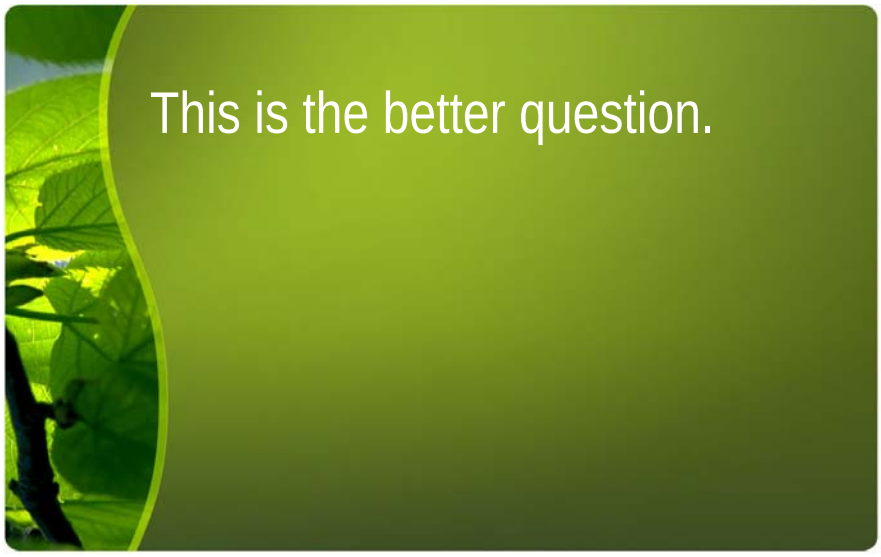
Is your IT infrastructure helping destroy the Planet?

Angus MacDonald
Chief Technologist
Sun Australasia

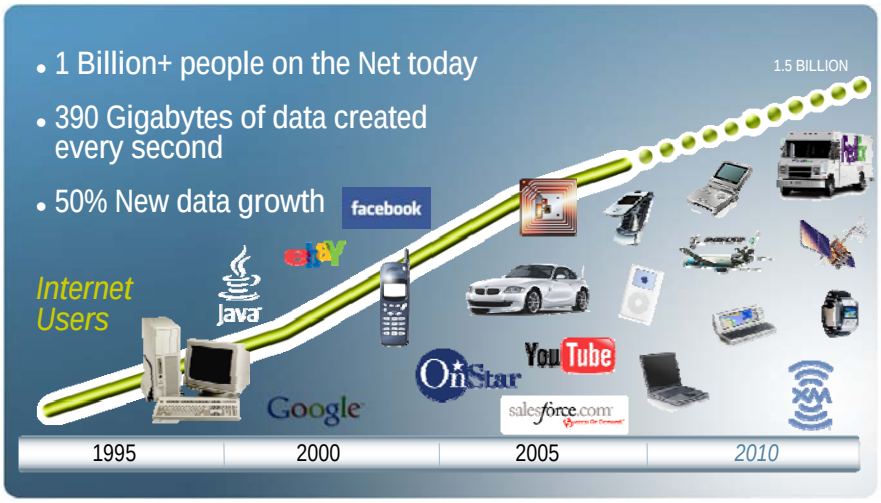
Is Computing Sustainable?



Sustainability is

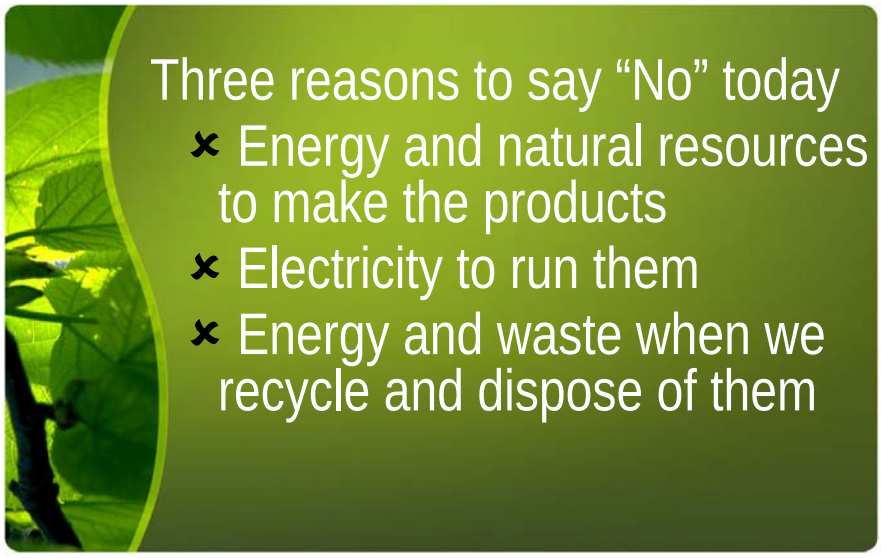
The IT Challenge ....

Sun's Vision : The Network is the Computer



Everyone and everything participates on the network

Is Computing Sustainable?



Three reasons to say “No” today

- Energy and natural resources to make the products
- Electricity to run them
- Energy and waste when we recycle and dispose of them

Decision points ...

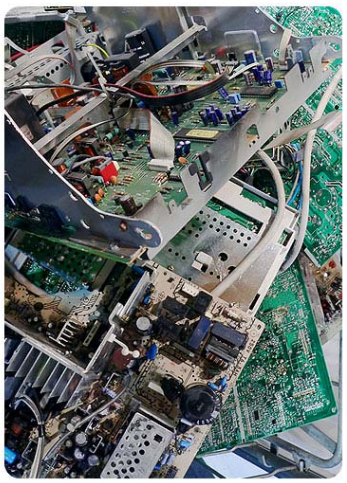
Some things you need the vendor community to change...

Manufacturing and recycling ...

So ask them .....

Product Life Cycle Management

- Design for disassembly, reuse and recycling
- Global takeback program
  - > Free return of products anywhere in the world
  - > Over 50% is reused
  - > All metal and plastic recycled
  - > Less than 5% enters waste stream
- Replace plastics with metal
- WEEE and RoHS compliant



Growing eWaste Problem

300 million computers already obsolete by 2004…

- Content problem: over 700 esoteric compounds per system
- Volume problem: 1 million computers average to more than 25,000 tons of electronic junk
- Some is noxious
- Increasingly international problem

Decision points ...

Our Customers' Perspectives

- Recent survey of over 800 companies, 2500 individuals
- Current state of the IT nation
  - Only 38% have started “greening” their datacentre
  - Another 15% will in the next 12 months
- What are they doing?
  - using energy efficient technology (72%); virtualizing (66%)
  - power/cooling methods (59%); consolidation (48%)
- Why are they doing it?
  - Reduce power consumption (78%); Reduce cost (73%)
  - Lower carbon emissions and impact (61%); Save space (50%)
  - Utilisation and performance benefits (49% each)
  - Not much change in the last 12 months
- *21% have data centre power bills > A$1,000,000*

The Drive for Energy Efficiency: Governments Are Taking Notice

US House of Representatives

H.R. 5646: To study and promote the use of energy efficient computer servers in the United States

EU Commission

Energy Efficiency Action Plan to reduce energy consumption €100B by 2020

EPA Report to Congress – Server & Data Center Energy Efficiency

- Data center energy more than doubled from 2000 to 2006.
- The power and cooling infrastructure accounts for 50% of data center total energy consumption.
- The energy used by the nation's servers and data centers in 2006:
  - 61 billion kilowatt-hours (kWh)
  - 1.5% of total U.S. electricity consumption
  - Total electricity cost of about $4.5 billion.
  - Equal to 5.8 million average US Households

Source: EPA Report to Congress on Server and Data Center Energy Efficiency

What about Australia? New government, new ideas?

IT consumes 2-4% of global energy

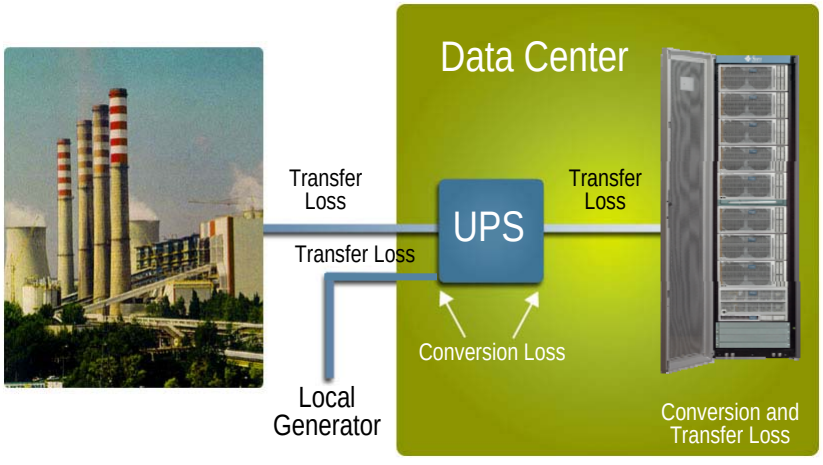
2MW Datacentres are not uncommon
- equivalent to about 2000 houses
- over $1,000,000 in electricity/pa

Queensland
- peak demand about 8200MW
  - so 160-320MW for IT?
  - 53% growth in past 10 years
- Second highest consumer in Australia
- 90% generated from Coal
  - but "relatively" clean

(source : www.energy.qld.gov.au)

Garnaut CLIMATE CHANGE REVIEW

Powering a server - Power Loss



The Datacenter Power Picture

Sun's Broomfield, CO datacenter (May 2006)

	Power (kW)	Notes
Power out of Utility	1236	
Power lost in distribution	36	3% loss
Power into Sun datacenter	1200	
Power for air conditioning	209	
Power lost in distribution	277	
Power into servers, storage	714	
Power lost to server power supplies	107	15% loss
Usable DC power for servers	607	
% Usable power	**49%**	
Actual Power to "work"	**???**	

Utilization?

Sun and Eco Innovation

Eco = Economics + Ecology

What we did ourselves and lessons you can take

Sun's Eco Responsibility Initiative

INNOVATE

Apply innovation to create Eco responsible products and services

ACT

Apply our technology and innovation to making Sun's own operations more Eco responsible

SHARE

Apply open source and community concepts to our energy and environmental challenges

Sun Eco Leadership

UltraSPARC® T1 Processor with CoolThreads™ Technology

11/2005

SunFire™/SPARC Enterprise T1000/T2000 Systems

12/2005

PG&E Rebate

8/15/2006

100 Best Corporate Citizens

2006 and 2007 Sun Named to List of 100 Best Corporate Citizens

2006-2007

FORTUNE

Sun Named "Greenest Company Under the Sun" by Fortune Editor David Kirkpatrick

4/2007

Open Work and the CoolThreads Servers Each Won Flex Your Power Awards

5/7/2007

UltraSPARC T2 Processor

8/2007

"Greening" Our Own Datacenters

And Sharing Our Experiences

- Scalable, repeatable, modular 'pod' architecture
  - > Modular power busway
  - > Adaptable cooling systems
  - > Simplified cabling
- Energy-efficient technology
- Metering and measurement
- Cross-function design team
- Quick, easy wins

Sun's Approach to Datacenter Design Available to customers! ?

- Scalable, repeatable, modular architecture
  - > Modular right-sized power and cooling
  - > Simplified, flexible cabling and plumbing
- Real-time energy monitoring
- Scale cost with use
- Easy to build and expand

Entering a New Age of Engineered Datacenters

Santa Clara Lab Consolidation

Before
- 2177 servers
- 202,000 ft.^{2} (550 racks)
- Power: 2.2 MW
- Utility Cost: $1.89M / year

After
- 1015 servers
- 76,000 ft.^{2} (65 racks)
- Power: 500 kW
- Utility Cost: $739k / year

Results:
- Decommissioned >5000 servers, storage, and networking devices
- 88% reduction in floor space
- 61% drop in annual utility costs (not including cooling)

Eco Responsibility at Sun

- *Open Work*
  - > *Reducing economic and ecological costs of commuting*
  - > *Lowered annual CO_2 emissions by est. 30,000 tons*
- *Sun Ray thin clients*
  - > *Desktop runs on shared server resulting in carbon savings and lower maintenance costs*
- *Efficient datacenters*
  - > *Innovative modular design*
  - > *Consolidation and virtualization*
  - > *Technology upgrades*

Open Work Program

- ***A global, location-independent program providing technologies, workspaces and best practices***
- ***2006 EPA Award: 1st in nation for commuter friendliness***

Participation

Flex Location Workers
14,803 Participants
46% of Work Force

Flexible Offices
127 Locations Worldwide

Benefits

Real Estate
6,600 Seats Saved/Avoided
in FY06 = $67.9M

thin clients
Over $24M Saved Annually
No-Cost Moves and Energy Savings

Carbon Reduction
75,000 tons/year and growing

UltraSPARC® T2 Processor

NEW!

The World's Fastest, Most Energy Efficient Commodity Microprocessor

&

1, 2 and 4 socket servers

(The T5000 series)

Sun's new x86 Enterprise Servers

World's smallest 4-socket, x86, quad-core Server

Proof not all x86 servers are created equal....

Sun Fire x4450

Compared to HP, IBM, Dell

- half the space (2 vs 4RU)
- 40-60% less power
- up to 71% less heat
- 90%+ efficiency power supply
- same or better performance

Java solaris Windows vmware intel Xeon

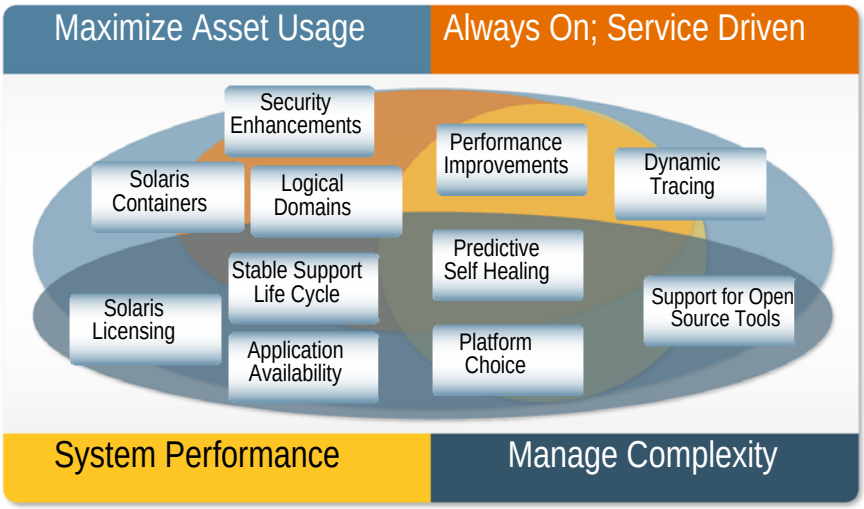
Tiered Storage Architecture

Primary Tape Uses As Little As 40% of the Energy Compared With Other Libraries

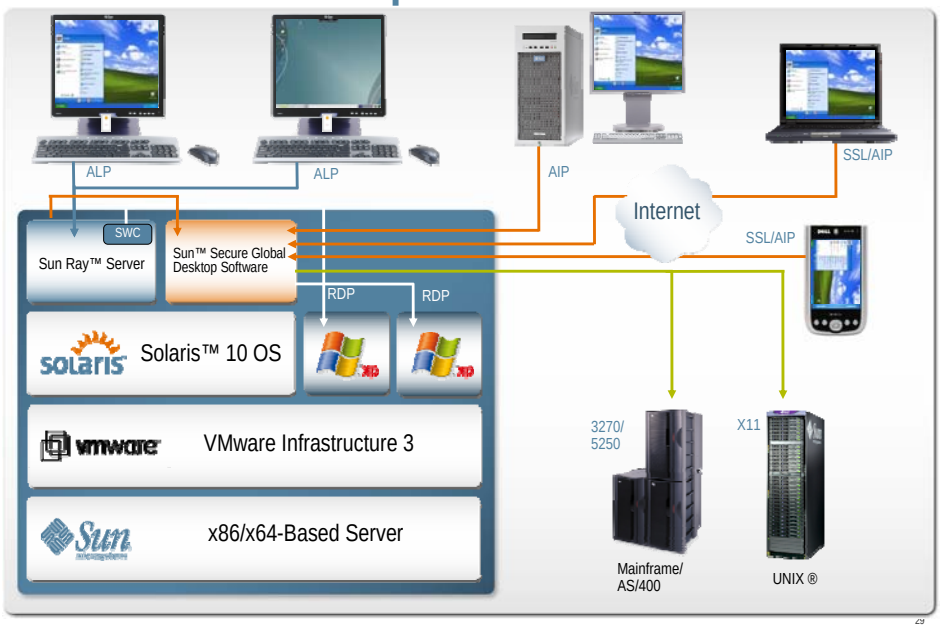
Sun StorageTek™ SL8500 Tape Library

- 25–50% less space than comparable libraries
- Power reduced as much as 40% vs. other libraries
- 3x the performance of previous generation
- 2x drive capacity and performance with T10000 tape drive
- Don't forget virtual tape

Solaris 10 Addresses the Eco Initiative



Sun Virtual Desktop Solution

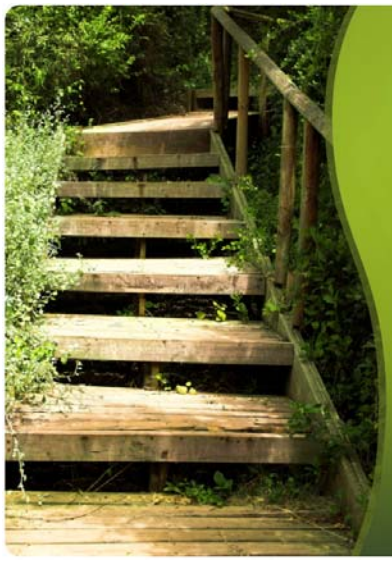


To achieve sustainability we need to:

- Reduce raw material extraction by half
  - > No built in obsolescence, nanoscale
- De-couple economic growth from the need to increase consumption of natural resources
  - > Dematerialisation, service based economy
- Increase efficiency of primary resource use
  - > Shared services, optimisation, recover, reuse, recycle
- Reduce energy requirements by 4 – 10 fold
  - > Low carbon

So ... it is not just about Electricity, it's also about
Oil, Gas, Copper, Gold, eWaste, ...

Simple 3 Step Approach to Improve Your Efficiency



1. Assess

Measure the current state of your datacenter and recommend ways to optimize space, power and cooling for better efficiency, utilization and ROI

2. Optimize

Upgrade to energy efficient Sun systems for improved performance, efficiencies and better datacenter economics

3. Virtualize

Expanded end to end approach to with new levels of Eco efficiency – both economic and ecological

It's A Global Economy, It Pays To Protect Your Assets

Changes you can make to save energy, money, and the planet in 30 days:

- Adjust the thermostat set point to 25° C per ASHRAE standards
- Identify and turn off unused machines (typically 8-10% of machines)
- Enable power management features where available (PowerNow, SpeedStep)
- Refresh old servers; use trade-in and rebate programs to help pay.
- Refresh disk technology (replace <70GB drives with >500GB)
- Move old data to tape (tape provides 20x-200x more TB/KW)

See Benefits in Just a Few Weeks!

To find out more about why being green doesn't have to mean compromise, visit:

http://www.sun.com/eco


Sun
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