Apple and iOS

General Architecture Tools
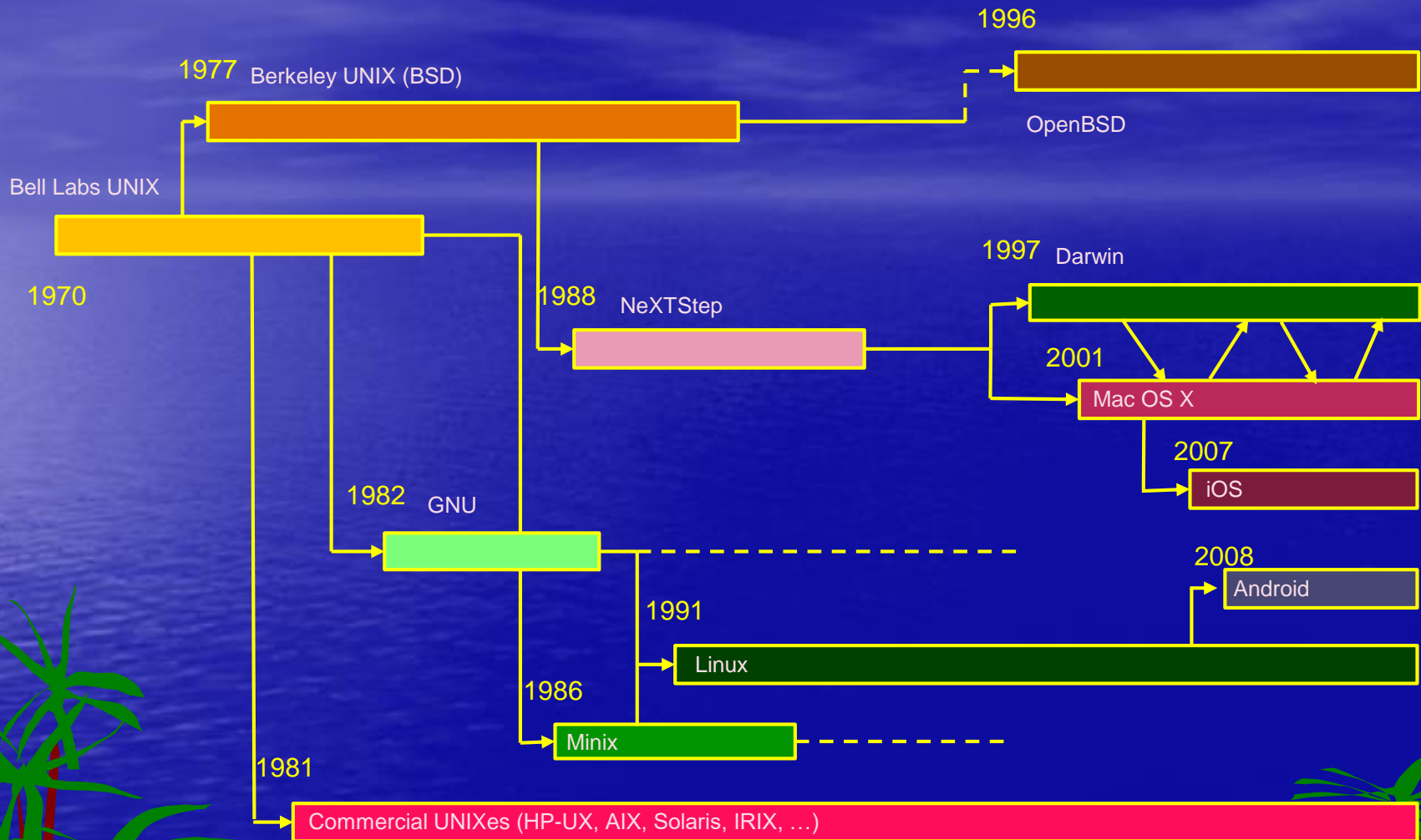
General Characteristics
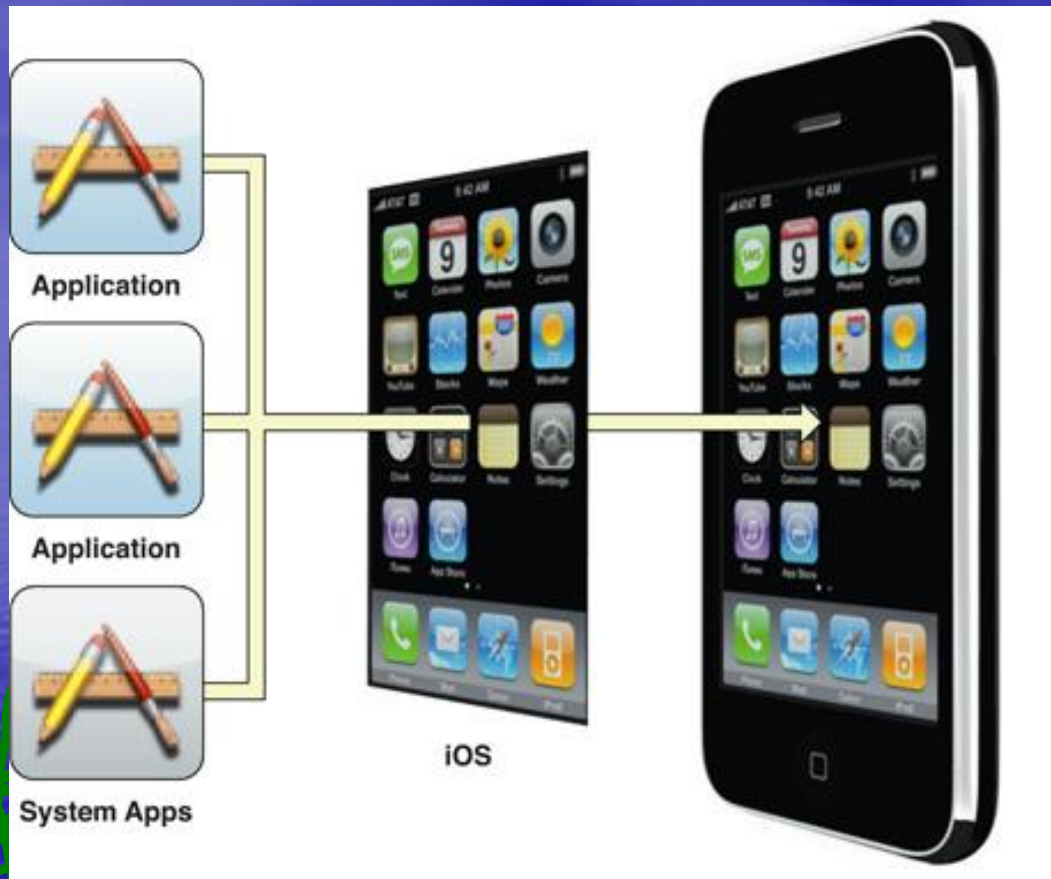
❖ **iPhone**

- **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

1996

1977 Berkeley UNIX (BSD)

OpenBSD

Bell Labs UNIX

1970

1997 Darwin

1988 NeXTStep

2001

Mac OS X

2007

iOS

1982 GNU

2008

Android

1991

Linux

1986

Minix

1981

Commercial UNIXes (HP-UX, AIX, Solaris, IRIX, …)

iOS Architecture

iOS and Hardware

Application

Application

System Apps

iOS

iOS supplies the API's needed to develop the final user applications and some system applications
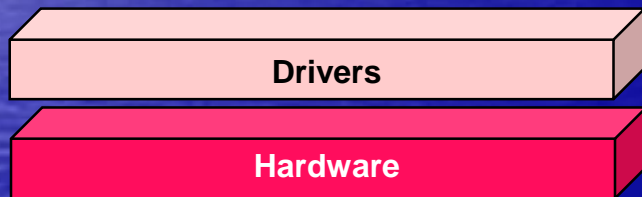
Those API's are layered.

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
Media
Core Services
Core OS

iOS

Drivers

Device

Hardware

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
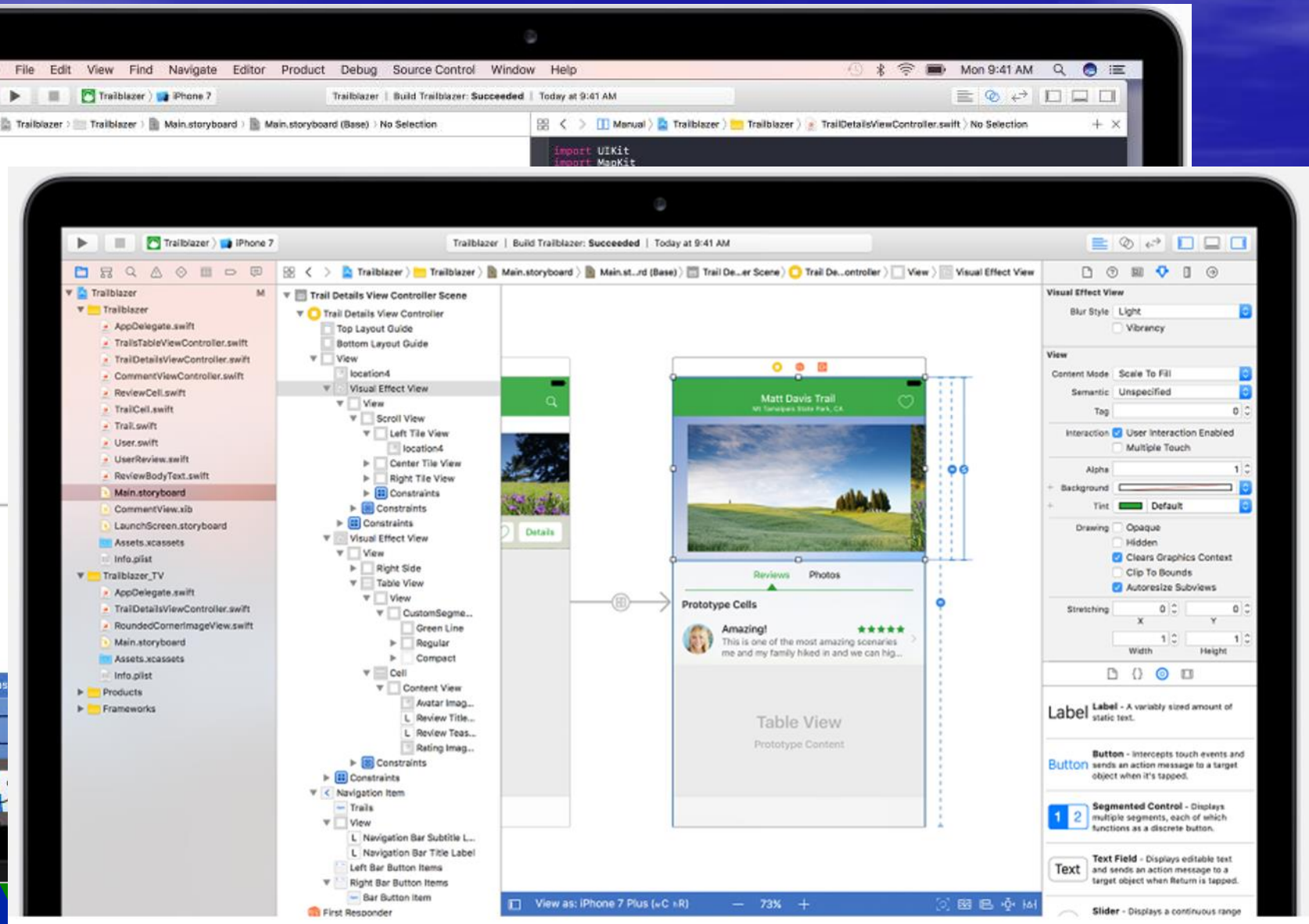 SQLite
  XML: parser and transformations

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
<?xml version="1.0" encoding="UTF-8" standalone="no"?>
<document type="com.apple.InterfaceBuilder3.CocoaTouch.Storyboard.XIB" version="3.0" toolsVersion="8187.4"
systemVersion="14F27" targetRuntime="iOS.CocoaTouch" propertyAccessControl="none" useAutolayout="YES"
useTraitCollections="YES" initialViewController="BYZ-38-t0r">
    <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-t0r" 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-M5v">
                                <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="sB0-A0-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-t0r" eventType=
                                    "editingDidEndOnExit" id="eYJ-le-btr"/>
                                </connections>
                            </textField>
                            <label opaque="NO" userInteractionEnabled="NO" contentMode="left" horizontalHuggingPriority
```

The controller

```swift
////  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

```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
        }
    }
}
```