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DATA CONVERGENCE & MULTI-SCREEN DISPLAY *For Collaborative Work Environment*

Systems and devices are evolving and becoming more intelligent by getting connected and passing relevant data to upper layers. Today, sensors in the plant floor can send data that helps in monitoring processes and plant performance in real-time. This data can be integrated with enterprise level business data to make optimum decisions. Such Real Time Data Convergence for Multiscreen Displays (RTDCMD referred to as 'RecoMaker' in this article) has the ability to optimize productivity, asset management, energy management and enhance safety and regulatory compliance. RecoMaker is set to become a critical component of business success.



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The evolution of industrial automation

It is history, but well worth re-visiting. The 2010 oil spill in the Gulf of Mexico was the largest accidental marine spill ever. An explosion at an oil and gas major operated oil well claimed 11 lives, sank an oil rig and a seafloor oil

gusher flowed for 87 days.¹ The company lost millions of dollars paying for its liabilities and for the clean-up operations as a consequence of the accident. The company has since launched a program that integrates data from field devices in real time. It can now monitor field assets and plant health parameters so that it can prevent such disasters in the future.

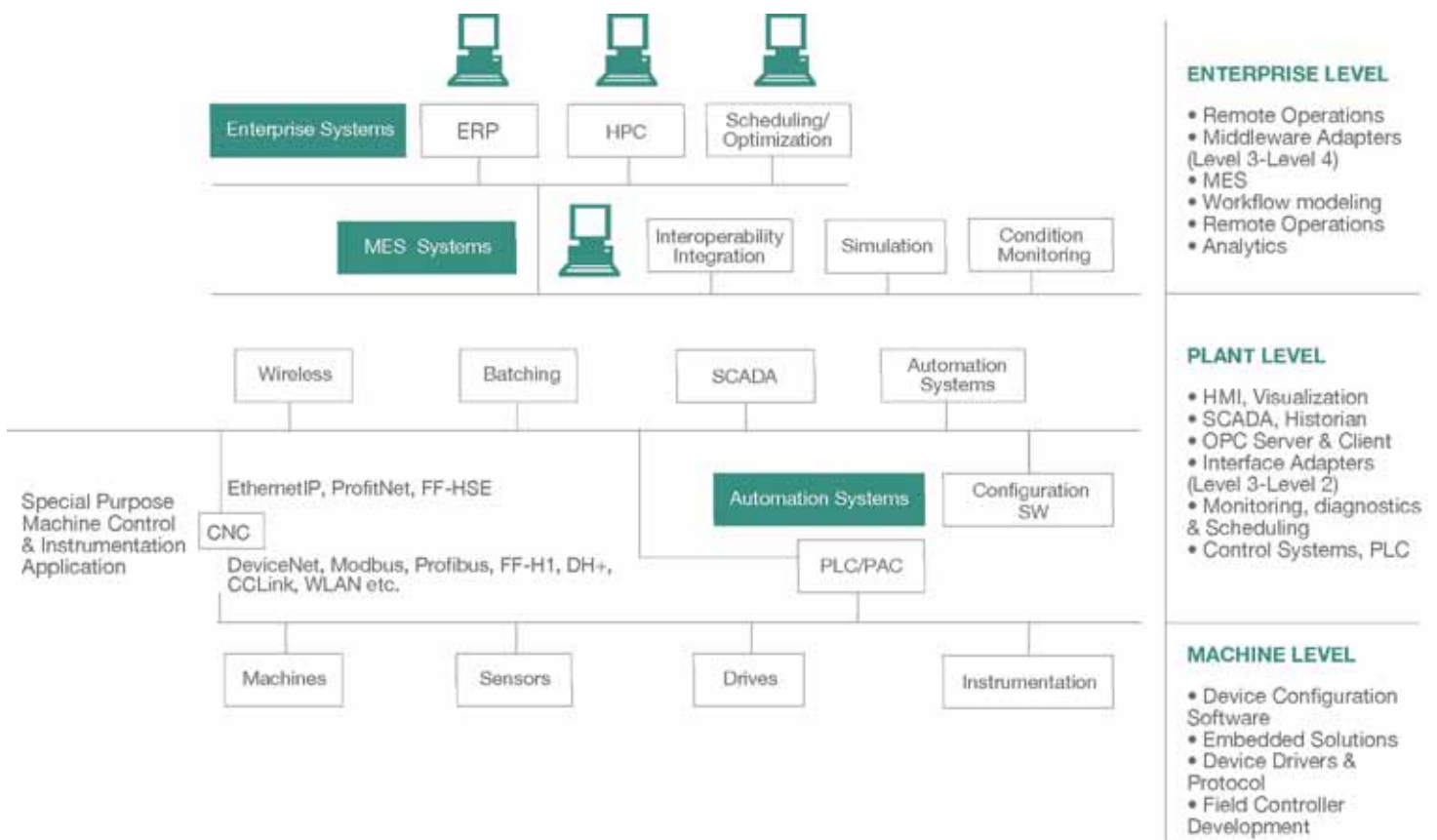
Today, Real Time Data Convergence for Multiscreen

Displays (RecoMaker) makes it possible to predict, isolate and respond to such calamities before they strike. Digital oilfields are making it possible to manage assets in remote and inaccessible locations. This is thanks to the fact that remote monitoring and automation have come a long way in the last few decades.

The change started with the arrival of semi-automated

devices and systems. These devices and systems began to come with embedded intelligence (software) that could pass the data to upper layers and offer operators a variety of actionable information. More recently, full-fledged automation with wireless sensors has gone even deeper to ensure that devices and systems can pass data in real time. These systems can also send alerts to appropriate stakeholders based on operational

Fig:1 From Machines to Operations to Enterprise
End-to-End System Integration



CNC – Computer Numerical Control, **CCLink** – Control and Communication Link, **ERP** – Enterprise Resource Planning, **HMI** – Human Machine Interface, **HPC** – High Performance Computing, **MES** – Manufacturing Execution System, **OPC** – Object Linking and Embedding (OLE) for process control, **PLC/PAC** – Programmable logic Controllers / Programmable Automation Controller, **SCADA** – Supervisory Control and Data Acquisition, **WLAN** – Wireless Local Area Network

Collaborative Work Environment for Plants



CDE delivers performance benefits by

- Redesigning business processes and individual behavior to expedite and improve decisions through Collaboration based on consistent and real-time data (Big Data)
- Connecting decision making to relevant information through Workflow and Data Analysis and Visualization
- Connecting multi-screen to data convergence via design and installation of Infrastructure & Smart Equipment

thresholds or business rules.

Arrival of RecoMaker – Managing the connected universe of machines

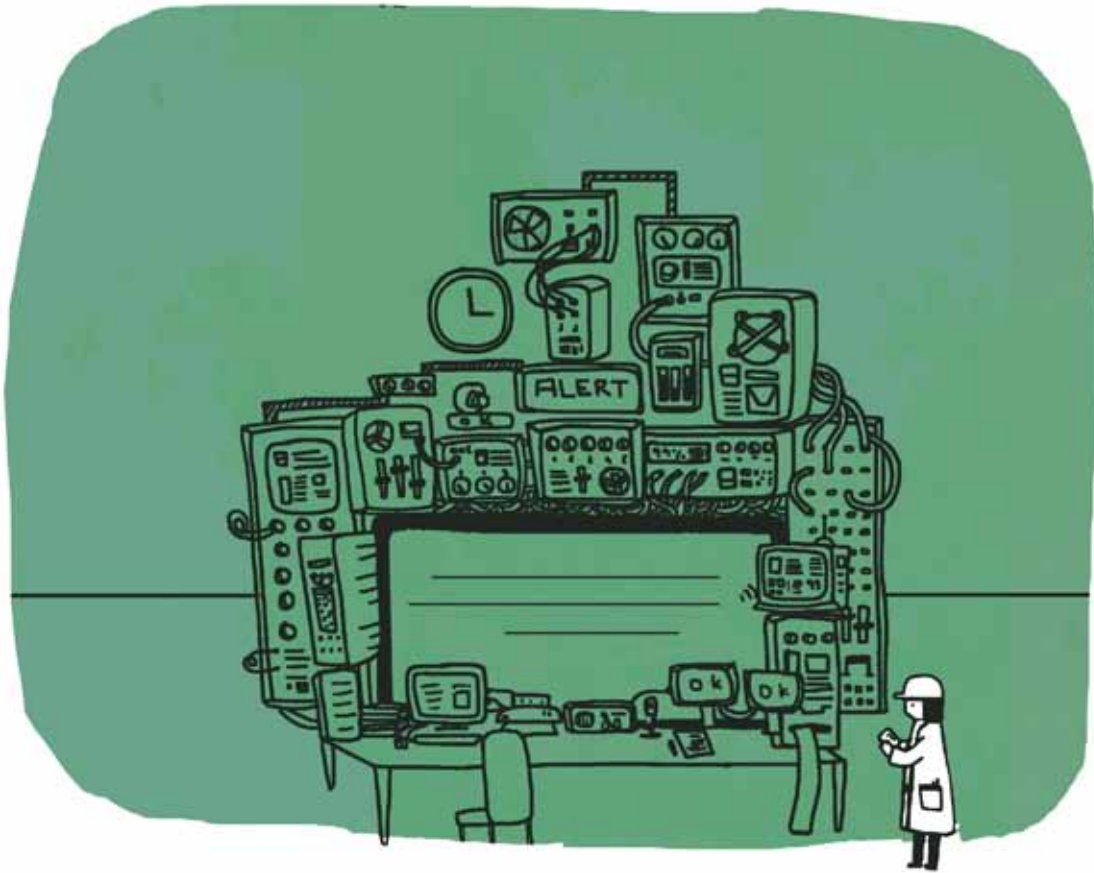
The transformation in industrial monitoring and automation has been magnified several fold by yet another development – the use of multiscreen devices that are becoming popular with end users. Different stakeholders for the plant, as well as field personnel, use different visualization screens and hand held devices. The emerging IT and operational technology (OT) ecosystem consists of devices, sensors, real time data, analytic engines, always-on mobile networks and powerful mobile applications. The key to successfully using this ecosystem is to accumulate the data in a large and central database. The central database enables businesses to have access to a single source of truth. Above this is a layer of real time analytics that distributes

actionable insights to different screens for consumption based on user roles and needs. This is the essence of RecoMaker.

Older plants may have obsolete devices that lack the ability to record events or pass data along to other machines in the network. Newer plants may have smart devices that are connected with a wireless architecture. However, every device can be made smart by retrofitting the devices with a wireless interface so that they adapt to a connected architecture. In most instances, this allows owners to bring all the elements of a plant to a minimum level of intelligence and connectivity via M2M platforms.

Inherent Benefits of Connected Systems

The value of connected devices in a RecoMaker environment is self-evident. Data is presented to users from a consistent database enabling reliable



collaboration. Data is filtered and in many instances analyzed before it is sent to the end user and this showcasing of only relevant data/alerts based on access levels drives quicker decision-making and adds to data security. There is a reduction in data duplication and a concurrent increase in data consistency which increases the reliability, speed and efficiency of data usage.

Remote monitoring of assets such as equipment, machines, fleets, etc. and automated event alerts ensure more efficient use of assets. Also, integrated operations can help in sourcing material and producing the end-product nearer to the consumer by optimized use of the production assets, thereby avoiding costs and logistics of transportation and warehouse management. Enhanced

remote condition monitoring and control of equipment, assets, sensors and processes can optimize energy use and real-time data and remote tracking can enable better mobile work force management, implement better maintenance processes and can enhance security, leading to operational excellence.

There are an increasing number of scenarios where such a seamlessly connected eco-system of devices can be invaluable. Imagine for a moment data being picked up by sensors along the pipelines of a water utility. Data analytics will easily be able to predict leaks in such systems. When a leak is forecasted or detected, the information can be distributed to maintenance personnel in the field for a pro-active response; operations can be

alerted about possible changes that can impact water distribution, and CRM teams can be prepared to manage consumer queries and complaints. In effect real-time glues teams across functions to enable tighter and more effective collaboration.

Increasingly, plant level data is being integrated with business layers (ex: ERP) and with analytics. This allows the enterprise to arrive at the correct actions which are then sent back to plant level machines and devices.

Technical competencies around RecoMaker

The ability to integrate data and systems at all three levels (machine, plant, enterprise) is reliant on the strength of technical competencies and partnerships around the RecoMaker framework. The extensive ecosystem of partnerships required for this includes engineering and automation specialists and Information Technology providers (OT + IT).

The type of RecoMaker described here can enable automation and efficient management of very complex plants and globalized industrial/ business environments. For example, a very large O&G major with global operations leveraged RecoMaker by creating a Collaborative Work Environment (CWE), and a major utility company is striving to establish a global control room as well as regional control rooms that could take independent decisions.

RecoMaker can be particularly helpful in complex environments where safety is a critical factor. M2M platforms and applications, with RecoMaker as the backbone, can orchestrate access controls and authorization levels to ensure accidents and security lapses are eliminated.



The truly connected business future

The evolution of RecoMaker is inevitable. It will gather momentum as the benefits become evident. With its ability to contextualize data and constantly deliver integrated solutions – rather than point solutions – it is bound to see increasing adoption across industries. Most of all, it presents the tantalizing possibility of collaboration in real time and of using M2M to give businesses granular control over their operations.



- 1. Oil Spill in Gulf of Mexico:** <http://www.wsus.org/en/articles/2010/04/oilr-a29.html> ■