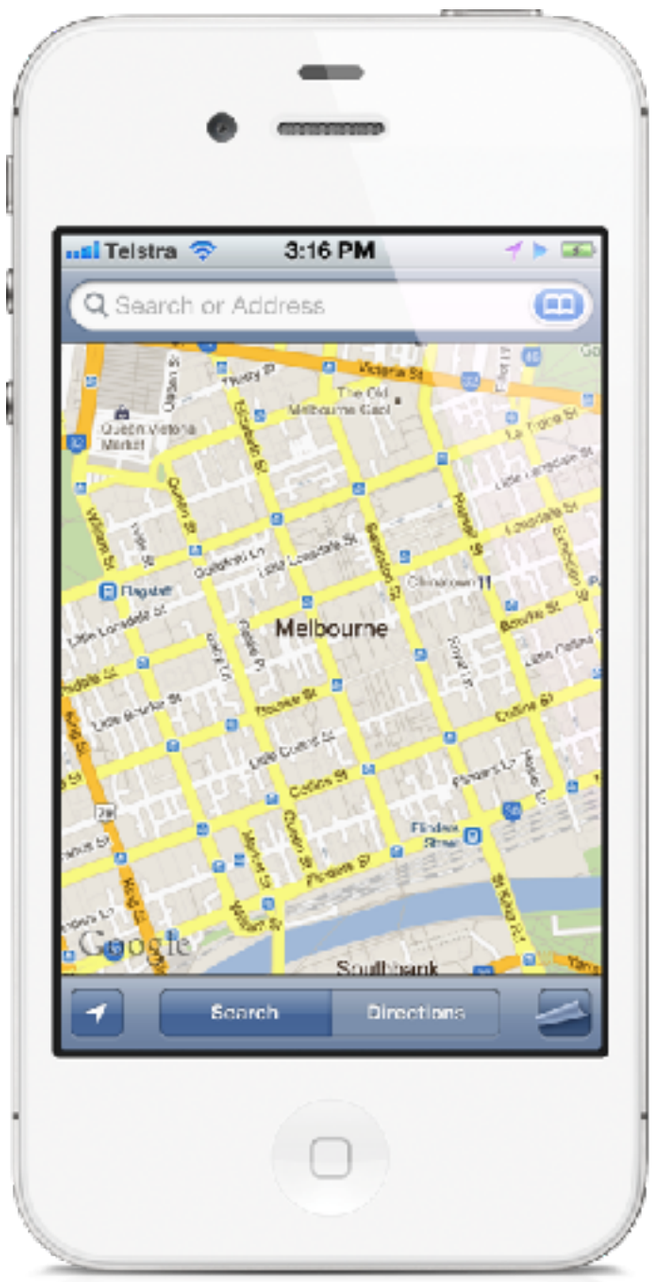
CATiledLayer

Jesse Collis, Melbourne Cocoaheads, February 2012
jesse@jcmultimedia.com.au / @sirjec

CATiledLayer



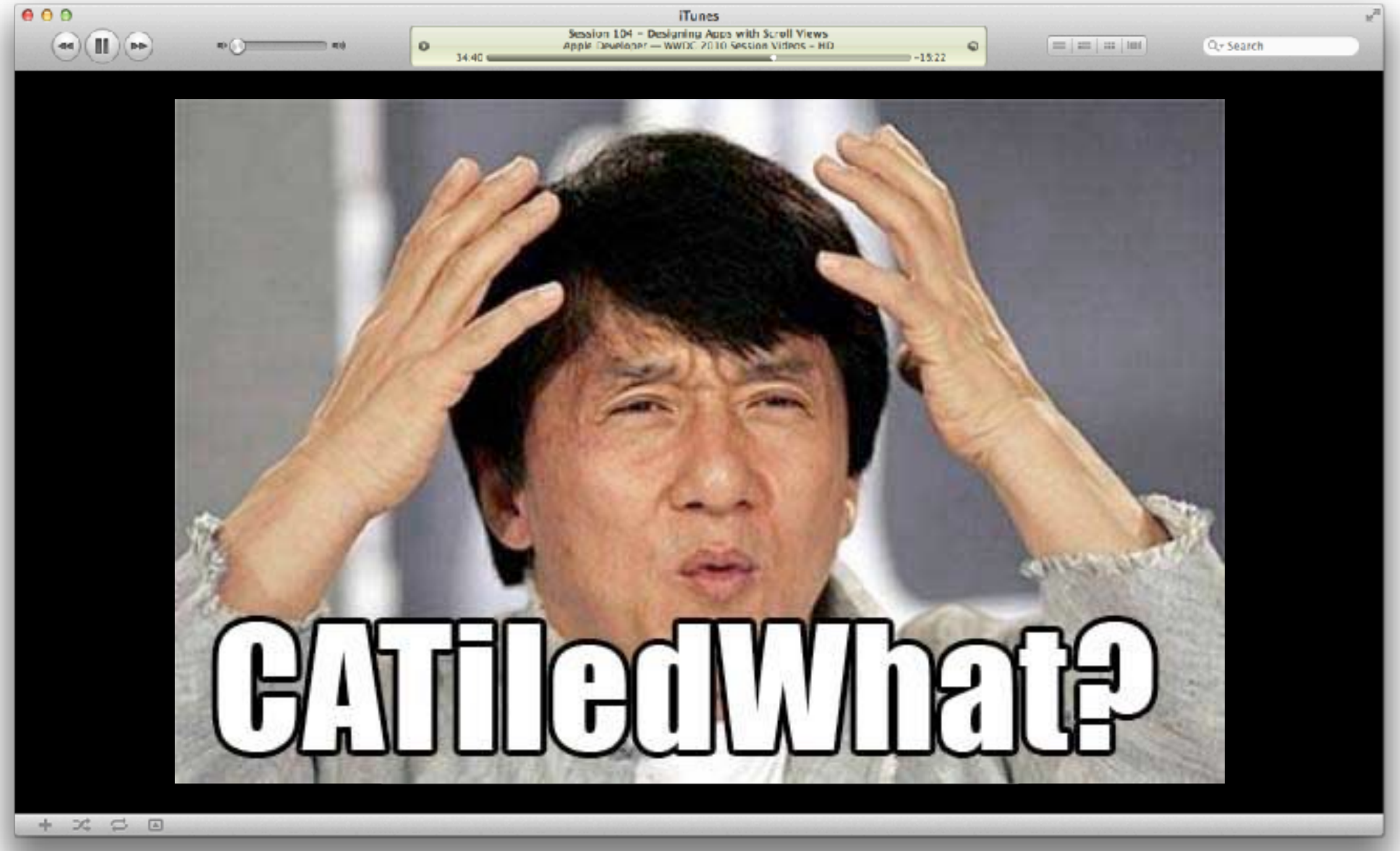
Tiled Views in 2009

Tiled UIScrollViews

iOS 3 Compatibility

@2x.png

CATiledLayer in iOS4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Session 104 - Designing Apps with Scroll Views
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CATiledWhat?

My main goals

- CATiledLayer in a zooming scrollView
- Seamless integration into iOS4+
- Seamless integration between retina / non-retina screens
- provide only one sized tile (not @2x)


Success

Here's what I learnt

- UIViews are backed by CALayers
- All good CALayer documentation is OSX based
- NSView is **not** backed by CALayer
- drawRect: (more or less) equals drawLayer:inContext delegate method in OSX docs

What I learnt cont...

- Core Graphics helps with high resolution screens **most** of the time
- CATiledLayer is just a CALayer subclass
  - It's instantiated as a UIView's layer
  - It uses drawRect:
  - contentScale is set by it's UIView

Basic Implementation

```
+(Class)layerClass
{
  return [CATiledLayer class];
}

- (id)initWithFrame:(CGRect)frame
{
  ...
  [(CATiledLayer *)self.layer setLevelsOfDetail:1];
  [(CATiledLayer *)self.layer setLevelsOfDetailBias:3];
  ...
}

- (void)drawRect:(CGRect)rect
{
  CGContextRef c = UIGraphicsGetCurrentContext();
  CGFloat scale = CGContextGetCTM(c).a;

  NSInteger col = (CGRectGetMinX(rect) * scale) / self.tileSize.width;
  NSInteger row = (CGRectGetMinY(rect) * scale) / self.tileSize.height;

  UIImage *tile_image = [self.tileSource tiledView:self
                                       imageForRow:row
                                    column:col scale:scale];
  [tile_image drawInRect:rect];
}
```

LOD & LODB

- LOD is the number of levels it will ask you for as you zoom out
- LODB is the number of levels it will use as you zoom in

UIScrollView zoomScale vs. CATiledLayer LODB

- zoomScale is measured on a linear scale
- zoomScale has an exponential effect on pixels
- Each LODB/LOD is a power of two more or less than the previous level of detail.

UIScrollView zoomScale vs. CATiledLayer LODB

UIScrollView zoomScale	CATIledLayer LODB	CATIledLayer LOD
0.125	-	3
0.25	-	2
0.5	-	1
1.0	0	0
2.0	1	-
4.0	2	-
8.0	3	-

Some Notes

- Setting LOD and LODB to 0 causes a blank view
- Setting LOD and LODB to 1 seems to be undefined behaviour
- Setting LOD to 1, and LODB > 1 is fine, but I like to set LOD to 0 if I'm using LODB.

Code Time

JCTiledLayer

Retina Display

Apple's docs on Supporting High Resolution screens:

[You] may need to adjust [Core Animation Layers] drawing code to account for scale factors. Normally, when you draw in your view's *drawRect:* method … of the layer's delegate, the system automatically adjusts the graphics context to account for scale factors. **However**, knowing or changing that scale factor might still be **necessary** when your view does one of the following:

- Creates additional Core Animation layers with **different scale factors** and composites them into its own content.

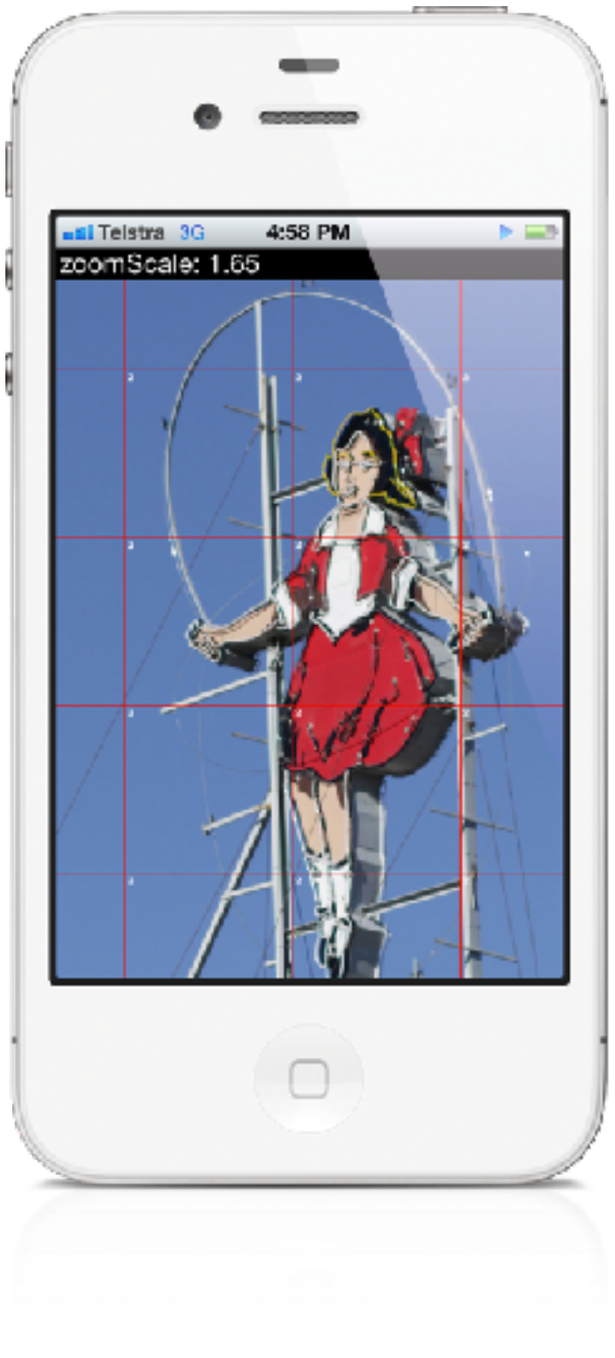
A few things you need to do

- layer.contentsScale == 2 so everything in pixel land is squared
- Multiply the original tileSize by the contentsScale
- Multiply drawRect: *rect* by the context scale giving us our 512x512 tileSize
- divide *rect* by contentsScale to give us *rect* with 256x256 dimensions
- *rect* origin can now be used to grab the right tile
- draw said tile it into *rect*; Core Graphics will do the rest

What's next

- Add UIGestureRecognizer support for more map-like features
- Overlay support
- Replace UIImages with vectors or SVG drawing

JCTiledView is on Github



- github.com/jessedc/JCTiledScrollView

Thanks!

Jesse Collis

jesse@jcmultimedia.com.au

twitter.com/sirjec

JC Multimedia Design