



## Automation Performance Report - GRC [ ITRM - TVI Registration & User Management ]

BCT Automation And Performance Testing Team

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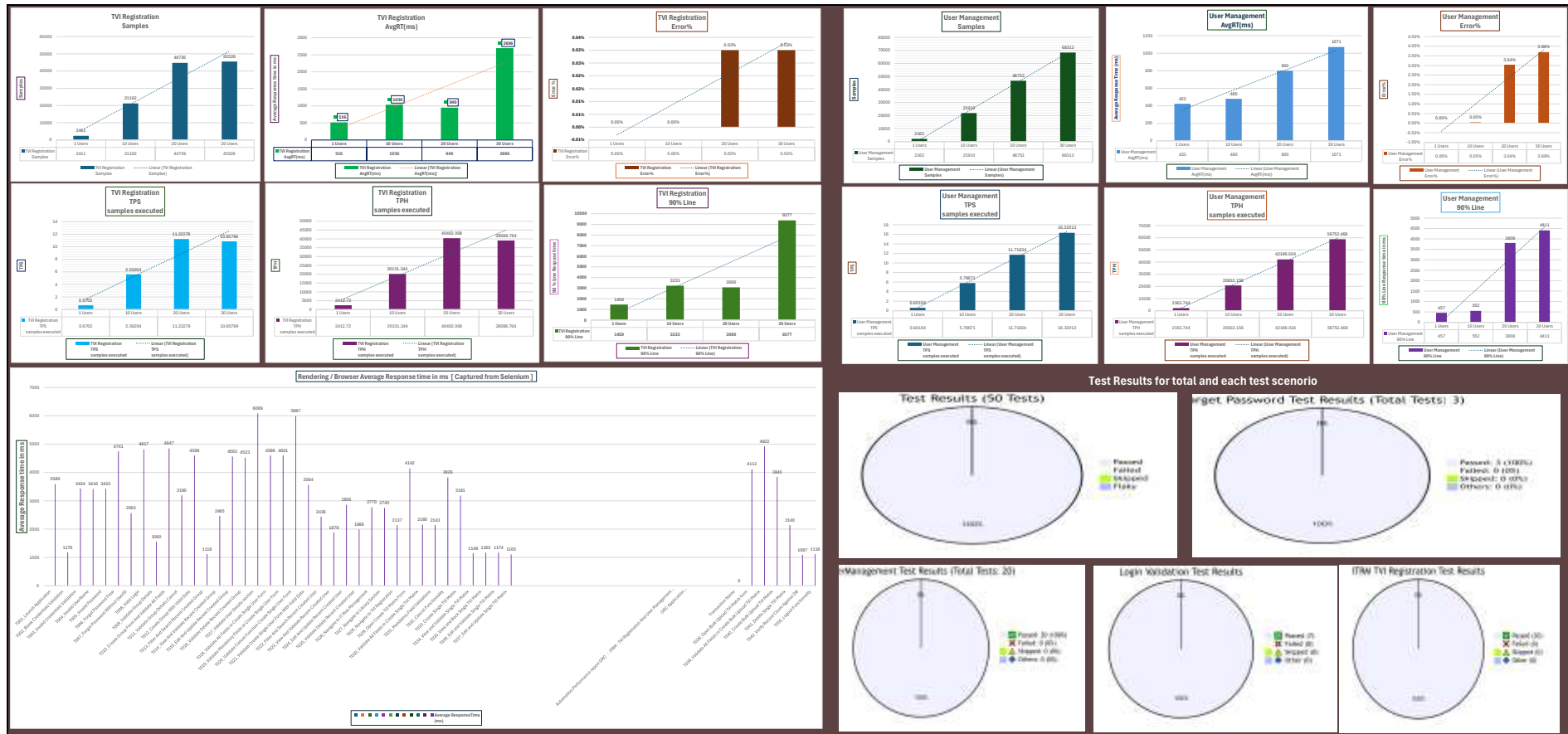
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## GRC Application - Automation And Performance Reports in Graph representation

### Module Name : ITRM TVI Resistration & User Management - UM

#### Performance Summary Report in Graph representation For ITRM - TVI Registration Module

1. Average Response Time vs User Load
2. 90% Line Response Time vs User Load
3. Number of Samples / api requests in an hour
4. TPS & TPH 5. Error %



## GRC Application - Automation And Performance Execution Load Test Summary

### Module Name : ITRM TVI Resistration & User Management - UM

Performance Report GRC Module Name : ITRM - TVI Registration	Performance Report GRC Module Name : GRC - User Management - UM	Automation Test Report GRC Module Name : ITRM TVI Resistration & User Management - UM
<p>Overall Performance Report – itrm tvi registration with Stability Analysis</p> <p>Execution Overview</p> <ul style="list-style-type: none"><li>- Concurrent Users: 40, highest load tested.</li><li>- Test Duration: 60 minutes, including ramp-up and ramp-down.</li><li>- Total Samples Executed: 21,637, indicating system stress at peak load.</li></ul> <p>Performance Metrics</p> <ul style="list-style-type: none"><li>- Average Response Time: 12,374 ms (12.37 seconds)—significantly higher than previous runs, indicating serious performance degradation.</li><li>- Overall Throughput (TPS): 4.92549 transactions/sec, lower than the previous 10.85 TPS, showing scaling challenges.</li><li>- Error Rate: 0.01%, low but worth monitoring.</li></ul> <p>Resource Utilization</p> <ul style="list-style-type: none"><li>- CPU Utilization: 80.50%, near saturation—this suggests performance limits are being reached.</li><li>- Memory Utilization: 58.00%, stable but nearing potential scalability concerns.</li></ul> <p>Application Stability Analysis</p> <p>Based on the reports:</p> <ul style="list-style-type: none"><li>- The application showed consistent stability up to 20 concurrent users, maintaining a reasonable response time of 949 ms and a high TPS of 11.22/sec.</li><li>- At 30 concurrent users, response times spiked to 2696 ms, indicating resource strain but still functioning within operational limits.</li><li>- At 40 users, response times ballooned to 12,374 ms, showing significant performance degradation and possible system bottlenecks.</li><li>- CPU usage surpassed 80%, meaning additional load could result in system instability or failures.</li></ul> <p>Optimization Recommendations</p> <ul style="list-style-type: none"><li>- Maintain optimal user load at 20 users for stability.</li><li>- Scale infrastructure (horizontal scaling or load balancing) to sustain higher concurrency.</li><li>- Migrate PostgreSQL to a separate VM to prevent resource contention.</li><li>- Optimize API response with caching, pagination, and indexing.</li></ul> <p>Reports:</p> <p><a href="http://192.168.0.160:3000/d/1XaPi0lnk/19688-appserver-metrics?orgId=1&amp;from=1748949180000&amp;to=1748952840000">http://192.168.0.160:3000/d/1XaPi0lnk/19688-appserver-metrics?orgId=1&amp;from=1748949180000&amp;to=1748952840000</a></p> <p>file:///C:/Users/Hemanth/Desktop/BCT/apache-jmeter-5.6.3/TestScripts/Performance_Scripts_ITRM_TVI_User_Management_Modules/40Users_1Hr/40Users_1Hr/index.html</p>	<p>Overall Performance Report – GRC_USER_MANAGEMENT</p> <p>Execution Overview</p> <ul style="list-style-type: none"><li>- Concurrent Users: 30, significantly scaling up from previous tests.</li><li>- Test Duration: 60 minutes, including ramp-up and ramp-down phases.</li><li>- Total Samples Executed: 68,313, reflecting high transaction volume.</li></ul> <p>Performance Metrics</p> <ul style="list-style-type: none"><li>- Average Response Time: 1071 ms, increasing from 800 ms at 20 users, indicating system strain.</li><li>- Overall Throughput (TPS): 16.32013 transactions/sec, improved from 11.71 TPS.</li><li>- Error Rate: 3.69%, increased from 3.04%, primarily due to license restrictions.</li></ul> <p>Resource Utilization</p> <ul style="list-style-type: none"><li>- CPU Utilization: 63.30%, showing significant load but still within operational limits.</li><li>- Memory Utilization: 46.00%, consistent across tests, indicating memory is not a bottleneck.</li></ul> <p>Key Performance Bottlenecks &amp; Observations</p> <ul style="list-style-type: none"><li>- License Restriction (412 Error):<ul style="list-style-type: none"><li>- The high error rate is not due to server-side issues but a PostgreSQL database license limit.</li></ul></li><li>- API logs indicate:<ul style="list-style-type: none"><li>- "errorMsg":"Maximum licensed user limit exceeded, Kindly upgrade your license"</li><li>- "status":"Failed"</li></ul></li><li>- Recommendation: Upgrade the PostgreSQL database license to support additional concurrent users.</li><li>- High Response Time API:<ul style="list-style-type: none"><li>- riskusermgmt/1/users/user/view is experiencing delays, likely due to large data retrieval without pagination.</li></ul></li><li>- Solution: Implement pagination and indexing to reduce load on queries.</li><li>- Test Execution Halted:<ul style="list-style-type: none"><li>- The test did not complete the logout phase because user creation failed due to the 412 license error.</li></ul></li><li>- Ensuring license expansion is necessary before scaling further tests.</li></ul> <p>Optimization Recommendations</p> <ul style="list-style-type: none"><li>- License Upgrade Requirement<ul style="list-style-type: none"><li>- Engage with the licensing team to increase PostgreSQL user limits.</li></ul></li><li>- Ensure proper configurations for handling higher concurrency post-upgrade.</li><li>- API Performance Enhancements<ul style="list-style-type: none"><li>- Optimize query execution plans for better performance.</li></ul></li><li>- Implement caching &amp; pagination in riskusermgmt/1/users/user/view.</li><li>- Infrastructure Scaling Considerations<ul style="list-style-type: none"><li>- Monitor CPU trends as concurrency grows.</li></ul></li><li>- Evaluate horizontal scaling or load balancing mechanisms to sustain higher loads.</li></ul> <p>Reports:</p> <p>file:///C:/Users/Hemanth/Desktop/BCT/apache-jmeter-5.6.3/TestScripts/Performance_Scripts_ITRM_TVI_User_Management_Modules/UM/30Users_1Hr/30Users_1Hr/index.html</p> <p><a href="http://192.168.0.160:3000/d/1XaPi0lnk/19688-appserver-metrics?orgId=1&amp;from=1749133850000&amp;to=1749138350000">http://192.168.0.160:3000/d/1XaPi0lnk/19688-appserver-metrics?orgId=1&amp;from=1749133850000&amp;to=1749138350000</a></p>	<p>Test Modules &amp; Scenarios Overview</p> <p>1. Forgot Password Module - User Work Flow</p> <ul style="list-style-type: none"><li>- Application launch</li><li>- Password reset flow validation</li><li>- Forgot password without entering User ID</li><li>- End-to-end process validation</li></ul> <p>Key Observations:</p> <ul style="list-style-type: none"><li>- Forgot workflow functionality is working fine as expected.</li></ul> <p>2. User Management Module - User Work Flow</p> <ul style="list-style-type: none"><li>- Application launch</li><li>- User login verification</li><li>- Group management (creation, validation, editing, searching, deletion)</li><li>- User creation process validation (mandatory &amp; optional fields)</li><li>- User search, view, edit, update, and deletion workflows</li><li>- Logout functionality</li></ul> <p>Key Observations:</p> <ul style="list-style-type: none"><li>- The "Update User" functionality is creating new records in the database instead of updating existing ones. This is reflected in the frontend where multiple entries for the same user (with slightly modified data) appear in the user management table.</li></ul> <p>Problem Areas: Data Access Layer: The repository method might be calling save() or insert() instead of update() - Missing "upsert" logic (update if exists, otherwise insert)</p> <p>3. Login Validation Module - User Work Flow</p> <ul style="list-style-type: none"><li>- Application launch</li><li>- Login validation (blank credentials, invalid credentials, incorrect username/password)</li><li>- Successful login verification</li><li>- Logout functionality</li></ul> <p>Key Observations:</p> <ul style="list-style-type: none"><li>- Login validation covered negative and positive scenarios effectively.</li></ul> <p>4. IT Risk Management - TVI Registration Module - User Work Flow</p> <ul style="list-style-type: none"><li>- Application launch</li><li>- Navigating to IT Risk Management section</li><li>- Library section access validation</li><li>- TVI Registration process testing</li><li>- Create TVI Matrix (single &amp; bulk upload) validation</li><li>- Field validations (mandatory &amp; optional)</li><li>- Edit, view, update, and delete TVI Matrix records</li><li>- Database record count verification</li><li>- Logout functionality</li></ul> <p>Key Observations:</p> <ul style="list-style-type: none"><li>- Smooth navigation through IT Risk Management features. - Bulk upload validations worked correctly. - Data integrity maintained through database verification.</li></ul> <p>Individual Reports :</p> <p>Forgot Password: <a href="https://192.168.0.160:8080/SeleniumReport/extent-reports/Test-Report-2025.05.06.22.48.19.html">https://192.168.0.160:8080/SeleniumReport/extent-reports/Test-Report-2025.05.06.22.48.19.html</a> , Login Validation: <a href="https://192.168.0.160:8080/SeleniumReport/extent-reports/Test-Report-2025.05.06.22.54.32.html">https://192.168.0.160:8080/SeleniumReport/extent-reports/Test-Report-2025.05.06.22.54.32.html</a> , User Management: <a href="https://192.168.0.160:8080/SeleniumReport/extent-reports/Test-Report-2025.05.06.22.48.48.html">https://192.168.0.160:8080/SeleniumReport/extent-reports/Test-Report-2025.05.06.22.48.48.html</a> , IT Risk Management - TVI Registration: Test Report : <a href="https://192.168.0.160:8080/SeleniumReport/extent-reports/Test-Report-2025.05.06.22.55.19.html">https://192.168.0.160:8080/SeleniumReport/extent-reports/Test-Report-2025.05.06.22.55.19.html</a></p> <p>Consolidated TestNG Report: <a href="https://192.168.0.160:8080/SeleniumReport/test-output/#">https://192.168.0.160:8080/SeleniumReport/test-output/#</a></p>

## GRC Application - Automation And Performance Environment Application & Database Server Details

### Module Name : ITRM TVI Resistration & User Management - UM

Application and Environment Details	
Application Server	OracleVM : Windows Server 2019 [BCTHYV-NS4 ] CPU : 8 Core MEM / RAM : 32 GiB Disk Space : 500GB
DataBase Server	OracleVM : Windows Server 2019 [BCTHYV-NS4 ] DB : PostgreSQL CPU : 8 Core MEM / RAM : 32 GiB Disk Space : 500GB
Application	GRC
Modules	ITRM ITRM - TVI Registration [ Edit, view, update, and delete TVI Matrix records ] GRC - User Management - UM [ User , Group Creation , Edit , Update & Delete ]

PostgreSQL Database Size in Terms of Records:

Total Number of Assets:

Total Assets Count in DB: 1000+

Total Number of Users:

Total Users Count in DB: 110

Load Test Execution Details GRC - ITRM Module Name : ITRM - TVI Registration & User Management								
Load Test Execution Summary - GRC [ ITRM - TVI Registration & User Management ]								
Test Execution Date	6/3/2025	6/5/2025	6/3/2025	6/5/2025	6/3/2025	6/5/2025	6/3/2025	6/5/2025
User Work Flow	GRC - ITRM_TV I Registration	GRC - User Management - UM	GRC - ITRM_TV I Registration	GRC - User Management - UM	GRC - ITRM_TV I Registration	GRC - User Management - UM	GRC - ITRM_TV I Registration	GRC - User Management - UM
No Of Concurrent Users	1	1	10	10	20	20	30	30
Test Duration	60 minutes	60 minutes	60 minutes	60 minutes	60 minutes	60 minutes	60 minutes	60 minutes
Total Test Duration Including Ramp Up + Ramp Down	60 minutes	60 minutes	60 minutes	60 minutes	60 minutes	60 minutes	60 minutes	60 minutes
Total Samples Executed	2411	2163	21192	21910	44726	46752	45526	68313
Average Response times in milli seconds	516	423	1036	480	949	800	2696	1071
Overall Throughput [TPS]	0.6702 /sec	0.60104 /sec	5.59204 /sec	5.78671 /sec	11.22278 /sec	11.71834 /sec	10.85799 /sec	16.32013 /sec
Error Rate	0.00%	0.00%	0.00%	0.05%	0.04%	3.04%	0.03%	3.69%
Average CPU Utilization ( Worker Node )	6.13%	5.94%	15.10%	19.30%	27.80%	28.40%	59.80%	63.30%
Average Memory Utilization ( Worker Node )	52%	45%	56%	46%	58%	46%	58%	46%

## GRC Application - Performance Api Request TPS Details and Response times each User Action

### Module Name : ITRM TVI Resistration & User Management - UM

Sample / API Request Wise TPS Details Module Name : ITRM - TVI Registration & User Management								
Total Users	#Samples		AvgRT(ms)		Error%		TPS samples executed	
Module Name	GRC - ITRM TVI Registration	GRC - User Management	GRC - ITRM TVI Registration	GRC - User Management	GRC - ITRM TVI Registration	GRC - User Management	GRC - ITRM TVI Registration	GRC - User Management
1 Users	2411	2163	516	423	0.00%	0.00%	0.6702	0.60104
10 Users	21192	21910	1036	480	0.00%	0.05%	5.59204	5.78671
20 Users	44726	46752	949	800	0.04%	3.04%	11.22278	11.71834
30 Users	45526	68313	2696	1071	0.03%	3.69%	10.85799	16.32013
<ul style="list-style-type: none"> <li>#Samples -- Total number of api's executed</li> <li>AvgRT(ms) -- Average api response time in milli seconds</li> <li>90% Line -- The 90th percentile is the value for which 90% of the data points / response times are smaller in milli seconds</li> <li>Error% -- Error% denotes the percent of api requests with errors in percentage</li> <li>TPS -- api requests that the system can handle per second during a performance test</li> <li>TPH -- api requests that the system can handle per hour during a performance test</li> </ul>								

User Workflow Response Times : GRC_ITRM_TVI_Registration User Action / Transaction Response time												
Transaction Name	1 Users 60 minutes			10 Users 60 minutes			20 Users 60 minutes			30 Users 60 minutes		
	Steady State test run : 60 min Total Test Duration : 60 min Think Time : 5 Sec			Steady State test run : 60 min Total Test Duration : 60 min Think Time : 5 Sec			Steady State test run : 60 min Total Test Duration : 60 min Think Time : 5 Sec			Steady State test run : 60 min Total Test Duration : 60 min Think Time : 5 Sec		
	# Samples	90% Line	Error %	# Samples	90% Line	Error %	# Samples	90% Line	Error %	# Samples	90% Line	Error %
T001_Launch_Application	34	176	0.00%	294	1652	0.00%	621	504	0.00%	638	1832	0.00%
T002_Valid_Login	33	6172	0.00%	293	10669	0.00%	620	8608	0.32%	637	13383	0.31%
T003_Itrm_TVI_Registration	33	2159	0.00%	291	5151	0.00%	618	4491	0.00%	635	13641	0.47%
T004_Open_Create_Single_TVI_Matrix_Form	33	236	0.00%	290	1624	0.00%	618	454	0.00%	631	5080	0.00%
T005_Cancel_Single_TVI_Matrix_Form	33	1443	0.00%	290	5112	0.00%	618	5026	0.00%	626	13222	0.00%
T006_Create_Single_TVI_Matrix	33	1971	0.00%	290	6421	0.00%	618	5492	0.00%	626	19412	0.16%
T007_View_Recent_Single_TVI_Matrix	33	306	0.00%	290	2169	0.00%	617	1064	0.00%	623	6760	0.00%
T008_View_Back_Recent_Single_TVI_Matrix	33	1482	0.00%	290	4808	0.00%	616	5036	0.00%	621	13309	0.00%
T009_Edit_Recent_Single_TVI_Matrix	33	179	0.00%	290	1853	0.00%	615	1037	0.00%	620	6742	0.00%
T010_Update_Recent_Single_TVI_Matrix	33	1763	0.00%	290	5797	0.00%	610	5372	0.33%	616	15308	0.00%
T011_Create_Bulk_Upload_TVI_Matrix	33	1922	0.00%	290	6050	0.00%	605	5483	0.00%	615	17042	0.00%
T012_Delete_Recent_Single_TVI_Matrix	33	1916	0.00%	287	5204	0.00%	602	5637	0.33%	611	17413	0.00%
T013_Delete_Bulk_TVI_Matrix_3	33	1562	0.00%	287	5159	0.00%	598	5035	0.33%	606	16223	0.17%
T014_Logout	33	300	0.00%	286	1631	0.00%	595	704	0.00%	602	1937	0.00%
TOTAL ( Actions )	463	1541.928571	0.00%	3198	4664.181818	0.00%	6776	3869.727273	5.92%	6888	11430.09091	8.60%
TOTAL ( Actions + Samples )	2411	1459	0.00%	21192	3233	0.00%	44726	3080	0.04%	45526	9377	0.03%

## GRC Application - Performance Response times each User Action

### Module Name : ITRM TVI Resistration & User Management - UM

User Workflow Response Times : User Management User Action / Transaction Response time												
Transaction Name	1 Users 60 minutes			10 Users 60 minutes			20 Users 60 minutes			30 Users 60 minutes		
	Steady State test run : 60 min			Steady State test run : 60 min			Steady State test run : 60 min			Steady State test run : 60 min		
	# Samples	90% Line	Error %	# Samples	90% Line	Error %	# Samples	90% Line	Error %	# Samples	90% Line	Error %
T001_Launch_Application	28	156	0.00%	282	154	0.00%	831	352	0.00%	1289	313	0.00%
T002_Login	28	5650	0.00%	281	5921	0.00%	828	10247	0.36%	1286	12194	0.54%
T003_UM_Group_Details_Section	28	324	0.00%	281	359	0.00%	823	678	0.00%	1278	1028	0.00%
T004_UM_Open_Group_Form	28	118	0.00%	281	192	0.00%	822	487	0.00%	1277	1505	0.00%
T005_UM_Group_Form_Cancel	28	258	0.00%	281	422	0.00%	820	679	0.00%	1273	2383	0.00%
T006_UM_Create_Group_With_Valid_Data	28	343	0.00%	281	445	0.00%	819	679	3.05%	1272	2572	4.40%
T008_UM_View_Recent_Created_Group	28	111	0.00%	281	195	0.00%	792	384	0.00%	1214	2264	0.00%
T009_UM_Edit_Recent_Created_Group	27	113	0.00%	281	187	0.00%	791	491	0.00%	1212	1993	0.00%
T010_UM_Update_Recent_Created_Group	27	324	0.00%	280	399	0.00%	790	715	0.00%	1208	1305	0.00%
T011_UM_Delete_Recent_Created_Group	27	114	0.00%	280	167	0.00%	790	396	0.00%	1208	882	0.00%
T012_UM_User_Details_Section	27	4147	0.00%	280	4919	0.00%	786	7839	0.00%	1205	9460	0.00%
T013_UM_Create_Single_User_Form	27	548	0.00%	280	558	0.00%	786	1264	0.00%	1204	2809	0.00%
T014_UM_Cancel_Create_Single_User_Form	27	4151	0.00%	278	4557	0.00%	784	7582	0.00%	1200	7700	0.00%
T015_UM_Create_Single_User_Form_With_Valid_Data	27	255	0.00%	276	404	1.09%	783	3359	87.10%	1198	3813	100.00%
T016_UM_View_Recent_Created_User	27	740	0.00%	273	1058	0.37%	101	1053	0.00%			
T017_UM_Edit_Recent_Created_User	27	261	0.00%	270	359	0.37%	101	532	0.00%			
T018_UM_Update_Recent_Created_User	27	261	0.00%	269	351	0.00%	101	350	0.00%			
T019_UM_Delete_Recent_Created_User	27	464	0.00%	269	653	0.00%	101	710	0.00%			
T020_Logout	27	308	0.00%	269	275	0.00%	101	354	0.00%			
TOTAL ( Actions )	520	981.3684211	0.00%	4735	1214.529412	10.72%	11447	2296.0625	565.73%	10921	3644.222222	1160.03%
TOTAL ( Actions + Samples )	2163	457	0.00%	21910	552	0.05%	46752	3808	3.04%	68313	4411	3.69%

## GRC Application - Performance Standard Parameters and Details

### Module Name : ITRM TVI Resistration

High Response time API's ( 90th Percentile >= 3 sec)				
<ul style="list-style-type: none"> <li>• riskusemgmt/1/users/user/view</li> <li>• grc/triskmgmt/1/assessment/find/all</li> </ul>				

Performance Report GRC									
SI No	Performance Parameters	Definition	Metric	Benchmark	Test Execution Results				Why it's Important ?
					1 Users	10 Users	20 Users	30 Users	
1	Concurrent Users / Load	The number of users simultaneously using the system during testing.	Measured by the number of concurrent users.		1 Users	10 Users	20 Users	30 Users	To see how the system handles multiple users and whether it can scale.
2	Avg Response Time	The time it takes for the system to respond to a user request.	Measured in milliseconds or seconds.	100 ms - 500 ms:	516	1036	949	2696	Ensures the system responds within acceptable limits for end users.
3	Throughput	The number of transactions the system can handle over a specific period.	Measured in requests per second (RPS) or transactions per second (TPS).	RPS: 500 RPS TPS: Small: 50 - 500 requests per second (RPS),Medium/Large: 500 - 5,000 RPS.	0.6702 /sec	5.592 /sec	11.222 /sec	10.857 /sec	Determines the system's capacity to handle concurrent user requests.
4	Error Rate	The percentage of requests that fail compared to total requests made.	Measured as a percentage (%).	0% - 1%: Expected under normal conditions. < 0.1%: Ideal error rate for mission- critical systems. > 1%: Indicates underlying issues and needs immediate investigation.	0.00%	0.00%	0.03%	0.03%	High error rates indicate issues in the system that need to be addressed.
5	Peak Load	The maximum load that the system can handle without degradation in performance.	Maximum number of requests or users.	100% increase from normal load should be handled without performance degradation for most applications. Systems should ideally handle 2x - 5x peak loads (especially for e-commerce, financial services, etc.) during special events like product launches or holiday	2411	21192	44726	45526	Determines the upper limits of system performance.

SI No	Performance Parameters	Definition	Metric	Benchmark	Test Execution Results				Why it's Important ?
					1 Users	10 Users	20 Users	30 Users	
6	Avg Page Load Time	The time it takes for a page or element to load completely.	Measured in seconds.	< 1 second: Ideal for a seamless user experience. 1 - 2 seconds: Acceptable, but improvements may be needed. > 2 seconds: Slow; likely to result in user frustration and higher bounce rates.	1.34 Sec	2.80 Sec	2.48 sec	6.92 sec	Slow page loads can negatively affect user experience.
7	App Server CPU Usage	The amount of CPU resources being used by the system during load.	Measured in percentage (%).	30% - 70%: Healthy range under normal load. 70% - 85%: System is approaching high usage; consider optimization. > 85%: System may become unstable or slow, requiring load balancing, vertical scaling, or code optimizations.	6.13%	15.10%	27.80%	59.80%	High CPU utilization can signal bottlenecks and potential resource shortages.
8	App Server Memory Usage	The amount of memory being used by the system under load.	Measured in MB/GB or as a percentage (%).	40% - 70%: Healthy range under load. > 70%: Consider tuning or memory leak investigation. > 90%: Likely to cause out-of-memory errors or slow performance.	52.00%	56.00%	58.00%	58.00%	Excessive memory usage can lead to out-of- memory issues and poor performance.
9	Database Performance	Time taken by the database to handle queries and transactions.	Measured in terms of query response time, number of transactions processed per second, and deadlock rates.	100 ms - 500 ms: Acceptable for transactional databases.	No Dead Locks	No Dead Locks	No Dead Locks	No Dead Locks	A slow database can severely impact overall system performance.



SI No	Performance Parameters	Definition	Metric	Benchmark	Test Execution Results				Why it's Important ?
					1 Users	10 Users	20 Users	30 Users	
10	DB Server CPU Usage	The amount of CPU resources being used by the system during load.	Measured in percentage (%).	30% - 70%: Healthy range under normal load. 70% - 85%: System is approaching high usage; consider optimization. > 85%: System may become unstable or slow, requiring load balancing, vertical scaling, or query optimizations.	6.13%	15.10%	27.80%	59.80%	High CPU utilization can signal bottlenecks and potential resource shortages.
11	DB Server Memory Usage	The amount of memory being used by the system under load.	Measured in MB/GB or as a percentage (%).	40% - 70%: Healthy range under load. > 70%: Consider query tuning . > 90%: Likely to cause slow performance , Require Horizontal scaling, or query optimizations.	52.00%	56.00%	58.00%	58.00%	High Memory utilization can signal bottlenecks and potential resource shortages.
12	DB Server Queue Length	The number of requests waiting to be processed by the system.	Number of queued requests.	< 10 items in the queue at any time for smooth operation. 10 - 50 items: Monitor closely; system could be under stress. > 50 items: Indicates a bottleneck, possibly due to high traffic or resource limitations.	0	0	0	0	Long queue lengths can indicate that the system is overwhelmed by the load.

SI No	Performance Parameters	Definition	Metric	Benchmark	Test Execution Results				Why it's Important ?
					1 Users	10 Users	20 Users	30 Users	
13	Scalability	How well the system can handle increasing loads by scaling up or out.	Linear or non-linear performance increase with added resources.	Linear scalability: As resources (CPU, memory, etc.) are added, performance should improve proportionally. Non-linear performance degradation: A warning sign that the system needs better resource management or architectural improvements.	Optimizing queries and using indexing effectively can significantly improve the performance of all GET calls.	Optimizing queries and using indexing effectively can significantly improve the performance of all GET calls.	Optimizing queries and using indexing effectively can significantly improve the performance of all GET calls.	To address the "High Response Time: Due to lack of pagination and high cpu utilization" issue, increasing the JDBC pool size can be an effective solution.	Ensures the system can scale efficiently with growing user or transaction volume.
					Implementing pagination for all GET calls is a great way to improve system performance and ensure quicker responses from the server. <b>Benefits of Pagination</b> Improved Performance: Reduces the amount of data transferred and processed at once. Better User Experience: Faster response times and easier navigation through large datasets. Scalability: Helps manage large datasets more efficiently.	Implementing pagination for all GET calls is a great way to improve system performance and ensure quicker responses from the server. <b>Benefits of Pagination</b> Improved Performance: Reduces the amount of data transferred and processed at once. Better User Experience: Faster response times and easier navigation through large datasets. Scalability: Helps manage large datasets more efficiently.	Implementing pagination for all GET calls is a great way to improve system performance and ensure quicker responses from the server. <b>Benefits of Pagination</b> Improved Performance: Reduces the amount of data transferred and processed at once. Better User Experience: Faster response times and easier navigation through large datasets. Scalability: Helps manage large datasets more efficiently.	Implementing Pagination: Breaking down large data sets into smaller, manageable chunks can reduce the amount of data processed at once, thus improving response times. SQL Queries: Use LIMIT and OFFSET for SQL databases. API Responses: Include parameters in API calls to fetch data in pages. Optimizing SHA-2 Digest Operations Efficient Hashing: Parallel Processing: Implementing multi-threading or multi-processing to handle SHA-2 digest operations concurrently.	

## GRC Application - Individual Request / api Performance Response time and Details

### Module Name : ITRM TVI Resistration

Module Name : ITRM - TVI Registration Aggregate Report Performance Report GRC - ITRA User Workflow or Scenario : S001_GRC_ITRM_TVI_REGISTRATION Detailed metrics on response times and error rates for individual requests / Api's												
Transaction / Request Name	1 Users 60 min			10 Users 60 min			20 Users 60 min			30 Users 60 min		
Label	# Samples	90% Line	Error %	# Samples	90% Line	Error %	# Samples	90% Line	Error %	# Samples	90% Line	Error %
S001_TC_001_01_Launch/grc	34	176	0.00%	294	1652	0.00%	621	504	0.00%	638	1832	0.00%
T001_Launch_Application	34	176	0.00%	294	1652	0.00%	621	504	0.00%	638	1832	0.00%
S001_TC_002_01_token	33	94	0.00%	293	1033	0.00%	621	401	0.00%	638	1204	0.00%
S001_TC_002_02_token	33	224	0.00%	293	398	0.00%	621	306	0.00%	638	552	0.00%
S001_TC_002_03_grcoauth/1/oauth/token?grant_type	33	26	0.00%	293	207	0.00%	621	126	0.00%	638	308	0.00%
S001_TC_002_04_grcoauth/1/oauth/token?grant_type	33	479	0.00%	293	663	0.00%	621	468	0.32%	638	695	0.31%
S001_TC_002_05_riskusermgmt/1/users/user/view (Login)	33	46	0.00%	293	108	0.00%	619	75	0.00%	636	190	0.00%
S001_TC_002_06_itrmrisk/1.0/dashboard/residual/heatmapcounts (Login)	33	60	0.00%	293	89	0.00%	619	67	0.00%	636	157	0.00%
S001_TC_002_07_itrmrisk/1.0/dashboard/inherent/heatmapcounts (Login)	33	38	0.00%	293	98	0.00%	619	64	0.00%	636	124	0.00%
S001_TC_002_08_riskusermgmt/1/country/dropdown (Login)	33	43	0.00%	293	82	0.00%	619	61	0.00%	636	113	0.00%
S001_TC_002_09_itrmrisk/1.0/dashboard/residual/heatmapcounts (Login)	33	198	0.00%	293	192	0.00%	619	125	0.00%	636	191	0.00%
S001_TC_002_12_itrmrisk/1.0/dashboard/inherent/heatmapcounts (Login)	33	251	0.00%	293	254	0.00%	619	177	0.00%	636	247	0.00%
S001_TC_002_13_riskusermgmt/1/country/dropdown (Login)	33	166	0.00%	293	173	0.00%	619	103	0.00%	636	134	0.00%
S001_TC_002_15_riskusermgmt/1/users/user/view (Login)	33	4040	0.00%	293	7803	0.00%	619	5830	0.00%	636	9395	0.00%
S001_TC_002_16_riskusermgmt/1/users/user/Perfuser008/view (Login)	33	36	0.00%	293	189	0.00%	618	78	0.00%	635	292	0.00%
S001_TC_002_17_riskusermgmt/1/menus/menu (Login)	33	26	0.00%	293	156	0.00%	618	66	0.00%	635	250	0.00%
S001_TC_002_18_riskusermgmt/1/menus/menu (Login)	33	167	0.00%	293	187	0.00%	618	93	0.00%	635	231	0.00%
S001_TC_002_19_riskusermgmt/1/users/user/Perfuser008/view (Login)	33	279	0.00%	293	484	0.00%	618	300	0.00%	635	438	0.00%
T002_Valid_Login	33	6172	0.00%	293	10669	0.00%	620	8608	0.32%	637	13383	0.31%
S001_TC_003_01_grctvi/1/tvi/matrix/find/all (lib_tvi)	33	60	0.00%	292	745	0.00%	618	251	0.00%	635	548	0.00%
S001_TC_003_02_grctvi/1/tvi/matrix/find/all (lib_tvi)	33	2126	0.00%	292	4610	0.00%	618	4267	0.00%	635	13491	0.47%
T003_Itrm_TVI_Registration	33	2159	0.00%	291	5151	0.00%	618	4491	0.00%	635	13641	0.47%
S001_TC_004_01_grctvi/1/tvi/dropdownvalues (lib_tvi)	33	51	0.00%	290	841	0.00%	618	232	0.00%	631	701	0.00%
S001_TC_004_02_grctvi/1/tvi/dropdownvalues (lib_tvi)	33	175	0.00%	290	613	0.00%	618	199	0.00%	631	4883	0.00%
T004_Open_Create_Single_TVI_Matrix_Form	33	236	0.00%	290	1624	0.00%	618	454	0.00%	631	5080	0.00%
S001_TC_005_01_grctvi/1/tvi/matrix/find/all (lib_tvi)	33	48	0.00%	290	874	0.00%	618	367	0.00%	631	602	0.00%
S001_TC_005_02_grctvi/1/tvi/matrix/find/all (lib_tvi)	33	1413	0.00%	290	4467	0.00%	618	4697	0.00%	630	12908	0.00%
T005_Cancel_Single_TVI_Matrix_Form	33	1443	0.00%	290	5112	0.00%	618	5026	0.00%	626	13222	0.00%
S001_TC_006_01_grctvi/1/tvi/dropdownvalues (lib_tvi)	33	51	0.00%	290	801	0.00%	618	290	0.00%	626	586	0.00%
S001_TC_006_02_grctvi/1/tvi/dropdownvalues (lib_tvi)	33	70	0.00%	290	639	0.00%	618	219	0.00%	626	4209	0.16%
S001_TC_006_03_grctvi/1/tvi/matrix/new (lib_tvi)	33	28	0.00%	290	249	0.00%	618	91	0.00%	625	510	0.00%
S001_TC_006_04_grctvi/1/tvi/matrix/new (lib_tvi)	33	290	0.00%	290	550	0.00%	618	395	0.00%	625	3293	0.00%
S001_TC_006_05_grctvi/1/tvi/matrix/find/all (lib_tvi)	33	31	0.00%	290	134	0.00%	618	91	0.00%	625	327	0.00%
S001_TC_006_06_grctvi/1/tvi/matrix/find/all (lib_tvi)	33	1559	0.00%	290	4569	0.00%	618	4186	0.00%	625	12669	0.00%
T006_Create_Single_TVI_Matrix	33	1971	0.00%	290	6421	0.00%	618	5492	0.00%	626	19412	0.16%
S001_TC_007_01_grctvi/1/tvi/dropdownvalues (lib_tvi)	33	53	0.00%	290	891	0.00%	617	271	0.00%	623	880	0.00%

## GRC Application - Individual Request / api Performance Response time and Details

### Module Name : ITRM TVI Resistration

Transaction / Request Name	1 Users 60 min			10 Users 60 min			20 Users 60 min			30 Users 60 min		
Label	# Samples	90% Line	Error %	# Samples	90% Line	Error %	# Samples	90% Line	Error %	# Samples	90% Line	Error %
S001_TC_007_02_grctvi/1/tvi/dropdownvalues (lib_tvi)	33	72	0.00%	290	782	0.00%	617	244	0.00%	623	3345	0.00%
S001_TC_007_03_grctvi/1/tvi/matrix/find/1716 (lib_tvi)	33	27	0.00%	290	179	0.00%	617	113	0.00%	623	456	0.00%
S001_TC_007_04_grctvi/1/tvi/matrix/find/1716 (lib_tvi)	33	178	0.00%	290	315	0.00%	617	251	0.00%	623	2398	0.00%
T007_View_Recent_Single_TVI_Matrix	33	306	0.00%	290	2169	0.00%	617	1064	0.00%	623	6760	0.00%
S001_TC_008_01_grctvi/1/tvi/matrix/find/all (lib_tvi)	33	47	0.00%	290	572	0.00%	616	260	0.00%	622	622	0.00%
S001_TC_008_02_grctvi/1/tvi/matrix/md/all (lib_tvi)	33	1440	0.00%	290	4290	0.00%	616	4888	0.00%	622	12898	0.00%
T008_View_Back_Recent_Single_TVI_Matrix	33	1482	0.00%	290	4808	0.00%	616	5036	0.00%	621	13309	0.00%
S001_TC_009_01_grctvi/1/tvi/matrix/find/1716 (lib_tvi)	33	50	0.00%	290	876	0.00%	615	303	0.00%	620	532	0.00%
S001_TC_009_02_grctvi/1/tvi/dropdownvalues (lib_tvi)	33	28	0.00%	290	315	0.00%	615	176	0.00%	620	323	0.00%
S001_TC_009_03_grctvi/1/tvi/matrix/find/1716 (lib_tvi)	33	67	0.00%	290	327	0.00%	615	202	0.00%	620	3718	0.00%
S001_TC_009_04_grctvi/1/tvi/dropdownvalues (lib_tvi)	33	68	0.00%	290	210	0.00%	615	149	0.00%	620	1965	0.00%
T009_Edit_Recent_Single_TVI_Matrix	33	179	0.00%	290	1853	0.00%	615	1037	0.00%	620	6742	0.00%
S001_TC_010_01_grctvi/1/tvi/matrix/modify (lib_tvi)	33	65	0.00%	290	905	0.00%	611	289	0.00%	619	846	0.00%
S001_TC_010_02_grctvi/1/tvi/matrix/modify (lib_tvi)	33	298	0.00%	290	780	0.00%	611	468	0.33%	619	3747	0.00%
S001_TC_010_03_grctvi/1/tvi/matrix/find/all (lib_tvi)	33	34	0.00%	290	196	0.00%	609	102	0.00%	619	439	0.00%
S001_TC_010_04_grctvi/1/tvi/matrix/find/all (lib_tvi)	33	1448	0.00%	290	4398	0.00%	609	4417	0.00%	619	12579	0.00%
T010_Update_Recent_Single_TVI_Matrix	33	1763	0.00%	290	5797	0.00%	610	5372	0.33%	616	15308	0.00%
S001_TC_011_01_grctvi/1/tvi/matrix/bulk/new (lib_tvi)	33	43	0.00%	290	907	0.00%	608	272	0.00%	616	696	0.00%
S001_TC_011_02_grctvi/1/tvi/matrix/bulk/new (lib_tvi)	33	233	0.00%	290	718	0.00%	608	349	0.00%	616	4869	0.00%
S001_TC_011_03_grctvi/1/tvi/matrix/find/all (lib_tvi)	33	44	0.00%	290	168	0.00%	608	104	0.00%	616	453	0.00%
S001_TC_011_04_grctvi/1/tvi/matrix/find/all (lib_tvi)	33	1607	0.00%	290	4842	0.00%	608	4485	0.00%	616	12764	0.00%
T011_Create_Bulk_Upload_TVI_Matrix	33	1922	0.00%	290	6050	0.00%	605	5483	0.00%	615	17042	0.00%
S001_TC_012_01_grctvi/1/tvi/matrix/remove (lib_tvi)	33	61	0.00%	289	765	0.00%	603	234	0.00%	613	685	0.00%
S001_TC_012_02_grctvi/1/tvi/matrix/remove (lib_tvi)	33	193	0.00%	289	586	0.00%	603	371	0.17%	612	4650	0.00%
S001_TC_012_03_grctvi/1/tvi/matrix/find/all (lib_tvi)	33	28	0.00%	289	206	0.00%	602	90	0.00%	612	517	0.00%
S001_TC_012_04_grctvi/1/tvi/matrix/find/all (lib_tvi)	33	1711	0.00%	289	3946	0.00%	602	4789	0.17%	612	13129	0.00%
T012_Delete_Recent_Single_TVI_Matrix	33	1916	0.00%	287	5204	0.00%	602	5637	0.33%	611	17413	0.00%
S001_TC_013_01_grctvi/1/tvi/matrix/remove/list (lib_tvi)	33	46	0.00%	287	889	0.00%	598	255	0.00%	610	710	0.00%
S001_TC_013_02_grctvi/1/tvi/matrix/remove/list (lib_tvi)	33	88	0.00%	287	479	0.00%	598	232	0.33%	610	4603	0.00%
S001_TC_013_03_grctvi/1/tvi/matrix/find/all (lib_tvi)	33	27	0.00%	287	202	0.00%	596	119	0.00%	610	454	0.00%
S001_TC_013_04_grctvi/1/tvi/matrix/find/all (lib_tvi)	33	1398	0.00%	287	4029	0.00%	596	4346	0.00%	610	12318	0.16%
T013_Delete_Bulk_TVI_Matrix_3	33	1562	0.00%	287	5159	0.00%	598	5035	0.33%	606	16223	0.17%
S001_TC_014_01_grcoauth/1/oauth/token (lib_tvi)	33	47	0.00%	286	725	0.00%	595	277	0.00%	603	594	0.00%
S001_TC_014_02_grcoauth/1/oauth/token (lib_tvi)	33	50	0.00%	286	387	0.00%	595	169	0.00%	603	418	0.00%
S001_TC_014_03_revoke (lib_tvi)	33	50	0.00%	286	311	0.00%	595	174	0.00%	603	503	0.00%
S001_TC_014_04_revoke (lib_tvi)	33	165	0.00%	286	106	0.00%	595	84	0.00%	602	227	0.00%
T014_Logout	33	300	0.00%	286	1631	0.00%	595	704	0.00%	602	1937	0.00%
TOTAL	2411	1459	0.00%	21192	3233	0.00%	44726	3080	0.04%	45526	9377	0.03%

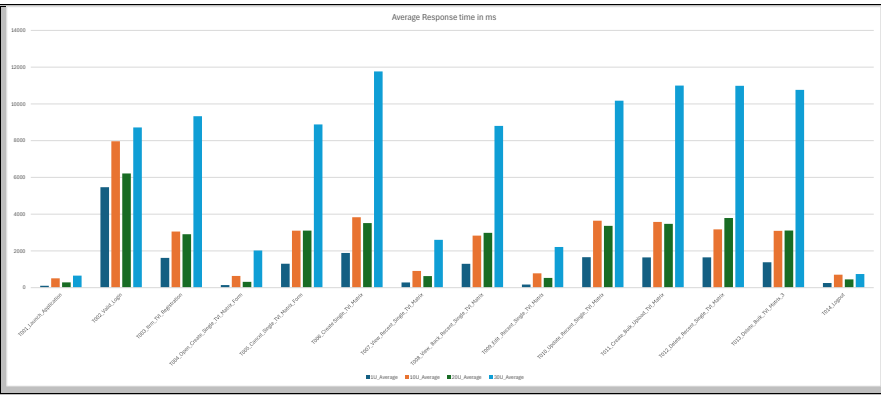
## GRC Application - Graph representation of the performance results for user actions and Details

### Module Name : ITRM TVI Resistration

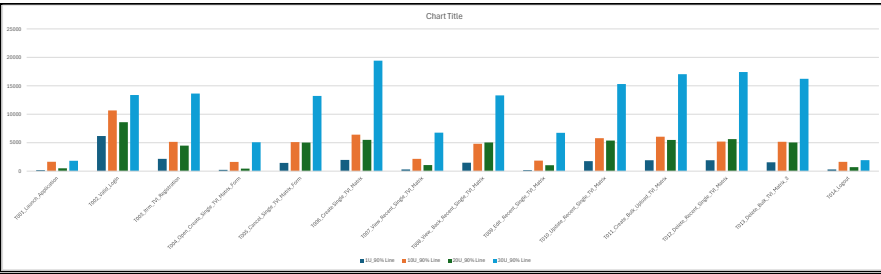
#### Graph representation of the performance results for user actions

1. Average Response Time vs User Load
2. 90% Line Response Time vs User Load
3. Error Rate vs User Load
4. TPS vs User Load

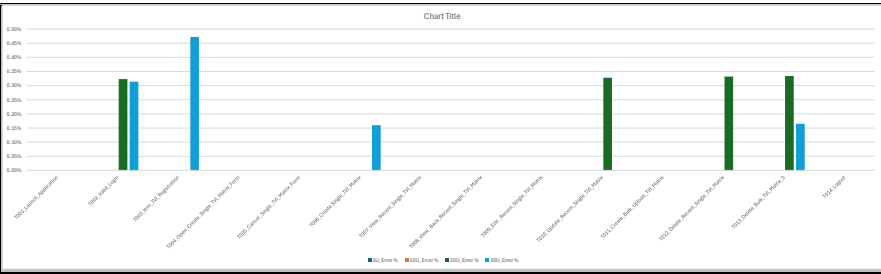
Transaction_Name	1U_Average	10U_Average	20U_Average	30U_Average
T001_Launch_Application	102	506	285	653
T002_Valid_Login	5468	7968	6215	8718
T003_Itrm_TVI_Registration	1618	3054	2909	9328
T004_Open_Create_Single_TVI_Matrix_Form	141	636	316	2021
T005_Cancel_Single_TVI_Matrix_Form	1301	3101	3106	8884
T006_Create_Single_TVI_Matrix	1889	3833	3512	11767
T007_View_Recent_Single_TVI_Matrix	282	908	629	2603
T008_View_Back_Recent_Single_TVI_Matrix	1296	2832	2984	8805
T009_Edit_Recent_Single_TVI_Matrix	167	778	527	2213
T010_Update_Recent_Single_TVI_Matrix	1657	3643	3364	10175
T011_Create_Bulk_Upload_TVI_Matrix	1645	3575	3471	10999
T012_Delete_Recent_Single_TVI_Matrix	1651	3173	3789	10984
T013_Delete_Bulk_TVI_Matrix_3	1380	3091	3110	10763
T014_Logout	254	706	451	742



Transaction_Name	1U_90% Line	10U_90% Line	20U_90% Line	30U_90% Line
T001_Launch_Application	176	1652	504	1832
T002_Valid_Login	6172	10669	8608	13383
T003_Itrm_TVI_Registration	2159	5151	4491	13641
T004_Open_Create_Single_TVI_Matrix_Form	236	1624	454	5080
T005_Cancel_Single_TVI_Matrix_Form	1443	5112	5026	13222
T006_Create_Single_TVI_Matrix	1971	6421	5492	19412
T007_View_Recent_Single_TVI_Matrix	306	2169	1064	6760
T008_View_Back_Recent_Single_TVI_Matrix	1482	4808	5036	13309
T009_Edit_Recent_Single_TVI_Matrix	179	1853	1037	6742
T010_Update_Recent_Single_TVI_Matrix	1763	5797	5372	15308
T011_Create_Bulk_Upload_TVI_Matrix	1922	6050	5483	17042
T012_Delete_Recent_Single_TVI_Matrix	1916	5204	5637	17413
T013_Delete_Bulk_TVI_Matrix_3	1562	5159	5035	16223
T014_Logout	300	1631	704	1937

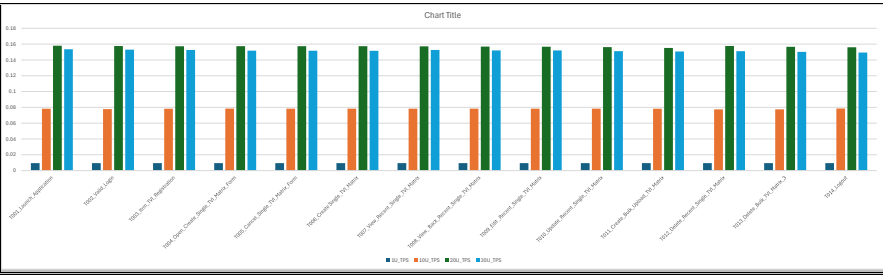


Transaction_Name	1U_Error %	10U_Error %	20U_Error %	30U_Error %
T001_Launch_Application	0.00%	0.00%	0.00%	0.00%
T002_Valid_Login	0.00%	0.00%	0.32%	0.31%
T003_Itrm_TVI_Registration	0.00%	0.00%	0.00%	0.47%
T004_Open_Create_Single_TVI_Matrix_Form	0.00%	0.00%	0.00%	0.00%
T005_Cancel_Single_TVI_Matrix_Form	0.00%	0.00%	0.00%	0.00%
T006_Create_Single_TVI_Matrix	0.00%	0.00%	0.00%	0.16%
T007_View_Recent_Single_TVI_Matrix	0.00%	0.00%	0.00%	0.00%
T008_View_Back_Recent_Single_TVI_Matrix	0.00%	0.00%	0.00%	0.00%
T009_Edit_Recent_Single_TVI_Matrix	0.00%	0.00%	0.00%	0.00%
T010_Update_Recent_Single_TVI_Matrix	0.00%	0.00%	0.33%	0.00%
T011_Create_Bulk_Upload_TVI_Matrix	0.00%	0.00%	0.00%	0.00%
T012_Delete_Recent_Single_TVI_Matrix	0.00%	0.00%	0.33%	0.00%
T013_Delete_Bulk_TVI_Matrix_3	0.00%	0.00%	0.33%	0.17%
T014_Logout	0.00%	0.00%	0.00%	0.00%



GRC Application - Graph representation of the performance results for user actions and Details  
Module Name : ITRM TVI Resistration

Transaction_Name	1U_TPS	10U_TPS	20U_TPS	30U_TPS
T001_Launch_Application	0.00945	0.07822	0.158	0.15346
T002_Valid_Login	0.00945	0.07774	0.15755	0.15305
T003_Itrm_TVI_Registration	0.00946	0.07822	0.15728	0.15265
T004_Open_Create_Single_TVI_Matrix_Form	0.00947	0.07842	0.15741	0.15173
T005_Cancel_Single_TVI_Matrix_Form	0.00946	0.0784	0.15735	0.15167
T006_Create_Single_TVI_Matrix	0.00946	0.07837	0.15736	0.15159
T007_View_Recent_Single_TVI_Matrix	0.00946	0.07841	0.1572	0.15263
T008_View_Back_Recent_Single_TVI_Matrix	0.00946	0.07838	0.15692	0.15201
T009_Edit_Recent_Single_TVI_Matrix	0.00946	0.07841	0.15673	0.152
T010_Update_Recent_Single_TVI_Matrix	0.00946	0.07834	0.15625	0.15102
T011_Create_Bulk_Upload_TVI_Matrix	0.00946	0.07829	0.1551	0.15069
T012_Delete_Recent_Single_TVI_Matrix	0.00946	0.07748	0.15767	0.15104
T013_Delete_Bulk_TVI_Matrix_3	0.00946	0.07749	0.1566	0.15017
T014_Logout	0.00946	0.07855	0.15602	0.14928



Dependency service to execute the load test

Main Module : IT Risk management  
Sub Module : ITRM TVI Registration  
Services :  
Auth Service  
Mso2 Service  
UserManagement Service  
GRC-ITRisk-0.0.1-SNAPSHOT.war  
TVI-Registration.war  
TomCat Server [ Frontend Server ]  
PostgreSQL [ DataBase Server ]

Total Users	TVI Registration Samples	TVI Registration AvgRT(ms)	TVI Registration Error%	TVI Registration TPS samples executed	TVI Registration TPH samples executed	TVI Registration 90% Line
1 Users	2411	516	0.00%	0.6702	2412.72	1459
10 Users	21192	1036	0.00%	5.59204	20131.344	3233
20 Users	44726	949	0.03%	11.22278	40402.008	3080
30 Users	45526	2696	0.03%	10.85799	39088.764	9377

TVI Registration Samples

TVI Registration AvgRT(ms)

TVI Registration Error%

TVI Registration TPS samples executed

TVI Registration TPH samples executed

TVI Registration 90% Line

## GRC Application - Performance Standard Parameters and Details

### Module Name : User Management

Performance Report GRC									
SI No	Performance Parameters	Definition	Metric	Benchmark	Test Execution Results				Why it's Important ?
					1 Users	10 Users	20 Users	30 Users	
1	Concurrent Users / Load	The number of users simultaneously using the system during testing.	Measured by the number of concurrent users.		1 Users	10 Users	20 Users	30 Users	To see how the system handles multiple users and whether it can scale.
2	Avg Response Time	The time it takes for the system to respond to a user request.	Measured in milliseconds or seconds.	100 ms - 500 ms:	423	480	800	1071	Ensures the system responds within acceptable limits for end users.
3	Throughput	The number of transactions the system can handle over a specific period.	Measured in requests per second (RPS) or transactions per second (TPS).	RPS: 500 RPS TPS: Small: 50 - 500 requests per second (RPS), Medium/Large: 500 - 5,000 RPS.	0.601/sec	5.786/sec	11.718/sec	16.320/sec	Determines the system's capacity to handle concurrent user requests.
4	Error Rate	The percentage of requests that fail compared to total requests made.	Measured as a percentage (%).	0% - 1%: Expected under normal conditions. < 0.1%: Ideal error rate for mission- critical systems. > 1%: Indicates underlying issues and needs immediate investigation.	0.00%	0.05%	3.03%	3.69%	High error rates indicate issues in the system that need to be addressed.
5	Peak Load	The maximum load that the system can handle without degradation in performance.	Maximum number of requests or users.	100% increase from normal load should be handled without performance degradation for most applications. Systems should ideally handle 2x - 5x peak loads (especially for e-commerce, financial services, etc.) during special events like product launches or holiday	2163	21910	46752	68313	Determines the upper limits of system performance.

SI No	Performance Parameters	Definition	Metric	Benchmark	Test Execution Results				Why it's Important ?
					1 Users	10 Users	20 Users	30 Users	
6	Avg Page Load Time	The time it takes for a page or element to load completely.	Measured in seconds.	< 1 second: Ideal for a seamless user experience. 1 - 2 seconds: Acceptable, but improvements may be needed. > 2 seconds: Slow; likely to result in user frustration and higher bounce rates.	0.88 Sec	1.06 Sec	1.51 sec	2.11 sec	Slow page loads can negatively affect user experience.
7	App Server CPU Usage	The amount of CPU resources being used by the system during load.	Measured in percentage (%).	30% - 70%: Healthy range under normal load. 70% - 85%: System is approaching high usage; consider optimization. > 85%: System may become unstable or slow, requiring load balancing, vertical scaling, or code optimizations.	5.94%	19.30%	28.40%	63.30%	High CPU utilization can signal bottlenecks and potential resource shortages.
8	App Server Memory Usage	The amount of memory being used by the system under load.	Measured in MB/GB or as a percentage (%).	40% - 70%: Healthy range under load. > 70%: Consider tuning or memory leak investigation. > 90%: Likely to cause out-of-memory errors or slow performance.	44.80%	45.60%	45.90%	46.00%	Excessive memory usage can lead to out-of- memory issues and poor performance.
9	Database Performance	Time taken by the database to handle queries and transactions.	Measured in terms of query response time, number of transactions processed per second, and deadlock rates.	100 ms - 500 ms: Acceptable for transactional databases.	No Dead Locks	No Dead Locks	No Dead Locks	No Dead Locks	A slow database can severely impact overall system performance.



SI No	Performance Parameters	Definition	Metric	Benchmark	Test Execution Results				Why it's Important ?
					1 Users	10 Users	20 Users	30 Users	
10	DB Server CPU Usage	The amount of CPU resources being used by the system during load.	Measured in percentage (%).	30% - 70%: Healthy range under normal load. 70% - 85%: System is approaching high usage; consider optimization. > 85%: System may become unstable or slow, requiring load balancing, vertical scaling, or query optimizations.	5.94%	19.30%	28.40%	63.30%	High CPU utilization can signal bottlenecks and potential resource shortages.
11	DB Server Memory Usage	The amount of memory being used by the system under load.	Measured in MB/GB or as a percentage (%).	40% - 70%: Healthy range under load. > 70%: Consider query tuning . > 90%: Likely to cause slow performance , Require Horizontal scaling, or query optimizations.	44.80%	45.60%	45.90%	46.00%	High Memory utilization can signal bottlenecks and potential resource shortages.
12	DB Server Queue Length	The number of requests waiting to be processed by the system.	Number of queued requests.	< 10 items in the queue at any time for smooth operation. 10 - 50 items: Monitor closely; system could be under stress. > 50 items: Indicates a bottleneck, possibly due to high traffic or resource limitations.	0	0	0	0	Long queue lengths can indicate that the system is overwhelmed by the load.

SI No	Performance Parameters	Definition	Metric	Benchmark	Test Execution Results				Why it's Important ?
					1 Users	10 Users	20 Users	30 Users	
13	Scalability	How well the system can handle increasing loads by scaling up or out.	Linear or non-linear performance increase with added resources.	Linear scalability: As resources (CPU, memory, etc.) are added, performance should improve proportionally. Non-linear performance degradation: A warning sign that the system needs better resource management or architectural improvements.	Optimizing queries and using indexing effectively can significantly improve the performance of all GET calls.	Optimizing queries and using indexing effectively can significantly improve the performance of all GET calls.	Optimizing queries and using indexing effectively can significantly improve the performance of all GET calls.	To address the "High Response Time: Due to lack of pagination and high error rate due license issue.	Ensures the system can scale efficiently with growing user or transaction volume.
					Implementing pagination for all GET calls is a great way to improve system performance and ensure quicker responses from the server.	Implementing pagination for all GET calls is a great way to improve system performance and ensure quicker responses from the server.	Implementing pagination for all GET calls is a great way to improve system performance and ensure quicker responses from the server.		
					<b>Benefits of Pagination</b> Improved Performance: Reduces the amount of data transferred and processed at once. Better User Experience: Faster response times and easier navigation through large datasets. Scalability: Helps manage large datasets more efficiently.	<b>Benefits of Pagination</b> Improved Performance: Reduces the amount of data transferred and processed at once. Better User Experience: Faster response times and easier navigation through large datasets. Scalability: Helps manage large datasets more efficiently.	<b>Benefits of Pagination</b> Improved Performance: Reduces the amount of data transferred and processed at once. Better User Experience: Faster response times and easier navigation through large datasets. Scalability: Helps manage large datasets more efficiently.	To address the "High Response Time: Due to lack of pagination and high error rate due license issue.	

## GRC Application - Individual Request / api Performance Response time and Details

### Module Name : User Management

Module Name : GRC - User Management - UM  
Aggregate Report Performance Report GRC  
User Workflow or Scenario : S001\_GRC\_Usermanagement  
Detailed metrics on response times and error rates for individual requests / Api's

Transaction / Request Name	1 Users 60 min			10 Users 60 min			20 Users 60 min			30 Users 60 min		
Label	# Samples	90% Line	Error %	# Samples	90% Line	Error %	# Samples	90% Line	Error %	# Samples	90% Line	Error %
S002_TC_001_01_grc/ (launch)	28	156	0	28	156	0	831	352	0	1289	313	0
T001_Launch_Application	28	156	0	28	156	0	831	352	0	1289	313	0
S002_TC_002_01_token (Login)	28	87	0	28	87	0	830	332	0	1286	295	0
S002_TC_002_02_token (Login)	28	197	0	28	197	0	830	269	0	1286	300	0
S002_TC_002_03_grcoauth/1/oauth/token?grant_type=password&username=Perfuser091	28	27	0	28	27	0	830	118	0	1286	112	0
S002_TC_002_04_grcoauth/1/oauth/token?grant_type=password&username=Perfuser091	28	384	0	28	384	0	830	523	0.00361	1286	724	0.00544
S002_TC_002_05_riskusermgmt/1/users/user/view (Login)	28	26	0	28	26	0	827	141	0	1279	128	0
S002_TC_002_08_riskusermgmt/1/country/dropdown (Login)	28	37	0	28	37	0	827	114	0	1279	122	0
S002_TC_002_12_riskusermgmt/1/country/dropdown (Login)	28	189	0	28	189	0	827	166	0	1279	1276	0
S002_TC_002_15_riskusermgmt/1/users/user/view (Login)	28	4156	0	28	4156	0	827	7907	0	1279	8886	0
S002_TC_002_16_riskusermgmt/1/menus/menu (Login)	28	39	0	28	39	0	825	230	0	1279	247	0
S002_TC_002_17_riskusermgmt/1/users/user/Perfuser091/view (Login)	28	33	0	28	33	0	825	222	0	1279	220	0
S002_TC_002_18_riskusermgmt/1/menus/menu (Login)	28	161	0	28	161	0	825	268	0	1279	987	0
S002_TC_002_19_riskusermgmt/1/users/user/Perfuser091/view (Login)	28	327	0	28	327	0	825	435	0	1279	708	0
T002_Login	28	5650	0	28	5650	0	828	10247	0.00362	1286	12194	0.00544
S002_TC_003_01_riskusermgmt/1/groups/group (UM_GroupDetails)	28	60	0	28	60	0	825	203	0	1278	210	0
S002_TC_003_02_riskusermgmt/1/groups/group (UM_GroupDetails)	28	274	0	28	274	0	823	435	0	1278	829	0
T003_UM_Group_Details_Section	28	324	0	28	324	0	823	678	0	1278	1028	0
S002_TC_004_01_riskusermgmt/1/menus/menu (UM_GroupDetails)	28	49	0	28	49	0	822	190	0	1277	295	0
S002_TC_004_02_riskusermgmt/1/menus/menu (UM_GroupDetails)	28	74	0	28	74	0	822	251	0	1277	1142	0
T004_UM_Open_Group_Form	28	118	0	28	118	0	822	487	0	1277	1505	0
S002_TC_005_01_riskusermgmt/1/groups/group (UM_GroupDetails)	28	43	0	28	43	0	820	222	0	1273	232	0
S002_TC_005_02_riskusermgmt/1/groups/group (UM_GroupDetails)	28	219	0	28	219	0	820	453	0	1273	2172	0
T005_UM_Group_Form_Cancel	28	258	0	28	258	0	820	679	0	1273	2383	0
S002_TC_006_03_riskusermgmt/1/groups/group (UM_GroupDetails)	28	54	0	28	54	0	819	185	0	1272	227	0
S002_TC_006_04_riskusermgmt/1/groups/group (UM_GroupDetails)	28	289	0	28	289	0	819	499	0.03053	1272	2426	0.04403
T006_UM_Create_Group_With_Valid_Data	28	343	0	28	343	0	819	679	0.03053	1272	2572	0.04403
S002_TC_008_01_riskusermgmt/1/menus/menu (UM_GroupDetails)	28	42	0	28	42	0	792	159	0	1214	195	0
S002_TC_008_02_riskusermgmt/1/menus/menu (UM_GroupDetails)	28	71	0	28	71	0	792	198	0	1214	2163	0
T008_UM_View_Recent_Created_Group	28	111	0	28	111	0	792	384	0	1214	2264	0
S002_TC_009_01_riskusermgmt/1/menus/menu (UM_GroupDetails)	27	60	0	27	60	0	791	193	0	1212	273	0
S002_TC_009_02_riskusermgmt/1/menus/menu (UM_GroupDetails)	27	74	0	27	74	0	791	242	0	1212	1836	0
T009_UM_Edit_Recent_Created_Group	27	113	0	27	113	0	791	491	0	1212	1993	0
S002_TC_010_01_riskusermgmt/1/groups/group (UM_GroupDetails)	27	43	0	27	43	0	790	223	0	1209	290	0
S002_TC_010_02_riskusermgmt/1/groups/group (UM_GroupDetails)	27	287	0	27	287	0	790	477	0	1209	934	0
T010_UM_Update_Recent_Created_Group	27	324	0	27	324	0	790	715	0	1208	1305	0
S002_TC_011_01_riskusermgmt/1/groups/group/e52c2016-61c3-4bdf-be42-7a9bc6a8ccbd	27	45	0	27	45	0	790	174	0	1208	254	0
S002_TC_011_02_riskusermgmt/1/groups/group/e52c2016-61c3-4bdf-be42-7a9bc6a8ccbd	27	60	0	27	60	0	790	193	0	1208	526	0

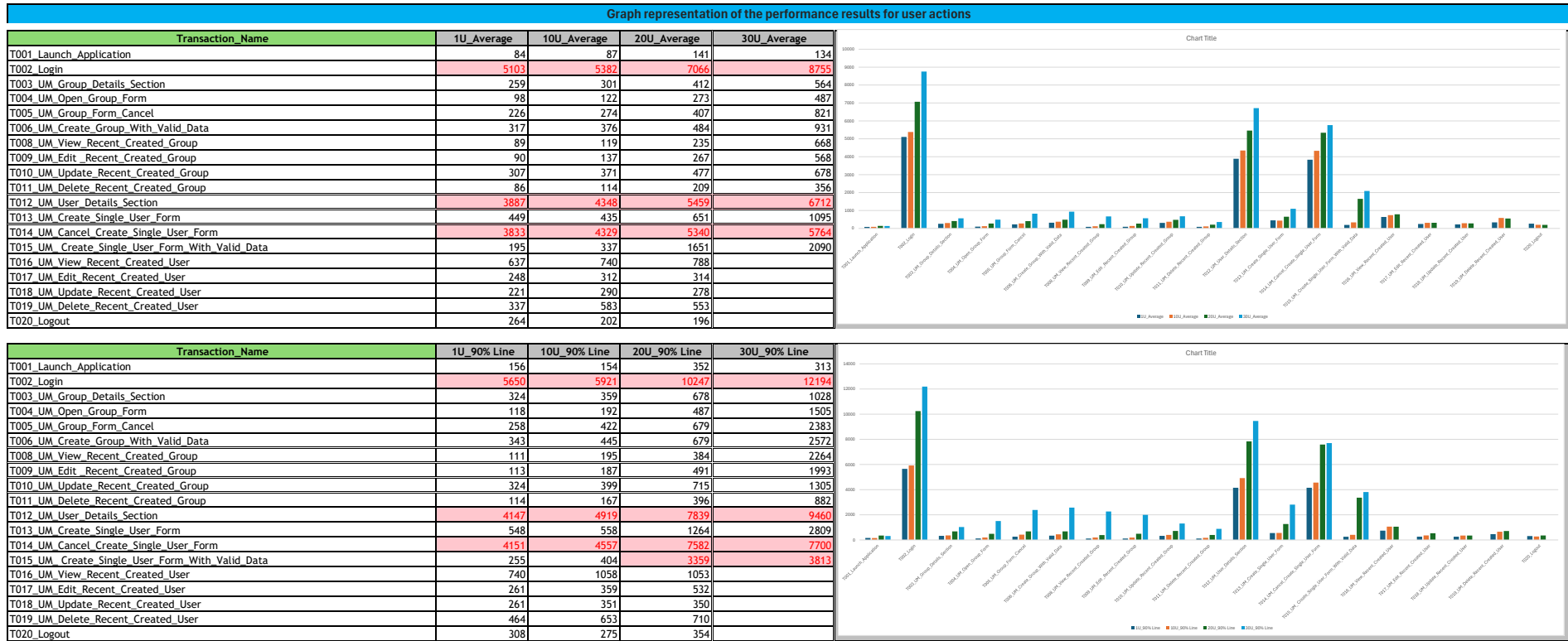
## GRC Application - Individual Request / api Performance Response time and Details

### Module Name : User Management

Transaction / Request Name		1 Users 60 min				10 Users 60 min				20 Users 60 min				30 Users 60 min			
Label	# Samples	90% Line	Error %		# Samples	90% Line	Error %		# Samples	90% Line	Error %		# Samples	90% Line	Error %		
T011 UM_Delete_Recent_Created_Group	27	114	0		27	114	0		790	396	0		1208	882	0		
S002_TC_012_01_riskusermgmt/1/users/user/view (UM_UserDetails)	27	52	0		27	52	0		787	307	0		1207	449	0		
S002_TC_012_02_riskusermgmt/1/users/user/view (UM_UserDetails)	27	4096	0		27	4096	0		787	7637	0		1207	9338	0		
T012 UM_User_Details_Section	27	4147	0		27	4147	0		786	7839	0		1205	9460	0		
S002_TC_013_01_riskusermgmt/1/groups/group (UM_UserDetails)	27	50	0		27	50	0		786	208	0		1204	218	0		
S002_TC_013_02_riskusermgmt/1/org/dropdown (UM_UserDetails)	27	27	0		27	27	0		786	154	0		1204	191	0		
S002_TC_013_03_riskusermgmt/1/config/user/grades (UM_UserDetails)	27	28	0		27	28	0		786	146	0		1204	163	0		
S002_TC_013_04_riskusermgmt/1/config/user/grades (UM_UserDetails)	27	62	0		27	62	0		786	191	0		1204	1128	0		
S002_TC_013_05_riskusermgmt/1/org/dropdown (UM_UserDetails)	27	163	0		27	163	0		786	160	0		1204	391	0		
S002_TC_013_06_riskusermgmt/1/groups/group (UM_UserDetails)	27	290	0		27	290	0		786	323	0		1204	561	0		
T013 UM_Create_Single_User_Form	27	548	0		27	548	0		786	1264	0		1204	2809	0		
S002_TC_014_01_riskusermgmt/1/users/user/view (UM_UserDetails)	27	50	0		27	50	0		786	209	0		1202	201	0		
S002_TC_014_02_riskusermgmt/1/users/user/view (UM_UserDetails)	27	4121	0		27	4121	0		786	7472	0		1202	7627	0		
T014 UM_Cancel_Create_Single_User_Form	27	4151	0		27	4151	0		784	7582	0		1200	7700	0		
S002_TC_015_01_riskusermgmt/1/users/user (UM_UserDetails)	27	58	0		27	58	0		783	225	0		1198	201	0		
S002_TC_015_02_riskusermgmt/1/users/user (UM_UserDetails)	27	222	0		27	222	0		783	3198	0.87101		1198	3695	1		
T015 UM_Create_Single_User_Form_With_Valid_Data	27	255	0		27	255	0		783	3359	0.87101		1198	3813	1		
S002_TC_016_01_riskusermgmt/1/groups/group (UM_UserDetails)	27	48	0		27	48	0		101	184	0						
S002_TC_016_02_riskusermgmt/1/org/dropdown (UM_UserDetails)	27	23	0		27	23	0		101	100	0						
S002_TC_016_03_riskusermgmt/1/users/user/TestUser00001/view (UM_UserDetails)	27	26	0		27	26	0		101	102	0						
S002_TC_016_04_riskusermgmt/1/org/dropdown (UM_UserDetails)	27	57	0		27	57	0		101	155	0						
S002_TC_016_05_riskusermgmt/1/groups/group (UM_UserDetails)	27	236	0		27	236	0		101	263	0						
S002_TC_016_06_riskusermgmt/1/users/user/TestUser00001/view (UM_UserDetails)	27	216	0		27	216	0		101	251	0						
S002_TC_016_07_riskusermgmt/1/org/subs/departments/dropdown (UM_UserDetails)	27	22	0		27	22	0		101	83	0						
S002_TC_016_08_riskusermgmt/1/org/subs/departments/dropdown (UM_UserDetails)	27	161	0		27	161	0		101	86	0						
T016 UM_View_Recent_Created_User	27	740	0		27	740	0		101	1053	0						
S002_TC_017_01_riskusermgmt/1/users/user/TestUser00001/edit (UM_UserDetails)	27	46	0		27	46	0		101	172	0						
S002_TC_017_02_riskusermgmt/1/users/user/TestUser00001/edit (UM_UserDetails)	27	219	0		27	219	0		101	316	0						
T017 UM_Edit_Recent_Created_User	27	261	0		27	261	0		101	532	0						
S002_TC_018_01_riskusermgmt/1/users/user (UM_UserDetails)	27	62	0		27	62	0		101	155	0						
S002_TC_018_02_riskusermgmt/1/users/user (UM_UserDetails)	27	216	0		27	216	0		101	256	0						
T018 UM_Update_Recent_Created_User	27	261	0		27	261	0		101	350	0						
S002_TC_019_01_riskusermgmt/1/users/user (UM_UserDetails)	27	38	0		27	38	0		101	183	0						
S002_TC_019_02_riskusermgmt/1/users/user (UM_UserDetails)	27	221	0		27	221	0		101	303	0						
S002_TC_019_03_riskusermgmt/1/users/user (UM_UserDetails)	27	213	0		27	213	0		101	285	0						
T019 UM_Delete_Recent_Created_User	27	464	0		27	464	0		101	710	0						
S002_TC_020_01_grcoauth/1/oauth/token (UM_UserDetails)	27	39	0		27	39	0		101	127	0						
S002_TC_020_02_grcoauth/1/oauth/token (UM_UserDetails)	27	47	0		27	47	0		101	99	0						
S002_TC_020_03_revoke (UM_UserDetails)	27	69	0		27	69	0		101	101	0						
S002_TC_020_04_revoke (UM_UserDetails)	27	173	0		27	173	0		101	38	0						
T020 Logout	27	308	0		27	308	0		101	354	0						
TOTAL	2163	457			2163	457			46752	3808	0.03037		68313	4411		0.03692	

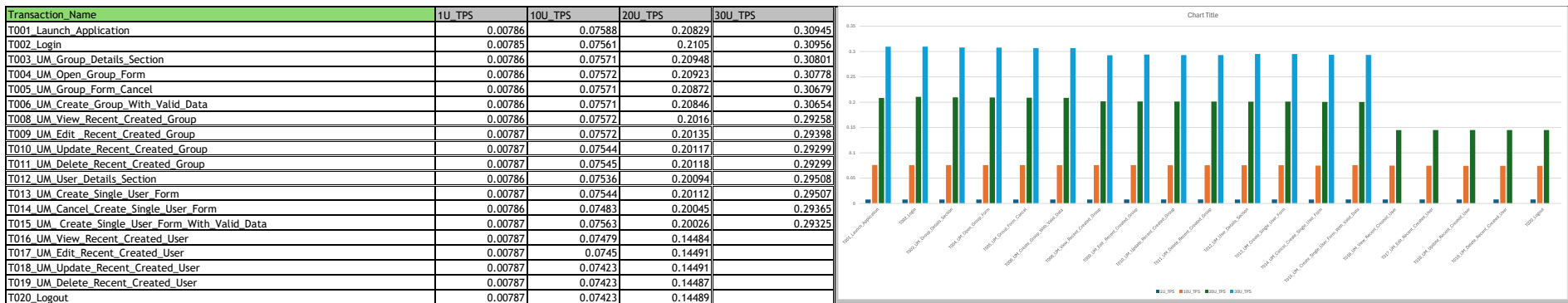
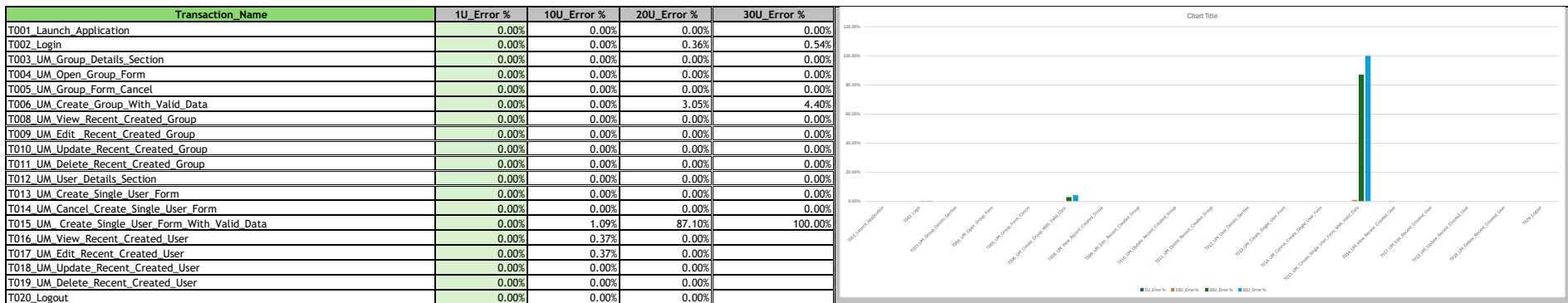
## GRC Application - Graph representation of the performance results for user actions and Details

### Module Name : User Management



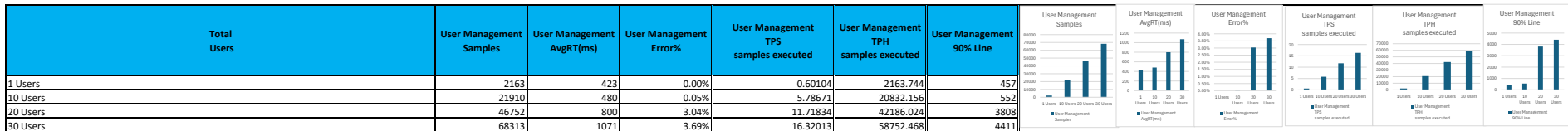
## GRC Application - Graph representation of the performance results for user actions and Details

### Module Name : User Management



#### Dependency service to execute the load test

Main Module : User management  
Sub Module : User Management  
Services :  
Auth Service  
Sso2 Service  
UserManagement Service  
TomCat Server [ Frontend Server]  
PostgreSQL [ DataBase Server ]



## GRC Application

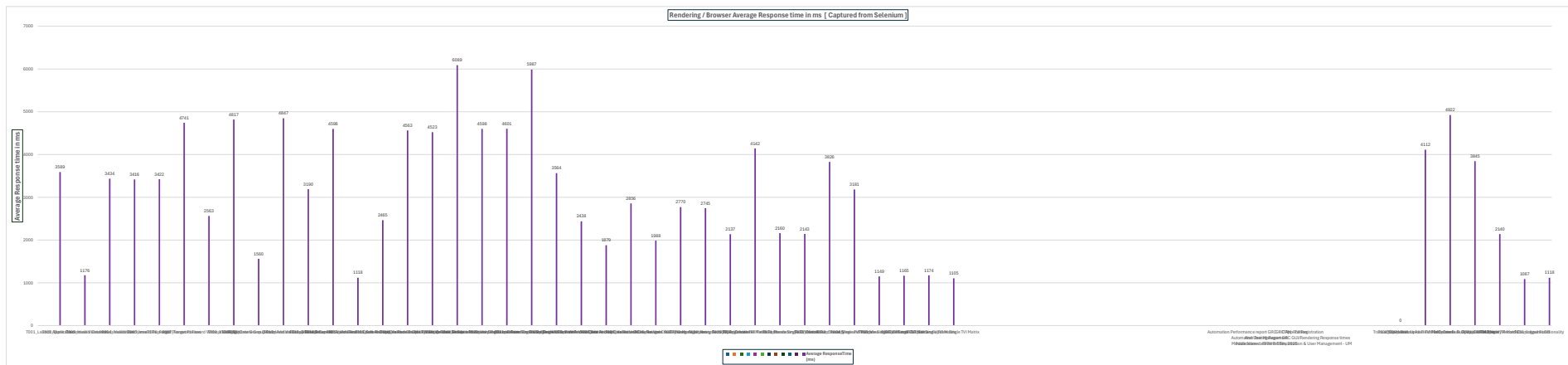
### Automation Testing Report GRC GUI/Rendering Response times

#### Module Name : ITRM TVI Resistration & User Management - UM

Transaction Name	Average ResponseTime (ms)
T001_Launch Application	3589
T002_Blank Credentials Validation	1176
T003_Invalid Credentials Validation	3434
T004_Invalid UserName	3416
T005_Invalid Password	3422
T006_Forgot Password Flow	4741
T007_Forgot Password Without UserID	2563
T008_Valid Login	4817
T009_Validate Group Details	1560
T010_Create Group Form And Validate All Fields	4847
T011_Validate Group Details Cancel	3190
T012_Create Group With Valid Data	4598
T013_Filter And Search Recent Created Group	1118
T014_View And Validate Recent Created Group	2465
T015_Edit And Update Recent Created Group	4563
T016_Validate Delete Recent Created Group	4523
T017_Validate User Details section	6089
T018_Validate All Fields in Create Single User Form	4598
T019_Validate Mandatory Fields in Create Single User Form	4601
T020_Validate Cancel Function Create Single User Form	5987
T021_Validate Create Single User Form With Valid Data	3564
T022_Filter And Search Recent Created User	2438
T023_View And Validate Recent Created User	1879
T024_Edit And Update Recent Created User	2856
T025_Validate Delete Recent Created User	1988
T026_Navigate to IT Risk Management	2770
T027_Navigate to Library Section	2745
T028_Navigate to TVI Registration	2137
T029_Open Create TVI Matrix Form	4142
T030_Validate All Fields in Create Single TVI Matrix	2160
T031_Mandatory Field Validations	2143
T032_Cancel Functionality	3826
T033_Create Single TVI Matrix	3181
T034_View and Validate Single TVI Matrix	1149
T035_View and Back Single TVI Matrix	1165
T036_Edit and Validate Single TVI Matrix	1174
T037_Edit and Update Single TVI Matrix	1105

**GRC Application**  
**Automation Testing Report GRC GUI/Rendering Response times**  
**Module Name : ITRM TVI Resistration & User Management - UM**

Transaction Name	Average ResponseTime (ms)
T038_Open Bulk Upload TVI Matrix form	4112
T039_Validate All Fields in Create Bulk Upload TVI Matrix	4922
T040_Create Bulk Upload TVI Matrix	3845
T041_Delete Single TVI Matrix	2140
T042_Verify Record Count Against DB	1087
T050_Logout Functionality	1118





## GRC Application

## Automation Testing Report Found **Functionality issue**

**Module Name : ITRM TVI Resistration & User Management - UM**

The "Update User" functionality is creating new records in the database instead of updating existing ones. This is reflected in the frontend where multiple entries for the same user (with slightly modified data) appear in the user management table.

**Problem Areas:** Data Access Layer: The repository method might be calling save() or insert() instead of update() - Missing "upsert" logic (update if exists, otherwise insert)

### Evidence from Screenshot

**The user table shows two nearly identical entries for what appears to be the same user:**

**Original entry:** "Test Employee First Name Test Employee Last Name" (created 27-05-2025 13:12:30)

**Updated entry: "Test Employee First Name Updated Test Employee Last Name Updated" (created 27-05-2025 13:14:25)**

**Both entries share the same Employee ID (TestUser00001) and Group (UserAdmin), suggesting they represent the same user account.**

Governance Risk & Compliance

English

Perfuser091

IT Risk Management

Policy Management

User Management > User Details

User Details

Export As

+ Create User

User Name	Employee ID	Group	User Status	Created On...	Last Access...	Actions
Test Employee First Name Updated Test Employee Last Name Updated	TestUser00001Update	UserAdmin	<input checked="" type="checkbox"/>	27-05-2025 13:14:25		<div>View</div> <div>Edit</div> <div>Delete</div>
Test Employee First Name Test Employee Last Name	TestUser00001	UserAdmin	<input checked="" type="checkbox"/>	27-05-2025 13:12:30		<div>View</div> <div>Edit</div> <div>Delete</div>