



Cloud Development, 2021 fall. Homework 4

Report

Microsoft Identity Platform

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Almaty 2021

Task

Develop a simple web application, allowing users to be authenticated by Microsoft Identity Platform. Information about current user identity (Full name, for example) has to be reflected on the page headers. Use Microsoft Graph SDK for simplicity. To reduce the amount of work, you can add the mentioned functionality to your existing site from previous homework. Additionally create a blob container, named "securedphotos" (in a Storage Account) with access to blobs allowed only to authenticated users. Your web application have to show images from this container to authorized users only.

Report

The first screenshot shows the 'Register an application' page in the Microsoft Azure portal. The application name is 'Homework4'. Under 'Supported account types', 'Accounts in any organizational directory (Any Azure AD directory - Multitenant) and personal Microsoft accounts (e.g. Skype, Xbox)' is selected. The 'Redirect URI (optional)' is set to 'http://localhost:3000/auth/callback'. A 'Register' button is at the bottom.

The second screenshot shows the 'Homework 4' application overview page. It displays essential information: Display name (Homework 4), Application (client) ID (0796b05-5a74-4073-920e-bea33f07e4c), Object ID (e7fc984-31bd-46c4-a593-f89ac542f93), Directory (tenant) ID (57081b5e-e66a-4993-beaf-15b0b309293f), and Supported account types (My organization only). It also shows client credentials (Add a certificate or secret), redirect URIs (1 web, 0 spa, 0 public client), application ID URI (Add an Application ID URI), and managed application in L (Homework 4).

The third screenshot shows the 'Homework4 | Certificates & secrets' page. It includes a 'Got feedback?' link, a description of credentials, and a table of client secrets. A 'New client secret' button is present. The table lists one secret:

Description	Expires	Value	Secret ID
Forux	4/30/2022	rm07Q~1Uz2tBqQ85zstV4uAMXSeRG...	4201e5d8-10ca-4688-9c32-a708aba25d8e

```
>> npx express-generator --hbs graph-tutorial
```

```
>> npm install
>> npm install express@4.17.1 http-errors@1.8.0 morgan@1.10.0 debug@4.3.1 hbs@4.1.2
>> npm start
>> npm install dotenv@10.0.0 date-fns@2.23.0 date-fns-tz@1.1.6 connect-flash@0.1.1
express-validator@6.12.1
>> npm install express-session@1.17.2 express-promise-router@4.1.0 isomorphic-fetch@3.0.0
>> npm install @azure/msal-node@1.3.0 @microsoft/microsoft-graph-client@3.0.0 windows-iana@5.0.2
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9  const session = require('express-session');
10 const flash = require('connect-flash');
11 const msal = require('@azure/msal-node');
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```

```

1 OAUTH_APP_ID=3fb31701-8f13-4817-843d-7a5eb0660a25
2 OAUTH_APP_SECRET=HFW7Q-VamD_Io-kzq43ptNG9fmLsEhtVQ1c
3 OAUTH_REDIRECT_URI=http://localhost:3000/auth/callback
4 OAUTH_SCOPES='user.read,mailboxsettings.read'
5 OAUTH_AUTHORITY=https://login.microsoftonline.com/common/
6 ACCOUNT=securedphotos
7 CONTAINER=securedphotos
8 SECRET=ay2VChKtGfDUK1c8dqMxucEnFinnzRxzcZFW8vH+b35yF4wq15vhr1DUKebvsiVpn1ME18m6gs3nu120JAu==

```

Msal config

```

1 app.locals.users = {};
2 const msalConfig = {
3   auth: {
4     clientId: process.env.OAUTH_APP_ID,
5     authority: process.env.OAUTH_AUTHORITY,
6     clientSecret: process.env.OAUTH_APP_SECRET
7   },
8   system: {
9     loggerOptions: {
10      loggerCallback(logLevel, message, containsPii) {
11        console.log(message);
12      },
13      piiLoggingEnabled: false,
14      logLevel: msal.LogLevel.Verbose,
15    }
16  }
17 };
18
19 app.locals.msalClient = new msal.ConfidentialClientApplication(msalConfig);

```

Routes

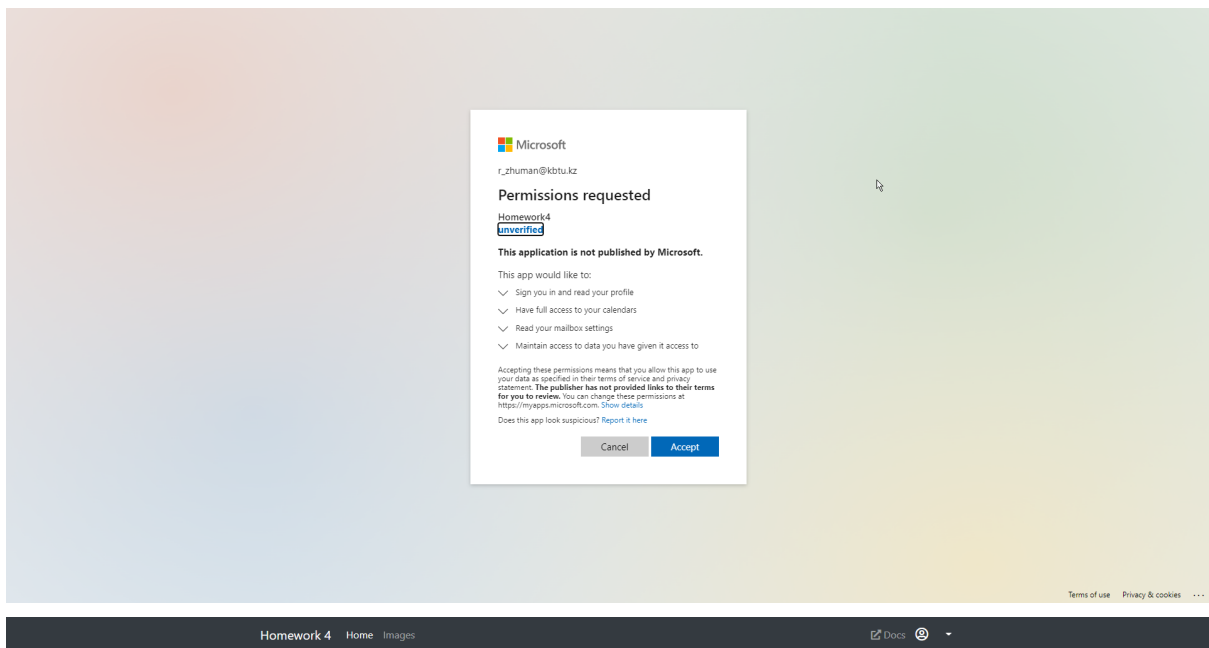
```

1 const router = require('express').router();
2 const graph = require('../graph');
3
4 /* GET auth callback. */
5 router.get('/signin',
6   async function(req, res) {
7     const urlParameters = {
8       scopes: process.env.OAUTH_SCOPES.split(','),
9       redirectUri: process.env.OAUTH_REDIRECT_URI
10    };
11
12    try {
13      const authUrl = await req.app.locals
14        .msalClient.getAuthCodeUrl(urlParameters);
15      res.redirect(authUrl);
16    }
17    catch (error) {
18      console.log('Error: ' + error);
19      req.flash('error_msg', {
20        message: 'Error getting auth URL',
21        debug: JSON.stringify(error, Object.getOwnPropertyNames(error))
22      });
23      res.redirect('/');
24    }
25  }
26 );
27
28 router.get('/callback',
29   async function(req, res) {
30     const tokenRequest = {
31       code: req.query.code,
32       scopes: process.env.OAUTH_SCOPES.split(','),
33       redirectUri: process.env.OAUTH_REDIRECT_URI
34     };
35
36     try {
37       const response = await req.app.locals
38         .msalClient.acquireTokenByCode(tokenRequest);
39
40       // Save the user's homeAccountid in their session
41       req.session.userId = response.account.homeAccountid;
42       console.log('Token', response.accessToken);
43       const user = await graph.getUserDetails(response.accessToken, req.session.userId);
44       console.log('User', user);
45
46       // Add the user to user storage
47       req.app.locals.users[req.session.userId] = {
48         displayName: user.displayName,
49         email: user.mail || user.userPrincipalName,
50         timeZone: user.mailboxSettings.timeZone
51       };
52     }
53     catch (error) {
54       req.flash('error_msg', {
55         message: 'Error completing authentication',
56         debug: JSON.stringify(error, Object.getOwnPropertyNames(error))
57       });
58       res.redirect('/');
59     }
60   }
61 );
62
63 router.get('/signout',
64   async function(req, res) {
65     // Sign out
66     if (req.session.userId) {
67       // Look up the user's account in the cache
68       const accounts = await req.app.locals.msalClient
69         .getTokenCache()
70         .getAllAccounts();
71
72       const userAccount = accounts.find(a => a.homeAccountid === req.session.userId);
73
74       // Remove the account
75       if (userAccount) {
76         req.app.locals.msalClient
77           .getTokenCache()
78           .removeAccount(userAccount);
79       }
80     }
81
82     // Destroy the user's session
83     req.session.destroy(function (err) {
84       res.redirect('/');
85     });
86   }
87 );

```

Graph config

```
1 var graph = require('@microsoft/microsoft-graph-client');
2 require('isomorphic-fetch');
3
4 module.exports = {
5   getUserDetails: async function(msalClient, userId) {
6     const client = getAuthenticatedClient(msalClient, userId);
7
8     const user = await client
9       .api('/me')
10      .select('displayName,mail,mailboxSettings,userPrincipalName')
11      .get();
12     return user;
13   },
14 };
15
16 function getAuthenticatedClient(msalClient, userId) {
17   if (!msalClient || !userId) {
18     throw new Error(
19       'Invalid MSAL state. Client: ${msalClient ? 'present' : 'missing'}, User ID: ${userId ? 'present' : 'missing'}');
20   }
21
22   const client = graph.Client.init({
23     authProvider: async (done) => {
24       try {
25         done(null, msalClient);
26       } catch (err) {
27         console.log(JSON.stringify(err, Object.getOwnPropertyNames(err)));
28         done(err, null);
29       }
30     }
31   });
32
33   return client;
34 }
```




Homework 4 Graph

This sample app shows how to use the Microsoft Graph API to access a user's data from Node.js

Welcome Rakhat E. Zhuman!

Use the navigation bar at the top of the page to get started.

 Microsoft

r_zhuman@kbtu.kz

Permissions requested

Homework4

unverified

This application is not published by Microsoft.

This app would like to:

✓ Sign you in and read your profile

✓ Have full access to your calendars

✓ Read your mailbox settings


✓ Maintain access to data you have given it access to

Accepting these permissions means that you allow this app to use your data as specified in their terms of service and privacy statement. The publisher has not provided links to their terms for you to review. You can change these permissions at <https://myapps.microsoft.com>. [Show details](#)

Does this app look suspicious? [Report it here](#)

Cancel

Accept

 Microsoft

r_zhuman@kbtu.kz

Permissions requested

Homework4

unverified

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This app would like to:

✓ Sign you in and read your profile

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Does this app look suspicious? [Report it here](#)

Cancel

Accept

Microsoft Azure

Search resources, services, and docs (Ctrl+J)

Home > Create a resource >

Create a storage account

Basics Advanced Networking Data protection Tags Review + create

storage accounts

Project details

Select the subscription in which to create the new storage account. Choose a new or existing resource group to organize and manage your storage account together with other resources.

Subscription * Azure for Students

Resource group * [blank] homework4
[Create new](#)

Instance details

If you need to create a legacy storage account type, please click [here](#).

Storage account name * securedphotos

Region * (Europe) North Europe

Performance * ☒ Standard: Recommended for most scenarios (general-purpose v2 account)
☐ Premium: Recommended for scenarios that require low latency.

Redundancy * Locally-redundant storage (LRS)

[Review + create](#) < Previous Next: Advanced >

Microsoft Azure

Search resources, services, and docs (Ctrl+J)

Home > securedphotos_1635590270548 > securedphotos

securedphotos | Containers

Storage account

Search (Ctrl+J)

+ Container Change access level Restore containers Refresh Delete

Search containers by prefix

Show deleted containers

Name	Last modified	Public access level	Lease state
<input type="checkbox"/> \$logs	10/30/2021, 4:38:18 PM	Private	Available
<input type="checkbox"/> securedphotos	10/30/2021, 4:41:58 PM	Private	Available

Microsoft Azure

Search resources, services, and docs (Ctrl+J)

Home > АО "Казахстанско-Британский Технический Университет" > Node Js Test

Node Js Test | API permissions

Search (Ctrl+J)

Refresh Got feedback?

Overview

Quickstart

Integration assistant

Manage

Branding

Authentication

Certificates & secrets

Token configuration

API permissions

Expose an API

App roles

Owners

Roles and administrators | Preview

Manifest

Support + Troubleshooting

Troubleshooting

New support request

Starting November 9th, 2020 end users will no longer be able to grant consent to newly registered multitenant apps without verified publisher.

The "Admin consent required" column shows the default value for an organization. However, user consent can be customized per permission.

Configured permissions

Applications are authorized to call APIs when they are granted permissions by users/admins as part of the consent process. The list of configured permissions for this application is shown below. Learn more about permissions and consent.

+ Add a permission Grant admin consent for АО "Казахстанско-Британский Технический Университет"

API / Permissions name	Type	Description	Admin consent required
Microsoft Graph (1)			
User.Read	Delegated	Sign in and read user profile	No

To view and manage permissions and user consent, try [Enterprise applications](#).

Request API permissions

single endpoint.

- Azure Communication Services: Rich communication experiences with the same secure CPaaS platform used by Microsoft Teams.
- Azure Cosmos DB: Fast NoSQL database with open APIs for any scale.
- Azure DevOps: Integrate with Azure DevOps and Azure DevOps server.
- Azure Key Vault: Manage your key vaults as well as the keys, secrets, and certificates within your Key Vault.
- Azure Rights Management Services: Allow validated users to read and write protected content.
- Azure Service Management: Programmatic access to much of the functionality available through the Azure portal.
- Azure Storage: Secure, massively scalable object and data lake storage for unstructured and semi-structured data.
- Data Export Service for Microsoft Dynamics 365: Export data from Microsoft Dynamics CRM organization to an external destination.
- Dynamics 365 Business Central: Programmatic access to data and functionality in Dynamics 365 Business Central.
- Dynamics CRM: Access the capabilities of CRM business software and ERP systems.
- Flow Service: Embed flow templates and manage flows.
- Intune: Programmatic access to Intune data.
- Office 365 Management APIs: Retrieve information about user, admin, system, and policy actions and events from Office 365 and Azure AD activity logs.
- OneNote: Create and manage notes, lists, pictures, files, and more in OneNote notebooks.
- Power BI Service: Programmatic access to Dashboard resources such as Datasets, Tables, and Rows in Power BI.

Microsoft Azure

Home > АО "Казахстанско-Британский Технический Университет" > Node Js Test

Node Js Test | API permissions

Overview

Quickstart

Integration assistant

Manage

Branding

Authentication

Certificates & secrets

Token configuration

API permissions

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Configured permissions

Applications are authorized to call APIs when they are granted permissions by users/admins as part of the consent process. The list of all the permissions the application needs. [Learn more about permissions and consent.](#)

+ Add a permission ✓ Grant admin consent for АО "Казахстанско-Британский Технический Университет"

API / Permissions name	Type	Description	Admin consent required
Microsoft Graph (1)			
User.Read	Delegated	Sign in and read user profile	No

To view and manage permissions and user consent, try [Enterprise applications](#).

Request API permissions

< All APIs

Azure Storage
https://storage.azure.com/ Docs

What type of permissions does your application require?

Delegated permissions
Your application needs to access the API as the signed-in user.

Application permissions
Your application runs as a background service or daemon without a signed-in user.

Select permissions

Start typing a permission to filter these results

The "Admin consent required" column shows the default value for an organization. However, user consent can be customized per permission, user, or app. This column may not reflect the value in your organization, or in organizations where this app will be used. [Learn more](#)

Permission	Admin consent required
user_impersonation	No
Access Azure Storage	No

Add permissions Discard

Images

```

1 const router = require('express-promise-router')();
2 const graph = require('../graph.js');
3 const { body, validationResult } = require('express-validator');
4 const validator = require('validator');
5 const { retrieve } = require('../blob.js');
6
7 router.get('/',
8   async function(req, res) {
9     if (!req.session.userId) {
10       res.redirect('/')
11     } else {
12       const result = await retrieve()
13
14       const params = {
15         active: { image: true },
16         data: result
17       };
18       console.log(params);
19       res.render('Images', params);
20     }
21   }
22 );
23
24 module.exports = router;

```

```

1 const { DefaultAzureCredential, ManagedIdentityCredential } = require("@azure/identity");
2 const { BlobServiceClient, StorageSharedKeyCredential } = require("@azure/storage-blob");
3 const { ClientSecretCredential, ChainedTokenCredential } = require("@azure/identity");
4 const { getBlobSasUri } = require("../functions");
5
6 // When an access token is requested, the chain will try each
7 // credential in order, stopping when one provides a token
8 // const credential = new ClientSecretCredential(process.env.TENANT, process.env.OAUTH_APP_ID, process.env.OAUTH_APP_SECRET);
9 const credential = new StorageSharedKeyCredential(process.env.ACCOUNT, process.env.SECRET);
10 const account = process.env.ACCOUNT;
11 // const defaultAzureCredential = new ManagedIdentityCredential(userAssignedClientId)
12
13 const blobServiceClient = new BlobServiceClient(
14   `https://${account}.blob.core.windows.net`, credential
15 );
16
17 const containerName = process.env.CONTAINER;
18 async function retrieve() {
19   const containerClient = blobServiceClient.getContainerClient(containerName);
20   console.log(containerClient)
21   // const sasuri = await getBlobSasUri(containerClient, account, '538466.marx2x.jpg', credential, null)
22   let i = 1;
23   let arrayOfBlobs = []
24   let blobs = containerClient.listBlobsFlat();
25   for await (const blob of blobs) {
26     const sasuri = await getBlobSasUri(containerClient, blob.name, credential, null)
27     arrayOfBlobs.push(sasuri)
28     console.log('Blob ${i++}: ${blob.name} , ${sasuri}');
29   }
30   return arrayOfBlobs
31 }
32
33 module.exports = {
34   retrieve
35 }

```

```

1 const { generateBlobSASQueryParameters, BlobSASPermissions } = require('@azure/storage-blob');
2
3 function getBlobSasUri(containerClient, blobName, sharedKeyCredential, storedPolicyName) {
4     const sasOptions = {
5         containerName: containerClient.containerName,
6         blobName: blobName
7     };
8
9     if (storedPolicyName == null) {
10         sasOptions.startsOn = new Date();
11         sasOptions.expiresOn = new Date(new Date().valueOf() + 1209600000); // 1209600000 => 14 days => 2 weeks
12         sasOptions.permissions = BlobSASPermissions.parse("r");
13     } else {
14         sasOptions.identifier = storedPolicyName;
15     }
16     const sasToken = generateBlobSASQueryParameters(sasOptions, sharedKeyCredential).toString();
17     console.log("SAS token for blob is: " + sasToken);
18     return `${containerClient.getBlockBlobClient(blobName).url}${sasToken}`;
19 }
20
21 module.exports = {
22     getBlobSasUri
23 }
24
25
26
27
28
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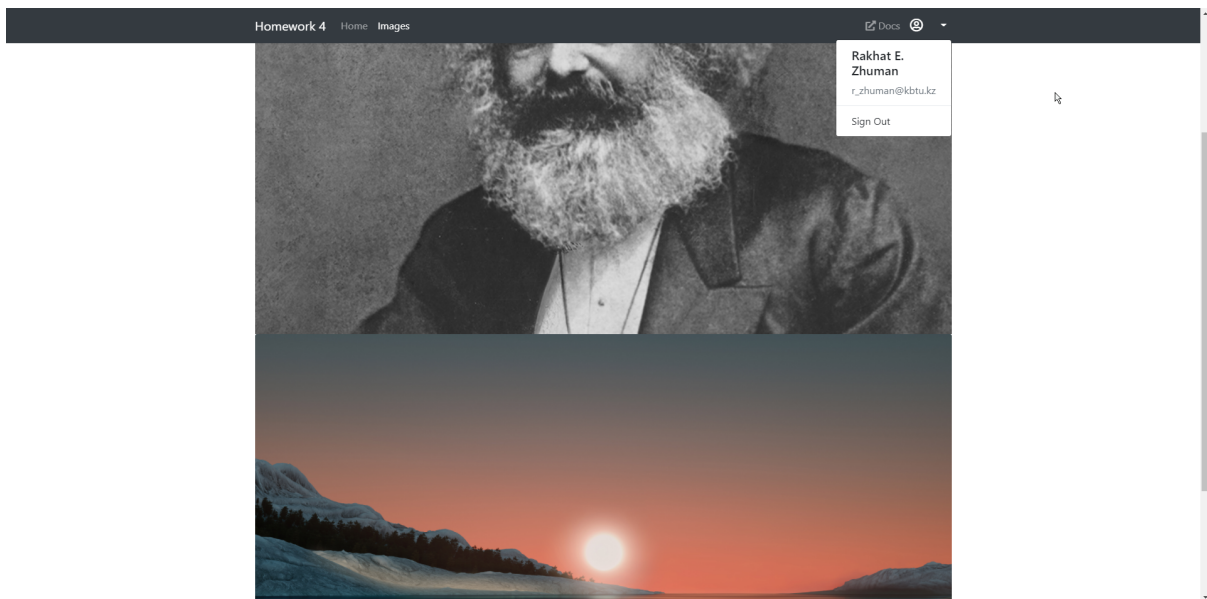
```

```

1 <div>
2   {{#each data}}
3   <img src={{this}} class="card-img-top" alt="...">
4   {{/each}}
5 </div>

```

Result



Cleaning up workspace

```

Bash
Requesting a Cloud Shell.Succeeded.
Connecting terminal...

Welcome to Azure Cloud Shell

Type "az" to use Azure CLI
Type "help" to learn about Cloud Shell

rakhat@Azure:~$ az group delete --name ContainerCompute --no-wait --yes
(ResourceGroupNotFound) Resource group 'ContainerCompute' could not be found.
rakhat@Azure:~$ az group delete --name homework4 --no-wait --yes
rakhat@Azure:~$

```

