

# **THE ANALYSIS AND DEVELOPMENT OF AN APPLICATION SERVER**

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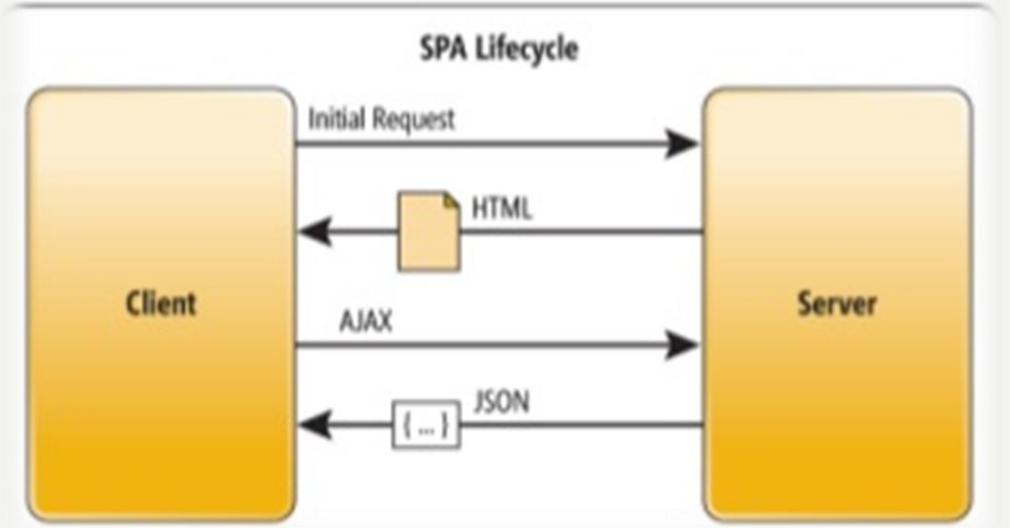
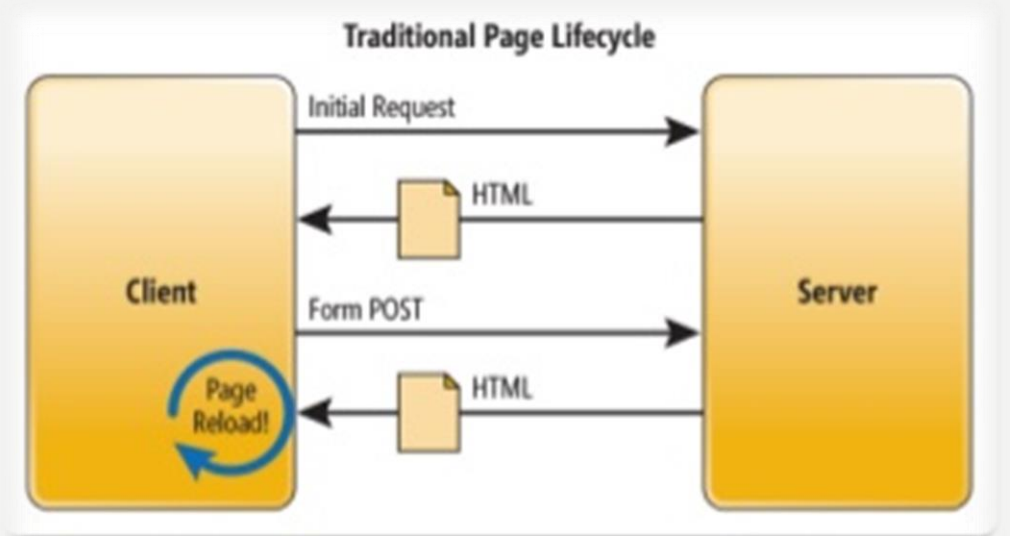


# OBJECTIVE

**DESIGN OF A FRAMEWORK FOR BUILDING AN APPLICATION SERVER THAT SUPPORTS A LARGE NUMBER OF REQUESTS BY COMBINING ASPECTS OF THREADS & EVENT-BASED PROGRAMMING MODULES.**

# WHY?

- Single Page
  - MVC
  - Data comes in portions (JSON format)
    - Lot of requests
- Client's processing power greater nowadays

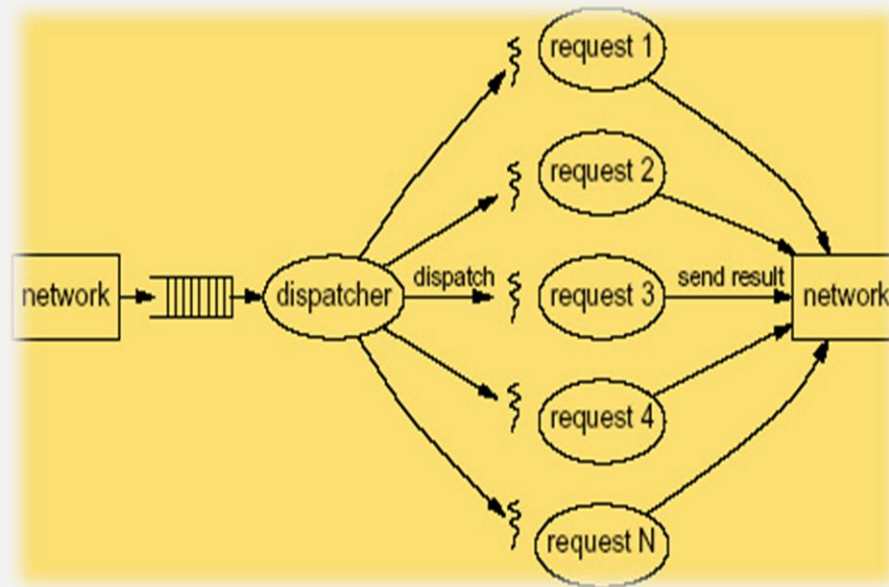


# SOFTWARE REQUIREMENTS

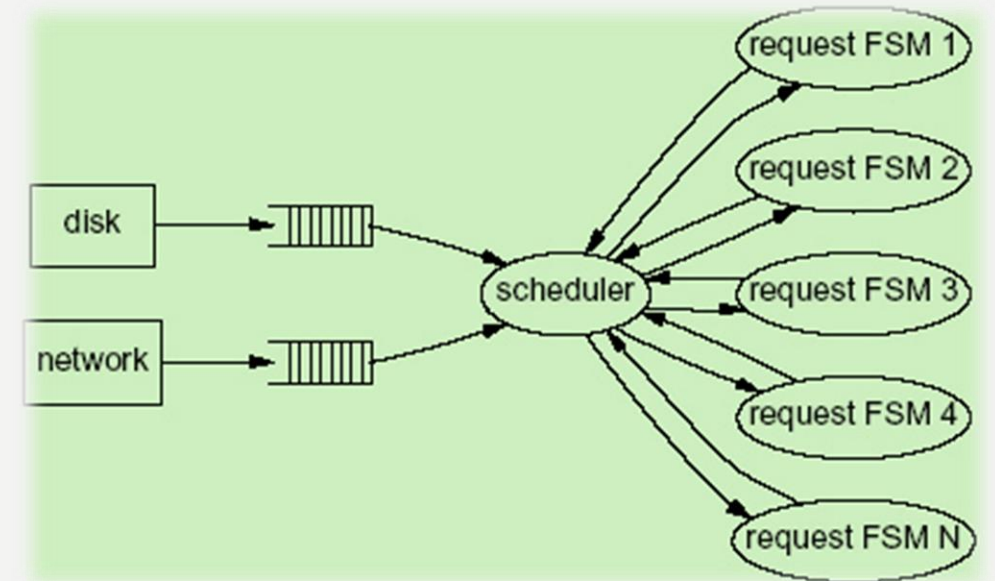
- SW serves as a framework for building an application server
- SW supports programming in different phases
- Accepts a large number of requests
  - Little response time
- Mechanism that aid SW developers obtain highly concurrent, well-conditioned services
- Uses best of both worlds
  - Event-based
  - Thread-based

# DESIGN (CURRENT ARCHITECTURES)

## THREAD-BASED

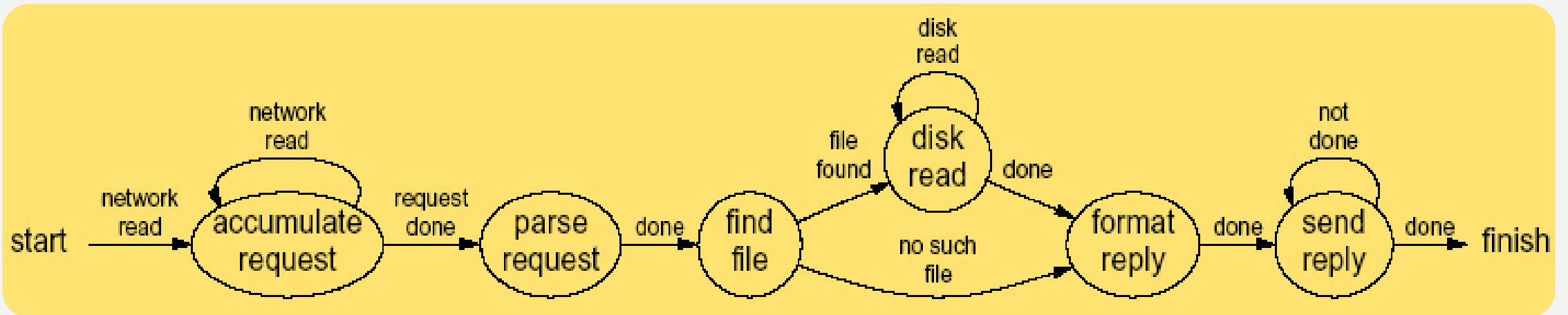


## EVENT-BASED



# DESIGN (PROPOSED ARCHITECTURE) PIPELINE

- SEDA architecture
  - Web Server
  - Design in phases
  - Non-blocking request



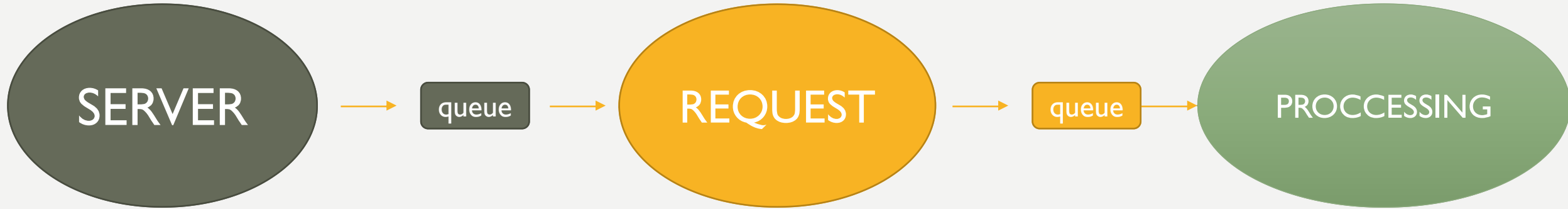
# **IMPLEMENTATION**

## **DEVELOPMENT ENVIRONMENT & TECHNOLOGIES**

- OS Linux Mint 64 bit
- C++
- STD C++ 14 library
- Threads Library



# IMPLEMENTATION



- Builds socket server
- Listen to port 30000 for a new request
- Inform the next phase for the new request

- Waits for the request from previous phase
- Reads and formats the request
- Inform the next phase for the new request

- Processes the request
- Applies the required business logic
- Prepares data structure

# TESTING

## *COMPARISON WITH APACHE*

- 1000 requests

	Project's web server	Apache
Test's total time	0.204 sec	0.208 sec
Requests/sec	4911	4810
Max time of request	20.359 ms	20.7 ms
Average time for all concurrents	0.204 ms	0.208ms

# TESTING

## *COMPARISON WITH APACHE*

- 10000 requests

	Project's web server	Apache
Test's total time	0.85 sec	1.3 sec
Requests/sec	11649	7634
Max time of request	85.8 ms	13 ms
Average time for all concurrents	0.086 ms	0.131ms

# TESTING

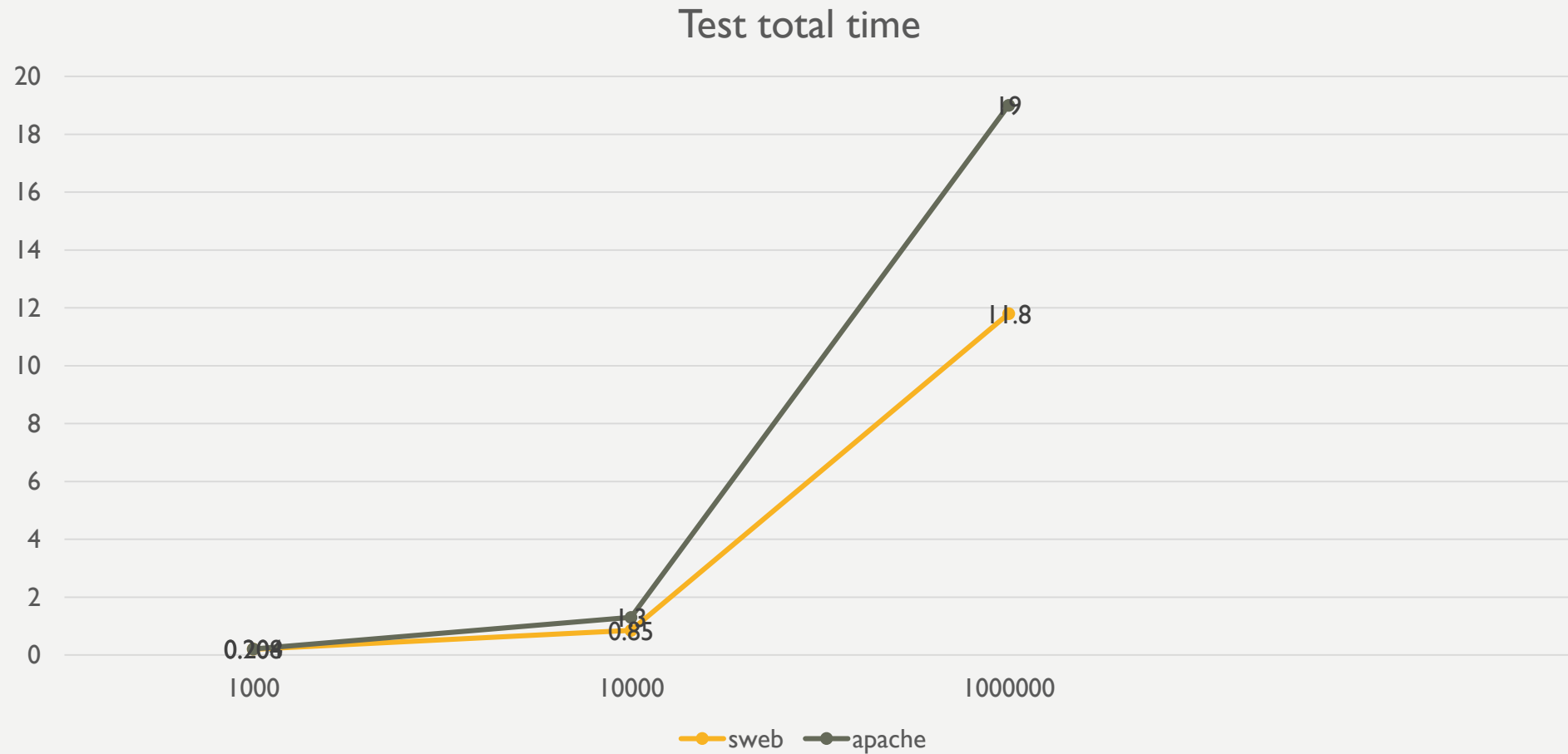
## *COMPARISON WITH APACHE*

- 100000 requests

	Project's web server	Apache
Test's total time	11.8 sec	19.0 sec
Requests/sec	6001	5230
Max time of request	16.3 ms	191.1ms
Average time for all concurrent	0.164 ms	0.191ms

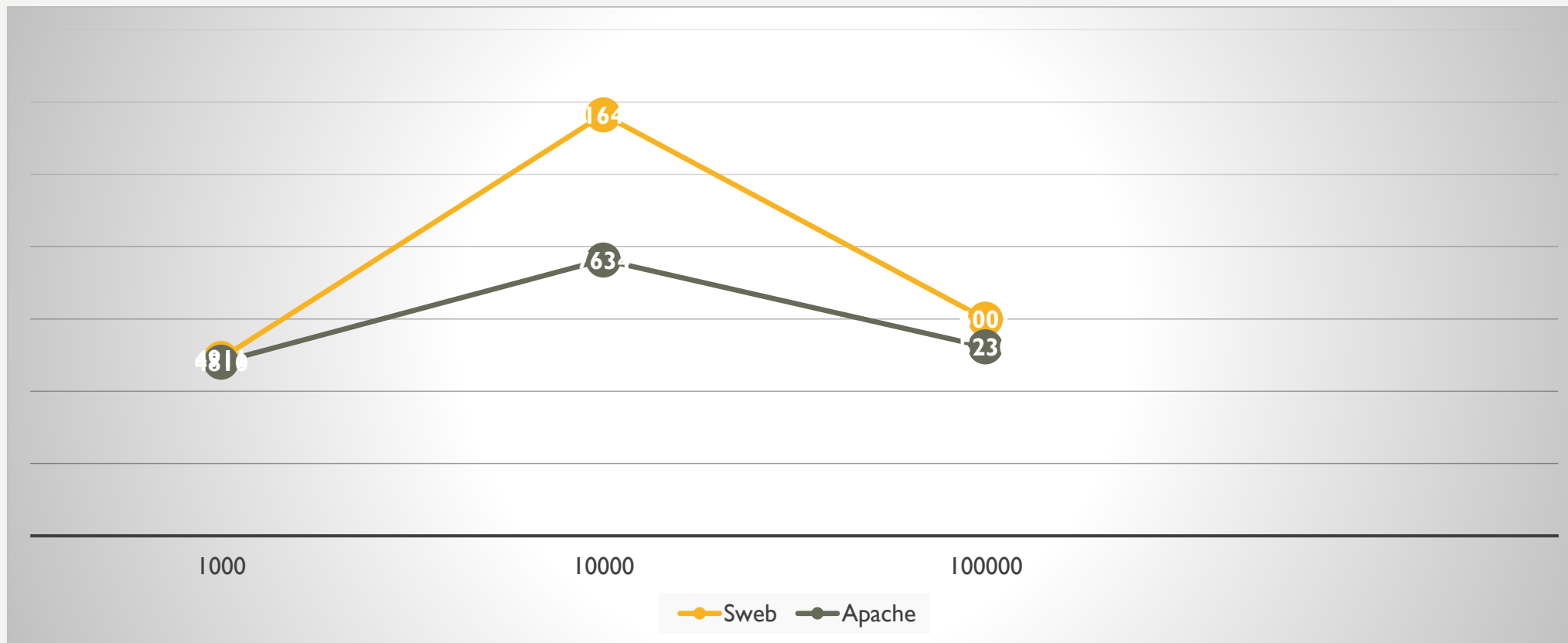
# TESTING

## *TOTAL TIME OF TEST*



# TESTING

## *REQUESTS PER SECOND*



# CONCLUSIONS

- The architecture proposed is easily implemented as a SW using C++
- The framework for building an application server has successfully been developed
- The performance in comparison with current architectures in web servers has improved
  - Multi-threading and pipeline programming combined boost the performance of the application server.



**THANK YOU!**