

## AppDynamics Lite Performance Benchmark

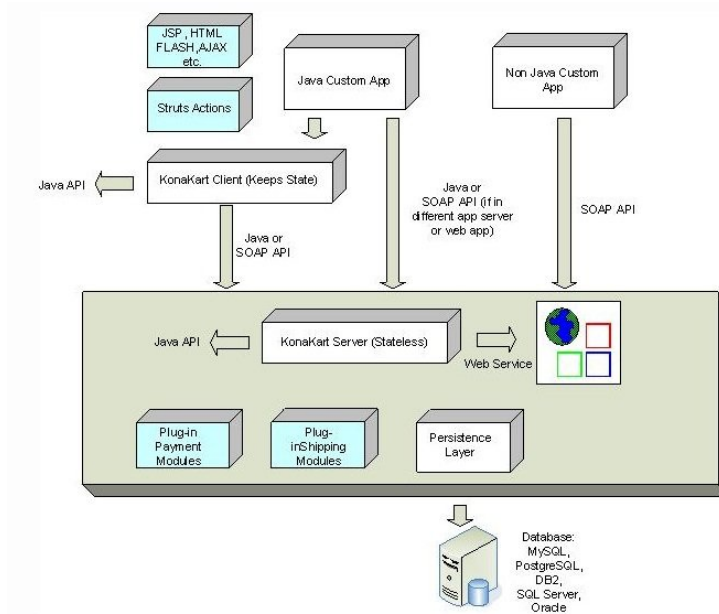
### For KonaKart E-commerce Server (Tomcat/JSP/Struts)

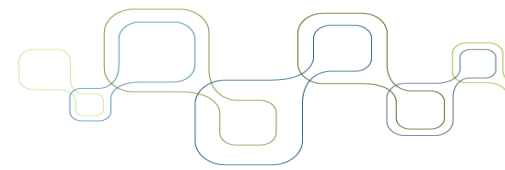
At AppDynamics, we constantly run a lot of performance overhead tests and benchmarks with all kinds of Java/J2EE applications, to measure the overhead of AppDynamics agent on a production application.

In this article, we are publishing the results of benchmarks tests we performed recently with AppDynamics Lite on a well-known E-Commerce application suite called KonaKart (<http://www.konakart.com/>). We picked KonaKart as one of applications for our performance benchmarks because it is a complex business application used in real-world revenue-critical environments, and is more representative of how our customers use AppDynamics, compared to simple demo applications like MedRec and PetStore. Also, KonaKart is available to download for free, and anyone can run the same performance benchmark tests as we do and replicate the results.

### Test Application

The KonaKart application uses Sun Java 1.6, Tomcat Servlet Container, and a MySQL Database. The application uses a standard JSP/Struts based web programming stack. Here is the architecture of the application:





## Test Goals

The goals of the benchmark tests are to measure the following:

- Response Time (Latency) overhead of AppDynamics Agent, measured as change in Response Time for different transactions
- Throughput overhead of AppDynamics Agent, measured as change in Throughput for different transactions
- CPU, Network I/O and Disk I/O overhead of AppDynamics Agent, measured as change in CPU utilization, and Network/Disk activity on the App Server machine

## Test Environment

We used 3 machines for this benchmark test.

Machine 1: Tomcat Application Server

Machine 2: MySQL Database

Machine 3: Apache JMeter Load Generator Scripts

All the 3 machines have Ubuntu Linux on them, and are Dell PowerEdge SC 1425 boxes with Quad-Core Intel Xeon 2.8GHz CPU and 4 GB RAM.

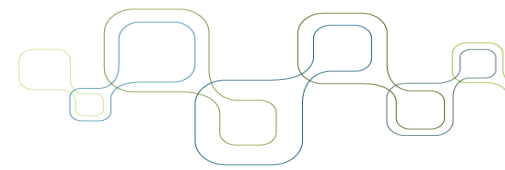
## Test Methodology

The tests were done by using JMeter to generate load. We generated concurrent user load using 15 JMeter threads. The JMeter scripts & AppDynamics Agent thresholds were configured to simulate a good distribution of normal requests, slow requests and very slow requests, with the goal to simulate a high-volume production environment having some performance problems and the AppDynamics solution configured to collect all diagnostic data needed to troubleshoot those problems.

All the JMeter scripts are available on request, and these tests can be reproduced by anyone by downloading a) KonaKart server (<http://www.konakart.com/downloads>), b) AppDynamics Lite (<http://www.appdynamics.com/free>), and c) the JMeter scripts and instructions.

## Response Time Overhead Test

To measure Response Time overhead, we used JMeter to generate load on a populated KonaKart application. We captured the JMeter results on Response Time (Average, Median, 90% Line, Min and Max) with and without the AppDynamics Agent. The test was run for 6 hours in both the cases, and JMeter was configured to generate load representative of high-volume production environments, of about 120K requests per hour.



The results are:

Transaction	Without AppDynamics Agent							With AppDynamics Agent						
	# Samples	Average	Median	90% Line	Min	Max		# Samples	Average	Median	90% Line	Min	Max	
/	26439	364	304	503	141	42067		26362	352	314	500	150	20713	
/Welcome.do	26439	351	294	452	137	42070		26360	334	305	452	137	20457	
/LogIn.do	26437	63	45	76	21	35774		26359	62	49	82	25	5145	
/LoginSubmit.do	26436	147	122	200	43	41607		26359	151	132	216	54	3797	
/SelectCat.do	158606	82	59	115	24	35852		158154	85	63	122	26	20270	
/SelectProd.do	105730	93	68	129	33	41725		105431	96	73	137	38	20465	
/ShowReviews.do	52864	63	47	79	23	16219		52712	66	50	85	25	20330	
/QuickSearch.do	26433	52	36	57	18	25425		26359	51	38	61	20	3050	
/ShowRandomReviewDetails.do	26433	57	44	71	23	4108		26359	62	47	77	25	20257	
/ShowSearchByManufacturerResults.do	26433	78	55	105	28	3530		26359	85	60	118	32	20244	
/ShowCartItems.do	52866	136	111	187	8	41364		52714	140	120	200	9	20536	
/AddToCartSubmit.do	26433	261	227	357	90	36373		26358	270	243	375	108	20817	
/EditCartSubmit.do	79294	123	109	208	12	42193		79062	123	118	220	14	20471	
/AddToCartFromProdid.do	26430	309	261	422	60	36290		26352	311	279	434	68	20748	
/ShowOrderDetails.do	26428	44	31	49	18	4127		26350	45	34	52	19	5717	
/MyAccount.do	26425	69	50	84	23	41555		26349	67	54	89	28	3681	
<b>TOTAL</b>	<b>766559</b>	<b>119</b>	<b>67</b>	<b>274</b>	<b>8</b>	<b>42193</b>		<b>764355</b>	<b>121</b>	<b>72</b>	<b>281</b>	<b>9</b>	<b>20817</b>	

Measured Overhead on Avg Response Time for the period of 6 hours: 1.68%

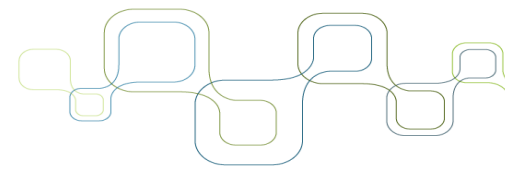
## Throughput Overhead Test

To measure Throughput overhead, we used JMeter to generate load on a populated KonaKart application. We captured the JMeter results with and without the AppDynamics Agent. The test was run for 6 hours in both the cases, and JMeter was configured to generate load representative of high-volume production environments, of about 120K requests per hour.

The results are:

Transaction	Without AppDynamics Agent		With AppDynamics Agent	
	Throughput	KB/sec	Throughput	KB/sec
/	1.224044042	46.09305204	1.223352533	46.07162512
/Welcome.do	1.224268494	46.10610669	1.22339635	46.07792249
/LogIn.do	1.224243173	30.1583273	1.223397823	30.14212972
/LoginSubmit.do	1.224234679	30.12649002	1.223391875	30.12880493
/SelectCat.do	7.345326634	176.3021875	7.339832091	176.308399
/SelectProd.do	4.897342929	119.4848757	4.892863161	119.4397303
/ShowReviews.do	2.448666657	63.84731677	2.446258055	63.80173434
/QuickSearch.do	1.224673665	25.26198767	1.223398186	25.25876106
/ShowRandomReviewDetails.do	1.224672757	29.00474788	1.223457654	28.99900692
/ShowSearchByManufacturerResults.do	1.224672019	27.47074245	1.223458107	27.46667017
/ShowCartItems.do	2.449046754	62.75711551	2.446639869	62.85632423
/AddToCartSubmit.do	1.224652841	32.44364116	1.223449722	32.40758965
/EditCartSubmit.do	3.673576586	100.9313515	3.669744146	100.8428521
/AddToCartFromProdid.do	1.224647129	31.94742363	1.223367302	31.92131547
/ShowOrderDetails.do	1.224614605	17.18753108	1.223363902	17.17020268
/MyAccount.do	1.224510147	30.17576667	1.22337603	30.15256719
<b>TOTAL</b>	<b>35.48854521</b>	<b>1082.963721</b>	<b>35.46750589</b>	<b>1082.809962</b>

Measured Avg Overhead on Throughput for the period of 6 hours: 0.06%

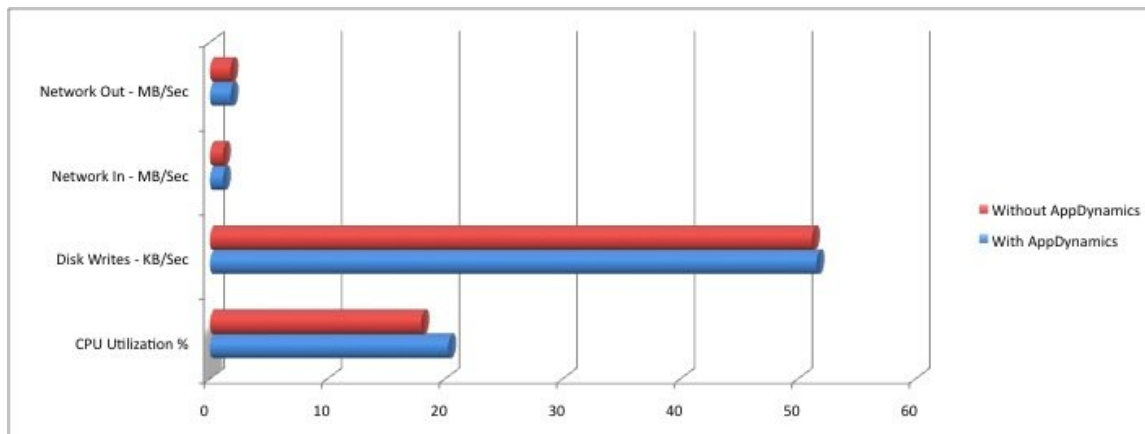


## CPU, Network I/O & Disk I/O Overhead Test

To measure CPU, Network I/O & Disk I/O overhead, we used JMeter to generate load on a populated KonaKart application. We captured resource utilization metrics using the Linux Collectl tool (<http://collectl.sourceforge.net>) with and without the AppDynamics Agent. The test was run for 6 hours in both the cases, and JMeter load generation was configured to generate load representative of high-volume production environments, of about 120K requests per hour.

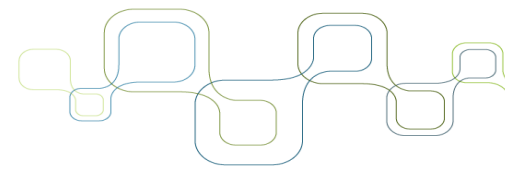
The results are:

	CPU Utilization %	Disk Writes - KB/Sec	Network In - MB/Sec	Network Out - MB/Sec
Without AppDynamics	17.98	51.19	1.10093	1.75184
With AppDynamics	20.27	51.57	1.110988	1.7655



### Measured Avg Overhead for the period of 6 hours:

CPU Utilization	2.29%
Network In MB/sec	0.91%
Network Out MB/sec	0.78%
Disk Writes KB/sec	0.74%



## Summary

The summary of the results of the above benchmark tests to measure the overhead of AppDynamics Lite on a high-volume KonaKart E-commerce server application is:

Response Time Overhead	1.68%
Throughput Decrease	0.06%
CPU Utilization Increase	2.29%
Network Reads Increase	0.91%
Network Writes Increase	0.78%
Disk Writes Increase	0.74%

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