

# **HPE Project and Portfolio Management Center**

Software Version 9.42

## **DM Benchmark Result Document**

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Software Release Date: September 2016



**Hewlett Packard**  
Enterprise

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# 1 Introduction

## 1.1 Purpose and Scope

This document provides a benchmark that characterizes the performance of PPM version 9.42. It provides contextual data regarding the data environment within which a specific functional workload is applied representing the benchmark workload. Test results for a benchmark run within HPE PPM Performance Labs are provided for reference purposes. HPE LoadRunner version 12.53 was used to simulate the workload for the benchmark test run. Additionally the document provides instructions with respect to setup and execution the benchmark in a customized environment.

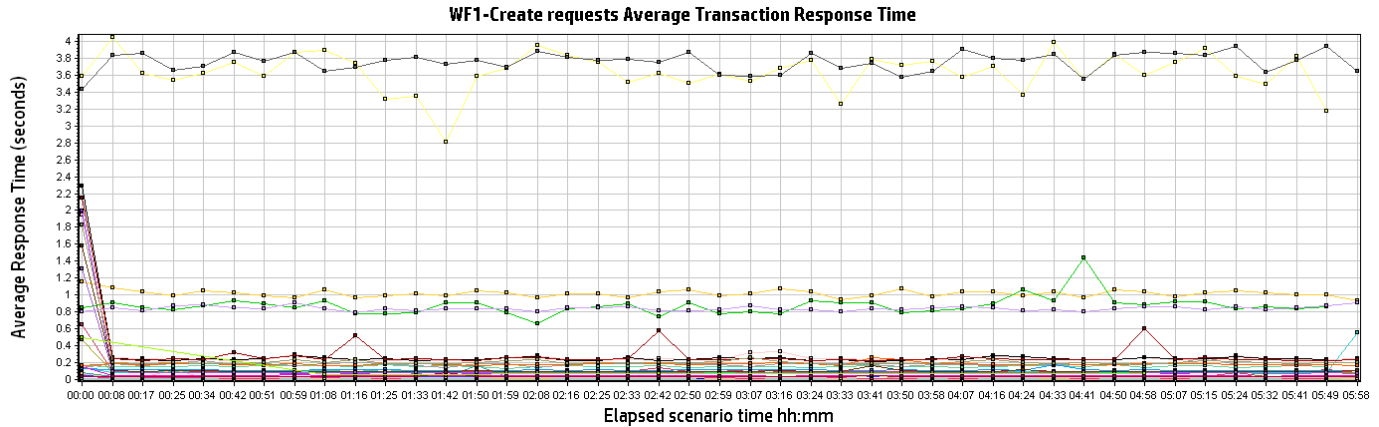
## 1.2 Terms and Definitions

Term	Definition
Vuser	Simulation of real user performing the actions on the product through LR scripts
Injector Host/Load Generator (LG)	The client machine from which the Vusers will run from and activate the different scripts and scenarios.
LoadRunner Controller (LC)	The LoadRunner controller is used to create and run scenarios. When running a scenario, the controller coordinates all the vusers in terms of scheduling and pacing and captures correlated resource utilization for subsequent analysis
Transaction	An end-to-end (browser-to backend-to browser) measurement of one or more user actions that has a tangible business value to the end-user. This is also termed as a "Business Process".
Transaction Throughput	Number of successful Transaction instances running through the product within a specified period of time
Transaction Response Time	The time measured by LoadRunner generator as the response time of the transaction. This is defined by LoadRunner as the time taken for all web requests belonging to the transaction, to return the responses. This is also termed as "Transaction Latency"
Think-Time	Delay provided between HTTP requests while simulating users (Vusers) through LoadRunner scripts, in order to simulate real world delays between various user actions while using the product
Concurrent users	Users that execute the same step in the same business process at the same time instance
Connected users	Uses that logged into the system, but not necessary execute any business process at this time
Active users	Connected users that execute activity at this moment, can be concurrent (but not necessarily so)

## 2 Benchmark Scenario Run

The following section provided results from a benchmark in PPM Performance Labs divided by WFs.

### 2.1 WF1-Create requests Average Transaction Response Time



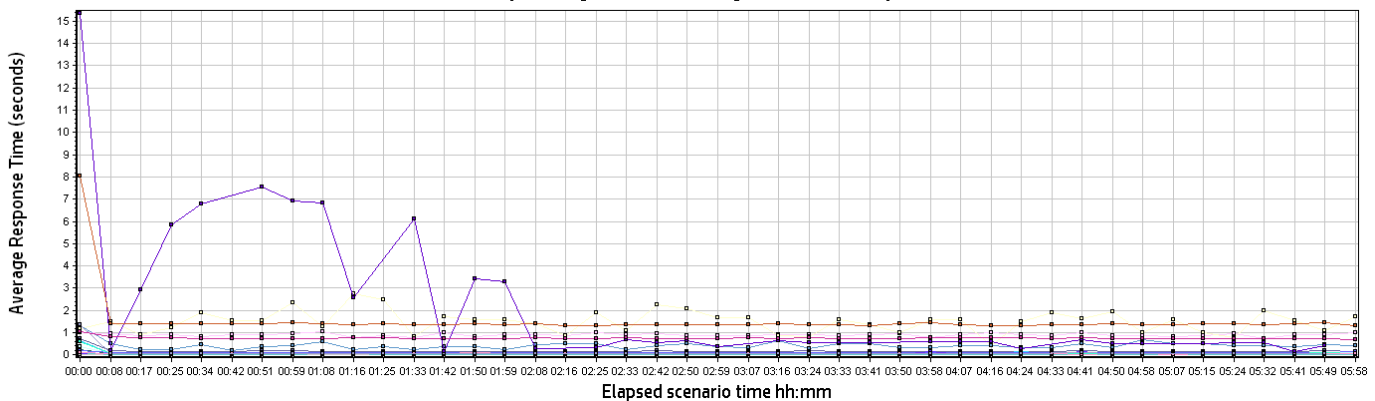
Color	Scale	Measurement	Minimum	Average	Maximum	Std. Deviation
	1	DMBM_01_TX_01_SelectRequest_RT_1	0.074	0.109	3.519	0.2
	1	DMBM_01_TX_02_SelectContactName_RT_1	0.634	1.019	3.023	0.145
	1	DMBM_01_TX_03_OpenScheduledStartDate_RT_1	0.006	0.012	0.487	0.029
	1	DMBM_01_TX_04_SelectScheduledStartDate_RT_1	0.005	0.009	0.273	0.014
	1	DMBM_01_TX_05_OpenScheduledFinishDate_RT_1	0.027	0.036	0.375	0.021
	1	DMBM_01_TX_06_SelectSkill_RT_1	0.025	0.034	0.246	0.014
	1	DMBM_01_TX_07_SelectDate_RT_1	0.01	0.015	0.292	0.015
	1	DMBM_01_TX_08_SubmitRequest_RT_1	0.174	0.298	3.583	0.408
	1	DMBM_02_TX_01_SelectRequest_RT_4	0.06	0.139	4.962	0.511
	1	DMBM_02_TX_02_ClickAssignToMultiVal_RT_4	2.588	3.629	4.287	0.394
	1	DMBM_02_TX_03_ClickFind_AssignToMultiVal_RT_4	0.099	0.152	0.208	0.018
	1	DMBM_02_TX_04_ChooseDate_RT_4	0.01	0.014	0.077	0.006
	1	DMBM_02_TX_05_ClickTab_ShortContact_RT_4	0.11	0.177	0.416	0.031
	1	DMBM_02_TX_06_ShowAll_ShortContacts_RT_4	0.559	0.87	2.64	0.193
	1	DMBM_02_TX_07_Submit_RT_4	0.174	0.292	3.34	0.397
	1	DMBM_03_TX_01_SelectRequest_RT_5	0.063	0.088	1.532	0.116
	1	DMBM_03_TX_02_ChooseApplication_RT_5	0.025	0.037	1.333	0.069

	1	DMBM_03_TX_03_ChooseRequestGroup_RT_5	0.023	0.031	0.18	0.01
	1	DMBM_03_TX_04_NewReferenceAttachment_RT_5	0.069	0.088	1.036	0.056
	1	DMBM_03_TX_05_ChooseDate_RT_5	0.01	0.019	0.953	0.053
	1	DMBM_03_TX_06_Submit_RT_5	0.091	0.11	0.659	0.029
	1	DMBM_04_TX_01_SelectRequest_RT_6	0.076	0.141	4.788	0.437
	1	DMBM_04_TX_02_ClickTabOnNonExistentContactName_RT_6	0.032	0.043	0.552	0.038
	1	DMBM_04_TX_03_ClickShowAll_RT_6	0.527	0.836	1.026	0.091
	1	DMBM_04_TX_04_ClickFindContact_RT_6	0.101	0.18	1.193	0.057
	1	DMBM_04_TX_05_Submit_RT_6	0.179	0.32	5.065	0.552
	1	DMBM_05_TX_01_SelectRequest_RT_7	0.064	0.113	5.311	0.41
	1	DMBM_05_TX_02_AssignToMultiSelect_RT_7	2.498	3.759	4.462	0.363
	1	DMBM_05_TX_03_ChooseRequestGroup_RT_7	0.024	0.033	0.676	0.032
	1	DMBM_05_TX_04_Submit_RT_7	0.136	0.248	3.816	0.4
	1	OpenRequestsMenu	0.056	0.615	2.461	0.619

## 2.2 WF2 – Search requests, Average Transaction Response Time

### 2.2.1 Regular Searches

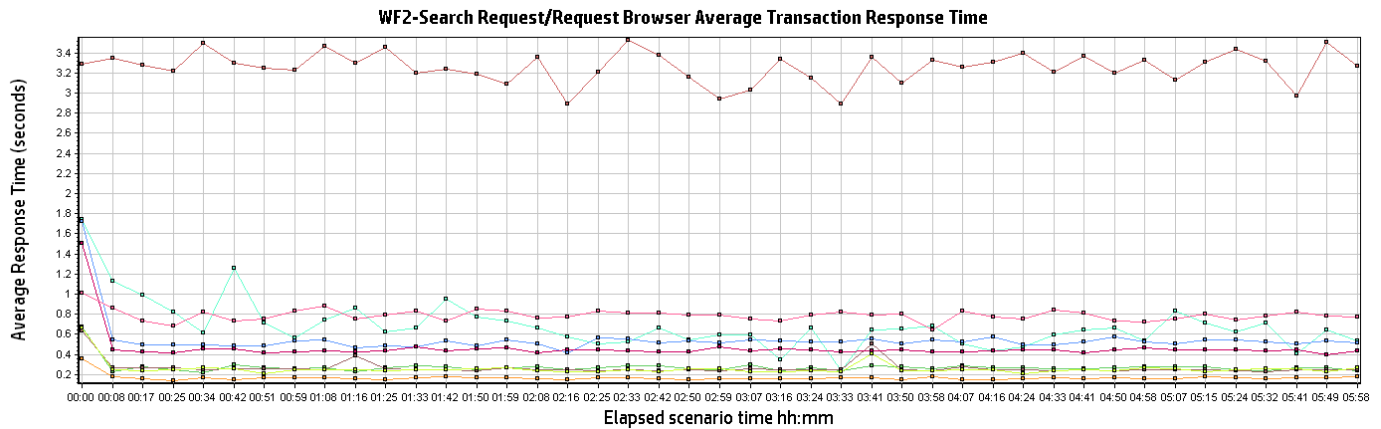
WF2-Search Request/Regular Search Average Transaction Response Time



Color	Scale	Measurement	Minimum	Average	Maximum	Std. Deviation
	1	DMBM_06_TX_01_OpenSearchMenu	0.057	0.079	1.881	0.082
	1	DMBM_06_TX_02_Submit	0.129	0.186	3.031	0.165
	1	DMBM_07_TX_01_OpenSearchMenu	0.058	0.083	1.911	0.107
	1	DMBM_07_TX_02_Submit	0.253	0.906	2.431	0.309
	1	DMBM_08_TX_01_OpenSearchMenu	0.057	0.079	1.881	0.082

1	DMBM_08_TX_02_ClickTabOnReque stType	0.057	0.087	2.118	0.153
1	DMBM_08_TX_03_ClickAdvancedSea rch	0.016	0.021	0.098	0.008
1	DMBM_08_TX_04_ClickPriority	0.074	0.098	0.524	0.035
1	DMBM_08_TX_05_Submit	0.031	0.045	1.301	0.08
1	DMBM_09_TX_01_OpenSearchMenu	0.06	0.087	2.039	0.146
1	DMBM_09_TX_02_selectRT	0.015	0.022	0.669	0.032
1	DMBM_09_TX_03_selectPriority	0.029	0.04	0.463	0.032
1	DMBM_09_TX_04_ChooseWorkflow	0.033	0.049	0.657	0.042
1	DMBM_09_TX_05_ClickSearch	0.096	0.434	5.048	0.443
1	DMBM_10_TX_01_OpenSearchMenu	0.063	0.106	1.356	0.214
1	DMBM_10_TX_02_ClickSearch	0.132	2.261	15.348	3.253
1	DMBM_18_TX_01_ChoosePortlet	0.904	1.607	49.608	2.789
1	DMBM_18_TX_02_ChooseRequest	0.618	0.764	3.142	0.141

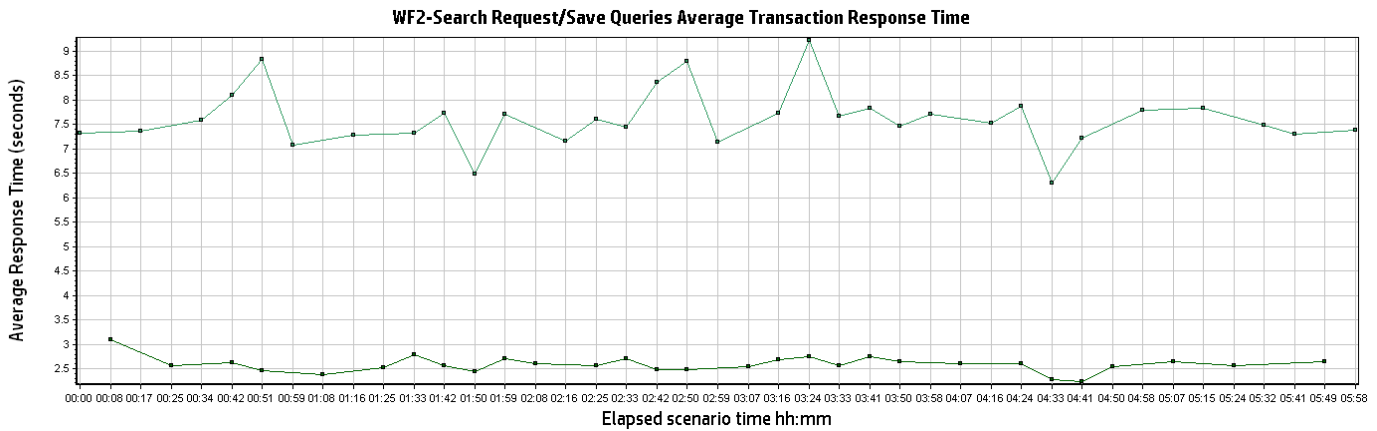
## 2.2.2 Request Browser



Color	Scale	Measurement	Minimum	Average	Maximum	Std. Deviation
	1	DMBM_21_OnlySearchRequestBr owser_TX01_Choose_Req_Brow ser	0.187	0.697	4.38	0.534
	1	DMBM_22_Request_Browser_Sa ved_Set_1_TX01_Click_Saved_S et_1	0.326	0.554	3.486	0.266
	1	DMBM_22_Request_Browser_Sa ved_Set_1_TX02_Click_Tree_Le vel_1	0.169	0.274	2.281	0.156
	1	DMBM_22_Request_Browser_Sa ved_Set_1_TX03_Click_Tree_Le vel_2	0.208	0.267	1.788	0.136
	1	DMBM_22_Request_Browser_Sa ved_Set_1_TX04_Click_Link	2.316	3.251	5.48	0.359

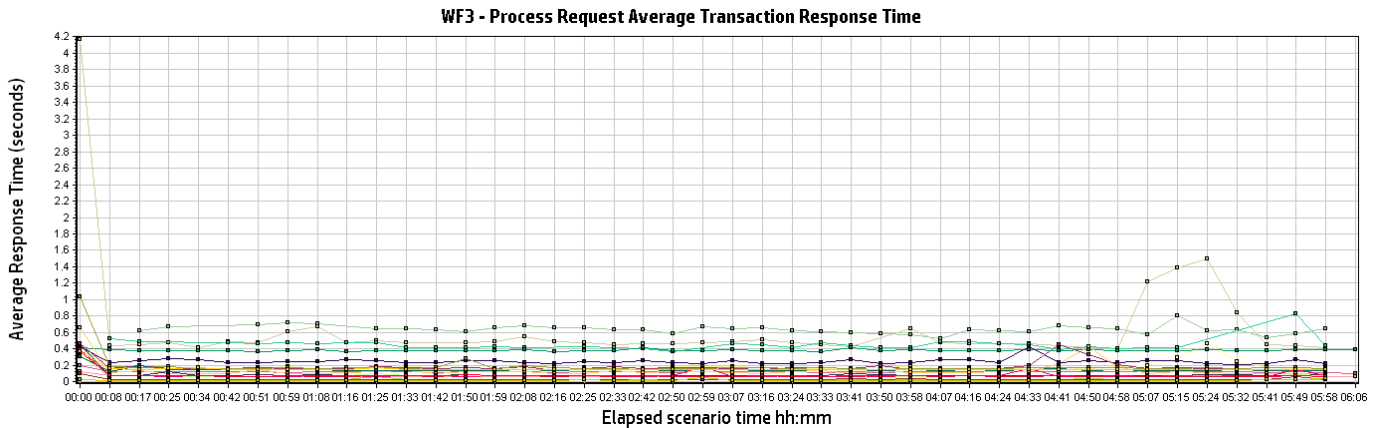
1	DMBM_23_Request_Browser_Saved_Set_2_TX01_Push_Saved_Set_2	0.289	0.468	3.012	0.244
1	DMBM_23_Request_Browser_Saved_Set_2_TX02_Click_1st_Level	0.153	0.257	2.358	0.166
1	DMBM_23_Request_Browser_Saved_Set_2_TX03_Click_2nd_Level	0.103	0.167	1.222	0.082
1	DMBM_23_Request_Browser_Saved_Set_2_TX04_Click_Link	0.528	0.789	2.286	0.145

### 2.2.3 Run from Saved queries



Color	Scale	Measurement	Minimum	Average	Maximum	Std. Deviation
Dark Green	1	DMBM_24_Run_Queries_FromSaved_Query_Builder_Choose_Query_1	1.786	2.589	5.986	0.376
Light Green	1	DMBM_24_Run_Queries_FromSaved_Query_Builder_Choose_Query_2	5.398	7.514	9.241	0.847

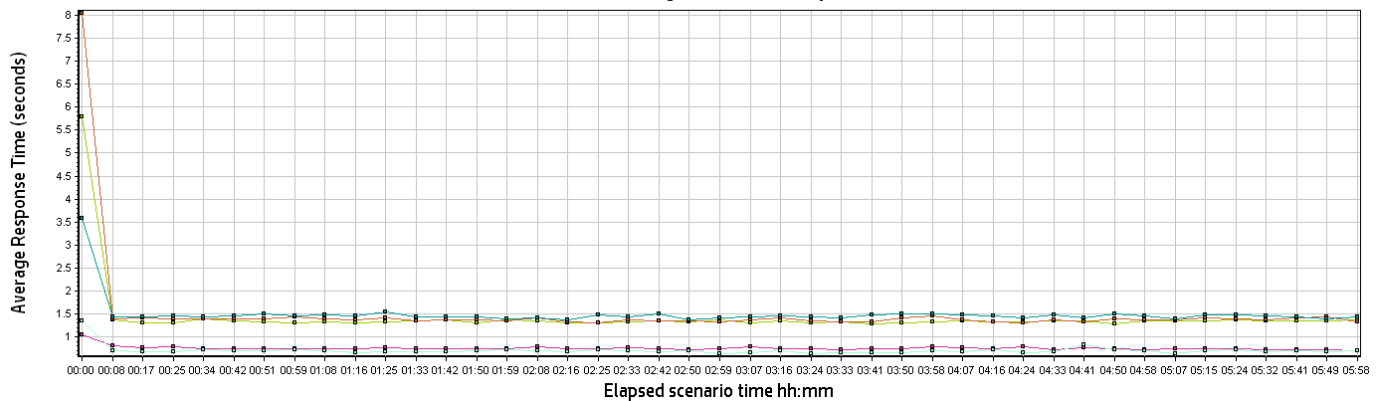
### 2.3 WF3 - process request Average Transaction Response Time



Color	Scale	Measurement	Minimum	Average	Maximum	Std. Deviation
	1	DMBM_11_TX_01_OpenSearchMenu	0.054	0.077	2.018	0.095
	1	DMBM_11_TX_02_SearchRequestID	0.11	0.189	2.015	0.13
	1	DMBM_11_TX_03_ClickAssign_RT_1	0.341	0.772	7.607	1.13
	1	DMBM_11_TX_03_ClickAssign_RT_6	0.425	0.638	4.911	0.24
	1	DMBM_11_TX_03_ClickAssign_RT_7	0.343	0.449	1.211	0.066
	1	DMBM_12_TX_01_OpenSearchMenu	0.054	0.071	2.036	0.04
	1	DMBM_12_TX_02_SearchRequestID	0.077	0.121	2.149	0.046
	1	DMBM_12_TX_03_ClickAssign_RT5	0.274	0.383	3.767	0.085
	1	DMBM_13_TX_01_OpenSearchMenu	0.021	0.043	2.047	0.14
	1	DMBM_13_TX_02_SearchRequestID	0.073	0.145	2.196	0.2
	1	DMBM_13_TX_03_ShowGraphicalView	0.196	0.253	2.653	0.135
	1	DMBM_14_TX_01_OpenSearchMenu	0.065	0.093	2.035	0.132
	1	DMBM_14_TX_02_SearchRequestID	0.124	0.187	2.277	0.145
	1	DMBM_14_TX_03_ShowApprovalDetails	0.028	0.149	2.111	0.091
	1	DMBM_15_TX_01_OpenSearchMenu	0.053	0.087	1.473	0.121
	1	DMBM_15_TX_02_SearchRequestID	0.122	0.199	7.421	0.398
	1	DMBM_15_TX_03_ShowTransactionalDetails	0.016	0.03	1.055	0.051
	1	DMBM_16_TX_01_OpenSearchMenu	0.055	0.079	2.054	0.117
	1	DMBM_16_TX_02_SearchRequestID	0.117	0.156	2.385	0.1
	1	DMBM_16_TX_03_openAttachment	0.007	0.018	0.871	0.033

## 2.4 WF4 - View Portlets

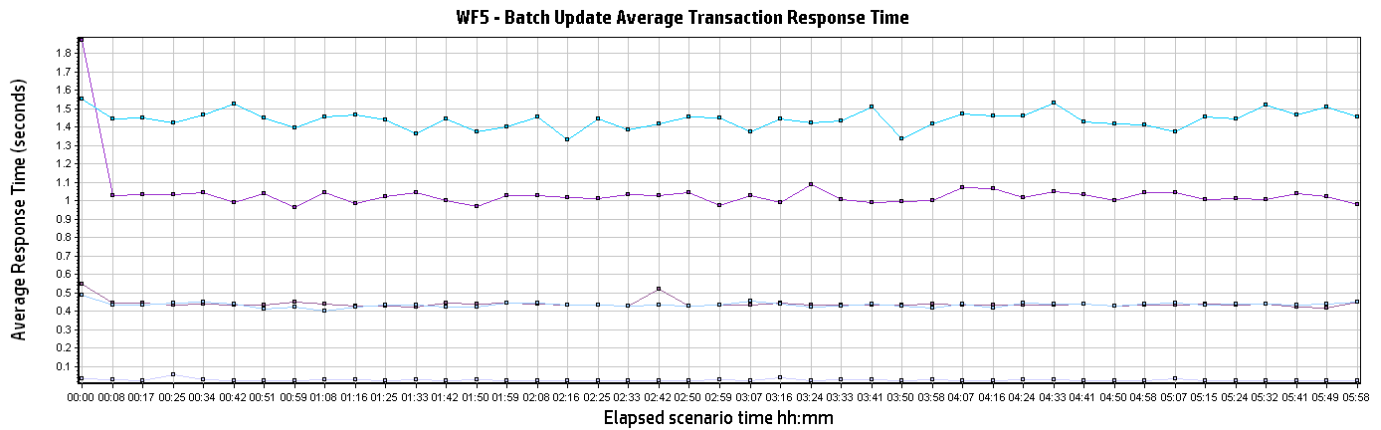
WF4 - View Portlets Average Transaction Response Time



Color	Scale	Measurement	Minimum	Average	Maximum	Std. Deviation
	1	DMBM_17_TX_01_ChoosePortlet	0.855	1.465	49.626	2.006
	1	DMBM_18_TX_01_ChoosePortlet	0.904	1.607	49.608	2.789
	1	DMBM_18_TX_02_ChooseRequest	0.618	0.764	3.142	0.141
	1	DMBM_20_TX_01_ViewPortlet_With_Bar_And_Pie_Chart	0.969	1.53	15.031	0.937
	1	DMBM_20_TX_02_ClickOnPieChart	0.454	0.717	6.599	0.332

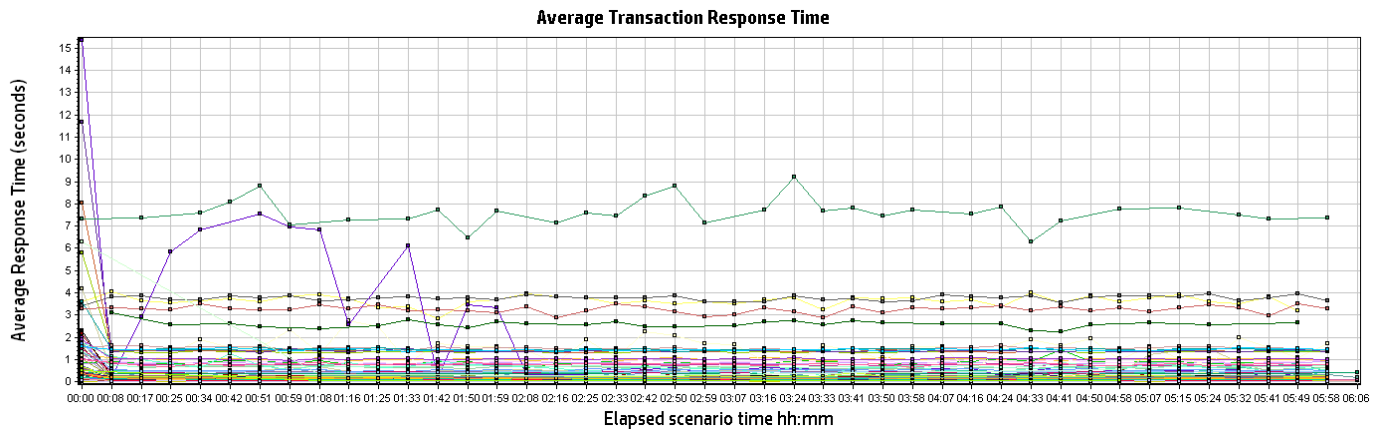


## 2.5 WF5 – Batch update



Color	Scale	Measurement	Minimum	Average	Maximum	Std. Deviation
	1	DMBM_25_PPM_BatchUpdate_TX 01_SearchRequests	0.351	0.44	1.552	0.088
	1	DMBM_25_PPM_BatchUpdate_TX 02_Search75Req	0.634	1.041	8.532	0.387
	1	DMBM_25_PPM_BatchUpdate_TX 03_ClickMassUpdate	0.303	0.435	0.797	0.043
	1	DMBM_25_PPM_BatchUpdate_TX 04_ClickDone	0.016	0.027	0.519	0.021
	1	DMBM_25_PPM_BatchUpdate_TX 05_ClickContinue	0.852	1.441	2.202	0.146

## 2.6 Average Transaction Response Time-Total TRT's



Color	Scale	Measurement	Minimum	Average	Maximum	Std. Deviation
	1	DMBM_01_TX_01_SelectRequest_RT_1	0.074	0.109	3.519	0.2
	1	DMBM_01_TX_02_SelectContactName_RT_1	0.634	1.019	3.023	0.145

1	DMBM_01_TX_03_OpenScheduledStartDate_RT_1	0.006	0.012	0.487	0.029
1	DMBM_01_TX_04_SelectScheduledStartDate_RT_1	0.005	0.009	0.273	0.014
1	DMBM_01_TX_05_OpenScheduledFinishDate_RT_1	0.027	0.036	0.375	0.021
1	DMBM_01_TX_06_SelectSkill_RT_1	0.025	0.034	0.246	0.014
1	DMBM_01_TX_07_SelectDate_RT_1	0.01	0.015	0.292	0.015
1	DMBM_01_TX_08_SubmitRequest_RT_1	0.174	0.298	3.583	0.408
1	DMBM_02_TX_01_SelectRequest_RT_4	0.06	0.139	4.962	0.511
1	DMBM_02_TX_02_ClickAssignToMultiVal_RT_4	2.588	3.629	4.287	0.394
1	DMBM_02_TX_03_ClickFind_AssignToMultiVal_RT_4	0.099	0.152	0.208	0.018
1	DMBM_02_TX_04_ChooseDate_RT_4	0.01	0.014	0.077	0.006
1	DMBM_02_TX_05_ClickTab_ShortContact_RT_4	0.11	0.177	0.416	0.031
1	DMBM_02_TX_06_ShowAll_ShortContacts_RT_4	0.559	0.87	2.64	0.193
1	DMBM_02_TX_07_Submit_RT_4	0.174	0.292	3.34	0.397
1	DMBM_03_TX_01_SelectRequest_RT_5	0.063	0.088	1.532	0.116
1	DMBM_03_TX_02_ChooseApplication_RT_5	0.025	0.037	1.333	0.069
1	DMBM_03_TX_03_ChooseRequestGroup_RT_5	0.023	0.031	0.18	0.01
1	DMBM_03_TX_04_NewReferenceAttachment_RT_5	0.069	0.088	1.036	0.056
1	DMBM_03_TX_05_ChooseDate_RT_5	0.01	0.019	0.953	0.053
1	DMBM_03_TX_06_Submit_RT_5	0.091	0.11	0.659	0.029
1	DMBM_04_TX_01_SelectRequest_RT_6	0.076	0.141	4.788	0.437
1	DMBM_04_TX_02_ClickTabOnNonExistentContactName_RT_6	0.032	0.043	0.552	0.038
1	DMBM_04_TX_03_ClickShowAll_RT_6	0.527	0.836	1.026	0.091
1	DMBM_04_TX_04_ClickFindContact_RT_6	0.101	0.18	1.193	0.057
1	DMBM_04_TX_05_Submit_RT_6	0.179	0.32	5.065	0.552
1	DMBM_05_TX_01_SelectRequest_RT_7	0.064	0.113	5.311	0.41
1	DMBM_05_TX_02_AssignToMultiSelect_RT_7	2.498	3.759	4.462	0.363
1	DMBM_05_TX_03_ChooseRequestGroup_RT_7	0.024	0.033	0.676	0.032
1	DMBM_05_TX_04_Submit_RT_7	0.136	0.248	3.816	0.4
1	DMBM_06_TX_01_OpenSearchMenu	0.057	0.079	1.881	0.082
1	DMBM_06_TX_02_Submit	0.129	0.186	3.031	0.165

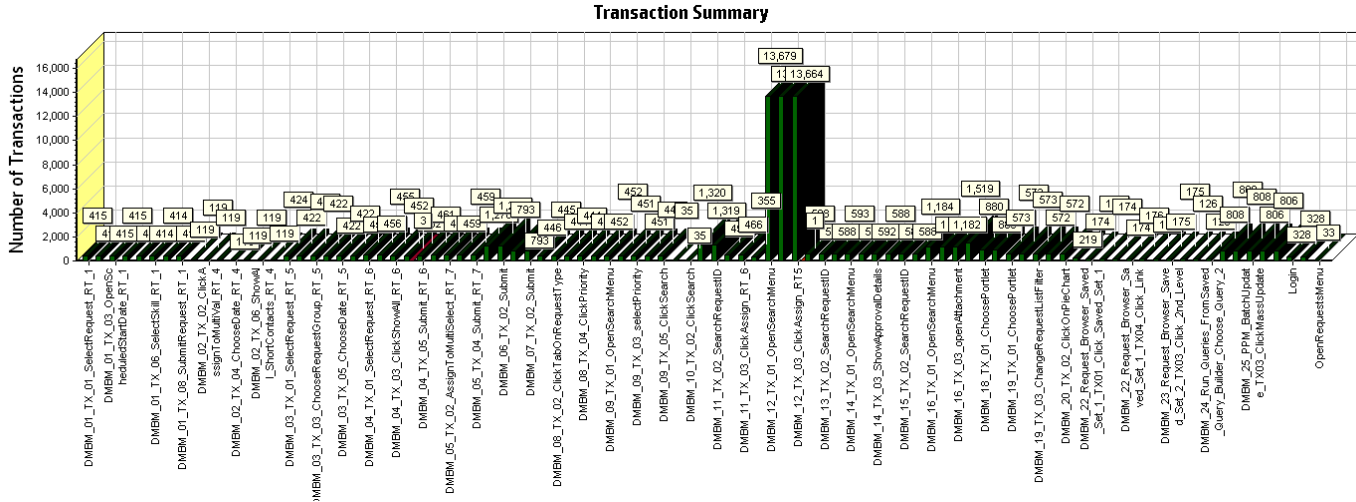
1	DMBM_07_TX_01_OpenSearchMenu	0.058	0.083	1.911	0.107
1	DMBM_07_TX_02_Submit	0.253	0.906	2.431	0.309
1	DMBM_08_TX_01_OpenSearchMenu	0.057	0.087	2.118	0.153
1	DMBM_08_TX_02_ClickTabOnRequest Type	0.016	0.021	0.098	0.008
1	DMBM_08_TX_03_ClickAdvancedSearch	0.074	0.098	0.524	0.035
1	DMBM_08_TX_04_ClickPriority	0.031	0.045	1.301	0.08
1	DMBM_08_TX_05_Submit	0.116	1.484	5.233	1.604
1	DMBM_09_TX_01_OpenSearchMenu	0.06	0.087	2.039	0.146
1	DMBM_09_TX_02_selectRT	0.015	0.022	0.669	0.032
1	DMBM_09_TX_03_selectPriority	0.029	0.04	0.463	0.032
1	DMBM_09_TX_04_ChooseWorkflow	0.033	0.049	0.657	0.042
1	DMBM_09_TX_05_ClickSearch	0.096	0.434	5.048	0.443
1	DMBM_10_TX_01_OpenSearchMenu	0.063	0.106	1.356	0.214
1	DMBM_10_TX_02_ClickSearch	0.132	2.261	15.348	3.253
1	DMBM_11_TX_01_OpenSearchMenu	0.054	0.077	2.018	0.095
1	DMBM_11_TX_02_SearchRequestID	0.11	0.189	2.015	0.13
1	DMBM_11_TX_03_ClickAssign_RT_1	0.341	0.772	7.607	1.13
1	DMBM_11_TX_03_ClickAssign_RT_6	0.425	0.638	4.911	0.24
1	DMBM_11_TX_03_ClickAssign_RT_7	0.343	0.449	1.211	0.066
1	DMBM_12_TX_01_OpenSearchMenu	0.054	0.071	2.036	0.04
1	DMBM_12_TX_02_SearchRequestID	0.077	0.121	2.149	0.046
1	DMBM_12_TX_03_ClickAssign_RT5	0.274	0.383	3.767	0.085
1	DMBM_13_TX_01_OpenSearchMenu	0.021	0.043	2.047	0.14
1	DMBM_13_TX_02_SearchRequestID	0.073	0.145	2.196	0.2
1	DMBM_13_TX_03_ShowGraphicalView	0.196	0.253	2.653	0.135
1	DMBM_14_TX_01_OpenSearchMenu	0.065	0.093	2.035	0.132
1	DMBM_14_TX_02_SearchRequestID	0.124	0.187	2.277	0.145
1	DMBM_14_TX_03_ShowApprovalDetails	0.028	0.149	2.111	0.091
1	DMBM_15_TX_01_OpenSearchMenu	0.053	0.087	1.473	0.121
1	DMBM_15_TX_02_SearchRequestID	0.122	0.199	7.421	0.398
1	DMBM_15_TX_03_ShowTransactional Details	0.016	0.03	1.055	0.051
1	DMBM_16_TX_01_OpenSearchMenu	0.055	0.079	2.054	0.117
1	DMBM_16_TX_02_SearchRequestID	0.117	0.156	2.385	0.1
1	DMBM_16_TX_03_openAttachment	0.007	0.018	0.871	0.033
1	DMBM_17_TX_01_ChoosePortlet	0.855	1.465	49.626	2.006
1	DMBM_18_TX_01_ChoosePortlet	0.904	1.607	49.608	2.789
1	DMBM_18_TX_02_ChooseRequest	0.618	0.764	3.142	0.141
1	DMBM_19_TX_01_ChoosePortlet	0.914	1.746	49.609	3.463
1	DMBM_19_TX_02_EditPortlet	0.096	0.12	0.672	0.037
1	DMBM_19_TX_03_ChangeRequestList Filter	0.996	1.516	2.064	0.168

1	DMBM_20_TX_01_ViewPortlet_With_Bar_And_Pie_Chart	0.969	1.53	15.031	0.937
1	DMBM_20_TX_02_ClickOnPieChart	0.454	0.717	6.599	0.332
1	DMBM_21_OnlySearchRequestBrowser_TX01_Choose_Req_Browser	0.187	0.697	4.38	0.534
1	DMBM_22_Request_Browser_Saved_Set_1_TX01_Click_Saved_Set_1	0.326	0.554	3.486	0.266
1	DMBM_22_Request_Browser_Saved_Set_1_TX02_Click_Tree_Level_1	0.169	0.274	2.281	0.156
1	DMBM_22_Request_Browser_Saved_Set_1_TX03_Click_Tree_Level_2	0.208	0.267	1.788	0.136
1	DMBM_22_Request_Browser_Saved_Set_1_TX04_Click_Link	2.316	3.251	5.48	0.359
1	DMBM_23_Request_Browser_Saved_Set_2_TX01_Push_Saved_Set_2	0.289	0.468	3.012	0.244
1	DMBM_23_Request_Browser_Saved_Set_2_TX02_Click_1st_Level	0.153	0.257	2.358	0.166
1	DMBM_23_Request_Browser_Saved_Set_2_TX03_Click_2nd_Level	0.103	0.167	1.222	0.082
1	DMBM_23_Request_Browser_Saved_Set_2_TX04_Click_Link	0.528	0.789	2.286	0.145
1	DMBM_24_Run_Queries_FromSaved_Query_Builder_Choose_Query_1	1.786	2.589	5.986	0.376
1	DMBM_24_Run_Queries_FromSaved_Query_Builder_Choose_Query_2	5.398	7.514	9.241	0.847
1	DMBM_25_PPM_BatchUpdate_TX01_SearchRequests	0.351	0.44	1.552	0.088
1	DMBM_25_PPM_BatchUpdate_TX02_Search75Req	0.634	1.041	8.532	0.387
1	DMBM_25_PPM_BatchUpdate_TX03_ClickMassUpdate	0.303	0.435	0.797	0.043
1	DMBM_25_PPM_BatchUpdate_TX04_ClickDone	0.016	0.027	0.519	0.021
1	DMBM_25_PPM_BatchUpdate_TX05_ClickContinue	0.852	1.441	2.202	0.146
1	Login	0.282	6.213	28.21	6.72
1	Logout	0.155	0.296	2.282	0.344
1	OpenRequestsMenu	0.053	0.448	1.02	0.29



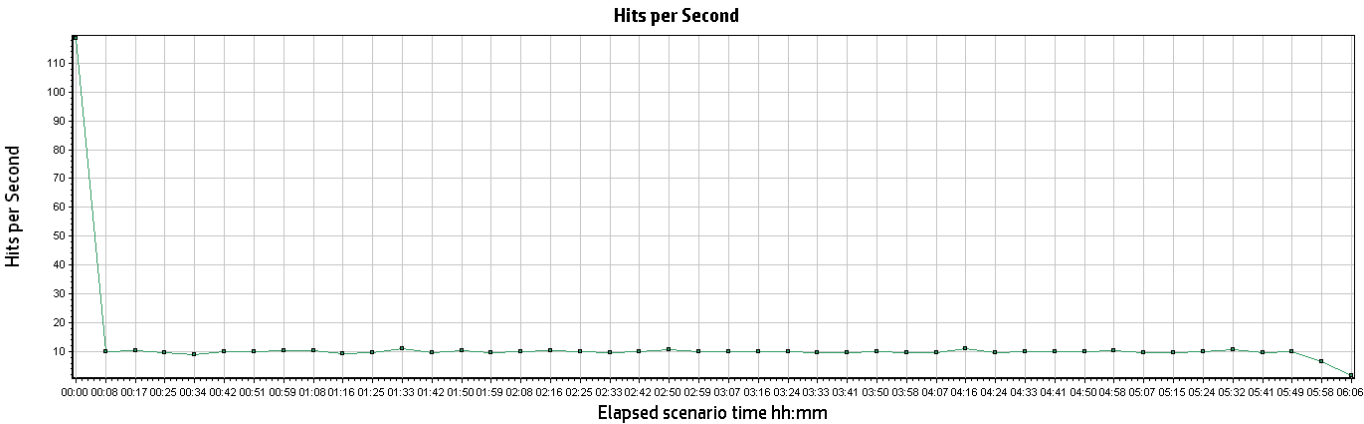
1	Fail	0.000	0.000	0.002	0.000	0.000
1	Pass	0.984	3.834	4.578	3.887	0.458
1	Stop	0.000	0.000	0.002	0.000	0.000

## 2.9 Transaction Summary



Color	Scale	Measurement
Green	1	Pass
Pink	1	Fail
Orange	1	Stop

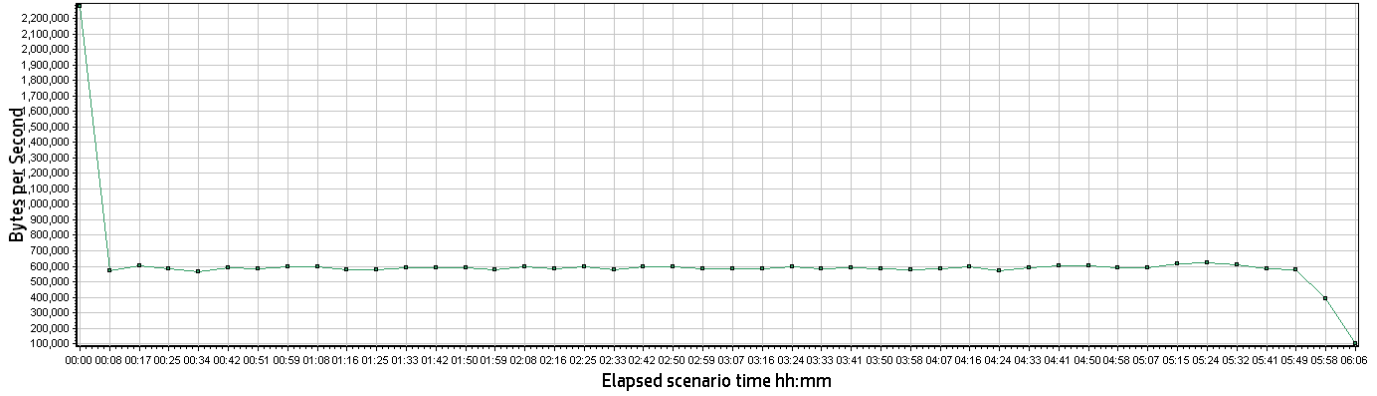
## 2.10 Hits per Second



Color	Scale	Measurement	Graph Minimum	Average	Graph Maximum	Graph Median	Graph Std. Deviation
Green	1	Hits	1.536	12.071	118.648	9.773	16.317

## 2.11 Network Throughput

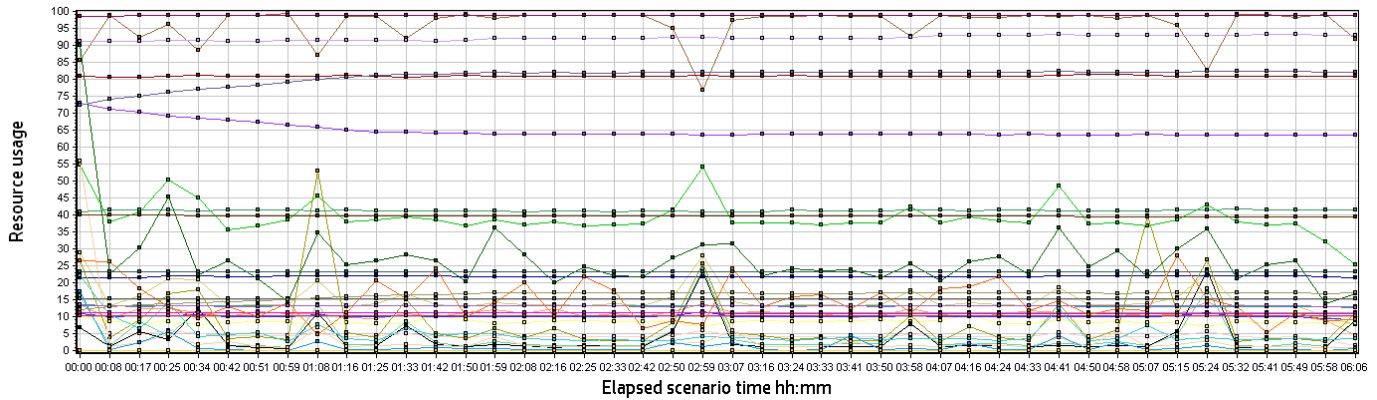
Throughput



Color	Scale	Measurement	Graph Minimum	Average	Graph Maximum	Graph Median	Graph Std. Deviation
	1	Throughput	101,224.281	614,588.556	2,277,133.809	588,937.271	265,761.837

## 2.12 PPM Application Servers CPU Usage

Windows Resources



Color	Scale	Measurement	Minimum	Average	Maximum	Std. Deviation
	1	% Disk Time (PhysicalDisk_Total):16.186.76.172	0.000	4.285	140.023	15.621
	1	% Idle Time (PhysicalDisk_Total):16.186.76.172	3.987	96.211	100.296	15.084
	100	% Interrupt Time (Processor_Total):16.186.76.172	0.000	0.109	0.976	0.100
	10	% Privileged Time (Processor_Total):16.186.76.172	0.000	1.516	19.385	1.577

1	% Processor Time (Processor _Total):16.186.76.172	0.000	4.547	86.016	3.942
0.01	Available MBytes (Memory):16.186.76.172	6,269.000	6,483.814	7,764.000	228.402
0.001	Avg. Disk Bytes/Transfer (PhysicalDisk _Total):16.186.76.172	0.000	8,481.205	352,256.000	7,420.535
100	Avg. Disk Queue Length (PhysicalDisk _Total):16.186.76.172	0.000	0.043	1.400	0.156
0.001	Bytes Total/sec (Server):16.186.76.172	10,758.293	21,807.887	26,711.500	657.687
1E-07	Cache Bytes (Memory):16.186.76.172	803,217,408.000	809,694,525.425	820,629,504.000	2,048,738.605
1E-09	Committed Bytes (Memory):16.186.76.172	10,945,994,752.000	11,159,783,084.811	11,349,016,576.000	62,454,760.130
0.01	Context Switches/sec (System):16.186.76.172	1,773.738	3,935.420	43,758.809	1,941.221
0.1	Disk Transfers/sec (PhysicalDisk _Total):16.186.76.172	0.000	36.597	1,913.075	157.293
0.1	File Data Operations/sec (System):16.186.76.172	3.331	91.694	62,516.798	961.066
0.001	Free Megabytes (LogicalDisk _Total):16.186.76.172	13,065.000	13,097.098	13,131.000	16.170
0.001	Interrupts/sec (Processor _Total):16.186.76.172	8,361.695	10,074.298	20,482.402	1,226.273
0.01	Page Faults/sec (Memory):16.186.76.172	0.999	492.372	62,047.125	1,478.108



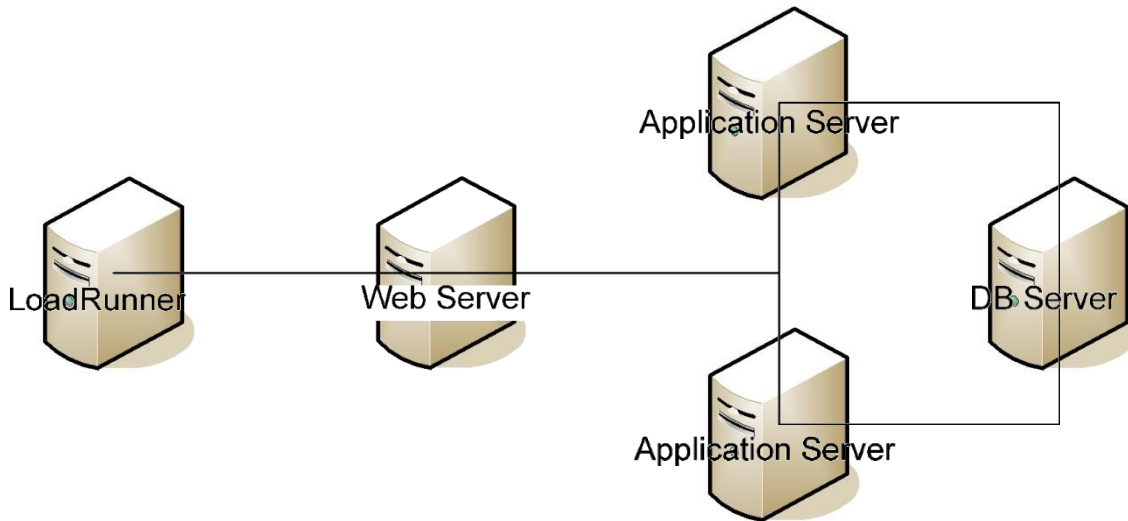
	10	Page Reads/sec (Memory):16.186.76.172	0.000	0.325	241.879	3.823
	1	Pages/sec (Memory):16.186.76.172	0.000	1.304	1,849.289	26.769
	1E-07	Pool Nonpaged Bytes (Memory):16.186.76.172	395,059,200.000	396,540,533.922	399,917,056.000	1,181,438.006
	1E-05	Pool Nonpaged Bytes (Server):16.186.76.172	4,037,109.000	4,126,422.420	4,213,237.000	32,279.812
	1E-08	Pool Paged Bytes (Memory):16.186.76.172	1,096,957,952.000	1,104,945,428.498	1,129,861,120.000	7,336,270.272
	0.0001	Pool Paged Bytes (Server):16.186.76.172	102,636.000	102,636.274	103,148.000	11.836
	1	Pool Paged Failures (Server):16.186.76.172	0.000	0.000	0.000	0.000
	1E-08	Private Bytes (Process_Total):16.186.76.172	8,987,271,168.000	9,220,748,185.477	9,412,468,736.000	67,339,338.634
	100	Processor Queue Length (System):16.186.76.172	0.000	0.146	24.000	0.641
	10	Split IO/Sec (PhysicalDisk_Total):16.186.76.172	0.000	2.723	78.660	6.635
	1E-07	System Cache Resident Bytes (Memory):16.186.76.172	803,217,408.000	809,694,497.501	820,629,504.000	2,048,690.882
	0.01	Threads (Objects):16.186.76.172	1,238.000	1,315.389	1,521.000	20.627
	1E-08	Working Set - Private (Process java#1):16.186.76.172	1,528,336,384.000	1,529,243,126.487	1,529,462,784.000	237,277.017
	1E-07	Working Set - Private (Process java#2):16.186.76.172	986,755,072.000	988,113,567.534	988,651,520.000	628,273.018

	1E-08	Working Set - Private (Process java#3):16.186.76.172	948,039,680.000	1,627,134,224.391	1,736,065,024.000	127,334,790.186
	0.0001	Working Set - Private (Process java):16.186.76.172	233,472.000	233,472.000	233,472.000	0.000
	1E-08	Working Set (Process _Total):16.186.76.172	6,743,281,664.000	8,086,667,985.632	8,338,857,984.000	246,501,616.678

## APPENDIX A – Benchmark Environment

### Benchmark Test Environment

The environment created for the benchmarking effort is illustrated in the figure below.



- **Web Server.** Microsoft IIS server which balances the load between across the PPMC nodes handling user requests on the application server hosts. The Web server communicates with the HPE PPMC application container using the AJP13 protocol. The web server host has the following characteristics:
  - Linux version 2.6.18-231.el5
  - 1 Intel(R) Xeon(R) CPU L5640 @ 2.27GHz
  - 800 MB of RAM
  - Red Hat Enterprise Linux Server release 5.6 Beta (Tikanga)
- **Application Servers.** The environment consists of 2 clustered Application Server machines with PPM nodes, designated "Application Server 1" and "Application Server 2". Each server has a PPMC node for handling incoming user requests. One of the servers has an additional node for handling background services. The application servers have the following characteristics:
  - 8 Core 2.27 GHZ Intel Xeon(R) L5640
  - 16 GB of RAM
  - Microsoft Windows 2008 R2 Enterprise Service Pack 1
- **Database Server.** The database runs on a dedicated host machine and communicates with both PPMC application servers using the JDBC protocol. The database server has the following characteristics:
  - 40 Intel(R) Xeon(R) CPU E7-4820 v3 @ 1.90GHz
  - 256 GB of RAM
  - Linux version 3.10.0-327.10.1.el7.x86\_64
  - Oracle version 12.1.0.2.0
  - Gigabit Ethernet adapter
- **Client Browser** settings are consistent with the default settings of Microsoft Internet Explorer 11.0, and the simulation assumes that the browser:
  - Has caching turned on
  - Supports GZIP encoding, where the application server compresses HTTP replies and thereby reduces network bandwidth utilization.

## Hardware Configuration Table

Purpose	CPU	Memory	Software	OS
Web Server / Load Balancer	1 x 2.27 Ghz	8GB	Apache 2.2	Red Hat Linux version 5.6 Beta (Tikanga)
App Server #1	8 x 2.27 Ghz	16GB	PPM 9.42	Windows 2008 R2 SE
App Server #2	8 x 2.27 Ghz	16GB	PPM 9.42	Windows 2008 R2 SE
DB Server	40 x 1.90 Ghz	256GB	Oracle 12.1.0.2.0	RH Linux version 7.2 (Maipo)

## LoadRunner Run Time Detail Settings

Tool	LoadRunner Controller
Logging	Enable logging; Send message only when error occurs
Additional Attributes	N/A
Miscellaneous	Generate snapshot on error Run Vuser as thread
Speed Simulation	Use maximum bandwidth
Browser Emulation	User Agent: Mozilla/4.0 (compatible; MSIE 6.0; Windows NT 5.1; SV1; .NET CLR 1.1.4322; .NET CLR 2.0.50727 Simulate browser cache; cache URLs requiring content (HTMLs) Download non-HTML resources Simulate a new user on each iteration Clear cache on each iteration
Internet Protocol Preferences	Hits per second and HTTP codes Response bytes per second File and line in automatic transaction names Non-critical resource errors as warnings Save snapshot resources locally
Internet Protocol Content Check	Enable content check during replay