

## Netra™ High Availability Suite Foundation Services 2.1 7/05 Accelerate time to market



### Key feature highlights

- Continuous availability of core Foundation Services, including Reliable NFS, Reliable Boot, Reliable DHCP services, and Reliable IP Transport
- Designed for a high level of horizontal scalability to enable the dynamic addition of new nodes and applications
- Fault management capabilities provided via a Cluster Membership Management (CMM) service
- Support for Service Availability Forum (SA Forum) Cluster Membership Service (CLM)
- 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 online rolling upgrade
- Support for a wide range of Netra rack and blade platforms



Today's competitive telecom industry is facing pressure to reduce CAPEX and OPEX while at the same time accelerate time to market. Network equipment providers (NEPs) and original equipment manufacturers (OEMs) must provide highly available and scalable systems to carriers so that services are available to end users all the time with little or no downtime.

### Sun's Netra High Availability (HA) Suite Foundation Services

Sun's Netra High Availability (HA) Suite Foundation Services provide 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 offer customers enhanced reliability for system services, increasing overall availability. Using Netra HA Suite Foundation Services 2.1 7/05, customers can build cost-effective, carrier-grade HA solutions for network infrastructures, blade computing, and embedded environments.

### Netra HA Suite Foundation Services benefits

Netra HA Suite Foundation Services help customers accelerate the deployment of highly available applications while lowering costs.

### Reduced development costs

Leveraging Netra HA Suite Foundation Services, customers can create HA services on their highly available integrated environment with minimal development costs. Eliminating the burden of recreating HA middleware, customers can focus their resources on competitive services.

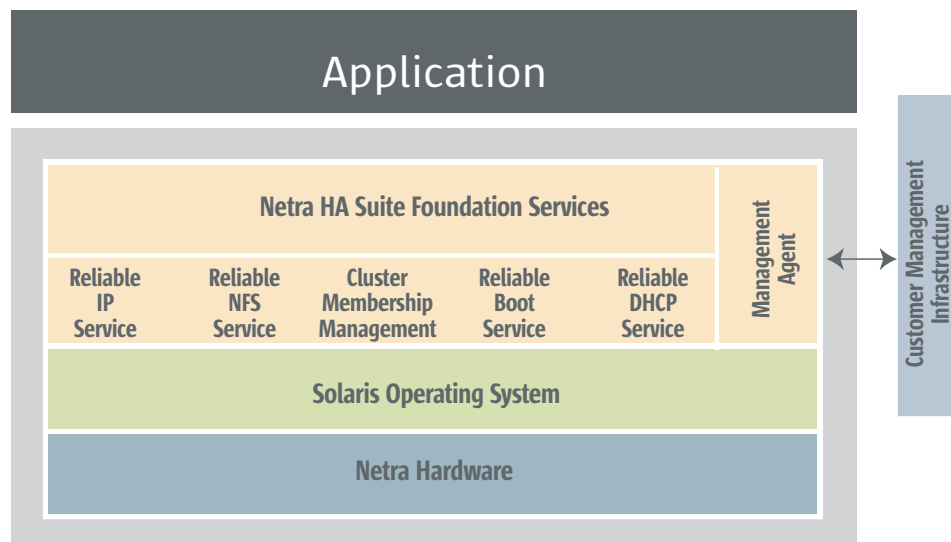
### Faster integration

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 easily be deployed into existing or new HA environments with minimal development effort.

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



### Continuous availability of core services

#### Redundancy for preventing failures

Redundant software and hardware components and communication links ensure that the Netra HA Suite Foundation Services cluster provides a reliable core platform and does not present any single point of failure.

#### Reliable NFS service

Netra HA Suite Foundation Services provide a reliable file system accessible through NFS. This reliable NFS service 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 failover
- Disk mirroring using a reliable IP link
- NFS server IP address remains unchanged during failover
- Support for diskless and dataless 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™ 4.2.2 software (in the Solaris™ 8 2/02 OS) or Solaris Volume Manager software (in the Solaris™ 9 OS)
- Disk sharing to share data between Master Eligible nodes

#### Reliable boot and DHCP services

Enhanced reliability for standard boot and DHCP services helps ensure that diskless nodes can boot correctly despite hardware and software failures. 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
- IP address remains unchanged during failover

#### Reliable cluster communication over IP

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 retransmission, eliminating latency in communication. 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

### Reliable cluster management

Netra HA Suite Foundation Services include reliable, Java™ Management Extension (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
- SNMP personality for the management agent, which can be integrated into existing SNMP-based management infrastructures

### Reduction of planned outages

Netra HA Suite Foundation Services make 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.

### 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 include a process monitor daemon and watchdog timer that contribute to fault management.

- Fault detection
  - Detects failure of cluster nodes
  - Detects failure of external links
  - Detects failure of major Netra HA Suite Foundation Services, Solaris OS processes, and other service daemons
  - 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
  - Detects failure of external links

### Rolling upgrade

Enables Foundation Services version upgrade on a cluster without service interruptions.

### 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 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 are based on open standards, such as IP, DHCP, NFS, SNMP, SA Forum CLM, and the JMX open specifications.

#### Full Solaris OS compatibility

Netra HA Suite Foundation Services are 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. Similar extensions are also planned for carrier-grade (CG) Linux.

### Embedded solution

Netra HA Suite Foundation Services are designed to be embedded inside the customer solution, eliminating the burden to create a specific HA platform.

### 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.

### Horizontal scalability

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

### Software installation and configuration

Automated and manual installation enables a high level of flexibility in the software configuration. Features include:

- Deployment of operating system, Netra HA Suite Foundation Services 2.1, and third-party applications
- Based on standard Solaris OS tools

### Hardware platforms

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

### Solid, proven OS foundation

Netra HA Suite Foundation Services 2.1 run 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 7/05 support the Solaris 8 2/02, Solaris 8 7/03, and Solaris 9 9/04 Operating Systems.

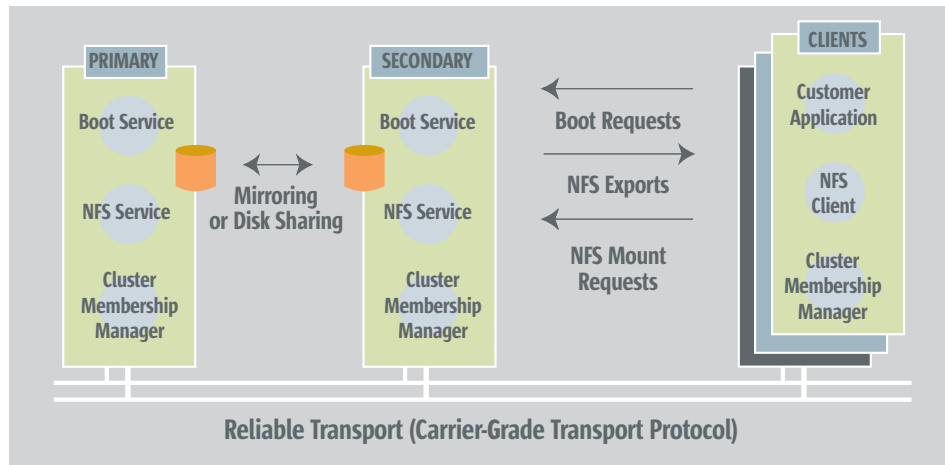
### Target markets

- Telecom and Internet:
  - Softswitch
  - Radio network controller (RNC)
  - Base station controller (BSC)
  - Media gateway
  - Signaling gateway
  - Home location register
  - GGSN/SGSN Nodes
  - Label switching router
  - Internet servers
- Defense
- Manufacturing
- Aerospace
- Healthcare
- Media imaging

### About Sun

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## Netra HA Suite Architecture



### For more information

To learn more about Netra HA Suite Foundation Services 2.1 7/05, please visit [sun.com/netrahasuite](http://sun.com/netrahasuite).

To learn more about Sun's offerings from telecom network infrastructure, please see [sun.com/netra](http://sun.com/netra).

To receive additional information on Sun software, products, programs, and solutions, visit [sun.com/software](http://sun.com/software).