



Performance Report

Introduction

To determine the performance and scalability of ZK framework, we arrange a series of tests, a simple form, and grid with 15 or 150 records. We record the average response time, memory consumption, and cpu loading of each test. For comparison, we also include static page of ZK, and ICEfaces which is a JSF Framework.

Test Environment

- **Hardware**
 - CPU: Intel Core 2 Duo P8600 2.4 GHz 2GB
 - Memory:4GB
 - Network Adapter: Intel 82567LM Gigabit Ethernet Connection

- **Software**
 - ZK 3.5.2
 - ICEfaces 1.7.2
 - JDK 1.6.0_10
 - Apache Tomcat Server 6.0.18
 - Jmeter 2.3.2
 - VisualVM 1.1.1
- **Configurations**
 - Tomcat
 - ◆ Session time-out: 30 mins
 - ◆ -Xms 256MB
 - ◆ -Xmx 1024MB
 - ◆ maxThreads: 1000
 - ◆ acceptCount: 200
 - Jmeter
 - ◆ Loop per test case: 50.

Test Plan

This performance test includes 3 test scenarios, a simple form, a grid with 15 records, and a grid with 150 records. To determine the performance of ZK, we also test the static page of ZK, and ICEfaces, a JSF framework.

- Target
 - Static page (ZK), ZK, Icefaces
- Test Cases
 - Simple Form, Grid with 15 records, Grid with 150 records

Test Case1 – Simple Form

- Test Case

This simple form includes 3 fields, name, password, and comment.

ZK

ICEfaces

- Response Time

- ZK:

- Less than 2 seconds response time when concurrent threads reach 1000.

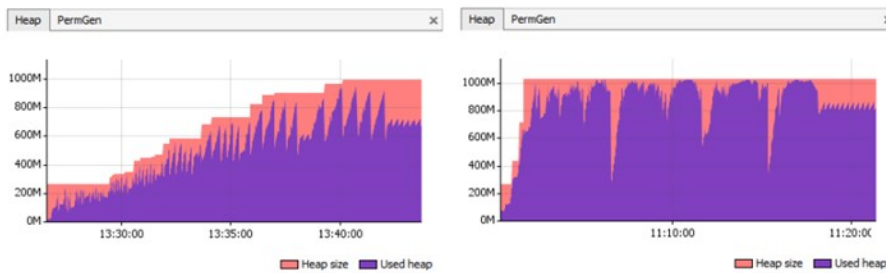
- ICEfaces:

- Response time exceeds 4 seconds when concurrent threads are over 700.

- Response time exceeds 5 seconds when concurrent threads are over 800

- Response time exceeds 6 seconds when concurrent threads are over 900.

- Memory Consumption



ZK

ICEfaces

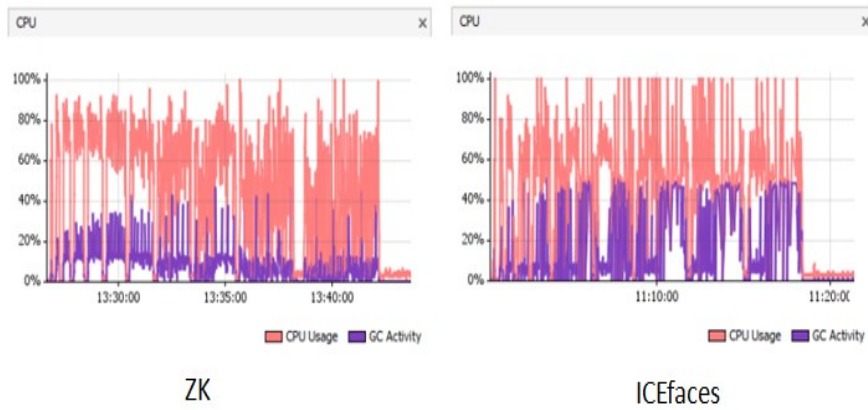
- ZK

- Use 100 MB memory per 100 concurrent threads.

- ICEfaces

- Use approximate 1 GB memory when 400 concurrent threads

- CPU Loading



■ ZK



■ ICEfaces

Test Case2 – Grid with Model

- Test Case:

This test case includes a grid, and a model with 15 records of employees' information.

Aul Title	Publisher	Hardcover
10 Ethan	Smith	555-4562
15 Jacob	Smith	555-4563
20 Logan	Smith	555-4564
25 Benjamin	Smith	555-4565
30 Jack	Smith	555-4566
35 Noah	Johnson	555-4567
40 William	Johnson	555-4568
45 Andrew	Johnson	555-4569
46 Samuel	Johnson	555-4570
47 Joseph	Johnson	555-4571
50 Daniel	Williams	555-4572
16 Anthony	Williams	555-4573
17 Angel	Williams	555-4574
18 Jacob	Williams	555-4575
10 Ethan	Smith	555-4562

ZK

ID	First Name	Last Name	Phone
10	Ethan	Smith	555-4562
15	Jacob	Smith	555-4563
20	Logan	Smith	555-4564
25	Benjamin	Smith	555-4565
30	Jack	Smith	555-4566
35	Noah	Johnson	555-4567
40	William	Johnson	555-4568
45	Andrew	Johnson	555-4569
46	Samuel	Johnson	555-4570
47	Joseph	Johnson	555-4571
50	Daniel	Williams	555-4572
16	Anthony	Williams	555-4573
17	Angel	Williams	555-4574
18	Jacob	Williams	555-4575
10	Ethan	Smith	555-4562

ICEfaces

- Response Time

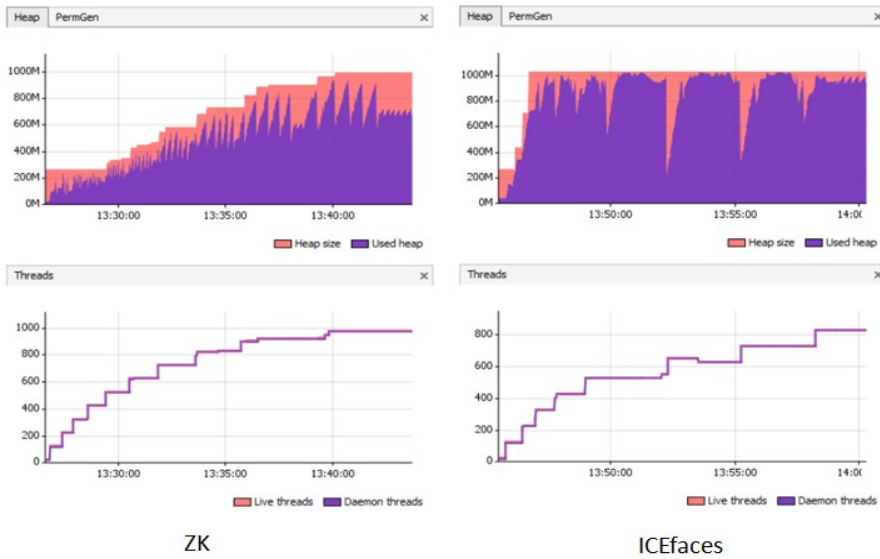
■ ZK

- ◆ Less than 1 second response time when 600 concurrent threads.
- ◆ Less than 2 seconds response time when 800 concurrent threads.
- ◆ Exceeds 3 seconds response time when 1000 concurrent threads.

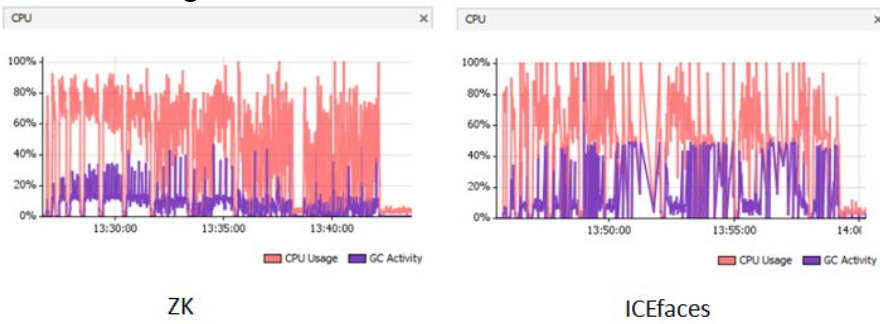
■ ICEfaces

- ◆ Exceeds 2 seconds response time when 500 concurrent threads.
- ◆ Exceeds 3 seconds response time when 600 concurrent threads.
- ◆ Exceeds 6 seconds response time when 800 concurrent threads.

- Memory Consumption



- ZK
 - Use 100MB memory per 100 concurrent users.
- ICEfaces
 - Use approximate 1GB memory when 400 concurrent users.
- CPU Loading



Test Case2 – Grid with 150 records

- Test Case:

This test case includes a grid, and a model with 150 records of employees' information.

live data			ID First Name Last Name Phone		
10	Ethan	Smith	555-4562		
15	Jacob	Smith	555-4563		
20	Logan	Smith	555-4564		
25	Benjamin	Smith	555-4565		
30	Jack	Smith	555-4566		
35	Noah	Johnson	555-4567		
40	William	Johnson	555-4568		
45	Andrew	Johnson	555-4569		
46	Samuel	Johnson	555-4570		
47	Joseph	Johnson	555-4571		
50	Daniel	Williams	555-4572		
16	Anthony	Williams	555-4573		
17	Angel	Williams	555-4574		
18	Jacob	Williams	555-4575		
10	Ethan	Smith	555-4562		

ZK

ID	First Name	Last Name	Phone
10	Ethan	Smith	555-4562
15	Jacob	Smith	555-4563
20	Logan	Smith	555-4564
25	Benjamin	Smith	555-4565
30	Jack	Smith	555-4566
35	Noah	Johnson	555-4567
40	William	Johnson	555-4568
45	Andrew	Johnson	555-4569
46	Samuel	Johnson	555-4570
47	Joseph	Johnson	555-4571
50	Daniel	Williams	555-4572
16	Anthony	Williams	555-4573
17	Angel	Williams	555-4574
18	Jacob	Williams	555-4575
10	Ethan	Smith	555-4562

ICEfaces

- Response Time

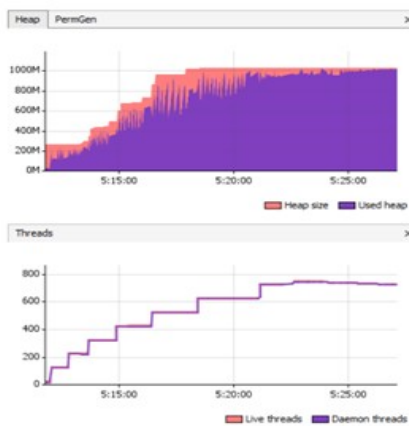
- ZK

- ◆ Less than 5 seconds response time when 600 concurrent threads.
 - ◆ Exceeds 15 seconds response time when 700 concurrent threads.

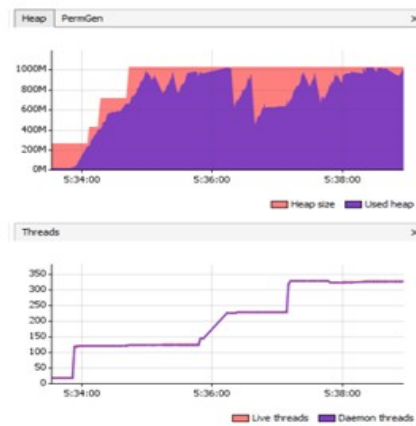
- ICEfaces

- ◆ Exceeds 7 seconds response time when 200 concurrent threads.
 - ◆ Exceeds 20 seconds response time when 300 concurrent threads.

- Memory Consumption



ZK



ICEfaces

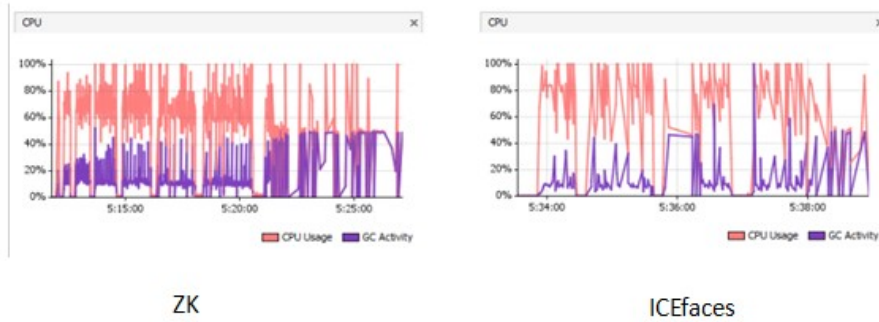
- ZK

- Use approximate 1GB when 700 concurrent threads.

- ICEfaces

- Use approximate 1GB memory when 200 concurrent users.

- CPU Loading



Summary

In all of above tests, ZK outcores ICEfaces regarding server response time, and memory consumption. ZK runs even 10 times faster than ICEfaces in the test case, Grid with 150 records. And its memory consumption is less than ICEface's, from one half to one fourth. Overall, ZK performs better performance, and scalability than ICEfaces.

- Simple form:
 - The response time of ZK is as good as its static page, and its response is six times faster than ICEfaces when 900 concurrent users.
 - Averagely, ICEfaces consumes 2 times of memory than ZK.
- Grid with 15 records
 - Less than 3 seconds response time of ZK when 100 concurrent threads.
 - The response time of ZK is 3 times faster than ICEfaces when 900 threads.
 - Averagely, ICEfaces consumes 2 times of memory than ZK.
- Grid with 150 records
 - The response time of ZK is less than 5 seconds when 600 concurrent threads.
 - ZK is 10 times faster than ICEfaces when 300 concurrent threads.
 - Averagely, ICEfaces consumes 2.5 times of memory than ZK.