Security Risks

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What are we protecting against?

- Indirect Attacks
- Direct Attacks
- Theft / Physical Attacks

Personal Data
Sensitive Data

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40%

- Cases where is was possible to recover passwords from stolen devices

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"Security in IT is like locking your house or car – it doesn't stop the bad guys, but if it's good enough they may move on to an easier target."

Paul Herbka
VP at IT security firm South Seas Corp

Application Data Storage

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AES Encryption

- Advanced Encryption Standard
- Symmetric Encryption
- Requires a key

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System.Security.Cryptography

- Part of the .NET Framework
- Easy to use
- Keys can be auto generated for ease of use
- Default properties are safe to use
- Supports *Secret-Key* encryption and *Public-Key* encryption

You don't need to be an expert

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Secret Key Encryption

- Also known as symmetric encryption
- Uses a single secret key to encrypt and decrypt data
- Key MUST be kept secret
- Algorithms are typically very fast

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AES Encryption / Decryption

```
using System.Security.Cryptography;

public static string EncryptStringAES (string plainText,
                                       string sharedSecret)
{
}

public static string DecryptStringAES (string encryptedText,
                                       string sharedSecret)
{
}
```

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RijndaelManaged class

- Gives access to encryption algorithms
- Use with **Rfc2898DeriveBytes()** to create sufficiently strong encryption keys

```
// generate the key from shared secret and salt
// with repeating hashing to create a longer key
var key = new Rfc2898DeriveBytes(sharedSecret, Salt);
aesAlgorithm = new RijndaelManaged();
aesAlgorithm.Key = key.GetBytes(aesAlgorithm.KeySize / 8);
```

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It's better with Salt

- Random Data
- Added to the end of Keys
- Defends against *Dictionary Attacks*

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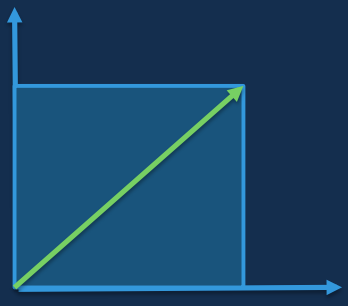
Initialization Vector

- Commonly referred to as "IV"
- Random Value
- Ensures that the encrypted data is always different
- Provided by our Encryption object (RijndaelManaged)



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ICryptoTransform Interface

- Used to manage Encryption block size
- Represents the cryptographic transform (encryption / decryption)

- `CreateEncryptor()` – if you want to *encrypt* data
- `CreateDecryptor()` – if you want to *decrypt* data

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Demo

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Accessing Web Services with OAuth

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OAuth

- Allow 3rd parties access to a resource without giving them login credentials
- Designed to work over HTTP
- Uses Access Tokens instead of direct login information

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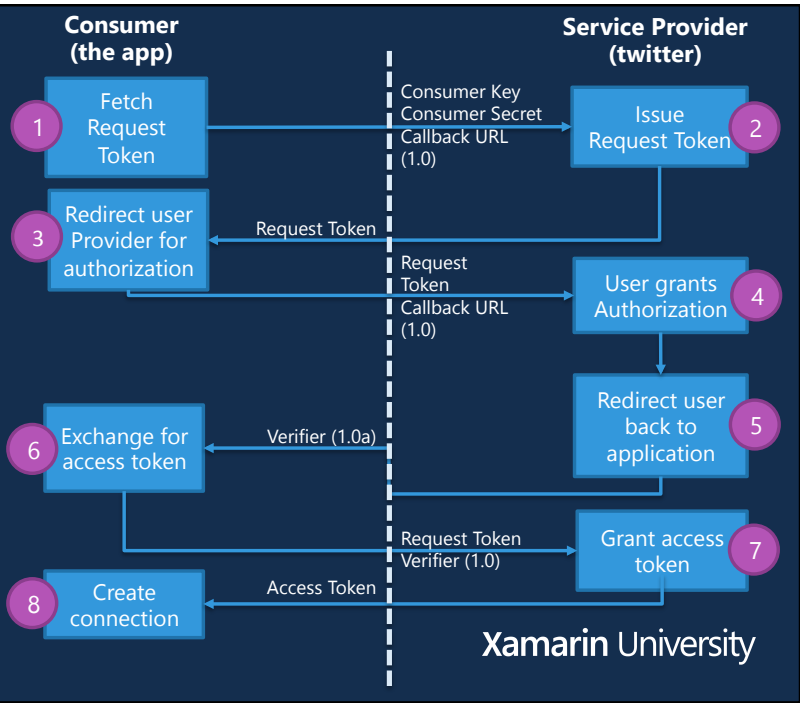
OAuth 1. 0 Flow

- 3 *Actors*, the User, the Consumer and the Service Provider
- The Consumer gains access to the Provider
- The Consumer never sees the Login information



Xamarin.Auth

- Cross-platform API for Authentication
- Xamarin.iOS & Xamarin.Android
- Supports OAuth 1.0 & 2.0
- Open Source & Extensible

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OAuth 2.0

```
using Xamarin.Auth;
...
var auth = new OAuth2Authenticator (
          clientId: "App ID from https://developers.facebook.com/apps",
          scope: "",
          authorizeUrl: new Uri ("https://m.facebook.com/dialog/oauth/"),
          redirectUrl: new Uri
             ("http://www.facebook.com/connect/login_success.html"));
```

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Demo

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Summary

- Protect your user's data with symmetric encryption
- **System.Security.Cryptography** provides the tools we need for encryption
- **Xamarin.Auth** makes accessing OAuth enabled services much easier

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Securing Data in your Mobile Apps

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