Platform Computing

What does Platform Computing do?
- Platform Computing develops intelligent, practical grid software to help organizations optimize IT resources to fuel business performance
- Our business is grid software solutions (Flagship product: LSF)

What Makes Platform Unique?
- Industry-leading partnerships virtually all system vendors and ISV's
- Global Presence
- 1,600 Fortune 2000 customers around the world
  - GM, GE, Boeing, Nissan, Airbus, Daimler-Chrysler, Pratt & Whitney
- 12 years experience with mature, proven production solutions
  - Demonstrated success in automotive, aerospace and general manufacturing
- Dedicated vertical industry teams and expertise
  - Products, solutions, support and services
The Challenge of Pre-Grid Computing

- Isolated - Bounded ROI - Increased TCO - Limited Scalability

- Grid computing solves these challenges

- Shared Resources - Accelerated ROI - Cap Ex/Op Ex Savings - Enhanced Scalability

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Choosing a Grid Solution and Technology Partner

Grid solutions deliver significant value only if they satisfy key technical and business criteria for your organization – 10 evaluation areas for value realization

### Grid Solution Criteria

- **Reliability**
  - Automatic failover
  - Self management features
  - Re-runnable jobs
  - Service level agreement support

- **Scalability**
  - Small clusters to 1,000’s of nodes
  - 10’s of thousands of flows and 100’s thousands of jobs
  - Multiple global cluster support

- **Compatibility**
  - Heterogeneous HW and operating systems
  - Desktops, servers, super-computers, and mainframes
  - Data sharing integration

- **Performance**
  - Workload throughput
  - Response time

- **Security**
  - Plug-in security modules
  - Kerberos, UNIX, LDAP support

- **Application support**
  - Large inventory of pre-integrated applications
  - Easy to use API for new integrations

- **Functionality**
  - Comprehensive scheduling policies for all resources
  - Job flow management
  - Reporting and analytics

### Technology Partner Criteria

- **Grid vision**
  - Complete family of integrated grid solutions
  - Large R&D team with defined product roadmaps
  - Supports and contributes to grid standards

- **Services**
  - 24x7 global support
  - Repeatable methodologies based on best practices
  - Partnerships with leading HW, SW, and services companies

- **Qualified**
  - Large installed base of production grids
  - Industry focused solutions and case studies

Industrial Manufacturing Solution Landscape

Grid solutions allow Platform to deliver significant value to all aspects of the manufacturing enterprise. By using Platform solutions, more work can be done in less time on the existing IT infrastructure. This has been proven to result in faster to market, higher quality, and more innovate products.
Industrial Manufacturing Solutions for MCAE

Virtually all MCAE applications have been integrated with Platform technologies. These solutions are running on servers, desktops, and across multiple locations.

Platform Solution for MCAE Acceleration

- Integrations with all major MCAE applications
  - ABAQUS, ANSYS, STAR-CD, iSIGHT, Fluent, LS-DYNA, MSC.Nastran, MSC.Patran, MSC.Patran Analysis Manager
  - Virtually any batch or interactive MCAE and EDA application can be run in a Platform cluster

- Ability to extend grid computing to UNIX or Windows workstations to harness idle CPU cycles

- Ability to support multiple locations to allow geographic collaboration and sharing of resources

- Engineering user centric Web interface to simplify use and adoption

Bottom line benefits
- Reduce IT capital expenditures by 20% to 40%
- Reduce operational expenditure spending by 5% to 10%
- Increase workload throughput by 10 times in 25 times
- Increase utilization of the existing IT infrastructure by 25% to 75%

Top line benefits
- Higher quality (lower warranty costs)
- Lower material costs
- Faster time to market
- Higher customer satisfaction
- Improved standards compliance
- Better crashworthiness ratings
Solutions for MCAE - How it works

CAE Applications:
- Design of Experiments
- Optimization
- Crash/Impact testing
- Computational Fluid Dynamics
- Noise/Vibration/Harshness
- Durability
- Structural Analysis

Capability and Capacity
- High throughput
- Low-latency
- Fine-grain parallelism
- Automated scalability

Distributed tasks
- Fault-tolerance
- Intelligent prioritization
- Transparent access to compute resources

Architecture

Integrations are intended to be transparent and seamless to the engineer

Model Creation

Job Submission

Workload Management

Application Execution

Client Side

Integrated App

Scripts

Web Portal

Scheduling Master

HPC cluster

Remote clusters

Servers and Workstations
What are large scale simulations?

Large scale simulations can have one or more of the following characteristics:

- Multiple jobs – collections of jobs used to study various permutations (i.e. DOE, Stochastic, etc.)
- Heavy memory and disk requirements – simulations that require substantial amounts of available memory and disk space to complete
- Long duration – simulation jobs that typically take a long time (cpu and wall clock) to complete
The Challenges

Multiple jobs
- How can engineers find the right resources to run all the jobs they need to run
- How can they manage all of these jobs

Heavy memory and disk requirements
- Budget limitations may limit the amount of resources
- How does one match job requirements to available resources?

Long Duration
- How can engineers run big jobs and still leave resources available for smaller jobs?
- How can an organization fairly allocate limited resources?

The Solution – Clustering → Grid Computing

Solutions to solve these problems, within the existing corporate infrastructure:
- Data center high performance computing
- Workstation clusters
- Platform LSF MultiCluster
- Any or all of the above

Let the software find the resources for you
The Integrations

<table>
<thead>
<tr>
<th>Product Name</th>
<th>Job Submission</th>
<th>Checkpointing</th>
<th>Parallelization</th>
<th>License Scheduling</th>
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<tbody>
<tr>
<td>LS-Dyna</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
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</tbody>
</table>

Some flagship clients running LS Dyna on Grid

- Proctor and Gamble on HP Opteron Linux using Scali MPI
- Land Rover Jaguar
- GM
- DCX

Automotive manufacturers tell us that they use anywhere from 75%-80% of their HPC capacity for Dyna
Conclusion

The capabilities of an organization are measured by the size of the jobs it can handle.

By effective utilization of existing resources, most companies could run larger jobs than they run today.

Which leads to a new definition of “large”…

Thank you.