Solaris™ 10 Operating System

Systems Software Products

Sun Microsystems, Inc.

February 2004

SOLARIS™

Sun microsystems

We make the net work.

Sun Vision

Everything of Value Connected to the Network
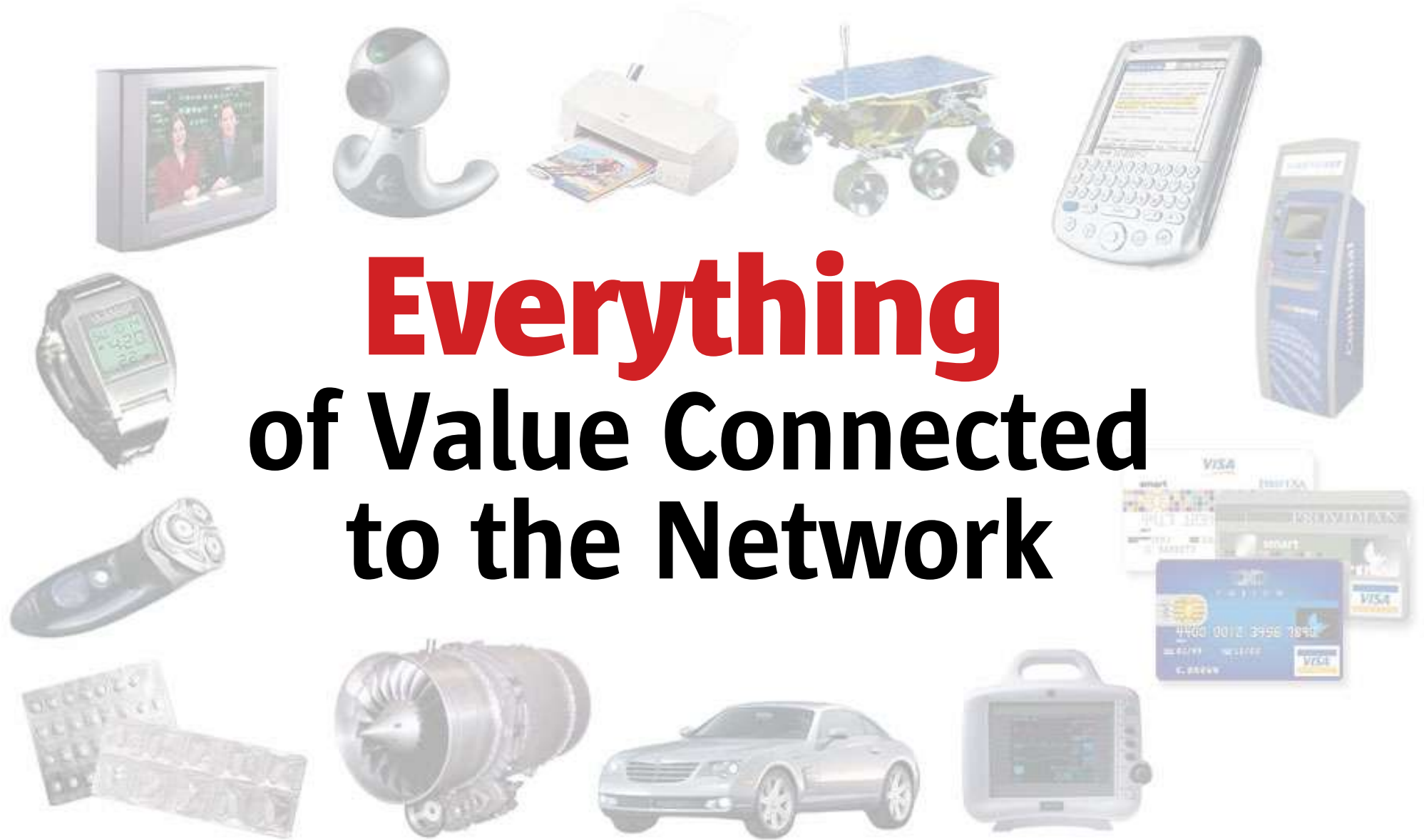
Sun Investment

Multi-platform OS Strategy

- SPARC and x86
- 32 and 64-bit
- Sun and 3rd party hardware
- Run Linux apps unchanged
- R&D leadership

- Complement Solaris
- 32 and 64-bit
- Sun and 3rd party hardware
- Solaris interoperability
- Volume

- Interoperate

What We Heard

Dependable

Private

Protected

Secure-by-Default

Immune

"Keep me safe..."

Impregnable

Military-grade

Certified

Defended

Unassailable

Safe

Bulletproof

Shielded

Unbreakable

Impenetrable

Tomorrow's Data Center ...Today

SOLARIS™

10

Tomorrow's Data Center, Today

- ✔ **Relentless Availability**
- ✔ **Optimal Utilization**
- ✔ **Extreme Performance**
- ✔ **Unparalleled Security**
- ✔ **Platform Choice**

VERTICAL

HORIZONTAL

SOLARIS™

Sun microsystems

Massive Scaleup, Scaleout, Savings

- 4 billion sockets
- 340 undecillion addresses
- Multi-TB file-systems

- 1.2GB /sec throughput
- 1/13th cost of MS Windows
- 1/4th administrative cost of MS Windows
- $12.6B less in virus costs

- 1,000,000 processes
- 4,000 containers
- 30,000 probes
- >100 dual-thread processors

Solaris 10: A Generation Ahead

Extreme Performance
Dynamic Tracing

Unparalleled Security
Process Rights Management
Solaris Cryptographic Infrastructure

Optimal Utilization
N1 Grid Containers

Relentless Availability
Predictive Self Healing

Platform Choice
New UltraSPARC IV, New AMD Opteron

SOLARIS™

N1 Grid Containers

Consolidation Made Simple, Safe and Secure

UNIQUE

- Breakthrough approach to virtualization
  - Host 1,000s of applications/services on one system, with a single OS instance
  - Hardware independent
- Superior resource utilization
  - Dynamically adjust to business goals
  - Less than 1% system overhead
  - Easy to create, replicate and maintain
- Significant increase in uptime and security
  - Each service fault- and intrusion- isolated
  - Instant Restart: containers start in seconds
- Reduced costs
  - Simplifies and accelerates consolidation

Predictive Self Healing

Online Recovery with Automated Services

UNIQUE

- Breakthrough approach to service availability
  - Error detection & aggregation, auto recovery
- Reduced downtime
  - Components proactively offlined before failure
  - Automatic service restart
  - Diagnosis & mitigation in milliseconds, not hours
- Reduced complexity
  - Simplified error reporting
  - All system & service interdependencies recorded and correlated
- Reduced costs
  - Reduced system downtime, increased utilization
 - Higher server-to-administrator ratio

Dynamic Tracing

The Performance Bottleneck Buster

UNIQUE

- Breakthrough approach for tuning
  - Power tool for real-time analysis, diagnosis
- Safe and comprehensive
  - Non invasive, little overhead, easy to use
  - One view into both system and application level
  - Over 30,000 data monitoring points
- Designed for live use on production systems
  - No need to force failure, then do postmortem debug
  - No need to re-create the problem on test systems
  - No need to run different, slow, instrumented OS in production
- Reduced costs
  - Solutions found in minutes or hours, not days or weeks
  - Optimized apps: cases of 3-30x speedups already seen
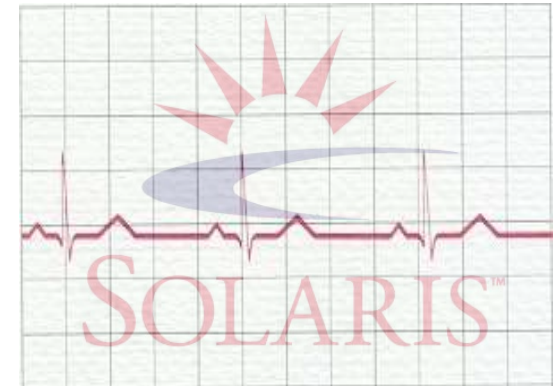
Unparalelled Security

Military Grade for the Commercial World

UNIQUE

- Breakthrough approach to enterprise security
    - Military grade, built in and easy to use
- Interoperability
    - From open source to MS Windows
- Reduced costs
    - Less system downtime, less admin sinktime

Identity	Data	Access	Apps	System
Stronger authentication Smart-card interfaces	Pervasive cryptographic infrastructure	Access rights management with stronger login controls	Process rights management Containers	IP filtering Hardened system settings

Over 20 years of design, testing, refinement and experience

Scaling Up

VERTICAL

- Extreme Performance
    - 2x system improvement via CMT
    - 47% web gain for midframe systems
    - 42% gain for multi-user systems
    - 37% gain for scientific apps
    - System boot time 65% faster
- Optimal Utilization
    - Up to 80% system utilization with N1 Grid Containers
    - Up to one million threads per OS instance: more apps per server
    - More apps on each server: smaller data center footprint
- Relentless Availability
    - Service levels shielded from CPU & memory failures
    - Problems diagnosed in milliseconds and minutes, not hours and days

Scaling Out

- ## Extreme Performance
  - Wire speed for 10 Gb Ethernet
  - 20-52% increase for Java app servers
  - 30% increase for webservers
- ## Choice of Platforms
  - One Solaris
  - Standard, volume platforms
  - SPARC, x86, AMD Opteron, Intel Xeon
- ## Seamless Scaling
  - New 64-bit support for AMD64
  - N1 Grid Containers on any system: blades, 1P, 4P, x86, SPARC...

HORIZONTAL

Road To Solaris 10

1. **Software Express**
- Monthly releases
- Free downloads
- Support available

2. **Beta Testing**
- Begins March 2004
- Big enrollments
  - 2-tiered program
- Full Java Enterprise System available

3. **Shipping Q3 2004**
- **Simultaneous ship with JES**

Getting ready for Solaris 10

Easy to start planning today

Application compatibility guaranteed

Easy adoption toolsets

Solaris 10 adoption services

Free upgrade with selected new Sun Fire Systems

Request your applications:
`sun.com/solaris/10`

Solaris Momentum

Solaris SPARC

- New UltraSPARC IV platforms
- 950,711 registered licenses
- Over 8,000 ISVs

Solaris x86

- New AMD platforms
- Over 180 systems, 200 components
- 514,156 registered licenses
  - 300% increase from prior month
- Over 600 ISVs
- Over 800 solutions available
- SunCluster support (April '04)
- StarOffice 7

Solaris 10

- Software Express today
- Over 4600 downloads
- ISV endorsements:
  - BEA Systems, Inc.
  - BMC Software, Inc.
  - Cadence Design Systems, Inc.
  - NetIQ Corporation
  - Oracle Corporation
  - Sybase, Inc.
  - VERITAS SoftwareCorporation
- Production systems at Sun
- Key customer rollouts

What Customers Say...

"As one of Germany's foremost scientific and medical institutions, we have significant demand for reliable computing power, seamless updates and system interoperability. [...] For almost one year, through the Software Express for Solaris Pilot program, we've been able to take advantage of the improved security, relentless availability and great software compatibility in Solaris 10. We were also able to achieve higher levels of system throughput and system uptime, which in turn reduces TCO."

Thomas Nau, IT Director,
University of Ulm Communication and Information Center

"The University of Delaware has been a Solaris customer for nearly a decade and has participated in Sun's beta programs since Solaris 2.5. The beta programs allow the University to take advantage of next-generation Solaris features, helping us to better plan our future IT environment. We look forward to the Solaris 10 beta program and the opportunity to test upcoming features aimed at improving efficiencies, system security and reducing cost and complexity."

Daniel J. Grim, Executive Director of
Network and Systems Services, University of Delaware

Solaris 10: A Generation Ahead

Extreme Performance

Optimal Utilization

Unparalleled Security

Relentless Availability

Platform Choice

SOLARIS™

Thank You

Systems Software Products

Sun Microsystems, Inc.

BACK UP SLIDES

Providing the Right Choices

Open Source Software

Infrastructure Services

Operating Systems

Hardware

Service

Java / XML / Web Services
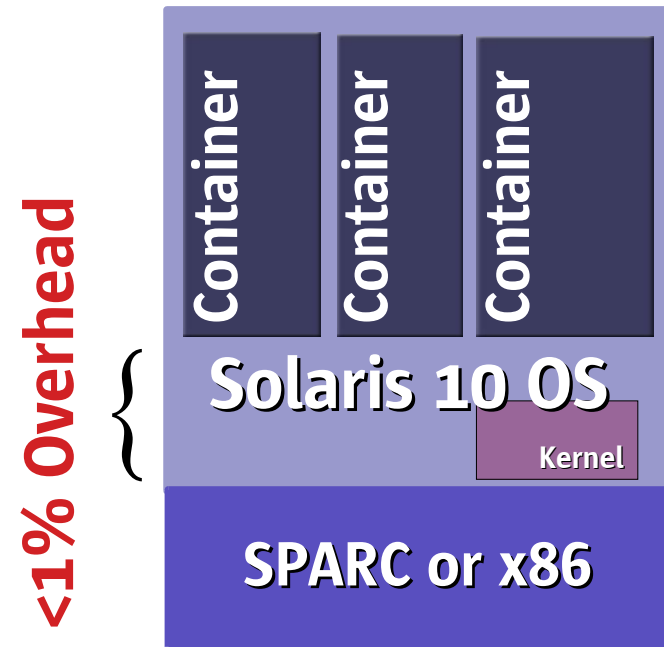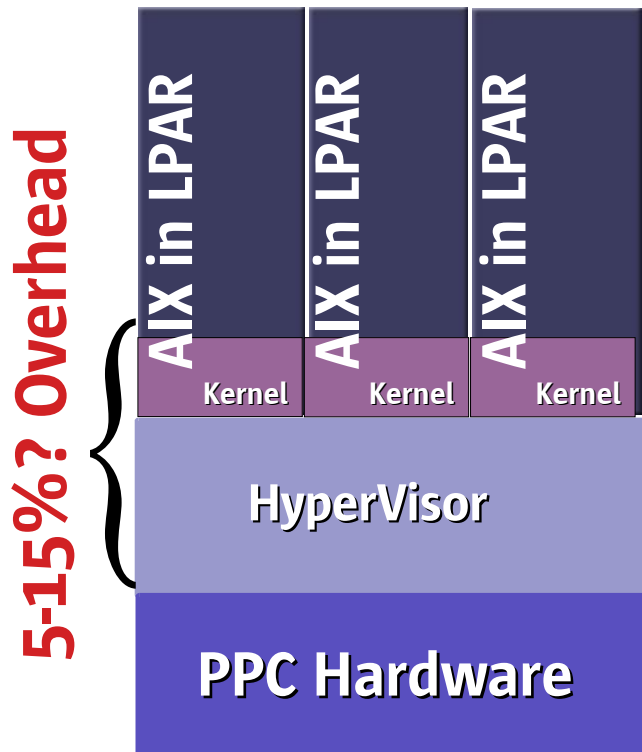
Software Leadership for Throughput Computing

- MT-hot kernel, Java VM, system libraries
- Fast thread library
- 64 bit memory addressing
- Memory Placement Optimization
- Solaris Containers
- Development & tuning tools

- Ready for *multi-threaded* applications
- Ready for *multiple* applications

Software Partitioning
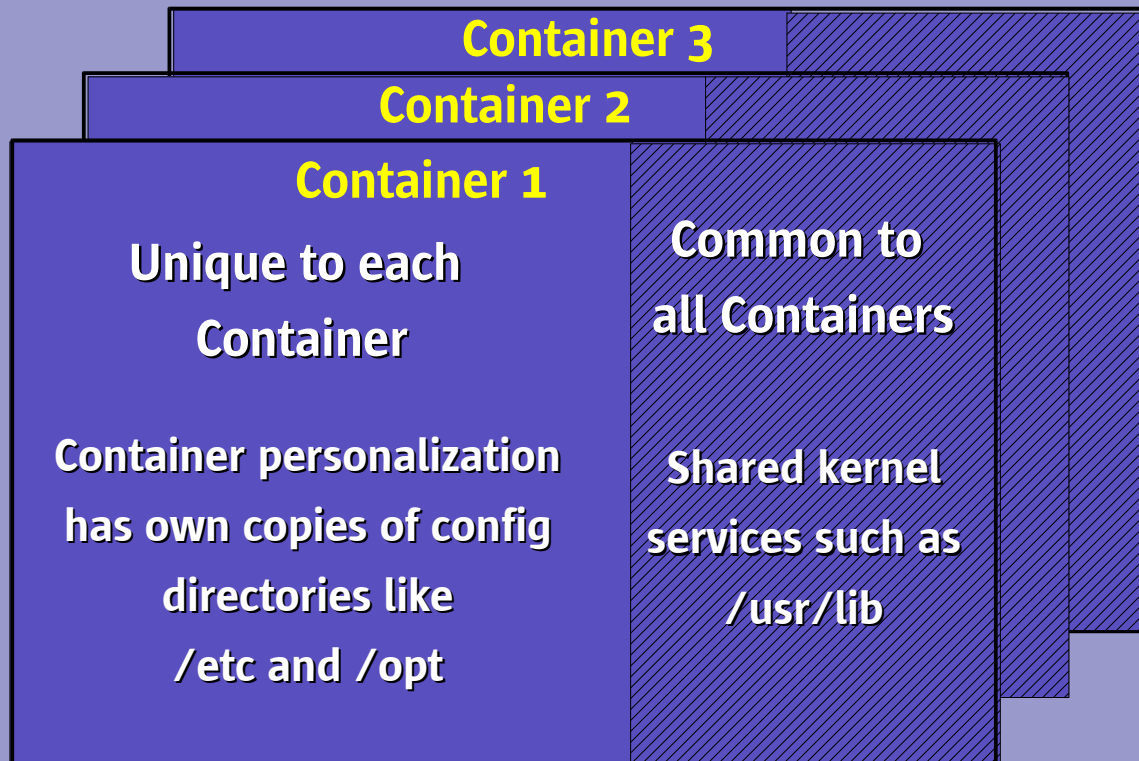
Many OS instances

Single OS instance

5-15%? Overhead

AIX in LPAR — Kernel
AIX in LPAR — Kernel
AIX in LPAR — Kernel

HyperVisor

PPC Hardware

<1% Overhead

Container
Container
Container

Solaris 10 OS — Kernel

SPARC or x86

Containers

Container 3
Container 2
Container 1

Unique to each Container

Container personalization has own copies of config directories like /etc and /opt

Common to all Containers

Shared kernel services such as /usr/lib

Solaris 10 Global Zone

Global kernel services such as file system and volume manager

Container Attributes
- **Highly secure**
- **Invisible to each other**
- **Very efficient**
- **Easily administered**
- **4,000 per OS instance**

Solaris — To the 10th
Tomorrow's Data Center, Today

1. Solid
2. Screaming
3. Secure
4. Scalable
5. Self healing

6. Serious
7. Standards based
8. Saves money
9. Superior
10. System software