

# Netra™ High Availability Suite Foundation Services 2.1 6/03

Raise availability. Lower costs.  
Reduce time to market.



## Key feature highlights

- Continuous availability of core services, including Reliable NFS, Reliable Boot, Reliable DHCP services, and Reliable IP Transport
- Designed for high levels of horizontal scalability to enable the dynamic addition of new nodes and applications
- Fault management capabilities provided via a Cluster Membership Management service
- Automated software installation and configuration for quick and easy deployment
- Based on open industry standards and stable Solaris™ Operating System compatible APIs
- External connectivity to the Netra™ High Availability (HA) Suite cluster for monitoring and software management purposes
- Support for a wide range of Netra server platforms

Today, customers expect services, applications, and information to be accessible when and where they want them. Computing systems and networks must deliver high levels of availability at low cost, and with minimized development efforts that new market pressures demand.

Sun's Netra™ High Availability (HA) Suite Foundation Services provides a reliable and scalable platform on which developers and system integrators can rapidly develop and deploy highly available applications. In addition, Netra™ HA Suite Foundation Services offers customers enhanced reliability for system services, increasing overall availability. Using Netra HA Suite Foundation Services 2.1 6/03, customers can build cost-effective, carrier-grade HA solutions for network infrastructures, blade computing, and embedded environments.

### Reduce Costs and Time to Market

Netra HA Suite Foundation Services helps customers accelerate the deployment of highly available applications while lowering costs through:

- *Limit Development Costs:* Netra HA Suite Foundation Services enables customers to increase the availability of standard computing platforms while focusing resources on the development of value-added applications.
- *Faster Integration:* With Sun's Netra servers and board-level products, customers benefit from a complete preintegrated hardware and software platform, reducing final integration time.
- *Quicker Deployment:* Based on open standards, Netra HA Suite Foundation Services can be easily deployed into existing or new HA environments — with minimal development effort.

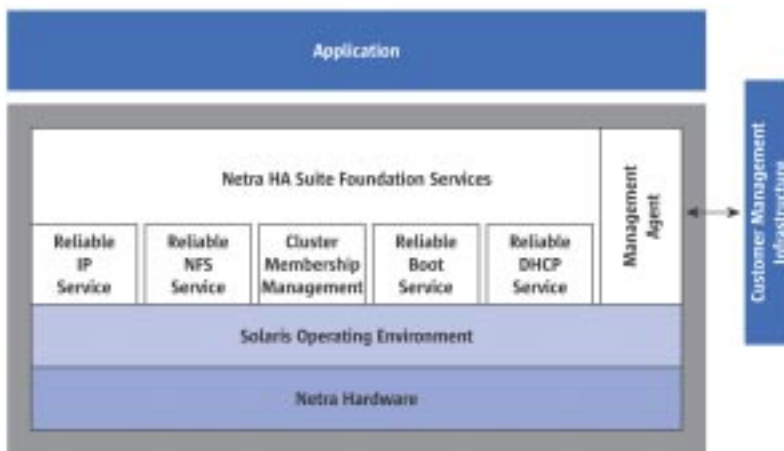
### Netra HA Suite Foundation Services 2.1

Netra HA Suite Foundation Services 2.1 provides a suite of reliable software services that enable the deployment of Solaris™ Operating System (OS) applications in an HA environment. Netra HA Suite Foundation Services can be used to augment existing HA frameworks, or to create a highly available, dynamically scalable cluster of distributed nodes enabling applications to leverage the enhanced reliability of the platform.

### Netra HA Suite Foundation Services Benefits

*Continuous Availability of Core Services*  
**Redundancy for Preventing Failures** — Full software redundancy, redundant hardware components, and redundant communication links are designed to ensure that the Netra HA Suite Foundation Services cluster provides a stable core platform and does not present single points of failure.

Running on the robust Solaris Operating System and multiple Sun hardware platforms, the Netra HA Suite Foundation Services provides a carrier-grade reliable, scalable, and embeddable platform that is designed to meet customers' highest availability needs.



**File Sharing and Data Replication** — Cluster file sharing and data replication are provided by a highly available NFS service. This helps ensure that cluster information and user-defined data is not lost in the event of a system failure.

**Reliable Cluster Communication** — Cluster communication is duplicated over two high-speed Ethernet links. In the event of an error on a single link, vital information continues to its destination on the second link without needing to be retransmitted — helping ensure no added latency in communication.

**Reliable Boot and DHCP Services for Diskless and Dataless Nodes** — Enhanced reliability for standard boot and DHCP services helps ensure that diskless and dataless nodes can boot correctly despite hardware and software failures.

**Fault Management** — To limit the impact of hardware and software faults on the cluster, Netra HA Suite Foundation Services provides fault management capabilities that include fault detection, reporting, isolation, and recovery.

**Reduction of Planned Outages** — Netra HA Suite Foundation Services makes it possible to replace nodes on a running cluster. Customers do not need to plan system outages for hardware replacements and upgrades.

**Mapping Services to Nodes** — With Netra HA Suite Foundation Services, IP addresses and software can be assigned to specific nodes for DHCP and boot services. If a node fails, it can be replaced and the new node will run the same software and service.

**Higher Availability for Existing Software** — Netra HA Suite Foundation Services can be integrated with certain non-HA-aware software, allowing the cluster to benefit from higher availability levels without additional development.

*Easy to Develop and Deploy*

**Open Standards** — To ensure ease of integration into existing infrastructures and interoperability in multi-vendor environments, Netra HA Suite Foundation Services is based on open standards, such as IP, DHCP, NFS, SNMP and the Java™ Management Extension (JMX™) open specifications.

**Full Solaris OS Compatibility** — Netra HA Suite Foundation Services is fully compatible with the Solaris Operating System (OS), leveraging all the benefits of this robust OS and utilizing the same APIs, protocols, and standards for easy development and deployment. It extends the Solaris OS with carrier-grade extensions.

**Embedded Solution** — Netra HA Suite Foundation Services has been designed to be embedded inside the customer solution, eliminating the burden to create a specific HA platform.

**Flexible Installation and Configuration** — A choice of custom and standard installation methods, from manual installation to automatic duplication, provides the flexibility to adapt to different customer deployment environments.

**Horizontal Scalability** — Netra HA Suite Foundation Services is designed to scale horizontally, helping customers meet growing network demands by adding new nodes and applications for *capacity on demand*.

*Reliable Cluster Management*

**Reliable Management Agents** — Reliable management agents provide access to essential cluster information and statistics — even in the event of a cluster hardware or software failure.

**External Management Capabilities** — External access to the Netra HA Suite Foundation Services cluster enables customers to easily access cluster information and conduct management and administration tasks from outside the cluster.

*Easy Management Integration* — Support for industry standards such as SNMP means customers can easily integrate Netra HA Suite Foundation Services management into deployed management infrastructures.

### Highly Available Services

**Reliable NFS Service** — Netra HA Suite Foundation Services provides a reliable file system accessible through NFS. This feature leverages the redundancy of the hardware platform, enabling failover of NFS data and services to the secondary node if the primary fails.

Features include:

- Limited loss of service or corruption of committed data due to physical disk failure or NFS server failure
- Exported file systems that are unavailable for no more than a few seconds during transitions
- Disk mirroring using a reliable IP link
- NFS server IP address remains unchanged during failover
- Support for diskless clients (Solaris OS or other)
- Support for partitions containing non-Netra HA Suite Foundation Services user-defined data
- Soft partitioning and locally mirrored disk with support for Solstice DiskSuite™ 4.2.1 (in the Solaris 8 2/02 OS) or Solaris Volume Manager (in the Solaris 9 OS)

**Reliable Boot and DHCP Services** — To raise overall system availability, reliable boot and DHCP services enable node reboot regardless of potential hardware or software failures in the cluster.

Features include:

- Recovery from software failure (boot or DHCP server application failure)
- Recovery from hardware failure (server node, disk, or network link failure)
- Support for diskless nodes (Solaris OS or other)
- IP address remains unchanged during failover

**Reliable IP Transport** — To help ensure that a single network failure does not result in data loss or additional transmission delay, Netra HA Suite Foundation Services includes a redundant cluster network for reliable IP transport.

Features include:

- Network traffic in the cluster is duplicated and sent over two physical links
- No added latency when errors occur on a link or during failure of a single link

### Fault Management

Core fault management is provided by the Cluster Membership Management service, which detects node failure, tracks cluster registration, and informs applications of cluster changes. Netra HA Suite Foundation Services also includes a process monitor daemon and watchdog timer that contribute to fault management.

#### *Fault Detection*

- Detects failure of cluster nodes
- Detects failure of major Netra HA Suite Foundation Services and Solaris OS processes and services
- Monitors hardware watchdogs and the boot process

#### *Fault Reporting*

- Logs error reports for all errors that indicate potential failures
- Notifies subscribed system services and applications when a node fails

#### *Fault Isolation*

- Helps ensure that the failed node cannot communicate with other cluster nodes

#### *Fault Recovery*

- Performs failover from a primary to a secondary node
- Notifies other nodes and applications of changes
- Restarts major Netra HA Suite Foundation Services

### Cluster Management and Administration

**Software Installation and Configuration** — Customers can choose from custom or standard software installation. Custom installation enables a high level of flexibility in the software configuration. Standard installation tools provide the ability to build software loads and deploy them widely across clusters, helping reduce errors in deployment.

Features include:

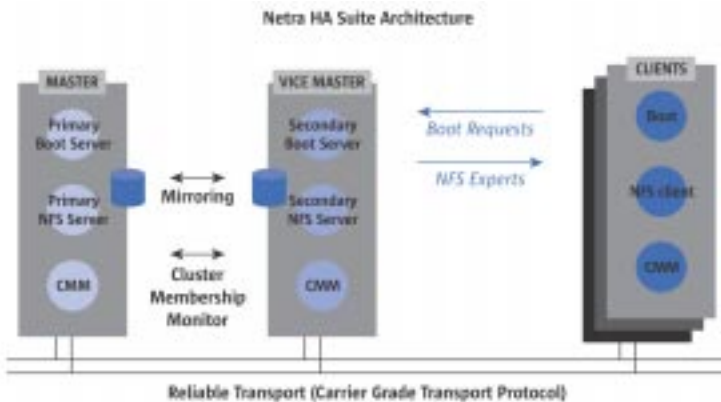
- Fast and automated cluster deployment
- Creation of mastered software loads that enable customers to reproduce the same configuration on several nodes or clusters
- Regeneration of a cluster configuration by redeploying the corresponding software load
- Deployment of operating system, Netra HA Suite Foundation Services 2.1, and third-party applications
- Based on standard Solaris OS tools

**Node Management** — Netra HA Suite Foundation Services includes reliable, JMX API-compliant node management agents to monitor core services. Cluster-wide management statistics are accessible on the primary node, and are designed to failover to the secondary if the primary fails.

Features include:

- Access to statistics for cluster management, reliable NFS, and IP services via SNMP (v1, v2, v3), HTTP, and HTML

## Netra™ High Availability Suite Foundation Services 2.1 6/03



- SNMP personality for the management agent, which can be integrated into existing SNMP-based management infrastructures

### Hardware Platforms

To meet different customer needs, Netra HA Suite Foundation Services 2.1 is compatible with a range of Sun hardware platforms. For more information, visit [sun.com/netrahasuite](http://sun.com/netrahasuite).

### Solid Proven OS Foundation

Netra HA Suite Foundation Services 2.1 runs on the Solaris OS, which includes HA features such as:

- OS, driver, and protocol stack hardening
- POSIX compliance
- Hot patching/hot diagnostics
- System event Framework
- Disk volume management
- Watchdog

Netra HA Suite Foundation Services 2.1 6/03 supports the Solaris 8 2/02, Solaris 9, and Solaris 9 9/02 Operating Systems.

### Target Markets

- Telecom and Internet:
  - Softswitch
  - Radio Network Controller (RNC)
  - Base Station Controller (BSC)
  - Media Gateway
  - Signaling Gateway
  - Label Switching Router
- Internet Servers
- Defense
- Manufacturing
- Aerospace
- Health Care
- Media Imaging

### About Sun Software

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technology, the Solaris Operating System, Sun ONE middleware, and N1 — continues to revolutionize the industry and create new value for customers.

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### About Sun

For years, customers have turned to Sun Microsystems to help them expand their business, lower their costs, and gain competitive advantage. Sun is a leading provider of industrial-strength hardware, software, services, and technologies that make the Net work.

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### For More Information

To learn more about Netra HA Suite Foundation Services 2.1 6/03, please visit [sun.com/netrahasuite](http://sun.com/netrahasuite).

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