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Intelligent Solutions for Critical Environments
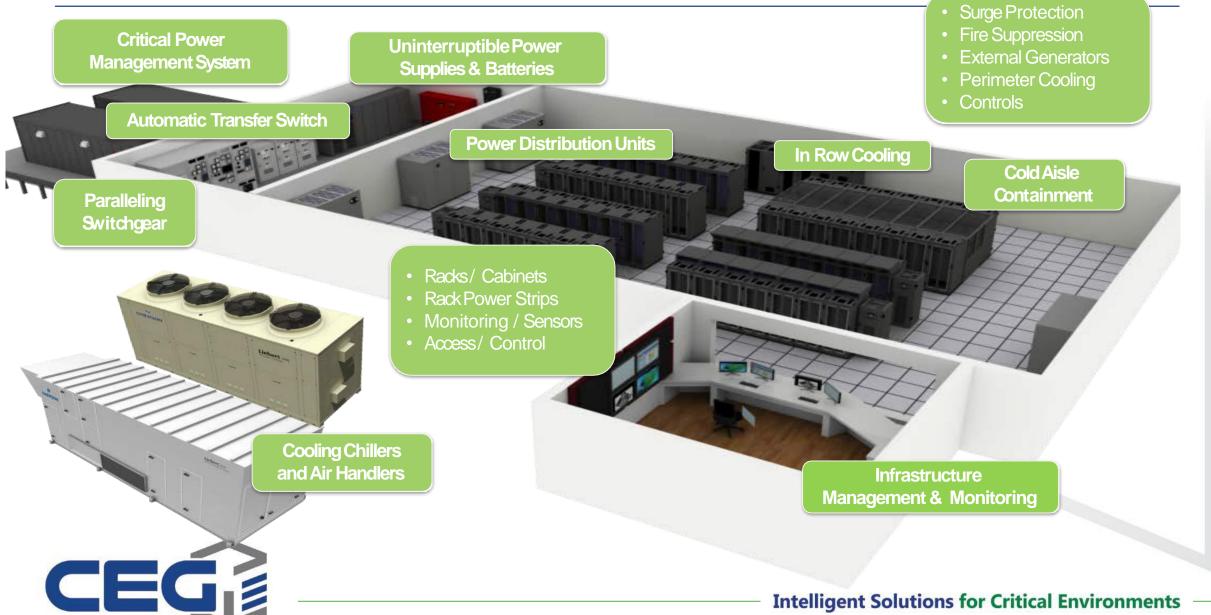
What is a data center?

A **data center** is a [facility](#) used to house [computer systems](#) and associated components, such as [telecommunications](#) and [storage systems](#). It generally includes redundant or backup [power supplies](#), redundant data communications connections, environmental controls (e.g. air conditioning, fire suppression) and various security devices. A large data center is an industrial-scale operation using as much electricity as a small town.[1][2]

A data center must also contain an adequate infrastructure, such as power distribution and supplemental power subsystems, including electrical switching; uninterruptable **power** supplies; backup generators and so on; [ventilation and data center **cooling** systems, such as computer room air conditioners; and adequate provisioning for network carrier (telco)](#) connectivity. All of this demands a physical facility with physical security and sufficient physical **space** to house the entire collection of infrastructure and equipment.

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What does a data center look like?

- Surge Protection
- Fire Suppression
- External Generators
- Perimeter Cooling
- Controls

Critical Power Management System

Uninterruptible Power Supplies & Batteries

Automatic Transfer Switch

Power Distribution Units

In Row Cooling

Cold Aisle Containment

Paralleling Switchgear

- Racks / Cabinets
- Rack Power Strips
- Monitoring / Sensors
- Access / Control

Cooling Chillers and Air Handlers

Infrastructure Management & Monitoring

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Tier 1 – "Basic (n)" Site Infrastructure

Non-redundant site capacity components

Non-redundant distribution path serving computer equipment

Site at risk to disruption from planned & unplanned activities

Complete site shutdown for preventative maintenance

Human error

Failure of facilities infrastructure equipment

Annual site downtime: 28.8 hours

Annual site availability: 99.67%

Tier 2 – "Redundant Capacity Components (n+1)" Site Infrastructure

Redundant site capacity components (UPS & gensets)

Non-redundant distribution path serving computer equipment

Site at risk to disruption from planned activities and unplanned events

Complete site shutdown for Preventative Maintenance

Human Error

Failure of facilities infrastructure equipment

Annual site downtime: 22.0 hours

Annual site availability: 99.7%

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Tier 3 – "Concurrently Maintainable (n+1)" Site Infrastructure
- **Redundant site capacity components (UPS & gensets)**
- **Multiple distribution paths serving computer equipment - generally 1 path active and 1 path passive**
- Site at risk to disruption from unplanned activities
  - Human Error
  - Failure of facilities infrastructure equipment
- Site not at risk to disruption from planned activities
  - PM performed using redundant capacity components and distribution paths
  - All computer equipment requires dual feeds
- Annual site downtime: 1.6 hours
- Annual site availability: 99.98%

Tier 4 – "Fault Tolerant (minimum n+1, 2N preferred)" Site Infrastructure

- Redundant site capacity components (UPS & gensets)
- Multiple distribution paths serving computer equipment - simultaneously
- Site at risk to disruption from unplanned activities
  - Sabotage
- Site not at risk to disruption from planned activities
  - PM performed using redundant capacity components and distribution paths
  - All computer equipment requires dual feeds
- Annual site downtime: .8 hours
- Annual site availability: 99.99%

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CEG can provide it all! – consulting, equipment, service, support

Infrastructure Assessments
- Power Utilization Efficiency Study
- Thermal Load Analysis
- Computational Fluid Dynamics (CFD)
- Capacity Benchmarking
- Data Center Space Optimization
- Redundancy and Failure Analysis

Factory Installation & Integration
- Custom Cabinet Configuration
- Preset Rail Setback and Depth
- Locate and Mount LCD Drawers
- Power Distribution Installation
- Setup of Access and Control Devices

On-site Services & Support
- Cabinet Installation
- Technology Integration
- Equipment Commissioning
- Connectivity
- Training

Project Management & Support
- Design Build Support
- Data Center Expansions
- Layout and Capacity Planning
- Build Site Analysis
- Product Deployment
- Infrastructure Retrofit

Power Distribution
- Basic PDU
- Metered PDU
- Monitored/Smart PDU
- Switched PDU
- Outlet Level Monitored PDU
- Automatic Transfer Switch
- Power Distribution Cabinets
- 'Right-size' Power Cords

UPS Systems
- Desktop UPS (<1500VA)
- Tower UPS (<20kVA)
- Rackmount UPS (<20kVA)
- Enterprise UPS (>20Kva)
- Liebert Advance 3-Phase Certified

Passive Thermal Containment
- Blanking Panels
- Foam, Skirts and Covers
- Raised Floor Grommets
- Brush Seal Solutions
- Under-floor Baffle System
- Containment Curtains, Panels and Doors
- Capped Aisles

Dynamic Airflow Management
- In-rack Airflow Delivery and Distribution
- Under-floor and Overhead Air Movers
- Intelligent Airflow Distribution and Management
- Pressure-managed Heat Extraction

Air Conditioning Efficienci
- Advanced In-row Cooling
- High-capacity CRAC/CRAH Solutions
- Liebert Advance Cooling Certified

Facility Monitoring & Control
- Customized Infrastructure Management Solutions
- Protocol Conversion and Aggregation
- Turnkey DCIM Solutions
- Comprehensive IT Facility Monitoring

IT Asset Management
- KVM Appliances
- Secure KVM Appliances
- Serial Appliances
- Service Processor Managers
- Extension Products
- LCD Console Trays

Environmental Monitoring & Alerting
- Spot, Zone or Distance Read Leak Detection
- Rack-based Environmental Monitoring
- Room-based Environmental Monitoring
- Wide Variety of Sensors for Most Applications
- Wireless and Networked Options

Power Monitoring
- Intelligent Rack Power Management Software
- Outlet and Rack-level Power Administration
- Branch Circuit Protection
- Facility and Multi-site Consumption Management

Server Cabinets & Enclosures
- High Density Rack Enclosures
- Enclosed Network and Distribution Racks
- Open Network and Distribution Racks
- Wall-mount and Specialty Racks
- Seismic Zone 4 Cabinets
- Cable Management Solutions
- Custom Design and Engineering Services

Media Management
- High Density Storage Tape Racks
- Traditional Storage and Staging Racks
- Media Transport Carts and Cases
- Media Storage Cabinets
- Media Storage Packs
- Media Management Software
- Installation and Maintenance Services

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