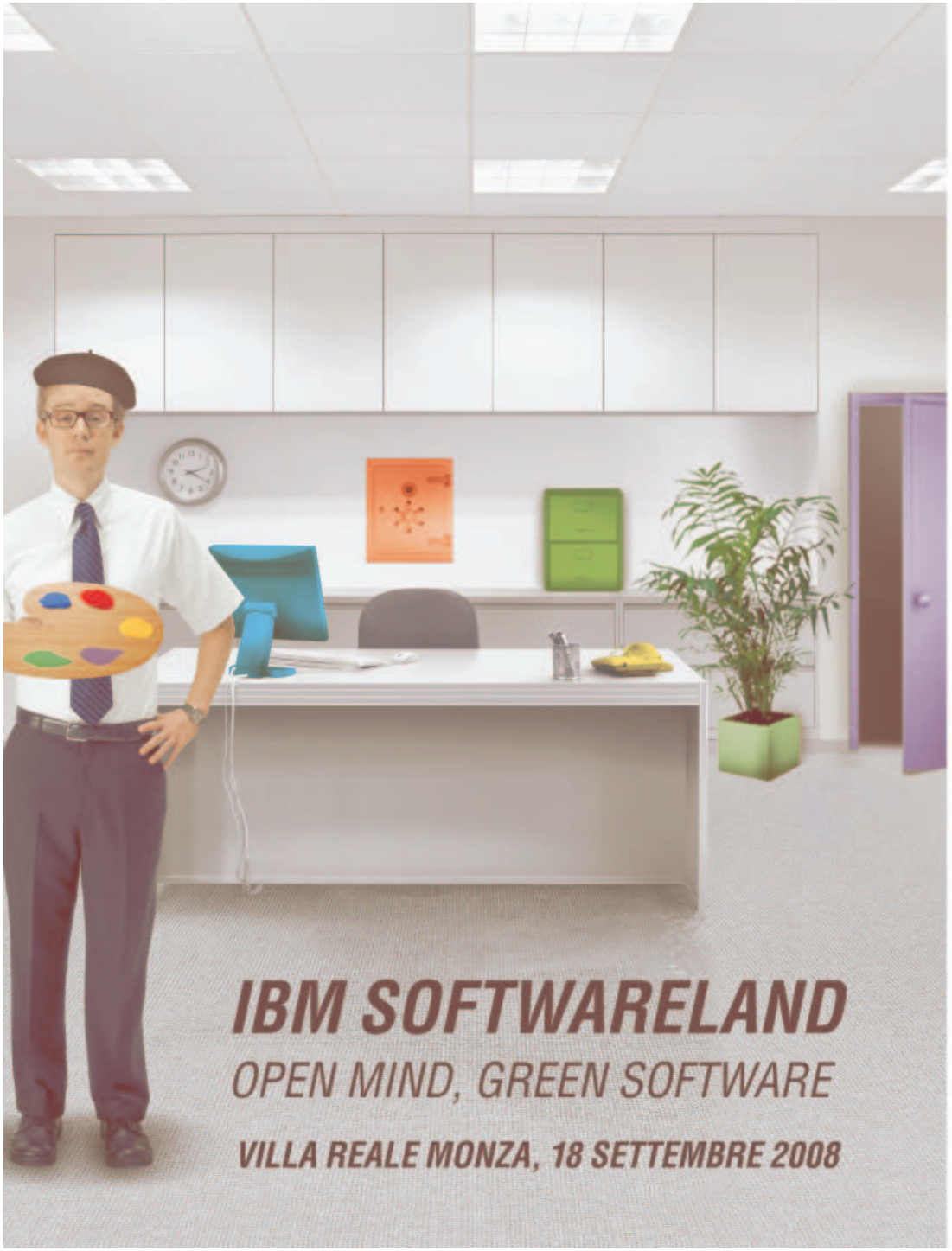


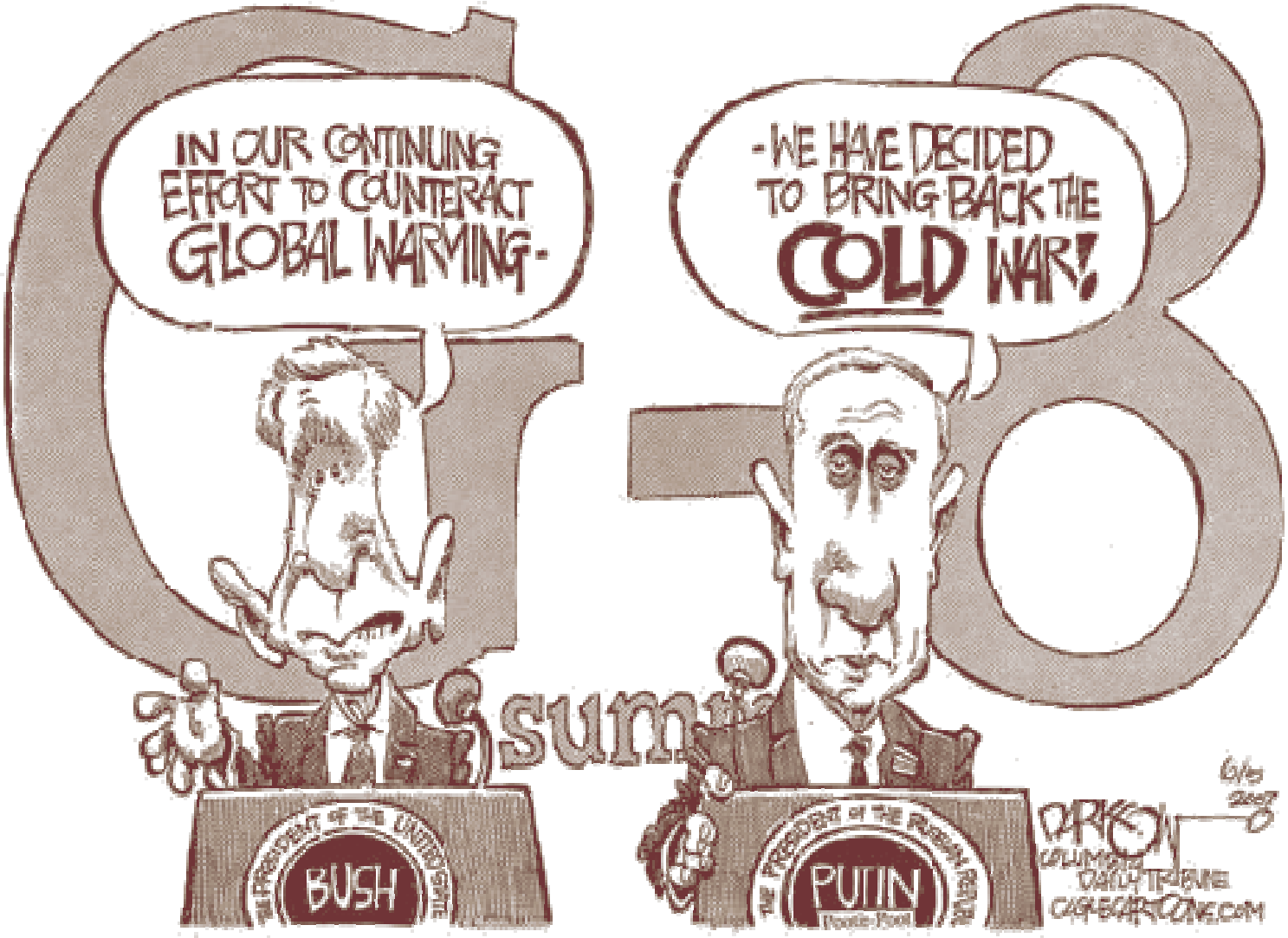
IBM Software for a greener World

Alan Ganek

CTO Tivoli Software and VP
Autonomic Computing IBM

Questo evento è a Impatto Zero. Le emissioni di CO_2 sono compensate con la creazione di nuove foreste.

The environment concerns everyone and they want to help



Multiple factors are driving Organizations

Costs

Energy costs continue to increase

Oil peaked at $147/barrel, long term trends are higher

Regulatory Mandates

Increased regulatory scrutiny, with government regulations around water usage, carbon emissions etc

"Going Green"

Workload Growth

Growth in Application and Business workloads doubles every 2 years driving the need new servers, DASD, power and cooling

Operational

Capacity shortages for data centre power and cooling are limiting ability to expand

Social & People

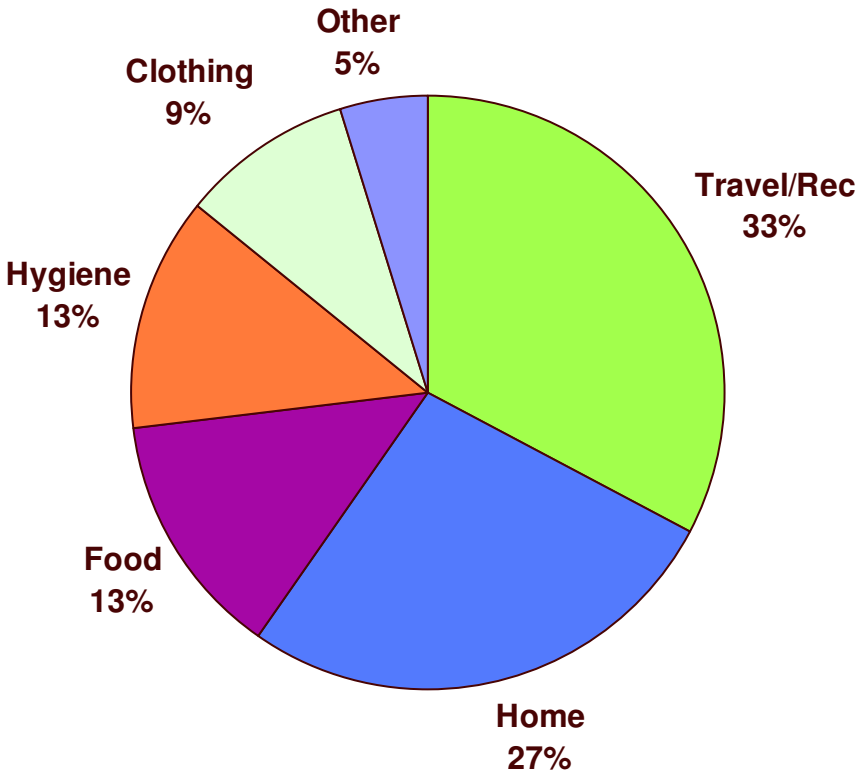
Customers have started evaluating the green credentials of suppliers and products

Cultural Shifts

Demographics changes and global teams require collaboration across cultural, generational and geographic boundaries

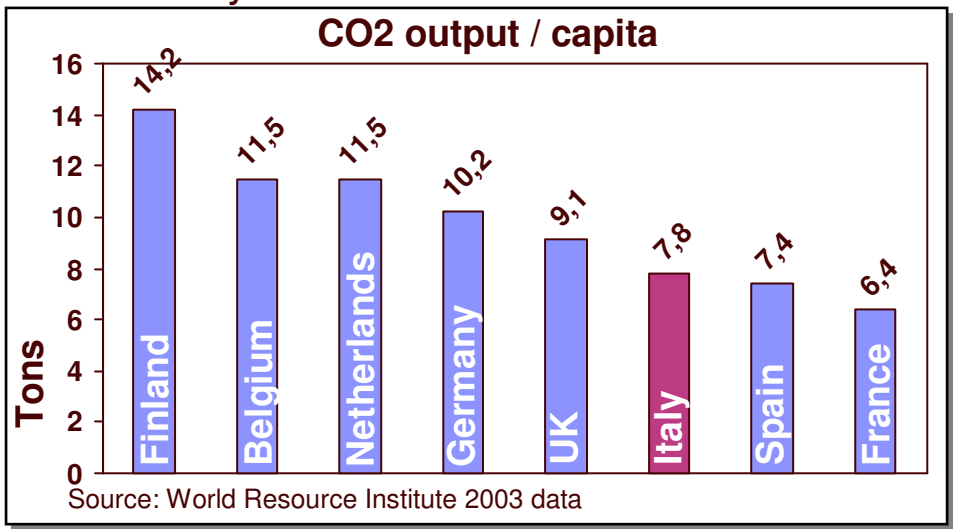
People actions impact the environment

U.K. CO_2 Footprint / Person



Source: UK Carbon Trust

- **Workforce globalization** allows us to compose world wide teams
  - **Employee efficiency** is affected by interpersonal relationships, teaming, cultural differences and structure
  - **Travel and face-to-face** are seen often as the only viable alternatives improve efficiency



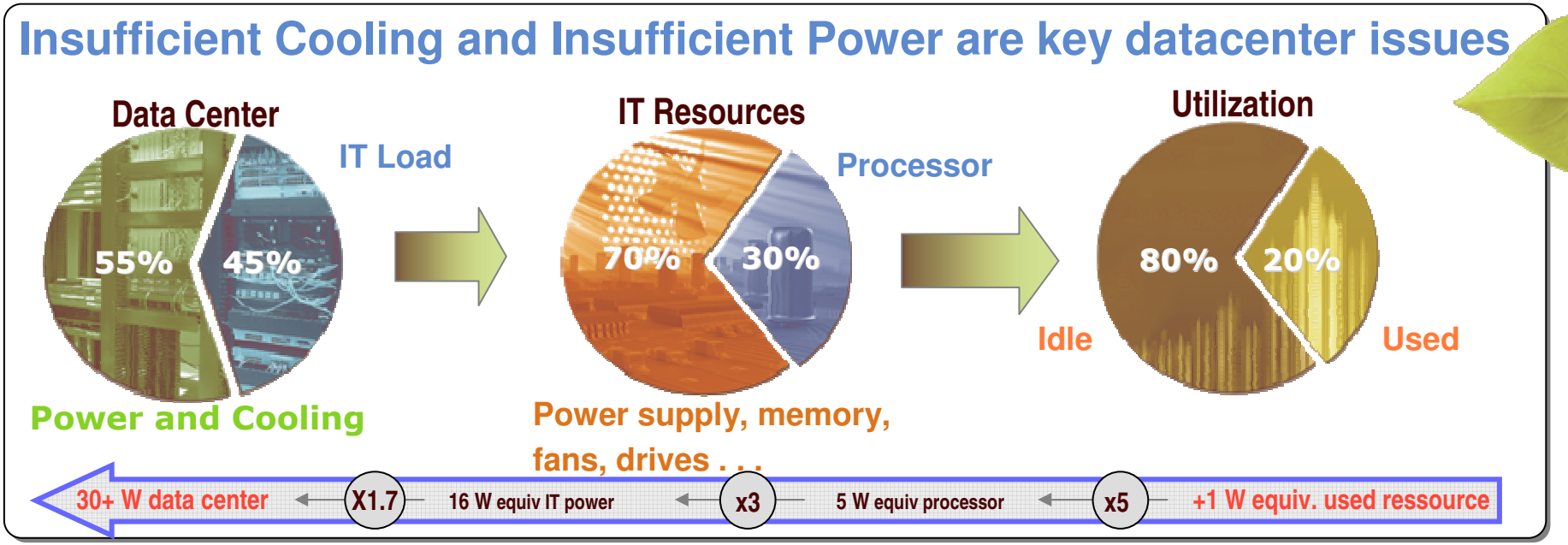
Source: World Resource Institute 2003 data

IT and Property infrastructure drive energy utilization

On average, *40% of energy use and emissions* come from building heating and cooling

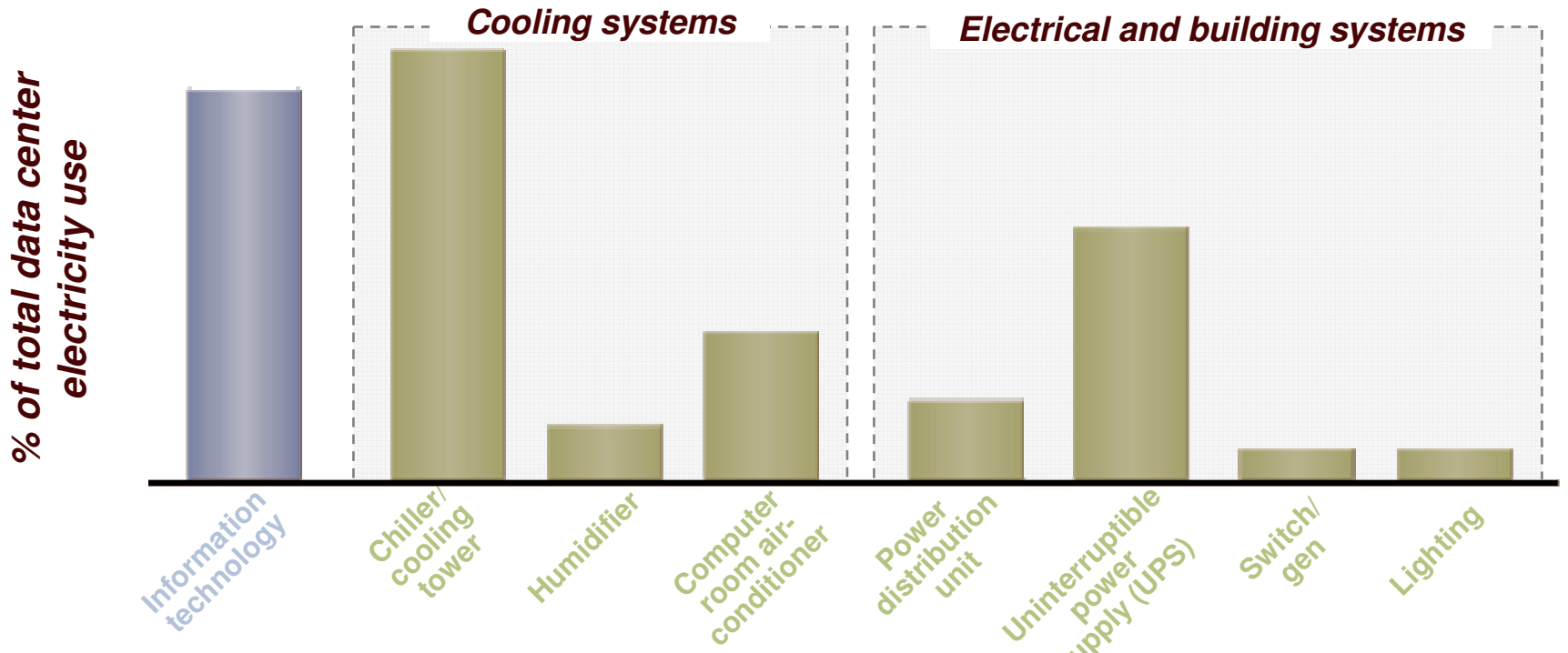
Within the last five years, the total amount of energy utilized by all domestic US data centers has doubled.

Insufficient Cooling and Insufficient Power are key datacenter issues



Challenges In Moving Toward A Green Data Center

Facilities represent the majority of data center energy costs, and must be managed along with IT to achieve a green data center.



- Power and thermal metrics are not sufficiently integrated
- Facilities and IT assets are not well-integrated
- Current service management tools are not sufficiently energy-aware
- No way to measure or demonstrate improvements

IBM capabilities can help the entire organization be greener

So . . . How can Software make you greener?

- Reduce business travel
- Reduce commuting
- Consolidate and Virtualize
- Optimize HVAC for hot spots
- Optimize business processes
- Compress your data
- Deliver greener products
- Schedule workload to off-peak hours
- Optimize applications
- Reduce use of paper

Green Economic Advantage with IBM Software

Lotus software
Rational software
Tivoli software

- Online collaboration (IM, Web Conference etc)
- Online learning
- Multi-site software development coordination
- Remote operations

WebSphere software
Information Management
Tivoli software
Lotus software
Rational software

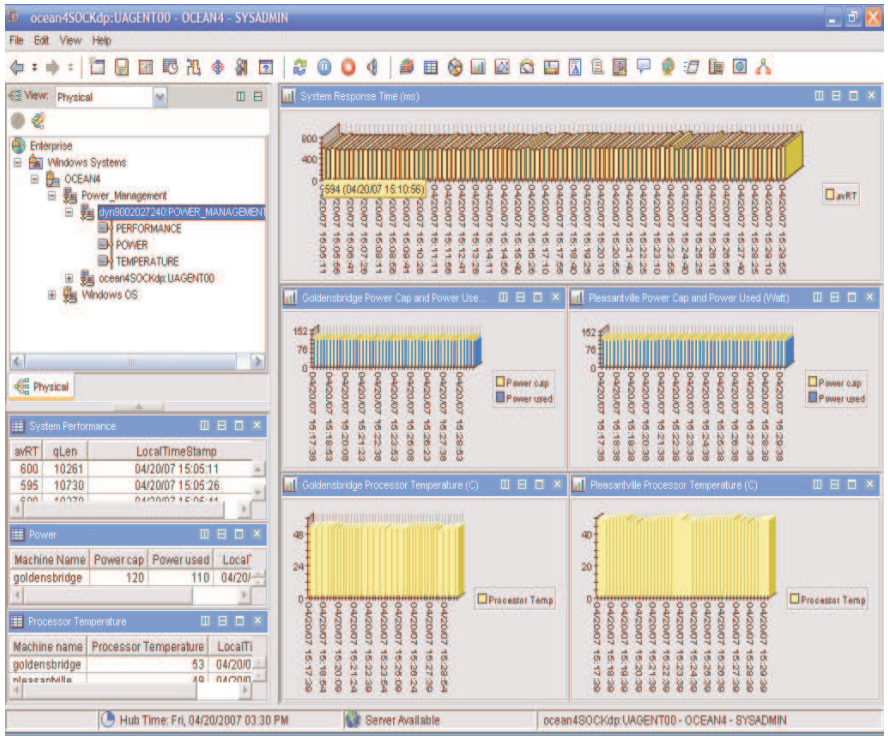
- Business process modeling and redefinition
- Processes with eForms and images
- Human task automation
- Dynamic workload distribution
- Smart SOA efficiencies
- Application consolidation
- Energy cost allocation and billing
- Streamline product development cycle, with less material and energy waste

Lotus software
Information Management
Tivoli software
WebSphere software

- Consolidate and Virtualize IT
- De-duplication and data compression
- Tiered storage
- Optimize IT and Facility energy use
- Maintenance schedule and status tracking
- Energy use measurement and reporting
- Secure, traceable, categorized and indexed information

Introducing Tivoli Monitoring for Energy Management

Now all your IT compute data plus all your facilities metrics in one spot ! ! !



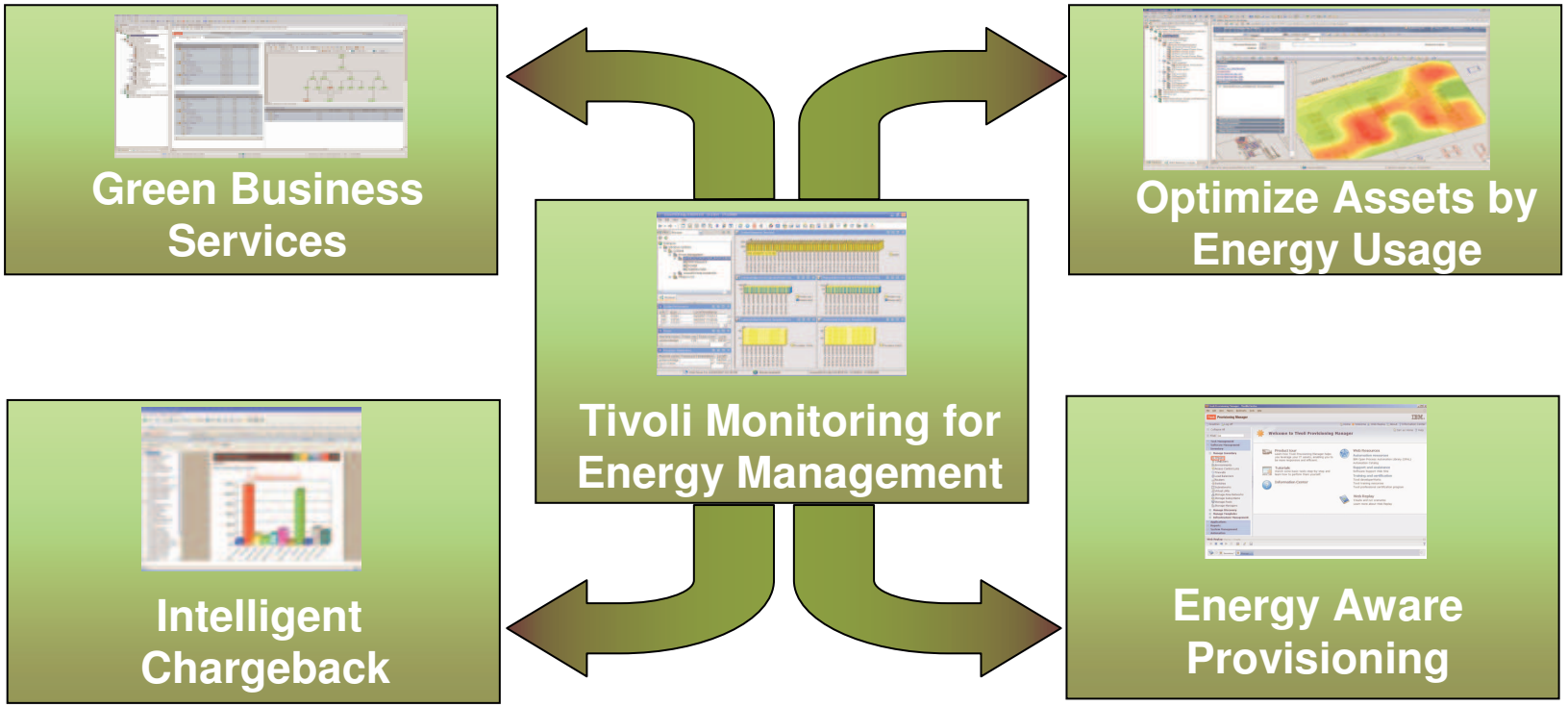
- Visualize the power consumption and thermal signatures of data center resources
- Alert operators and facility managers before servers reach critical energy and temperature thresholds
- Automate and control server's energy usage to optimal levels including triggers to 3rd party partners

New Partner Ecosystem Announcing 5/19/08:

vmware Johnson Controls t.a.c EATON APC by Schneider Electric OSIsoft. MatrikonOPC SIEMENS SYNAPSENSE

IBM Service Management's Green Data Center

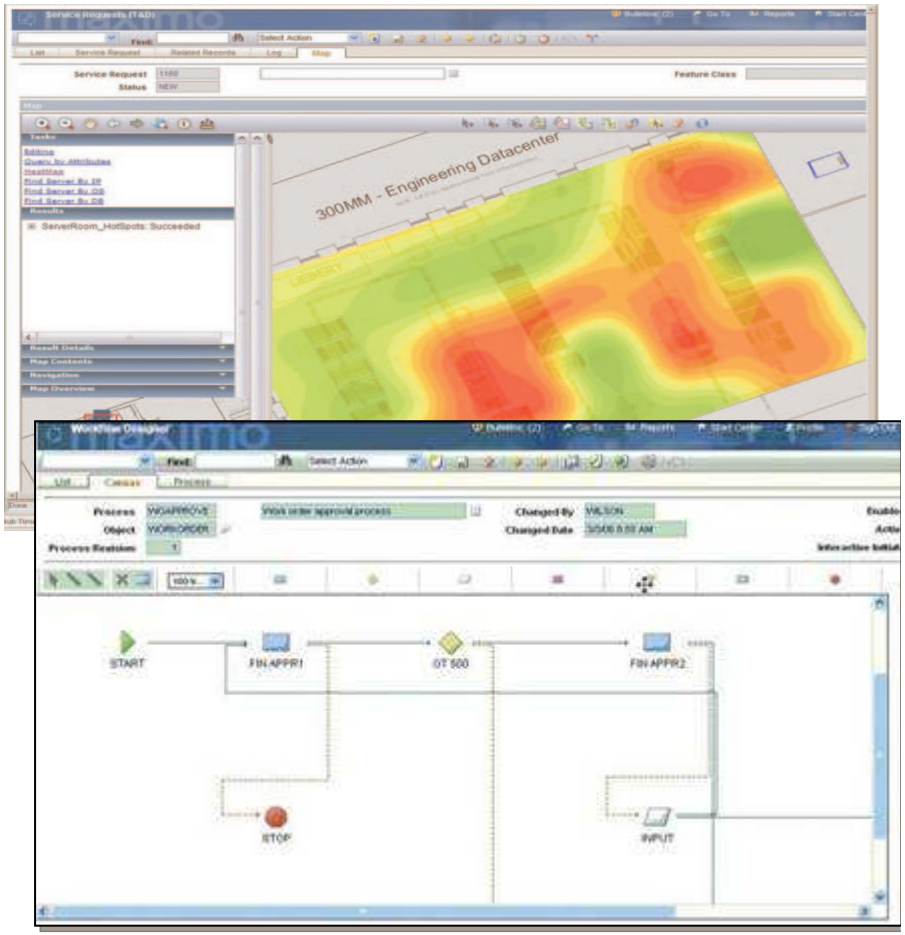
Using Green Data to accent Tivoli's existing event architecture and data model



Introducing: Tivoli Maximo Enterprise Asset Management Spatial

Optimize assets by your energy usage

- Optimize the energy utilization of your assets and extend asset life based on energy utilization via ***Tivoli Maximo Enterprise Asset Management***
- Visualize the thermal dynamics of the data center and identify problem areas
- Alert source for Facility and DC “operators” of upcoming energy problems
- Enable workflows that allow you to create role based Automation of Asset lifecycles

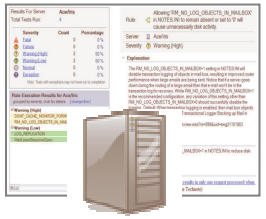


New Lotus Notes and Domino 8.5 for Green Collaboration

The Ultimate Green Collaboration Platform

Lotus Notes

Lotus Domino



Collaboration Server Consolidation

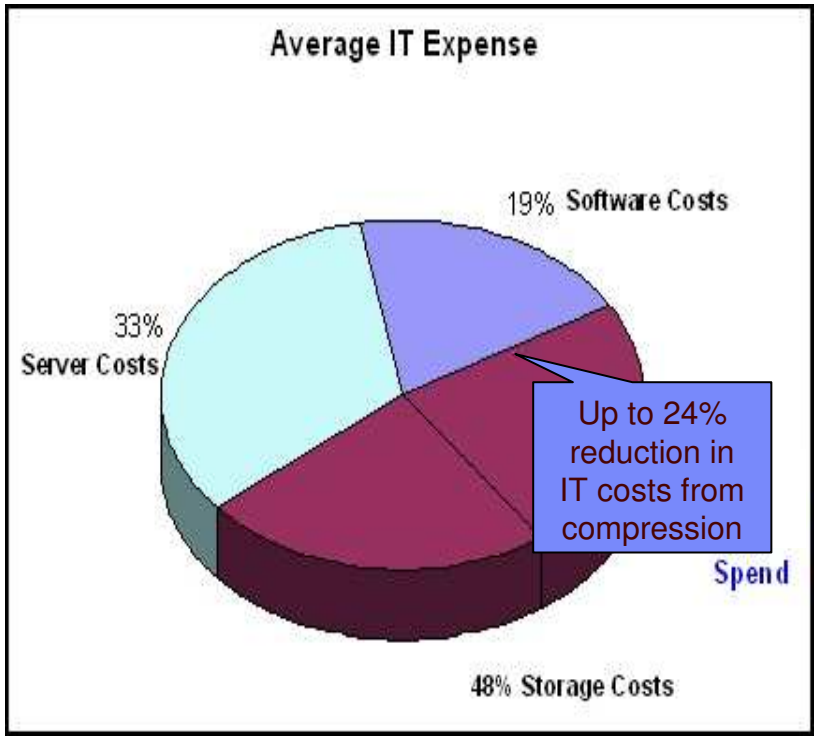
Less hardware requires less energy. Lotus Domino 8.5 supports larger numbers of users per server.
Since release 6.5, Lotus Domino has reduced CPU and I/O usage by 50%!

Data Compression

Reduces disk storage, network traffic, backup costs, and the needed physical space
Domino data compression feature savings typically range from 20 – 50%!

Information Management Solutions- Reduce and Optimize

- DB2 9 Deep Compression & Storage Optimization
  - Disk space reductions between 40% to 80%
- IBM Optim; Cubing Services in DB2 9.5; InfoSphere Warehouse No Copy Analytics helps Manage Data Growth
  - Increase database performance/response time
  - Remove historical business records from Production
  - Archive to selected target format
  - Implement tiered storage strategies to maximize efficiencies
- IBM Information Server Blade – Optimize Workload
  - Energy Efficient Grid-Based Information Integration Solution
  - Competitive solutions
    - Need up to 58% more power
    - Generate up to 32% more heat



Enterprise Content Management

Eliminate the Costs and Risks of Managing Paper

- Prevent Documents From Being Printed and Stored
  - **Dramatically Reduce Paper Usage & Consumption**
- Eliminate Paper Handling Risks and Costs
  - **Streamline content driven business processes**
- Enable Reliable and Timely Access to All Info
- Enable Better Visibility and Cost Reduction from Operations
  - **Support compliance to local regulations**

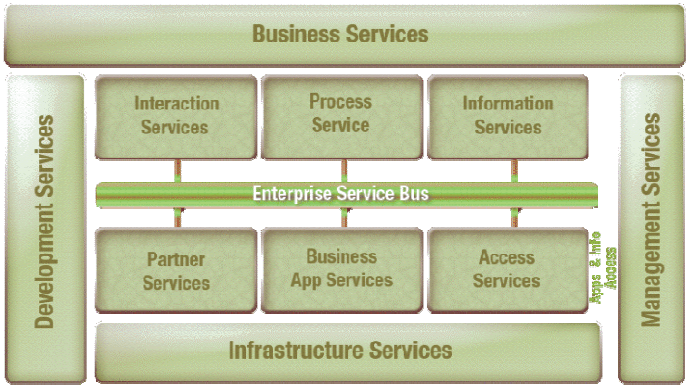
Increase productivity through new business process workflows

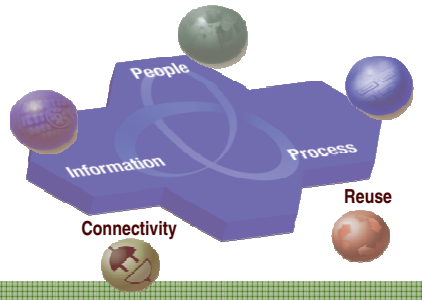
Reduce your paper consumption up to 80 – 90%, or 350 lb paper/yr per employee

Smart SOA™ Approaches for Carbon Management

Maximizing your return on your investment by approaching carbon management from the SOA entry point perspective.

- People: Enable the workforce with tools for sustainable behavior change across the organization
- Process: Maximize the opportunity to reduce carbon emissions enterprise wide across current business processes
- Reuse: Enhance or repurpose existing services and assets to fulfill carbon emissions management needs.
- Connectivity: Connect systems, users, and business channels allowing for the sharing of carbon emissions management data
- Information: SOA provides the flexibility to share real time information across the enterprise.





Smart SOA

IBM Software for a Greener World

Cutting costs and carbon emissions and streamlining compliance with IBM

Improve carbon footprint by directly reducing travel for collaboration

- 42% of IBM's employees do not regularly come into an office saving $100M annually in real estate costs
- Saved $70k on one training event by avoiding travel

Lotus software

Optimize processes to improve energy efficiency and comply with regulations

- Reduced average process cycle time by 50%
- Using SOA to drive energy efficient processes
- Consolidating 3900 → 33 System Z servers providing an 80% annual energy savings
- Optimized policies and practices to enable regulatory and legal compliance

Information Management | WebSphere software | Rational software

Consolidate, Virtualize, Compress and maintain to reduce energy costs

- Achieved data compression rates of 83%
- Consolidated 11 servers down to 3
- Saved 90K tons of CO2 with resource planning
- 40 to 50% reduction in floor space, 30% reduction in power and cooling costs

Tivoli software | Information Management

IBM 'Project Big Green' Commitments

May 10, 2007

"IBM to reallocate $1 billion a year"

- **R&D for IT energy efficiency technologies**
- **850 member worldwide IBM "Green Team"**
- **Convert our facilities to Green Data Centers**

"IBM reaffirming long standing commitment to environmental responsibility"

1. **IBM energy conservation actions from 1990 – 2007**
   - **Reduced or avoided CO2 emissions by an amount equal to 40% of its 1990 emissions**
   - **Saved $310 million**
2. **Goal is to achieve a 12% reduction in CO2 emissions between 2005-2012**
   - **Double the compute capacity of our Green Data Centers by 2010**
   - **No increase in power consumption**

avoiding 5 billion kilowatt hours per year and CO2 emissions equal to taking 1M cars off the road.

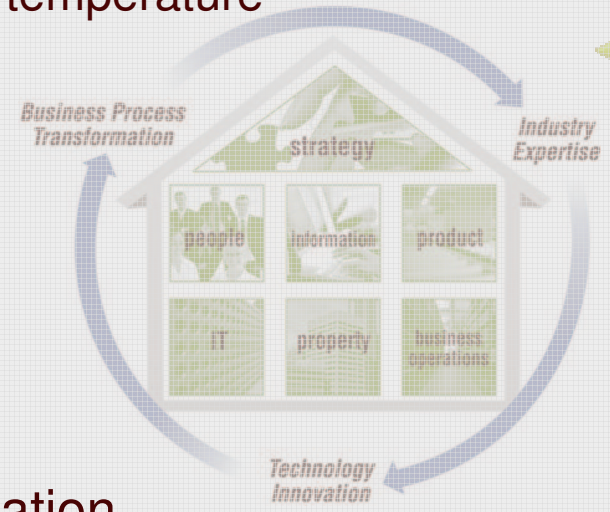
Progress Toward Our Goals

- **More than 2,000 client projects**
- **1,000 IBMers trained and deployed**
- **'Green' specialization program Partners**
- **$97 million saved last year in travel costs from use of Web conferencing**
- **IBM Strategic Data Centers benefits realized since May 10,2007**
  - New 72,000 square foot data center designed to achieve 71% efficiency rating
  - 18,500 virtualized images deployed as part of 3900-to-40 consolidation
  - Achieved operational savings as high as 70%
  - Annual energy usage reduced by as much as 80%
  - Reduced floor space at one location by 85%

Take Time to THINKFORWARD

Get Started now with today's benefits !!!

- Gain visibility into energy consumption
- Identify resources that can be unplugged
  - up to 10% energy reduction
- Turn up temperature in the data center
  - 4% energy reduction for every 1º increase in temperature
- Consolidate and virtualize resources
  - up to 80% energy reduction
- De-duplicate and compress information
  - up to 80% compression rate for databases
  - 20%-50% compression rate for email
- Reduce business travel with online collaboration
  - IBM saved $97 million in travel costs



SEE BLUE. THINK GREEN.

www.ibm.com/software/green