Migrating repositories from Azure DevOps to GitHub Enterprise Cloud

In this article

You can migrate repositories from Azure DevOps to GitHub Enterprise Cloud, using the GitHub CLI or the GraphQL API.

API GitHub CLI

About repository migrations with GitHub Enterprise Importer

You can run your migration with either the GitHub CLI or the API.

The GitHub CLI simplifies the migration process and is recommended for most customers. Advanced customers with heavy customization needs can use the API to build their own integrations with GitHub Enterprise Importer.

To see instructions for using the API, use the tool switcher at the top of the page.
To see instructions for using the GitHub CLI, use the tool switcher at the top of the page.

Prerequisites

- To ensure you understand the known support limitations of the Importer, review "About GitHub Enterprise Importer."
- We strongly recommend that you perform a trial run of your migration and complete your production migration soon after. To learn more about trial run best practices, see "Preparing to run a migration with GitHub Enterprise Importer."
- While not required, we recommend halting work during your production migration. The Importer doesn't support delta migrations, so any changes that happen during

the migration will not migrate. If you choose not to halt work during your production migration, you'll need to manually migrate these changes.

- For the destination organization on GitHub.com, you need to be an organization owner or have the migrator role. For more information, see "Granting the migrator role for GitHub Enterprise Importer."

Step 0: Get ready to use the GitHub GraphQL API

To make GraphQL queries, you'll need to write your own scripts or use an HTTP client like Insomnia.

To learn more about getting started with the GitHub GraphQL API, including how to authenticate, see "Forming calls with GraphQL."

Step 1: Get the `ownerId` for your migration destination

As an organization owner in GitHub Enterprise Cloud, use the `GetOrgInfo` query to return the `ownerId`, also called the organization ID, for the organization you want to own the migrated repositories. You'll need the `ownerId` to identify your migration destination.

`GetOrgInfo` query

```
query(
  $login: String!
){
  organization (login: $login)
  {
    login
    id
    name
    databaseId
  }
}
```

Query variable	Description
`login`	Your organization name.

`GetOrgInfo` response

```
{
  "data": {
    "organization": {
      "login": "Octo",
      "id": "MDEyOk9yZ2FuaXphdGlvbjU2MTA=",
      "name": "Octo-org",
      "databaseId": 5610
    }
  }
}
```

In this example, `MDEyOk9yZ2FuaXphdGlvbjU2MTA=` is the organization ID or `ownerId`, which we'll use in the next step.

Step 2: Identify where you're migrating from

You can set up a migration source using the `createMigrationSource` query. You'll need to supply the `ownerId`, or organization ID, gathered from the `GetOrgInfo` query.

Your migration source is your ADO organization.

`createMigrationSource` mutation

```
mutation createMigrationSource($name: String!, $ownerId: ID!) {
  createMigrationSource(input: {name: $name, url: "https://dev.azure.com",
ownerId: $ownerId, type: AZURE_DEVOPS}) {
    migrationSource {
      id
      name
      url
      type
    }
  }
}
```

Note: Make sure to use `AZURE_DEVOPS` for `type`.

Query variable	Description
`name`	A name for your migration source. This name is for your own reference, so you can use any string.
`ownerId`	The organization ID of your organization on GitHub Enterprise Cloud.

`createMigrationSource` response

```
{
  "data": {
    "createMigrationSource": {
      "migrationSource": {
        "id": "MS_kgDaACQxYmYxOWU4Yi0wNzZmLTQ3NTMtOTdkZC1hNGUzZmYxN2U2YzA",
        "name": "Azure Devops Source",
        "url": "https://dev.azure.com",
        "type": "AZURE_DEVOPS"
      }
    }
  }
}
```

In this example, `MS_kgDaACQxYmYxOWU4Yi0wNzZmLTQ3NTMtOTdkZC1hNGUzZmYxN2U2YzA` is the migration source ID, which we'll use in the next step.

Step 3: Start your repository migration

When you start a migration, a single repository and its accompanying data migrates into a brand new GitHub repository that you identify.

If you want to move multiple repositories at once from the same source organization, you can queue multiple migrations. You can run up to 5 repository migrations at the same time.

`startRepositoryMigration` mutation

```
mutation startRepositoryMigration (
  $sourceId: ID!,
  $ownerId: ID!,
  $sourceRepositoryUrl: URI!,
  $repositoryName: String!,
  $continueOnError: Boolean!,
  $accessToken: String!,
  $githubPat: String!,
  $targetRepoVisibility: String!
){
  startRepositoryMigration( input: {
    sourceId: $sourceId,
    ownerId: $ownerId,
    repositoryName: $repositoryName,
    continueOnError: $continueOnError,
    accessToken: $accessToken,
    githubPat: $githubPat,
    targetRepoVisibility: $targetRepoVisibility
    sourceRepositoryUrl: $sourceRepositoryUrl,
  }) {
    repositoryMigration {
      id
      migrationSource {
        id
        name
        type
      }
      sourceUrl
    }
  }
}
```

Query variable	Description
`sourceId`	Your migration source `id` returned from the `createMigrationSource` mutation.
`ownerId`	The organization ID of your organization on GitHub Enterprise Cloud.
`repositoryName`	A custom unique repository name not currently used by any of your repositories owned by the organization on GitHub Enterprise Cloud. An error-logging issue will be created in this repository when your migration is complete or has stopped.
`continueOnError`	Migration setting that allows the migration to continue when encountering errors that don't cause the migration to fail. Must be `true` or `false`. We highly recommend setting `continueOnError` to `true` so that your migration will continue unless the Importer can't move Git source or the Importer has lost connection and cannot reconnect to complete the migration.
`githubPat`	The personal access token for your destination organization on GitHub Enterprise Cloud. For personal access token requirements, see "Managing access for GitHub Enterprise Importer."
`accessToken`	The personal access token for your source.
`targetRepoVisibility`	The visibility of the new repository. Must be `private`, `public`, or `internal`. If not set, your

	`private`, `public`, or `internal`. If not set, your repository is migrated as private.
`sourceRepositoryUrl`	The URL of your source repository, using the format `https://dev.azure.com/{organization}/_git/{repository}`.

In the next step, you'll use the migration ID returned from the `startRepositoryMigration` mutation to check the migration status.

Step 4: Check the status of your migration

To detect any migration failures and ensure your migration is working, you can check your migration status using the `getMigration` query. You can also check the status of multiple migrations with `getMigrations`.

The `getMigration` query will return with a status to let you know if the migration is `queued`, `in progress`, `failed`, or `completed`. If your migration failed, the Importer will provide a reason for the failure.

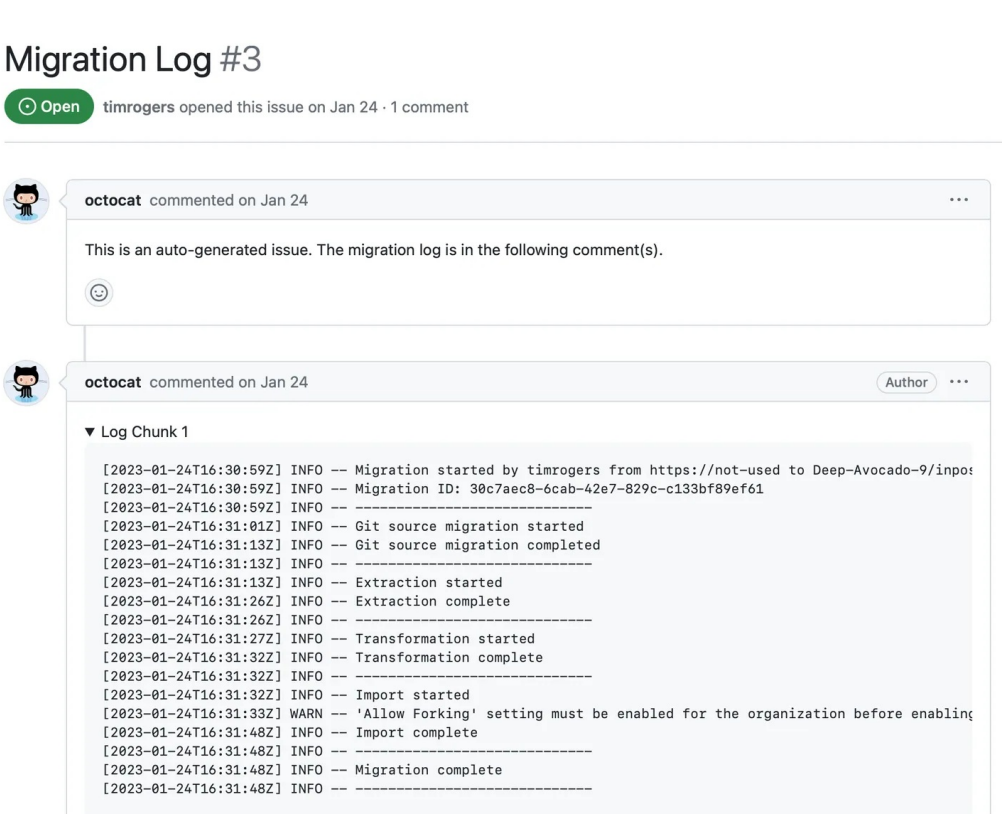
`getMigration` query

```
query (
  $id: ID!
){
  node( id: $id ) {
    ... on Migration {
      id
      sourceUrl
      migrationSource {
        name
      }
      state
      failureReason
    }
  }
}
```

Query variable	Description
`id`	The `id` of your migration that the `startRepositoryMigration` mutation returned.

Step 5: Validate your migration and check the error log

To finish your migration, we recommend that you check the "Migration Log" issue. This issue is created on GitHub in the destination repository.



Finally, we recommend that you review your migrated repositories for a soundness check.

Step 1: Install the ADO2GH extension of the GitHub CLI

If this is your first migration, you'll need to install the ADO2GH extension of the GitHub CLI. For more information about GitHub CLI, see "About GitHub CLI."

1. Install the GitHub CLI. For installation instructions for GitHub CLI, see the GitHub CLI repository.

   > **Note:** You need version 2.4.0 or newer of GitHub CLI. You can check the version you have installed with the `gh --version` command.

2. Install the ADO2GH extension.

   Shell

   ```
   gh extension install github/gh-ado2gh
   ```

Any time you need help with the ADO2GH extension, you can use the `--help` flag with a command. For example, `gh ado2gh --help` will list all the available commands, and `gh ado2gh migrate-repo --help` will list all the options available for the `migrate-repo` command.

Step 2: Update the ADO2GH extension of the GitHub CLI

The ADO2GH extension of the GitHub CLI is updated weekly. To make sure you're using the latest version, update the extension.

Shell

```
gh extension upgrade github/gh-ado2gh
```

Step 3: Set environment variables

Before you can use the ADO2GH extension to migrate to GitHub Enterprise Cloud, you must create personal access tokens that can access the source and destination organizations, then set the personal access tokens as environment variables.

1. Create and record a personal access token (classic) that will authenticate for the destination organization on GitHub Enterprise Cloud, making sure that the token meets all requirements. For more information, see "Managing access for GitHub Enterprise Importer."
2. Create and record a personal access token that will authenticate for the source organization, making sure that this token also meets all of the same requirements.
3. Set environment variables for the personal access tokens, replacing TOKEN in the commands below with the personal access tokens you recorded above. Use `GH_PAT` for the destination organization and `ADO_PAT` for the source organization.
   - If you're using Terminal, use the `export` command.

     Shell

     ```
     export GH_PAT="TOKEN"
     export ADO_PAT="TOKEN"
     ```

   - If you're using PowerShell, use the `$env` command.

     Shell

     ```
     $env:GH_PAT="TOKEN"
     $env:ADO_PAT="TOKEN"
     ```

Step 4: Generate a migration script

If you want to migrate multiple repositories to GitHub Enterprise Cloud at once, use the GitHub CLI to generate a migration script. The resulting script will contain a list of migration commands, one per repository.

> **Note:** Generating a script outputs a PowerShell script. If you're using Terminal, you will need to output the script with the `.ps1` file extension and install PowerShell for either Mac or Linux to run it.

If you want to migrate a single repository, skip to the next step.

Generating a migration script

To generate a migration script, run the `gh ado2gh generate-script` command.

Shell

```
gh ado2gh generate-script --ado-org SOURCE --github-org DESTINATION --output
FILENAME
```

To add additional functionality to the script, such as rewiring pipelines, creating teams, and configuring Azure Boards integrations, you can add the `--all` flag.

If you want the script to download the migration log for each migrated repository, add the `--download-migration-logs` flag. For more information about migration logs, see "Accessing your migration logs for GitHub Enterprise Importer."

Replace the placeholders in the command above with the following values.

Placeholder	Value
SOURCE	Name of the source organization
DESTINATION	Name of the destination organization
FILENAME	A filename for the resulting migration script If you're using Terminal, use a `.ps1` file extension as the generated script requires PowerShell to run. You can install PowerShell for Mac or Linux.

Reviewing the migration script

After you generate the script, review the file and, optionally, edit the script.

- If there are any repositories you don't want to migrate, delete or comment out the corresponding lines.
- If you want any repositories to have a different name in the destination organization, update the value for the corresponding `--target-repo` flag.

Step 5: Migrate repositories

You can migrate multiple repositories with a migration script or a single repository with the `gh ado2gh migrate-repo` command.

Migrate multiple repositories

To migrate multiple repositories, run the script you generated above. Replace FILENAME in the commands below with the filename you provided when generating the script.

- If you're using Terminal, use `./`.

  Shell
  ```
  ./FILENAME
  ```

- If you're using PowerShell, use `.\`.

  Shell
  ```
  .\FILENAME
  ```

Migrate a single repository

To migrate a single repository, use the `gh ado2gh migrate-repo` command.

Shell

```
gh ado2gh migrate-repo --ado-org SOURCE --ado-team-project TEAM-PROJECT --ado-
repo CURRENT-NAME --github-org DESTINATION --github-repo NEW-NAME
```

Replace the placeholders in the command above with the following values.

Placeholder	Value
SOURCE	Name of the source organization
CURRENT-NAME	The name of the repository you want to migrate
DESTINATION	Name of the destination organization
NEW-NAME	The name you want the migrated repository to have
TEAM-PROJECT	Name of the team project of the repository you want to migrate

Step 6: Validate your migration and check the error log

When your migration is complete, we recommend reviewing your migration log. For more information, see "Accessing your migration logs for GitHub Enterprise Importer."

We recommend that you review your migrated repositories for a soundness check.