



How Optimization boosts Transportation Control Tower

A Transportation Logistics Special Report

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1. Market overview

The current environment in the transportation industry is extremely challenging with low margins, pressure on volumes and increasing labor costs. In addition, globalization, higher customer demands, legislation and cost increases all continue to add to the complexity. This includes also tactical decision making on issues such as optimal hub locations, line hauls and daily routes. The industry is comprised of many smaller companies, though the current trend is towards consolidation through mergers and acquisitions. The extent to which transportation is outsourced from shippers to third-party logistics providers (3PLs) varies from country to country, but is increasing as companies explore the potential for further synergies.

According to Accenture, control towers bring together the capabilities required to manage complex, end-to-end supply chains and help combat rising volatility, complexity and uncertainty [1]. Control Towers enable the integration of supply chain processes and tools across silos, bringing together large amounts of data to support strategic decision making. They target improvements in costs, inventory, quality, customer service and asset utilization. Control towers also support an integrated framework of real-time visibility, root-cause analytics enabling rapid response, and continuous improvement of process execution.

Supply chain control towers are supported by three sets of technologies in particular:

- **Supply chain partners' technologies:** These include ERP, planning and optimization, transportation and warehouse management. These technologies make available a wealth of data about operations along the end-to-end supply chain.
- **Cloud-based technologies:** New technologies have emerged that allow all the nodes along the end-to-end supply chain to be connected, regardless of the underlying execution platform. These cloud-based technologies are dramatically reducing the cost and time-to-value of inter-enterprise integration.
- **Analytics:** Advances in analytics are enabling organizations to make use of the enormous amount of data being collected and connected across the supply chain.

Poor supply chain visibility is crippling growth for many companies. The supply chain is the heartbeat of the company and in order to see what it needs to see, and achieve an end-to-end view of inbound and outbound operations, an integrated control tower solution is required. In its 2013 Supply Chain agenda, Capgemini Consulting reports that improving supply chain visibility is also the number one priority among SC Managers, above even operational excellence, supply chain collaboration and other key areas [2]. The PWC Global Supply Chain Survey 2013 also lists end-to-end supply chain planning and visibility as one of the top priorities for over 500 global supply chain leaders [3].

*The 2013 Supply Chain
Agenda Source:
Capgemini Consulting*

2013
1 Supply chain visibility improvement
2 Reducing environment footprint
3 Operational excellent
4 Network redesign / distribution strategy
5 Supply chain collaboration

What is a transportation control tower?

The universal need for supply chain visibility has spiked interest in transportation control towers. Capgemini defines a supply chain control tower as 'a central hub with the required technology, organization and processes to capture and use supply chain data to provide enhanced visibility for short- and long-term decision-making that is aligned with strategic objectives [4].

Capgemini identifies the following essential functions for managing supply chains:

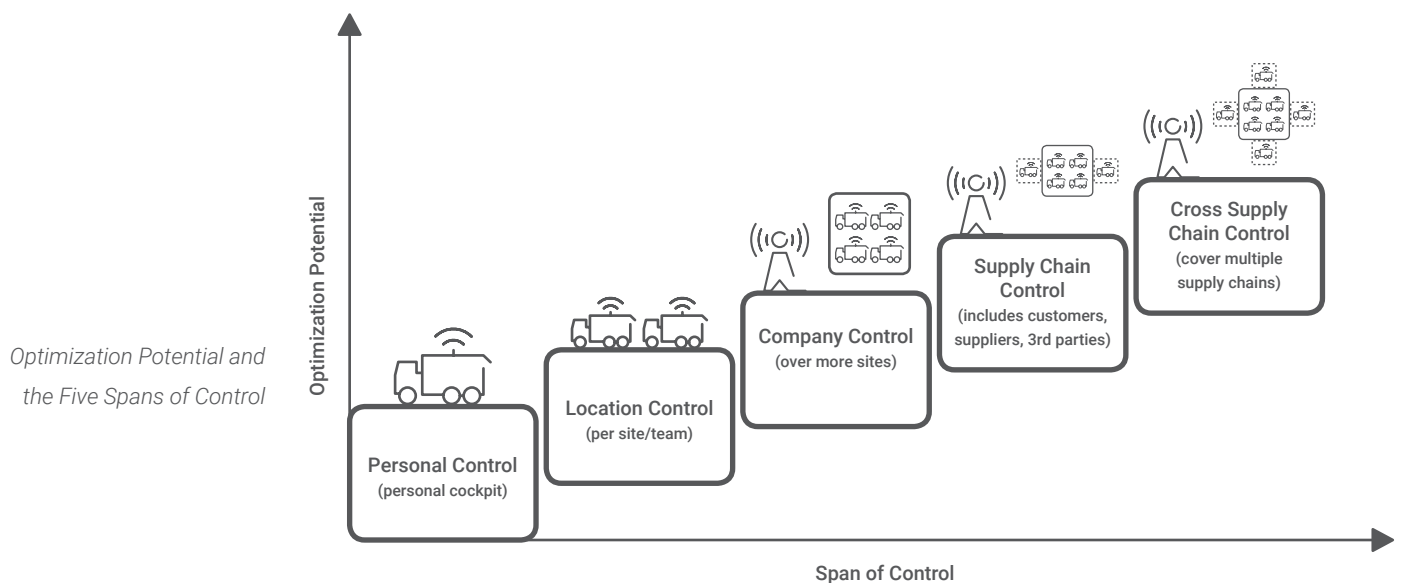
- Provide end-to-end supply chain visibility
- Respond and adapt to supply chain disruptions
- Deliver multi-tier process orchestration and supply chain collaboration
- Maximize predictive decision-making and dynamic supply chain execution

Gartner also has a strong focus on end-to-end visibility in and across supply chains [5]. They state that Supply Chain Visibility adoption is no longer a "nice to have" for any organization, regardless of size, geography or industry. Gartner recommends to assess and prioritize the supply chain planning, execution and cross-domain visibility use cases, and to define your preferred delivery model. Based on this, develop a prioritized roadmap for a layered visibility solution using an approach that encompasses your high-priority use cases. Leverage risk identification and mitigation benefits. Visibility is not only crucial for decision-making. It also delivers service improvements for customer, supplier and management: they can view management information on their part of the supply chain and then align their part of the supply chain accordingly.

A transportation control tower requires similar functions to a supply chain control tower, but with everything focused on the various transportation related aspects (all modes, load, trip, route, cross dock, backhaul, resources, etc.) by providing enhanced visibility for short- and long-term decision-making in transportation. And since transportation is the only link between the supply chain partners, it is also the point where transparency and visibility are most urgent.

The Control Tower can be organized in five spans of control and with different corresponding supply chain optimization potentials, which is fully in line with the Gartner Maturity Model:

1. **Personal Control:** the first level of control, the individual within a company, is a natural starting point but offers limited benefits.
2. **Location Control:** the second level (e.g. at location or division) allows synergy for transportation planning within a team, such as more combinations of inbound and outbound or pickup and delivery.
3. **Company Control:** the third level of control in transportation is to have one central platform within the company for visibility at all locations. This means across all transportation divisions within the company (e.g. over multiple depots, or by exchanging employees across teams).
4. **Supply Chain Control:** the fourth level also involves customers, sub-contractors, agencies and suppliers. This can be purely for information purposes, but also with them working on the central system. Thus achieving supply chain optimization across multiple companies (e.g. with sub-contractors identifying the most attractive options from their perspective).
5. **Cross Supply Chain Control:** the fifth level is to have a control tower across multiple supply chains. From a theoretical point of view, this is the ultimate way of working, but from a practical point of view it is challenging: horizontal co-operation rules are required for fair profit-sharing, for what information is allowed and necessary for proper optimization, and whether a third (central) party is involved in the execution.



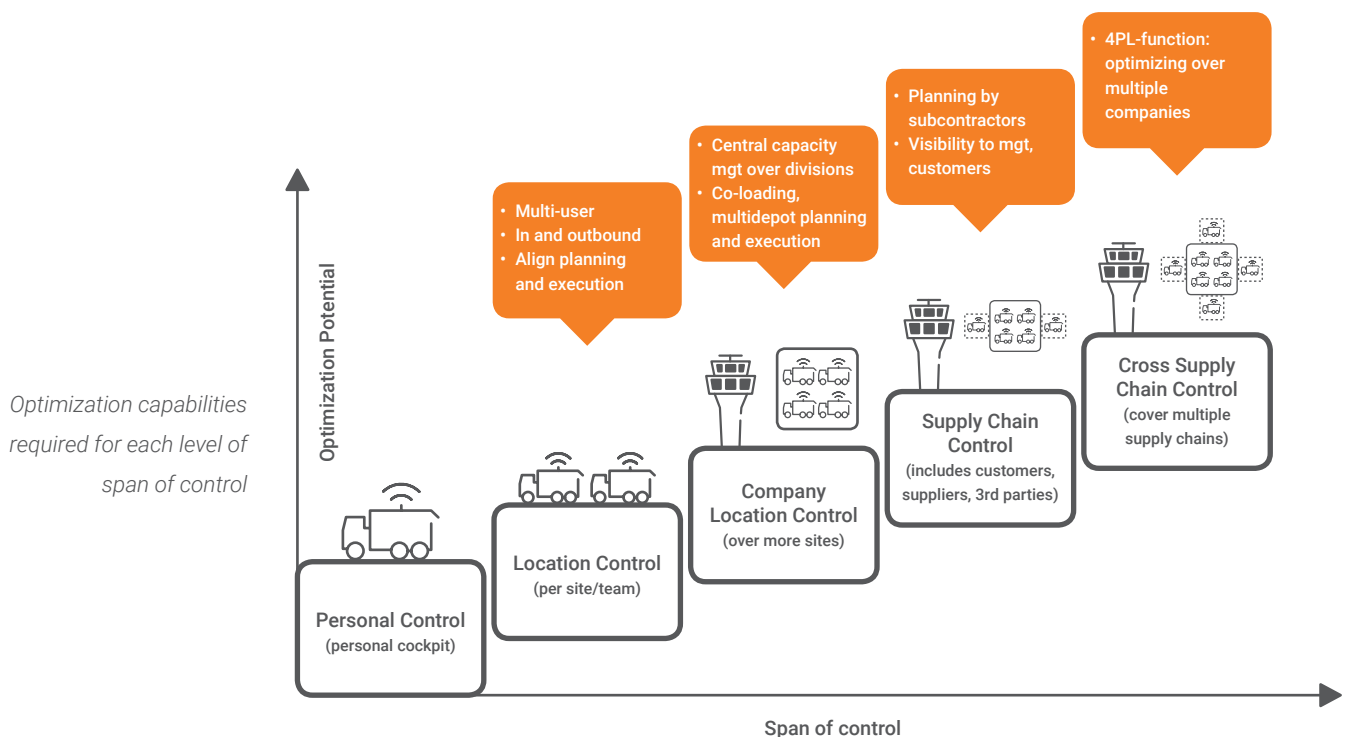
The tipping point is optimization

There are two crucial elements for an effective use of control towers in transportation. The first element is that logistical concepts such as cross-docking, merge-in-transit, multi-modal, etc. can be handled. This sounds simple, but it means that when there is any delay or change in a part of the plan, the effects on all subsequent routes and resources, and on corresponding estimated times of arrival (ETAs), must in turn become visible. This requires a central scheduler that manages all these dependencies and business rules, which is easier said than done.

The second element is the optimization engine. Visibility is important, but being able to make the right decisions on it is more important. Over ten years ago, companies started to truly adapt OBCs/GPS devices to know where their trucks are located, but what does that truly provide? Giving a driver a planned route with expected ETA and stop durations, provides them with their targets and having a real time OBC enforces the plan, provides route compliance and true ETA for the customer. Then to layer on real-time business decision support when things go awry, with cost based proposals for a better plan are even more relevant. These optimization engines should work at various moments:

- In advance when orders are available (or a first forecast is there), and routes must be created (in order to start the picking and loading process).
- Later, when assigning the right resource to the right route, given the availability of trucks and trailers. Here it could be the option to assign two driver-shifts (day and night) for one truck to use the equipments 24/7. Considering all the regulations governing drivers hours, such as mandates for electronic driver logs, permits and road restrictions, assigning the right resource is critical.
- During execution to re-optimize the plan given ad-hoc orders, real-time information and disruptions to present proposals at local situations (e.g., to solve an issue).

In particular, the latest aspect of optimization is crucial: if the customer is informed in time that the expected arrival time will be for example half an hour later (but still within the agreed SLA), then the customer can adjust his plan accordingly. When you leverage optimization for decision support, it can provide you more than one way to get back on plan. The options can only be as good as the information you use to support the decision process. For example, knowing if you have additional vehicles domiciled locally and can put another truck on it, or having real time telematics updates that also inform you of their available capacity and what is on the truck in order to change the stop sequence. All the decision support choices have varying costs associated with it.



Learn from the leaders

True control tower optimization solutions need to be a convergence of planning and execution in one platform to allow for real-time updates, compliance to routes, proactive visibility and manage by exception. Control tower optimization gives the users visibility to all data and insights in how to use it. ORTEC, a global leader in transportation planning and optimization, has recognized the gap between the demands of the industry and the limitations of TMS- and ERP-solutions. Based on more than 35 years of experience delivering logistic optimization solutions, ORTEC offers the required functionality for all five spans, described in the previous chapter, including the optimization potential. Each control level requires additional functionality in order to realize the desired optimization potential in an easy way (see figure 4).

Planning process using the centralized structure

As you move towards a central solution structure, synergies are created such as:

- Combining inbound and outbound planning, for example, backhauling at supplier after delivery to customer or interspersed pick up and delivery depending on capacity and business rules.
- Loading at multiple depots either at the start of the route or when capacity is available after some deliveries have been completed.
- Cross-docking, if it turns out this will lead to a more efficient plan (for this the optimal cross-docking location also needs to be computed).

The optimizers in the control tower solutions take of course into account the business rules and KPIs of the relevant sub-industries, and compute the solution with minimal cost (where cost can be defined as cost per hour/day/mile/etc., but also by more complex tariff structures).

A centralized platform enables the software platform to support multiple divisions and planning concepts in one central database, while each user is still supported with the right functionalities for their specific planning concept. This requires the right authorization and views for each user. It should also be possible to provide direct access for customers (via a web-portal, app or sms), so they can track their orders and estimated time of arrivals (ETAs).

Each sub-industry may also have its own logistics concept with related requirements, for example:

- **Retail:** support trailers with multi-temperature compartments; backhauling at supplier; balance workload at departure.
- **Bulk:** optimize compartment usage; meet contamination and cleaning rules; align with production at plants; compute optimal loading location for each order.
- **Intermodal:** optimal routing of transportation orders from loading to unloading location. Use of options like rail and barge, with tariffs and timetables; optimal assignment of each road section to trucks.

Real-time visibility during execution

During execution, these concepts require the scheduler to compute and show in real-time all types of resources, with ETAs for all actions, while taking all dependencies into account. These dependencies can occur from crossdocking, merge-in-transit, swapping or changing trailers, inter-modal, synchro-modality or multi-depot, co-loading and/or backhauling. The amount of dependencies and consequences can be huge (similar to those for a delayed train), and should therefore not be underestimated in the design of control tower solutions. This requires of course real-time interfacing: with devices such as onboard computers and PDAs to ensure the information available to the planner is an exact representation of the actual situation on the road.

Real-time dynamic optimization

According to Gartner, the industry is shifting to more real-time dynamic optimization models that respond better and faster to supply chain changes. For example, where dispatchers historically had to manually respond to an emergency pick-up or an order cancelation, newer generation VRS solutions can algorithmically recommend the best course of action, considering the customers' rules and constraints. [6]

The optimization opportunities for a transportation control tower during execution include:

- **Combining planning and execution**, for example, planning ad hoc orders, automatic re-spin/re-planning when violations occur in the plan or, the plan is no longer optimal.
- **Continuous calculation**: the software should continuously calculate the effect on all remaining activities within the transportation plan, by keeping track of all relevant dependencies. This should result in reliable, up-to-date ETAs, taking into account planned and actual congestion, as well as answers to such questions as how many empty (and/or) cleaned trailers are available at a terminal.
- **Re-optimize and presenting proposals** which should either be done automatically or by showing a list of best possible options to the user (and/or customer services department).

Visibility means that reporting on restrictions is important: to check whether time restrictions such as delivery windows and customer opening times are still satisfied. If not, the planner is warned automatically, allowing him to take corrective action. This could mean adjusting the affected part of the transportation plan, for example by sending another truck that is nearer the customer. The user sees these warnings in an overview, with comprehensive information, priority and a short description. The list can be viewed in various formats (e.g. grids or Gantt charts) and is automatically updated. Similarly when delivering proposals by the optimizer to the user to plan new ad hoc orders, or to assign a driver or a route to a truck, etc. These functions are also useful for solving violations that might occur due to actual updates.

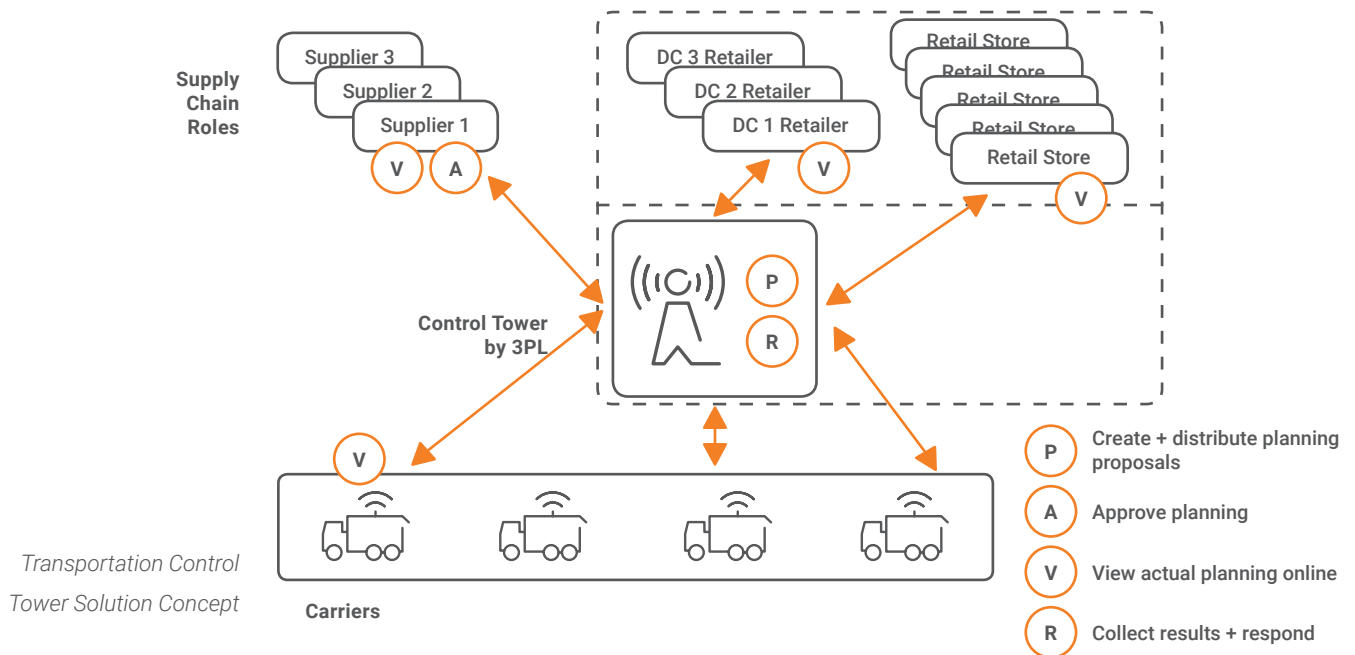
Case Study One - Leading food retailer increases transparency for 900+ users

Company: This food retailer, with some 600 stores, is a subsidiary of one of the world's leading companies with over 9,000 stores globally.

Objective: Optimize the related transportation costs for 300 hired vehicles and deliver transparency for their stores on ETAs. As a result, the project involved multiple stakeholders including the DCs, carriers (3PL) and supplier warehouses.

Solution: In total over 900 people use the system. As a result of the control tower implementation most of them now have online access to the planning, delivering a huge increase in transparency for all stakeholders. Users can access and add information, and optimize their role in the supply chain (e.g. a store can better plan its resource capacity to replenish shelves on the basis of more accurate ETAs). As a result, the service level the central organization provides to stores has risen. Truck utilization has also increased from having a central multi-depot optimization, and fewer trucks are now needed.

ORTEC Control Tower Concept for a retailer with 900+ users



The control tower, owned by the retailer, is operated by one of their carriers (3PL). The 3PL is in contact with the suppliers and the central retail organization. Everyone can view not only the resulting plan, but also actual results (based on actual information from, for example, GPS) online via the web.

How it works - manage complexity

The optimization and scheduling functionalities deliver clear benefits.

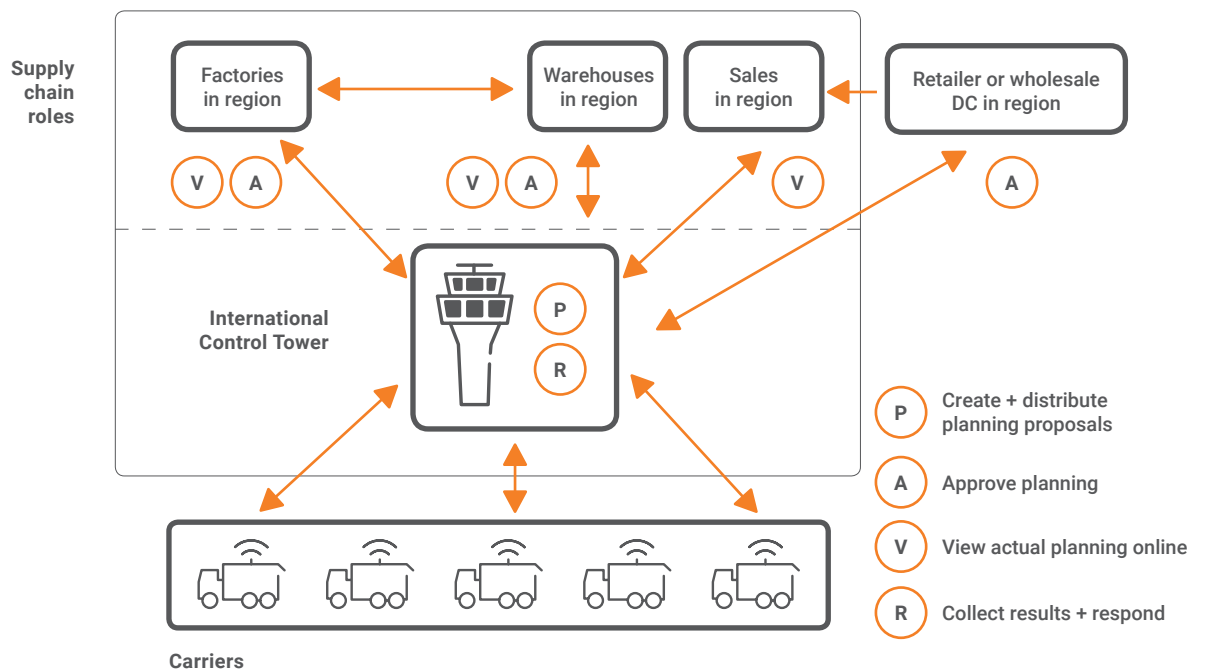
1. During planning using the centralized structure
2. During execution using the real-time visibility and recalculation of ETAs

And a notice that there is not a wall between planning and execution, they can share all kinds of information.

Case Study Two - Leading consumer goods company grows business with control tower

Company: One of the world's top potato processing companies and part of a group with an annual revenue of some €1.8 billion. Production is spread over 10 locations in the Benelux, Germany, Spain and Poland, with markets in Western and Eastern Europe. Transport is executed via a pan-European network of 120 trucks daily from 85 haulers. There are 2,500 customer orders a week resulting in 800 transport orders and 300 intercompany transports. Total yearly transport budget is about €36 million.

ORTEC Control Tower Concept for CPG Company



Objective: The company initiated a control tower project to provide more ICT support to their transport planning process, reduce overall transportation costs and be prepared for future growth.

Solution: This was achieved by implementing a pan-European multi-depot transport optimization platform. The solution makes possible scenarios and effects on changes directly visible, but also gives direct input to sub-contractors. Additional benefits are greater transparency, an improved planning process, easy-to-make adjustments, and an overall 10% efficiency improvement.

In the past, each warehouse did its own local planning for their region and regional carriers. With the new concept one central control tower oversees all warehouses, sales regions and carriers. This also facilitates transportation synergies (e.g. backhauling and central purchasing), and provides visibility for carriers and regional sales.

How to start?

In this white paper we demonstrate a strong need for more visibility in the supply chain, especially regarding transportation. To meet this need the transportation control tower concept offers the most robust solution. In the normal definition a transportation control tower only delivers end-to-end visibility. However, visibility supported by optimization engines delivers much greater benefits improving supply chain efficiency and customer service. In this way it can really act as a central hub with the required technology to support decision making. A study by IBM showed that ERP and TMS systems do not deliver the appropriate foundation for this [7].

There are multiple ways to start using a Transportation Control Tower including utilizing optimization technology. Our experience is that first the right APS must be selected and implemented, supporting requirements like:

- Central and decentral end-to-end visibility, based on central data and schedule storage
- Optimization technology to construct a plan, and to re-optimize the plan during execution
- Supporting logistical concepts like cross-docking, merge-in-transit, multi-compartments, multi-modal, etc.

The implementation is not only a technical implementation, but requires also change management skills. In particular a when moving towards a more central way of working, delivering visibility during execution done by the drivers, and the trust in optimization technology. It is important to determine at which level the company is today (see the 5 defined definitions of Span of Control), and which level the company wants to evolve towards in the near future. Typically, this is a step-by-step approach. The selected APS should have the right foundation and functionalities to support the next levels. Additionally, accurate use case descriptions and functional roles descriptions are necessary for success.

Be a leader

As noted by Deloitte, supply chains are becoming ever more complex systems to manage. For any given business, this represents a challenge [8]. In the midst of a shifting landscape, some businesses are emerging as supply chain leaders, while others are followers. Increasingly, the difference comes down to the desire to see and believe that supply chain complexity can be managed with a control tower approach and the commitment of senior leadership to transform the business. Are you a leader or a follower?

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About ORTEC



ORTEC is one of the largest providers of advanced planning and optimization solutions and services. Our products and services fully optimize fleet routing and dispatch, vehicle and pallet loading, workforce scheduling, delivery forecasting, logistics network planning, and warehouse control. We offer stand-alone, custom-made and SAP® certified and embedded solutions that are supported by strategic partnerships. Our 750 employees support over 1,800 customers worldwide from offices in Europe, North America, South America, and Asia Pacific.



Want to learn more about our solutions? Contact us at:

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