P.E.S. UNIVERSITY

Department of Computer Scince and Engineering

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UE17CS355 – Web Technologies-II Lab

Project Phase – II

Test Report

Project Title: SanAdiUl - A Career Networking Website

Section: 6G

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Unit Testing

By: Sanjay Chari PES1201700278

1. Introduction
   The application is a career networking website built with HTML, CSS, Javascript, Bootstrap and jQuery on the front end; and Flask and MySQL on the backend. For unit testing, we created scripts in unit testing using the unittest module. We called our API endpoints through the requests module in each test case that was part of the unittest main loop.
2. Objective
   In unit testing, we are trying to observe if all the backend APIs of our application return the expected response when provided with a given JSON request. Basically, unit testing checks that the backend portion of the application returns the expected output for all test cases, including corner cases.
3. Test Report

Test case No.	Test Case Description	Expected Output	Actual Output	Test Result (Pass/Fail)
1	Test Add User(Password in Wrong Format), Method : POST Request Type : JSON URL Arguments : No	Password in Wrong Format	Password in Wrong Format	Pass
2	Test Add User(Password and Repeat Password do not match), Method : POST Request Type : JSON URL Arguments : No	Password and Repeat Password do not match	Password and Repeat Password do not match	Pass
3	Test Add User(Email Already Registered), Method : POST Request Type : JSON	Email Already Registered	Email Already Registered	Pass

	URL Arguments : No			
4	Test Add User(Profile Created Successfully), Method : POST Request Type : JSON URL Arguments : No	Profile Created Successfully	Profile Created Successfully	Pass
5	Test Login(Password in Wrong Format), Method : POST Request Type : JSON URL Arguments : No	Password in Wrong Format	Password in Wrong Format	Pass
6	Test Login(Email Not Registered), Method : POST Request Type : JSON URL Arguments : No	Email Not Registered	Email Not Registered	Pass
7	Test Login(Invalid Password), Method : POST Request Type : JSON URL Arguments : No	Invalid Password	Invalid Password	Pass
8	Test Login(Login Successful), Method : POST Request Type : JSON URL Arguments : No	Login Successful	Login Successful	Pass
9	Test Add Job, Method : POST Request Type : JSON URL Arguments : No	Job Created Successfully	Job Created Successfully	Pass
10	Test List Jobs, Method : GET Request Type : None URL Arguments : Yes	HTML response containing <div class=\"row align-items-start job-item border-bottom pb-3 mb-3 pt-3\">	HTML response containing <div class=\"row align-items-start job-item border-bottom pb-3 mb-3 pt-3\">	Pass

11	Test Add Connections(Invalid Email), Method : POST Request Type : JSON URL Arguments : No	Invalid Email	Invalid Email	Pass
12	Test Add Connections(Connection Request Sent), Method : POST Request Type : JSON URL Arguments : No	Connection Request Sent	Connection Request Sent	Pass
13	Test Update Connections, Method : POST Request Type : JSON URL Arguments : No	Request Approved	Request Approved	Pass
14	Test List Connections(List All), Method : GET Request Type : None URL Arguments : Yes	HTML response containing <div class=\"row mb-5 justify-content-center\">	HTML response containing <div class=\"row mb-5 justify-content-center\">	Pass
15	Test List Connections That Match with the search tag, Method : GET Request Type : None URL Arguments : Yes	HTML response containing <div class=\"row mb-5 justify-content-center\">	HTML response containing <div class=\"row mb-5 justify-content-center\">	Pass
16	Test Add Messages(Invalid Username), Method : POST Request Type : JSON URL Arguments : No	Invalid Username	Invalid Username	Pass
17	Test Add Messages(Message Sent Successfully), Method : POST Request Type : JSON	Message Sent Successfully	Message Sent Successfully	Pass

	URL Arguments : No			
18	Test Get Messages(Check if new message was added), Method : GET Request Type : None URL Arguments : Yes	New messages added	No new message added	Fail
19	Test Get Messages that match with the search tag, Method : GET Request Type : None URL Arguments : Yes	HTML response containing <div class=\"chat_list\"	HTML response containing <div class=\"chat_list\"	Pass
20	Test Get Messages(Fetch all messages), Method : GET Request Type : None URL Arguments : Yes	HTML response containing <div class=\"chat_list\"	HTML response containing <div class=\"chat_list\"	Pass
21	Test Add Post, Method : POST Request Type : JSON URL Arguments : No	Post Created	Post Created	Pass
22	Test Add Comments, Method : POST Request Type : JSON URL Arguments : No	Comment Posted Successfully	Comment Posted Successfully	Pass
23	Test Get Posts(Fetch Personal Feed for a given user), Method : GET Request Type : None URL Arguments : Yes	HTML response containing <div class=\"col-md-6 col-lg-4 mb-5\">	HTML response containing <div class=\"col-md-6 col-lg-4 mb-5\">	Pass
24	Test Get Post(Fetch content of a single post with the user who posted it and comments),	HTML response containing <div class=\"pt-5\"><h3 class=\"mb-	HTML response containing <div class=\"pt-5\"><h3 class=\"mb-	Pass

	Method : GET Request Type : None URL Arguments : Yes	5\">	5\">	

4. Observation and Conclusion
   We observed that the Flask application returns the expected output for 23 out of 24 test requests sent as part of 12 test cases to the application. This gives a success rate of 95.83% for the application. The request for which a wrong output was returned was the the test case which checks if new messages were added to the database. This might be related to a bug in eventaul consistency on our application. In conclusion, our Flask application is working as expected for the requirements and unit testing results reflect the same observation, with a success rate of 95.83% for incoming requests.

System Testing

By: Athul Sandosh PES1201701110

1. Introduction
   The application is a career networking website built with HTML, CSS, Javascript, Bootstrap and jQuery on the front end; and Flask and MySQL on the backend. For system testing, we used the Selenium IDE tool. We used the record and playback feature of the Selenium IDE for testing our project.
2. Objective
   In system testing, we are trying to observe if the front end of our website is working as expected. Basically, the objective of system testing is to simulate end user engagement from all possible scenarios, so that it can be ensured that an end user faces no hassle while the website is deployed in a production environment. To test for this, we recorded various scenarios that an end user using our website would be exposed to and executed them multiple times.
3. Test Report

Test case No.	Test Case Description	Expected Output	Actual Output	Test Result (Pass/Fail)
1	Accept Connection Request : Logged in user accepts a connection request sent by another user.	<p> tag with id Request Approved will appear on screen, and assert element present id=Request Approved will be triggered.	<p> tag with id Request Approved appears on screen, and assert element present id=Request Approved is triggered.	Pass
2	Add Comment : Logged in user adds comment to an existing post.	<p> tag with id Comment Posted Successfully will appear on	<p> tag with id Comment Posted Successfully appears on	Pass

		screen, and assert element present id= Comment Posted Successfully will be triggered.	screen, and assert element present id= Comment Posted Successfully is triggered.	
3	Add Job Listing : Logged in user adds a job listing	User is redirected to index.html after pressing the submit button.	User is redirected to index.html after pressing the submit button.	Pass
4	Add Message in Existing Chat : Logged in user adds a message in an existing chat.	Message is added and can be seen in the chat.	Message is added and can be seen in the chat.	Pass
5	Add Post : Logged in user creates a new post	User is redirected to feed.html after pressing the submit button.	User is redirected to feed.html after pressing the submit button.	Pass
6	Login(Email Not Registered) : Login Failed because email id is not present in the database.	User is redirected to signup.html after pressing the submit button.	User is redirected to signup.html after pressing the submit button.	Pass
7	Login(Invalid Password) : Login Failed because entered password is incorrect.	<p> tag with id Invalid Password will appear on screen, and assert element present id= Invalid Password will be triggered.	<p> tag with id Invalid Password appears on screen, and assert element present id= Invalid Password is triggered.	Pass
8	Login(Login Successful)	User is redirected to index.html after	User is redirected to index.html after	Pass

		pressing the submit button.	pressing the submit button.	
9	Search For Job Listings : Logged in user searches for job listings	Job listings that match the search parameters are displayed on the index.html page.	Job listings that match the search parameters are displayed on the index.html page.	Pass
10	Send Connection Request to non suggestion : Logged in user sends connection request to non suggestion	User is redirected to connections.htm l after pressing the submit button.	User is redirected to connections.htm l after pressing the submit button.	Pass
11	Send Connection Request to suggestion : Logged in user sends connection request to suggestion	<p> tag with id Request Sent will appear on screen, and assert element present id= Request Sent will be triggered.	<p> tag with id Request Sent appears on screen, and assert element present id= Request Sent is triggered.	Pass
12	Signup(Email Already Registered) : Signup failed because email is already present in the database.	User is redirected to login.html after pressing the submit button.	User is redirected to login.html after pressing the submit button.	Pass
13	Signup(Passwor d and Repeat Password do not match) : Signup failed because password and	<p> tag with id Password and repeat password do not match will appear on screen, and assert element	<p> tag with id Password and repeat password do not match will appear on screen, and assert element	Pass

	repeat password are not the same.	present id= Password and repeat password do not match will be triggered.	present id= Password and repeat password do not match will be triggered.	
14	Signup(Profile Created Successfully) :	User is redirected to index.html after pressing the submit button.	User is redirected to index.html after pressing the submit button.	Pass
15	Start New Chat(Invalid Username) : Logged in user attempts to start a new chat with a non existent user.	<p> tag with id Message too long or Invalid Username will appear on screen, and assert element present id= Message too long or Invalid Username will be triggered.	<p> tag with id Message too long or Invalid Username will appear on screen, and assert element present id= Message too long or Invalid Username will be triggered.	Pass
16	Start New Chat(Message Sent Successfully) : Logged in user starts a new chat with another user successfully.	User is redirected to messages.html after pressing the submit button.	User is redirected to messages.html after pressing the submit button.	Pass

4. Observation and Conclusion

   We observed our website mimics the expected behaviour for 16 out of 16 test cases. This gives a success rate of 100% for the application. In conclusion, our website is working as expected for the requirements and system testing results reflect the same observation, with a success rate of 100% for the the test cases that we recorded.

Performance/Load Testing

By Aditya Shankaran: PES1201700710

1. Introduction
   The application is a career networking website built with HTML, CSS, Javascript, Bootstrap and jQuery on the front end; and Flask and MySQL on the backend. For load testing, we used the Locust software built in Python. We mentioned the specifications of our testing in a locustfile.py, which Locust reads and performs tests accordingly.
2. Objective
   In performance/load testing, we are trying to observe the volume and velocity of incoming requests that our Flask application can handle. Basically, the objective of load testing is to simulate a huge number of concurrent users at one time, in order to test the robustness and durability of our backend application. Locust takes three input parameters on its console : the IP address where the application is running, the number of concurrent users to simulate, and the hatch rate or velocity of the user creation. We run our Flask application on localhost:5000, and we tested our application with 100 concurrent users and a hatch rate of 5. It should be noted that the number of users does not match with the number of incoming requests. For each user spawned, 23 requests are sent to the Flask application. This means that a total of 2300 requests are sent to the Flask application by Locust, with 115 requests per second being sent.
3. Test Report

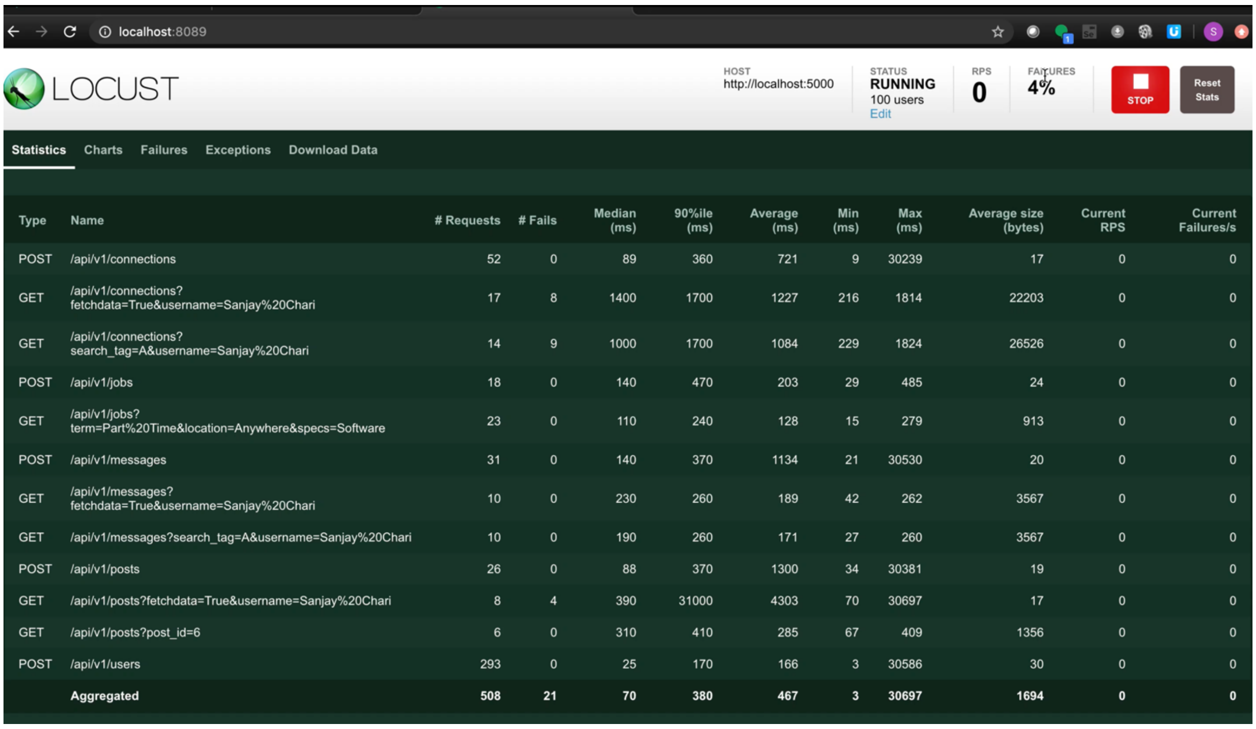
Test case No.	Test Case Description	Expected Output	Actual Output	Test Result (Pass/Fail)
1	API path : /api/v1/connections Method : POST	Invalid Email/Connection Request Sent/Request Approved	Same as expected output in 55/62 cases	Pass in 55/62 cases
2	API path : /api/v1/connections ?fetchdata=True	HTML response containing <div class=\"row mb-5	Same as expected output in	Pass in 9/59 cases

	&username=Sanjay %20Chari Method : GET	justify-content-center\">	9/59 cases	
3	API path : /api/v1/connections ?search_tag=A &username=Sanjay %20Chari Method : GET	HTML response containing <div class=\"row mb-5 justify-content-center\">	Same as expected output in 5/40 cases	Pass in 5/40 cases
4	API path : /api/v1/jobs Method : POST	Job Created Successfully	Same as expected output in 18/22 cases	Pass in 18/22 cases
5	API path : /api/v1/jobs ?term=Part%20Time &location=Anywhere &specs=Software Method : GET	HTML response containing <div class=\"row align-items-start job-item border-bottom pb-3 mb-3 pt-3\">	Same as expected output in 23/63 cases	Pass in 23/63 cases
6	API path : /api/v1/messages Method : POST	Invalid Username/ Message Sent Successfully	Same as expected output in 31/38 cases	Pass in 31/38 cases
7	API path : /api/v1/messages ?fetchdata=True &username=Sanjay %20Chari Method : GET	HTML response containing <div class=\"chat_list\"	Same as expected output in 10/18 cases	Pass in 10/18 cases
8	API path : /api/v1/messages ?search_tag=A &username=Sanjay %20Chari Method : GET	HTML response containing <div class=\"chat_list\"	Same as expected output in 10/23 cases	Pass in 10/23 cases
9	API path : /api/v1/posts	Post Created/ Comment Posted	Same as expected	Pass in 26/35

	Method : POST	Successfully	output in 26/35 cases	cases
10	API path : /api/v1/posts ?fetchdata=True &username=Sanjay %20Chari Method : GET	HTML response containing <div class=\"col-md-6 col-lg-4 mb-5\">	Same as expected output in 4/15 cases	Pass in 4/15 cases
11	API path : /api/v1/posts ?post_id=6 Method : GET	HTML response containing <div class=\"pt-5\"><h3 class=\"mb-5\">	Same as expected output in 6/14 cases	Pass in 6/14 cases
12	API path : /api/v1/users Method : POST	Signup : Email Already Registered, Password and Repeat Password do not match, Password in wrong format, Profile Created Successfully; Login : Email Not Registered, Invalid Password, Login Successful	Same as expected output in 355/355 cases	Pass in 355/355 cases

4. Observation and Conclusion :

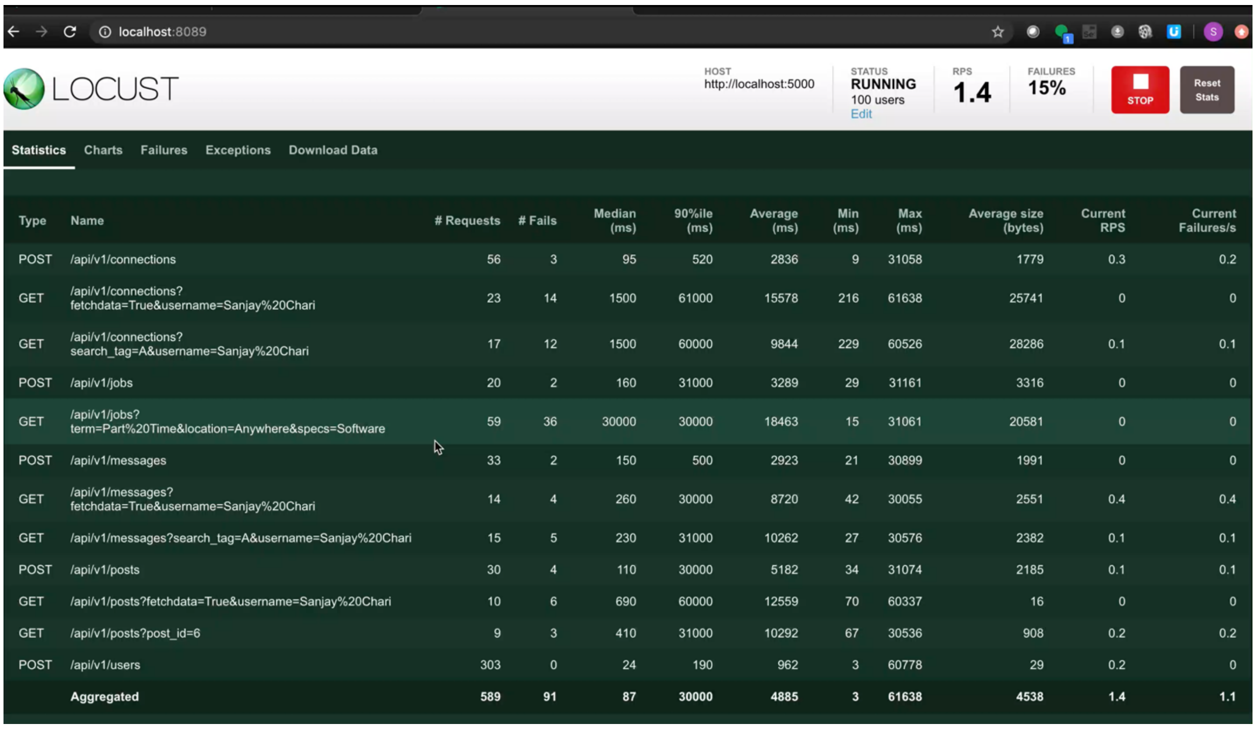
After 1 minute of Locust Execution :



HOST http://localhost:5000 | STATUS RUNNING 100 users Edit | RPS 0 | FAILURES 4%

Type	Name	# Requests	# Fails	Median (ms)	90%ile (ms)	Average (ms)	Min (ms)	Max (ms)	Average size (bytes)	Current RPS	Current Failures/s
POST	/api/v1/connections	52	0	89	360	721	9	30239	17	0	0
GET	/api/v1/connections?fetchdata=True&username=Sanjay%20Chari	17	8	1400	1700	1227	216	1814	22203	0	0
GET	/api/v1/connections?search_tag=A&username=Sanjay%20Chari	14	9	1000	1700	1084	229	1824	26526	0	0
POST	/api/v1/jobs	18	0	140	470	203	29	485	24	0	0
GET	/api/v1/jobs?term=Part%20Time&location=Anywhere&specs=Software	23	0	110	240	128	15	279	913	0	0
POST	/api/v1/messages	31	0	140	370	1134	21	30530	20	0	0
GET	/api/v1/messages?fetchdata=True&username=Sanjay%20Chari	10	0	230	260	189	42	262	3567	0	0
GET	/api/v1/messages?search_tag=A&username=Sanjay%20Chari	10	0	190	260	171	27	260	3567	0	0
POST	/api/v1/posts	26	0	88	370	1300	34	30381	19	0	0
GET	/api/v1/posts?fetchdata=True&username=Sanjay%20Chari	8	4	390	31000	4303	70	30697	17	0	0
GET	/api/v1/posts?post_id=6	6	0	310	410	285	67	409	1356	0	0
POST	/api/v1/users	293	0	25	170	166	3	30586	30	0	0
	Aggregated	**508**	**21**	**70**	**380**	**467**	**3**	**30697**	**1694**	**0**	**0**

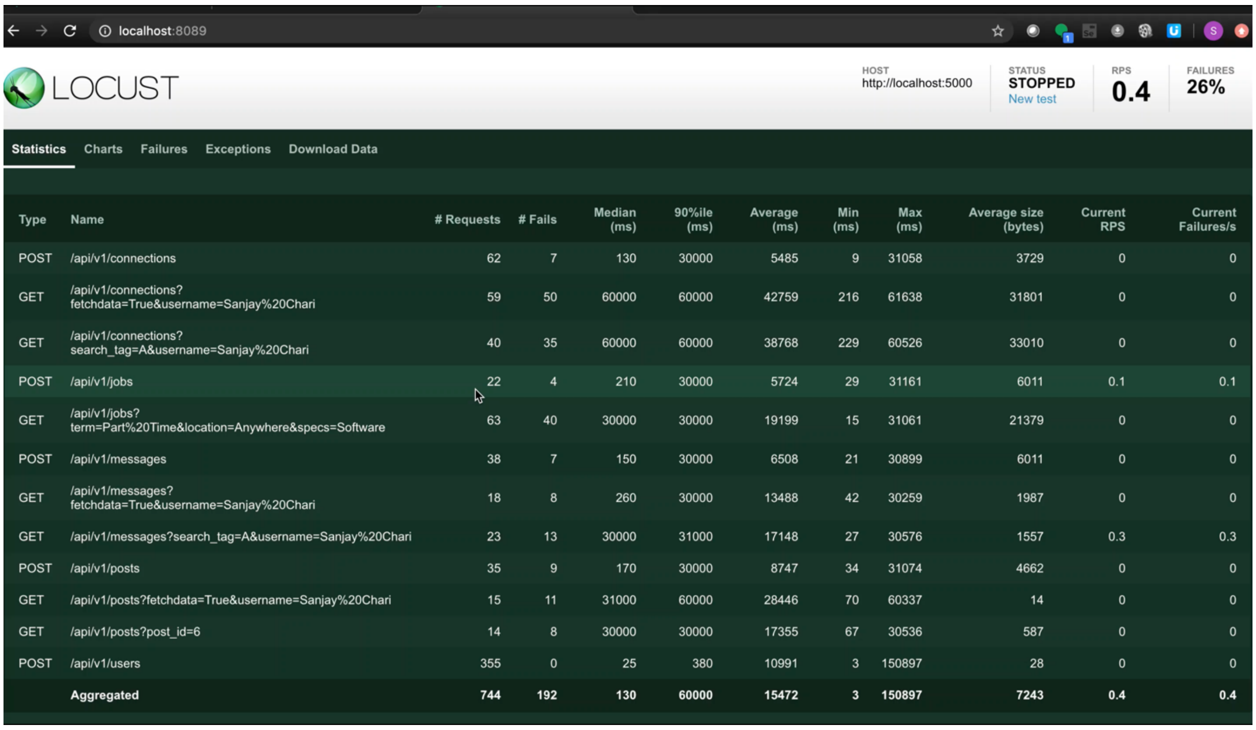
After 2 Minutes of Locust Execution :



HOST http://localhost:5000 | STATUS RUNNING 100 users Edit | RPS 1.4 | FAILURES 15%

Type	Name	# Requests	# Fails	Median (ms)	90%ile (ms)	Average (ms)	Min (ms)	Max (ms)	Average size (bytes)	Current RPS	Current Failures/s
POST	/api/v1/connections	56	3	95	520	2836	9	31058	1779	0.3	0.2
GET	/api/v1/connections?fetchdata=True&username=Sanjay%20Chari	23	14	1500	61000	15578	216	61638	25741	0	0
GET	/api/v1/connections?search_tag=A&username=Sanjay%20Chari	17	12	1500	60000	9844	229	60526	28286	0.1	0.1
POST	/api/v1/jobs	20	2	160	31000	3289	29	31161	3316	0	0
GET	/api/v1/jobs?term=Part%20Time&location=Anywhere&specs=Software	59	36	30000	30000	18463	15	31061	20581	0	0
POST	/api/v1/messages	33	2	150	500	2923	21	30899	1991	0	0
GET	/api/v1/messages?fetchdata=True&username=Sanjay%20Chari	14	4	260	30000	8720	42	30055	2551	0.4	0.4
GET	/api/v1/messages?search_tag=A&username=Sanjay%20Chari	15	5	230	31000	10262	27	30576	2382	0.1	0.1
POST	/api/v1/posts	30	4	110	30000	5182	34	31074	2185	0.1	0.1
GET	/api/v1/posts?fetchdata=True&username=Sanjay%20Chari	10	6	690	60000	12559	70	60337	16	0	0
GET	/api/v1/posts?post_id=6	9	3	410	31000	10292	67	30536	908	0.2	0.2
POST	/api/v1/users	303	0	24	190	962	3	60778	29	0.2	0
	Aggregated	**589**	**91**	**87**	**30000**	**4885**	**3**	**61638**	**4538**	**1.4**	**1.1**

Final Output of Locust Execution :



Type	Name	# Requests	# Fails	Median (ms)	90%ile (ms)	Average (ms)	Min (ms)	Max (ms)	Average size (bytes)	Current RPS	Current Failures/s
POST	/api/v1/connections	62	7	130	30000	5485	9	31058	3729	0	0
GET	/api/v1/connections?fetchdata=True&username=Sanjay%20Chari	59	50	60000	60000	42759	216	61638	31801	0	0
GET	/api/v1/connections?search_tag=A&username=Sanjay%20Chari	40	35	60000	60000	38768	229	60526	33010	0	0
POST	/api/v1/jobs	22	4	210	30000	5724	29	31161	6011	0.1	0.1
GET	/api/v1/jobs?term=Part%20Time&location=Anywhere&specs=Software	63	40	30000	30000	19199	15	31061	21379	0	0
POST	/api/v1/messages	38	7	150	30000	6508	21	30899	6011	0	0
GET	/api/v1/messages?fetchdata=True&username=Sanjay%20Chari	18	8	260	30000	13488	42	30259	1987	0	0
GET	/api/v1/messages?search_tag=A&username=Sanjay%20Chari	23	13	30000	31000	17148	27	30576	1557	0.3	0.3
POST	/api/v1/posts	35	9	170	30000	8747	34	31074	4662	0	0
GET	/api/v1/posts?fetchdata=True&username=Sanjay%20Chari	15	11	31000	60000	28446	70	60337	14	0	0
GET	/api/v1/posts?post_id=6	14	8	30000	30000	17355	67	30536	587	0	0
POST	/api/v1/users	355	0	25	380	10991	3	150897	28	0	0
	Aggregated	**744**	**192**	**130**	**60000**	**15472**	**3**	**150897**	**7243**	**0.4**	**0.4**

As can be seen in the above screenshots, the percentage of failures to total requests goes up from 4% after 1 minute, to 15% after 2 minutes, to 26% finally. Also, other metrics like median, average, min and max also seem to go up.
Additionally, after 2 minutes, the Flask application began reporting a maximum queue size reached error, which implies that the maximum capacity of the backend application was reached due to inavailability of sufficient RAM at that instant of time.
Thus, as the load testing software ran for a longer amount of time, performance metrics like failure rate,median, average, min, max began deteriorating rapidly.
To conclude, load testing of our Flask application reported a failure rate of 26% for 100 concurrent users(each user 23 requests) with a hatch rate of 5. It can be concluded that the performance of a Flask application begans to deteriorate rapidly after the number of concurrent incoming requests exceeds the maximum queue size dictated by the computing capacity of the host machine on which the application is deployed.