Introducing Passbook

Part 2: Framework and Web Service API

Session 309

Ken Ferry and Eliza Block
Passbook Group

These are confidential sessions—please refrain from streaming, blogging, or taking pictures

Ecosystem

Companion
App

Server

Conduit
App

Ecosystem

Companion
App

Server

Conduit
App

Ecosystem

Companion
App

Server

Conduit
App

Ecosystem

Companion
App

Server

Conduit
App

Ecosystem

Companion
App

Server

Conduit
App

Ecosystem

Companion
App

Server

Conduit
App

Companion Apps
Modifying passes

Show Installed Passes

Show Installed Passes

Get Installed Passes
PKPassLibrary

```objc
passLibrary = [[PKPassLibrary alloc] init];

passes = [passLibrary passes];

noteCenter = [NSNotificationCenter defaultCenter];
[noteCenter addObserver:self
               selector:@selector(passLibraryDidChange)
                   name:PKPassLibraryDidChangeNotification
                 object:passLibrary];
```

Get Installed Passes
PKPassLibrary

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Get Installed Passes
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```objc
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```

PKPassLibrary Is Not a Singleton
alloc/init to instantiate

```
[noteCenter addObserver:self
             selector:@selector(passLibraryDidChange)
                 name:PKPassLibraryDidChangeNotification
               object:passLibrary];
```

- Notifications are per-library
- Thread confined

Entitlements

An app must declare the passes it accesses

```
passes = [passLibrary passes];
```

```
<key>com.apple.developer.pass-type-identifiers</key>
<array>
  <string>pass.com.oceanic.BoardingPass</string>
</array>
```

Display a Pass in Table Form

Display a Pass in Table Form

Display a Pass in Table Form
Grabbing text off the pass

```
[pass localizedValueForFieldKey:@"monkeyProfession"]
```

```
{
    "key": "monkeyProfession"
    "label": "PROFESSION",
    "value": "Butler",
}
```

Display a Pass for Scanning
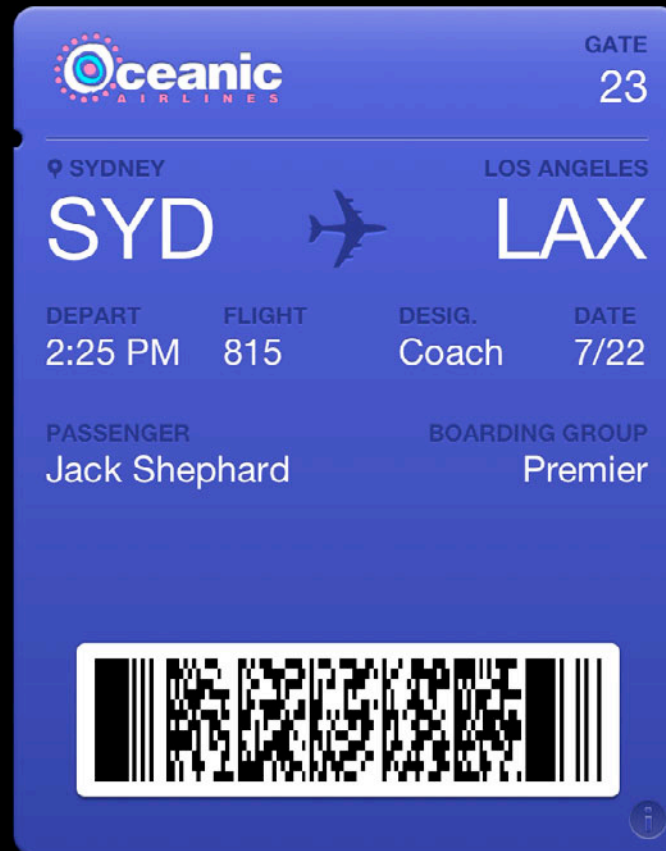
Display a Pass for Scanning
…in Passbook

```
[sharedApp openURL:[tappedPass passURL]]
```

Companion Apps Are for Editing

Don't write an app if you don't need one

- Avoid duplicating Passbook
- A pass should not require an app to be useful

Modifying a Pass

Modifying a Pass
PKPass isn't mutable

Your Server

Modifying a Pass
PKPass isn't mutable

request

Your Server

Modifying a Pass
PKPass isn't mutable

request →

← .pkpass data

Your Server

Modifying a Pass
Identifying a pass to your server

```objc
@property NSString *passTypeIdentifier;
@property NSString *serialNumber;
```

Modifying a Pass
Incorporating a change

```
replacementPass = [[PKPass alloc] initWithData:data error:&error];
...
[passLibrary replacePassWithPass:replacementPass];
```

Demo
Using PassKit

Eliza Block

Ecosystem

Companion
App

Server

Conduit
App

Ecosystem

Server

Companion
App

Conduit
App

Dealing with Incoming Pass Data
PKPass

Dealing with Incoming Pass Data
Recognizing the data

UTI	com.apple.pkpass
MIME Type	application/vnd.apple.pkpass
Extension	.pkpass

Dealing with Incoming Pass Data
Instantiating PKPass

```
[[PKPass alloc] initWithData:data error:&error]
```

Dealing with Incoming Pass Data
Displaying the pass
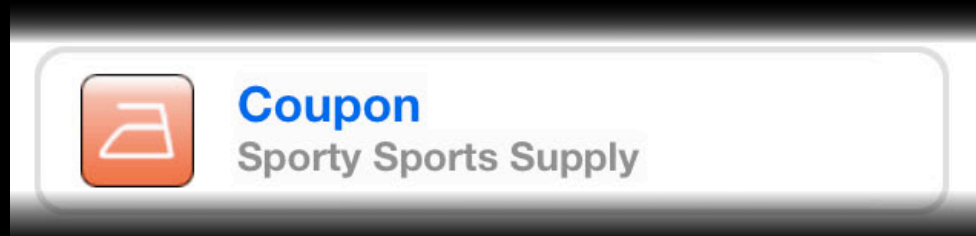
Dealing with Incoming Pass Data
Displaying the pass

Add a Pass to Passbook

PKAddPassesViewController

```objc
addPassesVC = [[PKAddPassesViewController alloc]
                initWithPass:downloadedPass];

[self presentViewController:addPassesVC
           animated:YES
         completion:^{}];
```

Check for Pass Already Present

```
[passLibrary containsPass:aPass]
```

Check for Capability
Passbook is not available on iPad

```
[PKPassLibrary isPassLibraryAvailable]
```

PassKit

PassKit

PKAddPasses
ViewController

PKPass
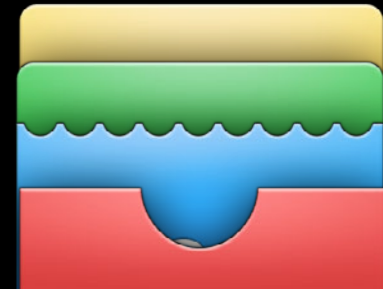
PKPassLibrary

Ecosystem

Companion
App

Server

Conduit
App

Ecosystem

Companion
App

Server

Conduit
App

Passbook from the Server Side

Eliza Block

Web Services

How to opt in

```
pass.json:
{
    ...
    "webServiceURL" : "https://www.foo.com/passes/",
    ...
    "authenticationToken" : "PZ8GL23T24JEB41X6U",
    ...
}
```

Web Services

Overview

Web Services

Overview

Web Services
Overview

Web Services

Overview

Web Services

Overview

Apple Push Notification Service

Register
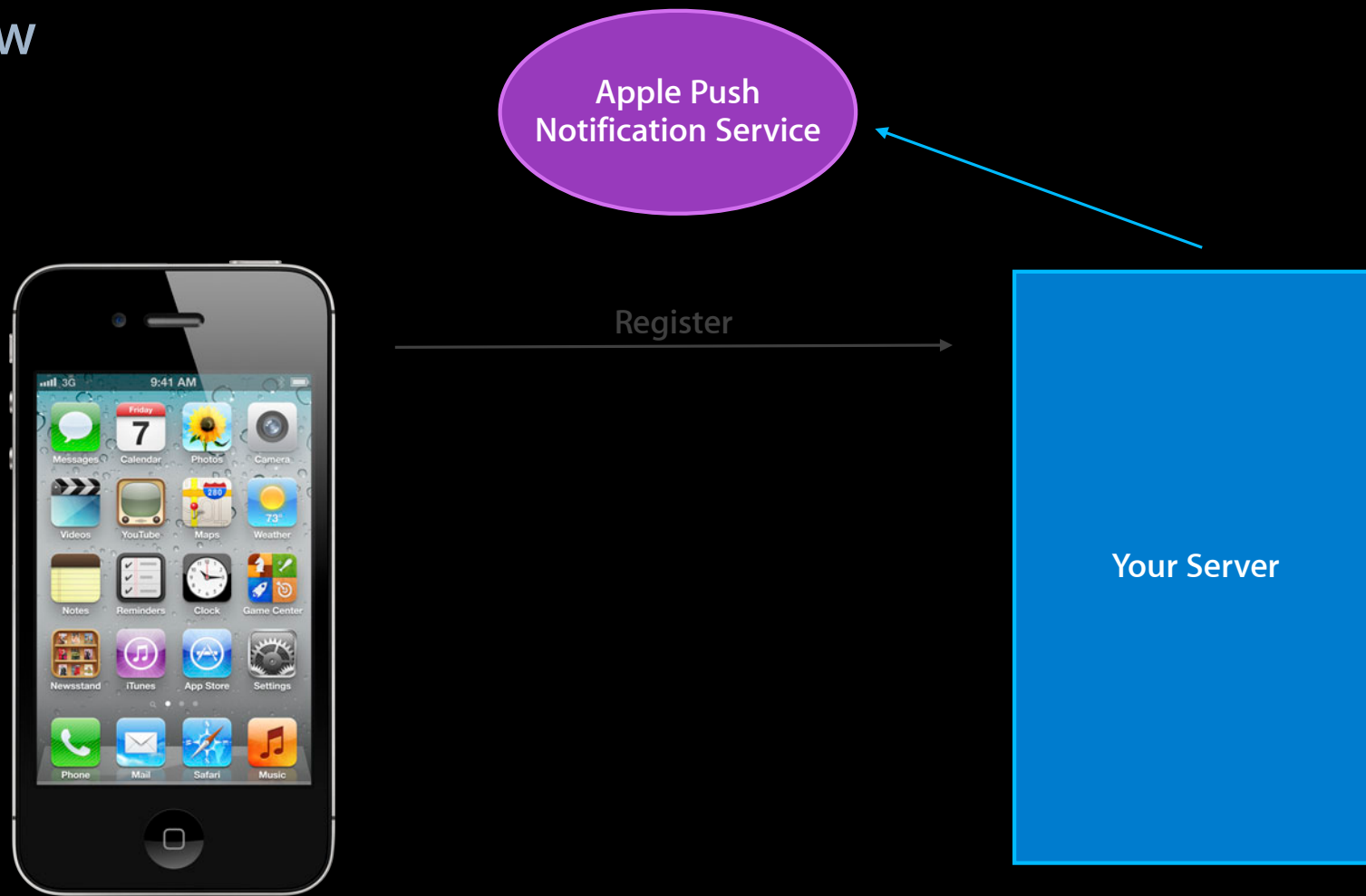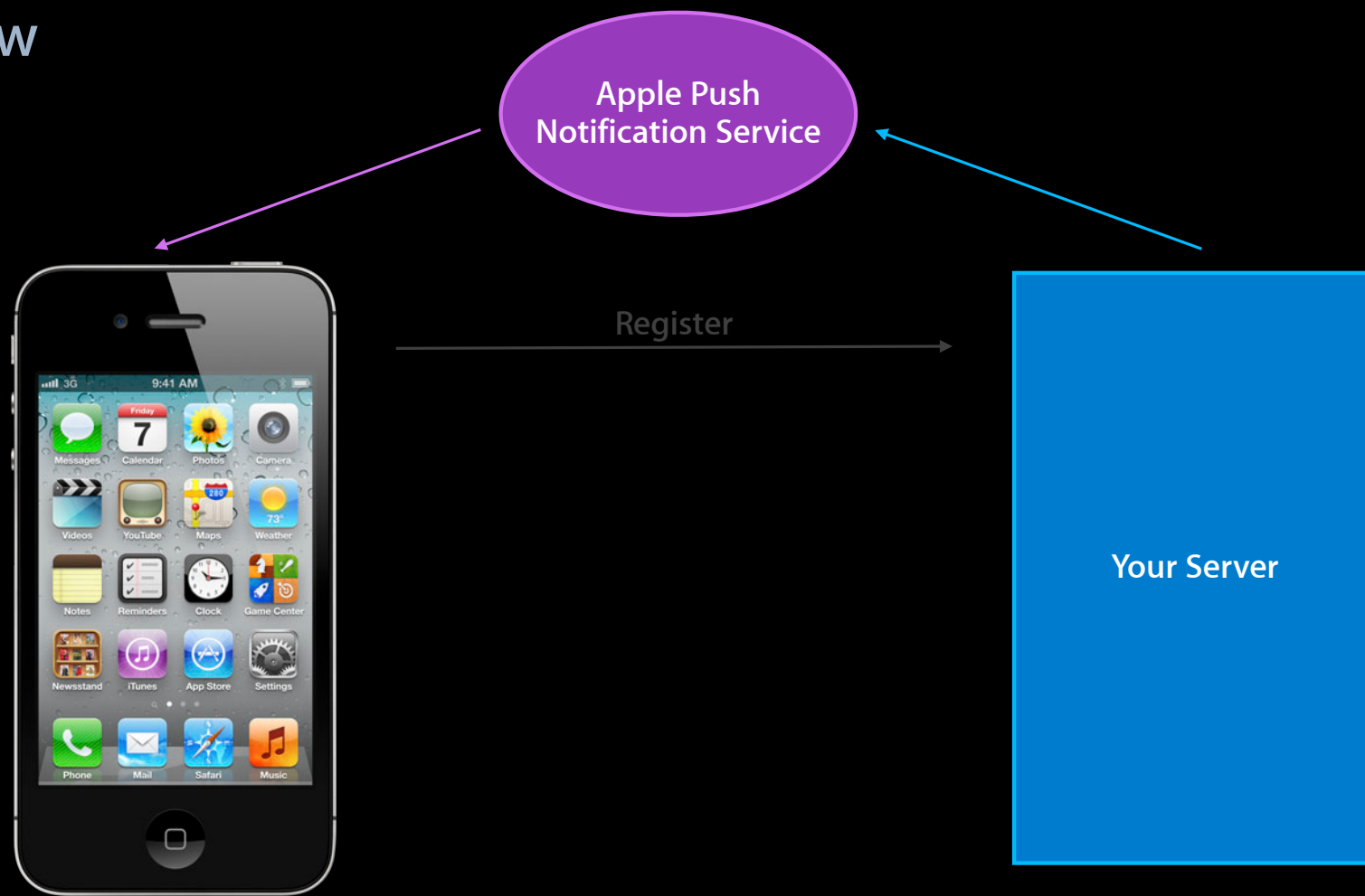
What serial numbers changed?

Your Server
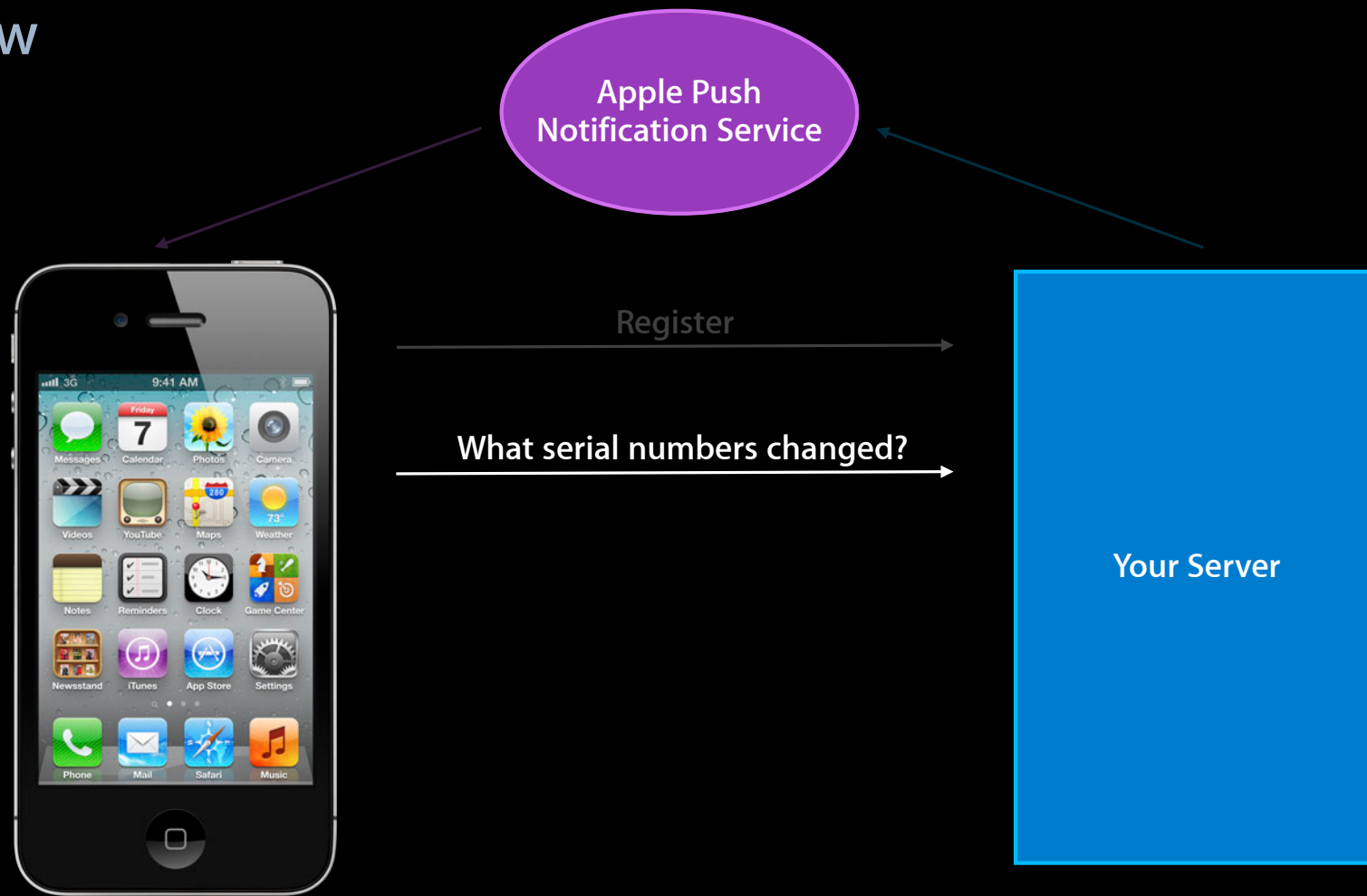
Web Services
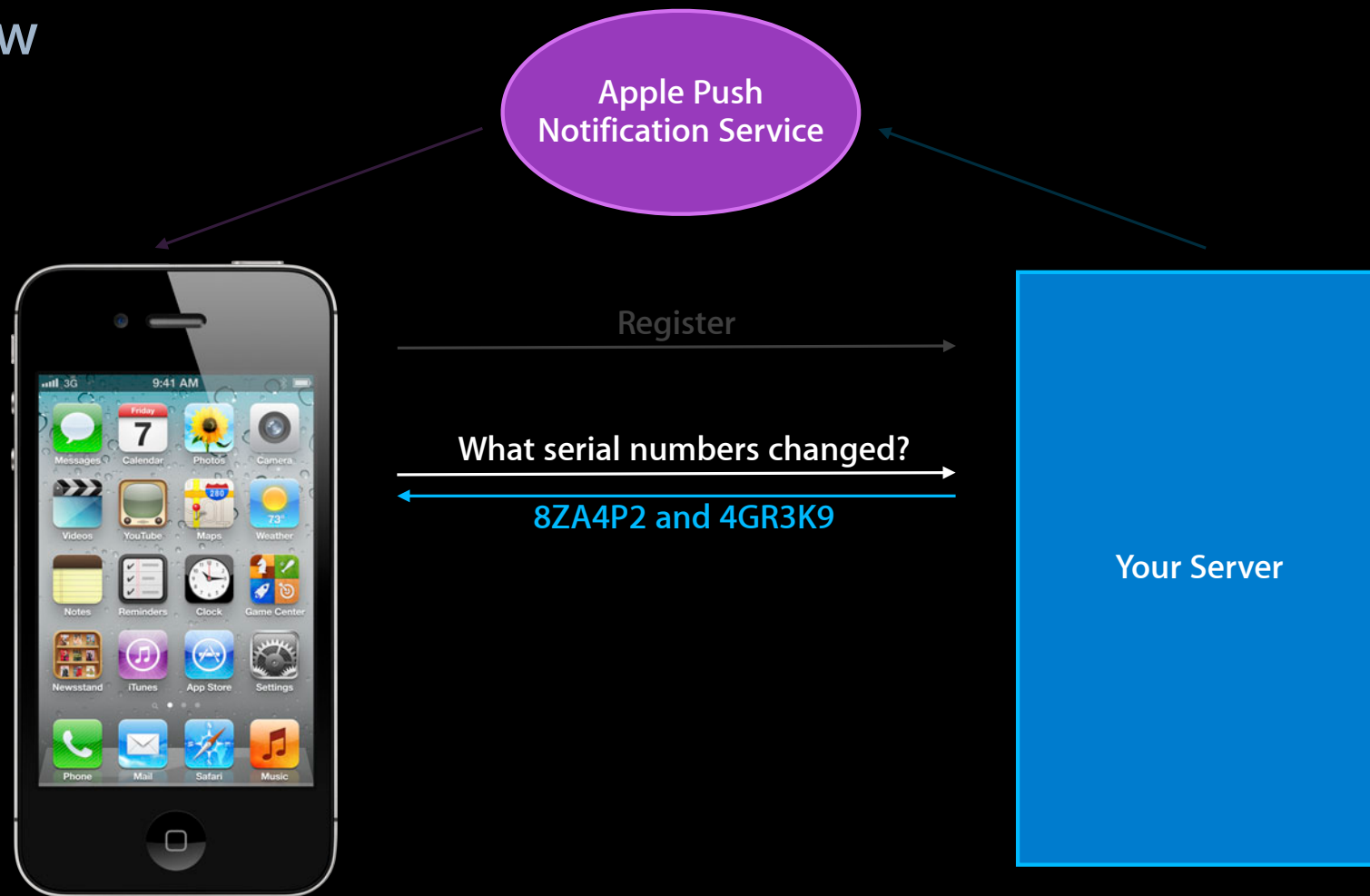
Overview

Web Services
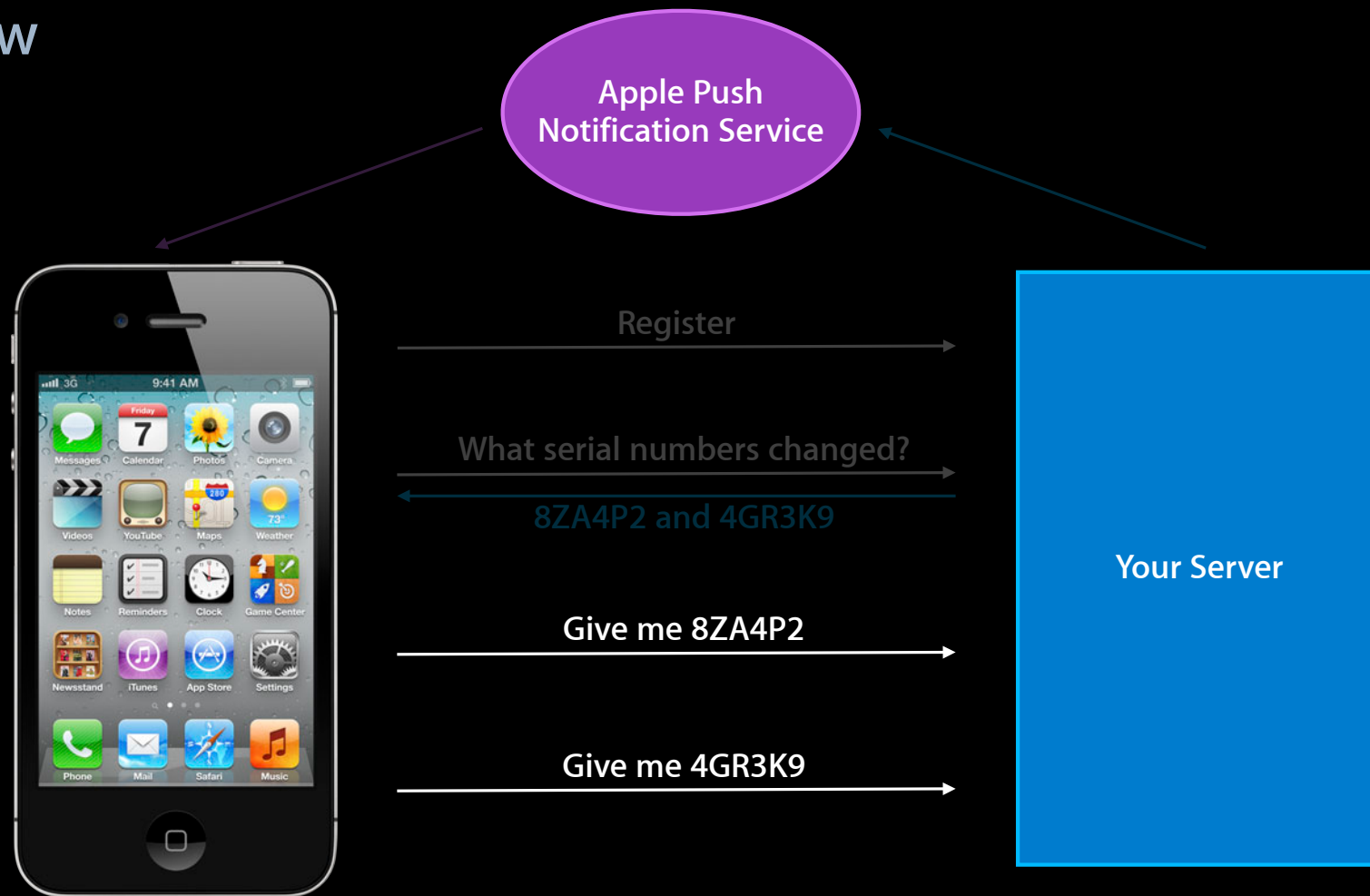
Overview

Web Services

Overview
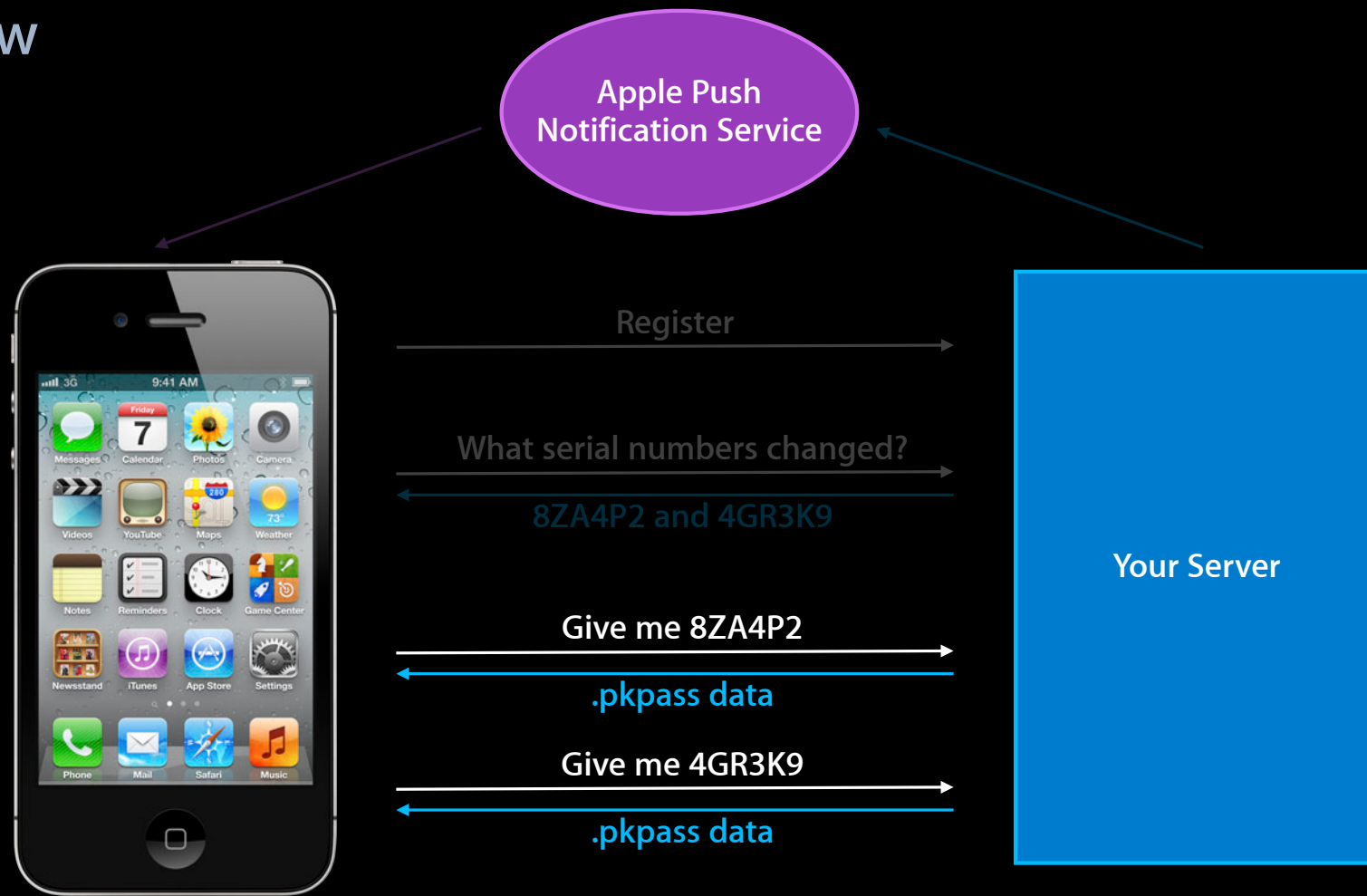
Web Services

Communication elements

Web Services

Communication elements

- From pass.json

PassTypeID   SerialNo.   AuthToken

Web Services

Communication elements

- From pass.json

  | PassTypeID | SerialNo. | AuthToken |

- From device

  | DeviceID | PushToken |

Web Services
Communication elements

- From pass.json

  PassTypeID   SerialNo.   AuthToken

- From device

  DeviceID   PushToken

- From your server

  UpdateTag

Web Services

Registration

Your Server

Web Services

Registration

Register

PassTypeID SerialNo. AuthToken

DeviceID PushToken

Your Server

Web Services

Registration

Your Server

| DeviceID | PushToken | PassTypeID | SerialNo. | AuthToken |

Web Services

Registration

Your Server

DeviceID PushToken PassTypeID SerialNo. AuthToken

Web Services

Registration

Your Server

AuthToken

DeviceID   PushToken   PassTypeID   SerialNo.
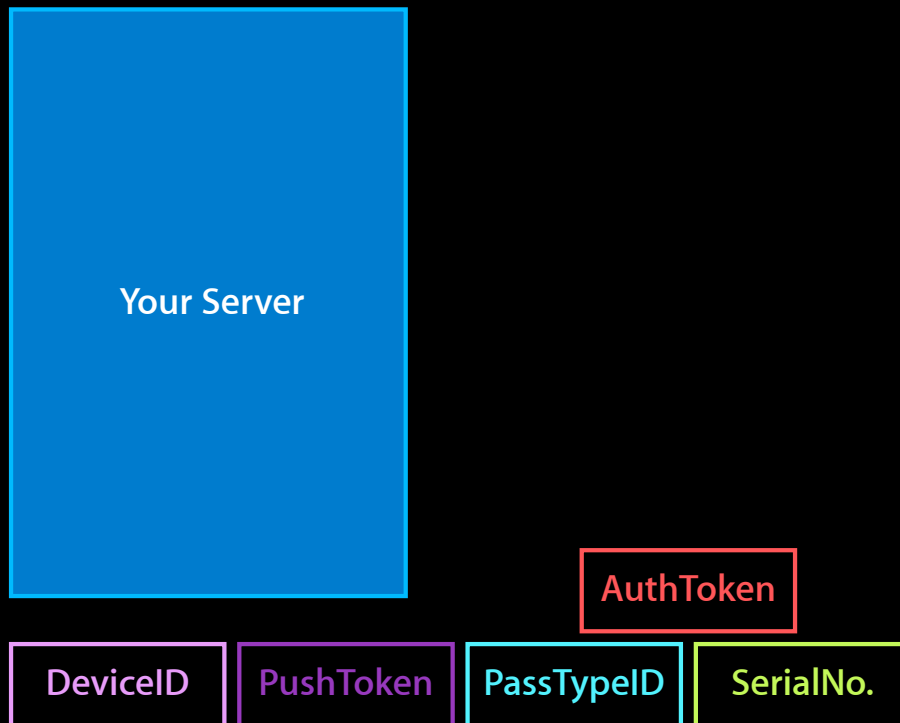
Web Services

Registration

Your Server

| DeviceID | PushToken | PassTypeID | SerialNo. |

Web Services

Storage on your server

Your Server

| DeviceID | PushToken | PassTypeID | SerialNo. |

Web Services

Storage on your server

Devices

Your Server		

DeviceID	PushToken	PassTypeID	SerialNo.

Web Services
Storage on your server

Devices

Your Server		
	Device A	PushToken A
	Device B	PushToken B

DeviceID	PushToken	PassTypeID	SerialNo.

Web Services

Storage on your server

Devices

Your Server	Device A	PushToken A
	Device B	PushToken B
	DeviceID	PushToken

PassTypeID **SerialNo.**

Web Services

Storage on your server

Devices

Your Server	Device A	PushToken A
	Device B	PushToken B
	DeviceID	PushToken

PassTypeID **SerialNo.**

Web Services

Storage on your server

Devices

Device A	PushToken A
Device B	PushToken B
DeviceID	PushToken

Registrations

Device A	pass.oceanic	JA38
Device A	pass.oceanic	EK91
Device B	pass.oceanic	XD28

PassTypeID	SerialNo.

Web Services

Storage on your server

Devices

Device A	PushToken A
Device B	PushToken B
DeviceID	PushToken

Registrations

Device A	pass.oceanic	JA38
Device A	pass.oceanic	EK91
Device B	pass.oceanic	XD28

PassTypeID · SerialNo.

Web Services

Storage on your server

Devices

Device A	PushToken A
Device B	PushToken B
DeviceID	PushToken

Registrations

Device A	pass.oceanic	JA38
Device A	pass.oceanic	EK91
Device B	pass.oceanic	XD28
DeviceID		

PassTypeID	SerialNo.

Web Services

Storage on your server

Devices

Device A	PushToken A
Device B	PushToken B
DeviceID	PushToken

Registrations

Device A	pass.oceanic	JA38
Device A	pass.oceanic	EK91
Device B	pass.oceanic	XD28
DeviceID	PassTypeID	SerialNo.

Web Services

Registration endpoint

Web Services
Registration endpoint

- POST

    /v1/devices/<deviceID>/registrations/<passTypeID>/<serialNo.>

Web Services
Registration endpoint

- POST

  `/v1/devices/<deviceID>/registrations/<passTypeID>/<serialNo.>`

- In the HTTP header

  `Authorization: ApplePass <authToken>`

Web Services
Registration endpoint

- POST

  `/v1/devices/<deviceID>/registrations/<passTypeID>/<serialNo.>`

- In the HTTP header

  `Authorization: ApplePass <authToken>`

- JSON payload

  `{ "pushToken" : <pushToken> }`

Web Services

Unregistration endpoint

Web Services
Unregistration endpoint

- DELETE

  `/v1/devices/<deviceID>/registrations/<passTypeID>/<serialNo.>`

Web Services
Unregistration endpoint

- DELETE

  `/v1/devices/<deviceID>/registrations/<passTypeID>/<serialNo.>`

- In the HTTP header

  `Authorization: ApplePass <authToken>`

Web Services

Storage on your server

Devices

Device A	PushToken A
Device B	PushToken B
Device C	PushToken C

Registrations

Device A	pass.oceanic	JA38
Device A	pass.oceanic	EK91
Device A	pass.oceanic	CL55
Device B	pass.oceanic	XD28
Device C	pass.oceanic	JA38

Web Services

Storage on your server

Boarding Passes

JA38								
EK91								
XD28								
CL55								

Web Services

Storage on your server

Boarding Passes

JA38	Hugo Reyes	9/18, 7pm	OA177	SYD	PER	19C	...	
EK91								
XD28								
CL55								

Web Services

Storage on your server

Boarding Passes

JA38	Hugo Reyes	9/18, 7pm	OA177	SYD	PER	19C	...	
EK91	Hugo Reyes	9/21, 9am	OA26	PER	SYD	6F	...	
XD28	Jack Shephard	9/22, 3pm	OA815	SYD	LAX	22D	...	
CL55	Hugo Reyes	9/22, 3pm	OA815	SYD	LAX	20G	...	

Web Services

Storage on your server

Boarding Passes

JA38	Hugo Reyes	9/18, 7pm	OA177	SYD	PER	19C	...	9/12, 10am
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XD28	Jack Shephard	9/22, 3pm	OA815	SYD	LAX	22D	...	8/22, 6pm
CL55	Hugo Reyes	9/22, 3pm	OA815	SYD	LAX	20G	...	9/1, 8pm

Web Services

Handling a change

Boarding Passes

JA38	Hugo Reyes	9/18, 7pm	OA177	SYD	PER	19C	...	9/12, 10am
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Web Services

Handling a change

Boarding Passes

JA38	Hugo Reyes	9/18, 7pm	OA177	SYD	PER	19C	...	9/12, 10am
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Web Services

Handling a change

Boarding Passes

JA38	Hugo Reyes	9/18, 7pm	OA177	SYD	PER	3A	...	9/12, 10am
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Web Services
Handling a change

Boarding Passes

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Web Services

Handling a change

Boarding Passes

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Web Services
Handling a change

Registrations

Device A	pass.oceanic	JA38
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Device A	pass.oceanic	CL55
Device B	pass.oceanic	XD28
Device C	pass.oceanic	JA38

Boarding Passes

JA38	Hugo Reyes	9/18, 7pm	OA177	
EK91	Hugo Reyes	9/21, 9am	OA26	
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CL55	Hugo Reyes	9/22, 3pm	OA815	

Web Services

Handling a change

Registrations

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Boarding Passes

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Web Services

Handling a change

Registrations

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Boarding Passes

JA38	Hugo Reyes	9/18, 7pm	OA177	
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Web Services

Handling a change

Devices

Device A	PushToken A
Device B	PushToken B
Device C	PushToken C

Registrations

Device A	pass.oceanic	JA38
Device A	pass.oceanic	EK91
Device A	pass.oceanic	CL55
Device B	pass.oceanic	XD28
Device C	pass.oceanic	JA38

Boarding Passes

JA38	Hu
EK91	Hu
XD28	Jack
CL55	Hu

Web Services

Handling a change

Devices

Device A	PushToken A
Device B	PushToken B
Device C	PushToken C

Registrations

Device A	pass.oceanic	JA38
Device A	pass.oceanic	EK91
Device A	pass.oceanic	CL55
Device B	pass.oceanic	XD28
Device C	pass.oceanic	JA38

Boarding Passes

JA38	Hu
EK91	Hu
XD28	Jack
CL55	Hu

Web Services

Sending a push notification

Devices

Device A	PushToken A
Device B	PushToken B
Device C	PushToken C

Registrations

Device A	pass.oceanic	JA38
Device A	pass.oceanic	EK91
Device A	pass.oceanic	CL55
Device B	pass.oceanic	XD28
Device C	pass.oceanic	JA38

Boarding Passes

JA38	Hu
EK91	Hu
XD28	Jack
CL55	Hu

Web Services

Sending a push notification
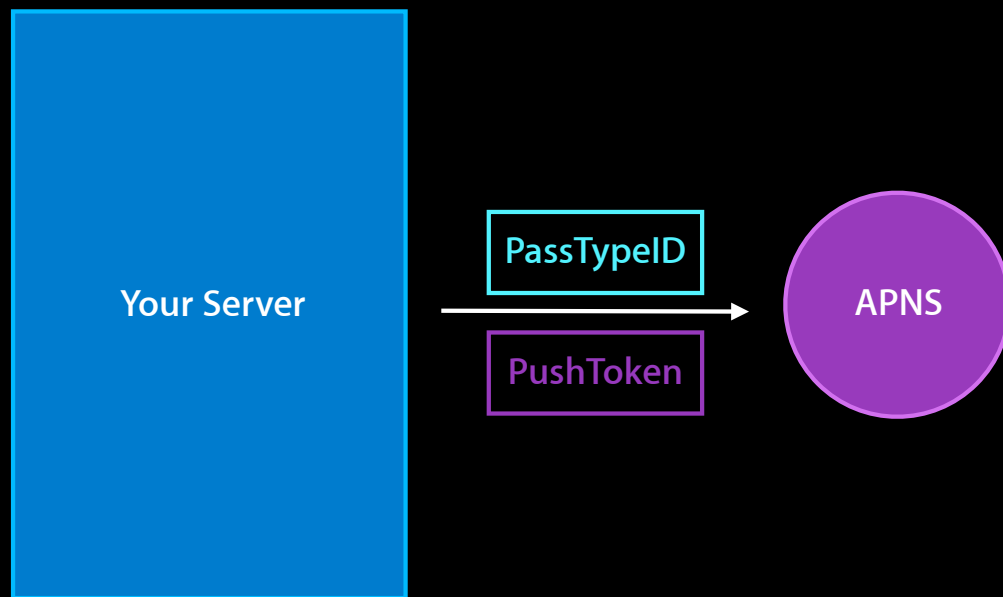
Your Server

Web Services
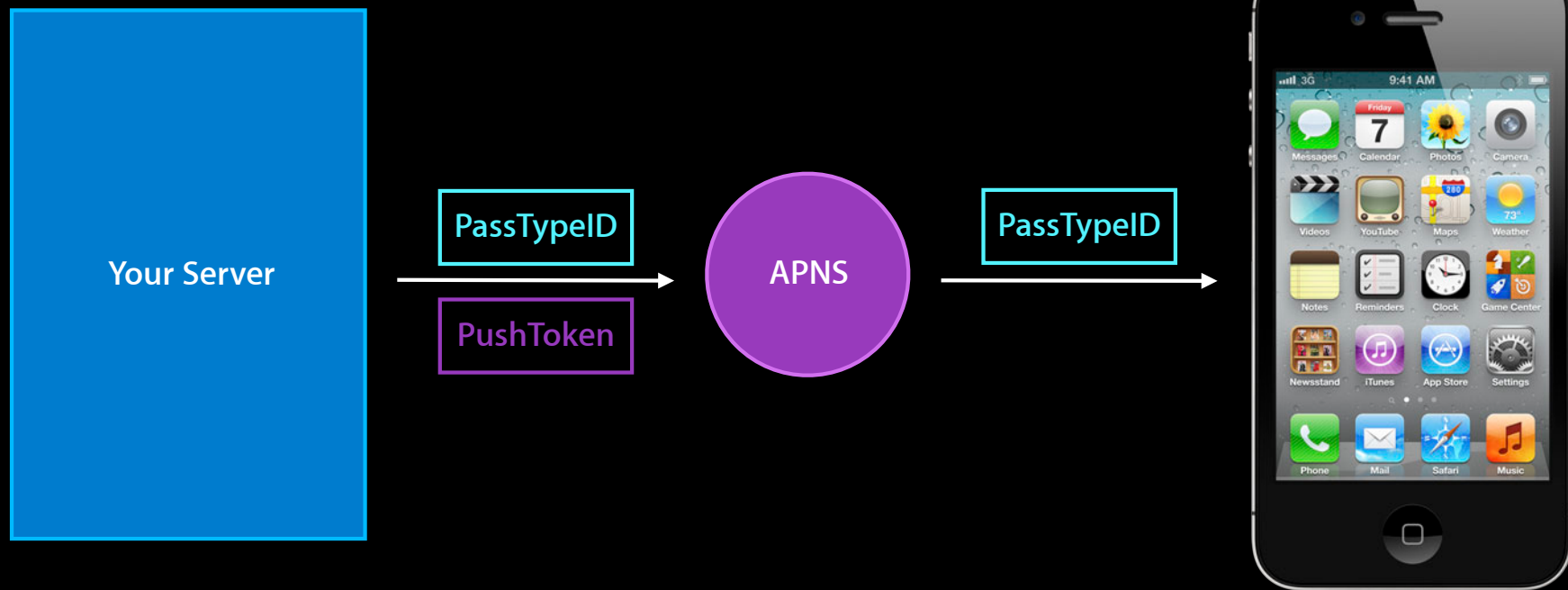
Sending a push notification

Your Server

Web Services
Sending a push notification

Web Services

Sending a push notification

Web Services

"What changed?"

PassTypeID

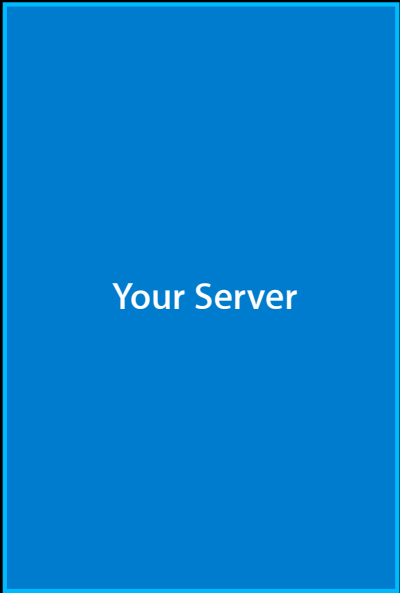# Web Services

"What changed?"

PassTypeID

Web Services
"What changed?"

What serial numbers changed?
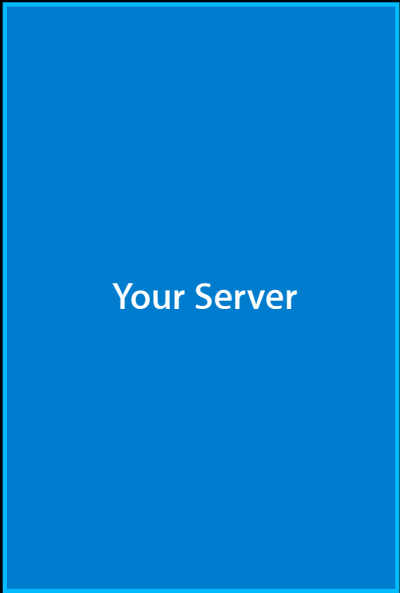
PassTypeID

Your Server

Web Services
"What changed?"

What serial numbers changed?

DeviceID

PassTypeID

Your Server

Web Services
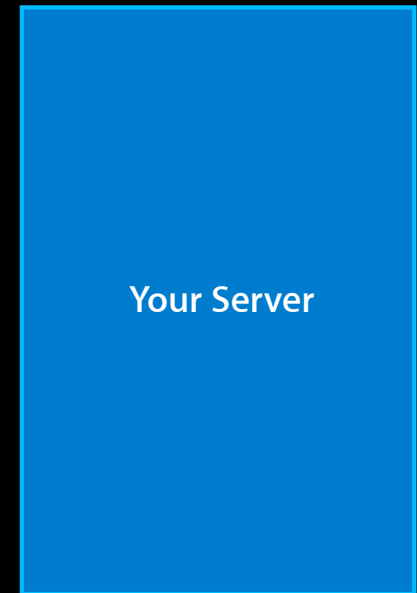## "What changed?"

What serial numbers changed?
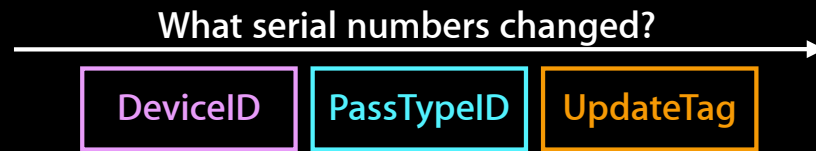
DeviceID PassTypeID

Your Server

Web Services
"What changed?"

What serial numbers changed?

DeviceID PassTypeID UpdateTag

UpdateTag SerialNo.

Your Server

Web Services
"What changed?"

What serial numbers changed?

DeviceID	PassTypeID	UpdateTag
Device A	pass.oceanic	9/12, 10am

UpdateTag   SerialNo.

Your Server

Web Services

Figuring out what changed

Registrations

Device A	pass.oceanic	JA38
Device A	pass.oceanic	EK91
Device A	pass.oceanic	CL55
Device B	pass.oceanic	XD28
Device C	pass.oceanic	JA38

Device A   pass.oceanic   9/12, 10am

Web Services
Figuring out what changed

Registrations

Device A	pass.oceanic	JA38
Device A	pass.oceanic	EK91
Device A	pass.oceanic	CL55
Device B	pass.oceanic	XD28
Device C	pass.oceanic	JA38

Device A	pass.oceanic	9/12, 10am

Web Services
Figuring out what changed

Registrations

Device A	pass.oceanic	JA38
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Device A	pass.oceanic	CL55
Device B	pass.oceanic	XD28
Device C	pass.oceanic	JA38

Device A   pass.oceanic   9/12, 10am

Web Services
Figuring out what changed

Boarding Passes

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Device A   pass.oceanic   9/12, 10am

Web Services
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Device A   pass.oceanic   9/12, 10am

Web Services

Figuring out what changed

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Device A   pass.oceanic   9/12, 10am

Web Services
Figuring out what changed

Boarding Passes

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Device A   pass.oceanic   9/12, 10am

Web Services

Figuring out what changed

Boarding Passes

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XD28	Jack Shephard	9/22, 3pm	OA815	SYD	LAX	22D	...	8/22, 6pm
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Device A   pass.oceanic   9/12, 10am   JA38

Web Services

Figuring out what changed

Boarding Passes

JA38	Hugo Reyes	9/18, 7pm	OA177	SYD	PER	3A	...	9/18, 5pm
EK91	Hugo Reyes	9/21, 9am	OA26	PER	SYD	6F	...	9/12, 10am
XD28	Jack Shephard	9/22, 3pm	OA815	SYD	LAX	22D	...	8/22, 6pm
CL55	Hugo Reyes	9/22, 3pm	OA815	SYD	LAX	20G	...	9/1, 8pm

Device A   pass.oceanic   9/12, 10am   JA38   9/18, 5pm

Web Services

"What changed?" endpoint

Web Services

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- GET

   `/v1/devices/<deviceID>/registrations/<passTypeID>`

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- Server responds with JSON payload

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{
    "serialNumbers" : [ <serialNo.>, <serialNo.>, ... ],
    "lastUpdated"   : <tag>
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"passesUpdatedSince" vs. "if-modified-since"

- "if-modified-since" applies to a single resource
  - Returns either the whole resource or 304 (not modified)

- "passesUpdatedSince" applies to a collection
  - Picks out the individual elements that have changed

Web Services

Getting up-to-date pass

Your Server
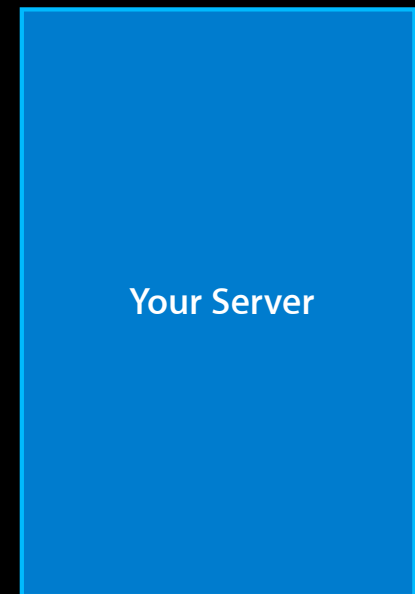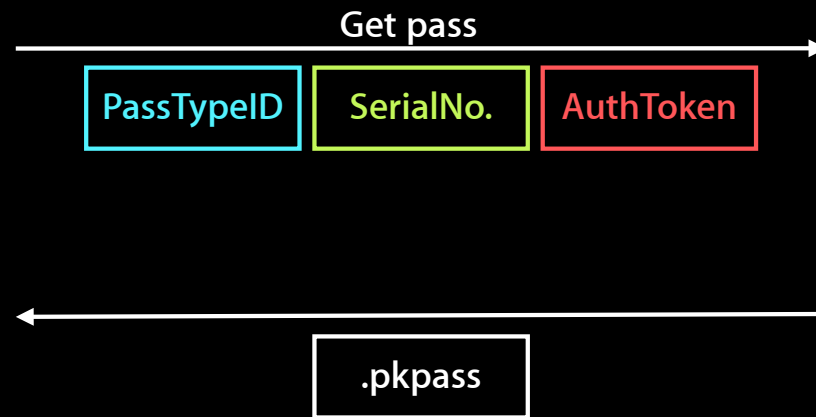
Web Services

Getting up-to-date pass

Web Services

Getting up-to-date pass

Get pass

PassTypeID SerialNo. AuthToken

Your Server

.pkpass

Web Services

Get pass endpoint

Web Services
Get pass endpoint

- GET

```
/v1/passes/<passTypeID>/<serialNo.>
```

Web Services
Get pass endpoint

- GET

  `/v1/passes/<passTypeID>/<serialNo.>`

- In the HTTP header

  `Authorization: AplePass <authToken>`

Web Services
Get pass endpoint

- GET

```
/v1/passes/<passTypeID>/<serialNo.>
```

- In the HTTP header

```
Authorization: ApplePass <authToken>
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- Server responds with signed, zipped .pkpass data

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Get pass endpoint

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- In the HTTP header

    ```
    Authorization: ApplePass <authToken>
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- Server responds with signed, zipped .pkpass data or 304

Web Services
Get pass endpoint

- GET

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  /v1/passes/<passTypeID>/<serialNo.>
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- In the HTTP header

  ```
  Authorization: ApplePass <authToken>
  If-modified-since: <timestamp>
  ```

- Server responds with signed, zipped .pkpass data <u>or</u> 304

- In the response header

  ```
  Last-modified: <timestamp>
  ```

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Pass signing algorithm

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- Zip the <u>contents</u> of the pass directory

Demo
Running the sample web service implementation

Ken Ferry

Web Services

Rules of the road

Web Services
Rules of the road

- Don't send unnecessary push notifications

Web Services
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  - Only send pushes when something has changed

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Rules of the road

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  - Respect unregistration requests: Only send pushes for registered passes

- Verify authentication tokens

- Implement `passesUpdatedSince`/`lastUpdated` for the "what changed?" endpoint

- Implement `if-modified-since`/`last-modified` for the "get pass" endpoint

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Enforcement and feedback

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    POST /v1/log
    ```
    - Payload: Human-readable description of the problem
  - We may rate-limit your updates or tell APNS to stop delivering your pushes altogether
  - Angry phone call

Summing Up

- PassKit
  - PKPass
  - PKPassLibrary
  - PKAddPassesViewController

- Web Services API

```
/v1/devices/<deviceID>/registrations/<passTypeID>/<serialNo.>
/v1/devices/<deviceID>/registrations/<passTypeID>?passesUpdatedSince=<tag>
/v1/passes/<passTypeID>/<serialNo.>
/v1/log
```

More Information

Paul Marcos
Application Services Evangelist
pmarcos@apple.com

Documentation
Pass Kit Programming Guide
http://developer.apple.com

Apple Developer Forums
http://devforums.apple.com

Related Sessions

| Introducing Passbook, Part 1 | Presidio
Wednesday 11:30AM |

Labs

| Passbook Lab | App Services Lab B
Friday 9:00AM |