Wellness Agent AI: HIPAA Data Flow Diagram

Complete PHI Flow Analysis for HIPAA Compliance

Status: **COMPLIANCE READY**
Version: 1.0.0
Date: 2025-01-XX
Pattern: DATA × FLOW × HIPAA × COMPLIANCE × ONE

EXECUTIVE SUMMARY

This document provides a detailed data flow diagram showing where PHI flows through Wellness Agent AI, identifying:

- **PHI Status:** Whether data at each stage is PHI/ePHI
- **Vendor Status:** Whether third-party vendors are involved
- **BAA Status:** Whether Business Associate Agreements are required
- **Controls:** Security and privacy controls applied at each stage

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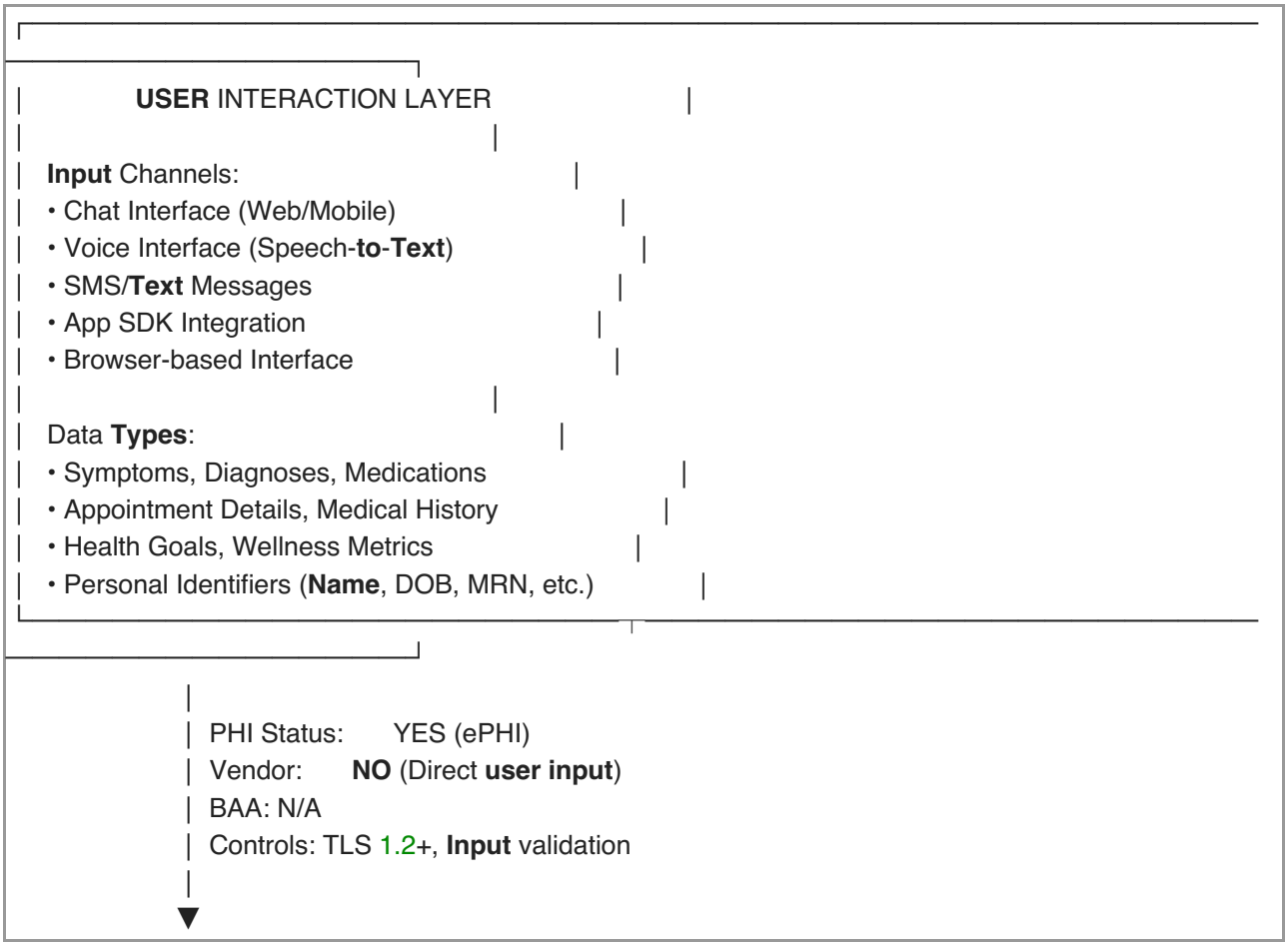
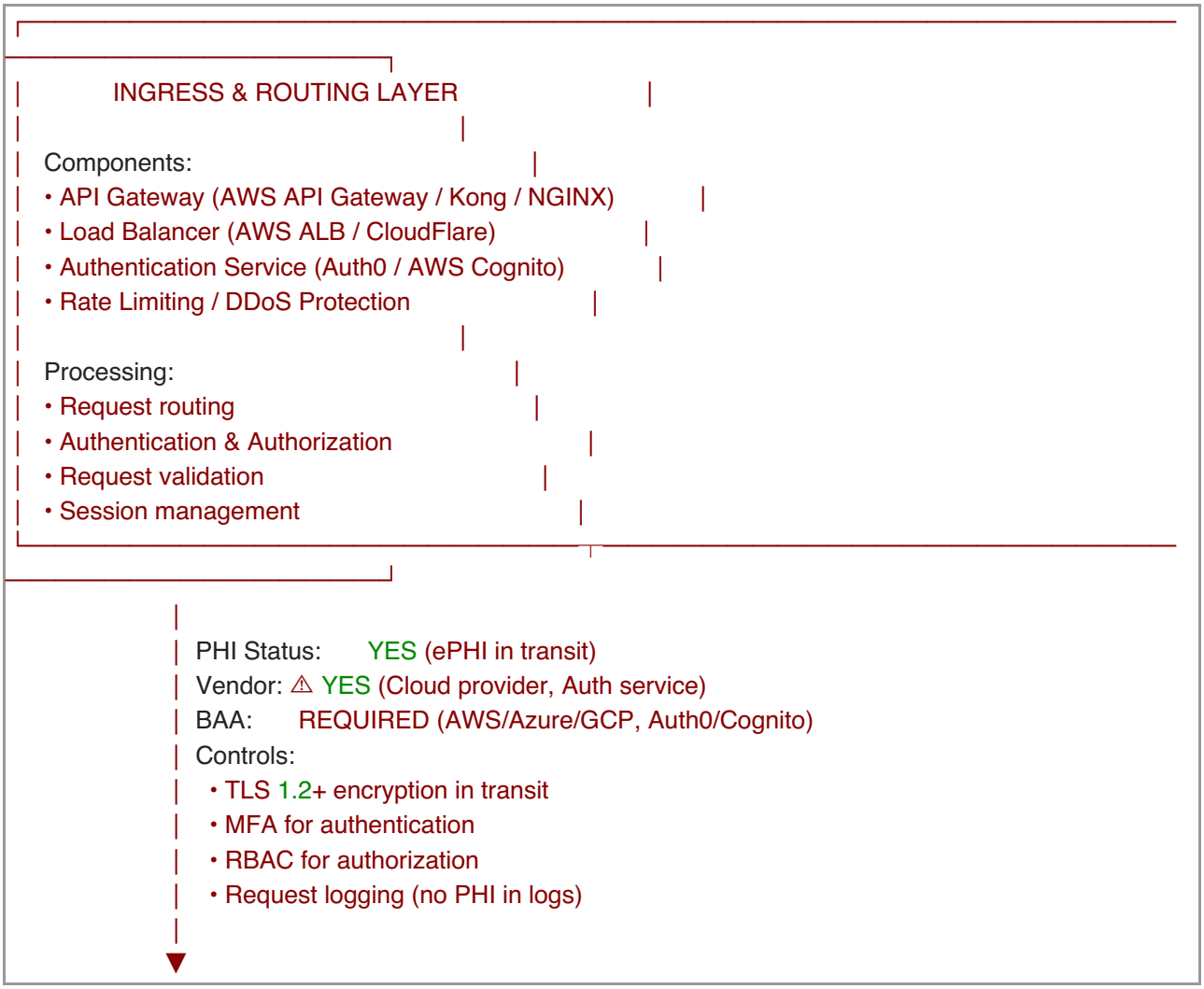
COMPLETE DATA FLOW ARCHITECTURE

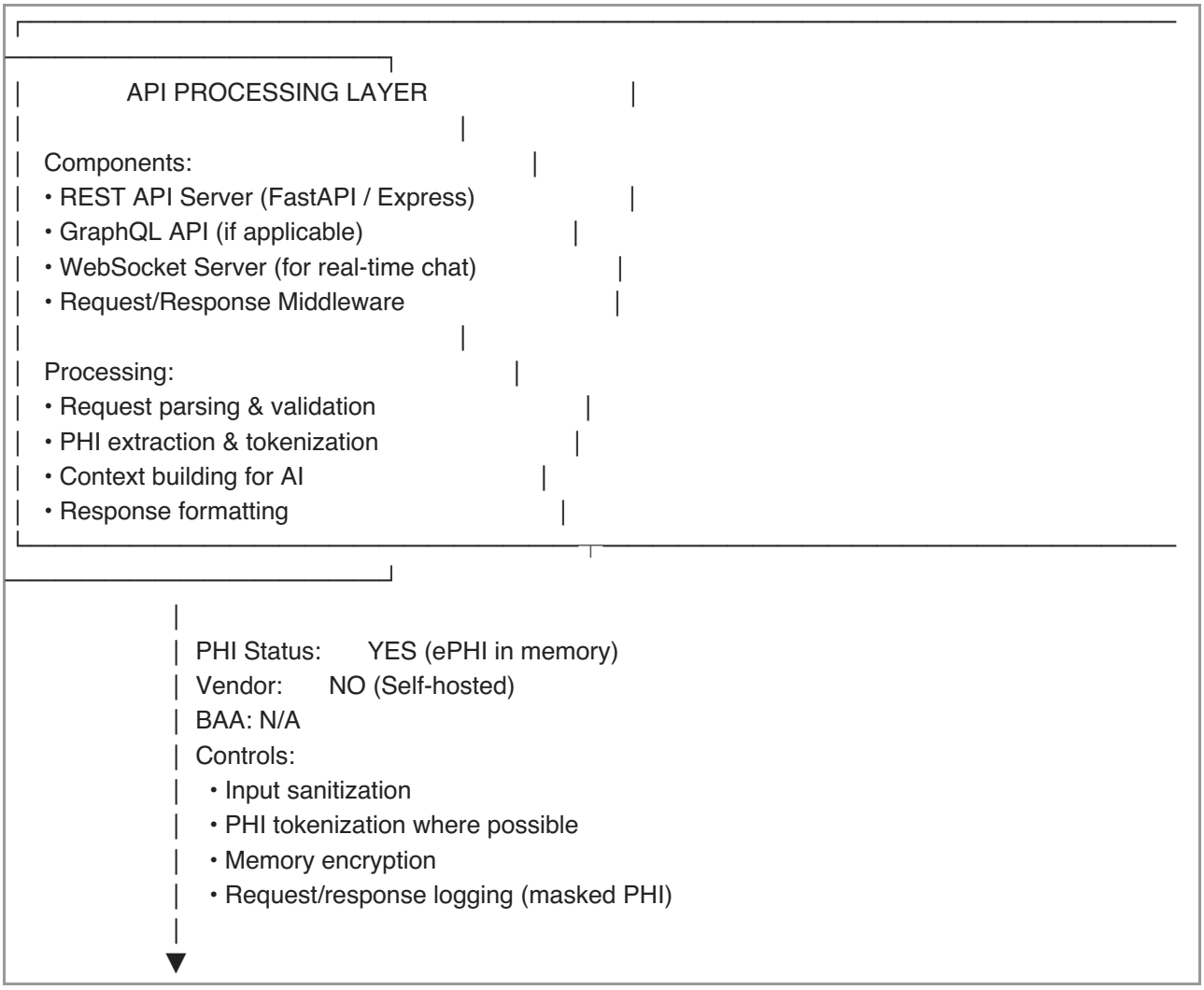
Stage 1: User Interaction Layer



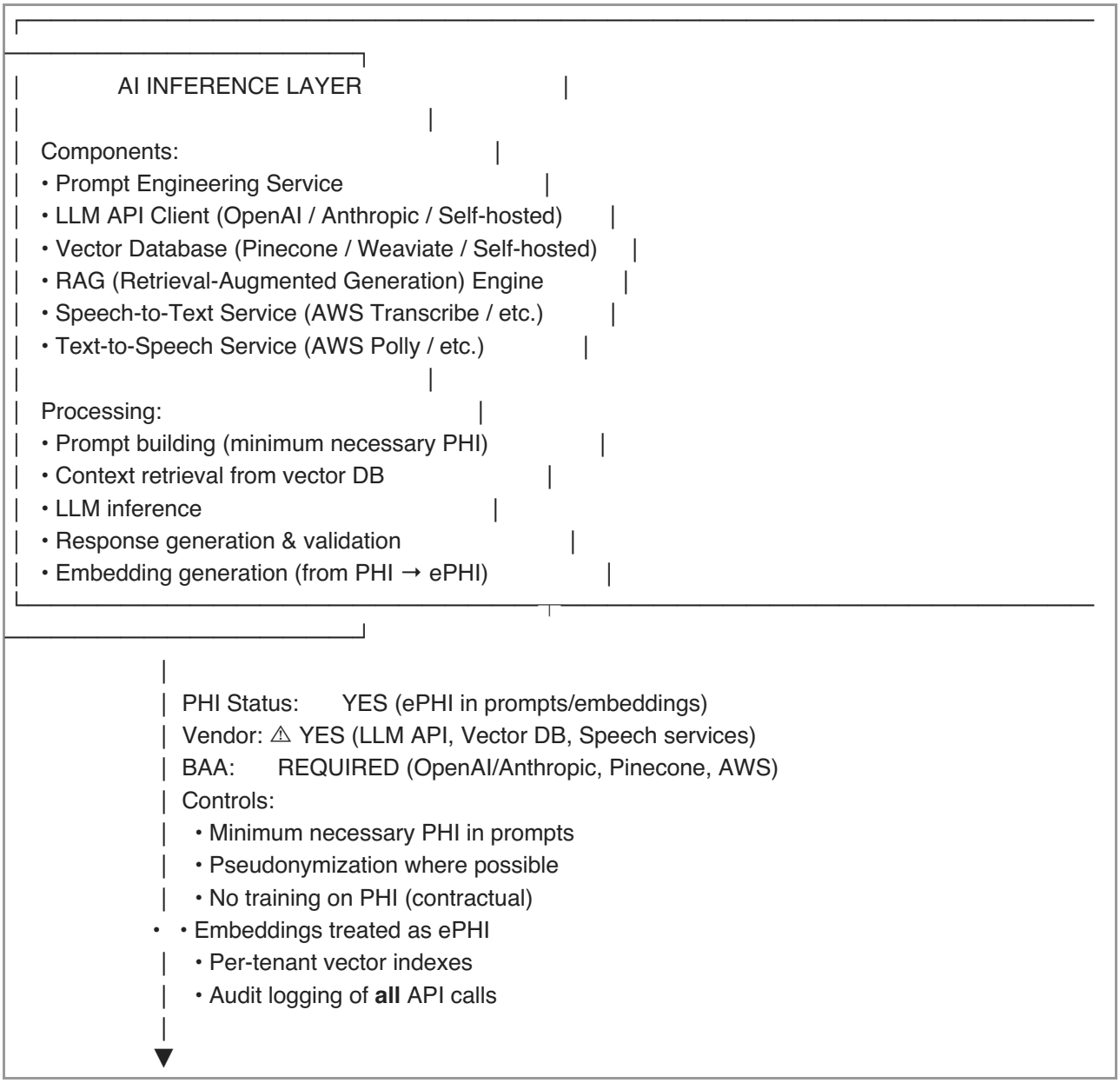
Stage 2: Ingress & Routing Layer



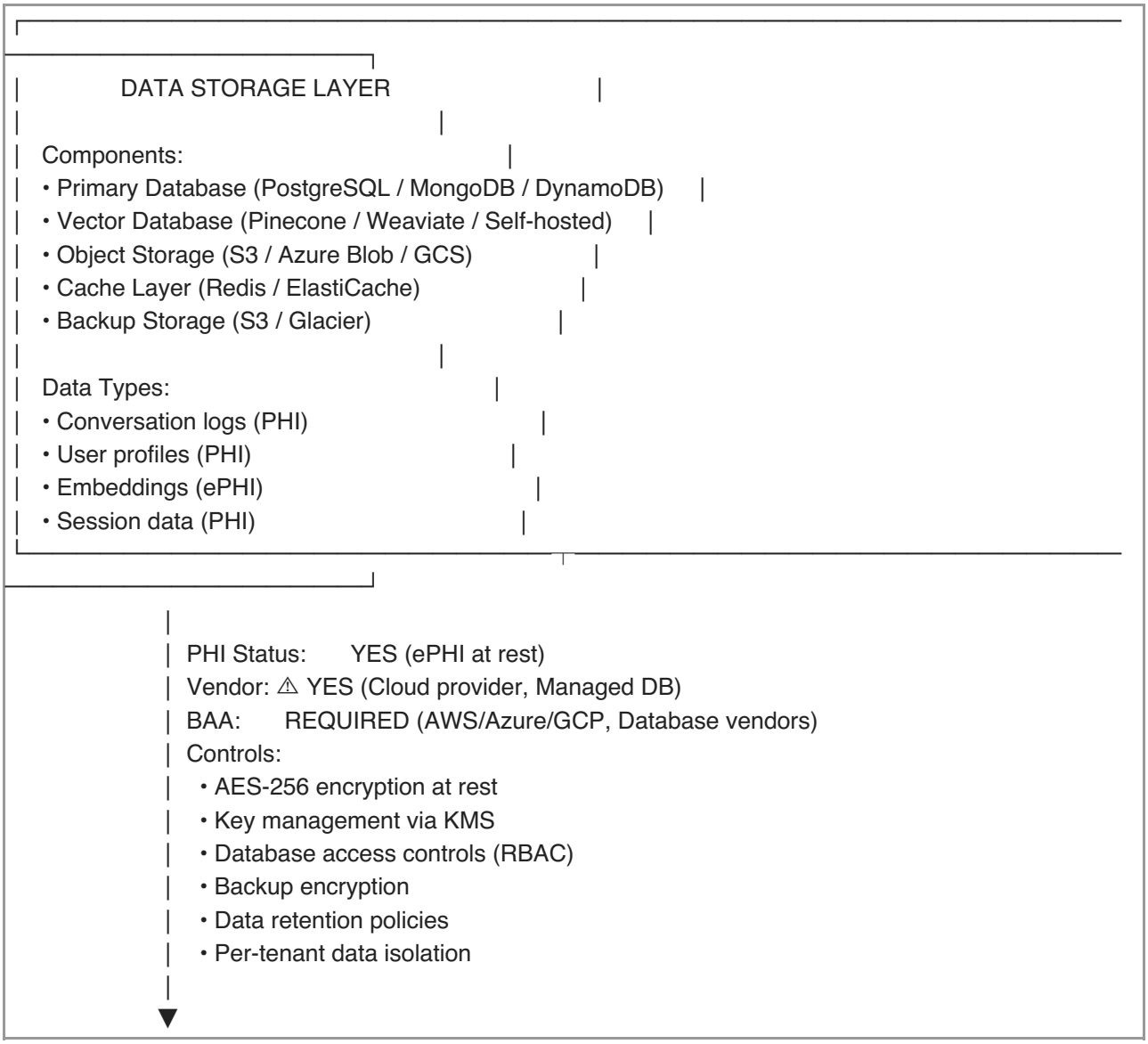
Stage 3: API Processing Layer



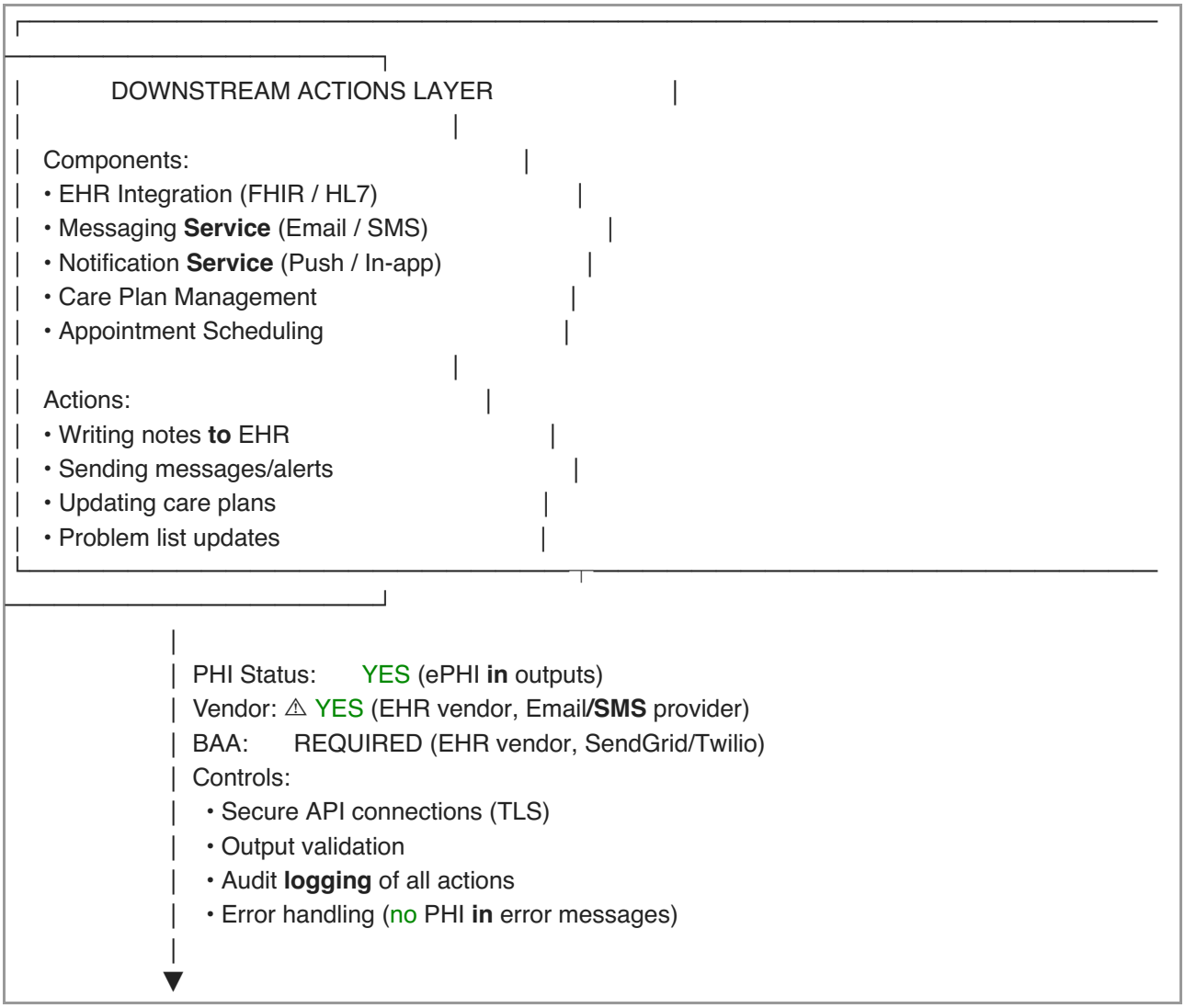
Stage 4: AI Inference Layer



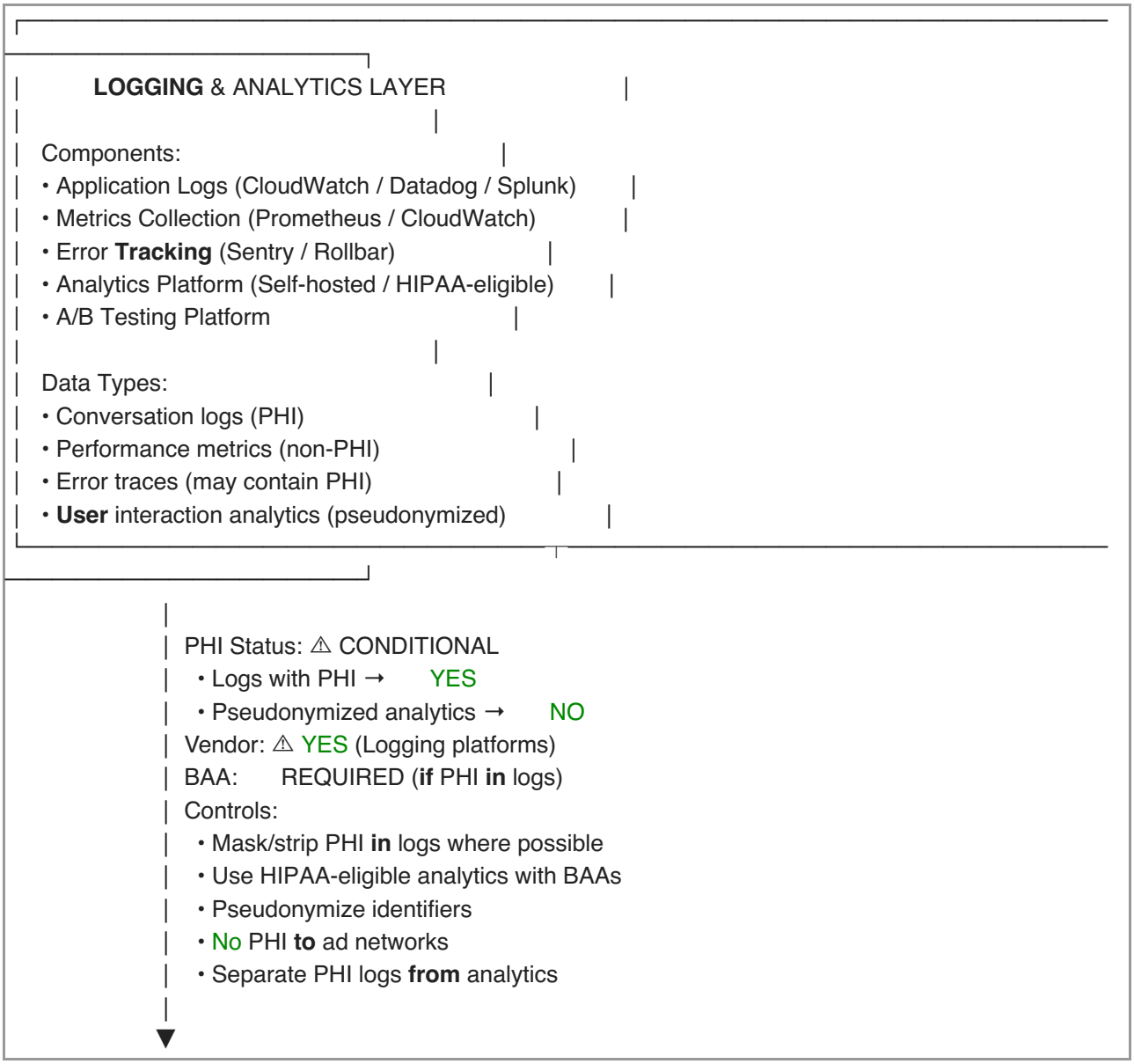
Stage 5: Data Storage Layer



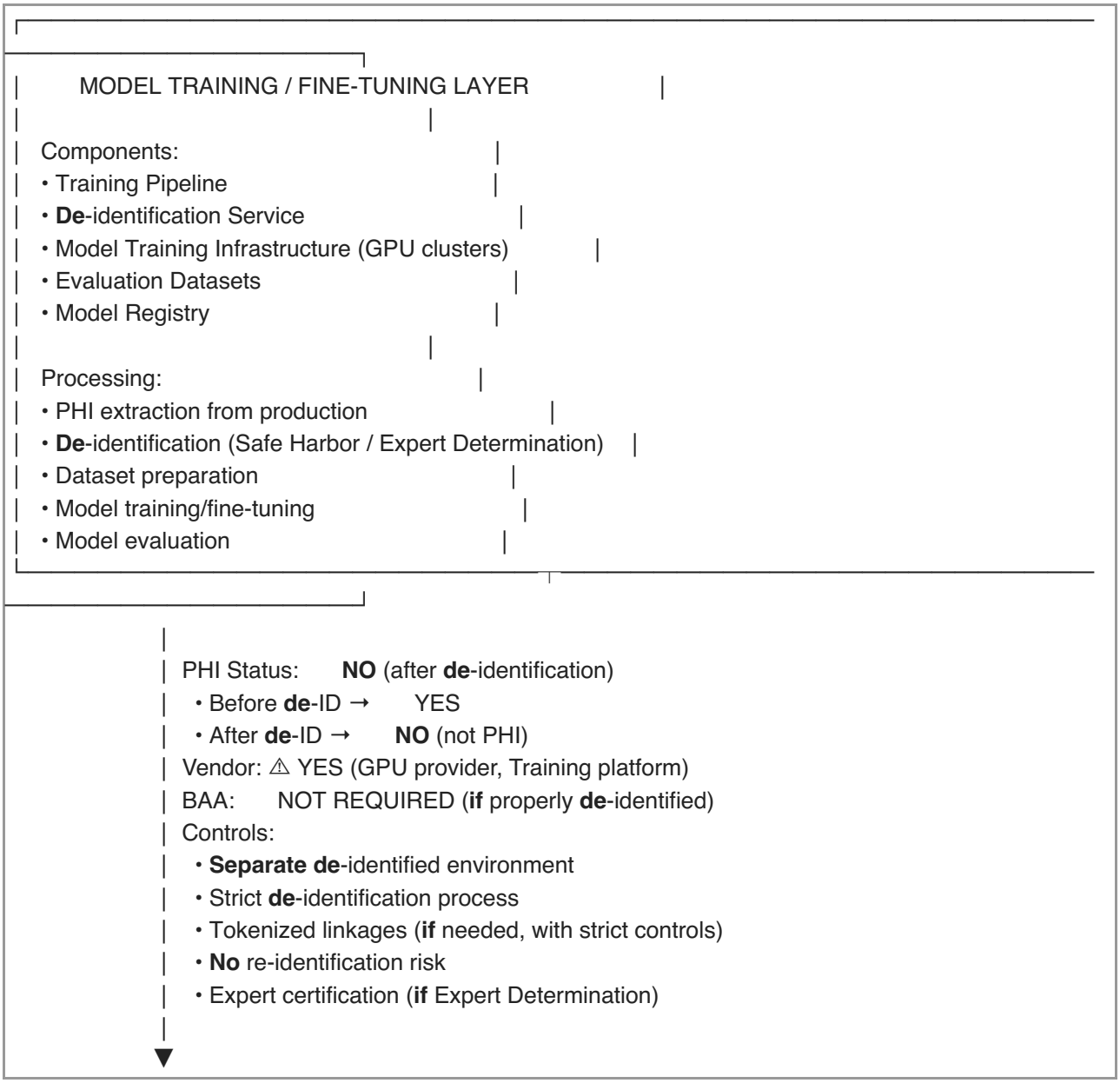
Stage 6: Downstream Actions Layer



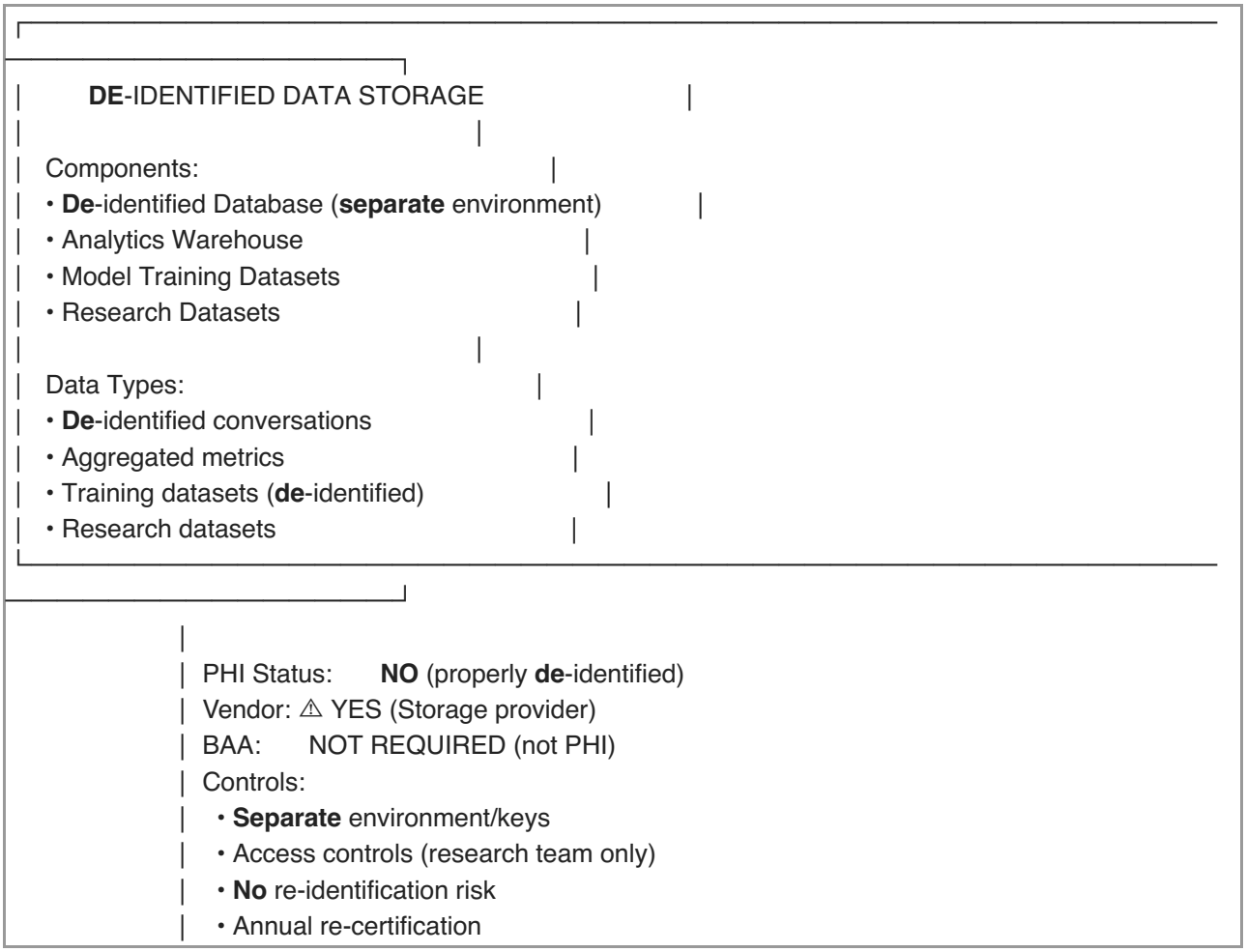
Stage 7: Logging & Analytics Layer



Stage 8: Model Training / Fine-Tuning Layer



Stage 9: De-Identified Data Storage



DATA FLOW SUMMARY TABLE

Stage	Component	PHI?	Vendor?	BAA Required?	Key Controls
1. User Interaction	Chat/Voice/SMS	Yes	No	N/A	TLS, Input validation
2. Ingress & Routing	API Gateway, Auth	Yes	⚠ Yes	Yes	TLS, MFA, RBAC
3. API Processing	REST/GraphQL API	Yes	No	N/A	Tokenization, Logging
4. AI Inference	LLM, Vector DB	Yes	⚠ Yes	Yes	Min necessary, No training
5. Data Storage	Database, S3	Yes	⚠ Yes	Yes	Encryption at rest, KMS
6. Downstream Actions	EHR, Messaging	Yes	⚠ Yes	Yes	Secure APIs, Audit logs
7. Logging & Analytics	Logs, Metrics	⚠ Conditional	⚠ Yes	If PHI	Mask PHI, Pseudonymize
8. Model Training	Training Pipeline	No (after de-ID)	⚠ Yes	No	De-ID, Separate env
9. De-ID Storage	Analytics DB	No	⚠ Yes	No	Separate keys, Access control

CRITICAL DATA FLOW DECISIONS

Decision Point 1: LLM Provider Selection

Question: Which LLM provider will we use?

Options:

- **Option A:** External LLM (OpenAI, Anthropic)
    - Requires BAA
    - No training on PHI (contractual)
    - ⚠ PHI leaves your infrastructure
    - ⚠ Higher compliance risk
- **Option B:** Self-Hosted LLM
    - No BAA needed (you control it)
    - PHI stays in your infrastructure
    - ⚠ Higher infrastructure costs
    - ⚠ You're responsible for all security

Recommendation: Start with Option A (external with BAA) for faster time-to-market, consider Option B for high-security deployments.

Decision Point 2: Analytics Platform

Question: How do we handle analytics without violating HIPAA?

Options:

- **Option A:** HIPAA-eligible analytics with BAA (e.g., AWS Analytics)
    - Can include PHI
    - Requires BAA
    - Full analytics capabilities
- **Option B:** Self-hosted analytics (e.g., PostHog self-hosted)
    - No BAA needed
    - Full control
    - ⚠ More infrastructure to manage
- **Option C:** Pseudonymized analytics (e.g., Google Analytics with no PHI)
    - No BAA needed
    - Easy to implement
    - ⚠ Limited analytics capabilities

Recommendation: Use Option A or B for production analytics, Option C for marketing analytics.

Decision Point 3: De-identification Method

Question: Safe Harbor or Expert Determination?

Options:

- **Option A:** Safe Harbor (remove 18 identifiers)
    - Clear checklist
    - Easier to implement
    - ⚠ May be too restrictive for free text
- **Option B:** Expert Determination
    - More flexible for free text
    - Better for AI/ML use cases
    - ⚠ Requires expert certification
    - ⚠ More complex

Recommendation: Start with Safe Harbor, move to Expert Determination for advanced use cases.

VENDOR DEPENDENCIES MAP

Critical Path Vendors (Must Have BAAs)

1. **Cloud Provider** (AWS/Azure/GCP)
    - **PHI Access:** Infrastructure hosting
    - **BAA Status:** Standard BAA available
    - **Risk Level:** High (hosts all data)
2. **LLM Provider** (OpenAI/Anthropic)
    - **PHI Access:** Prompts, responses
    - **BAA Status:** ⚠ Check availability
    - **Risk Level:** High (PHI in prompts)
3. **Vector Database** (Pinecone/Weaviate)
    - **PHI Access:** Embeddings (ePHI)
    - **BAA Status:** ⚠ Check availability
    - **Risk Level:** High (embeddings contain PHI)
4. **EHR Integration** (Epic/Cerner/etc.)
    - **PHI Access:** Full PHI exchange
    - **BAA Status:** Standard BAA
    - **Risk Level:** High (PHI exchange)
5. **Messaging Provider** (SendGrid/Twilio)
    - **PHI Access:** Messages may contain PHI
    - **BAA Status:** ⚠ Check availability
    - **Risk Level:** Medium (messages)

Secondary Vendors (BAA If PHI Present)

6. **Logging Platform** (Datadog/Splunk)
    - **PHI Access:** Logs may contain PHI
    - **BAA Status:** ⚠ Check availability

    - **Risk Level:** Medium (if PHI in logs)

7. **Authentication** (Auth0/AWS Cognito)
    - **PHI Access:** User identifiers
    - **BAA Status:** ⚠ Check availability
    - **Risk Level:** Low-Medium (identifiers)

8. **Error Tracking** (Sentry/Rollbar)
    - **PHI Access:** Error traces may contain PHI
    - **BAA Status:** ⚠ Check availability
    - **Risk Level:** Medium (if PHI in errors)

COMPLIANCE CHECKLIST BY STAGE

Stage 1: User Interaction

- [ ] TLS 1.2+ enabled on all endpoints
- [ ] Input validation implemented
- [ ] Rate limiting configured
- [ ] DDoS protection enabled

Stage 2: Ingress & Routing

- [ ] BAA signed with cloud provider
- [ ] BAA signed with authentication provider
- [ ] MFA enabled for all users
- [ ] RBAC implemented
- [ ] Request logging (no PHI)

Stage 3: API Processing

- [ ] PHI tokenization implemented
- [ ] Input sanitization
- [ ] Memory encryption
- [ ] Masked logging

Stage 4: AI Inference

- [ ] BAA signed with LLM provider
- [ ] BAA signed with vector DB provider
- [ ] Minimum necessary PHI in prompts
- [ ] Pseudonymization where possible
- [ ] No training on PHI (contractual)
- [ ] Per-tenant vector indexes
- [ ] Audit logging of API calls

Stage 5: Data Storage

- [ ] BAA signed with database provider
- [ ] BAA signed with object storage provider

- [ ] AES-256 encryption at rest
- [ ] KMS key management
- [ ] Database access controls (RBAC)
- [ ] Backup encryption
- [ ] Data retention policies
- [ ] Per-tenant data isolation

Stage 6: Downstream Actions

- [ ] BAA signed with EHR vendor
- [ ] BAA signed with messaging provider
- [ ] Secure API connections (TLS)
- [ ] Output validation
- [ ] Audit logging

Stage 7: Logging & Analytics

- [ ] BAA signed with logging platform (if PHI)
- [ ] PHI masking in logs
- [ ] Pseudonymized analytics
- [ ] No PHI to ad networks
- [ ] Separate PHI logs from analytics

Stage 8: Model Training

- [ ] De-identification pipeline implemented
- [ ] Separate de-identified environment
- [ ] Expert certification (if Expert Determination)
- [ ] No re-identification risk

Stage 9: De-Identified Storage

- [ ] Separate environment/keys
- [ ] Access controls
- [ ] Annual re-certification

CONCLUSION

This data flow diagram provides a complete view of where PHI flows through Wellness Agent AI. Use this to:

1. Identify all vendors that need BAAs
2. Determine security controls at each stage
3. Plan de-identification pipeline
4. Design audit logging
5. Create incident response procedures

Next Steps:

1. Review this diagram with your team
2. Complete vendor inventory
3. Obtain all required BAAs
4. Implement controls at each stage

5. Document in your risk analysis

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Status: **COMPLIANCE READY**
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