Hardware 100% load Estimate: JDA® Warehouse Management

Prepared for Woolworths SLDC Warehouse

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Legal Notice

Change owner:	Version:	Comment:
H.Roeffen	V1.0	First written

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1.0 Introduction

The purpose of this document is to outline the hardware and software requirements to support the installation of the JDA solution for Woolworths, hereinafter referred to as “Company” or “Customer”. It is meant to serve as a guide for planning and budgeting purposes.

2.0 Sizing and Performance Considerations

There are many factors that must be considered when sizing a JDA system solution. Since the implementation of JDA usually involves changes to the way you currently do business, not all factors can be included at this time. Some of these key factors are:

- Changing business objectives and requirements for the JDA system
- Changing hardware and software systems capabilities and characteristics
- Changing JDA application functionality and performance characteristics

Because of these factors, JDA strongly recommends an approach to systems sizing that will allow flexibility and growth in the systems' capacities and other key characteristics. Being prepared to grow the systems' capacities (CPU's, RAM, hard disk, networking, etc.) as necessary and as appropriate is critical to the success of the implementation.

Since hardware is constantly changing, new equipment may become available that will offer better price/performance than the hardware outlined in this proposal. It may be necessary to readdress the recommended models if the hardware vendor has introduced new models since the proposal was presented.

Taking all of these factors into account, the specific system sizing and configuration utilized for the implementation must be validated as part of the technical implementation, with proper systems integration testing and benchmarking.

3.0 Assumptions

The hardware configuration recommendations were determined based on relevant information provided by Woolworths, covering projected business requirements and application/system users. The recommendations are also based on the following assumptions:

3.1 General Assumptions

- The servers will not be shared with any other applications.
- Each Cluster node must be able to run 100% of the load (exception can be made for separate integrator node)
- JDA Warehouse Management (WMS) including Labor Management,Archive,Model, and EMS are the only products included in scope.
- The servers are sized to meet requirements stated below.
- The following environments will be provisioned: production, QA,Test,Development.
- The version of software to be to be implemented is 2017.1 or newer.

3.2 High-level technical assumptions

- The database hardware platform will be Oracle 12.1.0.2
- The application platform will be Windows 2012

3.3 Specific Assumptions – Production Instance

Capacity Factors	Value
Number of Production Instances	1
Industry Profile	Liquor / Ambient
JDA Modules	Warehouse Management Warehouse Labor Management & model Reporting EMS
Number of sites	1
Total Number of concurrent users	300 (225)
Number of orders per day	1100
Average Number of Lines per Order	107
Number of order lines per day	117700
Online Retention	90 days
Archive Retention	365 days
Growth Factor	3%

4.0 Hardware Requirements

The Listed virtual servers are for a single cluster setup for DR requirement doubles.

4.1 Production WMS/WLM/Reporting/Portal Application (cluster)

Item	Definition
Number of Virtual servers	2 (1 separate integration server)
Processor per VM	20 cores of a Intel Xeon E5-269X v4 2,6GHZ class processor or similar
Memory per VM	2x72 GB memory 1x16GB
Local Disk Storage per VM	150 GB

Item	Definition
Number of Virtual servers	separate integration server
Processor per VM	6 cores of a Intel Xeon E5-269X v4 2,6GHZ class processor or similar
Memory per VM	32GB
Local Disk Storage per VM	150 GB

4.2 Explanation:

Main Cluster Nodes:

CPU: *8 cores wms, 8 cores Portal (users combined), 4 cores integrator in case of failover.*

Memory: *32GB originally +32GB portal users +8GB integrator*)

Integrator Node:

CPU: 2 cores for OS, 4 for integrator

Memory: 8GB os,8GB integrator instance +90 native processes.

4.3 Production *Combined* EMS/Model Application server (not clustered)

Item	Definition
Number of Virtual servers	1
Processor per VM	2 cores of a Intel Xeon E5-269X v4 2,6GHZ class processor or similar
Memory per VM	16 GB memory
Local Disk Storage per VM	100

*Note: *Between the EMS servers, there is a shared drive*.

4.4 Production Database Server

Item	Definition
Number of Servers	2
Processor	8 cores of a Intel Xeon E5-269X v4 2,6GHZ class processor or similar
Memory	48 GB memory
Local Disk Storage	100 GB
Shared/Network Disk Storage	400 GB: data files (15krpm SAS or FC discs)

4.5 Archive Application

Item	Definition
Number of Virtual servers	1
Processor per VM	4 cores of a Intel Xeon E5-269X v4 2,6GHZ class processor
Memory per VM	16 GB memory
Local Disk Storage per VM	100 GB

4.6 Archive Database Server requirement (can be shared db server)

Item	Definition
Number of Servers	2
Processor	4 cores of a Intel Xeon E5-269X v4 2,6GHZ class processor
Memory	16 GB memory
Local Disk Storage	100 GB per Server Local Storage
Shared/Network Disk Storage	1000 GB: data files (15krpm SAS or FC discs)

**This is a data warehouse, these might increase depending on the usage.*

4.7 GUI Client

Platform	**Intel x86/64**		
Operating Systems	Windows 8.1 (32-bit or 64-bit)	Windows 7 SP1 (32-bit or 64-bit)	Windows 10 (32-bit or 64-bit)
Minimum CPU	Single Core 2.5GHz or faster; Intel or AMD processor	Single Core 2.5GHz or faster; Intel or AMD processor	Single Core 2.5GHz or faster; Intel or AMD processor
Minimum Disk Space	20 GB	20 GB	20 GB
Minimum Memory	6 GB	6 GB	6 GB
Recommended Memory	8 GB	8 GB	8 GB
Graphics Device	DirectX 9 graphics device with WDDM 1.0 or later driver	DirectX 9 graphics device with WDDM 1.0 or later driver	DirectX 9 graphics device with WDDM 1.0 or later driver
Additional Requirements	• Microsoft .NET Framework 3.5 • Microsoft Office 2007 or later with the most current Service Pack, if you want to view exported data in Microsoft Excel or Microsoft Word • Adobe Reader 11 • iReport 5.2, available from http://sourceforge.net/projects/ireport/files/iReport/, if you want to customize reports		
Browser Requirements	Web Browsers: • Google Chrome 45 or later • Internet Explorer 11 • Mozilla Firefox 41 or later • Safari 9 Important: JavaScript must be enabled		

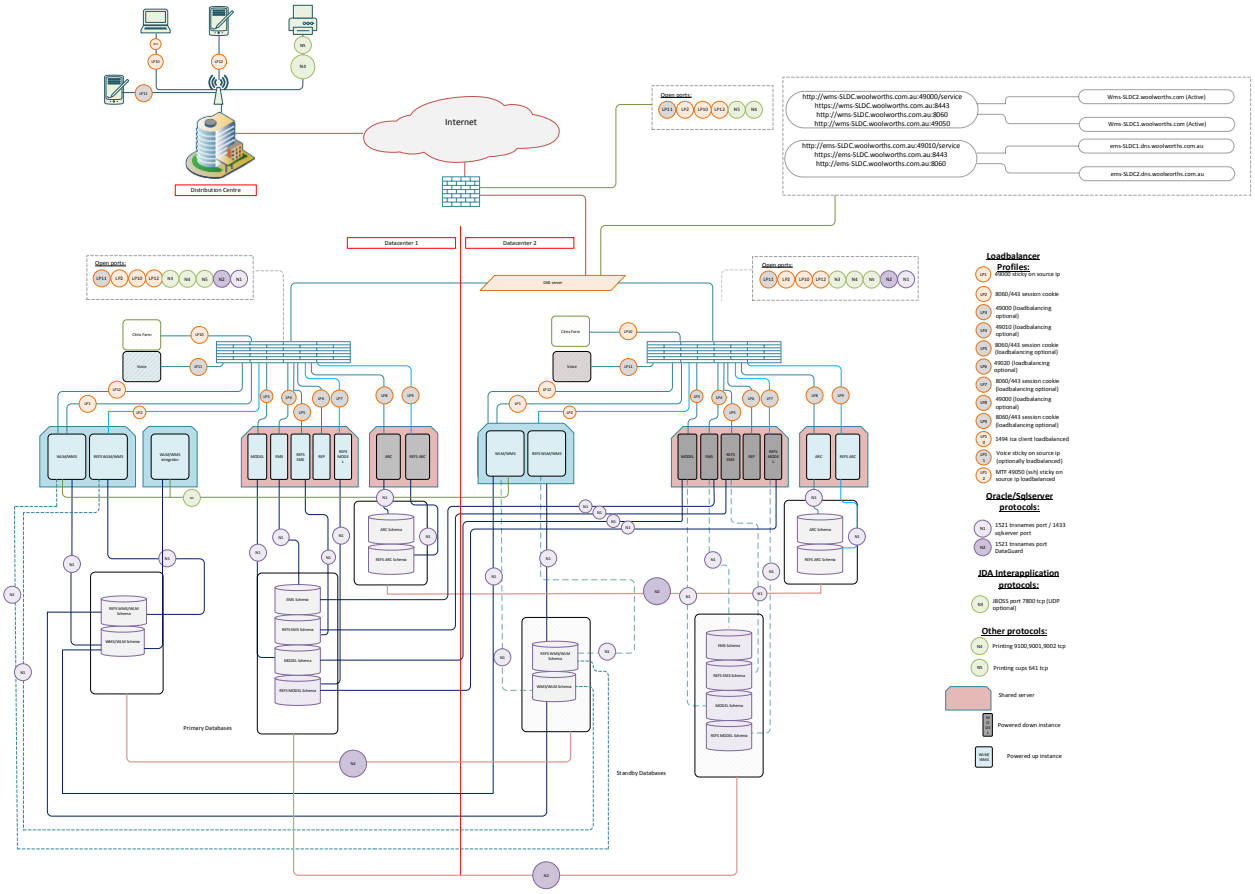
4.8 Recommended Network Bandwidth

JDA recommends that the network bandwidth be less than 100ms between the application servers and the RF, PC, and printers. Less than 50ms is preferred if possible.

5.0 System Architecture Overview

Latest design as per 14/02/2018

WW - prod - 100%
Dual Datacenter one



6.0 Software Requirements

The current operating system patches or service packs may be required, depending on the operating system.

6.1 Application Server – Windows 2012 R2

Item	Definition
Machine	AMD or Intel x64 / VMware ESX 5.5 or later
Operating System	Windows Server 2012 R2 (64-bit)
Additional Requirements	• Microsoft .NET Framework 3.5 • ActiveState ActivePerl 5.22 or later (32-bit) (http://www.activestate.com/activeperl/downloads), or Strawberry Perl 5.22 or later (32-bit) (http://strawberryperl.com/) • Java SE Development Kit 8 (64-bit) with update 60 or later; available from the Oracle Technology Network (http://www.oracle.com/technetwork/java) • Visual Studio 2008 Service Pack 1 or Visual C++ 2008 Express Edition Service Pack 1; only required if you will be building source code on this server • Apache Ant 1.9.x (http://ant.apache.org); only required if you will be building source code on this server

6.2 Database Server Requirements

6.2.1 Oracle Server Requirements

- Supported Version
  Hardware Platform Independent, but must support the following:
  - Oracle 12.1.0.2 or later with or without Real Application Clusters (RAC)

- Configuration
  Adhere to these configuration requirements when using an Oracle database:
  - Be sure that you install Oracle patch releases prior to installing the JDA product.
  - If your configuration of a specific JDA product version requires multiple database servers, all the servers must have the same version of Oracle. For example, if your Production database has Oracle 12.1.0.2 installed, then the Test database must also have Oracle 12.1.0.2 installed for that specific JDA product version.
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6.3 Network Bandwidth Requirements

General guidelines concerning the network latency and bandwidth requirements:

Item	Description	Min Network Capacity	WAN Latency Requirements
1	PC/Laptops and Tablets using Citrix XenApp Terminal Services	10 to 20 kbps per device	Ideally less than 200 ms latency
2	PC/Laptops and Tablets connected directly	50 kbps per device	Ideally 50 to 100 ms latency
3	Mobile Terminals (RF) operating a VT220/ANSI Term Emulation	5 kbps per device	Ideally less than 200 ms latency
4	Voice Terminals (for eg., VoCollect)	5 kbps per device	Ideally less than 200 ms latency
5	Laser Printers	50 kbps per printer	Ideally less than 200 ms latency
6	Label Printers	10 kbps per printer	Ideally less than 200 ms latency
7	MHE Equipment	10 kbps per interface	Ideally less than 300 ms latency

7.0 Disclaimer

The foregoing suggested hardware configuration/sizing is provided by JDA to Woolworths solely as a courtesy. JDA's suggested configuration is based upon a variety of assumptions and upon information from Woolworths. Because JDA is relying on assumptions and on information provided by Woolworths or others, JDA does not represent or warrant the suggested configuration in any manner, and JDA is not responsible for any results of the suggested configuration. Woolworths should independently verify the adequacy and completeness of the suggested configuration, and any decisions related to the suggested configuration are the sole responsibility of Woolworths.

8.0 About JDA Software, Inc.

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