

## Software Test Documentation

Testing has been carried out using Postman to send HTTP requests to the API's endpoints.

Before testing, ensure that the latest version of the Docker container is being used ( `` docker pull coreyrichardson1/trails-api` , ` docker run -p 8000:8000 coreyrichardson1/trails-api` ) and that you are connected to the University of Plymouth network, either directly or through the FortiClient VPN.`

Testing was carried out on a fresh, empty instance of the schema using files *Schema\DROP.sql*, *Schema\init.sql* and *Schema\VIEW.sql*.

Test	Request Body	Expected Response	Actual Response
<b>Check that frontend displays content as expected.</b>			
http://localhost:8000/	N/A	Ensure <a href="http://localhost:8000/">http://localhost:8000/</a> displays a box with a summary of the application and a navigation link to the Swagger UI page.	As expected.
http://localhost:8000/api/ui/	N/A	Ensure <a href="http://localhost:8000/api/ui/">http://localhost:8000/api/ui/</a> displays the API documentation, with section tags for Authentication, Features, Points, Trails, Trail-Feature Links and Users.	As expected.
<b>Test that GET/READ endpoints don't require authentication.</b>			
A GET request to <i>/feature</i> returns OK.	N/A	200 OK []	200 OK []
A GET request to <i>/feature/1</i> returns NOT FOUND.	N/A	404 NOT FOUND { "detail": ..., "status": 404, "title": "Not Found", "type": ... }	404 NOT FOUND { "detail": ..., "status": 404, "title": "Not Found", "type": ... }

A GET request to <i>/point</i> returns OK.	N/A	200 OK	200 OK
A GET request to <i>/point/1</i> returns NOT FOUND.	N/A	404 NOT FOUND	404 NOT FOUND
A GET request to <i>/trail</i> returns OK.	N/A	200 OK	200 OK
A GET request to <i>/trail/1</i> returns NOT FOUND.	N/A	404 NOT FOUND	404 NOT FOUND
A GET request to <i>/trail-feature</i> returns OK.	N/A	200 OK	200 OK
A GET request to <i>/trail-feature/1/features</i> returns NOT FOUND.	N/A	404 NOT FOUND	404 NOT FOUND
A GET request to <i>/trail-feature/1/1</i> returns NOT FOUND.	N/A	404 NOT FOUND	404 NOT FOUND
<b>Test that GET endpoints associated with User objects ARE protected and require authentication.</b>			
A GET request to <i>/user</i> is blocked.	N/A	401 UNAUTHORIZED	401 UNAUTHORIZED
A GET request to <i>/user/1</i> returns UNAUTHORIZED.	N/A	401 UNAUTHORIZED	401 UNAUTHORIZED
<b>Test that the <i>/login</i> endpoint returns a JWT token on POST of valid credentials.</b>			
Authentication highlights missing credentials.	{ "email" : "john.doe@example.com" }	400 BAD REQUEST	400 BAD REQUEST
Authentication rejects invalid credentials.	{ "email" : "john.doe@example.com", "password" : "Password123!" }	401 UNAUTHORIZED	401 UNAUTHORIZED
Authentication returns JWT token on post of valid credentials.	{ "email" : "grace@plymouth.ac.uk", "password" : "ISAD123!" }	200 OK	<b>500 INTERNAL SERVER ERROR</b>  "AttributeError: module 'jwt' has no attribute 'encode'" Caused by a naming conflict between PIP modules 'jwt' and 'PyJWT'.
^	^	200 OK	200 OK

		{ "token": "x.y.z" }	{ "token": "x.y.z" }
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{ "token": "x.y.z" }
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The authentication endpoint returns a JSON Web Token (JWT) which can be passed into the *Authorization* header of a request to allow access to Create, Update and Delete operations via POST, PUT and DELETE HTTP requests. Using Postman, this header can either be manually set as a Custom Header or it can be provided in the *Authorization* tab as a *Bearer Token*. With the Authorization header set, protected endpoints will now be accessible.

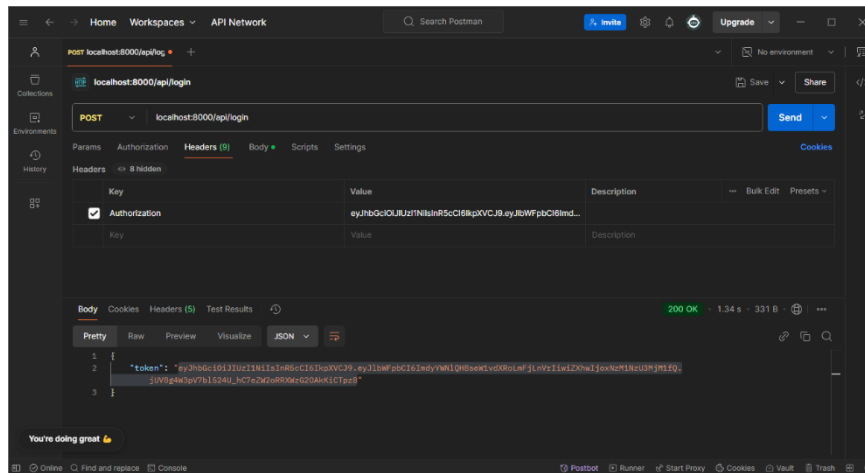


Figure 1: Custom Authorization Header

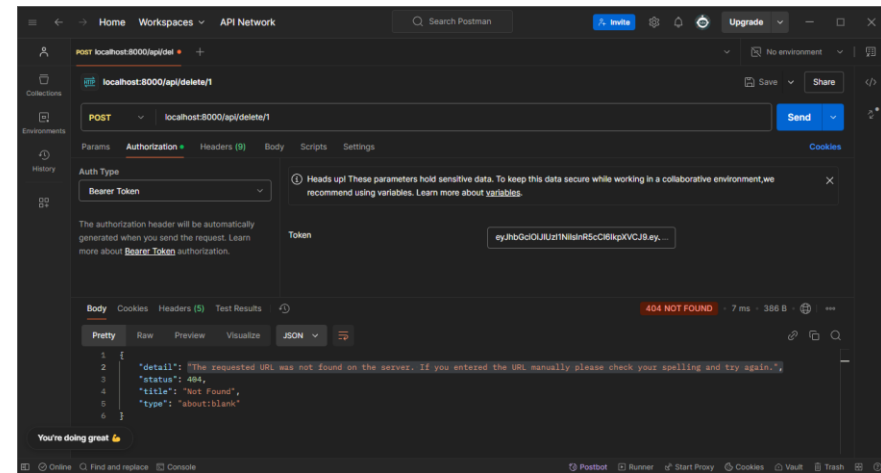


Figure 2: Authorization > Auth Type > Bearer Token

Test	Request Body	Expected Response	Actual Response
<b>Check user was added to the User table during authentication.</b>			
A GET request to <i>/user</i> shows that “grace@plymouth.ac.uk” is present in the table with the role “ADMIN”.	N/A	200 OK JSON List containing User	200 OK [ { "email": "grace@plymouth.ac.uk", "id": 1, "role": "ADMIN" } ]
A GET request to <i>/user/1</i> returns “grace@plymouth.ac.uk”	N/A	200 OK JSON Object containing User	200 OK { "email": "grace@plymouth.ac.uk", "id": 1,

			"role": "ADMIN" }
Test	Request Body	Expected Response	Actual Response
<b>Test Feature Endpoints</b>			
A POST request to <i>/feature</i> creates a new Feature and adds it to the database.	{ "feature" : "Aeroporto" }	201 CREATED	201 CREATED
A PUT request to <i>/feature/1</i> will update a Feature's attributes.	{ "feature" : "Airport" }	200 OK	200 OK
A GET request to <i>/feature</i> returns a single Feature from the database.	N/A	200 OK	200 OK
A DELETE request to <i>/feature/1</i> deletes a Feature from the database.	N/A	204 NO CONTENT	204 NO CONTENT
A GET request to <i>/feature</i> returns an empty JSON list.	N/A	200 OK	200 OK
<b>Test Point Endpoints</b>			
A POST request to <i>/point</i> creates a new Point and adds it to the database.	{ "latitude": 50.423698, "longitude": -4.110593, "description": "Point 1" }	201 CREATED	201 CREATED
A POST request to <i>/point</i> rejects a new Point if the next or previous linked Points don't exist.	{ "latitude": 50.420222, "longitude": -4.099503, "description": "Point 2", "next_point_id": 100, "previous_point_id": 98 }	404 NOT FOUND	404 NOT FOUND
A PUT request to <i>/point/1</i> will update a Point's attributes.	{ "latitude": 50.424958,	200 OK	200 OK

	"longitude": -4.108179 }		
A GET request to <i>/point</i> returns a single Point from the database.	N/A	200 OK	200 OK
A DELETE request to <i>/point/1</i> deletes a Point from the database.	N/A	204 NO CONTENT	204 NO CONTENT
A GET request to <i>/point</i> returns an empty JSON List.	N/A	200 OK	200 OK
<b>Test Trail Endpoints</b>			
A POST request to <i>/trail</i> creates a new Trail and adds it to the database.	{ "author_id": 1, "description": "Trail description", "difficulty": "Easy", "elevation_gain": 10, "length": 100.5, "location": "Plymouth, UK", "name": "Trail name", "route_type": "Loop", "summary": "string" }	201 CREATED	201 CREATED
A POST request to <i>/trail</i> rejects a new Trail if the Starting Point doesn't exist.	{ "author_id": 1, "description": "Trail description", "difficulty": "Easy", "elevation_gain": 10, "length": 100.5, "location": "Plymouth, UK", "name": "Trail name", "route_type": "Loop", "summary": "string", "starting_point_id": 100 }	404 NOT FOUND	404 NOT FOUND

A POST request to <i>/trail</i> rejects a new Trail if the Difficulty isn't in the enumerated type.	{ "author_id": 1, "description": "Trail description", "difficulty": "Super Duper Tricky", "elevation_gain": 10, "length": 100.5, "location": "Plymouth, UK", "name": "Trail name", "route_type": "Loop", "summary": "string" }	400 BAD REQUEST	400 BAD REQUEST  'Super Duper Tricky' is not one of ['Easy', 'Moderate', 'Hard'] - 'difficulty'
A POST request to <i>/trail</i> rejects a new Trail if the Route Type isn't in the enumerated type.	{ "author_id": 1, "description": "Trail description", "difficulty": "Easy", "elevation_gain": 10, "length": 100.5, "location": "Plymouth, UK", "name": "Trail name", "route_type": "Circular", "summary": "string" }	400 BAD REQUEST	400 BAD REQUEST  'Circular' is not one of ['Loop', 'Out & back', 'Point to point'] - 'route_type'
A PUT request to <i>/trail/1</i> will update a Trail's attributes.	{ "summary": "Updated Trail Summary" }	200 OK	200 OK
A GET request to <i>/trail</i> returns a single Trail from the database.	N/A	200 OK	200 OK
A DELETE request to <i>/trail/1</i> deletes a Trail from the database.	N/A	204 NO CONTENT	204 NO CONTENT

A GET request to <i>/trail</i> returns an empty JSON List.	N/A	200 OK	200 OK
<b>Test Trail-Feature Link Endpoints</b>			
Create a temporary Trail using a POST request to <i>/trail</i> to use to test the Trail-Feature link.	{ "author_id": 1, "description": "There and Back Again", "difficulty": "Hard", "elevation_gain": 3500, "length": 950, "location": "Middle Earth", "name": "A Quest to Slay a Dragon", "route_type": "Out & back", "summary": "Trail Summary" }	201 CREATED	401 UNAUTHORIZED (Token expired!)  201 CREATED  Returned ID: 2
Create a temporary Feature using a POST request to <i>/feature</i> to use to test the Trail-Feature link. #1	{ "feature": "Trolls" }	201 CREATED	201 CREATED  Returned ID: 3
Create a temporary Feature using a POST request to <i>/feature</i> to use to test the Trail-Feature link. #2	{ "feature": "Dragons" }	201 CREATED	201 CREATED  Returned ID: 4
A POST request to <i>/trail-feature</i> creates a link between a Trail and a Feature. #1	{ "trail_id": 2, "feature_id": 3 }	201 CREATED	201 CREATED
A PUT request to <i>/trail-feature/2/3</i> updates a link between a Trail and a Feature	{ "feature_id": 4 }	200 OK	200 OK
A POST request to <i>/trail-feature</i> creates a link between a Trail and a Feature. #2	{ "trail_id": 2, "feature_id": 3 }	201 CREATED	201 CREATED

A GET request to <i>/trail-feature/2/features</i> returns a JSON list with two <i>Features</i> .	N/A	200 OK	200 OK
A DELETE request to <i>/trail-feature/2/3</i> removes a link between a Trail and a Feature.	N/A	204 NO CONTENT	204 NO CONTENT
A GET request to <i>/trail-feature</i> returns a JSON list with a single Trail-Feature Link.	N/A	200 OK	200 OK
A DELETE request to <i>/trail-feature/2/4</i> removes a link between a Trail and a Feature.	N/A	204 NO CONTENT	204 NO CONTENT
Delete the temporary Trail using a DELETE request to <i>/trail/2</i> .	N/A	204 NO CONTENT	204 NO CONTENT
Delete a temporary Feature using a DELETE request to <i>/feature/3</i> .	N/A	204 NO CONTENT	204 NO CONTENT
Delete a temporary Feature using a DELETE request to <i>/feature/4</i> .	N/A	204 NO CONTENT	204 NO CONTENT
<b>Test User Endpoints</b>			
A POST request to <i>/user</i> creates a new User and adds them to the database.	{ "email": "john.doe@example.com", "role": "USER" }	201 CREATED	201 CREATED
A PUT request to <i>/user/3</i> will reject an update on a User's attributes if the role isn't in the enumerated type.	{ "role": "ADMINISTRATOR" }	400 BAD REQUEST	400 BAD REQUEST
A PUT request to <i>/user/3</i> will update a User's attributes.	{ "role": "ADMIN" }	200 OK	200 OK
A GET request to <i>/user/3</i> returns a single User from the database.	N/A	200 OK	200 OK



A DELETE request to <i>/user/3</i> deletes a User from the database.	N/A	204 NO CONTENT	204 NO CONTENT
A GET request to <i>/user</i> returns a single User: "grace@plymouth.ac.uk".	N/A	200 OK	200 OK
<b>Test the Trail Creation Workflow</b>			
Create a series of Points using POST requests to <i>/point</i> .	{ "latitude": 50.423698, "longitude": -4.110593, "description": "Point 1" }	200 OK	200 OK  Returned ID: 3
	{ "latitude": 50.424958, "longitude": -4.108179, "description": "Point 2" }	200 OK	200 OK  Returned ID: 4
	{ "latitude": 50.420222, "longitude": -4.099503, "description": "Point 3" }	200 OK	200 OK  Returned ID: 5
	{ "latitude": 50.422134, "longitude": -4.113191, "description": "Point 4" }	200 OK	200 OK  Returned ID: 6
	{ "latitude": 50.424262, "longitude": -4.109453, "description": "Point 5" }	200 OK	200 OK  Returned ID: 7

Link a series of Points using PUT requests to <i>/point/{point_id}</i> .	<i>/point/3</i> <pre>{   "next_point_id": 4,   "previous_point_id": 7 }</pre>	200 OK	200 OK
	<i>/point/4</i> <pre>{   "next_point_id": 5,   "previous_point_id": 3 }</pre>	200 OK	200 OK
	<i>/point/5</i> <pre>{   "next_point_id": 6,   "previous_point_id": 4 }</pre>	200 OK	200 OK
	<i>/point/6</i> <pre>{   "next_point_id": 7,   "previous_point_id": 5 }</pre>	200 OK	200 OK
	<i>/point/7</i> <pre>{   "next_point_id": 3,   "previous_point_id": 6 }</pre>	200 OK	200 OK

Create a Trail using a POST request to <i>/trail</i> using Point 3 as the <i>starting_point_id</i> . This trail is a Loop.	{ "author_id": 1, "starting_point_id": 3, "name": "Plymouth Airport Runway", "summary": "A walk that follows Plymouth Airports runway", "description": "This trail follows the Plymouth airport runway. Not technically legal to walk this one.", "difficulty": "Easy", "location": "Plymouth, UK", "length": 5.0, "elevation_gain": 1, "route_type": "Loop" }	201 CREATED	201 CREATED  Returned ID: 3
Create a Feature using a POST request to <i>/feature</i> .	{ "feature": "Runway Walk" }	201 CREATED	201 CREATED  Returned ID: 5
Link the created Trail and Feature using a POST request to <i>/trail-feature</i> .	{ "trail_id": 3, "feature_id": 5 }	201 CREATED	201 CREATED
Send a GET request to <i>/trail-feature/3/features</i> to confirm the link has been created.	N/A	200 OK	200 OK  [ { "feature": "Runway Walk", "id": 5 } ]

