Real-Time Collaborative Apps with Realm

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realm

Agenda

- Intro to the Realm Mobile Database
- Getting started with the Realm Mobile Platform
- [Demo] Deploying on Azure
- [Demo] Implementing a messaging app

Realm Mobile Database

- On-device cross-platform **object** database
- Launched July 2014
- Developed in the open, fully open source
- 19K+ GitHub stars, 100K+ active developers

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How does it differ from SQLite?

Realm is an object database

- Realm is built from scratch and optimized specifically for mobile
- There is no translation layer - the objects are the database
- Realm is fast and therefore easy on the battery.

How do I use it?

Models

```
public class Dog : RealmObject
{
    public string Name { get; set; }
    public int Age { get; set; }
}
```

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Use **LINQ** to perform complex queries across your object graph

```
// Fluent or Extension Syntax
var oldDogs = realm.All<Dog>().Where(d => d.Age > 8);

// RealmResult collection conforms to the IQueryable
foreach (var d in oldDogs)
{
    Debug.WriteLine(d.Name);
}
```

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Mutate data in transactions

```
realm.Write(() =>
{
    realm.Add(new Dog { Name = "Rex", Age = 1 });
    realm.Add(new Dog { Name = "Fido", Age = 2 });
});
```

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Relations work like they should

```
public class Dog : RealmObject
{
    public string Name { get; set; }
    public int Age { get; set; }
}

public class Person : RealmObject
{
    public string Name { get; set; }
    public IList<Dog> Dogs { get; }
}
```

Notice that there is no ID property on Dog

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Liveness and reactiveness

Objects and queries represent the current state of the database. You don't need to manually refresh.

Realm objects **live-update** in response to changes

```
var puppies = realm.All<Dog>().Where(d => d.Age < 2);

puppies.Count(); // => 0 because no dogs have been added yet

// Update and persist objects with a transaction
realm.Write(() =>
{
    realm.Add(new Dog
    {
        Name = "Rex",
        Age = 1
    });
});

// Queries are updated in realtime
puppies.Count(); // => 1
```

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Databinding

All RealmObject's implement INotifyPropertyChanged.
Lists and query results implement INotifyCollectionChanged.

These work cross-thread and cross processes.

TwoWay databinding

All RealmObject's implement IReflectableType to handle properties being set by the binding engine

Threading

```
public class Dog : RealmObject
{
    [PrimaryKey]
    public string Id { get; set; } = Guid.NewGuid().ToString();

    public string Name { get; set; }
    public int Age { get; set; }
}

string id = null;
realm.Write(() =>
{
    var dog = realm.Add(new Dog { Name = "Rex", Age = 1 });
    id = dog.Id;
});

Task.Run(() =>
{
    var realm = Realm.GetInstance();
    var dog = realm.Find<Dog>(id);
    // compute something really expensive here
});
```

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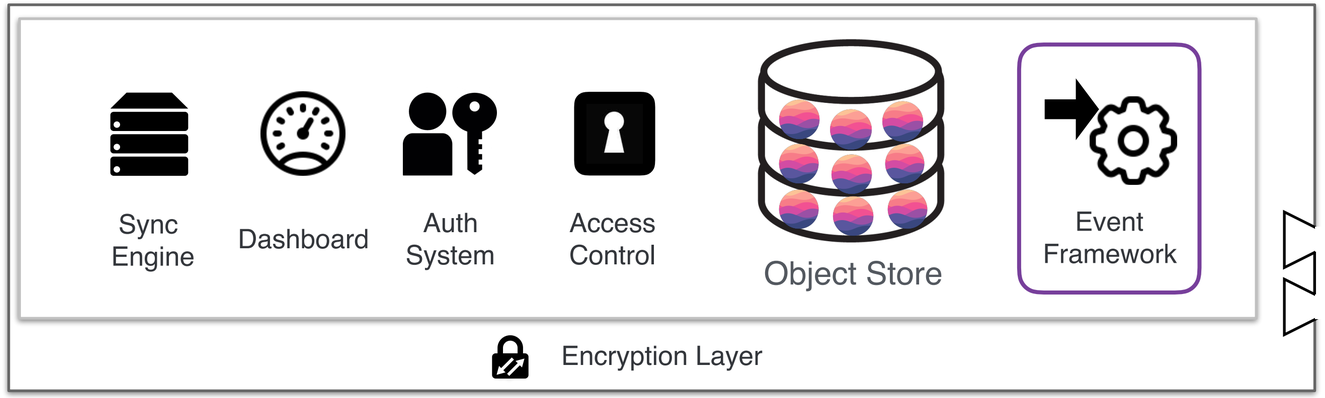
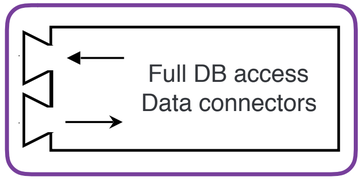
Realm Mobile Platform

What is it?

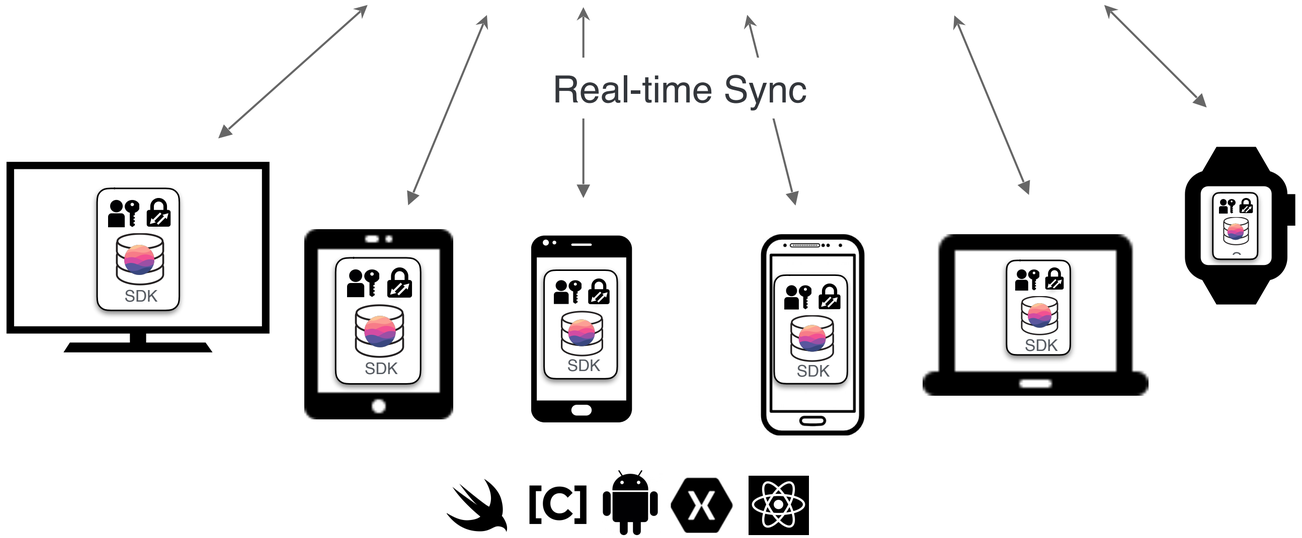
Realm Object Server NEW





Enterprise Feature

Realm Mobile Database



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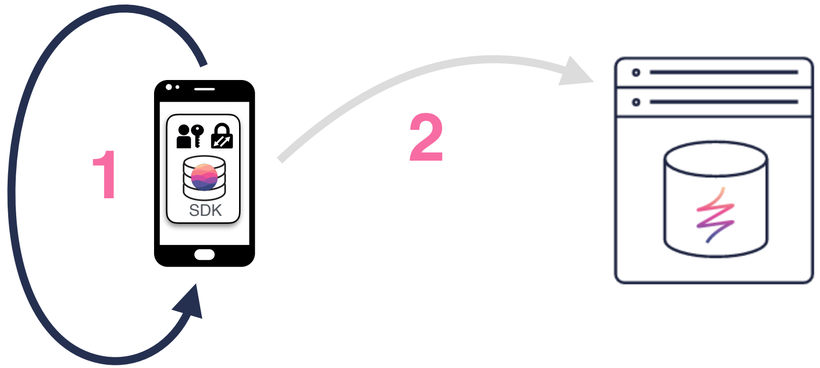
Eliminate Network Challenges

- Offline-first
- Full database on the device
  - Queries run locally
  - Writes apply immediately
- Reactive architecture keeps UI up-to-date
- Automatic sync happens in the background
- Resilient to any network conditions



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Open your realm with sync

```
var credentials = Credentials.UsernamePassword(username, password, false);

var authURL = new Uri("http://my.realm-auth-server.com:9080");
var user = await User.LoginAsync(credentials, authURL);

var serverURL = new Uri("realm://my.realm-server.com/~/default");
var configuration = new SyncConfiguration(user, serverURL);

var realm = Realm.GetInstance(syncConfiguration);
```

Demo

Tips and key takeaways

- Use multiple realms in an app
- Make the most of databinding support
- Back the smallest shareable unit with a single realm

Questions?

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