NUCLEUS RESEARCH

CONTROL TOWER TECHNOLOGY VALUE MATRIX 2020

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THE BOTTOM LINE

The COVID-19 pandemic has highlighted the need for businesses to implement resilience and agility into their supply chain processes. Decision makers rely on control towers to predict delays and mitigate the downstream effects of external disruptions. Originally, control towers were specialized to manage customer operations, but proactive planning and operational agility require visibility across multiple tiers of suppliers, distributors, and partner operations. As a result, the market for control towers has begun to adjust to this need for end-to-end visibility by expanding the scope of their functionalities to take on additional operating responsibilities and drive increased value for customers.

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FACILITATOR — LEADER

Kinaxis

Elementum
LLamasoft
One Network Enterprises
E2open

MPO
Blue Yonder

Infor

o9 Solutions

ShipitSmarter
SAP

Viewlocity
Elemica

CORE PROVIDER — EXPERT

Greater Usability ➤
Better Functionality ➤

MARKET OVERVIEW

With the turmoil brought on by the COVID-19 pandemic, businesses have faced an unprecedented level of operational challenges. Supply chain disruption often lies at the core, where the pandemic has exacerbated the common issues of stock outs, transportation delays, and surpluses. Now more than ever, companies rely on Control Tower solutions to improve their supply chain processes by implementing agility and resilience measures. Nucleus defines a Control Tower solution as software that grants or extends the view of a

customer's operations to enable supply chain planning (SCP) and supply chain execution (SCE) activities. Given the wide spectrum of industry focuses, target segments, and target roles, the market for control tower solutions is saturated with applications of varying scopes and features.

With the spotlight on supply chain resilience, solution vendors differentiate themselves based on their products' ability to identify or predict delays and the speed at which they can resolve exceptions. Nucleus has identified several areas of development that lead the market in delivering tangible results to both the bottom line and service levels to users, including end-to-end supply chain management (SCM), network enhancement, partner collaboration, automated decision-making, and machine learning (ML) functionalities.

Vendors aim to connect the data flows of their customers' partner ecosystem to create an end-to-end view of the supply chains. Vendors work closely with customers to onboard as many tiers of partners as necessary with the correct data by developing integrations for individual connections; thereby forming a network centered on providing the customer with vital information. Select vendors onboard their customers as well as their partner networks onto a centralized global network hosted by the solution provider. This data management method enables users to connect with other organizations on the network without the need to form additional connections for partnerships, which reduces the barriers for collaboration. Additionally, the global network provides data from unaffiliated companies to feed ML algorithms that support estimated time of arrivals (ETAs), supply and demand planning, and inventory optimization.

Advancements in artificial intelligence (AI) have improved analytics, automation, and simulation functionalities. With additional external data sources, such as weather, geopolitical events, and partner networks, users can leverage AI to predict potential disruptions and their downstream effects. In response, forecasts and plans can automatically adjust to match supply with demand, while balancing capacity constraints, costs, and service levels. In the event of a disruption, many solutions use AI enhancements to provide users with prescriptive actions and make adjustments to execution processes automatically.

In this Value Matrix, Nucleus provides a snapshot of the market based on how vendors are delivering value to customers through the usability and functionality of their software (Nucleus Research *S142 – Understanding the Value Matrix*, September 2018). The Value Matrix also captures the direction vendors are headed relative to the rest of the market with respect to the investments they are making today that promise to deliver value in the future. This is helpful for both customers and prospects to understand what a vendor is bringing to market today and what to expect moving forward.

LEADERS

BLUE YONDER

Blue Yonder is a Leader in the 2020 Control Tower Technology Value Matrix, recognized for continuously improving its customer's connection with their suppliers, manufacturers, and distributors. With its Luminate Platform underpinned by a robust Control Tower layer, Blue Yonder integrates both its customers' and their partners' software ecosystems to inform workflows at any stage of the supply chain. Blue Yonder focuses on streamlining transportation and planning processes for retail, process manufacturing, discrete manufacturing, restaurant, foodservice, pharmaceutical, transportation, and wholesale distribution industries.

Recognizing that its customers not only require end-to-end view of their supply chains but also need the functionality and agility to take action at any stage, Kinaxis develops a holistic control tower solution that provides visibility, analytics, collaborative execution, and self-learning AI capabilities. Blue Yonder's customers equip themselves with multiple tools that address supply chain resilience by providing insights to understand the effects of exceptions and collaborative simulation features to support decision-making. Data signals from partners or external factors inform on the downstream situation with predicted ETAs, potential shortage detection, and inventory optimization options. Once a problem area has been identified, the Luminate Control Tower platform provides "Situation Rooms" where relevant parties and partners can run and share simulations in real-time to generate solutions. Allowing suppliers and distributors to view one another's capacities and interact with forecasts helps to identifying mismatches, make commitments, and submit proposals. With both collaborative planning and execution functions consolidated under a single UI, supply chain managers improve communication and accountability across the network to reduce preventable disruption events.

Blue Yonder is currently developing its multi-party planning capabilities by introducing more viewing options and classifications of exception types. Planners will have the ability to drill down on exception events based on selected variables, from ETAs to revenue flows, to make more informed impact assessments. An exception workbench will soon be available for planners to automatically prioritize specific clients and disruption events based on projected impacts and company objectives to improve productivity and agility. With the acquisition of Yantriks in July 2020, Blue Yonder can fold in commerce and transactional services to manage the upstream ordering and downstream fulfillment processes, expanding its users range of functionality, especially within retail segments. Nucleus recognizes the incremental upgrades Blue Yonder has made to instill resilience into its users supply chain and believes it will continue to lead the market in those efforts.

E2OPEN

E2open is a Leader in the 2020 Control Tower Value Matrix. The vendor aims to simplify the concept of supply chain control towers for customers by unifying all management capabilities under its single operating platform and Harmony® user experience. The resulting clarity enables organizations to quickly make data-informed decisions across all levels of their operational ecosystem, including suppliers, global trade and logistics, and channel partners. E2open's flexibility and scalability are often cited as differentiators in competitive deals, while the vendor's partner network is one of the largest in the world with more than 200,000 members.

Since the publication of last year's Value Matrix, E2open has maintained its vigorous development schedule with a larger emphasis on integrating new capabilities and acquisitions into its broad ecosystem. The vendor's recent additions of Amber Road, a global trade management specialist, and INTTRA, an ocean shipping network provider, have opened up many new opportunities for routing and logistics optimization and enable customers to conduct additional layers of their supply chain operations. In May 2020, E2open released its second quarter technology update, which included user interface improvements for Global Trade Management and the launch of its virtual assistant Maestro. In June 2020, the vendor announced solution support for organizations managing the transition to the US-Mexico-Canada Agreement and the release of In-Transit Visibility for its logistics applications

E2open's pursuit of providing a unified supply chain management platform has led to a comprehensive solution that can support a broad range of use cases, from basic process optimization to long-term transformational initiatives. The vendor's support for an end-to-end single version of the truth and roadmap towards fully autonomous planning and execution both contribute to risk reduction and agility enhancements for companies with complex supply chains. Nucleus expects that E2open's investments in solution integrations and network expansions will continue to drive value for its customers and help maintain its position on future editions of the Value Matrix.

INFOR

Infor is a Leader in this edition of the Control Tower Technology Value Matrix following enhancements to the usability of its solution from the prior year. Infor Nexus is the end-to-end control tower solution, containing both sense and respond functionality to enable continuous supply chain management. Infor Nexus is used by companies across a number of industries including industrial manufacturing and machinery, transportation, automotive, aerospace and defense, high technology, retail, fashion, and wholesale.

As the majority of supply chain data lies outside its customers' organizations, Infor creates a network of the partner ecosystem to generate real-time view across the entire supply chain, incorporating both physical and financial elements. Currently, the vendor hosts over 74,000 businesses on the Infor Nexus Network. Infor Nexus leverages machine learning to provide customers with predictive insights to potential supply chain issues such as late shipments and product shortages. The Control Center solution provides enhanced visualizations to help users understand the flow and state of orders, supply, demand, and capital across the network. Continuous network monitoring facilitates supply and demand alignment by comparing various elements, including forecasts, in-transit data, demand signals, stock-outs, and inventory levels.

Since the 2019 Control Tower Value Matrix, Infor enhanced both its intelligent sensing and response capabilities. Infor has also expanded its logistics management functionality by implementing geofencing and granular cargo tracking capabilities coupled with temperature, separation, and physical impact monitoring functions. On the response side, Infor has strengthened its decision support capabilities by providing enhanced in-context data and visualizations on customer orders and the status of supply throughout the network. Inventory simulation and additional direct resolution paths with multi-party collaboration enable organizations to identify corrective actions and avoid problems including late deliveries and shortages. As Infor delivers on functionality promises and improves overlays and workflow visualizations, Nucleus has noted a rise in customer satisfaction with the Infor Nexus Network and updated Nexus Platform.

KINAXIS

Kinaxis is a Leader in the 2020 Control Tower Value Matrix. With continued investments to its RapidResponse platform, Kinaxis delivers supply and demand planning for its customers in aerospace and defense, automotive, consumer products, high tech, industrial manufacturing, life sciences, and retail industries. To continue its core focus of supply chain agility, Kinaxis has made advancements in implementing AI capabilities to support users in accelerating decision-making and implementing adjustments to changing business scenarios.

Supported by its concurrent planning engine, the Kinaxis control tower can create a full end-to-end visibility model of its users' supply chain. This includes a granular view of upstream production and scheduling to downstream visibility into transportation tracking and revenue flows. A real-time flexible supply chain model enables fast and accurate scenario simulation capabilities that enable planners to tie local decisions to global KPIs.

With robust visibility and planning functions, the control tower solution can inform on execution through automated decision-making functions, from customizable decision triggers to impact calculations and prescriptive exceptions, to achieve a "self-healing supply

chain." Plans can automatically adjust to trends from external or third-party data signals, and forecasts are generated to adjust to new lead times, complete with impact assessments to help supply chain managers balance costs and service levels. Recent updates have equipped Kinaxis users with tools to proactively address risk and machine learning algorithms that enhance long-term planning and real-time execution, with active exception prediction that continuously updates the likelihood of disruptions to increase supply chain agility.

Recent acquisitions and partnerships have further expanded on Kinaxis's core value propositions. In June 2020, Kinaxis acquired retail and consumer packaged goods (CPG) AI specialist, Rubikloud. Folding in the demand sensing and planning capabilities of Rubikloud's enterprise AI platform, Kinaxis will improve its demand management and S&OP functions for its CPG customers and gain entry into the enterprise retail sector. The vendor continues to announce new partnerships to help expand the scope of tis digital transformation efforts and drive accelerated time-to-value for customers. Nucleus believes Kinaxis's focus on seamless UI design and visualization practices leads the market in usability and secures it as a leading player.

ONE NETWORK ENTERPRISES

One Network Enterprises is a Leader in the 2020 Control Tower Technology Value Matrix. The vendor prioritizes connectivity and visibility into its customer's supply chains, joining not just its users' immediate neighbors but also their vendors' partner networks as well. One Network supports suppliers, manufacturers, and distributors in a wide range of industries, including retail, high tech, healthcare, restaurant and food services, pharmaceuticals, aerospace and defense, automotive, and transportation.

One Network's global network lies at the core of its value proposition and underpins its unified planning and execution capabilities. The vendor aims to onboard its customer's entire supply chain, to the nth tier to create a true end to end view. Incentivizing its users' partners with access to the network such that they can benefit from the increased visibility, One Network currently hosts over 90,000 businesses on its global network. Besides visibility into one's own supply chain, users have the opportunity of collaboration with other parties on the network. Forming new partnerships is made easy as there is no need to establish additional connections since the required data streams have already been linked to the global network and can be shared through the permissibility framework.

One Network has made functionality enhancements to its AI capabilities in supply chain planning and execution functions that it has labeled as "NEO Intelligent Agents". Specifically, focus has been on the fulfillment (global supply-demand matching), transportation and last-mile delivery segments, where NEO Agents are leveraged to increase automation for prescriptive actions. For example, reported or predicted upstream

delays could trigger a NEO agent to develop options and perform automated rescheduling or reallocation based on cost and service level optimization to avoid snowballing delays and costs from propagating down various partner links. Further, updates to global inbound and last-mile support allow products and materials to be tracked at a serialized level to establish accountability at every stage. IoT device integrations also notify relevant parties to temperature variations and physical impact events for sensitive or fragile assets. Nucleus believes One Network will continue leading in functionality as a result of its investments in its network of networks approach and machine learning capabilities.

EXPERTS

ELEMICA

Elemica is an Expert in this year's Control Tower Technology Value Matrix, recognized for providing visibility and streamlining processes for customers in process industries, such as chemicals, food and beverage, automotive, and pharmaceutical. The vendor aims to support network participants' replenishment, orders, scheduling, transportation, and risk and quality activities, all managed through the Digital Supply Network.

As users implement and migrate onto Elemica's platform, they can onboard partners along their value chains onto the Digital Supply Network, with reusable connections. This means users can onboard new vendors and share in the data flows without forming individual connections with all parties on the network; thereby, reducing operational costs and increasing supply chain agility from accelerated collaboration. Control Tower capabilities leverage data on the shared network to provide end-to-end visibility and grant users the ability to monitor changes to vendor constraints and quantities. Coupled with AI capabilities, Elemica can proactively warn users to disruptions and surface relevant insights to support decision-making.

Since folding in its acquisition of EMNS, a material quality compliance company, last march, Elemica has provided quality control capabilities to the control solution. In January 2020, the vendor announced the acquisition of Eyefreight Transportation Management, a SaaS TMS provider. The combination stands to expand Elemica's logistics management capabilities and increase the inflow of relevant information to better inform on potential disruptions and shipment optimization opportunities. Elemica has also undergone considerable transformation to its C-suite in June 2020, announcing Matt McAluney as Chief Commercial officer and David Muse as CEO. Nucleus believes that Elemica is quickly maturing its solution scope and functionality through recent partnerships and acquisition, and once new technologies are successfully incorporated into its platform, it will improve its value proposition to all clients.

O9 SOLUTIONS

o9 Solutions is an Expert in the 2020 Control Tower Value Matrix. The vendor specializes in what it refers to as decision management software, which covers functionalities for integrated business planning, revenue management, and supply chain management. The o9 Solutions platform is native to the cloud and unifies data sources, planning capabilities, and executive functions to create dynamic strategies that can adjust to external disruptions as they happen. The vendor uses Enterprise Knowledge Graph technology to create a digital twin of an organization's planning processes and execute AI-enhanced models to deliver detailed insights on supply chain plans. o9 Solutions is ideally suited for the complex needs of enterprise organizations and serves a variety of industries including industrial manufacturing, retail and apparel, high tech, semiconductors, pharmaceuticals, medical devices, oil and gas, and consumer products and goods.

As o9 Solutions continues developing its platform's functionalities, it has also aggressively expanded its partner ecosystem in recent months. In 2020, o9 Solutions has added the following partners:

- High Radius, a fintech SaaS vendor
- Operaize GmbH, a manufacturing operations specialist
- Samsung SDS, an IT solutions services provider focused on high tech
- vTradeX, a TMS SaaS provider
- FourKites, a real-time TMS visibility platform

The growing partner ecosystem will help bolster o9's end-to-end capabilities by connecting a broad scope of specialized analytics, planning, and execution functionalities into o9's unified platform. o9 Solutions can be hosted on all three of the major public clouds, Amazon Web Services, Microsoft Azure, and the Google Cloud Platform, enabling customers to use the cloud architecture that best aligns with their growth plans. Additionally, in April 2020, o9 Solutions announced that it had received an investment for a minority stake of the company from the firm KKR.

Because of its dynamic approach to data management and analytics, o9 Solutions pursues customers that are holistically rethinking their planning and operational requirements. While much of the solution's infrastructure is standardized to allow for rapid implementations, o9 Solutions also has the flexibility to enable organizations to develop their own customized functions to preserve existing best practices within their operational ecosystems. Nucleus expects that o9 Solutions' scalability and functionality investments will help confirm its value propositions to new industries and improve its position on future editions of the Value Matrix.

SAP

SAP is an Expert in the 2020 Control Tower Value Matrix. The SAP Supply Chain Control Tower provides customers with real-time visibility into their supply chain operations and uses deep analytical functionalities to help keep track of exceptions and external disturbances. The control tower can work as a standalone solution but drives the most value for users when it is combined with other SAP solutions and their functionalities. Examples include strategic planning with the SAP Integrated Business Planning (IBP) platform, analytics with SAP Leonardo, and SAP Ariba for supply chain collaboration. SAP Control Tower users can integrate data from external ERP solutions through dashboards built on the SAP Fiori user interface, which can help organizations remove data and operational silos to carry out corrective actions more quickly.

SAP has maintained its dynamic functionality development schedule for its entire portfolio with recent updates focusing on incorporating machine learning and artificial intelligence techniques to its predictive capabilities. The Control Tower also provides exception management and built-in collaborative functionalities that further facilitate the links between supply chain planning and execution. The SAP Supply Chain Control Tower can manage large and highly complex workloads and help companies identify and correct ineffective supply chain processes. As a well-established presence in the supply chain management space, Nucleus expects that SAP's upgrades for the latest version of its control tower solution will drive additional value for customers with enterprise-grade requirements.

FACILITATORS

ELEMENTUM

Elementum is a Facilitator in the 2020 Control Tower Technology Value Matrix. The vendor is recognized for Its flagship product, the Elementum Orchestration platform, which combines internal, partner, and global data to provide users with a real-time end-to-end visibility over its value chain. Users leveraging the platform for planning and execution around the activities of suppliers, logistics providers, and manufacturers within food and beverage, retail, healthcare, and manufacturing sectors.

With a unified supply chain, Elementum provides a single source of truth to its user networks which in turn enables inter-party collaboration and analytics as data matches across all instances at all times. Additionally, users can leverage partner data and external data signals, such as product availability, order status, weather, geopolitical events, and oil prices, to predict and warn users of potential exceptions to their supply chains. In response to the pandemic, Elementum released its newest online collaboration interface, coined "The

Virtual War Room", providing users and their partners a space to work on forecasts, and simulations to resolve unexpected disruptions from their own homes. Users can rapidly deploy a War Room in under an hour and use task management functions to prioritize resolutions and host meetings to review incidents and trends. Further enhancements to automation and machine learning functions should improve Elementum's functionality scores within the Value Matrix.

LLAMASOFT

LLamasoft is a Facilitator in the 2020 Control Tower Value Matrix. The vendor has continued to make significant investments to connect its supply chain design expertise to the control tower space through enhancements to its technology platform. The application works as a digital twin of an organization's value chain and operates with four primary elements: Data Integration, Visualization, Modeling, and App Building. Organizations can centralize data and analysis with LLamasoft to evaluate complex decisions and optimize their strategy across all operational pillars including sourcing, manufacturing, distribution, inventory, and service.

In January 2020, LLamasoft announced the release of llama.ai, an enterprise-scale platform that incorporates artificial intelligence and machine learning enhancements to its analytics capabilities, and the vendor has seen significant adoption of the platform within its global customer-base. Companies can rapidly configure and deploy apps using a no-code design studio to enable business users to run multi-scenario analysis, assess operational trade-offs, and operationalize key supply chain decisions. Using the llama.ai platform in March 2020, the vendor launched the LLamasoft COVID-19 Response Center to help customers affected by the operational damage caused by the global pandemic. The Response Center is a collection of llama.ai apps and services specifically designed to help customers restore operations and improve the long-term resilience of their supply chains.

LLamasoft's is especially strong with helping a company work around its constraints to create an optimized plan based on both short- and long-term obligations. Instead of treating policies as firm guidelines, LLamasoft helps organizations work around these constraints to find models that will guide optimal long-term supply chain strategies. Nucleus expects that LLamasoft's unique approach to delivering supply chain optimization from the design stage will continue to drive value for its customers and its sustained investments in control tower technology will improve its position on future editions of the Value Matrix.

MP OBJECTS

MPO (MP Objects) is a facilitator in the 2020 Control Tower Technology Value Matrix. With a full suite of supply chain management (SCM) solutions, the vendor provides users with a

platform to benefit from the convergence of planning and execution functions. Specializing in B2B and B2C order optimization, MPO serves high tech, industrial manufacturing, healthcare, pharmaceutical, wholesale distribution, logistics service, and retail industry customers on its MPO Platform. System integrations with carriers, WMS, and partner systems provides real-time visibility to orders in transit and allows users to monitor and manage orders from sourcing to last-mile delivery to invoicing.

With complete support for all order types, distribution channels and transportation modes, MPO supports order management, e-commerce fulfillment, reverse logistics, spare parts management, supplier collaboration and transport management for road, rail, air, and sea. The MPO real-time visibility and in-app control functionality is underpinned by a centralized database as it onboards its customers' value chains onto its unified cloud platform. Customers have access to a wide breadth of information from an order, inventory, transport, and cost perspectives coupled with KPIs, including provider savings and performance comparisons, capacities, lead times, and order statuses. This enables inventory control and transport optimization across all business partners and modes of shipments, as well as ETAs informed by machine learning practices for continuous improvement. Additionally, the Control Tower solution can automate order management activities such as sourcing, routing, labeling, and invoicing to generate time savings for managers to focus on other value-add tasks. Interviewed customers report streamlined workflows and recent UI updates that have increased the vendor's usability scores. Nucleus believes MPO stands to improve its placement on the Value Matrix with continual upgrades to the user experience.

CORE PROVIDERS

SHIPITSMARTER

ShipitSmarter is recognized as a Core Provider in the 2020 Control Tower Technology Value Matrix. The vendor specializes in shipment lifecycle management across all modalities. Users can leverage the multiple cloud-based software-as-a-service (SaaS) solutions for financial management, transportation management, carrier management, and freight auditing. As a niche solution provider, ShipitSmarter targets clients seeking to streamline and reduce the complexity of their transportation processes.

Acting as the intermediary between shippers and the client, the vendor provides visibility and analytics to ensure confidence in ETAs and balances financials with service levels. Partnering with all major logistics providers in Europe, ShipitSmarter maintains close relationships with shippers to ensure constant updates and visibility, even for flows across multiple carriers.

ShipitSmarter's control tower capabilities are underpinned by tight integrations with carrier systems, which enables supply chain visualizations to improve the user experience, improve trust between partners, and support decision-making for both short- and long-term planning. In addition, users leverage the various tools for data management, shipment management, reverse logistics and trade management. Nucleus has noted that customers with stringent transportation requirements continue to benefit from their ShipitSmarter deployments, especially as they automate order and shipping processes and lower operational costs by reducing bottlenecks and inefficiencies.

VIEWLOCITY

Viewlocity is a Core Provider of the 2020 Control Tower Technology Value Matrix. With a focus on supply chain visibility and control, the vendor offers SaaS solutions, managed services, and licensed deployments. Provided solution suites include supply chain design, inventory and asset management, supply chain management, logistics and transportation, planning and production, order lifecycle management, and supplier management. Customers in high tech, automotive, aerospace and defense, logistics, manufacturing, retail, and consumer goods industries can use control tower capabilities to monitor and streamline their transportation processes. Viewlocity offers real-time and single source data availability from the partners ecosystem to provide an accurate view for users to manage the supply chain from producer to consumer.

Since its acquisition by FOG Software Group in 2011, funds and efforts have been transferred to maintaining the Control Tower Platform solution, while solution research and development slowly tapered off. Without any substantial upgrades to solution functionality and usability for the past few years, the vendor has continued to lose ground to the market. Sustained by clients unwilling or unable to migrate off the Viewlocity platform, the vendor risks obsolescence without net new customers.