

TABLE OF CONTENTS

	Page
FOREWORD.....	3
1. INTRODUCTION	4
2. SCOPE OF WORK	4
3. NORMATIVE REFERENCES	4
4. DEFINITIONS	5
5. OBJECTIVES	6
6. CITY POWER CURRENT INFRASTRUCTURE ENVIRONMENT	7
7. ARCHITECTURE REQUIREMENTS	8
8. METHODOLOGY	13
9. LISENCING.....	14
9.1 OPERATING SYSTEM LICENCES.....	14
10 DOCUMENTATION	14
11 TRAINING	14
12 QUALITY MANAGEMENT	15
13 ENVIRONMENTAL MANAGEMENT	15
14 OCCUPATIONAL HEALTH AND SAFETY (OHS) MANAGEMENT	15
ANNEX - A BIBLIOGRAPHY	16
ANNEX - B REVISION INFORMATION	17

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1. INTRODUCTION

Over the years, City Power has deployed and used the SAP system as an Enterprise Resource Planning (ERP) system to ensure its business continuity. SAP defines ERP as “the central nervous system of an enterprise,” an ERP software system provides the automation, integration, and intelligence that is essential to efficiently run all day-to-day business operations. Therefore, to enhance the organizational competitiveness in terms of Functionality and Customization, City Power would like to upgrade its SAP environment. This upgrade will include the SAP Application, Operating Systems, Databases and Hardware. The purpose of this upgrade is to ensure that City Power is compliant with the 2027 SAP Upgrades deadline and 2030 extension to SAP S/4HANA,

2. SCOPE OF WORK

City Power has deployed its ICT infrastructure in Reuven (Production) and in Roodepoort (DR). City Powers SAP Environment caters for SAP Test, Development, QA and Production. This standard details requirements for provision of a turn-key Solution for the SAP Enviroment. The Solution will require highly skilled resources with relevant knowledge and expertise to facilitate and oversee the upgrade of SAP infrastructure/ hardware, which includes installation, configuration and commissioning. The upgrade shall be accompanied by maintenance and support for the duration of the contract and licencing for VMWare and Suse Linux. In addition to the technical requirements associated with setting up and operating SAP S/4HANA system, a solid project plan must be created and deployed with due considerations given to the issues such as IT governance and strategic alignment, business practices and process improvement, Change management, Humane resources development and training. The below requirements are for both Production and Secondary Site (DR)

- 2.1 Preliminary assessment must take place to ensure adequate hardware and license requirement are documented. This will ensure a turn-key solution is implemented within the SAP Enviroment.
- 2.2 Implementation, Installation and Commissioning of SAP Hardware
- 2.3 Reinstallation of ECC 6 and existing SAP Environment on the new SAP Hardware and OS
- 2.4 Upgrade SAP Application from ECC 6 to ECC 8
- 2.5 Upgrading the Database to latest Supported Oracle version
- 2.6 Upgrade from ECC 8 to SAP S/4 Hana
- 2.7 Upgrade the Oracle Database to SAP S/4 Hana Database
- 2.8 Migration and testing of Functionality and integrations to SAP S/4 Hana
- 2.9 SAP Licencing and Support
- 2.10 Training for Hardware, Software and Database
- 2.11 Creation of supporting technical and functional documentation

3. NORMATIVE REFERENCES

The following documents contain provisions that, through reference in the text, constitute requirements of this specification. At the time of publication, the editions indicated were valid. All standards and specifications are subject to revision, and parties to agreements based on this specification are encouraged to investigate the possibility of applying the most recent editions of the documents listed below.

SAP Note 2235581 ("SAP HANA: Supported Operating Systems") - enterprise support from SAP is dependent on the completion of SAP's official validation and its publication on SAP Note 2235581 – SAP HANA: Supported Operating Systems.

SAP Activate Methodology documentation (SAP SE) - sap.com/products/erp/activate-methodology.html; learning.sap.com/learning-journeys; help.sap.com/docs

SAP Product Availability Matrix (PAM) - userapps.support.sap.com/sap/support/pam (SAP S-User login required); overview at support.sap.com/en/release-upgrade-maintenance.html

Oracle Database certification matrix for SAP NetWeaver and SAP S/4HANA - oracle.com/sap/database; SAP Notes 1174136, 2606828, 2799958; Oracle MOS Note 742060.1

SAP HANA Tailored Data Center Integration (TDI) requirements - help.sap.com/docs/SAP_HANA_PLATFORM (TDI and Hardware/Software Requirements pages); SAP HANA Hardware Directory; SAP Note 2493172

VMware vSphere Foundation (VVF) licensing and compatibility documentation - techdocs.broadcom.com (VMware-cis/vSphere); VVF Specific Program Documentation (SPD) at ftpdocs.broadcom.com; Broadcom Compatibility Guide

SUSE Linux Enterprise Server for SAP Applications certification documentation - suse.com/products/sles-for-sap; documentation.suse.com/sles-sap; SAP Note 2235581 – SAP HANA: Supported Operating Systems

4. DEFINITIONS

The definitions and abbreviations in the above document (Normative Reference) shall apply to this specification. In addition, the following terms and acronyms are used in this document:

Abbreviation	Description
ERP	Enterprise Resource Planning
SAP	Systeme, Anwendungen, Produkte (the ERP system vendor and product family)
ECC	ERP Central Component
OS	Operating System
DR	Disaster Recovery
QA	Quality Assurance
ICT	Information and Communication Technology
FI-CO	Financial and Controlling
FM	Funds Management
SD	Sales and Distribution
HCM	Human Capital Management
PY	Payroll
TM	Time Management
OM	Organisational Management
L&D	Learning and Development
PM	Plant Maintenance
PS	Project Systems
MM	Materials Management
DMS	Document Management System

Abbreviation	Description
WF	Workflow
ISU-CCS	Industry Solution Utilities – Customer Care and Service
AM	Asset Management
PI/PO	Process Integration / Process Orchestration
ALM	Application Lifecycle Management
UI	User Interface
UX	User Experience
ABAP	Advanced Business Application Programming
SDC	Secondary Data Centre
WAN	Wide Area Network
SAN	Storage Area Network
NVMe	Non-Volatile Memory Express
RAID	Redundant Array of Independent Disks
SSD	Solid-State Drive
RDIMM	Registered Dual In-Line Memory Module
GbE	Gigabit Ethernet
SFP28	Small Form-factor Pluggable 28 (network transceiver standard)
DAC	Direct-Attach Cable
CPU	Central Processing Unit
VVF	VMware vSphere Foundation
OEM	Original Equipment Manufacturer
SHERQ	Safety, Health, Environment, Risk and Quality
OHS	Occupational Health and Safety
HANA	High-performance ANalytic Appliance

5. OBJECTIVES

- 5.1 Conduct a SAP Assessment clearly outlining the best approach to upgrade the current City Power SAP environment to SAP S/4HANA and considering future growth within the City Power SAP Environment
- 5.2 Implement the latest SAP Certified Infrastructure in the Production and DR Sites at City Power which includes but not limited to Servers, Network and Storage
- 5.3 Successfully implement the Unicode upgrade on SAP ECC 6 in preparation for the Upgrade to ECC 8
- 5.4 Upgrade the SAP ECC 6 Application to SAP ECC 8

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- 5.5 Upgrade the Oracle Database Version to the latest supporting
- 5.6 Upgrade SAP ECC 8 to SAP S/4 HANA
- 5.7 Upgrade the Oracle Database to SAP S/4 HANA Database
- 5.8 Migrate all SAP Functions and integrations to the SAP S/4 HANA and
- 5.9 Have a fully functional Backup process
- 5.10 Have a fully functional Disaster Recovery Site with the capability to allow business process to continue
- 5.11 A SAP Innovation and Optimization Pathfinder report, which provides tailor-made recommendations on areas of relevant SAP innovations, business process improvements and IT optimization potentials for your SAP S/4HANA system shall be generated.
- 5.12 The following shall be reviewed to understand the business impacts: Delta simplifications due to the ongoing transformation from SAP Business Suite to SAP S/4HANA, New and changed functionality in SAP S/4HANA, Business function activation impacts, Add-on impacts for SAP S/4HANA releases and Impacts due to the future of Compatibility Packs.
- 5.13 Upgrade planning: A plan shall be compiled, which includes but not limited to the scope, schedule, risks, resource requirements in accordance with the OEM's requirements.
- 5.14 Roadmap for a technical upgrade of SAP S/4HANA containing all activities and tasks only covering the technical upgrade shall be provided.
- 5.15 Implementation Roadmap representing a structured approach to the software implementation process that allows work to be split into distinct phases, with deliverables and tasks, that help project teams to better plan, execute, and manage their implementation project shall be provided.
- 5.16 An Activate Methodology Implementation Roadmap aims to assist by providing implementation project teams with a recommended list of deliverables (the "what") in each phase, a process description in the form of tasks (the "how"), and accelerators (such as templates, examples, guides and web links) in a user friendly format
- 5.17 Preparation: This process entails streamlining of all resources such as software, hardware, including data backups.
- 5.18 Execution: System downtime, installation of new hardware, data migration and testing.
- 5.19 Post upgrade activities. Testing, commissioning and handover.

6. CITY POWER CURRENT INFRASTRUCTURE ENVIRONMENT

6.1 Existing modules

- 6.1.1 Financial and Controlling (FI-CO), Funds Management (FM), Sales and Distribution (SD)
- 6.1.2 SAP HCM, Payroll (PY), Time Management (TM), Organisational Management (OM) and Learning and Development (L&D)
- 6.1.3 Plant Maintenance (PM)
- 6.1.4 Project Systems (PS)
- 6.1.5 Materials Management (MM)

6.1.6 Document Management System (DMS)

6.1.7 Workflow (WF)

6.1.8 Industry Solution Utilities (ISU-CCS)

6.1.9 Asset Management (AM)

6.1.10 SAP PIPO Integration

6.1.11 SAP Cloud ALM

7. ARCHITECTURE REQUIREMENTS

7.1 Customizability and Configurability

All customizations and configurations shall follow the City Power change management process.

7.2 Environments

The following environments shall be catered for: Disaster Recovery (DR) Environment, identical to the Production Environment. DEV, QA / Test Environment, Production Environment. Training / Pre-production Environment. The production environment shall be in accordance with the City Power requirements. The site for centralized deployment is City Power Reuven. The disaster recovery environment shall be in accordance with the City Power requirements at Roodepoort SDC

7.3 Client Workstations

The Service Provider is required to specify the minimum hardware and operating system requirements accordingly. The cost of all installation and licenses.

7.4 Network Communication

The Service Provider shall provide a high-level network architecture, and indicate Security measures and standards, Availability and performance levels, as well as DR system network communication. The Service Provider shall make available the following details; network bandwidth required for integration to other business applications, network bandwidth required for user interfaces, considering the user base and locations, as well as various system loading scenarios. City Power shall evaluate and consider during the evaluation of costs and services, the need to increase its WAN network capacity based on these returnable.

7.5 Solution Implementation

The Service Provider shall clearly indicate the implementation plan covering the phases of the deliverables and associated timelines not more than three years. The Service Provider shall clearly indicate all third-party products utilized as part of its solution. City Power shall provide the following: Integration platform Access to data residing in existing systems. City Power communication network access. Remote access to the Service Provider

7.6 Application Integration

The Service Provider shall ensure that all current SAP Integrations are migrated during the reinstallation of the hardware and software. This will also include the upgrading of the SAP PIPO versions to the latest patch level as part of the SAP Infrastructure upgrades.

7.7 Implementation Partner

The Service Provider shall meet the following requirements:

- 7.7.1 A Credible footprint showing previous experience of conducting a SAP Infrastructure upgrade
- 7.7.2 Equipped with certified individual capability of team members
- 7.7.3 Experience with S/4HANA as opposed to older versions of SAP
- 7.7.4 Proven experience in at least two end to end SAP S/4 HANA Upgrades
- 7.7.5 SAP Industry experiences
- 7.7.6 Ability to provide the complete solution
- 7.7.7 Ability to handle the customization
- 7.7.8 Ability to handle integration Migration
- 7.7.9 Project cost, time and training facilities
- 7.7.10 Proven industrial experience in Unicode upgrades
- 7.7.11 Professional Residency SAP Basis Support for duration of the contract with a certified SAP Basis Partner

7.8 Resource requirements

- 7.8.1 Project Manager
- 7.8.2 Solution Architect
- 7.8.3 Organizational Change Manager
- 7.8.4 Test manager
- 7.8.5 Business Process Experts
- 7.8.6 UX, integration and technical lead
- 7.8.7 SAP Solution experts/consultants for all relevant SAP modules including and ABAP
- 7.8.8 Training expert.
- 7.8.9 SAP Basis Consultant with Oracle Database knowledge

7.8.10 SAPPI/PO Consultant

7.8.11 SAP S/4 Hana Database expert

7.9 Hardware Requirements

7.9.1 Required hardware is eight (8) enterprise-class rack-mounted servers in total, comprising four (4) servers for the Production environment and four (4) servers for the Disaster Recovery environment.

Each server must, at a minimum, meet the following requirements:

7.9.1.1 Be based on a two-socket x86 server architecture

7.9.1.2 Include 2 x enterprise-class processors per server

7.9.1.3 Each processor must provide 32 physical cores (Intel Xeon 6 Performance 6530P 2.3G, 32C CPU is the preferred CPU)

7.9.1.4 Each server must therefore provide a minimum of 64 physical cores total

7.9.1.5 Processor specification must be at least equivalent to:

7.9.1.5.1 2.3 GHz base frequency

7.9.1.5.2 high-core-count enterprise performance profile

7.9.1.5.3 support for DDR5-6400 memory

7.9.1.6 Each server must also include:

7.9.1.6.1 A minimum of 2 TB RAM per server

7.9.1.6.2 Memory must be supplied using 64 GB RDIMM modules

7.9.1.6.3 Memory performance must be at least equivalent to 6400 MT/s

7.9.2. Internal Server Storage

The server platform shall be configured as diskless compute nodes for application and database workload execution, with workload data hosted on shared enterprise storage.

7.9.2.1 Each server must include:

7.9.2.1.1 A dedicated, resilient boot-optimized storage subsystem Minimum boot capacity of 2 x 960 GB M.2 SSD

7.9.2.1.2 Boot drives must be configured in RAID 1 mirror for resilience

7.9.3. Ethernet Network Connectivity

7.9.3.1 Each server must provide a minimum of:

7.9.3.1.1 4 x 25GbE SFP28 Ethernet ports for data and virtualization traffic

7.9.3.1.2 1 GbE Port for out of band management

7.9.3.2 The proposed design must include all required transceivers, DACs, or optical cables necessary to make the solution fully operational.

7.9.4. SAN Host Connectivity

7.9.4.1 Each server must provide a minimum of:

7.9.4.1.1 2 x Fibre Channel host ports per server

7.9.4.1.2 SAN host connectivity must operate at minimum 32Gb Fibre Channel speed end-to-end

7.9.4.2 The bidder shall ensure full interoperability between the server host bus adapters, SAN switches, and the proposed shared storage platform.

7.9.5. SAN Switching Requirements

The Service Provider shall provide a redundant SAN fabric for both Production and Disaster Recovery sites.

7.9.5.1 Per site, the SAN solution must include:

7.9.5.1.1 2 x Fibre Channel SAN switches

7.9.5.1.2 Each switch must have a minimum of 16 licensed and active Fibre Channel ports

7.9.5.1.3 Licensed ports must operate at minimum 32Gb Fibre Channel speed

7.9.5.2 Accordingly, the minimum licensed SAN port requirement shall be:

7.9.5.2.1 32 licensed SAN ports per site

7.9.5.2.2 64 licensed SAN ports across Production and Disaster Recovery combined

7.9.5.2 All switch ports required for host, storage, and fabric connectivity must be supplied fully licensed from day one.

7.9.6 Shared Storage Requirements

7.9.6.1 The Service Provider shall provide one enterprise shared storage array per site, comprising:

7.9.6.1.1 1 x storage array for Production

7.9.6.1.2 1 x storage array for Disaster Recovery

7.9.6.2 Each storage array must, at a minimum, provide:

7.9.6.2.1 Enterprise all-NVMe architecture

7.9.6.2.2 192GB appliance memory, comprising 96GB per storage node

7.9.6.2.3 10 x 3.84 TB NVMe self-encrypting solid-state drives

7.9.6.2.4 Minimum 38.4 TB raw storage capacity per site

7.9.6.3 The storage platform must include:

7.9.6.3.1 Protection against at least single drive failure

7.9.6.3.2 Native enterprise storage services for resilience and operational continuity

7.9.6.3.3 A vendor-backed data reduction guarantee or contractual data reduction assurance programme applicable to the proposed all-flash configuration

7.9.6.3.4 Always-on inline data reduction, including deduplication and compression

7.9.6.3.5 Scale-out clustering of up to four storage appliances under a single management plane

7.9.6.3.6 Non-disruptive scale-up and scale-out expansion within the same storage family

7.9.6.3.7 Native synchronous replication for supported workloads and supported distances

7.9.6.3.8 Metro-distance active-active or equivalent metro replication capability for business continuity architectures

7.9.6.3.9 Unified block and file storage services delivered natively within the same platform or appliance family

7.9.6.3.10 Deep VMware integration, including native integration with VMware management, orchestration, and storage policy frameworks

7.9.6.3.11 Application-consistent snapshots, cloning, and replication orchestration for enterprise workloads

7.9.6.3.12 Policy-based automation and analytics for provisioning, performance monitoring, and lifecycle operations

7.9.6.4 Each storage array must provide front-end connectivity of at least:

7.9.6.4.1 8 x 25GbE ports (4 ports per storage controller)

7.9.6.4.2 8 x 32Gb Fibre Channel ports (4 ports per controller)

7.9.7. Required Platform Capabilities

To ensure operational consistency, supportability, and lifecycle efficiency, the proposed solution must include the following embedded or native platform capabilities:

7.9.7.1 Server management and security

7.9.7.1.1 The server platform must provide:

7.9.7.1.1.1 Embedded out-of-band lifecycle management with dedicated enterprise management controller functionality

7.9.7.1.1.2 Secure remote management, virtual console, remote media mounting, power control, and hardware telemetry

7.9.7.1.1.3 Centralised fleet management and compliance capability for firmware, configuration templates, and policy-driven administration

7.9.7.1.1.4 Component integrity verification and secure platform validation features

7.9.7.1.1.5 OEM-integrated secure support connectivity and telemetry-based support enablement

7.9.8 Storage data services

7.9.8.1 The storage platform must provide native support for:

7.9.8.1.1 Local protection services

7.9.8.1.2 Remote replication services

7.9.8.1.3 Application-aware or application-consistent copy management/orchestration capability for supported workloads

7.9.9 Cloud and virtualization integration

The proposed infrastructure should support OEM-aligned private cloud automation and orchestration capabilities for virtualized infrastructure lifecycle management, including deployment integration and ongoing operational support.

8. METHODOLOGY

The Service Provider Shall follow the applicable parts of the SAP Activate methodology as prescribed by SAP. This is a phased delivery-oriented methodology that minimizes risk and reduces the total cost of implementation. The whole process consists of the roadmap that provides a detailed plan to help document SAP systems, collect and implement recommendations. Each step of the process is accompanied by quality control that helps to track deliveries and other critical success factor.

9. LISENCING

9.1 Operating System Licensing

The Service Provider shall provide operating system subscriptions for SAP-certified enterprise Linux, covering all required servers in both Production and Disaster Recovery environments.

9.1.1 The operating system licensing must include:

9.1.1.1 8 subscriptions in total

9.1.1.2 Subscription model suitable for 1–2 sockets per server or equivalent

9.1.1.3 3-year subscription term

9.1.1.4 Enterprise support suitable for SAP workloads, including high-availability support Entitlements

9.1.2 The operating system must be certified and supported for SAP HANA

9.2 VMWare Licensing

The Service Provider shall also include VMware vSphere Foundation (VVF) licenses.

9.2.1 The VMware licensing requirement must include:

9.2.1.1 VVF licenses sufficient to cover 256 CPU cores for the Production environment

9.2.1.2 VVF licenses sufficient to cover 256 CPU cores for the Disaster Recovery environment

9.2.1.3 A 3-year subscription term for both environments

10 DOCUMENTATION

11.1 Full technical and functional details for all items offered shall be submitted on request.

11.2 All instruction manuals shall be provided for the service offered.

11.3 The manuals shall be in English and sufficiently detailed to enable City Power staff to use and maintain the system.

11.4 The new environment shall be outlined and document in an architectural format that clearly indicates the Production and Disaster Recovery sites, Connections and link between Hardware.

11 TRAINING

12.1 The Service Provider shall provide comprehensive training courses on the operation and maintenance of the SAP system and hardware to City Power's IOT personnel.

12.2 The Service Provider shall clearly outline the layout of the recommended training (pricing and scheduling).

12.3 The Service Provider shall provide training on the enhanced features and functionality as the system is upgraded

12.4 The Service Provider shall provide technical, functional and integration documentation related to the upgrades

12 QUALITY MANAGEMENT

A quality management system/plan shall be set up to assure quality of Sap application software, Os database and hardware upgrade during installation, removal, transportation, and disposal. Guidance on the requirements for a quality management system may be found in the following standards: ISO 9001:2015. The details shall be subject to an agreement between the purchaser and supplier.

13 ENVIRONMENTAL MANAGEMENT

An environmental management system/ plan shall be set up to ensure the proper environmental management and compliance is adhered to SAP application software, OS database and hardware upgrade during installation, removal, transportation, and disposal. Guidance on the requirements for an environmental management system shall be found in ISO 14001:2015 standards. The details shall be subject to an agreement between City Power and the Supplier. This is to ensure that the asset created conforms to environmental standards and City Power SHERQ Policy.

14 OCCUPATIONAL HEALTH AND SAFETY (OHS) MANAGEMENT

A health and safety system/plan shall be set up to ensure proper management and compliance of Sap application software, Os database and hardware upgrade during installation, removal, transportation, and disposal. Guidance on the requirements of a health and safety plan shall be found in ISO 45001:2018 standards. The details shall be subject to an agreement between City Power and the Supplier.

ANNEX - A BIBLIOGRAPHY

A PROJECT PLAN FOR THE IMPLEMENTATION OF S/4HANA (Ganesh Neupane)

Upgrading SAP S/4HANA: Why, How, and Best Practices Version: January 2023 (SAP)

ANNEX - B REVISION INFORMATION

DATE	REV. NO.	NOTES
May 2025	0	First issue
June 2026	1	Second issue Service requirements changes and general editing