



# GET UP TO SPEED ON NEW CAPABILITIES IN WITSML

Ross Philo – President & CEO

Jay Hollingsworth - CTO

May 9<sup>th</sup>, 2019

# Agenda



- » Industry Standards
- » WITS vs WITSML
- » Faster real-time monitoring – and its HSE impact
- » Trusted Data & Digital Transformation
- » Discussion

# Our Industry Understands Standards



» We have standards for practically everything:

- Offshore structures
- Tubular goods
- Valves and wellhead equipment
- Drilling structures and equipment
- Well cement
- Drill, completions and fracturing fluids
- Well control equipment
- Subsea production equipment

» We also have data standards...



# How Are Standards Developed & Made Available?



- » Energistics is not a vendor. We are a non-profit industry organization.
- » We have served the industry for more than 25 years
- » Our **110+** members include leading E&P companies, oilfield service companies, software vendors, system integrators, & regulatory agencies
- » Our standards are the result of open collaboration between our members, through industry workgroups facilitated by Energistics
- » In short, the standards are created **by the industry** and **for the industry**
- » They are freely available from Energistics

# Key Members: Global Impact, Industry-Wide



# Energistics Spectrum of Upstream Data Standards



← UNIVERSAL INTEROPERABILITY →

**<WITSML/>**<sup>TM</sup>

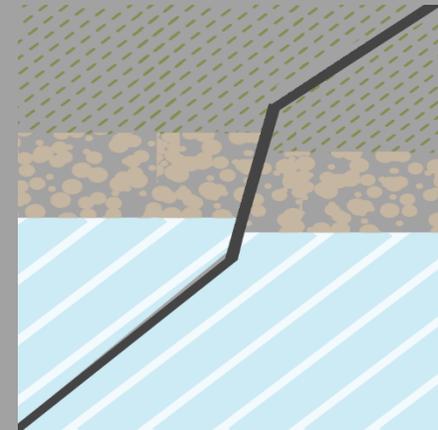
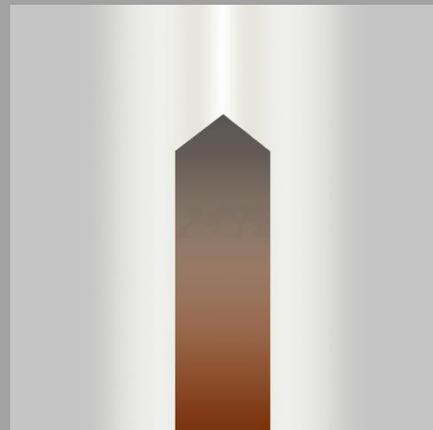
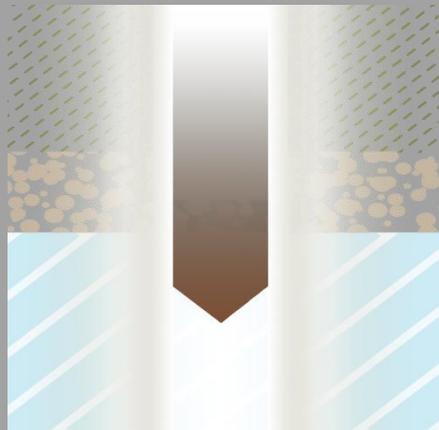
**<PRODML/>**<sup>TM</sup>

**<RESQML/>**<sup>TM</sup>

DRILLING/WELL

PRODUCTION

RESERVOIR



Energistics Transfer Protocol (ETP)

Common Technical Architecture (CTA)

- Defined by collaboration between member SMEs
- Coherent set of standards to eliminate data 'friction'
- Goal is to cover all key activities in upstream
- Shared components enable cross-functional workflows
- ETP = new 'Netflix-like' capability for streaming data



# How Did We Get Here?

## » Industry Real-time Data Centers in 1980s

- Superior/XOM – 1981-present
- Amoco/BP – 1984-1989
- Tenneco/CVX – 1983-1990

## » WITS (Wellsite Information Transfer Std)

- Pre-Internet. Differing approaches to WITS implementations fragmented interoperability.
- Only 25 Record Types
- Obsolete, but still used today in some rig systems

## » Statoil (late 1990s)

- DART (Drilling Automation Real Time) Project

## » All were proprietary systems



From SPE-14387

DART evolved into a multi-company effort to create a new open standard, replacing WITS – called **WITSML**

# WITSML & Real-Time Monitoring (2001 – 2016)



- » **WITSML introduced in early 2000's**
  - Unrelated to WITS
  - WITSML uses self-defining XML schemas
  - Offers plug-and-play interoperability
  - Carries both real time and contextual data
  - Uses SOAP\* protocol to exchange data
  
- » A client program polls a server for data
  - Rig-site, service co. or internal
  - Queues can back up, delaying data
  
- » Commercially very successful
  
- » Success fueled desire for tech refresh



\*SOAP= Simple Object Access Protocol for exchanging structured data

# Houston – We Have A Problem



- » WITSML has become the de-facto standard for real-time drilling monitoring
- » BUT... volumes of data have increased dramatically
  - One service company reports ~500 jobs per week; 350 million WITSML requests per week
  - ~600 WITSML requests/sec
- » Request from industry was to develop a new data streaming method
  - “We need a rocket-powered carrier pigeon”
  - High-frequency, low-latency
  - Firewall / Internet friendly
  - Built on broadly accepted technologies and standards
  - Licensing model acceptable to all parties
  - Lead-in to future cross-standards platform



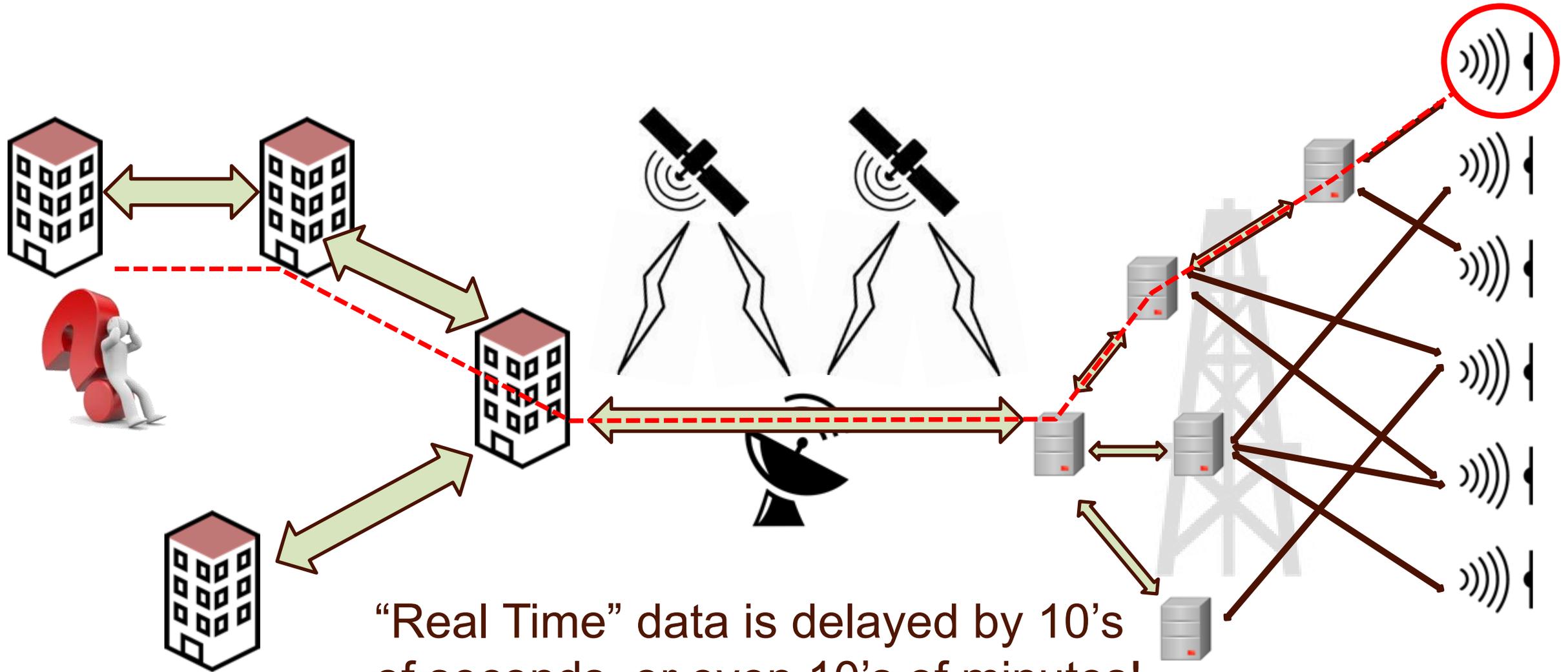
# Energistics Transfer Protocol (ETP)

# What Does High Frequency/Low Latency Imply?



- » From the original project definitions:
  - High Frequency
    - 50hz data rate. (20ms per data point/row)
  - Low Latency
    - 100ms + one-way communications channel delay
  
- » Proof of Concept in 2013/14 successfully demonstrated the following:
  - 350,000 data points per second
  - <50 ms streaming one-way
  
- » This new Energistics Transfer Protocol (ETP) was released in late 2016, as part of a comprehensive upgrade to entire suite of Energistics Standards

# What You Thought was “Real Time” really isn’t...



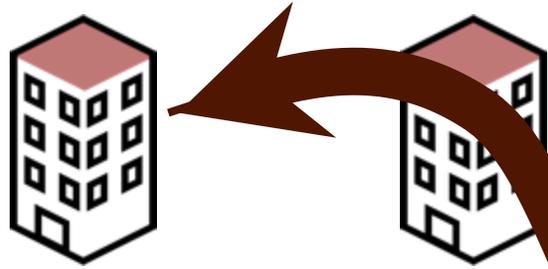
“Real Time” data is delayed by 10’s of seconds, or even 10’s of minutes!

# ETP Streaming Delivers True Real-Time Data



Streaming data delivered an order of magnitude faster than legacy systems

And using 1/10 of the bandwidth



True “Real-Time” Data for the First Time

# Equinor-Kongsberg-BHGE Pilot



- » Side-by-side viewing comparison
  - Data via SOAP API appeared in discontinuous blocks, with noticeable delays
  - Data via ETP streams continuously and in true real time, with immediate updates
  
- » ETP had average latency of 1.2 secs versus legacy latency of 10-15 secs
  - An order of magnitude improvement in transfer from acquisition to decision system
  - ETP required 1/10 of the bandwidth
  - Results suggest that ETP can easily handle 100,000 data points per second
  
- » ETP has also been used to transfer wired pipe data via low-angle satellite

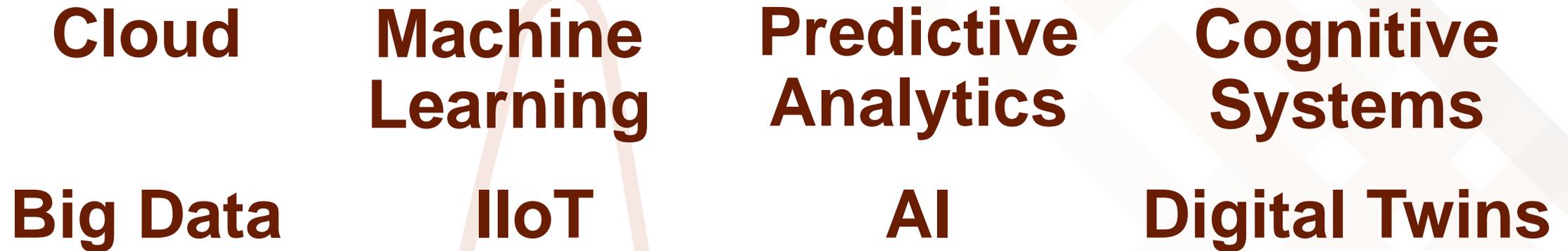
# Equinor's Conclusions from Pilot



- » In drilling operations, minutes make a difference
  - ETP improves time to receive valid data by an order of magnitude
  - Allows faster resolution of data anomalies
  - Allows better collaboration, since all parties are seeing the same data
  
- » Improves integrated operations between Operator and Service Companies
  - ETP allows data to be shared instantly with service providers
  - Problems can be resolved more quickly, and with fewer trips to the rig
  
- » True real-time data means less personnel required on the rig itself
  - Fewer people on board = lower cost and reduced risk
  - Better use of resources
  - Improves efficiency of work processes

# Digital Transformation & Trusted Data

# Data Standards & Digital Transformation

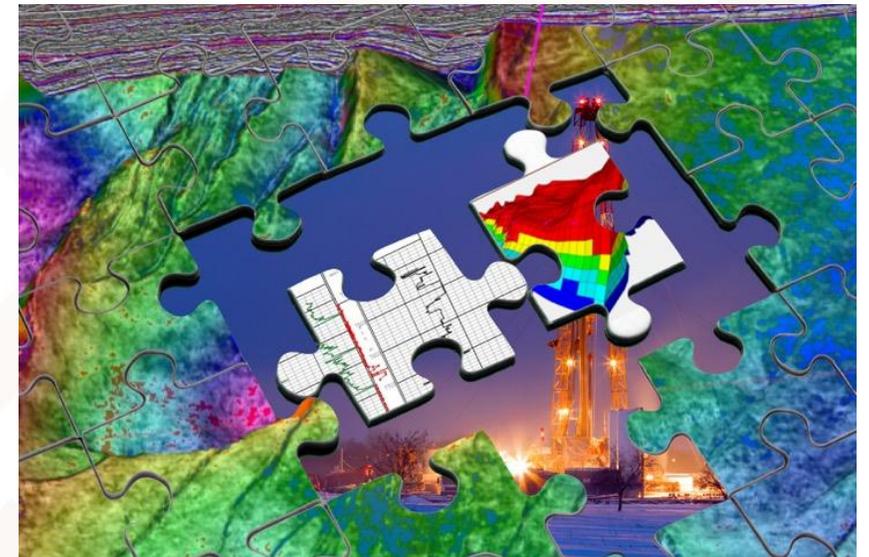


- » None of these initiatives will be meaningful unless you have trust and confidence in the underlying data
- » Standards are thus **an essential foundation** for Digital Transformation
- » McKinsey: *The best analytics are worth nothing with inconsistent data*

# Trust is Everything



- » In a world of decentralized decisions, you have to have trusted data
  - AI, ML are only as good as the input data
  - The GIGO rule still applies
  - Even more critical as we move to autonomous systems, and automated drilling
- » Is data properly referenced ?
  - E.g. inconsistent time indexing can create false anomalies
- » Is data complete?
  - Both real-time and historical
- » Is data accurate/trusted?
  - Fit for purpose or flawed?
  - Time & cost spent on data validation?



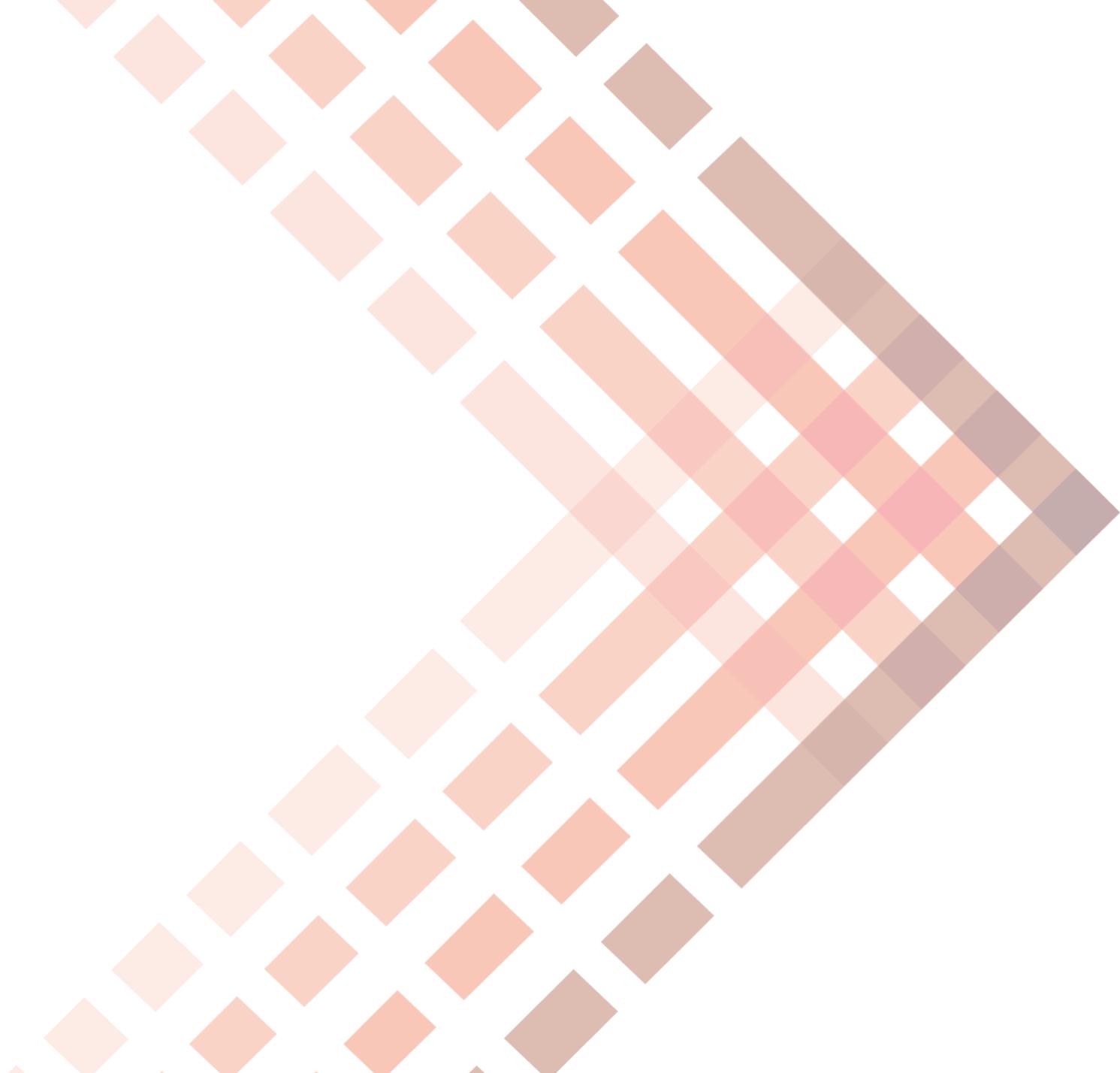
# How Do Energistics Standards Help?



- » With Energistics' WITSML, PRODML and RESQML:
  - Data AND metadata are transferred as part of the standard format
  - Allows the context of the data to be captured and recorded, as well as the data itself
  - Data Assurance functionality establishes trustworthiness of data
  - This trust assessment can be passed between users throughout the workflow
  
- » Benefit of latest standards:
  - Reduces time and resources needed for data validation, verification & correction
  - Understanding trustworthiness >>> Higher level of confidence that data is fit for purpose
  - Higher trust >>> Better informed decisions (whether human or AI/ML)
  - Faster transfers >>> Faster response, whether to drilling event or safety issue



# In Closing



# Shouldn't You Be Using the Latest Version of WITSML?



# ENERGISTICS

ADOPT > ADVANCE > ACCELERATE

**THANK YOU!**

[www.energistics.org](http://www.energistics.org)