

## Today's Moderator



**Ed Sullivan**

*Editor*

building  
OPERATING  
management

## Today's Presenter

### Jeff Kegley



Business Development  
Manager,  
Tridium, Inc

Jeff Kegley is Business Development Manager — DCIM for Tridium, Inc., the provider of the industry-leading Niagara Framework. Jeff has 25 years of controls automation experience, spending the last six years in the building automation and smart building technology space. Most recently Jeff has led the team which successfully launched Tridium's data center solution, Niagara DCIM.

## Operational Excellence for The Data Center Enterprise

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### Disclosure:

Today's presenter is currently employed by Tridium, which manufactures the technology referenced in this presentation.

## Learning Objectives:

- Explore the technologies, techniques, and case studies that delivered improved reliability and energy savings
- Learn how open systems enable a best of breed strategy for the White Space and beyond
- Examine the benefits of integration between the white space and the facility

## To ask questions:

Please use the question and answer panel on the right-hand side of the screen, and send to all panelists.



## Polling Questions

Today's event will include a multiple-choice polling question. Your participation is appreciated.

## Presentation Handouts

All participants will receive an e-mail by the end of the day with a link to download a PDF copy of today's presentation slides.

## CEU Information



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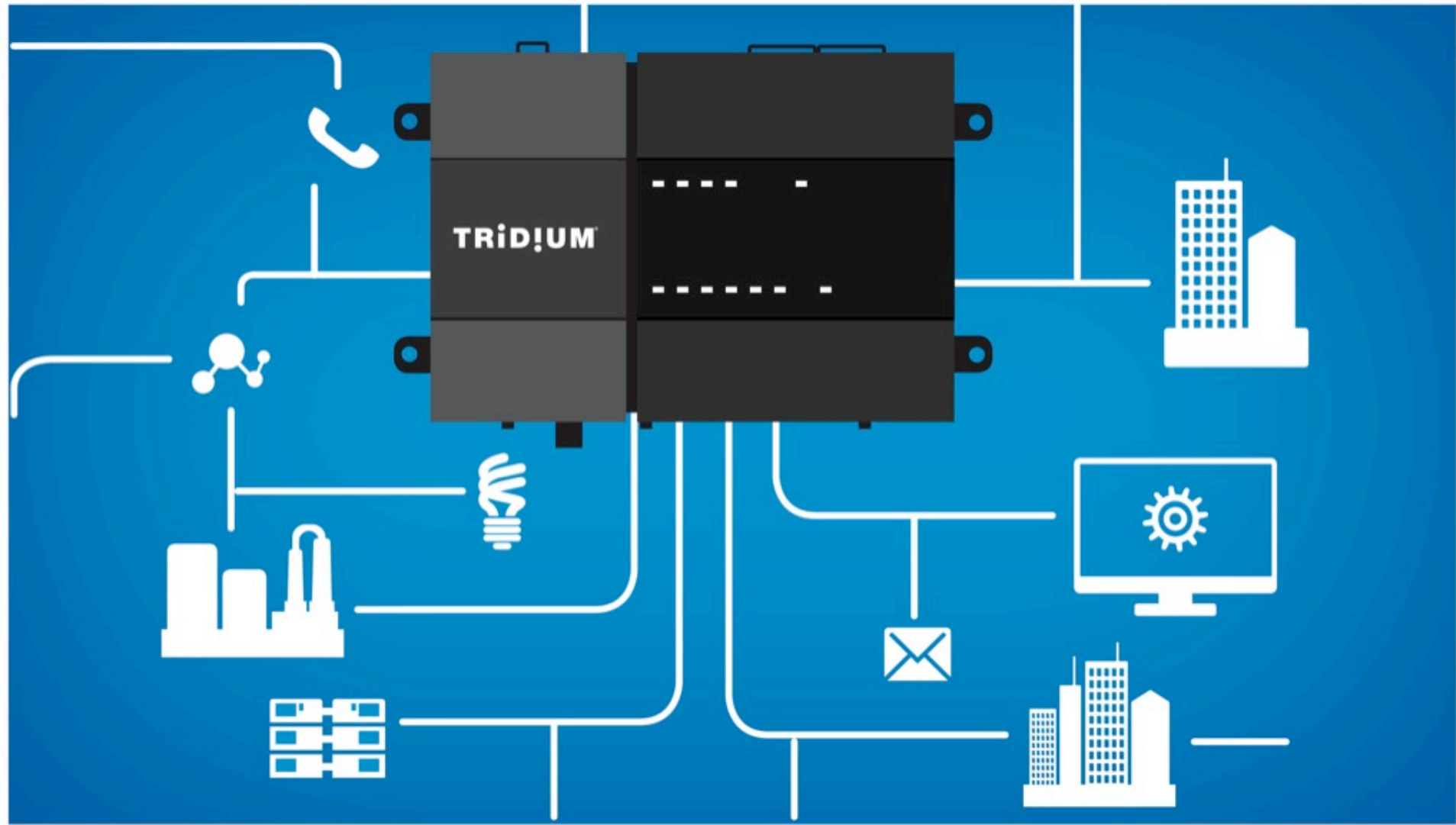
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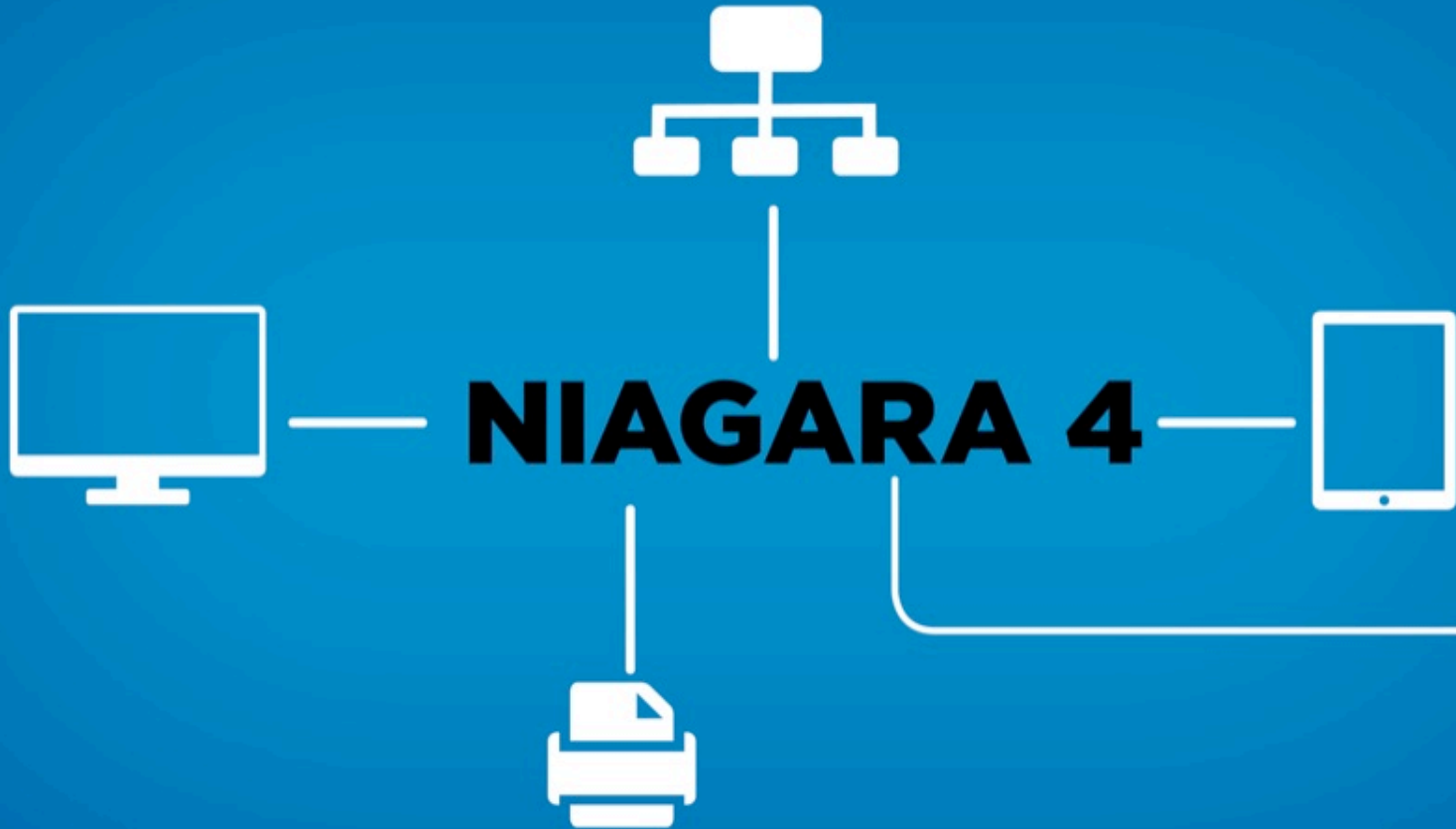


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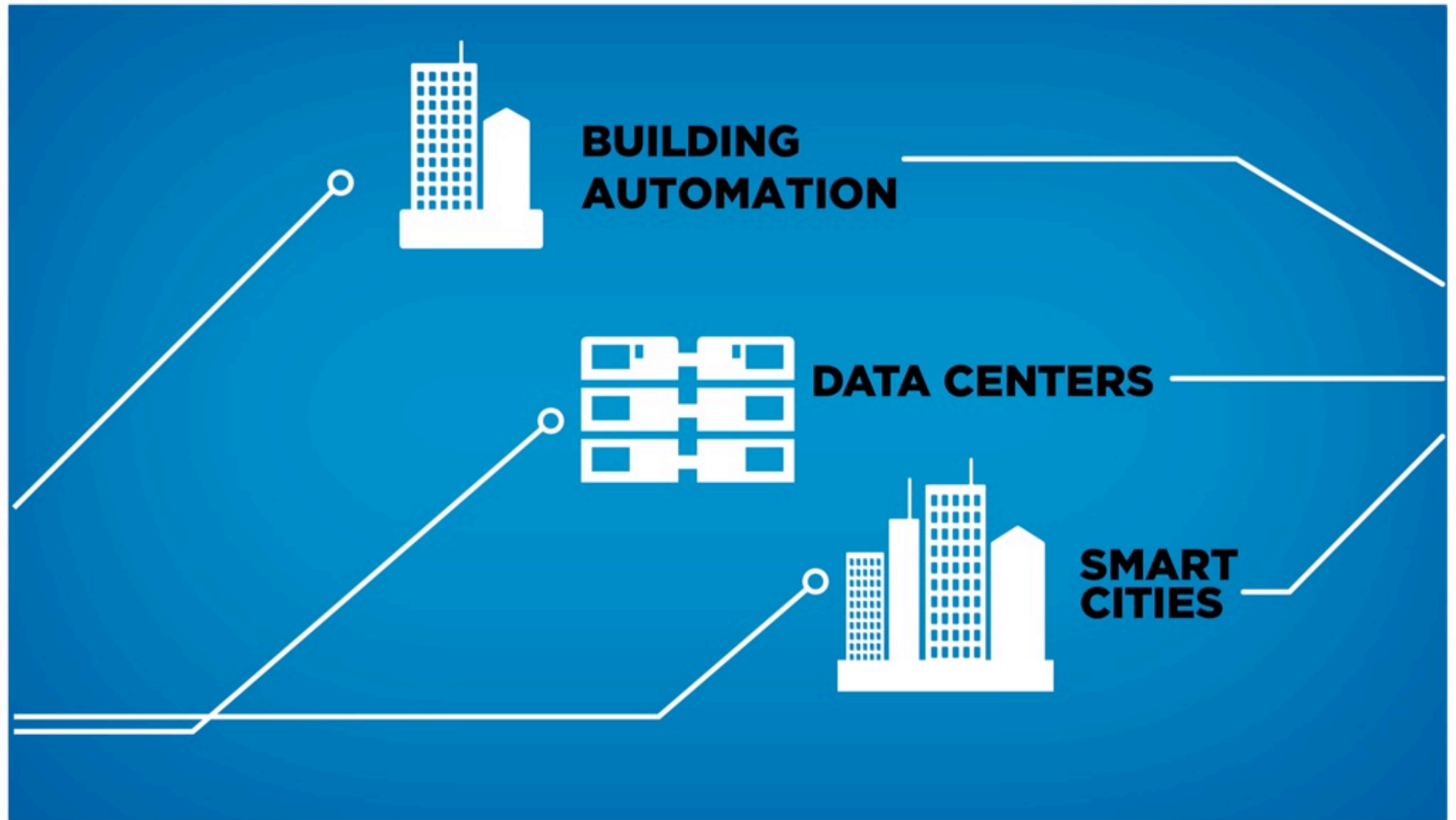
**BUILDING  
AUTOMATION**



**DATA CENTERS**



**SMART  
CITIES**





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# Operational Excellence for the Data Center Enterprise

July 31, 2014

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## Agenda

- The Changing Landscape of the White Space
- Impact of White Space Inefficiency
- New Possibilities Through Open Integration
- The Bottom Line

## About Tridium

- Global leader in:
  - open platforms
  - application software frameworks
  - energy management
  - device-to-enterprise integration solutions
- Committed to developing open internet of things frameworks that create smarter, safer and more efficient buildings, data centers and communities



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**THE CHANGING LANDSCAPE  
OF THE WHITE SPACE**



## Data Centers THEN

- Simple
- Uptime focused at all cost
- Single purpose
- Total Cost of Ownership not considered



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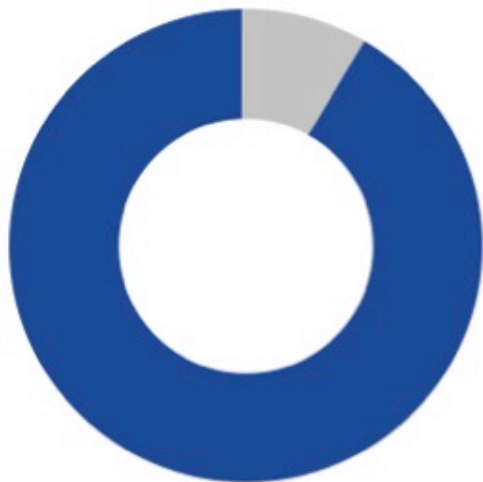
# Data Centers NOW

- More complex
- Uptime optimized
- Multi-purpose
- Total Cost of Ownership a significant factor



## THE FACTS

90% waste



Data centers can waste more than 90% of the energy they pull off the grid.<sup>1</sup>

<sup>1</sup> "Power, Pollution and the Internet," *New York Times*, September 2012

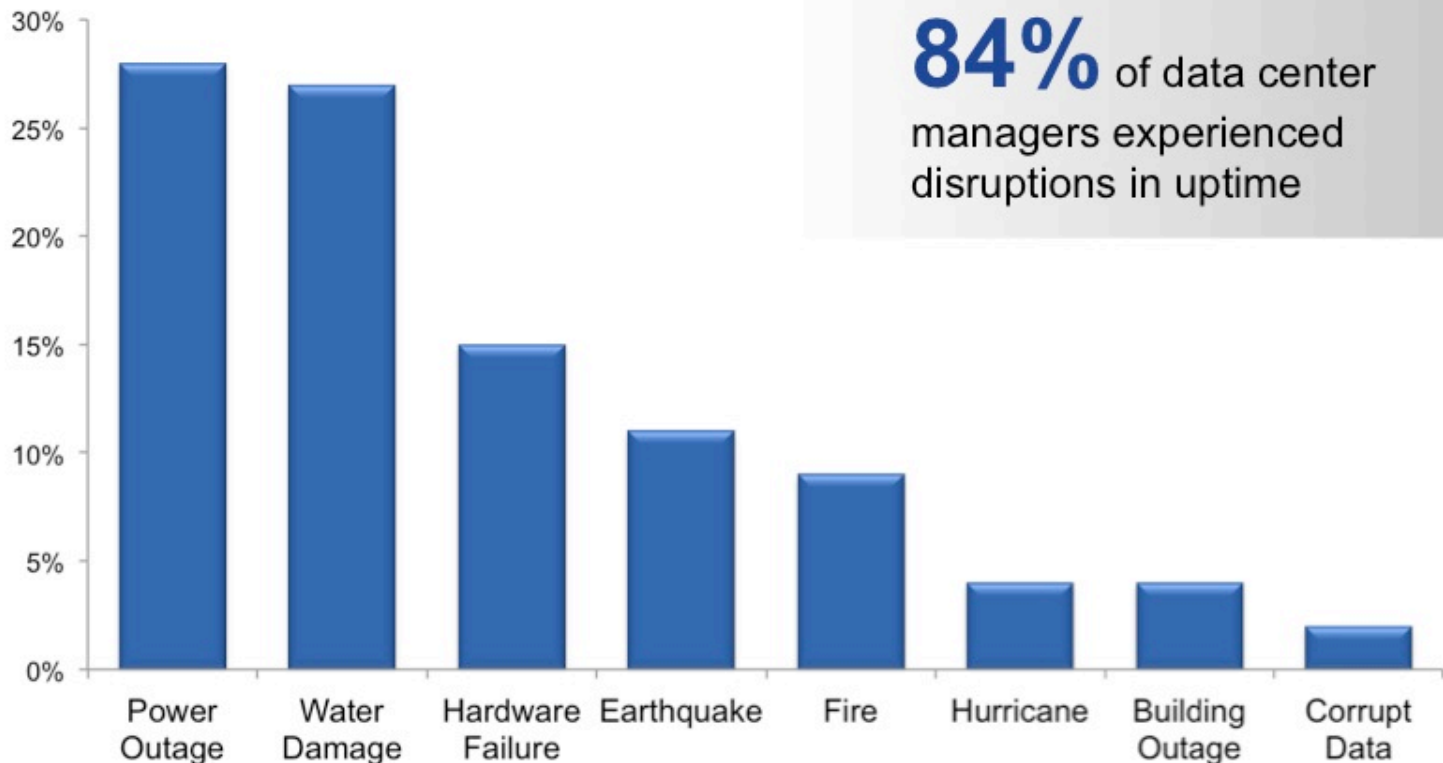
<sup>2</sup> 2013 Cost of Data Center Downtime Study, Ponemon Institute

Cost \$7K+  
per minute



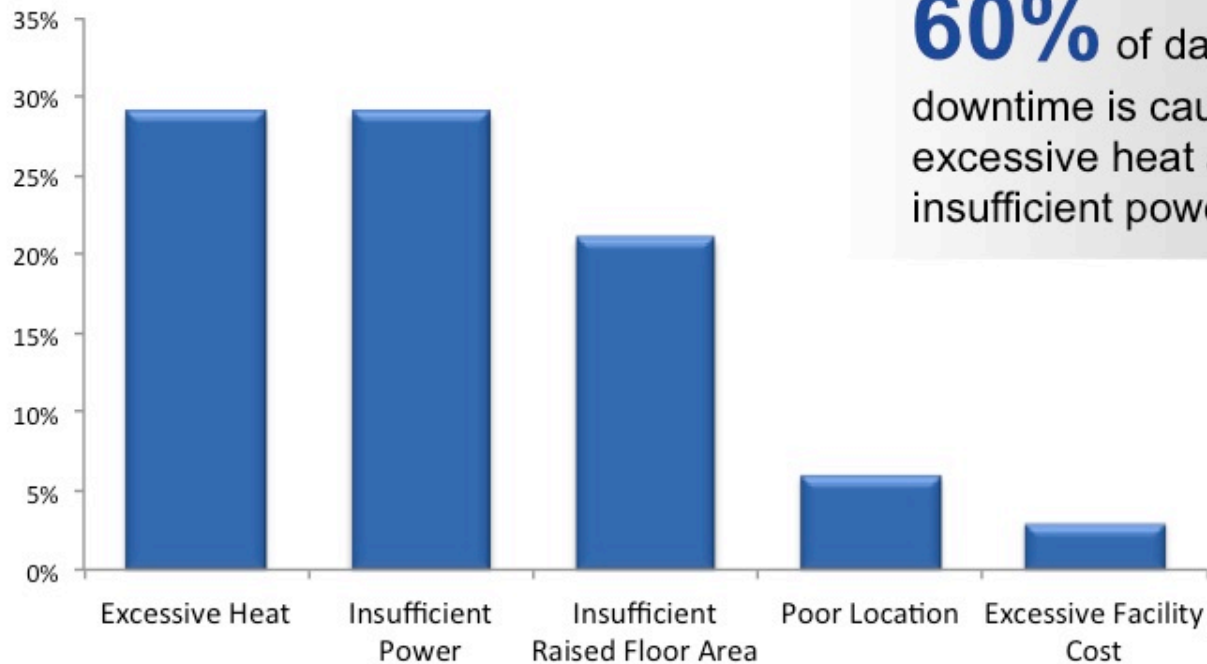
Downtime can cost upward of \$7K per minute on average.<sup>2</sup>

## Downtime: A Key Issue



Graph Source: Contingency Planning Research, a division of Eagle Rock Alliance  
Statistic Source: 2012 IDC study

## Symptoms: Inefficiency



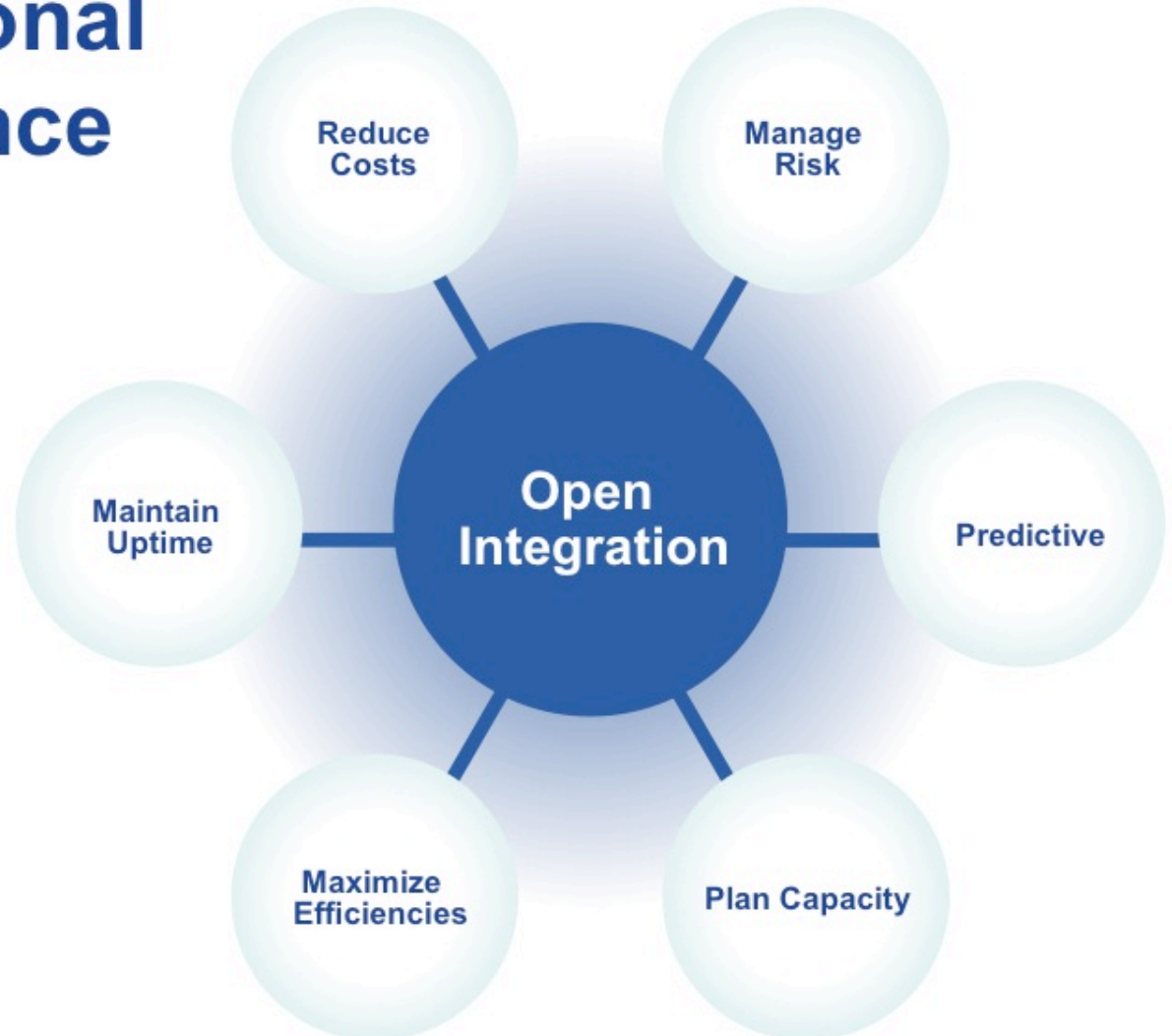


## The Real Cost of Downtime

<b>Business Application</b>	<b>Estimated Outage Cost-Per-Minute</b>	<b>Estimated Outage Cost-Per-Hour</b>
Supply chain management	\$11,000	\$660,000
E-commerce	\$10,000	\$600,000
Customer service	\$3,700	\$222,000
ATM/POS/EFT	\$3,500	\$210,000
Financial management	\$1,500	\$90,000
Human capital management	\$1,000	\$60,000
Messaging	\$1,000	\$60,000
Infrastructure	\$700	\$42,000

Source: Network World, 2009, ALINEAN Research

# Operational Excellence





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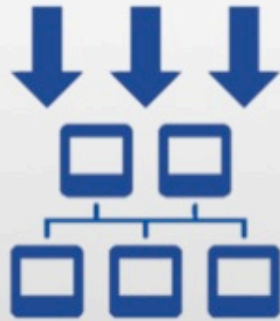
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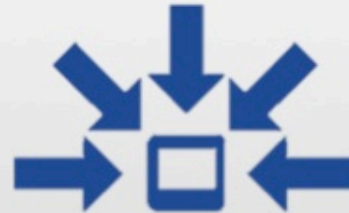
## The Opportunity Is Clear

### TRADITIONAL



- Wide Ethernet Deployment
- Increasing Business Pressures

### CONVERGENCE



- Technology
- Network
- Organization
- Culture

### INNOVATION



- Business Agility
- Competitive Advantage

PAST

FUTURE



# The Benefits of Open Integration

## EXTEND

Extend Life and  
Capacity of Existing  
Structures

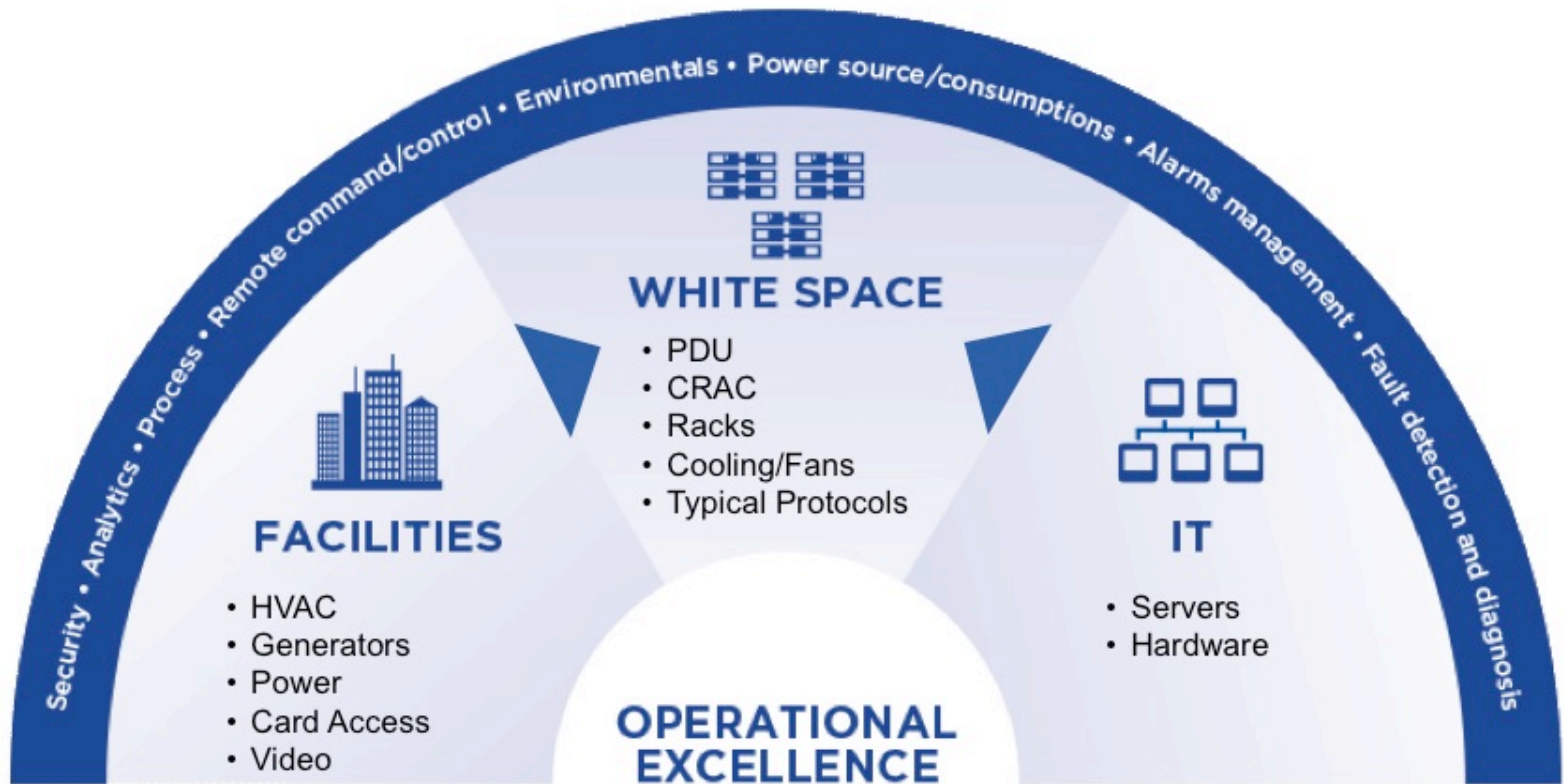
Defer Need to Build  
New Generating  
Capacity

## DEFER

## SAVE

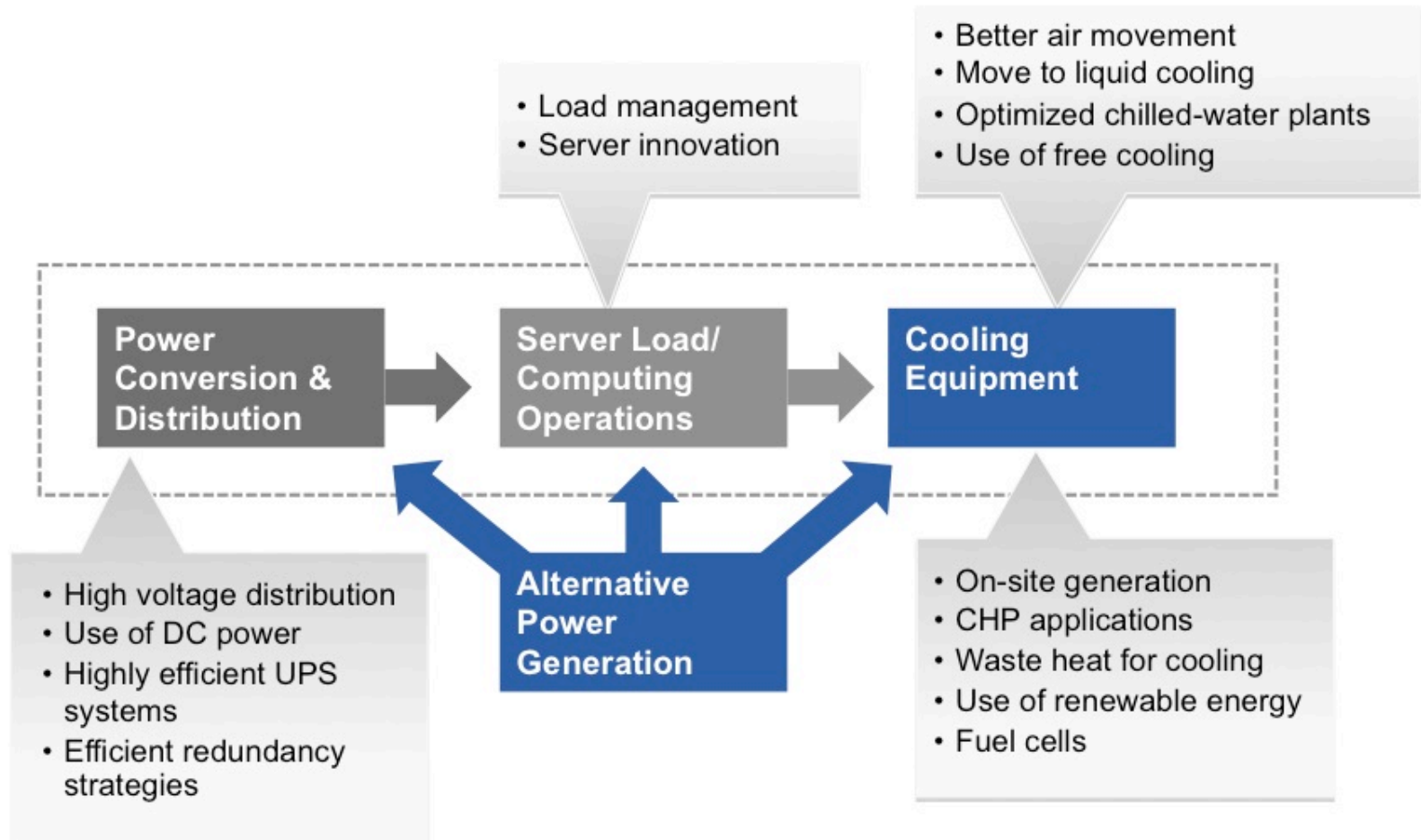
Time  
Space  
Energy

# New Convergence





# Open Integration Drives Efficiency



# The Value and Impact

## Open Integration

### Business

- Preserves legacy system
- Lowers TCO
- Scalable platform
- Future proof
- Optimizes PUE

### IT

- Resource efficiencies
- Manages thermal loads
- Expansion planning
- Asset management
- Uptime

### Facilities

- Resource efficiencies
- Maintenance and repairs
- Reliability
- Energy savings



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**THE BOTTOM LINE**

## Integration Gets Results

Unplanned Downtime (Mission-Critical)	Typical Uptime	Hours Down Per Year	Average Downtime Cost Per Hour	Downtime Risk
<b>Worse than average</b>	98%	174.72	\$336,000	\$58,705,920
<b>Average</b>	99%	87.36	\$336,000	\$29,443,680
<b>Better than average</b>	99.5%	43.68	\$336,000	\$14,676,480
<b>Good</b>	99.9%	8.736	\$336,000	\$2,935,296
<b>Best in class</b>	99.999%	.09	\$336,000	\$30,240

Average cost of downtime per minute US-based data centers **\$5,600.00** May 2011 Ponemon Institute Study sponsored by Emerson Network Power [Understanding the Cost of Data Center Downtime](#)



# Open Integration Drives Results

## CHALLENGE

- PUE above 2.0, resulting in high costs and inefficiency

## GOALS

- Increase energy efficiency, reduce costs while maintaining 24/7 operation
- Reduce PUE to 1.7 or better

# Open Integration Drives Results

## SOLUTION

- Streamlined containment system, heat-capturing chimneys sized to the KW load of each cabinet/row of cabinets
- Monitoring software to measure results, monitor for temperature and humidity trending

## RESULTS

- PUE goal achieved
- Power usage reduced by more than 950,000 KWh/year

# Open Integration Drives Results

## CHALLENGE

- Need for high-availability, high-density platforms
- Eliminate manual recording to measure usage

## GOALS

- Ensure detailed, highly accurate reporting
- Condense access points (over 65,500) and manage devices (over 240) for more efficient monitoring
- Reduce personnel costs



# Open Integration Drives Results

## SOLUTION

- Controls for sophisticated temperature and pressure sensors to regulate fan speeds and exhaust hot air
- Software to gather live data per circuit, automate bill generation

## RESULTS

- Consistent, climate-controlled environment, improving uptime by approximately 30 percent
- Automated process and standardized practices improve productivity and increase efficiencies
- Reduced operating expense and energy usage
- Thousands of points of information available real-time through easily accessible reporting tools



# Open Integration Drives Results

## CHALLENGE

- As part of data center expansion, build integrated system with multiple protocols
- Replace rudimentary monitoring systems that used analog signals

## GOALS

- Reduce operating expense
- Increase recurring revenue

# Open Integration Drives Results

## SOLUTION

- Customized software that provides flexibility in storing data, alerting and alarming
- Automate HVAC units based on defined temperature thresholds

## RESULTS

- Comprehensive trend analyses enable growth monitoring through predictive, rather than reactive, approach
- Lowered run time of six CRAC units approximately 20 percent, providing annual savings of over \$23,000



## Key Takeaways

- Analyze symptoms that can lead to inefficiency and waste
- Extend, defer and save through open integration
- Achieve operational excellence with a new type of convergence
- Get results: increased efficiency and productivity with lower costs
- With the help of open integration build your organization on business needs and don't be held back by technology limitations

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## Contact Us

Learn more about how open integration can help your enterprise achieve operational excellence.

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Thank you

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