

Postman

Part 1: Basic Concepts

- Part 1 Agenda

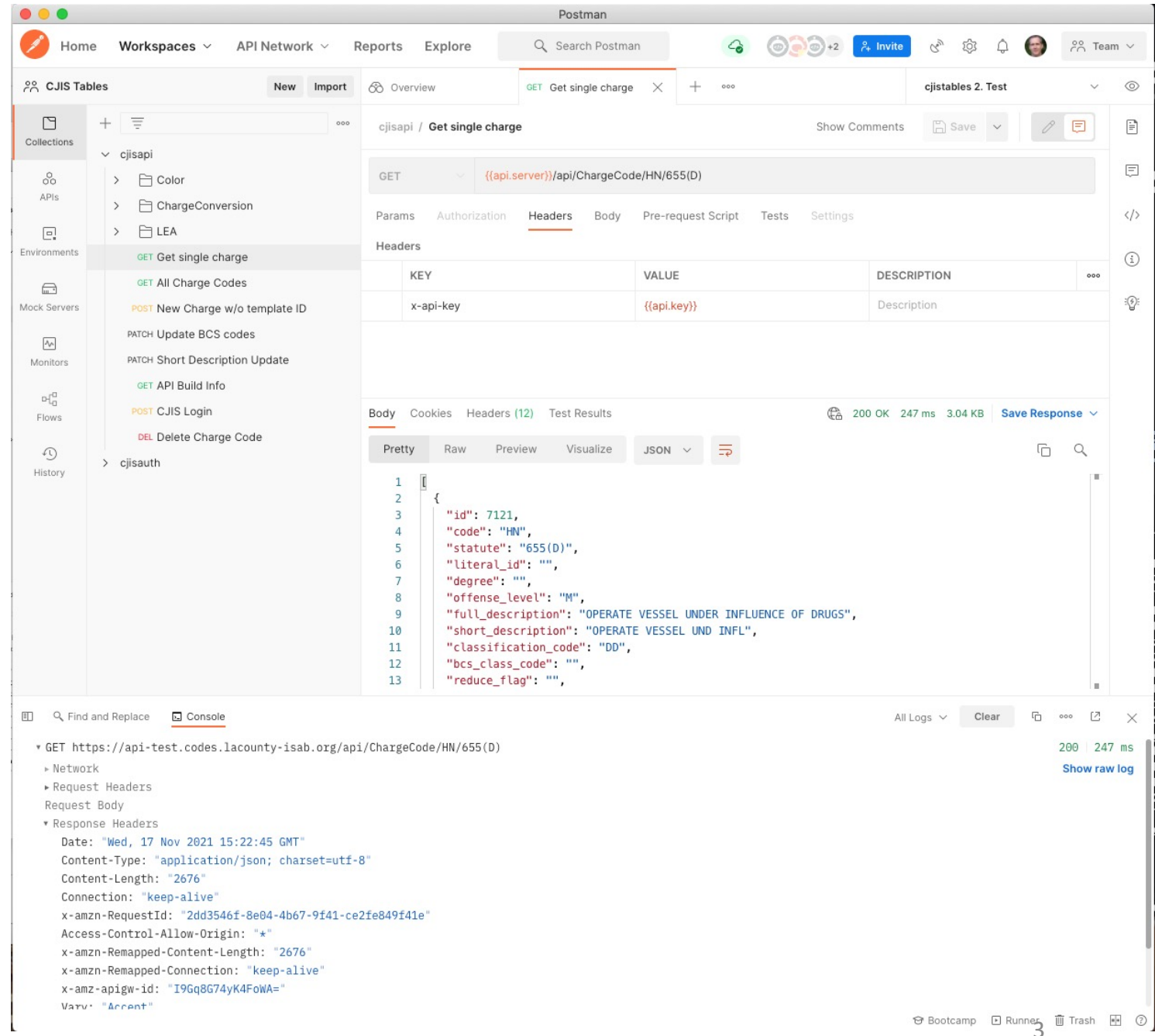
- Postman Overview
- Native App vs Web
- Workspaces
- Collections
- Environments

- Assumptions – you

- ✓ are involved with API development as a
 - provider,
 - consumer, or
 - analyst;
- ✓ understand the role that Postman plays in API testing;
- ✓ understand the difference between a web application and a workstation application;
- ✓ have a Postman account.

What is Postman

- A Web API testing tool
 - Configure all details of a request
 - Inspect all details of a response
 - Organize requests
 - Multi-environment support
- Other features
 - Mock Servers
 - OpenAPI interface specifications
 - Private API Network
 - Team Support



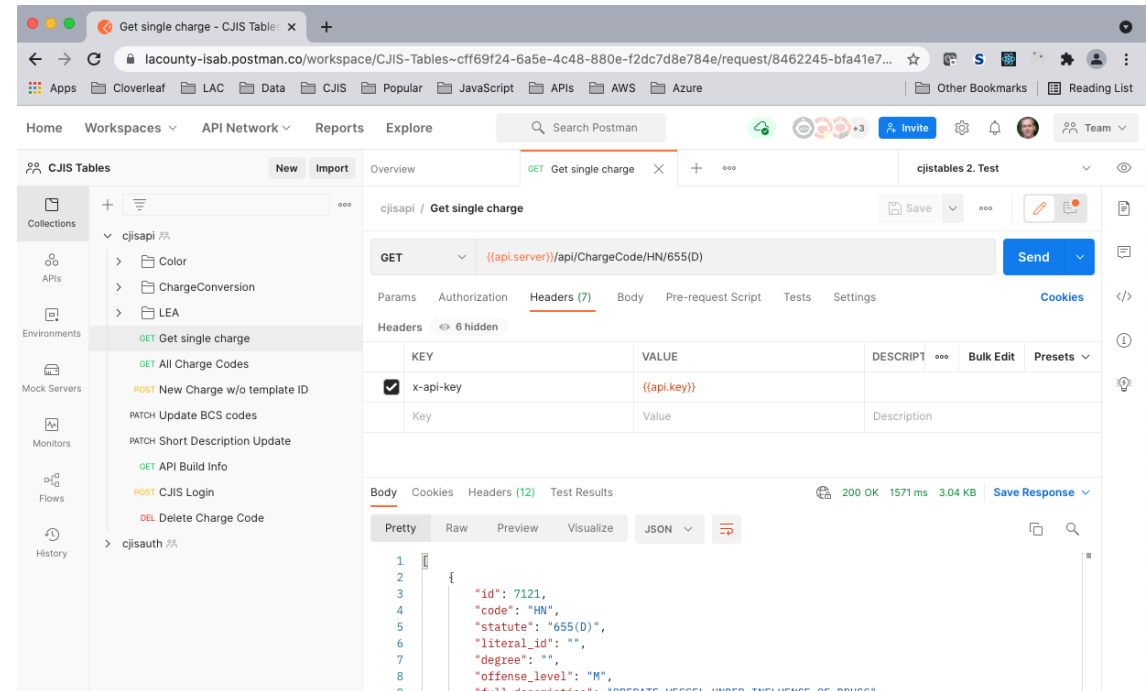
Native vs Web Application

The native and web Postman applications are almost identical. The primary difference is that the web application runs in a browser tab. As such, the web application is prone to

- getting lost among other browser tabs,
- user accidentally navigates away from the app,
- user accidentally closes the tab.

The native application has direct access to your machine's file system and network sockets.

But the browser has the advantage of being better integrated with network perimeter security.



Using Postman as a web application in a browser tab

Quick Dive

The quickest way to get a feel for the Postman UI is just to use it for some simple scenarios.

Exercise 1 – Workspaces and collections

Exercise 2 – Making changes

Exercise 3 – Managing environments

Exercise 4 – Managing Headers

Exercise 5 – Documentation and Comments

Exercises 6 – 10 – Full Scenario (Part 2)

The exercises use a pair of API keys and a sample account. These values are located in the MS Teams **Postman** channel. Select the **Info** wiki and then the **Credentials** page. It might help if you open that right now for reference.



Photo by [Ryoji Hayasaka](#) on [Unsplash](#)

Exercise 1 – Workspaces and Collections

The goal of this exercise is to quickly obtain hands-on experience with the fundamental Postman concepts of a *workspace* and a *collection*.

1. Open Postman, either the native application or the web application.
2. Create a new workspace by selecting the **Workspaces** dropdown and selecting **Create Workspace**.
 - a) For **Name** enter: ISAB Workshop 1
 - b) For **Summary** enter: First workspace for Postman workshop
 - c) For **Visibility** select **Personal**.
 - d) Click **Create Workspace** button. This should create a new empty workspace.
3. Underneath the summary, click your mouse in the **Description** area. When empty, it contains placeholder text. Add the following description and click **Save**.

Used for **private** workshop experimentation. Will likely be ****deleted**** after the workshop.
Markdown descriptions support

- * bullet lists
- * ``monospace font`` entries
- * [links to other pages] (<https://workshops.lacounty-isab.org>)

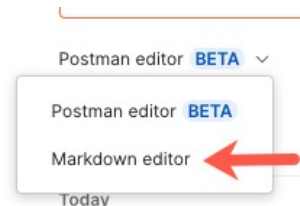
and other basic formatting.



Learn Markdown

Markdown has become the de facto formatting syntax for web documentation. For more information on markdown and its syntax, see the following links.

- <https://daringfireball.net/projects/markdown/basics>
- <https://guides.github.com/features/mastering-markdown/>



Exercise 1 – Continued


4. Select **Collections** from the left navbar and click **Create Collection**. Name the new collection **Samples**.
5. Click the "..." next to the collection name in the collection hierarchy and select **Add folder**. Name the new folder **Postman** and add, as documentation, "Sample APIs hosted by Postman".
6. Click the "..." next to the new folder and select **Add Request**. Name the request **Echo** and leave the method as **GET**. enter a request URL of `https://postman-echo.com/get`.
7. Click the big blue **Send** button to invoke the sample API. It should return the request header values as a JSON object. Save the request.
8. Using the same process, create another top-level folder called **CJIS Tables**.
9. Add a new request named *Charge 826*.
10. Leave the method as **GET** and add a URL of `https://api.codes.lacounty-isab.org/api/ChargeCode/826`.
11. Click **Send**. The HTTP response code should be *403 Forbidden*. We'll fix this later. Save the request.

In this exercise you

- created a new personal workspace
- created a new collection
- created multiple folders
- created multiple GET requests
- observed different HTTP status codes
 - 200 – "success"
 - 403 – "forbidden"

Exercise 2 – Changing Environments

This exercise continues where the previous exercise ended – with the *Charge 826* request.

1. Change the URL request field of the request to invoke the TEST API instead of PROD by changing `api.codes` to `api-test.codes` in the URL field.
2. Send the request with the **Send** button. You should see the same 403 response as you did for PROD.
3. Select the **Authorization** tab in the request section for adding an API key. The type defaults to *Inherit auth from parent*. In this case, the parent is the **CJIS Tables** folder. Since the same API key will work across all requests, it makes sense to configure authorization at the folder level to avoid duplicating it across several requests.
4. Select the parent folder, **CJIS Tables**, and the **Authorization** tab within it. Notice that it, too, is configured to *Inherit auth from parent*. But since this authorization doesn't apply to the other folders (like the Postman folder), we'll configure the authorization here.
5. From the dropdown box, select **API Key**.
6. For the **Key** field, enter `x-api-key`
7. For the **Value** field, enter the TEST API key. This will add the API key to the header.
8. Save the folder settings.
9. Go back to the *Charge 826* request tab and send the request. It should be successful.
10. Now change the URL back to the PROD URL, i.e. change `api-test` back to `api` and try again. 

The request should fail. That's because we still have the TEST API key configured in the folder authorization. Changing environments is no longer as simple as changing the URL. Now we must change the URL **and** the authorization. As our API becomes more realistic, these environment differences grow cumbersome to swap. **Environment configurations** address this.

Exercise 3 – Managing Environments

In the previous exercise, we saw that switching between environments can become cumbersome as the number of environmental dependencies grow. This exercise will demonstrate how **Postman environments** address this.

1. Select **Environments** from the left navbar. So far, we should have no environments defined.
2. Click the plus symbol, **+**, at the top-left of the (empty) environment list to create a new environment.
3. Name the new environment **Test**. It is displayed as a table of values.
4. For the first row of the table, make the following entries:
 - a. **Variable:** `baseUrl`
 - b. **Initial Value:** `https://api-test.codes.lacounty-isab.org`

The Current Value should be filled automatically with the Initial Value. If not, make sure it is.

- a. **Variable:** `apikey`
 - b. **Initial Value:** `Your API Key`
 - c. **Current Value:** `<Test API key>`
6. **Save** the environment.

You can see that each Postman environment variable contains two values:

- **Initial Value** – visible to **all** members of the workspace
- **Current Value** – used by **your** workspace

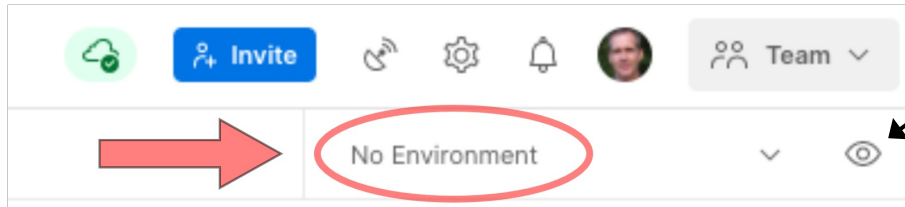
Test		Your team sees these values		Only you can see these  Fork
	VARIABLE	TYPE ⓘ	INITIAL VALUE ⓘ	CURRENT VALUE ⓘ
<input checked="" type="checkbox"/>	baseUrl	default ▾	https://api-test.codes.lacounty-isab.org	https://api-test.codes.lacounty-isab.org
<input checked="" type="checkbox"/>	apikey	default ▾	Your API Key	Your Test Environment's API Key

The **Type** column allows you to obscure the values for a row by setting selecting **secret**. This may be useful if you are sharing your screen with people outside your team.

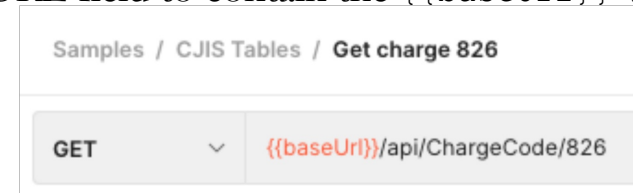
Exercise 3 (continued)

7. Create a new environment with the **+** button again.
8. Name the new environment **Production**.
9. Add the **baseUrl** variable with an initial value of `https://api.codes.lacounty-isab.org`.
10. Save the environment (we're not adding an API key yet).
11. Close the **Test** and **Production** environment tabs from your workspace and select the **CJIS Tables** folder. It should still have the **Authorization** section selected.
12. Change the **Value** field to `{{apikey}}`.

At this point, the value should appear in red. This is because it's not defined for the current environment. In fact, there is no current environment.



13. From the environment list in the upper-right corner, select **Test**. At this point, the `{{apikey}}` value you provided in Step 12 should turn from red to orange. This indicates this value can be read from the current environment.
14. Save the folder tab and select the *Charge 826* tab.
15. Change the URL field to contain the `{{baseUrl}}` variable.
16. Now send the request. You should see the result from the CJIS Tables TEST environment.
17. Select **Production** from the environment list.
18. Send another request to verify the request fails due to the fact we didn't set the API key for this environment.
19. Verify the environment values by clicking the "eye" icon.



Production			Edit
VARIABLE	INITIAL VALUE	CURRENT VALUE	
baseUrl	https://api.codes.lacounty-isab.org	https://api.codes.lacounty-isab.org	

Exercise 3 (conclusion)

20. We can see from the environment view that we're missing the API key. Rather than navigating back to the environment section to edit the current environment, just click the **Edit** link in the viewer.
21. Add the API key like before, using the production value instead of the test value.
 - a. **Variable:** apikey
 - b. **Initial Value:** Your PROD API key
 - c. **Current Value:** <PROD API key>
22. **Save** the environment.
23. Return to the *Charge 826* tab and send the request. This should return the production result since the **Production** environment should still be selected.
24. Select the **Test** environment and re-run.
25. Select *No Environment* and re-run.

Postman environments are important for

- keeping your workspace organized by reducing the need to duplicate requests for different environments
- tracking which values are environment-specific
- limiting the visibility of sensitive environment variables.

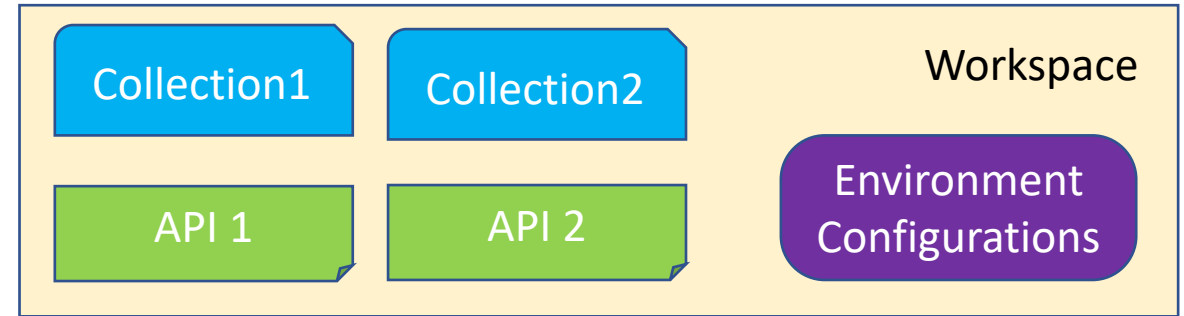
This last point is not as apparent for a **private** workspace. In team workspaces it allows developers to keep their keys, tokens and passwords confidential.

A set of environment definitions is scoped to a workspace. Each workspace has its own set of environment definitions.

Test		Your team sees this	Only you can see this
	VARIABLE	INITIAL VALUE ⓘ	CURRENT VALUE ⓘ
<input checked="" type="checkbox"/>	baseUrl	https://api-test.codes.lacounty-isab.org	https://api-test.codes.lacounty-isab.org
<input checked="" type="checkbox"/>	apikey	Your API key	[REDACTED]

Concept Review

- **Workspace** – a unit of access control
 - *Personal* workspace – Artifacts to which only you have access.
 - *Private* workspace – Only invited team members can access
 - *Team* workspace – Artifacts accessed by members of the workspace.
 - Often a team workspace starts as personal until ready to be shared; then made private or team by inviting team members.
- **Collection** – a set of request definitions
 - Can be subdivided into folders
 - Configuration variables, scripts, and authentication methods can be set at the collection, folder or request level.
 - It's common to scope a collection to an API specification.
 - A collection is defined inside a workspace. It may be copied, moved or synchronized between workspaces.



- **Environments** – Variables are defined with values particular to each environment. Variables are valid throughout the workspace.
- **API** – An OpenAPI specification (either in YAML or JSON format).
 - Provides the interface specification for your API
 - Payload formats
 - Operation methods and URIs
 - Header requirements
 - Security requirements
 - Expected response codes and their associated formats.
 - An API can be the basis for generating a collection.
 - An API is defined inside a workspace; usually the same workspace in which its associated collections are defined.

Exercise 4 – Request Headers

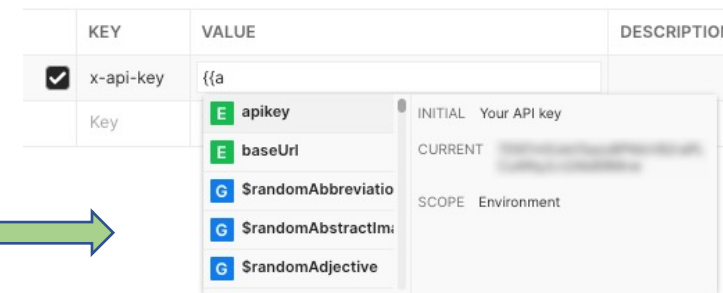
1. Change to the **Collections** view and choose the **CJIS Tables** folder. This is the folder in which we configured our API Key authorization.
2. Change the **Type** of the authorization back to *Inherit auth from parent* and **save** the change.
3. From the environment dropdown, select **Test**.
4. Go back to the *Charge 826* request and click **Send** to verify that our API key is no longer sent.
5. Select the **Headers** tab of the request definition. This should present a table of header values.
6. Add the API key to the header.
 - a. **Key:** x-api-key
 - b. **Value:** {{apikey}}
 - c. **Description:** API key for CJIS Tables

The UI provides auto-complete help that displays existing environment entries.

7. Try the request again to verify API key explicitly added to the header works the same way as when configured through the authorization tab.

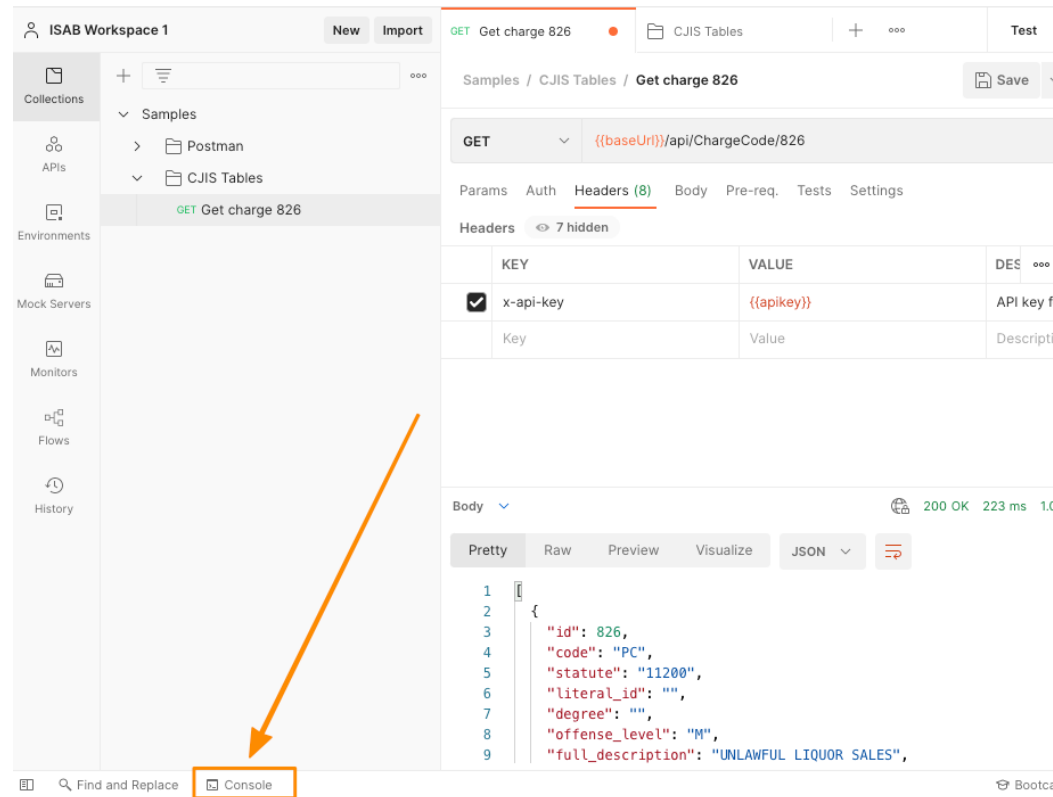
Whether we configure through the **Authorization** section or as a **Header** depends on the context.

- The Authorization section provides scope options.
- The Header gives more fine-grained control. It's the right option to use when an API key is only used for throttling purposes and a different method is used for user authorization.

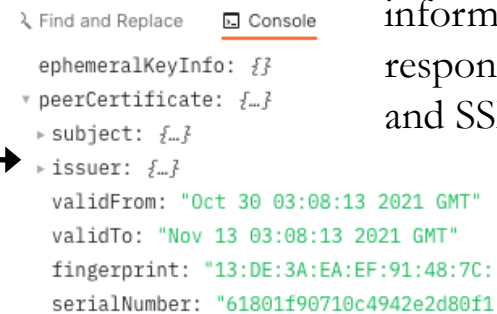
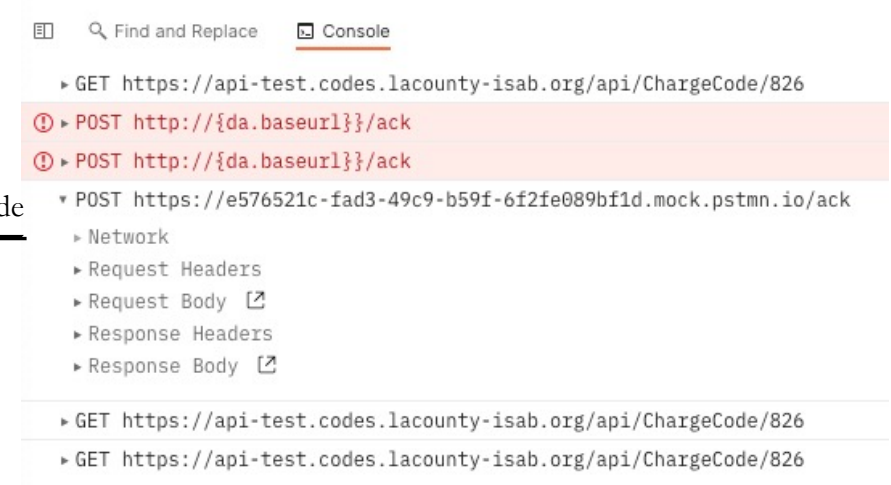


Request Details – The Console

A good amount of information about the requests and response are available within their respective panes in the UI. Many more details are available through the **Console** link.



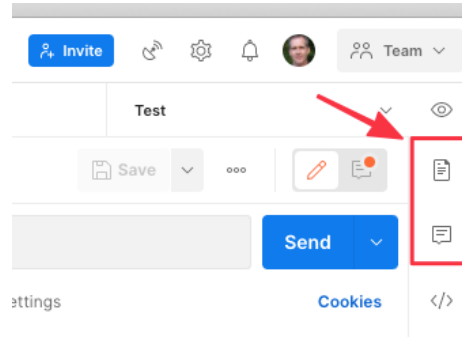
Expand the
Network node



The console provides detailed information about the request, response, network protocols and SSL certificate details.

Exercise 5 – Documentation and Comments

On the right side of the request definition, there are buttons for adding documentation and comments to a request.



1. Select the Postman Echo request we created earlier.
2. Click the **Documentation** button.
3. Click the pencil icon under the address field to active the Markdown edit box.
4. Type "This is just for getting ****started****." in the box and Save.
5. Click the **Comments** button.

6. Add something like

That's nice; but how about invoking an API of your own.

7. Click the **Add Comment** button at the bottom.

The value of documentation and comments will become more apparent in a **team workspace** setting. It keeps the conversation about the request local to the request, rather than dispersed across several email threads.

Team Workspaces

- Motivation

- Avoids export/import of requests
- Reduces errors
- Keeps API specification, documentation and requests together.
- Reduces email clutter from
 - workspace setup
 - defining new requests
 - API schema changes

- Part 2 will

- simulate a team workspace
 - can't actually share a workspace due to limited licenses
 - most private/team features are similar
 - working with multiple workspaces is the main difference
- obtain update credentials
 - issue login API call
 - store token using script
 - reference the token for update API
- use dynamic variables

Appendix: Bluecoat Root Certificate

Early in the workshop we discussed why you might need to use the web application version of Postman if you're within an LA County internal network. The network perimeter security interferes with the native application's ability to "phone home."

Another problem that may present itself is the invocation of remote APIs over HTTPS. The LA County network perimeter will terminate the connection and swap SSL server certificates with one signed by its root. But a default Postman installation will not recognize this root. The symptom of this problem is a warning in the console:

Warning: Unable to get local issuer certificate

The request may still succeed, but your API client may not be so lucky if the trust store is not properly configured.

You can remove this warning by configuring the LA County perimeter root issuer within the Postman certificate store. This process is described in this and the next slide.

The first step is to acquire a copy of the perimeter issuer certificate. A copy is attached below if you don't have one handy. Just copy the contents in the grey box below to a file named `lac-sof-root.pem`. A quick check can verify the subject.

```
openssl x509 -in lac-sof-root.pem -noout -subject  
subject=DC = COM, DC = LAC, CN = LAC-SOF-Root CA II
```

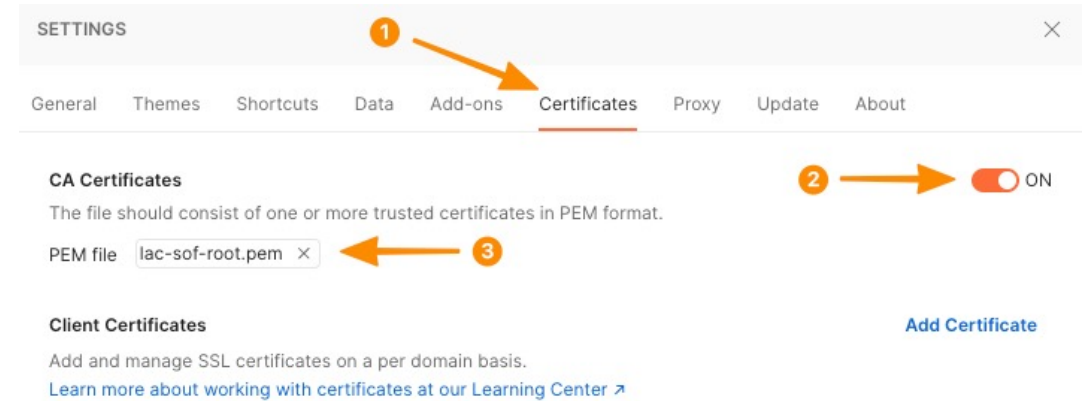
```
-----BEGIN CERTIFICATE-----  
MIIDaTCCAIGgAwIBAgIQLA+VADnZMZFE8sdynYppIDANBgkqhkiG9w0BAQsFADBH  
MRMwEQYKCZImiZPyLGQBGRYDQ09NMRMwEQYKCZImiZPyLGQBGRYDTEFDMRswGQYD  
VQQDExJMQUmtU09GLVJvb3QgQ0EgSUKwHhcNMjYxMTIxMTgyMjU5WhcNMjYxMTIx  
MTgzMjU5WjBHRMwEQYKCZImiZPyLGQBGRYDQ09NMRMwEQYKCZImiZPyLGQBGRYD  
TEFDMRswGQYDVQQDExJMQUmtU09GLVJvb3QgQ0EgSUKwggEiMA0GCSqGSIb3DQEB  
AQUAA4IBDwAwggEKAoIBAQPdpF3yIhdS7R4ElzXmqzh00SdIaXOp+GCG+gEmFk5Q  
DrdDTlzDlOQxiM+dDv49QEH+hEUSWT2ROfpXWhTp6ZO7I9M9lveCARGaMM5Zn4oX  
unG+ATDYvMQpt6n/VtHCgoY4d+KeqYPJqm8yCrLGUhlOmLJ8ZD9EQ+dcHvJKUAHC  
Ugd+CsEwQ9kd/lJpaV9dKZ88ZReIw5yJorWbNfqrgrW+AnuGpJWQEZWbZHxjl42j  
pAl1R99m3/szkCO3rN0jAtT8W0ylM9XqGuaGCB6021cGItsSl6k93A1qRf5Ms+Se  
nLtrbrwcu9/rrqsESx55wc4ArRVUMBvHAreOFcMsa3SchAgMBAAGjUTBPMAsGA1Ud  
DwQEAwIBhjAPBgNVHRMBAf8EBTADAQH/MB0GA1UdDgQWBBSIy8+g/VdchH65hEP7  
N6gIQpKw5DAQBgkrBgEEAYI3FQEEAwIBADANBgkqhkiG9w0BAQsFAAOCAQEAv2H  
3OX9LravtVGul7QiZm7hUCHMYC4Jdl19PAY0wDLl10KDhoNRNhdVwjUs1As04pKL  
NZQozRn8KoMjHE1TpoFN0hiLOMbKetNfruuYLCtUpEI5+axBBOyAzvm0yo0MmuXw  
cmT5/lS0FH2hos0AfrHO/ralowAxxrTWEdu/8ZOvJRXmvyYBOxfRQOR2kSdhe3Aw  
pnzx54vRaoyeCMLnxKQOD87/Y+aqA/A08KAeYKbFBlkNdBE09H8av/2LK7gs4Doj  
ZCcHUueOmfqnVFimkDbA6oVZgw1HE5s94LZFW8prCgGyaBs6buocQkkyhq1E0ob/  
StZ7ql7oBR1gIFHE9g==  
-----END CERTIFICATE-----
```

Appendix: Install Issuer

To install the LA County issuer certificate as a CA (Certificate Authority), open the Postman **Preferences** dialog. It should appear as shown in the screen shot.

1. Select the **Certificates** tab.
2. Enable CA Certificates by toggling the setting to **ON**.
3. Load the CA certificate file from the previous slide.

Dismiss the dialog and try again. The issuer warning should disappear on your next request.



Note: If you try to invoke an SSL server **within** your local network (with no intermediate SSL termination), this will cause the problem again. Simply disable the toggle in Step 2 above to return to the default certificate store.

Appendix: Postman Part 2 and 3

This workshop has focused on working with GET **requests**.
There are two other parts that follow this.

Part 2

- POST and PATCH requests
- Storing values between requests
- Generating dynamic values

Part 3

- Processing XML payloads and responses