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REFERENCE ARCHITECTURE

Digital platforms on the infrastructure: application platform, API and event layer, digital workplace, observability — on 2026 standards

CAPABILITY	DOCUMENT	VERSION	DATE
Digital	SRA-DIG-001	1.1	Oct 10, 2026

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Document control

Document	SRA-DIG-001	Version	1.1
Issued	Oct 10, 2026	Status	Issued by Symbeeo
Classification	Public	Supersedes	1.0, Sep 27, 2026
Capability	Digital	Author	Avinash Dhinakaran
Role	Principal Integration Architect	Tested by	STP-DIG-001
Credentials	iSAQB Certified Professional for Software Architecture – Advanced Level (CPSA-A), Oracle Certified Consultant – Value Chain Planning, Master Data Management, SCM Cloud		
Approval	Approved by Edwin Ozer, Founder, Oct 10, 2026. Issued by Symbeeo, Oct 10, 2026.		
Sign-off	"The practice lead signs this document before any build proceeds under it."		

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CONVENTIONS

Source tags. [S] read Sep 24, 2026 from a standards body, an open-source project's own release page or a vendor's own lifecycle page; numbered S1–S20 with URLs in §9. [A] design assumption for a typical buyer, to be confirmed by the signing engineer. No figure comes from any prior engagement, file or asset. Where Symbeeo compares vendors for the buyer, this document names the **option class and the standard it must meet**, not the winner (§5). A row with more than one tag is counted once: as a published figure if any tag is [S] or [S*], otherwise as an assumption if any tag is [A], otherwise as a design target.

Table 1. Revision history

Date	Version	Change
Sep 27, 2026	1.0	First issue.
Oct 10, 2026	1.1	Approval line now reads: approved by the Founder, issued by Symbeeo. Avinash Dhinakaran remains the author.

1 · Scope

Who it is for. The head of infrastructure who runs the platforms digital services sit on — container platform, API and event layer, collaboration estate, telemetry — and must replace what went out of support in 2025–26 without buying one vendor's roadmap.

Typical buyer [A]. The SRA-NET-001 client: 1,500 users at HQ, 3 branches, 2 data centers, two hyperscalers. Digital estate: 60 applications, 25 exposing APIs; an ERP integrated per SRA-INT-001; 30 meeting rooms; a SaaS collaboration suite; one on-premises mail server on a release out of support since October 14, 2025 **[S19]**; Kubernetes ingress on ingress-nginx, retired March 2026 **[S3]**.

What is in. Application platform; API edge and management; event streaming; interfaces for AI agents; observability; digital-workplace identity, provisioning and device lifecycle; portal accessibility. **What is out.** Network (SRA-NET-001), DC compute (SRA-DC-001), policy engine and SIEM (SRA-SEC-001, whose identity provider is consumed here), ERP and data-space exchange (SRA-INT-001), AI compute (SRA-AI-001), application code.

2 · Requirements register

Each row after R1, the input, passes the ISO/IEC/IEEE 29148 test: one requirement, verifiable by a T-case in STP-DIG-001, no product named. Standards appear only as the measure.

Table 2. Requirements register

#	Requirement	Value	Source
R1	Estate size	1,500 HQ users · 3 branches · 60 applications, 25 exposing APIs · 30 rooms	[A] input

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#	Requirement	Value	Source
R2	Every API consumed outside its owning team has a machine-readable contract in the catalog before its first production call	100 %; OpenAPI 3.2.0 (HTTP), AsyncAPI 3.1.0 (events)	[S5] [S6]
R3	No API accepts the implicit or resource-owner password grant	0 accepted	[S7]
R4	Latency added by the API edge	≤ 10 ms p95 at design load	[A]
R5	API edge availability	99.95 % per calendar month	[A]
R6	Acknowledged events lost when one broker node fails	0	[A]
R7	Kubernetes minor release on every cluster	inside upstream patch support: 1.35–1.37 on Sep 24, 2026	[S1]
R8	Components on a production traffic path with a published security-maintenance commitment for the next 12 months	100 %	[S3] [A]
R9	Drift of production platform state from version control detected	≤ 15 min	[A]
R10	Production services emitting traces, metrics and logs over OTLP with W3C Trace Context propagated	100 % of tier-1 and tier-2	[S12] [S14]
R11	A request crossing edge, service and broker is retrievable as one trace	1 trace per request	[S14]
R12	Telemetry records dropped by the pipeline at design load	≤ 0.1 %, counted	[A]
R13	Tier-1 services paged by an SLO burn-rate alert	≤ 5 min after threshold	[A]
R14	Joiner and mover change reaches every in-scope collaboration service over SCIM 2.0	≤ 15 min	[S16] [A]
R15	Disabled identity loses access to every collaboration service, live sessions included	≤ 5 min in every service that receives CAEP session-revocation events (SRA-SEC-001 R11); ≤ 15 min in any other, the platform's own stated bound	[S15]

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#	Requirement	Value	Source
R16	Servers, endpoints and room devices past their vendor's support end date at handover	0	[S17]–[S19]
R17	WCAG 2.2 Level AA failures on employee-facing portals	0 in audit	[S20]
R18	Telemetry retention	metrics 13 months · traces 14 days · logs 12 months (SRA-SEC-001 R10)	[A]

Eighteen rows; one is an input (R1), ten carry a figure or standard from a source (R8 and R14 with an assumption beside it), seven are typical-buyer assumptions.

3 · Architecture overview

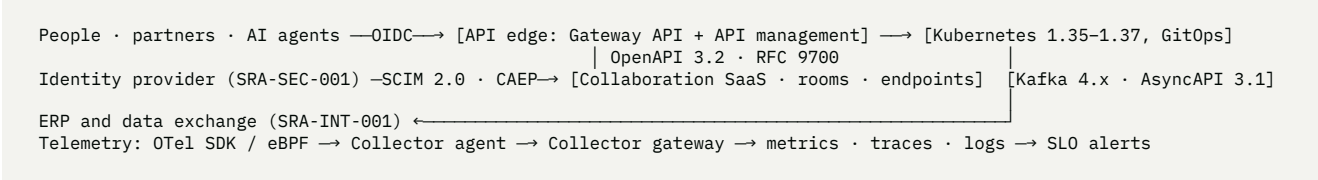


Figure 1. Digital platform architecture

One identity provider, one telemetry pipeline, and an open specification on every interface, so each platform can be re-sourced without redesigning the others. Network, compute and policy sit underneath (SRA-NET-001, SRA-DC-001, SRA-SEC-001).

4 · Component design

4.1 Application platform.

Conformant Kubernetes inside upstream support: the project patches the three newest minors — 1.37 (August 26, 2026), 1.36, 1.35 — for about a year each **[S1] [S2]**. Two production clusters, one per data center or zone [A]; state reconciled from Git (R9). Rejected: 1.34 or older (R7).

4.2 North–south traffic.

Gateway API, not Ingress: ingress-nginx was retired in March 2026 with no further security fixes **[S3]**. v1.5 (February 27, 2026) moved ListenerSet, TLSRoute, CORS, client-certificate validation and ReferenceGrant to Standard; v1.6 (June 30, 2026) added TCPRoute and UDPRoute **[S4]**. Rejected: ingress-nginx (R8).

4.3 East–west traffic.

Mutual TLS by mesh where several teams share a cluster [A]. Istio ambient mode (no per-pod sidecar) is GA since 1.24; ambient multicluster is beta since March 2026 and is not used until GA **[S13]**.

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4.4 API management.

Contract first (R2): OpenAPI 3.2.0 (September 2025: streaming media types, QUERY method, OAuth device flow) or AsyncAPI 3.1.0 **[S5]** **[S6]**. The edge validates identity-provider tokens: authorization code with PKCE for people, client credentials for services, implicit and password grants refused per RFC 9700, BCP 240 **[S7]**. Security tests follow the OWASP API Security Top 10, 2023 edition, still current **[S8]**.

4.5 Event layer.

Apache Kafka 4.x, KRaft only — ZooKeeper removed in 4.0; share groups ("queues") production-ready in 4.2; 4.3.0 released May 22, 2026 **[S9]**. Replication factor 3, min in-sync replicas 2, producer acks from all in-sync replicas [A] (R6).

4.6 Interfaces for AI agents.

Agents call through the API edge like any consumer. The Model Context Protocol Jul 28, 2026 specification is stateless and adds issuer validation and issuer-bound credentials **[S10]**, so an MCP server deploys as an ordinary API behind the edge.

4.7 Observability.

OpenTelemetry SDKs, a Collector agent per node, a Collector gateway tier; OTLP the only transport (R10); semantic conventions pinned to 1.44.0 **[S12]**. W3C Trace Context (Recommendation) for propagation; Level 2 is a Candidate Recommendation, not required **[S14]**. Metrics in any Prometheus-3-compatible store: native OTLP ingestion and UTF-8 names **[S11]**. Uninstrumentable services use OpenTelemetry eBPF Instrumentation, **pre-1.0 (v0.13.0, September 4, 2026)**, for coverage only; the Profiles signal (public alpha, March 2026) is out of scope **[S12]**.

4.8 Digital workplace.

Collaboration services federate to the identity provider (OIDC or SAML), provision over SCIM 2.0 **[S16]**, and revoke sessions over the OpenID Shared Signals Framework and CAEP, Final since September 2, 2025 **[S15]**. Lifecycle floor (R16): Windows 10 ended October 14, 2025 **[S18]**; Exchange Server 2016/2019 ended the same day, successor Exchange Server SE or the online service **[S19]**; Teams-certified Android 10/11 room and phone devices lost certification September 3, 2026, support ends September 3, 2027 **[S17]**. The same check runs against whichever suite the buyer's comparison selects.

4.9 Accessibility.

WCAG 2.2 AA. EN 301 549 v4.1.1 (September 2026) references WCAG 2.2; until cited in the Official Journal, v3.2.1 (WCAG 2.1 AA) stays the legal reference **[S20]**. 2.2 meets both.

5 · Options and platform choices

One row per decision. Every option weighed is kept, rejected ones included, with its §2 result and cost band. [CMP] marks a choice the buyer's published comparison decides; this document names the class and the test it must pass, not the winner.

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Table 3. Options and platform choices

ID	Decision	Requirement	Alternatives considered	Decision taken	Rationale
D1	Application platform	R7, R8	managed Kubernetes from the hyperscaler (meets §2; subscription) · conformant distribution on premises (meets §2; license + support)	**both, by placement**: managed for cloud workloads, on-premises distribution for resident data	same Kubernetes API either way **[S1]**; managed: provider carries the control plane [A]; on premises: client carries upgrades
D2	North–south traffic edge	R4, R5, R8	Gateway API implementation with a Standard-channel conformance report (meets §2; open source to commercial) · ingress-nginx (fails R8)	**Gateway API**; implementation [CMP]	portable routes **[S4]**; ingress-nginx retired March 2026, no further security fixes **[S3]**
D3	API management	R2, R3	commercial API management suite (meets §2; per-call pricing) · gateway + open catalog (meets §2; low cost)	**catalog by default; suite above 10 external partners [A]**	R2 is met either way; the suite's per-call cost is justified only at partner scale [A]
D4	Event layer	R6	Kafka 4.x self-run or managed Kafka-compatible service (meets §2; mid cost) · Kafka 3.x on ZooKeeper (no forward path)	**Kafka 4.x, KRaft**; self-run or managed [CMP]	KRaft only and share groups in 4.x; ZooKeeper removed in 4.0 **[S9]**
D5	Telemetry collection and backend	R10–R12	OpenTelemetry collection with an open backend (ops effort) · OpenTelemetry collection with an OTLP-native commercial backend (per GB) · proprietary agents only (fails R10; cost varies)	**OpenTelemetry collection**; backend [CMP]	OTLP keeps the backend swappable (R10) **[S12]**; proprietary agents lock the estate to one backend
D6	Collaboration suite	R14–R16	suites on the buyer's shortlist (per user)	[CMP] — buyer's choice	each suite checked for SCIM **[S16]**, CAEP **[S15]** and device lifecycle **[S17]** before it can win
D7	Mail platform	R16	Exchange Server 2016/2019 on premises (fails R16) · Exchange Server SE on premises · the vendor's online service	**SE or online service**, recorded at SDD-DIG-001 P8; 2016/2019 rejected	2016/2019 unsupported since Oct 14, 2025; SE is the on-premises successor **[S19]**

6 · Failure conditions

Table 4. Failure conditions

#	Condition	What the user sees	Recovers by itself	Needs a hand	Time
F1	One API edge replica down	none	remaining replicas	no	seconds [A]
F2	API edge tier down in one cluster	none on global DNS	second cluster takes traffic	investigate	≤ 60 s [A]
F3	One worker node down	none	pods rescheduled	replace node	≤ 5 min [A]
F4	Cluster control plane down	running apps continue; no deploys	no	restore	per runbook

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#	Condition	What the user sees	Recovers by itself	Needs a hand	Time
F5	One broker node down	none; producers continue	partition leaders move (R6)	replace	seconds [A]
F6	Identity provider unreachable	new sign-ins fail; existing tokens valid to expiry	no	restore IdP	SRA-SEC-001 F3
F7	Collector gateway replica down	none	agents retry to other replicas; drops counted (R12)	no	seconds
F8	Telemetry store down	none; dashboards stale	agents buffer to disk limit	restore	buffer 2 h [A]
F9	Gateway listener certificate expires	TLS errors	no	renew	alert 21 days before [A]
F10	SCIM connector fails	new joiners lack access; leavers still cut by CAEP (R15)	retry	fix connector	≤ 15 min detection [A]

7 · Validation

None yet. STP-DIG-001 tests every requirement row except the input R1, and every failure condition, against the first build under SDD-DIG-001; results recorded there and summarized here make this a validated architecture.

8 · Operations and lessons learned

Day 2: Kubernetes minor upgrade at least yearly, sandbox first (R7); Gateway API and semantic-conventions pins reviewed quarterly; lifecycle report against R16 quarterly; SLO review monthly. Lessons: to be written by the signing engineer after the first build.

9 · Appendix

Component list, typical buyer [A]: 2 production clusters (one on premises, one in the hyperscaler) · Gateway API edge, 3 replicas per cluster · API catalog · Kafka 4.x, 3 brokers · Collector gateway tier of 3 · SCIM and CAEP connectors per collaboration service · 30 rooms on certified firmware.

References, all read Sep 24, 2026. S1 Kubernetes releases — https://kubernetes.io/releases/ · S2 Kubernetes v1.37 — https://kubernetes.io/blog/2026/08/26/kubernetes-v1-37-release/ · S3 Ingress NGINX retirement — https://kubernetes.io/blog/2025/11/11/ingress-nginx-retirement/ and https://kubernetes.io/blog/2026/01/29/ingress-nginx-statement/ · S4 Gateway API v1.5 and v1.6 — https://kubernetes.io/blog/2026/04/21/gateway-api-v1-5/ and https://kubernetes.io/blog/2026/08/03/gateway-api-v1-6-release/ · S5 OpenAPI 3.2.0 — https://spec.openapis.org/oas/v3.2.0.html · S6 AsyncAPI 3.1.0 — https://www.asyncapi.com/docs/reference/specification/v3.1.0 · S7 RFC 9700 — https://www.rfc-editor.org/info/rfc9700 · S8 OWASP API Security Top 10 — https://api-security.owasp.org/ · S9 Apache Kafka 4.2.0 announcement and release list — https://kafka.apache.org/blog/2026/02/17/apache-kafka-4.2.0-release-announcement/ and https://kafka.apache.org/blog/ · S10 MCP Jul 28, 2026 — https://blog.modelcontextprotocol.io/posts/2026-07-28/ · S11 Prometheus 3 and OTLP — https://prometheus.io/blog/2024/11/14/prometheus-3-0/ and https://prometheus.io/docs/guides/opentelemetry/ · S12 OpenTelemetry semantic conventions 1.44.0, Profiles alpha, OBI releases — https://opentelemetry.io/docs/specs/semconv/ · https://opentelemetry.io/blog/2026/profiles-alpha/ · https://github.com/open-telemetry/opentelemetry-ebpf-instrumentation/releases · S13 Istio ambient GA and 2026

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announcements — https://istio.io/latest/blog/2024/ambient-reaches-ga/ and https://www.cncf.io/announcements/2026/03/25/istio-brings-future-ready-service-mesh-to-the-ai-era-with-new-ambient-multicluster-gateway-api-inference-extension-and-more/ · S14 W3C Trace Context and Level 2 — https://www.w3.org/TR/trace-context/ and https://www.w3.org/TR/trace-context-2/ · S15 OpenID SSF, CAEP, RISC final — https://openid.net/three-shared-signals-final-specifications-approved/ · S16 SCIM 2.0 protocol — https://www.rfc-editor.org/rfc/rfc7644 · S17 Android versioning for Teams devices — https://learn.microsoft.com/en-us/microsoftteams/devices/android-version-support · S18 Windows 10 end of support — https://support.microsoft.com/en-us/windows/deployment/updates-lifecycle/windows-10-support-has-ended-on-october-14-2025 · S19 Exchange 2016/2019 end of support and Exchange SE — https://learn.microsoft.com/en-us/troubleshoot/exchange/administration/exchange-2019-2016-end-of-support and https://techcommunity.microsoft.com/blog/exchange/exchange-server-subscription-edition-se-is-now-available/4424924 · S20 EN 301 549 v4.1.1 — https://accessible-eu-centre.ec.europa.eu/content-corner/news/european-accessibility-standard-en-301-549-has-been-updated-2026-09-07_en

9.1 · Industry rules this architecture helps a buyer meet.

From Symbeeo's industry research of September 2026. Only rules that research links to this document's requirements are listed; rules it found this document does not address are left out.

Table 5. Industry rules this architecture helps a buyer meet

Rule	Jurisdiction	What it asks of infrastructure	Requirements here	Coverage
Section 508, Revised 508 Standards (36 CFR Part 1194), with a VPAT 2.5Rev conformance report	US · federal agencies	ICT the agency buys conforms to WCAG 2.0 Level AA; the vendor documents conformance	R17	partial
ADA Title II web rule, 28 CFR Part 35 Subpart H (DOJ interim final rule of Apr 20, 2026 moved compliance to Apr 26, 2027 and Apr 26, 2028)	US · state and local government	WCAG 2.1 Level AA for public websites and apps (R17 covers employee portals only)	R17	partial

Naming a rule here is not a claim of compliance or certification: the buyer's assessor decides compliance, and Symbeeo holds no certification or authorization.

Sources for §9.1, read Sep 25, 2026: Revised 508 Standards [S] https://www.access-board.gov/ict/ · VPAT 2.5Rev [S] https://www.itic.org/policy/accessibility/vpat · DOJ interim final rule, 2026 [S] https://www.ada.gov/assets/pdfs/2026-ifr.pdf.

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Each vendor's tool shows you their option. We show you all of them against one requirement.

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

SRA-DIG-001 · Version 1.1 · Oct 10, 2026