MOBA1: MOBILE APPLICATIONS 1

DEVICES AND PLATFORMS

OVERVIEW

- Introduction to MOBA1
- Mobile Devices
- Mobile Platforms
- Mobile Applications

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TOPICS MOBA1

1. Introduction, Mobile Platform
2. Design & Development of Mobile Apps (1)
3. Design & Development of Mobile Apps (2)
4. Kotlin
5. Android (1)
6. Android (2)
7. Android (3)
8. Android (4)
9. Beacons

TOPICS MOBA1

10. Mobile Web: Overview, Basics
11. Mobile Web: Style & Layout
12. Mobile Web: Device APIs, Cordova/Capacitor
13. Presentations: Projects and Labs
14. Presentations: Projects and Labs

OUTLOOK: MOBA2 (PLANNED)

1. Mobile Web: Component driven UIs
2. Mobile Web: React.js
3. Mobile Web: Ionic/React
4. React Native (1): Basics, Navigation
5. React Native (2): Components and APIs
6. iOS Introduction
7. Swift
8. SwiftUI (1)
9. SwiftUI (2)
10. SwiftUI (3)
11. Presentations: Projects and Labs
12. Presentations: Projects and Labs

LESSONS AND SELF-STUDY

- Lecture: two lessons per week
- Practical exercises: also two lessons
- Self-study

PREVIOUS KNOWLEDGE

- HTML, CSS, JavaScript (WBE)
- Programming in C and Java

ASSESSMENT

Weight	Type
20%	Exercises and presentations during class time
80%	Final exam

EXERCISES AND PRESENTATIONS

- Small mobile project
- Exercises on most topics
- Presentation: project results

EXERCISES AND PRESENTATIONS

- Small mobile project / presentation (teams of 2)
  up to 5 points (project: 3, presentation: 2)
- Solved exercises / presentation
  up to 5 points

Points acquired during class time count for the semester finals (weighted, 20%)

If the practical results are inferior to the semester finals, only the latter count for the course grade

FINAL EXAM

- Mobile Project, 3h, on-site
- Open book, internet allowed except communication

Changes are possible depending on the Corona situation...

DOCUMENTS

In electronic form in Moodle:

- Slides
- Exercises
- Additional material

MOODLE

https://moodle.zhaw.ch/course/view.php?id=2155

- Weekly schedule
- Documents
- Course details and conditions
- Forum (?)

PRACTICAL LESSONS AND LECTURES

PRACTICAL LESSONS

- Tasks explained
- You work with your notebooks
- Teamwork is appreciated

LECTURES

- Private conversations disturbing
- Interaction and participation appreciated
- Take notes

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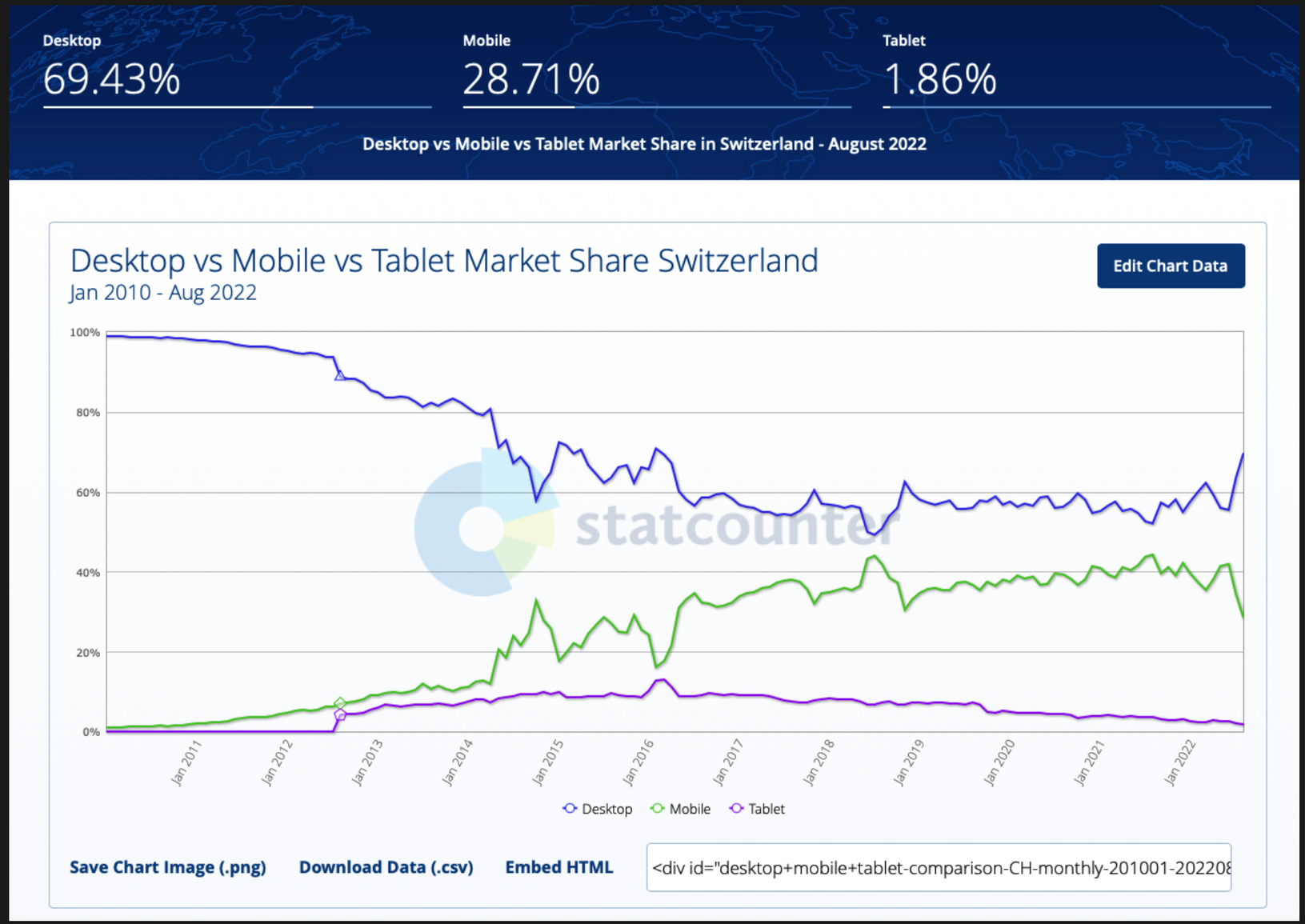
SMARTPHONE AND TABLET MARKET



FEATURE PHONE TO SMART PHONE

↓ more ↓

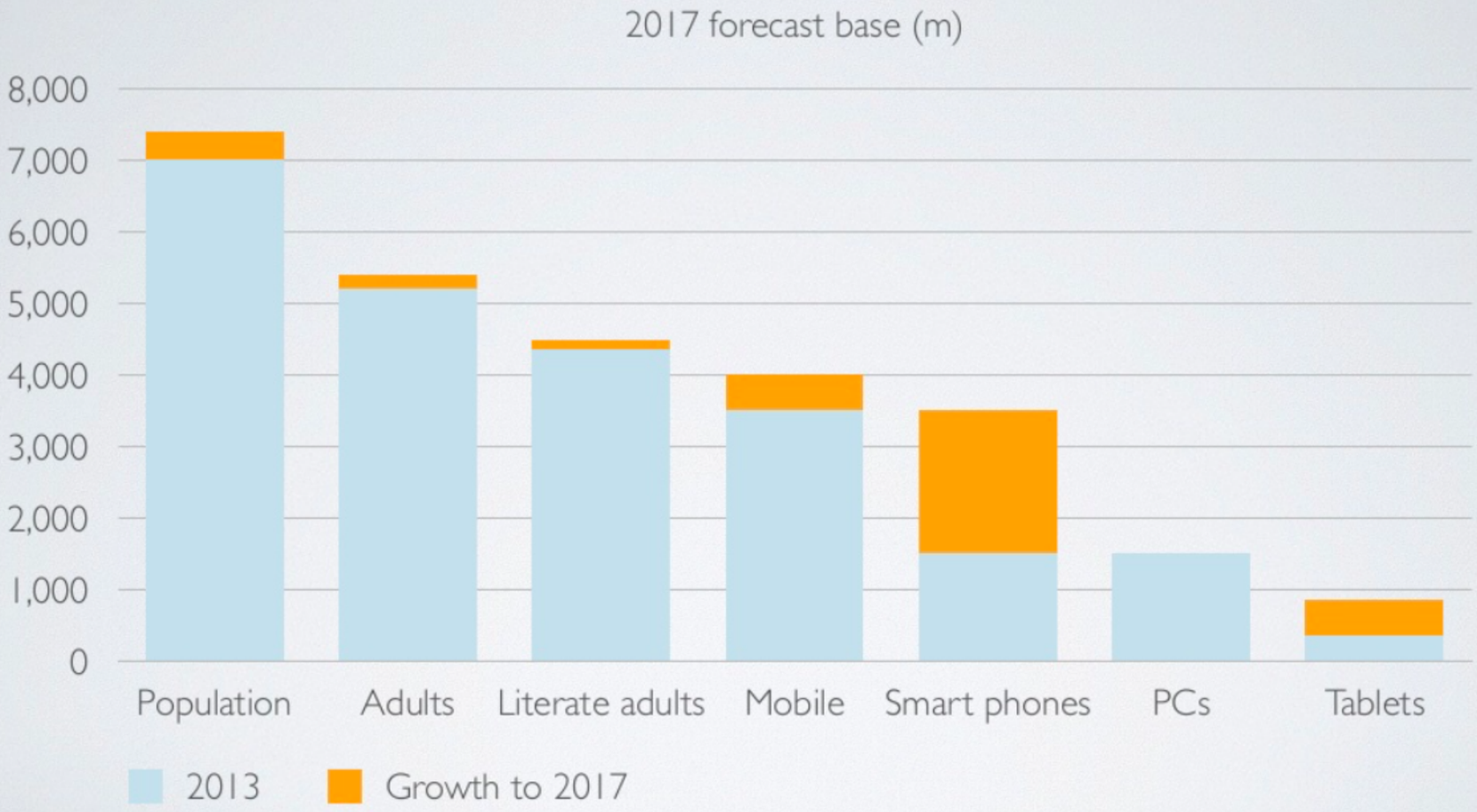
Quelle:
https://www.samsung.com

MOBILE DEVICES

MOBILE DEVICES ??

- Notebooks
- Netbooks
- Feature Phones
- Personal Digital Assistants
- Smartphones
- Tablets
- Smartwatches
- SmartTags, AirTags
- Calculator watches
- Handheld game consoles
- Head-mounted displays
- Wearable computers
- Portable media players
- Digital still cameras (DSC)
- Digital video cameras (DVC) or digital camcorders
- Personal navigation devices (PND)

The world in 2017



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Source: GSMA, World Bank, Enders Analysis

MOBILE DEVICES IN MOBA 1/2

- In MOBA1/2 we focus on Smartphones
- With some comments on other devices
- Priority on devices with widespread mobile OSs

FEATURES OF MOBILE DEVICES

- Smaller screens (here, smartphones and tablets differ)
- Different input concepts (touch, keyboard, stylus)
- Slow, unstable network connection
- Less powerful processors
- Batteries – minimize power consumption

DEVICE SENSORS

- Camera
- Microphone
- Geolocation, GPS
- Acceleromter
- Gyroscope
- Magnetometer
- Battery state
- Proximity sensor

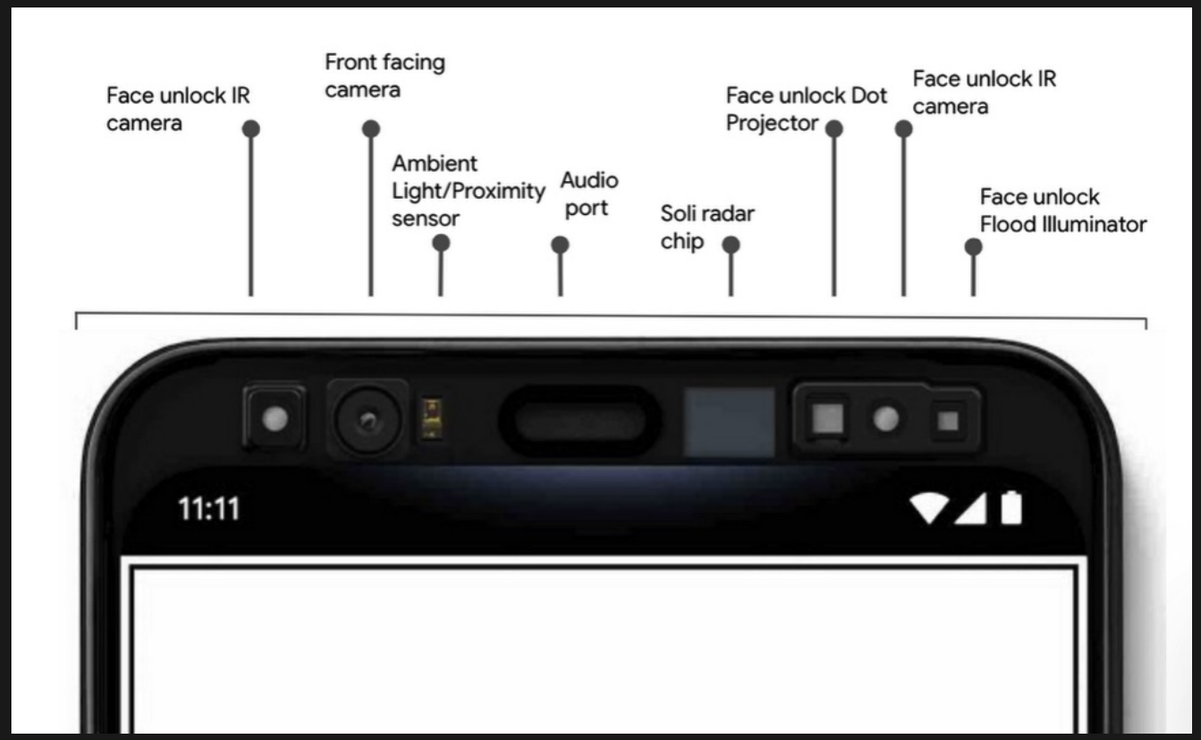
INSIDE IPHONE 13 PRO VS 12 PRO

Teardown

INSIDE SAMSUNG GALAXY S21 ULTRA

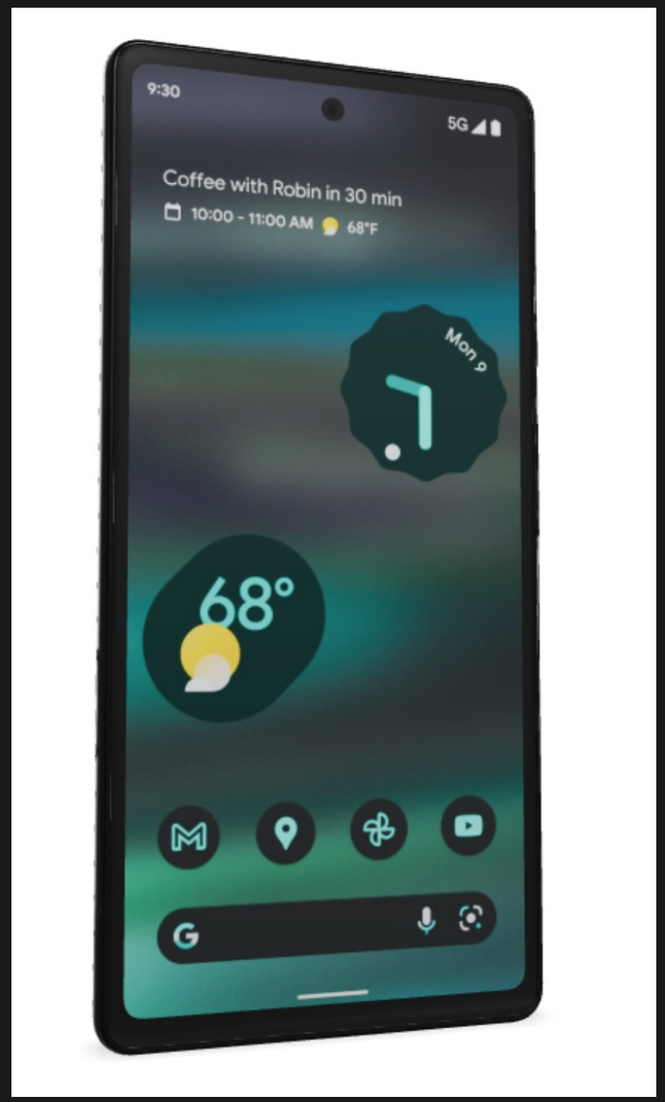
Teardown

GOOGLE PIXEL 4 SOLI RADAR



- Google’s Pixel 4 had built-in radar
- Pixel 5 and 6: radar sensor was ditched

PROBLEM: FRONT CAMERA, SENSORS



- Google Pixel 6a
- Fingerprint unlock
- 8 MP front camera

DYNAMIC ISLAND (APPLE)

- iPhone 14 Pro
- Front camera, Face ID sensors integrated in UI

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Mobile platform wars over?

- Apple and Google's Android have won: unlikely that other platforms will be relevant
- Apple camped out at the high end, Android taking the rest
- But Google's control of Android is partial
- Facebook and Amazon trying to extract value
- Samsung's position uncertain

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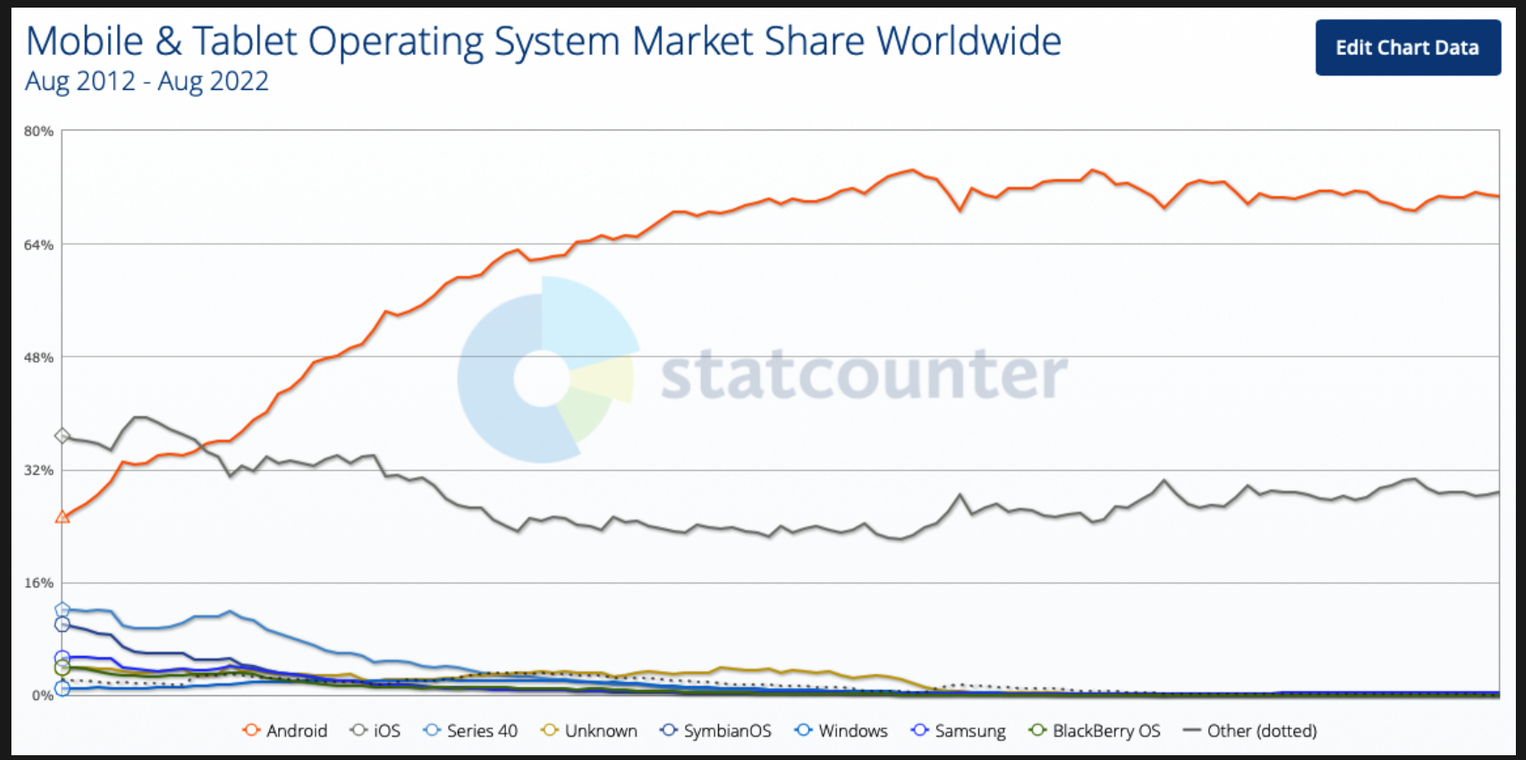
ANDROID AND IOS

- Dominate the smartphone market
- Also at the top in terms of developer mindshare
- But: Mobile space changes continuously



Source:

statcounter

Different focus for innovation

Apple

- Integrated hardware & software
- Fingerprints, Bluetooth, Airdrop, 64 bit etc
- Move innovation down the stack (hard for Google)
- Directed discovery (iBeacon)

Google

- Systemic fragmentation, little hardware control
- Google Now, Maps, Plus, semantic search etc
- Move innovation up the stack (hard for Apple)
- Predictive discovery (Now)

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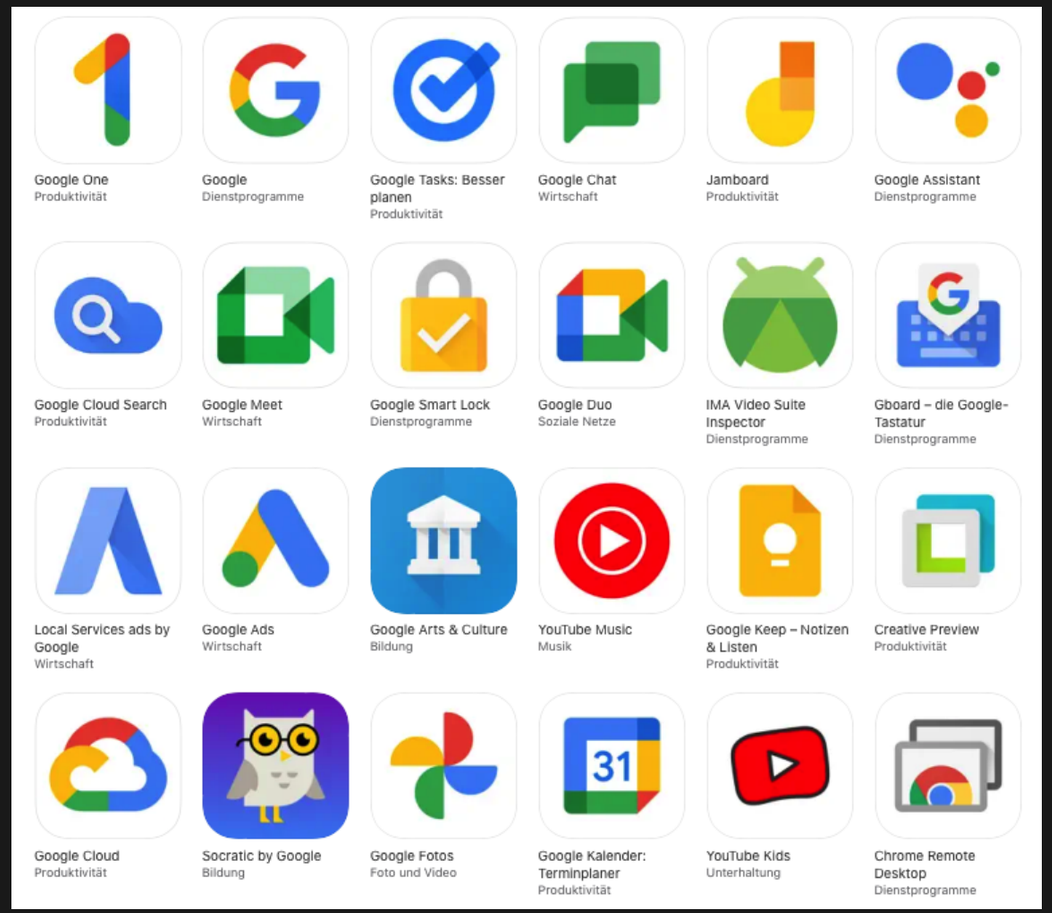
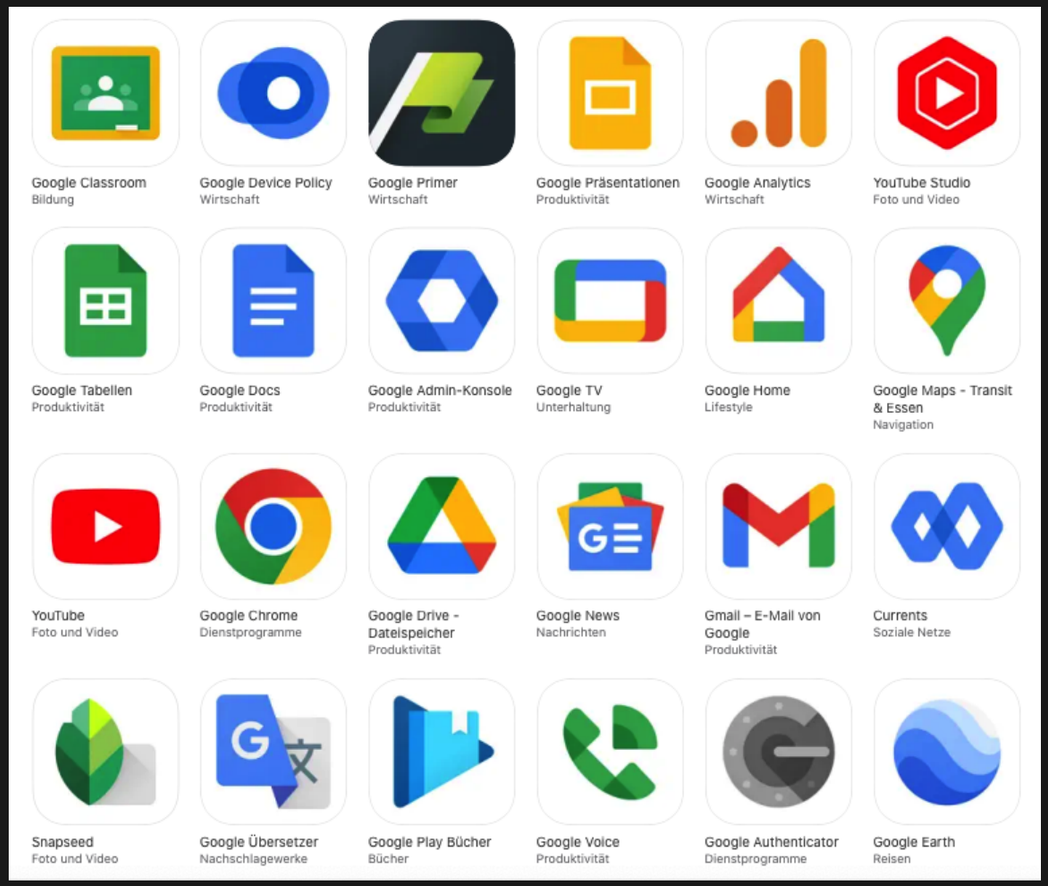
GOOGLE APPS FOR IOS

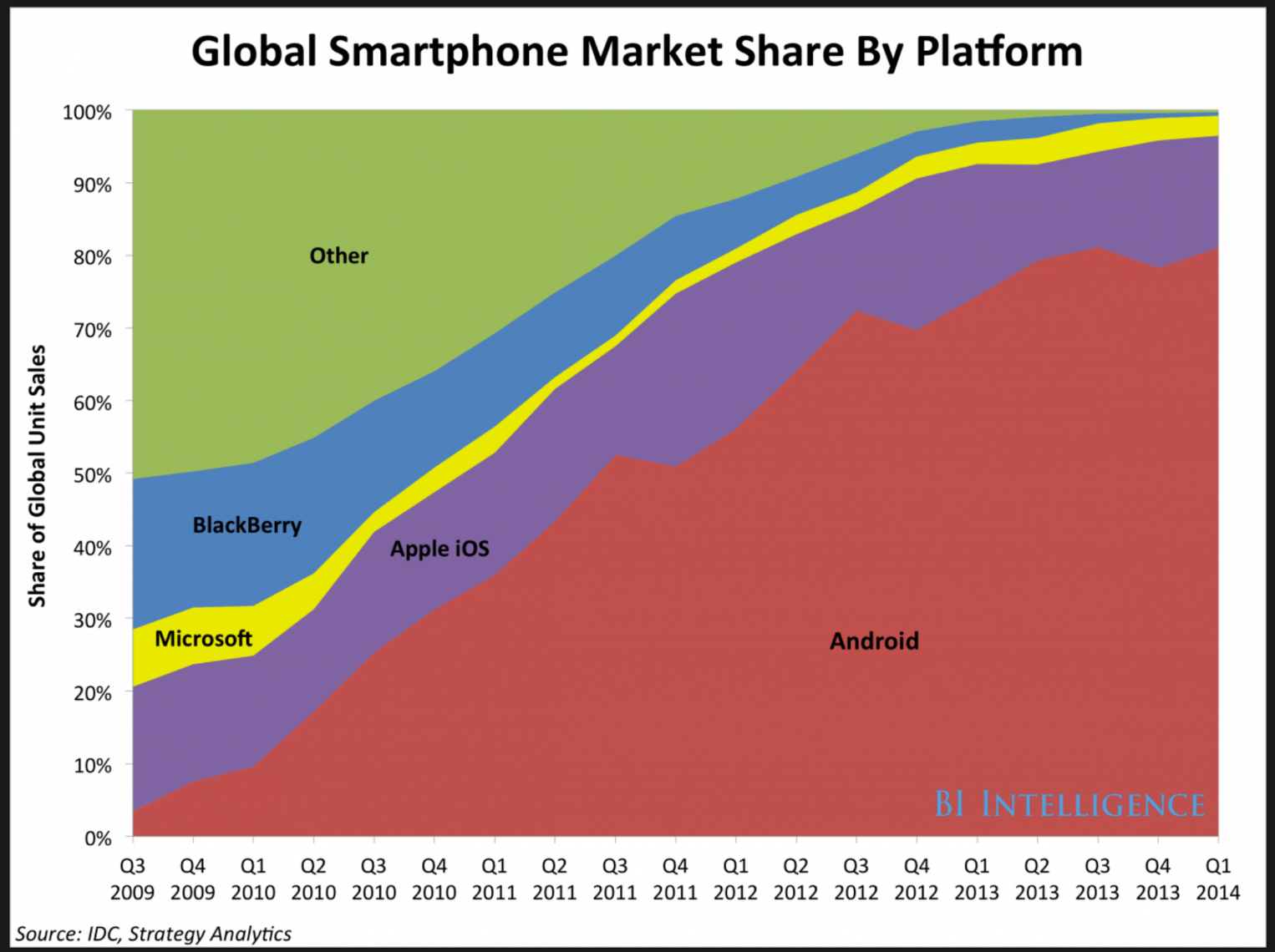




ANDROID'S PURPOSE

- Spreading the use of Google services across the mobile web
- Makes economic sense to offer Android for free
- In 2009 device vendors needed an answer to the iPhone
- Android was available (and free...)
- Most device vendors jumped on the Android bandwagon
- Except for Apple, Nokia, and BlackBerry
- Nokia and BlackBerry failed

↓ more ↓



ANDROID DIFFERENTIATION

- Google allowed Android differentiation
- Purpose: Get device vendors to adopt it
- Vendors could create their own interface layer
- They could also change default apps, including the browser
- Samsung TouchWiz, HTC Sense, MotoBlur, ...
- Differentiation is the positive slant on fragmentation

IOS: HISTORY (1)

- iPhone unveiled by Steve Jobs January 9th 2007
- OS named iPhone OS
- November 2010: launch of the fourth generation of the OS
  - renamed to iOS
  - launch of the original iPad
- New version each year

And Then Steve Said, ‘Let There Be an iPhone’

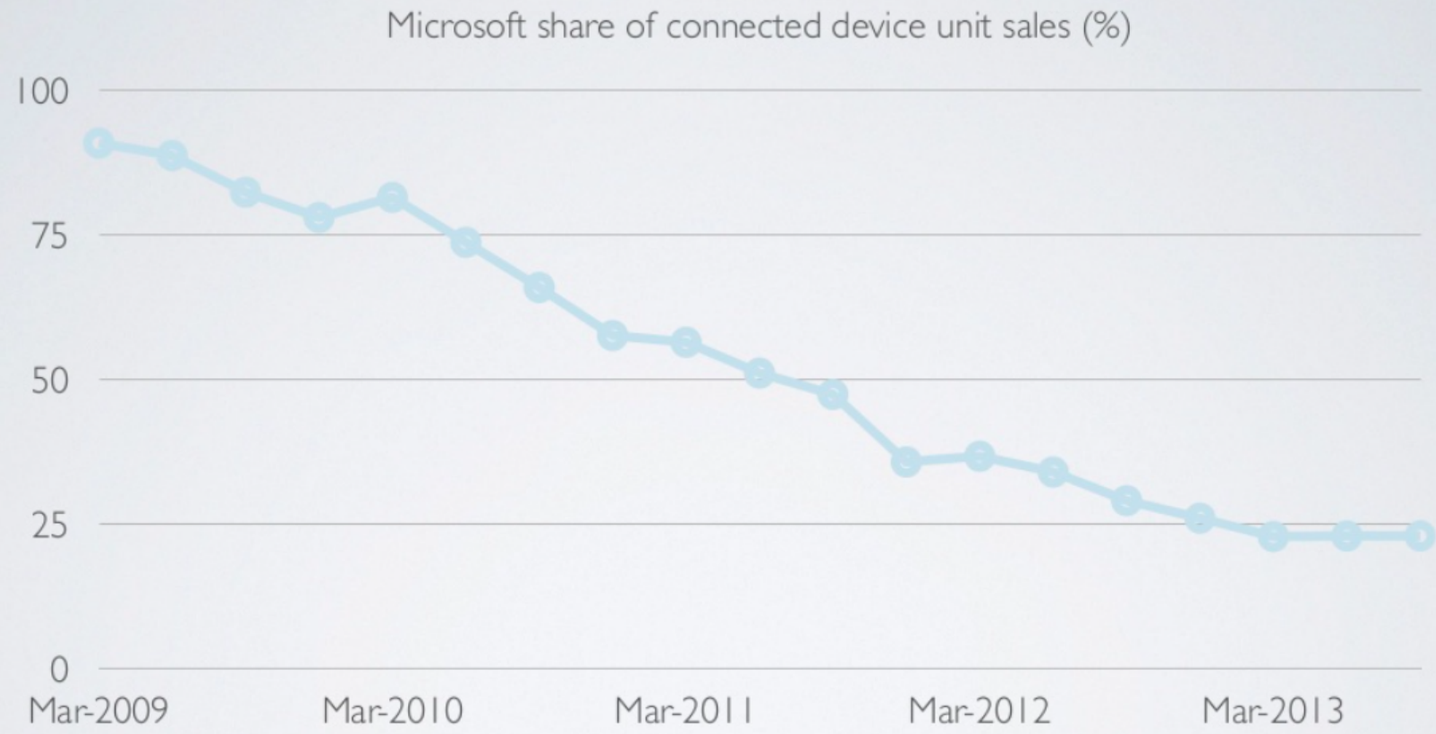
IOS: HISTORY (2)

- iOS 7 was touted as a major UI refresh
- iOS 8 with new frameworks and services, Apple Watch
- iOS 9 with split view on iPad, better Siri, faster graphics
- iOS 10 with haptic feedback, better Siri, better search
- iOS 11…16 with ?? (various improvements)
  - iOS 14 with Widgets on Home Screen
  - iOS 16: lock screen customization

→ Release notes for developers

High adoption rate of each iOS version soon after release

The irrelevance of Microsoft



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Source: Enders Analysis

MARKET SHARE

Period	Android	iOS	Windows	BlackBerry	Others
2018	85.1%	14.9%	0.0%	0.0%	0.0%
2017	85.0%	14.7%	0.1%	0.0%	0.1%
2016	83.4%	15.4%	0.8%	0.0%	0.4%
2015	78.0%	18.3%	2.7%	0.3%	0.7%
2014	81.2%	15.2%	2.5%	0.5%	0.7%
2013	75.5%	16.9%	3.2%	2.9%	1.5%
2012	59.2%	22.9%	2.0%	6.3%	9.5%

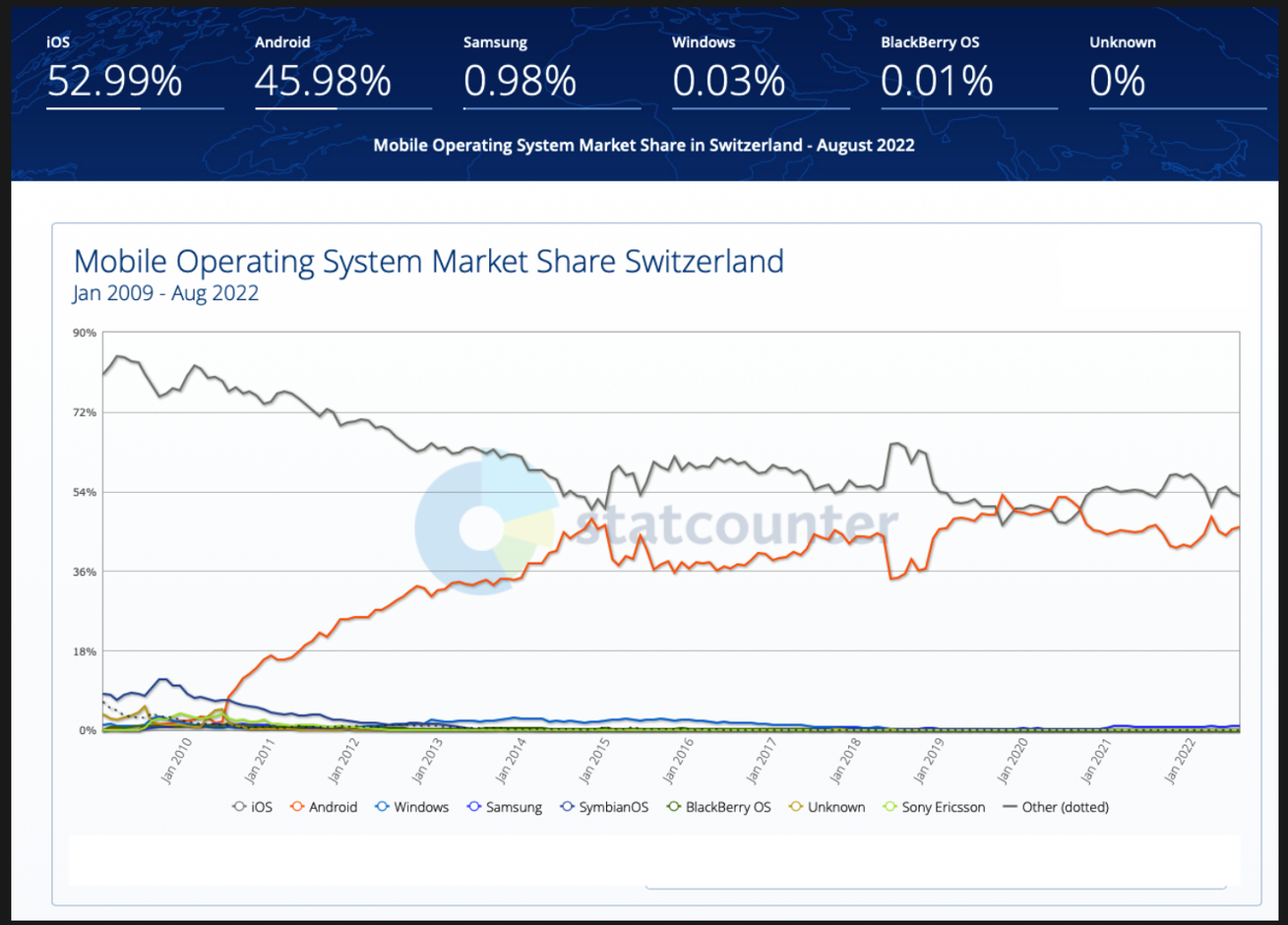
(Source: IDC)

THE UNDERDOGS

Discontinued or irrelevant

- Firefox OS
- BlackBerry OS
- Ubuntu Phone
- Tizen
- Sailfish OS
- …

ECOSYSTEM SIZES

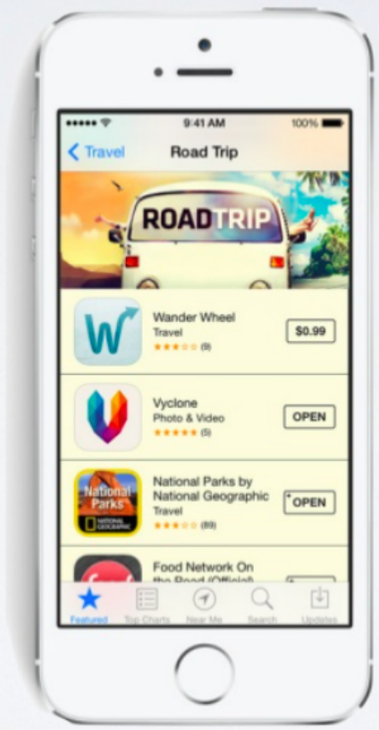


- Regional differences
- Sources
  StatCounter
  kantarworldpanel
  netmarketshare

ECOSYSTEM DIFFERENCES

Ecosystem is the key leverage point

For Apple, the ecosystem is what sells hardware



For Amazon, Google and Facebook, the experience on the phone is what drives engagement with all their services

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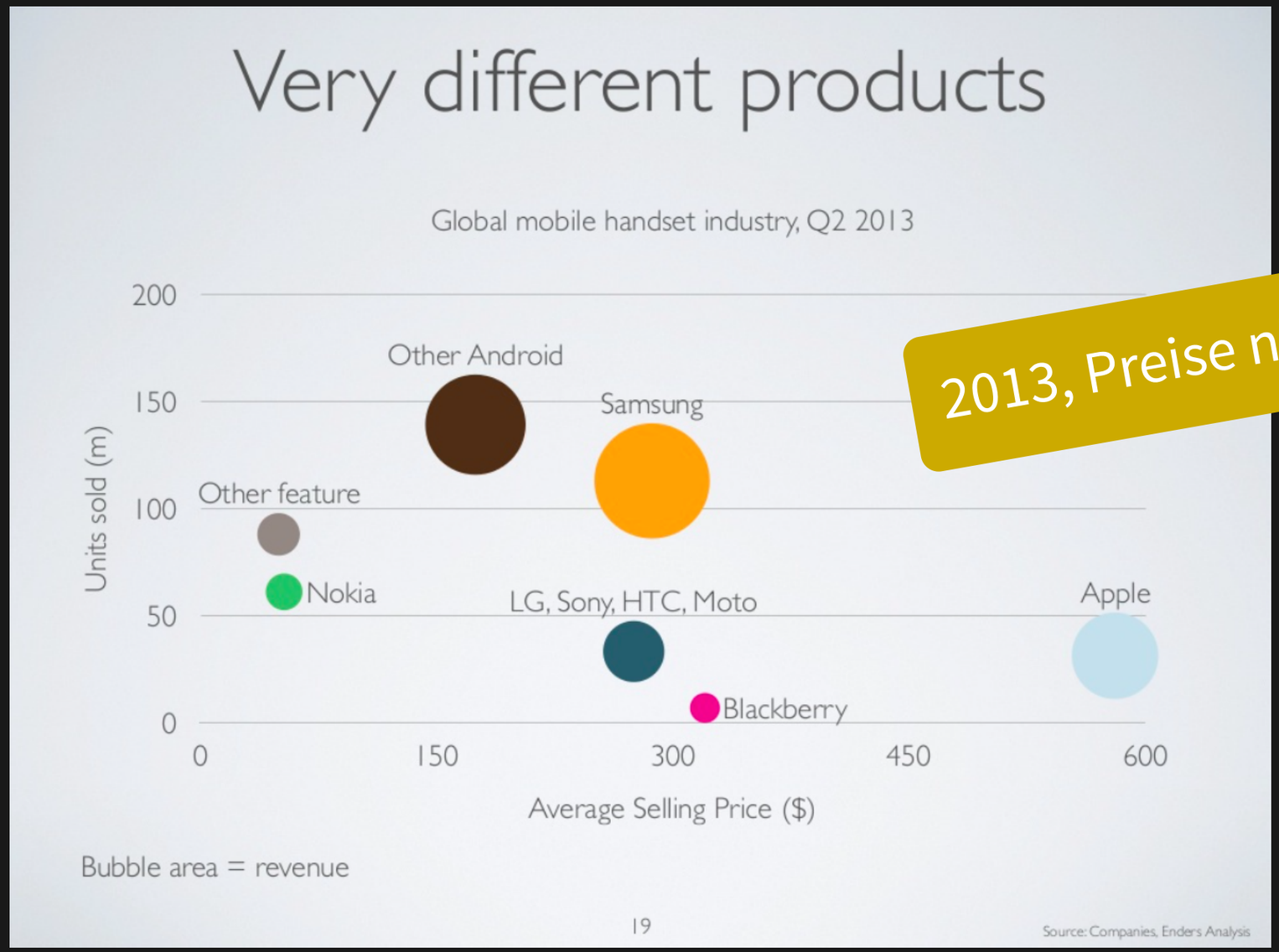
PRODUCT CATEGORIES



2013, Preise nicht mehr ganz aktuell :)

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MOBILE APPLICATIONS

- Traditionally we targeted phones
- Then tablets followed
- Today we have a complete range of device types
  - smartwatch, phone, tablet, TV and automotive
  - Each one poses its own usability challenges

MOBILE APPLICATIONS

- Native
- Web-based
- Hybrid

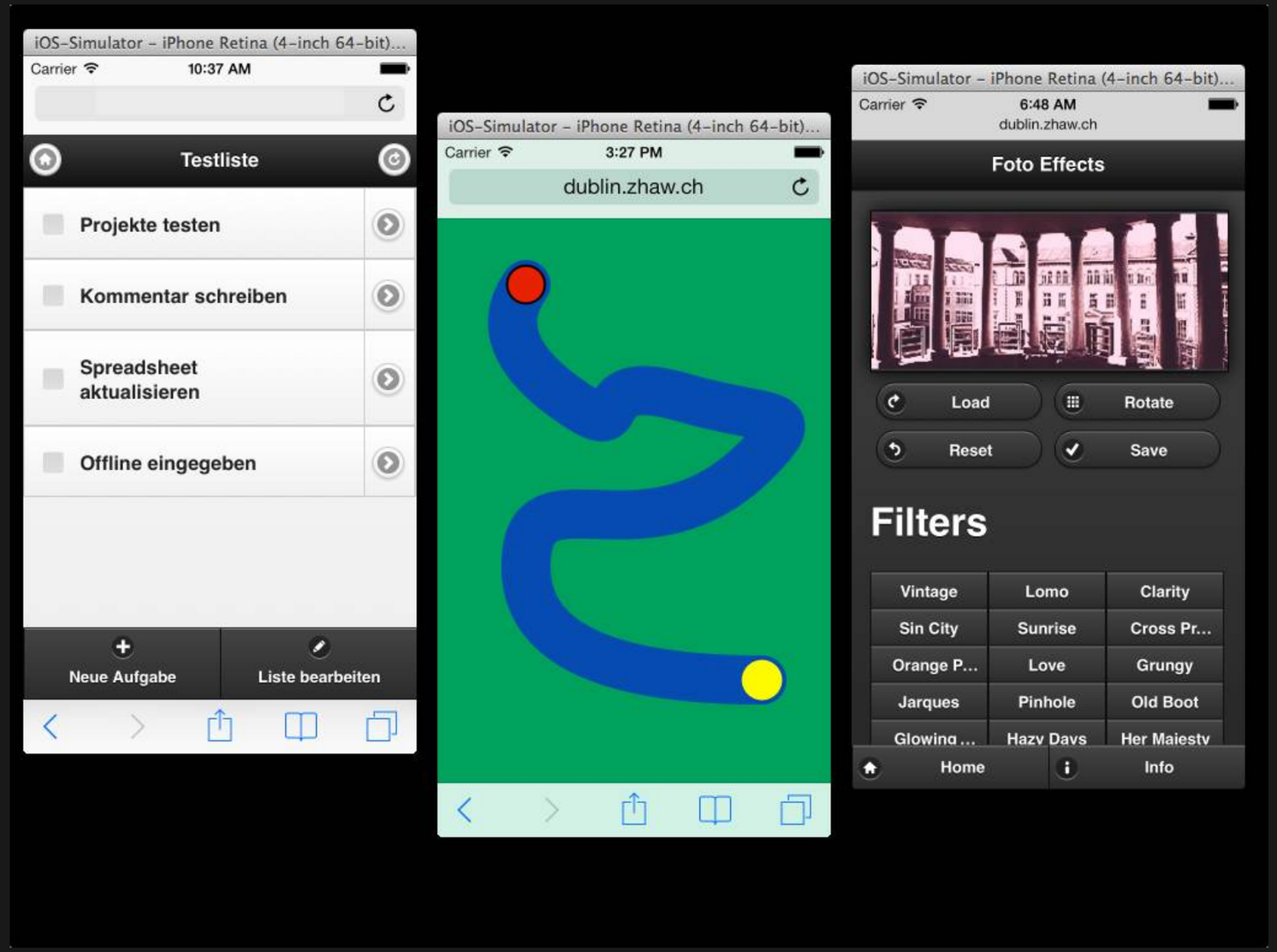
NATIVE MOBILE APPLICATIONS

- Platform specific language
- Platform specific APIs
- Platform specific central app store
- Advantages
  - Usually offer the best performance
  - Deepest integration
  - Best overall user experience
- Disadvantage
  - Most complex development option

WEB-BASED MOBILE APPLICATIONS

- Based on HTML, JavaScript and CSS
- Do not rely on an app store
- Essentially locally stored mobile sites
- Try to emulate the look-and-feel of an app
- Can be added to the home screen

SAMPLE WBE PROJECTS



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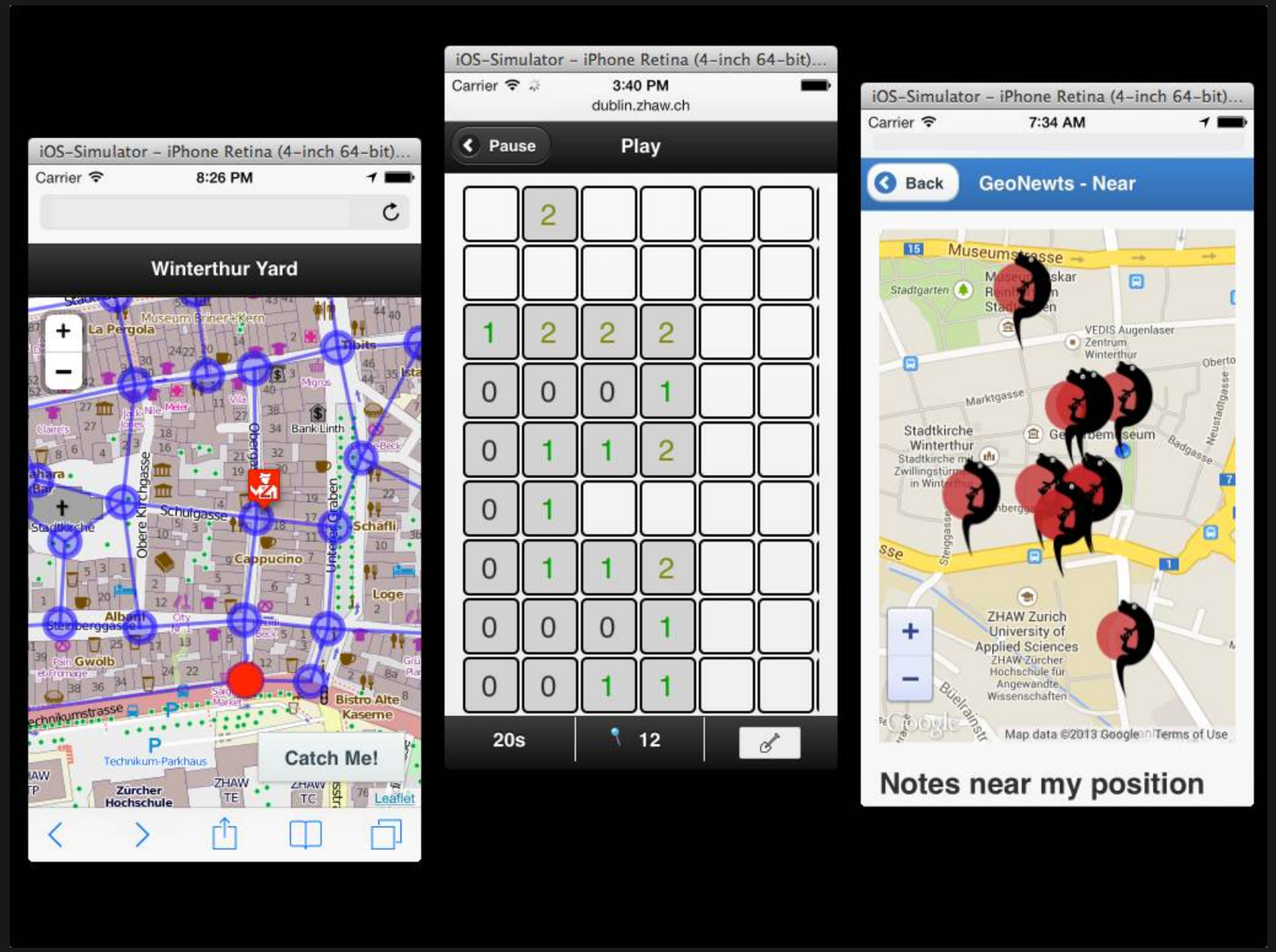

HYBRID MOBILE APPLICATIONS

- Frameworks can build a native wrapper around web apps (examples: Cordova, Capacitor)
- Use native code for enhanced performance and integration
- Use a webview with HTML-based content for other parts
- Allow to revise content and features without using the app stores

SOURCES

- Slides and other material from courses WEB1, WBE
- Mobile Developer’s Guide To The Galaxy, 18th Edition, Open XChange, https://www.open-xchange.com/resources/mobile-developers-guide-to-the-galaxy/
- Mobile is eating the world, Benedict Evans, 2013, http://de.slideshare.net/bge20/2013-11-mobile-eating-the-world