Performance Testing

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Introduction

For the purpose of this deliverable, I have been in charge for the user stories I implemented in the application for the previous springs.

US (id)	Name
US-10	User Adopts a Pet
US-14	Vet schedules new Intervention
US-15	Vet plans Intervention
US-16	Owners sees Interventions
US-17	Owners sees Vet’s personal information

The 10th and 15th user stories are create feature where as the 14th,16th and 17th are listing feature. Between those who has the same feature the results are very similar and the number use to test the performance are the same. This decision of using the same number had in mind save time due to lack a capable computer where to run tests fast.

Computer used

Aspire E1-522, age 8 years.

Processor

- CPU Type A4
- Processor Number A4-5000
- Manufacturer AMD
- Clock Speed 1.5 GHz

Ram

- Technology DDR3L SDRAM
- Installed Size 4 GB

Memory

- Max Supported Size 8 GB
- Technology DDR3L SDRAM

Methodology

I follow the instructions in the video provided in the EV. First I started working on us-10 and us-15, hen move to the others.

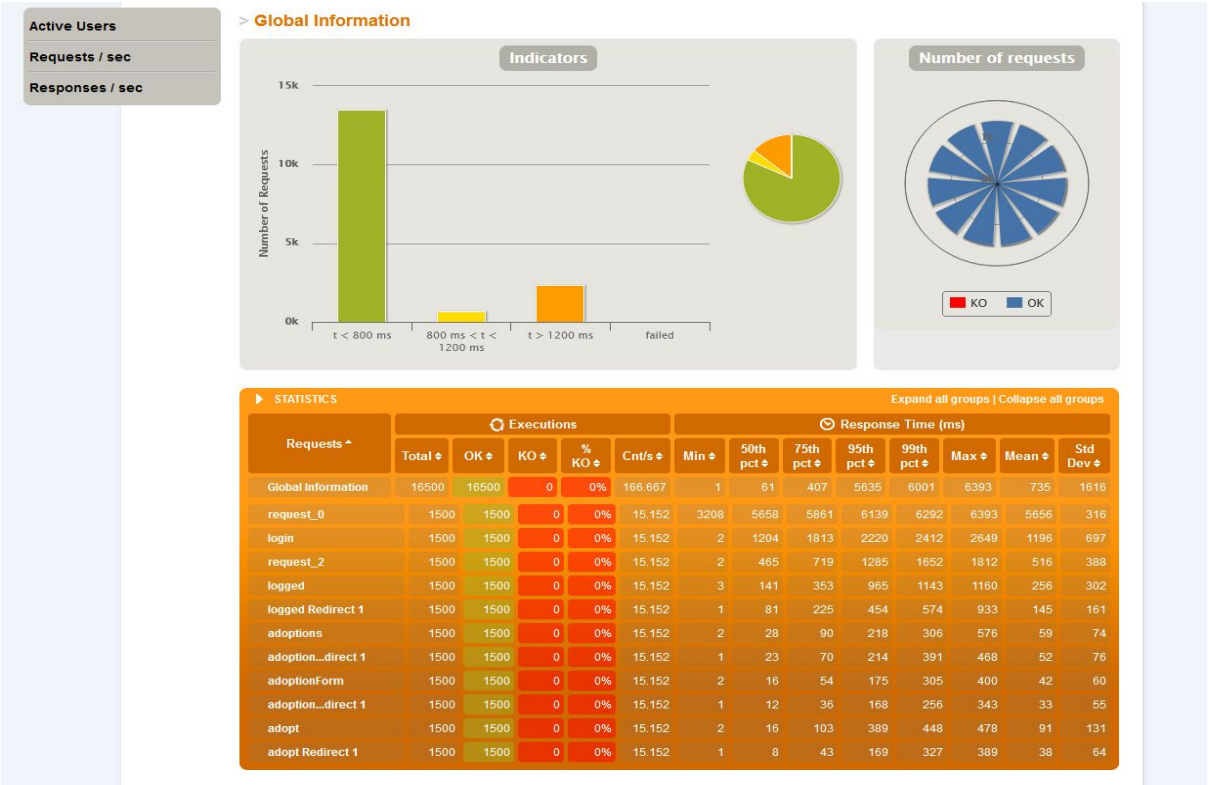
The first test was the more challenging because I was not sure of the number of users I should start with. Once I knew the intervals I had to try each us was easier than the last one, having to judge just by the complexity of the feature.

Results

Maximum number of users (app works)

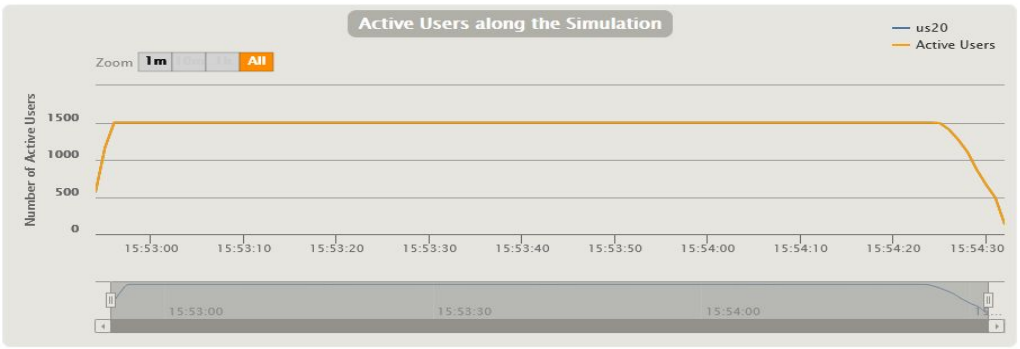
us-10

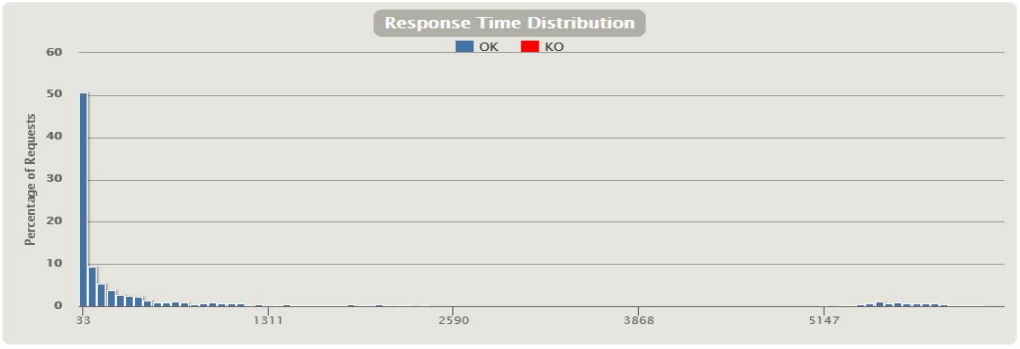
-1500 users. While running test with more than 1500 users, some request started failing/been rejected/taking a lot of time.(I tested adding or subtracting +-200 users per test)



STATISTICS — Expand all groups | Collapse all groups

Requests	Executions					Response Time (ms)							
	Total	OK	KO	% KO	Cnt/s	Min	50th pct	75th pct	95th pct	99th pct	Max	Mean	Std Dev
Global Information	16500	16500	0	0%	166.667	1	61	407	5635	6001	6393	735	1616
request_0	1500	1500	0	0%	15.152	3208	5658	5861	6139	6292	6393	5656	316
login	1500	1500	0	0%	15.152	2	1204	1813	2220	2412	2649	1196	697
request_2	1500	1500	0	0%	15.152	2	465	719	1285	1652	1812	516	388
logged	1500	1500	0	0%	15.152	3	141	353	965	1143	1160	256	302
logged Redirect 1	1500	1500	0	0%	15.152	1	81	225	454	574	933	145	161
adoptions	1500	1500	0	0%	15.152	2	28	90	218	306	576	59	74
adoption...direct 1	1500	1500	0	0%	15.152	1	23	70	214	391	468	52	76
adoptionForm	1500	1500	0	0%	15.152	2	16	54	175	305	400	42	60
adoption...direct 1	1500	1500	0	0%	15.152	1	12	36	168	256	343	33	55
adopt	1500	1500	0	0%	15.152	2	16	103	389	448	478	91	131
adopt Redirect 1	1500	1500	0	0%	15.152	1	8	43	169	327	389	38	64

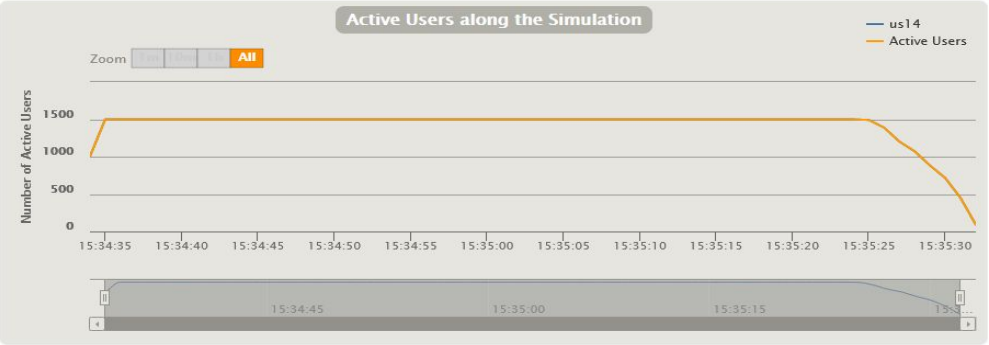


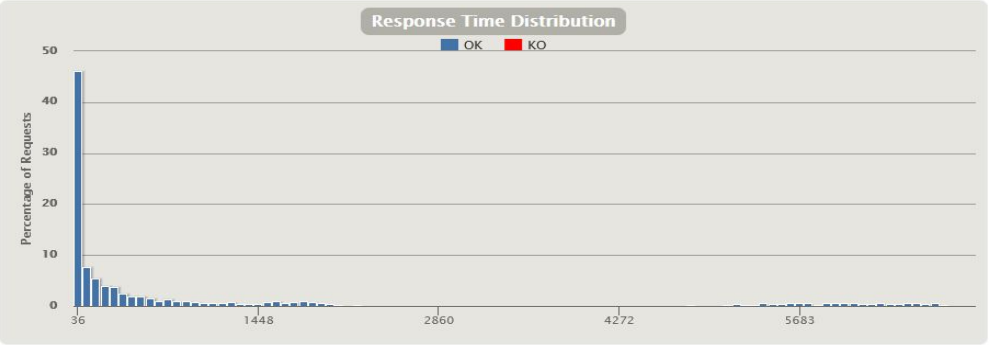


us-14

-1500 users. While running test with more than 1500 users, some request started failing/been rejected/taking a lot of time.(I tested adding or subtracting +-200 users per test)

Requests	Executions					Response Time (ms)							
	Total	OK	KO	% KO	Cnt/s	Min	50th pct	75th pct	95th pct	99th pct	Max	Mean	Std Dev
Global Information	13500	13500	0	0%	228.814	1	104	711	6064	6672	7060	939	1846
home	1500	1500	0	0%	25.424	2858	5999	6419	6736	6860	7060	5955	555
login	1500	1500	0	0%	25.424	2	1432	1788	2078	2378	2547	1203	706
request_2	1500	1500	0	0%	25.424	1	428	725	1256	1508	1658	493	377
logged	1500	1500	0	0%	25.424	2	157	565	1578	1709	1863	364	458
logged Redirect 1	1500	1500	0	0%	25.424	1	107	294	832	1103	1316	203	259
veterinarians	1500	1500	0	0%	25.424	2	57	185	410	661	1591	120	147
veterina...direct 1	1500	1500	0	0%	25.424	1	36	107	248	336	441	68	81
showVet	1500	1500	0	0%	25.424	2	9	17	171	476	728	32	83
showVet Redirect 1	1500	1500	0	0%	25.424	1	8	15	47	111	815	17	48



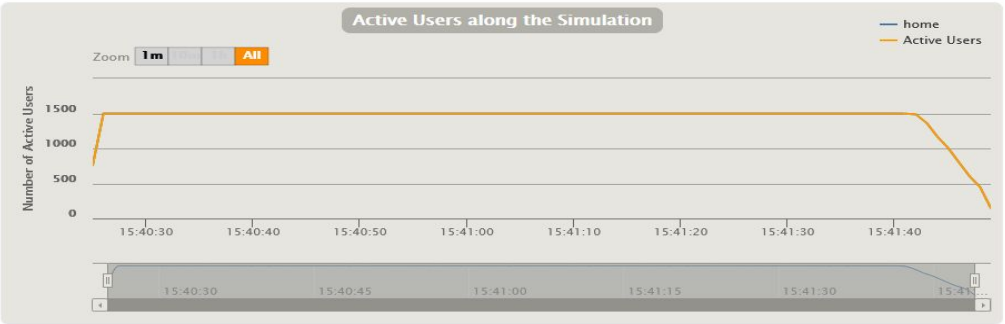


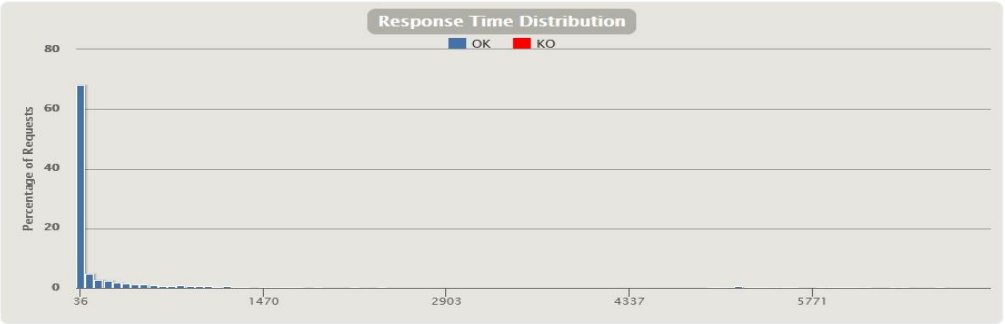
us-15

-1500 users. While running test with more than 1500 users, some request started failing/been rejected/taking a lot of time.(I tested adding or subtracting +-200 users per test)

STATISTICS — Expand all groups | Collapse all groups

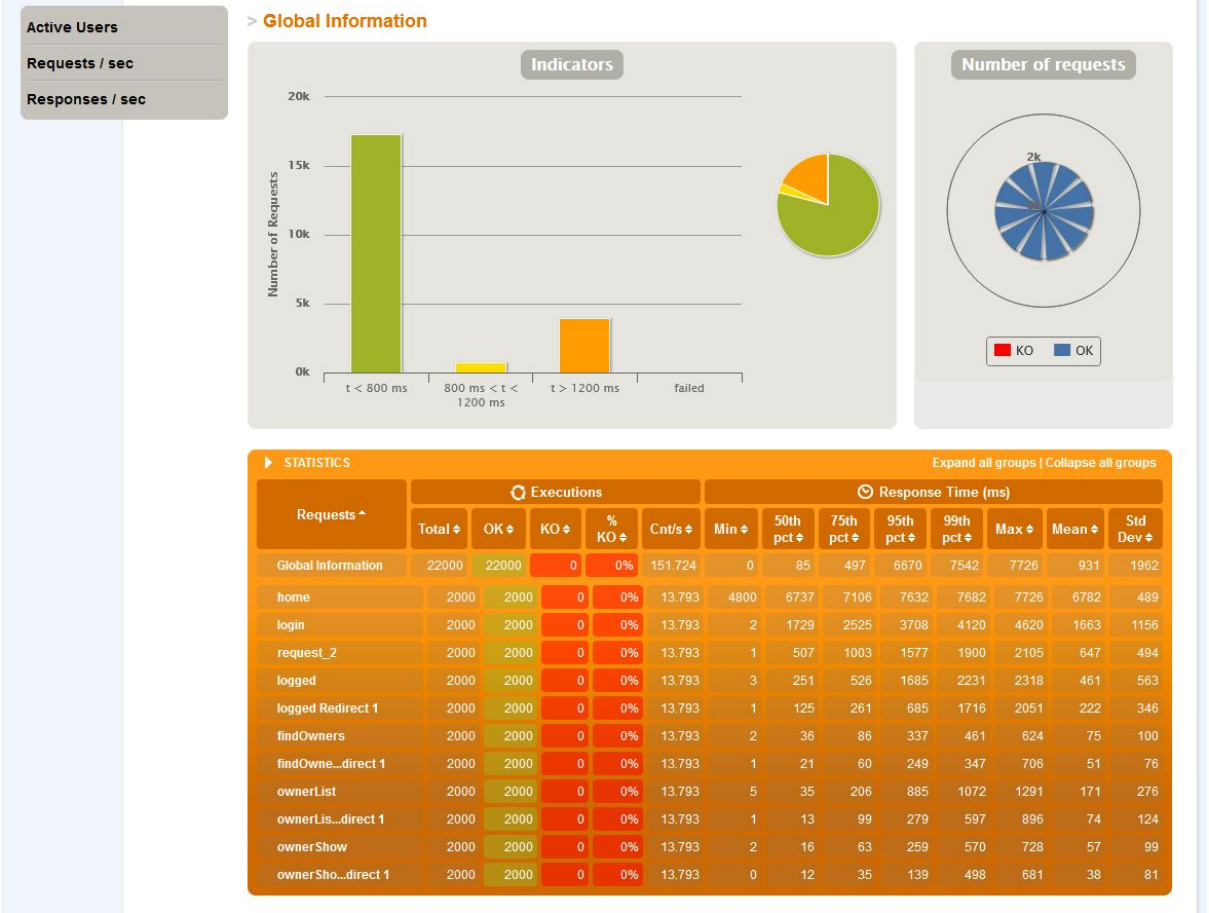
Requests	Executions					Response Time (ms)							
	Total	OK	KO	% KO	Cnt/s	Min	50th pct	75th pct	95th pct	99th pct	Max	Mean	Std Dev
Global Information	22500	22500	0	0%	264.706	0	16	196	5231	6395	7169	545	1440
request_0	1500	1500	0	0%	17.647	2927	5606	6136	6738	6885	7169	5696	585
login	1500	1500	0	0%	17.647	2	1101	1690	2472	2644	2950	1133	781
request_2	1500	1500	0	0%	17.647	1	352	712	1317	2025	2259	476	439
logged	1500	1500	0	0%	17.647	3	110	495	1065	1196	1249	296	348
logged Redirect 1	1500	1500	0	0%	17.647	1	79	284	786	1092	1191	206	258
findOwners	1500	1500	0	0%	17.647	2	45	252	722	874	995	166	232
findOwne...direct 1	1500	1500	0	0%	17.647	1	23	92	424	578	1087	87	141
ownerList	1500	1500	0	0%	17.647	2	13	32	115	216	454	28	42
ownerLis...direct 1	1500	1500	0	0%	17.647	1	10	26	78	148	258	21	29
ownerShow	1500	1500	0	0%	17.647	2	6	10	29	59	116	10	12
ownerSho...direct 1	1500	1500	0	0%	17.647	0	6	10	20	46	114	8	10
addIntervention	1500	1500	0	0%	17.647	2	5	9	33	62	74	9	11
addInter...direct 1	1500	1500	0	0%	17.647	0	5	8	32	47	66	8	10
add	1500	1500	0	0%	17.647	2	6	11	53	98	181	13	18
add Redirect 1	1500	1500	0	0%	17.647	1	5	10	34	85	177	11	16

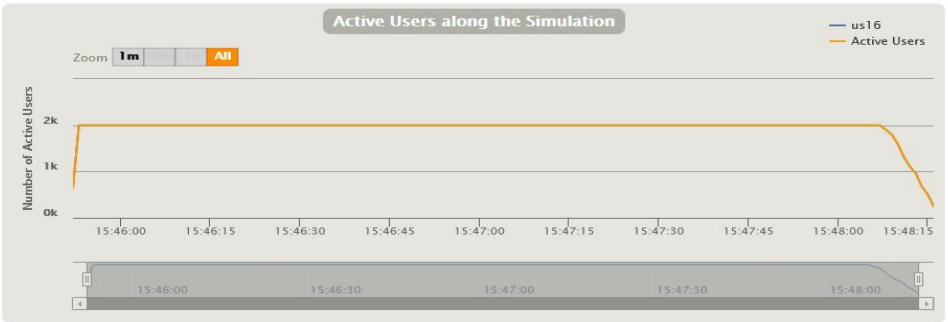


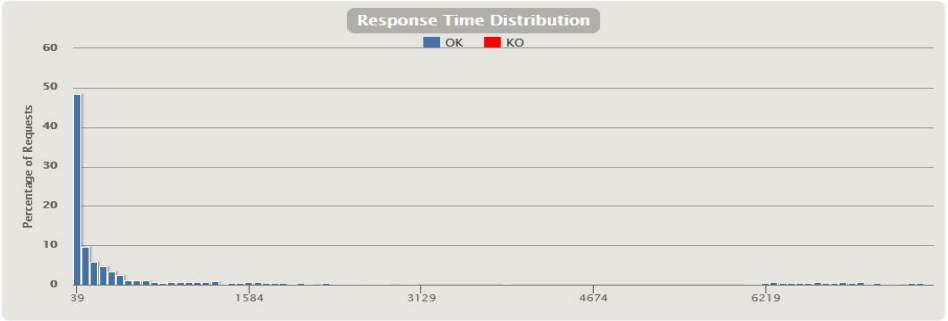


us-16

-2000 users. While running test with more than 2000 users, some request started failing/been rejected/taking a lot of time.(I tested adding or subtracting +-200 users per test)

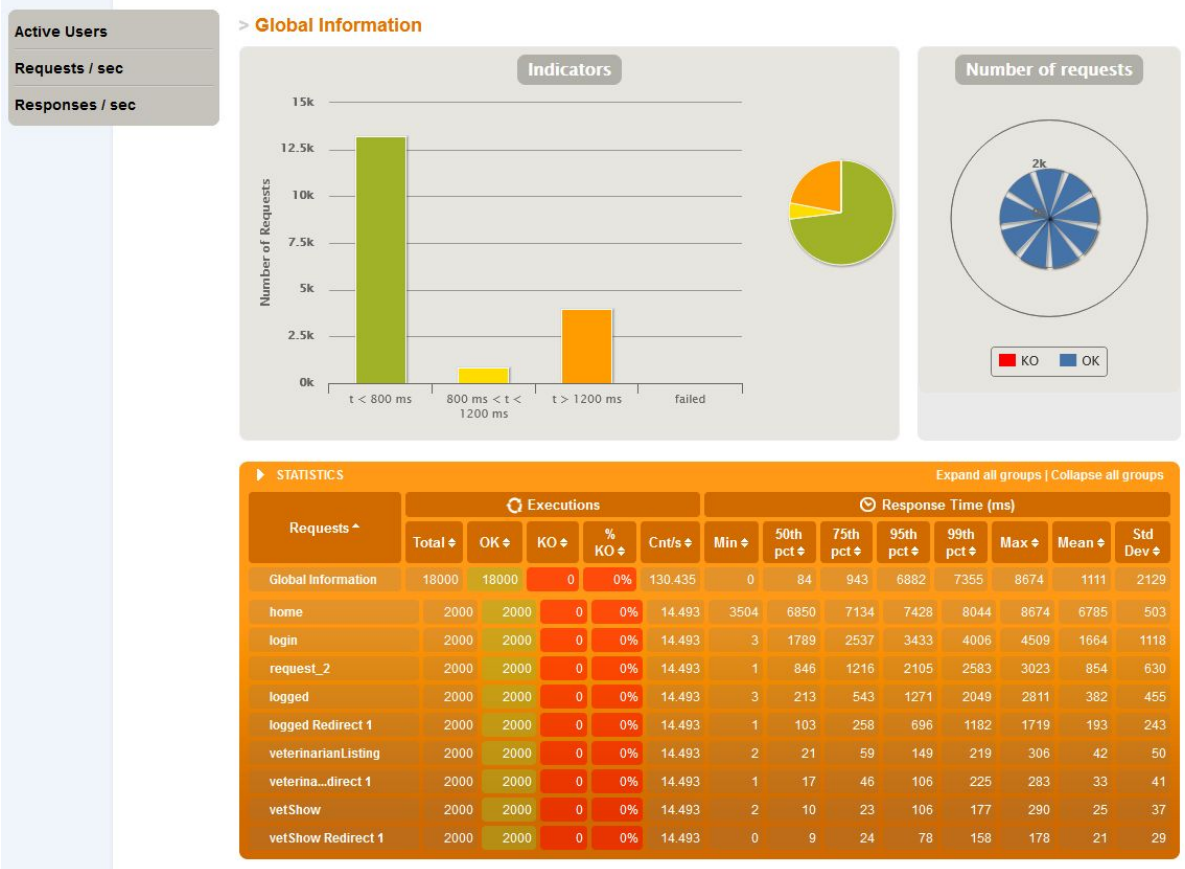


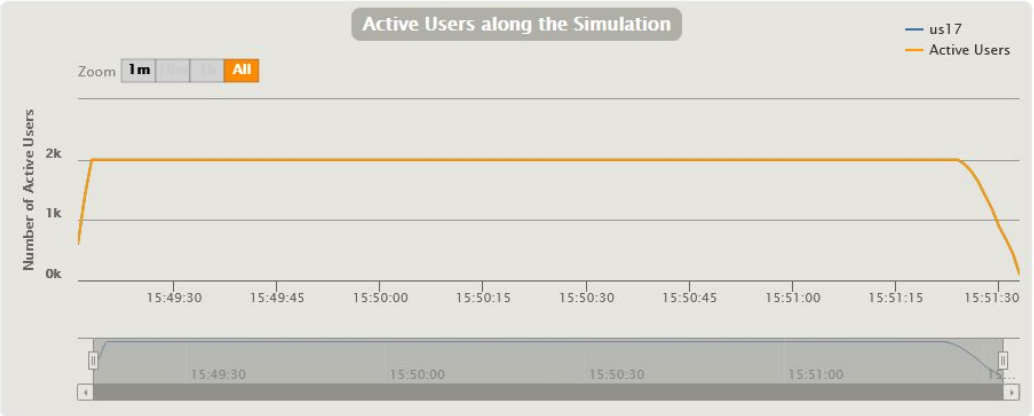


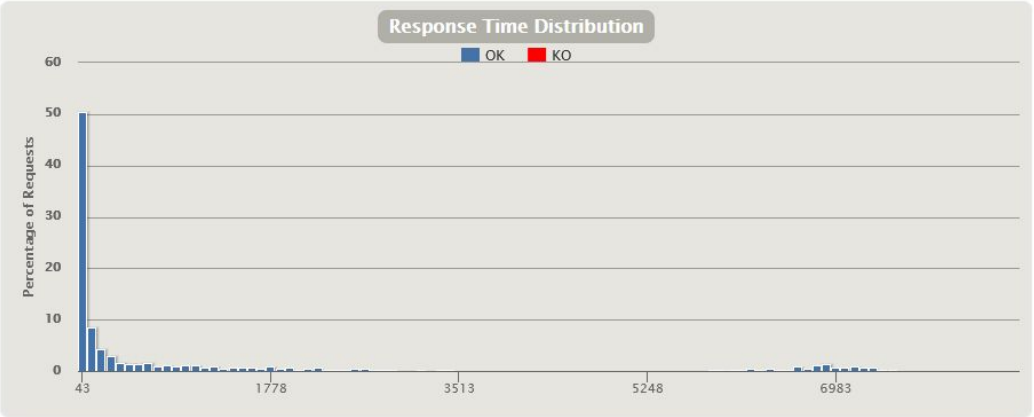


us-17

-2000 users. While running test with more than 2000 users, some request started failing/been rejected/taking a lot of time.(I tested adding or subtracting +-200 users per test)




Active Users along the Simulation
us17
Active Users
Zoom
1m
All
Number of Active Users
2k
1k
0k
15:49:30
15:49:45
15:50:00
15:50:15
15:50:30
15:50:45
15:51:00
15:51:15
15:51:30


Response Time Distribution
OK
KO
Percentage of Requests
60
50
40
30
20
10
0
43
1778
3513
5248
6983

Minimum number of users (app does not work)

For this measurement I have considered the failure point when the applications stopped and rejected all requests.

us-10

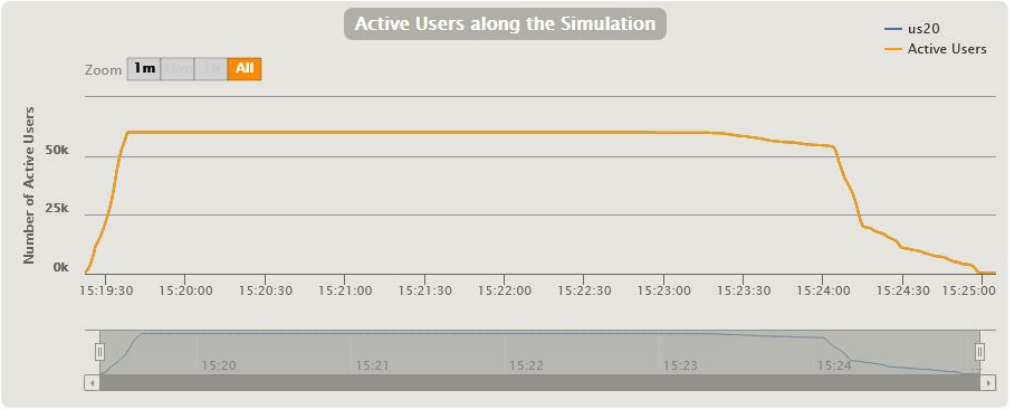
The failure point for this user story has been 70000 current users.

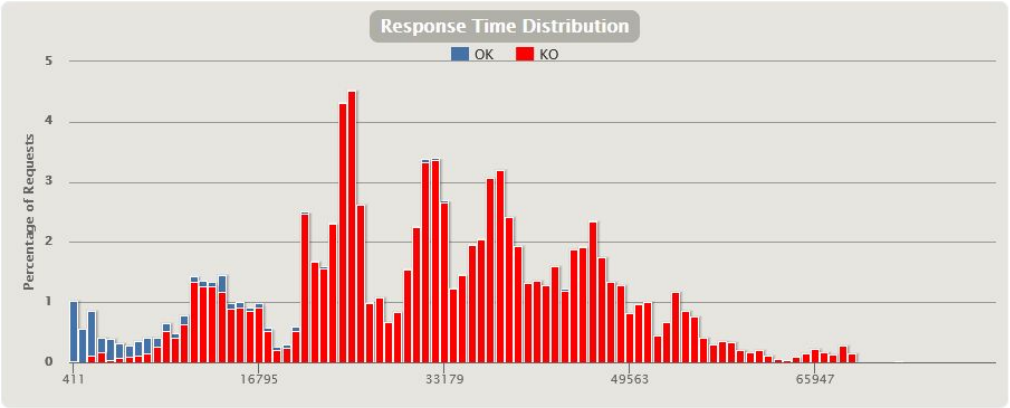
STATISTICS — Expand all groups | Collapse all groups

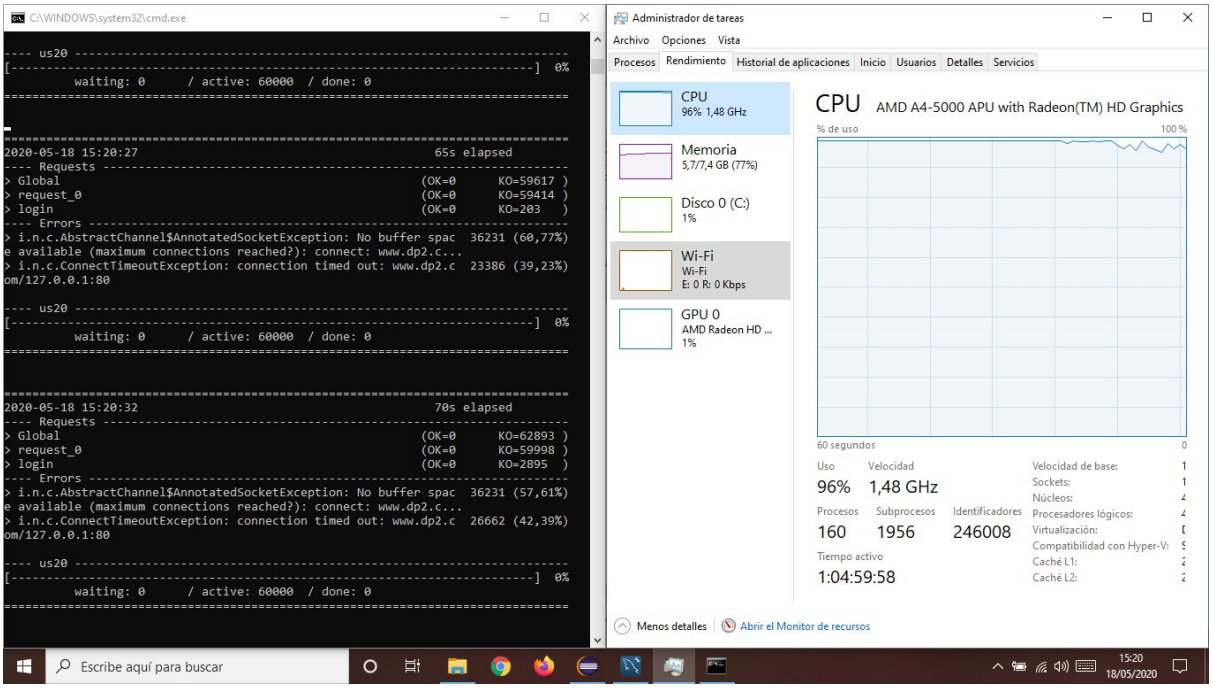
Requests	Executions					Response Time (ms)							
	Total	OK	KO	% KO	Cnt/s	Min	50th pct	75th pct	95th pct	99th pct	Max	Mean	Std Dev
Global Information	372159	23041	349118	94%	1081.858	1	32205	41672	54182	65377	81922	31840	13998
request_0	60000	0	60000	100%	174.419	20948	25378	37444	45773	49196	81922	30114	7609
login	60000	0	60000	100%	174.419	22036	33132	44133	51293	57670	60065	37774	8238
logged	60000	0	60000	100%	174.419	20	27187	40074	52559	59485	61444	30363	12152
adoptions	60000	46	59954	100%	174.419	8903	37373	46313	54315	57890	59484	37653	11515
adoptionForm	60000	1233	58767	98%	174.419	1698	24215	36558	61386	68525	73824	26339	16222
adopt	60000	10880	49120	82%	174.419	3	36810	45586	55822	66216	69732	33344	16078
adoption...direct 1	1233	2	1231	100%	3.584	3	66563	67262	68448	69227	69727	66588	2832
adoption...direct 1	46	0	46	100%	0.134	65204	67125	67718	69084	69618	69691	67248	956
adopt Redirect 1	10880	10880	0	0%	31.628	1	1892	4238	7417	8412	9358	2688	2340

ERRORS

Error	Count	Percentage
i.n.c.ConnectTimeoutException: connection timed out: www.dp2.com/127.0.0.1:80	170850	48.938 %
i.n.c.AbstractChannel$AnnotatedSocketException: No buffer space available (maximum connections reached?): connect: www.dp2.com/127.0.0.1:80	157123	45.006 %
i.n.c.AbstractChannel$AnnotatedSocketException: Address already in use: no further information: www.dp2.com/127.0.0.1:80	19789	5.668 %
i.g.h.c.i.RequestTimeoutException: Request timeout to www.dp2.com/127.0.0.1:80 after 60000 ms	1356	0.388 %


Active Users along the Simulation
us20
Active Users
Zoom
1m
All
Number of Active Users
50k
25k
0k
15:19:30
15:20:00
15:20:30
15:21:00
15:21:30
15:22:00
15:22:30
15:23:00
15:23:30
15:24:00
15:24:30
15:25:00
15:20
15:21
15:22
15:23
15:24


Response Time Distribution
OK
KO
Percentage of Requests
5
4
3
2
1
0
411
16795
33179
49563
65947


C:\WINDOWS\system32\cmd.exe
---- us20 ----------
[----------] 0%
waiting: 0 / active: 60000 / done: 0
2020-05-18 15:20:27 65s elapsed
---- Requests ----------
> Global (OK=0 KO=59617)
> request_0 (OK=0 KO=59414)
> login (OK=0 KO=203)
---- Errors ----------
> i.n.c.AbstractChannel$AnnotatedSocketException: No buffer spac 36231 (60,77%)
e available (maximum connections reached?): connect: www.dp2.c...
> i.n.c.ConnectTimeoutException: connection timed out: www.dp2.c 23386 (39,23%)
om/127.0.0.1:80
2020-05-18 15:20:32 70s elapsed
> Global (OK=0 KO=62893)
> request_0 (OK=0 KO=59998)
> login (OK=0 KO=2895)
> i.n.c.AbstractChannel$AnnotatedSocketException: No buffer spac 36231 (57,61%)
> i.n.c.ConnectTimeoutException: connection timed out: www.dp2.c 26662 (42,39%)
Administrador de tareas
Archivo Opciones Vista
Procesos Rendimiento Historial de aplicaciones Inicio Usuarios Detalles Servicios
CPU 96% 1,48 GHz
Memoria 5,7/7,4 GB (77%)
Disco 0 (C:) 1%
Wi-Fi Wi-Fi E: 0 R: 0 Kbps
GPU 0 AMD Radeon HD ... 1%
CPU AMD A4-5000 APU with Radeon(TM) HD Graphics
% de uso
100 %
60 segundos
0
Uso 96%
Velocidad 1,48 GHz
Procesos 160
Subprocesos 1956
Identificadores 246008
Tiempo activo 1:04:59:58
Velocidad de base:
Sockets:
Núcleos:
Procesadores lógicos:
Virtualización:
Compatibilidad con Hyper-V:
Caché L1:
Caché L2:
Menos detalles
Abrir el Monitor de recursos
Escribe aquí para buscar
15:20
18/05/2020

us-14

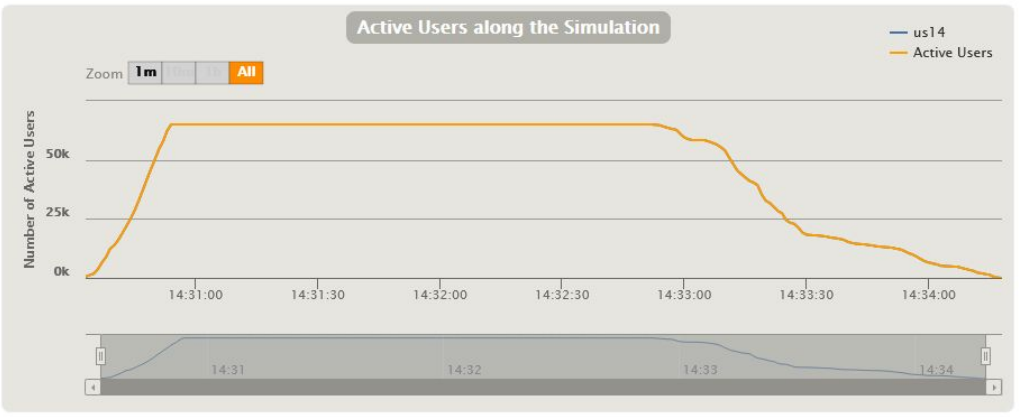
The failure point for this user story has been 65000 current users.

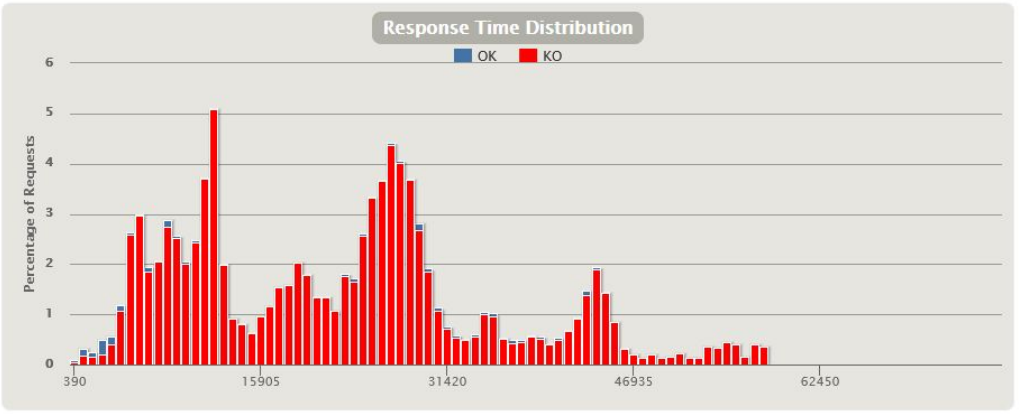
STATISTICS — Expand all groups | Collapse all groups

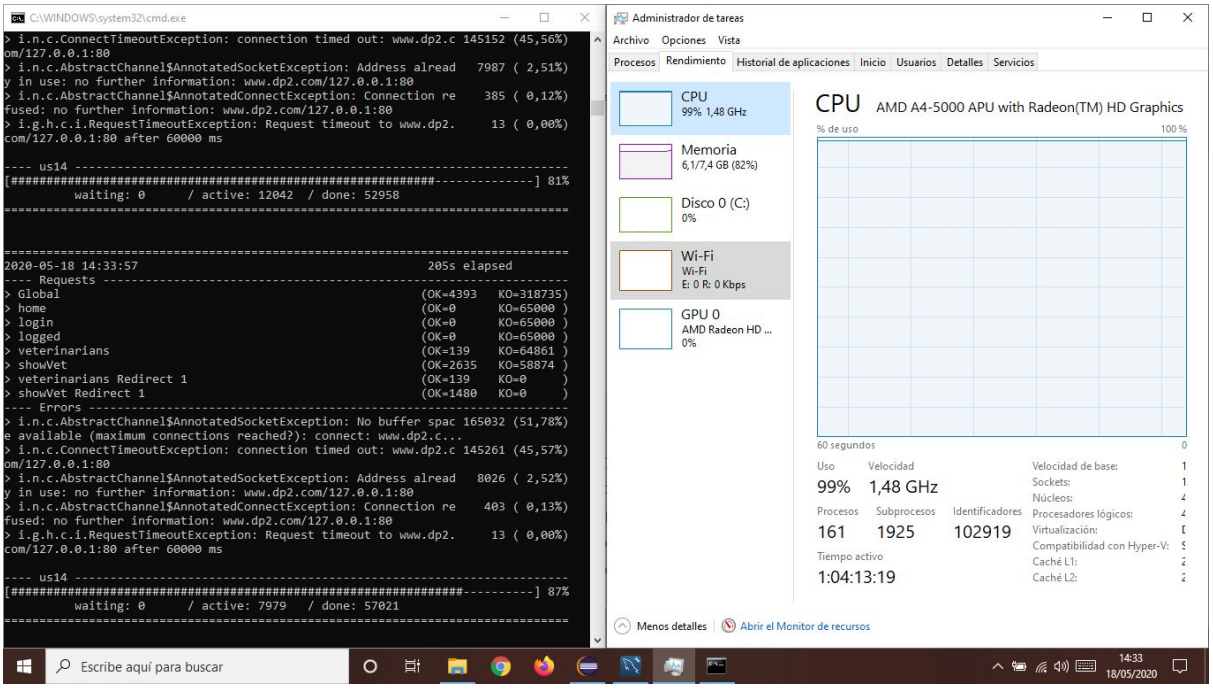
Requests	Executions					Response Time (ms)							
	Total	OK	KO	% KO	Cnt/s	Min	50th pct	75th pct	95th pct	99th pct	Max	Mean	Std Dev
Global Information	330133	10266	319867	97%	1460.765	2	23012	28858	45056	55781	77577	22471	12831
home	65000	0	65000	100%	287.611	15995	30191	40189	55824	57721	77577	33613	11572
login	65000	0	65000	100%	287.611	6987	29739	42971	45186	47095	54411	32544	10055
logged	65000	0	65000	100%	287.611	6204	12543	25719	28777	30973	40214	17302	7984
veterinarians	65000	139	64861	100%	287.611	3502	12254	20880	26734	28753	31523	15081	6979
showVet	65000	4994	60006	92%	287.611	77	15329	20442	34014	42761	47018	15042	10195
veterina...direct 1	139	139	0	0%	0.615	14212	23993	24382	27491	28438	28925	23904	2581
showVet Redirect 1	4994	4994	0	0%	22.097	2	3996	8426	23398	26906	28925	6419	6053

ERRORS

Error	Count	Percentage
i.n.c.AbstractChannel$AnnotatedSocketException: No buffer space available (maximum connections reached?): connect: www.dp2.com/127.0.0.1:80	165032	51.594 %
i.n.c.ConnectTimeoutException: connection timed out: www.dp2.com/127.0.0.1:80	146133	45.686 %
i.n.c.AbstractChannel$AnnotatedSocketException: Address already in use: no further information: www.dp2.com/127.0.0.1:80	8200	2.564 %
i.n.c.AbstractChannel$AnnotatedConnectException: Connection refused: no further information: www.dp2.com/127.0.0.1:80	489	0.153 %
i.g.h.c.i.RequestTimeoutException: Request timeout to www.dp2.com/127.0.0.1:80 after 60000 ms	13	0.004 %


Active Users along the Simulation
us14
Active Users
Zoom
1m
All
Number of Active Users
50k
25k
0k
14:31:00
14:31:30
14:32:00
14:32:30
14:33:00
14:33:30
14:34:00
14:31
14:32
14:33
14:34


Response Time Distribution
OK
KO
Percentage of Requests
6
5
4
3
2
1
0
390
15905
31420
46935
62450

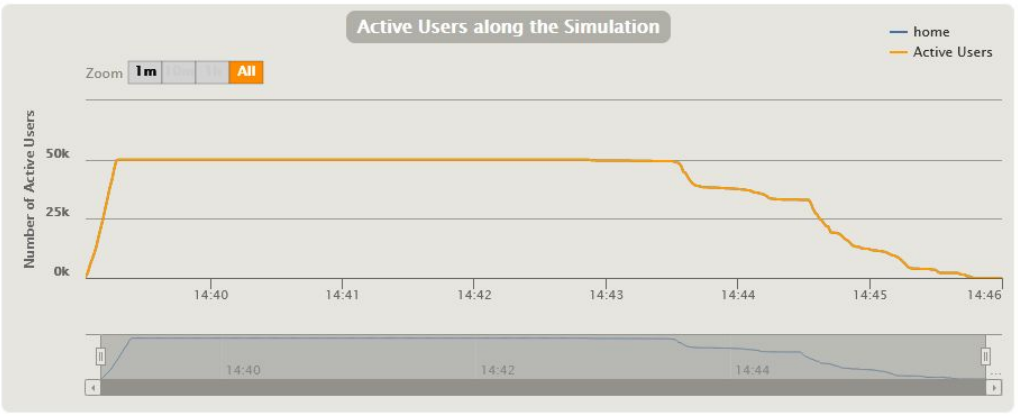

C:\WINDOWS\system32\cmd.exe
> i.n.c.ConnectTimeoutException: connection timed out: www.dp2.c 145152 (45,56%)
om/127.0.0.1:80
> i.n.c.AbstractChannel$AnnotatedSocketException: Address alread 7987 (2,51%)
y in use: no further information: www.dp2.com/127.0.0.1:80
> i.n.c.AbstractChannel$AnnotatedConnectException: Connection re 385 (0,12%)
fused: no further information: www.dp2.com/127.0.0.1:80
> i.g.h.c.i.RequestTimeoutException: Request timeout to www.dp2. 13 (0,00%)
com/127.0.0.1:80 after 60000 ms
---- us14 ----------
[##########] 81%
waiting: 0 / active: 12042 / done: 52958
2020-05-18 14:33:57 205s elapsed
---- Requests ----------
> Global (OK=4393 KO=318735)
> home (OK=0 KO=65000)
> login (OK=0 KO=65000)
> logged (OK=0 KO=65000)
> veterinarians (OK=139 KO=64861)
> showVet (OK=2635 KO=58874)
> veterinarians Redirect 1 (OK=139 KO=0)
> showVet Redirect 1 (OK=1480 KO=0)
---- Errors ----------
> i.n.c.AbstractChannel$AnnotatedSocketException: No buffer spac 165032 (51,78%)
e available (maximum connections reached?): connect: www.dp2.c...
> i.n.c.ConnectTimeoutException: connection timed out: www.dp2.c 145261 (45,57%)
om/127.0.0.1:80
> i.n.c.AbstractChannel$AnnotatedSocketException: Address alread 8026 (2,52%)
y in use: no further information: www.dp2.com/127.0.0.1:80
> i.n.c.AbstractChannel$AnnotatedConnectException: Connection re 403 (0,13%)
fused: no further information: www.dp2.com/127.0.0.1:80
> i.g.h.c.i.RequestTimeoutException: Request timeout to www.dp2. 13 (0,00%)
com/127.0.0.1:80 after 60000 ms
---- us14 ----------
[##########] 87%
waiting: 0 / active: 7979 / done: 57021
Administrador de tareas
Archivo Opciones Vista
Procesos Rendimiento Historial de aplicaciones Inicio Usuarios Detalles Servicios
CPU
99% 1,48 GHz
Memoria
6,1/7,4 GB (82%)
Disco 0 (C:)
0%
Wi-Fi
Wi-Fi
E: 0 R: 0 Kbps
GPU 0
AMD Radeon HD ...
0%
CPU AMD A4-5000 APU with Radeon(TM) HD Graphics
% de uso
100 %
60 segundos
0
Uso
99%
Velocidad
1,48 GHz
Procesos
161
Subprocesos
1925
Identificadores
102919
Tiempo activo
1:04:13:19
Velocidad de base:
Sockets:
Núcleos:
Procesadores lógicos:
Virtualización:
Compatibilidad con Hyper-V:
Caché L1:
Caché L2:
Menos detalles
Abrir el Monitor de recursos
Escribe aquí para buscar
14:33
18/05/2020

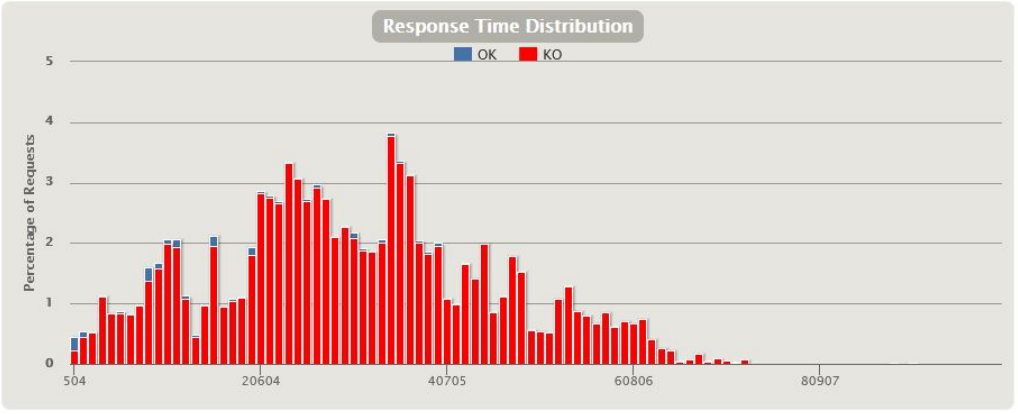
us-15

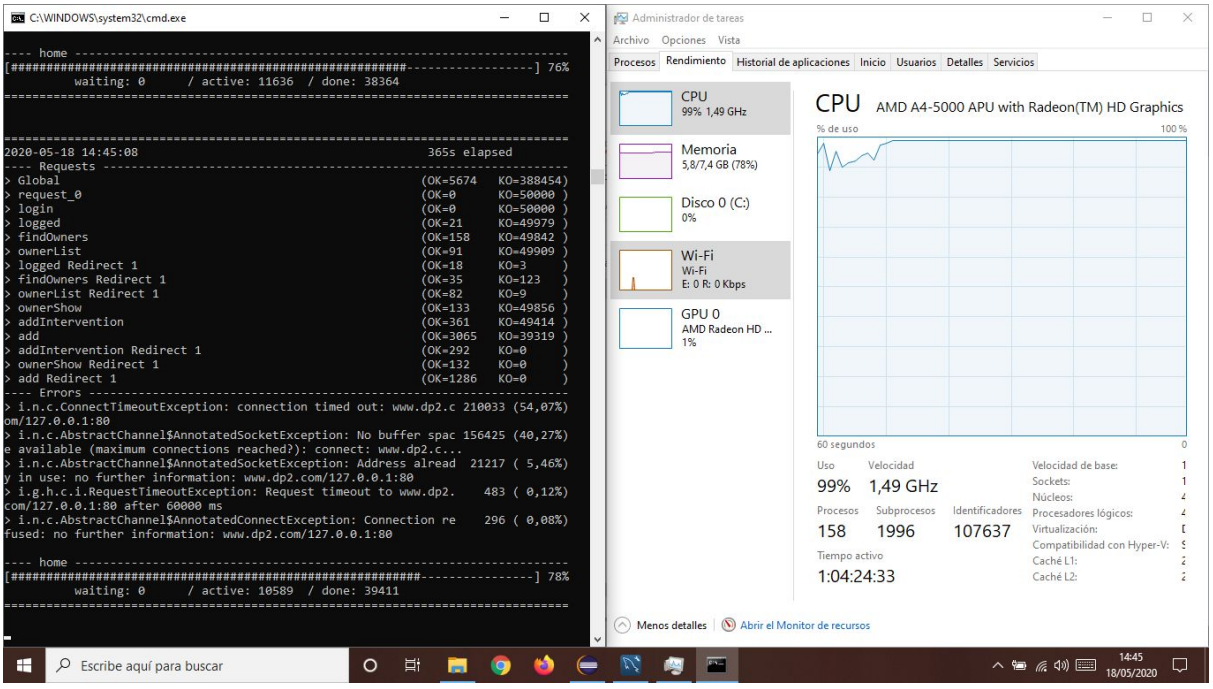
The failure point for this user story has been 50000 current users.

▶ ERRORS

Error	Count	Percentage
i.n.c.ConnectTimeoutException: connection timed out: www.dp2.com/127.0.0.1:80	213870	54.214 %
i.n.c.AbstractChannel$AnnotatedSocketException: No buffer space available (maximum connections reached?): connect: www.dp2.com/127.0.0.1:80	156425	39.652 %
i.n.c.AbstractChannel$AnnotatedSocketException: Address already in use: no further information: www.dp2.com/127.0.0.1:80	23266	5.898 %
i.g.h.c.i.RequestTimeoutException: Request timeout to www.dp2.com/127.0.0.1:80 after 60000 ms	635	0.161 %
i.n.c.AbstractChannel$AnnotatedConnectException: Connection refused: no further information: www.dp2.com/127.0.0.1:80	296	0.075 %

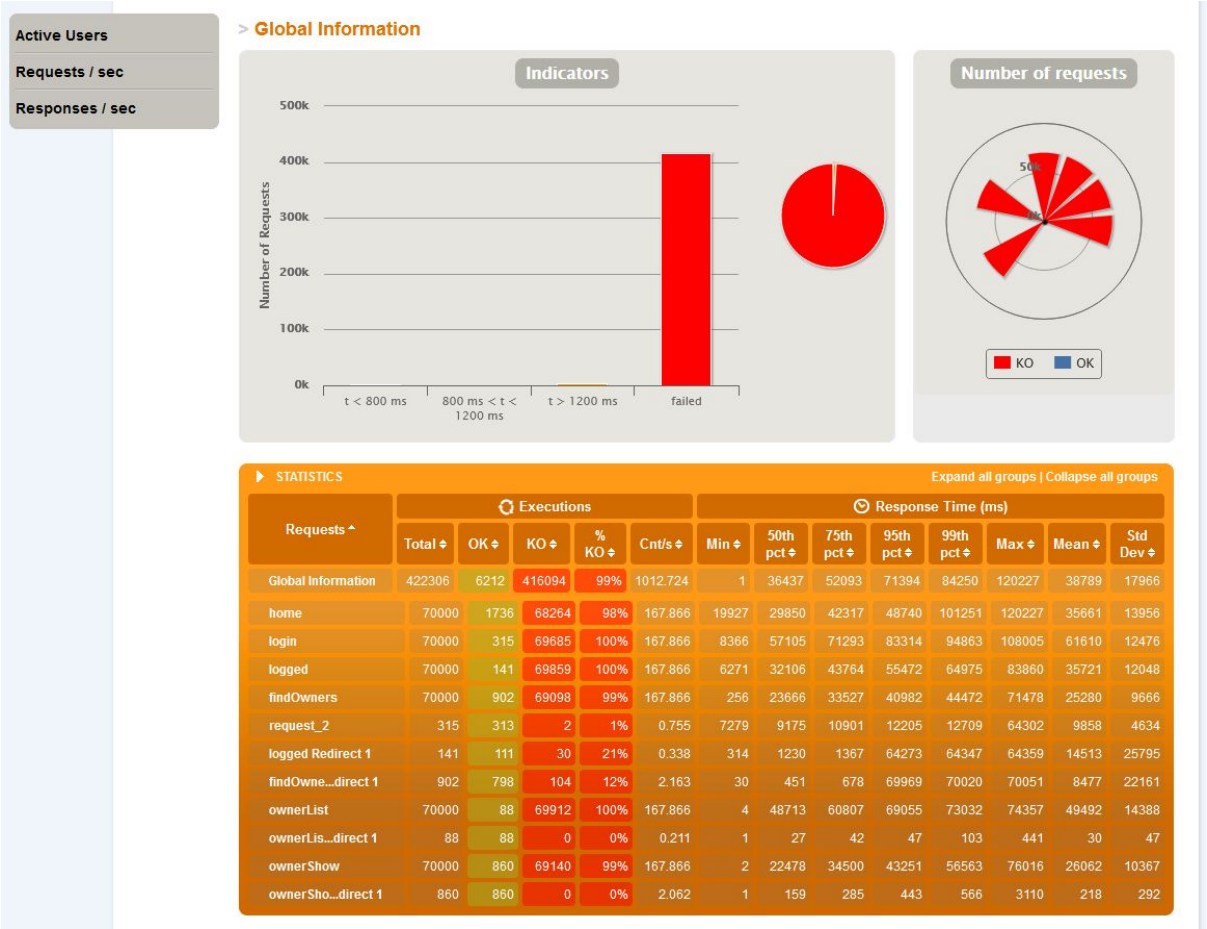






us-16

The failure point for this user story has been 70000 current users.

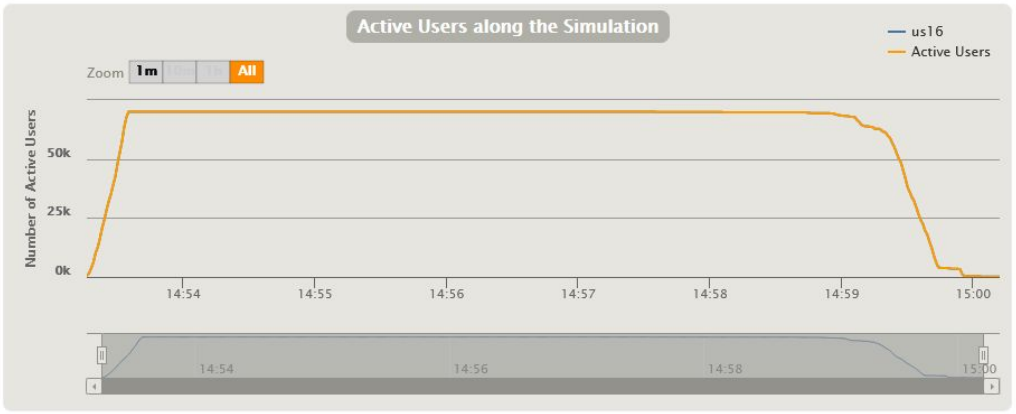


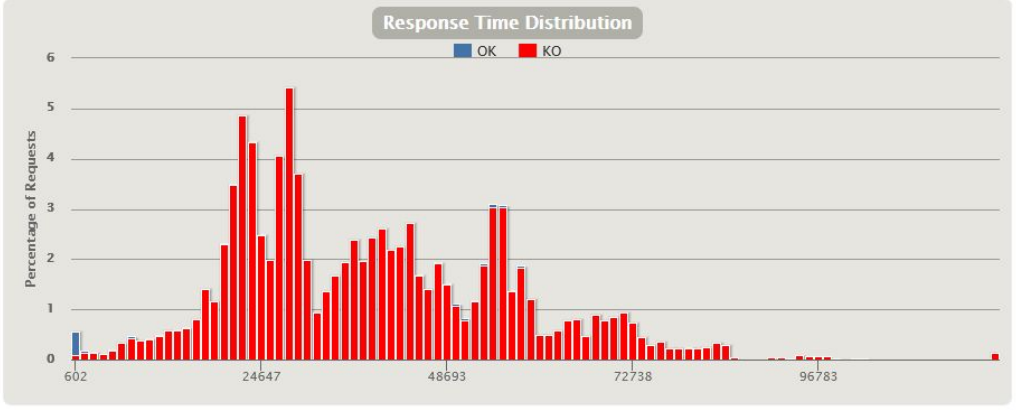
STATISTICS — Expand all groups | Collapse all groups

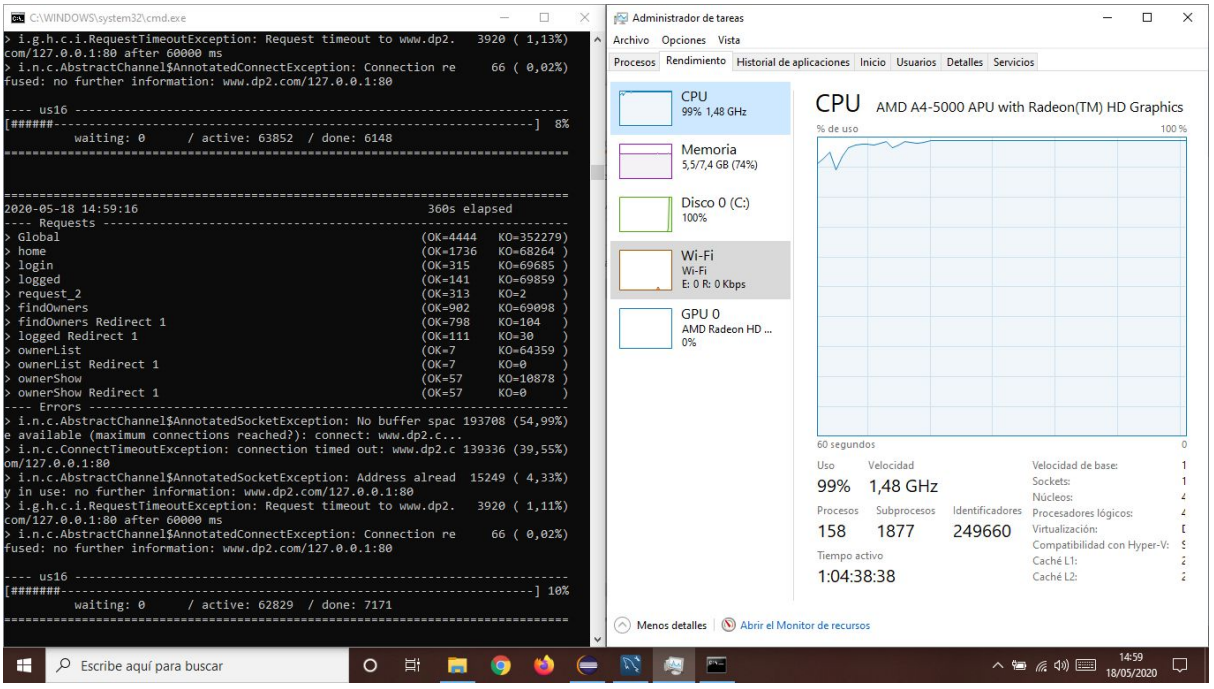
Requests	Executions					Response Time (ms)							
	Total	OK	KO	% KO	Cnt/s	Min	50th pct	75th pct	95th pct	99th pct	Max	Mean	Std Dev
Global Information	422306	6212	416094	99%	1012.724	1	36437	52093	71394	84250	120227	38789	17966
home	70000	1736	68264	98%	167.866	19927	29850	42317	48740	101251	120227	35661	13956
login	70000	315	69685	100%	167.866	8366	57105	71293	83314	94863	108005	61610	12476
logged	70000	141	69859	100%	167.866	6271	32106	43764	55472	64975	83860	35721	12048
findOwners	70000	902	69098	99%	167.866	256	23666	33527	40982	44472	71478	25280	9666
request_2	315	313	2	1%	0.755	7279	9175	10901	12205	12709	64302	9858	4634
logged Redirect 1	141	111	30	21%	0.338	314	1230	1367	64273	64347	64359	14513	25795
findOwne...direct 1	902	798	104	12%	2.163	30	451	678	69969	70020	70051	8477	22161
ownerList	70000	88	69912	100%	167.866	4	48713	60807	69055	73032	74357	49492	14388
ownerLis...direct 1	88	88	0	0%	0.211	1	27	42	47	103	441	30	47
ownerShow	70000	860	69140	99%	167.866	2	22478	34500	43251	56563	76016	26062	10367
ownerSho...direct 1	860	860	0	0%	2.062	1	159	285	443	566	3110	218	292

ERRORS

Error	Count	Percentage
i.n.c.AbstractChannel$AnnotatedSocketException: No buffer space available (maximum connections reached?): connect: www.dp2.com/127.0.0.1:80	218324	52.47 %
i.n.c.ConnectTimeoutException: connection timed out: www.dp2.com/127.0.0.1:80	166691	40.061 %
i.n.c.AbstractChannel$AnnotatedSocketException: Address already in use: no further information: www.dp2.com/127.0.0.1:80	27093	6.511 %
i.g.h.c.i.RequestTimeoutException: Request timeout to www.dp2.com/127.0.0.1:80 after 60000 ms	3920	0.942 %
i.n.c.AbstractChannel$AnnotatedConnectException: Connection refused: no further information: www.dp2.com/127.0.0.1:80	66	0.016 %







us-17

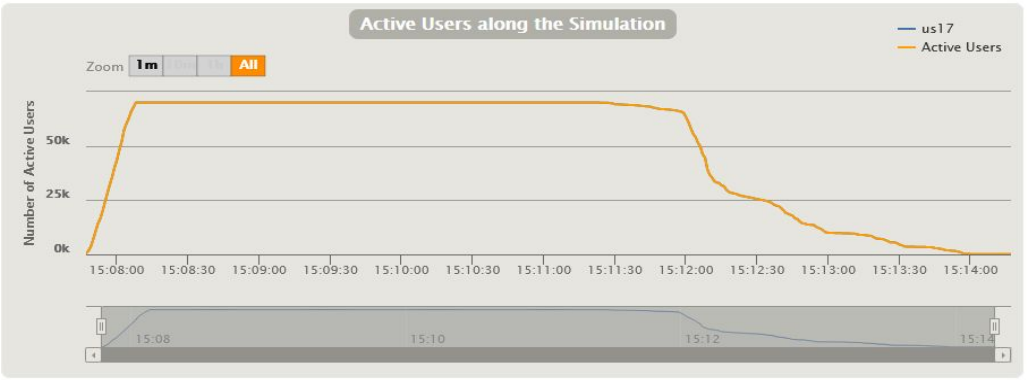
The failure point for this user story has been 70000 current users.

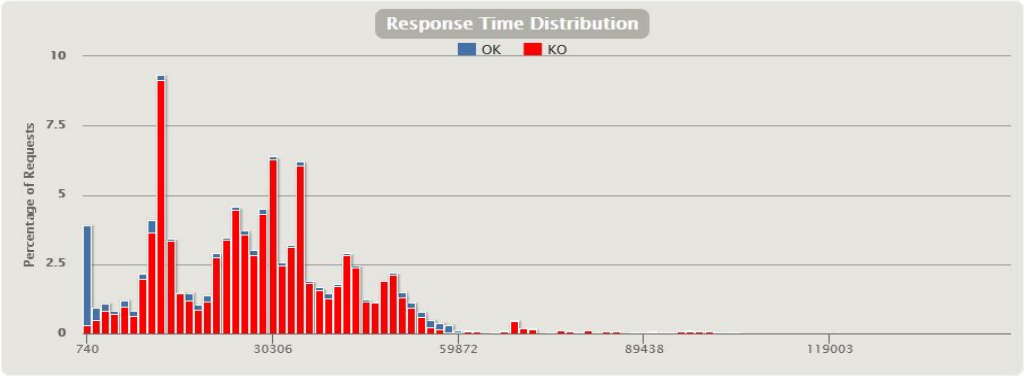
STATISTICS — Expand all groups | Collapse all groups

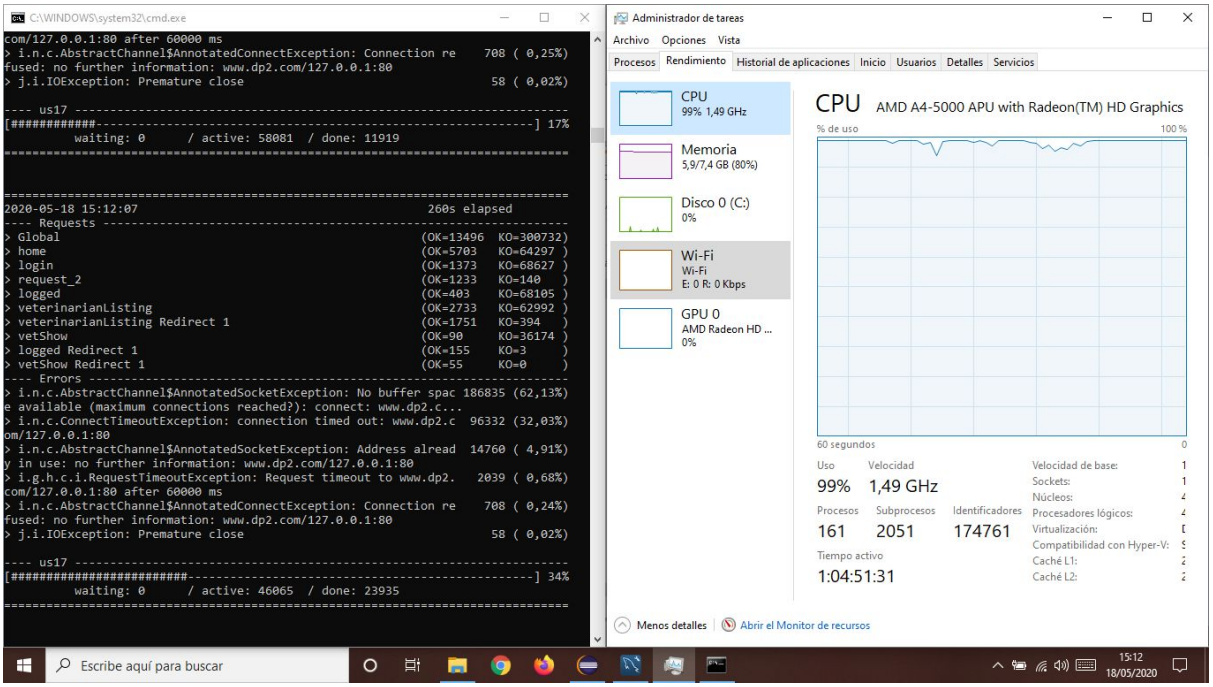
Requests	Executions					Response Time (ms)							
	Total	OK	KO	% KO	Cnt/s	Min	50th pct	75th pct	95th pct	99th pct	Max	Mean	Std Dev
Global Information	366851	38310	328541	90%	938.238	1	27671	36347	52902	82127	147830	27892	16515
home	70000	5703	64297	92%	179.028	21403	31222	43035	54190	59060	97640	36647	9156
login	70000	1373	68627	98%	179.028	89	34955	47440	80352	100767	147830	40966	15972
request_2	1373	1233	140	10%	3.512	67	11057	13770	71044	71387	71449	16846	18273
logged	70000	1019	68981	99%	179.028	113	12924	22767	37457	51014	88934	17422	10390
veterinarianListing	70000	5168	64832	93%	179.028	12	17027	26278	58951	71749	82595	22200	16317
logged Redirect 1	1019	1016	3	0%	2.606	2465	7861	9774	41191	41285	69994	10539	9256
veterina...direct 1	5168	4221	947	18%	13.217	2	10744	17046	69823	70578	70889	18497	24768
vetShow	70000	9291	60709	87%	179.028	2	25464	35404	49412	53987	73720	26885	12812
vetShow Redirect 1	9291	9286	5	0%	23.762	1	337	1057	2950	23205	73543	1528	4689

▶ ERRORS

Error	Count	Percentage
i.n.c.AbstractChannel$AnnotatedSocketException: No buffer space available (maximum connections reached?): connect: www.dp2.com/127.0.0.1:80	186835	56.868 %
i.n.c.ConnectTimeoutException: connection timed out: www.dp2.com/127.0.0.1:80	116005	35.309 %
i.n.c.AbstractChannel$AnnotatedSocketException: Address already in use: no further information: www.dp2.com/127.0.0.1:80	22192	6.755 %
i.g.h.c.i.RequestTimeoutException: Request timeout to www.dp2.com/127.0.0.1:80 after 60000 ms	2743	0.835 %
i.n.c.AbstractChannel$AnnotatedConnectException: Connection refused: no further information: www.dp2.com/127.0.0.1:80	708	0.215 %
j.i.IOException: Premature close	58	0.018 %







Conclusion

As all screenshot shows, in every us test the CPU got to 99%/100& usage and the memory to 80% making the CPU the main bottle net or point failure in the system. Given that the computer used to run the test is a laptop and for that, impossible to upgrade it, the best solutions would be to purchase a new computer give significant improvement regarding CPU performance and also more memory capability.