Distributed Applications
Project 1: Cloud-based Deployment and Testing

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Group 21:

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1 Code for the Analysis

1.1 Definition of the functions

The function `concurrent_test` is used to test the performance of the API requests. This function sends multiple requests to a server concurrently using Python's ThreadPoolExecutor, and calculates the total response time for each request. The function takes in the DNS, port, list of requests, number of requests, and request type (either REST or SOAP) as inputs. The output is a dictionary containing the total response time for each request.

```
def send_rest(url, method, payload=None)
def send_soap(url, data)
def concurrent_test(dns, port, request_list, num_requests, req='REST')
```

1.1.1 Run the REST requests

```
rest_port = 8081
rest_request_list = [
    ['/rest/order', 'POST', {'address': '123 Main St', 'meals': ['Fish and␣
 ↪Chips', 'Steak']}],
    ['/rest/meals', 'GET'],
    ['/rest/largest-meal', 'GET'],
    ['/rest/cheapest-meal', 'GET']
]
```
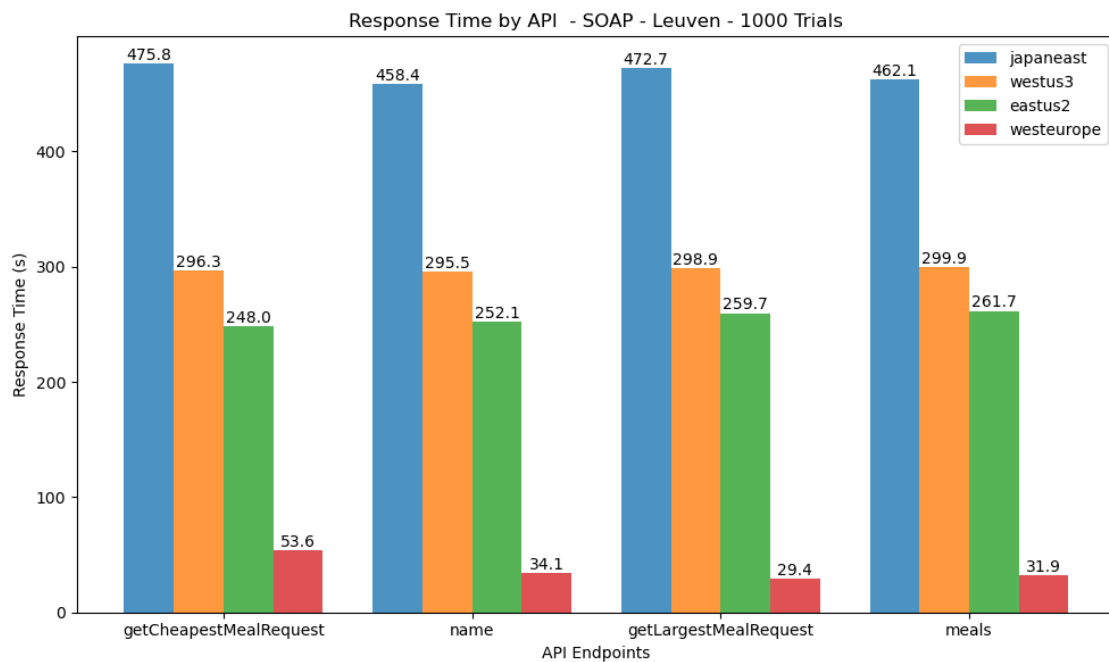
1.1.2 REST Request - Leuven

Response Time by API - REST - Leuven - 1000 Trials
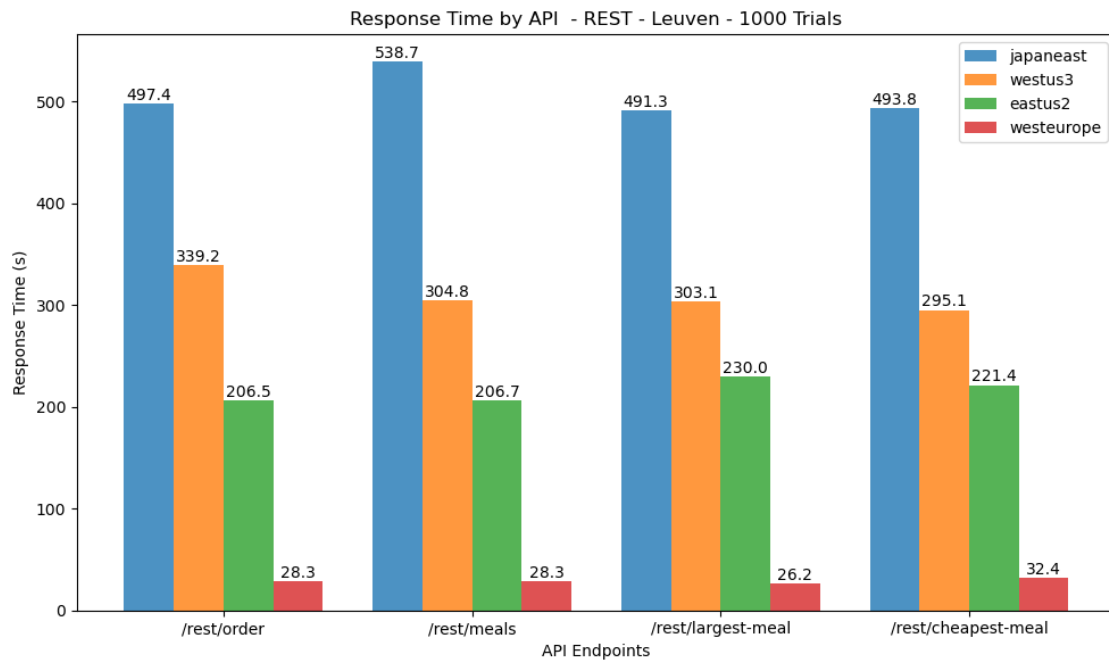
1.1.3 Run the SOAP requests

```
soap_port = 8082
# read the soap requests from the soap_requests directory
```

1.2 SOAP Requests - Leuven

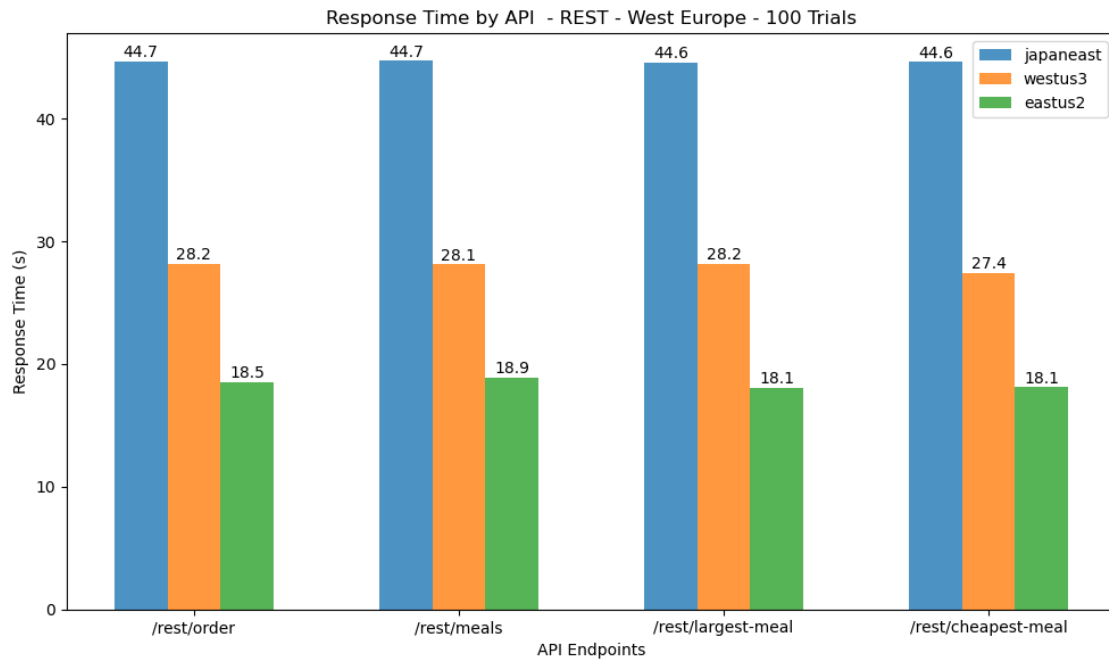**Response Time by API - SOAP - Leuven - 1000 Trials**
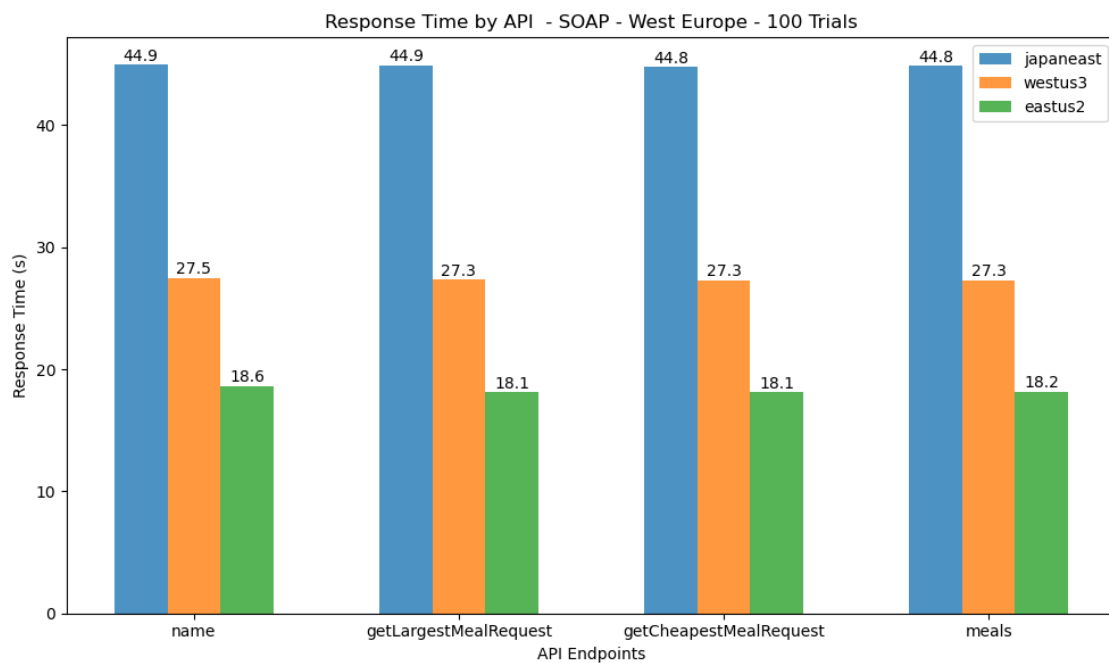
2 Data from the Azure VMs

The following data was generated by running the scripts on the Azure VMs.

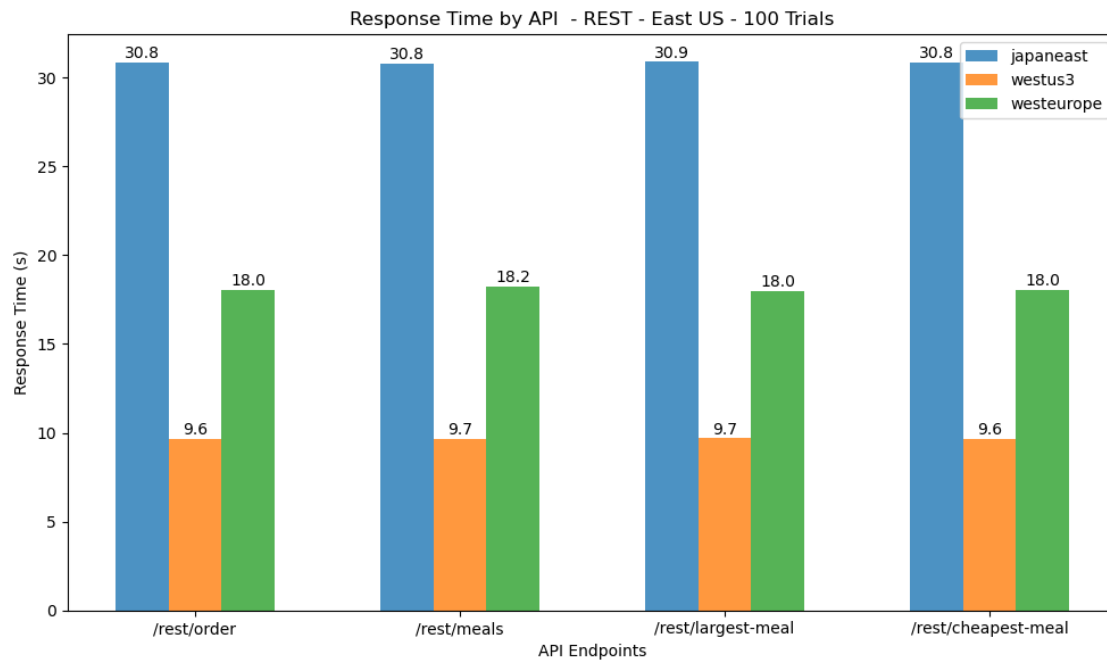## 2.1 West Europe

2.1.1 REST Requests - West Europe

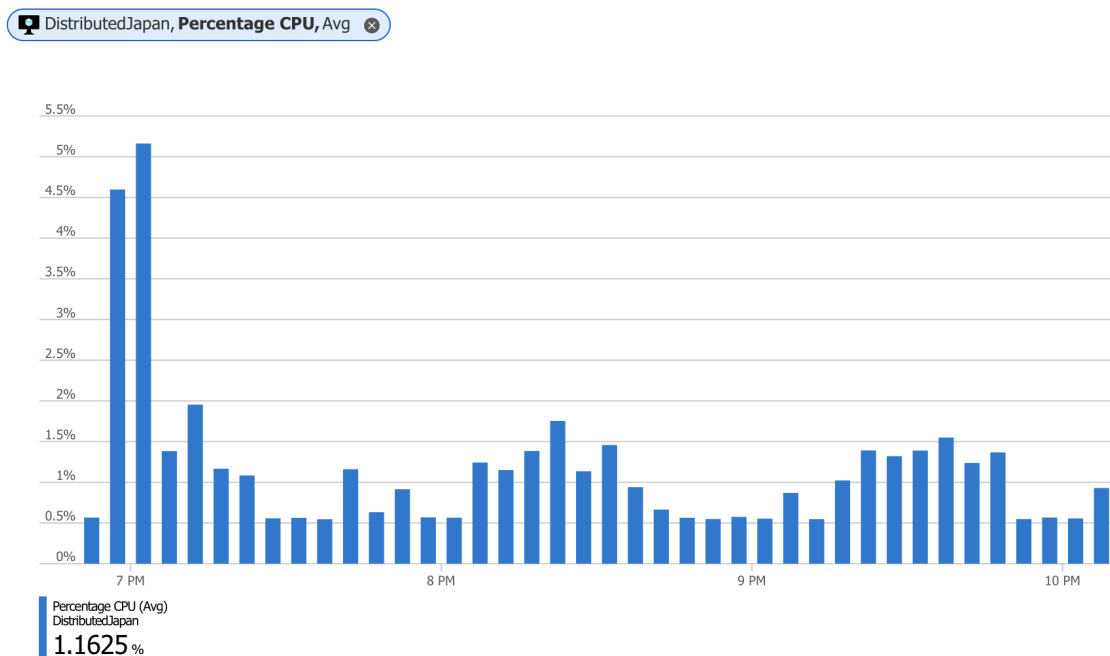### 2.1.2 SOAP Requests - West Europe

2.2 East US
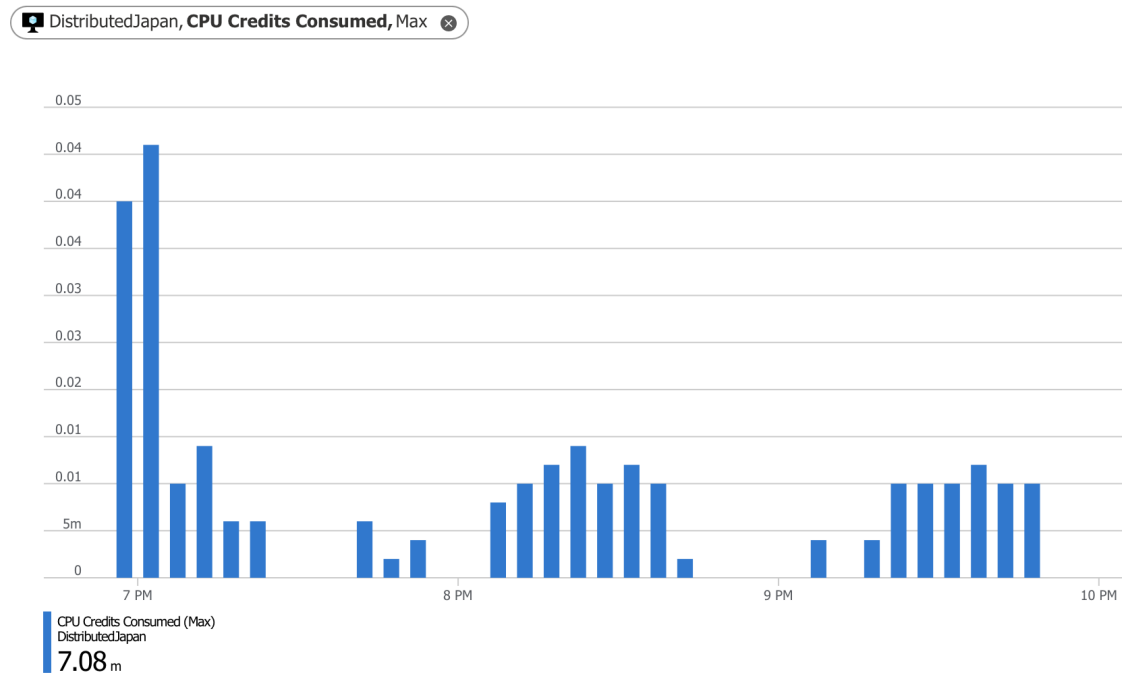
2.2.1 REST Requests - East US

Response Time by API - REST - East US - 100 Trials

3 Azure Metrics

3.1 Japan East

3.1.1 CPU Usage

DistributedJapan, **Percentage CPU,** Avg

Percentage CPU (Avg)
DistributedJapan
1.1625 %

3.1.2 Credit Usage

4 Observations

1. **Geographical Proximity**: The response times are generally shorter when the server is geographically closer to the client. In this case, since the client is running the code from West Europe, the response times for the West Europe server are significantly lower than the response times for servers located in Japan, East US, and West US.

2. **API Type**: REST API response times are generally lower than SOAP API response times due to JSON being more compact and faster to parse than XML used by SOAP APIs. REST APIs also have a simpler message structure.

3. **CPU and Credit Usage**: As expected, Azure's CPU and credit usage increases during request processing.