



## ENERGISTICS & DIGITALIZATION

Moving Beyond Data Integration

Eric Griffith, Petrotechnical Data Systems

[eric.griffith@pds.group](mailto:eric.griffith@pds.group)

February 27, 2019

## PDS Group



### » Company Overview

- PDS => Petrotechnical Data Systems
- Fusion of IT expertise and upstream E&P expertise
- Offices in Houston, London, Aberdeen, the Hague, and Sofia in Bulgaria
- 25 year history of consulting and bespoke software for oil and service companies

### » PDS Brands

- Ava focused on streamlining and enhancing geological modeling
- WITSMLstudio focused on:
  - Integrating with existing systems to deliver existing data as WITSML
  - Bringing drilling data inhouse for analytics via WITSML
  - Providing open source WITSML technology to the community

## Agenda and Objectives



### » Agenda

- What is digital transformation?
- How do we build the technology?
- How can standards facilitate successful and sustainable transformation?
- How can Energistics support digitally transformed organizations?

### » Objectives:

- Examine digitalization in the context of Energistics and its standards
- Look at where standards currently play a role and where they do not
- Stimulate future discussions on expanding the role of standards in digitalization

## What is Digital Transformation?



Minority Report

# Digitalization and Digital Transformation



- » **Digitalization** is innovative **digital technology** and **digitized processes**
- » **Digital Transformation** is radical change that leverages **Digitalization**
  - New people
  - New roles
  - New skillsets
  - New workflows
  - New teams
  - New organizations
  - ...
- » Revolutionary (\*), not evolutionary
  - \* Goals defined by and changes carried out by current organizations



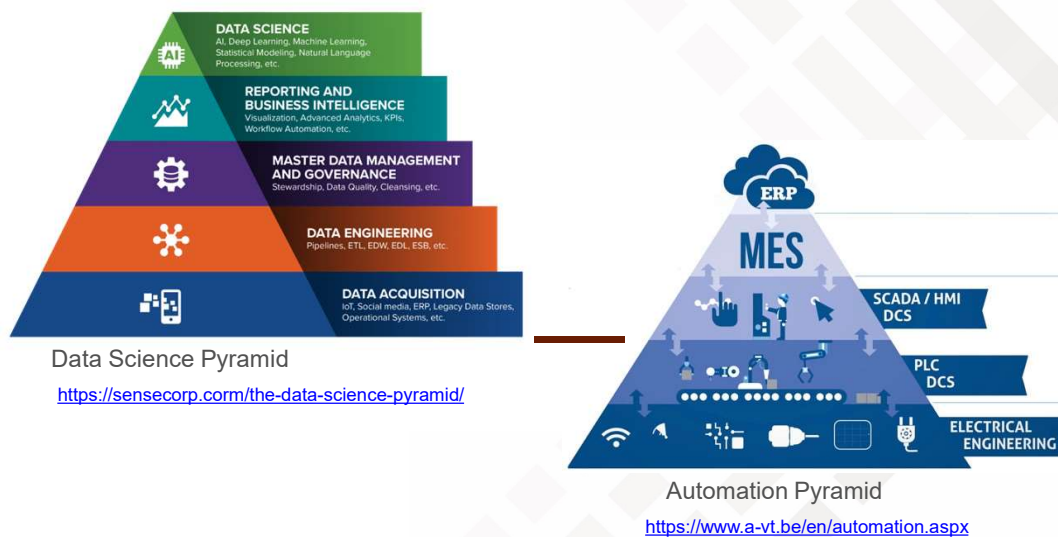
<https://www.flickr.com/photos/sharonhahndarlin/13746340925>

27 February 2019

©2019 Energistics Inc.

5

# Digital Transformation Journeys

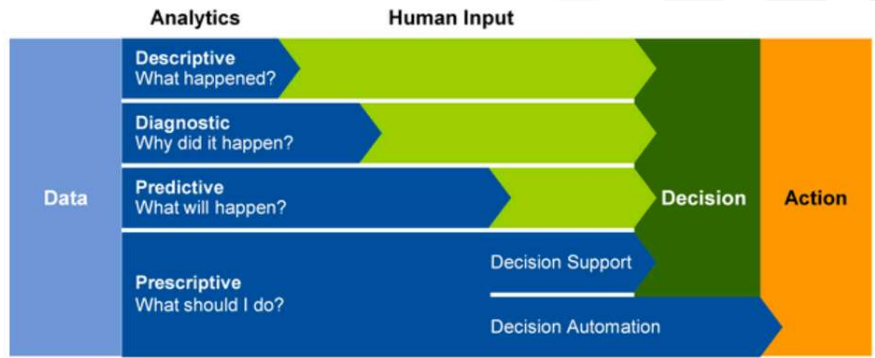


27 February 2019

©2019 Energistics Inc.

6

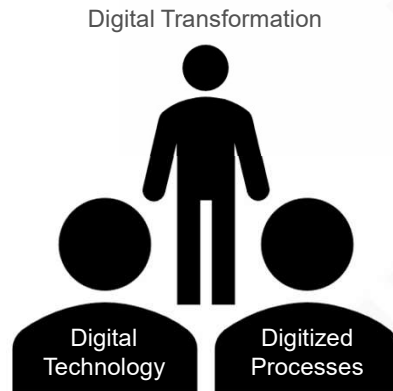
# Digital Transformation Journeys



Analytics Hierarchy

<http://adviscent.com/en/blog/analytics-does-your-business-need-descriptive-diagnostic-predictive-or-prescriptive-capabilities.html>

# Digital Technology at the Foundation



## Building the Technology



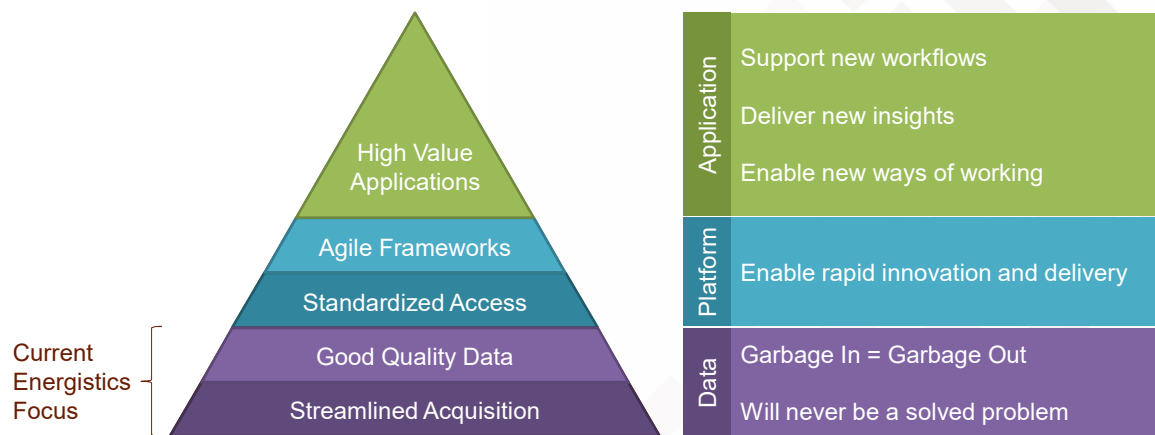
<https://thetowerinfo.com/buildings-list/burj-khalifa>

27 February 2019

©2019 Energistics Inc.

9

## Invest in the Base and Build Upwards



27 February 2019

©2019 Energistics Inc.

10

## Digital Transformation Building Blocks



### » Core Concepts

- Big Data
- Data Lakes
- Cloud Computing
- Edge Computing
- IoT

### » Enabling Techniques

- Data Science
- Deep Learning / AI
- Digital Twins
- Data Analytics
- Process Automation
- Microservice Architectures

### » Enabling Processes

- Lean
- Agile
- Responsive

### » Enabling Technologies

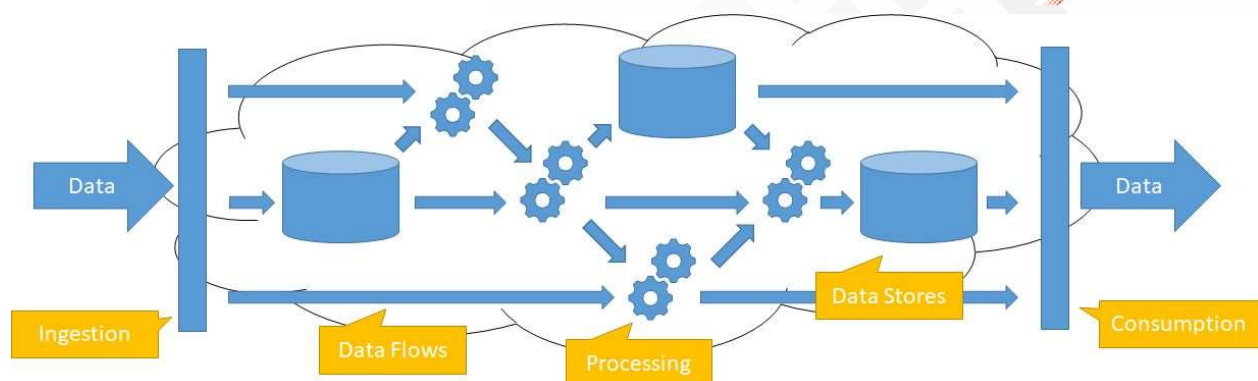
- Blockchain
- 3D Printing

27 February 2019

©2019 Energistics Inc.

11

## Digital Transformation Computing Model



**Ingestion:** Message Queue Consumers, APIs, Direct Data Store Connections

**Data Flows:** Message Queues, Direct Connections, Data Orchestrations

**Processing:** Stream Processing, Batch Processing, Event Processing

**Data Stores:** SQL, NoSQL, Data Lakes

**Consumption:** Message Queue Producers, API, Direct Data Store Connections

27 February 2019

©2019 Energistics Inc.

12

# Technologies Enabling Digital Transformation

<b>Message Queues</b> ActiveMQ MSMQ RabbitMQ Kafka NiFi	<b>Complex Event Processing</b> SQLstream Streambase Apama Apache Flink WebSphere Business Events SAP ESP Oracle Event Processing Informatica RulePoint	<b>Business Intelligence</b> Spotfire Tableau PowerBI Excel QlikView Chartio Looker	<b>Master Data Management</b> IBM Infosphere Information Server SAS Data Management PowerCenter Informatic Dell Boomi Profisee Master Data Management SAP NetWeaver MDM Teradata MDM	<b>Subsurface</b> Petrel JewelEarth DecisionSpace RMS IMEX CoVIZ 4D SKUA
<b>Data Stores</b> SQL Server / Oracle MongoDB Cassandra Google Big Table Amazon Red Shift Microsoft CosmosDB SAP HANA Apache HBase ...	<b>Batch Processing</b> Apache Spark	<b>ML / Data Science</b> TensorFlow R Matlab Python	<b>ERP / CRM / HR / Finance / Logistics</b> EnterpriseOne SAP PeopleSoft Salesforce Dynamics Sage NetSuite	<b>Drilling</b> EDM WellView SiteCom PetroVault
<b>Stream Processing Engines</b> Storm Azure Stream Analytics Kineses Cloud Dataflow Apache Beam				<b>Production</b> Prosper Saphir Carina

IT

Business

Enterprise

Petrotechnical

27 February 2019
©2019 Energistics Inc.
13

# Technology Islands

- » No standard ways to exchange data across all these technologies
- » Each technology interoperates with different subsets

27 February 2019
©2019 Energistics Inc.
14

## Sustainable Transformation through Standards



27 February 2019

©2019 Energistics Inc.

15

## Transformed Organizations Depend on Data



- » Transformed workflows are data-centric
  - The presence, consistency, security and quality of data must be assured



- » Innovation drives transformed organizations
  - Data must be provided to the right people in the right way at the right time



- » Transformed organizations embrace disruptive change
  - The data landscape must evolve to meet changing business needs



- » Data Management is key to transformed organizations
  - How can they do all this efficiently in terms of cost and effort?

27 February 2019

©2019 Energistics Inc.

16



# Data Standards Support Transformed Organizations



» Data Standards support transformed organizations through:



Robust, Secure,  
Low-Latency Data Transfer



Domain-Appropriate  
Data Models



Standard Interfaces



Data Assurance  
Best Practices

» Data Standards further help these organizations avoid:



Competing  
Data Formats



Vendor Lock-In  
with Data Stores



Out-Dated Data  
Exchange Mechanisms



Poor Quality Solutions  
and Unhappy Users

# How Is WITSML Used Now?



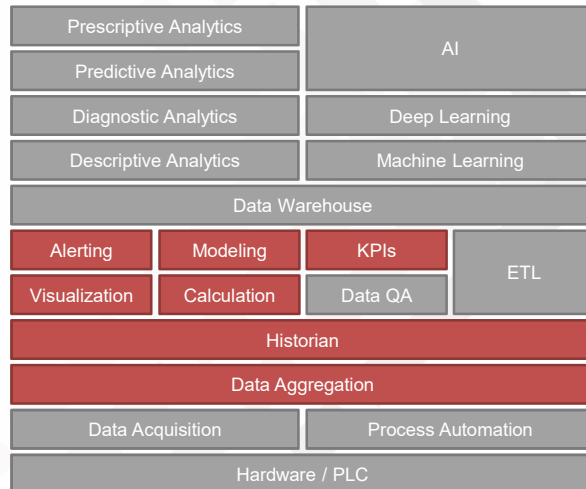
## Data Models

WITSML  
1.x

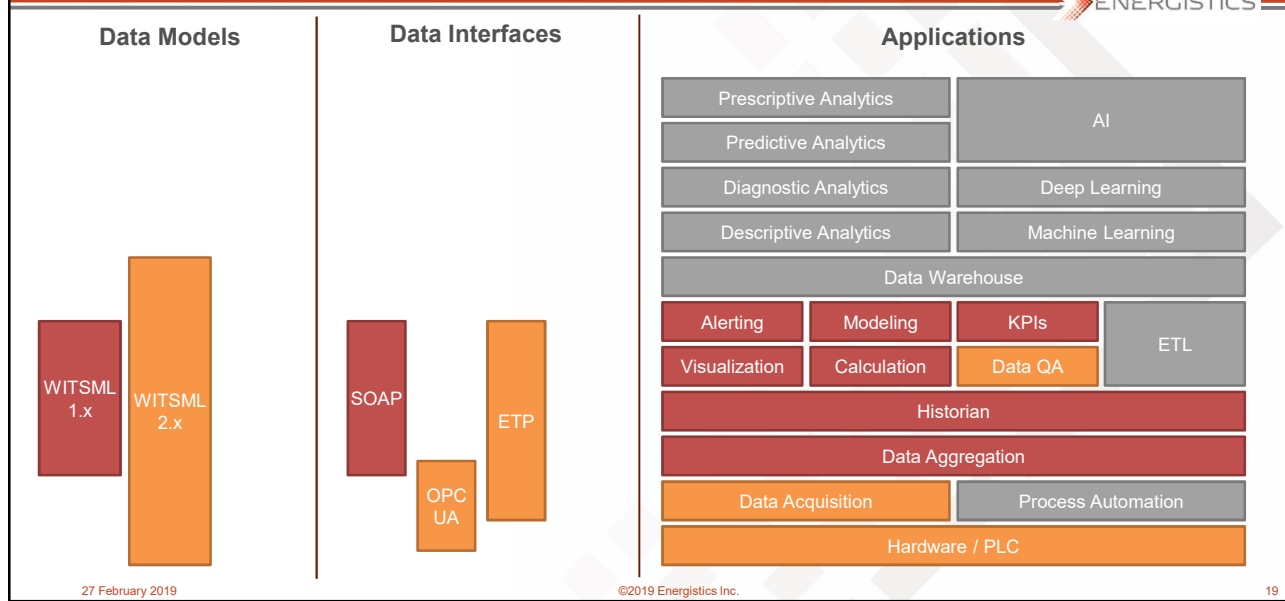
## Data Interfaces

SOAP

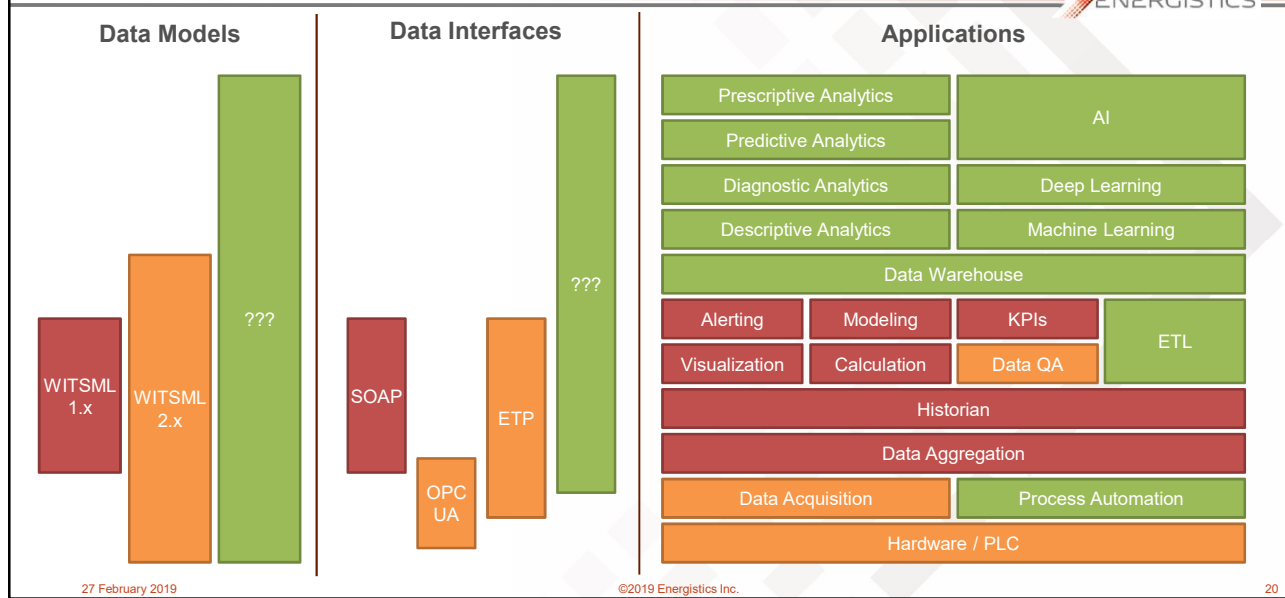
## Applications



# Where Do the New Standards Help?



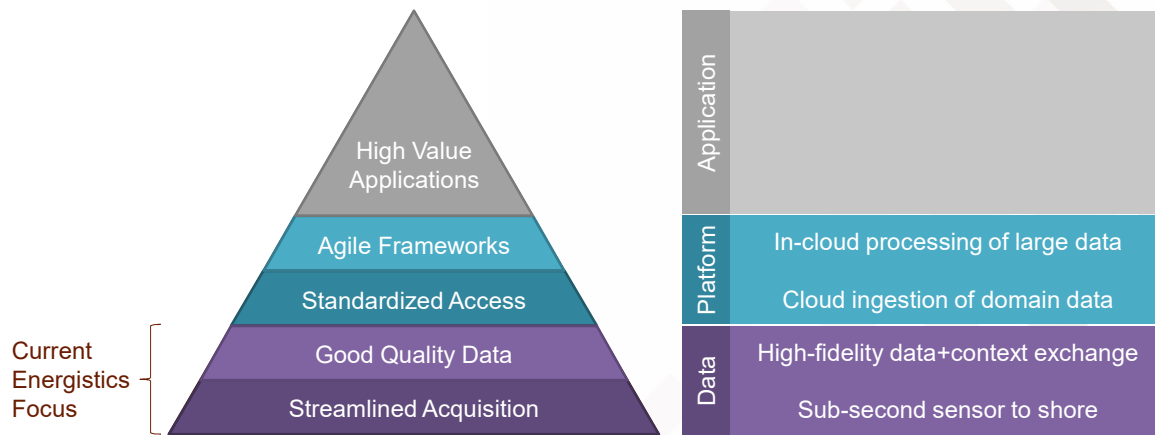
# How Could Standards Help in the Future?



# Energistics and Digitalization



# Modern Data Integration Challenges



## And What About...



- » Integrating engineering, finance, logistics and customer data:
  - Adjusting drilling program budget forecast based on revised targets
  - Optimizing activities based on equipment performance and local availability
  - Automatically issuing invoices and payment based on completed services
  - ...
- » Crossing domains like:
  - Rerunning reservoir simulation based on actual formation tops while drilling
  - Revising production forecast based on revised understanding of geology
  - Revising planned injector well locations based on revised simulation results
  - ...

27 February 2019

©2019 Energistics Inc.

23

## Moving Beyond Data Integration



- » How could Energistics help Operators?



Enabling high-value workflows like data analytics, ML, automation, etc.



Standardizing data quality best practices and procedures

- » How could Energistics help service companies / equipment providers?



Optimizing workflows to reduce complexity and human error



Defining standard touch points for value adding technology

- » How could Energistics help the industry as a whole?



Defining true best practices in addition to standardizing existing practices



Involving new partners to broaden the footprint covered by standards

27 February 2019

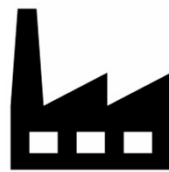
©2019 Energistics Inc.

24

## Why Energistics?



- » Energistics is an established industry framework for standardization
  - Broad E&P domain footprint
  - Broad industry participation
  - Focus on both data representation and system integration



27 February 2019

©2019 Energistics Inc.

25

## Energistics in a Digitally Transformed World



- » How will standards be helping:
  - Operators?
  - Service companies?
  - Equipment providers?
  - Technology companies?
  - Independent software vendors?
  - Governments and regulatory bodies?
- » How could E&P standards benefit:
  - Cloud technology?
  - Drilling automation?
  - Finance? HR? Logistics?
- » How could more of the industry be involved in defining standards?
- » How could standards development be improved?
- » How could adoption and implementation be improved?

27 February 2019

©2019 Energistics Inc.

26