SYMBEEO

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SOLUTION DESIGN DOCUMENT

Campus, branch and DCI design for a typical buyer, applying SRA-NET-001

Design document (HLD + LLD)

CAPABILITY	DOCUMENT	VERSION	DATE
Networking	SDD-NET-001	1.5	Nov 4, 2026

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What this document is. The reference architecture says what a good design looks like. This document is that design applied to one client, with names, numbers, addresses and a cut-over plan, in the shape an integrator hands over: a technical design document (versions table, purpose, approach, solution overview, services, requirements) and the LLD content a large integrator lists for a low-level design (all prerequisites, detailed network design, wired and wireless asset and version verification). The client here is the typical buyer from SRA-NET-001 §1 [A]; every value marked [A] is replaced by the real client's during the design workshop.

Document control

Document	SDD-NET-001	Version	1.5
Issued	Nov 4, 2026	Status	Issued by Symbeeo
Classification	Public	Supersedes	1.4, Oct 10, 2026
Capability	Networking	Author	Mark Winston
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Approval	Approved by Edwin Ozer, Founder, Oct 10, 2026 (version 1.4). Version 1.5 issued by Symbeeo, Nov 4, 2026.		
Sign-off	"The customer's named representative signs this document before build; the practice lead signs it after."		

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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.
Sep 29, 2026	1.3	Optical platform lifecycle entry brought in line with SRA-NET-001 §9.2: no end-of-sale notice.
Oct 10, 2026	1.4	Approval line now reads: approved by the Founder, issued by Symbeeo. Mark Winston remains the author.
Nov 4, 2026	1.5	Data-center interconnect re-specified on the Cisco NCS 1014 with the 2.4T line card, as SRA-NET-001 v1.5: devices, names, rack, cabling, power, software and cut-over step 1.

1 · Introduction

1.1 Purpose.

Technical design for the refresh of the client's head-office campus, three branches and data-center interconnect on the platforms in SRA-NET-001. After review, the client's representatives sign this document and work continues to build.

1.2 Project overview and goals.

Replace end-of-support access and core switching; move the wireless estate to Wi-Fi 7; move the WAN to SD-WAN with two transports per site; put encrypted optical transport between the two data centers. Goals: 10G to every AP, 400G-capable core, sub-second convergence, no single point of failure per site.

1.3 Approach and phases.

Phase 1 data-center interconnect (so the core can be dual-homed before campus work). Phase 2 HQ core and access, closet by closet. Phase 3 wireless. Phase 4 branches, one per week. Phase 5 decommission and as-built.

1.4 Change control and reporting.

Every change is a ticket in the client's change system with this document's section as reference; emergency changes are recorded within 24 hours.

- **Change orders.** Once this document is signed, any change to the design is a written change order stating what changes, why, and its cost and schedule effect. Both parties sign it before the change is built. The change ticket above then carries the signed change order's number.
- **Weekly status report.** Every week of the build Symbeeo sends the client's infrastructure manager a status report giving, per deliverable in §8: % complete, slippage against the plan in §1.3.
- **Escalation.** Contacts on both sides, by role, are listed in §8.

1.5 Intended audience.

Client infrastructure team; Symbeeo build engineers; the client's security team for §6.

1.6 Related documents.

SRA-NET-001 · STP-NET-001 · vendor datasheets listed in SRA-NET-001 §1 · lifecycle notices and recommended software releases read Sep 24, 2026, with URLs, in SRA-NET-001 §9.2 · NIST SP 800-88 Rev. 2 (§9).

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2 · Prerequisites (all must be true before build)

Table 2. Prerequisites (all must be true before build)

#	Prerequisite	Owner	Status
P1	Site survey complete for HQ, 3 branches, 2 DCs: rack space, power, fiber paths, ceiling heights for APs	Symbeeo	open
P2	Wireless predictive design signed (AP count and placement per floor)	Symbeeo	open
P3	Dark fiber or wavelengths between DC-A and DC-B ordered on two diverse paths, one per DCI wavelength [A], with loss budget measured per path	client	open
P4	Two internet transports per branch ordered	client	open
P5	IP plan and VLAN plan approved (§4)	client	open
P6	Certificate authority reachable for 802.1X (SRA-SEC-001)	client	open
P7	Software baseline agreed (§5.4)	both	open
P8	Staging space and burn-in window at Symbeeo scheduled	Symbeeo	open

3 · Solution overview

3.1 Architecture.

As SRA-NET-001 §3: two-tier campus, Wi-Fi 7, SD-WAN, NCS 1014 DCI. The architecture diagram is SRA-NET-001 §3.

3.2 Sites and device inventory [A].

Table 3. Sites and device inventory [A]

Site	Role	Devices	Naming	End of sale / end of support, read Sep 24, 2026
HQ	campus core	2 × Catalyst 9500X-60L4D, StackWise Virtual	hq-core-01/02	no notice [S]; dates restated on the quote
HQ	access, 6 closets	12 × Catalyst 9300X-48HX in 6 stacks of 2	hq-acc-f1a … hq-acc-f3b	no notice [S]; dates restated on the quote
HQ	wireless	40 × CW9178I; 2 × CW9800M (HA, SSO)	hq-ap-f1-01 … ; hq-wlc-01/02	CW9178I orderable, no notice [S]; CW9800M no notice [S]; 9800-40 end of sale Dec 31, 2025, not quoted
HQ	WAN	2 × SD-WAN edge, Cisco G2 Secure Router range, model sized at quote [A]	hq-wan-01/02	first-generation C8200/C8300/C8500L parts end of sale Jan 31 or Jul 31, 2027, not quoted [S]
Branch 1–3	access + wireless + WAN	per branch: 2 × 9300X-48HX, 6 × CW9178I, 2 × SD-WAN edge	br1-acc-01 …	as the rows above

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Site	Role	Devices	Naming	End of sale / end of support, read Sep 24, 2026
DC-A, DC-B	DCI	2 × NCS 1014 each (4 in all), one NCS1K14-2.4T-K9 line card with one CIM8-C-K9 and 1 × 400GbE client per chassis (2 × 400GbE per data center, SRA-NET-001 R10); chassis 01 at each end carries wavelength 1, chassis 02 wavelength 2, on diverse fiber paths [A]	dca-opt-01/02, dcb-opt-01/02	no end-of-sale notice [S], read Nov 4, 2026; dates restated on the quote
all	OOB	console server, management switch, LTE router per site	<site>-oob-01	models and dates set at quote [A]

Sources and URLs for every lifecycle entry: SRA-NET-001 §9.2.

3.3 Locations.

HQ: 3 floors, 6 wiring closets, 1 core room. Branches: 1 closet each. DCs: 1 rack each for DCI and OOB (two 2 RU NCS 1014 chassis plus the OOB devices).

4 · Logical design

4.1 VLAN plan [A].

Table 4. VLAN plan [A]

VLAN	Name	Purpose	Subnet
10	mgmt	device management	10.<site>.10.0/24
20	users	corporate laptops, 802.1X	10.<site>.20.0/22
30	voice	IP phones	10.<site>.30.0/24
40	wifi-corp	Wi-Fi corporate SSID	10.<site>.40.0/22
50	wifi-guest	guest, internet only	10.<site>.50.0/24
60	ot	printers, building systems, MAB	10.<site>.60.0/24
99	quarantine	posture-failed devices	10.<site>.99.0/24

4.2 IP plan [A].

Site octets: HQ 1, branches 2–4, DC-A 8, DC-B 9. Core SVIs on the StackWise Virtual pair; branches route locally with SD-WAN edge as default gateway for WAN. Loopbacks 10.255.<site>.<device>/32.

4.3 Routing.

OSPF area 0 at HQ between core and SD-WAN edges; static default from core to SD-WAN; branches static to SD-WAN edge; DCI is layer 2 transparent at the optical layer with routed links above it from the DC fabrics (SRA-DC-001).

4.4 Wireless.

Two SSIDs: corp (WPA3-Enterprise, 802.1X, VLAN 40) and guest (WPA3 with captive portal, VLAN 50). 6 GHz enabled for corp only. Controller HA pair at HQ; branches use FlexConnect local switching [A].

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4.5 WAN.

SD-WAN policy: voice and video on the lowest-loss transport, bulk on the cheapest; failover on loss > 2 % or latency > 150 ms for 10 s [A].

4.6 Security enforcement.

802.1X on every user port, MAB on VLAN 60 ports, SGT tagging from access to core; policy engine per SRA-SEC-001.

5 · Physical design

5.1 Rack and closet elevations.

One elevation per closet, drawn before staging: PDU-A/B, console server, management switch, access stack, patch panels; core room: core pair, WLC pair, SD-WAN edges, OOB.

5.2 Cabling.

Access to core: 2 × 100G per stack, one to each core member, single-mode. AP cabling: Cat6A, 10G mGig, 90 W UPOE+. DCI: one 400GbE client per NCS 1014 chassis to the DC fabric; each chassis's line side to its own fiber path's patch, the two paths diverse [A], with measured loss within the CIM 8 budget (output up to +3 dBm, input floor –12 dBm: 15 dB [S], SRA-NET-001 §4.5).

5.3 Power.

Access stacks on A/B PDUs; core and WLC dual PSU; each of the four NCS 1014 chassis dual PSU, fed from the rack's A and B PDUs [A]; about 520 W typical per chassis, 250 W empty plus 271 W for the line card [S].

5.4 Software baseline [A].

Catalyst 9300X and 9500X: the current recommended IOS XE release on the day of staging, to be recorded at the first build against this design; CW9800M controller and CW9178I: matching release; NCS 1014: the current IOS XR 26.x release (26.3.1 read Nov 4, 2026 [S]). Recorded in the as-built with checksums. Planned baseline read Sep 24, 2026 [S]: IOS XE 17.18.4 on 9300X and 9500X (Cisco recommended release, page updated Sep 4, 2026); IOS XE 17.18.4a with APSP2 on the CW9800M and CW9178I (TAC recommendation where Wi-Fi 7 features are enabled, page updated Sep 3, 2026). 17.18.4 is taken over the also-recommended 17.15.6 because every train from 17.9.x to 17.17.x, 17.15.x included, carries an end-of-sale notice on Cisco's listing. Checked again on the day of staging; URLs in SRA-NET-001 §9.2.

6 · Network services

6.1 DHCP and DNS.

Client's existing servers; DHCP relay from core SVIs; option 43 for controller discovery. **6.2 NTP.** Two internal stratum-2 sources; all devices synchronized. **6.3 QoS.** Voice EF, video AF41, default best effort; trust boundary at the access port; policy consistent from AP to WAN. **6.4 Management.** SSH only, TACACS+ to the client's AAA, syslog and streaming telemetry to the client's NMS, SNMPv3 read-only.

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7 · Migration and cut-over

Table 5. Migration and cut-over

Step	Action	Rollback
1	Install the four NCS 1014 chassis (two per data center), light the two wavelengths, one per chassis pair, test (STP-NET-001 T10–T12, T17)	keep existing DCI
2	Stage all HQ hardware at Symbeeo; burn in; ship	—
3	Install new core in parallel; dual-connect to old core; move SVIs one VLAN per window	move SVI back
4	Replace access stacks one closet per window; migrate ports	old stack stays racked for one week
5	Wireless: new controllers and APs in parallel SSID; migrate SSID per floor	old SSID stays for one week
6	Branches: one per week, new stack and SD-WAN in parallel, cut at a weekend window	old edge stays for one week
7	Decommission (storage media sanitized per §9 before leaving the client's control), as-built, handover pack (§8), acceptance (STP-NET-001 §4)	—

8 · Roles and deliverables

Table 6. Roles and deliverables

Role	Symbeeo	Client
Design authority	practice lead (signs)	infrastructure manager (signs)
Build	build engineers	change approver
Acceptance	test lead	named acceptor

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

Table 7. Roles and deliverables

Level	Symbeeo	Client	When
1	build engineer on site	change approver	day-to-day issue in a change window
2	practice lead	infrastructure manager	slippage against §1.3, a failed T-case, a disputed change order
3	the Founder	the client's executive sponsor	unresolved at level 2 within 2 business days [A]; any security incident (§9)

Deliverables: this document · STP-NET-001 with results · as-built (device list, ports, IPs, software, checksums, elevations) · acceptance certificate · weekly status reports (§1.4) · signed change orders.

Handover pack, delivered at the end of Phase 5 and before signed acceptance: as-built drawings (elevations, cabling, logical diagrams) · configurations of every device, with checksums · credentials transferred to the client and Symbeeo's build credentials revoked · licenses, with term and renewal date · vendor support contracts, with severity levels (§9) ·

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STP-NET-001 signed · open items, each with owner and date · media-sanitization certificates for decommissioned equipment (§9).

9 · Security and lifecycle clauses

- **Incident reporting.** A security incident affecting the client's data or systems, discovered by Symbeeo during the engagement, is reported to the client's named security contact within 24 hours of discovery, then escalated per §8.
- **Media sanitization.** Storage media leaving the client's control (decommissioned switch flash and SSDs, controller disks, returned faulty units) are sanitized to **NIST SP 800-88 Rev. 2** (final, Sep 26, 2025), with a certificate per device giving serial number, method and date [S] `https://csrc.nist.gov/pubs/sp/800/88/r2/final`, read Sep 24, 2026. Sanitization is done before the media 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.
- **No equipment past end of sale.** No item is quoted past its vendor's end-of-sale date. The quote shows the end-of-sale and end-of-support date of every item; §3.2 carries the status read on Sep 24, 2026, restated on the day of the quote. The Catalyst 9800-40 (end of sale Dec 31, 2025) and the first-generation Catalyst 8000 edge parts named in SRA-NET-001 §4.4 are excluded on this clause.
- **Support level by severity.** Every quote states the vendor support level bought for each item, as the vendor's response time for severity 1, 2, 3 and 4. The values come from the vendor contract offered at the quote [A]; none is stated here.
- **Handover pack.** Delivered as listed in §8.

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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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