SiliconExpert

DRIVE PROACTIVE SUPPLY CHAIN RESILIENCE STRATEGIES

Advanced risk analytics in the age of uncertainty

Introduction

Disruptions spawning from the COVID pandemic in 2019 sent shockwaves throughout the supply chain, causing market volatility, shipment delays, and supply issues like never before. The impacts touched all industries, from telecommunications to healthcare, perhaps hitting automotive the hardest. The subsequent China heatwave in the summer 2022 is reported to have caused a direct economic loss of $400 million in July alone.[1] But not only did companies suffer a monetary loss, most also experienced reputational damage[2], losing customers and struggling to acquire new business. As we look back to this volatile period, one thing is clear: the global supply chain was not prepared for this level of disruption.[3]

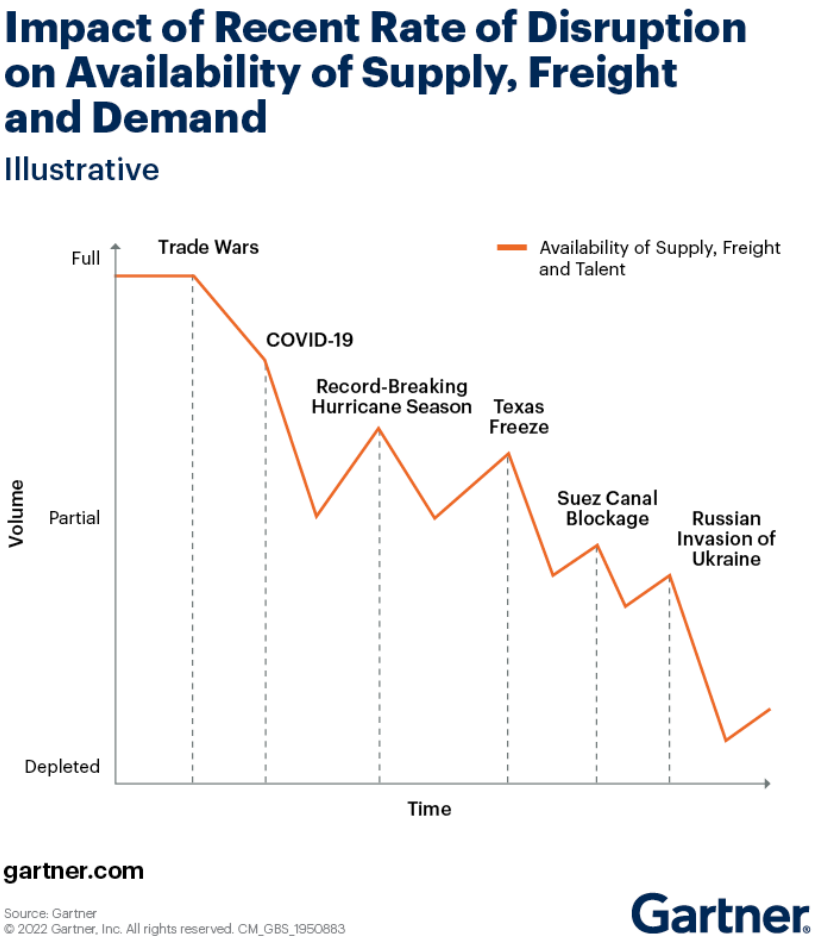

Figure 1: The depletion of volume available to be transported over time due to disruptions.[4]

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Supply Chain Digitization

Global digital transformation

While retail was one of the first movers towards digitalization, with the first pizza delivered from an online order in 1994, this soon evolved into ecommerce, internet-enabled food delivery services, and then rideshare service apps, providing a custom experience tailored to an individual's needs and interests. The recent pandemic acted as a catalyst to widespread adoption of digitalization as the world was shifting preference towards remote and hybrid engagements. Companies in other industries, including supply chain, were forced to respond by going digital at an unprecedented rate.

Making the world transparent

Digitalization is unlocking a new level of transparency across the global supply chain. In fact, improving visibility across the supply chain has since become a top priority.[4] In 2020, SupplyChainBrain, a supply chain management information resource, said most enterprises had visibility into just 20 percent of their supply chain, where 70 to 90 percent visibility is recommended.[5] This further supports findings that organizations best able to manage the pandemic were the ones that embraced digital transformation.[6] While there has been a general consensus around the role of visibility in effective supply chain risk management, few companies have been able to establish this in practice as a gap persists between the idea and its execution.

SiliconExpert is helping to address that gap, working with companies to digitally map their supply chains. Once the supply chain is mapped and information is aggregated, a data lake with millions of data points is created. SiliconExpert has leveraged that data lake in the development of "Resilience Rating," a proprietary algorithm which applies advanced analytics, machine learning, and AI to quantitatively score and assess risks in the supply chain to identify pressure points and weaknesses that can be addressed before they result in an issue.

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Overall Risk Visibility for Proactive Management

Quantifying Resilience

SiliconExpert is a leader in technology lifecycle intelligence, and a platform of one of the world's largest databases of electronic components. Some of the information contained within the database includes over 100 part characteristics, which have been further categorized into 12 individual risk factors. Resilience Rating is a culmination of these risk factors, which feed into a proprietary resilience algorithm, resulting in an overall rating (between 0.0-10.0). A low Resilience Rating indicates that a part is more prone to disruptions, illuminating potential risks to part availability, security, and performance. This intelligence allows businesses to better strategize across teams, aligning engineering, compliance, and procurement.

Assurance of Supply	**Lifecycle Risk**
	Origin Risk
	Inventory Risk
	Sourcing Risk
	Leverage Risk
	Market Risk
Security	**Counterfeit Risk**
	Environmental Compliance Risk
Performance	**Price Risk**
	Lead Time Risk
	Manufacturer Obsolescence
	Manufacturer Lead Time

Figure 2: SiliconExpert's risk factors that offer a visibility profile unique to Resilience Rating.

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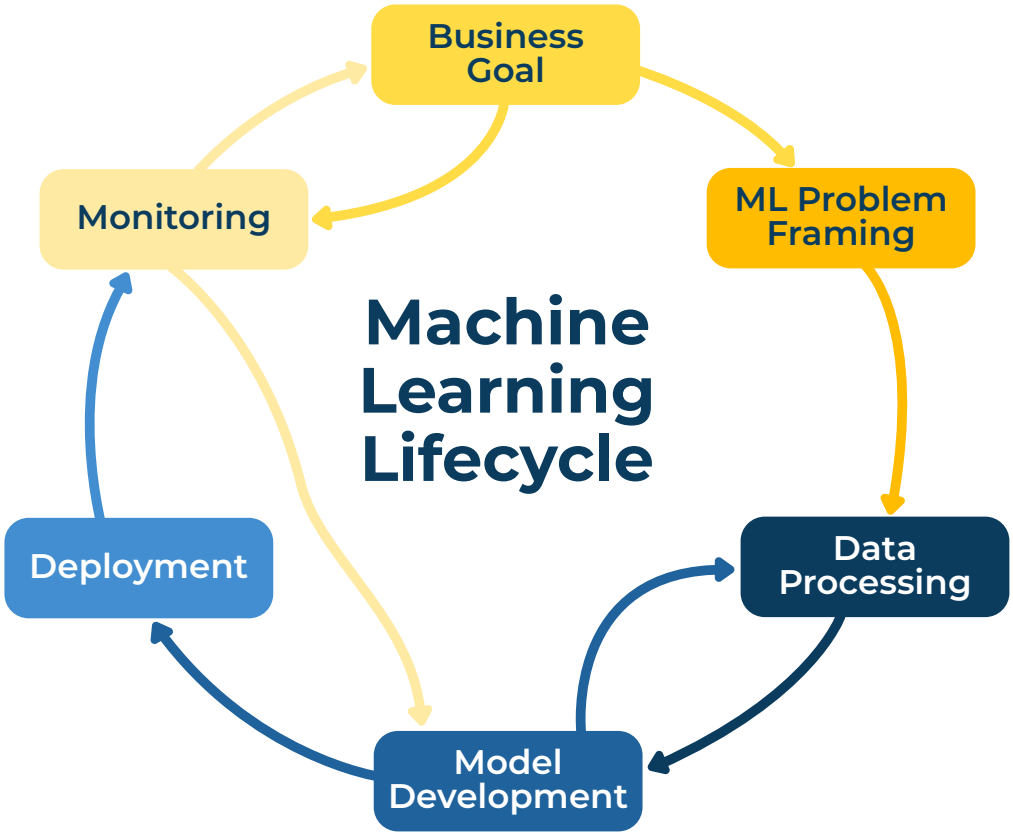

Figure 3: Machine learning lifecycle

Predictive and Prescriptive Risk Analytics

Since history is often a good predictor of the future, Resilience Rating starts with learning patterns from historical data. For example, a part with a high sourcing risk has a higher probability of creating a line-down event due to a lack of alternatives. And because SiliconExpert is able to feed an immense quantity of historical data into its proprietary machine learning model, the Resilience Rating is an industry leader in comprehensive risk analytics.

As supply chain disruptions continue to occur, new information from changing circumstances feeds into the algorithm. Consequently, the machine learning model will automatically track risks, monitor impacts, predict future impacts, and measure its own accuracy. As the model then reconsumes this information, repeating this cycle, accuracy improves over time, making it easier to drive proactive risk management strategies.

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Breaking Down Silos to Rebuild a Culture of Resilience

Design for resilience

Supply chain's involvement with engineering in the design phase is becoming critical in developing resilience. One benefit of designing for resilience is its ability to greatly reduce the need for redesigns throughout the technology lifecycle, from NPI to maturity. This can be accomplished by considering Resilience Rating to guide engineers early on in their risk analysis. Additional positive impacts include reduction in R&D costs and repurposed resources for new product innovation, both essential as the industry grows more competitive and cost-conscious with technological advancements.

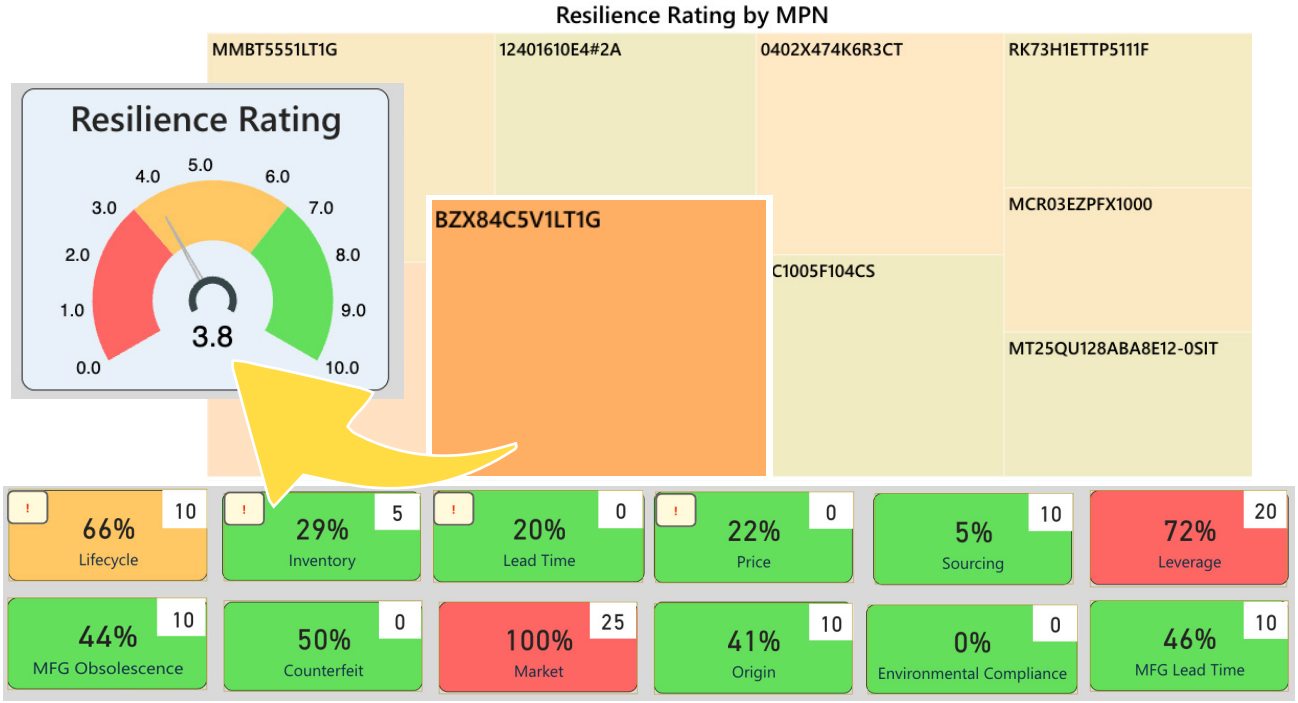

Figure 5: Resilience Rating dashboard illustrating a risky part with a breakdown of individual risk factor scores.

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Ensure collaboration to build resilience

As the roles and responsibilities of engineering, procurement and supply chain teams transform by leveraging data-driven insights, a new playbook is needed. Teams need to collaborate, connected with a single source of truth, breaking down silos and building resilience. Identifying these roles and responsibilities ensures alignment and drives supply chain strategies. (See Figure 6)

		Engineering	Commodity Management / Sourcing /	Supply Chain Strategy & Design	Supply Chain Operations (Purchasing, Inventory Mangement, Planning)	Compliance	Business Continuity / Resilience Task
Assurance of Supply							
	Lifecycle Risk	I	A		R		R
	Origin Risk		R	R			A
	Inventory Risk		R		A		R
	Sourcing Risk		A	R			R
	Leverage Risk		A	R			R
	Market Risk		A	C	C		R
Security Risk							
	Counterfeit Risk	I	A	R		C	I
	Environmental Compliance Risk	I	R	R		A	I
Performance							
	Price Risk		AR		I		I
	Lead Time Risk		AR		I		I
	Manufacturer Obsolescence	I	A	R			
	Manufacturer Lead Time		A	R	C		I

R = RESPONSIBLE A = ACCOUNTABLE C = CONSULTED I = INFORMED

Figure 6: RACI chart illustrating how to potentially manage Resilience Rating risks across interdepartmental teams in order to build resilience

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Monitor results and improvements

As resilience is propagated to new designs and current products, companies can be more responsive to disruptions, more efficient across teams, and bring their products to market faster. Changes will vary depending on company and vertical, however results will be perpetually measurable through decreased lead times, fewer supply-demand gaps, fewer disruptions, and fewer part shortages. Companies will ultimately benefit from reduced costs, improved customer experiences, and more agility to respond to market conditions.

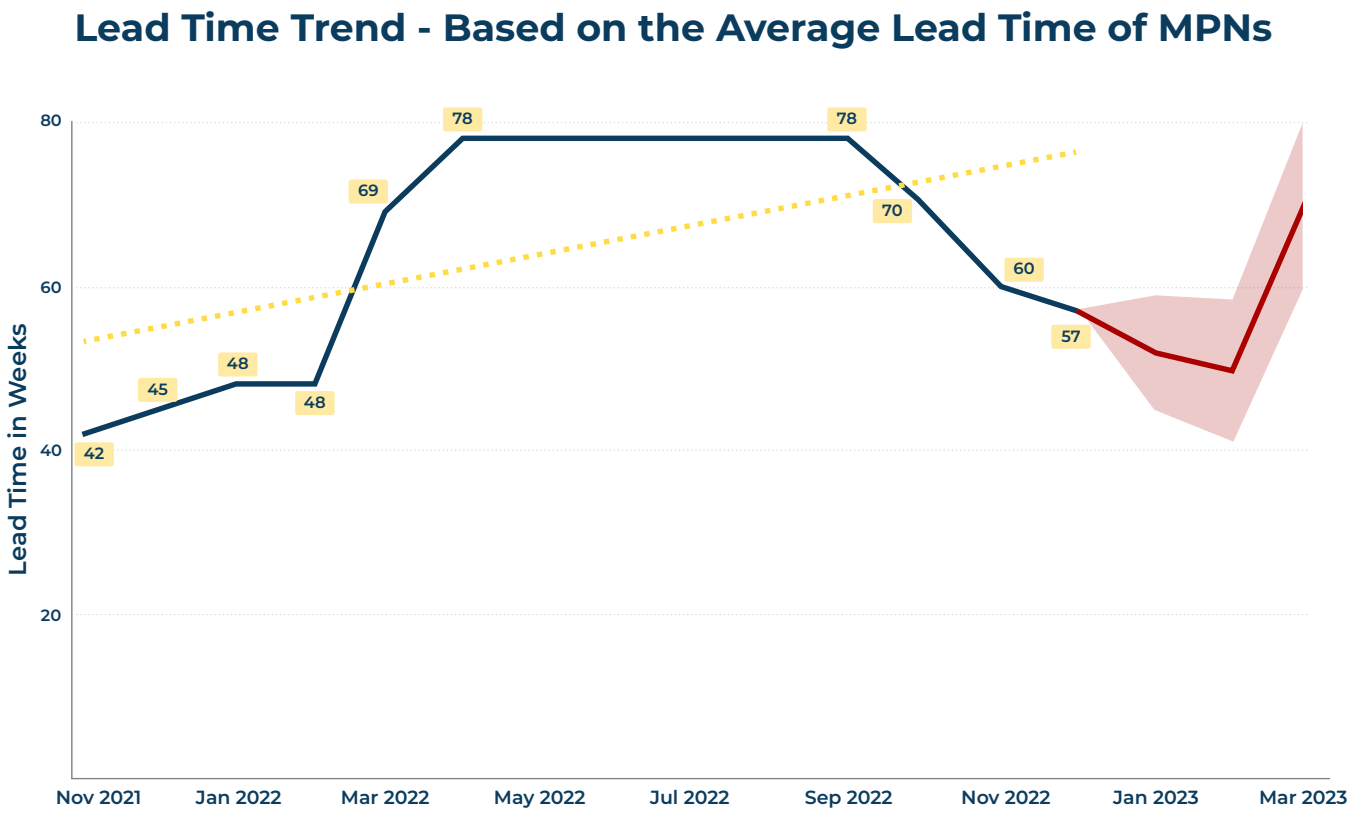

Figure 7: SiliconExpert's historical and projected average lead time for a list of parts

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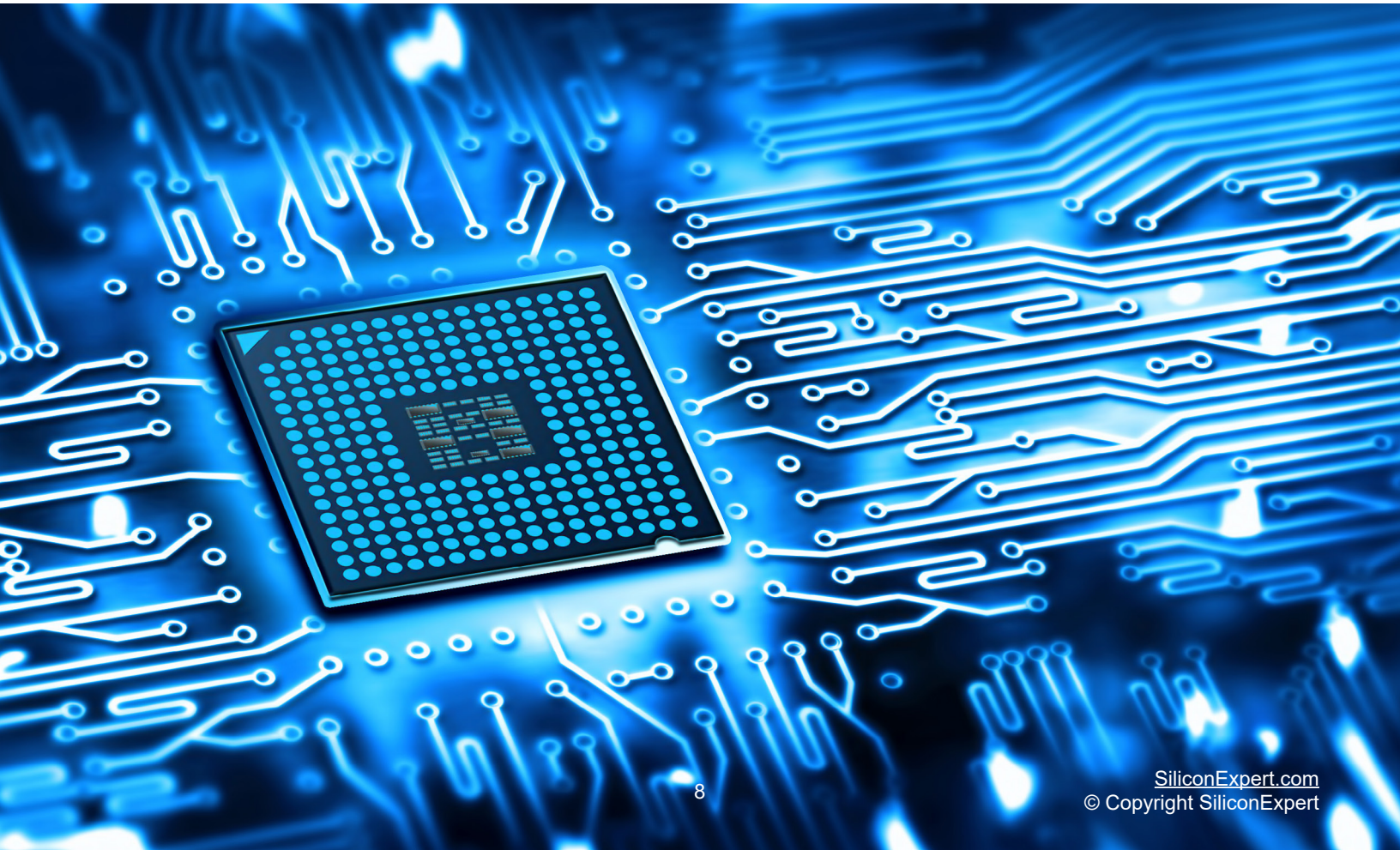
Conclusion

Access to advanced market intelligence in the age of uncertainty offers companies key advantages necessary to get ahead of their competition. If the past three years has taught us anything, it's that the geopolitical and socioeconomic landscape can change overnight, and the bullwhip effect of these changes can be catastrophic. This new ultra-competitive climate has left industries racing to build new technology and accelerate to market, leaving companies anxiously searching to find an effective solution to de-risk their supply chain and build a culture of resilience. In 2022, one automotive OEM attributed a $3.1B profit loss within the space of three months to the semiconductor shortage crisis.[7] Sub-tier visibility, predictive analytics, and machine learning will anticipate shortage risks like these, offering companies the agility required to thrive in fluctuating market conditions. Adopting a platform of intelligence as the core of an organization's digital transformation will enable a culture of resilience throughout the entire technology lifecycle.

Resilience Rating sits atop the digital architecture, combining artificial intelligence and machine learning with billions of data points, designed to empower organizations to overcome ever-changing supply chain challenges.



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