

NEST HACKATHON

ARCHITECTURE AND DESIGN DOCUMENT

Submitted By

CARBON TEAM

ANOOP P M

JOHN CHRISTO

MANU FASIL M

Abstract

This Application is used for transfer money from one account to another accounts using mt103 parse method. When the user send a transfer request this application convert into MT103 Message Then Convert to MX message.

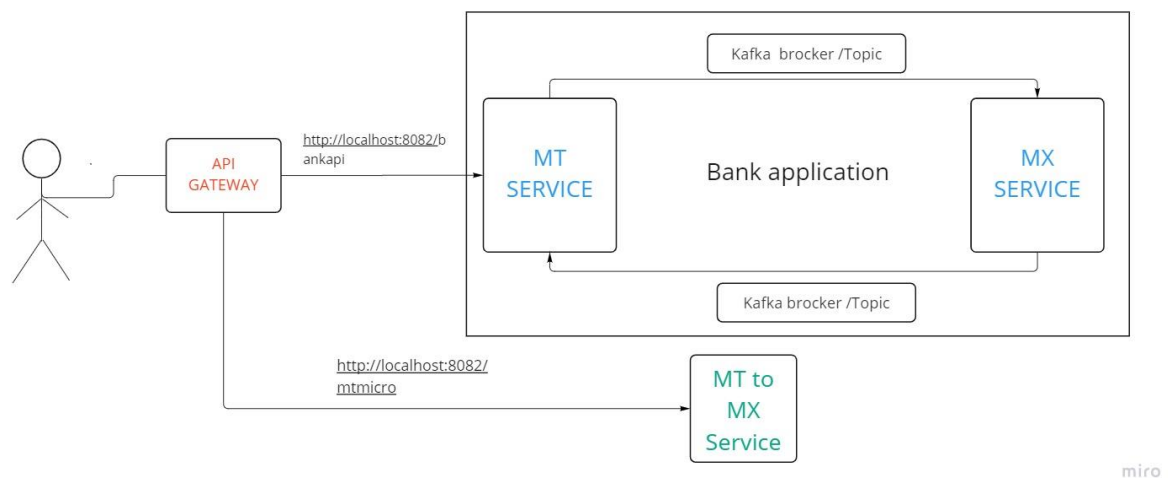
Used Technologies

- Java 8
- Spring boot
- Docker
- Kafka
- Mysql
- Swagger

Used Tools

- Docker Desktop
- Mysql Workbench
- Jmeter
- Spring tool
- Postman

ARCHITECTURE AND DESIGN



API GATEWAY

This Service is provides a flexible way of routing requests based on a number of criteria, as well as focuses on cross-cutting concerns such as security, resiliency, and monitoring. Spring Cloud Gateway aims to provide a simple, yet effective way to route to APIs and provide cross cutting concerns to them such as: security, monitoring/metrics, and resiliency.

Here we used to route the 2 micro services.

MT Service

This Service is used to convert User request to MT103 messages then This application produce message to a kafka topics(mtmessage).Also listening the kafka topic and Consume the messages and give a response to user .

- Also provide user registration for creating user account.
- Store Receiver account details.
- User Deposit
- Check user balance .

When we create account it is a zero balance account . All transactions are reflected through this given datas.

MX Service

This service is used to convert MT103 message to MX message .Using kafka consume technology for listening messages then this converted XML message produce to a kafka topics(mx message).

MT to MX Service .

This service is used to convert MT103 message to MX message Directly .Then give a response to user

Project Setup

- Install Java 8
- Set up Kafka Using Docker ,Docker compose file attached in project folder
- Create Kafka topic

```
kafka-topics.sh --create --topic mtmessage --bootstrap-server localhost:9092
```

```
kafka-topics.sh --create --topic mxmessage --bootstrap-server localhost:9092
```

Listen Kafka Messages

```
kafka-console-consumer.sh --topic mtmessage --from-beginning --
bootstrap-server localhost:9092
```

```
{
  "SenderAccountnumber": "790773028412345",
  "MTMessage": {
    "1: F01ENFEESS1A230000000000",
    "2: 103ENF43332XXXXN",
    "3: 121:724209c7-6d6e-4a68-becd-6c51bb0997bf",
    "4: \r\n:20:REFERENCE\r\n:23B:CRED\r\n:32A:220829INR1\r\n:50A:/790773028412345\r\nSBI\r\n:59:/9539931867123\r\nSBI\r\n:71A:OUR\r\n-)",
    "time": "2022-08-29T09:50:12.369307200Z"
  }
}
```

```
kafka-console-consumer.sh --topic mxmessage --from-beginning --
bootstrap-server localhost:9092
```

```
{ "MXmessage": "<message>\r\n<block1>\r\n\t<applicationId>F</applicationId>\r\n\r\n\t<serviceld>01</serviceld>\r\n\r\n\t<logicalTerminal>0000000000</logicalTerminal>\r\n\r\n\t</block1>\r\n\r\n\t<block2  
type=\"\r\n\r\n\t\t<messageType>103</messageType>\r\n\r\n\t\t<receiverAddress>N</receiverAddress>\r\n\r\n\t\t</block2>\r\n\r\n\t\t<blo  
ck3>\r\n\r\n\t\t\t<tag>\r\n\r\n\t\t\t\t<name>121</name>\r\n\r\n\t\t\t\t<value>6e7e8273-8467-4b0b-8b3a-  
0bc9a1d356a5</value>\r\n\r\n\t\t\t\t</tag>\r\n\r\n\t\t\t\t</block3>\r\n\r\n\t\t\t\t<block4>\r\n\r\n\t\t\t\t\t<tag>\r\n\r\n\t\t\t\t\t\t<name>20</name>\r\n\r\n\t\t\t\t\t\t<value>REFEREN  
CE</value>\r\n\r\n\t\t\t\t\t\t</tag>\r\n\r\n\t\t\t\t\t\t<tag>\r\n\r\n\t\t\t\t\t\t\t<name>23B</name>\r\n\r\n\t\t\t\t\t\t\t<value>CRED</value>\r\n\r\n\t\t\t\t\t\t\t</tag>\r\n\r\n\t\t\t\t\t\t\t<tag>\r\n\r\n\t\t\t\t\t\t\t\t<  
name>32A</name>\r\n\r\n\t\t\t\t\t\t\t\t<value>220829100</value>\r\n\r\n\t\t\t\t\t\t\t\t</tag>\r\n\r\n\t\t\t\t\t\t\t\t<tag>\r\n\r\n\t\t\t\t\t\t\t\t\t<name>50A</name>\r\n\r\n\t\t\t\t\t\t\t\t\t<value>/1  
70364789995554\r\n\r\n\t\t\t\t\t\t\t\t\tSBI</value>\r\n\r\n\t\t\t\t\t\t\t\t\t</tag>\r\n\r\n\t\t\t\t\t\t\t\t\t<tag>\r\n\r\n\t\t\t\t\t\t\t\t\t\t<name>59</name>\r\n\r\n\t\t\t\t\t\t\t\t\t\t<value>/11225546165621\r\n\r\n\t\t\t\t\t\t\t\t\t\tSBI  
</value>\r\n\r\n\t\t\t\t\t\t\t\t\t\t</tag>\r\n\r\n\t\t\t\t\t\t\t\t\t\t<tag>\r\n\r\n\t\t\t\t\t\t\t\t\t\t\t<name>71A</name>\r\n\r\n\t\t\t\t\t\t\t\t\t\t\t<value>OUR</value>\r\n\r\n\t\t\t\t\t\t\t\t\t\t\t</tag>\r\n\r\n\t\t\t\t\t\t\t\t\t\t\t</block4>\r\n\r\n\t\t\t\t\t\t\t\t\t\t</  
message>"}
```

- Install mysql and give password as root (password = root) and create Database mtbank(DB = mtbank)
- Then Run the 4 Spring boot applications using spring or other tools

Hackathon API Request Examples

Make sure all four API are running successfully

1. Create User

URI = <http://localhost:8082/bankapi/usercreate> (post method)

Json Request body =

```
{
  "accountnumber": "1720364789995555",
  "username": "Ajay"
}
```

2. Create Receivers bank details

URI = <http://localhost:8082/bankapi/addreceiveraccount> (post method)

Json Request body =

```
{
  "accountnumber": "11225546165620",
  "bankName": "SBI",
  "ifsc": "SBIN112445",
  "receivername": "Arshad"
}
```

3. User Deposit

URI = <http://localhost:8082/bankapi/deposit> (put method)

Json Request body =

```
{
  "accountnumber": "1720364789995555"
}
```

4. Transfer amount :this api take user data and create mt103 then send the mt103 message

URI = <http://localhost:8082/bankapi/transferrmessage> (post method)

Json Request body =

```
{
  "accountnumber": "790773028412345",
  "address": "SBI",
  "amount": "100",
  "bankname": "SBI",
  "currency": "INR",
  "receiver": "ENF43332",
  "receiverAccountNo": "9539931867123",
  "reference": "CRED",
  "sender": "ENFEES123"
}
```

```
{
  "status": 200,
  "message": "Amount Transferred Successfully",
  "mtmessage": "{1:F01ENFEESS1A230000000000}{2:I103ENF43332XXXXN}{3:{121:ebalf58e-ad28-429d-b2ba-2576fa8e06fb}}{4:{\r\n:20:ENF112344\r\n:23B:CRED\r\n:32A:220830INR1\r\n:50A:/1720364789995558\r\n\r\nSBI\r\n:59:/112255461656148\r\n\r\nSBI\r\n:71A:OUR\r\n-}}",
  "mxmessage": "<?xml version=\"1.0\" encoding=\"UTF-8\" ?>\n<Document xmlns=\"urn:iso:std:iso:20022:tech:xsd:pacs.008.001.08\">\r\n  <FIToFICstm\r\n    rCdtTrf>\r\n      <GrpHdr>\r\n        <MsgId>ENF112344</MsgId>\r\n        <CreDtTm>2022-08-30T17:32:16.773+05:30</CreDtTm>\r\n        <NbOfTxs>1</NbOfTxs>\r\n        <SttlmInf>\r\n          <SttlmMtd>INDA</SttlmMtd>\r\n          <SttlmAcct>\r\n            <Id>\r\n              <Othr>\r\n                <Id>00010013800002001234</Id>\r\n              </Othr>\r\n            </Id>\r\n          </SttlmAcct>\r\n          </SttlmInf>\r\n          <InstgAgt>\r\n            <FinInstn\r\n              Id></FinInstnId>\r\n            </InstgAgt>\r\n            <InstdAgt>\r\n              <FinInstn\r\n                Id></FinInstnId>\r\n              </InstdAgt>\r\n              </GrpHdr>\r\n              <CdtTrfTxInf>\r\n                <PmtId>\r\n                  <InstrId>ENF112344</InstrId>\r\n                  <EndTo\r\n                    EndId>ENF112344</EndToEndId>\r\n                  <TxId>ENF112344</TxId>\r\n                  </PmtId>\r\n                  <IntrBkSttlmAmt Ccy=\"INR\">1</IntrBkSttlmAmt>\r\n                  <IntrBkSttlmDt>2022-08-30</IntrBkSttlmDt>\r\n                  <ChrgBr>DEBT</ChrgBr>\r\n                  <Dbtr>\r\n                    <Nm>JOE DOE</Nm>\r\n                    <PstlAdr>\r\n                      <AdrLine>SBI</AdrLine>\r\n                    </PstlAdr>\r\n                    </Dbtr>\r\n                    <DbtrAcct>\r\n                      <Id>\r\n                        <Othr>\r\n                          <Id>1720364789995558</Id>\r\n                        </Othr>\r\n                      </Id>\r\n                    </DbtrAcct>\r\n                    <DbtrAgt>\r\n                      <FinInstnId>\r\n                        <BICFI>FOENXM</BICFI>\r\n                      </FinInstnId>\r\n                      </DbtrAgt>\r\n                      <CdtrAgt>\r\n                        <FinInstnId>\r\n                          <BICFI>1720364789995558 SBI</BICFI>\r\n                        </FinInstnId>\r\n                        </CdtrAgt>\r\n                        <Cdtr>\r\n                          <Nm>TEST C\r\n                          ORP</Nm>\r\n                          <PstlAdr>\r\n                            <AdrLine>LAS SBI</AdrLine>\r\n                          </PstlAdr>\r\n                          </Cdtr>\r\n                          <CdtrAcct>\r\n                            <Id>112255461656148</Id>\r\n                            </CdtrAcct>\r\n                            </CdtTrfTx\r\n                              Inf>\r\n                            </FIToFICstm\r\n                              rCdtTrf>\r\n                            </Document>\nXML : <message>\r\n\r\n<block1>\r\n\r\n\t<applicati\r\n          onId>F</applicationId>\r\n\r\n\t\t<serviceId>01</serviceId>\r\n\r\n\t\t\t<logicalTerminal>ENFEESS1A230</logi\r\n              calTerminal>\r\n\r\n\t\t\t\t<sessionNumber>0000</sessionNumber>\r\n\r\n\t\t\t\t\t<sequenceNumber>00000</sequenceNumb\r\n                  er>\r\n\r\n\t\t\t</block1>\r\n\r\n\t\t<block2 type=\"input\">\r\n\r\n\t\t\t<messageType>103</messageType>\r\n\r\n\t\t\t\t<receiver\r\n              Address>ENF43332XXXX</receiverAddress>\r\n\r\n\t\t\t\t\t<messagePriority>N</messagePriority>\r\n\r\n\t\t\t</block2>\r\n\r\n\t\t\t<block3>\r\n\r\n\t\t\t\t<tag>\r\n\r\n\t\t\t\t\t<name>121</name>\r\n\r\n\t\t\t\t\t\t<value>ebalf58e-ad28-429d-b2ba-2576fa8e06fb</value>\r\n\r\n\t\t\t\t\t</tag>\r\n\r\n\t\t\t\t</block3>\r\n\r\n\t\t\t\t<block4>\r\n\r\n\t\t\t\t\t<tag>\r\n\r\n\t\t\t\t\t\t<name>20</name>\r\n\r\n\t\t\t\t\t\t\t<value>ENF112344</value>\r\n\r\n\t\t\t\t\t\t</tag>\r\n\r\n\t\t\t\t\t\t<tag>\r\n\r\n\t\t\t\t\t\t\t<name>23B</name>\r\n\r\n\t\t\t\t\t\t\t\t<value>CRE\r\n                  D</value>\r\n\r\n\t\t\t\t\t\t\t</tag>\r\n\r\n\t\t\t\t\t\t\t<tag>\r\n\r\n\t\t\t\t\t\t\t\t<name>32A</name>\r\n\r\n\t\t\t\t\t\t\t\t\t<value>220830INR1</value>\r\n\r\n\t\t\t\t\t\t\t\t</tag>\r\n\r\n\t\t\t\t\t\t\t\t<tag>\r\n\r\n\t\t\t\t\t\t\t\t\t<name>50A</name>\r\n\r\n\t\t\t\t\t\t\t\t\t\t<value>/1720364789995558\r\n\r\n\t\t\t\t\t\t\t\t\t\tSBI</value>\r\n\r\n\t\t\t\t\t\t\t\t\t</tag>\r\n\r\n\t\t\t\t\t\t\t\t\t<tag>\r\n\r\n\t\t\t\t\t\t\t\t\t\t<name>59</name>\r\n\r\n\t\t\t\t\t\t\t\t\t\t\t<value>/112255461656148\r\n\r\n\t\t\t\t\t\t\t\t\t\t\tSBI</value>\r\n\r\n\t\t\t\t\t\t\t\t\t\t</tag>\r\n\r\n\t\t\t\t\t\t\t\t\t\t<tag>\r\n\r\n\t\t\t\t\t\t\t\t\t\t\t<name>71A</name>\r\n\r\n\t\t\t\t\t\t\t\t\t\t\t\t<value>OUR</value>\r\n\r\n\t\t\t\t\t\t\t\t\t\t\t</tag>\r\n\r\n\t\t\t\t\t</block4>\r\n\r\n\t</message>"
}
```

5. User Balance

URI =http://localhost:8082/bankapi/userbalance (Get Method)

Json request body:

```
{  
  "accountnumber": "1720364789995555"  
}
```

6. Receiver Balance

URI =http://localhost:8082/bankapi/receiverbalance (Get Method)

Json request body:

```
{  
  "accountnumber": "1244"  
}
```

7. MT to MX Converter

URI = http://localhost:8082/mtmicro/mttovalue (Get Method)

Json request body: This message takes from given 103.txt file

```
{  
  "message": "{1:F01BICFOOYYAXXX8683497519}{2:01031535051028ESPBESMMAXX5423752247  
0510281535N}{3:{113:ROMF}{108:0510280182794665}{119:STP}}{4:\r\n:20:006135011308990  
8\r\n:13C:/RNCTIME/1534+0000\r\n:23B:CRED\r\n:23E:SDVA\r\n:32A:061028EUR100000,\r\n  
:33A:081029EUR120000,\r\n:33B:EUR100000,\r\n:50K:/12345678\r\nAGENTES DE BOLSA FOO  
AGENCIA\r\nAV XXXXX 123 BIS 9 PL\r\n12345 BARCELONA\r\n:52A:/2337\r\nFOOAESMMXXX\r\n  
:53A:FOOAESMMXXX\r\n:57A:BICFOOYYXXX\r\n:59:/ES0123456789012345671234\r\nFOO AGENT  
ES DE BOLSA ASOC\r\n:71A:OUR\r\n:72:/BNF/TRANSF. BCO. FOO\r\n-  
}{5:{MAC:88B4F929}{CHK:22EF370A4073}}"  
}
```

Response

```
"status": 200,  
  "message": "<message>\r\n<block1>\r\n\t<applicationId>F</applicationId>\r\n\t<serviceId>01  
</serviceId>\r\n\t<logicalTerminal>BICFOOYYAXXX</logicalTerminal>\r\n\t<sessionNumber>8683</se  
ssionNumber>\r\n\t<sequenceNumber>497519</sequenceNumber>\r\n\t<block1>\r\n\t<block2 type=\"outpu  
t\">\r\n\t\t<messageType>103</messageType>\r\n\t\t<senderInputTime>1535</senderInputTime>\r\n\t\t<MI  
RDate>051028</MIRDate>\r\n\t\t<MIRLogicalTerminal>ESPBESMMAXX</MIRLogicalTerminal>\r\n\t\t<MIRSe  
sionNumber>5423</MIRSessionNumber>\r\n\t\t<MIRSequenceNumber>752247</MIRSequenceNumber>\r\n\t\t<re  
ceiverOutputDate>051028</receiverOutputDate>\r\n\t\t<receiverOutputTime>1535</receiverOutputTime  
>\r\n\t\t<messagePriority>N</messagePriority>\r\n\t</block2>\r\n\t<block3>\r\n\t\t<tag>\r\n\t\t\t<name>1
```

```
13</name>\r\n\t\t<value>ROMF</value>\r\n\t</tag>\r\n\t<tag>\r\n\t\t<name>108</name>\r\n\t\t<value>0510280182794665</value>\r\n\t</tag>\r\n\t<tag>\r\n\t\t<name>119</name>\r\n\t\t<value>STP</value>\r\n\t</tag>\r\n\t</block3>\r\n\t<block4>\r\n\t\t<tag>\r\n\t\t\t<name>20</name>\r\n\t\t\t<value>0061350113089908</value>\r\n\t\t</tag>\r\n\t\t<tag>\r\n\t\t\t<name>13C</name>\r\n\t\t\t<value>/RNCTIME/1534+0000</value>\r\n\t\t</tag>\r\n\t\t<tag>\r\n\t\t\t<name>23B</name>\r\n\t\t\t<value>CRED</value>\r\n\t\t</tag>\r\n\t\t<tag>\r\n\t\t\t<name>23E</name>\r\n\t\t\t<value>SDVA</value>\r\n\t\t</tag>\r\n\t\t<tag>\r\n\t\t\t<name>32A</name>\r\n\t\t\t<value>061028EUR100000,</value>\r\n\t\t</tag>\r\n\t\t<tag>\r\n\t\t\t<name>33A</name>\r\n\t\t\t<value>081029EUR120000,</value>\r\n\t\t</tag>\r\n\t\t<tag>\r\n\t\t\t<name>33B</name>\r\n\t\t\t<value>EUR100000,</value>\r\n\t\t</tag>\r\n\t\t<tag>\r\n\t\t\t<name>50K</name>\r\n\t\t\t<value>/12345678\r\nAGENTES DE BOLSA FOO AGENCIA\r\nAV XXXXX 123 BIS 9 PL\r\n12345 BARCELONA</value>\r\n\t\t</tag>\r\n\t\t<tag>\r\n\t\t\t<name>52A</name>\r\n\t\t\t<value>/2337\r\nFOOAESMMXXX</value>\r\n\t\t</tag>\r\n\t\t<tag>\r\n\t\t\t<name>53A</name>\r\n\t\t\t<value>FOOAESMMXXX</value>\r\n\t\t</tag>\r\n\t\t<tag>\r\n\t\t\t<name>57A</name>\r\n\t\t\t<value>BICFOOYXXX</value>\r\n\t\t</tag>\r\n\t\t<tag>\r\n\t\t\t<name>59</name>\r\n\t\t\t<value>/ES0123456789012345671234\r\nFOO AGENTES DE BOLSA ASOC</value>\r\n\t\t</tag>\r\n\t\t<tag>\r\n\t\t\t<name>71A</name>\r\n\t\t\t<value>OUR</value>\r\n\t\t</tag>\r\n\t\t<tag>\r\n\t\t\t<name>72</name>\r\n\t\t\t<value>/BNF/TRANSF. BCO. FOO</value>\r\n\t\t</tag>\r\n\t\t</block4>\r\n\t<block5>\r\n\t\t<tag>\r\n\t\t\t<name>MAC</name>\r\n\t\t\t<value>88B4F929</value>\r\n\t\t</tag>\r\n\t\t<tag>\r\n\t\t\t<name>CHK</name>\r\n\t\t\t<value>22EF370A4073</value>\r\n\t\t</tag>\r\n\t</block5>\r\n</message>",&br/>"mxMessage": "<?xml version=\"1.0\" encoding=\"UTF-8\" ?>\n<Document xmlns=\"urn:iso:std:iso:20022:tech:xsd:pacs.008.001.08\">\r\n  <FIToFICstmrCdtTrf>\r\n    <GrpHdr>\r\n      <MsgId>0061350113089908</MsgId>\r\n      <CreDtTm>2022-08-30T17:34:52.522+05:30</CreDtTm>\r\n      <NbOfTx>1</NbOfTx>\r\n      <SttlmInf>\r\n        <SttlmMtd>INDA</SttlmMtd>\r\n        <SttlmAcct>\r\n          <Id>\r\n            <Othr>\r\n              <Id>00010013800002001234</Id>\r\n            </Othr>\r\n          </Id>\r\n        </SttlmAcct>\r\n        <SttlmInf>\r\n          <InstgAgt>\r\n            <FinInstnId>\r\n              <BICFI>FOOAESMMXXX</BICFI>\r\n            </FinInstnId>\r\n          </InstgAgt>\r\n          <InstdAgt>\r\n            <FinInstnId>\r\n              <BICFI>BICFOOYXXX</BICFI>\r\n            </FinInstnId>\r\n          </InstdAgt>\r\n        </GrpHdr>\r\n        <CdtTrfTxInf>\r\n          <PmtId>\r\n            <InstrId>0061350113089908</InstrId>\r\n            <EndToEndId>0061350113089908</EndToEndId>\r\n            <TxId>0061350113089908</TxId>\r\n            <PmtId>\r\n              <IntrBkSttlmAmt Ccy=\"EUR\">100</IntrBkSttlmAmt>\r\n              <IntrBkSttlmDt>2022-08-30</IntrBkSttlmDt>\r\n              <ChrgBr>DEBT</ChrgBr>\r\n              <Dbtr>\r\n                <Nm>JOE DOE</Nm>\r\n                <PstlAdr>\r\n                  <AdrLine>BARCELONA</AdrLine>\r\n                </PstlAdr>\r\n              </Dbtr>\r\n              <DbtrAcct>\r\n                <Id>\r\n                  <Othr>\r\n                    <Id>12345678</Id>\r\n                  </Othr>\r\n                </Id>\r\n              </DbtrAcct>\r\n              <DbtrAgt>\r\n                <FinInstnId>\r\n                  <BICFI>FOOAESMMXXX</BICFI>\r\n                </FinInstnId>\r\n              </DbtrAgt>\r\n              <CdtrAgt>\r\n                <FinInstnId>\r\n                  <BICFI>BICFOOYXXX</BICFI>\r\n                </FinInstnId>\r\n              </CdtrAgt>\r\n              <Cdtr>\r\n                <Nm>TEST CORP</Nm>>\r\n                <PstlAdr>\r\n                  <AdrLine>LAS ASOC</AdrLine>\r\n                </PstlAdr>\r\n              </Cdtr>\r\n              <CdtrAcct>\r\n                <Id>\r\n                  <Othr>\r\n                    <Id>ES0123456789012345671234</Id>\r\n                  </Othr>\r\n                </Id>\r\n              </CdtrAcct>\r\n            </CdtTrfTxInf>\r\n          </FIToFICstmrCdtTrf>\r\n        </Document>\n"
```

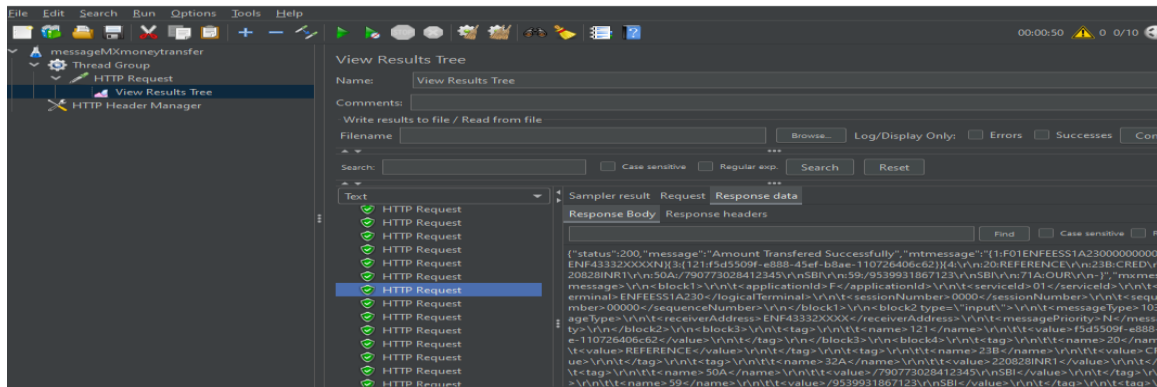

Project Performance Test

Using JMETER

Here we give 2 threads and 100 loops in one second ramp period so we get zero Error%.

When we give 10 thread with 50 loops the error percentage is 5% .

Here only showing our major rest api call for Transfer money .



AGGREGATE REPORT

Aggregate Report													
Name: Aggregate Report													
Comments:													
Write results to file / Read from file													
Filename: Browse...													
Log/Display Only: Errors Successes Configure													
Label	# Samples	Average	Median	90% Line	95% Line	99% Line	Min	Maximum	Error %	Throughput	Received KB...	Sent KB/sec	
HTTP Reque...	210	11127	10279	10304	10315	41308	5157	51395	0.00%	11.3/min	0.29	0.08	
TOTAL	210	11127	10279	10304	10315	41308	5157	51395	0.00%	11.3/min	0.29	0.08	

Label	# Samples	Average	Min	Max	Std. Dev.	Error %	Throughput	Received KB/...	Sent KB/sec	Avg. Bytes
HTTP Request	10	25117	5150	45104	12747.95	0.00%	11.7/min	0.30	0.08	1557.0
TOTAL	10	25117	5150	45104	12747.95	0.00%	11.7/min	0.30	0.08	1557.0

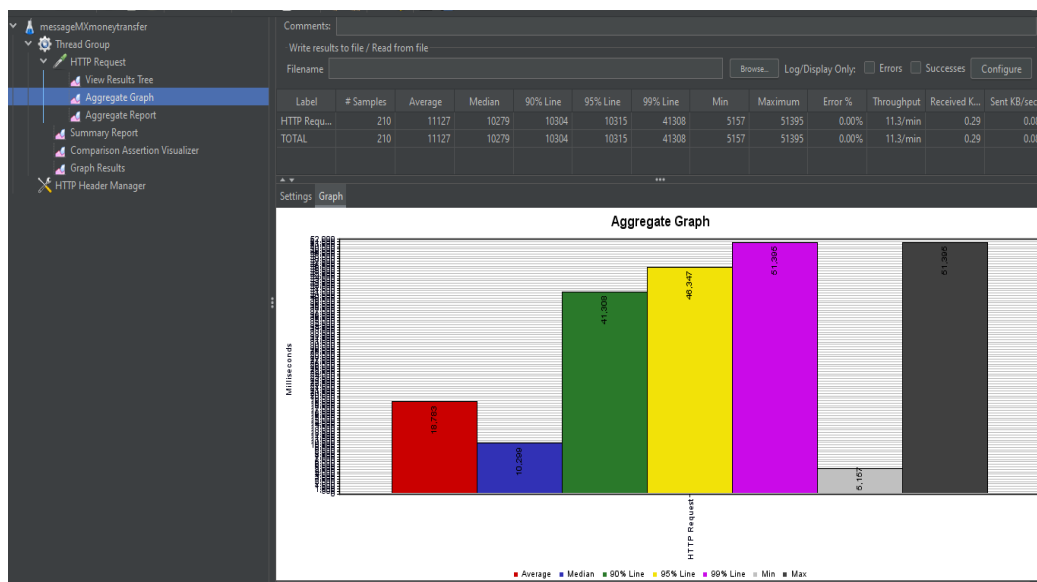
AGGREGATE Summary

Label	# Samples	Average	Min	Max	Std. Dev.	Error %	Throughput	Received KB/sec	Sent KB/sec	Avg. Bytes
HTTP Request	210	11127	5157	51395	5055.50	0.00%	11.3/min	0.29	0.08	1551.9
TOTAL	210	11127	5157	51395	5055.50	0.00%	11.3/min	0.29	0.08	1551.9

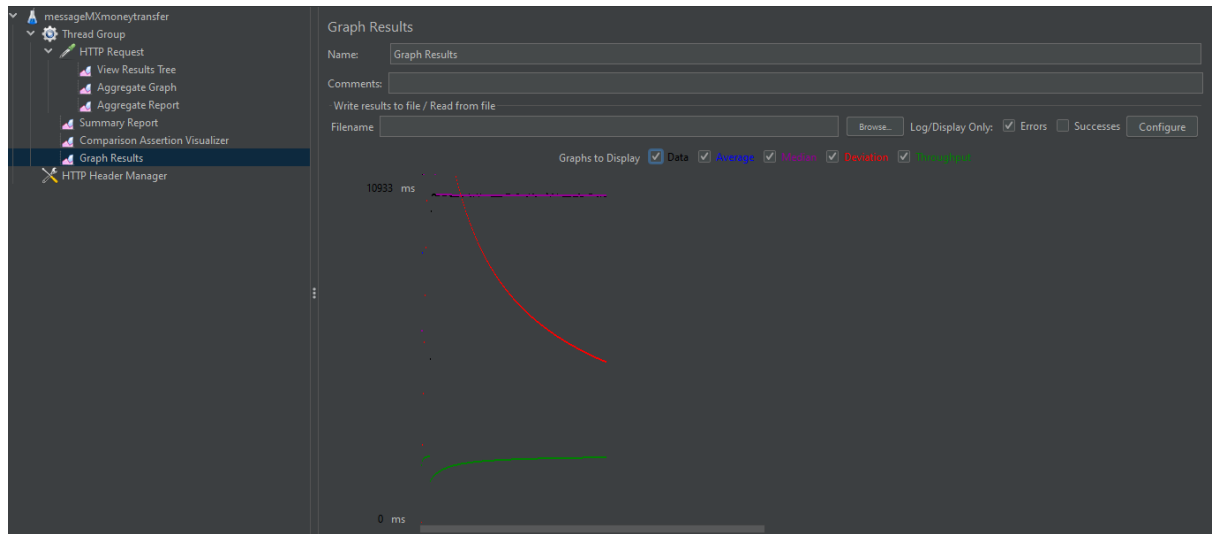
AGGREGATE Summary

Label	# Samples	Average	Min	Max	Std. Dev.	Error %	Throughput	Received KB/sec	Sent KB/sec	Avg. Bytes
HTTP Request	100	32433	128	81374	20437.87	5.00%	8.5/min	0.21	0.06	1489.3
TOTAL	100	32433	128	81374	20437.87	5.00%	8.5/min	0.21	0.06	1489.3

AGGREGATE Graph



GRAPH



JUNIT TESTING

JUnit test for 7 modules

Here we created 8 Unit test cases for all rest api services . All service tests are passed .

```
100 //
101 //
102 //
103 //
104 //
105 //
106 //
107 //
108 //
109 //
110 //
111 //
112 //
113 //
114 //
115 //
116 //
117 //
118 //
119 //
120 //
121 //
122 //
123 //
124 //
125 //
126 //
127 //
128 //
129 //
130 //
131 //
132 //
133 //
134 //
135 //
136 //
137 //
138 //
139 //
140 //
141 //
142 //
143 //
144 //
145 //
146 //
147 //
148 //
149 //
150 //
151 //
152 //
153 //
154 //
155 //
156 //
157 //
158 //
159 //
160 //
161 //
162 //
163 //
164 //
165 //
166 //
167 //
168 //
169 //
170 //
171 //
172 //
173 //
174 //
175 //
176 //
177 //
178 //
179 //
180 //
181 //
182 //
183 //
184 //
185 //
186 //
187 //
188 //
189 //
190 //
191 //
192 //
193 //
194 //
195 //
196 //
197 //
198 //
199 //
200 //
```

Finished after 13.022 seconds

Runs: 8/8 Errors: 0 Failures: 0

TestRest (Runner: JUnit 5) (6.013 s)

- testCreate() (0.345 s)
- getBalance() (0.170 s)
- getReceiverBalance() (0.010 s)
- receiverAccount() (0.009 s)
- serviceOne() (0.019 s)
- serviceTwo() (0.009 s)
- transfer() (5.399 s)
- receiverBankService() (0.042 s)

Failure Trace

```
1340 @Test
1341 @Order(8)
1342 public void receiverBankService() {
1343     ReceiverBank p = new ReceiverBank();
1344     p.setId(1L);
1345     p.setAccountBalance(0);
1346     p.setAccountNumber("11111");
1347     p.setBankName("sbi");
1348     p.setIfscCode("sbins55");
1349 }
```

Element	Coverage	Covered Instruction...	Miss
usermtmessageservices	69.2 %		835
src/main/java	64.4 %		664
com.example.usermtmessageservices.servi	59.7 %		339
com.example.usermtmessageservices.conf	4.3 %		3
com.example.usermtmessageservices.entit	72.2 %		127
com.example.usermtmessageservices.mocl	62.5 %		30
com.example.usermtmessageservices	37.5 %		3
com.example.usermtmessageservices.conf	100.0 %		162
src/test/java	97.7 %		171
com.example.usermtmessageservices	97.7 %		171
UsermtmessageservicesApplicationTest	0.0 %		0
TestRest.java	100.0 %		171

Console Problems Progress

<terminated> TestRest (JUnit5) D:\s\orino-tool-suite-

SWAGGER IMPLIMENTATION

We use the swagger for the rest control testing and documentation.

