



APM CASE STUDY 2024

Problem Statement

You are a PM at HiLabs and tasked to build a network management tool that leverages publicly accessible price transparency data and advanced web scraping technologies to compare and recruit providers from different health plans. The platform should have actionable performance analytics (provider ratings, quality, cost, health outcomes) and competitive analysis to make the insurer identify and recruit high value providers and build high performing narrow networks.

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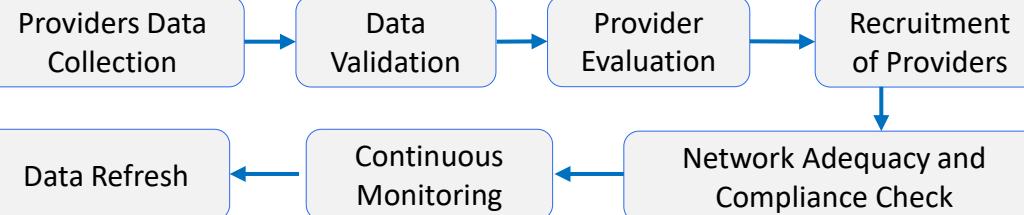
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Defining The Scope

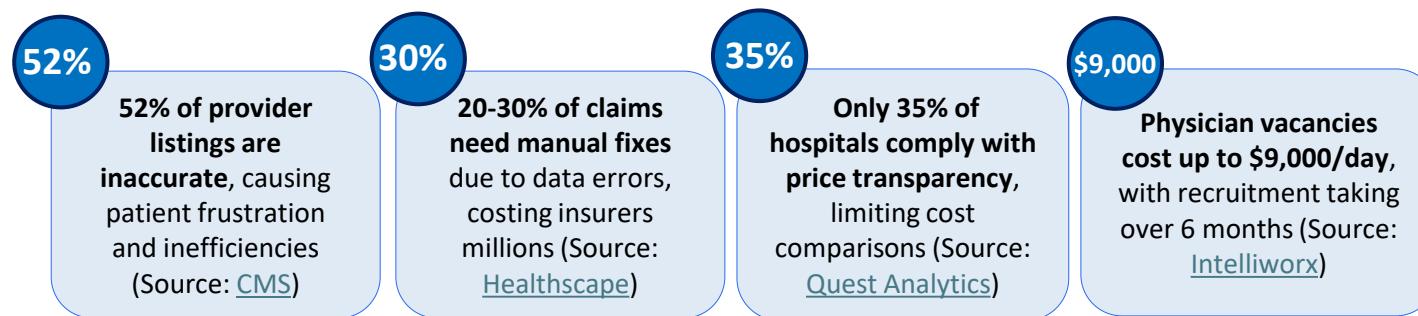
Understanding the current process



Health insurers face a complex, manual process in managing provider networks. Data collection is inconsistent and often outdated, making it hard to keep provider information accurate. Frequent provider changes and limited insights into competitor networks make it difficult to ensure quality and compliance. This results in higher costs, slower updates, and a frustrating experience for members seeking timely care.

Reasons for the current problems

- Data Inaccuracy:** Outdated and fragmented provider data leads to inefficiencies in network management.
- Manual Recruitment:** Labor-intensive provider recruitment processes are slow and costly.
- Limited Price Transparency:** Insurers struggle to leverage cost data for effective provider comparisons.
- Compliance Challenges:** Meeting CMS network adequacy standards is complex and time-consuming.
- Poor Member Experience:** Ghost networks and access delays reduce patient satisfaction and trust.



Potential impact of solving it

- Improves Data Accuracy:** Automating validation reduces inaccuracies by over 50%, boosting member satisfaction (Source: [BCG Report](#))
- Cuts Recruitment Costs:** AI-powered recruitment can save up to \$9,000/day by reducing vacancy times (Source: [McKinsey Report](#))
- Enhances Compliance:** Real-time monitoring ensures CMS compliance, reducing fines and increasing efficiency (Source: [McKinsey Report](#))
- Optimizes Costs:** Leveraging price data can cut network expenses by up to 15% through better provider selection (Source: [McKinsey Report](#))

Assumptions

- Data Integrity:** CMS price transparency files provide sufficient granularity for MA and QHP benchmarking
- Scalable Compliance:** AI adapts to varying CMS Network Adequacy standards like HSD submissions
- Provider Recruitment:** High-value providers will join the network when presented with data-driven insights and incentives
- Operational Efficiency:** Automating data validation and recruitment will cut manual effort, boosting claims auto-adjudication rates

Stakeholders And Our Target Users

Stakeholders	Job to Be Done	Requirements/Data Needs
Patients (Members)	Access timely, cost-effective, and high-quality healthcare services	<ul style="list-style-type: none">Accurate and up-to-date provider directories for informed decision-makingReal-time availability of appointment scheduling to reduce wait timesTransparent insurance coverage details, including costs and co-payments
Insurance Providers	Optimize provider networks for cost efficiency and regulatory compliance	<ul style="list-style-type: none">Comprehensive provider performance data, including cost, quality, and outcomesPredictive analytics to identify and recruit high-value providers efficientlyCompliance metrics for CMS standards
Healthcare Providers	Attract patients by joining high-performing insurance networks	<ul style="list-style-type: none">Access to network performance benchmarksPatient demographics for better targetingQuick onboarding tools to streamline entry into insurer networks
Regulatory Bodies (CMS)	Ensure insurers meet network adequacy and compliance requirements	<ul style="list-style-type: none">Automated compliance reports with real-time updates on network adequacy metricsCentralized dashboards for tracking time-distance complianceTracking of Provider-to-enrollee ratios



Insurance providers, particularly those managing Medicare Advantage and Qualified Health Plans (QHP), are struggling with outdated and inaccurate provider data. This core issue not only affects compliance but also hampers the efficiency of provider recruitment, leading to increased operational costs and limited network optimization.

Why this
is core
issue?

Data Inaccuracy Impacts Compliance: Outdated provider directories directly affect network adequacy metrics, resulting in compliance challenges with CMS standards, which can lead to penalties.

Inefficiencies in Recruitment: Without accurate and up-to-date data, recruiting high-quality providers becomes a resource-intensive process, slowing down network optimization and increasing costs.

Limited Competitive Insights: Inaccurate data prevents insurers from leveraging analytics to compare provider performance and optimize their networks, resulting in missed opportunities for cost savings and improved patient outcomes.

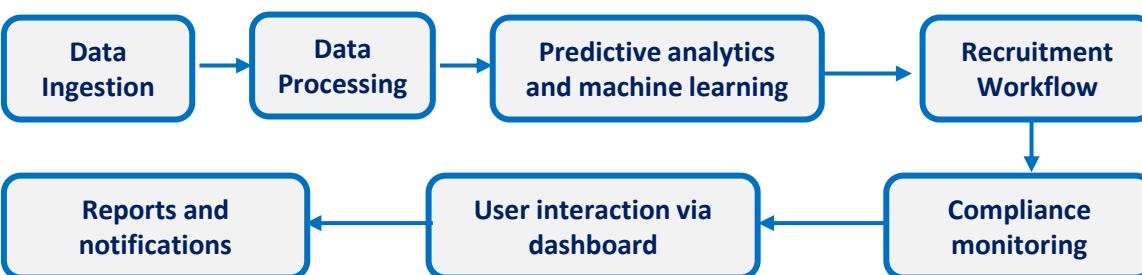
Solution(1/2): Technology Outline

Introducing M-Recruit

M-Recruit is an AI-powered platform built to address the critical challenge of outdated and inaccurate provider data in the insurance industry, especially for Medicare Advantage (MA) and Qualified Health Plans (QHP).

By leveraging real-time data integration, predictive analytics, and automated compliance monitoring, it ensures insurers can seamlessly optimize their provider networks. This solution will help insurers reduce administrative overhead, meet CMS compliance standards, and efficiently recruit high-value providers, ultimately leading to better network performance and cost savings.

End-to-End System Architecture



AI-Driven Provider Scoring Engine: Ranks providers based on real-time metrics like quality, cost, and compliance. Users can compare providers side-by-side and prioritize recruitment using tables and visual charts.

Real-Time Compliance Monitoring: Ensures providers meet CMS standards with automated checks. Issues like credential status and time-distance compliance are flagged, with quick actions to resolve directly from the dashboard.

Predictive Recruitment & Onboarding: Identifies high-value providers and tracks their onboarding. Opportunities and progress stages are managed through tables, with automated reminders and actions for seamless integration.

Step	Objective	Key Processes	Technologies Used
Data Ingestion	Gather real-time data from multiple sources	<ul style="list-style-type: none">Pull data from CMS, state boards, and directories via APIsReal-time sync using Apache Kafka	Apache Kafka, AWS RDS, RESTful API Integration (Axios, Requests), AWS API Gateway
Data Processing	Clean, transform, and standardize data	<ul style="list-style-type: none">ETL pipelines for data transformationAI-powered data cleaning	Python, ETL scripts, MongoDB
Predictive Analytics	Generate insights for compliance & recruitment	<ul style="list-style-type: none">Provider Scoring EngineCompliance NLP AnalyzerRecruitment Forecasting ModelAutomated Alert System	SpaCy, Prophet, AWS Comprehend, ML
Recruitment Workflow	Streamline provider recruitment	<ul style="list-style-type: none">Identify, outreach, review, and onboard providersTrack onboarding progress	Node.js, Express, AI-based outreach tools
Compliance Monitoring	Ensure network meets CMS standards	<ul style="list-style-type: none">Real-time dashboardsTime-distance (county-specialty) compliance checksAutomated reporting	Python, D3.js, AWS SNS
User Interaction	Provide real-time insights via dashboards	<ul style="list-style-type: none">Home, Providers, Compliance, Recruitment screensInteractive charts and maps	React.js, Chart.js, D3.js, Node.js
Reporting & Analytics	Generate actionable reports	<ul style="list-style-type: none">Recruitment and compliance reportsExport to PDF, Excel, CSV formats	Node.js, PDF libraries, Excel/CSV tools

Solution(2/2): Solution Outline

The Home screen provides a quick overview of the organization's performance. Key metrics include the number of providers (1250), a compliance score of 92%, cost savings of \$90k, and 32 recruitment opportunities. A sidebar menu offers navigation to Home, Providers, Compliance, Recruitment, Reports, and Admin.

Screen 1: Home Screen

- Centralized Dashboard:** Quick view of key metrics like providers, compliance, and cost savings
- Interactive Visuals:** US map and charts for real-time network insights
- Quick Navigation:** Easy access to Networks, Activity, and Tasks
- Customizable View:** Edit Dashboard feature allows users to tailor their insights to specific organizational needs

This screen allows users to manage and analyze provider data. It displays a database of providers with various details and provides tools for tracking provider performance and comparing different providers side-by-side.

Screen 2: Providers details

- Provider Database:** Searchable list with key metrics like quality and cost
- Performance Charts:** Visual insights on provider quality and efficiency
- Comparison Tool:** Side-by-side analysis for informed decisions
- Quick Actions:** Generate reports and onboard providers seamlessly

The Compliance screen provides a detailed look at the organization's compliance status. It shows key metrics such as alerts (8 Critical), audits (5 Due), and renewals (12 Pending). An issues table lists specific compliance issues for each provider, along with a time-distance compliance table.

Screen 3: Compliance details

- Compliance Overview:** Key metrics for compliance status, alerts, and audits at a glance
- Issues Table:** Quick actions to resolve non-compliance for providers
- Time-Distance Check:** Tracks compliance by county-specialty pairs, ensuring providers meet CMS distance standards
- Instant Reports:** Generate compliance reports and filter data effortlessly

The Recruitment screen provides an overview of the organization's recruitment efforts. It shows key metrics such as opportunities (24), onboarding (18), savings (\$120k), and pipeline (5 in review). An opportunities table lists potential candidates, and an onboarding tracking table monitors the progress of current recruits.

Screen 4: Recruitment screen

- Opportunities List:** AI-driven provider recommendations with quick action buttons.
- Onboarding Tracker:** Tracks provider progress through onboarding stages.
- Key Metrics:** Overview of opportunities, savings, and recruitment pipeline.
- Filters & Reports:** Easy filtering and report generation for targeted recruitment.

Prioritization And Success Metrics

Prioritization of Features

Feature	Reach	Impact	Confidence	Effort	RICE Score
Compliance Monitoring ¹	9	••••	85%	••	12.75
Onboarding Tracking ²	8	•••	80%	••	12.8
Provider Management ³	7	•••	75%	••	7
Reports & Analytics ⁴	6	•••	70%	•••	6.3

Qualitative analysis for Prioritization

- Compliance Monitoring (Top Priority):** Ensures network compliance, avoiding costly penalties and ensuring regulatory adherence. High reach and impact with moderate effort required.
- Onboarding Tracking (Second Priority):** Reduces the time taken to onboard new providers, improving network efficiency. High reach, impactful, and relatively low effort.
- Provider Management:** Supports effective management and comparison of provider data. Moderate reach and effort with substantial impact on network optimization.
- Reports & Analytics:** Provides strategic insights for network and compliance optimization. Moderate reach and impact but relatively low effort.

Success Metrics

Why?

North Star Metric Compliance Rate

It is the percentage of providers meeting CMS time-distance and credentialing standards, and it ensures the platform's core goal of meeting CMS standards, reducing legal and financial risks.

Metric Type	Metrics	Definition
Primary	Compliance Score	Average adherence to CMS compliance standards across the provider network.
	Audit Pass Rate	Percentage of audits that pass without compliance issues.
	Time-to-Compliance	Average time taken to onboard providers to meet compliance standards.
	Data Validation Accuracy	Percentage of provider data validated as accurate post-ingestion.
Secondary	User Engagement	Frequency of platform usage by the insurance provider's team (e.g., daily active users)
	Alert Resolution Time	Average time taken to address and resolve compliance alerts
	Report Utilization	Number of reports generated monthly by users
	Cost Savings	Total cost reduction achieved through provider optimization

Pitfalls

Pitfalls

Workarounds

Data Accuracy Issues

Use existing **AI-powered validation rules** to cross-check provider data against public databases to reduce inaccuracies

Time-Consuming Compliance Monitoring

Utilize the current **automated alerts** and **scheduled compliance reports** to streamline compliance checks and audits

Limited Recruitment Insights

Leverage the **provider comparison tool** to manually analyze key metrics like quality scores and cost efficiency

User Adoption Challenges

Offer **contextual tooltips** and an in-app **chat support feature** to guide new users through the platform

Future Enhancements

Future Enhancements

Description

Advanced AI Data Cleaning

Integrate **advanced AI algorithms** to enhance **data extraction accuracy** from provider documents

Predictive Recruitment Analytics

Introduce **predictive models** to identify and **prioritize providers** with the **highest recruitment potential**

Automated Compliance Reports

Implement **auto-generated reports** for compliance metrics, **reducing manual workload** and **improving accuracy**

Scalable Backend Infrastructure

Upgrade backend to handle **larger datasets** and **more concurrent users**, ensuring **platform scalability**

Geographic Expansion

Extend **time-distance compliance checks** to include additional states for **broader network coverage**