Making sense of health data with Amazon HealthLake

Simplify data integration and analysis

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Amazon HealthLake

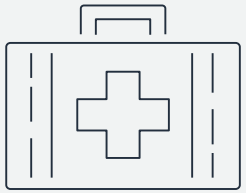
A standards based, managed HIPAA-eligible storage and analytics service

Store clinical/claims data using interoperability standards

Store a complete view of patient medical history from multiple data sources in the normalized common data model (FHIR-based) format to facilitate the exchange of information

Easily extract meaning from health data

Built-in Comprehend Medical to automatically extract meaning from unstructured data for easy search and querying



Apply analytics and ML on health data

Make predictions and identify trends with health data using Amazon SageMaker machine learning models and Amazon QuickSight analytics.

What we hear and how we solve it

Customer pain points

- Customers have health data in various **data silos** they want to use for analysis
- Customers don't want the **burden** to create & maintain **complex analytic pipelines**
- Customers need **data interoperability** and **data governance**
- Customers want to run **analytics** on **unstructured data** (e.g. clinical notes)
- Customers want to **make data actionable** using ML/analytics on disparate healthcare data

HealthLake solutions

- One click health datastore to store siloed data in normalized FHIR schema
- Fully managed service
- FHIR APIs for interoperability & development of 3P apps and dashboards
- Easily share data with centrally managed fine-grained access controls
- Built-in Comprehend Medical (NLP) to extract medical terminology from unstructured clinical data.
- Capability for analytics across HealthLake data and other data sources*

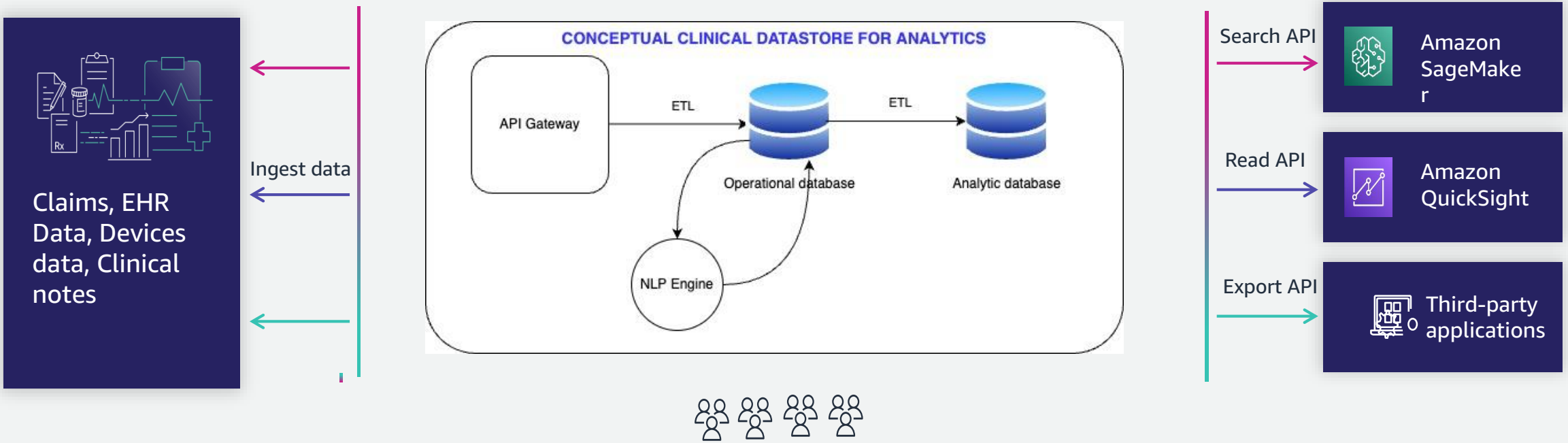
*in Private preview

Benefits/ROI

- Amazon HealthLake accelerates **time to market**, as it offers a fully managed datastore that is operational in less than 30 minutes.
- Amazon HealthLake is a "**health-data" datastore** supporting the FHIR standard for APIs and data resource schemas
- As Interoperability in healthcare continues its wider acceptance, **Amazon HealthLake's** FHIR support enables to stay ahead to meet current and future requirements
- Amazon HealthLake has **built-in NLP** to extract medical terminology from unstructured clinical data.
- Amazon HealthLake **reduces total cost of ownership** for maintaining complex ETL pipelines and transformations from multiple data sets and data models, infrastructure, software licensing
- Amazon HealthLake provides for **easy integration** with all HIPAA-eligible AWS analytics/ML services such as Athena, Redshift, SageMaker, QuickSight and 3rd party analytic tools and services

Typical data integration architecture for analytics

Today many customers have complex architectures for analytics on health data. Technical teams invest a lot of time in building this complex architecture and maintaining it



HealthLake simplifies healthcare analytics

Amazon HealthLake manages the "Undifferentiated heavy lifting" associated with designing, creating, and managing a scalable Data Store supporting multiple data instances, unstructured data, and integration of the data and AWS services for analytics

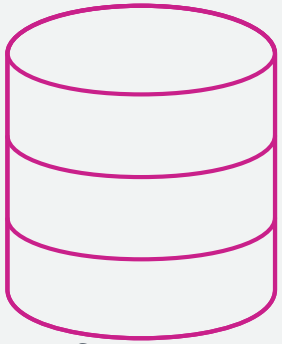
Claims, EHR Data,
Devices data,
Clinical notes

Create API

Update API

Delete API

Amazon HealthLake



Structure

Tag and index

FHIR v4 resource definitions

Comprehend Medical

Search and query

Search API

Read API

Export API

Amazon SageMaker

Amazon QuickSight

Third-party applications

aws machine learning

Build variety of use cases across payers

- Patient phenotyping
- Population Health Management & Value based care
    - Risk scores for chronic diseases for population health
    - Identify patient risk of substance abuse
    - Predicting disease outcomes
    - Disease progression and comorbidities
- Predicting treatment plans
- Predicting benefits of certain drugs
- Predicting Med adherence
- Detecting fraud risk
- Alternate payment models
- Prescription auditing
- Patient enrollment
- Detection for high cost claimant members
- Predicting and reducing patient no-shows
- Lower hospital readmission rates
- Predicting patterns to inform utilization management (UM)

Build variety of use cases across providers

- Prevent ER diversions and overcrowding
- Patient risk identification (e.g. predict patient falls, sepsis detection)
- Identify care gaps
- Predict severity risk for chronic disease
- Reducing readmissions
- Reduced ER wait times
- Gain Insights from clinical notes

Build variety of use cases across life sciences and pharma

- Discover patients eligible for clinical trials
- RWE (real-world evidence)
- Secondary data analysis
- Predicting drug efficacy

Amazon HealthLake

Data sources

Structured data (internal systems)
EHR
Claims

Un-structured data:
Clinical notes
Care plan and notes
Case records
Diagnosis
Gaps in care
Devices
Social data
Genomics
Clinical Audio files
Images/ PDFs

Semi-structured data:
Clinical data
ADT
Assessments
Discharge summaries
Referrals
Authorizations
Behavioral (PHQ- 9)
Radiology Reports
Lab data
Medications
Vaccinations
NCPDP – PBMs Rx

Real Time systems:
Provider systems
External APIs

Amazon HealthLake Managed Service

APIs
Create
Update
Read
Delete

Import jobs

Data Store
Structure
Tag and index
FHIR v4 resource definitions
Integrated Comprehend Medical
Search and query

APIs Get Search Export

HealthLake Analytics
Analytics on AHL using SQL(1)

Longitudinal Med Record

BI dashboard/ ML models

IDENTIFY TRENDS

Amazon QuickSight

Easily search and query the data

Develop interactive dashboards

MAKE PREDICTIONS

Amazon SageMaker

Create predictive models for chronic (e.g., HTN, CKD) or acute conditions (e.g., Sepsis)

SHARE DATA SECURELY

3rd party Apps

Healthcare providers and patients can easily share and access their data

Create your own BI dashboard and ML models

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Notes: (1) Private Preview

Demo

Amazon HealthLake partners to help you get started

One click access to partners from the Amazon HealthLake console

Collaterals and Contacts

Product info, Documentation

Overview, features, Dev Guide, API Reference, partners, and pricing

https://aws.amazon.com/healthlake/resources/

Workshop

Self-paced resource on importing, exporting, and building dashboards

bit.ly/3JfLeja

Email: Healthlake-feedback@amazon.com

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Questions

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Thank you!

APPENDIX

1. What is healthlake – analytics store and services
2. Data in silos
3. Why would you (business benefit and implementation ease) (isv / end customer) use ahl? – simplicity, saves a lot of stitching of diff services – illustrate with relatable use case with and without ahl
    1. Managed Service – savings on undifferentiated lifting
    2. Cost savings – tech resources saved by using ahl (patch, upgrades, etc.)
    3. 1-click datastore, analytics ready format
    4. Permissions
    5. nlp
4. Use cases that are unlocked for end customers
5. Data lake for healthcare & lifesciences modeled on FHIR

Care insights at a population-level

CHALLENGE

Health equity remains a challenge in the Chicago area with barriers to healthcare access across the city.

SOLUTION

Rush University Medical Center created a cloud-based analytics hub using Amazon HealthLake. This hub allows them to securely analyze patient admissions, discharges, and hospital capacity via real-time dashboards to provide care to the most critically ill patients.

Using the Amazon HealthLake API they are leveraging predictive models around social determinants of health across the West Side of Chicago to help identify and fill care gaps before they happen.

BENEFIT

Rush is now applying learnings from this effort to help it achieve its mission to provide personalized care and improve health equity for individuals that they serve.

Get deeper insights to improve patient care

CHALLENGE

Create a data analytics platform to store health data from multiple sources to better understand patient goal progression in their multispecialty approach to autism treatment.

SOLUTION

Developed a data analytics hub using Amazon HealthLake to store a patient's medical history, medication history, behavioral assessments, lab reports, and genetic variants in FHIR format. HealthLake was used to create a composite view of the patient's health journey and apply advance analytics to understand trends in patient progression with Cortica's treatment approach

BENEFIT

Using Amazon HealthLake, Cortica created a centralized platform in weeks instead of months to securely store patients' data, enabling their team to use enhanced analytics to accelerate access to deeper patient insights to improve patient care and advance research into autism treatment.

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Modernize data infrastructure and derive patient insights

CHALLENGE

HealthHIE Nevada, the Health Information Exchange (HIE) for the state of Nevada serves over 4 million patients and processes over 1 million messages per day. HealthHIE Nevada faces rising operational costs, high latency, and an influx of health data with limited ability to derive insights.

SOLUTION

HealthHIE Nevada worked with Cognosante, an advanced AWS partner, to migrate to the cloud and build a FHIR enabled rapid viewer on Amazon HealthLake to extract, normalize, and visualize health data using natural language processing (NLP) and link to medical ontologies, like SNOMED CT and ICD-10 to enable analysis.

BENEFIT

HealthHIE Nevada saw a 60% cost reduction by switching to Amazon HealthLake and Cognosante's eSante Clarity FHIR Viewer – enabling advanced insights and at the same time complying with new regulations and requirements.

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Typical architecture for data integration

Today many customers have complex architectures for analytics on health data. Technical teams invest a lot of time in building this complex architecture, maintaining it, time that is better invested in adding features to enhance product value