ACME Intranet Performance Testing

Purpose of this document

Prior to the official launch of the ACME Intranet, a set of performance tests were carried out to ensure that the platform could cope with estimated demand. This document presents the findings of the Performance tests and ends with a set of conclusions and recommendations.

Test Environment

Design of the Intranet

The Intranet has been implemented on top of SharePoint 2010 with minimal customisations. The Intranet is a publishing site utilising the Page Output cache where appropriate. Controls or Web Parts that need to present personalised content to the user, have been amended to use post-cache substitution.

In addition to the publishing site “My Sites” have been implemented allowing users to manage their profile and utilise many of the social improvements built into SharePoint 2010 such as Activity Feeds, blogging, tagging and User Notes. There are approximately 11,000 User Profiles with about 3,000 users maintaining a content site within their My Site.

Another major area of functionality is around Search to locate documents, content or users. SharePoint search has been implemented for this purpose.

There is also some use of Managed Metadata service to tag document content and also to store a User’s Location in their profile. However, overall adoption of this area is minimal and shouldn’t greatly affect test results.

Search, My Sites and publishing pages use a custom-built Master Page which allows custom navigation, Header and Footer to be used. Back-end administration pages still use the out of the box Master Page.

At the time of testing the Object Cache and Blob Cache are configured to be used, but the Page Output cache is not. (However a couple of tests attempt to gauge the result of turning on the Page Output Cache).

Expected Usage

The portal is expected to meet the following requirements for peak usage. The purpose of this report is detail whether these figures can be obtained using the current production environment.

- 200 concurrent user sessions
- 1500 document searches per hour
- 1500 people searches per hour
- 5 seconds Average Page Response time
- 25 Page Request per second.

In addition to this, under near-disaster circumstances the platform is expected to be fully operational with 1 Application Server and 2 web front ends. However, some performance degradation is expected during this time.

The testing carried out was all run across production kit over a weekend period, when the portal was not in use.

Servers in the Production Environment

ACMESPW001	Web Front End (4 vCPUs)
ACMESPW002	**Web Front End**
ACMESPW003	**Web Front End**
ACMESPW004	**Web Front End**
ACMESPA001	**Web Front End**
ACMESPA002	Application Server
ACMESPW001	Application Server
ACMESPW001	SQL Cluster

Test Strategy

Recording of test results

Performance data was extracted from all the servers involved in the performance test including the agent machines emulating the user load. The full detail of the test is stored with the Test Database on ACMESPD003, but is also summarised at a high-level within this report.

Users

As part of the general testing strategy 150 test users were created with differing permissions and Audiences to ensure that the performance data applies to not only page content, but, also to User Rights and personalisation requirements. These test users are applied during the various testing phases.

Search testing

It is envisaged that about 40% of activity on the Intranet will be accredited to searching for people and document content. Hence, to emulate predicted load a set of pre-defined search terms have been configured to ensure accurate results.

Test Scenarios Cases

The following test cases were used to make up the full test scenario. The % mixture of results can also be seen, which indicates the weighting given to each type of test.

Scenario	Description	% Mix of overall run
Homepage	Hits the homepage and News Hub	12%
A – Z	Navigates A-Z menu	2%
ACME News	Navigates Several News Pages	10%
FAQ	Navigates the FAQ section	7%
Featured News	Selects Feature News Pages	7%
My Links	Views the My Links	1%
My News	Access “My News” and hits several articles	2%
My Site Blogs	Navigates CEO’s blog	7%
My Site Colleagues	Access My Site Colleagues section	1%
My Site Profile	Navigates the Users Profile	3%
My Site Organisation	View My Site organisation	3%
Quick Links	Manage Quick links	5%
Search	Search for content in the portal	20%
Search People	Search for people in the portal	22%

Scenarios excluded from testing

User activity relating to adding or amending documents, posting of comments, or tagging of pages was all excluded from the test scenarios. This is mainly because the tests were run on a production environment and there is little time to remove test data. However, a certain level of confidence can be applied to the results for 2 reasons:

1. Collaboration will be extremely low until phase 2 of the ACME Intranet.
2. Most of the Collaboration carried out is un-customised and uses Standard SharePoint functionality.

Test Runs

The performance tests carried out covered 4 scenarios to try to understand exactly how the performance of the site will be affected over time.

Goal based Test

The intention of the Goal-based test is to identify the number of page / requests that can be served while the WFE's are running at around 70% utilisation. The test runs for 10 minutes and readjusts load based on CPU utilisation.

Soak Test

The intention of this test is to hit the production farm at about 50 – 75% of expected peak Usage over long periods of time. This will hopefully identify specific problems that are time related, such as memory leaks, or scheduled tasks that disrupt service.

Stepped Tests

The purpose of this test is to gradually ramp up the User load to find the point at which response rates start to fall away.

Constant Load Tests

This type of testing hits the servers with a constant load that is expected at peak performance.

Test Goal-1 (No Page output cache)

Summary data

Start Time	**17/04/2011 13:02:58**
Test Duration	**10 Minutes**
WFE's in Load	**ACMESPW001, ACMESPW002 and 2 Application Servers**
Agents used	**All**
Avg. User Load	**105**
Pages / Sec	**33**
Avg. Page Time (Sec)	**1.59**
Requests / Sec	**588**
Requests Cached %	**16.2**
Avg. Response Time	**0.25**

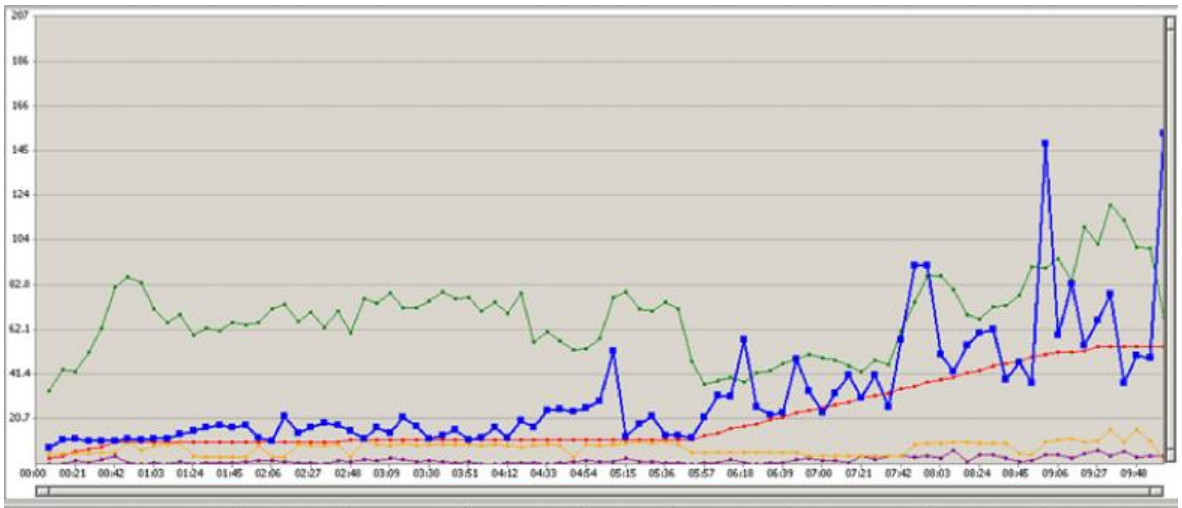
Environment Metrics

Machine	% Processor Time	Available Memory at Completion (Mb)
ACMESCL002B	**8.23%**	**14,509**
ACMESPW001	**63.0%**	**11,600**
ACMESPW002	**61.9%**	**12,463**
ACMESPW003	**5.37% (No Load)**	**11,634**
ACMESPW004	**0.61% (No Load)**	**11,898**
ACMESPA001	**40.0%**	**2,368**
ACMESPA002	**24.4%**	**10,830**

Analysis

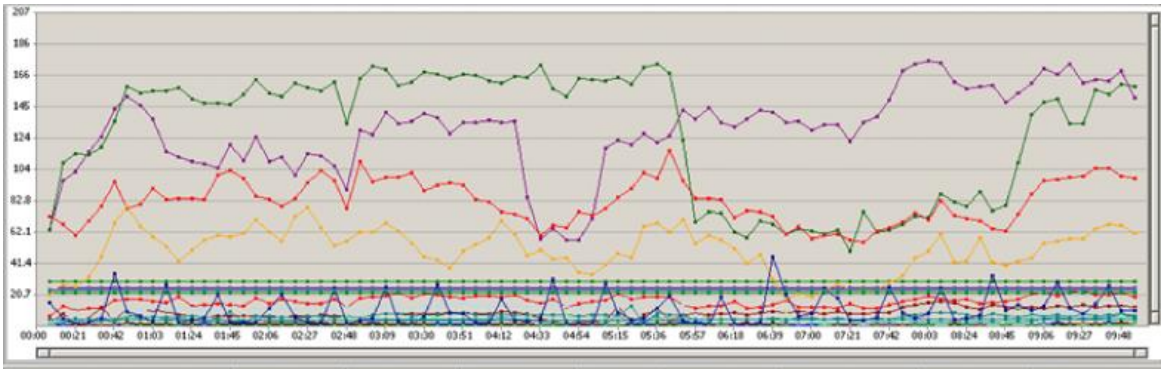
- The page response time started to fall away with over 50 – 60 concurrent users. However, the CPU on the WFE's was still in acceptable ranges.
- Further analysis of individual results indicates that it's custom SharePoint pages that are performing badly.

Key Indicators



Counter	Instance	Category	Computer	Color	Range	Min	Max	Avg
User Load	_Total	LoadTest:Scenario	ACMESPD002		1,000	15	265	105
Pages/Sec	_Total	LoadTest:Page	ACMESPD002		100	16.6	58.0	33.0
Avg. Page Time	_Total	LoadTest:Page	ACMESPD002		10	0.37	7.42	1.59
Errors/Sec	_Total	LoadTest:Errors	ACMESPD002		100	0	3.14	0.94
Threshold Violations/Sec	_Total	LoadTest:Errors	ACMESPD002		100	1.00	7.86	3.72

Production Utilisation



Counter	Instance	Category	Computer	Color	Range	Min	Max	Avg
% Processor Time	_Total	Processor	ACMESCL002B		100	3.57	11.7	8.23
Available MBytes	-	Memory	ACMESCL002B		100,000	14,426	14,510	14,473
Transactions/sec	_Total	SQLServer:Database	ACMESCL002B		-	-	-	-
% Processor Time	_Total	Processor	ACMESPW001		100	27.7	85.2	63.0
Available MBytes	-	Memory	ACMESPW001		100,000	11,568	11,738	11,658
Bytes Total/sec	_Total	Web Service	ACMESPW001		100,000,000	491,480	4,656,204	2,442,792
Total Method Requests/sec	_Total	Web Service	ACMESPW001		10,000	83.5	806	437
% Processor Time	_Total	Processor	ACMESPW002		100	24.2	84.0	61.9
Available MBytes	-	Memory	ACMESPW002		100,000	12,174	12,516	12,451
Bytes Total/sec	_Total	Web Service	ACMESPW002		100,000,000	236,628	6,647,536	2,561,609
Total Method Requests/sec	_Total	Web Service	ACMESPW002		10,000	43.4	1,176	453
% Processor Time	_Total	Processor	ACMESPW004		100	0	6.26	0.61
Available MBytes	-	Memory	ACMESPW004		100,000	11,884	11,911	11,906
Bytes Total/sec	_Total	Web Service	ACMESPW004		100,000,000	0	21.7	4.71
Total Method Requests/sec	_Total	Web Service	ACMESPW004		10,000	0	0.31	0.067
% Processor Time	_Total	Processor	ACMESPA002		100	26.9	56.3	40.0
Available MBytes	-	Memory	ACMESPA002		100,000	10,764	10,852	10,819
Bytes Total/sec	_Total	Web Service	ACMESPA002		100,000,000	97,322	1,357,980	741,420
Total Method Requests/sec	_Total	Web Service	ACMESPA002		10,000	4.55	84.6	46.3
% Processor Time	_Total	Processor	ACMESPA001		100	8.71	38.5	24.4
Available MBytes	-	Memory	ACMESPA001		100,000	2,118	2,368	2,181
Bytes Total/sec	_Total	Web Service	ACMESPA001		100,000,000	0	1,310,261	722,280
Total Method Requests/sec	_Total	Web Service	ACMESPA001		10,000	0	96.1	48.5
% Processor Time	_Total	Processor	ACMESPW003		100	0.39	22.3	5.37
Available MBytes	-	Memory	ACMESPW003		100,000	11,581	11,644	11,626
Bytes Total/sec	_Total	Web Service	ACMESPW003		100,000,000	0	346,186	74,528
Total Method Requests/sec	_Total	Web Service	ACMESPW003		10,000	0	68.1	19.2

Test Goal-2 (No Page output cache)

This test is a repeat of the previous test but uses ACMESPD003 instead of ACMESPD001. This is to ensure that there is no issue with the front end test server.

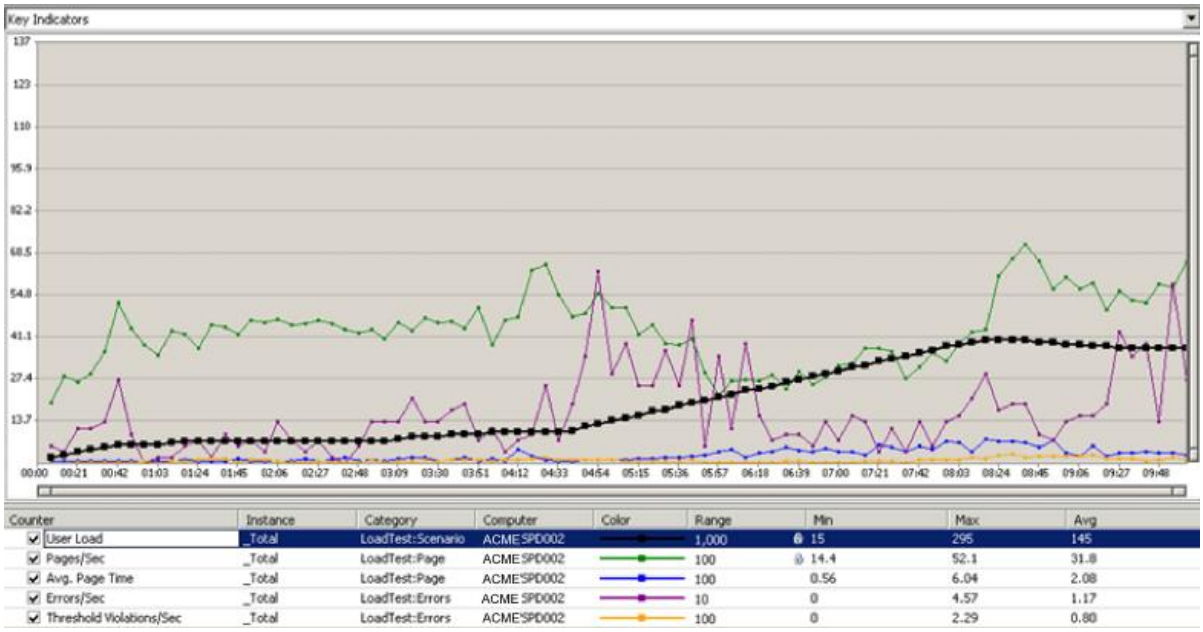
Summary data

Start Time	**17/04/2011 15:36**
Test Duration	**10 Minutes**
WFE's in Load	**ACMESPW002, ACMESPW003 and 2 Application Servers**
Agents used	**All**
Avg. User Load	**145**
Pages / Sec	**31.8**
Avg. Page Time (Sec)	**2.08**
Requests / Sec	**542**
Requests Cached %	**17.2**
Avg. Response Time	**0.36**

Environment Metrics

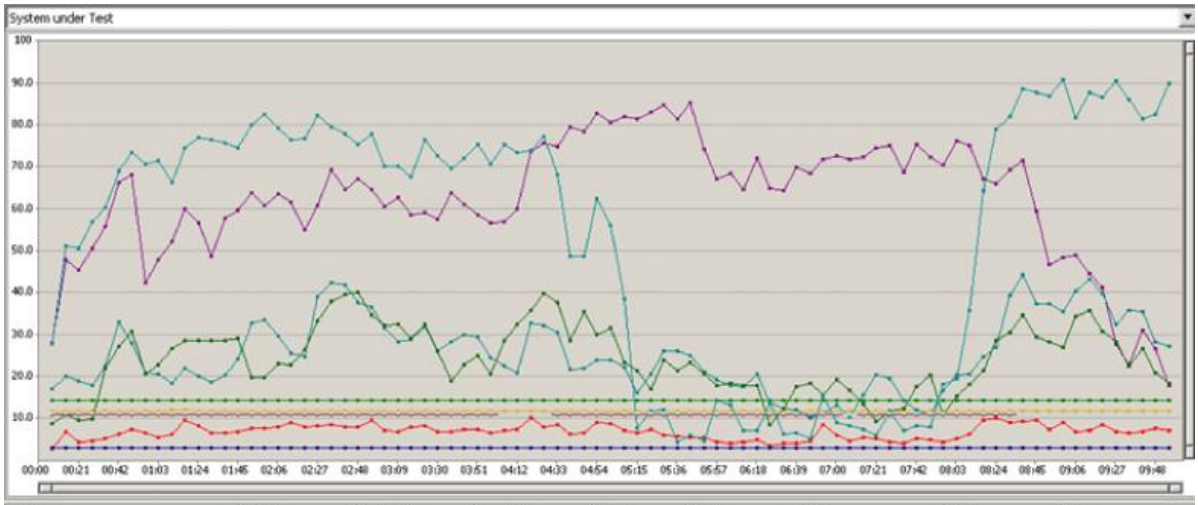
Machine	% Processor Time	Available Memory at Completion (Mb)
ACMESCL002B	**6.96%**	**14,478**
ACMESPW002	**62.5%**	**12,028**
ACMESPW003	**54.0%**	**11,278**
ACMESPA001	**24.3%**	**3,230**
ACMESPA002	**25.5%**	**11,059**

Key Indicators



Counter	Instance	Category	Computer	Color	Range	Min	Max	Avg
User Load	_Total	LoadTest:Scenario	ACME SPD002		1,000	15	295	145
Pages/Sec	_Total	LoadTest:Page	ACME SPD002		100	14.4	52.1	31.8
Avg. Page Time	_Total	LoadTest:Page	ACME SPD002		100	0.56	6.04	2.08
Errors/Sec	_Total	LoadTest:Errors	ACME SPD002		10	0	4.57	1.17
Threshold Violations/Sec	_Total	LoadTest:Errors	ACME SPD002		100	0	2.29	0.80

Production Utilisation



Counter	Instance	Category	Computer	Color	Range	Min	Max	Avg
% Processor Time	_Total	Processor	ACME SCL002B		100	2.77	10.2	6.96
Available MBytes	-	Memory	ACME SCL002B		100,000	14,356	14,500	14,485
Transactions/sec	_Total	SQLServer:Data...	ACME SCL002B		-	-	-	-
% Processor Time	_Total	Processor	ACME SPW002		100	18.2	85.6	62.6
Available MBytes	-	Memory	ACME SPW002		100,000	11,966	12,123	12,061
% Processor Time	_Total	Processor	ACME SPA002		100	10.3	44.5	25.5
Available MBytes	-	Memory	ACME SPA002		100,000	11,057	11,061	11,059
% Processor Time	_Total	Processor	ACME SPA001		100	8.63	40.4	24.3
Available MBytes	-	Memory	ACME SPA001		100,000	3,181	3,232	3,218
% Processor Time	_Total	Processor	ACME SPW003		100	4.65	91.0	54.0
Available MBytes	-	Memory	ACME SPW003		100,000	11,260	11,418	11,334

Analysis

- Utilising a different front end, demonstrated that performance is similar to the previous test.

Test Goal-3 (output cache ON)

This test is a repeat of the previous test with the output cache turned on.

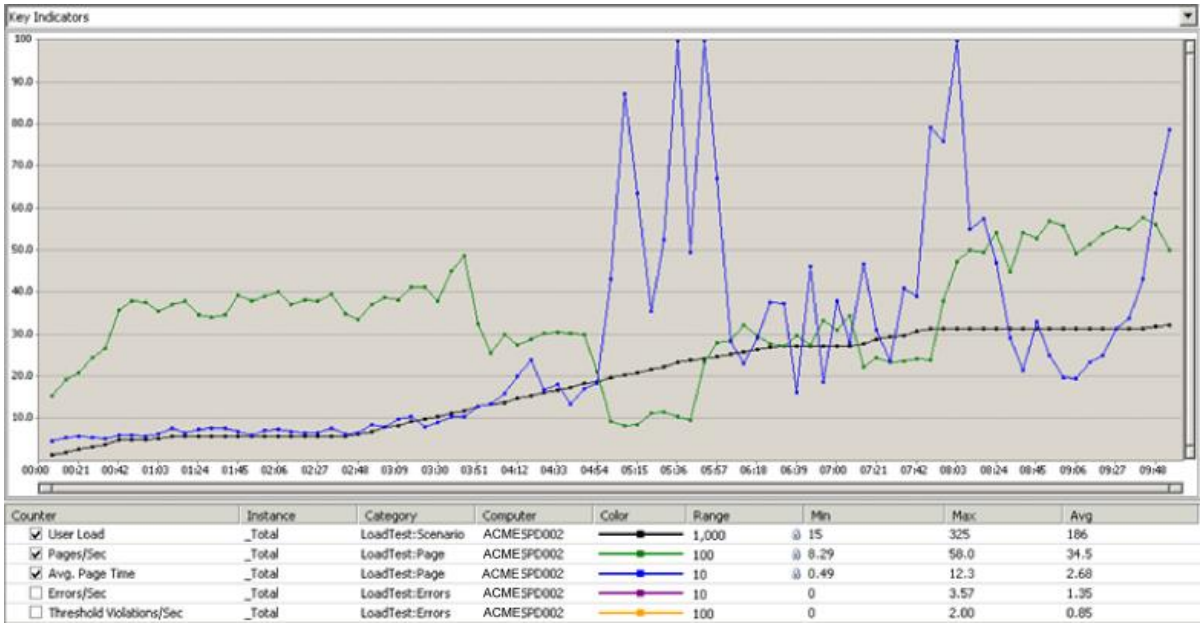
Summary data

Start Time	**16/04/2011 16:30**
Test Duration	**10 Minutes**
WFE's in Load	**ACMESPW002, ACMESPW003 and 2 Application Servers**
Agents used	**All**
Avg. User Load	**186**
Pages / Sec	**34.5**
Avg. Page Time (Sec)	**2.68**
Requests / Sec	**588**
Requests Cached %	**19.5**
Avg. Response Time	**0.47**

Environment Metrics

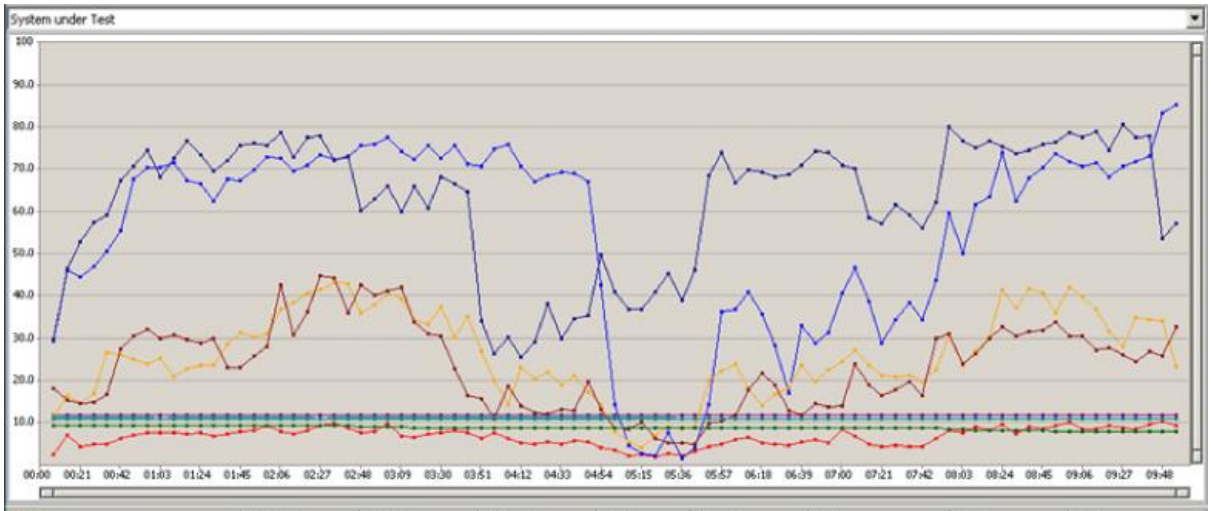
Machine	% Processor Time	Available Memory at Completion (Mb)
ACMESCL002B	**6.86**	**Not Recorded**
ACMESPW002	**55.5%**	**12,063**
ACMESPW003	**62.7%**	**11,230**
ACMESPA001	**23.4%**	**8,114**
ACMESPA002	**26.2%**	**11,107**

Key Indicators



Counter	Instance	Category	Computer	Color	Range	Min	Max	Avg
User Load	_Total	LoadTest:Scenario	ACMESPD002		1,000	15	325	186
Pages/Sec	_Total	LoadTest:Page	ACMESPD002		100	8.29	58.0	34.5
Avg. Page Time	_Total	LoadTest:Page	ACMESPD002		10	0.49	12.3	2.68
Errors/Sec	_Total	LoadTest:Errors	ACMESPD002		10	0	3.57	1.35
Threshold Violations/Sec	_Total	LoadTest:Errors	ACMESPD002		100	0	2.00	0.85

Production Utilisation



Counter	Instance	Category	Computer	Color	Range	Min	Max	Avg
% Processor Time	_Total	Processor	ACMESCL002B		100	2.13	10.6	6.86
Available MBytes	-	Memory	ACMESCL002B		-	-	-	-
% Processor Time	_Total	Processor	ACMESPW002		100	1.92	85.5	55.5
Available MBytes	-	Memory	ACMESPW002		100,000	11,988	12,089	12,068
% Processor Time	_Total	Processor	ACMESPA002		100	4.32	43.4	26.2
Available MBytes	-	Memory	ACMESPA002		100,000	11,107	11,112	11,110
% Processor Time	_Total	Processor	ACMESPA001		100	5.15	45.1	23.4
Available MBytes	-	Memory	ACMESPA001		100,000	8,113	9,529	8,972
% Processor Time	_Total	Processor	ACMESPW003		100	25.7	60.8	62.7
Available MBytes	-	Memory	ACMESPW003		100,000	11,203	11,350	11,281

Analysis

- Utilising the Output cache does have some impact, but it will not be as significant as it can be. This is due to the following reasons:
    - (15%) “My Sites” aren’t cached
    - (40%) Searches will not be cached
    - (20%) Hits for the homepage now use post cache substitution due to the need for personalisation.
    - (7%) RSS is personalised to the user and is always a separate request.

- Even though page cache hits were reasonably low (for reasons above), it is worth noting that the Average User Count (186 Users) is **28.3**% better Average User Count (145 Users).
- If we have the test mix incorrect and real usage hits more application pages (e.g not search), then this figure will be much higher.

Test Soak-1

The purpose of this test is to test the farm for a long period at low load. This will highlight issues such as memory leaks or high disk usage.

Summary data

Start Time	**16/04/2011 20:31:37**
Test Duration	**12 hours**
WFE's in Load	**All 4 WFE's and 2 Application Servers**
Agents used	**All**
User Load	**30 concurrent**
Pages / Sec	**23**
Avg. Page Time (Sec)	**0.87**
Requests / Sec	**396**
Requests Cached %	**15.6**
Avg. Response Time	**0.14**

Environment Metrics

Machine	% Processor Time	Available Memory at Completion (Mb)
ACMESCL002B	**6.29%**	**14,605**
ACMEWSPW001	**20.6%**	**12,143**
ACMEWSPW002	**1.23%**	**13,309**
ACMEWSPW003	**73%**	**12,384**
ACMEWSPW004	**1.47%**	**11,207**
ACMEWSPA001	**24.2%**	**4,994**
ACMEWSPA002	**24.5%**	**11,651**

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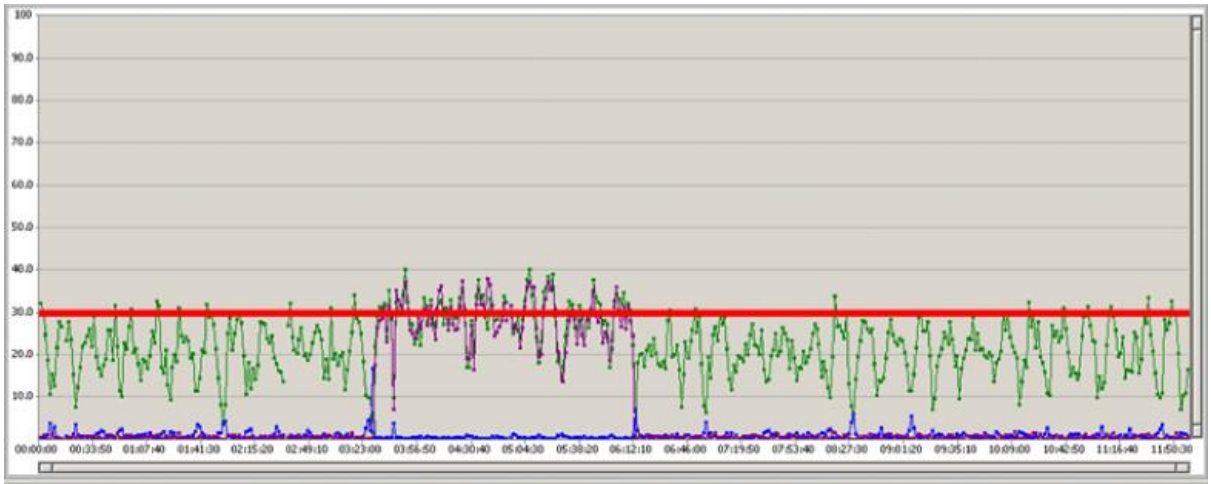
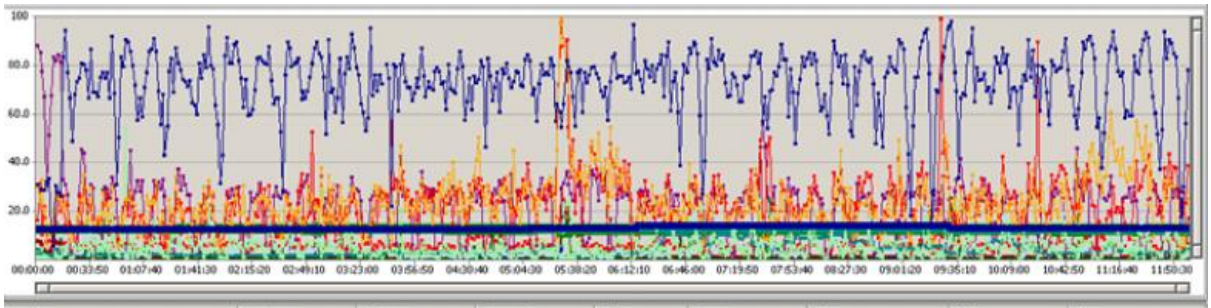
Key Indicators



Counter	Instance	Category	Computer	Color	Range	Min	Max	Avg
User Load	_Total	LoadTest:Scenario	ACMESPD002		100	30	30	30
Pages/Sec	_Total	LoadTest:Page	ACMESPD002		100	0.14	42.3	23.0
Avg. Page Time	_Total	LoadTest:Page	ACMESPD002		100	0	47.8	0.87
Errors/Sec	_Total	LoadTest:Errors	ACMESPD002		100	0	39.9	7.03

Production Utilisation



Counter	Instance	Category	Computer	Color	Range	Min	Max	Avg
% Processor Time	_Total	Processor	ACMESCL002B		100	0.31	34.2	6.29
Available MBytes	-	Memory	ACMESCL002B		100,000	14,162	14,762	14,595
Transactions/sec	_Total	SQLServer:Data...	ACMESCL002B		-	-	-	-
% Processor Time	_Total	Processor	ACMESPW001		100	0.055	97.2	20.6
Available MBytes	-	Memory	ACMESPW001		100,000	11,489	13,840	12,294
Bytes Total/sec	_Total	Web Service	ACMESPW001		100,000,000	0	18,726,160	629,440
Total Method Requests/sec	_Total	Web Service	ACMESPW001		10,000	0	1,524	113
% Processor Time	_Total	Processor	ACMESPW002		100	0	37.3	1.23
Available MBytes	-	Memory	ACMESPW002		100,000	12,646	14,242	13,333
Bytes Total/sec	_Total	Web Service	ACMESPW002		100,000,000	0	29,496	26.3
Total Method Requests/sec	_Total	Web Service	ACMESPW002		10,000	0	0.88	0.068
% Processor Time	_Total	Processor	ACMESPW004		100	0	54.7	1.47
Available MBytes	-	Memory	ACMESPW004		100,000	11,875	14,125	12,856
Bytes Total/sec	_Total	Web Service	ACMESPW004		100,000,000	0	24,791	96.0
Total Method Requests/sec	_Total	Web Service	ACMESPW004		10,000	0	30.3	0.16
% Processor Time	_Total	Processor	ACMESPA002		100	0.0019	99.9	24.5
Available MBytes	-	Memory	ACMESPA002		100,000	8,992	11,726	11,346
Bytes Total/sec	_Total	Web Service	ACMESPA002		100,000,000	0	8,342,629	608,997
Total Method Requests/sec	_Total	Web Service	ACMESPA002		10,000	0	1,550	41.3
% Processor Time	_Total	Processor	ACMESPA001		100	0	100	24.2
Available MBytes	-	Memory	ACMESPA001		100,000	836	11,048	4,308
Bytes Total/sec	_Total	Web Service	ACMESPA001		100,000,000	0	6,043,557	598,061
Total Method Requests/sec	_Total	Web Service	ACMESPA001		10,000	0	153	37.7
% Processor Time	_Total	Processor	ACMESPW003		100	0.055	99.9	73.0
Available MBytes	-	Memory	ACMESPW003		100,000	10,785	13,529	12,087
Bytes Total/sec	_Total	Web Service	ACMESPW003		100,000,000	0	24,818,740	4,674,186
Total Method Requests/sec	_Total	Web Service	ACMESPW003		10,000	0	2,014	525

Analysis

- The Soak Test was run across all WFE's., however, the Load Balancer doesn't evenly spread the load. This is apparent because the W003 Server took most of the requests, which resulted in 73% CPU Utilisation.
- The CPU, memory and disk I/O across the SQL server was well within expected limits.

Test Soak-2

The purpose of this test is to test the production farm for a long period at expected peak load.

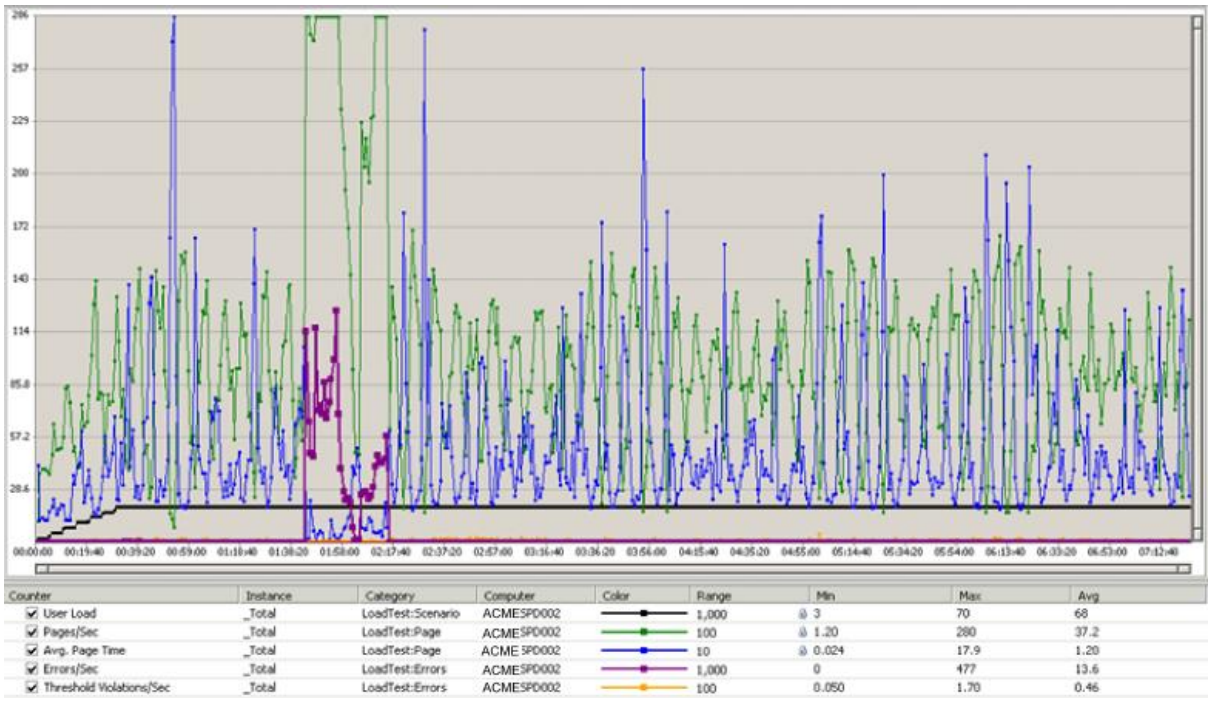
Summary data

Start Time	**16/04/2011 23:21:43**
Test Duration	**7:30 hours**
WFE's in Load	**All 4 WFE's and 2 Application Servers**
Agents used	**All**
User Load	**70 concurrent**
Pages / Sec	**37.2**
Avg. Page Time (Sec)	**1.20**
Requests / Sec	**527**
Requests Cached %	**16.0**
Avg. Response Time	**0.25**

Environment Metrics

Machine	% Processor Time	Available Memory at Completion (Mb)
ACMESCL002B	**6.86%**	**14,239**
ACMEWSPW001	**Not in test**	**Not in test**
ACMEWSPW002	**58.1%**	**11,976**
ACMEWSPW003	**55%**	**11,961**
ACMEWSPW004	**Not in test**	**Not in test**
ACMEWSPA001	**25.4%**	**3,246**
ACMEWSPA002	**27.1%**	**11,961**

Key Indicators



Counter	Instance	Category	Computer	Color	Range	Min	Max	Avg
User Load	_Total	LoadTest:Scenario	ACMESPD002		1,000	3	70	68
Pages/Sec	_Total	LoadTest:Page	ACMESPD002		100	1.20	280	37.2
Avg. Page Time	_Total	LoadTest:Page	ACMESPD002		10	0.024	17.9	1.20
Errors/Sec	_Total	LoadTest:Errors	ACMESPD002		1,000	0	477	13.6
Threshold Violations/Sec	_Total	LoadTest:Errors	ACMESPD002		100	0.050	1.70	0.46

Production Utilisation

Counter	Instance	Category	Computer	Color	Range	Min	Max	Avg
% Processor Time	_Total	Processor	ACMESCL002B		100	0.54	24.3	6.86
Available MBytes	-	Memory	ACMESCL002B		100,000	14,050	14,321	14,236
Transactions/sec	_Total	SQLServer:Databa...	ACMESCL002B		-	-	-	-
% Processor Time	_Total	Processor	ACMESPW002		100	2.07	96.9	58.1
Available MBytes	-	Memory	ACMESPW002		100,000	10,202	14,093	11,967
% Processor Time	_Total	Processor	ACMESPA002		100	0.12	99.6	27.1
Available MBytes	-	Memory	ACMESPA002		100,000	9,476	12,801	10,903
% Processor Time	_Total	Processor	ACMESPA001		100	0.45	100	25.4
Available MBytes	-	Memory	ACMESPA001		100,000	1,489	11,299	4,358
% Processor Time	_Total	Processor	ACMESPW003		100	0.43	98.6	55.0
Available MBytes	-	Memory	ACMESPW003		100,000	10,983	14,346	12,357

ACME

Analysis

- The Soak Test highlighted an error that disrupted service for 40 minutes. The main pages affected were around Search. Early investigations link to a problem with User Profile service.
- Under a load of 75 users, the resource utilisation on the production servers was all in acceptable ranges. Most un-customised pages were returned within 1 – 2 seconds. However, some of the more popular pages (such as the home page), still returned in 10 seconds+.

Test Step-1 (No Page output cache)

The intention of this test is to find the maximum number of requests / second that the environment can handle and still meet the required load. This figure is expected to outweigh expected peak usage and gives an indication of how well the platform can scale to meet future demand.

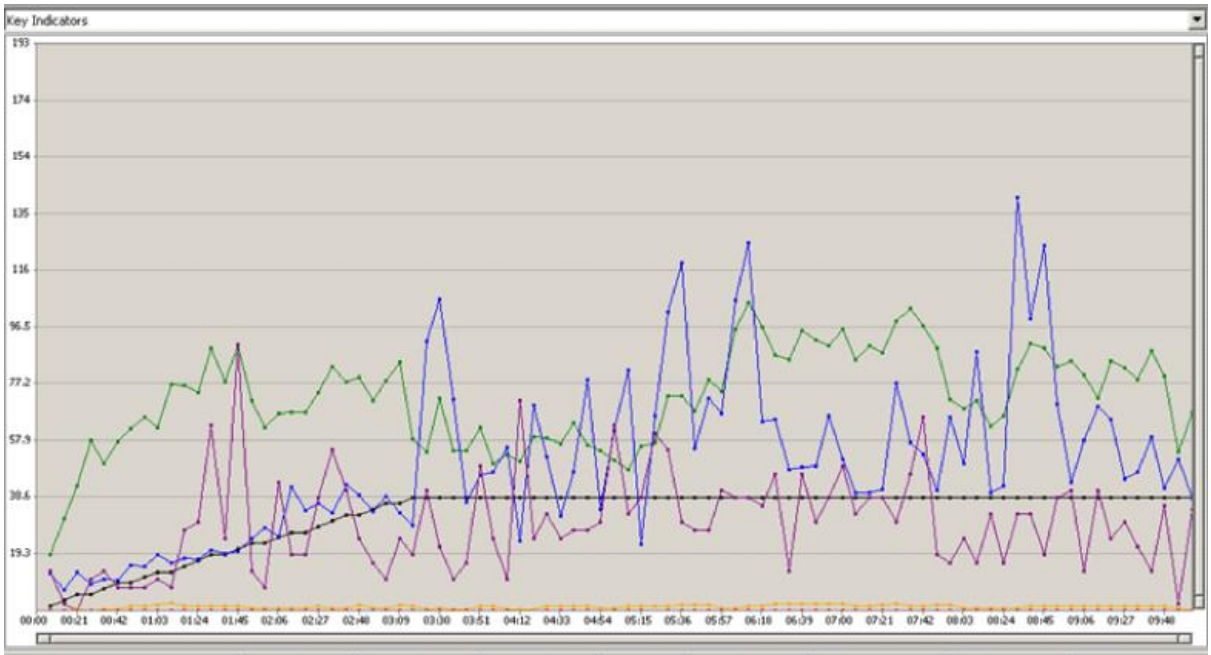
Summary data

Start Time	**17/04/2011 20:37**
Test Duration	**10 Minutes**
WFE's in Load	**ACMESPW002, ACMESPW003 and 2 Application Servers**
Agents used	**All**
User Load	**Steps up 10 users every 10 seconds (max 200)**
Pages / Sec	**37.6**
Avg. Page Time (Sec)	**2.74**
Requests / Sec	**583**
Requests Cached %	**17.6**
Avg. Response Time	**0.55**

Environment Metrics

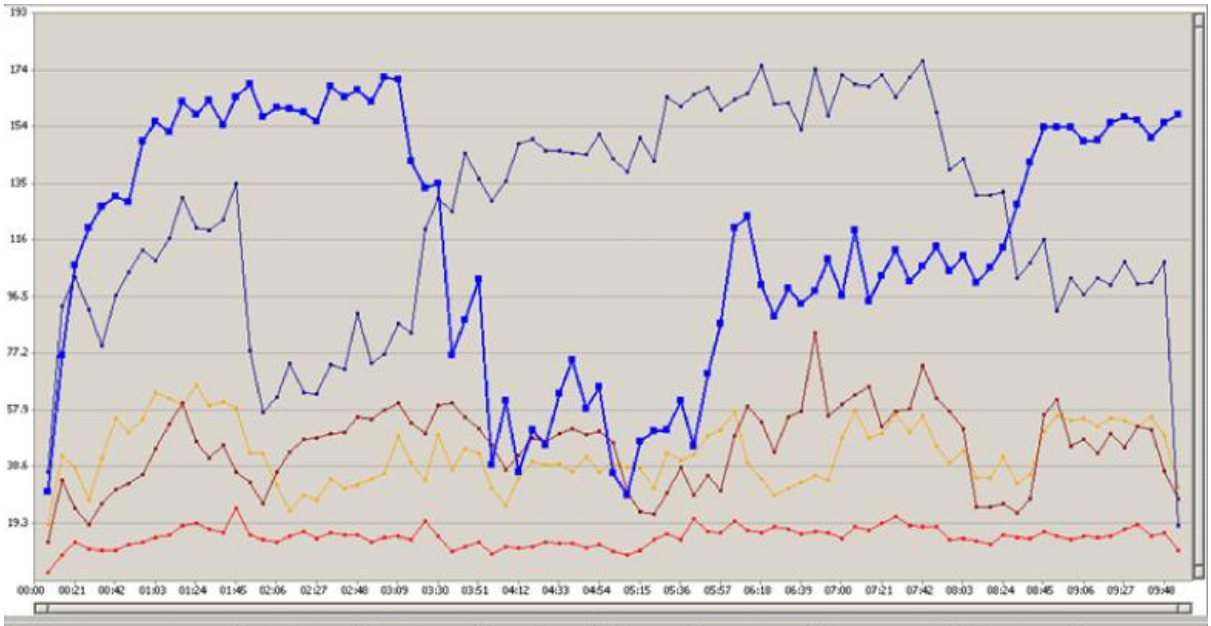
Machine	% Processor Time	Available Memory at Completion (Mb)
ACMESCL002B	**7.77%**	**Note recorded**
ACMESPW002	**60.0%**	**Note recorded**
ACMESPW003	**64.2%**	**Note recorded**
ACMESPA001	**22.6%**	**Note recorded**
ACMESPA002	**23.7%**	**Note recorded**

Key Indicators



Counter	Instance	Category	Computer	Color	Range	Min	Max	Avg
User Load	_Total	LoadTest:Scenario	ACMESPD002		1,000	10	200	169
Pages/Sec	_Total	LoadTest:Page	ACMESPD002		100	10.0	54.6	37.6
Avg. Page Time	_Total	LoadTest:Page	ACMESPD002		10	0.37	7.30	2.74
Errors/Sec	_Total	LoadTest:Errors	ACMESPD002		10	0	4.71	1.54
Threshold Violations/Sec	_Total	LoadTest:Errors	ACMESPD002		100	0	1.57	0.78
Avg. Connection Wait Time	UKMLWSPD006	LoadTest:Request	ACMESPD002		100	0	0	0

Production Utilisation



Counter	Instance	Category	Computer	Color	Range	Min	Max	Avg
% Processor Time	_Total	Processor	ACMESCL002B		100	1.54	12.9	7.77
Available MBytes	-	Memory	ACMESCL002B		-	-	-	-
% Processor Time	_Total	Processor	ACMESPW002		100	15.1	88.9	60.0
Available MBytes	-	Memory	ACMESPW002		-	-	-	-
% Processor Time	_Total	Processor	ACMESPA002		100	10.1	34.4	22.6
Available MBytes	-	Memory	ACMESPA002		-	-	-	-
% Processor Time	_Total	Processor	ACMESPA001		100	6.86	43.9	23.7
Available MBytes	-	Memory	ACMESPA001		-	-	-	-
% Processor Time	_Total	Processor	ACMESPW003		100	9.71	91.9	64.2
Available MBytes	-	Memory	ACMESPW003		-	-	-	-

Analysis

- Even though the CPU and memory in the production farm were in acceptable ranges, the response times for some of the key pages was poor with 200 concurrent Users. However, even at 200 Users no timeouts or page queuing occurred on the WFE’s.

Test Constant-1 (No Page output cache)

After the previous tests, it is estimated that the WFE's can operate safely with 100 users. The purpose of this test is to give us data relating to how the performance rig works at this peak load with no stepping involved. (This gives more accurate averages than stepped testing).

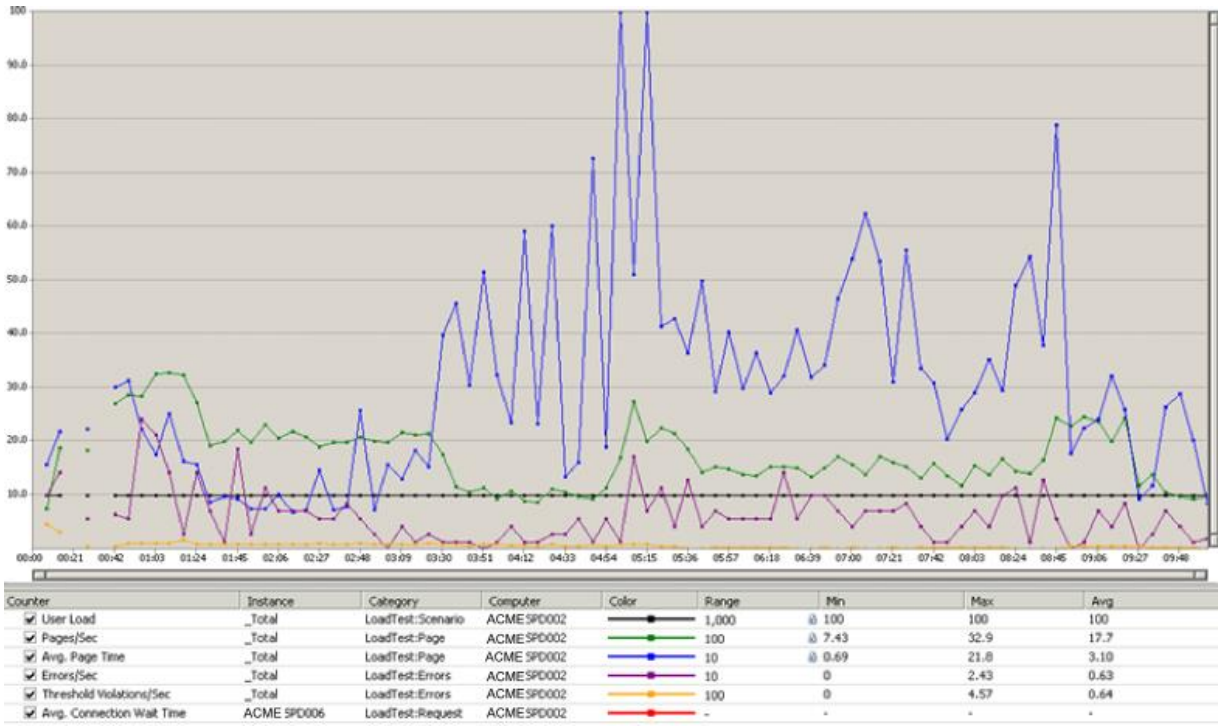
Summary data

Start Time	**17/04/2011 22:02**
Test Duration	**10 Minutes**
WFE's in Load	**ACMESPW002, ACMESPW003 and 2 Application Servers**
Agents used	**All**
User Load	**100 constant**
Pages / Sec	**17.7**
Avg. Page Time (Sec)	**3.10**
Requests / Sec	**282**
Requests Cached %	**18.5**
Avg. Response Time	**0.54**

Environment Metrics

Machine	% Processor Time	Available Memory at Completion (Mb)
ACMESCL002B	**Not recorded**	**Note recorded**
ACMESPW002	**Not recorded**	**Note recorded**
ACMESPW003	**55.0%**	**Note recorded**
ACMESPA001	**14.1%**	**Note recorded**
ACMESPA002	**11.7%**	**Note recorded**

Key Indicators



Counter	Instance	Category	Computer	Color	Range	Min	Max	Avg
User Load	_Total	LoadTest:Scenario	ACME SPD002		1,000	100	100	100
Pages/Sec	_Total	LoadTest:Page	ACME SPD002		100	7.43	32.9	17.7
Avg. Page Time	_Total	LoadTest:Page	ACME SPD002		10	0.69	21.8	3.10
Errors/Sec	_Total	LoadTest:Errors	ACME SPD002		10	0	2.43	0.63
Threshold Violations/Sec	_Total	LoadTest:Errors	ACME SPD002		100	0	4.57	0.64
Avg. Connection Wait Time	ACME SPD006	LoadTest:Request	ACME SPD002		-	-	-	-

Production

Graph unavailable.

Analysis

- Under a load of merely 100 users, the response times for the application pages become unacceptable. However, response times for SharePoint standard pages are still acceptable.

The table below details some of the response times on average (during this load).

Page	Avg. Time	Count
ACME Home Page	**23.2**	**26**
“CEO Figures Update”	**13.4**	**20**
Main Search Results	**4.83**	**1,229**
People Search Results	**4.66**	**2,019**
Rss Proxy Page	**0.55**	**55**

Test Constant-2 (Page output cache ON)

This test duplicates the previous test, but has Page Output caching turned on.

Summary data

Start Time	**17/04/2011 22:26**
Test Duration	**10 Minutes**

WFE's in Load	**ACMESPW002, ACMESPW003 and 2 Application Servers**
Agents used	**All**
User Load	**100 constant**
Pages / Sec	**30.6 (17.7)**
Avg. Page Time (Sec)	**2.23 (3.1)**
Requests / Sec	**506 (282)**
Requests Cached %	**16.9 (18.5)**
Avg. Response Time	**0.43 (0.54)**

Environment Metrics

Machine	% Processor Time	Available Memory at Completion (Mb)
ACMESCL002B	**Not recorded**	**Note recorded**
ACMESPW002	**Not recorded**	**Note recorded**
ACMESPW003	**48.6%**	**11,463**
ACMESPA001	**20.4%**	**2,183**
ACMESPA002	**19.4%**	**10,988**

Analysis

- In comparison to the non-cached pages, please see the table below (non cached in brackets).

The table below details some of the response times on average – during this load.

Page	Avg. Time	Count
ACME Home Page	**11 (23.2)**	**47 (26)**
"CEO Figures Update"	**2.32 (13.4)**	**24 (20)**
Main Search Results	**2.92 (4.83)**	**3,519 (1,229)**
People Search Results	**3.41 (4.66)**	**2,393 (2,019)**
RSS Proxy Page	**0.42 (0.55)**	**237 (55)**
TOTAL TESTS / SECOND	**7.08 (6.43)**	**11.5 /sec**

	(5.29 / sec)

Conclusions

To maintain adequate response times (< 5 seconds per page) and also keep the production farm within sensible ranges, the findings of these tests are that the production servers can handle:

- **800** Requests / second.
- **60** Page Requests / Second
- **150 - 200** concurrent user sessions.

Please Note: These figures are based on a "best guess" of user journeys and also correct mixture of those user journeys.

These figures also assume that Page Output caching will be turned on.

Recommendations

- The tests have assumed only moderate My Site usage, however, if users use them more than expected this will require more performance testing.
- Implementation of the Page Output cache for custom pages, or pages that have a large number of web parts on. **The home page is especially slow to load even under low loads**.
- The tests have assumed that 40% of user activity will be using Search, which performs extremely well. All future customisations (that can't be cached), should use search if appropriate.
- Add more memory to ACMESPA001 as this is consistently lower than all other servers.
- Investigate the logic used by the Load Balancer to ensure that it can evenly spread load under peak times.