];
```

Custom View Controller Transitions

Which transitions can be customized?

Custom View Controller Transitions

Which transitions can be customized?

- UINavigationController

```
pushViewController:animated:
popViewControllerAnimated:
setViewControllers:animated:
```

Custom View Controller Transitions

Which transitions can be customized?

- UINavigationController

```
pushViewController:animated:
popViewControllerAnimated:
setViewControllers:animated:
```

```
self.delegate = navigationControllerDelegate;
[self pushViewController:vc animated:YES];
```

Custom View Controller Transitions

UINavigationController meets UICollectionViewController

Custom View Controller Transitions

UINavigationController meets UICollectionViewController

- Layout-to-layout navigation transitions

Custom View Controller Transitions

UINavigationController meets UICollectionViewController

- Layout-to-layout navigation transitions

```
UICollectionViewLayout *layout1,*layout2,*layout3;
UICollectionViewController *cvc1, *cvc2, *cvc3;
cvc1 = [cvc1 initWithCollectionViewLayout:layout1];
```

…

```
[nav pushViewController:cvc1 animated:YES]
cvc2.useLayoutToLayoutNavigationTransitions = YES;
cvc3.useLayoutToLayoutNavigationTransitions = YES;
[nav pushViewController:cvc2 animated:YES];
[nav pushViewController:cvc3 animated:YES];
[nav popViewControllerAnimated:YES];
```

Demo

Some examples of custom transitions

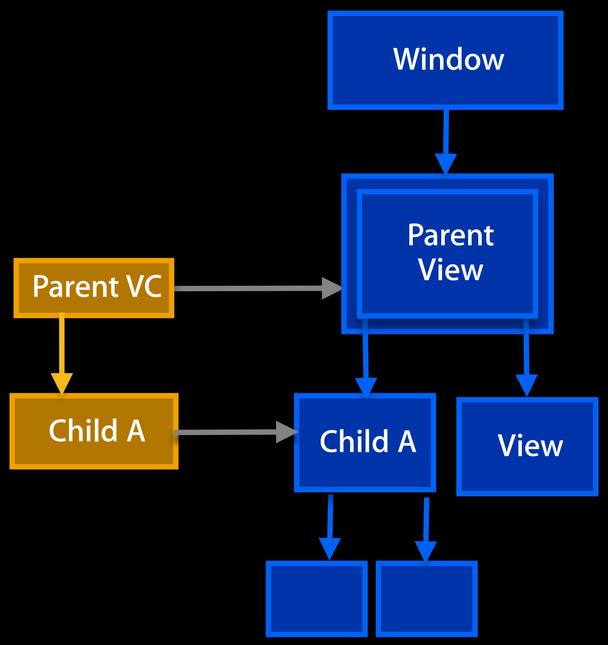
Customizing Your View Controller Transitions

Concepts and APIs

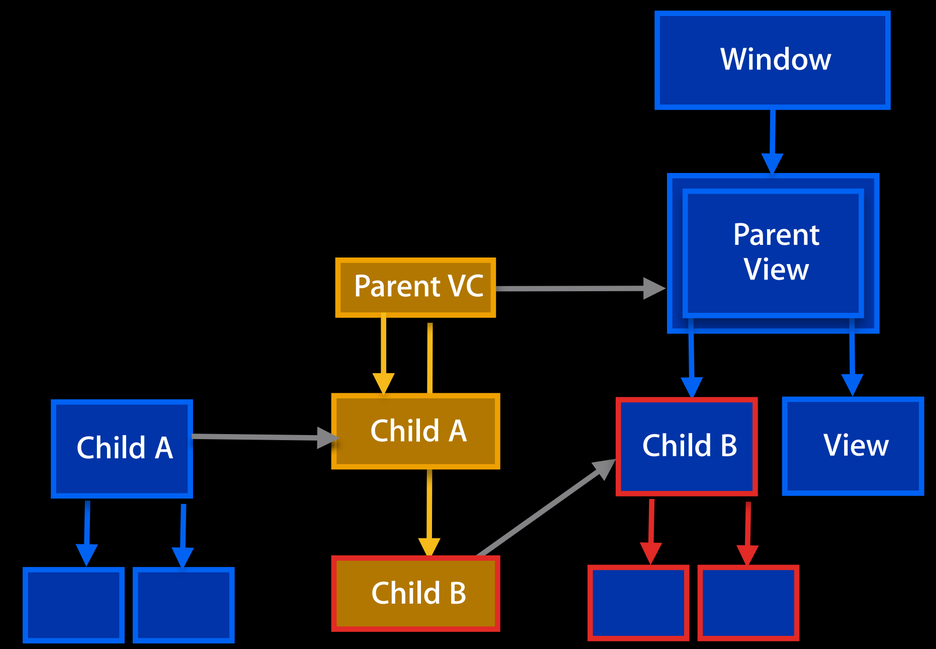
Custom View Controller Transitions

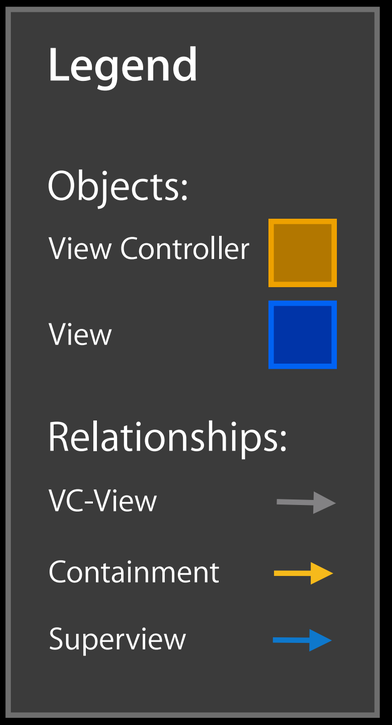
The anatomy of a transition

Start State



End State

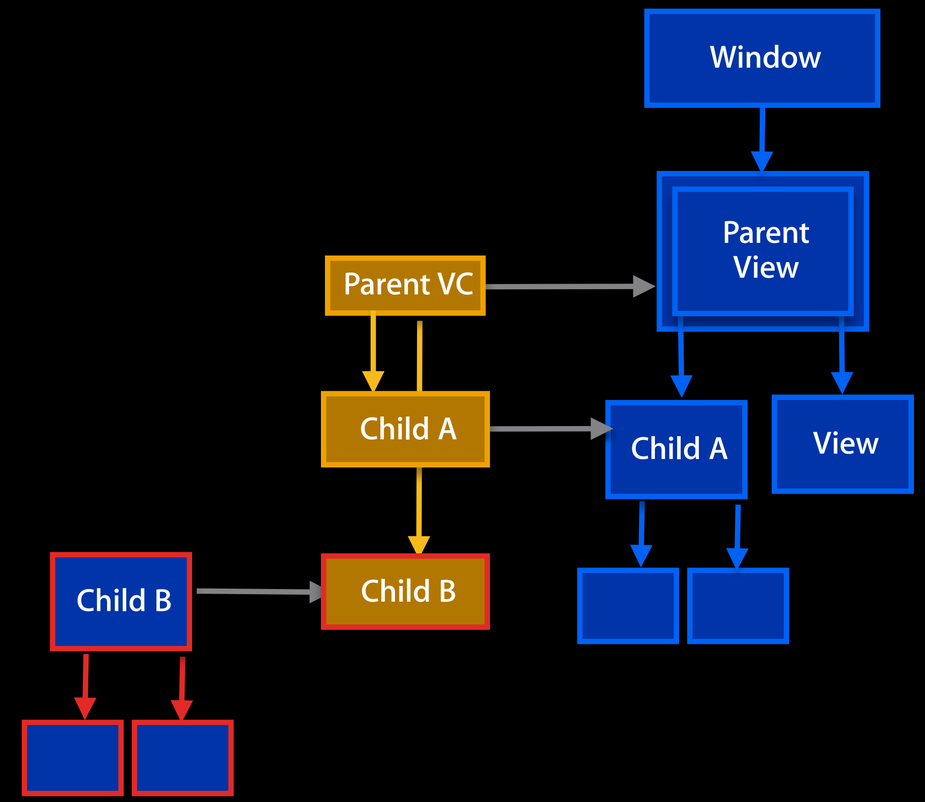




Custom View Controller Transitions

The anatomy of a transition

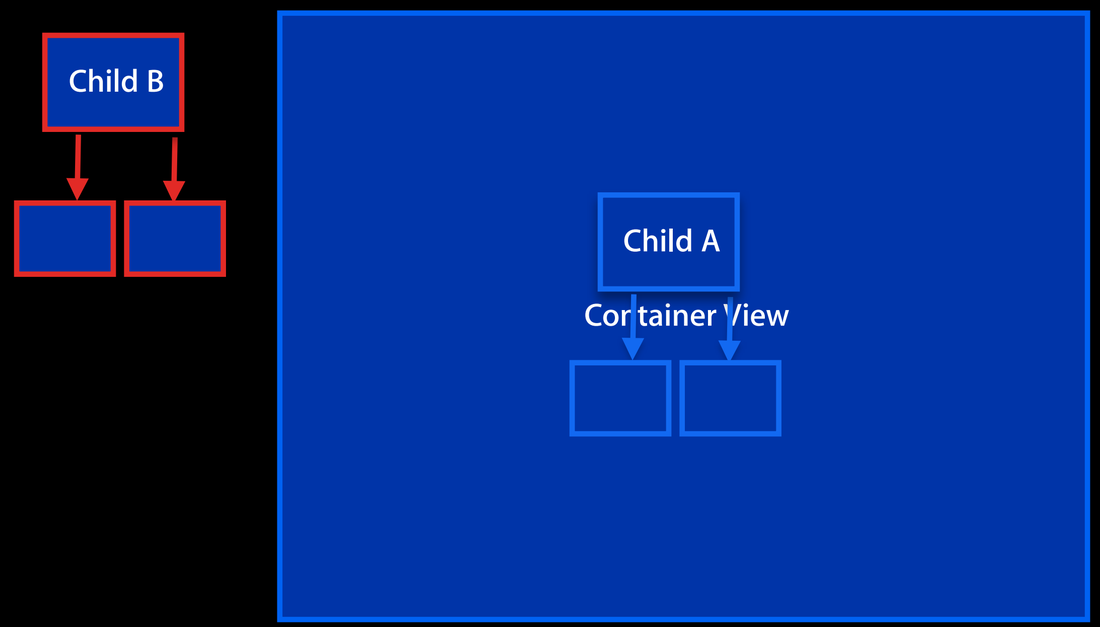
Intermediate State

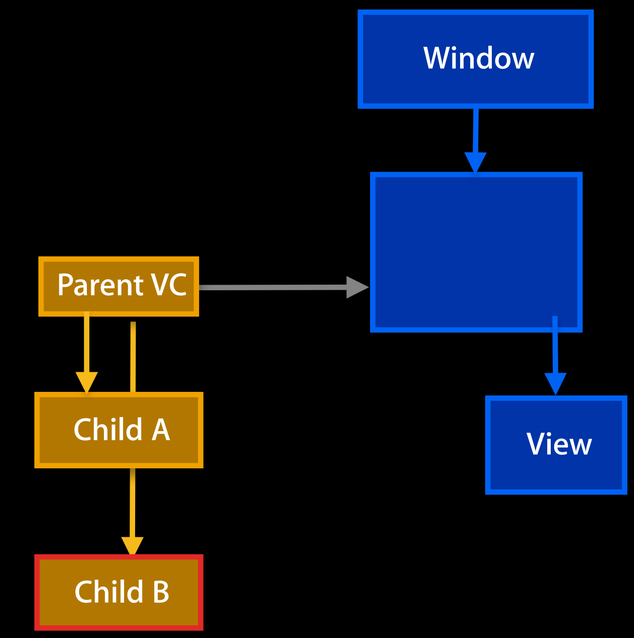


Custom View Controller Transitions

The anatomy of a transition

Intermediate State

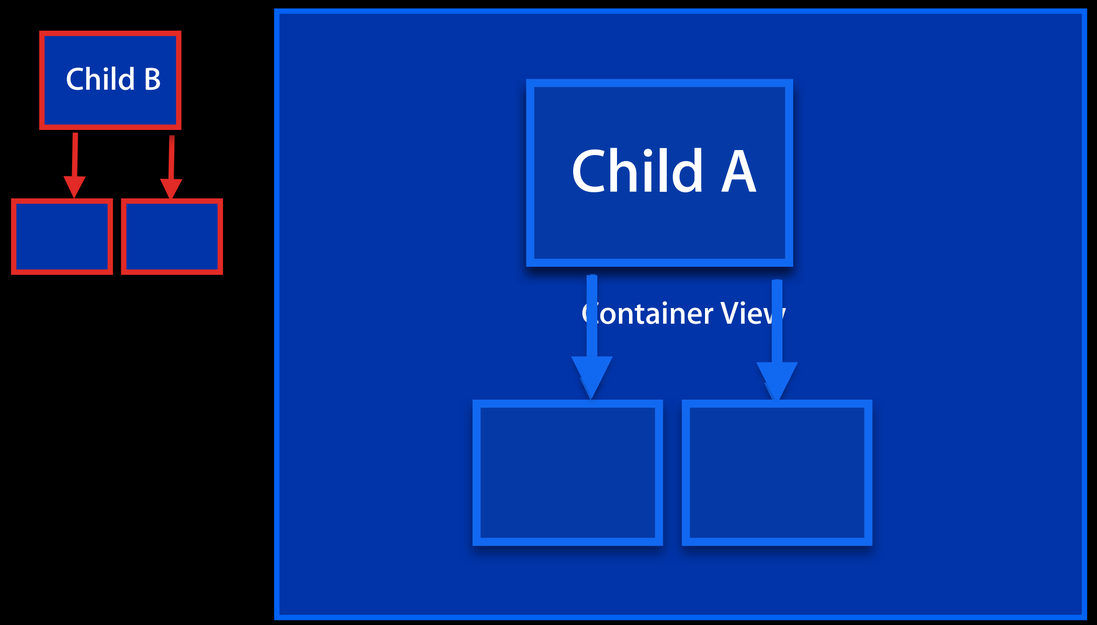


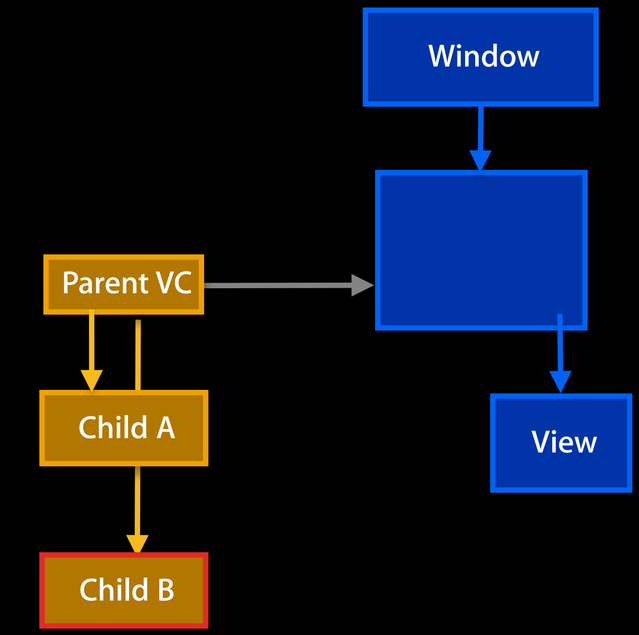


Custom View Controller Transitions

The anatomy of a transition

Intermediate State

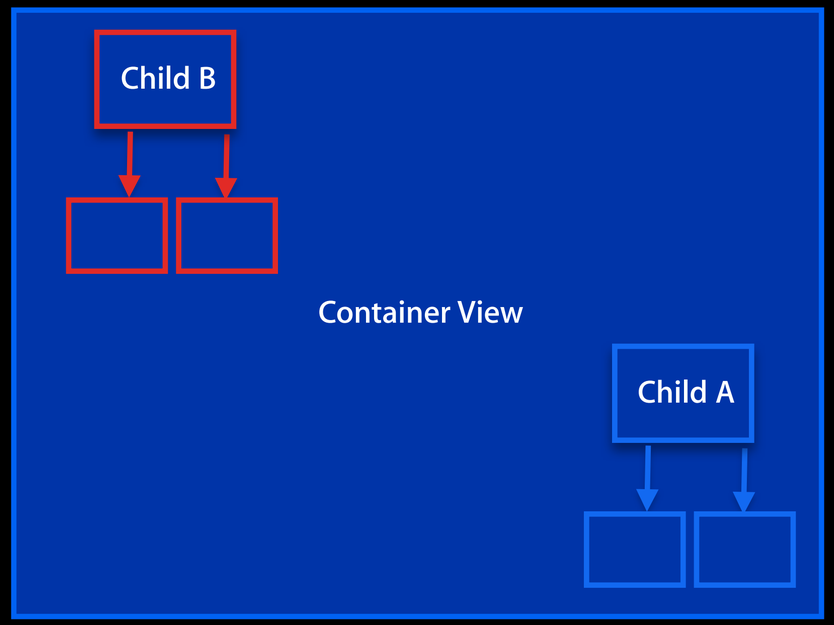


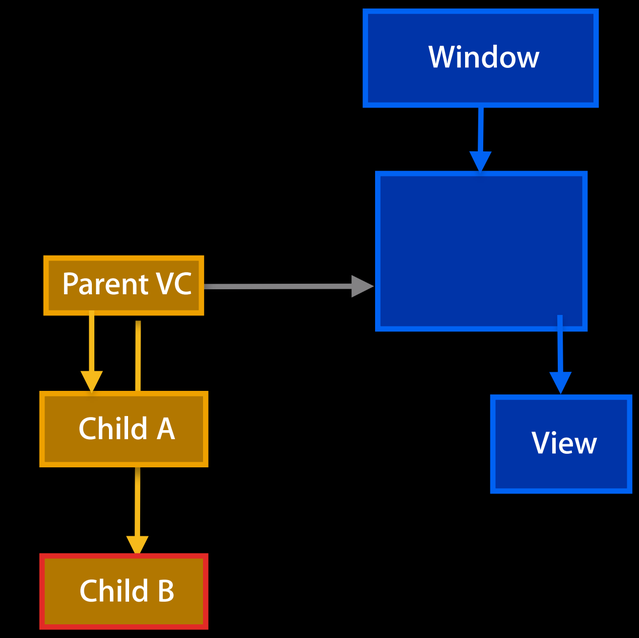


Custom View Controller Transitions

The anatomy of a transition

Intermediate State

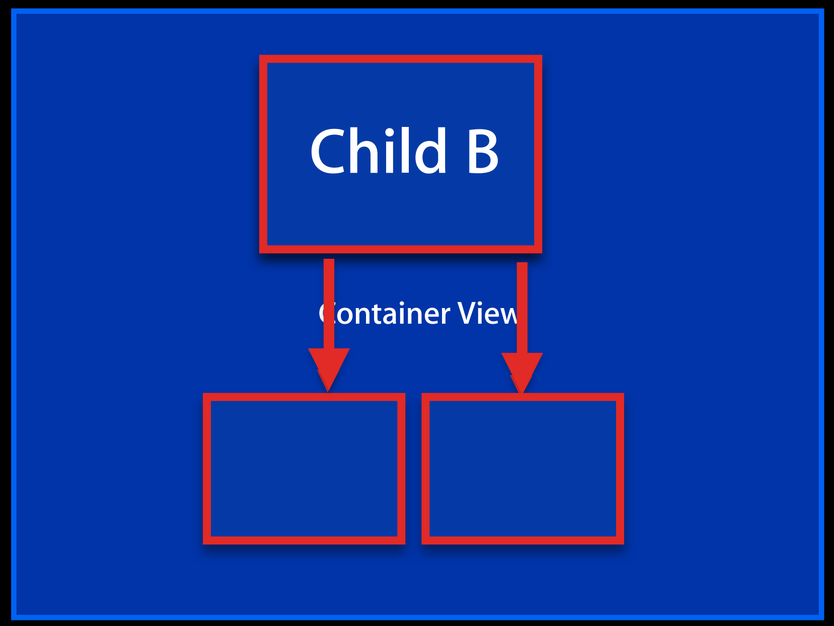


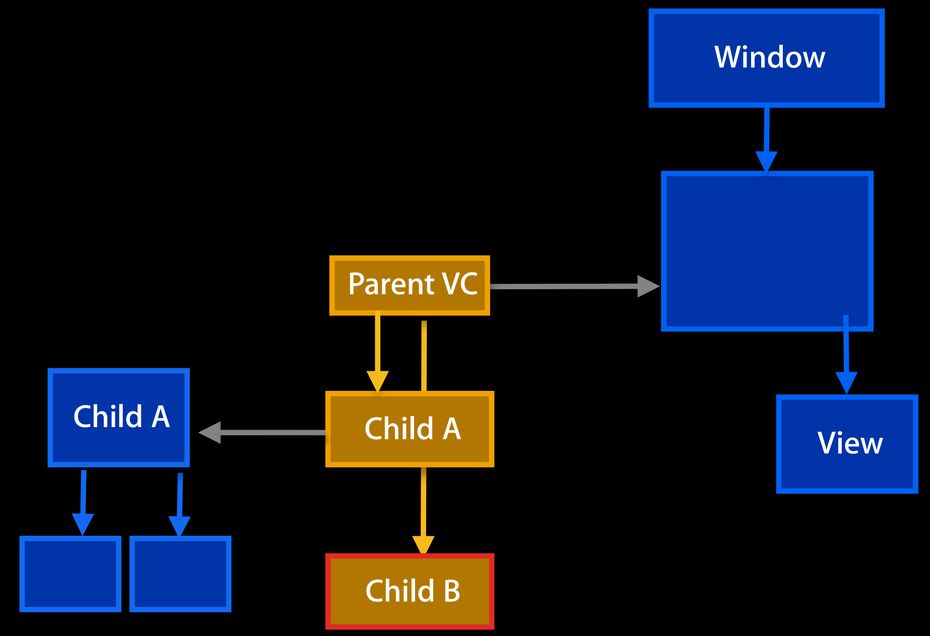


Custom View Controller Transitions

The anatomy of a transition

Intermediate State

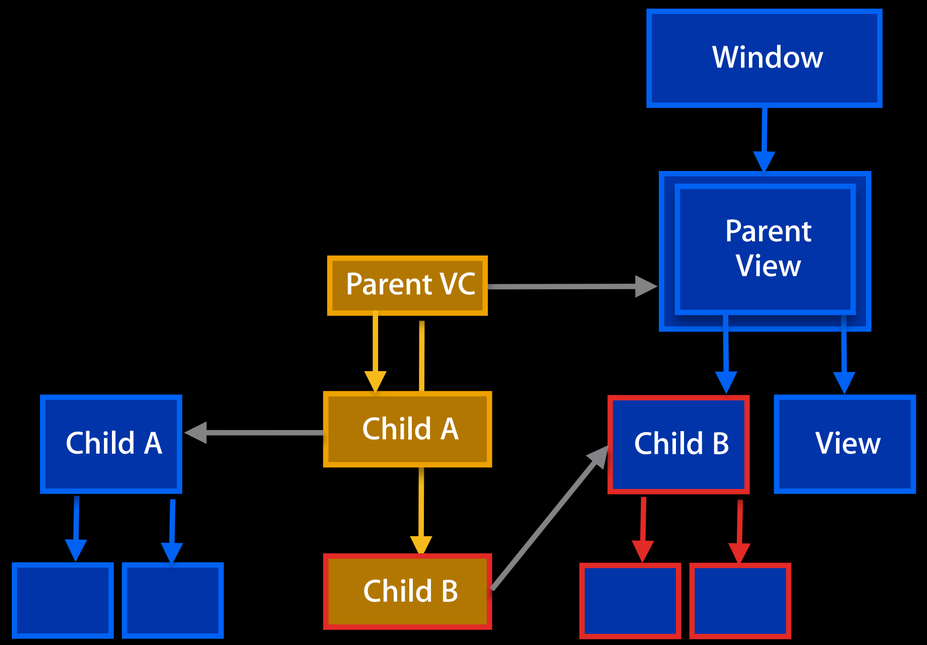




Custom View Controller Transitions

The anatomy of a transition

End State



Custom View Controller Transitions

The anatomy of a transition

Custom View Controller Transitions

The anatomy of a transition

- Start state
  - Consistent view controller hierarchy and view hierarchy

Custom View Controller Transitions

The anatomy of a transition

- Start state
  - Consistent view controller hierarchy and view hierarchy
- User or programmatic transition commences

Custom View Controller Transitions

The anatomy of a transition

- Start state
  - Consistent view controller hierarchy and view hierarchy
- User or programmatic transition commences
- Internal structures are updated, callbacks made, etc.

Custom View Controller Transitions

The anatomy of a transition

- Start state
  - Consistent view controller hierarchy and view hierarchy
- User or programmatic transition commences
- Internal structures are updated, callbacks made, etc.
- Container view, and start and final view positions are computed

Custom View Controller Transitions

The anatomy of a transition

- Start state
  - Consistent view controller hierarchy and view hierarchy
- User or programmatic transition commences
- Internal structures are updated, callbacks made, etc.
- Container view, and start and final view positions are computed
- Optional animation to end state view hierarchy is run

Custom View Controller Transitions

The anatomy of a transition

- Start state
  - Consistent view controller hierarchy and view hierarchy
- User or programmatic transition commences
- Internal structures are updated, callbacks made, etc.
- Container view, and start and final view positions are computed
- Optional animation to end state view hierarchy is run
- Animation completes
  - Internal structures are updated, callbacks made, etc.

Custom View Controller Transitions

The anatomy of a transition

- Start state
  - Consistent view controller hierarchy and view hierarchy
- User or programmatic transition commences
- Internal structures are updated, callbacks made, etc.
- Container view, and start and final view positions are computed
- Optional animation to end state view hierarchy is run
- Animation completes
  - Internal structures are updated, callbacks made, etc.
- End State
  - Consistent view controller hierarchy and view hierarchy

Custom View Controller Transitions

The anatomy of a transition

- Start state
  - Consistent view controller hierarchy and view hierarchy
- User or programmatic transition commences
- Internal structures are updated, callbacks made, etc.
- Container view, and start and final view positions are computed
- Optional animation to end state view hierarchy is run
- Animation completes
  - Internal structures are updated, callbacks made, etc.
- End State
  - Consistent view controller hierarchy and view hierarchy

Custom View Controller Transitions

<UIViewControllerContextTransitioning>

```
@protocol UIViewControllerContextTransitioning <NSObject>

// The view in which the animated transition should take place.
- (UIView *)containerView;

// Two keys for the  method below are currently defined by the system
// UITransitionContextToViewControllerKey, and
UITransitionContextFromViewControllerKey.

- (UIViewController *) viewControllerForKey:(NSString *)key;
- (CGRect) initialFrameForViewController:(UIViewController *)vc;
- (CGRect) finalFrameForViewController:(UIViewController *)vc;

// This MUST be called whenever a transition completes (or is cancelled.)
- (void)completeTransition:(BOOL)didComplete;
...
@end
```

Custom View Controller Transitions

<UIViewControllerContextTransitioning>

```
@protocol UIViewControllerContextTransitioning <NSObject>

// The view in which the animated transition should take place.
- (UIView *)containerView;

// Two keys for the  method below are currently defined by the system
// UITransitionContextToViewControllerKey, and
UITransitionContextFromViewControllerKey.

- (UIViewController *) viewControllerForKey:(NSString *)key;
- (CGRect) initialFrameForViewController:(UIViewController *)vc;
- (CGRect) finalFrameForViewController:(UIViewController *)vc;

// This MUST be called whenever a transition completes (or is cancelled.)
- (void)completeTransition:(BOOL)didComplete;
...
@end
```

Custom View Controller Transitions

<UIViewControllerContextTransitioning>

```
@protocol UIViewControllerContextTransitioning <NSObject>

// The view in which the animated transition should take place.
- (UIView *)containerView;

// Two keys for the  method below are currently defined by the system
// UITransitionContextToViewControllerKey, and
UITransitionContextFromViewControllerKey.

- (UIViewController *) viewControllerForKey:(NSString *)key;
- (CGRect) initialFrameForViewController:(UIViewController *)vc;
- (CGRect) finalFrameForViewController:(UIViewController *)vc;

// This MUST be called whenever a transition completes (or is cancelled.)
- (void)completeTransition:(BOOL)didComplete;
...
@end
```

Custom View Controller Transitions

<UIViewControllerContextTransitioning>

```
@protocol UIViewControllerContextTransitioning <NSObject>

// The view in which the animated transition should take place.
- (UIView *)containerView;

// Two keys for the  method below are currently defined by the system
// UITransitionContextToViewControllerKey, and
UITransitionContextFromViewControllerKey.

- (UIViewController *) viewControllerForKey:(NSString *)key;
- (CGRect) initialFrameForViewController:(UIViewController *)vc;
- (CGRect) finalFrameForViewController:(UIViewController *)vc;

// This MUST be called whenever a transition completes (or is cancelled.)
- (void)completeTransition:(BOOL)didComplete;
...
@end
```

Custom View Controller Transitions

<UIViewControllerAnimatedTransitioning>

```
@protocol UIViewControllerAnimatedTransitioning <NSObject>

- (NSTimeInterval)transitionDuration:(id <UIViewControllerContextTransitioning>)ctx;

// This method can only  be a nop if the transition is interactive and not a
percentDriven interactive transition.
- (void)animateTransition:(id <UIViewControllerContextTransitioning>)ctx;

@optional

// This is a convenience and if implemented will be invoked by the system when the
transition context's completeTransition: method is invoked.
- (void)animationEnded:(BOOL) transitionCompleted;

@end
```

Custom View Controller Transitions

<UIViewControllerAnimatedTransitioning>

```
@protocol UIViewControllerAnimatedTransitioning <NSObject>

- (NSTimeInterval)transitionDuration:(id <UIViewControllerContextTransitioning>)ctx;

// This method can only  be a nop if the transition is interactive and not a
percentDriven interactive transition.
- (void)animateTransition:(id <UIViewControllerContextTransitioning>)ctx;

@optional

// This is a convenience and if implemented will be invoked by the system when the
transition context's completeTransition: method is invoked.
- (void)animationEnded:(BOOL) transitionCompleted;

@end
```

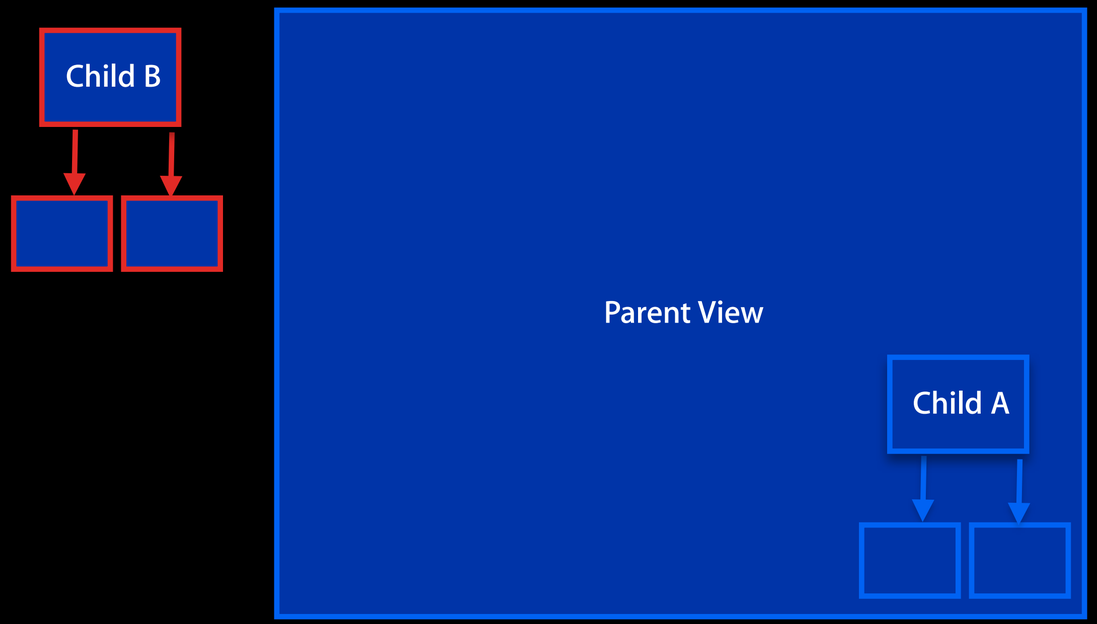
Custom View Controller Transitions

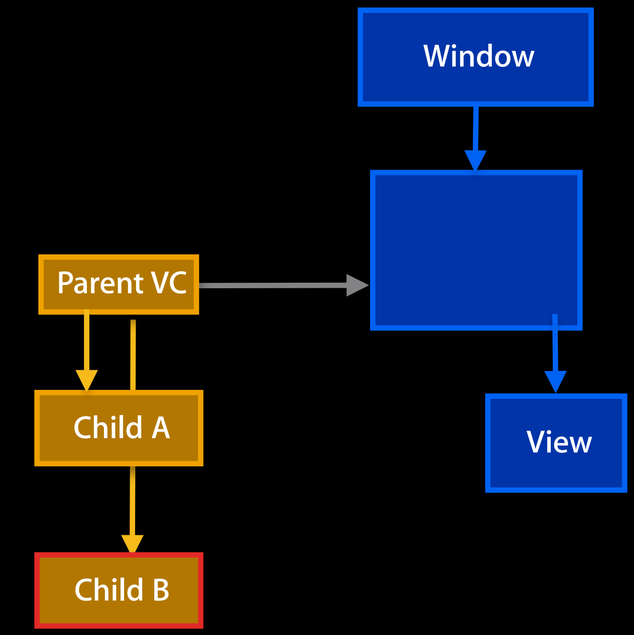
<UIViewControllerAnimatedTransitioning>

```
@protocol UIViewControllerAnimatedTransitioning <NSObject>

- (NSTimeInterval)transitionDuration:(id <UIViewControllerContextTransitioning>)ctx;

// This method can only  be a nop if the transition is interactive and not a
percentDriven interactive transition.
- (void)animateTransition:(id <UIViewControllerContextTransitioning>)ctx;

@optional

// This is a convenience and if implemented will be invoked by the system when the
transition context's completeTransition: method is invoked.
- (void)animationEnded:(BOOL) transitionCompleted;

@end
```

Custom View Controller Transitions

The anatomy of a transition

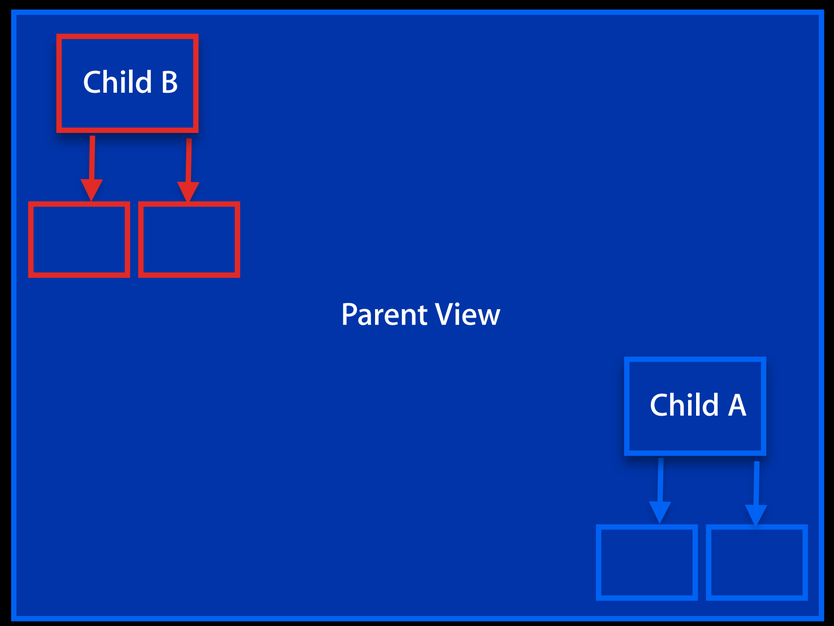


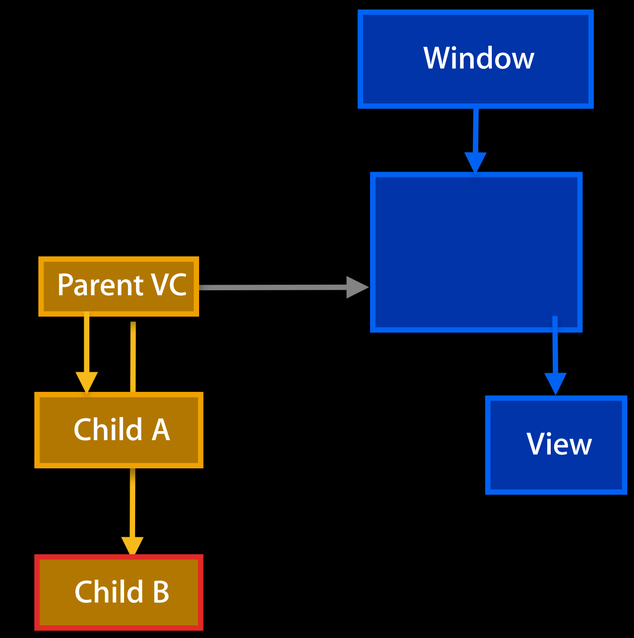


Custom View Controller Transitions

The anatomy of a transition

```
(id <UIViewControllerContextTransitioning>) context;
[animationController animateTransition: context];
```

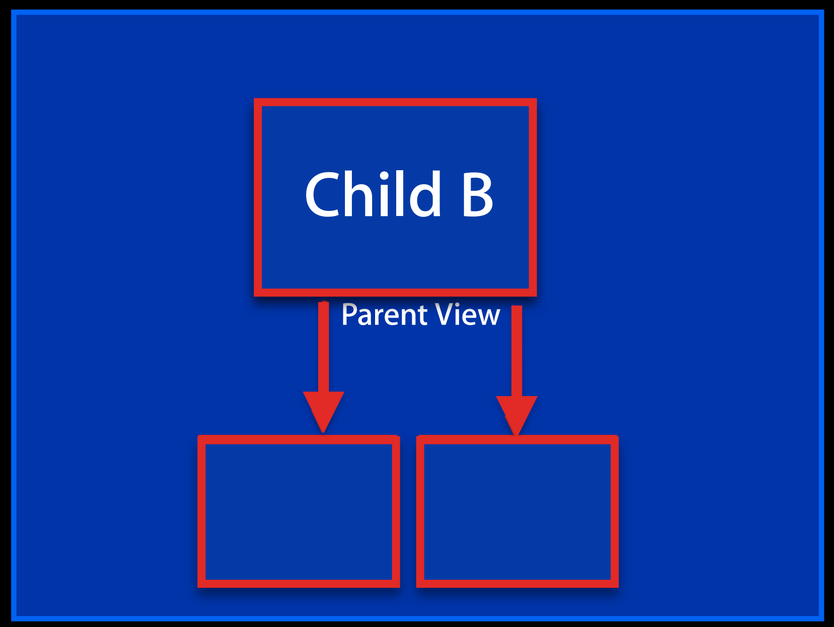


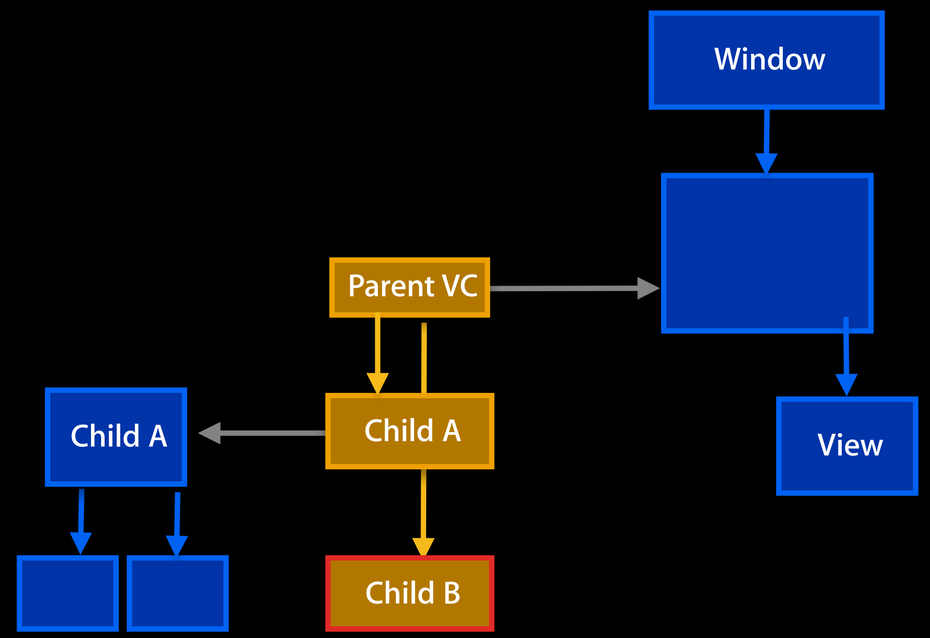


Custom View Controller Transitions

The anatomy of a transition

```
(id <UIViewControllerContextTransitioning>) context;
[animationController animateTransition: context];
```

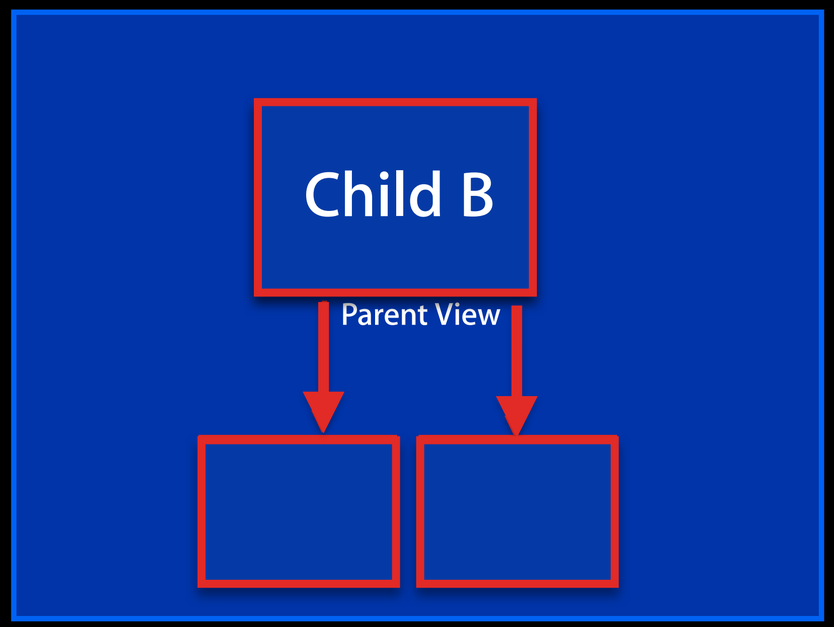


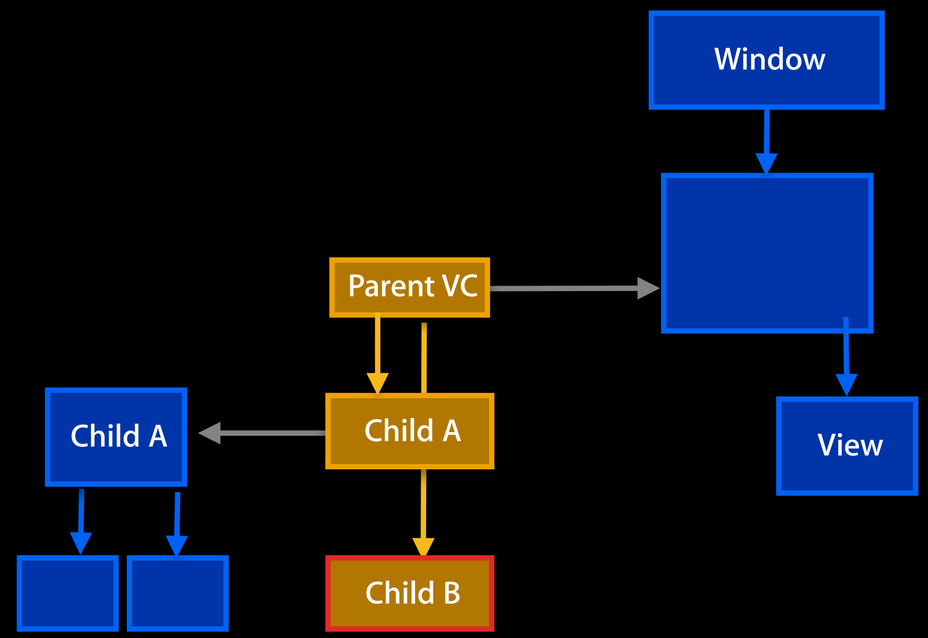


Custom View Controller Transitions

The anatomy of a transition

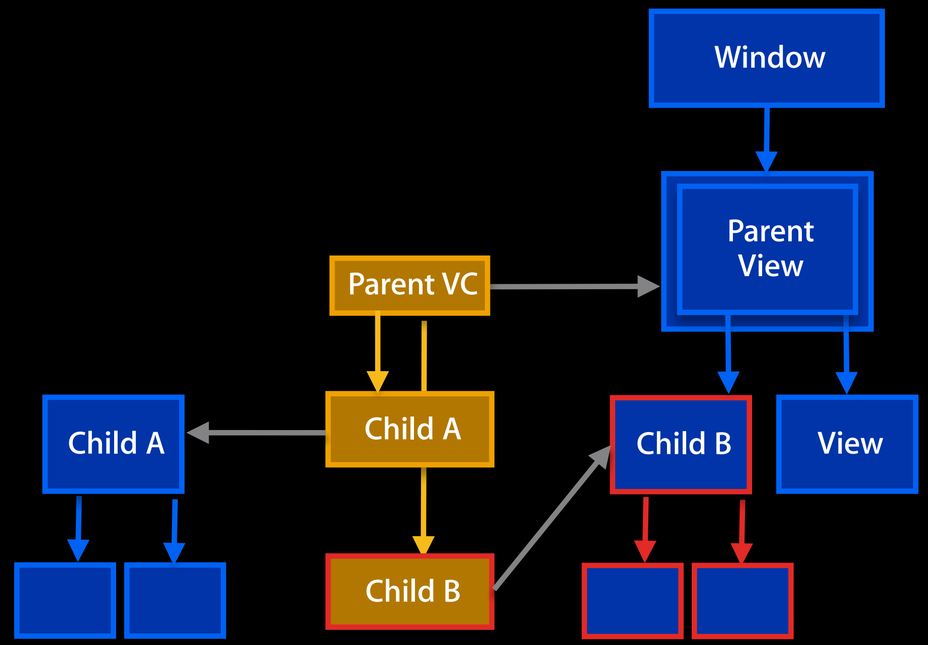
```
(id <UIViewControllerContextTransitioning>) context;
[context completeTransition: YES];
```





Custom View Controller Transitions

The anatomy of a transition



Custom View Controller Transitions

Wiring it all together

Custom View Controller Transitions

Wiring it all together

- Animation and interaction controllers are vended by delegates

```
<UIViewControllerTransitioningDelegate>
<UINavigationControllerDelegate>
<UITabBarControllerDelegate>
```

Custom View Controller Transitions

Wiring it all together

- Animation and interaction controllers are vended by delegates

```
<UIViewControllerTransitioningDelegate>
<UINavigationControllerDelegate>
<UITabBarControllerDelegate>
```

- Animation controllers conform to a protocol

```
<UIViewControllerAnimatedTransitioning>
```

Custom View Controller Transitions

Wiring it all together

- Animation and interaction controllers are vended by delegates

```
<UIViewControllerTransitioningDelegate>
<UINavigationControllerDelegate>
<UITabBarControllerDelegate>
```

- Animation controllers conform to a protocol

```
<UIViewControllerAnimatedTransitioning>
```

- Interaction controllers conform to a protocol

```
<UIViewControllerInteractiveTransitioning>
```

Custom View Controller Transitions

Wiring it all together

- Animation and interaction controllers are vended by delegates

```
<UIViewControllerTransitioningDelegate>
<UINavigationControllerDelegate>
<UITabBarControllerDelegate>
```

- Animation controllers conform to a protocol

```
<UIViewControllerAnimatedTransitioning>
```

- Interaction controllers conform to a protocol

```
<UIViewControllerInteractiveTransitioning>
```

- A system object passed to the controllers conforms to

```
<UIViewControllerContextTransitioning>
```

Custom View Controller Transitions

Start of a custom presentation

Presented Controller

Presenting Controller

transitionDelegate

Custom View Controller Transitions

Start of a custom presentation

Presented Controller

`setTransitioningDelegate:`

<UIViewControllerTransitioningDelegate> (transitionDelegate)

Presenting Controller

transitionDelegate

Custom View Controller Transitions

Start of a custom presentation

Presented Controller

`setTransitioningDelegate:`

<UIViewControllerTransitioningDelegate> (transitionDelegate)

Presenting Controller

`presentViewController:`

Presented Controller

transitionDelegate

Custom View Controller Transitions

Start of a custom presentation

Presented Controller

setTransitioningDelegate:

<UIViewControllerTransitioningDelegate> (transitionDelegate)

Presenting Controller

presentViewController:

Presented Controller

transitionDelegate

animationControllerForPresentingController:
presentedController:sourceController:

<UIViewControllerAnimatedTransitioning> (animationController)

Custom View Controller Transitions

End of a custom presentation

animationController

animationController

context

Custom View Controller Transitions

End of a custom presentation

animationController

`transitionDuration:`

<UIViewControllerContextTransitioning>
(context)

animationController

context

Custom View Controller Transitions

End of a custom presentation

animationController

`transitionDuration:`

<UIViewControllerContextTransitioning>
(context)

animationController

`animateTransition:`

<UIViewControllerContextTransitioning>
(context)

context

Custom View Controller Transitions

End of a custom presentation

animationController `transitionDuration:` <UIViewControllerContextTransitioning> (context)

animationController `animateTransition:` <UIViewControllerContextTransitioning> (context)

context `completeTransition:` animationController

Custom View Controller Transitions

Pseudo-code of a custom presentation

Custom View Controller Transitions

Pseudo-code of a custom presentation

```
id <UIViewControllerTransitioningDelegate> delegate;
[presentedController setTransitioningDelegate:delegate];
[presentedController setModalPresentationStyle: UIModalPresentationCustom];
[self presentViewController:presentedController animated: YES
completion:nil];
```

Custom View Controller Transitions

Pseudo-code of a custom presentation

```
id <UIViewControllerTransitioningDelegate> delegate;
[presentedController setTransitioningDelegate:delegate];
[presentedController setModalPresentationStyle: UIModalPresentationCustom];
[self presentViewController:presentedController animated: YES
completion:nil];
```

```
id <UIViewControllerAnimatedTransitioning> animationController =
[delegate animationControllerForPresentedController: presented
                                presentingController: presenter
                                    sourceController: target];
```

Custom View Controller Transitions

Pseudo-code of a custom presentation

```
id <UIViewControllerContextTransitioning>)ctx;
NSTimeInterval duration =  [animationController transitionDuration:ctx];
[animationController animateTransition:ctx];
```

Custom View Controller Transitions

Pseudo-code of a custom presentation

```
id <UIViewControllerContextTransitioning>)ctx;
NSTimeInterval duration =  [animationController transitionDuration:ctx];
[animationController animateTransition:ctx];
```

Custom View Controller Transitions

Pseudo-code of a custom presentation

```
- (void)animateTransition:(id <UIViewControllerContextTransitioning>ctx {
    UIView *inView = [ctx containerView];
    UIView *toView = [[ctx viewControllerForKey:…]  view];
    UIView *fromView = [[ctx viewControllerForKey: …];
    CGSize size = toEndFrame.size;

    if(self.isPresentation) {
        …
      [inView addSubview: toView];
    }
    else {
        …
      [inView insertSubview:toView belowSubview: [fromVC view]];
    }

    [UIView animateWithDuration: self.transitionDuration animations: ^ {
        if(self.isPresentation) {
            toView.center = newCenter;
            toView.bounds = newBounds;
        }
        else {
        …
        } completion: ^(BOOL finished) { [ctx completeTransition: YES];}];
}
```

Custom View Controller Transitions

Pseudo-code of a custom presentation

```
- (void)animateTransition:(id <UIViewControllerContextTransitioning>ctx {
    UIView *inView = [ctx containerView];
    UIView *toView = [[ctx viewControllerForKey:…]  view];
    UIView *fromView = [[ctx viewControllerForKey: …];
    CGSize size = toEndFrame.size;

    if(self.isPresentation) {
        …
      [inView addSubview: toView];
    }
    else {
        …
      [inView insertSubview:toView belowSubview: [fromVC view]];
    }

    [UIView animateWithDuration: self.transitionDuration animations: ^ {
        if(self.isPresentation) {
            toView.center = newCenter;
            toView.bounds = newBounds;
        }
        else {
        …
        } completion: ^(BOOL finished) { [ctx completeTransition: YES];}];
}
```

Custom View Controller Transitions

Pseudo-code of a custom presentation

```
- (void)animateTransition:(id <UIViewControllerContextTransitioning>ctx {
    UIView *inView = [ctx containerView];
    UIView *toView = [[ctx viewControllerForKey:…]  view];
    UIView *fromView = [[ctx viewControllerForKey: …];
    CGSize size = toEndFrame.size;

    if(self.isPresentation) {
        …
      [inView addSubview: toView];
    }
    else {
        …
      [inView insertSubview:toView belowSubview: [fromVC view]];
    }

    [UIView animateWithDuration: self.transitionDuration animations: ^ {
        if(self.isPresentation) {
            toView.center = newCenter;
            toView.bounds = newBounds;
        }
        else {
        …
        } completion: ^(BOOL finished) { [ctx completeTransition: YES];}];
}
```

Custom View Controller Transitions

Pseudo-code of a custom presentation

```
id <UIViewControllerContextTransitioning>)ctx;
[ctx completeTransition:YES];
```

Custom View Controller Transitions

UIViewControllerTransitioningDelegate

```
@protocol UIViewControllerTransitioningDelegate <NSObject>

@optional

- (id <UIViewControllerAnimatedTransitioning>)
      animationControllerForPresentedController:(UIVC *)presented
                           presentingController:(UIVC *)presenting
                               sourceController:(UIVC *)source;

- (id <UIViewControllerAnimatedTransitioning>)
      animationControllerForDismissedController:(UIVC *)dismissed;

- (id <UIViewControllerInteractiveTransitioning>)
    interactionControllerForPresentation:(id <UIViewControllerAnimatedTransitioning>)a;

- (id <UIViewControllerInteractiveTransitioning>)
    interactionControllerForDismissal:(id <UIViewControllerAnimatedTransitioning>)a;

@end
```

Custom View Controller Transitions

UIViewControllerTransitioningDelegate

```
@protocol UIViewControllerTransitioningDelegate <NSObject>

@optional

- (id <UIViewControllerAnimatedTransitioning>)
      animationControllerForPresentedController:(UIVC *)presented
                           presentingController:(UIVC *)presenting
                               sourceController:(UIVC *)source;

- (id <UIViewControllerAnimatedTransitioning>)
      animationControllerForDismissedController:(UIVC *)dismissed;

- (id <UIViewControllerInteractiveTransitioning>)
    interactionControllerForPresentation:(id <UIViewControllerAnimatedTransitioning>)a;

- (id <UIViewControllerInteractiveTransitioning>)
    interactionControllerForDismissal:(id <UIViewControllerAnimatedTransitioning>)a;

@end
```

Custom View Controller Transitions

UIViewControllerTransitioningDelegate

```
@protocol UIViewControllerTransitioningDelegate <NSObject>

@optional

- (id <UIViewControllerAnimatedTransitioning>)
      animationControllerForPresentedController:(UIVC *)presented
                           presentingController:(UIVC *)presenting
                               sourceController:(UIVC *)source;

- (id <UIViewControllerAnimatedTransitioning>)
      animationControllerForDismissedController:(UIVC *)dismissed;

- (id <UIViewControllerInteractiveTransitioning>)
    interactionControllerForPresentation:(id <UIViewControllerAnimatedTransitioning>)a;

- (id <UIViewControllerInteractiveTransitioning>)
    interactionControllerForDismissal:(id <UIViewControllerAnimatedTransitioning>)a;

@end
```

Custom View Controller Transitions

UIViewControllerTransitioningDelegate

```
@interface UIViewController(CustomTransitioning)

@property (nonatomic,retain) id <UIViewControllerTransitioningDelegate>transitionDelegate;

@end
```

Custom View Controller Transitions

UIViewControllerTransitioningDelegate

```
@interface UIViewController(CustomTransitioning)

@property (nonatomic,retain) id <UIViewControllerTransitioningDelegate>transitionDelegate;

@end
```

Custom View Controller Transitions

UINavigationControllerDelegate Extensions

```
- (id <UIViewControllerAnimatedTransitioning>)navigationController:  (UINC *)nc
          animationControllerForOperation: (UINavigationControllerOperation)op
                       fromViewController:(UIViewController *)fromVC
                         toViewController:(UIViewController *)toVC;

- (id <UIViewControllerInteractiveTransitioning>)navigationController: (UINC *)nc
interactionControllerForAnimationController: (id <UIViewControllerAnimatedTransitioning>)a;
```

Custom View Controller Transitions

UITabBarControllerDelegate Extensions

```
- (id <UIViewControllerAnimatedTransitioning>)tabBarController: (UITABC *)tbc
            animationControllerForTransitionFromViewController:(UIVC *)fromVC
                                              toViewController:(UIVC *)toVC;

- (id <UIViewControllerInteractiveTransitioning>)tabBarController: (UITABC *)tbc
interactionControllerForAnimationController: (id <UIViewControllerAnimatedTransitioning>)a;
```

Custom View Controller Transitions

Responsibilities of the animation controller

Custom View Controller Transitions

Responsibilities of the animation controller

- Implementation of `animateTransition:` and `transitionDuration:`
  - Insertion of “to” view controller’s view into the container view

Custom View Controller Transitions

Responsibilities of the animation controller

- Implementation of `animateTransition:` and `transitionDuration:`
  - Insertion of "to" view controller's view into the container view
- When the transition animation completes
  - The "to" and "from" view controller's views need to be in their designated positions
  - The context's `completeTransition:` method must be invoked

Interactive View Controller Transitions

Introduction

Interactive View Controller Transitions

Running transition animations interactively

- UINavigationController
  - Interactive pop gesture is pervasive on iOS 7.0

Interactive View Controller Transitions

Running transition animations interactively

- UINavigationController
  - Interactive pop gesture is pervasive on iOS 7.0
- Applications can define their own interactive transitions

Interactive View Controller Transitions

Running transition animations interactively

- UINavigationController
  - Interactive pop gesture is pervasive on iOS 7.0
- Applications can define their own interactive transitions
  - Interactive transitions need not be gesture driven

Interactive View Controller Transitions

Running transition animations interactively

- UINavigationController
  - Interactive pop gesture is pervasive on iOS 7.0
- Applications can define their own interactive transitions
  - Interactive transitions need not be gesture driven
  - Interactive transitions usually run forwards and backwards
    - Often a transition can start and be cancelled

Interactive View Controller Transitions

Running transition animations interactively

- UINavigationController
  - Interactive pop gesture is pervasive on iOS 7.0
- Applications can define their own interactive transitions
  - Interactive transitions need not be gesture driven
    - Interactive transitions usually run forwards and backwards
      - Often a transition can start and be cancelled
- UIKit provides a concrete interaction controller class
  - UIPercentDrivenInteractiveTransition

Interactive View Controller Transitions

<UIViewControllerInteractiveTransitioning>

```
@protocol UIViewControllerInteractiveTransitioning <NSObject>

- (void)startInteractiveTransition:(id <UIViewControllerContextTransitioning>)ctx;

@optional
- (CGFloat)completionSpeed;
- (UIViewAnimationCurve)completionCurve;

@end
```

Interactive View Controller Transitions

<UIViewControllerInteractiveTransitioning>

```
@protocol UIViewControllerInteractiveTransitioning <NSObject>

- (void)startInteractiveTransition:(id <UIViewControllerContextTransitioning>)ctx;

@optional
- (CGFloat)completionSpeed;
- (UIViewAnimationCurve)completionCurve;

@end
```

Interactive View Controller Transitions

Start of an interactive presentation

Presented Controller

Presenting Controller

transitionDelegate

Interactive View Controller Transitions

Start of an interactive presentation

Presented Controller

`setTransitioningDelegate:`

<UIViewControllerTransitioningDelegate> (transitionDelegate)

Presenting Controller

transitionDelegate

Interactive View Controller Transitions

Start of an interactive presentation

Presented Controller

`setTransitioningDelegate:`

<UIViewControllerTransitioningDelegate> (transitionDelegate)

Presenting Controller

`presentViewController:`

Presented Controller

transitionDelegate

Interactive View Controller Transitions

Start of an interactive presentation

Presented Controller

setTransitioningDelegate:

<UIViewControllerTransitioningDelegate> (transitionDelegate)

Presenting Controller

presentViewController:

Presented Controller

animationControllerForPresentingController:
presentedController:sourceController:

transitionDelegate

interactionControllerForPresentation:

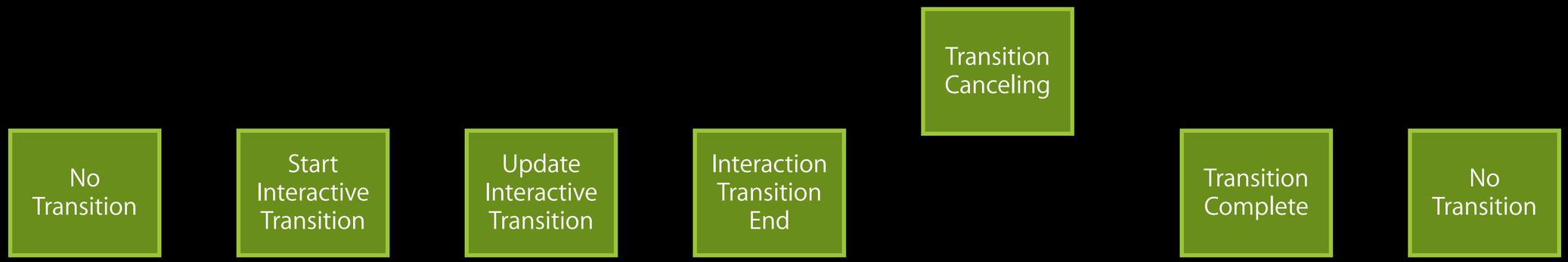
<UIViewControllerAnimatedTransitioning> (animationController)

<UIViewControllerInteractiveTransitioning> (interactionController)

UIViewControllerTransitioning

Interactive transitioning states

States

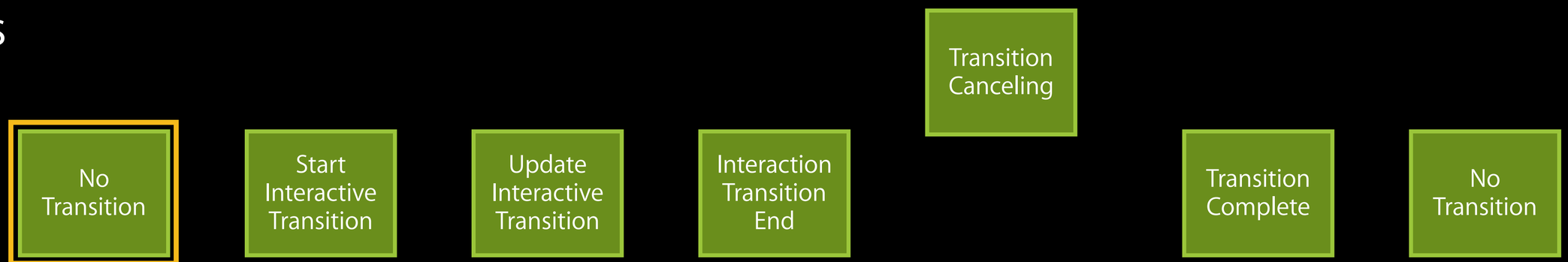


Agents

UIViewControllerTransitioning

Interactive transitioning states

States

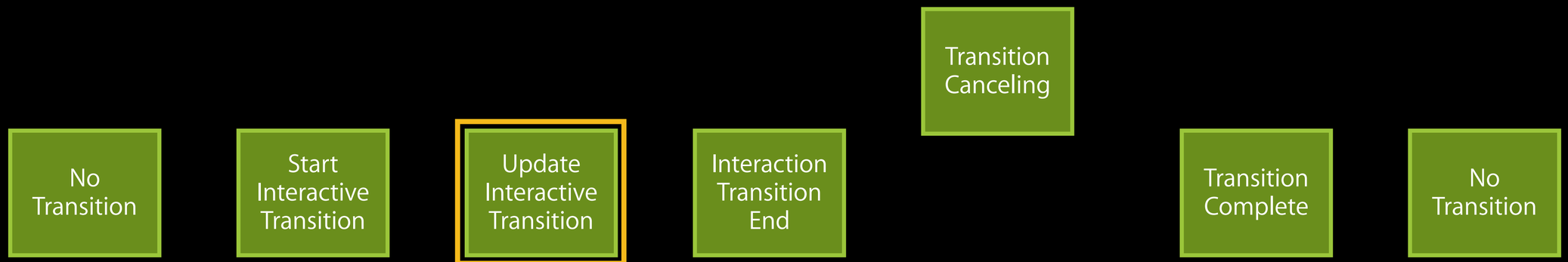


Agents

UIViewControllerTransitioning

Interactive transitioning states

States

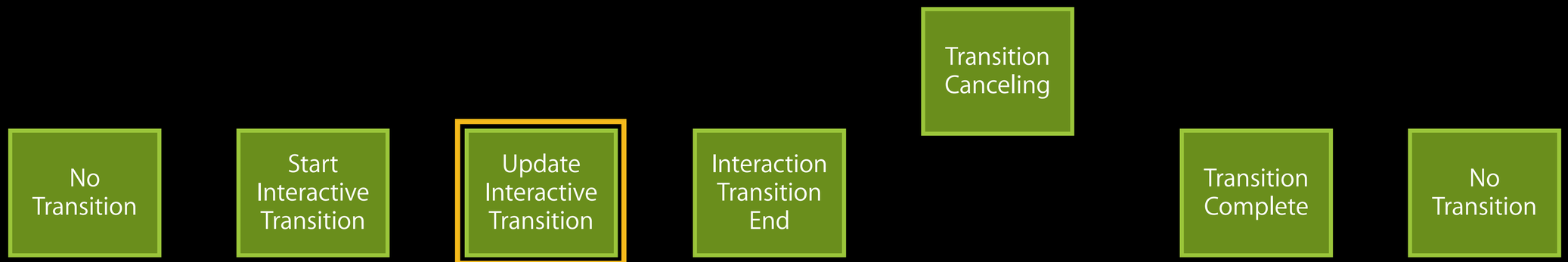


Agents

UIViewControllerTransitioning

Interactive transitioning states

States

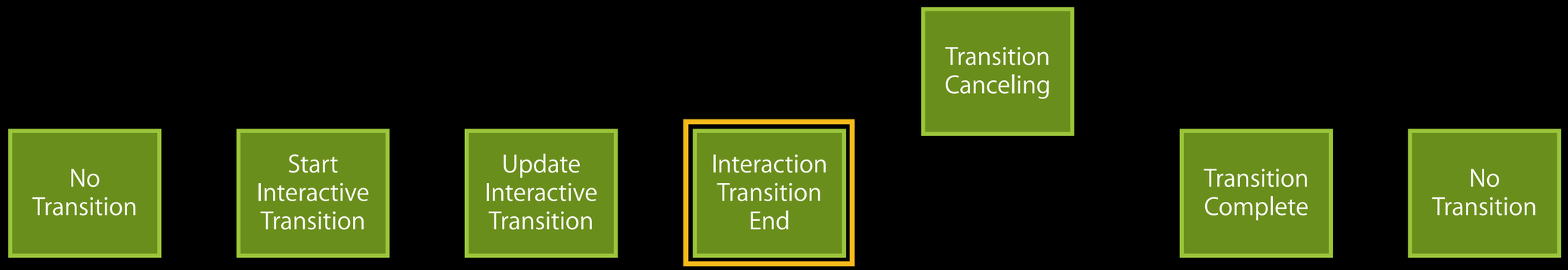


Agents

UIViewControllerTransitioning

Interactive transitioning states

States



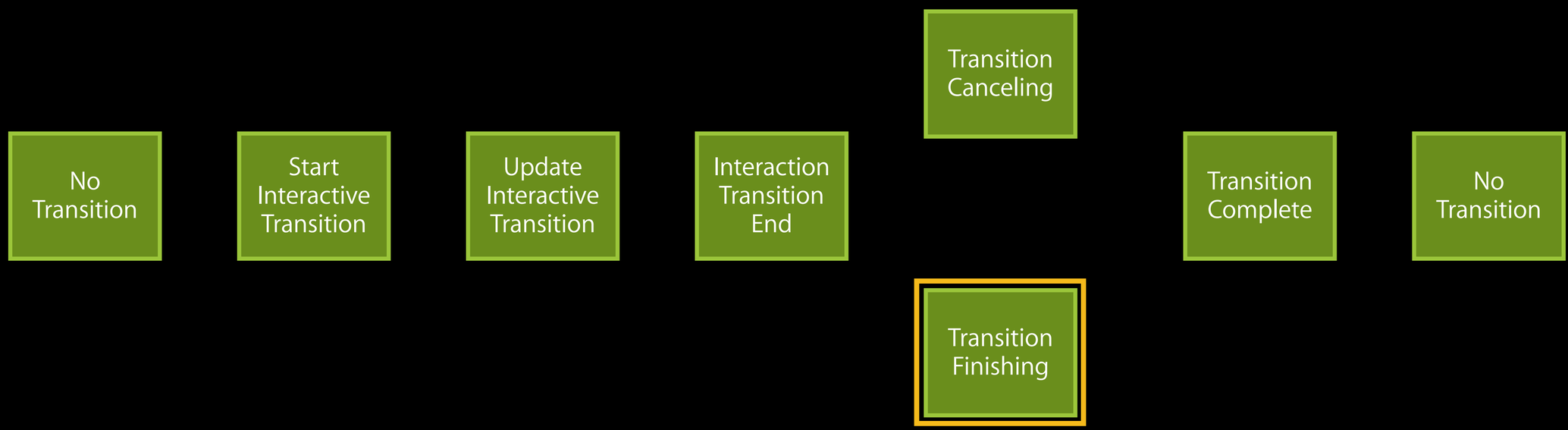
Agents

`finishInteractiveTransition`

UIViewControllerTransitioning

Interactive transitioning states

States

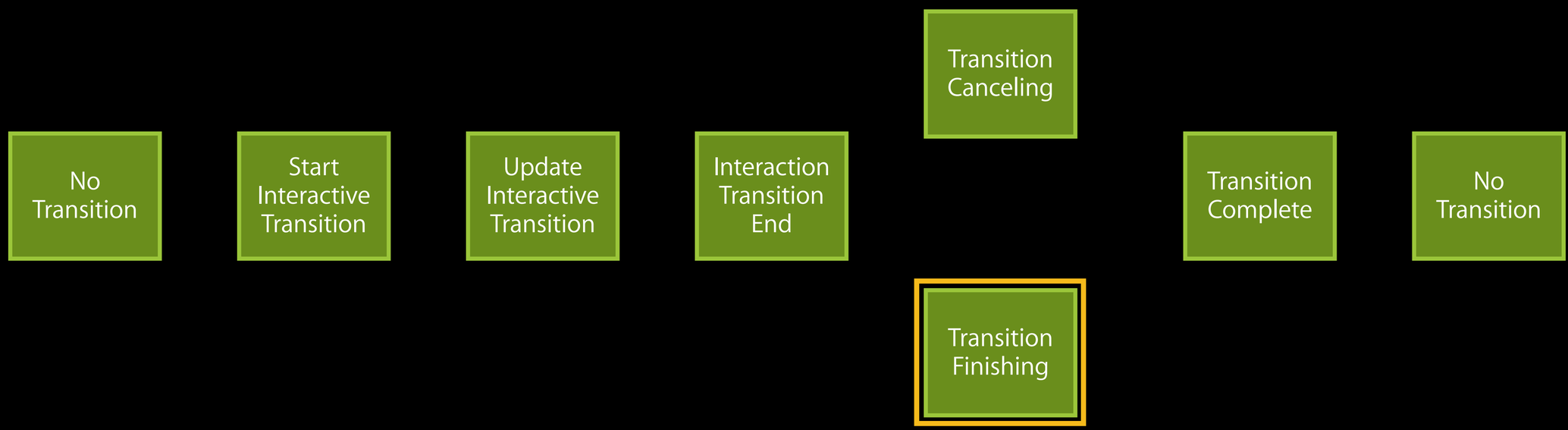


Agents

UIViewControllerTransitioning

Interactive transitioning states

States

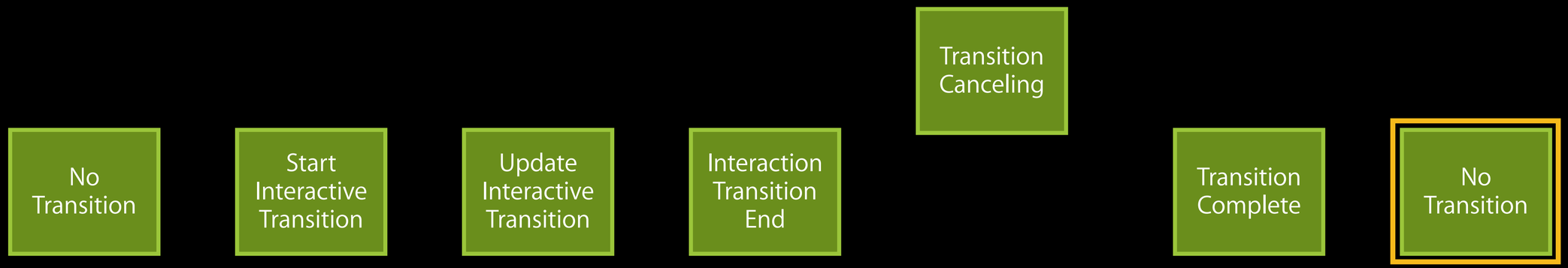


Agents

UIViewControllerTransitioning

Interactive transitioning states

States

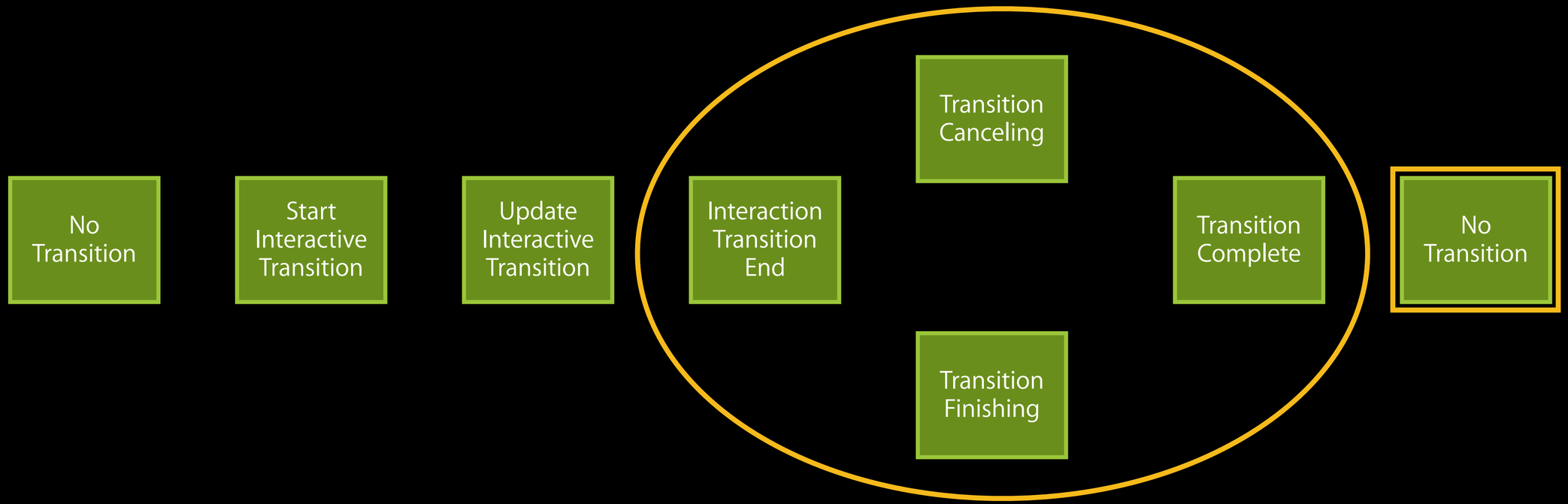


Agents

UIViewControllerTransitioning

Interactive transitioning states

States



Agents

Interactive View Controller Transitions

The easy way—use UIViewControllerPercentDrivenTransition

Interactive View Controller Transitions

The easy way—use UIViewControllerPercentDrivenTransition

- Implement the animation controller
  - animatePresentation: must be implemented using the UIView animation block APIs

Interactive View Controller Transitions

The easy way—use UIViewControllerPercentDrivenTransition

- Implement the animation controller
  - animatePresentation: must be implemented using the UIView animation block APIs
- Implement the logic that will drive the interaction
  - e.g. The target of a gesture recognizer
  - Often this target is a subclass of UIViewControllerPercentDrivenTransition

Interactive View Controller Transitions

The easy way—use UIViewControllerPercentDrivenTransition

- Implement the animation controller
  - animatePresentation: must be implemented using the UIView animation block APIs
- Implement the logic that will drive the interaction
  - e.g. The target of a gesture recognizer
  - Often this target is a subclass of UIViewControllerPercentDrivenTransition
  - The interaction logic will call
    - updateInteractiveTransition:(CGFloat)percent
    - completeInteractiveTransition or cancelInteractiveTransition
    - (Note that startInteractiveTransition is handled automatically)

Interactive View Controller Transitions

UIPercentDrivenInteractiveTransition

```
// The associated animation controller must animate its transition using UIView animation APIs.
@interface UIPercentDrivenInteractiveTransition : NSObject <UIViewControllerInteractiveTransitioning>

@property (readonly) CGFloat duration;
// The last percentComplete value specified by updateInteractiveTransition:
@property (readonly) CGFloat percentComplete;

// completionSpeed defaults to 1.0 which corresponds to a completion duration of
// (1 - percentComplete)*duration.  It must be greater than 0.0.
@property (nonatomic,assign) CGFloat completionSpeed;

// When the interactive part of the transition has completed, this property can
// be set to indicate a different animation curve.
@property (nonatomic,assign) UIViewAnimationCurve completionCurve;

// Used instead of the corresponding context methods.
- (void)updateInteractiveTransition:(CGFloat)percentComplete;
- (void)cancelInteractiveTransition;
- (void)finishInteractiveTransition;
@end
```

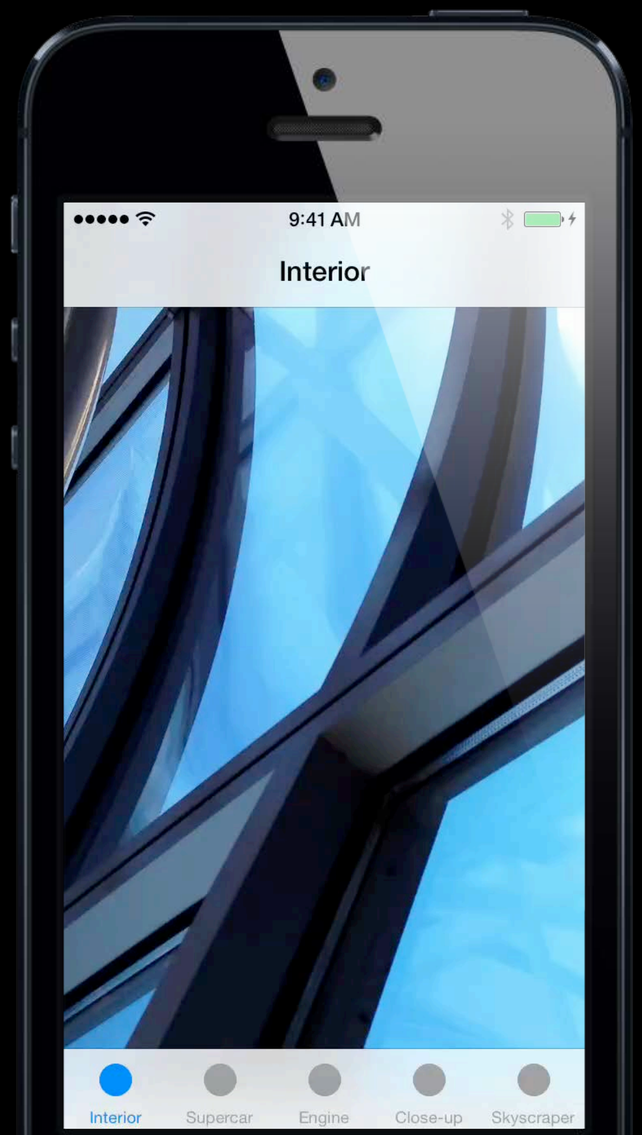
Interactive View Controller Transitions

UIPercentDrivenInteractiveTransition

```
// The associated animation controller must animate its transition using UIView animation APIs.
@interface UIPercentDrivenInteractiveTransition : NSObject <UIViewControllerInteractiveTransitioning>

@property (readonly) CGFloat duration;
// The last percentComplete value specified by updateInteractiveTransition:
@property (readonly) CGFloat percentComplete;

// completionSpeed defaults to 1.0 which corresponds to a completion duration of
// (1 - percentComplete)*duration.  It must be greater than 0.0.
@property (nonatomic,assign) CGFloat completionSpeed;

// When the interactive part of the transition has completed, this property can
// be set to indicate a different animation curve.
@property (nonatomic,assign) UIViewAnimationCurve completionCurve;

// Used instead of the corresponding context methods.
- (void)updateInteractiveTransition:(CGFloat)percentComplete;
- (void)cancelInteractiveTransition;
- (void)finishInteractiveTransition;
@end
```

Interactive View Controller Transitions

The easy way—use UIViewControllerPercentDrivenTransition



Interactive View Controller Transitions

The easy way—use UIViewControllerPercentDrivenTransition

Interactive View Controller Transitions

UIPercentDrivenInteractiveTransition

```
@interface YYSlideInteractor : UIPercentDrivenInteractiveTransition

- (instancetype)initWithNavigationController:(UINavigationController *)nc;

@property(nonatomic,assign) UINavigationController *parent;
@property(nonatomic,assign,getter = isInteractive) BOOL interactive;

@end
```

Interactive View Controller Transitions

UIPercentDrivenInteractiveTransition

```
- (void)handlePinch:(UIPinchGestureRecognizer *)gr {
  CGFloat scale = [gr scale];
  switch ([gr state]) {
      case UIGestureRecognizerStateBegan:
          self.interactive = YES; _startScale = scale;
          [self.parent popViewControllerAnimated:YES];
          break;
      case UIGestureRecognizerStateChanged: {
          CGFloat percent = (1.0 - scale/_startScale);
          [self updateInteractiveTransition: (percent <= 0.0) ? 0.0 : percent];
          break;
      }
      case UIGestureRecognizerStateEnded:
      case UIGestureRecognizerStateCancelled:
          if([gr velocity] >= 0.0 || [gr state] == UIGestureRecognizerStateCancelled)
            [self cancelInteractiveTransition];
          else
            [self finishInteractiveTransition];
          self.interactive = NO;
          break;
    }
}
```

Interactive View Controller Transitions

UIPercentDrivenInteractiveTransition

```
- (void)handlePinch:(UIPinchGestureRecognizer *)gr {
  CGFloat scale = [gr scale];
  switch ([gr state]) {
      case UIGestureRecognizerStateBegan:
          self.interactive = YES; _startScale = scale;
          [self.parent popViewControllerAnimated:YES];
          break;
      case UIGestureRecognizerStateChanged: {
          CGFloat percent = (1.0 - scale/_startScale);
          [self updateInteractiveTransition: (percent <= 0.0) ? 0.0 : percent];
          break;
      }
      case UIGestureRecognizerStateEnded:
      case UIGestureRecognizerStateCancelled:
          if([gr velocity] >= 0.0 || [gr state] == UIGestureRecognizerStateCancelled)
            [self cancelInteractiveTransition];
          else
            [self finishInteractiveTransition];
          self.interactive = NO;
          break;
    }
}
```

Interactive View Controller Transitions

UIPercentDrivenInteractiveTransition

```
- (void)handlePinch:(UIPinchGestureRecognizer *)gr {
  CGFloat scale = [gr scale];
  switch ([gr state]) {
      case UIGestureRecognizerStateBegan:
          self.interactive = YES; _startScale = scale;
          [self.parent popViewControllerAnimated:YES];
          break;
      case UIGestureRecognizerStateChanged: {
          CGFloat percent = (1.0 - scale/_startScale);
          [self updateInteractiveTransition: (percent <= 0.0) ? 0.0 : percent];
          break;
      }
      case UIGestureRecognizerStateEnded:
      case UIGestureRecognizerStateCancelled:
          if([gr velocity] >= 0.0 || [gr state] == UIGestureRecognizerStateCancelled)
            [self cancelInteractiveTransition];
          else
            [self finishInteractiveTransition];
          self.interactive = NO;
          break;
    }
}
```

Interactive View Controller Transitions

UIPercentDrivenInteractiveTransition

```
- (void)handlePinch:(UIPinchGestureRecognizer *)gr {
  CGFloat scale = [gr scale];
  switch ([gr state]) {
      case UIGestureRecognizerStateBegan:
          self.interactive = YES; _startScale = scale;
          [self.parent popViewControllerAnimated:YES];
          break;
      case UIGestureRecognizerStateChanged: {
          CGFloat percent = (1.0 - scale/_startScale);
          [self updateInteractiveTransition: (percent <= 0.0) ? 0.0 : percent];
          break;
      }
      case UIGestureRecognizerStateEnded:
      case UIGestureRecognizerStateCancelled:
          if([gr velocity] >= 0.0 || [gr state] == UIGestureRecognizerStateCancelled)
            [self cancelInteractiveTransition];
          else
            [self finishInteractiveTransition];
          self.interactive = NO;
          break;
    }
}
```

Interactive Collection View Layout Transitions

Olivier Gutknecht

UICollectionViewTransitionLayout

UICollectionViewTransitionLayout

- A new layout interpolating between two layouts

UICollectionViewTransitionLayout

- A new layout interpolating between two layouts
- Interactively or not, with the `transitionProgress` property

UICollectionViewTransitionLayout

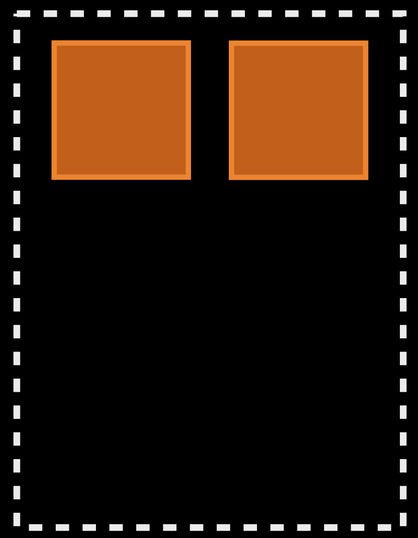
- A new layout interpolating between two layouts
- Interactively or not, with the `transitionProgress` property
- Subclassable

UICollectionViewTransitionLayout

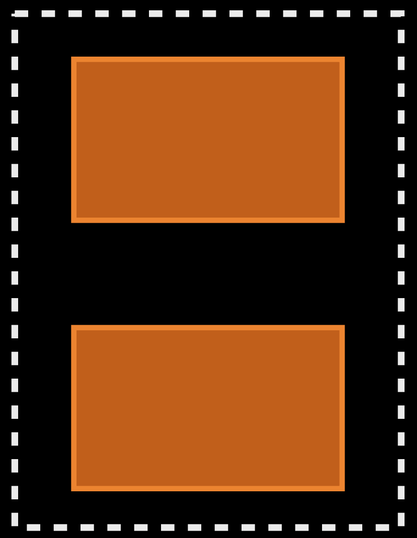
- A new layout interpolating between two layouts
- Interactively or not, with the `transitionProgress` property
- Subclassable
- Simple integration with view controller transitions

Collection Views and Transition Layout

UICollectionViewTransitionLayout



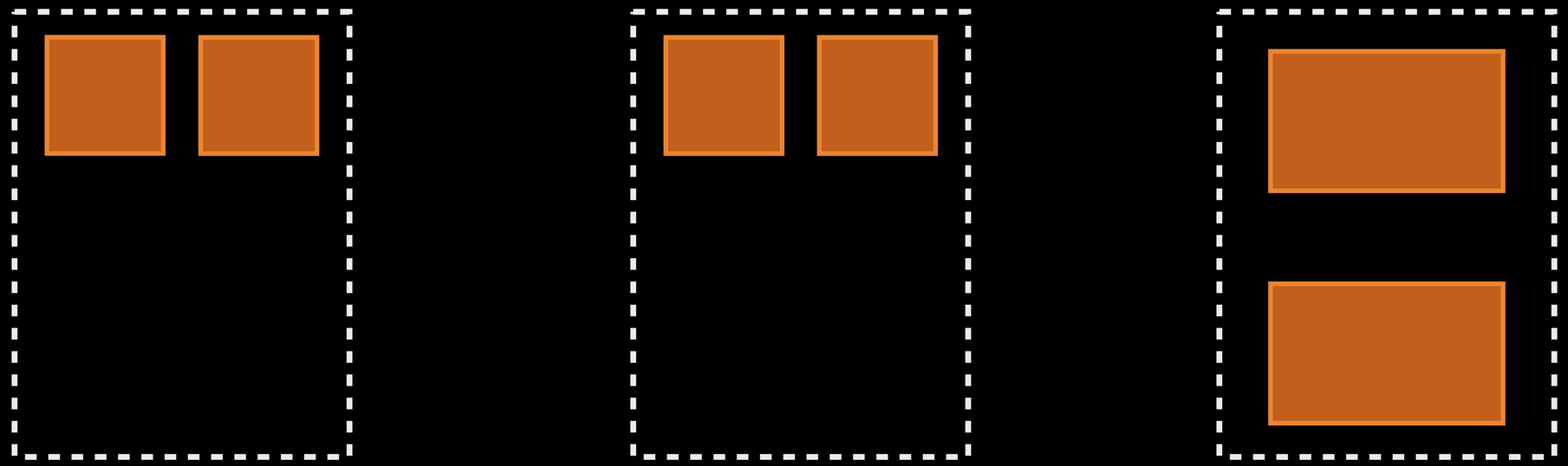
Layout A



Layout B

Collection Views and Transition Layout

UICollectionViewTransitionLayout



Layout A

Transition Layout

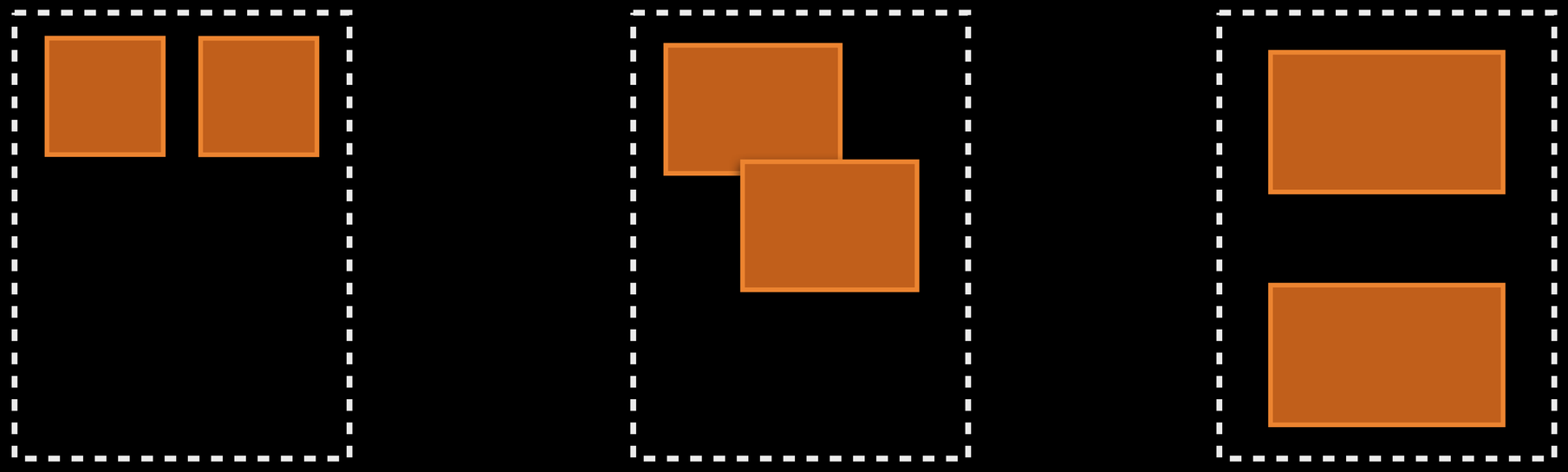
`transitionProgress`

0.0

Layout B

Collection Views and Transition Layout

UICollectionViewTransitionLayout



Layout A

Transition Layout

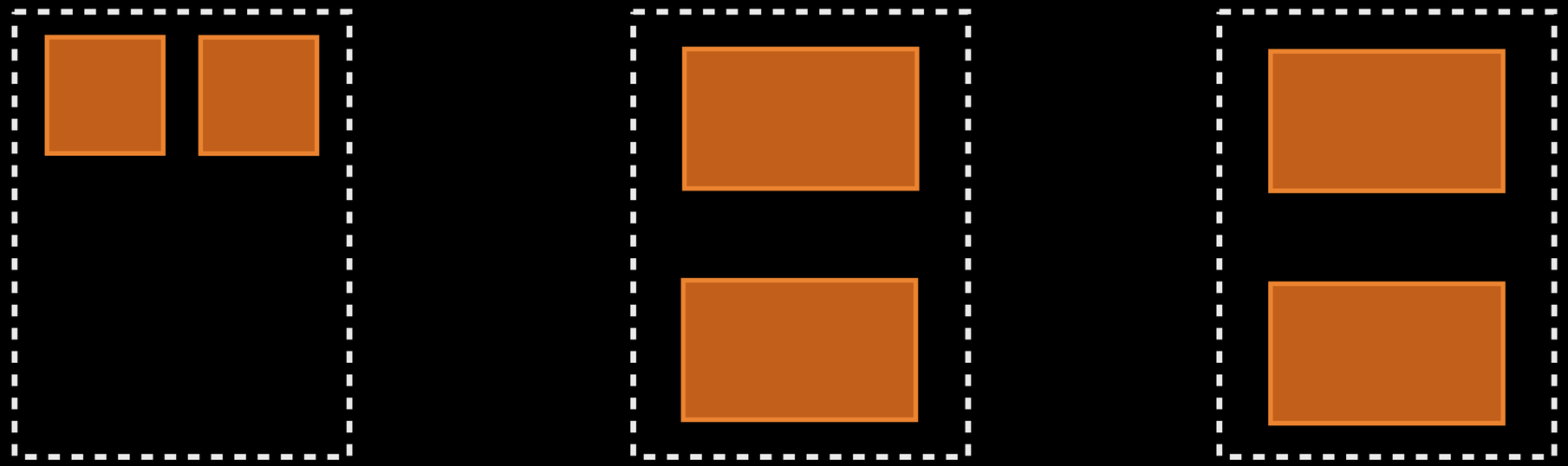
`transitionProgress`

0.5

Layout B

Collection Views and Transition Layout

UICollectionViewTransitionLayout



Layout A

Transition Layout

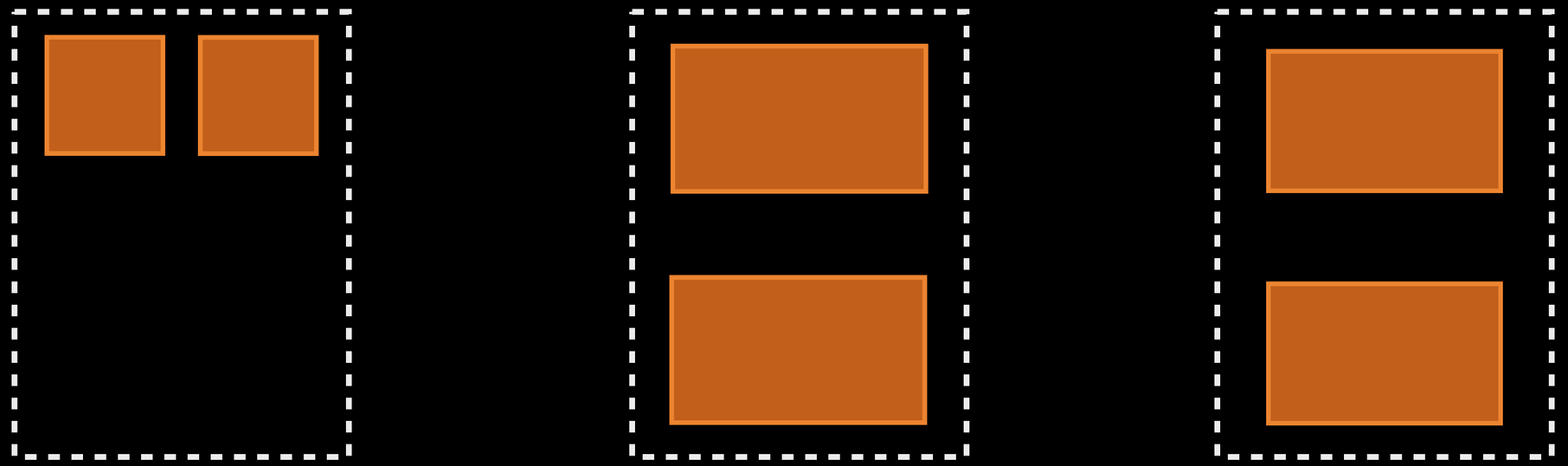
`transitionProgress`

1.0

Layout B

Collection Views and Transition Layout

UICollectionViewTransitionLayout



Layout A

Transition Layout

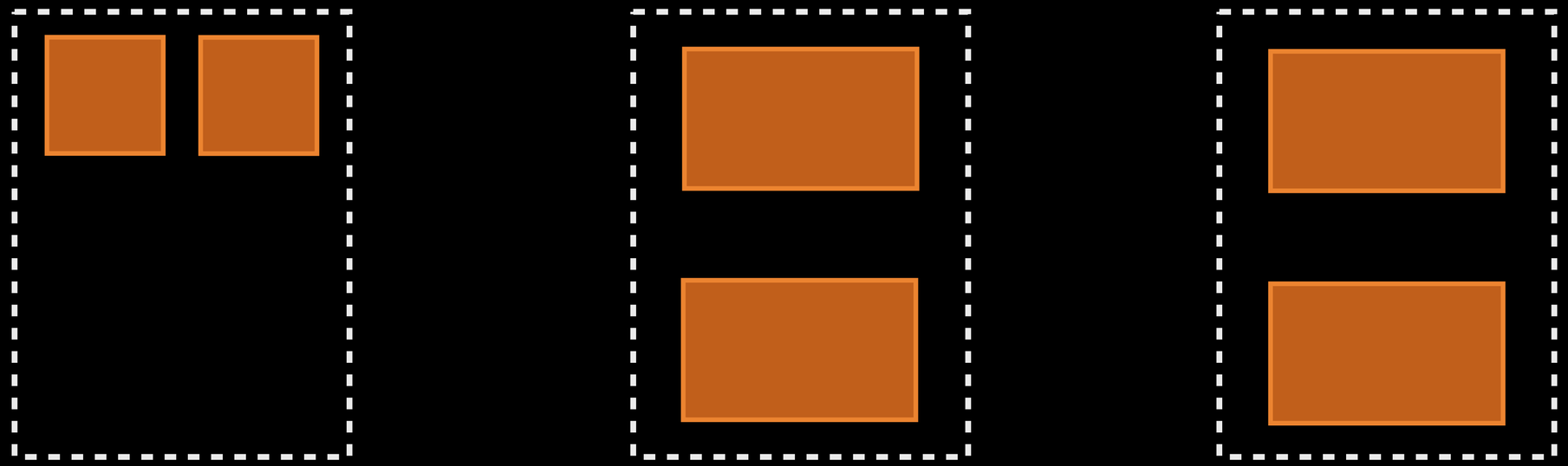
`transitionProgress`

1.1

Layout B

Collection Views and Transition Layout

UICollectionViewTransitionLayout



Layout A

Transition Layout

`transitionProgress`

1.0

Layout B

Interactive Transitions

UICollectionView

Interactive Transitions

UICollectionView

- New methods in UICollectionView

```
- (UICollectionViewTransitionLayout *)
        startInteractiveTransitionToCollectionViewLayout:completion:
- (void)finishInteractiveTransition
- (void)cancelInteractiveTransition
```

Interactive Transitions

UICollectionView

- New methods in UICollectionView

```
- (UICollectionViewTransitionLayout *)
        startInteractiveTransitionToCollectionViewLayout:completion:
- (void)finishInteractiveTransition
- (void)cancelInteractiveTransition
```

- New delegate method

```
- (UICollectionViewTransitionLayout *)collectionView:(UICollectionView*)v
                        transitionLayoutForOldLayout:(UICollectionViewLayout*)o
                                           newLayout:(UICollectionViewLayout*)n
```

Interactive Transitions

UICollectionView

- New methods in UICollectionView

```
- (UICollectionViewTransitionLayout *)
        startInteractiveTransitionToCollectionViewLayout:completion:
- (void)finishInteractiveTransition
- (void)cancelInteractiveTransition
```

- New delegate method

```
- (UICollectionViewTransitionLayout *)collectionView:(UICollectionView*)v
                        transitionLayoutForOldLayout:(UICollectionViewLayout*)o
                                           newLayout:(UICollectionViewLayout*)n
```

- Does not replace

```
- (void)setCollectionViewLayout:animated:
```

Subclassing Transition Layout

Subclassing Transition Layout

- Implement your `UICollectionViewTransitionLayout` subclass
  - e.g. update cell positions based on gesture position

Subclassing Transition Layout

- Implement your `UICollectionViewTransitionLayout` subclass
  - e.g. update cell positions based on gesture position
- Create an instance of your own class in your delegate method

Subclassing Transition Layout

- Implement your `UICollectionViewTransitionLayout` subclass
  - e.g. update cell positions based on gesture position
- Create an instance of your own class in your delegate method
- On finish or cancel, UIKit animates at correct velocity
  - Track your own parameters

    `updateValue:forAnimatedKey:`
  - UIKit will monitor velocity
  - UIKit gives you in-sync values on completion and cancel with

    `valueForAnimatedKey:`

Demo

Collection Views Transitions

Other enhancements

Collection Views Transitions

Other enhancements

- Better control of target offsets everywhere

```
targetContentOffsetForProposedContentOffset:
```

Collection Views Transitions

Other enhancements

- Better control of target offsets everywhere

`targetContentOffsetForProposedContentOffset:`

- Layouts are now notified on transitions

`prepareForTransitionToLayout:`
`prepareForTransitionFromLayout:`
`finalizeLayoutTransition`

Collection Views Transitions

Other enhancements

- Better control of target offsets everywhere

  `targetContentOffsetForProposedContentOffset:`

- Layouts are now notified on transitions

  `prepareForTransitionToLayout:`
  `prepareForTransitionFromLayout:`
  `finalizeLayoutTransition`

- Better animations
  - Initial and final layout attributes are now supported
  - A new completion handler

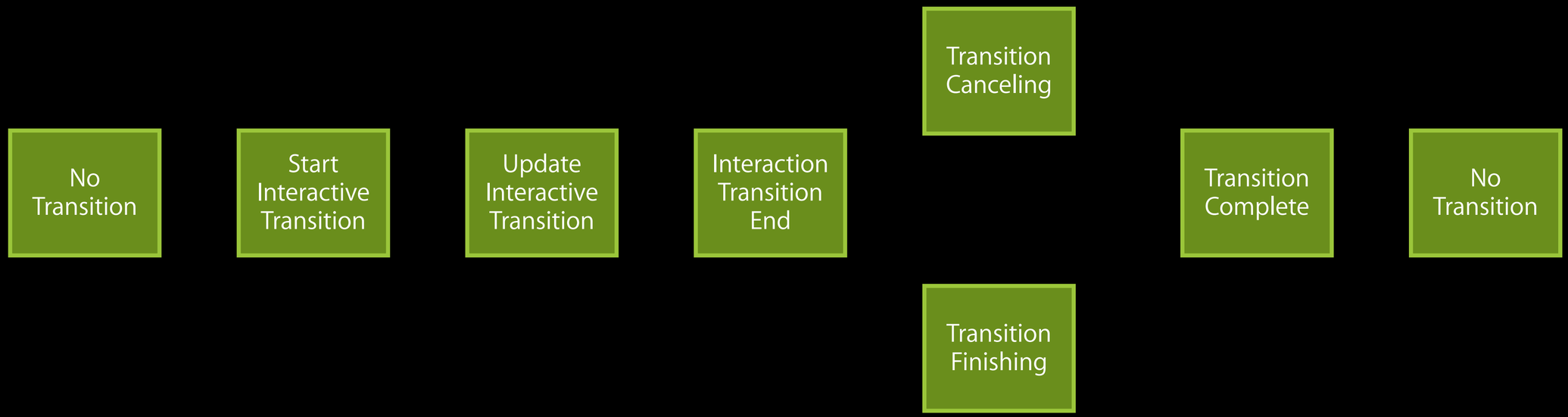
    `setCollectionViewLayout:animated:completion:`

Interactive View Controller Transitions

Cancellation and coordinators

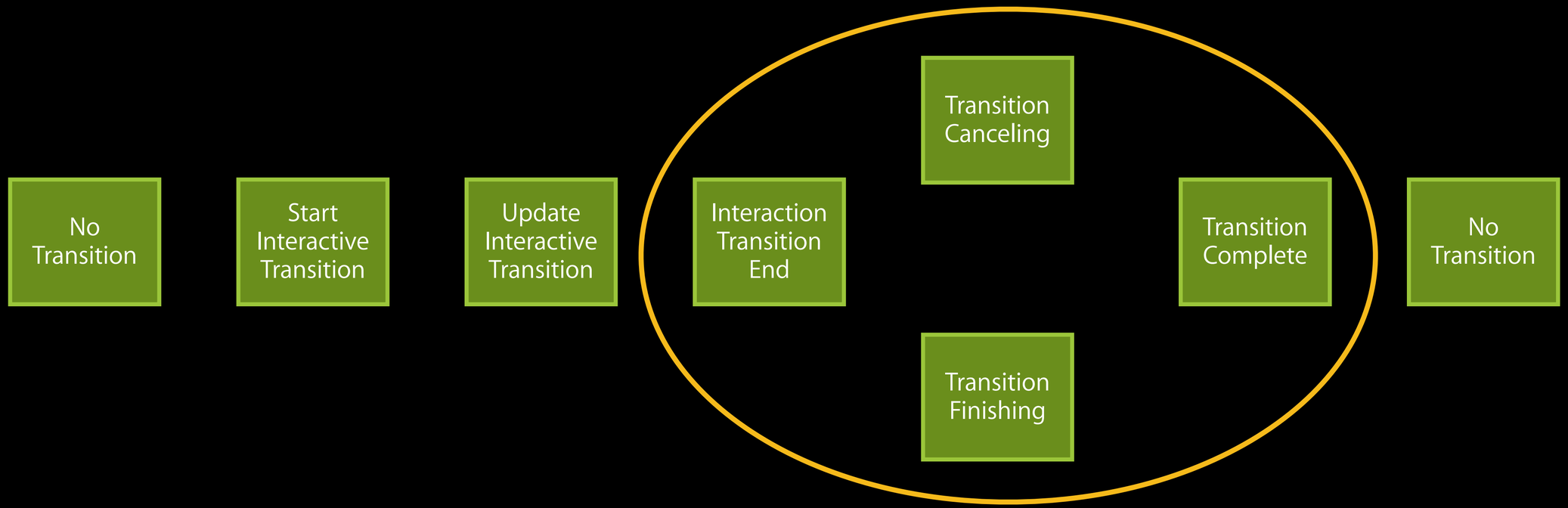
UIViewControllerTransitioning

Interactive transitioning states



UIViewControllerTransitioning

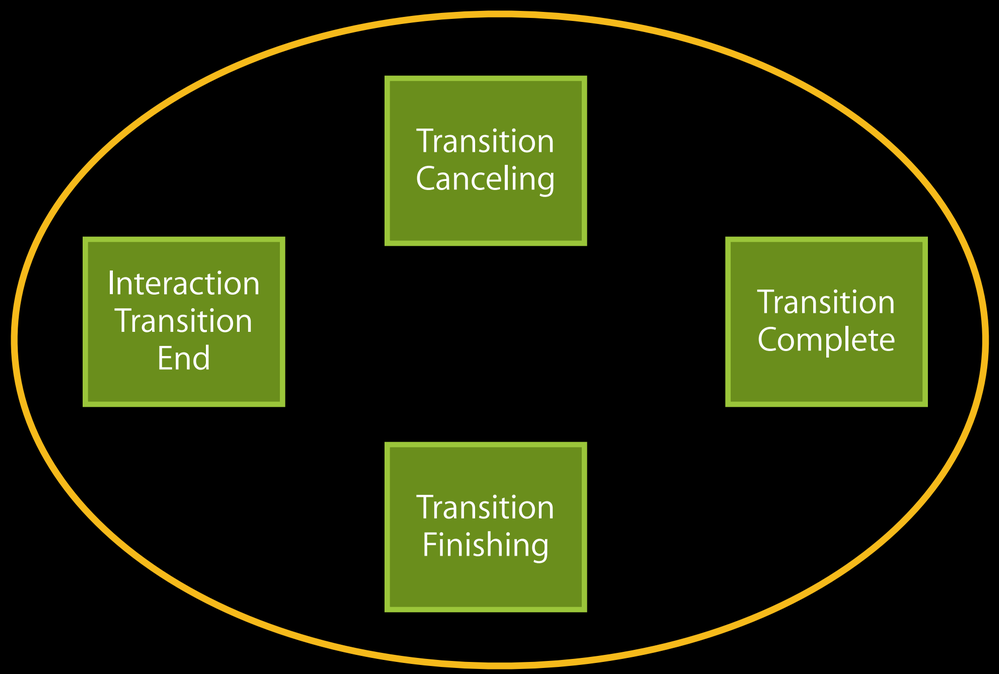
Interactive transitioning states



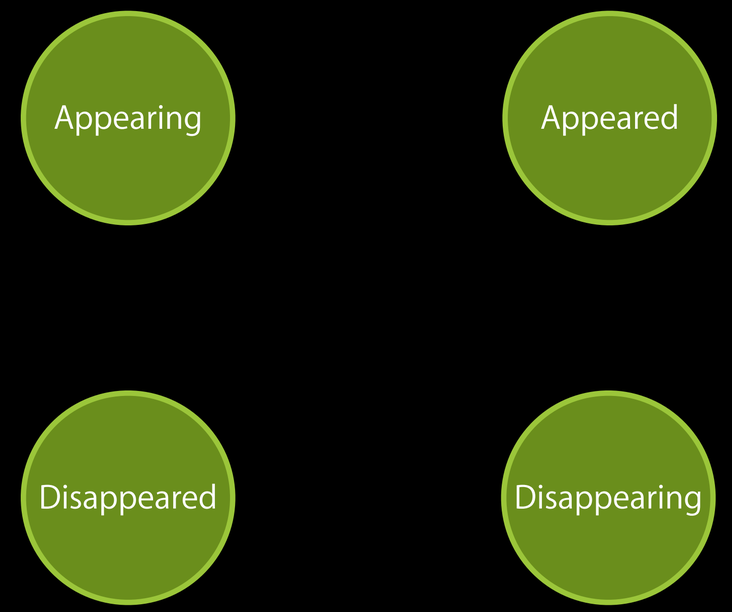
UIViewControllerTransitioning

Cancellation and appearance callbacks

Interactive transitioning states



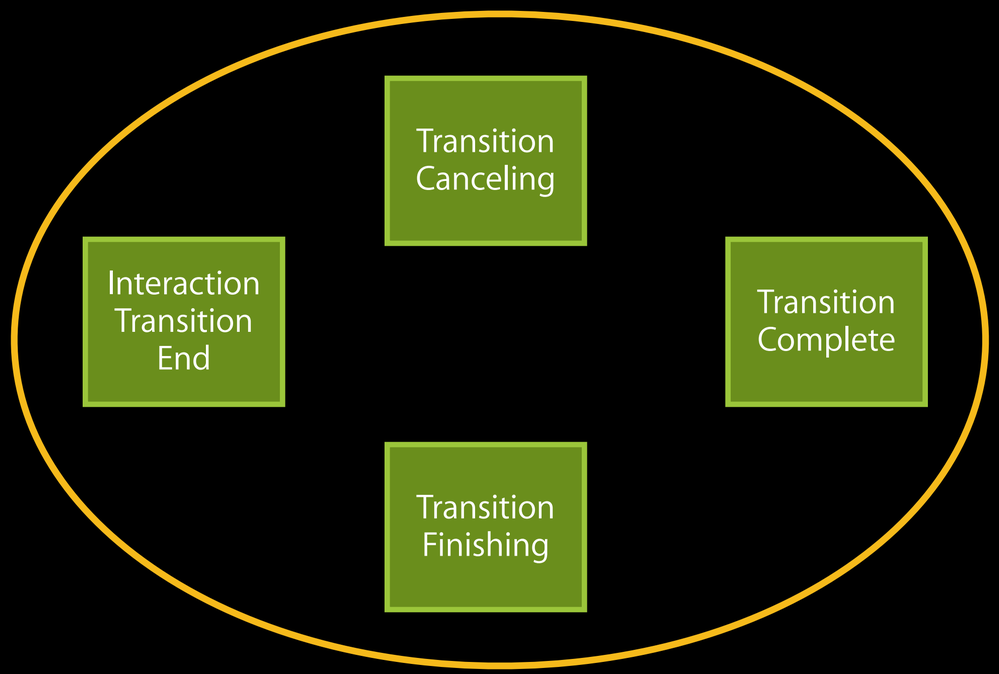
View controller appearance states



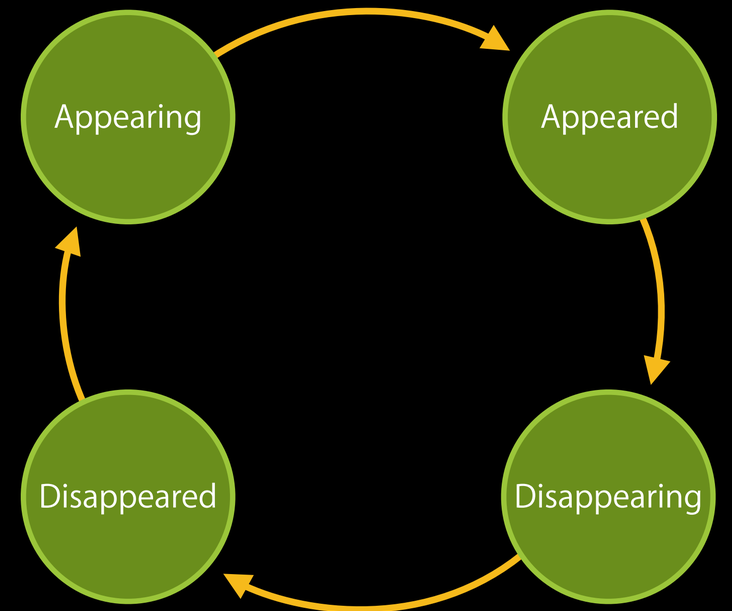
UIViewControllerTransitioning

Cancellation and appearance callbacks

Interactive transitioning states



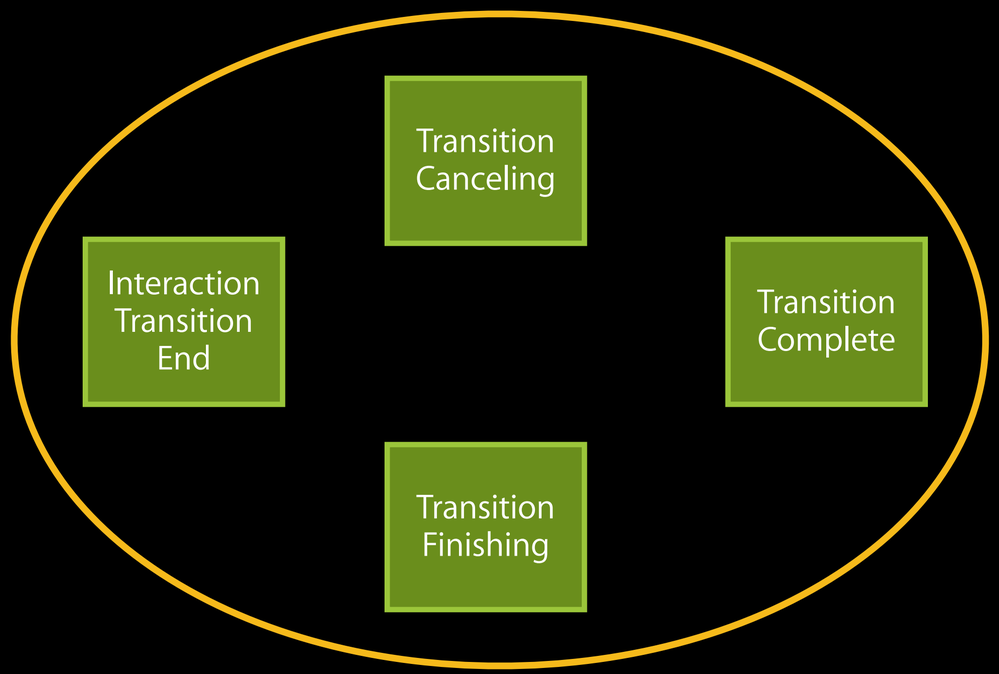
View controller appearance states



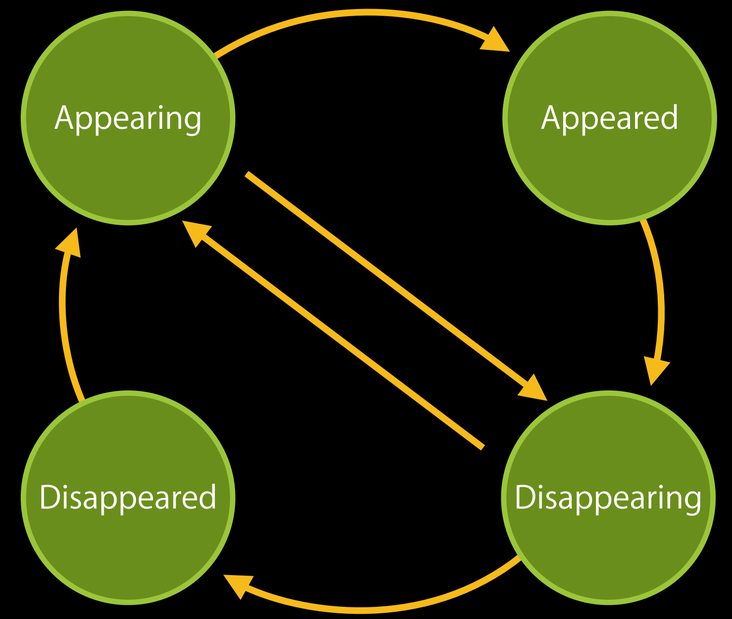
UIViewControllerTransitioning

Cancellation and appearance callbacks

Interactive transitioning states



View controller appearance states



Interactive View Controller Transitions

Canceling an interactive transition

Interactive View Controller Transitions

Canceling an interactive transition

- Don’t assume that viewDidAppear follows viewWillAppear

Interactive View Controller Transitions

Canceling an interactive transition

- Don’t assume that viewDidAppear follows viewWillAppear
- Make sure to undo any side effects
  - There is new API to help manage this

Interactive View Controller Transitions

<UIViewControllerTransitionCoordinator>

```
@interface UIViewController(TransitionCoordinator)

@property (nonatomic,retain) id <UIViewControllerTransitionCoordinator>
                                                        transitionCoordinator;
@end
```

Interactive View Controller Transitions

<UIViewControllerTransitionCoordinator>

```
@interface UIViewController(TransitionCoordinator)

@property (nonatomic,retain) id <UIViewControllerTransitionCoordinator>
                                                        transitionCoordinator;
@end
```

Interactive View Controller Transitions

<UIViewControllerTransitionCoordinator>

```
@protocol UIViewControllerTransitionCoordinator
                    <UIViewControllerTransitionCoordinatorContext>
@optional

- (BOOL) notifyWhenInteractionEndsUsingBlock:
        (void (^ (id<UIViewControllerTransitionCoordinatorContext)handler;

- (BOOL) animatorAlongsideTransition:
                  (void (^) (id <UIViewControllerTransitionCoordinatorContext)a;
                  completion:(void (^)(id<UIViewControllerTransitionCoordinatorContext)c;

- (BOOL) animatorAlongsideTransitionInView:(UIView *)view
                  animation: (void (^) (id <UIViewControllerTransitionCoordinatorContext)a;
                 completion:(void (^) (id<UIViewControllerTransitionCoordinatorContext)c;
@end
```

Interactive View Controller Transitions

<UIViewControllerTransitionCoordinator>

```
@protocol UIViewControllerTransitionCoordinator
                    <UIViewControllerTransitionCoordinatorContext>
@optional

- (BOOL) notifyWhenInteractionEndsUsingBlock:
        (void (^ (id<UIViewControllerTransitionCoordinatorContext)handler;

- (BOOL) animatorAlongsideTransition:
                    (void (^) (id <UIViewControllerTransitionCoordinatorContext)a;
                    completion:(void (^)(id<UIViewControllerTransitionCoordinatorContext)c;

- (BOOL) animatorAlongsideTransitionInView:(UIView *)view
                    animation: (void (^) (id <UIViewControllerTransitionCoordinatorContext)a;
                   completion:(void (^) (id<UIViewControllerTransitionCoordinatorContext)c;
@end
```

Interactive View Controller Transitions

<UIViewControllerTransitionCoordinatorContext>

```
@protocol UIViewControllerTransitionCoordinatorContext <NSObject>

- (UIView *)containerView;
- (UIViewController *) viewControllerForKey:(NSString *)key;
- (CGRect) initialFrameForViewController:(UIViewController *)vc;
- (CGRect) finalFrameForViewController:(UIViewController *)vc;

- (BOOL) isCancelled;
- (BOOL) initiallyInteractive;
- (BOOL) isInteractive;

@end
```

Interactive View Controller Transitions

<UIViewControllerTransitionCoordinatorContext>

```
@protocol UIViewControllerTransitionCoordinatorContext <NSObject>

- (UIView *)containerView;
- (UIViewController *) viewControllerForKey:(NSString *)key;
- (CGRect) initialFrameForViewController:(UIViewController *)vc;
- (CGRect) finalFrameForViewController:(UIViewController *)vc;

- (BOOL) isCancelled;
- (BOOL) initiallyInteractive;
- (BOOL) isInteractive;

@end
```

Interactive View Controller Transitions

Canceling an interactive transition

Interactive View Controller Transitions

Canceling an interactive transition

- Don’t assume that viewDidAppear follows viewWillAppear:

Interactive View Controller Transitions

Canceling an interactive transition

- Don’t assume that viewDidAppear follows viewWillAppear:

```
- (void) viewWillAppear: {
     [self doSomeSideEffectsAssumingViewDidAppearIsGoingToBeCalled];

     id <UIViewControllerTransitionCoordinator> coordinator;
     coordinator = [self transitionCoordinator];

     if(coordinator && [coordinator initiallyInteractive]) {
        [transitionCoordinator notifyWhenInteractionEndsUsingBlock:
             ^(id <UIViewControllerTransitionCoordinatorContext> ctx) {
             if(ctx.isCancelled) {
                [self undoSideEffects];
             }
          }];
     }
}
```

Interactive View Controller Transitions

Canceling an interactive transition

- Don’t assume that viewDidAppear follows viewWillAppear:

```
- (void) viewWillAppear: {
      [self doSomeSideEffectsAssumingViewDidAppearIsGoingToBeCalled];

      id <UIViewControllerTransitionCoordinator> coordinator;
      coordinator = [self transitionCoordinator];

      if(coordinator && [coordinator initiallyInteractive]) {
         [transitionCoordinator notifyWhenInteractionEndsUsingBlock:
              ^(id <UIViewControllerTransitionCoordinatorContext> ctx) {
              if(ctx.isCancelled) {
                 [self undoSideEffects];
              }
           }];
      }
}
```

Interactive View Controller Transitions

Canceling an interactive transition

- Don’t assume that viewDidAppear follows viewWillAppear:

```
- (void) viewWillAppear: {
      [self doSomeSideEffectsAssumingViewDidAppearIsGoingToBeCalled];

      id <UIViewControllerTransitionCoordinator> coordinator;
      coordinator = [self transitionCoordinator];

      if(coordinator && [coordinator initiallyInteractive]) {
         [transitionCoordinator notifyWhenInteractionEndsUsingBlock:
               ^(id <UIViewControllerTransitionCoordinatorContext> ctx) {
               if(ctx.isCancelled) {
                  [self undoSideEffects];
               }
            }];
      }
}
```

Interactive View Controller Transitions

Canceling an interactive transition

- Don’t assume that viewDidAppear follows viewWillAppear:

```
- (void) viewWillAppear: {
     [self doSomeSideEffectsAssumingViewDidAppearIsGoingToBeCalled];

     id <UIViewControllerTransitionCoordinator> coordinator;
     coordinator = [self transitionCoordinator];

     if(coordinator && [coordinator initiallyInteractive]) {
        [transitionCoordinator notifyWhenInteractionEndsUsingBlock:
             ^(id <UIViewControllerTransitionCoordinatorContext> ctx) {
             if(ctx.isCancelled) {
                [self undoSideEffects];
             }
          }];
     }
}
```

Interactive View Controller Transitions

<UIViewControllerTransitionCoordinator>

Interactive View Controller Transitions

<UIViewControllerTransitionCoordinator>

- The transitionCoordinator does even more
  - Allows completion handlers to be registered for transitions

Interactive View Controller Transitions

<UIViewControllerTransitionCoordinator>

- The transitionCoordinator does even more
  - Allows completion handlers to be registered for transitions
  - Allows other animations to run alongside the transition animation

Interactive View Controller Transitions

<UIViewControllerTransitionCoordinator>

- The transitionCoordinator does even more
  - Allows completion handlers to be registered for transitions
  - Allows other animations to run alongside the transition animation
- In addition to custom transitions on iOS 7
  - UINavigationController transitions have an associated transition coordinator

Interactive View Controller Transitions

<UIViewControllerTransitionCoordinator>

- The transitionCoordinator does even more
  - Allows completion handlers to be registered for transitions
  - Allows other animations to run alongside the transition animation
- In addition to custom transitions on iOS 7
  - UINavigationController transitions have an associated transition coordinator
  - Present and Dismiss transitions have an associated coordinator

Interactive View Controller Transitions

<UIViewControllerTransitionCoordinator>

```
- (BOOL)
  animatorAlongsideTransition:(void (^) (id <UIViewControllerTransitionCoordinatorContext)a;
                   completion:(void (^) (id<UIViewControllerTransitionCoordinatorContext)c;
- (BOOL)
  animatorAlongsideTransitionInView:(UIView *)view
                   animation: (void (^) (id <UIViewControllerTransitionCoordinatorContext)a;
                   completion:(void (^) (id<UIViewControllerTransitionCoordinatorContext)c;
```

Interactive View Controller Transitions

<UIViewControllerTransitionCoordinator>

```
- (BOOL)
  animatorAlongsideTransition:(void (^) (id <UIViewControllerTransitionCoordinatorContext)a;
                   completion:(void (^) (id<UIViewControllerTransitionCoordinatorContext)c;
- (BOOL)
  animatorAlongsideTransitionInView:(UIView *)view
                   animation: (void (^) (id <UIViewControllerTransitionCoordinatorContext)a;
                   completion:(void (^) (id<UIViewControllerTransitionCoordinatorContext)c;
```

Interactive View Controller Transitions

Fun with transition coordinators

```
UIViewController *vc;
[self pushViewController:vc animated: YES];

id <UIViewControllerTransitionCoordinator>coordinator;
coordinator = [viewController transitionCoordinator];

[coordinator animateAlongsideTransition:
     ^(id <UIViewControllerTransitionCoordinatorContext> c) {
        ;;; some animation
     }
     completion:(id <UIViewControllerTransitionCoordinatorContext> c) {
         ;;; Code to run after your push transition has finished.
     }];
```

Interactive View Controller Transitions

Fun with transition coordinators

```
UIViewController *vc;
[self pushViewController:vc animated: YES];
```

```
id <UIViewControllerTransitionCoordinator>coordinator;
coordinator = [viewController transitionCoordinator];
[coordinator animateAlongsideTransition:
     ^(id <UIViewControllerTransitionCoordinatorContext> c) {
        ;;; some animation
     }
     completion:(id <UIViewControllerTransitionCoordinatorContext> c) {
         ;;; Code to run after your push transition has finished.
     }];
```

Interactive View Controller Transitions

Fun with transition coordinators

```
UIViewController *vc;
[self pushViewController:vc animated: YES];
```

```
id <UIViewControllerTransitionCoordinator>coordinator;
coordinator = [viewController transitionCoordinator];
```

```
[coordinator animateAlongsideTransition:
     ^(id <UIViewControllerTransitionCoordinatorContext> c) {
        ;;; some animation
     }
     completion:(id <UIViewControllerTransitionCoordinatorContext> c) {
         ;;; Code to run after your push transition has finished.
     }];
```

Interactive View Controller Transitions

Fun with transition coordinators

```
UIViewController *vc;
[self pushViewController:vc animated: YES];

id <UIViewControllerTransitionCoordinator>coordinator;
coordinator = [viewController transitionCoordinator];
```

```
[coordinator animateAlongsideTransition:
     ^(id <UIViewControllerTransitionCoordinatorContext> c) {
        ;;; some animation
     }
     completion:(id <UIViewControllerTransitionCoordinatorContext> c) {
         ;;; Code to run after your push transition has finished.
     }];
```

Concluding Remarks

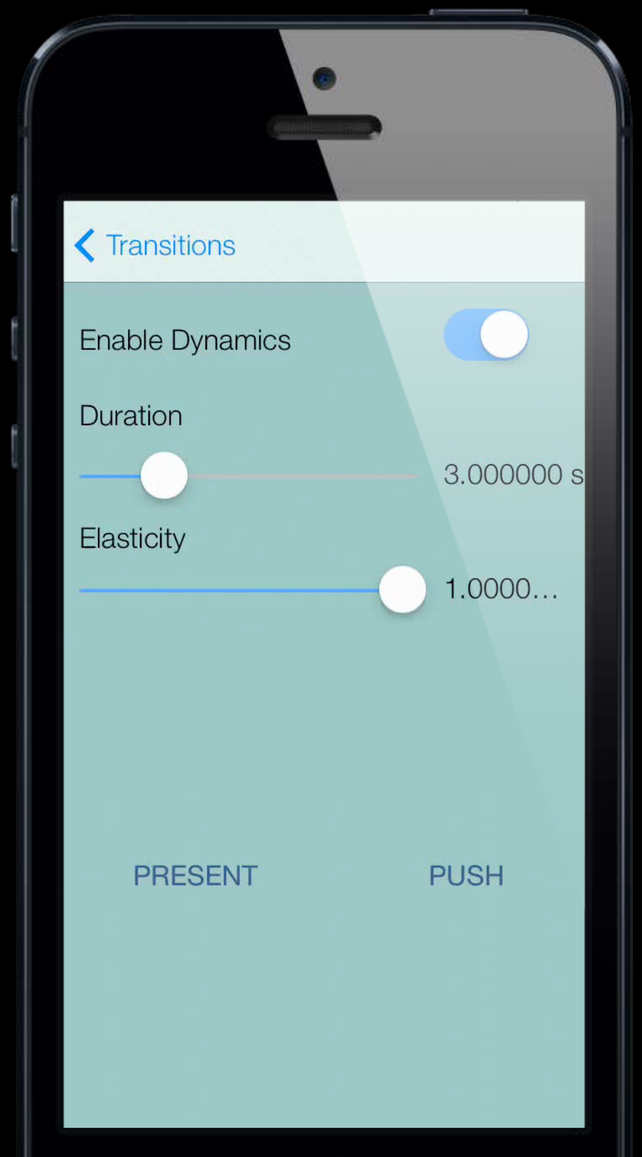
"With great power comes greater responsibility"

Concluding Remarks

“With great power comes greater responsibility”

Concluding Remarks

“With great power comes greater responsibility”



Concluding Remarks

"With great power comes greater responsibility"

Concluding Remarks

“With great power comes greater responsibility”

- Powerful new animation and snapshot APIs can be used to create awesome transition animations

Concluding Remarks

"With great power comes greater responsibility"

- Powerful new animation and snapshot APIs can be used to create awesome transition animations
- Many view controller transition animations can be customized
  - `UICollectionViewControllers` and `UICollectionViews` can be easily used to define custom transitions
  - The protocol based expression of this API is very flexible

Concluding Remarks

"With great power comes greater responsibility"

- Powerful new animation and snapshot APIs can be used to create awesome transition animations
- Many view controller transition animations can be customized
  - `UICollectionViewControllers` and `UICollectionViews` can be easily used to define custom transitions
  - The protocol based expression of this API is very flexible
- View controller transitions can be interactive
  - Is it `viewWillAppear:` or `viewWillProbablyAppear:`?

Concluding Remarks

"With great power comes greater responsibility"

- Powerful new animation and snapshot APIs can be used to create awesome transition animations
- Many view controller transition animations can be customized
  - `UICollectionViewControllers` and `UICollectionViews` can be easily used to define custom transitions
  - The protocol based expression of this API is very flexible
- View controller transitions can be interactive
  - Is it `viewWillAppear:` or `viewWillProbablyAppear:`?
- A transition coordinator can be used with/without custom transitions
  - `animateAlongsideTransition:completion:`
  - `notifyWhenInteractionEndsUsingBlock:`

More Information

Jake Behrens
App Frameworks Evangelist
behrens@apple.com

Documentation and Sample Code
iOS Dev Center
http://developer.apple.com

Apple Developer Forums
http://devforums.apple.com

Related Sessions

Building User Interfaces for iOS 7	Presidio Tuesday 10:15AM
Getting Started with UIKit Dynamics	Presidio Tuesday 4:30PM
Advance Techniques with UIKit Dynamics	Presidio Thursday 3:15PM
Best Practices for Great iOS UI Design	Presidio Friday 10:15AM

Labs

Cocoa Touch Animation Lab	Frameworks Lab B Thursday 2:00PM

WWDC2013