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# Index

## Introduction

To determine the performance and scalability of server-centric RIA framework, we choose 2 frameworks, 4 targets, including ZK 6.0.1 CE, ZK 6.0.1 EE and PrimeFaces with 2 different settings, and we arrange a test, grid containing 2000 records. We use JMeter to record the average response time, and VisualVM to record the memory consumption of each test case.

## **Test Environment**

The following paragraph includes the hardware spec of this test, required software, and corresponding parameters.

#### • Hardware

- CPU: AMD Athlon II X4 635 Processor @2.90 GHz
- Memory: 8.00 GB
- Software
  - ZK 6.0.1 CE
  - ZK 6.0.1 EE
  - PrimeFaces 3.2 with settings S/C/R
  - PrimeFaces 3.2 with settings S/S/S
  - JDK 1.6.0.32
  - JBOSS 6
  - JMeter 2.6
  - Visual VM

### PrimeFaces settings

```
S/S/S
```

#### S/S/S:

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## ■ S/C/R



## Configurations

- JBOSS 6
  - Session time-out: default
  - -Xms 2048MB
  - -Xmx 2048MB
  - -XX:PermSize 1024MB
  - -XX:MaxPermSize 1024MB
  - maxThreads: 2000
  - acceptCount: 1024
- JMeter
  - 100, 200, ..., 1000 concurrent threads in 1 second

## **Test Plan**

The test case is a Grid containing 10 columns x 2000 rows of data where three of the columns are text input fields and seven of the columns are display labels. Testing is done by loading page once (direct link to page) followed by sending two ROD requests (by scrolling page several times).

Target

ZK 6.0.1 CE, ZK 6.0.1 EE, PrimeFaces S/S/S, PrimeFaces S/C/R (for the details of PrimeFaces' settings, please refer to the Test Environment section.)

 Test action
 Deploy only one war file at a time, restart JBOSS 6 server and load page once before each test (for preloading the static data)

# Test Case – Grid with 2000 records, ROD twice

id	whkey	sono	solinenumbe	sodetailsysic	externsono	
1	1	sono1	solinenumb	1	externsono1	•
2	2	sono2	solinenumb	2	externsono2	
3	3	sono3	solinenumb	3	externsono3	
4	4	sono4	solinenumb	4	externsono4	
5	5	sono5	solinenumb	5	externsono5	
6	6	sono6	solinenumb	6	externsono6	
7	7	sono7	solinenumb	7	externsono7	
8	8	sono8	solinenumb	8	externsono8 ▶	Ŧ

#### • Test Case Screen shot

#### ΖK

#### PrimeFaces

id	whkey	sono	solinenumber	sod	let
1	1	sono1	solinenumber1	1	Â
2	2	sono2	solinenumber2	2	=
3	3	sono3	solinenumber3	3	
4	4	sono4	solinenumber4	4	
5	5	sono5	solinenumber5	5	-
6	6	sono6	solinenumber6	6	-
7	7	sono7	solinenumber7	7	-
•				•	

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# 

## Response Time (The lower the better)

PrimeFaces SCR

200

300

400

500

600

100

6000

4000

2000

0

500 concurrent threads: more than 3.35 seconds response time

700

800

- 1000 concurrent thread: More than 13.24 seconds response time
- PrimeFaces SSS
  - 500 concurrent threads: more than 3.26 seconds response time
  - 1000 concurrent thread: more than 10.88 seconds response time
- ZK 6.0.1 CE

500 concurrent threads: less than 0.17 second response time
 1000 concurrent threads: less than 8.36 second response time

- ZK 6.0.1 EE
  - 500 concurrent threads: less than 0.08 second response time
  - 1000 concurrent threads: less than 0.78 second response time

JSF S/C/R

JSF S/S/S

ZK6CE

1000

900



## • Memory Consumption (The lower the better)

- PrimeFaces SCR
  - 500 concurrent threads: 726 MB memory consumption
  - 1000 concurrent threads: 1067 MB memory consumption
- PrimeFaces SSS
  - 500 concurrent threads: 750 MB memory consumption
  - 1000 concurrent threads : 922 MB memory consumption
  - ZK 6.0.1 CE
    - 500 concurrent threads: 1116 MB memory consumption
    - 1000 concurrent threads: 1765 MB memory consumption
- ZK 6.0.1 EE
  - 500 concurrent threads: 956 MB memory consumption
  - 1000 concurrent threads: 1534 MB memory consumption

# Summary

ZK performance is much faster than PrimeFaces in terms of average server response time for both CE and EE. ZK EE in particular is approximately 14 and 42 times faster than that of PrimeFaces S/S/S for 1000 and 500 concurrent users respectively. Regarding memory consumption, ZK uses slightly more memory than PrimeFaces by approximately 1.2-1.6 times.



# Appendices

#### • Raw data

PrimeSCR	#Samples	Average	Median	90% Line	Min	Max	Error%	Throughput	KB/sec	Memory	
100	300	111	125	172	12	356	0.00%	11.8/sec	281.5	б44	
200	600	242	131	685	11	1458	0.00%	20.9/sec	499.3	607	
300	900	872	222	3142	10	5957	0.00%	28.3/sec	675.7	675	
400	1200	1983	406	6865	10	11367	0.00%	33.1/sec	790.6	782	
500	1500	3351	929	10927	10	18284	0.00%	37.1/sec	885.1	726	
600	1800	5045	1125	18354	10	28993	0.00%	36.1/sec	861.8	888	
700	2100	6087	1354	19167	10	32920	0.00%	37.6/sec	898.4	798	
800	2400	8372	1999	27991	10	38589	0.00%	36.8/sec	879.7	864	
900	2700	9441	3712	29588	10	44673	0.00%	41.4/sec	988.6	893	
1000	3000	13247	8859	32805	10	51476	0.00%	37.4/sec	892.8	1067	
PrimeSSS	#Samples	Average	Median	90% Line	Min	Max	Error%	Throughput	KB/sec	Memory	
100	300	99	118	155	11	254	0.00%	11.8/sec	261	637	
200	600	235	128	643	10	2130	0.00%	21.7/sec	479.9	б18	
300	900	774	178	2894	10	5351	0.00%	30.5/sec	674.7	б44	
400	1200	1827	288	6865	9	11799	0.00%	33.7/sec	746.8	758	
500	1500	3261	654	11485	10	16839	0.00%	36.2/sec	801.4	750	
600	1800	5095	916	16804	9	22916	0.00%	35.3/sec	782.6	б4б	
700	2100	5994	1284	20190	10	31881	0.00%	37.8/sec	837.1	894	
800	2400	7349	2003	24512	9	34314	0.00%	39.4/sec	872.3	911	
900	2700	8834	2240	29744	9	43487	0.00%	42.0/sec	929.9	932	
1000	3000	10878	3978	34888	9	47935	0.00%	38.7/sec	857.9	922	

						•			
Samples	Average	Median	90% Line	Min	Max	Error%	Throughput	KB/sec	Memory
400	38	5	78	2	974	0.00%	11.2/sec	58.2	596
800	42	5	82	2	1356	0.00%	22.5/sec	117.1	650
1200	58	5	99	2	1720	0.00%	31.1/sec	162	784
1600	89	4	224	2	2465	0.00%	44.7/sec	233	1041
2000	177	5	733	2	3312	0.00%	55.1/sec	287.1	1116
2400	485	5	2051	2	6963	0.00%	бб.7/sec	347.8	1541
2800	981	5	4048	2	10216	0.00%	71.5/sec	372.6	1764
3200	1798	31	6379	1	17028	0.00%	69.8/sec	363.5	1779
3600	4374	3172	10999	1	22155	0.00%	63.0/sec	328.2	1831
4000	8358	3264	29243	1	41431	0.00%	56.2/sec	292.8	1765
Samples	Average	Median	90% Line	Min	Max	Error%	Throughput	KB/sec	Memory
400	20		E 1	-					
100	20	24	51 51	2	851	0.00%	12.2/sec	36.2	655
800		24	51 69	2	851 2147	0.00% 0.00%	12.2/sec 23.5/sec	36.2 69.8	655 673
800 1200	30 72 36	24 21 19	51 69 51	2 2 1	851 2147 1403	0.00% 0.00% 0.00%	12.2/sec 23.5/sec 35.4/sec	36.2 69.8 105.3	655 673 742
800 1200 1600	50 72 36 64	24 21 19 17	51 69 51 64	2 2 1	851 2147 1403 2796	0.00% 0.00% 0.00% 0.00%	12.2/sec 23.5/sec 35.4/sec 43.7/sec	36.2 69.8 105.3 129.8	655 673 742 813
800 1200 1600 2000	50 72 36 64 78	24 21 19 17	51 69 51 64 81	2 2 1 1 1	851 2147 1403 2796 2600	0.00% 0.00% 0.00% 0.00% 0.00%	12.2/sec 23.5/sec 35.4/sec 43.7/sec 53.2/sec	36.2 69.8 105.3 129.8 158.3	655 673 742 813 956
800 1200 1600 2000 2400	50 72 36 64 78 152	24 21 19 17 17 17	51 69 51 64 81 234	2 2 1 1 1 1	851 2147 1403 2796 2600 3437	0.00% 0.00% 0.00% 0.00% 0.00%	12.2/sec 23.5/sec 35.4/sec 43.7/sec 53.2/sec 64.4/sec	36.2 69.8 105.3 129.8 158.3 191.4	655 673 742 813 956 1065
800 1200 1600 2000 2400 2800	38 72 36 64 78 152 208	24 21 19 17 17 17 17	51 69 51 64 81 234 585	2 2 1 1 1 1 1 1	851 2147 1403 2796 2600 3437 4519	0.00% 0.00% 0.00% 0.00% 0.00% 0.00%	12.2/sec 23.5/sec 35.4/sec 43.7/sec 53.2/sec 64.4/sec 77.5/sec	36.2 69.8 105.3 129.8 158.3 191.4 230.4	655 673 742 813 956 1065 1153
800 1200 1600 2000 2400 2800 3200	72 36 64 78 152 208 289	24 21 19 17 17 17 17 18	51 69 51 64 81 234 585 981	2 2 1 1 1 1 1 1 1	851 2147 1403 2796 2600 3437 4519 5534	0.00% 0.00% 0.00% 0.00% 0.00% 0.00% 0.00%	12.2/sec 23.5/sec 35.4/sec 43.7/sec 53.2/sec 64.4/sec 77.5/sec 79.9/sec	36.2 69.8 105.3 129.8 158.3 191.4 230.4 237.5	655 673 742 813 956 1065 1153 1289
800 1200 1600 2000 2400 2800 3200 3600	72 36 64 78 152 208 289 351	24 21 19 17 17 17 17 17 18 20	51 69 51 64 81 234 585 981 1460	2 2 1 1 1 1 1 1 1 1 1	851 2147 1403 2796 2600 3437 4519 5534 3933	0.00% 0.00% 0.00% 0.00% 0.00% 0.00% 0.00%	12.2/sec 23.5/sec 35.4/sec 43.7/sec 53.2/sec 64.4/sec 77.5/sec 79.9/sec 93.6/sec	36.2 69.8 105.3 129.8 158.3 191.4 230.4 237.5 278.3	655 673 742 813 956 1065 1153 1289 1316
r;	Samples 400 800 1200 2000 2400 2800 3200 3600 4000 Samples	Samples         Average           400         38           800         42           1200         58           1600         89           2000         177           2400         485           2800         981           3200         1798           3600         4374           4000         8358           Samples         Average	Samples         Average         Median           400         38         5           800         42         5           1200         58         5           1600         89         4           2000         177         5           2400         485         5           2800         981         5           3200         1798         31           3600         4374         3172           4000         8358         3264           Samples         Average         Median	Samples         Average         Median         90% Line           400         38         5         78           800         42         5         82           1200         58         5         99           1600         89         4         224           2000         177         5         733           2400         485         5         2051           2800         981         5         4048           3200         1798         31         6379           3600         4374         3172         10999           4000         8358         3264         29243           Samples         Average         Median         90% Line	Samples         Average         Median         90% Line         Min           400         38         5         78         2           800         42         5         82         2           1200         58         5         99         2           1600         89         4         224         2           2000         177         5         733         2           2400         485         5         2051         2           2800         981         5         4048         2           2800         981         5         4048         2           3200         1798         31         6379         1           3600         4374         3172         10999         1           4000         8358         3264         29243         1           Samples         Average         Median         90% Line         Min	Samples         Average         Median         90% Line         Min         Max           400         38         5         78         2         974           800         42         5         82         2         1356           1200         58         5         99         2         1720           1600         89         4         224         2         2465           2000         177         5         733         2         3312           2400         485         5         2051         2         6963           2800         981         5         4048         2         10216           3200         1798         31         6379         1         17028           3600         4374         3172         10999         1         22155           4000         8358         3264         29243         1         41431           Samples         Average         Median         90% Line         Min         Max	Samples         Average         Median         90% Line         Min         Max         Error%           400         38         5         78         2         974         0.00%           800         42         5         82         2         1356         0.00%           1200         58         5         99         2         1720         0.00%           1600         89         4         224         2         2465         0.00%           2000         1777         5         733         2         3312         0.00%           2400         485         5         2051         2         6963         0.00%           2800         981         5         4048         2         10216         0.00%           3200         1798         31         6379         1         17028         0.00%           3600         4374         3172         10999         1         22155         0.00%           4000         8358         3264         29243         1         41431         0.00%           Samples         Average         Median         90% Line         Min         Max         Error% </td <td>Samples         Average         Median         90% Line         Min         Max         Error%         Throughput           400         38         5         78         2         974         0.00%         11.2/sec           800         442         5         82         2         1356         0.00%         21.5/sec           1200         58         5         99         2         1720         0.00%         31.1/sec           1600         89         4         224         2         2465         0.00%         44.7/sec           2000         177         5         733         2         3312         0.00%         65.1/sec           2400         485         5         2051         2         6963         0.00%         65.7/sec           2800         981         5         4048         2         10216         0.00%         69.8/sec           3200         1798         31         6379         1         17028         0.00%         69.8/sec           3600         4374         3172         10999         1         22155         0.00%         63.0/sec           4000         8358         3264         29243</td> <td>Samples         Average         Median         90% Line         Min         Max         Error%         Throughput         KB/sec           400         38         5         78         2         974         0.00%         11.2/sec         58.2           800         442         5         82         2         1356         0.00%         22.5/sec         117.1           1200         58         5         99         2         1720         0.00%         31.1/sec         162           1600         89         4         224         2         2465         0.00%         44.7/sec         233           2000         1177         5         733         2         3312         0.00%         55.1/sec         287.1           2400         485         5         2051         2         6963         0.00%         66.7/sec         347.8           2800         981         5         4048         2         10216         0.00%         69.8/sec         363.5           3200         1798         31         6379         1         17028         0.00%         69.8/sec         363.5           3600         4374         3172         10999&lt;</td>	Samples         Average         Median         90% Line         Min         Max         Error%         Throughput           400         38         5         78         2         974         0.00%         11.2/sec           800         442         5         82         2         1356         0.00%         21.5/sec           1200         58         5         99         2         1720         0.00%         31.1/sec           1600         89         4         224         2         2465         0.00%         44.7/sec           2000         177         5         733         2         3312         0.00%         65.1/sec           2400         485         5         2051         2         6963         0.00%         65.7/sec           2800         981         5         4048         2         10216         0.00%         69.8/sec           3200         1798         31         6379         1         17028         0.00%         69.8/sec           3600         4374         3172         10999         1         22155         0.00%         63.0/sec           4000         8358         3264         29243	Samples         Average         Median         90% Line         Min         Max         Error%         Throughput         KB/sec           400         38         5         78         2         974         0.00%         11.2/sec         58.2           800         442         5         82         2         1356         0.00%         22.5/sec         117.1           1200         58         5         99         2         1720         0.00%         31.1/sec         162           1600         89         4         224         2         2465         0.00%         44.7/sec         233           2000         1177         5         733         2         3312         0.00%         55.1/sec         287.1           2400         485         5         2051         2         6963         0.00%         66.7/sec         347.8           2800         981         5         4048         2         10216         0.00%         69.8/sec         363.5           3200         1798         31         6379         1         17028         0.00%         69.8/sec         363.5           3600         4374         3172         10999<

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