CSC 581: Mobile App Development

Spring 2019

Mobile platforms

- Web vs. Native vs. Hybrid apps
- App stats
    - number of apps, app categories, retention
- iOS vs. Android
    - feature comparisons, typical users, tradeoffs

1

Web apps

Web app is a Web page you access through your mobile browser
- generally optimized to fit on smaller screen and utilize touch interface

Progressive Web Apps (WPAs) are a recent variant
- utilize browser support to provide some native-like features
    - (e.g., push notifications, access to device controls & sensors)

Advantages	Disadvantages
• easy to build	• needs a browser to run
• easy to maintain	• much slower than native apps
• an inexpensive option	• less interactive and intuitive
• build one app for all platforms	• no icon on mobile desktop
	• cannot leverage device utilities

2

Native apps

native apps are built for a specific platform
- using platform-specific languages (Swift/Objective-C for iOS, Java/Kotlin for Android)
- using platform-specific IDEs (Xcode for iOS, Android Studio et al. for Android)

- platforms exist that allow you to code in a single language/IDE, then export as native code (e.g., Xamarin in C#, React Native in JavaScript & React)

Advantages	Disadvantages
• very fast and responsive	• difficult languages to learn
• distributed in app stores	• more expensive (at least initially)
• more interactive and intuitive	• overkill on very simple apps
• can access all device features	• user must download updates
• Internet connection not required	
• overall better user experience	

3

Hybrid apps

hybrid app is a combination of native & Web app
- users download and install it like a native app, but it runs like a Web app

- back-end written in JavaScript, CSS & HTML
- front-end is a native shell that loads the back-end code using a webview
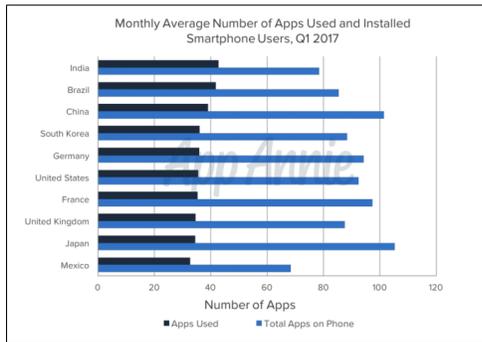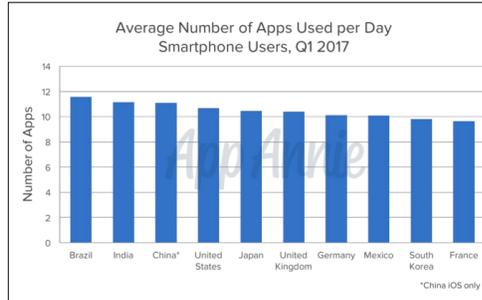- popular frameworks: Phone Gap, Ionic, Mobile Angular, …

Advantages	Disadvantages
• built on Web technology	• slower than native
• cheaper than native	• more expensive/complex than Web app
• one app for all platforms	• less interactive than native
• no browser needed	• customization leads away from single-build
• access to device API & features	
• fast to develop multi-platform	

4

App use

in a 2017 survey by App Annie, smart phone users accessed
- 9+ apps per day
- 30+ apps per month

Average Number of Apps Used per Day
Smartphone Users, Q1 2017

Monthly Average Number of Apps Used and Installed
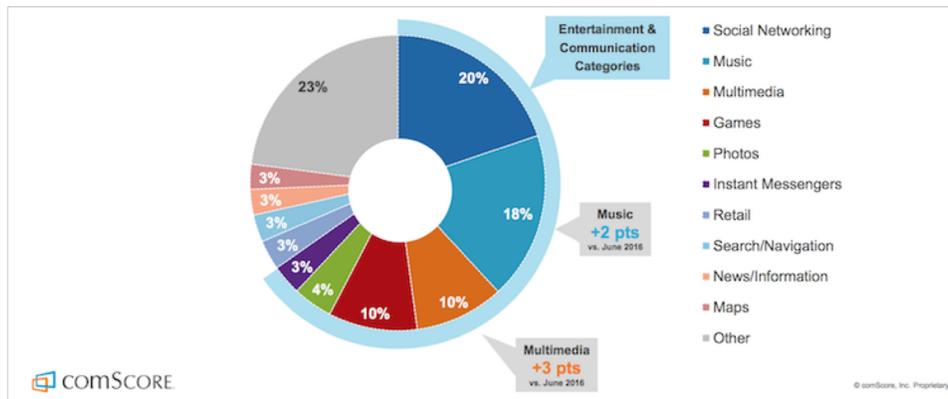Smartphone Users, Q1 2017

in 2018, mobile was responsible for 52.2% of all Internet traffic (source: comScore)
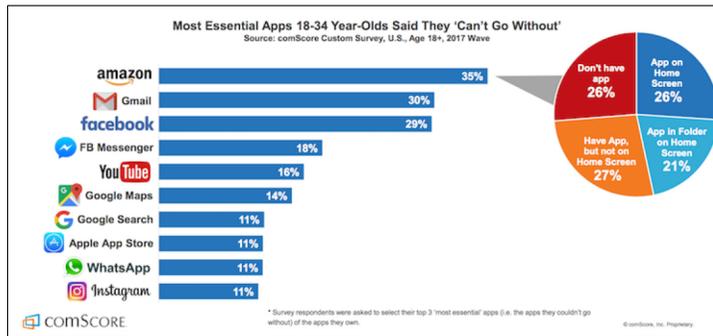- 71% in the U.S.
- 75% in Mexico

5

App use by category
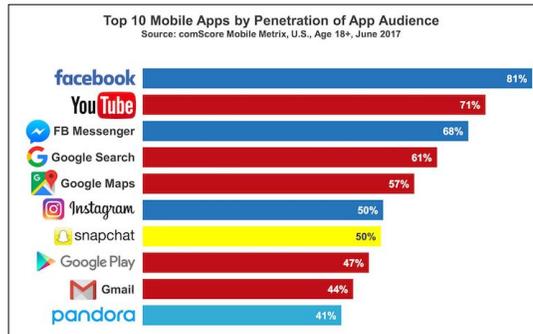
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Most popular apps

Top 10 Mobile Apps by Penetration of App Audience
Source: comScore Mobile Metrix, U.S., Age 18+, June 2017

- facebook — 81%
- You Tube — 71%
- FB Messenger — 68%
- Google Search — 61%
- Google Maps — 57%
- Instagram — 50%
- snapchat — 50%
- Google Play — 47%
- Gmail — 44%
- pandora — 41%

Most Essential Apps 18-34 Year-Olds Said They 'Can't Go Without'
Source: comScore Custom Survey, U.S., Age 18+, 2017 Wave

- amazon — 35%
- Gmail — 30%
- facebook — 29%
- FB Messenger — 18%
- You Tube — 16%
- Google Maps — 14%
- Google Search — 11%
- Apple App Store — 11%
- WhatsApp — 11%
- Instagram — 11%

Don't have app 26%
App on Home Screen 26%
App in Folder on Home Screen 21%
Have App, but not on Home Screen 27%

* Survey respondents were asked to select their top 3 'most essential' apps (i.e. the apps they couldn't go without) of the apps they own.
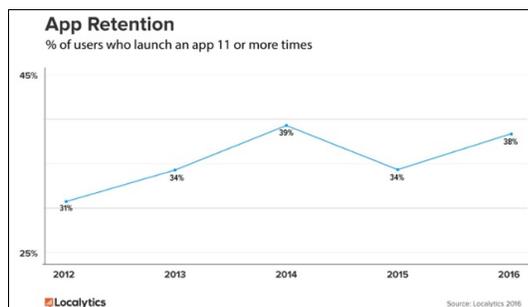
comSCORE

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7

App retention

nearly ¼ of users abandon an app after one use

common standard: app is successful if 11+ uses

App Abandonment
% of users who abandon an app after one use

- 2012 — 22%
- 2013 — 22%
- 2014 — 20%
- 2015 — 25%
- 2016 — 23%

Localytics

Source: Localytics 2016

App Retention
% of users who launch an app 11 or more times

- 2012 — 31%
- 2013 — 34%
- 2014 — 39%
- 2015 — 34%
- 2016 — 38%

Localytics

Source: Localytics 2016

8

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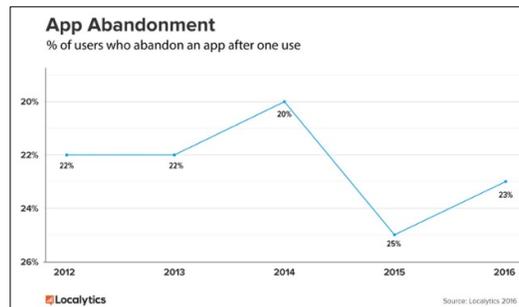
iOS vs. Android

recall: Android has a much larger (64%) market share than iOS (32%)

The number of users diagram
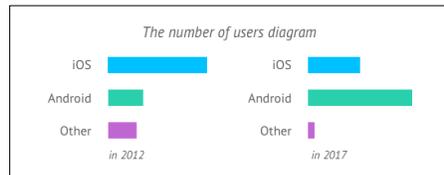
but, iOS has higher revenue
- Android apps tend to be more ad driven

Q4 2016 Net Revenue, App Store and Google Play, Worldwide

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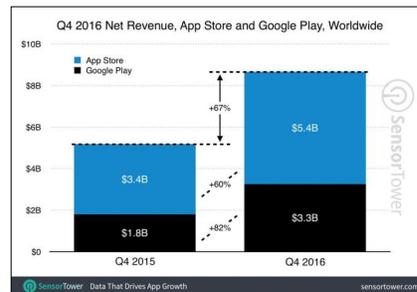
iOS vs. Android comparison (from Bondarenko)

	iOS	Android
Market share & number of users		X
Average revenue	X	
Number of downloads		X
Development complexity	X	
Development time	X	
Development costs	X	X
Publishing		X

Typical users (from Bondarenko)

iOS	Android
• mostly live in North America and Western Europe	• mainly live in South American, Asia, Central & Eastern Europe
• prefer creative and entrepreneurial professions	• prefer technical professions
• tend to spend more money on the Internet & mobile apps	• highly appreciate price-quality ratio
• pay more attention to apps from business, education, & lifestyle categories	• pay more attention to apps from tools, entertainment, & communication categories
• more inclined to make in-app purchases	• more loyal to in-app ads

11

Tradeoffs (from Bondarenko)

Advantages of iOS app development:

- Easier, faster and cheaper building process;
- Solid market share in the USA and Europe;
- Brings more revenue on the average;
- Apps have fewer bugs.

Disadvantages of iOS app development:

- iOS has twice fewer users;
- More difficult to publish an app;
- You will have to buy Mac and iPhone or iPad;
- Apps bring less revenue from in-app ads.

12

6

Questions

1. The first article describes the different development options for mobile: native apps, Web apps, and Hybrid apps. What do you see as the greatest advantages that native apps have over Web apps? What is the difference between a Web app and a Progressive Web app?

2. Describe what is meant by the term "hybrid app." Identify and describe one major advantage of developing a native app versus taking a hybrid development approach? Identify and describe one major disadvantage.

3. Are there any games or services that you regularly access on your mobile device through the browser? Is there an app alternative? If so, why do you continue to access the content/service through your mobile browser? If there is not an app alternative, why do you think it has not been developed as an app?

4. The second article compares the iOS and Android platforms, rating each on numerous characteristics (e.g., market share, development complexity). Which category and argument did you find most compelling in favor of Android? Which category and argument did you find most compelling in favor of iOS? As part of your answer, identify which type of phone you own (if you do own a smartphone) and your main reason for selecting that phone.

5. One of the obvious distinction between iOS and Android is that iOS runs on a single family of devices designed by a single company (Apple), while Android runs on a wide variety of devices from different manufacturers. From a developer's perspective, describe the trade-offs between these two scenarios. If you had an idea for a new game app that you wanted to market, which platform would you focus on?

13