

Dynamic Infrastructure for Web Services

Rapid and Secure Infrastructure Deployment



Organizations that depend on Web-based applications for competitive advantage need agile, flexible, and secure infrastructure in order to prosper. Web services infrastructure must be ready to respond on demand to serve new business opportunities, address sudden changes in load, and solve emerging technical challenges. While horizontally-scaled systems have certainly delivered availability and scalability, for the most part these environments have remained statically conceived and configured, and manually managed. The result is inflexible, inefficient, and overly complex infrastructure that is increasingly expensive, and at odds with the fundamental needs of the business. In response, Sun has designed its Dynamic Infrastructure for Web Services offering to provide a complete set of technology and services that assist in the creation of an agile and secure Web services environment. This innovative approach leverages significant automation and virtualization technology to deliver truly flexible and efficient consolidated and dynamic Web-based application infrastructure.

Key Benefits

Dynamic

- Automate configuration and provisioning for both servers and networks
- Consolidate, create, and grow application workloads dynamically without re-cabling

Rapid

- Up to 80 percent faster management activities for Web applications
- Save hours or even days while moving or growing Web-based applications
- Speed deployment with the factory-integrated and tested Sun™ Grid Rack System for Web Services

Secure

- Experience comprehensive security, from virtual networks to the underlying platforms and Web applications
- Deploy security and flexibility with the Sun™ Secure Application Switch, hardened Solaris™ Operating System, and N1™ and Java™ technologies

Toward dynamic Web infrastructure

Even as Web services face growing demand for capacity and performance, many organizations are experiencing very real challenges:

- Power and space limitations are now a primary concern, and some larger datacenters literally can't get any more power to handle new servers and the heat they produce, even if they could afford it.
- Aging hardware increasingly can't support the latest software or provide needed levels of performance, and utilization levels remain quite low.
- The cost of complexity remains a significant factor, from manual cable management to dealing with (often unique) hardware configurations, to deploying (and re-deploying) multiple versions of different operating systems and their respective applications.
- Effective security has never been more important, but the increasing demand for encryption/decryption is consuming vital resources needed for providing application services.

Fortunately, a number of technology developments offer reason for hope. With the advent of powerful AMD Opteron™ x64 processors,

significantly more capable systems are facilitating the consolidation of multiple older x86 systems. At the same time, UltraSPARC™ T1 processor based Sun Fire™ servers with CoolThreads™ technology have completely redefined scalability and power consumption for Web services deployments. Together these new systems offer increased performance and capacity while drastically improving manageability, compute density, and power and cooling profiles over the systems they replace.

Aiding with essential consolidation efforts, virtualization technology is helping to enable unprecedented flexibility and agility, and significantly better utilization of system resources. Virtualization is taking place at multiple levels in systems, storage, and in the network itself, allowing entirely new ways to define available, reliable, and secure services. New tools for the automation and dynamic management of Web infrastructure round out these capabilities, allowing administrators to sense, analyze, capture, and consolidate workloads while they manage existing production software environments in a highly automated fashion.

Even with the wealth of virtualization tools and technologies that are becoming available, customers are still left to choose and integrate these technologies into a meaningful whole that serves their own unique and pressing needs. Ultimately, most organizations want to focus on running their business, not breaking new ground in IT infrastructure provisioning. While most want the flexibility that comes

The Dynamic Infrastructure for Web Services offering helps customers rapidly consolidate and optimize Web applications

from virtualization technology and automation techniques, they need standardized and proven best practices that can get them rapid and reliable results with low risk.

Dynamic infrastructure from Sun

As a key innovator in a range of related technologies, Sun is in an ideal position to help organizations achieve an agile and secure infrastructure. To speed that process, Sun experts have created a technology offering that helps enable rapid and flexible deployment of Web and Java™ 2 platform Enterprise Edition (J2EE™ platform) applications. Sun estimates that dynamic infrastructure can save customers up to 80 percent of the time required for activities such as deploying and provisioning a rack of servers, migrating workloads, and growing workload capacity.

The Dynamic Infrastructure for Web Services offering is based on Sun's proven Service Delivery Network Architecture (SDNA), and demonstrates dynamic, secure, and rapid deployment of Web applications using Sun's complete technology stack. Much more than mere racks of servers, this offering includes Sun's leading servers based on the UltraSPARC

T1 and AMD Opteron processors, Sun Secure Application Switch technology, Solaris Containers virtualization technology from the Solaris 10 Operating System, and sophisticated N1 optimization, automation, and management software technology. This infrastructure offering is ideally implemented using the Sun Grid Rack System for Web Services — an approach that allows fast and low-risk installation of fully-integrated racks (Figure 1).

In addition to the underlying hardware and software technologies, the SDNA brings a series of Sun BluePrints™ publications, best practices, and services that help facilitate deploying dynamic Web

infrastructure to virtually any environment. Organizations can take advantage of Sun's expertise through professional services, or they can leverage these extensive materials and building blocks to deploy their own dynamic infrastructure for Web services.

The Service Delivery Network Architecture (SDNA) — standardization around high-level building blocks

A part of Sun's effort to support *service-optimized datacenters*, the SDNA represents a "client-service" architecture. This intentional nomenclature implies that clients connect to a virtualized service and not directly to a specific server. Rather than focusing on technology, servers, or other design components, the SDNA emphasizes the services delivered to the end-user. De-coupling services from the underlying infrastructure that supports them allows for massive network scalability with the potential of extremely high performance features. Agility, flexibility, security, and manageability are also maximized.

The SDNA works by standardizing two key datacenter elements, the infrastructure itself, and the common activities that operate on the infrastructure. This approach leads to considerable simplification because higher-level building blocks are used both to deploy infrastructure as well as operate on it.

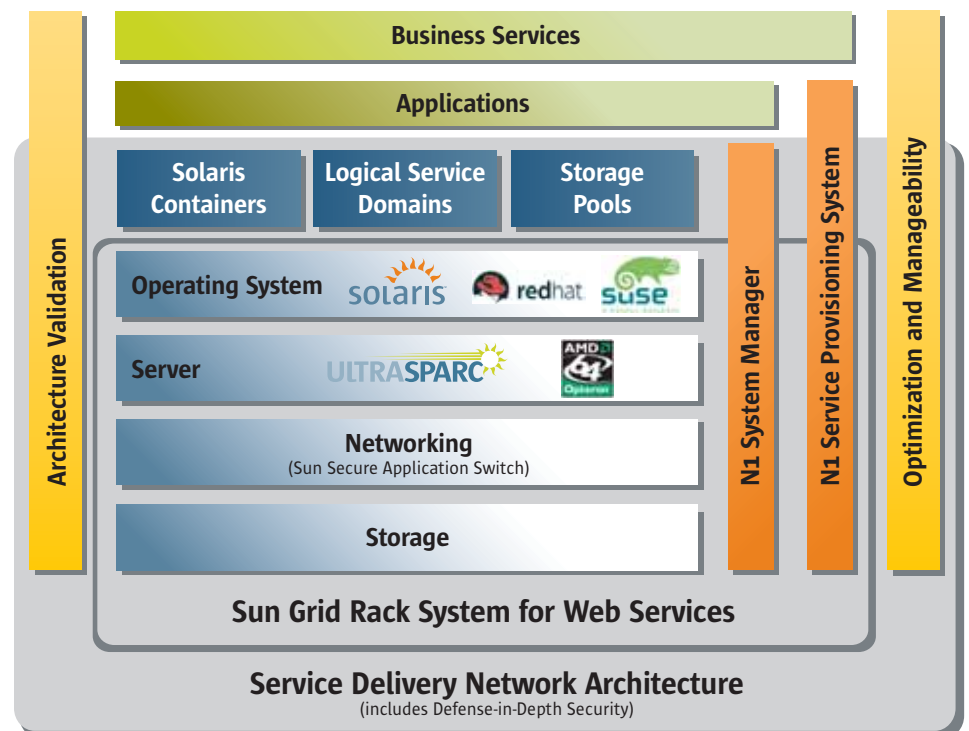


Figure 1: Sun's Dynamic Web Infrastructure offering represents a complete approach

“In our IT-modernization project, improving resource utilization and reducing time-to-market for adding new services and customers are two high priorities. Sun’s vision and technology for virtualization, optimization, and automation will help us fulfill our future needs for a dynamic datacenter. We have employed the Sun SDNA, together with the Sun Secure Application Switch and N1 software. We have into these early stages high expectations when going into production, and are pleased that Sun is enhancing its solutions to create integrated offerings.”

Iren Rutle, Project Director

BBS, Norway

For example, it is simpler for an organization to address infrastructure by deploying racks of pre-configured servers as a ready resource pool than it is for them to install, cable, configure, and provision individual servers by hand.

SDNA Solutions are built around common real-world activities (known as Patterns) that address a recurring problem, with the goal of standardizing applications, configurations, and network architecture. For example, a pattern might address the need to automate the migration and consolidation of many different servers running a variety of distinct workloads. Another pattern might address adding capacity to serve existing services. Growing organizations might also leverage a pattern to rapidly add a new service. The result is effective infrastructure for virtualized services and networks that provide resilient, scalable, and secure application services. While many businesses need consolidation, others need to deploy infrastructure in modular, self-contained units to address rapid deployment, scalability, and

the ability to evolve functionality as needed. Achieving these characteristics while supporting maximum scalability requires the ability to partition services, even as infrastructure components are grouped to match business and technical needs. The Dynamic Infrastructure for Web Services offering addresses this need directly, with key concepts such as pod-based modular design, centered around application-optimized solutions that use the Sun Grid Rack System as building blocks.

Consolidating multiple Web or application servers to dynamic infrastructure

Dynamic infrastructure for Web services holds significant promise, letting organizations move from static, manually-managed legacy infrastructure to a flexible and agile environment. Significantly larger, scalable and expandable pools of available resources are the result. Applications and services can be deployed, moved, and redeployed at will, and administrators can copy, replicate, automate, and standardize application-level components.

Unfortunately, many organizations face the daunting task of migrating hundreds or thousands of legacy Web or application servers. To address this need, the Dynamic Infrastructure for Web Services offering employs sophisticated detection and automation technology to help consolidate multiple Web or application servers, virtually at the push of a button.

Its important to note that as a part of this process, Web or application servers on individual hardware platforms are moved into virtualized systems through the use of Solaris Containers technology. Unlike static infrastructure where available extra resources on individual servers go unused, Solaris Containers provide effective consolidation, security isolation, and very high levels of sustained utilization. Containers also facilitate effective testing prior to production deployment, allowing consolidation and migration

with minimal impact to existing infrastructure. A typical migration of legacy Web servers is automated as follows:

1. To provide a new pool of resources, a new Sun Grid Rack for Web Services is deployed on the network, with servers and operating systems tailored to the needs of the organization. The individual servers are discovered by N1™ System Manager software, and a standard operating environment (SOE) is installed consisting of base OS, common software agents, and patches.
2. N1™ Service Provisioning System software is then used to discover and identify legacy Web server systems. The N1 Service Provisioning System Web Server Migration plug-in scans the legacy system, locates and encapsulates workloads, and determines their ability to be migrated.
3. Through a simple GUI, an administrator initiates the migration. N1 Service Provisioning Server software then configures and initializes a Solaris Container on a target server. Each Container functions as an isolated and secure Solaris instance, and a given target server may ultimately host multiple containers that each, in turn, host their own Web or application server.
4. Once the newly-consolidated Web server is ready for deployment, N1 Service Provisioning System software configures the SDNA through additional network provisioning software and the Sun Secure Application Switch. This process initializes any load balancing, in addition to adding the new container to appropriate subnet.
5. The process is complete when the virtualized system represented by the Solaris container and its resident Web server are added to the active resource pool.

Consolidation of services is only one of many patterns described by the SDNA that can be implemented by Sun’s Dynamic Infrastructure for Web Services offering. Patterns to grow services and launch new services are also included. These high-level building blocks help organizations save considerable time and money while reducing the risk of errors and security breaches from manual configuration.

The Dynamic Infrastructure for Web Services Offering

Key components and their function

The Dynamic Infrastructure for Web Services offering is based on innovative technology from Sun and key partners.

Service Delivery Network Architecture (SDNA)

- The SDNA provides a proven methodology for designing and deploying virtualized, scalable, and secure network infrastructure. Beyond switches and topology, the SDNA puts agile and flexible application services at its focus

The Sun Grid Rack System for Web Services

- The Sun Grid Rack System for Web Services (right) provides an effective high-level building block for creating grids of powerful x64 or UltraSPARC T1 based servers. These racks—preconfigured with servers, networking, and software—provide 90 percent faster installation.

Sun x64 Servers Based on the AMD Opteron™ processor

- Sun x64 servers based on single- or multi-core AMD Opteron™ processors provide new levels of industry-leading performance. Sun Fire™ X2100, X4100, X4200, X4500, X4600 servers and the Sun Blade 8000 Modular System provide excellent consolidation platforms built from standardized components.

Sun Fire Servers with CoolThreads™ technology

- Sun Fire servers with CoolThreads technology offer innovative chip multithreaded (CMT) UltraSPARC T1 processors, redefining Web services consolidation opportunities. Sun Fire™ T1000 and T2000 servers provide virtually unprecedented scalability for Web services applications while drastically lowering power and cooling costs.

Sun Secure Application Switch – N1000 Series

- Redundant model N1400 Sun Secure Application Switches provide support for SDNA and allow organizations to cable once, reconfiguring and redeploying at will. With specialized hardware acceleration, Sun Secure Application Switches supply multi-rack virtualization, full layer 4-7 packet termination and inspection, and massive SSL acceleration and consolidation.

The Solaris 10 OS with Solaris Containers

- Innovative Solaris Containers provide fine-granularity system virtualization and resource allocation for powerful Sun fire servers. The Dynamic Infrastructure offering automates the deployment of multiple secure Web or application servers on a single system, allowing resources to be allocated as needed.

N1 System Manager and N1 Service Provisioning System

- Together, N1 System Manager and N1 Service Provisioning System software facilitate the capture, packaging, and re-deployment of applications and their workloads. These powerful tools can also detect hardware from the bare metal, provision secured OS packages and provision complete application environments.

Learn More

Contact your Sun Sales Representative to learn more about the Dynamic Infrastructure for Web Services offering, or visit: sun.com/servers/dynamicweb

Sun Java System Web Infrastructure Suite

- The Sun Java Web Infrastructure Suite is a complete, secure and pre-tested solution that is fully interoperable with existing Web environments. Components of the suite include the Java System Web Server, the Java System Web Proxy Server, the Java System Application Server, the Java System Directory Server, and the Java System Access Manager.

Comprehensive Services

- Sun offers comprehensive services to assess, architect, implement, and manage the Dynamic Infrastructure for Web Services offering and the SDNA. Contact your Sun or partner representative today to schedule a Workshop to find out how this offering could benefit your IT environment.



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