**CARESTREAM HEALTH**

Revision History

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| --- | --- | --- |
| **Revision** | **Description of Change** | **Revision date** |
| 0.1 | Initial version | 2019-08-02 |
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# Introduction

Puma MR3 is released as the Puma Third Maintenance Release to support new infrastructure Windows Server 2016 and database performance improvement, also address enhancements from sites and defects which have been identified as must-be-fixed in this release by DRC.

The PUMA MR3 reliability testing will focus on the Print Server of Kiosk (PS) .We should confirm the reliability of system will meet the requirement and real work environments.

# Test Environment

The detailed hardware configurations of all servers are described as follow:

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Computer name** | **CPU** | **Memory** | **HD** | **OS** | **Database** |
| PS Server main | Interl(R) Xeon® CPU Bronze 3104 @ 1.70 \* 6 | 16GB | 1TB | Windows 2012 R2 64bit |  |
| PS Server virtual server | Interl(R) Xeon® CPU Bronze 3104 @ 1.70 \* 6 | 12GB | 1TB | Windows 2008 R2 64bit | SQL server Standard 2008 |
| Terminal | Intel Atom D525 1.8GHz | 4GB | 450GB | Windows 7 Embedded Standard SP1 64bit or  Window10 |  |

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Computer name** | **CPU** | **Memory** | **HD** | **OS** | **Other** | **Comments** |
| PUMA Main Server | Intel(R) Xeon® Bronze CPU 3140 @ 1.70 \* 6 | 16GB | 300GB | Windows 2012 R2 64bit |  |  |
| PUMA Store Server | Intel(R) Xeon® Bronze CPU 3140 @ 1.70 \* 6 | 16GB | 8T | Windows 2012 R2 64bit |  |  |
| PUMA virtual server | Intel(R) Xeon® Bronze CPU 3140 @ 1.70 \* 6 | 12GB | 7T | Windows 2012 R2 64bit | SQL server 2008 Sp3 | PS 3.0.4.0.0031 |
| Terminal | Intel(R) Celeron CPU J1900 2.0GHz | 4GB | 450GB | Windows 10 Enterprise 2016 | AUTOIT 3.0 |  |

Table 1 Hardware Configuration

# Test Strategy

## Test Object

We will integrate the 3rd party system and patients can print their reports and films including gray film and color film in ONE terminal with color printer as new extension hardware.

We will focus on the PS system reliability testing work. We will simulate the web service call and send them to PS server, and monitor the transactions response time, service performance and hardware resource usage. This scenario will include the 3rd request, report achieved, film and report print and web query, update operations etc.

## PS Transactions analysis

1. Report print by E1 terminal:
   1. Create patient information in system.
   2. Send the report by web service and size is 100KB or 4MB randomly.
   3. Print the report.
2. Film print including grey film and color film by K2/K3 terminal:
   1. Create patient order in system.
   2. Send the film data by 3rd party service.
   3. Print the film by web service.
   4. Print the color film to paper printer.
3. Film archive:
   1. Send the film from workstation and let the OCR indentify the information and archived in PUMA MR3 system.
4. Related operations in web work list:
   1. Query the patient information by date include all, latest month, latest week, latest two days, today and random date
   2. Query the detail patient information by accession number, patient ID, patient name.
   3. User login.
   4. Set the study holding time.
   5. Set the film exam to printed, unprinted, not print with exam expand.
   6. Set the film exam to printed, unprinted, not print without exam expand.
   7. Set the report exam to printed, unprinted, not print without exam expand.
   8. Set the report exam to printed, unprinted, not print without exam expand.
   9. Expand the film and report study.
5. Query Operations in web monitor:
   1. Get department information from web.
   2. View the terminal monitor information.
6. Query Operations in web reconciliation:
   1. Search all film data which need reconciliation.
   2. Search all report data which need reconciliation.
7. Query Operations in web statistic:
   1. Film information by modality type, name, terminal, film size, unprinted film size, central print type.
   2. Report information by modality type, terminal, Paper size, central print type.
   3. OCR successful rate by modality type, name.
   4. The system space usage.

## Test Tool

Load Runner

## Background data

We will simulate 1,000,000 records in the PS as background data. The data size is calculated by typical site. We will stop the SMS and LRU services of PS in order to keep the history data.These data will be added by automation scripts, test tool or SQL script. The detail data information as follow:

|  |  |  |
| --- | --- | --- |
| No. | Items | Amount |
| 1 | Patients | >=1,000,000 |
| 2 | Films | >=1,000,000 |
| 3 | Reports | >=1,000,000 |
| 4 | Exams | >=1,000,000 |
| 5 | Unprinted Films | >=700,000 |
| 5 | Unprinted Reports | >=300,000 |

Wait the detail backgroud data from song yang.

# Test scenario

## Test target analysis

Follow chapter 3.2, the main transactions during the testing work is similar to reliability test, but the target is different. Reliability test will focus on the transactions and service correctness.

The automation scripts will have checkpoint or assert to confirm the each transaction are correct or not. The system services and database should not have high-level errors during the testing work. As an internet product, we plan the system can support 7\*24 work stress.

The test target will define as the follow:

1. The transactions or requests pass percent should more than 99%.
2. No services （IIS, 3rd party API etc）errors during testing work.
3. No database errors during testing work.
4. No hardware issues during testing work.
5. The system can work 7\*24 hours with index from step1 to step4.

Errors define:

1. Transaction error:
   1. Transaction requests send fail.
   2. Response content do not meet asserts or checkpoints.
   3. Transaction process time out more than two minutes.
2. Service error:
   1. Service down.
   2. Service stop service more than one minute.
3. Database error:
   1. Database down.
   2. Database lost data.
   3. Database stop work more than one minute.
4. Hardware error:
   1. CPU usage more than 90%.
   2. Memory usage more than 90%.
   3. Have memory leak issues. The memory cannot release in one hour.

Below items do not consider as error:

1. Transaction:
   1. Transaction requests send fail caused by scripts, network and other reasons.
2. Service:
   1. Service down or stop caused by error requests.
3. Database error:
   1. Database errors caused by DB software.
4. Hardware error:
   1. Errors caused by other software (like office, anti-virus software)

For reliability testing work: If the test result doesn’t meet the requirements and targets, we will tuning the software or change the target for testing work. Any change should be reviewed and discussed with the project core team.

## PUMA reliability test scenario

Virtual User: 60 Users

Duration: 8\*7 hour

Description: Use the test tool simulates the patient operations. Monitor the server software and hardware resource usage. The detail information as follow:

1. Use automation tool simulate the doctor print film work. Simulate 20 workstations print 2,000 films to PS server.
2. Use LR tool simulate 8 K2/K3 terminals to print gray films. Each client prints one film which size is 10MB random 60 to 120 seconds.
3. Use auto tool simulate 1 K2/K3 terminals to print color films. The film size will more than 80MB. The color film will print to PDF file create software instead of the real paper printer.
4. Use LR tool simulate 21 users to do paper report archive operations. Each client archive report in random 60 to 90 seconds and size is random with 100kb and 4Mb.
5. The OCR setting will has rule configuration from GX platforms film information in step1 and thread setting is set as 10.
6. Simulate 10 users to do the query information, view monitor page, query reconciliation films and report, expand the record, change the status, set holding time and other operations in work list in random 60 to 120 seconds.
7. Simulate 1 user to do the statistic operations with latest month data in web. The operations will execute every 300 secon
8. Monitor the hardware resource usage on PS.
9. Monitor the resource usage for database on PS.
10. Start/Stop 2 virtual users every 10 seconds and run the scenario for 8\*7 hours.

# Test Scope

## In Scope

Kiosk SQE team is responsible for below items:

1. Design software reliability test plan.
2. Prepare test data, design scripts and scenario, execute test cases and result collect.
3. Monitor the software and hardware resource usage information.
4. Bottleneck identification and tuning suggestion include the software and hardware.
5. Write reliability test summary report.

## Out Scope

1. Code-level bottleneck tuning.
2. Other transactions which do not define in plan.
3. 3rd party system reliability testing work.

# Risk

1. Need more time to indentify whether the test tool meets the test requirements or not.
2. QE need more time and resource to familiar with the APIs for PUMA MR3 in order to design the test scripts.
3. QE Team needs more time to prepare the background test data with tool.
4. The 3rd party system is not the real customer environment. The API performance will affect the reliability of PUMA MR3.
5. Any requirements or code design change will affect the schedule.
6. New design for PUMA MR3, need more time to design and verify the script.

# Human Resource

| Name | ORG | Role Technician/Engineer | Testing Type | Phase Needed |
| --- | --- | --- | --- | --- |
| Yunfei Zhu | Shanghai R&D | Quality Leader | Quality Planning and Reporting | 4 |
| Hao Wang | Shanghai R&D | Quality Engineer | Software reliability Planning and Reporting  SW reliability test(script development and execution) | 4 |

# Deliverables

The follow data would be delivered to team during the reliability testing phase:

1. Test scenario and test scripts
2. Background test data and scripts.
3. Reliability test summary report.
4. Reliability tuning recommendation.

# Schedule

|  |  |  |  |
| --- | --- | --- | --- |
| Testing Milestone | **Target Date** | **Content** | **Owner** |
| Planning | 07/29/2019-08/02/2019 | * Test plan design * Test plan review and update | Hao Wang |
| Drop33 | 2019/09/02-2019/09/13 | * Test environment set up * Prepare the test background test data * Optimization | Hao Wang |
| Drop34 | 2019/09/16-2019/09/30 | * Test environment set up * Prepare the test background test data * reliability test for PS on Windows Server 2008 * Optimization & verification * Test report | Hao Wang |
| Drop 35 | 2019/10/08-2019/10/18 | * Reliability test for PS on Windows Server 2008 if necessary * Optimization & verification * Test report | Hao Wang |

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