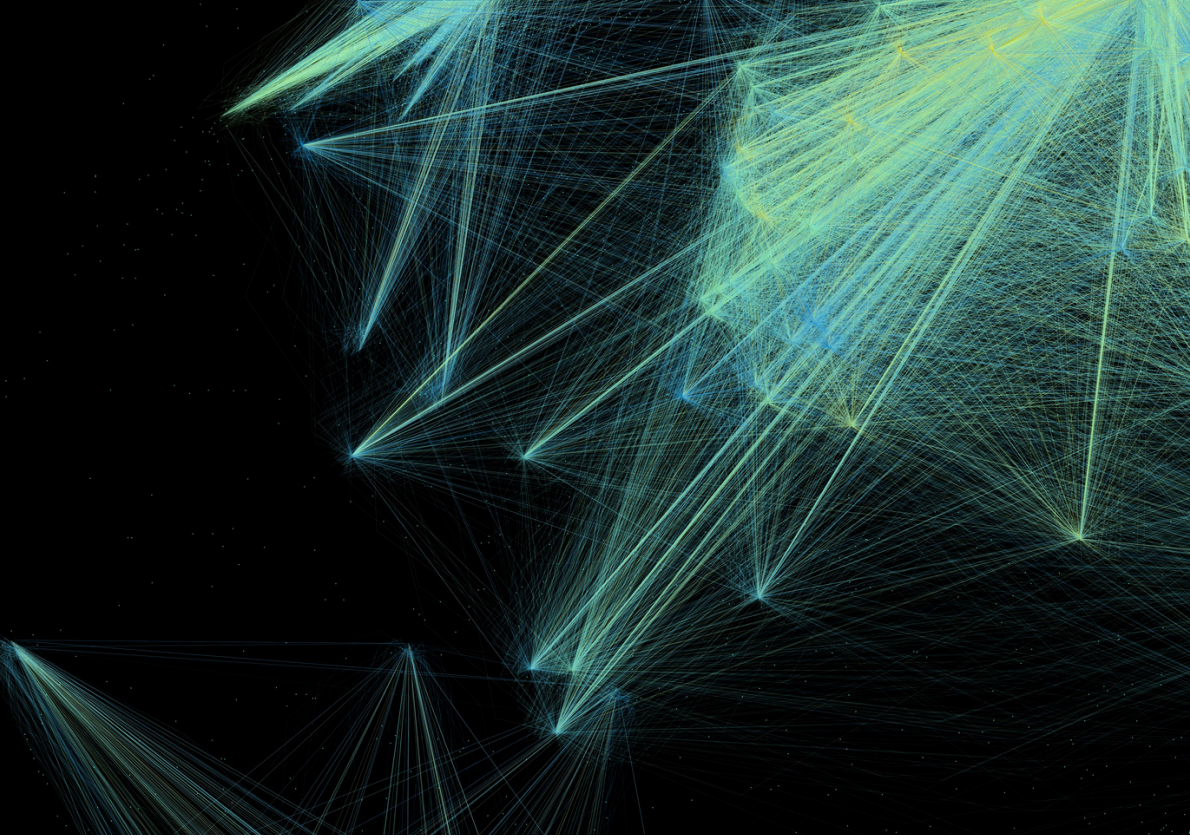


KEZZLER

Solution brief

The power of GS1's EPCIS 2.0 standard

Driving visibility, operational efficiency, and data-driven strategies with Kezzler and GS1

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Improve supply chain visibility, increase operational efficiency, and build data-driven strategies

This solution brief gives an overview of GS1's Electronic Product Code Information Services (EPCIS) 2.0 standard and its practical applications across multiple industries.

Drawing on case studies from Kezzler projects, we illustrate how EPCIS 2.0 enables organizations to use high volumes of granular event data to improve supply chain visibility, increase operational efficiency, and build data-driven strategies.



Supply chain management challenges

In recent decades, supply chain management has become increasingly strategic for brands. Many companies now use sophisticated technology and work with suppliers that can provide production and logistics data, yet visibility remains limited. Systems often operate in disconnected silos, which makes supply chains harder to optimize and slows the response to disruptions.

This lack of visibility is further complicated by evolving regulatory demands for sustainable practices, enhanced product safety, and the rise of circular business models, which introduce new stakeholders and complexities. In this environment, gaps in traceability and visibility create significant challenges for organizations.

Foundational challenges

Limited visibility
Without a comprehensive view of product flows, organizations struggle to measure, analyze, and improve processes related to efficiency, quality, and sustainability. Disruptions such as late dispatches, product loss, or spoilage often go undetected until shipments reach their final destination. This delays intervention and can lead to financial losses, customer dissatisfaction, and compliance risks.

Insufficient traceability
Transparency may still feel optional, but traceability is not. Without robust traceability, regulatory requirements such as product recalls and Digital Product Passports (DPPs) become nearly impossible to fulfill. And as DPPs take effect, transparency will no longer be optional either.

Poor integration and collaboration among stakeholders compound these challenges. Disparate systems, manual data entry, and communication barriers introduce inefficiencies, errors, and delays. In fragmented environments like these, EPCIS offers a clear remedy. By providing a standardized framework for capturing and sharing event data, EPCIS supports interoperability, streamlines communication, and enables a more cohesive and responsive supply chain.



EPCIS as a foundation for supply chain visibility

The initial EPCIS standard, introduced in 2007, showed potential for improving supply chain visibility but saw limited adoption outside highly regulated industries. The release of EPCIS 2.0 in 2022* marks a major step forward, supported by shifts in the market and new capabilities in the standard itself:

Technological advancements
The rise of cloud computing, the Internet of Things (IoT), and simpler data exchange has increased the strategic value of data and made integration easier. These advancements, combined with growing demand for traceability and visibility, are set to drive significant growth in EPCIS adoption.

Transparency demands
Consumer demand for product information, along with regulatory pressure for greater traceability and sustainability, has made visibility a priority for many companies.

Certifications
EPCIS 2.0 enables the inclusion of product and process certifications, supporting more transparent and sustainable supply chains.

Expanded event dimensions and IoT capture
The addition of the "How" dimension, alongside the "What, When, Where, and Why" framework, allows for richer context and deeper insights into supply chain events. EPCIS 2.0 can also capture sensor data, such as temperature and humidity, which is crucial in fresh food supply chains.

GS1 Digital Link compatibility
Support for the GS1 Digital Link standard, which is expected to be widely used for DPPs, helps future-proof investments in EPCIS 2.0.



These advancements, coupled with the increasing demand for traceability and visibility, are set to drive significant growth in EPCIS adoption.

**While EPCIS 2.0 JSON-LD is the recommendation, Kezzler's ingestion layer fully supports EPCIS 1.2 XML payloads, allowing clients with legacy supplier networks to integrate without having to upgrade first.*

Core components of an EPCIS event

EPCIS 2.0 defines five distinct event types, each characterized by five core dimensions:

What, When, Where, Why, and How.

The EPCIS standard is closely linked to the Core Business Vocabulary (CBV) standard, which provides a standardized set of vocabulary elements for describing events and related information.

Following the CBV is crucial for ensuring interoperability and consistent communication across the supply chain. Deviations from the CBV, while possible, can hinder communication and complicate data exchange, particularly as new stakeholders join the ecosystem. For a detailed explanation, see the official GS1 Core Business Vocabulary (CBV) Standard.

Below is a concise overview of the five event dimensions and five event types, and their role within the EPCIS framework.

EPCIS 2.0 dimensions

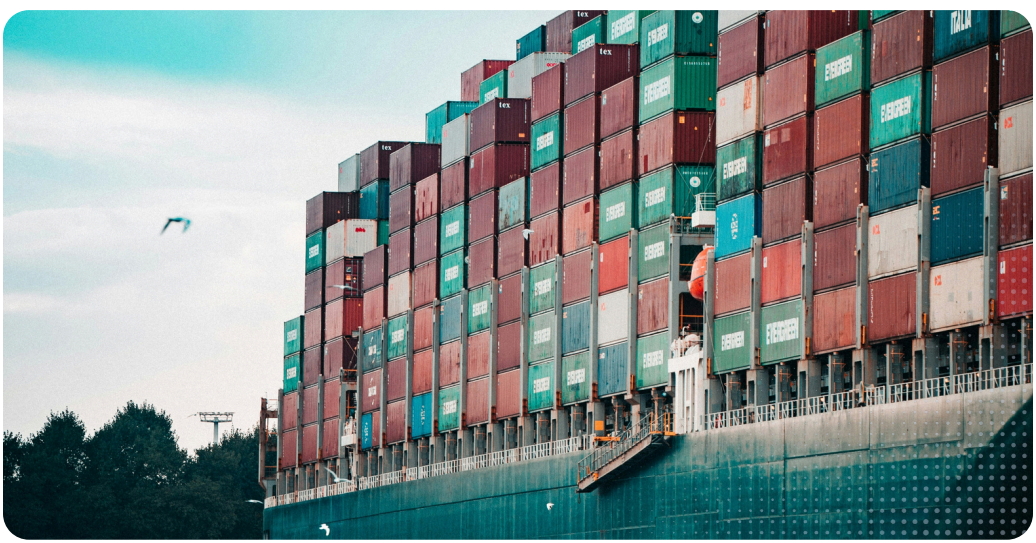
What	Identification of the physical or digital object. This can be at item level (e.g., SGTIN) or at an aggregated class level, such as batch (e.g., LGTIN).
When	Timestamp for the event and its registration in the EPCIS repository (including time zone).
Where	Where the event took place (ReadPoint) and where the object is located after the event has taken place (BusinessLocation). E.g., Receiving area 1 (SGLN) at DC A (GLN).
Why	The business context of the event: • Business step (e.g., receiving) • Disposition (e.g., active, in transit, recalled) • Business transaction list (e.g., purchase order, advance shipping notice, invoice) • Source/destination list (e.g., shipper and receiver, as well as shipping and receiving locations)
How	Optional and new in EPCIS 2.0. Captures sensor data such as temperature and humidity. With predefined thresholds, companies can make sure these values stay within set limits. This also gives better insight into processes and makes it easier to take preventive action.

Figure 1: EPCIS 2.0 dimensions

EPCIS event types

EPCIS 2.0 contains five different event types. The most common are ObjectEvent, AggregationEvent, and TransformationEvent. All event types except TransformationEvent require one of three actions: add, delete, or observe.

ObjectEvent	Events involving the object itself (e.g., receiving an item, returnable transport item, pallet, or container).
AggregationEvent	Events where objects are aggregated or disaggregated (e.g., packing items into boxes and boxes onto a pallet). Aggregation can be captured at instance level or at any class level that can be identified.
TransformationEvent	Events where objects are transformed into new objects (e.g., in a food supply chain, where ingredients are combined to create a new product).
TransactionEvent	Events where objects are linked to business transactions (e.g., purchase orders, invoices, or advance shipping notices). This event type is less widely used than the three above, because transactions can also be recorded in the Why dimension of the other event types.
AssociationEvent	New in EPCIS 2.0. Events where longer-term associations are needed (e.g., between a sensor device and a container).



EPCIS tech components

A traditional EPCIS system has three different components, as illustrated and explained below.

- → **EPCIS repository:** Data storage where all raw data of visibility events are stored.
- → **EPCIS capture applications:** Software applications and execution systems that translate real-world operational steps into standardized EPCIS events and submit them through an EPCIS capture interface to the repository. Examples include a warehouse management system (WMS) capturing goods receiving via barcode scans, RFID middleware logging pallet aggregation through automated reader tunnels, or a manufacturing execution system (MES) recording lot commissioning and batch transformations.
- → **EPCIS accessing applications:** Enterprise software applications that process EPCIS events from the EPCIS repository through an EPCIS query interface, either for direct consumption or to carry out new business tasks using EPCIS data.

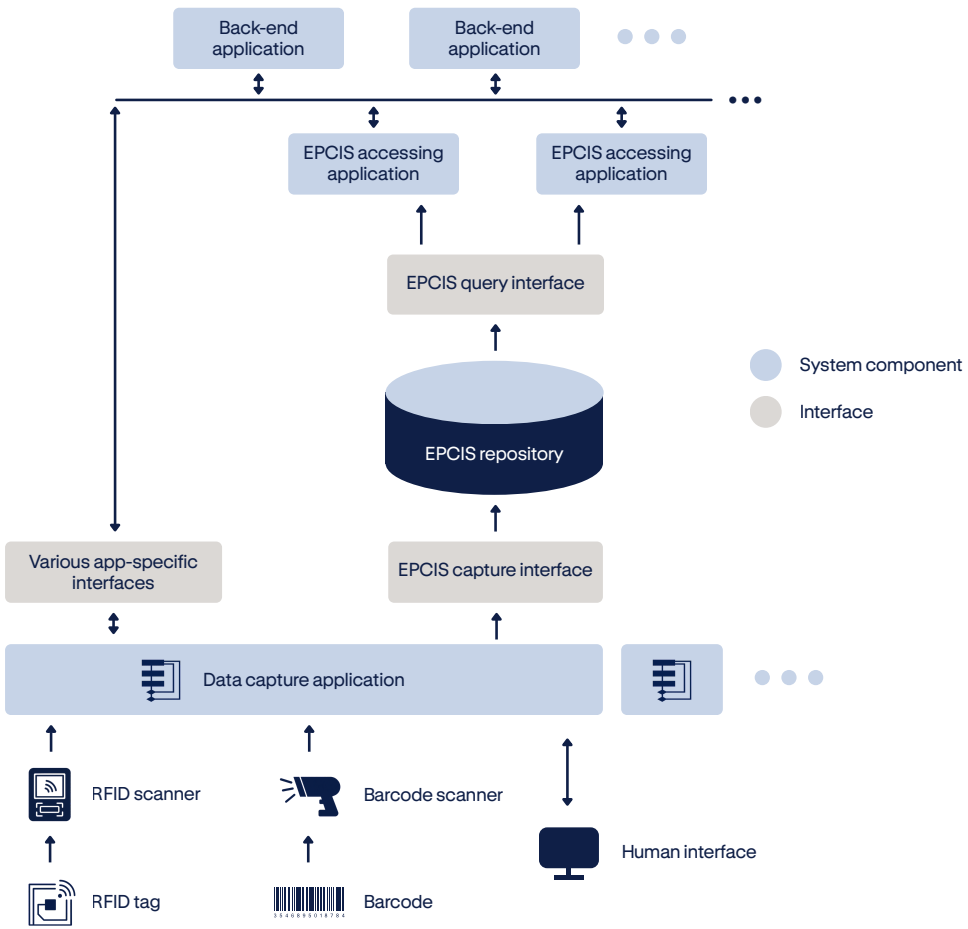


Figure 3: EPCIS tech components

Sharing EPCIS data

Unlike master data or transactional data, which are more static, EPCIS event data can be collected across the entire value chain.

In complex value chains, this often produces very large volumes of events, which makes it challenging to share actionable information within reasonable response times.

Data can be shared through an EPCIS Query Interface in either pull or push mode. Push mode has two variations, pre-arrangement and subscription, as detailed in Chapter 6 of GS1's EPCIS and CBV Implementation Guideline.

Another key concept is separating content from choreography, meaning the arrangement for how data moves between partners. This keeps the content of visibility data independent of how it is shared among stakeholders.

The choreography can be either centralized in one event repository or distributed across multiple repositories, for example, one for each partner in the value chain.



EPCIS 2.0 benefits: enhanced quality, reduced risk, and increased efficiency

For organizations grappling with visibility and traceability challenges, standardizing on EPCIS 2.0 can help to significantly improve operational performance and mitigate risks.

This delivers measurable benefits, such as:



Enhanced quality and risk mitigation

Near real-time visibility into supply chain events, regardless of data origin, helps organizations quickly identify and respond to disruptions. This visibility facilitates more timely interventions, prevents cascading issues, and enables process improvements to mitigate future risks.



Increased efficiency

By casting a light on the supply chain, EPCIS enables companies to identify bottlenecks, optimize workflows, and drive efficiency gains through:

Reduced manual workload: EPCIS supports automated data capture through auto-ID technologies like RFID, which reduces manual effort and helps minimize errors.

Synchronized processes: EPCIS ensures a synchronized flow of information and goods, helping prevent costly halts to production or delays caused by data discrepancies. For example, by capturing aggregation events (e.g., combining individual items into pallets) and including the corresponding business transactions in the “Why” dimension, EPCIS enables a timely, accurate, and efficient receiving processes, while reducing the need for time-consuming manual checks and reconciliation.

Improved collaboration: EPCIS helps create seamless data exchange among stakeholders, facilitating collaboration and reducing communication breakdowns. This shared visibility encourages proactive problem-solving.

The Kezzler platform: EPCIS-driven traceability and compliance

The Kezzler platform represents a culmination of over twenty years of experience in product digitization and traceability. The platform provides a comprehensive solution for capturing, structuring, and sharing data across the value chain.

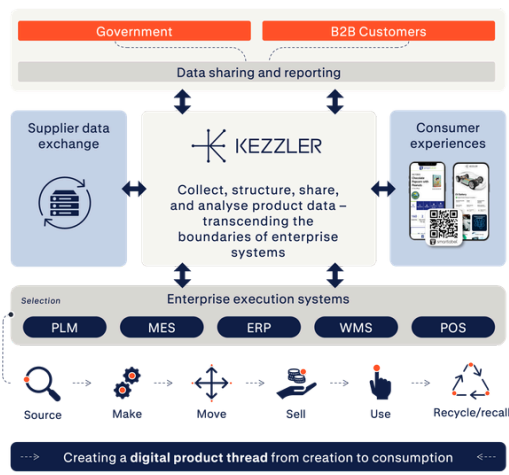
Today, the Kezzler solution suite covers three main areas:

- → Value chain traceability
- → Regulatory compliance
- → Stakeholder engagement

The platform connects enterprise execution systems (such as PLM, MES, ERP, WMS, and POS) with external supply chain partners, collecting, structuring, and sharing event data across organizational boundaries.

By leveraging GS1 EPCIS standards, Kezzler creates a continuous digital product thread — from creation and transformation to consumption and end-of-life — powering the Compliance and Traceability solutions within the Kezzler suite. Indirectly, even the third pillar, Engagement, is enriched by event data. **Ultimately, true transparency relies on robust traceability.**

Kezzler Platform



Solution suite

Engagement

QR Engagement
Deliver enterprise-class management and analysis of QR codes for digital consumer connections.

Smart Packaging
Gather and organize product data to publish digital product labels for transparency and disclosure.

Compliance

EU Digital Product Passport (DPP/DBP)
Secure market access by providing the compliant digital infrastructure required by the EU.

FSMA 204
Ensure seamless audit readiness by automating collection and reporting of required CTE data

Traceability

ProductLifecycle
Follow each product item from manufacturing to end-of-life by registering key lifecycle events.

ProductVerify
Leverage serialised codes to protect your business against counterfeiting, diversion, and inventory shrinkage.

BatchFlow
Transform complex event data into precise batch traceability intelligence in one trusted source of truth.

DataExchange
Collect, harmonise, and securely share traceability event data internally and externally based on GS1 standards.

Figure 4: Kezzler Platform and solution suite overview

Value chain traceability

Kezzler's traceability modules capture and harmonize physical event data across complex multi-tier supply chains, turning raw event streams into actionable operational intelligence:

→ **ProductLifecycle**
Tracks individual serialized items or batches across their complete journey — from raw material sourcing and manufacturing to retail sales, returns, and end-of-life recycling.

→ **BatchFlow**
Transforms complex production event data (Transformation and Aggregation event types) into precise, multi-tier batch genealogy, delivering a single trusted source of truth for ingredient and batch tracking.

→ **ProductVerify**
Leverages serialized item identity (cryptographically generated Kezzler codes or external codes) to perform instant authentication, protecting products against counterfeiting, diversion, and inventory shrinkage.

→ **DataExchange**
Acts as a collaborative data marketplace to collect, harmonize, and share event data internally and with external supply chain partners. It supports both on-demand queries (pull mode) and automated subscriptions (push mode) based on GS1 standards.

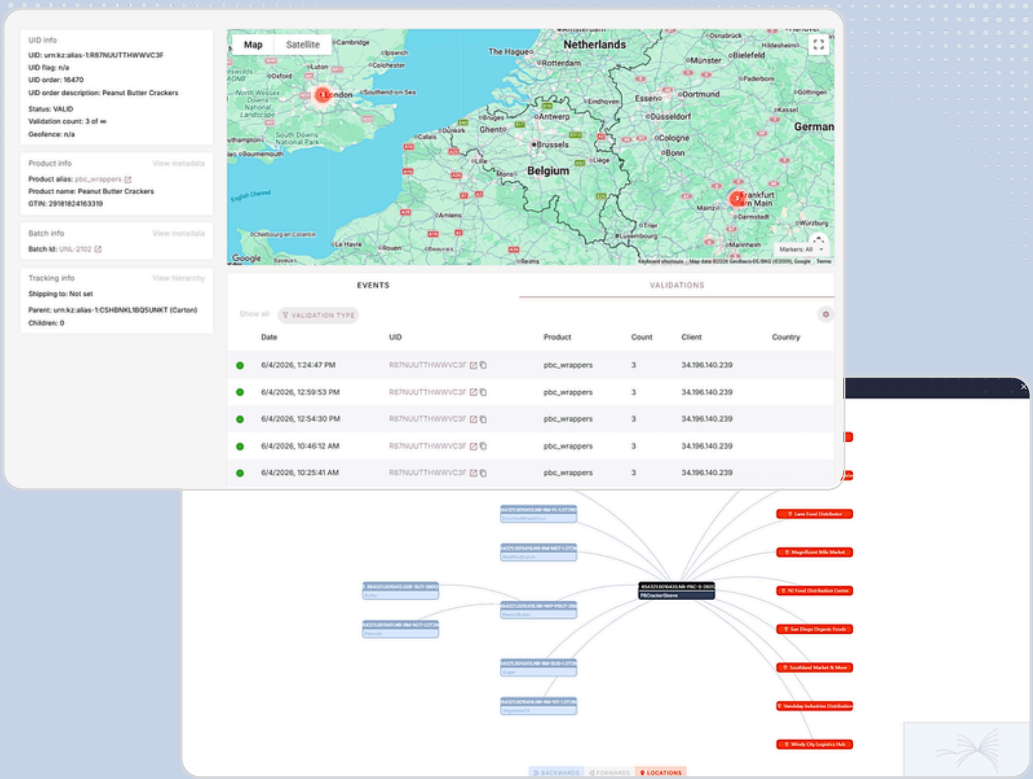


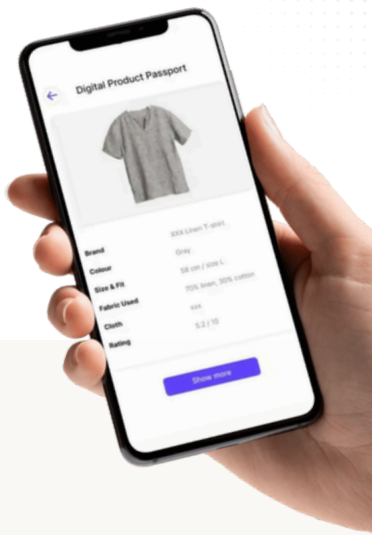
Figure 5: Data Exchange and Batch Flow solutions in the Kezzler Platform

Regulatory compliance

While EU DPP (and DPP requirements in other regions) and FSMA 204 represent key current market drivers, they are illustrative examples of how Kezzler leverages standardized EPCIS event data to meet evolving global regulatory mandates across industries.

→ **EU Digital Product Passport (DPP)**
Provides the digital infrastructure to collect, structure, and share DPP data, such as origin, material composition, and sustainability credentials. The solution follows the semantics required by the European Commission and integrates with the central DPP system, in a workflow that can be configured to automate the generation of consumer facing and machine readable DPPs.

The same data carrier can also meet other requirements, such as DPP rules in other regions or digital labeling under the Packaging and Packaging Waste Regulation (PPWR), while supporting consumer engagement, product authentication, and circular services.



→ **FSMA 204**
Harmonizes batch data from across your supply chain into one coherent view, for faster recalls, streamlined audits, and full FSMA 204 compliance.

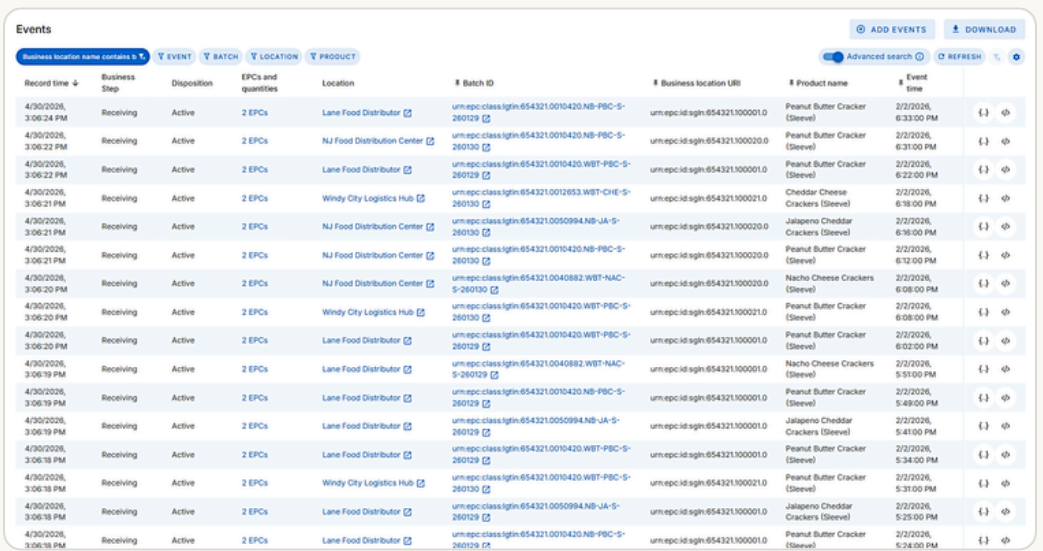


Figure 6: FSMA 204 report table in the Kezzler Platform

Consumer engagement

By connecting physical products to dynamic digital channels via GS1 Digital Link URIs, Kezzler enriches consumer trust with verified supply chain data.



Image source: Royal FrieslandCampina

→ **QR Engagement**
Delivers enterprise-class management and analytics for QR codes, driving personalized digital consumer experiences and first-party data capture. Turns every interaction into a gateway for education, promotions, loyalty, and brand storytelling, across every surface and market.

→ **Smart Packaging**
Gathers and structures product data to publish dynamic digital labels for transparency, sustainability disclosure, recycling guidelines, and targeted recall alerts. Brands get a single source of truth that meets current and evolving disclosure requirements, supported by a detailed analytics dashboard.

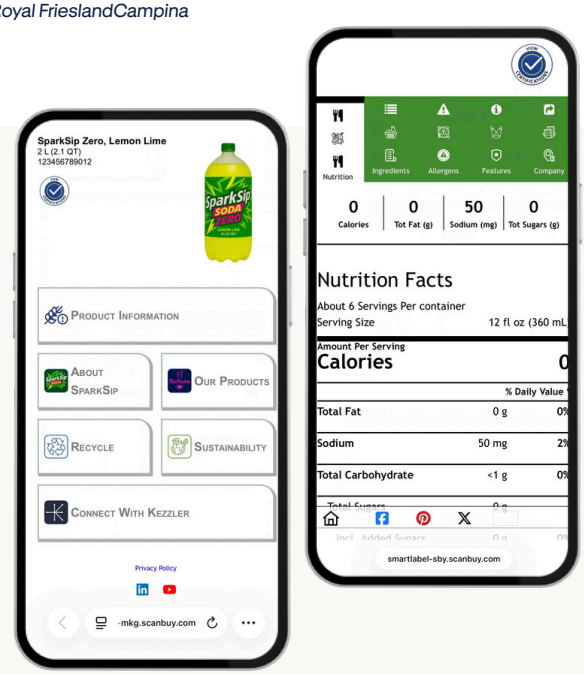


Figure 7: Product landing page and digital label page examples

Kezzler platform EPCIS architecture: Enterprise scale and interoperability

Building the Kezzler platform on GS1 EPCIS standards enables seamless connectivity with existing enterprise execution systems (PLM, MES, ERP, WMS, POS) and facilitates secure, multi-party data exchange across the supply chain.

Kezzler's EPCIS implementation is built on three enterprise-grade pillars:

- **Scalable and immutable data management:** Engineered to handle massive volumes of serialized event data across global deployments. Incoming event streams are stored in an immutable raw events repository, preserving unalterable audit trail fidelity without inserting synthetic or "ghost" events.
- **Flexible data integration and open ingestion:** Kezzler provides RESTful APIs and standard data exchange interfaces that support both web-native EPCIS 2.0 (JSON-LD) and legacy EPCIS 1.2 (XML) payloads from brownfield supplier networks. The platform separates syntax validation from business logic, utilizing configurable alerting mechanisms for suboptimal data rather than blocking critical operational events.
- **Advanced analytics and event interpretation:** A secondary Interpreted Events Repository applies business logic to raw event streams, resolving missing operational links, building complete batch genealogy, and generating actionable insights without compromising raw audit history.



The Kezzler platform is foundationally built on GS1 EPCIS standards, bridging legacy enterprise systems with web-native visibility.

Identify, capture, share: Operationalizing GS1 EPCIS in Kezzler Events

By collecting and structuring both static product master data and dynamic lifecycle event data into a single EPCIS-based data model, Kezzler eliminates enterprise data silos. This single source of truth feeds the entire solution suite — simultaneously powering regulatory compliance, value chain traceability, and dynamic stakeholder engagement.

01

Identify

Kezzler Core and the Digital IDs Repository form the foundation for identity management across all granularity levels — from product classes (GTIN) and batch/lots (LGTIN) to instance-level items (Kezzler UIDs or SGTIN in GS1 Digital Link) and logistical units (SSCC/GRAI). By establishing high-integrity identifiers at production, Kezzler Core provides the standardized 'What' dimension referenced across all downstream EPCIS visibility events.

02

Capture

Kezzler DataExchange facilitates the automated ingestion and normalization of standard EPCIS event types (ObjectEvent, AggregationEvent, TransformationEvent, TransactionEvent, and AssociationEvent). Event data is ingested via RESTful APIs directly from RFID gates, handheld scanners, MES, or WMS platforms across manufacturing, logistics, and retail execution.

03

Share

Kezzler DataExchange functions as a secure event marketplace, enabling controlled data exchange across enterprise boundaries. External trading partners and internal enterprise execution systems retrieve visibility data via on-demand queries (pull mode) or receive configured subscriptions (push mode) based on GS1 EPCIS standards, maintaining synchronized transparency while enforcing data governance.

Unlocking the value of EPCIS data

Dual-repository architecture and analytics

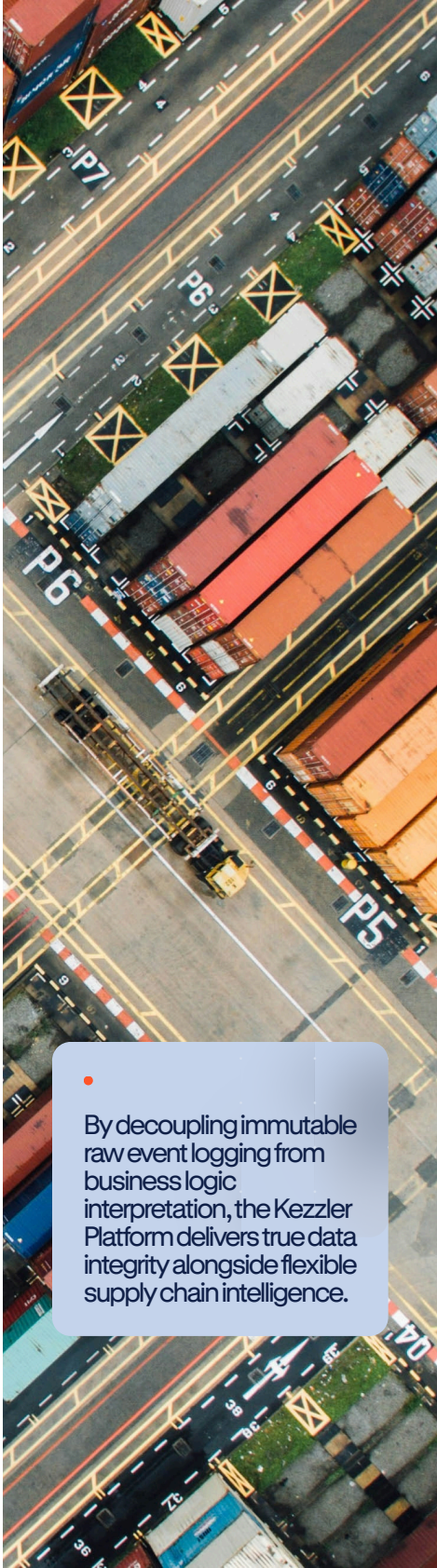
Capturing high-volume EPCIS visibility events across global supply chains is essential, but the true value lies in transforming raw event streams into reliable operational intelligence without compromising audit trail integrity. To achieve this, the Kezzler Platform separates raw data capture from business logic interpretation through a dual-repository model:

Raw events repository (immutable audit log): Maintains an unalterable record of every incoming EPCIS payload as received from suppliers or internal execution systems. Adhering to an open ingestion model, Kezzler avoids modifying raw payloads or inserting synthetic "ghost" events, guaranteeing complete data provenance and audit readiness for regulatory compliance.

Interpreted events repository (business logic and analytics layer): A secondary interpretation engine that applies domain-specific business logic to raw event streams. It connects fragmented event chains, constructs end-to-end batch genealogy, calculates last-known locations, and detects supply chain anomalies — delivering real-time operational insights without altering the underlying raw audit history.

Transactional data versus visibility event data: While traditional enterprise execution systems (such as ERP and EDI platforms) manage static transactional data (e.g. purchase orders, invoices and advance shipping notices), Kezzler DataExchange captures dynamic visibility event data across all five EPCIS dimensions: when (event time), where (location), what (identities and quantities), why (business step and disposition), and how (sensor data and environmental conditions).

Scalability and flexibility: The Kezzler Platform is engineered for scalability and performance, capable of handling the demands of large-scale EPCIS deployments. Supporting some of the world's largest retailers, the platform maintains flexibility and responsiveness, adapting to the unique needs of diverse industries and use cases.



By decoupling immutable raw event logging from business logic interpretation, the Kezzler Platform delivers true data integrity alongside flexible supply chain intelligence.

Demonstrated value: Kezzler's EPCIS solution case studies

Item-level visibility for a global fashion retailer

A leading European fashion retailer, producing billions of garments annually across a vast network of suppliers, faced significant challenges in achieving item-level visibility. Manual processes and disparate systems hindered their ability to track products, optimize inventory, and respond effectively to disruptions in the supply chain.

Solution

By implementing Kezzler's traceability solution and using GS1 Digital Link (encoded as a QR code) together with RFID technology, the retailer achieves end-to-end, item-level traceability.

- **Product digitization:** Each garment is assigned a unique digital identity using GS1 Digital Link, enabling granular tracking and data association.
- **RFID integration:** Source tagging with RFID simplifies data capture and enables efficient aggregation of items and shipments using the standard EPCIS AggregationEvent type.
- **EPCIS event tracking:** Key events, including commissioning, shipping, receiving, and retail sales, are captured as EPCIS events, providing a comprehensive audit trail.
- **Real-time visibility:** Kezzler provides real-time insights into production status, inventory levels, and product movements across the entire supply chain.

Benefits

- → **Improved inventory management:** Real-time visibility enables accurate inventory tracking, reducing stockouts and overstocking.
- → **Higher production efficiency:** Accurate production data supports better planning and reduces manual reconciliation.
- → **Smoother logistics:** Efficient aggregation and tracking of shipments minimizes delays and improves delivery accuracy.
- → **Loss prevention:** Item-level tracking helps deter theft and makes it faster to identify stolen goods.
- → **Extended product lifecycle management:** Tracking products beyond the point of sale makes it possible to support repairs, resale, and take-back programs.

Results

The retailer gains clear visibility into its global inventory, enabling data-driven decisions, improved operational efficiency, and higher customer satisfaction. Kezzler's scalability supports seamless management of hundreds of billions of data points, providing a robust foundation for future growth.

End-to-end supply chain visibility for a grocery retailer

A large European grocery retailer struggled with inefficiencies, manual data entry, and poor supply chain visibility. Too much time was spent on manual tasks like data entry and handling code carrying paper labels. Limited collaboration and data sharing among stakeholders hindered process improvements, while system challenges and data volumes forced critical data to be archived, undermining its value for optimization.

Solution

By implementing RFID-enabled RTIs and deploying Kezzler DataExchange as a centralized data marketplace, the retailer improves efficiency, on-shelf availability, traceability, food safety, and waste reduction.

- **RFID enabled RTIs:** Each returnable transport item is assigned a unique, serialized GRAI for efficient and secure identification as well as better utilization of the RTIs.
- **Kezzler DataExchange as a collaborative marketplace:** Supply chain stakeholders are onboarded to a single event marketplace, enabling secure multi-party data sharing via standard EPCIS on-demand queries (pull) and subscriptions (push) without requiring complex bilateral EDI setups.
- **Standardized EPCIS event tracking:** Supporting both legacy EPCIS 1.2 XML and web-native EPCIS 2.0 payloads from brownfield suppliers, the platform records batch-level produce linked to RTIs and aggregates RTIs onto pallets with Serial Shipping Container Codes (SSCCs). Key logistics steps — including picking, commissioning, shipping, and receiving — are captured using EPCIS event types (ObjectEvent, AggregationEvent and TransactionEvent).

Benefits

- → **Improved supply chain efficiency:** Automated data capture of critical events reduces manual data entry, errors, and time. RFID-enabled RTIs and aggregated SSCCs on higher levels allows for accurate, efficient goods receiving and distribution.
- → **Synchronized flow of data and goods:** Event data capture at any critical process step and including transaction documents as part of events ensures seamless supply chain handoffs.
- → **Improvements to process and batch-level traceability:** Full visibility enables accurate measurement and optimization (e.g., comparing tomato shipment durations or conditions). Batch-level traceability all the way back to the source enables efficient recalls.
- → **Reduced waste and improved service levels:** More efficient supply chains allow for smaller, frequent deliveries, cutting waste while improving service.

Results

The retailer gains full visibility into critical process steps, enabling them to measure and improve processes and supplier performances. Automated data capture reduces manual work and errors. Efficiency improvements support smaller production runs, reducing waste and enhancing service levels.

Granular traceability for food safety and recall management in food production

A food manufacturer experienced a major product recall due to raw ingredient contamination. This scenario highlights the critical need for end-to-end traceability across complex manufacturing processes to protect consumer safety and brand reputation. Capturing visibility data in standardized EPCIS 2.0 format provides the granular, audit-ready traceability required throughout the entire production lifecycle.

Solution

By deploying the Kezzler platform to digitize ingredient inputs and capture critical manufacturing steps, the producer established real-time batch genealogy and automated recall readiness:

- **Ingredient tracking:** Kezzler Core assigns and manages unique batch/lot identifiers (LGTINs) for incoming raw ingredients, establishing origin provenance and enabling full tracking from supplier receipt to finished products.
- **Transformation event capture:** The manufacturing process (including mixing and packaging) is using EPCIS transformation events to preserve batch information throughout product transformations.
- **Real-time visibility:** Kezzler DataExchange provides real-time visibility into multi-tier batch genealogy, enabling rapid upstream and downstream tracing to pinpoint potentially compromised batches.
- **Targeted recall capabilities:** In the event of a contamination incident, the solution can deliver precise identification and recall of affected batches, minimizing disruption and waste.

Benefits

→ **Enhanced food safety:** Granular traceability enables proactive identification and mitigation of contamination risks, protecting consumer health.

→ **Reduced recall scope:** Targeted recall capabilities minimize financial losses and prevent unnecessary removal of safe products from the market.

→ **Improved supplier management:** Traceability data facilitates collaboration with suppliers to identify and address root causes of contamination.

→ **Strengthened brand reputation:** Demonstrates a commitment to food safety and to proactive risk management, enhances consumer trust, and increases brand loyalty.

Results

The manufacturer can significantly reduce the risks associated with future recalls and strengthen its food safety protocols. The Kezzler Platform provides a robust, standardized EPCIS 2.0 framework for managing multi-tier product traceability, protecting consumers, and ensuring business continuity.

How to prepare: visibility modeling

A successful EPCIS implementation requires thorough preparations, particularly in relation to well-engineered processes and identification of critical business steps that require visibility. Following the eight steps in GS1's "Visibility modeling methodology" will be quite helpful for most companies (for a more comprehensive implementation guideline, we recommend studying GS1's EPCIS and CBV Implementation Guideline):

01 **Collect visibility goals and requirements**
The main question to answer here is "What problem(s) are we trying to solve, and what are the requirements to meet those goals?"

02 **Document the business process flows**
Once the overall requirements are understood, the detailed process flow and specific data requirements based on EPCIS and the CBV can be determined.

03 **Break each process flow into a series of discrete business steps**
Before deciding on where more visibility is needed, every business step in the process should be documented.

04 **Decide which business steps require visibility event**
Which business steps need visibility events depends on two factors: which data is valuable and which data is feasible to capture. In general, data is valuable if it helps solve the problem directly, or if another critical step in the process needs the data (e.g., in a goods receiving process on pallet level it's usually valuable to know the content of the pallet).
This is a task that should involve all stakeholders to make sure all parts and interests are covered. If data is valuable but not feasible to capture, it's worth investing some time to consider if small process adjustments could facilitate events capturing.

05 **Model the completion of each step as a visibility event**
Now the steps where visibility is needed are known, and the EPCIS data that will capture what happens in each step can be designed. The first decision is to select the event type (discussed above) that best fits each situation, and then define the action (add, delete, observe) if the decision is to use, e.g., an ObjectEvent or an AgreggationEvent.

06 **Decide what data fields are to be included in the visibility event**
The next decision is to define what data to populate the five EPCIS dimensions with. A good rule is to start asking what the receiving application needs to understand what has happened in the event. If the standard EPCIS data fields do not cover the needs, extensions can be customized if necessary (keep in mind that this will influence overall interoperability).

07 **Determine the vocabularies that populate each data field according to section 7 and 8 of the CBV standard**
The recommended vocabulary to use to populate the data elements in all the EPCIS dimensions is described in GS1's Core Business Vocabulary. If the CBV does not contain any appropriate identifier for a given data element, it is possible to create new — but as before, not without negative effects on interoperability. Note that it is highly recommended to use the GS1 Digital Link format with EPCIS 2.0.

08 **Document the visibility events in a Visibility Data Matrix**
When previous steps 5-7 are described for all business steps requiring visibility events, the results should be documented in a Visibility Data Matrix (as illustrated on the next page).

Visibility data matrix

DIM	Data element	V1	V2	V3	V4
	Description	Print and apply case label	Print the pallet label	Pack cases into pallet	Ship the pallet
	Event type	ObjectEvent, AggregationEvent	ObjectEvent, AggregationEvent	ObjectEvent, AggregationEvent	ObjectEvent, AggregationEvent
	Action	ADD	ADD	ADD	OBSERVE
What	**EPC list**	SGTIN of case	SCC of pallet	Parent: SCC of pallet; Children: SGTIN of cases	SCC of pallet
When	**Event time**	Current date/time	Current date/time	Current date/time	Current date/time
	Event time zone offset	Local timezone offset	Local timezone offset	Local timezone offset	Local timezone offset
Where	**Read point**	SGLN of packaging line	SGLN of packaging line	SGLN of packaging line	SGLN of packaging line
	Business location	GLN of factory	GLN of factory	GLN of factory	(omitted)
Why	**Business step**	Commissioning	Commissioning	Packing	Shipping
	Disposition	Active	Active	In progress	In transit
	Business transaction list	(omitted)	(omitted)	(omitted)	Retailer's GLN + PO # Manufacturer's GLN + invoice #
	Source list	(omitted)	(omitted)	(omitted)	owning_party: Manufacturer's GLN or PGLN
	Destination list	(omitted)	(omitted)	(omitted)	owning_party: Retailer's GLN or PGLN

Figure 4: Visbility data matrix

Embracing EPCIS 2.0 for a transparent future

The convergence of the EPCIS 2.0 standard, rising consumer demand for transparency, and evolving regulations, such as the EU's Ecodesign for Sustainable Products Regulation (ESPR), signals a significant shift in supply chain management. Digital Product Passports, mandated by the ESPR and other regulations, will further accelerate product digitization and create strong conditions for adopting EPCIS 2.0. The EU Battery Regulation, for example, already requires digital battery passports for certain categories of larger batteries from February 2027.

As organizations digitize more of their products, the opportunity to capture and use granular event data grows. EPCIS 2.0 provides the framework for comprehensive visibility and traceability, enabling:

- → **Greater operational efficiency:** Simpler processes, reduced manual effort, and improved inventory management.
- → **Proactive risk mitigation:** Early detection of disruptions, targeted recalls, and improved quality control.
- → **Increased transparency and trust:** Product information and provenance that meet consumer demand and strengthen brand reputation.
- → **Support for circular economy initiatives:** Product repairs, resale, and recycling made possible through secure data sharing.

Powered by EPCIS 2.0, the Kezzler Platform empowers businesses to maximize the value of product digitization, adapt seamlessly to regulatory shifts, and build connected, data-driven supply chains that are agile, transparent, and sustainable.



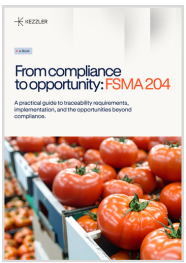
Ready to put GS1's EPCIS 2.0 standard to work? Contact us to explore how Kezzler can bring full visibility to your supply chain.

Have a look at our other resources

e-Books, white papers, and solution briefs









Case studies











Webinars













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