

Challenges of moving Information & Data Management to the cloud both software and data

Practical examples of how a small- medium E&P company can distribute their workforce and virtualise their office using modern cloud based approach

Hampton Data Services Ltd

www.hamptondata.com

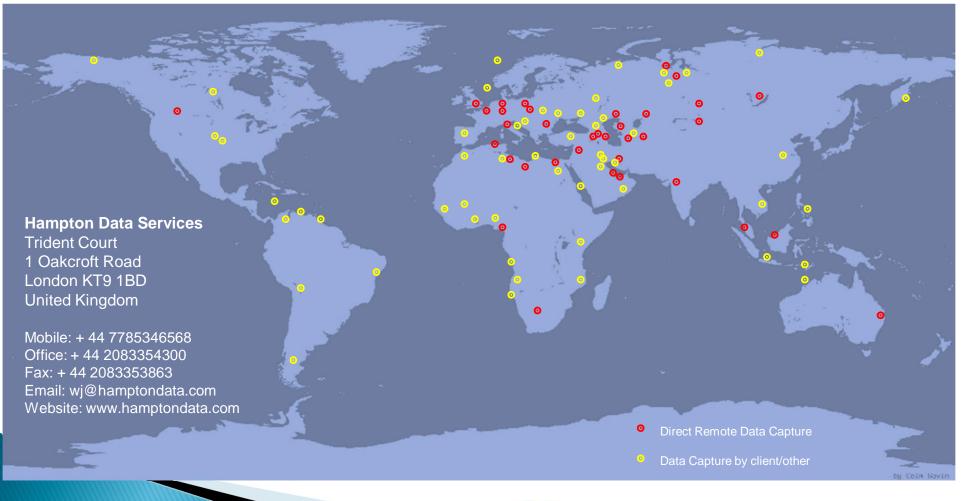
Waclaw (Wally) Jakubowicz

Finding Petroleum Solving E&P Problems with Digitisation 19th November 2017



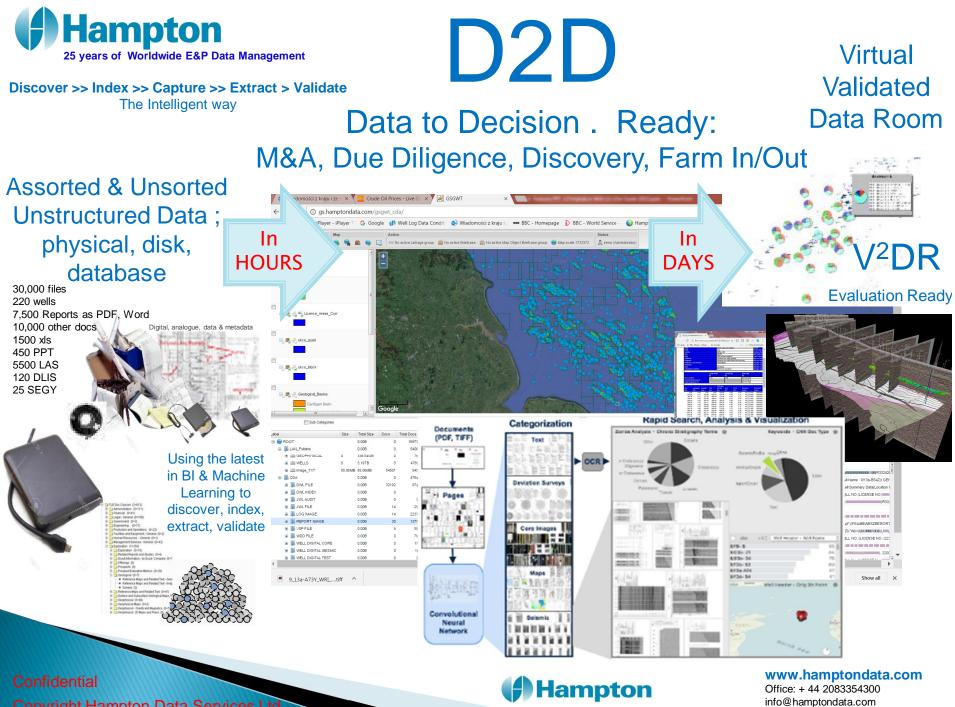
Hampton Data 25 years of E&P Data Management

Worldwide experience of Remote Data Capture Data Rooms, Oil Co archives



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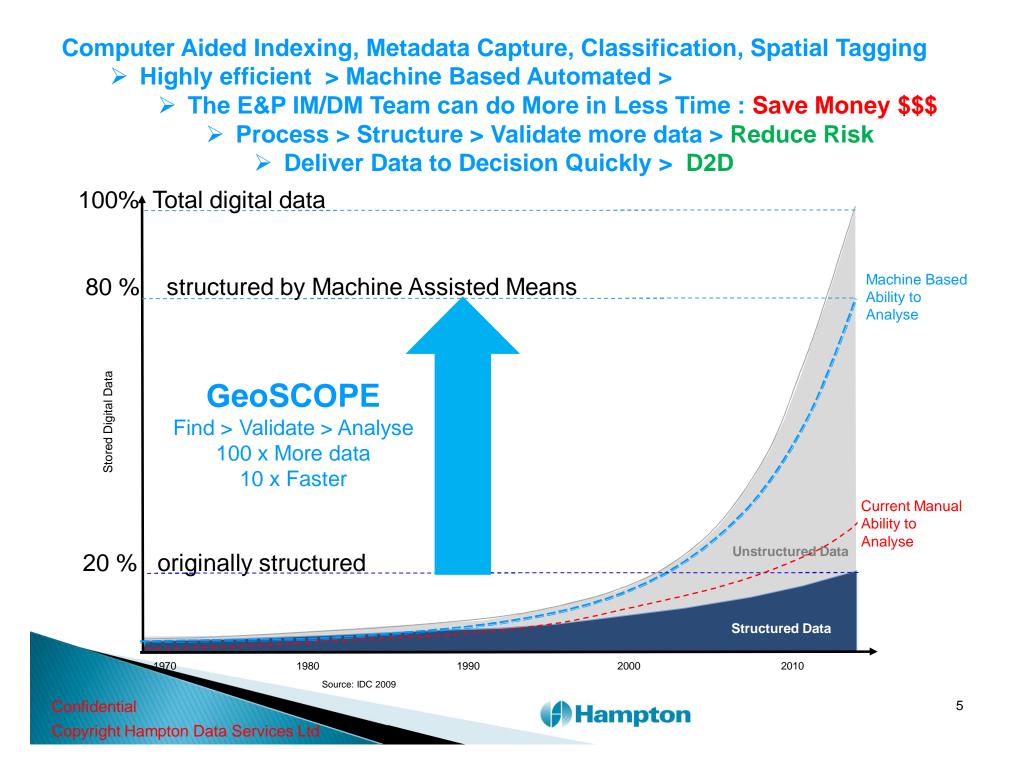
Presentation Key Points

- E&P IM/DM Works on cloud
- How ?
- What can be done ?
 - Examples
 - Emir Oil
 - language XTM
 - Services
 - HDS
 - XTM
 - Nephin
 - Volumes
 - Services
- Applications on the Cloud where are they ?
 - SLB HLB Emmerson LR IHS
 - Antheus GeoFIT



Nephin Energy

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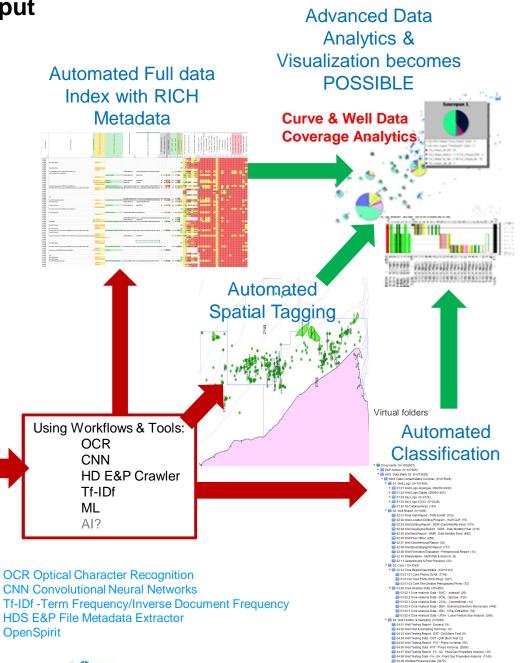
Assorted & Unstructured E&P Data Input Can be effectively managed using Autonomous Machine Assisted & Machine Learned methods:



MS Office PPT DOC XLS TXT ASCII XML HTML PDF etc Other Raster Image & Graphic Files (& embedded in docs): TIFF JPG PDS CGM WMF Physical & Hardcopy

Standard E&P Databases: Petrel, R5000,OW/SW,Paradigm EPOS, Geolog, RMS, VIP, Eclipse, IHS_Kingdom ArcGIS, IKON RokDOC ? etc





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The Key to preforming these services is GeoSCOPE

GeoSCOPE is designed by E&P professionals working with real live project data

The Metadata Database that Autonomously Collects, Stores & Aggregates information about files and other DB records thus enabling Data Analytics to be done

Maintaining a comprehensive, high-quality, "trusted" information base is a critical activity in E & P projects. For the geoscientist, evaluating and interpreting data sets is the key to timely and effective decision making. Whilst traditional oilfield data management systems provide a framework for quantitative interpretation, their high cost, complex internal structures and narrow scope means that important information can often remain stranded on data islands outside the reach of the project team.

GeoScope provides a high performance, cost effective solution for staging and delivering all your E & P information to the whole project team. The intuitive map-based interface, powerful searching & data mining modes and flexible indexing schemes deliver results straight to your

desktop. The client/server architecture exploits the latest networking standards and technologies to provide a centrally managed, low maintenance solution that is easily integrated into corporate networks and workflows.

GeoScope incorporates deep data mining and analytics that assist in data indexing and discovery. The tool and workflows used by GeoSCOPE ustilise:

- OCR (Optical Character Recognition), to provide metadata that can be searched and analysed
- CNN (Convolutional Neural Networks) to identify pictures, images and graphics, so as to classify maps, logs, seismic, graphs, well sketches etc
- Tf-IDf –(Term Frequency/Inverse Document Frequency) for full test signature analysis based on machine learning to classify content
- HDS E&P File Metadata Extractor to extract metadata from industry file formats SEGY LIS LAS DLIS P190 UKOOA
- 3rd party E&P Application metadata extractors OpenSpirit, Kingdom, Petrel, OW, SW , R500, Eclipse, Geolog etc

GeoScope is a highly efficient & <u>autonomous</u> <u>document archiving and retrieval system</u> utilising Java & Web technology to run through local Intranet and Internet applications on a broad range of platforms and operating systems. GeoScope combines the searchability of a database with the intuitive searching of objects within a graphical interface (typically a map) to recover appropriate documents for any given search criteria.

The built-in Entitlements and Workflow management modules, allow E&P IM/DM professionals to manage large scale E&P data workflows from reception, through discovery, classification, validation, editing and new data creation prior to delivery to trusted Master Data Stores with full auditability and identification of provenance and data quality.

The application and services can be purchased on a fixed monthly subscription



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Transforming diverse unstructured E&P data into valuable interpretation & analytics ready assets

^{*} HDS provides a range of services driven by proprietary software, carried out by analysts with direct experience in data acquisition and interpretation and managed in close association with customers

Capture, Condition, Database Interaction & **ANALYTICS &** Analyse & Crawl & Extract **Unstructured Data** Management Compose* Visualisation Characterise Metadata Identify / characterise data Digitise analogue data Database design & build Disks, tapes, film, paper Different file formats and GIS interface documents types, paths / structure Repair, correct and data types 3rd Party Intuitive flexible search. normalise data Analog files Digital file formats auto Catalogue, Index Updated examined include Rank data Splice & Composite retrieval and storage Digital files **Content for** Create digital audit trail Clear audit trail of QC important data Data and metadata; "Image Raster, Vector Identify missing and / or Reconstruct metadata changes to data and " PDF complete **SHAREPOINT** metadata Organise data with user incomplete "TXT. MS Office incorrect data defined system ″ LAS missing SpotFire "LIS, DLIS (taxonomy) Different vintages Tableau ″ SEG-Y Link/tag data to metadata Duplicate data files TerraData Manual extraction of Unknown quality Myr:Conn paper document metadata MindTree E&P Application DBs **ExpertSystems** Talus iPoint **IQinsights** OCR RokDOC BI PARS CNN Techdrill ML RogQC BI LR Analytics **MP Geomechanics Other Solutions** Knowledge DB Stored Machine Learning & **Business Intelligence Rules** HDS Proprietary GeoScope GeoScope GeoScope GeoScope GeoScope Analytics Software LogEDITX E&P Data Crawler LogCARDX E&P Data Crawler Analogue data file **OO** Digital data file (structured & unstructured) Structured digital data Digital files created from scanned analogue data 🔘 Metadata - complete 💭 Incomplete metadata Semi-structured digital data * Grey text relates to CCC activities, Blue . data organisation

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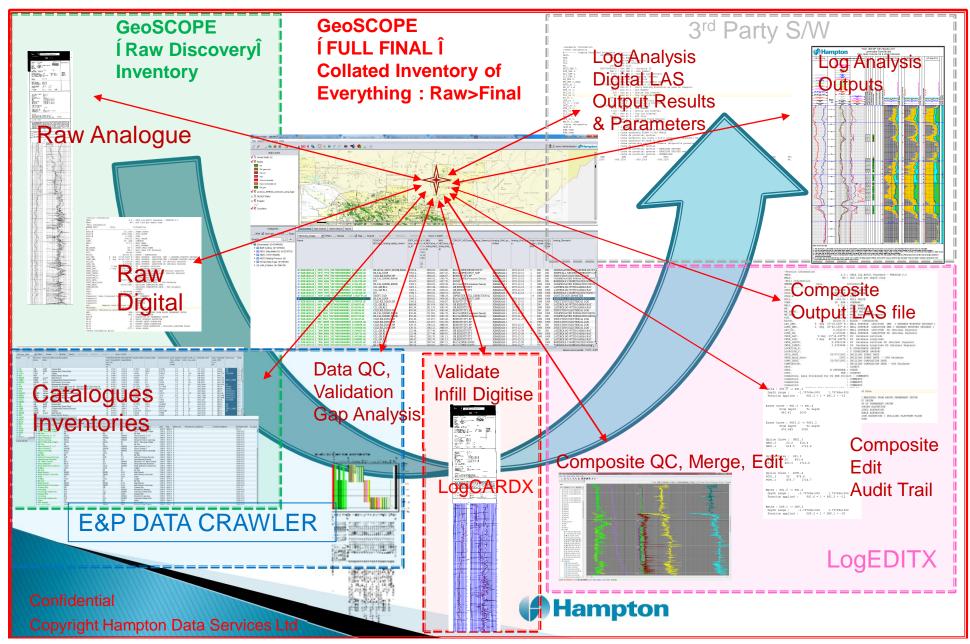
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Capture, Condition, Database Interaction & Analyse & Compose* Unstructured Data Management Crawl & Extract Metadata Characterise **Traditional Evalq& Decision Making** Hampton **Evaluation & Decision Making** Increased use of **Evaluation & Decisions Starts Earlier** with access to Greater Volume of Quality Data ! Automation 100 % MARK MINING LINES (CONS) (BENGIN (courses) the states % Data Evaluation & Decisions Start 1901.00 0% Traditional Hampton TIME > Indexed Catalogued Data Validated Data Autonomous Virtual Project IM/DM Cleansed & Decision ready Data 100 % Index, capture, Cleanse, Phase % **NEW / OPERATIONAL** Traditionally LOST !? Project , Analysis, Decision Making Phase % Data Data / Knowledge / IP Captured Data Capture Continues . Autonomously !! 0 % Total NEW Data, Information, Knowledge, IP Actually Created TIME > Total NEW Data, Information, Knowledge, IP Captured by HAMPTON Solution Total NEW Data, Information, Knowledge, IP Captured during TRADITIONAL project operations 9 Hampton Copyright Hampton Data Services Ltd

Efficiencies in The Hampton Data Solution 2

GeoSCOPE can manage E&P workflows and the data value chain: Capture the Provenance and Audit information for each Data Object :



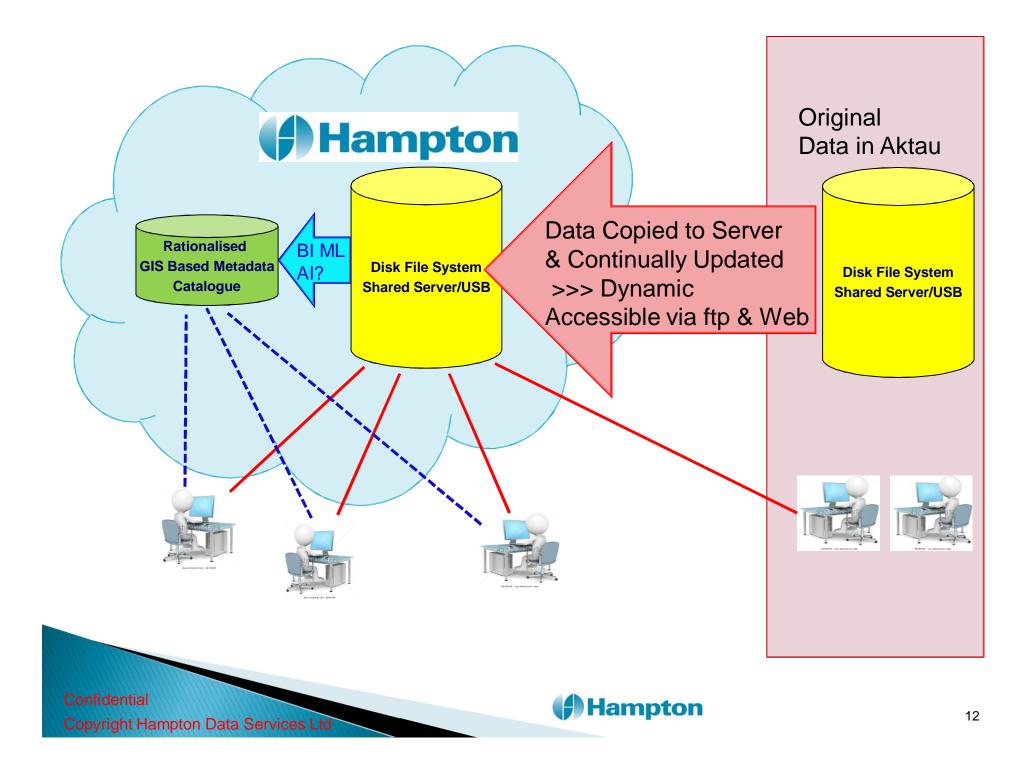
Example 1 - Reach Energy Bhd

- KL Registered and KL & HK funded E&P Co
- Acquires controlling interest in Emir Oil LLC Kazakhstan
 - Assets have seen several previous Operators
 - Legacy Data processed in different E&P cultures
 - Mixed English, Russian, Mandarin & Kazakh
 - Many data silos in different countries/institutes gathered
 - Many previous studies done
 - Much data duplicated
 - Multiple seismic versions,
 - Multiple (poorly labelled) maps frequently with unknown datums etc
 - Mobile Expat Management who want to "work & access data on the move"
 - Require secure data access to consultants and consultancies doing reserves audits, evaluation, subsurface modelling

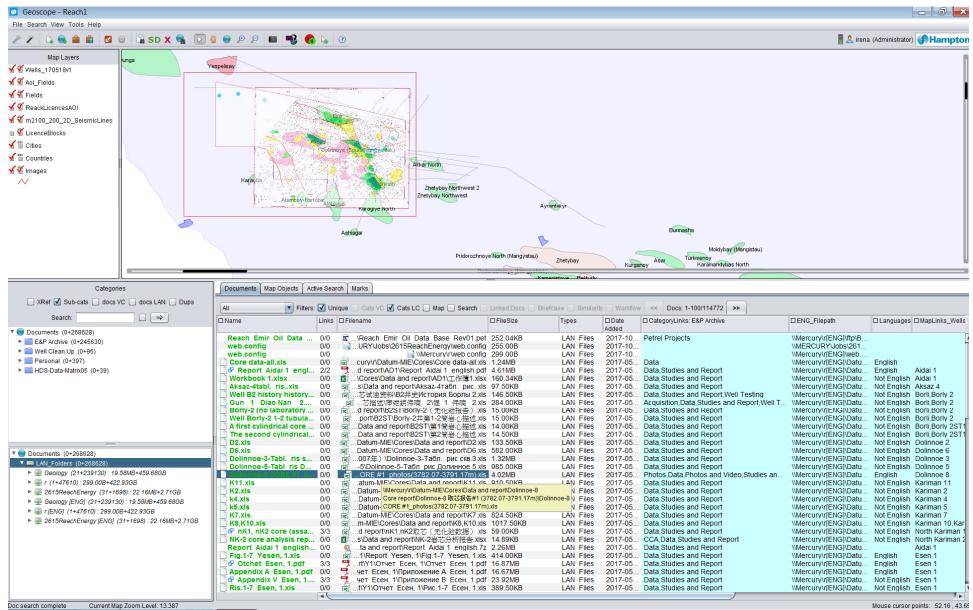








Total of 268,628 files managed by GeoSCOPE > without duplicates = 114722



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Added problem of well/field/asset ALIAS names

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Production (2+179): 548.43KB+65.61MB	Dolinnoe 6	0	D6	3475	3539	3474	3538				nnoe	6	Долинное, Долин, Д 6 -ST	D 6 -ST,STK,SIDE*
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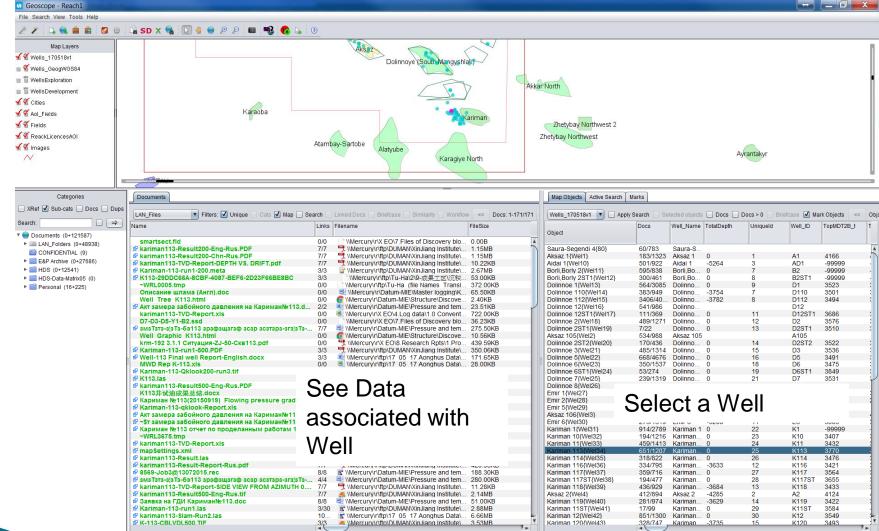
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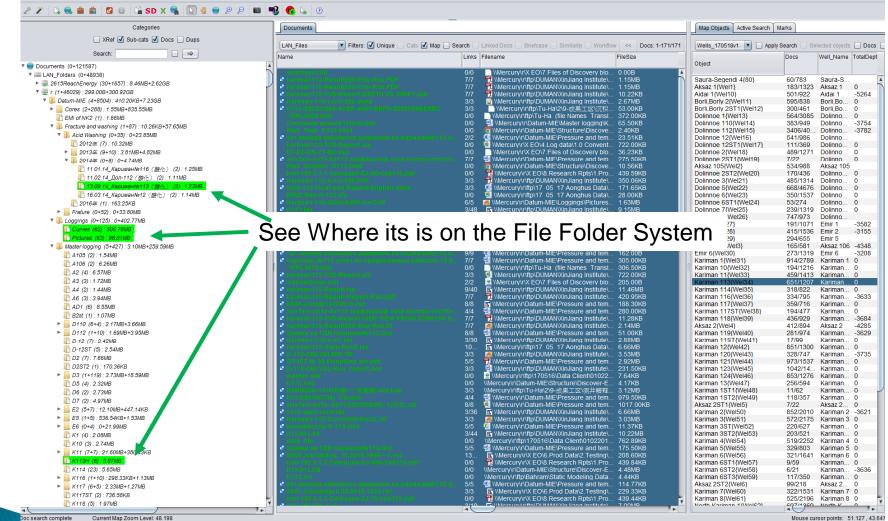
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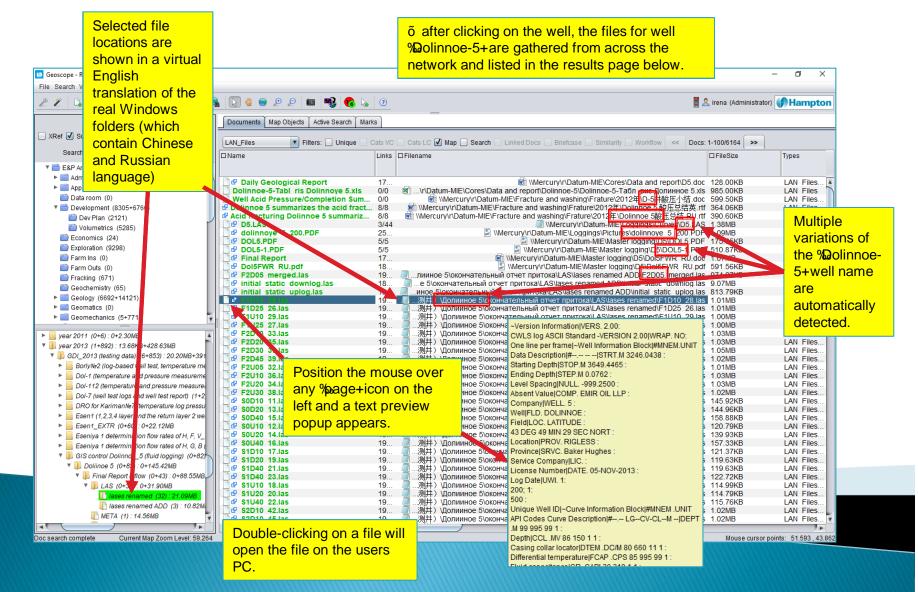


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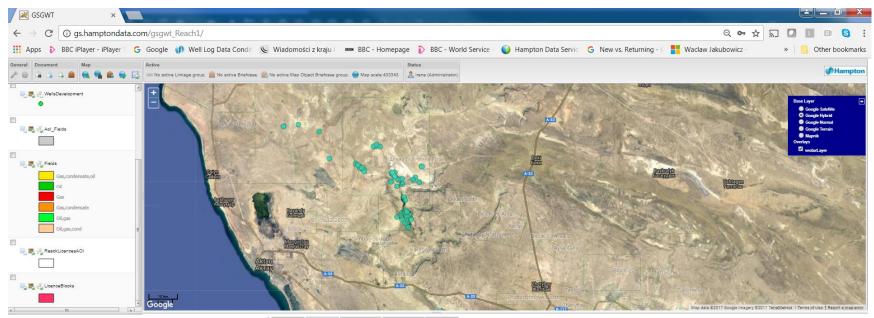




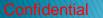


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Phase 1: Project Initialisation

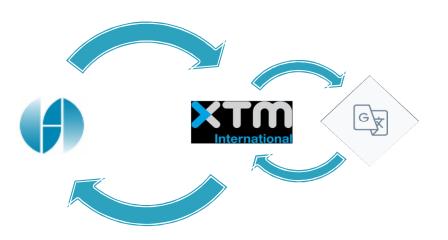
- Identify all documents in the project
- Derive actual and translated <folder>\<file> names
- Extract meta data from translated file paths and by document scanning to create virtual file folder hierarchy.
- GeoSCOPE and XTM operate collaboratively, in the background, to provide translation between >190 languages.





Phase 2: Fast draft document translation

- Translate individual documents
- Batch process several files
 - Add to "Draft Translation" briefcase.
 - Completed Translations returned in "Completed Draft Translations"
- Translated documents stored in a separate folder/file hierarchy
 - Original document is tagged to show that a translation exists.
 - Translated document is tagged to indicate that it is a draft.
- GeoSCOPE works with XTM and and cloud based Machine Translation engines to provide a fast turnaround time

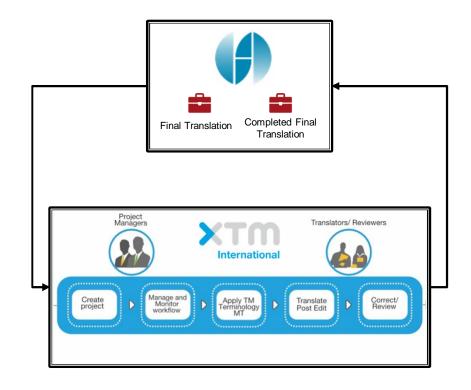


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Phase 3: Final document translation

- Selected Files placed in a GeoSCOPE briefcase.
- The briefcase contents enter a XTM managed translation process:
 - Quality of the final document(s) is managed by linguistic and domain specialists.
- Finalised documents are returned to the user/project and are appropriately tagged.



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smiths medical

The Beginning XTM International was formed in 2002 by Bob Willans and Andrzej Zydron

Around the world XTM International has offices around the world, including United Kingdom, United States, Poland, Argentina, Ireland and Japan Independent Developer XTM International is an independent Translation Management System and CAT Tool developer.

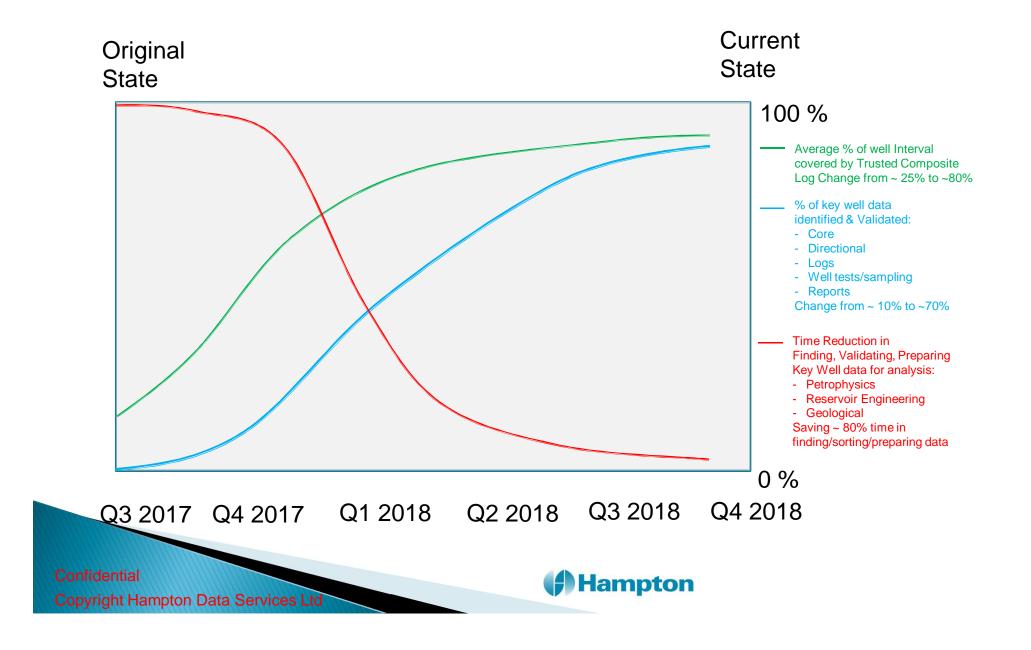
Innovative at its core XTM International launched XTM Cloud a web based Translation Management System in 2010



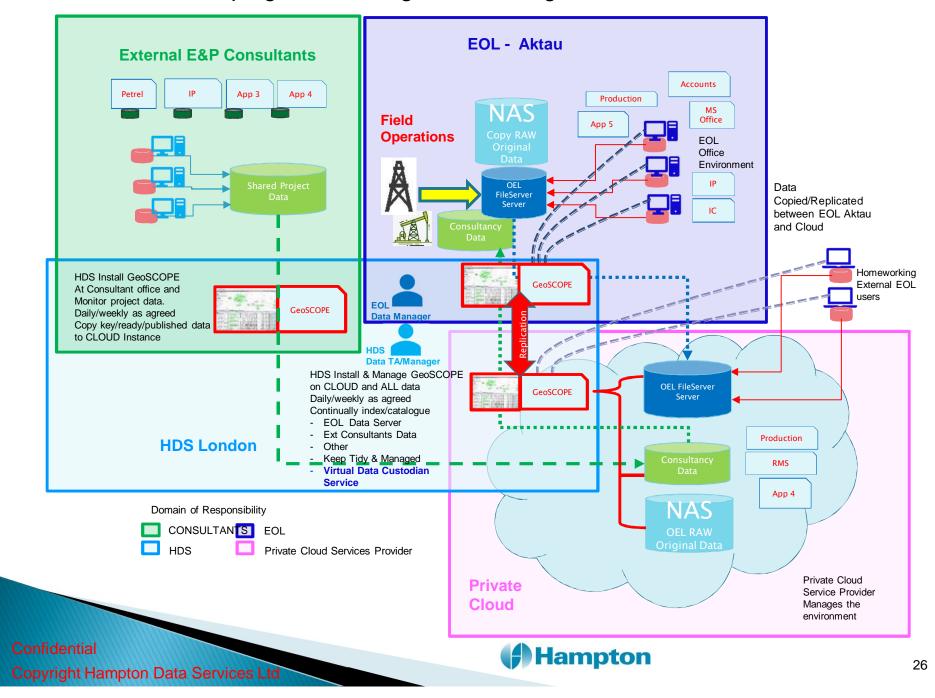
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Developing Data Management Configuration



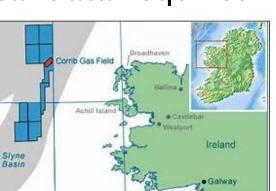
Example 2 - Nephin Energy Ltd

New Dublin Registered Company



- Currently in process of acquiring SEPIL's share of Corrib Gas field – West of Ireland on behalf of a Canadian Pension Fund – CPPIB
- Corrib Produces ~60% of Rol Gas
- Non Operator
- >18TB & 170k of technical data transfer
- Quick & thorough audit of technical data required

- NEPHIN wish to outsource:
 - IT Infrastructure to the Cloud
 - IM/DM



Technical Services: Geology Geophysics Reservoir Engineering

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As part of the transfer process, Nephin is in the process of receiving the SEPIL technical data package of some 18 TB in disk volume, containing some 170k data files. Seismic data makes up the bulk of this data volume, taking up 15 TB, but other files include all the normal types associated with a producing field including but not limited to wells data, logs, PETREL subsurface models, production data, facilities drawings (CAD DXF DWG files) and ROV surveys

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Data files & folder structure extracted & indexed from delivered disks



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Key Advantages of cloud based IT and IM/DM

Minimal IT costs in-house (massive total IT cost reductions) This is primarily a result from outsourcing of Corporate IT to the CLOUD

Minimal IM/DM costs in-house

This is primarily the result of outsourcing & virtualising Corporate IM/DM to a 'CLOUD Ready' environment using Hampton Data GeoSCOPE and Virtual Data Custodian Service which:

- Operates on the data structure "As Is" and therefore avoids the need to create new file folder systems & data duplication
- Operates "Virtually" & flexibly from anywhere, from multiple simultaneous locations, as long as broadband access to the www is available
- ["] Allows easy access to data for consultants & other Co's as and when needed.
- Keeps ALL Data managed continually in real-time for all operational and evaluation needs, keeping it "Evergreen" and "Validated" 24/7 and "Operationally Ready".
 - ⁷ Data is Autonomously & Continually
 - " scanned for :Duplications / New data arrivals / creations / deletions / renames / Changes in file content or file movement
 - ["] Mined for content which is extracted from files and records
 - Tagged/classified to multiple Taxonomies (client defined) using "intelligent HDS data mining" algorithms (both BI & ML based)
 - *Tagged/linked to spatial entities (Geo-tagged) wells, surveys, field, block etc Manually Validated as regards set TAXONOMIES (Classes) and SPATIAL Links made,*

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Key Advantages of cloud based IT and IM/DM

- Manages ALL "users work & activity" in the background, WITHOUT the need for the users to be involved in an IM/DM role (and EDMS form filling or data entry to Corp DB) - providing apparent seamless "Lite" E&P IM/DM for the user.
- Allows users to continue working and creating data, information and KNOWLEDGE without any superimposed IM/DM workflows.
 - *Users have freedom to work, create and evaluate in the style that is most comfortable to them*
 - Petroleum Engineers, Geologist, Geophysicist, etc. can <u>spend max time in evaluation and decision</u> <u>making</u> and minimise time spent in DM & search, therefore releasing them from non-core tasks
- ² Efficiently and thoroughly Captures Data, Information, Knowledge & Corporate IP
- ["] Provides online Data Support Services centre at fixed commodity charges on a per usage basis for:
 - Workstation loading
 - ⁷ Data conversion
 - ["] Data validation
 - ["] Digitising
 - Editing/compositing
 - Processing etc



Summary of Advantages of Cloud Based Virtual & Autonomous E&P IM/DM

- ["] IT and IM/DM costs are significantly reduced
- Allows flexibility & distributed remote working
- Provides an "central" automated indexing, classification, geo-tagging of the content on a dynamic shared filesystem, therefore:
 - KNOWLEDGE and INFORMATION Created and placed anywhere on the filesystem, by all company users
 & contractors, is automatically identified, tagged and retained.
 - The "IM/DM Management" of KNOWLEDGE & IP becomes independent of :
 - *the users and corporate IM/DM skills and capability,* and does not rely on the users to do any "tagging" or" data key-in" or "entry" into a DM systems for future retrieval and search by others.
 - ["] the presence of the data originator (or former data owner) in the Company and therefore NEVER lost. It's quickly, easily & intuitively found by new personnel and other staff unfamiliar with the data, as well as any outside consultants on demand.

The Company retains its KNOWLEDGE & IP once the key staff member/consultant leaves the project or the Company.

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E&P Applications on the Cloud **Ë** where are they ?

Basic cloud based IM/DM . is here !.

But the big E&P applications providers tend to favour use of <u>their</u> software on their cloud. Reluctant to park it on private clouds. Licencing is generally restrictive.

The majority of the E&P applications are still traditional client server, desktop applications working on in-house infrastructure. Few are web browser / internet enabled. But Virtual Machines can be created on a cloud environment allowing them to accessed and used remotely (providing the licence keys allow).

But <u>some</u>qsignificant E&P software providers, without a large vested interest in promoting %beir cloud+, are becoming flexible

There are however smaller embryonic E&P development initiatives that are developing browser & cloud based applications





https://operations.antaeus.cloud/

Why did we create Antaeus?

O&G Industry challenges of today

[¹] × [¹]

Limited

Worksharing



Scattered Data, Impaired Analysis



Siloed Solutions

Poor User

Experience



Outdated Systems



Inaccessible Solutions



High Capital Cost



3 3

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Why did we build our cloud platform?

How Antaeus' platform (GeoFitTM) is designed



Data Management



Single Global Platform Accessible Anywhere



Innovative & secure cloud technology



Open to 3rd Party Apps Continuous Development



Intuitive User Interface, Improved Connectivity



Internal and External Workspaces



Scalable Cost Software As A Service SaaS model

3

4





GeoFit[™] Cloud Collaborative Platform



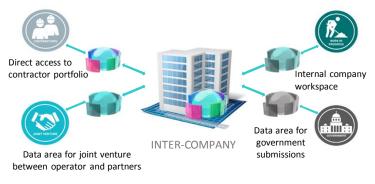
Independent internal Project Collaboration Workspaces (PCW)

Partner Collaboration Workspace for external worksharing

Instantaneous changes reflected on common workspaces

- ightarrow No breach of security during worksharing
- \rightarrow Preserved confiden ality for projects and nego a ons
- \rightarrow Enhanced collabora on within the company and with partners





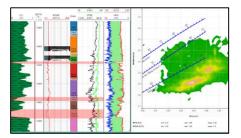
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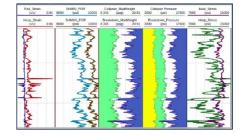


Current Domain Algorithms

Petrophysics



Geomechanics



(Pore pressure

and Wellbore

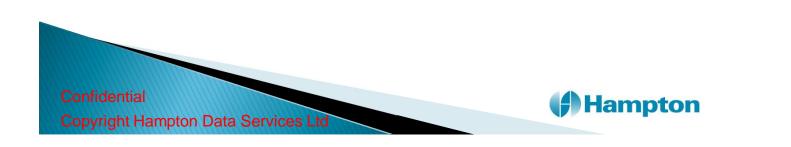
Stability)

Coming Soon;

Realtime Measurement Drilling & Completion Production

(Conventionals and Unconventionals Interpretation)

+ Custom Development to suit client Requirements





Our Plan.



Open to Third Party Solutions, Continuous Development

Independent development, no vendor partiality

Secure hosting for third party applications

Plan for continuous expansion of Antaeus suite technical apps

 \rightarrow One-stop shop for all current and future technical software needs on the cloud

 \rightarrow User freedom to choose best app for the job



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Thank You

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