Attero, an India-based company, is Materials Reborn—sustainable Engineering solutions for a resource-constrained world.

Deep Tech. Urban Mining. Recycling. Sustainability. Selsmart. MetalMandi.

Engagement Overview

Crownstack engaged with Attero as an Engineering partner in 2025 to revamp and continuously improve its products, delivering a better user experience and making them more structured and scalable. The scope includes both front-end and back-end development.

About the Customer

Attero Recycling was founded in 2008 and is a leader in e-waste management in India, employing innovative technology to recover valuable materials sustainably from electronic waste. India's largest electronic asset management company and clean-tech pioneer, Attero, actively promotes eco-friendly reuse and recycling of electronics. As a NASA-recognised technology innovator, they have developed disruptive technology that enables us to establish low-cost, low-capacity, eco-friendly recycling plants for processing e-waste and extracting rare earth and precious metals.
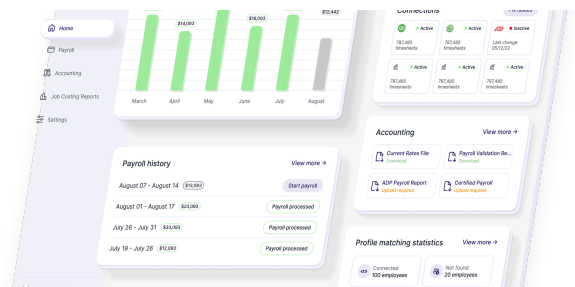
Industry	Climate Technology Product Manufacturing

Business Challenges

Attero effectively addresses various business challenges frequently encountered by organisations with online selling Scrap (Metal Mandi) requirements.

- **Managing Hierarchical User Structures for Scrap Seller Networks:**
  - Organisations dealing with large-scale scrap sellers often face significant challenges in managing complex user hierarchies, primarily when a primary seller must oversee multiple sub-users or internal team members.
  - Traditional systems typically lack the flexibility to handle such multi-level account structures, resulting in operational inefficiencies, inconsistent user access, and increased risk of unauthorised actions. Moreover, user creation and updates across various platform modules are often disjointed, leading to data fragmentation and administrative overhead. Without robust, granular role-based permission systems, it becomes difficult to enforce access

control policies, ensure data integrity, and streamline user operations at scale.

- **Enabling Secure and Compliant Seller Onboarding through KYC :**
  - Before any scrap can be listed or sold on the Metal Mandi platform, sellers must complete a mandatory Know Your Customer (KYC) process. This onboarding step presents its own set of challenges, particularly given the stringent compliance requirements imposed by government authorities.
  - The platform must integrate with both third-party verification services and official government systems, adhering to evolving regulatory guidelines. Real-time communication between these systems is essential for a seamless user experience.
  - Meanwhile, sensitive seller data, such as identification documents and business credentials, must be stored securely using encryption protocols. Moreover, the internal KYC management team must be able to review, update, approve, or reject applications efficiently and effectively.
  - Ensuring data privacy, regulatory compliance, and operational transparency throughout this multi-layered process is complex and critical to establishing trust and enabling legitimate business transactions on the platform.

- **Challenges in Streamlining the Scrap Selling Lifecycle:**
  - Selling scrap through a digital platform like Metal Mandi involves a multi-step, collaborative process, including creating a listing, negotiating prices, arranging inspections, and managing order fulfilment. However, coordinating these steps introduces several operational challenges.
  - Sellers must first create accurate listings, which are then subject to price negotiations via real-time chat, often requiring back-and-forth between buyers and sellers. Pre-inspections by inspection executives add another layer of scheduling and validation.
  - Furthermore, each listing is overseen by a "Scrap Captain," responsible for managing progress across multiple status stages, from initial listing to final order placement. Without an integrated system to coordinate these roles, statuses, and workflows, businesses face delays, communication breakdowns, and a lack of visibility into the listing lifecycle, ultimately hindering seller efficiency and buyer trust.

- **Challenges in Managing the End-to-End Scrap Order Fulfilment Workflow:**
  - Once a scrap listing is converted into an order, the operational complexity increases significantly. Sellers are required to submit multiple critical documents, such as the e-way bill, LR (Lorry Receipt), KATA Parchi (weighbridge slip), and transportation details, which must be accurately recorded and verified.
  - Transportation tracking, often handled by third-party logistics partners, adds another dependency that must be managed in real-time. After verification by Metal Mandi, the order enters a planning and execution phase involving multiple stakeholders.

- - This includes preparing a plan report, coordinating with unloaders, submitting the unloading report, and subsequently generating a production report by the production manager. Additionally, store teams provide their validation reports.
    - Each of these touchpoints introduces potential delays, data mismatches, or process breakdowns if not streamlined. Without a unified workflow system and proper status tracking, ensuring visibility, accountability, and timely financial processing becomes a significant challenge, ultimately affecting seller satisfaction, operational efficiency, and customer trust.
- **Challenges in Establishing a Dynamic Pricing Engine for Scrap:**
    - Scrap pricing is highly volatile, driven by daily fluctuations in the global and domestic metal markets. For platforms like Metal Mandi, this presents a significant challenge in ensuring that sellers can price their listings competitively and accurately. Since prices vary not only by metal type but also by geographic location, maintaining real-time, city-wise pricing requires continuous data aggregation and analysis.
    - The data analytics team must collect pricing signals from diverse sources—stock markets, commodity exchanges, and localised suppliers—and interpret them to derive actionable daily prices. These rates must then be programmatically delivered via custom APIs and webhooks across the platform to support live pricing logic.
    - Without a robust dynamic pricing engine, sellers may rely on outdated or inconsistent rates, resulting in reduced trust, lost revenue, and inefficiencies in deal negotiations.

Business Solution

Metal Mandi offers a robust, end-to-end digital infrastructure specifically designed for the scrap trading industry, automating seller onboarding, dynamic pricing, listing workflows, and order fulfilment with built-in compliance and real-time coordination.

Key Features of Metal Mandi's Solution:

- **Hierarchical User Management:** Enables primary scrap sellers to manage sub-users with role-based access across modules, improving security and operational clarity.
- **Secure and Compliant KYC Integration:** Offers real-time KYC verification through third-party and government services, ensuring encrypted data handling and regulatory compliance.
- **Dynamic Scrap Pricing Engine:** Automatically calculates and updates city-wise scrap prices daily using aggregated market data via custom APIs and webhooks.
- **End-to-End Listing Workflow Management:** Streamlines the entire scrap selling lifecycle, including listing creation, real-time chat-based negotiation, inspection scheduling, and status tracking through "Scrap Captains."
- **Integrated Order Fulfilment System:** Centralises document submission, transport tracking, unloading, production, and store reports into a unified workflow for accurate status updates and faster financial processing.

Technology Stack

Frontend	ReactJs, TypeScript, TailwindCSS
Backend	Nodejs, Express, Typescript, Monorepo, Nx, Pnpm, Microservices.
Database	Postgres, TypeOrm
Workflow	CI/CD, Docker Orchestration, AWS Services

Business Outcome

Metal Mandi delivers measurable business impact by digitising the end-to-end scrap trading process, resulting in faster operations, better compliance, and global reach:

- **Fully Digital KYC Onboarding:** Sellers no longer need to visit physical centres for verification—Metal Mandi's online KYC system, integrated with third-party and government services, enables fast, remote, and secure onboarding from anywhere.
- Faster Seller Activation: With real-time KYC approval and listing capabilities, sellers can start selling scrap within hours, rather than days, drastically reducing onboarding time.
- **Accelerated Scrap Transactions:** Digital listing creation, live chat-based price negotiation, and automated inspections streamline the selling process, speeding up deal closures.
- **Global Accessibility:** The platform enables sellers to connect with buyers across regions, expanding their market beyond local boundaries and enabling global scalability.
- **Elimination of Manual Workflows:** Outdated spreadsheet-based operations are replaced with an intelligent digital system, ensuring data consistency, efficiency, and reliability.
- **Real-Time Market-Aligned Pricing:** The dynamic pricing engine ensures that sellers always operate with the most accurate, city-specific market rates, based on daily data feeds.
- **Organised & Compliant Documentation:** All documents—from KYC to transport and production reports—are stored securely and centrally, enabling quick access and audit readiness.
- **Transparent Order Lifecycle:** Every order stage—from listing to unloading and finance—is tracked in a centralised system, improving accountability and stakeholder coordination.

Further Links
Learn More About Crownstack's Offerings
Learn More about Attero