



JiniTM Technology & the Grid: a Technology Exploration

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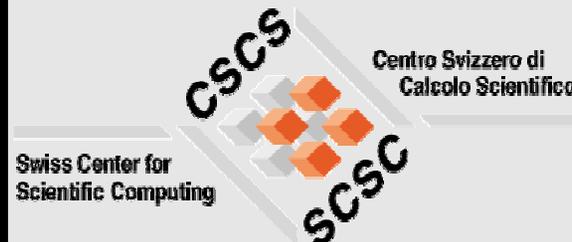
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Overview

- **Definition of Computational Grids**
- **Collaborative Research Overview**
- **Usage Scenario**
 - Jini™ technologies employed
- **Summary**
- **Q & A**

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Computational Grid

- **Resources**
 - Computation, storage, instrumentation
- **Geographically Distributed**
 - Spanning administrative domains
 - Governed by local policies
- **Integrated**
 - In a unified manner
 - Ubiquitous
 - Respecting local site policies



Collaborative Research

- Sun Microsystems
- Swiss Center for Scientific Computing (CSCS)
- Research! Not a current or future Sun product
 - Technology Exploration: Java™ in HPC
 - Domain: Distributed Resource Management
- Technologies employed
 - Java™, Jini™, JavaSpaces™
 - Sun™ Grid Engine

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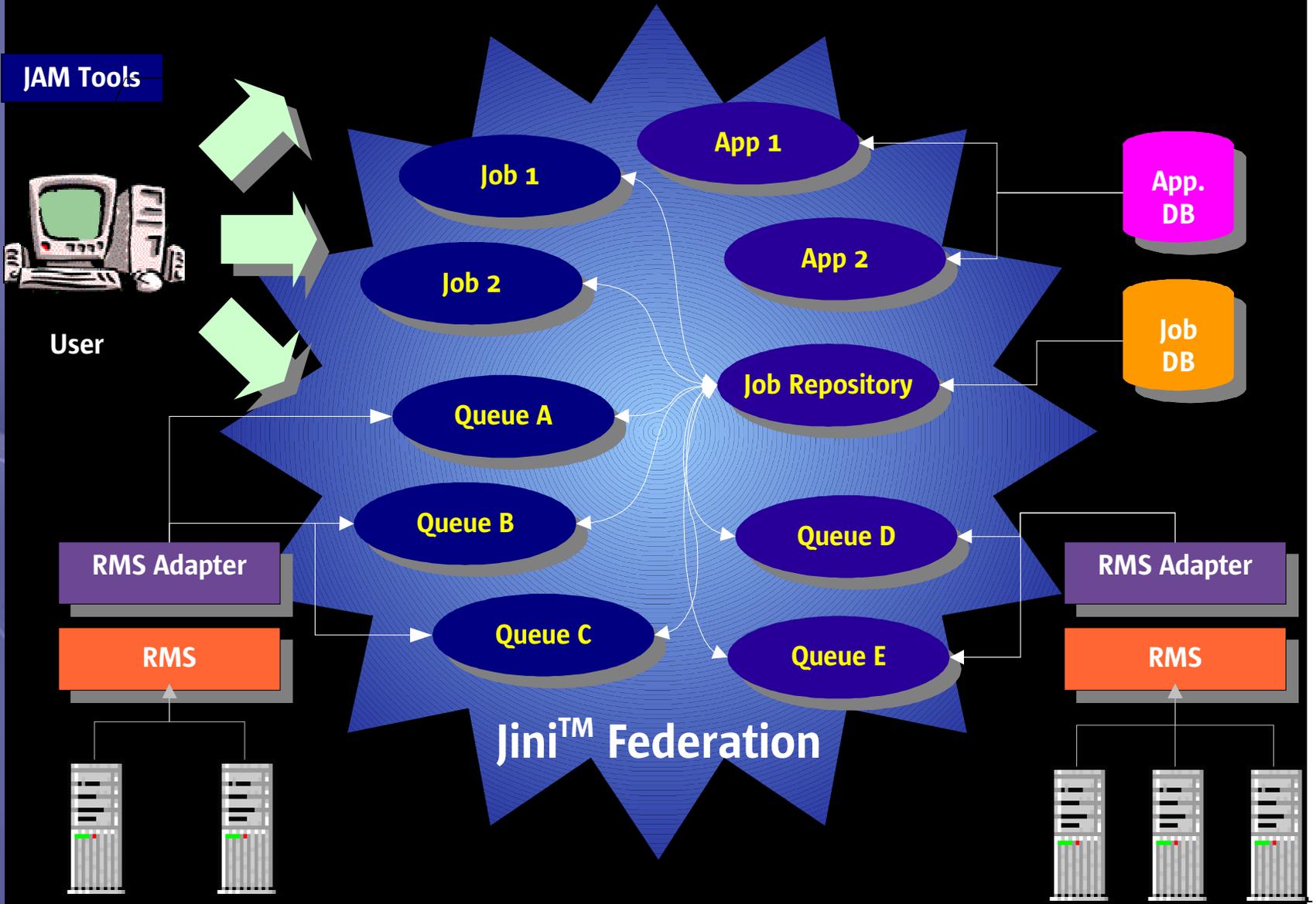


Job & Application Manager (JAM)

- **Resources**
 - Applications
 - Existing, unmodified HPC codes
 - Compute cycles
 - Local resource manager queues
- **Geographically Distributed**
 - Intranet domain
- **Integrated**
 - Application selection & execution framework

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JAM Architecture





JiniTM Services for JAM

- **JAM entities reflected as JiniTM services**
 - Applications, queues
 - Currently executing jobs submitted via JAM
- **Benefits of the JiniTM service model**
 - Services visible on the network (ubiquity; mobility)
 - Service interfaces; proxies (unified view)
 - Leases; events (dynamic view)

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Usage Scenario

- **Two Phases**
 - User application & Queue Selection
 - Job lifecycle management
 - Launch, Monitor, Control
- **Describe and illustrate each phase**



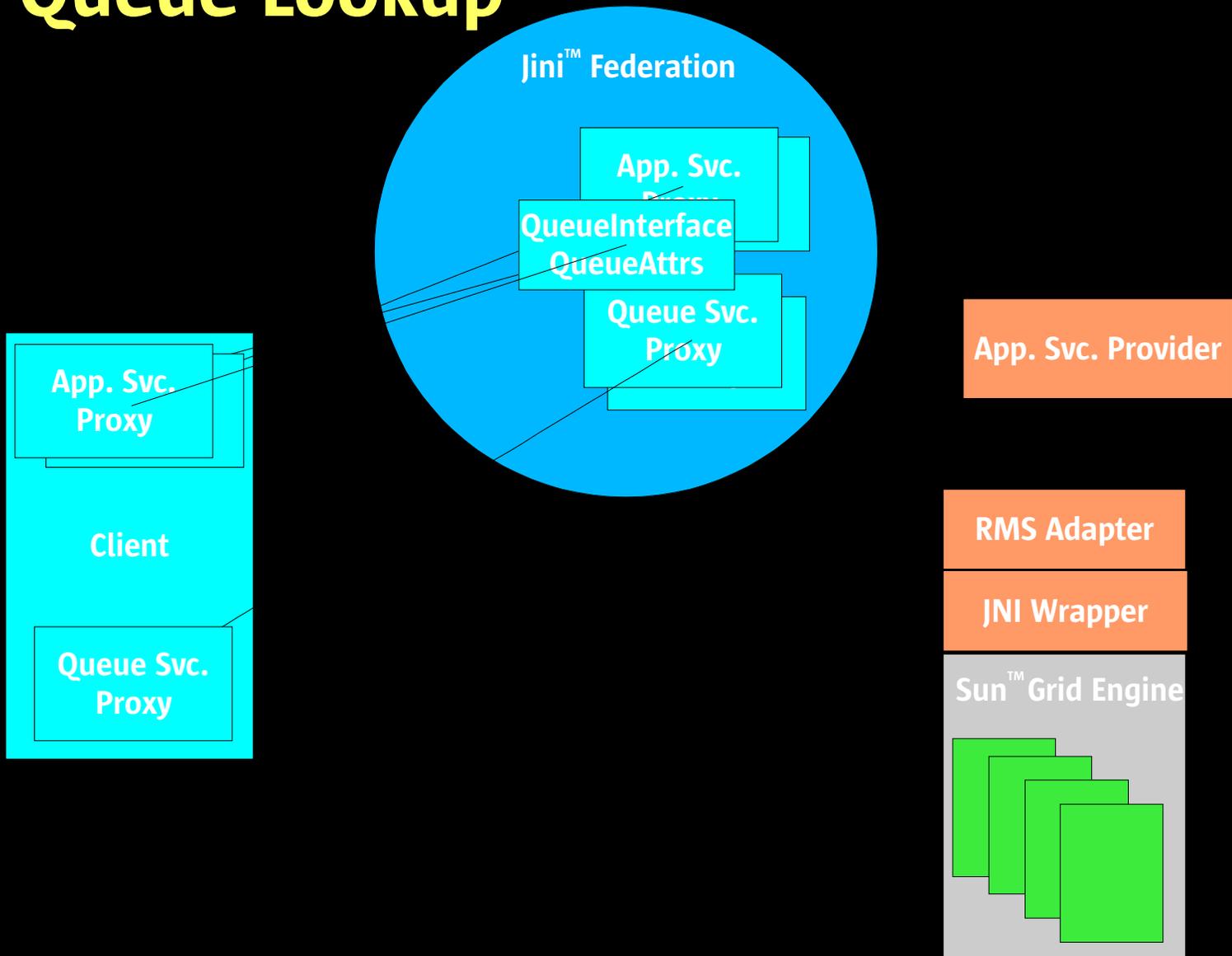
Application & Queue Selection

- 1) Jini™ lookup of applications
 - By JAM client
- 2) User selects application
- 3) Jini™ lookup of candidate queues
 - By application proxy
 - Attribute matching
 - Application defined
 - User specified
- 4) User selects queue

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App. & Queue Selection: Queue Lookup





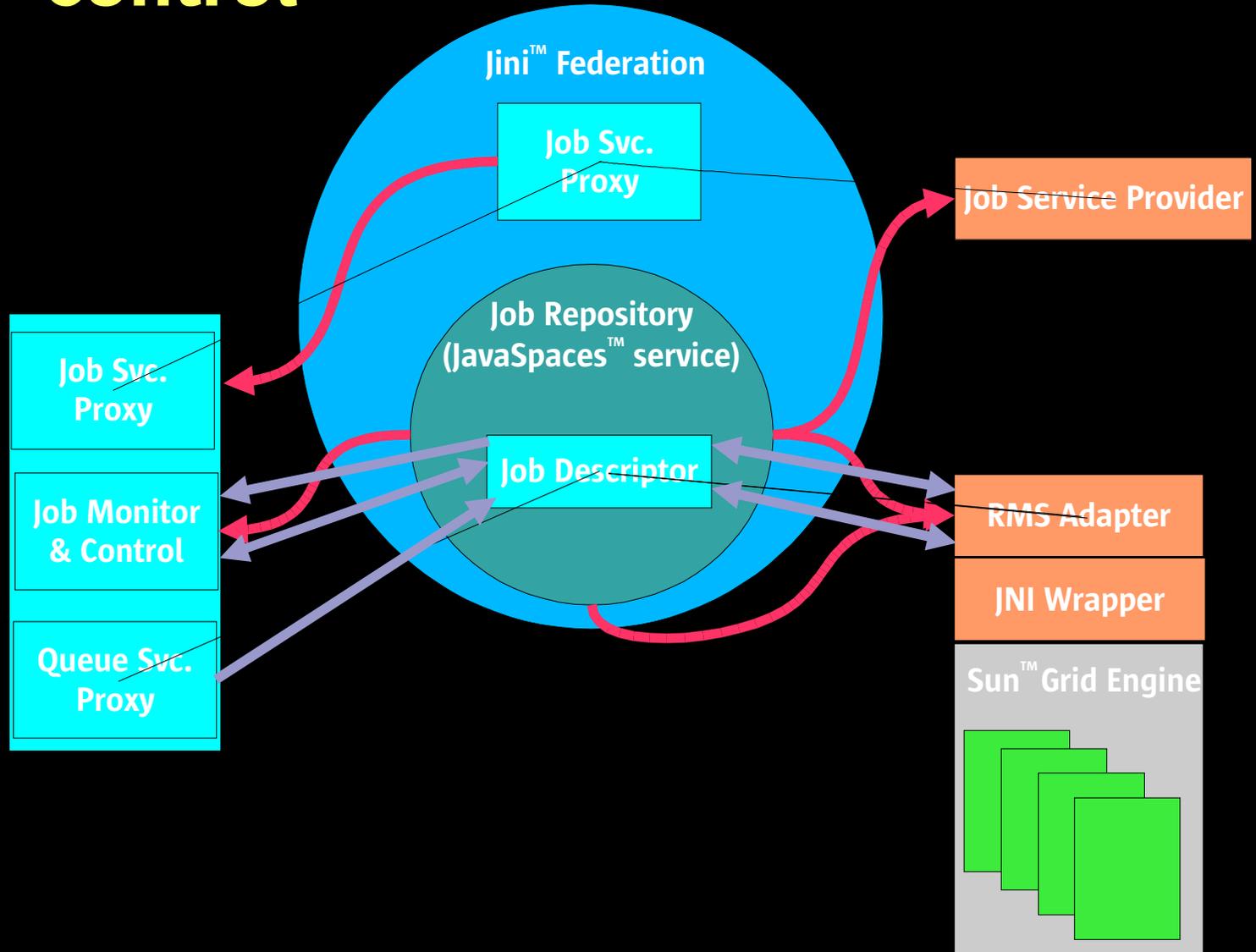
Job Launch, Monitoring & Control

- **Loosely coupled distributed system**
 - Interacting autonomous entities
- **JavaSpaces™ Service**
 - Distributed coordination/collaboration framework
 - Shared object repository
 - Storage; exchange mechanism
 - Content-based lookup
 - Polling or event-driven
- **Job Descriptors**



Job Lifecycle Management:

Control





Summary

- **Grid infrastructure enablers:**
 - Java™, Jini™, JavaSpaces™ technologies
 - Sun™ Grid Engine
- **We're actively researching...**
 - Sun white paper: "Distributed Application Management using Jini™ Connection Technology"
 - Grid Forum
 - <http://www.gridforum.org>
 - Jini™ task group:
<http://www.cs.cf.ac.uk/User/O.F.Rana/jini/>
 - BOF
 - Wednesday 5:30-7:00PM; Room D262-264

