Push Notifications with Firebase in Swift 5

Published by **florian** on February 27, 2020

Every iOS app should leverage push notifications to boost user engagement and retention. Push notifications are a powerful tool, but implementing them in Swift 5 has been historically tricky since you usually needed a server. If you're just getting started with your app development, chances are you're already using Firebase as your backend. That's great news – implementing push notifications with Firebase in Swift 5 is what we cover in this tutorial. In fact, we've followed exactly these steps to add push notifications to our Group Chat app.

The other day, I was working on a dating app template, where I also needed device-to-device push notifications (for a chat feature). As part of that, I wasted several hours debugging multiple issues, while integrating push

notifications with Firebase in Swift 5. So I decided to write down all the learnings as well as open-source the implementation so that I'll save everyone landing on this page a lot of trouble.

After completing this tutorial, you'll be able to:

- **Have your users register for push notifications**
- **Send notifications from Firebase Dashboard to any user**
- **Send device-to-device push notifications**

On a high-level, here are the steps to integrate Firebase push notifications in Swift 5:

- Generate an APNs certificate on Apple's Developer portal
- Enable Push Notification in Firebase Cloud Messaging Console
- Add the Firebase Cocoa dependencies to your Pod file
- Write the code to generate the push notification token
- Send a push notification from Firebase Notifications dashboard

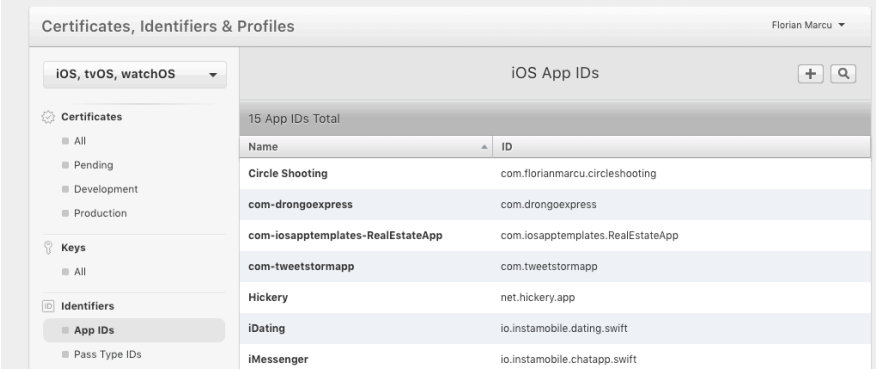
For device-to-device push notifications you'll also need to:

- Write the code to save the push token into Firestore
- Write the class that sends a push notification to a given push token

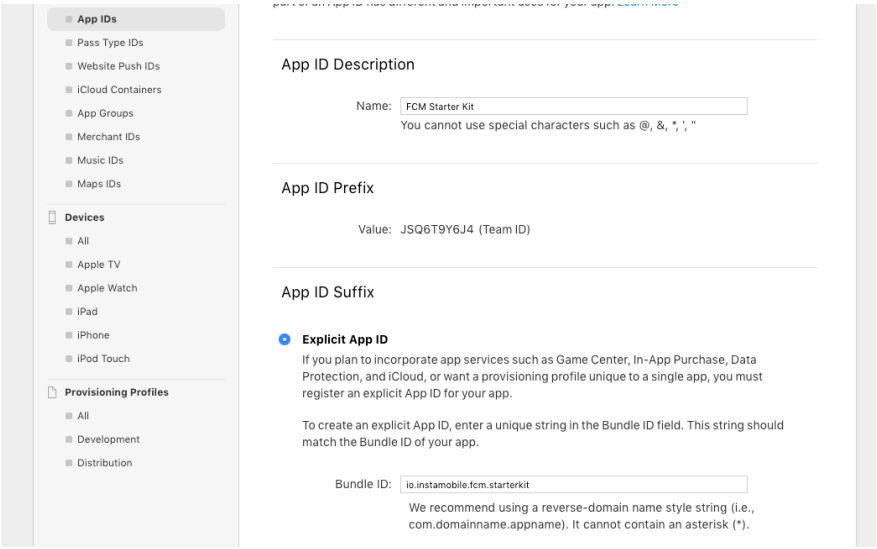
Feel free to jump to the end or download the free Swift starter kit directly, if you feel confident with your set up already. Let's get started.

1. Generate an APNs certificate

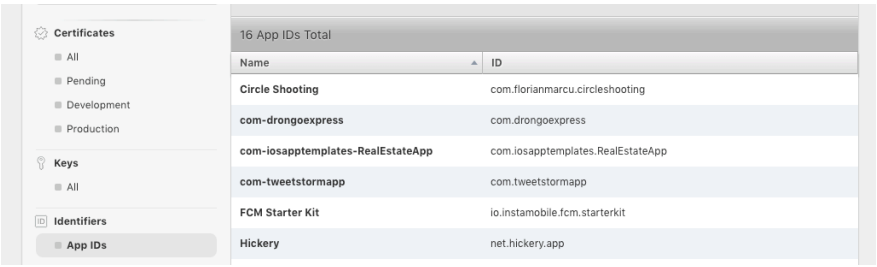
- Head over to Apple, click "**Account**" and log into your developer account.

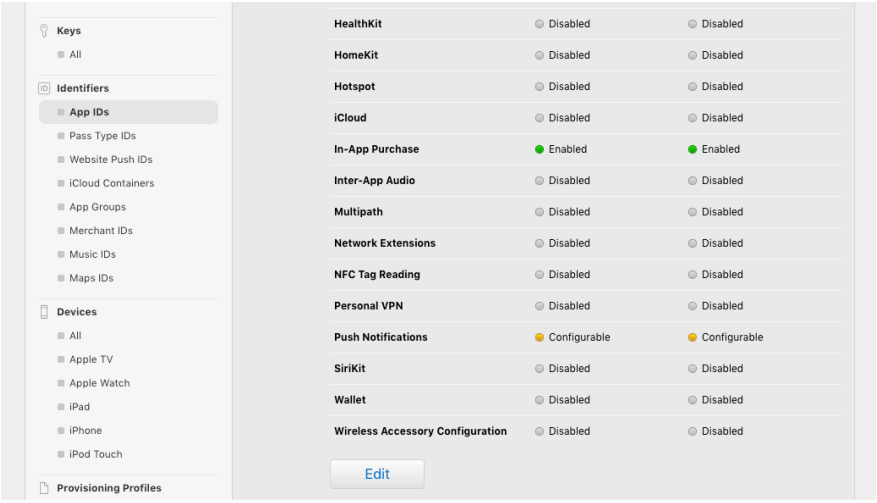


- In the left menu, select "**Certificates, IDs & Profiles**"
- In the Identifiers section menu, select "App IDs" and click the "Add New App ID" button
- Fill out **App ID Description** & **Bundle ID** fields. Check "**Push Notifications**" and click "**Continue**". The on the next screen click "**Register**"



- In the new “App IDs” list, select the newly created App ID and click “**Edit**“.





- Scroll down to the “**Push Notifications”** section and click on “**Create Certificate**” (you’re good with Development SSL Certificate for now) – you’ll create the other one only when you submit your app to the

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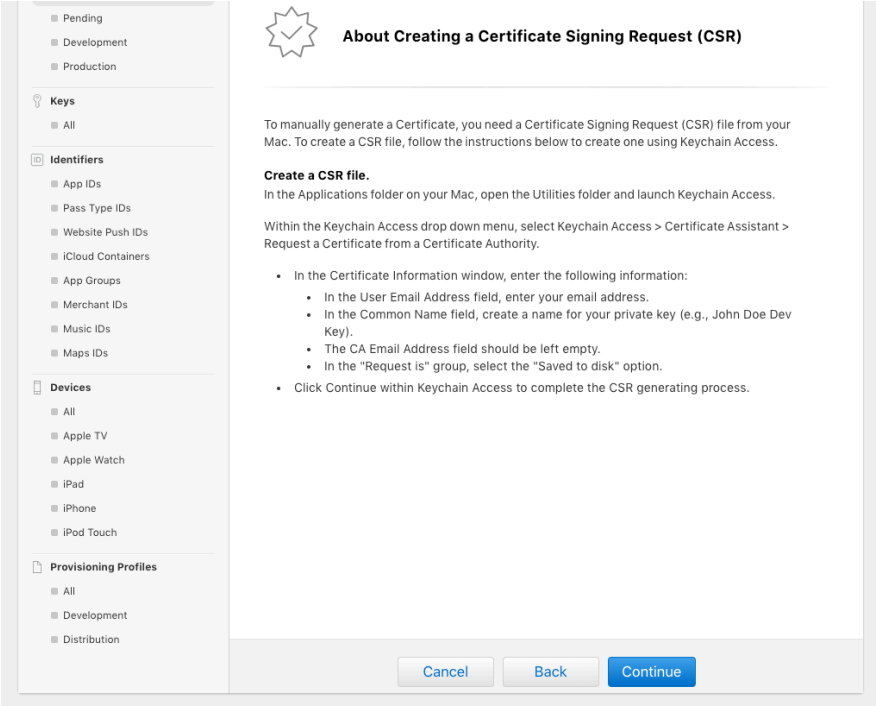
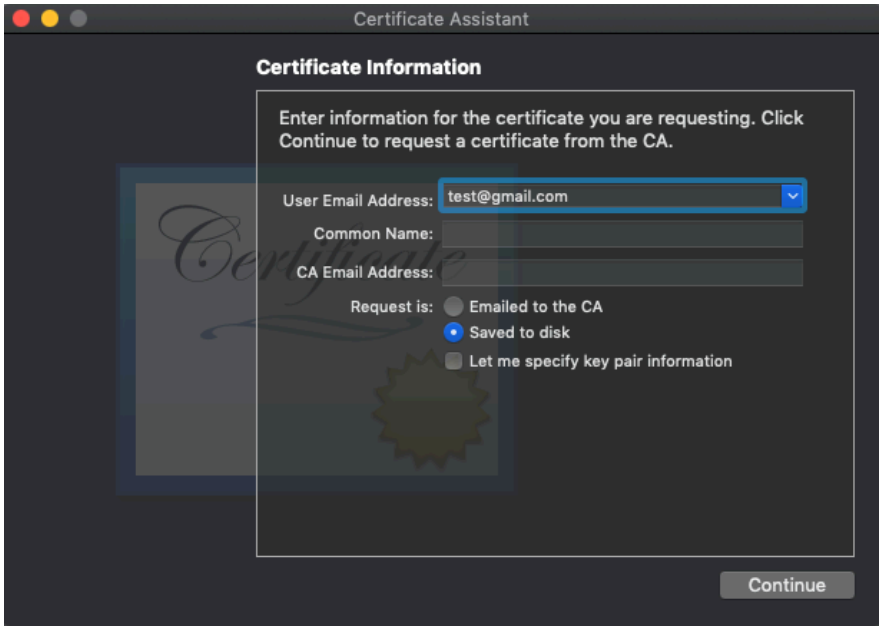
- Follow the instructions for creating a CSR certificate from a Certificate Authority, using Keychain Access app on your laptop. And then click "**Continue**"





- In the next screen on Apple's website, upload the certificate you've just saved to disk. If you're getting

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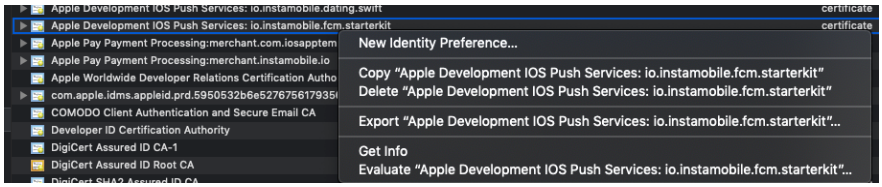
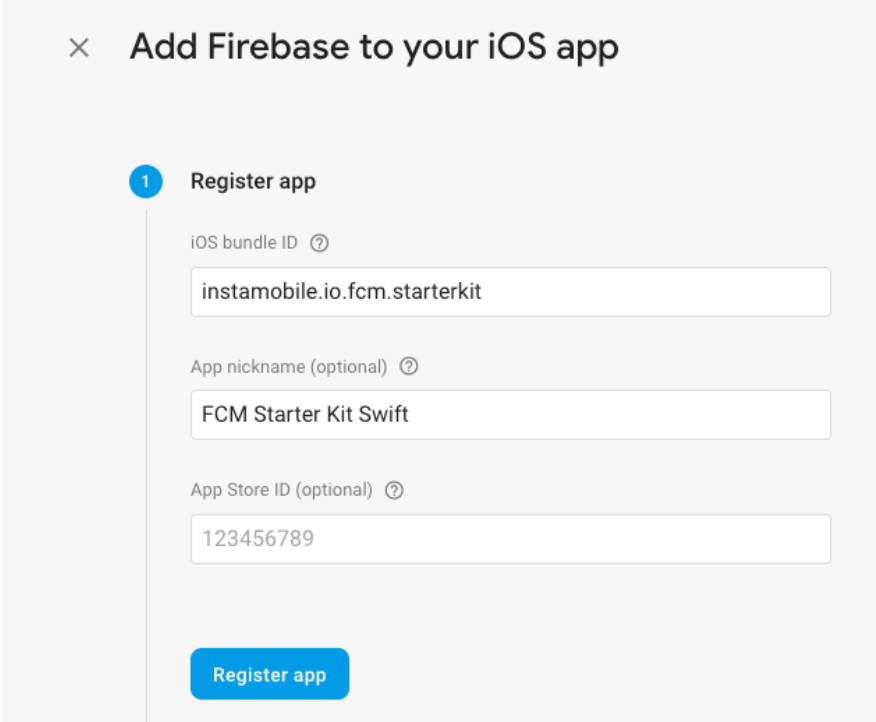
an “Invalid Certificate” error try removing all the expired certificates in your Keychain and re-create the CSR from the previous step. Now you should have a certificate created – download and store it securely on your laptop (the file extension is **.cer**).

- Then, open the **.cer** file (by double-clicking on it) and add it to your **Keychain**. Once in Keychain, right-click on the certificate and then choose “**Export**“. This will create a **.p12** file for you (you can choose an encryption password as well for extra security)

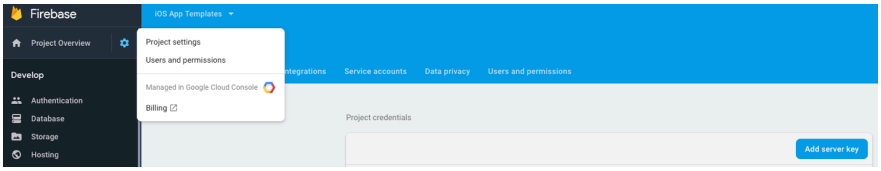


2. Enable Push Notification in Firebase Cloud Messaging Console

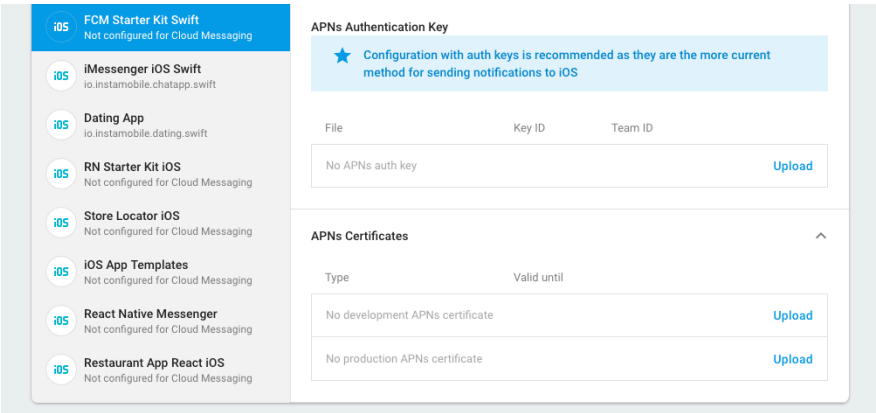
- Head over to Firebase Console. If you don’t have a project, create one. Then choose a project and head over to its console.
- If you don’t have an iOS app already, create one by clicking “Add App”. on Firebase Console homepage. Make sure you use **exactly the same bundle ID** as the one you used in Apple Developer portal. Then download the **GoogleService.plist** file, which you’ll need to add to your Xcode project.



- In Firebase, locate your app and go to **Project Settings** -> **Cloud Messaging** tab



- Locate the "**APNs Certificates**" section and upload the **.p12** file you've generated previously. If you used a password, you also need to type it in the password field.



- Now you'll be able to send push notifications with Firebase in Swift 5.

3. Add the Firebase Cocoa dependencies to your Pod file

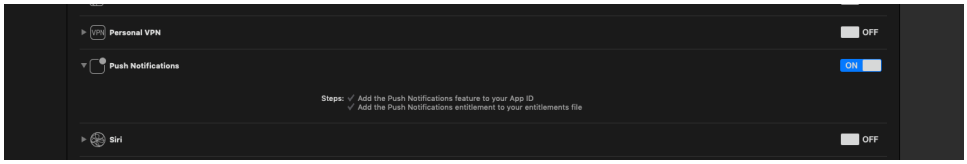
- Create a new empty Xcode project (File -> New Project -> Single View App -> Next -> Create) or clone our Starter Kit to make it easier
- In your projects root directory, run "**pod init**" or create a ***Podfile*** manually.
- Open *Podfile* (for instance, in Sublime) and add the following Firebase Pod dependencies

```
platform :ios, '11.0'

target 'FirebaseStarterKit' do
  # Comment the next line if you're not using Swift and don't want to use dynamic frameworks
  use_frameworks!

  # Pods for FirebaseStarterKit

  pod 'Firebase/Core'
  pod 'Firebase/Auth'
  pod 'Firebase/AdMob'
  pod 'Firebase/Database'
  pod 'Firebase/Messaging'
  pod 'Firebase/Storage'
  pod 'Firebase/Firestore'

end
```

- Run "**pod update**" to install the cocoa pods

- Open the **.xcworkspace** file in Xcode

3.1 Enable “Push Notifications” capabilities in Xcode, by selecting the build target and then **Capabilities** tab



3.2 Add GoogleService.plist file to your Xcode project

This is the file you’ve downloaded earlier from Firebase Console. In order to connect the iOS app to the Firebase server, you’ll have to add this to the Xcode project. Otherwise, you’ll get a crash.

4. Write the code to generate the push notification token

For that, we are providing a helper class to encapsulate the whole logic. PushNotificationManager will handle the registration of the push token for the current device. It’ll also trigger a system dialog asking users to accept push notification permissions. Make sure you say “Yes” to that, otherwise notifications won’t send. The object takes in a userID string and maps that userID with the generated push token into users_table in Firestore – this is needed for device-to-device remote push notifications.

```
import Firebase
```

```
import FirebaseFirestore
import FirebaseMessaging
import UIKit
import UserNotifications

class PushNotificationManager: NSObject, MessagingDelegate,
UNUserNotificationCenterDelegate {
    let userID: String
    init(userID: String) {
        self.userID = userID
        super.init()
    }

    func registerForPushNotifications() {
        if #available(iOS 10.0, *) {
            // For iOS 10 display notification (sent via
APNS)
            UNUserNotificationCenter.current().delegate =
self
            let authOptions: UNAuthorizationOptions =
[.alert, .badge, .sound]

UNUserNotificationCenter.current().requestAuthorization(
                options: authOptions,
                completionHandler: {_, _ in })
            // For iOS 10 data message (sent via FCM)
            Messaging.messaging().delegate = self
        } else {
            let settings: UIUserNotificationSettings =
                UIUserNotificationSettings(types: [.alert,
.badge, .sound], categories: nil)

UIApplication.shared.registerUserNotificationSettings(setti
ngs)
        }


UIApplication.shared.registerForRemoteNotifications()
```

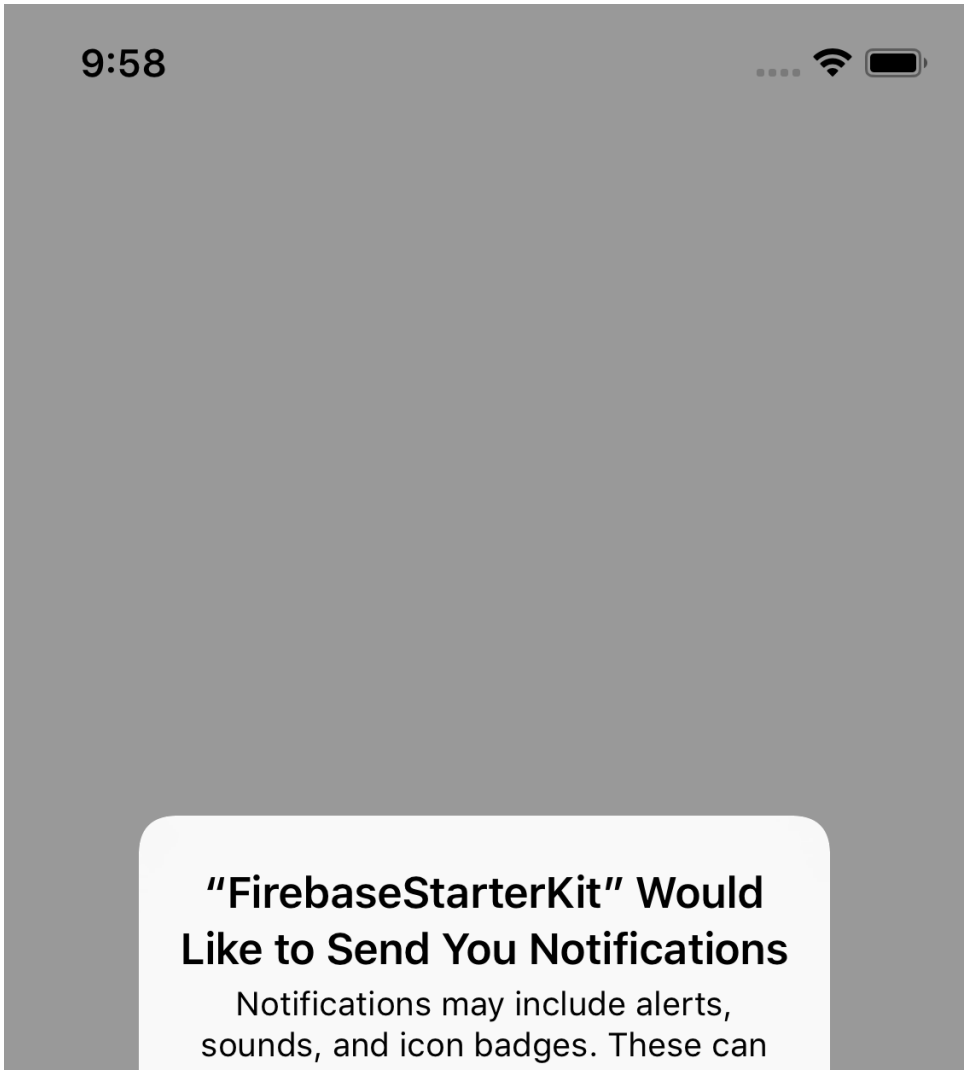
```
        updateFirestorePushTokenIfNeeded()
    }

    func updateFirestorePushTokenIfNeeded() {
        if let token = Messaging.messaging().fcmToken {
            let usersRef =
Firestore.firestore().collection("users_table").document(us
erID)
            usersRef.setData(["fcmToken": token], merge:
true)
        }
    }

    func messaging(_ messaging: Messaging, didReceive
remoteMessage: MessagingRemoteMessage) {
        print(remoteMessage.appData)
    }

    func messaging(_ messaging: Messaging,
didReceiveRegistrationToken fcmToken: String) {
        updateFirestorePushTokenIfNeeded()
    }

    func userNotificationCenter(_ center:
UNUserNotificationCenter, didReceive response:
UNNotificationResponse, withCompletionHandler
completionHandler: @escaping () -> Void) {
        print(response)
    }
}
```

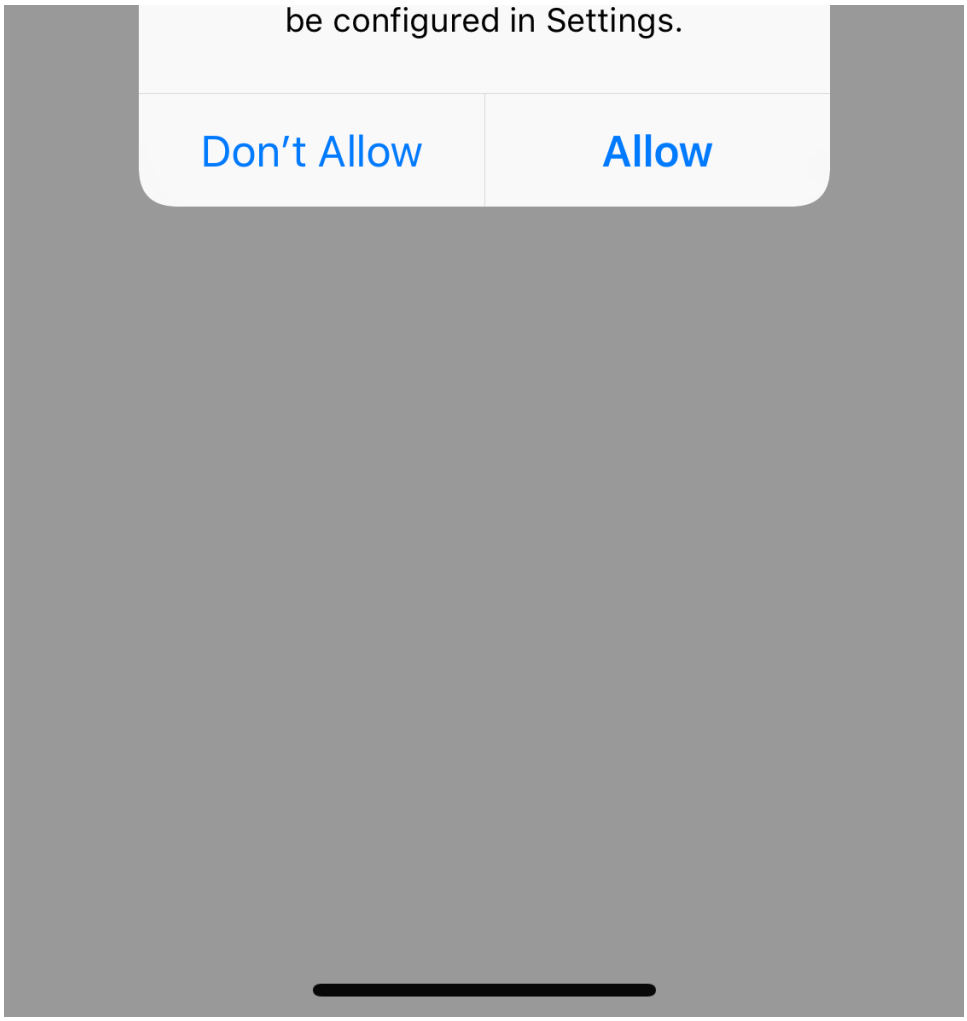
Now open the AppDelegate.swift class and two lines of code:

```
import Firebase

func application(_ application: UIApplication,
```

```
didFinishLaunchingWithOptions launchOptions:
[UIApplication.LaunchOptionsKey: Any]?) -> Bool {
    let pushManager = PushNotificationManager(userID:
"currently_logged_in_user_id")
    pushManager.registerForPushNotifications()

    FirebaseApp.configure()

    return true

}
```

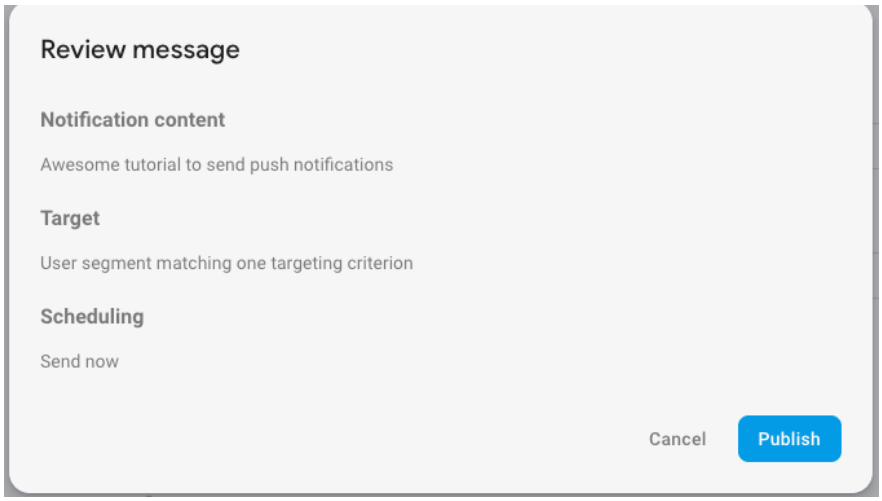
Now run your app and you should see the system dialog popping up. Accept it and move on to the next step.



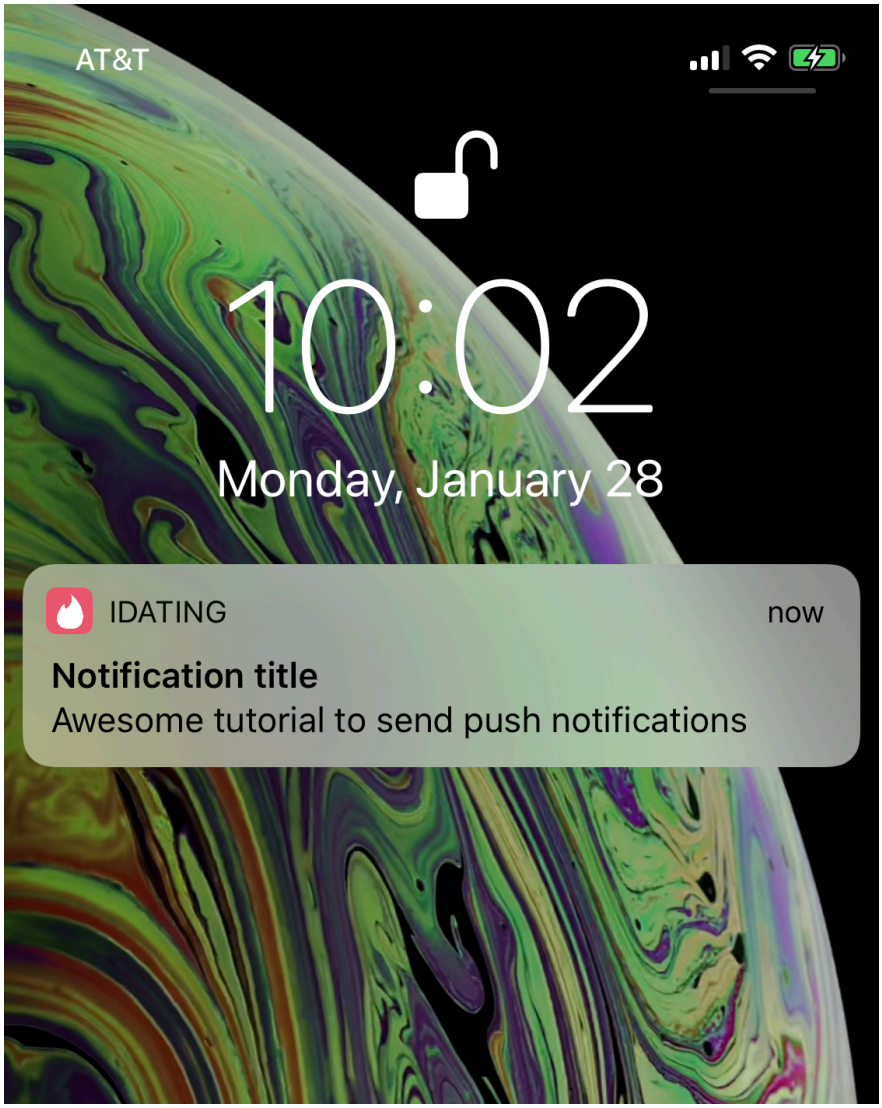


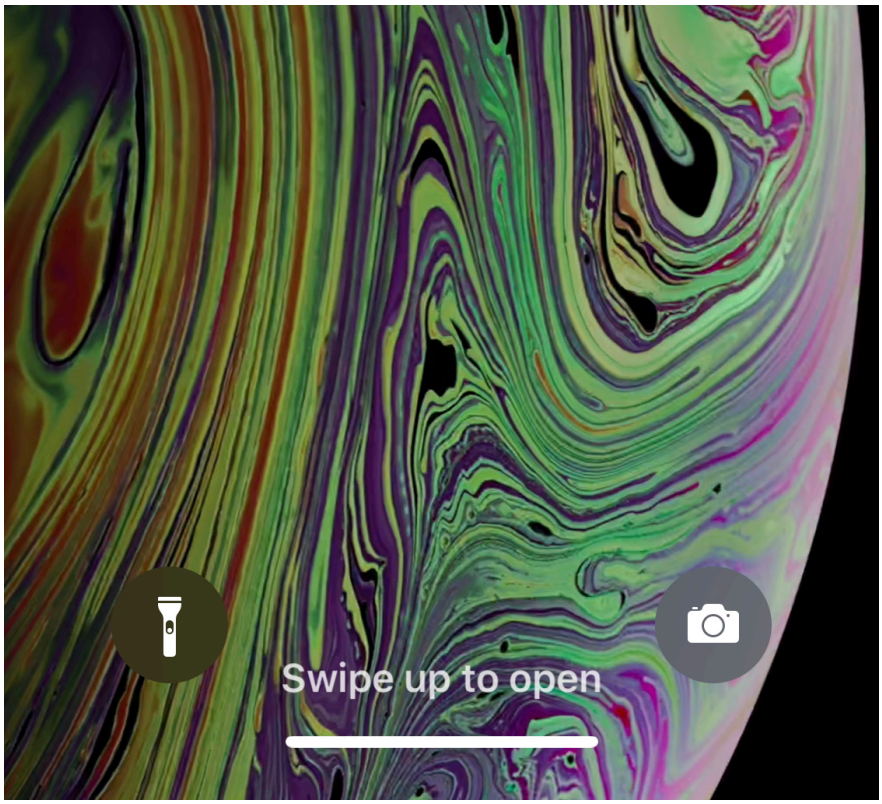
5. Send a push notification from Firebase Notifications dashboard

- Head over to Firebase Console again. In the left menu, under **Grow** click on **Cloud Messaging**. -> **New Notification**
- Fill out the required details (notification title and body), choose the correct bundle identifier, and **Send**



- You should receive the push notification on your device. Please note that this doesn't work on simulators. You'll need a real iOS device.





And that's it – you've just sent the first notification with Firebase in Swift 5. Take a moment to celebrate. As we mentioned at the beginning of this tutorial, we are going to show our readers how they can send device-to-device push notifications, through Firebase Cloud Messaging. This comes in handy for chatting apps, dating apps, multiplayer iOS games, etc.

6. Write the code to save the push token into Firestore

Good news – you've already done that at step 4. Just as a reminder, here's the code in PushNotificationManager that saves the user ID – push token mapping to Firestore:

```
func updateFirestorePushTokenIfNeeded() {
        if let token = Messaging.messaging().fcmToken {
            let usersRef =
Firestore.firestore().collection("users_table").document(us
erID)
            usersRef.setData(["fcmToken": token], merge:
true)
        }
    }
```

7. Write the class that sends a push notification to a given push token

More great news – I've already written a class that does that and I'm sharing it here. Meet PushNotificationSender:

```
import UIKit

class PushNotificationSender {
    func sendPushNotification(to token: String, title:
String, body: String) {
        let urlString =
"https://fcm.googleapis.com/fcm/send"
        let url = NSURL(string: urlString)!
        let paramString: [String : Any] = ["to" : token,
                                           "notification" :
["title" : title, "body" : body],
                                           "data" : ["user"
: "test_id"]
        ]

        let request = NSMutableURLRequest(url: url as URL)
        request.httpMethod = "POST"
        request.httpBody = try?
```

```
JSONSerialization.data(withJSONObject:paramString, options:
[.prettyPrinted])
        request.setValue("application/json",
forHTTPHeaderField: "Content-Type")
        request.setValue("key=AAAApGSLQJc:APA91bG-
ibWUznAImUmsdmJG6NsZVXy8KgGazESfVwSRXx3xT9Zw060Jdp6wOlB7kon
ATcugJX2Oje1PaELf3HplGf1SsQE-
QiAw0Gl4VnPCfwzT0woK3P_RzT3ehGSFbgafJUw-RYG3",
forHTTPHeaderField: "Authorization")

        let task =  URLSession.shared.dataTask(with:
request as URLRequest)  { (data, response, error) in
            do {
                if let jsonData = data {
                    if let jsonDataDict  = try
JSONSerialization.jsonObject(with: jsonData, options:
JSONSerialization.ReadingOptions.allowFragments) as?
[String: AnyObject] {
                        NSLog("Received data:\n\
(jsonDataDict))")
                    }
                }
            } catch let err as NSError {
                print(err.debugDescription)
            }
        }
        task.resume()
    }
}
```

Please notice that you need to replace the ***Authorization*** header with your own server key. You can get that from **Firebase Console** -> **Project Settings** -> **Cloud Messaging**. And that's it. All you need to do to send a notification from an iOS device to another iOS device (for which you know the push token) is this:

```
let sender = PushNotificationSender()
sender.sendPushNotification(to: "token", title:
"Notification title", body: "Notification body")
```

Easy, right? This is assuming you know the push notification token. But that's easy to retrieve for any user because you've stored the push tokens in the users_table in Firestore, each time a user accepts the push permissions dialog.

You can download our open-source Firebase Push Notifications Starter Kit to bypass all these steps. Regardless, you still need to configure your own Apple certificates as well as Firebase projects to be able to send your own notifications.

Before submitting to the App Store, make sure you generate a production certificate and upload the .p12 file to Firebase.

Was this tutorial useful to you? Please let us know in the comments, star our Github repo, and consider sharing the article to other people who might need it.

Categories: IOS DEVELOPMENT

SWIFT PROGRAMMING

28 Comments

Han · June 9, 2019 at 3:45 am

This was insanely helpful! There really isn't anything online how to send push notifications without having to have web server knowledge. Just wanted to add this comment to encourage these great and useful posts. Thank you

REPLY

florian · June 9, 2019 at 3:50 am

Awesome, I'm glad it helped. Sending push notifications without any web server knowledge was the reason I wrote it.

REPLY

ZetRider · June 17, 2019 at 10:46 am

Hi, thanks it's work! But you should set
FirebaseApp.configure()
before
let pushManager = …

otherwise you can't get token from
Messaging.messaging().fcmToken

REPLY

florian · June 19, 2019 at 7:35 pm

Good catch. Thanks for sharing the tip!

REPLY

Nil · July 14, 2019 at 8:15 pm

Thanks for the tutorial! I just have a question, nothing is being saved under Firestore in my app project, but I don't know what I forgot or did wrong

REPLY

florian · July 16, 2019 at 2:15 am

You need to turn on Firebase Firestore and set the write rules to "public" (in Firebase Console).

REPLY

Abdul · July 16, 2019 at 1:25 pm

let pushManager = PushNotificationManager(userID: "currently_logged_in_user_id")

what userID should be used here for getting push notifications |?

REPLY

florian · July 17, 2019 at 2:48 am

Hey, you need to use the user ID that's currently logged in (UUID column from Firebase Auth)

REPLY

Om · July 27, 2019 at 12:04 am

This only works some of the times. I have to keep deleting the app and reinstalling it to get notifications. Is there a more correct way of doing

this so once it works, it actually works?

REPLY

Jack · September 11, 2019 at 12:58 am

Awesome tutorial – thanks for sharing – I am wondering how you get the "currently_logged_in_user_id" before didFinishLaunchingWithOptions runs in AppDelegate? I can't figure out how to set "currently_logged_in_user_id" quickly enough to allow it to be sent to Firestore.

REPLY

florian · September 11, 2019 at 2:48 am

Hey Jack, thanks! That's actually a good point. I think it'd be better if we don't pass the userID at all in the constructor of PushNotificationManager, but instead, just pass in the userID in the updateFirestorePushTokenIfNeeded method. In this way, we register for push right when the app opens, without needing a userID, and only once we have an actual userID we get to update the push token in Firebase. Let me know if this makes sense

REPLY

reham · September 19, 2019 at 2:43 pm

when send notification from firebase console , received notification exactly
but when send it from code not received it , why?

REPLY

florian · September 19, 2019 at 6:41 pm

What code are you using to send notifications?

REPLY

reham · September 22, 2019 at 10:11 am

thanks for your help , i used your code , i solved it by added
“priority” : “high” to paramString: [String : Any]

REPLY

Nathan · October 2, 2019 at 9:17 am

Hey Reham i have the same problem as you, i added “priority” : “high” to paramString: [String : Any] but i don t receive any notification. but with firebase console everything works

REPLY

florian · October 8, 2019 at 5:00 am

Hey guys, did you update the sender class with your correct Authorization key?

Nathan · October 8, 2019 at 12:12 pm

Yes i put my key from firebase in : request.setValue(“key=MY_KEY”, forHTTPHeaderField: “Authorization”)

Nathan · October 2, 2019 at 9:21 am

Hey Reham i have the same problem as you. Even if i add

“priority” : “high” nothing happen. But in firebase console everything work.

REPLY

Jorge · October 7, 2019 at 1:32 pm

Hey Reham i have the same problem has you even if i add “priority” : “high” to paramString: [String : Any].

REPLY

bvbvbvb · October 7, 2019 at 2:13 pm

Same problem as reham even if i add priority high :/

REPLY

Hey · October 7, 2019 at 3:12 pm

Nice tutorial, but I have a question, why “didReceive remoteMessage” is not called and “print(remoteMessage.appData)” is not printed? Thanks

REPLY

Hey · October 7, 2019 at 3:13 pm

Nice tutorial, but I have a question, why “didReceive remoteMessage” is not called and “print(remoteMessage.appData)” is not printed? And why are you using certificate instead of key? Thanks

REPLY

Faure Baptiste · November 13, 2019 at 4:55 pm

Simply perfect ! Thank you so much ! Extremely well explained and detailed, providing the code but still making it clear to understand for new people using firebase messaging.

REPLY

Aroon Nair · February 14, 2020 at 3:05 am

florian, I can't thank you enough. Your solution was to the point and saved me many many hours as I was writing up the code from scratch. However, thank you!

REPLY

Mina Gerges · February 27, 2020 at 3:27 pm

Thanks so much .
It's a nice , helpful and well-organized tutorial.

REPLY

Nouha · March 15, 2020 at 10:46 am

Thank you so much! I believe this was the most helpful tutorial in firebase messaging available online so far! Thanks again!

REPLY

Arpita · March 16, 2020 at 11:23 am

Great and very easy tutorial. But I am getting this error :
Invalid value around character 0." UserInfo= {NSDebugDescription=Invalid value around character 0.

In sendPushNotification(…) function .

Please help me

REPLY

Sean · April 11, 2020 at 3:14 pm

AWESOME stuff. Really didn't realise I could get push notifications going without knowing javascript until I found this. SO so helpful.

Added sound and badge info to the payload and it

all works just lovely.

Cheers!

REPLY

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