



An Open Approach to Drilling Systems Automation



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What is your area of interest?



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Have you engaged in direct automation efforts at the rig site?



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If yes, how were the results?



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What are the biggest hurdles to automation?



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Speakers



Hans-Uwe Brackel



Nick Morriss



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An Open Approach to Drilling Systems Automation

Hans-Uwe Brackel, Sr. Systems Architect
Baker Hughes, a GE company
(based on SPE-191939-MS)



Agenda



Case study

Implementing Drilling Systems Automation (DSA) at the rigsite

A real-world example - Automated directional drilling with rotary-steerables



- 01 DSA Application Case: Automated Trajectory Drilling
- 02 Rigsite Data Aggregation
- 03 DSA Decision Making and Control Framework
- 04 Key Takeaways & Lessons Learned
- 05 Questions & Answers

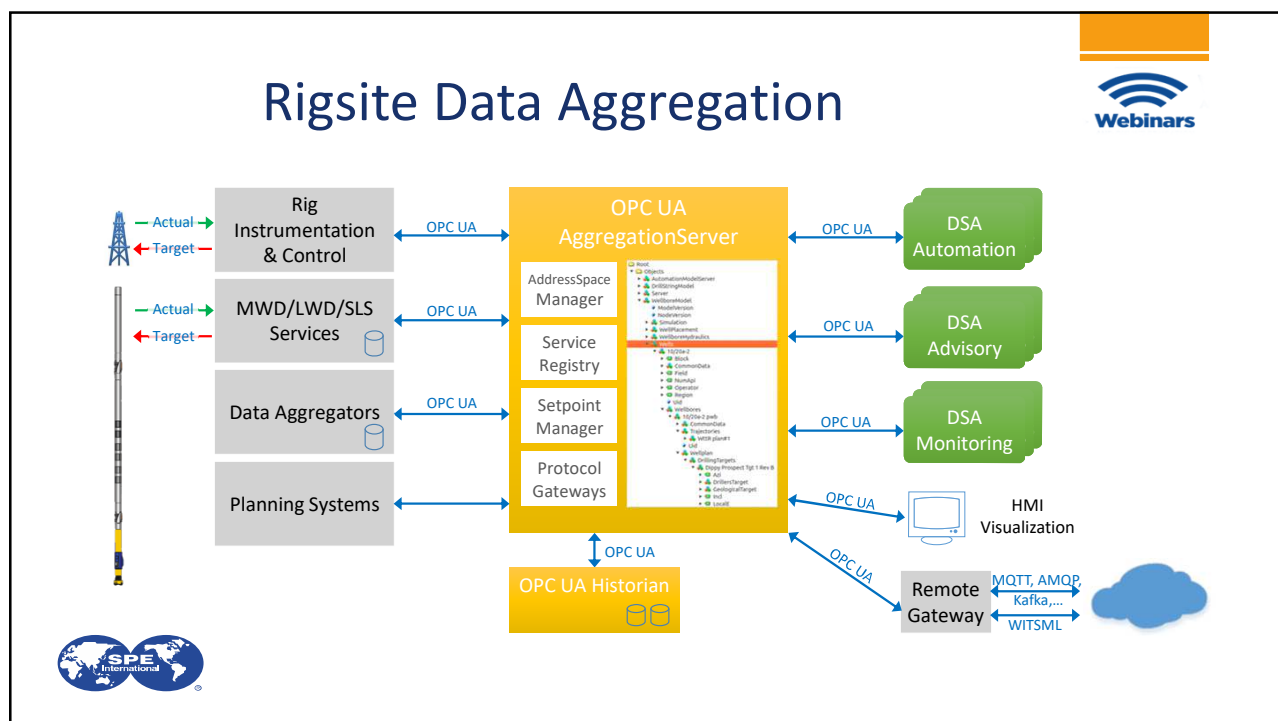
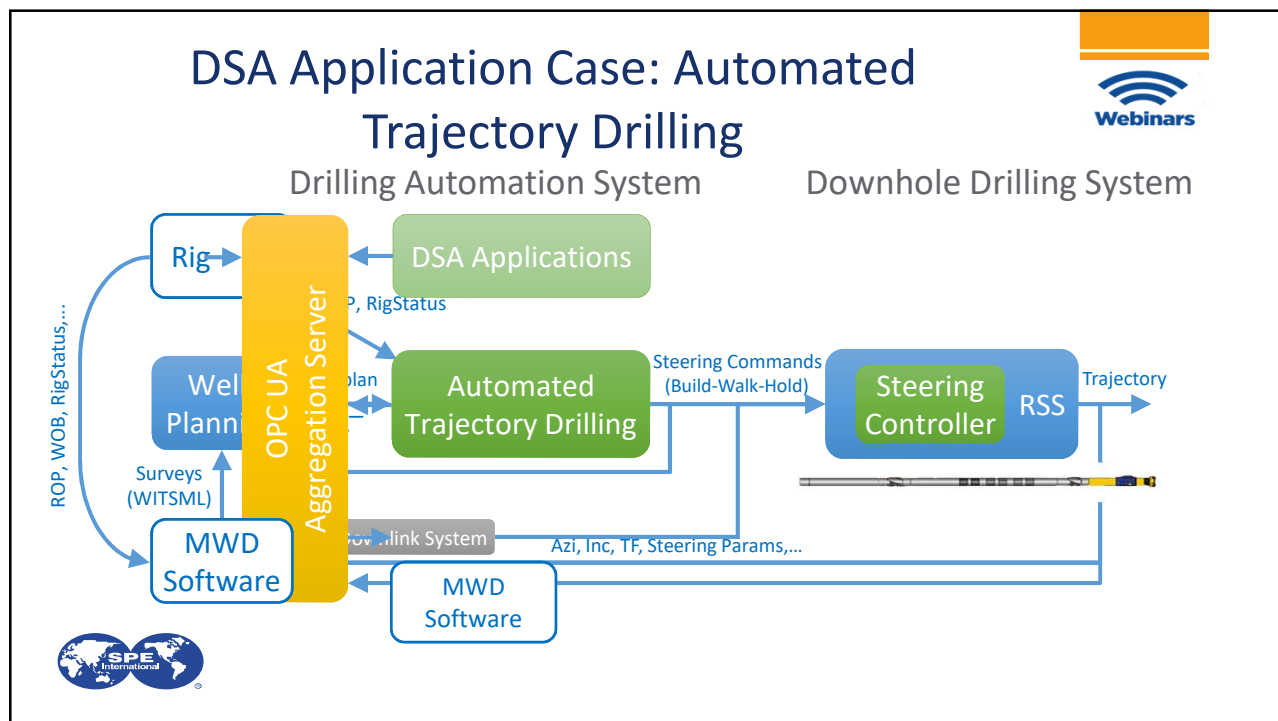
DSA Application Case: Automated Trajectory Drilling



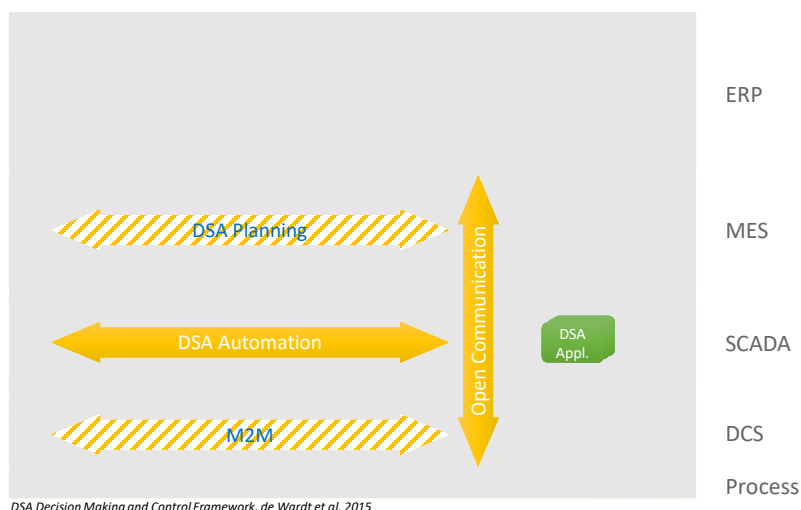
Drilling Automation System

Downhole Drilling System





DSA Decision Making and Control Framework – from ISA 95



Key Takeaways & Lessons Learned



- Use of open and standard protocols – appropriate for the purpose
- Capable Data Aggregation
 - Performance
 - Service registry & discovery
 - Secure, configurable data access
 - Setpoint manager
- Separation of concerns
 - Acquisition – processing – planning – control
 - Aggregation – persistence – conversion
- Structure the data/information for understandability by the human
- Standardize on the necessary – do not over-regulate
 - Define the interfaces, leave the implementation open





Automation Standards. Brain says YES, Gut says CAUTION!

Nick Morriss, Commercialization Director
National Oilwell Varco



Why the Caution?



- Is this practical?
- Show me the money?
- Where was I reminded of “standards” recently?
- While we talk, people are busy doing.



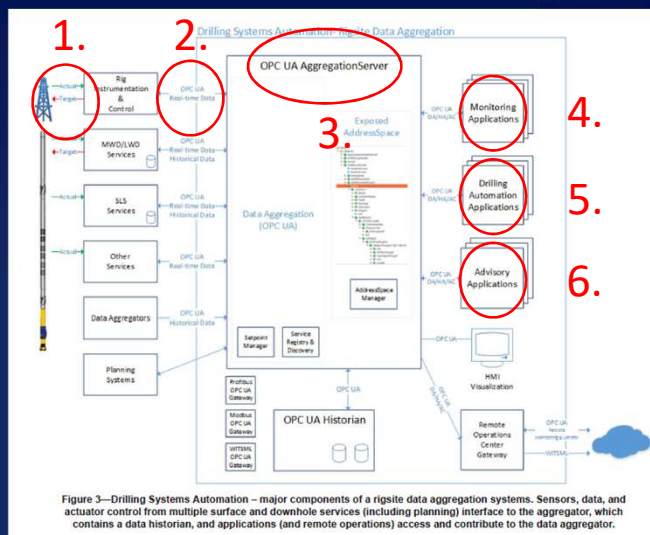


Is this Practical?



It is ideal, but is it practical?

1. Rig controls are a mess across the fleet!
2. Adapters will be numerous.
3. Aggregation methods are numerous.
4. Bespoke service industry today.
5. See #1.
6. Bespoke service industry today.



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It is ideal, but is it practical?



- There are no standards for functionality. i.e. pumping, rotating, hoisting maybe...everything else...no.
- UA to UA needs testing...is this better than no UA standard?
- Ins and Outs will change...are standards revisionary?



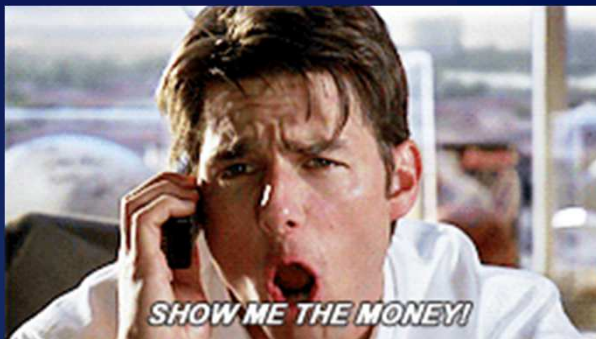
Show me the money?



Show me the money?



- OEM vs. Driller vs. Services vs. Operator perspectives.
- Where is the money?
Golden rule, "he/she with the gold rules."



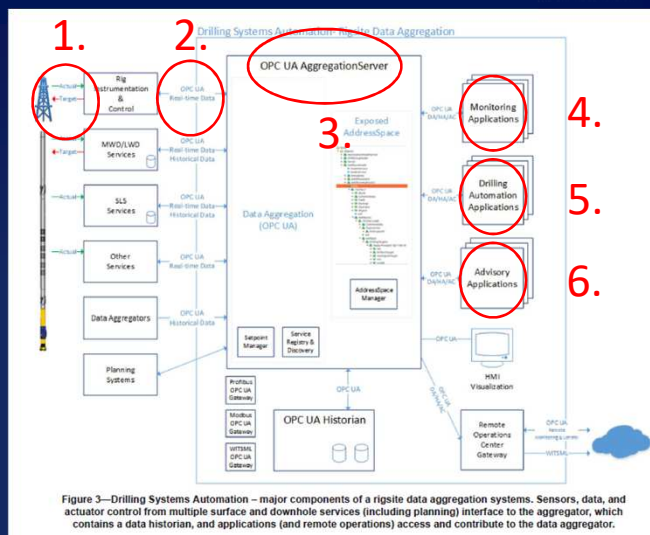
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Show me the money?



1. Run rig, pay driller.
2. Extract data, pay driller.
3. Aggregate data, pay for data services.
4. Service companies numerous.
5. See #1.
6. Service companies numerous.

*Colors denote evidence of cash flow



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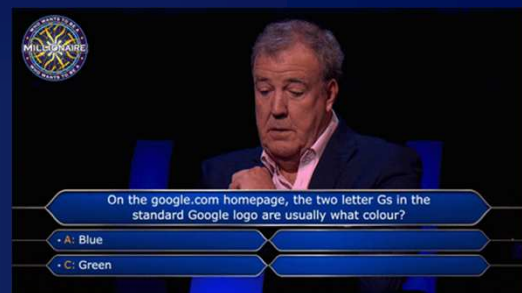
Where was I reminded of “standards” recently?



Where was I reminded of “standards” recently?



- Trains. CBS 60 Minutes episode recently about track safety systems. “Hi, I’m from the government and I’m here to help!”
- XML
- NOVOS example—we built an OPC UA adapter, then made bespoke changes to it.
- I imagine “the standard” being competencies with a portfolio of standards.





While we talk, people are busy
DOING.



While we talk, people are busy DOING.



COMPANY MAN SAID IT WAS GOOD



PUT SOME MORE WEIGHT ON IT

- If efforts continue, what does the future look like?
- What happens when there are no standards?
- Are markets efficient?





Thank you!

Questions?

