

## Software Development

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# Step-by-Step Guide to Perform JMeter API Testing

Lesson 4 of 4

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**Tutorial Playlist**

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The QA team tests APIs to validate the application core on the server-side, and doing this activity manually takes time. [JMeter](#) API Testing comes into play here. In this tutorial, you will understand all that is needed to perform API Testing using JMeter.

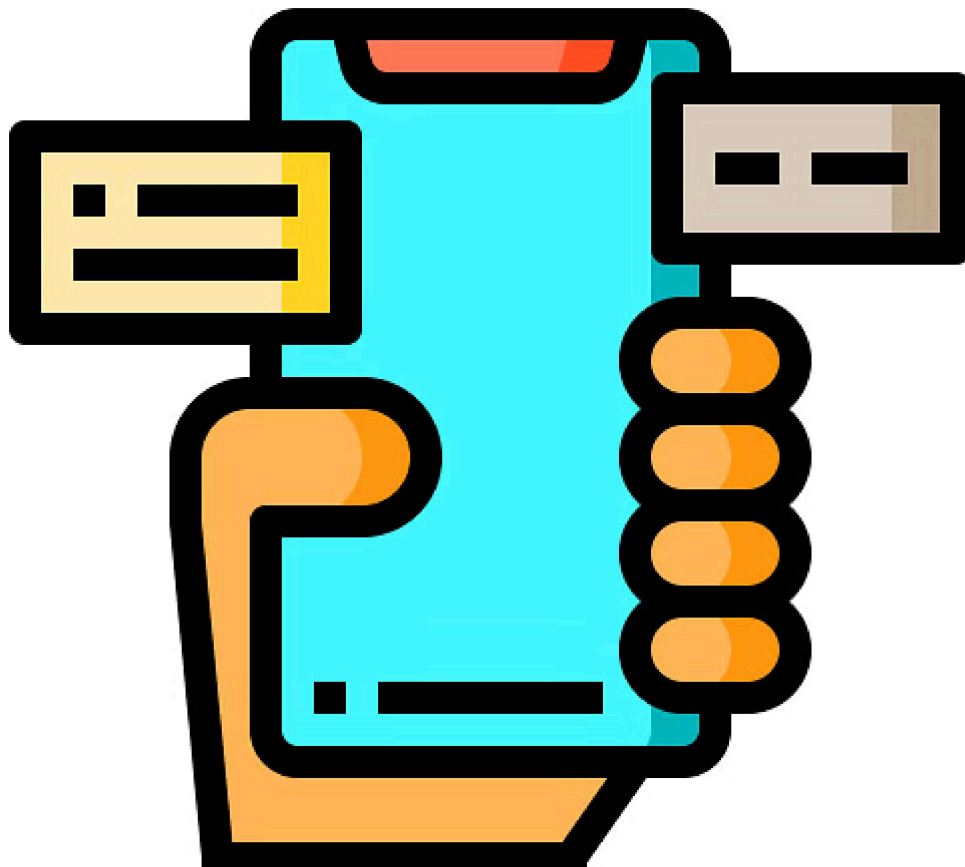
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## What Is an API?

API or Application Programming Interface is an intermediate software that makes the interaction between two applications possible. To understand this even better, let's take an example.

For example, If you are booking a flight, you begin the process by searching online for flights that match your destination, departure, return dates, and many other related filters. To make a decision that considers all these choices, you interact with the airline's website and access their database. You need to see if any seats are available on those dates and what the costs might be for them. This entire process that you undergo, from the time you begin to the time you finish, is facilitated by an API.





Every time you use an application on your mobile phone, send a message or check the weather on the phone, you are using an API.

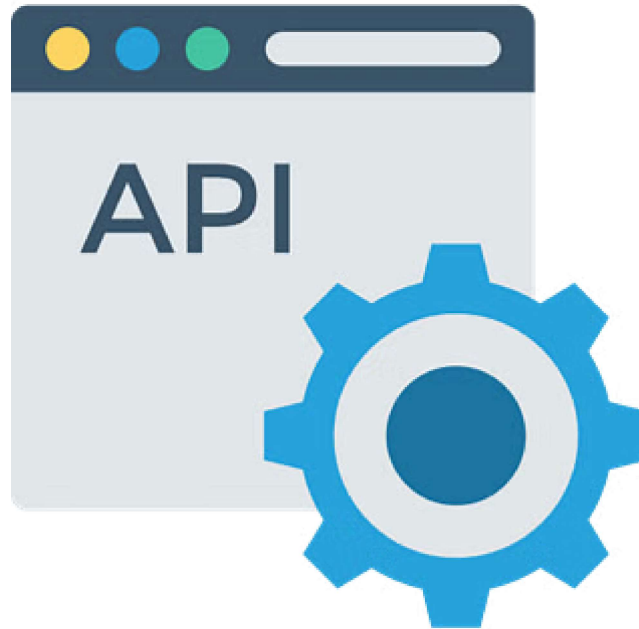
These APIs are tested to check the functionality, performance, readability, and security of any [programming](#) interface. One of the most popular and simple tools to perform API Testing is the Apache JMeter.



## Why Choose Apache JMeter for API Testing?

Some of the prominent reasons as to why Apache JMeter is used for API Testing are:

- Open-source tool - The Apache JMeter is an open-source tool based on [Java](#) used to perform load testing and [performance testing](#).
- Cross-platform testing - Since JMeter is solely Java-based, it can be used on any platform that has a [JVM](#); Windows, Linux, or macOS.
- Smooth API Testing - API Testing enables easy, smooth, and rapid API testing.



- Quick scope tests - JMeter is a potent tool for performance testing, making the process easy for everyone, whether experienced or inexperienced.
- Enables load testing - JMeter is a very effective tool to measure if a web application satisfies a particular load requirement or not.
- Enables stress testing - JMeter can simulate users to measure the application performance under a lot of stress.
- Lots of plugins - JMeter offers a lot of [plugins](#), and more plugins can be installed easily by installing a Plugins Manager.

Now, let's see the process of performing JMeter API testing.

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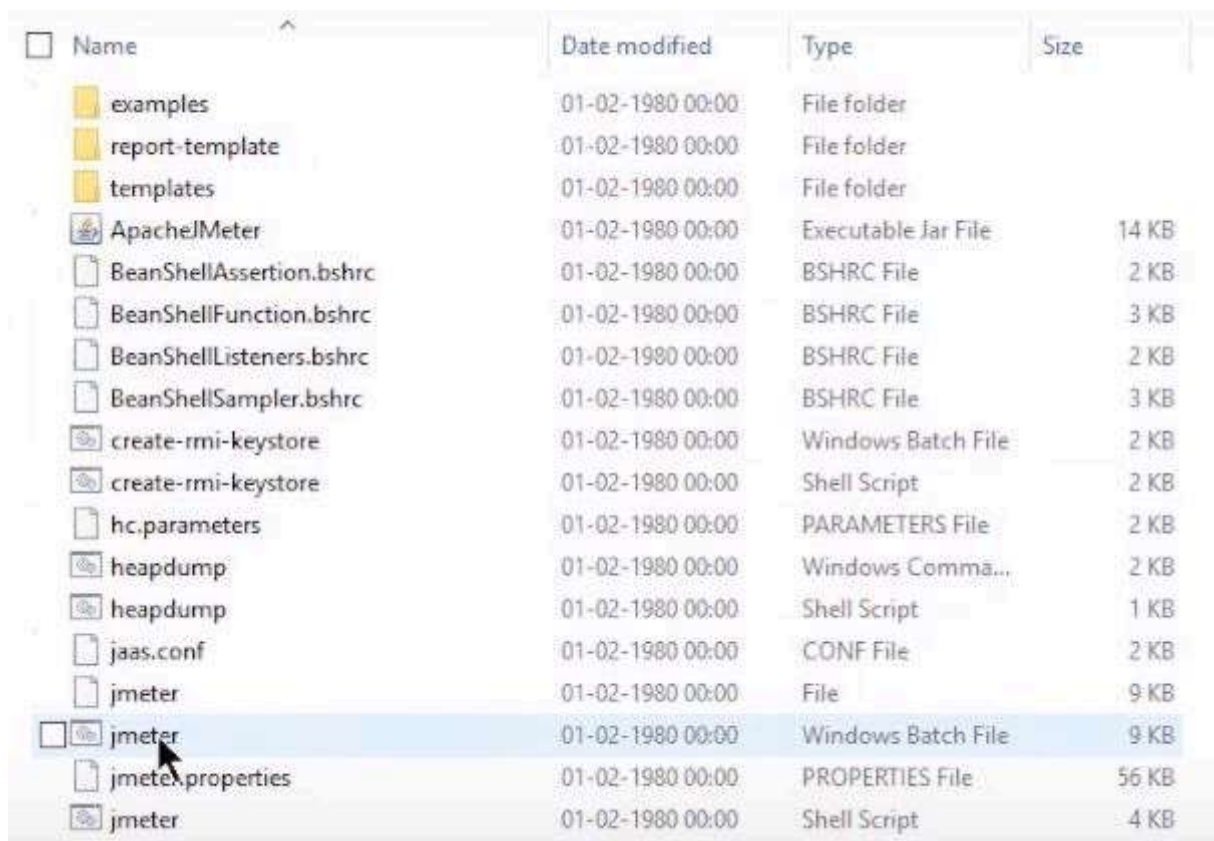
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## Demo: JMeter API Testing

To download JMeter, you will need to access the Apache JMeter website and download the file. To know the entire download and installation process for JMeter, you can check this [JMeter Download and installation video](#).

The first step is to set up the Apache JMeter, as shown below.

- Go to the Apache JMeter folder → bin folder → open the batch file.



Name	Date modified	Type	Size
examples	01-02-1980 00:00	File folder	
report-template	01-02-1980 00:00	File folder	
templates	01-02-1980 00:00	File folder	
ApacheJMeter	01-02-1980 00:00	Executable Jar File	14 KB
BeanShellAssertion.bshrc	01-02-1980 00:00	BSHRC File	2 KB
BeanShellFunction.bshrc	01-02-1980 00:00	BSHRC File	3 KB
BeanShellListeners.bshrc	01-02-1980 00:00	BSHRC File	2 KB
BeanShellSampler.bshrc	01-02-1980 00:00	BSHRC File	3 KB
create-rmi-keystore	01-02-1980 00:00	Windows Batch File	2 KB
create-rmi-keystore	01-02-1980 00:00	Shell Script	2 KB
hc.parameters	01-02-1980 00:00	PARAMETERS File	2 KB
heapdump	01-02-1980 00:00	Windows Comma...	2 KB
heapdump	01-02-1980 00:00	Shell Script	1 KB
jaas.conf	01-02-1980 00:00	CONF File	2 KB
jmeter	01-02-1980 00:00	File	9 KB
jmeter	01-02-1980 00:00	Windows Batch File	9 KB
jmeter.properties	01-02-1980 00:00	PROPERTIES File	56 KB
jmeter	01-02-1980 00:00	Shell Script	4 KB

This might take a while. Wait till the JMeter window opens on the screen.

It divides the home window into two sections: the left side has all the test plan elements, and on the right side, all the configurations of that element are added.

As you are on the test plan element, you can see the configurations of the same.

- Right-click on the test plan
- Select the add option
- Then in the menu that appears, select the threads option and then thread groups

Here, the number of threads refers to the number of users. The ramp-up period in seconds option states the time gap between the users' hits. There is a loop count where you can choose how many times the test will run for the number of users, and also, you can select the test to run infinite times.

There is also a scheduler here to help you schedule the test start-time and end-time.

For the purpose of this tutorial, let's set everything to one.

Now, select some sample APIs, as given below;

- Go to your browser
- Search for "some sample rest API for testing"
- Open the first link "reqres.in"

Let's create and run GET, POST, PUT, and DELETE Rest API requests in JMeter in the demo.

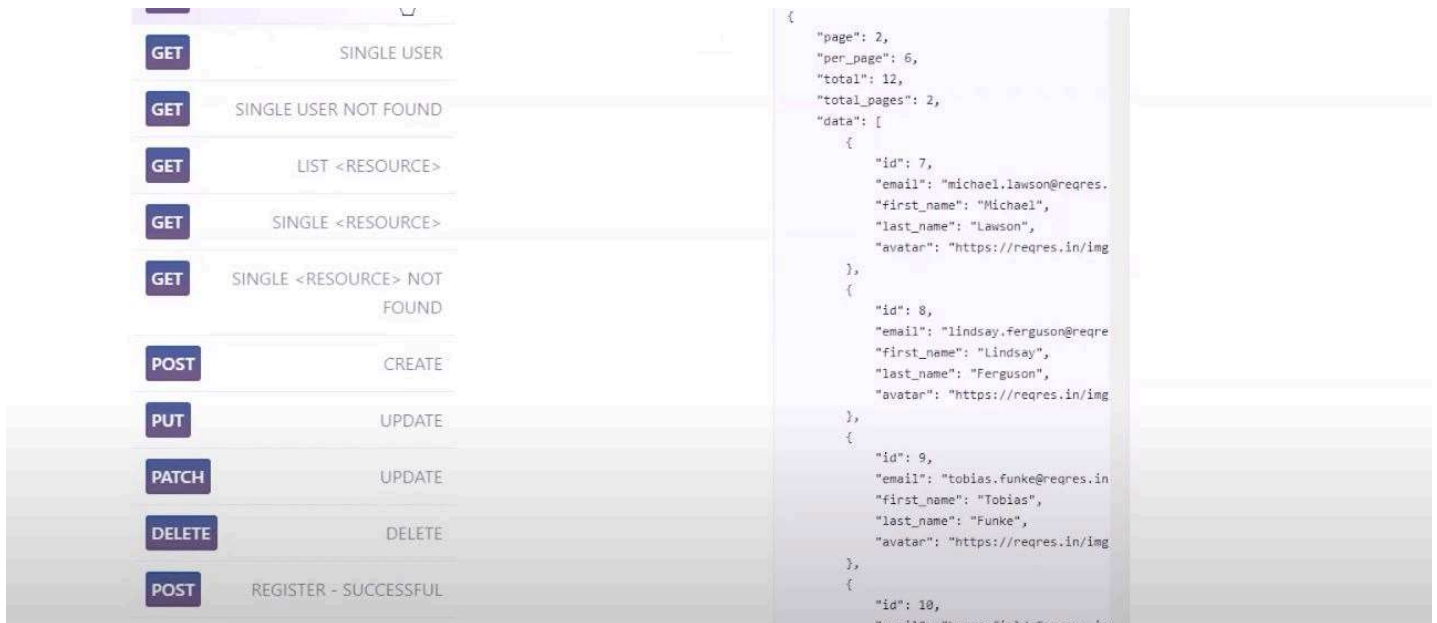
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Here, in this link, you can GET, POST, PUT, and DELETE Rest APIs.





So, choose the first link: List Users.

- Here, click on the request link
- Open the link that appears in the new tab
- Identify the URL for this API
- Copy this URL and open the JMeter window

Then in the JMeter window, do the following:

- Right-click on the Thread group
- Navigate to "add"
- In the box that appears, select "samplers"

You can see the types of requests that JMeter can work on

- Choose the HTTP request.

Here, you will have to give the address to some home pages or websites

- In the Server Name or IP box, give the paste the GET API request URL
- In the Protocol box, put "HTTPS"

If the URL in the protocol was HTTP, this box would have been left empty. In the URL, put the URL



link; remember not to put any slashes in the [IP Address](#). Also, anything after the URL should be put in the path.

- Now, put the path from the URL in the path box

Next, you must take part of the URL, beginning with the “question mark” and use it to assign the parameters. This is required since it is the GET API type.

- Add the name in the parameters
- Give the name as page and value as 2
- Name this HTTP Request as GetAPI

HTTP Request

Name:

Comments:

Basic Advanced

Web Server

Protocol [http]:  Server Name or IP:  Port Number:

HTTP Request

GET Path:  Content encoding:

☐ Redirect Automatically ☒ Follow Redirects ☒ Use KeepAlive ☐ Use multipart/form-data ☐ Browser-compatible headers

Parameters Body Data Files Upload

Send Parameters With the Request:

Name	Value	URL Encode?	Content-Type	Include Equals?
page	2	<input type="checkbox"/>	text/plain	<input checked="" type="checkbox"/>

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After this HTTP request is ready, perform the test on it. To determine what the results of the test will be, add some listeners.

- Right-click on the Thread group

- Go to listener options
- In the box, check the different types of reports that JMeter provides
- For now, Select two "view results tree" and "view results in table"
- Then save the test and run it

Simply click on the green button to run the test.

After running the test, it's time to check the results:

- Go to the "view results tree"

The green status shows that the test was successful.

- Then go "view results in a table"

The green status again shows the test was successful.

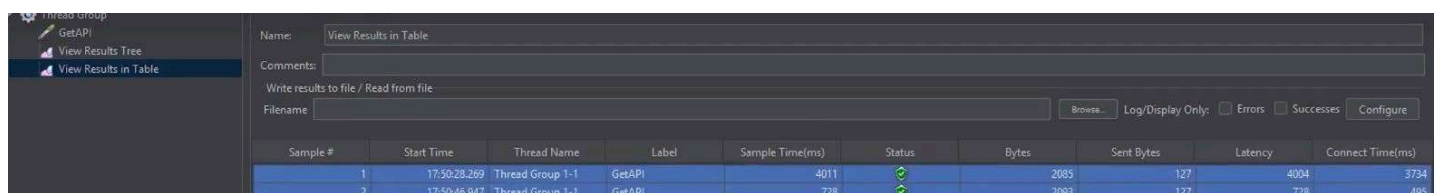
Since the number of threads and loop was denoted as one - both at the entry in both the results, the test result has come out accordingly.



Now, try one more thing:

- Go to the thread group
- Change the number of threads to be 10
- Run the test

After running the test, check the "results in the table" and see the testing being performed. This can be seen in case "view results in the table" is available too.

In the view results tree, you can click on a request and see different information. Here you can see the sample start, load time, latency error, etc. In the "view results in table," window, you will be able to see all the information in a tabular format.



Sample #	Start Time	Thread Name	Label	Sample Time(ms)	Status	Bytes	Sent Bytes	Latency	Connect Time(ms)
1	17:50:28.269	Thread Group 1-1	GetAPI	4011		2585	127	4004	3734
2	17:50:46.947	Thread Group 1-1	GetAPI	728		2093	127	728	495

3	17:50:47.058	Thread Group 1-2	GetAPI	736	✓	2093	127	736	463
4	17:50:47.155	Thread Group 1-3	GetAPI	674	✓	2085	127	674	438
5	17:50:47.264	Thread Group 1-4	GetAPI	716	✓	2089	127	716	458
6	17:50:47.356	Thread Group 1-5	GetAPI	734	✓	2089	127	734	476
7	17:50:47.456	Thread Group 1-6	GetAPI	701	✓	2087	127	701	471
8	17:50:47.559	Thread Group 1-7	GetAPI	660	✓	2088	127	660	430
9	17:50:47.654	Thread Group 1-8	GetAPI	647	✓	2089	127	647	420
10	17:50:47.748	Thread Group 1-9	GetAPI	673	✓	2085	127	672	415
11	17:50:47.850	Thread Group 1-10	GetAPI	690	✓	2095	127	690	458

You can also see the response data in the above image. This is the same data available when you copied the URL from the browser. Furthermore, the response headers and the request placed can also be checked.

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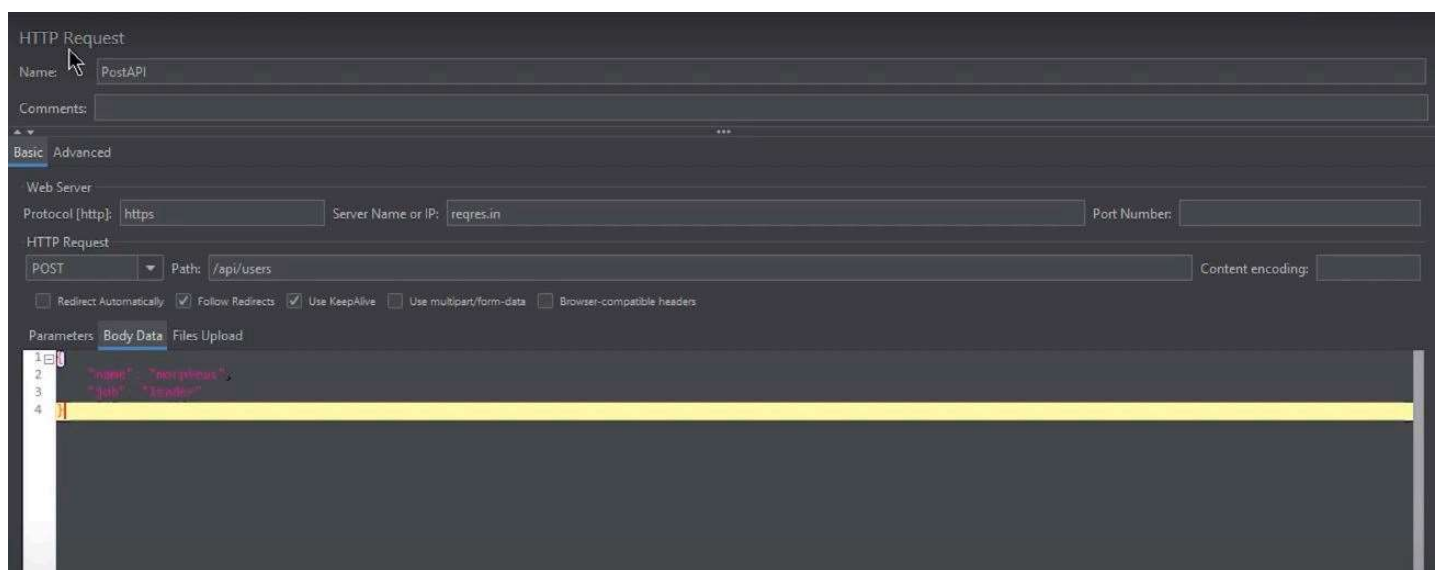
Now, when you are done with the GET API request, let's add the second request that is the POST request.

- Add an HTTP request again by going to the sampler in the thread group
- Come back to the browser window
- Click on the POST API option
- Open the request URL in a new window
- Go to this window and copy the URL
- Come back to the JMeter window
- Rename this HTTP request as Post API
- Then paste the URL in the server name or IP box
- Place HTTP in the protocol box, address in the Server or IP address box, and path in the path box
- And in the HTTP Request drop-down, select the POST option this time

- Navigate to the parameter part
- Here, select the body data option and add body

For adding the body:

- Go back to the browser window
- Copy the body from here
- Come back to the JMeter window
- Paste the body here



Now, when the test is all set it's time to check the output.

- Go to the two listeners and clear the previous output
- Then save the test and run it
- Now you can see the two tests since the thread count is one

Making the thread count 10 again, you can see the test running a required number of times, 20 times. Furthermore, the information about different requests that include other parameters like latency, errors, etc., can be accessed.

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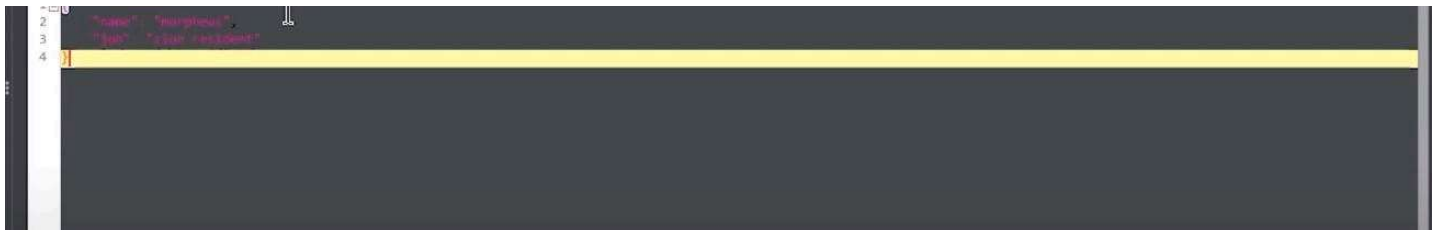
Now, let's move on to the third API request, the PUT request.

- Go back to the browser
- Click on the PUT request
- Open the requests in the new tab
- Copy the URL
- Come back to the JMeter window
- Make a new HTTP request like the previous two times
- Rename this HTTP request as Put API
- Paste the URL in the server name or IP box
- Put HTTP in the protocol box, address in the Server or IP address box, and path in the path box
- And in this HTTP Request drop-down, select the PUT option this time

Here too, you will have to add body data.

- Go back to the browser window
- Copy the body from here
- Coming back to the JMeter window, select the body data option and paste the body here





Now, after it sets the test, run the test in the case of the previous two APIs.

- Go to the two listeners and clear the previous output
- Make the thread count as one
- Save the test and run it

Again make the thread count as 10 and see what happens.

- You can see the test running a required number of times
- And a lot of information can be checked again, as in the previous cases

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Now, let's add the last API request that is the DELETE request.

- Go back to the browser
- Click on the DELETE request
- Open the requests in the new tab
- Copy the URL
- Come back to the JMeter window

- Make a new HTTP request
- Rename this HTTP request as Delete API
- Paste the URL in the server name or IP box
- Put HTTP in the protocol box, address in the Server or IP address box, and path in the path box
- And in this HTTP Request drop-down, select the Delete option this time

HTTP Request

Name: DeleteAPI

Comments:

Basic Advanced

Web Server

Protocol [http]: https Server Name or IP: reqres.in Port Number:

HTTP Request

DELETE Path: /api/users/2 Content encoding:

☐ Redirect Automatically ☒ Follow Redirects ☒ Use KeepAlive ☐ Use multipart/form-data ☐ Browser-compatible headers

Parameters Body Data Files Upload

Send Parameters With the Request:

Name:	Value	URL Encode?	Content-Type	Include Equals?

Here you do not have to add anything in the parameters section.

- So, go to the two listeners and clear the existing information
- Save the test and run it

Since the number of threads was not 1 this time, the test can be seen running the required number of times. You can see the information for any API request by clicking on it.

Test Plan

- Thread Group
  - GetAPI
  - View Results Tree
  - View Results in Table
  - PostAPI
  - PutAPI
  - DeleteAPI

View Results in Table

Name: View Results in Table

Comments:

Write results to file / Read from file

Filename: Browse... Log/Display Only: ☐ Errors ☐ Successes Configure

Sample #	Start Time	Thread Name	Label	Sample Time(ms)	Status	Bytes	Sent Bytes	Latency	Connect Time(ms)
1	18:00:34.291	Thread Group 1-1	GetAPI	675	✓	2089	127	675	455
2	18:00:34.966	Thread Group 1-1	PostAPI	244	✓	1052	217	244	0
3	18:00:34.493	Thread Group 1-3	GetAPI	753	✓	2081	127	740	445
4	18:00:34.591	Thread Group 1-4	GetAPI	662	✓	2091	127	662	425
5	18:00:35.210	Thread Group 1-1	PutAPI	240	✓	1036	225	240	0
6	18:00:35.253	Thread Group 1-4	PostAPI	832	✓	1056	217	832	0
7	18:00:35.246	Thread Group 1-3	PostAPI	853	✓	1050	217	853	0
8	18:00:36.085	Thread Group 1-4	PutAPI	255	✓	1032	225	255	0
9	18:00:35.092	Thread Group 1-9	GetAPI	1248	✓	2087	127	1248	990
10	18:00:36.099	Thread Group 1-3	PutAPI	253	✓	1036	225	253	0
11	18:00:36.340	Thread Group 1-4	DeleteAPI	252	✓	953	208	0	0
12	18:00:35.450	Thread Group 1-1	DeleteAPI	1158	✓	951	208	0	0
13	18:00:36.340	Thread Group 1-9	PostAPI	268	✓	1056	217	268	0
14	18:00:36.352	Thread Group 1-3	DeleteAPI	267	✓	953	208	0	0
15	18:00:34.882	Thread Group 1-7	GetAPI	1784	✓	2089	127	1783	419
16	18:00:35.192	Thread Group 1-10	GetAPI	1554	✓	2083	127	1554	1341
17	18:00:36.809	Thread Group 1-9	PutAPI	268	✓	1038	225	268	0
18	18:00:34.992	Thread Group 1-8	GetAPI	1909	✓	2085	127	1909	469
19	18:00:36.676	Thread Group 1-7	PostAPI	274	✓	1056	217	274	0
20	18:00:36.746	Thread Group 1-10	PostAPI	261	✓	1052	217	261	0

21	18:00:34.795	Thread Group 1-8	GetAPI	2334	✓	2883	127	2334	483
22	18:00:36.877	Thread Group 1-9	DeleteAPI	382	✓	951	208	0	0
23	18:00:36.901	Thread Group 1-8	PostAPI	323	✓	1046	217	323	0
24	18:00:36.950	Thread Group 1-7	PutAPI	274	✓	1036	225	274	0
25	18:00:37.008	Thread Group 1-10	PutAPI	217	✓	1032	225	217	0
26	18:00:37.225	Thread Group 1-10	DeleteAPI	744	✓	957	208	0	0

So, this is how you can create, run and perform API Testing for different API requests in JMeter.

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## Conclusion

By now, you would have understood everything you need to know about JMeter API Testing. In the beginning, you learned what an API is, and then you saw why JMeter is chosen to perform API Testing. Then finally, you understood the process of performing API Testing using JMeter with a hands-on demo. Check out our [Java Certification Training](#) to know more about Jmeter Testing.

To know more about JMeter API Testing, you can have a look at [this](#) video.

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If you have any questions for us, let us know in the comments section of the tutorial, we shall have our experts answer them for you.

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## About the Author



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Ishan Gaba is a Research Analyst at Simplilearn. He is proficient in Java Programming, Data Structures, and Project Management. Graduated in Information Technology, Ishan is also passi...

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