

Returnable container management: Optimizing logistics for manufacturers



Highlights

- ***Improves turnaround time and reduces losses of returnable containers in the automotive industry***
- ***Provides container tracking through RFID technology***
- ***Optimizes investment in containers through a combination of process and organizational changes and a corresponding IT solution***
- ***Benefits all participants in the container network due to improved visibility and availability of containers***

The automotive industry has long used standardized, reusable containers to simplify the transport of parts and material from a supplier to an original equipment manufacturer (OEM), and between OEM plants. The containers, which come in a wide variety of sizes, are provided to supply chain partners—often free of charge—by the manufacturer.

This arrangement represents an excellent example of waste and cost reduction, because the containers are durable and reusable.

Ideally, there should be little cost for the OEM associated with them beyond initial purchase: containers may need routine maintenance and are replaced as they wear out in the normal course of events. For the suppliers, there should be no cost at all. By driving waste and cost out of the system, product prices can be kept low and competitiveness maintained.

But the reality is somewhat different. Containers can get lost, stolen, damaged or soiled, requiring replacement, repair or cleaning. Normally, OEMs charge these costs to the suppliers, shippers or business units that are at fault for these losses. Yet, it is often challenging or impossible to do so because of the difficulty associated with tracking the location and status of the containers.

In addition, the rise of globalization is driving the increased use of (and investment in) containers because of longer turnaround times caused by reliance on remotely located suppliers; additional containers need to be fed into the network to ensure an adequate supply.

The amount of money involved is not trivial, due to the sheer number and variety of containers in use. Typical loss rates are between two and five percent per year, and the cost of a standard metal container is generally several hundred dollars. This represents a considerable investment on the part of manufacturers.

The financial challenge is compounded by the tight margins that exist in the automotive manufacturing industry. Making additional investments in tracking and managing the flow of these containers is thus justifiable and can yield an economically viable ROI for manufacturers.

The benefits associated with effective container management are not limited to loss reduction. By increasing visibility into the supply chain and gaining accurate, timely knowledge of container location and status, considerable efficiency can be realized. Order-to-delivery cycle times can be reduced, which facilitates just-in-time supply chain operations. The OEM benefits directly through reduced long-term investment, while the suppliers and third-party logistics providers benefit from better visibility and planning quality.

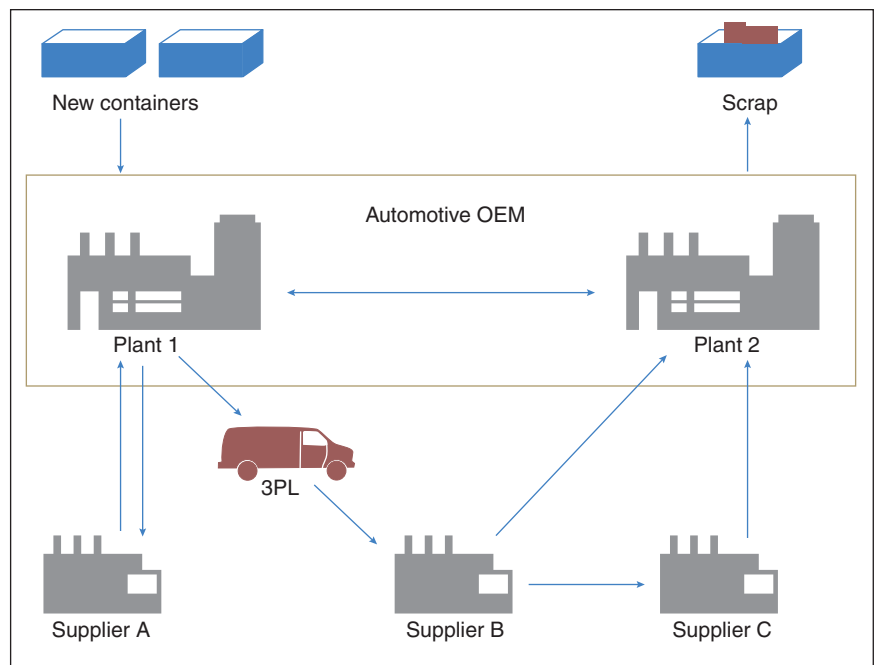


Figure 1 – Container flow within the supply chain network

By reducing turnaround time, loss rates and the use of expendable packaging, and through more accurate cost allocation, a container management system can potentially produce a positive ROI in less than one year.¹

A complex supply chain flow

When examined at its most basic level, the movement of a container appears very simple. A complete cycle consists of the following steps:

- *Transport of the container from OEM to the supplier*
- *Filling of the container at the supplier with the parts*
- *Transport of the full container to the OEM's plant*
- *Emptying of the container at the plant*

The real-world process is more complicated. Often containers are not simply exchanged between OEMs and suppliers on a one-to-one basis. The difficulty in tracking containers within the supply chain network is due in large part to the complex nature of the relationships between the various suppliers and business units, as shown in Figure 1.

Containers can travel between suppliers, between OEM plants, or start at one plant and wind up at another, having made several stops along the way. Transport between the various suppliers and OEM business units is usually, but not always, handled by a third-party logistics provider. Thus, a given container may be handled by many organizations in each cycle, which increases the potential for tracking error and delay.

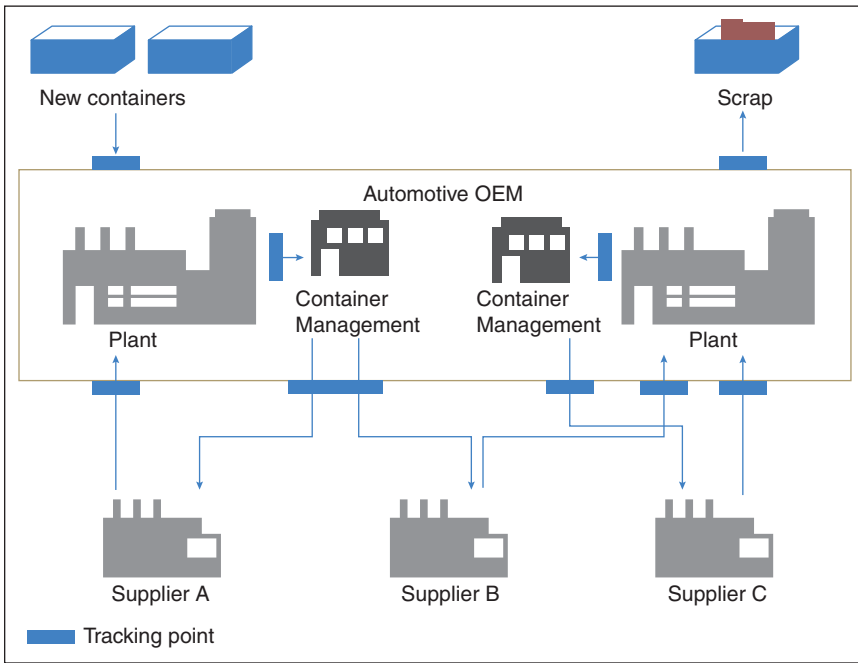


Figure 2–Centralized container management flow

Often, the container tracking procedures that exist at the various organizations in the network are not consistent and not able to interact, which compounds the problem.

An end-to-end container management process

While the supply chain’s complex nature cannot be changed, the methods by which containers are managed can be dramatically improved by the introduction of an end-to-end process that incorporates organizational, process and IT elements. Figure 2 shows such a solution.

A critical part of this system is the tracking of containers whenever they move. Tracking technology is key; however, it is only one component of the total solution. To make the entire system function optimally, it is necessary to introduce nontechnological elements to more closely manage container usage and flow. For example:

- *A dedicated department at the OEM, responsible for container management including booking and planning, should be created.*

This department resolves shortage issues, handles complaints due to incorrect tracking and wrongly applied fees, and follows up on damage issue resolution by identifying and charging the responsible party. It is also the keeper of tracking and inventory data, and is responsible for maintaining accuracy and consistency.

- *In order to control costs more closely and allocate charges more accurately, a payment model should be used that allocates costs to individual suppliers on a pay-per-use basis. Depending on OEM policy, suppliers may be charged for container use, or alternatively for excess container use above allocated stock levels.*
- *Logistical controls should be instituted to optimize container usage, such as planning and allocation of container supplies and penalties if the inventory exceeds the allocation (thus providing an incentive to keep the containers in circulation).*

The container management system’s technology and processes should also be linked to the OEM’s back-office systems, such as legacy container management systems (assuming they are retained) and enterprise systems for accounting and reporting purposes.

Tracking technology: RFID

Most members of the supply chain network already have some form of container tracking process in place, but often these are not consistent with one another. This stands in the way of a central goal of container management, which is total visibility and transparency throughout the supply chain.

Some of these processes are simple paper accounting methods, but, more typically, containers are tracked via attached barcodes. While far more efficient than manual, paper-based tracking, barcodes are limited when compared to the AudioID technology of Radio Frequency Identification (RFID).

RFID systems are faster, are more accurate, do not require line-of-sight access to be read, are not as susceptible to physical damage and are more difficult to copy.

Also, RFID tags offer capabilities beyond those of barcodes: they are rewriteable, and have the potential to hold extra (user-) data. Because of these additional capabilities, RFID represents more than just an incremental improvement on barcode systems.

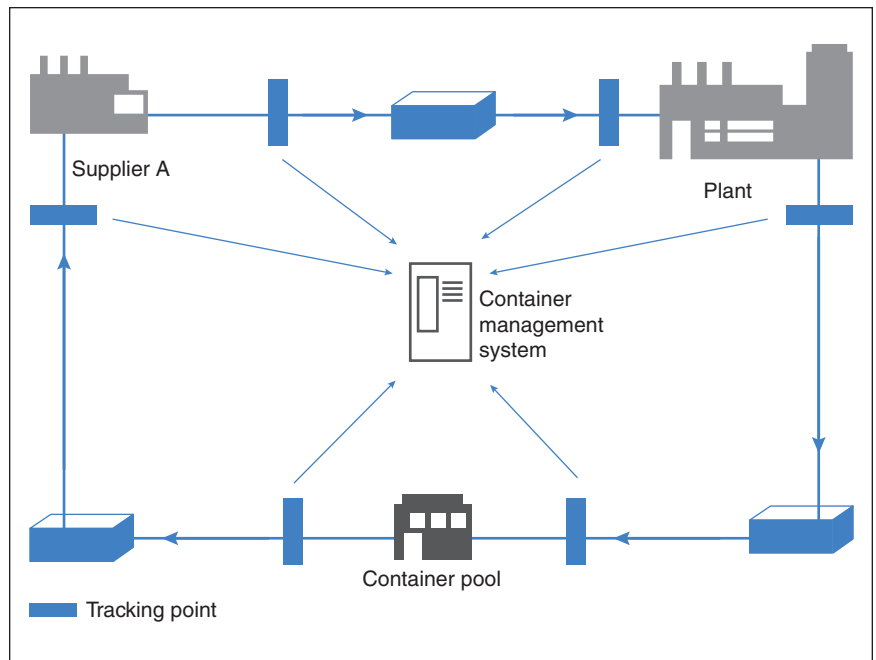


Figure 3—RFID-based container tracking with centralized data management

RFID technology, when combined with global industry standards like the Electronic Product Code (EPC) and automation, enables significant process transformation that spans the entire supply chain.

A typical RFID-based tracking flow is illustrated in Figure 3. This represents a significant improvement over existing, fragmented and inconsistent tracking systems, because all movement events are stored centrally. This enables tight management and end-to-end consistency of information. In addition, speed is improved through automation of check-in, check-out and accounting processes.

Planning and booking process

To optimize their investments in containers, OEMs need to keep as many containers in circulation as possible while simultaneously ensuring that enough of the right containers are on hand at any given location at any given time to meet the needs of the supply chain. Should there be a shortage anywhere in the system, costs immediately rise. Suppliers are forced to fall back on expensive one-way, disposable packaging.

Because of the complexity of the supply chain network and the need to synchronize operations to satisfy just-in-time manufacturing, planning and scheduling is a daunting task. The overall number of required containers in the network can be estimated by calculating the round trip time for every supplier site and the average container flow with the supplier site, and factoring in production schedules and requirements.

But the overall number of containers is only part of the challenge. Making sure the correct containers are available everywhere in the system when needed is another matter.

Accurate supplier input is important to the planning process. The supplier books containers in advance using a Web-based booking system; the OEM is then able to plan appropriately and handle any anticipated shortages, either by rerouting or adding containers, or by crediting the supplier for increased costs due to the need for one-way packaging. If the supplier does not book appropriately, unanticipated shortages can occur or containers may sit idle. This is why close control of container movements and total visibility and transparency throughout the supply chain network is necessary for proper container management.

The impact of container management

Container management can have a powerful impact on a company's bottom line. The experience of one European automotive industry manufacturer provides a representative case.

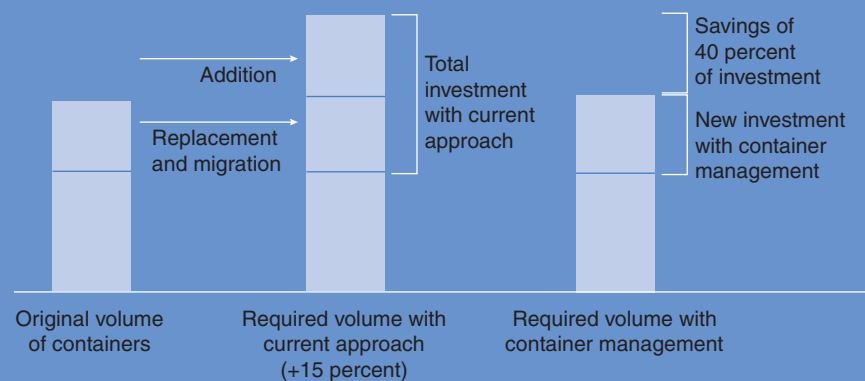
The OEM was facing a major investment in new containers due to a number of factors:

- *Replacement of approximately one-third of containers as a result of obsolescence*
- *A partial migration to smaller container sizes*
- *Replacement of one-way, disposable packages with returnable containers to reduce costs*

Container loss also presented a challenge. A significant number of containers were being lost each year for various reasons, driving a need to reduce inventory shrinkage and recover the cost of lost containers more effectively.

The application of a new container management process reduced the overall number of containers needed by the company, representing an investment savings of approximately 40 percent. This was accomplished in large part by instituting flow management of the container pool, which optimized utilization; inventory turns went up by a factor of three, meaning that the manufacturer could use fewer containers to meet the same requirements. Additional cost savings were realized by reducing the variety of containers in use, moving to a pay-per-use cost allocation scheme and instituting penalties to suppliers for extended use.

Comparison of original investment vs. required investment with and without container management



The OEM plays a part as well, by leveraging historical data to estimate the container requirements for each supplier and its current stock of containers. The OEM also factors in anticipated requirements based on its manufacturing resource planning (MRP) systems. Using predefined packaging rules, the parts requirements are transformed into container requirements.

The role of IT in container management

An integrated, end-to-end container management process, illustrated in Figure 4, depends on supporting IT applications. A representative IT architecture for container management consists of three parts: legacy systems, the container management applications and data repository, and the OEM's enterprise systems.

The existing legacy systems for container movement recording are integrated with a central repository (the OEM's enterprise application suite) that handles the container accounts and the master data.

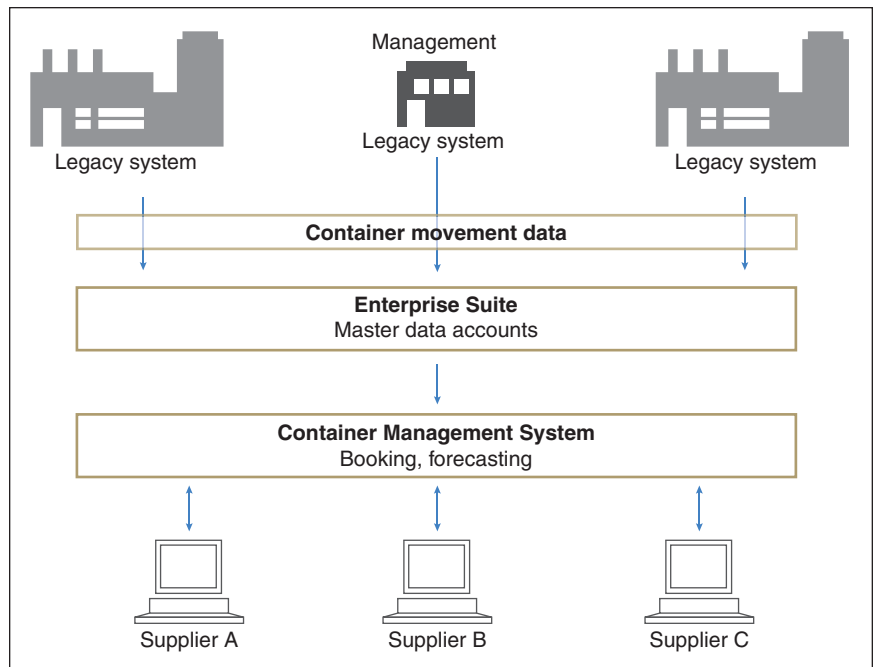


Figure 4 – IT architecture for container management

The container management system offers a Web interface to both the suppliers and the OEM's container management department that covers all aspects of container management: container movements, booking, planning, fees and complaints.

The key part of the overall system is tight integration across the enterprise, which enables automation and accurate accounting.

Why IBM for container management

IBM has developed a robust, standards-based platform for container tracking that integrates hardware, middleware and services to create solutions designed to meet the specific needs of manufacturers. Each solution is built around key IBM planning, design and implementation services that ensure an optimal end result, tailored for the customer.

Leveraging its expertise and leadership in RFID technology as well as experience gained from its own use of this technology, IBM has created dedicated offerings for RFID systems that include WebSphere® family middleware products—RFID Information Center, RFID Premises Server and the automotive industry-specific Manufacturing Industry Framework—that provide essential capabilities and integrate seamlessly with the overall IT architecture.

IBM is able to deliver a complete, end-to-end container management solution, including assessment, business case development, planning, business process transformation, design, pilot system development, solution deployment, systems integration and ongoing maintenance.

IBM's global presence, deep industry and business transformation expertise, proven methodologies and experience gained from thousands of engagements worldwide help clients achieve real business results and innovation—quickly and cost-effectively.

For more information

To learn more about how IBM can help optimize your logistical processes through effective management of assets, contact IBM or visit us at:

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¹ Based on results of IBM engagements in 2006.