



RFP
For
Transnet
Datacenter Colocation Services

SCOPE:

This is the datacentre colocation services specification to the Master Services Agreement between Transnet Limited ("Transnet") and Service Provider.

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1.0. Background and Overview

1.1. Background

The previous service provider for IT data Services was appointed from the 1st of December 2019 for a period of 5 years until 30th of November 2024. The Master Services Agreement for IT Data Services is a transversal contract that services all Transnet Operating Divisions including Transnet Corporate Centre. The value of the contract has been depleted in advance thus requiring Transnet to consider other measures for business continuity. The current primary datacenter where all the Transnet workloads are hosted for Gauteng and surrounding areas are owned and managed by the current incumbent. Upon disengagement from the current incumbent, Transnet will lose the ability to host workloads at the datacenter. Transnet also realizes that hosting ICT workloads at the Incumbent's 141 datacenter is not an option because of the disengagement between them. Transnet has recently received communication from Eskom IT executives indicating that Eskom is unable to provide Transnet with datacenter colocation space, this space has served as Transnet's disaster recovery environment for the past ten years. A recent audit on the current datacenters has revealed that Transnet lacks the appropriate datacenter facilities and capabilities required for hosting the workloads effectively.

1.2. The Objective of the Transnet's Private Cloud Datacenter Architecture

Transnet Corporate Centre has gone out to the market for IT Infrastructure Services which will be configured in the Colocation Service Providers datacentre. This infrastructure will support the critical workloads currently hosted and supported by the current incumbent. When the incumbent disengages from Transnet, Transnet will need to provide a platform and location to where all Transnet's applications, data, and intellectual property will migrate to.

1.3. Overview of a Tiered Colocation Solutions

As organisations flock to the Cloud and companies decommission their company owned datacentres, it would surprise many to learn that the demand for hardware colocation is increasing.

In around 5 years 80% of self-owned and operated datacentres will have closed across the corporate landscape while colocation will double.

A huge portion of that growth is being driven by hybrid cloud as not all applications run in the cloud, Sometime data must remain on legacy hardware or in its country of origin. Compute-intensive operations at on-demand prices or transmitting large data sets over & over can become quite expensive depleting the value of the agreement. Transnet require an effective and cost-efficient solution that meets its

organisational needs with Operations and Disaster recovery. Acquiring a datacentre Colocation solution gives Transnet the flexibility and resources to achieve these goals.

A datacenter colocation facility is generally classified as one of two types: retail or wholesale. A third type that has become more prominent, hybrid cloud-based colocation facilities.

Name	Description
Retail Colocation	A customer leases space within a datacenter, usually a rack, space within a rack, or a caged off area.
Wholesale Colocation	A tenant leases a fully built datacenter space, generally at a cheaper rate than retail vendors, but with lower power and space requirements.
Hybrid Cloud Based Colocation	Hybrid cloud-based colocation is a mix of in house and outsourced datacenter services.

The Uptime Institute has a grading system for operational sustainability to augment tier standards. The tiers focus on the design of the colocation datacenter facility; the operational sustainability grades target how well the facility is run.

Datacenter Tier Standards

Tier 1

- A single, non-redundant distribution path serving IT equipment.
- Non-redundant capacity components.
- Active capacity components: N

Tier 2

- All Tier 1 requirements.
- Redundant capacity components.
- Active capacity components: N+1

Tier 3

- All Tier 1, 2 and 3 requirements.
- Two independent distribution paths serving IT equipment. Generally, only one distribution path serves equipment at any given time.
- All IT equipment is dual-powered and fully compatible within the topology of a site's architecture.
- Active capacity components: N+1
- Not within 100-year flood hazard area or less than 91 m from 50-year flood hazard area.

Tier 4

- All Tier 1, 2 and 3 requirements.

- The facility is fully fault-tolerant, through electrical, storage and distribution networks.
- Two independent simultaneously active distribution paths serving IT equipment.
- All cooling equipment is independently dual-powered, including HVAC systems.
- Active capacity components: N after any failure
- Less than 91m within 100-year flood hazard area

Additional requirements for this specification (In line with Uptime Institute guidelines):

- The maximum usable capacity of any system, component or capacity element shall not exceed 90% of its designed continuous rating.
- The maximum usable capacity of generator systems shall not exceed 70% of their designed continuous prime rating.

2.0. Scope of Work

Please refer to Annexure B for detailed dimensioning requirements.

2.1. Project Requirements

The colocation facility shall deliver technical space, power, cooling, fire protection, security, and connectivity to ensure a fail-safe 24/7 computing site with site support. This datacenter will serve as a hot site with live production systems that run Transnet's virtual environment and production storage.

The colocation facility should be able to offer Transnet a minimum of 20 fully populated 42U racks with option to increase to 20 or more, these racks should use single phase 16A 220-240V. The racks should be in a secured area and accessible by key card system (backed up with a physical key) that also secures access to the general colocation facility. The total current and future requirements are summarised in Annexure B.

Transnet intends to move and /or install equipment including the following types of equipment.

- Rack mount servers
- Rack mount SAN storage
- Network switching equipment.

2.2. Minimum facilities requirement

2.2.1 Location

An Uptime Institute tier 3 or higher rated colocation facility preferably located close to Transnet sites in Johannesburg, Durban & Cape Town. However, this may not be limited to Johannesburg, Durban or Cape Town as Transnet has operational environments across South Africa and Africa at large.

2.2.2 Building and Grounds

2.2.2.1 The building should meet all applicable municipal standards. It is Transnet's

preference that the facility must be certified to meet the Uptime Institute's Tier III, higher or "Concurrently Maintainable site Infrastructure" rating. This means the datacenter has redundant capacity components and multiple independent distribution paths serving the computer equipment. During normal operation, only one distribution path is required to serve the computer equipment at any time unless otherwise requested. If Tier III certification cannot be provided then sufficient proof for Tier III compliance need to be supplied.

- 2.2.2.2 Controlled access by Transnet's personnel and designated service providers at any time, 24 hours a day and 7 days a week, must be allowed. A Security counter is required. This access will also be needed during disasters.
- 2.2.2.3 Parking for a minimum of four vehicles for Transnet personnel or its service providers.
- 2.2.2.4 Facility access for loading and unloading of equipment. Lifts need to have sufficient access and at least 3000 kg weight (fully populated 42U rack) loading capability.
- 2.2.2.5 Process for receiving and securing storage of any deliveries for Transnet's equipment.
- 2.2.2.6 Optionally, A room shall be provided for the holding of IT equipment spares, minimum 12 square meters.
- 2.2.2.7 There shall be sufficient workspace with tables and power for at least 4 staff and laptop computers, and one printer.
- 2.2.2.8 There shall be rest rooms.
- 2.2.2.9 There shall be lightning protection and water leak detection systems.

2.2.3 Cabinets & Racks

- 2.2.3.1. The lockable equipment cabinets or Rack equipment provided by the Tenderer must be at least. 42U or larger in height. These racks must be properly grounded.
- 2.2.3.2. Each rack should use single phase with at least 16A 220-240V. The detailed dimensioning requirements are provided in Annexure B.
- 2.2.3.3. Power Distribution Units (PDU's) will be furnished by Tenderer.

2.2.4 Computer Room

- 2.2.4.1. The facility must supply a raised floor with a cable tray system. The raised flooring with cable tray system and power systems must have sufficient space for proper airflow after equipment and wiring is installed. Ideally it should have space for alternating rows to allow for hot/cold aisle air flow design.
- 2.2.4.2. This facility must maintain a management information system used for monitoring the environmental systems such as power, air-conditioning, humidity controls of the server room.
- 2.2.4.3. The facility shall have maintenance staff that respond to system alarms on a 24/7 basis, according to thresholds and action plans specified by the Tenderer. Additionally Transnet will be granted portal access to real-time remote monitoring (snmp-based) of datacenter alarms and the ability to set conditions (e.g. threshold) with notification via text and email with 5 minutes of an event shall be sent.

2.2.4.4. The facility's datacenter must address the following fire protection requirements:

The facility must have a zone-based fire and early-warning smoke detection system with the datacenter facilities to monitor and continuously sample the air for any indication of fire and warn onsite staff of potential fire hazards, initiating extensive and localized emergency procedures to extinguish any fire at the source. The emergency procedures must include proper notification to the local fire department.

- a) The facility must have a dry pipe suppression system.
- b) The facility will take proper precautions and implement the proper industry standard safeguards to ensure unnecessary activation of fire-suppression equipment.
- c) The facility must maintain emergency response plans and procedures, including fire and natural disasters. The must inform Transnet of any facility or procedural changes five or more days prior to such changes taking effect.

2.2.4.5. Access to Transnet's racks must be controlled and limited to Transnet and necessary colocation facility staff. The facility shall provide 24/7 access to the datacenter facilities for Transnet's authorized individuals (This would include pre-approved Transnet employees, and Vendors authorized to work on Transnet's behalf).

2.2.4.6. The computer room floor should be able to support at least 1500 Kg per rack (typically: 600 mm depth, 42 U height).

2.2.4.7. Proper tile cut-outs are required for cabling, routing, and proper airflow.

2.2.4.8. Space layout must be acceptable – no odd, shaped areas. The floor to ceiling clearance must be at least around 3 meters.

2.2.5. Power Requirements

The Tenderer must propose a datacenter facility that address the following power requirements (refer to Annexure B for detailed requirements):

2.2.5.1. The facility will provide power billing to Transnet based on the actual usage per kilowatt hour(KWh).

2.2.5.2. The facility must have sufficient electrical capacity to accommodate Transnet's current and potential future infrastructure with an assumption of minimum 200 W per 1U server, i.e. for fully populated rack will be $42 \times 0.2\text{kW} = 8.4\text{ kW}$. The number of aisles should be 4 with hot and cold design. The number of racks should be initially 20 expandable to 24.

2.2.5.3. Power will enter the datacenter facility via two feeds from one or more local geographically separated (minimum 20 km) electrical utilities providers and shall be configured as required to

support Transnet's IT infrastructure requirements. The Tenderer shall provide redundant power distribution throughout the facility and each component within the system must be at least N+1 redundant. The incoming power will feed into two busses. Bus A and Bus B, providing the option for diverse power distribution to the floor areas ultimately powering the PDU's within the racks.

2.2.5.4 The Tenderer will be responsible for installing the ground strips and for making sure the racking is properly grounded. Transnet provided computer hardware in the facility-provided racks must be properly grounded to the existing datacenter infrastructure.

2.2.5.5. The Tenderer shall provide the datacenter facility with conditioned power delivered via redundant UPS systems. Power quality monitoring will be done by the Tender to protect Transnet's equipment and prevent data loss by eliminating surges and other irregularities in power. All power cabling must be in segregated cable trays. Transnet must be alerted of all power incidents by text and email withing 5 minutes of an event. The UPS shall be able to provide at least 60 minutes of backup power. The requirements are detailed in Annexure B. Lithium-Ion batteries are mandatory with capability to recharge within 4 hours at 80% depth of discharge.

2.2.5.6. It is preferred for Transnet to have access to the breaker panels that always supply power to their space. If this is not possible; Transnet must be provided with clear process for requesting changes.

2.2.5.7. N + 1 redundant PDU's must feed Transnet's space. PDU's must have redundant, diverse feeds from separate UPS modules. The circuitry for the electrical feeds should have no single point of failure from the grid to the Cabinets/racks. Power systems shall be designed to meet electrical power draw as specified in section 2.2.5.5.

2.2.5.8. Cabling and power receptacles must be provided from the site power distribution unit(s)(PDU) to Transnet's equipment.

- Emergency power Off (EPO) system
- Load Bus synchronization (i.e synchronization of 2 UPS units: for Voltage, frequency and phase)
- Battery room separate from UPS/Switchgear Equipment Rooms

2.2.5.9. Sites must conduct monthly generator tests.

2.2.5.10. The facility should have resilient backup generators (at least 2) that are fuelled to provide a minimum of 48 hours of backup fuel under full load design conditions.

2.2.6 HVAC requirements

2.2.6.1. Sufficient heating, air conditioning and humidity control to handle Transnet's equipment and maintain temperature of between 18-25 degrees. Temperature as measured approximately 48 inches or 1.21meters above the raised floor surface on the front intake of each supported

equipment cabinet / rack. In addition to the 20 fully populated server racks as well as the UPSs, provision shall be made for 8 staff working onsite (assume 800 BTU per person)

- 2.2.6.2. Humidity Guidelines: Maximum Humidity of 50% as measured at approximately 48 inches or 1.21meters above the raised floor surface on the front intake of each supported equipment cabinet/rack.
- 2.2.6.3. The Tenderer shall ensure that HVAC controls are in place to provide appropriate airflow, temperature, humidity and such HVAC controls will be designed according to at least N+1 redundancy specification.
- 2.2.6.4. HVAC must function when commercial power is unavailable.
- 2.2.6.5. Airflow positioning of equipment must be capable of handling our requirements. This would include side-to-side (most network equipment). Front-to-back (servers) and bottom-to-top airflow requirements with defined cold and hot aisle design principles.
- 2.2.6.6. Transnet must be alerted of all HVAC incidents by text and email within five minutes of the event. Communication of alerts via SNMP interface shall be possible (e.g. to Transnet's NOC). The supply and return water piping shall comprise multiple paths for the cooling plant.

2.2.7 Monitoring and Recording and Security Access

- 2.2.7.1. Building and computer room area must remain locked and secured at all times.
- 2.2.7.2. Security procedures must be documented.
- 2.2.7.3. Access must be controlled and logged using a biometric system.
- 2.2.7.4. The Tenderer shall monitor and record all aspects of the datacenter facility 24/7. The recorded data shall be archived to disk for 30 days.
- 2.2.7.5. Interior cameras must cover all areas of the production floor and all corridors, all egress/exit points for secured areas within the datacenter facility, all mechanical areas and all shipping and receiving areas.
- 2.2.7.6. Upon request of Transnet, recorded camera data of controlled areas shall be made available to authorized personnel.
- 2.2.7.7. A list of all personnel authorized to enter must be kept at all times.
- 2.2.7.8. Intrusion alarms must be in place at all entry or exit points.
- 2.2.7.9. The Tenderer will perform annual audits of facility security by a third party whose results are shared upon release of the report with Transnet.

2.2.7.10. Details must be submitted regarding any datacenter Infrastructure management (DCIM) solution the tenderer has or is installing, and a customer portal view into the DCIM solution.

Dedicated Security-Control-Room-Monitoring-Staff employed 24/7 provided to Transnet?	Yes/No
Qualifications, accreditations and experience of Control Room/Monitoring Staff provided?	Yes/No
Perimeter building doors: card access if entrance ?	Yes/No
Measure performance of the DC MEP Operations?	Yes/No
Security office need to be separate from other areas of DC	Yes/No

2.2.8. Internet and Services Point of Presence Requirements

2.2.8.1. The facility will be carrier neutral and have a broad range of Internet providers within the facility with a minimum of 2 Gb Internet Port services provided upgradable to 10 Gb as and when required.

2.2.8.2. The facility enables a cloud strategy through direct or extended cross connects.

2.2.8.3. Transnet will require two (2) ports for services redundancy with High availability.

2.2.8.4. The proposal will include a minimum of (2) fiber connections (with route diversity and automatic failover) to the internet service provider, with the option to include Cat 6 connections if necessary.

2.2.8.5. The proposal will include an enabling business model to allow alternative service providers access to the facility.

2.2.9 Disaster recovery

The following Disaster recovery tests shall be performed:

2.2.9.1 10 integrity tests per year

2.2.9.2 Two major DR tests annually according to the Transnet DR plan

2.2.10 Other requirements

The site shall not be susceptible to disruption from unplanned activities. Operational errors or spontaneous failures of the site infrastructure components shall not cause a server disruption. Uninterrupted planned site infrastructure maintenance shall be possible by using the redundant capacity components and distribution paths to safely work on the remaining equipment.

Essential spares and consumables shall be held on site?	Yes/No
Earthing system for DC to be ≤ 3 Ohms?	Yes/No
Qualifications, accreditations and experience of MEP (Mechanical, Earthing and Plumbing) Operations and Maintenance provided?	Yes/No
Operational and emergency procedures in support of DC MEP?	Yes/No
Testing and Inspections captured on a database?	Yes/No
Detailed asset register listing all plant, equipment and systems?	Yes/No
Maintenance specification for each and every asset?	Yes/No
Operational and emergency procedures in support of DC MEP Operations?	Yes/No