Industrial businesses care about four core principles that are foundational to their long-term business growth – safety, regulatory compliance, asset performance, and operational efficiency. In a previous paper I penned called “Operations Maturity - Smart Management of Smart Grids”, I focused on the importance for businesses in the utility industry to implement strategic plans to progress towards operational maturity. These same core tenets of the operational maturity model also apply to oil and gas and others industrial sectors.

For those who have not had a chance to read that paper, here is a quick overview of the operational maturity model. Put simply, the operational maturity model measures an industrial business’ effectiveness and efficiency of its operations. We used the Carnegie Mellon University Capability Maturity Model to fit the utility industry. Ranking a utility on a scale from Level 1 to Level 5.

**People, Process, Technology**

A key to ensuring people, process and technology operate seamlessly and with optimal performance has to do with the information-to-data ratio (IDR), the ratio of actionable information that a human operator needs to deal with, compared with the amount of “noise” or data elements that can be ignored. For those new to the concept of the Industrial Internet of Things (IIoT), here is an easy way to compare the complexity of the industrial enterprise to the more consumer-oriented Internet of Things:

A major source of data in the consumer world is from social media, which essentially says, “Hello, I am here, I ate Cheerios this morning.” There are millions of these types of data points coming off of Twitter and Facebook daily. In contrast, for an industrial business, there could be one sensor during the middle of summer that is telling the operator, “Help, potential system failure because of excessive heat.” The first example is considered “noise.” – it does not add much value to improve daily lives. The second example could mean the difference for an elderly person depending on electricity from the electrical grid to keep their air conditioner working when temperatures rise, and therefore requires much greater attention and data resiliency.

IIoT use cases are looking at data coming in at different time intervals that need to be correlated and synthesized. It is important for businesses to be efficient in removing noise and correlating important data to allow for data-driven automation.

A business that is just starting down the road of modernizing technology infrastructure is still learning the surroundings of their enterprise and is still responding reactively to downtime caused by asset failures or operational inefficiencies. An operationally mature business is one that is not just thinking about today’s operations, but is proactively positioned to be able to adapt and predict potential impacts on production, reliability and performance.

**How to Reach Operational Maturity?**

As I have already touched on, one of the keys to business success lies with the quality and collaborative function of people, process and technology. The glue that holds all these elements together is when an operationally mature organization reaches level five with the help of software to automate operations.
The evolution leads to what Bit Stew calls, Software Defined Operations (SDO). Within the IIoT, enterprises have millions of connected sensors and devices bringing information from disparate systems into the enterprise. This massive influx of data on a daily basis prompts most companies and technology providers to think the business problem they need to tackle is “Big Data.” Unfortunately, for industrial enterprises this leads to more confusion and can actually become detrimental towards a business maintaining or reaching operational maturity.

**Beyond Big Data: The Convergence of IT and OT**
Bit Stew believes Big Data should not be the focus. The real opportunity that needs to be addressed is how businesses deal with the collision resulting from the convergence of Information Technology (IT) and Operational Technology (OT).

This convergence is really about having intelligent devices connected and communicating in a network hosted in a cloud or data center. Most businesses get bogged down when they deploy connected devices and cannot figure out a way to derive actionable intelligence from the disparate data sets.

**Use Your Time and Resources Wisely**
To deal with this massive amount of data from millions of data points, most businesses today end up either throwing the data away or hiring more people to manage the data and its associated challenges. Both of these can be costly to long-term growth. Most businesses understand the costs of hiring more people to address technology challenges. However, the biggest opportunity cost occurs when a business throws away data that could be deciphered into information used to improve operations and customer satisfaction.

**A Single Source of Truth**
The best way to navigate this challenge is to leverage the power of the IIoT through software to help manage and scale the operations. Software can help businesses analyze the massive amounts of data into a single source of truth, while also automating key business functions that formerly required human intervention to triage an issue. This is Software Defined Operations.

**Contextual View leads to Intelligent Automation**
Let us be clear: Software Defined Operations is not about eliminating jobs. It is about helping employees spend more time on the critical business tasks that cannot be solved by technology. Instead of hiring more IT staff to fight Big Data, organizations can hire more operations staff to improve production on an oil pipeline, or more field staff to keep electricity or water flowing to their customers.

Some businesses have been trying to achieve SDO on their own by cobbling together homegrown systems to manage this data. Others have looked to their existing technology vendors whom they already use for an unrelated operation in their business. In both these scenarios, the businesses end up focused on one function in one system. Instead, organizations need better contextual view for how to intelligently automate business processes across the entire enterprise.

**Solving the Integration Challenge**
This is what makes Bit Stew’s solutions unique. Bit Stew’s software is the only solution on the market today that can solve the integration problem. By leveraging machine learning, Bit Stew’s Mix Core™ can integrate to multiple systems and create semantic data models automatically. Automating data integration is just the beginning of reaching true SDO as businesses progress along the operational maturity curve.

For example, let’s say there is a torrential rainstorm coming into town. A utility will be connected to meteorological and geospatial data to be able to automatically alert operators and field staff of potential issues so they can either prevent them or have a proactive plan in place for how to quickly address potential service outages.

Software Defined Operations enables seamless coordination of different systems and ineffect create virtual operators. By doing this, Bit Stew’s Mix Core and Mix Director™ lets the operations experts be just that and removes the technology guesswork out of industries like oil and gas, where production is the measure of success. SDO is the “technology” side of people, process and technology.

**Mix Core, the Catalyst for Software Defined Operations**
Not only does Bit Stew’s Mix Core has the ability to create SDO by rapidly integrating multiple data sources within an enterprise. It also has a high-speed analytics engine and a knowledgebase repository to capture machine-learning as well as knowledge and experience from human operators. Mix Core is highly scalable and extensible to help grow with a business and adapt as businesses change. The platform’s flexibility allows it to make tremendous impact across many different industrial business verticals.
Another element that makes Bit Stew Mlx solutions unique is that we span from the edge of the network, to the cloud and to the operations center. Enterprises need a consistent, flexible architecture that allows them to move from the edge, which has constrained computing and storage capabilities, and scale up to the cloud (whether it is private or public) so applications can be built on top of it. All of this is part of Bit Stew’s approach to SDO. It is a broad architecture that can address issues across the entire vertical stack.

**What does SDO look like?**

**Scalability**
- Rapidly and accurately processes and analyzes all the data coming from connected sensors and devices

**Coordination of disparate systems**
- Communicate with all business systems across the company (e.g. asset, work order, customer, GIS, telecom management)
- Based on open standards relevant to the industry

**Virtual Operator**
- Automates operations, allowing a business to streamline its use of human resources
- Alerts human operators only to issues it cannot resolve on its own

**Predictive Automation**
- Capable of machine intelligence and supports both supervised and unsupervised learning

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**Knowledge Repository**
- An SDO application serves as a repository of all the knowledge it has accumulated from human operators and its own machine learning
- Building expertise into the application and safeguarding against "brain drain" from staff turnover

**Rich Visualization**
- Interface must be easy for the human operator to use, and to its full capacity
- Visualize the business’ current state of operations in a rich and easily digestible display

**Adaptability and Extensibility**
- Easily leveraged to manage a change in operational procedures - with minimal tech support
- Must be extendable with add-on functionalities that serve new business needs

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**The Future with Software Defined Operations**

As the only company that can currently deliver this truly integrated and intelligent solution to industrial businesses, Bit Stew has a unique perspective as to what the future holds with SDO.

Perhaps the most important potential is that SDO has the power to help businesses and deal with knowledge transfer, or the "brain drain" which happens when an employee leaves the organization, is sick, or when a new employee that does not yet understand the business begins work.

**Deriving Value from SDO**

The keys to success for an industrial business are safety, regulatory compliance, asset performance, and operational efficiency. SDO will allow companies to address these aspects of their business.

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**About Kai Hui:** As chief technology officer for Bit Stew Systems, Kai Hui works to keep Bit Stew's world-leading Mlx Director™ platform at the forefront of smart grid technology standards and real-time network operations. His experience as director of technology for the smart metering and infrastructure program at BC Hydro, British Columbia’s largest electric utility, informs his current role as a technology vendor.
About Bit Stew Systems Inc.

Through data-driven automation, Bit Stew Systems removes the complexity of industrial operations and connected machines to give clarity and control back to the operator. Purpose-built for the Industrial Internet of Things, Bit Stew’s MIx Core™ platform automates data ingestion, applies machine intelligence to learn patterns in the data, allowing industrial companies to discover actionable insights that optimize operational performance. MIx Director™ (formerly Grid Director™) is powered by the MIx Core platform, and is the application industrial enterprises rely on for a contextual and real-time view of their operations, assets and customers. Incorporated in 2009, Bit Stew is a venture-backed private company that is headquartered in Canada with offices in the USA, Australia and Europe.

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