ICBC Flex Work

Installation Instructions

April 6, 2020
Version 0.1

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1 Introduction

This document is the **Installation Instructions** for **Flex Work**, the desk-sharing solution by *Team Flex*, for *ICBC*. We are a team of six UBC Computer Science students. This Installation Instruction will discribles how to set up dependencies, how to install our application, and how to start our application.

2 Dependencies

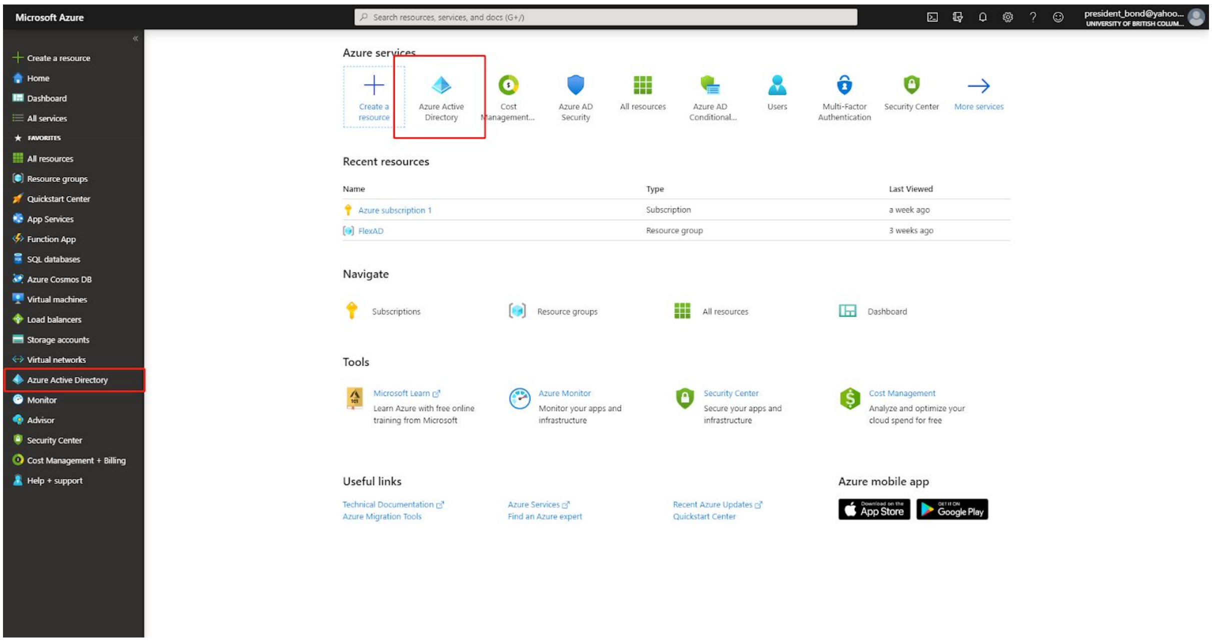
2.1 Microsoft Active Directory

In the production environment, ICBC should register our application under their Active Directory. Then edit Active Directory config in our application: `frontend/src/auth.js` More specifically, edit `clientId`. Active Directory should add domain name to their Redirect URIs.

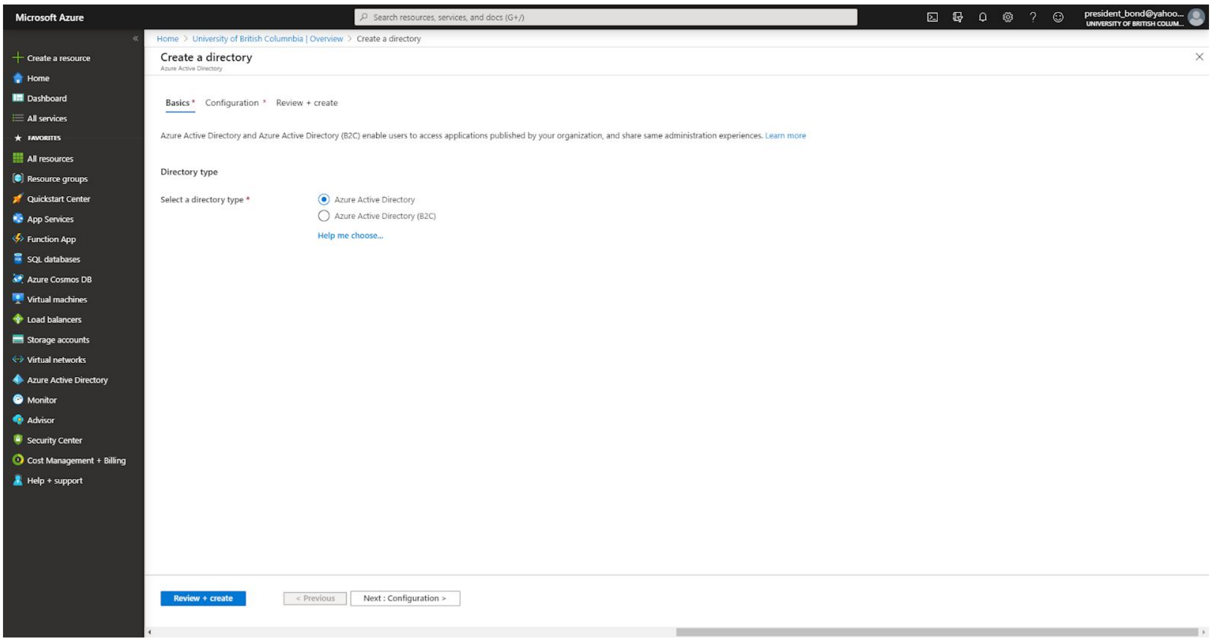
In the development and testing environment, We use Azure Active Directory to simulate production environments. We assume Active Directory stores email address and employee's name. Use email address as identifier. Current version of Flex Work application connects to our Azure Active Directory.

Here are the steps of setting up development Active Directory
Step 1: Login Azure Portal at https://portal.azure.com/

Step 2: after login, find Azure Active Directory in the left hand side menu or Azure services. Click on the Azure Active Directory



Step 3: click on “create a directory” after entering Azure Active Directory page.



Create a directory

Azure Active Directory

Azure Active Directory and Azure Active Directory (B2C) enable users to access applications published by your organization, and share same administration experiences. Learn more

Directory type

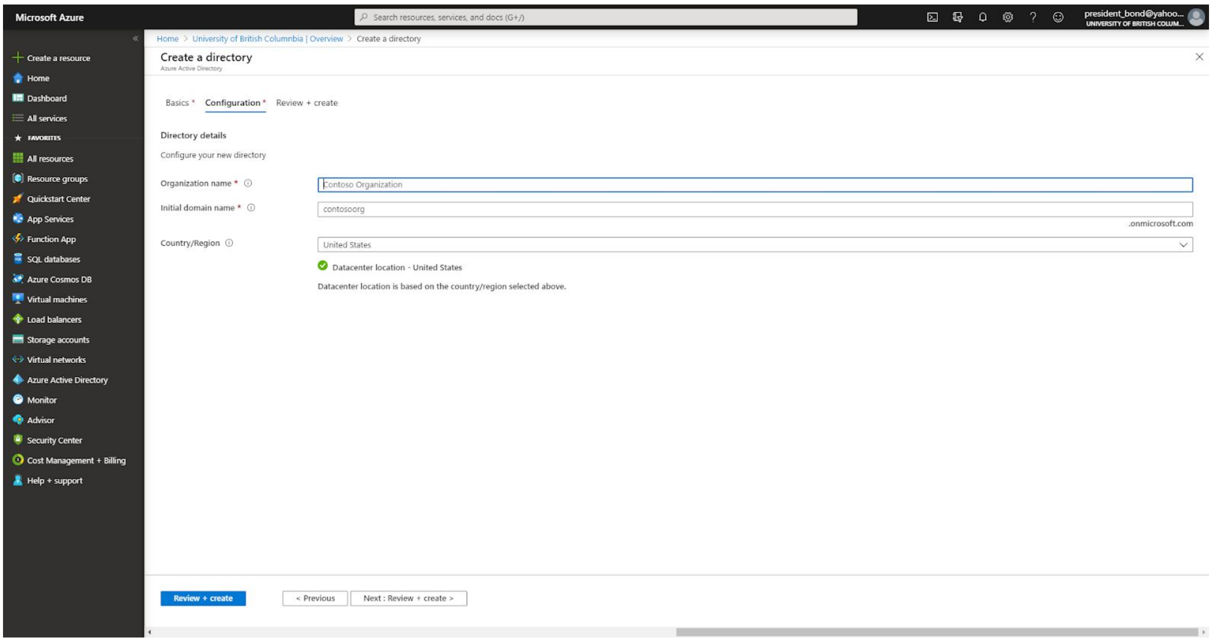
Select a directory type *

● Azure Active Directory

○ Azure Active Directory (B2C)

Help me choose...

Step 4: select “Azure Active Directory”, then click “Next: Configuration”



Create a directory

Azure Active Directory

Directory details

Configure your new directory

Organization name * Contoso Organization

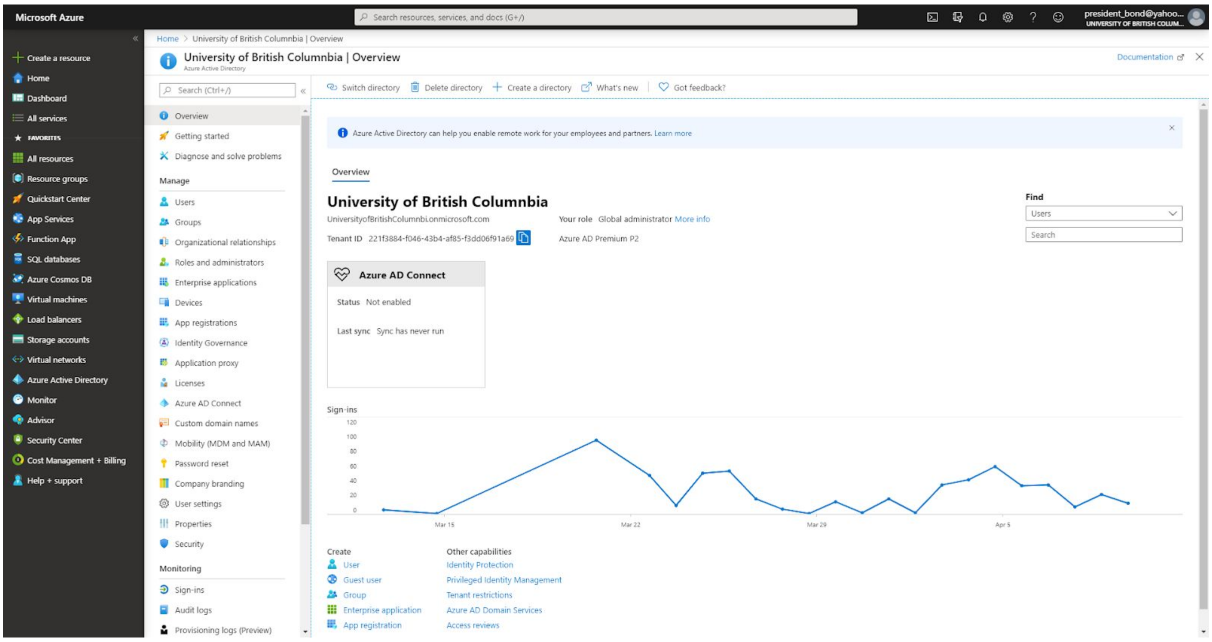
Initial domain name * contosoorg .onmicrosoft.com

Country/Region United States

Datacenter location - United States

Datacenter location is based on the country/region selected above.

Step 5: enter Organization name and initial domain name, then click “Review + create”. We used organization name “University of British Columnbia” as an example. You should see overview of your organization after creation complete



University of British Columnbia | Overview

Azure Active Directory can help you enable remote work for your employees and partners. Learn more

University of British Columnbia

UniversityofBritishColumnbi.onmicrosoft.com

Your role Global administrator More info

Tenant ID 221f3884-f046-43b4-af85-f3dd06f91a69

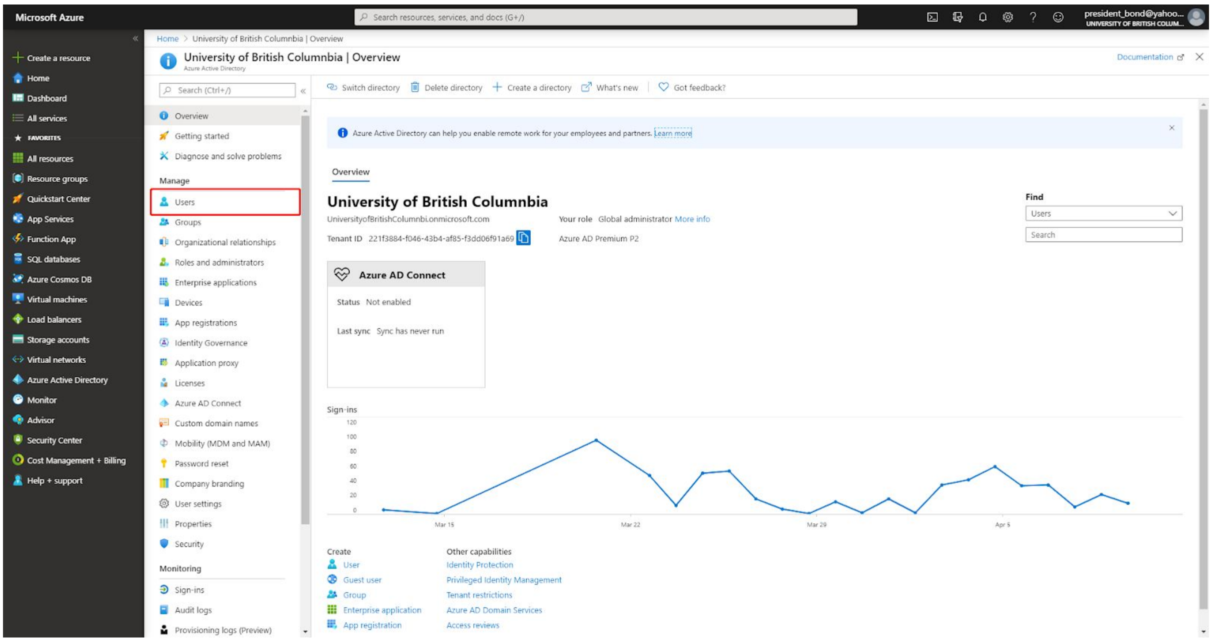
Azure AD Premium P2

Azure AD Connect

Status Not enabled

Last sync Sync has never run

Step 6: Then we can create users to our Active Directory. Click on the users button on the left, then click on “New user”



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Your role Global administrator More info

Tenant ID 221f3884-f046-43b4-af85-f3dd06f91a69

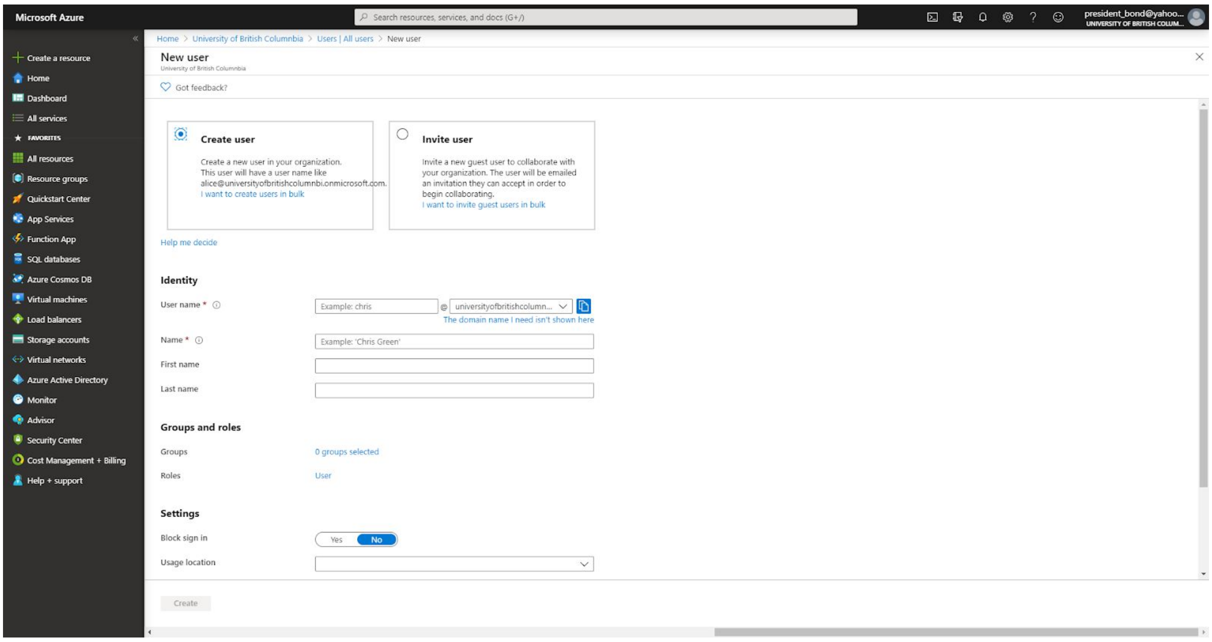
Azure AD Premium P2

Azure AD Connect

Status Not enabled

Last sync Sync has never run

Step 7: In the new user page you can enter “user name” and name



New user

University of British Columnbia

● Create user

Create a new user in your organization. This user will have a user name like alice@universityofbritishcolumnbi.onmicrosoft.com.

I want to create users in bulk

○ Invite user

Invite a new guest user to collaborate with your organization. The user will be emailed an invitation they can accept in order to begin collaborating.

I want to invite guest users in bulk

Help me decide

Identity

User name * ⓘ Example: chris @ universityofbritishcolumn...

The domain name I need isn't shown here

Name * ⓘ Example: 'Chris Green'

First name

Last name

Groups and roles

Groups 0 groups selected

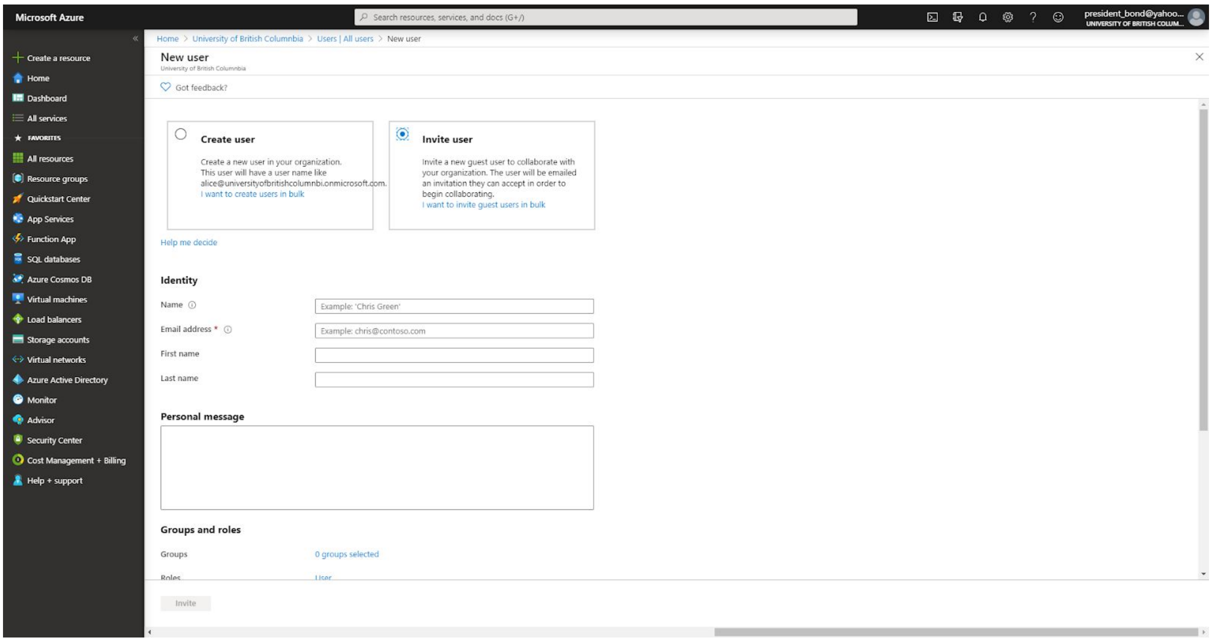
Roles User

Settings

Block sign in Yes [✓ No]

Usage location

You can choose to invite user if you select “invite user”



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University of British Columnbia

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I want to create users in bulk

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I want to invite guest users in bulk

Help me decide

Identity

Name ⓘ Example: 'Chris Green'

Email address * ⓘ Example: chris@contoso.com

First name

Last name

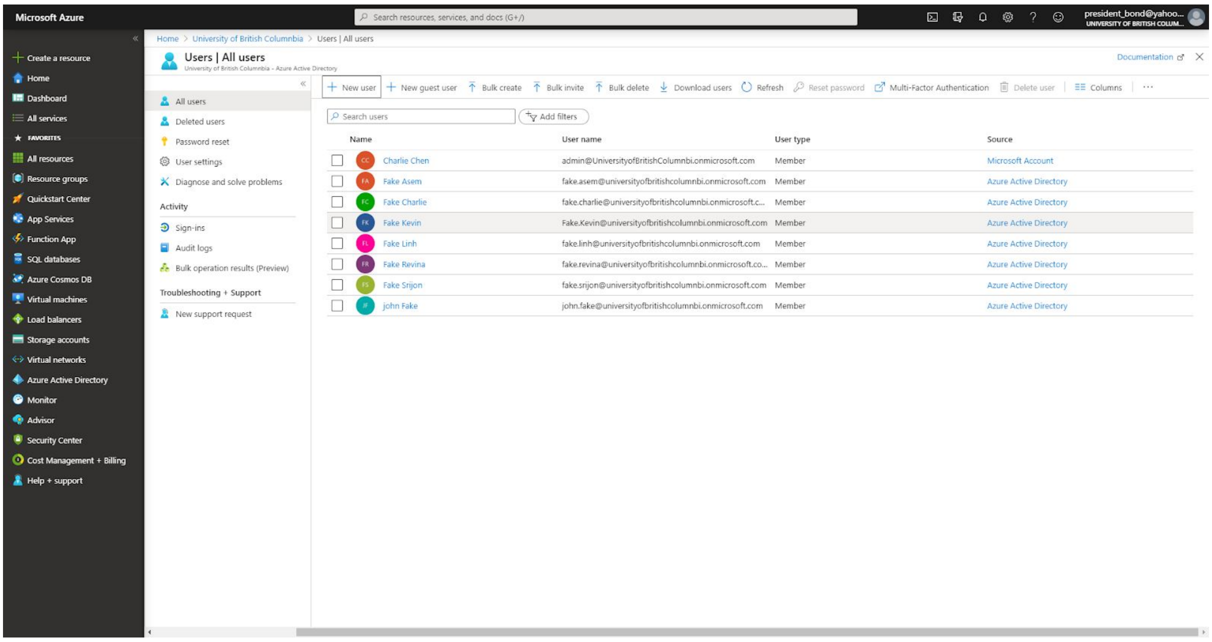
Personal message

Groups and roles

Groups 0 groups selected

Roles User

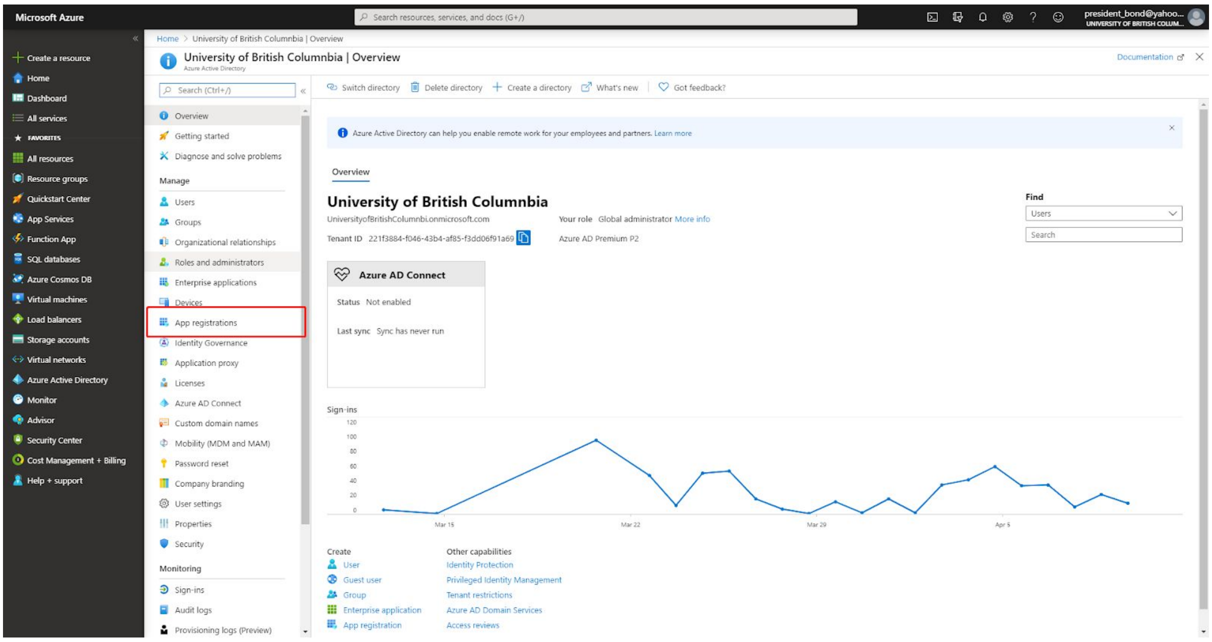
Step 8: after user creation completes you can see a list of users in the users page.



Name	User name	User type	Source
Charlie Chen	admin@UniversityofBritishColumnbi.onmicrosoft.com	Member	Microsoft Account
Fake Asem	fake.asem@universityofbritishcolumnbi.onmicrosoft.com	Member	Azure Active Directory
Fake Charlie	fake.charlie@universityofbritishcolumnbi.onmicrosoft.c...	Member	Azure Active Directory
Fake Kevin	Fake.Kevin@universityofbritishcolumnbi.onmicrosoft.com	Member	Azure Active Directory
Fake Linh	fake.linh@universityofbritishcolumnbi.onmicrosoft.com	Member	Azure Active Directory
Fake Revina	fake.revina@universityofbritishcolumnbi.onmicrosoft.co...	Member	Azure Active Directory
Fake Srijon	fake.srijon@universityofbritishcolumnbi.onmicrosoft.com	Member	Azure Active Directory
john Fake	john.fake@universityofbritishcolumnbi.onmicrosoft.com	Member	Azure Active Directory

This is all users added to our development Azure Active Directory at this time.

Step 9: Now we can register our application. Click on “app registrations” on the left panel, then click “new registration”



Azure Active Directory can help you enable remote work for your employees and partners. Learn more

University of British Columnbia

UniversityofBritishColumnbi.onmicrosoft.com

Tenant ID 221f3884-f046-43b4-af85-f3dd06f91a69

Your role Global administrator More info

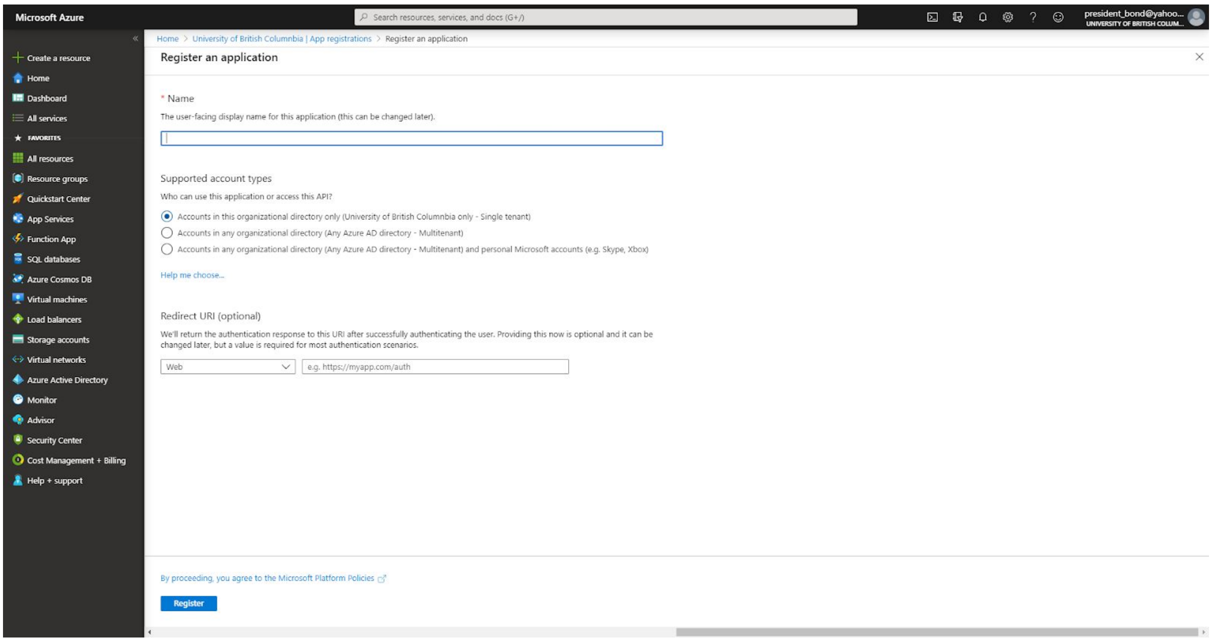
Azure AD Premium P2

Azure AD Connect

Status Not enabled

Last sync Sync has never run

Step 10: enter “Name” of your application. In this example we use “flexWorkICBC”. Select “Accounts in this organizational directory only (University of British Columnbia only - Single tenant) ” then click Register



Register an application

* Name

The user-facing display name for this application (this can be changed later).

Supported account types

Who can use this application or access this API?

● Accounts in this organizational directory only (University of British Columnbia only - Single tenant)
○ Accounts in any organizational directory (Any Azure AD directory - Multitenant)
○ Accounts in any organizational directory (Any Azure AD directory - Multitenant) and personal Microsoft accounts (e.g. Skype, Xbox)

Help me choose...

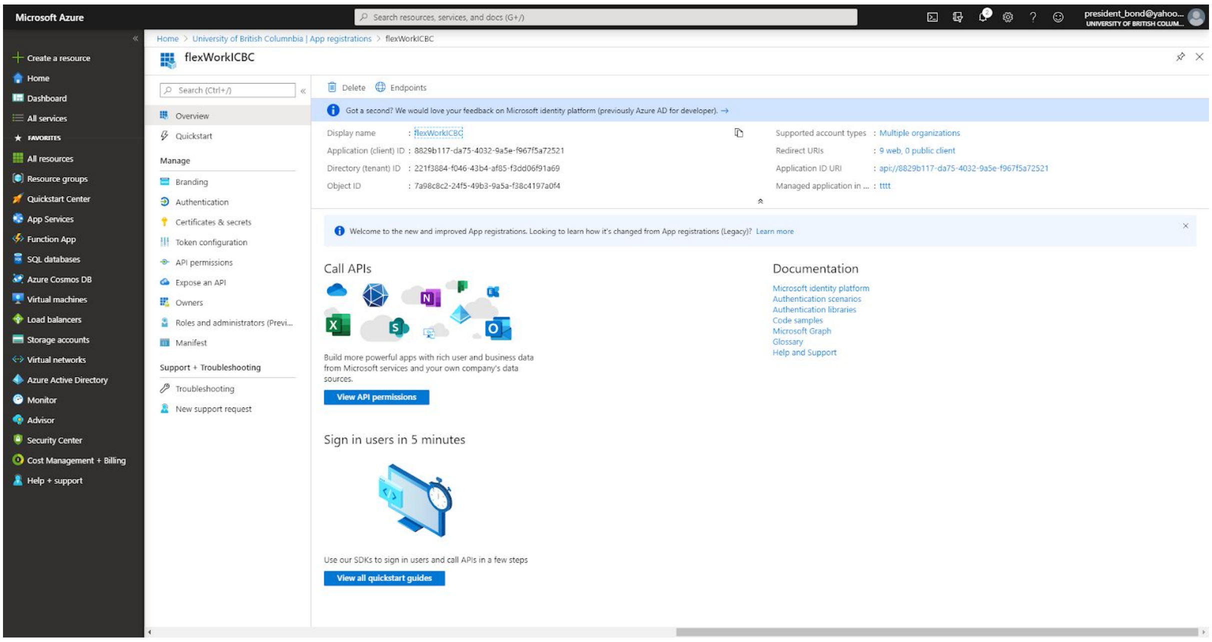
Redirect URI (optional)

We'll return the authentication response to this URI after successfully authenticating the user. Providing this now is optional and it can be changed later, but a value is required for most authentication scenarios.

Web | e.g. https://myapp.com/auth

By proceeding, you agree to the Microsoft Platform Policies

Step 11: after creation completes we should see an overview of application.



flexWorkICBC

Got a second? We would love your feedback on Microsoft identity platform (previously Azure AD for developer). →

Display name : flexWorkICBC
Application (client) ID : 8829b117-da75-4032-9a5e-f967f5a72521
Directory (tenant) ID : 221f3884-f046-43b4-af85-f3dd06f91a69
Object ID : 7a98c8c2-24f5-49b3-9a5a-f38c4197a0f4

Supported account types : Multiple organizations
Redirect URIs : 9 web, 0 public client
Application ID URI : api://8829b117-da75-4032-9a5e-f967f5a72521
Managed application in ... : tttt

Welcome to the new and improved App registrations. Looking to learn how it's changed from App registrations (Legacy)? Learn more

Call APIs

Build more powerful apps with rich user and business data from Microsoft services and your own company's data sources.

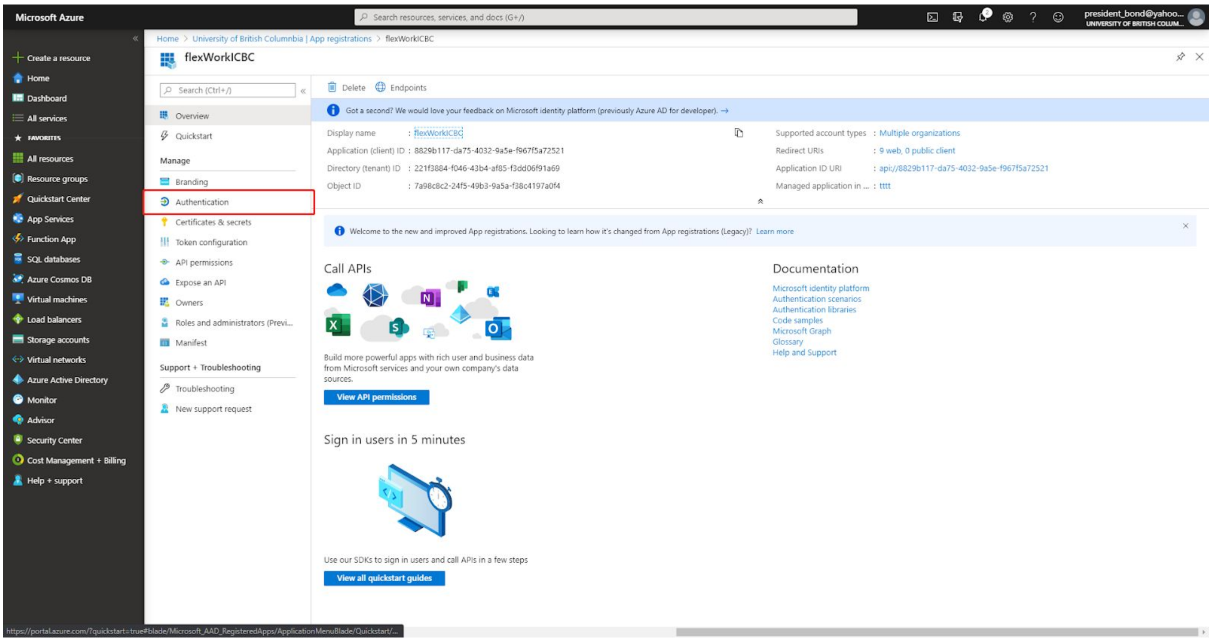
Sign in users in 5 minutes

Use our SDKs to sign in users and call APIs in a few steps

Documentation

Microsoft identity platform
Authentication scenarios
Authentication libraries
Code samples
Microsoft Graph
Glossary
Help and Support

Then we can edit authentication by click on “Authentication” on the left panel



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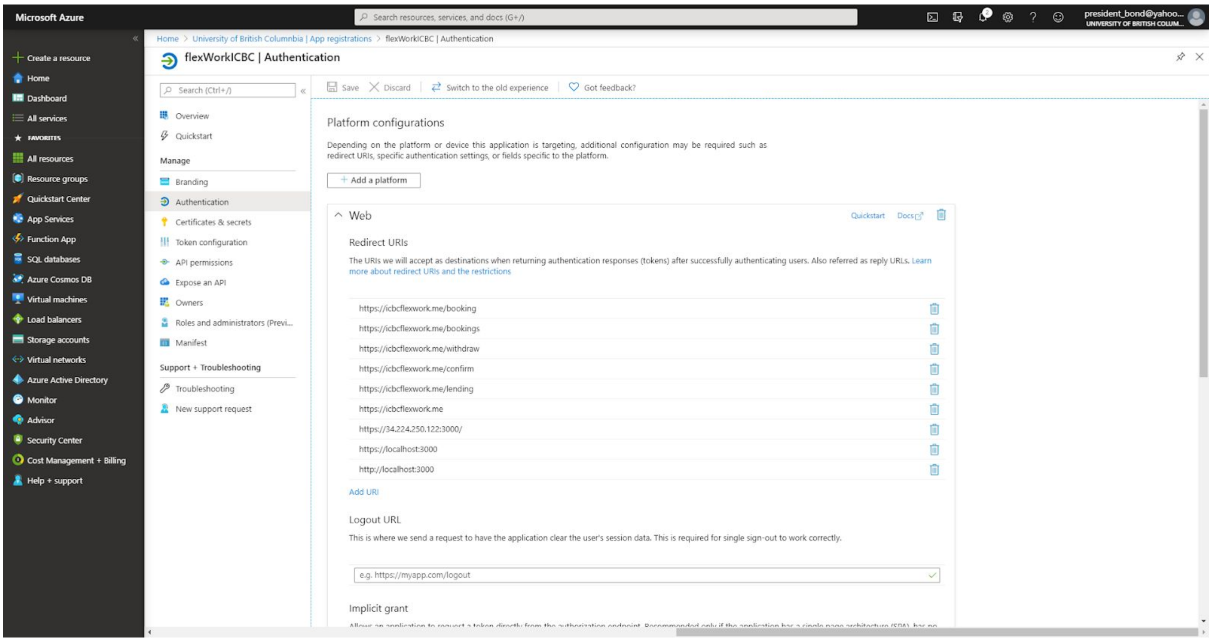
Use our SDKs to sign in users and call APIs in a few steps

https://portal.azure.com/?quickstart=true#blade/Microsoft_AAD_RegisteredApps/ApplicationMenuBlade/Quickstart/...

Step 12: You should add Redirect URIs and check “Access tokens” and “ID tokens” in Implicit grant.



Platform configurations

Depending on the platform or device this application is targeting, additional configuration may be required such as redirect URIs, specific authentication settings, or fields specific to the platform.

Redirect URIs

The URIs we will accept as destinations when returning authentication responses (tokens) after successfully authenticating users. Also referred as reply URLs. Learn more about redirect URIs and the restrictions

https://icbcflexwork.me/booking
https://icbcflexwork.me/bookings
https://icbcflexwork.me/withdraw
https://icbcflexwork.me/confirm
https://icbcflexwork.me/lending
https://icbcflexwork.me
https://34.224.250.122:3000/
https://localhost:3000
http://localhost:3000

Logout URL

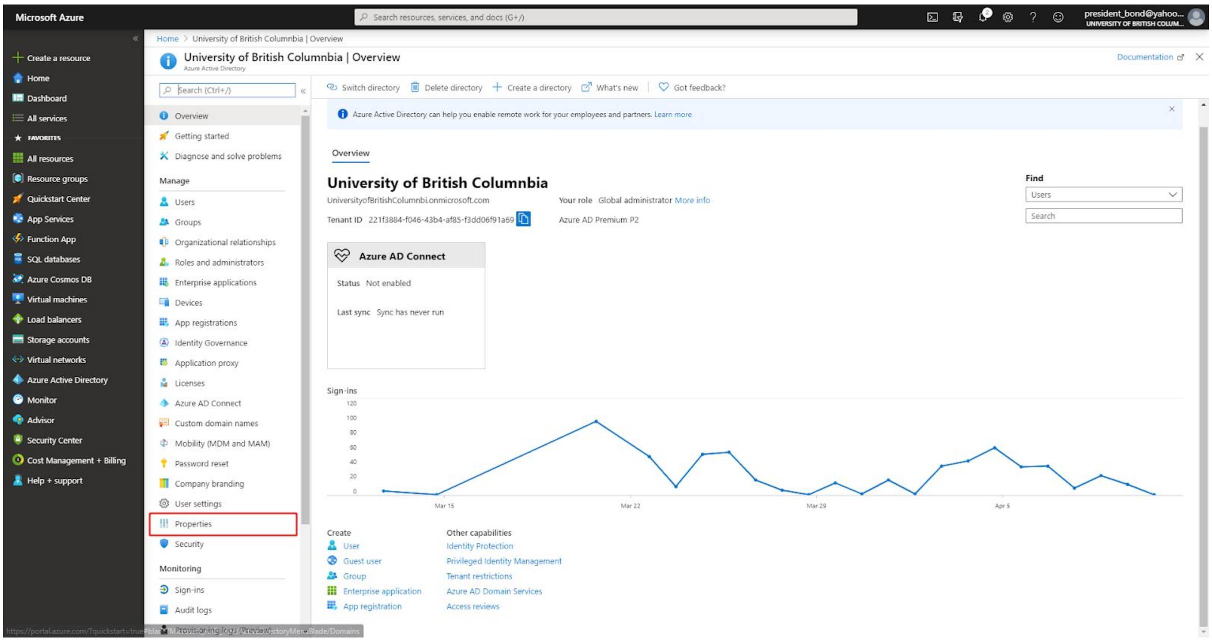
This is where we send a request to have the application clear the user's session data. This is required for single sign-out to work correctly.

e.g. https://myapp.com/logout

Implicit grant

In the redirect URIs part, you should add all web URI you want to protect behind Active Directory. In this example we added https://icbcflexwork.me/booking, https://icbcflexwork.me/bookings, https://icbcflexwork.me/withdraw, https://icbcflexwork.me/confirm, https://icbcflexwork.me/lending, https://icbcflexwork.me
And the following is not necessary. They are only for debugging purpose. https://34.224.250.122:3000/, https://localhost:3000, http://localhost:3000 Please keep in mind that these fields only allow https and localhost domain names. Click save to save the changes.

Step 13: This step is optional, if you want to disable two-factor authentication, you can go back the to Azure Active Directory page, then click on “Properties”



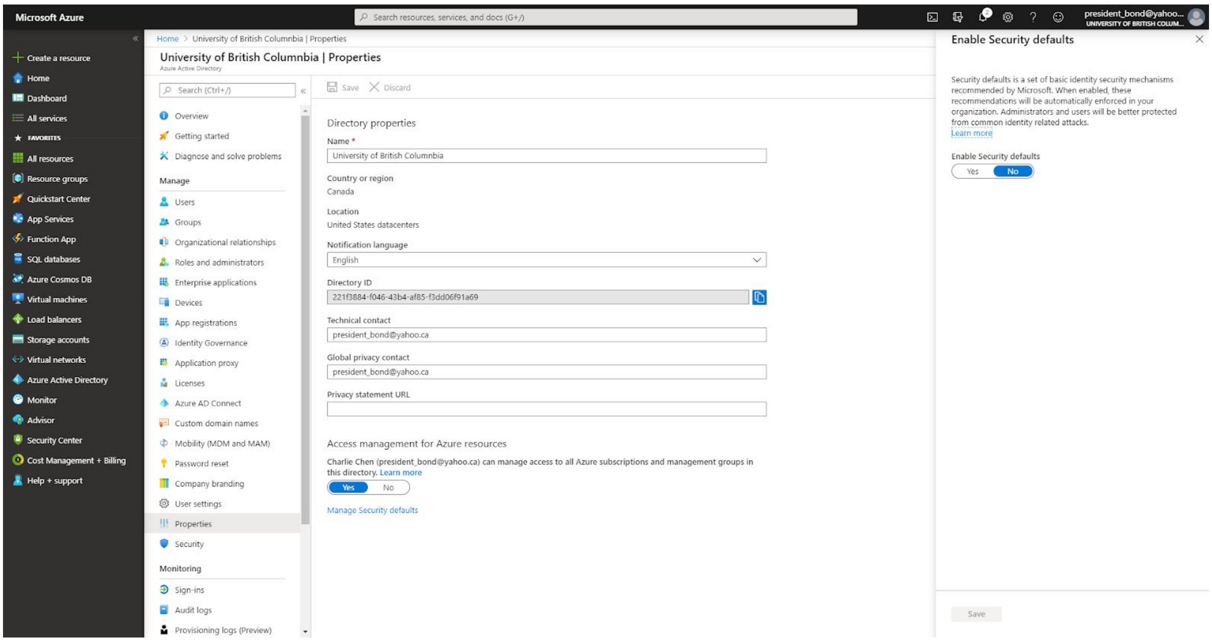
University of British Columbia | Overview
Azure Active Directory

Azure Active Directory can help you enable remote work for your employees and partners. Learn more

University of British Columbia
UniversityofBritishColumbi.onmicrosoft.com
Tenant ID 221f3884-f046-43b4-af85-f3dd06f91a69
Your role Global administrator More info
Azure AD Premium P2

Azure AD Connect
Status Not enabled
Last sync Sync has never run

Then click on “Manage Security Defaults”. Then turn off “Enable Security defaults”, then click save



University of British Columbia | Properties
Azure Active Directory

Directory properties

Name *
University of British Columbia

Country or region
Canada

Location
United States datacenters

Notification language
English

Directory ID
221f3884-f046-43b4-af85-f3dd06f91a69

Technical contact
president_bond@yahoo.ca

Global privacy contact
president_bond@yahoo.ca

Privacy statement URL

Access management for Azure resources

Charlie Chen (president_bond@yahoo.ca) can manage access to all Azure subscriptions and management groups in this directory. Learn more

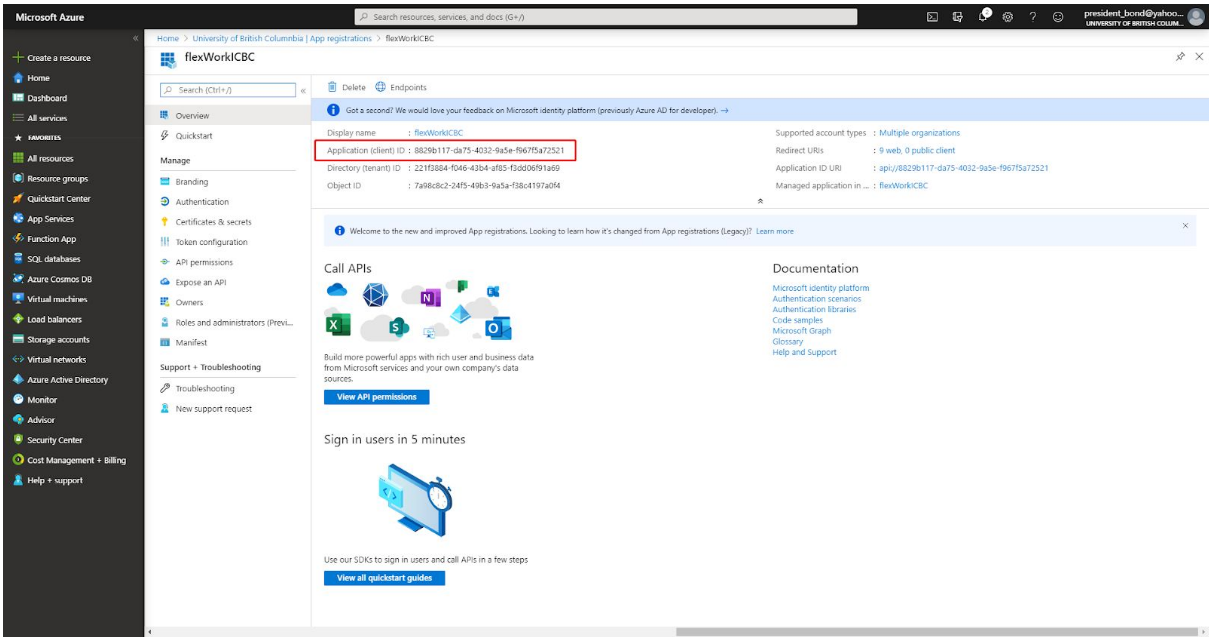
[✓ Yes] No

Enable Security defaults

Security defaults is a set of basic identity security mechanisms recommended by Microsoft. When enabled, these recommendations will be automatically enforced in your organization. Administrators and users will be better protected from common identity related attacks.
Learn more

Enable Security defaults
Yes [✓ No]

Step 14: Next, go back to the application page. Copy the “Application ID” to our source code configuration.



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Supported account types : Multiple organizations
Redirect URIs : 9 web, 0 public client
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Managed application in ... : flexWorkICBC

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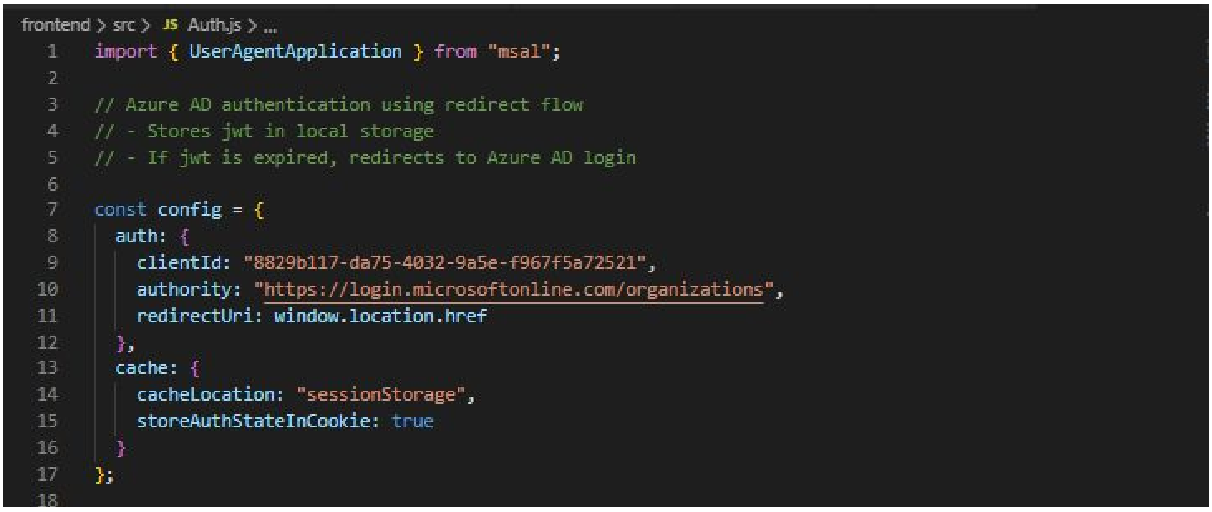
Build more powerful apps with rich user and business data from Microsoft services and your own company's data sources.

Use our SDKs to sign in users and call APIs in a few steps

In `frontend/src/auth.js`, `clientId` field


frontend > src > JS Auth.js > ...

```
import { UserAgentApplication } from "msal";

// Azure AD authentication using redirect flow
// - Stores jwt in local storage
// - If jwt is expired, redirects to Azure AD login

const config = {
  auth: {
    clientId: "8829b117-da75-4032-9a5e-f967f5a72521",
    authority: "https://login.microsoftonline.com/organizations",
    redirectUri: window.location.href
  },
  cache: {
    cacheLocation: "sessionStorage",
    storeAuthStateInCookie: true
  }
};
```

At this point, Development and testing environment setup for Azure Active Directory is finished.

2.2 Database setup

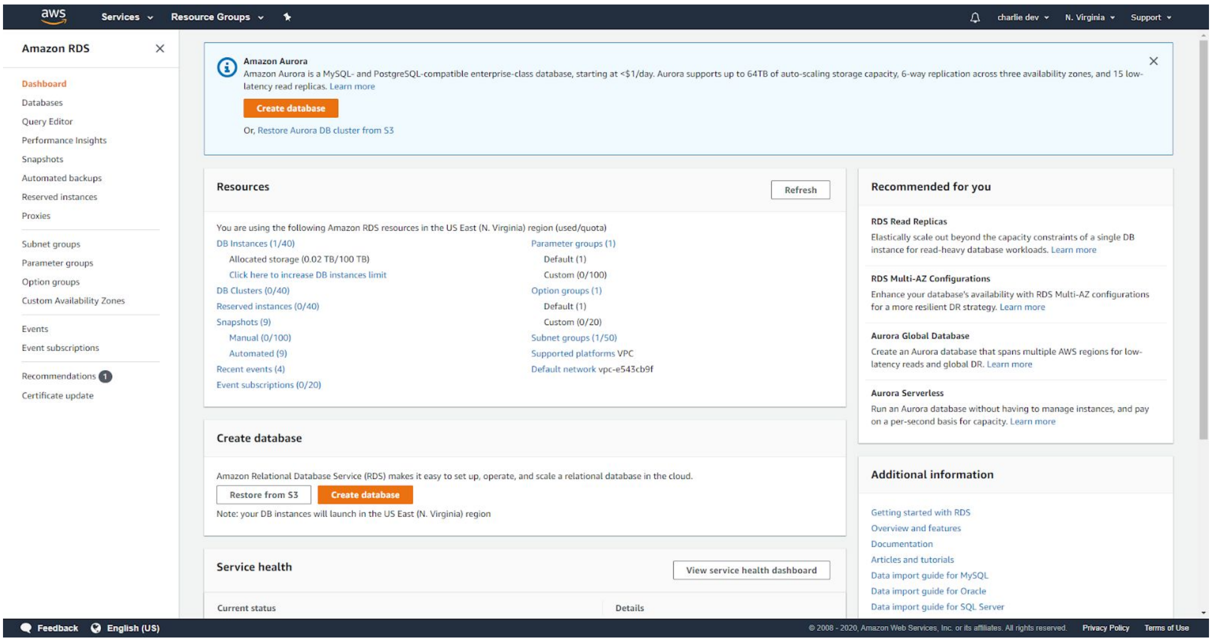
The production environment should use MySQL relational database. To connect our application to production database, you should edit `backend/db/mysqlDB.js` file `remoteOption` field. The insert table script is in `script/insert_table.sql`. The offload DBA script is in `script/archiveBookingsAndAvailabilities.sql`. This DBA script should run everyday at midnight.

The development environment uses Amazon RDS MySQL database. The endpoint is `flexdb.ckmtd5etwo6b.us-east-1.rds.amazonaws.com`, port `3306`. Our application is currently connected to it.

The Testing environment has the same set up as development. Except that the testing environment has some auto generated fake data. The fake record is inserted by SQL scripts in `backend/sql/generated` folder. The generation script is in `backend/sql/generator` folder. Run `npm run gen` to start generation.

Here are the steps to create Amazon RDS MySQL database.

Step 1: Sign in to the AWS Management Console and open the Amazon RDS console at https://console.aws.amazon.com/rds/



Amazon Aurora

Amazon Aurora is a MySQL- and PostgreSQL-compatible enterprise-class database, starting at <$1/day. Aurora supports up to 64TB of auto-scaling storage capacity, 6-way replication across three availability zones, and 15 low-latency read replicas. Learn more

Or, Restore Aurora DB cluster from S3

Resources

You are using the following Amazon RDS resources in the US East (N. Virginia) region (used/quota)

DB Instances (1/40)	Parameter groups (1)
Allocated storage (0.02 TB/100 TB)	Default (1)
Click here to increase DB instances limit	Custom (0/100)
DB Clusters (0/40)	Option groups (1)
Reserved instances (0/40)	Default (1)
Snapshots (9)	Custom (0/20)
Manual (0/100)	Subnet groups (1/50)
Automated (9)	Supported platforms VPC
Recent events (4)	Default network vpc-e543cb9f
Event subscriptions (0/20)	

Create database

Amazon Relational Database Service (RDS) makes it easy to set up, operate, and scale a relational database in the cloud.

Note: your DB instances will launch in the US East (N. Virginia) region

Service health

Current status | Details

Recommended for you

RDS Read Replicas

Elastically scale out beyond the capacity constraints of a single DB instance for read-heavy database workloads. Learn more

RDS Multi-AZ Configurations

Enhance your database's availability with RDS Multi-AZ configurations for a more resilient DR strategy. Learn more

Aurora Global Database

Create an Aurora database that spans multiple AWS regions for low-latency reads and global DR. Learn more

Aurora Serverless

Run an Aurora database without having to manage instances, and pay on a per-second basis for capacity. Learn more

Additional information

Getting started with RDS
Overview and features
Documentation
Articles and tutorials
Data import guide for MySQL
Data import guide for Oracle
Data import guide for SQL Server

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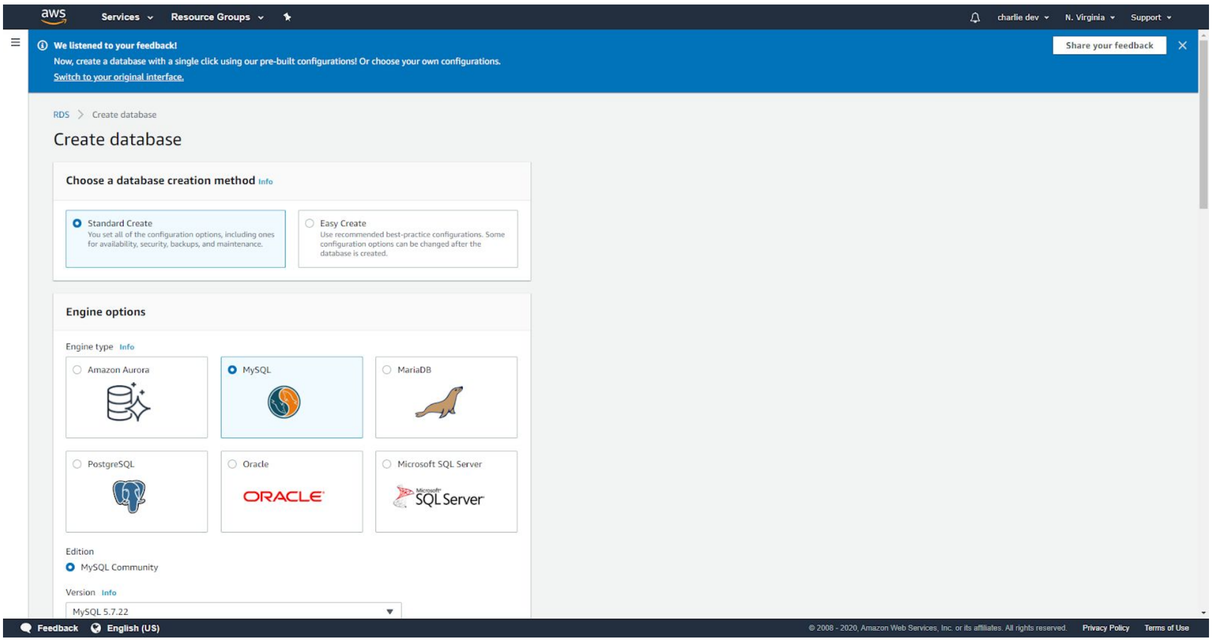
Step 2: In the upper-right corner of the AWS Management Console, choose the AWS Region in which you want to create the DB instance. This example uses the US West (Oregon) Region. In the navigation pane, choose Databases.Choose Create database.On the Create database page, shown following, make sure that the Standard Create option is chosen, and then choose MySQL.



We listened to your feedback!
Now, create a database with a single click using our pre-built configurations! Or choose your own configurations.
Switch to your original interface.

RDS > Create database

Create database

Choose a database creation method Info

● Standard Create
You set all of the configuration options, including ones for availability, security, backups, and maintenance.

○ Easy Create
Use recommended best-practice configurations. Some configuration options can be changed after the database is created.

Engine options

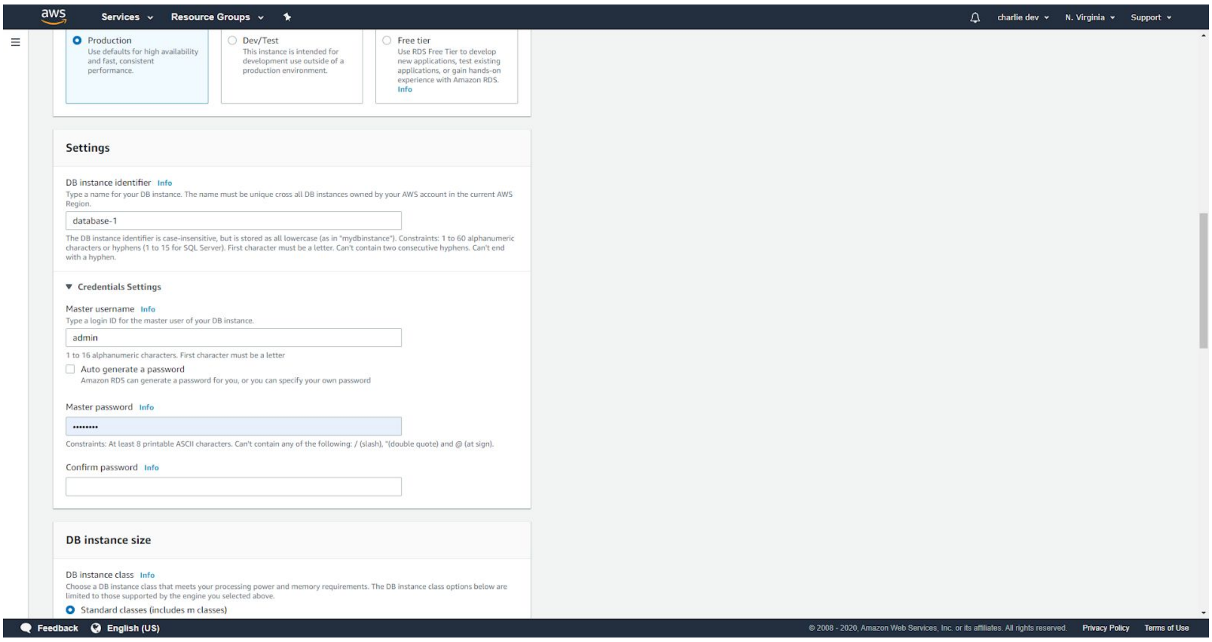
Engine type Info

○ Amazon Aurora ● MySQL ○ MariaDB
○ PostgreSQL ○ Oracle ○ Microsoft SQL Server

Edition
● MySQL Community

Version Info
MySQL 5.7.22

Step 3: enter database username and password. In the development and testing environment database we used “admin” as the username. “Flex2019” as password.



● Production
Use defaults for high availability and fast, consistent performance.

○ Dev/Test
This instance is intended for development use outside of a production environment.

○ Free tier
Use RDS Free Tier to develop new applications, test existing applications, or gain hands-on experience with Amazon RDS. Info

Settings

DB instance identifier Info
Type a name for your DB instance. The name must be unique cross all DB instances owned by your AWS account in the current AWS Region.
database-1
The DB instance identifier is case-insensitive, but is stored as all lowercase (as in "mydbinstance"). Constraints: 1 to 60 alphanumeric characters or hyphens (1 to 15 for SQL Server). First character must be a letter. Can't contain two consecutive hyphens. Can't end with a hyphen.

▼ Credentials Settings

Master username Info
Type a login ID for the master user of your DB instance.
admin
1 to 16 alphanumeric characters. First character must be a letter

□ Auto generate a password
Amazon RDS can generate a password for you, or you can specify your own password

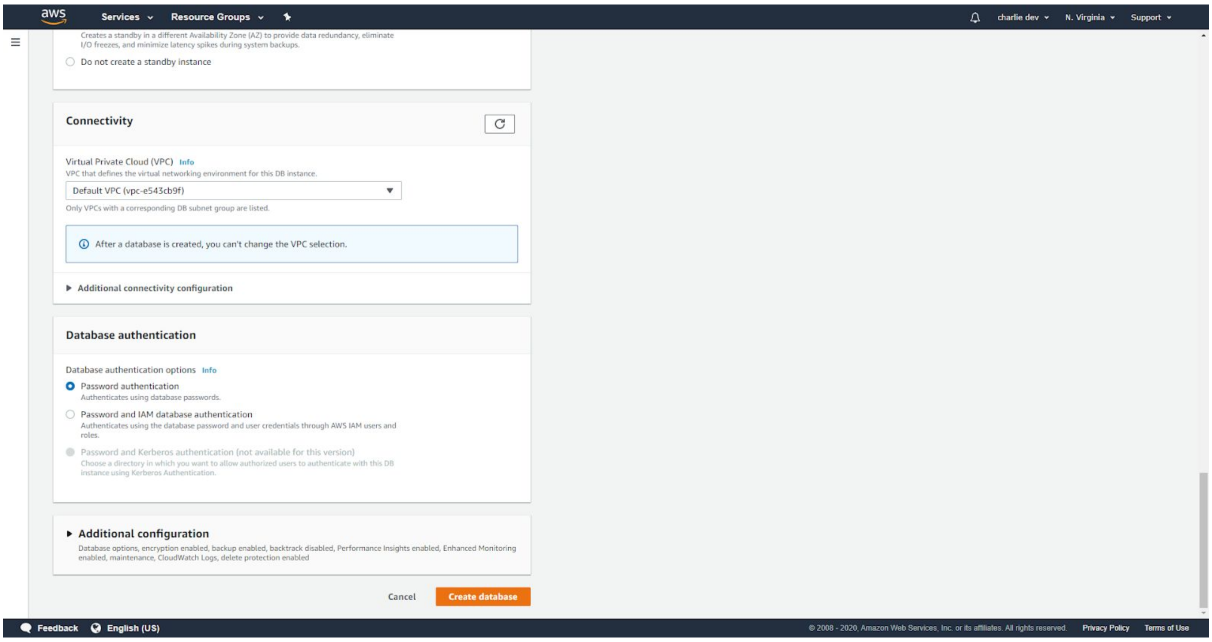
Master password Info
••••••••
Constraints: At least 8 printable ASCII characters. Can't contain any of the following: / (slash), "(double quote) and @ (at sign).

Confirm password Info

DB instance size

DB instance class Info
Choose a DB instance class that meets your processing power and memory requirements. The DB instance class options below are limited to those supported by the engine you selected above.
● Standard classes (includes m classes)

Step 4: keep everything else default, click “create database”



Creates a standby in a different Availability Zone (AZ) to provide data redundancy, eliminate I/O freezes, and minimize latency spikes during system backups.

○ Do not create a standby instance

Connectivity

Virtual Private Cloud (VPC) Info

VPC that defines the virtual networking environment for this DB instance.

Default VPC (vpc-e543cb9f)

Only VPCs with a corresponding DB subnet group are listed.

After a database is created, you can't change the VPC selection.

▸ Additional connectivity configuration

Database authentication

Database authentication options Info

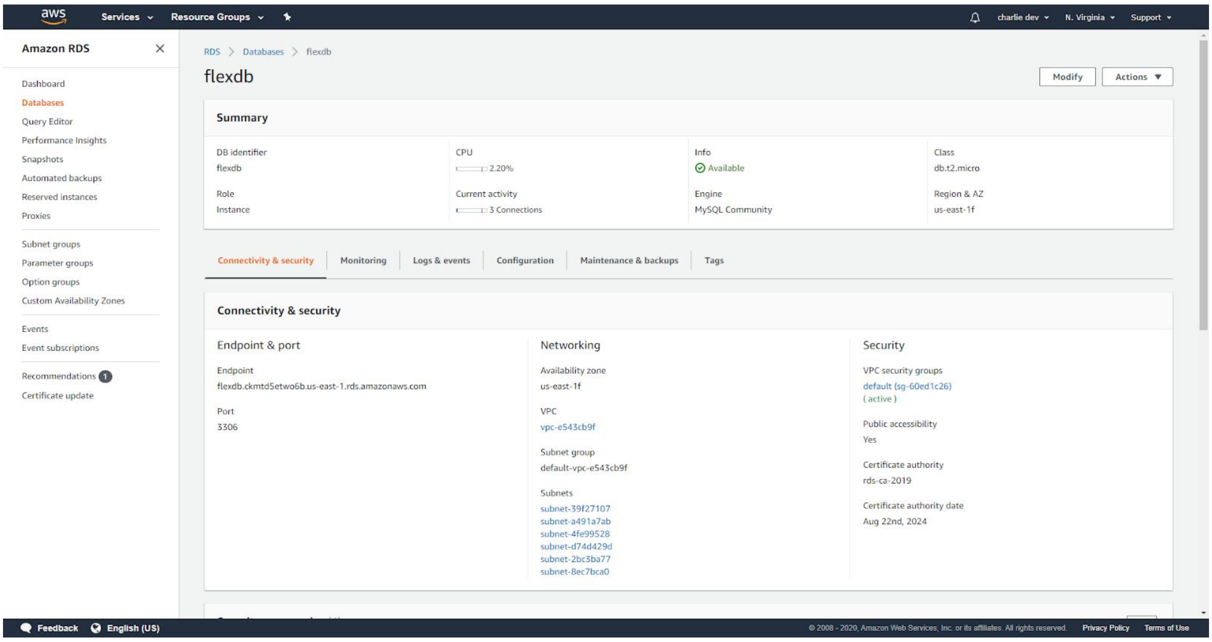
● Password authentication
Authenticates using database passwords.

○ Password and IAM database authentication
Authenticates using the database password and user credentials through AWS IAM users and roles.

○ Password and Kerberos authentication (not available for this version)
Choose a directory in which you want to allow authorized users to authenticate with this DB instance using Kerberos Authentication.

▸ **Additional configuration**
Database options, encryption enabled, backup enabled, backtrack disabled, Performance Insights enabled, Enhanced Monitoring enabled, maintenance, CloudWatch Logs, delete protection enabled

Step 5: after database creation completes we can review it on the management page.



flexdb

Summary

DB identifier: flexdb
CPU: 2.20%
Info: Available
Class: db.t2.micro
Role: Instance
Current activity: 3 Connections
Engine: MySQL Community
Region & AZ: us-east-1f

Connectivity & security

Endpoint & port

Endpoint
flexdb.ckmtd5etwo6b.us-east-1.rds.amazonaws.com

Port
3306

Networking

Availability zone
us-east-1f

VPC
vpc-e543cb9f

Subnet group
default-vpc-e543cb9f

Subnets
subnet-39f27107
subnet-a491a7ab
subnet-4fe99528
subnet-d74d429d
subnet-2bc3ba77
subnet-8ec7bca0

Security

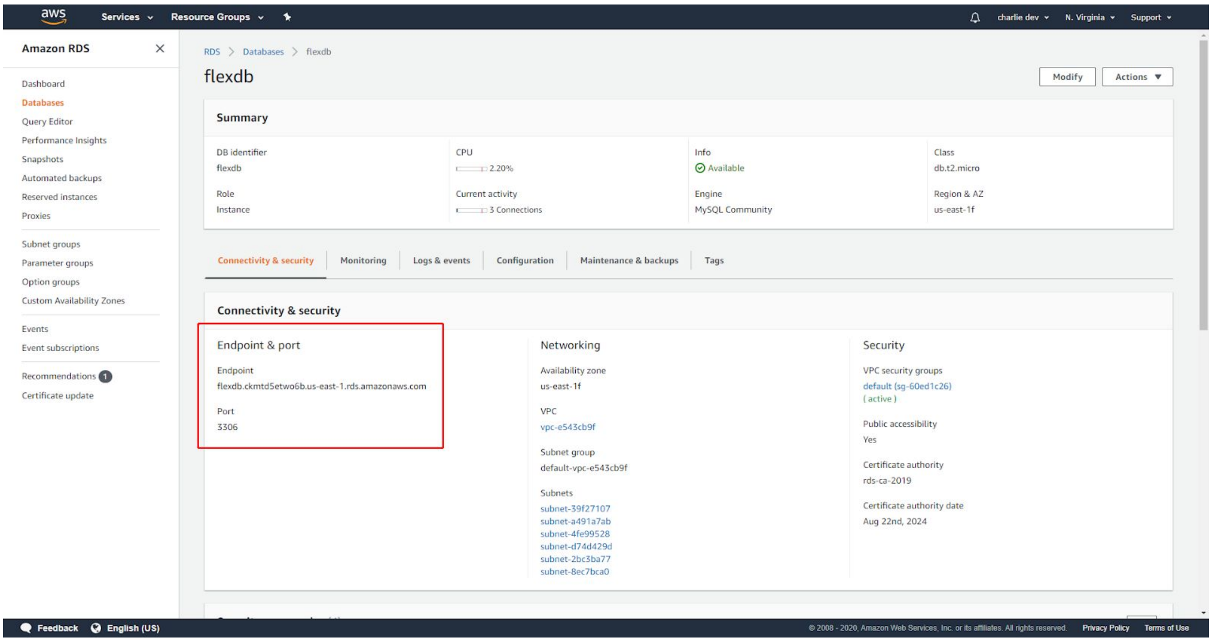
VPC security groups
default (sg-60ed1c26)
(active)

Public accessibility
Yes

Certificate authority
rds-ca-2019

Certificate authority date
Aug 22nd, 2024

Step 6: copy the “endpoint” and “port” in “connectivity and security” tab



flexdb

Summary

DB identifier
flexdb

Role
Instance

CPU
2.20%

Current activity
3 Connections

Info
Available

Engine
MySQL Community

Class
db.t2.micro

Region & AZ
us-east-1f

Connectivity & security

Endpoint & port

Endpoint
flexdb.ckmtd5etwo6b.us-east-1.rds.amazonaws.com

Port
3306

Networking

Availability zone
us-east-1f

VPC
vpc-e543cb9f

Subnet group
default-vpc-e543cb9f

Subnets
subnet-39f27107
subnet-a491a7ab
subnet-4fe99528
subnet-d74d429d
subnet-2bc3ba77
subnet-8ec7bca0

Security

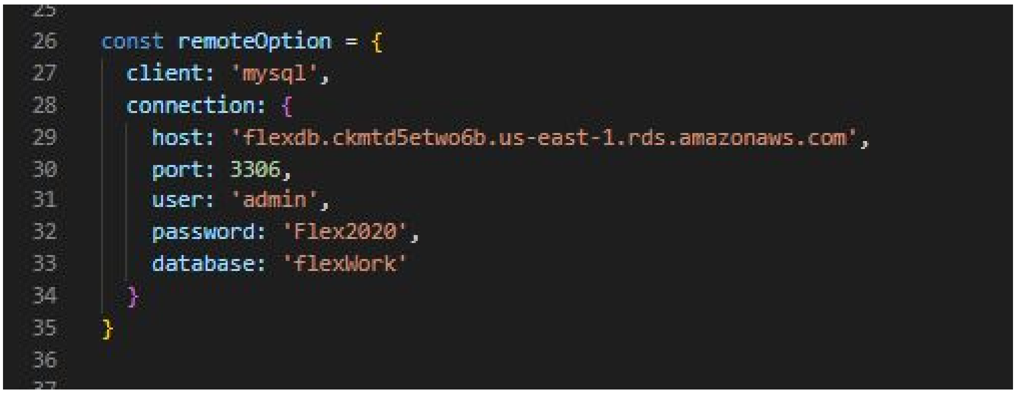
VPC security groups
default (sg-60ed1c26)
(active)

Public accessibility
Yes

Certificate authority
rds-ca-2019

Certificate authority date
Aug 22nd, 2024

To `backend/db/mysqlDB.js` file `remoteOption` field. Enter username and password



```
const remoteOption = {
  client: 'mysql',
  connection: {
    host: 'flexdb.ckmtd5etwo6b.us-east-1.rds.amazonaws.com',
    port: 3306,
    user: 'admin',
    password: 'Flex2020',
    database: 'flexWork'
  }
}
```

Step 7: insert table. Use MySQL Workbench or command line tool to connect remote database instance. Run `script/insert_table.sql` to insert tables. Run `script/archiveBookingsAndAvailabilities.sql` to enable offload DBA script.

At this point, the development database environment setup is complete.

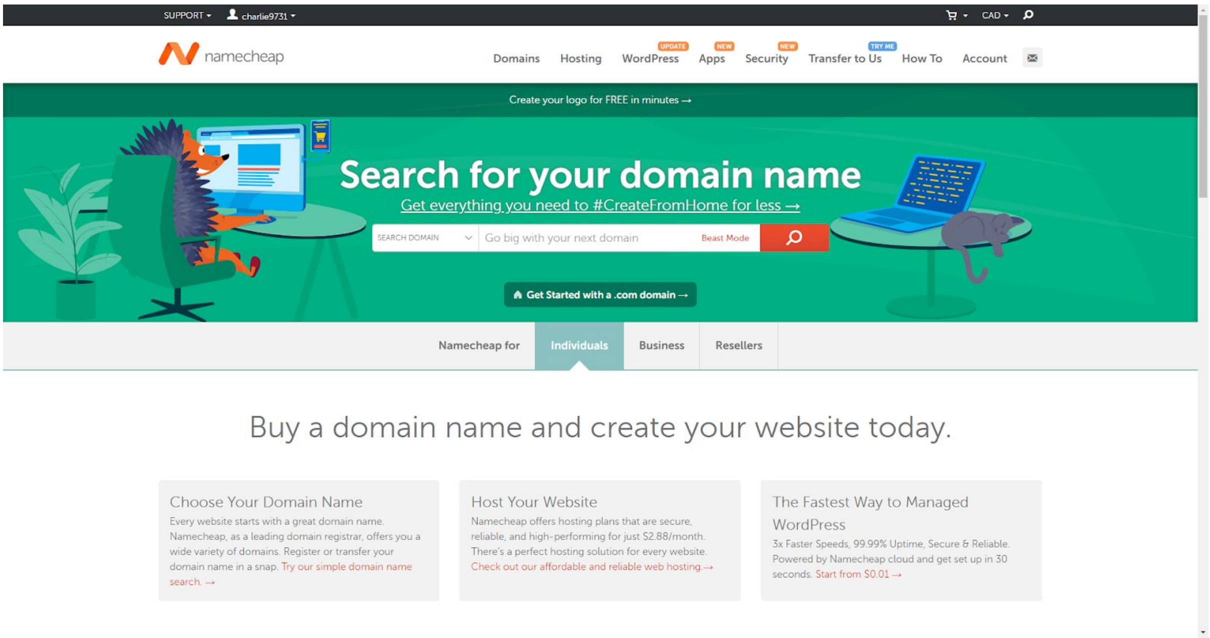
2.3 Server setup

Production, development, and testing environment use Centos 7 linux distribution with minimum 2 GB of memory, 30 GB of storage. Production environment should have network setup with port 22 open for SSH connection, port 8080 open for backend service connection. Port 443 open for frontend HTTPS service connection.

Development and testing environment have port 2222 open for SSH connection. Port 3000 open for HTTP service connection. Other network configurations are the same as production.

Here are the steps for getting a domain name and getting a CA certificate. We use “Namecheap” as domain name server and connect it to AWS EC2 instance

Step 1: login into https://www.namecheap.com/



Create your logo for FREE in minutes →

Search for your domain name

Get everything you need to #CreateFromHome for less →

Buy a domain name and create your website today.

Choose Your Domain Name
Every website starts with a great domain name. Namecheap, as a leading domain registrar, offers you a wide variety of domains. Register or transfer your domain name in a snap. Try our simple domain name search. →

Host Your Website
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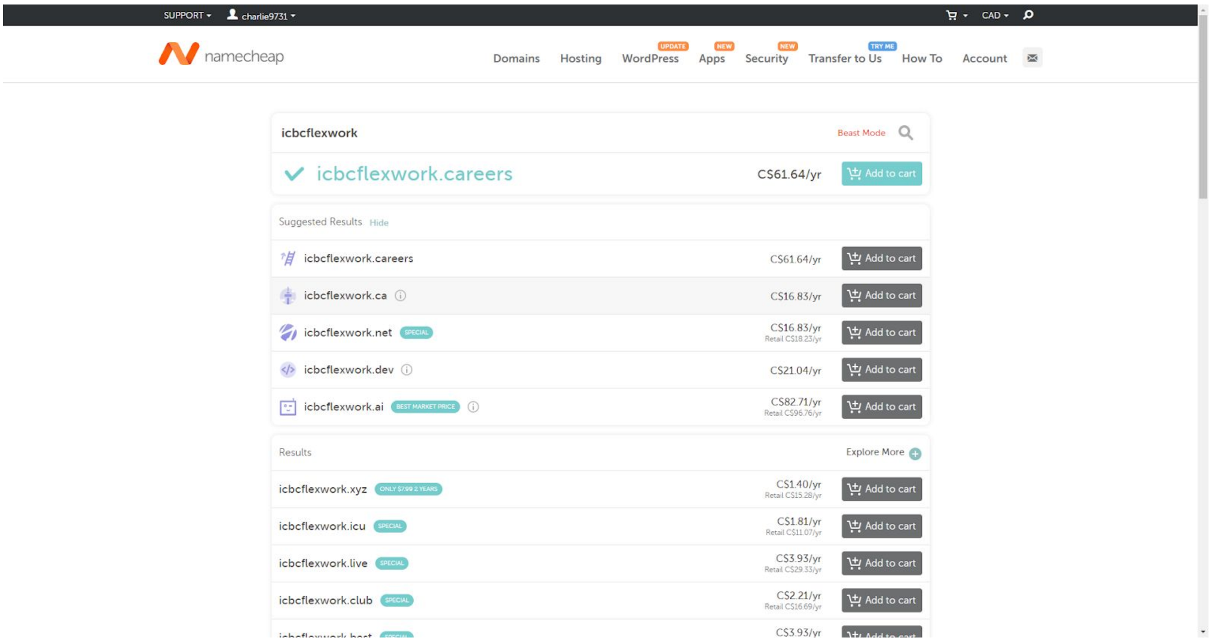
The Fastest Way to Managed WordPress
3x Faster Speeds, 99.99% Uptime, Secure & Reliable. Powered by Namecheap cloud and get set up in 30 seconds. Start from $0.01 →

Step 2: in the search panel, search for a domain name you want, we use icbcflexwork as example



icbcflexwork

✓ icbcflexwork.careers C$61.64/yr Add to cart

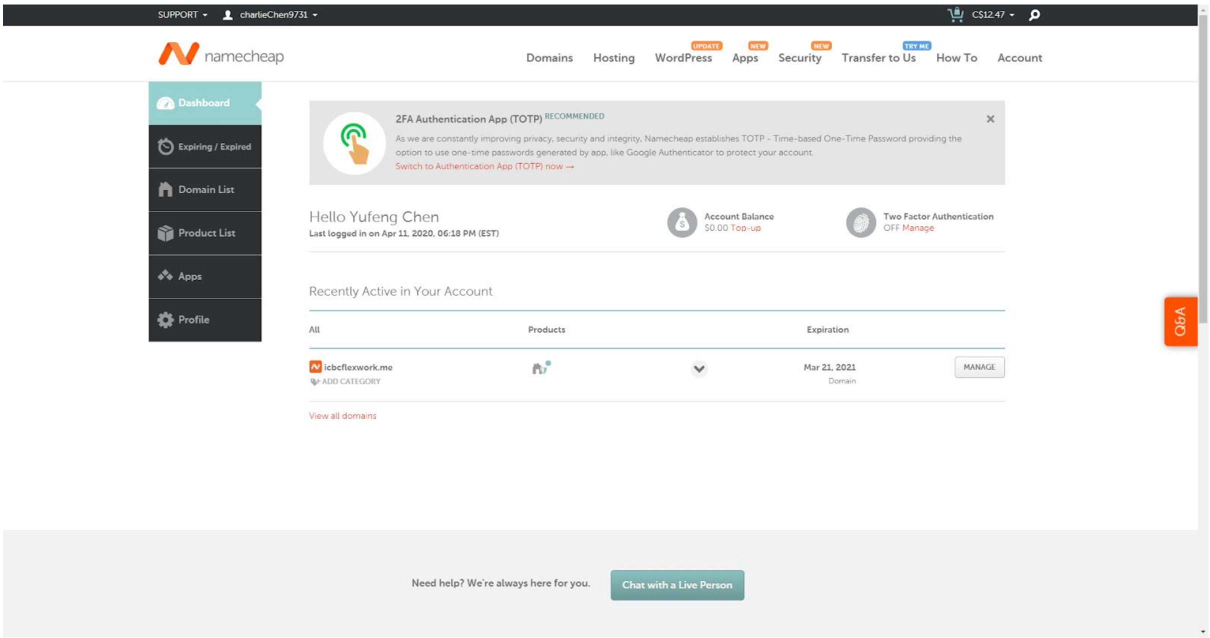
Suggested Results

icbcflexwork.careers	C$61.64/yr	Add to cart
icbcflexwork.ca	C$16.83/yr	Add to cart
icbcflexwork.net SPECIAL	C$16.83/yr Retail C$18.23/yr	Add to cart
icbcflexwork.dev	C$21.04/yr	Add to cart
icbcflexwork.ai BEST MARKET PRICE	C$82.71/yr Retail C$96.76/yr	Add to cart

Results

icbcflexwork.xyz ONLY $7.99 2 YEARS	C$1.40/yr Retail C$15.28/yr	Add to cart
icbcflexwork.icu SPECIAL	C$1.81/yr Retail C$11.07/yr	Add to cart
icbcflexwork.live SPECIAL	C$3.93/yr Retail C$29.33/yr	Add to cart
icbcflexwork.club SPECIAL	C$2.21/yr Retail C$16.69/yr	Add to cart
icbcflexwork.host SPECIAL	C$3.93/yr	Add to cart

Step 3: select domain name you want to use, then you can review it in the account dashboard



2FA Authentication App (TOTP) RECOMMENDED

As we are constantly improving privacy, security and integrity, Namecheap establishes TOTP - Time-based One-Time Password providing the option to use one-time passwords generated by app, like Google Authenticator to protect your account.

Switch to Authentication App (TOTP) now →

Hello Yufeng Chen
Last logged in on Apr 11, 2020, 06:18 PM (EST)

Account Balance
$0.00 Top-up

Two Factor Authentication
OFF Manage

Recently Active in Your Account

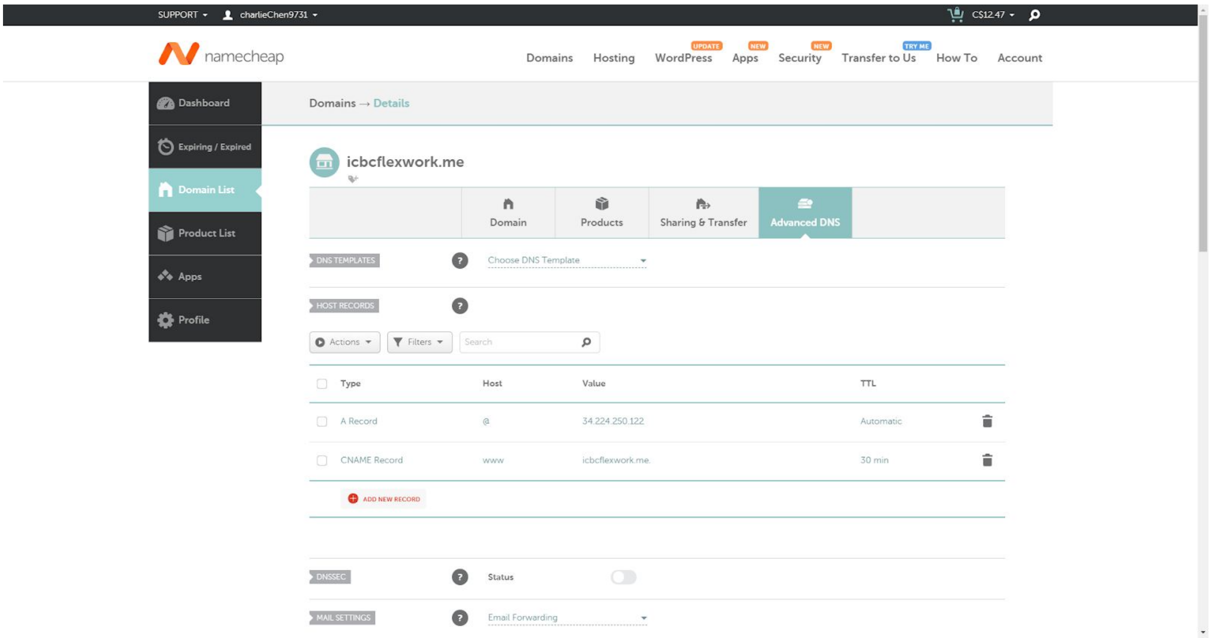
All	Products		Expiration	
icbcflexwork.me ADD CATEGORY			Mar 21, 2021 Domain	MANAGE

View all domains

Need help? We're always here for you. Chat with a Live Person

Step 4: click on the manage button to edit contact information.

Step 5: in Advanced DNS panel add an “A record” to register this domain to Server IP address



Type	Host	Value	TTL
A Record	@	34.224.250.122	Automatic
CNAME Record	www	icbcflexwork.me.	30 min

Step 6: get CA certificate. We use certbot to get free CA certificate for our development environment. https://certbot.eff.org/

Step 6.1: ssh into server. Make sure EPEL repo is enabled.

Step 6.2: run command

```
$ yum -y install yum-utils
$ yum-config-manager --enable rhui-REGION-rhel-server-extras
rhui-REGION-rhel-server-optional
```

Step 6.3: install certbot

```
$ sudo yum install certbot
```

Step 6.4: run certbot

```
$ sudo certbot certonly --webroot
```

Step 7: copy `cert.pem` and `privkey.pem` file to our application.

At this point domain name is enabled and certified. We can use HTTPS to enter development website.

3 Start Service

3.1 Production service

Production environment should register domain name with Certificate authority then copy certificate file to `backend/cert.pem` and `frontend/cert.pem`. Copy private key file to `backend/privkey.pem` and `frontend/privkey.pem` Then run `production-install.sh` in root with command:

```
sudo sh ./production-install.sh
```

This will install npm dependencies and start frontend and backend service with `forever`

3.1 Development and Testing service

The Development and Testing environment uses `icbcflexwork.me` as domain name. The current CA certificate and private key stored in this package belongs to this domain name. Start service by running `develop-install.sh` in root with command:

```
sudo sh ./develop-install.sh
```

Our current development and testing website can be accessed with https://icbcflexwork.me/