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# **MuG - 3D model RESTful API Documentation**

*Release 0.1*

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### 1.1 Requirements

#### 1.1.1 Software

- Python 2.7.10+
- pyenv
- pyenv virtualenv
- pip

#### 1.1.2 Python Modules

- h5py
- NumPy
- Flask
- Flask-Restful
- json
- pytest
- Waitress
- Sphinx
- sphinx-autobuild

## 1.2 Installation

### 1.2.1 Basics

Directly from GitHub:

```
1 git clone https://github.com/Multiscale-Genomics/mg-rest-3d.git
2 cd mg-rest-3d/
3 pip install -e .
4 pip install -r requirements.txt
```

Using pip:

```
1 pip install git+https://github.com/Multiscale-Genomics/mg-rest-3d.git
```

### 1.2.2 Setting up a server

```
1 git clone https://github.com/Multiscale-Genomics/mg-rest-3d.git
2
3 cd mg-rest-3d
4 pyenv virtualenv 2.7.12 mg-rest-3d
5 pyenv activate mg-rest-service
6 pip install git+https://github.com/Multiscale-Genomics/mg-dm-api.git
7 pip install -e .
8 pip install -r requirements.txt
9 pyenv deactivate
```

Starting the service:

```
1 nohup ${PATH_2_PYENV}/versions/2.7.12/envs/mg-rest-3d/bin/waitress-serve --listen=127.
  ↪0.0.1:5002 rest.app:app &
```

## 1.3 Testing

Test scripts are located in the *test/* directory. Run *pytest* to from the root repository directory to ensure that the API is working correctly.

The scripts require a valid hdf5 file generated using the scripts from *mg-storage-hdf5* and a matching *datasets.json* file located in the *rest/* directory

## 1.4 Documentation

To build the documentation:

```
1 pip install Sphinx
2 pip install sphinx-autobuild
3 cd docs
4 make html
```

## 2.1 Methods

### 2.1.1 Get Endpoints

**class** `rest.app.GetEndpoints`

Class to handle the http requests for returning information about the end points

**static** `get ()`

GET list all end points

List of all of the end points for the current service.

#### Example

```
1 curl -X GET http://localhost:5001/mug/api/3dcoord
```

### 2.1.2 Get Resolutions

**class** `rest.app.GetResolutions`

Class to handle the http requests for returning information about the resolutions that models have been generated for

**get** (`*args, **kwargs`)

GET List available resolutions from dataset

#### Parameters

- `user_id (str)` – User ID
- `file_id (str)` – Identifier of the file to retrieve data from

**Returns** `file` – JSON file listing the available resolutions within the dataset

**Return type** json

### Examples

```
1 curl -X GET http://localhost:5001/mug/api/3dcoord/resolutions?user_id=test&  
↪file_id=test_file
```

## 2.1.3 Get Chromosomes

**class** rest.app.GetChromosomes

Class to handle the http requests for returning information about the chromosomes that the models have been generated across

**get** (\*args, \*\*kwargs)

GET List available chromosomes from dataset

#### Parameters

- **user\_id** (*str*) – User ID
- **file\_id** (*str*) – Identifier of the file to retrieve data from
- **res** (*int*) – Resolution

**Returns** **file** – JSON file listing the available chromosomes within a dataset at a given resolution

**Return type** json

### Examples

```
1 curl -X GET http://localhost:5001/mug/api/3dcoord/chromosomes?user_id=test&  
↪file_id=test_file
```

## 2.1.4 Get Regions

**class** rest.app.GetRegions

Class to handle the http requests for returning information about the regions that are available in a given region and level of resolution

**get** (\*args, \*\*kwargs)

GET List available models from dataset

#### Parameters

- **user\_id** (*str*) – User ID
- **file\_id** (*str*) – Identifier of the file to retrieve data from
- **res** (*int*) – Resolution
- **chrom** (*str*) – Chromosome identifier (1, 2, 3, chr1, chr2, chr3, I, II, III, etc) for the chromosome of interest
- **start** (*int*) – Start position for a selected region
- **end** (*int*) – End position for a selected region



**Returns file** – JSON file listing the available models within a dataset at a given resolution and chromosomal region

**Return type** json

### Examples

```
1 curl -X GET http://localhost:5001/mug/api/3dcoord/regions?user_id=test&file_
   ↪id=test_file&res=1000000&chrom=1&start=1&end=1000000
```

## 2.1.5 Get Models

**class** rest.app.**GetModels**

Class to handle the http requests for returning information about the models that are available within a given region.

**get** (\*args, \*\*kwargs)

GET List available models from dataset

### Parameters

- **user\_id** (*str*) – User ID
- **file\_id** (*str*) – Identifier of the file to retrieve data from
- **res** (*int*) – Resolution
- **region** (*str*) – Region ID

**Returns file** – JSON file listing the available models within a dataset at a given resolution and chromosomal region

**Return type** json

### Examples

```
1 curl -X GET http://localhost:5001/mug/api/3dcoord/models?user_id=test&file_
   ↪id=test_file&res=1000000&region=1
```

## 2.1.6 Get Model

**class** rest.app.**GetModel**

Class to handle the http requests for returning the models from a given region. The list of models is a comma separated list that can return multiple models from the same region

**get** (\*args, \*\*kwargs)

GET List available model from dataset

### Parameters

- **user\_id** (*str*) – User ID
- **file\_id** (*str*) – Identifier of the file to retrieve data from
- **res** (*int*) – Resolution

- **region** (*str*) – Region ID
- **model** (*str*) – model ID

**Returns** **file** – JSON file listing the available models within a dataset at a given resolution and chromosomal region

**Return type** `json`

### Examples

```
1 curl -X GET http://localhost:5001/mug/api/3dcoord/model?user_id=test&file_  
↪id=test_file&region=1&model=model1
```

## 2.1.7 Ping

**class** `rest.app.Ping`

Class to handle the http requests to ping a service

**static** `get ()`

GET Status

List the current status of the service along with the relevant information about the version.

### Example

```
1 curl -X GET http://localhost:5001/mug/api/3dcoord/ping
```

## CHAPTER 3

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### Architectural Decision Record (ADR)

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This file is a record of the choices that have been made about the choice of software, packages, pipelines and data structures that have been made in this repository. This document should serve the help future developers (including the original authors) understand what certain choices were made.



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## CHAPTER 5

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