



Maximizing Returns

The Role of Tracking Technologies in Reusable Container Management



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The Global Returnable Packaging market is anticipated to grow significantly through 2028 due to increasing demand from numerous sectors led by the automotive industry. Returnable packaging is environmentally friendly, reducing the amount of packaging trash in landfills and promoting a positive customer brand.

The returnable packaging industry includes returnable containers like pallets – wood and plastic, kegs, barrels, racks and other specialized containers. How do companies ensure their returnable containers do return to the owning company? Employing an effective reusable container tracking system helps companies optimize their valuable assets, providing a maximum return on their investment.

This resource answers many questions about reusable containers and tracking them and provides real-world customer success stories about their returnable container tracking applications.



Unlocking the Value of Returnable Containers

Companies use returnable containers for various reasons as they offer several advantages over traditional disposal containers, including:



Cost Savings

As the name implies, returnable containers can be reused multiple times, reducing the need for frequent purchases of disposable containers. Over time, this can lead to significant cost savings in packaging and logistics expenses.



Environmental Sustainability

Reusing containers instead of discarding them after a single use helps reduce waste and minimize the environmental impact of packaging materials. Companies can demonstrate their commitment to sustainability and ecological responsibility by implementing regulable container systems.



Improved Supply Chain Efficiency

Returnable containers are designed for durability and easy handling. They often feature standardized sizes and shapes, making them suitable for automated handling and storage systems, streamlining processes and reducing the time and effort required to load, transport and unload goods.



Branding and Marketing Opportunities

Returnable containers can be branded with company logos, colors, or other marketing messages. This branding helps reinforce the company's image and visibility throughout the supply chain.



Regulatory Compliance

In some industries, regulations or industry standards are promoting the use of returnable containers to reduce waste and enhance sustainability practices. Returnable containers can help companies comply with these regulations and meet industry expectations.

Efficiently Navigating Container Management: Enhancing Visibility and Operations

Container management refers to monitoring and tracking returnable containers' movement, location and status as they are transported and through different stages of the supply chain. This practice is crucial for organizations to ensure the timely and efficient delivery of goods and offers multiple benefits including:

- 1. Improved Visibility** – Businesses gain better visibility into their supply chain operations, allowing them to make informed decisions, optimize routes and address potential delays.
- 2. Efficient Resource Allocation** – Real-time tracking helps allocate resources such as labor, transportation and storage more effectively, reducing operational costs and enhancing efficiency.
- 3. Enhanced Customer Service** – With accurate tracking information, companies can provide customers with timely updates on shipment status, improving customer satisfaction.
- 4. Risk Management** – By monitoring conditions such as temperature and humidity, companies can ensure that sensitive or perishable goods are handled appropriately, minimizing spoilage and losses.
- 5. Security** – Container tracking helps mitigate security risks by identifying unauthorized access or tampering during transportation.





Returnable Container Tracking: Key Technologies and Operational Advancements

Container tracking systems can vary in complexity, ranging from simple track-and-trace solutions to comprehensive logistics platforms that integrate with other supply chain management tools. These systems often use a combination of hardware devices and software applications to collect, process and present tracking data to users in a meaningful way.

The unique identifier, or number, is at the core of returnable container tracking technologies. This number can carry or be linked to essential information about the returnable container, such as its origin, destination, contents and status. This data can be used for various purposes, such as asset management, tracking the container's journey, and monitoring its conditions. Tracking returnable containers involves the use of multiple technologies to monitor and manage their movements throughout the supply chain including:



Barcodes

Barcodes are one of the simplest and most widely used tracking technologies. Each returnable container is assigned a unique barcode, which can be scanned at various points in the supply chain to record its movements.



Radio Frequency Identification (RFID)

RFID tags and readers enable wireless communication and automated data capture. RFID tags are placed on or embedded within returnable containers, and RFID can detect and record the containers' presence and movement without requiring line-of-sight scanning.



Cloud-Based Tracking Platforms

Data from tracking technologies is sent to cloud-based tracking platforms. These platforms centralize the data and provide real-time visibility into the movement and status of returnable containers.



Mobile Applications

Employees or partners can use mobile applications to scan barcodes, read RFID tags, or update container status.

By leveraging these technologies, companies can gain better control over their returnable container assets, improve supply chain efficiency, reduce losses and enhance overall operational performance.



Using Barcode to Track Returnable Containers

Barcodes are a widely used and effective technology for tracking returnable containers due to several advantages they offer for container management including:

- 1. Cost Effective** – Barcodes are relatively inexpensive to produce. Implementing a barcode system is a cost-effective way to track returnable containers.
- 2. Simplicity and Ease of Use** – Barcodes don't require sophisticated equipment or extensive training. The risk of manual data entry errors is significantly reduced since scanning the barcode eliminates the need for manual typing.
- 3. Accuracy** – Barcodes provide accurate and reliable data capture. The risk of manual data entry errors is significantly reduced since scanning the barcode eliminates the need for manual typing.
- 4. Scalability** – Barcode systems can quickly scale to handle large numbers of returnable containers. As the number of containers increases, adding new barcodes and integrating them into the existing tracking system is easy.
- 5. Durability** – Barcodes can be printed on durable materials and affixed with strong adhesives, making them resistant to wear, tear and environmental conditions typically found during transportation and handling.
- 6. Interoperability** – Barcodes are widely accepted and recognized across various industries and supply chain partners. They provide a standardized way of identifying returnable containers, ensuring compatibility and ease of integration with different systems.

While barcodes have certain limitations, such as limited data storage capacity compared to RFID or other automated technologies, they remain a popular choice for tracking returnable containers due to their simplicity, cost-effectiveness, and reliability. Many businesses find barcode systems an efficient solution for gaining visibility and control over their container assets throughout the supply chain.



Using RFID to Track Returnable Containers

RFID is a powerful technology that offers several advantages for tracking returnable containers. Its unique capabilities make it an excellent choice for container management and supply chain operations.

- 1. Automatic and Contactless Tracking** – RFID tags can be read without the direct line of sight, enabling automated and contactless data capture. This feature allows for faster and more efficient tracking of containers, as they can be scanned even when stacked or enclosed within other containers.
- 2. High Data Storage Capacity** – RFID tags can store significantly more data than barcodes. This allows them to carry additional information about the container, such as its contents, origin, destination, maintenance history, and other relevant details.
- 3. Real-Time Visibility** – RFID readers can provide real-time tracking information, allowing companies to monitor the location and status of returnable containers at any point in the supply chain. This real-time visibility facilitates better decision-making, improves operational efficiency and enables faster response to issues or delays.
- 4. Increased Accuracy** – RFID eliminates the need for manual scanning, reducing the risk of human error. With RFID, data capture is automated, leading to higher accuracy and more reliable tracking information.
- 5. Long Read Ranges** – RFID technology offers extended read ranges, allowing multiple containers to be scanned simultaneously from a distance. This feature is particularly advantageous when managing many containers in warehouses or during transportation.

While RFID is more expensive and can be more complicated to implement than other automatic identification technologies, it is an excellent choice for tracking returnable containers due to the ability to scan multiple containers simultaneously and not requiring direct line-of-sight to be read.

RFID or Barcode for Tracking Containers

How Do You Choose?

When deciding between RFID and barcode technology for container tracking, your selection hinges on various factors. These factors include your business's unique requirements, financial considerations, environmental circumstances, and the level of automation you seek. Each technology has advantages and drawbacks, necessitating a tailored assessment based on your use case. Here's a concise comparison to facilitate an educated choice.



Data Management

RFID provides ample data storage capacity, allowing you to house extensive information about each container on the tag itself, encompassing its history, upkeep records, contents, and whereabouts. Alternatively, the license plate approach assigns a distinct identifier to each container, connecting to backend database details.



Automation and Efficiency

The level of automation required for container tracking is a crucial consideration. With its non-line-of-sight reading capability and ability to read multiple tags simultaneously, RFID supports automated, touchless data capture, significantly boosting efficiency and curtailing manual labor. RFID might prove more suitable if extensive container volumes and seamless integration with automated systems are vital.



Cost and Budget

Barcodes generally offer a more cost-effective solution concerning equipment and setup, making them appealing for businesses constrained by budgets. Although RFID entails higher upfront costs, it could yield more substantial long-term benefits and return on investment (ROI) for businesses necessitating advanced tracking features.



Environmental Aspects

RFID performance can be influenced by specific materials and environmental factors like metal or moisture. In contrast, barcodes are generally more robust across diverse environments, rendering them preferable for challenging conditions.



Integration with Existing Systems

Barcodes are compatible and can be seamlessly integrated into existing inventory management and logistical systems. This feature makes them a convenient option to leverage your current infrastructure. On the other hand, RFID integration might demand significant modifications and investments in compatible hardware and software.



Scalability

The scalability of RFID is notable, thanks to its capacity to manage large quantities of containers and support intricate logistics.

Ultimately, the decision between RFID and barcodes for returnable containers rests on your precise requirements and objectives. In some instances, combining both technologies could present an optimal solution, harnessing each technology's strengths for different facets of container management.

Getting Started

Effectively Implementing a Container Tracking Solution

The decision to track your containers should not be taken lightly. It requires total buy-in throughout the organization. Done correctly, the organization will reap the benefits of the container tracking system for years to come. To get started tracking returnable containers, a company should follow a systematic approach that involves the following steps:

- 1. Define Objectives and Requirements** – clearly outline the goals and objectives of the container tracking initiative. Identify the specific data you need to capture, the required visibility level, and the key performance indicators (KPIs) you will use to measure success.
- 2. Choose the Tracking Technology** – Evaluate the available tracking technologies based on your requirements, budget and operational considerations. Consider data storage capacity, automation capabilities, real-time visibility and integration with existing systems.
- 3. Select Container Identification Method** – decide on a unique identification method for each container, such as assigning a unique barcode or RFID tag.
- 4. Select Tracking Hardware and Software** – acquire the necessary equipment, such as barcode scanner, RFID readers, etc. Be sure to ensure compatibility with software selected for data management and analytics.
- 5. Tag Containers** – affix barcodes or RFID tags to each container and ensure the tracking technology is properly integrated with your system.
- 6. Data Collection and Analysis** – start collecting tracking data for the returnable containers. Utilize the data to analyze container movement, identify patterns, optimize routes and access container utilization and maintenance needs.
- 7. Integration with Existing Systems** – if needed, integrate the container tracking data with your existing inventory management, logistics, or ERP systems to ensure seamless data flow and comprehensive visibility.

Using these steps, a company can effectively implement a returnable container tracking system, leading to improved asset management, better supply chain visibility and enhanced operational efficiency.



Case Studies

Pallets, wine barrels, and beer kegs – what do these items have in common? The companies described herein have a vested interest in tracking and managing all types of returnable containers. See why they all turned to Metalcraft for assistance implementing their returnable container tracking systems.

Protecting Pallets

TriEnda, Metalcraft partner to provide innovative packaging solutions



Background

Sustainability is a buzzword in many industries today. Companies look to become more sustainable by investing in returnable containers. They can be kinder to the environment and the company's balance sheet by not having to purchase single-use containers continually.

Many companies don't stop there. To maximize their investment in their returnable containers, they seek innovative ways to track their pallets and products. More intelligent systems lead to less loss and less loss leads to happy customers. That is a concept that Wisconsin-based TriEnda wanted to explore further.

Opportunity

TriEnda, the largest manufacturer of thermoformed packaging and material handling solutions in North America, had customers in both the automotive and food and beverage industries inquire about making their systems smarter using radio frequency identification (RFID) technology. After researching potential options, the team at TriEnda found Iowa-based Metalcraft, a manufacturer of customized, durable RFID labels and tags. "We knew of Metalcraft in the industry, so we contacted them about RFID," said Heidi Bulgrin, New Product Development Manager at TriEnda.

Challenge

Several challenges faced the team when they started offering RFID. First, RFID is not a one-size-fits-all technology. Different companies wanted to track information about the pallets and the products they carried. With Metalcraft's customized RFID programming capabilities, this was a non-issue. The Metalcraft team even worked with the individual customers' internal IT teams to ensure an easy integration to their backend software.

Finding the correct RFID tag was another issue the team faced. TriEnda wanted to assure their customers the RFID tags would survive the environment they'd be exposed to regularly. Again, the Metalcraft team provided RFID tags with different adhesives for customers to test. "The samples went a long way in securing the business because they eased customers' minds – ensuring that not only the technology would work, but that the adhesive would last as well," said Bulgrin. "Metalcraft also provided test reports that showed tag durability."

Solution

Metalcraft's support went beyond finding the right product for TriEnda's customers. They helped the team better understand how incorporating RFID into an asset-tracking system would benefit their customers. "Metalcraft was able to provide the knowledge and education we needed to feel comfortable offering RFID to customers," said Bulgrin. "They walked us through the process and ensured we were all on the same page." Metalcraft also worked with TriEnda's integration partner to ensure the system worked smoothly.

Result

Bulgrin reports TriEnda now offers the RFID system as a standard product. The system also appears to be pandemic-proof, as this portion of TriEnda's business continues to grow during COVID-19. "Customers have less loss of products and pallets," she said. "We were able to provide value-add, and it wasn't that expensive to add the tag component, which is the most important part."

It's been a great partnership between TriEnda and Metalcraft. "Ultimately, we chose Metalcraft because they had the best solution, price and service," said Bulgrin. "We know these tags will last as long as the pallets themselves."

If the Shoe Fits

KegShoe and Metalcraft partner to provide a complete keg-tracking solution



Background

Keg tracking is tagging and tracking kegs through the production and distribution process, gathering insights into where containers are and determining what's in them. For most breweries, the process involves a combination of scattered papers and scribbled whiteboards, but advancements in mobile keg tracking technology are helping to solve this.

At its core, Canadian-based Kegshoe is software for craft brewers that helps them manage their inventory and keep track of their products and sales. However, in reality, it's so much more. Kegshoe provides:

- An intuitive, mobile keg tracking solution
- Allowing breweries to track their entire fleet – including filling
- Delivering and returning – all with just the phone in their pockets

Kegshoe works to empower breweries to increase turnover, reduce keg loss, streamline their distribution cycle, and make the most of their limited resources.

Properly tracking, maintaining and inventorying kegs using Kegshoe allows breweries more flexibility to brew the beer they want, ensure the product is as fresh as possible and track their business's expensive assets. Simply put, keg management is essential to running a successful brewery.

Challenge/Opportunity

Kegs are an expensive yet essential asset for breweries, so they cannot afford to lose or misplace something critical to their business's success. According to Nick Amador, Kegshoe's Head of Growth, the average brewery should factor in a loss rate of 5-10% annually.

Kegshoe's challenge was helping customers to track their keg inventory—information in the barcode links to the product inside the keg and the keg's history. The derived data lets brewers know what products are selling and how to maintain a quality project. By identifying and tracking how many days the beer has been in the kegs, brewers can manage their inventory and deliver the best products possible to their customers – never selling lousy beer.

The software is just one piece of the puzzle. Breweries need to link the asset (keg) to the information being tracked about the asset (keg) and its contents. That's where the labels come in. "Labels are an important piece," said Amador. "They are the backbone of the software."

Amador explains that the company bounced around a lot with different label supplies. "The kegs go through a lot – both hot and cold temperatures, so the labels take a lot of abuse," said Amador. "We needed labels that would withstand those conditions."

Solution

After researching, Amador came across Metalcraft and contacted Territory Specialist Mike Winchell. "He's been great to work with," said Amador. "He explained the different materials and sent samples for us to test."

Ultimately Amador and his team decided to go with Metalcraft's Premium Polyester Barcode Labels due to their flexibility and ability to withstand the rigors of the environmental conditions the kegs are exposed to. "The lead time is great," said Amador.

Adhesive performance is key to a successful implementation, and the Metalcraft labels have more than been up to the task. "The adhesive performance has been great," said Amador. "It's been testing on all kinds of kegs and coatings, from stainless steel to plastic and rubber.

Result

Kegs can last upwards of 20 years with proper cleaning and maintenance, so the labels need to last the asset's lifetime and track the keg's entire history. "We've been using them for 1.5 years and they've been working out great," said Amador. "The labels have received great reviews from our customers."

In addition to providing quality products, Amador reports that the customer service they receive from Metalcraft is excellent. "It allowed us to be responsive to our customers because we had confidence in the service we received."

Tracking Spirits

GlobeRanger and Metalcraft team up to provide ID solution to whiskey distillery



Opportunity

Making whiskey is an age-old process that large distilleries have down to a science. One large US-based distillery wanted to improve its data collection process by integrating RFID technology to track and utilize data about a critical asset in the production process – the barrel.

To accomplish this, they turned to GlobeRanger, a provider of intelligent edgware for IOT enablement and asset inventory management for manufacturing, distribution/logistics, aviation, construction, healthcare and defense.

Challenge

GlobeRanger set out to develop a system to assist their customer in liquid loss prevention by capturing as many data points as possible. Fluid loss can happen in several ways, from evaporation due to environmental conditions, aka “angel’s share,” to inefficiencies in harvesting. Regardless of how the leakage occurs, it can be an expensive issue for the distillery to manage in this highly regulated industry and potentially a considerable loss of revenue.

Proper barrel management is essential in liquid loss prevention. Distilleries constantly reuse barrels and need to know where they are stored and for how long. “The barrel ID is like a birth certificate, and the data points are a breadcrumb trail tracking its history,” said Joe East, Director of Customer Support at GlobeRanger.

Solution

The project has several phases. The first phase involved identifying over 2.1 million barrels at three locations with a unique identifier to perform accurate inventories. The second phase involved determining the barrel and its contents during filling. The third phase consists of the harvest process. Harvesting occurs when the liquor is put into the barrels and stored. Ensuring contents are not mixed is essential as mixing changes the flavor profile, potentially compromising more expensive brands with lower-level liquor and a lower price level.

GlobeRanger worked with Metalcraft to develop the RFID tag to track the whiskey barrels. “We’ve worked with Metalcraft for over seven years and have a long-standing relationship,” said East. “We work together to find the right RFID tag for the application and industry.”

The team at GlobeRanger gave Metalcraft the criteria their customer developed. “Metalcraft showed a lot of ingenuity in developing the product,” said East.

The customer needed a tag that wouldn’t tear and had to have both barcode and RFID. In addition, the tag had to be printed using FDA-approved ink in case it came in contact with any product.

Surviving the environment wasn’t the only concern for Metalcraft when developing the tags. The labels needed to work with the automation equipment installed at the distillery. Metalcraft engineers made material and liner adjustments to ensure a smooth process. They also helped develop a quality assurance process, according to East.

Result

The team reports the solution is working well, and they are already looking at additional enhancements to the application.

Future plans include incorporating IOT (Internet of Things) devices to track environmental data, i.e. temperature and humidity to determine if there is any impact on the product.

Exceeding Expectations

Metalcraft RFID labels prove more than up to the challenge in a distribution center



Opportunity

An industry leader in pallets, waste and recycling containers and supply chain solutions, helps thousands of customers worldwide streamline their supply chain systems. To meet the needs of their large and diverse customer base, they needed an identification (ID) product partner they could count on.

They reached out and started working with Metalcraft, a manufacturer of customized barcode labels and radio frequency identification (RFID) tags, nearly ten years ago for barcode and RFID products with many of their customers.

Challenge

Recently, one installation caught the Solution Architect's attention. As he was swapping out some product, he came upon pallets with Metalcraft RFID tags that he concluded were at least six years old because of their early tag value sequence.

"When I started checking some of the labels, I was surprised to see the adhesive remaining intact and the tags reading as if they were brand new," he commented to Metalcraft. Many of these labels were on pallets in active circulation since 2015. He noted that the pallets often don't last that long in a typical distribution center environment, let alone the labels.

Distribution centers can be hot and dirty, with temperatures ranging from 70°F to 120°F with both forklifts and pallet jacks abusing the pallets regularly. Given these conditions, the Solution Architect was impressed with what he found. "I was amazed to see these pallets and tags still operating and active with a 20 ft plus read range."

Solution

The application described herein involves a plastic pallet. Drivers bring pallets back and forth from convenience stores to restock shelves, aka "milk runs." The pallet and contents are first tied together at the distribution centers where the tag is read and then to both the pallet and in the software on the backend. This is known as load verification – ensuring the correct items are loaded onto the suitable pallets and ultimately sent to the correct location.

Automating the quality assurance (QA) process on load verification helps minimize missed deliveries to convenience stores, a problem costing \$25-30 million annually nationwide.

Result

While the application described above is worth noting, the customer says Metalcraft's support is central to their relationship.

"They (Metalcraft) provide support internally by testing potential new adhesives, looking at potential new substrates and explaining the importance of the tag construction and its correlation to tag longevity."

The Solution Architect also noted they have completely gone away from less durable wet inlays for this application because of the shift from hot and cold temperatures and the exposure to chemicals. "We can't have them shrink going through the wash process," he said.

Additionally, the importance of tag construction can be seen with onsite printable tags. For example, if things are not set up correctly – meaning the wrong adhesive is used – tags will fall off the pallets, or adhesive could gum up the printers for onsite printable RFID tags.

This leading manufacturer plans to continue working with Metalcraft – providing customers with complete identification solutions so durable and reliable they may even continue surprising themselves!

Improving Distribution

Casey's turns to Metalcraft for durable labels for use on returnable containers



Challenge

A thin profit margin in the convenience store business puts extra pressure on inventory control, so individual Casey's General Stores holds no inventory. Instead, delivered items are placed directly on the shelf space. The publicly owned chain's nearly 2,000 stores place orders that are filled in weekly shipments across 14 Midwestern states from 600,000 square feet of distribution center space in Iowa and Indiana.

This just-in-time approach includes SKUs available as single items to reduce dollar amount inventory and retain freshness. The distribution centers use a voice picking system to fill reusable totes combined on pallets and loaded to semi-trailers that leave every 30 minutes, 24-hours a day, six days per week.

Each reusable tote is assigned to an order with a barcode scanner. When it's filled and ready to ship, tote pullers scan them again at the end of the line to ensure they get to the right pallet.

The trouble was that Casey's more than 150,000 tote inventory labels weren't sticking.

"We were using just a standard label on each side of the tote that we could run through our printers and they weren't holding very well," said Bill Brauer, distribution center manager. "We didn't want to replace them all the time."

Fortunately, Brauer got a call from Metalcraft as he recognized the need for a more robust label.

Solution

Brauer worked with Metalcraft to select Premium Polyester Barcode Labels for the reusable totes.

"Our best-case scenario would be to reuse a tote 26 times a year, and they last between three and five years," said Brauer. "The label will last as long as the tote."

The durable label is pliable enough to conform to curved surfaces. Subsurface printing keeps the barcode readable despite abrasion, and the adhesive holds against heat, cold and humidity as the totes travel to and from stores.

Brauer's tote supplier even applies the labels for Casey's; he orders almost 15,000 totes annually to accommodate replacements and the company's growth.

Result

Smith reports the tags are holding up very well. "So far all the feedback we have received has been positive," he said. "We just had some equipment come in for service and the tags didn't even look a year old."

Knowing these tags are guaranteed provides peace of mind to Smith. "We're putting something on their product that they know is durable and reliable," he said. "It will last the lifetime of the product."



Deep Expertise, Customizable Options and Swift Delivery

Metalcraft offers a depth of experience dealing with returnable container tracking applications. We understand the environment, challenges and timeliness companies face. Metalcraft can help companies with returnable container tracking needs by:

- Supplying custom solutions for varied environments a returnable container tracking system might encounter, from low energy surfaces to high energy, for assets that could meet harsh chemicals, to the day-in, day-out wear and tear from a lot of physical handling. Count on Metalcraft for durable, technology-agnostic solutions and an unmatched breadth of adhesives to match your containers.
- Metalcraft solutions last for the asset's lifetime. We ensure the barcode or RFID tag will consistently, reliably read data and provide tracking and data for analysis and reporting that will enable you to optimize your container usage.
- Metalcraft specializes in offering a complete solution for total asset management. The mixture of our team's RFID expertise and traditional labeling experience helps companies track and manage containers, using the best tagging system to accomplish the task. Deep product and technical knowledge can benefit customers' toughest asset management challenges.
- Our team can draw from various customizable product offerings to meet the task. We offer the most durable, technology-agnostic solutions and an unmatched selection of tag adhesives that supply the industry's most durable, accurate and reliable tracking solutions.
- Working with Metalcraft is a collaborative partnership. We listen intensely and learn from the customer to create an ideal solution. We dedicate time and resources to each product to find the best suitable, individualized and long-term solution based on individual customer circumstances and specifications. This customized approach cannot be matched by catalog or off-the-shelf products.



Are you looking for an expert, responsive and intelligent partnership for asset management to help your distribution facility or warehouse facility run more efficiently and effortlessly? Partner with Metalcraft. [Contact us today](#) with your returnable container wish list and be delighted with the solutions we can create.



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