

SPE 128729: A Step Forward in Collaborative Well Planning: Deployment Challenges Under Windows Platform for Drilling Application in the Ekofisk Operations

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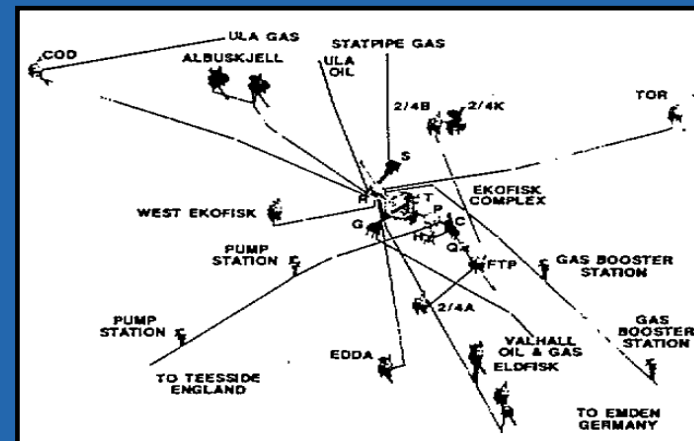
Mike Herbert & Karen Bashford – ConocoPhillips Norway

Agenda

- Integrated Operation – Case History
- Collaboration Well Planning improvement processes
 - 3D Windows platform integration
 - 3D Visualization Work Flows
 - AssetView™ – DecisionSpace® Software
 - Well Planning tools
- Collaborative Well Planning desktop
- Delivery & Challenges
- Connecting G&G and Drilling : Added value
- Discussion

Case History – Integrated Operation Initiative

- *IO is enabled by consistent use of real time data, collaborative technologies, and multi-discipline work flows*
- The Ekofisk field is hosting many application to face the subsidence effect of the reservoir:
 - Deployment of 3D Visualization platform to enhance drilling NPT.
 - Improve G&G and Drilling performance

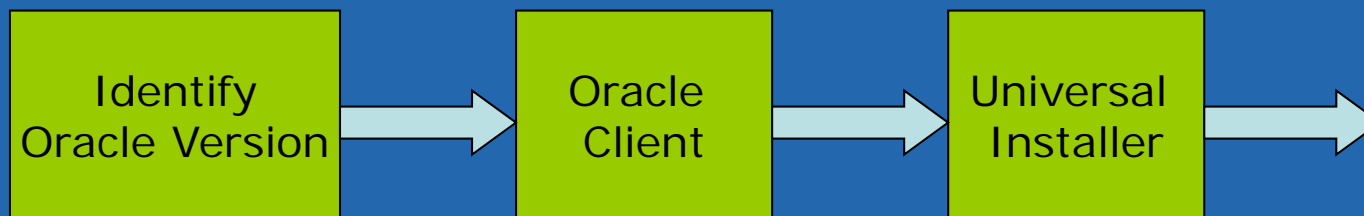


Improving the Well Planning Process

Process #1 – Identify the tools used to do the work : Windows Platform as a common platform for G&G and Drilling

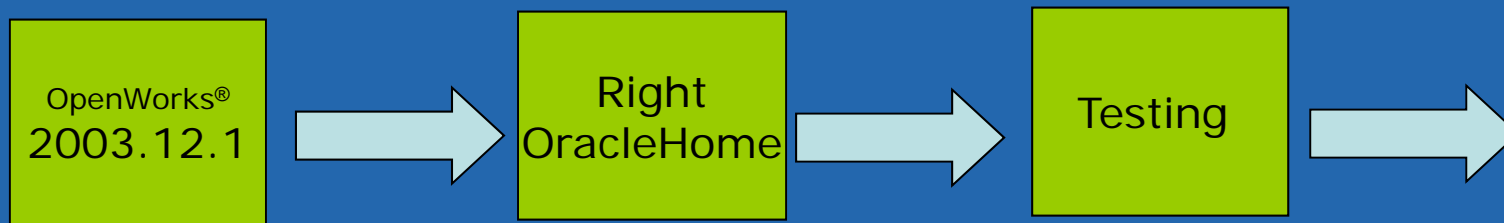
Oracle Client : Problematic issues

Oracle Client installation must comply with the original Oracle version in the Windows machine.



OpenWorks® Software : 2003.12.1

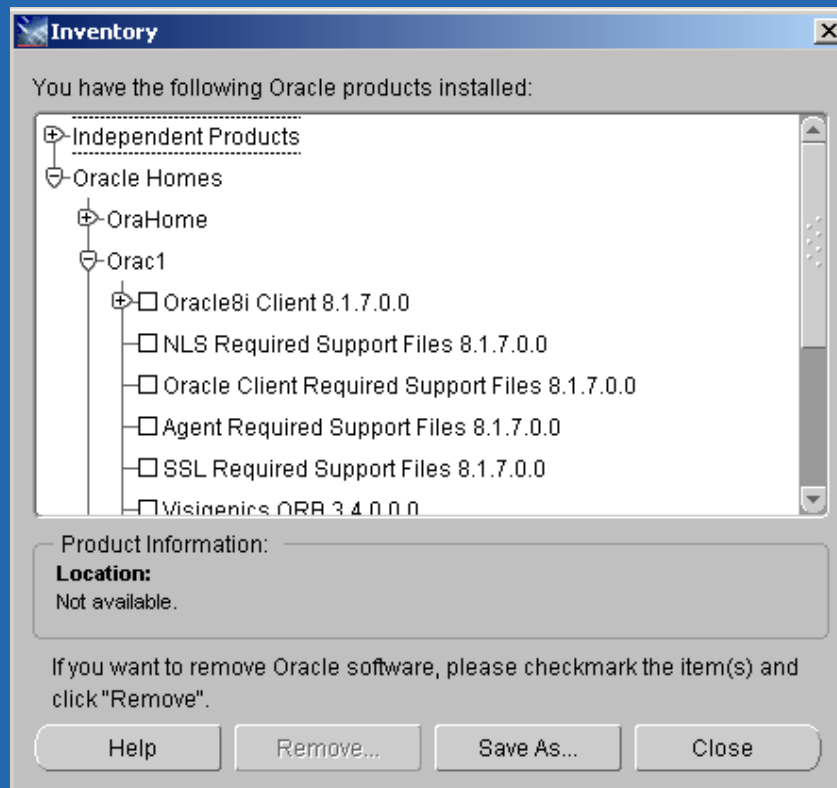
Need to pick up the right version of OpenWorks® 2003.12.1 software – Oracle9i compatibility.



Hummingbird® Exceed 9i

- Box from Linux to Windows
- Need a license per user.

Windows Platform : Oracle Challenges

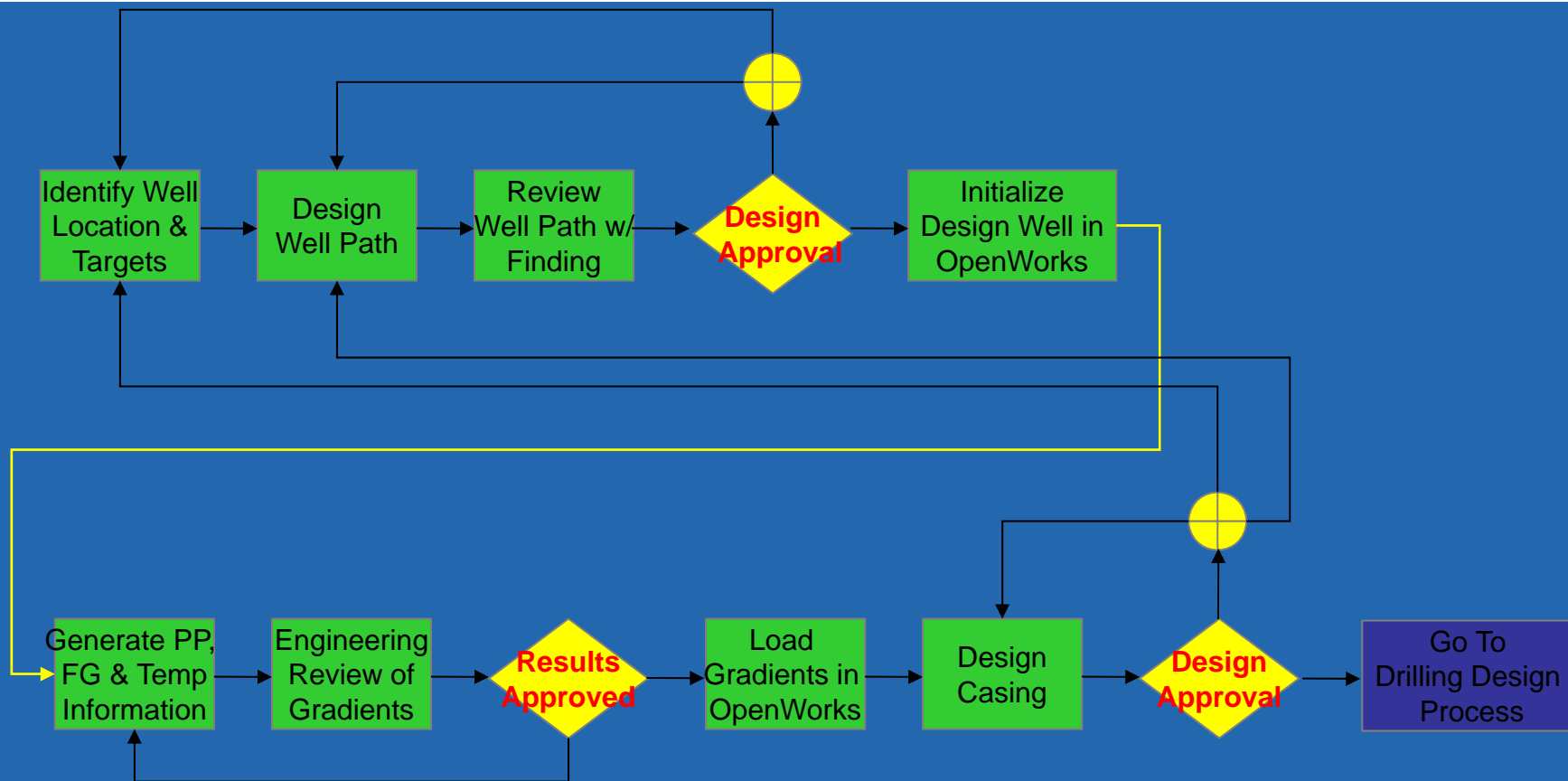


- Oracle10g : How to Deal with different version?
- Oracle Client9

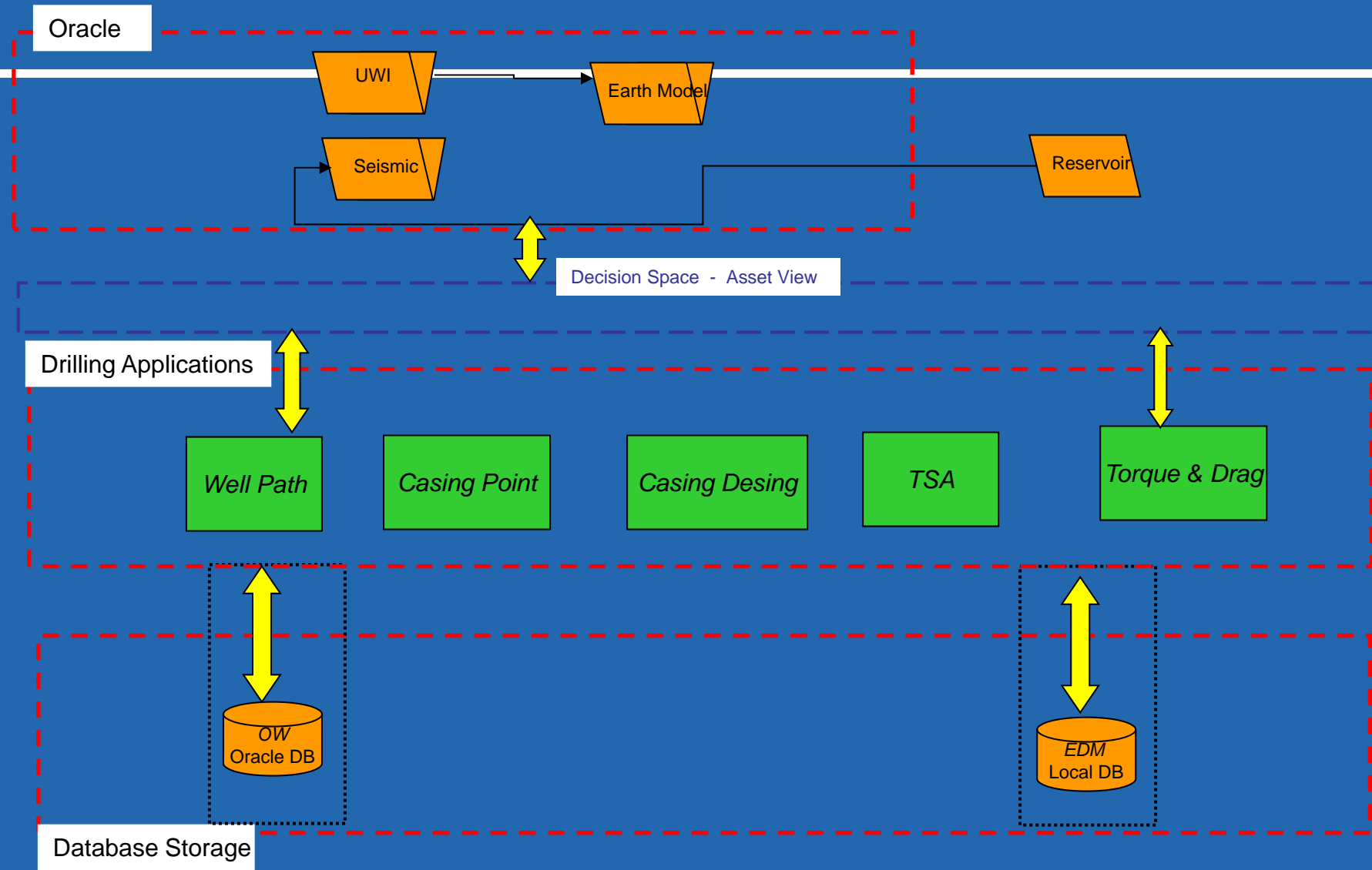
Improving the Well Planning Process

Process #2 – Identify the work flows.

Collaborative Wellbore Design Workflow



CWP – Application Data Flow



Improving the Well Planning Process

- Identify the tools used to do the work.

3D Visualization Workflows

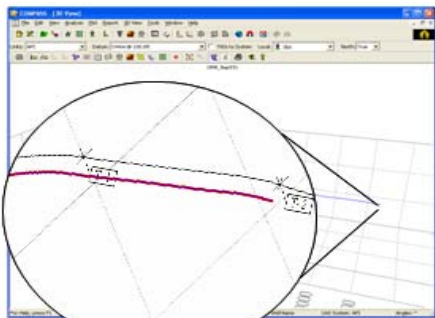


```
<?xml version="1.0" encoding="UT
<trajectories xmlns="http://www.wits
<trajectory uidTraj="dynSrvy" uid#
<nameWell>EDM_Well</name
<nameWellbore>EDM_Well</
<nameTraj>dynSrvy</nameTrc
<aziRef>True north</aziRef>
<trajectoryStation uidTrajStn="
<dTimStn>2007-03-06T00:0
<typeTrajStation>TieInPoint
<md uom="ft">-999.999938#
<td uom="ft">-999.999938#
<incl uom="dega">0.0</incl#
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<dispNs uom="ft">0.0</disp
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```

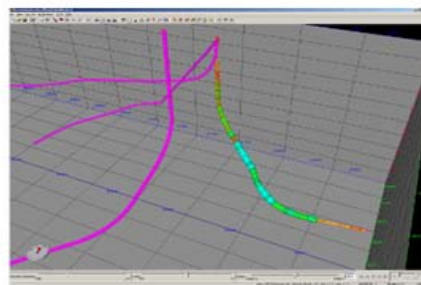
```
<?xml version="1.0" encoding="UT
<trajectories xmlns="http://www.wits
<trajectory uidTraj="dynSrvy" uid#
<nameWell>EDM_Well</name
<nameWellbore>EDM_Well</
<nameTraj>dynSrvy</nameTrc
<aziRef>True north</aziRef>
<trajectoryStation uidTrajStn="
<dTimStn>2007-03-06T00:0
<typeTrajStation>TieInPoint
<md uom="ft">-999.999938#
<td uom="ft">-999.999938#
<incl uom="dega">0.0</incl#
<azi uom="dega">-1.52670#
<mtf uom="dega">0.0</mtf#
<dispNs uom="ft">0.0</disp
<dispEw uom="ft">0.0</disc
```

Trajectory
(WITSML)

Log
(WITSML)



Real Time
Visualization in
ODC



DecisionSpace -XP
Platform

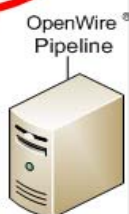


ODC



Visualization Room
XP Platform Decision
Space Machine

EDM Log Mapping		
Simulator		
Well:	EDM_Well	
Wellbore:	EDM_Well	
<input type="button" value="Drill Down"/> <input type="button" value="Drill Up"/>		
Log Curves in Log HYD		
Mnemonic	Start	
<input checked="" type="checkbox"/> MDEPTH	2004-01-	
<input checked="" type="checkbox"/> FLOW_RATE	2004-01-	
<input checked="" type="checkbox"/> ECD_SHOE	2004-01-	
<input checked="" type="checkbox"/> ECD_TD	2004-01-	
<input checked="" type="checkbox"/> STAND_PIPE_PRES	2004-01-	



OpenWire
Pipeline

Need New
OpenWire
Server set to
Oracle Data
Base

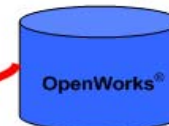


WellPlanner Work
Station



TracPlanner

New Target can be
pushed to EDM via Trac
Planner or imported



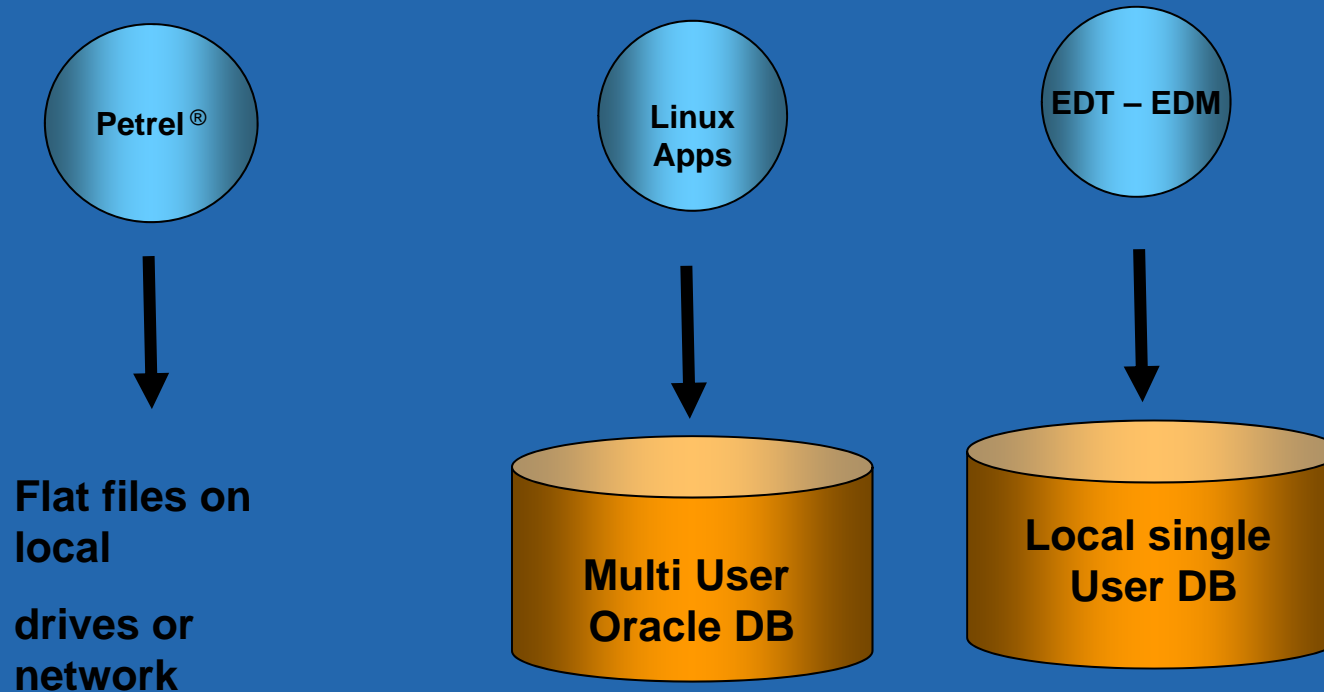
OpenWorks

The Well Planning Process : Consolidation

Process #3 : Bridg Unix and Windows



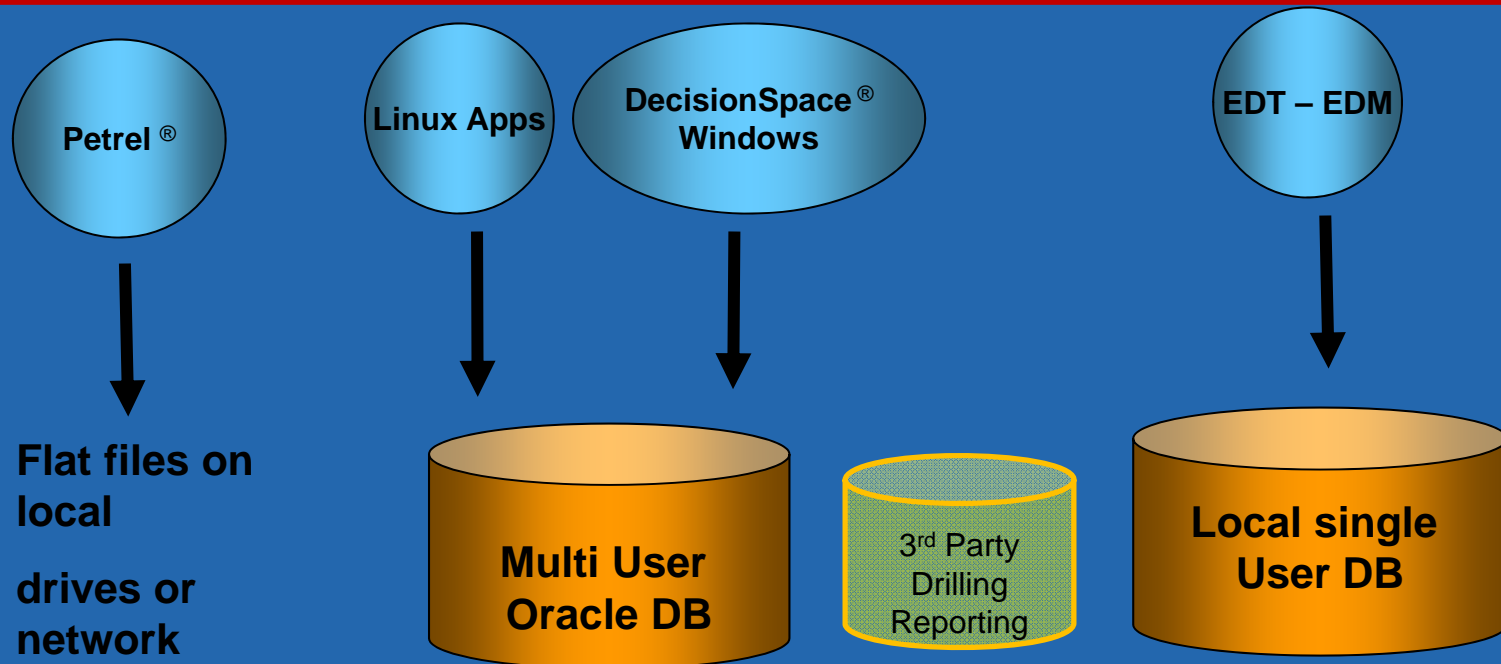
Windows – Linux Environment



- Petrel® connected through WITSML
- Transfer of data between applications achieved primarily via flat file transfer in Petrel®

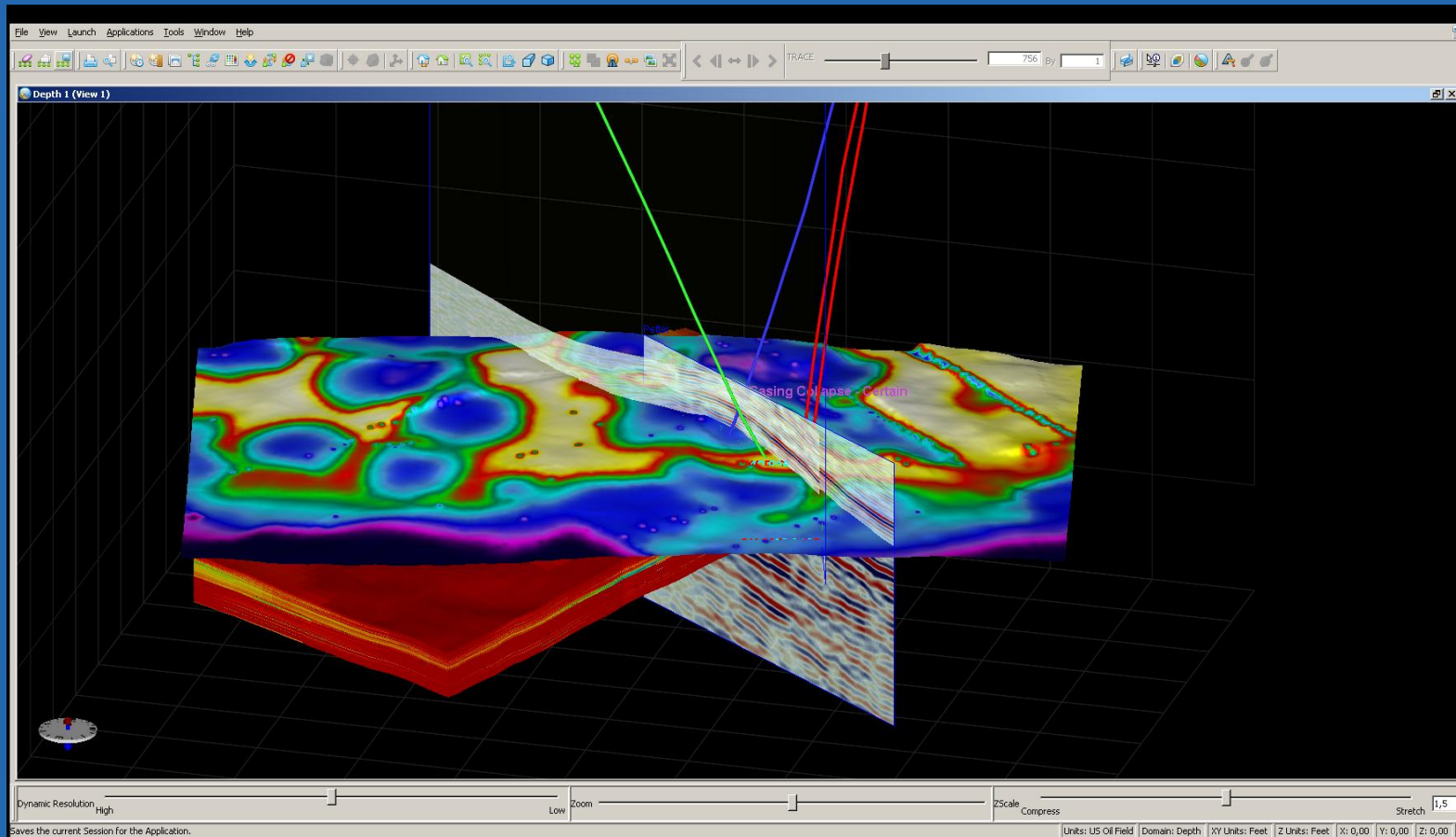
Windows Interaction with Linux – Enhancement

3D Visualization Environment & DecisionSpace® Workflows



- DecisionSpace® AssetView applications connected to Oracle DB

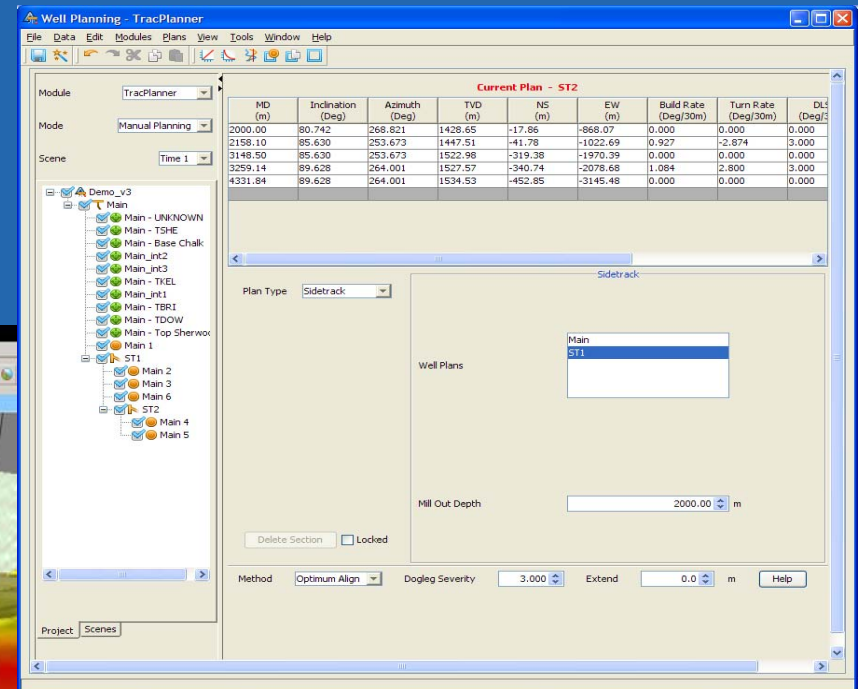
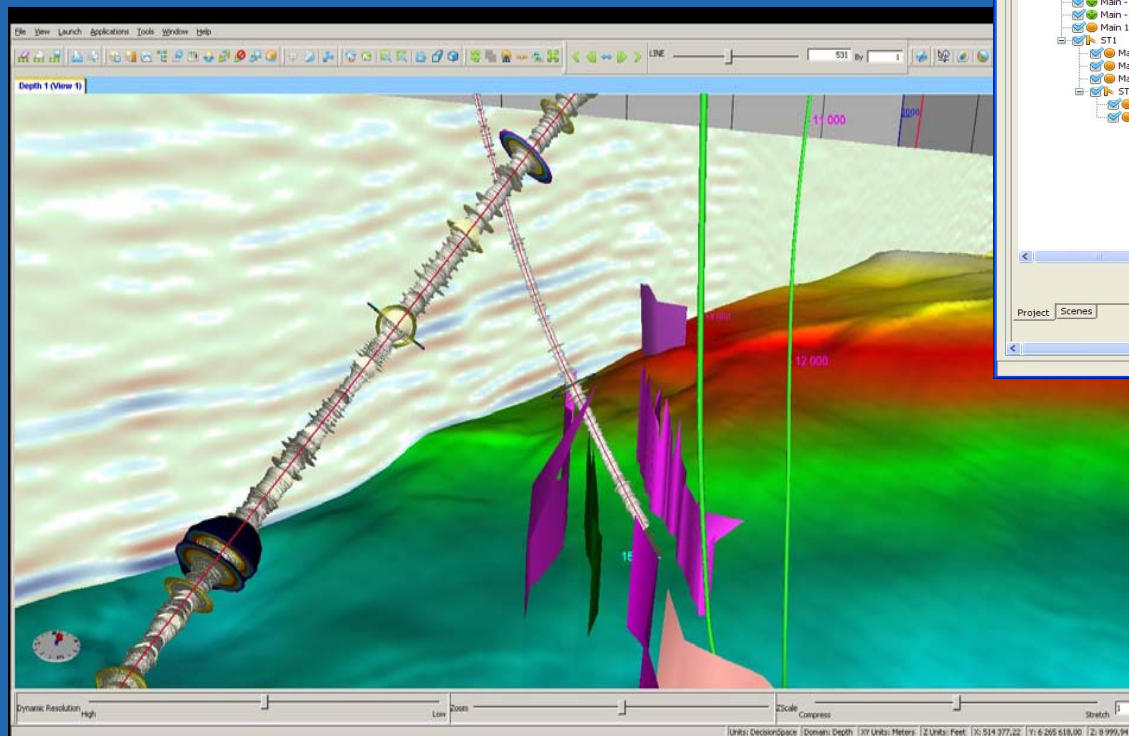
AssetView™, the 3D viewer



- All subsurface and drilling data can be viewed in depth and time simultaneously and updated in real-time

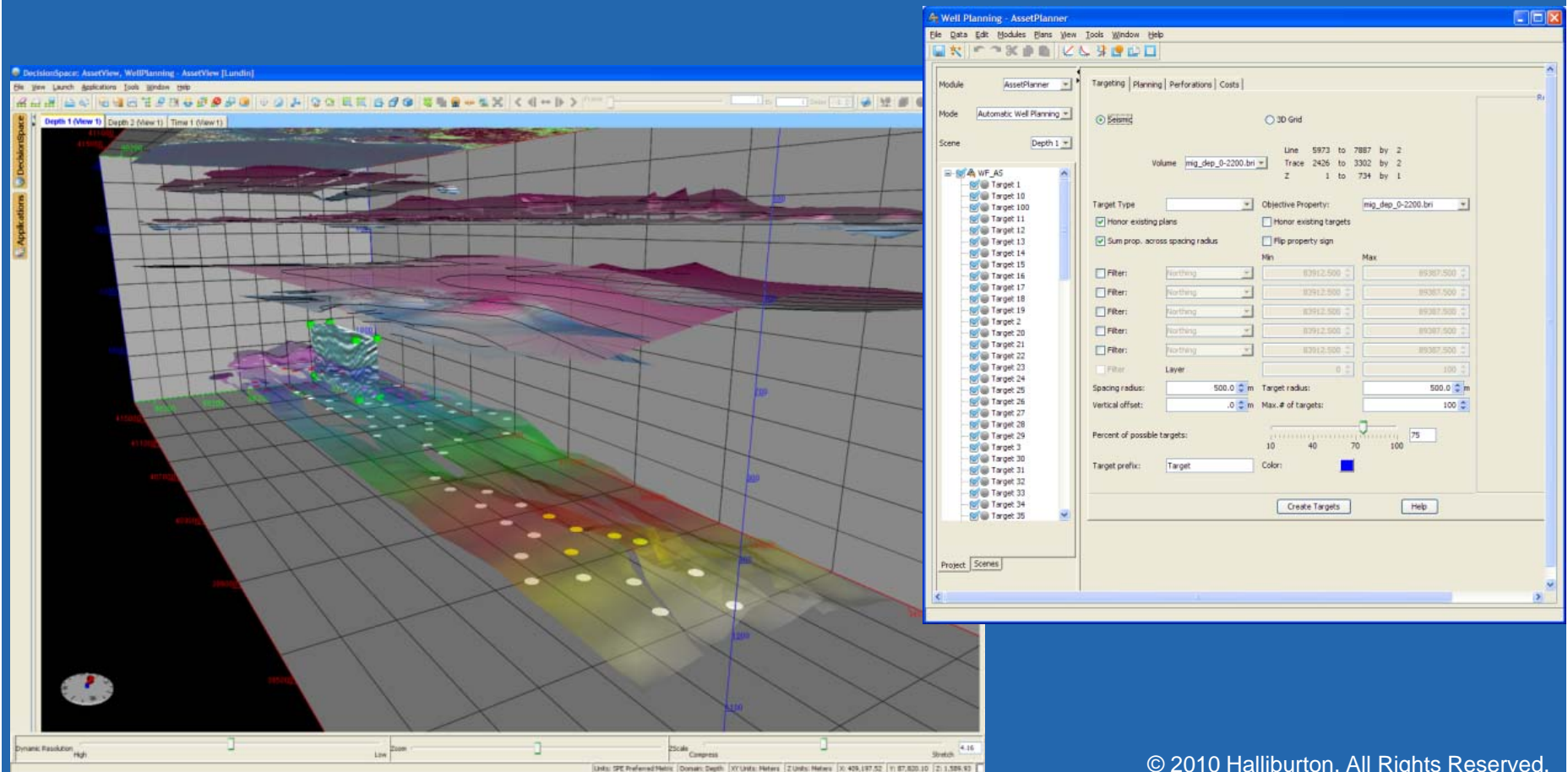
TracPlanner™ software

- Well planning plug-in for AssetView application.
- Create targets visually
- Define & display trajectory constraints
- Wellpath planning in the earth model.



AssetPlanner™ application

- Automatically generate targets using Seismic or reservoir model parameters
- Use filters to specify constraints on where the targets will be created e.g. depth range, porosity, permeability.



Well Planning Tools

- Create hazards from seismic volumes
- Create hazards from faults
- Create hazards from 3D Grids
- Targets can be defined as hazards (*anti-targets to avoid*)

- Generate intercept details of objects along the wellbore; formation tops, faults etc.
 - Dynamic lithology column creation workflow

- Wellbore Analyzer can extract the along-wellbore intersection of a well with any 3D data block and display these as 'lathes', traces or tabulated values.
 - Pore pressure & fracture gradient creation workflow

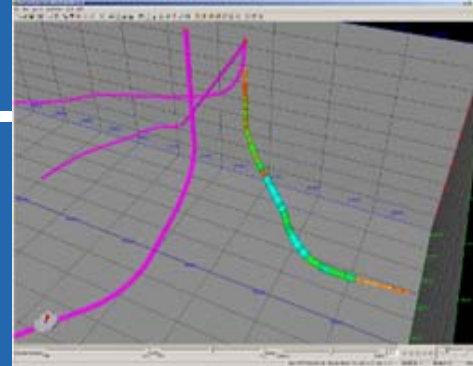
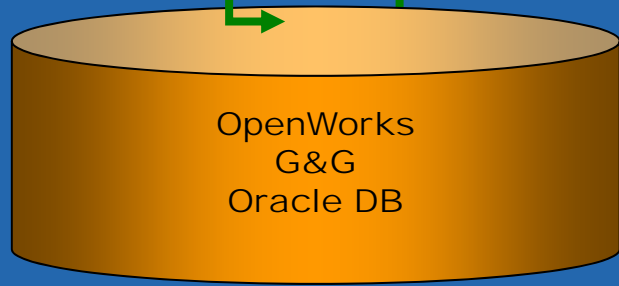
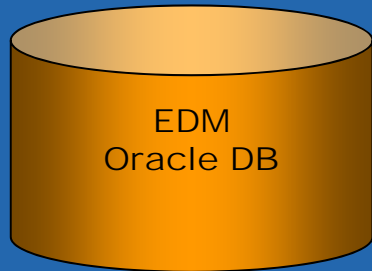
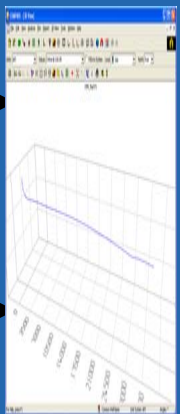
Improving the Well Planning Process

Process #4 – Delivery & Challenges.

Collaborative Well Planning Desktop

3D Visualisation Environment & DecisionSpace®
Workflows

Engineering Desktop



Export/ Import

Third Party Drilling reporting

Local DecisionSpace®
Machine



Summary

- Easy access to windows users
- Adapt G&G and Drilling groups
- High Visualization capabilities for drilling
- Demystify the G&G world for drillers
- Knowledge transfer between G&G and Drilling
- Culture change and Team work space



Thank You

**"Whoever admits that he is too busy to improve his methods has acknowledged himself to be at the end of his rope."
- J. Ogden Armour**

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