Program 42

Workbrain Scalability Assessment Test Plan

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Shared Service Solutions

Approvals

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0.2	09/04/08	Changes to the file transfer test	Amir Mahmoudi
0.3	09/04/08	Updated after internal review	Amir Mahmoudi
0.4	10/04/08	Updated schedule, removing file transfer portion of the assessment from the scope of Test 3	Amir Mahmoudi
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Reviewer List

Name	Title

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Related Documents

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	Workbrain Scalability Assessment, Project Execution Plan	0.1

Definitions

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Term	Description

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1. Introduction

1.1 Purpose

The purpose of this document is to describe the scalability assessment planning activities for the proposed IBM Workbrain solution. At a high level this document describes:

- How - The assessment and testing approach, including entry and exit criteria;
- Who - The testing resources required including people, hardware (environments) software and tools;
- When - Testing Schedules extending to people, requirements, dependencies, schedules and environment schedules;
- What – Testing scope, what software is being tested, what is not being tested, what testing focus area will be tested.

1.2 Overview

The original SSS solution design for non rostering Agencies relied solely on the SAP application for award interpretation processing. Based on actual payroll processing results at the Department of Housing, and extrapolating these to include the remainder of non rostering agencies, it became evident that the SAP application would be unable to process the award interpretation function within an acceptable timeframe to meet SSS business requirements.

In IBM's Invitation to Offer, it was proposed to replace the SAP centric approach to award interpretation with the Workbrain application (see Figure 1) to alleviate processing time constraints and to realise the additional following benefits:

- Economies of scale through developing only one set of rules that will be utilised across all Agencies. The Workbrain architecture allows pay rules to be designed so they are fully configurable across multiple awards and across multiple Agencies. The award configurations have a large number of similarities allowing a small set of rule components to be built that can then simply be reconfigured to fit any number of awards. Currently awards and their associated pay rules will be developed in Workbrain as part of the Phase One roll out to Health. Therefore, huge efficiencies can be gained through re-using these existing rules and configurations for other Agencies, eliminating the costly and time consuming development phase in SAP.

- Implementing all awards in Workbrain provides a single system of record for their configuration, therefore providing significant efficiencies for maintenance, EBA updates, training, etc.

- The Workbrain rule and leave accrual engine is extremely efficient in providing considerable time savings, particularly when all awards will already have been interpreted when SAP payroll runs are made, vastly improving the time window required for this.

- The system architecture of the Workbrain rule engine is designed to allow simple and efficient integration with custom components. This allows for a very short development cycle where all customisations are written in Java and fully extendable and re-usable.

- Workbrain provides a large number of standard pay rules within the core system, considerably reducing the size of custom development required.

- Changes to award agreements can be made quickly and easily via the pay rule editor in Workbrain, eliminating the need for further custom development and associated costs.

- Configuration of pay rules in Workbrain is simple relative to SAP, with all configurations fully exportable via XML.

In principle, SSS accepted IBM's proposal to utilise the Workbrain application for both rostering and non rostering agency award interpretation. Before proceeding with this approach, SSS has requested that IBM perform a series of tests that must evidence Workbrain's ability to scale, providing comfort that business requirements can be satisfied. This scalability test requirement is documented as a deliverable in SOW 5 - Priority Core HR & Finance Development. On test completion, a Workbrain Scalability Assessment Test Completion Report (contracted deliverable) will be presented to SSS, outlining the tests performed, results obtained and interpreted findings. A go/no-go decision on the proposed solution will be made by SSS after review and consideration of this report. A go decision will be made if it is proven that the Workbrain application can scale.
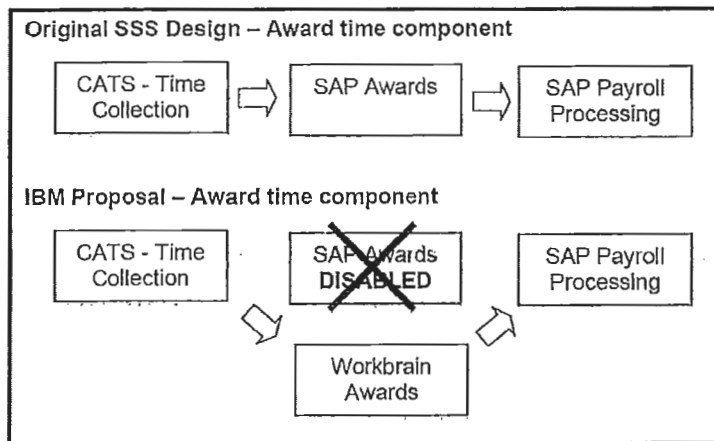

Figure 1. The original SSS design for award interpretation (for non-rostering agencies) and IBM's proposed solution, disabling SAP and utilising the Workbrain application to process awards

The Workbrain Scalability Assessment Test Plan (this document) outlines the tests to be performed to evidence the ability for Workbrain to scale to meet SSS business requirements.

In summary, three tests will be conducted to cover:

- Test 1- Non-rostering agency processing (Test 1) on interim hardware;

- Test 2 - Rostering agency processing (Test 2) on interim hardware. This test will be conducted in three iterations: 2a, 2b and 2c;

- Test 3 - Combined rostering and non-rostering (Test 3).

(Note that in the earlier versions of this document, the Test 3 included integration with SAP via XI. This integration is no longer in the scope of this test.)

Due to dependencies on hardware availability, tests have been scheduled iteratively (initially on interim hardware) so that results can be obtained as soon as possible. This allows for the early identification of potential issues, risks and impacts to the project and related schedule.

SSS Technology Services will be responsible for the provision of appropriately sized hardware for the Workbrain and SAP environments and will also be responsible for the installation and tuning of the software.

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Individual test scope (including process scenario, inputs and cases) will be developed by the IBM Workbrain Scalability Test team. Workbrain online tests will be executed by SSS Technology Services. IBM will execute the Workbrain batch tests. Test execution results will be provided to IBM for interpretation.

1.3   Current system environment

The following diagram is a logical representation of the solution. Further detail is covered in subsequent sections.
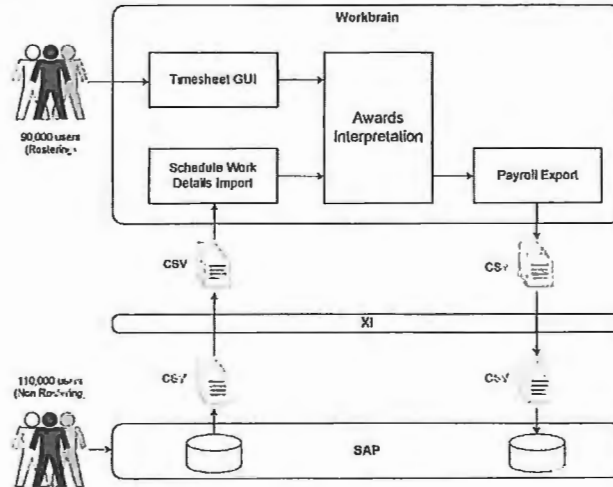
Figure 1 - logical system environment

Employees enter their timesheets via SAP. A file will be generated containing employee timesheet data. The file will be transferred to Workbrain for Awards interpretation, via XI. Once the award is calculated, the result will be exported from Workbrain, and will be sent to SAP via XI.
The 90,000 employees enter their timesheets using the Workbrain native GUI. The timesheets then will be fed into the Award Interpretation sub system for calculation.

Below diagram shows the Workbrain topology:

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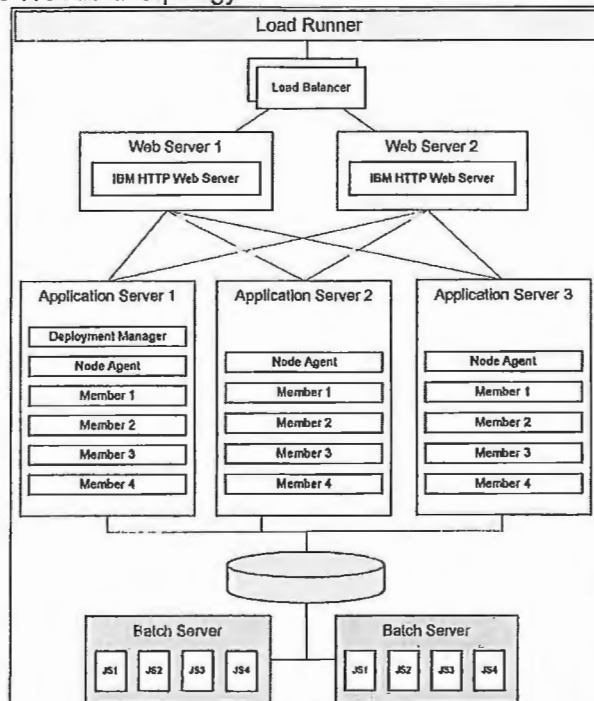
LoadRunner simulates the online employees. LoadRunner interacts with the Workbrain platform via two (Network Load Balancer) NLBs. The NLBs interact with the Workbrain application servers via two Web Servers.

The following applications/components will be utilised and observed in the test phase:

• Citrix NetScaler;

• Workbrain Web Servers (IBM HTTP Server, based on Apache);

• Java 2 Platform Enterprise Edition (J2EE);

• Workbrain Application Servers (IBM WebSphere 5.x for Tests 1, 2 and 3);

• Oracle database 10.2.0.2; and

• Any switches, routers, firewalls crossed in the architecture

Below diagram shows how the application components are distributed across physical servers: (Note: only the Operating System resides on the local storage, all the application and non application software components reside on the SAN)
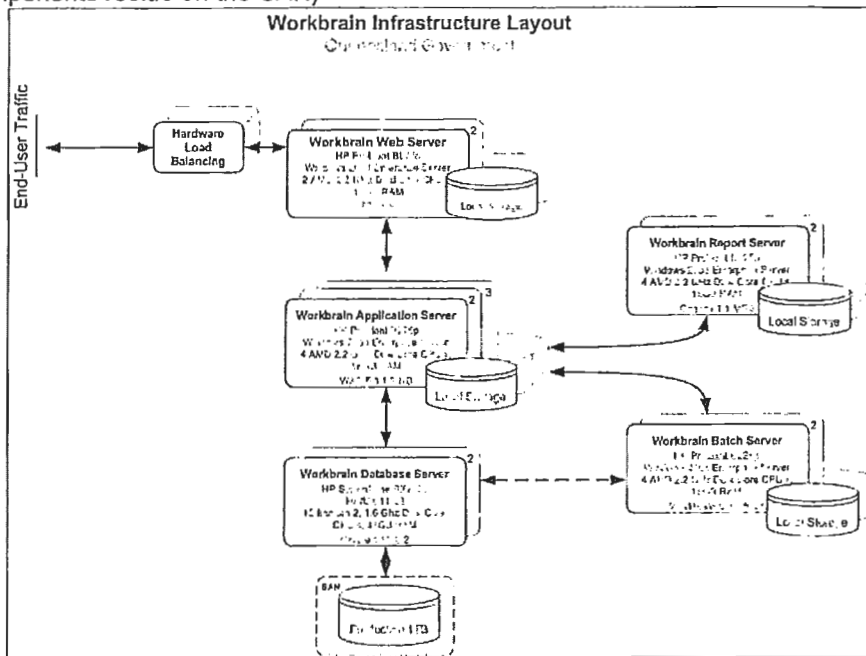
Figure 2 - System topology

1.4 Project Goals

The goal of the project is to replace the SAP centric approach to award interpretation with the Workbrain application to alleviate processing time constraints. For additional benefits please refer to section 1.1.

The major risk of this project is that the Workbrain solution may not scale. The purpose of this particular assessment is prove whether the Workbrain solution is scalable or not.

1.5 Release Objectives

Not applicable.

2. Test Objectives

The key objective of this assessment is to obtain evidence to support Workbrain's ability to linearly scale, providing comfort that SSS award interpretation processing business requirements can be satisfied. The term **scalability** refers to the capability or ability of the system to either handle growing amounts of work in a graceful manner, or to be readily enlarged. That is the capability of the system to increase total throughput under an increased load when resources (hardware) are added.

3. Test Scope

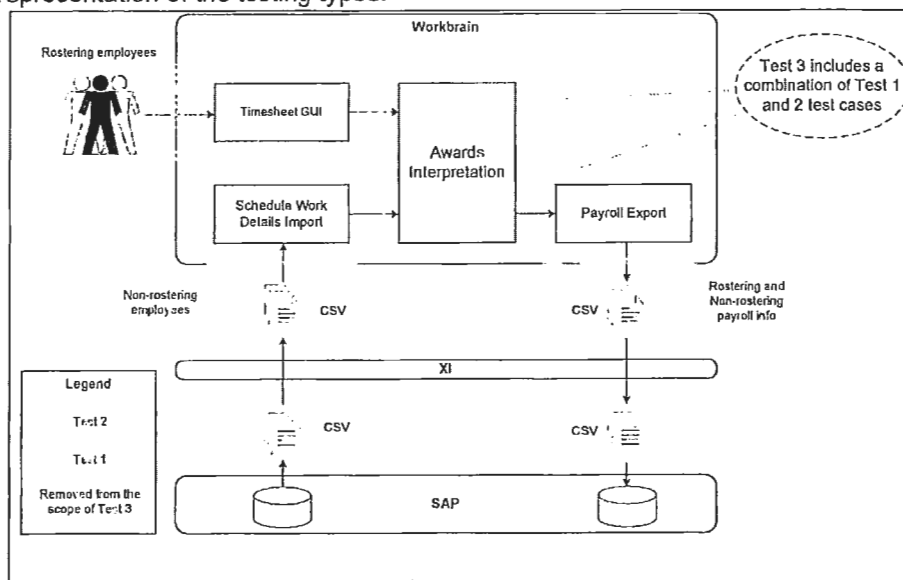The scope of this project is to assess the scalability capability of Workbrain application. As such any application functional testing, performance testing, stress and volume testing, and any tests to confirm production sizing is out of scope of this project.
There are three types of testing involved in this assessment:

- Non-rostering agency processing (Test 1) will execute award interpretation in batch utilising an imported employee file as input. This test will be executed on interim sized batch and production sized database servers;

- Rostering agency processing (Test 2) that will test concurrent user scalability by submitting timesheets through the Workbrain application front end and subsequently perform the Award interpretation. This test will be conducted on a production sized database server and on interim hardware (approximately ~ 50% production) for the application servers;

- Combined rostering and non-rostering (Test 3) scenarios on production sized hardware using a range of transactions per hour and a range of concurrent users. Results will be assessed against anticipated volumes. The rostering and non-rostering tests will not overlap in time. Ie. They will be executed at different times.

Important Note: Initially Test 3 included a file transfer portion via SAP XI. A decision has been made to exclude the same from the scope of Test 3. CorpTech is currently in the process of raising a change request to alter the current contract, and remove this file transfer portion from the scope of the Test 3.

Below is a representation of the testing types:

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4. Assumptions and Constraints

The following assumptions and constraints have been identified:

- Workbrain scalability test products developed to date will be leveraged where possible;

- Workbrain scalability deliverables will be confined to those outlined in SOW 5;

- SSS Technology Services will be responsible for the provision of required infrastructure to perform the tests;

- No integration is required with SAP XI, as the related test portion is out of scope of Test 3. A Change Request will be raised by CorpTech in order to remove this requirement from the current contract. It is also assumed that this change request will be accepted;

- SSS Technology Services will be responsible for tuning the environment;

- SSS Technology Services will be responsible for test execution;

- IBM will be responsible for test interpretation;

- IBM will be responsible for the development of the test report;

- Valid HP LoadRunner licences are available.

5. Test Strategy

5.1 Business Functions

Not applicable as no business functions will be tested.

5.2 Structural Functions

Not applicable as there is currently no non functional requirements.

5.3 Risk Assessment

The following risks and issues have been identified and require management:
- Availability of sufficiently skilled resources to resolve performance, network, application or infrastructure problems encountered during test phases;
- Late delivery of hardware for Test 3 has impacted planned project delivery timelines;
- Risk that hardware is insufficiently sized for scalability testing;
- There is no component model, operational model and deployment model for the solution;
- There is no documented architectural decision describing the rational behind the existing design.

5.4 Test Focus Area

This assessment is focused to obtain evidence to support Workbrain's ability to scale, providing comfort that SSS award interpretation processing business requirements can be satisfied. No other non functional requirements will be tested.

5.5 Levels of Testing

The only level of testing is limited to scalability test. By definition this is testing the ability of Workbrain to continue to function well when it is changed in size or volume in order to meet a growing need.

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5.6   Entry / exit criteria

The basic entry criteria is that the hardware and software platform exist and the Workbrain is installed and tuned. The installed Workbrain may not have all the functionality, which is not an issue as the intention of this assessment is only to prove that the solution is scalable.

The exit criteria for scalability tests may not be that 'all defects above a stated severity level are fixed' because scalability tests do not necessarily reveal 'defects' in the classic sense of functional failure. The result of scalability tests may only be a set of performance metrics that must be assessed in the context of the total system. The aim is to assess how variable *Number of Servers* affects the other variable *Virtual Users*. The resultant response time, shows the impact, which should be within a reasonable variance.

This assessment is to prove that as the volumes increase, and physical resources increase, the response time extrapolates in a leaner fashion. Below are expected results:

- It should scale linearly;
- It should reach the expected capacity of 1500 concurrent users linearly for Test 2, or 3000 for Test 3.

Below are expected results for the batch Award processing, ie. Non rostering employees:

- Import duration less than 4 hrs;
- Award processing duration less than 1 hr;
- Payroll information export duration less than 30 mins;

5.7   Functional and Structural Test Types

This assessment involves no functional and/or structural testing.

6.   Test Plan

6.1   Test Planning Workshops

No workshops were planned.

6.2   Roles and responsibilities

The following matrix will form the basis of this assessment:

Activity	Sub Activity	Accountabilities	
		IBM	SSS
Project Management	Manage IBM and SSS Team	IBM Project Manager	
	Manage SSS Technology Solutions and CITEC Team		SSS Project Manager
	Governance Team Reporting	IBM Project Manager	SSS Project Manager
	Plan Definition and Maintenance	IBM Project Manager	SSS Project Manager
	Document Signoff Management	IBM Project Manager	SSS Project Manager
	Manage Dependencies	IBM Project Manager	SSS Project Manager
	Manage External Dependencies	IBM Project Manager	SSS Project Manager

Activity	Sub Activity	Accountabilities	
		IBM	SSS
Scope Definition and Establishment	Define and agree project scope with the SDA	IBM Project Manager	SSS Project Manager

Activity	Sub Activity	Accountabilities IBM	Accountabilities SSS
	Define technical environment	IBM Project Manager	SSS Project Manager
	Establish project structure roles and accountabilities	IBM Project Manager	SSS Project Manager
	Define dependencies and engage required parties	IBM Project Manager	SSS Project Manager
	Management and reporting activities	IBM Project Manager	SSS Project Manager

Activity	Sub Activity	Accountabilities IBM	Accountabilities SSS
Test 1	Establish interim technical environment		SSS Technology Services, CITEC
	Validate environment		SSS Technology Services, CITEC
	Database setup and configuration	IBM Team	
	Execute Test 1	IBM Team	
	Collate Test 1 results	IBM Team	
	Interpret Test 1 results and develop report	IBM Team	

Activity	Sub Activity	Accountabilities IBM	Accountabilities SSS
Test 2a	Establish interim technical environment		SSS Technology Services
	Cluster Workbrain application		SSS Technology Services
	Validate environment		SSS Technology Services, CITEC
	Load Runner setup and configuration		SSS Technology Services
	Load calculation group, schedule and employee data	IBM Team	
	Execute Test 2a		SSS Technology Services
	Collate Test 2a results		SSS Technology Services
	Interpret Test 2a results and develop report	IBM Team	

Activity	Sub Activity	Accountabilities IBM	Accountabilities SSS
Test 2b	Confirm Test 2b strategy and objectives	IBM Project Manager	SSS Technology Services
	Tune Workbrain environment		SSS Technology Services, CITEC
	Execute Test 2b		SSS Technology Services
	Collate Test 2b results		SSS Technology Services
	Interpret Test 2b results and develop report	IBM Team	

Activity	Sub Activity	Accountabilities IBM	Accountabilities SSS
Test 2c	Confirm Test 2c strategy and objectives	IBM Project Manager	SSS Technology Services

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Activity	Sub Activity	Accountabilities	
		IBM	SSS
	Tune Workbrain environment		SSS Technology Services, CITEC
	Execute Test 2c		SSS Technology Services
	Collate Test 2c results		SSS Technology Services
	Interpret Test 2c results and develop report	IBM Team	

Activity	Sub Activity	Accountabilities	
		IBM	SSS
Test 3	Establish production sized SAP and Workbrain environments		SSS Technology Services
	Cluster Workbrain		SSS Technology Services
	Validate environment		SSS Technology Services, CITEC
	Load Runner setup and configuration		
	Load calculation group, schedule and employee data	IBM Team	
	Tune Workbrain environment		SSS Technology Services
	Perform network baseline test		SSS Technology Services, CITEC
	Execute Test 3		SSS Technology Services
	Collate Test 3 results		SSS Technology Services
	Interpret Test 3 results and develop report	IBM Team	
	Go/no-go decision	IBM Project Manager	SDA

6.3 Test Schedule

Milestone	Date	Deliverables associated
Scope Defined (Completed)	14/12/2007	Workbrain Scalability Assessment Test Plan
		Workbrain Scalability Assessment Test Environment Hardware Requirements Definition
Test 1		
Establish interim technical environment	Completed	
Validate environment	Completed	
Database setup and configuration	Completed	
Perform network baseline test	Completed	
Execute Test 1	Completed	
Collate Test 1 results	Completed	
Interpret Test 1 results and develop report	Completed	
Test 2a		

Milestone	Date	Deliverables associated
Establish interim technical environment	Completed	
Cluster Workbrain application	Completed	
Validate environment	Completed	
Load Runner setup and configuration	Completed	
Load calculation group, schedule and employee data	Completed	
Perform network baseline test	Completed	
Execute Test 2a	Completed	
Collate Test 2a results	Completed	
Interpret Test 2a results and develop report	Completed	
Test 2b	Completed	
Tune Workbrain environment	Completed	
Execute Test 2b	Completed	
Collate Test 2b results	Completed	
Interpret Test 2b results and develop report	Completed	
Test 2c (2b re-run)		
Tune Workbrain environment	Completed	
Execute Test 2c	Completed	
Collate Test 2c results	Completed	
Interpret Test 2c results and develop report	Completed	
Execute Test 2c	Completed	
Test 3		
Hardware delivery	07/03/2008	Target date not met by SSS Technology Solutions Hardware delivered on 12/03/2208
Installation, connectivity (CITEC)		Target date not met due to delayed delivery of hardware Revised due date 04/04/2008
Establish production sized Workbrain environment	14/03/2008	Revised due date 11/04/2008
Cluster Workbrain	14/03/2008 – 28/03/2008	Revised due date 11/04/2008
Validate environment	28/03/2008	Revised due date 18/04/2008
Load Runner setup and configuration	14/03/2008 – 28/03/2008	Revised due date 18/04/2008
Load calculation group, schedule and employee data	28/03/2008	Revised due date 18/04/2008
Tune Workbrain environment	14/03/2008 – 28/03/2008	Revised due date 28/04/2008
Perform network baseline test	28/03/2008	Revised due date 28/04/2008

Milestone	Date	Deliverables associated
Execute Test 3 (online)	28/03/2008 – 03/04/2008	Revised due date 29/04/2008 – 06/05/2008
Execute Test 3 (online)	28/03/2008– 03/04/2008	Revised due date 07/05/2008– 15/05/2008
Collate Test 3 results	03/04/2008	Revised due date 16/05/2008
Interpret Test 3 results and develop report	04/04/2008	Revised due date 22/05/2008
Go/no-go decision	04/04/2008	Workbrain Scalability Assessment Test Report Revised due date 23/05/2008

Note: The revised dates in the above table refer to the planned date, based on the expectation at the time of producing the earlier version of this document. These dates may have been changed by now.

6.4   Major testing milestones

Test 3	Date	Comment
Hardware delivery	11/04/08	Previous target date was not met.
Installation, setup and validation	18/04/08	
Perform network baseline test	28/04/08	
Test execution completion	15/05/08	
Go/no go decision	23/05/08	

6.5   Resource requirements

6.5.1   Testing team

The table below indicates the resources and roles required to develop, execute and report on the specified test:

Job Title	Responsibility	Name
Stress Test Team	Design and develop LoadRunner™ scripts. Manage execution of test cases. Suspend / resume testing. Deliver daily test reports.	Frank Bajart, Trevor Boyd, William Knott
Manager S&V and Special Projects	Co-ordination of environments, test data and access to test systems.	William Knott
IBM	Co-ordination and escalation of performance defects and issues identified during the testing execution phase.	John Sinclair Cc: Amir Mahmoudi
IBM	Producing Test Report	John Sinclair Cc: Amir Mahmoudi

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6.5.2 Test support team

The groups listed below are required to provide support services to the testing team on both a scheduled and an "as required" basis:

Support group	Responsibility	Name
Network	Configuration of network monitoring. Configuration verification. Statistics collection (eg error rates, bandwidth usage, etc...)	CITEC Connectivity Team
Application Support	Performance monitoring. Performance tuning. Suggesting configuration changes. Implementing configuration changes. Configuration verification.	IBM S&V Team SSS Non-SAP System Support
Server Team	Performance monitoring. Performance tuning. Suggesting configuration changes. Implementing configuration changes. Configuration verification.	CITEC S&V Team SSS Non-SAP System Support

6.6 Contingencies

Existing backup procedures will be followed.

7. Test Environment Build Strategy

7.1 Test Data Strategy

The test data will be generated by Workbrain data generator and will be loaded by IBM staff.

7.2 Test Tools Build / Buy

Mercury LoadRunner will be used in order to simulate the online users. This tool has already being used for this scalability testing.

8. Test Management & Reporting Procedures

8.1 Test Management

8.1.1 Problem Tracking/Management Procedures

The existing problem and issue management procedures used by the program will also be used for this assessment.

8.1.2 Change Management Procedures

The existing Change Management procedures used by the program will also be used for this assessment.

8.1.3 Progress Tracking Procedures

The current project standards for progress tracking during weekly status meetings will be used. Normal escalation procedures used by the project will apply.

8.2 Test Reporting

8.2.1 Test Reports

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Appendix A.   Definitions and Acronym

Term	Description
CPU	Central Processing Unit
End-State	This term refers to the end of the SSI, SSS design, build and implementation program, when all Queensland Government agencies and Shared Service Providers have gone live with the new SSS business solutions
GUI	Graphical User Interface
HTTP	Hypertext Transfer Protocol
J2EE	Java 2 Platform, Enterprise Edition
JVM	Java Virtual Machine
SSI	Shared Service Initiative
SSL	Secure Socket Layer
SSS	Shared Service Solutions
SVT	Stress and Volume Testing
TPH	Transactions per hour
TPS	Transactions per second
Vuser	Virtual User, HP/Mercury LoadRunner user that emulates the business transaction of a normal user
XFA	Cross Functional Applications

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