Ceramic Early Access Technical Brief — October 2025

Ceramic is a modern electronic health record system designed specifically for independent physicians and small practices. Ceramic prioritizes speed, simplicity, and data integrity without sacrificing clinical functionality or compliance requirements.

This technical brief is designed to give you a look at Ceramic's commitment to security, data integrity, and speed.

For questions, email robert@tryceramic.com

Architecture and Performance

Frontend: React 18 with Next.js 14, optimized for sub-second page loads and instant data saves

Backend: PostgreSQL with server-side operations for security and consistency

State Management: TanStack Query (React Query) with intelligent caching strategies

Performance Benchmarks

- Note Saves: <200ms
- Page loads: <300ms for most views
- Chart data: <500ms for initial load, instant on return visits

The architecture uses server-side actions for all database operations, ensuring data never leaves the secure server environment unnecessarily. Client-side caching provides instant UI updates while background sync keeps data current.

Security and Compliance

HIPAA Readiness: Infrastructure hosted on Render with HIPAA-compliant PostgreSQL instances. All data encrypted at rest and in transit (TLS 1.3).

Access Controls

- Multi-tenant architecture with database-level Row-Level Security (RLS) policies
- Hard tenant scoping ensures organization data physically cannot cross organizational boundaries
- Audit logging for all ePHI access (who, what, when, why)
- Session-based authentication with configurable timeout policies

Security and Compliance (cont'd)

Data Protection

- Automated point-in-time backups with 7-day retention (expandable to 30+ days on production HIPAA tier)
- Soft-delete pattern preserves data integrity while allowing recovery
- All patient data operations logged for compliance auditing

> #### Early Access Constraints
>
> Patient creation is disabled during early access. All organizations are pre-loaded with realistic synthetic patient data for evaluation purposes. This allows thorough testing of clinical workflows without storing real PHI until BAA and production readiness procedures are complete.
>
> Early access is evaluation-only with synthetic patient data. Production use with real PHI requires completion of Business Associate Agreement and additional security procedures (targeted for Summer 2026).

Data Standards and Interoperability

FHIR R4 Implementation

Core clinical resources implemented using HL7 FHIR R4 specifications:

- Patient, Practitioner, Organization
- Encounter, Appointment, Task
- Condition, Observation, MedicationStatement, AllergyIntolerance
- DocumentReference, DiagnosticReport
- Financial resources (Coverage, Claim, ChargeItem)

Data Model Strategy

Ceramic stores data in FHIR-compatible formats internally, making future integrations straightforward. Each resource includes both standardized FHIR fields and practical extensions for clinical workflows.

Infrastructure & Vendors

Database: Render PostgreSQL

- HIPAA-compliant hosting with Business Associate Agreement
- Automatic backups and point-in-time recovery
- 99.95% uptime SLA
- US-based data centers

Infrastructure & Vendors (cont'd)

Authentication: Clerk

- Healthcare-grade authentication and session management
- Multi-factor authentication support
- HIPAA BAA available

Application Hosting: Vercel

- Edge-optimized content delivery
- Zero-downtime deployments
- HIPAA BAA available for Enterprise tier

Each vendor offers HIPAA compliance as a standard offering, not an afterthought. This infrastructure supports individual practices now and scales to larger organizations without requiring platform migration.

Key Technical Differentiators

Speed Through Smart Caching

TanStack Query manages a sophisticated client-side cache that predicts which data you'll need next. When you click on a patient, their chart is often already loaded before the page renders.

Server-Side Operations

All Ceramic database operations happen on secure servers. This prevents common security vulnerabilities and ensures consistent data validation.

Optimistic Updates

When you save a note or update a status, the UI updates instantly while the server confirms the change in the background. If something fails, changes roll back automatically with user notification.

Progressive Enhancement

The system works efficiently on slower connections by prioritizing critical data and deferring non-essential information.

We believe that these choices enable Ceramic to ship updates faster, maintain secure and standard infrastructure, and focus on what our user's need and want in a great EHR experience.