— CHAPTER 01 · COLD OPEN

# FHIR in 2026 — and why *R4* is still the answer.

Every pre-2024 tutorial tells you to ship on the latest FHIR version. In 2026 that advice is wrong. Epic and Oracle Health both declined to commit to R5, the industry is waiting for R6, and R4 is the only realistic production target through roughly 2031. That is the story we unpack.

**What this topic covers**

- Spec lineage
- The 2026 surprise
- Mental model
- What FHIR is NOT

— CONCEPT · SPEC LINEAGE

# From HL7 v2 in 1989 to FHIR R6 ballot in 2026.

Thirty-seven years of healthcare interoperability standards — and one inflection in 2019.

• 1989

### HL7 v2

Pipe-delimited messages. Still runs most lab feeds in production today.

• 2005

### HL7 v3 / CDA

XML-heavy RIM model. Adopted narrowly; CDA survives for clinical documents.

• 2014

### FHIR DSTU

Grahame Grieve's REST + JSON reboot. The first standard that web developers could read.

• OCT 2019 · ACTIVE

### FHIR R4

First normative release. The version every regulator, EHR vendor, and SMART app speaks today.

• MAR 2023

### FHIR R5

Published — but Epic and Oracle Health declined to commit. Effectively skipped at vendor scale.

• JAN 2026 · BALLOT

### FHIR R6

Currently in ballot. Industry consensus: R4 → R6 direct path. Production migration ~2028 onward.

• You ship on R4

• R6 ballot in flight · 2026

— THE 2026 SURPRISE

# R5 shipped. Then the two largest EHRs said no.

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MAJOR EHR VENDORS COMMITTING TO R5

Of the top five US EHRs by installed base — Epic, Oracle Health (Cerner), Meditech, Allscripts, Athena — none has published an R5 commitment.

**~2031**

EARLIEST REALISTIC R6 PRODUCTION MAJORITY

R6 ballot January 2026 · normative ~2027 · early adopters 2028 – 2029 · majority production ~2031.

**R4**

THE ONLY PRODUCTION TARGET TODAY

Every EHDS exchange, every TEFCA FAST endpoint, every US Core 7 profile — all R4. Build on R4.

**Ava**

Both. Epic said no to R5 — that decided it for the rest of us.

**Marcus · production scar**

— COMPARISON · THE VERSION DECISION

# R4 · R4B · R5 · R6 — which one ships today?

● R4 · 2019 · NORMATIVE

### Use this. Always.

Every regulator (ONC, EHDS, TEFCA) writes R4 conformance. Every EHR vendor speaks R4. Every HAPI release supports R4 as first-class.

● R4B · 2022 · MAINTENANCE

### Subscriptions only.

Patch release that ships the new Subscriptions framework. Use R4B only if you need server-sent FHIR subscriptions; otherwise stay on R4.

● R5 · 2023 · SKIPPED

### Do not target.

Epic and Oracle Health declined to commit. No EHDS or TEFCA mandate references R5. Building greenfield on R5 in 2026 strands the deployment.

● R6 · 2026 · BALLOT

### Watch, don't ship.

Ballot opened January 2026. Normative likely 2027. Plan a migration path from R4 — but production runs on R4 through ~2031.

● Ship · R4 ● Niche · R4B (subscriptions) ● Skip · R5 ● Watch · R6 ballot Jan 2026

— CONCEPT · FIVE-PILLAR MENTAL MODEL

# FHIR in five pillars — everything else is detail.

TRANSPORT

## REST + JSON

Plain HTTP verbs on resource URLs. Anything that speaks HTTP and JSON can read or write FHIR.

DOMAIN

## ~150 Resources

Patient, Observation, Encounter, Condition, Medication and ~145 more. Typed, versioned, with defined cardinality.

COMPOSITION

## Bundles

Transaction, batch, document, message, searchset. Atomic writes and grouped reads — same envelope shape every time.

VOCABULARY

## Terminology

CodeSystem, ValueSet, ConceptMap. Where SNOMED, LOINC, ICD-10 and RxNorm hang off the resource model.

CONSTRAINT

## Profiles

StructureDefinition narrows base resources to your jurisdiction — US Core, IPS, EHDS profiles. Validation is the contract.

Every chapter that follows lives inside one of these pillars. Chapter 2 dissects a resource. Chapter 4 builds bundles. Chapter 7 wires terminology. Chapter 9 ships profile validation.

— WHY NOW · REGULATORY PRESSURE

# Four regulators, four deadlines — all writing R4.

EU · EHDS 2025/327

## European Health Data Space

In force March 2026. Cross-border patient-summary exchange mandatory by March 2029. Conformance profile: FHIR R4 + IPS.

US · TEFCA FAST

## FHIR At Scale Taskforce

January 2026 production milestone. QHIN-to-QHIN FHIR exchange via TEFCA. R4 endpoints only.

US · ONC HTI-1

## Certified Health IT

Decision support, USCDI v3, and SMART-on-FHIR endpoints required for certification. R4 is the baseline.

US · US CORE 7.0.0

## Profile pack · mandatory

Current mandatory US implementation guide for ONC certification. Built on R4. No US Core release exists for R5.

- March 2026 · EHDS in force
- January 2026 · TEFCA FAST
- ONC HTI-1 certified
- US Core 7 mandatory

— SCOPE · HONEST BOUNDARIES

# What FHIR IS — and what it is NOT.

## FHIR IS

A REST API SPECIFICATION

### Verbs, URLs, status codes

An exchange contract — how systems read, write, and search clinical data over HTTP.

A DATA INTERCHANGE STANDARD

### JSON · XML · Turtle

A typed wire format with versioning, references, and a defined resource model.

A CLINICAL RESOURCE MODEL

### ~150 typed Resources

Shared semantics for Patient, Observation, Encounter and the rest of the clinical domain.

## FHIR is NOT

A DATABASE

### Bring your own storage

HAPI stores FHIR in Postgres. Aidbox uses Postgres + JSONB. Firely uses SQL Server. You choose the engine.

A WORKFLOW ENGINE

### No state machine

FHIR carries Task and ServiceRequest resources but does not orchestrate them. BPMN, Camunda, or your service layer drive workflow.

A SECURITY MODEL

### SMART-on-FHIR sits on top

FHIR defines no auth. OAuth 2.0 + SMART-on-FHIR scopes + UDAP layer above. The spec is intentionally transport-agnostic on identity.

— RECAP · THE COURSE SPINE

# Four frameworks. One FHIR-native stack.

What you will build across the next chapters: a production-shaped FHIR system, end to end.

SERVER

## HAPI FHIR

Open-source Java reference server. Postgres-backed JPA storage, validation, terminology, subscriptions.

BFF

## NestJS

Backend-for-frontend in TypeScript. Authentication, aggregation, audit logging, SMART scopes.

UI

## Next.js

React clinical UI with server components, streaming, and FHIR-typed forms.

AGENT

## MCP server

Model Context Protocol bridge that exposes FHIR resources as typed tools for LLM clients.

Ch 2 – 5 · HAPI

Ch 6 – 8 · NestJS BFF

Ch 9 – 11 · Next.js UI

Ch 12 · MCP agent

— TRY IT YOURSELF · 30 SECONDS

# One curl. One jq. A real FHIR R4 server.

The HAPI public sandbox at hapi.fhir.org runs a live R4 endpoint. Hit its capability statement to see the version, the software name, and how many resource types it serves.

— RUN THIS IN YOUR TERMINAL

**curl https://hapi.fhir.org/baseR4/metadata | jq '.fhirVersion, .software.name, (.rest[0].resource | length)'**

You should see `"4.0.1"`, the HAPI server name, and a count near 150 — the live resource catalogue. That is the surface area we spend the rest of the course mastering.

— NEXT CHAPTER

**Chapter 02 — Resource anatomy: Patient, Observation, and the typed model in detail.**

- hapi.fhir.org · public R4 sandbox
- Next · Ch 2 · Resource anatomy