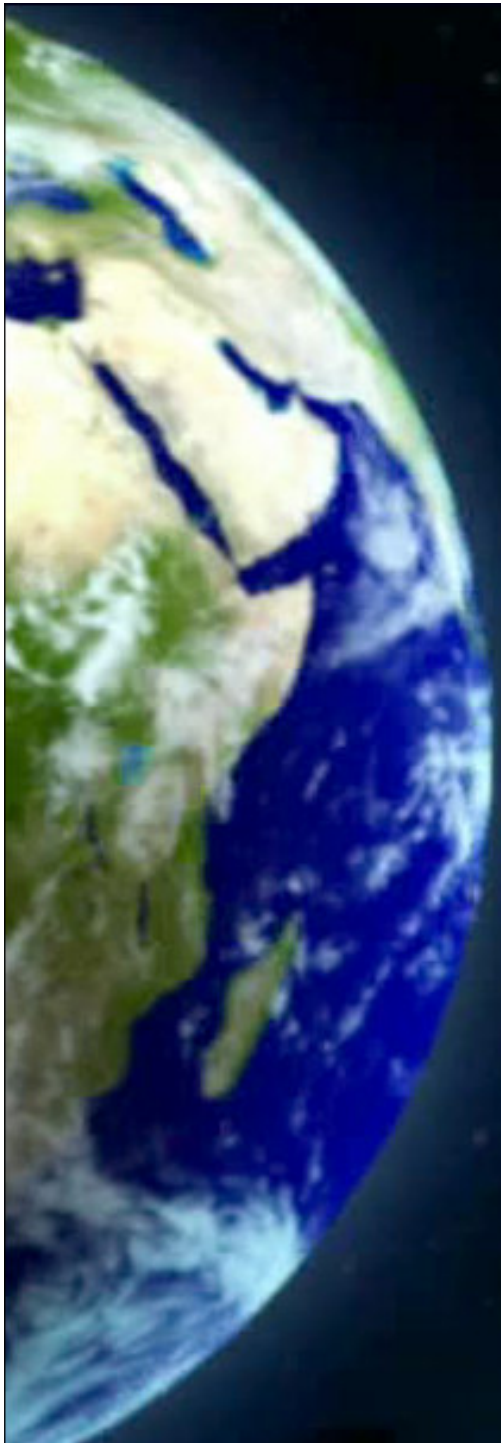


Green & Beyond – Green IT

Fabrizio Renzi
IBM Central And Eastern Europe, Middle East And Africa
Director
IBM Systems & Technology Group

For us to make sense of this new world, we must consider four critical questions

"My infrastructure is inflexible and costly"

More Agility

How do we create an intelligent infrastructure that drives down cost, is secure, and is just as dynamic as today's business climate ?

Dynamic Infrastructure

"Data is exploding and it's in silos"

Making Better Decisions

How can we analyze the wealth of information available to make rapid, informed and confident decisions throughout the organization?

New Intelligence

"New business & process demands "

Responding to New Behaviors

How can we work smarter supported by flexible and dynamic processes modeled for the new way people buy, live & work.

Smart Work

"Our resources are limited"

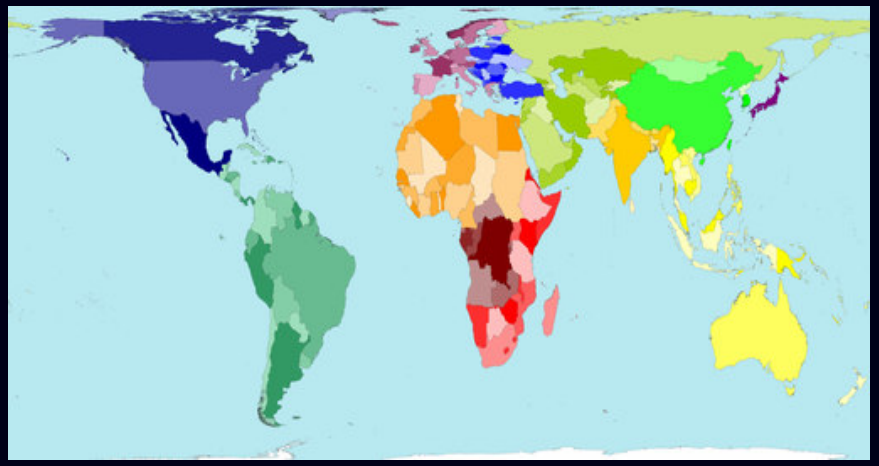
Doing More With Less

How do we drive greater efficiencies, compete more effectively, and respond more quickly by taking action now on energy, the environment, and sustainability.

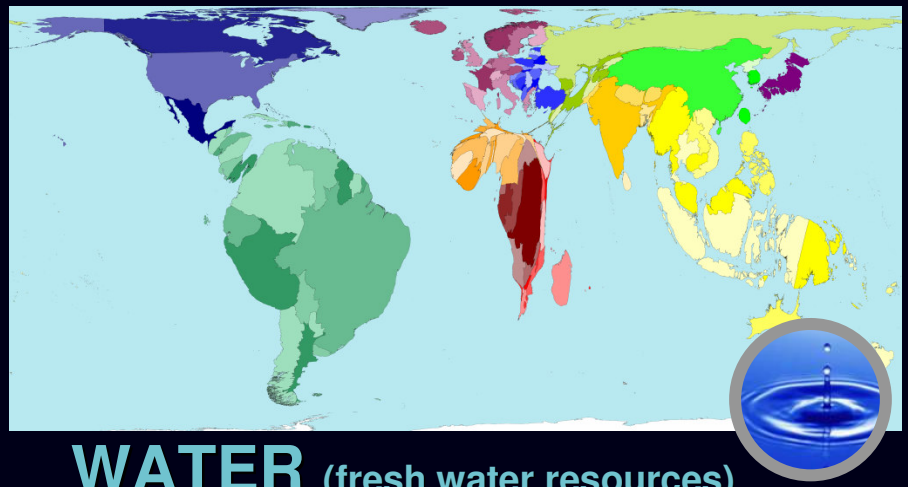
Green & Beyond

Green maps of the world

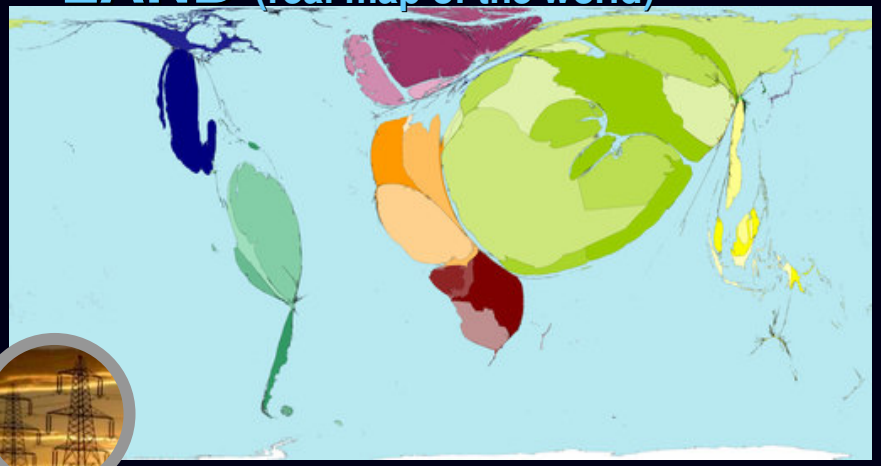
Green: optimize use of energy and water and minimize GHG emissions



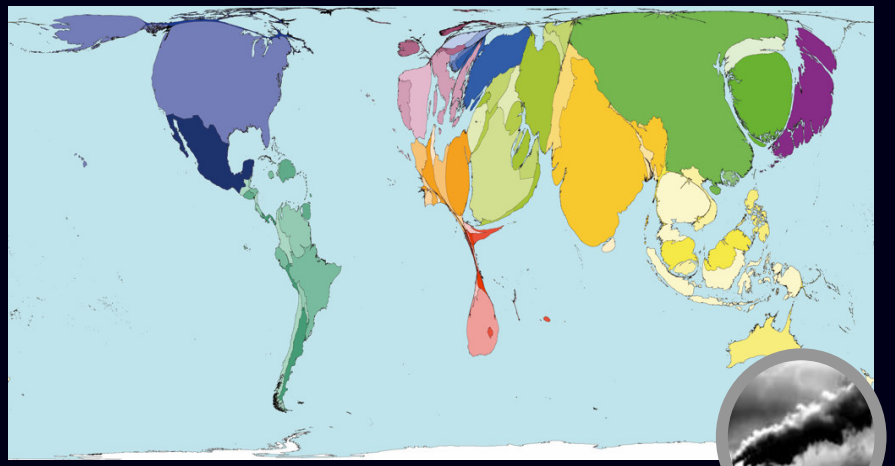
LAND (real map of the world)



WATER (fresh water resources)



ENERGY (crude oil exports)



CARBON (emission increases)

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www.worldmapper.org

IBM

Green & beyond is a major opportunity for smarter clients to:

Lower costs while overcoming operational barriers.

MANUFACTURING

Strengthen reputations while meeting regulations.

IT

Create products and services that give rise to new markets.

CUSTOMERS

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To achieve these benefits, business and organizations need:

1 Green infrastructures

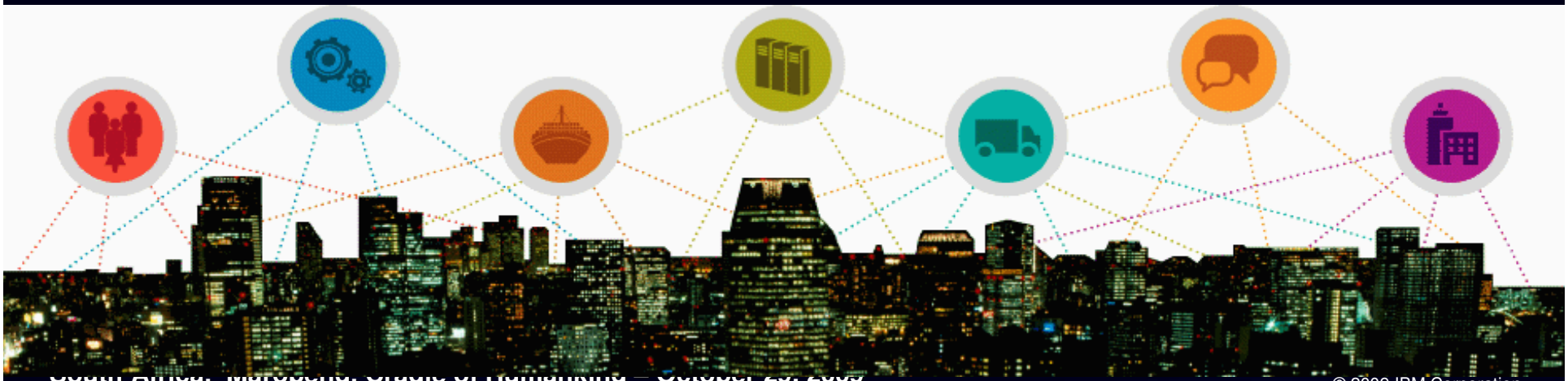
- Take out cost and improve the efficiency of IT and other infrastructure.
- Manage environmental impact of assets.
- Enable readiness with regulatory compliance.

2 Sustainable solutions

- Increase organizational efficiency, abating impact of processes, products and people.
- Create ability to measure, monitor, improve and report on processes.
- Decrease employee environmental impact with remote work and collaboration strategies.

3 Intelligent systems

- Manage resources at a macro level.
- Use predictive analytics for water management.
- Optimize power grid performance; automate, monitor and control two-way flow of energy from power plant to plug.
- Optimized transportation systems.

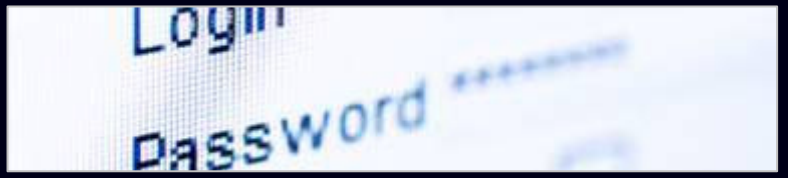


1 IBM Green Infrastructure is an instrumented and interconnected system enabled by intelligent energy management.

IT Equipment

- Energy efficient hardware
- Virtualization and consolidation
- Active energy management
- Tiered storage

Applications and Data



- Lifecycle management, retention, archiving of data
- Optimization of application servers
- Application performance monitoring
- Data deduplication, compression and clean up

Data Center

- Accurate thermal and energy usage assessments
- Extend life of existing infrastructure
- Rationalize infrastructures across company
- Design flexibility into new data center infrastructure

Real estate and facilities

- Trend analysis and building maintenance diagnostics
- Building management systems integration
- Process management automation
- Dashboard reporting

Energy Management

- IT and Infrastructure interfaces
- Threshold controls
- Optimize assets for energy efficiency
- Track and verify energy efficiency

1 Green infrastructure: Applications and benefits

SMART IS
Building green data centers using IBM green technologies to support corporate brand objectives

World fastest IT:

is also the greenest 85% of top500 supercomputers run on IBM. 100% of top 15 **ABSA**: using world coolest and greenest technology IBM system z to run mission critical banking applications.

ABSA
Today, tomorrow, together

SMART IS
Proactively addressing information growth and environmental regulation.

A smart organization: Can build a green infrastructure to anticipate and respond to information growth, measure and verify performance and achieve data compression rates of up to 80%.

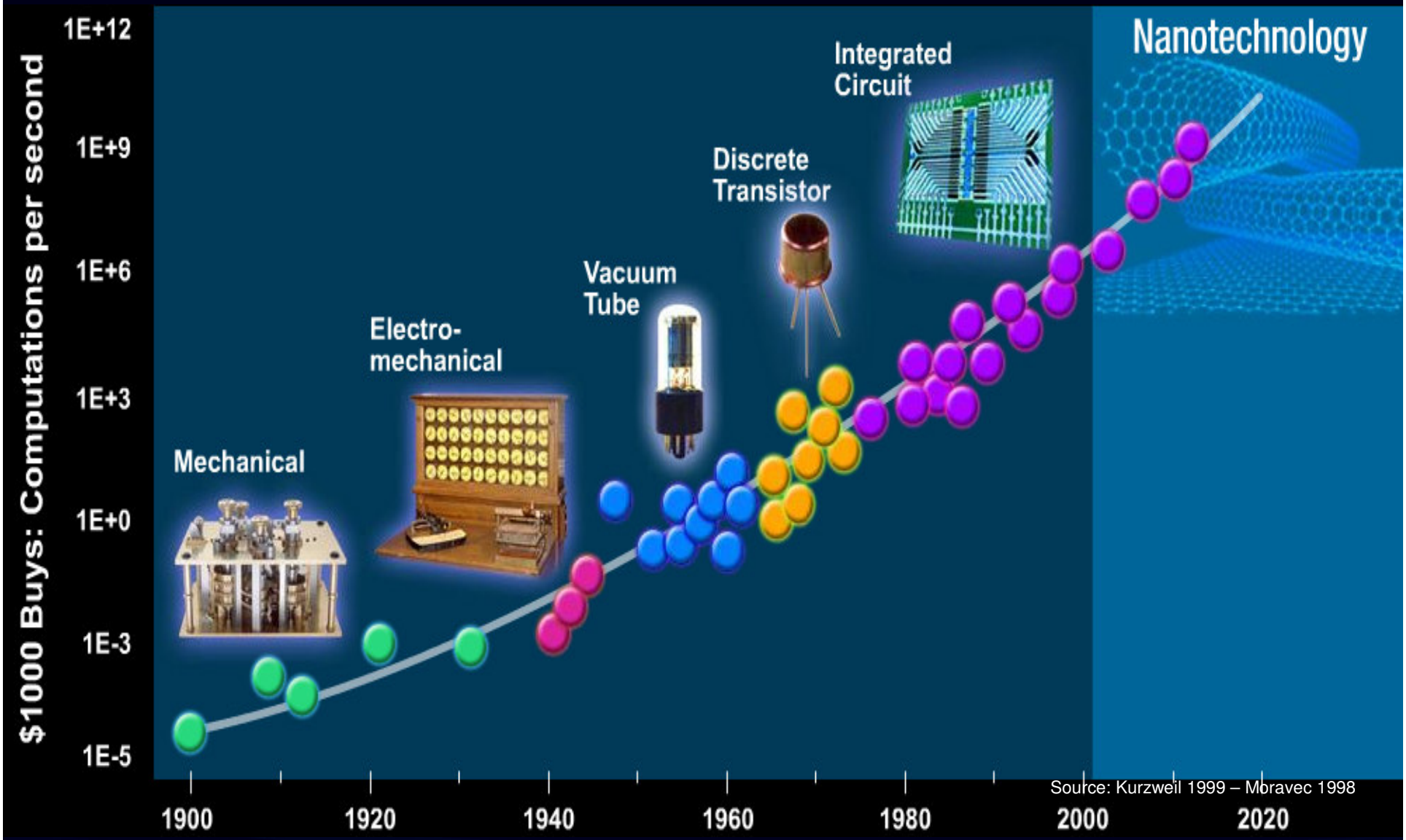
SMART IS
Holistic view of energy consumption that enhances the efficiency of buildings, fleet and physical assets.

SAPREF: that fully redesign its data center using IBM blade technologies instead of HP, IBM Site & Facilities services, and Tivoli for monitoring the whole

Tivoli software

WELCOME
SAPREF

IBM was technology



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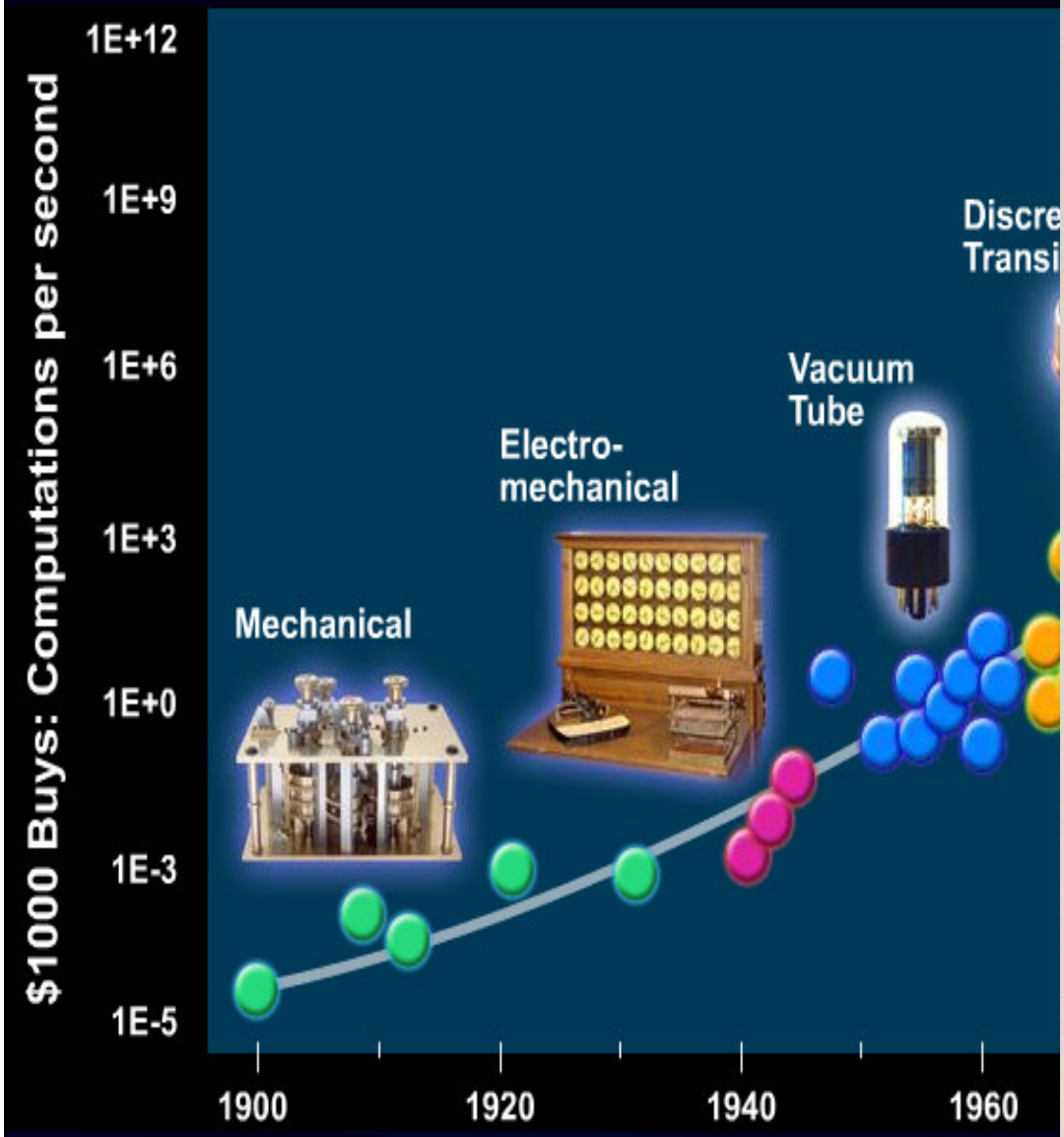
IBM was technology



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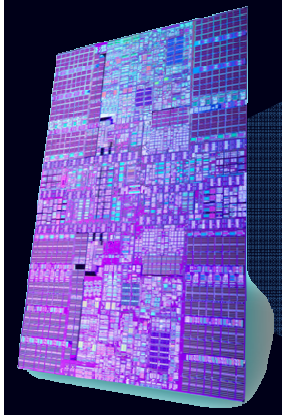
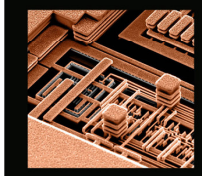
IBM is technology

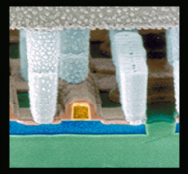


IBM will be technology: R&D leadership + “green” investments

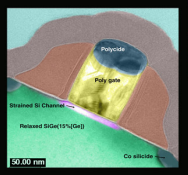
10 Years | 10 Breakthroughs



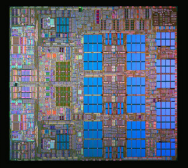
Copper



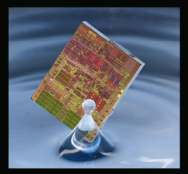
SOI



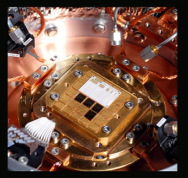
Strained Silicon



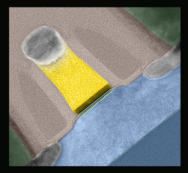
Dual Core



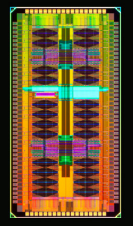
Immersion



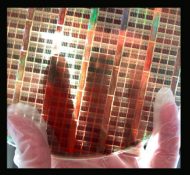
Frozen SiGe Chip



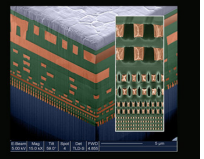
High-k



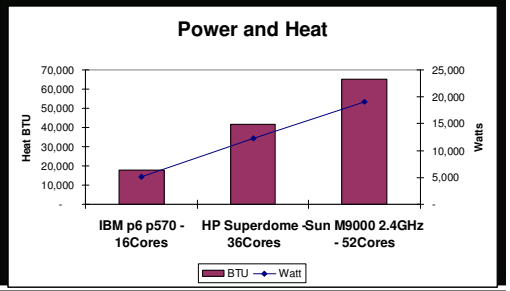
eDRAM

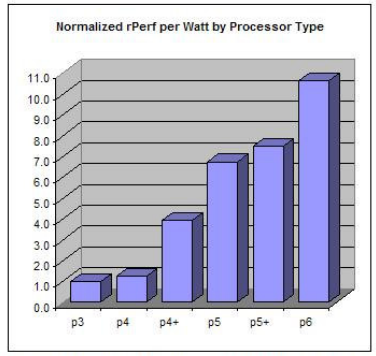


3D Chip Stacking



Airgap





Mod	Chip	GHz	rPerf	Watts	rPerf / Watt	Normalized
640	p3	0.375	3.47	1,536	0.002	1.0
630	p4	1.000	7.12	2,540	0.003	1.2
615	p4+	1.200	4.00	450	0.009	3.9
520	p5	1.500	9.13	600	0.015	6.7
520	p5+	1.650	10.15	600	0.017	7.5
570	p6	4.700	134.35	5,600	0.024	10.6

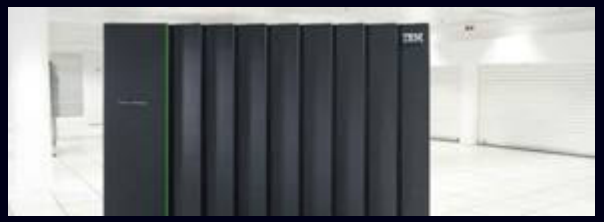
IT Equipment:
Virtualization and consolidation boost utilization.

Server Virtualization

Up to 30-70% TCO savings

- Up to 33-50% floor space and facility costs.
- 33-70% hardware costs.
- Up to 50% maintenance costs.
- Up to 33% support costs.

Storage Virtualization



Up to 25% less capacity needed

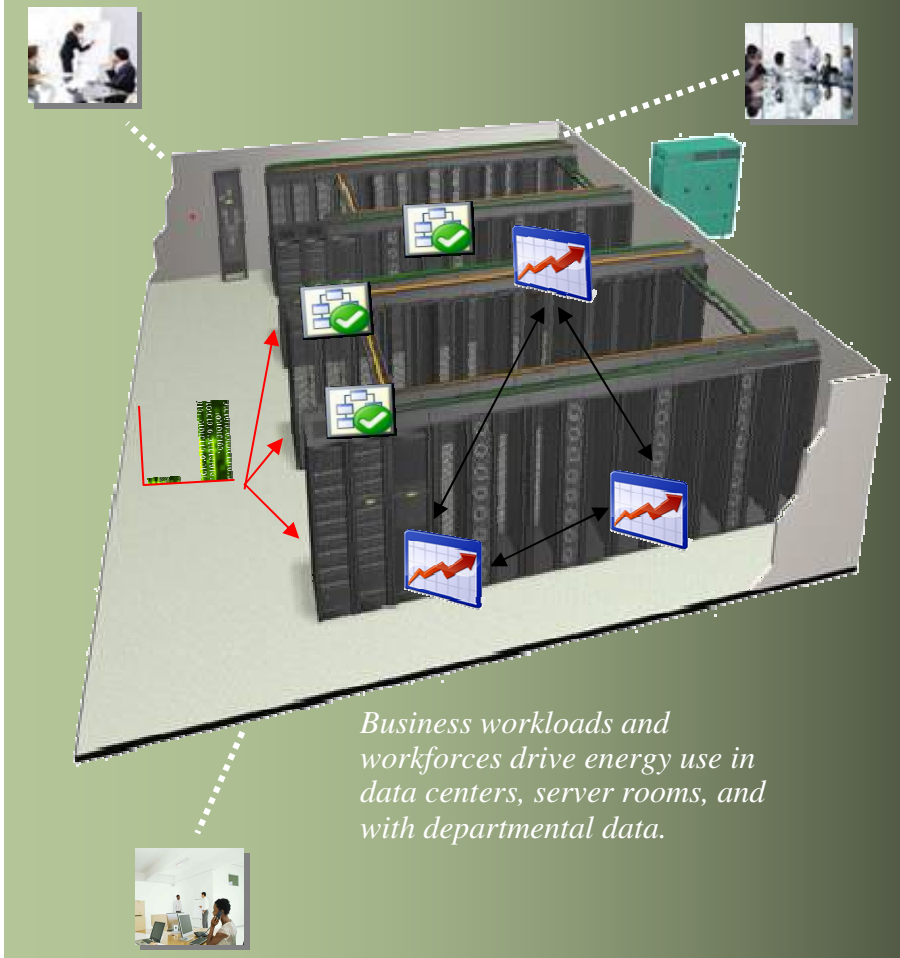
- Up to $50,000 power savings per 1,000TBs of installed storage.
- Up to 60% migration costs savings.
- Up to 300% increase in utilization.

Client Virtualization

Up to 40% overall TCO savings

- Up to 45% power savings.
- Up to 90% deskside support.
- Up to 50% on helpdesk.
- Up to 75% in security and user administration.

Applications and data: Improve operations and environmental impact.



Business workloads and workforces drive energy use in data centers, server rooms, and with departmental data.

Measure and **control** energy usage of applications, manage storage infrastructure for efficiency.

Tivoli. software

Lower energy cost of applications with application level **virtualization** that increases utilization while meeting transaction level service level agreements.

WebSphere. software

Intelligent management of information via **de-duplication, compression** and hierarchical storage to reduce both storage and energy costs.

Information Management

Optimize application design and deployment architecture for reduced resource and energy needs.

Rational. software

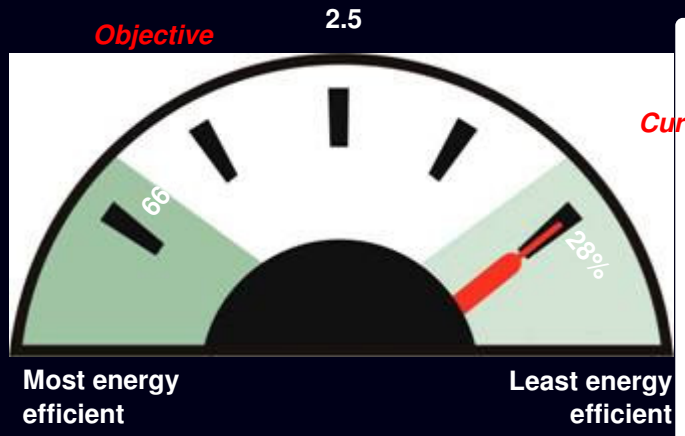
Data Center:
Extend the life of your data center infrastructure with assessments.

Solution

- Comprehensive, fact-based analysis.
- Evaluate cooling, electrical, and building systems.
- Baseline MPG for data center energy efficiency.
- Roadmap of cost justified recommendations.

Benefits

- 40% annual savings on actions.
- < 2 year payback.
- Spend $14K to save $100K per year.



Improvements	Cost ($K)	Payback
Reduce recirculation and bypass of cooling air	< 5	< 1 year
Increase CRAC air discharge temperature	< 5	<1 year
Adjust indoor temperature and relative humidity	< 3	<1 year
Turn off CRACs where no IT equipment load	< 1	immediate
Improve UPS efficiency	40-140	1-2 years
Consider transferring IT loads to two PDUs	Varies	varies
Implement occupancy sensor light controls	< 5	1.5 years
Variable speed fans	200	6 years
Variable speed scroll compressors	300	18 years
Total	60 - 700	1 To 18 years

Real estate and facilities: Asset based management

IBM

Facilities Operations
- Asset & work mgmt
- Supply chain
- Reservations
- Maintenance

Capital Projects
- Condition Assessment
- Construction Estimates
- Budgeting
- Project mgmt

Portfolio Management
- Lease mgmt
- Operating expense mgmt
- Compliance mgmt

Service Management
- Facilities Service desk
- Service Level Agreements
- Contracted Services
- Customer Billing

Space Management
- Space Utilization
- Capacity Planning
- Move, Add, Change

Energy and Environmental
- Utility Tracking
- Carbon output
- Compliance Reporting
- Asbestos tracking

Data center Infrastructure Management Operations
- Utilization Optimization
- Allocation planning
- IT / Infrastructure mgmt

External Interactions
- Utility Grid
- Weather
- City Services
- Environmental Policy

Business Operations ERP
- Finance
- HR
- Billing

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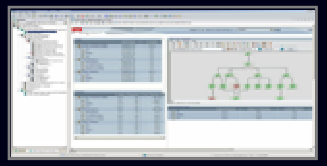
Energy management:
Actionable time-relevant management that can inform optimized energy use.

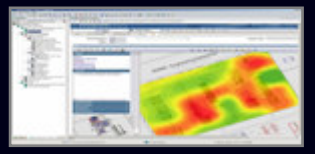
IBM

Identify Underutilized Assets

Storage and Data Optimization

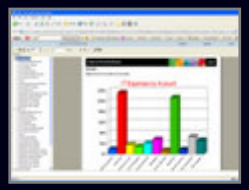
Energy Efficient Business Service Management





Optimize Energy Usage

Financial Accounting for Energy



Energy Aware Provisioning and Scheduling

Tivoli Energy Management

Centralized Views and Reports

Active Energy Management

INFORMATION TECHNOLOGY

DATA CENTER INFRASTRUCTURE

BUILDING INFRASTRUCTURE

ASSETS

2 Sustainable solutions from IBM help account for the environmental and social impacts of doing business.

Governance & Business Strategy

- Develop CSR and sustainability strategies
- Benchmark for sustainability and corporate social responsibility (CSR)
- Develop strategies to reduce energy and CO2 emissions
- Provide reliable and verified collection and reporting of energy and environment data to streamline compliance

Business Process Management

- Apply lean and six sigma principles to reduce energy and water usage, CO2 emissions and waste generation
- Model, simulate, redesign and automate processes for energy efficiency and environmental impact
- Reduce use of paper in business processes
- Monitor & analyze green KPIs across operations
- Adapt processes dynamically to environmental challenges that affect operations

Product & Supplier Management

- Optimize the supply chain for service levels, quality, cost, and CO2 emissions
- Product Lifecycle Management

Distribution & Logistics

- Optimization strategies to balance environmental impact and cost
- RFID tagging and tracking systems
- Networked sensors and meters for environmental data collection

Workforce & Stakeholders

- Travel reduction and work from home strategies
- Distributed employee collaboration via email, instant-messaging, online conferences, and other tools
- Online events and collaboration Jams

2 Sustainable solutions: Applications and benefits

SMART IS
Using IBM technologies to compute climate changes and renewable energies

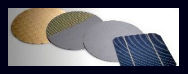
University of Cape Town: use IBM grid technologies to compute climate changes in Africa

Climate Systems Analysis Group
START/PACOM Centre of Excellence
Regional node for climate modeling

SMART IS
Reinventing manufacturing processes to use less water, energy and other chemicals. Recycle chips in Kenya for solar cells

IBM Burlington FAB: Retooled its chip-making process to cut annual water use by 20 million gallons, chemical use by 15,000 gallons and electricity use by more than 1.5 million kWh.

IBM & Virginiatech: recycle IBM 300 mm wafer for solar cells to power hospitals in Kenya



SMART IS
Reducing travel, real-estate and office costs while appealing to top talent and improve on new products development.

A smart organization: Can improve collaboration among employees, reduce travels, improve new pharma products development, cut annual real-estate costs

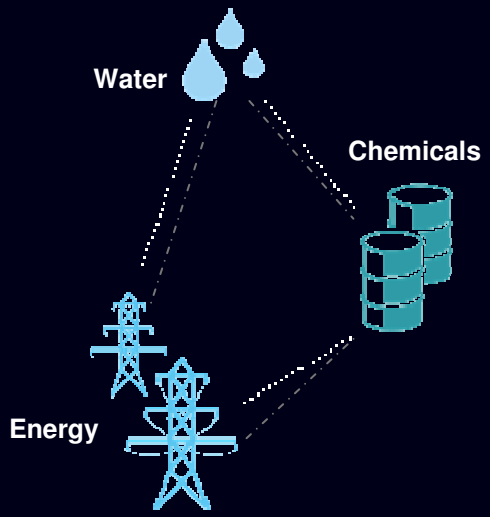
Lotus. software

JANSSEN-CILAG
Your partner in integrated healthcare

3 Intelligent systems gather, synthesize and apply information to change the way entire industries operate.

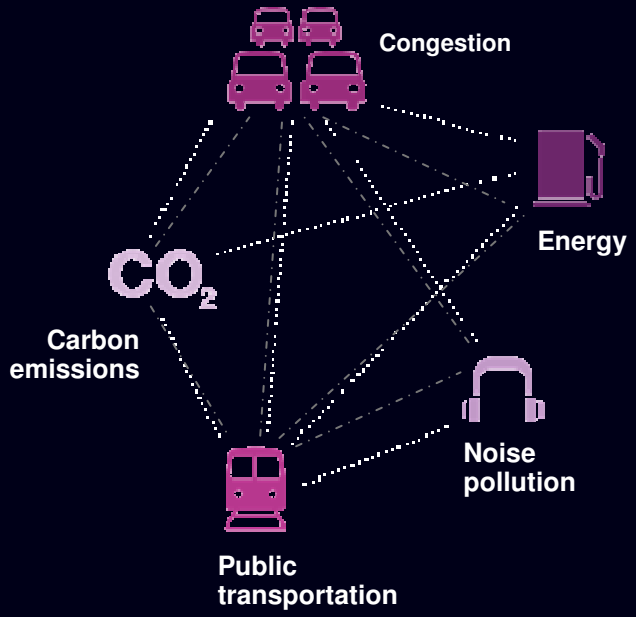
Smart water

Apply monitoring and management technologies to help reduce the use of water, as well as related energy and chemicals.



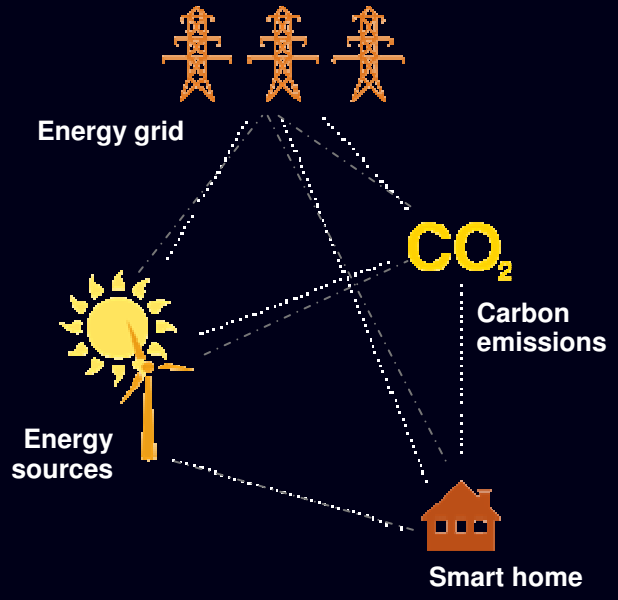
Smart traffic

Use real-time traffic prediction and dynamic tolling to reduce congestion and reduce CO2 emissions
while positively influencing related systems.



Smart energy

Optimize grid performance; automate, monitor and control energy flow, prevent outages, restore outages faster and allow consumers to manage energy usage.



3 Intelligent systems: Applications and benefits

SMART IS
Lowering congestion and carbon emissions by influencing traffic patterns on a city scale.

Stockholm, Sweden: Implemented an intelligent toll system to identify vehicles and charge drivers based on when and where they drive—cutting traffic by 20% and emissions by 12%.

Dubai Road&Transport Authority

SMART IS
Knowing exactly where a power outage occurs and instantly dispatching a crew to fix the problem.

DONG Energy: Installed remote monitoring and control devices to gain an unprecedented level of information about the current state of the grid, lessening outage times by a potential 25-50%.

SMART IS
New hybrid systems that can reduce fuel consumption in urban delivery vehicles by up to 70%

Toyota: and IBM are working toghether on a solution for optimizing collaboration among suppliers for Toyota production. Reducing emission with the cars and reducing emissions in his production