

DOC-2026-347 — SynthIQ: DICOM Conformance Statement

Document number: DOC-2026-347 **Release version:** 1.0.3.200 **Version:** 6 **Product:** SynthIQ v1.0.3.200+
Family: Synth{} (Synthology Healthcare Solutions Group) **Audience:** Integrating vendors, customer IT, interoperability reviewers **Owner:** Synthology Healthcare Solutions Group, LLC (SHSG) **Cross-references:** - DOC-2026-351 (SynthIQ Installation Guide) - DOC-2026-348 (SynthIQ Hardware & Software Requirements) - DOC-2026-353 (SynthIQ End-User Guide) - DOC-2026-074 v2 (XyDromatics Router Conformance — sibling product; SynthIQ commonly sits IN FRONT of a Router pool; Router DOC-074 v2 §3.5 carries the matching Storage Commitment SCP/SCU role)

This statement is structured per **DICOM PS3.2 (Conformance) 2024c**.

1. Introduction

1.1 Revision History

Version	Date	Change
1	2026-05-14	Initial release (SynthIQ v1.0.0.5 — Synthology.Shared.Auth integration ship).
2	2026-05-29	DCR-2026-513: close Storage Commit documentation gap. Add §3.5 Storage Commitment SCP + reverse-association N-EVENT-REPORT SCU role (covers code already shipped in DCR-2026-394 / SynthIQ 1.0.0.45 + DCR-2026-398 / SynthIQ 1.0.0.46). Add §6.4 Storage Commit configuration. Remove stale “No Storage Commitment” entry from §9.2 Non-Conformances. Product header bumped to 1.0.0.46+.
3	2026-07-31	DCR-2026-2136 / RI-2026-424: GA re-cut for SynthIQ 1.0.2.196 (supersedes released 1.0.1.153). Masthead + current-capability version labels aligned to the 1.0.2.x series; reconciled the affinity-DB SQLCipher at-rest crypto (§5 / §6.3 / §8.2) as shipped-default since v1.0.0.10. DICOM-TLS + ATNA + Q/R remain reserved/planned for v1.1 (unchanged).
6	2026-08-06	RI-2026-485 / DCR-2026-2273: GA release alignment to 1.0.3.200 (release-marker; 3rd-tuple bump, build counter preserved; no product feature change, no term change). Masthead Release version + Product fields and current-shipping-series labels (1.0.2.x → 1.0.3.x) bumped; historical/provenance and reserved-v1.1 mentions unchanged.
### 1.2 Audience		

Engineers integrating SynthIQ with DICOM peers — modalities (upstream) and XyDromatics Router instances, PACS, VNAs, or any DICOM Storage SCP (downstream). Assumes DICOM familiarity at PS3.1–PS3.7 level.

1.3 Remarks

SynthIQ is the **Synthology Intelligent DICOM Load Balancer** — a real-time DICOM proxy that distributes inbound C-STORE traffic across a configurable **pool** of downstream DICOM Storage destinations using **study-affinity routing**: every Study Instance UID is pinned to a single backend for the configured window (default 96

hours), so prior images and follow-up images of the same study reliably co-locate. Routing decisions on cold studies use health-aware least-busy distribution.

SynthIQ's role in the information model is a **transparent pass-through Storage SCP** (upstream) + **Storage SCU** (downstream). **SynthIQ does NOT store DICOM Composite Objects at rest.** Payloads are streamed through; the only persistent state SynthIQ maintains is a small affinity record (SOP Instance UID hash + backend identifier + timestamps) in its local affinity database. **No PHI bodies, no image pixel data, and no clinical narrative text are persisted by SynthIQ.**

Customers requiring durable buffering with retry-after-outage semantics should deploy SynthIQ **in front of** a XyDromatics Router pool — Router provides spool-and-forward durability; SynthIQ provides intelligent distribution across the pool. This composition is the recommended reference architecture (see §9.3 Reference Architecture).

1.4 Terms and Definitions

Per PS3.3, plus SynthIQ-specific:

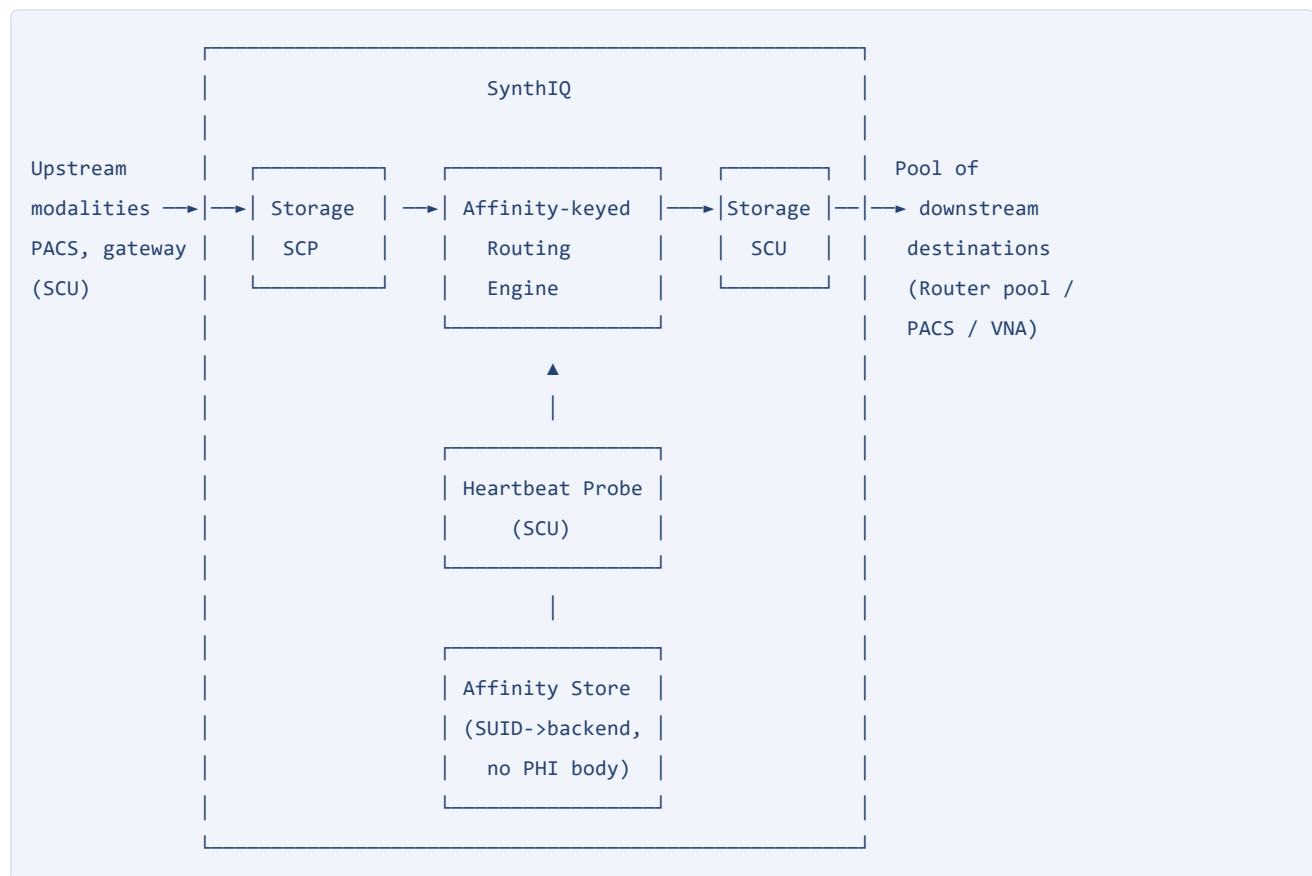
- **Pool** — a set of downstream DICOM Storage SCP destinations that share a single inbound listening port + AE Title. SynthIQ may host multiple pools simultaneously on distinct ports.
- **Backend** — an individual DICOM Storage SCP within a pool.
- **Affinity binding** — a persistent record that maps a Study Instance UID to one specific backend within a pool. Once bound, all instances of that study route to the same backend until the binding expires.
- **Affinity window** — the duration a binding remains valid (default 96 hours; configurable).
- **Routing tier** — the decision class for a given association:
 - Tier 1: persistent-affinity hit (existing binding found)
 - Tier 2: health-aware least-busy (new binding, all healthy backends in scope)
 - Tier 3: fallback (first-enabled-node when no healthy backend exists)

1.5 Conformance References

- DICOM PS3.1–PS3.18, 2024c
 - IHE ITI ATNA (audit) — planned for v1.1, not in 1.0.3.x
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2. Implementation Model

2.1 Application Data Flow



2.2 Functional Definitions

- **Storage SCP (upstream)** — receives C-STORE associations on a pool's listening port, honours the upstream's negotiated transfer syntax verbatim, and pipes each C-STORE request through to the selected backend.
- **Routing Engine** — evaluates the inbound study's affinity binding (Tier 1) or, on miss, picks a backend via health-aware least-busy (Tier 2) or the first-enabled-node fallback (Tier 3). Records the new binding. Holds per-association SUID→backend cache for the duration of the association.
- **Storage SCU (downstream)** — opens (or reuses, see §3.2.2) an SCU association to the selected backend and re-issues the C-STORE.
- **Heartbeat Probe (SCU)** — every configurable interval (default 5 s) polls each backend's HTTP `/api/health` endpoint to refresh health state; backend's DICOM-side reachability is implicit (backends mark themselves unhealthy in their own HTTP health endpoint when their DICOM SCP is offline).
- **Verification SCP/SCU** — C-ECHO both directions.

2.3 Sequencing of Real-World Activities

1. Upstream AE opens DICOM association on a pool's listening port (default 11112/tcp; configurable per pool).
2. SynthIQ negotiates presentation contexts per §3.1.2.5.
3. On C-STORE request, the routing engine:
4. **First instance in association** — performs full routing decision (Tier 1 → Tier 2 → Tier 3 fallback). Records affinity binding if this is a new study.
5. **Subsequent instances** — uses the per-association SUID→backend cache (sub-millisecond lookup; no affinity-store DB round-trip).
6. C-STORE is **synchronously** forwarded to the selected backend over a pooled SCU association (see §3.2.2). The backend's C-STORE response status is propagated **verbatim** back to the upstream AE. SynthIQ does **not** synthesize Success responses on the upstream side until the backend has acknowledged.
7. On backend reject / C-STORE failure, the failure status propagates to the upstream AE. SynthIQ does NOT retry failed C-STOREs (no spool); the upstream is expected to retry per its own logic.
8. Association lifecycle: SCU pooled connections are held open for the inbound association's lifetime; they close cleanly on inbound `A-RELEASE-RQ`, `A-ABORT`, or TCP teardown.

3. AE Specifications

3.1 Storage SCP AE

3.1.1 SOP Classes Supported

SynthIQ accepts **all Storage SOP Classes** (PS3.4 Annex B) — the SCP does not enforce an abstract-syntax whitelist. Any Abstract Syntax offered by the association initiator will be evaluated against the transfer-syntax list in §3.1.2.5.2 and accepted if at least one common transfer syntax exists.

Additionally supported as SCP:

SOP Class	UID
Verification	1.2.840.10008.1.1

3.1.2 Association Policies

3.1.2.1 General

- **Maximum PDU size (received):** 16,384 bytes default; configurable via `SynthIQ:Pools[] .MaxPDULength` up to **131,072 bytes**.
- **Maximum number of simultaneous inbound associations per pool:** 64 (configurable; soft limit, hardware-bound).

3.1.2.2 Number of Associations

- Inbound, simultaneous, per pool: 64 max (configurable).

- Outbound (SCU) per backend per inbound association: 1 (pooled — see §3.2.2).

3.1.2.3 Asynchronous Nature

Asynchronous operations **NOT supported**. `MaxOpsInvoked = 1` , `MaxOpsPerformed = 1` .

3.1.2.4 Implementation Identifying Information

Field	Value
Implementation Class UID	1.2.826.0.1.3680043.10.1443.2
Implementation Version Name	SYNTHIQ_1_0

3.1.2.5 Presentation Contexts — Acceptance

3.1.2.5.1 Accepted Abstract Syntaxes

All Storage SOP Classes per PS3.4 Annex B.4, plus Verification (1.2.840.10008.1.1).

3.1.2.5.2 Accepted Transfer Syntaxes

Transfer Syntax	UID
Explicit VR Little Endian	1.2.840.10008.1.2.1
Implicit VR Little Endian	1.2.840.10008.1.2
Explicit VR Big Endian (retired)	1.2.840.10008.1.2.2
Deflated Explicit VR Little Endian	1.2.840.10008.1.2.1.99
JPEG Baseline (Process 1)	1.2.840.10008.1.2.4.50
JPEG Extended (Process 2 & 4)	1.2.840.10008.1.2.4.51
JPEG-LS Lossless	1.2.840.10008.1.2.4.80
JPEG-LS Near-Lossless	1.2.840.10008.1.2.4.81
JPEG 2000 Lossless	1.2.840.10008.1.2.4.90
JPEG 2000	1.2.840.10008.1.2.4.91
RLE Lossless	1.2.840.10008.1.2.5

SynthIQ performs **NO transcoding**. The transfer syntax negotiated on the upstream side is the transfer syntax offered to the downstream backend during SCU negotiation. If the backend does not accept that transfer syntax, the inbound C-STORE fails and the failure status propagates to the upstream.

3.1.2.6 Extended Negotiation

Not supported.

3.1.2.7 SOP-Specific Conformance

- **Verification:** standard. SynthIQ responds Success unconditionally if at least one downstream backend in the addressed pool is healthy. If the entire pool is unhealthy, SynthIQ accepts the C-ECHO but responds with a warning (not failure — C-ECHO is a connectivity ping, not a routing test).
- **All Storage SOP Classes:** SynthIQ pipes the DICOM dataset through verbatim, byte-for-byte. **SynthIQ does NOT modify any DICOM tag in transit.** Patient ID, Accession Number, Study UID, Series UID, SOP Instance UID, Specific Character Set, and every other element of the Composite Object are passed through untouched. Tag-morphing workflows belong on the XyDromatics Router downstream tier, not on SynthIQ.

3.2 Storage SCU (Forwarder)

3.2.1 SOP Classes Supported

SynthIQ SCU forwards whatever SOP Class was received on the SCP side. SynthIQ never synthesizes objects it did not receive.

3.2.2 Association Policies

- **Called-AE-Title:** per backend configuration (`SynthIQ:Pools[].Nodes[].CalledAe` ; no default). Required.
- **Pooled SCU associations:** for each (inbound-association × backend) pair, SynthIQ opens **exactly one** outbound SCU association and reuses it for the duration of the inbound association. The `AssociationLingerTimeoutInMs` is 30 s; if no further C-STORE is routed to a given backend within that window the SCU connection closes. This pattern delivers ~24× throughput vs. unpooled per-instance associations (measured ~24 instances/sec single-pool three-backend pool on commodity hardware).
- **Transfer syntax preference order:** matches what the upstream negotiated (no transcoding — see §3.1.2.5.2).
- **On association reject / C-STORE failure:** SynthIQ does NOT retry. The failure status is forwarded to the upstream AE. (Retry is a durable-buffering semantic; SynthIQ is route-only.)

3.3 Verification SCU

SynthIQ does NOT issue DICOM-level C-ECHO heartbeats. Instead, SynthIQ polls each backend's HTTP `/api/health` endpoint on the configurable heartbeat interval (default 5 s). HTTP health is a strict superset of DICOM-level reachability for backends in the Synthology product family (each backend's HTTP `/api/health` endpoint reports DICOM SCP listener-bind state explicitly).

For non-Synthology backends without an `/api/health` endpoint, the operator configures `HealthUrl: ""` for that backend and SynthIQ treats it as **always healthy** — routing decisions for cold studies in pools containing such backends fall back to Tier 3 (first-enabled-node) rather than Tier 2 (least-busy).

3.4 Query/Retrieve

Not supported in 1.0.3.x — neither SCU nor SCP. SynthIQ is a forward-direction routing engine only; it does not host studies for query, and it does not initiate prefetch / scheduled-retrieve workflows. Customers requiring Q/R should integrate SynthIQ downstream of (or in parallel with) an XyDromatics Router or a PACS that hosts Q/R.

3.5 Storage Commitment SCP + reverse-association N-EVENT-REPORT SCU (v2; DCR-2026-394, DCR-2026-398)

SynthIQ accepts IHE TF RAD-10 / PS3.4 Annex J **Storage Commitment Push Model** N-ACTION requests on the dedicated Storage Commit listener (port 104 by default). This closes the Storage Commit workflow for modalities that pair C-STORE with a commitment verification N-ACTION on the same encounter.

3.5.1 SOP Classes

Role	SOP Class	UID	Action Type
SCP	Storage Commitment Push Model	1.2.840.10008.1.20.1	1 (request)
SCU	Storage Commitment Push Model (reverse)	1.2.840.10008.1.20.1	n/a (Event)

3.5.2 Behavior

1. Modality (or upstream PACS) opens an association on the Storage Commit listener port and proposes the Storage Commitment Push Model SOP class.
2. SynthIQ accepts the PC and returns **N-ACTION-RSP Success synchronously** (status 0x0000). The transaction UID, requested SOP-instance list, and the requesting AE's (host, port) are recorded.
3. SynthIQ then closes the inbound association cleanly. The commitment outcome is delivered asynchronously.
4. After a configurable **deferred-send delay** (default ~2 s; see §6.4), SynthIQ opens a **reverse association** as **SCU** to the requesting AE's Storage Commitment SCP listener and sends **N-EVENT-REPORT-RQ** with success / failure SOP-instance lists. The delay is required to let the requesting AE's SCP listener attach; reducing it risks ASSOCIATE-RJ on slow networks.
5. The receiving SCP returns N-EVENT-REPORT-RSP; SynthIQ then closes the reverse association.

3.5.3 Address resolution for the reverse association

The requesting AE's host:port pair is resolved in this order:

1. Operator-configured destination address (if any matching destination row carries an explicit `storage_commit_callback_host` + `_port` field).
2. Fallback: the inbound association's `RemoteHost` paired with the well-known IHE Storage Commit reverse-association port **104**.

The fallback path is the **default** in v1.0.0.46+ (DCR-2026-398) — no operator action is required at first deploy. Pre-.46 code paths required a Sources-table entry per upstream AE; this is no longer necessary.

3.5.4 Operator-visible signals

Surface	Entry	When
Audit log	<code>storage_commit.n_action_received</code>	N-ACTION accept time, with calling AE + transaction UID
Audit log	<code>storage_commit.n_event_report_sent</code>	After deferred-send timer fires; carries success / partial / failure status
Journal (verbose)	<code>[StorageCommit] N-ACTION accepted from {ae} txn={uid}</code>	At N-ACTION accept
Journal (verbose)	<code>[StorageCommit] N-EVENT-REPORT sent txn={uid} status={success\ partial\ failure}</code>	After deferred-send completes
<code>/api/health.checks.storage_commit</code>	<code>{pending: [...], sent_24h: N, failed_24h: N}</code>	Always

3.5.5 Forwarding semantics

The Storage Commit SCP role on SynthIQ is **independent of** backend routing. SynthIQ does NOT propagate N-ACTION to a Router pool member; the commitment claim is satisfied locally based on the fact that C-STORE arrived and was accepted by SynthIQ (which guarantees the routing pipeline received the instance). Backends that themselves offer Storage Commitment (e.g., XyDromatics Router per DOC-2026-074 v2 §3.5) operate independently on their own AE + listener. **Commit-of-commit is explicitly out of scope** — SynthIQ does NOT act as a Storage Commit SCU toward downstream backends.

4. Communication Profiles

4.1 Supported Communication Stacks

DICOM Upper Layer on TCP/IP (PS3.8). IPv4 and IPv6 both supported. DICOM on shared physical media (PS3.10) **NOT supported**.

4.2 TLS

DICOM-TLS (PS3.15 Secure Transport Connection) is **NOT supported in 1.0.3.x**. Planned for v1.1. Customers requiring encryption today should:

- Tunnel via IPsec or VPN at the network layer, OR
- Deploy a TLS-terminating proxy in front of SynthIQ, OR
- Restrict DICOM traffic to a private VLAN.

4.3 Physical Media

Ethernet (any speed). No constraints beyond standard TCP/IP.

5. Extensions, Specializations, Privatizations

No DICOM extensions. Three SynthIQ-private mechanisms worth noting:

1. **Study-affinity routing** — SynthIQ persists a `(StudyInstanceUID hash, pool, backend, first_seen, last_seen, instance_count, committed)` row per study for the affinity window. Bindings are keyed by SHA-256 hash of the StudyInstanceUID (the UID itself is not stored in cleartext at-rest under the v1.0.0.4+ at-rest crypto scheme; the full row is SQLCipher-encrypted under scope `SynthIqAffinityDb`, shipped as the default since v1.0.0.10).
 2. **Per-association SUID cache** — within a single inbound association, the second-through-Nth instances of a study skip the affinity-DB round trip via an in-memory map. This is internal and not user-observable except through the cache-hit-rate KPI on the admin dashboard.
 3. **HTTP-based backend health probe** — see §3.3. Synthology-family backends (XyDromatics Router, VNA, etc.) expose a richer health surface than DICOM-level C-ECHO would provide: per-backend queue depth, last-write timestamp, disk-pressure state, etc. SynthIQ's routing engine consumes those fields to make richer Tier 2 decisions than C-ECHO alone could support.
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6. Configuration

6.1 AE Title / Port (per pool)

- **Default Listener AE Title:** `SYNTHIQ` (configurable per pool via `SynthIQ:Pools[].ListenAeTitle`).
- **Default SCP port:** 11112/tcp (configurable per pool via `SynthIQ:Pools[].ListenPort`). Multiple pools may run on multiple ports simultaneously within one SynthIQ instance.
- **Inbound firewall rule:** created automatically by MSI on Windows; Linux installs require manual `ufw` / `firewalld` configuration.

6.2 Pools and Backends

Each pool binds one listening port + AE Title to a list of backends. Each backend is configured with:

Field	Type	Required	Default	Purpose
Id	string	yes	—	Stable backend identifier; persisted in affinity DB
Name	string	no	(=Id)	Display label for admin UI
Host	string	yes	—	DICOM SCP host/IP
Port	int	yes	—	DICOM SCP port
CalledAe	string	yes	—	Backend's advertised AE Title
HealthUrl	string	no	""	HTTP health-probe URL; empty = always-healthy
Enabled	bool	no	true	Master enable flag

Pool-level settings include `AffinityMode` (`study` , the default; or `patient` , reserved for v2), `MaxPDULength` , and routing-policy knobs.

6.3 Affinity Cache

- **Window:** default 96 h (configurable via `StudyCacheWindowHours`).
- **Purge schedule:** daily 02:00 local (`StudyCachePurgeCron`).
- **Backend store:** SQLite (default), PostgreSQL, or SQL Server (selected via `StudyCache.Provider`). The metadata schema is identical across backends — migration between them is supported via a documented `INSERT ... SELECT` script.
- **At-rest encryption:** see §5.1; the SQLite file at `{dataDir}/study-affinity.db` is SQLCipher-encrypted under scope `SynthIqAffinityDb` — shipped as the default since v1.0.0.10.

6.4 Storage Commitment configuration (v2; DCR-2026-394, DCR-2026-398)

Key	Type	Default	Purpose
<code>storage_commit_listener_port</code>	int	104	TCP port for the dedicated Storage Commit SCP listener. Set 0 to disable the listener entirely (the SOP class becomes non-supported on the wire).
<code>storage_commit_listener_ae_title</code>	str	(defaults to pool <code>ListenAeTitle</code>)	AE Title advertised by the Storage Commit listener. Distinct from the pool's main C-STORE AE so a multi-tenant SyntheQ instance can carry per-tenant commit AEs if desired.
(hard-coded) deferred-send delay	—	~2 s	Delay between N-ACTION accept + reverse-association open. Per DCR-2026-393 §4.3 this delay is required to let the requesting SCU's SCP listener attach; not operator-tunable in v1.0.0.46. Future versions may expose it.
(per-destination override, optional)	str / int	unset	Future: <code>storage_commit_callback_host</code> + <code>_port</code> per destination row for explicit address resolution overrides. Resolution falls back to the inbound <code>RemoteHost</code> + port 104 when unset (DCR-2026-398).

Firewall rules: the Storage Commit listener requires port 104/tcp **inbound** to be reachable from modalities/PACSeS that emit N-ACTION. The reverse-association leg requires **outbound** TCP to the requesting AE's commit SCP listener (typically also 104/tcp on the modality side, occasionally a vendor-specific port — verify per modality's conformance statement).

Disabling Storage Commit entirely: set `storage_commit_listener_port = 0`. The listener will not bind; any N-ACTION request from a modality receives `ASSOCIATE-RJ` (no negotiated PC) — the modality's commit workflow will fail loud, not silently mis-acknowledge.

7. Support of Character Sets

SyntheQ **preserves** `(0008,0005) Specific Character Set` as received; it does not recode any PHI element. ISO-IR 6 (default), ISO-IR 100 (Latin-1), ISO-IR 192 (UTF-8), and multi-byte sets (ISO 2022 series, GB18030) all pass

through intact.

8. Security

8.1 Network

- **Service identity:** runs as `LocalSystem` on Windows (configurable to a domain account at install time) or as the `synthiq` system user on Linux (created by the package's `useradd` postinst).
- **DICOM-TLS:** not supported in 1.0.3.x (see §4.2).
- **Admin HTTP surface** (port 5106/tcp by default): see §8.3.

8.2 At-Rest Crypto

SynthIQ uses the unified Synthology IKeyEscrow architecture (DOC-2026-306 / SPEC-2026-005) for at-rest secret protection:

- **users.json** (admin/operator/viewer local accounts): encrypted-at-rest at scope `SynthIqUsersJson` (v1.0.0.4+).
- **JWT signing key** (bearer-token issuance): derived per-login via `LegacyKeyAdapter.GetKeyAsync(SynthIqApiTokens)` (v1.0.0.4+).
- **Machine-local fallback key** (`synthiq.local.key`): 32-byte random key auto-generated on first run, atomic-write. Used when IKeyEscrow has not yet been activated by the customer (no customer master-key file present).
- **study-affinity.db** (SQLCipher at-rest; shipped as the default since v1.0.0.10): scope `SynthIqAffinityDb`, 5-case state machine for migration of existing plain-SQLite installs (mirrors SR Engine 1.0.0.25 / IPE 1.0.0.22 patterns).
- **No DICOM Composite Objects are persisted at rest**, by design.

8.3 Admin HTTP Authentication (v1.0.0.5+)

The admin dashboard + JSON API at `http://<host>:5106/` enforces authentication on every `/api/*` endpoint except `/api/version` and `/api/health` (anonymous-accessible for liveness probes). Two mechanisms supported:

- **Cookie session** — login via the branded `/login.html` form; 8-hour idle timeout.
- **Bearer token** — `POST /api/auth/login` returns a JWT (HMAC-SHA256, signing key per §8.2); subsequent calls include `Authorization: Bearer <jwt>`.

RBAC via 18 permission keys across 4 groups (View / Operate / Administer / System), 3 canonical built-in roles (admin / operator / viewer), and admin-extendable custom roles via the role matrix overlay at `{dataDir}/role_matrix.json`.

The DICOM SCP listener (11112/tcp) has NO authentication. Calling-AE whitelist + IP pinning at the DICOM layer is reserved for a future Synthology.Shared.Dicom audit module; today, deployments should restrict DICOM ingress at the network layer.

8.4 Audit

ATNA audit emission is planned for v1.1. Current 1.0.3.x logs all routing decisions to the SynthIQ service log file (`{dataDir}/logs/synthiq-YYYY-MM-DD.log`) with structured fields (association ID, source AE, destination backend, decision tier, SUID hash) — non-ATNA-compliant but operator-useful for incident review.

9. Annexes

9.1 Abstract Syntaxes (abbreviated)

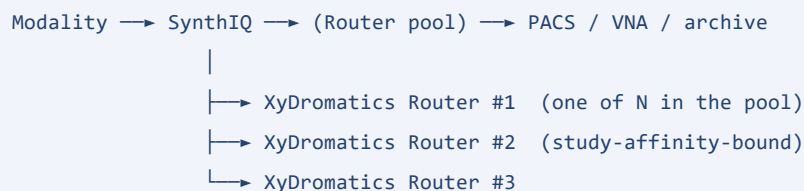
Because SynthIQ accepts **all Storage SOP Classes**, a full enumeration is omitted. Consult PS3.4 Annex B.4 for the authoritative list. Every Storage SOP Class listed there is accepted by SynthIQ SCP at negotiation time provided at least one transfer syntax from §3.1.2.5.2 is offered.

9.2 Non-Conformances

- No DICOM-TLS (1.0.3.x — planned v1.1)
- No DICOM Worklist (SCP or SCU)
- No Query/Retrieve (SCP or SCU)
- No Hanging Protocol, no Structured Reporting Authoring
- No Media Storage (PS3.10)
- No Extended Negotiation
- No DICOM-level Calling-AE whitelist (today — reserved for future Synthology.Shared.Dicom audit module)
- No on-the-fly transcoding (by design — see §3.1.2.7)
- No at-rest storage of DICOM Composite Objects (by design — see §1.3)
- No retry-after-failure (by design — see §3.2.2)

9.3 Reference Architecture

Recommended composition for production deployments requiring durable buffering, tag-morphing, or query/retrieve:



Each Router in the pool provides its own spool-and-forward buffering, tag-morphing, Q/R, etc. SynthIQ provides the cross-router intelligent distribution so prior+follow-up studies co-locate, while each Router provides per-node DICOM-protocol features.

Review cycle: 1 year, OR on any of: new SOP class category support, DICOM-TLS addition, Q/R SCP / SCU addition, Storage Commitment addition, Extended Negotiation support, tag-mapping semantics addition, ATNA audit transport addition. **Next review due:** 2027-08-01.

Drafted 2026-05-14 as the SynthIQ release-readiness gate 3 deliverable. Registered in SynthQMS document control as DOC-2026-347. Reissued for the SynthIQ 1.0.3.200 GA re-cut (DCR-2026-2273 / RI-2026-485).

Regulatory classification. Non-device software under the FD&C Act §520(o)(1)(D) software exclusion. This statement is published by Synthology Healthcare Solutions Group, LLC as a controlled document; the authoritative version is the approved record in the Synthology quality-management system.