

■ Performance Test Result

This document contains the actual time measured during the VaR margin calculation process using the new software.

This data is provided as reference for building an environment of your own.

Please note that it only serves as a guide, and you will have to make adjustments according to the environment and method of your use.

1. API Application (Information Added)
2. API Application (Multiple Requests)
3. CLI Application
4. GUI Application

Change History

#	Date	Version	Sheet	Description
1	Nov. 1, 2022	1.0		First Release
2	Jan. 31, 2023	1.01	Outline	Addition of new sheet names to the list Removal of an obsolete sentence
3			1. API App	Addition of measurement result using a different machine
4			3. CLI App 4. GUI App	Addition of sheets
5	Jan. 30, 2024	2.0	1. API App 2. API App (Multiple Requests) 3. CLI App 4. GUI App	Update "Measurement Result"
6	Dec. 9, 2024	3.0	1. API App 2. API App (Multiple Requests) 3. CLI App 4. GUI App	Update "Measurement Result"
7	Nov. 28, 2025	4.0	1. API App 2. API App (Multiple Requests) 3. CLI App 4. GUI App	Update "Measurement Result"
8			4. GUI App	Changed the OS used for GUI measurements from Windows 10 to Windows 11

1. API Application

Measurement Description

The time for processing API requests described in "2.5.1 Input File Reading" and "2.5.2 Calculation" in the API Application Specification was measured.

The measurement for input file reading shows the time required to execute 1 reading process of 3 files: BPF, VPF and APF. The number of instruments in the BPF was varied as seen in the Measurement Result table below.

The measurement for calculation process shows the time required to process 1 request with account and position settings seen in the Calculation table below.

Measurement Environment

The following AWS virtual machines were used.

A Amazon EC2 Instance: m5d.12xlarge CPU: 48Cores 2.5GHz Memory: 192GiB SSD OS: Red Hat Enterprise Linux Server release 7.7 (Maipo) Java: openjdk version "1.8.0_332"

B Amazon EC2 Instance: m5ad.xlarge CPU: 4Cores 2.2GHz Memory: 16GiB SSD OS: Red Hat Enterprise Linux Server release 7.7 (Maipo) Java: openjdk version "1.8.0_332"

The following parameter settings were used for measurement. (Parameters not affecting process time are left out.)

pool.size.max = pool.size.core

pool.size.queue = 0 (* All calculation processes not allocated to threads will be moved to the queue.

pool.threshold = 1 (* Calculation processes will be allocated to threads account-by-account and executed.)

server.tomcat.threads.max = 200

server.tomcat.threads.min-spare = 10

server.tomcat.accept-count = 100

Measurement Result

Input File Reading

(Unit: ms)

#	Item	Setting	Machine A (Core:48)	Machine B (Core:4)
			pool.size.core=1	
1	BPF target instrument	1,000	270	652
2	BPF target instrument	7,000	1,591	5,123
3	BPF target instrument	15,000	3,308	11,917
4	BPF target instrument	30,000	6,514	24,280
5	BPF target instrument	50,000	10,045	—

Calculation

(Unit: ms)

#	Item	Setting	Machine A (Core:48)			
			pool.size.core=1	pool.size.core=5	pool.size.core=20	pool.size.core=50
			OutputType:SAM	OutputType:SAM	OutputType:SAM	OutputType:SAM
1	Number of accounts	5,000	4,521	1,287	743	1057
	Average number of positions per account	2				
2	Number of accounts	10,000	8,916	2,516	1,414	2,059
	Average number of positions per account	2				
3	Number of accounts	25,000	22,215	6,276	3,324	5,029
	Average number of positions per account	2				
4	Number of accounts	50,000	44,115	13,130	7,004	10,574
	Average number of positions per account	2				
5	Number of accounts	10	358	177	159	146
	Average number of positions per account	100				
6	Number of accounts	50	237	121	102	105
	Average number of positions per account	10				
7	Number of accounts	500	731	235	159	181
	Average number of positions per account	3				
8	Number of accounts	1,000	950	317	202	243
	Average number of positions per account	2				
9	Number of accounts	2,000	2,654	791	469	523
	Average number of positions per account	3				
10	Number of accounts	4,000	8,555	2,445	1,338	1,415
	Average number of positions per account	5				

(Unit: ms)

#	Item	Setting	Machine B (Core:4)	
			pool.size.core=1	pool.size.core=5
			OutputType:SAM	OutputType:SAM
1	Number of accounts	5,000	6,988	3,386
	Average number of positions per account	2		
2	Number of accounts	10	614	408
	Average number of positions per account	100		
3	Number of accounts	1,000	1,630	911
	Average number of positions per account	2		

2. API Application (Multiple Requests)

Measurement Description

The number of API requests in this volume "2.5.2 Calculation" defined in the "Setting" on the table of Measurement Result were processed simultaneously by the API application, and the average processing time of these requests was measured.

The calculation object (Output Type) was VaR Margin.

Only 1 account was contained in a request.

The number of positions contained in 1 account was 50.

Measurement Environment

The following 2 machines were used.

A: Amazon EC2 Instance: m5d.12xlarge CPU: 48Cores 2.5GHz Memory: 192GiB SSD OS: Red Hat Enterprise Linux Server release 7.7 (Maipo) Java: openjdk version "1.8.0_332"

B: Amazon EC2 Instance: m5ad.xlarge CPU: 4Cores 2.2GHz Memory: 16GiB SSD OS: Red Hat Enterprise Linux Server release 7.7 (Maipo) Java: openjdk version "1.8.0_332"

Parameter Settings

The following parameter settings were used for measurement. (Parameters not affecting process time are left out.)

pool.threshold = 1 (* All requests processed in multithread processing.Only the influence of tomcat threads was measured.)

server.tomcat.threads.min-spare =server.tomcat.threads.max

Measurement Result (Unit: TPS)

#	Item	Setting	Machine A (Core:48)			
			server.tomcat.threads.max=1	server.tomcat.threads.max=5	server.tomcat.threads.max=20	server.tomcat.threads.max=50
			OutputType:VaR Margin	OutputType:VaR Margin	OutputType:VaR Margin	OutputType:VaR Margin
1	Number of requests simultaneously sent	1	64	64	64	65
2		3	72	184	187	187
3		10	72	342	593	602
4		50	72	340	1178	1436
5		100	70	344	1176	1429
6		1,000	71	337	1170	1436

*E.g., for server.tomcat.threads.max=5 and Setting=100 the TPS is 344. This gives a process time of 290 msec per request.

*Remark the performance will not be significantly improved when server.tomcat.threads.max is more than the number of the machine core.

(Unit: TPS)

#	Item	Setting	Machin B (Core:4)	
			server.tomcat.threads.max=1	server.tomcat.threads.max=5
			OutputType:VaR Margin	OutputType:VaR Margin
1	Number of requests simultaneously sent	1	45	43
2		3	48	100
3		10	50	122
4		50	46	128
5		100	47	134

3. CLI Application

Measurement Description

The time required for calculation in accordance with the procedure described in "2.2.2 Execution of Calculation" in the CLI Application Specification was measured.

The time required for parameter File Reading: and the time required for processing requests with the account and position details seen in the Calculation table below are listed.

Measurement Environment

The following AWS virtual machines were used.

A Amazon EC2 Instance: m5d.12xlarge CPU: 48Cores 2.5GHz Memory: 192GiB SSD OS: Red Hat Enterprise Linux Server release 7.7 (Maipo) Java: openjdk version "1.8.0_332"

B Amazon EC2 Instance: m5ad.xlarge CPU: 4Cores 2.2GHz Memory: 16GiB SSD OS: Red Hat Enterprise Linux Server release 7.7 (Maipo) Java: openjdk version "1.8.0_332"

The following parameter settings were used for measurement. (Parameters not affecting process time are left out.)

pool.size.max = pool.size.core (* Time required for thread increase will not be measured.)

pool.size.queue = 0 (* Without request timeout)

pool.threshold = 1 (* All requests will be processed by multithreading.)

Measurement Result

Calculation

(Unit: ms)

#	Item	Setting	Breakdown	Machine A (Core:48)			
				pool.size.core=1	pool.size.core=5	pool.size.core=20	pool.size.core=50
				OutputType:SAM	OutputType:SAM	OutputType:SAM	OutputType:SAM
1	BPF Target Instrument	7,000	Total	3,959	3,408	3,360	3,425
	Number of accounts	1,000	File Reading	1,753	1,784	1,807	1,781
	Average number of positions per account	2	Margin Calc	1,199	588	527	640
2	BPF Target Instrument	7,000	Total	5,161	3,991	3,808	3,999
	Number of accounts	2,000	File Reading	2,048	2,061	2,035	2,058
	Average number of positions per account	2	Margin Calc	2,092	921	742	914
3	BPF Target Instrument	7,000	Total	8,487	5,560	5,021	5,768
	Number of accounts	5,000	File Reading	2,417	2,449	2,393	2,402
	Average number of positions per account	2	Margin Calc	5,055	2,087	1,616	2,341
4	BPF Target Instrument	7,000	Total	12,861	6,913	5,998	7,244
	Number of accounts	10,000	File Reading	2,591	2,578	2,632	2,574
	Average number of positions per account	2	Margin Calc	9,227	3,343	2,349	3,652
5	BPF Target Instrument	30,000	Total	5,853	5,901	5,943	5,846
	Number of accounts	10	File Reading	4,324	4,403	4,407	4,335
	Average number of positions per account	100	Margin Calc	484	487	515	504
6	BPF Target Instrument	30,000	Total	5,591	5,645	5,471	5,649
	Number of accounts	50	File Reading	4,190	4,303	4,151	4,352
	Average number of positions per account	10	Margin Calc	388	320	292	265
7	BPF Target Instrument	30,000	Total	6,639	6,048	5,987	6,242
	Number of accounts	500	File Reading	4,674	4,485	4,478	4,470
	Average number of positions per account	3	Margin Calc	939	520	486	753
8	BPF Target Instrument	1,000	Total	2,388	2,037	2,026	2,102
	Number of accounts	500	File Reading	601	589	594	585
	Average number of positions per account	2	Margin Calc	756	427	406	478
9	BPF Target Instrument	1,000	Total	3,388	2,449	2,390	2,572
	Number of accounts	1,000	File Reading	635	627	622	645
	Average number of positions per account	3	Margin Calc	1,726	798	760	910
10	BPF Target Instrument	1,000	Total	6,532	3,677	3,263	3,325
	Number of accounts	2,000	File Reading	750	757	760	728
	Average number of positions per account	5	Margin Calc	4,748	1,899	1,480	1,589

* Since File Reading: is performed by a single core, changing pool.size.core does not influence the processing time.

* Remark the performance will not be significantly improved when server.tomcat.threads.max is more than the number of the machine core.

(Unit: ms)

#	Item	Setting	Breakdown	Machine B (Core:4)	
				pool.size.core=1	pool.size.core=5
				OutputType:SAM	OutputType:SAM
1	BPF Target Instrument	7,000	Total	9,374	8,597
	Number of accounts	1,000	File Reading	4,975	4,932
	Average number of positions per account	2	Margin Calc	2,436	1,724
2	BPF Target Instrument	30,000	Total	15,129	14,725
	Number of accounts	10	File Reading	12,253	12,007
	Average number of positions per account	100	Margin Calc	924	757
3	BPF Target Instrument	1,000	Total	5,163	4,778
	Number of accounts	500	File Reading	1,581	1,508
	Average number of positions per account	2	Margin Calc	1,643	1,297

4. GUI Application

Measurement Description

The time required for calculation in accordance with the procedure described in "2.2.3 Execution of Calculation" in the GUI Application Specification was measured.

The time required for parameter file reading and the time required for processing requests with the account and position details seen in the Calculation table below are listed.

Measurement Environment

The following physical machine was used.

C Physical terminal (Dell Latitude3520) CPU: Core (TM) i7-1165G7 Memory: 16GB SSD OS: Windows Client 11 (24H2) Java: 11.0.21 (Corretto)

The following parameter settings were used for measurement. (Parameters not affecting process time are left out.)

pool.size.max = pool.size.core (* Time required for thread increase will not be measured.)

pool.size.queue = 0 (* Without request timeout)

pool.threshold = 1 (* All requests will be processed by multithreading.)

Measurement Result

Calculation

(Unit: ms)

#	Item	Setting	Breakdown	Machine C (Core:4)		
				pool.size.core=1	pool.size.core=4	pool.size.core=8
				OutputType:SAM	OutputType:SAM	OutputType:SAM
1	BPF Target Instrument	7,000	Total	4,073	4,202	3,947
	Number of accounts	100	File Reading	2,950	3,134	2,895
	Average number of positions per account	5	Margin Calc	641	575	586
2	BPF Target Instrument	7,000	Total	4,708	4,713	4,510
	Number of accounts	200	File Reading	3,034	3,221	2,994
	Average number of positions per account	5	Margin Calc	1,010	740	811
3	BPF Target Instrument	30,000	Total	15,810	15,662	14,906
	Number of accounts	100	File Reading	11,934	12,839	12,148
	Average number of positions per account	50	Margin Calc	2,977	1,896	1,827
4	BPF Target Instrument	30,000	Total	24,960	20,184	19,991
	Number of accounts	200	File Reading	15,426	15,397	14,906
	Average number of positions per account	50	Margin Calc	8,053	3,433	3,671
5	BPF Target Instrument	1,000	Total	3,204	2,900	3,319
	Number of accounts	100	File Reading	1,081	1,084	1,170
	Average number of positions per account	20	Margin Calc	1,478	1,143	1,417
6	BPF Target Instrument	1,000	Total	4,636	3,473	3,794
	Number of accounts	200	File Reading	1,086	1,039	1,134
	Average number of positions per account	20	Margin Calc	2,529	1,506	1,650