Set up OAuth 2.0 client credentials flow in Azure Active Directory B2C

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Before you begin, use the **Choose a policy type** selector at the top of this page to choose the type of policy you're setting up. Azure Active Directory B2C offers two methods to define how users interact with your applications: through predefined user flows or through fully configurable custom policies. The steps required in this article are different for each method.

The OAuth 2.0 client credentials grant flow permits an app (confidential client) to use its own credentials, instead of impersonating a user, to authenticate when calling web resource, such as REST API. This type of grant is commonly used for server-to-server interactions that must run in the background, without immediate interaction with a user. These types of applications are often referred to as daemons or service accounts.

In the client credentials flow, permissions are granted directly to the application itself by an administrator. When the app presents a token to a resource, the resource enforces that the app itself has authorization to perform an action since there's no user involved in the authentication. This article covers the steps needed to authorize an application to call an API, and how to get the tokens needed to call that API.

Note

This feature is in public preview.

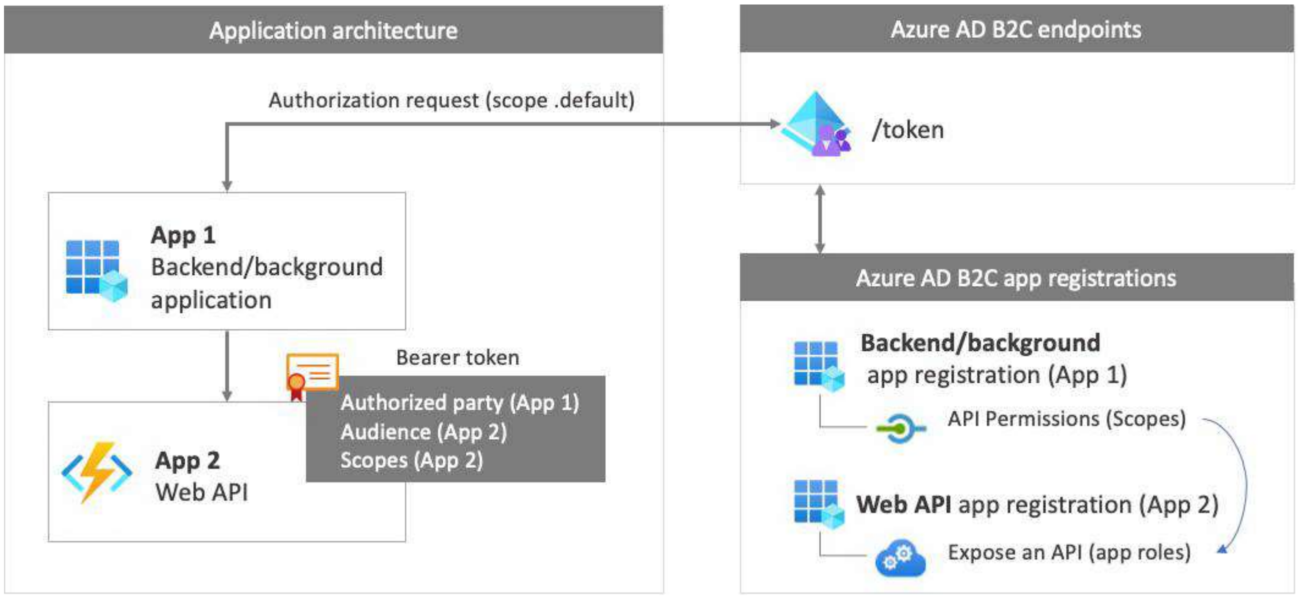
App registration overview

To enable your app to sign in with client credentials, then call a web API, you register two applications in the Azure AD B2C directory.

- The **application** registration enables your app to sign in with Azure AD B2C. The app registration process generates an *application ID*, also known as the *client ID*, which uniquely identifies your app. You also create a *client secret*, which your app uses to securely acquire the tokens.

- The **web API** registration enables your app to call a secure web API. The registration includes the web API *scopes*. The scopes provide a way to manage permissions to protected resources, such as your web API. Then, you grant your application permissions to the web API scopes. When an access token is requested, your app specifies the `.default` scope parameter of the request. Azure AD B2C returns the web API scopes granted to your app.

The app architecture and registrations are illustrated in the following diagram:


Application architecture
Authorization request (scope .default)
App 1
Backend/background application
Bearer token
Authorized party (App 1)
Audience (App 2)
Scopes (App 2)
App 2
Web API
Azure AD B2C endpoints
/token
Azure AD B2C app registrations
Backend/background app registration (App 1)
API Permissions (Scopes)
Web API app registration (App 2)
Expose an API (app roles)

Step 1: Register the web API app

In this step, you register the web API (**App 2**) with its scopes. Later, you grant your application (**App 1**) permission to those scopes. If you already have such an app registration, skip this step, then move to the next one, Step 1.1 Define web API roles (scopes).

To create the web API app registration (**App ID: 2**), follow these steps:

1. Sign in to the Azure portal .

2. Make sure you're using the directory that contains your Azure AD B2C tenant. Select the **Directories + subscriptions** icon in the portal toolbar.

3. On the **Portal settings | Directories + subscriptions** page, find your Azure AD B2C directory in the **Directory name** list, and then select **Switch**.

4. In the Azure portal, search for and select **Azure AD B2C**.

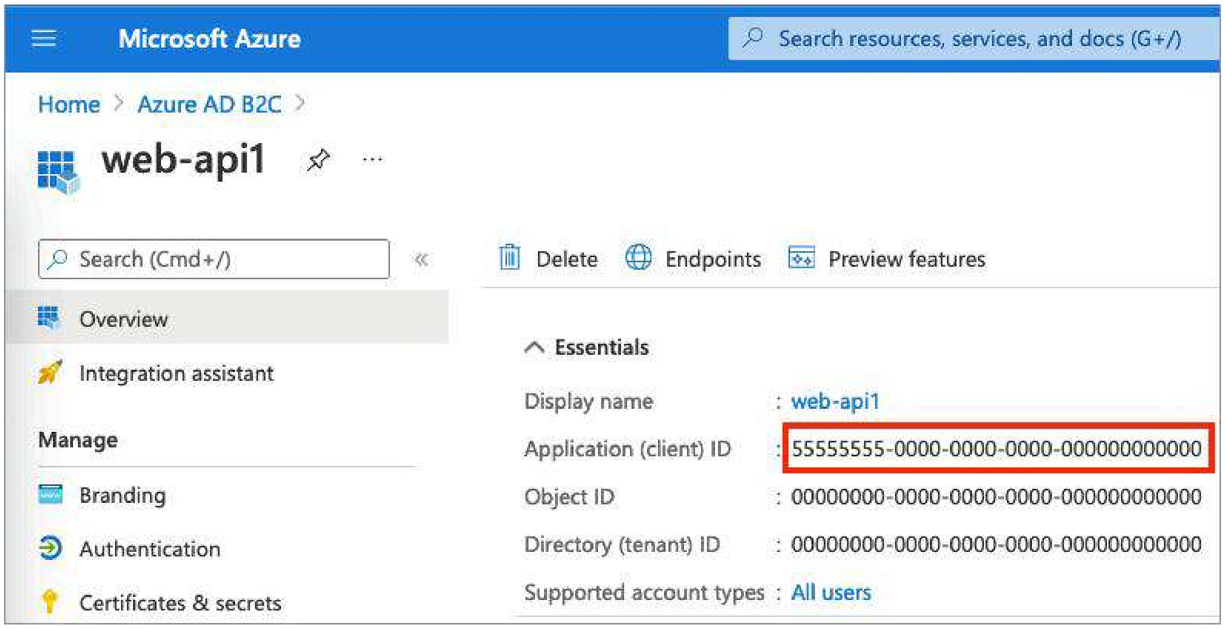
5. Select **App registrations**, and then select **New registration**.

6. For **Name**, enter a name for the application (for example, **my-api1**). Leave the default values for **Redirect URI** and **Supported account types**.

7. Select **Register**.

8. After the app registration is completed, select **Overview**.

9. Record the **Application (client) ID** value for later use when you configure the web application.



Display name : web-api1
Application (client) ID : 55555555-0000-0000-0000-000000000000
Object ID : 00000000-0000-0000-0000-000000000000
Directory (tenant) ID : 00000000-0000-0000-0000-000000000000
Supported account types : All users

Step 1.1 Define web API roles (scopes)

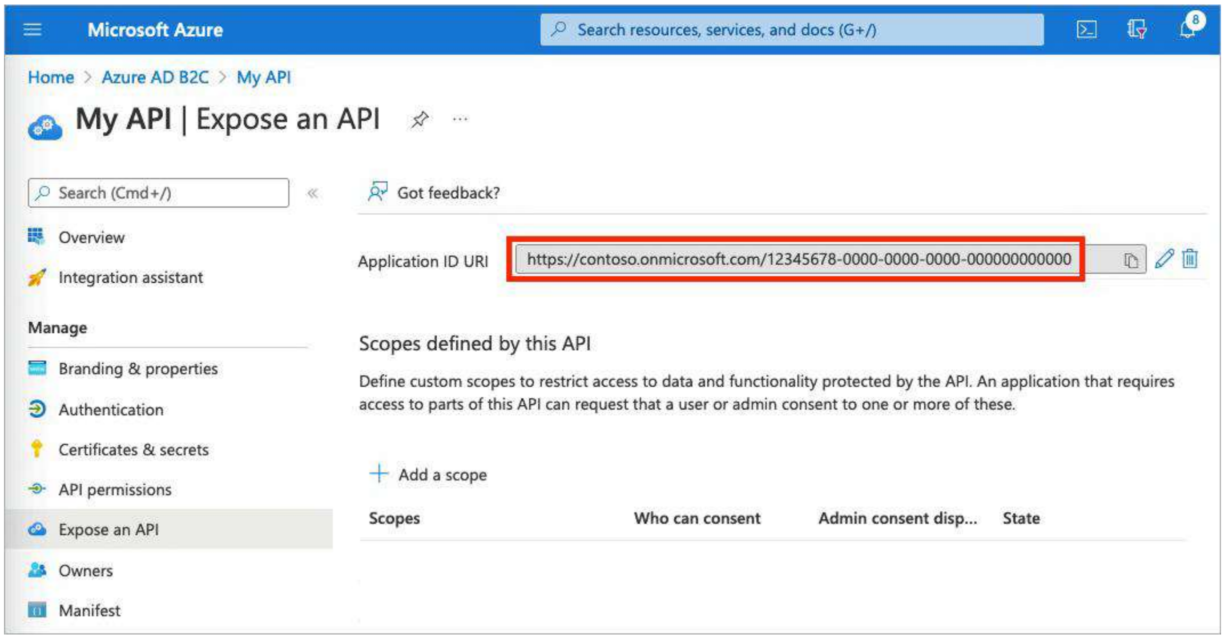
In this step, you configure the web API **Application ID URI**, then define **App roles**. The app *roles*, used by the OAuth 2.0 *scopes* and defined on an application registration representing your API. Your application uses the Application ID URI with the `.default` scope. To define app roles, follow these steps:

1. Select the web API that you created, for example *my-api1*.

2. Under **Manage**, select **Expose an API**.

3. Next to **Application ID URI**, select the **Set** link. Replace the default value (GUID) with a unique name (for example, **api**), and then select **Save**.

4. Copy the **Application ID URI**. The following screenshot shows how to copy the Application ID URI.


Microsoft Azure
Search resources, services, and docs (G+/)
Home > Azure AD B2C > My API
My API | Expose an API
Search (Cmd+/)
Overview
Integration assistant
Manage
Branding & properties
Authentication
Certificates & secrets
API permissions
Expose an API
Owners
Manifest
Got feedback?
Application ID URI
https://contoso.onmicrosoft.com/12345678-0000-0000-0000-000000000000
Scopes defined by this API
Define custom scopes to restrict access to data and functionality protected by the API. An application that requires access to parts of this API can request that a user or admin consent to one or more of these.
Add a scope
Scopes
Who can consent
Admin consent disp...
State

5. Under **Manage**, select **Manifest** to open the application manifest editor. In the editor, locate the `appRoles` setting, and define app roles that target `applications`. Each app role definition must have a global unique identifier (GUID) for its `id` value. Generate a new GUID by running `new-guid` command in the Microsoft PowerShell, or an online GUID generator . The `value` property of each app role definition appears in the scope, the `scp` claim. The `value` property can't contain spaces. The following example demonstrates two app roles, read and write:

JSON

```json
"appRoles": [
{
  "allowedMemberTypes": ["Application"],
  "displayName": "Read",
  "id": "d6a15e20-f83c-4264-8e61-5082688e14c8",
  "isEnabled": true,
  "description": "Readers have the ability to read tasks.",
  "value": "app.read"
},
{
  "allowedMemberTypes": ["Application"],
  "displayName": "Write",
  "id": "204dc4ab-51e1-439f-8c7f-31a1ebf3c7b9",
  "isEnabled": true,
  "description": "Writers have the ability to create tasks.",
  "value": "app.write"
}],
```

6. At the top of the page, select **Save** to save the manifest changes.

Step 2: Register an application

To enable your app to sign in with Azure AD B2C using client credentials flow, you can use an existing application or register a new one (**App 1**).

If you're using an existing app, make sure the app's `accessTokenAcceptedVersion` is set to `2`:

1. In the Azure portal, search for and select **Azure AD B2C**.
2. Select **App registrations**, and then select your existing app from the list.
3. In the left menu, under **Manage**, select **Manifest** to open the manifest editor.
4. Locate the `accessTokenAcceptedVersion` element, and set its value to `2`.
5. At the top of the page, select **Save** to save the changes.

To create a new web app registration, follow these steps:

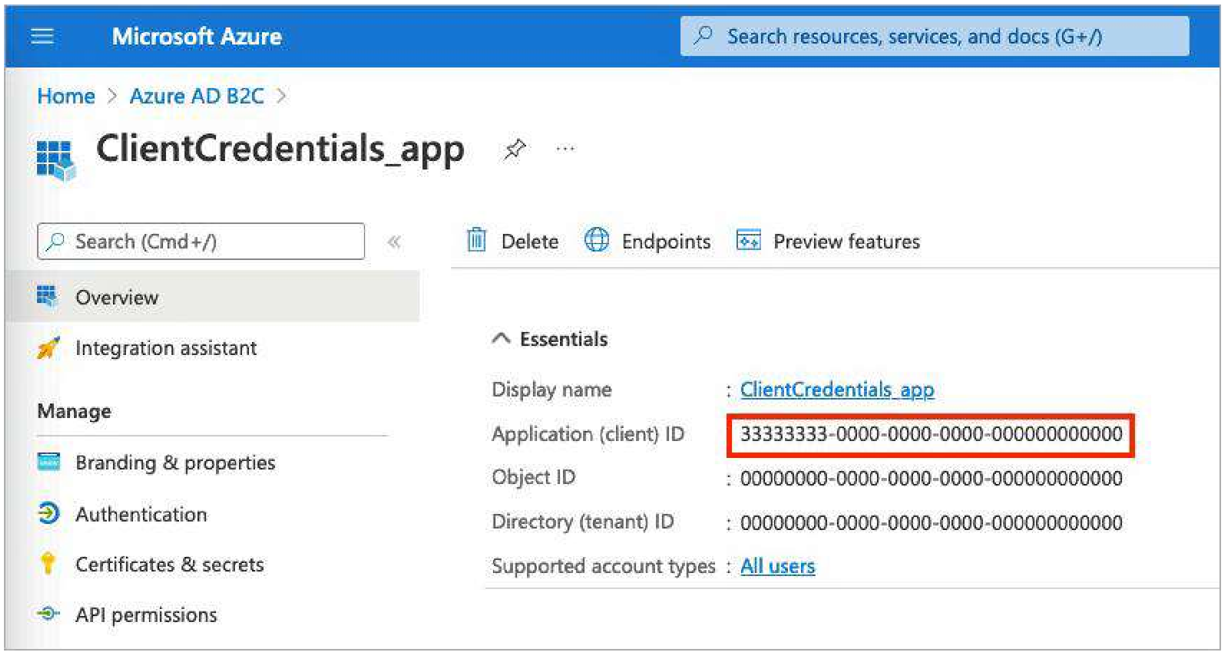
1. In the Azure portal, search for and select **Azure AD B2C**

2. Select **App registrations**, and then select **New registration**.

3. Enter a **Name** for the application. For example, *ClientCredentials_app*.

4. Leave the other values as they are, and then select **Register**.

5. Record the **Application (client) ID** for use in a later step.



Display name	: ClientCredentials_app
Application (client) ID	33333333-0000-0000-0000-000000000000
Object ID	: 00000000-0000-0000-0000-000000000000
Directory (tenant) ID	: 00000000-0000-0000-0000-000000000000
Supported account types	: All users

Step 2.1 Create a client secret

Create a client secret for the registered application. Your app uses the client secret to prove its identity when it requests tokens.

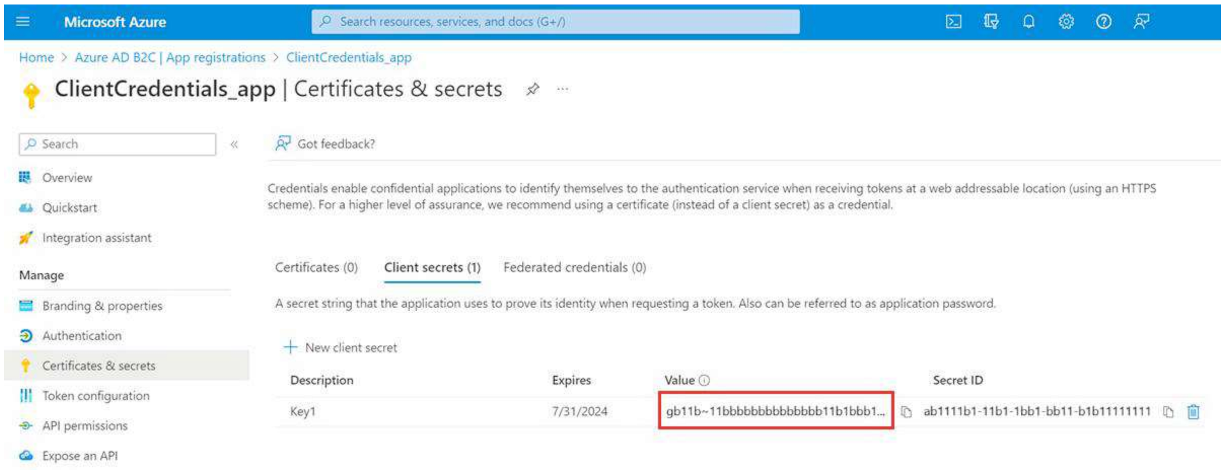
1. Under **Manage**, select **Certificates & secrets**.

2. Select **New client secret**.

3. In the **Description** box, enter a description for the client secret (for example, *clientsecret1*).

4. Under **Expires**, select a duration for which the secret is valid, and then select **Add**.

5. Record the secret's **Value**. You use this value for configuration in a later step.



Credentials enable confidential applications to identify themselves to the authentication service when receiving tokens at a web addressable location (using an HTTPS scheme). For a higher level of assurance, we recommend using a certificate (instead of a client secret) as a credential.

A secret string that the application uses to prove its identity when requesting a token. Also can be referred to as application password.

Description	Expires	Value	Secret ID
Key1	7/31/2024	gb11b~11bbbbbbbbbbbbb11b1bbb1...	ab1111b1-11b1-1bb1-bb11-b1b11111111

Step 2.2 Grant the app permissions for the web API

To grant your app (**App 1**) permissions, follow these steps:

1. Select **App registrations**, and then select the app that you created (**App 1**).

2. Under **Manage**, select **API permissions**.

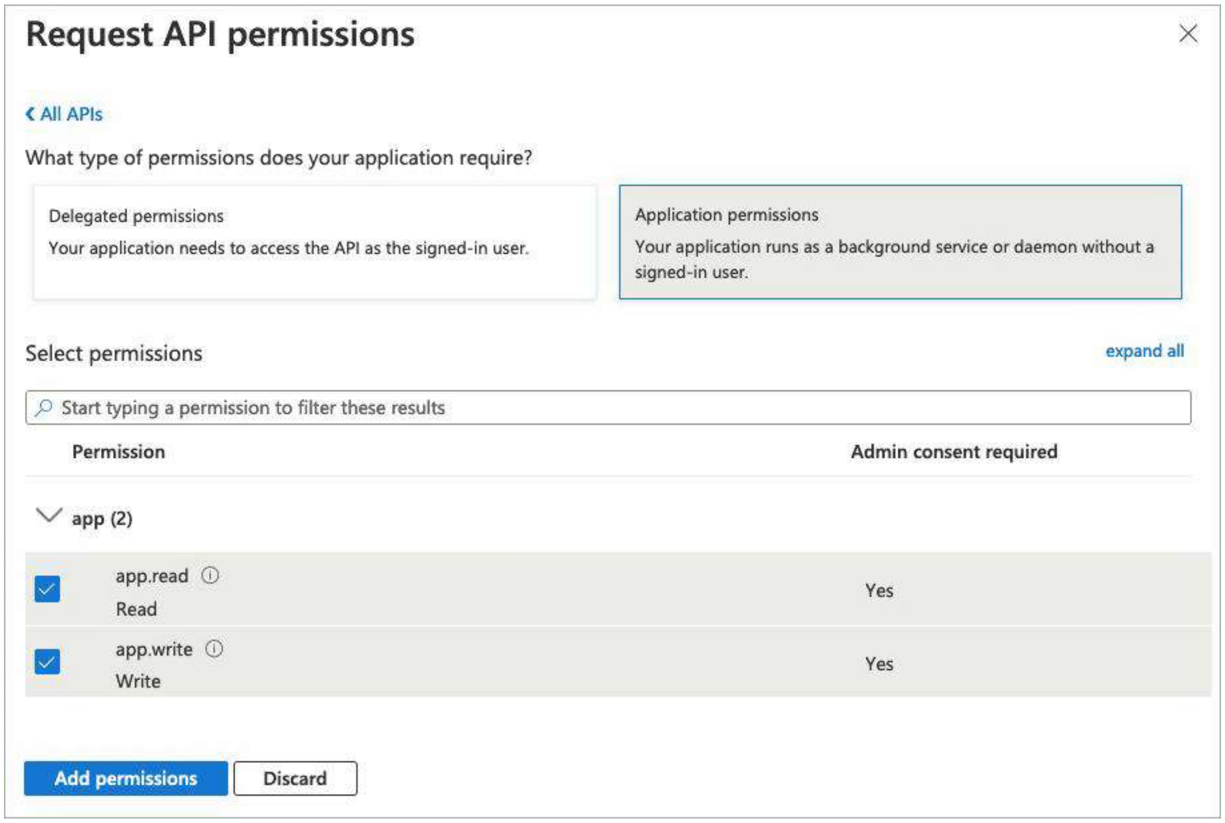
3. Under **Configured permissions**, select **Add a permission**.

4. Select the **My APIs** tab.

5. Select the API (**App 2**) to which the web application should be granted access. For example, enter **my-api1**.

6. Select **Application permission**.

7. Under **Permission**, expand **app**, and then select the scopes that you defined earlier (for example, **app.read** and **app.write**).



Request API permissions

‹ All APIs

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

expand all

Start typing a permission to filter these results

Permission	Admin consent required
app (2)	
✓ app.read Read	Yes
✓ app.write Write	Yes

8. Select **Add permissions**.

9. Select **Grant admin consent for <*your tenant name*>**.

10. Select **Yes**.

11. Select **Refresh**, and then verify that **Granted for ...** appears under **Status** for both scopes.

Step 3: Obtain an access token

There are no specific actions to enable the client credentials for user flows or custom policies. Both Azure AD B2C user flows and custom policies support the client credentials flow. If you haven't done so already, create a user flow or a custom policy. Then, use your favorite API development application to generate an authorization request. Construct a call like this example with the following information as the body of the POST request:

```
https://<tenant-name>.b2clogin.com/<tenant-name>.onmicrosoft.com/<policy>/oauth2/v2.0/token
```

- Replace `<tenant-name>` with the name of your Azure AD B2C tenant. For example, `contoso.b2clogin.com`.
- Replace `<policy>` with the full name of your user flow, or custom policy. Note, all types of user flows and custom policies support client credentials flow. You can use any user flow or custom policy you have, or create a new one, such as sign-up or sign-in.

Expand table

Key	**Value**
grant_type	`client_credentials`
client_id	The **Client ID** from the Step 2 Register an application.
client_secret	The **Client secret** value from Step 2.1 Create a client secret.
scope	The **Application ID URI** from Step 1.1 Define web API roles (scopes) and `.default`. For example `https://contoso.onmicrosoft.com/api/.default`, or `https://contoso.onmicrosoft.com/12345678-0000-0000-0000-000000000000/.default`.

The actual POST request looks like the following example:

Request:

https

```
POST /<tenant-name>.onmicrosoft.com/B2C_1A_SUSI/oauth2/v2.0/token HTTP/1.1
Host: <tenant-name>.b2clogin.com
Content-Type: application/x-www-form-urlencoded

grant_type=client_credentials
&client_id=33333333-0000-0000-0000-000000000000
&client_secret=FyX7Q~DuPJ...
&scope=https%3A%2F%2Fcontoso.onmicrosoft.com%2Fapi%2F.default
```

Response:

JSON

```
{
    "access_token":
"eyJ0eXAiOiJKV1QiLCJhbGciOiJSUzI1NiIsImtpZCI6IlBFcG5OZDlnUkNWWUc2dUs...",
    "token_type": "Bearer",
    "not_before": 1645172292,
    "expires_in": 3600,
    "expires_on": 1645175892,
    "resource": "33333333-0000-0000-0000-000000000000"
}
```

Learn about the return access token claims. The following table lists the claims that are related to the client credentials flow.

Expand table

Claim	Description	Value
`aud`	Identifies the intended recipient of the token.	The **Client ID** of the API.
`sub`	The service principal associate with the application that initiated the request.	It's the service principal of the `client_id` of the authorization request.
`azp`	Authorized party - the party to which the access token was issued.	The **Client ID** of the application that initiated the request. It's the same value you specified in the `client_id` of the authorization request.
`scp`	The set of scopes exposed by your application API (space delimiter).	In client credentials flow, the authorization request asks for the `.default` scope, while the token contains the list of scopes exposed (and consented by the app administrator) by the API. For example, `app.read app.write`.

Step 3.1 Obtain an access token with script

Use the following PowerShell script to test your configuration:

PowerShell

```powershell
$appId = "<client ID>"
$secret = "<client secret>"
$endpoint = "https://<tenant-name>.b2clogin.com/<tenant-
name>.onmicrosoft.com/<policy>/oauth2/v2.0/token"
$scope = "<Your API id uri>/.default"
$body = "grant_type=client_credentials&scope=" + $scope + "&client_id=" +
$appId + "&client_secret=" + $secret

$token = Invoke-RestMethod -Method Post -Uri $endpoint -Body $body
```

Use the following cURL script to test your configuration:

Bash

```bash
curl --location --request POST 'https://<your-tenant>.b2clogin.com/<your-
tenant>.onmicrosoft.com/<policy>/oauth2/v2.0/token' \
--header 'Content-Type: application/x-www-form-urlencoded' \
--form 'grant_type="client_credentials"' \
--form 'client_id="<client ID>"' \
--form 'client_secret="<client secret>"' \
--form 'scope="<Your API id uri>/.default"'
```

Step 4: Customize the token

This feature is available only for custom policies. For setup steps, select **Custom policy** in the preceding selector.

Next steps

Learn how to set up a resource owner password credentials flow in Azure AD B2C