Solution Brief

AI Image Analysis
Automated Volume Measurement

Improve Supply Chain Logistics with the Siena Insights Solution

Powered by Intel™ Xeon® processors and optimized with the OpenVINO™ Toolkit, Siena Insights empowers business logistics operations with AI image recognition and machine learning to convert data collected at the enterprise's edge into actionable insights and protocols.

What can Siena Do?

SIENA ANALYTICS

Siena Analytics has developed a range of bespoke AI and ML models, for logistics operations, capable of running at the edge as well as in the cloud.

Package Detection
Identify or flag based on shape, type, and damage

Barcode Detection
Ensure quality and legibility of barcodes to optimize tracking

Label Detection
Generate re-sellable key insights on partners and clients

Gap Detection
Identify problems in operations

No-Read Reasons: Hazmat and Arrow Detection
Maximize safely and product quality by gaining immediate actionable insights on safety and health hazards

Logistics Operations in the 21st Century are Facing Unprecedented Volumes and Challenges

The 4th Industrial Revolution has forced logistics operations, manufacturers, and other complex packaging supply-chains to reconsider how they utilize data gathered at the edge. Among the greatest challenges for supply chain leaders are inventory visibility, data analysis, reporting, standardizing operations, and implementing large scale automation.

On top of these challenges, the massive pressure created by booming e-commerce markets makes meeting market demand and vendor compliance a critical concern. Parcel shipment volume grew more than 18% over 2020 and could reach as high as 303 billion packages per year by 2026 according to the Pitney Bowes Parcel Shipping Index.[1]

At such sizeable volume, mistakes can be extremely costly. Historically, retailers and logistics companies were expected to absorb chargebacks to cover costs when merchandisers shipped packages with incorrect recipient addresses, smudged or incorrect bar codes, or used flimsy packing tape that caused the contents to spill out at the loading dock.

Chargebacks are a $40 billion problem that impacts every logistics operation's bottom line. It's estimated that for every $100 in chargebacks, the true chargeback cost is over $200 in wasted time, expensive fees, penalties or additional losses of goods and services.[2]

So how can businesses address these challenges to reduce costs, get greater visibility into their operations, and standardize and automate error-prone processes?

Better data and AI.

Logistics organizations require the use of cameras and sensors at the edge to manage the flow of packages through every stage of shipping and logistics. This generates large quantities of data that often goes to waste. This, coupled with the ability to help automate processes and respond to anomalies, makes AI a natural match to use in concert with logistics technology stacks. That's where Siena Analytics comes in.

The Siena Insights Solution

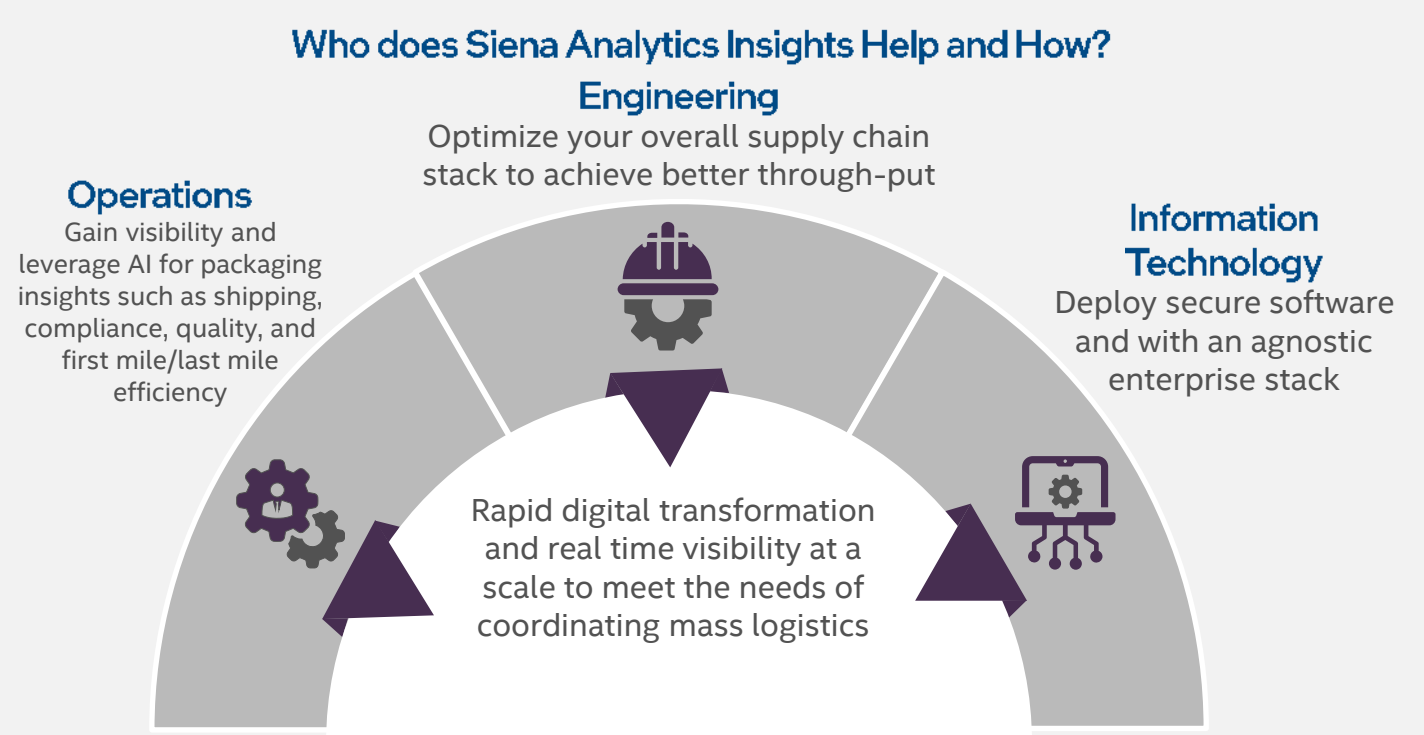
Siena Analytics' vision is to provide customers with machine learning enabled computer vision solutions for the most high-tech, high-demand logistics, shipping, and packaging operations. It provides a modular suite of AI technology providing package Intelligence across tunnels and supply chains.
AI systems evaluate incredibly large and unstructured data sets, finding patterns and deviations which allow them to make intelligent, data-based decisions to reach optimal outcomes. By utilizing Siena Insight's powerful custom platform, warehousers and shipping companies can rapidly scan codes, assess quality, triage damages, and attain a wide array of data driven insights.

What are the Primary Values and Benefits Provided by Siena Insights?

Siena Insights is one of the only vendor-agnostic, no-code AI solutions for shipping and logistics for non-stop sorting. By capturing, managing, and analyzing large quantities of image data from warehouse and logistics operations, Siena Analytics provides a diverse range of benefits. These include the automation of visual inspection, facilitation of inventory management, optimization of delivery, strengthening of operational efficiency, and transparency in end-to-end insights across tunnels, lines, warehouses, and enterprises. Through these benefits, logistics operations can increase visibility over package tracking and logistics and save warehousers on operational expenses by optimizing tracking, quality assurance, the first-mile/last-mile shipping chain.

1. Automating and improving visual inspection

Logistics operations have used cameras and sensors for years to manage quality assurance and other operational engagements, but few of these businesses are optimizing their operations by learning from digital image data.



AI-based visual inspection can be used in combination with other technologies for a variety of valuable applications including quality control and exception handling. Specifically, Siena Insights enhances supply chain automation by enabling in-tunnel edge devices to spot quality problems, such as identifying compromised labels or packages that might be missed by less capable systems.

After Siena Insight is deployed, AI driven machine vision models are trained to monitor and alert events based on specific parameters, such as identifying and resolving no reads, monitoring sensor performance, flagging anomalies, and other actions.

2. Facilitating more accurate inventory management

AI systems can help organizations reduce and optimize holding and carrying costs.

Through Siena Analytics, customers can search and export all collected barcode data, package conditions, and dimension attributes. With these tools, operations can filter by no-read, multi-read, valid-read, side-by-side, barcode, or other custom criteria. By transforming every box into traceable, actionable data point, binning, managing, and delivering insights across an enterprise becomes executable at the click of a button. Furthermore, these inventory tracking features rank high among the key components that consist of Siena's chargeback and fraudulent activity prevention protocols.

Because Siena insights is designed to manage and process vast quantities of data, it helps logistics companies increase accountability in inventory management across a wide network of warehouse locations, with high providence, at incredible speeds.

For example, one major warehousing enterprise trusts Siena Analytics to analyze millions of datapoints captured every day in 1,500 tunnels, across 200 distribution centers.

With this data, Siena Insights aggregates, filters, and analyzes this vast amount of information, and produces a single source of truth in inventory management and accounting.

3. Improving delivery time and reliability

Logistics organizations have been pushed to integrate AI to optimize their delivery processes and meet market demand. With the solution's data processing capacity, a user of Siena Analytics can achieve a diverse range of logistics goals. This includes:

- Facilitating optimal organization of the warehouse for fastest distribution
- Identifying warehousing options for the most useful facilities to streamline and optimize shipping
- Isolating areas where products can, or should, be produced more locally to reduce transportation cost
- Optimizing delivery routes with real-time GPS and weather data, order configuration, and last-mile operations

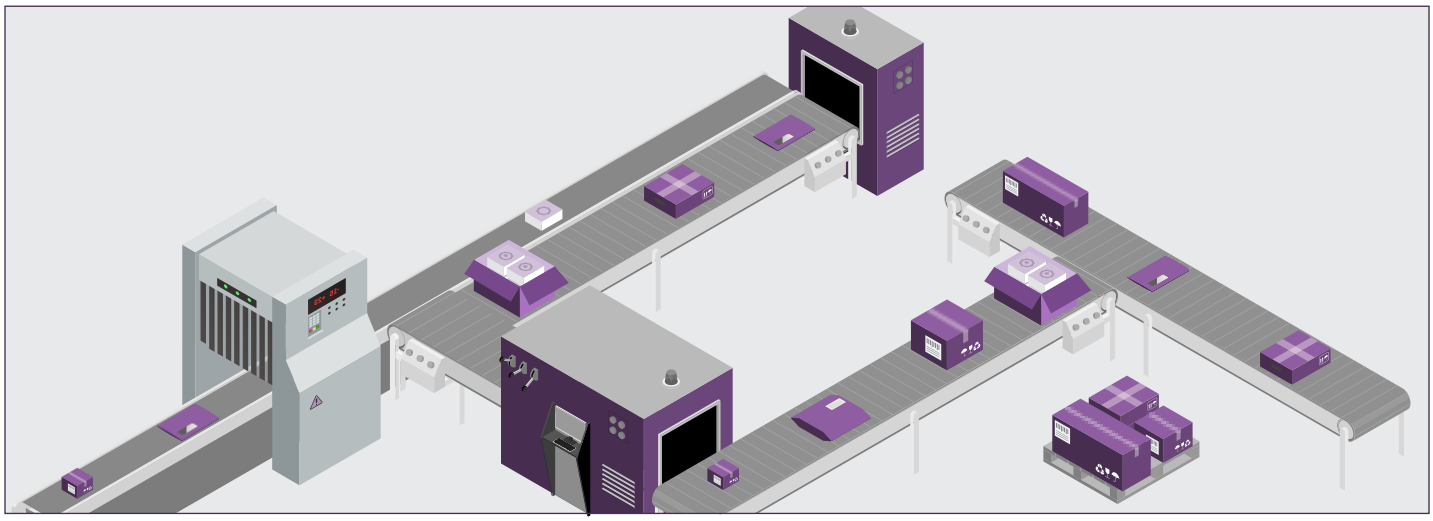
By using Siena Insights to augment warehouse operations, customers can learn beyond their tunnels. Through the analysis of warehouser shipping and receiving data, customers can automate and streamline key functions like inventory purchase and sale or shipping and receiving for inventories at scale.

4. Increasing operational efficiency

Siena insights is trained to recognize patterns and trends based on business values defined by the customer. The more data it can utilize for learning, the better it gets at creating added benefits for supply chain analytics.

Furthermore, it is able to identify systemic issues for supply chain planning and deploy dynamic prescriptive analytics to detect bottlenecks in sorting operations.

Many warehouses struggle with package picking times. AI models can help a warehouse worker identify products which helps increase labor efficiency and overall employee health.



By enabling the rapid iteration of root-cause analysis, logistics personnel are freed to reallocate their time towards higher level tasks. In some cases, these models can also be used to develop fully automated lines for picking and sorting packages, thus optimizing human resources for high-level tasks and management.

5. Enhancing end-to-end visibility

AI can provide unprecedented transparency and a high level of efficiency in overall tracking and logistics.

This helps operations inspire confidence in the consistency of their supply chains and quality of management. As soon as a product is logged into Siena Insights, the AI models can help give manufacturers, marketers, distributors and others full visibility over order fulfillment, inventory management, returns and identify other key trends.

One of the most powerful components of Siena Analytics comes from its ability to reduce reliance on manual reporting. By integrating AI with a vendor compliance program, Siena Analytics can help customers detect delivery and vendor issues, analyze and compare patterns from dimension measurements against vendor manifests, divert sensitive packages, and build dashboards tracking package parameters and no-reads. Together, these functions help customers identify errors and fraud by leveraging real-time data analysis against near-instant recognition of suspicious activity, such as fraudulent chargebacks or record keeping.

This makes Siena Insights both a flexible solution capable of enabling stability and reliability at package, tunnel, and enterprise levels.

How It Works

Siena Analytics takes pride in developing system agnostic, evergreen solutions. Every client integration comes with specific needs and goals. Siena Analytics holds this as a core philosophy, and endeavors to provide a holistic, custom approach to system development and integration. The first step is to have a Siena Analytics representative perform a diagnostic exercise using the analytics platform to understand how their solution can help customers meet their goals, KPIS, and identify the opportunity for ROI. While the solution comes with pre-trained models that meet the most common needs of logistics operations, Siena also utilizes specific customer data from their warehouse to help further train their AI models. This helps create even more accurate analysis that can help cover custom customer aspects, like a private label brand from a particular grocer the warehouse processes. Once the AI models have been trained on the customer's data, it is ready to be deployed inside the warehouse. Siena Insights is hardware agnostic and leverages existing hardware, integrating with sensors that are already installed in warehouse tunnels.

These sensors are easily connected to Siena's edge appliance, based on Intel® Xeon Processors, which is installed inside scanning tunnels and captures data at the edge.

On-premise installation by Siena Analytics technicians is available and can customized accordingly to a customer's needs and equipment. Siena Analytics Insights only needs to assign one edge device per tunnel but can manage up to three lines on one device. The edge appliance can be also scaled to handle specific customer needs as well, whether it needs to handle high-volume, high-speed lines, or slower and lower volume lines.

Siena's ability to ingest vast quantities of data comes in part from its integration with Intel® Xeon® edge processors, which is designed to capture, store, and run AI models at the edge.

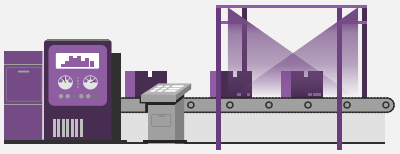
Intel Xeon® processors provide Siena Analytics with the multithread capability to preform all of the tasks they require and deliver the performance they need.

By uniting data across edge devices tunnels and other operations packaging and other data can be captured in a lightweight, swiftly verifiable data profile that is saved at the optimal resolution to optimize storage efficiency.

Once data has been captured, data is analyzed through Siena's AI models, optimized with the Intel® Distribution of OpenVINO™ Toolkit which enables rapid inferencing at the edge so customers can automate quality control and monetize supply chain innovation faster. This data is fed to the Siena Facility Insights platform, which can run on a VM in the customer's server room or to the Siena Cloud solution. The insights can be used to identify trends, trigger responses to particular events, and overall help increase throughput and visibility into operations at scale.

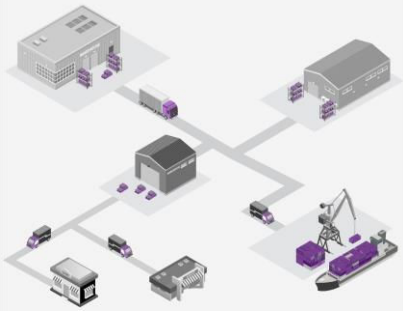
Tunnel Insights

- TunnelView: Real-time image stream and barcode readouts of all packages as they are scanned
- Queries, no-read filters and replays by timeframe
- Efficient edge storage for quick, local access and analysis
- Read rates for each camera
- Performance stats for the tunnel and each sensor
- Diagnose maintenance and package
- Issues faster
- Identify and resolve no reads
- Maximize equipment uptime
- Monitor sensor performance



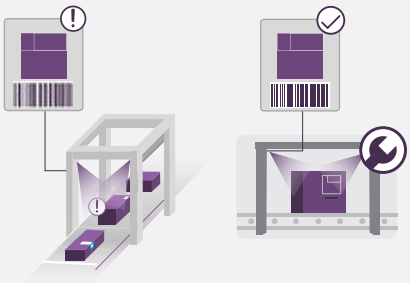
Facility Insights

- Quick, local access to TunnelView™ and barcode readout
- Identify systemic issues for supply chain planning
- Apply rich analytics and event monitoring to detect bottlenecks in your sorting operation
- Maximize uptime by alerting personnel as issues are detected
- Improve capacity utilization: Compare dimension measurements against vendor manifests
- Benchmark the performance of multiple tunnels, configurations and vendors Dashboard view of all tunnels in a facility
- Filter by no-read, multi-read, valid-read, side-by-side, barcodes or by custom criteria
- Queries, no-read filters and replays by timeframe
- Diagnose maintenance and package issues faster



Learning Insights

- Automatically detect and classify problem packages
- Create a robust Vendor Compliance program
- Automate quality control and exception handling
- Detect delivery and vendor issues
- Analyze & compare patterns from dimension measurements against vendor manifests
- Divert fewer packages to intervention
- Label images based on business values you define
- Capability to deploy multiple Al & ML models across the enterprise
- Includes up to 3 complex pipelines
- Orchestrate complex, multi-step AI models – to run in a real-time production environment



Disrupting Traditional Logistics Operations with the Cutting-Edge Siena Insights Solution

Siena Insights delivers a suite of tools built to optimize logistics operations trusted by some of the most complex logistics operations in the world. From visibility, tracking, quality assurance, first-mile/last-mile shipping, budgeting, and automation controls, Siena Insights provides the power necessary to help logistics operations grow and succeed during this new industrial revolution of artificial intelligence and machine learning.

About Siena Analytics

Siena Analytics was founded in 2013 with a single vision: Transform the painstaking, hands-on world of logistics with AI for a virtual inventory. Since then, Siena Analytics has partnered with some of the largest retail and parcel shipping organizations in the world. By developing applications to provide immediate insights into vendor compliance, quality assurance, and problem packages, and end-to-end, no-code Edge AI, Siena Analytics is a trusted partner for some of the largest retail and parcel shipping organizations in the world.

Intel Solution Components

Intel® Distribution of OpenVINO™ Toolkit: The Open Visual Inference and Neural Network Optimization Toolkit enables developers to build and optimize AI-based computer vision models on Intel® hardware and makes it simple to adopt and maintain code. Developers can take advantage of existing Intel® processor architecture to quickly build, optimize, and scale deep learning and visual inference applications.

Intel® Xeon® Processors: These Intel Processors handle the heaviest data loads across cloud, enterprise, HPC, network, security, and IoT workloads, AI acceleration, and other advanced capabilities. This processor is equipped with up to 40 powerful cores, comes wide range of power features. This combination of technologies enhances data protection and privacy by increasing the performance of encryption-intensive workloads including SSL web serving, 5G infrastructure, VPNs and firewalls, or other networks from edge to cloud.

Learn More

Supply Chain Analytics & Business Intelligence | Siena Analytics

Working With Siena | Siena Analytics

Supply Chain Analytics Solutions | Siena Analytics

Supply Chain Blog | Siena Analytics

1. Parcel Shipping Index, Pitney Bowes, 2021
2. Chargeback Gurus, 2021 Chargeback Fees, 2021