# Modern smartphone forensics

Apple iCloud (backups, FindMyPhone, document storage)
encrypted BlackBerry backups (BB 10 and Olympia Service)
Windows Phone 8 (yet another cloud for backups)

*HITBSecConf2013*
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# Global smartphone market

**Top Smartphone Operating Systems, Shipments, and Market Share, 2013 Q3 (Units in Millions)**

| Operating System | 2Q13 Unit Shipments | 2Q13 Market Share | 2Q12 Unit Shipments | 2Q12 Market Share | Year-over-Year Change |
|---|---|---|---|---|---|
| Android | 187.4 | 79.3% | 108 | 69.1% | 73.5% |
| iOS | 31.2 | 13.2% | 26 | 16.6% | 20.0% |
| Windows Phone | 8.7 | 3.7% | 4.9 | 3.1% | 77.6% |
| BlackBerry OS | 6.8 | 2.9% | 7.7 | 4.9% | -11.7% |
| Linux | 1.8 | 0.8% | 2.8 | 1.8% | -35.7% |
| Symbian | 0.5 | 0.2% | 6.5 | 4.2% | -92.3% |
| Others | N/A | 0.0% | 0.3 | 0.2% | -100.0% |
| **Total** | **236.4** | **100.0%** | **156.2** | **100.0%** | **51.3%** |

- About 1.2 billion smartphones worldwide
- “Smart devices” – carry a lot of sensitive data
- Corporate deployments are increasing
- ... hard need for forensics!

*(Source: IDC Worldwide Quarterly Mobile Phone Tracker)*

# Smartphone forensics methods

| | Android | iOS | Windows Phone | BlackBerry OS |
|---|---|---|---|---|
| Logical acquisition | Yes | Yes | Yes | ? |
| Physical acquisition | Yes/No | Yes/No | No | Yes* |
| Chip-off | Yes/No | No | ? | Yes |
| Local backup | Yes | Yes | No | Yes |
| Cloud backup | Yes | Yes | Yes | No |
| Documents in cloud | Yes | Yes | Yes | No |
| Location service | Yes | Yes | Yes | No |

# Backups to cloud: why?

# iOS Support Matrix

Autumn 2013 Edition – v3.0b2
http://iossupportmatrix.com
@isupportmatrix
English

ARMv6 | ARMv7 | ARMv7s | ARM64

| Device Compatibility | iPhone June 2007 | iPod touch September 2007 | iPhone 3G July 2008 | iPod touch (2nd gen) September 2008 | iPhone 3GS June 2009 | iPod touch (3rd gen) September 2009 | iPad April 2010 | iPhone 4 June 2010 | iPod touch (4th gen) September 2010 | iPad 2 March 2011 | iPhone 4S October 2011 | [new] iPad March 2012 | iPod touch (5th gen) September 2012 | iPad mini October 2012 | iPhone 5 September 2012 | iPad October 2012 | iPhone 5c September 2013 | iPhone 5s September 2013 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 128MB | 128MB | 128MB | 128MB | 256MB | 256MB | A4 256MB | A4 512MB | A4 256MB | A5 512MB | A5 512MB | A5X 1GB | A5 512MB | A5 512MB | A8 1GB | A8X 1GB | A8 1GB | A7 1GB |
| iPhone OS 1.0 | ▲ 1.0 | ▲ 1.1 | | | | | | | | | | | | | | | | |
| iPhone SDK 2.0 | | | ▲ 2.0 | ▲ 2.1.1 | | | | | | | | | | | | | | |
| iPhone SDK 3.0 | 136 3.1.3 ▼ | 135 3.1.3 ▼ | | | ▲ 3.0 | ▲ 3.1.1 | iPad SDK 3.2 | | | | | | | | | | | |
| iPhone SDK 4.0 | | | 136 4.2.1 ▼ | 188 4.2.1 ▼ | | | 4.3.5 | (GSM) 4.0 / 4.2.6 (CDMA) | ▲ 4.2.1 | ▲ 4.3.5 | | | | | | | | |
| iOS 5 | | | | | | 278 5.1.1 ▼ | 454 5.1.1 ▼ | | | | ▲ 5.0 | ▲ 5.1 | | | | | | |
| iOS 6 | | | | | 275 6.1.3 ▼ | | | | 375 6.1.3 ▼ | | | | ▲ 6.0 | ▲ 6.0 | ▲ 6.0 | ▲ 6.0 | | |
| iOS 7 | | | | | | | | 378 7.0 | | 771 7.0 | 643 7.0 | 720 7.0 | 810 7.0 | 751 7.0 | 1586 7.0 | 1757 7.0 | 7.0.1 | 7.0.1 |
| Model ID | iPhone1,1 | iPod1,1 | iPhone1,2 | iPod2,1 | iPhone2,1 | iPod3,1 | iPad1,1 | iPhone3,1 | iPod4,1 | iPad2,1 iPad2,4 | iPhone4,1 | iPad3,1 iPad3,2 | iPod5,1 | iPad2,5 iPad2,6 | iPhone5,1 iPhone5,2 | iPad3,4 | iPhone5,3 iPhone5,4 | iPhone6,1 iPhone6,2 |

## Key

A7 1GB — Chip generation / Device memory

- Accelerometer
- Bluetooth LE
- GPS (Cellular iPad only)
- Microphone
- Still Camera
- Retina Display
- ARM Version
- Camera Flash
- Gyroscope
- OpenGL ES Version
- Telephony
- Lightning Port
- M7 Coprocessor
- Front Facing Camera
- Location Services
- Peer-to-Peer
- Video Camera
- TouchID
- Auto-Focus Camera
- Game Kit
- Magnetometer
- SMS
- Wifi

Do not support / Full support

▲ 4.2.1 ▼ — Earliest release / Latest release

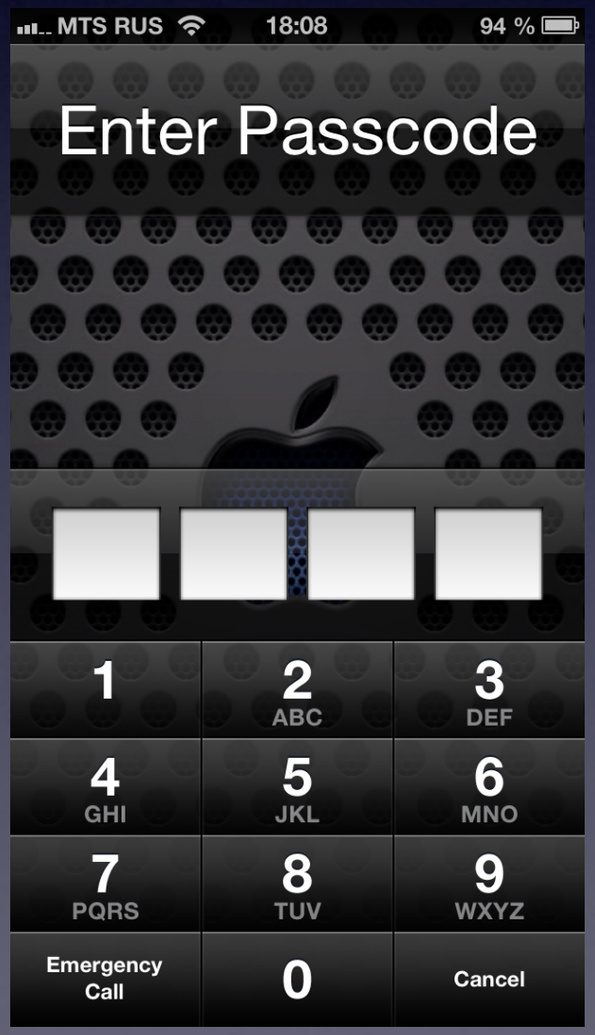
454 — Geek Bench rating

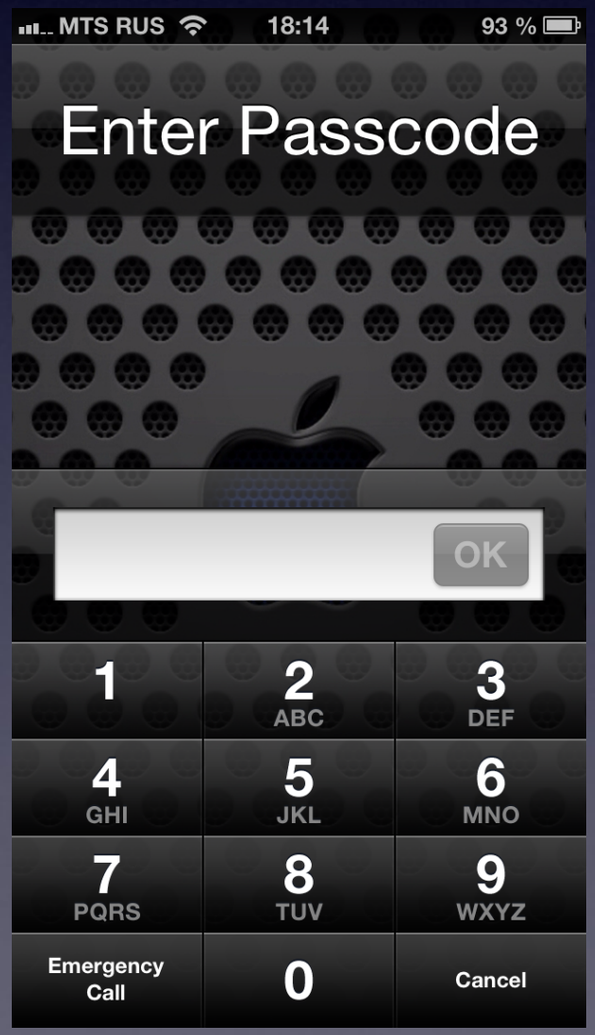
# iOS forensics
# - logical & physical acquisition

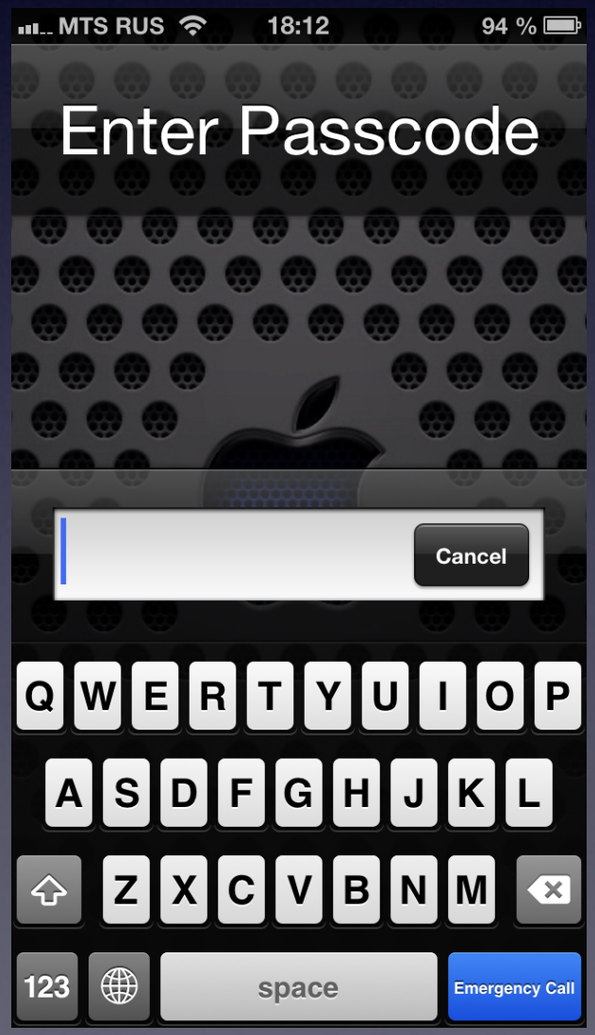
- Logical acqusition
  - “Ask” device to produce backup
  - Device must be unlocked (by passcode or iTunes)
  - Device may produce encrypted backup
  - Limited amount of information
- Physical acqusition
  - Boot-time exploit to run unsigned code or jailbreak
  - Device lock state isn’t relevant, can bruteforce passcode
  - Can get all information from the device
  - ... but not for iPhone 5 and iPad 4 :(

# iOS passcode

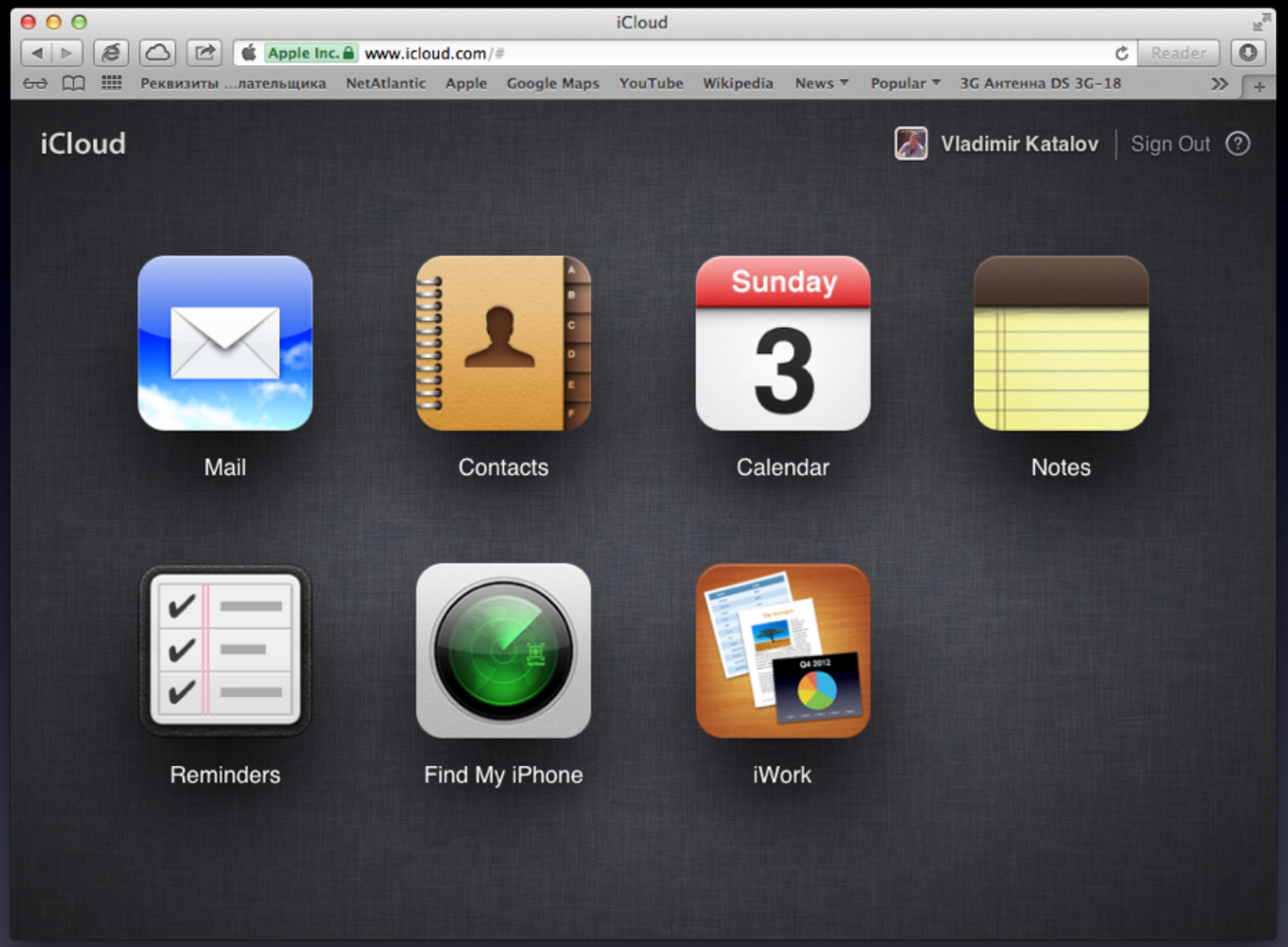
- Device passcode
  - Protect unauthorized access to the device
  - Bypassing is not enough (used in encryption)
- Disk encryption
- Keychain
  - System-wide storage for sensitive data (keys, passwords etc)
  - Data is encrypted



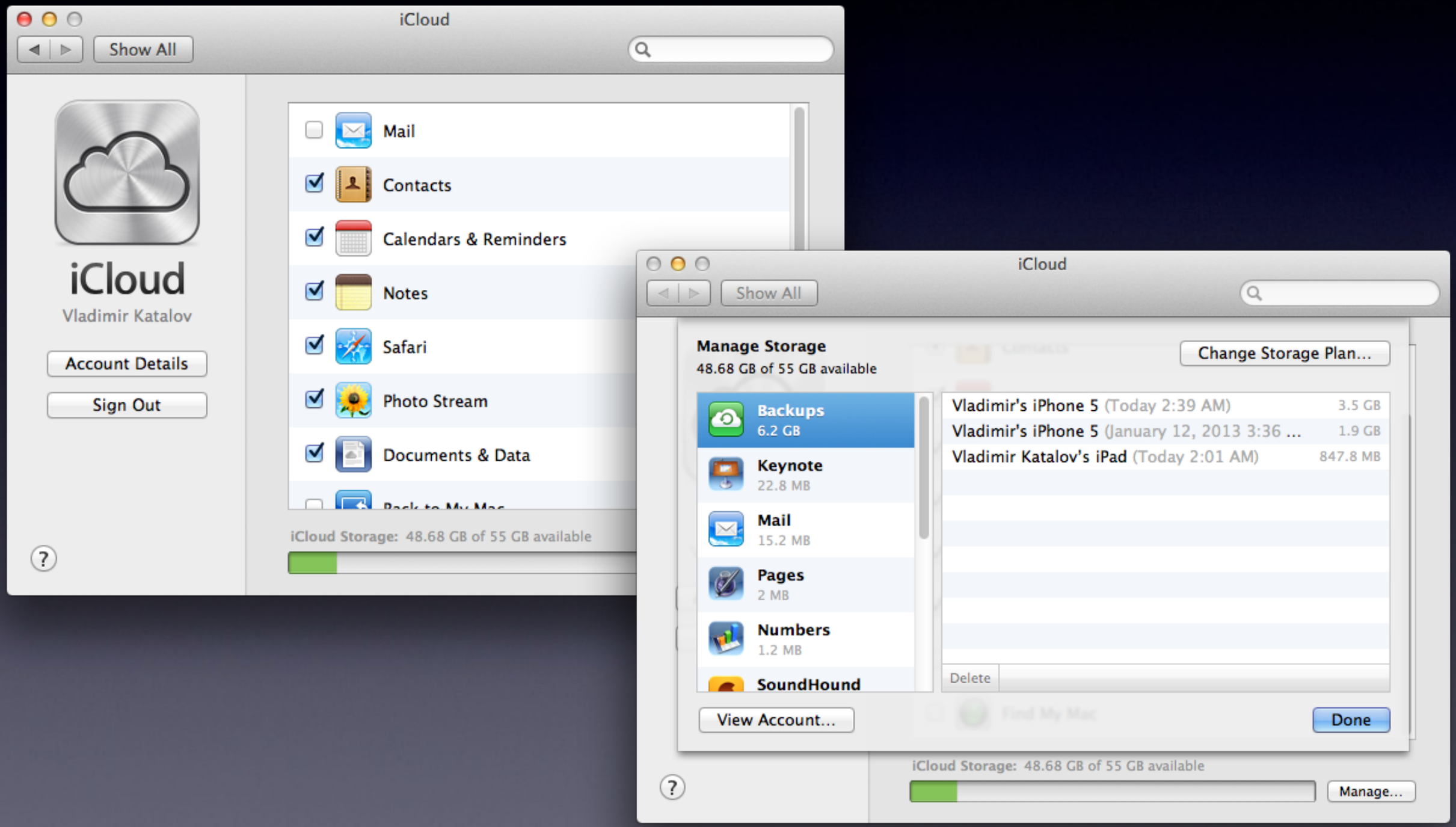



# iCloud services




- Introduced in Oct 2011
- Introduced with iOS 5
- 5 GB free storage
- Up to 50 GB paid storage
- Over 320 million users in July 2013
- Backups, documents, notes, calendar, Find My Phone

# iCloud Control Panel



# iCloud backup - what & when

- Contacts and Contact Favorites
- Messages (including iMessages)
- Call history
- Application data
- Device settings
- Camera roll (photos and videos)
- Purchases (music, movies, TV, apps, books)
- Mail accounts
- Network settings (saved Wi-Fi hotspots, VPN settings etc)
- Paired Bluetooth devices
- Offline web application cache/database
- Safari bookmarks, cookies, history, offline data
- ... and much more

- Backup runs daily when device is:
  - Connected to the Internet over Wi-Fi
  - Connected to a power source
  - Locked
- Can force backup
  - [Settings] | [iCloud] | [Storage & Backup] | [Back Up Now]

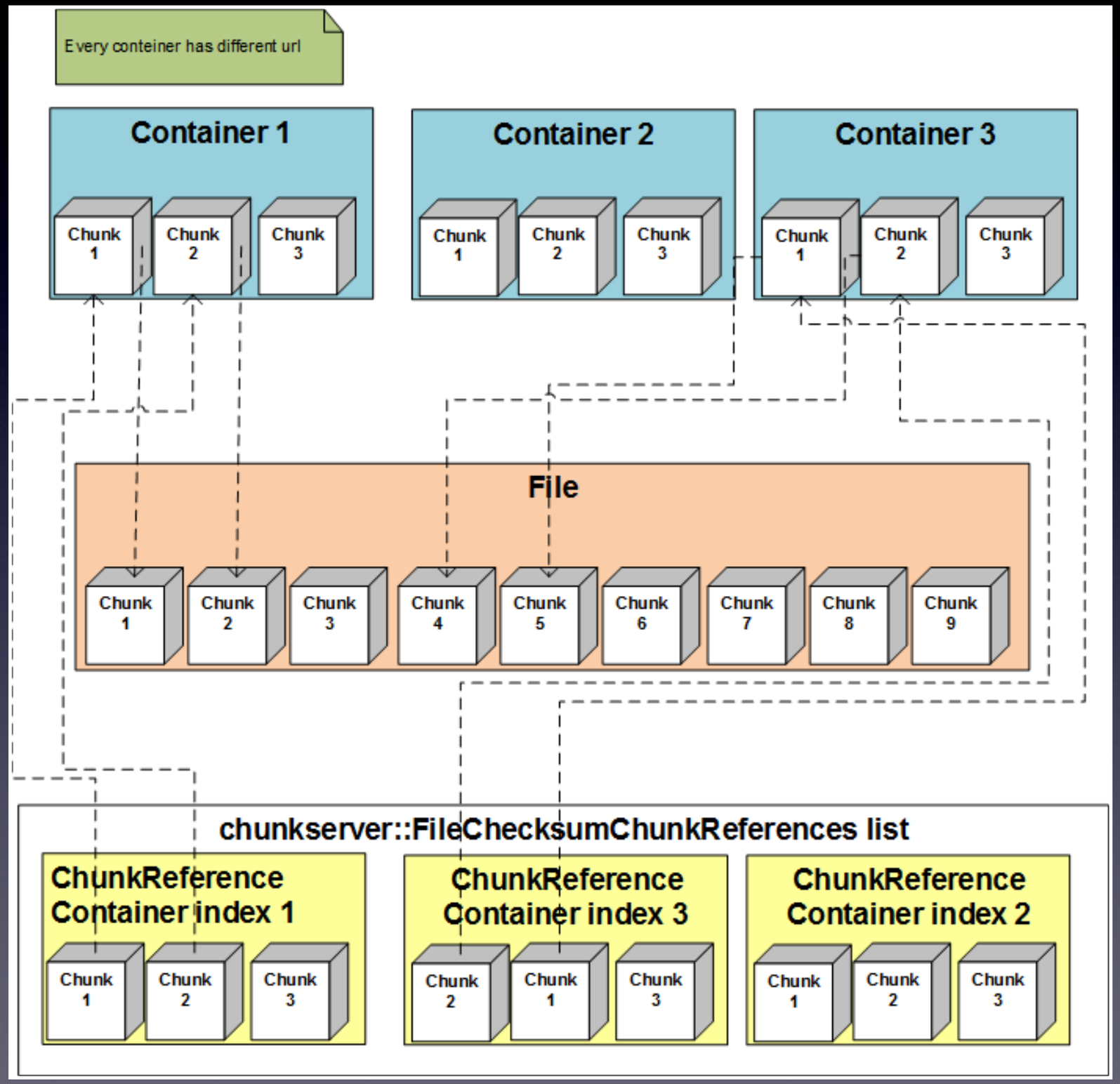
# iCloud backups reverse-engineering

- jailbreak iPhone
- Install Open SSH, get keychain (keychain-2.db)
- [Settings] | [iCloud] | [Delete Account] | [Delete from My iPhone]
- [Settimngs] | [General] | [Reset] | [Reset All Settings]
- reboot
- set up Wi-Fi connection (proxy)
- replace keychain with our own trusted root certificate (need key 0x835 & keychain)
- ... read all the traffic :)

# iCloud backup protocol flow

- Dynamic: endpoints depend on Apple ID
- Built on Google Protocol Buffers (mostly)
- Files are split into chunks
- Apple provides file-to-chunks mapping, chunk encryption keys, and full request info to 3rd-party storage provider (Amazon/Microsoft)
- Encryption key depends on chunk data

# Files in iCloud



# iCloud backup: authentication

query:
https://setup.icloud.com/setup/authenticate/$APPLE_ID$,

Authorization:Basic <authentication data>
authentication data = mime64 (AppleID:password)

returns: mmeAuthToken, dsPrsID

*example:*

GET /setup/authenticate/$APPLE_ID$ HTTP/1.1
Host: setup.icloud.com
Accept: */*
User-Agent: iCloud.exe (unknown version) CFNetwork/520.2.6
X-Mme-Client-Info: <PC> <Windows; 6.1.7601/SP1.0; W> <com.apple.AOSKit/88>
Accept-Language: en-US
Authorization: Basic cXR0LnRld3RAaWNtb3VkLmNvbTqRd2VydHkxMjM0NQ==

# iCloud backup:
# get auth. token, backup IDs, keys

query:
https://setup.icloud.com/setup/get_account_settings

Authorization:Basic <authentication data>
authentication data = mime64 (dsPrsID:mmeAuthToken)

returns: mmeAuthToken (new/other one!!)

query:
https://p11-mobilebackup.icloud.com/mbs/(dsPrsID)

Authorization: <authentication data>
authentication data = mime64 (dsPrsID:mmeAuthToken)

returns: list of backup IDs (backupudid)

query:
https://p11-mobilebackup.icloud.com/mbs/2005111682/(backupudid)/getKeys

# iCloud backup: download files (1)

*Enumerate snapshots*

HTTPS GET
https://p11-mobilebackup.icloud.com/mbs/(dsPrsID) /
(backupudid)/ (snapshotid)/listFiles?
offset=(offset)&limit=(limit)

*Get file authentication tokens*

HTTPS POST

https://p11-mobilebackup.icloud.com/mbs/(dsPrsID)/
(backupudid)/(snapshotid)/getFiles

# iCloud backup: download files (2)

*Download chunks*

Windows Azure:
http://msbnx000004.blob.core.windows.net:80/cnt/g6YMJKQBPxQruxQAr30C?sp=r&sr=b&byte-range=154-31457433&se=2013-06-07T10:14Z&st=2013-06-07T09:19Z&sig=0EdHy75gGHCee%2BjKePZBqz8xbWxpTxaYyASwFXVx2%2Fg%3D

*'se' contains iCloud authorization time (expires in one hour)*

Amazon AWS:
http://us-std-00001.s3-external-1.amazonaws.com/l9rh20QBPX4jizMAr3vY?x-client-request-

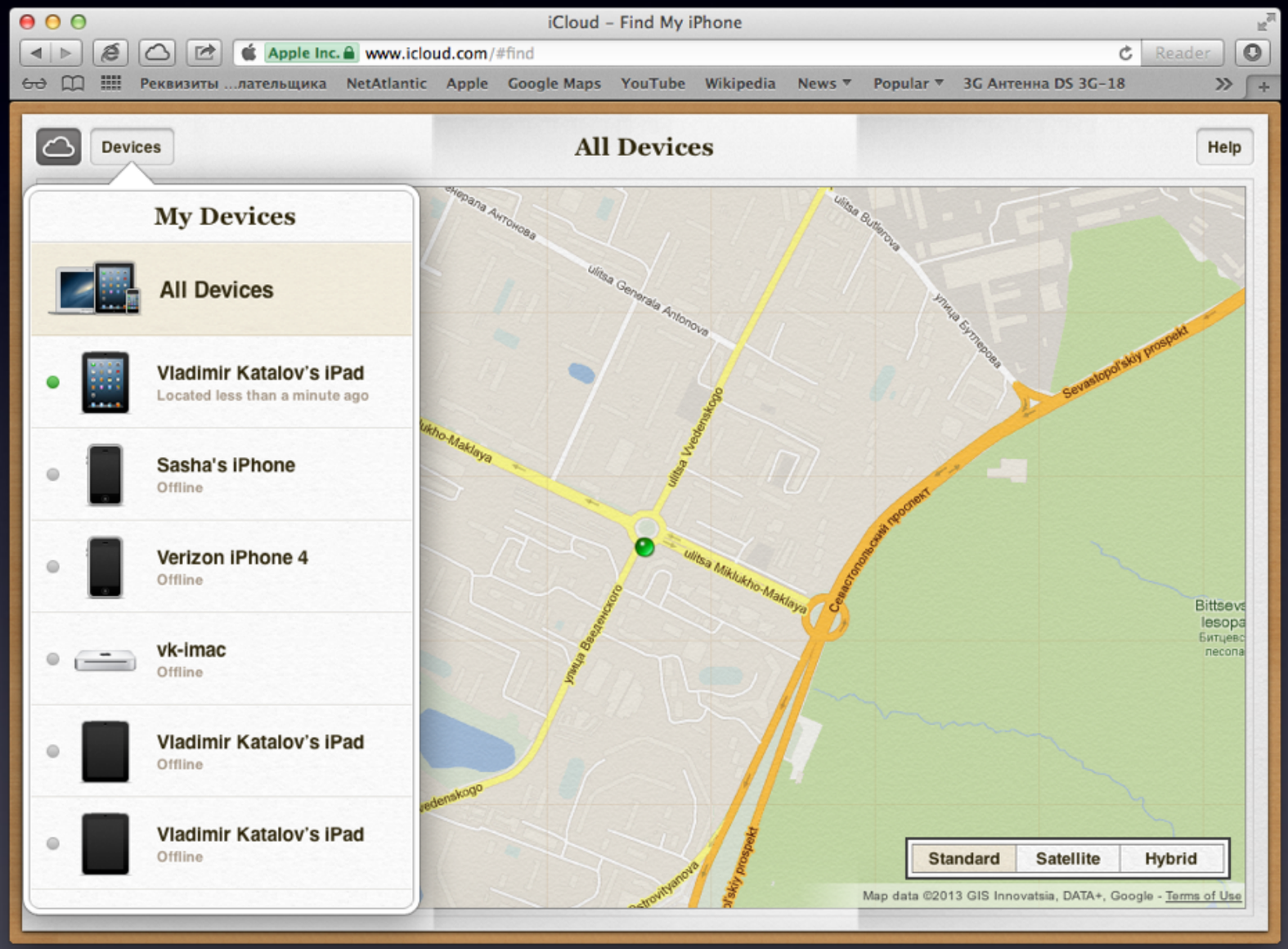
# iCloud encryption

- Data stored at 3rd-party storage providers is encrypted
- Apple has encryption keys to that data
- Few files are further encrypted using keys from OTA backup keybag
- Keychain items are encrypted using keys from OTA backup keybag
- Need key 0x835 (securityd) to decrypt most keys from OTA backup keybag

# iCloud backups - summary

- There is no user-configurable encryption for iCloud backups
- iCloud backups are stored in Microsoft and Amazon clouds in encrypted form
- Apple holds encryption keys and thus have access to data in iCloud backups
- **If Apple stores 0x835 keys then it can also have access to Keychain data (i.e. passwords)**
- Apple may have legal obligations to do this (e.g. LE)
- No notification after backup downloading (as with device restore)

# Find My Phone




# FindMyPhone protocol

How: just sniffing HTTP traffic (www.icloud.com, Find My Phone)

## Authorization:

validate:
https://setup.icloud.com/setup/ws/1/validate)

*ClientBuildNumber=1M.63768 (constant)*
*ClientId (random GUID)*
<- instance

login:
https://setup.icloud.com/setup/ws/1/login

*AppleID*
*extended_login*
*id=sha1(apple_id+instance)*
*password*
<- dsid

## Get devices with location:

initClient:
https://p11-fmipweb.icloud.com/fmipservice/client/web/initClient

refreshClient:
https://p11-fmipweb.icloud.com/fmipservice/client/web/refreshClient

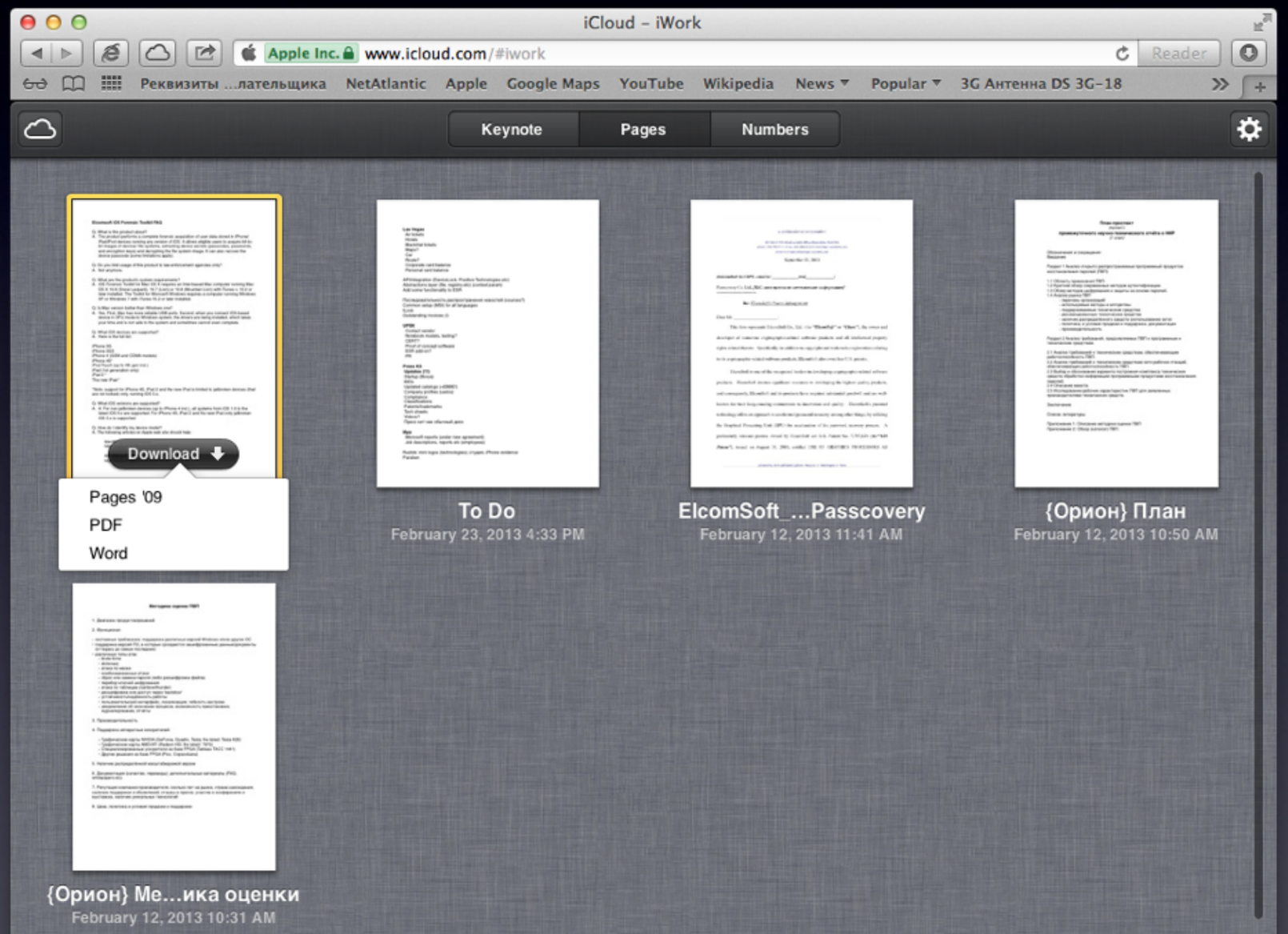
*id*
*dsid*
*<- content (location)*

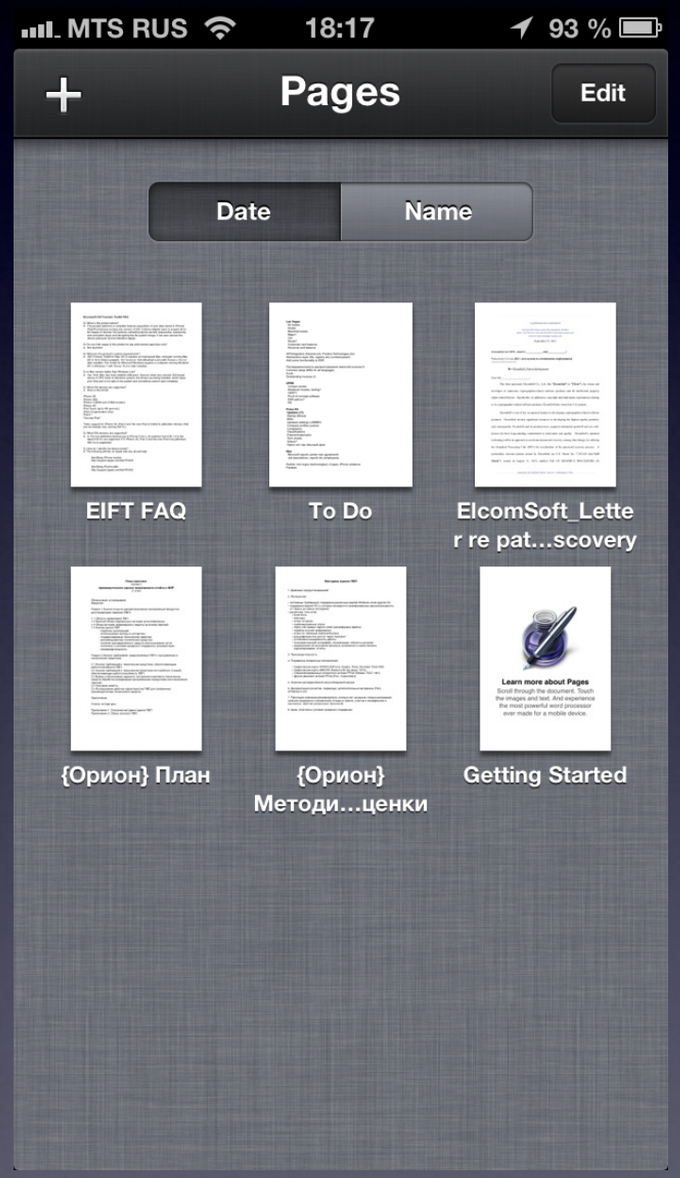
# FindMyPhone - demo output

locations.txt — Edited

```
====================== Device #1====================
deviceModel = SixthGen-white
modelDisplayName = iPhone
id = QVBTOmIwMjZiMDY5ODg5NDA2MTcwMDhjOWY4MWRkOWU2YWIxM2UwN2JiY2M~
deviceDisplayName = iPhone 5
name = Vladimir's iPhone 5
batteryLevel = 0.700216
locationEnabled = 1
longitude = 37.6243
latitude = 55.8114
positionType = Wifi
isOld = 0
Device found: 00:00:27.786000 ago

====================== Device #3====================
deviceModel = MacBookAir3_2
modelDisplayName = MacBook Air
id = QVBTOjg3MzBFNjQ5LTdGRjktNTkzRC1CMzI3LUZCMkRFNjA2NjRCRA~~
deviceDisplayName = MacBook Air 13"
name = Vladimir Katalov’s MacBook Air
batteryLevel = 0
locationEnabled = 1
longitude = 0
latitude = 0
positionType =
isOld = 0
Device not found

====================== Device #6====================
deviceModel = ThirdGen-4G
modelDisplayName = iPad
id = QVBTOjAzYjU2YzhiMjYzZWFhZmE3NWU2MTk5YzQzYzQwNDJjYTljNjRkZjg~
deviceDisplayName = iPad
name = Vladimir Katalov’s iPad
batteryLevel = 0.74746
locationEnabled = 1
longitude = 37.6245
latitude = 55.8113
positionType = Wifi
isOld = 0
Device found: 00:00:36.485000 ago
```

# iCloud documents



# Get files from iCloud

**To get list of files**

- Authentication request (with given AppleID & password). Client gets mmeAuthToken in return; which, in order, is used to create authentication token (together with dsid). dsid (Destination Signaling IDentifier) is an unique ID assigned to the user when registering at iCloud.com.

- Request to get AccountSettings. Client gets an URL (ubiquityUrl) with an address to get UUID (unique user identifier), file list, info on file tokens and for authorization.

- Request to get file list (POST). Output (for every file):

    - file name
    - file id
    - parent folder id
    - last change time
    - checksum
    - access rights

**To download given file**

- Request to get file token (using file id, checksum and aliasMap).

- Authorization request. Returns information on file chunks and containers. Output: container list (with URLs) and chunk information.

# iCloud backup: packages

- KeyNote: PDF, Microsoft PowerPoint, KeyNote ’09
- Pages: PDF, Microsoft Word, Pages ’09
- Numbers: PDF, Microsoft Excel, Numbers ’09
- Some other programs (1Password etc)

Storage: plist + content (text, media files)

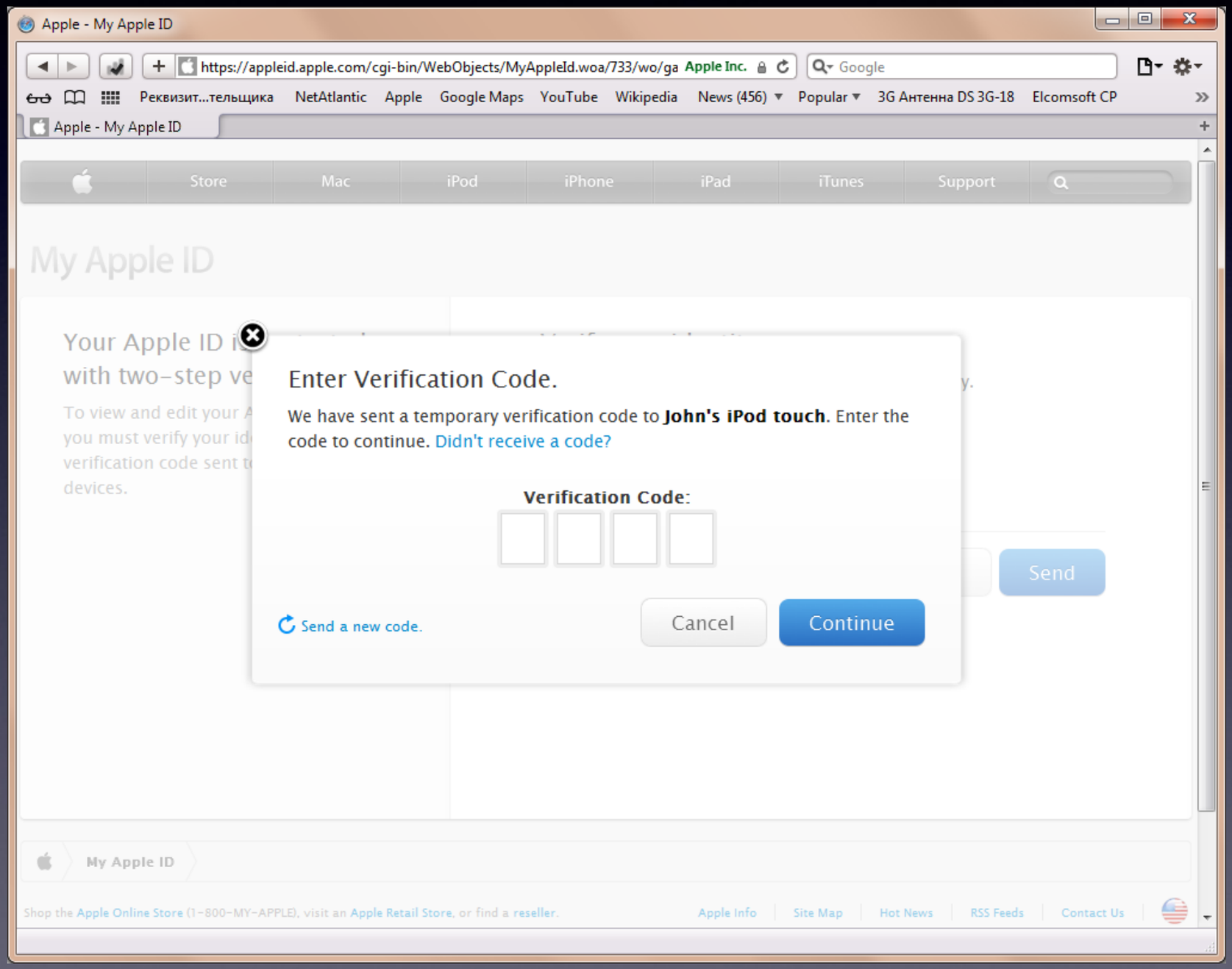
Reguests:

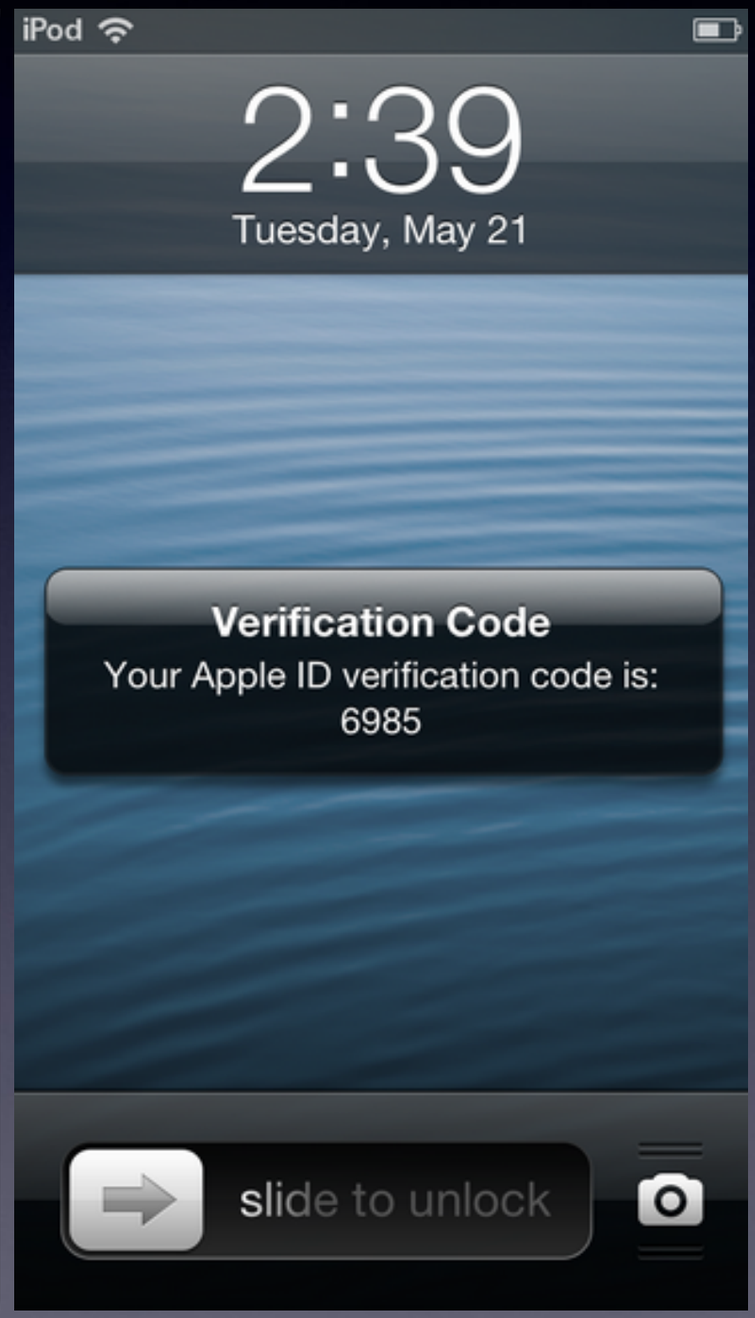
# iCloud docs: demo output

files_list.txt — Edited

```
File name: buildVersionHistory.plist
File path: /com~apple~Pages/Documents/EIFT FAQ.pages-tef/buildVersionHistory.plist
File id:   4222124650662430
File size: 221 bytes

File name: index.db
File path: /com~apple~Pages/Documents/EIFT FAQ.pages-tef/index.db
File id:   4222124650662429
File size: 376832 bytes

File name: index.viewstate
File path: /com~apple~Pages/Documents/EIFT FAQ.pages-tef/index.viewstate
File id:   4222124650662435
File size: 713 bytes

File name: metadata.plist
File path: /com~apple~Pages/Documents/EIFT FAQ.pages-tef/metadata.plist
File id:   4222124650662431
File size: 416 bytes

File name: preview-micro.jpg
File path: /com~apple~Pages/Documents/EIFT FAQ.pages-tef/preview-micro.jpg
File id:   4222124650662442
File size: 1489 bytes

File name: preview-web.jpg
File path: /com~apple~Pages/Documents/EIFT FAQ.pages-tef/preview-web.jpg
File id:   4222124650662443
File size: 11782 bytes

File name: preview.jpg
File path: /com~apple~Pages/Documents/EIFT FAQ.pages-tef/Previews/preview.jpg
File id:   4222124650662444
File size: 45229 bytes

File name: EIFT FAQ.jpg
File path: /com~apple~Pages/iWorkPreviews/EIFT FAQ.jpg
File id:   4222124650662514
File size: 45229 bytes
```

# Apple 2FA
## (two-step verification)



# Apple 2FA
## (cont-d)

Requires to verify your identity using one of your devices before you can:

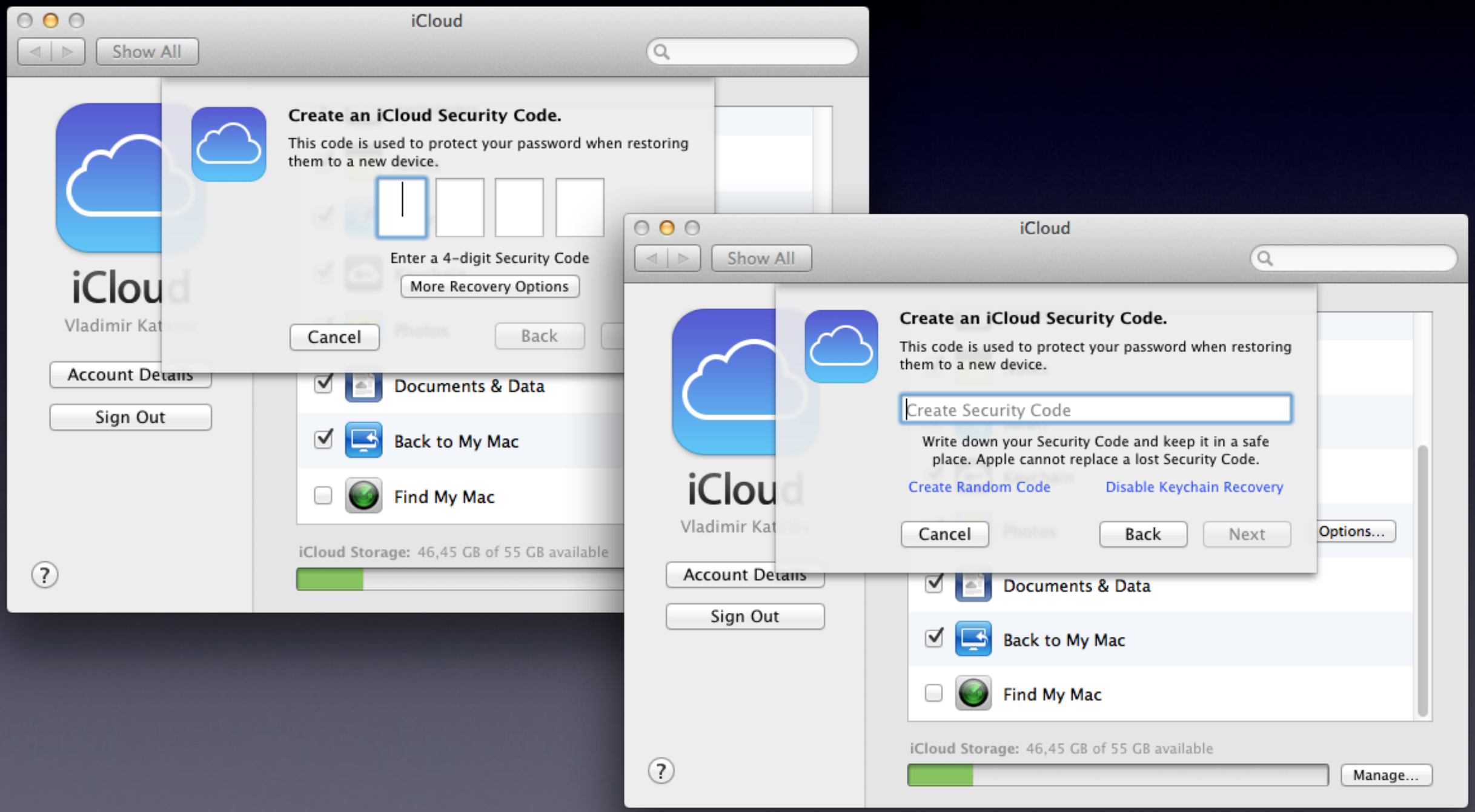
- Sign in to My Apple ID to manage your account.
- Make an iTunes, App Store, or iBookstore purchase from a new device.
- Get Apple ID-related support from Apple.

Does **NOT** protect:

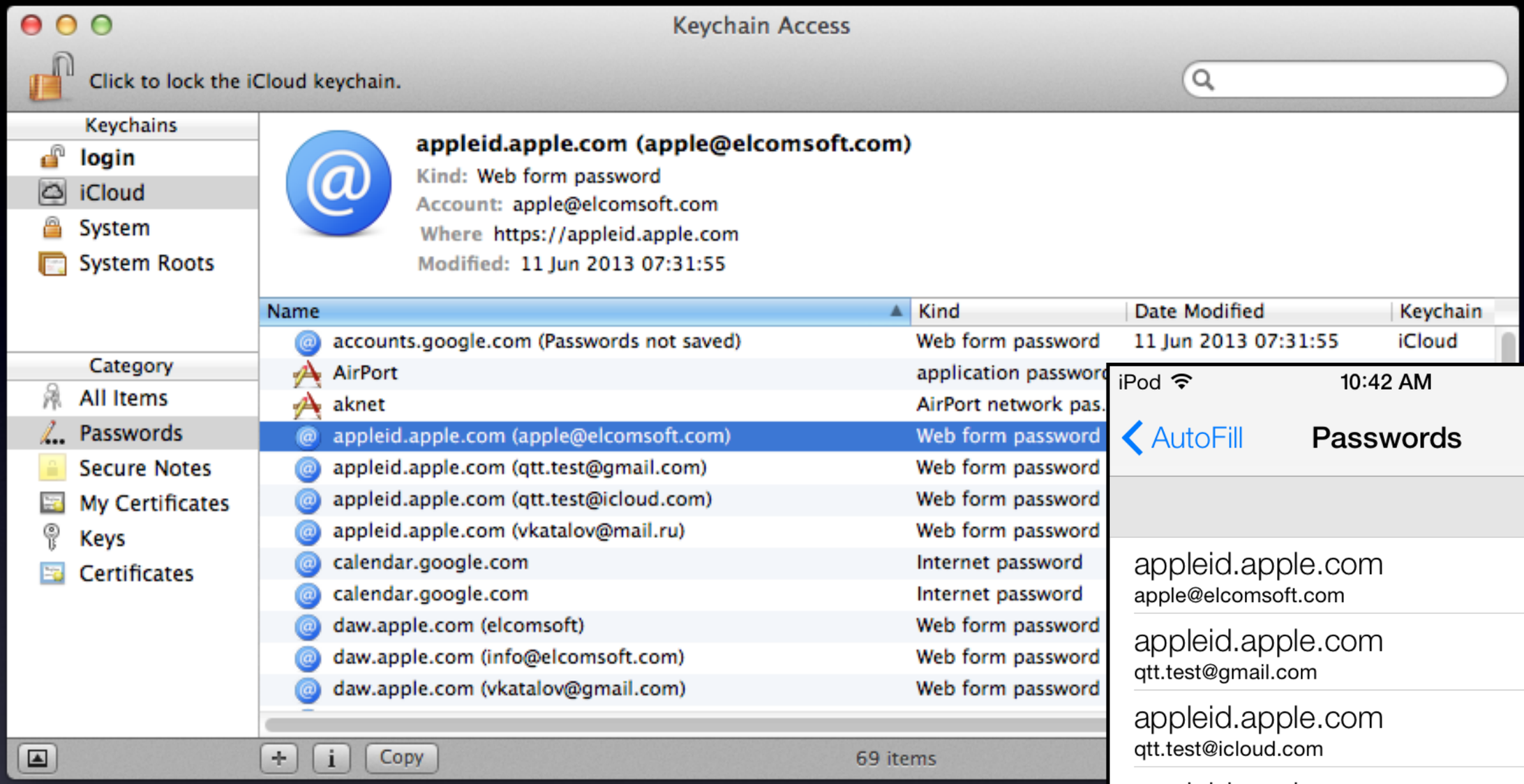
- iCloud backups
- Find My Phone data
- Documents stored in the cloud

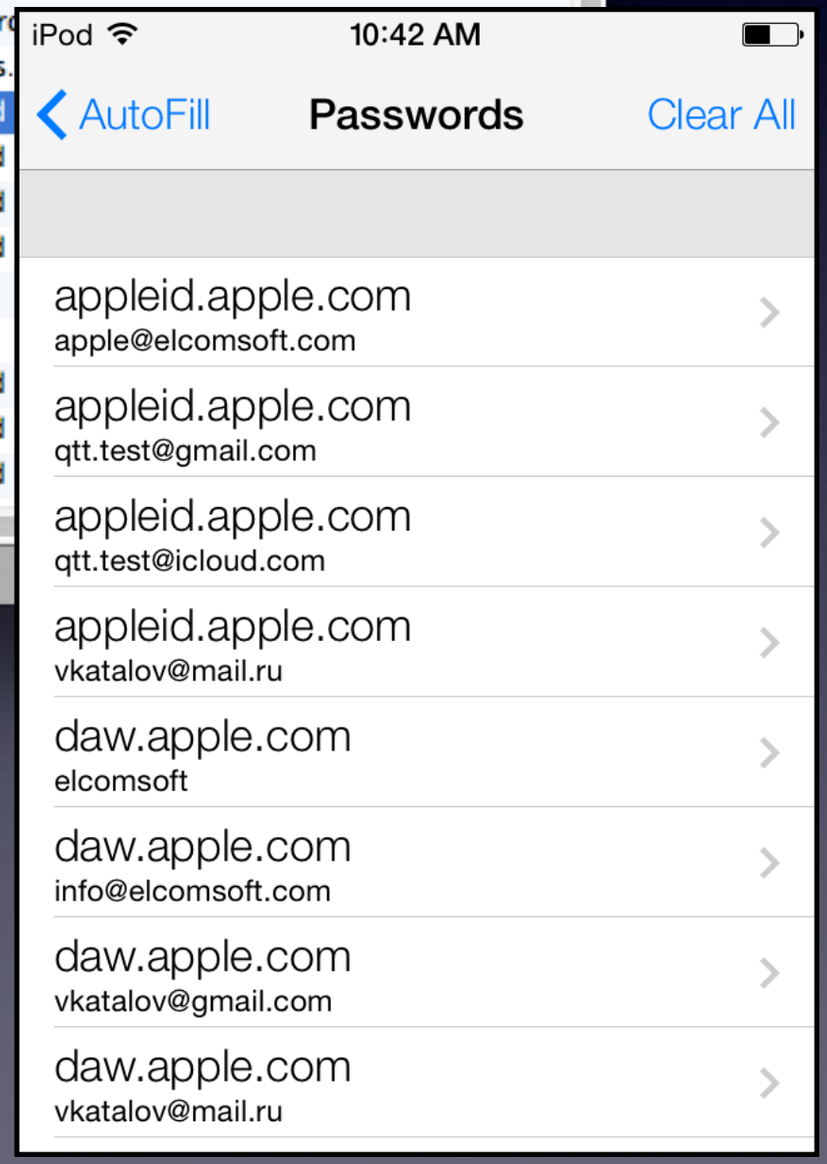
# Apple iOS 7

## iCloud keychain



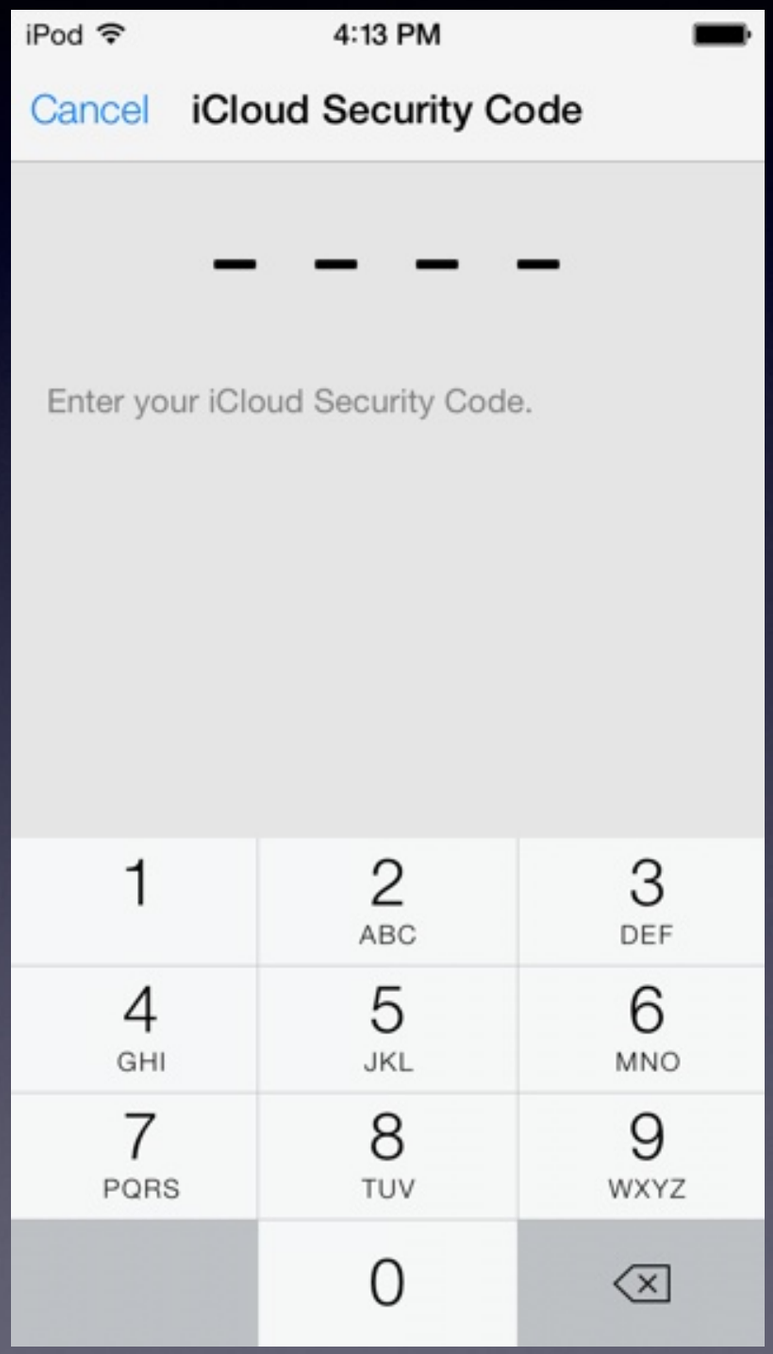
# iCloud keychain

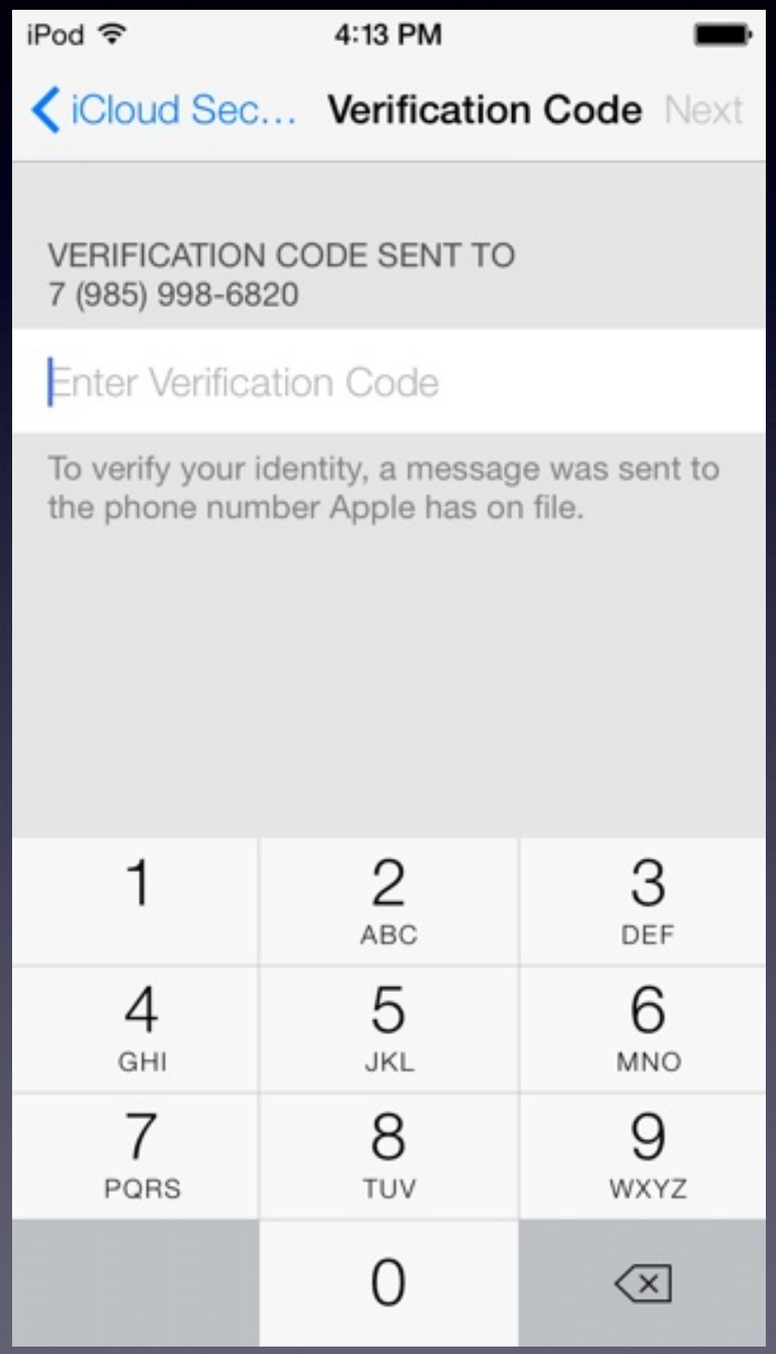


# Apple iOS 7

## iCloud keychain - cont-d




# Apple iCloud: Conclusion

- Balance between security, privacy and convenience
- iCloud security risks
- Use additional encryption
- Better 2FA implementation
- Need further work
  - My Photo Stream
  - Photo Sharing
  - 3rd party apps data
  - New security classes
  - iCloud keychain
  - Back To My Mac
  - FindMyPhone on iOS 7
  - Touch ID (iPhone 5S)

# Windows Phone backups

What is saved:

- Internet Explorer Favourites
- List of installed apps
- Theme and accent configuration
- Call history
- App settings (where applicable - email and accounts, lock screen etc)
- Test messages (SMS conversations)
- Photos (good quality - uses data allowance)

Can get with LiveSDK:

- Basic user information
- Contacts
- Calendars
- Files, photos, videos, documents

**Download full backup?**

# Windows Phone: Live SDK

Identity API

- Get basic information on user

Hotmail API:

- Manage contacts
- Manage calandars & events

SkyDrive API

- Files & documents
- Photos
- Videos

# Windows Live SDK (cont'd)

- Authentication
  - Needs client_id of registered application
  - Several requests to https://login.live.com to get redirects and some parameters
  - Get *antiForgeryVerificationToken*
  - Get *access_token*

- Get basic info

  GET https://apis.live.net/v5.0/me?access_token=…

- Get contacts

  GET https://apis.live.net/v5.0/me/contacts?access_token==…

- Get access to SkyDrive

  GET https://apis.live.net/v5.0/me/skydrive/my_documents?access_token==...

# WP8: get SMS

- Server: https://???-m.hotmail.com
  (to get correct name: send request to blum-hotmail.com)
- Protocol: ASHTTP
- Data format: wbxml
- Can be compressed ("Accept-Encoding: gzip, deflate")

Requests/responces:

- Get (login, password in base64
  - ★ success
- FolderHierarchy
  - ★ success
- SyncKeys
  - ★ success
- CategoriesItems (CollectionId)
  - ★ return: SyncKey
- GetItemEstimate (SyncKey, CollectionId)
  - ★ number of SMS
- GetSMS (SyncKey, CollectionId)
  - ★ new SyncKey and SMS
- GetClosedSMS

# WP8: get mail

GET http://mail.live.com/ HTTP/1.1
Host: mail.live.com
Connection: keep-alive
Accept: text/html,application/xhtml+xml,application/xml;q=0.9,*/*;q=0.8
User-Agent: Mozilla/5.0 (Windows NT 6.2; WOW64) AppleWebKit/537.36 (KHTML, like Gecko) Chrome/27.0.1453.116 Safari/537.36
Accept-Encoding: gzip,deflate,sdch

< redirect to authentication (https://login.live.com/login.srf?...)

> POST https://login.live.com/ppsecure/post.srf?... (login, password)

< redirect to mail.live.com?id=XXX

> GET https://mail.live.com/?id=XXX

< redirect to mailbox:

HTTP/1.1 302 Found
Location: https://col131.mail.live.com/default.aspx?id=XXX&rru=inbox

Go to mailbox:

GET https://col131.mail.live.com/default.aspx?id=XXX&rru=inbox HTTP/1.1
Host: col131.mail.live.com
Connection: keep-alive

# WP8: find my phone

- Map phone's location

  GET https://www.windowsphone.com/ru-ru/my/find HTTP/1.1

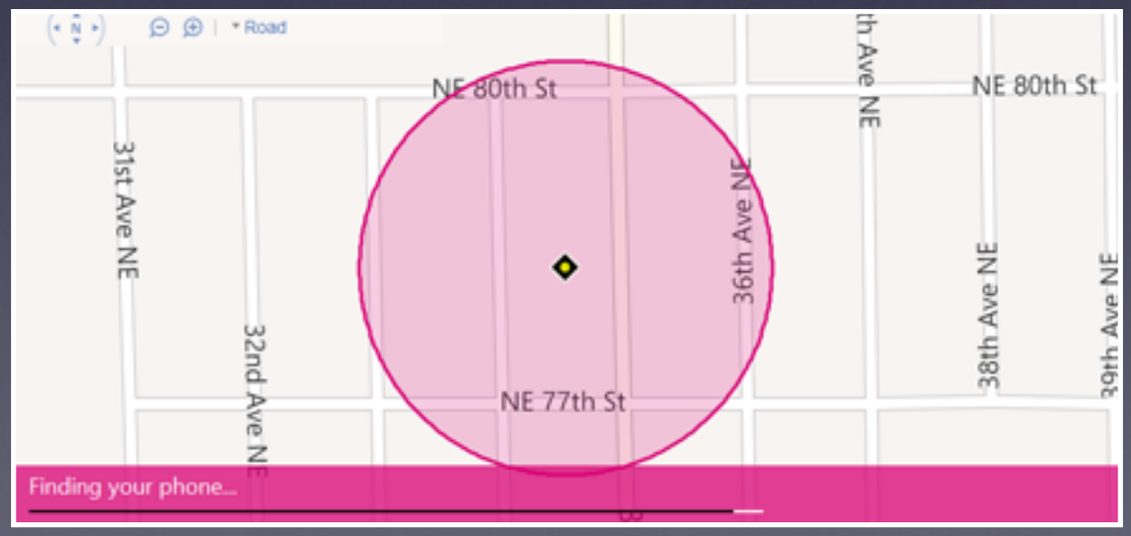
  or

  GET https://www.windowsphone.com/ru-ru/my/phones/.../locate-status?request=17
- Make the phone ring

  https://www.windowsphone.com/ru-ru/my/phones/c34a5c89b6aabc87cdc457b49e5f3abbf81c72e0b19d48bdbd3918e36785f646/ring
- Lock the phone and show a message
- Erase the phone

**Authentication is required, of course!**

*You can set up Find My Phone to save your location every few hours or to use push notifications instead of text messages to send commands (and apps)*



# BlackBerry backups

Old format:

- IPD files (all databases in a single container)
- BBB files (in fact, ZIP archives with several IPDs, one database per IPD)

New format:

- Unencrypted BBB-QNX (three .tar files inside); for PlayBook with firmware <2.0
- Encrypted BBB-QNX (all .tar files are encrypted); for BB OS 10 (backup created with BlackBerry Link

For old formats - simple password protection:

- Encryption: AES-256
- Password verification:
  - BlackBerry Desktop Software 5: pbkdf2 (1) - *yes, just one iteration*
  - BlackBerry Desktop Software 6: pbkdf2 (20,000)

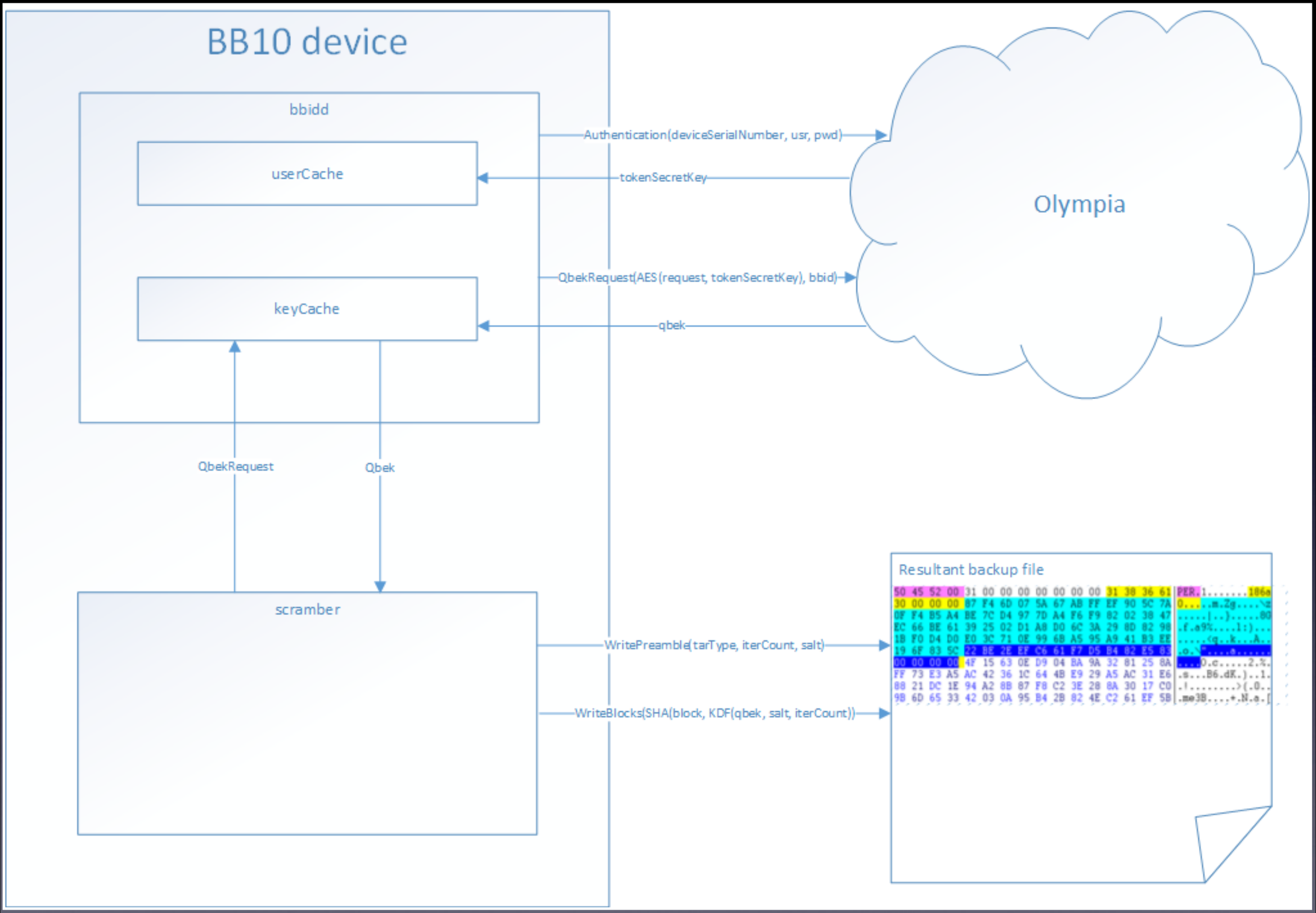
# BB10 backups

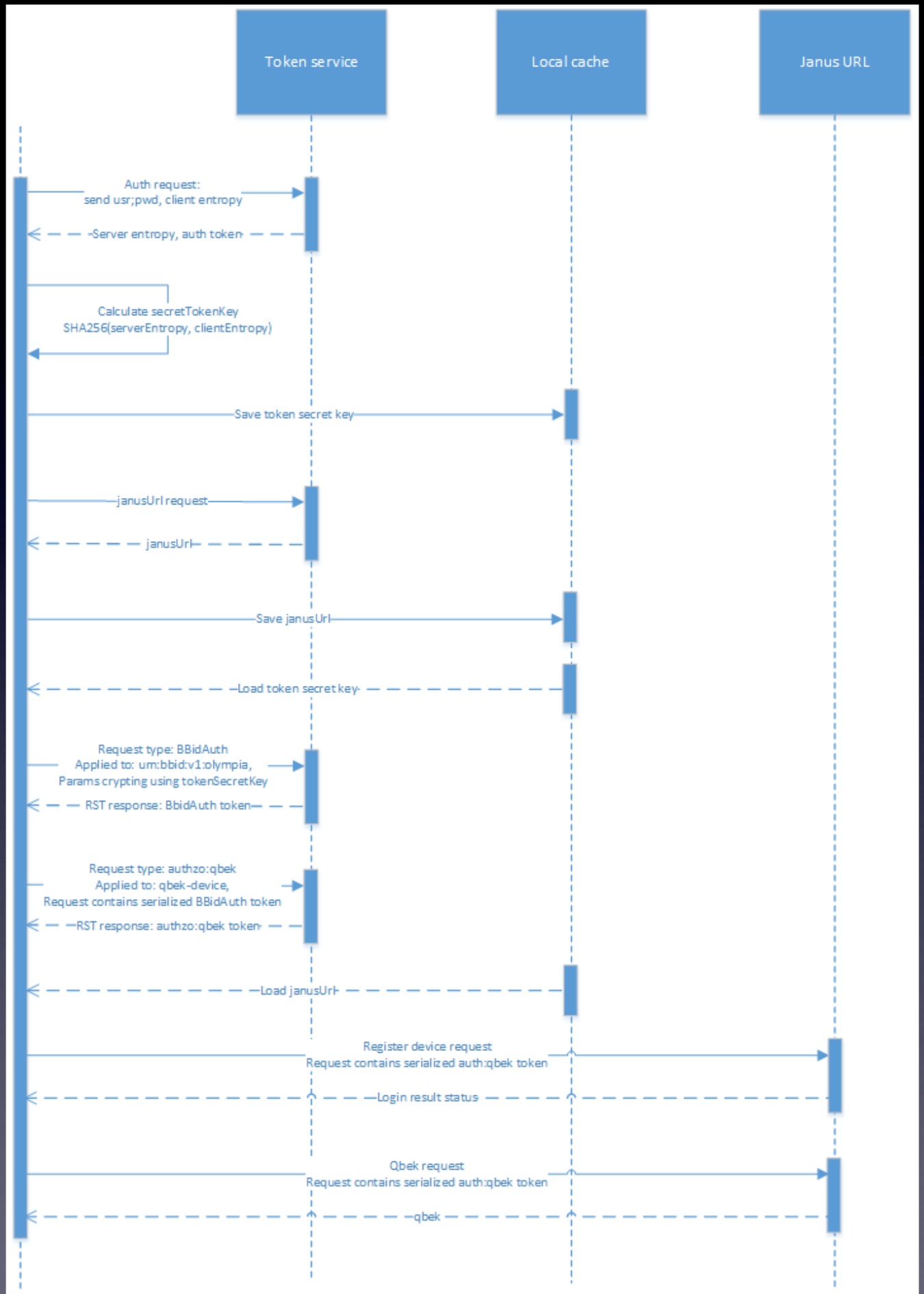
- mounting QNX6 partitions
- backup encryption: AES-256
- authentication/verification: HMAC-SHA1
- backup.cgi:backuparch
- backup.cgi:scramble
  - bbid (BlackBerry ID)
    (libbbid.so:bbid_profile_get_user_properties(urn:bbid:username)
  - qbek
    (libbbid.so:bbid_profile_get_user_properties(urn:bbid:backupandrestorekey)
  - cache storage: /accounts/<id>/sys/bbid/keyCache
  - if not found: request to BB Olympia Service
    (blackberryid.blackberry.com)

# BlackBerry Token Service

- request: bbid, password, pin, salt (client's entropy)
- response:

  Hct=1379081439336&st=1379168703336&**se=PF3V5ikbH8fx2wSb2mbHITGy0q1xIcGZZ66Oma3o66k**&et=1381673439336&fn=John&ln=Doe&nn=johndoe-59094&un=john.doe%40gmail.com&ec=AcDGzWbVM12nd0BigqIfJYw%3D&em=john.doe%40gmail.com&**at=AQ:AQ:zTh0_L5BwTuZf0w0L2CYVGmMyrzSbs7OszPBq72NIYY:ibKt2ZKGOsAjODk6lITmQA:asSsJMYRzS8Tf2IMQY44_HiCDaWzCBRwQj68XDDH0z6Qhp7gCXuKqSk6_v4KTQ8pWMtpVriBNBWO4t2lg879MY_Oro2upCzw32EmCgAKapUPGTleAIKeo3kr13v-Td2IpWU0b3kQJVJsTMz9GBjG29RFkcxw-039ksxUJYnDxkCrgbrAwVFpw5Pg5XmAZxtA**
- se - server entropy
- at - authentication token
- ec - user ID for BB cloud rervices (saved to /dev/rpmb/BBID_BDEK)
- at (creation time), st (server time), et (expity time)
- further reuests: RST (Request Secure Token) with token type and serice name
- to get qbek:
  - get authentication token
  - get BBIDAuthN_1 token for urn:bbid:v1:olympia)
  - send request for authzo:qbek token
  - register device ob BB server (using authzo:qbek token)
  - get request on backupAndRestoreKey info (two IDs)
  - get janusUrl by request to kronos.bbprotect.blackberry.com
  - get qbek from %janusUrl%/FlashGetFile


BB10 device
bbidd
userCache
keyCache
QbekRequest
Qbek
scramber
Authentication(deviceSerialNumber, usr, pwd)
tokenSecretKey
QbekRequest(AES(request, tokenSecretKey), bbid)
qbek
WritePreamble(tarType, iterCount, salt)
WriteBlocks(SHA(block, KDF(qbek, salt, iterCount))
Olympia
Resultant backup file


Token service
Local cache
Janus URL
Auth request:
send usr;pwd, client entropy
Server entropy, auth token
Calculate secretTokenKey
SHA256(serverEntropy, clientEntropy)
Save token secret key
janusUrl request
janusUrl
Save janusUrl
Load token secret key
Request type: BBidAuth
Applied to: urn:bbid:v1:olympia,
Params crypting using tokenSecretKey
RST response: BbidAuth token
Request type: authzo:qbek
Applied to: qbek-device,
Request contains serialized BBidAuth token
RST response: authzo:qbek token
Load janusUrl
Register device request
Request contains serialized auth:qbek token
Login result status
Qbek request
Request contains serialized auth:qbek token
qbek

Thank you!

# Modern smartphone forensics

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http://www.elcomsoft.com
http://blog.crackpassword.com