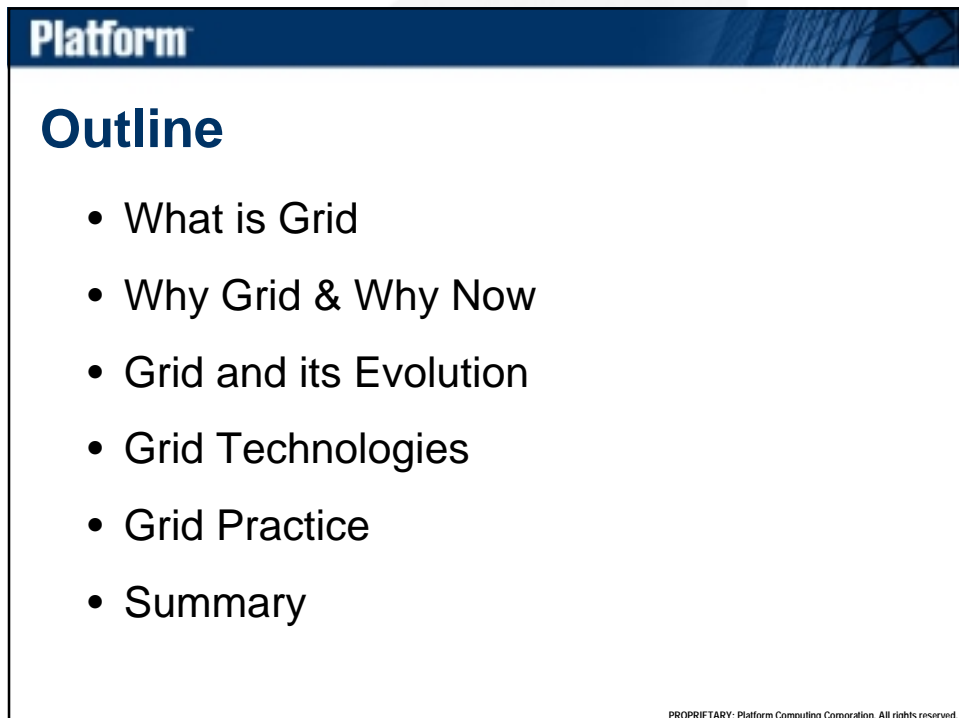




Platform™

Grid: Next Big Wave

Dr. Fubo Zhang, A/P CTO



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Outline

- What is Grid
- Why Grid & Why Now
- Grid and its Evolution
- Grid Technologies
- Grid Practice
- Summary

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Computer Dilemma

- Expensive IT infrastructure (Resource demand on Peak time is 5-10 times more)
- People's work is isolated by silos
- No clear link between IT investment and business objectives
- IT Department is only resource holder, not service providers
- Lower resource utilization, but people keep purchasing

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IT Business Challenges

- IT no longer just support – integral part of on-line enterprise
- Need for collaboration and sharing
- IT cost spiral cannot go on
- Poor visibility, poor utilization, poor management
- Reduce IT costs, reduce capital
- Use what's there, efficiency, outsourcing ops

Current IT challenges hurt us all

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Changing Concepts in Computing

- **Computer**: from the box to the collection of HW across enterprise – servers, storage, network, clients
- **OS**: from the native node OS to the distributed system infrastructure software layer – Grid software
- **Application**: from individual package to the dynamic, distributed services running the packages and supporting business processes

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What's Grid

Grid: is an infrastructure for providing variety computing resource and service via to network

We don't need computer, but its computing power and capacity.

We don't need software, but its functionality and service.

Virtualization, integration, automation

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Grid is

- **Taping resource**
People use computing resource just easy as using electric power, water, gas
- **Sharing resource**
Resource is maximized via to sharing, and reduce the cost by minimize investment
- **Always-on and unlimited resource**
Computing resource is great capacity for unlimited usage

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Grid must be an industry supported by Government

- **Always-on and unlimited resource**
- **Resource is shared among enterprise and society**
- **Secured by law and Government**
- **Standard, open, general-purpose protocols and interfaces**

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Grid will bring business

- **Storage service grid**(image, files, DB,etc.)
- **Application service grid**(MDA, EDA, Biotech, etc)
- **Entertainment service grid**(Game, Movie, CD, etc)
- **PC(personal Computing)service Grid**

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What are these Grids anyway?

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Ian Foster came to the rescue

“What is Grid, a Guide for the Perplexed”
Grid Today, July 17, 2002,

A Grid Check List

- ✓ *coordinates resources that are **not** subject to **centralized control***
- ✓ *using **standard, open, general-purpose protocols and interfaces***
- ✓ *to deliver nontrivial **qualities of service***

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Why Grids?

- A biochemist exploits **10,000** computers to screen **100,000** compounds in an hour
- Climate scientists visualize, annotate, & analyze **terabyte** simulation datasets
- An emergency response team couples real time data, weather model, population data
- A home user invokes architectural design functions at an application service provider

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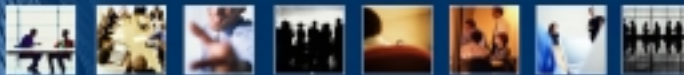
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Why Now?

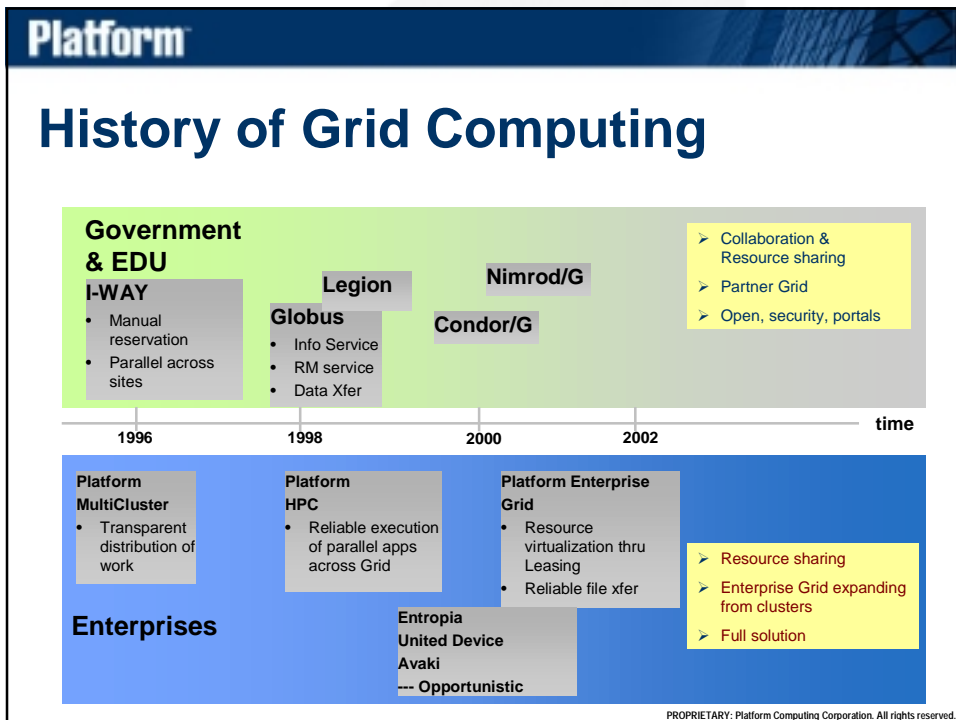
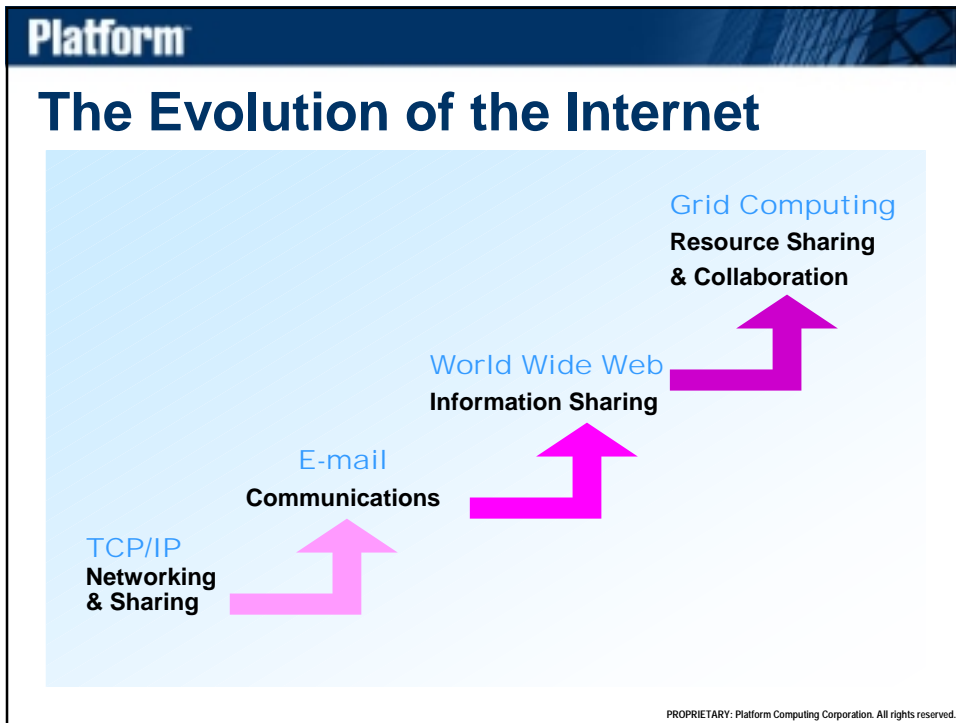
- Moore's law improvements in computing produce highly functional endsystems
- The Internet and burgeoning wired and wireless provide universal connectivity
- Changing modes of working and problem solving emphasize teamwork, computation
- Network exponentials produce dramatic changes in geometry and geography

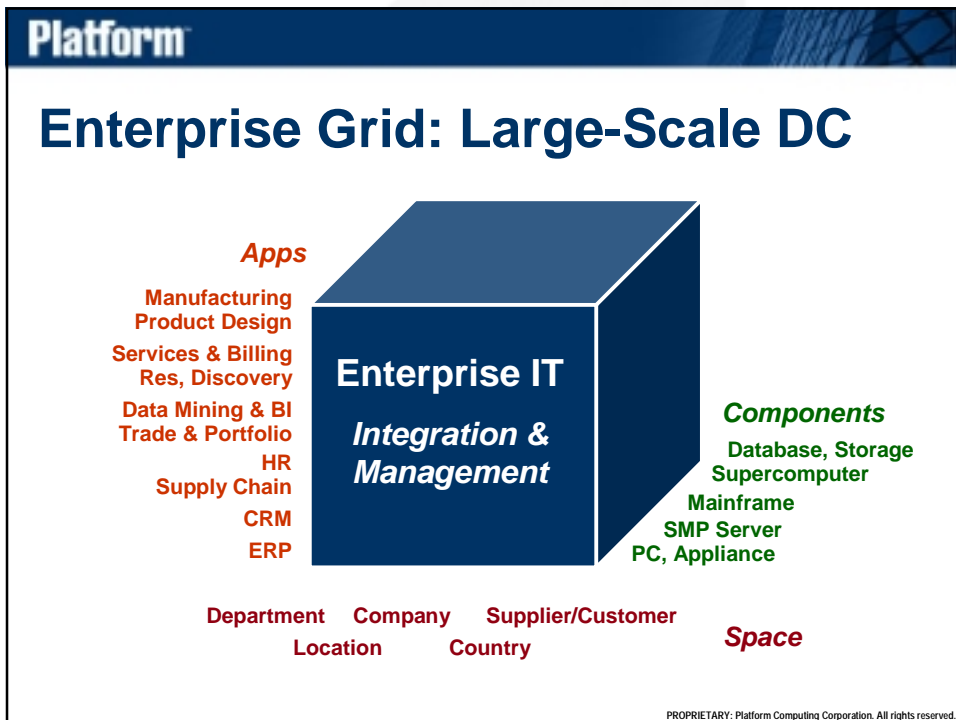
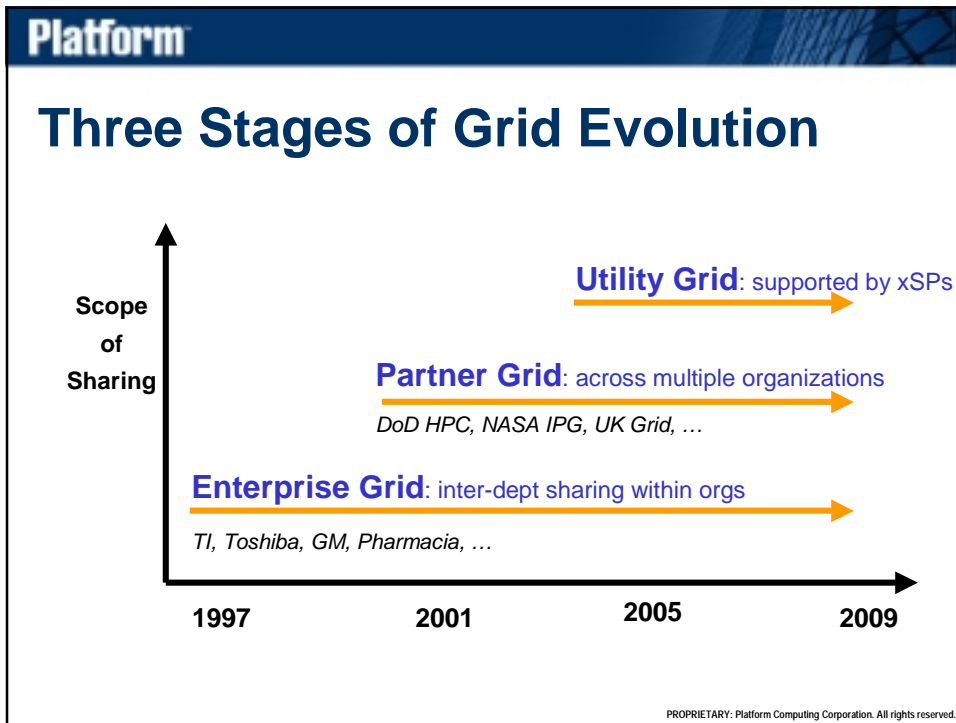
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Grid and Its Evolution





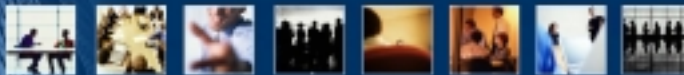
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Business Benefits

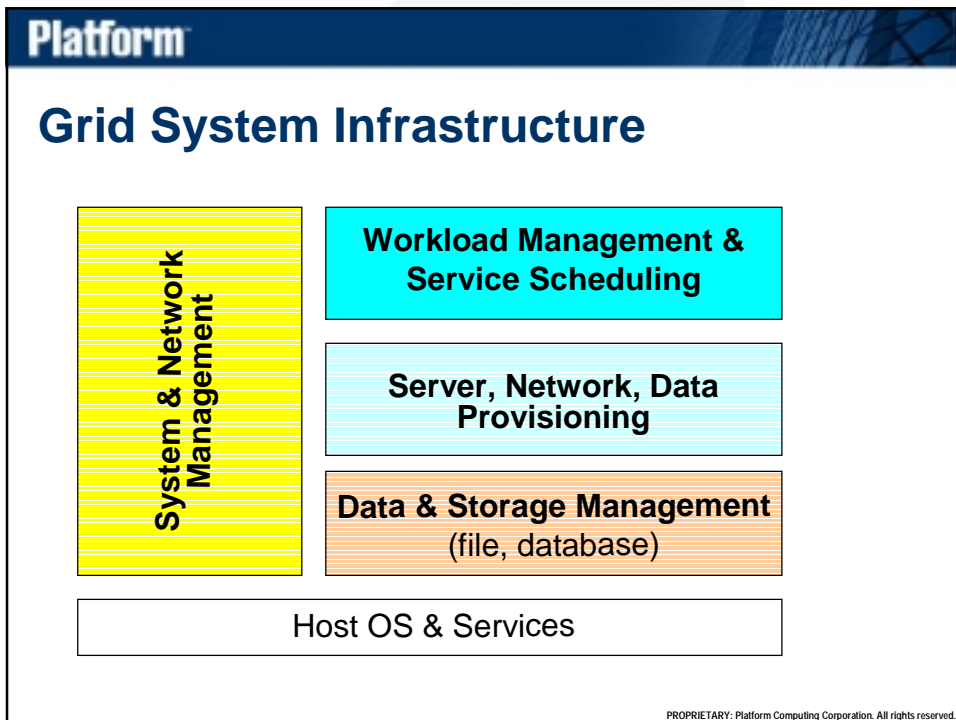
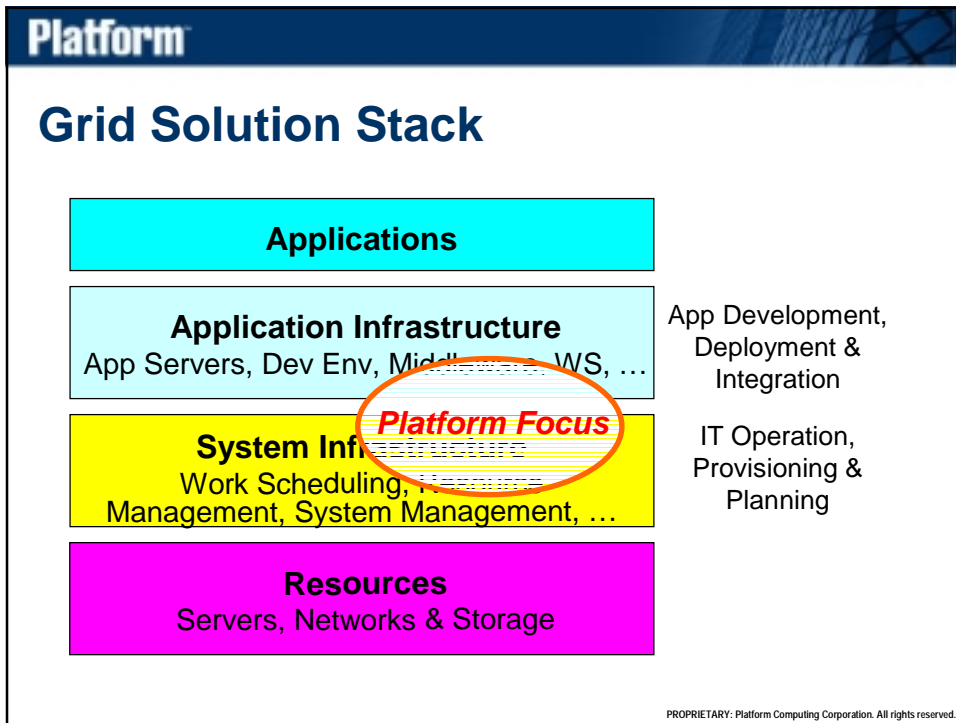
- **Scalable service capacity:** As workload increases, resources can be dynamically provisioned to ensure QoS
- **Higher resource utilization:** Total resources for total workload of all apps, rather than app silos with poor utilization
- **Simpler management:** All resources structured across the board and managed; all apps managed
- **Easy to change:** less work and disruption to increase capacity or support new apps

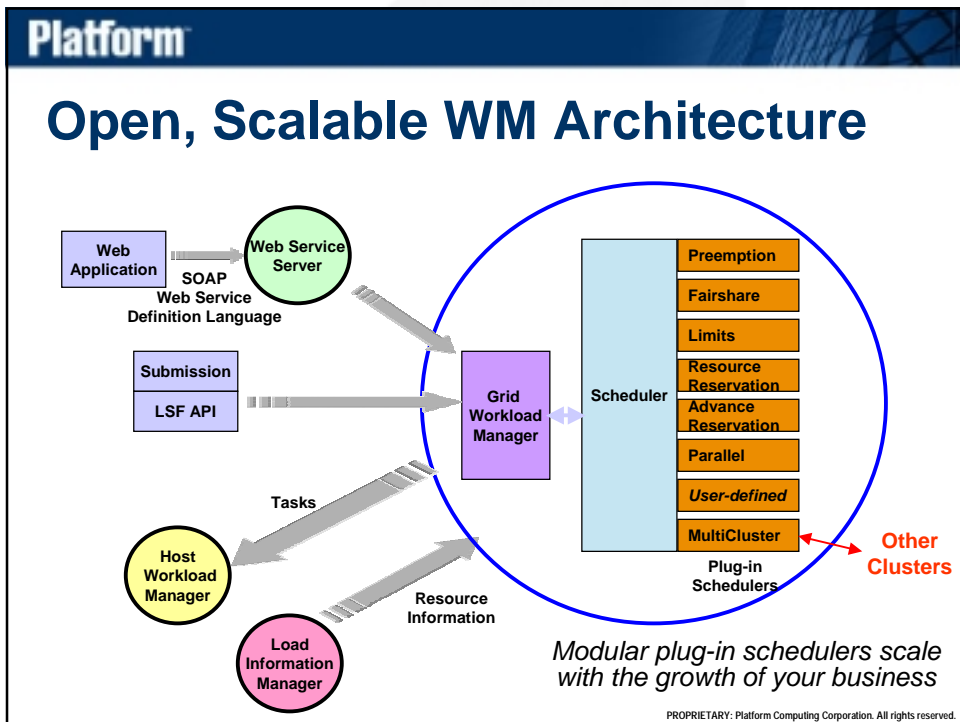
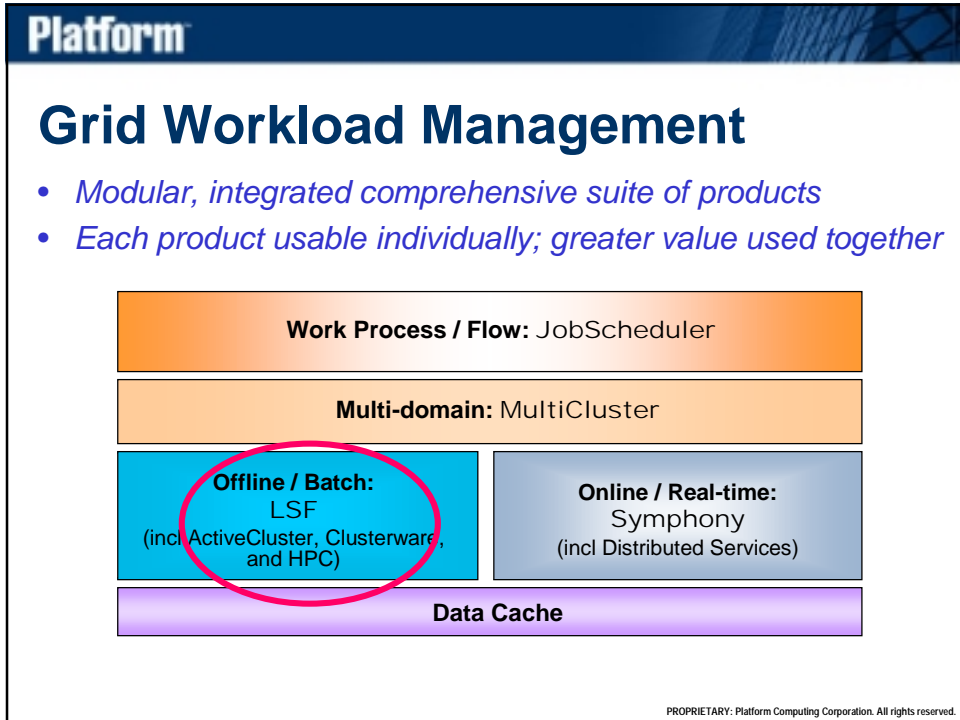
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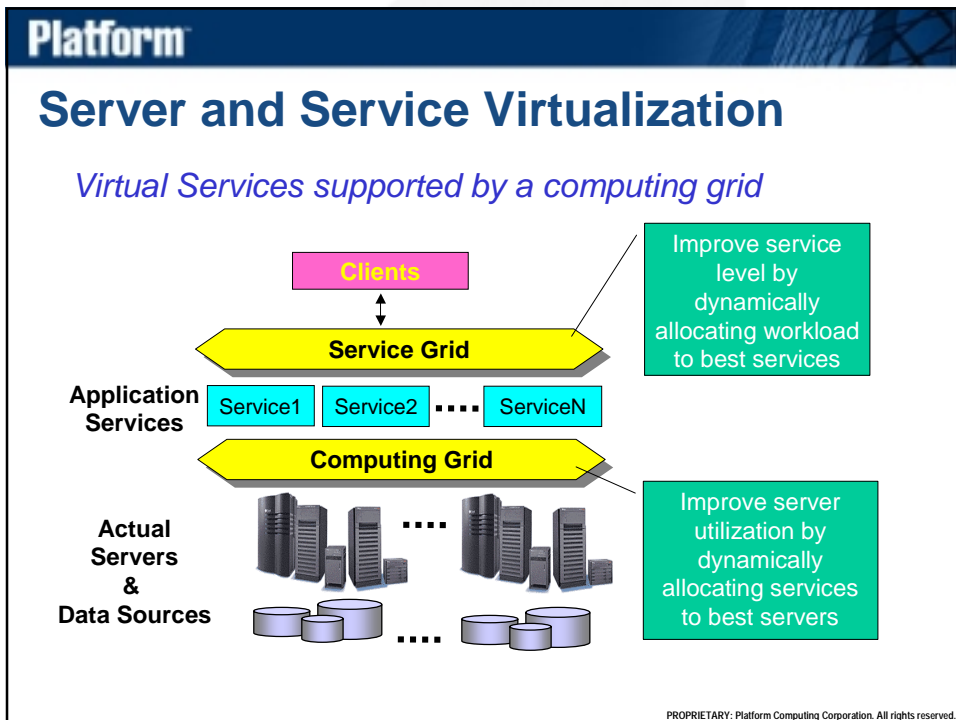
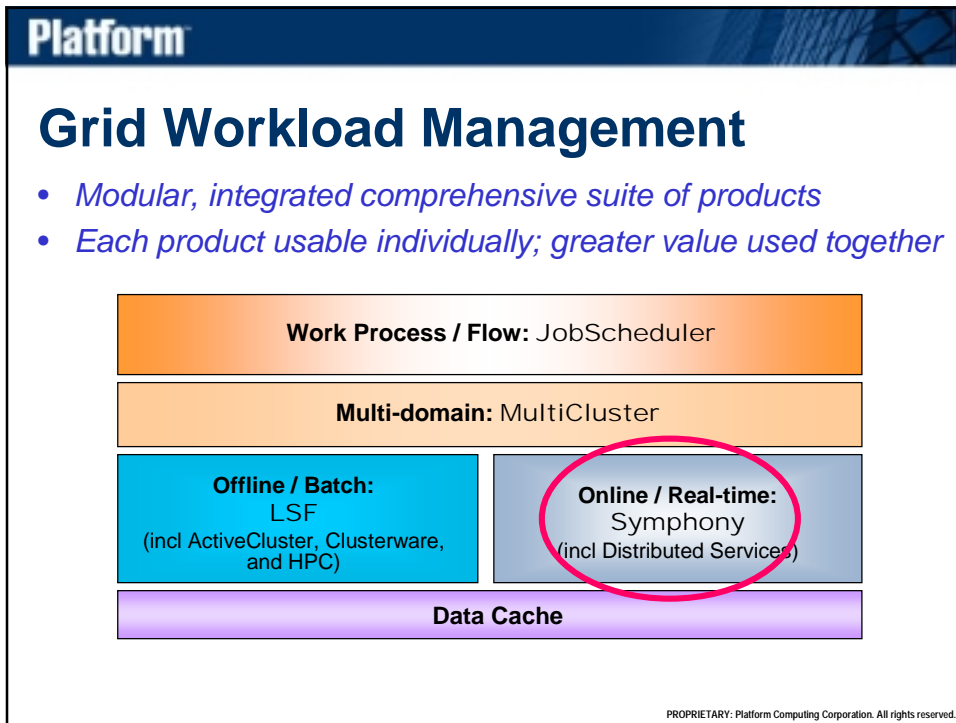
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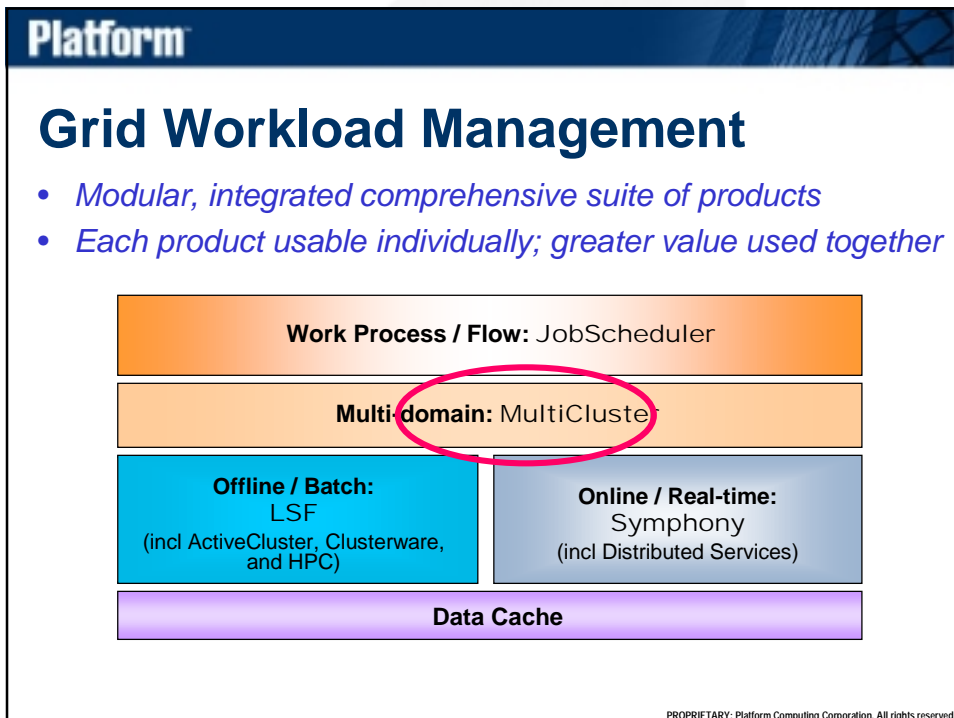
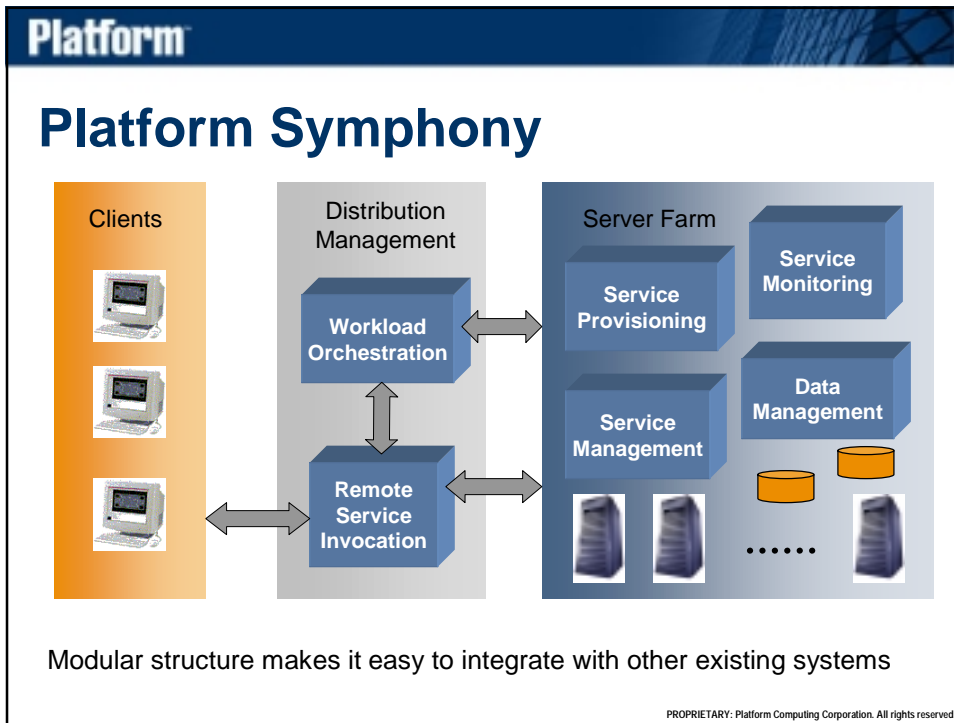


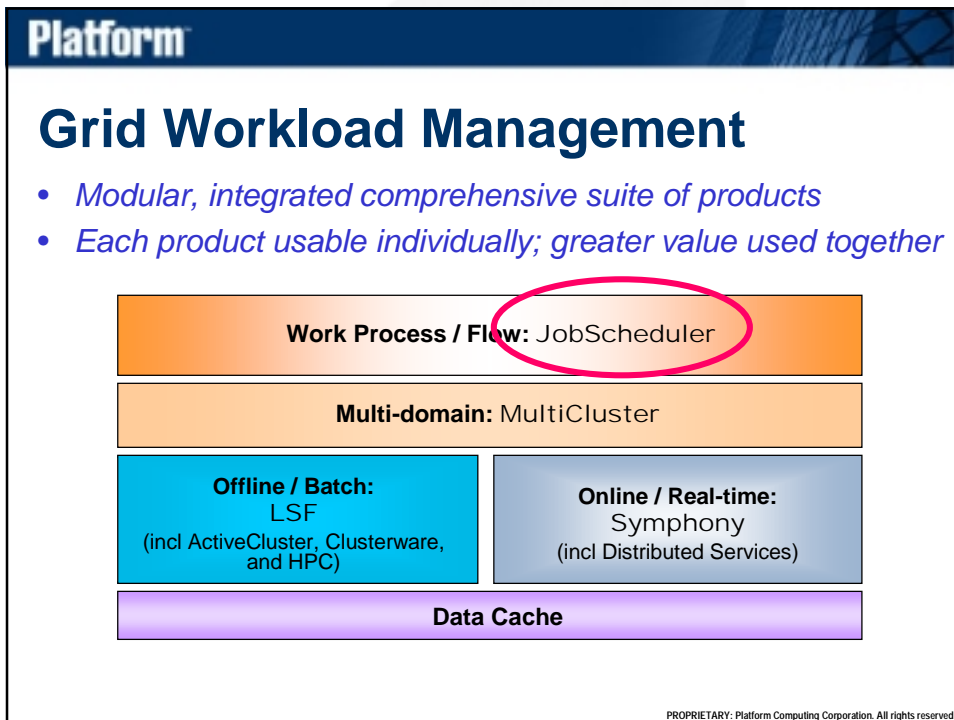
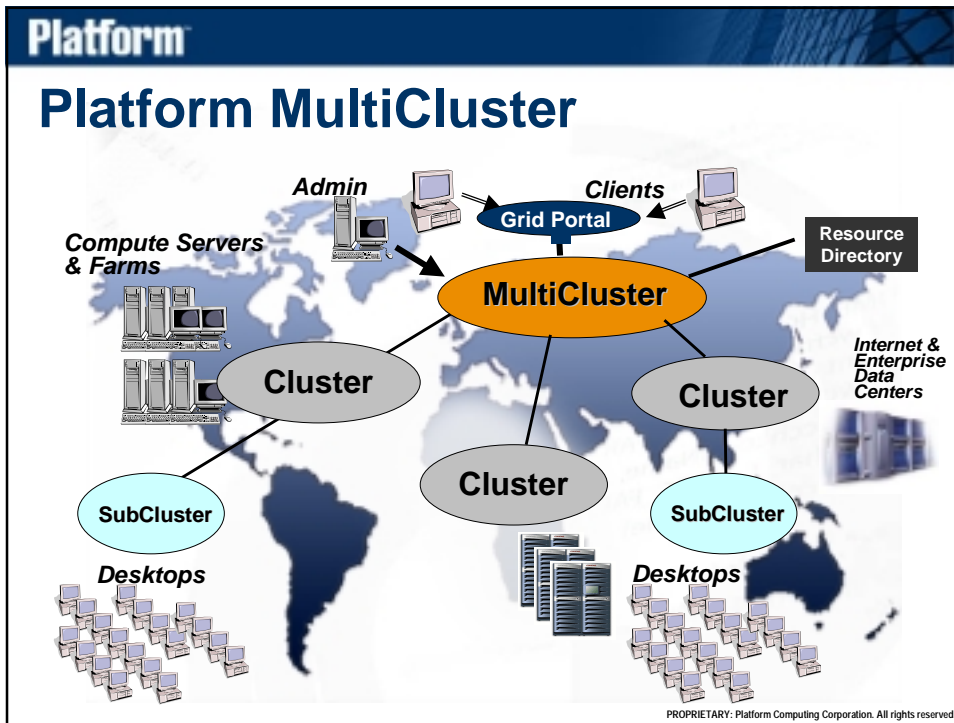
Grid Technologies







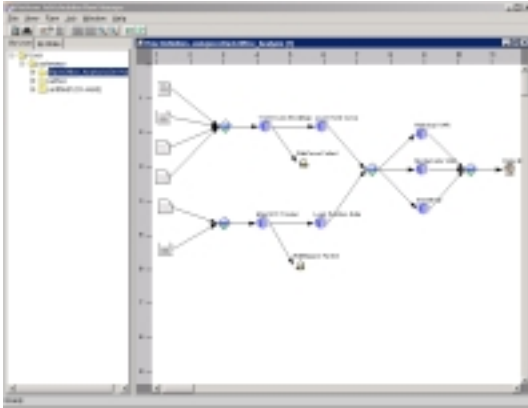




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Business Processes

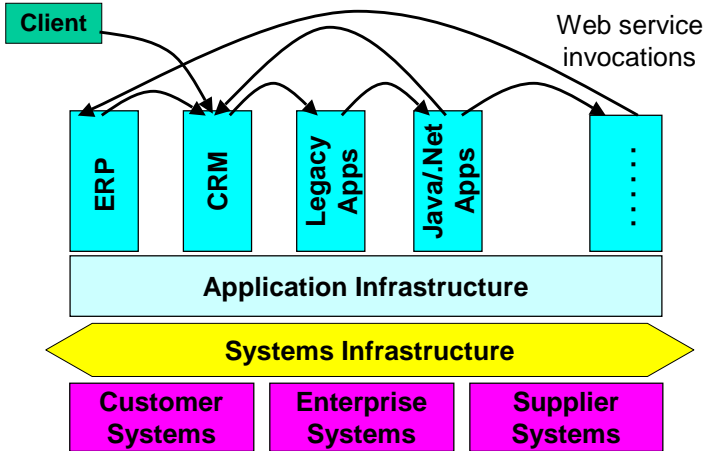
- Automation to ensure results and reduce costs
- Define, Run, monitor and audit flows
- Distributed & dynamic events and calendars
- Combine computer and human steps
- Cross systems, LOBs, and locations



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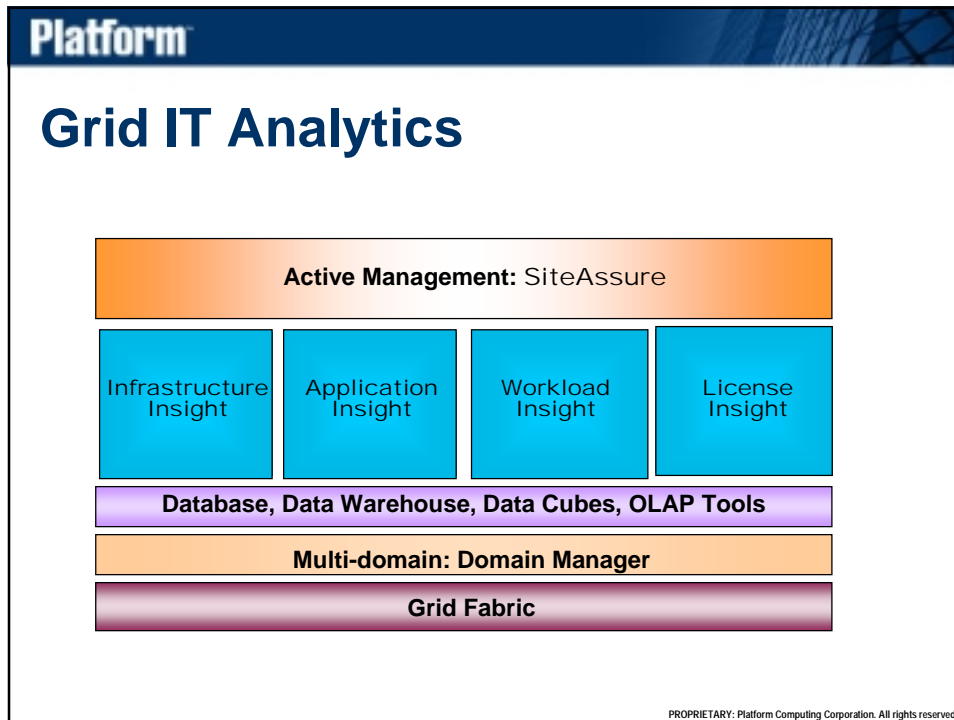
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Business Processes



The diagram illustrates a multi-layered architecture. At the top, a green box labeled 'Client' has arrows pointing to five cyan boxes: 'ERP', 'CRM', 'Legacy Apps', 'Java/.Net Apps', and '.....'. These boxes are collectively labeled 'Application Infrastructure'. Below this is a yellow double-headed arrow labeled 'Systems Infrastructure'. At the bottom are three pink boxes: 'Customer Systems', 'Enterprise Systems', and 'Supplier Systems'. Curved arrows labeled 'Web service invocations' connect the Application Infrastructure layer to the Systems Infrastructure layer.

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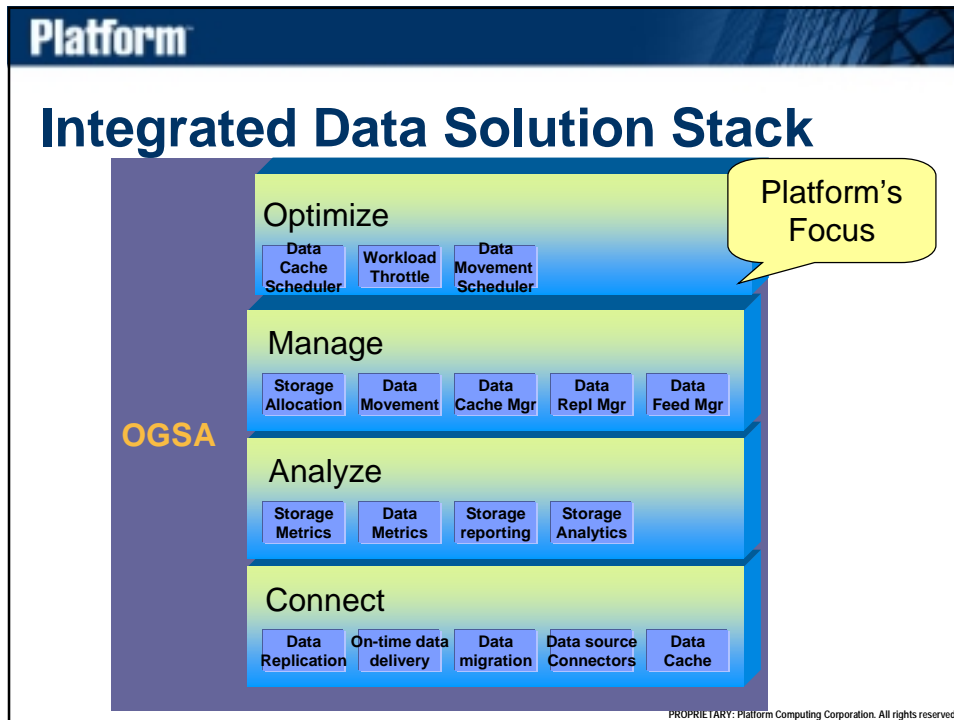


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Storage and Data Provisioning

<p>Storage Provisioning ensures</p> <ul style="list-style-type: none">• Storage resources are rightly provisioned to users or projects<ul style="list-style-type: none">• Just-in-time storage• No over-provisioning• No tie-up the resources• Workload not fail / delay due to insufficient storage resource allocation or availability	<p>Data Provisioning ensures</p> <ul style="list-style-type: none">• Data is where it needs to be• When it needs to be• Applications can be run across Grid <p>Satisfying all the sharing and consistency requirements</p>
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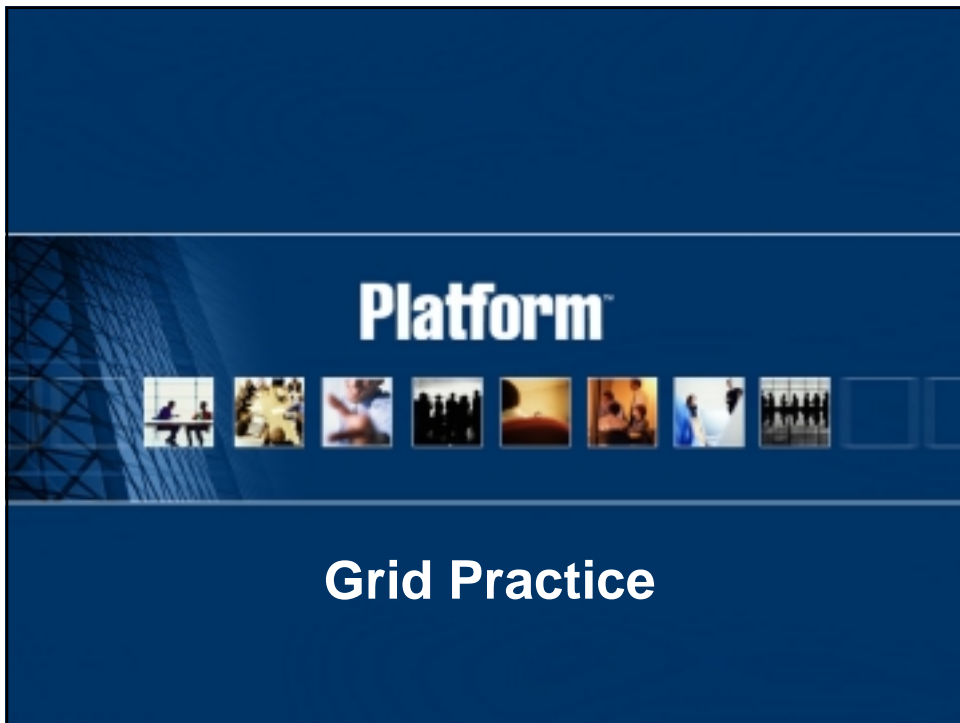
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Platform and Standards

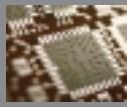
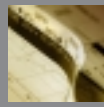
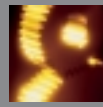


- Industry standards critical to Grid success
- Platform is committed to standards and drives their development – GGF, OGSA, Web Services
- Working closely with Globus Project and IBM as the Grid software expert
- Commercial offering of Platform Globus & integration of Globus 3.0 with other Platform products

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Examples of Grid Adoption

Computer Manufacturing	Financial Services	Industrial Manufacturing	Life Sciences	Government & Research
<ul style="list-style-type: none"> Intel Cisco IBM Lucent Motorola NVIDIA Texas Instruments HP 	<ul style="list-style-type: none"> JP Morgan Banco Pastor Deutsche Bank Morgan Stanley Fidelity Toronto Dominion Royal Bank Vertex 	<ul style="list-style-type: none"> Bombardier GE Lockheed Martin Pratt & Whitney Airbus Ford Volkswagon 	<ul style="list-style-type: none"> AstraZeneca Celera Entelos Incyte Merck Monsanto GSK Pharmacia Whitehead Inst. 	<ul style="list-style-type: none"> US DoD US DoE US NASA CERN ENEA PNNL Univ Tokyo 

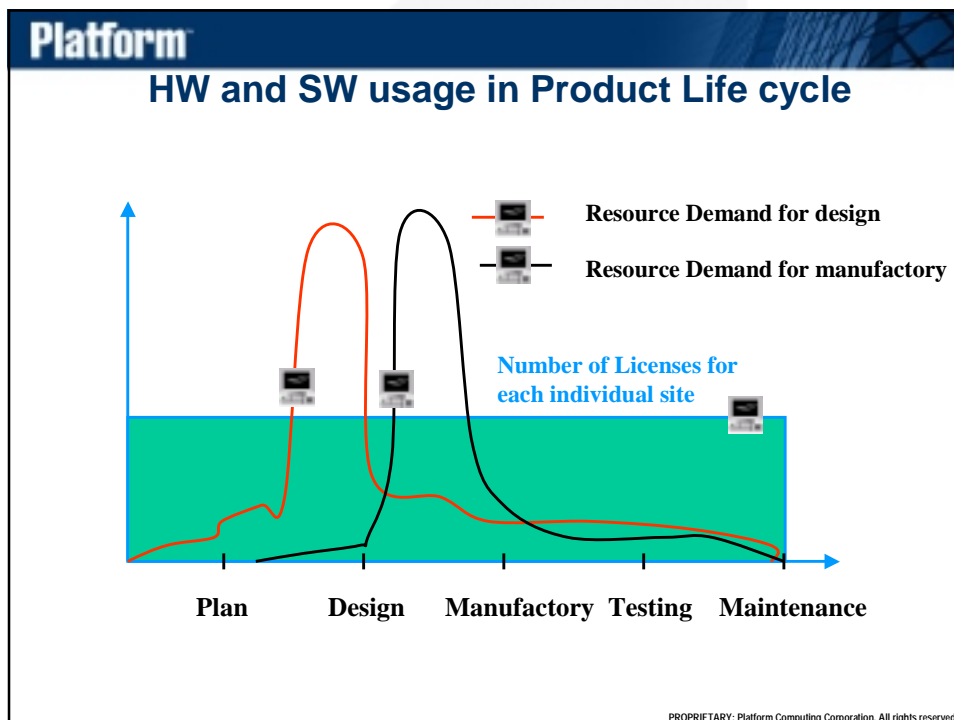
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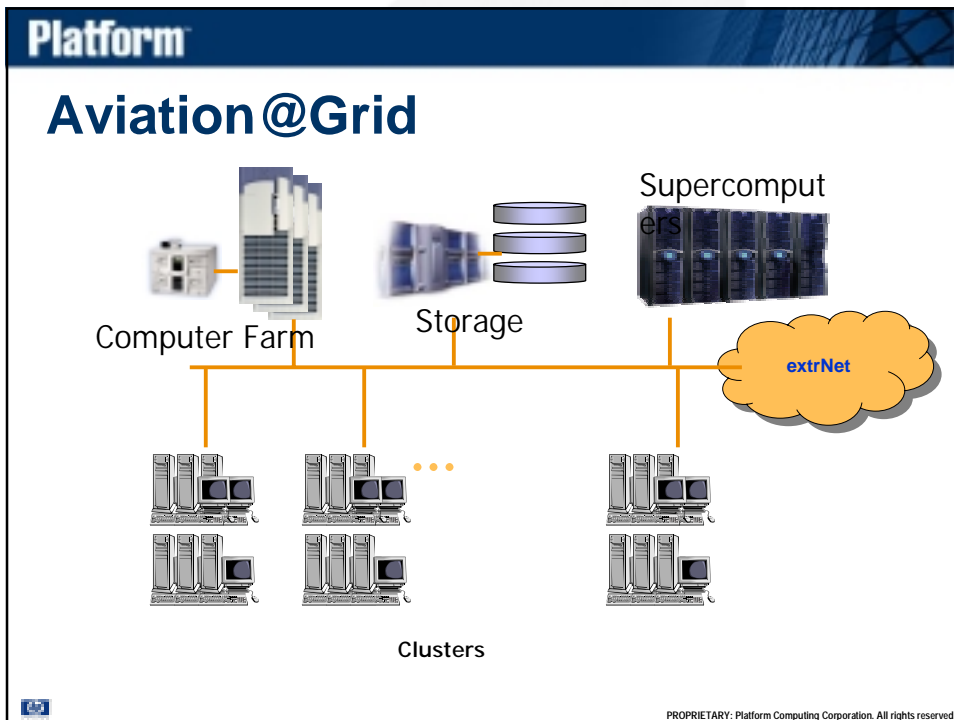
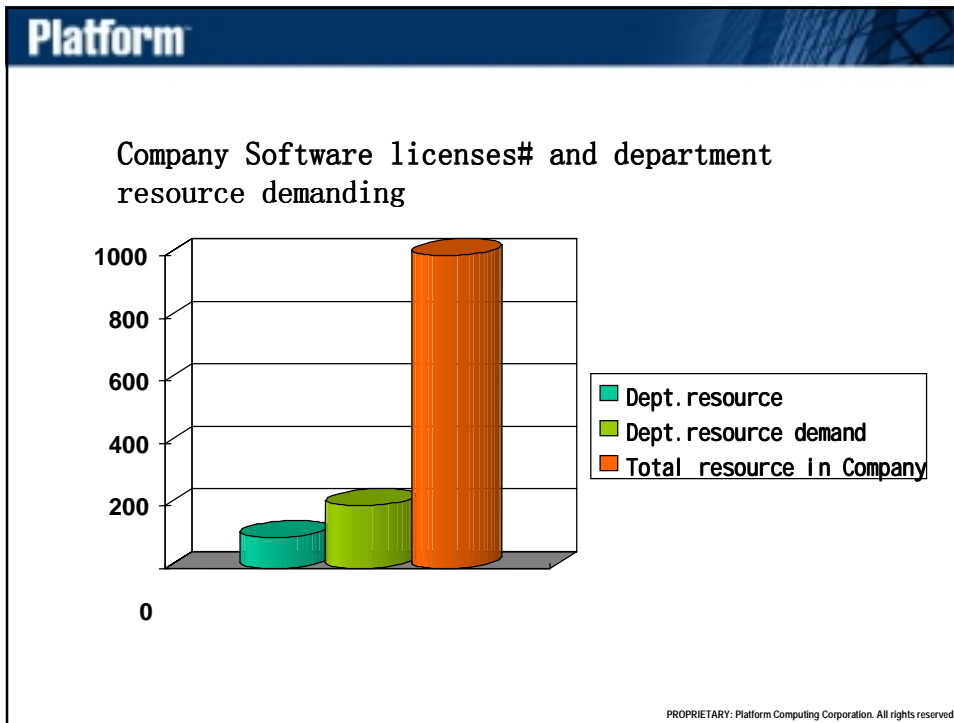
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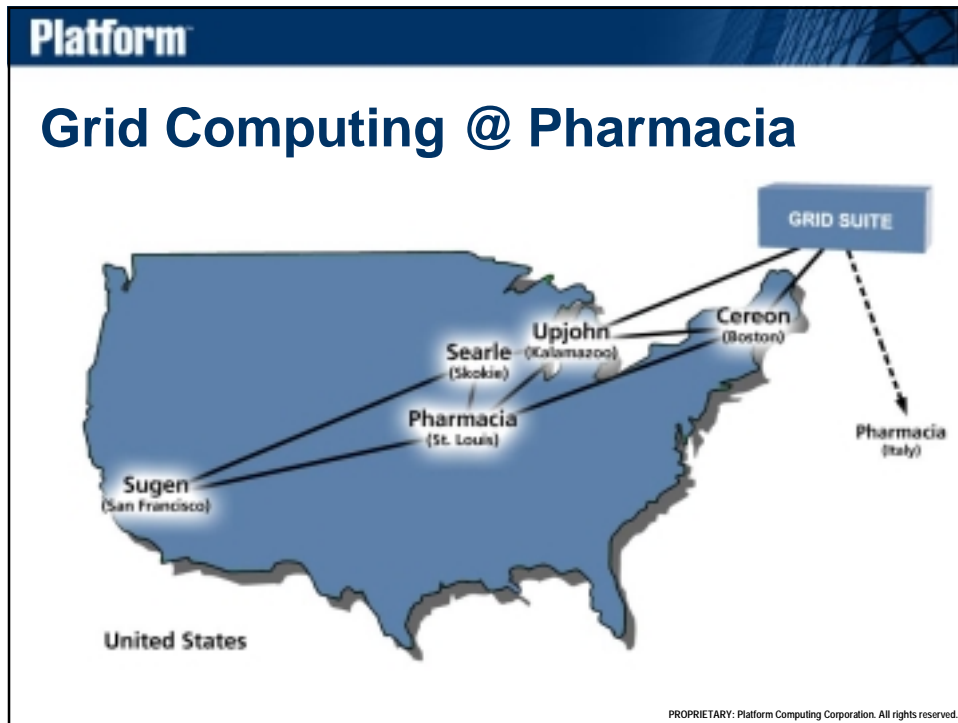
The Requirements for MDA Grid

- Harness Heterogeneous DC
- Project Management, Data Sharing
- Application License Sharing and management
- HPC Center
- Data and system reliability and security

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Grid @ TI



- First installed LSF in 1995 on 100 systems in 1 site
 - More than doubled CPU utilization
 - Doubled # of jobs = **doubled productivity / engineer**
- Now over 6000 systems at 17 sites as a single global processing engine
 - UK, Dallas, Houston, Toronto, San Jose, Bangalore, Tokyo, Nice, Israel, ...
 - Attack larger, more complex designs
 - *Work locally and compute globally*

"We can make a design modification in Northampton, check it into the database, and have test engineers in Dallas working with the fix within the hour."

- Engineering extranet at TI

"We actually have contract people from different design houses accessible within our network under reasonable restrictions via LSF."

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Partnering with IBM

- IBM's strategic direction is e-business on demand – Utility Computing
- Grid is the infrastructure
- Platform: Advanced Partner to Premier Partner as its “preferred partner” for Grid solutions
- Product integration (e.g., Platform HPC for IBM), vertical industry solutions & services (e.g., global services agreement), around the world

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Platform Computing

- Founded in 1992
- 400+ Employees
- Headquartered in Toronto, ON, Canada
- More than 1,500 customers worldwide
- 150+ people focused on R&D
- Average growth in last 4 years is 50%+
- *Profitable every year*



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Why Platform

- Leader in distributed computing: 75% software market share
- Open: all platforms, all operating systems, all leading applications integrated
- Flexible & scalable: from Desktop to Grid
- Sophisticated monitoring & reporting tools to quantify results
- Proven track record, many customer success stories with measurable ROI
- Leverage extensive partnerships to deploy DC solutions ...
your competitive advantage

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Summary

- Grid is a paradigm shift in computing infrastructure – driven by user demands
- Sharing, collaboration, cost reduction
- Expanding from niche adoption to mainstream IT
- With technologies, customers and organization, Platform leads the market
- Great opportunity for Chinese users and vendors

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