

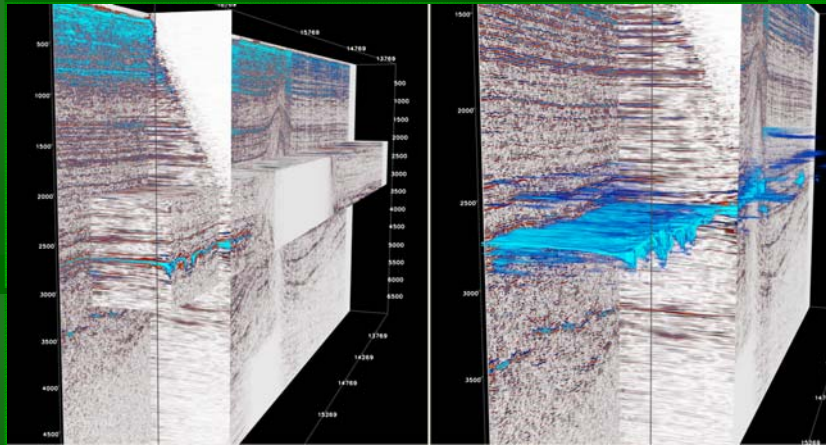
Accelerating Resource Discovery

GPUs uncover hidden meaning
in seismic surveys.

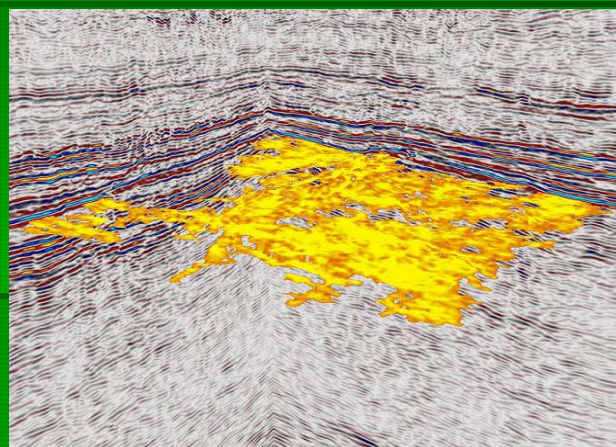
Headwave, Inc.

- Incorporated 2005
- Focused on prestack volumetric visualization and analysis
 - Seismic QC
 - Data Discovery
- Three years later we've shed blood and learned a lot

Seismic QC



Seismic Data Discovery



high amplitude horizon of a seismic layer with amplitude attribute coloring

Experiences with Headwave

- Gains in speed can be unexpected
 - Slowdowns occur also
- Bottlenecks abound
 - #1 Bottleneck = infrastructure
 - #2 Bottleneck = disk speeds
- Bottlenecks abound, but so do roadblocks

The Need for Speed

- Prestack data is enormous today and getting bigger
 - 10 MCS blocks ~ 1 TB of prestack
- Data discovery requires either lots of eyeballs, or massive memory, or GPUs.
 - We chose the latter approach
- First step – GPU decompression on the fly of prestack data
- Next – GPU acceleration of attribute calculations
 - Simple attributes of prestack data
 - Trace horizon time delta to poststack time
 - Prestack trace count for stacked trace

Bottlenecks 101

- Infrastructure
 - GigE – even with compression you're moving lots of bytes
 - Storage – forget disk cache, get RPMs, get spindles
 - Disk speeds – enough said
 - Compression requires large JBOD arrays
 - SS Disks will help, some
 - Tape – sob, sob – don't get me started

Roadblocks

- "That's not how we do it."
- WAZ
 - 600 fold coverage is coming
 - If 36 fold coverage of 10 MCS blocks takes 1 TB, what does WAZ of the same area take?
- Graphics memory
 - More is better, too much – might just make it
- Algorithms
 - Many of them were parallel, now are serial
 - Help is coming

Future Music

- EAGE – timeframe
 - API for plug-ins to Headwave
 - Interactive semblance
 - Interactive FFTs
 - Interactive gradient/intercept
 - Interactive probe-based stacking
- Big idea
 - Get local parameters optimized, then submit for batch
- The Future will contain CPUs, GPUs, and other potentially more specialized (yet programmable) electronic circuits