NVIDIA Base Command Platform

Quickstart Guide
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Chapter 1. Introduction

NVIDIA Base Command™ Platform is a comprehensive platform for businesses, their data scientists, and IT teams that accelerate ROI for AI initiatives. It manages the end-to-end lifecycle of AI development including workload management and resource sharing with both a graphical user interface and command line APIs with integrated monitoring and reporting dashboards. Offered in a cloud-hosted solution that continuously delivers NVIDIA innovations directly into your AI workflow, Base Command Platform works across on-prem and cloud resources with a single pane of glass view into your AI development process.

The following is a description of the primary concepts of NVIDIA Base Command Platform.

**Container Images**

All applications running in NGC are containerized as Docker containers and execute in our Runtime environment. Containers are stored in the NGC Container Registry `nvcr.io`, accessible from both the command-line interface (CLI) and the Web UI.

**Datasets**

Datasets are the data inputs to a job, mounted as read-only to the location specified in the job. Datasets can contain data or code. Datasets are covered in detail in the Datasets section.

**Workspaces**

Workspaces are shareable read-write persistent storage mountable in jobs for concurrent use. Workspaces can be mounted to a job in read-only mode also, making that ideal for configuration/code/input use cases in the comfort of knowing that the job will not corrupt/modify any of the data. Mounting workspaces in read-write mode (which is the default) in a job works well for use as a checkpoint folder.

**Jobs**

A Job is the fundamental unit of computation - a container running an NVIDIA Base Command Platform instance in an accelerated computing environment (ACE). A set of attributes specified at the time of submission defines a job. Chapters 8 and 10 of the *NVIDIA Base Command Platform User Guide* provide details about the architecture of Base Command Platform.
Chapter 2. Inviting Users

This section is for org or team administrators (with User Admin role) and describes the process for inviting (adding) users to NVIDIA Base Command Platform.

As the organization administrator, you must create user accounts to allow others to use the NVIDIA Base Command Platform within the organization.

1. Log on to the NGC web UI and select the NGC Org associated with NVIDIA Base Command Platform.

2. Click **Organization > Users** from the left navigation menu.

   ![Organization menu](image)

   This capability is available only to User Admins.

3. Click **Invite New User** menu at the top right of the screen.

   ![Invite New User button](image)

4. Select the **Personal Info** tab and then enter the display name and email where indicated.
5. Click Next or select the Membership tab and then select one or more user roles.

The following are brief descriptions of the user roles:

**Table 1. NVIDIA Base Command Platform Roles**

<table>
<thead>
<tr>
<th>Role</th>
<th>Description</th>
</tr>
</thead>
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<tr>
<td>Base Command Admin</td>
<td>Admin persona with the capabilities to manage all artifacts available in Base Command Platform. The capabilities of the Admin role include resource allocation and access management.</td>
</tr>
</tbody>
</table>
Inviting Users

<table>
<thead>
<tr>
<th>Role</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Base Command Viewer</td>
<td>Admin persona with the read-only access to jobs, workspaces, datasets, and results within the user’s org or team.</td>
</tr>
<tr>
<td>Registry Admin</td>
<td>Registry Admin persona for managing NGC Private Registry artifacts and with the capability for Registry User Management. The capabilities of the Registry Admin role include the capabilities of all Registry roles.</td>
</tr>
<tr>
<td>Registry Read</td>
<td>Registry User persona with capabilities to only consume the Private Registry artifacts.</td>
</tr>
<tr>
<td>Registry User</td>
<td>Registry User persona with the capabilities to publish and consume the Private Registry artifacts.</td>
</tr>
<tr>
<td>User Admin</td>
<td>User Admin persona with the capabilities to only manage users.</td>
</tr>
</tbody>
</table>

Refer to the section Assigning Roles in the NVIDIA Base Command Platform User Guide for additional information.

6. [Optional] Select a team for the user and select one or more roles for the user to have within that team.

7. Click Assign.

If you want to assign the user to more than one team, select another team and role, then click Assign. The following example screenshot shows a user assigned to two teams:
8. Click **Confirm** to complete the process.

An invitation email is automatically sent to the user.
Chapter 3. Joining an NGC Org or Team

Before using NVIDIA Base Command Platform, you must have an NVIDIA Base Command Platform account created by your organization administrator. You need an email address to set up an account. Activating an account depends on whether your email domain is mapped to your organization’s single sign-on (SSO). Choose one of the following processes depending on your situation for activating your NVIDIA Base Command Platform account.

- Joining an NGC Org or Team Using Single Sign-on
- Joining an Org or Team with a New NVIDIA Account
- Joining an Org or Team with an Existing NVIDIA Account

3.1. Joining an NGC Org or Team Using Single Sign-on

This section describes activating an account where the domain of your email address is mapped to an organization’s single sign-on.

After NVIDIA or your organization administrator adds you to a new org or team within the organization, you will receive a welcome email that invites you to continue the activation and login process.
1. Click the link in the email to open your organization’s single sign-on page.
2. Sign in using your single sign-on credentials.

   The **Set Your Organization** screen appears.
This screen appears any time you log in.

3. Select the organization and team under which you want to log in and then click Continue. You can always change to a different organization or team you are a member of after logging in.

The NGC web UI opens to the Base Command dashboard.
3.2. Joining an Org or Team with a New NVIDIA Account

This section describes activating a new account where the domain of your email address is not mapped to an organization’s single sign-on.

After NVIDIA or your organization administrator sets up your NVIDIA Base Command account, you will receive a welcome email that invites you to continue the activation and login process.

1. Click the Sign In link to open the sign in dialog in your browser.
Joining an NGC Org or Team

2. Fill out your information, create a password, agree to the Terms and Conditions, and click Create Account.

You will need to verify your email.
The verification email is sent.

3. Open the email and then click **Verify Email Address**.
4. Select your options for using recommended settings and receiving developer news and announcements, and then click **Submit**.

5. Agree to the NVIDIA Account Terms of Use, select desired options, and then click **Continue**.

6. Click **Accept** at the **NVIDIA GPU Cloud Terms of Use** screen.
7. The Set Your Organization screen appears.
This screen appears any time you log in.

8. Select the organization and team under which you want to log in and click **Continue**.

You can always change to a different organization or team you are a member of after logging in.

The NGC web UI opens to the **Base Command** dashboard.
3.3. Joining an Org or Team with an Existing NVIDIA Account

This section describes activating an account where the domain of your email address is not mapped to an organization’s single sign-on (SSO).

After NVIDIA or your organization administrator adds you to a new org or team within the organization, you will receive a welcome email that invites you to continue the activation and login process.

![Welcome Email]

1. Click the Sign In link to open the sign in dialog in your browser.
2. Enter your password and then click **Log In**.
   The Set Your Organization screen appears.
This screen appears any time you log in.

3. Select the organization and team under which you want to log in and click **Continue**.

You can always change to a different organization or team you are a member of after logging in.

The NGC web UI opens to the **Base Command** dashboard.
Chapter 4. Signing in to Your Account

During the initial account setup, you are signed into your NVIDIA Base Command Platform account on the NGC web site. This section describes the sign in process that occurs at a later time. It also describes the web UI sections of NVIDIA Base Command Platform at a high level, including the UI areas for accessing available artifacts and actions available to various user roles.

1. Open https://ngc.nvidia.com and click Continue by one of the sign-on choices, depending on your account.
   - NVIDIA Account: Select this option if single sign-on (SSO) is not available.
   - Single Sign-on (SSO): Select this option to use your organization’s SSO. You may need to verify with your organization or Base Command Platform administrator whether SSO is enabled.

2. Continue to sign in using your organization’s single sign-on.

3. Set the organization you wish to sign in under, then click Continue.

You can always change to a different org or team that you are a member of after logging in.

The following image and table describe the main features in the left navigation menu of the web site, including the controls for changing the org or team.
<table>
<thead>
<tr>
<th>ID</th>
<th>Description</th>
</tr>
</thead>
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<tr>
<td>1</td>
<td><strong>CATALOG</strong>: Click this menu to access a curated set of GPU-optimized software. It consists of containers, pre-trained models, Helm charts for Kubernetes deployments, and industry-specific AI toolkits with software development kits (SDKs) that are periodically released by NVIDIA and are read-only for a Base Command Platform user.</td>
</tr>
<tr>
<td>2</td>
<td><strong>PRIVATE REGISTRY</strong>: Click this menu to access the secure space to store and share custom containers, models, resources, and Helm charts within your enterprise.</td>
</tr>
<tr>
<td>3</td>
<td><strong>BASE COMMAND</strong>: Click this menu to access controls for creating and running Base Command Platform jobs.</td>
</tr>
<tr>
<td>4</td>
<td><strong>ORGANIZATION</strong>: (User Admins only) Click this menu to manage users and teams.</td>
</tr>
<tr>
<td>5</td>
<td><strong>User Info</strong>: Select this drop down list to view user information, select the org to operate under, and download the NGC CLI and API key, described later in this document.</td>
</tr>
<tr>
<td>6</td>
<td><strong>Team Selection</strong>: Select this drop down list to select which team to operate under.</td>
</tr>
</tbody>
</table>
Chapter 5. Introduction to the NGC CLI

This chapter introduces the NGC Base Command Platform CLI, installable on your workstation for interfacing with Base Command Platform. In this section you will learn about generic features of CLI applicable to all commands as well as CLI modules that map to the Web UI areas that you have learned about in a previous chapter.

The NGC Base Command Platform CLI is a command-line interface for managing content within the NGC Registry and for interfacing with the NVIDIA Base Command Platform. The CLI operates within a shell and lets you use scripts to automate commands.

With NGC Base Command Platform CLI, you can connect with:

- NGC Catalog
- NGC Private Registry
- User Management (available to org or team User Admins only)
- NVIDIA Base Command Platform workloads and entities

5.1. Installing NGC CLI

To install NGC CLI, perform the following:

2. In the top right corner, click your user account icon and select an org that belongs to the Base Command Platform account.
3. From the user account menu, select Setup, then click Downloads under CLI from the Setup page.
4. From the CLI Install page, click the Windows, Linux, or macOS tab, according to the platform from which you will be running NGC CLI.
5. Follow the Install instructions that appear on the OS section that you selected.
6. Verify the installation by entering `ngc --version`. The output should be "NGC CLI x.y.z" where x.y.z indicates the version.

5.2. Generating Your NGC API Key
This section describes how to obtain an API key needed to configure the CLI application so you can use the CLI to access locked container images from the NGC Catalog, access content from the NGC Private Registry, manage storage entities, and launch jobs.

The NGC API key is also used for docker login to manage container images in the NGC Private Registry with the docker client.

1. Sign in to the NGC web UI.
   a). From a browser, go to https://ngc.nvidia.com/signin/email and then enter your email
   b). Click Continue by the Sign in with Enterprise sign in option.
   c). Enter the credentials for your organization.
2. In the top right corner, click your user account icon and then select an org that belongs to the NVIDIA Base Command Platform account.
3. Click your user account icon again and select Setup.
4. Click Get API key to open the Setup > API Key page.
5. Click Get API Key to generate your API key. A warning message appears to let you know that your old API key will become invalid if you create a new key.
6. Click Confirm to generate the key.

Your API key appears.

You only need to generate an API key once. NGC does not save your key, so store it in a secure place. (You can copy your API key to the clipboard by clicking the copy icon to the right of the API key.) Should you lose your API key, you can generate a new one from the NGC website. When you generate a new API Key, the old one is invalidated.

5.3. Getting Help Using NGC CLI

This section describes how to get help using NGC CLI.
5.3.1. Getting Help from the Command Line

To run an NGC CLI command, enter "ngc" followed by the appropriate options.

To see a description of available options and command descriptions, use the option -h after any command or option.

**Example 1**: To view a list of all the available options for the ngc command, enter

```
$ ngc -h
```

**Example 2**: To view a description of all ngc batch commands and options, enter

```
$ ngc batch -h
```

**Example 3**: To view a description of the dataset commands, enter

```
$ ngc dataset -h
```

5.3.2. Viewing NGC CLI Documentation Online

The NGC Base Command Platform CLI documentation provides a reference for all the NGC Base Command Platform CLI commands and arguments. You can also access the CLI documentation from the NGC web UI by selecting Setup from the user drop down list and then clicking Documentation from the CLI pane.

5.4. Configuring the CLI for your Use

To make full use of NGC Base Command Platform CLI, you must configure it with your API key using the ngc config set command.

While there are options you can use for each command to specify org and team, as well as the output type and debug mode, you can also use the ngc config set command to establish these settings up front.

If you have a pre-existing set up, you can check the current configuration using:

```
$ ngc config current
```

To configure the CLI for your use, issue the following:

```
$ ngc config set
Enter API key. Choices: [<VALID_APIKEY>, 'no-apikey']:
Enter CLI output format type [ascii]. Choices: [ascii, csv, json]:
Enter org [nv-eagledemo]. Choices: ['nv-eagledemo']:
Enter team [nvtest-repro]. Choices: ['nvtest-repro', 'no-team']:
Enter ace [nv-eagledemo-ace]. Choices: ['nv-eagledemo-ace', 'no-ace']:
Successfully saved NGC configuration to C:\Users\jsmith\ngc\config
```

If you are a member of several orgs or teams, be sure to select the ones associated with NVIDIA Base Command Platform.

5.5. Running the Diagnostics
Diagnostic information is available which provides details to assist in isolating issues. You can provide this information when reporting issues with the CLI to NVIDIA support.

The following diagnostic information is available for the NGC Base Command Platform CLI user:

- Current time
- Operating system
- Disk usage
- Current directory size
- Memory usage
- NGC CLI installation
- NGC CLI environment variables (whether set and or not set)
- NGC CLI configuration values
- API gateway connectivity
- API connectivity to the container registry and model registry
- Data storage connectivity
- Docker runtime information
- External IP
- User information (ID, name, and email)
- User org roles
- User team roles

Syntax

$ ngc diag [all,client,install,server,user]

where

all
Produces the maximum amount of diagnostic output.

client
Produces diagnostic output only for the client machine.

install
Produces diagnostic output only for the local installation.

server
Produces diagnostic output only for the remote server.

user
Produces diagnostic output only for the user configuration.
Chapter 6. Quickly Launching a Job

This section contains example workflows demonstrating commonly used functionalities along with useful notes. If you have already completed the sections so far (i.e. onboarded and configured CLI), you will be able to try any of the included commands using your own account.

6.1. Launching a Job from Existing Templates

1. Click BASE COMMAND > Jobs in the left navigation menu and then click Create Job.
2. Click the Templates tab.
3. Click the menu icon for the template to use, then select Apply Template.
The create a job page opens with the fields populated with the information from the job template.

4. Verify the pre-filled fields, enter a unique name, then click **Launch**.

6.2. **Cloning an Existing Job**

You can clone jobs, which is useful when you want to start with an existing job and make small changes for a new job.

1. Click **Jobs** from the left navigation menu, then click the ellipsis menu for the job you want to copy and select **Clone Job** from the menu.
The create a job page opens with the fields populated with the information from the cloned job.

2. Edit fields as needed to create a new job, enter a unique name in the **Name** field, then click **Launch**.

   The job should appear in the job dashboard.

To clone jobs via the CLI, use the --clone flag and add other flags to override any parameters being copied from the original job.

```bash
$ ngc batch run --clone <job-id> --instance dgx1v.32g.8.norm
```
Chapter 7. Managing Jobs

This section describes various job management tasks.

7.1. Checking Job Name, ID, Status, and Results

Using the NGC Web UI

Log into the NGC website, then click **Base Command > Jobs** from the left navigation menu. The Jobs page lists all the jobs that you have run and shows the status, job name and ID. The Status column reports the following progress along with timestamps: Created -> Queued -> Starting -> Running -> Finish.

When a job is in the Queued state, the Status History tab in the Web UI shows the reason for the queued state. The job info command on CLI also displays this detail.

When finished, click on your job entry from the JOBS page. The **Results** and **Log** tab both show the output produced by your job.

Using the CLI

After launching a job using the CLI, the output confirms a successful launch and shows the job details.

**Example:**

```
Job Information
Id: 1854152
Name: ngc-batch-simple-job-raid-dataset-mnt
Number of Replicas: 1
Job Type: BATCH
Submitted By: John Smith
Job Container Information
Docker Image URL: nvidia/pytorch:21.02-py3
...
Job Status
Created at: 2021-03-19 18:13:12 UTC
Status: CREATED
Preempt Class: RUNONCE
```
The Job Status of CREATED indicates a job that was just launched.

You can monitor the status of the job by issuing:

```
$ ngc batch info <job-id>
```

This returns the same job information that is displayed after launching the job, with updated status information.

To view the stdout/stderr of a running job, issue the following:

```
$ ngc batch attach <job_id>
```

All the NGC Base Command Platform CLI commands have additional options; issue `ngc --help` for details.

### 7.2. Monitoring Console Logs (joblog.log)

Job output (both STDOUT and STDERR) is captured in the `joblog.log` file.

**Using the NGC Web UI**

To view the `joblog.log` file, select the job from the Jobs page, then select the Log tab.

**Using the CLI**

Issue the following.

```
$ ngc result download <job-id>
```

The `joblog.log` file is included with the results which are downloaded to the current directory on your local disk in a folder labelled `job-id`.

To view the STDOUT/STDERR of a running job, issue the following:

```
$ ngc batch attach <job_id>
```

### 7.3. Downloading Results (interim and after completion)

**Using the NGC Web UI**

To download job results, do the following:

1. Select the job from the Jobs page, then select the Results tab.
2. From the Results page, select the file to download.
The file is downloaded to your Download folder.

**Using the CLI**

Issue the following:

$ ngc results download <job-id>

The results are downloaded to the current directory on your local disk in a folder labelled <job-id>.

### 7.4. Terminating Jobs

**Using the NGC Web UI**

To terminate a job from the NGC website, waiting until the job appears in the Jobs page, then click the menu icon for the job and select **Kill Job**.

**Using the CLI**

Note the job ID after launching the job, then issue the following:

$ ngc batch kill <job-id>

**Example:**

$ ngc batch kill 1854178

Submitted job kill request for Job ID: '1854178'

You can also kill several jobs with one command by listing multiple job IDs as a combination of comma-separated IDs and ranges; for example '1-5', '333', '1, 2', '1,10-15'.

NVIDIA Base Command Platform
7.5. Deleting Results

Results remain in the system consuming quota until removed:

$ ngc result remove <job_id>
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