Innovating Through Supply Chain Risk Management

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Abstract
Today’s electronics supply chains face risks from many factors including natural disasters, political upheavals, regulatory compliance mandates, increasing economic uncertainty, rapid changes in technology, demanding customer expectations, capacity constraints and the effects of globalization.

In this session and paper, we will explain Cisco’s approach to Supply Chain Risk Management. It will include an overview and discussion on Cisco’s preparedness, mitigation and resiliency programs, to include:
- Supply chain risk analytics & metrics
- Business continuity program
- Crisis management program
- Component resiliency program
- Supply chain resiliency program

Background
The Supply Chain Risk Management (SCRM) team at Cisco Systems, Inc. is responsible for ensuring Cisco has the most resilient supply chain in its industry -- ensuring that Cisco can respond more quickly than any of its competitors in the event of any operational or catastrophic disruption. Cisco's SCRM team does this by incorporating resiliency requirements into the design and release process for new products, as well as by driving product and supply chain risk resiliency for sustaining products. The team is pioneering an approach to managing supply chain risk by defining ways to anticipate and measure risk, building a standards-based Business Continuity Planning (BCP) program that actively measures and improves recoverability, and by developing and executing resiliency programs at the product and supply chain level. Cisco has developed a SCRM process framework, engagement model, metrics and tool set which are truly best-in-class

Program Overview
Cisco’s supply chain risk management program consists of 5 key elements:

- **Business Continuity Planning**: focuses on Cisco's suppliers, manufacturing partners (EMS partners), and transportation & logistics providers to document recovery plans, recovery times and drive resiliency standards. Cisco's BCP program identifies critical business processes, people and systems associated with over 600 supply chain "nodes" and assesses the time-to-recover (TTR) for each node. TTR is based on the longest recovery time for any critical capability within a node, and is a measure of the time required to restore 100% output at that node following a disruption. Cisco's BCP program is unique in that Cisco has been able to build a BCP dashboard with data that plays two key roles: (1)
it is used by the Crisis Management team to assess the impact of any disruption and (2) it illuminates vulnerabilities in the supply chain that Cisco can then mitigate.

- **Risk Analytics**: Cisco has developed a "risk engine" which incorporates many data sets (such 100 year flood data, actuary data, geological & geo-political data, site incident data, supplier performance data) to assess the likelihood of a disruption. These disruptions are correlated to Cisco supply chain locations including supplier sites, contract manufacturing facilities and logistics centers. The impact of a disruption is determined based on the revenue enabled by each node in the supply chain and that node’s TTR. Finally, Cisco uses simulation capabilities to integrate all of these data sets into a single model that generates "heat maps" based on likelihood and impact.

- **Crisis Management**: Cisco's crisis management team is responsible for monitoring disruptions globally on a 24/7 basis. In the event a disruption is impactful or potentially impactful to Cisco's supply chain, the Crisis Management team uses the BCP dashboard to quickly conduct an impact assessment -- assessing what supply chain nodes are in the affected region, what parts and/or product are made within the affected, what alternate / fail-over sites should be engaged, and what customers and revenue may be impacted. The Crisis Management team then engages a broad cross-functional team to execute response playbooks which have been tailored to the disruption type, location and anticipated duration.

- **Product Resiliency**: Cisco's product resiliency team works closely with Cisco's supply management team to identify components with recovery times (TTRs) that are outside of Cisco's established TTR tolerances. For such components, Cisco's SCRM and Commodity Management teams develop resiliency plans, to include 2nd / multi-sourcing, alternate site qualification, component risk buffers, and manufacturing rights & escrow agreements. Cisco identified components at the product-level with non-compliant TTRs and executed a combination of the above resiliency options to ensure the product TTR, which is based on the longest TTR for any associated component, achieves compliance.

- **Supply Chain Resiliency**: Cisco's supply chain resiliency team works closely with Cisco's manufacturing operations, manufacturing partners (EMS) and logistics and transportation providers to identify nodes with recovery times (TTRs) that are outside of Cisco's established TTR tolerances. For such nodes, Cisco's SCRM and manufacturing operations team develop resiliency plans, to include alternate site qualification, capacity reservations, and semi-FGI² / FGI risk buffers. Here again, Cisco measures the TTR for the applicable supply chain based on the longest TTR for any node associated with the manufacturing and final delivery of products, and then drives to a compliant TTR using a combination of the above resiliency options.

**Key Business Partners**
Cisco's SCRM program required a truly collaborative effort to deliver resiliency for Cisco’s highly complex supply chain. For NPIs³, the team partners with Cisco’s development organization (CDO) to assess the resiliency attributes for new products. This engagement occurs well in advance of first-customer-ship (FCS) so that the development engineers have visibility to the recovery times associated with components with enough lead-time to consider alternate / more resilient components before the design hardens. Similarly, the SCRM team
engages with Cisco's Supply Chain Product Operations & Manufacturing Operations team to assess the resiliency attributes of the anticipated build-to-ship supply chain -- this forward looking assessment allows the team to incorporate supply chain resiliency as a consideration in supply chain design and business awards to manufacturing partners.

For sustaining products, the team has developed a highly collaborative model with Cisco’s Global Supply Management and Manufacturing Operations teams. The team work closely to scope the resiliency programs that need to be executed (based on the BCP program which helps Cisco identify which components, manufacturing sites and T&L partners have non-compliant TTRs). However, once these programs are scoped, it falls upon the Global Supply Management and Manufacturing Operations teams to do the heavy lifting by working with our supply chain partners to implement the applicable resiliency program (e.g., qualifying 2nd sourcing, qualifying alternate sites, negotiating and implementing buffers).

It is also important to note that support for the program comes from the very top. CEO John Chamber and SVP for Cisco Customer Value Chain are staunch supporters of the program and maintain an active role in promoting and driving ongoing attention to supply chain resiliency.

**Impact to Supply Chain Performance**

The result of Cisco’s supply chain risk management program is evidenced by our commitment to deliver products to our customers and protect shareholder value in the face of any disruption. This commitment requires us to design and build supply chains with flexibility and resiliency, so that we are able to minimize, if not avoid, any impacts to customer shipments. Thus far, the program has proven highly effective in response to myriad disruptions (e.g., Chengdu earthquake, financial crisis, China Olympics shutdown, Hurricane Ike, Bangkok airport closures, etc.). Through these disruptions, to name just a few, Cisco has demonstrated an ability to spot disruptions early-on, to conduct rapid impact assessments, and to engage cross-functional teams globally to exploit the resiliency programs we have implemented. Key performance metrics such as on-time shipments and customer satisfaction demonstrate the impact of our world class supply chain risk management program.

**Key Challenges**

Cisco’s diverse product portfolio represents one of the biggest challenges for the team. While Cisco’s broad portfolio of products (in the thousands) by itself represents a form of financial resiliency and buoyancy, it results in many complex supply chains with unique resiliency challenges and requirements. As discussed above, a key initiative to address this challenge is our Design for Risk program. The goal is to develop products and supply chains with robust resiliency attributes and performance characteristics prior to FCS. This is accomplished through standardization and proactive risk mitigation. Additionally, Cisco has implemented lean within our global outsourced manufacturing footprint and component supply network - this obviously could translate into a more vulnerable supply chain if not managed effectively. Cisco has addressed this by integrating our SCRM and lean programs to ensure we have a balance between these otherwise competing programs.
What Contributed to Our Success
First and foremost to the programs success is Cisco's tops-down commitment to risk management and resiliency and the highly collaborative engagement model. Cisco's senior leaders, supply chain functions, business units (BU), and development organization share an understanding of the strategic importance of the program, and act accordingly.

The SCRM tool set is also a key enable to our success. Cisco SCRM and IT have developed a truly best in class tool set -- developed out of necessity as commercially available SCRM tools are still extremely limited (emphasis added). Cisco's SCRM tool set includes the following:

- **BCP Dashboard**: tabulate and codifies BCP responses into leverageable data to include part-site mapping (which supplier sites are responsible for making which parts), TTRs, alternate sites, 2nd sources, emergency contacts, recovery plans, etc.

- **Risk Engine**: enables the team to provide comprehensive statistical modeling of supply chain risks (likelihood & impact modeling), provides heat maps as a key input to program priorities, and provides simulation capabilities.

- **Crisis Management Dashboard**: allows the team to monitor supply chain disruptions globally by mapping alerts from a 3rd party monitoring service to our supply chain nodes, and operates a collaboration workspace for cross functional crisis management team.

- **Global Component Risk Manager**: this tool has become a central repository for identifying and managing resiliency programs for over 2000 "high-risk" components - the tool enables identification of high risk components, helps commodity teams identify appropriate resiliency options, tracks implementation activities, tracks the qualification process, etc.

Finally, the team has developed metrics that enable Cisco to measure resiliency at the product, site, regional, geo and business unit level. In particular, Cisco has developed a "Resiliency Index" which is a composite of resiliency attributes which is calculated and reported by BUs at Cisco's semi-annual Op's Review with senior management. By having a resiliency metrics which is shared by the BUs and supply chain, we have driven a common awareness and understanding of what resiliency means to Cisco, as well as a common framework for driving improvements.

**Summary**
In this new globally connected economy, companies are facing an increasing array of risks. It is incumbent upon management to formulate and implement a SCRM strategy attuned to the needs of their market and customers. A key to success is commitment from the top (Board level, CEO, etc.) A successful risk management strategy will include robust tools, comprehensive metrics and a dynamic nature that allows it to flex with the needs of the business.

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1 EMS – Electronics Manufacturing Services
2 FGI – Finished Goods Inventory
3 NPI – New Product Introduction
4 T&L – Transportation and Logistics