The Innovation Group
TIG Claims

Testing Template:

This document will be used to describe, from a technical perspective, the elements that were included as part of the IBM TotalStorage Proven testing. It is intended to give an overall picture of the technical elements of the configuration, with a brief description of the results of the testing including any specific highlights of the interoperability results.

High-level architecture/description, include a list of products that meet the compatibility requirements ("Approved Product(s)") as well as a list of the IBM storage products with which the Approved Products meet the compatibility requirements ("Qualified IBM Storage Products"):

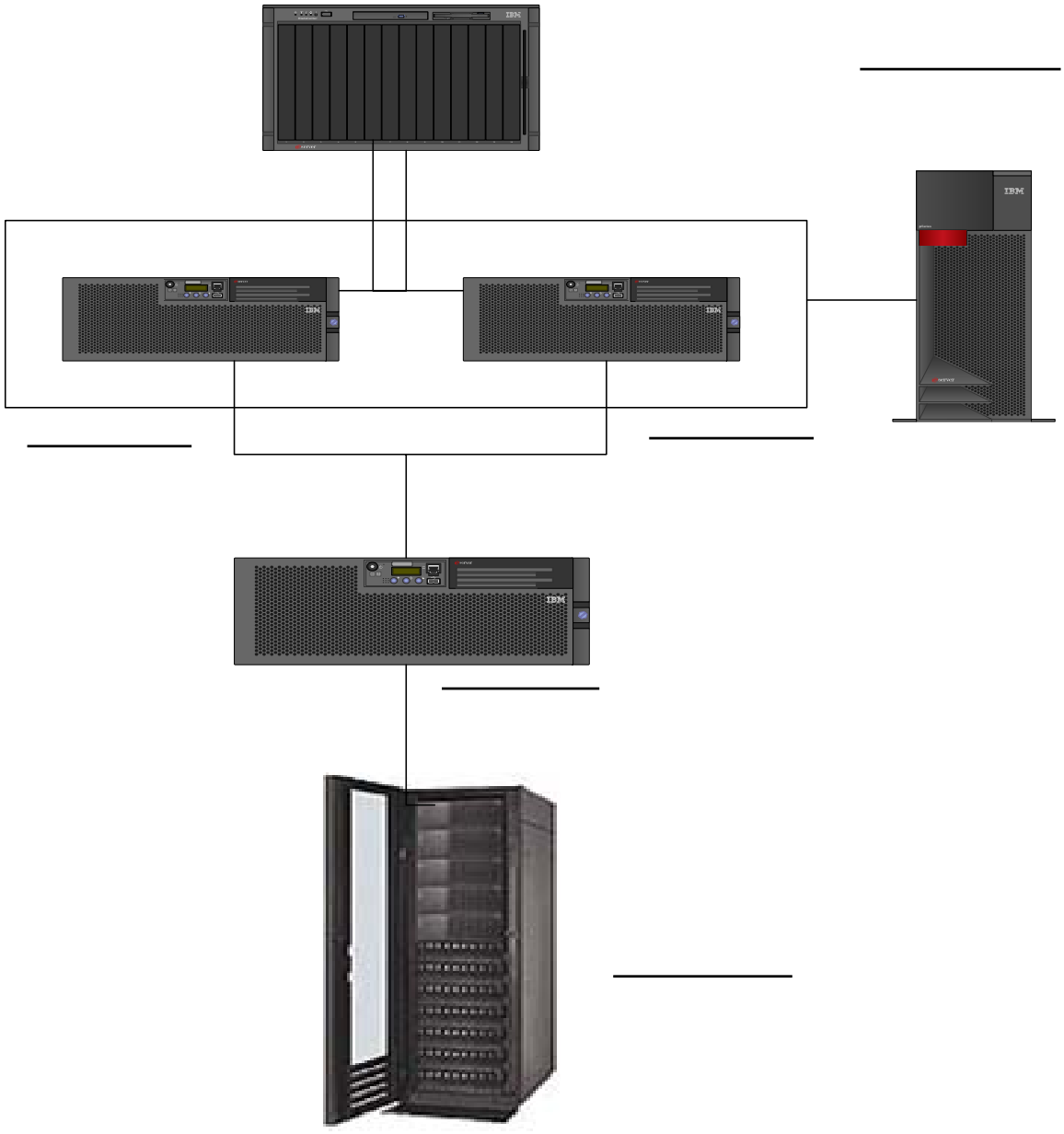
Products

AIX –	5.3 Maintenance Level 2
WebSphere	5.1 – WebSphere ND.
UDB/DB2	8.2 FixPak 9
JRE	1.4.2
TiGClaims	v3.4
IDS	v1.21

Physical Layout

The IDS servlet was deployed to WebSphere, the required EJB's were also deployed using pre-built ear files. The hardware setup comprised of three p570 Lpars, two application Lpars and one database Lpar. IDS runtime components such as the Data-Connector Engine, Service Integration Layer Engine, Process Engine and Integration Proxy and Diary Engine were deployed across the two Lpars.

Testing scenario:



The purpose of the testing was to establish an idea of the hardware requirements necessary for TiGClaims v3.4 to operate and perform under pre-defined realistic testing conditions. It was expected that TiGClaims v3.4 would have to deal with an expected 2400 users all utilizing the system for a spread of business functions which included call centre requirements and back office functionality. Scalability was also a key factor for testing as this load was expected to potentially increase.

TiGClaims v3.4 was required to demonstrate the ability to scale to a user base of 2400 claims application users, along with providing a current hardware specification to do so. Mercury Load Runner was utilized for the required injection of users. The specific requirements for this engagement were to be able to determine the hardware requirements necessary to support the user base system. It is for this reason, and this alone, that the user count was capped at 2400.

Component Breakdown (by Lpar)

Lpar 1 Application - Server

IBM WebSphere Application Server
IDS Interpreter Servlet
2 x IDS EJBCallers
IDS Data Connector Engine (heads down)
IDS Process Engine (heads down)
IDS Proxy Server
IDS Cache Server
IDS Repository Server
IDS Diary Engine

Lpar 2 Application - Server

IDS Data Connector Engine (heads up)
IDS Process Engine (heads up)
IDS Proxy Server

Lpar 3 Database Server

IBM DB/2 UDB

Testing level achieved: Comprehensive

- Standard: The standard test consists of elements like install, configuration, load, exercise I/O, and backup/restore testing.
- Comprehensive: Comprehensive testing would include the standard testing in addition to a much higher level of integration and failure testing. In either case, these tests are customized for the specific product(s) being tested, and in consultation with the participant.
- The level is determined by IBM based on the test plan and results.

Test configuration:

3 x p570 4 CPU Lpar (SMT Enabled)
Breakdown

Storage - DS4500 (60RU) UDB Database (CIO Enabled)

2 TiGClaims v3.4 Application Server cluster 16 GB RAM

pSeries 2 x 1.5GHz CPU 8Gb RAM (WebSphere Deployment Manager)

Test configuration:

(i)	OS	AIX 5.3 Maint 2
(ii)	JRE	1.4.2 (cal420-20040626)
(iii)	UDB/DBD	8.2 (FixPak 9)
(iv)	WebSphere	ND 5.1.0
(v)	WebSphere AppServer	5.1 (FixPak1 and 5)
(vi)	TiGClaims	v3.4
(vii)	IDS	v1.21

Test results:

(i) System setup on one node to confirm operability.
Mercury LoadRunner used to inject 350 users from 1 HS20 Blade
(ii) The additional Lpar was introduced and the load was split across the 2 Lpars.
(iii) WebSphere ORB Thread pool (and set to growable).
(iv) TCP_NAGLE_LIMIT set to 0
(v) CIO enabled
(vi) SMT enabled
(vii) System resources set to unlimited
(viii) Threads increased for the Web Container thread pool as waits were experienced as the thread pool increased.
(ix) DFT_QUERYOPT reduced as default is really for Data Warehouse applications. Level reduced to 3 for the purposes of this exercise.
(x) Runstats were performed against the database once sufficient rows were present in the process engine database.
(xi) The load was increased and tests run overnight.
(xii) Mercury injectors increased in number using 5 x HS20 Blades
(xiii) Load distributed across business functions

Breakdown of load:

400 Users

First Notice of Loss – adding a new motor claim including allocation of repairer, addition witness and third party

1000 Users

Back Office Complex – Entering Back Office. Searching for an existing claim by the claim number, performing an operation on the claim such as adding a new note against the claim and then exiting Back Office.

1000 users

Back Office Simple – Entering Back Office, Searching for an existing claim by claim number

Notable Observations and results

(i) WebSphere's JVM memory peaked at 1.6 Gb RAM for 2400 users.
(ii) Application Server 1 - Average CPU usage was approximately 60% busy during the test.
(iii) Application Server 2 - Average CPU usage was approximately 50% busy during the test.
(iv) Database Server Average CPU usage was approximately 40% busy during the test.
(v) The IDS Interpreter Servlet records statistics based on the transactions requested. The following is an excerpt of this data at the end of the 2400 user test.

Task Name	Iteration Count	Average Time (MSecs)	Min Time (MSecs)	Max Time (MSecs)	Last Instance (MSecs)	Last Instance At
AdvRule.Execute	67736	214.96	6	4391	186	17:33:22.923
Audit.List	27939	28.43	4	941	93	17:33:23.234
DB.GetValues	34262	0.23	0	500	0	17:33:22.839
DB.Lookup	471530	11.79	1	2188	6	17:33:23.238
DB.RetValues	126684	13.72	2	1471	5	17:33:23.240
DB.Save	7105	18.37	4	1017	20	17:33:22.977
DB.Update	27988	67.43	6	2208	17	17:33:22.948
File.Exit	2	16.5	15	18	15	15:52:46.147
General.DoLogon	2402	42.43	12	1885	30	17:32:11.477
Process.PopupForm	33620	0.24	0	180	0	17:33:23.264
Process.Proceed	77320	118.88	43	2215	87	17:33:23.212
Process.Reconnect	2402	119.74	69	1154	187	17:32:11.664
Process.ResetBookmark	9604	15.12	4	1073	45	17:33:22.943
Process.startProcess	2402	93.14	52	1014	91	17:32:11.415
SQL.Read	2402	55.1	5	1279	102	17:32:11.837
Warehouse.Retrieve	17197	23.31	2	1112	31	17:33:23.234
_Servlet Transactions	767521	**78.24**	0	4464	62	17:33:23.264

Load Test Results

The following tables show the minimum, average, maximum and 90th percentile results for transactions recorded during the running of the Load Runner scripts.

It can be seen from the tables that the majority of the transactions are under two seconds, with a large proportion of them being sub second.

These results were collected from the individual Mercury Load Runner injectors.

400 FNoL (First Notice of Loss) Users

Transaction Name	Minimum	Average	Maximum	90 Percent
Claim Create	0.928	3.101	3.386	3.151
Collect initial Details	0.005	0.032	1.31	0.053
Collect initial Details proceed	0.062	0.207	1.017	0.313
Doc Suppression	0.186	0.671	1.05	1.099
Driver Details Accident	0.117	0.538	1.982	0.897
Fill in Veh Damage	0.038	0.225	1.347	0.364
Incident Details AD	0.029	0.21	1.912	0.344
Log on	0.132	0.198	0.779	0.243
Log on Create WIP	0.245	0.359	1.385	0.424
Logoff	0.018	0.048	0.313	0.063
New Claim	0.153	0.205	1.148	0.263
Policy Search	0.008	0.057	1.929	0.083
Policy Search popup	0.047	0.291	1.814	0.474
Proceed out of Incident Details AD	0.349	1.401	2.474	2.268
Proceed out of Veh Damage	0.151	0.799	2.219	1.382
Proceed past Claim Validate 1	0.217	1.214	2.906	2.268
Proceed past Claim Validation 2	0.217	0.787	1.521	1.241
Proceed past Summary	0.035	0.248	1.312	0.404
Proceed to Claim Validate 1	0.418	1.897	3.14	3.049
Set Reserves	0.208	0.802	2.101	1.22

2 x 500 Back Office Complex

Transaction Name	Minimum	Average	Maximum	90 Percent
Create Note	0.015	0.104	1.409	0.22
Exit BO	0.226	1.103	2.107	2.01
Open BO	0.549	1.9	3.797	3.365
Save Note	0.029	0.158	1.571	0.33
Search Select	0.133	0.68	1.074	1.146

Transaction Name	Minimum	Average	Maximum	90 Percent
Create Note	0.016	0.114	1.468	0.25
Exit BO	0.242	1.244	2.043	2.142
Open BO	0.562	2.139	3.112	3.634
Save Note	0.028	0.181	1.317	0.381
Search Select	0.129	0.782	1.191	1.4

2 x 500 Back Office Simple

Transaction Name	Minimum	Average	Maximum	90 Percent
Claim Search	0.125	0.688	1.605	1.298
Claim View	0.101	0.611	1.532	1.146
Logoff	0.006	0.009	0.195	0

Transaction Name	Minimum	Average	Maximum	90 Percent
Claim Search	0.127	0.671	1.527	1.237
Claim View	0.102	0.604	1.272	1.136
Logoff	0.007	0.014	0.399	0.01

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