Decision Spot

WHITEPAPER

From Planning to Decision Making

How Network Optimization Transforms Supply Chain Planning from Static Plans to Continuous, Decision-Driven Systems

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Executive Summary

Supply chain planning is operating in a more difficult environment than ever before. Networks are more complex, disruptions are more frequent, and shifts in demand, supply, cost, and capacity can make plans outdated far more quickly than before.

When disruptions occur, the impact is rarely confined to one function. A sourcing shock affects production, inventory, transportation, and service. Yet in many organizations, these cross-functional trade-offs are still addressed through manual interventions, spreadsheets, and planner judgment. The result is often a patched-up plan that helps each function respond but does not produce the best overall outcome for the business.

This is not simply an execution problem. It reflects a structural gap in how two important capabilities evolved. Planning systems became stronger at managing recurring processes and running the business at scale. Network optimization became stronger at evaluating end-to-end trade-offs across sourcing, production, inventory, transportation, and capacity. But because network optimization was difficult to operationalize, it remained largely confined to periodic studies instead of becoming part of ongoing planning.

The opportunity now is not to replace planning systems, but to connect them with a more continuous network optimization capability. Organizations need more than a static plan. They need the ability to evaluate trade-offs across the network as conditions change, connect short-term decisions with longer-term supply chain goals, and guide planning with a stronger view of the overall business outcome, including service, resiliency, and total cost-to-serve.

Advances in cloud computing, optimization technology, workflow design, and AI are now making this shift practical. Together, they make it possible to move from periodic planning cycles to more continuous, decision-driven operations, where network optimization helps planning systems respond to change with greater alignment, speed, and resilience.

WHAT YOU WILL LEARN

- Why supply chain plans break more quickly in today's environment
- How network optimization complements planning by evaluating broader trade-offs
- Why this matters for S&OP and other recurring planning processes
- Why important cross-network decisions still happen outside planning systems
- What it means to move from one-time studies to a recurring decision capability

SECTION 01

Why supply chain planning is under more strain

Supply chain planning is operating in an environment with more volatility, more complexity, and more cross-functional interdependence than many planning processes were originally designed for. A change in one part of the network rarely stays contained. A capacity shortfall in one node can create ripple effects across the broader system.

This is one reason plans break more quickly. Many planning processes were built around periodic cycles and relatively stable assumptions. But when conditions change frequently, organizations are forced to respond between planning cycles through manual interventions, planner judgment, and spreadsheet-based analysis.

Inventory rebalancing is a good example. In one global CPG company, planners were manually calculating transshipments across a network of multiple distribution centers and more than 2,000 products. The process served as the final line of defense to maintain service levels, but it required at least 140 human-hours per week and had to weigh lead times, logistics costs, product behavior, demand type, and changing stock positions across the network. That is not a narrow local decision. It is a recurring network decision with real cost and service implications, yet it was managed manually outside the planning system.

The result in situations like this is often a plan that helps the business react but leaves the overall supply chain suboptimal. This is not simply an execution challenge. It reflects a gap between what planning systems are designed to manage and the broader cross-functional trade-offs that organizations increasingly need to make.

WHEN LOCAL DECISIONS COLLIDE

Function-by-function decisions

Each team improves its own metric, but the choices can work against each other.

- **Production** — Maximize OEE / utilization
- **Inventory** — Minimize inventory costs
- **Transportation** — Hold orders for full-truckload efficiency

Each choice makes sense alone. Together, they can weaken service, agility, or total cost.

→ TOTAL OUTCOME

Network-aware decisions

The same choices are evaluated together before the plan moves forward.

- **Production** — Capacity, batches, changeovers
- **Inventory** — Buffers, working capital, service risk
- **Transportation** — Cost, speed, reliability

Best total network outcome, not just the best local metric.

SECTION 02

How planning systems and network optimization evolved apart

To understand why this gap exists, it helps to look at how these capabilities developed over time.

Planning systems' strengths are managing workflows, enforcing process discipline, maintaining master data, and coordinating the business at scale. They are designed to help organizations run agreed processes repeatedly and consistently.

Network optimization evolved along a different path. It was largely seen as a tool for supply chain design, used to determine facility locations and capacity requirements. In a more stable world, that made sense. Large structural decisions did not need to be revisited as often, and optimization remained largely episodic.

But even then, network optimization was capable of much more than strategic design. It could also support many tactical and operational decisions by evaluating sourcing, production, inventory, fulfillment, and transportation choices together and finding the right trade-offs across functional goals. However, it was rarely used that way in practice.

The distinction is not really strategic versus operational. Planning systems were designed to follow rules rather than challenge them. They could run the business well within defined processes, but they were not built to continuously evaluate trade-offs across the entire network or consistently align short-term decisions with longer-term supply chain goals.

While network optimization tools provided deep algorithmic capabilities and a broader scope for what-if scenario analysis, their complexity and computing requirements limited their regular use. The bigger challenge was that they were not designed for planners. The software required expert modelers who could build and maintain complex optimization models, not business users who needed an easy-to-use tool and explainable insights. As a result, optimization capabilities often sat in the hands of small, specialized teams and were used mainly for one-off network studies.

Many planning systems also support what-if scenario analysis. But those scenarios are usually evaluated within the boundaries of an existing planning process. Network optimization can evaluate much broader network-wide trade-offs and what-if scenarios.

The two capabilities remained separate. This separation is one reason many important cross-functional decisions are still managed outside a unified system or workflow today, and why short-term planning decisions can drift away from what is best for the supply chain over the longer term.

SECTION 03

How network optimization improves planning decisions

Network optimization improves planning not by replacing planning systems, but by helping organizations evaluate decisions that cut across functions, time horizons, and constraints.

A production decision may seem like a plant-level choice, but it affects inventory positioning, transportation flows, service levels, and working capital. Larger batch sizes may improve utilization and reduce unit cost, but they can also increase inventory and reduce flexibility. Smaller batches may improve responsiveness, but they can create capacity losses. The right answer depends not on one objective, but on the interaction of several.

This matters because many supply chain decisions that appear local are not local in impact. A supply-demand mismatch at one location can be addressed by producing more, reallocating existing supply, changing flows, using different fulfillment paths, or accepting a service trade-off. Each option affects the network differently. What looks reasonable from one function's perspective may create a worse total outcome overall.

The inventory rebalancing case illustrates this clearly. The company's planners were making transshipment decisions manually. The optimization model analyzed the full product range daily and generated stock transfer orders that reflected network-wide logic rather than isolated planner calculations. The business impact was substantial: $18 million in incremental earnings, $3.5 million in logistics savings, and a 75% reduction in decision-making time.

INVENTORY REBALANCING IMPACT

$18M	$3.5M	75%
INCREMENTAL EARNINGS	LOGISTICS SAVINGS	FASTER DECISIONS

Network optimization improves planning decisions by evaluating these trade-offs together. Instead of asking each function, plant, or warehouse to optimize within its own boundaries, it determines the best overall combination of actions across the network.

THE BOTTOM LINE

This is where network optimization strengthens planning. It provides a stronger decision foundation for planning, and can also fill gaps in current planning processes where decision logic is overly simplified or still managed through spreadsheets.

SECTION 04

From one-time studies to continuous planning capability

Traditionally, network optimization was used as a one-time or occasional exercise. A model was built for a study, scenarios were evaluated, recommendations were delivered, and the work largely ended there. That approach no longer matches the pace at which many supply chain decisions now need to be made.

A more continuous network optimization capability means using end-to-end optimization models on a recurring basis to guide tactical and operational planning as conditions change. It is not just about running models more often. It is about connecting them to real workflows, real decisions, and real feedback over time.

That shift can already be seen in practice. In the inventory rebalancing case, the model was not used as a one-off analytical exercise. It was designed to run daily, integrate data from the ERP and Planning system, generate optimized transfer orders back into ERP, and support weekly impact monitoring and continuous improvement.

A second case shows the same idea in a different planning context. In fulfillment capacity planning for an omnichannel retailer, optimization was used to support recurring decisions about inventory allocation, service levels, workforce deployment, and hiring temp workers. The solution became the cornerstone of the retailer's monthly supply planning process and leadership meetings, helping align decisions across departments and business lines.

Going from one-time studies to a continuous planning capability requires a different kind of model and a different level of practical usability. Historically, optimization models were often simplified to make them tractable for strategic design decisions. Products were grouped, customers were clustered, and time was grouped into broader periods. That made sense for long-term questions.

Planning decisions closer to execution require a different standard. When optimization is expected to guide tactical and operational decisions, those simplifications can hide variability that materially affects outcomes. Product-level differences, short-term imbalances, local constraints, and service commitments become much more important. If the model does not represent enough of that complexity, planners will not trust the outcomes.

Advances in computing and optimization technology now make it possible to represent more of that real-world complexity than before. This is not about building the biggest or most complex model possible. It is about representing the business sufficiently to support better planning decisions in practice.

This does not mean one network optimization model is reused in the same form for every decision. Different business questions require different formulations, levels of detail, and workflows. The objective is to build a repeatable network optimization capability that can support recurring decisions, while adapting the model and user experience to the problem at hand.

> ***Continuous network optimization capability is not just about running models more frequently. It is about embedding optimization into planning workflows in a repeatable, credible way that guides decisions over time.***

SECTION 05

Making optimization usable for planners

One of the main reasons optimization remained confined to strategic studies was not only model complexity. It was also usability.

Traditional network optimization tools were built for expert modelers. They required specialized skills to build, maintain, and interpret. That made sense when optimization was used for occasional strategic studies, but it limited the ability to apply the same capability to recurring planning decisions.

For network optimization to become part of planning, it doesn't require turning planners into modeling experts. It is to extend expert-built models into workflows that planners can use to evaluate scenarios, review recommendations, understand trade-offs, and make better decisions with full clarity.

This is one area where AI can help materially. Optimization remains the core decision engine, but AI can make that engine easier for planners to use. It can help users create what-if scenarios in business language, modify assumptions, run analyses more easily, summarize solution outputs, and ask follow-up questions to better understand the implications of a recommendation. In that sense, AI is not replacing optimization. It is making optimization easier for planners to work with.

For example, a planner may not want to rebuild a production plan from scratch. They may want to start with the current plan and ask what minimum changes would be needed to meet the updated forecast. The more easily planners can express and explore questions like this, the more practical network optimization becomes in recurring planning.

Usability also depends on configurability. Network optimization capability must serve different roles in different ways. Modelers need flexibility to define assumptions, constraints, and goals. Planners need recommendations, guardrails, and explainable outputs they can work with in context. Business leaders need visibility into trade-offs and business impact without engaging with model complexity directly. Different teams and decision areas may need different inputs, outputs, review steps, and levels of control. If optimization is going to support ongoing planning, it must fit those realities rather than force every process into one rigid structure.

Review and override are especially important. In many planning environments, the goal is not to force automatic acceptance of every recommendation. It is to give planners a stronger starting point, allow them to apply business context where needed, and make those adjustments visible and structured rather than buried in side analysis or spreadsheets. That makes the process more transparent, repeatable, and useful for future improvement.

ONE CORE, DIFFERENT USER NEEDS

Optimization Core
Shared model logic, configured for different users

Modelers
Need control of assumptions, constraints, and model logic.
- Model control
- Advanced scenarios

Planners
Need recommendations they can understand, review, and adjust.
- What-if scenarios
- Review and override

Leaders
Need visibility into trade-offs, service, cost, and risk.
- Business impact
- Decision visibility

Process Owners
Need governance, handoffs, and repeatable decision flow.
- Guardrails
- Approval workflow

SECTION 06

How planning and optimization create a feedback loop

Planning systems and network optimization create the most value when they work together as part of a recurring cycle.

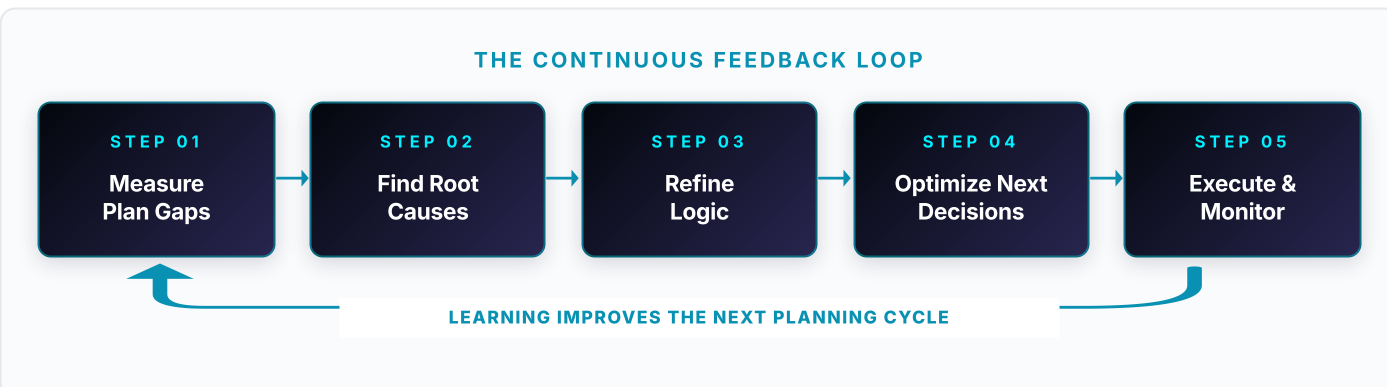
Network Optimization can generate decisions or decision guardrails. Planning systems then translate them into operational plans and execution. For example, it can create a starting production or sourcing plan that feeds into a company's planning system, or define flow, allocation, and inventory guardrails that guide day-to-day planning decisions. Execution reveals where assumptions held and where they did not. That, in turn, helps improve the next round of recommendations.

Together, they form a feedback loop.

There will always be a gap between projected outcomes and realized results. Some gaps reflect unavoidable variability, such as disruptions or demand shocks.

Others are more instructive. They may reveal that model assumptions need to be refined, that important data or constraints are missing, that planning processes are weakening the value of the recommendation, or that planners need better visibility into the model's logic to accept decisions rather than overriding them. Not every difference matters equally. The important thing is to identify where the gap is materially affecting outcomes and use that insight to improve the next cycle.

This is an important shift in thinking. Optimization is not the end of the process. It becomes more valuable when it is part of a recurring process in which it guides planning decisions, gaps in outcomes are measured, root causes are identified and addressed, and the next set of decisions improves.



SECTION 07

Toward a more continuous S&OP model

Traditional S&OP has often focused on reconciling functional plans. That role remains important, but the process itself needs to evolve.

In a more volatile and interconnected supply chain, organizations need more than a fixed planning cadence and one static plan. They need the ability to evaluate multiple scenarios, prepare for expected variability, and respond much faster when unexpected events occur.

This is where network optimization can strengthen S&OP. It can help teams prepare better-evaluated options across total cost-to-serve, service, and resiliency before they enter the forum. In that model, S&OP becomes less about reconciling disconnected functional positions and more about evaluating trade-offs, aligning on the best path forward, and adapting as conditions change.

In the fulfillment capacity planning case, the solution became part of the retailer's monthly supply planning process and leadership meetings, helping the business assess service, workforce, capacity, and inventory allocation decisions together rather than in isolation. The case also highlights the ability to test what-if questions in advance, such as whether to reallocate incoming inventory, expand shifts, or route more online orders through stores, and to understand the resulting impact on service levels and shipment costs.

> ***The goal is no longer a better static plan. The goal is a supply chain that can make better decisions continuously.***

TRADITIONAL S&OP VS. CONTINUOUS S&OP

TRADITIONAL S&OP Static plan cadence	CONTINUOUS S&OP Decision-ready options
1 Collect functional plans	1 Pre-evaluate scenarios
2 Reconcile manually	2 Align options before the forum
3 Debate trade-offs	3 Quantify trade-offs
4 Commit to one plan	4 Choose the best path
5 React when it breaks	5 Adapt as conditions change
One plan. Fragile under change.	**Multiple paths. Resilient by design.**

SECTION 08

Why this is becoming more practical now

For many years, the case for network optimization in planning was conceptually strong but operationally difficult. Models were harder to run frequently, harder to connect into workflows, and harder for non-specialists to use.

That is changing. Improvements in computing and workflow design are making it more practical to run richer models more regularly and connect them to business processes. At the same time, AI-assisted interaction is helping reduce the usability barrier. Planners can increasingly create scenarios in business terms, explore alternatives more easily, receive clearer summaries of solution outputs, and ask follow-up questions to understand why a recommendation changed.

This does not mean AI replaces model design or planner judgment. It means the path between business question and optimization-driven answer is becoming shorter and more usable. That is one reason network optimization can now play a more continuous role in supply chain planning, helping supply chains become more cost-efficient, resilient, and agile in how they make decisions.

WHY CONTINUOUS OPTIMIZATION IS MORE PRACTICAL NOW

Computing

Richer models can run more regularly at the scale real networks require.

Planner workflow design

Inputs, outputs, insights, and review steps appear where planners can act on them.

AI-assisted interaction

Planners create scenarios in business language and ask why recommendations changed.

RESULT **The path from business question to optimization-driven answer becomes shorter and more usable.**

ABOUT THE AUTHOR

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Prateek Rastogi is Co-Founder of Decision Spot, where he helps organizations apply advanced analytics to make better supply chain decisions. His background spans supply chain analytics, optimization, and logistics technology, including being the first employee at Opex Analytics and later holding leadership roles at LLamasoft, Coupa, and Mastery Logistics Systems. He earned an M.S. in Industrial Engineering and Management from Oklahoma State University.

ABOUT DECISION SPOT

Decision Spot helps organizations improve supply chain decisions through optimization, AI, and deep solution expertise. Its platform, Foresta®, enables teams to test scenarios, evaluate trade-offs, and make informed decisions across supply chain design, production, inventory, transportation, fulfillment, and capacity planning. Comprehensive and configurable, Foresta makes advanced analytics practical for real planning workflows, helping supply chains become more cost-efficient, agile, and resilient over time.

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