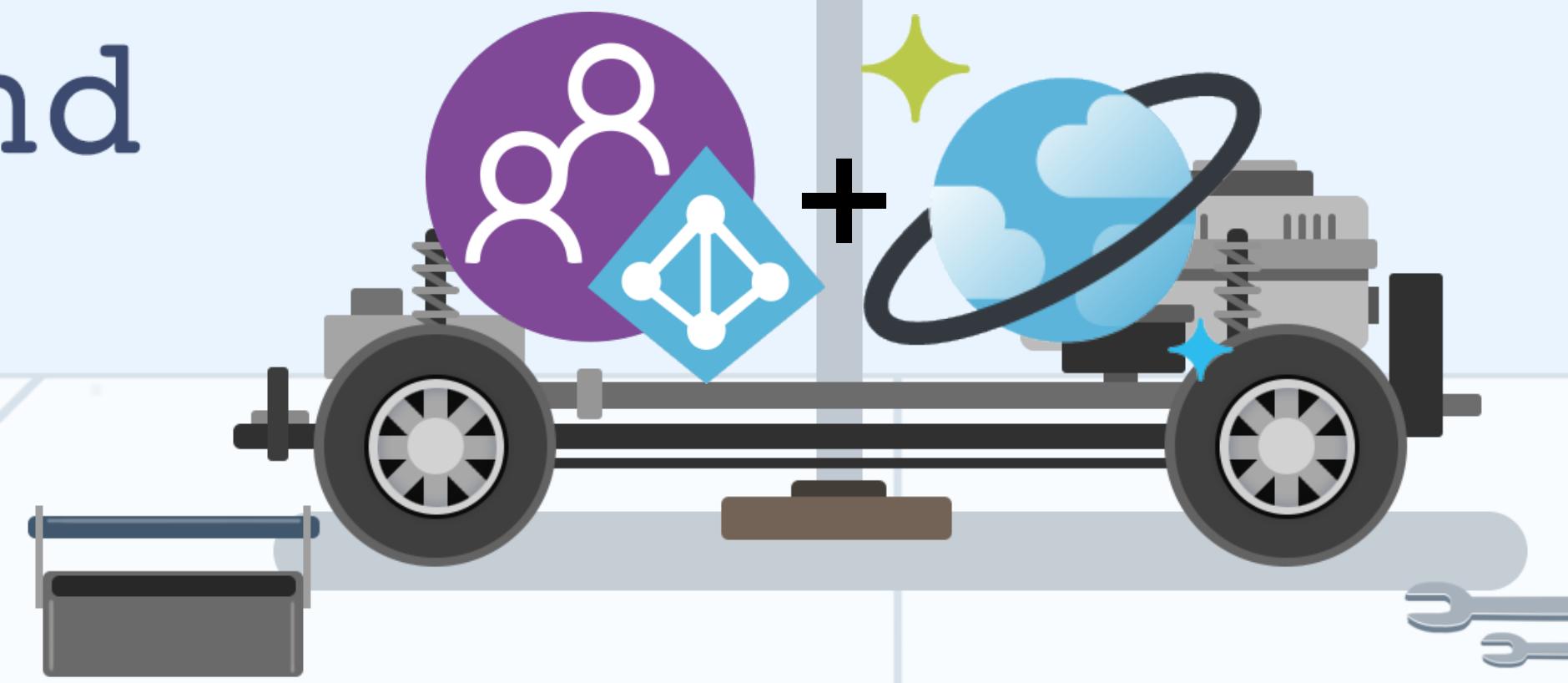


*Frontend*



*Backend*



TURN YOUR PENNIES INTO A MOBILE APP BACKEND WITH  
AZURE AD B2C & COSMOS DB

# ABOUT ME

## Tom Soderling

Sr. Mobile Apps Developer @ Polaris Industries; Ride Command  
Xamarin.Forms enthusiast & DevOps hobbyist  
5-year Xamarin Certified Mobile Developer

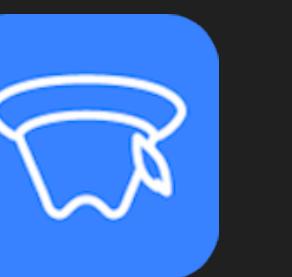
Blog: <https://tomsoderling.github.io>

GitHub: <https://github.com/TomSoderling>

Twitter: [@tomsoderling](https://twitter.com/tomsoderling)



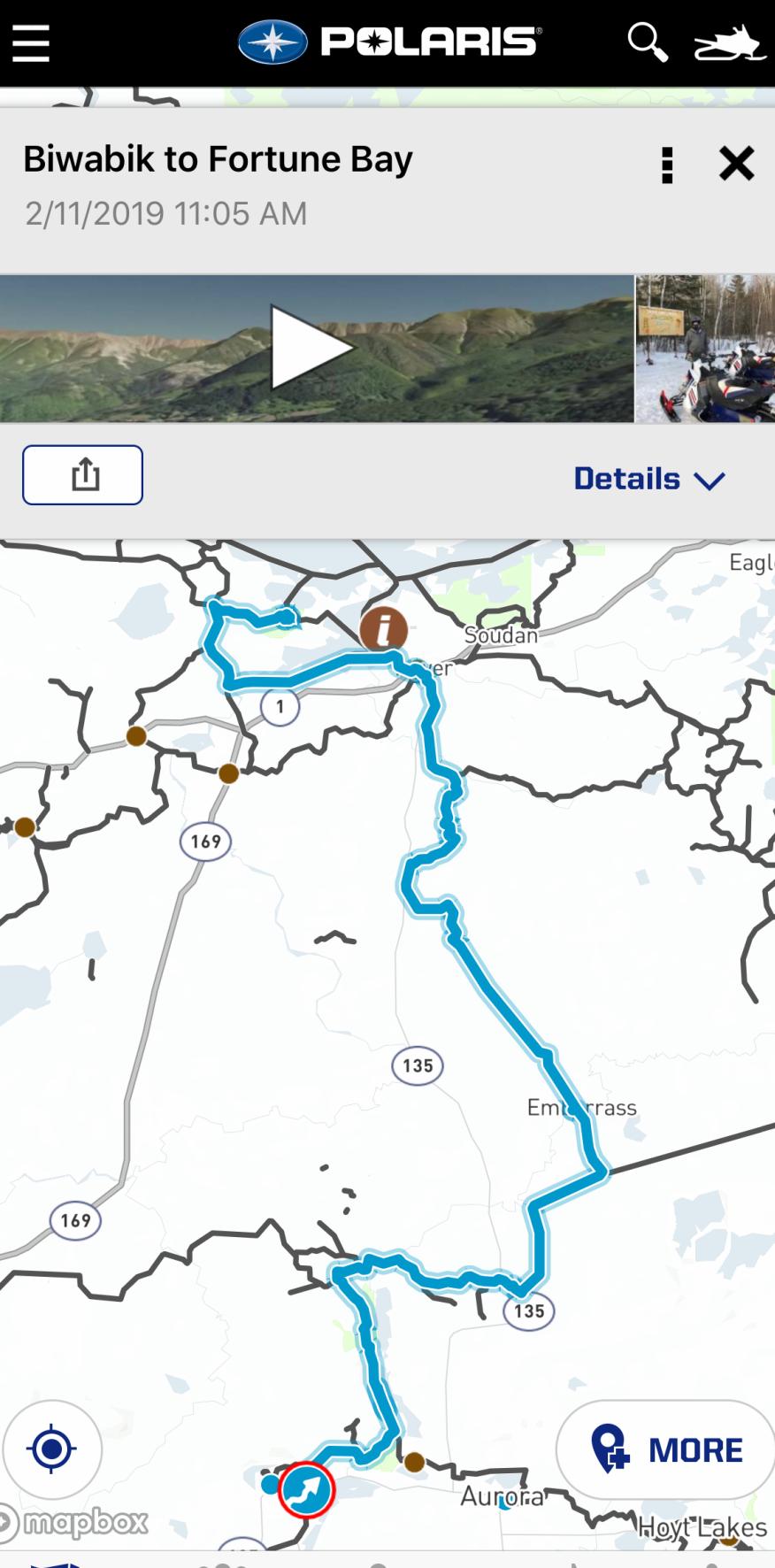
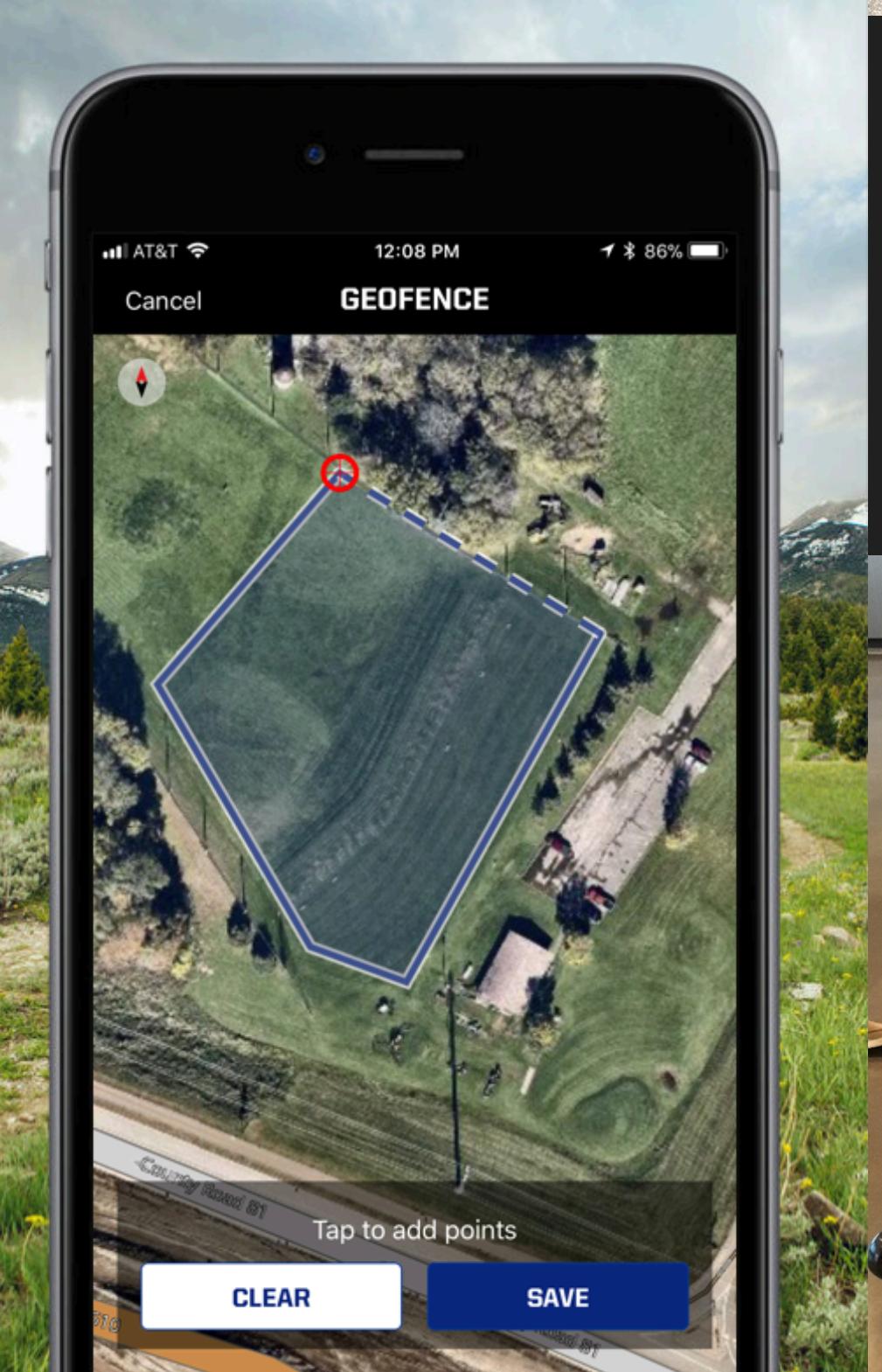
How Deep  
Is It?



Pickster



Spaniel



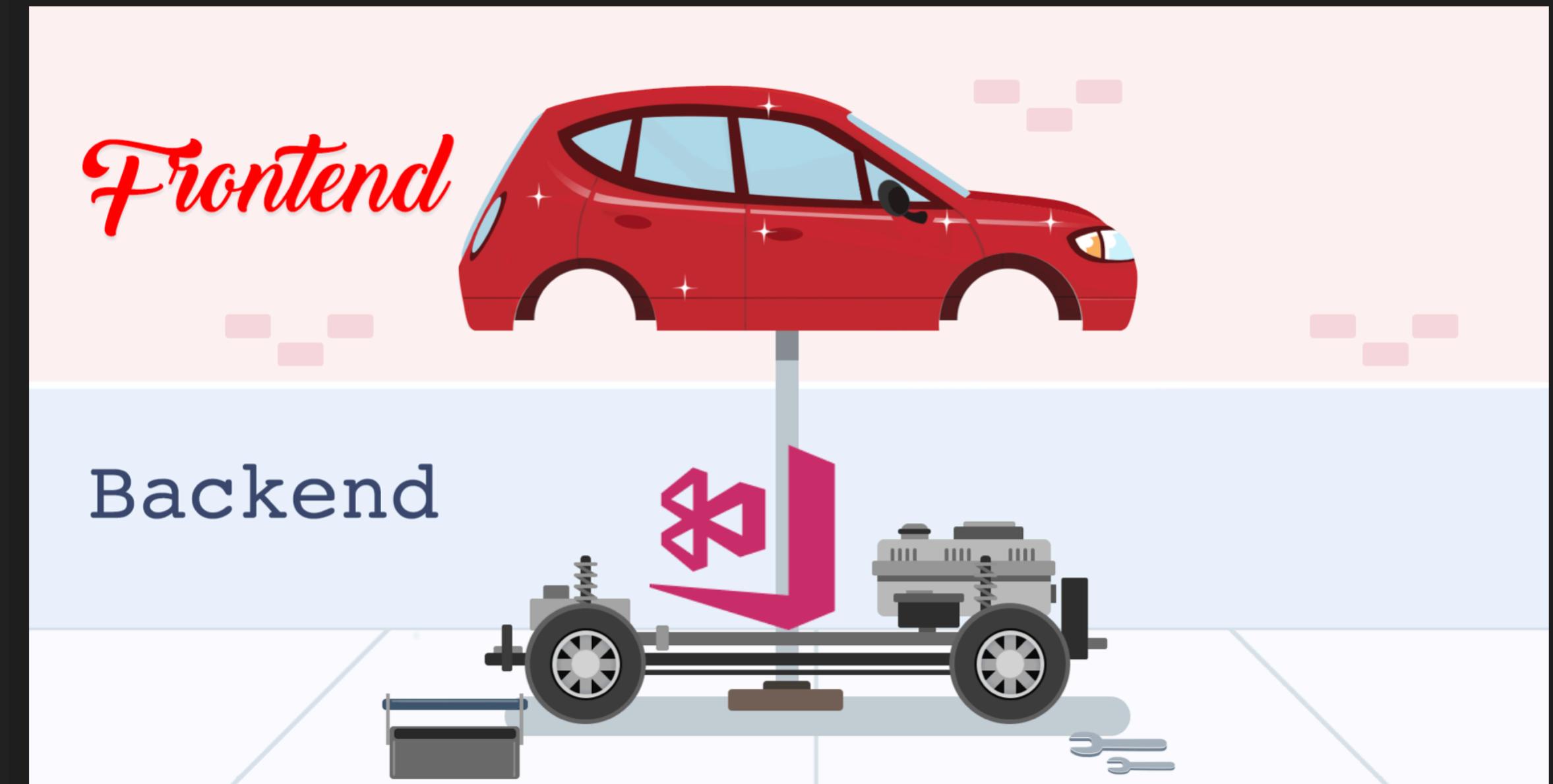
# THE PLAN

- **Introduction: What and Why**
- Authentication with Azure AD B2C
- Data with Cosmos DB
- Next Steps & Resources

Please ask any questions that come up!

# INTRODUCTION

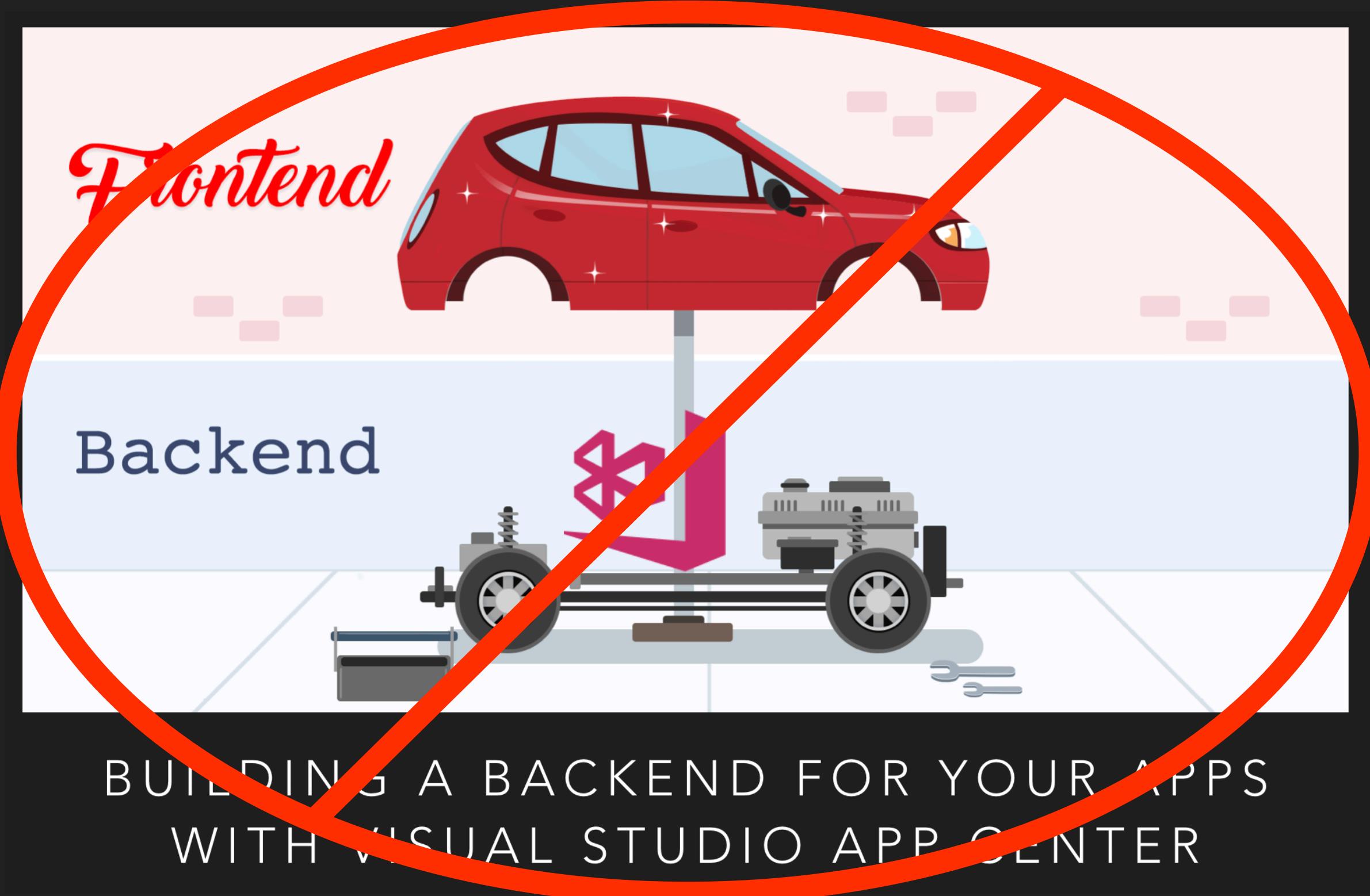
- Up until 2 weeks ago this talk was:



BUILDING A BACKEND FOR YOUR APPS  
WITH VISUAL STUDIO APP CENTER

# INTRODUCTION

- Microsoft retiring MBaaS services
  - Auth
  - Data
  - Push Notifications
- Focus on DevOps-related services
- May 3rd is the official date they'll disappear if you have them configured



# INTRODUCTION

- MBaaS Services
  - Auth → • Azure Service
  - Data → • Active Directory B2C
  - Push Notifications → • Cosmos DB
  - Notification Hubs

# INTRODUCTION

- No replacements for:
  - Easy setup wizards
  - Auto-configuration
  - Magical, simplified SDKs
  - Offline read/write caching
- Zumo (Azure Mobile Apps) team was part of App Center team
  - Continued support, but no future feature development
- There is a need for MBaaS products

# THE PLAN

- Introduction: What and Why
- **Authentication with Azure AD B2C**
- Data with Cosmos DB
- Next Steps & Resources

# AUTHENTICATION

- Who wants to be in charge of storing usernames and passwords?



# AUTHENTICATION WITH AZURE AD B2C

- Azure Active Directory (AD) B2C (Business to Consumer)
  - Enterprise-grade, highly available, and secure global service
  - SDK: Microsoft Authentication Library (MSAL)
    - Allows your application to access identities in Azure AD B2C
    - The App Center Data SDK wrapped this library
  - Azure AD B2C implements a form of the OpenID Connect and OAuth 2.0 protocols
  - 3rd party identity providers: Facebook, Google, Twitter, LinkedIn, +more



# ANATOMY OF AZURE AD B2C AUTH



Azure AD B2C Tenant

Represents your organization. A top-level container for your user objects.



Application

Models your mobile/WebAPI app within the Azure B2C Tenant. Specifies where the access token should be sent



User Flow or Policy

The experience that your users will go through to log in or create an account for your app

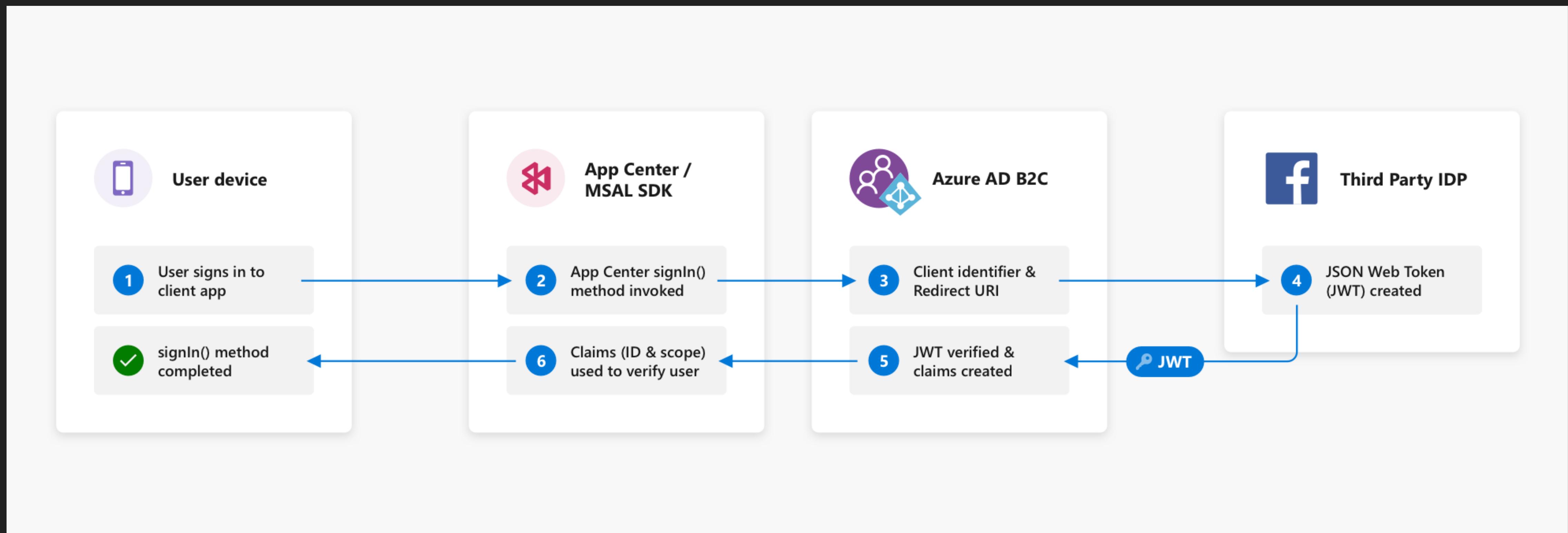


Scopes

A way to manage permissions to your protected resources

# AUTHENTICATION WITH AZURE AD B2C

- How it works
  - Token exchange service



# AUTHENTICATION WITH AZURE AD B2C

- Pricing
- Azure AD B2C is a free service, but you pay for authentications
  - Priced on a Monthly Active User basis (MAU)
  - The first 50,000 authentications/mo are free
  - Next 50,000 are \$0.0055 per MAU
- An authentication = a token issued for sign-in request or token refresh for a unique user within a given calendar month
- Storage of authenticated users in the Azure AD B2C tenant is free
- Multi-Factor Authentication: flat fee of \$0.03 per auth

# AUTHENTICATION WITH AZURE AD B2C

- **Demo**
  - Setup in Azure portal
  - Code
    - App setup
    - Sign in/out
    - Parse claims from JWT token
    - Associate App Center Crashes & Errors

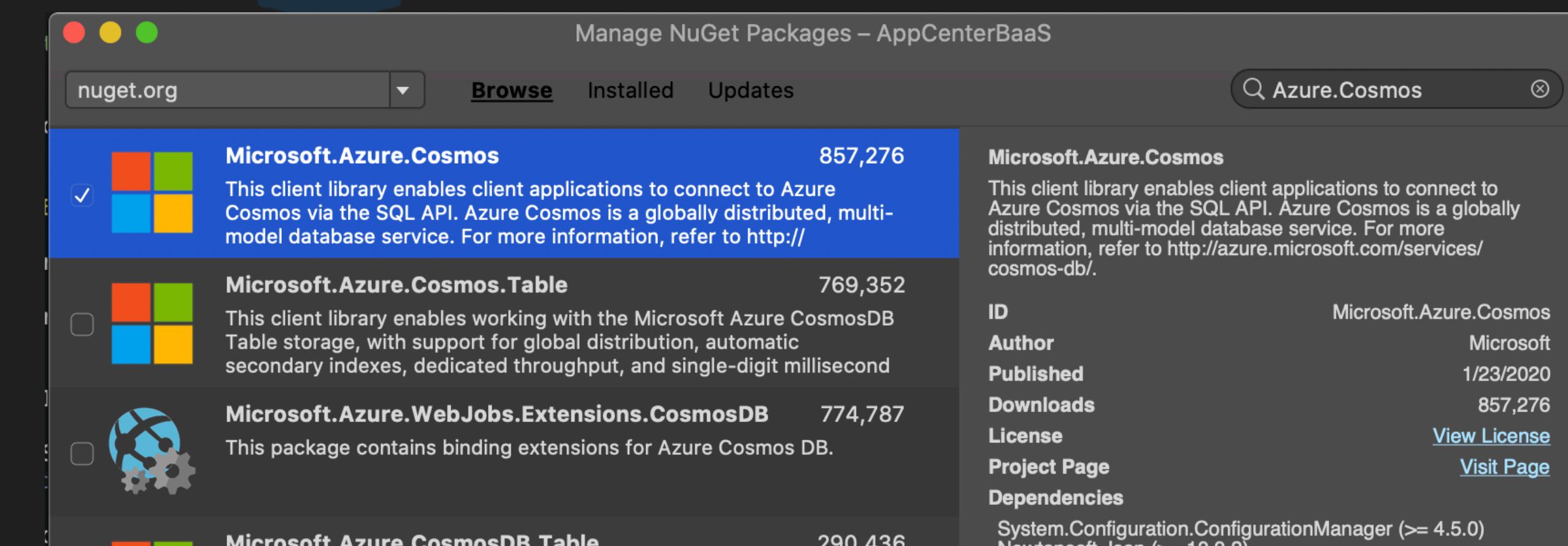


# THE PLAN

- Introduction: What and Why
- Authentication with Azure AD B2C
- **Data with Cosmos DB**
- Next Steps & Resources

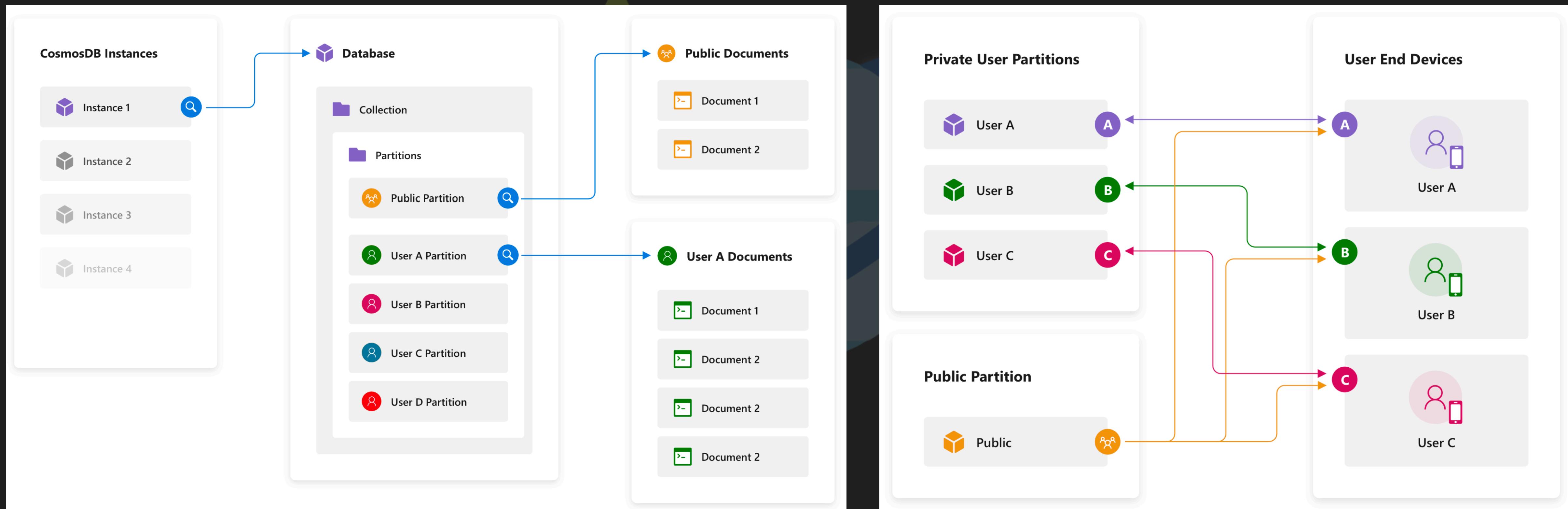
# DATA WITH COSMOS DB

- Cosmos DB
  - Azure hosted, globally distributed, NoSQL database
  - Low latency, high availability, and high scalability for all of your data
  - Next evolution of DocumentDB
- Interactions
  - CRUD operations via Microsoft.Azure.Cosmos SDK
- Version 3 and up



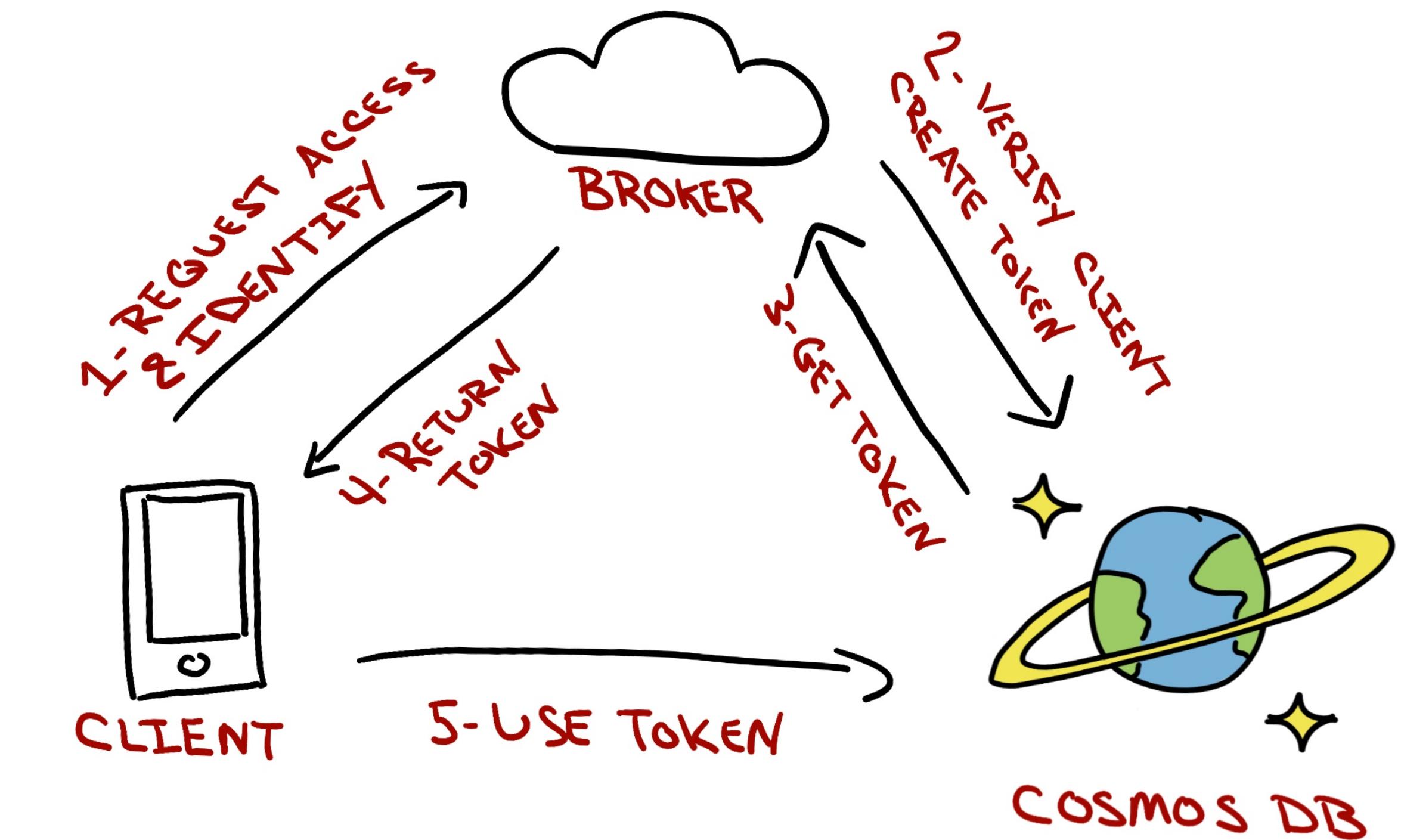
# DATA WITH COSMOS DB

- Data Architecture



# DATA WITH COSMOS DB

- One missing piece App Center was doing
- Resource token broker
- Only get access to the data belonging to your authenticated user
- Looks like it can be done with an Azure Function



# DATA WITH COSMOS DB

- Pricing
  - You pay for the throughput reserved and the storage that you consume
  - Lowest throughput tier is 400 RU/s (Request Unit per second)
    - \$0.77/day, \$24/mo
  - Request Unit is the currency for throughput
    - 1 RU = the cost to read a 1 KB item
    - All other database operations are assigned an RU cost
  - SSD Storage: \$0.25 GB/mo

# DATA WITH COSMOS DB

- **Demo**
  - Azure Portal
    - Cosmos DB Account
    - Generated quickstart Xamarin app
  - Data explorer
- Code
  - App setup
  - List Documents
  - Read Document by ID
  - Upsert & Delete



# THE PLAN

- Introduction: What and Why
- Authentication with Azure AD B2C
- Data with Cosmos DB
- **Next Steps & Resources**

## NEXT STEPS

- Find a good/easy/cheap way to implement resource token broker
- Use Sign-in with Apple as identity provider

# COMMON ISSUES

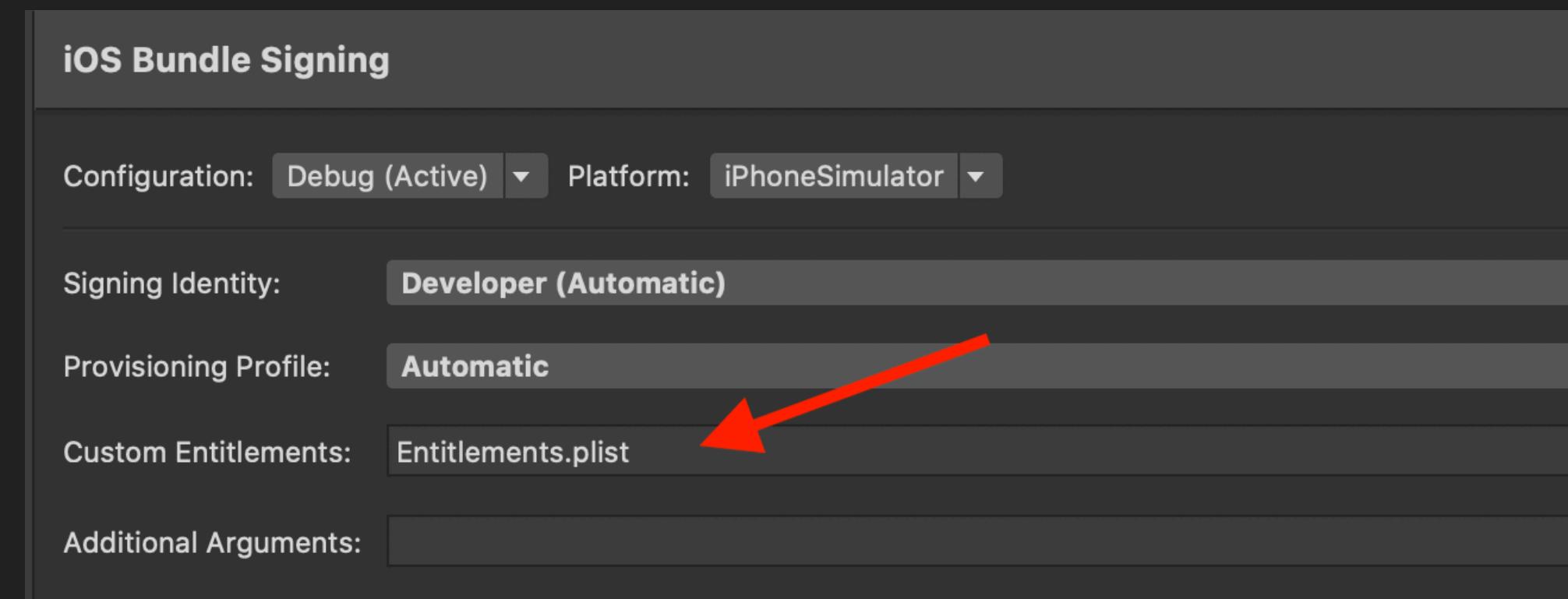
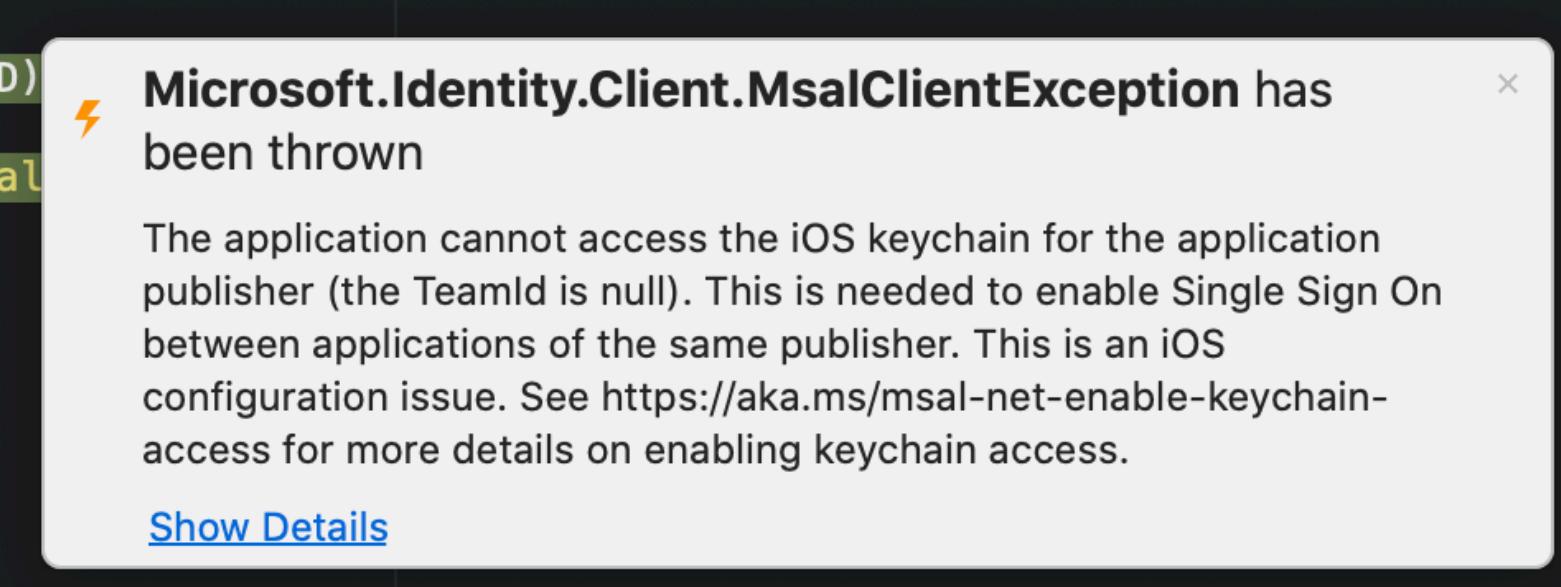
- "User scope is not supported" when attempting login
  - MSAL.Xamarin.iOS.4.8.1.0.MsalServiceException: ErrorCode: invalid\_request  
Microsoft.Identity.Client.MsalServiceException: AADB2C90117: The scope 'User.Read' provided in the request is not supported.
- Answer:
  - My scope name was "user\_impersonation", and it has to be formatted a particular way:  
`https://{{tenantName}}/{{AppID URI}}/{{Scope Name}}`
- Cannot access the iOS keychain for the application publisher
  - Answer: have to specify a custom entitlements file

```
public App()
{
    InitializeComponent();

    PCA = PublicClientApplicationBuilder.Create(ClientID)
        .WithRedirectUri($"msal{RedirectUri}://auth")
        .WithIosKeychainSecurityGroup("com.microsoft.adal")
        .Build();

    MainPage = new MainTabbedPage();
}

protected override void OnStart()
{
    // Handle when your app starts
}
```



# RESOURCES

- App code and slides <https://github.com/TomSoderling/AppCenterMBaaSDemo/tree/Converting>
- Overview of Azure AD B2C <https://docs.microsoft.com/en-us/azure/active-directory-b2c/overview>
- Overview of MSAL library <https://docs.microsoft.com/en-us/azure/active-directory/develop/msal-overview>
- Cosmos DB SDK on NuGet <https://www.nuget.org/packages/Microsoft.Azure.Cosmos>
- Xamarin and Cosmos DB tutorial <https://docs.microsoft.com/en-us/azure/cosmos-db/mobile-apps-with-xamarin>
- Cosmos DB v3 SDK Quickstart <https://docs.microsoft.com/en-us/azure/cosmos-db/create-sql-api-dotnet>
- Azure Function Resource Token Broker <https://github.com/adamhockemeyer/Azure-Functions---CosmosDB-ResourceToken-Broker>
- Sign in with Google Account directions <https://docs.microsoft.com/en-us/azure/active-directory-b2c/active-directory-b2c-setup-goog-app>
- Sign in with Apple, B2C directions <https://github.com/azure-ad-b2c/samples/tree/master/policies/sign-in-with-apple>
- App Center MBaaS Service Retirement <https://devblogs.microsoft.com/appcenter/app-center-mbaas-retirement>