

FHIR Patient Portal - Microservice to User Story Mapping Report

Project Overview

Total User Stories: 79
Total Microservices: 11
Average Stories per Service: 7.2

1. HL7-PARSER-SERVICE

Stories Assigned: 8
Complexity: High (HL7 processing, FHIR transformation)

Story #	User Story Description
1	HL7 Message Ingestion - Receive HL7 v2 messages (ADT, ORU, ORM) over MLLP and HTTP
2	Message Parsing - Parse HL7 segments into JSON for FHIR transformation
3	Auto-Routing - Automatically detect HL7 message type and route to correct transformer
4	Mapping Configuration - Define mapping rules between HL7 segments and FHIR resources
5	Idempotency Control - Apply idempotency checks to avoid duplicate processing
6	Batch Processing - Support batch HL7 messages with partial success handling
7	Data Lineage - Persist raw HL7 and FHIR with correlation ID for audit
8	Error Handling - Log malformed messages and use dead-letter queue with retry

2. PATIENT-SERVICE

Stories Assigned: 9
Complexity: High (Core patient data, privacy, compliance)

Story #	User Story Description
9	Patient Registration - Register with demographic and insurance details
10	Profile Updates - Edit/update personal data including address and contact
11	Patient Search - Search patients by MRN, mobile number, or email
12	Record Merging - Merge duplicate patient records while keeping audit history
13	Fuzzy Search - Perform fuzzy search with minor typos or spelling errors
14	Data Export - Download longitudinal summary in PDF/CDA/FHIR Bundle
15	Multi-Tenant Isolation - Ensure tenant isolation between multiple clinics
16	Granular Consent - Control visibility of health record parts by role
17	Right to Erasure - Full anonymization and deletion of PII upon approval

3. OBSERVATION-SERVICE

Stories Assigned: 9

Complexity: Medium-High (Clinical data, LOINC mapping, analytics)

Story #	User Story Description
18	Vital Signs Entry - Enter vital signs (BP, SPO2, Pulse) through portal
19	Lab Results Integration - Ingest lab results via HL7 ORU^R01 to FHIR
20	Trend Visualization - View graphs of patient lab results over time
21	Code Mapping - Map custom lab codes to LOINC codes for standardization
22	Time-Series Analysis - View time-series charts grouped by category with unit conversion
23	Correlation Analysis - Correlate lab results, trigger alerts, annotate trends
24	AI Predictions - Predict lab abnormalities using trend and diagnosis data
25	Clinical Alerts - Alert when observations breach clinical thresholds
26	Batch Ingestion - Push hundreds of Observations via Bundle transaction

4. APPOINTMENT-SERVICE

Stories Assigned: 8

Complexity: Medium (Scheduling, availability, conflicts)

Story #	User Story Description
27	Appointment Booking - Schedule appointment with specific doctor
28	Rescheduling - Reschedule or cancel appointment if needed
29	Schedule Viewing - View all appointments by doctor/date
30	Real-time Availability - See real-time availability and book valid slots
31	Double Booking Logic - Allow double booking with specific rules
32	Auto-Expiration - Auto-expire "No Show" appointments and notify
33	Analytics Integration - View no-show rates and overbooking suggestions
34	Waitlist Management - Waitlist queue with notifications when slots open

5. USER-AUTH-SERVICE

Stories Assigned: 8

Complexity: High (Security, SSO, MFA, compliance)

Story #	User Story Description
35	User Login - Log in using email/mobile + password and receive JWT
36	User Registration - Register using mobile/email with OTP verification
37	Password Reset - Reset password securely using email/mobile
38	Multi-Factor Authentication - Enable MFA with TOTP for protection
39	SSO Integration - Login using hospital SSO via SAML or OAuth2
40	Session Management - Auto-expire sessions after inactivity with warning
41	Rate Limiting - Throttle login attempts per IP to prevent brute force
42	Security Logging - Log failed logins and access grants with IPs

6. ROLE-MANAGEMENT-SERVICE

Stories Assigned: 6

Complexity: High (RBAC, ABAC, delegation, external IAM)

Story #	User Story Description
43	Role Assignment - Assign/revoke roles like Doctor, Nurse, Patient, Admin
44	Permission Validation - Validate permissions before granting resource access
45	Role Delegation - Delegate RBAC management to department heads
46	External IAM Sync - Sync user-role mappings from external IAM systems
47	Attribute-Based Access - Define ABAC controls like facility matching
48	Temporary Permissions - Allow temporary elevated permissions with expiry

7. TELEMEDICINE-SERVICE

Stories Assigned: 7

Complexity: Medium-High (Video, compliance, access control)

Story #	User Story Description
49	Secure Session Access - Join telemedicine session via secure link
50	Doctor Interface - Start secure video call from appointment slot
51	Multi-Access Points - Start call from email, app, or QR code
52	Pre-Call Preparation - Preview patient summary before launching call
53	Time-Limited Access - Access limited to 10-minute window around appointment
54	Consent Management - Store consent acknowledgment before call
55	Quality Monitoring - Track call quality metrics and completion rate

8. NOTIFICATION-SERVICE

Stories Assigned: 6

Complexity: Medium (Multi-channel, templates, retry logic)

Story #	User Story Description
56	Reminder System - Send email/SMS reminders to patients and doctors
57	Medication Alerts - Trigger alerts based on prescription expiry
58	Retry Logic - Retry failed SMS/email alerts with exponential backoff
59	Template Management - Create and test different message templates
60	Channel Preferences - Choose preferred communication channels
61	Bulk Scheduling - Schedule bulk notifications for campaigns

9. ANALYTICS-SERVICE

Stories Assigned: 6

Complexity: High (ML/AI, predictive analytics, research)

Story #	User Story Description
62	Risk Scoring - Generate disease risk scores based on symptoms
63	Dashboard Insights - Dashboard of active patients, conditions, appointments
64	ML Model Training - Train classification models for diabetes risk
65	Predictive Analytics - Personalized alerts based on ML inference
66	Research Capabilities - Query anonymized datasets for cohort studies
67	Trend Analysis - Monitor readmission rates and population health trends

10. AUDIT-LOGGING-SERVICE

Stories Assigned: 6

Complexity: High (Compliance, immutable storage, retention)

Story #	User Story Description
68	Access Logging - Log every PHI access with user, reason, IP/device
69	Export Capabilities - Export logs as digitally signed PDF/CSV files
70	Resource Versioning - Trace FHIR resource version chain
71	Anomaly Detection - Real-time alerts for suspicious data access
72	Immutable Logs - Use append-only mechanisms like WORM storage
73	Data Retention - Retain logs for 7 years for HIPAA compliance

11. FHIR-API-GATEWAY

Stories Assigned: 6

Complexity: Medium-High (Performance, routing, external access)

Story #	User Story Description
74	External API Access - Provide FHIR API access to external EHR systems
75	Security Enforcement - Enforce authentication and rate limits
76	Version Management - Support multiple FHIR versions (R4, R5)
77	Quota Management - Throttle per-token usage and track quotas
78	Smart Routing - Route requests to correct microservice by resource type
79	Performance Monitoring - Provide Prometheus metrics and Grafana dashboards

Complexity Analysis by Service

Service	Stories	Complexity	Key Challenges
HL7-Parser-Service	8	High	HL7 standards, FHIR transformation, interoperability
Patient-Service	9	High	Privacy, consent, multi-tenancy, GDPR compliance
Observation-Service	9	Medium-High	Clinical data validation, LOINC mapping, ML integration
Appointment-Service	8	Medium	Real-time scheduling, conflict resolution, waitlists
User-Auth-Service	8	High	Security, SSO integration, MFA, rate limiting
Role-Management-Service	6	High	Complex RBAC/ABAC, delegation, external IAM sync
Telemedicine-Service	7	Medium-High	Video streaming, compliance, time-based access
Notification-Service	6	Medium	Multi-channel delivery, template management, retry logic
Analytics-Service	6	High	ML/AI models, predictive analytics, research compliance
Audit-Logging-Service	6	High	Immutable storage, compliance, anomaly detection
FHIR-API-Gateway	6	Medium-High	Performance, external integration, version management

Development Priority Recommendations

Phase 1 (Foundation - Weeks 1-4)

- **User-Auth-Service** (Stories 35-42) - Authentication foundation
- **Patient-Service** (Stories 9-17) - Core patient data management

- **FHIR-API-Gateway** (Stories 74-79) - API access layer

Phase 2 (Core Clinical - Weeks 5-8)

- **HL7-Parser-Service** (Stories 1-8) - HL7 integration
- **Observation-Service** (Stories 18-26) - Clinical data handling
- **Audit-Logging-Service** (Stories 68-73) - Compliance foundation

Phase 3 (Advanced Features - Weeks 9-12)

- **Appointment-Service** (Stories 27-34) - Scheduling system
- **Role-Management-Service** (Stories 43-48) - Advanced security
- **Notification-Service** (Stories 56-61) - Communication system

Phase 4 (Intelligence & Telehealth - Weeks 13-16)

- **Analytics-Service** (Stories 62-67) - ML/AI capabilities
- **Telemedicine-Service** (Stories 49-55) - Video consultations

Total Implementation Estimate: 16 weeks with dedicated development teams per service