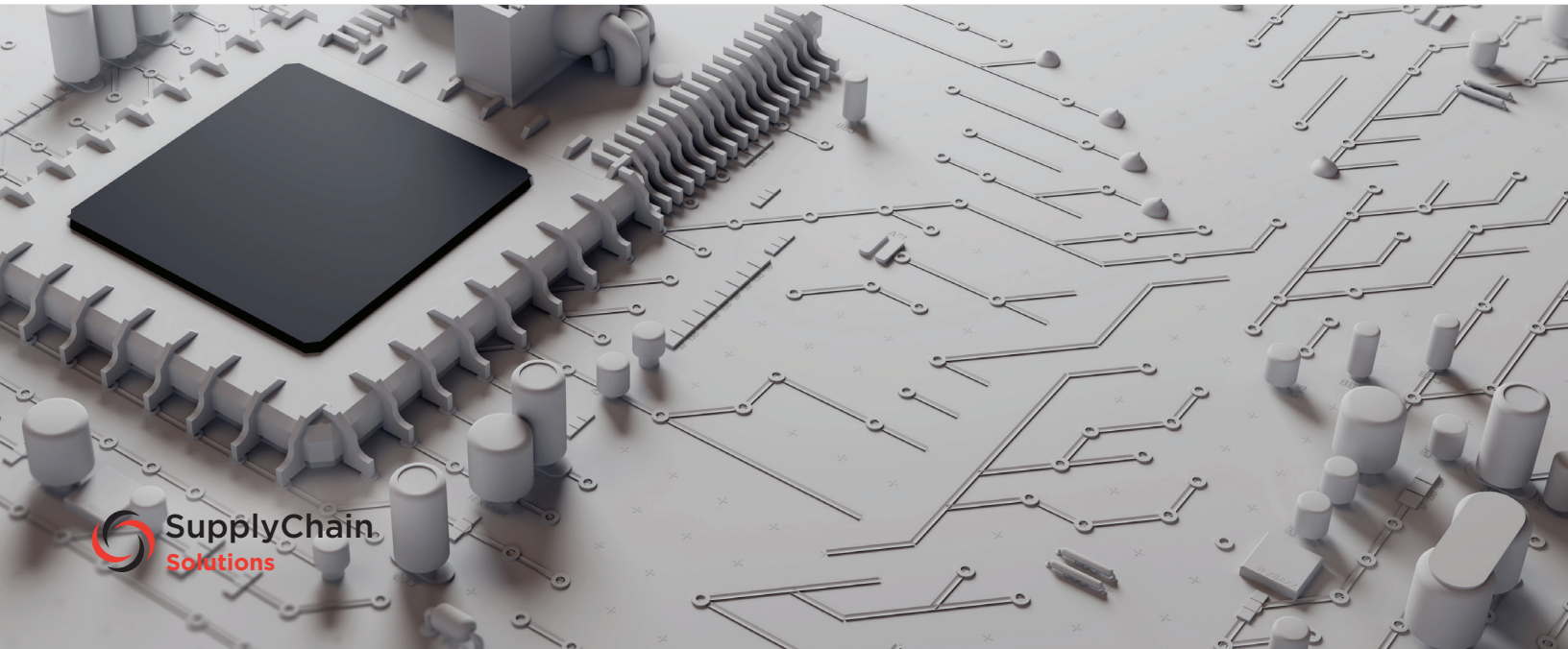
CASE STUDY

LIVING MODEL

Digital Twin Technology: Transform with Confidence

Companies with superior supply chains understand that to realize the full promise of visibility, it's not enough just to see what is happening now, but moreover what is likely to happen in the future. And while some organizations are leveraging sophisticated software to enable future state modeling, they are largely focused on speed over repeatability and accuracy. This makes it difficult to keep studies " fresh" for the amount of time it typically takes to implement, since the data is aging, and to prove that predicted results were achieved after implementation. In today's constantly changing environment, leveraging digital twin technology to create a 'Living Model' of the supply chain can mean the difference between moving ahead and falling behind.



OPPORTUNITY

A multinational computer hardware and software company was utilizing a routing model that moved all freight through regional gateways based on demand location. While this reduced outbound from gateway costs, it fragmented critical mass on the inbound leg, resulting in many customs entries, high MPF (Merchandise Processing Fee, a US Customs charge), and frequent minimum charge shipments.

OUR SOLUTION

Leveraging technology to identify the correct supply chain design for each type of product a company moves can often yield significant improvements: segment demand, build a supply chain to profitably service each segment, and optimize each supply chain. A hypothesis was proposed that changing the port of entry strategy for US build-to-order product would reduce the cost of the finished goods supply chain.

The company invested the time and resources to have Supply Chain Solutions build a persistent modeling environment, a digital twin with a continually validated baseline. Therefore, the work consisted of altering the existing model to optimize gateway use based on demand characteristics instead of demand location. In a typical modeling environment, new baselines are built for each study, but this was the same baseline used for many previous studies, saving time, and increasing confidence in the model.

RESULTS

The most cost-effective model for this product routed Asia supply through a single US gateway, reducing costs by 34% with an average 1-2 days increase in transit time. Service levels were adjusted (the origin leg accelerated for east coast demand) and the final results predicted a 17% reduction in transportation costs, a 16% reduction in MPF exposure, and a 52% reduction in customs entries – with no increase in lead time. The company decided to move forward with implementation.

Since the company had a digital twin, it was easy to revisit the study after implementation to prove that expected benefits were in fact achieved. At the end of the first month, current transactional data was run through the model, and this time the alternate used for comparison was the original state: What would have happened had the change not been made? Model results confirmed the projected savings were indeed being realized.

The model was run again at the end of each month for three months, and then again at the end of the next quarter to provide six months of evidence that the results of the change were as expected. Interestingly, during the second month of the second quarter, savings eroded significantly. An examination of the demand during that period uncovered a series of very large shipments. Since this was a minimums mitigation design, larger than normal shipments deteriorated savings. These shipments meant to go directly to the manufacturing base, but had routed them through a finished goods, minimums mitigation design, and it eroded savings. It also highlighted the fact that if demand characteristics were to change significantly, the design would need to be revisited.

In fact, that is exactly what happened, when the company experienced over capacity in a US plant that serviced US demand. They wanted to shift that production to Asia, which would change the average weight per incoming shipment to the US from Asia. This plant's produced product was significantly heavier than product currently produced in Asia for US demand.

A new study was initiated that pointed to a two-cross-dock model, with a deceleration of the origin leg and a further 7% reduction in cost over what would have been the case had the design not been revisited. When the trade wars ensued and they began pulling assembly out of China, extensive modeling of alternate sources, routing strategies, and network design ensured that they maintained the optimal network design as conditions changed.

The client has since used the Supply Chain Solutions team to examine many 'what if' scenarios, with a high degree of relational accuracy. Returning to previous studies with new rules, rates, or transactions is also easily accommodated, allowing for ongoing validation that studies, once implemented, do in fact achieve the results that were predicted.