

BCO Portal and BCODB



BioCompute
Objects

BCO Portal and BCODB

BCO PORTAL

- Aggregate of BioCompute resources
- Possible to have multiple instances of BCODB associated with one account

BCO DB

- Independent of the BCO Portal
- BCODB instance attached to the BCO Portal is available for the public
- Code is available via GitHub and anyone can set up an independent instance

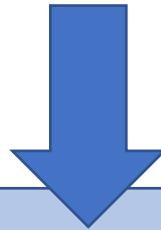
The screenshot shows the BCO Portal's main navigation bar with links to Resources, Builder, Objects, Prefix Registry, Account, and Log Out Hadley. Below the navigation, there are three main sections: BioCompute Documentation (with links to User Guide, Best Practices, SOP, and Tutorials), IEEE 2791-2020 (described as a standard for bioinformatics analyses generated by HTS to facilitate communication), and BCO TSC (described as the Technical Steering Committee of the BioCompute Partnership). To the right, there is a sidebar for News and Events, featuring a FDA Notice on BioCompute, and a section for Tweets from @BioComputeObj.

The screenshot shows the BCODB API documentation page, which is a Swagger interface. It includes a header with links to Swagger, BioCompute Builder, and Galaxy, and a URL https://biocomputeobject.org/api/docs/?format=openapi. The main content area is titled "BioCompute Object Data Base API (BCODB API)" (version 22.09) and describes it as a web application for creating, storing, and editing BioCompute objects. It provides links to Terms of service, Contact the developer, and MIT License. At the bottom, there are buttons for Django Login and Authorize, and a dropdown for Schemes (set to HTTPS).



BCO Portal and BCODB

BioCompute Portal 22.09 | BCODB 22.09 | Portal UserDB 22.09 | Contact Us | Report bug or request feature



BCO PORTAL

- JavaScript (React) front end

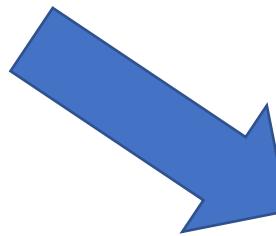
<https://github.com/biocompute-objects/portal>



BCO DB

- Python (Django) with SQLite 3 database

https://github.com/biocompute-objects/bco_api



BCO DB

- Python (Django) with SQLite 3 database

<https://github.com/biocompute-objects/userdbi>

Open Source

- All source code is available via GitHub
- Contributions WELCOME!!

BCO Portal and BCODB

Server Information - Account Page

- BCOs, prefixes, groups, and permissions are SERVER specific (BCODB instance)
- BCO Portal users can have multiple “servers” associated with their account.

The screenshot shows the 'Account' page of the BCO Portal. At the top, there are tabs for Resources, Builder, Objects, Prefix Registry, Account, and Log Out Hadley. The main area displays account details for a user named 'hadleyking'. The details include:

- Name: Hadley King
- Affiliation: George Washington University
- Email: hadley_king@gwu.edu
- ORCID: <https://orcid.org/0000-0003-1409-4549>
- Last name: King
- Email Address: hadley_king@gwu.edu
- Affiliation: George Washington University
- ORCID: <https://orcid.org/0000-0003-1409-4549>

Below the account details, there are sections for 'Change Password' and 'Database, Groups, and Permissions'. The 'Database, Groups, and Permissions' section contains instructions for managing database instances and a button to 'ADD SERVER'. It lists two BCO Server instances:

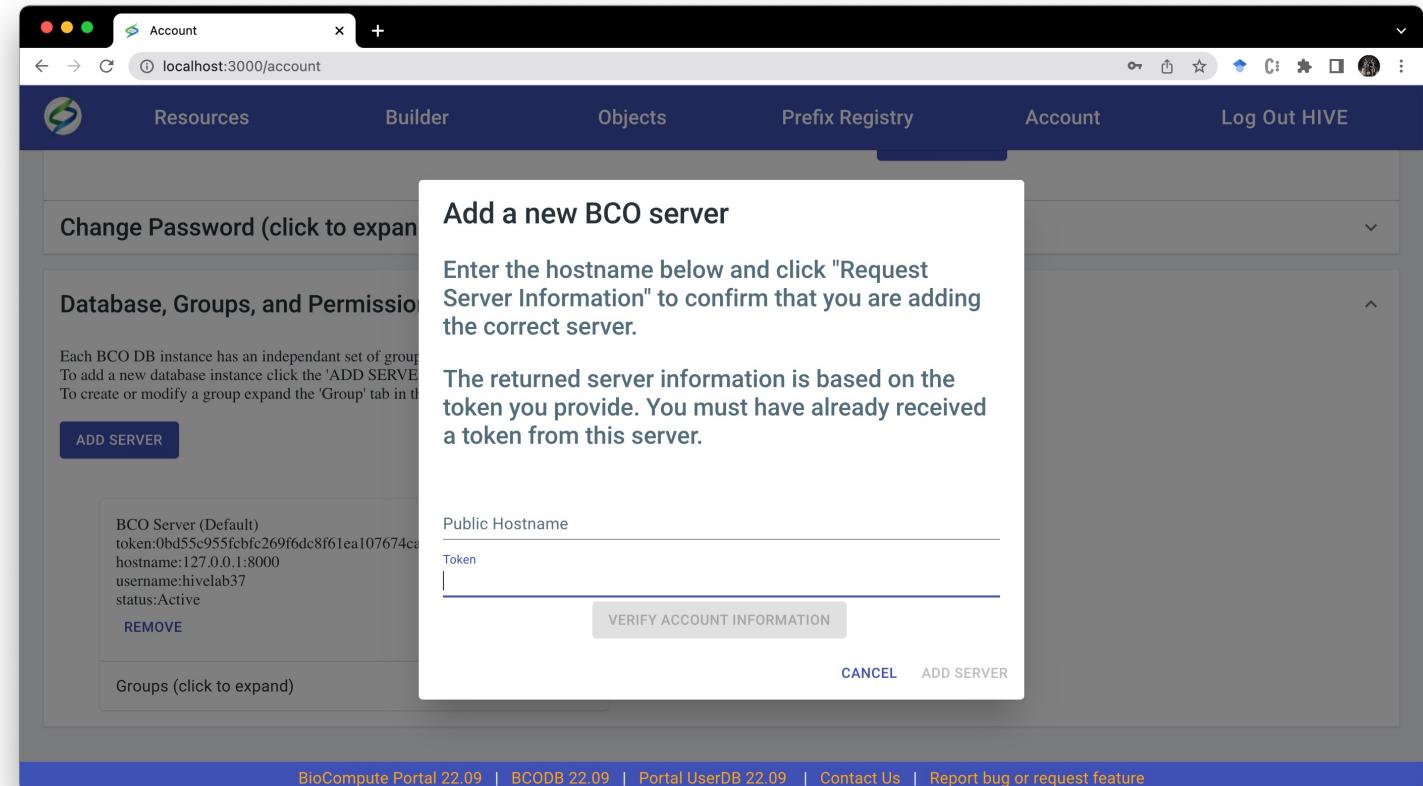
- BCO Server (Default)
token: [REDACTED]
hostname:biocomputeobject.org
username:hadley_king42
status:Active
REMOVE
Groups (click to expand) ▾
- BCO Server (Default)
token: [REDACTED]
hostname:bco.hive.fda.gov
username:hadley_king
status:Active
REMOVE
Groups (click to expand) ▾

At the bottom, there is a footer with links: BioCompute Portal 22.09 | BCODB 22.09 | Portal UserDB 22.09 | Contact Us | Report bug or request feature.

BCO Portal and BCODB

Adding a New Server (BCODB)

- Requires a Token and the URL
- “Verify Account Information” checks for access to provided URL via provided token
- Once an additional server is added the user has access to that BCODB via BCO portal



BCO Portal and BCODB

Adding a New Server (BCODB)

- When creating a new draft object the user can select from all available BCODB instances
- The user also has access to the groups function from the account page

1) Select BCODB to save draft to
Select server to save draft to.

[http://127.0.0.1:8000 - BCO Server \(Default\)](http://127.0.0.1:8000)

[https://test.portal.biochemistry.gwu.edu - BCO Server \(Default\)](https://test.portal.biochemistry.gwu.edu)

Database, Groups, and Permissions (click to expand)

Each BCO DB instance has an independent set of groups, prefix, and user permissions.
To add a new database instance click the 'ADD SERVER' button.
To create or modify a group expand the 'Group' tab in the appropriate server box.

ADD SERVER

BCO Server (Default)
token:0bd55c955fcfc269f6dc8f61ea107674cafdecb
hostname:127.0.0.1:8000
username:hivelab37
status:Active

REMOVE

Groups (click to expand)

BCO Server (Default)
token:0bd55c955fcfc269f6dc8f61ea107674cafdecb
hostname:test.portal.biochemistry.gwu.edu
username:hivelab37
status:Active

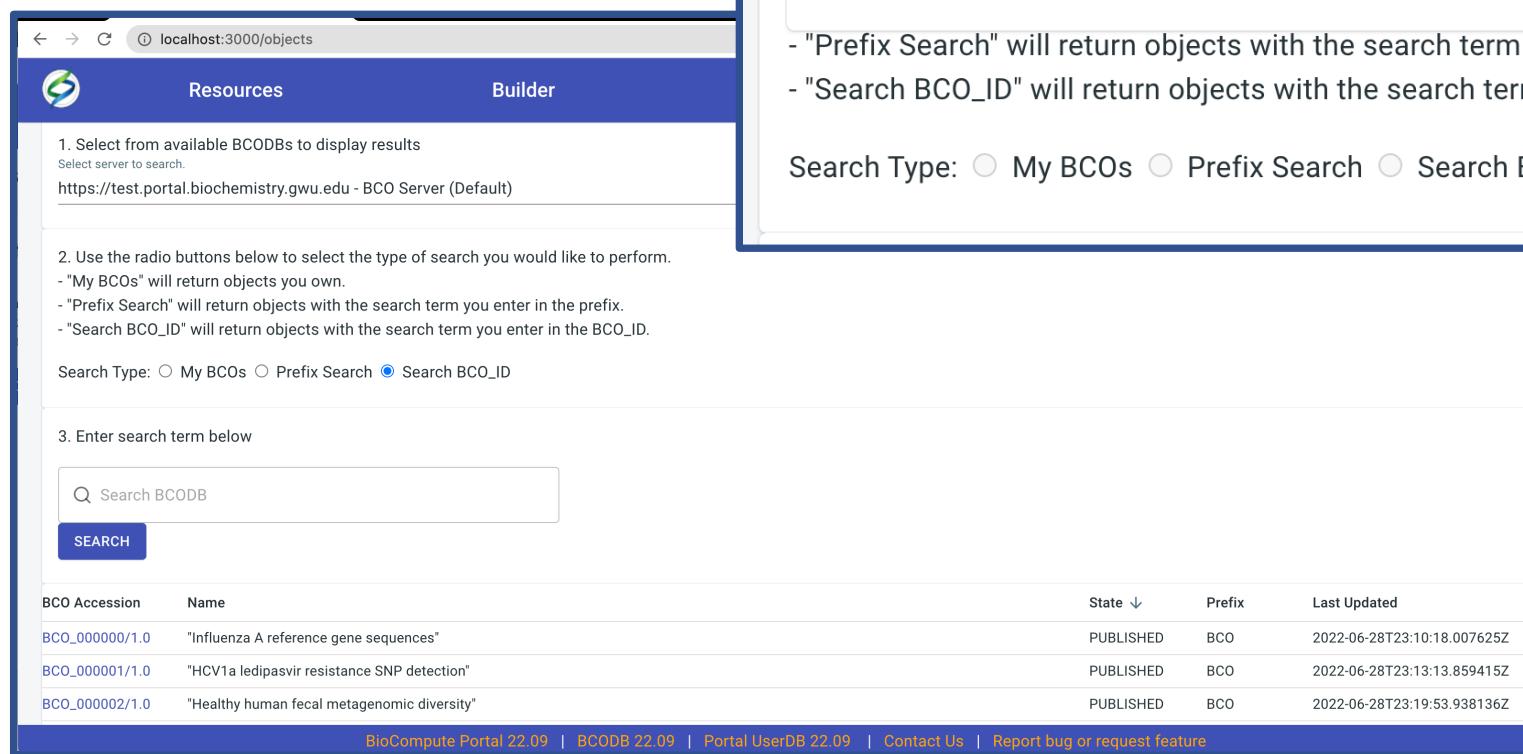
REMOVE

Groups (click to expand)

BCO Portal and BCODB

Adding a New Server (BCODB)

- When searching for BCOs the user can select from all available BCODB instances
- The user can search and brows BCOs for any instance they have access to



The screenshot shows the BioCompute Object DB search interface. At the top, it says "BioCompute Object DB". Below that, it says "1. Select from available BCODBs to display results" and "Select server to search." It lists two servers:

- http://127.0.0.1:8000 - BCO Server (Default)
- https://test.portal.biochemistry.gwu.edu - BCO Server (Default)

Below the servers, there is a note: "- "Prefix Search" will return objects with the search term you enter in the prefix.
- "Search BCO_ID" will return objects with the search term you enter in the BCO_ID." Then it says "Search Type: My BCOs Prefix Search Search BCO_ID". At the bottom, it says "3. Enter search term below" with a search bar containing "Search BCODB" and a "SEARCH" button. Below the search bar is a table with columns: BCO Accession, Name, State, Prefix, and Last Updated. The table contains three rows of data:

BCO Accession	Name	State	Prefix	Last Updated
BCO_000000/1.0	"Influenza A reference gene sequences"	PUBLISHED	BCO	2022-06-28T23:10:18.007625Z
BCO_000001/1.0	"HCV1a ledipasvir resistance SNP detection"	PUBLISHED	BCO	2022-06-28T23:13:13.859415Z
BCO_000002/1.0	"Healthy human fecal metagenomic diversity"	PUBLISHED	BCO	2022-06-28T23:19:53.938136Z

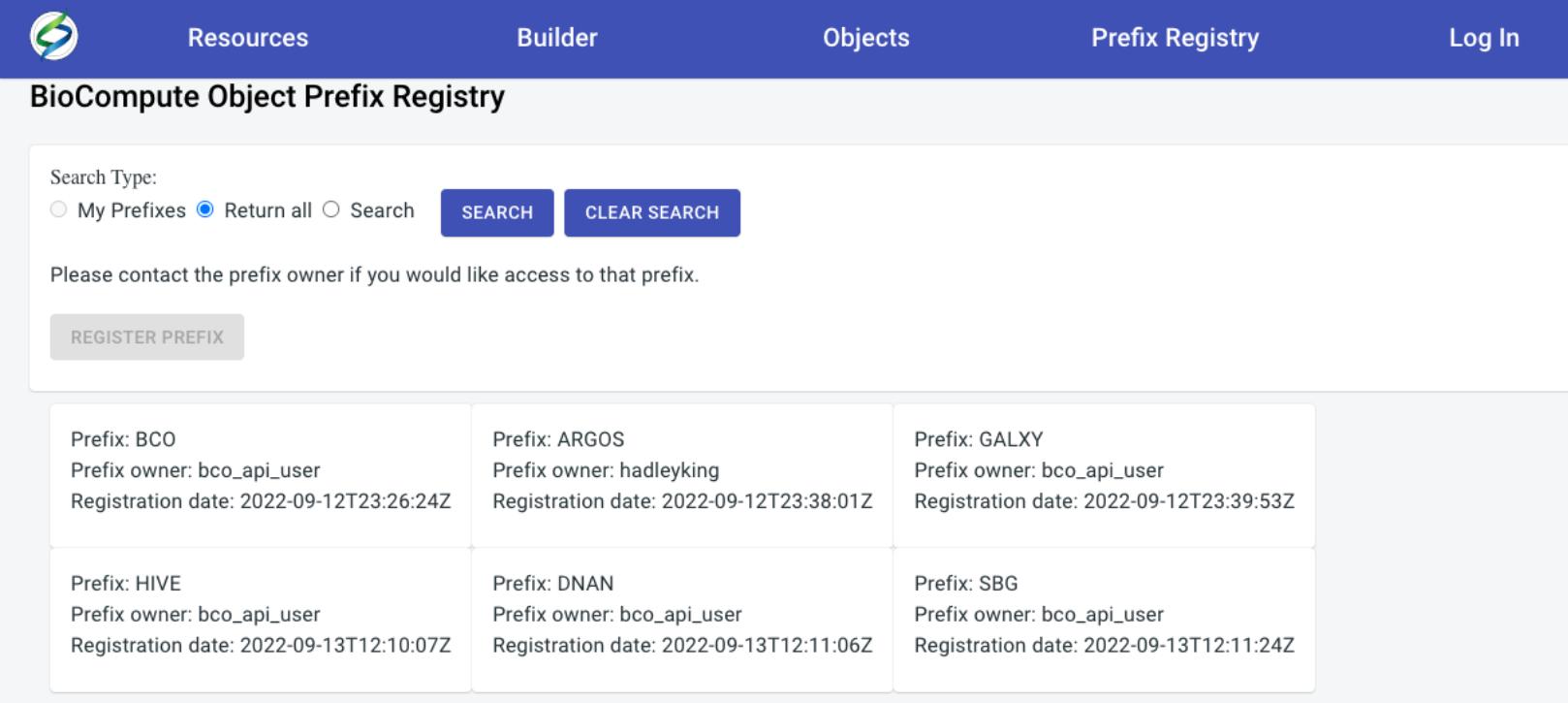
At the bottom of the page, there is a footer with links: BioCompute Portal 22.09 | BCODB 22.09 | Portal UserDB 22.09 | Contact Us | Report bug or request feature.

Prefix Registry



BioCompute
Objects

Prefix Registry



The screenshot shows the BioCompute Object Prefix Registry interface. At the top, there is a navigation bar with links for Resources, Builder, Objects, Prefix Registry (which is the active page), and Log In. Below the navigation bar, the title "BioCompute Object Prefix Registry" is displayed. A search bar with options "My Prefixes" (radio button), "Return all" (radio button, selected), and "Search" (text input) is present. There are also "SEARCH" and "CLEAR SEARCH" buttons. A message "Please contact the prefix owner if you would like access to that prefix." is shown above a "REGISTER PREFIX" button. Below this, there are two rows of three columns each, each containing prefix information:

Prefix: BCO Prefix owner: bco_api_user Registration date: 2022-09-12T23:26:24Z	Prefix: ARGOS Prefix owner: hadleyking Registration date: 2022-09-12T23:38:01Z	Prefix: GALXY Prefix owner: bco_api_user Registration date: 2022-09-12T23:39:53Z
Prefix: HIVE Prefix owner: bco_api_user Registration date: 2022-09-13T12:10:07Z	Prefix: DNAN Prefix owner: bco_api_user Registration date: 2022-09-13T12:11:06Z	Prefix: SBG Prefix owner: bco_api_user Registration date: 2022-09-13T12:11:24Z

BCO Prefix Registry

- <https://biocomputeobject.org/prefix>
- No account required to browse
- Any user can register a prefix (must be logged in)

Prefix Registry

The screenshot shows the BioCompute Object Prefix Registry interface. At the top, there is a navigation bar with links for Resources, Builder, Objects, Prefix Registry, Account, and Log Out Hadley. Below the navigation bar, the title "BioCompute Object Prefix Registry" is displayed. A search bar with options "My Prefixes", "Return all", and "Search" is present. A message encourages users to contact the prefix owner if they would like access to that prefix. On the left, there are two cards: one for "Prefix: BCO" and one for "Prefix: HIVE". A central modal window titled "Register a new BCO Prefix" is open, containing fields for "BCO DB Prefix" (set to "test"), "Prefix description" (set to "Just a test prefix"), and radio buttons for "Public Prefix" (selected) and "Private Prefix". At the bottom of the modal are "SUBMIT" and "CANCEL" buttons.

Create Prefix

- Users logged in can register a prefix
- Can choose public or private
- Public prefixes are available to all other users to create DRAFTs and publish

Prefix Registry



A screenshot of a "Group Information" dialog box. It shows the following details:

- Actions:** Check the box for each type of action you want to complete. Options include "Rename" (unchecked), "Edit description" (unchecked), and "Modify Users" (checked).
- Group Name:** test_drafter
- Group Description:** Just a test prefix.
- Members:** A list of users assigned to the group:
 - bco_api_user
 - test50
 - jdoe58
- Add User:** A text input field with a "+" button below it, labeled "Enter each username you want to be included in this group in the box above and then hit the '+'".
- Buttons:** "CANCEL" and "SUBMIT GROUP MODIFICATIONS"

Prefix access control

- Each PRIVATE prefix will spawn two user groups
 - <PREFIX>_DRAFTER and <PREFIX>_PUBLISHER
- Prefix owner must add other users to the group
- SERVER SPECIFIC
- Must use BCODB username

Prefix Registry

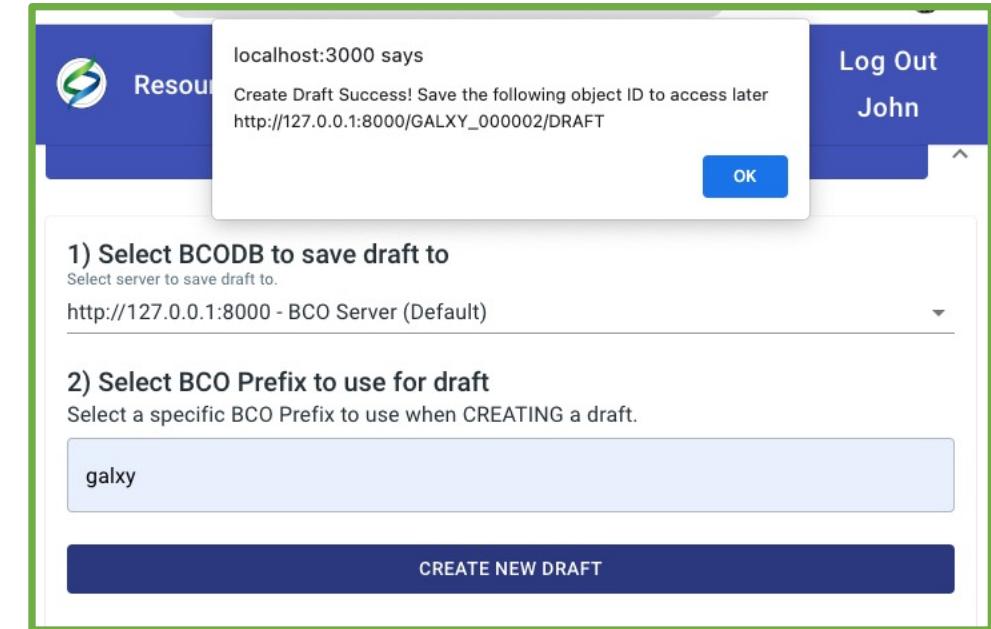
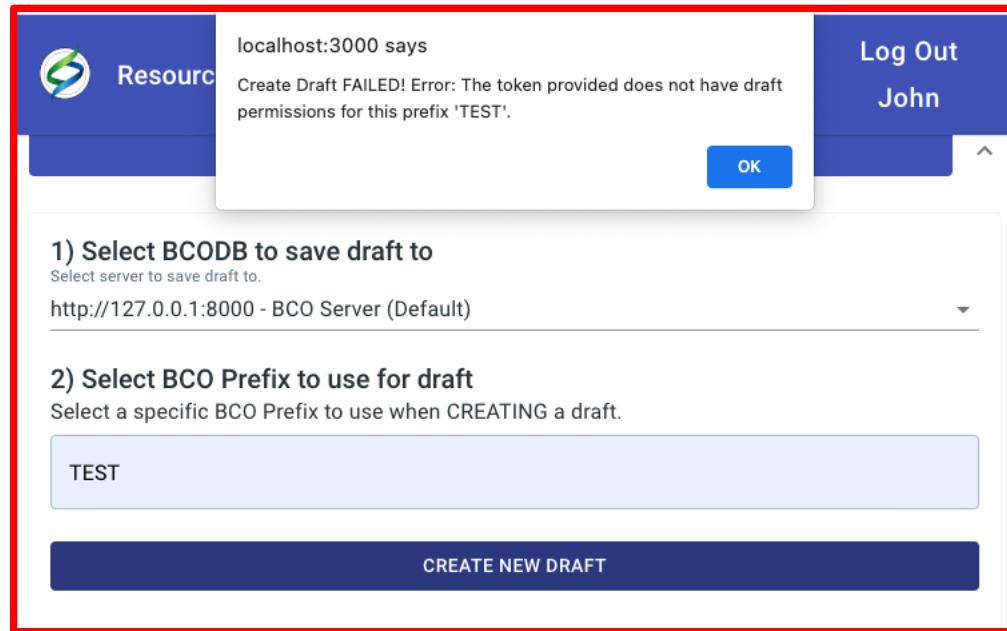
Searching for a prefix

- SERVER specific
- Can sort by:
 - state (DRAFT/PUBLISHED)
 - Accession
 - Name
 - Last updated (date)
- Prefixes can organize BCOs into categories

The screenshot shows the BioCompute Object DB Prefix Registry interface. The top navigation bar includes links for Resources, Builder, Objects, Prefix Registry, Account, and Log Out Hadley. The main section is titled "BioCompute Object DB" and contains three numbered steps: 1. Select from available BCODBs to display results (server selected: https://biocomputeobject.org - BCO Server (Default)). 2. Use the radio buttons below to select the type of search you would like to perform. (Prefix Search is selected). 3. Enter search term below (search term: ARGOS). Below these steps is a table of search results:

BCO Accession ↓	Name	State	Prefix	Last Updated
ARGOS_000013/1.1	"HIV1 reference proteins list"	PUBLISHED	ARGOS	2021-11-29T16:20:33Z
ARGOS_000001/1.1	"Influenza A reference gene sequences"	PUBLISHED	ARGOS	2021-12-01T18:50:15Z
ARGOS_000008/1.2	"BioProject assemblies metadata from SRA"	PUBLISHED	ARGOS	2021-12-07T18:52:12Z
ARGOS_000002/1.1	"Influenza A reference proteome sequences"	PUBLISHED	ARGOS	2022-06-14T21:36:58.585175Z
ARGOS_000003/1.0	"Influenza A reference proteins list"	PUBLISHED	ARGOS	2021-12-16T16:31:43Z
ARGOS_000004/1.0	"SARS-CoV-2 reference gene sequences"	PUBLISHED	ARGOS	2021-12-16T19:42:58Z

Prefix Registry



Creating a BCO with a prefix

- Once server is selected users can enter a prefix
- If they are in the <PREFIX>_DRAFTER group they will get a success message.
- This functionality also applies to the <PREFIX>_PUBLISHER group.

BCODB API



BioCompute
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BCODB API

BCODB API docs

- Two ways to view available API commands
- Out-of-the-box availability

The screenshot shows the Swagger interface for the BCODB API. At the top, it displays the URL <https://biocomputeobject.org/api/docs/?format=openapi>. Below this, the title "BioCompute Object Data Base API (BCODB API)" is shown with a status of "22.09". A note indicates that the API is a web application for creating, storing, and editing BioCompute objects based on the BCO specification document. It includes links for Terms of service, Contact the developer, and MIT License. On the left, there's a "Schemes" dropdown set to "HTTPS" and a "Filter by tag" input field. The main content area is titled "Account Management" and lists three endpoints: "GET /api/accounts/activate/{username}/{temp_identifier}" (with "api_accounts_activate_read" and a lock icon), "POST /api/accounts/describe/" (with "api_accounts_describe_create" and a lock icon), and "POST /api/accounts/new/ Account creation request" (with "api_accounts_new_create" and a lock icon).

<https://biocomputeobject.org/api/docs/>

The screenshot shows the Redoc interface for the BCODB API. The URL is <https://biocomputeobject.org/api/redocs/#tag/BCO-Management>. The left sidebar shows a navigation tree with "Authentication", "Account Management", "Group Management", and "BCO Management" expanded. Under "BCO Management", several endpoints are listed: "POST Create BCO Draft", "POST Modify a BCO Object", "POST Get Permissions for a BCO Object", "POST Set Permissions for a BCO Object", "POST Publish a BCO", "POST Read BCO", "POST Get Draft BCOs", "POST Directly publish a BCO", "GET Get Published BCOs", "POST Search for BCO", and "POST Get User Draft and Published BCOs". The right panel is titled "Create BCO Draft" and provides details for the "POST /api/objects/drafts/create/" endpoint. It says "Creates a new BCO draft object." under "Description", "AUTHORIZATIONS: Bearer" under "Auth", "REQUEST BODY SCHEMA: application/json" under "Body", and a detailed "Payload" schema. It also lists "Responses" for various HTTP status codes: 200 (Creation of BCO draft is successful), 300 (Some requests failed and some succeeded), 400 (Bad request), and 403 (Invalid token). A "Request samples" section is also present.

<https://biocomputeobject.org/api/redocs/>

BCODB API

The screenshot shows the BCODB API ReDocs interface. On the left, a sidebar lists various API endpoints under categories like Authentication, Account Management, Group Management, and BCO Management. The BCO Management category is expanded, showing endpoints such as Create BCO Draft, Modify a BCO Object, Get Permissions for a BCO Object, Set Permissions for a BCO Object, Publish a BCO, Read BCO, Get Draft BCOs, Directly publish a BCO, Get Published BCOs, Search for BCO, and Get User Draft and Published BCOs. The main content area is titled "BCO Management" and focuses on the "Create BCO Draft" endpoint. This endpoint is described as creating a new BCO draft object. It requires "Bearer" authorization and has a request body schema of "application/json". The "Payload" section shows a JSON schema for the "POST_api_objects_draft_create" command, which is described as an array of objects to create. Below this, the "Responses" section lists possible HTTP status codes: 200 (Creation of BCO draft is successful), 300 (Some requests failed and some succeeded), 400 (Bad request), and 403 (Invalid token). The top of the page shows a browser header with the URL "biocomputeobject.org/api/redocs/#tag/BCO-Management".

BCODB API ReDocs

- Designed for readability
- Standard layout for all API commands
- Three panel layout makes navigation easy

BCODB API

Swagger
Supported by SMARTBEAR

http://localhost:8000/api/docs/?format=openapi

Explore

BioCompute Object Data Base API (BCODB API) 22.09

[Base URL: localhost:8000 /]
<http://localhost:8000/api/docs/?format=openapi>

A web application that can be used to create, store and edit BioCompute objects based on BioCompute schema described in the BCO specification document.

[Terms of service](#)
[Contact the developer](#)
[MIT License](#)

Schemes
HTTP ▾

Django Login Authorize 

Filter by tag

Account Management

GET /api/accounts/activate/{username}/{temp_identifier} api_accounts_activate_read 

POST </api/accounts/describe/> api_accounts_describe_create 

Pass the request to the handling function

BCODB API Swagger Docs

- Designed for usability
- Standard layout for all API commands
- Organized by collapsible endpoints
- Can test out API functions in browser

BCODB API

GET /api/accounts/activate/{username}/{temp_identifier}

POST /api/accounts/describe/

Pass the request to the handling function

Parameters

Name Description

Authorization string (header) Authorization Token

Token 07801a1a4cd8f1945e22ac8439f1db27

Execute Clear

Responses

Response content type application/json

Curl

```
curl -X POST "http://localhost:8000/api/accounts/describe/" -H "accept: application/json" -H "Authorization: Token 07801a1a4cd8f1945e22ac8439f1db27fe813f7a" -H "X-CSRFToken: rZHRsNX8P71b1SRuXYWFNi0xRjHxvRZTl0hw0gD0BLI05YHFVzHz4MfnqPugSP" -d ""
```

Request URL

http://localhost:8000/api/accounts/describe/

Server response

The screenshot shows the BCODB API Swagger Docs interface. At the top, there are two tabs: 'GET /api/accounts/activate/{username}/{temp_identifier}' and 'POST /api/accounts/describe/'. Below each tab is a detailed description of the endpoint, including parameters, responses, and examples. The 'POST /api/accounts/describe/' section includes a 'Curl' command and a 'Request URL' field. A large JSON object is displayed under the 'Server response' section, representing the full response from the API. The JSON object contains fields like 'token', 'username', 'other_info', 'permissions', and a list of actions such as 'Can add BCos with prefix BCO', 'Can add BCos with prefix GALXY', etc.

BCODB API Swagger Docs

- Each function can be used in a browser
- Easy authentication when required
- FULL Request and full response displayed in browser

BCODB API

<https://biocomputeobject.org/api/objects/validate/>

OR

https://biocomputeobject.org/api/docs/#/BCO%20Management/api_objects_validate_create

POST /api/objects/validate/ Bulk Validate BCOs api_objects_validate_create 🔒

Bulk operation to validate BCOs.

```
{  
    "POST_validate_bco": [  
        {...},  
        {...}  
    ]  
}
```

Parameters

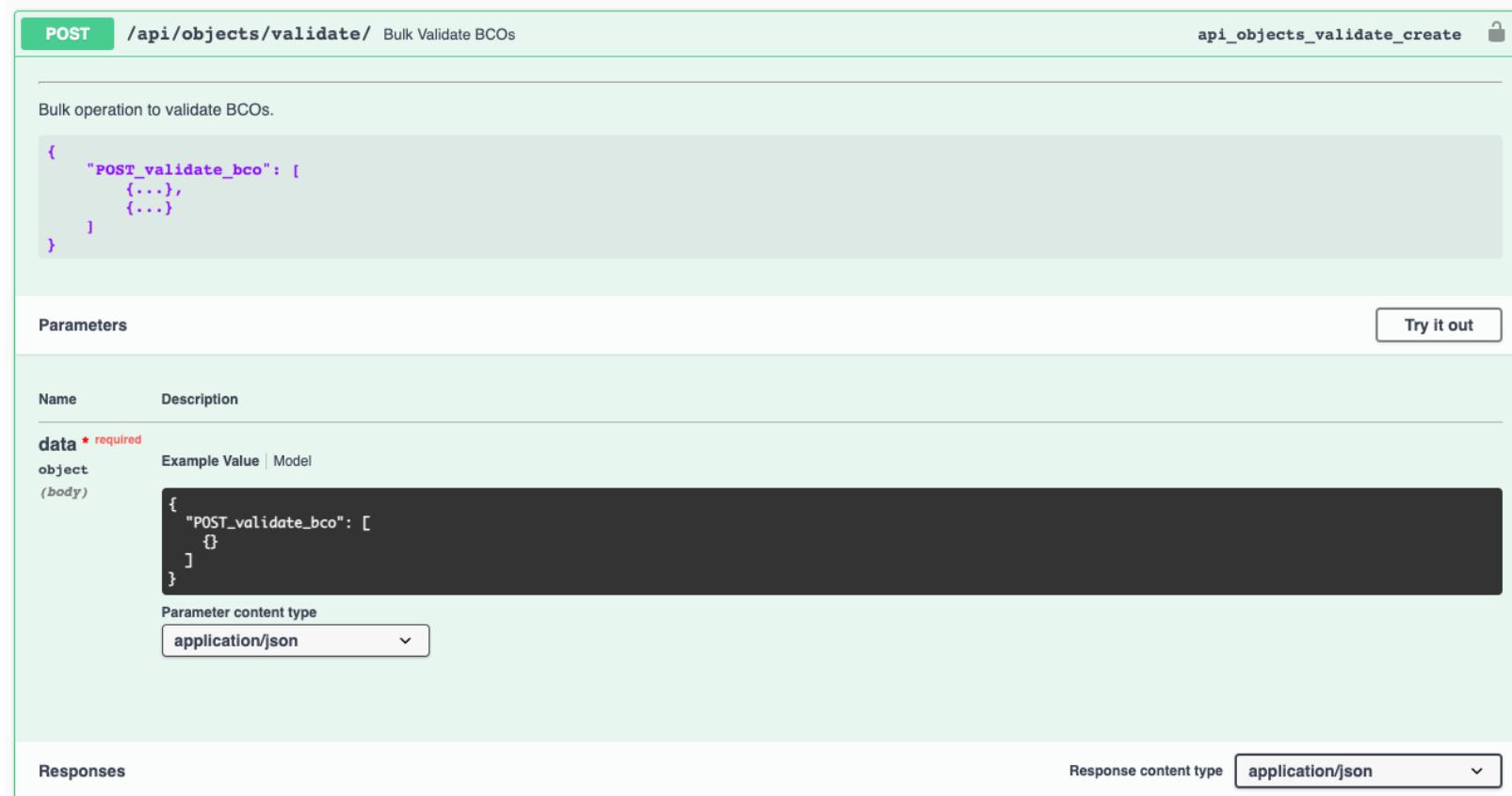
Try it out

Name	Description
data <small>* required</small> object <small>(body)</small>	Example Value Model <pre>{ "POST_validate_bco": [{}] }</pre>

Parameter content type
application/json

Responses

Response content type
application/json



Bulk BCO Validation

- No authentication required
- Can submit many BCOs at once
- Results are returned for each BCO

Bulk BCO Validation: Results

- Response is a JSON object.
- Results for each BCO returned based on `object_id`
- Each error is listed separately
- Also checks validity of `extension_domain`

Request URL
`https://biocomputeobject.org/api/objects/validate/`

Server response

Code Details

207 Undocumented Response body

```
{  
    "http://127.0.0.1:8000/GALXY_000001/DRAFT": {  
        "number_of_errors": 2,  
        "error_detail": [  
            {  
                "[etag)": "' does not match '^([A-Za-z0-9]+)$'"  
            },  
            {  
                "[execution_domain)": "'environment_variables' is a required property"  
            }  
        ]  
    },  
    "http://127.0.0.1:8000/TEST_000001/1.2": {  
        "number_of_errors": 0,  
        "error_detail": [  
            "BCO Valid"  
        ]  
    },  
    "http://www.w3id.org/biocompute/extension_domain/1.2.0/dataset/dataset_extension.json": {  
        "number_of_errors": 0,  
        "error_detail": [  
            "Extension Valid"  
        ]  
    }  
}
```

Response headers