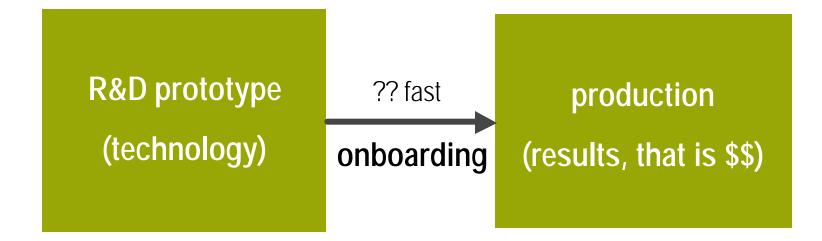
A new paradigm for rapid technology onboarding

Michael Glinsky, William Ryan, Matthew Lamont (BHP Billiton)

Synthia Kong and Olivier Lhemann (Interactive Network Technologies)







Outline



- Strategy
- Tactical plan
- Implementation
 - BHPviewer
 - Configurable XMLeditor
 - Wavelet based reservoir ID



- Java
 - 25% to 30% development time and cost
 - Easy to port to new hardware platforms
 - Extendable (10-20x more than C or Fortran)
 - Performance rivals that of C and Fortran
 - 400 Mflop/s performance per Linux processor (Colt dense matrix benchmark), 60 Mflop/s (Linpack benchmark)
 - CERN Colt library
 - Insignificant object oriented overhead, performance determined by FFT speed (same as optimized C and Fortran program)
- OpenSource maintenance
- Linux clusters with LSF
 - Low cost
 - Robust distribution



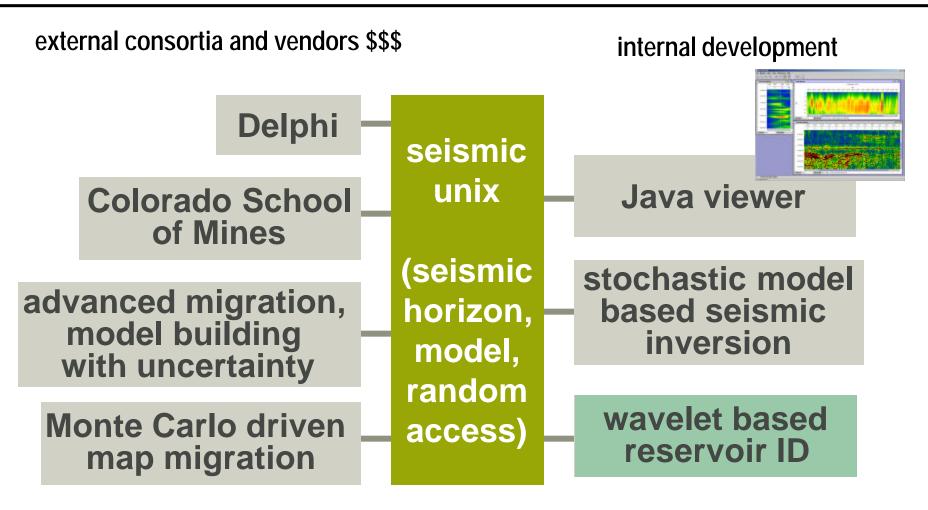
- Exploit superior knowhow
 - Increase the value of our assets
- Rapid technology development and onboarding
 - Maximize the rate of technology change



- 100% Java based development
- OpenSource maintenance whenever possible
- Seismic Unix backplane
- BHPviewer
 - servlet-applet, multi-tier structure
 - Java, XML saveset of view
 - Multidimensional 2D viewer, 3D in future
- Linux cluster with LSF
- General XML editor for parameters and distribution
 - Behavior determined by xsd
 - Servlet-applet infrastructure

Software architecture supporting fast implementation





Web page access to results – a picture that can be browsed

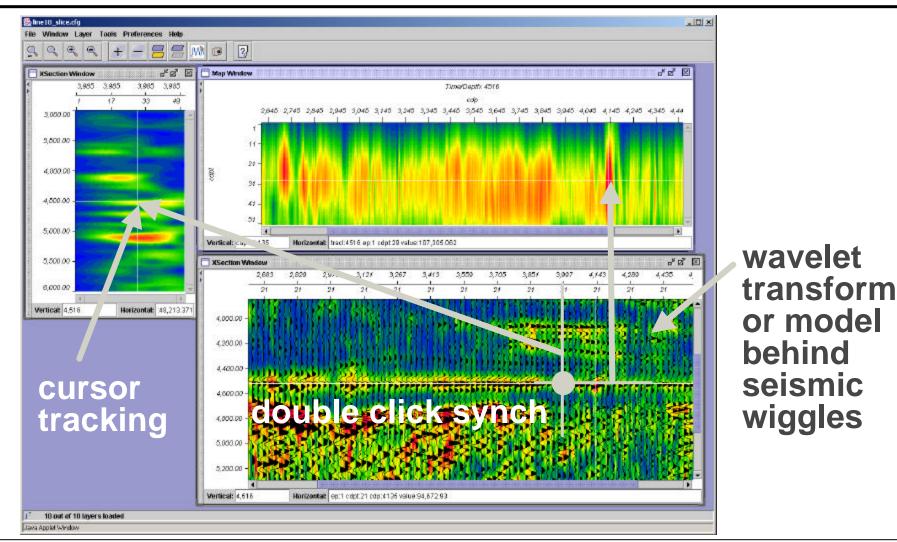


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BHPviewer (South Africa, Orange Basin) Continue Press the above button to get a new session. Wavelet Reservoir ID Line K2002-10 with wavelet transform and stratigraphically flattened If you cannot see the above button, your brower fails running the applet.	4
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A new paradigm for rapid technology onboarding Page 8 29 October 2003

Synchronized viewer





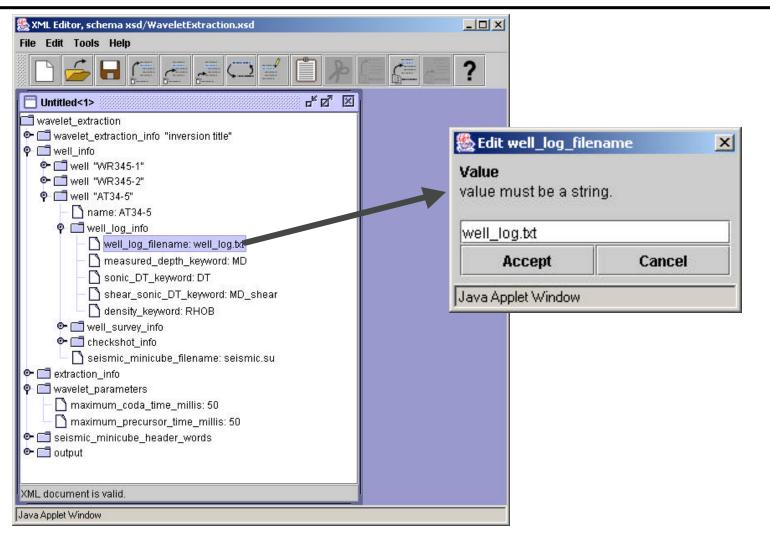
XML distribution via the web interface with application specific Java help



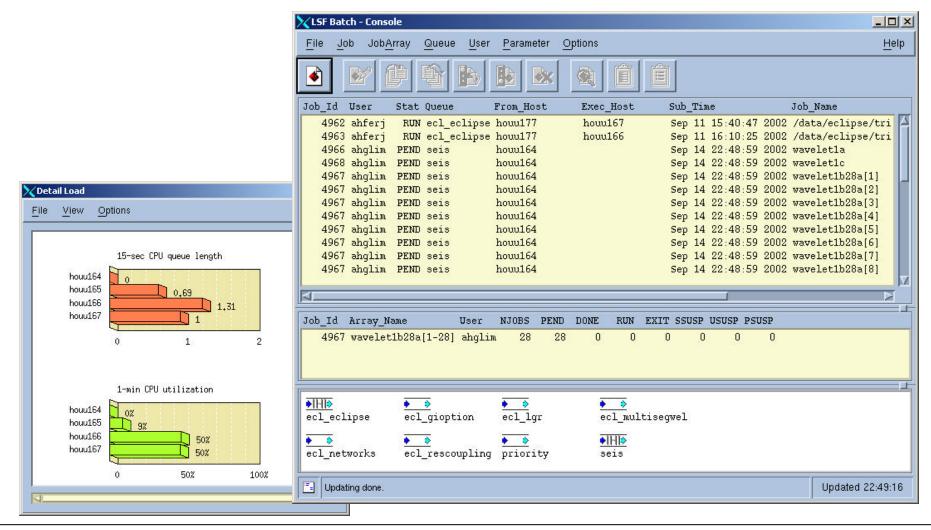
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XML explorer of parameter file



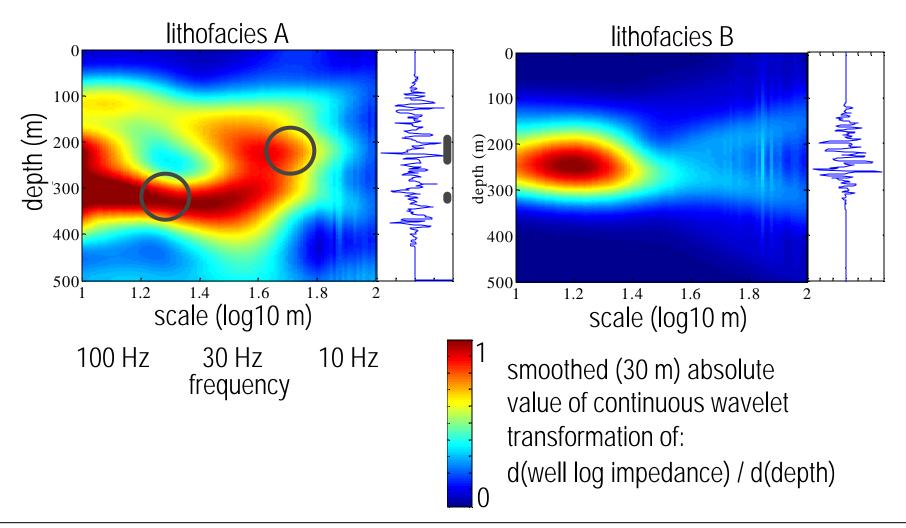






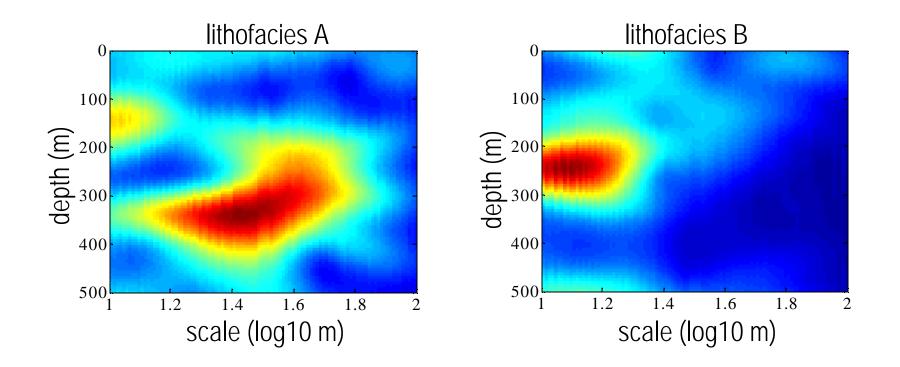
There is multiscale structure in seismic reflectors, can we detect it?





Linear inversion of real seismic data also recovers well log spectrum

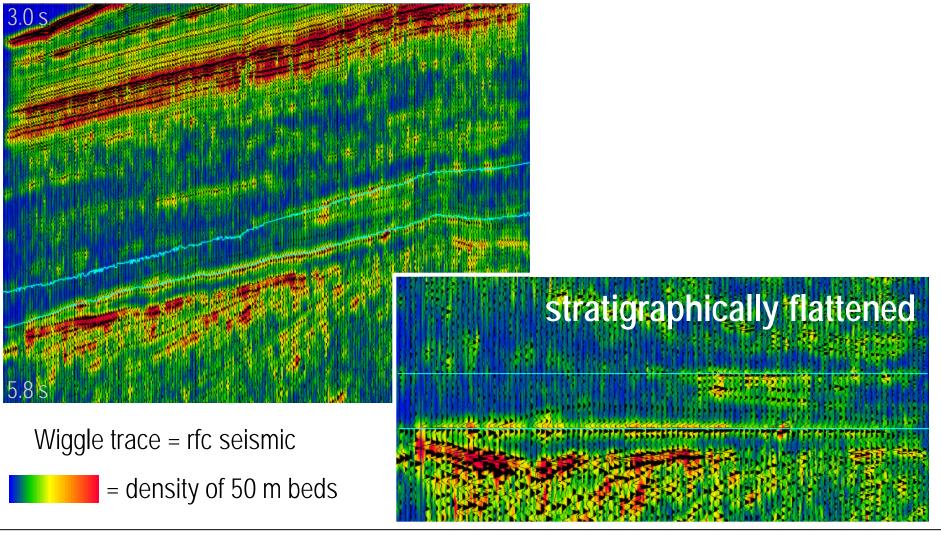




J. Appl. Phys. 94, 5350 (2003)

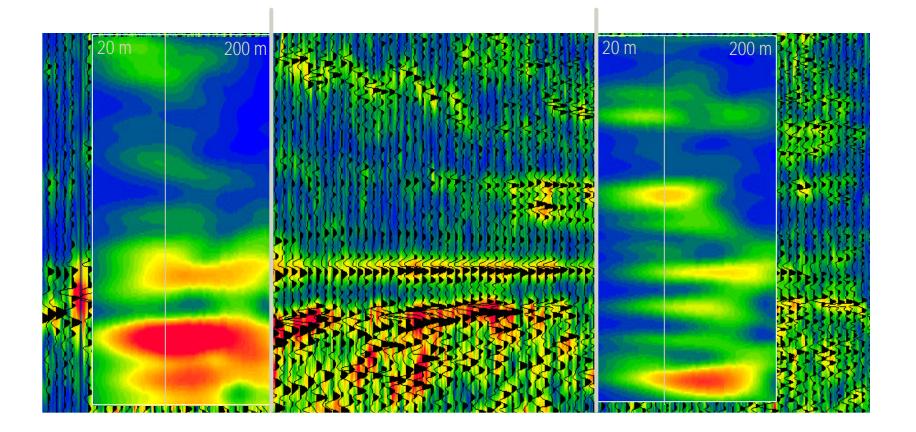
Stratigraphic slice with wavelet transform and movie





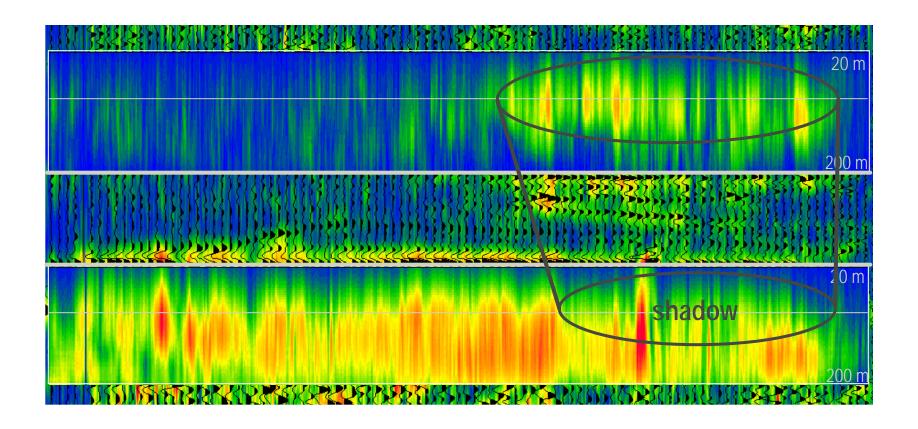






Wavelet spectrums for two times show spectral shadow







- New paradigm has enabled rapid reduction of the cycle time from concept to business value
 - Wavelet based reservoir ID (12 months)
 - Advanced horizon amplitude extraction (2 months)
 - Stratigraphic flattening (2 months)
 - Bayesian imaging velocity tomography (9 months)
 - Stochastic model based inversion (24 months)
 - Bayesian wavelet extraction (8 months, in progress)
 - Stochastic inversion to COUGAR reservoir simulation (18 months, in progress)