The Argument for Holistic IT Efficiency
(Or, STOP talking about PUE!)

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Mounting industry pressure

- Substantial number of clients have expressed concerns about where industry is headed in regards to data center energy and overall data center efficiency
- PUE has become the industry default metric and Executives are left with one place to go—PUE
- Many Facilities teams appear to have tactically improved infrastructure efficiency short of huge capital improvements
- But Executives are pressuring for more
- So, what’s next?
Does your company measure PUE?

Yes 72%
No 28%

By job function:
- Facilities 78%
- IT 55%
- Execs 82%

By vertical:
- Colo 95%
- Finance 73%
- Enterprise 60%
What is the target PUE for your primary site?

- 1.5 - 2.0: 37%
- 1.0 - 1.2: 12%
- 1.2 - 1.5: 47%
- 2.0 - 2.5: 2%
- Less than 1.0: 2%
What are we actually getting for this effort?

Average self-reported PUEs from Uptime Institute Surveys 2011 - 2014

- 2011: 1.89
- 2012: 1.80
- 2013: 1.67
- 2014: 1.70
Traditional data center metrics

- Facility or IT centric
- Power, space, cooling
- PUE
- Utility and other costs
- Other facility-centric metrics
What is missing from traditional data center metrics?

• IT utilization or effectiveness
• A compliment to PUE
• Information from ‘outside’ the data center
• Business context
PUE is the most visible, but least effective means of improving holistic IT efficiency.
Uptime Institute has long advised:

- PUE is good for its intended use, but only that use
- An IT metric complimentary to PUE is needed
- Good metrics are understood BY EXECUTIVES
- Relate the data center piece to the whole enterprise
- Link to the rising stars of the business
Executive metrics commonly used

Common enterprise-level metrics

- Per passenger seat mile
- Per location
- Per team member or customer
- Per transaction or activity
- Financial focus is always required
- What does your enterprise use?
Good metrics characteristics

• Consistent use and relationships
• Linked to the enterprise
• Translation or computation not required
• Demonstrates trends over time
• A group of metrics is needed
Usefulness vs. Precision

- Many of us hesitate to use something that is not precise
- Better to measure with a crooked stick than not to measure at all

“It is better to be vaguely right than exactly wrong.”

- Carveth Read

*Logic: Deductive and Inductive* (1898)
Persistent causes of poor IT efficiency

• Poor demand and capacity planning within and across functions (business, IT, facilities)

• Significant failings in asset management (6% average server utilization, 56% facility utilization)

• Boards, CEOs, and CFOs are not holding CIOs accountable for critical data center facilities CapEx and data center operational efficiency

- Uptime Institute circa 2007
Who pays the data center power bill?

- Facilities: 80%
- IT: 16%
- Don’t know: 4%
A multidisciplinary holistic IT efficiency approach: DESIGN

Effective investment in efficiency during site planning and design phase of the data center

- Site level considerations: Utility sourcing, ambient conditions, building materials, effective land use
- Design and topology matching business demands with maximum efficiency
- Effective monitoring and controls systems
- Phased buildouts to scale to deployment cycles
A multidisciplinary holistic IT efficiency approach: OPERATIONS

*Optimization of resource efficiency through ongoing management and operations*

- Computer room management: Rigorous airflow management, no Bypass Airflow
- Testing, documenting, and improving IT hardware utilization
- IT asset management: Consolidating, decommissioning, and recycling obsolete hardware
- Managing software and hardware life cycle from procurement to disposal
A multidisciplinary holistic IT efficiency approach: EXECUTIVE

Executive commitment to sustainable results

• Develop a formal reporting relationship between IT and data center facilities management, with a chargeback model that takes into account procurement and operations/maintenance costs

• Maintain KPIs and mandated reporting for power, IT, water, and carbon utilization

• Foster a culture of continuous improvement with incentives and recognition for staff efforts

• Provide cost modeling on IT efficiency improvements to senior management
Addressing the biggest challenge

Improving IT Efficiency
Financial: IT MW

![Graph showing IT Power ratio over three years. The ratio increases from Year 1 to Year 3.]
Transportation: IT MW

Years

Ratio

IT Power
Transportation: Business Context
Transportation: Business Ratios

Index

Years

- IT Power
- kW/Svc
- W/Team
- Svc/Team

Year 1  Year 2  Year 3
Financial: IT MW

Index

Years

Year 1
Year 2
Year 3

IT Power
Financial: Business Context

![Graph showing index trends over years for IT Power, Locations, and Team. The graph indicates an upward trend for IT Power and a slight decrease for Locations and Team over the three years.](image)
Financial: Business Ratios

Index

Years

IT Power
kW/Loc
kW/Team
What percentage of your servers are likely comatose?

- Under 5%: 61%
- 5 - 9%: 24%
- 10 - 25%: 12%
- Over 25%: 12%

Who thinks they’re under 5%

- Small Companies: 73%
- Big Companies: 50%
- IT Execs: 67%
How do they possibly know?

45% of Enterprise data centers have no scheduled auditing for comatose servers
If you have no scheduled auditing, what is the main barrier?

- Lack of management support 48%
- Resources too limited 33%
- ROI does not justify effort 10%

Top barriers:
- Lack of support 62%
- Limited resources 50%
- Facilities Management
- Senior Execs
Lack of management support +
Too limited resources =

Barclays Saved $10 Million in 2 Years of Disciplined Server Decommissioning
Barclays: Discipline in Decommissioning

Barclays removed nearly 10,000 servers in 2013.

- These servers directly consumed an estimated 2.5 megawatts of power
- Left on the wire, the power bill would be approximately US$4.5M higher than it is today
- Installed together, these servers would fill up 588 server racks
- Barclays also saved approximately US $1.3M on legacy hardware maintenance costs, reduced the firm’s carbon footprint, and freed up more than 20,000 network ports and 3,000 SAN ports due to this initiative
Making the financial case for dedicated server de-commissioning

- **Hard costs**: Hardware maintenance, software maintenance, software licensing
  Real money—not subjective

- **Soft costs**: Power savings—can be difficult to quantify in an active site, DC power likely not included in IT budget

- **Cost avoidance**: Data center space, infrastructure, ports, etc.—numbers are huge, but very subjective

- **Intangibles**: Simplicity, future-proofing, stability/reduced risk
Other systemic IT inefficiencies include

• Neglected application portfolios with outdated, duplicate, or abandoned software programs

• Separate low-risk, and test and development: Non-critical applications consuming high-resiliency, resource intensive capacity

• Server hugging—not deploying workloads to solutions with highly efficient, shared infrastructure

• Fragile legacy software applications requiring old, inefficient, outdated hardware, and often duplicate IT hardware installations are required to maintain availability requirements
Executive commitment to sustainable results
Combining IT and Facilities teams for global efficiency

A global financial firm (22 data centers, 7 time zones, 24xForever requirements) globally merged the facilities management of its data centers into its IT department in 2008.

The company achieved these outcomes

- **Stability**: Integrated team provides single entity accountability and continuous improvement
- **Energy Efficiency**: Holistic approach to energy from chips to chillers
- **Capacity**: Designs and planning much more closely aligned with IT requirements
Executive leadership holistic IT efficiency approach must-haves

- Formal documentation of responsibility, reporting, strategy, and implementation of the program
- Cost modeling and reporting on OpEx, cost per kW, cost per CO2, cost per VM, plus chargeback implementation
- KPIs and targets: Power, water, carbon emissions/offsets, hardware utilization, and cost reduction
- DCIM implementation: Dashboard which displays all KPIs and drivers that leadership deems important to managing to their business objectives
- Incentives and recognition for staff
Consistent findings in Uptime Institute’s field experience, survey data, and case studies

- Tracking and/or managing IT efficiency—it’s a bigger problem than you realize and at the forefront of executives’ priorities
- A multi-disciplined, mission critical governance-level approach is only way to drive efficiency, stability and lower cost
- The most efficient data center is the one you never build — Asset utilization improvements can save US$ tens of millions
- By focusing on PUE as a management methodology, executives are missing the much bigger efficiency opportunity and misleading corporate efforts
Conclusions

• Be aware of “Liars, Darn Liars, and Statisticians”
• Expand the world of your metrics
• Include some business context
• Use what your executives use
Conclusions

• Experiment a bit
• Try some new metrics and see if they ‘stick’
• Look for VALUE over precision
• Use things BEYOND PUE
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