House Course 59-20

Web and Mobile Applications
Week 0: Class Overview / Pre-work Review

Davis Gossage
Jesse Hu

Week 0

- About Us
- About the Course
- About You
- Importance of Mobile Apps / Swift History
- Homework for Week 1

Who are we?

Davis Gossage

P’16 ECE / CS

Co-Founder of CrowdTunes

Software Engineer @ Apple

Jesse Hu

T’16 CS

HackDuke Organizer

Engineering Intern @ Facebook

Course Goals

This class provides a broad understanding of modern web applications and mobile applications. The course will feature a series of guest lectures on modern design and development principles. Topics to be covered may include: HTML/CSS, JavaScript, jQuery, React.js, iOS Development. Students will be assigned weekly readings that will explain core concepts involved in application design. Students will then complete weekly homework assignments and a final project that asks them to apply their knowledge in developing a full application.

Course Policies

- Grading is Satisfactory / Unsatisfactory.
  0.5 Credits

- Absences: 2 max
  Notify Davis & Jesse by email before class (dcg13@duke.edu, jesse.hu@duke.edu)

- Out-of-class workload: 2-4 hours per week

- Homework consists of light reading and tutorials

- Second half of class focuses on project of choice

- More effort will benefit learning in the long term

Why are we teaching this?

- To give students practical applications for their theoretical knowledge

“As a CS major, I've gotten a lot of theoretical background, but often at the cost of practical application. So, I'm interested in taking this course to gain additional experience in building a production application.”

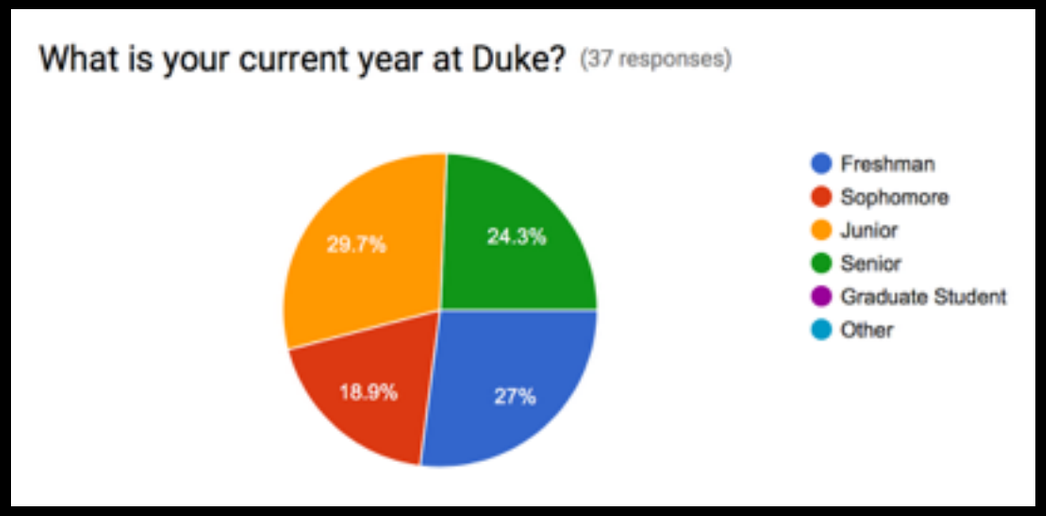
Why are we teaching this?

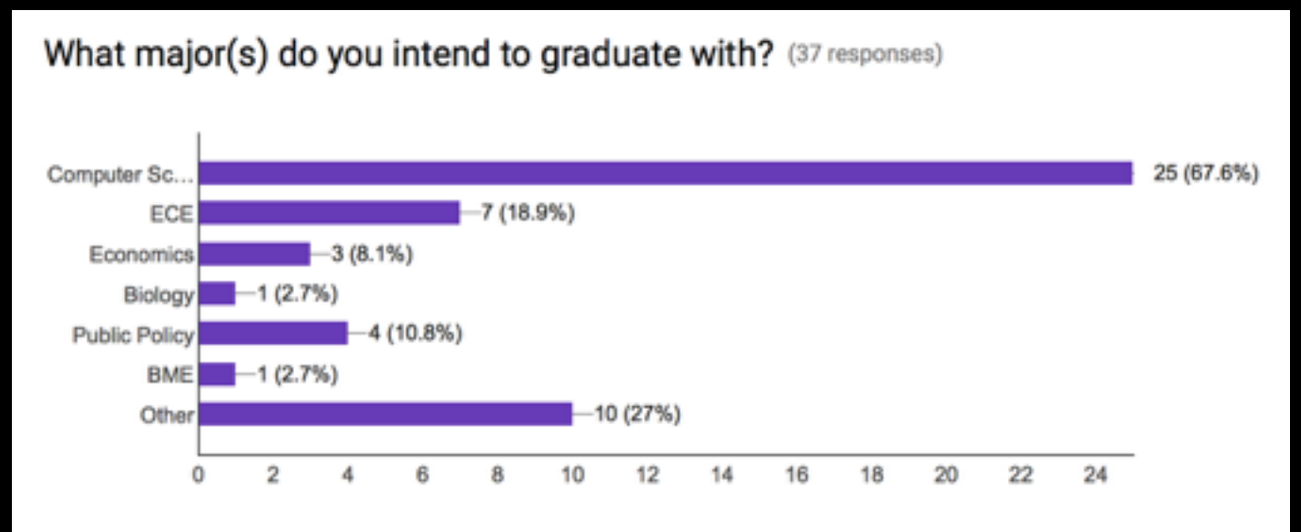
- To give students practical applications for their theoretical knowledge
- To give students the ability to pursue a business or project

“I've always had ideas about different apps, and I would love to have the technical skills to develop them myself.”

“Developing mobile app for a startup"

Background





- 80% of you have taken or will be taking CS201
- In order to get anything done, we're going to assume you know some things

What are we going to learn?

- Swift and iOS (90% indicated they wanted to learn, 60% as a first choice)
- Database principles, organizing and storing data
- HTML/CSS (50% indicated they wanted to learn, 10% as a first choice)
- JavaScript (70% indicated they wanted to learn, 10% as a first choice)

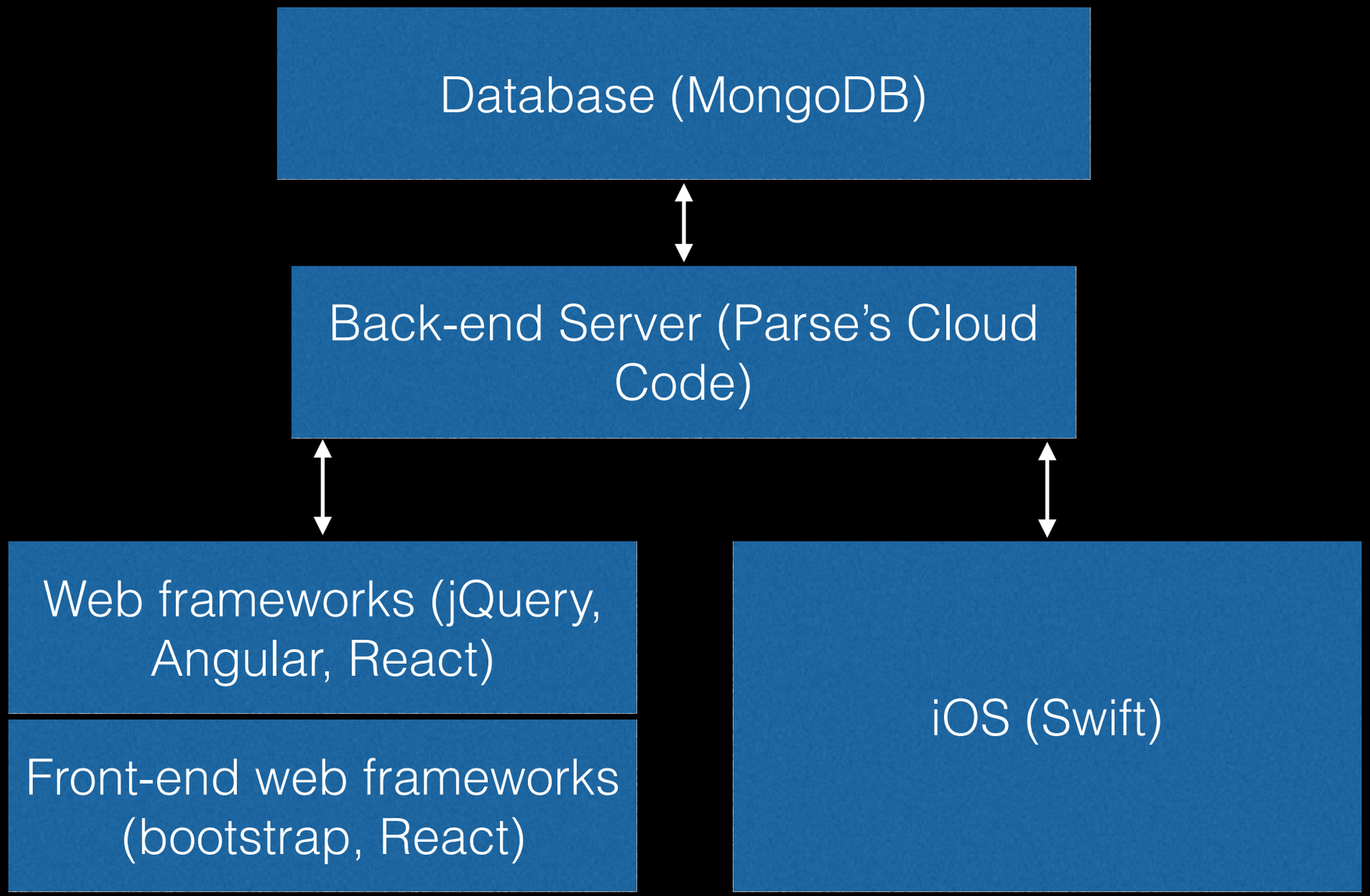
Class Intro

- Name
- Year and Major
- Need a Mac?

Need a Mac?

- The ECE department has given us access to their Macbook Airs for the semester
    - By borrowing hardware you agree to the following: “I agree to assume full financial responsibility for all components of the equipment for the time that it is checked out to me. I understand that I will be asked to pay a replacement charge for any damage or loss of the equipment issued to me. I understand that I am responsible for returning the equipment in person, with all parts, on time. I will not leave equipment unattended and understand that I must return the equipment during the time designated by OIT or the professor.”

High level goals



parse.com

- Back-end as a service
- Owned by Facebook, with clients including eBay, Groupon, Barclays
- Includes entire backend stack, DB based on Mongo.db
- Cloud Code is based on Node.js, allows DB manipulation (scheduled jobs, cloud functions)
- Simplifies overhead of advanced features (push notifications, user authentication)

Meeting Dates

- 01/20
- 01/27
- 02/03
- 02/10
- 02/17
- 02/24
- 03/02
- 03/09
- 03/16 (Spring break)
- 03/23
- 03/30
- 04/06
- 04/13
- 04/20
- 04/27 (LDOC)

Meeting Dates

- 01/20 - Intro
- 01/27 - The Swift Language, Playgrounds
- 02/03 - Xcode Environment
- 02/10 - UIKit
- 02/17 - iOS Frameworks
- 02/24 - Parse DB
- 03/02 - Wrap-up Demo
- 03/09 - Catch-up / JS Intro
- 03/16 (Spring break)
- 03/23 - Frontend JS & Frameworks
- 03/30 - Integrating Web Frontend and Backend
- 04/06 - TBD Special Topics / Project Work
- 04/13 - TBD Special Topics / Project Work
- 04/20 - TBD Special Topics / Project Work
- 04/27 - Cumulative Final and Final Presentations 7-10pm (kidding)

Meeting Dates

- 01/20 - Intro
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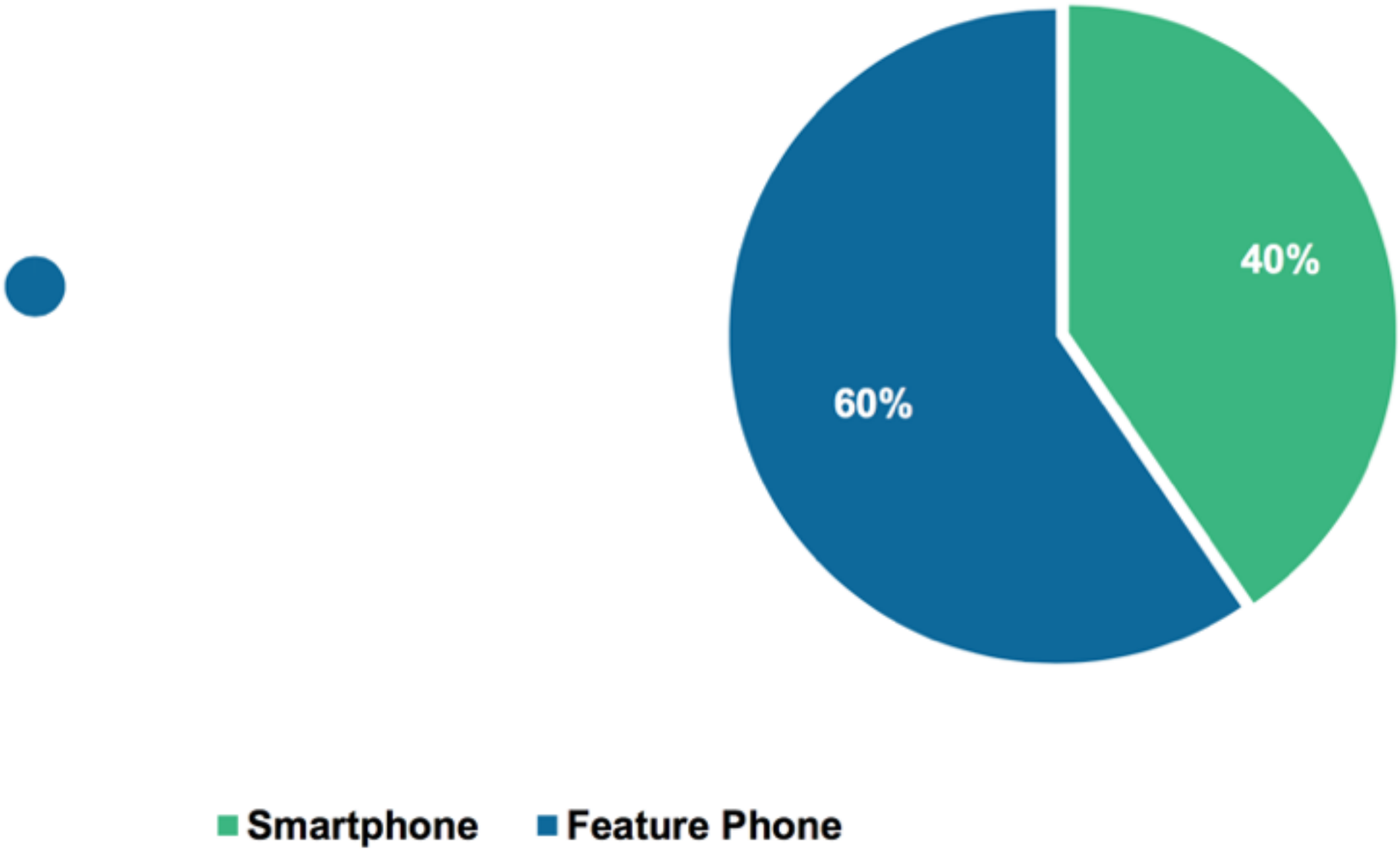
- 04/13 - TBD Special Topics / Project Work
- 04/20 - TBD Special Topics / Project Work
- 04/27 - (LDOC)

Importance of Apps

- Smart phone global penetration
- Evolution of multimedia
- Strong growth in developing markets
- Influence on design and user experience
- $$$

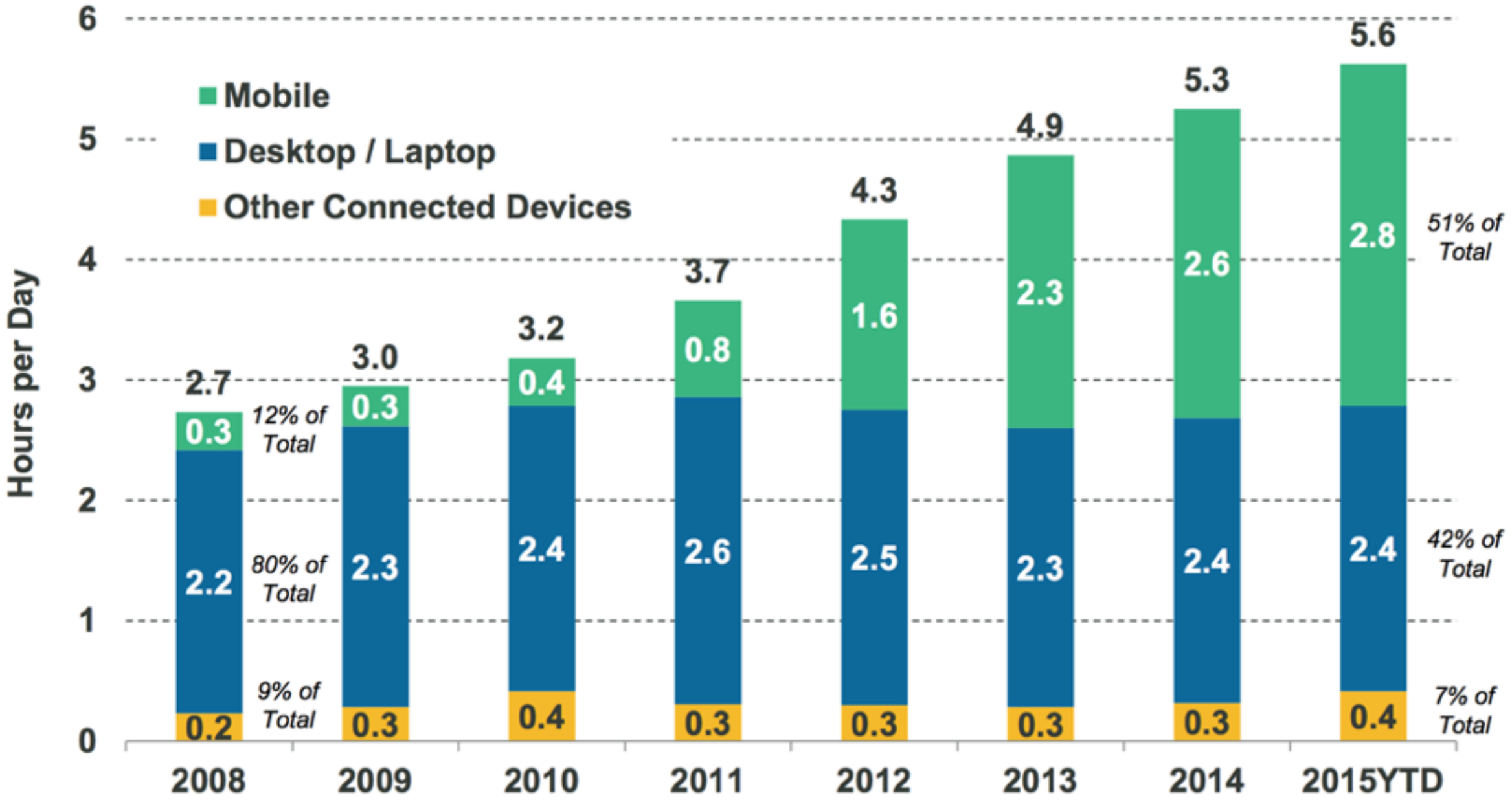
1995
80MM+ Mobile Phone Users
1% Population Penetration

2014
5.2B Mobile Phone Users
73% Population Penetration



Source: Informa, World Cellular Information Service (WCIS). Assumes in 1995, one mobile phone subscription per unique user (no duplication).
Note: In 2014, user base per KPCB estimates based on Morgan Stanley Research and ITU data. Smartphone users & mobile phone users represent unique individuals owning mobile devices; mobile subscribers based on number of connections & may therefore overstate number of mobile users.

Time Spent per Adult User per Day with Digital Media, USA, 2008 – 2015YTD



@KPCB Source: eMarketer 9/14 (2008-2010), eMarketer 4/15 (2011-2015). Note: Other connected devices include OTT and game consoles. Mobile includes smartphone and tablet. Usage includes both home and work. Ages 18+; time spent with each medium includes all time spent with that medium, regardless of multitasking.

6+ of Top 10 most used apps globally = Messaging Apps

Top Apps by Usage

Rank	App	
1		Facebook
2		WhatsApp
3		Messenger
4		Instagram
5		LINE
6		Viber
7		KakaoTalk
8		Clash of Clans
9		WeChat
10		Twitter

Top Apps By Number of Sessions

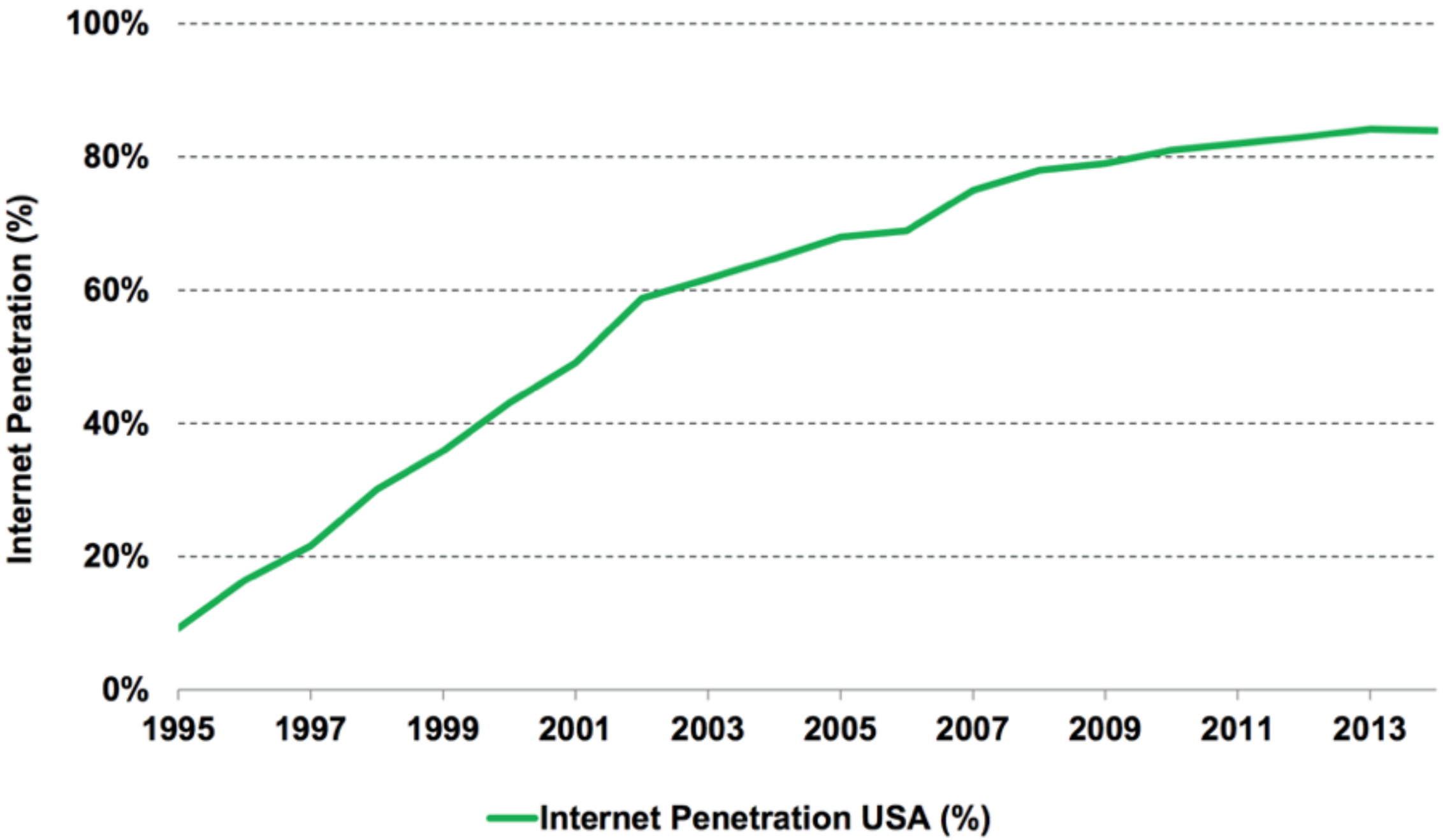
Rank	App		Sessions
1		KakaoTalk	55
2		WhatsApp	37
3		WeChat	29
4		VK	29
5		LINE	26
6		Viber	20
7		Facebook	20
8		Clash of Clans	16
9		Instagram	12
10		Messenger	8

Messaging Apps → significant app sessions

@KPCB

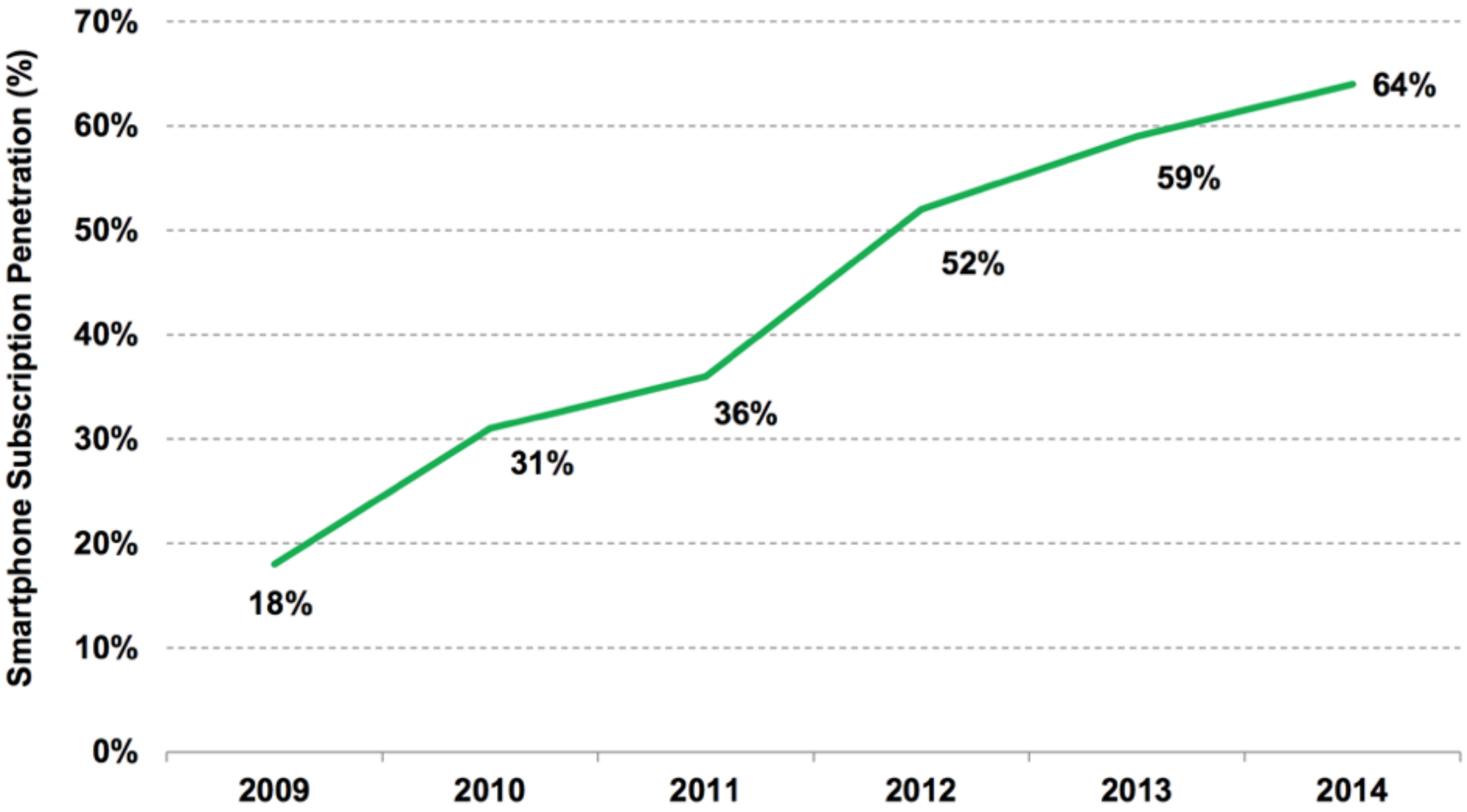
Source: Quettra, Q1:15. Data ranked based on usage.
Quettra analyzes 75MM+ Android users spread out in more than 150 countries, collecting install and usage statistics of every application present on the device. Q1:15 data analyzed three months of data starting from 1/1/15. Data excludes Google apps and other commonly pre-installed apps to remove biases. Only apps with 10K+ installs worldwide and 100+ DAU are counted.

Percent of Population with Internet Access, USA, 1995 – 2014



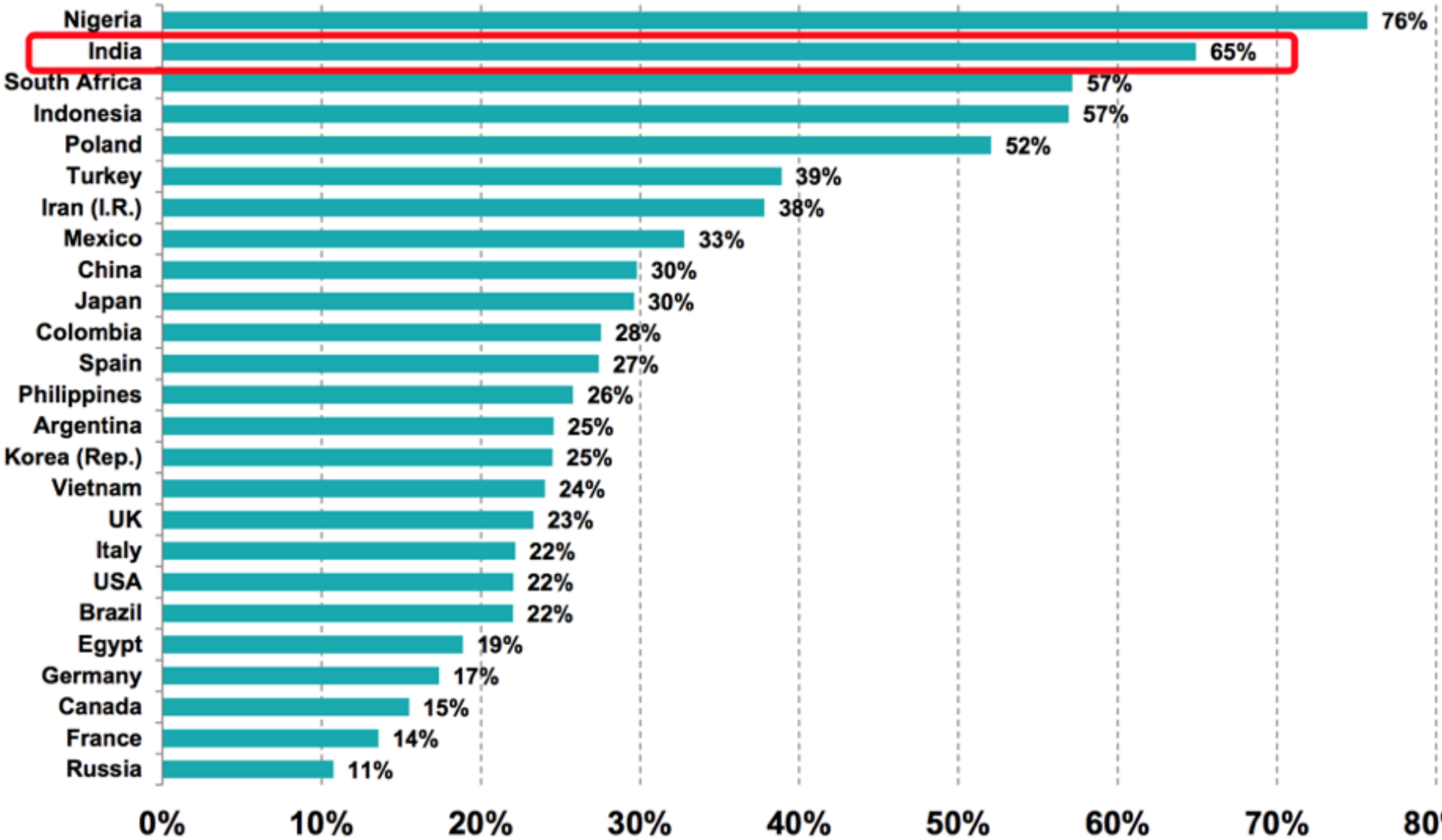
@KPCB Source: World Bank, IDC

Smartphone Subscription Penetration, USA, 2009 – 2014



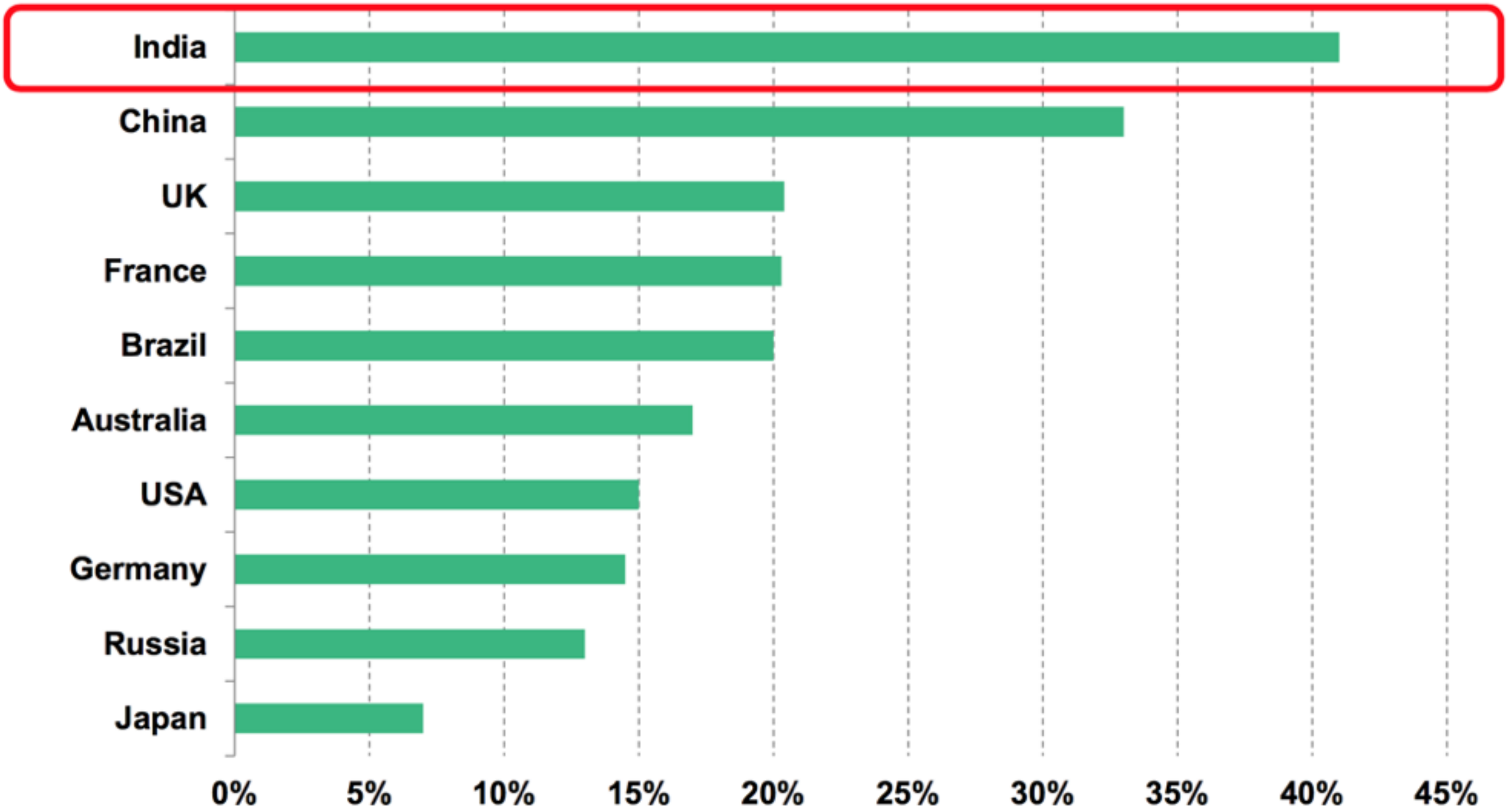
@KPCB Source: Informa, US Census Bureau.
Smartphone penetration data are based on subscriptions (also referred to as connections), which may overstate actual users for those who have multiple devices or connections.

Mobile % of Total Internet Traffic by Country, 5/15



@KPCB Source: Statcounter, 5/15.

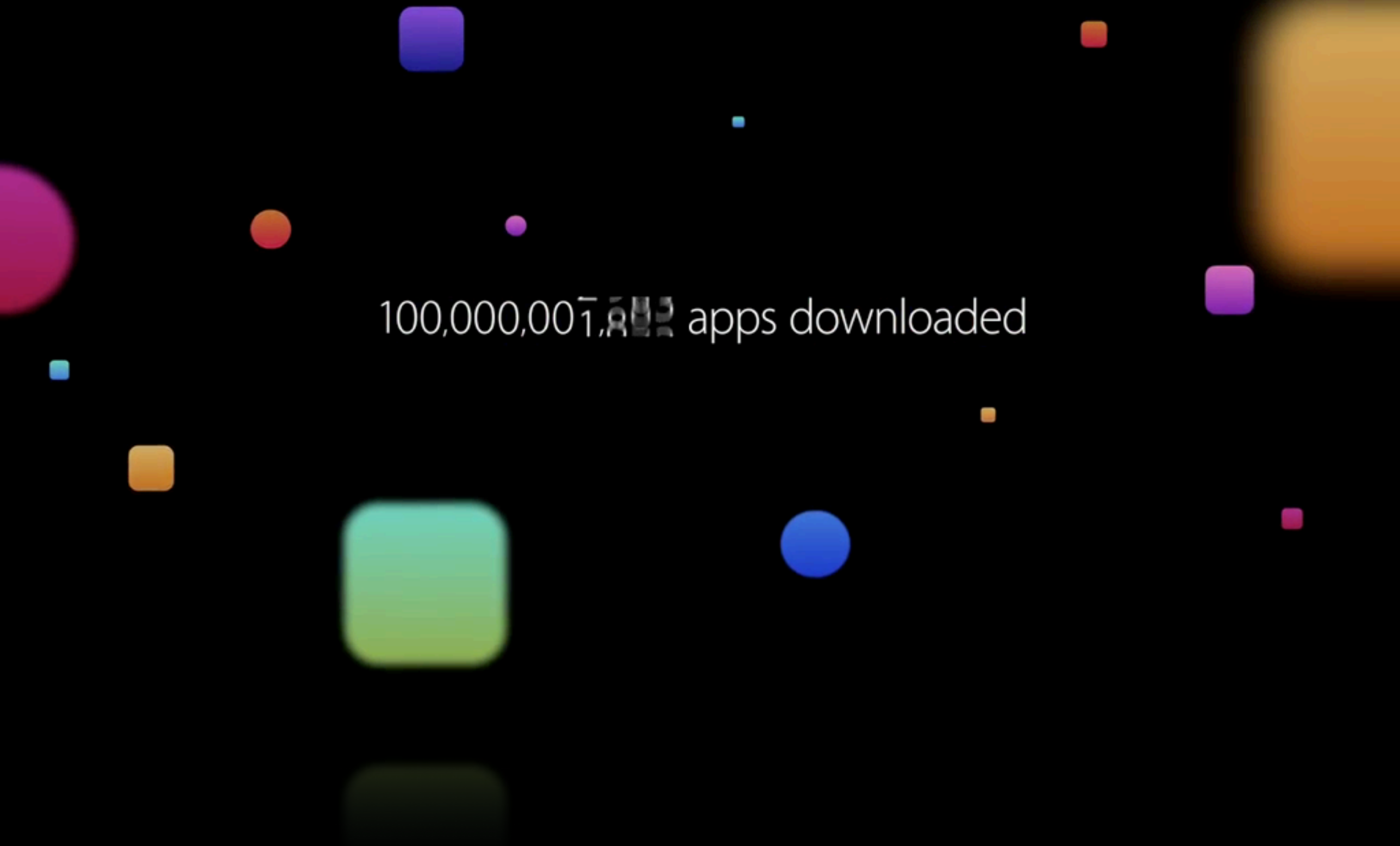
Mobile as % of Total E-Commerce Sales, 2014



@KPCB

*Mobile e-commerce penetration defined as % of total e-commerce sales made via mobile devices.
Source: Morgan Stanley Research.

Importance of Apps - Video



CLI Review

- cd {directory} : change directory
- ~ : home directory
- . : current directory
- .. : parent directory
- ~/Documents : documents directory for OS X
- pwd : print working directory

CLI Review

- ls : list files in directory
- Paths use / to denote levels
    - /Users/Davis is the absolute path of my home directory : ~
    - When inside ~
        - Documents is the relative path to /Users/Davis/Documents
        - I can simply type ‘cd Documents’
- touch : creates a new empty file

Git Review

iOS - A history

- Objective-C (Object-Oriented C)
    - Selected as the programming language for NeXT computers in 1988
        - Apple buys NeXT in 1997, iOS and OS X are derived from the NeXTSTEP OS

iOS - A history

- Objective-C Weaknesses
  - C at the core…

```
NSString *string = [someObject name];
if (string != nil){
    //do something with string
}
```

- Message based method calling

```
if ([delegate respondsToSelector:@selector(buttonClicked:)]){
  [delegate buttonClicked:self];
}
```

iOS - A history

- Swift
  - Introduced in 2014 alongside iOS 8 with the tagline “Objective-C without the C”
  - Interoperates with Objective-C
    - Legacy frameworks from NeXT still used
  - Safety Features
    - Auto memory management
    - Objects can never be nil (optionals)

Comparison

- Objective-C

```
if ([delegate respondsToSelector:@selector(buttonClicked:)]){
  [delegate buttonClicked:self];
}
```

- Swift

```
delegate?.buttonClicked(self)
```

Swift

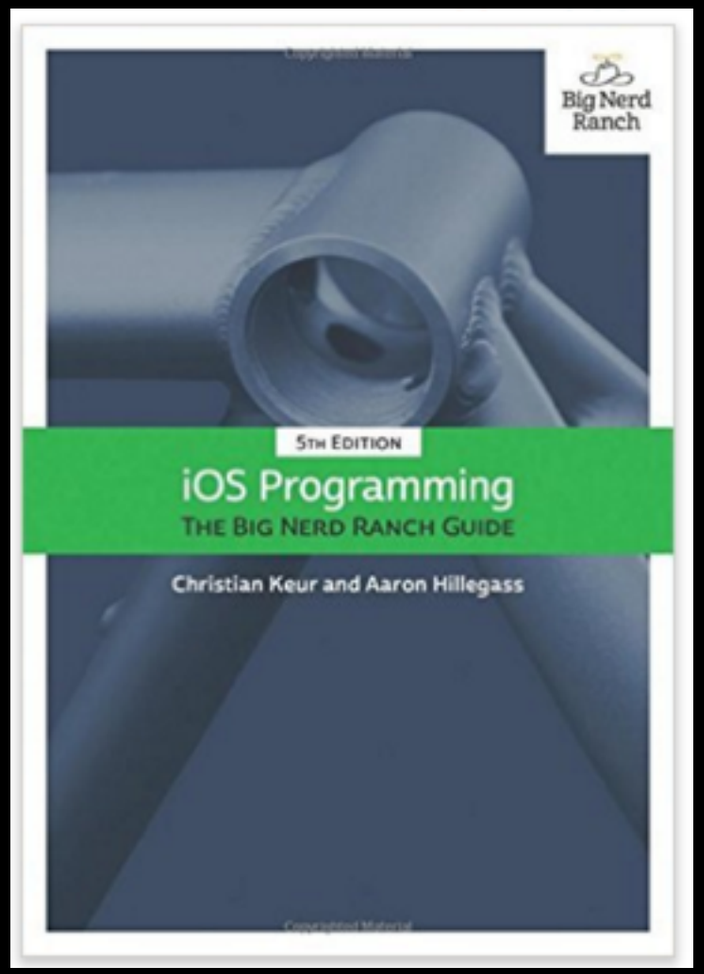
- Rapidly Changing
  - 2.0 release was June 2015
  - Open-sourced December 2015
  - How and where will Swift be used beyond Apple?

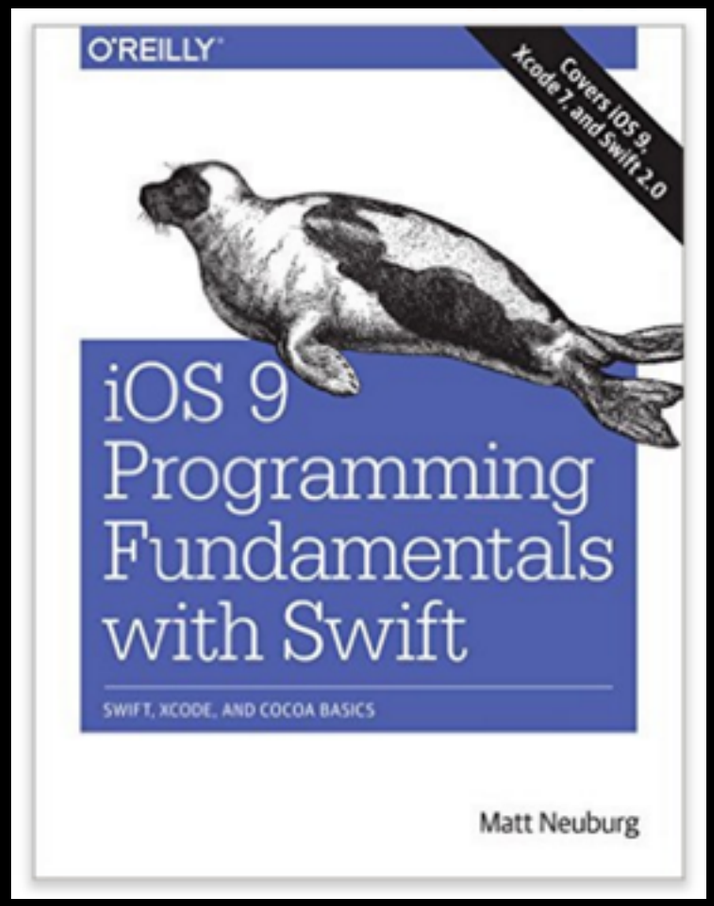
The Talk Show with John Gruber. Episode 139

Readings / HW

- Skim over 'The Basics' up to and including the 'Methods' section of The Swift Programming Language iBook or online at http://apple.co/1DgqEVo
- Download Xcode Version 7.X from the Mac App Store
- Do the prework assignment if you haven't (https://github.com/Duke-HC-Mobile-Apps-Web)

Books


Big Nerd Ranch
5th Edition
iOS Programming
The Big Nerd Ranch Guide
Christian Keur and Aaron Hillegass


O'REILLY
Covers iOS 9, Xcode 7, and Swift 2.0
iOS 9 Programming Fundamentals with Swift
SWIFT, XCODE, AND COCOA BASICS
Matt Neuburg