Dr. Rajat Ghosh

Founder and CEO
AdeptDC

Dr. Rajat Ghosh is the Chief Executive Officer of AdeptDC, a data center cooling controls and downtime risk management solution provider, founded in 2014. Prior to that in fall 2013, Dr. Ghosh completed his PhD in mechanical engineering from the Georgia Institute of Technology, Atlanta in the area of dynamic heat transfer modeling for data centers. He earned his B.Tech in mechanical engineering from IIT Kharagpur, India in 2008. He is a corresponding member of ASHRAE TC 9.9.

BACK TO SPEAKERS

Sessions

Oct 28 2015

10:00 AM **Using artificial intelligence to better manage IT downtime risk**
Dr. Rajat Ghosh, Founder and CEO, AdeptDC

Using Artificial Intelligence to Better Manage IT Downtime Risk

Rajat Ghosh, Founder/ CEO of AdeptDC

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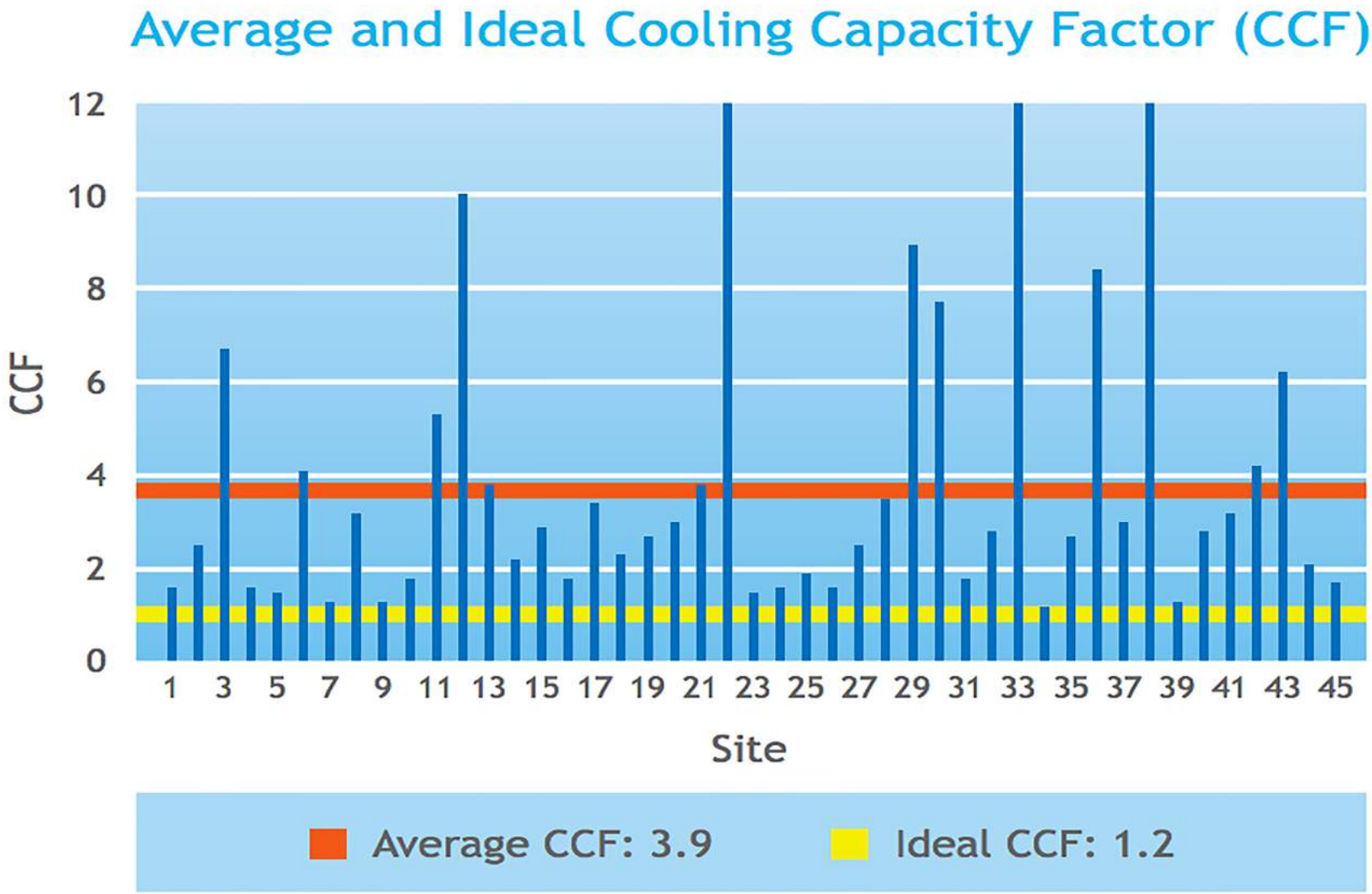
Thermal management issues cause more than 50% of data center downtime

MORE IS BETTER

To some it's simply a phrase, to others it's a way of life

CCF=Cooling Capacity/ Cooling Demand X 1.1



Mission CRITICAL
Data center and emergency backup solutions

Server not found

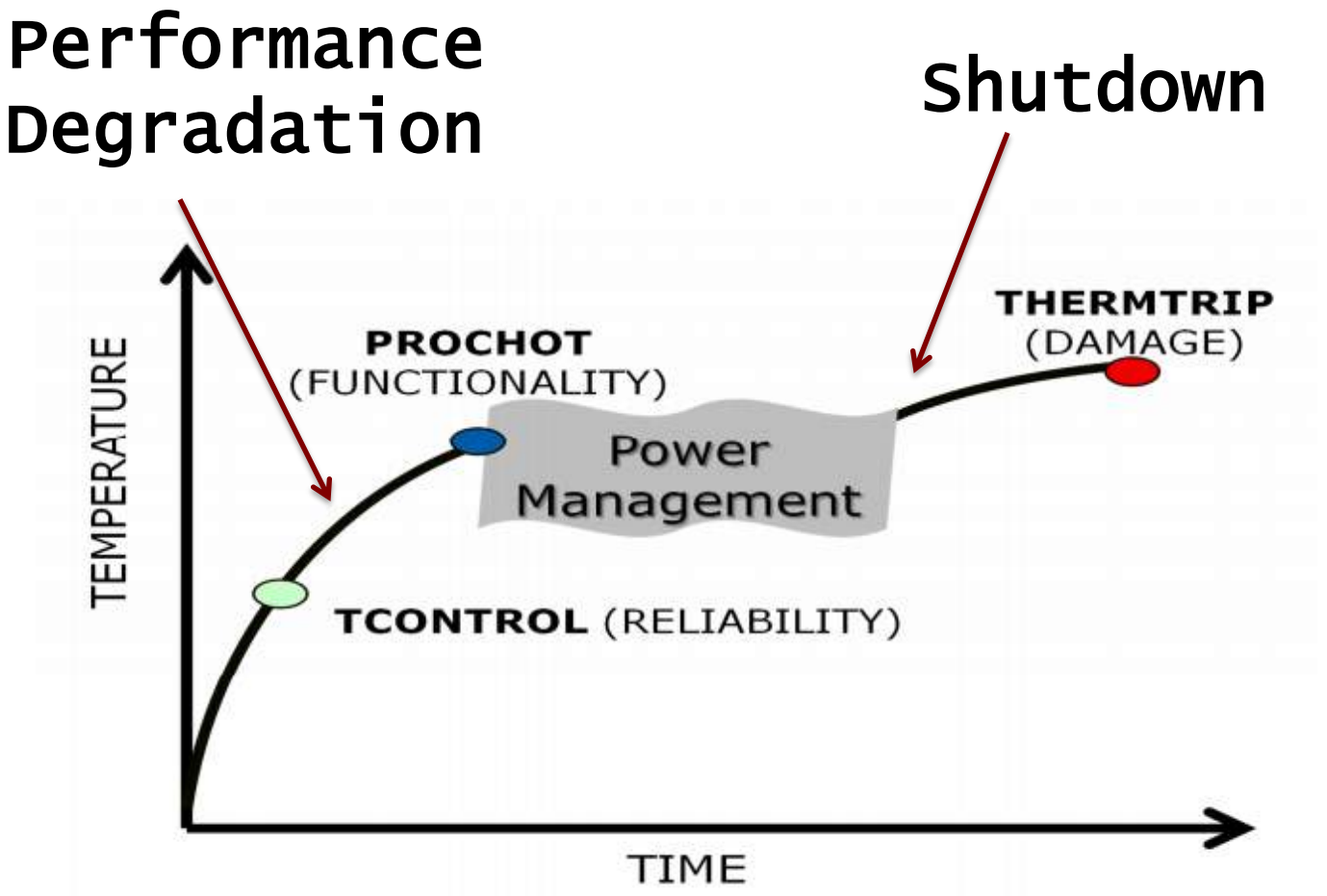
Firefox can't find the server at order.waytekwire.com.

- Check the address for typing errors such as **ww**.example.com instead of **www**.example.com
- If you are unable to load any pages, check your computer's network connection.
- If your computer or network is protected by a firewall or proxy, make sure that Firefox is permitted to access the Web.

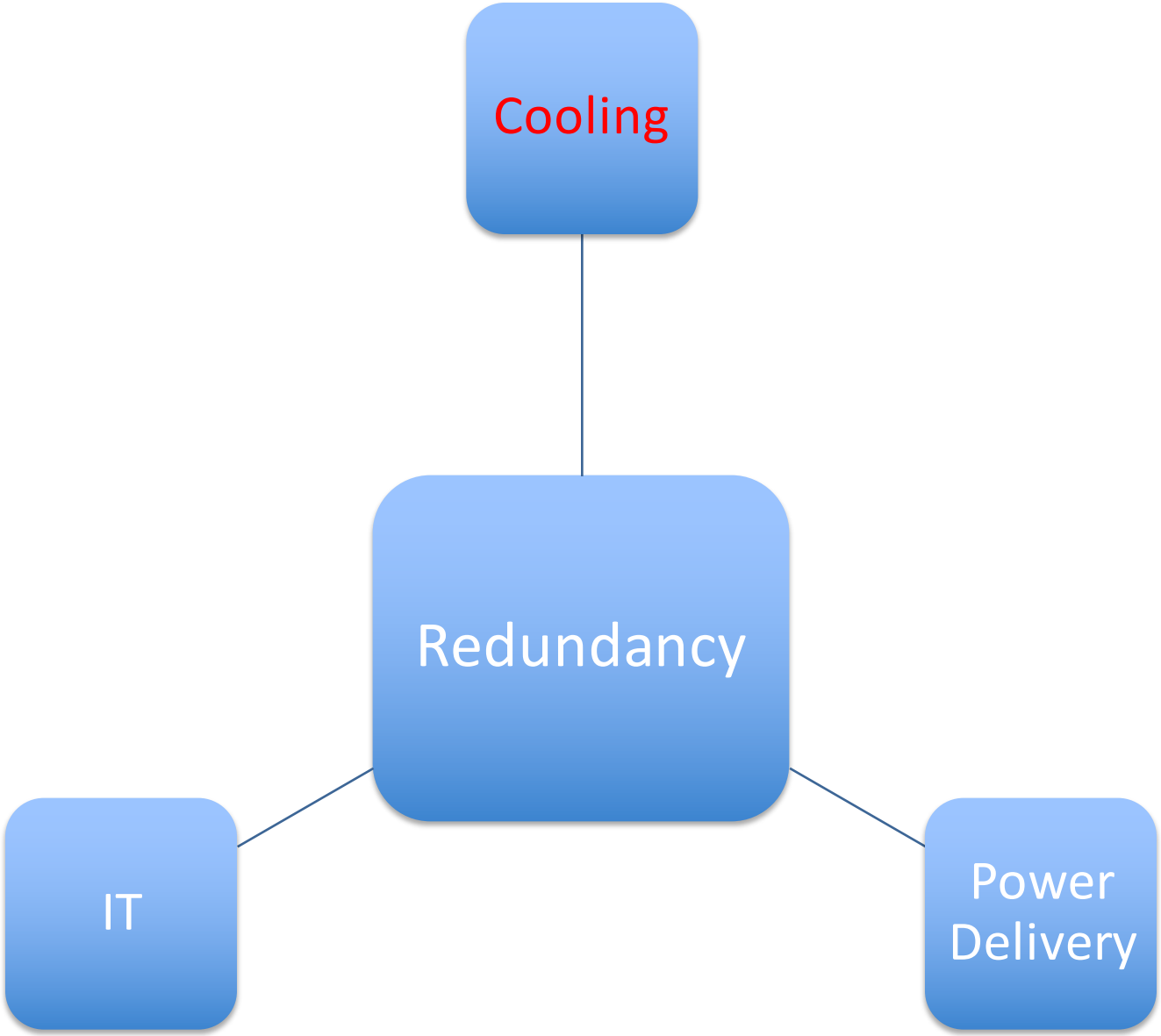
Try Again

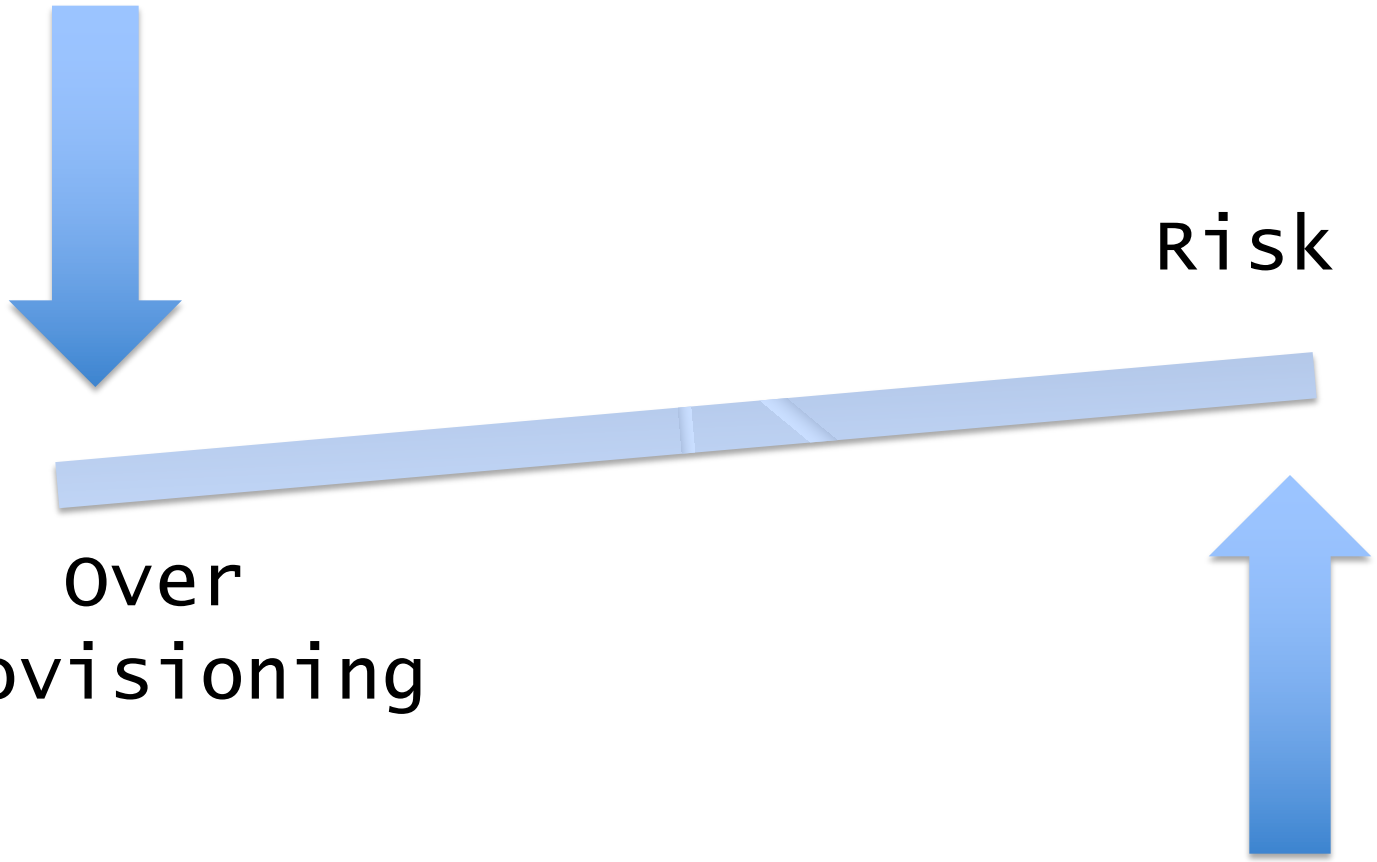
$10,000/ min

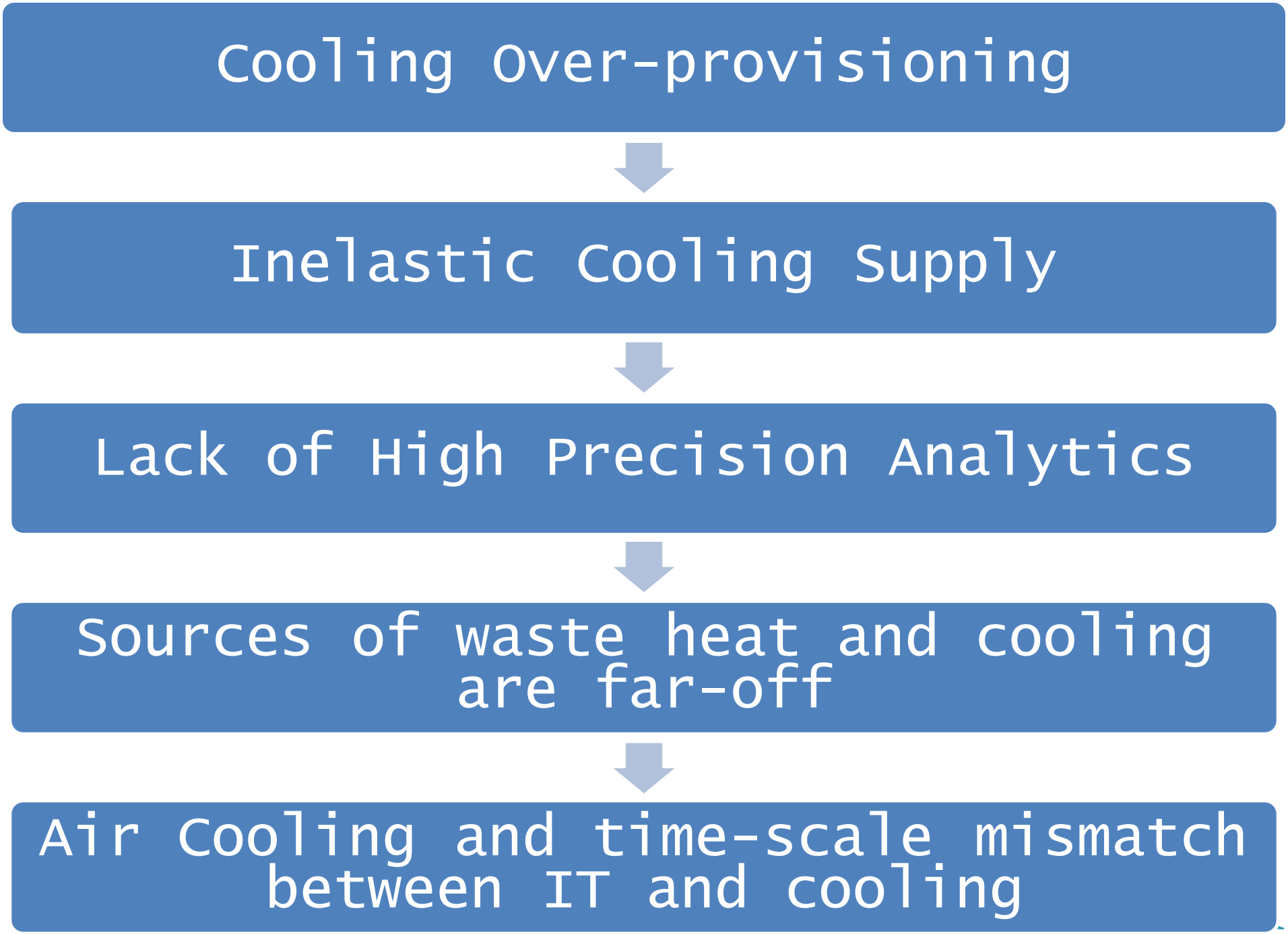
"One downtime,
and I am out of my job!!"

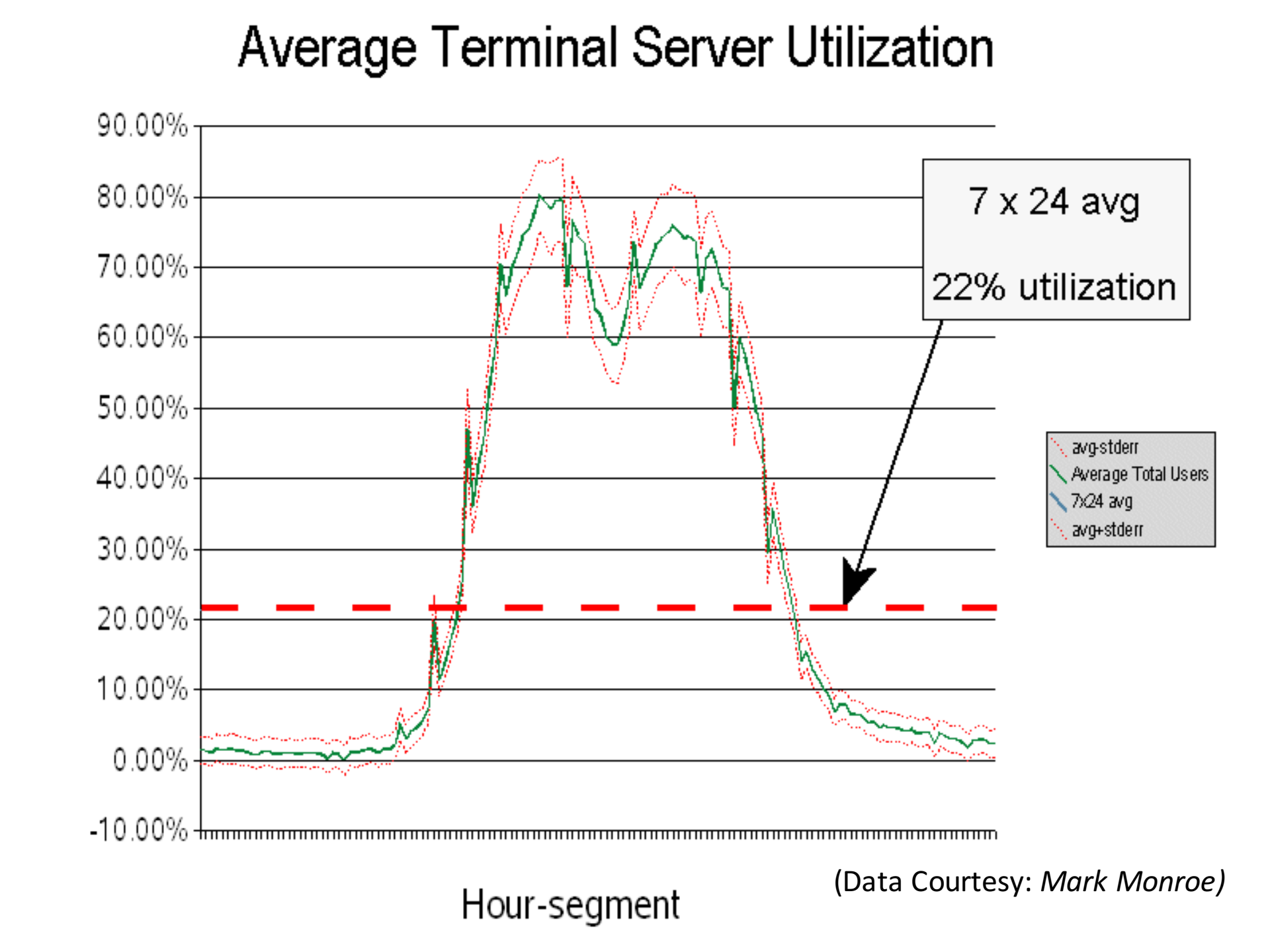


(Courtesy: ASHRAE TC 9.9 2012 Whitepaper)


Cooling
Redundancy
IT
Power Delivery

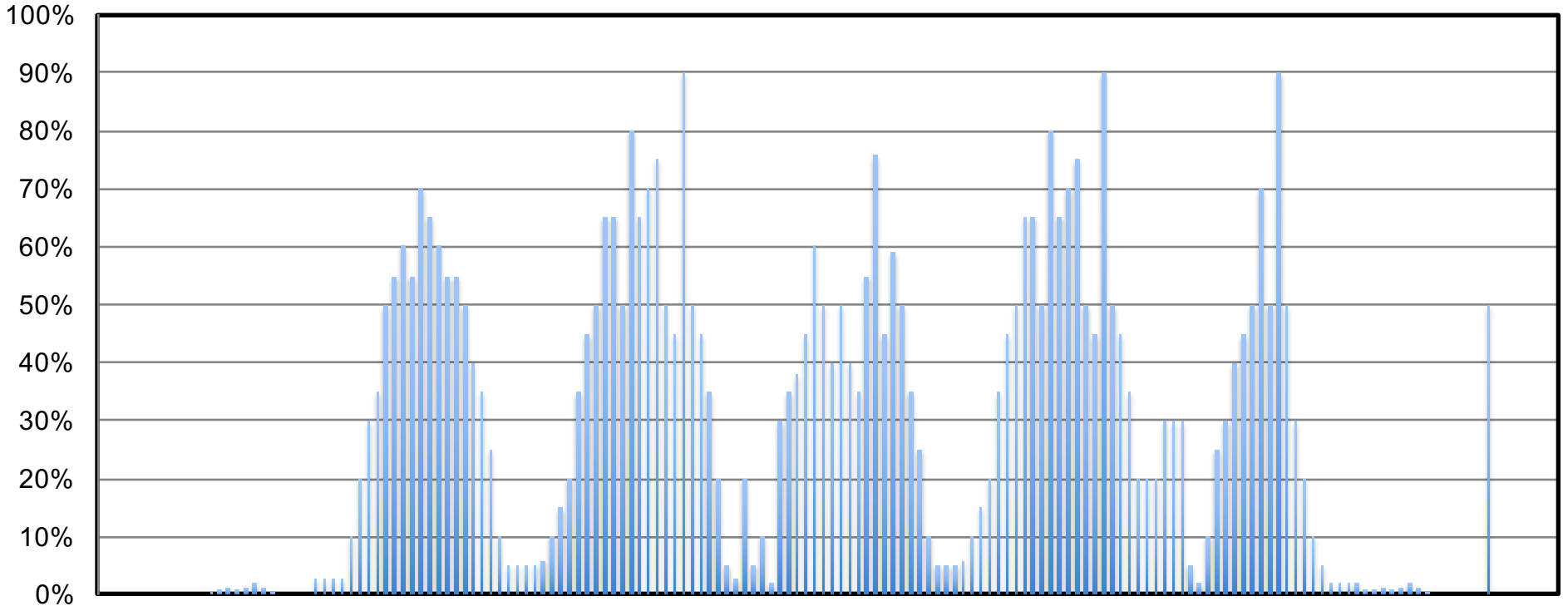

Risk
Over
provisioning


Cooling Over-provisioning
Inelastic Cooling Supply
Lack of High Precision Analytics
Sources of waste heat and cooling are far-off
Air Cooling and time-scale mismatch between IT and cooling



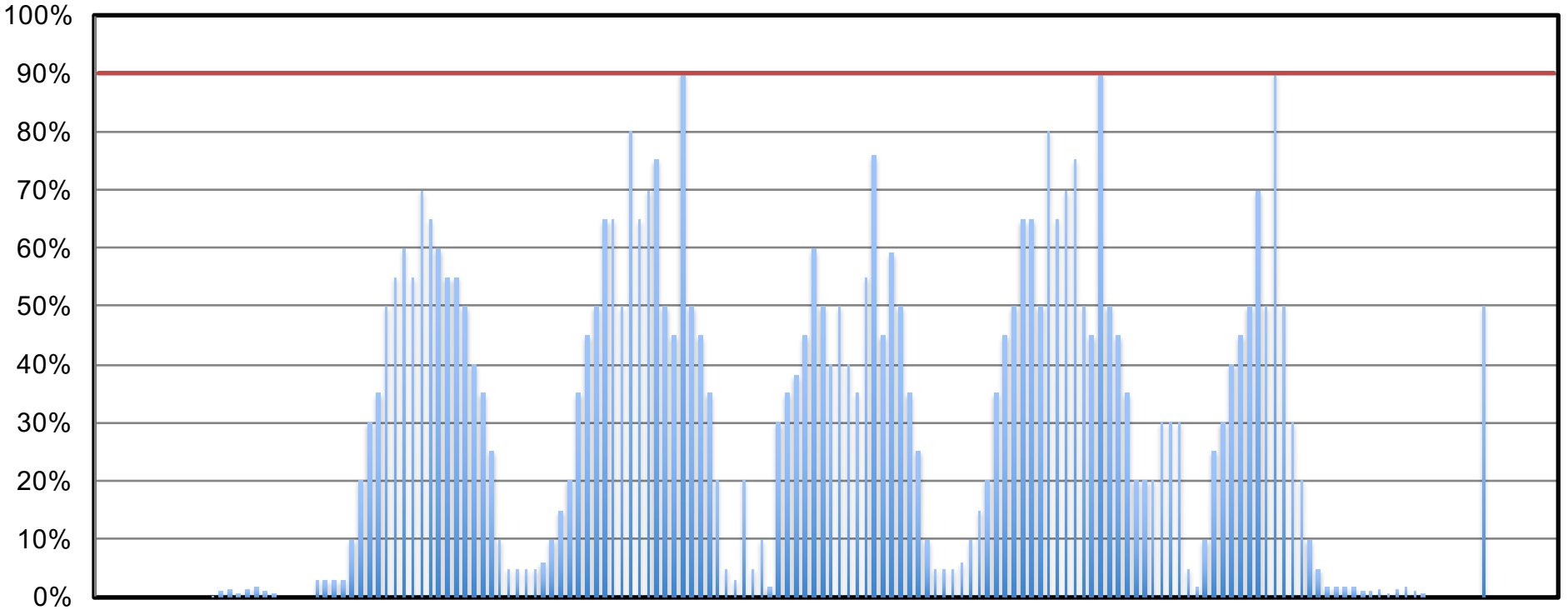
(Data Courtesy: *Mark Monroe)*

Hourly Cooling Demand Profile Over a Week



Mean	Variable
Diurnal Pattern, Lower in Weekends	Signification Deviations, Unexpected Surges in Demand (Flash Crowd)

Peak Provisioning

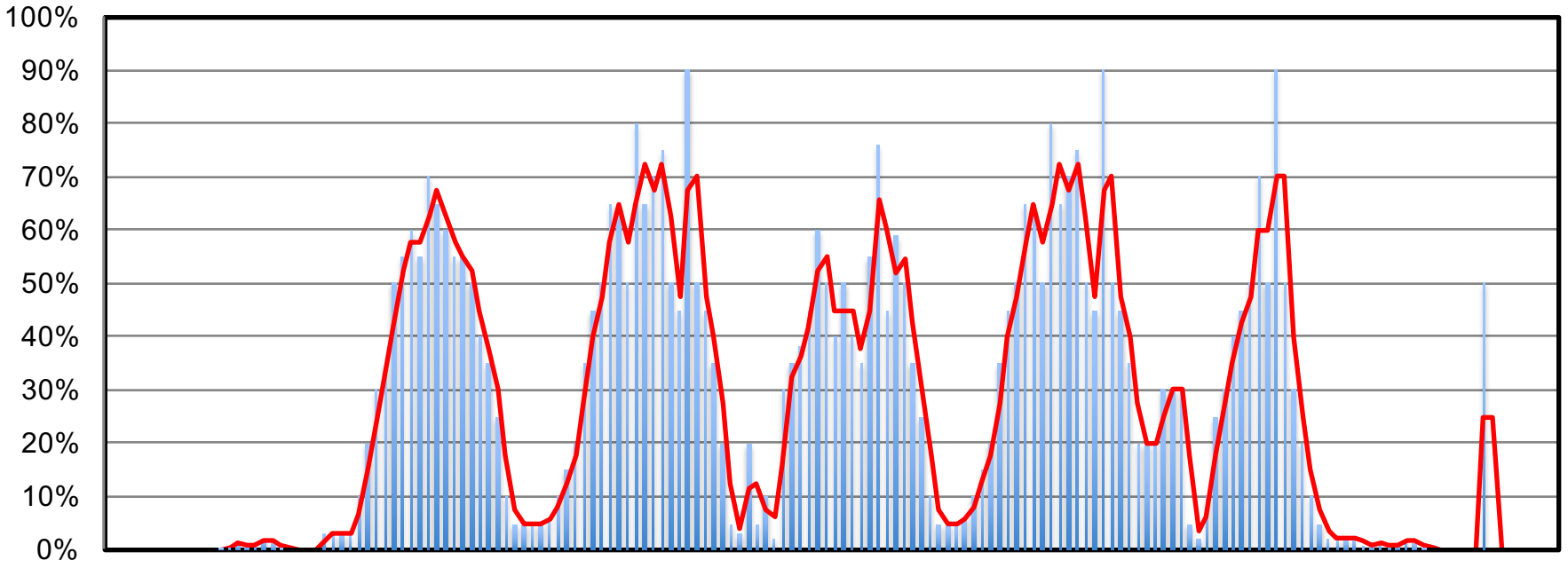


- Waste in operating electricity
- Higher HVAC failure risk

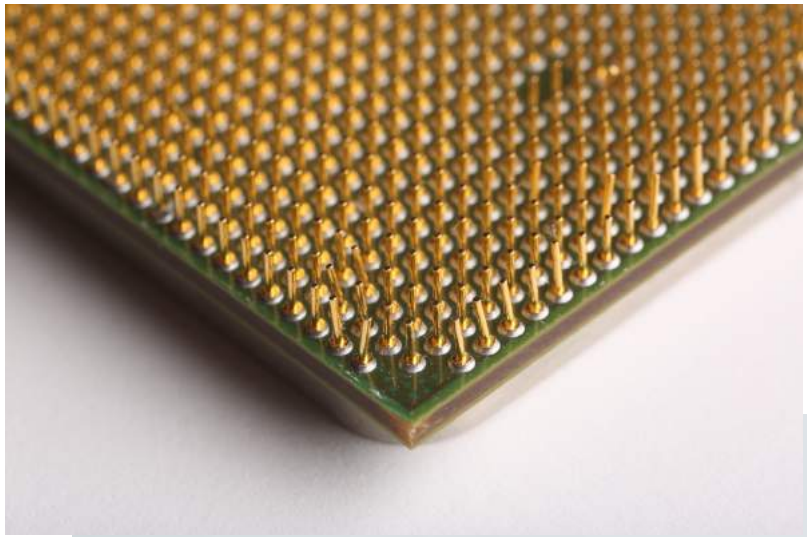
Smart HVAC Scheduling

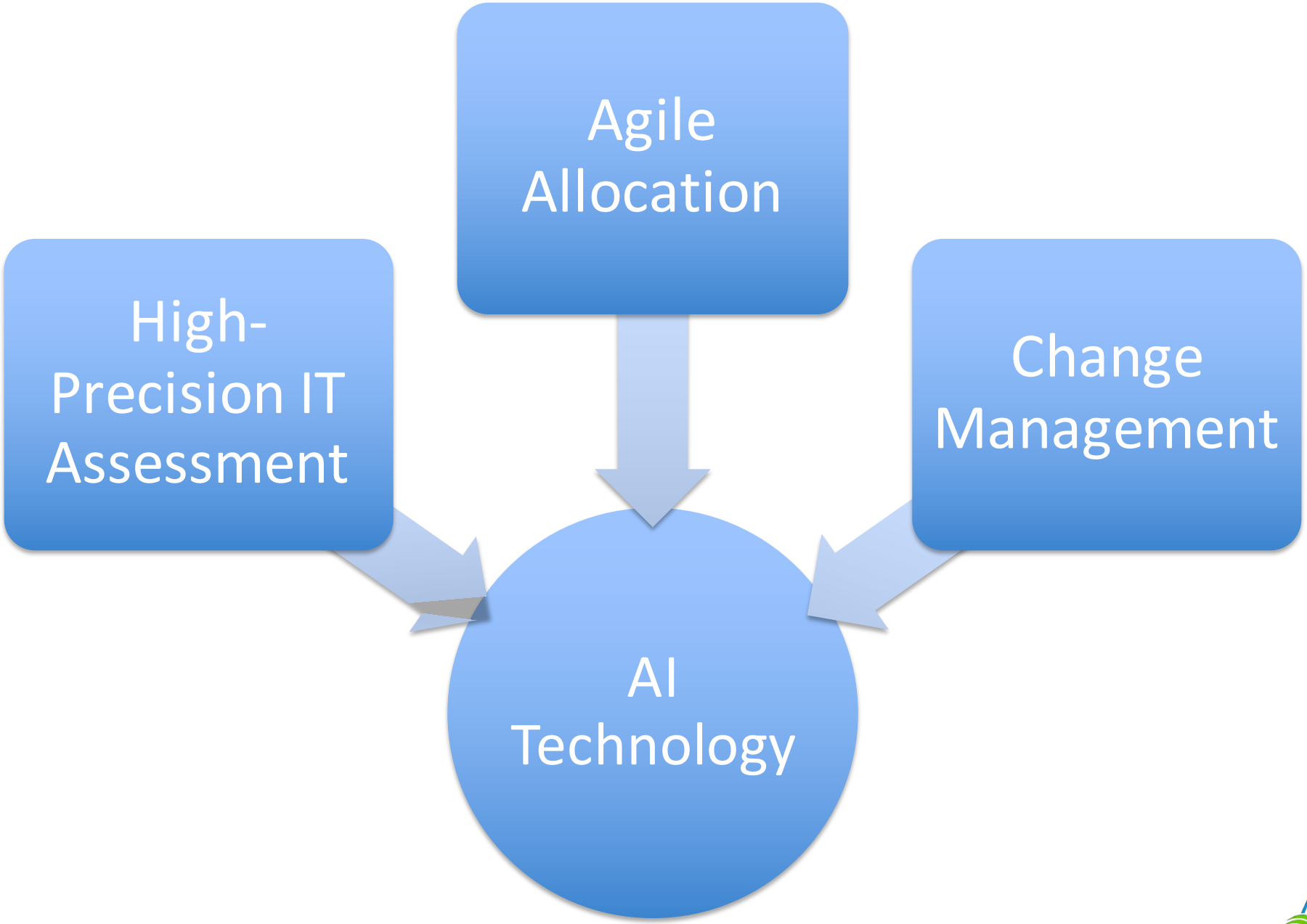
+

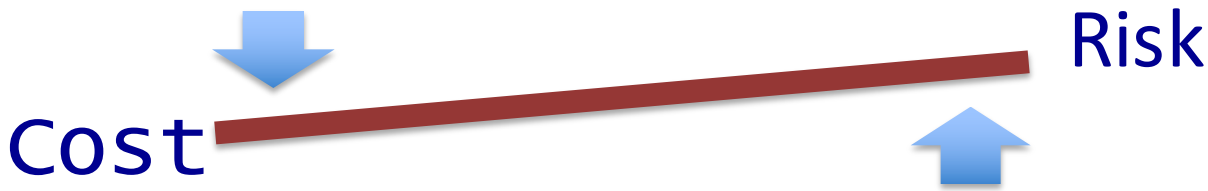
Response to Surges

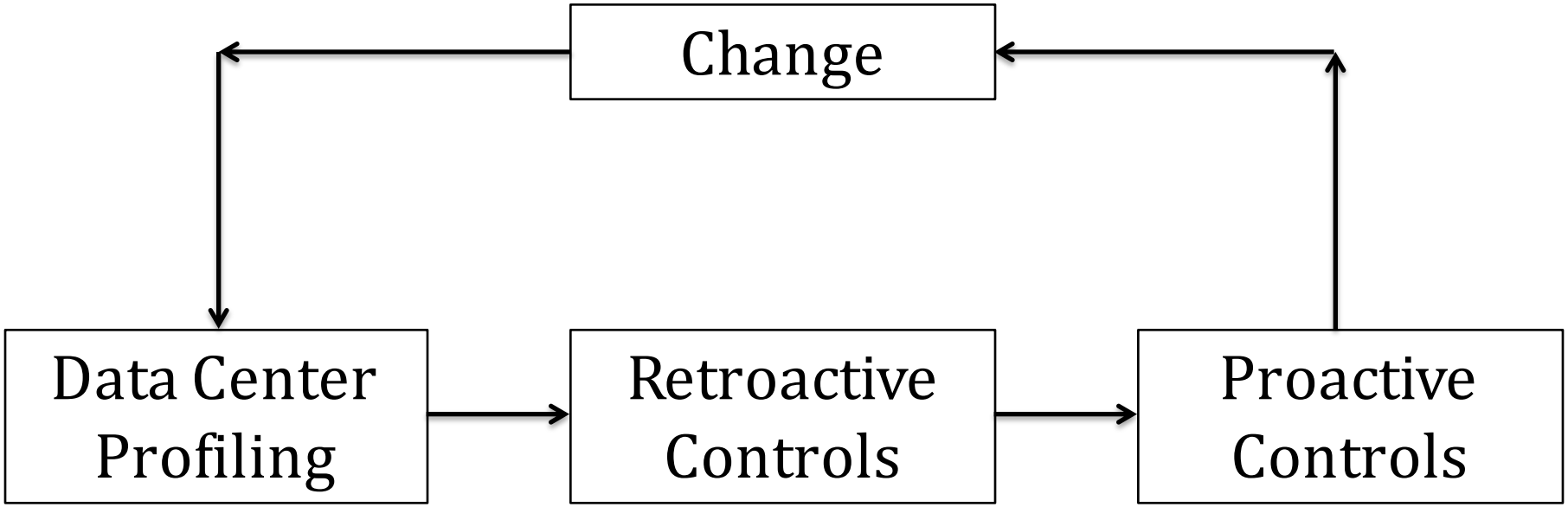


- High-precision demand assessment



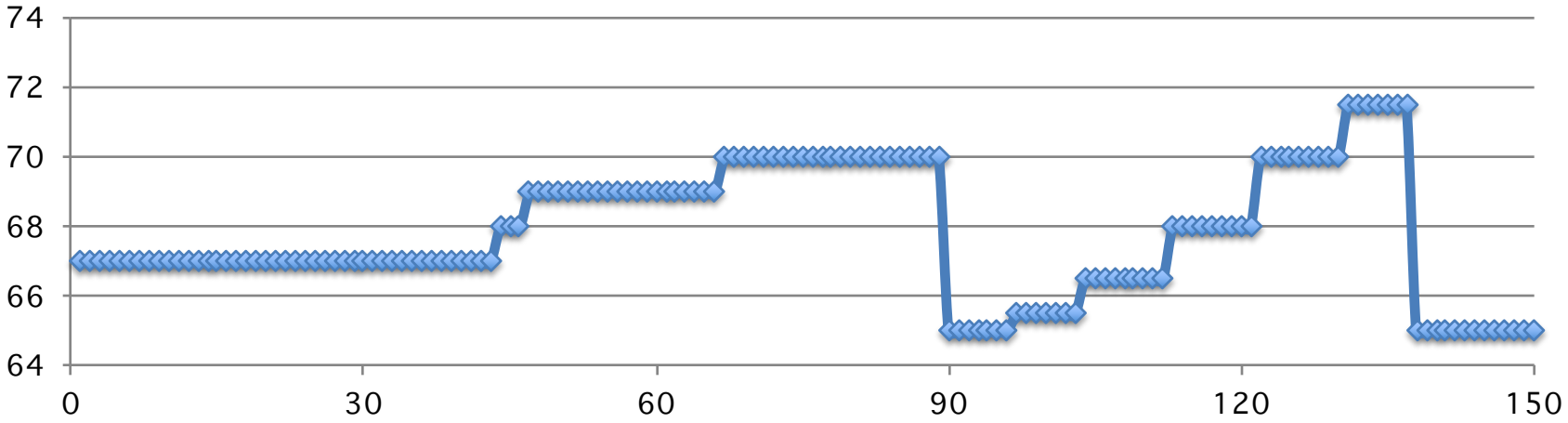

Agile Allocation
High-Precision IT Assessment
Change Management
AI Technology


Cost
Risk

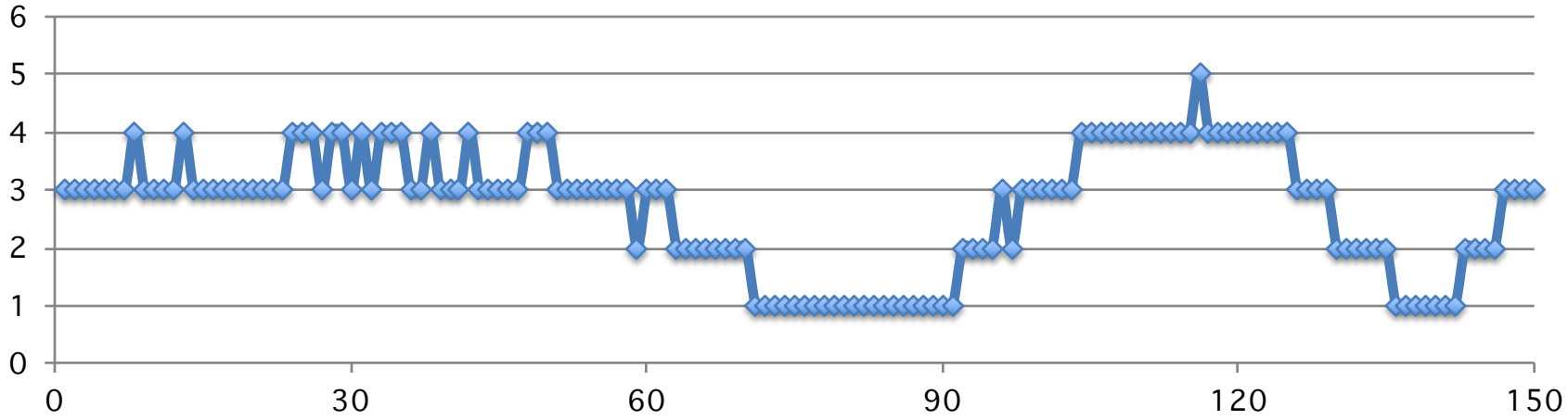

Change
Data Center Profiling
Retroactive Controls
Proactive Controls

Demo

CRAC Suppy Temperature (^{0}F)

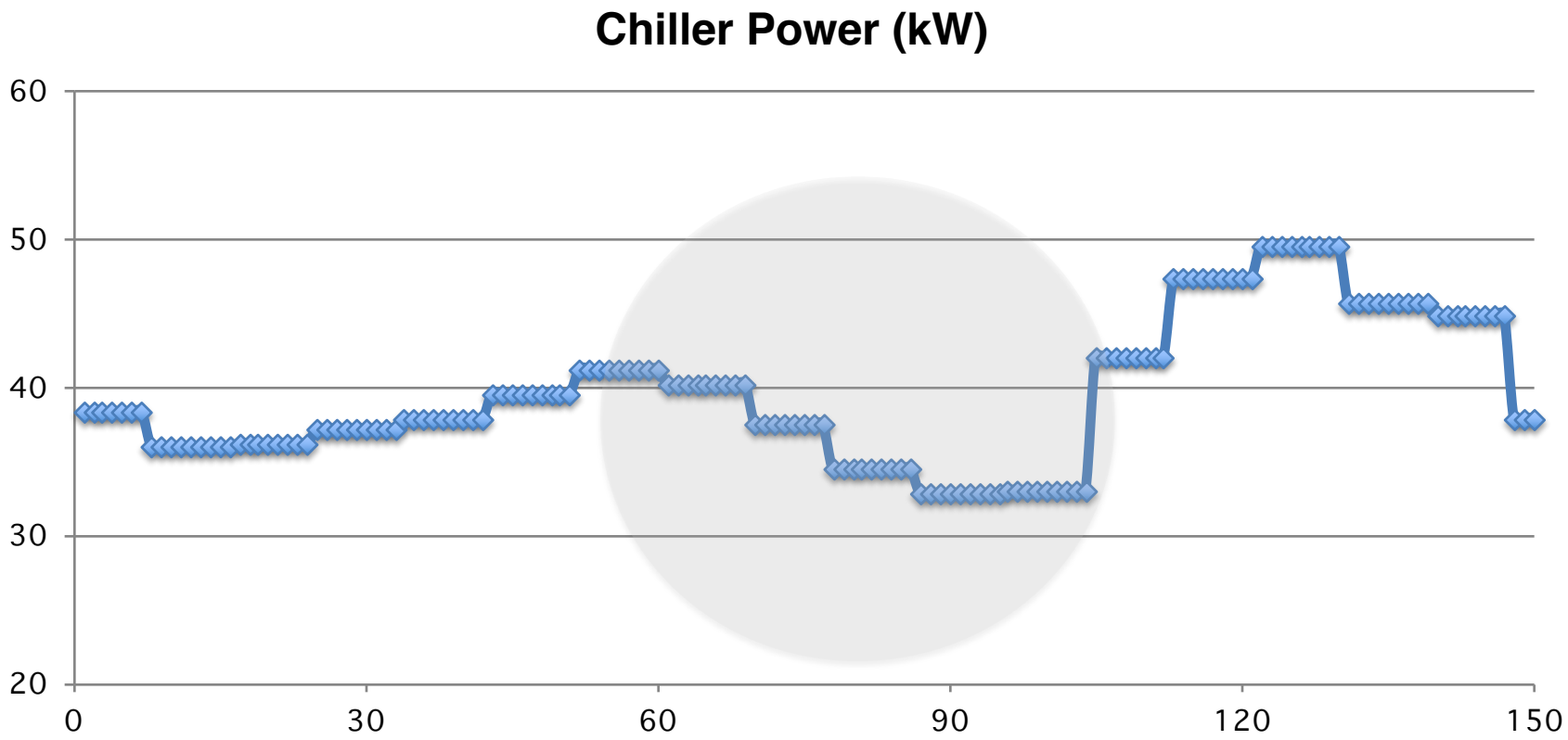


Critical Delta (^{0}C)



Delta = Threshold - Current

~20% Savings in Chiller Power



Predictive Maintenance

Failure Analysis for last 12 hours

Server	CPU1 Temperature	CPU2 Temperature	Memory1 Temperature	Memory2 Temperature
KID001	0.00%	0.00%	0.94%	1.52%
KID002	0.81%	0.00%	1.43%	1.89%
KID003	0.83%	0.00%	1.28%	2.01%
KID004	0.00%	0.00%	1.71%	2.34%
KID005	1.11%	0.00%	1.64%	2.81%
KID006	0.77%	0.00%	1.62%	2.68%
KID007	1.65%	0.00%	1.03%	2.71%
KID008	1.40%	0.79%	0.81%	2.91%
KID009	0.00%	0.00%	2.69%	2.42%
KID010	0.73%	0.00%	1.25%	1.94%
KID011	0.75%	0.00%	1.12%	2.46%
KID012	0.76%	0.00%	1.05%	2.72%
KID013	0.00%	2.51%	3.13%	3.33%
KID015	0.00%	0.00%	2.05%	2.86%

Scenario Analysis

IT Components
Rack 1
Blade Center 1
Blade 1
CPU 1
CPU 2
Blade 2
Blade 3
Blade 4
Blade 5
Blade 6
Blade 7
Blade 8
Blade 9
Blade 10
Blade 11
Scenario 1
Workload
Cloud
Cooling Setpoints
CRAC
°C
RDHx
psi
Scenario 2
Workload
HPC
Cooling Setpoints
CRAC
°C
RDHx
psi
CPU Temperature (°C)
60
57
54
51
48
0
1T/10
2T/10
3T/10
4T/10
5T/10
6T/10
7T/10
8T/10
9T/10
T
Time (s)
Scenario 1
Scenario 2

Thank You!