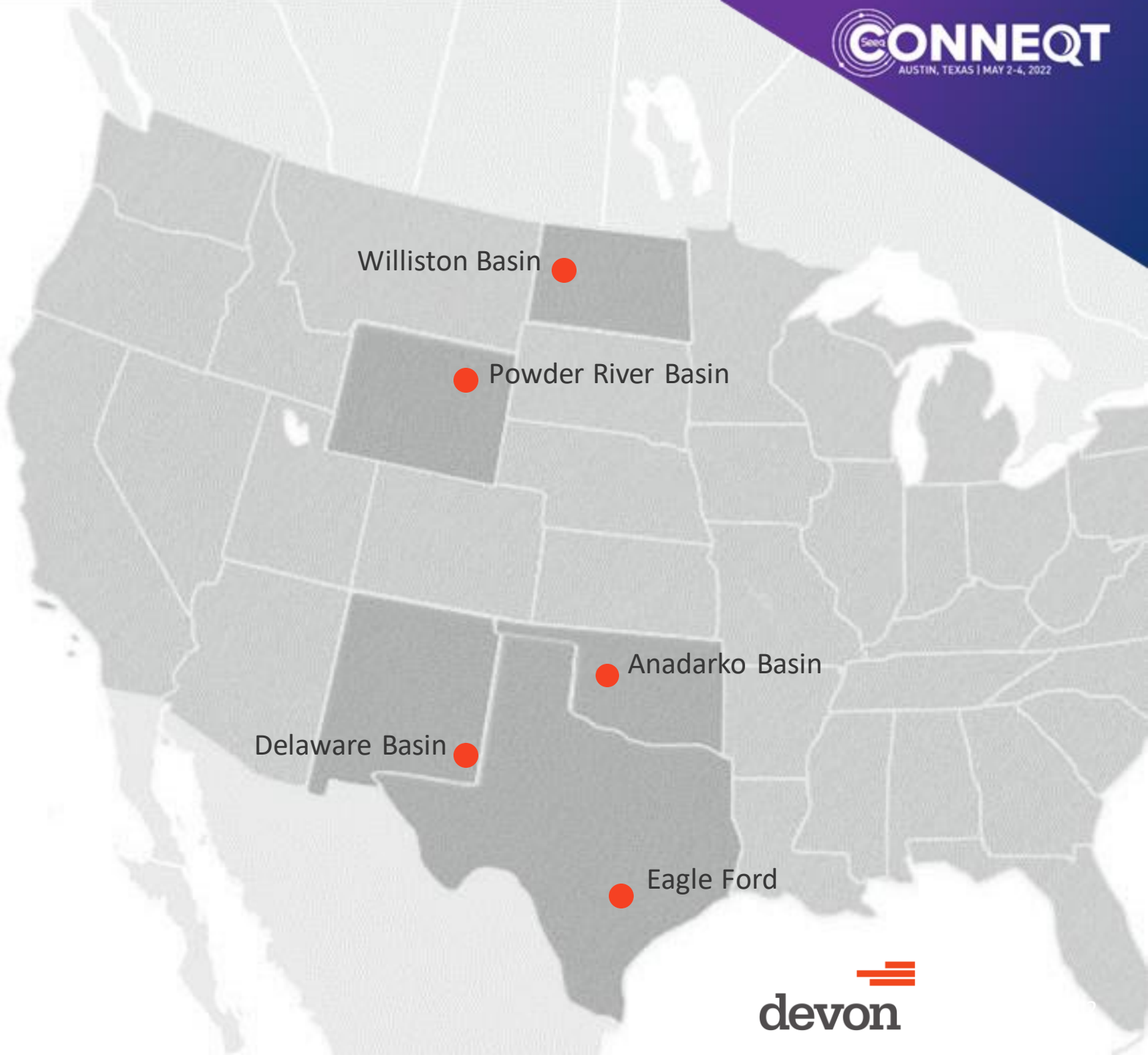
Seeq at Scale for Data and Analytics Integration

Don Morrison

About Devon Energy

- **Balanced** oil and gas portfolio
- **Industry Leader** in technology
- **Large Inventory** of future projects
- **Culture** of Innovation



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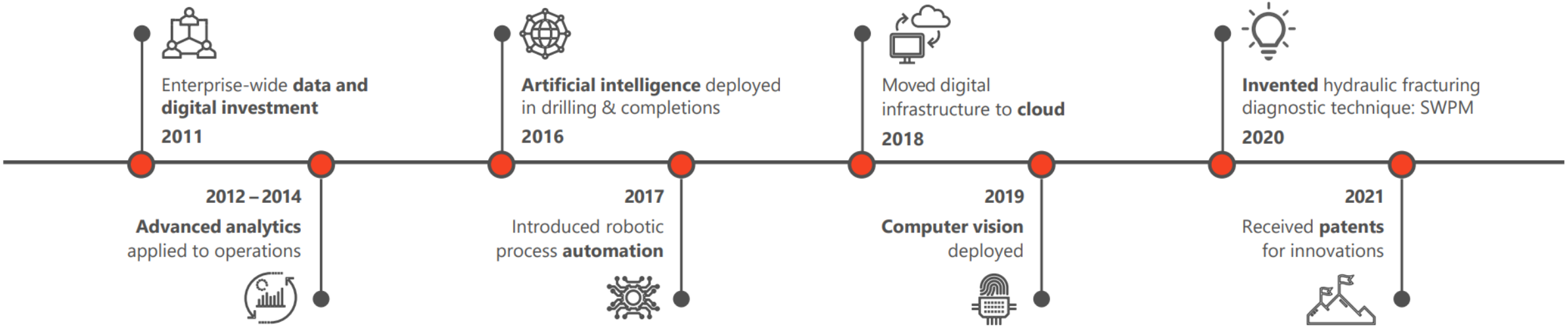
Innovation and Technology

OUR TECHNOLOGY EVOLUTION



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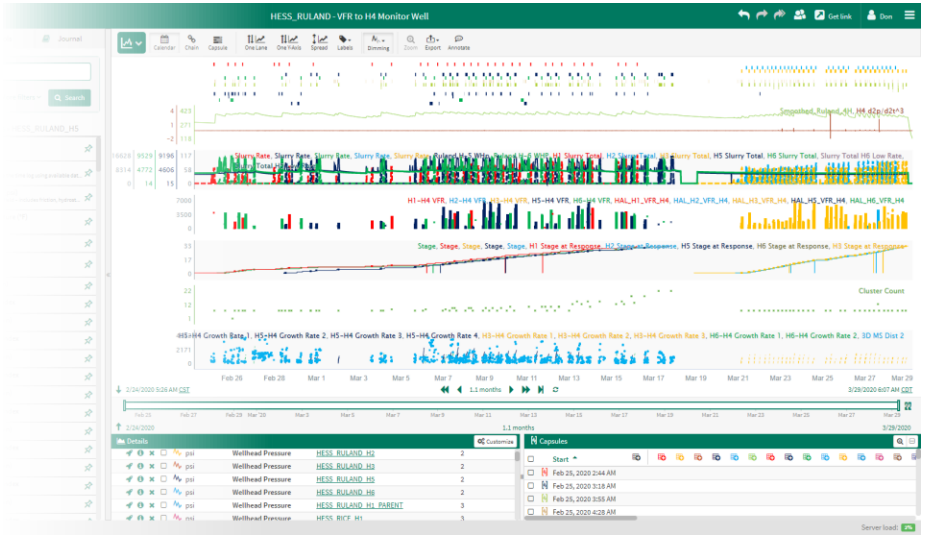
Devon + Seeq

How we discovered Seeq

- PI User Conference 2016
- “Stop by the booth”



Challenges

- Excel… No! Just. No.
- Analytics platforms often require a copy of our data in their cloud tenant
- Many solutions are “black boxes”
- Our engineers want control of the math

Benefits

- Seeq connects directly to our PI System
- Immediate visual feedback to engineering
- Speeds up the pace of development
- Software as a Service (SaaS)

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Speeding up Development Processes

CHALLENGE

- Engineers are experts in their data
- Ideas for solving operational problems are numerous
- Transferring those ideas into action is hard
- Working with data scientists is time consuming

SOLUTION

- Seeq allows engineer to experiment with their data
- Iterate use cases and edge cases into a broad-solution
- Solution can be scaled with technology resources AFTER engineering has tinkered with the math

RESULTS

- Engineer has a better experience than legacy processes
- Time to solution is faster than legacy processes
- Development resources are only required for implementation phase – after experimentation

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Scaling a Solution from 1 to 100X

CHALLENGE

- Seeq is not our data visualization layer – we use PIVision
- We want the results of solutions from Seeq to be available in our PI System
- We need Seeq to be an advanced calculation and data science tool for PI Users

SOLUTION

- Seeq has feature called “Export Directives”
- Scale a solution to 100’s of assets and output the result back to PI data archive
- The directive controls what, where, and how often

RESULTS

- Successfully scaled a complicated calculation from a single asset in Seeq to 250+ similar assets
- Analysis result written back to PI data archive
- Seeq manages the schedule and formulas

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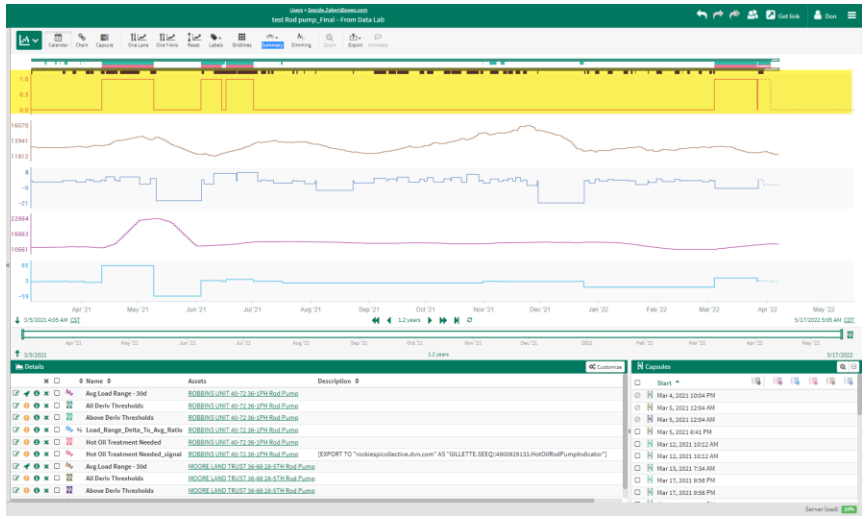
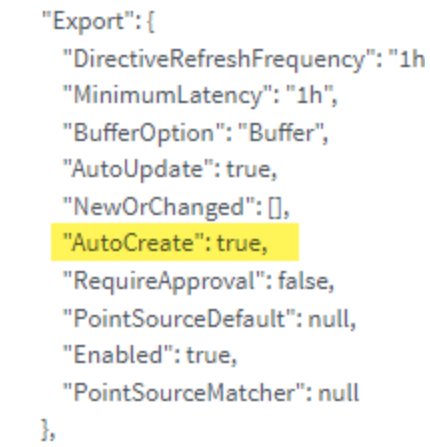
Exporting Data to a PI System





```
"Export": {
  "DirectiveRefreshFrequency": "1h
  "MinimumLatency": "1h",
  "BufferOption": "Buffer",
  "AutoUpdate": true,
  "NewOrChanged": [],
  "AutoCreate": true,
  "RequireApproval": false,
  "PointSourceDefault": null,
  "Enabled": true,
  "PointSourceMatcher": null
},
```

Description

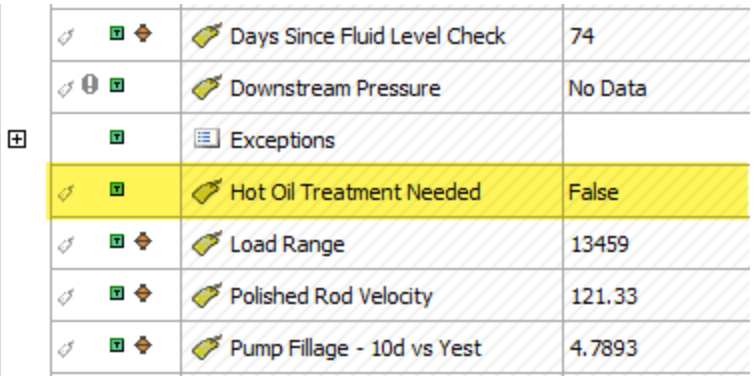
[EXPORT TO "rockiespicollective.dvn.com" AS "GILLETTE.SEEQ::4900929133.HotOilRodPumpIndicator" EVERY "12h" BACKFILL TO "2022-01-01"]

Export - Cursor
2022-03-27T00:00:00.0000000Z

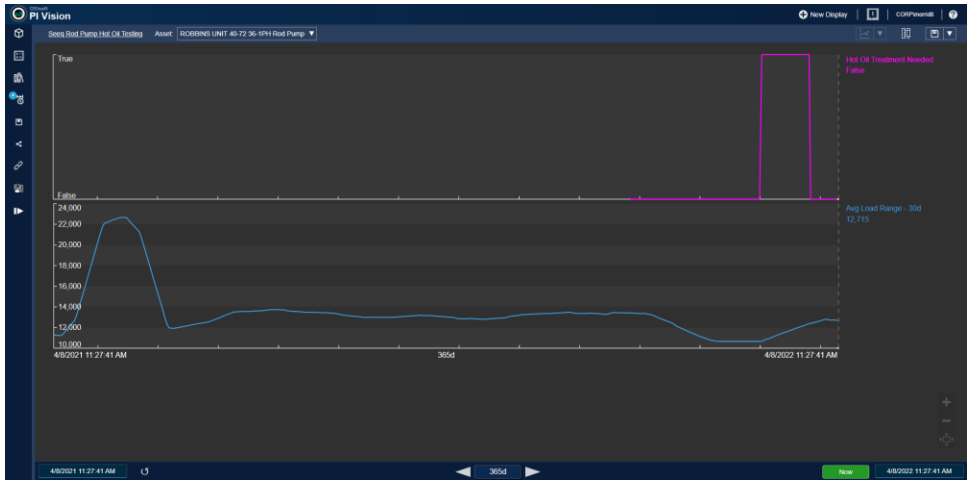
Export - Last Write Time
2022-04-08T16:20:09.6522377Z

Export - Message
Wrote 89 samples, at 614 per second, seconds

Export - Status
SUCCESS



Days Since Fluid Level Check	74
Downstream Pressure	No Data
Exceptions	
Hot Oil Treatment Needed	False
Load Range	13459
Polished Rod Velocity	121.33
Pump Fillage - 10d vs Yest	4.7893



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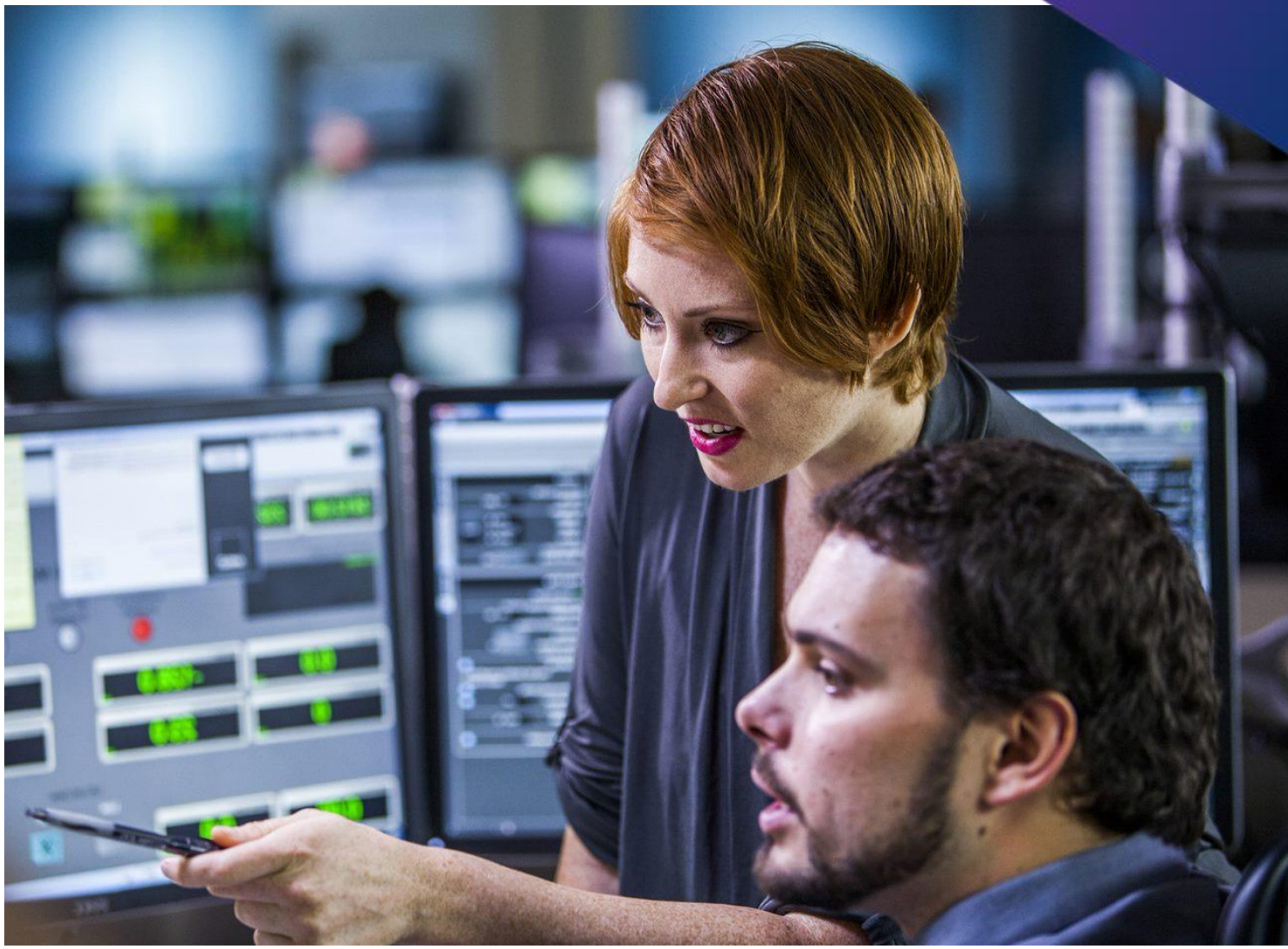
Future of Data Science at Devon

- **Seeq**
  - Ad-hoc analytics
  - Deep analysis and problem solving
  - Targeting subject matter experts
  - More use of export directives?
- **Data Science Tools/Expansion**
  - Azure Machine Learning
  - Seeq Data Lab
  - Databricks
- **Cloud Native Datasets**
  - Azure Data Lake / Snowflake
  - Streaming data



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