Integration of Middleware for Compute Farms

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Some Facts and Figures about s+c

- Revenue 2003/04: 20 Mio €
- Employees: 190 (September 2004)
- Locations: Tübingen, München, Berlin, Duisburg
- Company established: September 1989
- Legal Form of Company: Privately Owned Stock Corporation
Our Focus

We offer
IT services and solutions
for efficient IT management
in technical computing

Revenue Growth

Revenue in Mio. Euro
Today: about 190 employees
More than 85% hold advanced degrees in sciences, engineering, and computer science

An educated guess
Most of our customers do not want to operate Compute Farms ...
... they want solutions for their simulation problems
scITservices

- System Administration of Linux/Unix/Windows
- Installation and Configuration of Compute Farms
- Operation of Compute Farms
- Integration of Clusters in department networks
- Update of Applications/Operating System
- Operating System and Application specific Know-How

IT’s all about Distributed Resource Management

- Need for Middleware
- Increased complexity
  - Heterogeneous platforms
  - Multiple administrative domains
  - Multiple locations
  - Varying security policies
  - Flexible cooperation structures
The Administration with scVENUS

The functionality of computers are described through their group membership. Automated system administration: fast, reproducible, solid/stable performance, minimize influence of unreachable clients.

Different administrator accounts, different access rights, log files.

scVENUS Modules

User and filesystem administration
Configuration administration
Software administration
Inventory
Monitoring

scVENUS Base

scVENUS
Integration and Job Flow - Software Layers

- Easy access to compute resources over a WEB interface
- Comfortable job flow management with a graphical editor
- Optimal utilization of compute resources, LSF
- Integration of different applications
- Automate and reproduce system administration
- Operating systems

Integration and Job Flow - I

System Environment

Compute Farm

In a preprocessing process the CAE engineers are building the input decks on their workstations
Integration and Job Flow - II

**System Environment**

The CAE engineers submits batch jobs over a WEB interface, generated from EnginFrame.

**Compute Farm**

Integration and Job Flow - III

**System Environment**

With flowGuide the batch jobs are prepared to be submitted as job scripts in a load sharing tool, like LSF.
Integration and Job Flow - IV

**System Environment**

- Compute Farm

**Optimal distribution of batch jobs depending on system requirements**

**Platform**

- LSF Parallel:
  - Control for MPP Jobs
  - Proper Accounting

The Platform LSF Family of Products

- Platform LSF
- Platform LSF HPC
- Platform LSF MultiCluster
- Platform LSF License Scheduler
- Platform LSF Reports
- Platform LSF Analytics
Enterprise Grid-level: LSF Multicluster

Job Forwarding Model

You submit LSF cares for:
- Job transfer
- data staging
- Account mapping
- Accounting
Resource Leasing Model

**Single system image, ease of admin, scalability**

Enable fairshare, preemption, pending reason support, chunk jobs, advance reservation, interactive jobs, parallel jobs, ... across clusters

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**Easy to Configure**

```
BEGIN Queue
QUEUE=lease
HOSTS= all@siteB
End Queue

BEGIN HostExport
PER_HOST = hopper curie
DISTRIBUTION = [siteA, 10]
MEM = 2 GB
End HostExport

BEGIN Queue
QUEUE= export
SNDJOBS_TO = import@siteB
End Queue

BEGIN Queue
QUEUE = import
RCVJOBS_FROM= siteA
End Queue
```
Integration and Job Flow - V

**System Environment**

- Compute Farm
- Job script
- Scheduler
- Batch queues
- WS...

Calculation of the batch job in local working directories on the Compute Farm

Integration and Job Flow - VI

**System Environment**

- Compute Farm
- Job script
- Scheduler
- Batch queues
- WS...

For the post-processing process the results are automated copied back to the WS or other servers.

CAE engineers are informed per email.
Summary

- Simple and comfortable to use solution for CAE engineers
  (Compute Power out of the Box)
- Support of heterogeneous environment (Linux, Unix, Windows)
- Flexible configuration due to modular software layers: Easy to
  administrate with scVENUS
- Efficient distributed resource management with Platform LSF
- Comfortable user oriented workflows with flowGuide
- Portal Solutions with EnginFrame

Thank you
for your
attention

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