Project Name

Storage Implementation Statement of Work

– Regional Sales Director

– Systems Engineer

Date

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Table of Contents

Version Control

Version	*Purpose*	*Author*	*Date*
0.1	Initial Draft		

Distribution

Name	*Title*	*Company*

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Executive Summary

Document Purpose

The purpose of this document is to capture the services included by VAST as part of the installation and deployment.
This is NOT a design document.

About VAST Data

Designed from the ground up to make AI simple to deploy and manage the VAST Data Platform is a next-generation distributed data store, unifying file, object, and database services into one scalable, affordable all-flash system that simplifies data pipelines. VAST Data is a unified multi-protocol platform for unstructured (NFS, SMB, and S3) and structured data (native SQL applications and query engines like Spark and Trino).

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Project Resourcing

VAST Data have spent the past few years gathering a team of industry experts from across the globe to assist our customers in deploying effective solutions. These resources are available to Novartis, without charge to share knowledge and experience from deployments across many different organisations.

These resources include, but not limited to –

TBD

Project Overview

High Level Deliverables by VAST

- Provide a site survey document to enable data capture such as hostnames, IP addresses and rack locations.
- Provide a High Level Design Document (HLD) – To be agreed prior to install.
- Physical installation of the agreed storage system into the customer provided racks
- All “internal” network cabling*
- All VAST associated power cables
- Cluster Bring up and hand over to customer as a working cluster
    - NFS, SMB and S3 protocols available for testing
    - VIP pools (front end network) configured

***** Internal network cabling is the cabling that connects the VAST Compute and Data Nodes to the VAST provided NVME Fabric switches. It also includes the cables needed to connect the VAST Provided Spine and Leaf Switches. Although at this time it is assumed structured cabling will be in place to facilitate this.

Site Survey

The VAST Site Survey document is on Google Drive and will be shared with the customer with edit privileges. The document contains the following sections that must be completed prior to hardware being shipped from VAST.

- Racking information
    - Make/model
    - Placement restrictions
    - PDU placement
- Networking interconnect
    - Customer switches for external network
        - Uplink cabling and optics customer provided
    - Customer Management switch options
    - IP addressing requirements
- Shipping location and contact information

Installation Timelines

The following timelines are to be used as a guide only.

Activity	*Who*	*Due Date/Length of time*
Issue Site Surveys Part 1 – Captures Project details, including installation address, shipping address and confirmed hardware as per order, per site.	Vast	
Return Site Surveys Part 1- Completed	Customer	
Issue Site Survey Part 2 – Captures system information, inc rack location, hostnames, IP addresses power outlet requirements etc.	VAST	
Workshop to complete Site Surveys Part 2	All parts	
Return Site Surveys Part 2	Customer	
Assemble and Deliver hardware	VAST	
Create VAST Cluster build document	VAST	
Ship VAST hardware to different locations		
Physical Hardware installation by VAST	VAST	
Cluster 1 Bring up – Phase 1	VAST	
Cluster 1 Testing – Basic performance testing of cluster	VAST	
Cluster 1 Bring up – Phase 2 (Final phase)	VAST	
Customer Handover – Cluster orientation, support process, and customer adoption	VAST	
Customer Testing		

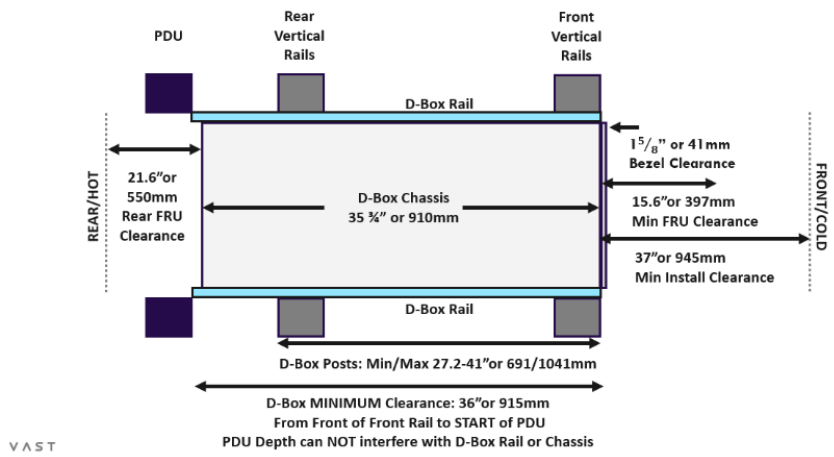
VAST Installation Overview

- Site Survey completes all sections required for hardware to ship
    - Site Survey is signed off by SE allowing manufacturing to ship
    - Details on shipping location are provided to manufacturing for delivery
- VAST Hardware Ships
    - Tracking numbers provided with details on delivery
    - Schedule of installation is coordinated with SE
    - Verify that gear is to arrive, and all cabling, power and other requirements are met.
    - Customer switch config and cabling is scheduled prior to VAST install
- Create Customer Support accounts
    - This is used for customer access to Support for Knowledge Base articles and support tickets
- Create Customer Slack Channel
    - VAST uses Slack internally but also extends Slack to our customers for faster interaction
- Customer Switches configured prior to install date.
    - Interconnect cabling and optics are on site
    - Management switch ports are allocated, and cabling provided for

Customer Pre-Requisites

The below is a guide only and may not be a definitive list:

- The customer is responsible for providing sufficient and compatible racks and power outlets as per the final design requirements. Details of rack requirements shown below:



- Ensure access to the data halls is available for VAST or VAST designated technical resources to perform physical installation. Customer to advise any HSE implications and working hours.
- Advise VAST Data any logistics/delivery restrictions/opening times to enable VAST to schedule deliveries accordingly
- Customer are responsible for all rubbish removal and recycling
- Structured cabling between cabinets for Switch connectivity.
- IP address allocation as per design and captured in Site Survey Part 2**
    - Device Management Network
    - Device IPMI (iLO) type Network
    - High Speed Data Network (ethernet or IB or both)
- Confirm there is no conflict with the internal address range as used by VAST Data.
    - 172.16.x.x/16
    - 172.17.x.x/16
    - 192.168.2.x/24
    - 192.168.3.x/24
- Ensure wireless internet connectivity is available within the data halls for the installation.
- Provide and install cables for connection to the VAST compute nodes and the customer management network.

Storage Design

Logical Storage Design

CUSTOMER have requested a storage solution that can serve protocols N,M across X Y Z sites

Performance Metrics Site 1	*Value*
Available HW Useable Capacity	
Initial Licensed HW Useable Capacity	
Read Bandwidth	
Write Bandwidth	
Random IOPS (4k)	

Performance Metrics Site 2	*Value*
Available HW Useable Capacity	
Initial Licensed HW Useable Capacity	
Read Bandwidth	
Write Bandwidth	
Random IOPS (4k)	

Physical Storage Design Site 1

Hardware Metrics	*Value*
Rack Units (Total)	
Number of “Leaf” Racks	
Number of “Spine” Racks	
Rack Units Per Rack	
Max Power Per Rack	
Combined Weight (not including cables)	
Max Weight per Rack	
Required Rack Depth	
Number of Leaf Switches	
Number of Spine Switches	

Physical Storage Design Site 2

Hardware Metrics	*Value*
Rack Units (Total)	
Number of “Leaf” Racks	
Number of “Spine” Racks	
Rack Units Per Rack	
Max Power Per Rack	
Combined Weight (not including cables)	
Max Weight per Rack	
Required Rack Depth	

Number of Leaf Switches	
Number of Spine Switches	

List of Components

The table below details the hardware and software components of the solution offered:

Category	*Product Code*	*Description*	*QTY*
VAST DBox	DF-1350	1350TB CERES V2 ENCLOSURE	
VAST CBox	1U Single Server Dual Nic	Supermicro 1U Gen5 Server	
VAST CBox Type #2	QUAD-4N-CL-1NIC	VAST Quad Server (Dual-Port 100GbE/EDR)	
VAST Internal Switch	ETH-NVMEF-1X64-200G	Mellanox SNxxx	
Gemini License		Storage capacity license	
Co-Pilot Support		Co-Pilot support services 5 Years	
Installation Services		Installation of the system including hand over	

Proposed Rack Elevation

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Cluster Bring Up Process

The below is a high-level cluster deploy process –

- Physical Installation into racks
- Cabling all internal networking
- Cabling external management networking
- Switch Power On
- Switch Configuration (Spine and Leaf) inc firmware upgrade if required
- Compute and Data Nodes Power On
- Compute and Data Node configuration applied to include
    - Hostname (which should include rack and U position)
    - Internal network configuration
    - External management and IPMI settings
- VAST easy installer to deploy the cluster (automated script that configure the VAST cluster)
- Verify installation finished successfully
- Verify power is balanced between supplies
- Enable call home feature (if customer agrees): The firewall on the cluster's network must be configured to allow outbound connections to *.cloud.vastdata.com on port 443. This is needed to allow the cluster to report to Uplink and to send callhomes.
- Initial setup and test from clients
- Perform customer handover, including sharing with customer password reset instructions to change default passwords from as build passwords.

Password Management

Now that the install is done and the cluster is working we need to tighten security. We've had issues with customers raising security concerns post install regarding well known passwords. Talk to your customers about this. If they are okay with defaults, get that in writing. Otherwise CHANGE ALL PASSWORDS.

That means:

- Change passwords for linux root, linux vastdata, and the IPMI admin password using VCLI - do not change them manually at the OS level! Look at 'cluster set-password'. Just note that you cannot change the BMC root password which is accessible over the network. You should have discussed that with the customer while filling out the site survey - if they care about IPMI network security they should have chosen IPMI back to back.
- Change the VMS admin, support, and root passwords from their defaults. Use the VMS UI for that.
- Change the Mellanox switch passwords for 'admin' and 'monitor' to non-default values.
- Do NOT record these values. They are customer secrets. It is up to them to share them with our Customer Success team when/if needed.