Common Sense Data Management

Philip Lesslar
Data Solutions Consultant

Digital Energy Journal Conference
4th October 2017
Impiana Hotel, Kuala Lumpur

Objectives

- Discuss the purpose of data management
- Talk about why data management can be a complex subject to tackle successfully
- Discuss a few selected areas where a common sense approach is the best way to make continuous progress

Main Discussion Topics

- Purpose of data
- What is data management?
- The opportunity space
- What sorts of problems are we trying to solve?
- Data consistency - Well header example
- Well logs
- Data quality metrics
- Effective prioritisation

Main Discussion Topics

- Purpose of data
- What is data management?
- The opportunity space
- What sorts of problems are we trying to solve?
- Data consistency - Well header example
- Well logs
- Data quality metrics
- Effective prioritisation

Often heard comments…..

- “Make sure we keep ALL the data….”
- “Transfer only the data that is needed….”
- “I want it to be fully integrated….”
- “We must have quality data…”
- “Make sure we get the priorities right…”
- “To integrate the data, all you need to do is write some code”

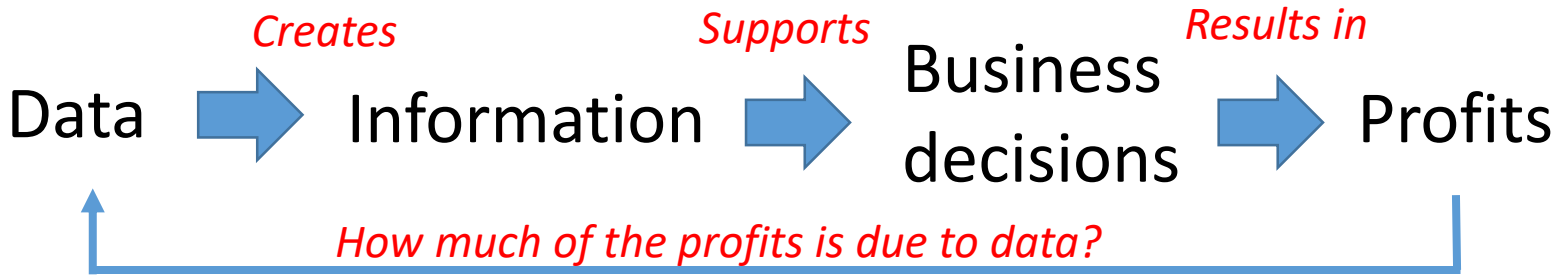
These are typical comments made by people who do not really understand data..!
- Wishful, naïve and unspecific

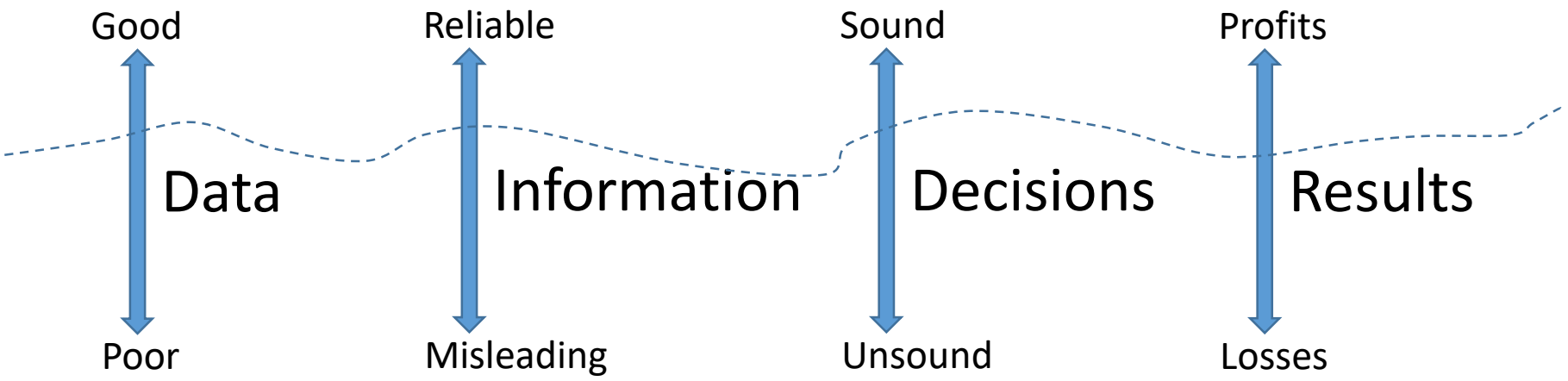
Often heard comments…..

• "Make sure we keep ALL the data…."	ALL is a LOT. There are over 100 data types in EP Upstream. So what does ALL mean?
• "Transfer only the data that is needed…."	Needed for what? Which data types and attributes? Which workflows? What business answers are we looking for?
• "I want it to be fully integrated…."	Why? To do what? What does "integrated" mean? Integration or simply connectivity?
• "We must have quality data…"	What does quality mean? How do we know when it is quality data?
• "Make sure we get the priorities right…"	Which priorities? Team priorities? Departmental? Workplan?
• "To integrate the data, all you need to do is write some code"	This is the same as saying "To find oil, you just need to poke a hole in the ground anywhere"

The above are all actual statements that the author has heard over the years..!

Purpose of data





Main Discussion Topics

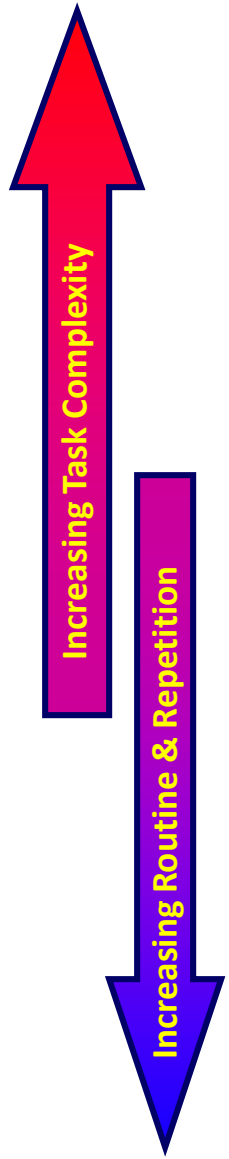
- Purpose of data
- What is data management?
- The opportunity space
- What sorts of problems are we trying to solve?
- Data consistency - Well header example
- Well logs
- Data quality metrics
- Effective prioritisation

What is data management?

E&P Data Management Activities Scale

These are the cumulative range of tasks that are carried out by data managers around the world

- Machine learning/AI
- Agent Technology
- Data Science
- Data Analysis / Mining / Analytics
- Quality Metrics
- Data Integration / Connectivity
- Data Mapping / Scripting
- Data Synthesis
- Data Integrity
- Promoting best practices
- Project Management
- Adherance to standards
- Implementation of standards
- Standards (Definition / Usage)
- Classification of standards
- Requirements definition
- DBA tasks
- BCP
- Capacity Forecasting
- Bulk Data Loading
- General QC
- Data Cleaning
- e-Libraries
- Data & Document Conversion
- Reports & Retrievals
- Plotting services
- Scanning
- Tape & Media Handling



Data Management

- Higher complexity with research elements
- More engagement with business disciplines
- Requires strong business understanding
- Requires broad IT knowledge
- People networking skills
- Project management and integration

In order to improve on EP Data Management, we need to focus on the upper half of the list.

Data Services

- Focus on speed and efficiency
- Physically apart from customers
- Requires specialised IT knowledge
- Addressing a global / regional community
- Employing defined standards
- Standardised services

Main Discussion Topics

- Purpose of data
- What is data management?
- The opportunity space
- What sorts of problems are we trying to solve?
- Data consistency - Well header example
- Well logs
- Data quality metrics
- Effective prioritisation

Opportunity Space : The Upstream Value Chain

Data aspects

Review	Regional studies, data rooms
Acquire	Acreage, production sharing contracts, seismic (2D, 3D, OBC etc), data purchase, exchanges
Explore	Regional reviews and compilations, play & prospect identification, well locations, well data, correlation
Appraise	Additional well planning & data, detailed studies and correlation, geological modeling, volumetrics,
Develop	Detailed interpretation and analysis, modeling and simulation, real time automation & control.
Produce	Production management, forecasting and economics.
Abandon	Data consolidation & achival.

Opportunity Space : Data Types - Upstream

Geology & Seismic	Interpretation and Compilations	Petroleum Engineering	Drilling, Engineering & Production Operations
Well header Info	Geology – Zones	Spill Points (Reqd. by RE)	Daily Drilling Data
Well Header Spatial	Geology – Markers	Well Logs – Raw	Well Schematics
Deviation	Faults (Field Extent & Major)	Well Logs – Processed & Qced	Well Completion Data
Checkshots	Seismic Horizons – Regional	Well Logs – Interpreted	Well Intervention Data
Seismic traces (2D & 3D)	Seismic Horizons – Local	Well Logs – Cased Hole	Well Integrity Data
Mud logs	Velocity Models	Vertical Seismic Profiling	Facilities (P&ID, Limit Diagrams)
Core description	Structure Maps	Core Analysis (SCAL RCA, Gamma)	Well design
Core Photos	TZ Curve	Formation Pressure (RFT, MDT)	Drilling Fluid Composition
Thin Sections / XRD	Gridded Time / Depth Maps	Well Test (DST,FIT)	Well Completion Cost
Environments of deposition	Sand Distribution Maps	Production Data (Allocated oil/gas/water rates)	Casing Data
Prospects & Leads	Static Models	Production Pressure Data (Well Tubing/Casing Head Pressure)	Bit Data
Pore Pressure	Dynamic Models	Production Well Test (FBU,PBU,SDS)	BHA (Borehole Analysis)
Temperature – Gradient	Synthetic Seismogram	Artificial Lift	Deviation (Drilling)
Temperature – Borehole	Biostratigraphy – Zones	Fluid Property	Well Hydraulics
Geomechanics	Biostratigraphy – Markers	Fluid Contacts	Shallow Hazards
Geospatial:	Geology – Zones	Stimulation Cases	Metocean Data eg Climate
-Well location Maps	Geology – Markers	Fluid Composition	Facilities As-Built drawings
-Block Boundaries		Material Balance	Facilities Info (type, function)
-Platforms		Prosper Models	Facilities Historical Info
-Pipelines		RMS Models	Pipeline (flowrate, function)
-Geohazards		Decline Curve Analysis	Pipeline (properties)
-Site Surveys		Volumetrics	Geotechnical data (general soil, seabed properties)
-Field Outlines		Reserves and Resources	
-Nett to Gross Thickness Maps		EOR Cases	
-FTG		Pressure Maintenance Cases	
-CSEM		Saturation Height Function	
-Gravity & Magnetic		Leak Off Test	
-Microseismic		PVT	

Main Discussion Topics

- Purpose of data
- What is data management?
- The opportunity space
- What sorts of problems are we trying to solve?
- Data consistency - Well header example
- Well logs
- Data quality metrics
- Effective prioritisation

Typical Problems encountered in E&P Data

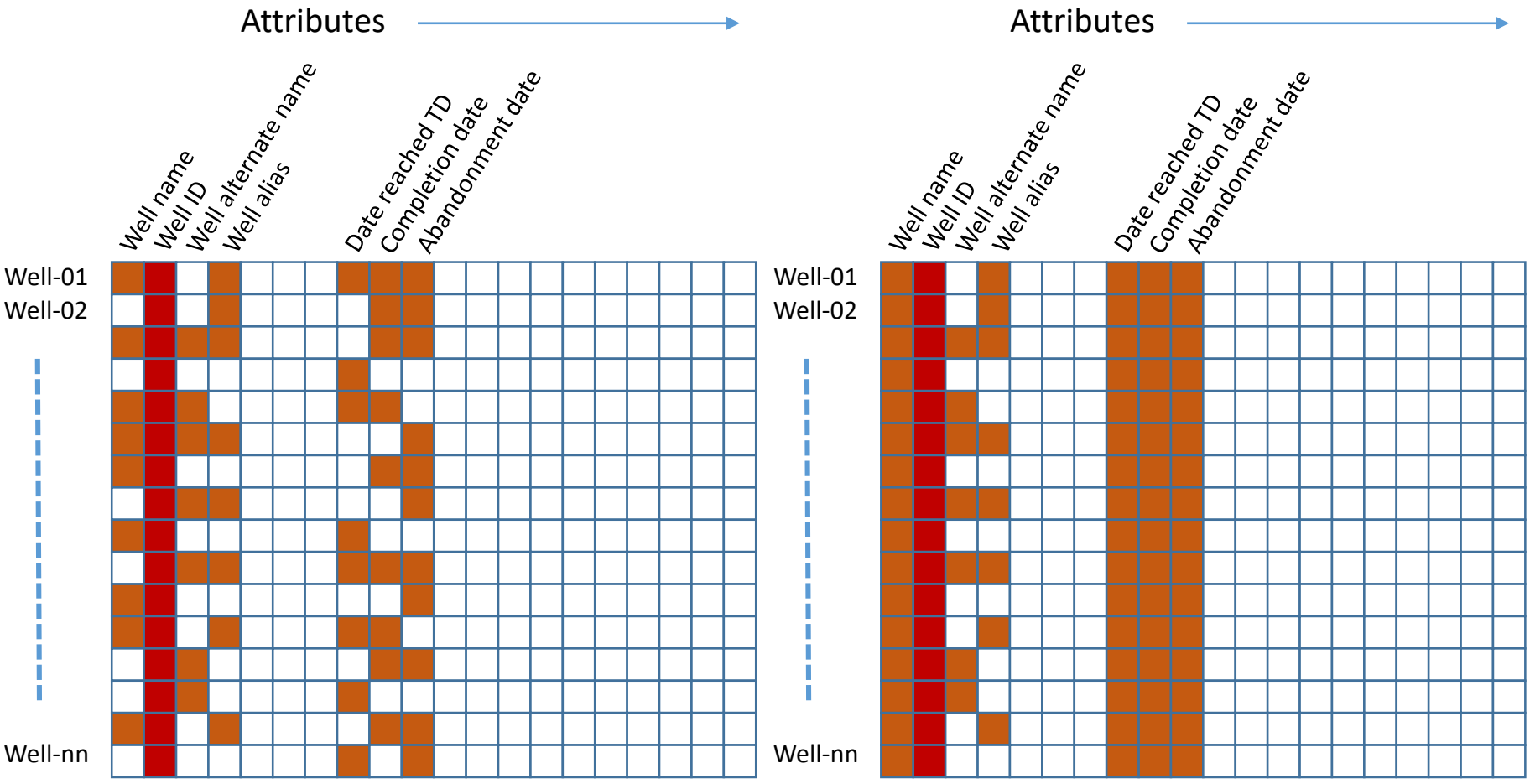
Physical Data	Electronic Data
• Sampling (accuracy) difficulty due to lack of hole integrity (ditch cuttings) • Contamination of ditch cuttings due to excessive cavings • Poor sample recovery (sidewall samples, cores, fluids) – both % recovery per sample as well as sample loss • Missing inventory due to poor logistics	• Missing entries • Missing attributes • Inconsistent storage locations in data models • Incorrect values entered • Inconsistent or lack of metadata in entries • Duplication • Large data sets • Distributed or federated data sets and databases • Overlapping data models • Integration challenges • Lack of consistent quality • Data flow breakdowns
People	**Processes & Methodology**
• Resource constraints • Lack of competency • Lack of people framework • Lack of proper accountability structure • Indecision • Office politics	• Lack of governance structure • Lack of standardized workflows • Lack of standards (data, process, systems etc) • Lack of effective data architecture • Lack of transparency • No or loose quantification methodology

Main Discussion Topics

- Purpose of data
- What is data management?
- The opportunity space
- What sorts of problems are we trying to solve?
- Data consistency - Well header example
- Well logs
- Data quality metrics
- Effective prioritisation

Consistency in data

Example: Well Header



The need for Data Standards

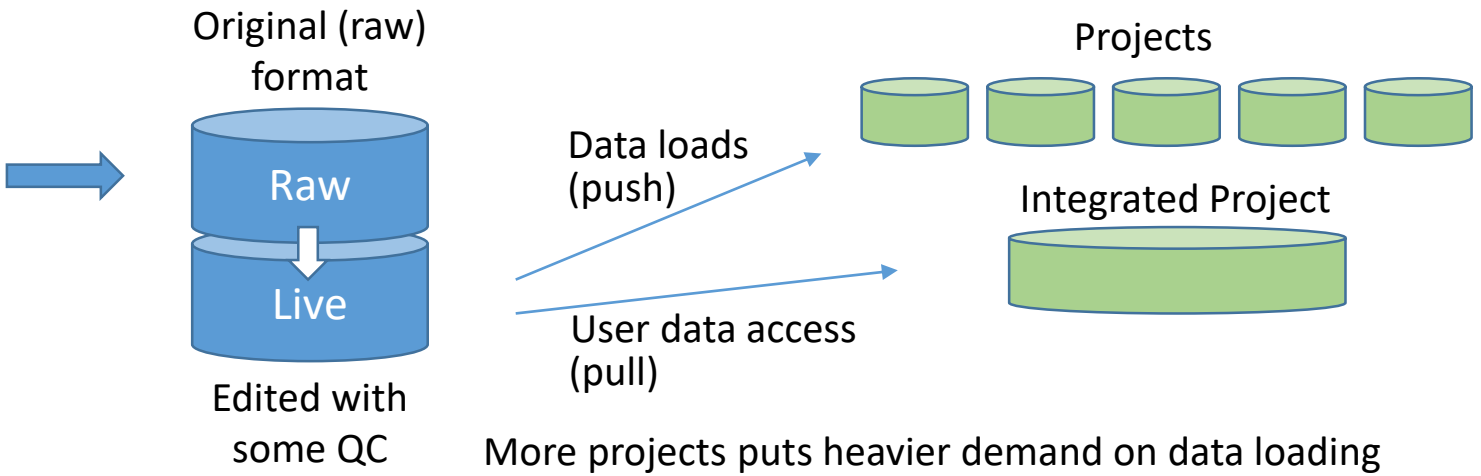
Main Discussion Topics

- Purpose of data
- What is data management?
- The opportunity space
- What sorts of problems are we trying to solve?
- Data consistency - Well header example
- Well logs
- Data quality metrics
- Effective prioritisation

Well Logs – The challenges

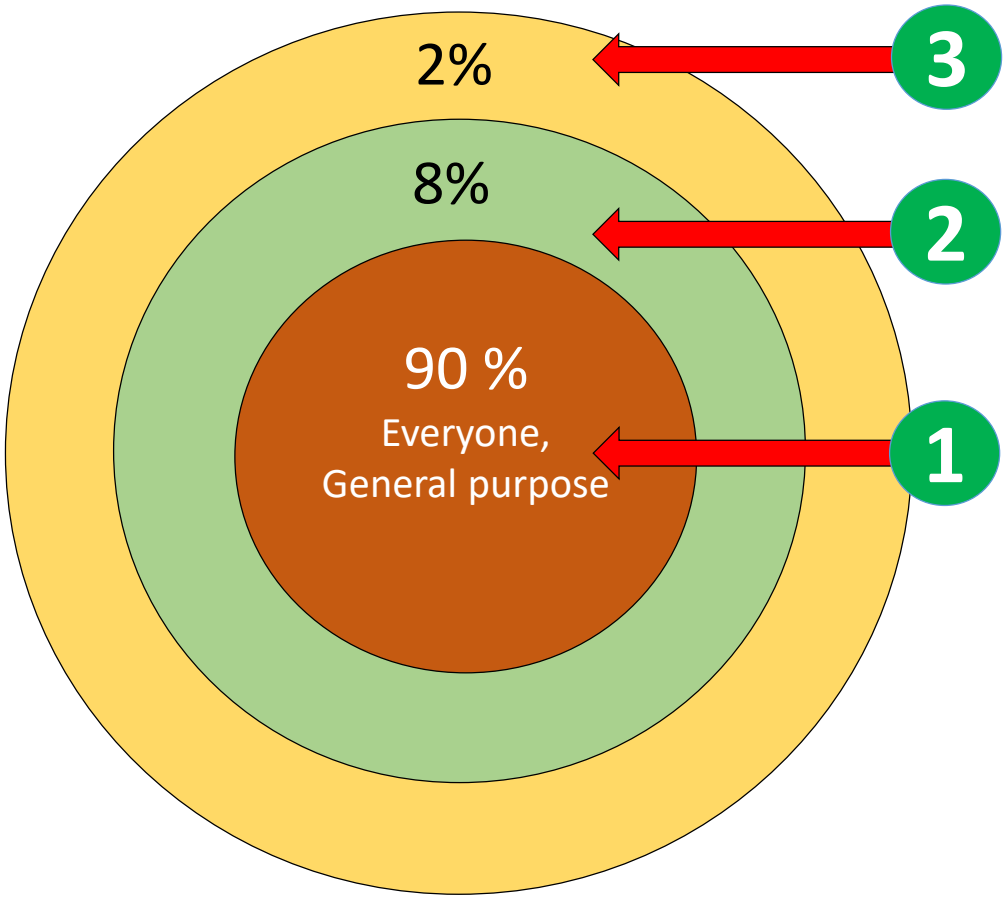
- Hundreds of different logs in the database
- Original format logs, edited, processed etc
- Different service companies and naming conventions
- Separate runs for each log type
- Technology evolution over the years
- Completeness of inventory

Typical architecture & workflow



More projects puts heavier demand on data loading
For pull, users may get confused searching among all available logs

Well Logs – Typical usage distribution

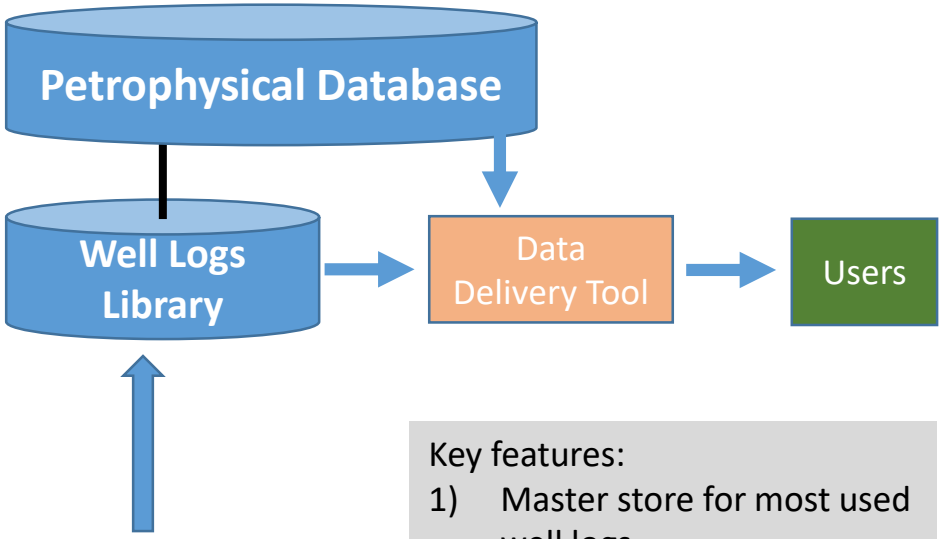


- Petroleum Eng/Prod.Geol special studies. Special Core Analysis (SCAL), High Res. Dipmeter, Borehole Imaging etc
- PE/PG higher resolution interpretation projects eg dipmeter
- 8 essential logs used by the majority
- Basic geological interpretation, correlation, environments of deposition etc
- GR, Sonic, Density, Neutron, Resistivity (S,M,D), Caliper

Well Logs – Serving the majority

Naming Convention

Well	Gamma Ray	Sonic	Density	Neutron	Resistivity (shallow)	Resistivity (medium)	Resistivity (Deep)	Caliper
1	Y	Y	Y	Y	Y		Y	Y
2	Y	Y	Y	Y	Y	Y	Y	Y
3	Y	Y	Y	Y	Y		Y	Y
4	Y	Y	Y	Y	Y	Y	Y	Y
5	Y	Y	Y	Y	Y		Y	Y
n	Y	Y	Y	Y	Y		Y	Y



Nominated Petrophysicist carries out the following activities:

1) All logs edited
2) Spliced
3) Joined
4) Quality stamp

Roles & Responsibilities

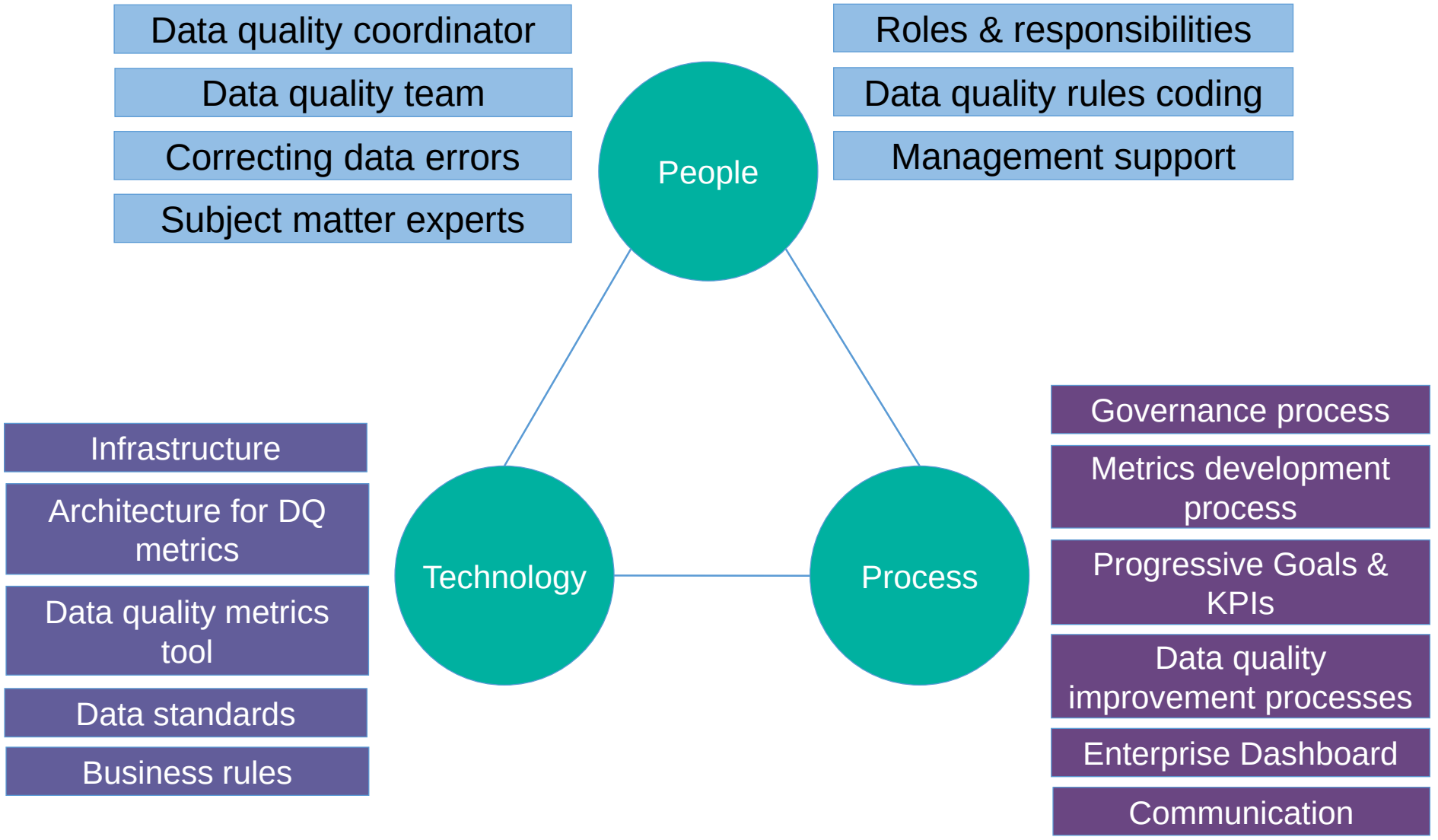
Key features:

1) Master store for most used well logs
2) Single delivery point to users
3) Governed by a strict control process
4) Data ownership & accountabilities
5) Cumulative

Main Discussion Topics

- Purpose of data
- What is data management?
- The opportunity space
- What sorts of problems are we trying to solve?
- Data consistency - Well header example
- Well logs
- Data quality metrics
- Effective prioritisation

Data Quality Metrics



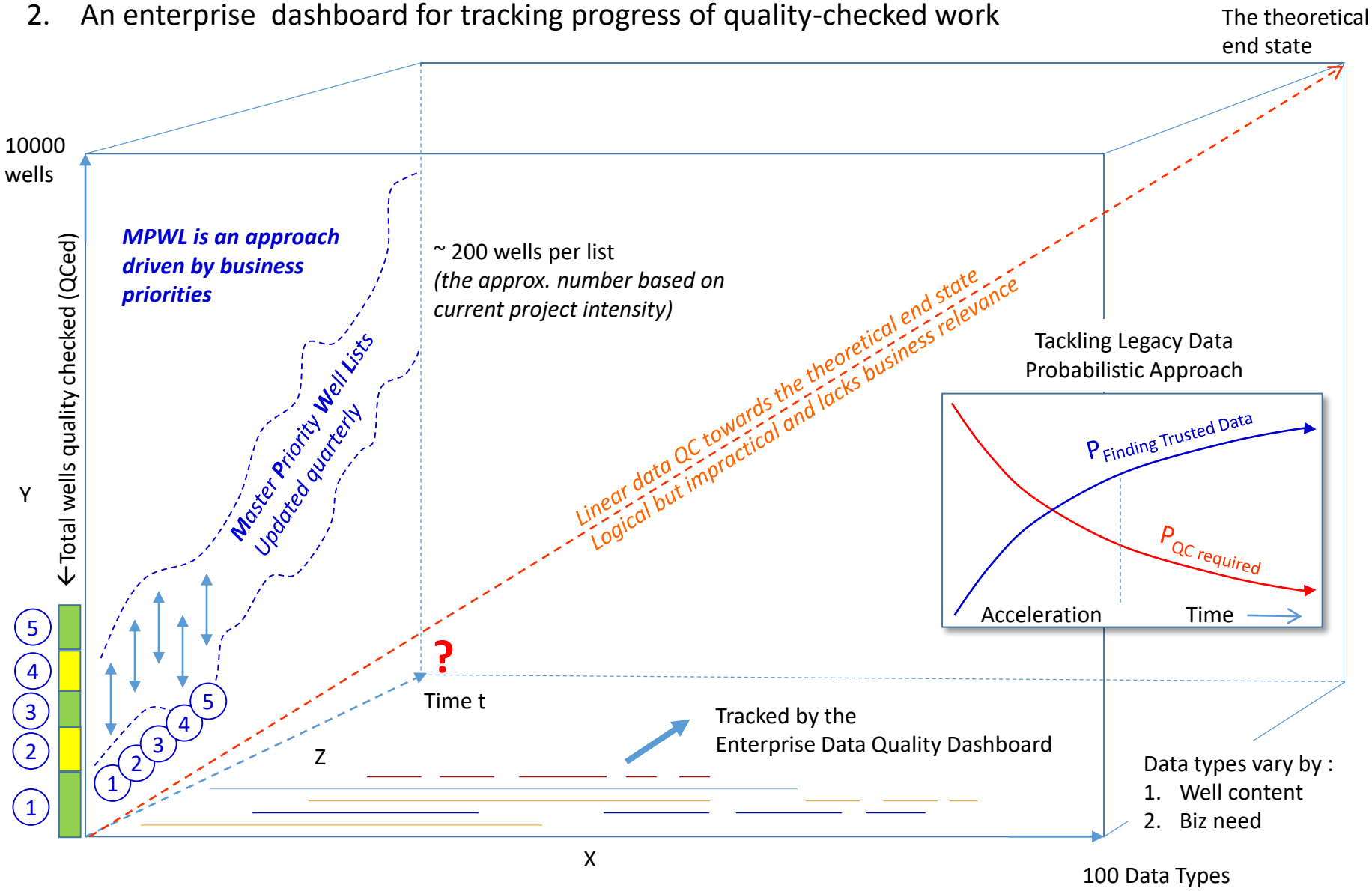
Main Discussion Topics

- Purpose of data
- What is data management?
- The opportunity space
- What sorts of problems are we trying to solve?
- Data consistency - Well header example
- Well logs
- Data quality metrics
- Effective prioritisation

Prioritisation for business relevance

Pre-requisites:

1. A master list of current priority wells, with a process for periodical updates
2. An enterprise dashboard for tracking progress of quality-checked work



Concluding remarks

- Understand your role and contribution to business success
- Identify with company strategies and directions
- Don’t try to boil the ocean
- Ensure early and stepwise deliverables
- Don’t try to manage data for the sake of data
- Effective prioritisation
- Communicate and enlighten – you’re in the hot seat

Thank You