

# Solaris™ 9 Resource Manager in the Solaris 9 Operating Environment

Manage system resources more effectively.

**Sun™ ONE**  
Open Net Environment



## Key feature highlights

Provides fine-grained resource control mechanisms.

Ensures predictable service level through resource allocation.

Provides detailed resource usage data for chargeback and capacity planning purposes.

GUI tool simplifies administrative tasks for resource management and monitoring.

Enables workload classification through “projects”.

Provides centralized management through network-wide name services.

Provides resource containment through establishing CPU boundaries.

Today’s explosive levels of growth — in terms of bandwidth, networks, and digital devices — are driving an even greater shift towards a services model of computing. The Services on Demand approach moves the burden of a computing infrastructure from end users and their PCs to the organizations that provide the services. Since its inception in 1982, Sun has been driven by a singular vision — The Network Is The Computer™ — and has helped businesses harness the transforming power of the network in order to create, deploy, and deliver reliable Services on Demand.

As the foundation for the Sun™ Open Net Environment (Sun ONE) — Sun’s vision, architecture, platform, and expertise for delivering Services on Demand — the Solaris™ 9 Operating Environment provides an integrated yet open architecture for building and deploying Services on Demand. The Solaris 9 Operating Environment (OE) offers new levels of performance in scalability, availability, manageability, and security, and delivers a complete and highly refined environment designed to enable customers to increase service levels while decreasing costs and reducing IT risks.

## The Need For Resource Management

IT managers are increasingly faced with the challenge of providing a consistent level of service to users and applications. Traditionally, servers have been configured to handle an average utilization of 20%-50%, with peaks planned for 75%. Responding to the escalating costs of managing vast networks of servers, the limited number of seasoned system administrators, and shrinking IT budgets, IT managers are looking for ways to reduce cost through simplifying administration, while still providing a consistent and predictable service level for their end users.

The traditional deployment model of hosting one application per system for more predictable service level leads to a proliferation of systems that are complex and expensive to administer. Flexible allocation and

control of major system resources become necessary in order to ensure service and application availability for users. And with server consolidation becoming a primary objective in IT operations, there is an even bigger demand for more effective resource management.

## Solaris 9 Resource Manager

Sun’s Solaris 9 Resource Manager software, now integrated into the Solaris 9 Operating Environment, helps system administrators manage system resources more effectively. It enables system administrators to control resources, such as CPU, physical memory, and network bandwidth, to multiple users or applications in order to provide more predictable service level. No single user or application is allowed to monopolize the system resources and impact others sharing the same system.

Solaris 9 Resource Manager provides the performance and capabilities to help you deliver predictable application service levels, reduce service level costs, and increase ease of management — today.

Solaris 9 Resource Manager also allows system administrators to monitor resource consumption and obtain accounting information for billing purposes. It redefines the traditional model of hosting one application per system and offers a flexible solution that enables you to consolidate servers to reduce service level cost while delivering more predictable service levels.

*Resource Containment*

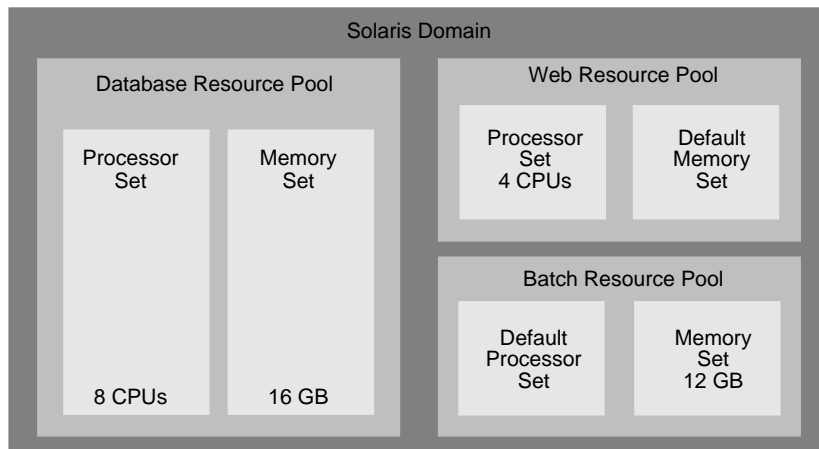
To reduce the complexity and cost of managing multiple servers, system administrators are consolidating applications onto fewer servers. And in doing so, it becomes increasingly important for them to have the ability to maintain isolation between the applications. Sun is introducing a new concept, called Solaris Containers, that offers the ability to isolate applications using flexible, software-defined boundaries.

With Solaris Containers, system administrators can create multiple execution environments within a single Solaris instance, providing resource containment, security isolation, and fault isolation. Solaris Containers will be delivered in phases, and the release of Solaris 9 Resource Manager marks the first step. With Solaris 9 Resource Manager, system administrators can establish resource boundaries such as CPU and physical memory for a specific application, thus, eliminating competition for resources with other applications.

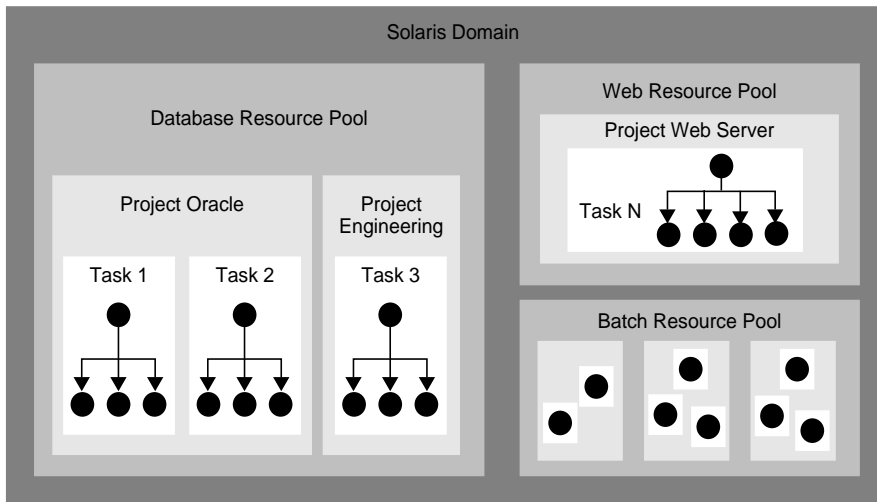
*Workload Classification*

To utilize system resources more efficiently, system administrators need a method for classifying application services and keeping track of their respective resource consumption.

The Solaris 9 Operating Environment enables system administrators to classify application services into “projects” and establish resource control limits at the project level. The project is simply a tag used to classify a service that is made up of a single application or user or a group of applications or users (e.g., a specific database instance). The system administrator also has the ability to identify a specific job (e.g., a query to the specific database instance) within a project using “tasks”. With projects and tasks, system administrators can track resource usage down to a more granular level.



**Resource pools partition a system as a set of smaller virtual environments.**



**Each project contains one or more tasks, each of which contains one or more processes.**

*Centralized Management*

In Solaris 9 Resource Manager, resource allocation policies are stored in the project name service database, which can be a local file or an NIS or LDAP database on a central server. This provides system administrators with the ability to centrally control the resource allocation configuration of a group of securely distributed machines, reducing the cost of administering multiple systems.

*Resource Controls*

UNIX® systems have traditionally provided a resource limit facility that allows system administrators to set numerical limits on the amount of resources a process can consume. In Solaris 9 Resource Manager, system administrators can also establish resource limits on a per-task and per-project basis. With the resource control mechanism, the system administrators can prevent applications from exhausting the available resources, leading to more manageable and predictable service levels.

*Differentiated Services*

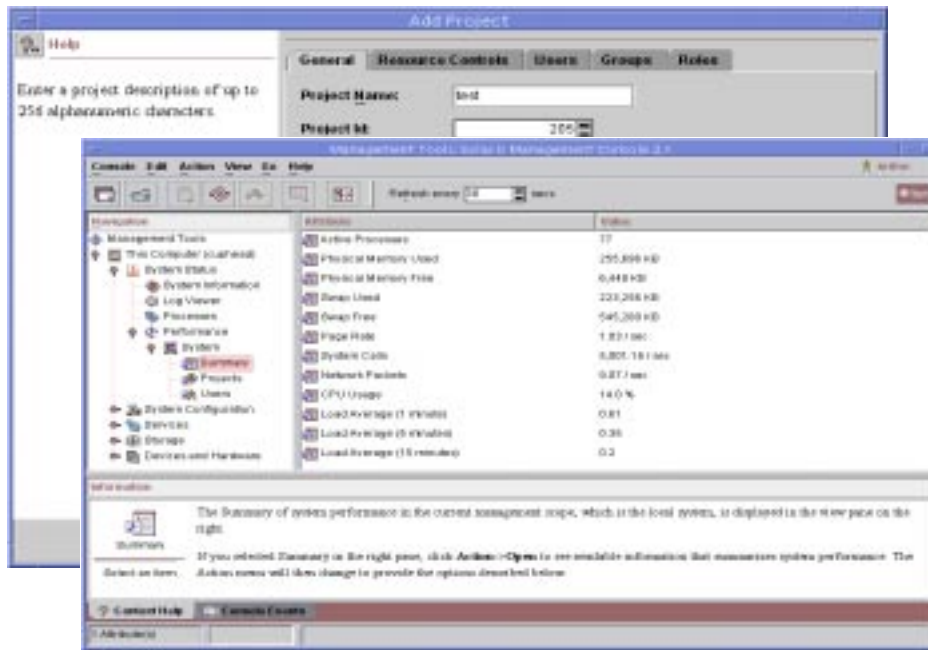
With Solaris 9 Resource Manager, system administrators can use the “fare-share scheduler” to allocate available CPU resources among projects based on their business priority. The priority is expressed by the number of *shares* of CPU resources assigned for each project. The system administrator can assign a larger number of shares to a project that has a higher priority — relative to the other projects — to ensure that the higher priority project receives more CPU resources.

*Resource Accounting*

Today, vendors and businesses are developing pricing models to offer their customers “pay as you go” capabilities. The metering and monitoring capabilities offered by Solaris 9 Resource Manager will play a major role in accounting for these usage needs. With Solaris 9 Resource Manager, system administrators can obtain detailed resource usage information to track resource consumption. The accounting information is available through public APIs and can be processed by third-party accounting packages for resource chargeback, workload monitoring, or capacity planning purposes.

## Solaris™ 9 Resource Manager in the Solaris 9 Operating Environment

- Reduce Service Level Cost — You can consolidate multiple applications on a single server and make full use of your resources.
- Increase Ease of Management — You can classify application services into projects and store resource allocation policies on a NIS or LDAP database service.



A view of the Project Manager and Performance Tool user interfaces.

### Ease of Use

Solaris 9 Resource Manager can be managed through either a command-line interface (CLI), an API, or a graphical user interface (GUI) to monitor system performance and configure resource allocation policies. The comprehensive and user-friendly GUI provides a convenient, secure alternative to the command-line interface for managing hundreds of configuration parameters.

### Upcoming Developments

Sun continues to invest in its dynamic resource-sharing capabilities — to further enable IT organizations to reduce cost and complexity — by investing in advanced

resource management technology. Sun intends to continue this trend by extending the features of Solaris 9 Resource Manager in future releases of the Solaris Operating Environment. New features planned to be introduced include:

- IP quality of service (QoS)
- Physical memory control
- Swap space control

### Summary of Main Benefits

- Deliver Predictable Application Service Level — You can establish and enforce policies that control how resources are used.

### About Sun ONE

The Sun Open Net Environment (Sun ONE) is Sun's vision, architecture, platform, and expertise for delivering Services on Demand today and in the future. Based on open standards such as Java™ and XML technology, Sun ONE provides a highly scalable and robust framework for building and deploying a variety of Services on Demand — from traditional Web-based applications to future context-aware Web services. By simplifying the way Web services are created, assembled, and deployed, the Sun ONE platform can enhance productivity, speed time to market, and increase business opportunities for enterprises worldwide.

### System Requirements

Solaris 9 Resource Manager is integrated into the Solaris 9 Operating Environment (SPARC® Platform Edition)

### For More Information

To learn more about Solaris 9 Resource Manager and the Solaris 9 Operating Environment, visit [sun.com/solaris](http://sun.com/solaris).

For more information on Sun ONE, visit [sun.com/sunone](http://sun.com/sunone).