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SOLUTION DESIGN DOCUMENT

Two-pod private cloud design for a typical buyer, applying SRA-DC-001

Design document (HLD + LLD)

CAPABILITY	DOCUMENT	VERSION	DATE
Data Center	SDD-DC-001	1.4	Oct 10, 2026

WRITTEN BY

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Document control

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Sign-off	"The customer's named representative signs this document before build; the practice lead signs it after."		

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> CONVENTIONS
>
> The reference architecture applied to one client with names, sizes and a migration plan. Client values are the typical buyer's from SRA-DC-001 §1 [A] until the design workshop replaces them. Platform figures are from the vendor documents cited in SRA-DC-001 [S]. Versions follow the 2026 technology review in SRA-DC-001 §9.2 (read Sep 24, 2026).

Table 1. Revision history

Date	Version	Change
Sep 15, 2026	1.0	First issue.
Sep 21, 2026	1.1	Corrections to wording, figure numbering and citations.
Sep 27, 2026	1.2	Revised to current platform versions and the current document format.
Oct 7, 2026	1.3	Reissued with the practice set; no change.
Oct 10, 2026	1.4	Approval line now reads: approved by the Founder, issued by Symbeeo. Steve Phillips remains the author.

1 · Introduction

1.1 Purpose.

Design for replacing the client's end-of-support virtualization hosts at two sites with one pod per site, replication between them, and self-service provisioning. The client signs before build.

1.2 Goals.

250 VMs at issue (2026-09), 400 by 2029; RPO 15 min between pods; RTO 2 h; a DR test record the regulator can read; no data center outage during migration.

1.3 Approach.

Phase 1 pod B built new and tested (STP-DC-001). Phase 2 workloads migrated group by group from the old hosts to pod B. Phase 3 old hosts at site A decommissioned; pod A built. Phase 4 replication A↔B, DR drill, acceptance.

1.4 Platform decision.

Hypervisor and platform: AHV on Nutanix Cloud Platform, or ESX on VCF 9.1.1; decided per client by the published comparison VMware: Stay or Leave. Software baseline SRA-DC-001 R14: AOS 7.5+, AHV 11.0+, pc.7.5+, or VCF 9.1.1+. Everything below is written for both paths; the workshop deletes one.

2 · Prerequisites

Table 2. Prerequisites

#	Prerequisite	Owner	Status
P1	Site survey both sites: rack space, power per rack, cooling, ToR uplinks	Symbeeo	open
P2	DCI between sites in service (SDD-NET-001 step 1)	Symbeeo	open
P3	Active Directory groups for RBAC created	client	open

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#	Prerequisite	Owner	Status
P4	Certificate authority issues server certificates	client	open
P5	VM inventory with sizes, dependencies and maintenance windows	client	open
P6	Backup retention policy stated in numbers	client	open
P7	Staging and burn-in window scheduled	Symbeeo	open

3 · Solution overview

3.1 Pods [A].

Table 3. Pods [A]

Pod	Site	Clusters	Nodes	Server
A	site A	management (4) · application (8)	12	Dell R7725 or HPE DL380 Gen12, per SRA-DC-001 D2
B	site B	management (4) · application (8) · storage-heavy (4)	16	same model

3.2 Node configuration [A], from the spec sheets [S].

Application node: 2 × 32-core CPU (EPYC 9005 or Xeon 6), 1.5 TB DDR5, 8 × NVMe, 2 × 100GbE + 2 × 25GbE, dual PSU. Management node: 2 × CPU, 512 GB, 4 × NVMe. Storage-heavy: 2 × CPU, 512 GB, 24 × NVMe.

3.3 Sizing.

400 VMs (the 2029 figure, §1.2) at three sizes (small 2 vCPU/8 GB, medium 4/16, large 8/64) at a 60/30/10 mix [A]: 240 small = 480 vCPU and 1,920 GB; 120 medium = 480 vCPU and 1,920 GB; 40 large = 320 vCPU and 2,560 GB; total **1,280 vCPU and 6,400 GB (6.4 TB) RAM**. Each pod carries the whole estate, so pod B can run every protected group when pod A is lost (SRA-DC-001 F6). Memory is not overcommitted [A]; usable memory per application node is 1.5 TB less 10 % for the hypervisor and storage controller = 1.35 TB [A]. Holding the 2029 estate at or below 70 % of usable memory (the capacity-review threshold, SRA-DC-001 §8) needs 6.4 ÷ 0.70 ÷ 1.35 = 6.8, so 7 nodes; plus one for N+1 = **8 application nodes per pod** (67.7 % with one node down, 59 % with all eight up). CPU at 4:1 vCPU overcommit [A]: 1,280 ÷ 4 = 320 physical cores on the 7 nodes left after a failure = at least 46 cores per node; 2 × 32 cores = 64 per node gives 448 cores on 7 nodes, 2.9:1. Storage capacity is sized from the P5 VM inventory; no per-VM disk figure is assumed here.

4 · Logical design

4.1 Networks per pod [A].

Table 4. Networks per pod [A]

VLAN	Purpose	Subnet
110	hypervisor management	10.<site>.110.0/24
120	storage / replication	10.<site>.120.0/24
130	VM production	10.<site>.130.0/22

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VLAN	Purpose	Subnet
140	VM DMZ	10.<site>.140.0/24
150	backup	10.<site>.150.0/24

4.2 Management plane.

AHV path: two Prism Central instances per pod, AD-integrated, AD-group RBAC [S] NVD-2031. ESX path: VCF 9.1.1 management domain per pod, vCenter, SDDC Manager, NSX [S]. Both: CA-signed certificates on every management endpoint.

4.3 Storage.

Distributed storage with replication factor 2 in pod, snapshots as the third copy [S]; vSAN ESA on the ESX path.

4.4 Replication and DR.

Pod A ↔ pod B asynchronous at 15 min for production VMs; 2 h for the rest; recovery plans per application group; long-term retention at pod B [S] NVD-2031 §5. AHV path: NearSync [S] NVD-2031. ESX path: vSphere Replication, enhanced replication, with recovery plans in Live Site Recovery; in VCF 9.1 these ship as Protection and Recovery, the renamed VMware Live Recovery **[S, Sep 27, 2026]**. The RPO is set per VM, from 5 minutes to 24 hours; below 5 minutes (from 1 minute) needs enhanced replication and an Advanced Cyber Compliance or Site Recovery Manager subscription, which the 15-minute target does not **[S, Sep 27, 2026]**. Limits: a vSphere Replication management server manages up to 5,000 replicated VMs, and vSphere Replication 9.0 documents a 5-minute RPO for 500 VMs, both above the 400-VM estate; up to 24 point-in-time instances per VM; an RPO violation is reported when the latest replica instance is older than the RPO; upgrading vSphere Replication to 9.1 requires every replication to be reconfigured to enhanced replication **[S, Sep 27, 2026]**. Licensing, no prices: the orchestrated recovery plans need the Advanced Cyber Compliance advanced service on the quote (VMware: Stay or Leave R-1); the January 2026 Live Recovery FAQ ties the subscription to each protected VM, including re-protected VMs at the recovery site **[S, Sep 27, 2026]**, and VMware: Stay or Leave R-3 records the unit (per protected VM or per core) as open, so it is confirmed at quote [A]. URLs in SRA-DC-001 §9.2.

4.5 Self-service.

Three VM sizes as a catalog; requests approved by the client's change process; provisioning automated [S].

4.6 Security.

SRA-DC-001 R12 item by item; hardening baseline applied at staging; policy deviation alerts to the staffed mailbox. Encryption at rest with the client's key manager and in transit on management and replication traffic; security logs sent over TLS to the client's collector, since VCF 9.1 blocks unencrypted syslog on port 514 **[S, Sep 24, 2026]**. The mechanism on the AHV path is confirmed at the design workshop [A].

5 · Physical design

Per pod: 2 racks (compute; ToR, OOB and, at pod B, the storage-heavy cluster), A/B PDUs, 2 × ToR at 100G to the DC fabric, 1 × OOB switch; elevations drawn before staging. Power per rack from the configured spec sheets [S], recorded in the as-built.

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6 · Migration

Table 5. Migration

Step	Action	Rollback
1	Build pod B; run STP-DC-001 T1–T9	—
2	Replicate the first application group to pod B; test failover in a window	fail back
3	Migrate application groups in dependency order, one per window	reverse migration
4	Decommission site A old hosts; build pod A; STP-DC-001 T1–T9 on pod A	—
5	Enable A↔B replication; DR drill (STP-DC-001 T11–T13); acceptance	—

7 · Roles and deliverables

Design authority: practice lead (signs) and client infrastructure manager (signs). Deliverables: this document · STP-DC-001 with results · as-built (nodes, serials, networks, versions) · DR runbook · acceptance certificate. The full handover pack is in §9.5.

8 · Change control, reporting and escalation

8.1 Change control.

After this document is signed, any change is a written change order: what changes, why, the cost effect and the schedule effect. Both parties sign it before it is built. Change orders are numbered and listed in the as-built.

8.2 Weekly status report.

Every week of the project, Symbeeo sends the client a status report giving: % complete per deliverable (§7) · slippage against the plan in §1.3 and §6.

8.3 Escalation contacts (by role; names filled at contract).

Table 6. Escalation contacts (by role; names filled at contract)

Level	Symbeeo	Client
1 · day to day	project engineer	infrastructure manager
2 · schedule, scope or cost	practice lead	head of infrastructure
3 · contract	the Founder	contract owner

9 · Security and lifecycle clauses

9.1 Incident reporting.

A security incident affecting the client's data or systems is reported to the client within 24 hours of discovery.

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9.2 Media sanitization.

Storage media leaving the client's control (failed NVMe drives, decommissioned old hosts at site A in §6 step 4) are sanitized to NIST SP 800-88 Rev. 2 **[S, Sep 24, 2026]**, with a certificate per device, before they leave the client's control; alternatively the media stay with the client under a non-return service. Media holding PHI or other regulated personal data are never taken back unsanitized.

9.3 End-of-sale and end-of-support.

No equipment is quoted past its vendor's end-of-sale date. The quote shows the end-of-support date of every item: servers, NVMe, NICs, ToR and OOB switches, and software subscriptions. Checked Sep 24, 2026: Dell R7725 and HPE DL380 Gen12 are current products; AOS 7.0 and pc.2024.3 are out of maintenance and are not quoted (SRA-DC-001 §9.2).

9.4 Vendor support level by severity.

Every quote states the vendor's response time per severity. Filled from the vendor's support contract at quote.

Table 7. Vendor support level by severity

Vendor and item	Severity 1	Severity 2	Severity 3	Severity 4
Server vendor (Dell or HPE)				
Platform software (Nutanix or Broadcom)				
ToR / OOB switch vendor				

9.5 Handover pack.

At the end of the project the client receives: as-built drawings (racks, elevations, networks) · configurations · credentials transferred to the client · licenses · support contracts · the signed STP-DC-001 · open items. It includes the §7 deliverables.

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SYMBEEO

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Figures are as published by their sources on the dates given in this document; figures marked [A] are assumptions.

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