OCWA
ONTARIO CLEAN WATER AGENCY
AGENCE ONTARIENNE DES EAUX

Blue Cities
Data Driven Decisions
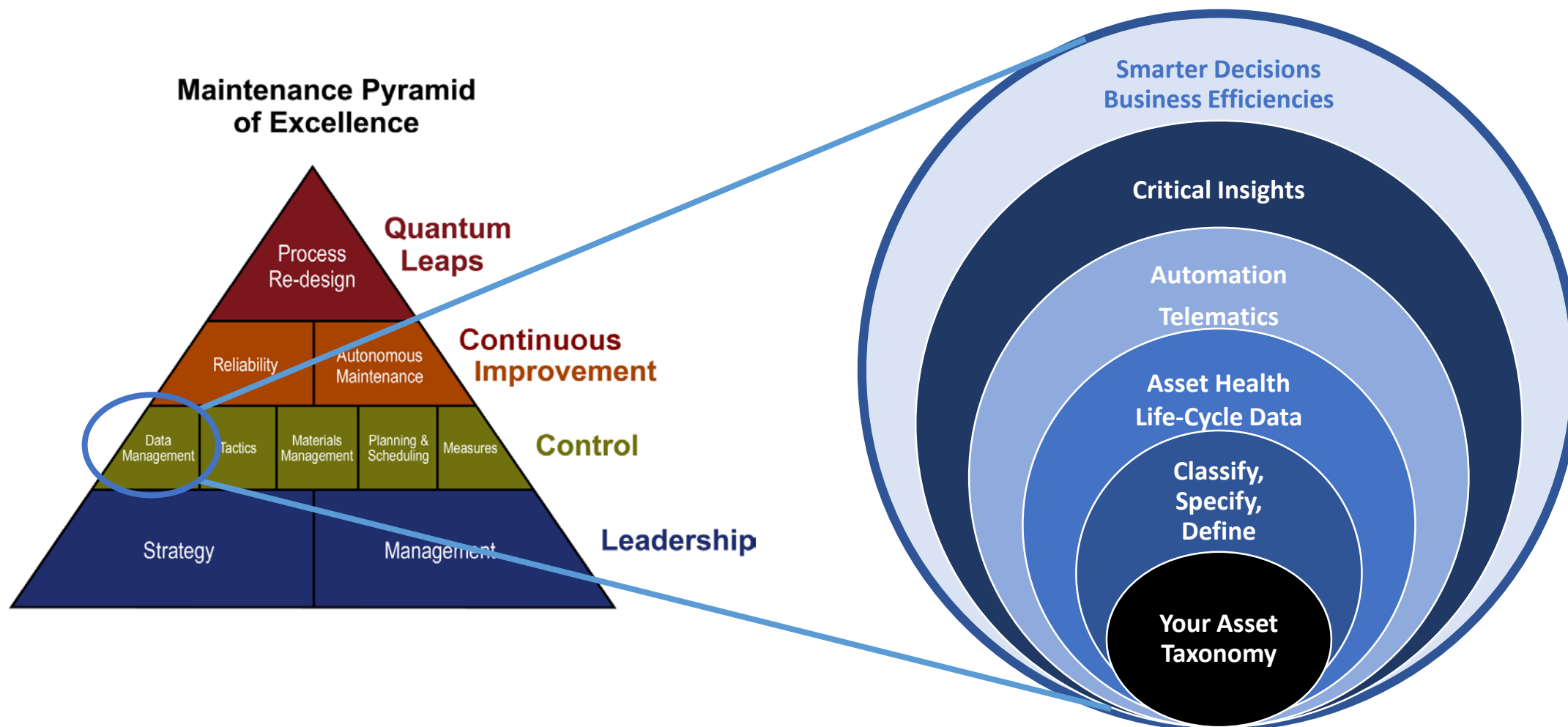## Asset Management data practices in Utilities

May 2017

Jason Speers (OCWA)
Atif Sheikh (IBM)

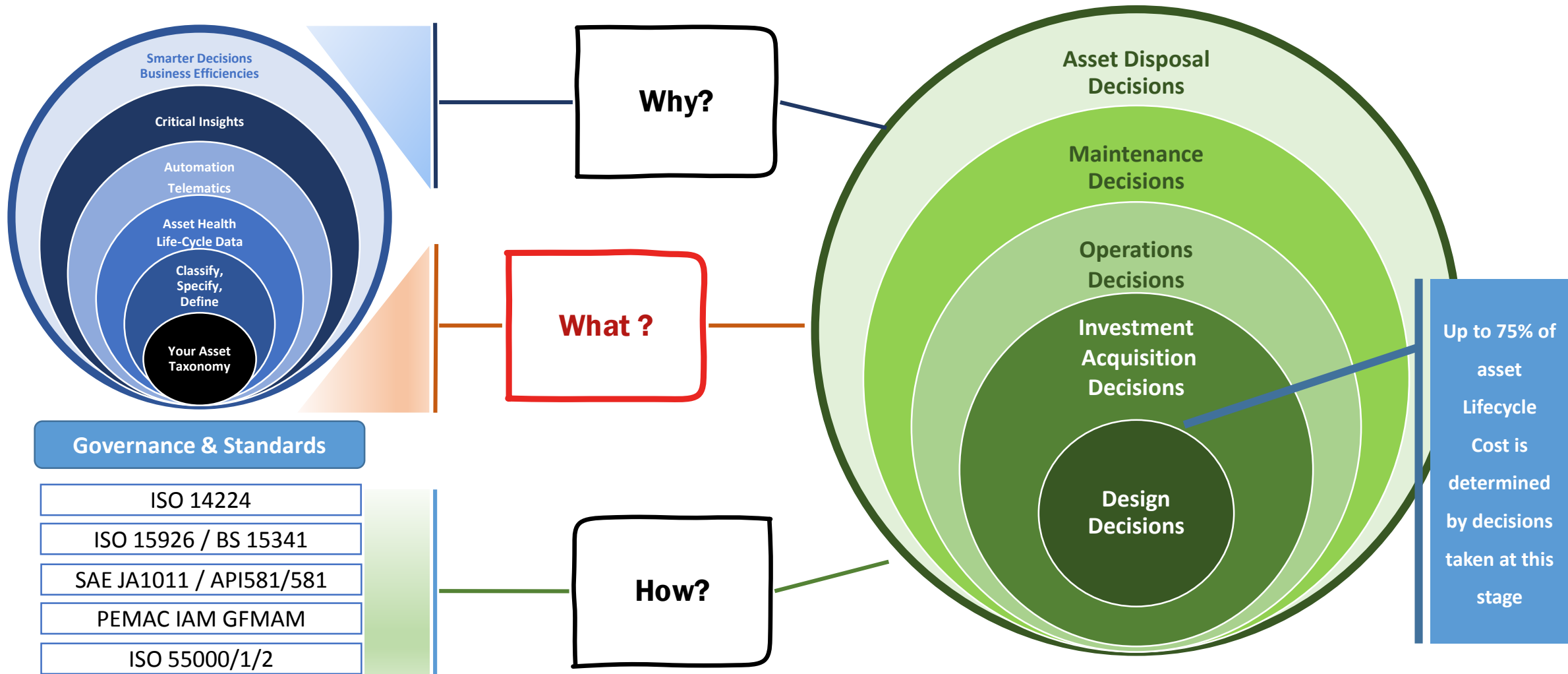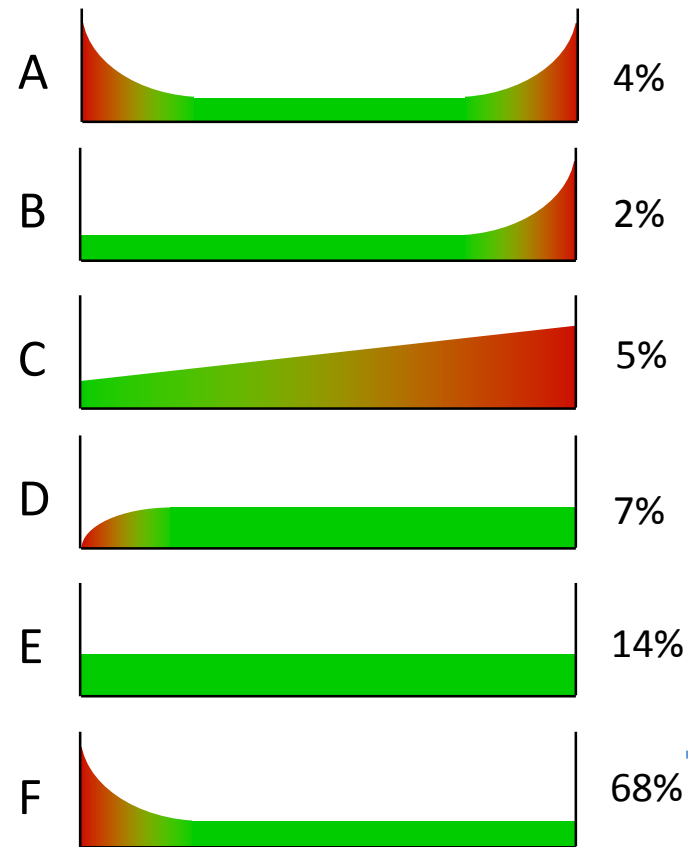Data at the helm of asset management pyramid of excellence

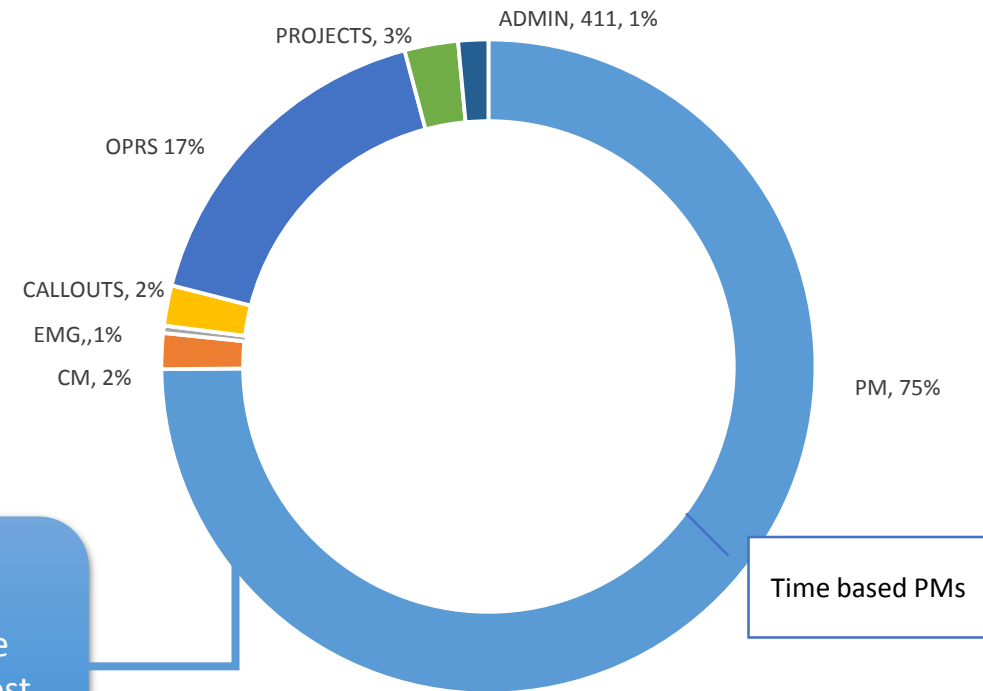# Big data – accelerators in Asset Life Cycle Decisions

Smarter Decisions
Business Efficiencies

Critical Insights

Automation
Telematics

Asset Health
Life-Cycle Data

Classify,
Specify,
Define

Your Asset
Taxonomy

Why?

What ?

Governance & Standards

ISO 14224
ISO 15926 / BS 15341
SAE JA1011 / API581/581
PEMAC IAM GFMAM
ISO 55000/1/2

How?

Asset Disposal
Decisions

Maintenance
Decisions

Operations
Decisions

Investment
Acquisition
Decisions

Design
Decisions

Up to 75% of asset Lifecycle Cost is determined by decisions taken at this stage

Problem: Defining an optimum maintenance regime?

A — 4%

B — 2%

C — 5%

D — 7%

E — 14%

F — 68%

Probably an incorrect maintenance regime for most dominant failure pattern

An RCM analysis will help validate this

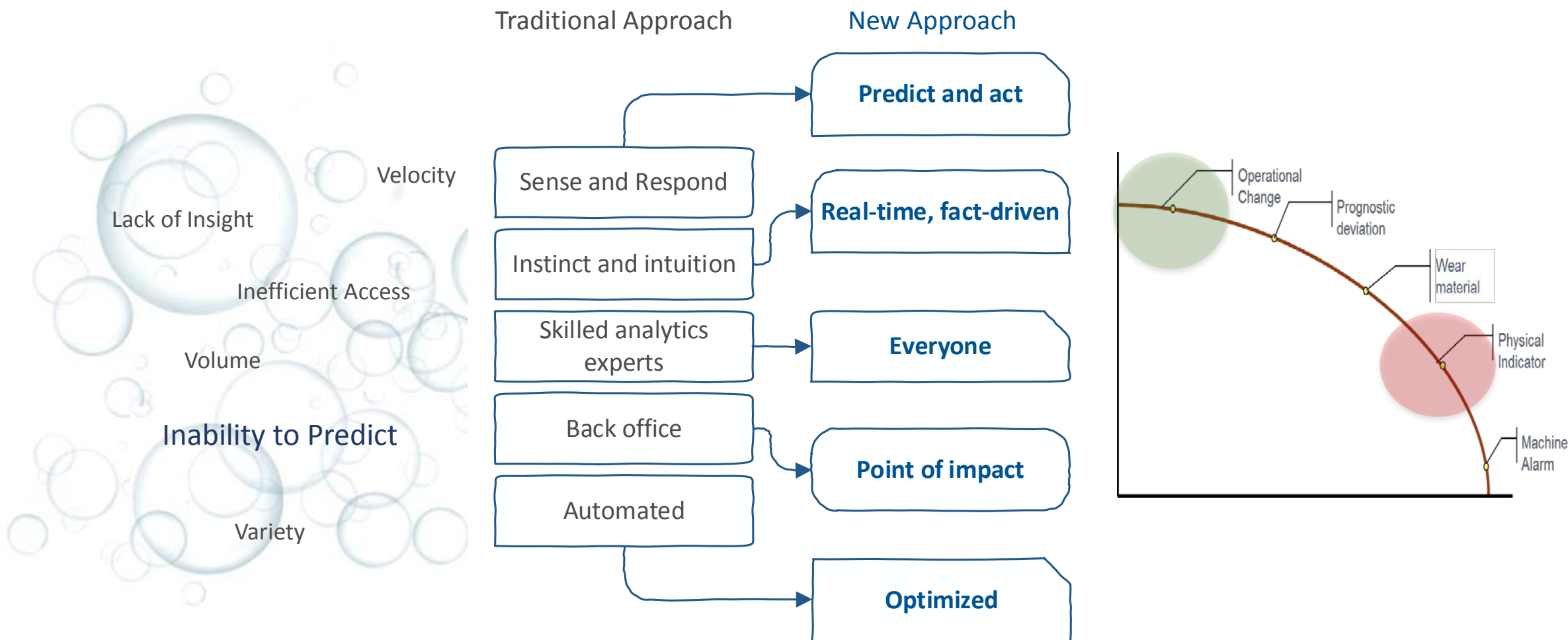## Utilities Work Type Distribution
(Open WOs 1Q 2017)

PROJECTS, 3%

ADMIN, 411, 1%

OPRS 17%

CALLOUTS, 2%

EMG,,1%

CM, 2%

PM, 75%

Time based PMs

4

Problem: Asset Health feedback – Information Breakdown

PM improvements based on Maint feedback

PM Feedback through Maximo Work Order

Central Planner

PM Data in Maximo → CMMS → PM WOs in Maximo

Field Maintenance

🚫 Failure Data (Codes) not filled in

🚫 Failure data not available for effective failure analysis

🚫 Equipment Reliability Analysis not available for PM optimization and effectiveness

🚫 Equipment Reliability Analysis not available for maintenance improvement

Reliability Analysis

New challenges and conditions have placed a renewed urgency on predictive analytics

Traditional Approach

New Approach

Velocity

Lack of Insight

Inefficient Access

Volume

Inability to Predict

Variety

Traditional Approach	New Approach
Sense and Respond	**Predict and act**
Instinct and intuition	**Real-time, fact-driven**
Skilled analytics experts	**Everyone**
Back office	**Point of impact**
Automated	**Optimized**

Operational Change

Prognostic deviation

Wear material

Physical Indicator

Machine Alarm

PMQ and Predictive Analytics – Leverage your RCM efforts

Asset Data
Failure Trends

Process Data
BI & Analytics

OEM & Market Data
Standardized Supply Chain · Business Porcesses

Economy Data
Historical Costs

Exogenous Factors
Human Factor · The Weather Company An IBM Business
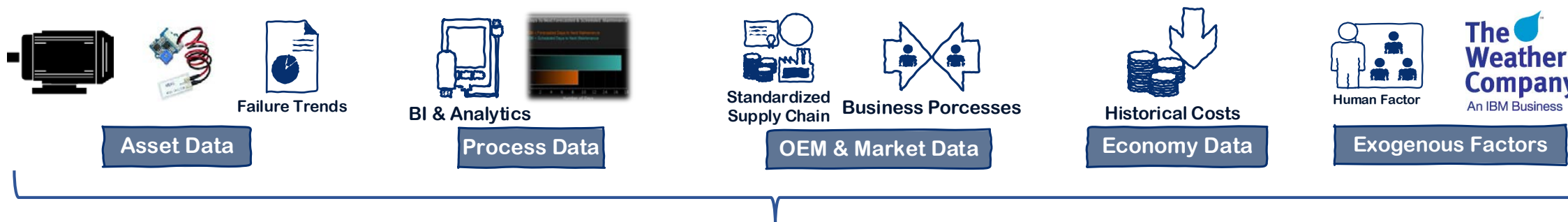
Connectivity

real-time, fact-based understanding of asset performance and usage
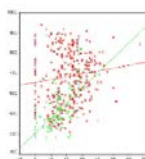
RCA - based on known Failure Modes, causal associations and failure patterns

Analytics

Monitoring Reporting

reduced unplanned downtime
lower maintenance costs
fewer warranty claims
lower parts and inventory costs
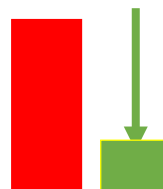
extended asset life
improved product quality
improved production yield
optimized maintenance schedule

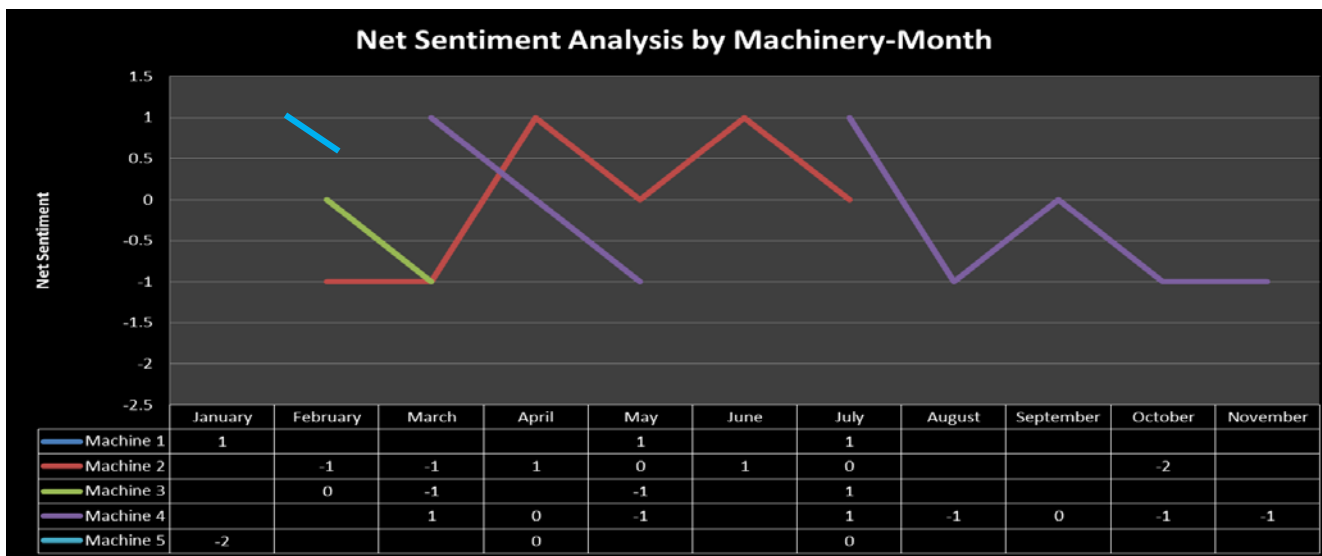# Next generation analytics – a transition towards cognitive asset care approach

Date	Shift	Remarks
01-07-13	10:00:00 PM	'All is good in this machine'
01-01-13	2:00:00 PM	'No problem Found in this Machine'
01-09-13	10:00:00 AM	'Vibration is more than usual'
01-07-13	10:00:00 AM	' adjust clamps from hitting heads '
01-04-13	10:00:00 PM	'Leak seems to have developed'
01-03-13	10:00:00 AM	'HYD LEAK ON CLAMPS, POSSIBLE BLOWN GUAGE'
01-02-13	10:00:00 AM	' Hyd. oil leak, B-Axis table.'
01-11-13	6:00:00 PM	' Hyd. oil leak, B-Axis table.'
01-05-13	10:00:00 PM	' Hyd. oil leak, B-Axis table.'

Signals received by Log analysis **and** sensor data, leading to fixing vibration issue, but no further investigation of already created damage due to vibration

Recommendation not captured in automated work order generation; work not done.

Important inspection logs not captured in structured predictive maintenance. No signals raised.

Employ text analysis to reveal detailed insight that is absent in structured predictive maintenance data

Net Sentiment Analysis by Machinery-Month

|	January	February	March	April	May	June	July	August	September	October	November
Machine 1	1				1		1				
Machine 2		-1	-1	1	0	1	0			-2	
Machine 3		0	-1		-1		1				
Machine 4			1	0	-1		1	-1	0	-1	-1
Machine 5	-2			0			0				

Text analytics indicates that machinery 2,3,4 & 5 have negative comments from inspection engineers.

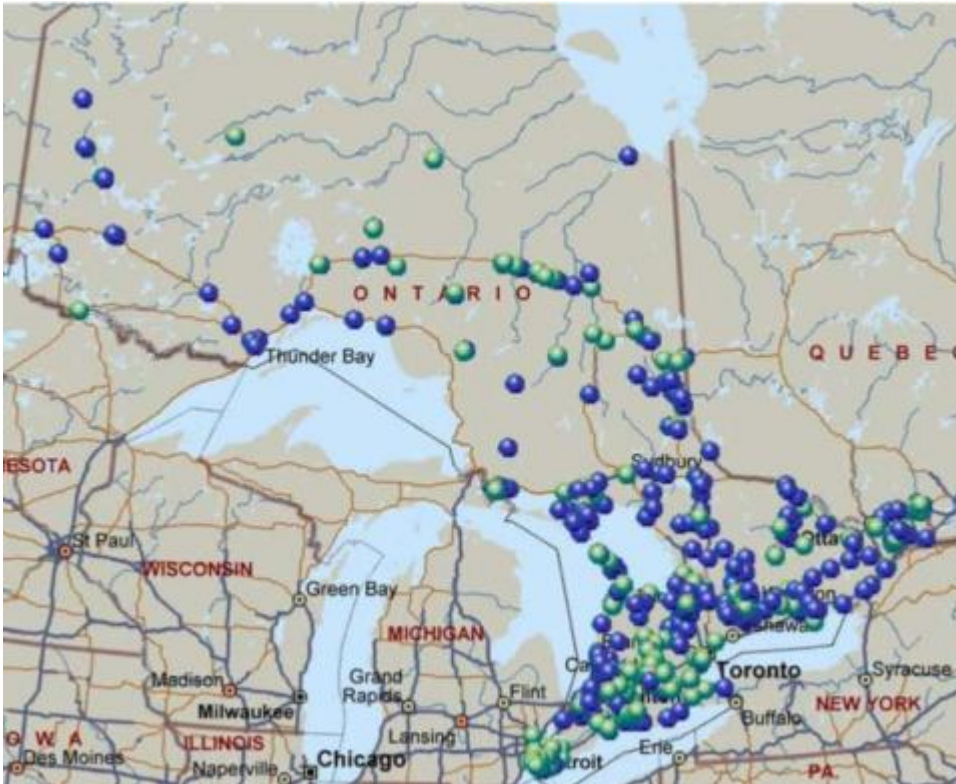This insight is NOT reflected in the sensor data.

8

Art of Possible – An evolution of Asset Management through data analytics
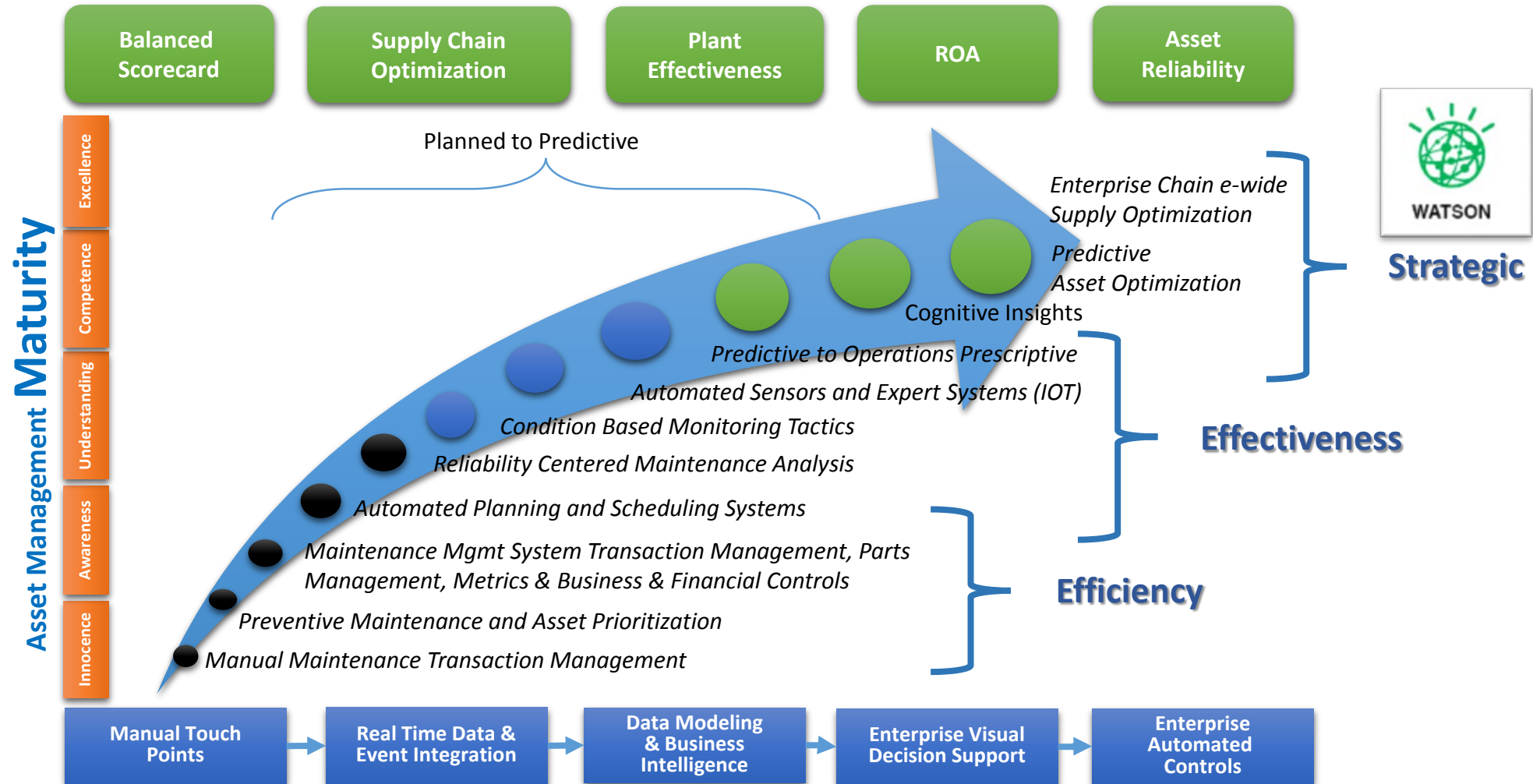
Ontario Clean Water Agency (OCWA)

- Serve a population over 4M

- Total Solutions Provider including, Operations and Maintenance (O&M), PM, and Financing

- 180 Municipalities and First Nations

- 600 treatment facilities

- Provincial Crown corporation with 800 staff

"Data-Driven Decisions"

...Starts with the word "Data"

Approx. 100K assets maintained worth $10B

250k Streaming SCADA Tags
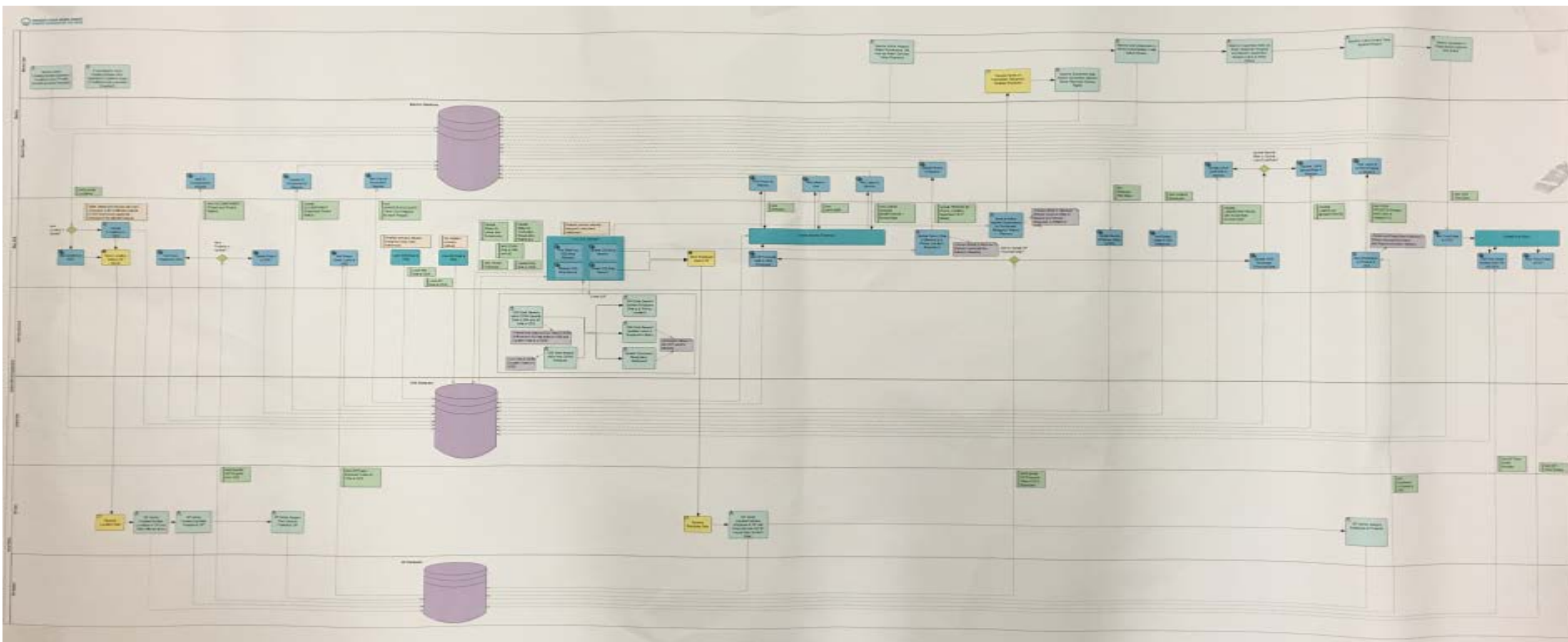

1.3M data points from accredited labs annually

3M data points from operator rounds annually

1.7M timesheet transactions annually in FIS

Physical Data Model

Functional Integration Design

Governance

- Information Governance
- Organizational Governance
  - What is the role of "IT" vs. what is *my* role in information management?

"The perceived value of IT and the role of the CIO are changing in the era of digital business. In the digital age, enterprises need a new approach to strategy, one that includes information and technology from the start."

Gartner, 2017; Leading through Business, Innovation and IT

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