

Managing the Cyber Risk in a Decoupled World: Does This Bring Potential Opportunities in Computer Science?

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Abstract

The last thirty years witnessed the growth of both globalization and digital transformation, characterized by information systems becoming interconnected and distributed on a worldwide scale with IT aimed to become a commodity. Cloud computing and blockchain being examples of such robust and distributed technologies which have been the main driver of this globalization process. Global technologies and infrastructures paved the way to organic and highly frequent interactions between millions of companies and organizations in multiple countries almost irrespective of geopolitical implications establishing global and complex interconnected supply chains whose aim was mainly keeping software/devices costs low. This created a virtuous loop that generated an exponential increase of countries' digitalization process and globalized industries.

Like energy, IT progressively became a strategic geopolitical factor as the nation's vital services implementation went digital. As a consequence, governments realized IT cannot be a simple commodity and that they have to manage the cyber risk associated with procured IT in strategic sectors like, for instance, telecommunication, finance and transportation. Governments have to understand and mitigate IT risks coming from these globalized supply chains against operations of potential powerful adversaries. Even a single supply chain dependency can be a risk, also from a national security perspective, when such dependency is established by a provider/vendor under the direct political influence of an untrusted nation or a trusted provider/vendor victim of a state-backed cyber attack. The recent Ukrainian crisis and the large degree of tension between US and China are amplifying risks coming from globalized supply chains in a world that is politically liquid polarizing in at least two blocks.

In addition, the globalization process has shown its natural limits and frailty culminating with the global supply chain crisis created by the effect of the covid-19 pandemic and extreme events due to climate change. Paradoxically, experience shows the main drawback of globalized supply chains is the centralization of certain key manufacturing in restricted geographical areas, this is the case for the infamous chip shortage. This centralization poses risks if a critical portion of these key manufacturing are owned by untrusted actors. A parallel can be seen in the permissionless blockchain technologies based on Proof-of-Work, where the decentralized worldwide spirit has mercilessly converged to a more convenient but weaker almost centralized system which makes it easier for a powerful adversary to take control of the whole blockchain.

The likely trends of the next few years will be a progressive decoupling of supply chains particularly for all software/hardware manufacturing employed into vital services of a nation. This will be a long and non-economically neutral process that will bring in a medium term towards the composition of "friendshoring" or "almost domestic" supply chains where developing robust technologies and algorithms compliant to society values. This is expected to increase the number, the magnitude and complexity of cyber attacks coming from other geopolitical blocks for espionage or terroristic reasons in a continuous hybrid warfare scenario. Computer scientists and engineers will have to cope with the new challenges within this decoupled world. The keynote will be an attempt to shed some light on what this could imply in terms of technology, computing paradigms and nation IT capability.

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