

# The Connected Mill: The Digital Manufacturing Era is Here

The logo for CUMULO features the word "CUMULO" in a bold, grey, sans-serif font. The letter "O" is replaced by a blue, stylized geometric icon consisting of several interconnected shapes that form a circular, crystalline structure.

**CUMULO**

Unlocking the human potential of data  
September 2016

# Our Passion - Big Data, Wired Machines, Predictive Results



## Connected mill and what that means

- Sensor to cloud to action
- Monitor, discover, predict
- Knowledge as soon as its knowable

Concept of now, of 5 minutes into the future, of the far future

Using data to improve productivity, see greater levels of efficiency, and reduce costs.

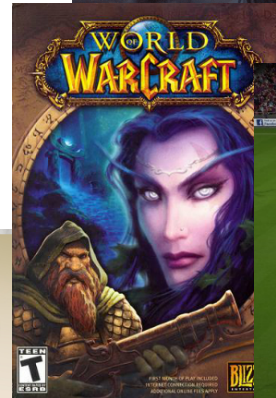
Convergence of operational tech and information tech – with the widespread adoption of smart sensors and advances in industrial software, this combination enables greater operational efficiency.



**What if we told you that our secret to managing Big Data comes from video games?** We believe that it's the humans interacting with the data - controlling what's happening and driving to well understood goals – that unlocks the true value of the data. Human Centered Design, which marries clear business goals with technology and the application of design art forms, is at the heart of the Cumul8 system

## Our Gaming Connection

- We come from a world of big, original thinking where anything is possible
- We come from the origins of connecting big data with a outcome
- We know how to connect software with the end user:
  - “Battlefield 1 Beta” – 13 million players
  - WOW – peak in 2012 – 15 million players
  - FIFA – 100 million life time units



# Our Evolution in Big Data Connection

- We created 3D conversion technology on many of Hollywood's biggest movies
- 3D conversion moves a VAST amount of digital data to all corners of the world
- A tool set based on the movement of big data, as well as intense security of that data



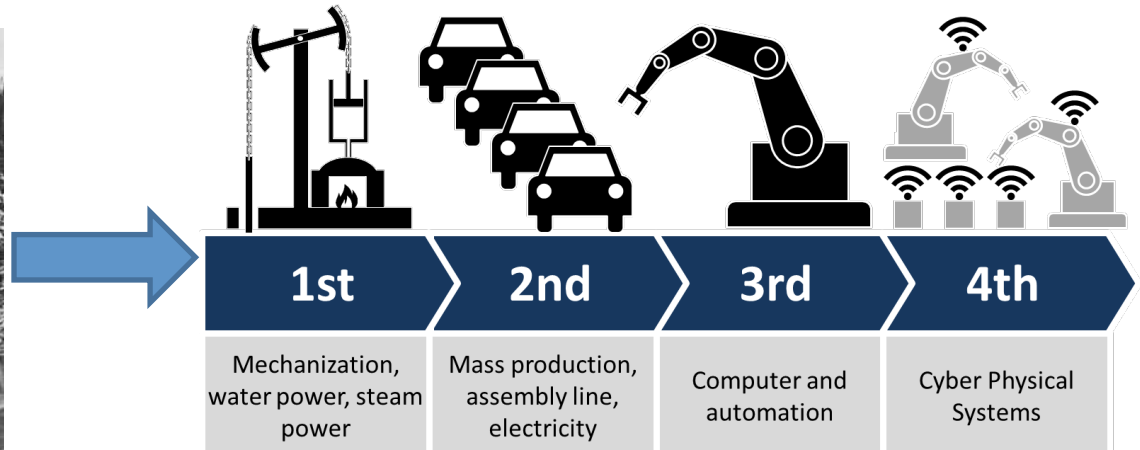
## A tech stack that supports:

- 1,819 users (India and Vancouver)
- 189 TB of synchronized data
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- 82 million files managed
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- 112,356 e-mails sent through Cumul8 in 2016

# Industry 4.0 – “Smart Factory (Mill)”

*Industry 4.0, or the fourth industrial revolution, is the current trend of automation and data exchange in manufacturing technologies. It includes cyber-physical systems, the Internet of Things and cloud computing. Industry 4.0 creates what has been called a “smart factory”.*

- Industry 4.0 digitalizes and integrates processes **vertically** across the entire organisation, from product development and purchasing, through manufacturing, logistics and service
- **All data** about operations processes, efficiency and quality management, as well as planning are available **real-time**, optimised in an integrated network
- **Horizontal** integration stretches beyond the internal operations from suppliers to customers and all key value chain partners
- “Smart factories” implement a framework of interconnected “smart” machines and sensors
- Smart factories rely on the widespread deployment of sensors to collect high-resolution data



# What is Industry 4.0

Big growth is always fueled by big manufacturing revolutions

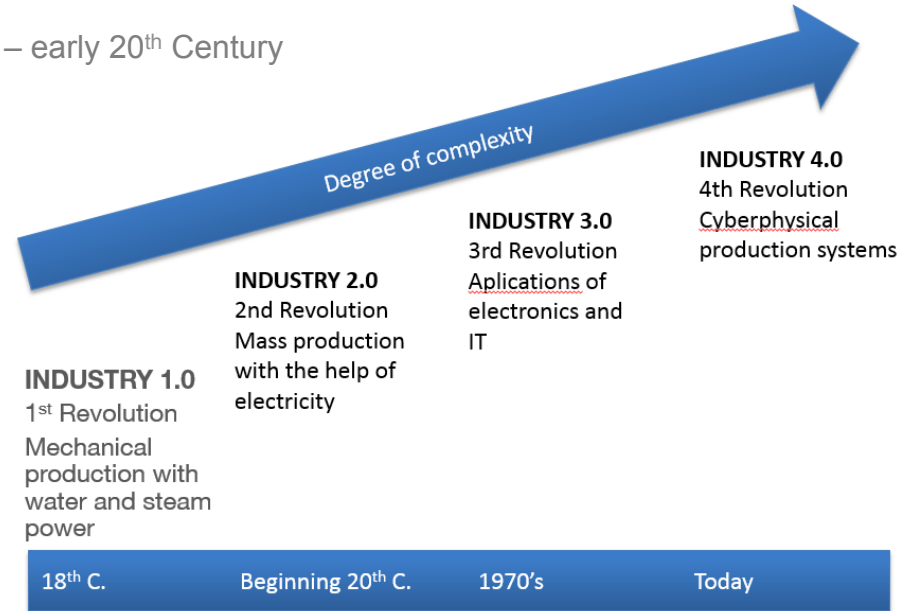
- First – Steam Engine – mid 19<sup>th</sup> century
- Second – Mass production (thanks to Henry Ford) – early 20<sup>th</sup> Century
- Third - 1<sup>st</sup> wave of Automation – 1970s
- Fourth is upon us now

The 4<sup>th</sup> revolution had a few false starts –

- Offshore and cheap labor but then that labor was no longer cheap
- Bigger plants that became rigid on one product and could not evolve to the changing needs of the buyer

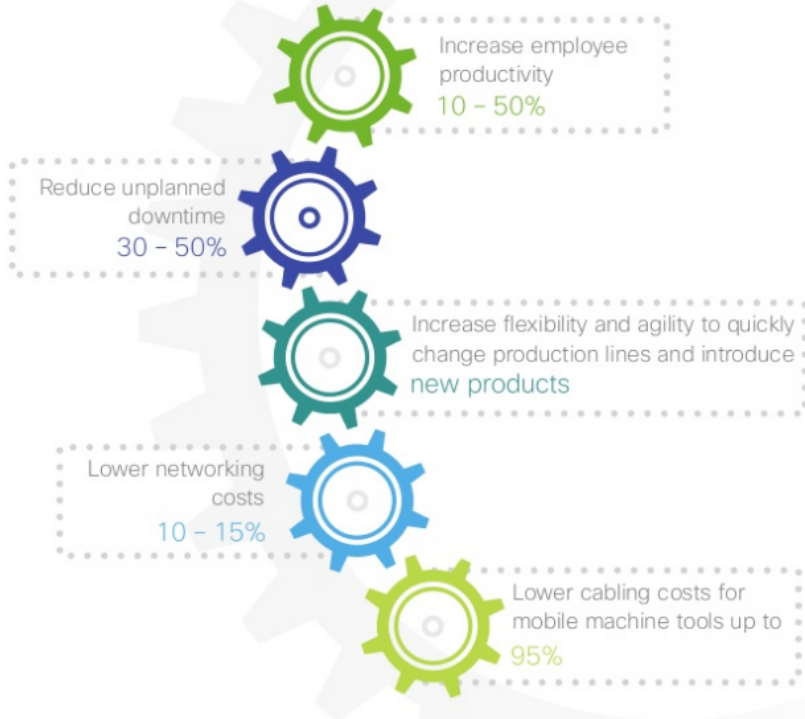
But by combining Technology Revolution with Big Manufacturing we get INDUSTRY 4.0

- Horizontal/vertical integration
- Increasing software focus
- Augmented reality
- Industrial Internet
- Big data / analytics



# The “Hope”, no “The Reality”, of Industry 4.0

## What if you could?



Legacy technology architectures can divide manufacturing operations into factory and business silos

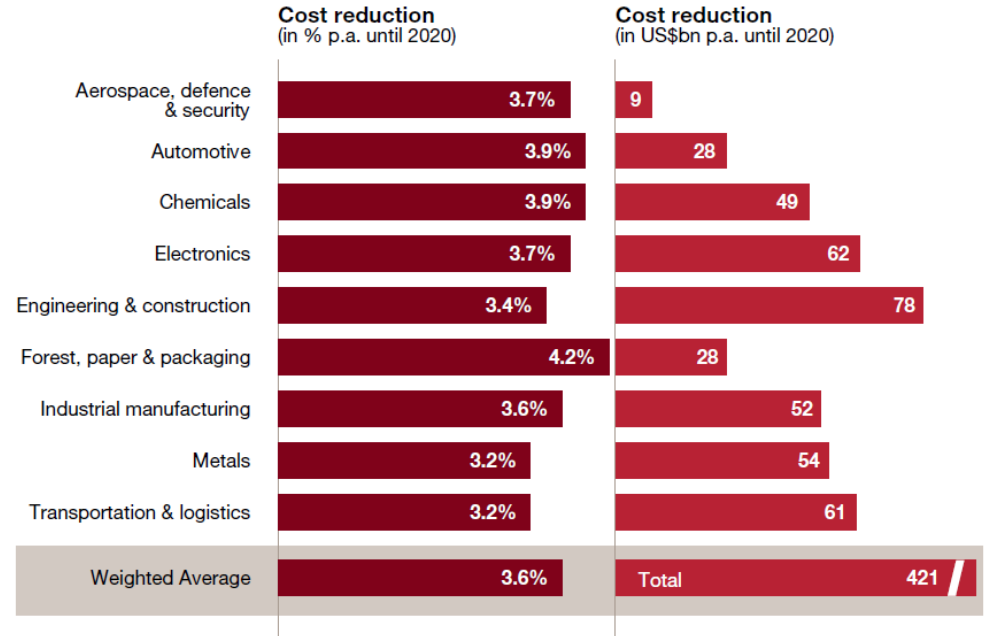


leading these businesses to become **outdated** and **uncompetitive**.



# PwC Survey (it must be real then?)

- PwC Survey of over 2,000 companies in 10 different industries, including forestry
- Average increase of 2.9% in annual revenues; average cost reduction of 3.6% per annum
- Early adopters in the survey (71 companies): average annual revenue increase of 30%; average cost reduction of 30% per annum



**Global corporate spending on Industry 4.0 reached \$20B in 2015 and is forecast to reach \$500B by 2020**

**PwC Message: Act now. Playing “catch up” will be difficult.**

# Industry 4.0 for Forestry – “my humble opinion”

- Big data collection and what that means with respect to each PLC, each solution, each machine, each sensor, new sensors, connect back to the forest and into the sales, etc.
- Edge vs Cloud computing
  - Scale of data generation will drive the trend towards processing that data at the edge Or – the point at which the data is generated
  - See the increase in smarter sensors – which could also eliminate the 2nd control layer of operational software. IE – process at the sensor and throw into the cloud and not have people come in and install middle layer machines – GOOD NEWS, LESS CAPEX
  - WHERE ARE PLC TRENDS GOING? This is a hint of how connection is inevitable

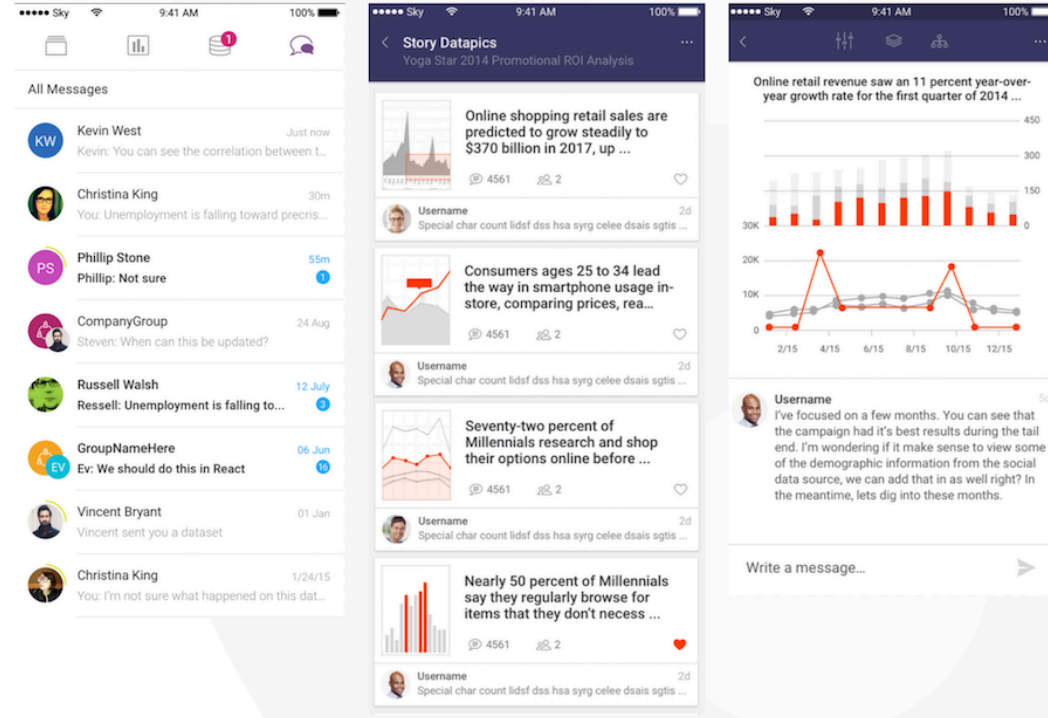
# Industry 4.0 Is No Longer a “Future Trend”

- Is showing that going digital is going to drive quantum leaps in performance
- Data analytics is the foundation for Industry 4.0
- Data lies at the heart of how to make this revolution a success, BUT unless it is analyzed it is of little value – the rapid growing number of embedded systems and connected devices provide a huge continuous data flow.
- It is not about pretty new reports, the hidden brilliant world is prediction
- It is the data narrative, the story that **live+historical** data is telling
- What also has to change is how we communicate that data narrative

# Industry 4.0 and the Data Narrative

For Industry 4.0, we need a new medium for communication about data insights:

- NOW: Real-time at the point of decision
- COLLABORATIVE: Friction-free dialog
- SIMPLE: Strip away complexity and get to the core insight
- State of the art MOBILE tools deliver on all this



# Simple First Step: Trust, Create a Plan, Trust and Invest

## *Blueprint for digital success*

- Trust investment vs economic benefit
- Digital trust is key to the culture – data informs rather than punishes
- Big data analytics is the key



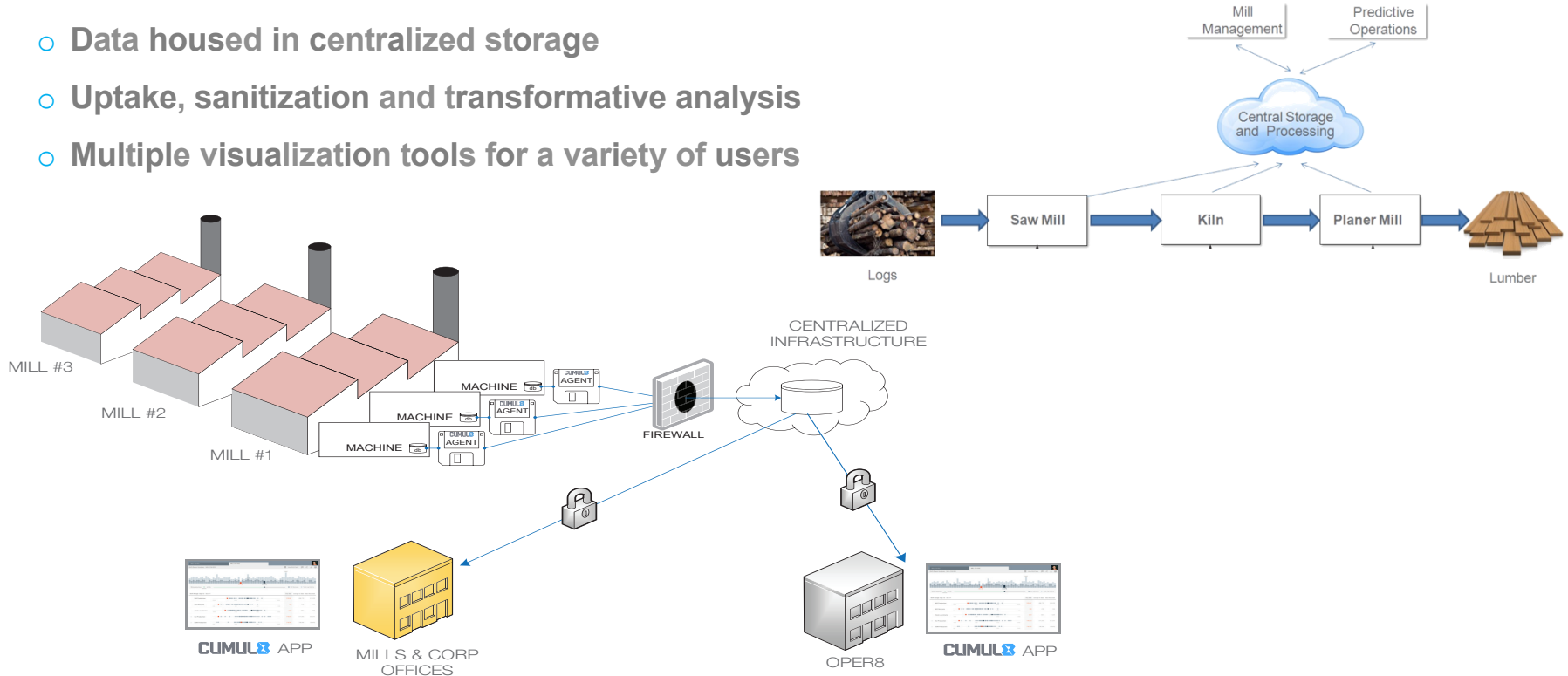
Note: The **Industrial Internet** is a term coined by GE and refers to the integration of complex physical machinery with networked sensors and software.

# We Think In Terms of 5 Minutes Ahead

- Why 5 minutes ahead? – we believe what is being created must be useable in today’s mills
- PLC advances lock step with Big Data (setting up for far in the future – edge computing)
  - Advancements to span communications from the plant floor to the top floor.
  - Current enhancements include faster processors for improved cycle time, added memory capacity, and new communication features
  - Higher-speed processors and more memory will open the floodgate for advanced features such as motion control, vision system integration, and simultaneous support for multiple communication protocols-while still maintaining much of the simplicity that makes the PLC so attractive to many users
- SNAP ON SOLUTIONS – must be easy to adapt current to 5 minutes ahead. Technology is helping pave that forward. A mill must have the ability to push forward without massive capex costs or IT infrastructure costs.
- Wifi vs hardwired – both are necessary
- Let software be the conversion utility – it adapts quicker to any raw sensor/data situation

# Cloud Based Operational Schematic

- Data captured at all levels
- Data housed in centralized storage
- Uptake, sanitization and transformative analysis
- Multiple visualization tools for a variety of users



# Some Data Comparisons for Your Journey Into Big Data Collection

## Sample of our film data

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## Sample of our mill data

Sawmill Module:

- 120 MB per day
- 36 GB per year

Grading Machines (single):

- 25 MB per day
- 8 gigs per year
- One sawmill total data for 2.6 years - 91 GB

*1 GB = 1,000 MB*

*1 TB = 1,000 GB*

*1 PB = 1,000 TB*

*1 TB = \$80 a month in the cloud*

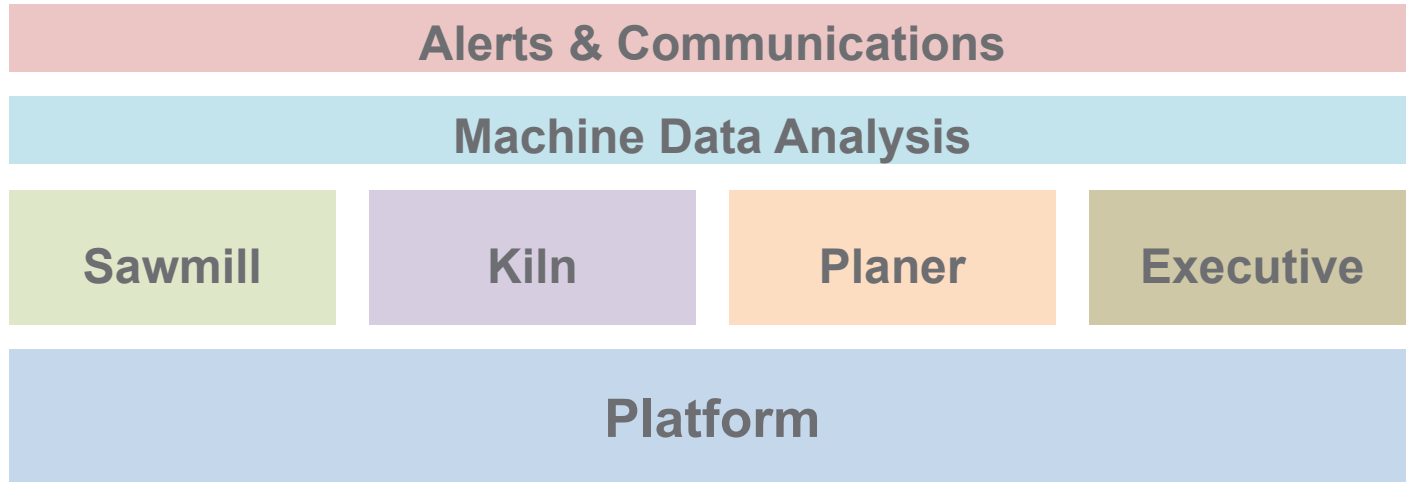
*Storage for 1 mill a year = roughly \$1,200 a year*

*CAP EX on BIG DATA in CLOUD barely a line item*



# THE CONNECTED MILL PLATFORM

- Threshold triggers, pattern matching, push alert messages, data tagging, threaded communications
- Integrated within each functional area module



Fully connected from sensor to boardroom

THANK YOU

Rory Armes