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Digital Thread: Unlocking Insights from Product Data Stream

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Digital Enterprise, Next Gen Design to

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As the world gets connected 24x7, it is getting easier to reimagine not only what products can deliver, but how they can be designed and manufactured as well. Technology frontiers are being breached every day, resulting in disruption of business models across industries to offer an increasingly tailored customer experience, using insights from the wealth of data generated every hour. The exponential rise in the product data stream has unlocked a bank of opportunities for businesses to gain a competitive edge, in the shape of the **Digital thread**.

The untold wealth of product data

The 'product' is the lifeline of an enterprise or a brand. While it is developed, launched and deployed in service, it generates tremendous amount of data. A connected enterprise must be geared toward tapping this continuous stream of data throughout the value chain to glean actionable, real-time insights that can be used for newer and more efficient outcomes, lending the organization a competitive edge. Yet, the majority of businesses lack the agility to adapt to the connected world due to various challenges that only a digital thread can address.

- An engineer in new product development at a manufacturing industry typically spends 12-18% of their time searching for product- and process-related information. This impacts productivity of the engineer, and hence time to market.
- Collaboration between manufacturing and engineering is far from ideal. Some [28% of the respondents to a survey conducted by iBASEt at AeroDef 2016](#), think that their collaboration with design engineering and manufacturing are below average. To enhance the efficiency of the value chain, there should be two-way product and related data flow between manufacturing and engineering.
- An array of disconnected systems operating in silos, with multiple data replications across the enterprise, slows down time to market and organizational efficiency. Some [39% of over 300 respondents to a survey conducted by LNS Research](#), said that disparate systems and data sources pose one of the top operational challenges today.
- Product performance data takes some time to find its way back to the enterprise. This leads to down time in services, and costly product recalls. The [average cost of a significant recall is](#)

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[\\$12 million](#), while ripple-effect events can cost billions. Product performance data should be leveraged to proactively address quality issues and improve product performance in design.

How does the digital thread work?



Digital thread is the stream of product and contextual data running through the value stream, enabling insights and providing opportunities for reimagining the value chain for newer possibilities and business outcomes. It brings agility within the organization in swiftly responding to customer demands through new products and product improvements, optimizing processes across the value chain instead of specific business functions, empowering stakeholders of the organization with insights for accelerated product launches, mitigating the risks, and focusing on customer-centric needs.

The digital thread platform is enabled through digital technologies, along with enhanced foundational digital capabilities (such as digital product definition and processes) of the enterprise. The platform connects with various enterprise data sources, both structured and unstructured, and has the ability to connect to data streams coming through IoT sensors from products in service. The platform comprises the following layers:

- **Data processing layer**—It carries out data normalization and data aggregation fundamentally driven by the business domain – say aerospace or automotive—and acts as a core data repository for the apps built on the platform.
- **Common services layer**—It provides technical utility services such as analytics, rules, workflows, alerts, security and so on, for use in various apps developed for multiple stakeholders of the enterprise.
- **Core services layer**—It is the critical layer that consists of micro services catering to various activities of the value stream, such as product definition, non-conformance management, etc.
- **Application layer**—It comprises the API gateway and the apps built with micro services to realize newer value creation scenarios.

How is the value created

A wide range of potential use cases below shows the great benefits of harnessing the power of the digital thread.

- Knocking down organization silos by establishing a thread, say on the key characteristics of the product, from design through manufacturing along with quality records, provides huge opportunities to gain insights that help accelerate new product launches and reduce rework of products waiting for release. [According to LNS Research, enabling the digital thread leads to a 20% improvement in new products.](#)
- Using time-sensitive insights from manufacturing / supply chain in design and manufacturing by running analytics on data sets from multiple data sources improves communication on the

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changes needed, resulting in reduced rework costs and improved product delivery rates.

- Fusing contextual insights from IoT-enabled sensor data provides vital feedback on product usage to a design engineer, who can then make data-driven decisions in improving product performance and reliability. This also tremendously helps in launching new products based on usage patterns across demographic groups in enhancing customer experience.
- Insights from products usage through connected sensor data provides opportunities to eliminate product recalls, reduce liability, improve safety, protect the brand image and ensure customer loyalty.
- Contextualizing insights on product-related information through analytics, from multiple data sources, helps to change the game in customer experience, while mitigating risks and improving productivity.

GE has delivered over \$730 million of productivity in 2016 through such an initiative.

The digital thread platform helps unearth data-driven insights for reimagining the value chain, thus enhancing revenue growth, cost rationalization, and risk management. More importantly, it enables enterprises to be agile in responding to dynamic customer demands by harnessing the product data stream for speedy iterations, better products as well as faster time to market, and thereby acquire a competitive edge in the market.

To continue reading more about the topic check out this blog on [Digital Thread: Break Traditional Silos in Connected Digital Enterprises](#).

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About Author



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Samuel Selvaraj is the Digital Thread Solutions Lead with Internet of Things, Business & Technology Services. His areas of expertise include digital thread, digital transformations enabling connected digital enterprise. He has experience spanning across consulting, technical leadership of solution teams, client relationships, and management of transformational initiatives across various industry sectors such as Aerospace, Energy, and HiTech. Samuel has been with TCS for the last 21 years, and has a total industry experience of over 25 years.

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