Mastering Table Views

Jason Beaver
iPhone Frameworks Engineer

Introduction

- Advanced use of UITableView
- Add a level of polish to your application that will delight your users

What You’ll Learn

- Changing the contents of your table view without reloading
- Combining updates with editing transitions
- iPhone/iPad differences
- Background loading
- Using gesture recognizers with table views

Updating the Contents of Your Table View

Updating the Contents of Your Table View

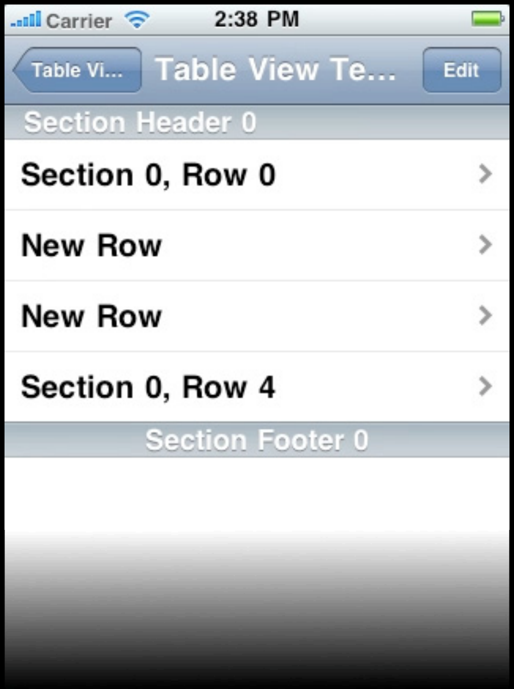
Why?

- Improved performance

Updating the Contents of Your Table View

Why?

- Improved performance
- Easier for the user to understand changes



Section Header 0

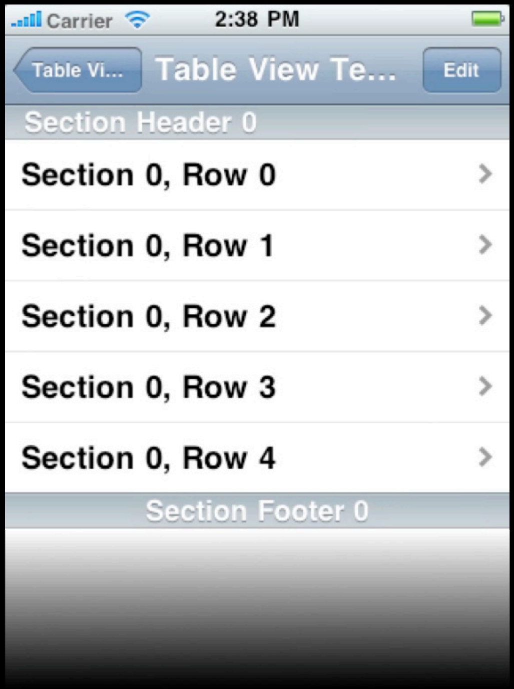
Section 0, Row 0

New Row

New Row

Section 0, Row 4

Section Footer 0



Section Header 0

Section 0, Row 0

Section 0, Row 1

Section 0, Row 2

Section 0, Row 3

Section 0, Row 4

Section Footer 0

Updating the Contents of Your Table View

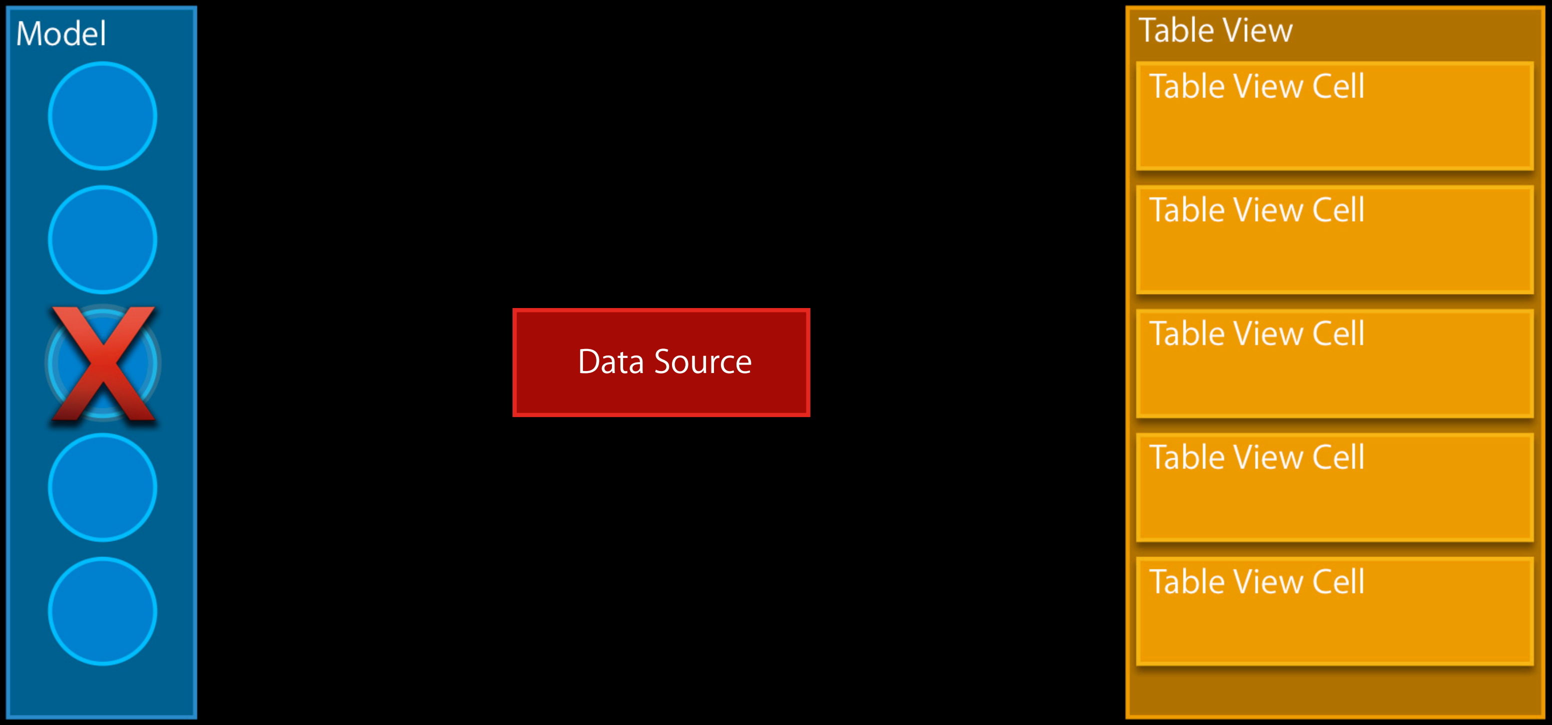
- Individual rows

```
insertRowsAtIndexPaths: withRowAnimation:
deleteRowsAtIndexPaths: withRowAnimation:
reloadRowsAtIndexPaths: withRowAnimation:
```

- Entire sections

```
insertSections: withRowAnimation:
deleteSections: withRowAnimation:
reloadSections: withRowAnimation:
```

Updating the Contents of Your Table View


Model

Data Source

Table View

Table View Cell

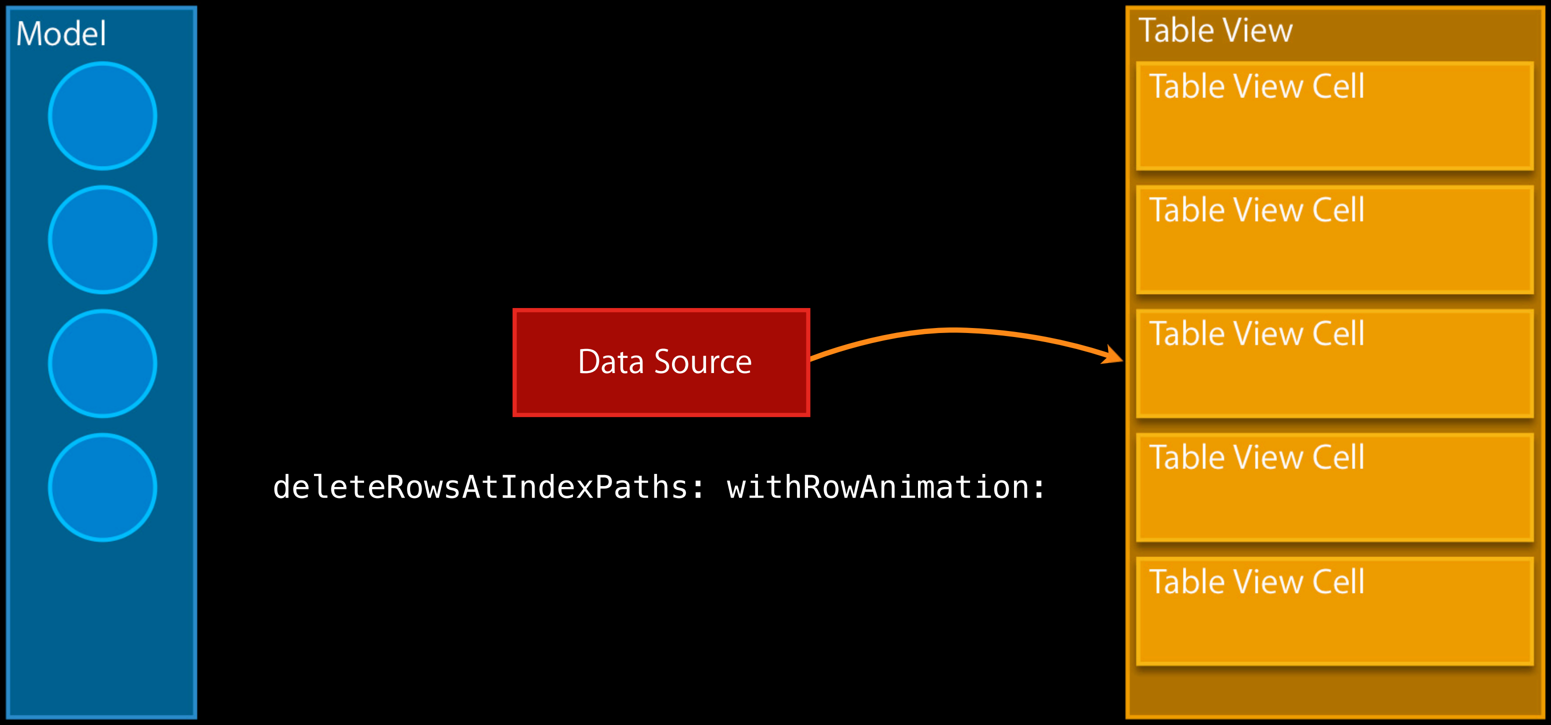
Table View Cell

Table View Cell

Table View Cell

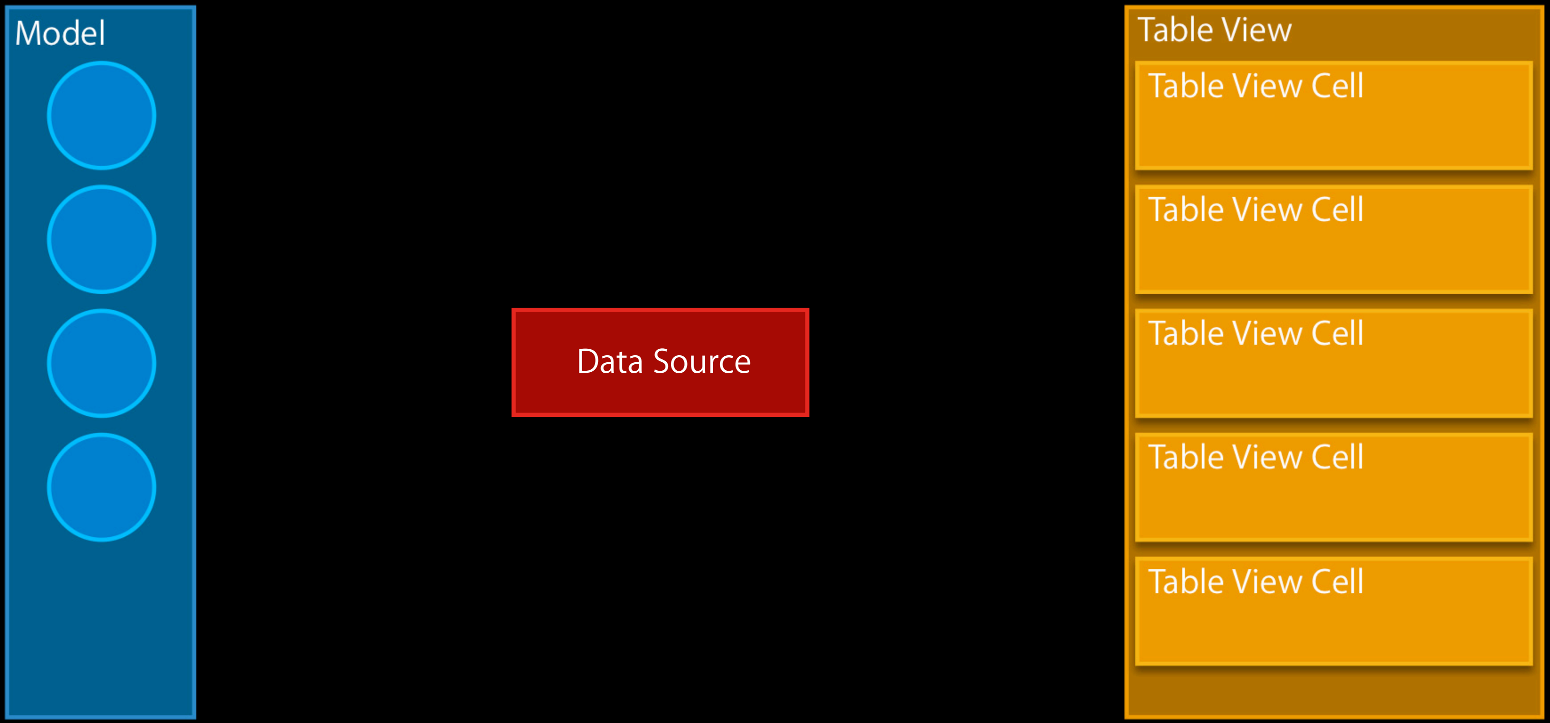
Table View Cell

Updating the Contents of Your Table View



```
deleteRowsAtIndexPaths: withRowAnimation:
```

Updating the Contents of Your Table View



Model

Data Source

Table View

Table View Cell

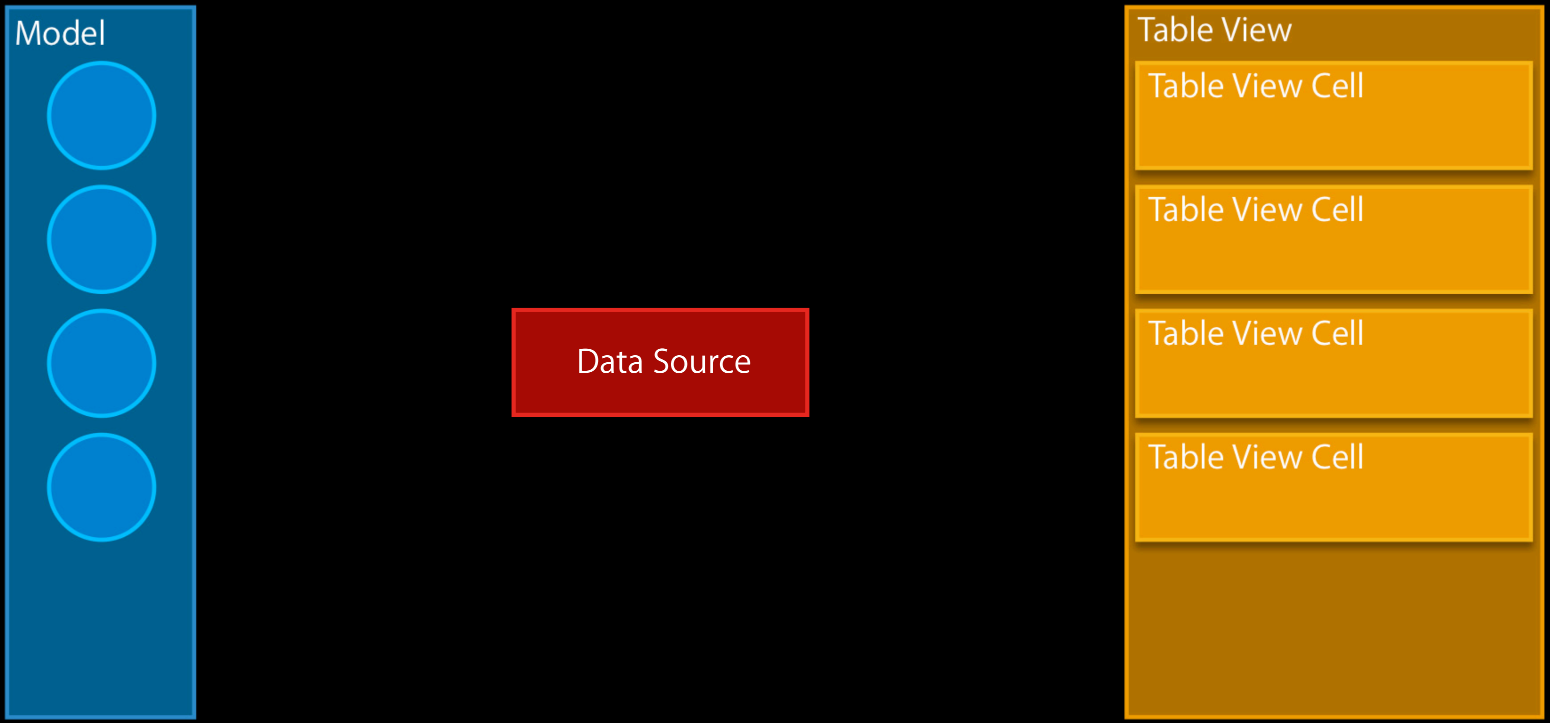
Table View Cell

Table View Cell

Table View Cell

Table View Cell

Updating the Contents of Your Table View



Model

Data Source

Table View

Table View Cell

Table View Cell

Table View Cell

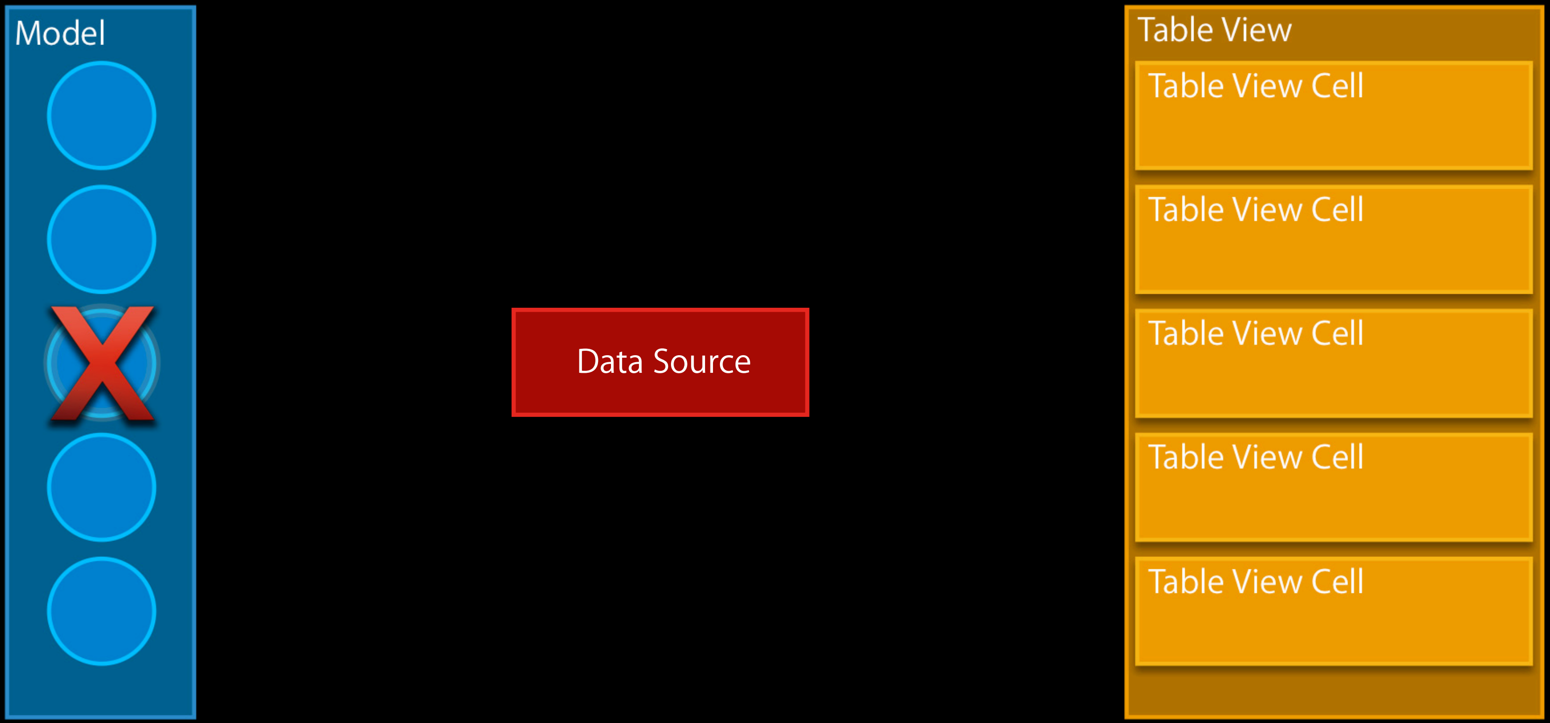
Table View Cell

Updating the Contents of Your Table View

- Batch updates

```
– (void)beginUpdates
– (void)endUpdates
```

Updating the Contents of Your Table View



Model

Data Source

Table View

Table View Cell

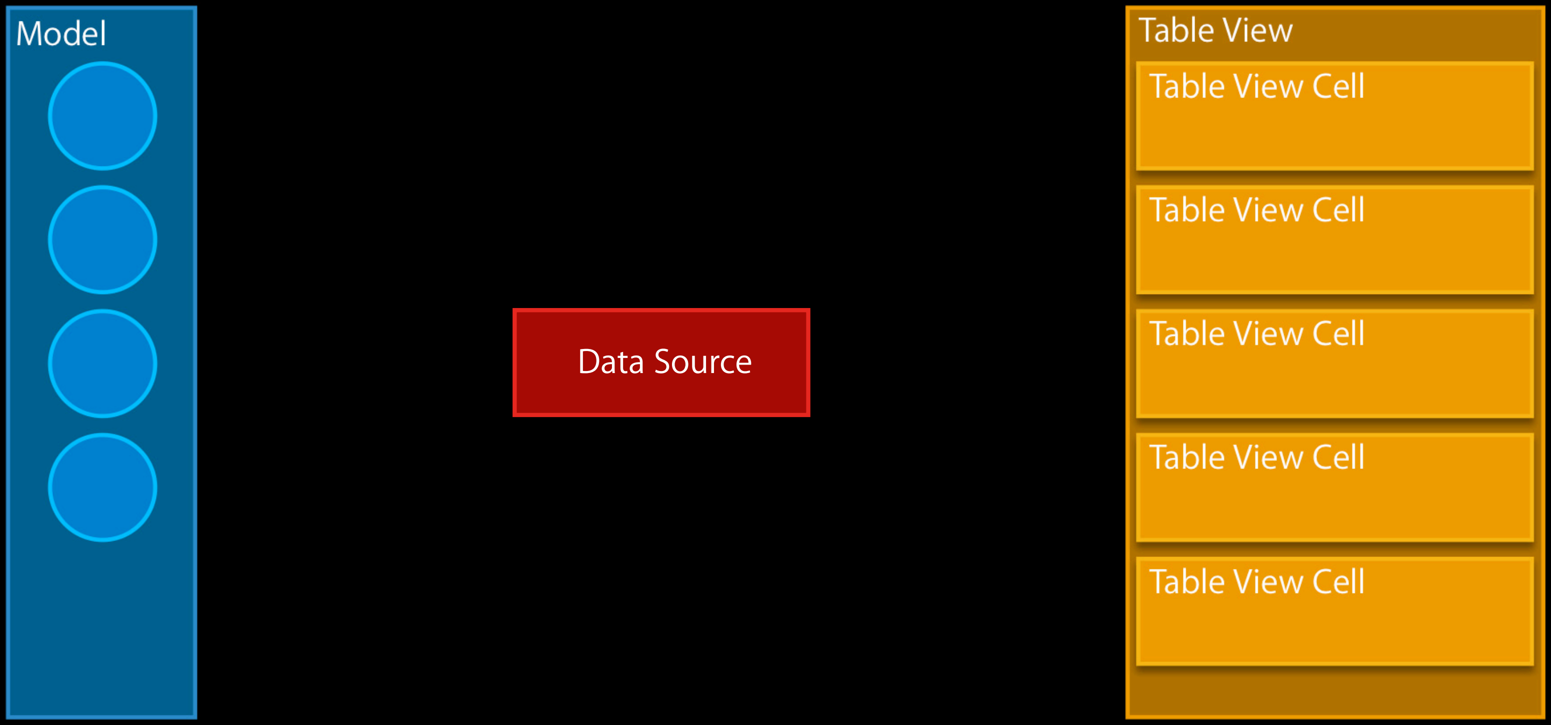
Table View Cell

Table View Cell

Table View Cell

Table View Cell

Updating the Contents of Your Table View



Model

Data Source

Table View

Table View Cell

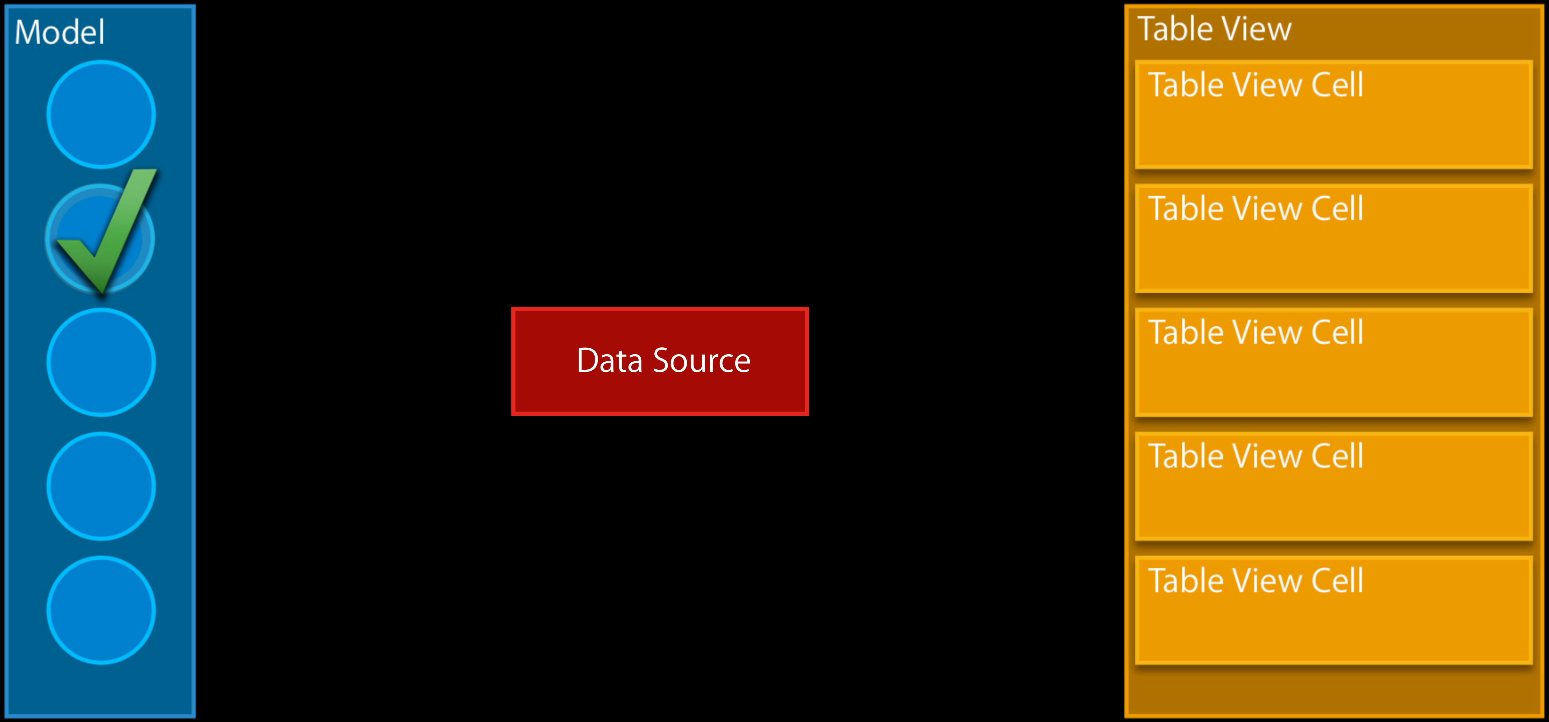
Table View Cell

Table View Cell

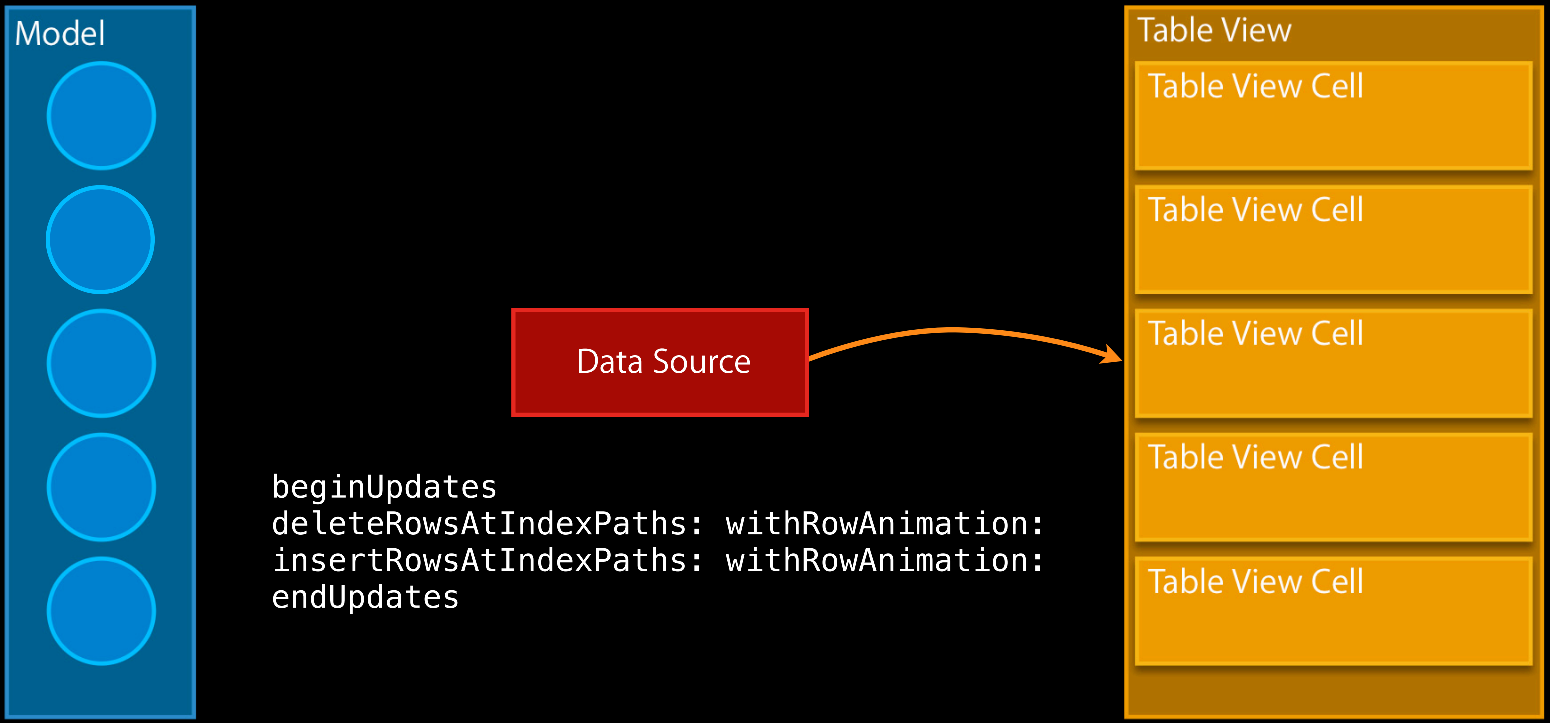
Table View Cell

Table View Cell

Updating the Contents of Your Table View

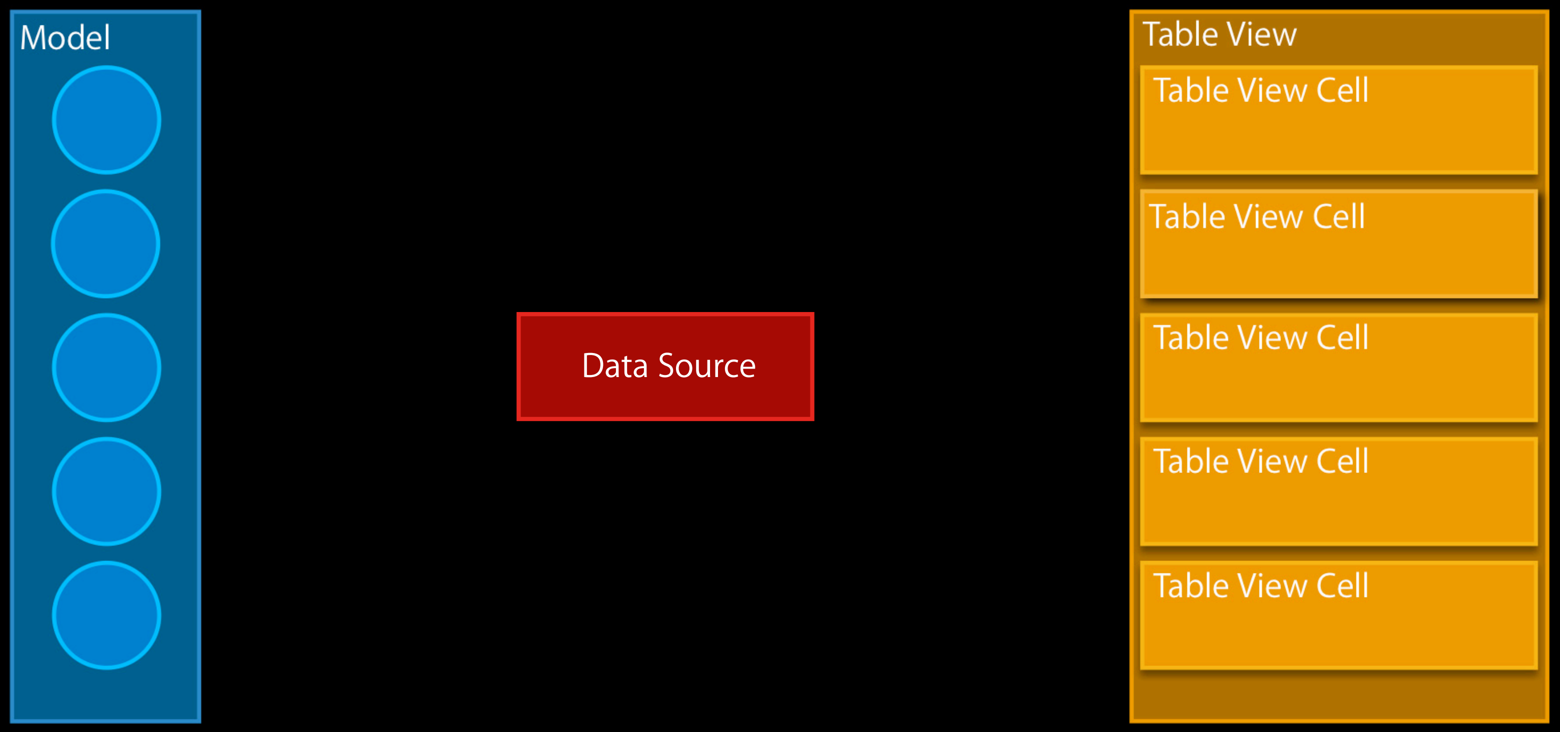


Updating the Contents of Your Table View



```
beginUpdates
deleteRowsAtIndexPaths: withRowAnimation:
insertRowsAtIndexPaths: withRowAnimation:
endUpdates
```

Updating the Contents of Your Table View



Updating the Contents of Your Table View

- Order of batched updates isn't important

```
NSArray *insert0 = [NSArray arrayWithObject:[NSIndexPath indexPathForRow:0 inSection:0]];
NSArray *insert1 = [NSArray arrayWithObject:[NSIndexPath indexPathForRow:1 inSection:0]];

[tableView beginUpdates];
[tableView insertRowsAtIndexPaths:insert0 withRowAnimation:animation];
[tableView insertRowsAtIndexPaths:insert1 withRowAnimation:animation];
[tableView endUpdates];
```

Updating the Contents of Your Table View

- Order of batched updates isn’t important

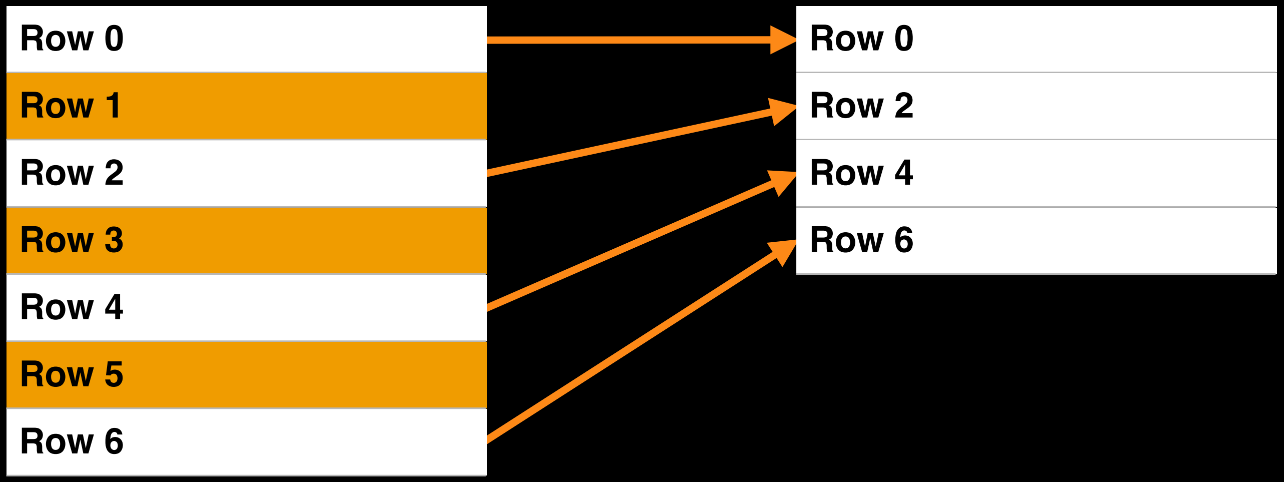
```
NSArray *insert0 = [NSArray arrayWithObject:[NSIndexPath indexPathForRow:0 inSection:0]];
NSArray *insert1 = [NSArray arrayWithObject:[NSIndexPath indexPathForRow:1 inSection:0]];

[tableView beginUpdates];
[tableView insertRowsAtIndexPaths:insert1 withRowAnimation:animation];
[tableView insertRowsAtIndexPaths:insert0 withRowAnimation:animation];
[tableView endUpdates];
```

Updating the Contents of Your Table View

- Order of batched updates isn’t important
- Table view state is not updated until the call to endUpdates

Row and Section Specification

Deletes specify all of the
current rows that should be removed



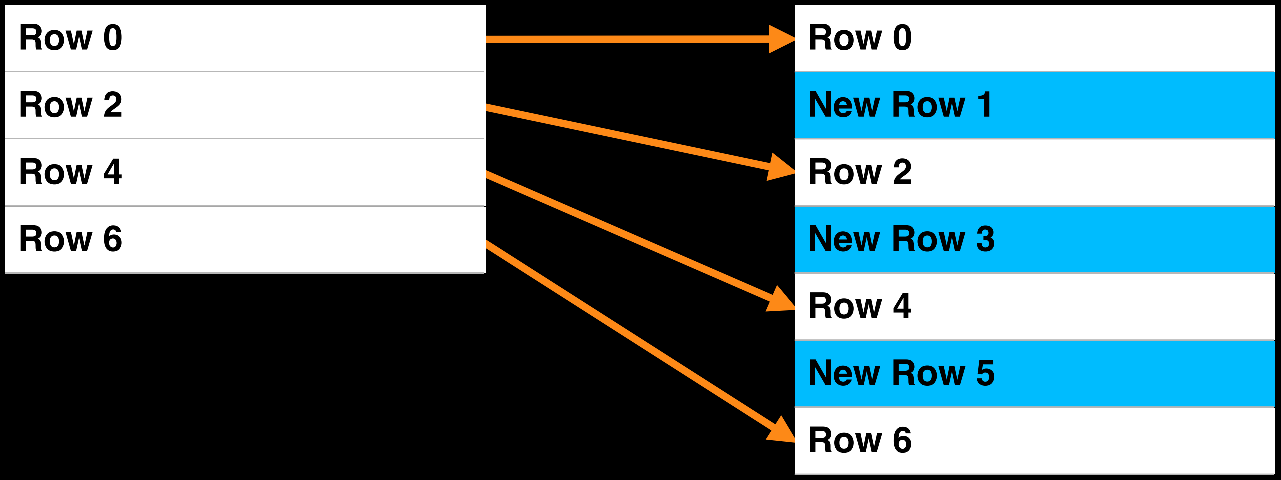
Row 0
Row 1
Row 2
Row 3
Row 4
Row 5
Row 6

Row 0
Row 2
Row 4
Row 6

Delete rows 1, 3, and 5

Row and Section Specification

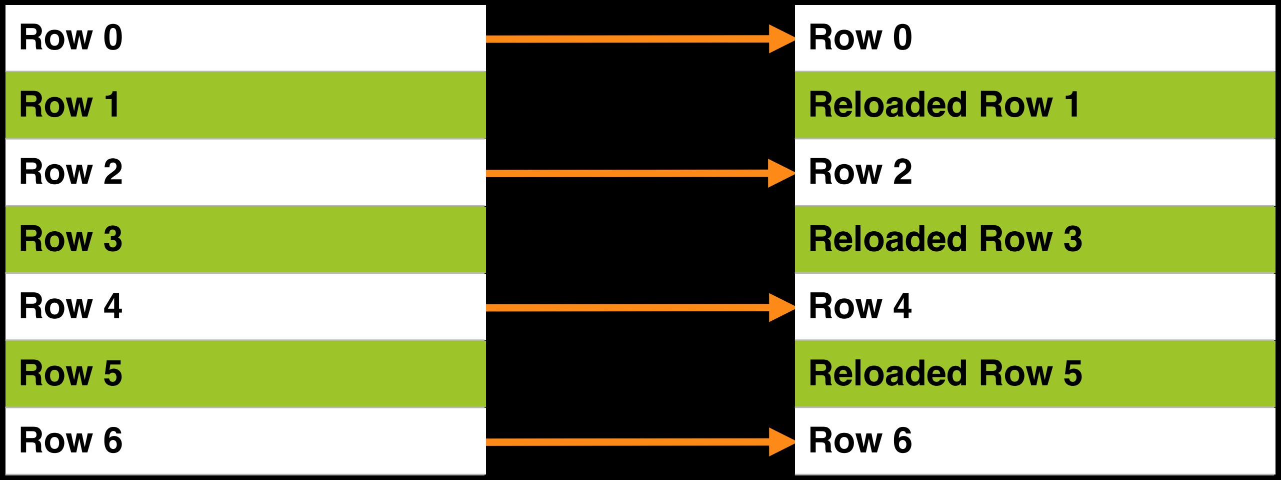
Inserts specify all of the rows that are new



Insert rows 1, 3, and 5

Row and Section Specification

Reloads specify all of the current rows that should be reloaded



Row 0

Row 1

Row 2

Row 3

Row 4

Row 5

Row 6

Row 0

Reloaded Row 1

Row 2

Reloaded Row 3

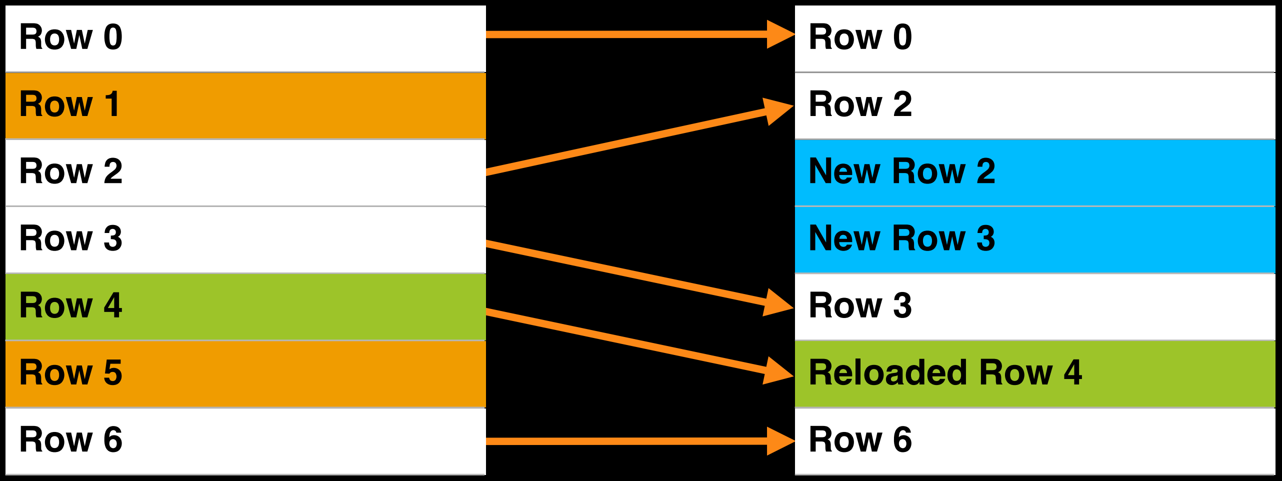
Row 4

Reloaded Row 5

Row 6

Reload rows 1, 3, and 5

Combining Inserts/Deletes/Reloads



Row 0
Row 1
Row 2
Row 3
Row 4
Row 5
Row 6

Row 0
Row 2
New Row 2
New Row 3
Row 3
Reloaded Row 4
Row 6

Delete rows 1 and 5

Insert rows 2 and 3

Reload row 4

What Happens Under the Covers

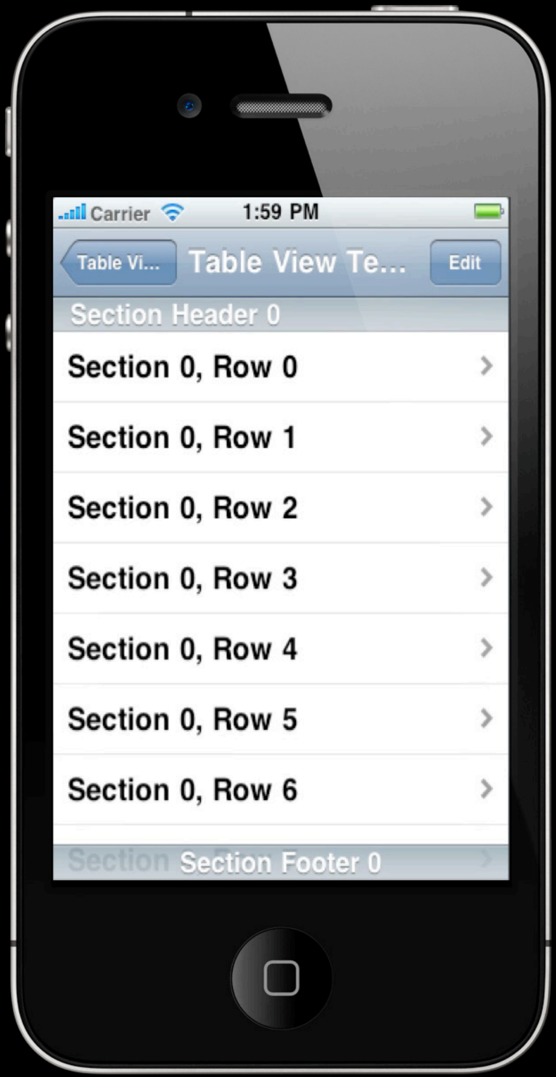
- Sanity check
    - Redundant updates
    - Update section/row count
    - Verify state
- Rebuild geometry
    - Update row/header/footer heights

Animation Styles

- UITableViewRowAnimation
    - UITableViewRowAnimationFade

Animation Styles

- UITableViewRowAnimation
  - UITableViewRowAnimationFade



Section Header 0

Section 0, Row 0

Section 0, Row 1

Section 0, Row 2

Section 0, Row 3

Section 0, Row 4

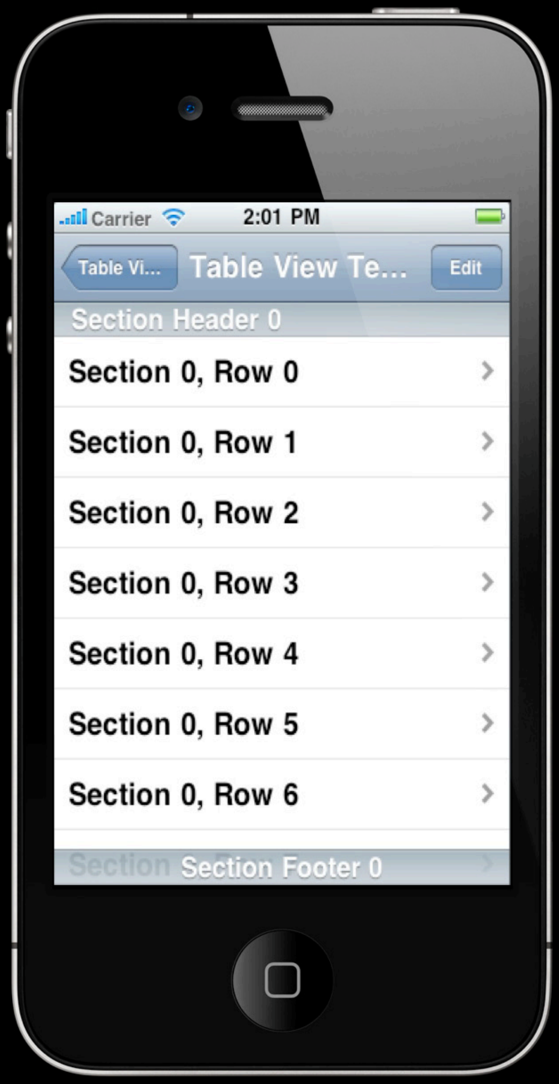
Section 0, Row 5

Section 0, Row 6

Section Footer 0

Animation Styles

- UITableViewRowAnimation
  - UITableViewRowAnimationFade
  - UITableViewRowAnimationRight



Section Header 0

Section 0, Row 0

Section 0, Row 1

Section 0, Row 2

Section 0, Row 3

Section 0, Row 4

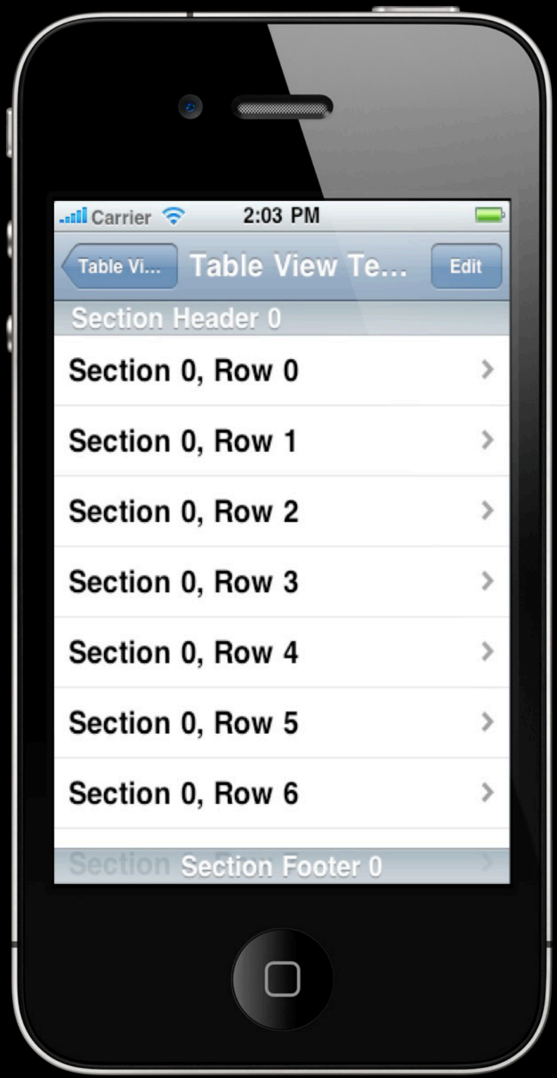
Section 0, Row 5

Section 0, Row 6

Section Section Footer 0

Animation Styles

- UITableViewRowAnimation
  - UITableViewRowAnimationFade
  - UITableViewRowAnimationRight
  - UITableViewRowAnimationLeft



Section Header 0

Section 0, Row 0

Section 0, Row 1

Section 0, Row 2

Section 0, Row 3

Section 0, Row 4

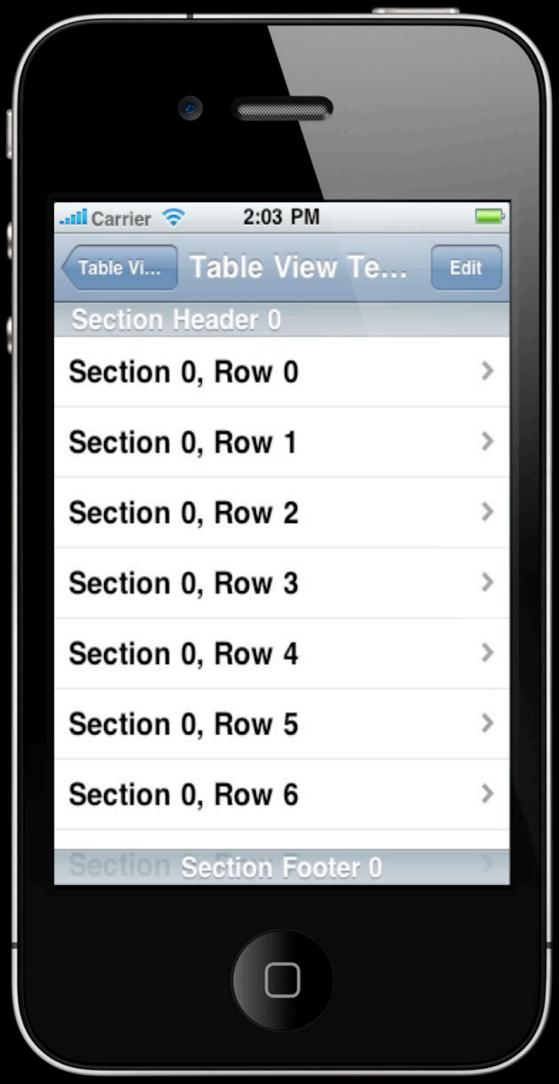
Section 0, Row 5

Section 0, Row 6

Section Footer 0

Animation Styles

- UITableViewRowAnimation
  - UITableViewRowAnimationFade
  - UITableViewRowAnimationRight
  - UITableViewRowAnimationLeft
  - UITableViewRowAnimationTop



Section Header 0

Section 0, Row 0

Section 0, Row 1

Section 0, Row 2

Section 0, Row 3

Section 0, Row 4

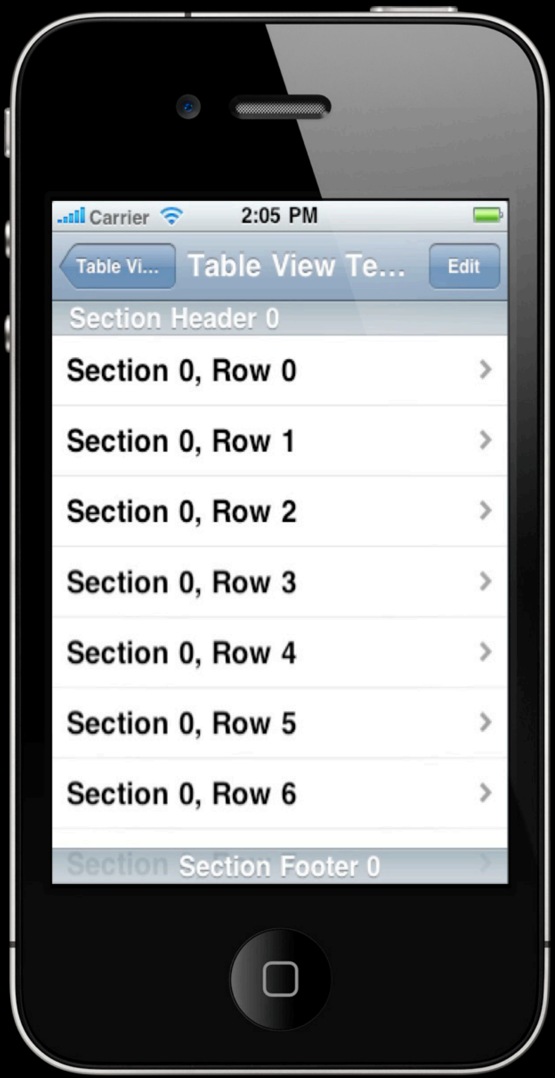
Section 0, Row 5

Section 0, Row 6

Section Section Footer 0

Animation Styles

- UITableViewRowAnimation
  - UITableViewRowAnimationFade
  - UITableViewRowAnimationRight
  - UITableViewRowAnimationLeft
  - UITableViewRowAnimationTop
  - UITableViewRowAnimationBottom



Section Header 0

Section 0, Row 0

Section 0, Row 1

Section 0, Row 2

Section 0, Row 3

Section 0, Row 4

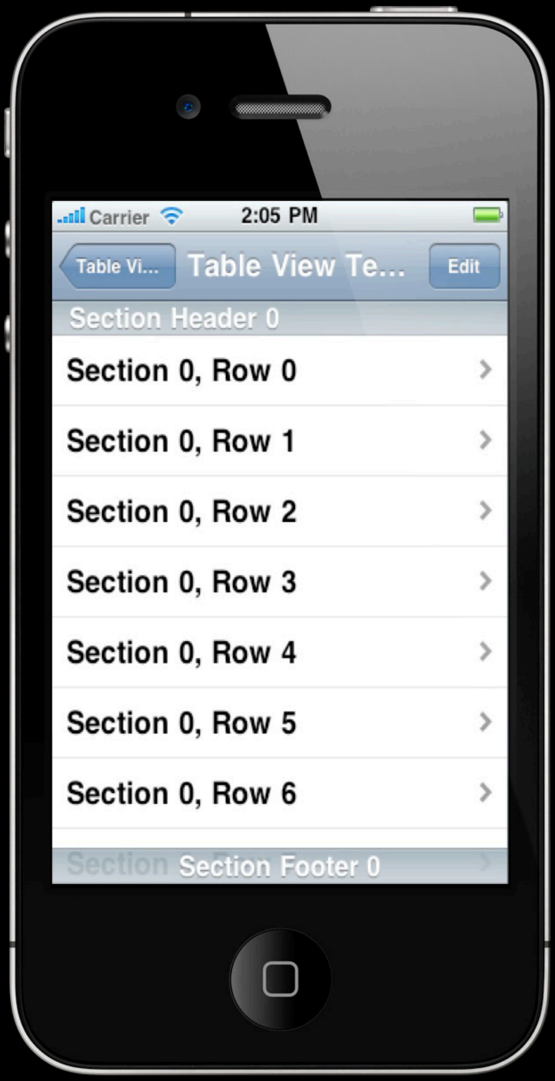
Section 0, Row 5

Section 0, Row 6

Section Footer 0

Animation Styles

- UITableViewRowAnimation
  - UITableViewRowAnimationFade
  - UITableViewRowAnimationRight
  - UITableViewRowAnimationLeft
  - UITableViewRowAnimationTop
  - UITableViewRowAnimationBottom
  - UITableViewRowAnimationNone



Section Header 0

Section 0, Row 0

Section 0, Row 1

Section 0, Row 2

Section 0, Row 3

Section 0, Row 4

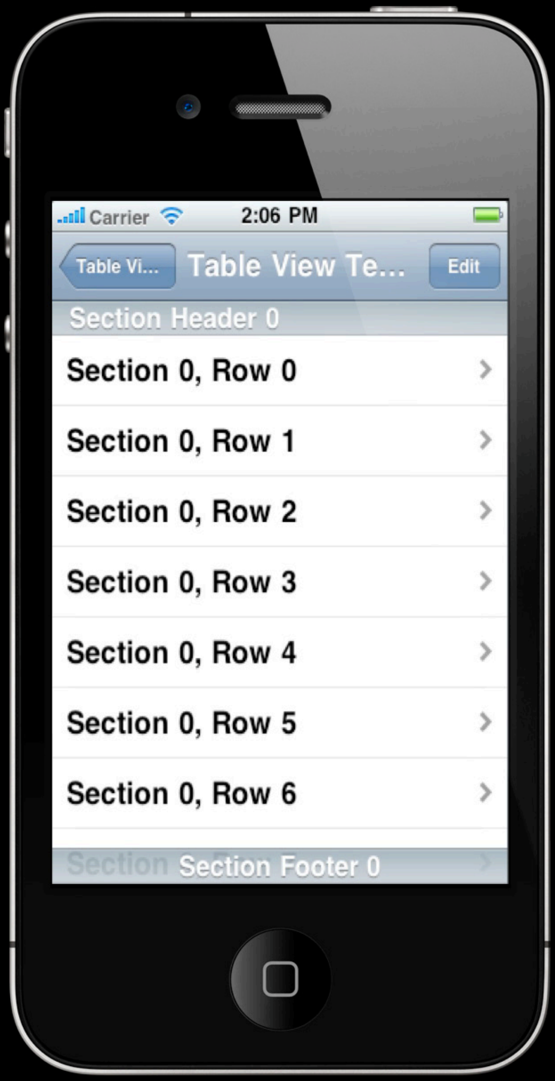
Section 0, Row 5

Section 0, Row 6

Section Footer 0

Animation Styles

- UITableViewRowAnimation
  - UITableViewRowAnimationFade
  - UITableViewRowAnimationRight
  - UITableViewRowAnimationLeft
  - UITableViewRowAnimationTop
  - UITableViewRowAnimationBottom
  - UITableViewRowAnimationNone
  - UITableViewRowAnimationMiddle



Section Header 0

Section 0, Row 0

Section 0, Row 1

Section 0, Row 2

Section 0, Row 3

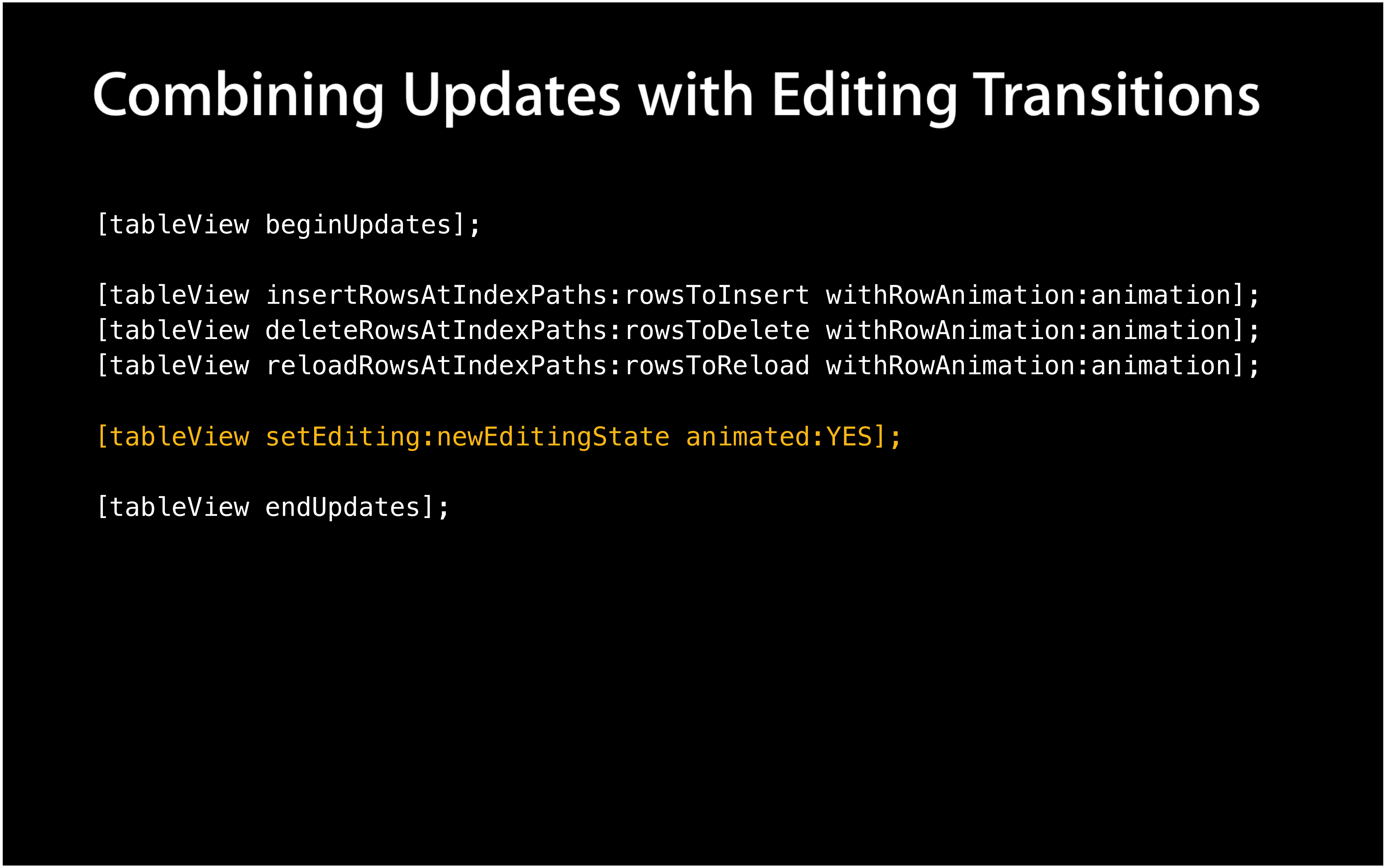
Section 0, Row 4

Section 0, Row 5

Section 0, Row 6

Section Footer 0

Combining Updates with Editing Transitions



Combining Updates with Editing Transitions

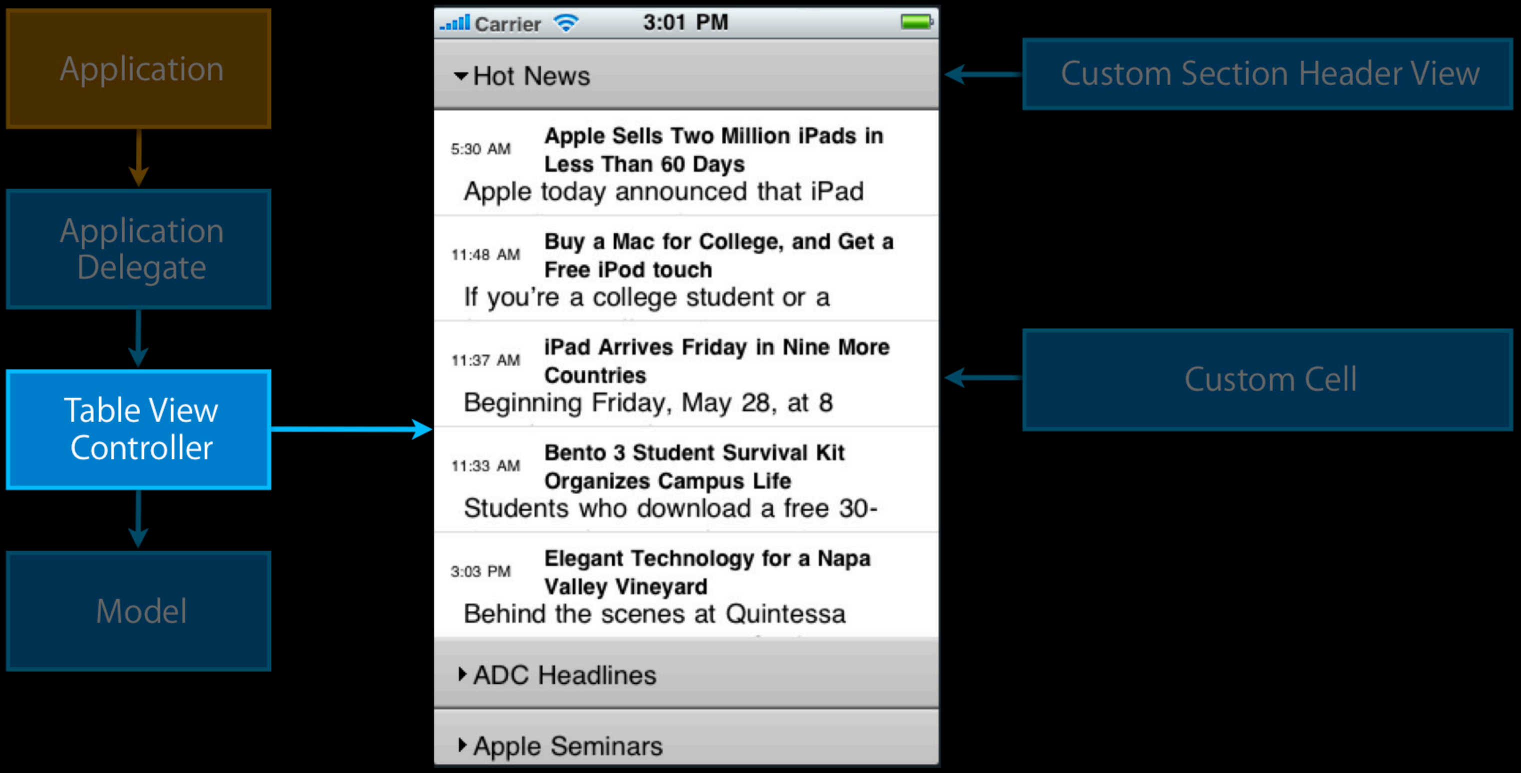
```
[tableView beginUpdates];

[tableView insertRowsAtIndexPaths:rowsToInsert withRowAnimation:animation];
[tableView deleteRowsAtIndexPaths:rowsToDelete withRowAnimation:animation];
[tableView reloadRowsAtIndexPaths:rowsToReload withRowAnimation:animation];

[tableView setEditing:newEditingState animated:YES];

[tableView endUpdates];
```

Demo

Luke the Hiesterman
iPhone Frameworks Engineer

Table View Updates

A simple RSS reader



Carrier 3:01 PM

▾ Hot News

5:30 AM **Apple Sells Two Million iPads in Less Than 60 Days**
Apple today announced that iPad

11:48 AM **Buy a Mac for College, and Get a Free iPod touch**
If you're a college student or a

11:37 AM **iPad Arrives Friday in Nine More Countries**
Beginning Friday, May 28, at 8

11:33 AM **Bento 3 Student Survival Kit Organizes Campus Life**
Students who download a free 30-

3:03 PM **Elegant Technology for a Napa Valley Vineyard**
Behind the scenes at Quintessa

▸ ADC Headlines

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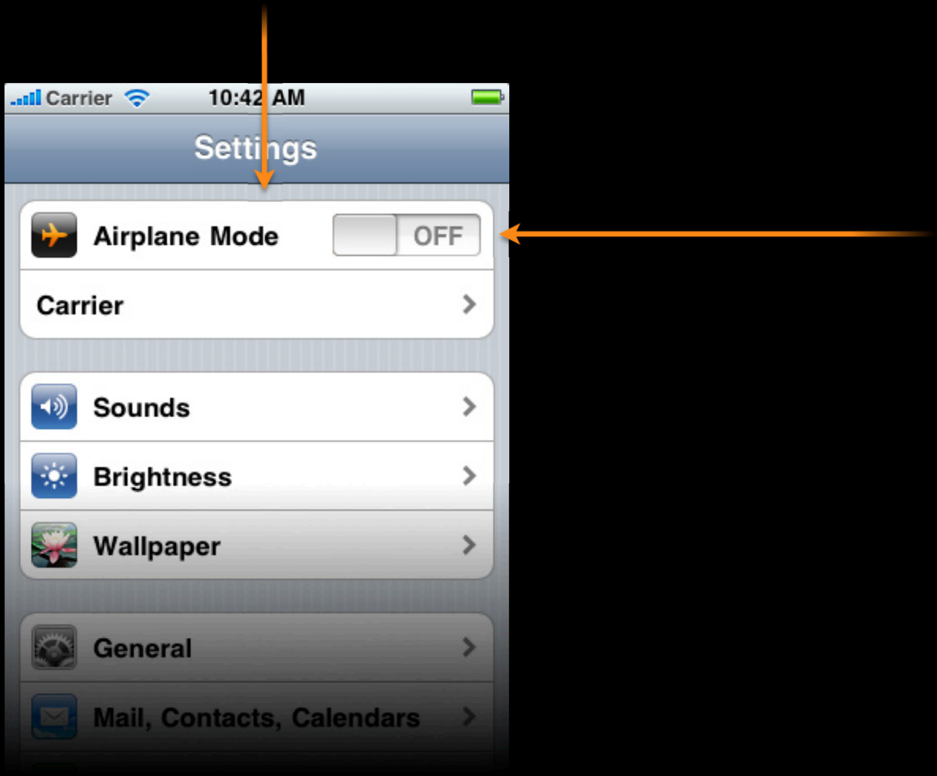
iPhone/iPad Differences

iPhone/iPad Differences

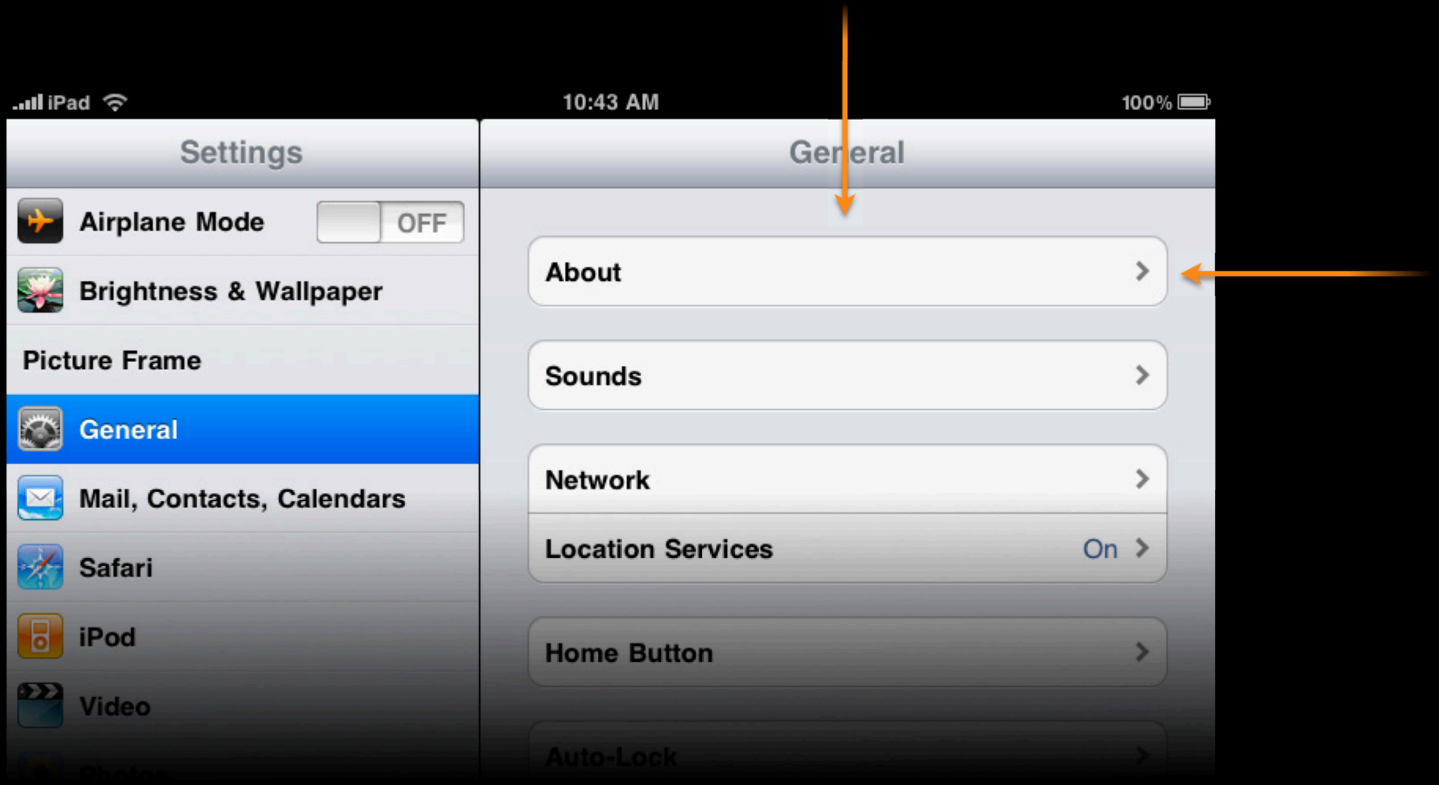
Grouped style margins



Airplane Mode OFF

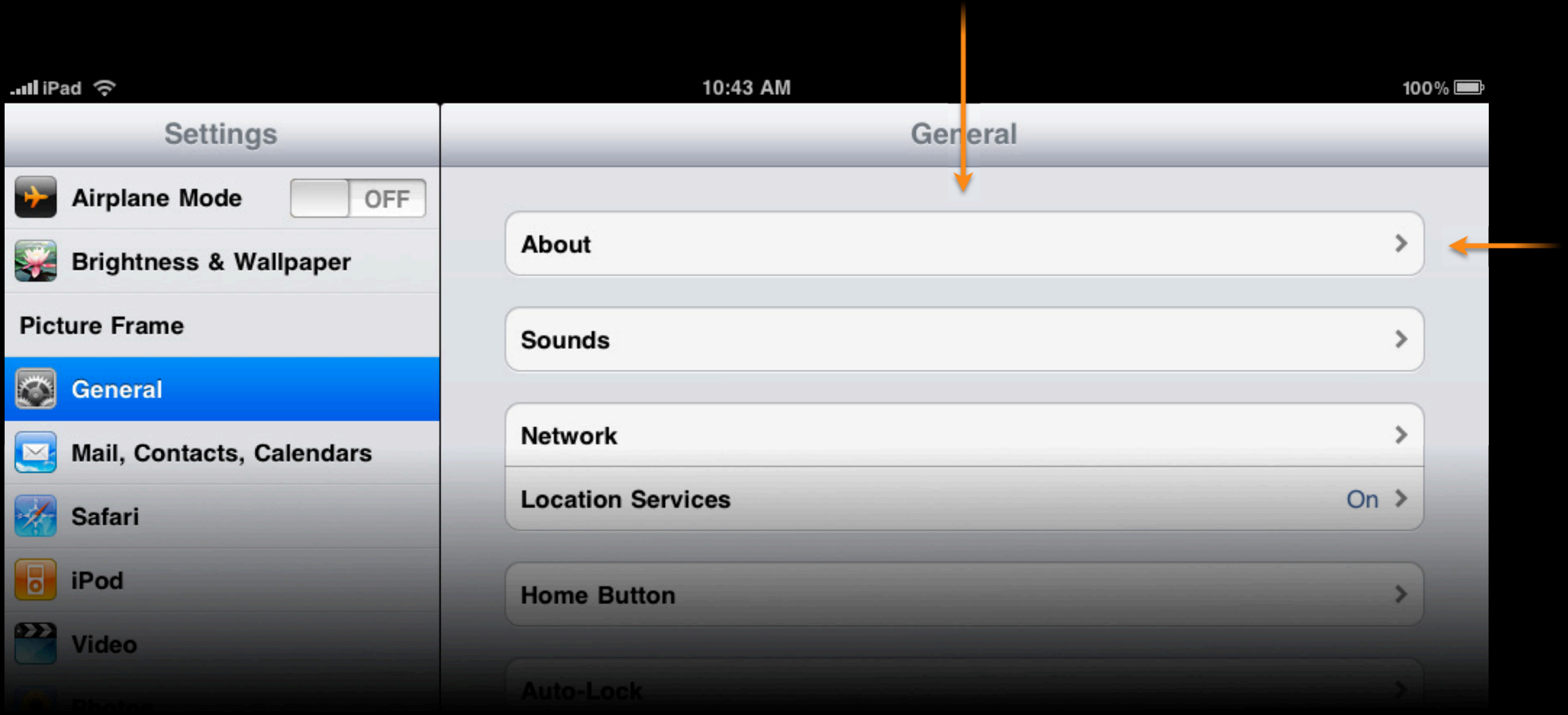
iPhone/iPad Differences

Grouped style margins



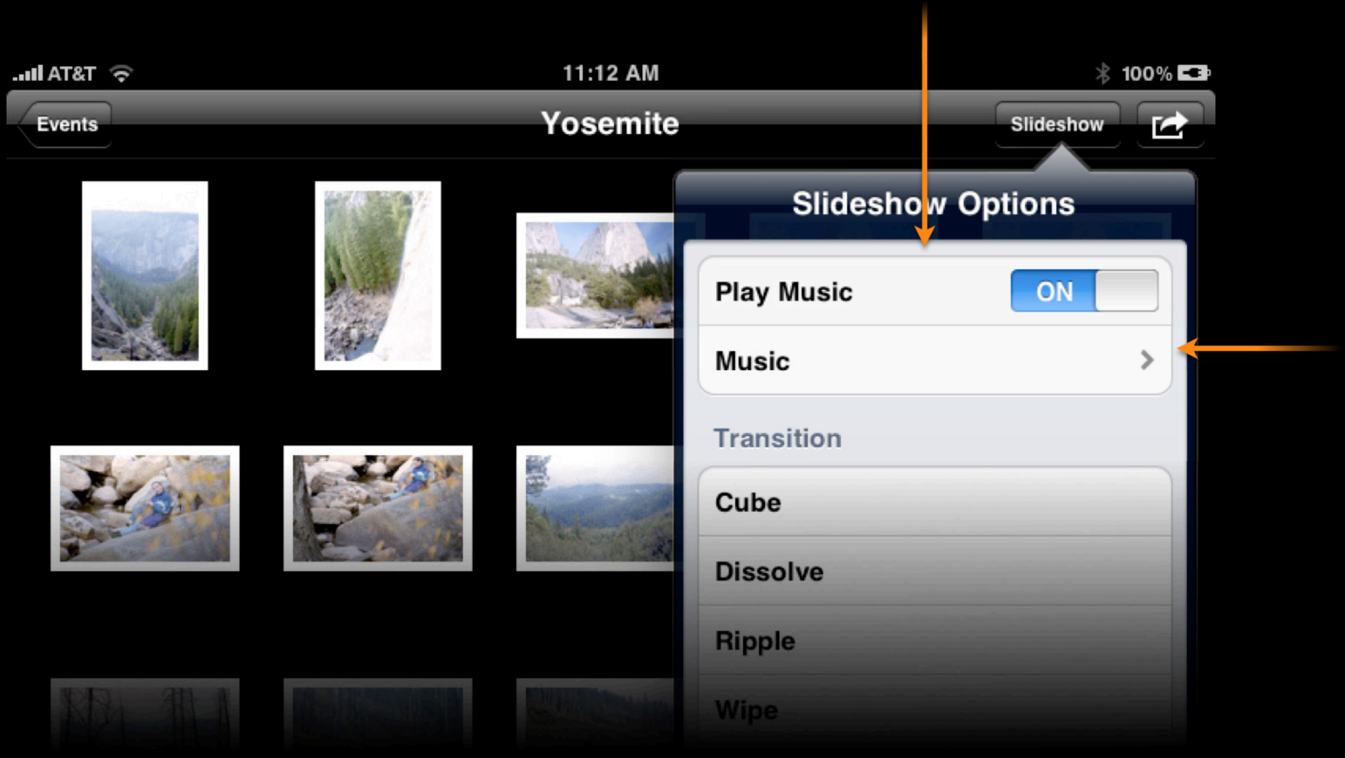
iPhone/iPad Differences

Grouped style margins



iPhone/iPad Differences

Grouped style margins



iPhone/iPad Differences

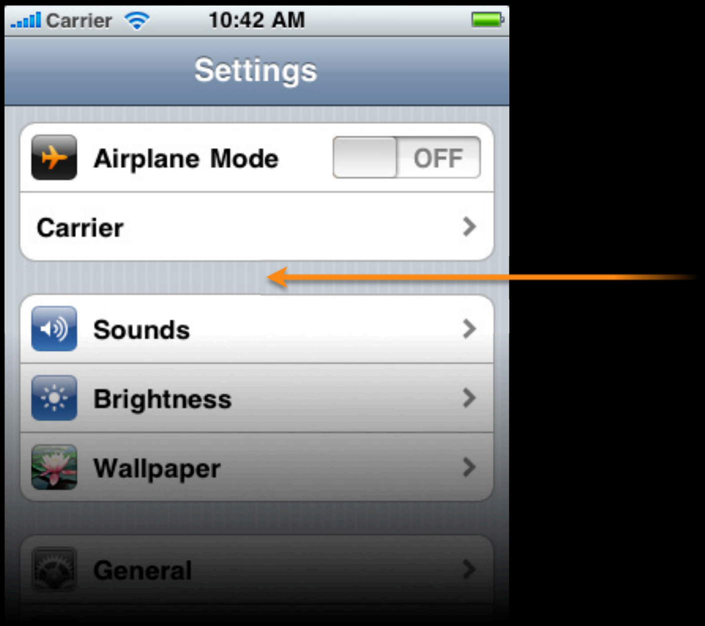
3.2

- Grouped style margins
- Background color/view

```
@property(nonatomic, readwrite, retain) UIView *backgroundView;
```

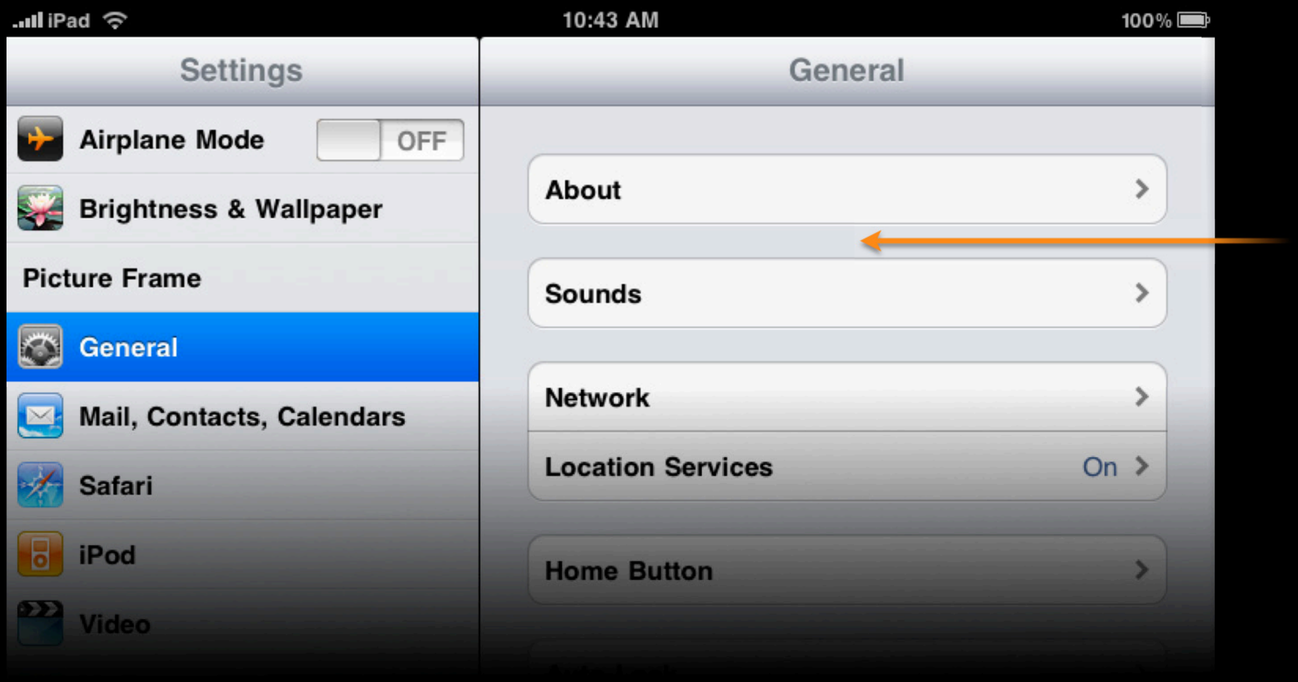
iPhone/iPad Differences

- Grouped style margins
- Background color/view



iPhone/iPad Differences

- Grouped style margins
- Background color/view

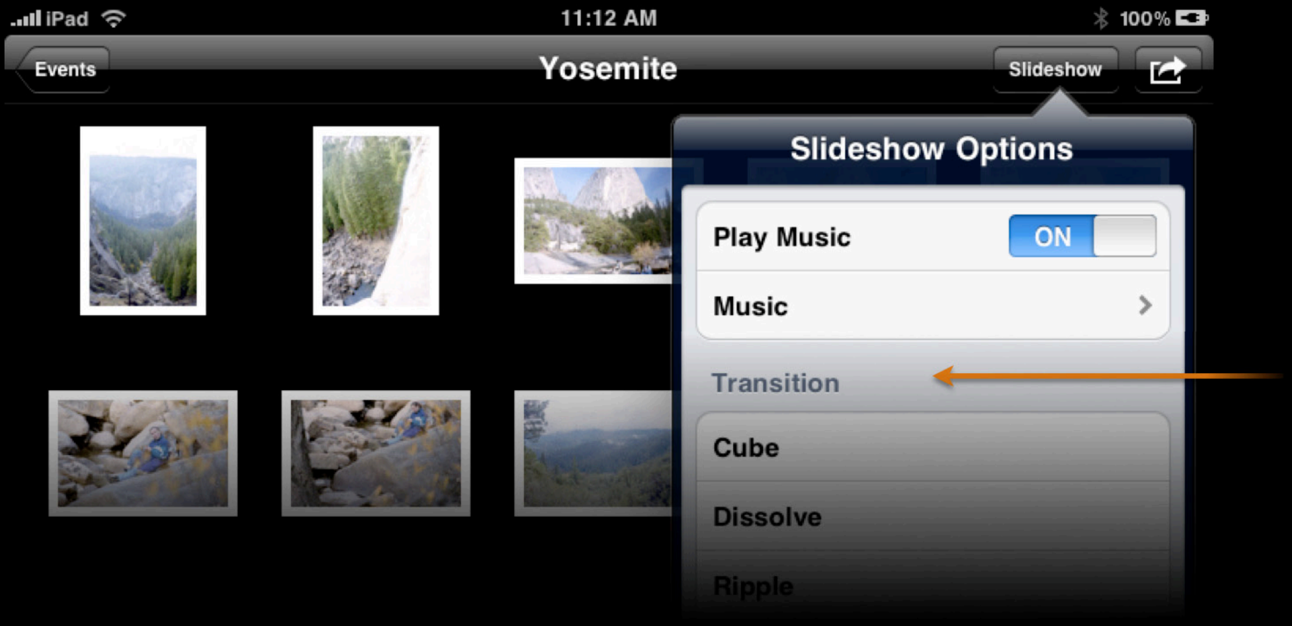


Airplane Mode OFF

Location Services On

iPhone/iPad Differences

- Grouped style margins
- Background color/view



Slideshow Options

Play Music ON

Music

Transition

Cube

Dissolve

Ripple

Background Loading

Background Loading

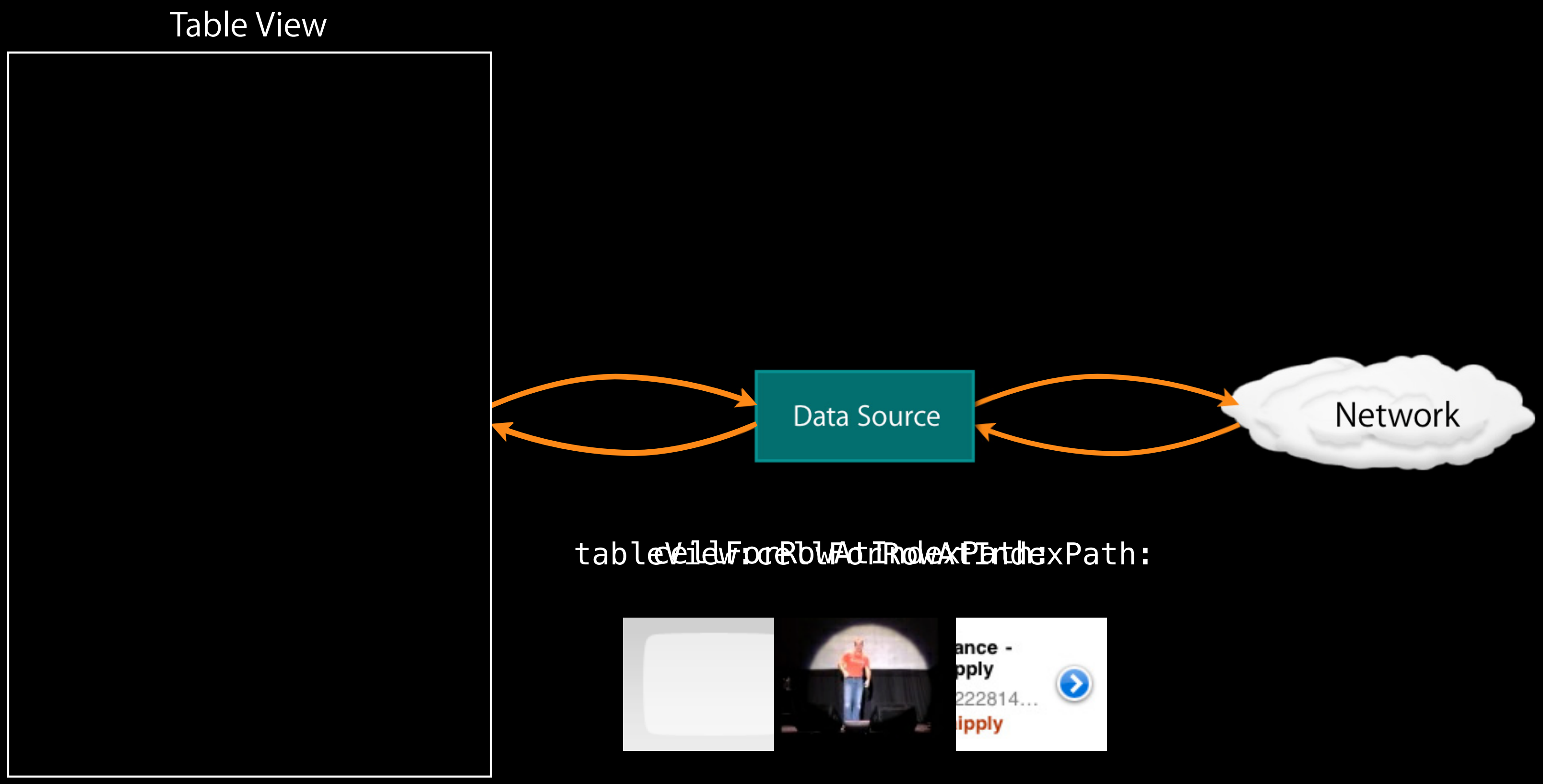


Table View

Data Source

Network

`tableView:cellForRowAtIndexPath:`

Background Loading

```
- (UITableViewCell *)tableView:(UITableView *)tableView
         cellForRowAtIndexPath:(NSIndexPath *)indexPath
{
    UITableViewCell *cell = [self cellForRowAtIndexPath:indexPath];

    if (DATA_NOT_PRESENT) {
        [self populatePlaceholderCell:cell forRowAtIndexPath:indexPath];
        [self requestThumbnailForRowAtIndexPath:indexPath];
    } else {
        [self populateCell:cell forRowAtIndexPath:indexPath];
    }

    return cell;
}
```

Background Loading

```
// You must call this method yourself.  It is not provided or called by UIKit.
- (void)dataAvailableForRowAtIndexPath:(NSIndexPath *)indexPath
{
  UITableViewCell *cell = [tableView cellForRowAtIndexPath:indexPath];

  if (cell != nil) {
      cell.imageView.image = [self thumbnailForCellAtIndexPath:indexPath];
  }
}
```

Background Loading

- Return cells to the table view as fast as possible
- Query for needed data asynchronously
- Change the contents of the cells directly instead of updating

Using Gesture Recognizers with Table Views

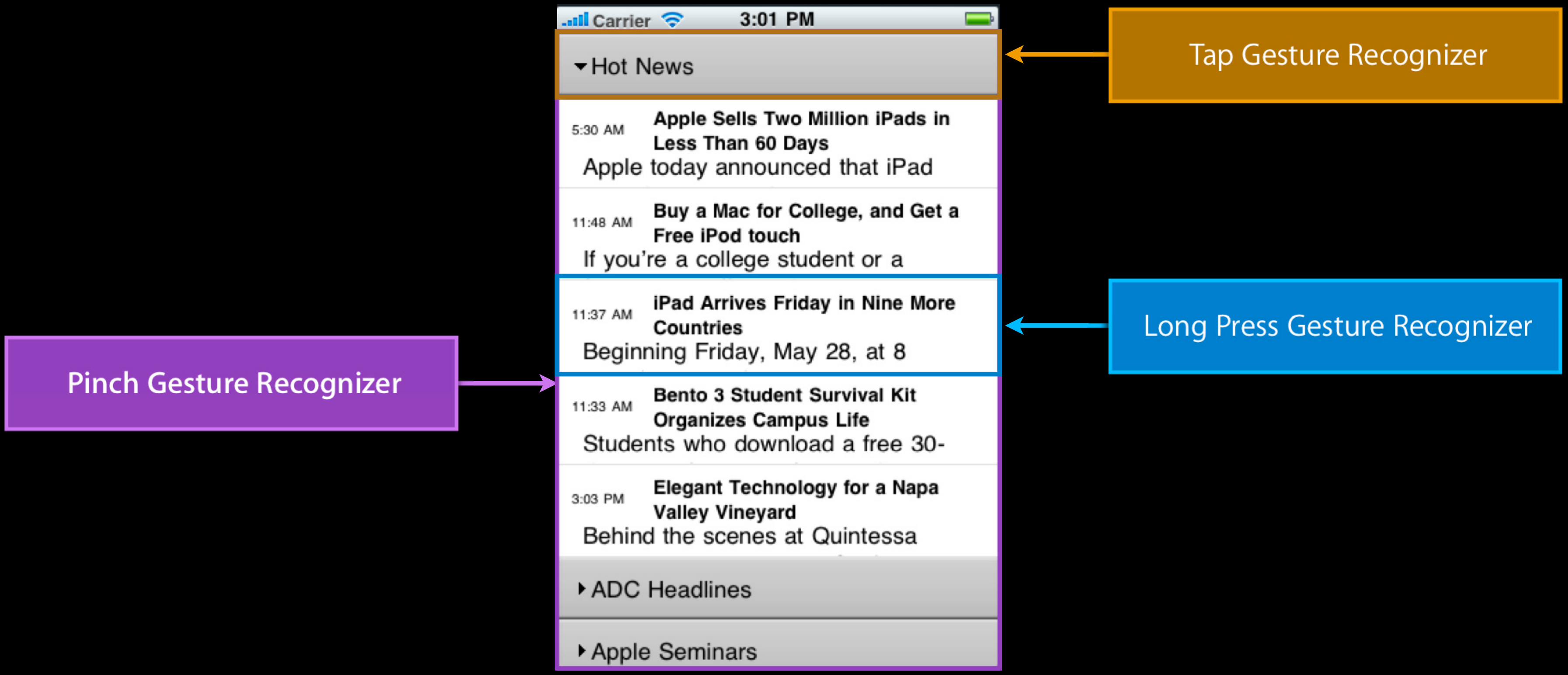
Using Gesture Recognizers with Table Views

- Gesture recognizers decouple event analysis from view implementation
- Gesture recognizers can be attached to the table view, table view cells, or other views in the table view

Demo

Luke the Hiesterman
iPhone Frameworks Engineer

Using Gesture Recognizers with Table Views



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▸ Apple Seminars

Tap Gesture Recognizer

Long Press Gesture Recognizer

Pinch Gesture Recognizer

More Information

Bill Dudney

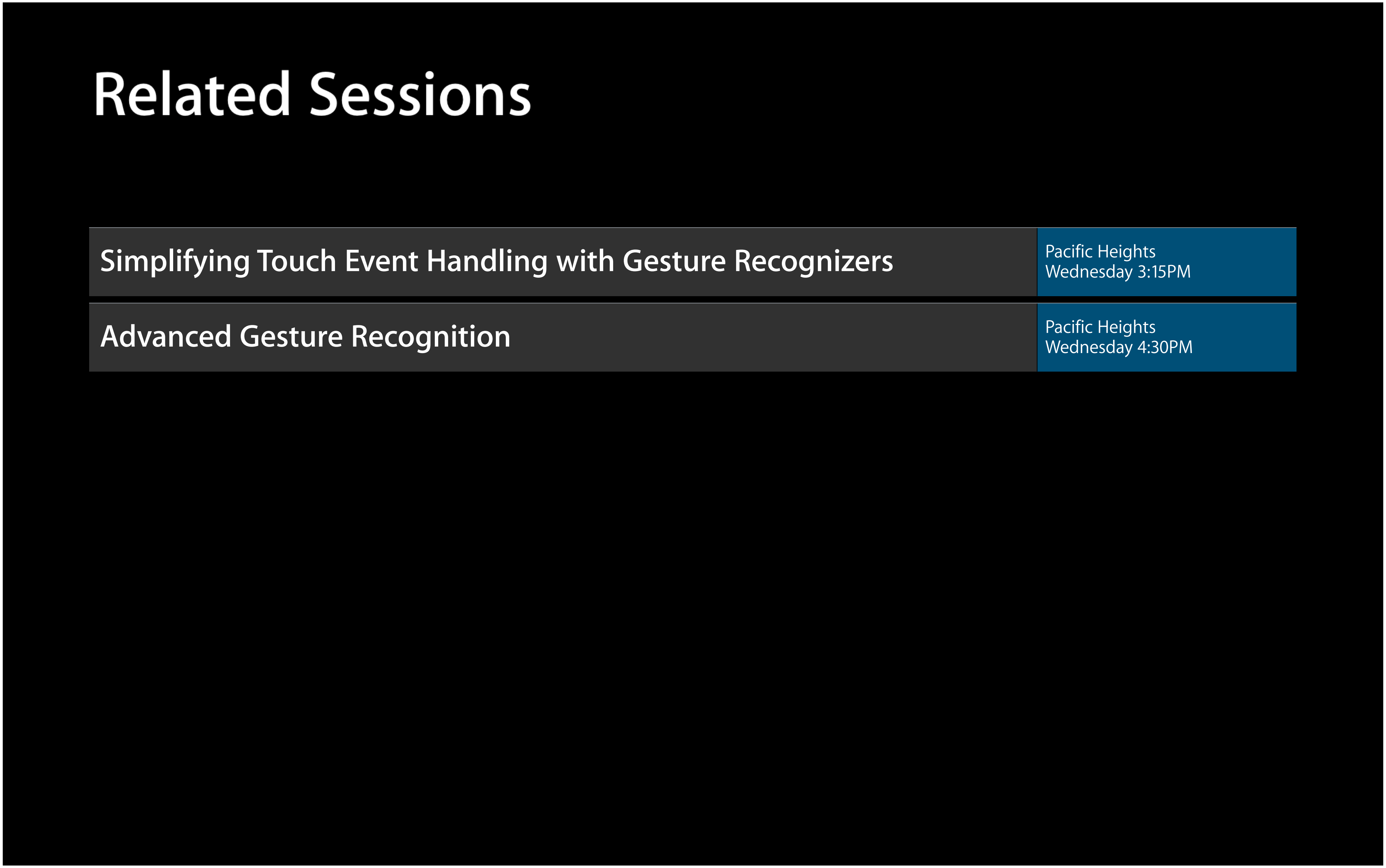
Application Frameworks Evangelist
dudney@apple.com

Documentation

UITableView Class Reference
http://developer.apple.com/iphone/library/documentation/uikit/reference/UITableView_class/Reference/Reference.html

Apple Developer Forums

http://devforums.apple.com



Related Sessions

Simplifying Touch Event Handling with Gesture Recognizers	Pacific Heights Wednesday 3:15PM
Advanced Gesture Recognition	Pacific Heights Wednesday 4:30PM

Labs

UITableView Lab	Application Frameworks Lab C Thursday 2:00PM

Summary

- Use animated updates to change your table view
- Use gesture recognizers to add new ways of interacting with your table views

Q&A

WWDC10

[redacted]