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October 20, 2011



A *Blue*print for a Smarter Data Center

Analytics-based data center services help you respond to change



Change is accelerating ...

IT demand



82M Servers installed by 2013

20% Server workloads have been virtualized

650% Storage growth by 2012

<30% Disk storage is used effectively

Cost pressures



75% Of CIOs anticipate a strongly centralized infrastructure in 5 years

2-3% Increase forecast for IT spending

Need for flexibility



70¢ Of every \$1 is spent on maintaining existing environment

71% Of data centers are > 7 years old

5-60% Of IT workloads may be cloud-enabled

Data Center Services can help customers respond to these challenges



Extend the life of an existing data center infrastructure.

Double IT capacity or reduce operational expenses by 50%.



Rationalize the data center infrastructure across the company.

Improve operational efficiencies while reducing operational expenses by 50%.



Flexible Design to be responsive to change.

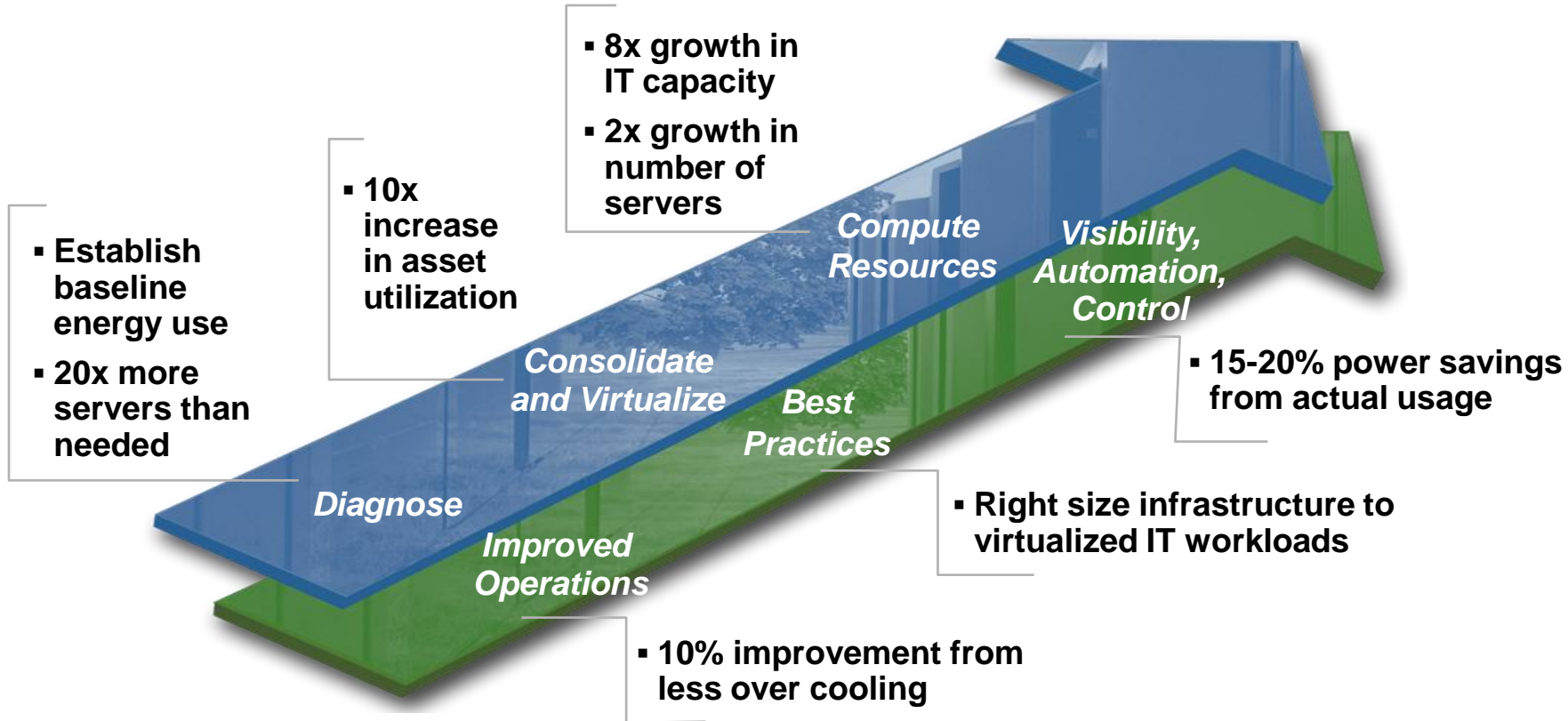
Pay as you grow by deferring 40-50% of capital and operational costs.



Integrated Management of IT and data center operations.

Lower operational costs up to 20%.

IBM Lexington leveraged IT and data center infrastructure analytics to avoid \$50M and gained 8x IT capacity



White paper: [Extend the life of an existing data center](http://www-935.ibm.com/services/us/cio/outsourcing/case_studies.html) (http://www-935.ibm.com/services/us/cio/outsourcing/case_studies.html)

Virtualization Log Jam

Server Virtualization Services

Storage Explosion

Storage Optimization Services

Application Rationalization

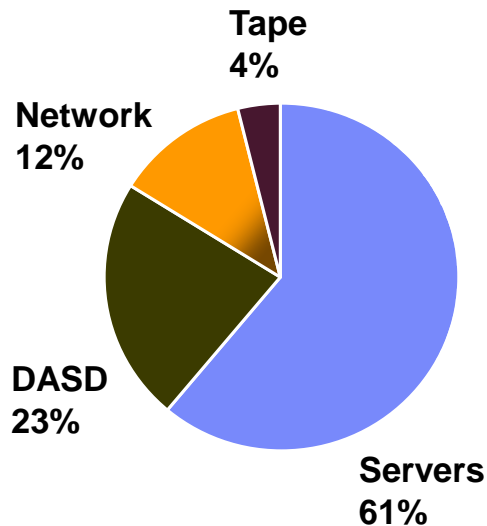
Middleware Strategy and Design Services

IBM has realized our data center Project 'Big Green' objective ...

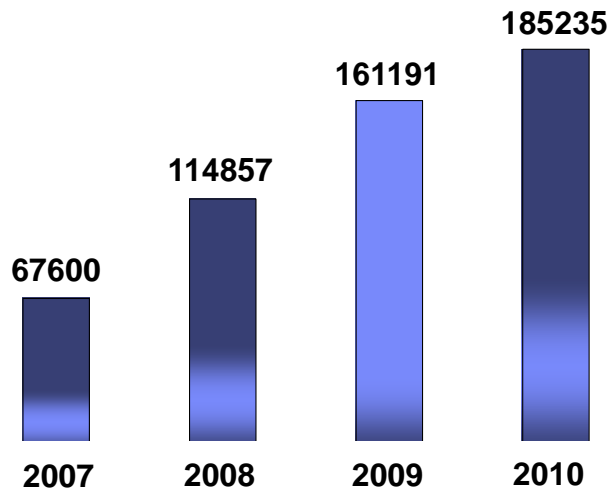
... in May 2007 stated it "expects to double the computing capacity of its data centers within the next three years without increasing power consumption and associated carbon dioxide emissions."



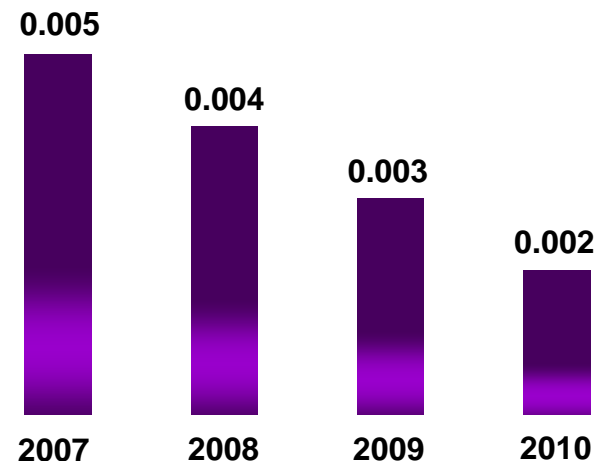
Power distribution by equipment type



Number of servers



Relative power performance estimate
"watts per transaction"



[Press release](#)

Replaced older server equipment with new equipment.
Virtualized applications and consolidating to fewer servers.
Improved the cooling efficiency in data centers.

IBM's data center transformation has delivered \$4.1 B of savings but the transformation journey continues

“The only way to combat politics is with facts”

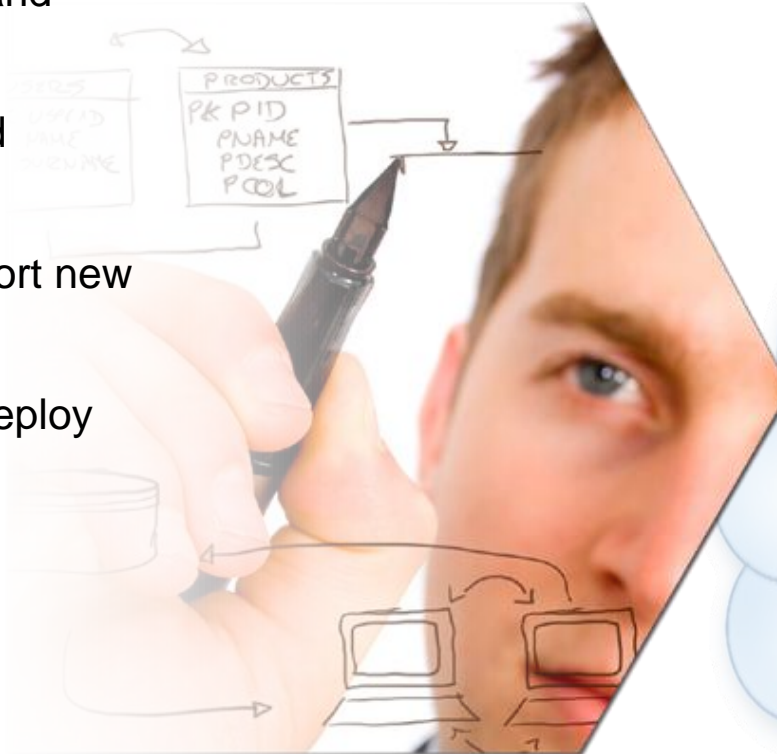
| | |
|---|---|
| Data center infrastructure consolidation | <ul style="list-style-type: none"> Reduce 235 data centers to 12 |
| IT consolidation and virtualization | <ul style="list-style-type: none"> Consolidate and virtualize 4,300 servers onto ~30 IBM System z™ mainframes |
| Application rationalization | <ul style="list-style-type: none"> 93% reduction in software licenses from 26,700 to 1,800 2,300 total applications in 2010 |

| | 1997 | 2007 |
|----------------------------|--------|-------|
| CIOs | 128 | 1 |
| Host data centers | 155 | 7 |
| Web hosting centers | 80 | 5 |
| Network | 31 | 1 |
| Applications | 15,000 | 4,700 |

Data center professionals need to manage requirements over a 15-20 year life – cloud adds a new variable.

Business objectives

- Meet business and IT growth
- Align capital and operating costs
- Flexible to support new technology
- Faster time to deploy
- Reduce risk
- Security



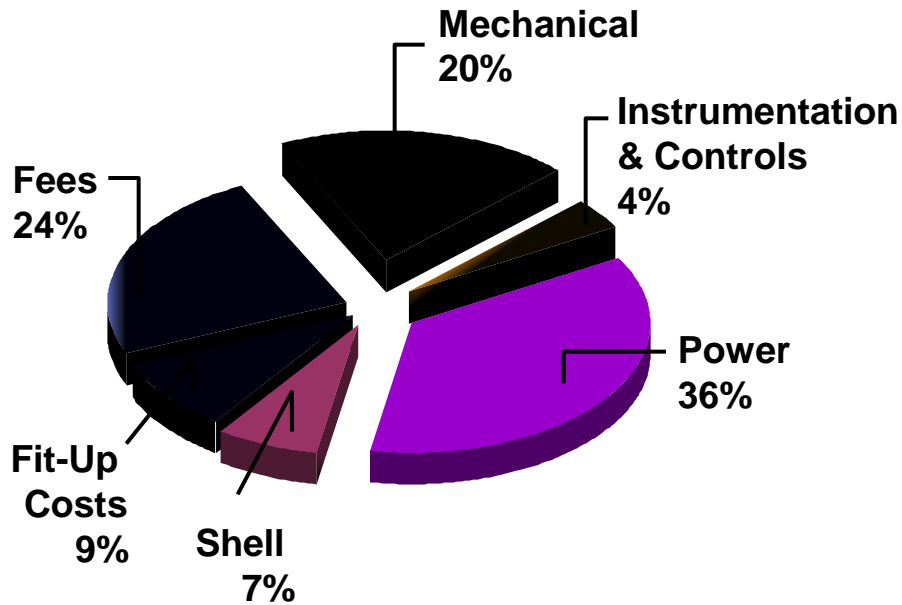
Data center requirements

- High availability
- Provide required capacity
- Optimize capital costs
- Maximize scalability
- Maximize flexibility for technology and computing model adoption
- Minimize capital and operational costs
- Interconnect IT, data centers and buildings for data centre operations management excellence

Modular data centers can defer 40-50% of the lifecycle costs to provide flexibility for the future

Data center capital costs

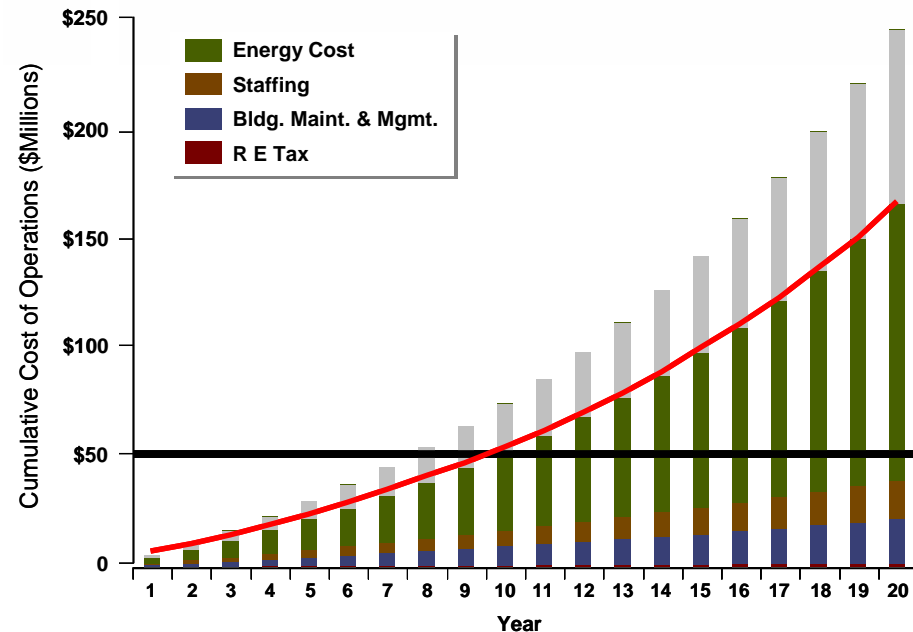
60% costs from mechanical / electrical systems



Source: IBM Estimates

Operating costs

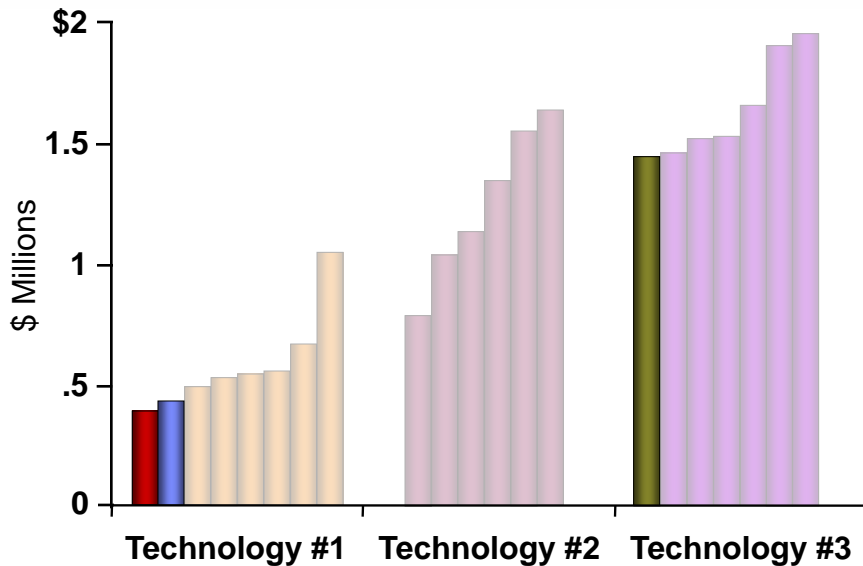
3- 5x capital costs



Improve data center investment governance by providing vendor and technology tradeoffs with data center design cost analytics

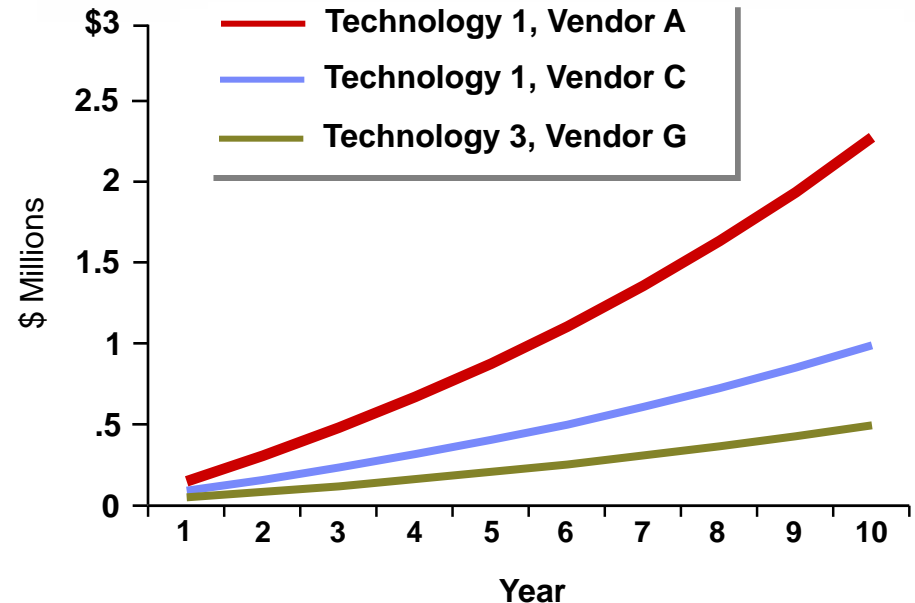
Capital Cost Analysis

Show 5x difference in technology alternatives



Operating Cost Analysis

Show 2.5x difference for vendor alternatives



Reduce data center total costs 15-30% over its useful life

Select options with lowest operational costs

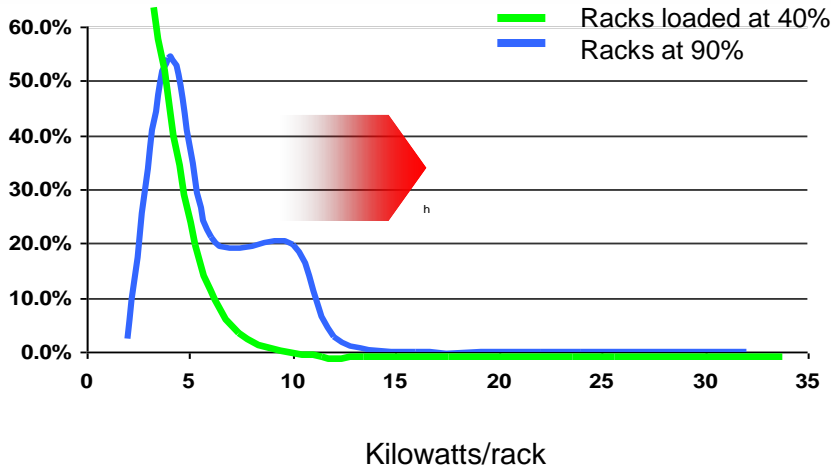
Save enough in operating costs to pay for the data center build

Clarify benefits and costs of emerging technology

Our data center strategy analytics help you develop a statement of requirements to model outcomes to support future IT requirements

Today

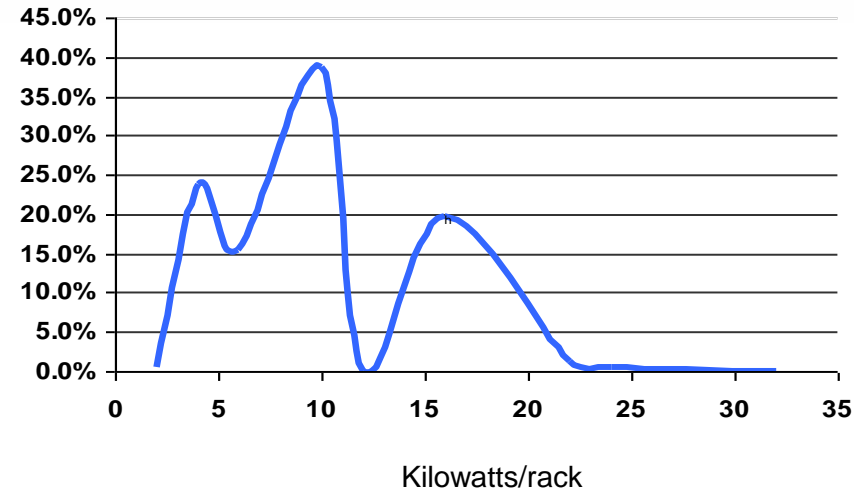
50% of server density is < 5 kw/Rack or less



Based on IBM estimates from client engagements

2020

60% of server density is > 10-20 kw/rack



- Unknown loads. Create a density requirement model which plans for changes over time
- Unknown capacity. Support 3-5x power density over the 10 year timeframe
- Design included efficient dual zone capacity; saving \$1M USD per year for client

IBM has designed over 500 modular data centers in the last 3 years to be responsive to change

Scalable modular data center



15-25% lower TCO than traditional data centers

Enterprise modular data center



Defer 40-50% of capex and opex cost

Portable modular data center



Fully functional data center

High density zone



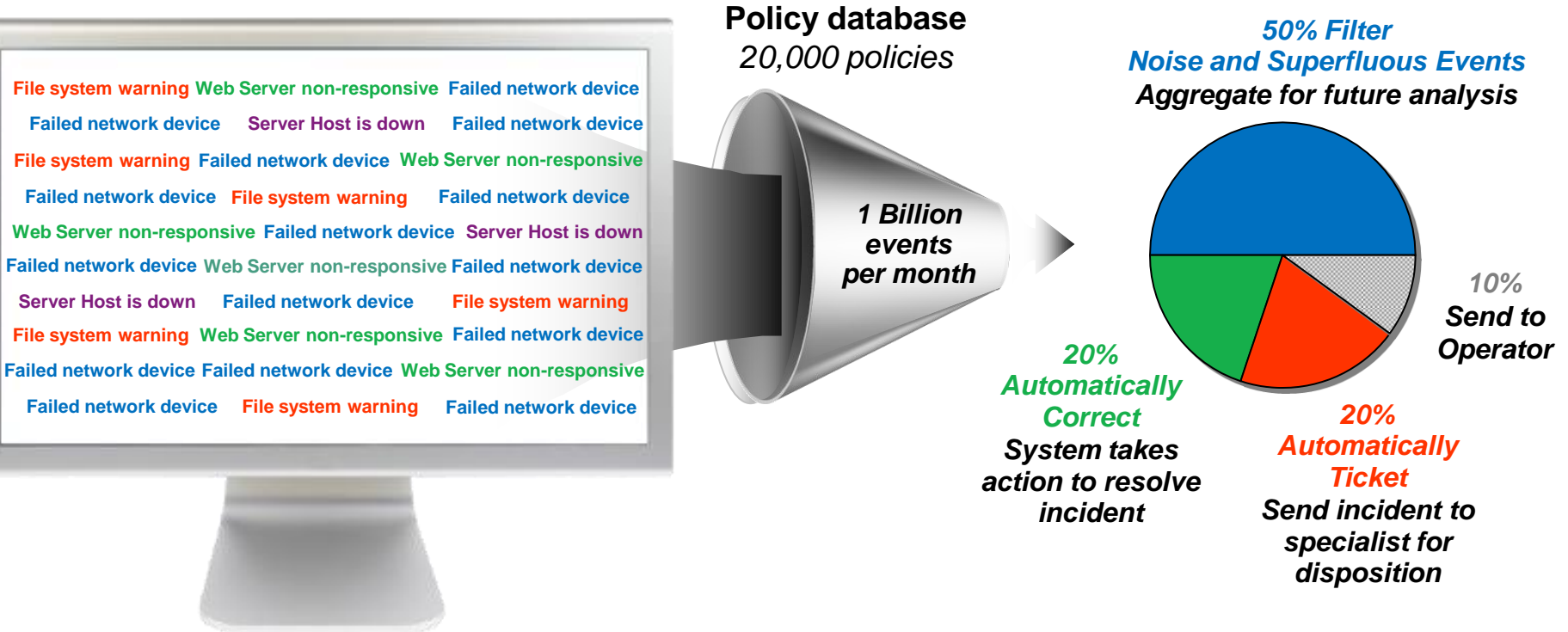
35% lower cost than site retrofit

*Capacity before you need it so it is ready when you need it
Maximize flexibility for future technology and computing models
Provide insight to make capital and operating trade-off decisions
Interconnect IT, data centers, and buildings for operations management excellence*

Watch a video at

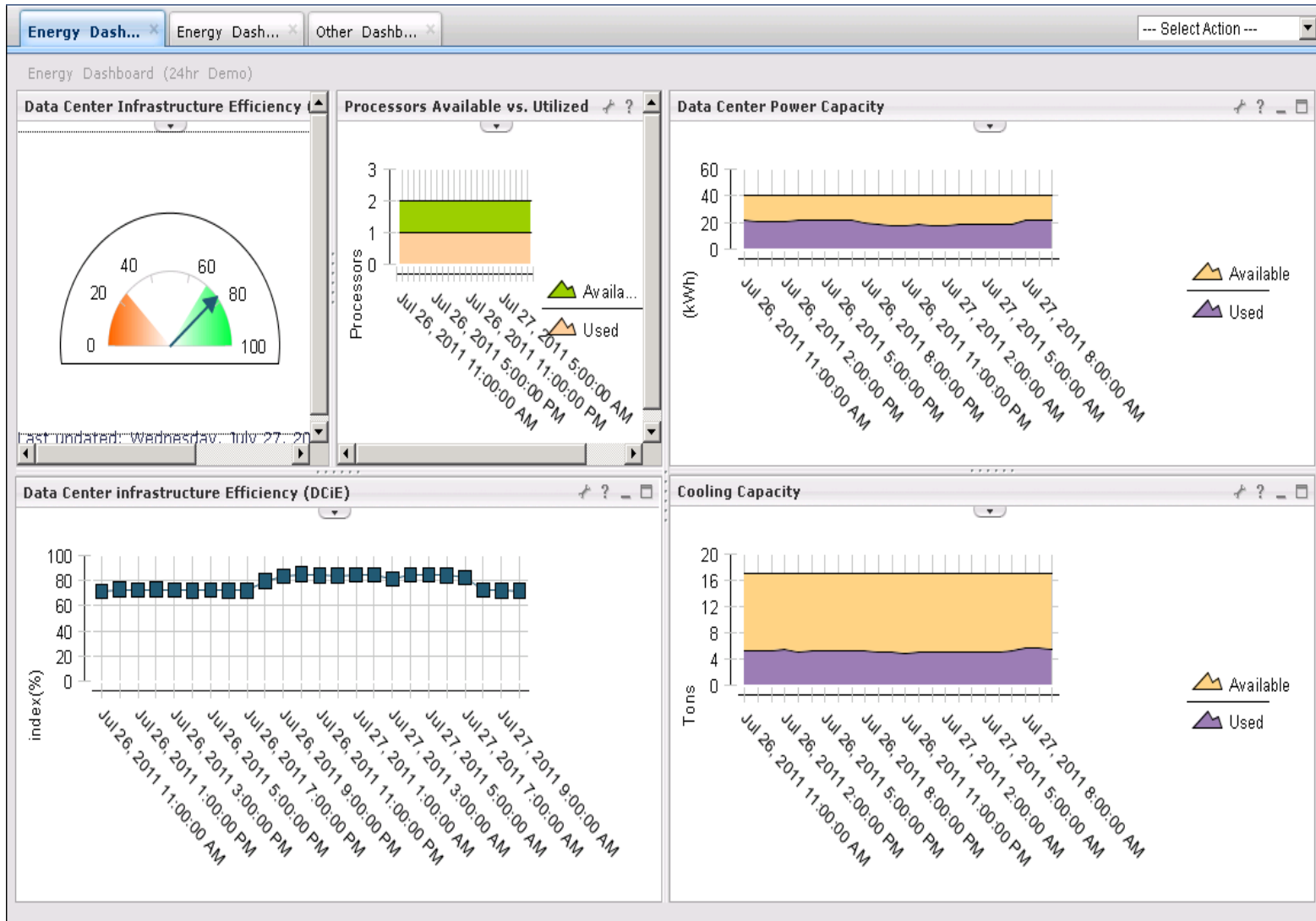
<http://www-03.ibm.com/systems/data/flash/dynamicinfrastructure/datacenterdesignsolutions/>

Clients experience dramatic improvements in availability and problem resolution driven by predictive analytics



Faster response to critical business issues impacting service
*Prevented a large financial services company from risking personal investments of their clients
Poor performing server was not allowing transactions to complete
Automation identified and corrected the problem – without manual intervention*

Integrating IT and Facilities monitoring and management delivers value throughout the lifecycle of the data center



IBM investments continue to transform the data center

| IBM Data Center and IT Rationalization | Project Big Green | IBM Family of Modular Data Centers | Cloud-enabled on demand IT | Data Center management & automation | Analytics-based services for IT |
|--|--|---|--|--|---|
| | | | | | |
| <ul style="list-style-type: none"> For every dollar invested, saw a \$4 cumulative benefit Consolidate and virtualize 4,300+ servers onto ~30 IBM System z™ mainframes | <ul style="list-style-type: none"> Double compute capacity in data centers we own or manage without increasing power consumption Applied same lessons to thousand of customers | <ul style="list-style-type: none"> RTP was engineered for cloud computing Instrumented, integrated and intelligent data center management <p><i>IBM's new center is "as close to state-of-the-art as I have seen."</i></p> <p>Data Centers Go Green</p> | <ul style="list-style-type: none"> 7 IBM cloud data centers and 11 cloud labs 1,200 users in China Dev Lab workplace cloud | <ul style="list-style-type: none"> Our enterprise command centers receive 1 billion alerts / month 90% handled automatically with analytics in our tools | <ul style="list-style-type: none"> Announced 20 services and 28 analytic-based tools More than 30 patents from IBM Research |

Leverage IBM's experience to help



Smarter Data Center Services: www.ibm.com/services/smarterdatacenter

Global Technology Services: www.ibm.com/services/it-insight