



Low Cost + Low Complexity  
= High Availability

Uptime Institute  
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the global data center authority  
[www.uptimeinstitute.com](http://www.uptimeinstitute.com)



# Global Data Center Authority



For over 20 years, Uptime Institute offers independent, technology neutral, and senior-level expertise, advisory, and Certification—in the Facilities/MEP, IT Systems, and Staff needs—at both the executive and technical level.

Uptime Institute goal is comprehensive, innovative, high performance, sustainable solution across the entirety of the assets and expertise that deliver information services to the end user.



## Unbiased & Vendor Neutral



Uptime Institute does not design, construct, commission, or operate data centers—or furnish Facilities or IT equipment.

Best known for thought leadership and data center standards:

*Tier Standard: Topology*

*Tier Standard: Operational Sustainability*

236 Tier Certifications Worldwide in 40 Countries



# Uptime Institute Offices Worldwide



- North America
  - > New York, San Francisco, Seattle, Denver
- Latin America & Brasil
  - > São Paulo, San Jose (Costa Rica)
- Europe, Middle East, & Africa
  - > London, Dubai
- North Asia
  - > Taipei
- South Asia
  - > Singapore
- Russia
  - > Moscow



# Data Center Solutions



- Driven by Business, IT Strategy, and Customers
- Multitude of Data Center Design Criteria
  - > Availability
  - > Location
  - > Connectivity
  - > Scalability
  - > Energy Efficiency with 100% Availability
  - > Innovation
- Many Data Centers 100% Uptime is an Expectation

**Simple and Cost-Effective Designs Lead to Uptime**



# Why Do Failures Occur?



## Uptime Institute Data and Analysis:

- Historically vast Majority of Outages are Caused by Human Error
- In 2011 Redundancy and Staffing led to 67% of Saves (outages prevented)

## Field Experience with Data Center Operations:

- Reviews of Dozens of Live Data Centers in the Past 2 Years

**Certain Design Solutions Increase the Chance for Human Error while other Designs Reduce the Risk and Allow for Saves**

# Highly Operable Engineering Solution?



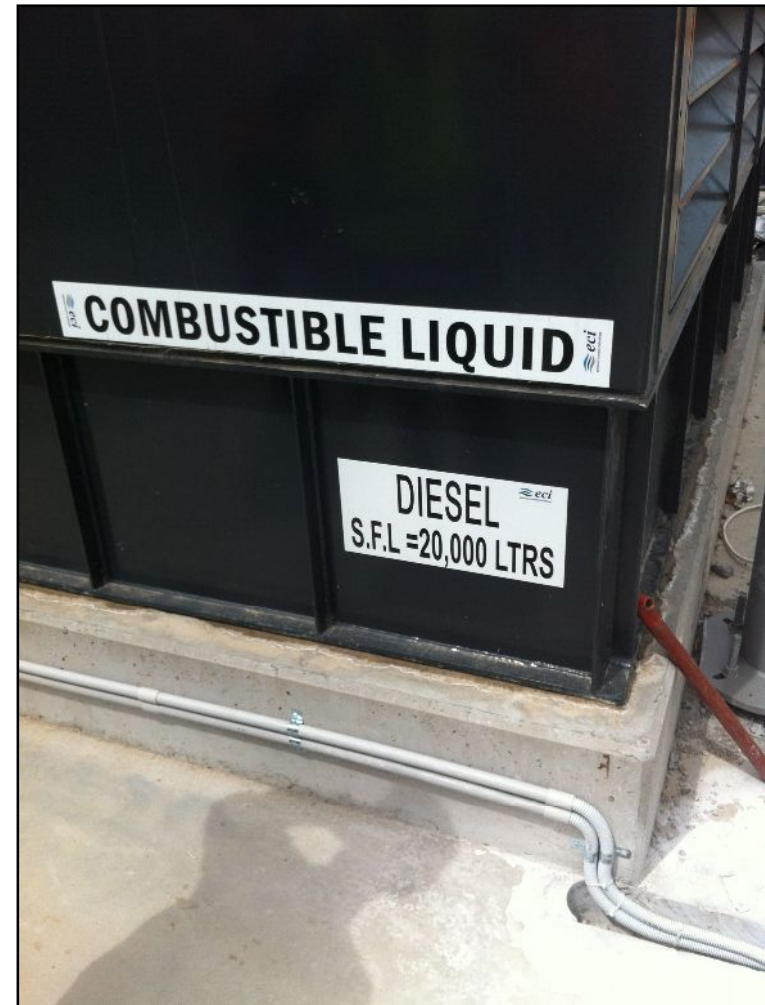
- Fuel Control, Pumping, and Filtration Room
- 2(N+1) Pumps
- Complex Design was Initially Built Incorrectly
- Operating Valves Required Climbing on and over Piping



# Highly Operable Engineering Solution



- 20,000-liter Engine Generator Belly Tank
- Engine Generator within Enclosure is Directly on top of Belly Tank
- No Additional Piping or Fuel Pumps Required







# Simple Solutions



- Traits of Simplicity
  - > Immediately understood architecture
    - 2N Topology versus Isolated Redundant
    - Well marked A and B Systems
  - > Avoid reliance and over provisioning of ATs or STs
  - > Limit Complex Building Automation Systems
- Allow for
  - > Reduced operator error
  - > Clear operations during emergency (allows for saves)
  - > Reduced cording error



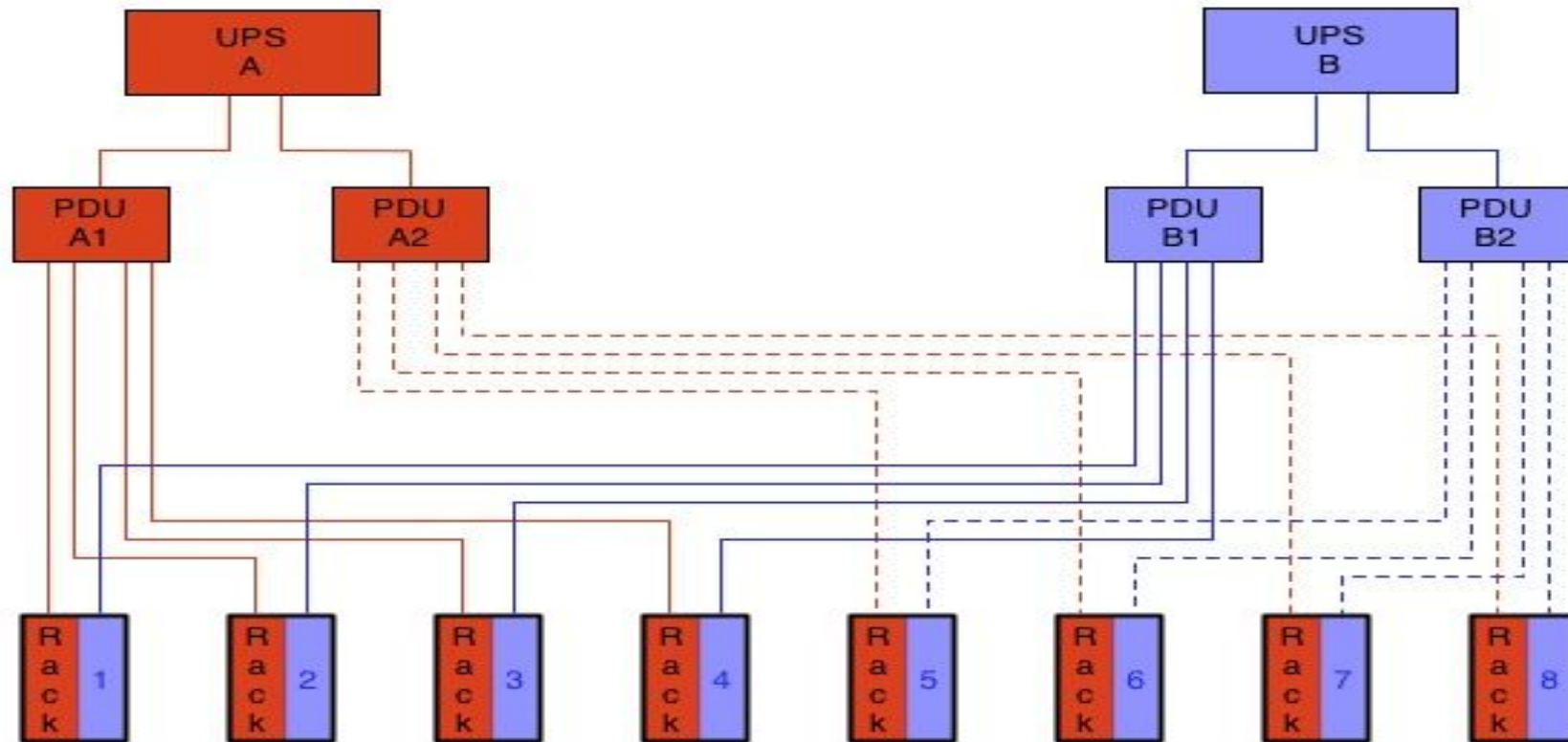


# Simplicity in Practice





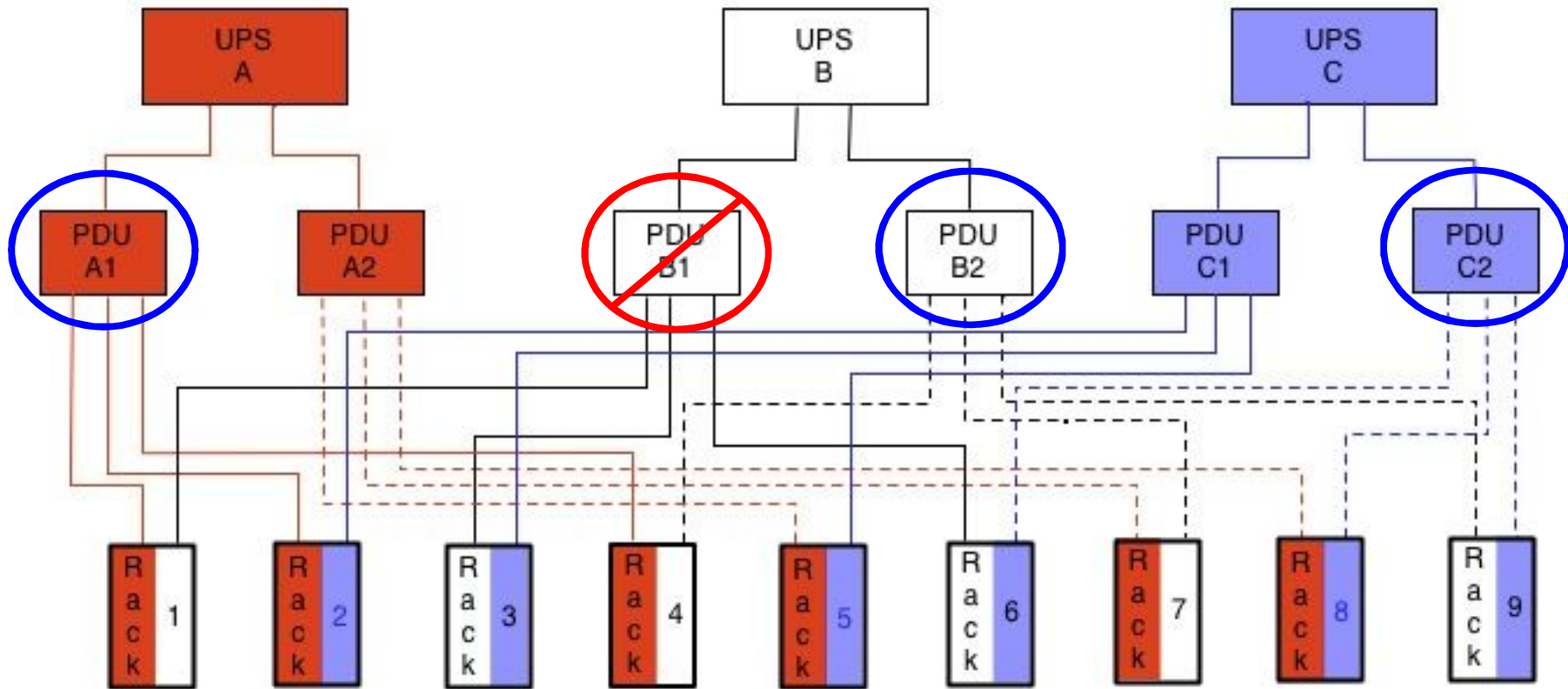
# Design Example: 2N Option



- Allows the UPSs and PDUs to be loaded at maximum of 50%
- Easiest layout to manage loads and connections



# Design Example: 3 to Make 2 Option



- Allows the UPSs and PDUs to be loaded at maximum of 66.6%
- Requires strict management of loads and connections



# Cost-Effective Solutions



- Utilize Proven, Supportable Systems
  - > Proven history of equipment in high availability data centers
    - New technologies may be appropriate for innovative or academic data centers, but not for mission critical applications
  - > Local, experienced technicians
  - > Availability of critical spare parts



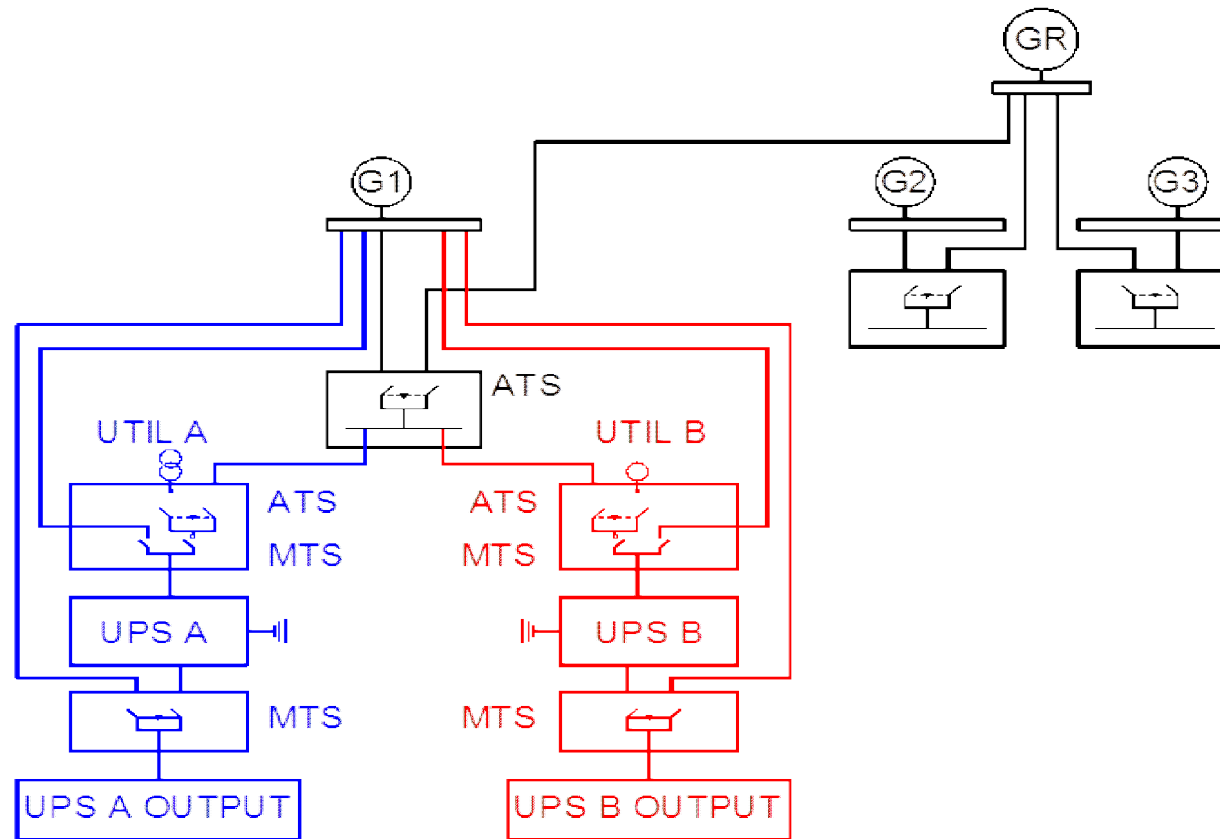
# Cost-Effective Solutions



- “Right sized” for Load
  - > Key equipment designed around major components
    - UPS, Engine Generators, and Chillers
  - > Phased build out to truly allow for “pay-as-you-grow” but without impacting the critical load
- Avoid Overspending
  - > Over provisioning of ATs and STs
  - > Excessive Redundancy at transformation layer
  - > Too many system ties



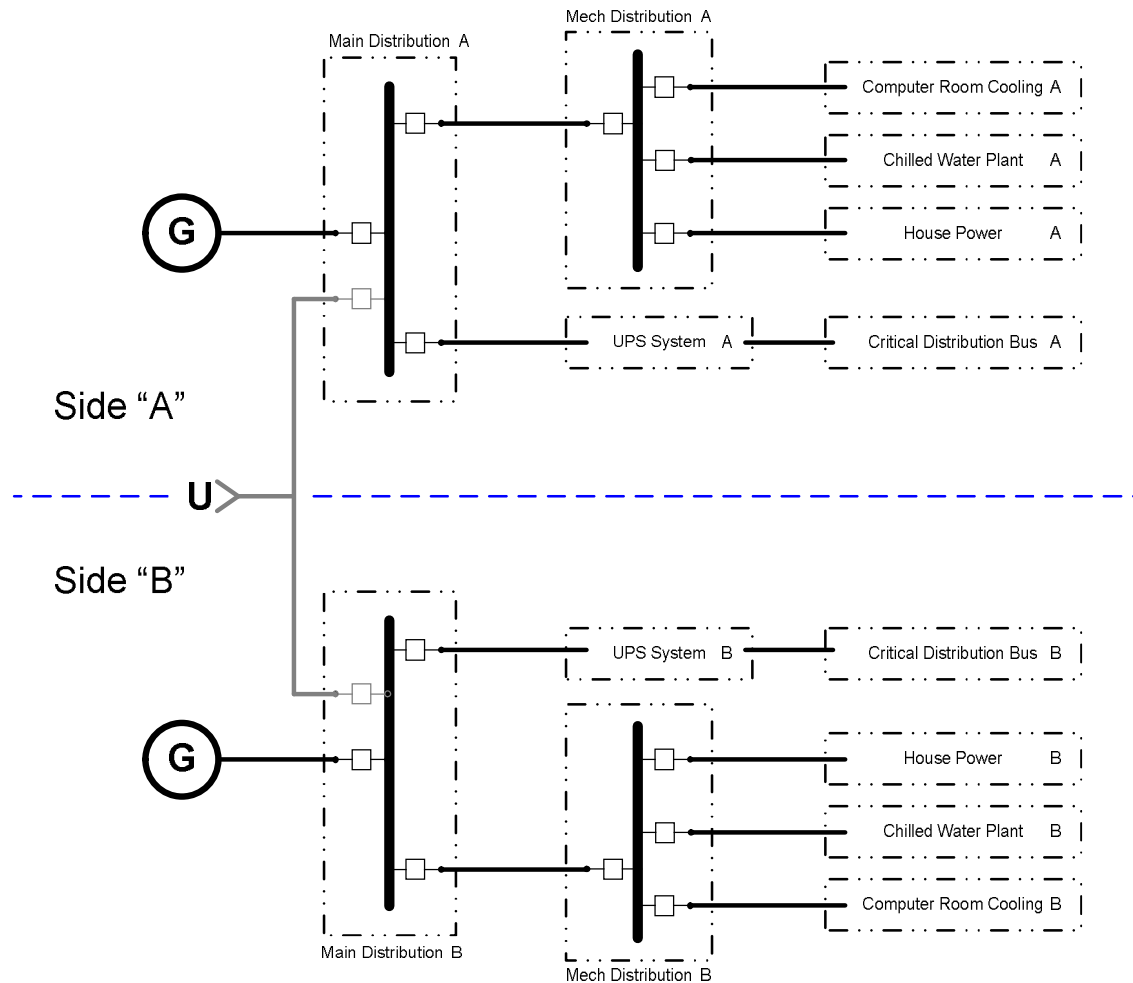
# Proposed Electrical Solution







# Simplified Electrical Solution





## Summary



Designers must be able to answer the following:

Is the Design Characteristic a Proven Performance Enhancement?

Does the Design Characteristic Increase Exposure to Human Error?



We've been there when the lights went out.

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