The Journey to Value
ADVANCED ANALYTICS
We are pleased to be talking about a MAJOR PROJECT we’ve got underway. In just 6 MONTHS, we’ve built a FULL SUITE of PREDICTIVE ANALYTICS. Powered by a CLOUD BASED, BIG DATA PLATFORM, we’ve developed 1000s of algorithms feeding into 100s of analytical models. TODAY, let’s talk about the BUSINESS OUTCOMES & the various Lessons Learned!
Australia’s largest independent oil & gas company.

- Over 30 years of experience in producing natural gas
- Operator of a number of world class facilities including the Northwest Shelf and Pluto Liquefied Natural Gas Plants
- Active Explorers with permits in 12 countries
- Strong record of innovation – world record water drilling depths in 1950s
- Engineering and Science company at heart
Accenture is Digital. Digital is Accenture.

- Accenture Digital is powered by three practices: Accenture Interactive, Accenture Analytics and Accenture Mobility
- Global network of over 36,000 analytics professionals and 1,200+ Data Scientists
- Alliances with leading academic institutions, and dedicated Big Data Academy
- Global network of 23 innovation centers
- 400+ Patents and patents pending globally for data and analytics related content
- Serving 70 of the FORTUNE Global 100 companies
Technological advances have enabled far greater scale and speed.

Data Science is not new – but has usually been done in siloes.

Make use of the corporate body of knowledge to make decisions, both from the past and the present.

Speed is a big differentiator—enables companies to disrupt their markets instead of being disrupted.
Predictive Analytics is a high priority in Woodside’s Data Science Program.

The Data Science program has a broad scope, including engineering, commercial activities, geoscience, and more...

It also includes significant efforts around cognitive computing and a range of optimisation projects.

The Predictive Analytics project revolving around LNG Operations is a high priority.
Think BIG. Prototype small. Scale fast.

This lean approach to solving problems ensures that we hone in on valuable projects early on.

We’ve learned that finding the ‘best end user’ is a discovery process.

Our cloud-based infrastructure helps us to scale rapidly. We have automated low level model development, generating 1000s of new models in a few days.

We use disciplined portfolio process to prioritise projects and focus on high value ideas, quickly eliminating ones less likely to succeed.
We build our solutions around a flexible and powerful platform.

This allows for modularisation of components, enabling us to keep pace with big data technology.

Evolution of big data and in-memory computing technologies has given us the ability to perform calculations at scale.

Together, Woodside & Accenture have built a cloud based analytics platform, capable of streaming 12M records a minute, and generating 500K predictions a day.

It is built around lambda architecture and includes leading edge components such as Apache Spark.
Partnering is a key element to success.

Woodside brings together an integrated team with a diverse range of skills.

Accenture brings a depth of data science talent and industry expertise, drawing from a global network.

Together we are ONE TEAM, committed to delivery regardless of obstacles, fostering new ways of thinking, and encouraging innovation.

We are responsive through an iterative process, and we build trust through openness and transparency.
Small improvements to our processes can yield significant value.
DELIVERY // DATA.SCIENCE

- Machine Learning
- Text Mining
- Data Quality Assurance
- Cluster & Networking Analysis
- Bayesian Belief Networks

END USER ENGAGEMENT
CLOUD SCALABILITY

#StrataHadoop
DELIVERY / PLATFORM & TECHNOLOGY

- **Calculations / Day**
  - 0.5 – 1M
- **Records / Second**
  - 6000
- **Storage**
  - +50TB / Year
  - 30 MB / Min
- **Processing**
  - Early Adoption of SPARK
  - Cutting Edge Architecture
  - 6000 Records / Second
  - 0.5 – 1M Calculations / Day

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**Diagram:**
- **Storage:**
  - Woodside (RDBMS, Documents, PHD Science, PHD Scout Express)
  - S3
  - EC2 / PHD Scout Express Upper Node & PHD XML Slicer
- **Processing:**
  - EMR
  - Talend
  - Redshift MPP
- **Cloud:**
  - AWS
  - Data Discovery Platform
- **Analytics:**
  - Talend
  - Spark
  - DynamoDB

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#StrataHadoop
Predictive Analytics has been used to optimise valve maintenance strategies.

**SITUATION**
- Process control valves very important part of LNG plant
- Represents major part of our annual maintenance bill
- Unforseen failures of these valves can even cause unexpected interruptions to our production and these costs can run into millions.

**OPPORTUNITY**
- Identify valves prior to failure
- Optimise overall valve reliability
- Proactively replacing valves about to fail
- Reduce overall number of annual valve failures

**APPLICATION**
- Engineers can use insights to decide if action is required
- High risk valves can be prioritised to be maintained
- Analysis can be used to prioritise maintenance strategies

**INSIGHTS**
Identified valve behaviour that have influence on valve failures:
- Valve Stiction
- Abnormal Behaviour
- Manufacturer Type
It has also been used to develop an advanced warning system for AGRU foaming.

**Situation**
- A foaming event would periodically happen in the Acid Gas Removal Unit
- This could be not be predicted
- This has caused unplanned shutdowns with lost revenue

**Insights**
- Factors that influence risk of foaming:
  - Gas flow
  - Ambient temperature

**Opportunity**
- Create advance warning to alert potential foaming events
- Free up time to concentrate on rest of plant when risk of foaming is low

**Application**
- Tool created to predict foaming events up to 4 days out
- Allows operators plenty of time to act
- Helped to optimise treatment of foaming and resultant costs
Business adoption is encouraged with the following:

- Replacing an existing step of business process
- Changing entire business process
- Collaboration in development builds trust
- Model management
- User experience

#StrataHadoop
QUESTIONS