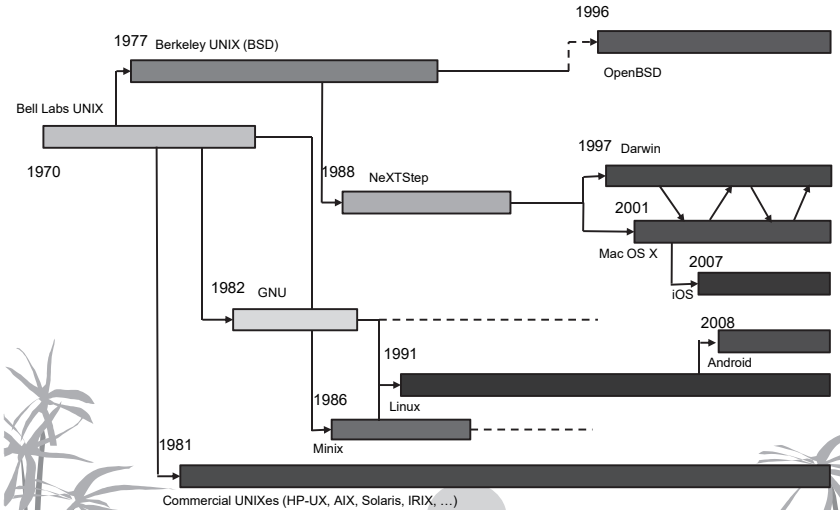
Apple and iOS

General Architecture Tools

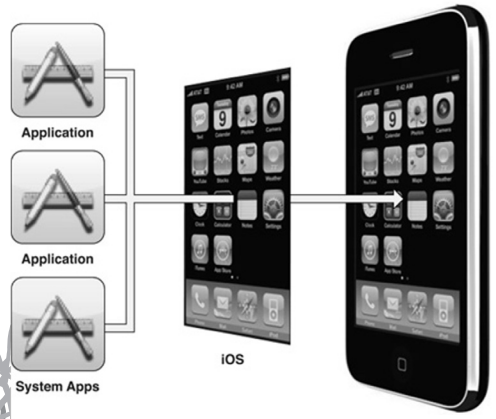
General Characteristics

- iPhone
  - Appeared on June 2007
    - OS named iPhone OS 1
    - First SDK appeared in March 2008
  - OS and SDK renamed to iOS 4 on June 2010
  - Multi-touch display, with gesture recognition
  - Sensors (3-axis accelerometer, proximity, light)
  - Camera (2 Mpixel)
  - 3.5” 18 bit 320x480 2:3 aspect and 163 ppi display
  - Rich audio and video
  - Wireless comms
    - GSM / GPRS / EDGE
    - Wi-Fi and Bluetooth

iOS Operating System



iOS and Hardware



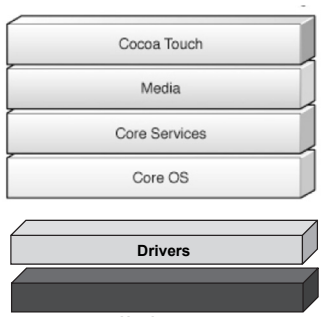
iOS supplies the API’s needed to develop the final user applications and some system applications

Those API’s are layered.

iOS itself can be considered as the intermediary between the applications and the hardware and other components present in the device

In the first versions only one application can use the screen and interact with the user.

Layers of iOS APIs



Cocoa Touch
UIKit: app integration, windows and graphics, event-handling, views and controls, web and text, access to sensors, camera and photo library, device info
Addressbook
Core Location

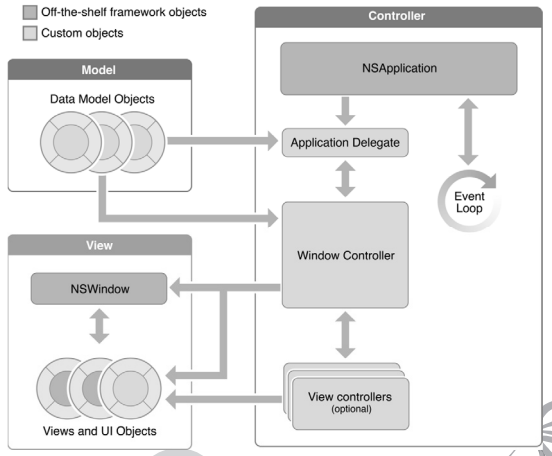
Media
Graphics: Quartz, animation, OpenGL ES
Audio
Video

Core Services
Core Foundation: collections, application bundle, data & time, raw data, preferences, URL, streams, port & sockets comms
CFNetwork: BSD sockets, FTP & HTTP protocols, Bonjour, DNS, SSL, TLS
Security: Certificates and keys, random numbers, keychain
SQLite
XML: parser and transformations

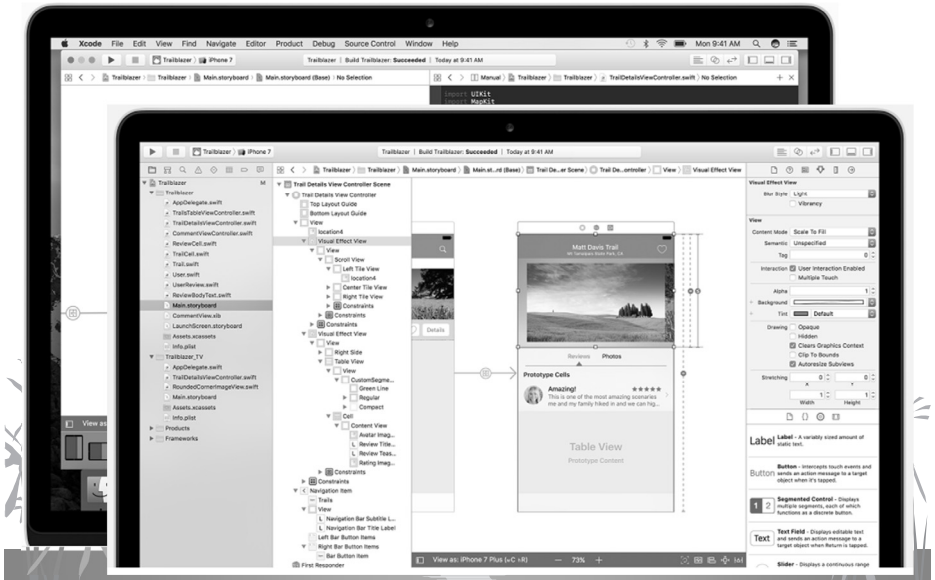
Core OS - LibSystem
threads, networking, files, standard I/O, memory, math

Standard App Structure

Use the MVC pattern



Development IDE



Screen specification

A storyboard

Main.storyboard

```
<?xml version="1.0" encoding="UTF-8" standalone="no"?>
<document type="com.apple.InterfaceBuilder3.CocoaTouch.Storyboard.XIB" version="3.0" toolsVersion="8107.4"
systemVersion="14F27" targetRuntime="iOS.CocoaTouch" propertyAccessControl="none" useAutolayout="YES"
useTraitCollections="YES" initialViewController="BYZ-38-tOr">
    <dependencies>
        <plugIn identifier="com.apple.InterfaceBuilder.IBCocoaTouchPlugin" version="8151.3"/>
        <capability name="Constraints to layout margins" minToolsVersion="6.0"/>
    </dependencies>
    <scenes>
        <!--View Controller-->
        <scene sceneID="tne-QT-ifu">
            <objects>
                <viewController id="BYZ-38-tOr" customClass="ViewController" customModule="Control_Fun"
                customModuleProvider="target" sceneMemberID="viewController">
                    <layoutGuides>
                        <viewControllerLayoutGuide type="top" id="y3c-jy-aDJ"/>
                        <viewControllerLayoutGuide type="bottom" id="wfy-db-euE"/>
                    </layoutGuides>
                    <view key="view" contentMode="scaleToFill" id="8bC-Xf-vdC">
                        <rect key="frame" x="0.0" y="0.0" width="600" height="600"/>
                        <autoresizingMask key="autoresizingMask" widthSizable="YES" heightSizable="YES"/>
                        <subviews>
                            <imageView userInteractionEnabled="NO" contentMode="center" horizontalHuggingPriority="251"
                            verticalHuggingPriority="251" image="apress_logo"
                            translatesAutoresizingMaskIntoConstraints="NO" id="aDW-Tv-M5y">
                                <rect key="frame" x="214" y="48" width="172" height="80"/>
                            </imageView>
                            <textField clearsContextBeforeDrawing="NO" contentMode="scaleToFill"
                            contentHorizontalAlignment="left" contentVerticalAlignment="center" borderStyle=
                            "roundedRect" placeholder="Type in a name" minimumFontSize="17"
                            translatesAutoresizingMaskIntoConstraints="NO" id="a8O-AO-NDA">
                                <rect key="frame" x="95" y="165" width="485" height="30"/>
                                <fontDescription key="fontDescription" type="system" pointSize="14"/>
                                <textInputTraits key="textInputTraits" autocapitalizationType="words" returnKeyType=
                                "done"/>
                                <connections>
                                    <action selector="textFieldDoneEditing:" destination="BYZ-38-tOr" eventType=
                                    "editingDidEndOnExit" id="eYJ-1e-btr"/>
                                </connections>
                            </textField>
                            <label opaque="NO" userInteractionEnabled="NO" contentMode="left" horizontalHuggingPriority
```

The controller

```
////  AppDelegate.swift
//  Control Fun

import UIKit

@UIApplicationMain
class AppDelegate: UIResponder, UIApplicationDelegate {
    var window: UIWindow?

   func application(application: UIApplication, didFinishLaunchingWithOptions launchOptions: [NSObject: AnyObject]?)
-> Bool {
      // Override point for customization after application launch.
       return true    }
   func applicationWillResignActive(application: UIApplication) {
   }
   func applicationDidEnterBackground(application: UIApplication) {
   }
   func applicationWillEnterForeground(application: UIApplication) {
   }
   func applicationDidBecomeActive(application: UIApplication) {
   }
   func applicationWillTerminate(application: UIApplication) {
   }
}
```


The ViewController

@IBOutlet

Represents an object in the interface builder

@IBAction

Handlers of events generated on the interface objects

ViewController.swift

```
//
//  ViewController.swift
//  Control Fun

import UIKit

class ViewController: UIViewController {
    @IBOutlet weak var nameField: UITextField!
    @IBOutlet weak var numberField: UITextField!
    @IBOutlet weak var sliderLabel: UILabel!
    @IBOutlet weak var leftSwitch: UISwitch!
    @IBOutlet weak var rightSwitch: UISwitch!
    @IBOutlet weak var doSomethingButton: UIButton!

    override func viewDidLoad() {
        super.viewDidLoad()
        sliderLabel.text = "50"
    }

    override func didReceiveMemoryWarning() {
        super.didReceiveMemoryWarning()
        // Dispose of any resources that can be recreated.
    }

    @IBAction func onTapGestureRecognized(sender: AnyObject) {
        nameField.resignFirstResponder()
        numberField.resignFirstResponder()
    }

    @IBAction func onSliderChanged(sender: UISlider) {
        sliderLabel.text = "\(lroundf(sender.value))"
    }

    @IBAction func onSwitchChanged(sender: UISwitch) {
        let setting = sender.on
        leftSwitch.setOn(setting, animated: true)
        rightSwitch.setOn(setting, animated: true)
    }

    @IBAction func toggleControls(sender: UISegmentedControl) {
        if sender.selectedSegmentIndex == 0 { // "Switches" is selected
            leftSwitch.hidden = false
            rightSwitch.hidden = false
            doSomethingButton.hidden = true
        } else {
            leftSwitch.hidden = true
            rightSwitch.hidden = true
            doSomethingButton.hidden = false
        }
    }
```