Use of SGE Enhances Geoscience Technology at Hess Corporation

September 10, 2007

- Who we are
- What we do
- Current installation
- How SGE helped us get here
- Future directions

- A Leading Global Independent Energy Company
  - 2006 Fortune 100 company
  - 2006 Production ~ 350000 BOE/Day
  - ~ 13000 employees

Exploration

Production

Refining

Marketing

- **Find economically producible deposits of hydrocarbons.**

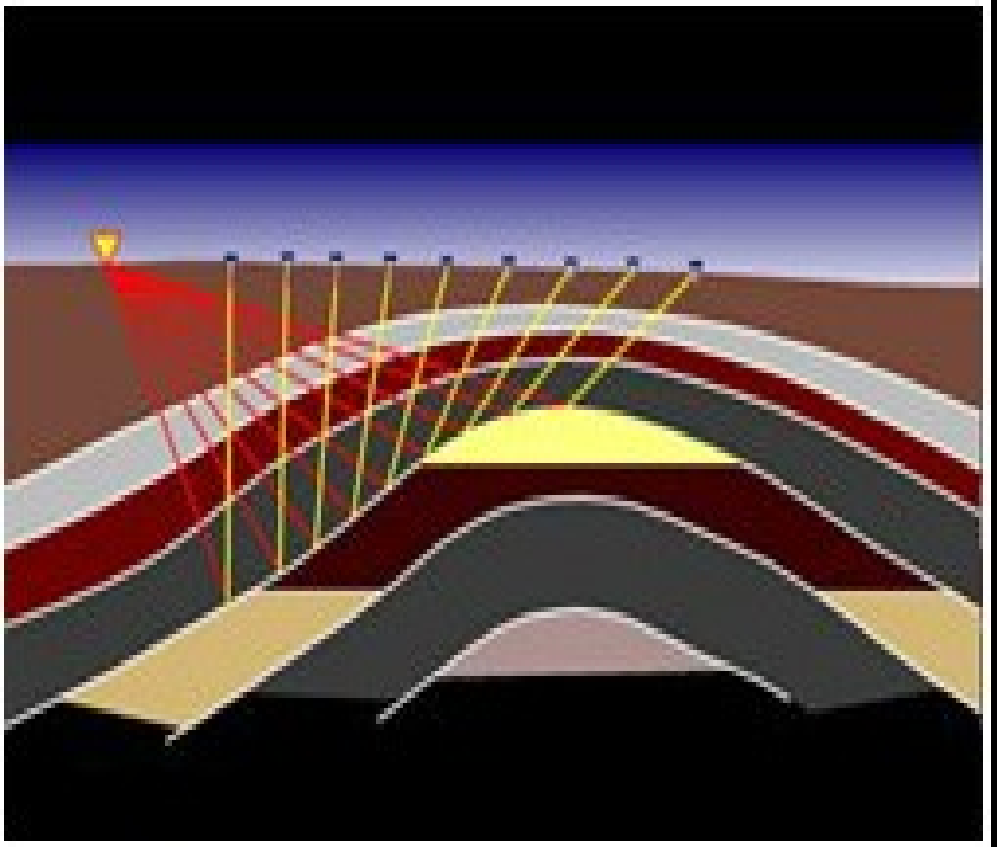
2007 GEOPHYSICAL GLOBAL ACTIVITY

Seismic Acquisition

Seismic Processing

Interpretation Software

- Each experiment
  - impulsive source: “shot”
  - record echos
    - hundreds of “receivers”
    - record for ~ 10 sec
    - at few ms sampling
    - recording called a “trace”
  - “shot record”



- Seismic survey
  - area ~ 10^3 km^2
  - shots ~ 10^5
  - traces ~ 10^9
  - sizeof(trace) ~ 10 kB
  - sizeof(survey) ~ 10 TB

2000 compute nodes

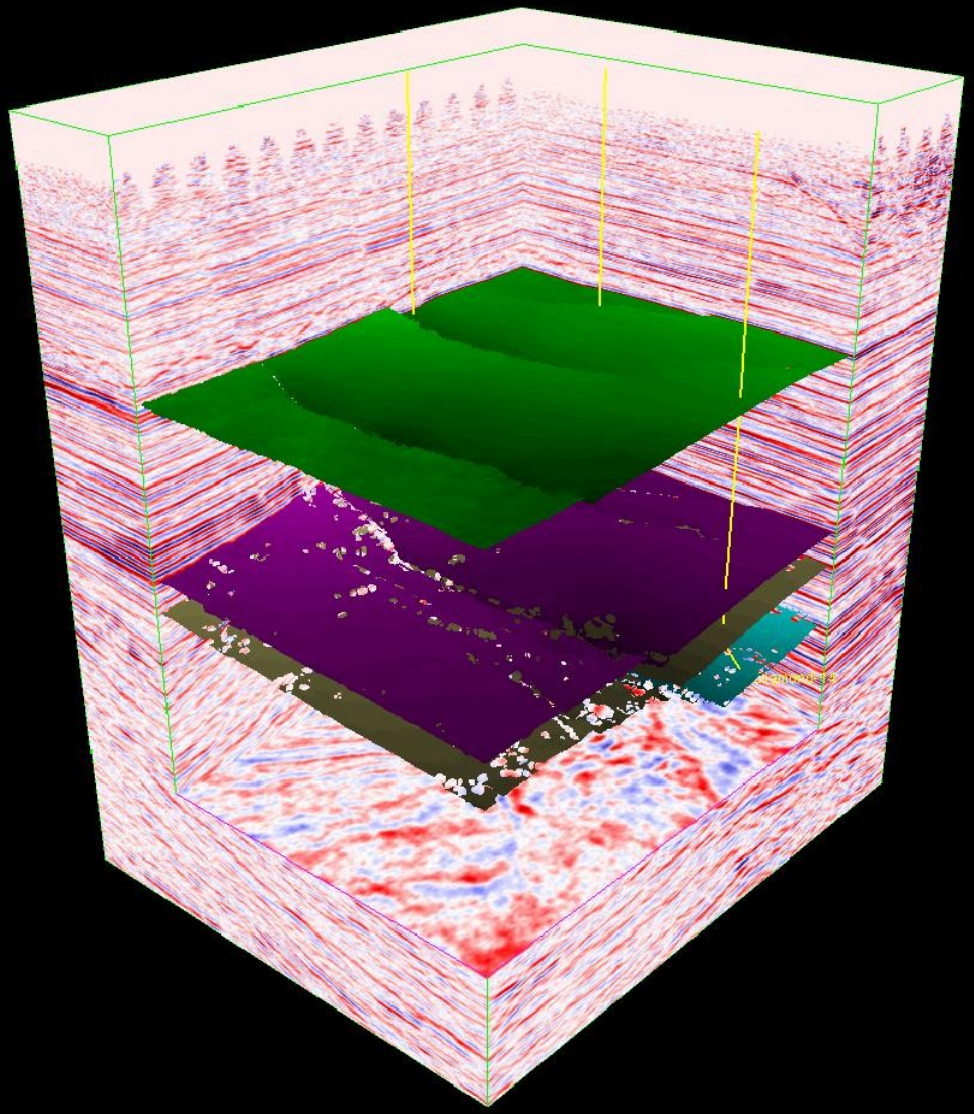
Environmental Statistics

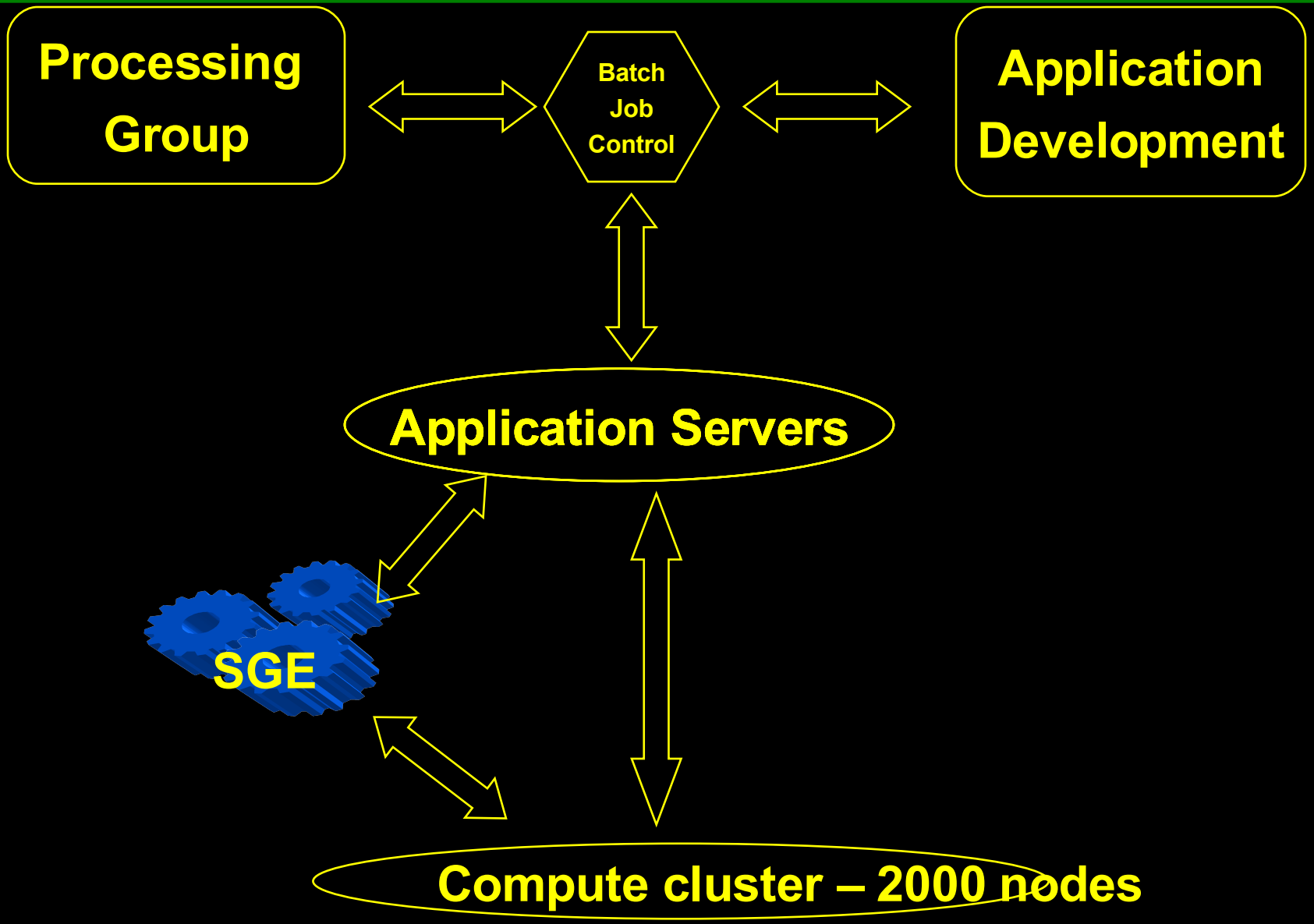
Power Requirements: 781 Kilowatts

Air Conditioning: 225 Tons

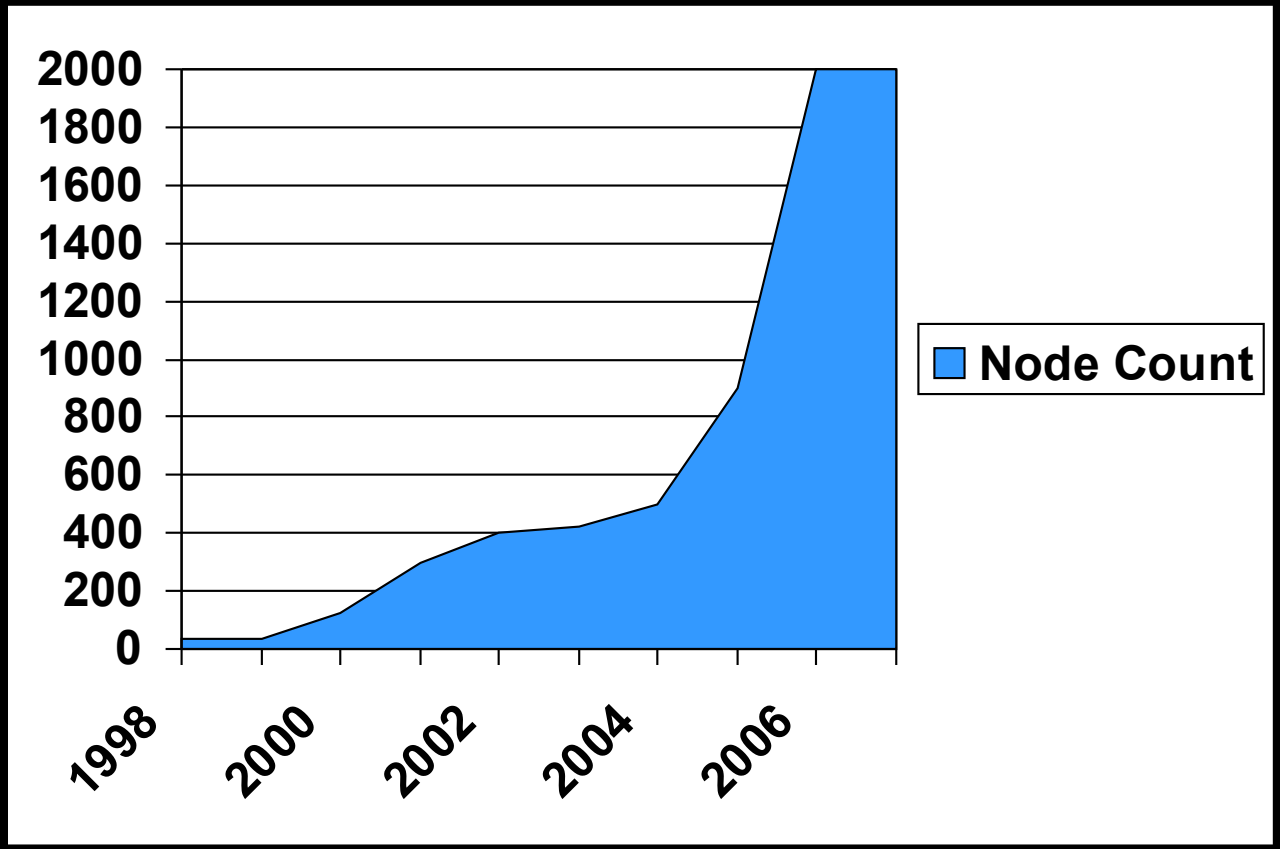
Storage: 1 Petabyte Harddisks

3-D Volume Interpretation





Cluster growth



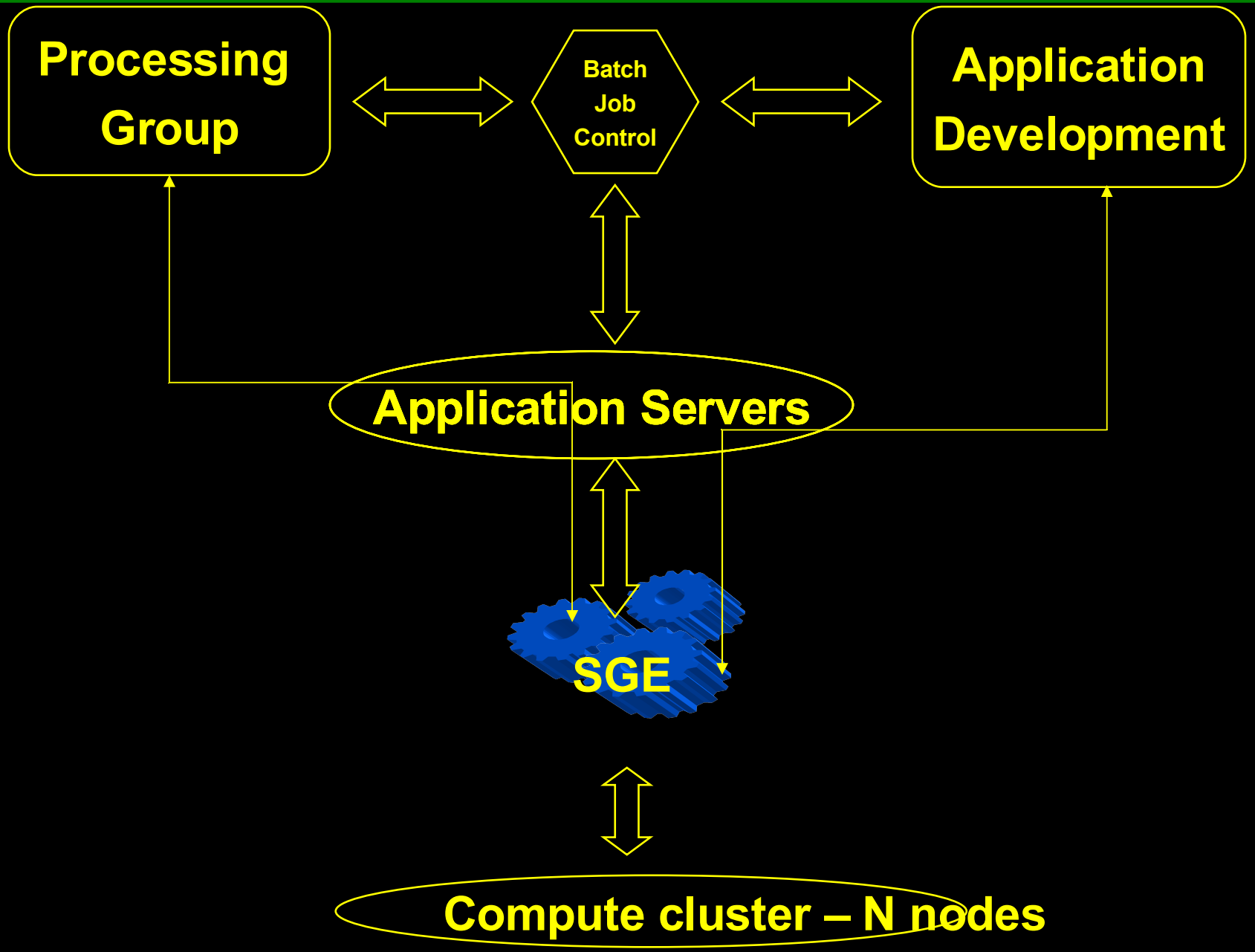
- The first problem: Job task failures due to local disk drive errors.
- The answer: Easy restartability using SGE

- The second problem: Now we can run enough simultaneous data copy tasks that we overwhelm our disk SAN.

- The answer: Limit the number of concurrent tasks using an SGE consumable complex .

- A third problem: MPI application gets node assignments that are non-optimum for network communication.

- The answer: Define SGE hostgroups that reflect the network switch configuration.



THANK YOU !