

# Publishing to Azure

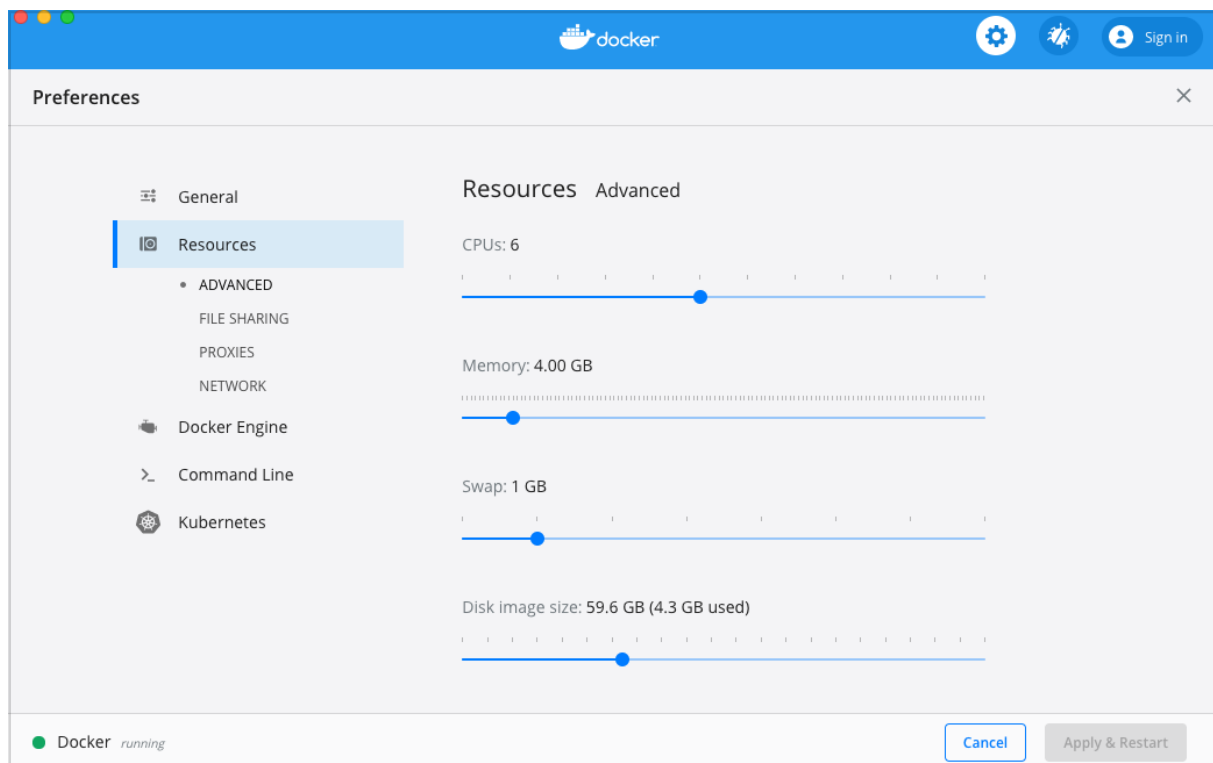
First of all we want to make sure our app runs without issue on Sql Server 2019. For windows you can just install this directly, but for Mac/Linux then you can get a docker image of SQL as Microsoft now has a Linux version of SQL. If you are on Windows but do not have SQL installed then so long as you have Docker then you can go ahead and do the same as me.

## Setting up Sql Server for Development

Since SQL is a bit of a big install I'm going to download the files to my computer by running the following command:

```
docker pull microsoft/mssql-server-linux:latest
```

SQL Server requires a bit more memory than other DBs so I am also going to increase the memory for Docker in the preferences to 4GB:

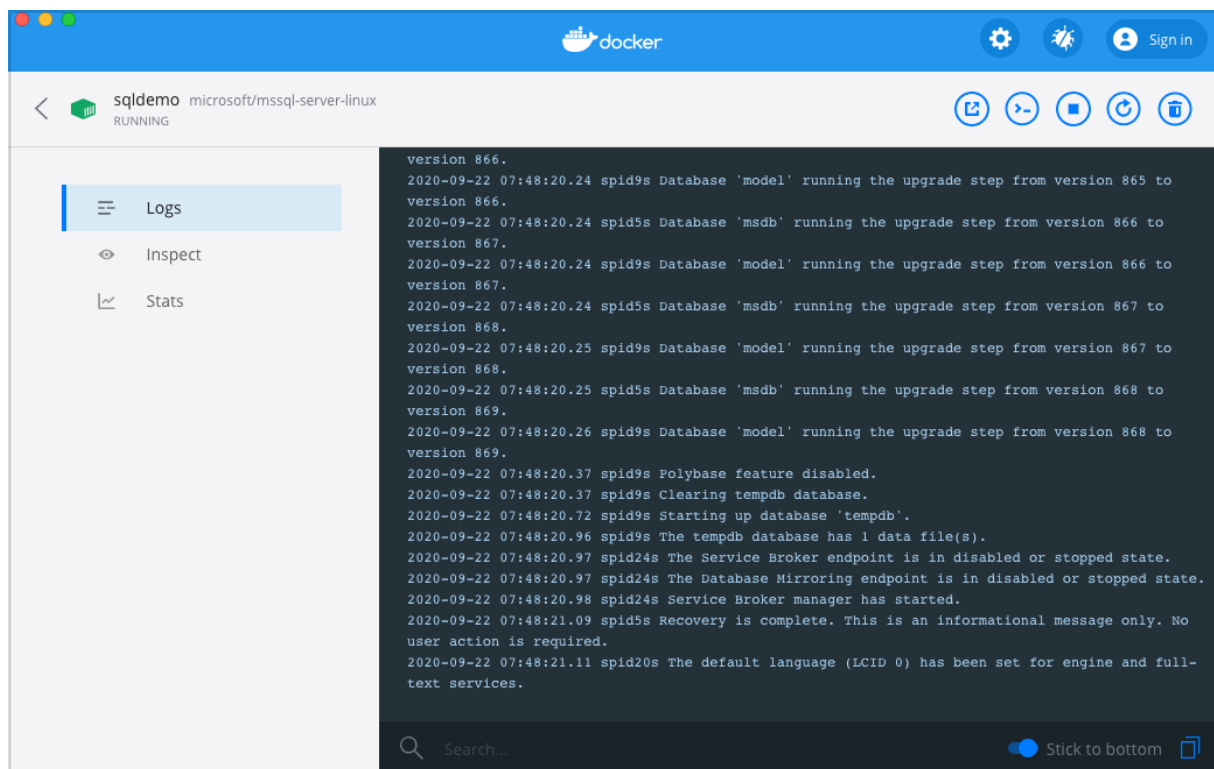


Then we can run the following command to run the SQL Server:

```
docker run -d --name sqldemo -e 'ACCEPT_EULA=Y' -e 'SA_PASSWORD=Password1!' -p 1433:1433 microsoft/mssql-server-linux
```

Sql SA account needs a strong password, and I am not saying the above is(!) but it does meet the complexity requirements.

Should see this now in the docker dashboard:



## Switching to use SQL Server for dev.

I'm going to create a new branch so that I do not interfere with the master branch. Run the following:

```
git checkout -b AzurePublish
```

Add the following Sql Server provider via Nuget:

Microsoft.EntityFrameworkCore.SqlServer

You can remove the package for Sqlite and Postgres if you still have them installed - we only need SqlServer for this

Ensure you pick the same version as your runtime.

Open the **appsettings.development.json** and change the default connection string to the following:

```
"ConnectionStrings" : {  
  "DefaultConnection": "Server=localhost; User Id=sa; Password=Password1!;  
Database=datingappdb"  
},
```

Update the ApplicationServiceExtensions to use this:

```
services.AddDbContext<DataContext>(options =>  
{  
  
options.UseSqlServer(config.GetConnectionString("DefaultConnection"));  
});
```

Delete the migrations folder from Data/Migrations and create a new migration for the Sql Server provider:

```
dotnet ef migrations add SqlInitial -o Data/Migrations
```

Check the migration and ensure you can see Sql server specific annotations in there:

```
migrationBuilder.CreateTable(
    name: "AspNetRoles",
    columns: table => new
    {
        Id = table.Column<int>(type: "int", nullable: false)
            .Annotation("SqlServer:Identity", "1, 1"),
        Name = table.Column<string>(type: "nvarchar(256)", maxLength: 256, nullable: true),
        NormalizedName = table.Column<string>(type: "nvarchar(256)", maxLength: 256, nullable: true),
        ConcurrencyStamp = table.Column<string>(type: "nvarchar(max)", nullable: true)
    },
    schema: "dbo",
    ifExists: false);
```

Restart the app and make sure everything works!

Well, it doesn't because Sql server is special:

```
fail: API.Program[0]
      An error occurred during migration
      Microsoft.Data.SqlClient.SqlException (0x80131904): Introducing FOREIGN KEY constraint 'FK_Likes_AspNetUsers_SourceUserId' on table 'Likes' may cause cycles or multiple cascade paths. Specify ON DELETE NO ACTION or ON UPDATE NO ACTION, or modify other FOREIGN KEY constraints.
      Could not create constraint or index. See previous errors.
      at Microsoft.Data.SqlClient.SqlConnection.OnError(SqlException exception, Boolean breakConnection, Action`1 wrapCloseInAction)
      at Microsoft.Data.SqlClient.SqlInternalConnection.OnError(SqlException exception, Boolean breakConnection, Action`1 wrapCloseInAction)
      at Microsoft.Data.SqlClient.TdsParser.ThrowExceptionAndWarning(TdsParserStateObject stateObj, Boolean callerHasConnectionLock, Boolean asyncClose)
      at Microsoft.Data.SqlClient.TdsParser.TryRun(RunBehavior runBehavior, SqlCommand cmdHandler, SqlDataReader dataStream, BulkCopySimpleResultSet bulkCopyHandler, TdsParserStateObject stateObj, Boolean& dataReady)
      at Microsoft.Data.SqlClient.SqlCommand.InternalEndExecuteNonQuery(IAsyncResult asyncResult, Boolean isInternal, String endMethod)
```

So we need to add an extra bit of configuration here to the DataContext.cs class and make sure one of the 'UserLike' specifies no action for the delete behaviour:

```
builder.Entity<UserLike>()
    .HasOne(s => s.SourceUser)
    .WithMany(l => l.LikedUsers)
    .HasForeignKey(s => s.SourceUserId)
    .OnDelete(DeleteBehavior.NoAction);

builder.Entity<UserLike>()
    .HasOne(s => s.LikedUser)
    .WithMany(l => l.LikedByUsers)
    .HasForeignKey(s => s.LikedUserId)
    .OnDelete(DeleteBehavior.Cascade);
```

Delete the migrations folder and recreate the migration

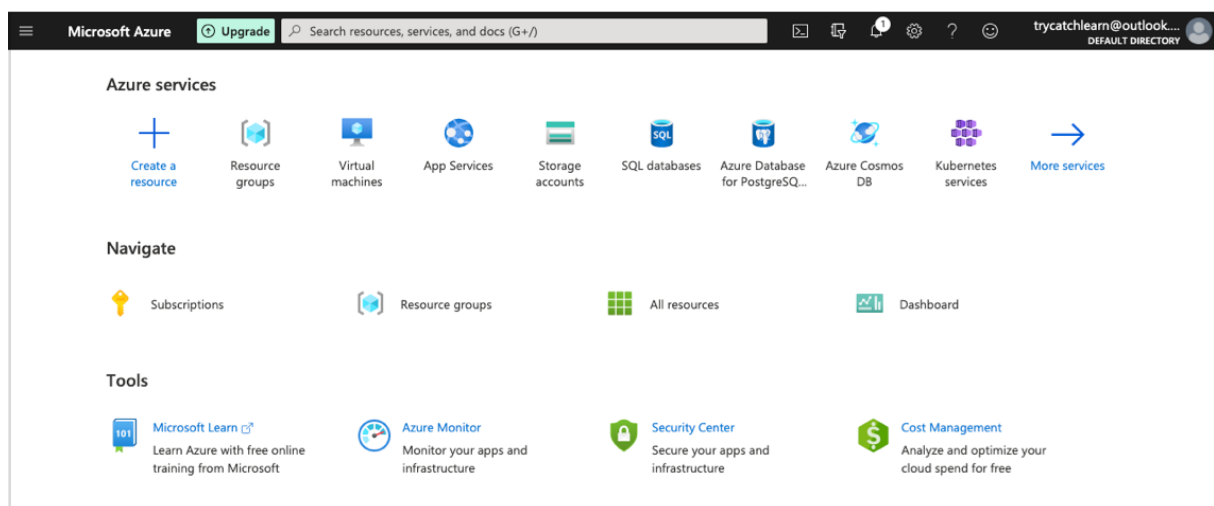
```
dotnet ef migrations add SqlInitial -o Data/Migrations
```

Restart the app again and make sure we have success!

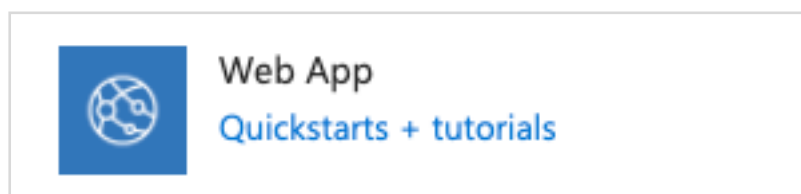
This time everything goes smoothly. Restart the angular app and ensure we can operate the application without any errors on localhost 4200. It should work fine.

## Creating an app service in Azure

Now is time to go and create an app in Azure. If you have never used Azure before then you will be able to use \$150 worth of resources for the first 12 months. You will still need to provide credit card info though which is why this is not part of the main course. Once you are in you should see something like this:



From here we want to create a new resource, so hit the 'Create resource' button, then select 'Web App' from the list:



We then need to complete a form (yay!). You will need to create a resource group which is just a container for... resources.

These are the options I've selected - the goal here is to select the absolute cheapest or

free options available so you will need to be careful as obviously Microsoft will select some expensive defaults for you if you just accept them without changing.

[Home](#) > [New](#) >

## Create Web App

[Basics](#) [Monitoring](#) [Tags](#) [Review + create](#)

App Service Web Apps lets you quickly build, deploy, and scale enterprise-grade web, mobile, and API apps running on any platform. Meet rigorous performance, scalability, security and compliance requirements while using a fully managed platform to perform infrastructure maintenance. [Learn more](#)

### Project Details

Select a subscription to manage deployed resources and costs. Use resource groups like folders to organize and manage all your resources.

Subscription \* ⓘ

Free Trial

Resource Group \* ⓘ

(New) DatingApp

[Create new](#)

### Instance Details

Name \*

datingappcourse

✓

.azurewebsites.net

Publish \*

☒ Code ☐ Docker Container

Runtime stack \*

.NET 5 (Early Access)

Operating System \*

☒ Linux ☐ Windows

Region \*

Central US

ⓘ Not finding your App Service Plan? Try a different region.

### App Service Plan

App Service plan pricing tier determines the location, features, cost and compute resources associated with your app. [Learn more](#)

Linux Plan (Central US) \* ⓘ

(New) DatingAppPlan

[Create new](#)

Sku and size \*

Free F1

1 GB memory

[Change size](#)

[Review + create](#)

< Previous

Next : Monitoring >

Note that .Net 5 is still in “Early Access”, but this is what we are looking for.

Click the next button... Monitoring:

[Home](#) > [New](#) >

## Create Web App

Basics **Monitoring** Tags Review + create

Application Insights is a code-less attach to provide detailed observability in to your application. [Learn more](#) 

### Application Insights

Enable Application Insights \* ☒ No ☐ Yes



Application Insights is not supported for your current selection of Runtime Stack, Operating System, Publish Type, or Resource Group.

Not much choice here. So either the Linux config does not allow this or (more likely) this is not available for freebies. Click Next: tags

[Home](#) > [New](#) >

## Create Web App

Basics Monitoring **Tags** Review + create

Tags are name/value pairs that enable you to categorize resources and view consolidated billing by applying the same tag to multiple resources and resource groups.

Note that if you create tags and then change resource settings on other tabs, your tags will be automatically updated.

Name ⓘ	Value ⓘ	Resource
<input type="text"/>	:	<input type="text" value="2 selected"/> 

I'm leaving this blank. Next: Review + Create (finally!)

Then we get to review our selections:

Microsoft Azure

Search resources, services, and docs (G+)

[Home](#) > [New](#) >

## Create Web App ...


Basics

Monitoring

Tags

Review + create

Summary

 **Web App**  
by Microsoft

Details

Subscription	0f9b9c90-b6b2-41ba-9f21-b58daf77d55e
Resource Group	DatingApp
Name	datingappcourse
Publish	Code
Runtime stack	.NET 5 (Early Access)

App Service Plan (New)

Name	DatingAppPlan
Operating System	Linux
Region	Central US
SKU	Free
ACU	Shared infrastructure
Memory	1 GB memory

Monitoring

Application Insights	Not enabled
----------------------	-------------

Create

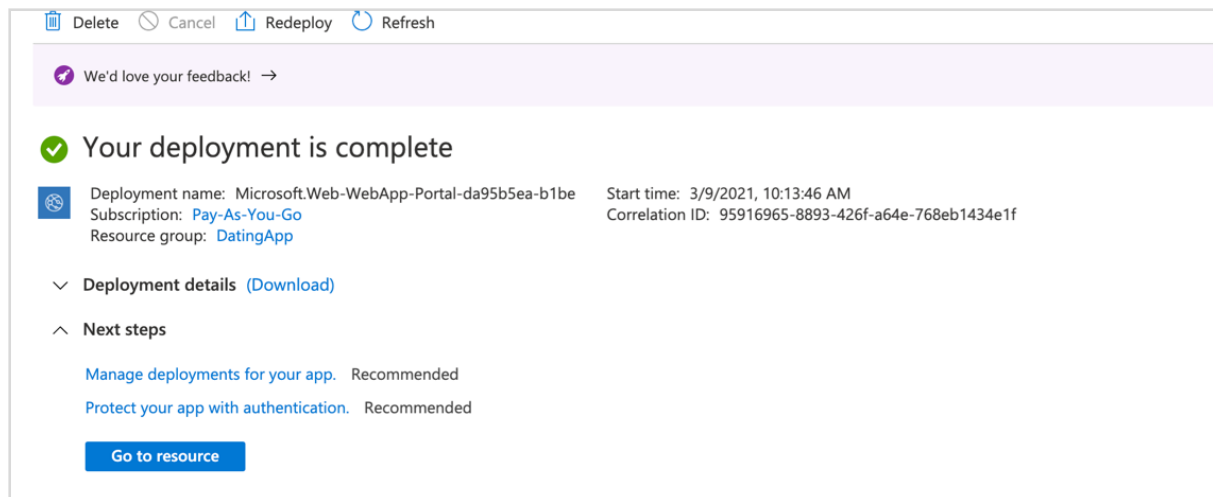
< Previous

Next >

[Download a template for automation](#)

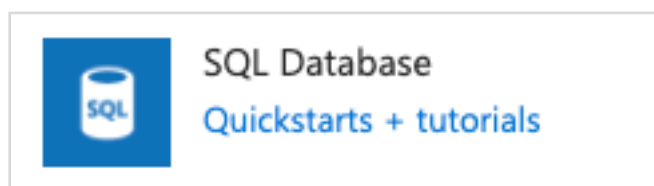
Then we get to hit the Create button and go make a coffee whilst it does its thing, it will probably take a few minutes. Once its done we should see this:





Now we need a Database server. Click the hamburger icon in the top left and hit the 'Create a resource' link.

Select the SQL Database:



We now have another form to fill out (yay!). Once again the goal here is not to accept the defaults but seek out the cheapest (or free) option available. The options here will be different depending on what your subscription here is so proceed with utmost caution unless you have more money than you know what to do with in which case the defaults will be fine.

We need to create a server here for our Database that has a unique name on Azure, as well as an admin account that cannot use the name 'admin' so I've gone for appuser as my admin account:

[Dashboard](#) > [New](#) >

## Create SQL Database

Microsoft

[Create new](#)

**Database details**

Enter required settings for this database, including picking a logical server and configuring the compute and storage resources

Database name \*

Server \*   
[Create new](#)

The value must not be empty.

By default Azure SQL Database backups are stored as [RA-GRS storage blobs](#) that are replicated to a [paired region](#) for protection against outages impacting backup storage in the primary region. If you plan to keep data only in a single region, please contact us at [sqlbackuppreview@microsoft.com](mailto:sqlbackuppreview@microsoft.com)

Want to use SQL elastic pool? \* ☐ Yes ☒ No

[Review + create](#) [Next : Networking >](#)

### New server

Microsoft

Server name \*

Server admin login \*

Password \*

Confirm password \*

Location \*

[OK](#)

Microsoft Azure

Search resources, services, and docs (G+)

trycatchlearn@outlook...  
DEFAULT DIRECTORY

[Dashboard](#) > [New](#) >

## Create SQL Database

Microsoft

Resource group \*   
[Create new](#)

**Database details**

Enter required settings for this database, including picking a logical server and configuring the compute and storage resources

Database name \*

Server \*   
[Create new](#)

Want to use SQL elastic pool? \* ☐ Yes ☒ No


Compute + storage \* 

**Standard S0**  
10 DTUs, 250 GB storage  
[Configure database](#)

[Review + create](#) [Next : Networking >](#)

Microsoft have kindly selected Standard S0 as the Database server that doesn't have any pricing info associated with it. I wonder how much this costs....

Click the configure database link to take a look:

	
Cost summary	
Cost per <b>DTU</b> (in GBP)	<b>1.12</b>
<b>DTUs</b> selected	<b>x 10</b>
<b>ESTIMATED COST / MONTH</b>	<b>11.18 GBP</b>

Ok not as much as I thought it was going to be but let's see if we can get a freebie.

Dashboard > New > Create SQL Database >

## Configure

Feedback

DTUs [What is a DTU? ↗](#)  
**5 (Basic)**  
Data max size  

100 MB

2 GB

2 GB

  
Cost summary  
Cost per **DTU** (in GBP) **0.74**  
**DTUs** selected **x 5**  
**ESTIMATED COST / MONTH** **3.72 GBP**

This is the cheapest option I can see on mine. No freebies :( Looks like I'll be eating into that \$150 they have provided for my new account.

Click next → Networking and set the following options:

Microsoft Azure

Search resources, services, and docs (G+)

[Home](#) > [New](#) >

## Create SQL Database ...

Microsoft

Basics

Networking

Additional settings

Tags

Review + create

Configure network access and connectivity for your server. The configuration selected below will apply to the selected server 'datingappcourse' and all databases it manages. [Learn more](#)

### Network connectivity

Choose an option for configuring connectivity to your server via public endpoint or private endpoint. Choosing no access creates with defaults and you can configure connection method after server creation. [Learn more](#)

Connectivity method \*

☐ No access

☒ Public endpoint

☐ Private endpoint

### Firewall rules

Setting 'Allow Azure services and resources to access this server' to Yes allows communications from all resources inside the Azure boundary, that may or may not be part of your subscription. [Learn more](#)

Setting 'Add current client IP address' to Yes will add an entry for your client IP address to the server firewall.

Allow Azure services and resources to access this server \*

No

Yes

Add current client IP address \*

No

Yes

You can take a look at the other options here but I'm going with this and will select create. Azure will now do its thing so time for another coffee.

Once this has complete you should see the following:



**Your deployment is complete**



Deployment name: Microsoft.SQLDatabase.newDatabaseNewServe...

Subscription: [Free Trial](#)

Resource group: [DatingApp](#)

Start time: 9/22/2020, 3:56:18 PM

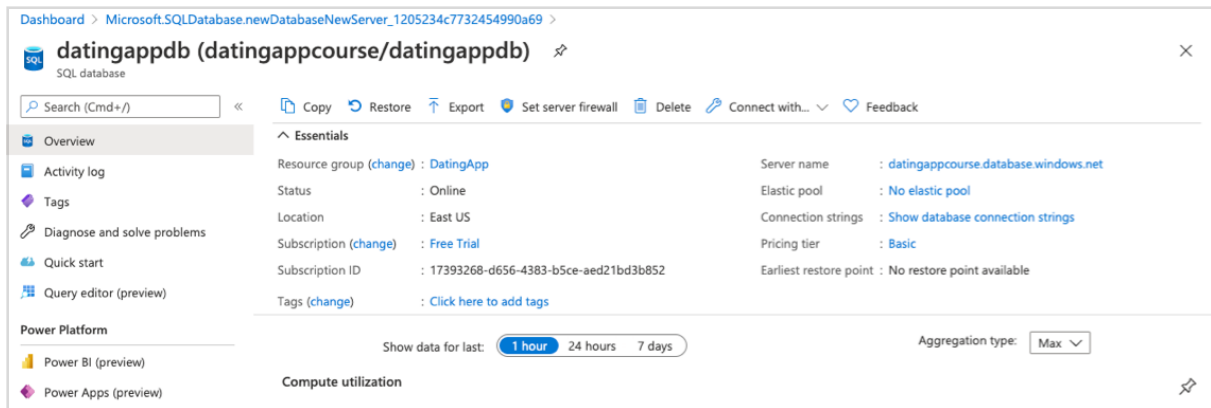
Correlation ID: a29cafd9-17dd-45a4-880e-d4902368823a

Deployment details [\(Download\)](#)

Next steps

Go to resource

We now need to tell our Web app about our new Database server, but we will need to get the connection string info so click the 'Go to resource' button and you should see the following:

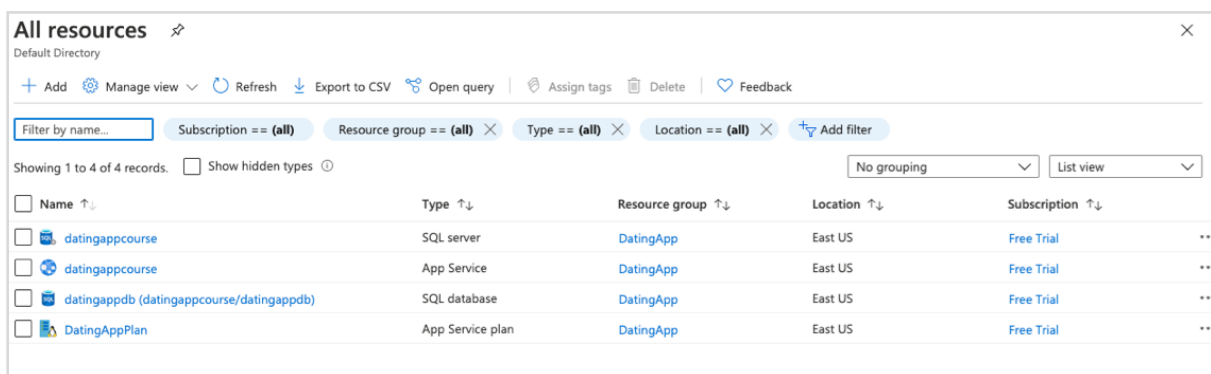


Click on the Show database connection strings and copy/paste them somewhere.

```
Server=tcp:datingappcourse.database.windows.net,1433;Initial
Catalog=datingappdb;Persist Security Info=False;User
ID=appuser;Password={your_password};MultipleActiveResultSets=False;Encrypt=True
;TrustServerCertificate=False;Connection Timeout=30;
```

Make a note to yourself you need to update the password as I am pretty sure I didn't set the password to {your\_password}

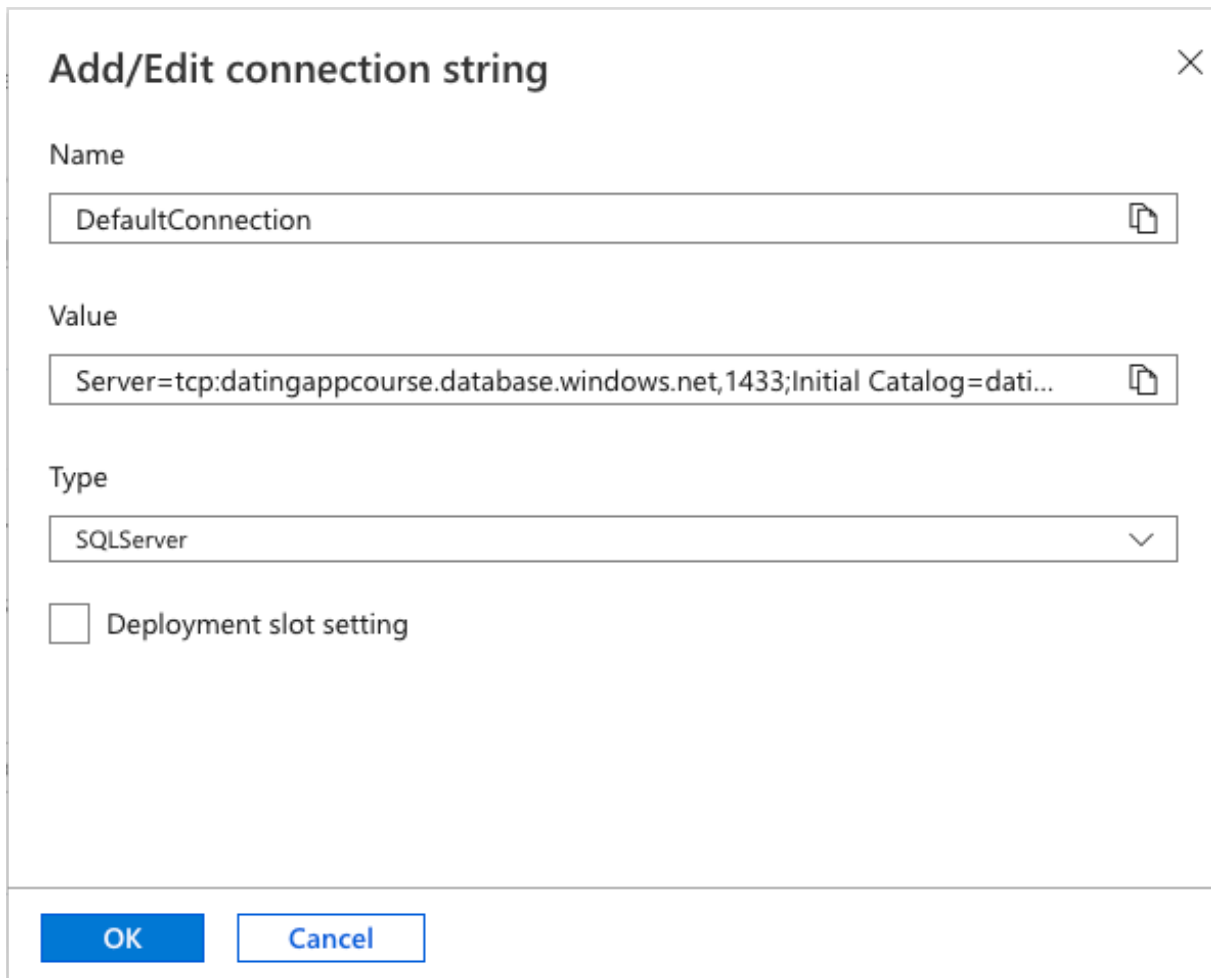
Click on the hamburger icon and select 'All resources' to get to the list of resources we have created. Should see something like this:



We need to provide environment variables to our app so it knows the following:

1. TokenKey
2. CloudinarySettings
3. ConnectionString

Click on the App Service, then once here select 'Configuration' from the list on the left. Click on the button to add a new Connection String:



**Add/Edit connection string** [X]

Name  
DefaultConnection [Copy]

Value  
Server=tcp:datingappcourse.database.windows.net,1433;Initial Catalog=dati... [Copy]

Type  
SQLServer [v]

☐ Deployment slot setting

OK Cancel

Make sure you call it "DefaultConnection" as this is what we called this connection in our app.

Don't forget to change {your\_password} to your password. Not literally 'your password' but the password you created earlier!

We can then add the application settings for the TokenKey and cloudinary. Make sure your token key is a strong key so use a password generator and go for at least 32 characters.

Also, add a key for the environment as well so set ASPNETCORE\_ENVIRONMENT to Production

Should see something like this once you are done:

Configuration

Refresh Save Discard

Click here to upgrade to a higher SKU and enable additional features.

Application settings \* General settings Path mappings

Application settings

Application settings are encrypted at rest and transmitted over an encrypted channel. You can choose to display them in plain text in your browser by using the controls below. Application Settings are exposed as environment variables for access by your application at runtime. [Learn more](#)

+ New application setting Show values Advanced edit

Filter application settings

Name	Value	Source	Deployment slot setting	Delete
ASPNETCORE_ENVIRONMENT	Hidden value. <a href="#">Click to show value</a>	App Config		
Cloudinary_ApiKey	Hidden value. <a href="#">Click to show value</a>	App Config		
Cloudinary_ApiSecret	Hidden value. <a href="#">Click to show value</a>	App Config		
Cloudinary_CloudName	Hidden value. <a href="#">Click to show value</a>	App Config		
TokenKey	Hidden value. <a href="#">Click to show value</a>	App Config		

Connection strings

Connection strings are encrypted at rest and transmitted over an encrypted channel.

+ New connection string Show values Advanced edit

Filter connection strings

Name	Value	Source	Type	Deployme...	Delete	Edit
DefaultConnection	Hidden value. <a href="#">Click to</a>	App Config	SQLServer			

We also need to enable WebSockets so on the General Settings tab enable this:

datingappcourse | Configuration

websockets Refresh Save Discard

Overview Activity log Access control (IAM) Tags Diagnose and solve problems Security Events (preview) Deployment Quickstart Deployment slots Deployment Center (Classic) Deployment Center Settings Configuration Authentication / Authorization Authentication (preview) Application Insights Identity Backups Custom domains TLS/SSL settings Networking

Click here to upgrade to a higher SKU and enable additional features.

Application settings General settings \* Path mappings

Stack settings

Stack .NET

Major version .NET 5

Minor version .NET 5 (Early Access)

Startup Command

Provide an optional startup command that will be run as part of container startup. [Learn more](#)

Platform settings

FTP state All allowed

FTP based deployment can be disabled or configured to accept FTP (plain text) or FTPS (secure) connections. [Learn more](#)

HTTP version 1.1

Web sockets On Off

Always on On Off

Prevents your app from being idled out due to inactivity. [Learn more](#)

ARR affinity On Off

Note that we cannot use a : for nested keys as we chose a linux container earlier. When specifying a nested key we have to use a double underscore

Also, don't forget to hit the Save changes button when you are done and continue which will restart our app.

Save changes

Any changes to applications settings and connection strings will restart your application. Are you sure you want to continue?

Continue

Cancel

+ New application setting

👁 Show values

✎ Advanced edit


🔍 Filter application settings

## Deploying the app.

Our next task is to get our app from our Dev machine over to Azure.

To do this we will need to add 2 new extensions to VS Code to make our life a bit easier.

Azure Account extension and Azure App Service.




**Azure Account** ms-vscode.azure-account

Microsoft | 1,508,134 | ★★★★★ | Repository | License

A common Sign-In and Subscription management extension for VS Code.

Install

[Details](#) [Feature Contributions](#) [Changelog](#)



**Azure App Service** ms-azuretools.vscode-azureappservice Pr

Microsoft | 445,023 | ★★★★★ | Repository | License | v

An Azure App Service management extension for Visual Studio Code.

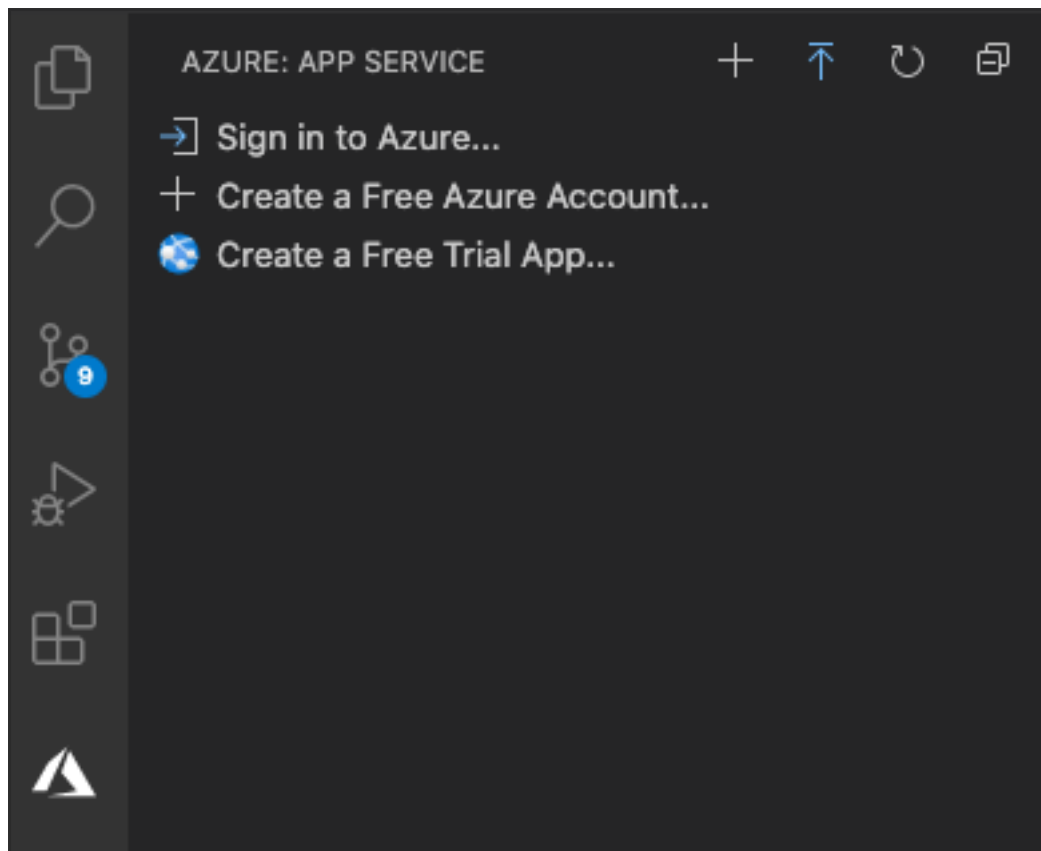
Uninstall *This extension is enabled globally.*

*This extension is recommended because you have Heroku CLI installed.*

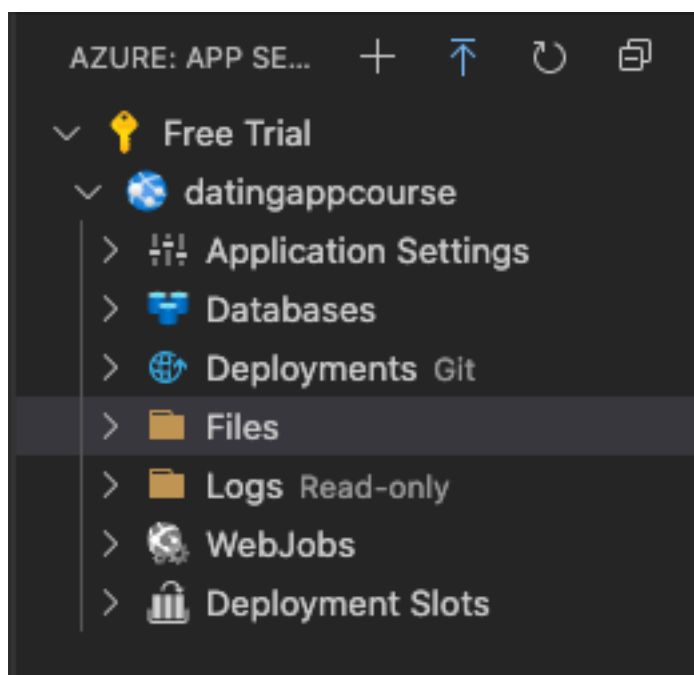
Ignore Recommendation



Click on the shiny new Azure Icon in VS Code and sign in with your account:

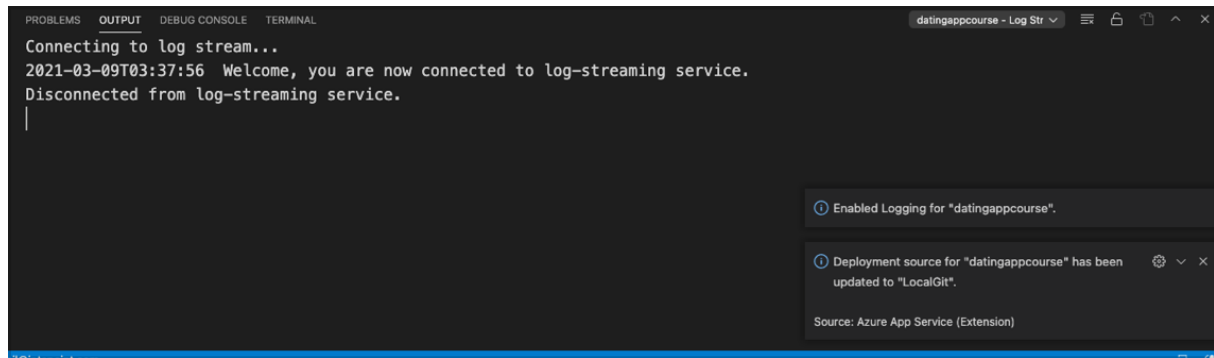


Should see the following:



Right click the app and select "start streaming logs" so that we get logging information

from Azure.



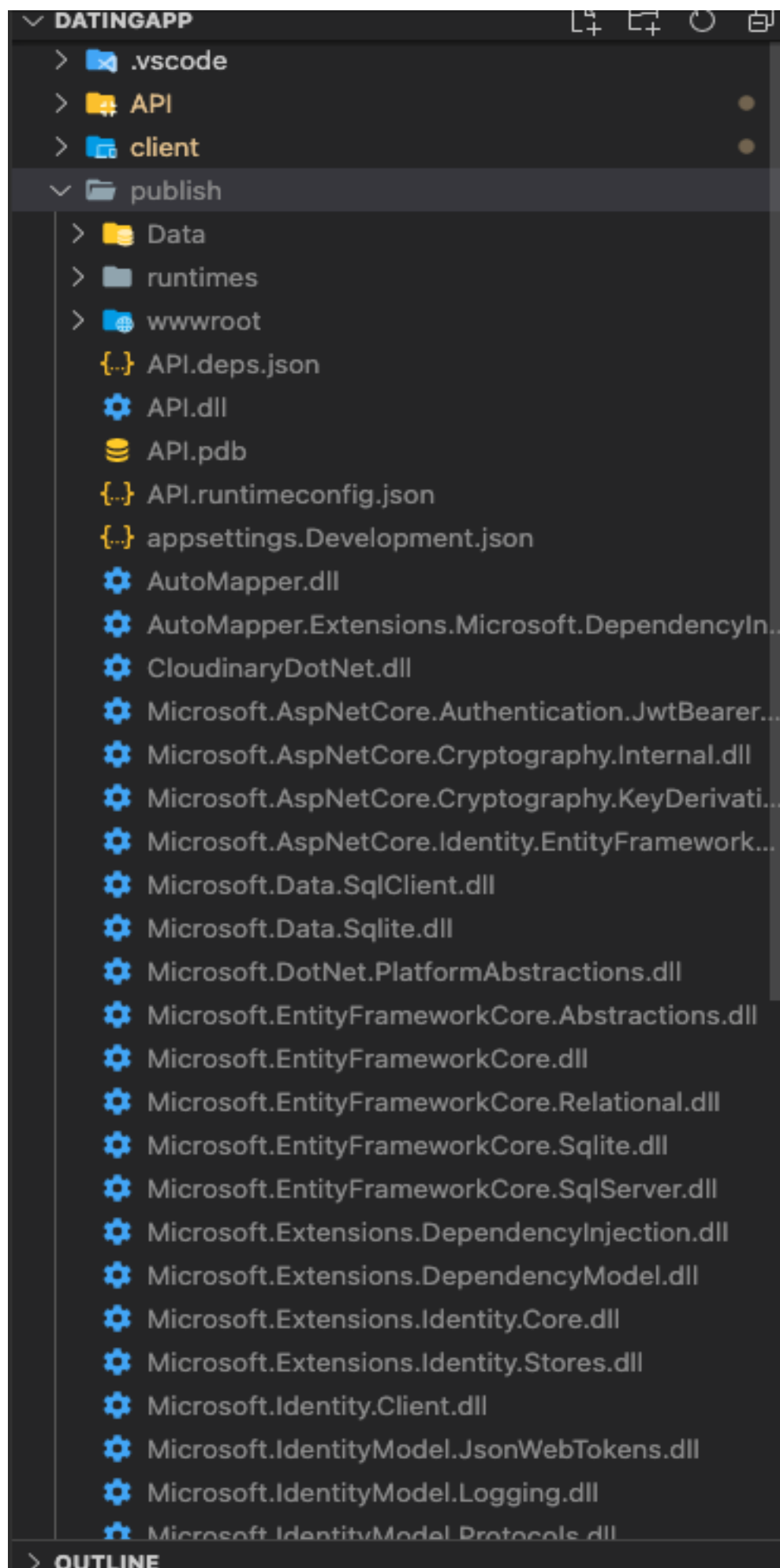
If you need to republish your Angular app for any reason now is a good time to do so.

```
ng build --prod
```

Now we will create a publish folder that we will use for deployment for the .Net application. In the solution folder run the following:

```
dotnet publish -c Release -o publish
```

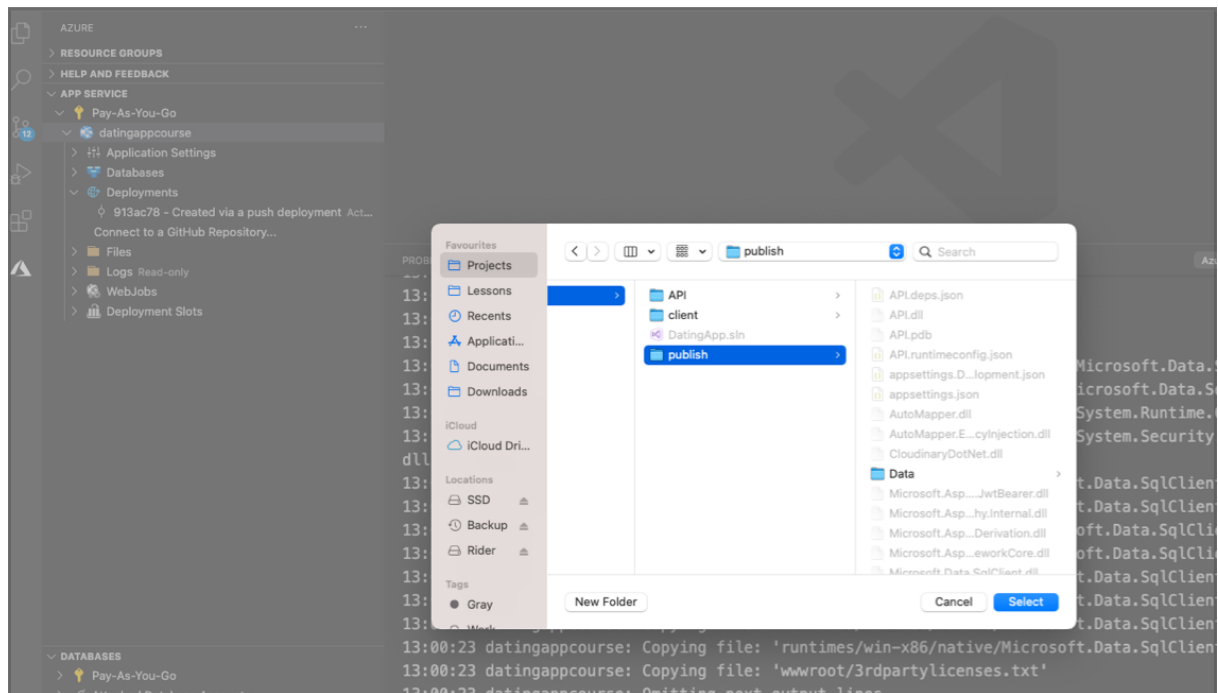
In your solution folder you should see:



Now we are ready to publish!

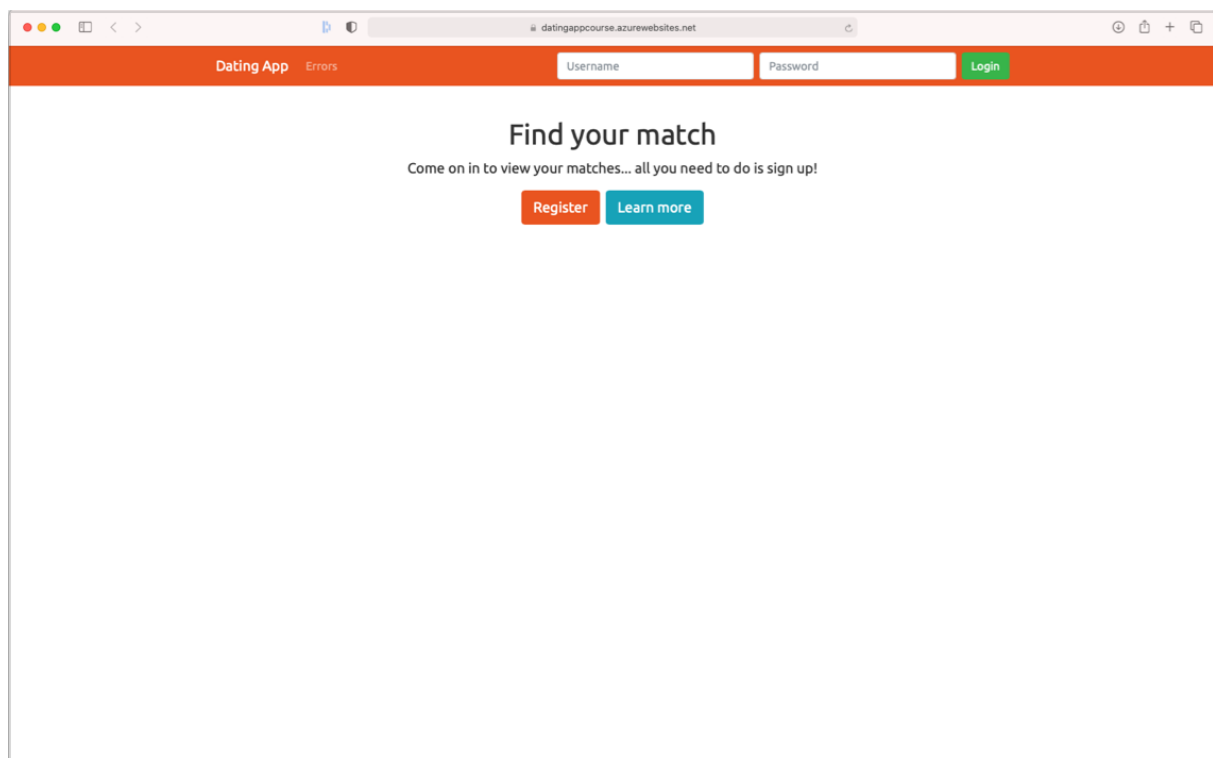
Right-click the app service in the Azure extension and select deploy to web app...

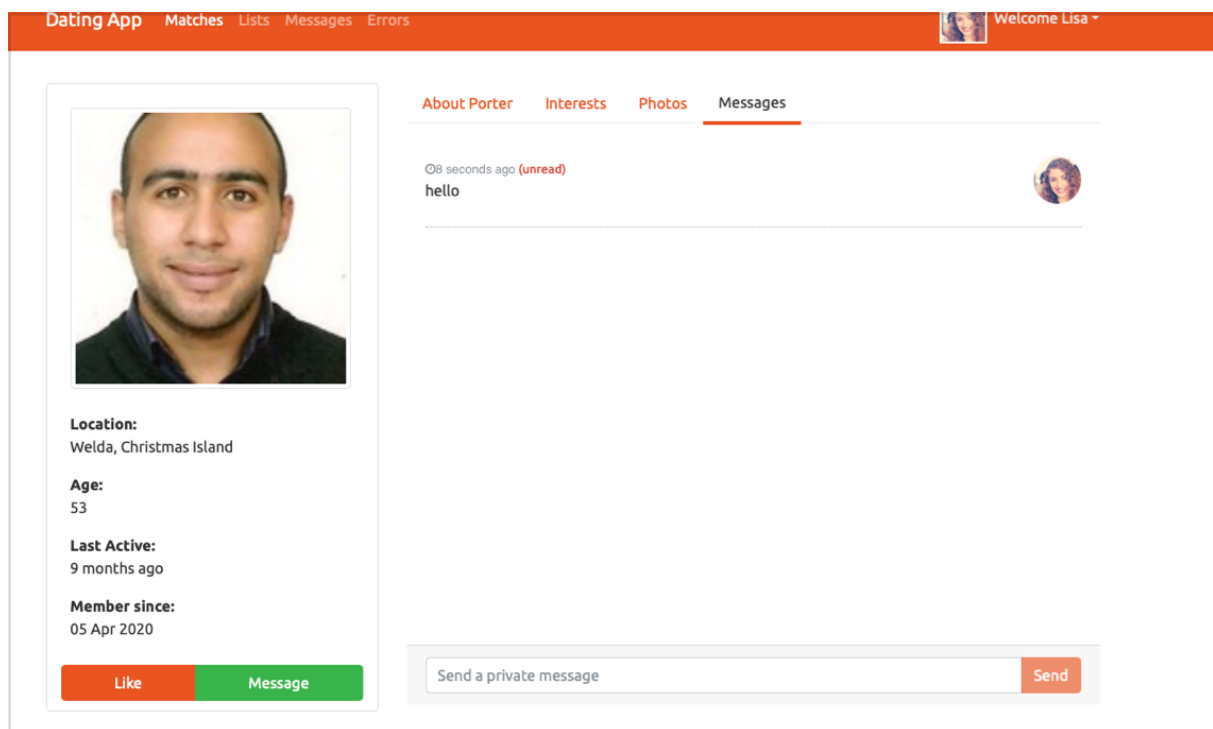
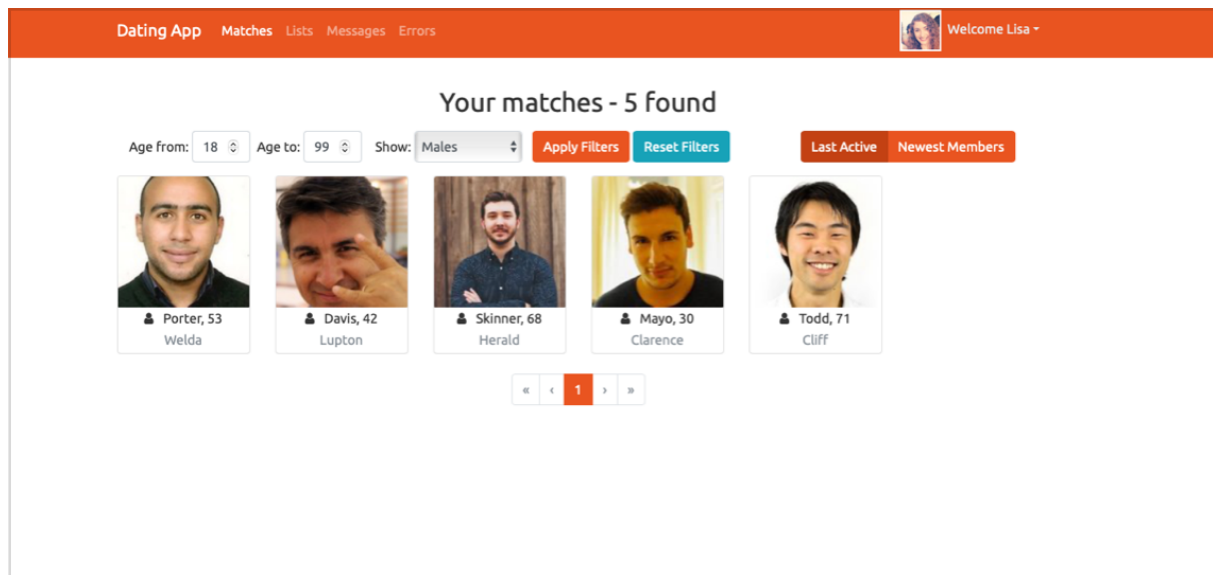
Browse to the publish folder and select it.



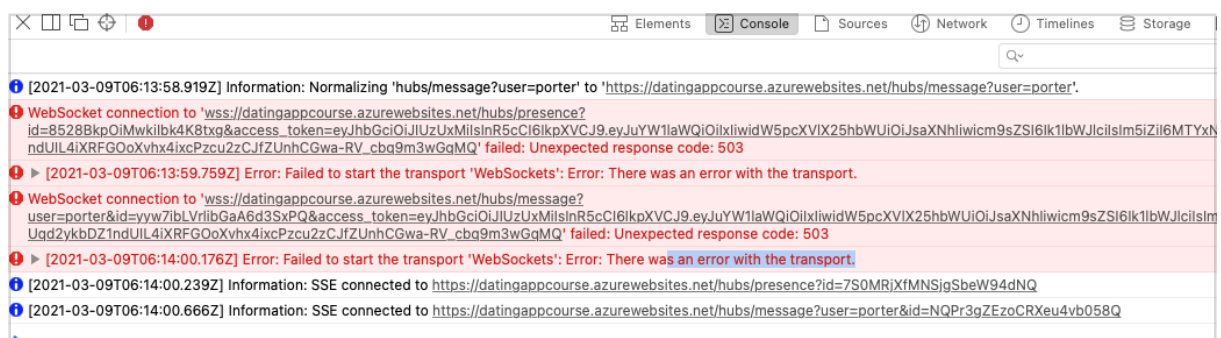
```
13:00:22 datingappcourse: Copying file: 'web.config'
13:00:22 datingappcourse: Deleting file: 'hostingstart.html'
13:00:22 datingappcourse: Copying file: 'Data/UserSeedData.json'
13:00:22 datingappcourse: Copying file: 'runtimes/unix/lib/netcoreapp3.1/M
13:00:22 datingappcourse: Copying file: 'runtimes/win/lib/netcoreapp3.1/Mi
13:00:23 datingappcourse: Copying file: 'runtimes/win/lib/netstandard2.0/S
13:00:23 datingappcourse: Copying file: 'runtimes/win/lib/netstandard2.0/S
dll'
13:00:23 datingappcourse: Copying file: 'runtimes/win-arm/native/Microsoft
13:00:23 datingappcourse: Copying file: 'runtimes/win-arm/native/Microsoft
13:00:23 datingappcourse: Copying file: 'runtimes/win-arm64/native/Microso
13:00:23 datingappcourse: Copying file: 'runtimes/win-arm64/native/Microso
13:00:23 datingappcourse: Copying file: 'runtimes/win-x64/native/Microsoft
13:00:23 datingappcourse: Copying file: 'runtimes/win-x64/native/Microsoft
13:00:23 datingappcourse: Copying file: 'runtimes/win-x86/native/Microsoft
13:00:23 datingappcourse: Copying file: 'runtimes/win-x86/native/Microsoft
13:00:23 datingappcourse: Copying file: 'wwwroot/3rdpartylicenses.txt'
13:00:23 datingappcourse: Omitting next output lines...
13:00:23 datingappcourse: Finished successfully.
13:00:24 datingappcourse: Running post deployment command(s)...
13:00:24 datingappcourse: Triggering recycle (preview mode disabled).
13:00:24 datingappcourse: Deployment successful.
13:00:39: Deployment to "datingappcourse" completed.
```

It will pop up with an option to browse the site and you can say yes and hey presto! The site is live and published in Azure.





Note: At time of writing there is an issue with Azure web sockets so it is defaulting to Server Side Events. You may see errors in the logs like follows:



This just means that Websockets is not available. The chat/presence still works but just using a different protocol. The fact that .Net is still in “Early access” and not released probably has something to do with this.

#datingapp-final/section19