

# Flight Management System

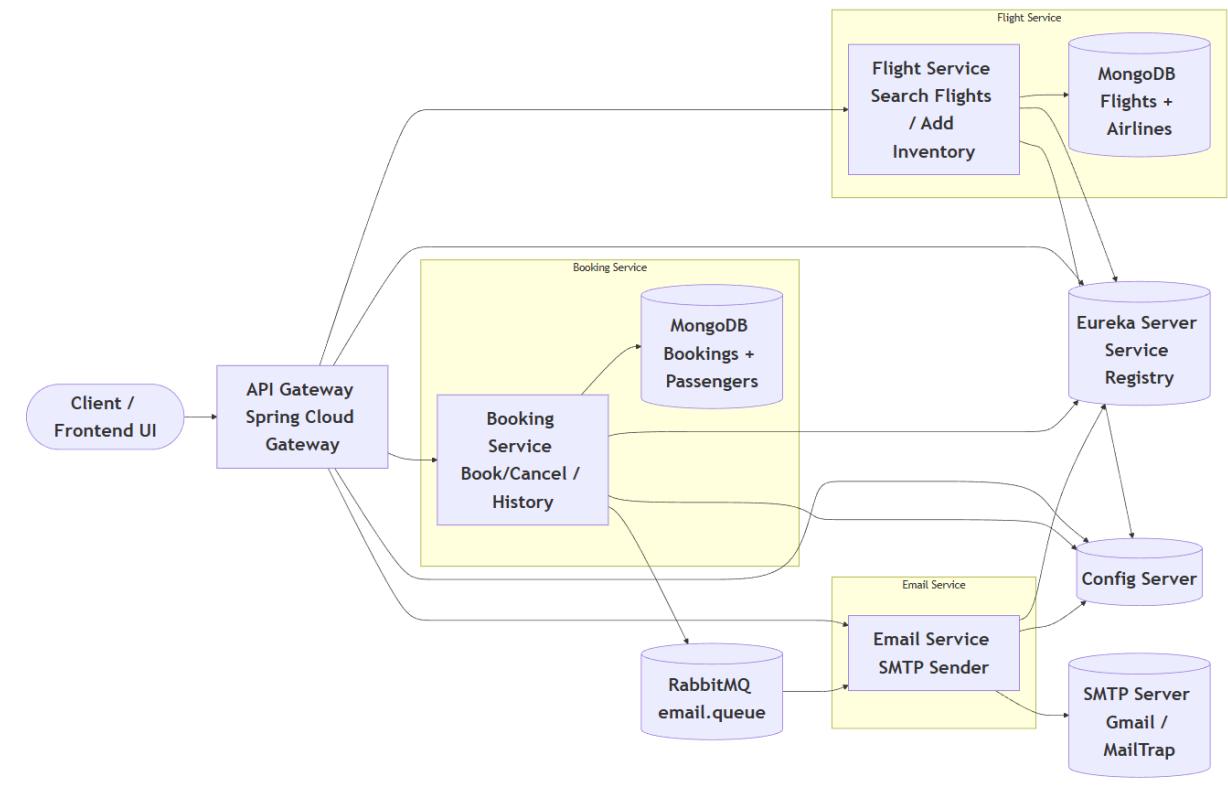
## MicroServices

### Week - 6

### Assignment

### Project Report

The Architecture: -



# These are my services which are registered in service registry

Application	AMIs	Availability Zones	Status
API-GATEWAY	n/a (1)	(1)	UP (1) - <a href="#">DESKTOP-U2KN9DC.api-gateway:8080</a>
BOOKING-SERVICE	n/a (1)	(1)	UP (1) - <a href="#">DESKTOP-U2KN9DC.booking-service:8082</a>
EMAIL-SERVICE	n/a (1)	(1)	UP (1) - <a href="#">DESKTOP-U2KN9DC.email-service:8084</a>
FLIGHT-SERVICE	n/a (1)	(1)	UP (1) - <a href="#">DESKTOP-U2KN9DC.flight-service:8081</a>
FMS-CONFIG-SERVER	n/a (1)	(1)	UP (1) - <a href="#">DESKTOP-U2KN9DC.fms-config-server:8888</a>

General Info

Name	Value
total-avail-memory	80mb
num-of-cpus	12
current-memory-usage	54mb (67%)
server-uptime	00:00
registered-replicas	<a href="http://localhost:8761/eureka/">http://localhost:8761/eureka/</a>
unavailable-replicas	<a href="http://localhost:8761/eureka/">http://localhost:8761/eureka/</a> ,
available-replicas	

Instance Info

# I have used RabbitMQ as my Message Broker to send emails

Containers		<a href="#">Give feedback</a>			
Container CPU usage	<span>i</span>	Container memory usage	<span>i</span>	Show charts	
0.65%	/ 1200% (12 CPUs available)	156MB	/ 6.54GB		
<input type="text"/> Search	<span>☰</span>	<input checked="" type="radio"/>	Only show running containers		
	Name	Container ID	Image	Port(s)	CPU (%) Last started Actions
<input type="checkbox"/>	rabbitmq	d62f89d2be6b	rabbitmq:3-management	15672:15672 <a href="#">Show all ports (2)</a>	0.27% 5 hours ago

[Overview](#) [Connections](#) [Channels](#) [Exchanges](#) [Queues and Streams](#) [Admin](#)

## Queues

▼ All queues (1)

Pagination

 Page  of 1 - Filter:   Regex ? 

Overview						Messages			Message rates			+/-
Virtual host	Name	Type	Features	State	Ready	Unacked	Total	incoming	deliver / get	ack		
/	email.queue	classic	D	running	0	0	0	0.00/s	0.00/s	0.00/s		

▶ Add a new queue
[HTTP API](#) [Documentation](#) [Tutorials](#) [New releases](#) [Commercial edition](#) [Commercial support](#) [Discussions](#) [Discord](#) 

## Connections

▼ All connections (2)

Pagination

 Page  of 1 - Filter:   Regex ? 

Overview			Details				Network			+/-
Name	User name	State	SSL / TLS	Protocol	Channels	From client	To client			
172.17.0.1:43606 rabbitConnectionFactory#3909a854:0	guest	running	○	AMQP 0-9-1	1	0 B/s	0 B/s			
172.17.0.1:58122 rabbitConnectionFactory#14fded9d:0	guest	running	○	AMQP 0-9-1	1	2 B/s	2 B/s			

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## This is the email that it will send when you book or cancel a ticket

Booking Confirmed Inbox ×



joelphilip208@gmail.com

to joel ▾

Your flight booking is confirmed.

PNR: F54F5B8B



Mail Delivery Subsystem <mailer-daemon@googlemail.com>

to me ▾



### Address not found

Your message wasn't delivered to **joel@example.com** because the domain [example.com](#) couldn't be found. Check for typos or unnecessary spaces and try again.

[LEARN MORE](#)

▲This link will take you to a third-party site

```
: EMAIL SERVICE → Using SMTP user: joelphilip208@gmail.com
: Attempting to send email to: joel@example.com
: Email sent successfully to joel@example.com
: Received EmailEvent from RabbitMQ: EmailEvent[to=joel@example.com, subject=Booking Confirmed, body=Your flight booking is confirmed.

: EMAIL SERVICE → Using SMTP user: joelphilip208@gmail.com
: Attempting to send email to: joel@example.com
: Email sent successfully to joel@example.com
: Received EmailEvent from RabbitMQ: EmailEvent[to=joel@example.com, subject=Booking Cancelled, body=Your booking has been cancelled.
```

I have used SMTP to do it and I put my credentials in my run configurations

Booking Cancelled Inbox ×

**J** joelphilip208@gmail.com  
Your booking has been cancelled. PNR: F54F5B8B

---

**Mail Delivery Subsystem** <mailer-daemon@googlemail.com>  
to me ▾

**Address not found**

Your message wasn't delivered to **joel@example.com** because the domain [example.com](#) couldn't be found. Check for typos or unnecessary spaces and try again.

[LEARN MORE](#)  
This link will take you to a third-party site

I have used newman tool to test my API end points and every request gave a valid response

```
C:\Users\Hp\OneDrive\Documents\Postman - Collections>newman --version
6.2.1

C:\Users\Hp\OneDrive\Documents\Postman - Collections>newman run FlightManagementSystem-Microservices.postman_collection.json
newman
```

```

Flight Management System - Microservices

□ Health Check
└ API Gateway Health
    GET http://localhost:8080/actuator/health [200 OK, 114B, 235ms]

└ Eureka Server UI
    GET http://localhost:8761 [200 OK, 6.08kB, 153ms]

□ Flight Service (via API Gateway)
└ Add Airline (Admin)
    POST http://localhost:8080/api/flight/airline [201 Created, 149B, 529ms]

└ Add Flight Inventory (Admin)
    POST http://localhost:8080/api/flight/airline/692e070f58e0122b39e5e1d1/inventory [201 Created, 156B, 53ms]

└ Search Flights (User)
    POST http://localhost:8080/api/flight/search [200 OK, 583B, 34ms]

└ Get Flight Details
    GET http://localhost:8080/api/flight/details/692e07c458e0122b39e5e1d2 [200 OK, 342B, 18ms]

□ Booking Service (via API Gateway)
└ Book Flight
    POST http://localhost:8080/api/book/book [201 Created, 222B, 634ms]

└ Cancel Booking
    DELETE http://localhost:8080/api/book/cancel/EC2AEC3E [200 OK, 155B, 83ms]

└ Booking History
    GET http://localhost:8080/api/book/history/joel@example.com [200 OK, 595B, 28ms]

└ Get Ticket
    GET http://localhost:8080/api/book/ticket/EC2AEC3E [200 OK, 648B, 36ms]

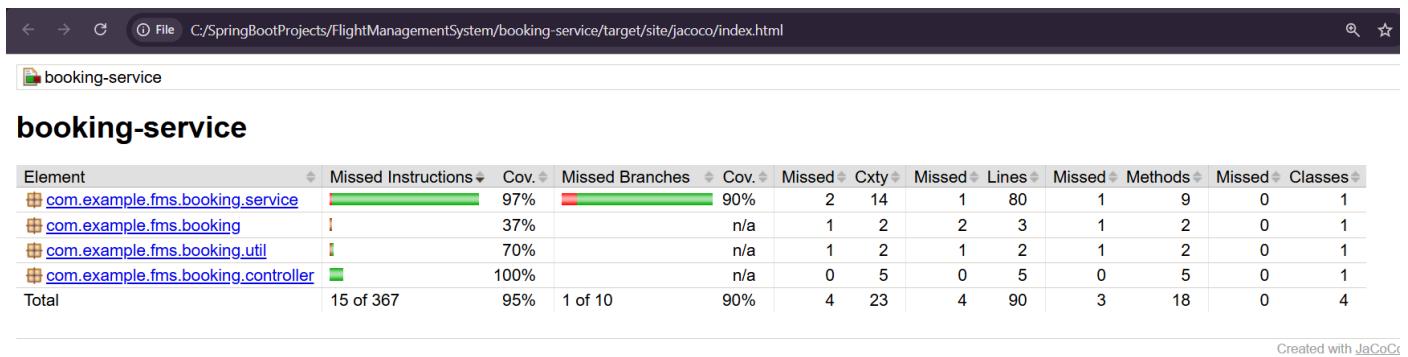
```

	executed	failed
iterations	1	0
requests	10	0
test-scripts	0	0
prerequest-scripts	0	0
assertions	0	0
<b>total run duration:</b>	1007ms	
<b>total data received:</b>	8.21kB (approx)	
<b>average response time:</b>	16ms [min: 10ms, max: 29ms, s.d.: 6ms]	

# JaCoCo Report

## For Booking Service :-

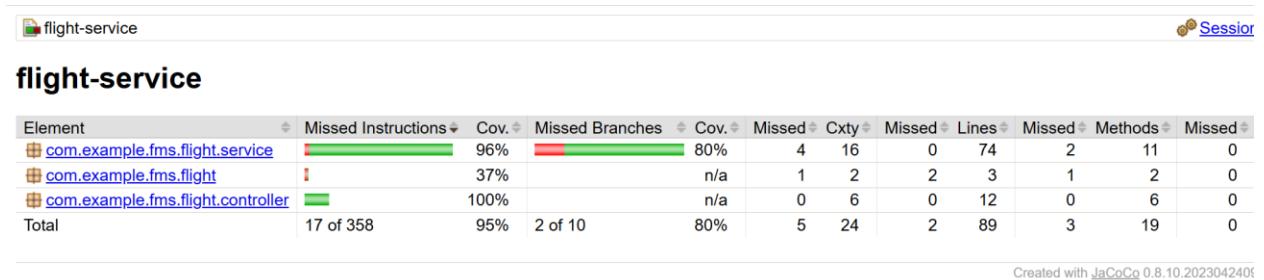
### Code coverage is 95 %



---

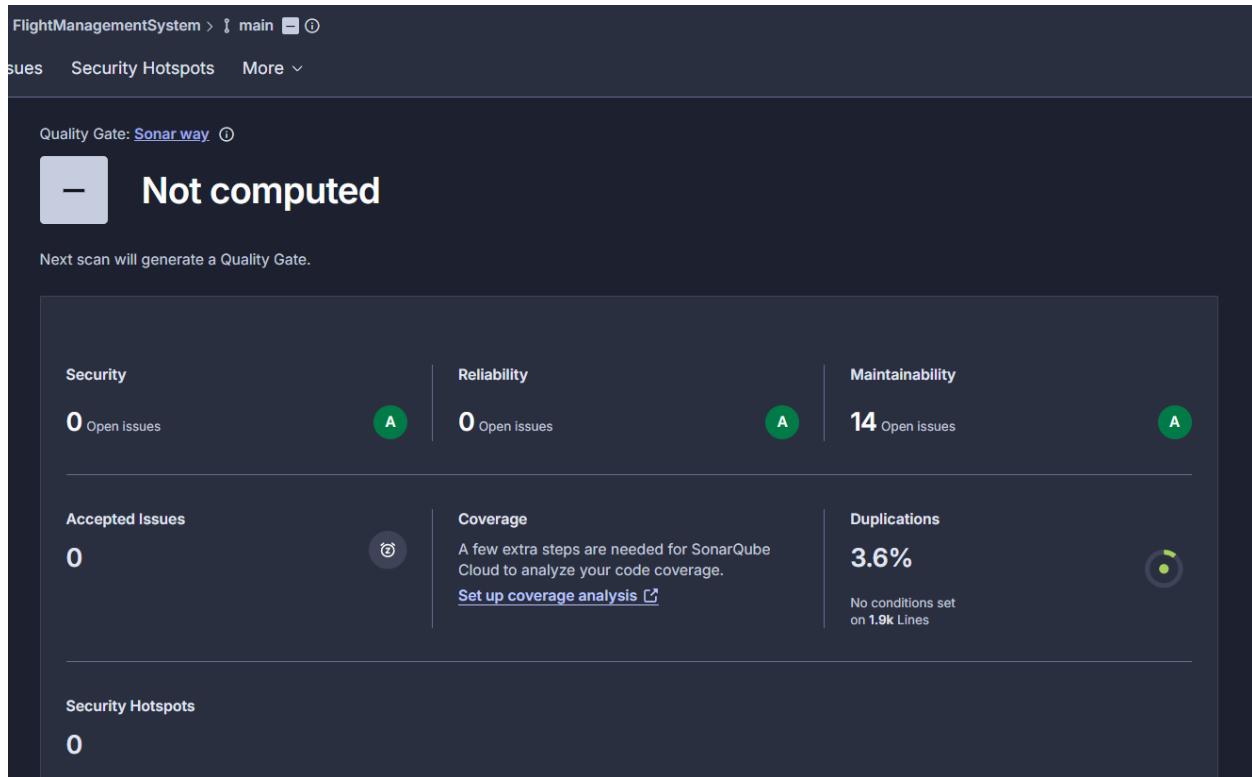
## For Flight Service:-

### Code Coverage is 95%

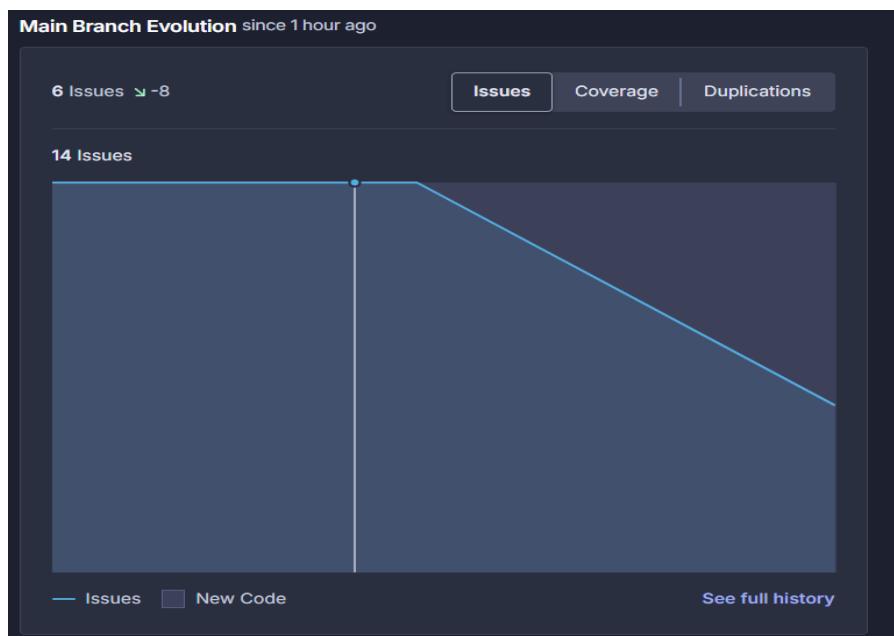


# SonarQube Report

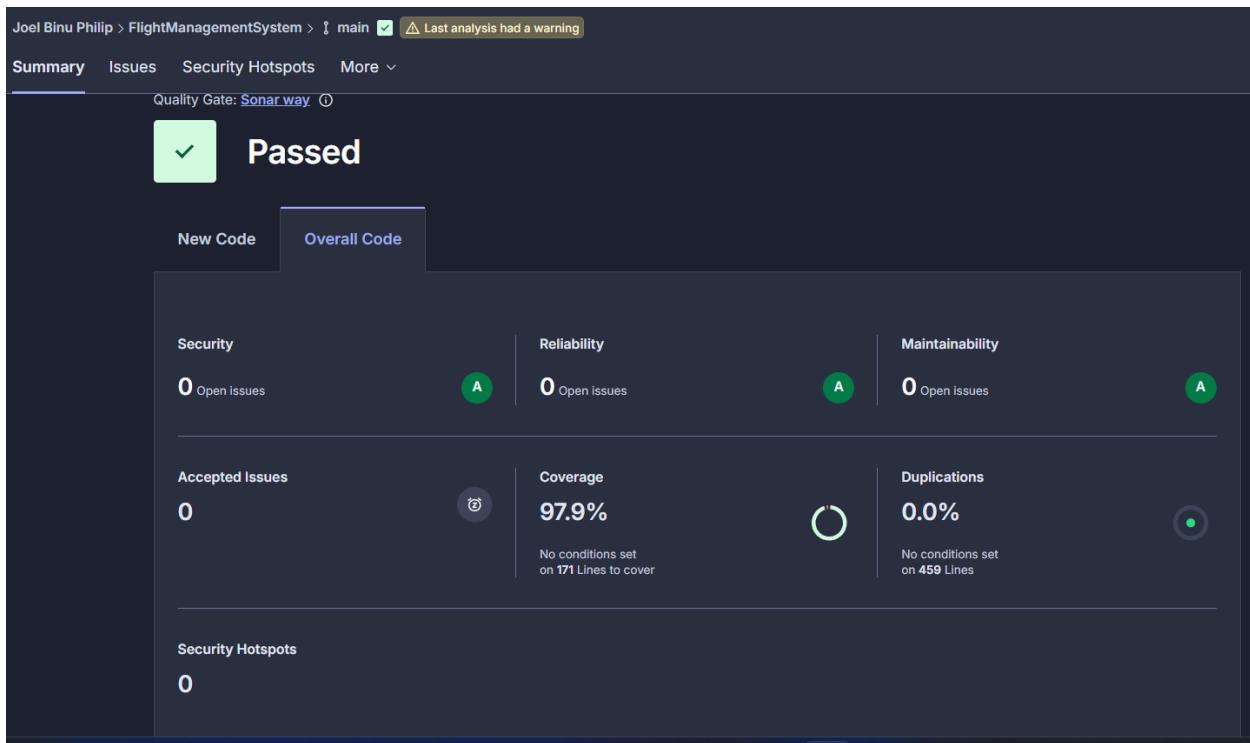
## Before :-



## Issue fixing history graph



After :-



## JMeter Load Testing Using CLI

20 threads

```
C:\Users\Hp\Downloads> "C:\Tools\apache-jmeter-5.6.3\apache-jmeter-5.6.3\bin\jmeter.bat" -n -t working_plan.jmx -l results20.jtl -e -o report20
WARN StatusConsoleListener The use of package scanning to locate plugins is deprecated and will be removed in a future release
WARN StatusConsoleListener The use of package scanning to locate plugins is deprecated and will be removed in a future release
WARN StatusConsoleListener The use of package scanning to locate plugins is deprecated and will be removed in a future release
WARN StatusConsoleListener The use of package scanning to locate plugins is deprecated and will be removed in a future release
Creating summariser <summary>
Created the tree successfully using working_plan.jmx
Starting standalone test @ 2025 Dec 2 07:23:55 IST (1764640435750)
Waiting for possible Shutdown/StopTestNow/HeapDump/ThreadDump message on port 4445
summary + 217 in 00:00:04 = 51.3/s Avg: 5 Min: 3 Max: 35 Err: 0 (0.00%) Active: 1 Started: 73 Finished: 72
summary + 293 in 00:00:06 = 51.2/s Avg: 4 Min: 3 Max: 10 Err: 0 (0.00%) Active: 0 Started: 170 Finished: 170
summary = 510 in 00:00:10 = 51.2/s Avg: 5 Min: 3 Max: 35 Err: 0 (0.00%)
Tidying up ... @ 2025 Dec 2 07:24:05 IST (1764640445783)
... end of run
```

## 50 threads

```
C:\Users\Hp\Downloads> "C:\Tools\apache-jmeter-5.6.3\apache-jmeter-5.6.3\bin\jmeter.bat" -n -t working_plan.jmx -l results50.jtl -e -o report50
WARN StatusConsoleListener The use of package scanning to locate plugins is deprecated and will be removed in a future release
WARN StatusConsoleListener The use of package scanning to locate plugins is deprecated and will be removed in a future release
WARN StatusConsoleListener The use of package scanning to locate plugins is deprecated and will be removed in a future release
WARN StatusConsoleListener The use of package scanning to locate plugins is deprecated and will be removed in a future release
Creating summariser <summary>
Created the tree successfully using working_plan.jmx
Starting standalone test @ 2025 Dec 2 07:24:42 IST (1764640482536)
Waiting for possible Shutdown/StopTestNow/HeapDump/ThreadDump message on port 4445
summary = 510 in 00:00:10 = 51.2/s Avg: 5 Min: 3 Max: 36 Err: 0 (0.00%)
Tidying up ... @ 2025 Dec 2 07:24:52 IST (1764640492569)
... end of run
```

## 100 Threads

```
C:\Users\Hp\Downloads> "C:\Tools\apache-jmeter-5.6.3\apache-jmeter-5.6.3\bin\jmeter.bat" -n -t working_plan.jmx -l results100.jtl -e -o report100
WARN StatusConsoleListener The use of package scanning to locate plugins is deprecated and will be removed in a future release
WARN StatusConsoleListener The use of package scanning to locate plugins is deprecated and will be removed in a future release
WARN StatusConsoleListener The use of package scanning to locate plugins is deprecated and will be removed in a future release
WARN StatusConsoleListener The use of package scanning to locate plugins is deprecated and will be removed in a future release
Creating summariser <summary>
Created the tree successfully using working_plan.jmx
Starting standalone test @ 2025 Dec 2 07:25:12 IST (1764640512339)
Waiting for possible Shutdown/StopTestNow/HeapDump/ThreadDump message on port 4445
summary = 510 in 00:00:10 = 51.2/s Avg: 4 Min: 2 Max: 32 Err: 0 (0.00%)
Tidying up ... @ 2025 Dec 2 07:25:22 IST (1764640522375)
... end of run
```

# 20 threads report

C:/Users/Hp/Downloads/report20/index.html

The screenshot displays a performance test report interface. At the top, there is a purple header bar with the path "C:/Users/Hp/Downloads/report20/index.html". Below the header, on the left, is a table showing Apdex values for four requests: Total, GET Ticket, GET Flight Details, and GET Booking History. All requests have an Apdex value of 1.000, a T (Tolerance threshold) of 500 ms, and an F (Frustration threshold) of 1 sec 500 ms. The "Label" column lists the request names. To the right of the table is a large green donut chart with a white center containing the text "PASS 100%". A legend indicates that red represents "FAIL" and green represents "PASS". Below the table and chart is a horizontal progress bar labeled "Execution".

**Statistics**

Requests	Executions				Response Times (ms)							Throughput		Network (KB/sec)	
	Label	#Samples	FAIL	Error %	Average	Min	Max	Median	90th pct	95th pct	99th pct	Transactions/s	Received	Sent	
Total	510	0	0.00%	5.28	3	35	4.00	7.90	8.00	10.00	51.87	28.37	7.36		
GET Booking History	170	0	0.00%	3.86	3	6	4.00	4.90	5.00	6.00	17.36	10.64	2.46		
GET Flight Details	170	0	0.00%	4.92	3	35	4.00	5.00	5.00	35.00	17.30	6.30	2.62		
GET Ticket	170	0	0.00%	7.07	5	10	7.00	8.00	9.00	10.00	17.37	11.54	2.31		

# 50 Threads Report

Screenshot of the Apache JMeter Dashboard showing the results of a 50-thread load test.

**Test and Report information:**

Source file	"results50.jtl"
Start Time	"12/2/25, 7:24 AM"
End Time	"12/2/25, 7:24 AM"
Filter for display	""

**APDEX (Application Performance Index):**

Apdex	T (Toleration threshold)	F (Frustration threshold)	Label
1.000	500 ms	1 sec 500 ms	Total
1.000	500 ms	1 sec 500 ms	GET Ticket
1.000	500 ms	1 sec 500 ms	GET Flight Details
1.000	500 ms	1 sec 500 ms	GET Booking History

**Requests Summary:**

A large green circle representing 100% successful requests. A small black square in the bottom right corner contains the text "PASS 100%". To the right of the circle is a legend: a red square labeled "FAIL" and a green square labeled "PASS".

**Statistics:**

Requests	Executions				Response Times (ms)							Throughput	Network (KB/sec)	
	Label	#Samples	FAIL	Error %	Average	Min	Max	Median	90th pct	95th pct	99th pct			
Total	510	0	0.00%	5.17	3	36	4.00	7.00	8.00	9.00	51.88	28.38	7.36	
GET Booking History	170	0	0.00%	3.85	3	6	4.00	5.00	5.00	6.00	17.37	10.64	2.46	
GET Flight Details	170	0	0.00%	4.94	3	36	4.00	5.00	6.00	36.00	17.31	6.31	2.62	
GET Ticket	170	0	0.00%	6.72	5	9	7.00	8.00	8.00	9.00	17.37	11.54	2.31	

# 100 Threads

Screenshot of the Apache JMeter Dashboard showing results for 100 threads.

**Test and Report information:**

Source file	"results100.jtl"
Start Time	"12/25, 7:25 AM"
End Time	"12/25, 7:25 AM"
Filter for display	""

**APDEX (Application Performance Index):**

Apdex	T (Toleration threshold)	F (Frustration threshold)	Label
1.000	500 ms	1 sec 500 ms	Total
1.000	500 ms	1 sec 500 ms	GET Ticket
1.000	500 ms	1 sec 500 ms	GET Flight Details
1.000	500 ms	1 sec 500 ms	GET Booking History

**Requests Summary:**

A large green circle representing 100% PASS requests. A small black box in the bottom right corner contains the text "PASS 100%". To the right of the circle is a legend: a red square labeled "FAIL" and a green square labeled "PASS".

**Statistics:**

Requests	Executions				Response Times (ms)							Throughput	Network (KB/sec)	
	Label	#Samples	FAIL	Error %	Average	Min	Max	Median	90th pct	95th pct	99th pct			
Total	510	0	0.00%	4.87	2	32	4.00	7.00	7.00	10.00	51.88	28.37	7.36	
GET Booking History	170	0	0.00%	3.65	2	7	4.00	4.00	5.00	7.00	17.36	10.63	2.46	
GET Flight Details	170	0	0.00%	4.64	3	32	4.00	5.00	5.00	32.00	17.31	6.30	2.62	
GET Ticket	170	0	0.00%	6.34	4	10	6.00	7.90	8.00	10.00	17.36	11.53	2.31	