Performance Evaluation & Comparative study of Oracle APEX, PHP and .NET Applications with Testing Tools

Digvijay Virpura¹

PhD Scholar, Rai University, Saroda, Ahmedabad, Gujarat- India. Dr. Priya Swaminarayan² Principal, Parul Institute of Computer Application, Parul University,

Vadodara, Gujarat- India

ABSTRACT

Software Development is changing rapidly and it also have different options to choose from for the development of application or website. Many application have been developed and deployed daily and all those applications or websites were tested to check the performance before they are deployed. To evaluate the performance of any application or website many open source and paid application is available so that testing team can test the performance of each application or website.

This paper focus on the Performance evaluation of basic application developed in Oracle APEX, PHP and .NET. APACHE JMeter have been chosen to measure the performance of above application with different virtual load. How applications behaves in different environment have been tested and results recorded. In APACHE JMeter initial test have been conducted with minimum number of virtual user load and slowly increased the user load to test the performance of an application. Different performance measures like Virtual User, Median, Throughput, and Average have been evaluated.

KEYWORDS

Performance Evaluation with JMeter, Oracle APEX Performance Evaluation, PHP Performance Evaluation, .NET Performance Evaluation, Apache JMeter, HP Load Runner

1. INTRODUCTION

Software Development is changing rapidly but the methods are almost same in all the development environment. Nowadays developers required a real Rapid Application Development Tool which can develop and deploy application rapidly. Performance testing is the testing which is performed to ascertain how the components of a system are performing under a particular given situation[1]. Every application or website is tested before it gets deployed to the end-user so that it can performance as if it was implemented to perform.

In this paper three different development platform have been chosen to evaluate the performance of their basic application. Development platform which is tested are Oracle Application Express, PHP and .NET. Basic application have been developed in all the above mentioned development environment and a test have been conducted to evaluated the performance of each development platform. To test the performance of above mentioned application APACHE JMeter have been chosen as this testing tool is one of the widely used tools in the Testing environment which is available as Open Source Tool. Demo version of HP Load Runner have been used to test the performance of application with different virtual user load.

2. BACKGROUND STUDY

Oracle Application Express have been chosen for the performance evaluation test as it is Rapid Application Development Tool.Oracle Application Express (Oracle APEX), is the low code web application development tool for the Oracle database[2].A Simple Oracle APEX Application have been developed and used for the performance evaluation. Using only a web browser and limited programming experience, you can rapidly develop and deploy professional applications that are both fast and secure for any device from desktop to mobile[2].

PHP development platform have been chosen to perform the test. PHP is a serverside scripting language designed primarily for web development but also used as a generalpurpose programming language.[3]

.NET Framework is developed by Microsoft which runs on Windows. It includes a large class library named Framework Class Library (FCL) and provides language interoperability (each language can use code written in other languages) across several programming languages[4].

Apache JMeter have been used to test the performance of application developed in Oracle APEX, PHP and .NET. Apache JMeter is a 100% pure java desktop application designed to load test client/server software (such as a web application).[5]JMeter is Javabased programming software that can perform a load test, performance oriented business (functional) test, regression test, and so on.[6]

3. RESEARCH METHODOLOGY

Following table shows the system on which the test have been run and result recorded. Initial test have been conducted with minimum virtual user load and then it was slowly increased to evaluate the performance of application in different environment.

Lasie	or resume		
Processor	Memory	HardDrive	Platform
Intel(R) Core(TM)i7-3500M CPU @2.90Ghz	8.00 GB	1 TB	Windows 8.1 64-bit

Table 1. System used for Testing

Different parameters have been evaluated which is recorded in APACHE JMeter while conducting a test on Oracle APEX, PHP and .NET. This test was conducted to check the performance of different development architecture with different virtual user load.

4. DEVELOPMENT PLATFORM ARCHITECTURES

1. Oracle Application Express Architecture:

APEX was created by Mike Hichwa, a developer at Oracle, after development of his previous project, Web DB, started to diverge from his original vision [7]. Oracle APEX architecture is so simple that even a developer with basic knowledge can develop and application in APEX. Oracle Application Express consists of a metadata repository that stores the definitions of applications and an engine (called the Application Express engine) that renders and processes pages. [8]



Fig 1: Oracle Application Express Listener[7]

2. PHP Platform Architecture

PHP code may be embedded into HTML or HTML5 markup, or it can be used in combination with various web template systems, web content management systems and web frameworks. [3]



Fig 2: PHP Architecture[9]

3. .NET Architecture

Microsoft's .NET technology brings together a number of elements, including the .NET framework, the user interface (UI), .NET languages and VisualStudio.NET[10].

5. TESTING RESULTS AND DISCUSSION

Test was conducted in the environment as shown in Table 1 to evaluate the performance of different development environment like Oracle APEX, PHP and .NET. Different performance parameters which is available with Apache JMeter have been used.

Initially 50 Virtual user load have been used to test the performance of Oracle APEX, PHP and .NET application. Test was conducted on all three technologies with 50

virtual user load and then with 400 virtual user load. Performance of all three application developed in different technology is evaluated with different available parameter.

APEX-PHP	View Results	View Results in Table												
HTTP Request Defaults	Name: View Res													
HTTP Request	Commente:	Comments:												
View Results in Table	Commence	Write results to the / Dead from the												
- Aggregate Graph	Write results to	White results to hie / Read from the												
Aggregate Report	Filename					Brow	Log/Display	y Only: 🔲 Errors	Successes	Configure				
Comparison Assertion Visualizer														
Grant Results	Sample #	Stort Time	Thread Name	Label	Sample Timer	Status	Butes	Sent Butes	Latency (Connect Time/				
Beenanae Time Cranh	24	11.02.02.174	Inread Group	HIT Request	Sample Innot	V	5088	138	9	ionno or minor				
Response Time Graph	25	11:02:02.972	Thread Group	HTTP Request	14	0	5588	138	14					
 Spine visualizer 	26	11:02:03.184	Thread Group	HTTP Request	9	0	5588	138	9					
Summary Report	27	11:02:03.37:	Thread Group	HTTP Request	9	9	5588	138	9					
View Results Tree	28	11:02:03.572	Thread Group	HTTP Request	10	0	5588	138	10					
WorkBench	29	11:02:03.772	Thread Group	HTTP Request	10	0	5588	138	10					
	30	11:02:03.975	Thread Group	HTTP Request	10	0	5588	138	10					
	31	11:02:04.174	Thread Group	HTTP Request	7	10	5588	138	7					
	32	11.02:04.372	Thread Group	HTTP Request	8	0	5588	138	8					
	33	11:02:04:575	Thread Group	HTTP Request	10	9	5588	138	10					
	34	11:02:04.77	Thread Group	HTTP Request	8	0	5588	138	8					
	35	11:02:04.97	Thread Group	HTTP Request	8	9	5588	138	8					
	36	11:02:05.17	Thread Group	HTTP Request	8		5588	138	8					
	37	11:02:05.371	Thread Group	HTTP Request	9	9	5588	138	9					
	38	11:02:05.572	Thread Group	HTTP Request	8		5588	138	8					
	39	11:02:05.77*	Thread Group	HTTP Request	22	0	5588	138	22					
	40	11:02:05.955	Thread Group	HTTP Request	8	9	5588	138	8					
	41	11:02:06.17	Thread Group	HTTP Request	8	0	5588	138	8					
	42	11:02:06:37	Thread Group	HTTP Request	8		5588	138	8					
	43	11:02:06:570	Thread Group	HTTP Request	8		5588	138	8					
	44	11:02:06.77	Inread Group	HTTP Request	8		5588	138	8					
	40	11.02.06.970	Thread Group	HTTP Request	10		0000	130	10					
	40	11.02.07.170	Thread Group	HTTP Request	10	×.	8800	138	10					
	4/	11.02.07.375	Thread Group	HTTP Request	9		8800	138	9					
	40	11.02.07.570	Thread Group	HTTP Request	0		0000	130	0					
	49	11.02.07.78	Thread Group	Inter Request	0		0000	1.30	0					

Fig 3: Oracle APEX Application with 50 Virtual User Load in Apache JMeter

TEST														
Thread Group	View Results in T	view results in Table												
	Name: View Results in	Name: View Results in Table												
Appregate Graph	Comments:	Comments:												
- 🐼 Spline Visualizer	Write results to file /	Read from file												
Summary Report	Channel				Las Dissis Only 1		and Cardo							
View Results Tree	rivename	Browse Logicitybey City: Entres Successes Comp												
Distribution Graph (alpha)														
Comparison Assertion Visualizer	Sample #	Start Time	Thread Name	Label	Sample Time(ms)	Status	Bytes	Latency	Connect Time(
a section	1	22:15:35.23	0 Thread Group 1-1	HTTP Request	89	2	5503	41						
	2	22:15:35.30	4 Thread Group 1-2	HTTP Request	69	2	5498	26						
	3	22:15:35.34	5 Thread Group 1-3	HTTP Request	97	4	5498	43						
	4	22:15:35.38	4 Thread Group 1-4	HTTP Request	77	A	5503	26						
	5	22:15:35.43	5 Thread Group 1-5	HTTP Request	96	4	5498	50						
	6	22:15:35.46	8 Thread Group 1-6	HTTP Request	74	A	5503	27						
	7	22:15:35.50	9 Thread Group 1-7	HTTP Request	81	4	5503	28						
	8	22:15:35.54	8 Thread Group 1-8	HTTP Request	105	A	5501	43						
	9	22:15:35.5	7 Thread Group 1-9	HTTP Request	110	A	5500	65						
	10	22:15:35.63	9 Thread Group 1-10	HTTP Request	68	4	5495	23						
	11	22:15:35.66	8 Thread Group 1-11	HTTP Request	93	1	5500	45						
	12	22:15:35.70	8 Thread Group 1-12	HTTP Request	82	A	5498	28						
	13	22:15:35.74	9 Thread Group 1-13	HTTP Request	85	4	5501	30						
	14	22:15:35.7	2 Thread Group 1-14	HTTP Request	82	A	5501	36						
	15	22:15:35.83	8 Thread Group 1-15	HTTP Request	70	4	5498	27						
	16	22:15:35.8	9 Thread Group 1-16	HTTP Request	69	1	5500	27						
	17	22:15:35.9	1 Thread Group 1-17	HTTP Request	71	A	5501	26						
	18	22:15:35.94	9 Thread Group 1-18	HTTP Request	82	(A)	5500	28						
	19	22:15:35.98	8 Thread Group 1-19	HTTP Request	88	14	5503	42						
	20	22:15:36.03	8 Thread Group 1-20	HTTP Request	69	4	5501	25						
	21	22:15:36.08	8 Thread Group 1-21	HTTP Request	77	10	5503	33						
	22	22:15:36.10	9 Thread Group 1-22	HTTP Request	71	-	5503	22						
	23	22:15:36.15	0 Thread Group 1-23	HTTP Request	73	4	5501	24						
	24	22:15:36.18	8 Thread Group 1-24	HTTP Request	71	4	5498	28						
	25	22:15:36.23	0 Thread Group 1-25	HTTP Request	67	-	5500	23						
	26	22:15:36.26	9 Thread Group 1-26	HTTP Request	71	10	5500	26						
	27	22:15:36.3	2 Thread Group 1-27	HTTP Request	71	1	5503	28						
	20	22,15,25.2		A COTTO D a series	20		5002	22						

Fig 4: PHP Application with 50 Virtual User Load in Apache JMeter

DV_Test Plan.jmx (F:\RAI	University/Important Soft	ware for PHD\ap	ache jmeter-2.1	3\apache-jme	ter-2.13\bin\DV_Te	st Plan.jmx) - Apache JMeter (2.13	r1665067)	- 0 ×			
			00	20 20 4	a 😼	15			111 🔔 0 / 50			
P 👗 DV_Test Plan	View Results in	Table										
Thread Group												
HTTP Request	Name: View Results in Table Comments:											
- Standard Graph												
- C Aggregate Report	Write results to file	/ Read from file										
Assertion Results						-			F			
Backend Listener	Filename					Browne	Log/Display Only: Err	ors 🛄 Successes	Configure			
S DeanShell Listener												
IST BSELISTEDER	Sample #	Start Time	Thread Name	Label	Sample Time(ms)	Status	Butes	Latency Cr	innect Time(ms)			
Comparison Assertion Maualitar	241	15 07.17 103 11	Head Group 1-23	TITE Request		64	9010	201	3			
	25	13:57:17.507 TI	read Group 1-25 8	HTTP Request	81	4	9677	17	1			
- Cal Ostributos Graph (apria)	26	13:57:17.695 TI	read Group 1-26	HTTP Request	79		9675	18	0			
Generate Summary Results	27	13.57.17.882 TI	nread Group 1-27 I	HTTP Request	64	4	9674	18	1			
Graph Results	28	13:57:18:172 TI	nread Group 1-28	HTTP Request	71	4	9679	16	1			
JSR223 Listener	29	13:57:18.350 TI	tread Group 1-29 8	HTTP Request	75	44	9678	15	0			
Mater Visualizer	30	13:57:18.549 TI	read Group 1-30	ITTP Request	79	64	9678	15	1			
Monitor Results	31	13.57.18.744 TI	nread Group 1-31	HTTP Request	74	<u></u>	9678	15				
Becacose Time Grach	32	13 57 18 941 11	aread Group 1-32	HTTP Request	67		9677	15	1			
CT Response rine origin	33	13:57:19.136 11	rread Group 1-33	HTTP Request	63		9679	18	0			
Save Heaponales to a tel	34	13:57:19.362 11	tread Group 1-34	HTTP Request	76		9678	15	0			
- Simple Data Writer	30	13.57.19.59111	tread Group 1-35	TTP Request	00		9678	20				
Spline Visualizer	40	13.57.19.77711	read Group 1-36	ATTP Request	70	64	9679	13				
Summary Report		13.57.19.951 11	iread Group 1-37	411P Request	67		9677	1.3				
View Results in Table	30	13.57.20.204 11	tread Group 1-38	TTP Request	61	<u>64</u>	9676	10				
View Results Tree	40	12:57:20.004 11	read Group 1-381	ITTP Request	60		0677	14				
(2) Martheren	40	13.57.20.700 T	read Group 1-40	JTTP Request	00		0679	14				
Del accumulat	42	13:57:21 020 T	read Group 1-47	HTTP Request	64	1	9677	15	1			
	43	13:57:21 198 T	tread Group 1-43	HTTP Request	61	10	9679	15				
	44	13:57:21 439 T	tread Group 1-44	ITTP Request	65		9679	13	1			
	45	13 57 21 660 T	read Group 1-45	ITTP Request	68	70	9677	18	1			
	46	13:57:21 882 11	read Group 1-46	HTTP Request	61	7	9679	14	4			
	47	13:57:22.084 T	read Group 1-47	HTTP Request	69	14	9678	15	1			
	40	13:57:22.291 TI	read Group 1-48	ITTP Request	81	2	9677	14	0			
	49	13.57.22.487 T	read Group 1-49	HTTP Request	94	2	9677	29	1			
	50	13 57 22 696 TI	read Group 1-50	HTTP Request	68		9675	16	1			
	Scroll automatica	lly? Child samp	iles?	No of Samples	50 Late	est Sample 6	Average 159	Deviation 158	8			

Fig 5: .NET Application with 50 Virtual User Load in Apache JMeter

Following chart shows the performance data analysis of three different application developed in different architecture.



Fig 6: Performance Evaluation Chart with 50 Virtual User Load



Fig 7: Response time of applications with 50 Virtual User Load

Further the test was extended with increasing the virtual user load to measure the performance of application in different environment. Test was conducted with 400 virtual user load.

- 🚳 🔒 🧐 🖬 🛃 👘 🖻	X 🗊 🖸 🔸 – 🔨		004	20 20 1	M 🕷 🏷	(ii)			0 📥 0 / 400
Test Plan Thread Croup	View Results i	n Table							
HTTP Request	Name: View Result	s in Table							
Appreciate Graph	Commenter								
- IV Anorenate Benort	Comments.								
The County Results	Write results to fil	e / Read from Sie	k						
Spline Visualizer	Filename					Browse	Log/Display Only: D Free	ors 🔛 Successes	Configure
Verw Results in Table	Sample #	Start Time	Thread Name	Latel	Sample Time(ms)	Status	Bytes	Latency Co	met Time(ms)
WardGeach	3/4	UU, 13 03.40	i mirau uruap i-	PTTP Request	10	-	2347	10	U
10	375	00.13 58.26	1 Thread Group 1	HTTP Request	12		2847	11	0
	376	00:13:55.27	4 Thread Group 1-	HTTP Request	2		2847	2	1
	3/7	00:13 55.27	5 Inread Group 1	HTTP Request	2		2047		1
	3/8	00:13:59.27	s Inread Group 1-	HITP REQUEST	2		2847	1	
	315	00.13.30.27	Thread Group 1-	HTTP Request	4		2047	-	1
		00.13.59.20	Citeres Coup 1-	HTTP Roequest			2047		
	301	00-12-55 20	2 Thread Oroug 1-	HTTP Request	2		2047		-
	383	00-13-58-29	1 Thread Group 1-	HTTP Request	2		2947	1	
	364	00/13/56 20/	Thread Group 1-	HTTP Demiser	1		20.47	1	
	385	00:13:55:29	5 Thread Group 1.	HTTP Request	2		2847	2	
	386	00:13 58.29	2 Thread Group 1-	HTTP Request	2		20.47	1	
	387	00:13:55:29	9 Thread Group 1-	HTTP Request	2	4	28.47	2	
	368	00:13:55.30	5 Thread Group 1	HTTP Request	2	1	2847	2	
	389	00113155.300	9 Thread Group 1-	HTTP Request	3	4	2847	2	
	390	00:13.58.30	8 Thread Group 1	HTTP Request	2	4	2847	2	
	391	00113:59.30	5 Thread Group 1-	HTTP Request	2	4	2847	1	1
	392	00:12:58.31	1 Thread Group 1	HTTP Request	2		2847	1	
	383	00:13:59.31	8 Thread Group 1-	HTTP Request	2	4	2847	2	1
	394	00:13:55.32	1 Thread Group 1	HTTP Request	2	-	2847	2	1
	395	00:13:55.32	0 Thread Group 1-	HTTP Request	2		2847	1	
	396	00:13:55.32	4 Thread Group 1	HTTP Request	2		2847	1	5
	397	00:13 59.32	3 Thread Group 1	HTTP Request	2		2847	1	
	308	00:13:55.32	7 Thread Group 1-	HTTP Request	1	-	2847	1	5
	399	00.13 56.33	2 Thread Group 1	HTTP Request	3		2847	2	1
	400	00:13:55.33	3 Thread Group 1-	HTTP Request	2	4	2847	2	

Fig 8: Oracle APEX Application with 400 Virtual User Load in Apache JMeter

International Journal of Management, Technology And Engineering

HTTP Request Aggregate Graph Aggregate Report Graph Rosults Spine Visualizer Vitwor Results in Tation nch	Name: Wew Results in Comments: Write results to file // Filename	Table															
Aggregate Graph Aggregate Report Graph Rosults Spine Visualizer Visco Results in Table Inch	Comments: Write results to file // Filename				Name: View Results in Table												
Aggregate Report Graph Rosalts Spice Visualizer View Results in Table Inch	Comments: Write results to file // Filename		Commenta														
Graph Hosaits Spline Visualizer View Results in Table Inch	White results to file / Filename	and the set of the set															
View Results in Table nch	Flename	Read from file															
		Flerame Brown. Log/Daplay Only: Brors Successes Configu															
	Sample #	Start Time	Thread Name	Label	Sample Time(ms)	Status	Bytes	Latency	Connect Time(m								
	374	21-02-47 28	B Thread Group 1-149	HTTP Para and	242		6719	463									
	375	21:02:47.78	7 Thread Group 1.251	HTTP Request	(66		6713	465									
	376	21:02:47.79	2 Thread Group 1-345	HTTP Request	464	74	6713	463									
	377	21:02:47.75	0 Thread Group 1-227	HTTP Request	509	Ā	6713	480									
	378	21:02:47.79	4 Thread Group 1-335	HTTP Request	465	A	6713	454									
	379	21:02:47.79	HThread Group 1-364	HTTP Request	468	14	6713	460									
	380	21:02:47.79	4 Thread Group 1-395	HTTP Request	469		6713	468									
	381	21:02:47.79	6 Thread Group 1-394	HTTP Request	469	4	6713	459									
	38.2	21:02:47.79	7 Thread Group 1-337	HTTP Request	470	14	6713	450									
	383	21:02:47.79	9 Thread Group 1-265	HTTP Request	471	-	6713	470									
	384	21:02:47.79	3 Thread Group 1-281	HTTP Request	475	-	6713	465									
	385	21:02:47.80	1 Thread Group 1-349	HTTP Request	470	24	6713	470									
	386	21:02:47.80	2 Thread Group 1-192	HTTP Request	473	-	6713	471									
	387	21:02:47.80	3 Thread Group 1-327	HTTP Request	471		6713	470									
	208	21:02:47.80	14 Thread Group 1-321	HTTP Request	473	4	6713	472									
	309	21:02:47.80	H Thread Group 1-215	HTTP Request	475	2	6713	474									
	390	21:02:47.80	5 Thread Group 1-143	HTTP Request	475	2	6713	475									
	391	21:02:47.80	15 Thread Group 1-253	HTTP Request	479	4	6713	477									
	392	21:02:47.80	6 Thread Group 1-295	HTTP Request	477		6713	477									
	393	21:02:47.80	6 Thread Group 1-164	HTTP Request	480	2	6713	480									
	294	21:02:47.80	7 Thread Group 1-353	HTTP Request	485	4	6713	484									
	395	21:02:47.79	8 Thread Group 1-160	HTTP Request	+97	2	6713	470									
	396	21:02:47.80	9 Thread Group 1-380	HTTP Request	488	-	6713	485									
	397	21:02:47.80	8 Thread Group 1-385	HTTP Request	488	-	6713	437									
	398	21:02:47.81	2Thread Group 1-366	HTTP Request	487	4	6713	485									
	399	21:02:47.81	(10thread Group 1,383	HITP Days soft	490	100	6212	.4201									

Fig 9: PHP Application with 400 VirtualUser Load in Apache JMeter

) 🕼 🎒 🤔 🕄 🔒 🌆 👘 🥙 👗	0 0 + - 4 1		to to to	1 🏙 🏘 🏷	1 III III III III III III III III III I				0 📥 0 / 4					
- 🛴 Test Plan 🕀 🍸 Thread Group	View Results in Ta	View Results in Table												
HTTP Request	Neme: View Results in 1	Name: View Results in Table												
- I Appregate Graph	Comments:	Conments												
Graph Results	Write results to file / R	White see the fits a Paral from the												
Spine Visualizer	Flename				Browse	Errors Succ	asses Configure							
12 Wondench	Sample #	Start Time	Thread Name	Label	Sample Time(ms)	Status	Bytes	Latency	Connect Time(ms)					
	274	20.57.20.257	Thread Group 1-274	MTTP Page and	275	0.00	6713	274						
	375	20:57:39.261	Thread Group 1-374	HTTP Request	373	-	6713	372						
	376	20:57:39.266	Thread Group 1-378	HTTP Request	368		6713	367						
	377	20:57:39.259	Thread Group 1-375	HTTP Request	376	- 74	6713	375						
	378	20:57:39.268	Thread Group 1-379	HTTP Request	363	1	6713	368						
	379	20:57:39.266	Thread Group 1-377	HTTP Request	370	74	6713	370						
	380	20:57:39.272	Thread Group 1-381	HTTP Request	368	A	6713	367						
	381	20:57:39.275	Thread Group 1-382	HTTP Request	365	A	6713	365						
	382	20:57:39.271	Thread Group 1-380	HTTP Request	370	A	6713	369						
	383	20:57:39.296	Thread Group 1-387	HTTP Request	347	A	6713	346						
	384	20:57:39.289	Thread Group 1-384	HTTP Request	354	1	6713	353						
	385	20:57:39.296	Thread Group 1-390	HTTP Request	343	-	6713	347						
	386	20:57:39.297	Thread Group 1-389	HTTP Request	348	4	6713	347						
	387	20:57:39.302	Thread Group 1-391	HTTP Request	343	-	6713	343						
	388	20:57:39.304	Thread Group 1-386	HTTP Request	343	4	6713	343						
	339	20:57:39.305	Thread Group 1-393	HTTP Request	343	4	6713	342						
	390	20:57:39.304	Thread Group 1-383	HTTP Request	344	4	6713	343						
	391	20:57:39.308	Thread Group 1-385	HTTP Request	342	4	6713	341						
	392	20:57:39.311	Thread Group 1-395	HTTP Request	339		6713	339						
	393	20:57:39.324	Thread Group 1-388	HTTP Request	328	4	6713	327						
	394	20:57:39.327	Thread Group 1-396	HTTP Request	326	-	6713	325						
	395	20:57:39.312	Thread Group 1-392	HTTP Request	341	- 4	6713	340						
	396	20:57:39.329	Thread Group 1-400	HTTP Request	326		6713	325						
	397	20:57:39.331	Thread Group 1-397	HTTP Request	325		6713	324						
	398	20:57:39.331	Thread Group 1-394	HTTP Request	325	- 44	6713	324						
	399	20:57:39.332	Thread Group 1-399	HTTP Request	325	-	6713	325						

Fig 10: .NET Application with 400 Virtual User Load in Apache JMeter



Fig 11: Performance Evaluation Chart with 400 Virtual User Load



Fig 12: Response time of Application with 400 Virtual User Load

Throughput Graph of APEX Application with 400 Virtual User Load



Throughput Graph of PHP Application with 400 Virtual User Load



Throughput Graph of .NET Application with 400 Virtual User Load



Fig: 13 Throughput Graph of three application with 400 Virtual User Load

As seen with above results that Oracle APEX application provide better results in response time with quick reply from the server on the selected platform in this research study. Different application development environment have been testing with different virtual user load and it have been seen that Oracle APEX performance is superior to other technologies in the above selected environment for the research.

6. CONCLUSION

The purpose of this paper is to show the performance testing on three different application developed under different architecture and conduct a performance evaluation with different virtual user load. As we can see the performance of Oracle Application having better response time, throughput/sec and average time occupied to aid a request with different users start with 50 and then with 400 virtual user load.

Initially test was conducted with 50 users which is increased to 400 to measure the performance of application with different users and it's have been seen that Oracle APEX application provide better performance compared to other selected technologies with this research study.

REFERENCES

- [1] "http://www.softwaretestinghelp.com," [Online]. Available: http://www.softwaretestinghelp.com/what-isperformance-testing-load-testing-stress-testing/. [Accessed 25 09 2017].
- [2] "Oracle.com," Oracle, [Online]. Available: http://www.oracle.com/technetwork/testcontent/what-is-apex-099128.html. [Accessed 25 09 2017].
- [3] "Wikipedia.com," [Online]. Available: https://en.wikipedia.org/wiki/PHP. [Accessed 25 09 2017].
- [4] Wikipedia, "https://en.wikipedia.org," [Online]. Available: https://en.wikipedia.org/wiki/.NET_Framework. [Accessed 20 October 2018].
- [5] R. P. Nisha Jha, "Comparative Analysis of Web Applications using JMeter," *International Journal of Advanced Research in Computer Science*, vol. 8, no. 3, pp. 774-777, 2017.
- [6] K. K. V. Janani1, "Evaluation of Cloud based Performance Testing," *Indian Journal of Science and Technology*, vol. 8, no. 35, pp. 1-7, 2015.
- [7] wikipedia, "https://en.wikipedia.org/wiki/Application_lifecycle_management," wikipedia, [Online]. Available: https://en.wikipedia.org/wiki/Application_lifecycle_management. [Accessed 22 September 2018].
- [8] "Oracle.Com," Oracle, [Online]. Available: http://www.oracle.com/technetwork/developertools/apex/apex-arch-086399.html. [Accessed 25 09 2017].
- [9] "php.net," [Online]. Available: http://php.net/manual/en/mongodb.overview.php. [Accessed 25 09 2017].
- [10] "https://www.automation.com," Automation.com, [Online]. Available: https://www.automation.com/library/articles-white-papers/manufacturing-intelligence-industrialinformation-management/understanding-microsofts-.net-technology-its-impact-on-automationapplication-development. [Accessed 30 September 2018].
- [11] "wikipedia," [Online]. Available: https://en.wikipedia.org/wiki/Software_performance_testing. [Accessed 20 09 2017].