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M.A.L.E.N.A.H. API

The MALENAH API was created using Google App Engine (Python) and hosted at:

<http://malenah-api.appspot.com>

Brief Recap of Background and Schema

MALENAH stands for **M**obile **A**lly for **L**GBT people, **E**nhacing through a **N**etwork, **A**ccess to **H**ealthcare. The MALENAH API stores information about healthcare providers as Provider entities. Each Provider has associated Specialization entities (e.g. chiropractic, emergency medicine, geriatrics, ophthalmology, endocrinology). Users can write reviews about a provider, which are stored as Review entities. Replies, which are responses to reviews are stored as Reply entities. Review entities are the root entities of an entity group containing Reply entities. In other words, Reply entities belong to a parent Review entity’s entity group. A Provider entity is the sole (root) entity of its entity group, and a Specialization entity is the root entity of its entity group.

API URL Structure for Accessing Resources

The MALENAH API exposes the following URI’s for public consumption (ending forward slashes are optional):

To access Provider entities (and its associated Review entities, and Review entities’ associated Reply entities), use the following URL’s:

<http://malenah-api.appspot.com/provider>

[http://malenah-api.appspot.com/provider/<providerID>/](http://malenah-api.appspot.com/provider/%3cproviderID%3e/)

[http://malenah-api.appspot.com/provider/<providerID>/review/](http://malenah-api.appspot.com/provider/%3cproviderID%3e/review/)

[http://malenah-api.appspot.com/provider/<providerID>/review/<reviewID>/](http://malenah-api.appspot.com/provider/%3cproviderID%3e/review/%3creviewID%3e/)

[http://malenah-api.appspot.com/provider/<providerID>/review/<reviewID>/reply](http://malenah-api.appspot.com/provider/%3cproviderID%3e/review/%3creviewID%3e/reply)

[http://malenah-api.appspot.com/provider/<providerID>/review/<reviewID>/reply/<replyID>/](http://malenah-api.appspot.com/provider/%3cproviderID%3e/review/%3creviewID%3e/reply/%3creplyID%3e/)

To access Specialization entities:

<http://malenah-api.appspot.com/specialization>

[http://malenah-api.appspot.com/specialization/<specializationID>/](http://malenah-api.appspot.com/specialization/%3cspecializationID%3e/)

To access Review entities (and its associated Reply entities):

<http://malenah-api.appspot.com/review>

[http://malenah-api.appspot.com/review/<reviewID>/](http://malenah-api.appspot.com/review/%3creviewID%3e/)

[http://malenah-api.appspot.com/review/<reviewID>/reply/](http://malenah-api.appspot.com/review/%3creviewID%3e/reply/)

[http://malenah-api.appspot.com/review/<reviewID>/reply/<replyID>/](http://malenah-api.appspot.com/review/%3creviewID%3e/reply/%3creplyID%3e/)

To access Reply entities:

<http://malenah-api.appspot.com/reply>

[http://malenah-api.appspot.com/reply/<replyID>/](http://malenah-api.appspot.com/reply/%3creplyID%3e/)

Explanation of URL Structure and API

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|  | The diagram to the left is a schema of the database to help understand the URL structure of the API.  Although a Review entity is always in its own entity group, a Review entity must be associated with a Provider entity because reviews are written about healthcare providers, and a Reply entity must be associated with a Review entity, so a Reply entity is always in an entity group with a Review entity as its parent. This explains the provider/providerID/review/reviewID/reply/replyID structure. To minimize contention during queries and writes, Review entities are not stored in the same entity group as their associated Provider entity. |

This screen capture of the code shows regular expressions handling the routes in Google App Engine (Python). These regular expressions tdetermine which handler the request will be routed to. Note that the API evaluates numeric inputs for pid (provider ID), revid (review ID), and repid (reply ID).



RESTful Constraints

Changes to the Schema from Last Week

No major changes to the schema were required. However, in order to complete the assignment in a timely fashion, I did not include user authentication or authorization, and thus did not include the User entity that was originally part of the schema submitted last week.

Test Suites

All tests were performed using **Postman**, **a Chrome browser plugin** that sends HTTP requests to my web application. I have included screen captures below, showing the input values for my tests. In addition to showing all of the JSON responses from Postman for HTTP GET, POST, PUT and DELETE requests, for HTTP delete requests, I have also included screen shots from the Google App Engine Administrator Console, showing that when an entity is deleted, all references to it are removed.

The following are two examples of one of my tests of the POST action for a Specialization entity in the Postman Chrome plugin. Note the URI (<http://malenah-api.appspot.com/specialization/),t> he Headers and Body contents. The Header has the Accept: application/json to indicate that the web application accepts JSON responses, and the Content-type: application/x-www-form-urlencoded indicates that the content of the request being submitted to the web application is in the form of query string.

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I have divided my tests based on the following base URI’s

1. /specialization: In addition to querying for Specialization entities (GET), these URI’s are used for adding (POST), editing (PUT) and removing (DELETE) Specialization entities from the NDB datastore.
2. /provider: Used for querying for Provider entities in (GET), adding Provider entities to (POST), editing existing Provider entities in (PUT), and removing existing Provider entities from (DELETE) the NDB datastore.
3. /review: Used for querying for Review entities in (GET), adding Review entities to (POST), editing existing Review entities in (PUT), and removing existing Review entities from (DELETE) the NDB datastore.
4. /reply: Used for querying for Reply entities in (GET), adding Reply entities to (POST), editing existing Reply entities in (PUT), and removing existing Reply entities from (DELETE) the NDB datastore.

Base URI: http://malenah-api.com/**specialization**

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| --- | --- | --- | --- | --- | --- | --- |
| **Type** | **HTTP Request** | **URI1** | **HTTP request header** | **HTTP request body** | **Expected Outcome** | **Actual Outcome from Postman** |
| empty datastore | GET | /specialization | Accept: application/json  Content-Type: application/x-www-form-urlencoded | None | {  "status": "200 - OK. No specializations currently in database."  } | {  "status": "200 - OK. No specializations currently in database."  } |
| empty datastore | GET | /specialization/ | Accept: application/json  Content-Type: application/x-www-form-urlencoded | None | {  "status": "200 - OK. No specializations currently in database."  } | {  "status": "200 - OK. No specializations currently in database."  } |
| empty datastore | GET | /specialization/1 | Accept: application/json  Content-Type: application/x-www-form-urlencoded | None | {  "status": "200 - OK. No specializations matching the provided specialization id. "  } | {  "status": "200 - OK. No specializations matching the provided specialization id. "  } |
| basic,  existing id | GET | /specialization/5657382461898752 | Accept: application/json  Content-Type: application/x-www-form-urlencoded | None | {  "name": "Motor Vehicle Accidents",  "key": 5657382461898752  } | {  "name": "Motor Vehicle Accidents",  "key": 5657382461898752  } |
| basic,  invalid id | GET | /specialization/111 | Accept: application/json  Content-Type: application/x-www-form-urlencoded | None | {  "status": "200 - OK. No specializations matching the provided specialization id. "  } | {  "status": "200 - OK. No specializations matching the provided specialization id. "  } |
| basic, empty datastore (empty body) | POST | /specialization | Accept: application/json  Content-Type: application/x-www-form-urlencoded | None | {  "status": "200 - Invalid input. Empty specializations[] field(s)."  } | {  "status": "200 - Invalid input. Empty specializations[] field(s)."  } |
| basic, missing required fields | POST | /specialization | Accept: application/json  Content-Type: application/x-www-form-urlencoded | name: ‘’ | {  "status": "200 - OK.",  "duplicate": [],  "added": [],  "**invalid**": ""  } | {  "status": "200 - OK.",  "duplicate": [],  "added": [],  "**invalid**": ""  } |
| basic, empty datastore (first post) | POST | /specialization/ | Accept: application/json  Content-Type: application/x-www-form-urlencoded |  | {  "status": "200 - OK.",  "duplicate": [],  "added": [  {  "name": "Urgent care",  "key": 5676830073815040  }  ],  "invalid": []  } | {  "status": "200 - OK.",  "duplicate": [],  "added": [  {  "name": "Urgent care",  "key": 5676830073815040  }  ],  "invalid": []  } |
| duplicate entry | POST | /specialization/ | Accept: application/json  Content-Type: application/x-www-form-urlencoded | Key: specializations[]  Value: Urgent care | {  "status": "200 - OK.",  "**duplicate**": [  {  "name": "Urgent care",  "key": 5676830073815040  }  ],  "added": [],  "invalid": []  } | {  "status": "200 - OK.",  "**duplicate**": [  {  "name": "Urgent care",  "key": 5676830073815040  }  ],  "added": [],  "invalid": []  } |
| basic, multiple entries including duplicates | POST | /specialization/ | Accept: application/json  Content-Type: application/x-www-form-urlencoded | Key: specializations[]  Value: Urgent care  Key: specializations[]  Value: Sports Chiropractic  Key: specializations[]  Value: Emergency care | {  "status": "200 - OK.",  "duplicate": [  {  "name": "Urgent care",  "key": 5676830073815040  }  ],  "added": [  {  "name": "Sports Chiropractic",  "key": 5750085036015616  },  {  "name": "Emergency care",  "key": 5094432508477440  }  ],  "invalid": []  } | {  "status": "200 - OK.",  "duplicate": [  {  "name": "Urgent care",  "key": 5676830073815040  }  ],  "added": [  {  "name": "Sports Chiropractic",  "key": 5750085036015616  },  {  "name": "Emergency care",  "key": 5094432508477440  }  ],  "invalid": []  } |
| empty, no specialization id provided in URI | PUT | /specialization/ | Accept: application/json  Content-Type: application/x-www-form-urlencoded | None | {  "status": "400 - Invalid. No specialization id provided."  } | {  "status": "400 - Invalid. No specialization id provided."  } |
| empty,  empty body | PUT | /specialization/5094432508477440 | Accept: application/json  Content-Type: application/x-www-form-urlencoded | None | {  "status": "400 - Invalid input: missing name."  } | {  "status": "400 - Invalid input: missing name."  } |
| basic, modify existing record | PUT | /specialization/5094432508477440 | Accept: application/json  Content-Type: application/x-www-form-urlencoded | Key: name  Value: Emergency Medicine  (changed from Emergency care) | {  "status": "200 - OK",  "name": "Emergency Medicine",  "key": 5094432508477440  } | {  "status": "200 - OK",  "name": "Emergency Medicine",  "key": 5094432508477440  } |
| empty,  no id provided in URI | DELETE | /specialization/ | Accept: application/json  Content-Type: application/x-www-form-urlencoded | None | {  "status": "400 - Invalid. No specialization id provided."  } | {  "status": "400 - Invalid. No specialization id provided."  } |
| basic, delete existing record | DELETE | /specialization/5094432508477440 | Accept: application/json  Content-Type: application/x-www-form-urlencoded | None | {  "status": "200 - Delete specialization successful."  } | {  "status": "200 - Delete specialization successful."  } |
| duplicate, delete already deleted record | DELETE | /specialization/5094432508477440 | Accept: application/json  Content-Type: application/x-www-form-urlencoded | None | {  "status": "400 - Invalid input. Unable to delete entity. No match for specialization id."  } | {  "status": "400 - Invalid input. Unable to delete entity. No match for specialization id."  } |
| basic, invalid id | DELETE | /specialization/123 | Accept: application/json  Content-Type: application/x-www-form-urlencoded | None | {  "status": "400 - Invalid input. Unable to delete entity. No match for specialization id."  } | {  "status": "400 - Invalid input. Unable to delete entity. No match for specialization id."  } |

1 All URI’s in the table above are preceded by <http://malenah-api.com>

**Deletion of Specialization entity removes its reference as well**

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| Postman HTTP Delete Request | Google Cloud Administrator Console | |
|  | **Before deletion** (11 entities) | **After deletion** (10 entities): Notice that the Specialization entity with id 565316480401408 has been removed. |

Base URI: http://malenah-api.com/**provider**

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| --- | --- | --- | --- | --- | --- | --- |
| **Type** | **HTTP Request** | **URI1** | **HTTP request header** | **HTTP request body** | **Expected Outcome** | **Actual Outcome from Postman** |
| empty  datastore | GET | /provider | Accept: application/json  Content-Type: application/x-www-form-urlencoded | None | {  "status": "200 - OK. No providers currently in database."  } | {  "status": "200 - OK. No providers currently in database."  } |
| empty  datastore | GET | /provider/ | Accept: application/json  Content-Type: application/x-www-form-urlencoded | None | {  "status": "200 - OK. No providers currently in database."  } | {  "status": "200 - OK. No providers currently in database."  } |
| empty  datastore,  invalid id | GET | /provider/123 | Accept: application/json  Content-Type: application/x-www-form-urlencoded | None | {  "status": "200 - OK. No providers matching the provided provider id. "  } | {  "status": "200 - OK. No providers matching the provided provider id. "  } |
| basic,  existing id | GET | /provider/5629499534213120 | Accept: application/json  Content-Type: application/x-www-form-urlencoded | None | {  "website": "",  "phone": "5034138988",  "first\_name": "Ben",  "last\_name": "Ly",  "key": 5629499534213120,  "designation": "MD",  "organization": "Legacy Medical Group - Northwest",  "specializations": [  5634387206995968,  5766466041282560  ],  "accepting\_new\_patients": true,  "email": ""  } | {  "website": "",  "phone": "5034138988",  "first\_name": "Ben",  "last\_name": "Ly",  "key": 5629499534213120,  "designation": "MD",  "organization": "Legacy Medical Group - Northwest",  "specializations": [  5634387206995968,  5766466041282560  ],  "accepting\_new\_patients": true,  "email": ""  } |
| basic,  invalid id | GET | /provider/123 | Accept: application/json  Content-Type: application/x-www-form-urlencoded | None | {  "status": "200 - OK. No providers matching the provided provider id. "  } | {  "status": "200 - OK. No providers matching the provided provider id. "  } |
| basic, empty datastore (empty body) | POST | /provider/ | Accept: application/json  Content-Type: application/x-www-form-urlencoded | None | {  "status": "400 - Invalid input: missing properties."  } | {  "status": "400 - Invalid input: missing properties."  } |
| basic, empty datastore (first post) | POST | /provider/ | Accept: application/json  Content-Type: application/x-www-form-urlencoded | first\_name: Ben  last\_name: Ly  designation: MD  organization: Legacy Medical Group – Northwest  specializations[]: 5634387206995968  specializations[]: 5766466041282560  phone: 5034138988  email: ‘’  website: ‘’  accepting\_new\_patients” True | {  "website": "",  "status": "200 - OK",  "first\_name": "Ben",  "last\_name": "Ly",  "designation": "MD",  "email": "",  "phone": "5034138988",  "key": 5629499534213120,  "organization": "Legacy Medical Group - Northwest",  "specializations": [  {  "name": "Transgender Medicine",  "key": 5634387206995968  },  {  "name": "Internal Medicine",  "key": 5766466041282560  }  ],  "accepting\_new\_patients": true  } | {  "website": "",  "status": "200 - OK",  "first\_name": "Ben",  "last\_name": "Ly",  "designation": "MD",  "email": "",  "phone": "5034138988",  "key": 5629499534213120,  "organization": "Legacy Medical Group - Northwest",  "specializations": [  {  "name": "Transgender Medicine",  "key": 5634387206995968  },  {  "name": "Internal Medicine",  "key": 5766466041282560  }  ],  "accepting\_new\_patients": true  } |
| basic, missing required fields | POST | /provider/ | Accept: application/json  Content-Type: application/x-www-form-urlencoded | first\_name: ‘’  last\_name: Ly  designation: MD  organization: Legacy Medical Group – Northwest  specializations[]: 5634387206995968  specializations[]: 5766466041282560  phone: 5034138988  email: ‘’  website: ‘’  accepting\_new\_patients” True | {  "status": "400 - Invalid input: missing properties."  } | {  "status": "400 - Invalid input: missing properties."  } |
| duplicate entry | POST | /provider/ | Accept: application/json  Content-Type: application/x-www-form-urlencoded | first\_name: Ben  last\_name: Ly  designation: MD  organization: Legacy Medical Group – Northwest  specializations[]: 5634387206995968  specializations[]: 5766466041282560  phone: 5034138988  email: ‘’  website: ‘’  accepting\_new\_patients” True | {  "status": "400 - Invalid input: provider already exists in database."  } | {  "status": "400 - Invalid input: provider already exists in database."  } |
| empty, no id provided in URI | PUT | /provider/ | Accept: application/json  Content-Type: application/x-www-form-urlencoded | None | {  "status": "400 - Invalid. No provider id provided."  } | {  "status": "400 - Invalid. No provider id provided."  } |
| empty,  missing properties | PUT | /provider/ | Accept: application/json  Content-Type: application/x-www-form-urlencoded | None | {  "status": "400 - Invalid input: missing properties."  } | {  "status": "400 - Invalid input: missing properties."  } |
| basic, modify existing record | PUT | /provider/ 5707702298738688 | Accept: application/json  Content-Type: application/x-www-form-urlencoded | specializations[]: 5203516087861248  specializations[]: 5673385510043648  specializations[]: 5634387206995968 | {  "website": "",  "status": "200 - OK",  "first\_name": "Kelly",  "last\_name": "Washburn",  "designation": "NP",  "email": "",  "phone": "5034138988",  "key": 5707702298738688,  "organization": "Merritt Health & Wellness",  "specializations": [  {  "name": "LGBTQI Care",  "key": 5203516087861248  },  {  "name": "Endocrinology",  "key": 5673385510043648  },  {  "name": "Transgender Medicine",  "key": 5634387206995968  }  ],  "accepting\_new\_patients": true  } | {  "website": "",  "status": "200 - OK",  "first\_name": "Kelly",  "last\_name": "Washburn",  "designation": "NP",  "email": "",  "phone": "5034138988",  "key": 5707702298738688,  "organization": "Merritt Health & Wellness",  "specializations": [  {  "name": "LGBTQI Care",  "key": 5203516087861248  },  {  "name": "Endocrinology",  "key": 5673385510043648  },  {  "name": "Transgender Medicine",  "key": 5634387206995968  }  ],  "accepting\_new\_patients": true  } |
| empty,  no id provided in URI | DELETE | /provider/ | Accept: application/json  Content-Type: application/x-www-form-urlencoded | None | {  "status": "400 - Invalid. No provider id provided."  } | {  "status": "400 - Invalid. No provider id provided."  } |
| basic, delete existing record | DELETE | /provider/5707702298738688 | Accept: application/json  Content-Type: application/x-www-form-urlencoded | None | {  "status": "200 - Delete provider successful."  } | {  "status": "200 - Delete provider successful."  } |
| duplicate,  delete already deleted record | DELETE | /provider/5707702298738688 | Accept: application/json  Content-Type: application/x-www-form-urlencoded | None | {  "status": "400 - Invalid input. Unable to delete entity. No match for provider id."  } | {  "status": "400 - Invalid input. Unable to delete entity. No match for provider id."  } |
| basic, invalid id | DELETE | /provider/123 | Accept: application/json  Content-Type: application/x-www-form-urlencoded | None | {  "status": "400 - Invalid input. Unable to delete entity. No match for provider id."  } | {  "status": "400 - Invalid input. Unable to delete entity. No match for provider id."  } |
| basic, invalid id | DELETE | /provider/123a | Accept: application/json  Content-Type: application/x-www-form-urlencoded | None | 404 Not Found  The resource could not be found. | 404 Not Found  The resource could not be found. |

1 All URI’s in the table above are preceded by <http://malenah-api.com>

Base URI: [http://malenah-api.com/**provider/[providerID/review/reviewID**](http://malenah-api.com/provider/%5bproviderID/review/reviewID)**/reply/replyID]**

The following tests are for /provider/providerID and any URI’s that extend on this base URI

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Type** | **HTTP Request** | **URI1** | **HTTP request header** | **HTTP request body** | **Expected Outcome** | **Actual Outcome from Poastman** |
| basic | GET | /provider/5629499534213120/review | Accept: application/json  Content-Type: application/x-www-form-urlencoded | None | [  {  "username": "kendrick",  "rating": 4.5,  "replies": [],  "comment": "busy office but caring staff",  "key": 5707702298738688,  "provider": 5629499534213120  },  {  "username": "yosef",  "rating": 4.5,  "replies": [],  "comment": "sensitive and cares about your issues",  "key": 5715999101812736,  "provider": 5629499534213120  }  ] | [  {  "username": "kendrick",  "rating": 4.5,  "replies": [],  "comment": "busy office but caring staff",  "key": 5707702298738688,  "provider": 5629499534213120  },  {  "username": "yosef",  "rating": 4.5,  "replies": [],  "comment": "sensitive and cares about your issues",  "key": 5715999101812736,  "provider": 5629499534213120  }  ] |
| basic  invalid id | GET | /provider/123/review | Accept: application/json  Content-Type: application/x-www-form-urlencoded | None | {  "status": "400 - Invalid. No matches for the provided provider id."  } | {  "status": "400 - Invalid. No matches for the provided provider id."  } |
| basic  invalid URI | GET | http://malenah-api.appspot.com/provider/review | Accept: application/json  Content-Type: application/x-www-form-urlencoded | None | 404 Not Found  The resource could not be found. | 404 Not Found  The resource could not be found. |
| basic  valid URI and id |  | /provider/5629499534213120/  review/5707702298738688 | Accept: application/json  Content-Type: application/x-www-form-urlencoded | None | {  "username": "kendrick",  "rating": 4.5,  "replies": [],  "comment": "busy office but caring staff",  "key": 5707702298738688,  "provider": 5629499534213120  } | {  "username": "kendrick",  "rating": 4.5,  "replies": [],  "comment": "busy office but caring staff",  "key": 5707702298738688,  "provider": 5629499534213120  } |
| basic  valid URI and invalid id | GET | /provider/5629499534213120/  review/11 | Accept: application/json  Content-Type: application/x-www-form-urlencoded | None | {  "status": "400 - No match for review id."  } | {  "status": "400 - No match for review id."  } |
| basic  valid URI, valid ID’s |  | /provider/5629499534213120/  review/5707702298738688/  reply/5685265389584384 | Accept: application/json  Content-Type: application/x-www-form-urlencoded | None | {  "username": "watsokel",  "comment": "agreed!",  "review": 5707702298738688,  "key": 5685265389584384,  "provider": 5629499534213120  } | {  "username": "watsokel",  "comment": "agreed!",  "review": 5707702298738688,  "key": 5685265389584384,  "provider": 5629499534213120  } |
| basic  valid URI and invalid id |  | /provider/5629499534213120/  review/5707702298738688/  reply/1 | Accept: application/json  Content-Type: application/x-www-form-urlencoded | None | {  "status": "400 - No match for reply id."  } | {  "status": "400 - No match for reply id."  } |
| basic  valid URI, valid ID’s | POST | /provider/5629499534213120/  review/5707702298738688  /reply | Accept: application/json  Content-Type: application/x-www-form-urlencoded |  | {  "comment": "agreed!",  "username": "watsokel",  "review": {  "key": 5707702298738688  },  "status": "200 - OK",  "key": 5066549580791808,  "provider": {  "first\_name": "Ben",  "last\_name": "Ly",  "key": 5629499534213120  }  } | {  "comment": "agreed!",  "username": "watsokel",  "review": {  "key": 5707702298738688  },  "status": "200 - OK",  "key": 5066549580791808,  "provider": {  "first\_name": "Ben",  "last\_name": "Ly",  "key": 5629499534213120  }  } |
| basic  valid URI, invalid ID’s | POST | /provider/5629499534213120/  review/5707702298738688  /reply | Accept: application/json  Content-Type: application/x-www-form-urlencoded |  | {  "comment": "agreed!",  "username": "watsokel",  "review": {  "key": 5707702298738688  },  "status": "200 - OK",  "key": 5066549580791808,  "provider": {  "first\_name": "Ben",  "last\_name": "Ly",  "key": 5629499534213120  }  } | {  "comment": "agreed!",  "username": "watsokel",  "review": {  "key": 5707702298738688  },  "status": "200 - OK",  "key": 5066549580791808,  "provider": {  "first\_name": "Ben",  "last\_name": "Ly",  "key": 5629499534213120  }  } |
| basic, POST | POST | /provider/5668600916475904/review/ | Accept: application/json  Content-Type: application/x-www-form-urlencoded |  | {  "comment": "Dr. Lyons is caring and kind",  "rating": 4.6,  "provider": {  "first\_name": "Jennifer",  "last\_name": "Lyons",  "key": 5668600916475904  },  "username": "watsokel",  "status": "200 - OK",  "key": 5668600916475904,  "replies": []  } | {  "comment": "Dr. Lyons is caring and kind",  "rating": 4.6,  "provider": {  "first\_name": "Jennifer",  "last\_name": "Lyons",  "key": 5668600916475904  },  "username": "watsokel",  "status": "200 - OK",  "key": 5668600916475904,  "replies": []  } |
| basic, missing required fields | POST | /provider/5668600916475904/review | Accept: application/json  Content-Type: application/x-www-form-urlencoded |  | {  "status": "400 - Invalid input: missing properties."  } | {  "status": "400 - Invalid input: missing properties."  } |
| basic, invalid required field | POST | /provider/5668600916475904/review | Accept: application/json  Content-Type: application/x-www-form-urlencoded |  | {  "status": "400 - Invalid input: Provider id must be an integer."  } | {  "status": "400 - Invalid input: Provider id must be an integer."  } |

**Deletion of Provider entity removes its reference as well**

|  |  |
| --- | --- |
| Postman HTTP Delete Request | Google Cloud Administrator Console |
|  | Before deletion (4 entities): |
| **After deletion** (3 entities): Notice that the entity with id 5724160613416960 has been removed |

Base URI: http://malenah-api.com/**review**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Type | HTTP Request | URI1 | HTTP request header | HTTP request body | Expected Outcome | Actual Outcome |
| empty  datastore | GET | /review | Accept: application/json  Content-Type: application/x-www-form-urlencoded | None | {  "status": "200 - OK. No reviews currently in database. "  } | {  "status": "200 - OK. No reviews currently in database. "  } |
| empty  datastore | GET | /review/ | Accept: application/json  Content-Type: application/x-www-form-urlencoded | None | {  "status": "200 - OK. No reviews currently in database. "  } | {  "status": "200 - OK. No reviews currently in database. "  } |
| empty  datastore,  invalid id | GET | /review/123 | Accept: application/json  Content-Type: application/x-www-form-urlencoded | None | {  "status": "200 - No match for review id."  } | {  "status": "200 - No match for review id."  } |
| basic,  existing id | GET | /review/5639445604728832 | Accept: application/json  Content-Type: application/x-www-form-urlencoded | None | {  "username": "watsokel",  "rating": 4.5,  "replies": [],  "comment": "caring and kind",  "key": 5639445604728832,  "provider": 5649050225344512  } | {  "username": "watsokel",  "rating": 4.5,  "replies": [],  "comment": "caring and kind",  "key": 5639445604728832,  "provider": 5649050225344512  } |
| basic,  invalid id | GET | /review/234 | Accept: application/json  Content-Type: application/x-www-form-urlencoded | None | {  "status": "400 - No match for review id."  } | {  "status": "400 - No match for review id."  } |
| basic, empty datastore (empty body) | POST | /review | Accept: application/json  Content-Type: application/x-www-form-urlencoded | None | {  "status": "400 - Invalid input: missing properties."  } | {  "status": "400 - Invalid input: missing properties."  } |
| basic, empty datastore (first post) | POST | /review | Accept: application/json  Content-Type: application/x-www-form-urlencoded | username: watsokel  rating: 4.5  comment: caring and kind  provider: 5649050225344512 | {  "comment": "caring and kind",  "rating": 4.5,  "provider": {  "first\_name": "Kelly",  "last\_name": "Washburn",  "key": 5649050225344512  },  "username": "watsokel",  "status": "200 - OK",  "key": 5629499534213120,  "replies": []  } | {  "comment": "caring and kind",  "rating": 4.5,  "provider": {  "first\_name": "Kelly",  "last\_name": "Washburn",  "key": 5649050225344512  },  "username": "watsokel",  "status": "200 - OK",  "key": 5629499534213120,  "replies": []  } |
| basic, missing required fields | POST | /review/ | Accept: application/json  Content-Type: application/x-www-form-urlencoded |  | {  "status": "400 - Invalid input: missing properties."  } | {  "status": "400 - Invalid input: missing properties."  } |
| empty, no id provided in URI | PUT | /review | Accept: application/json  Content-Type: application/x-www-form-urlencoded | None | {  "status": "400 - Invalid. No review id provided."  } | {  "status": "400 - Invalid. No review id provided."  } |
| empty,  missing properties | PUT | /review/5649391675244544 | Accept: application/json  Content-Type: application/x-www-form-urlencoded | rating: ‘’  comment: ‘meticulous’ | {  "status": "400 - Invalid input: missing rating."  } | {  "status": "400 - Invalid input: missing rating."  } |
| basic, modify existing record | PUT | /review/5649391675244544 | Accept: application/json  Content-Type: application/x-www-form-urlencoded | rating: 4.52  comment: ‘meticulous’ | {  "comment": "meticulous",  "rating": 4.52,  "provider": {  "first\_name": "Kelly",  "last\_name": "Washburn",  "key": 5649050225344512  },  "username": "watsokel",  "status": "200 - OK",  "key": 5649391675244544,  "replies": []  } | {  "comment": "meticulous",  "rating": 4.52,  "provider": {  "first\_name": "Kelly",  "last\_name": "Washburn",  "key": 5649050225344512  },  "username": "watsokel",  "status": "200 - OK",  "key": 5649391675244544,  "replies": []  } |
| empty,  no id provided in URI | DELETE | /review | Accept: application/json  Content-Type: application/x-www-form-urlencoded | None | {  "status": "400 -Invalid. No review id provided."  } | {  "status": "400 -Invalid. No review id provided."  } |
| basic, delete existing record | DELETE | /review/5649391675244544 | Accept: application/json  Content-Type: application/x-www-form-urlencoded | None | {  "status": "200 - Delete review successful."  } | {  "status": "200 - Delete review successful."  } |
| duplicate,  delete already deleted record | DELETE | /review/5649391675244544 | Accept: application/json  Content-Type: application/x-www-form-urlencoded | None | {  "status": "400 - Invalid input. Unable to delete entity. No match for review id."  } | {  "status": "400 - Invalid input. Unable to delete entity. No match for review id."  } |
| basic, invalid id | DELETE | /review | Accept: application/json  Content-Type: application/x-www-form-urlencoded | None | {  "status": "400 - Invalid input. Unable to delete entity. No match for review id."  } | {  "status": "400 - Invalid input. Unable to delete entity. No match for review id."  } |

1 All URI’s in the table above are preceded by <http://malenah-api.com>

Base URI: http://malenah-api.com/**reply**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Type | HTTP Request | URI1 | HTTP request header | HTTP request body | Expected Outcome | Actual Outcome |
| empty  datastore | GET | /reply | Accept: application/json  Content-Type: application/x-www-form-urlencoded | None | {  "status": "200 - OK. No replies currently in database."  } | {  "status": "200 - OK. No replies currently in database."  } |
| empty  datastore | GET | /reply/ | Accept: application/json  Content-Type: application/x-www-form-urlencoded | None | {  "status": "200 - OK. No replies currently in database."  } | {  "status": "200 - OK. No replies currently in database."  } |
| empty  datastore,  invalid id | GET | /reply/123 | Accept: application/json  Content-Type: application/x-www-form-urlencoded | None | {  "status": "400 - No match for reply id."  } | {  "status": "400 - No match for reply id."  } |
| basic,  existing id | GET | /reply/ | Accept: application/json  Content-Type: application/x-www-form-urlencoded | None | [  {  "username": "farah",  "comment": "painless experience",  "review": 5639445604728832,  "key": 5144752345317376,  "provider": 5649050225344512  },  {  "username": "watsokel",  "comment": "agreed!",  "review": 5707702298738688,  "key": 5066549580791808,  "provider": 5629499534213120  }  ] | [  {  "username": "farah",  "comment": "painless experience",  "review": 5639445604728832,  "key": 5144752345317376,  "provider": 5649050225344512  },  {  "username": "watsokel",  "comment": "agreed!",  "review": 5707702298738688,  "key": 5066549580791808,  "provider": 5629499534213120  }  ] |
| basic,  invalid id | GET | /reply/123 | Accept: application/json  Content-Type: application/x-www-form-urlencoded | None | {  "status": "400 - No match for reply id."  } | {  "status": "400 - No match for reply id."  } |
| basic, empty datastore (empty body) | POST | /reply | Accept: application/json  Content-Type: application/x-www-form-urlencoded | None | {  "status": "400 - Invalid input: missing properties."  } | {  "status": "400 - Invalid input: missing properties."  } |
| basic, empty datastore (first post) | POST | /reply | Accept: application/json  Content-Type: application/x-www-form-urlencoded | username: farah  comment: some comment str!  review: 5639445604728832  provider: 5649050225344512 | {  "comment": "some comment str!",  "username": "farah",  "review": {  "key": 5639445604728832  },  "status": "200 - OK",  "key": 5629499534213120,  "provider": {  "first\_name": "Kelly",  "last\_name": "Washburn",  "key": 5649050225344512  }  } | {  "comment": "some comment str!",  "username": "farah",  "review": {  "key": 5639445604728832  },  "status": "200 - OK",  "key": 5629499534213120,  "provider": {  "first\_name": "Kelly",  "last\_name": "Washburn",  "key": 5649050225344512  }  } |
| basic, missing required fields | POST | /reply | Accept: application/json  Content-Type: application/x-www-form-urlencoded | username: farah  comment: some comment str!  review:  provider: 5649050225344512 | {  "status": "400 - Invalid input: missing properties."  } | {  "status": "400 - Invalid input: missing properties."  } |
| basic, invalid review id | POST | /reply | Accept: application/json | username: farah  comment: some comment str!  review: 1  provider: 5649050225344512 | {  "status": "400 - Invalid input: no match for Review id. Please double check Provider id."  } | {  "status": "400 - Invalid input: no match for Review id. Please double check Provider id."  } |
| basic, invalid provider id | POST | /reply/ | Content-Type: application/x-www-form-urlencoded | username: farah  comment: some comment str!  review: 5639445604728832  provider: 1 | {  "status": "400 - Invalid input: no match for Provider id. Please double check Provider id."  } | {  "status": "400 - Invalid input: no match for Provider id. Please double check Provider id."  } |
| empty, no id provided in URI | PUT | /reply | Accept: application/json  Content-Type: application/x-www-form-urlencoded | username: maxine  comment: my comment  review 4626744929681408  provider: 5998935441145856 | {  "status": "400 - Invalid. No reply id provided."  } | {  "status": "400 - Invalid. No reply id provided."  } |
| empty,  missing properties | PUT | /reply/5629499534213120 | Accept: application/json  Content-Type: application/x-www-form-urlencoded | username: maxine  comment: my comment  review  provider: 5998935441145856 | {  "status": "400 - Invalid input: missing properties."  } | {  "status": "400 - Invalid input: missing properties."  } |
| basic, modify existing record | PUT | /reply/5629499534213120/ | Accept: application/json  Content-Type: application/x-www-form-urlencoded |  | {  "comment": "my comment string",  "username": "maxine",  "review": {  "key": 5639445604728832  },  "status": "200 - OK",  "key": 5629499534213120,  "provider": {  "first\_name": "Kelly",  "last\_name": "Washburn",  "key": 5649050225344512  }  } | {  "comment": "my comment string",  "username": "maxine",  "review": {  "key": 5639445604728832  },  "status": "200 - OK",  "key": 5629499534213120,  "provider": {  "first\_name": "Kelly",  "last\_name": "Washburn",  "key": 5649050225344512  }  } |
| empty,  no id provided in URI | DELETE | /reply | Accept: application/json  Content-Type: application/x-www-form-urlencoded | None | {  "status": "400 - Invalid. No reply id provided."  } | {  "status": "400 - Invalid. No reply id provided."  } |
| basic, delete existing record | DELETE | /reply/5707702298738688/ | Accept: application/json  Content-Type: application/x-www-form-urlencoded | None | {  "status": "200 - Delete reply successful."  } | {  "status": "200 - Delete reply successful."  } |
| duplicate,  delete already deleted record | DELETE | /reply/5707702298738688/ | Accept: application/json  Content-Type: application/x-www-form-urlencoded | None | {  "status": "400 - Invalid input. Unable to delete entity. No match for reply id."  } | {  "status": "400 - Invalid input. Unable to delete entity. No match for reply id."  } |
| basic, invalid id | DELETE | /reply | Accept: application/json  Content-Type: application/x-www-form-urlencoded | None | {  "status": "400 - Invalid input. Unable to delete entity. No match for reply id."  } | {  "status": "400 - Invalid input. Unable to delete entity. No match for reply id."  } |

1 All URI’s in the table above are preceded by <http://malenah-api.com>

**Deletion of Reply entity removes its reference as well**

The following screen shots of Postman and the Google App Engine Administrator Console show that when a correctly formed HTTP delete request is sent to my web application for a Reply entity, the result is that the entity and references to it are deleted.

|  |  |
| --- | --- |
| Postman HTTP Delete Request | Google Cloud Administrator Console before and after |
|  | Before (4 Reply entities) |
| After (3 Reply entities) Notice that the Reply entity with id 5668600916475904 has been removed |

Explanation of Failed Tests

All tests pass, except for routes that are not handled by the web application. These include alphabetic characters entered into the URI’s provider ID, review ID, or reply ID fields. For instance, the addition of the ‘a’ character results in a route that is not handled by the application, as shown in one of the test results below.

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Type** | **HTTP Request** | **URI1** | **HTTP request header** | **HTTP request body** | **Expected Outcome** | **Actual Outcome** |
| basic  **invalid id** | DELETE | /provider/123 | Accept: application/json  Content-Type: application/x-www-form-urlencoded | None | **404 Not Found**  **The resource could not be found.** | **404 Not Found**  **The resource could not be found.** |
| basic  **invalid URI** | GET | http://malenah-api.appspot.com/provider/review | Accept: application/json  Content-Type: application/x-www-form-urlencoded | None | **404 Not Found**  **The resource could not be found.** | **404 Not Found**  **The resource could not be found.** |

The screen capture below of the code shows the regular expressions that determine which handler the request will be routed to. Note that the API only evaluates numeric inputs for pid (provider ID), revid (review ID), and repid (reply ID).



Testing

**Sources/Citations**

[**http://stackoverflow.com/questions/4007969/application-x-www-form-urlencoded-or-multipart-form-data**](http://stackoverflow.com/questions/4007969/application-x-www-form-urlencoded-or-multipart-form-data)