We help John see the road ahead

How to fast track to a digitally enhanced manufacturing process
Like all verticals, manufacturing is being affected by the fourth industrial revolution. But what sets this sector apart from any other is the magnitude of the impact that physical innovation will have on longstanding and existing processes.

Whether it be research and development, supply chain, factory operations, sales, marketing or service, Industry 4.0 is presenting opportunities for manufacturing businesses to rethink the processes both individually, and as a whole.

There are a number of elements to transformation within the manufacturing industry, and leaders must understand the changing role of man and machine. Human intelligence and cognition have the potential to combine with the technological powers of efficiency, precision, and data-processing to create the intelligent manufacturing operations of the future.
In order to truly transform, a holistic view must be taken that unites all aspects of the manufacturing business - from stock levels of raw materials to customer feedback on social media - together by a single digital thread.

The technologies and practices making this all possible – IoT, Machine Learning, automation, cognitive systems and platforms – must be able to communicate in real time, and this requires an underlying network capable of supporting this information exchange.

The more connections there are between different groups of devices and sites at multiple locations, the more complex the network will become.

Monitoring and protecting the data exchange points requires the highest standards of cyber-security.

The challenge for many is understanding how to go about this process of transformation without disrupting existing business models and projections.

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So where do you begin

We will explore several areas we believe to be pivotal in how manufacturers go about embracing Industry 4.0, and how CenturyLink can help them on this journey.
Pharmaceutical manufacturers have developed manufacturing suites with footprints less than half the size of conventional factories.

Physical transformation

Mechanical innovation is increasingly replacing manual labour tasks with digitally-driven automation, enabling companies to operate with far greater efficiency.

Not only can tasks and activities be completed more quickly and cost-effectively than ever before, but they can also be done with increased precision and accuracy, significantly reducing the time and financial costs of human error.

The cost savings realised from digitising or automating parts of the manufacturing process allow for further investment in newer technologies, perpetuating an onward motion of transformation. In addition to optimising and streamlining production, assembly and inspection, many manufacturers are finding it possible to reduce the physical footprint of their facilities, bringing further financial savings.
Virtual transformation

As technologies such as the Internet of Things, AI, Robotic Process Automation (RPA) and Machine Learning combine, manufacturers are able to connect physical assets digitally and tap into the vast volumes of data in real-time.

Intelligently monitoring these streams of data allows for processes to be adjusted and optimised in real-time or halted in the event that fault or significant inefficiency is detected. The creation of ‘digital twins’ gives manufacturers the ability to run analyses on products while they are in production, detecting flaws and testing potential solutions in a virtual environment.

Businesses across all verticals are increasingly turning to the cloud for their digital infrastructure, and its big data computing power. If manufacturers are to make good on the potential of data-driven insight and decision making, then they too must plan to move to the cloud.

The smart factory

Actively monitoring the condition of the manufacturing machinery itself by processing and analysing data from IoT sensors in real-time allows for the predictive maintenance or replacement of components before a failure occurs.

Proactively mitigating mechanical issues that would restrict, interrupt or even stop your production processes avoids unnecessary downtime that will impact sales and revenue projections.

Predictive analysis and preventative action have been shown to reduce maintenance costs by up to 40%.

By 2020, 15% of 212 billion connectable assets will be hooked up and will generate about 44 ZB of data.
At the customer-facing end of the manufacturing and supply chain, IoT enabled devices and RFID tags on products are making it easier for stores and warehouses to supply up to date supply and stock information. Analysing sales, marketing, production and logistics data allows for the manufacturing arm to act with agility, adjusting processes to align with proven demands and to better prepare for anticipated peaks and troughs of seasonality.

Through Machine Learning, manufacturing lines can automatically adjust their output based on this data analysis to swiftly respond to market volatility or trends. Monitoring and self-regulation systems and technologies afford factories and production sites the ability to reap the benefits of faster cycle times, improved quality, downtime avoidance and lights-out operations, reducing labour costs.

Viewed as a bi-modal transformation strategy, existing operations can be optimised and improved, while the insights and savings realised from updating the processes allow them to focus on new areas of exploration and activity.
Cyber-Physical Systems

The future of manufacturing

Having established the need for a concurrent digital thread that weaves through the whole manufacturing process, the challenge then becomes how to bring together the information with the machinery – or in a sense, develop ‘hand-eye coordination’ on an industrial scale. To successfully bridge the gap between physical processes and virtual data that can inform and influence the actions of machines and businesses, many manufacturers are investing in Cyber-Physical Systems (CPS).

Going beyond simply monitoring sensor data, a CPS is able to analyse vast streams of information from different sources and make decisions from the results that dictate the actions of the physical machinery making up the manufacturing process. Data-scientist have identified five levels of tasks that are involved in a CPS for manufacturing:

- **Smart Connection Levels**
  - Plug and play / tether free communication / sensor network

- **Data-to-information Conversion Level**
  - Smart analytics for component machine health / Multi-dimensional data correlation

- **Cyber Level**
  - Twin model for components and machines / Time machine for variation identification and memory

- **Cognition Level**
  - Integrated simulation and synthesis / Remote visualisation / Collaborative diagnostics and decision making

- **Configuration Level**
  - Self-configure for resilience / Self-adjust for variation / Self-optimise for disturbance
CenturyLink has the knowledge and experience to work with your organisation to understand the heartbeat of your business and develop a manageable transformation strategy that meets your needs and objectives, built on the latest cloud technologies and leading network infrastructure.

For more information on how CenturyLink can transform your manufacturing processes, please get in touch with us.