THE UNIFIED SUPPLY CHAIN

Manhattan Associates®

Mutually Beneficial

Close your eyes and picture one of those documentaries shot with the gorgeous views of the African savannahs lit with the evening sun, with the heat rising against the horizon. The narrator inevitably turns to the extraordinary friendship of the massive rhinoceros and the delicate oxpecker perched on its back as they make their way through the bush. The relationship is often held up as a prime example of mutualism, a term defined by the Encyclopedia of Ecology as an interaction between individuals of different species that benefits reproduction and survival for both.

In the case of the rhino and the bird, not only do the two species benefit from each other, but their very survival depends upon it. The bird receives a constant supply of food from the ticks and bugs, while the rhino benefits from the cleaning and more importantly, an intruder warning system. You see, rhinos are nearly blind and have no natural predators, so they would struggle to see real danger approaching without their feathery friends. Roan Plotz, an environmental science lecturer at Victoria University in Australia, says "There's a whole heap of [untagged rhinos] avoiding us because they have oxpeckers on their back."[1]

When his team is out tagging rhinos, those that do not have oxpecker ride-alongs only noticed his team 25% of the time and only once they were 75 feet away. However, rhinos with the birds detected his team 100% of the time and at 200 feet away.

When we look outside the natural world there are other systems and environments where mutualism is at play as well. Physical concepts like mutualistic sustainability, which incorporates natural elements into the structures of cities, or even startup businesses that are built on another's technology platform, ensuring neither can grow without the other. And there was always a mutual symbiosis in the supply chain as well, between distribution and transportation, naturally harmonized to the ebb of inbound and outbound, that parallels the dance between rhino and oxpecker.

Until we broke it.

But before we get there, we need to step back in time a bit.

Start from the beginning

By the second century B.C., Rome had amassed over 300 warehouses storing 400,000 metric tons of grain, spirits, and olive oil, which included more than 100 million liters of wine. Some of these facilities were more than 225,000 square feet in size and were quite sophisticated, with fire walls in between units and high narrow windows to deter theft.[2]

Some even had floors raised slightly off the ground to allow air circulation to cool and protect the goods stored inside. Nearly 1700 ships would arrive and depart each year from Rome with goods headed all over the world, some as large as 180 feet long and carrying 1,000 tons of cargo. And none of that includes the tens of thousands of tons that travelled overland to and from Rome from as far away as China across the Silk Road.

The natural order of delivery and fulfillment was born during this era, as the greatest minds in the ancient world contemplated the most efficient and fluid way to receive goods from around the world and send items in return.

INBOUND AND OUTBOUND.

And the process did not change much over the next millennia or two. As motorized transports arrived, the distances stretched further, the routes became more numerous, and the first forays into automation in the warehouse emerged as well. But largely, the process of distribution and transportation remained the same elegant and fluid dance.

But as the end of the 20th century comes to an end, global growth stresses the balance, and the computerized supply chain era begins; and so do the artificial boundaries between distribution and transportation.

Unintended consequences

The first warehouse management computer systems were automated storage and automated retrieval systems (AS/RS) used for bulk inventory in the 1970s. The systems were slow and the reports sparse, but at least volume was manageable. As the industry approached the 1990s the cost of carrying extra inventory became too high and AS/RS systems gave way to 'just in time' inventory strategies using new computing technology and relational databases. The 1990s and early 2000s is when the first true warehouse management systems we know today began to emerge.

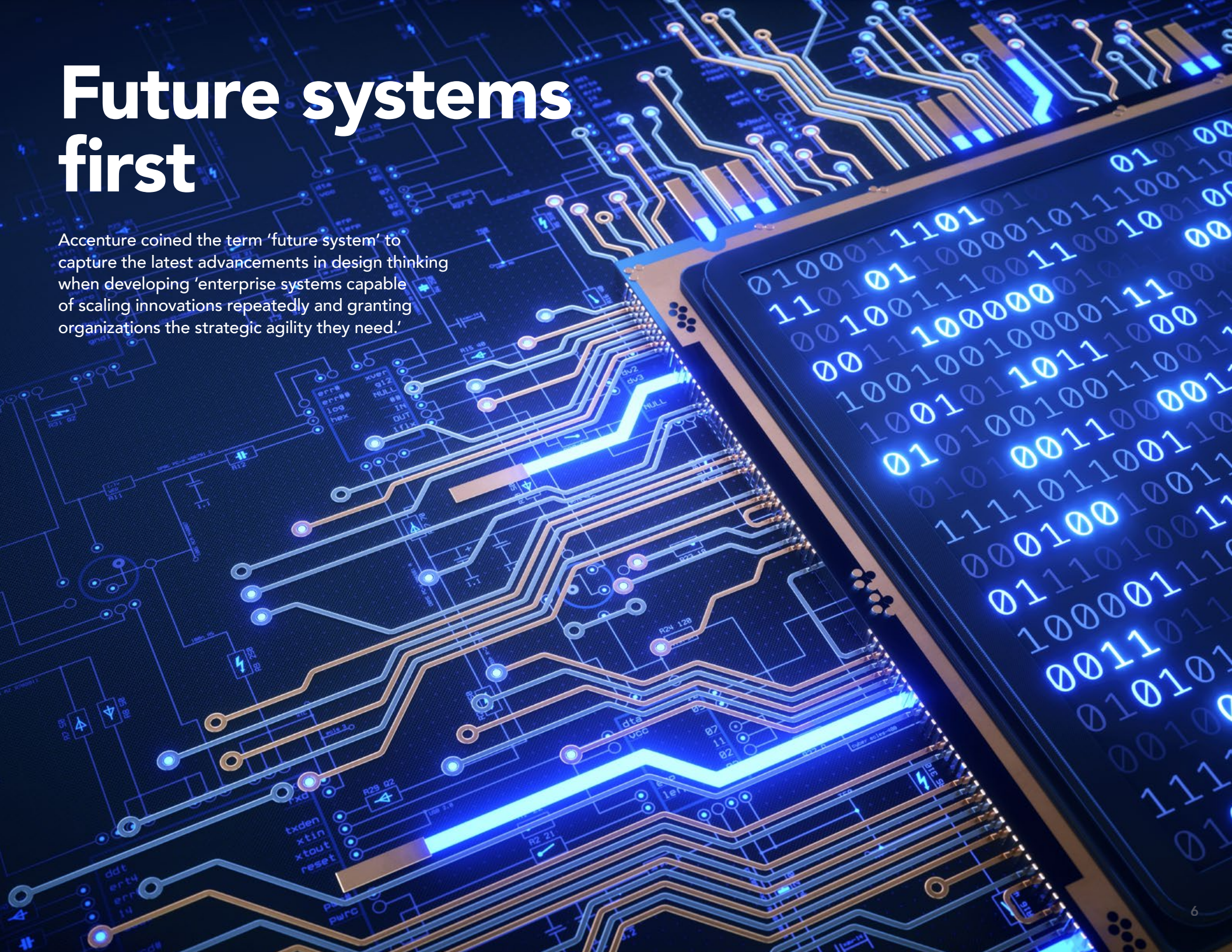
But it also initiated the artificial separation of inbound and outbound into subcategories like distribution and transportation. Warehouse and transportation management systems became specialized solutions that only worked in between shipment origins and destinations. Instead of considering outbound holistically, one tool focused on the efficiency and productivity within the four walls of the warehouse while another focused on incoming or outgoing shipping activity.

Over the next few decades these systems became more powerful, more complex, and more siloed in their processing. Not only were distribution and transportation separated, but even workflows like wholesale, retail and direct to consumer within a single distribution center were being separated. Labor management and automation execution systems were often managed outside the warehouse management system that understands inventory and demand. The result was a portfolio of solutions, often from different vendors with different architectures and version cycles, that required different approaches to integration, modification and upgrades.

The variety of architectures, interfaces, integrations, and workarounds creates artificial limitations on productivity potential and shackles profitability in unnecessary costs and overhead. The technology mess must be rectified before distribution and transportation can be reunited.

Future systems first

Accenture coined the term ‘future system’ to capture the latest advancements in design thinking when developing ‘enterprise systems capable of scaling innovations repeatedly and granting organizations the strategic agility they need.’



Future solutions must be 'boundaryless', meaning they take into consideration the connectivity of the world today. Traditional application strategies like legacy WMS and TMS were viewed as independent entities, but the future must be less divisive and more collaborative. But, before functional capabilities like transportation and distribution can be converged, the solution technology design and architecture itself must be re-engineered. Large relational databases and giant application code bases cannot provide the agility and scalability, much less the rapid access to innovation required today.

Instead, future systems are delivered as cloud-native software-as-a-service (SaaS) apps that are built entirely from microservices, composable units of capability that can be shared across functional solutions. Now, a single order or shipment entity can be accessed by both distribution and transportation functions. No duplication and no integration. This architecture approach also offers unlimited linear scalability whenever more performance is required.

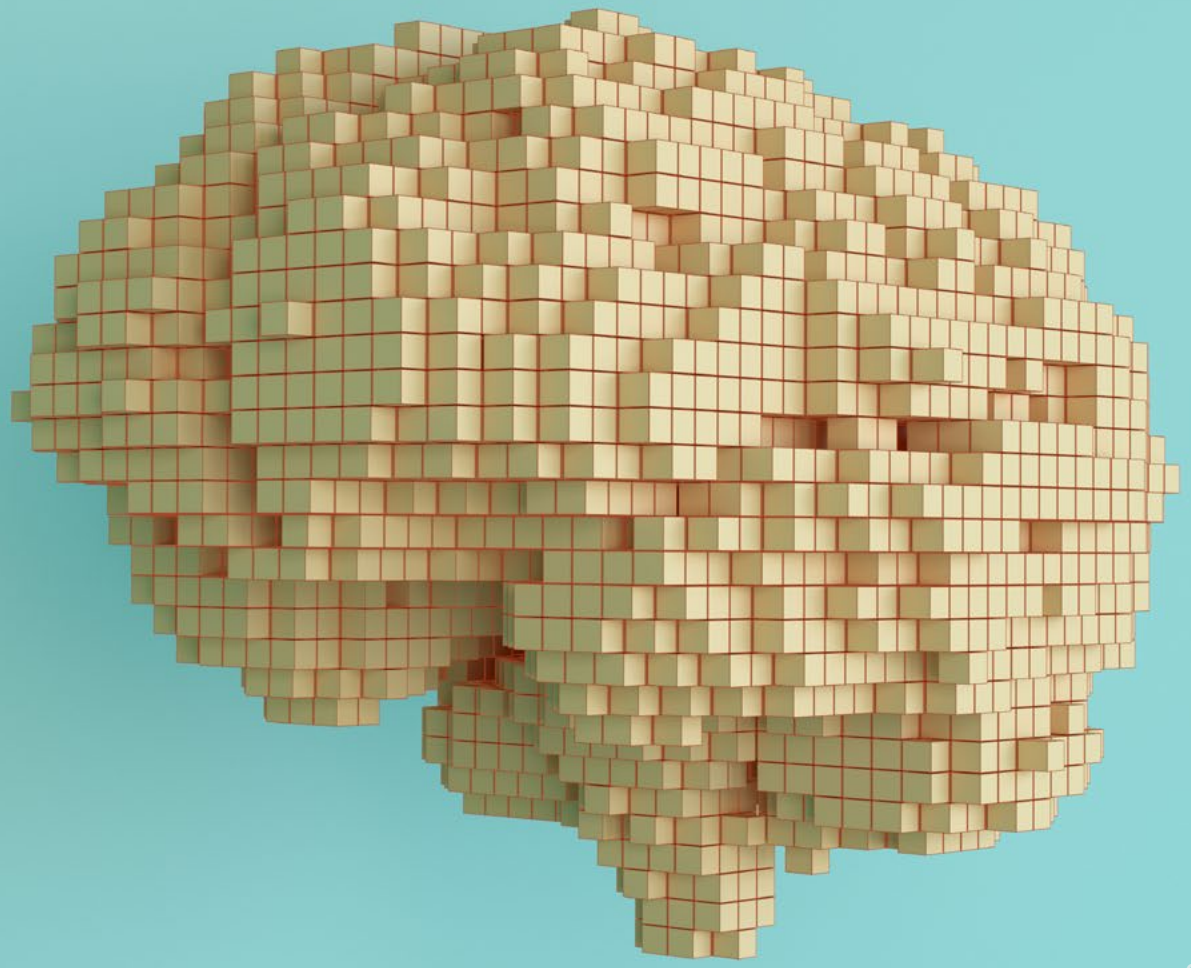
Future solutions must also be ‘adaptable’, meaning they innovate quickly and offer extensibility options to personalize the solution to meet the unique needs of individual organizations. Because the microservices are self-contained, they can be individually enhanced or replaced, making rapid innovation a cornerstone of a future system. And engineered extensibility ensures that when organizations need to add their own logic to the mix, they can be confident that future solution enhancements and updates will not break those extensions. The cloud-native nature of this architectural approach also ensures that every user is always on the latest version of the solution. When is the last time you had to upgrade Facebook or Netflix? Never, because new features and capabilities are automatically distributed to all users. With a future system, enterprise software users will experience the same convenience and expediency of new capabilities.

And finally, future systems must be 'radically human' according to Accenture. Human-like systems can talk, listen, and learn similarly to a us. They help us to bridge the gap between human and machine interactions and relationships. Behavior science disciplines like motivational determination theory are reshaping how we interact with systems and our work environments using gamification and other motivational techniques designed directly into the software to increase productivity and efficiency. Of course, data sciences within the supply chain are not new. For decades advanced mathematical solving algorithms have tackled the complexities of routing trucks and packing boxes as efficiently as possible. But new types of intelligence are emerging, bringing machine learning and other artificial intelligence technologies like advanced robotics to the forefront of distribution, transportation and commerce.

The unique advantage of a microservices solution architecture is the ability to add new components as new capabilities emerge. The unified management of the supply chain today requires distribution, labor, automation and transportation, all working together, not separately. But those capabilities require significantly different approaches to math, science, operations, and execution, which is why traditional portfolio collections of separate applications emerged to begin with.

Now, if a component for Alexa interactivity, or new machine learning for continuous optimization, or a new type of robot is required, it can be easily integrated into the supply chain, because the architecture was engineered for growth and expansion.

At Manhattan Associates, we believe a supply chain execution 'future system' can eliminate the artificial barriers to productivity and efficiency created by legacy software, making the unified supply chain a possibility at last.



The unified supply chain

When distribution, labor, automation, and transportation can be united into a single solution, the complexities of integration, regression testing, duplications, control towers and data lakes are reduced significantly and even eliminated. Information technology resources and costs are significantly reduced, while security, resiliency and stability of enterprise solutions are increased.

But while the IT benefits are significant, it is what becomes possible in the trains and trucks and on the warehouse floor that makes the unified supply chain special. Once distribution and planning optimization are finally collaborating, we start thinking inbound and outbound, instead of WMS versus TMS.

Within the inbound process, real-time shipment visibility can now be utilized to drive changes to the inbound appointment calendar and to match labor requirements by hour, shift, or day to the inbound arrivals. This also results in faster and more efficient trailer check-in at the gate. The shared nature of the unified application components means WMS-driven 'cubing' volumes can be utilized for more accurate transportation planning with no integration or delay. And dock assignments for unloading can be dynamically assigned based on projected put-away locations of the known items on the inbound trailer, reducing time and distance travelled.

Within the outbound process, the 'point of no return' for late lifecycle order changes can now be set to when the trailer doors close. This means customers can amend their orders from their mobile devices while the order is being processed in the DC. Retail store organizations can now support intraday sales changes within a store driving real-time updates to replenishment orders until the trailer pushes as well. Outbound trailer turns can be accelerated by prioritizing WMS labor tasking to focus on remaining containers to be picked, packed and loaded. And full visibility inside the shipment down to the SKU/container can be provided all the way through the supply chain to final delivery.

[1] popsci.com/story/animals/rhino-oxpecker/
[2] uwlabyrinth.uwaterloo.ca/labyrinth_archives/roman_warehousing/
[3] accenture.com/us-en/insights/future-systems/future-ready-enterprise-systems


The ‘future’ of the supply chain
Traditional, portfolio approaches to supply chain solution architecture create artificial barriers to efficiency by separating distribution, labor, automation and transportation. It’s why we developed Manhattan Active Supply Chain — to finally unify supply chain planning and execution into a single, extraordinary application.
Manhattan Associates continues to innovate at the forefront of delivering unified solutions with applied intelligence that are bringing together the capabilities needed to thrive in commerce and supply chain environments. Solutions like Manhattan Active® Omni and Manhattan Active® Supply Chain. Reach out today and learn more about future systems, the unified supply chain, and how Manhattan Associates can help you restore the symbiosis between distribution and transportation.
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