A woman with long blonde hair, wearing a blue and white striped shirt, is sitting at a white desk in a warehouse. She is looking at a laptop and has her hand on the keyboard. To her right is a cardboard box with a shipping label. In the background, there are stacks of cardboard boxes and a rack of clothes.

**Connected supply
chain: A true and
comprehensive
architecture**

Why connected supply chain

The concept of connected supply chain is understood mostly by people who watch commercials. Especially the ones that say you can expect the refrigerator to automatically place an order if you've run out of milk, or if the milk level goes down. It is assumed that the order is placed as an online order and the system somehow manages to find the vendor and get it delivered to the home. In reality, there are lots of moving parts and the process is more complicated than you'd think.

A simple order once placed has to go through multiple systems. The data in the software systems of the ERP are managed separately but the data in the physical systems is available separately. A True connected supply chain has to integrate the data together and use the common data for transactional accuracy.

The complexity of the systems

The most important systems that are needed to make the connected supply chain successful can be split into 3 parts.



Data generation layer



Data research and storage layer



Data visualization layer

Data generation layer

Generation of data is the part in which the physical system and ERP systems come into play, where the source data like the order number, tracking ID, device ID, GPS ID etc., are generated for every order. This is the source of the truth which enables the identification of the order and its location. It is the most important part of the whole system.

Data research and storage layer

Data research is the part where the integration of the physical and ERP data is done. The complexity of the system is to identify a common / unique identifier which acts as the common factor between the physical and the ERP layer. Once this is established, the back tracing of the data happens. Artificial intelligence plays a critical part in ensuring that feedback and improvements can be sent back to the systems and intelligence of prediction and prevention can be improved.

Data visualization layer

Data Visualization is the stage where the actions taken by the system become visible to the external world. Systems like dashboards and visualization mechanisms can be used to provide the right visibility, and help conduct 'what if' analysis and enhance operator performance.

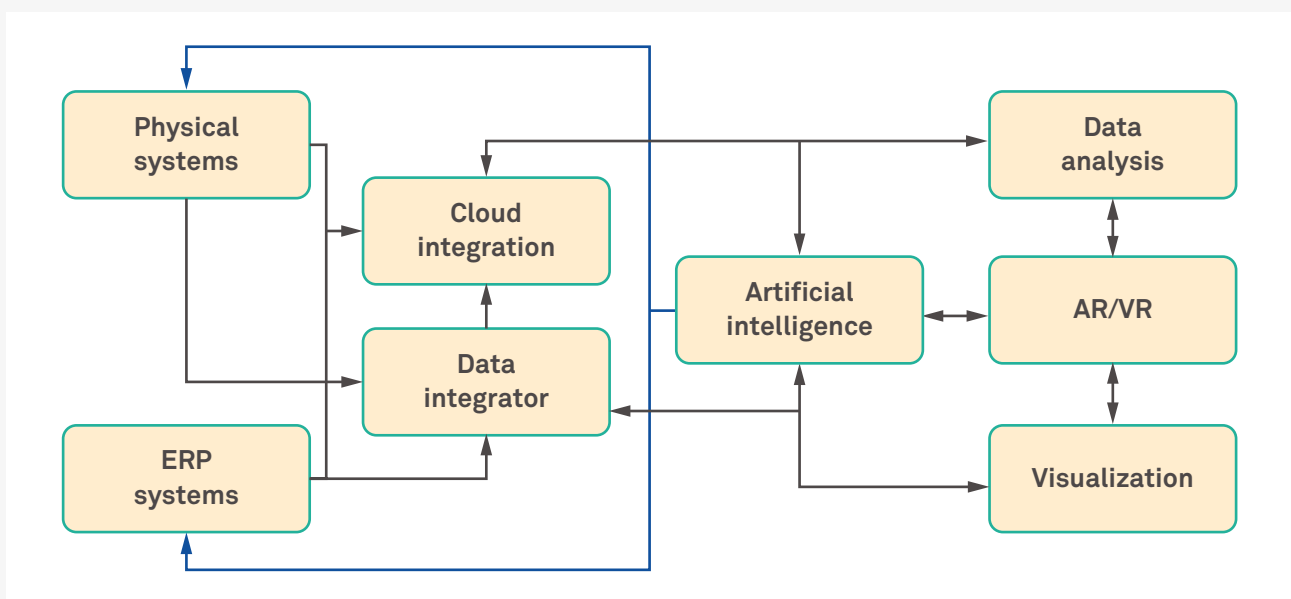


Fig1: Logical Architecture of connected supply chain

What does the system do for everyone?

Store Manager:

The store manager would be the person who placed the order on availability of an item at a store. He/she needs visibility to orders, where the truck is, how much time should the systems take to make the order ready, how can he/she avoid manual interventions, how to improve the overall adherence to the timeline, reduce incidence of order mismatch etc.

Distribution Center Manager:

The DC Manager needs to make sure he/she can load the right amount of people based on forecast, and also reduce the total manual intervention and improve the overall efficiency. To get there, he/she needs to know what the manual processes that can be done away with are so that the effectiveness can be improved as well as determining how can time spent by each resource on manual processes can be reduced to increase their throughput.

Truck Driver:

How much inventory is to be picked up and where and how to pick it up. The ideal route map of the most effective route and optimized location of the inventory as well as how to drop them.

Yard Manager:

How many trucks would come and how the yard has to be managed. Arrivals time sequencing, managing space effectively.

End User:

Today, the end user already gets the data that he/she wants with visibility to order. But what if it could also accurately explain the whole process? This includes GPS routing system of the order and a 100% accurate system to the minute.

References

[1]<https://www.inboundlogistics.com/cms/article/the-search-for-a-connected-supply-chain/>

[2]<https://www.supplychaindigital.com/supply-chain-management/how-ensure-truly-connected-end-end-supply-chain>

Conclusion

The end goal is a system that can effectively do the overall process. With the technical enhancement that has already happened across the industry, there needs to be a lot of integration and that is where the effectiveness of multiple solutions becomes the best. Wipro's Industrial Engineering team's technical advancements have ensured that proper integration of the system can be accomplished, and a successful and effective connected supply chain is achievable.

About the author

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Venkat is a Distinguished Member of Technical Staff and Head of Client Solutions for the Industrial Engineering Team. He is a technologist with about 40 patents filed/granted to his credit. He successfully architected the Digital twin testing concept as well as a comprehensive system of connected supply chain. With close to 20 years of industry experience, his expertise has enabled the success of multiple programs and customer wins.



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