How using faster, cheaper and better ways of managing data can help geoscientists achieve competitive advantage

Alan H Smith

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Connecting Subsurface, Drilling expertise with Digital Technology
Digital Energy / Finding Petroleum, Kuala Lumpur, 4 October 2016
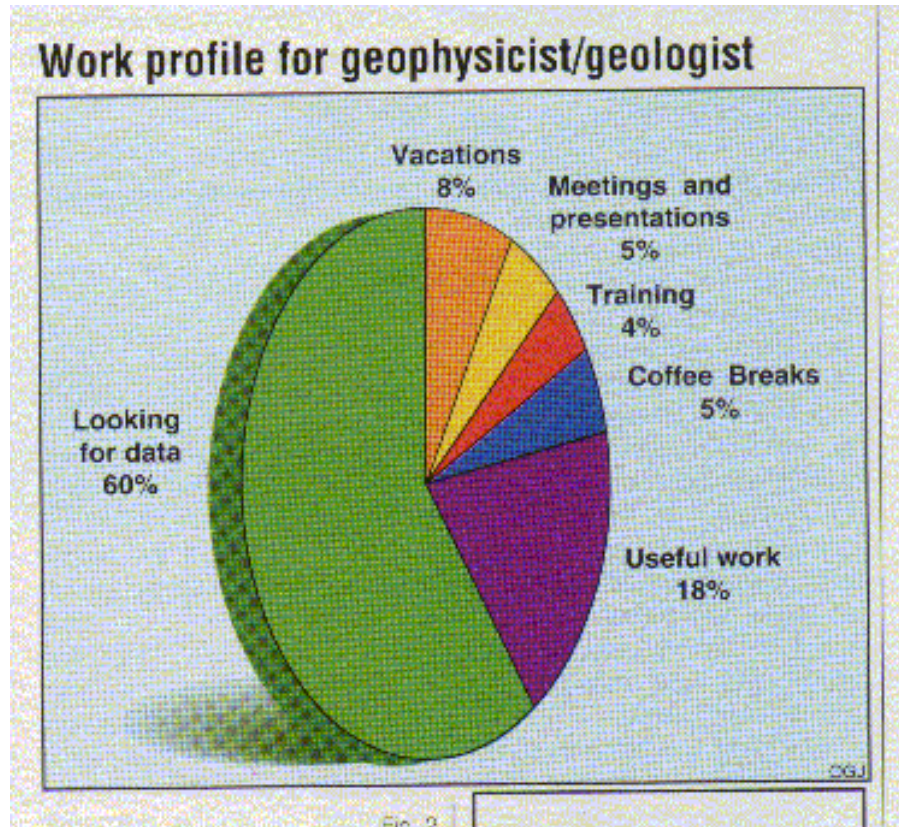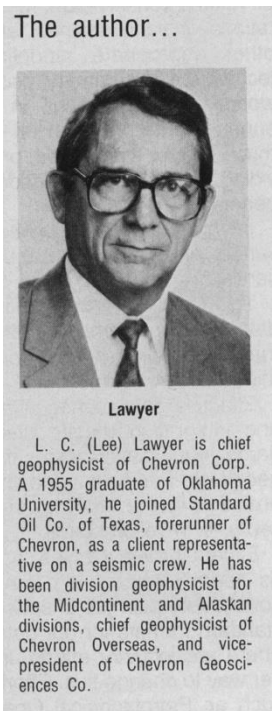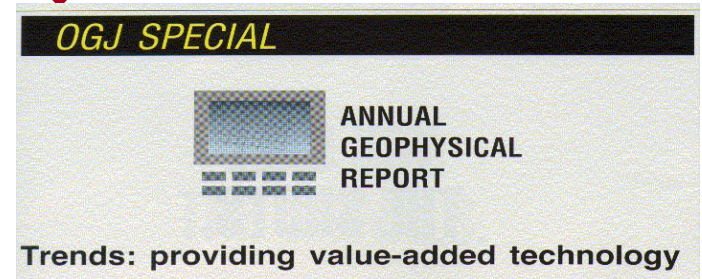
Acknowledgements

Agenda

- Introduction

- Changing people, process & technology

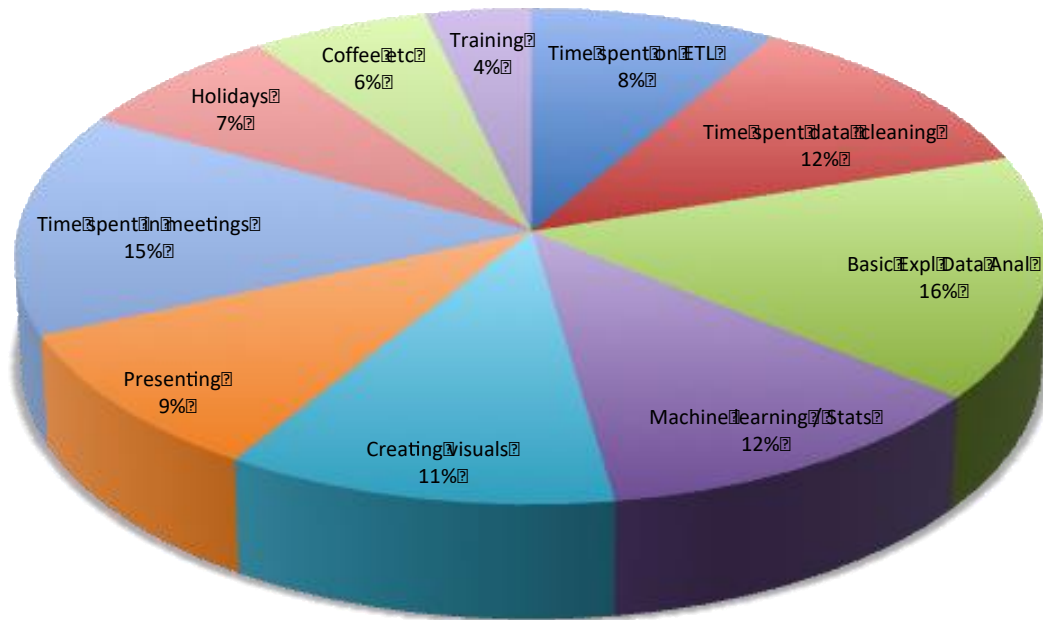- Example - MultiClient seismic data

- Where next?

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- Where next?

Status in 1991?

WEEK OF NOVEMBER 4, 1991
A PennWell Publication

OIL&GAS JOURNAL

International petroleum news and technology

OGJ SPECIAL

ANNUAL GEOPHYSICAL REPORT

Trends: providing value-added technology

The author...

Lawyer

L. C. (Lee) Lawyer is chief geophysicist of Chevron Corp. A 1955 graduate of Oklahoma University, he joined Standard Oil Co. of Texas, forerunner of Chevron, as a client representative on a seismic crew. He has been division geophysicist for the Midcontinent and Alaskan divisions, chief geophysicist of Chevron Overseas, and vice-president of Chevron Geosciences Co.

Work profile for geophysicist/geologist

- Vacations 8%
- Meetings and presentations 5%
- Training 4%
- Coffee Breaks 5%
- Looking for data 60%
- Useful work 18%

After Tonstad, 2002

Status 2015

Based on "Time spent on Data Science" (O'Reilly, 2016)

Examples from Analytics in E&P (Courtesy Teradata)

Well data example
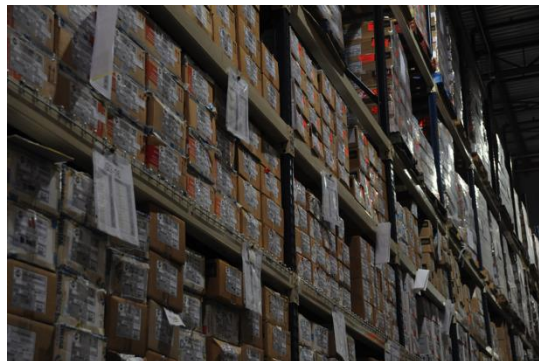- 50% of time spent preparing data

Seismic / Navigation data example.
- 80% of time spent finding & preparing data

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Technology in the 90s

What we were doing

- Did we have the technology capable of managing data types?
- Projects to get data into suitable systems
- The start of National Data Repositories
  - CDA, Diskos
- Efficiency discussed – but did things actually improve?

Technology

People

Process
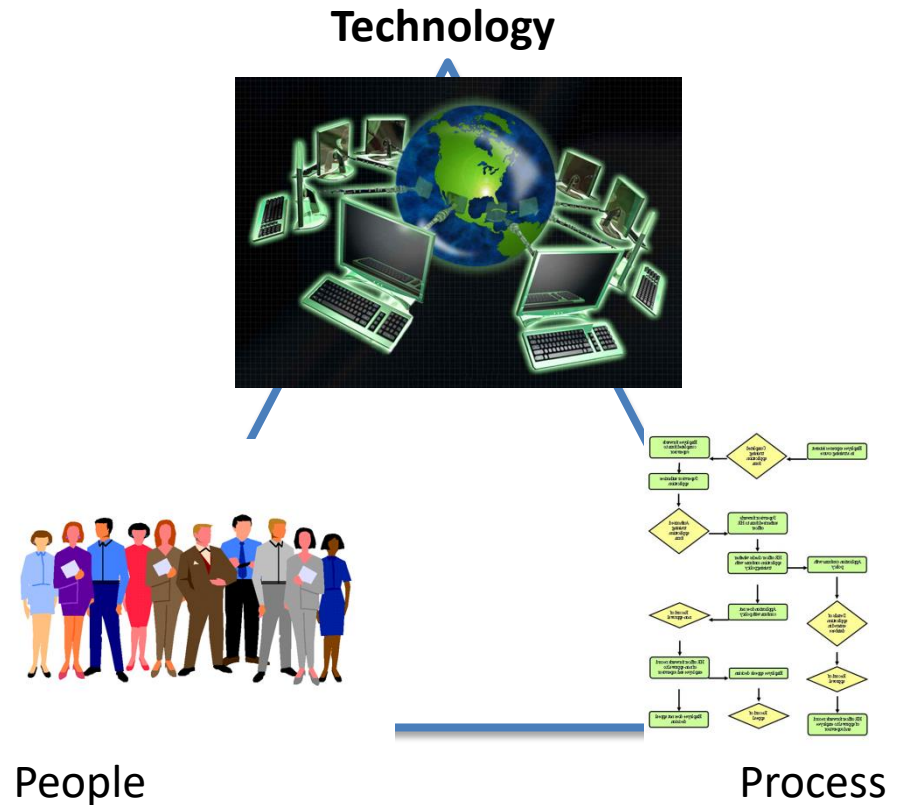
Technology about 2005

Holditch – 2002 SPE President

"Our members have changing needs and expectations," Holditch said. "Technical information needs to be available 'on demand'. Easy and efficient access to technical knowledge is key to success for today's E&P professionals."

SPE 78337

Evaluation of the DISKOS project

The tangible benefits exeeds the cost!

	94	95	96	97	98	99	00
Cost ac	2,1	4,8	9,1	13,9	19,2	26,2	33,5
Benerfit ac	0	0	0	5	15	42,4	69,8

Accumulated cost versus tangible benefits

- Intangible
- Tangible
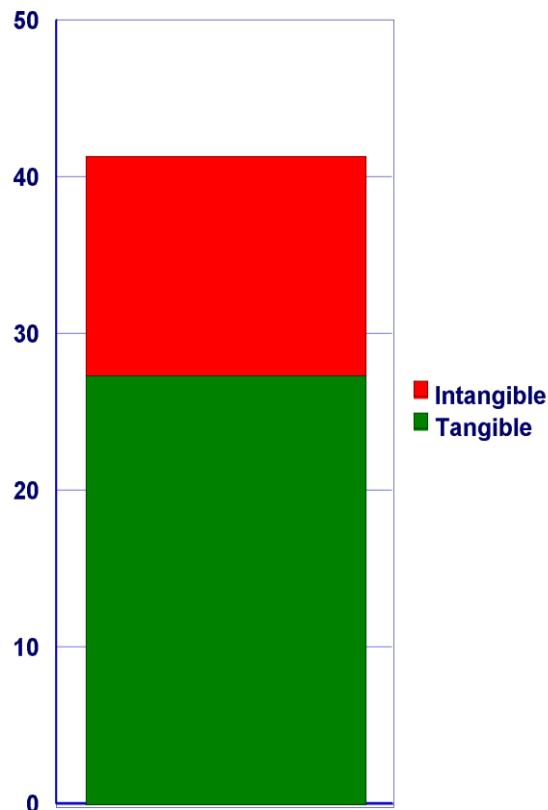
Cost

Benefits

Cost reduction in 1999

After Tonstad, 2002
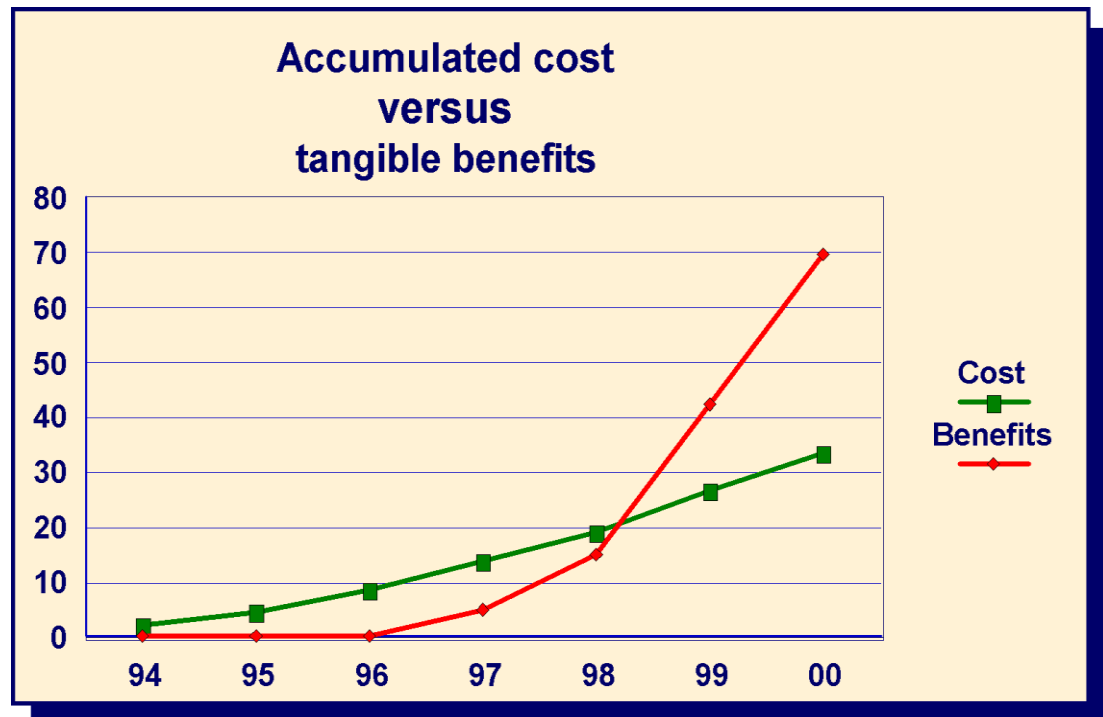
What we were doing

- Did we have the the processes in place?
- Understanding that services were needed not just projects
- Struggling with corporate / master / project data management
- Efficiency discussed – but did things actually improve?

Process
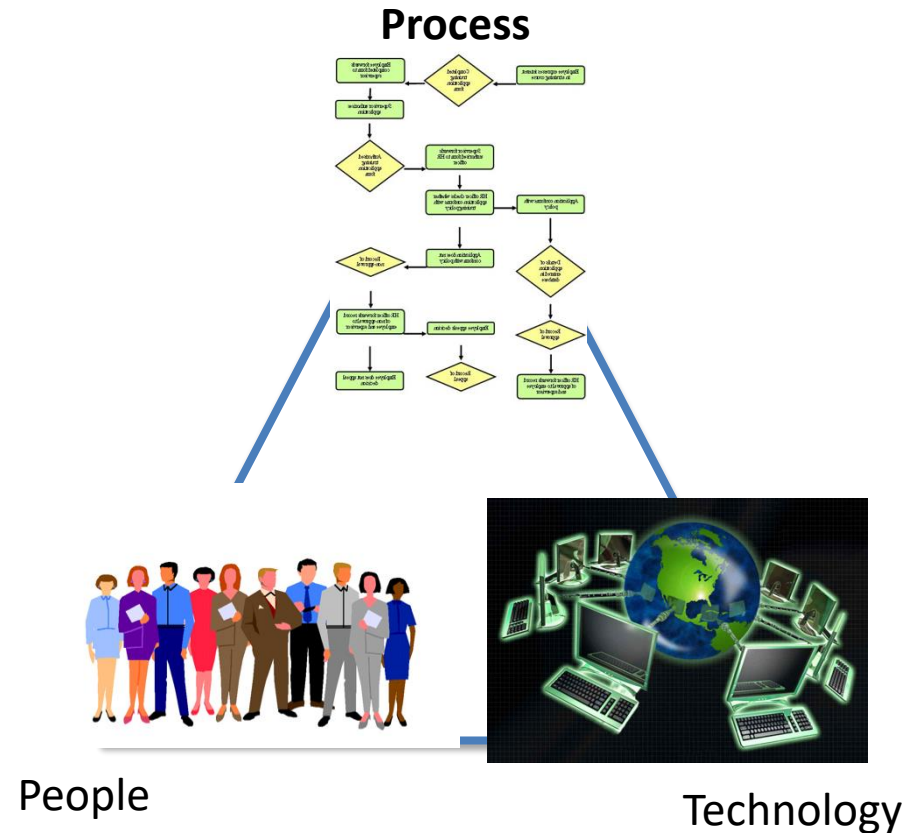
People

Technology

Technology from ~2015

What we were doing

- People to the fore
- Understanding that getting the right people with the appropriate skills is critical
- More acceptance of the need for good data management in organisations
- Efficiency still needs to be improved especially with low oil price
- Is technology making a comeback?
  - Web / Cloud based systems
  - High bandwidth communications
  - Legacy is still an issue

People
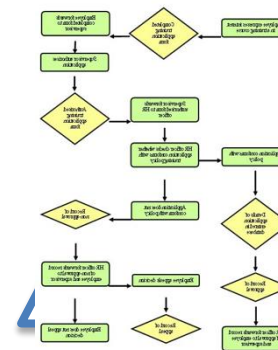
Process

Technology

The legacy problem
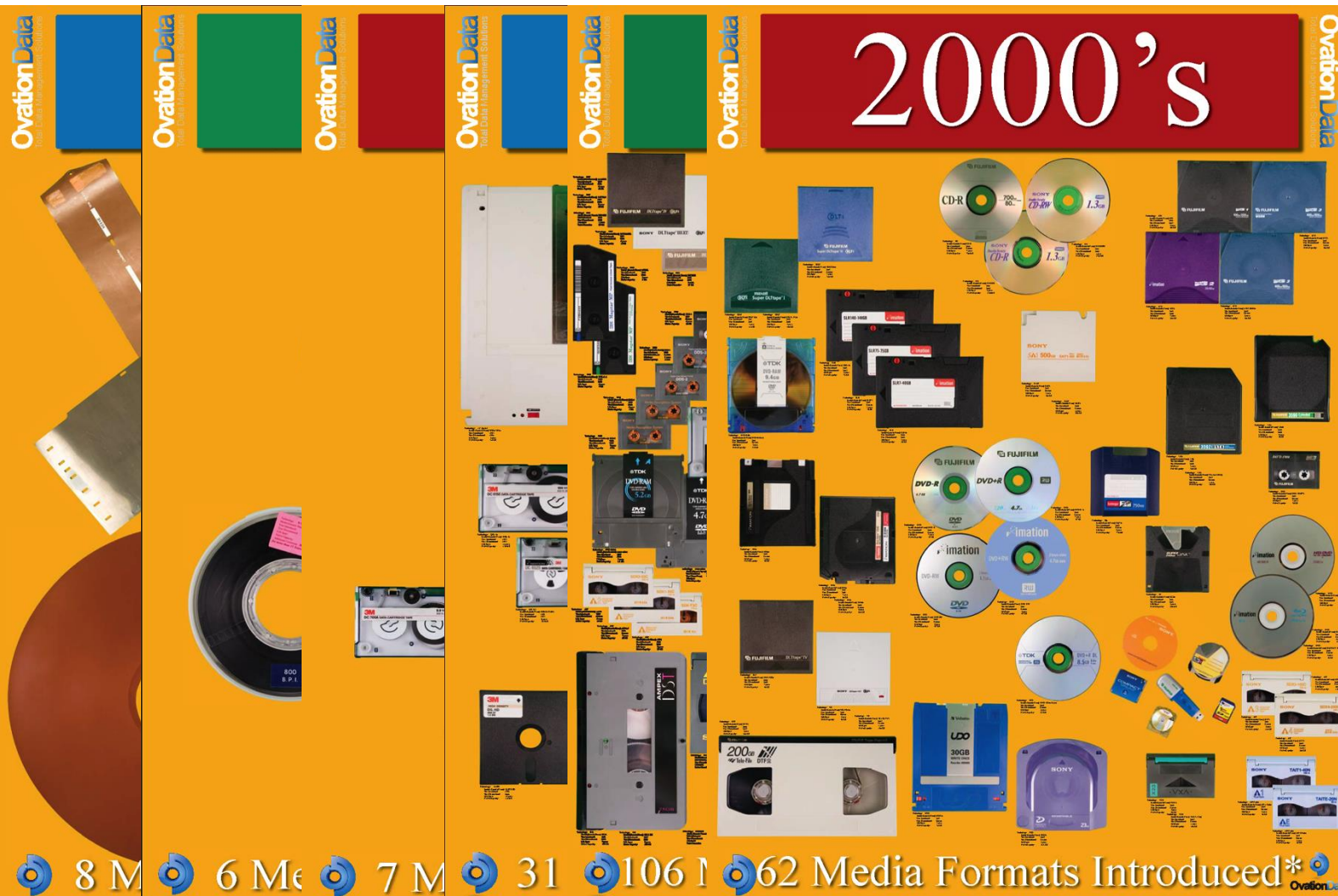
2006 – 2010 saw another 12 (upgrades)

2011 to mid 2016 another 8 (upgrades)

Total of **230** or more media types

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The statistics – PGS MultiClient

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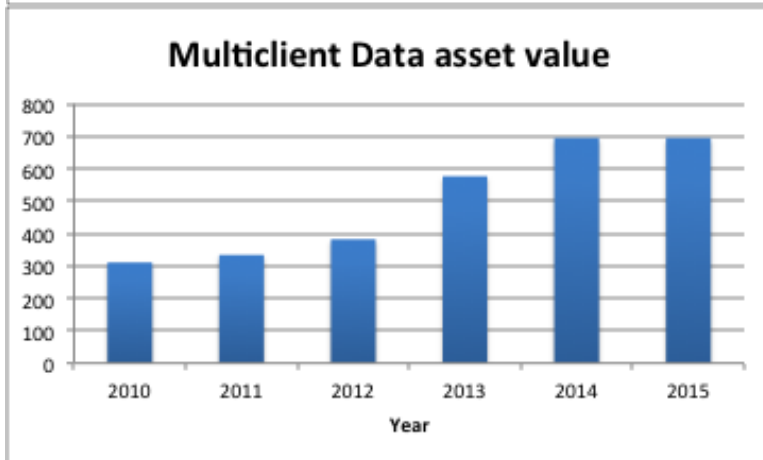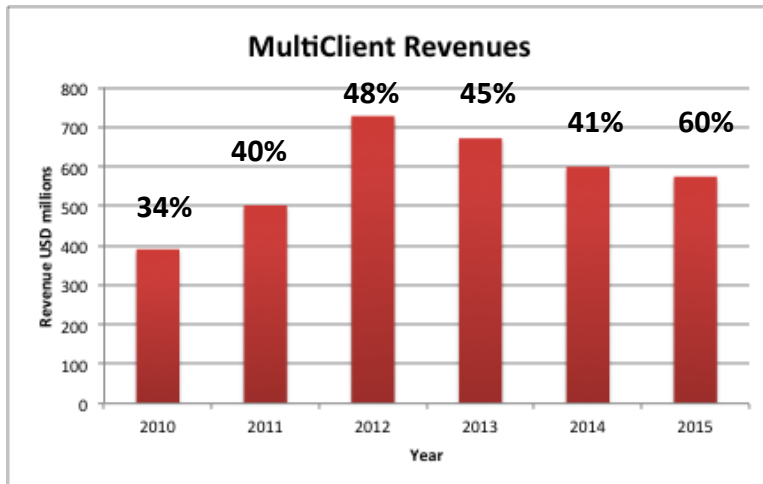
- Important Balance Sheet item
- Significant proportion of vessel time
- Significant revenues
- Huge data volumes acquired
- Long shelf life
- Shelf life "reset" with reprocessing etc
- Pre- and Post-Stack and Ancillary products all equally important
- Increasing demand for prestack products

Data from PGS Annual reports

PGS MultiClient Data delivery

- Heritage system developed in 1990s
  - Outsourced service provision
  - Slow & restricted functionality by current standards
  - Only really handled post stack
- New system
  - Still outsourced
  - Trace handling, not processing *(sensu stricto)*
  - Handles pre and post stack data efficiently
  - Modern database integrated with IT infrastructure and other enterprise software systems
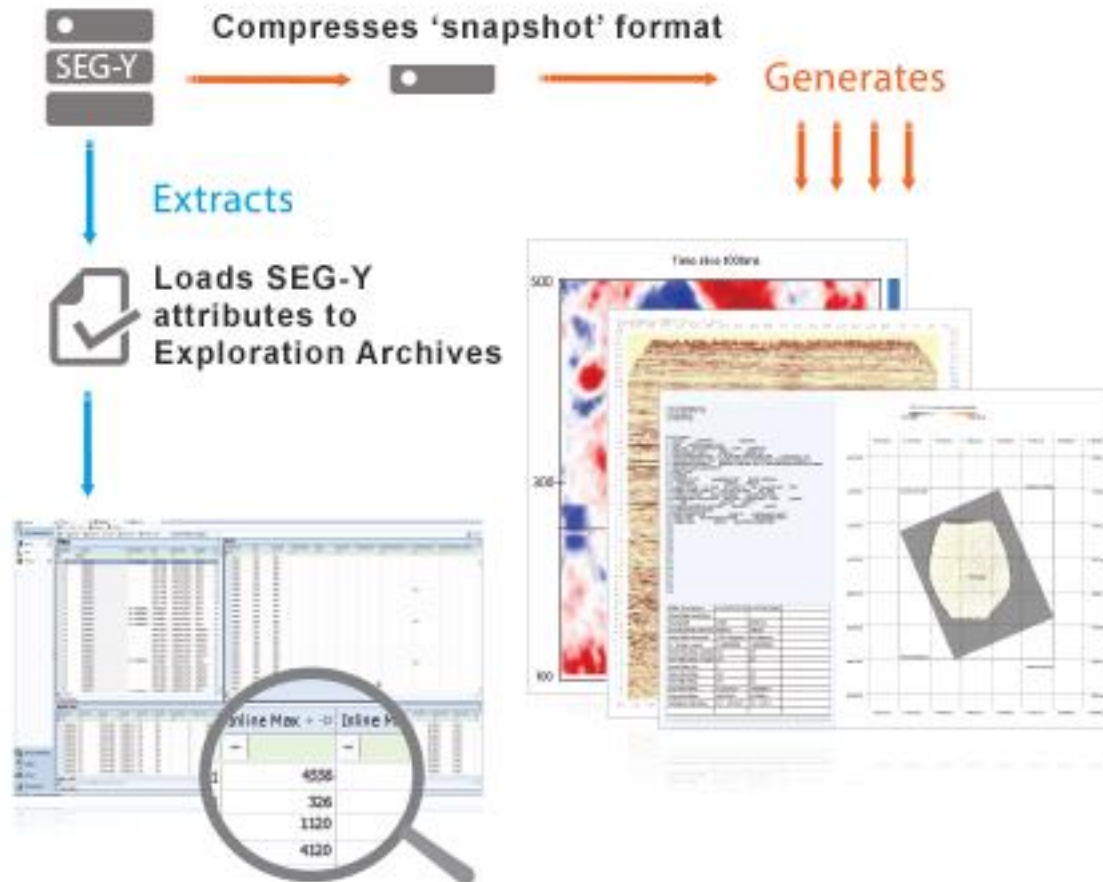
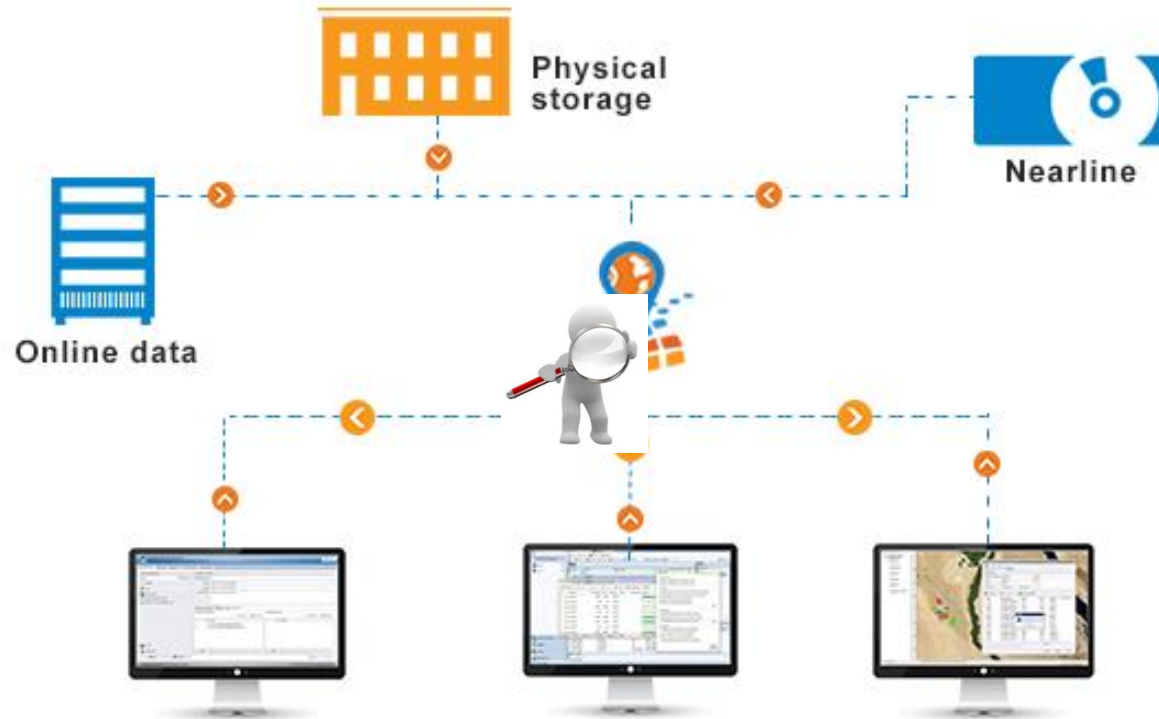# Multi client seismic management

Old
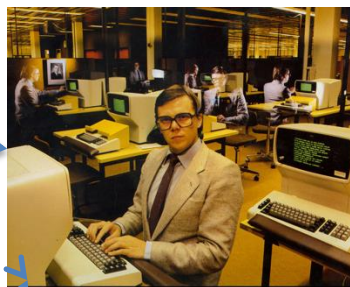
Final products
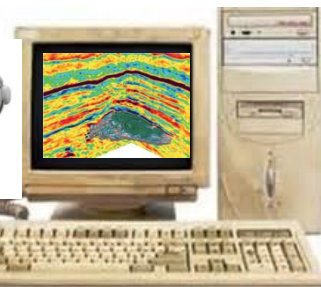
Field & Interim products

New
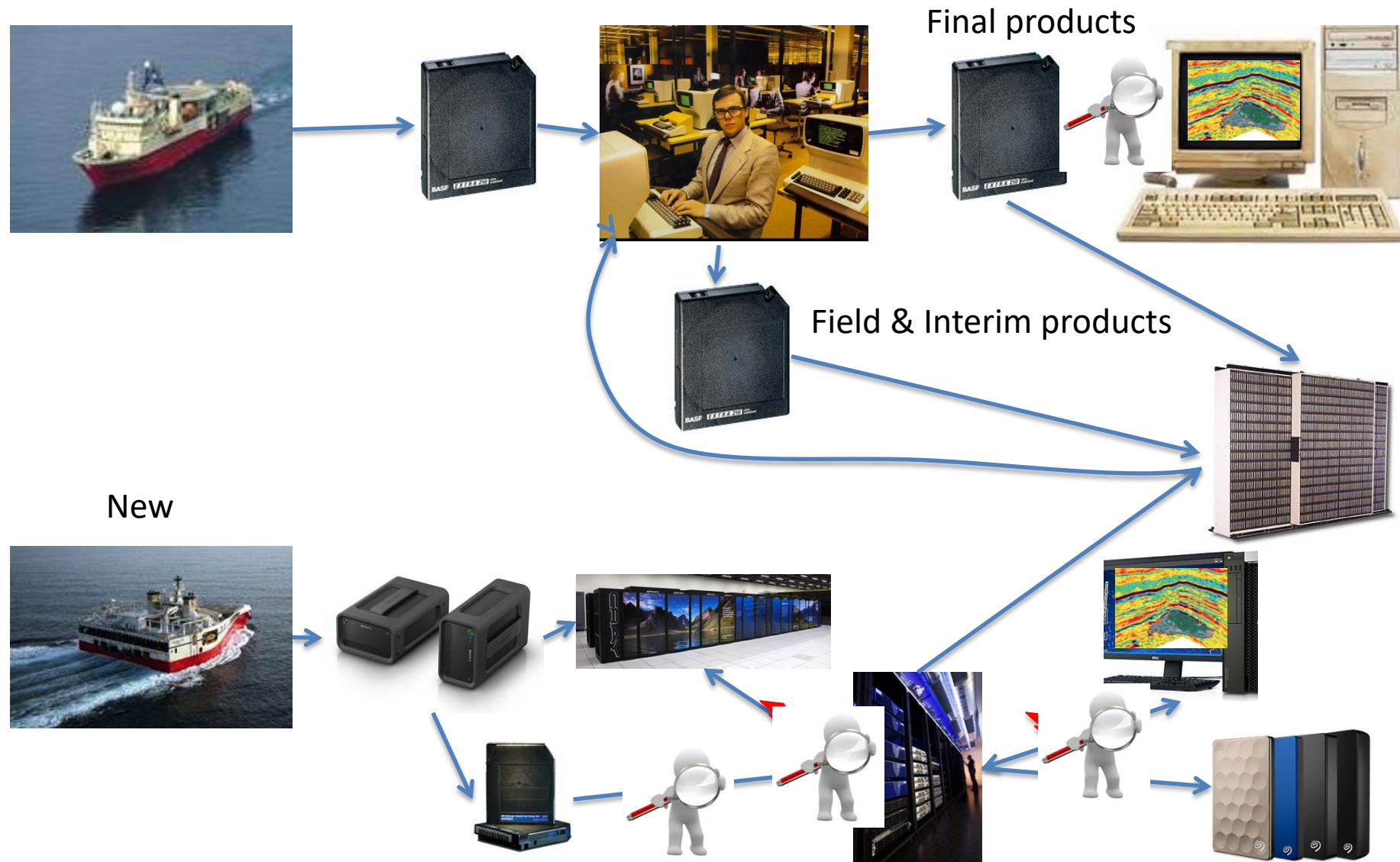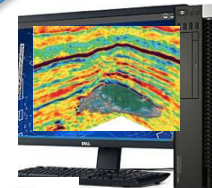
Loading & QC

Delivery & QC

Multiclient complications

What are they getting?

- Prestack (options)
- Stack
- Migration
- Velocities
- …

All need cutting to correct coordinates

Company A

Company D

Company C

Company B
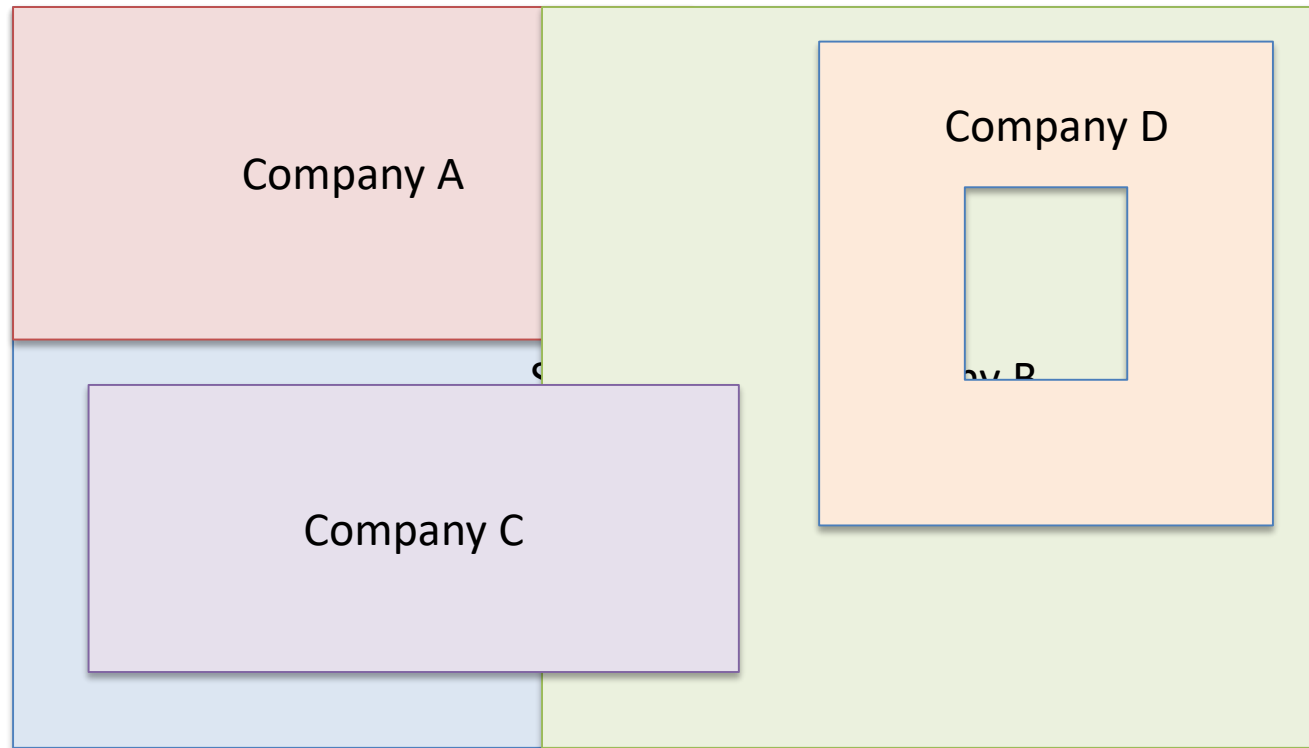
Historic
Manual handling
Manual intervention

Now
Automatic
Parallel processing

The impact

Then

Faster – Cheaper - Better

Ensuring availability
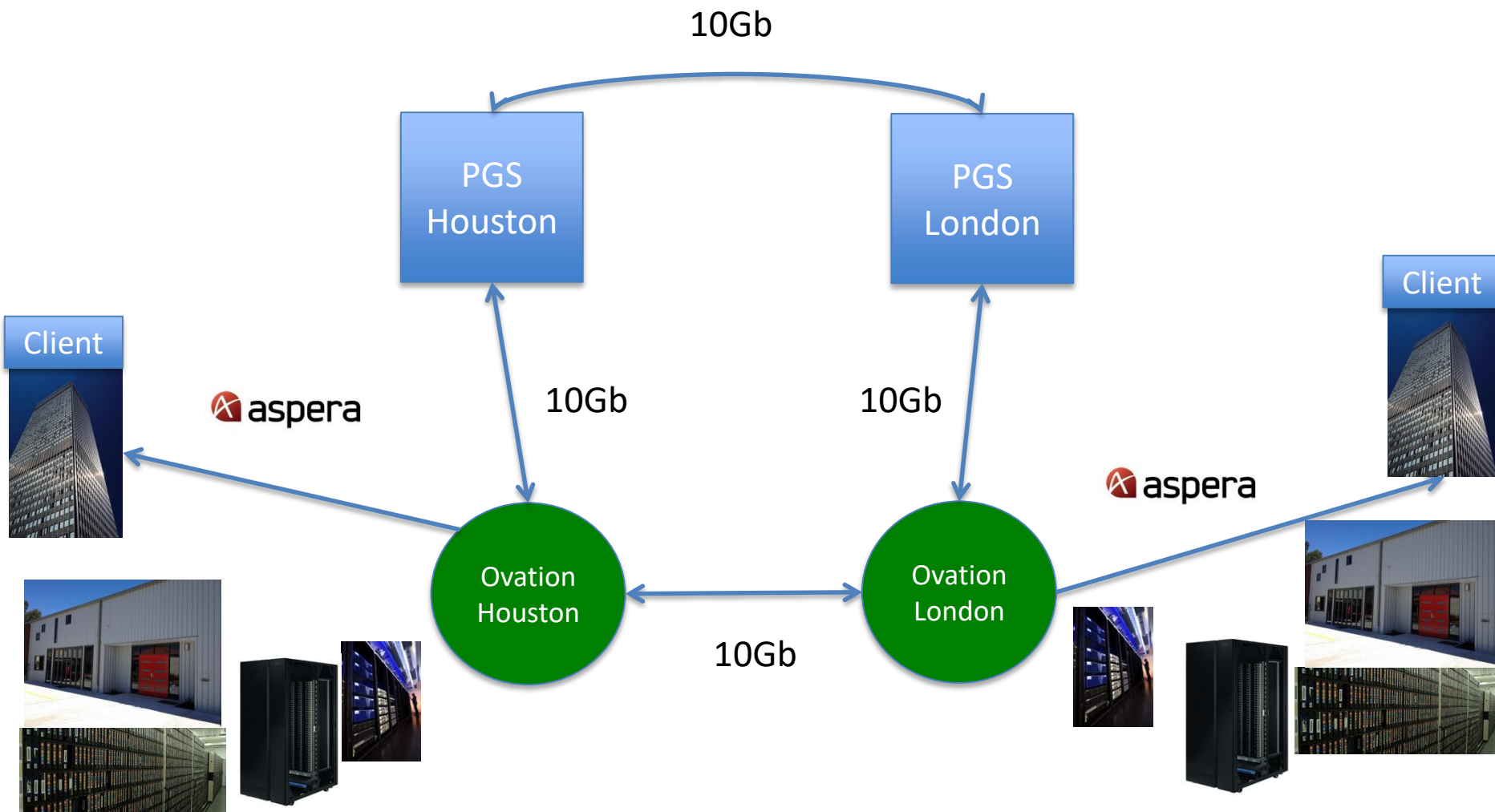
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Data storage

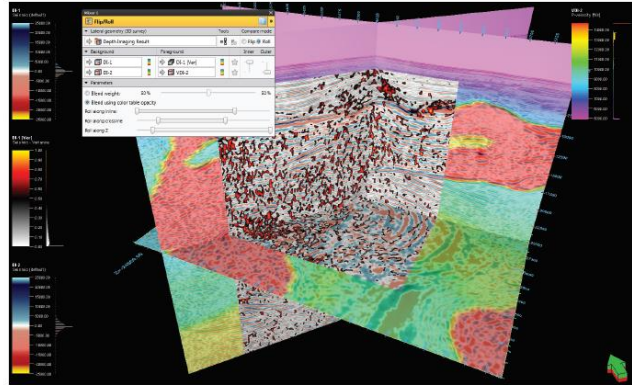- More data per unit area
- Faster
- Cheaper

Data transfer
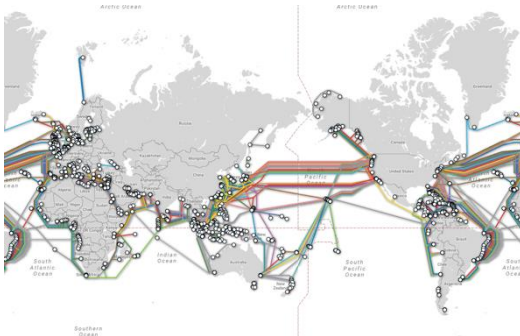
Cable everywhere (nearly) – massive capacity
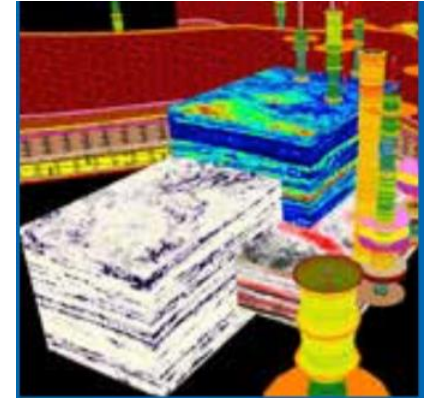Satellite – filling some holes at predicted speeds approaching 1Gb/s
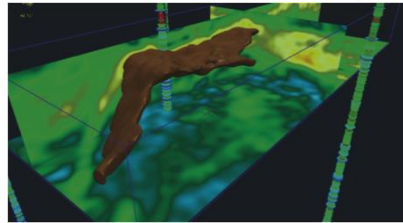
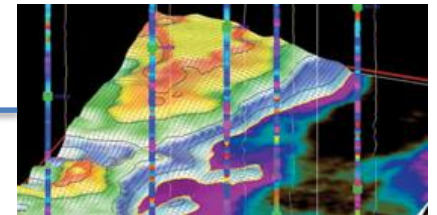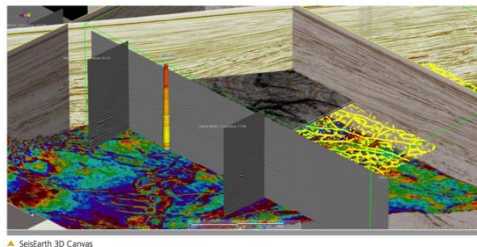Leave the data where it is
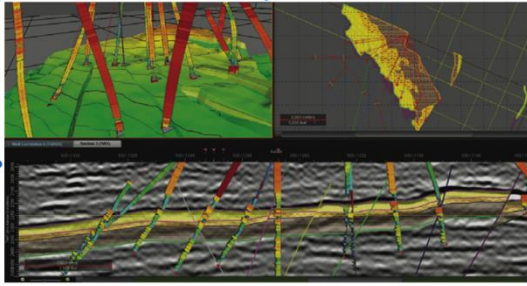
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Format "A"

Format "B"

Format "C"

Conclusions

- Large volumes of data can be live on the internet
  - QC is essential
  - Automate what you can
- Next steps
  - Take the application to the data

Acknowledgements

Thanks for your attention

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