**Studiu asupra imbunatatirii unui sistem folosind procese automate de testare si monitorizare continua a performantei**

**Studiul metodologiilor si solutiilor pentru imbunatatirea performantelor unei aplicatii software**

**JMeter Experiments**

The JMeter tool was used to perform a series of measurements and evaluate different metrics for each use case scenario (application flow) that might be accomplished by a user of the ScrumTaskboard web application. In addition to a wide variety of monitoring utilities that are provided by the JMeter tool, its main functionality is given by the virtual simulation of an established number of concurrent users. Therefore, several tests were conducted by suddenly changing the number of concurrent users (threads) of the web application. The results gathered from analyzing these tests’ outcome are as follows:

* For the **Login User** test case:
* The application responds successfully to 100 concurrent users (threads). This result is recorded in the images listed below which were obtained from different measurements:

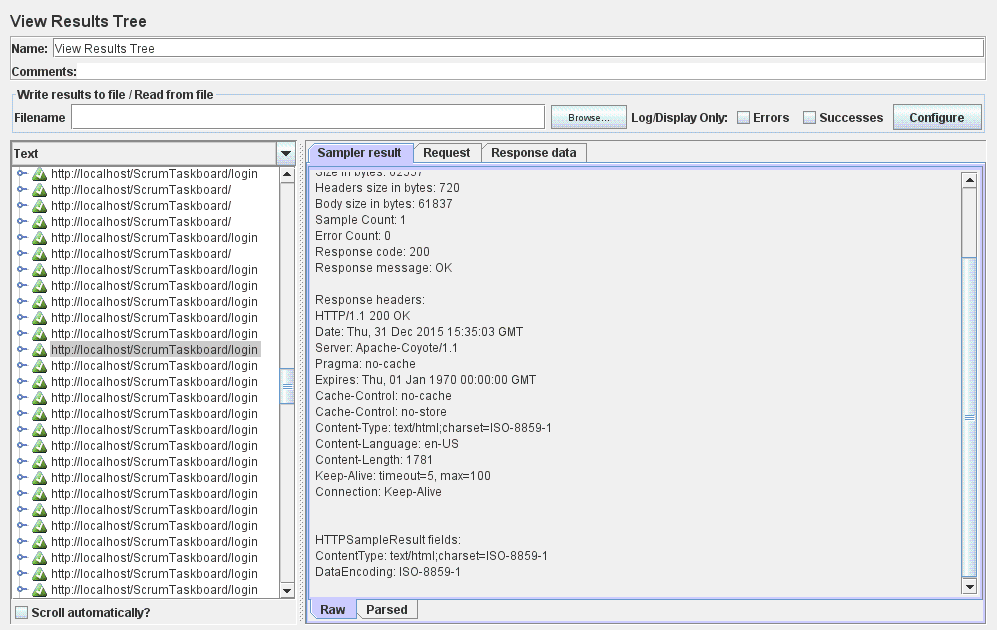


Figure 1: View Results Tree

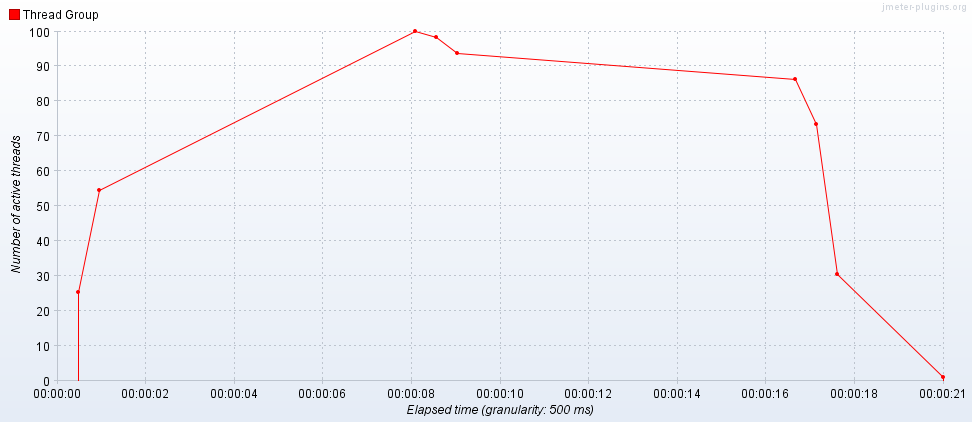


Figure 2: Active Threads Over Time

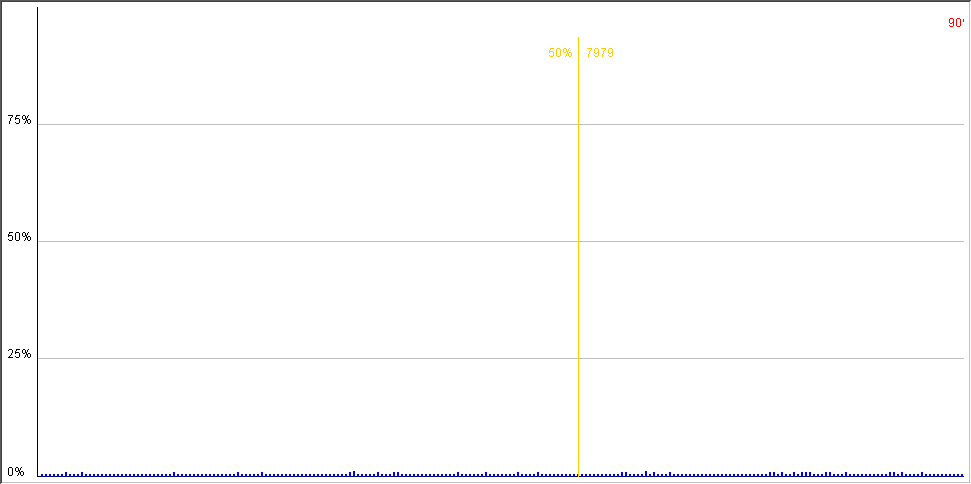


Figure 3: Distribution graph-alpha

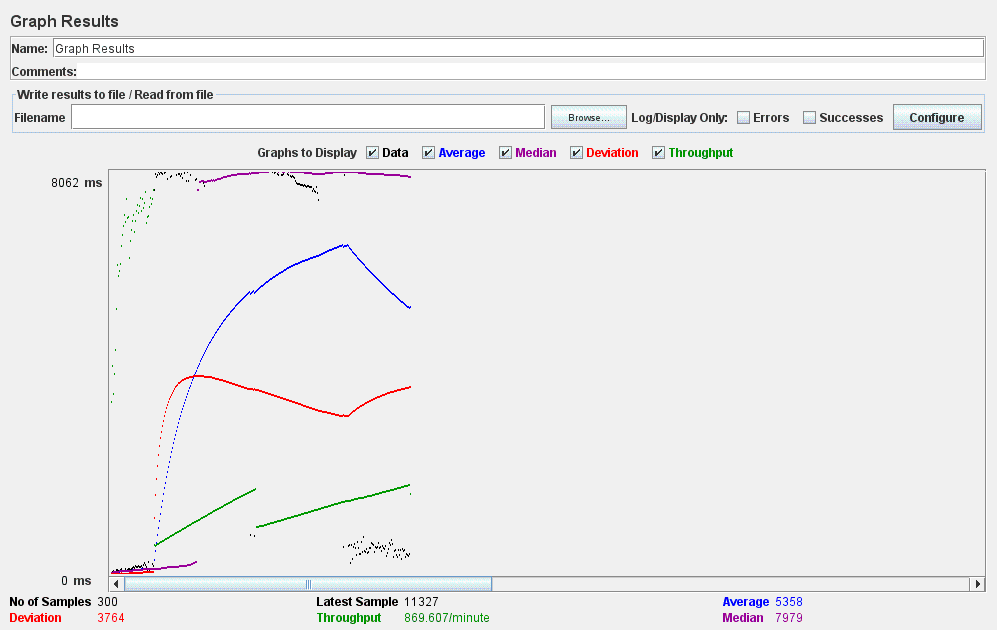


Figure 4: Graph Results

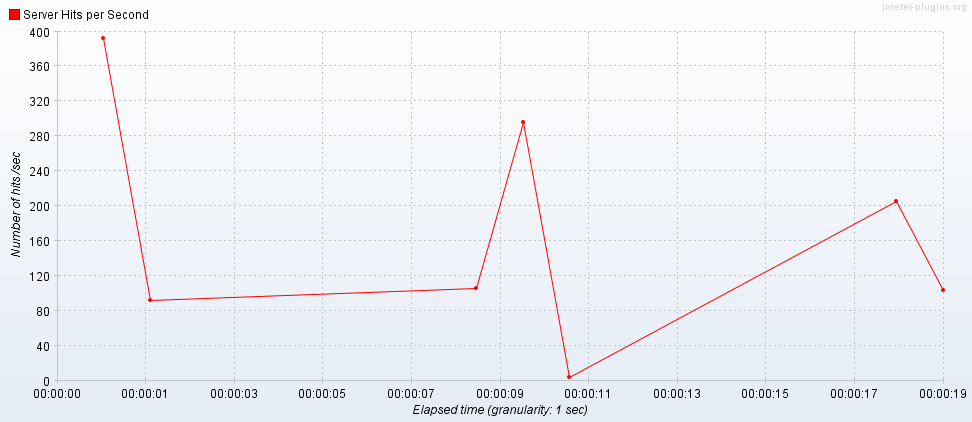


Figure 5: Hits per Second

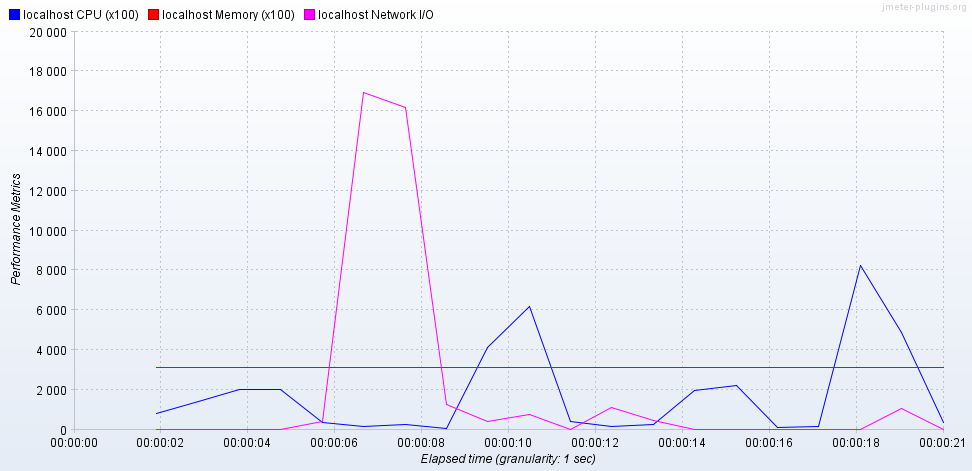


Figure 6: PerfMon Metrics Collector

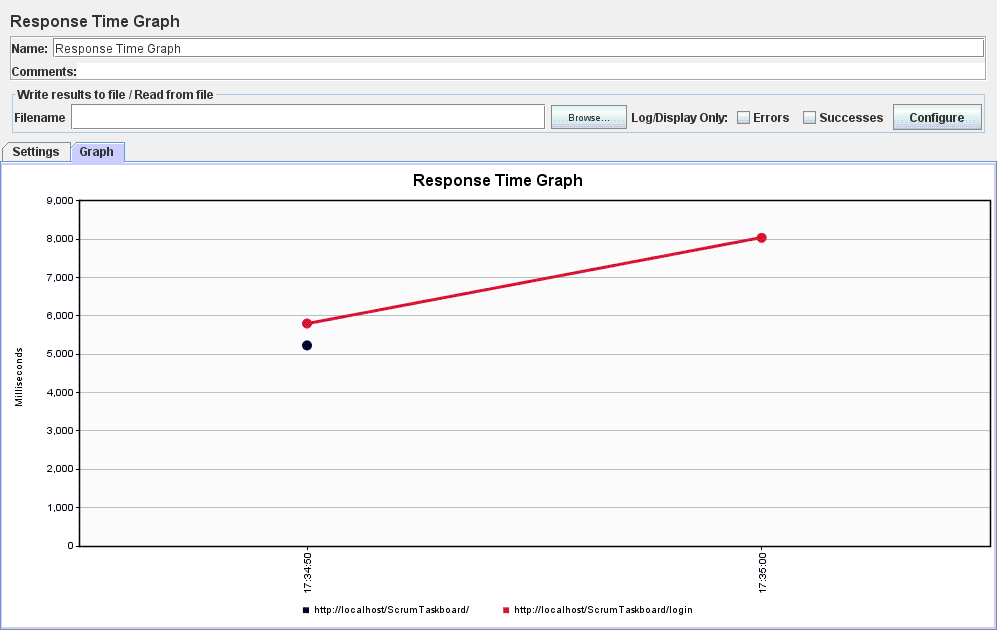


Figure 7: Response Time Graph

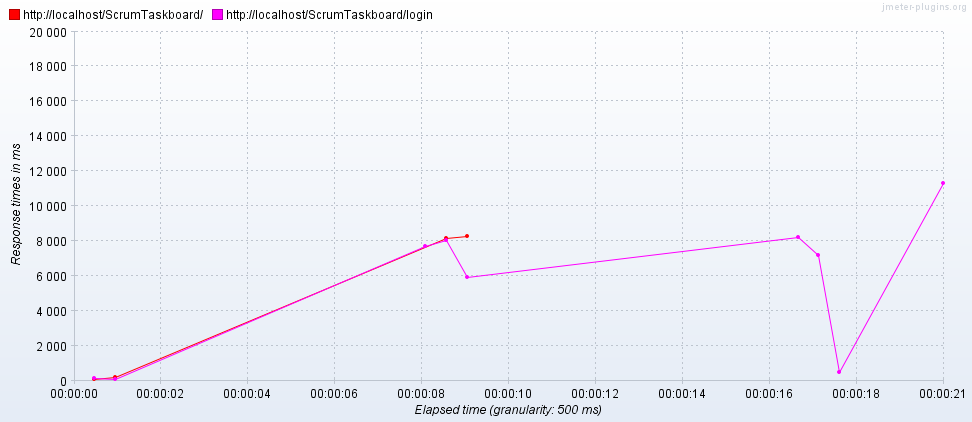


Figure 8: Response Times Over Time

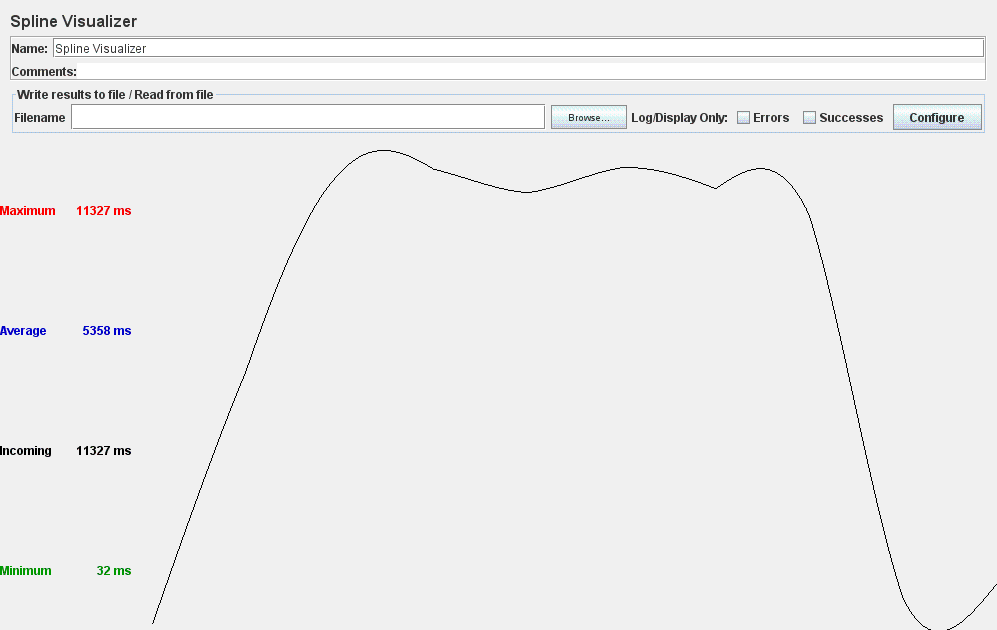


Figure 9: Spline Visualizer

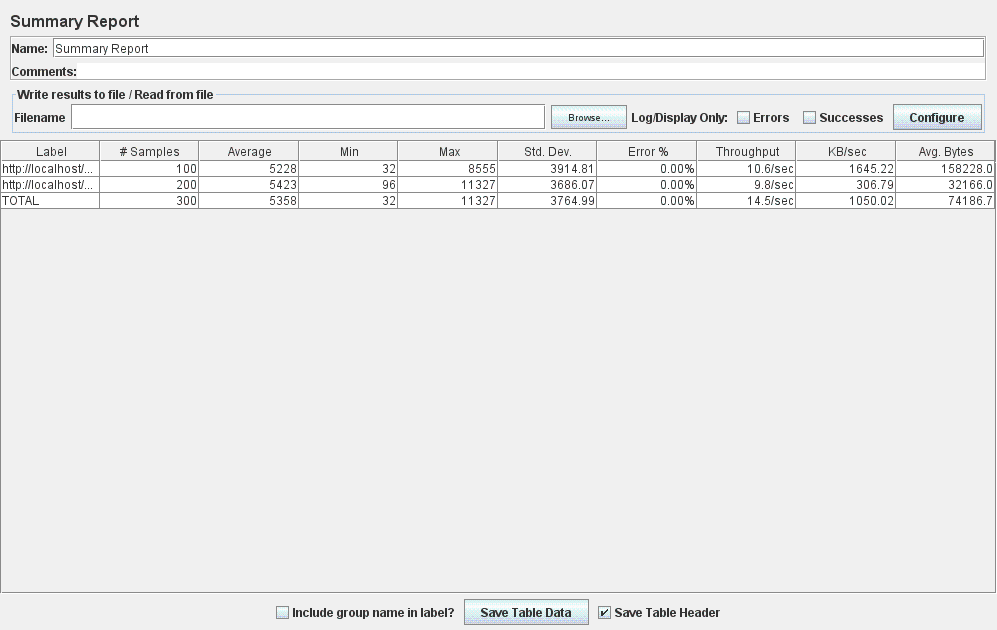


Figure 10: Summary Report

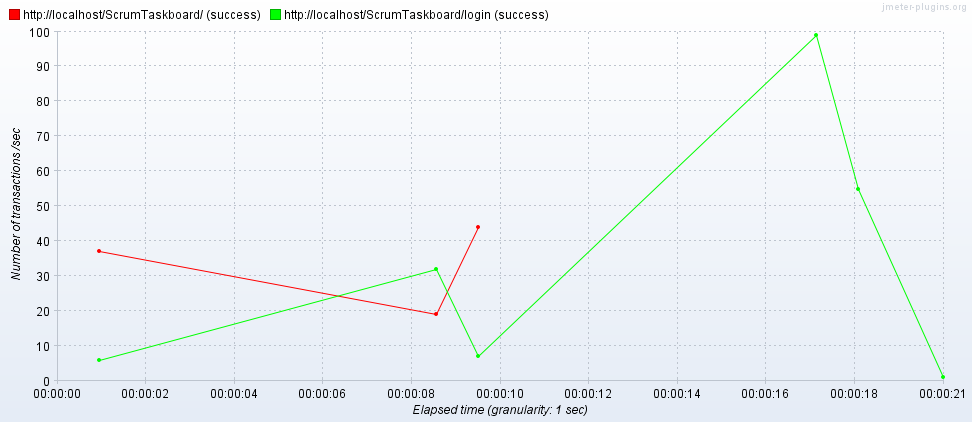


Figure 11: Transactions per Second

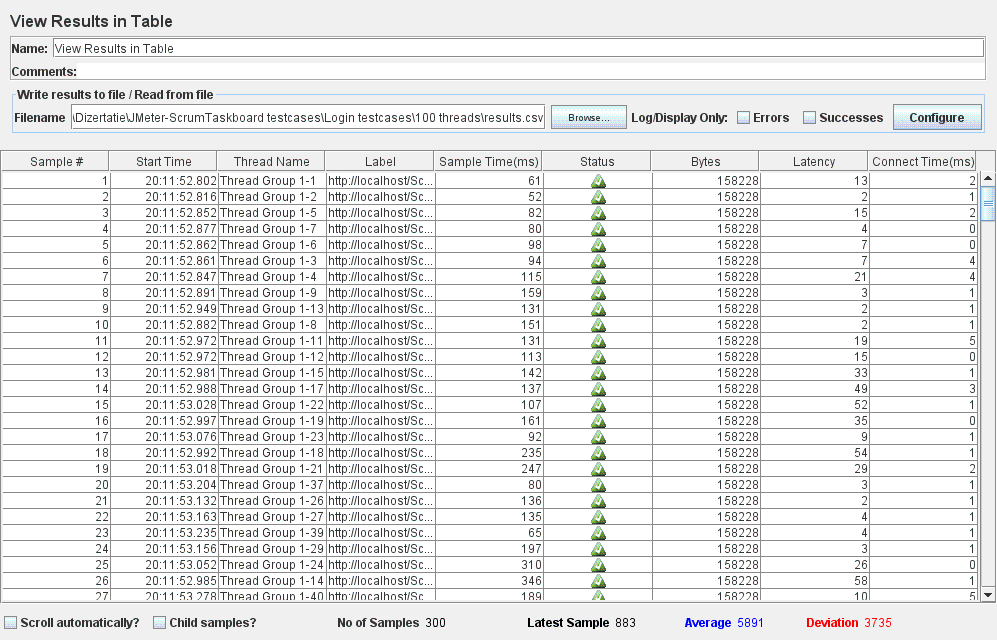


Figure 12: View Results in Table

* The application responds is unable to successfully handle a number of 300 concurrent users (threads) attempting to log in. Figure 13 listed below shows several requests for which the application responded with error. Additional information might be gathered by analyzing the results obtained from different measurements:

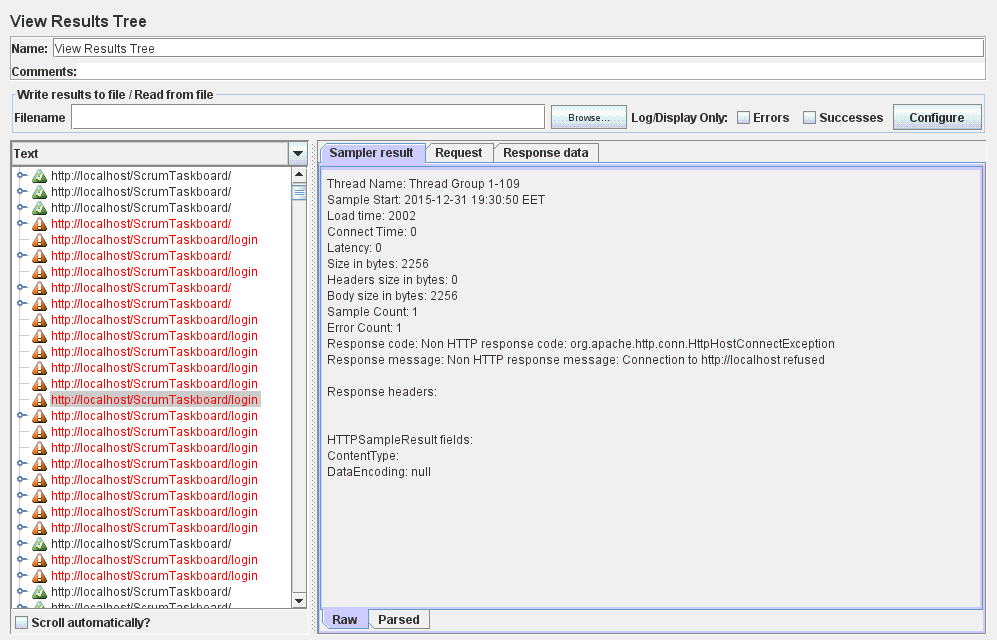


Figure 13: View Results Tree

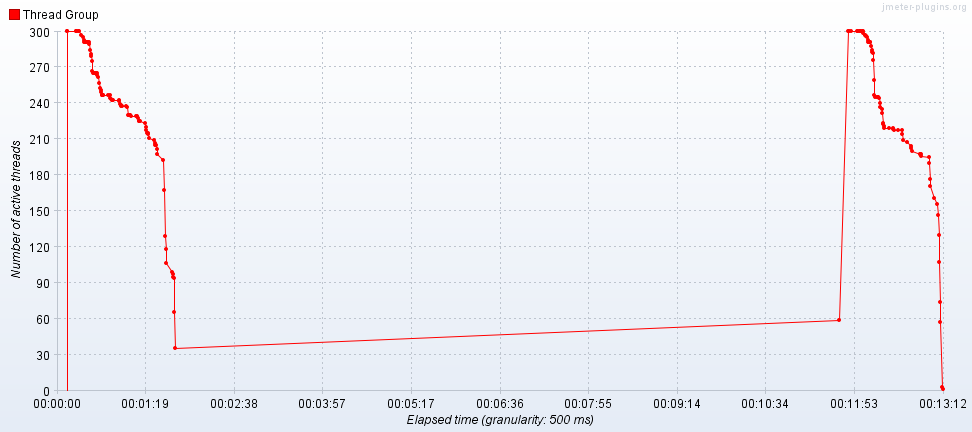


Figure 14: Active Threads Over Time

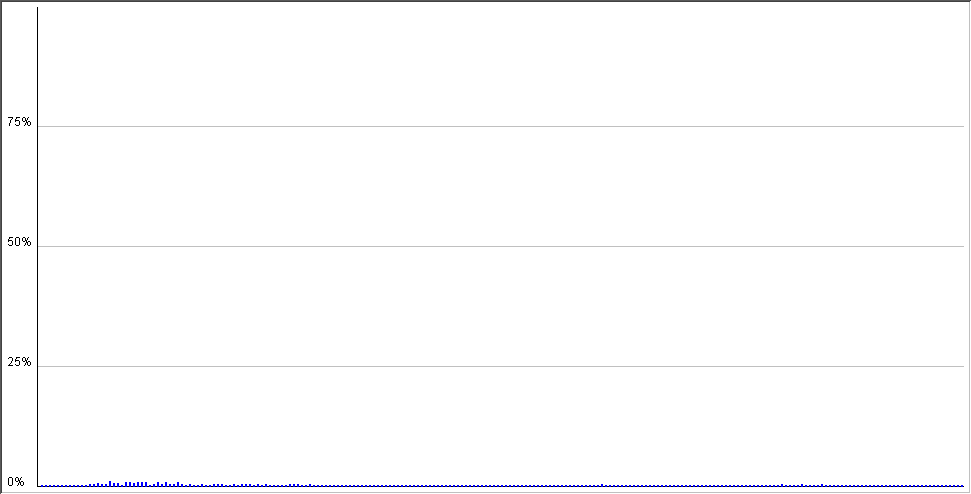


Figure 15: Distribution Graph (alpha)

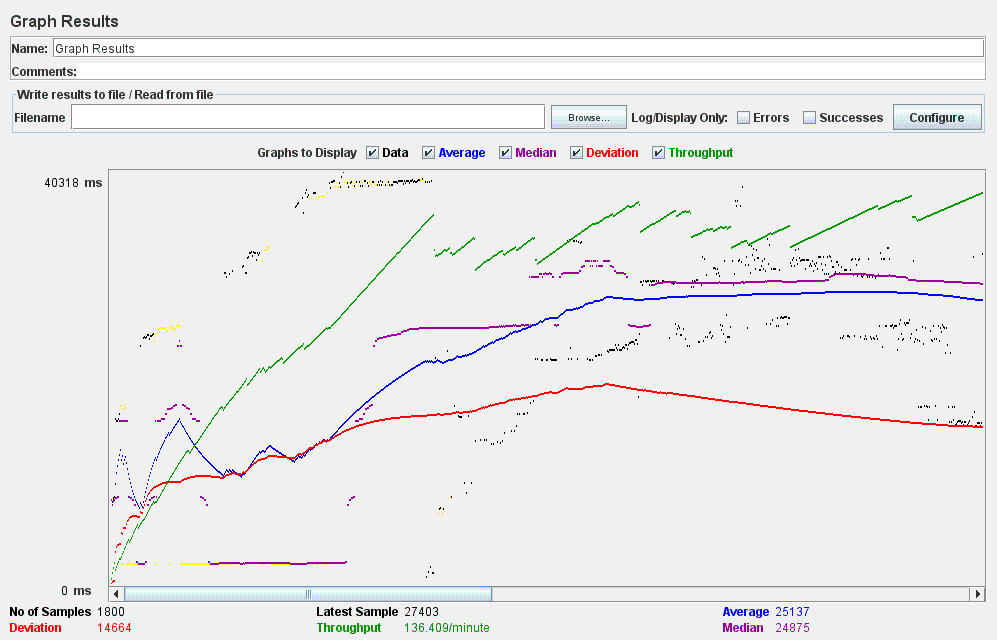


Figure 16: Graph Results

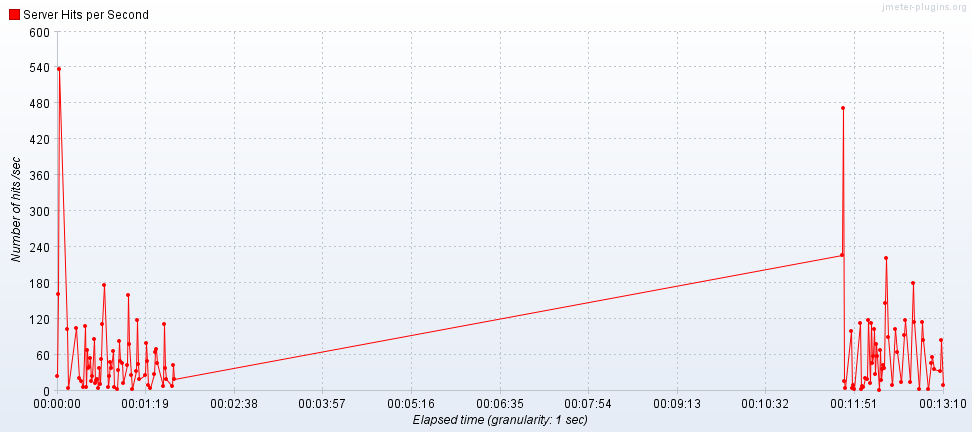


Figure 17: Hits per Second

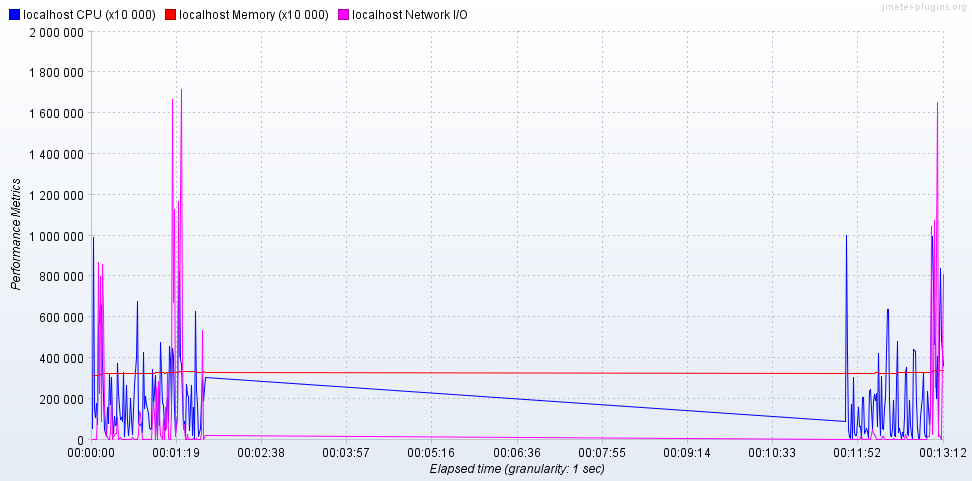


Figure 18: PerfMon Metrics Collector

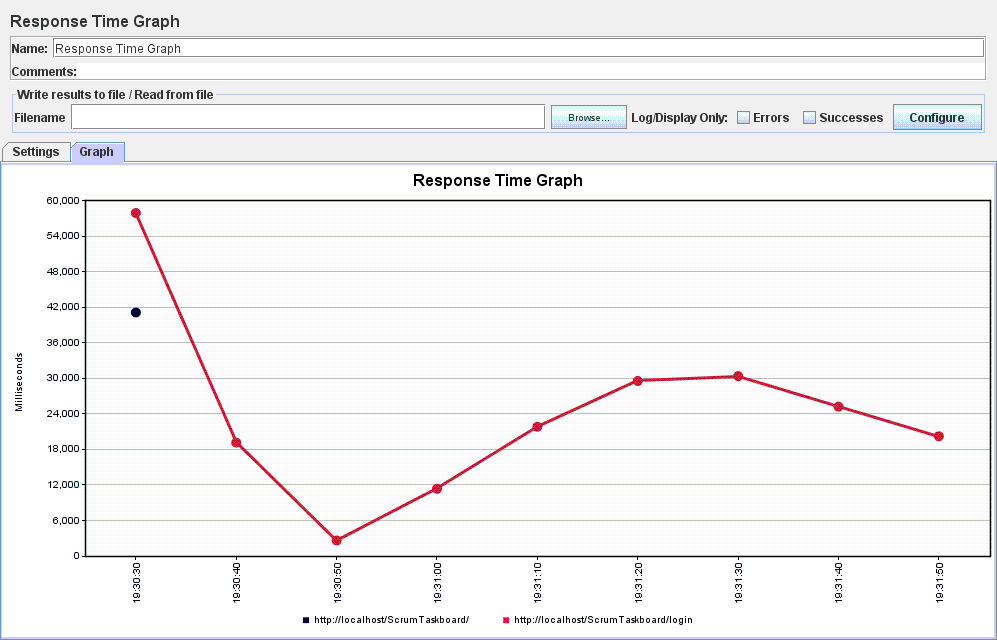


Figure 19: Response Time Graph

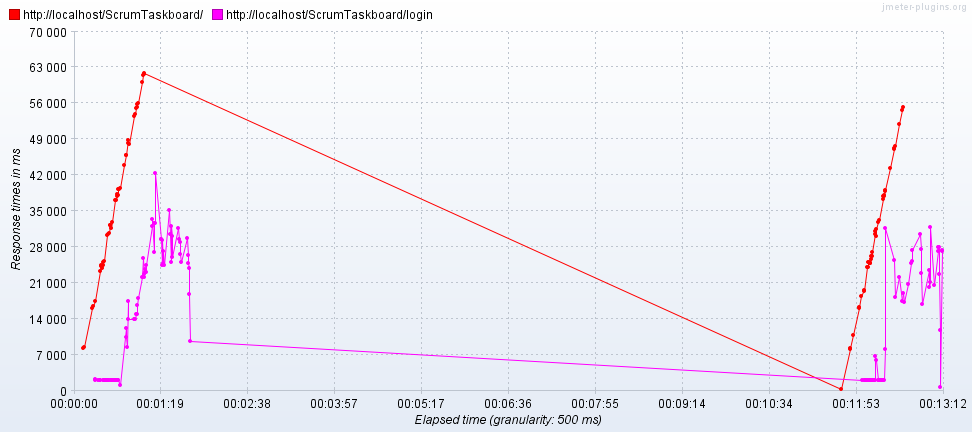


Figure 20: Response Times Over Time

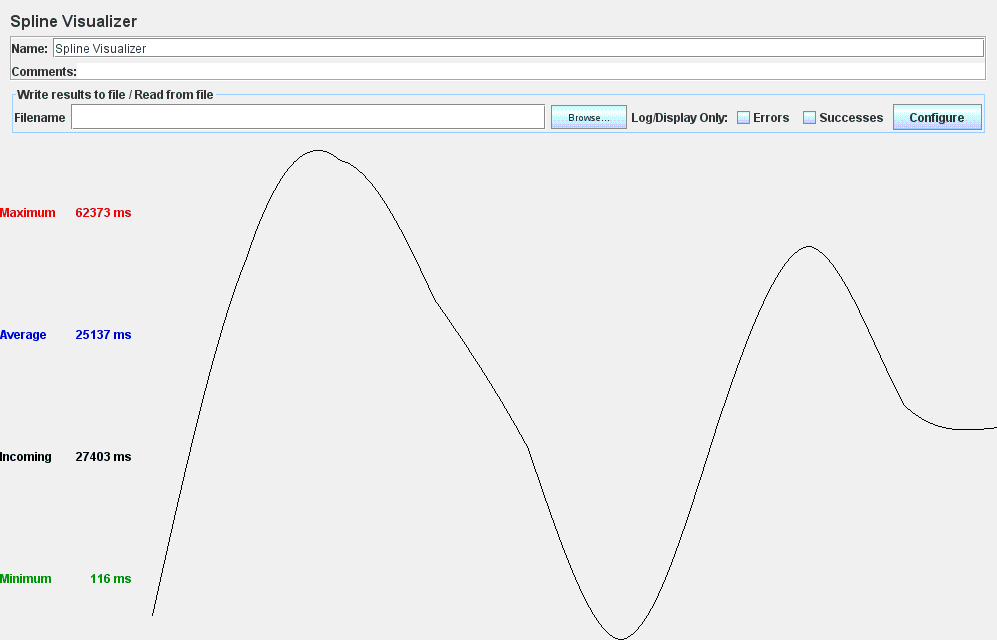


Figure 21: Spline Visualizer

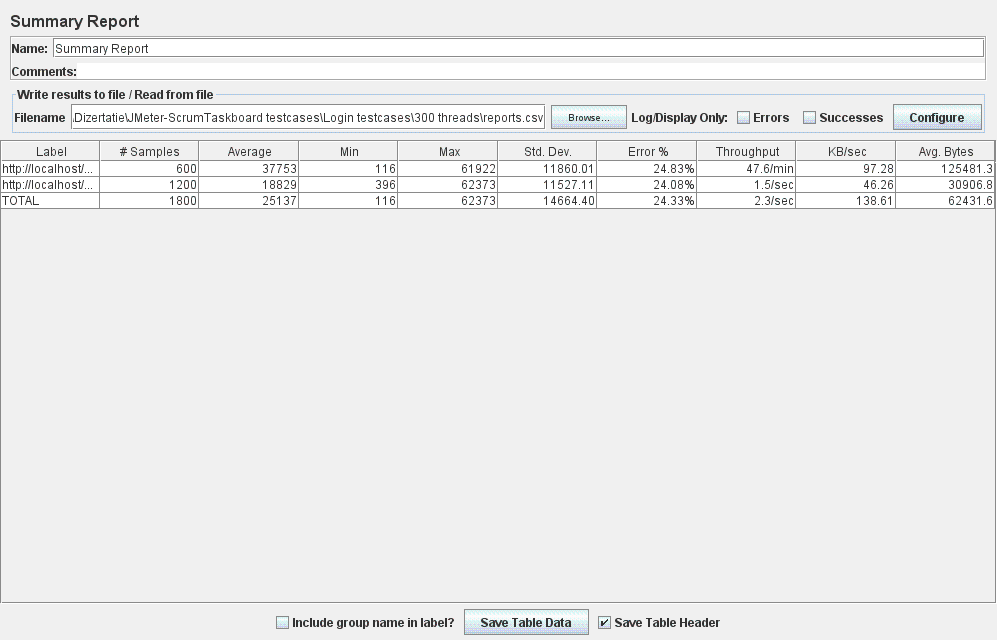


Figure 22: Summary Report

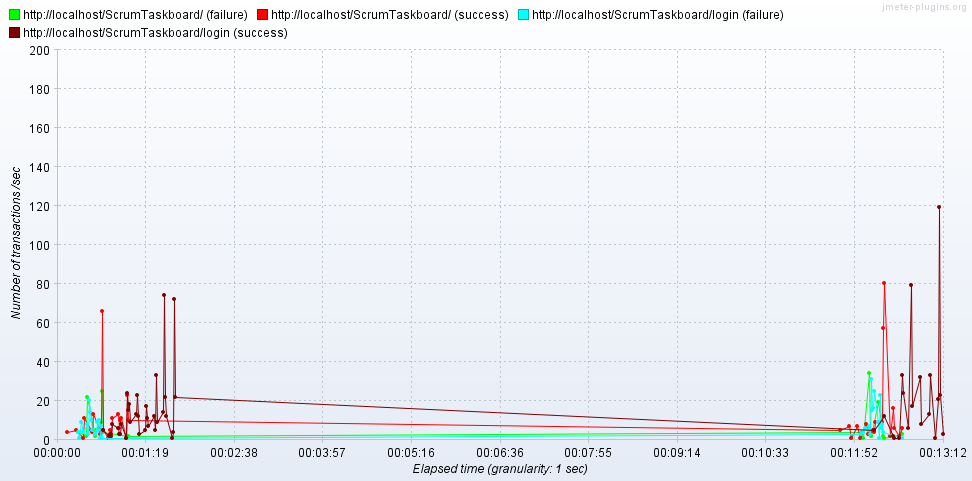


Figure 23: Transactions per Second

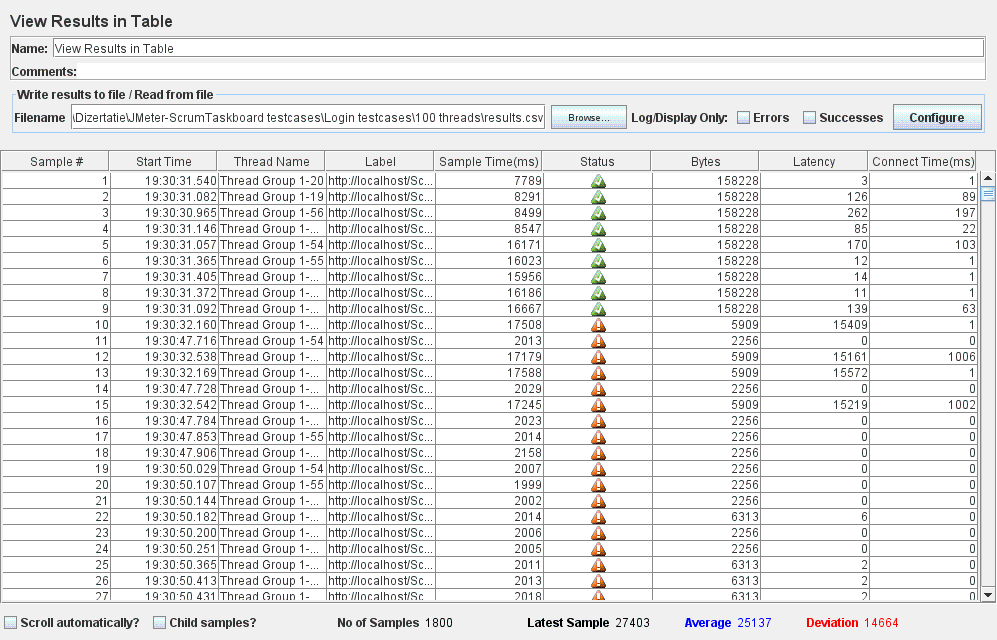


Figure 24: View Results in Table

* Even worst results are obtained when a number of 500 users (threads) try to simultaneously log in to the ScrumTaskboard web application. This outcome is denoted by the pictures obtained by performing a series of metrics on this scenario:

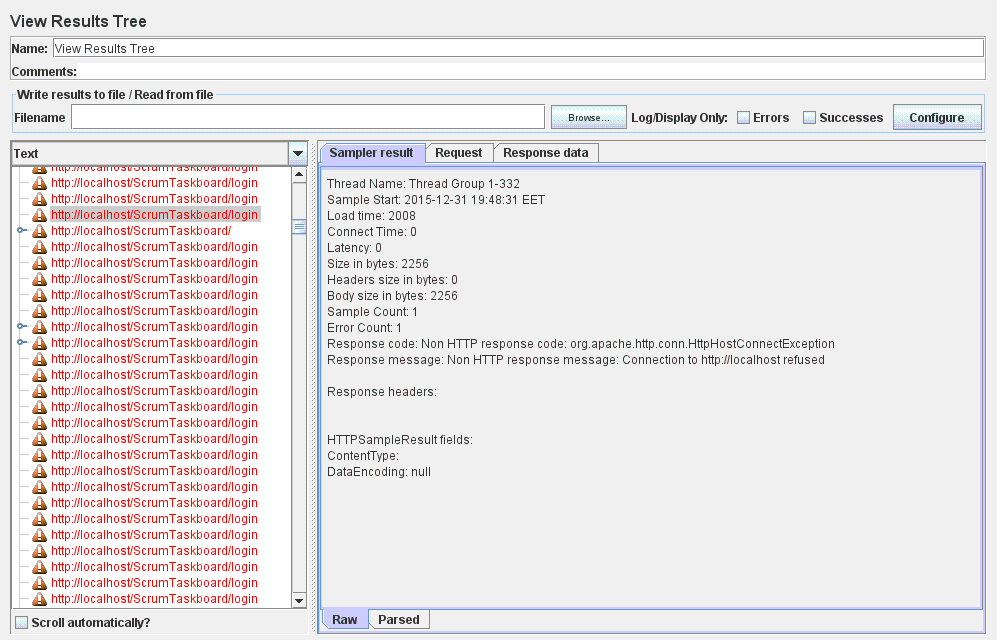


Figure 25: View Results Tree

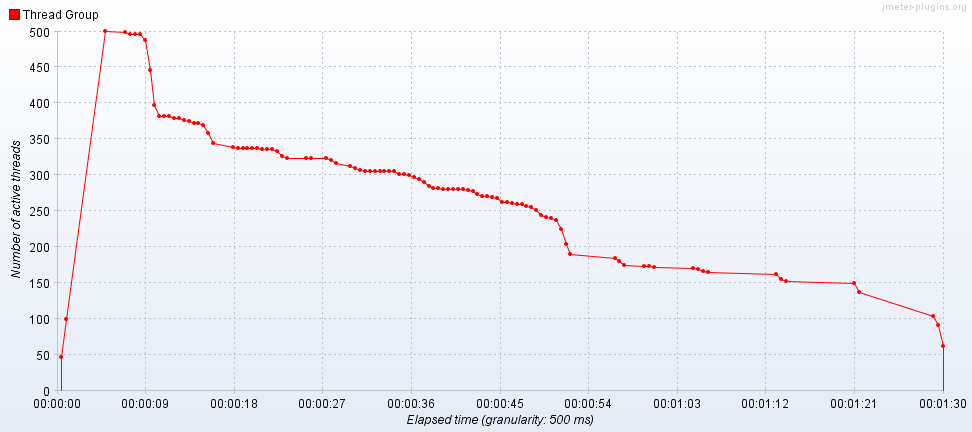


Figure 26: Active Threads Over Time

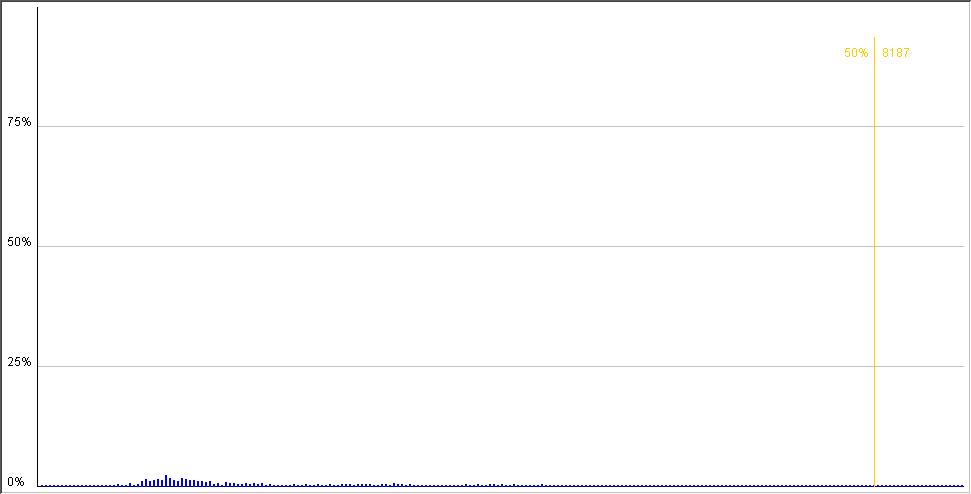


Figure 27: Distribution Graph (alpha)

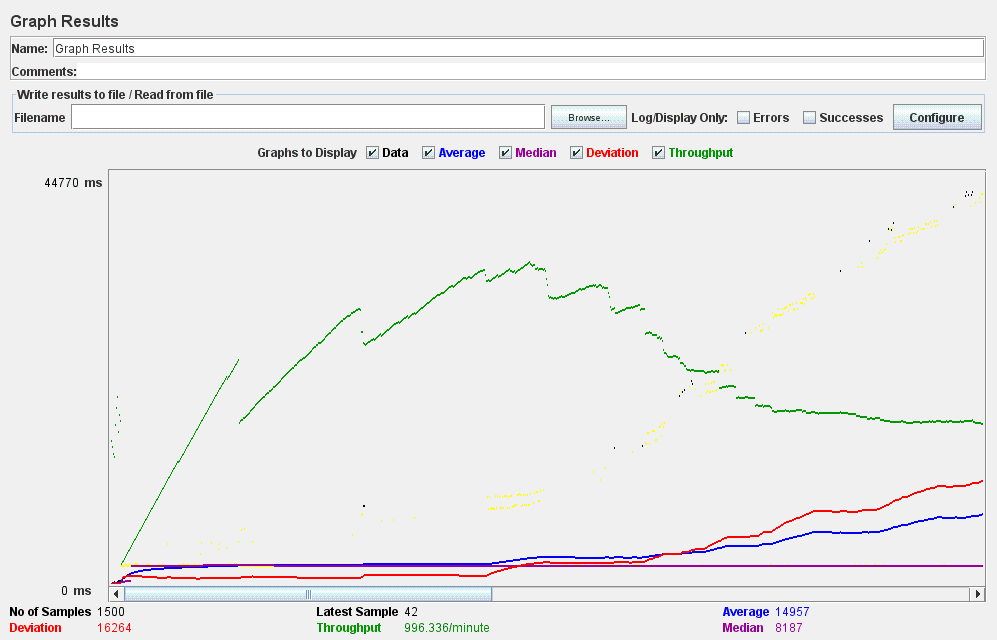


Figure 28: Graph Results

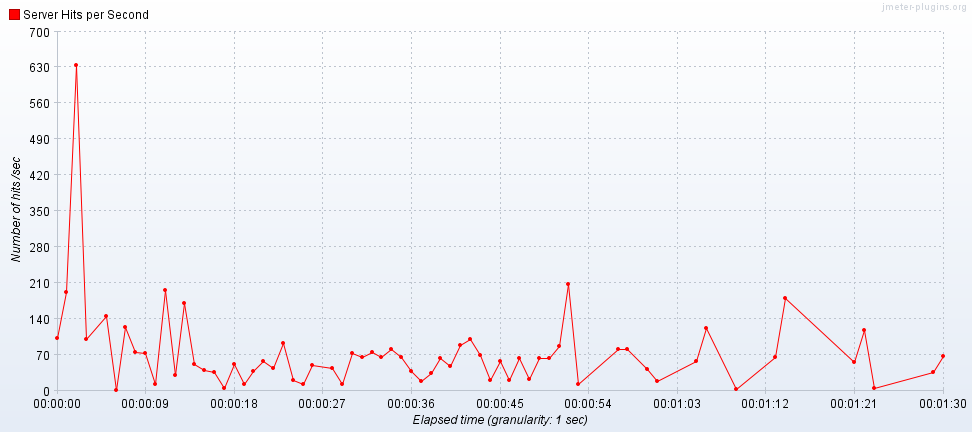


Figure 29: Hits per Second

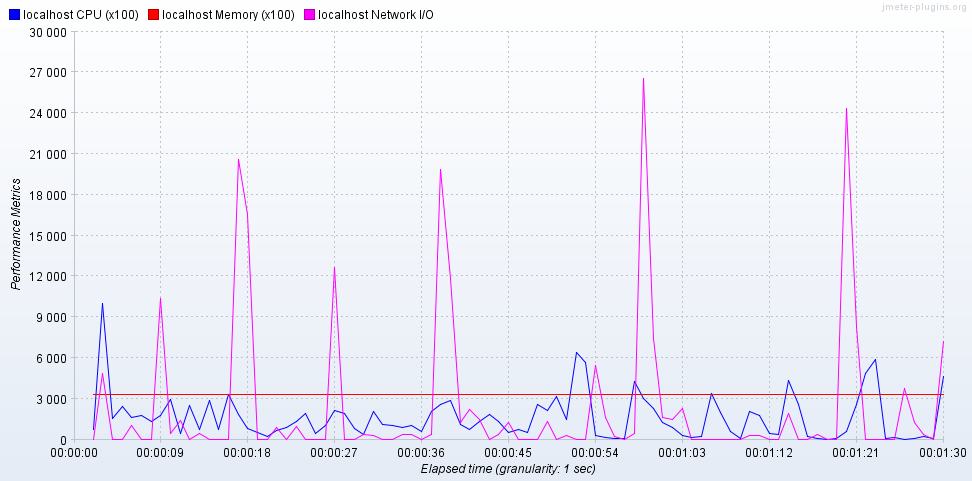


Figure 30: PerfMon Metrics Collector

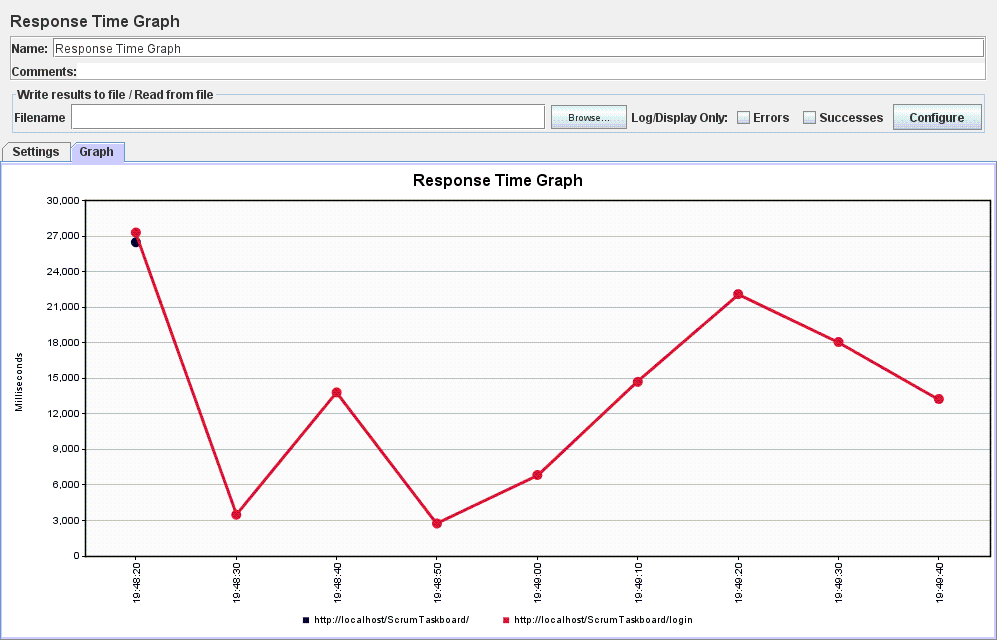


Figure 31: Response Time Graph

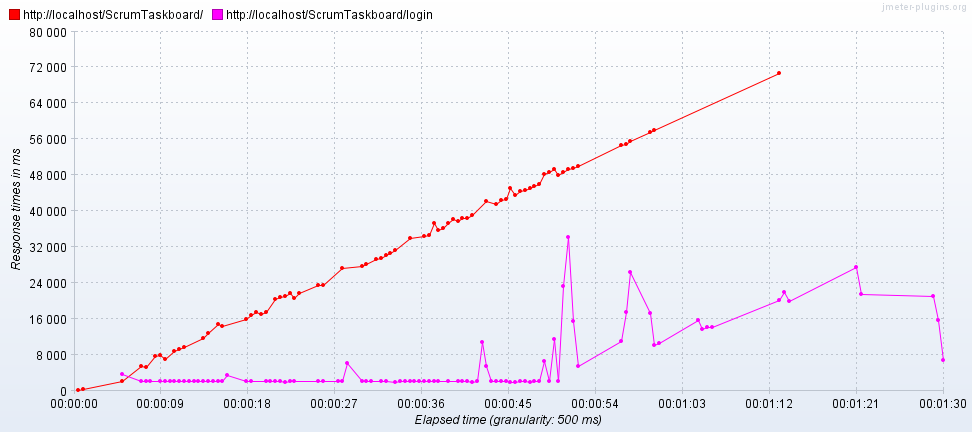


Figure 32: Response Times Over Time

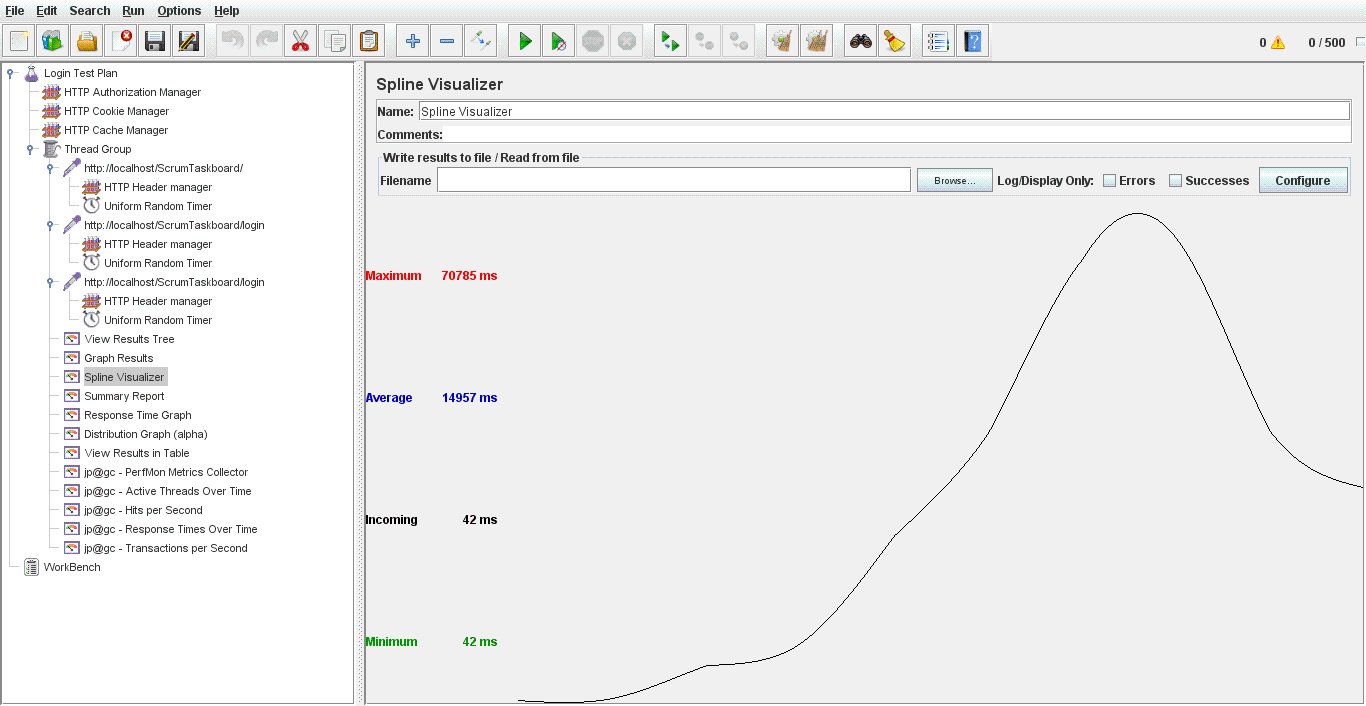


Figure 33: Spline Visualizer

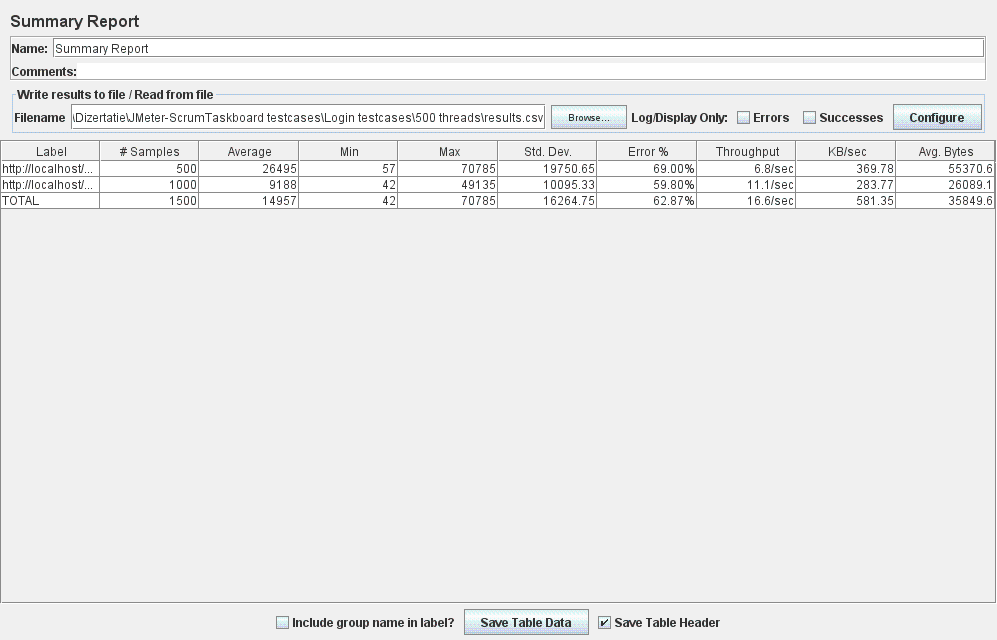


Figure 34: Summary Report

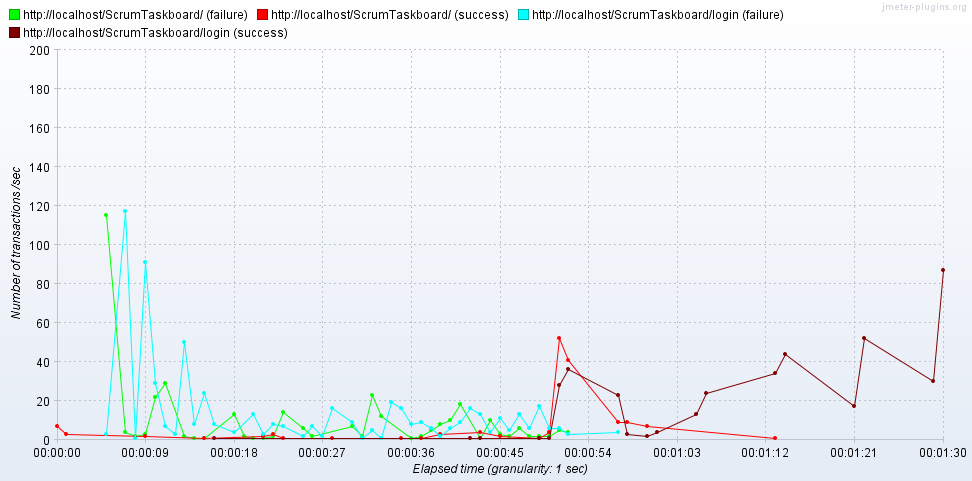


Figure 35: Transactions per Second

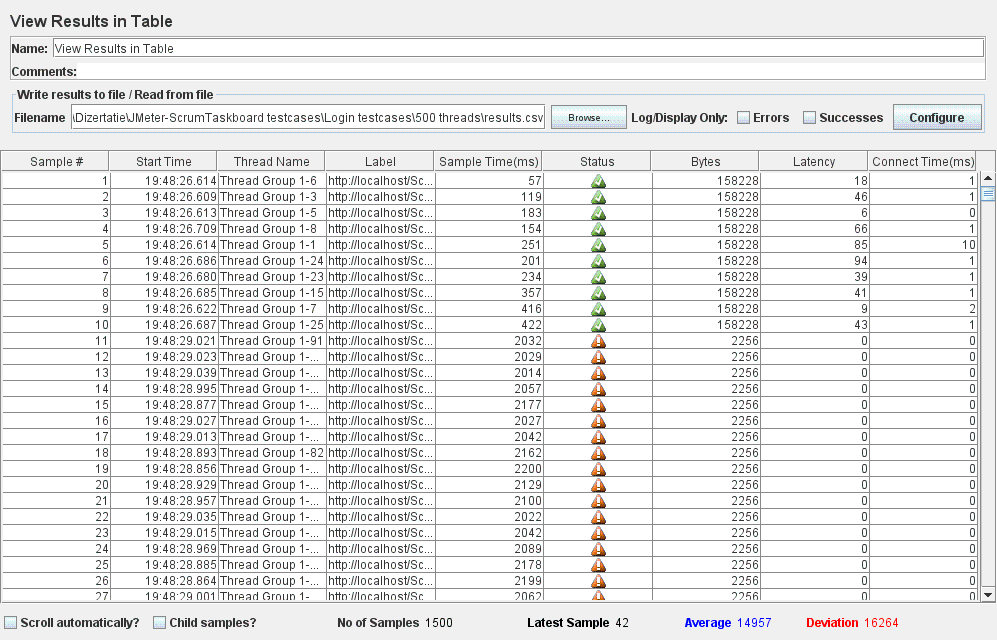


Figure 36: View Results in Table

* For the **Register User** test case:
* The application responds successfully to 100 concurrent users (threads This result is recorded in the images listed below which were obtained from different measurements:

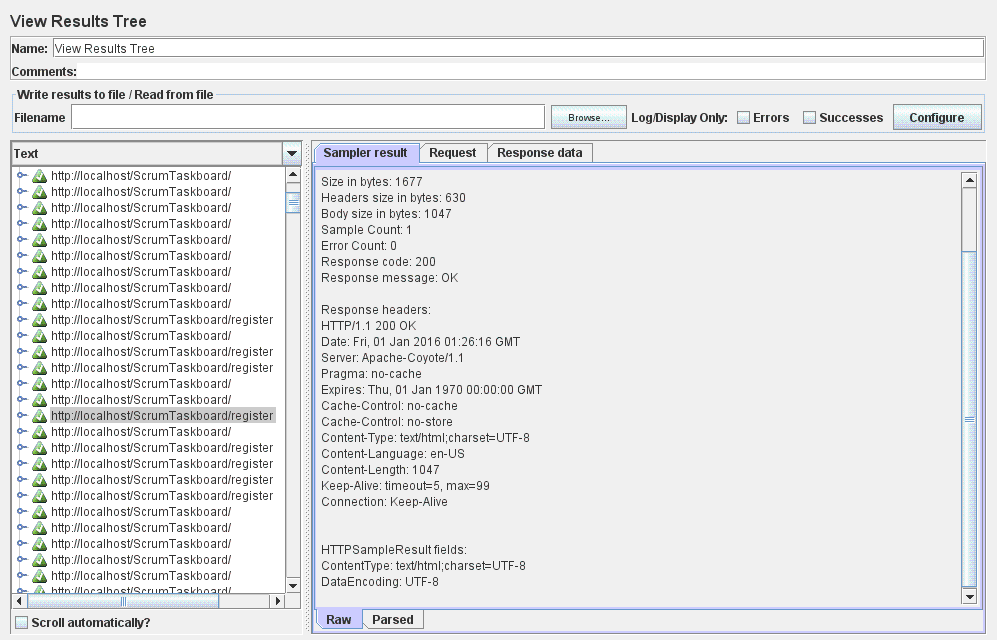


Figure 37: View Results Tree

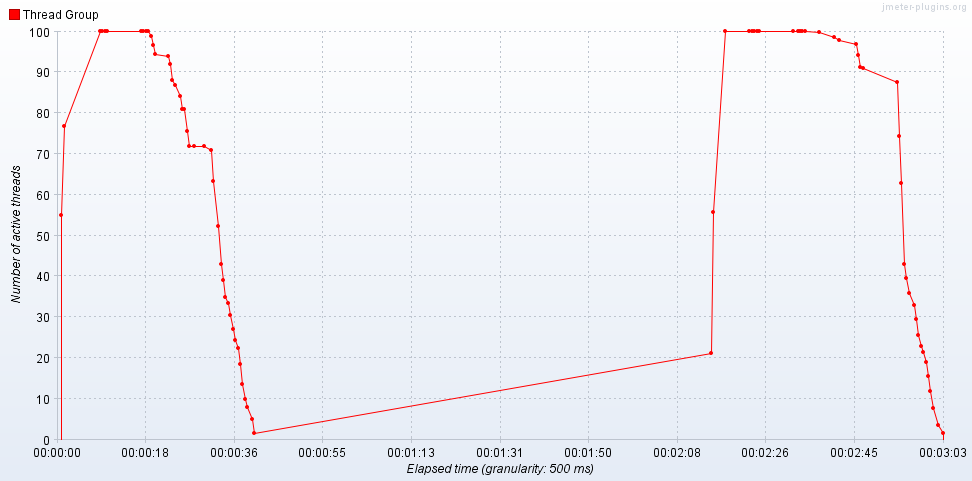


Figure 38: Active Threads Over Time

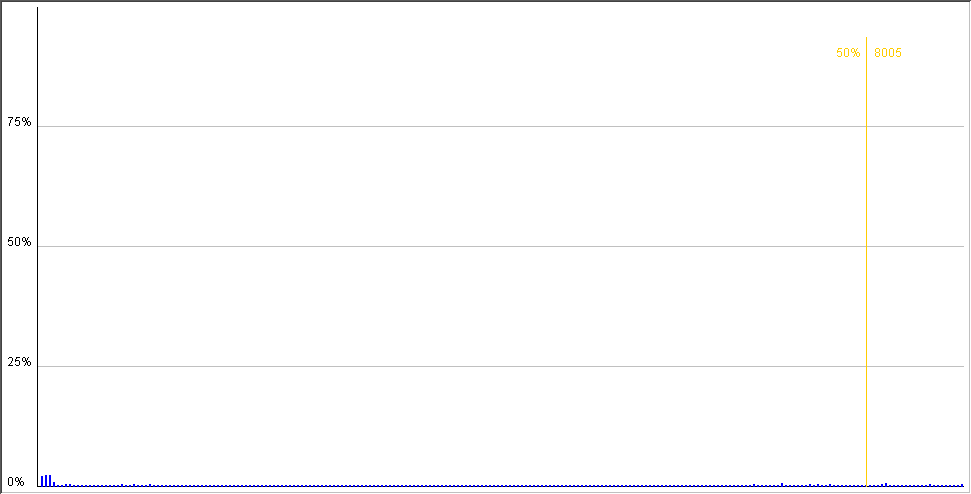


Figure 39: Distribution Graph (alpha)



Figure 40: Graph Results

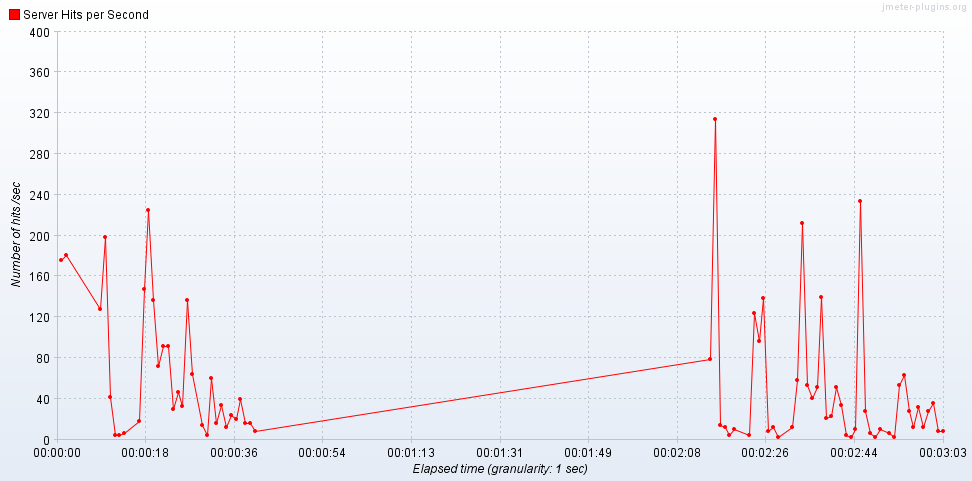


Figure 41: Hits per Second

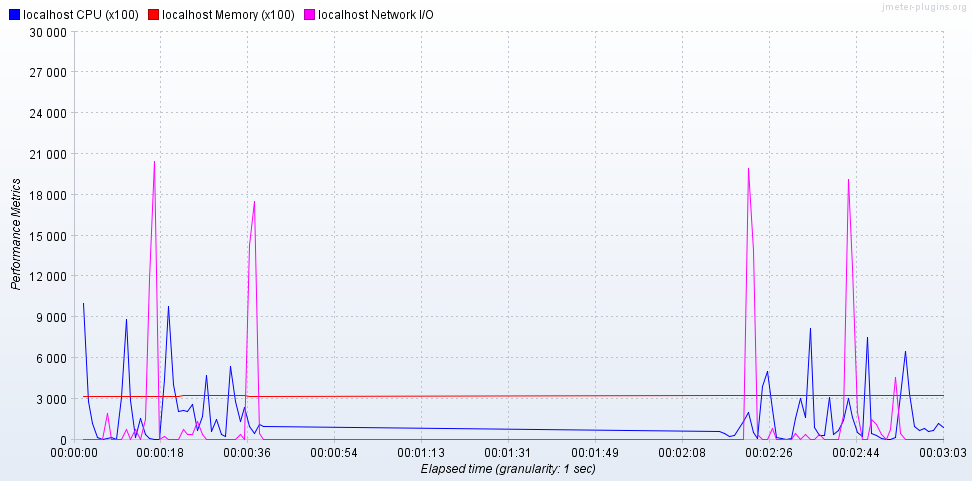


Figure 42: PerfMon Metrics Collector

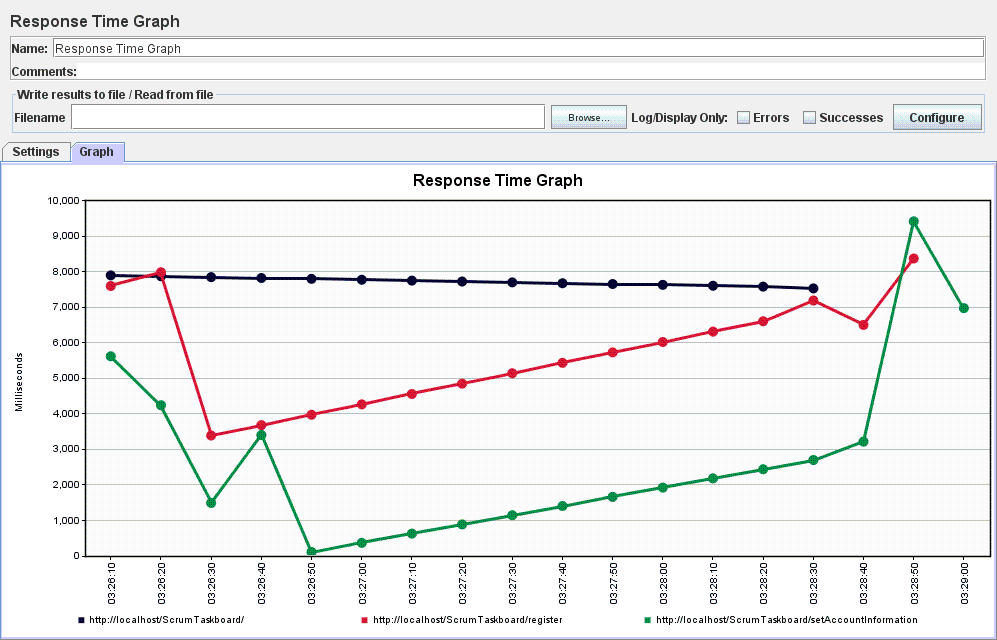


Figure 43: Response Time Graph

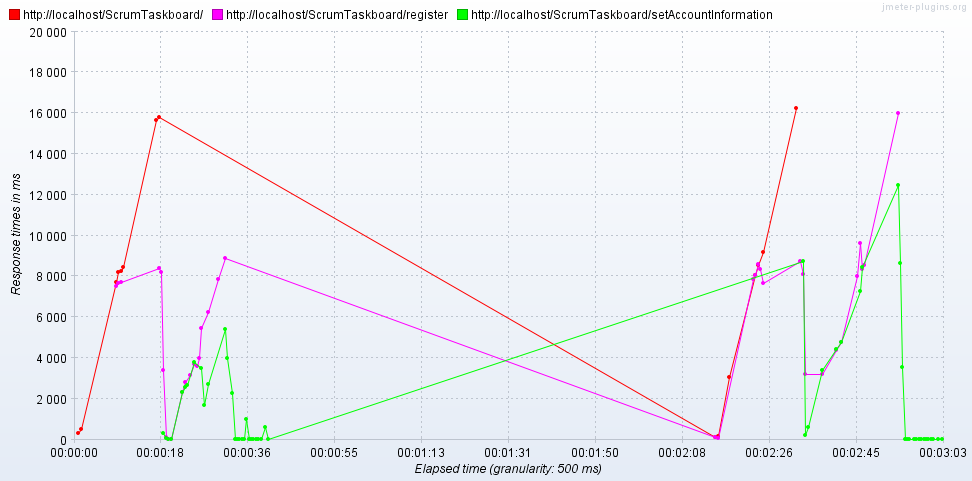


Figure 44: Response Times Over Time

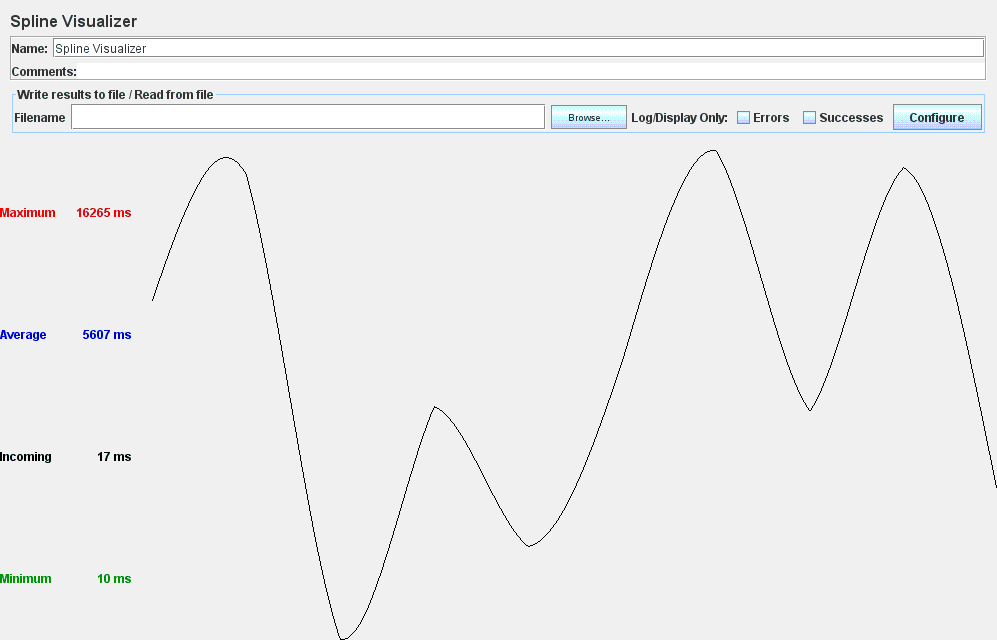


Figure 45: Spline Visualizer

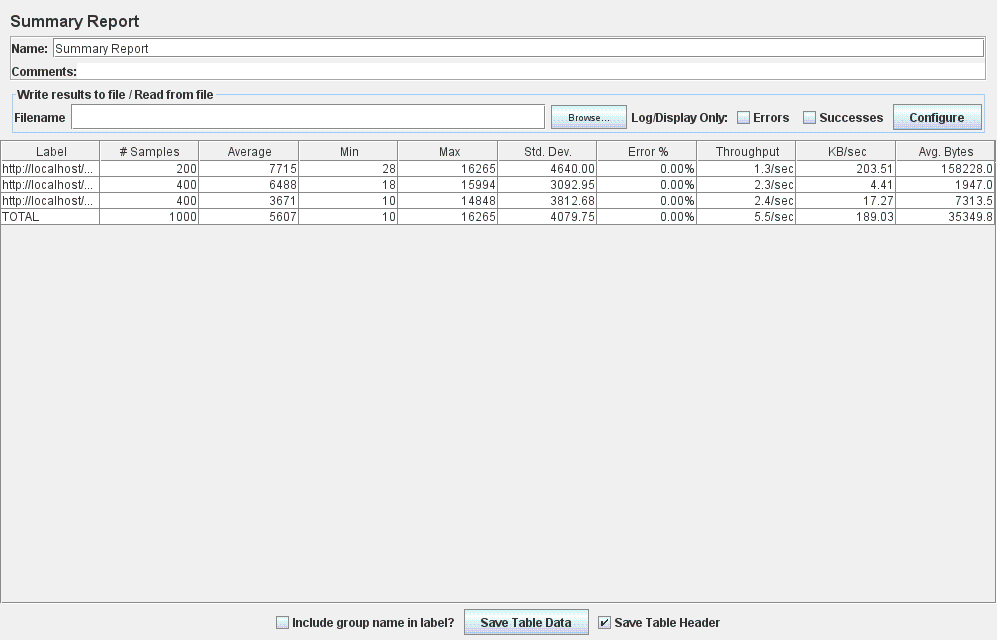


Figure 46: Summary Report

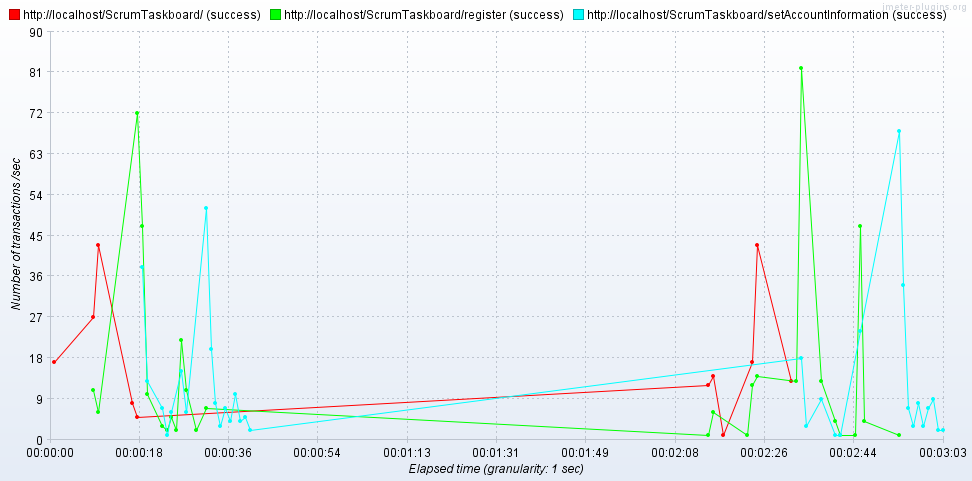


Figure 47: Transactions per Second

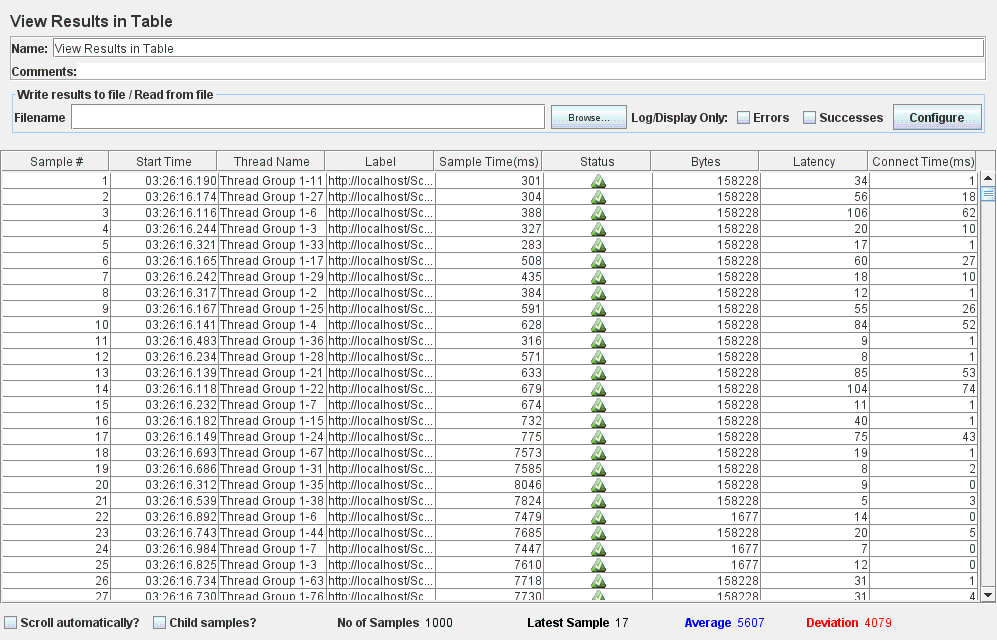


Figure 48: View Results in Table

* The application responds is unable to successfully handle a number of 300 concurrent users (threads) attempting to register. The results obtained from a series of measurements performed show several requests for which the application responded with error.

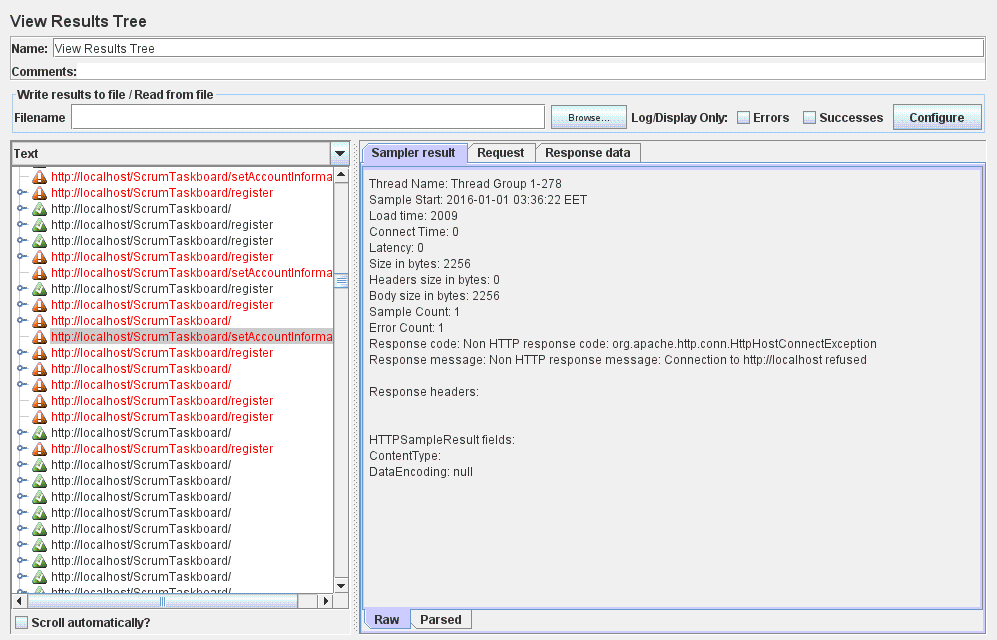


Figure 49: View Results Tree

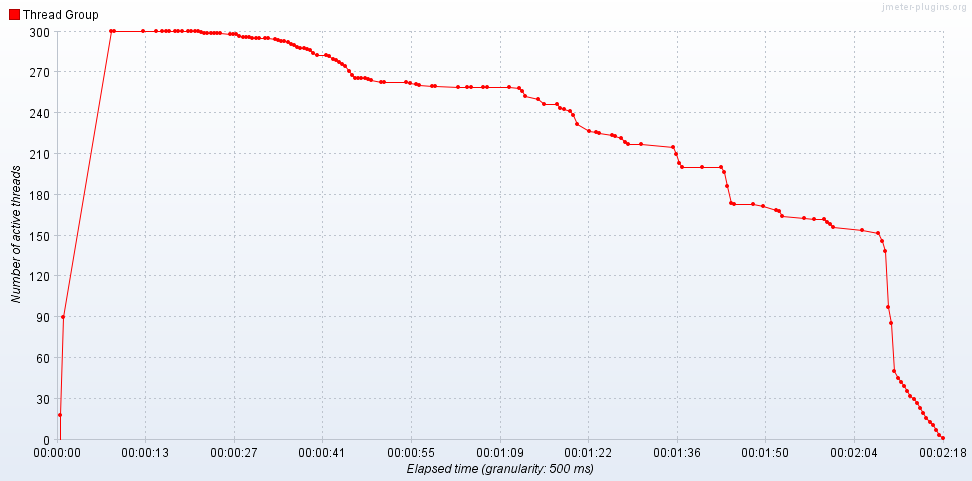


Figure 50: Active Threads Over Time

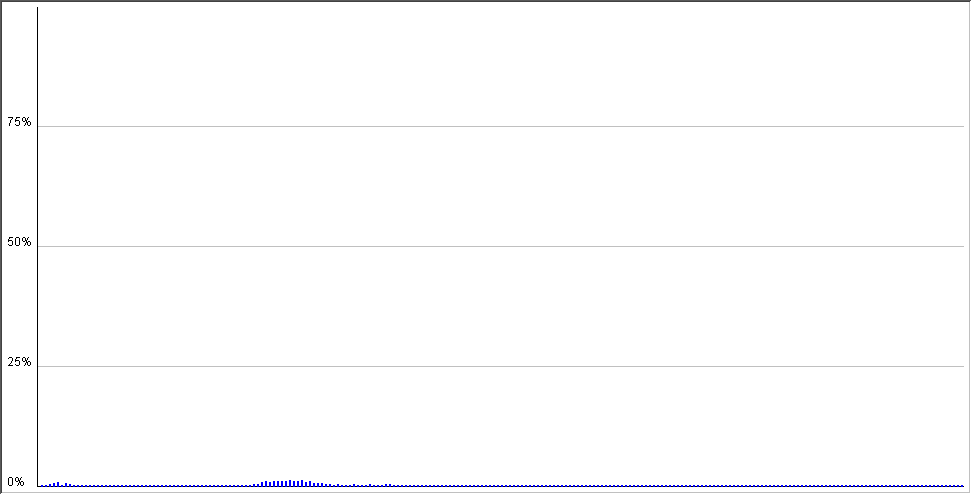


Figure 51: Distribution Graph (alpha)

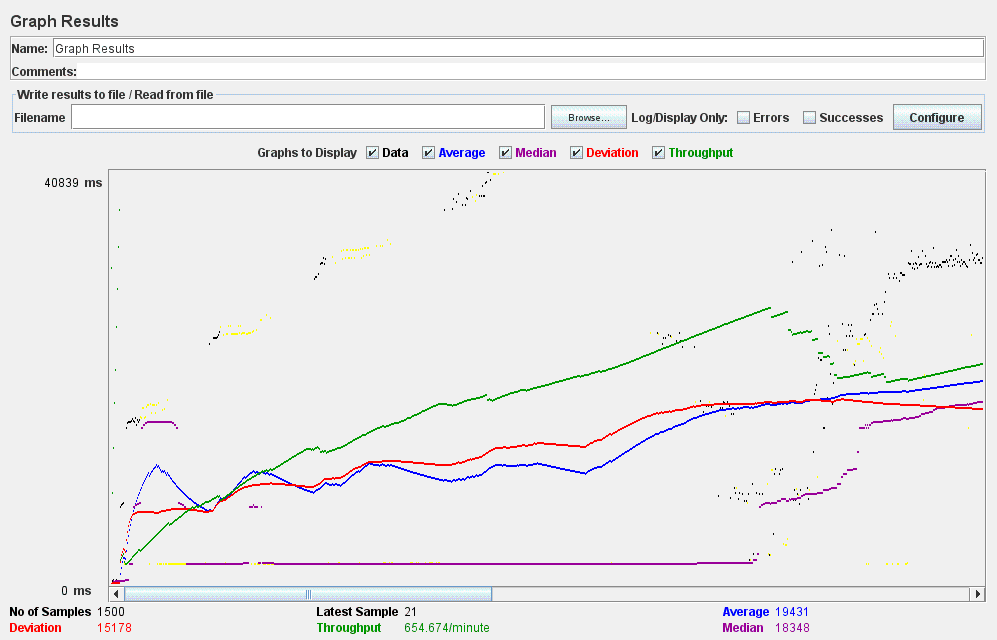


Figure 52: Graph Results

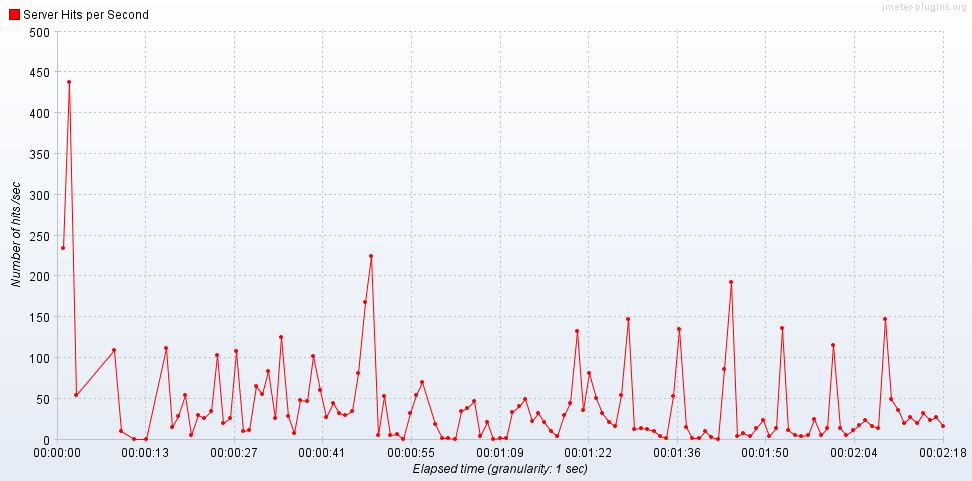


Figure 53: Hits per Second

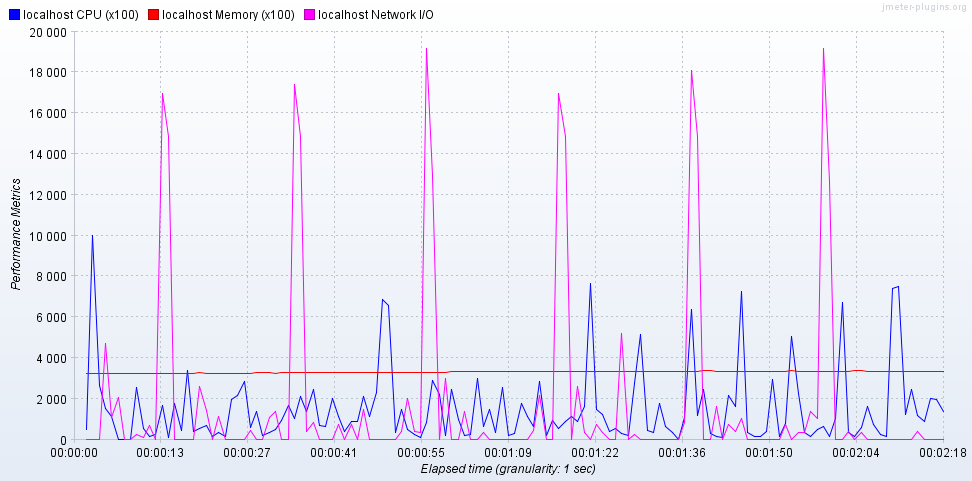


Figure 54: PerfMon Metrics Collector

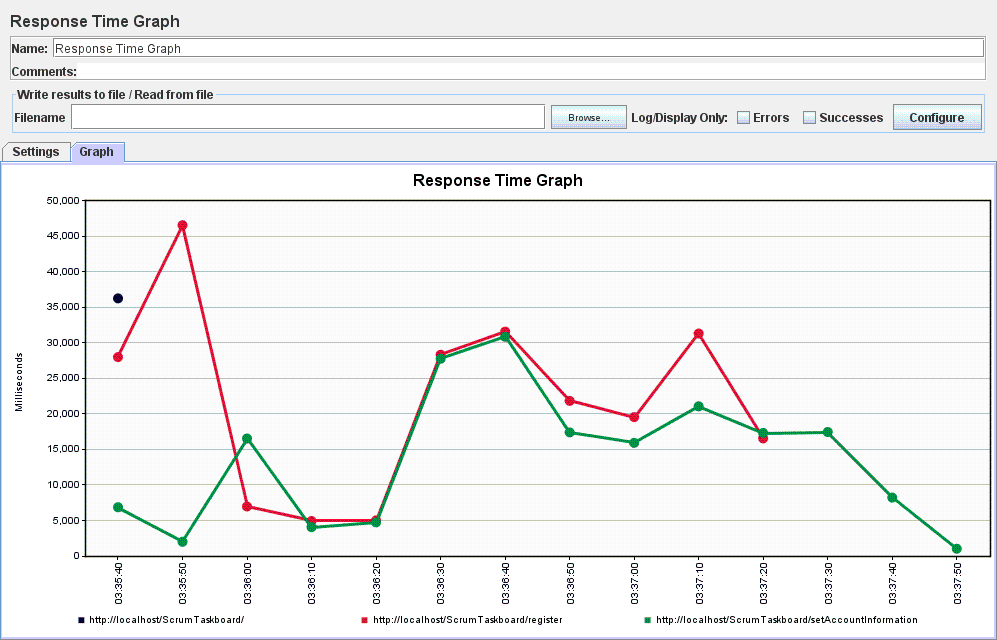


Figure 55: Response Time Graph

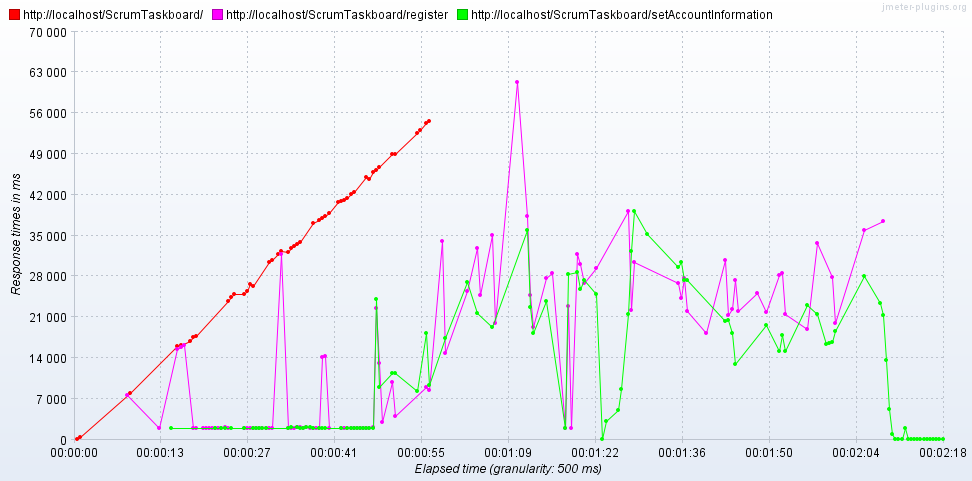


Figure 56: Response Times Over Time

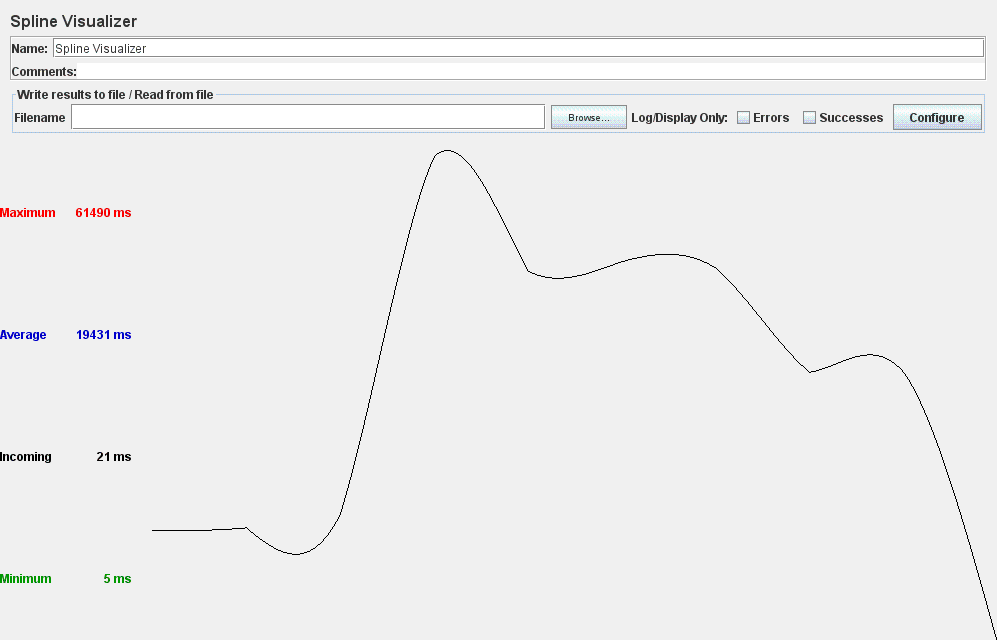


Figure 57: Spline Visualizer

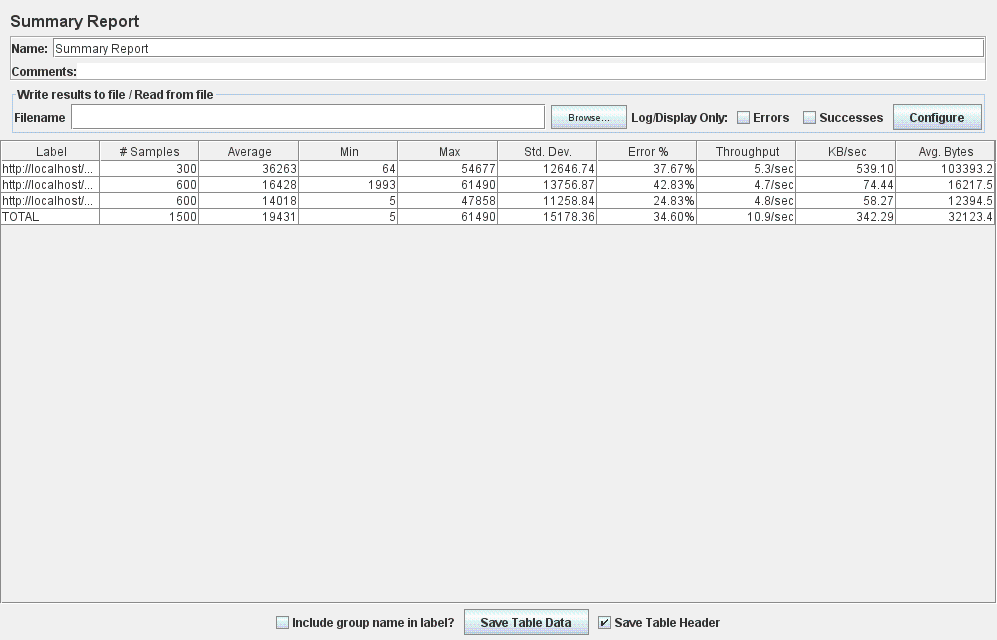


Figure 58: Summary Report

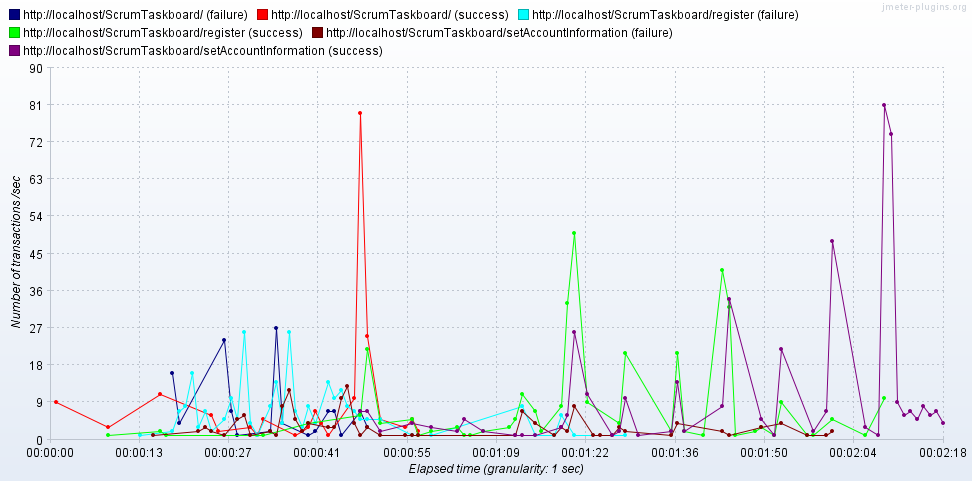


Figure 59: Transactions per Second



Figure 60: View Results in Table

* Even worst results are obtained when a number of 500 users (threads) try to simultaneously register in the ScrumTaskboard web application. The faulty behavior of the application for this case scenario is denoted by the pictures obtained by performing a series of metrics on the test case:

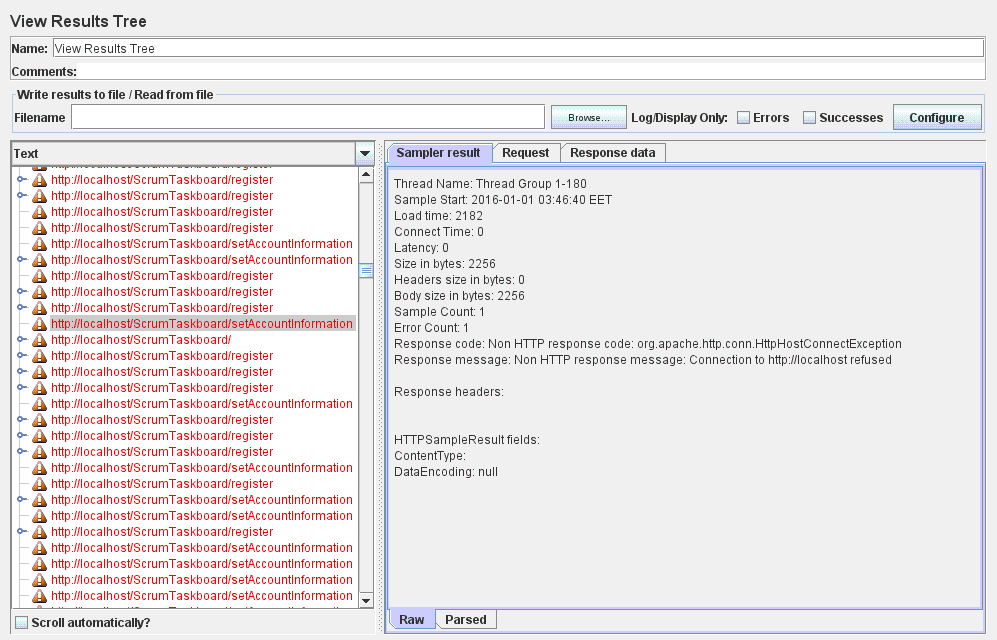


Figure 61: View Results Tree



Figure 62: Active Threads Over Time

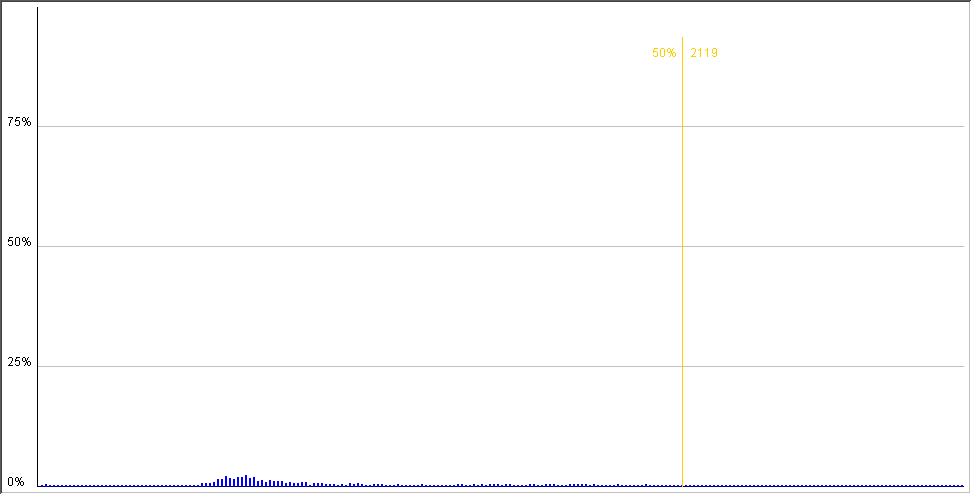


Figure 63: Distribution Graph (alpha)

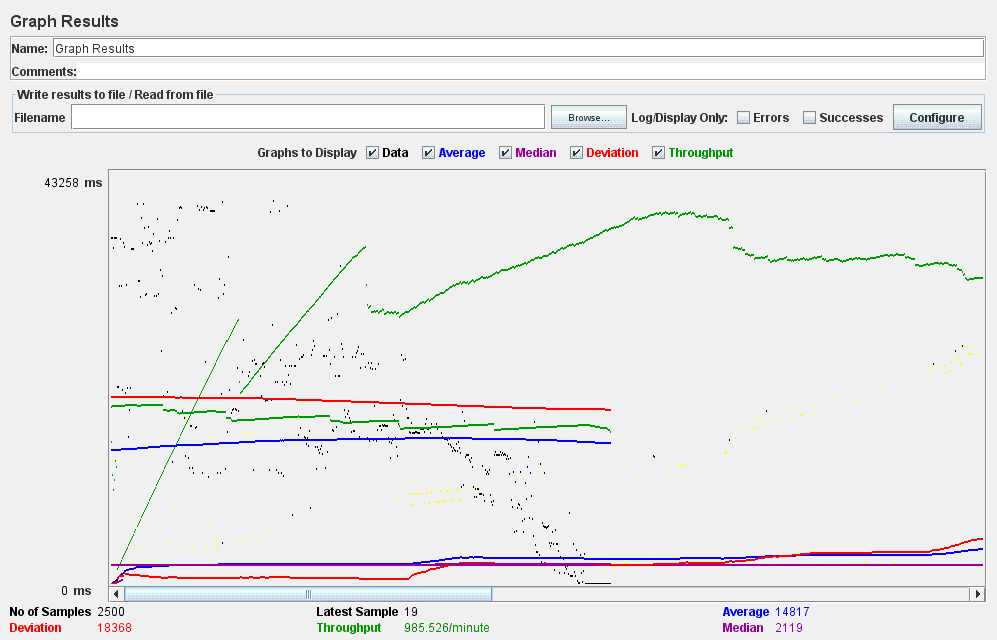


Figure 64: Graph Results

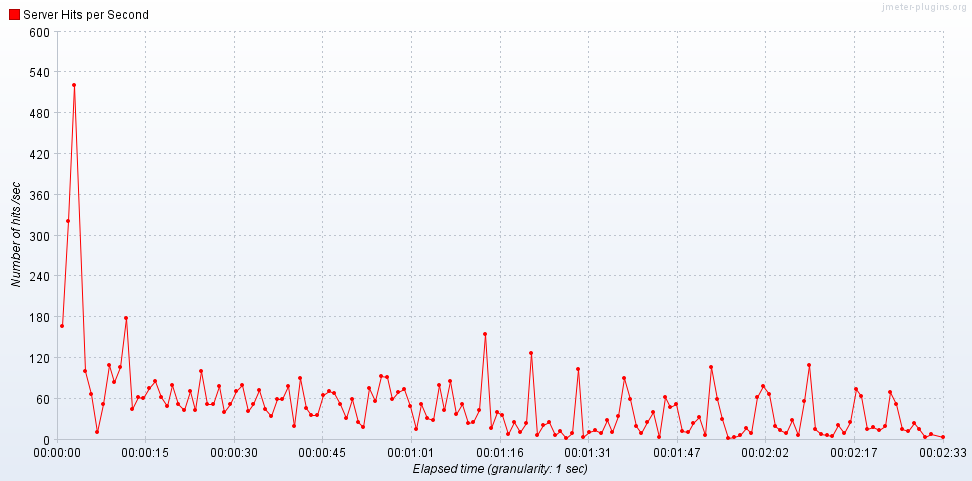


Figure 65: Hits per Second

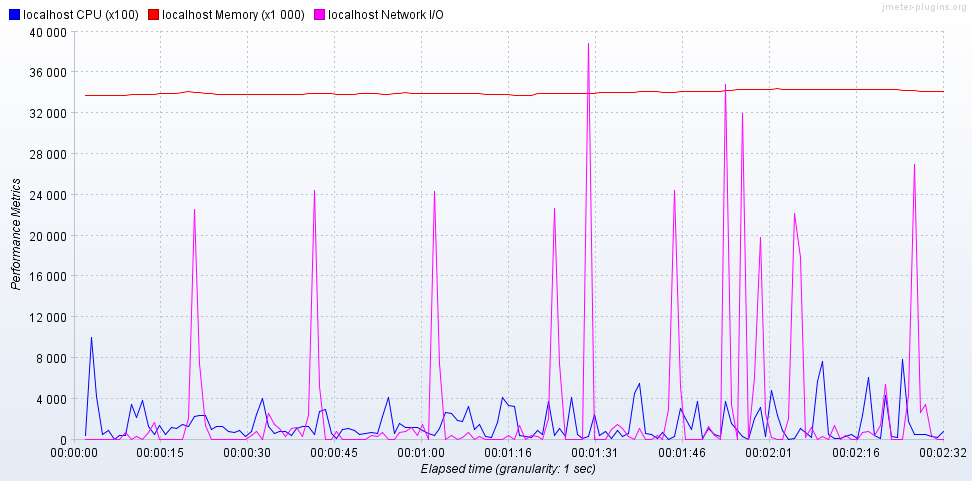


Figure 66: PerfMon Metrics Collector

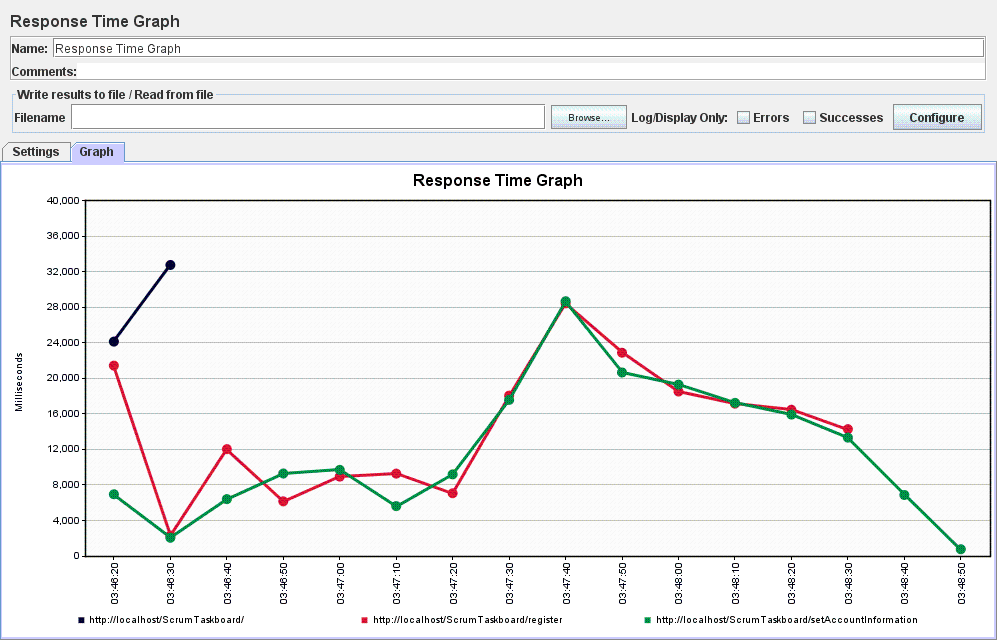


Figure 67: Response Time Graph

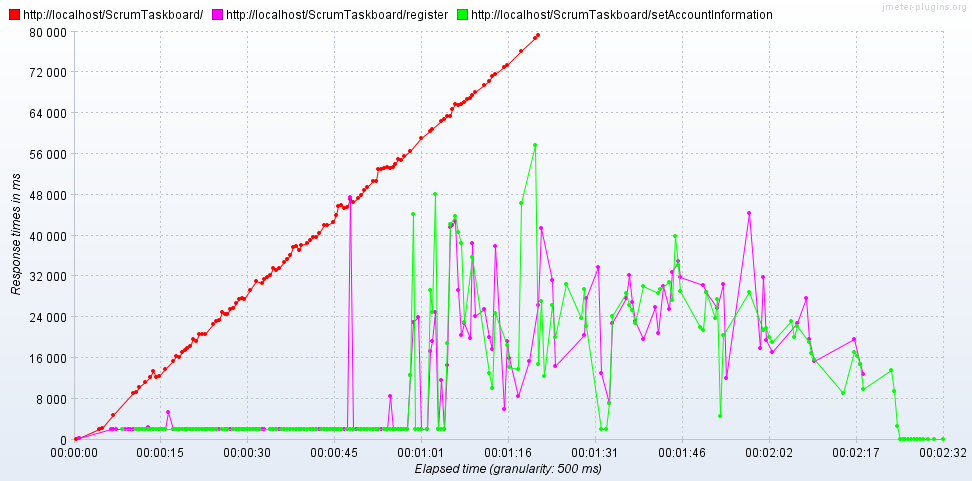


Figure 68: Response Times Over Time

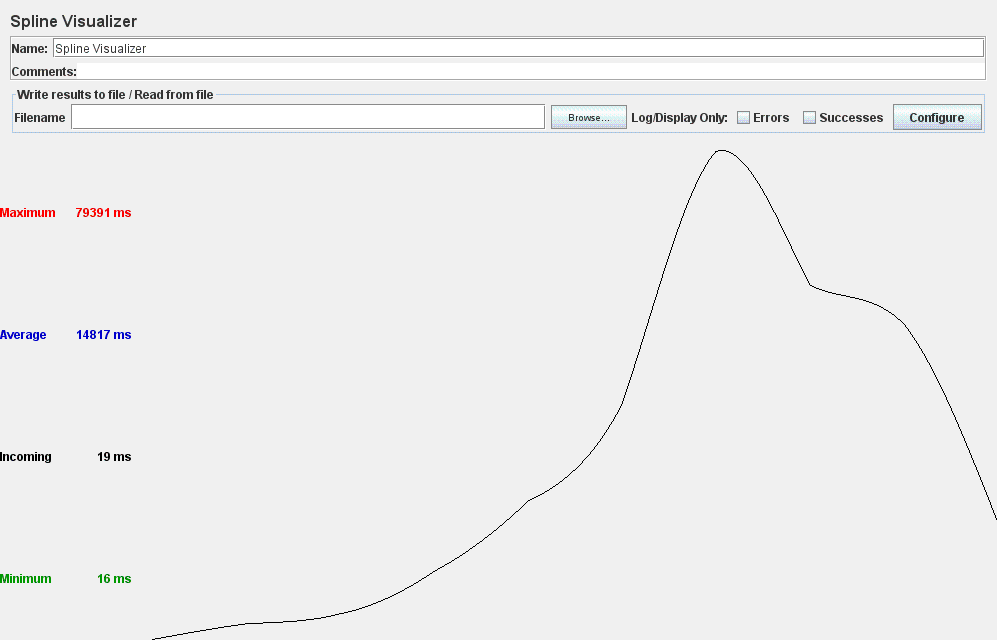


Figure 69: Spline Visualizer

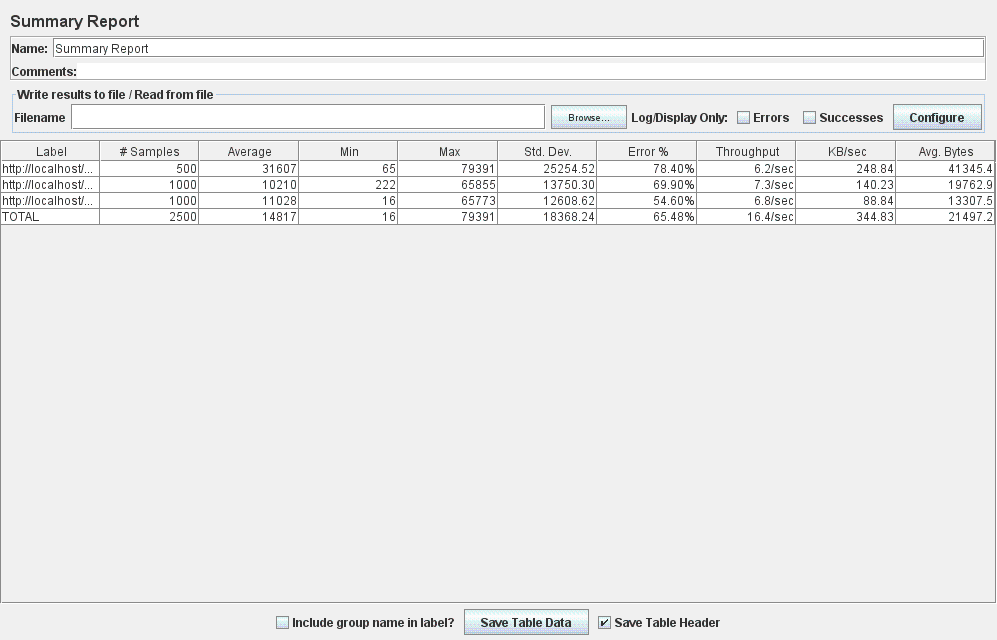


Figure 70: Summary Report



Figure 71: Transactions per Second

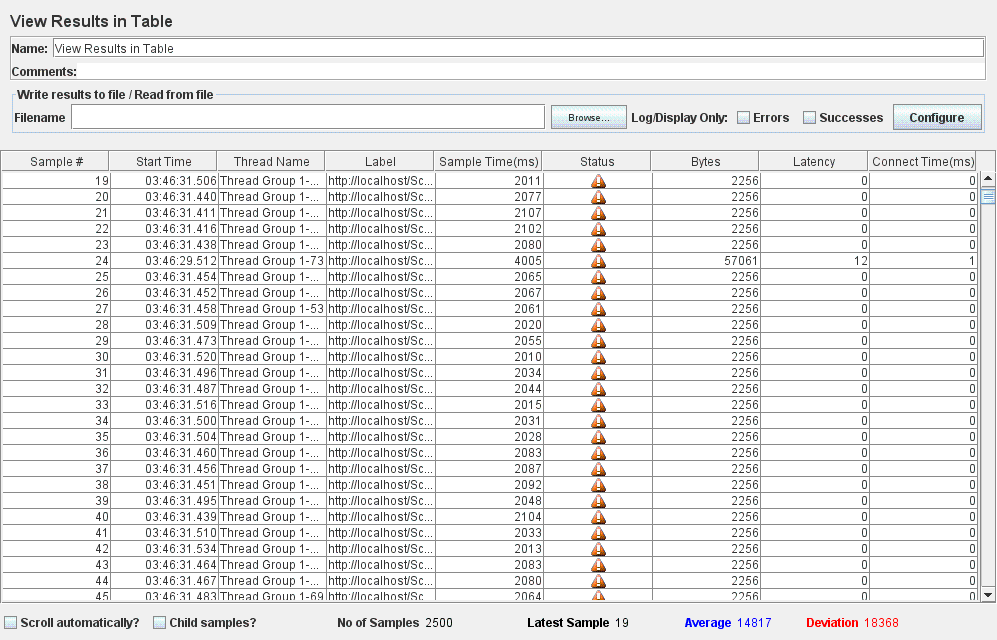


Figure 72: View Results in Table

* For the **Login-Visualize Taskboard-Logout** test case:
* The application responds successfully to 100 concurrent users (threads) trying to simultaneously log in, visualize the taskboard and log out. This result is recorded in the images listed below which were obtained from different measurements:

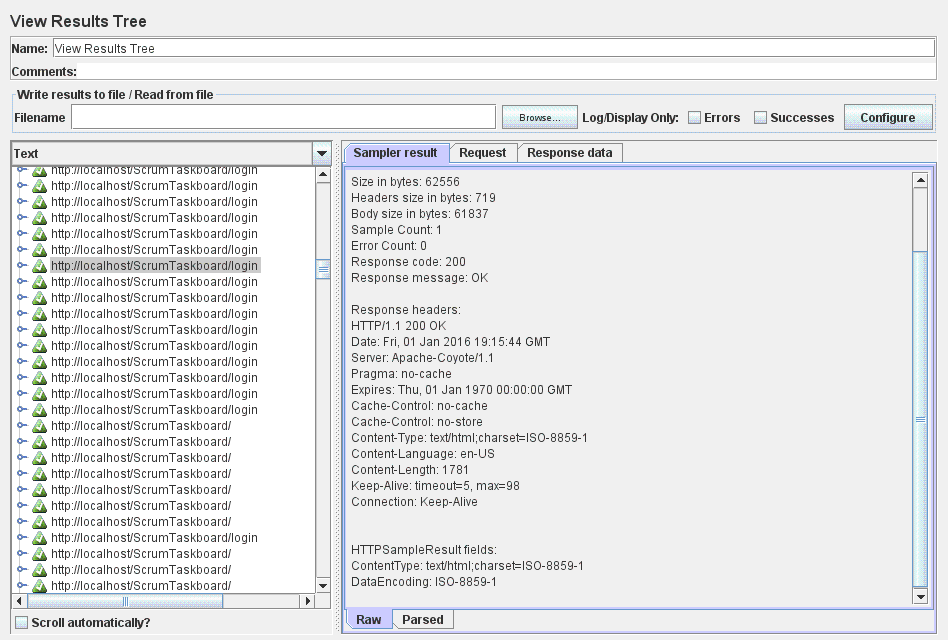


Figure 73: View Results Tree

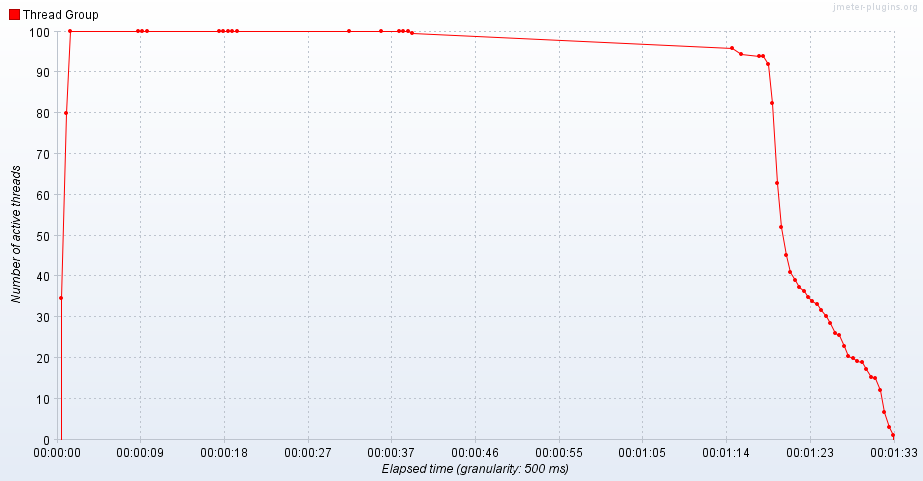


Figure 74: Active Threads Over Time

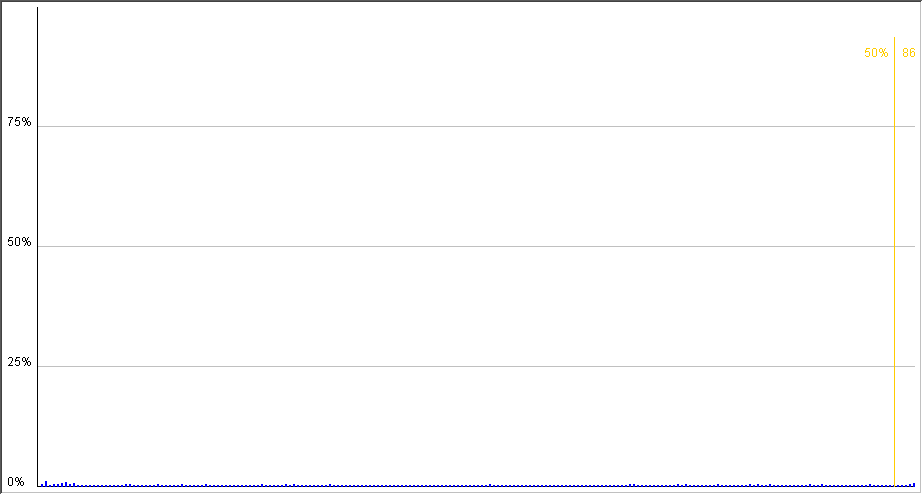


Figure 75: Distribution Graph (alpha)

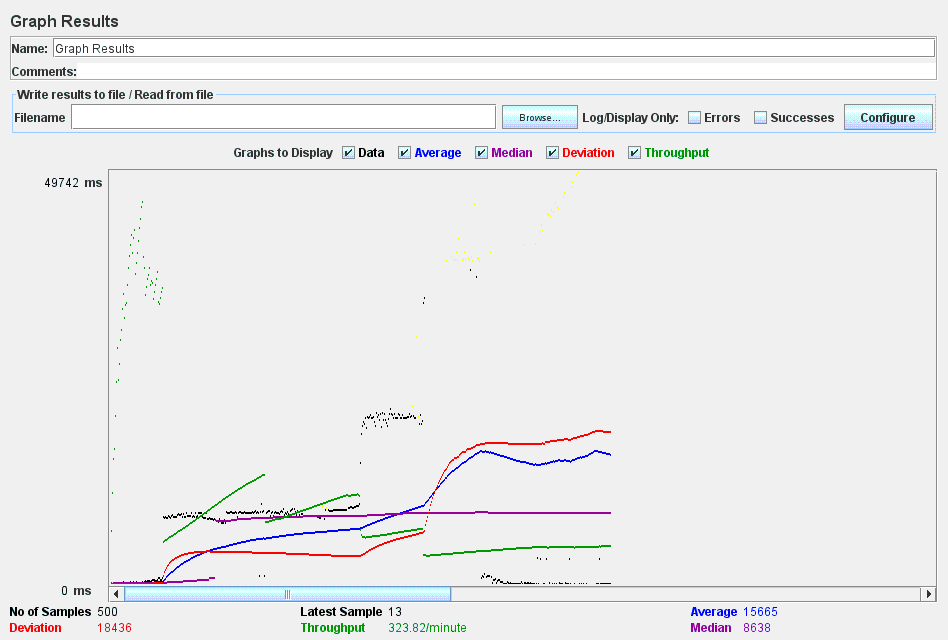


Figure 76: Graph Results

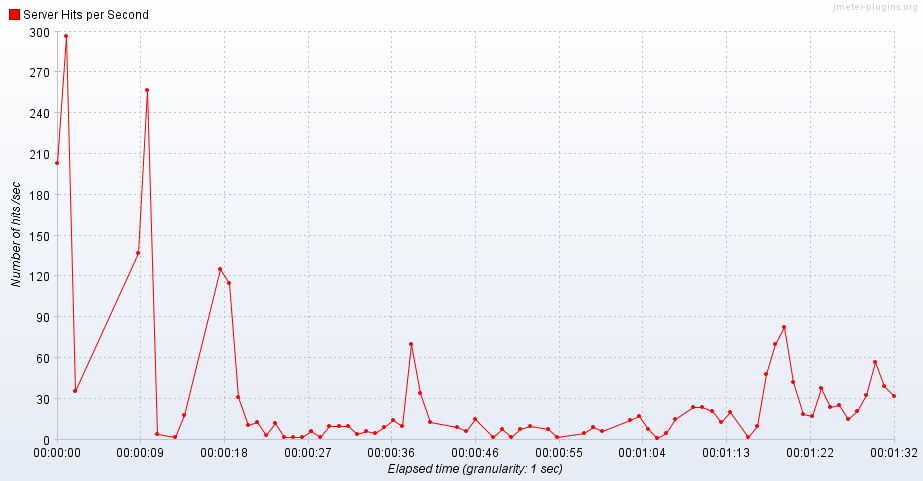


Figure 77: Hits per Second

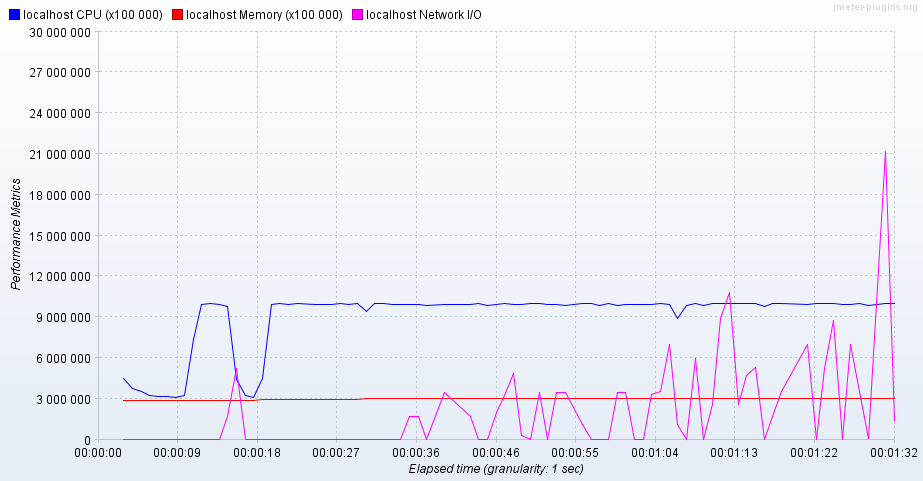


Figure 78: PerfMon Metrics Collector

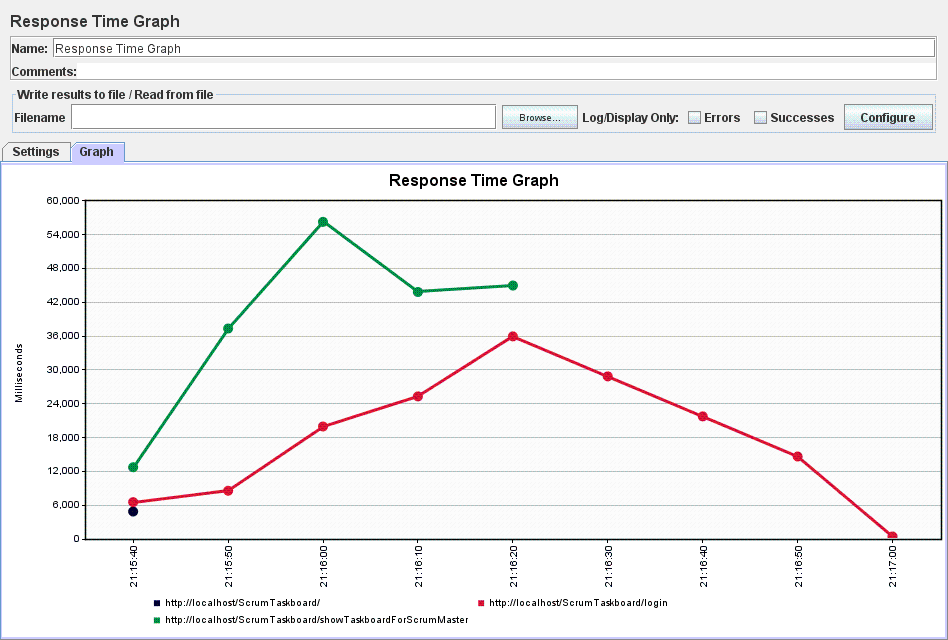


Figure 79: Response Time Graph

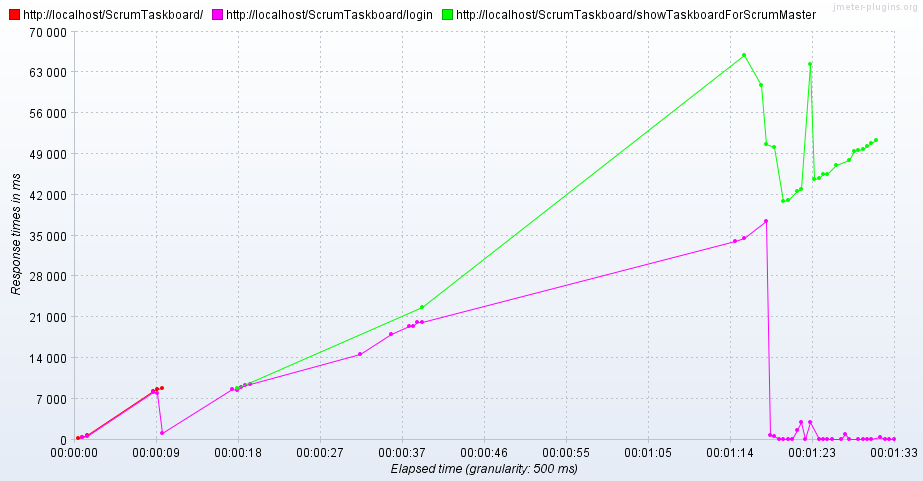


Figure 80: Response Times Over Time

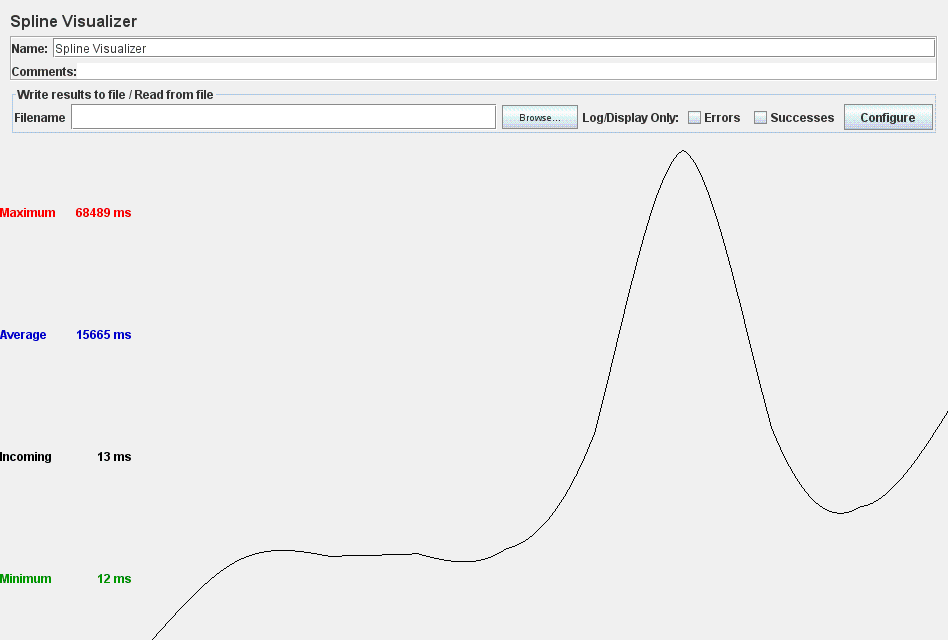


Figure 81: Spline Visualizer

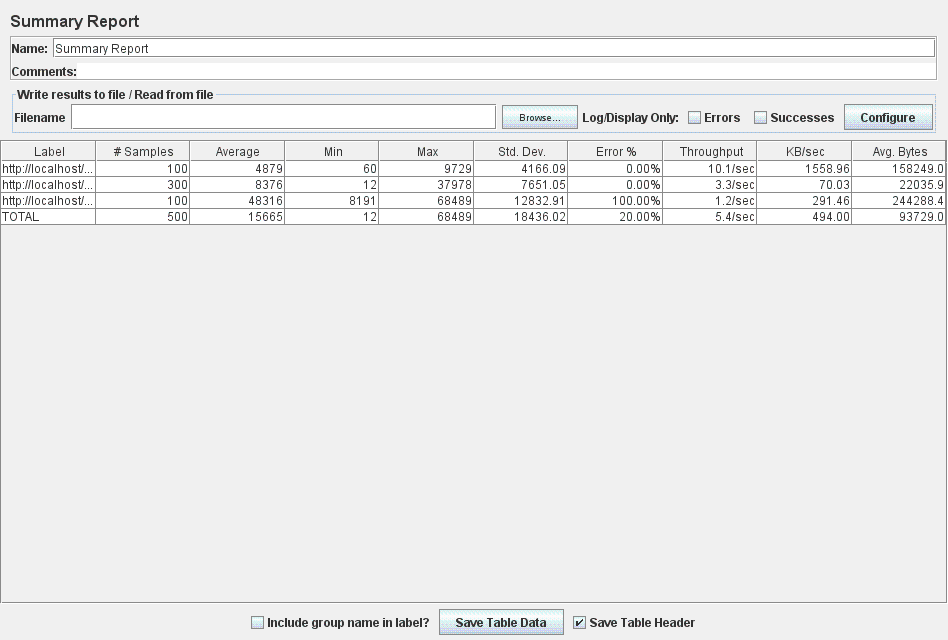


Figure 82: Summary Report

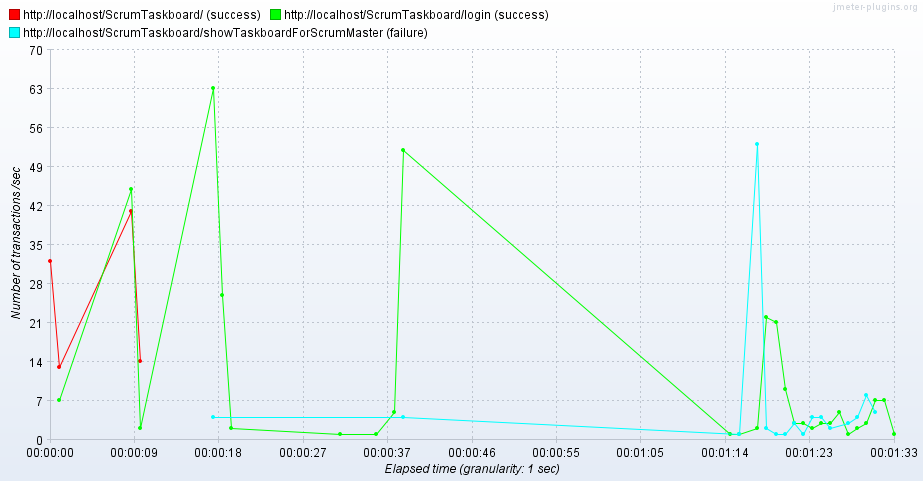


Figure 83: Transactions per Second

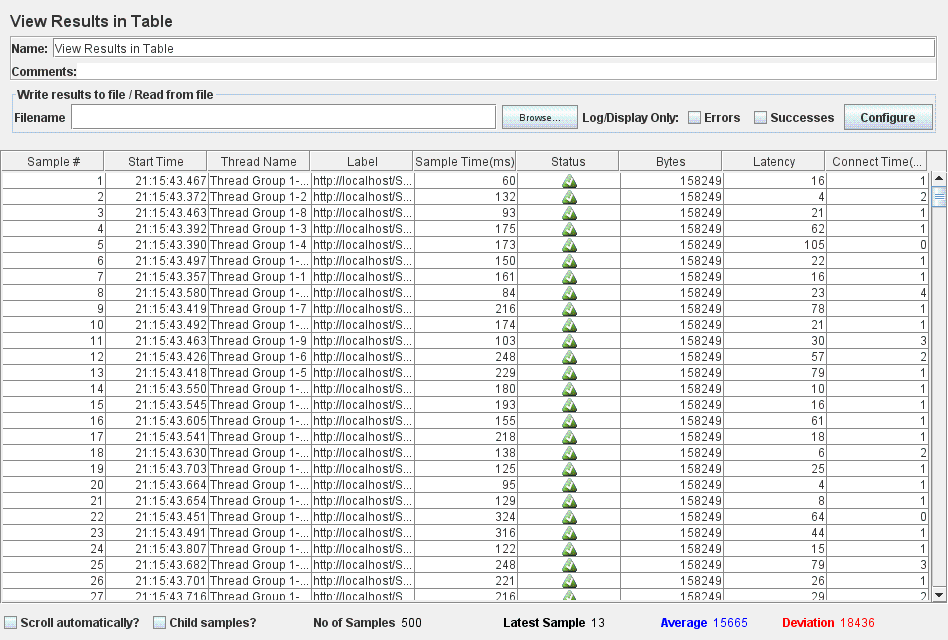


Figure 84: View Results in Table

* The ScrumTaskboard web application is almost unresponsive when a number of 300 concurrent users (threads) try to log in, visualize the taskboard and log out. Figure 85 listed below shows several requests for which the application responded with error. Additional information might be gathered by analyzing the results obtained from different measurements:

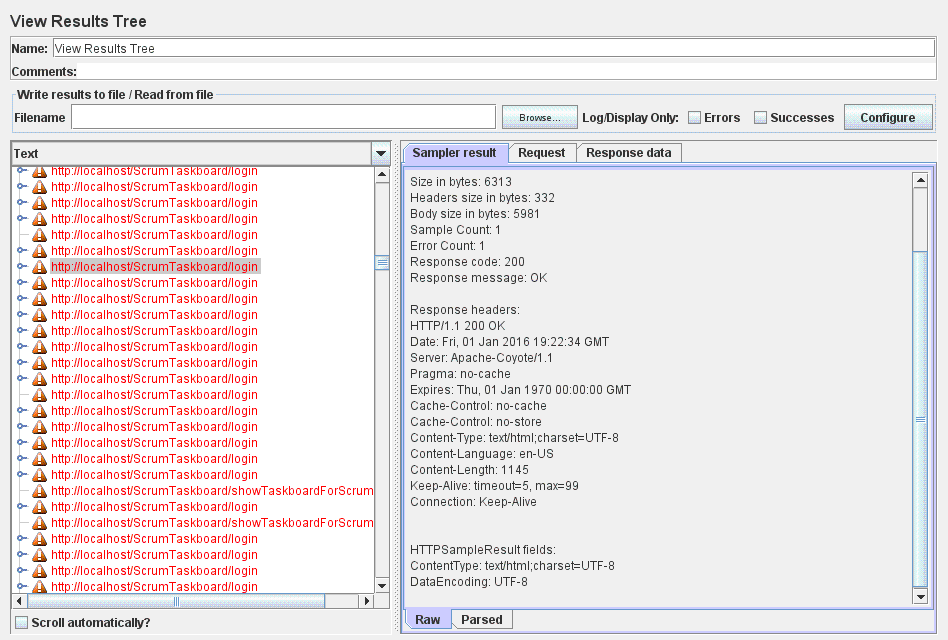


Figure 85: View Results Tree

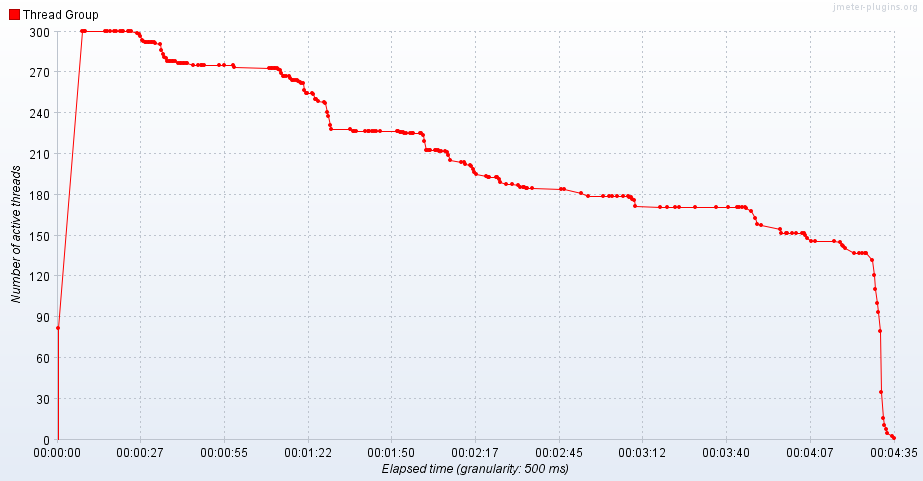


Figure 86: Active Threads Over Time

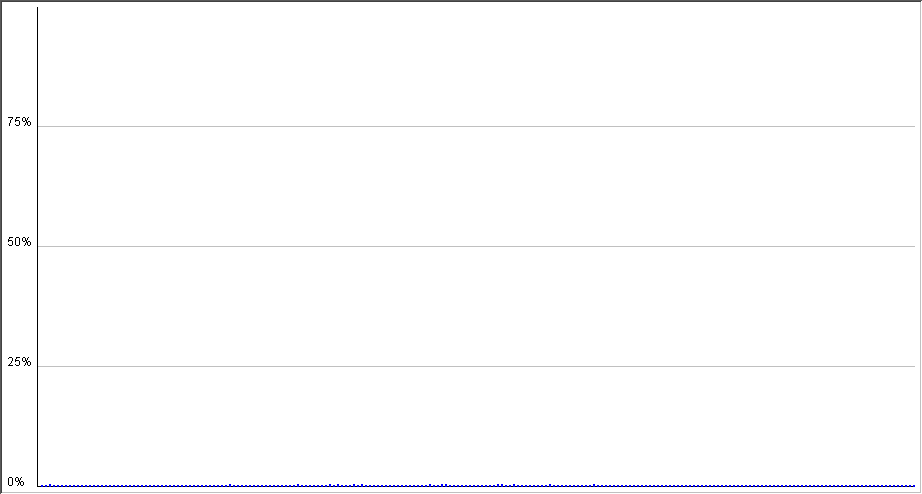


Figure 87: Distribution Graph (alpha)

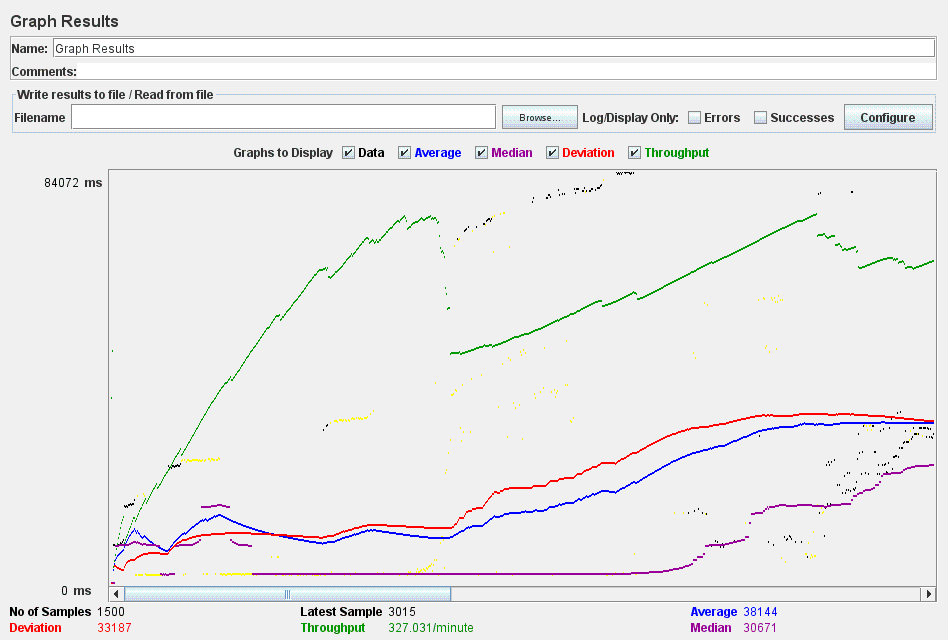


Figure 88: Graph Results

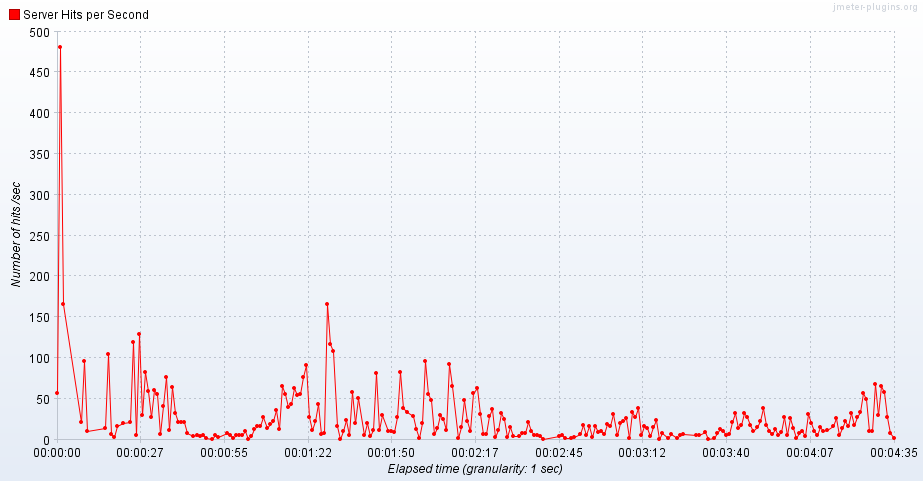


Figure 89: Hits per Second

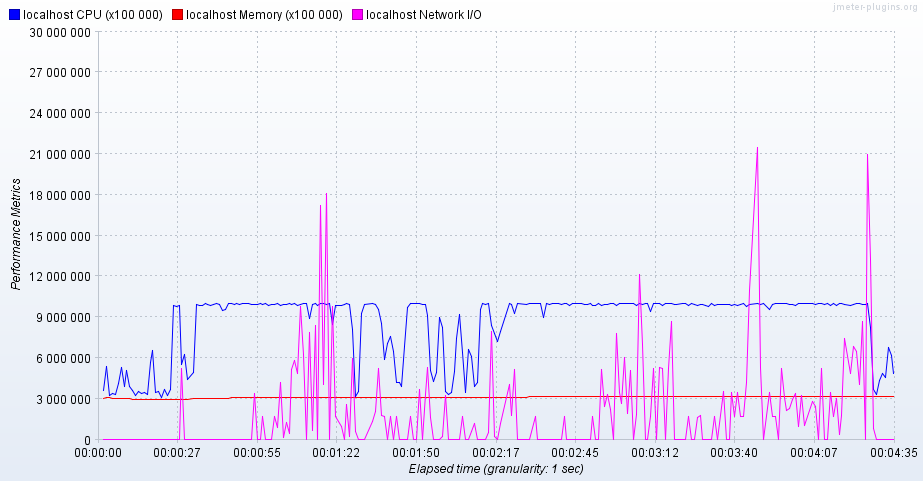


Figure 90: PerfMon Metrics Collector

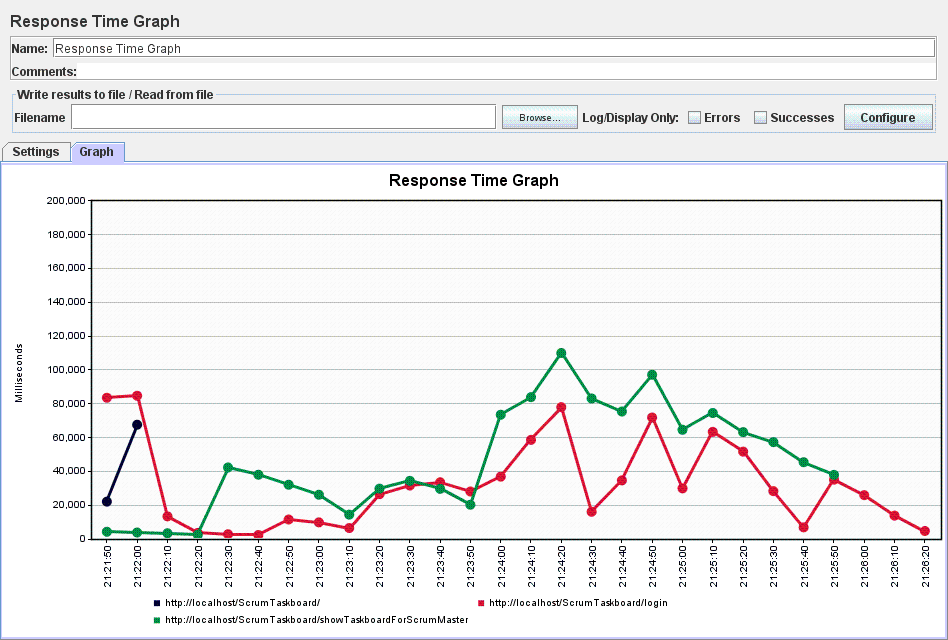


Figure 91: Response Time Graph

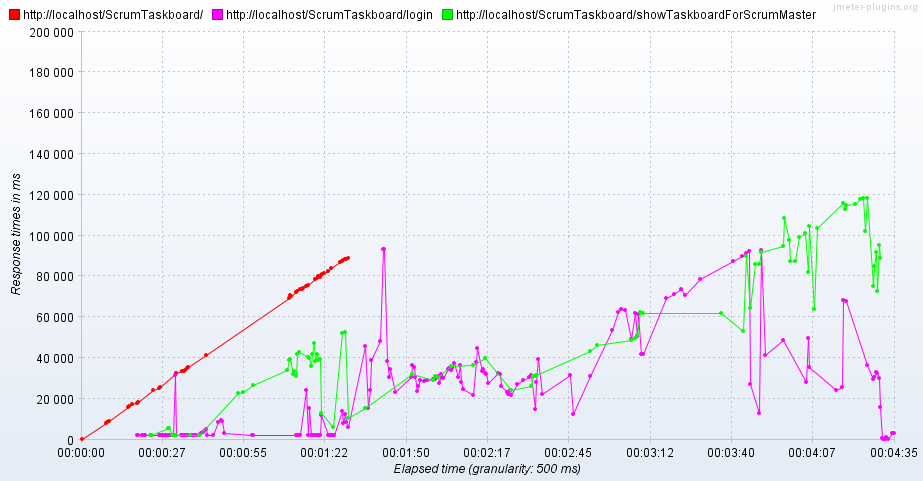


Figure 92: Response Times Over Time

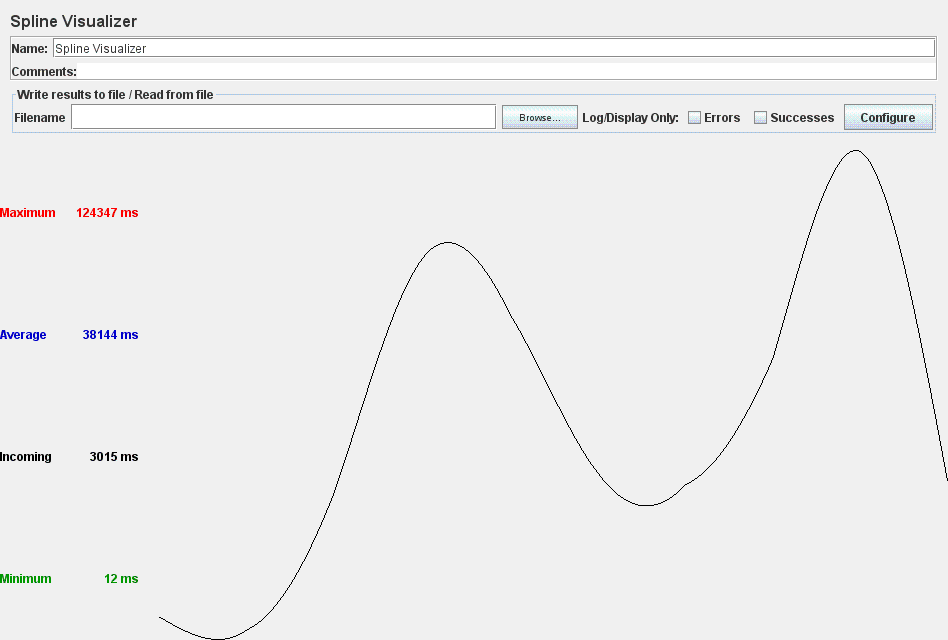


Figure 93: Spline Visualizer

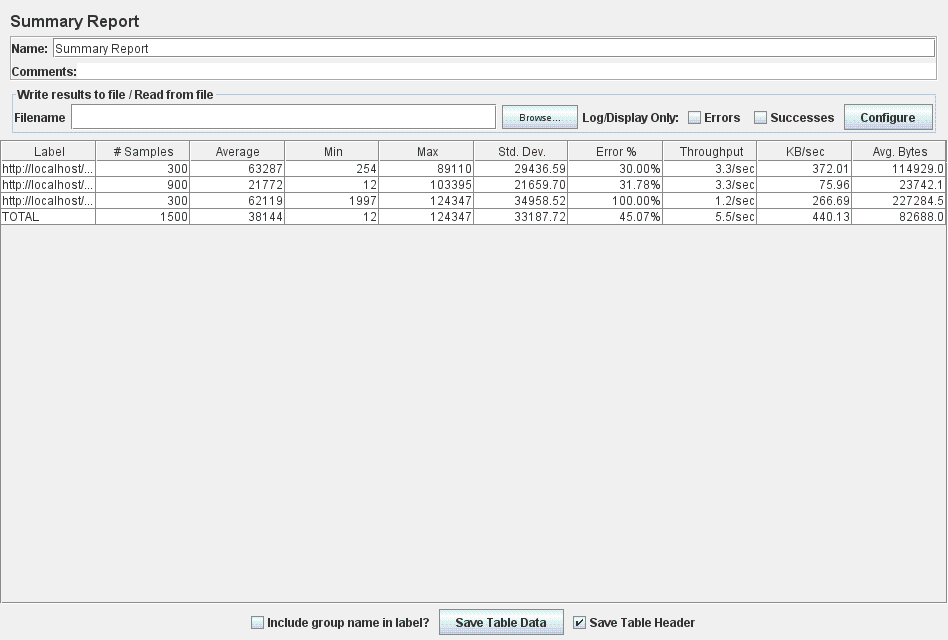


Figure 94: Summary Report

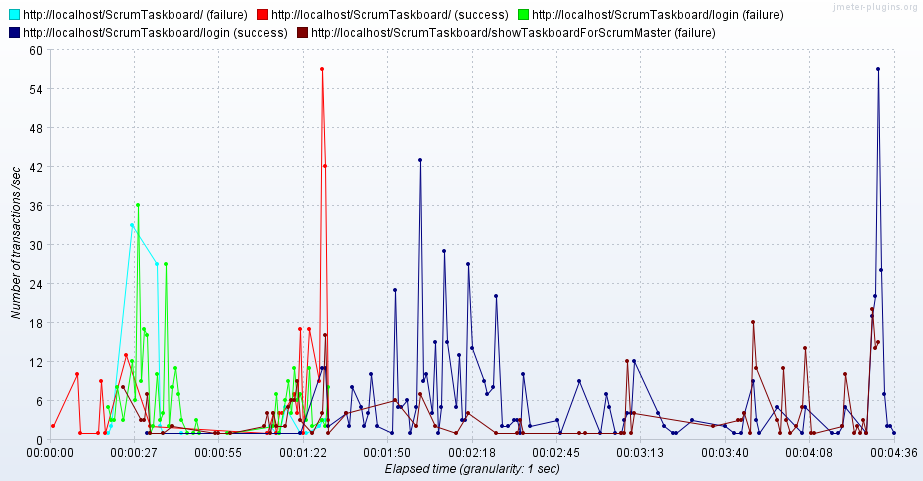


Figure 95: Transactions per Second

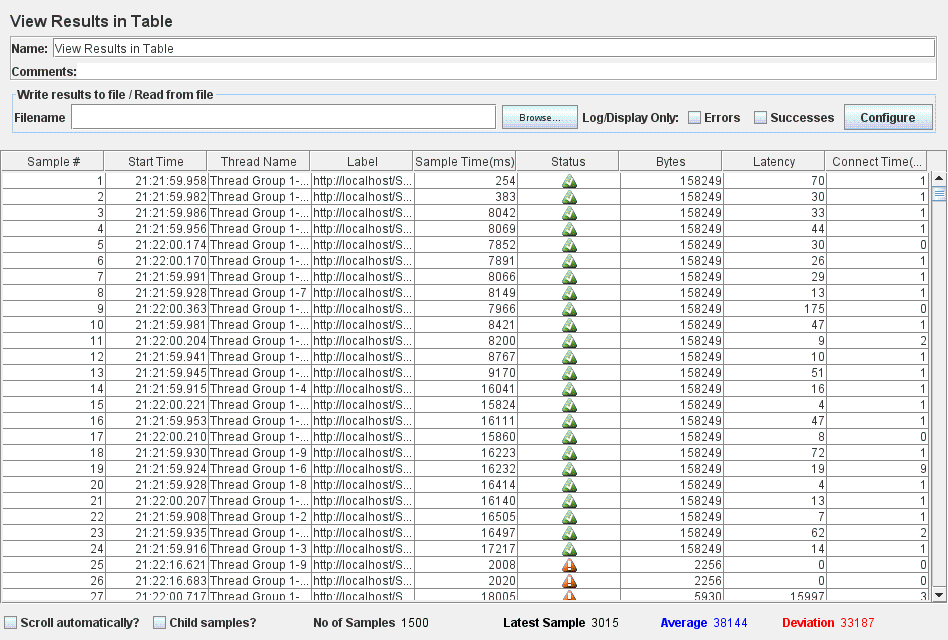


Figure 96: View Results in Table

* For the **Login-Add Task-Add Tag for Task-Visualize Taskboard-Logout** test case:
* The application responds successfully to 100 concurrent users (threads) trying to simultaneously log in, add a new task (as Scrum Master users), add a tag for that task, visualize the taskboard and then log out. This result is recorded in the images listed below which were obtained from different measurements:

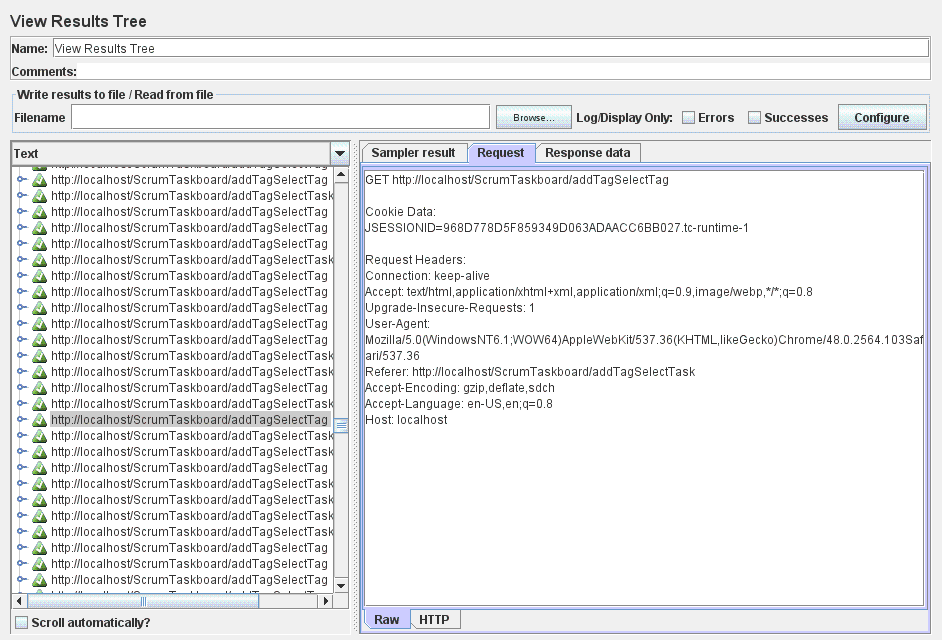


Figure 97: View Results Tree

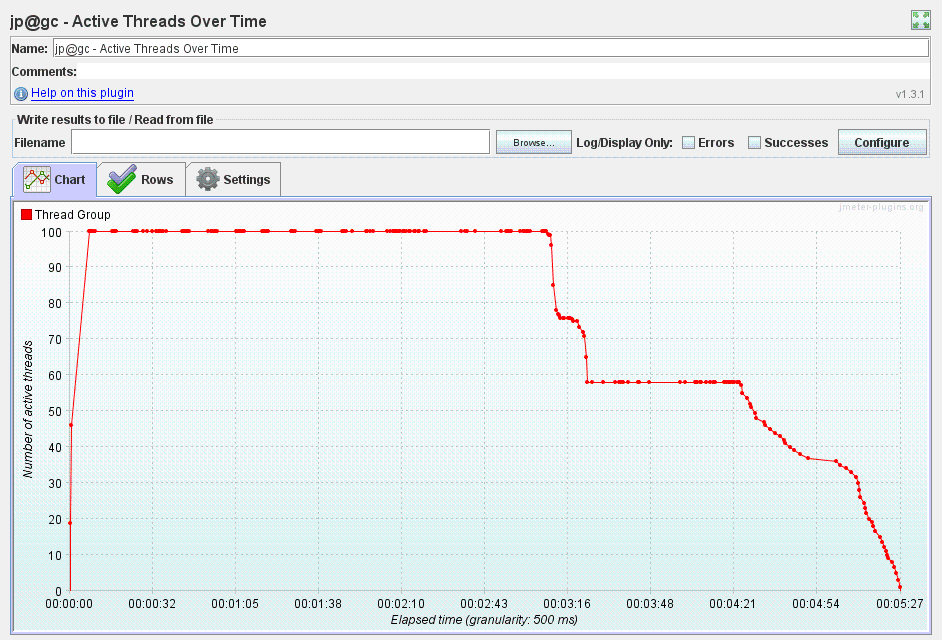
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Figure 98: Active Threads Over Time

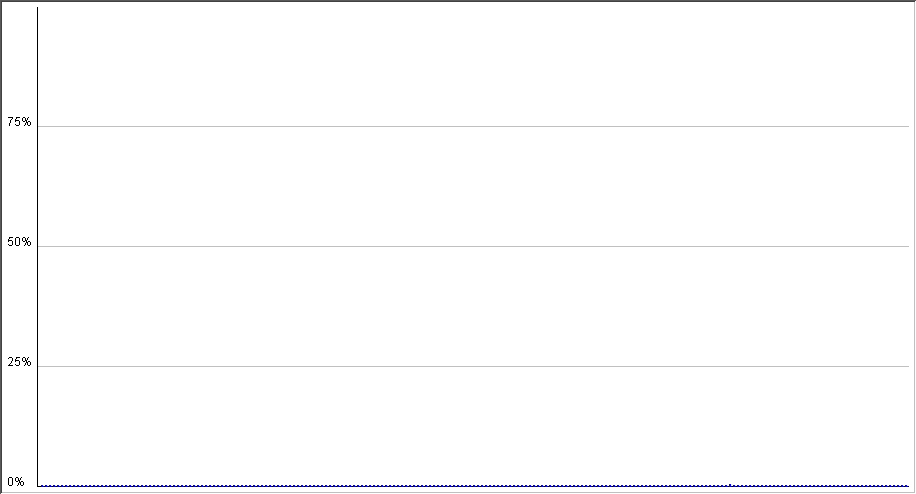


Figure 99: Distribution Graph (alpha)

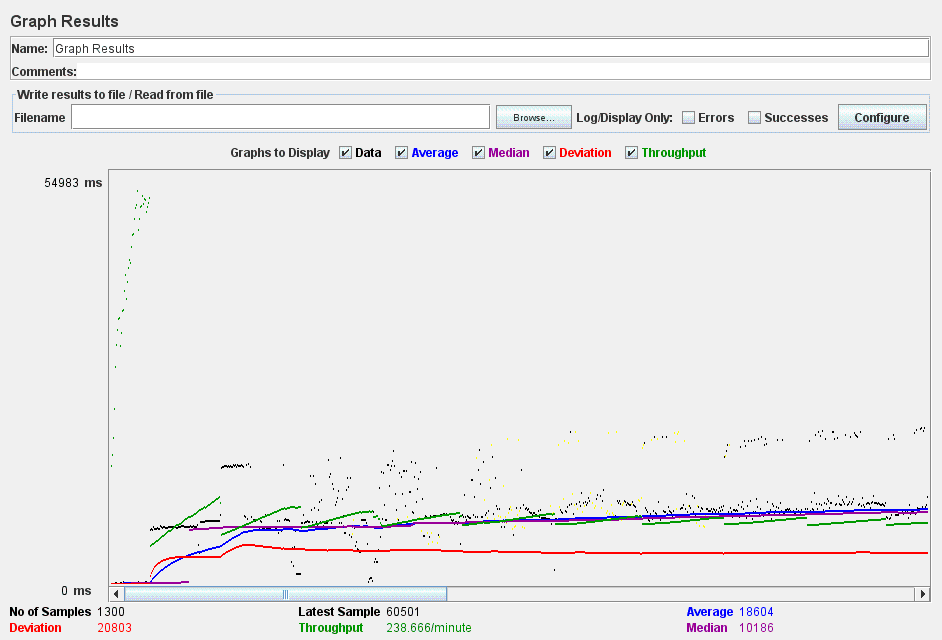


Figure 100: Graph Results

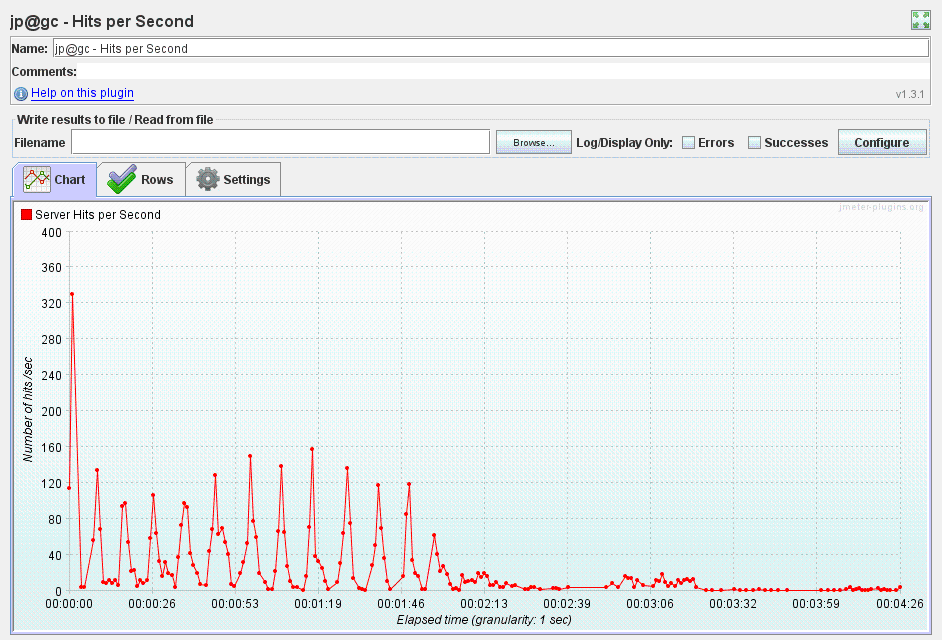


Figure 101: Hits per Second

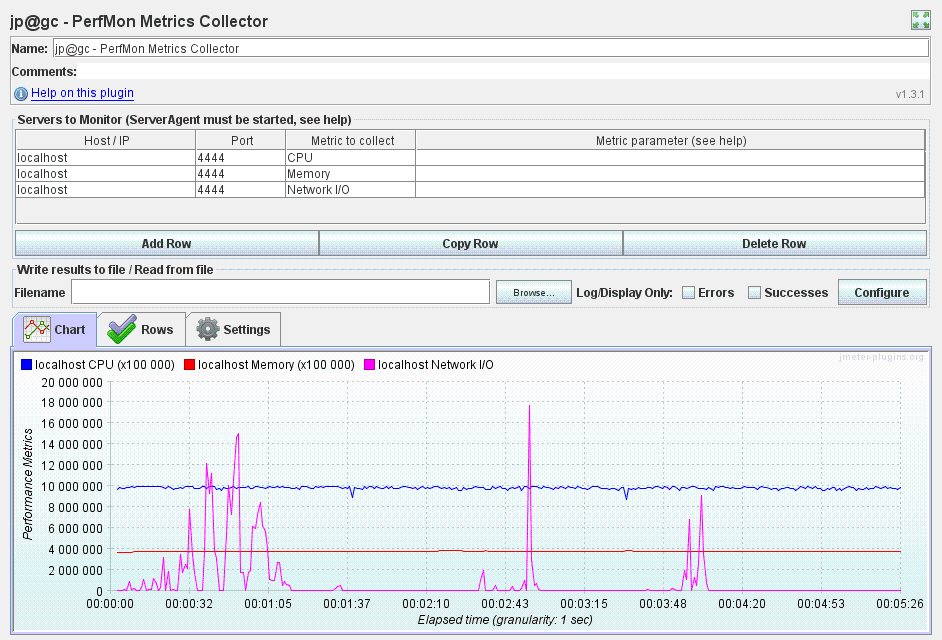


Figure 102: PerfMon Metrics Collector

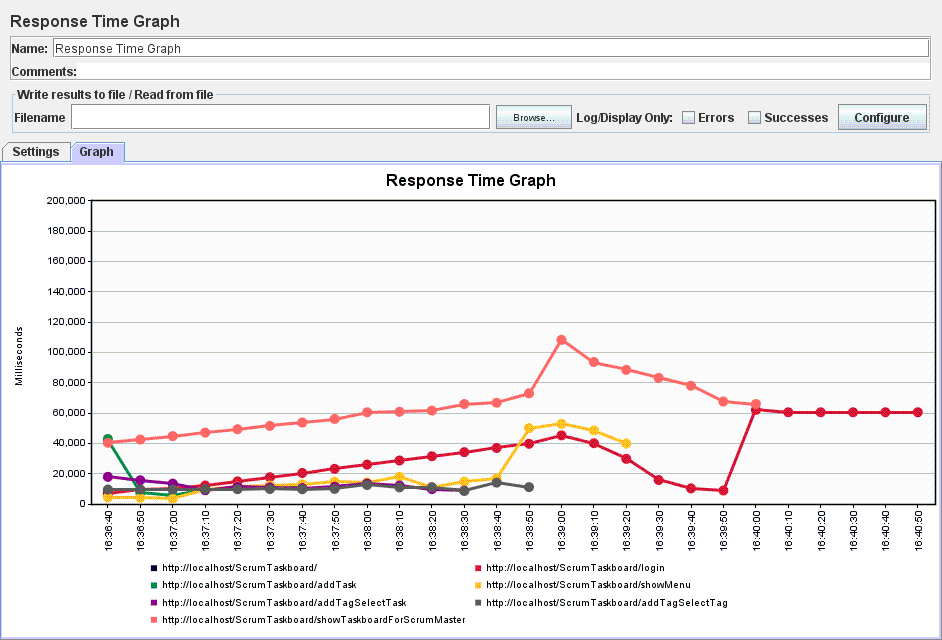


Figure 103: Response Time Graph



Figure 104: Response Times Over Time

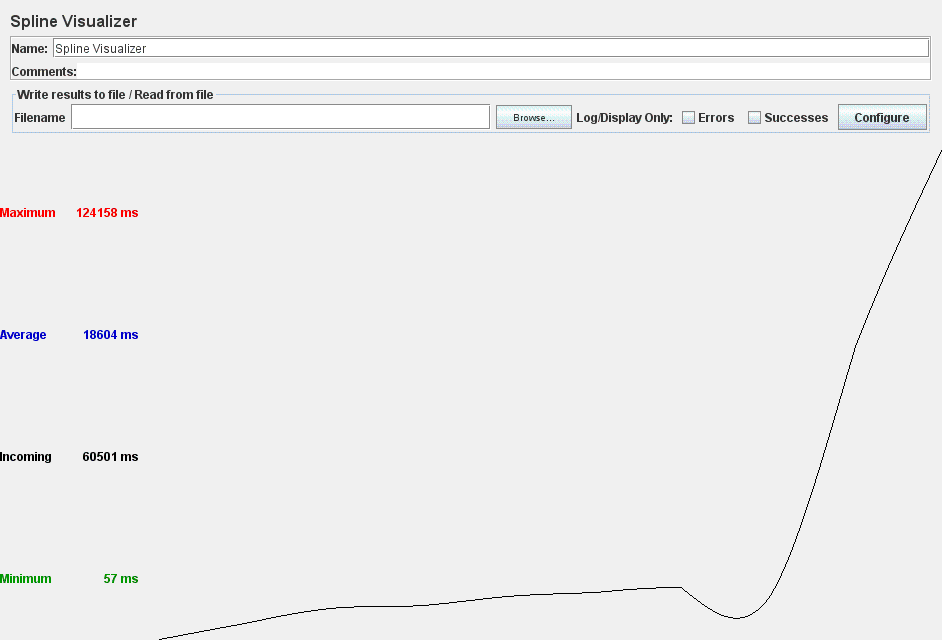


Figure 105: Spline Visualizer

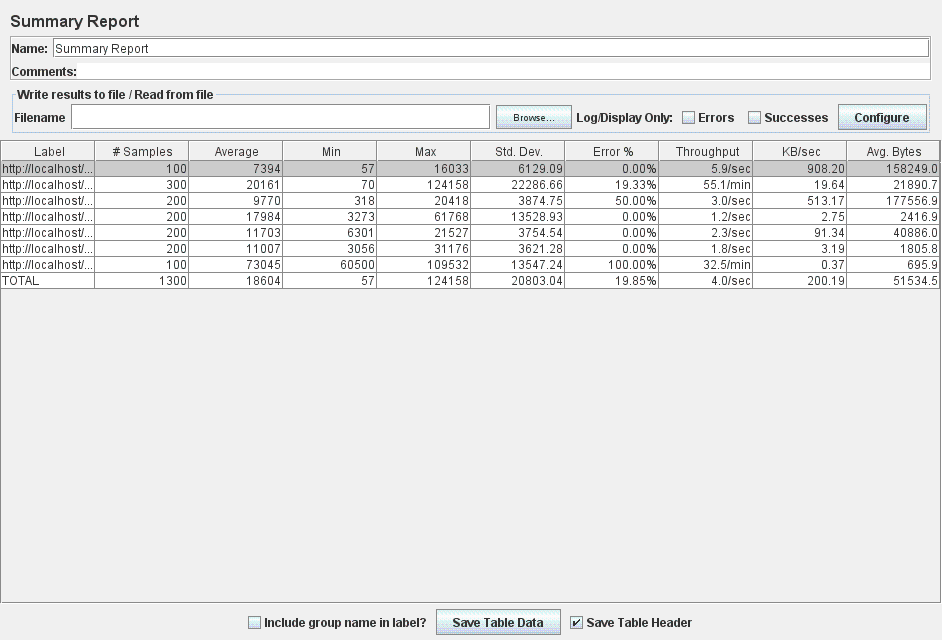


Figure 106: Summary Report

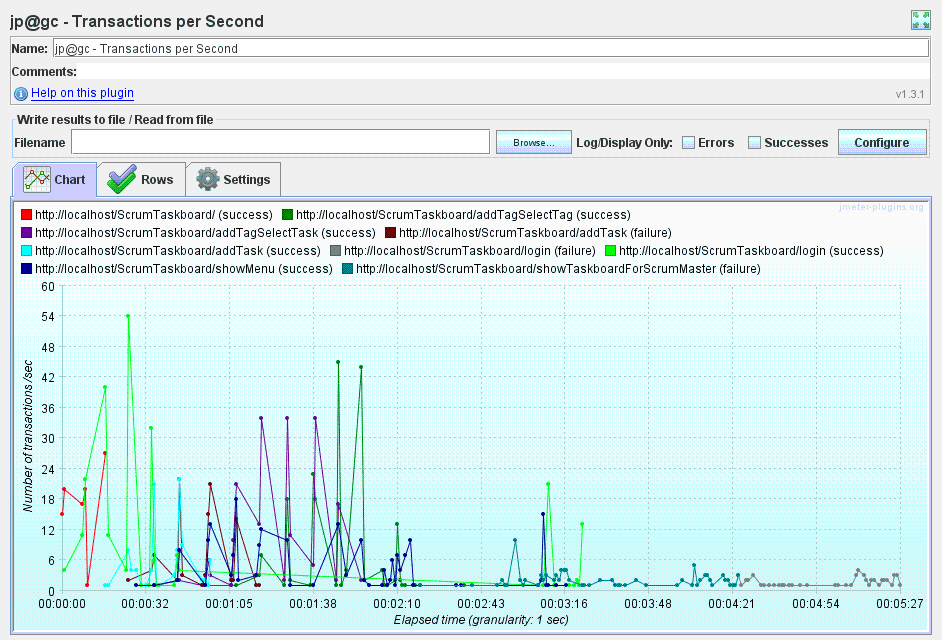


Figure 107: Transactions per Second

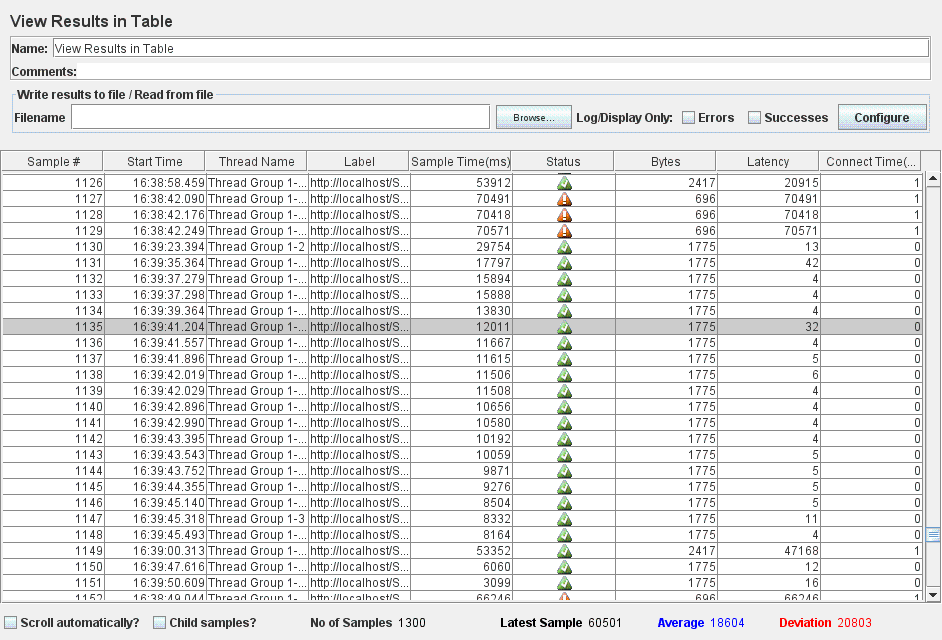


Figure 108: View Results in Table

* The ScrumTaskboard web application is unable to successfully handle all 300 concurrent users (threads) attempting to log in, add a new task (as Scrum Master users), add a tag for that task, visualize the taskboard and then log out. Figure 109 listed below shows several requests for which the application responded with error. Additional information might be gathered by analyzing the results obtained from different measurements:

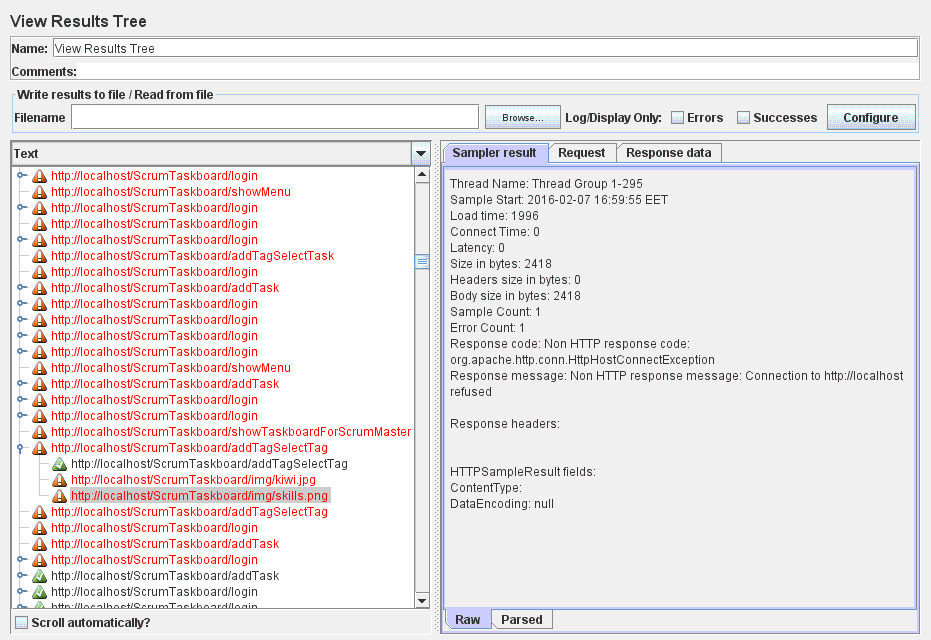


Figure 109: View Results Tree

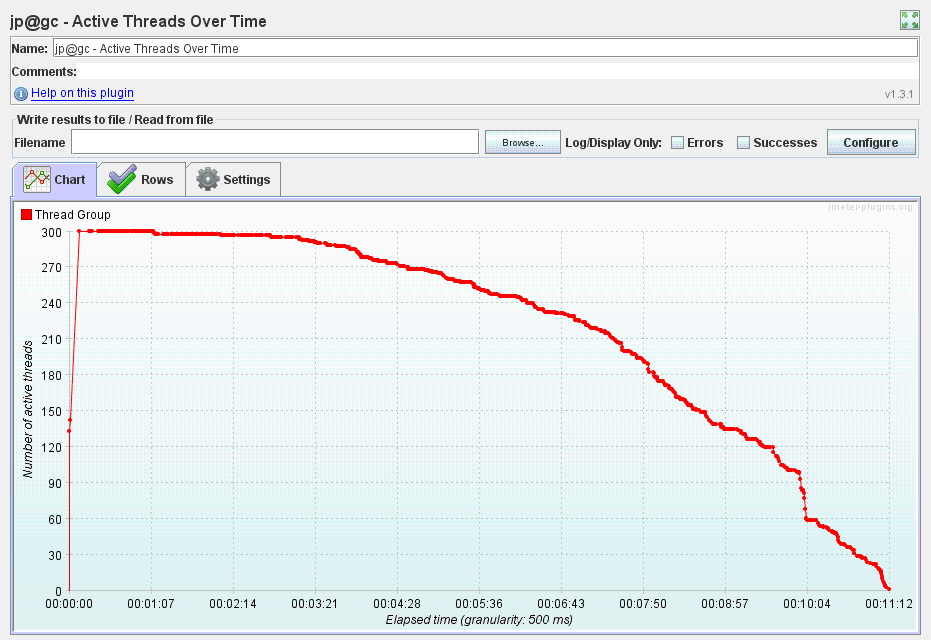


Figure 110: Active Threads Over Time



Figure 111: Distribution Graph (alpha)

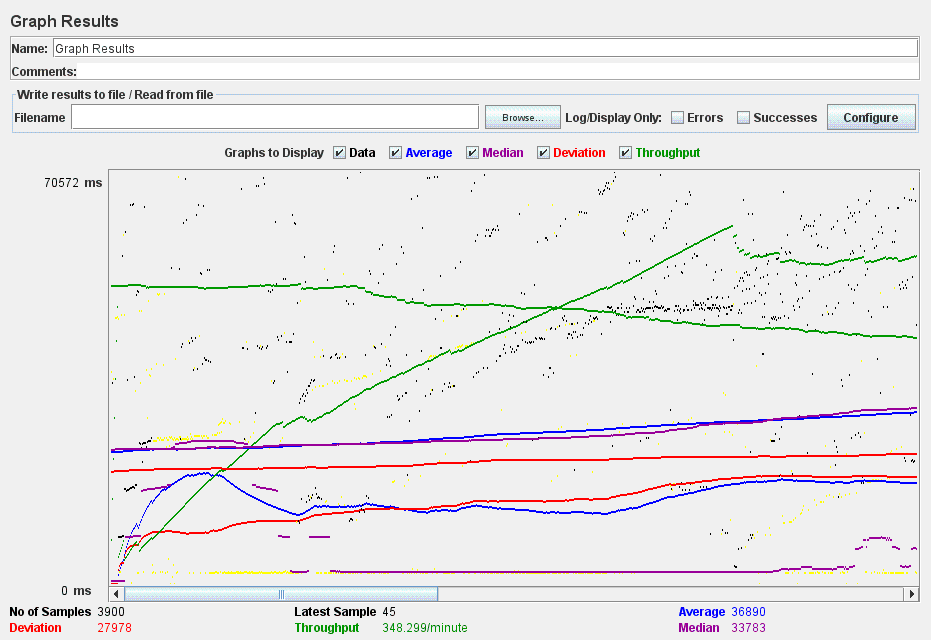


Figure 112: Graph Results

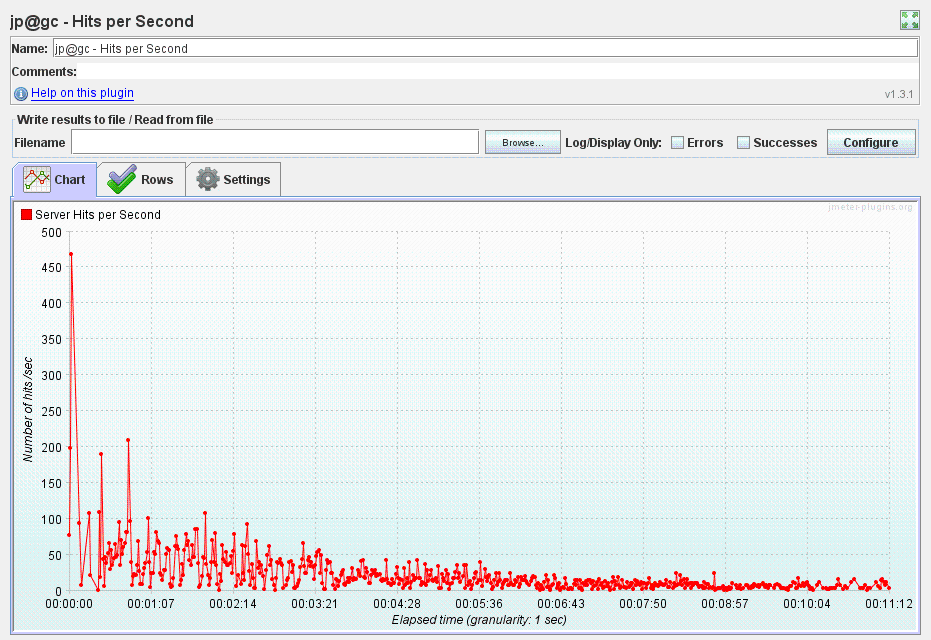


Figure 113: Hits per Second

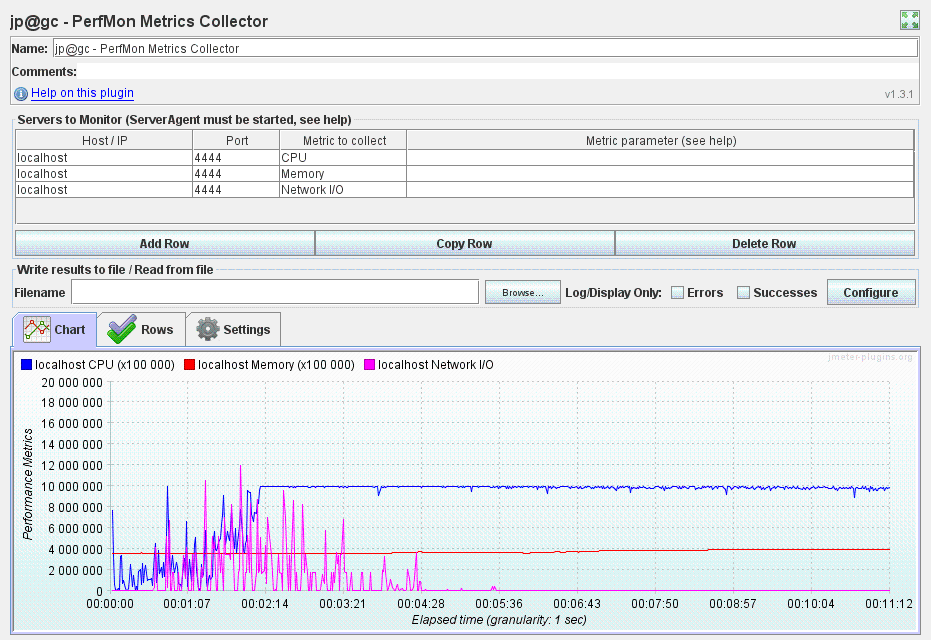


Figure 114: PerfMon Metrics Collector

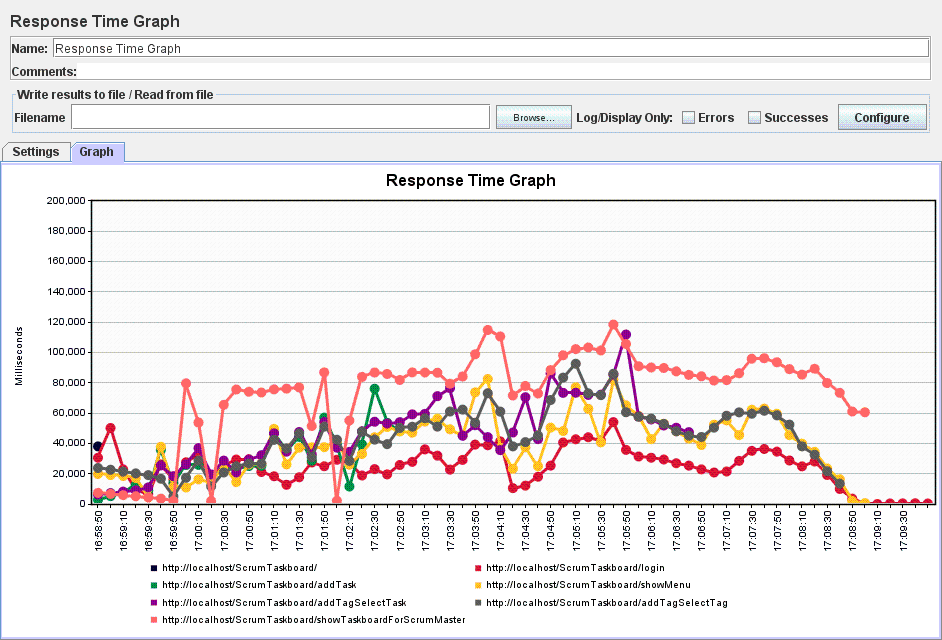


Figure 115: Response Time Graph

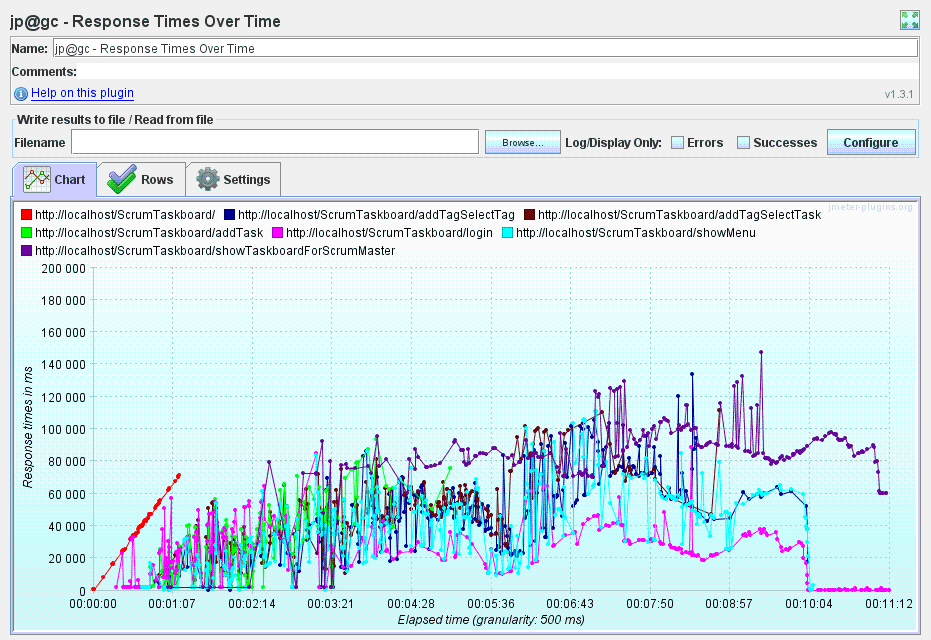


Figure 116: Response Times Over Time

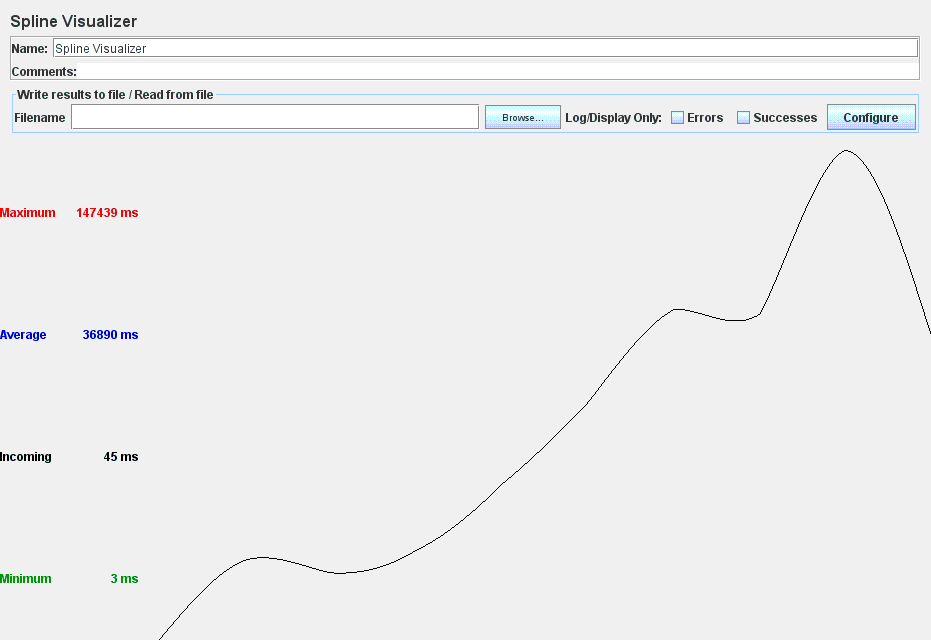


Figure 117: Spline Visualizer

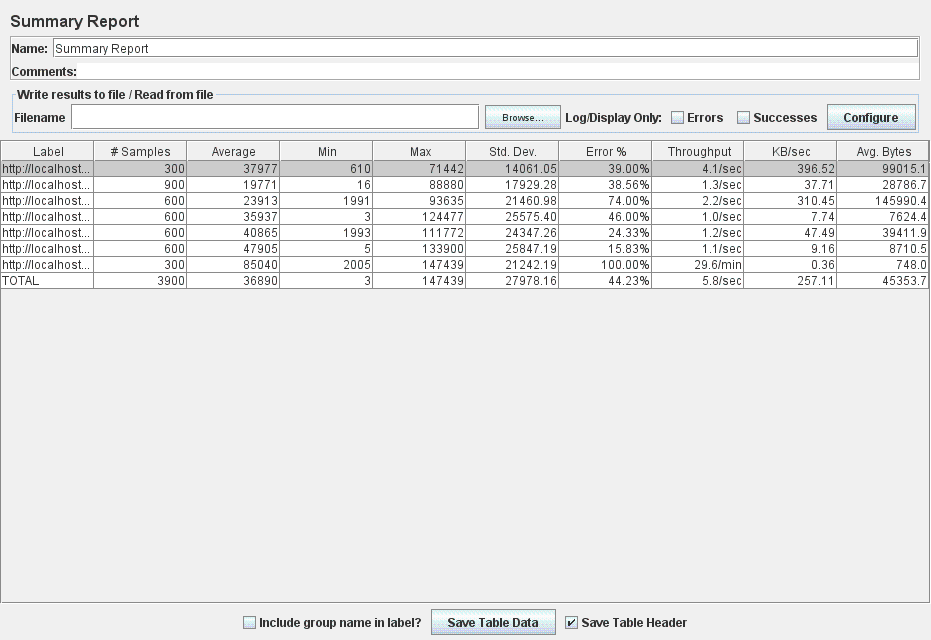


Figure 118: Summary Report

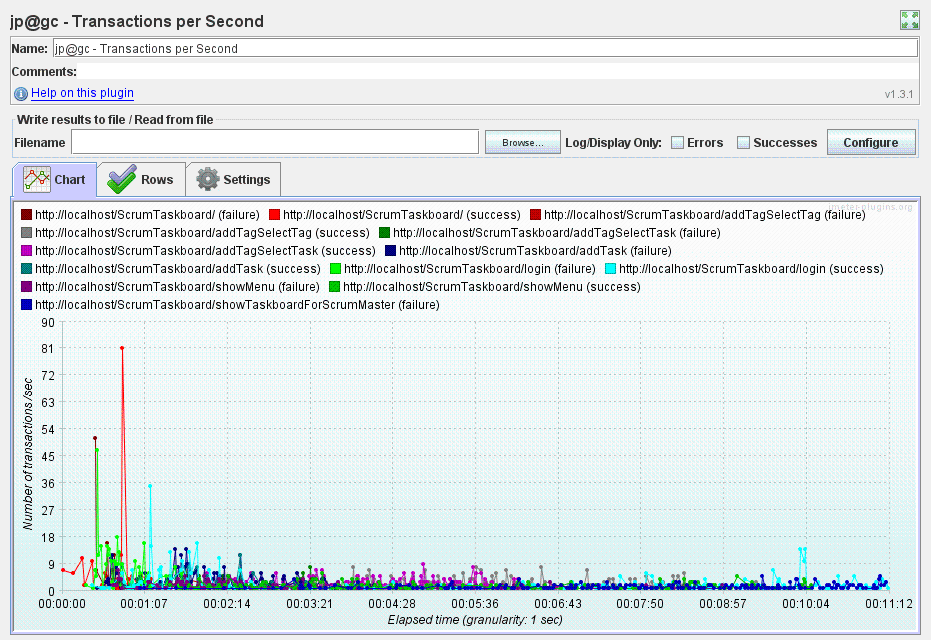


Figure 119: Transactions per Second

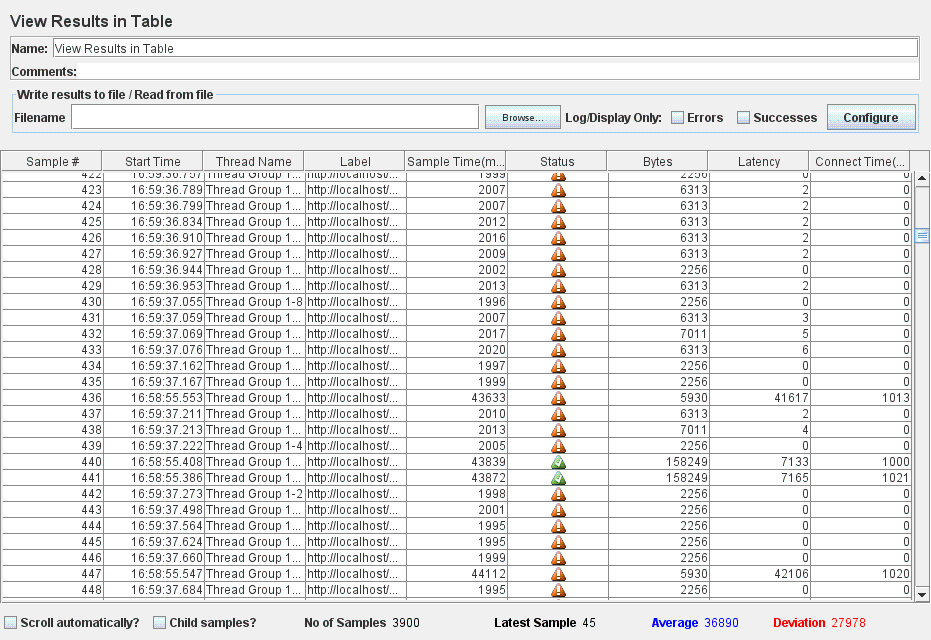


Figure 120: View Results in Table

* For the **Login-Set Sprint Duration-Visualize Burndown Chart Description-Visualize Team Information-Logout** test case:
* For 100 concurrent users (threads) trying to simultaneously log in, set the current sprint duration of the (as Scrum Master users), visualize the burndown chart description as well as relevant team information and then log out, the application responds successfully to all requests. This result is recorded in the images listed below which were obtained from different measurements:

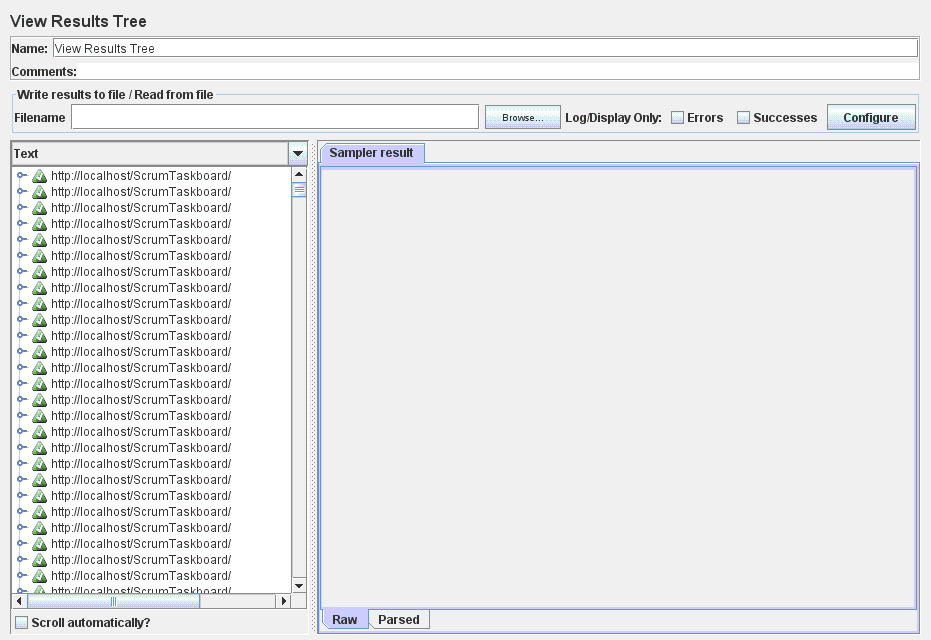


Figure121: View Results Tree

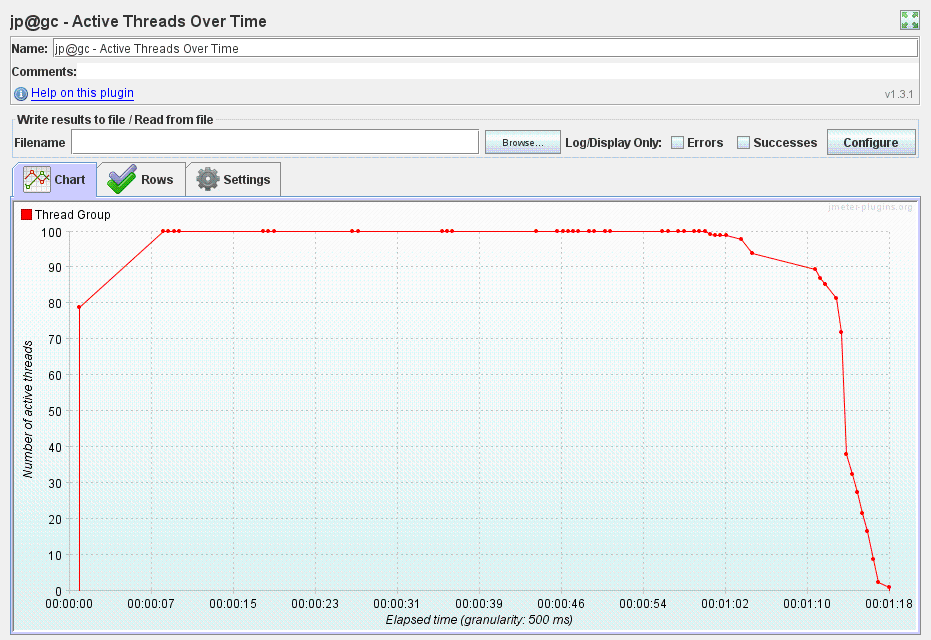
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Figure 122: Active Threads Over Time

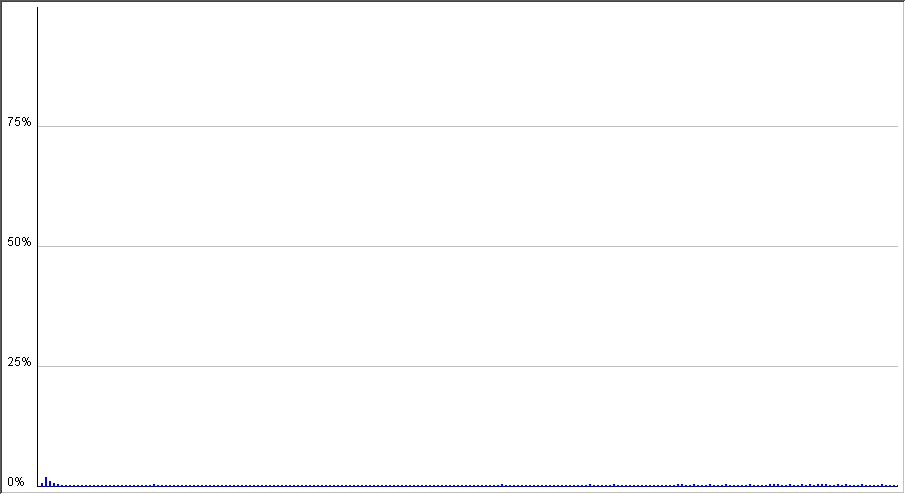


Figure 123: Distribution Graph (alpha)

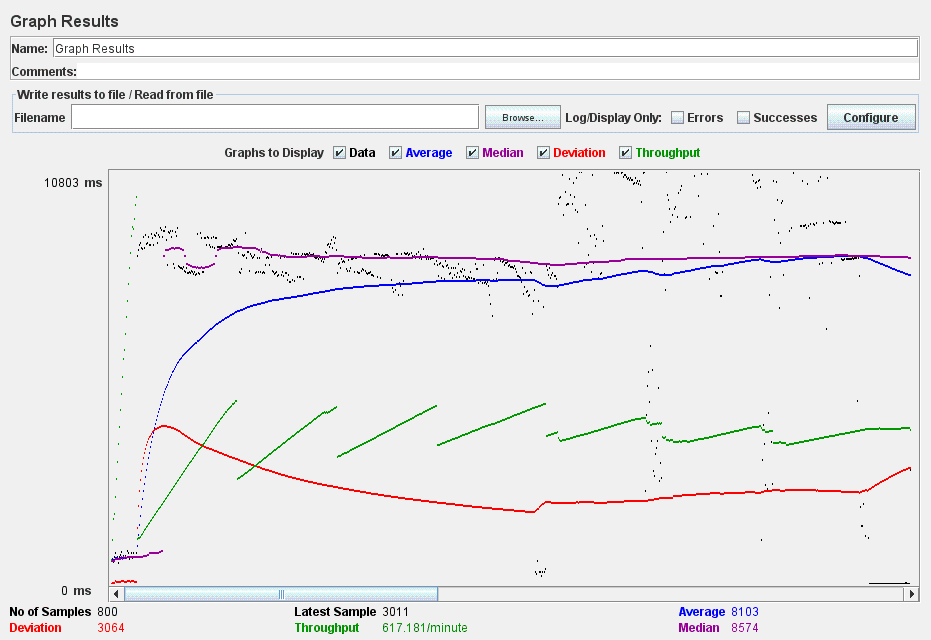


Figure 124: Graph Results

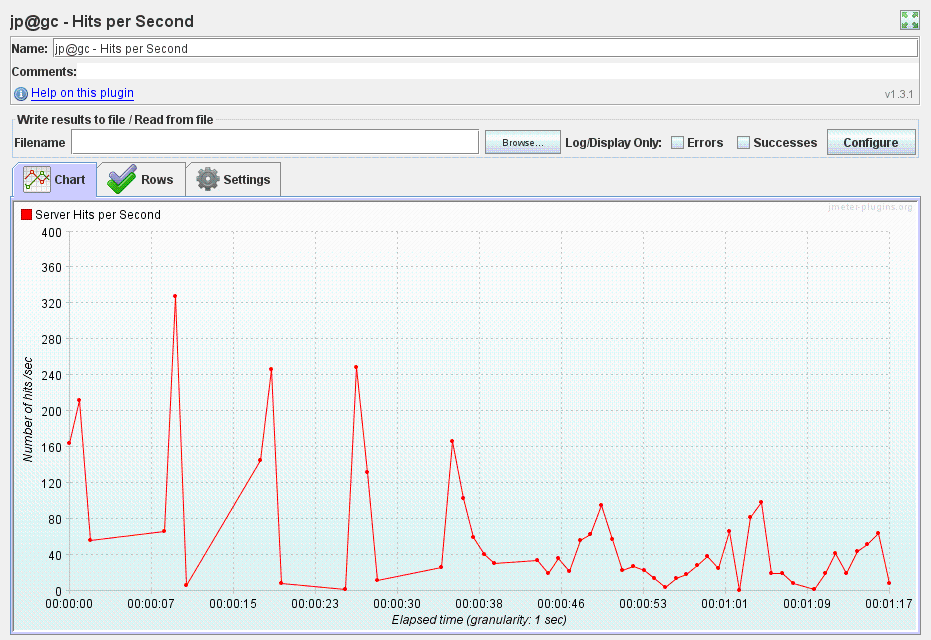


Figure 125: Hits per Second

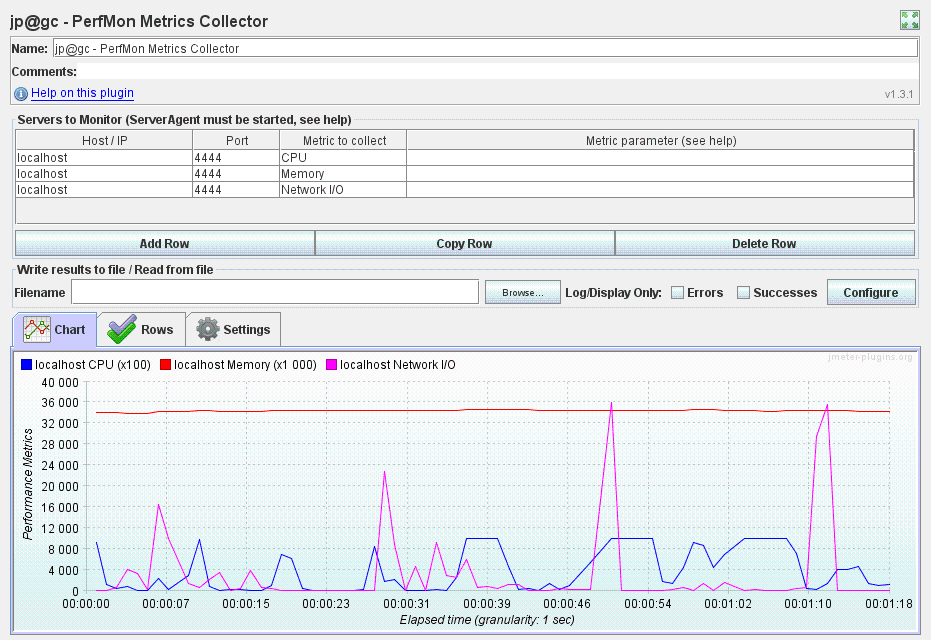


Figure 126: PerfMon Metrics Collector

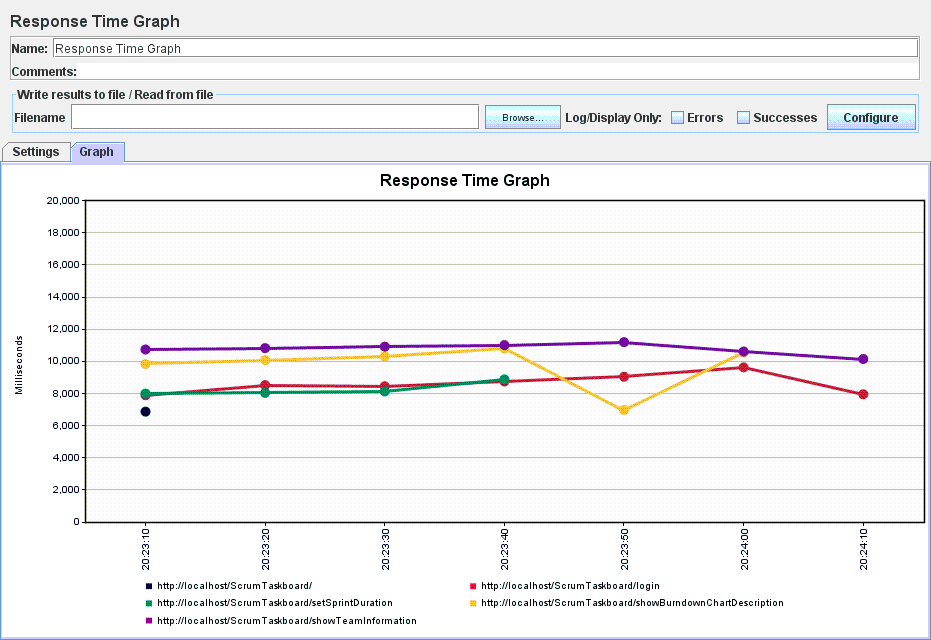


Figure 127: Response Time Graph

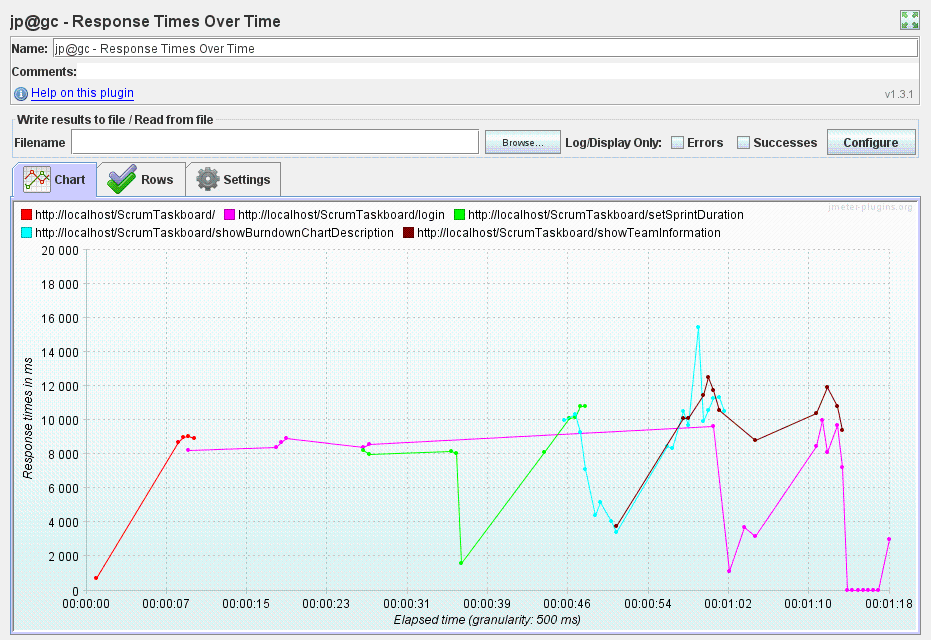


Figure 128: Response Times Over Time

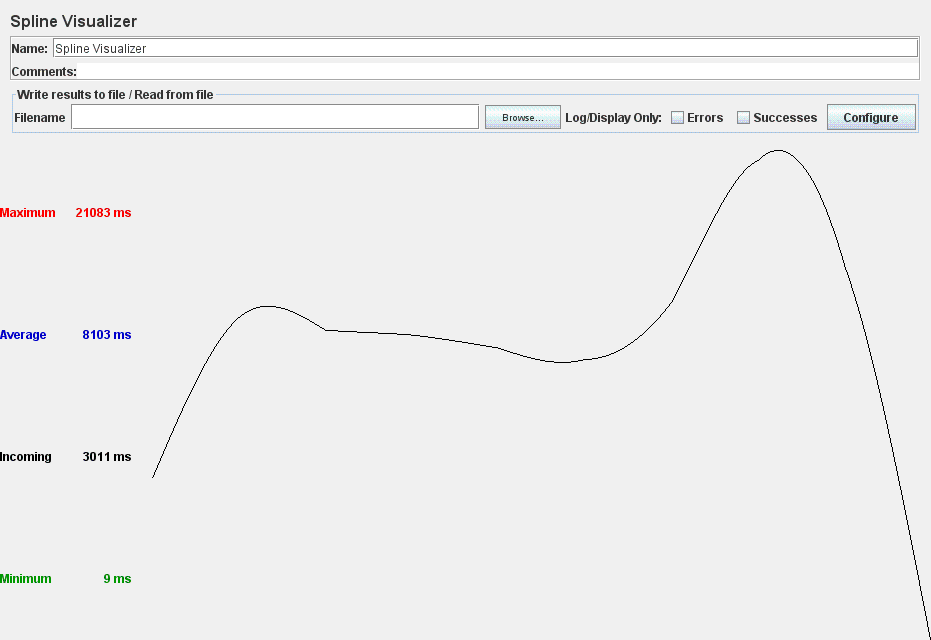


Figure 129: Spline Visualizer

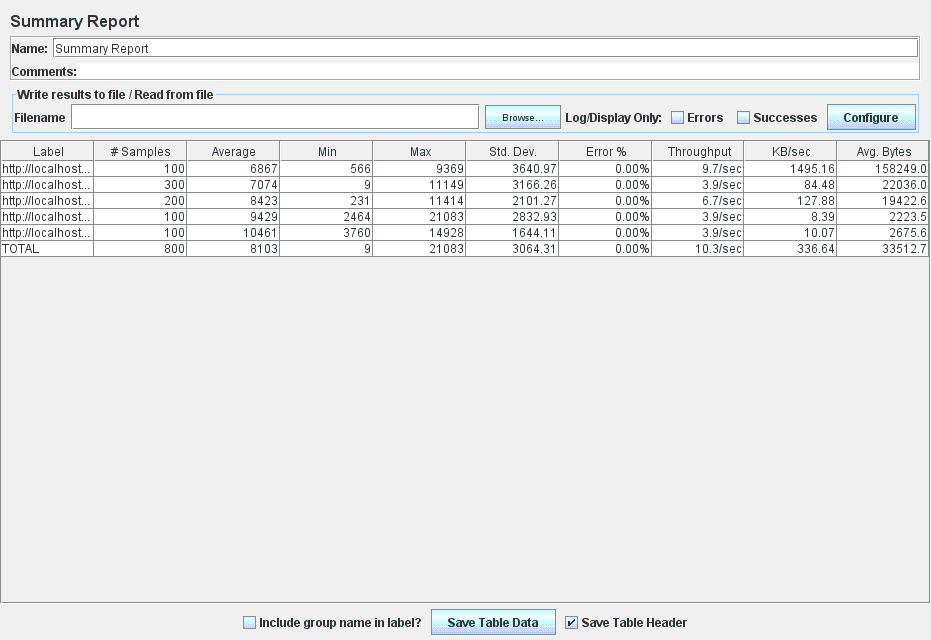


Figure 130: Summary Report

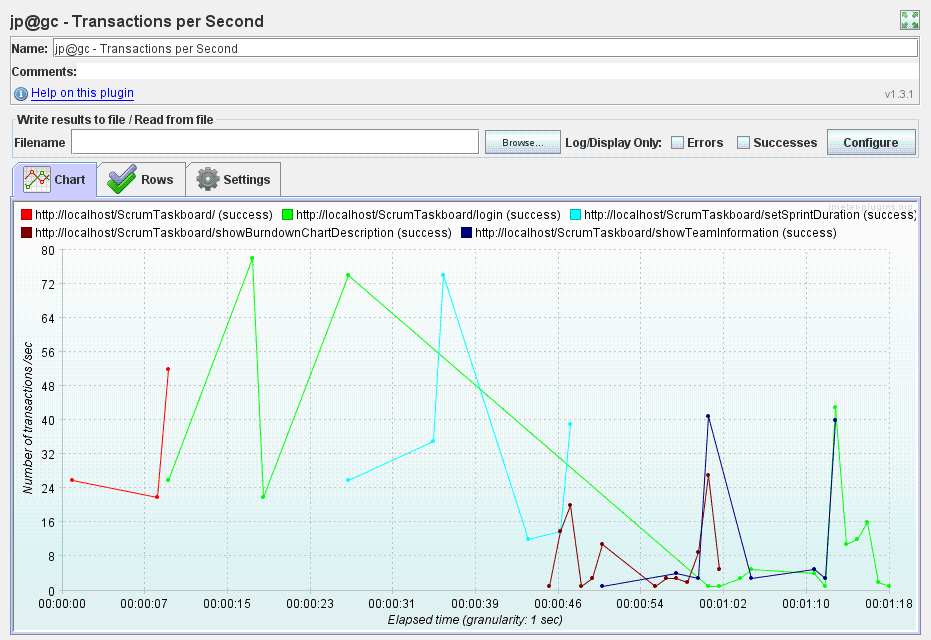


Figure 131: Transactions per Second

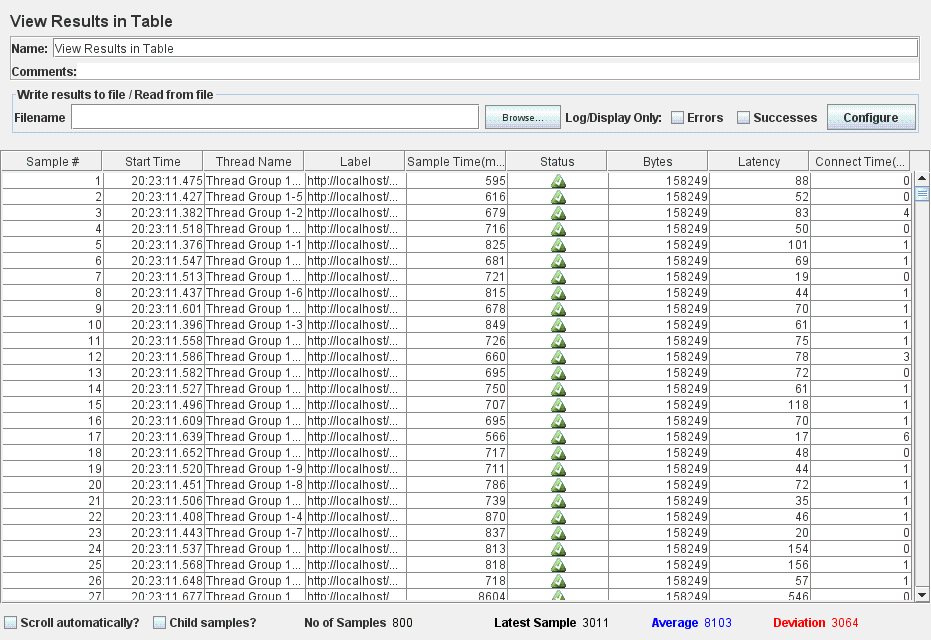


Figure 132: View Results in Table

* The ScrumTaskboard web application is unable to successfully handle all 300 concurrent users (threads) attempting to simultaneously log in, set the current sprint duration (as Scrum Master users), visualize the burndown chart description as well as relevant team information and then log out. Figure 133 listed below shows several requests for which the application responded with error. Additional information might be gathered by analyzing the results obtained from different measurements:

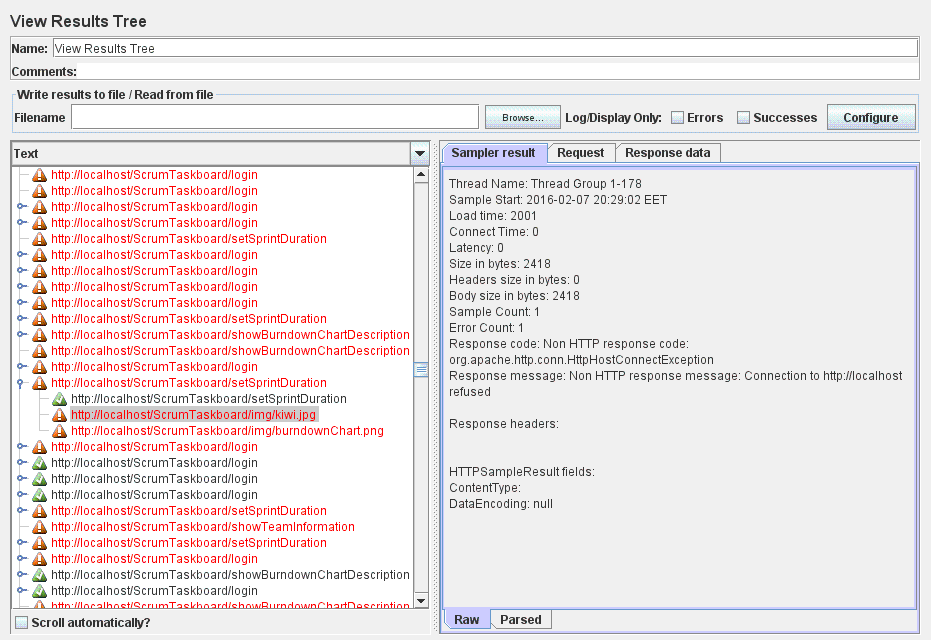


Figure 133: View Results Tree

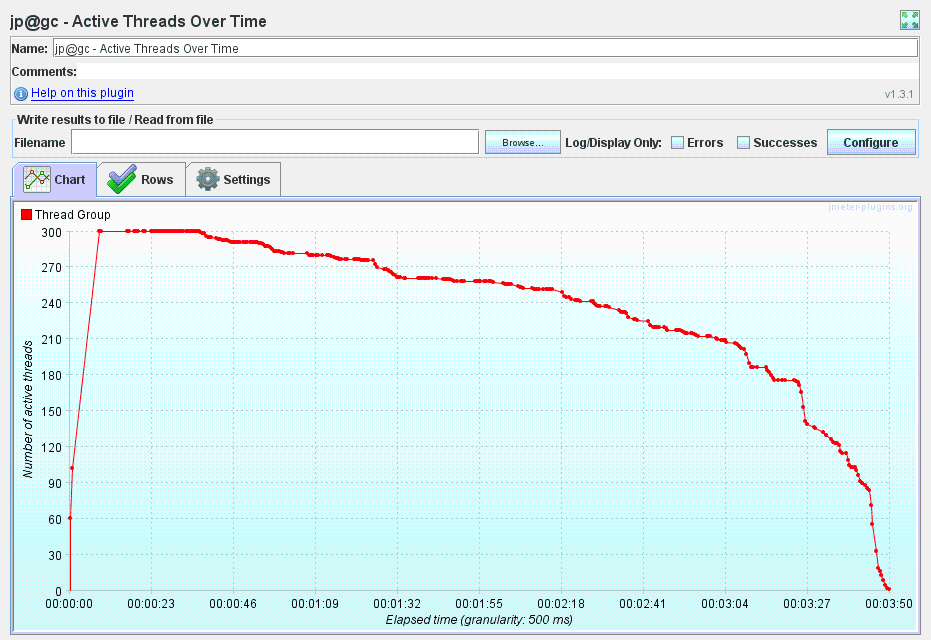


Figure 134: Active Threads Over Time

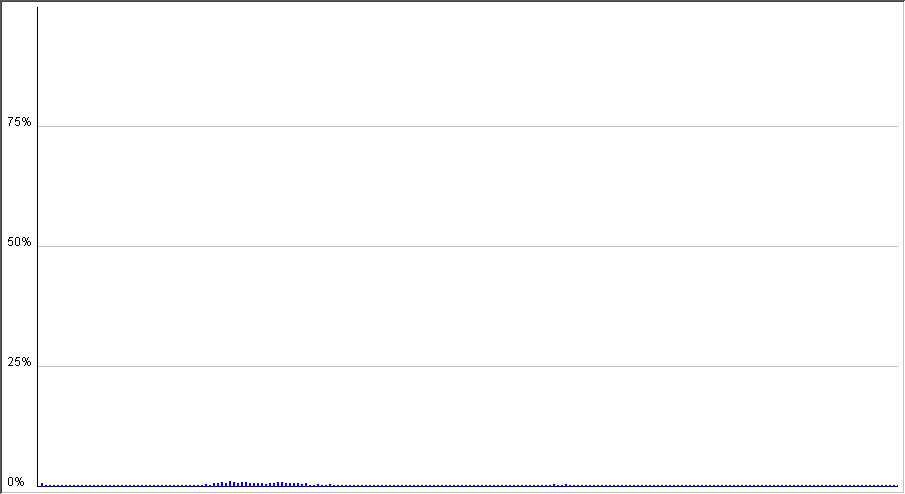


Figure 135: Distribution Graph (alpha)

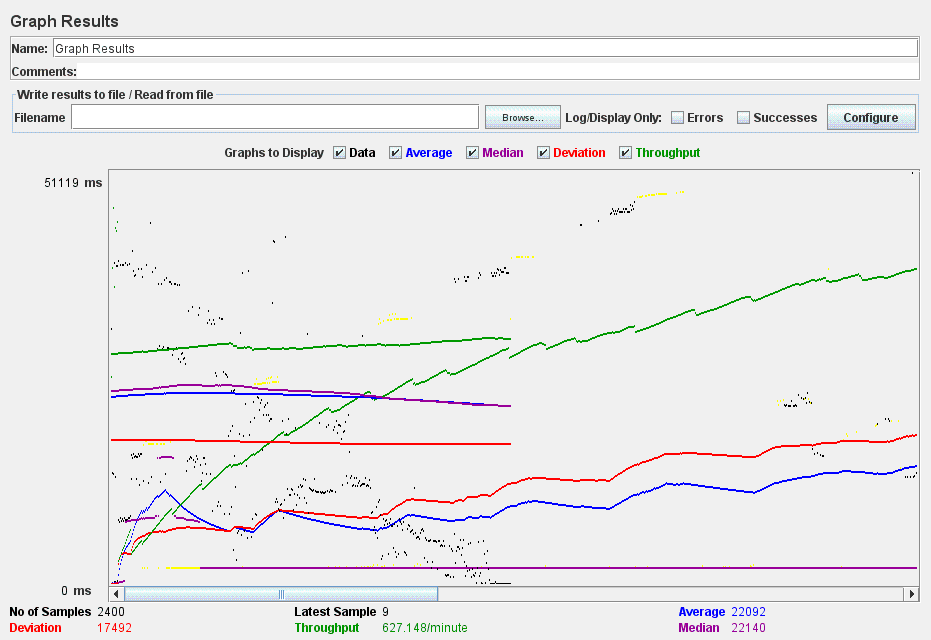


Figure 136: Graph Results

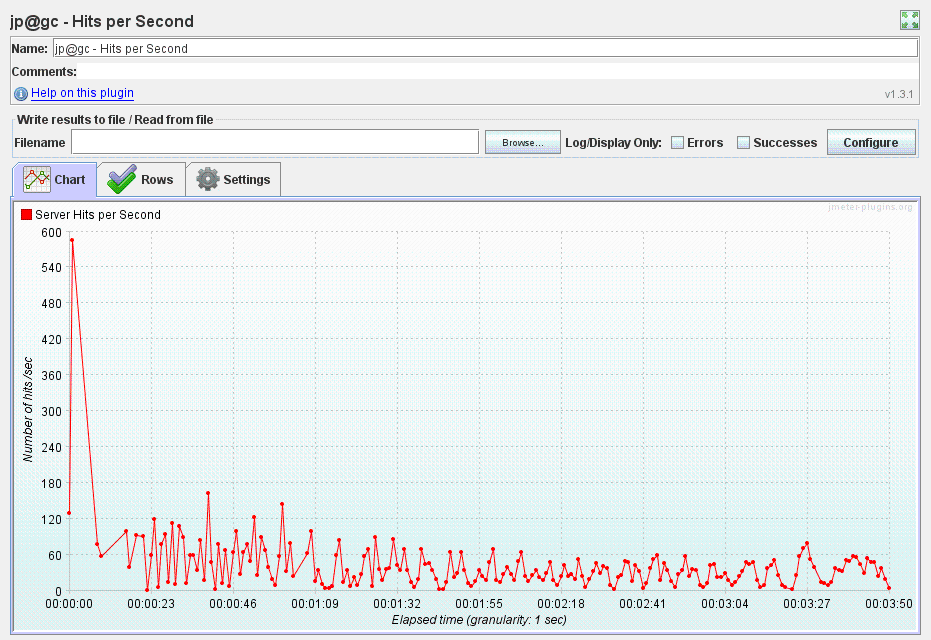


Figure 137: Hits per Second

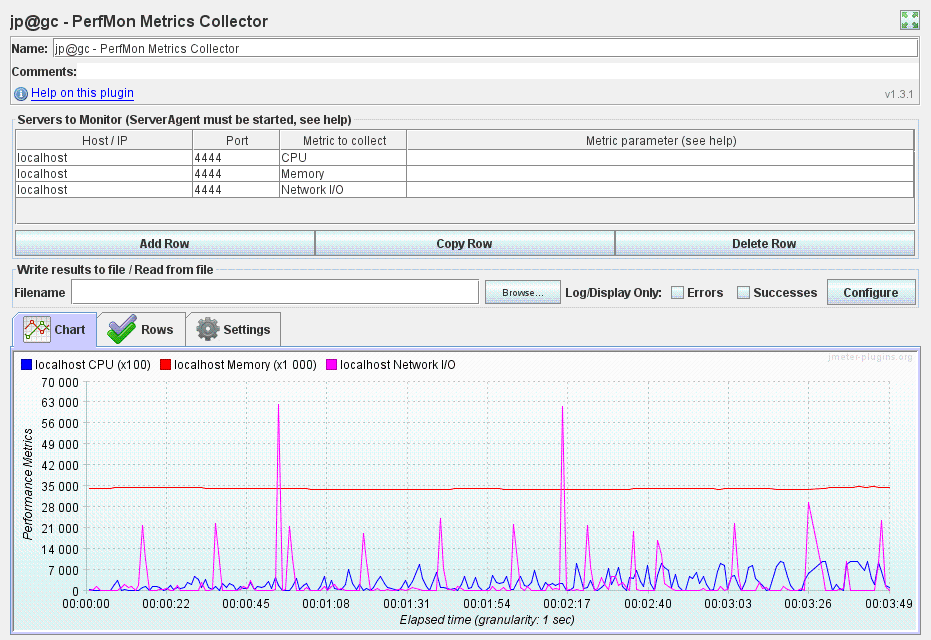


Figure 138: PerfMon Metrics Collector

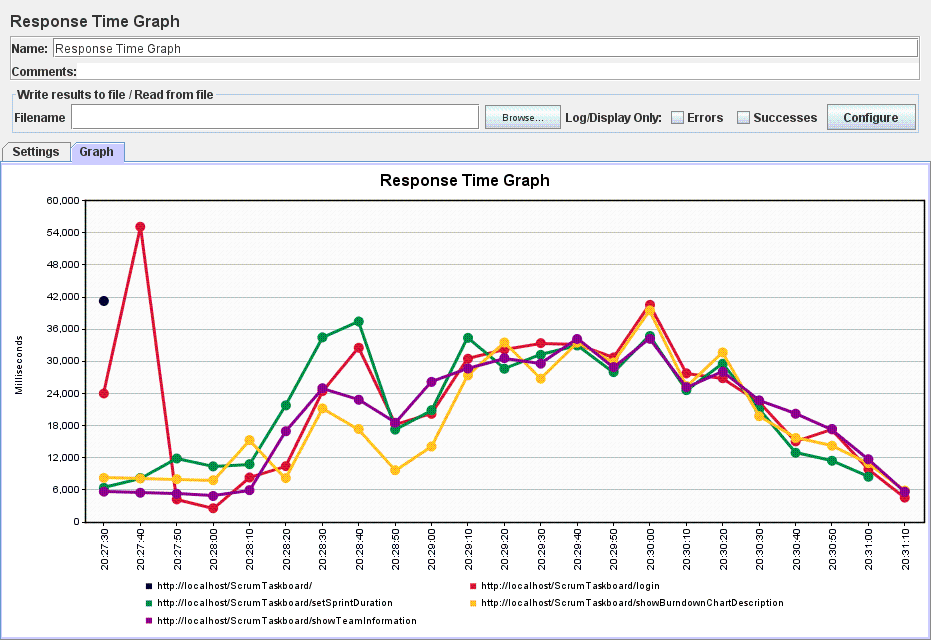


Figure 139: Response Time Graph

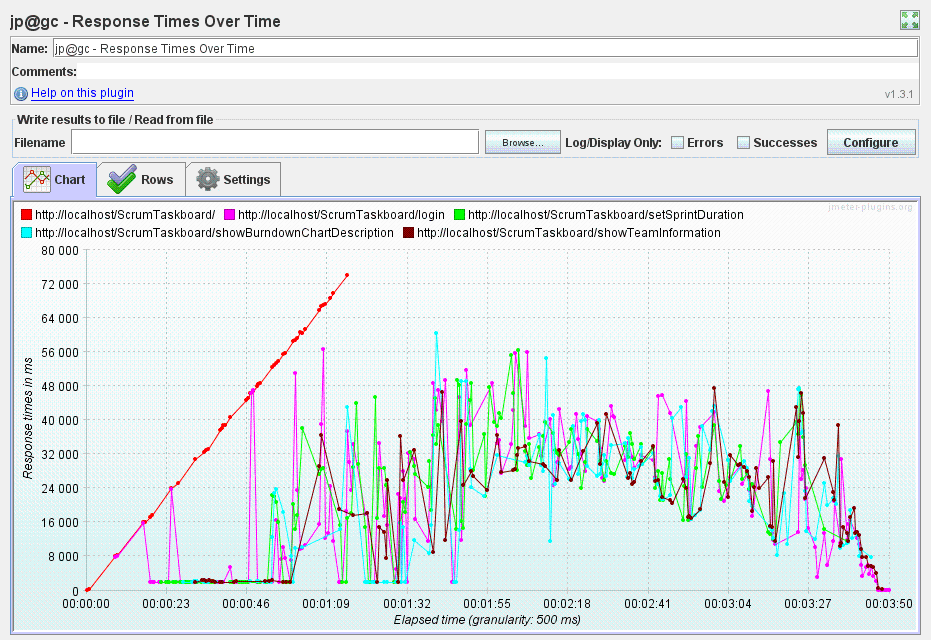


Figure 140: Response Times Over Time

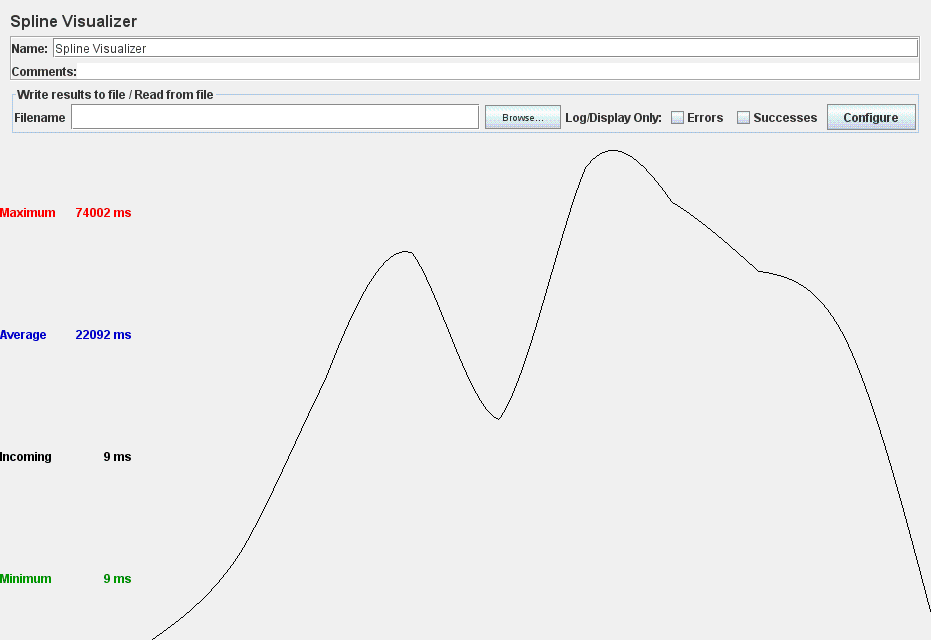


Figure 141: Spline Visualizer

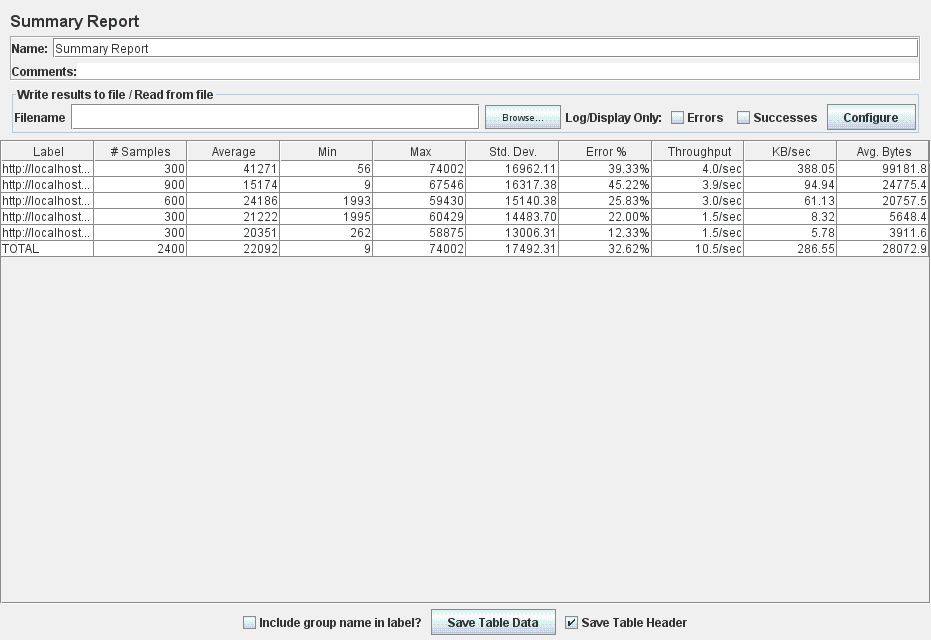


Figure 142: Summary Report

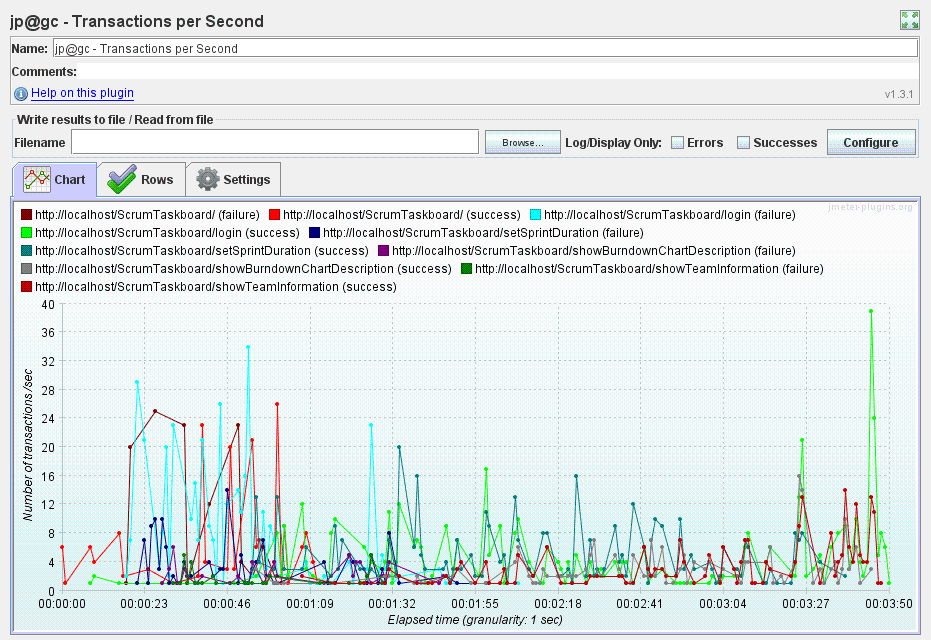


Figure 143: Transactions per Second

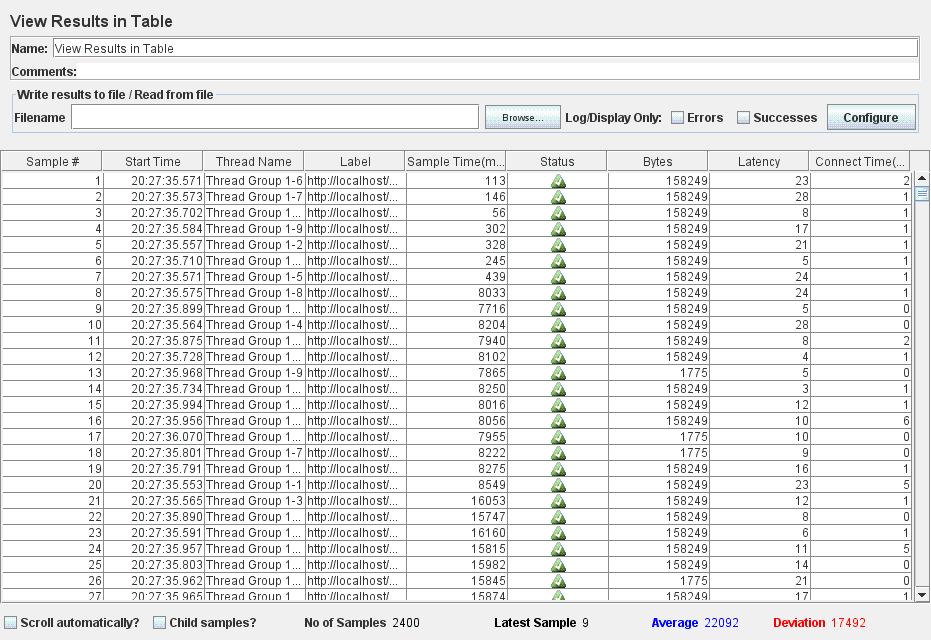


Figure 144: View Results in Table