Testing a Spatial Analysis Web Application

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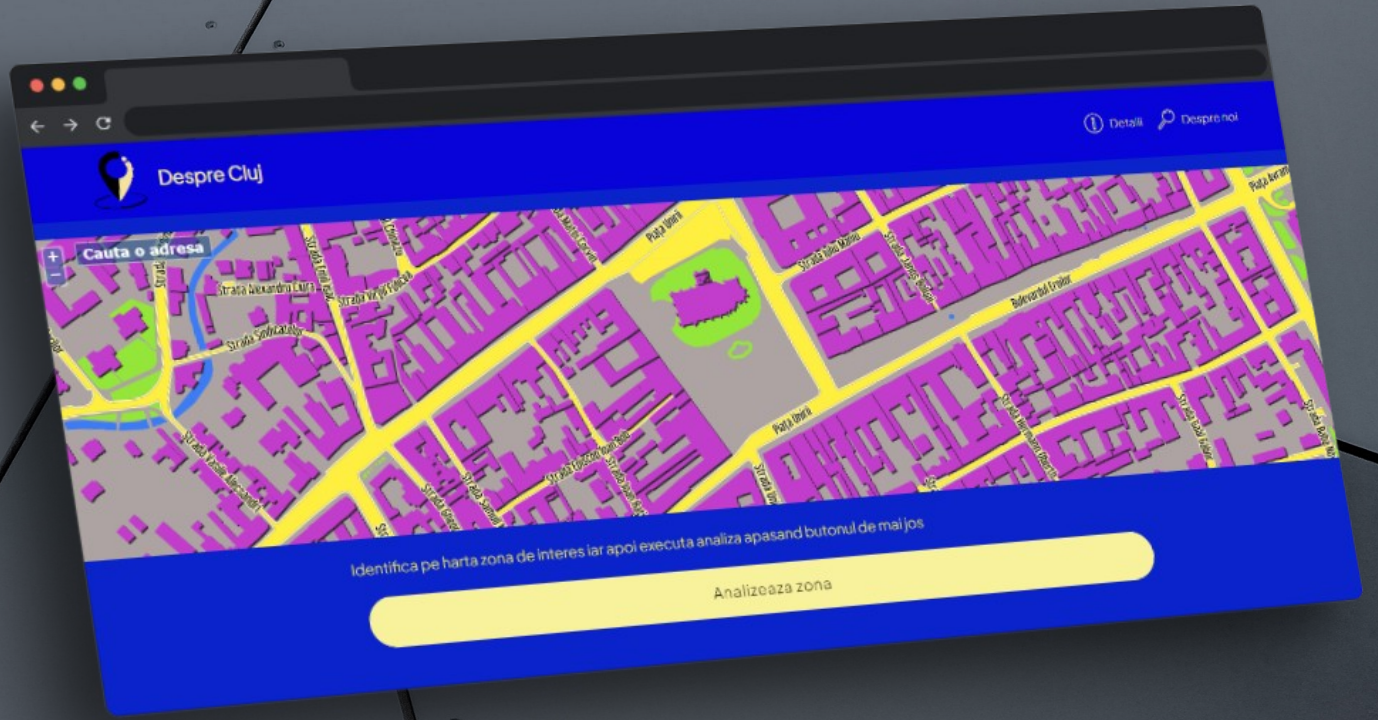
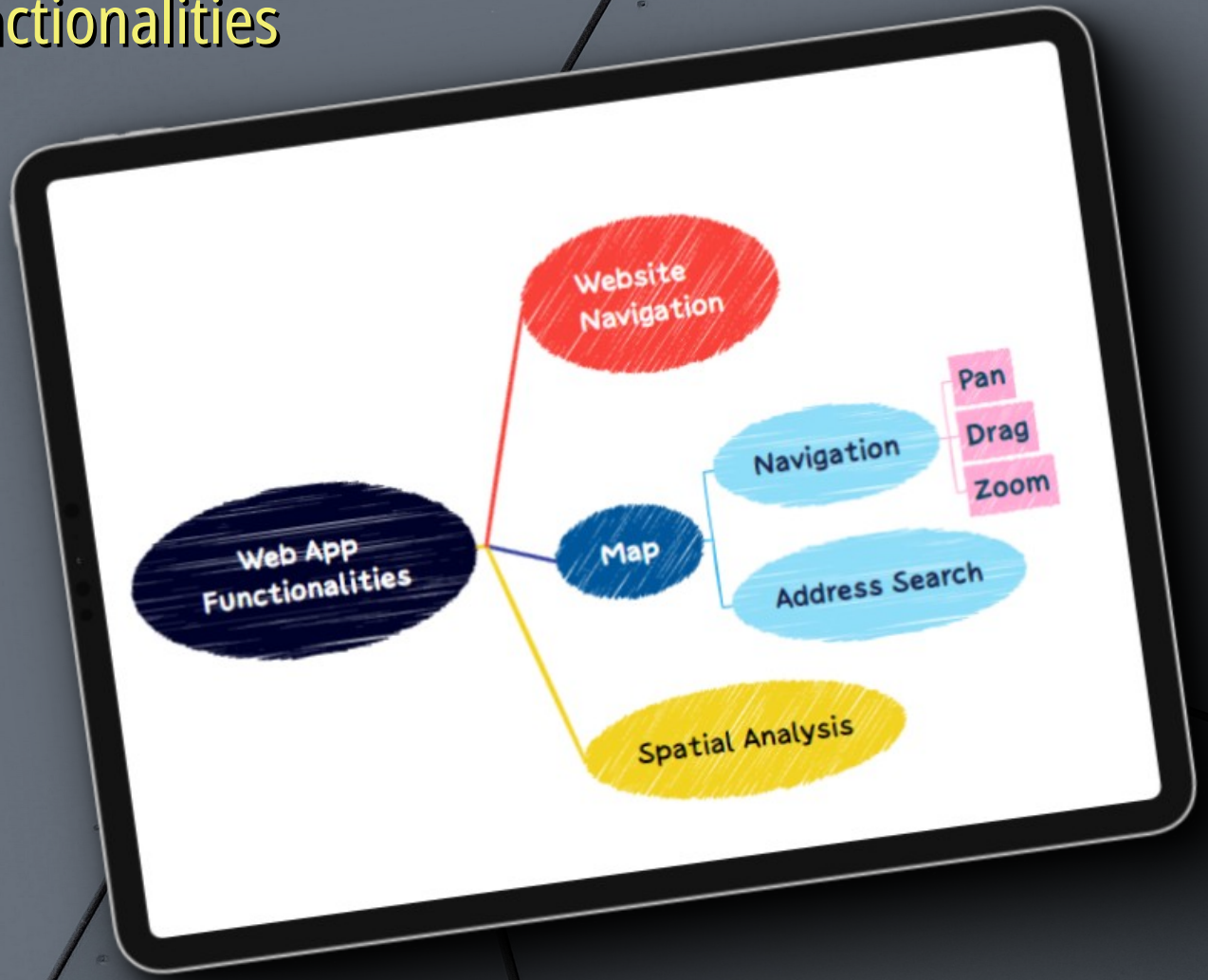
Despre Cluj

- its purpose was to bring to light Spatial Analysis, to unveil its potential and benefits
- users can navigate a map, identify a location and start the Analysis
- Spatial Analysis produces a report detailing various aspects of the location, including population, housing, area features, transportation, education, retail, real estate pricing, urban planning considerations, a.s.o.

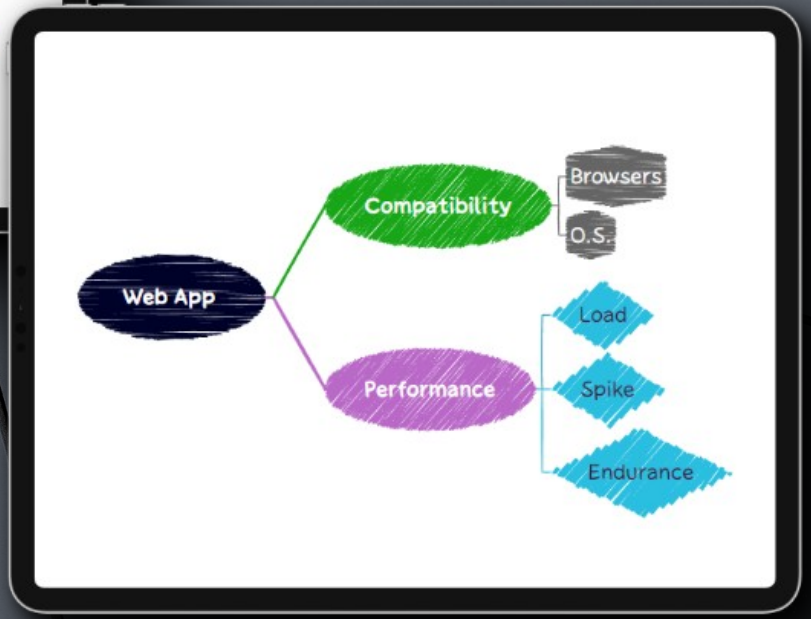


Despre Cluj - Functionalities



Testing Despre Cluj

⇦ Functional Testing
(mainly Smoke, Exploratory)



Non Functional Testing ⇨
(manual, automation testing)

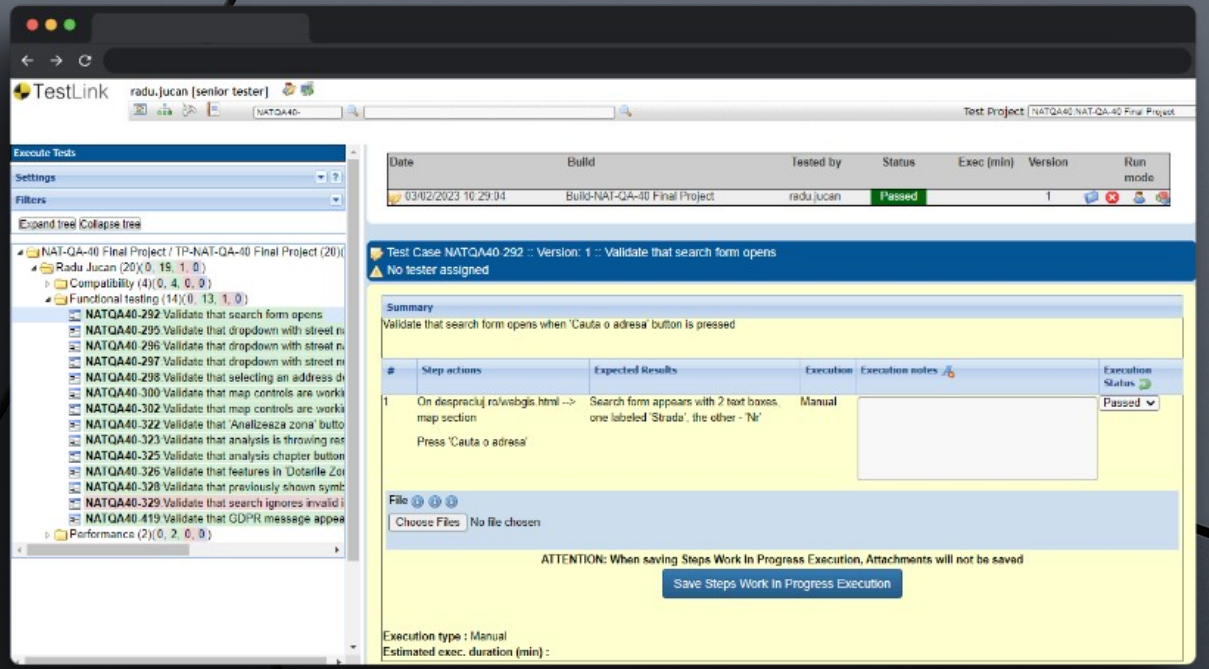
Functional Testing

14 Test cases - documented in TestLink

14 Executed

13 Passed

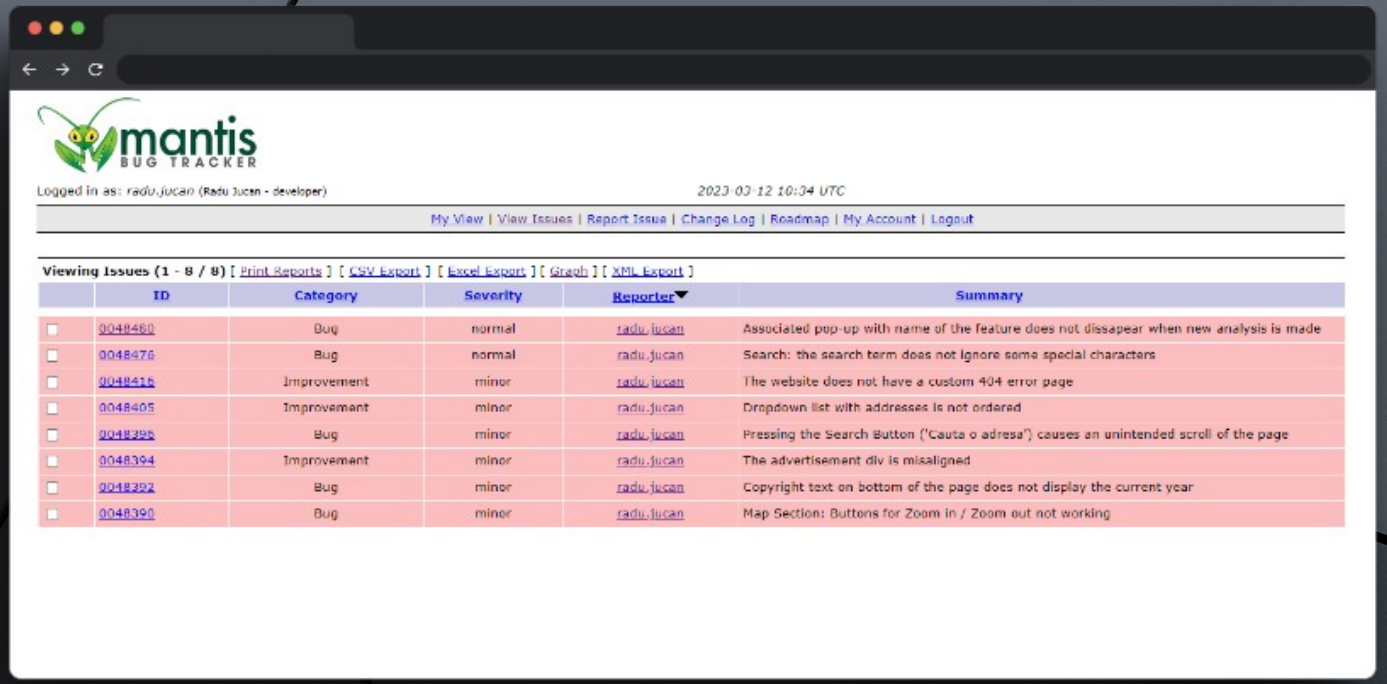
1 Failed



Bugs / Improvements

8 issues identified – documented in Mantis Bug Tracker

2 bugs – normal severity
3 bugs – minor severity
3 improvements



Non Functional Testing

1. Compatibility Testing (Browser / OS)

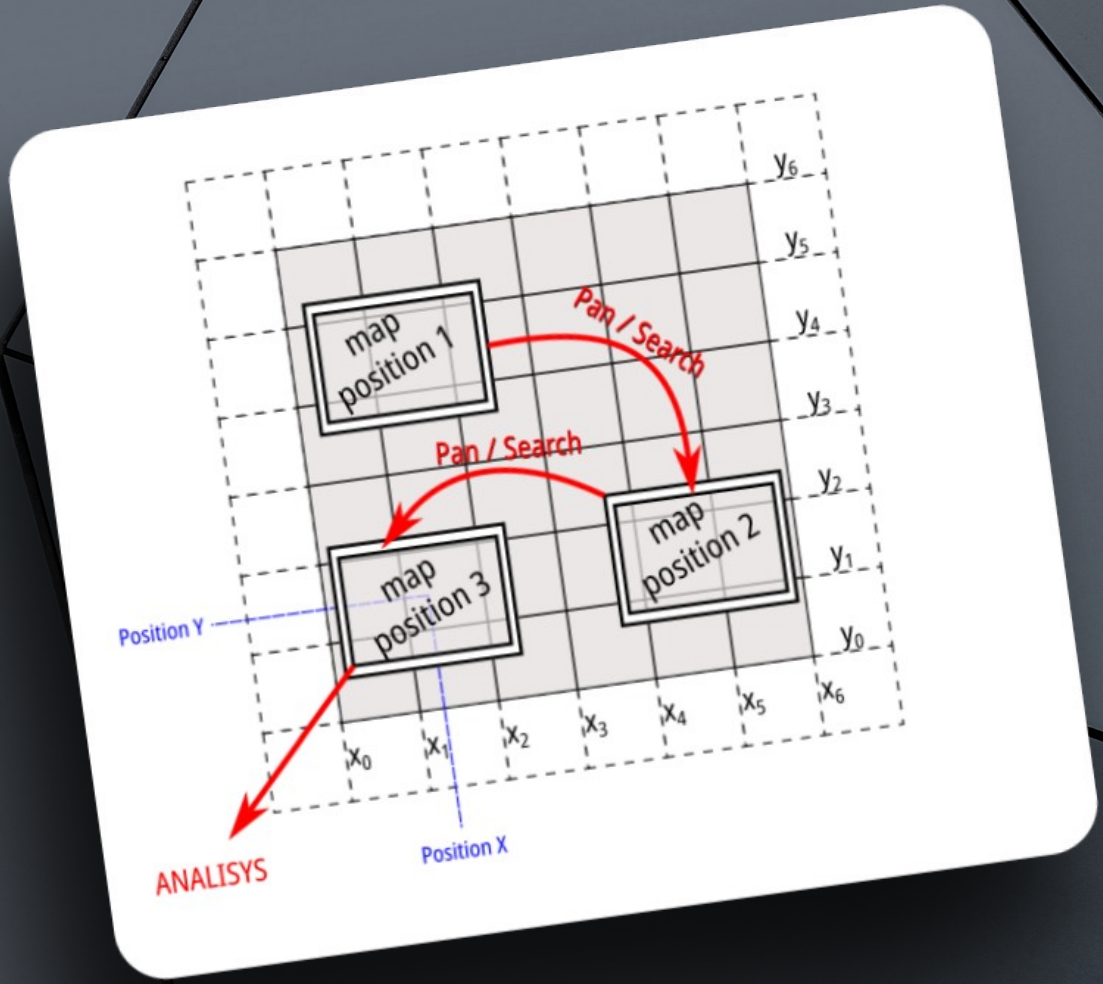
2. Performance Testing ⇨
using Apache JMeter

Challenges in developing an effective Test Plan in JMeter

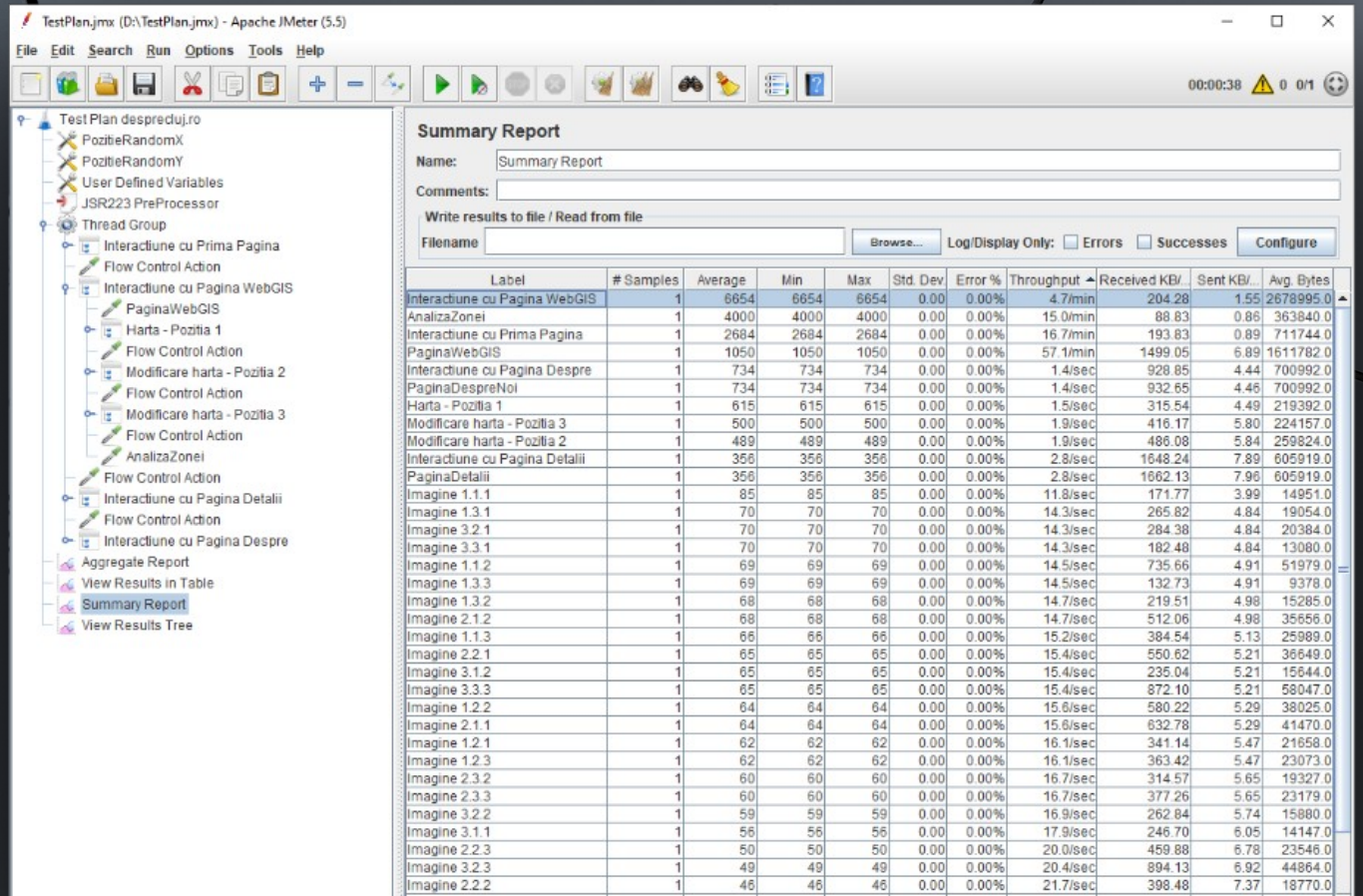
1. Identifying all HTTP Requests

!!! AJAX - ”allows web pages to be updated asynchronously by exchanging data with a web server behind the scenes” !!!

2. Creating a realistic simulation of user’s interaction with the web application



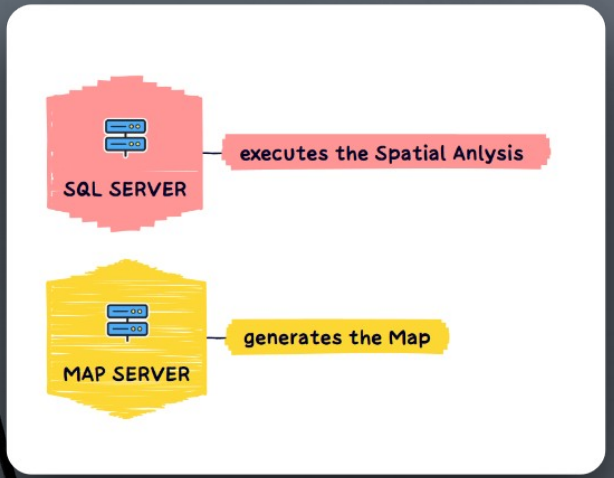
With an effective Test Plan in JMeter



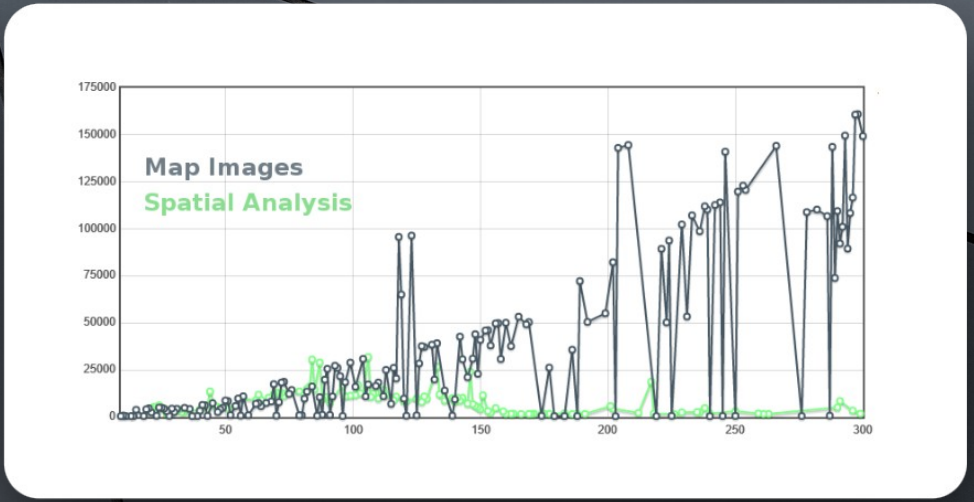
Label	# Samples	Average	Min	Max	Std. Dev	Error %	Throughput	Received KB/...	Sent KB/...	Avg. Bytes
Interactiune cu Pagina WebGIS	1	6654	6654	6654	0.00	0.00%	4.7/min	204.28	1.55	2678995.0
AnalizaZonei	1	4000	4000	4000	0.00	0.00%	15.0/min	88.83	0.86	363840.0
Interactiune cu Prima Pagina	1	2684	2684	2684	0.00	0.00%	16.7/min	193.83	0.89	711744.0
PaginaWebGIS	1	1050	1050	1050	0.00	0.00%	57.1/min	1499.05	6.89	1611782.0
Interactiune cu Pagina Despre	1	734	734	734	0.00	0.00%	1.4/sec	928.85	4.44	700992.0
PaginaDespreNoi	1	734	734	734	0.00	0.00%	1.4/sec	932.65	4.46	700992.0
Harta - Pozitia 1	1	615	615	615	0.00	0.00%	1.5/sec	315.54	4.49	219392.0
Modificare harta - Pozitia 3	1	500	500	500	0.00	0.00%	1.9/sec	416.17	5.80	224157.0
Modificare harta - Pozitia 2	1	489	489	489	0.00	0.00%	1.9/sec	486.08	5.84	259824.0
Interactiune cu Pagina Detalii	1	356	356	356	0.00	0.00%	2.8/sec	1648.24	7.89	605919.0
PaginaDetalii	1	356	356	356	0.00	0.00%	2.8/sec	1662.13	7.96	605919.0
Imagine 1.1.1	1	85	85	85	0.00	0.00%	11.8/sec	171.77	3.99	14951.0
Imagine 1.3.1	1	70	70	70	0.00	0.00%	14.3/sec	265.82	4.84	19054.0
Imagine 3.2.1	1	70	70	70	0.00	0.00%	14.3/sec	284.38	4.84	20384.0
Imagine 3.3.1	1	70	70	70	0.00	0.00%	14.3/sec	182.48	4.84	13080.0
Imagine 1.1.2	1	69	69	69	0.00	0.00%	14.5/sec	735.66	4.91	51979.0
Imagine 1.3.3	1	69	69	69	0.00	0.00%	14.5/sec	132.73	4.91	9378.0
Imagine 1.3.2	1	68	68	68	0.00	0.00%	14.7/sec	219.51	4.98	15285.0
Imagine 2.1.2	1	68	68	68	0.00	0.00%	14.7/sec	512.06	4.98	35656.0
Imagine 1.1.3	1	66	66	66	0.00	0.00%	15.2/sec	384.54	5.13	25989.0
Imagine 2.2.1	1	65	65	65	0.00	0.00%	15.4/sec	550.62	5.21	36649.0
Imagine 3.1.2	1	65	65	65	0.00	0.00%	15.4/sec	235.04	5.21	15644.0
Imagine 3.3.3	1	65	65	65	0.00	0.00%	15.4/sec	872.10	5.21	58047.0
Imagine 1.2.2	1	64	64	64	0.00	0.00%	15.6/sec	580.22	5.29	38025.0
Imagine 2.1.1	1	64	64	64	0.00	0.00%	15.6/sec	632.78	5.29	41470.0
Imagine 1.2.1	1	62	62	62	0.00	0.00%	16.1/sec	341.14	5.47	21658.0
Imagine 1.2.3	1	62	62	62	0.00	0.00%	16.1/sec	363.42	5.47	23073.0
Imagine 2.3.2	1	60	60	60	0.00	0.00%	16.7/sec	314.57	5.65	19327.0
Imagine 2.3.3	1	60	60	60	0.00	0.00%	16.7/sec	377.26	5.65	23179.0
Imagine 3.2.2	1	59	59	59	0.00	0.00%	16.9/sec	262.84	5.74	15880.0
Imagine 3.1.1	1	56	56	56	0.00	0.00%	17.9/sec	246.70	6.05	14147.0
Imagine 2.2.3	1	50	50	50	0.00	0.00%	20.0/sec	459.88	6.78	23546.0
Imagine 3.2.3	1	49	49	49	0.00	0.00%	20.4/sec	894.13	6.92	44864.0
Imagine 2.2.2	1	46	46	46	0.00	0.00%	21.7/sec	398.48	7.37	18770.0

- Load Testing
- Spike Testing
- Soak / Endurance Testing
- Stress Testing
- ...even Recovery Testing

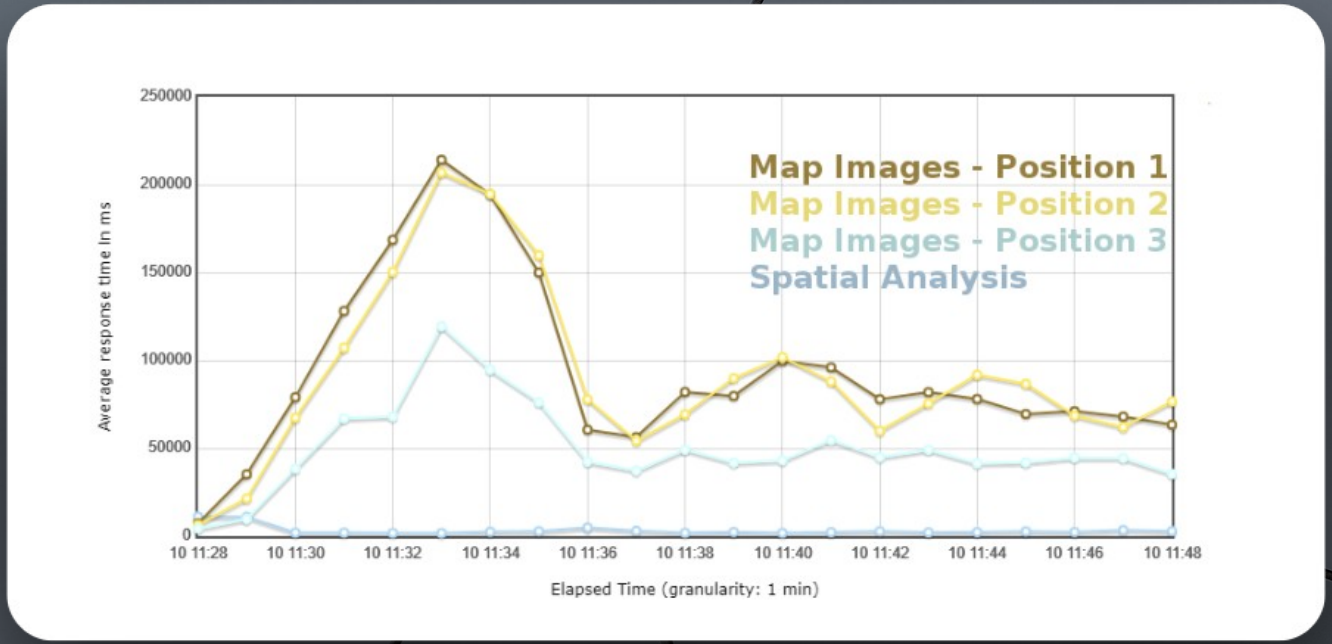
Some Interesting Results



Although the SQL Server responds more slowly than the Map Server, it doesn't seem to be affected by the rising number of users in same manner that the Map Server is (Map Server is the first to crash)



Some Interesting Results (part 2)



During the early stages of the Endurance Test, the server's response time increases dramatically. However, in a short period - it returns to acceptable levels and remains stable thereafter.

Conclusion

The web application was tested with both functional and non-functional tests.

Using Exploratory, Smoke, Negative testing techniques – Test Cases for the main functionalities of the app were created. Some bugs were identified in the testing process and soon they will be fixed.

The non-functional tests were particularly insightful, showing how the website performs under different conditions and with varying user loads.

Thank You!