CREATING CUSTOM VIEWS

moar graphs | moar gifs | moar maths

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How do we build amazing UI?

Customize UIViews via their properties

Customize UIViews by modifying their backing CALayer

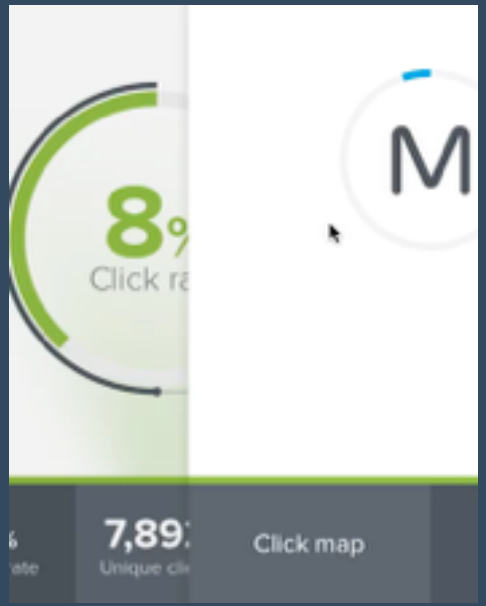
Compose multiple views into more complicated UI

What if this isn't enough?

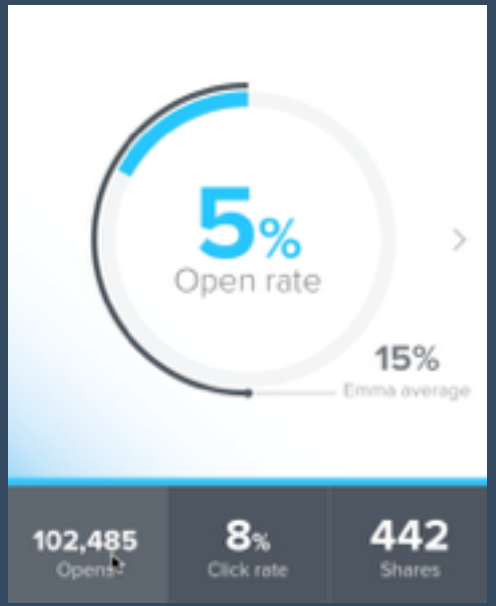
- What if we have a data backed view?
- What if we need to animate the way that view is drawn?

We can take more control over our UI by drawing with Core Graphics

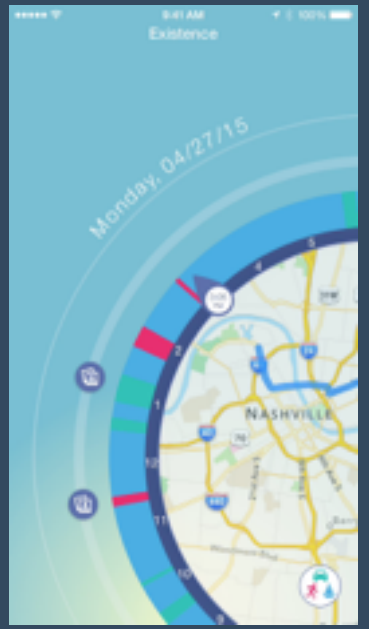
When have I needed to take more control?



Emma – Metric
Loading Indicator



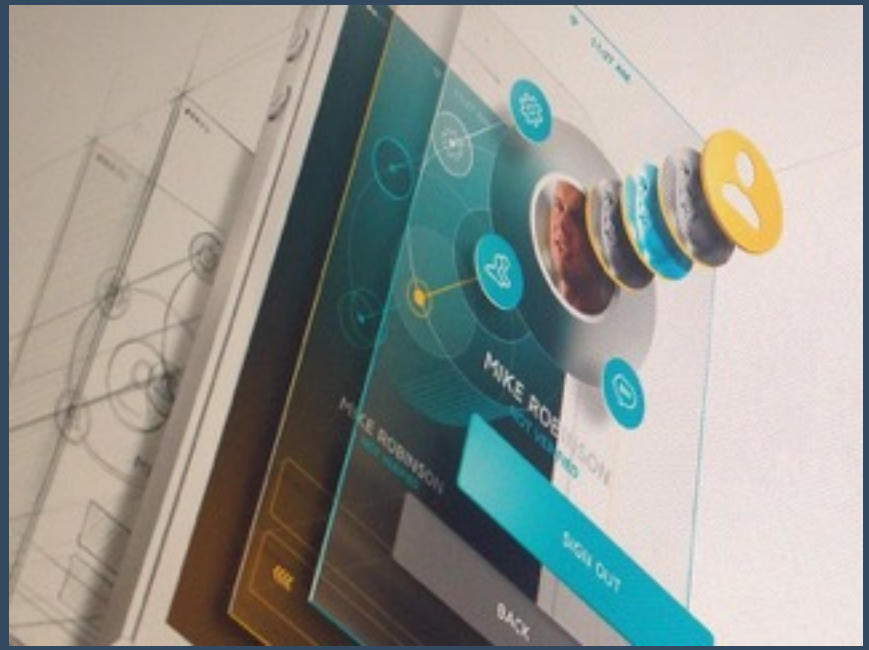
Emma – Metric
In-Progress Loading Graph



Healthways – Existence
Planet Control

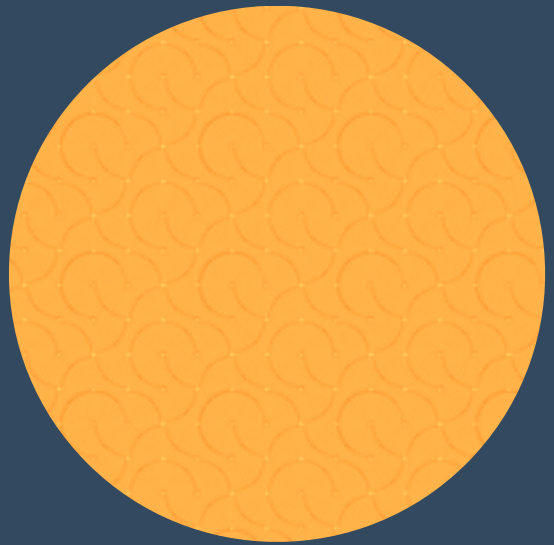
What is the role of a UIView?

- Rendering content
- Handing user interactions
- Managing subviews



Customizing appearance using UIViews properties

Alpha



Background Color

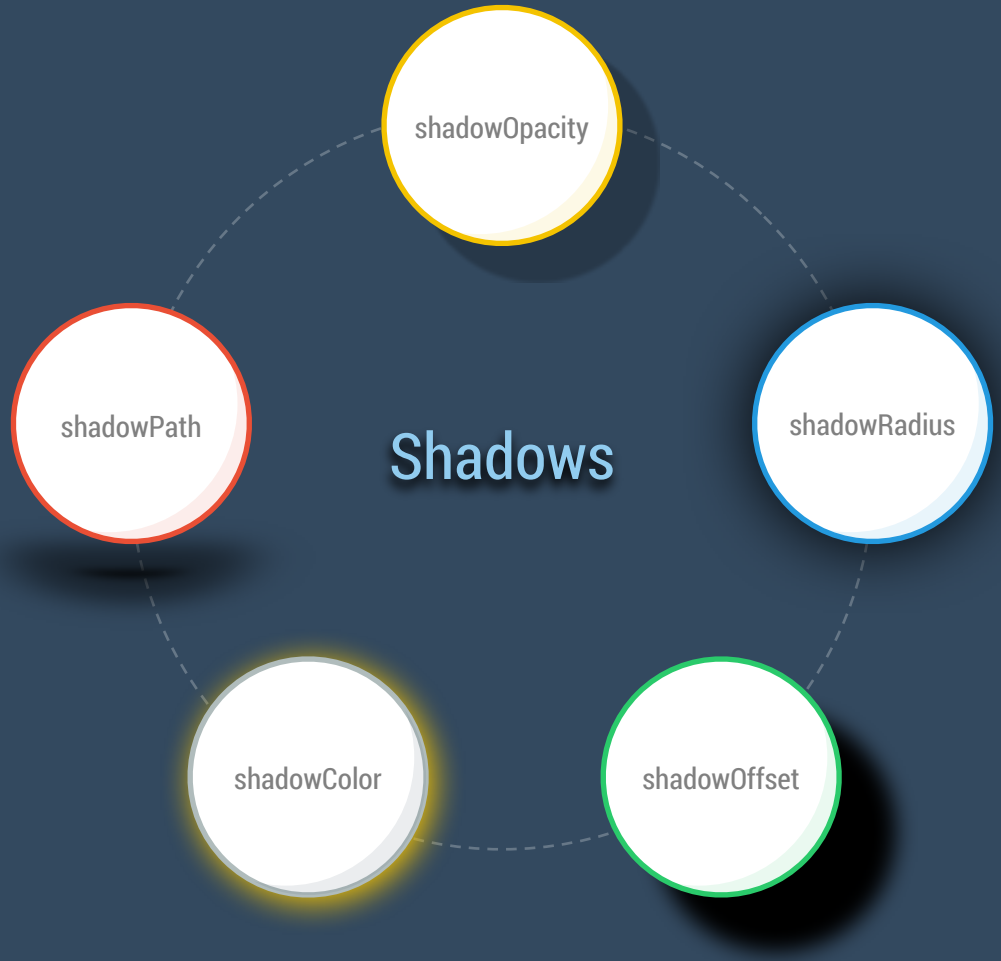
Transform

How do CALayers come into the mix?

- In iOS every view is backed by a CALayer by default
- In OS X you have to manually turn on layer backed views (setWantsLayer:YES)
- The CALayer effectively delegates drawing to the UIView's drawRect: method by default

CocoaHeads - Custom Views

Customizing appearance using CALayer properties



Customizing appearance using CALayer properties

Rounded corners

- cornerRadius (30px)

Borders

- borderWidth (2px)
- borderColor (red)

What if we need to draw something more complicated?

Enter Core Graphics!!!

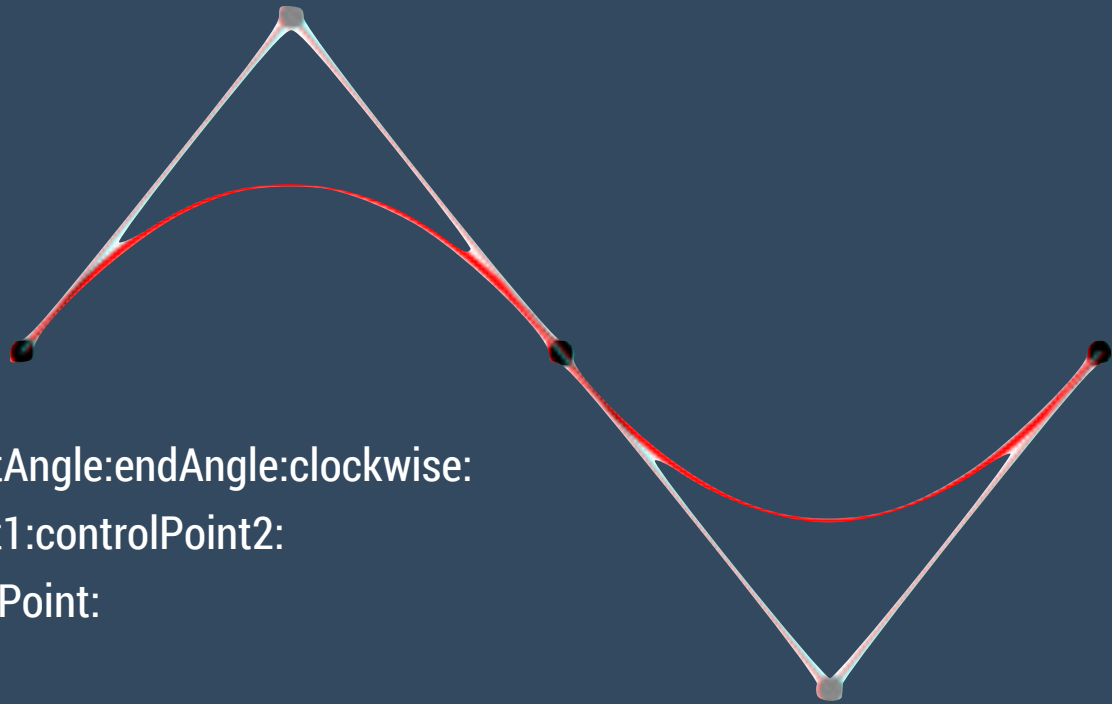
PATHS

AND SHAPES BASED ON PATHS

UIBezierPath

Lines

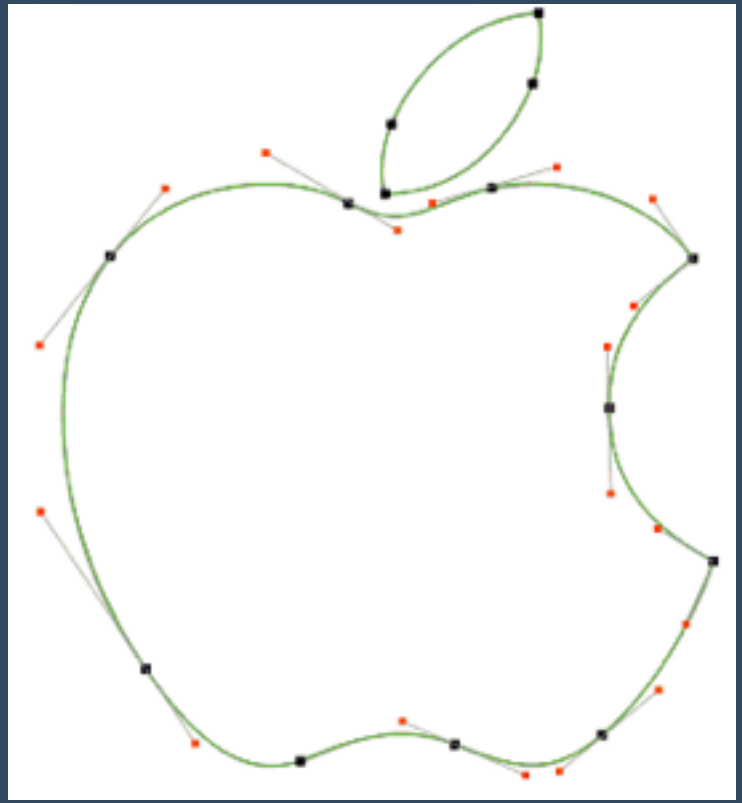
- moveToPoint:
- addLineToPoint:
- addArcWithCenter:radius:startAngle:endAngle:clockwise:
- addCurveToPoint:controlPoint1:controlPoint2:
- addQuadCurveToPoint:controlPoint:
- closePath
- removeAllPoints
- appendPath:



UIBezierPath

Shapes

- bezierPathWithRect:
- bezierPathWithOvalInRect:
- bezierPathWithRoundedRect:cornerRadius:
- bezierPathWithRoundedRect:byRounding Corners:cornerRadii:
- bezierPathWithArcCenter:radius:startAngle: endAngle:clockwise:



Draw shapes two different ways

1. Use a CAShapeLayer
2. Draw using drawRect: in the UIView
    - Draw using drawRect: in the UIView
    - construct path
    - set properties of path
        - color - fill and stroke
        - stroke width
        - stroke type
    - stroke or fill path

GRADIENTS

Gradient Types:

Draw 2 different ways:

- Use a CAGradientLayer
- Draw manually using CGContextDrawLinear Gradient(context, gradient, startPoint, endPoint, 0);

TEXT

- CATextLayer
- Core Text

IMAGES

USE UIIMAGEVIEW WHEN POSSIBLE

Note that you can easily draw to a bitmap with an Image Context

- UIGraphicsBeginImageContext(view.bounds.size);
- [view.layer renderInContext:UIGraphicsGetCurrentContext()];
- UIImage * img = UIGraphicsGetImageFromCurrentImageContext();
- UIGraphicsEndImageContext();

Core Graphics are great for so many other things

- Patterns
- PDFs
- etc.

DEMO TIME

Drawing a non-animated graph


USING CUSTOM
VIEWS IN IB

Rendering the view in IB using IBDesignable

- Add @IBDesignable above class declaration
- Use prepareForInterfaceBuilder() to setup view for display in IB
- Use the TARGET_INTERFACE_BUILDER preprocessor macro to determine if code is running for IB or app

Tweaking the view in IB

- Add @IBInspectable to property declarations
- Can use the following types of variables
  booleans, strings, and numbers (i.e., NSNumber or any of the numeric value types), as well as CGPoint, CGSize, CGRect, UIColor, NSRange, and UIImage
- Exposes UI in inspector panel of IB for your custom view
- Changes in IB override initialization in code

Animating custom drawn views

Implicit animation - default animations for CALayer Properties

- backgroundColor
- borderWidth
- bounds
- cornerRadius
- opacity
- shadowPath
- etc.

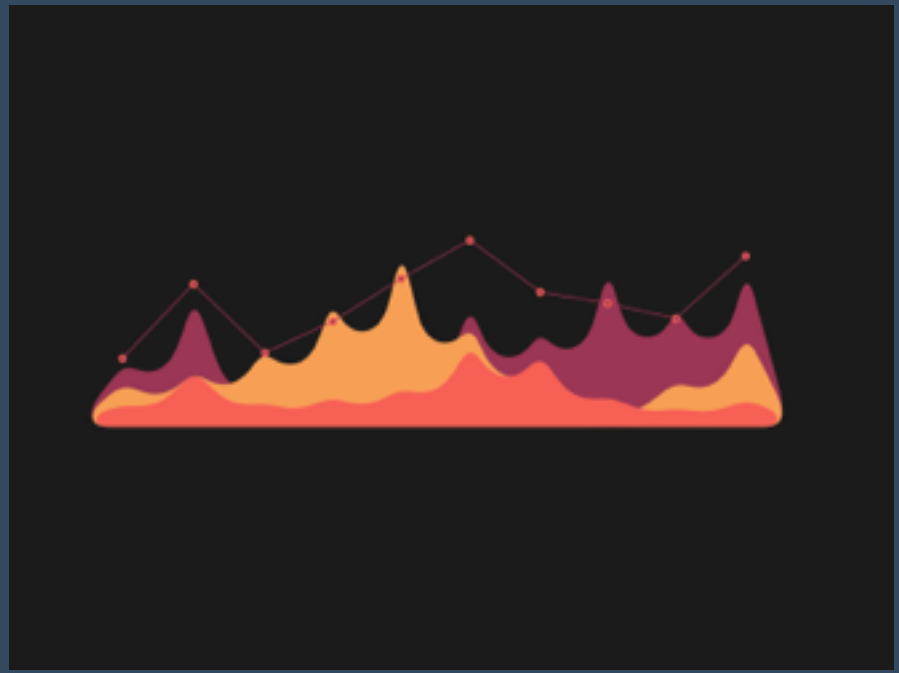
Animating custom drawn views

Explicit animation - Adding custom layer properties

- Add a dynamic property to your custom layer
- Return YES from needsDisplayForKey in your layer using your property's key
- Override actionForKey and provide a CABasicAnimation for your property's key
- Override the display method to draw

What happens when we animate?

- A new presentationLayer is created
- The presentationLayer keeps track of state during the animation



DEMO TIME

Example of an animated graph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