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THE POSSIBILITIES OF FAST DATA IN MANUFACTURING



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THE POSSIBILITIES OF FAST DATA IN MANUFACTURING

Today's business environment is complex and fast-paced. Enterprises need to make sense of the vast digital footprints generated by the interplay of various systems, things, and people thriving in its ecosystems, and do it fast, before competitors beat them to it. Many enterprises have already deployed Big Data solutions to gain mastery over the situation.

However, to their chagrin, many Big Data equipped enterprises find that collecting "Big Data" is the easy part. The hard part is identifying relevant data from the mass, and analyzing it to derive actionable insights. Many Big Data arrays in enterprises are filled with obsolete and irrelevant information, leading to a situation where Big Data, instead of contributing to the enterprise, actually ends up as a huge resource drain.

Additionally, many incumbent Big Data systems are incapable of offering real time access to powerful insights, at the point of action.

Even so, an answer is at hand with Fast Data solutions. Fast Data represents the evolution of Big Data analytics into a highly complex and sophisticated solution that is capable of handling continuous stream data, running into millions of data points per second, and providing real-time instant insights out of such data.

A Capgemini study estimates that 64% of enterprises believe Big Data is changing traditional business boundaries, and 58% of enterprises are expecting increased competition from start-ups enabled by data.



THE EVOLUTION OF FAST DATA FROM BIG DATA

While the earlier generations of Big Data analytics deal with static data, both structured and unstructured, the latest and emerging level of Fast Data deals with data emerging in continuous streams. Examples of such continuous stream data include heart beats, ocean currents, GPS data, and machine metrics. Such continuous stream data is time-sensitive, with the value of data decreasing significantly with time, even in a space of a few minutes or seconds. For instance, the value of traffic data is invaluable at the moment, when a vehicle's navigation system plots the optimal route to the destination, but the same data becomes worthless even a few minutes down the line.

The first wave of Big Data evolution saw Big Data systems becoming capable of handling massive variety and data velocity, along with data volume. The latest evolution into Fast Data, facilitated by the advancement of data capturing, data processing and storage technologies, allows the handling of continuous data streams with low latency. Fast Data systems are capable of handling data as it arrives, facilitating a paradigm shift from an overall reactive approach to a proactive approach in data processing. It also facilitates designing systems with highly accurate predictions. Such a shift corresponds with a shift in business thought process from post transaction approach to real-time decision approach, and modeling business systems with highly accurate predictions.

THE EMERGENCE OF FAST DATA TOOLS

Fast Data solutions such as Apache Kafka facilitate the construction of real-time data pipelines and streaming apps, to deliver real time analysis of data. Such tools come with advanced capabilities such as horizontal scaling and fault-tolerance, and enable the implementation of data models where data is available in a stream for a predefined amount of time, to be consumed and processed by interested stakeholders or partners.

Fast technologies are an extension of Big Data technologies, mostly offering additional capabilities to create data pipelines and streamline data processing. Technologies such as Kafka and others enable the creation of data pipelines, which capture real time data from different sources. Various tools and processes such as Kafka Stream, Spark, and Flink stream inject data from the streaming sources and provide insights from such data. Kafka stream is best for complex stream processing and micro streams, best suited to act on data immediately. Spark Streaming and Flink are more suited where greater processing is required. All these tools indulge in batch processing, which is the basic technical characteristic of Fast Data.

A common thread running across Fast Data tools is overcoming the limitations of traditional Big Data tools such as Hadoop. Despite all its capabilities, Hadoop is still weak for analytics workloads, and tends to be highly iterative. Spark, the open source cluster computing system, makes data analytics faster by retaining heavily used data in memory and loading it much quicker in Hadoop. Spark picks up machine distributed data, processes it and produces results, all in near real-time, with its in-memory processing improving the process by about 100%.

THE POSSIBILITIES OF FAST DATA

Fast Data offers tremendous opportunities, cutting across businesses and sectors. For instance, healthcare industry can leverage Fast Data analytics to generate real time alerts and MRIs, and connect with patient wearables and other devices.

The oil and gas industry uses Fast Data to understand trajectory and make better drilling decisions, which improves operational efficiency manifold. Sensor data creates 3D trajectory, shown on real time monitors. Geoscientists use such data to correctly predict trajectory, and course correct in real time. Following the wrong trajectory leads to wastage of huge resources.

Another major area of application is in manufacturing industries. Fast Data help manufacturing companies improve interactions with their customers, improve quality and efficiency, and reduce maintenance and inventory.

At present, the most common applications are in workflow improvements, proactive equipment management and intelligent alarms, both aimed at improving operational efficiency and enhancing Returns on Investment. However, this is only the tip of the iceberg compared to the possibilities ahead. Fast Data has the potential to bring about big disruptions and drive big innovations capable of changing the very face of manufacturing.

FAST DATA FACILITATES WORKFLOW IMPROVEMENTS

Fast Data promotes the cause of data driven manufacturing.

Embedding sensors in machines and tools, and collecting real-time data from such sources, is the backbone for data-driven workflow operations. Real-time factory-floor data collection offers a goldmine of information, and generates valuable insights to improve operational performance. At the very least, it leads to rich productivity and efficiency improvements. It could also unlock possibilities that were inconceivable before.

Enterprises may leverage time sensitive data arising from the work floor to redesign workflow, accelerate the flow of components, reduce energy consumption, right-size the workforce required, and do more. In a way, Fast Data is the precursor and the foundation for the impending age of Internet of Things (IoT).

Enterprises opting for data based manufacturing also facilitate the ever increasing customer demand for accurate real-time and historical information on part production.

FAST DATA ENABLES PROACTIVE MAINTENANCE

Fast Data facilitates proactive equipment maintenance. Manufacturing companies can identify problems quickly, and make timely decisions on products and processes.

Dashboards based on fast data display critical shop-floor metrics and vital machinery parameters, such as parts available, quality and flow of parts, planned versus actual performance, OEE, machine performance, and more.

Manufacturing companies can leverage such insights to identify problems proactively, or the moment they emerge, with a high level of accuracy. Generating real-time alerts based on Fast Data enables identifying problems, and nipping them in the bud. It facilitates servicing the machinery at the right time, offering a perfect trade-off between not wasting resources on unnecessary servicing, and risking machinery break-down and excessive wear and tear due to delayed servicing.

FAST DATA AIDS THE CREATION OF INTELLIGENT ALARMS

Fast Data enables the design of intelligent alarm and/or notifications. Sensors capture data from various sources and feed it into streaming sources, from where analytic engines pull in the data to generate real time insights.

Using multiple data from different units creates a formulation, and a formulation derived at certain points makes intelligent alarms.

Individual units create different combinations, which provided into a stream, makes it possible to derive actionable insights without waiting for the entire process to complete. Formulation of alarm systems from geographically separate manufacturing units enable the creation of smart factories, where issues are thwarted, and decisions taken at the right time. Creating such a connected set-up or smart factories also improves transparency, and enhances security by unveiling the dangers.

Several other use cases are abound for such intelligent alarms. For instance, pulling in sensor data makes it possible to identify air quality, and trigger automated turning on of air purifiers when air quality decreases. Such an action delivers big efficiency improvements and cost savings compared to continuous air purifying streams in hazardous units.

FAST DATA DRIVES INNOVATIVE PROCESSES

Fast Data can be applied to drive innovations.

Fast Data is the bedrock of developing new and innovative manufacturing designs based on advanced technologies such as additive manufacturing, machine-to-machine communications, cloud computing and services, and more. Fast Data acts as a catalyst to boost collaboration, and create highly customizable products that are faster, cheaper, greener, and overall better. All these technologies require reliable and accurate data in real time. For instance, additive manufacturing requires plotting components into the required product through a computer that feeds data to the machine.

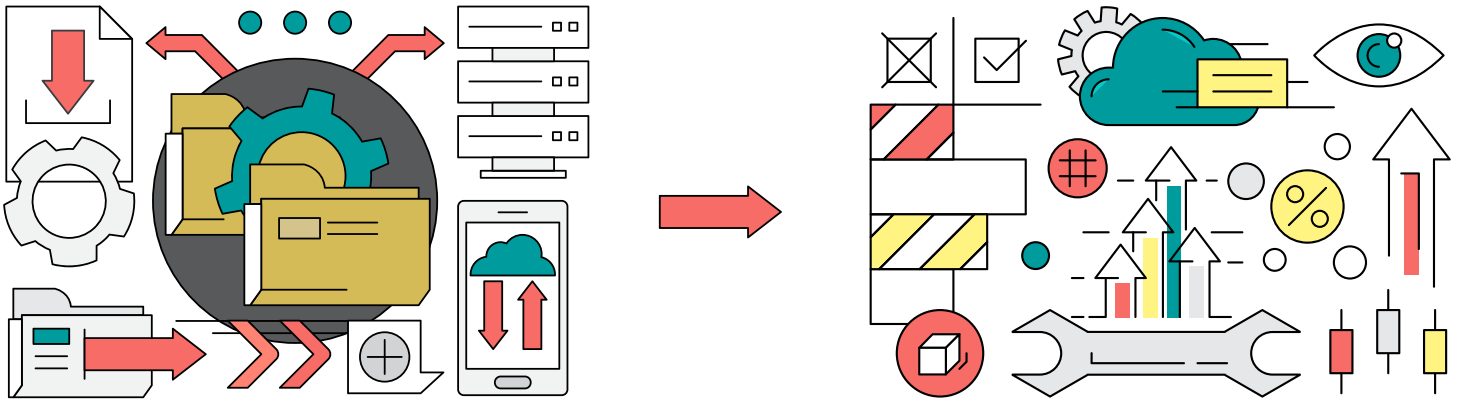
CONCLUSION

Enterprises planning to harness the power of Fast Data to transform their business or unlock new potential need to:

1. Understand and identify the data they require
2. Capture the data, especially data residing in silos
3. Use data as real time events to further the business
4. Apply the relevant Fast Data tools to gather and process the data

At present, only about 15% of an enterprise's data actually gets used to gain insights. Fast Data offers the potential to improve this percentage in a big way.

What Noel Yuhanna, principal analyst at Forrester Research said makes a fitting observation on the potential of Fast Data – "***But what if you could flip the iceberg and uncover new insights?***"



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ABOUT SUYATI



Suyati provides marketing technology and integration services for companies that wish to combine the best breed of solutions and create a unified approach to customer acquisition. This unified digital marketing approach requires system integration between various CMS and CRM platforms, and a slew of eCommerce, Marketing Automation, Social Media Listening, email and social marketing, and customer service systems. Our specialized knowledge in Salesforce, open source and .Net based systems enables us to build effective custom integrated solutions for our clients. Suyati's custom technology solutions have been deployed in companies in the US, Western Europe and Australia, and have helped many enterprises leverage the web/cloud/mobile technologies to acquire customers through integrated digital marketing. Suyati is based in Chicago with product engineering capability out of the US and India.

MORE AT: www.suyati.com
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REFERENCE

- https://www.automationworld.com/fast-data-would-you-supersize
- https://www.youtube.com/watch?v=RL83vQpi8-8
- https://www.capgemini.com/thought-leadership/big-fast-data-the-rise-of-insight-driven-business
- http://advancedmanufacturing.org/manufacturing-needs-real-time-data-collection/