

#WWDC18

Best Practices and What's New with In-App Purchases

Session 704

Dana DuBois, App Store Engineering Manager
Ross LeBeau, App Store Engineer

Introductory Pricing

Trials

Asking for Ratings and Reviews

Sandbox Testing

Best Practices for Processing Transactions

Techniques for Managing Receipts

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Introductory Pricing

Ross LeBeau, App Store Engineer

Introductory Pricing

One-time discount for new subscribers

One per subscription

Automatically applied by App Store

Eligibility based on subscription group

Introductory Pricing API

Reflects data from App Store Connect

Used to format and display UI

Used to determine eligibility

9:41



Subscription Offer

Done



Pro Subscription
for Forest Explorer
Detailed satellite imagery

1 year for \$19.99, then \$39.99/year
after trial.

INSTALL & SUBSCRIBE

In-App Purchases

```
// Introductory Pricing API
```

```
SKProduct
```

```
introductoryPrice:
```

```
  SKProductDiscount?
```

```
// Introductory Pricing API
```

```
SKProductDiscount
```

```
price: NSDecimalNumber
```

```
priceLocale: Locale
```

```
subscriptionPeriod:
```

```
    SKProductSubscriptionPeriod
```

```
numberOfPeriods: Int
```

```
SKProductSubscriptionPeriod
```

```
unit: SKProduct.PeriodUnit
```

```
    .day, .week, .month, .year
```

```
numberOfUnits: Int
```

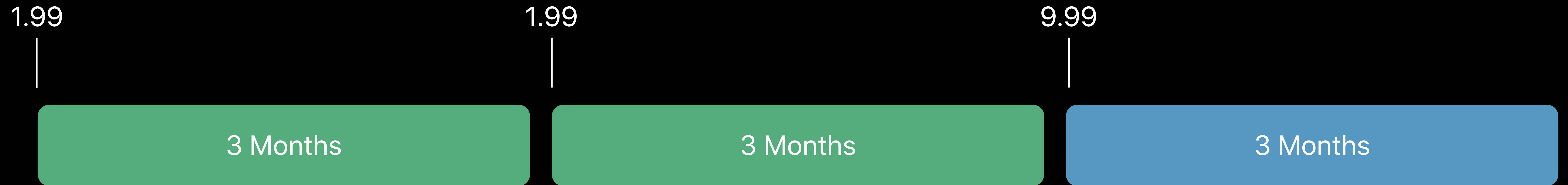
```
// Introductory Pricing API
```

```
SKProductDiscount
```

```
paymentMode: SKProductDiscount.PaymentMode
```

```
.payAsYouGo
```

Pay As You Go Example



```
SKProductDiscount  
price = 1.99  
subscriptionPeriod  
numberOfPeriods = 2  
paymentMode = .payAsYouGo
```

```
SKProductSubscriptionPeriod  
unit = .month  
numberOfUnits = 3
```



```
// Introductory Pricing API
```

```
SKProductDiscount
```

```
paymentMode: SKProductDiscount.PaymentMode
```

```
    .payAsYouGo
```

```
    .payUpFront
```

Pay Up Front Example



```
SKProductDiscount  
price = 3.99  
subscriptionPeriod  
numberOfPeriods = 1  
paymentMode = .payUpFront
```

```
SKProductSubscriptionPeriod  
unit = .month  
numberOfUnits = 6
```

```
// Introductory Pricing API
```

```
SKProductDiscount
```

```
paymentMode: SKProductDiscount.PaymentMode
```

```
    .payAsYouGo
```

```
    .payUpFront
```

```
    .freeTrial
```

Introductory Pricing

New in iOS 11.2 and macOS 10.13.2:

```
SKProduct.subscriptionPeriod: SKProductSubscriptionPeriod
```

New in iOS 12 and macOS 10.14:

```
SKProduct.subscriptionGroupIdentifier: String
```

Introductory Pricing eligibility is based on subscription group

One introductory price per user for each group

More Information

Engineering Subscriptions

Hall 1

Tuesday 3:00PM

Trials

Dana DuBois, App Store Engineering Manager

Free Trials for Non-Subscription Apps

Try before you buy



NEW

Non-subscription apps can now offer a free trial

Free app with non-consumable in-app purchase to unlock

Trial Period: Use non-consumable in-app purchase at price tier 0

- Naming convention: **14-day Trial**

Clearly inform customers

- Duration of trial
- Cost to unlock full functionality
- Features or content lost when trial ends

Asking for Ratings and Reviews

Asking for Ratings and Reviews

SKStoreReviewController

Introduced in iOS 10.3

Quick way to request a rating/review

Restrictions in place

- Limited requests per device
- Can be disabled by user in Settings

Asking for Ratings and Reviews

SKStoreReviewController

Strategies for when to request review

- Don't interrupt
- Wait for a positive experience
- Track previous requests

```
// Asking for Ratings and Reviews with SKStoreReviewController
```

```
if shouldPromptUser() {  
    SKStoreReviewController.requestReview()  
}
```

```
func shouldPromptUser() -> Bool {  
    // Local business rules  
}
```

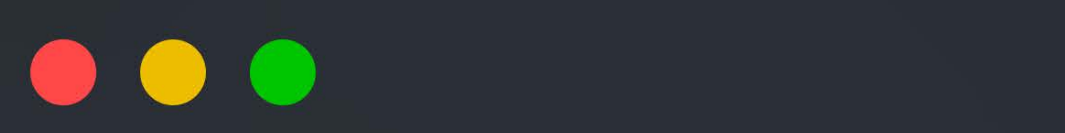
“StoreKit has made it so easy for our customers to provide ratings that we are getting over 10x the amount we used to. It gives us confidence that we are delivering the right things to our customers.”

- Zappos

“The Ratings and Reviews API has had enormous positive implications, not only for my App Store visibility, but also for the player insights it affords me as a consequence of a much larger (and arguably more relevant and engaged) sample size.”

- Frosty Pop

NEW



Search

Discover

Create

Work

Play

Develop

Categories

Updates 2

BEHIND THE SCENES Put a Spin on It

How the developer of *djay Pro 2* masterfully blends music and tech. [Read More](#)



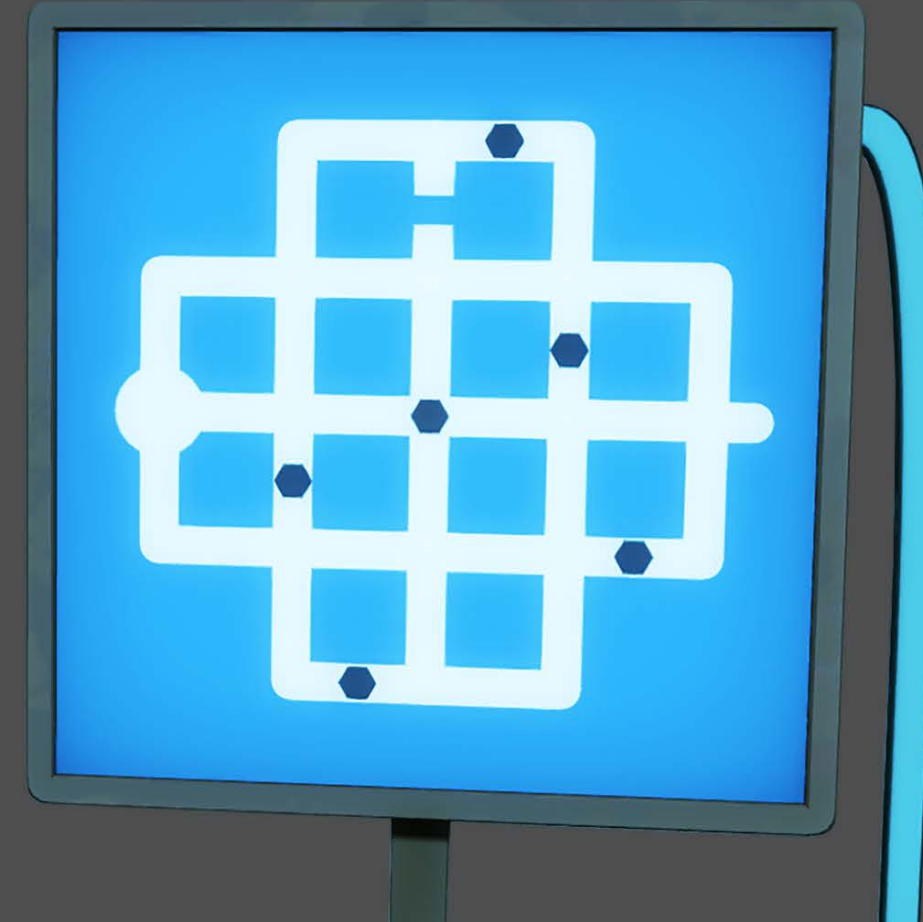
LIFE HACK Master the Menu Bar

How to keep your favorite apps top of screen at all times. [Read More](#)




EDITORS' CHOICE 4 Reasons You'll Love The Witness


This gorgeous puzzler sets a new bar for the genre. [Read More](#)





Top Paid

[See All](#)

 **Monica Velasquez**
\$29.97 Credit

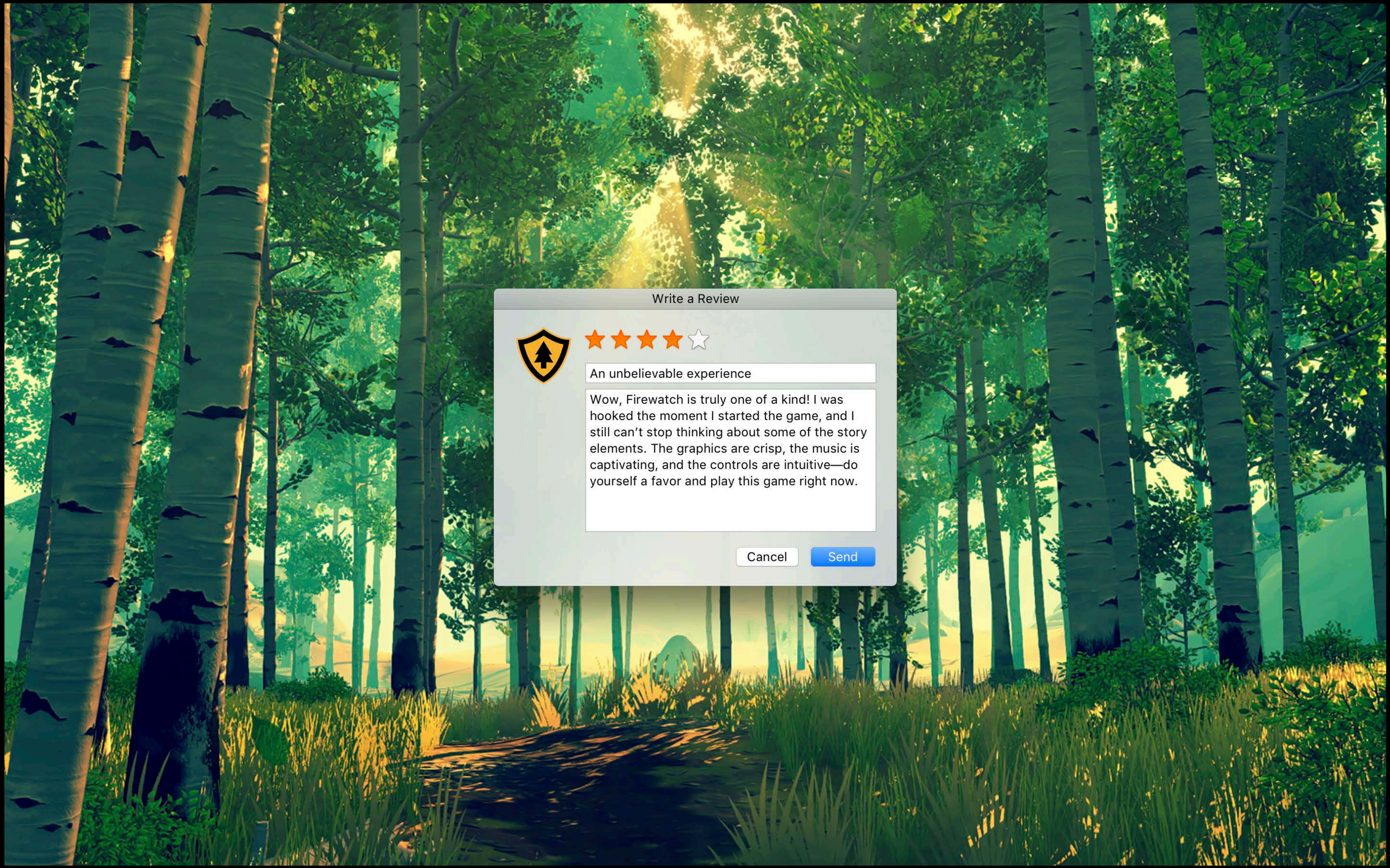
 **Magnet**
Organize your workspace \$0.99

 **The Sims™ 2**
Your faves in one place \$29.99


 **MainStage 3**
The ultimate live rig \$29.99

MacBook Pro

NEW



Write a Review

 ★★★★★

An unbelievable experience

Wow, Firewatch is truly one of a kind! I was hooked the moment I started the game, and I still can't stop thinking about some of the story elements. The graphics are crisp, the music is captivating, and the controls are intuitive—do yourself a favor and play this game right now.

Cancel Send

MacBook Pro

Asking for Ratings and Reviews

Deep link to write a review in App Store

Introduced in iOS 10.3

Now supported on macOS

Link to open your app in the App Store

- Presents compose review from app page

User-initiated actions

- Button in Settings

Asking for Ratings and Reviews

Deep link to write a review in App Store

URL is formed using regular product URL with an anchor tag

<https://itunes.apple.com/us/app/itunes-u/id490217893?action=write-review>

For creating product URLs visit

<https://linkmaker.itunes.apple.com/>

More Information

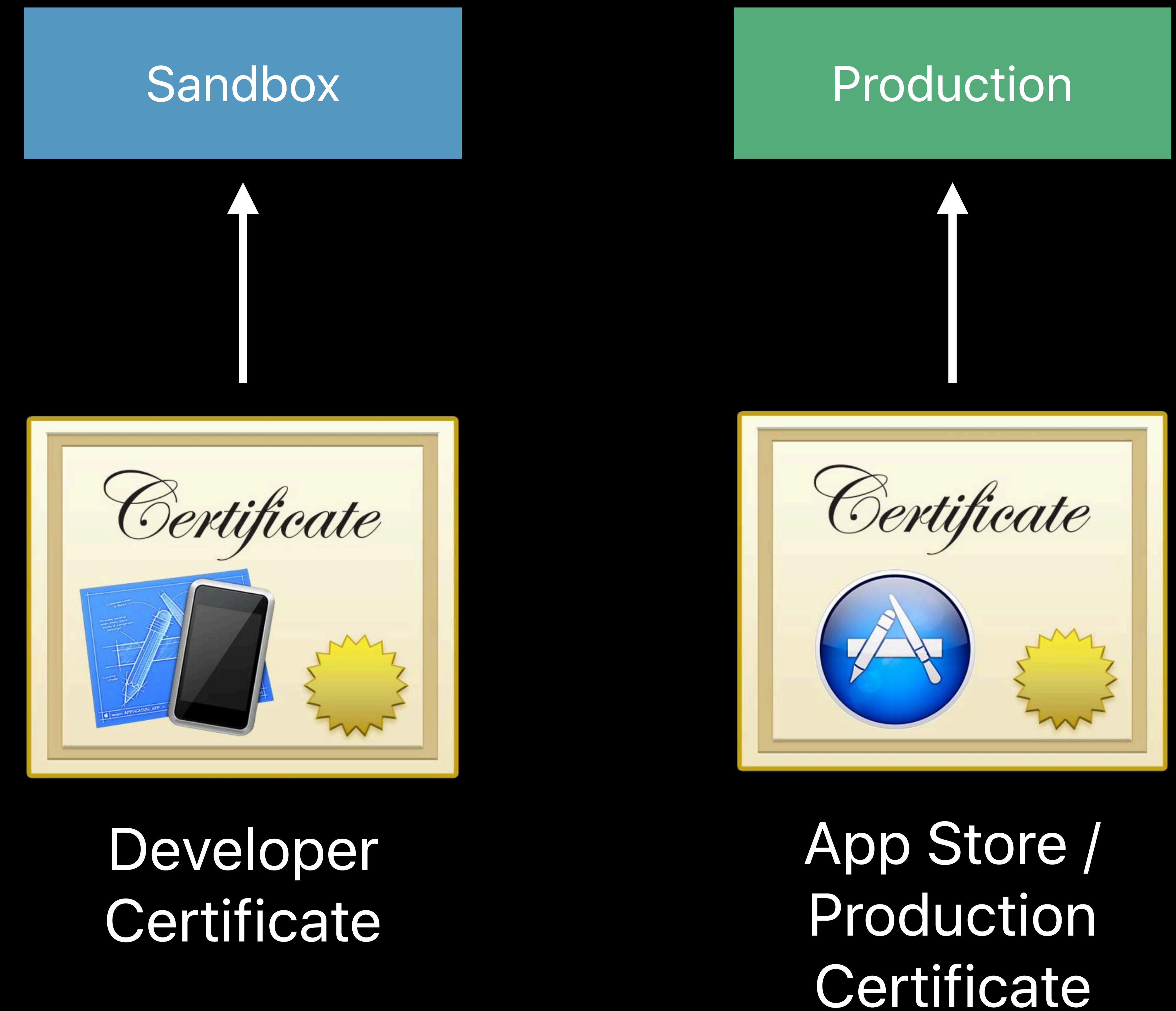
<https://developer.apple.com/app-store/ratings-and-reviews/>

Sandbox Testing

The Sandbox

Environment for testing purchases during development

Based on certificate used to sign your application



The Sandbox

Differences

No charge

Dedicated Sandbox accounts

Backend environment

- `https://sandbox.itunes.apple.com/verifyReceipt`

Test modes

- `SKReceiptRefreshRequest`
- `SKMutablePayment simulatesAskToBuyInSandbox`

Time contraction for subscriptions

Subscription Timing

Condensed intervals

Actual Duration	Test Duration
1 week	3 minutes
1 month	5 minutes
2 months	10 minutes
3 months	15 minutes
6 months	30 minutes
1 year	1 hour

Maximum **five** renewals

The Sandbox

Setting up the test environment

Setup in App Store Connect

- Create test user
- Enter products for sale

Build and sign your app

Buy products

- Sign in with test user when prompted

9:41







< Apple ID iTunes & App Stores

Apple ID: john.appleseed@icloud.com

Face ID is enabled for all purchases.

AUTOMATIC DOWNLOADS

-  Music
-  Apps
-  Books & Audiobooks
-  Updates

Automatically download new purchases (including free) made on other devices.

Use Cellular Data

Use cellular network for automatic downloads.

Video Autoplay On >

Automatically play app preview videos in the App Store.

In-App Ratings & Reviews

Help developers and other users know what you think by letting apps ask for product feedback.

Offload Unused Apps

9:41



< Apple ID iTunes & App Stores

 Apps

 Books & Audiobooks

 Updates

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Offload Unused Apps

Automatically remove unused apps, but keep all documents and data. Reinstalling the app will place back your data, if the app is still available in the App Store.

SANDBOX ACCOUNT

Apple ID: jappleseed_sandbox@icloud.com


This account will be only used for apps that are connected to the App Store test environment.

9:41



< Apple ID iTunes & App Stores

 Apps

 Books & Audiobooks

 Updates

Automatically download new purchases (including free) made on other devices.

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SANDBOX ACCOUNT

Apple ID: jappleseed_sandbox@icloud.com

This account will be only used for apps that are connected to the App Store test environment.

Best Practices for Processing Transactions

Ross LeBeau, App Store Engineer

Adding a Transaction Observer

Add as early as possible

Preferably during `application(_:didFinishLaunchingWithOptions:)`

Why?

- Interrupted buy
 - User leaves app
 - User needs to edit billing info
 - App crashes

Adding a Transaction Observer

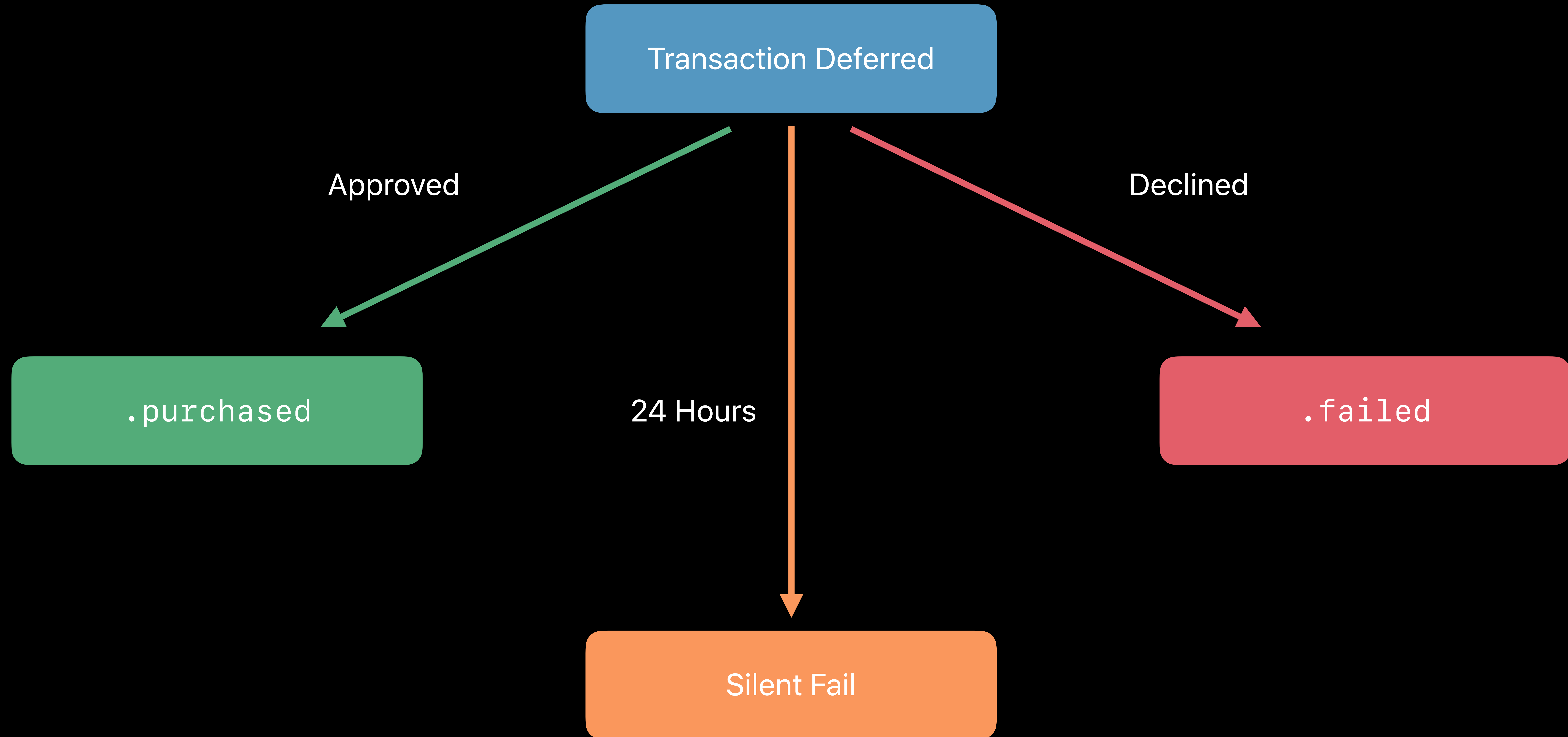
Why else?

- Subscription renewals
- Promoted In-App Purchases
- In-App Purchase Promo Codes

Finishing Transactions

Transaction State	Action Needed
.purchasing	None. Keep observing the payment queue and wait for the transaction state to change.
.purchased	Deliver the content to the user, then call finishTransaction.
.failed	Inspect error and handle as needed, then call finishTransaction.
.restored	Deliver the content to the user, then call finishTransaction.
.deferred	None. Keep observing the payment queue.

Ask To Buy



Finishing Transactions

Finish downloading hosted content first

- Downloads will cancel and become unavailable

Verify the receipt before finishing the transaction

- Consumables will not appear after finished

Techniques for Managing Receipts

Dana DuBois, App Store Engineering Manager

The Receipt

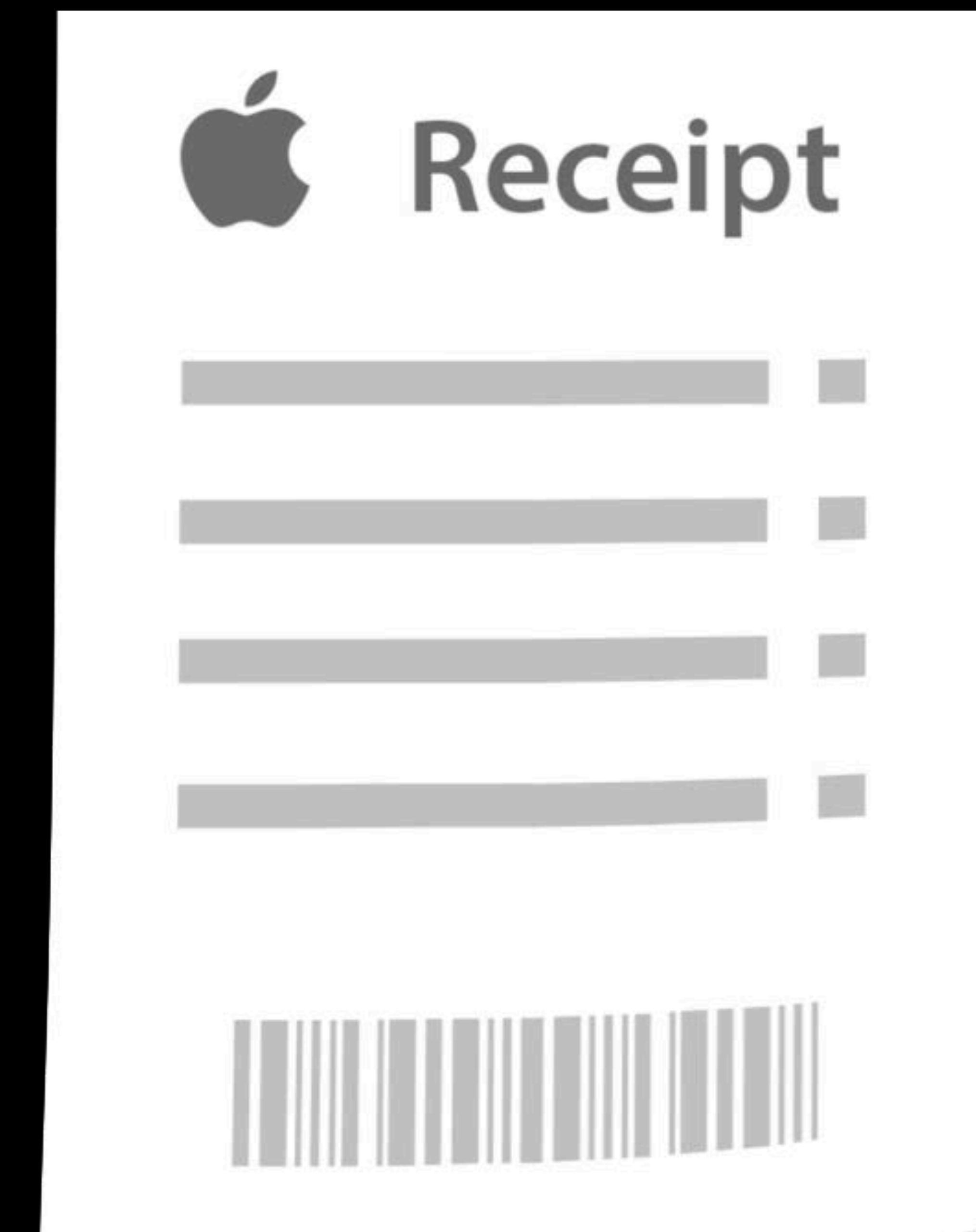
Trusted record of App and
In-App Purchases

Stored on device

Issued by the App Store

Signed and verifiable

For your app, on that device only



Receipt Validation

On-device validation

- Unlock features and content within the app

Server-to-server validation

- Online validation through a request to the App Store

- <https://buy.itunes.apple.com/verifyReceipt>

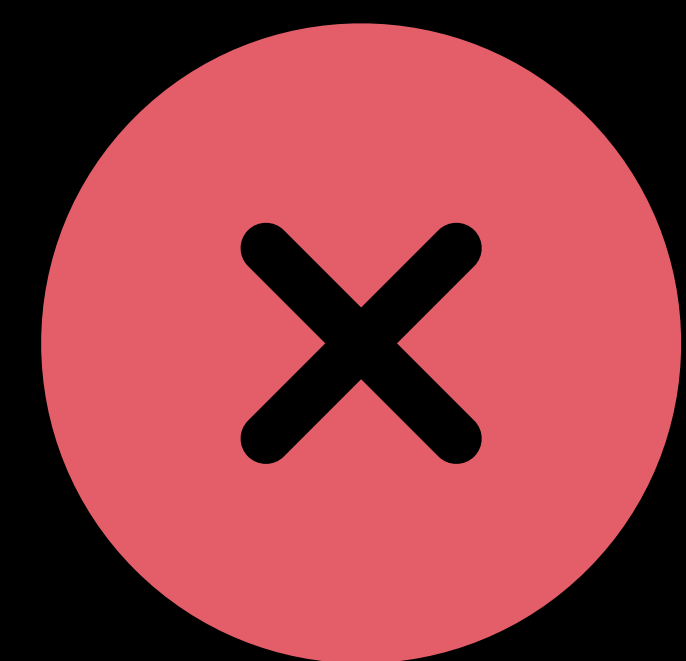
- Unlock features/subscription state on your server

Receipt Validation

Server-to-server validation



Use a trusted server to communicate with the App Store



Do NOT post the receipt directly to the App Store to be validated

On-Device Receipt Validation

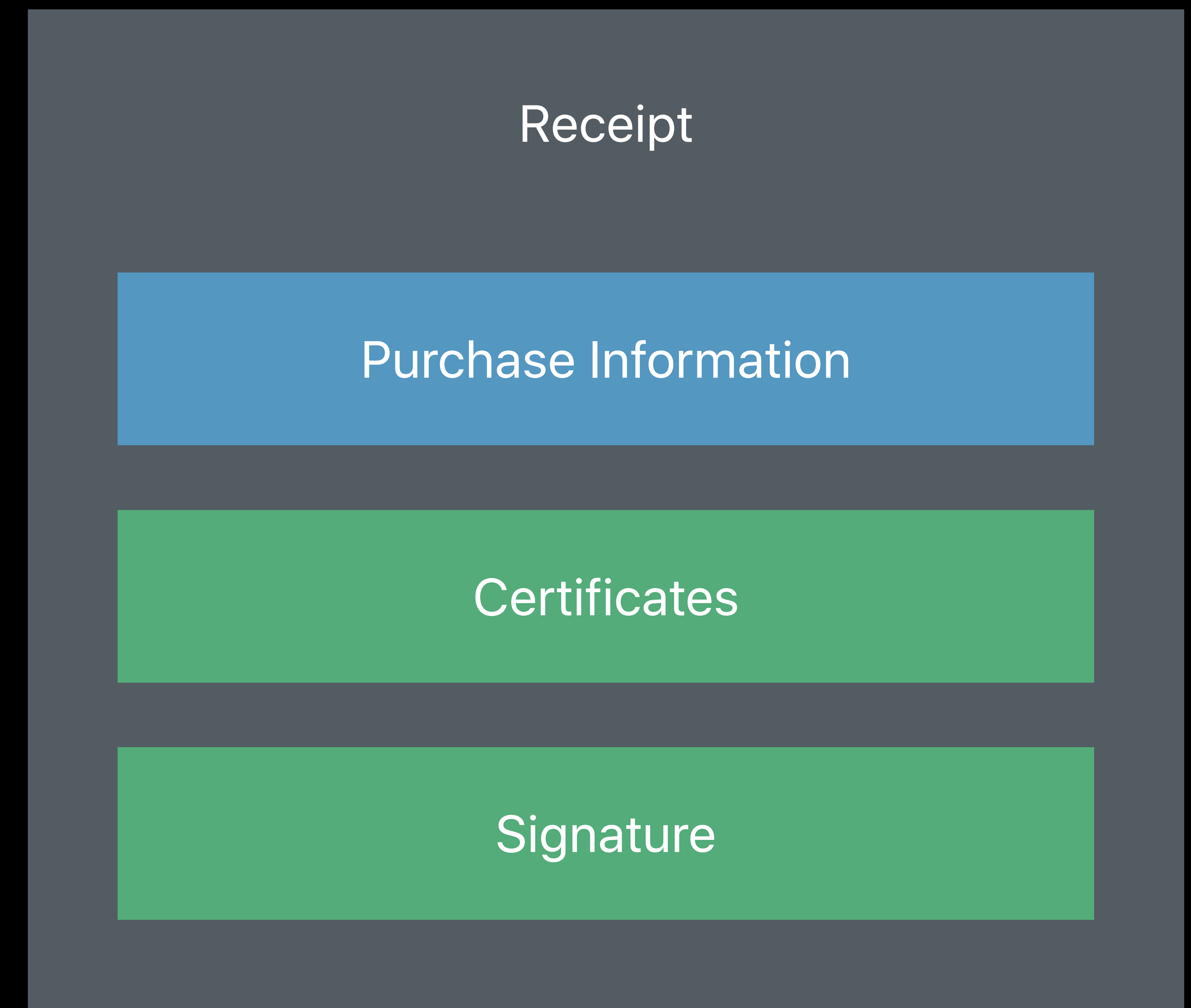
The basics

Stored in the app bundle

- API to get the path

Single file

- Purchase data
- Signature to check authenticity



On-Device Receipt Validation

Standards

Signing

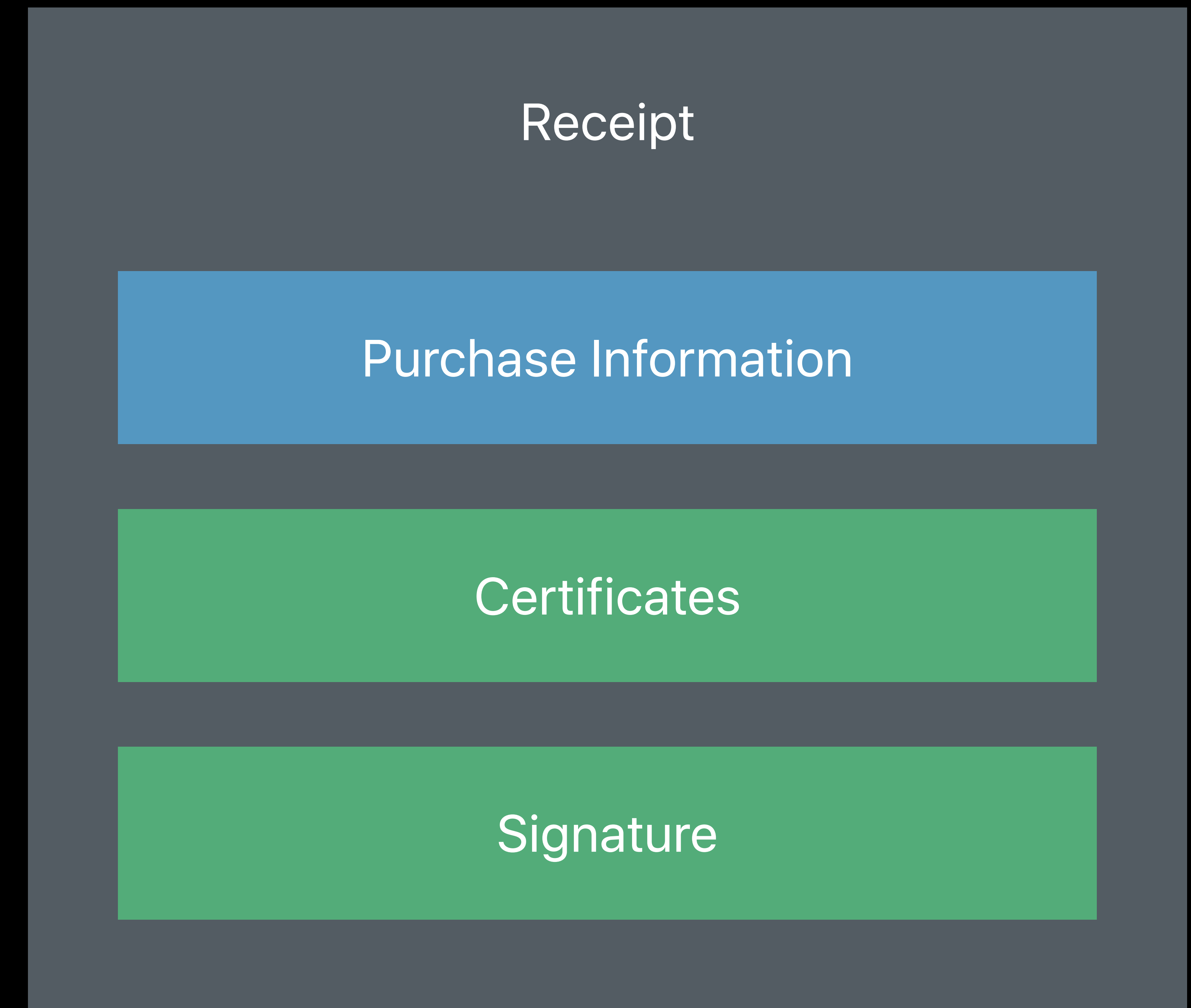
- PKCS#7 Cryptographic Container

Data Encoding

- ASN.1

Options for verifying and reading

- OpenSSL, asn1c, and more
- Create your own



On-Device Receipt Validation

The basics

Locate the receipt using Bundle API

```
// Locate the file
guard let url = Bundle.main.appStoreReceiptURL else {
    // Handle failure
    return
}
// Read the contents
let receipt = Data(contentsOf: url)
```

On-Device Receipt Validation

Tips for using OpenSSL

Build your own static library (.a file)

- Not a dynamic library

Include Apple Root CA Certificate

- Available online
- If bundled in app, watch out for expiry

Documentation online

On-Device Receipt Validation

Downloading pre-built solutions



On-Device Receipt Validation

Downloading pre-built solutions

Convenience comes at a price

- Reusing code brings with it bugs and vulnerabilities
- Single exploit affects many



On-Device Receipt Validation

Downloading pre-built solutions

Convenience comes at a price

- Reusing code brings with it bugs and vulnerabilities
- Single exploit affects many

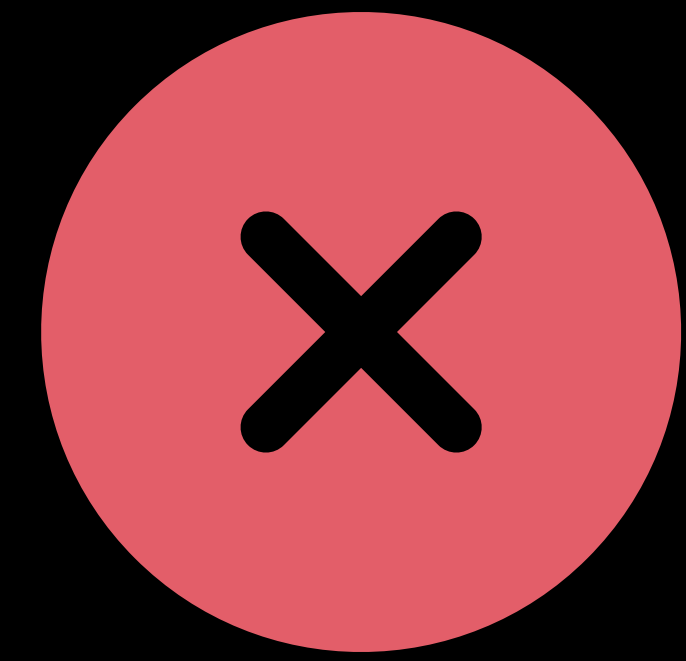
It's **your** revenue stream

- Make decisions that suit your product
- Know and own the risks



On-Device Receipt Validation

Certificate verification



Do not check the expiry date of the certificate relative to current date



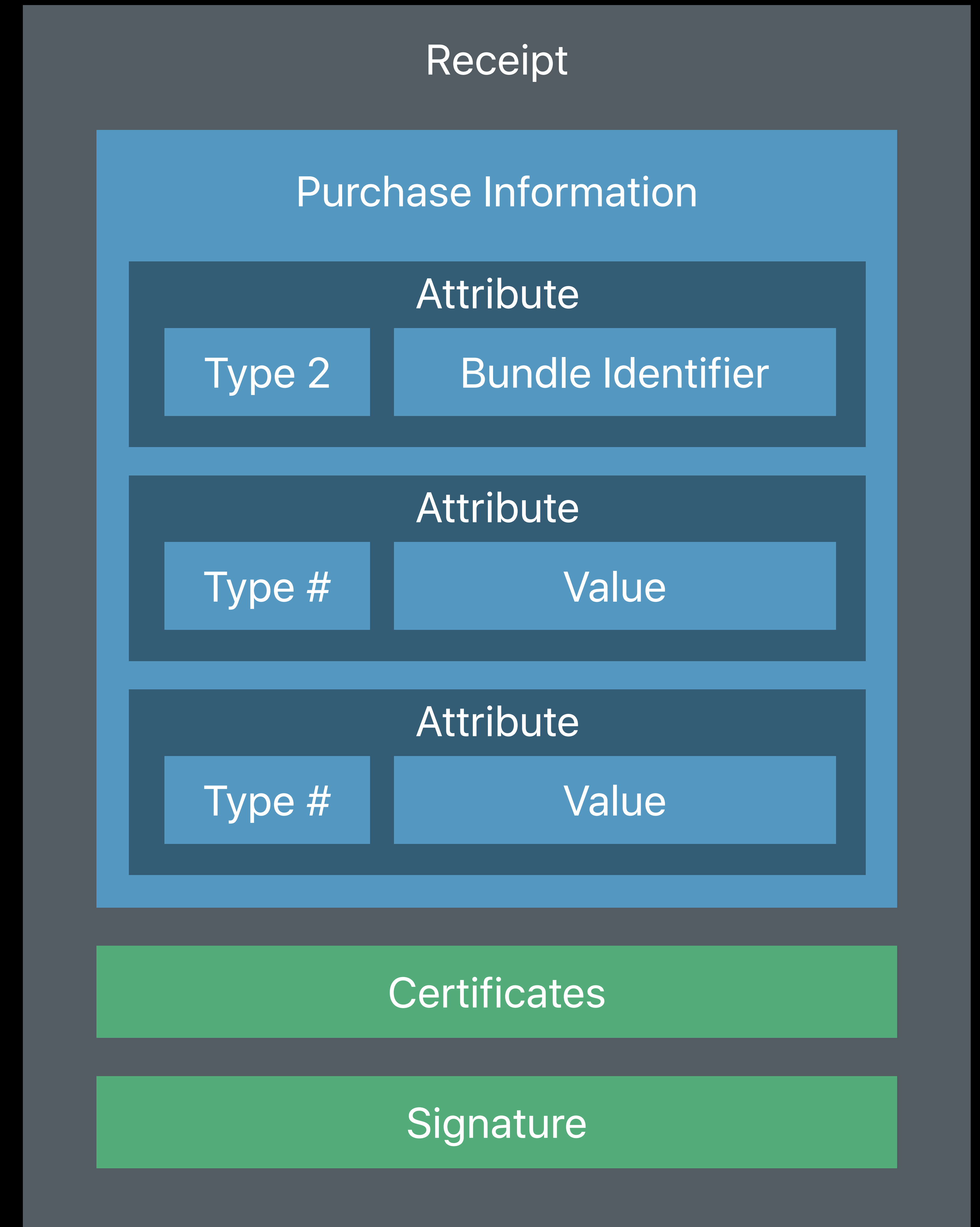
Compare expiry date to purchase date of the transaction

On-Device Receipt Validation

Receipt payload

Series of attributes

- Type
- Value
- (Version)



On-Device Receipt Validation

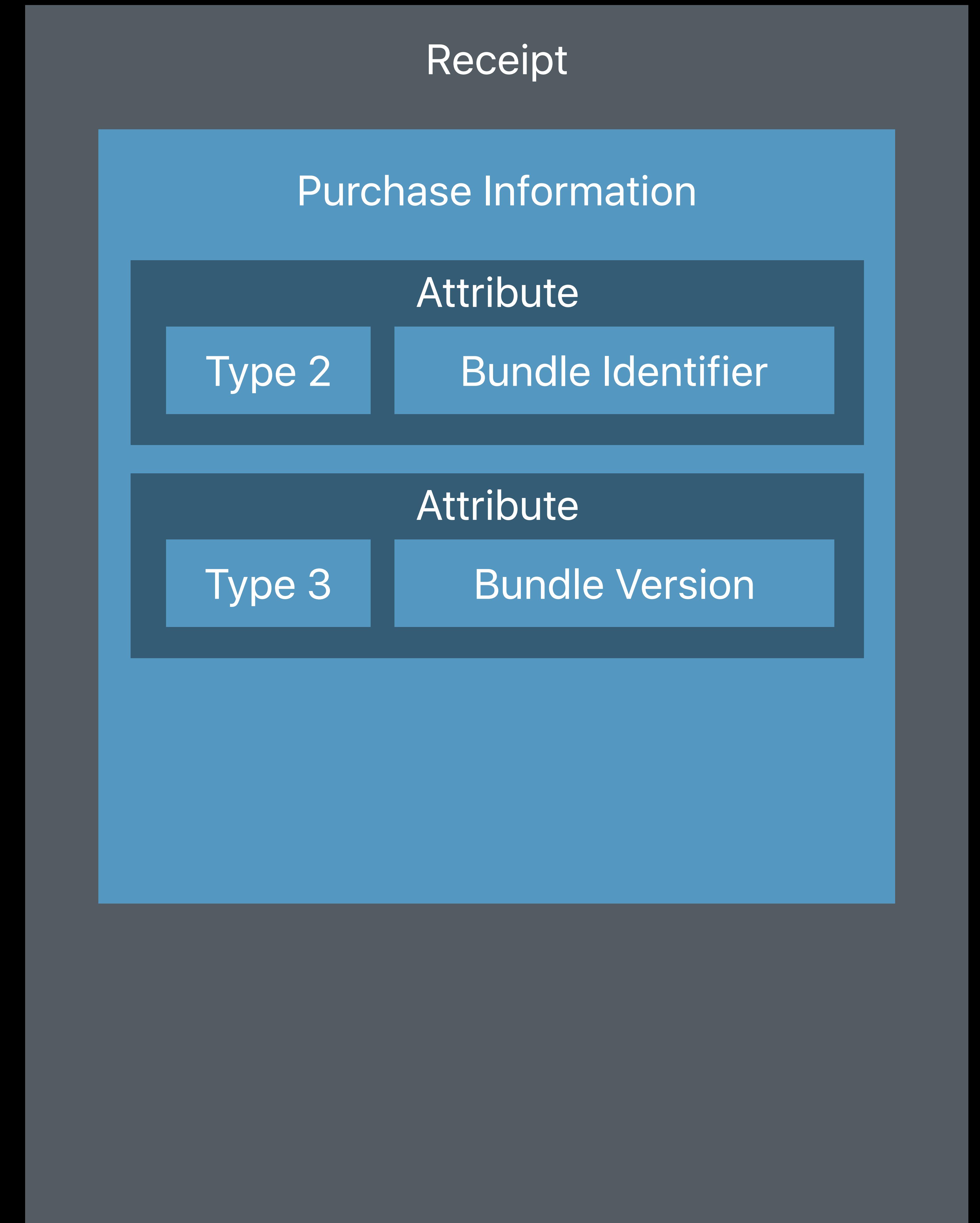
Verify application

Check the bundle identifier

Check the bundle version

Use hardcoded values

- Not Info.plist values



On-Device Receipt Validation

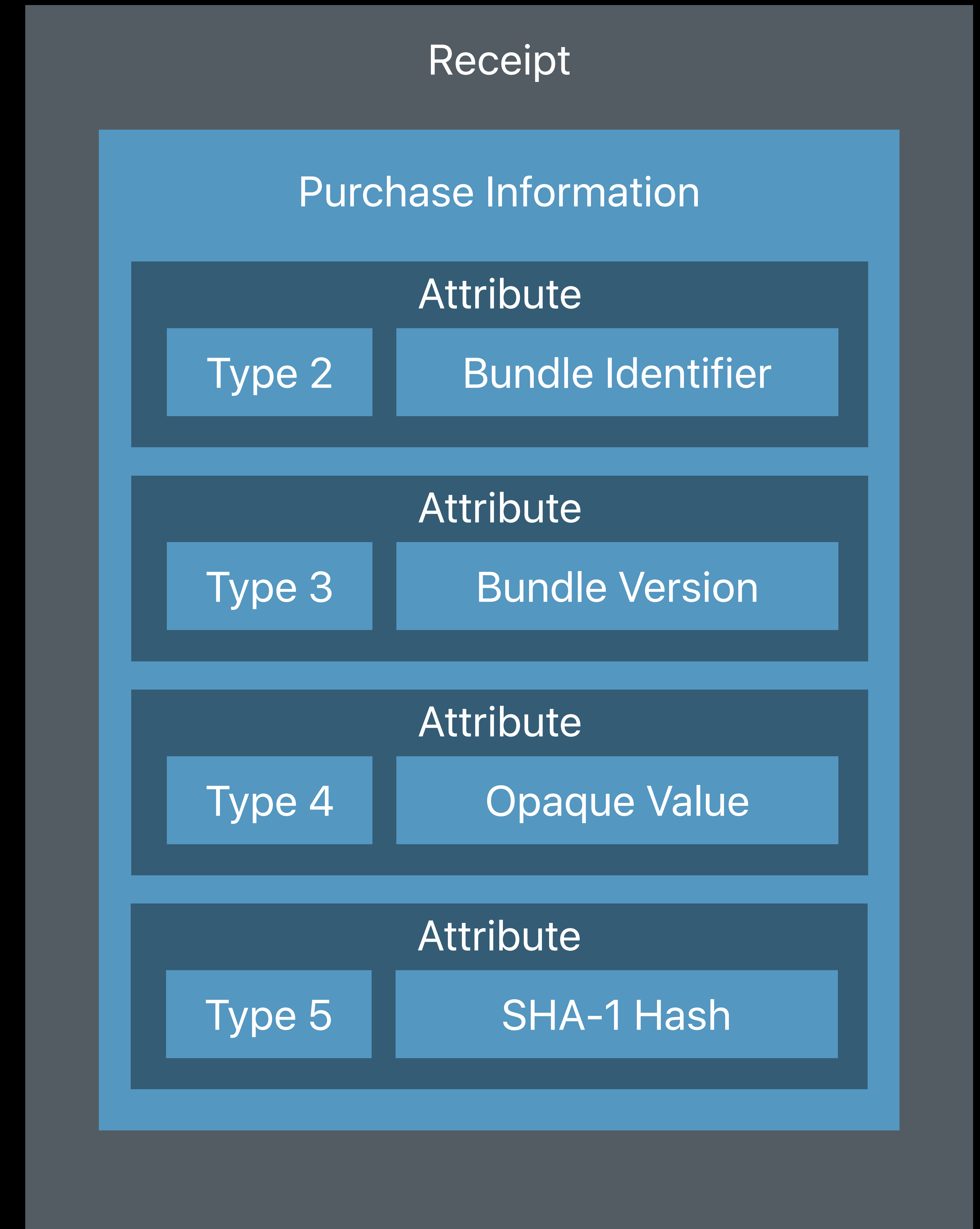
Verify application

Attribute 5 is a SHA-1 hash of three key values

- Bundle identifier
- Device identifier
- Opaque value (Attribute 4)

Unique to your app on this device

Create hash using hardcoded values, compare



On-Device Receipt Validation

Receipt refresh

If the receipt doesn't exist or is invalid, refresh the receipt using StoreKit

Receipt refresh will require network

Store sign-in will be required

Avoid continuous loop of validate-and-refresh

```
let request = SKReceiptRefreshRequest()  
request.delegate = self  
request.start()
```

On-Device Receipt Validation

Receipt refresh

If the receipt doesn't exist or is invalid, refresh the receipt using StoreKit

Receipt refresh will require network

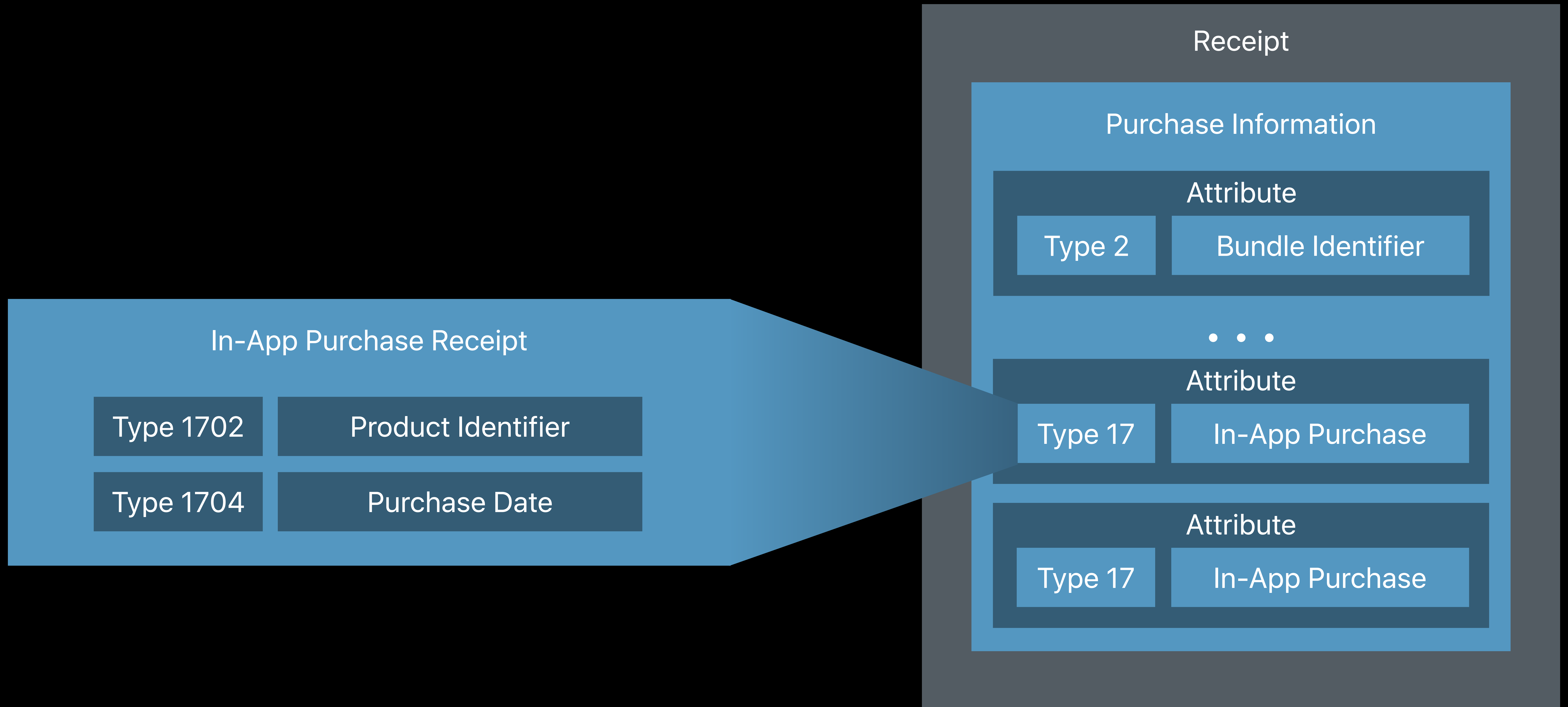
Store sign-in will be required

Avoid continuous loop of validate-and-refresh

```
// macOS only  
exit(173)
```


On-Device Receipt Validation

Free Trials



On-Device Receipt Validation

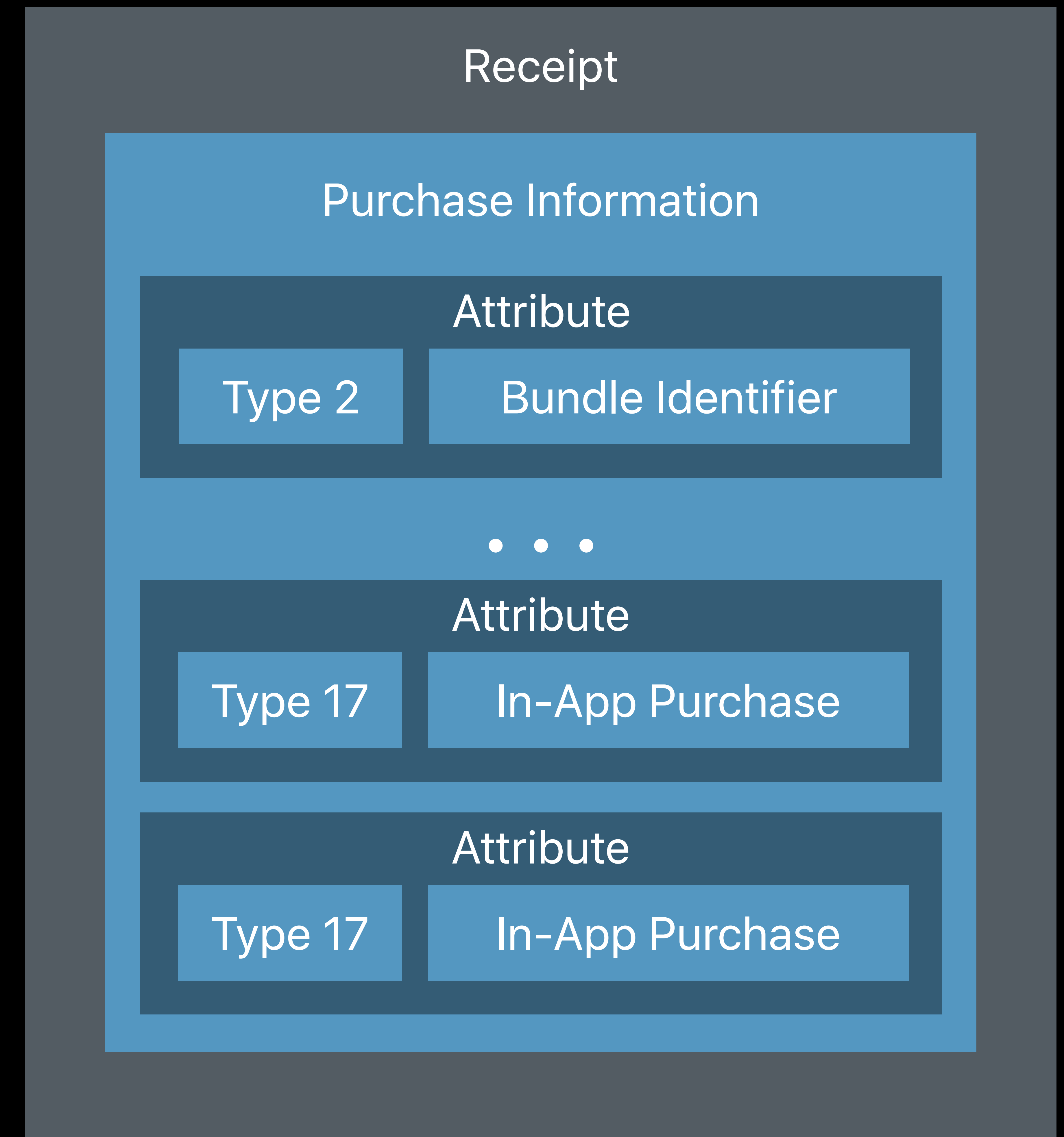
Free Trials

Iterate over In-App Purchases

If any has "Full Unlock" Product Identifier, unlock the app

If any has "Free Trial" Product Identifier, compare current date to Purchase Date

If neither are present, display UI to begin "Free Trial"



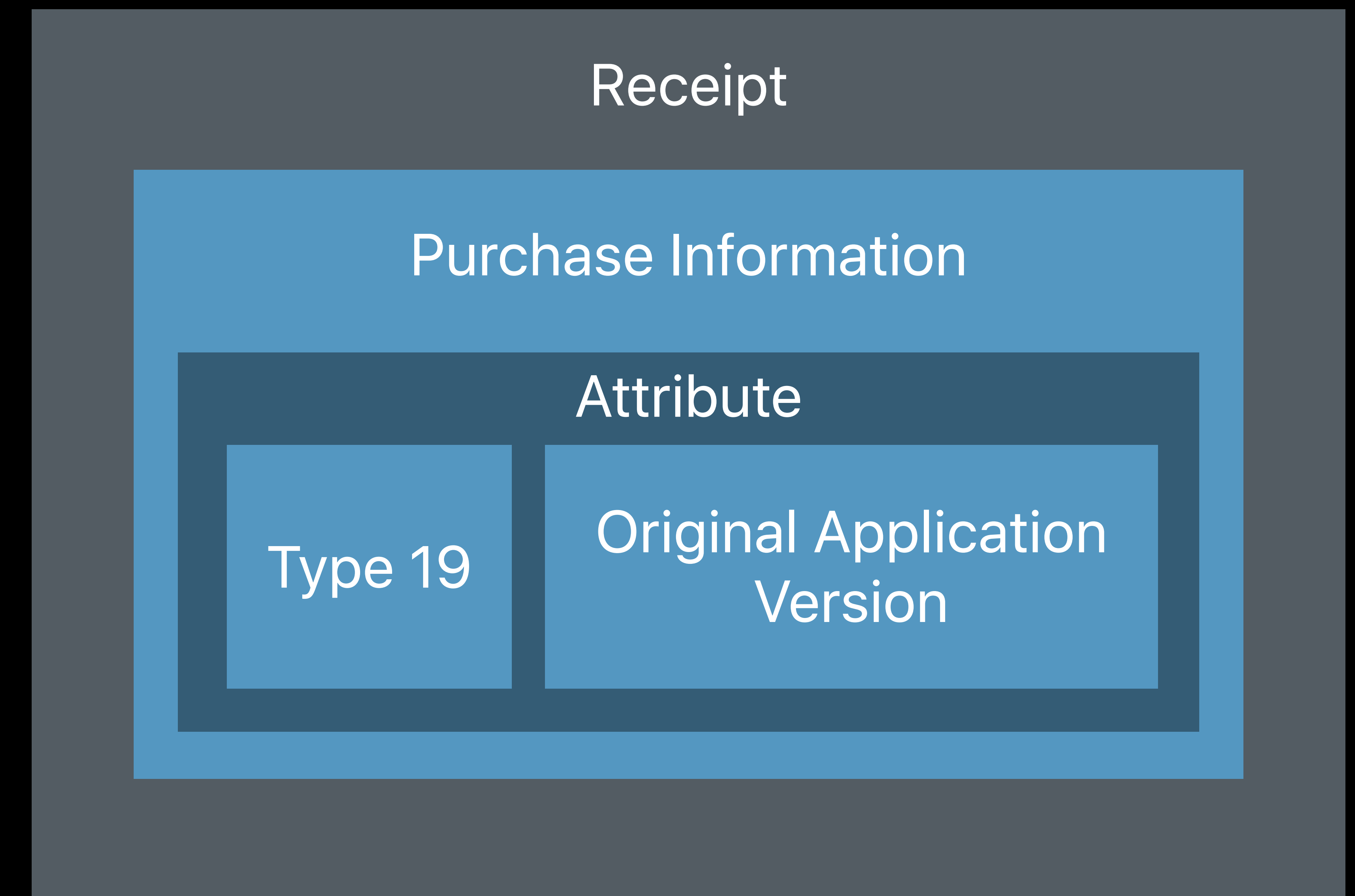
Changing Business Models

When moving from

- Paid upfront to subscription
- Paid upfront to free trial

Maintain functionality that users have already paid for

Original application version in receipt



Summary

Introductory Pricing

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Sandbox Testing

Best Practices for Processing Transactions

Techniques for Managing Receipts

More Information

<https://developer.apple.com/session704>

Engineering Subscriptions

Hall 1

Tuesday 3:00PM

StoreKit / Subscriptions Lab

Technology Lab 12

Tuesday 4:00PM

StoreKit / Subscriptions Lab

Technology Lab 12

Thursday 9:00AM

 **WWDC18**