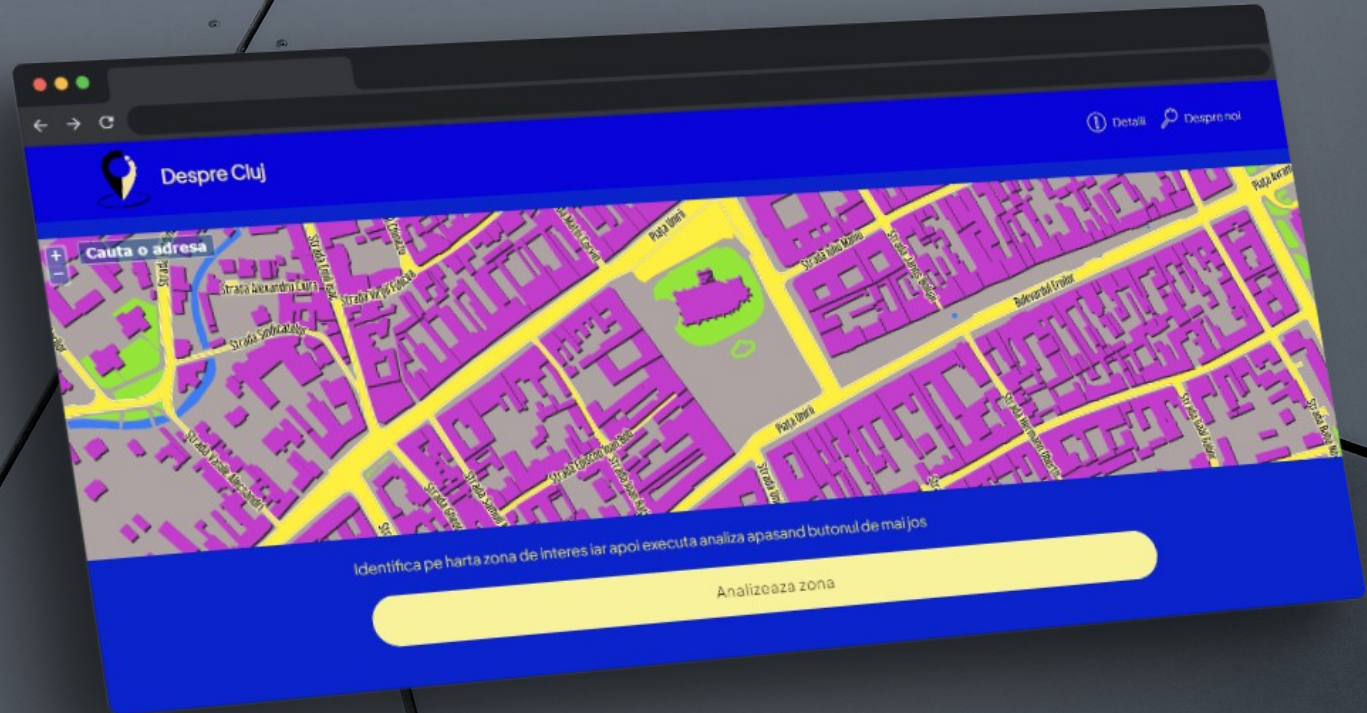


Testing a Spatial Analysis Web Application

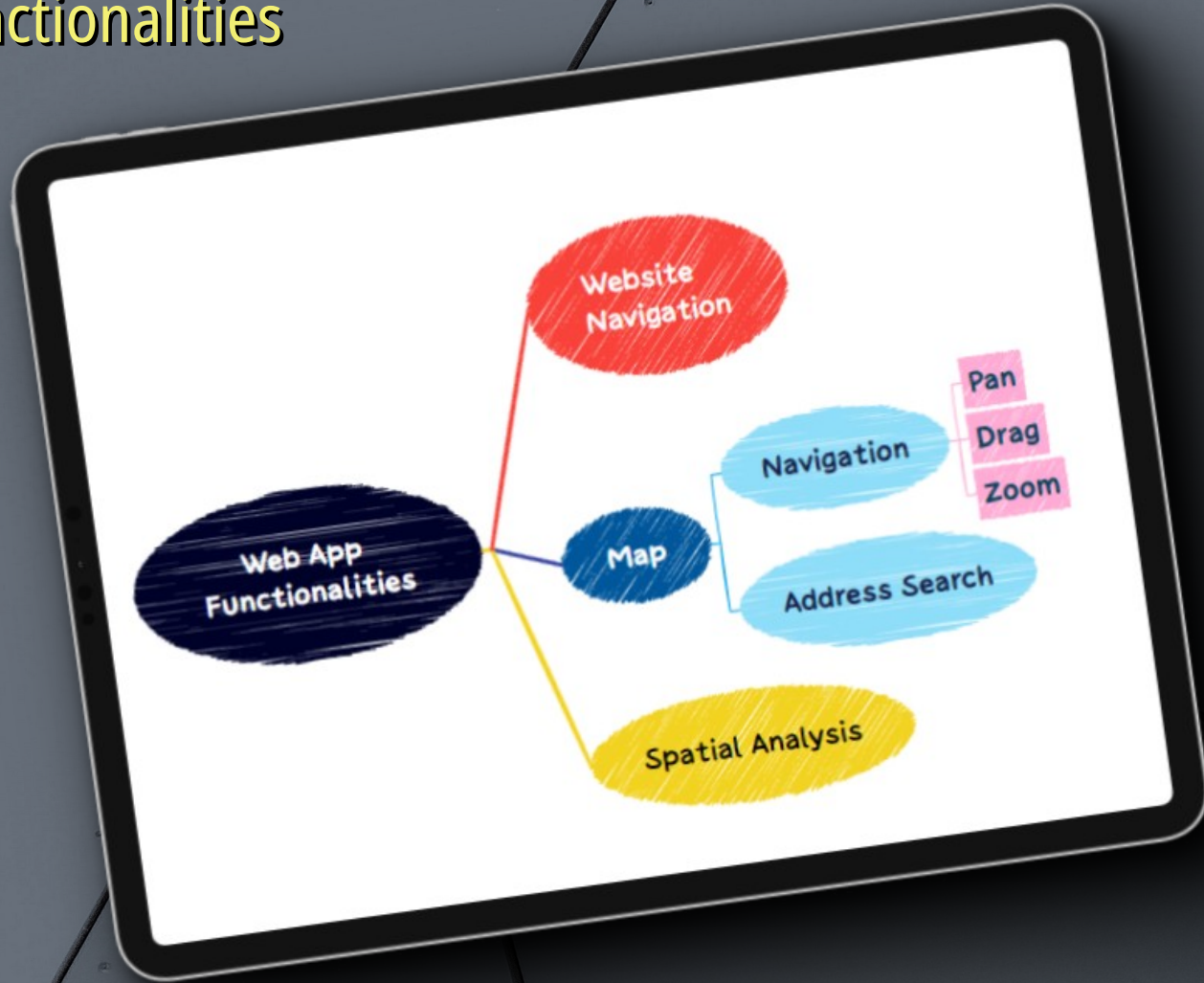


Despre Cluj

- 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

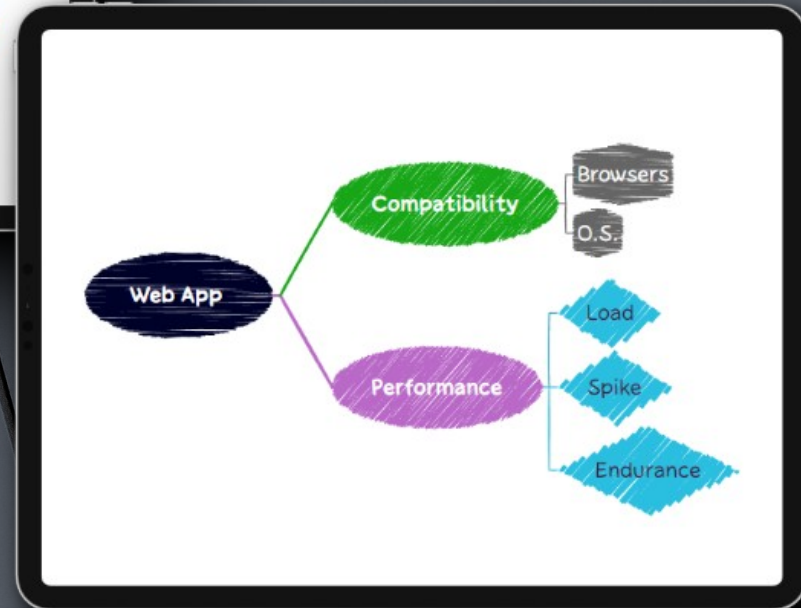


Testing Despre Cluj



⇐ Functional Testing
(mainly Smoke, Exploratory)

Non Functional Testing ⇒
(manual, automation testing)



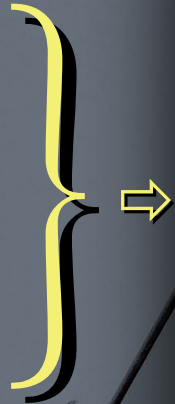
Functional Testing

14 Test cases - documented in TestLink

14 Executed

13 Passed

1 Failed



The screenshot displays the TestLink interface for a user named 'radu.jucan [senior tester]'. The left sidebar shows a tree view of test cases under 'Functional testing (14)'. The main area shows the execution details for 'Test Case NATQA40-292'. A table at the top lists execution results, showing a 'Passed' status. Below this, the 'Summary' section describes the test case. A table with 6 columns (Step actions, Expected Results, Execution, Execution notes, Execution Status) shows a single step that was 'Passed'. At the bottom, there is an 'ATTENTION' message and a 'Save Steps Work In Progress Execution' button.

Date	Build	Tested by	Status	Exec (min)	Version	Run mode
03/02/2023 10:29:04	Build-NAT-QA-40 Final Project	radu.jucan	Passed		1	

Test Case NATQA40-292 :: Version: 1 :: Validate that search form opens
No tester assigned

Summary
Validate that search form opens when 'Cauta o adresa' button is pressed

#	Step actions	Expected Results	Execution	Execution notes	Execution Status
1	On desprescriu.ro/webgis.html -> map section Press 'Cauta o adresa'	Search form appears with 2 text boxes, one labeled 'Strada', the other - 'Nr'	Manual		Passed

File
Choose Files No file chosen

ATTENTION: When saving Steps Work In Progress Execution, Attachments will not be saved
Save Steps Work In Progress Execution

Execution type : Manual
Estimated exec. duration (min) :

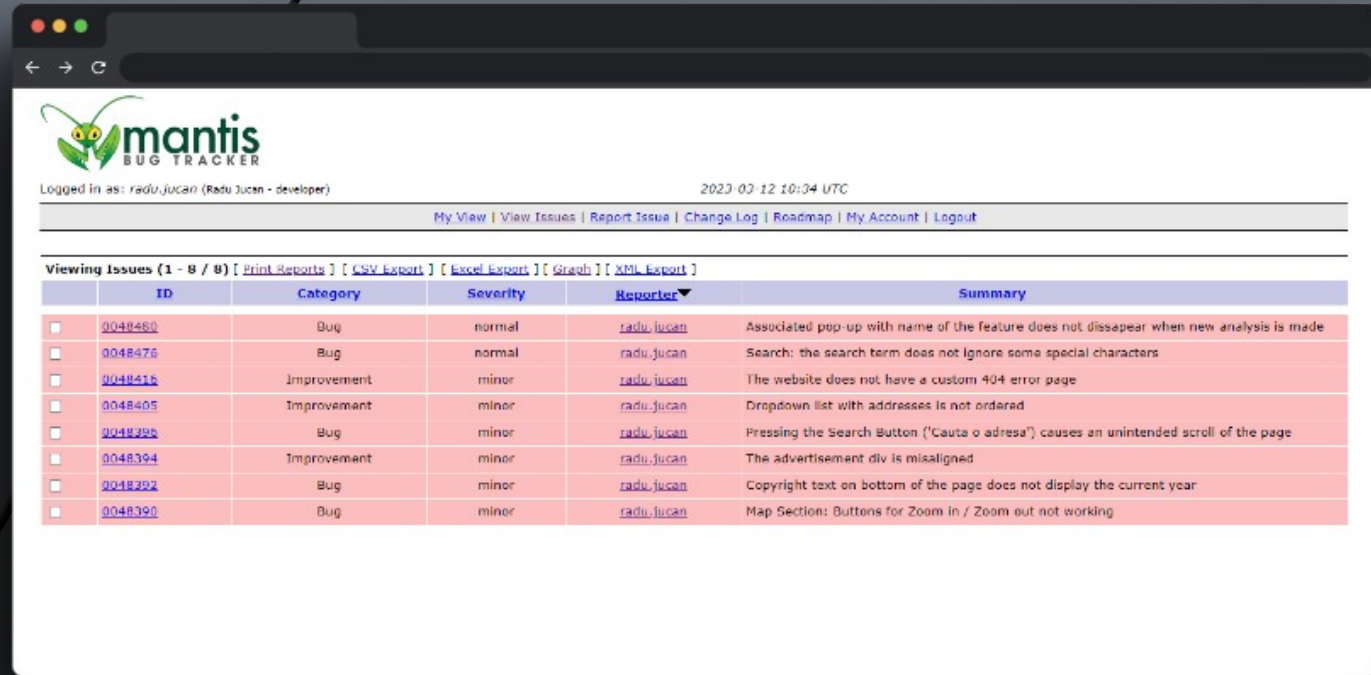
Bugs / Improvements

8 issues identified – documented in Mantis Bug Tracker

2 bugs – normal severity

3 bugs – minor severity

3 improvements



The screenshot shows the Mantis Bug Tracker interface. At the top, there's a logo for Mantis Bug Tracker and a navigation bar with links like 'My View', 'View Issues', 'Report Issue', etc. Below the navigation bar, there's a section titled 'Viewing Issues (1 - 8 / 8)' with links for 'Print Reports', 'CSV Export', 'Excel Export', 'Graph', and 'XML Export'. The main content is a table listing 8 issues, each with a checkbox, ID, Category, Severity, Reporter, and Summary.

	ID	Category	Severity	Reporter	Summary
<input type="checkbox"/>	0048460	Bug	normal	radu.jucan	Associated pop-up with name of the feature does not dissapear when new analysis is made
<input type="checkbox"/>	0048476	Bug	normal	radu.jucan	Search: the search term does not ignore some special characters
<input type="checkbox"/>	0048416	Improvement	minor	radu.jucan	The website does not have a custom 404 error page
<input type="checkbox"/>	0048405	Improvement	minor	radu.jucan	Dropdown list with addresses is not ordered
<input type="checkbox"/>	0048396	Bug	minor	radu.jucan	Pressing the Search Button ("Cauta o adresa") causes an unintended scroll of the page
<input type="checkbox"/>	0048394	Improvement	minor	radu.jucan	The advertisement div is misaligned
<input type="checkbox"/>	0048392	Bug	minor	radu.jucan	Copyright text on bottom of the page does not display the current year
<input type="checkbox"/>	0048390	Bug	minor	radu.jucan	Map Section: Buttons for Zoom in / Zoom out not working

Non Functional Testing

1. Compatibility Testing (Browser / OS)

2. Performance Testing ⇒ using Apache JMeter

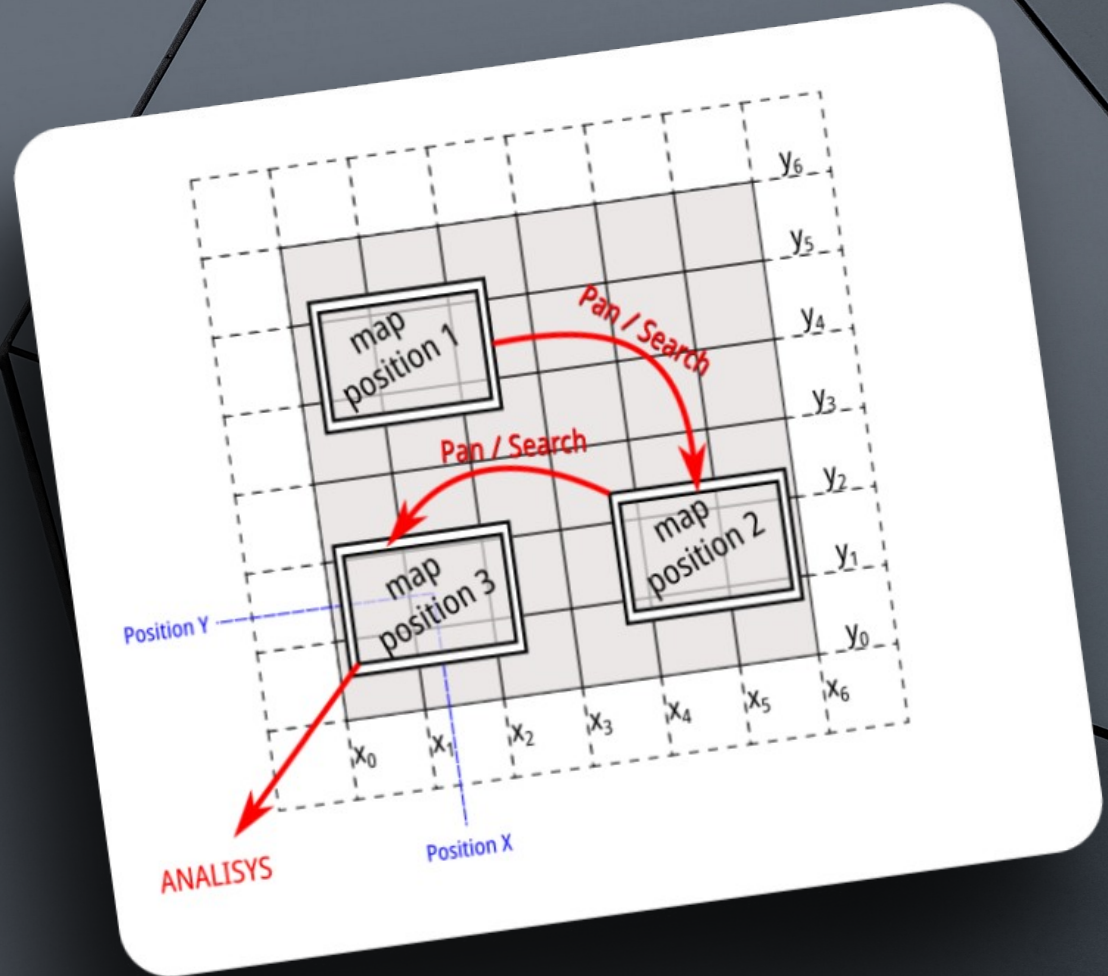


Challenges in developing an effective Test Plan in JMeter

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

TestPlan.jmx (D:\TestPlan.jmx) - Apache JMeter (5.5)

File Edit Search Run Options Tools Help

00:00:38 0 0/1

Test Plan despreduj.ro

- PositieRandomX
- PositieRandomY
- User Defined Variables
- JSR223 PreProcessor
- Thread Group
 - Interactiune cu Prima Pagina
 - Flow Control Action
 - Interactiune cu Pagina WebGIS
 - PaginaWebGIS
 - Harta - Pozitia 1
 - Flow Control Action
 - Modificare harta - Pozitia 2
 - Flow Control Action
 - Modificare harta - Pozitia 3
 - Flow Control Action
 - AnalizaZonei
 - Flow Control Action
 - Interactiune cu Pagina Detalii
 - Imagine 1.1.1
 - Imagine 1.3.1
 - Imagine 3.2.1
 - Imagine 3.3.1
 - Imagine 1.1.2
 - Imagine 1.3.3
 - Imagine 1.3.2
 - Imagine 2.1.2
 - Imagine 1.1.3
 - Imagine 2.2.1
 - Imagine 3.1.2
 - Imagine 3.3.3
 - Imagine 1.2.2
 - Imagine 2.1.1
 - Imagine 1.2.1
 - Imagine 1.2.3
 - Imagine 2.3.2
 - Imagine 2.3.3
 - Imagine 3.2.2
 - Imagine 3.1.1
 - Imagine 2.2.3
 - Imagine 3.2.3
 - Imagine 2.2.2

Aggregate Report

View Results in Table

Summary Report

View Results Tree

Summary Report

Name: Summary Report

Comments:

Write results to file / Read from file

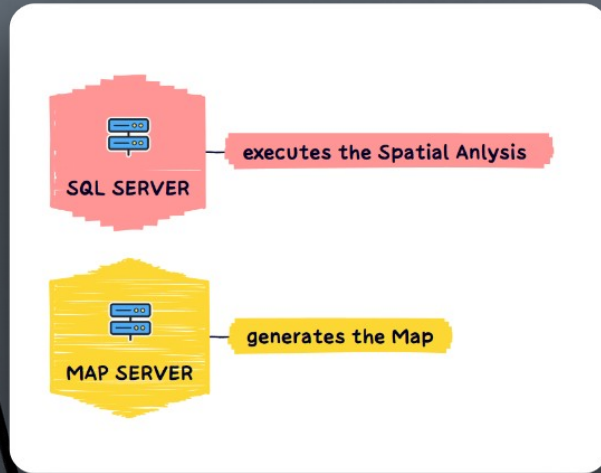
Filename: Browse...

Log/Display Only: ☐ Errors ☐ Successes

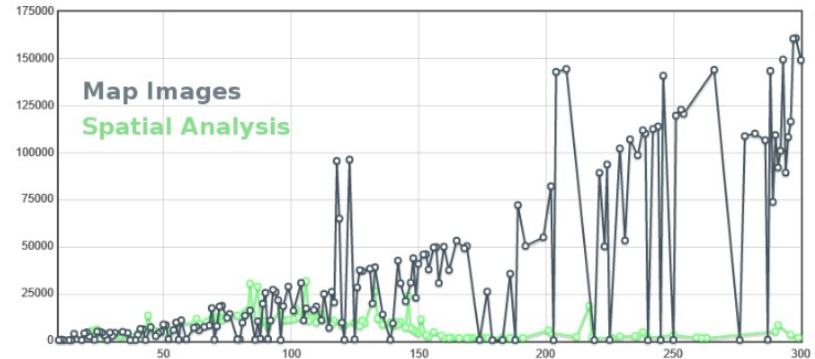
Label	# Samples	Average	Min	Max	Std. Dev.	Error %	Throughput	Received KB/s	Sent KB/s	Avg. Bytes
Interactiune cu Pagina WebGIS	1	6654	6654	6654	0.00	0.00%	4.7/min	204.28	1.55	2678995.0
AnalizaZonei	1	4000	4000	4000	0.00	0.00%	15.0/min	88.83	0.86	363840.0
Interactiune cu Prima Pagina	1	2684	2684	2684	0.00	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	932.65	4.46	700992.0
PaginaDespreNol	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	560.62	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

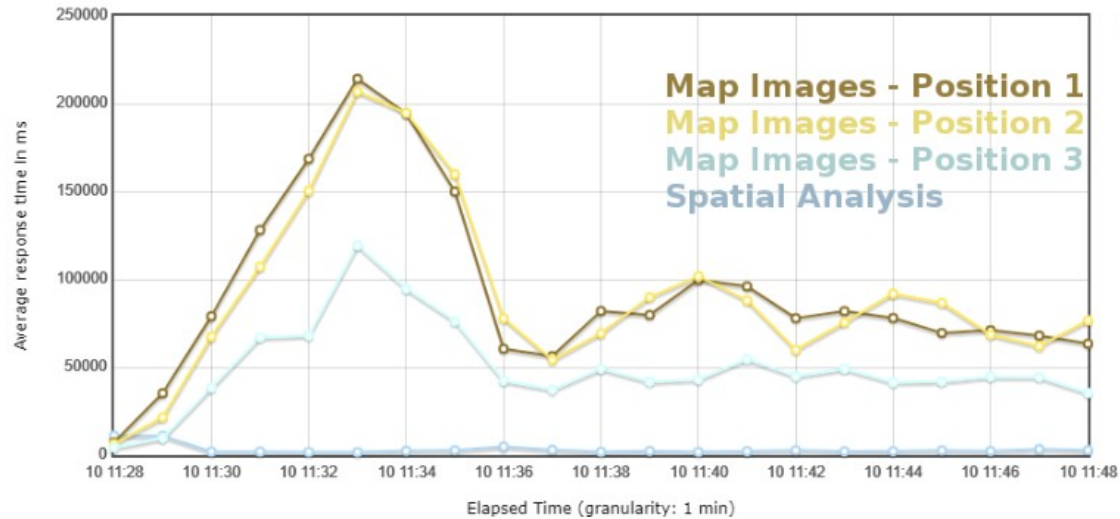
Some Interesting Results



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.

A tablet with a black bezel is positioned diagonally on a dark grey surface with a grid pattern. The screen is a solid dark grey and displays the text "Thank You!" in a bright yellow, bold, sans-serif font. The text is slightly tilted to match the angle of the tablet. The lighting is soft, creating a subtle shadow of the tablet on the surface below it.

Thank You!