Solaris 10 11/06 Update

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Ver 1.1

Agenda

- Solaris 10 Releases
- Logical Domains
- New Solaris Containers functionality
- Secure by Default
- Solaris Trusted Extensions
- New ZFS functionality

Solaris 10 Releases

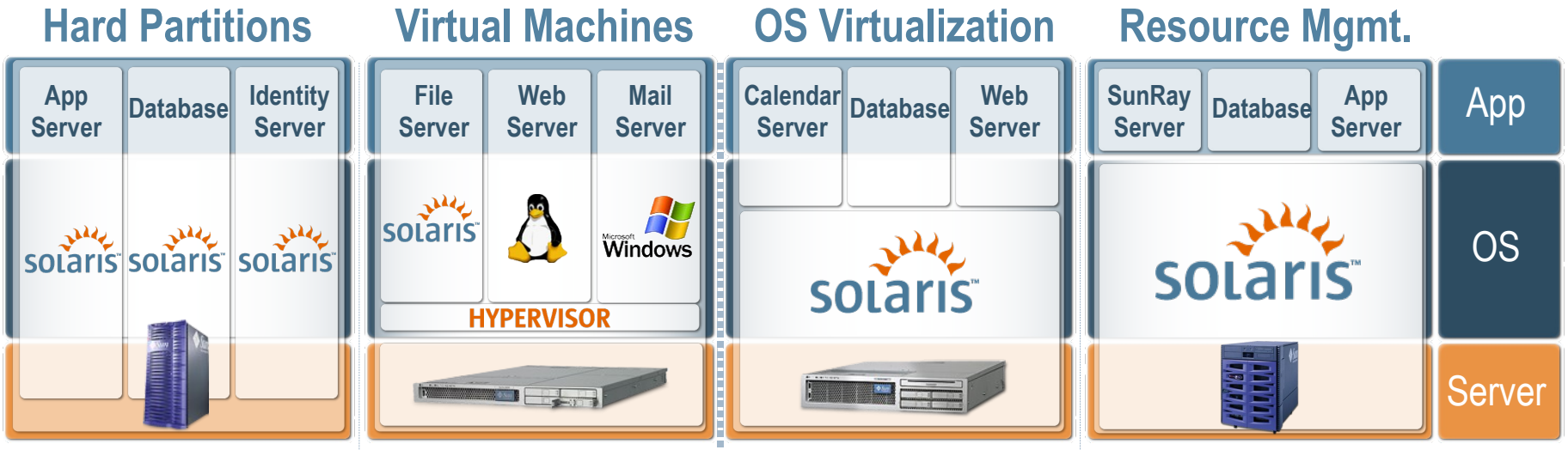
Solaris 10 03/05 = Solaris 10 GA (Generally Available)

Solaris 10 01/06 = Solaris 10 Update 1

Solaris 10 06/06 = Solaris 10 Update 2

Solaris 10 11/06 = Solaris 10 Update 3
Download: December 11, 2006
Media: December 19, 2006

Sun's Virtualization Offerings



Multiple OSes ← → Single OS

Trend to flexibility →

← Trend to isolation

Dynamic System Domains	Logical Domains Xen VMware Microsoft Virtual Server	Solaris Containers (Zones + SRM) Solaris Trusted Extensions Solaris Containers for Linux Applications	Solaris ResourceManager (SRM)

Logical Domains

- Multiple Software Partition Support for Sun4v based platforms
- Hypervisor / Virtualization Layer for SPARC
- sun4v SPARC architectures only
  - > Sun Fire T1000
  - > Sun Fire T2000

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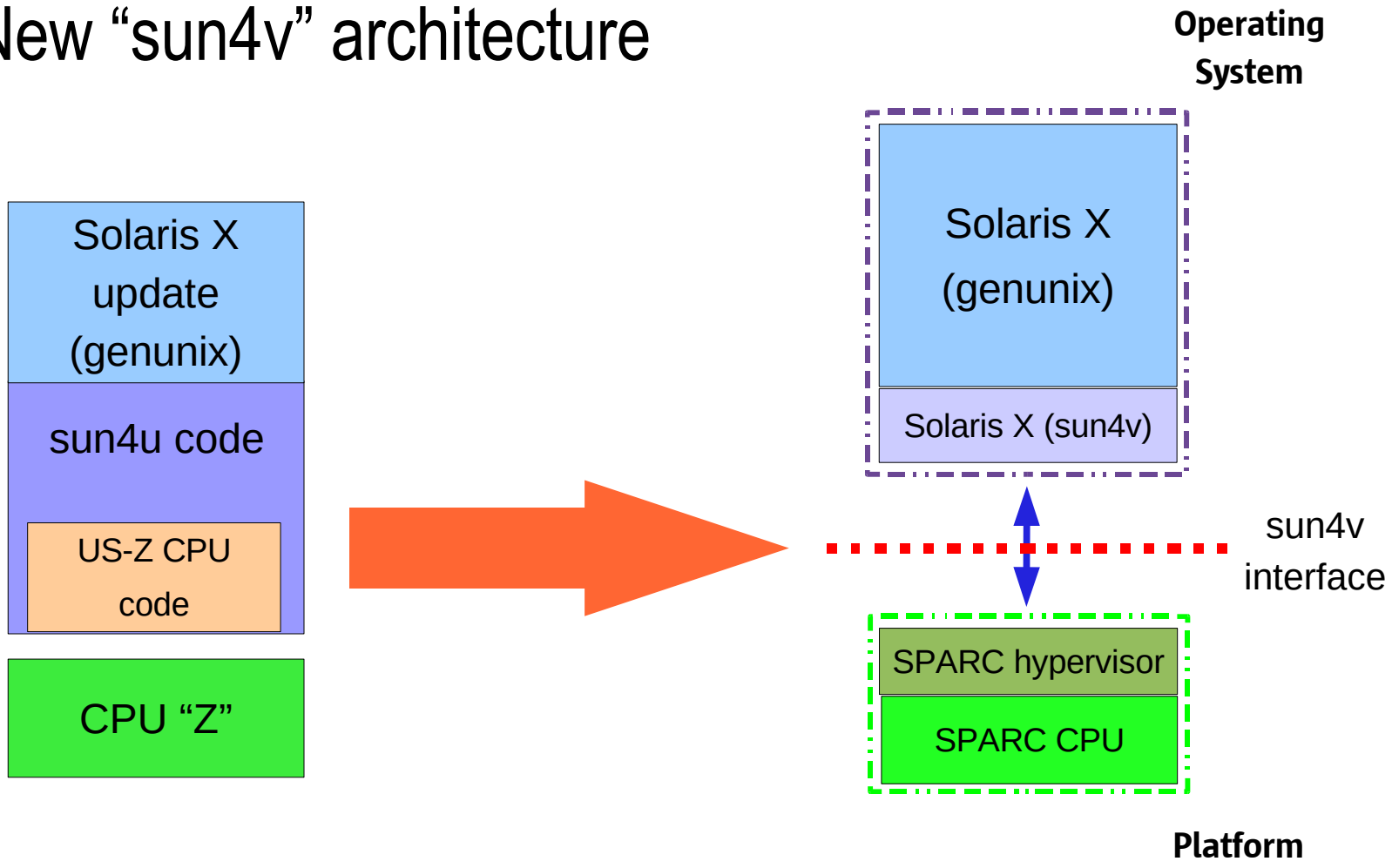
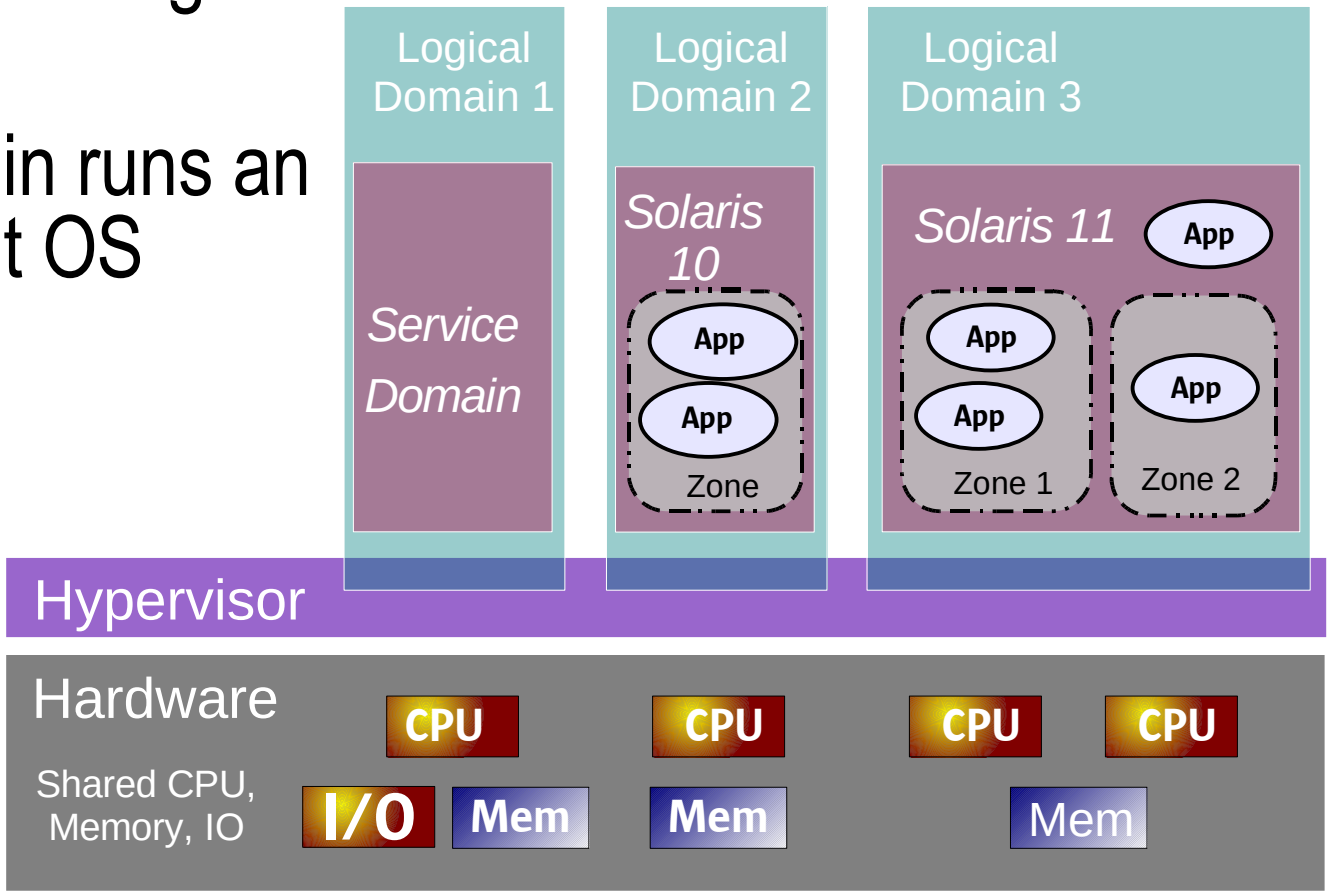
Niagara LDOMs

- New “sun4v” architecture



Logical Domains

- Highly flexible Logical Domains
- Each Domain runs an independent OS



Logical Domains

Logical Domains 1.0 Software – What is it?

- Software upgrade to UltraSPARC T1 systems (Solaris 10 11/06 and firmware upgrade)
- Up to 32 logical domains per system, managed by a CLI, the Logical Domains (LDoms) Manager 1.0 software
- Each guest domain can be created, destroyed, reconfigured, and rebooted independently
- Virtual console, Ethernet, disk, and cryptographic acceleration
- Live dynamic reconfiguration of virtual CPUs

New Solaris Containers functionality

Zone Rename

- *zonecfg(1M)* zonename property
- zone must be in “installed” or “configured” state

```
$ zonecfg -z myzone
zonecfg:myzone> set zonename=myzone2
zonecfg:myzone2> exit
```

New Solaris Containers functionality
Zone Move

- *zoneadm(1M) move* subcommand
- Relocate a non-global zone from one point on a system to another point on the same system
- Works within and across filesystems on local system
  - data copied if zone is moved across filesystems
- Zone must be halted prior to the move
- Read the Fast-Track Proposal (November 2005)
- http://www.opensolaris.org/jive/thread.jspa?threadID=3907&tstart=30

```
# zoneadm -z myzone move /newpath
```

New Solaris Containers functionality
Zone Clone

- *zoneadm(1M) clone* subcommand
- Provision a new zone based on the configuration of an existing zone on the same system
- New zone must be in configured state, source halted
- Much faster alternative to *install*
- New zone *sys-unconfig*'ed
- http://www.opensolaris.org/jive/thread.jspa?threadID=3907&tstart=30

```
# zoneadm -z newzone clone [-m method] method_params srczone
```

New Solaris Containers functionality

Support for Zone Re-hosting (Migration)

- *zoneadm(1M) detach* and *attach* subcommands
- Detach the zone to be moved (must be halted)
  - this creates manifest with configuration and validation information and places it in zonepath
- Move zonepath to new system
- Create configuration on new system using *zonecfg(1M)*
- Attach the zone
- Source and Destination must have
  - The same release as the original host
  - Same versions of packages and patches

New Solaris Containers functionality

Support for Zone Re-hosting (Migration)

```
host1# zoneadm -z myzone detach

** move the myzone zonepath from host1 to host2 **

host2# zonecfg -z myzone
myzone: No such zone configured
Use 'create' to begin configuring a new zone.
zonecfg:myzone> create -a /export/zones/myzone
zonecfg:myzone> commit
zonecfg:myzone> exit

host2# zoneadm -z myzone attach
```

New Solaris Containers functionality

Support for Zone Re-hosting (Migration)

- For each package installed in GZ
  - > if (SUNW_PKG_THISZONE == TRUE)
    - > ignore the package
  - > else if ((SUNW_PKG_ALLZONES == TRUE) ||
    (any file delivered by package is inherited by zone))
    - > validate the package
    - > validate the patches associated with the package
- http://www.opensolaris.org/jive/thread.jspa?messageID=21735&#21735
- http://bugs.opensolaris.org/bugdatabase/view_bug.do?bug_id=5022513

New Solaris Containers functionality

Zone Configurable Privileges

- Using this, you can:
  - Augment the default set of privileges
  - Beware that, depending on what you set, such changes might allow processes in one zone to affect processes in other zones by being able to control a global resource
  - Create a zone with fewer privileges than the default set
  - See *System Administration Guide: Solaris Containers - Resource Management and Solaris Zones*
    - http://docs.sun.com/app/docs/doc/817-1592

New Solaris Containers functionality

Zone Configurable Privileges

- *zonecfg(1M) limitpriv* property
  - Specifies the set of privileges that processes are limited to in a non-global zone
  - based on *user_attr(4)* and *priv_str_to_set(3C)*
- Privs may be added or deleted ('-' or '!')
- Privs identified as default, optional and prohibited
  - http://www.opensolaris.org/jive/thread.jspa?messageID=25389&#25389
  - default privs are assigned by default
    - careful about removing privs required for zone operations
  - optional may be added
  - prohibited cannot be added

New Solaris Containers functionality

Zone Configurable Privileges

```
global# zonecfg -z twilight
zonecfg:twilight> set limitpriv="default,sys_time,!net_icmpaccess"

(adds the ability to set the system clock and removes the
ability to send raw ICMP packets)

global# zonecfg -z twilight
zonecfg:twilight> set limitpriv="basic,sys_mount"

(sets the privilege set to the basic set of privileges as well
as the ability to mount and unmount file systems)
```

New Solaris Containers functionality

Zone DTrace availability – RFE 4970596

- Based on *zonecfg(1M) limitpriv* property
  - > add dtrace_proc, dtrace_user to default set
- http://blogs.sun.com/roller/page/dp?entry=dtrace_zones_crazy_delicious

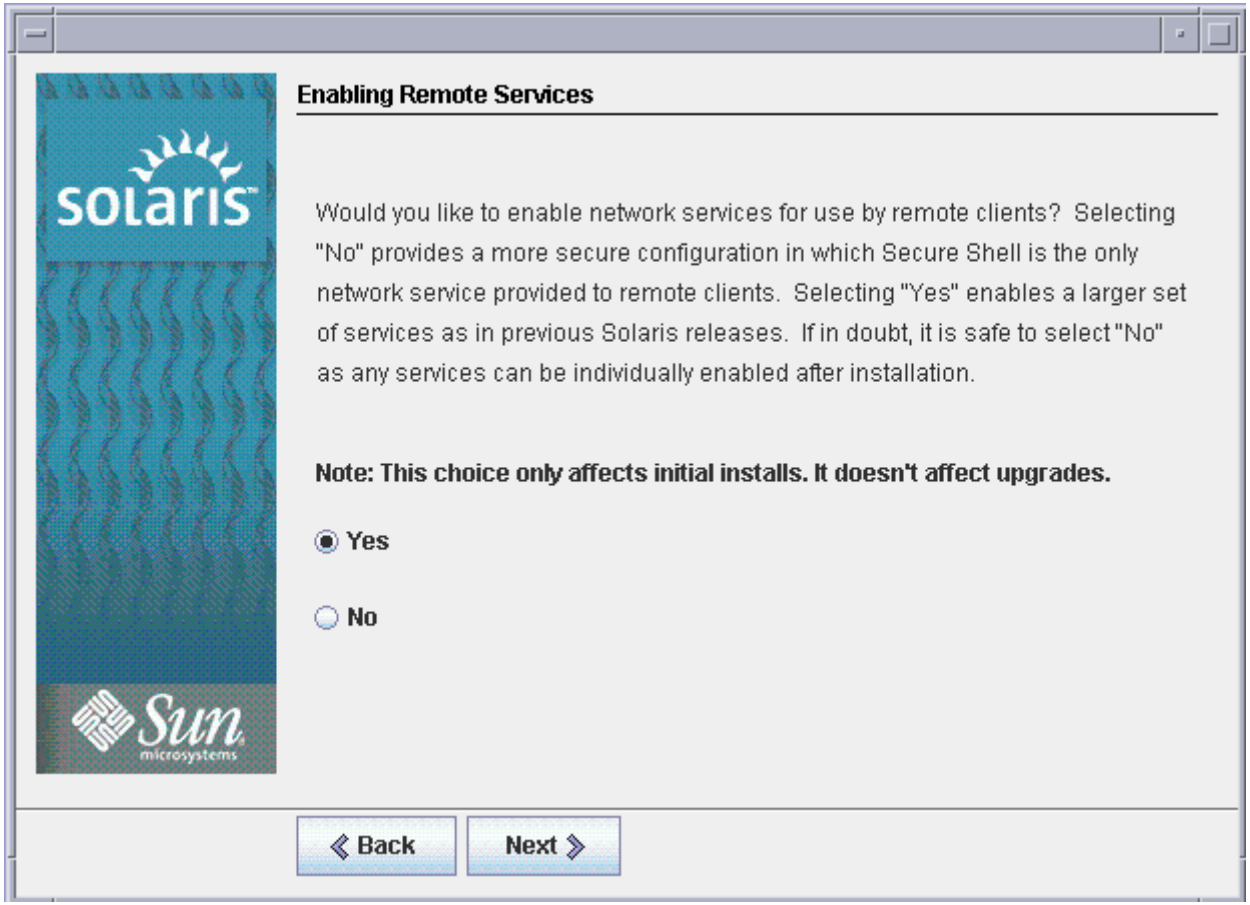
```
# zonecfg -z myzone
 zonecfg:myzone> set limitpriv=default,dtrace_proc,dtrace_user
 zonecfg:myzone> ^D
# zoneadm -z myzone boot
# zlogin myzone
myzone# dtrace -l
        ...

myzone# plockstat -Ap `pgrep startd`
        ...
```

Secure By Default

- On newly installed systems, all network services (except for ssh) that were previously enabled by default are now either disabled or constrained to respond to local requests only.
- This change minimizes the attack surface for an installed system and provides a base for customers to enable only the services they require.

Secure By Default

Screenshot during Solaris 10 11/06 Installation



Secure By Default

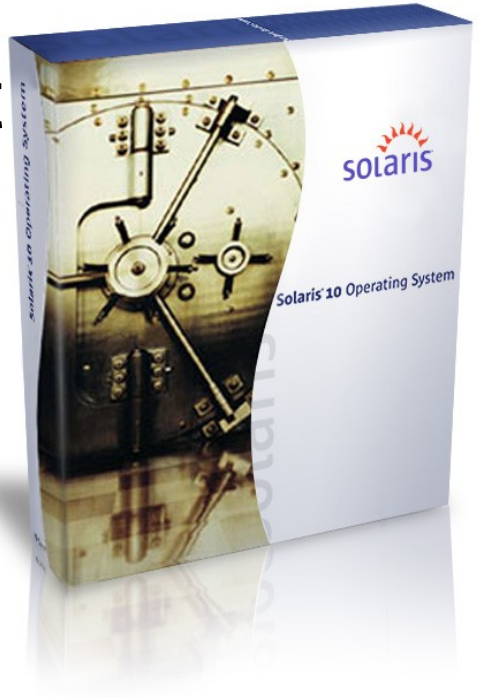
- For newly installed systems (initial install only), all services with external interfaces turned off
  - except those required for local login and boot, and ssh
- Implemented as SMF profile
- http://www.opensolaris.org/os/community/security/projects/sbd/

```
# netservices limited
<disable network services manually>

# netservices open
<enable default network services>
```

Solaris Trusted Extensions

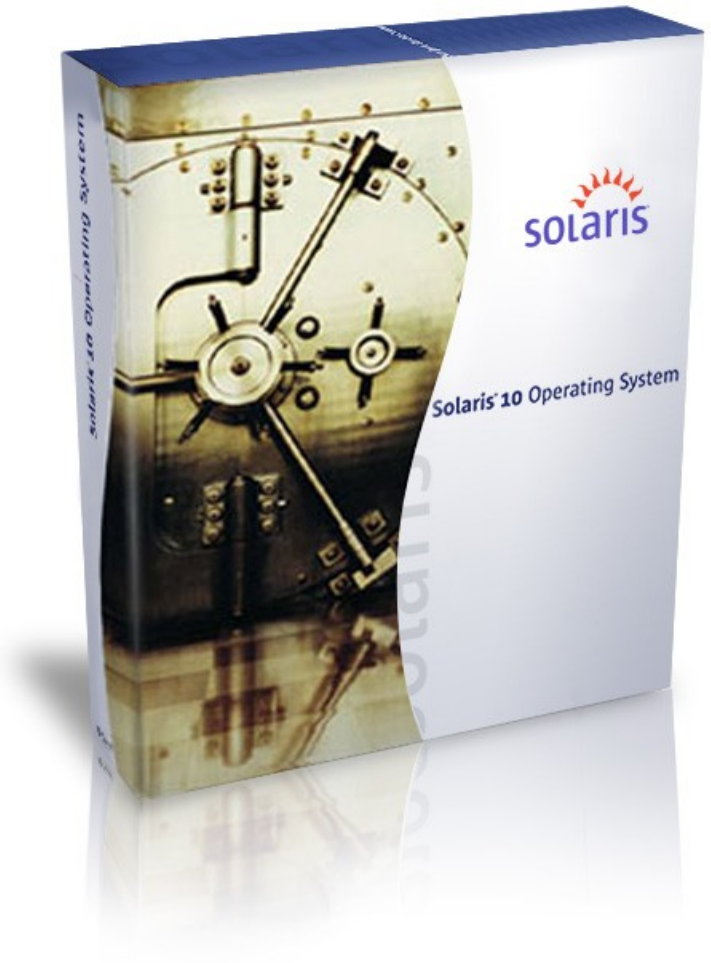
Trusted Extensions

- Historically known as “Trusted Solaris”
- Security policy: a set of rules and practices that help protect information and other resources. e.g., who's allowed to do what?
- Earlier releases were separate and distinct
- Available on SPARC and x86



Solaris Trusted Extensions

Multi-Level Labeled Security



- Adds labeled security to Solaris 10
- Multi-level networking, printing
- Multi-level CDE & Java DS GUI
- Leverages User & Process RM
- Uses Solaris Containers
- Compatible with all Solaris apps
- Target of CAPP, RBACPP, LSPP @ EAL 4+

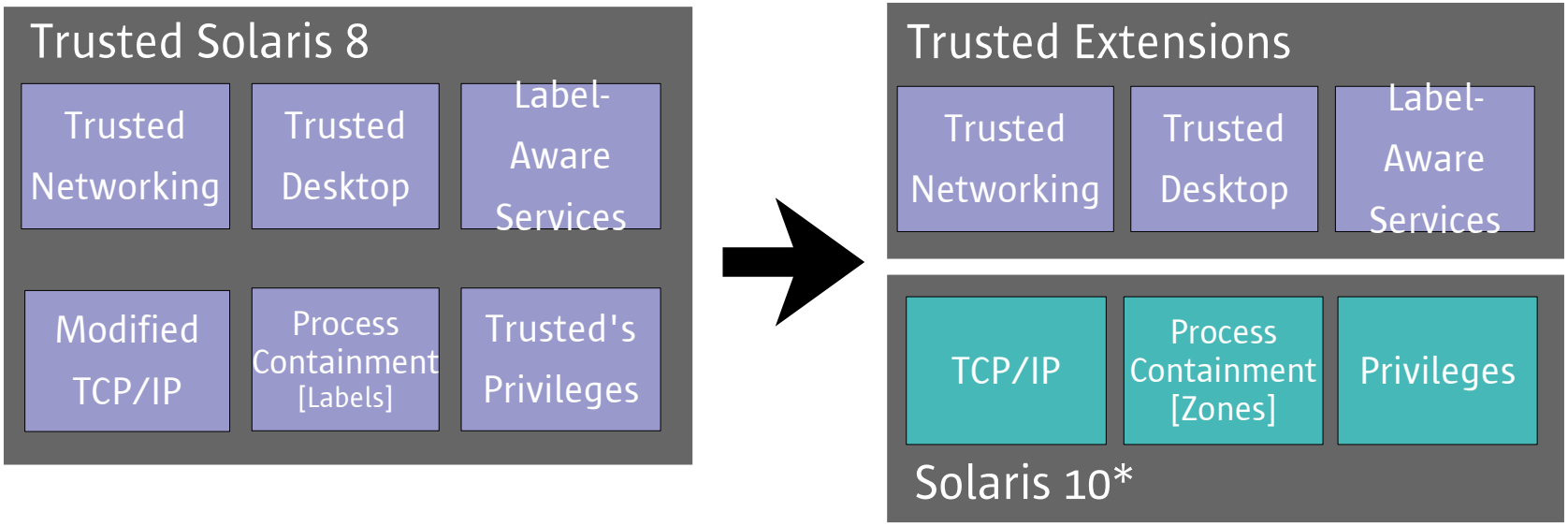
Solaris Trusted Extensions

Trusted Extensions

- Re-implementation of Trusted Solaris 8 based on new security features in Solaris 10
- “Extensions” because delivered as a set of extensions to Solaris
- Layered functionality consists of a set of label-aware services derived from Trusted Solaris
- Partial list of label-aware services:
  - Desktops (CDE, Java DS), Printing, Networking, System Management Tools, Device Allocation, Filsystem Mounting and Sharing

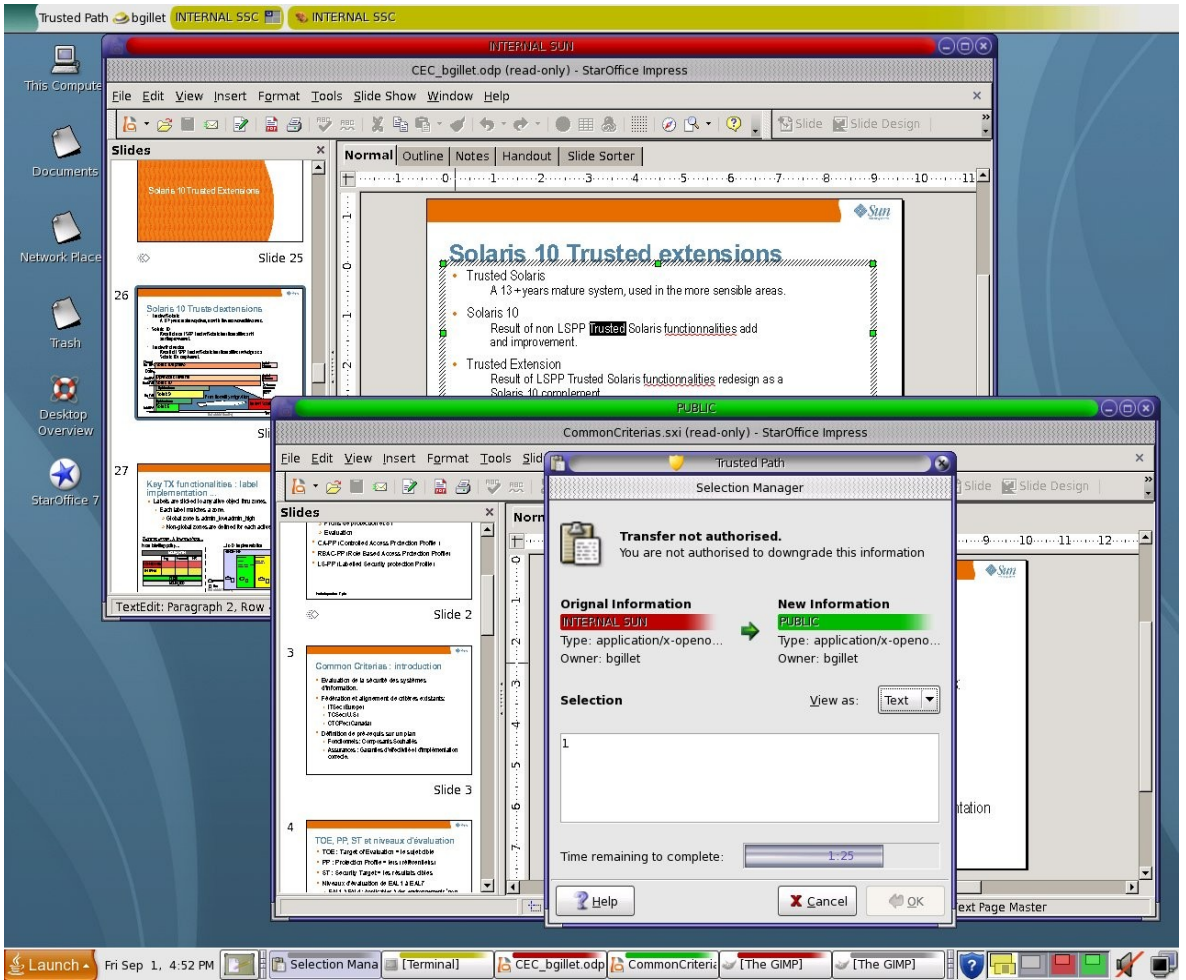
Solaris Trusted Extensions

Trusted Extensions

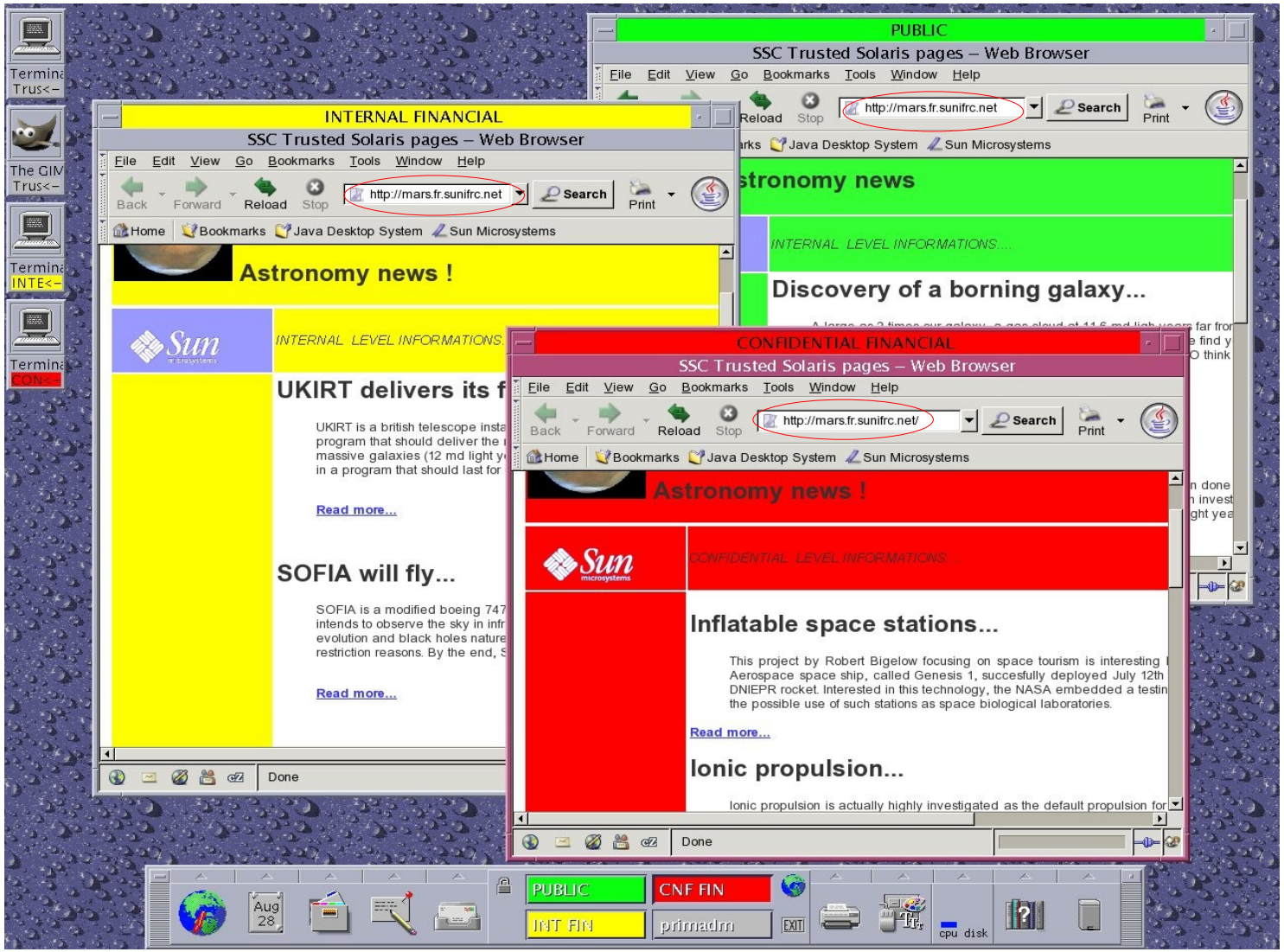


Key TX functionalities : Trusted GUI

- A user can use workspaces at different labels
  - > User can work simultaneously (and safely) at different clearances
    - > No productivity loss.
    - > low intrusive to users habits.
    - > Labelling policy is enforced.
- Trusted CDE and JDS.
- Trusted printing.



Trusted Networking : Simple cases...



Solaris Trusted Extensions

Trusted Extensions

- Trusted Extensions provides multilevel security for the Solaris OS, including *mandatory access control* for the following:
  - Files
  - File systems
  - Processes
  - Removable devices
  - Networking
  - Desktop environments
  - Printing

Solaris Trusted Extensions

Trusted Extensions

- Provides tools for the following actions
  - Defining Policies
    - Control information in a flexible but highly secure manner
  - Setting up *sensitivity labels*
    - Automatically applied to all sources of data (networks, filesystems, windows) and consumers of data (user and processes)
  - Performing trusted system management
- Access to all data is restricted based on the relationship between the label of the data (object) and the consumer (subject)

Solaris Trusted Extensions

Trusted Extensions

- Every object has a label associated with it
  - Files, windows, printers, devices, network packets, network interfaces, processes
- Accessing or sharing data is controlled by the objects' *label* relationship to each other
  - 'Secret' objects do not see 'Top Secret' objects
- Administrators utilize Roles for duty separation
  - Security admin, user admin, installation, etc...
- Programs / processes are granted privileges rather than full superuser access
- Strong independent certification of security

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Trusted Extensions

- Printing
  - Restricted output to printers by label ranges
  - Specially labeled banner and trailer pages
  - Specially labeled headers and footers
- File-system Labeling
  - Files and directories are labeled by the zone or host that exports them
  - The mount policy is restricted to prevent writing down

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Solaris Trusted Extensions: Zones

- Zones enhancements in support of Trusted Extensions
- Fixes, including functionality required by the TX project
  - PSARC 2005/485 Zone Rename
  - PSARC 2005/711 Zone move and clone
  - PSARC 2006/030 Zone Migration
  - PSARC 2006/124 Configurable Privileges for Zones

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Solaris Trusted Extensions for Printing

- PSARC 2005/573
  - Part of PSARC/2002/762
- Solaris Trusted Extensions for Printing
  - provides labeling services for printers and printed output.

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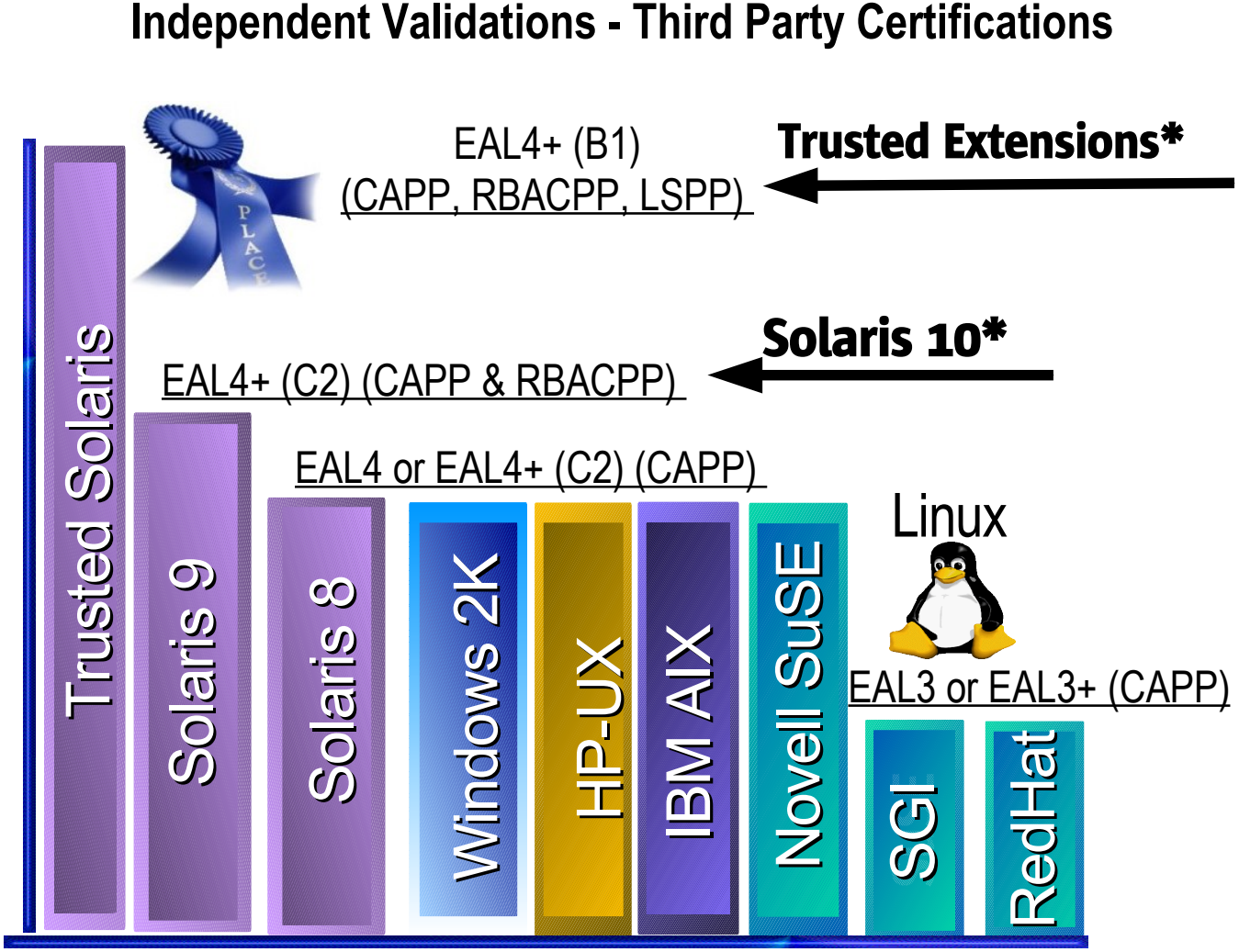
Trusted Networking With Security Labels

- Networking component of PSARC 2002/762
- Adds security label handling capability to Solaris networking stack

Solaris Trusted Extensions

Evaluation Assurance Levels and Controlled Access Protection Profiles

- Trusted Solaris 8: Only general purpose OS certified with 3 Protection Profiles at EAL4+
- Solaris 9 is EAL4+ with CAPP and RBACPP
- (*) Solaris 10 11/06 and it's Trusted Extensions feature are 'in evaluation' for Common Criteria certification against the CAPP, RBACPP, LSPP profiles at EAL 4+



Based on data from http://www.commoncriteriaportal.org/

Solaris Trusted Extensions

Evaluation Assurance Levels and Controlled Access Protection Profiles

CAPP: Controlled Access Protection Profile (Ensures proper login)

RBPP: Role-based Protection Profile (Role-based access control allows the system administrator to define roles based on job functions within an organization. The administrator assigns privileges to those roles)

LSPP: Labeled Security Protection Profile (All data and application components are formally labeled addressed, and tracked through role based access control.

New ZFS functionality
ZFS Snapshots

- Recursive ZFS snapshots
  - *zfs snapshot* with “-r” option to include descendant file systems.
- Double Parity RAID-Z (*raidz2,* a.k.a RAID-6)
  - Replicated RAID-Z configuration can now have either single or double parity; up to two device failures can be sustained.
    - Use *raidz2* for double parity RAID-Z configuration or use *raidz/raidz1* for keyword for a single parity RAID-Z configuration
- Hot-spares for ZFS storage pool devices
  - Allows you to identify disks that could be used as replacements in one or more storage pools

New ZFS functionality

ZFS Clone Promotion

- Clones (C) are R/W copies of a filesystem (F)
  - > created from a R/O Snapshot (S) of the filesystem
  - > implicit dependency between S and C
- Clone promotion breaks this dependency, allowing C to become a standalone filesystem
- http://www.opensolaris.org/jive/thread.jspa?messageID=37535&#37535

New ZFS functionality

ZFS Clone Promotion

- Replacing a ZFS file system with a ZFS clone
  - *zfs promote*
    - Replaces an existing ZFS fs with its clone
    - Assists if testing on an alternative version of the file system and then switching to it.
- Upgrading ZFS storage pools
  - *zpool upgrade* (in 06/06)
    - Allows upgrading of storage pools to use latest features

New ZFS functionality

ZFS Clone Promotion

```
# zfs create pool/project/production
 <populate /pool/project/production with data>

# zfs snapshot pool/project/production@today

# zfs clone pool/project/production@today pool/project/beta
 <make changes to /pool/project/beta and test them>

# zfs promote pool/project/beta

# zfs rename pool/project/production pool/project/legacy

# zfs rename pool/project/beta pool/project/production
 <once the legacy version is no longer needed, it can be
  destroyed>

# zfs destroy pool/project/legacy
```

New ZFS functionality
ZFS Hot Spares

- Add Hot Spare support to ZFS
- http://www.opensolaris.org/jive/thread.jspa?messageID=30323

```
# zpool create test mirror c0d0 c1d0 spare c2d0 c3d0

# zpool status
pool: test
....
c0d0 ONLINE 0 0 0
c1d0 ONLINE 0 0 0
spares
c2d0 ONLINE
c3d0 ONLINE

# zpool add test spare c4d0 c5d0
# zpool remove test c2d0
```

New ZFS functionality

- Clearing device errors
  - *zpool clear* (06/06)
    - clear error counts that are associated with a device or the pool
    - Previously, error counts were cleared when a device in a pool was brought online with the zpool online command
- *zpool import -D* (06/06)
    - recover pools that were previously destroyed via *zpool destroy*
- Renaming *zfs backup* and *zfs restore* (06/06)
    - *zfs send* and *zfs receive*
    - more accurately describes the function of these commands, which is to save and restore ZFS data stream representations

New ZFS functionality

- Taking a device “offline” (06/06)
  - *zpool offline -t*
    - Takes a device offline temporarily.
    - Upon reboot the device is automatically returned to the ONLINE state
- FMA and ZFS diagnostic engine (06/06)
  - Engine integrated with Fault Management Architecture
  - Capable of diagnosing and reporting pool and device failures
    - Additionally, reports on checksum, I/O, and device errors that are associated with pool or device failures
    - Diagnostic error information is logged {console|/var/adm/messages}
    - Recovery from an error begins by using the *zpool status* command

Backup Slides

Solaris 10 11/06

Dynamic Switching Between Polling and Interrupts

- PSARC/2004/630
- Mechanism to negotiate direct function calls to the NIC
  - Identify its Rx/Tx resources and capabilities
  - Optimizes interrupt-driven packet handling under heavy loads
- Improve networking performance by 15-20%
  - SPECWeb99
- Benefits users running 1Gb NICs and 10Gb NICs

Solaris 10 11/06

Olympus Product Line Support, part of Advanced Product Line

- PSARC/2004/750
- Named after first SPARC64 VI processor – Olympus-C
- Port of Solaris for Fujitsu Olympus-C architecture
  - Hardware Descriptor Structure for OPL
  - CPU/Mem FMA Events
  - Oberon (OPL PCI-E nexus) FMA Events
  - HDD Locator command
    - Turns on Service LED for disk drive
  - DSCP (Domain/SP Communication Protocol)
    - TCP/IP using shared SRAM
  - Lots more ARC cases

Solaris 10 11/06

Network Layer 7 Cache

- PSARC/2005/038
- RFE 6209091 - *"The Need For Speed 2"*
- Follow-on to Network Cache and Accelerator
  - NCA integrated with FireEngine into Solaris 10 earlier
  - Lower first byte latency
  - File prefetch for sendfilev(3EXT)
  - No application modification required
  - Uses NCA configuration files
- Completes integration of NCA into kernel as a module

Solaris 10 11/06

Userland binary: *pcitool*

- PSARC 2005/232
- Implementation of a new PCI nexus driver ioctls
  - *pcitool*
- Useful during initial bring-up and debugging of I/O problems

Solaris 10 11/06

Daemon: *intrd*

- PSARC 2004/199
  - > Implementation of RFE 5017144
- Dynamic interrupt distribution daemon
- A userland daemon which monitors the loads due to interrupts and may retarget interrupt to new CPUs in order to restore balance to the interrupt loads.

Solaris 10 11/06

Fire performance counters

- FWARC 2006/002
  - RFE 6290458
- support fire performance counters for:
  - Chicago – Ultra 45 Workstation
  - Ontario – 2U – T2000
  - Erie – 1U – T1000
- Project adds two new hypervisor fast trap functions
- “Fire” is a JBus to PCI Express bridge ASIC

Solaris 10 11/06

sun4v support for versioning API

- PSARC 2006/029
  - RFE 6347011
  - Enhance sun4v Solaris to support versioning API
  - Solaris support for API versioning is required to deliver future features/enhancements, such as logical domains, watchdog support, guest state. optimized demap cross calls
  - Needed to support future Niagara2 and Rock processors

Solaris 10 11/06

Generic file system observability (e.g., fsstat)

- PSARC 2006/034 and PSARC 2006/116
  - RFE 6335370
  - Updates to a generic file system observability (e.g., fsstat)
  - fsstat reports kernel file operation activity by file system type (fstype) or by path, which is converted to a mount-point.
  - The first line of output reports all activity since:
    - - The fs module was loaded (in the case of fstype)
    - - The file system was mounted (in the case of mount-point)
  - Statistics are gathered at the file system independent (vnode interface) layer at both the fstype and the mount-point levels.

Solaris 10 11/06

Multipath Management API Support

- Storage networking Industry Association Multipath Management API Support
- Provides Sun's implementation of the SNIA Multipath management API (MP API)
  - Includes the following
    - MP API common library
    - Plug-in library for Solaris native multipathing solution MpxIO/scsi_vhci driver
    - *mpathadm* command line interface

Solaris 10 11/06

Sun Java Web Console Changes

- Common location for users to work with web-based management applications
- Accessable via HTTPS; single entry point
- Auditing and logging services for all registered applications
  - Console server runs as a SMF service; managed by SMF
  - *smcwebserver* and *system/webconsole:console* service
  - *wcadmfin* for configuration of console properties
  - *smreg* used for older versions of the console

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NFSv4

- Compact NFSv4 ACL format (06/06)
  - New NFSv4 ACL formats are available: *verbose, positional,* and *compact*
  - *compact* and *positional* ACL formats are available to set and display ACLs
  - *chmod* is aware of these
  - *ls -V* to display compact and positional ACL formats
  - *ls -v* to display verbose ACL formats

Solaris 10 11/06
Resource Management Features

- Resource Pools Facility Service FMRIs
  - Resource pools and dynamic resource pools have been integrated into the Solaris service management facility (SMF)
    - *svc:/system/pools*
  - Dynamic resource pools are now enabled separately of the resource pools service
    - *svc:/system/pools/dynamic*
  - Enabling and disabling mechanisms through *pooladm(1M)* are still available
  - *During upgrades /etc/pooladm.conf file configuration is applied to the system

Solaris 10 11/06

PCI Express Support Enhancements

- Extending support for the PCIe interconnect
  - SPARC
  - x86
- Designed to connect peripheral devices to desktop, enterprise, mobile, communication, and embedded applications
- An industry-standard, high-performance, serial I/O bus

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PCI Express Support Enhancements

- PCIe software provides the following features in this Solaris release
  - Support for extended PCIe configuration space
  - Support for PCIe baseline error handling and MSI interrupts
  - Modified IEEE-1275 properties for PCIe devices
  - PCIe hot-plug support (both native and ACPI-based) by enhancing the *cfgadm_pci* component of the *cfgadm* command
  - ATTN button usage-based PCIe peripheral autoconfiguration

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PCI Express Support Enhancements

- Example output displays hot-pluggable PCIe devices
  - Display might differ from platform to platform
  - Check your hardware platform for the correct *cfgadm* syntax
  - *cfgadm(1M), cfgadm_pci(1M)*

```
# cfgadm pci
Ap_Id                  Type         Receptacle   Occupant     Condition
pcie1                  unknown      empty        unconfigured unknown
pcie2                  unknown      empty        unconfigured unknown
pcie3                  unknown      empty        unconfigured unknown
pcie4                  etherne/hp   connected    configured   ok
pcie5                  pci-pci/hp   connected    configured   ok
pcie6                  unknown      disconnected unconfigured unknown
```

Solaris 10 11/06

x4500 SATA Disk FMA

- A new Fault Management Architecture-based diagnosis engine (DE) is provided on the Sun Fire X4500
- DE monitors the disk drives for predictive failures by using the SMART technology in the disk drive's own firmware
- When a disk failure is imminent, the LED next to the disk is illuminated and a FMA fault is generated
- This alerts the administrator to take specific action to ensure system availability and full performance

Solaris 10 11/06

Network Drivers Update

- SPARC-Based Systems
  - ipge drivers are used in T2000 and other SPARC platforms that have the NorthStar card installed.
  - e1000g drivers are used in all other platforms
- Going forward
  - Make the e1000g the default driver for platforms that use Intel 1G chipsets
    - link aggregation
- Alternatively (pre-Solaris 10 11/06):
  - Patch 123334-02+ and follow the instructions in Sun Alert 102502
  - Transitions OS network configuration files from using ipge to e1000g network interface, resulting in a new e1000g network interface name

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LUN Masking improvements

- Solaris fibre channel logical unit number masking
  - Enables system administrators to prevent the kernel from creating device nodes for specific, unapproved LUNs
  - See *fp(7D)* man page

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Extended Message Signaled Interrupts (MSI-X)

- MSI-X are an enhanced version of MSI interrupts.
- With MSI-X support, device driver writers have a choice between MSI and MSI-X interrupts.
- MSI-X interrupts are now supported on SPARC PCI-Express platforms (Ultra 45 and Sun Fire T2000).
- The new mdb/kmdb debugger command, *::interrupts*, is also provided to retrieve a device's registered interrupt information on supported SPARC and x86 systems
- See “Interrupt Handlers” in *Writing Device Drivers*
  - *http://docs.sun.com/app/docs/doc/816-4854*

Solaris 10 11/06

Changes to the Desktop

- When a user logs in to the Solaris Desktop for the first time, Java Desktop System (Java DS) is the default desktop environment instead of the Common Desktop Environment (CDE)
- Java DS has also become the default environment for users who chose a desktop environment on an earlier Solaris release that is no longer present in this Solaris release, such as OpenWindows or GNOME 2.0
- Override the default choices by using the *defaultDt* and *fallbackDt* resources.
- See the *dtlogin(1M)* man page.

Solaris 10 11/06

Installation Enhancements

- Enhanced Security Using Limited Networking
  - Set the default behavior for network services to run in a much more secured manner
  - You can select a limited network profile by using a new *service_profile* keyword in the *sysidcfg* file
  - *service_profile=limited_net*
    - specifies that all network services, except for Secure Shell, are either disabled or constrained to respond to local requests only
  - *service_profile=open*
    - specifies that no network service changes are made
  - The network services can be easily reopened after installation via *netservices open* or individually (via SMF)

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Installation Enhancements – Things You *REALLY* Care About

- Restricted Security Specifics
  - If you choose to restrict network security, numerous services are fully **disabled**
  - The Secure Shell remains fully enabled
  - To disable network services manually:
    - *# netservices limited*
  - Default services can be enabled as they were in previous Solaris releases
    - *# netservices open*

Solaris 10 11/06

Installation Enhancements – Things You *REALLY* Care About

- Restricted Security Specifics
  - If you choose to restrict network security, numerous services are fully **disabled**
  - Other services are still enabled, but these services are restricted to local connections only

Service	FMRI	Property
rpcbind	svc:/network/rpc/bind	config/local_only
syslogd	svc:/system/system-log	config/log_from_remote
sendmail	svc:/network/smtp:sendmail	config/local_only
smcwebserver	svc:/system/webconsole:console	options/tcp_listen
WBEM	svc:/application/management/wbem	options/tcp_listen
X server	svc:/application/x11/x11-server	options/tcp_listen
dtlogin	svc:/application/graphical-login/cde-login	dtlogin/args
ToolTalk	svc:/network/rpccde-ttdbserver:tcp	proto=ticotsord
dtcm	svc:/network/rpccde-calendar-manager	proto=ticits
BSD print	svc:/application/print/rfc1179:default	bind_addr=localhost

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Installation Enhancements – Things You *REALLY* Care About

- Solaris Flash Archives
  - cpio: not larger than 2 Gbytes or 4 Gbytes, depending on the version of the cpio utility
  - Can now be > 4GB
    - Create with "*-L pax*" arguments to *flarcreate*
  - Can only be deployed on a Solaris OS with a pax(1) utility
    - *pax(1)* is included beginning with Solaris 7
  - When deploying the archive on Solaris 2.6 systems use the *"-L cpio"* option

Solaris 10 11/06

Sun Java System Message Queue

- Sun Java System Message Queue 3.7 Update 1
  - A maintenance release for MQ 3.6
  - Various bug fixes
  - Performance improvements which reduce disk write overhead for transacted messages

Solaris 10 11/06

Driver Updates

- Support for Quantum LTO-2 and LTO-3 Tape Drives
  - Updated *st* driver
- CDB (Command Descriptor Block) Length Capability
  - PSARC 2006/018
  - HBA drivers can enable target drivers to query the maximum supported CDB length by using *scsi_ifgetcap*
  - The target driver asks for the capability at *attach* time and if the HBA driver supports the capability, it returns the maximum length of the CDB in bytes
  - The target driver can then use this value to make decisions about which CDBs to use for that HBA

Solaris 10 11/06

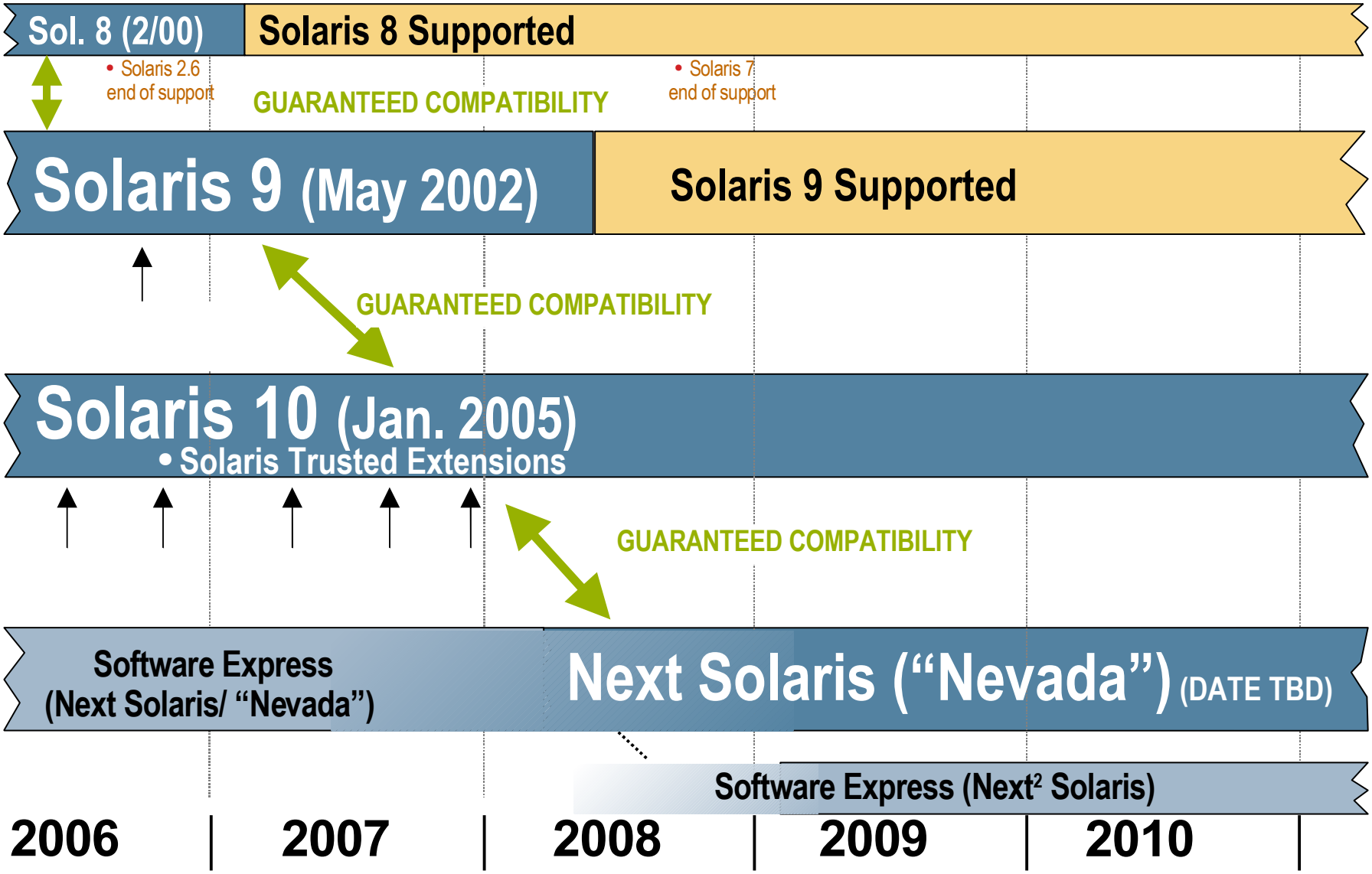
Platform Support for Project Montoya

- PSARC/2006/187
- A single-slot 8U form factor CPU blade
  - SUNW,Netra-CP3060 platform (*uname -i*)
- Based on the Ultrasparc T1 processor
- Brings CMT to NEP (Network Equipment Provider) customers (Telco's)
- Montoya platform software components include necessary boot code

SOLARIS ROADMAP

(Sure you want to see it?)

Solaris Roadmap, Apr 2006 – Mar 2010



Solaris 8 Transition

- Announcement: August 15, 2006
- Last order date: November 16, 2006
- Last ship date: February 17, 2007
- No additional license required for install on new Sun SPARC systems until August 15, 2007
- Support for five years after last ship
  - Two years “Vintage Support Phase 1” (ends Q1CY09)
  - Three years “Vintage Support Phase 2” (ends Q1CY12)
- Trusted Solaris 8 not affected
- Solaris 8 originally released in Feb 2000. Hence total service life of Solaris 8 will thus be more than 12 years.

Solaris 8 Transition

- The first phase lasts for two years and is referred to as "Vintage Support Phase I"; all support continues just as if the product were shipping, although requests for enhancement are no longer accepted.
- The second phase, "Vintage Support Phase II", begins and lasts for an additional three years. During this phase, all support operations continue, but new patches are only available on a "time and materials" basis. See the Solaris Operating System Life Cycle web page for more details. http://www.sun.com/software/solaris/lifecycle.html

More information...

- http://opensolaris.org
- http://opensolaris.org/os/community/networking/
- FireEngine Whitepaper:
  - http://opensolaris.org/os/community/networking/fe_wp_public.pdf
- Yosemite Whitepaper:
  - http://opensolaris.org/os/community/networking/yosemite-3.pdf
- Solaris Network Performance
  - http://www.sun.com/bigadmin/content/networkperf/
- Solaris Network Performance Discussion Forum
  - http://forum.sun.com/forum.jspa?forumID=272
- The Magic Revealed...
- http://blogs.sun.com/roller/page/sunay
- http://blogs.sun.com/roller/page/sunay?entry=solaris_networking_the_magic_revealed
- http://blogs.sun.com/roller/page/sunay?entry=the_solaris_networking_the_magic

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Solaris 10 11/06 Updates

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