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Security threats and mitigations for iOS developers

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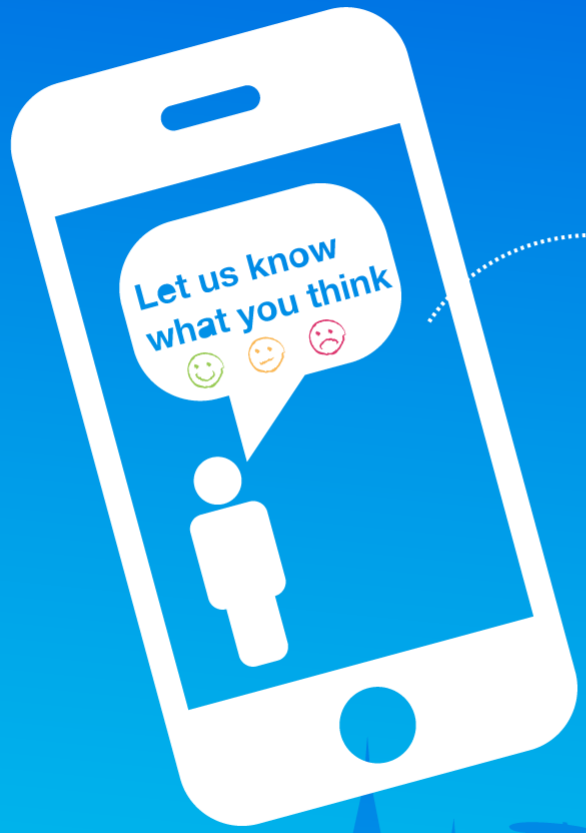

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Isn’t iOS secure?

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Q1 2014 : goto fail;

Major Apple security flaw: Patch issued, users open to MITM attacks

Apple rushed the release of iOS 7.0.6 on Friday with a patch for a shockingly overlooked SSL encryption issue that leaves iPhone, iPad and Mac computer users open to a man-in-the-middle (MITM) attack.

By Violet Blue for Zero Day | February 22, 2014 -- 10:30 GMT (10:30 GMT) | Topic: Security

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Q4 2014 : Wirelurker (Masque attacks)

Apple Has Shut Down The 'WireLurker' Malware Attacking iPads and iPhones

Sam Colt

Nov. 7, 2014, 12:07 AM 419

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Q2 2015 : New Masque Attacks

Hackers discover way to crack into Apple devices

by Jonathan Vanian @JonathanVanian AUGUST 6, 2015, 12:35 PM EDT

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Q3 2015 : AirDrop vulnerability

iOS 9, OS X El Capitan close serious AirDrop vulnerability allowing malware infections

By Roger Fingas
Thursday, September 17, 2015, 08:10 am PT (11:10 am ET)

iOS 9 and the forthcoming OS X El Capitan address a vulnerability in Apple's AirDrop feature that could allow malware infections and the theft of sensitive data, according to a security researcher.

Q3 2015 : Xcode Ghost

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Xcode Ghost

WeChat

DiDi Taxi

58 Classified - Job, Used Cars, Rent

Gaode Map - Driving and Public Transportation

Railroad 12306

Flush

China Unicom Customer Service (Official Version)*

CarrotFantasy 2: Daily Battle*

Miraculous Warmth

Call Me MT 2 - Multi-server version

Angry Bird 2 - Yifeng Li's Favorite*

Baidu Music - A Music Player that has Downloads, Ringtones, Music Videos, Radio, and Karaoke

DuoDuo Ringtone

NetEase Music - An Essential for Radio and Song Download

Foreign Harbor - The Hottest Platform for Oversea Shopping*

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From an attacker's point of view

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What's of interest?

- **Extracting app data**
  - Credentials, Documents, Email etc.
- **Execute code**
  - Impersonate legitimate apps
  - Steal app data
  - Phishing (credentials, credit card details etc.)
  - Command & Control (botnets etc.)

What are the security mechanisms?

What are the security mechanisms?

1. App store review

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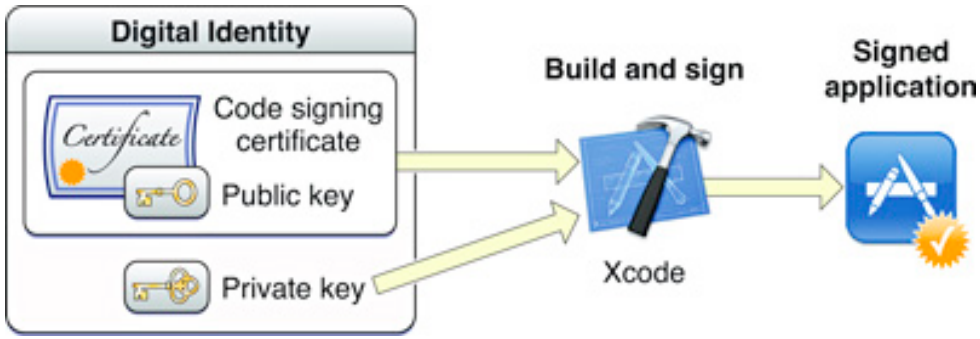
What are the security mechanisms?

2. Mandatory code signing



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Used to bypass app store review!

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What are the security mechanisms?

3. Sandboxing

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Sandboxing

- Enforced by platform
- Break-out vulnerabilities in almost all versions
  - Used by jailbreaks
  - App store is an extra safety net
- Cross-app access
  - Extensions
  - Custom URI scheme

What are the security mechanisms?

4. Data protection (at rest)

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Data protection

- Default encryption since iOS 8 (if passcode set)
  - NSFileProtectionComplete* flags
- Attacks
  - Backups (iCloud or iTunes)
  - Jailbreak
  - Masque attacks

Preventing backup of file

```
BOOL success = [URL setResourceValue: [NSNumber numberWithBool: YES]
                              forKey: NSURLIsExcludedFromBackupKey
                               error: &error];
```

https://developer.apple.com/library/ios/qa/qa1719/_index.html

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Keychain items

Use *ThisDeviceOnly access keys

Example: kSecAttrAccessibleAfterFirstUnlockThisDeviceOnly

What are the security mechanisms?

5. App Transport Security

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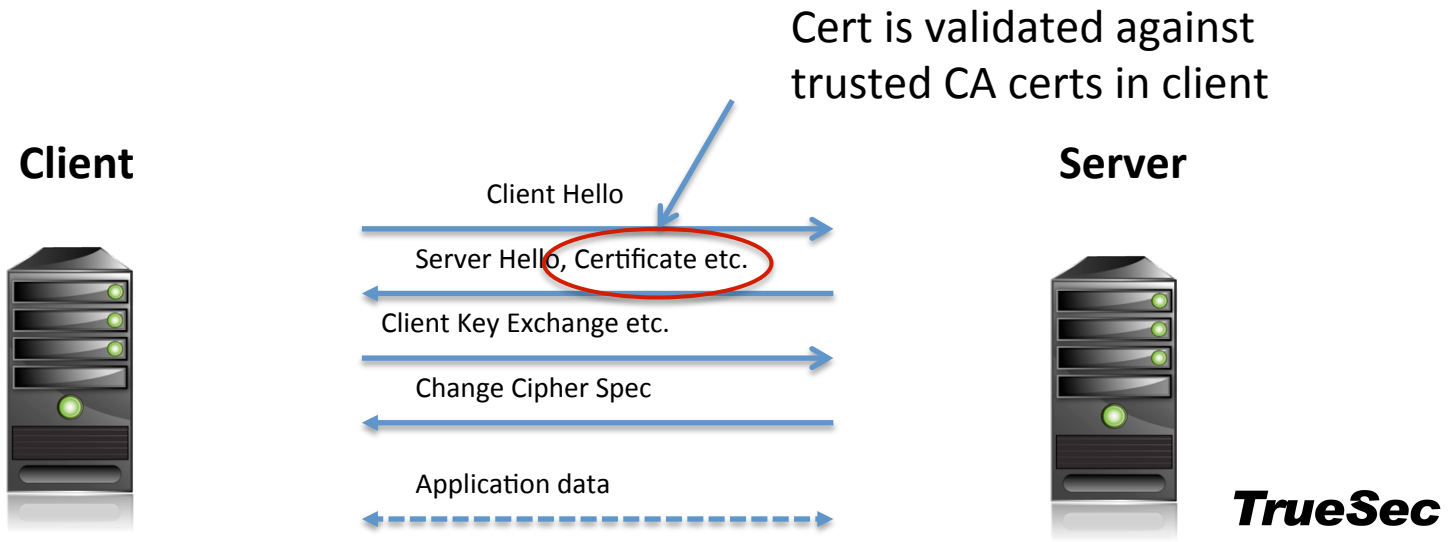
SSL/TLS

Authenticity | **Confidentiality** | **Integrity**



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App Transport Security

- Enforces best practices for server connections
  - https only
  - Only trusted certificates
  - TLS version 1.2, with forward secrecy

Developers must explicitly opt-out

[Don't opt-out!]

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More regarding SSL/TLS…

- **Cert pinning is recommended**
  - Validate certificate chain
  - Validate that cert corresponds to host name
- **If you use AFNetworking…**
  - Your app might be vulnerable to MiTM atttacks
  - Update to latest version

Time for demos…

Masque attacks

- App Masque
- URL Masque
- Extension Masque
- …and more

https://www.fireeye.com/blog/threat-research/2015/06/three_new_masqueatt.html

Injecting code in Xcode

- Steal Apple ID developer account
- Inject code in apps

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Summary

Summary

- Several great security mechanisms in iOS
- …but also vulnerabilities
  - Apps can be replaced
  - App data can be stolen
- Attackers attack your developer machines
  - Patch
  - Encrypt
  - Be careful what “tools” you are downloading

Full day about security for developers:

http://oredev.org/2015/security-day

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