Antelope
Antelope

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Antelope Presence

- Antelope running on All 7 Continents
- Countries
- Cities
- Critical Facilities
- Structures
Antelope Applications

- Seismic data center operations
  - Several-station networks
  - Hundreds of station networks – USArray, Italy/DPC, Chile
- Seismic network and inter-network operations
  - Weak motion processing
  - Strong motion processing
- Data exchange
  - Real-time “virtual” seismic networks
  - Non real-time (e.g. SEED, autoDRM, web-based)
  - Access to other tools, such as SAC and MATLAB
- CTBT/NDC operations
- Infrasound
- Hydroacoustics
- Portable telemetry deployments (USArray)
- Offline processing of “standalone” portable deployments (IRIS/PASSCAL)
- Research in seismology (University Community)
- Induced Seismicity Applications
- Structural health monitoring
- Generic “sensor webs” and multi-hazard monitoring
Antelope Key Points

- Enterprise-grade core infrastructure
- Dual support for data-driven mission and operations-support mission
Antelope Key Points

• Complete software package for traditional seismic network operations
• *Extensible Middleware Framework* for interconnecting data sources with data processing to create custom earth monitoring systems
• Store-and-forward packet system enables reliable transport, processing, dissemination
• Embedded relational database system
• Core utilities available for both streaming and batch-mode processing
• Has been applied to numerous environmental monitoring domains
  o seismic, tsunami, volcano, strong-motion, sensor-web, structural health
• *Open architecture*, with both closed and open-source components
• High performance and reliability
• High scalability
• High interoperability
• Minimum processing and communications latencies (early warning)
• Productive development environment for new/extended functionality
• *Coherent engineering throughout creates highly robust, highly functional, low cost-of-ownership system – only available from commercial code*
Data Transport Backbone

orbserver

- orbserver / orb protocol
- Network transparent
- Data-neutral
- Data-driven
- Extremely reliable
- Short-haul Inter-process communication
- Long-haul, low latency data transport
- Extension to standard networking stack:
  - IP = packet transport
  - TCP = reliable transport of bytes
  - Orb = reliable transport of monitoring-data packets
Antelope provides the worldwide premier software utilities to acquire data from, monitor the health of, and control Kinemetrics dataloggers.

Three-tiered model for acquisition:
- Data
- State-Of-Health
- Command-and-control
Data Acquisition Strategy

- One orb client executable for each datalogger model
- All data, state-of-health, commands exchanged through orb packets
- Programs are generally threaded: many dataloggers served by each program instance
- Huge amount of time and effort invested in these programs to foresee and circumvent every reasonable and many unreasonable acquisition problems
Data Acquisition: altus2orb

altus2orb

• Supports entire Kinemetrics Altus product line
• Works with legacy Altus dataloggers
• Works with Rock dataloggers running in Altus emulation mode
• Provides TCP server communication mode for modem threads
• Provides POC reception capability: keep streaming data alive when remote IP address changes
• Large-network field-proven
Data Acquisition: q3302orb

q3302orb

Over 2 years at USArray:

- 1166 dataloggers
- 10,292 physical data channels at multiple sample rates
- ~40,000 channels of SOH waveform data
- 8760 instance-days of software running
- 16 Terasamples of end user data collected (not including SOH)

- **0 downtime, 0 lost data** due to acquisition software failures
- 1 FTE to manage data center O&M
- **99.5% data completeness**
Dataflow SOH Monitoring

High Success rate of Antelope acquisition:
- Robust Software
- Sophisticated SOH Monitoring
Datalogger Command and Control

dlcmd

Random binary calibration processing results
Processed by dlcalc@andy.super.brtt.com at 8/17/1999 20:27:52.751

BRTT Antelope

Select Calibration Configuration Parameters

Select Parameter:
- Process Sites:
- Calibrator Output:
- Loopback Options:
- Calibration Start Time:
- Calibration Settle Time:
- Settle Time Without Autozero:
- Receiver Time:

Select RBC Calibration Parameters for Site

Select Amplitude in Volts:
Select Duration Time in Minutes:
Select Random Seed Value:
Select RBC Analysis Parameters:
- Select Low Frequency in Hz:
- Select Mid Frequency in Hz:

Status:
EXECUTE THE CALIBRATION SEQUENCE

BRTT Antelope
**Station Metadata Management**

**dbbuild**

- Program for building the “metadata” part of a Datascope database (*site, sitechan, sensor, instrument, calibration, stage* tables plus external instrument response files)
- Can operate in either interactive or batch mode.
- Can run from a master configuration file
- Based on well-documented ASCII files
- User-configurable single-stage response files
- Set of parameter files that describe standard dataloggers, pre-amps and sensors
Datascope

- Schema-independent relational database system
- Flat-file, no “black box” into which your data disappear
- Written directly from core ideas of relational databases
  - Create *sets* of things
  - Establish *relationships* amongst them
  - Intuitive database operations
- Optimized for real-time monitoring
- Coherently engineered with Real-time Tools
- Many specialized tools and features for seismic tasks
Real-time System

- Unix building-block design
  - Hundreds of small, well-designed programs, each with a clear job
  - Shared-object libraries of generic and specialized tools
- Framework to customize solutions
- Scalable
- Network-transparent
  - Allows local deployments
  - Allows distributed processing
- Demonstration system based on GSN
  - Learning and Testing
  - Augment small networks with global processing for context
  - Basis for rapid configuration of larger operations
Antelope is:

- The Premier, State-of-the-art seismic monitoring software platform in the world
- The industry leader in robustness, flexibility, and design quality
- Open-architecture
- 20 years field-proven
- Commercially maintained, commercially supported

Software is a critical, first-class element of systems that meet customer business mission
Remainder of Meeting

- Anza, CEUSN Network usage
- Dbmoment
- Extending Antelope
- Multi-hazard monitoring
- Afternoon: Discussion
Reminder
Antelope User Group
Meeting
August 17-19 Fairbanks, Alaska