Efficient System Administration using Sun's Systems Management Technologies

Michael Barrett
Connected Systems Management
Sun Microsystems, Inc.
Agenda

- Problems
- Solution Portfolio
  - Sun Connection
  - System Manager
  - Management Center
  - Container Manager
  - Service Provisioning System
- Strategic Direction
- Next Steps
Patching Problems

• Too many patches (> 2000/year)
• Difficulty getting the “right” patches to the “right” systems
• Patches can introduce new problems
• Patches require other patches, increasing change and risk
• Patches change configuration files
• Patches require too many reboots
• Maintenance windows are small
• SOX reporting on every change to every system by everyone
Provisioning Problems

- Firmware, OS and Application Provisioning/Reprovisioning is frequently needed
- Provisioning requirements are rapidly changing
- Data Center environments are complex and heterogeneous
- No down time is allowed
- “Do more with less” is the rule of the game
- Security demands are ever increasing
- Regulatory compliance is getting stringent
- Businesses are under intense competition
Monitoring Problems

- Hardware/Software Inventory is ever increasing
- Auditing/Tracking is a cumbersome process
- Physical view of the resources does not map to the logical view
- More time spent in curing than preventing
- Management policies are often times coded only in system administrators' minds
- Expertise is lost with the staff
What if...?

• Just one system administrator could control and manage thousands of systems, worldwide?

• You could ensure that all your systems were up to date and compliant in minutes, not days?

• Sun's Systems Management technologies make this a reality!
Sun's Systems Management Portfolio

- **Sun Connection**
  - Asset Tracking and Registration
  - Patch Lifecycle Management

- **N1 System Manager**
  - Service Processor Management
  - Bare Metal OS Provisioning

- **Sun Management Center (SunMC)**
  - FRU, OS, and Services Monitoring
  - Solaris Container Management

- **N1 Service Provisioning System (N1 SPS)**
  - Multi-tier Application Provisioning
  - SDK for Application Modeling
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Sun Connection (SCN)

Sun Connection delivers powerful analysis for managing the life cycle of Solaris and Linux systems on your network, including managing their updates and configuration changes.
Sun Connection – Key Features

- Discovery & Registration
  - Bulk Register Sun Assets

- OS & App Provisioning
  - Provision Solaris & Linux

- Update Management
  - Update Solaris & Linux

- Asset Portal
  - View Assets & Run Reports
Sun Connection - Key Benefits

<table>
<thead>
<tr>
<th>Activity</th>
<th>Without Sun Connection</th>
<th>With Sun Connection</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Discover</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Discover</td>
<td>Discover and Compare inventory for 100+ systems against baseline</td>
<td>Hours</td>
</tr>
<tr>
<td><strong>Validate</strong></td>
<td>Obtain software and patches and validate PKG/RPM installation</td>
<td>Days</td>
</tr>
<tr>
<td><strong>Deploy</strong></td>
<td>Convert a server into a Web Server</td>
<td>Hours</td>
</tr>
<tr>
<td><strong>Assess</strong></td>
<td>Identify patches required for 100+ servers and impact on system</td>
<td>Hours</td>
</tr>
<tr>
<td><strong>Rollback</strong></td>
<td>Rollback security fix across 100+ servers</td>
<td>Hours</td>
</tr>
<tr>
<td><strong>Patch</strong></td>
<td>Apply a security fix to 100+ servers</td>
<td>1 day</td>
</tr>
<tr>
<td><strong>Recover</strong></td>
<td>Restore server with pre-disaster inventory of components after disaster</td>
<td>2 – 5 hours</td>
</tr>
</tbody>
</table>
Sun Connection – Architecture

Local Site Lan

Sun Connection

Server

Knowledge Base Components

Dependency Manager

Solaris OS

Local Components

Solaris Agents

Linux Agents

Console

Knowledge Base

Solaris Components

Sun Microsystems

Components

Third Party Vendors

Sun Freeware

redhat

Suse
• Partner with the vendor to establish the most efficient software configuration
• Easy to use mass deployment of custom patch baselines
• Rollback, clone, and other provisioning methods to insure compliance with application test spec or security requirements

Sun Connection
SCN – A Knowledge Based Solution

Update Management
- Knowledge-Driven Updates
- Active Dependency Service
- Heterogeneous Patch Management
- Compliance Reporting & Enforcement

Provisioning
- Existing State Provisioning
- Configuration Management
- Rollback and Recovery
- Virtual Environment Management

System Administrators

Analyse

Collect

Improve

Publish

Sun Connection Activation

Knowledge Channels, Content & Rules

Customer Systems

Update

Register

Provision

Sun Microsystems
SCN – Knowledge Channels

Update Channel
- Take back your life by staying updated
- Manage critical dependencies
- Enforce policies across the enterprise

Provisioning Channel
- Create profiles for the enterprise
- Enable rollbacks, group operations, and reports

Inventory Channel (free)
- Discover and Register Sun assets
- Track Inventory & Organize data in the business context

Monitoring Channel (Will be available early 2008)
- Set Thresholds for OS and HW
- Manage on-demand HW and OS
SCN – Connected Systems Mgmnt

Locate Product Data

To begin the registration process, Sun products will be discovered on your local subnet. Or, you can specify to find Sun products on a different subnet, on one or more specific systems or you can load data about products whose data you previously saved to a file.

- Locate Products on Local Subnet: 192.168.1
- Locate Products on Other Subnets, Specific Systems or Load Previously Saved Data

For more information on what data the Registration Manager collects and how it is managed and used, see the Product Registration Information Page.
SCN - Registration Manager In Action

Step 1: Electronically Label Sun Products

Step 2: Discover and Register Installed Products

Step 3: Asset Management & Business Intelligence

Simple Inventory Management

Business Intelligence
Product Registration using Electronic Labels

- Sun products use digital identifiers called **Service Tags**
- Hold a small amount of product information
- Will be embedded in software or firmware
- Sun Connection Registration Manager discovers service tags and registers the products
SCN's Supported Platforms - Solaris

SPARC Architecture
- Solaris 8
- Solaris 9
- Solaris 10

X64 Architecture
- Solaris 10

Patching & Provisioning for Solaris
SCN's Supported Platforms - Linux

**Red Hat Knowledge Channels**

- Red Hat Enterprise Linux 3 (AS,ES,WS)
- Red Hat Enterprise Linux 4 (AS,ES,WS)
- Red Hat Enterprise Linux 5 (AS,ES,WS)
- zLinux
  - RHEL 3 zLinux
  - RHEL 4 zLinux

**SuSE Knowledge Channels**

- SUSE 8 and Linux Enterprise Server 8
- SUSE 9 and Linux Enterprise Server 9
- SUSE 10 and Linux Enterprise Server 10
Sun's Systems Management Portfolio

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- **N1 Service Provisioning System (N1 SPS)**
  - Multi-tier Application Provisioning
  - SDK for Application Modeling
N1 System Manager (N1 SM)

N1 System Manager software simplifies systems discovery, provisioning, monitoring and management functions to increase IT productivity. It accelerates IT to deploy Sun servers in a distributed and a heterogeneous environment.

Scale Out Element Management
• Status of available assets for use at any given time
• Drag and drop OS provisioning and BIOS/firmware on one-to-many system
• Remote execution of command with central capture of output
## N1SM - Features & Capabilities

<table>
<thead>
<tr>
<th>Features</th>
<th>Capabilities</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bare Metal Discovery</td>
<td>- x64 and SPARC</td>
</tr>
<tr>
<td>OS Provisioning</td>
<td>- Solaris, Linux, Windows</td>
</tr>
<tr>
<td></td>
<td>- Firmware</td>
</tr>
<tr>
<td>Health Monitoring</td>
<td>- Hardware and basic OS Monitoring</td>
</tr>
<tr>
<td></td>
<td>- Event notification</td>
</tr>
<tr>
<td>Element Management</td>
<td>- Server Management</td>
</tr>
<tr>
<td>Hybrid User Interface</td>
<td>- GUI and CLI</td>
</tr>
</tbody>
</table>
N1 SM - Architecture

Management Server

Web Console

HTTPS

CLI

TCP

Postgres

Agentless Poller

Main CACAO

ALLstart, Jumpstart, Kickstart, YAST

Services

PXE/DHCP

iLOM/ALOM

RSC

Newisys

SNMP

Managed Nodes - RH, SuSE, Solaris

SNMP MIB

telnet/ssh/IPMI
## N1 SM - Platform Support

<table>
<thead>
<tr>
<th>Platform Support</th>
<th>Version</th>
</tr>
</thead>
<tbody>
<tr>
<td>Solaris</td>
<td>9, 10</td>
</tr>
<tr>
<td>RH AS/ES/WS</td>
<td>3.0U2, 4.0</td>
</tr>
<tr>
<td>SuSE Enterprise</td>
<td>9.0, 9.2, 9.3</td>
</tr>
<tr>
<td>Windows</td>
<td>2003 SE/EE, 2000 S/AS/WE</td>
</tr>
</tbody>
</table>

**Bare Metal OS Provisioning**
N1 SM - Managed Node Support

Sun SPARC servers supporting ALOM 1.5, RSC
Sun Fire 210/215
Sun Fire 240/245
Sun Fire 440/445
V490/V890,
Netra 240
Netra 440
Sun Fire T1000, T2000

Sun Fire V20z and Sun Fire V40z
Sun Fire X4600, Sun Fire X4500, Sun Fire X4100, Sun Fire X4200 and Sun Fire X2100, X2200
Sun Blade 8400
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  - Multi-tier Application Provisioning
  - SDK for Application Modeling
Sun Management Center (SunMC) provides in-depth monitoring capabilities for Sun Servers, Operating Systems, and Services to ensure the health of your computing environment. It diagnoses and analyzes resources to improve system performance and availability. Also, enables configuration, monitoring, and management of Solaris Containers.

Deep Management for the Sun Stack
Management Center

- Real time photo-realistic modeling of hardware and 2-D topology relationship building
- Historic trending within the largest repository of attributes for the Sun stack
- Metric alarming and verification
SunMC - Key Features

- HW Monitoring, Physical and Logical view of Systems
- OS and Services Monitoring
- Threshold Monitoring and Alarm Management
- User and Role Based Security. Encrypted Communication.
- Hands Free Installation / Agent Update
- Group Operations, Scheduling
- Report Generation / Graphing - Live and Persisted
- Detailed Diagnostics of Solaris 10 features (Containers, Zones, etc.)
- Integrates with Enterprise Management Frameworks
- Add-On Modules for advanced capabilities
# Sun Management Center Add-on Modules

<table>
<thead>
<tr>
<th>Features</th>
<th>Capabilities</th>
</tr>
</thead>
<tbody>
<tr>
<td>Advanced System Monitoring</td>
<td>- Monitor directory, memory, cache, faults, swap, CPU/process/disk/IO/load/fs/user statistics, etc.</td>
</tr>
<tr>
<td>Solaris Container Manager</td>
<td>- Create &amp; manage Solaris Containers, zones</td>
</tr>
<tr>
<td></td>
<td>- Monitor &amp; control resource usage</td>
</tr>
<tr>
<td>Performance Reporting Manager</td>
<td>- Report resource utilization</td>
</tr>
<tr>
<td></td>
<td>- Enable planning, accounting, billing</td>
</tr>
<tr>
<td>Volume System Monitoring</td>
<td>- Event Integration with N1 SM</td>
</tr>
<tr>
<td>Service Reliability Manager</td>
<td>- Enhance system reliability</td>
</tr>
<tr>
<td></td>
<td>- Dump analyzer, file watcher, patch monitoring</td>
</tr>
<tr>
<td>Service Availability Manager</td>
<td>- Monitor availability of Internet services</td>
</tr>
<tr>
<td></td>
<td>- Web, directory, telnet, file transfer, mail</td>
</tr>
</tbody>
</table>
## Solaris Container Manager

<table>
<thead>
<tr>
<th>Features</th>
<th>Capabilities</th>
</tr>
</thead>
<tbody>
<tr>
<td>Zone Management</td>
<td>- Create, delete, modify, halt, reboot local zones</td>
</tr>
<tr>
<td></td>
<td>- Discover zones, detect zone changes</td>
</tr>
<tr>
<td></td>
<td>- Monitor resource utilization, generate alarms</td>
</tr>
<tr>
<td>Resource Pool Management</td>
<td>- Create, modify, delete resource pools</td>
</tr>
<tr>
<td></td>
<td>- dynamically adjust pool size</td>
</tr>
<tr>
<td>Network Bandwidth Management</td>
<td>- Monitor bandwidth utilization</td>
</tr>
<tr>
<td></td>
<td>- Graph historical utilization</td>
</tr>
<tr>
<td>Zone Migration</td>
<td>- Migrate zone across hosts</td>
</tr>
<tr>
<td>Scheduler Management</td>
<td>- Select scheduler class (timeshare/fairshare)</td>
</tr>
</tbody>
</table>
• Active control over all Solaris resource technologies (zones, pools, projects) to increase utilization
• Proactive alarming when goals at not meet
• Automatic discovery
## SunMC – Hardware Support

### Sun4d
- SPARCserver2000 *

### Sun Fire Classic
- Enterprise 3000/3500 *
- Enterprise 4000/4500 *
- Enterprise 5000/5500 *
- Enterprise 6000/6500 *

### Starfire
- Enterprise 10k *

### WildCAT
- Sun Fire Link IO *

### Dynamic Reconfiguration
- Sun Fire Classic DR *
- Starfire DR *
- Sun Fire DR v880/v890 DR

### Blades
- Sun Fire B1600 *
- Sun Fire B100s *

### Sun Fire
- Sun Fire 2900
- Sun Fire 3800
- Sun Fire 4800
- Sun Fire 4810
- Sun Fire 4900
- Sun Fire 6800
- Sun Fire 6900
- Sun Fire 12k
- Sun Fire 15k
- Sun Fire 20K
- Sun Fire 25K
- CP 1500
- CP 2000
- CP 2140/2160
- CP 2040/2060
- Sun Fire 2900

### Volume Server Products
- Netra T1 100/105 AC200 *
- Netra X1 *
- Sun Fire v100
- Sun Fire v120
- Netra t 1120/1125
- Netra t 1400/1405
- Netra T4
- Sun Fire v210/215
- Sun Fire v240/245
- Sun Fire v1280/1290
- Ultra 1 *
- Ultra 2 *
- Ultra 5/10 *
- Ultra 30 *
- Ultra 60 *
- Ultra 80 *
- Sun Fire T2000
- Sun Fire T1000
- Ultra 25
- Sun Fire 120

### Sun Blade
- Sun Blade 100
- Sun Blade 150
- Sun Blade 1000
- Sun Blade 1500
- Sun Blade 2000
- Sun Blade 2500
- Enterprise 220r *
- Enterprise 420r *
- N8400 filer *
- N8200 filer *
- Enterprise 250 *
- Ultra/Enterprise 450 *
- Sun Fire 280r
- Sun Fire v250
- Sun Fire v440/445
- Sun Fire v480
- Sun Fire v490
- Sun Fire v880
- Sun Fire v890
- Ultra 45
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• N1 Service Provisioning System (N1 SPS)
  > Multi-tier Application Provisioning
  > SDK for Application Modeling
N1 Service Provisioning System (N1 SPS) is a distributed software platform that simplifies application life cycle management by rapidly provisioning business services that span multiple tiers (Web, Application, Database) across heterogeneous environments.

Automated Services Deployment
- Tailor provisioning common task based on test specs or runbooks to guarantee configurations
- Author within a rich and complex provisioning language (schema enhanced xml) to promote re-use
- Deploy application content and infrastructure in a layered and dependent or independent manner
N1 SPS – Key Features (1)

- **Software Provisioning**
  - Middleware, Databases, Applications
  - Multi-tier Deployment

- **Distributed Systems Deployment**
  - Deploy on multiple systems in parallel

- **Heterogeneous Platform Support**
  - Wide Array of OS platform support

- **Configuration Management**
  - Compare against Gold Master
  - Compare between 2 instances or systems
  - Version Control and Rollback
N1 SPS – Key Features (2)

- Pre built Software Models
  - Application Awareness
  - A Wide Portfolio
- Software Development Kit
  - Customizability and Extensibility
- A Unified Deployment Interface
- Security and Auditability
  - Role Based Access Control
  - Deployment Simulation
- Solaris 10 Container Support
NetBeans Integration

- Design your infrastructure deployment plans in the same interface you author application content
- Work in a rich IDE that will help guide and enrich your XML datacenter plans
- Allow the SPS type-down and validate logic to save you development time
N1 SPS - Architecture

- **Master Server**
  - Remote Agents (RA)
  - Local Distributors (LD)

- **Internet**

- **Datacenters**
  - Boston Datacenter
  - Rome Datacenter
  - Bangalore Datacenter
  - Beijing Datacenter

**Legend**
- **RA**: Remote Agent
- **LD**: Local Distributor
- **SSH connection**
- **SSL connection**

**Interface**
- Web Browser / Command Line UI
N1 SPS - Pre-built Software Models

- BEA WebLogic
- IBM WebSphere
- Java ES Web Server
- Java ES Application Server
- Oracle Application Server
- Oracle Database Server
- SAP Applications
N1 SPS – Heterogeneous Platform Support

- Solaris 7, 8 (SPARC), Solaris 9, 10 (SPARC and x86)
- Red Hat Linux Advanced Server 2.1 (32-bit), 3&4 (32, 64 bit), RH Linux Workstation 3 U5 (32/64 bit)
- IBM AIX 5.1, 5.2, and 5.3
- SUSE Linux ES 8, ES 9(32-bit)
- HP-UX 11i V1 on PA-RISC based servers
- MS Windows 2000 Server, MS Windows 2000 AS
- MS Windows Standard 2003 x64 Edition or MS Windows Enterprise x64
N1 SPS – Key Benefits

- Deployment Time reduced from Weeks to Minutes
- Recovery Time reduced from Days to Minutes
- Unified Interface for Software Deployment
- Model Once, Deploy N Times
- Freedom from Custom Scripts
- Ease of Configuration Management
- Eases Regulatory Compliance
- Facilitates Asset Registration with Sun Connection
Summary

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What Is Planned Ahead?

- Sun Connection and N1 SM Integration – early 2008
- Sun Connection Online
  > Access all Update and Provisioning Knowledge Channels online
- 3rd Party Integration in Sun Connection
  > Enable Sun product groups and 3rd parties to offer compliant patches and knowledge
  > Documented, robust and scalable API for use in 3rd party integration and scriptable access
- Virtualization - Transparently manage LDOMs and xVM
- Monitoring - Monitoring Sun applications and non-Sun Hardware
- Reporting - Custom reporting creation
Take the Next Steps

Learn More

Take a look at our online resources for more information
sun.com/service/sunconnection/index.jsp

Download Products

Download and try Sun's Systems Management software products for free
sun.com/software/swportfolio/get.jsp

Join Us

Participate in our BigAdmin community to learn more
sun.com/bigadmin/hubs/sysmgmt

Attend A Webinar

Attend one of Sun's upcoming Webinars:
Webinar Schedule
sun.com/service/sunconnection/ucewebinar/index.html
Efficient System Administration using Sun's Systems Management Technologies

Michael Barrett
Connected Systems Management
Sun Microsystems, Inc.
Sun Connection Customer: PWC

Environment:
- 750+ Solaris systems across 3 separate environments (Production, WebHost (DMZ), and internal TestLabs).
- Many mission critical servers running GFS (Global Financial System, PWC's most important application)

Challenges:
- As of July 2006, PWC applied 0 patches to their 660 systems. The exception would be when a system breaks, they would call sun support and install 1-2 patches on an as needed basis.
- Bringing all systems up to a consistent patch baseline, and deploying the DST fixes - through automated patch management.
- Auditing all changes made to machines.

Business Results:
- Within the first 2 months, PWC applied 10,400 patches to 290 servers
- Met target to patch all 660 systems with the 7-25-2006 EIS baseline, plus the Daylight Savings Time patch before end of the year
Customer Quote:
"Through compelling video, up to-the-minute searchable schedules and listings, live results, blogs, ... and much more, we'll take fans closer to the athletes and games than ever before. We are thrilled to have the technology products, support and services from Sun Microsystems to help make this all possible." Gary Zenkel, President, NBC Olympics

Sun Solution:

Identical in Production and DR sites
- 32 active servers (v490 and v20) and 4 spare servers in 6 server farms running Sun N1 System Manager, Solaris 10, and Oracle 10g

Results:
- Sun N1 System Manager's lights-out capability remotely provisions DR site
- Complete failover to DR site in 15-30 minutes
- Off-site monitoring and management at 10-15% of a staff's time
- Build gold image in 1 day per system; provision to other servers in as little as 30 minutes per farm
SunMC Customer: General Motors

Environment:
- Supports 400 servers in 3 data center locations for GM product development.

Sun's Solution:
- SunMC is set up on a central controller.
- Alerts are piped to HP Openview and sent to Sun Services on-call engineer for proactive response and proactive hardware replacement.

Business Results:
- Sun was able to catch 34 out of the last 35 disk failures in the past year thus preventing outages. Quote from GM Director of Operations: "GM is very aware that Sun tools can see far more intimately into the hardware than common monitoring tools provided by the hosting provider. This is a key reason why we have chosen to have Sun as a valued IS&S partner along with our hosting provider"
N1 SPS Customer: Wells Fargo

Environment:
- Solaris systems across 3 data centers. Each server hosts multiple environments. The systems host many of Wells' public (and internal) sites, and are absolutely mission-critical.

Challenges:
- The web content is updated approximately once per month. The new code, containing server- and environment-specific data, needs to be deployed to all systems reliably and fast to minimize downtime.

Business Results:
- Drastically improve deployment times by saving 90% in error-analysis and error-correction time
- N1 SPS allowed Wells Fargo to develop a deployment framework where developers can easily check-in new code, and which can then be efficiently deployed to all servers and environments.
- No scripts need to be managed and run to customize the code after deployment