

The future of digital data center infrastructure

ABB - Aleksandar Grbic

About ABB

Let's write the future. Together.



ABB is a technology leader that is driving the digital transformation of industries, with a history of innovation spanning more than 130 years. ABB operates in more than 100 countries with about 147,000 employees.

Agenda

Data Center industry main drivers

Main challenges and advantages of digitalization

Digital on products

Digital on systems

Future of data center digital infrastructure

Digital ecosystems

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Drivers behind today's data center

Unprecedented scale

20B connected devices by 2025 per Gartner, 50B per Cisco



Wireless + 5G

3k cell sites in New York City today vs 100K in 2025



Latency

Will drive edge computing cells located at point of operation



Security

Target's security breach was enabled through HVAC communication "back door" in 2012



Flexibility

Infrastructure must scale like IT loads
Scarce technical resources

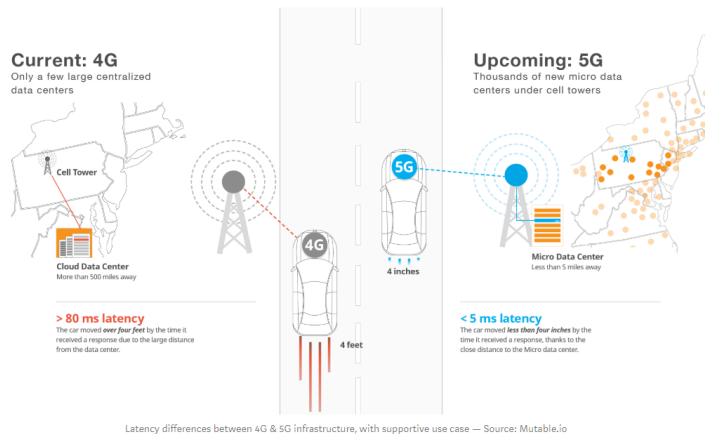


Visibility

Infrastructure needs to follow "fail small" paradigm

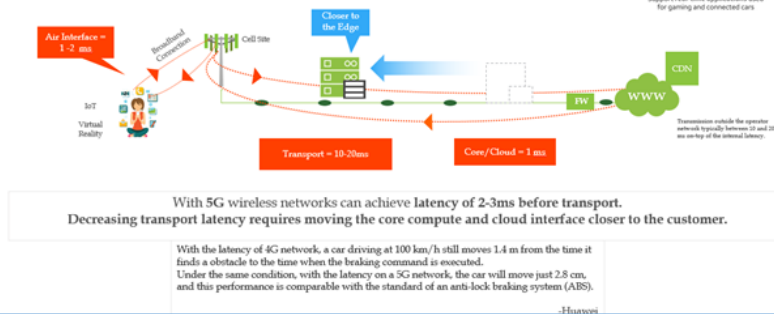


Data Center Trends



The Importance of Latency

Sample 5G network – latency is dependent on distance of transport



- Autonomous driving vehicles, Smart Cities, IoT, Remote Robotics, require new generation of internet with very low latency
- The latency needs to improve from 50 – 70+ ms down to 2 – 3 ms to satisfy new requirements

- To lower the latency, data centers need to move closer to the end users at the edge of the network

Source: Mutable: The PaaS Solution for 5G & Edge Compute Infrastructure

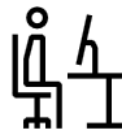
Source: The Edge Is Already Happening Inside 'Traditional' Data Centres In Secondary Markets

What is digitalization?

It is the combination of connected technologies that add value in new ways



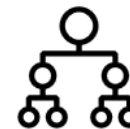
Connecting and
communicating



Collecting and
controlling



Analyzing and acting



New business models

Cyber security

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Data Center Key Requirements



Energy Efficiency

PUE trend

2.5 in 2007

1.6 in 2018

Up to

20%

of total electrical energy goes to distribution losses (UPS, cables, transformer...)



Space Saving

Number of people living in urban areas

0.7 B in 1950

6.4 B in 2050

Space is becoming crucial

Up to

35%

of space is occupied by power distribution equipment



Continuous Operation

Average cost of unplanned data center outage

505 k\$ in 2010

690 k\$ in 2013

750 k\$ in 2016

Outage most usual cause

33%

due to the power on premises supply failure



Modularity/Flexibility

Time needed to build a data center

18–24 months in the past

6–9 months today

On average

35%

of projects are finished on time

Advanced digital solutions – a value proposition



Energy Efficiency

Reduce down to

5%

electrical distribution losses



Continuous Operation

Unique UPS decentralized parallel architecture, complete and most reliable portfolio, 100% selectivity and predictive maintenance features to allow maximum reliability of the data center power supply



Space Saving



Up to

40%

footprint reduction of
distribution equipment



Modularity/Flexibility

Projects statistics

Up to **95%** of time saved during electrical system design

Up to **35%** of time saved during installation

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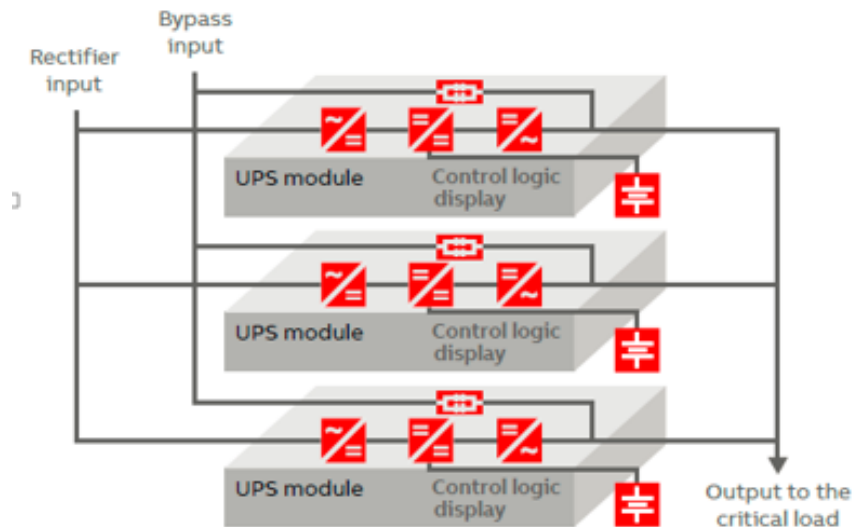
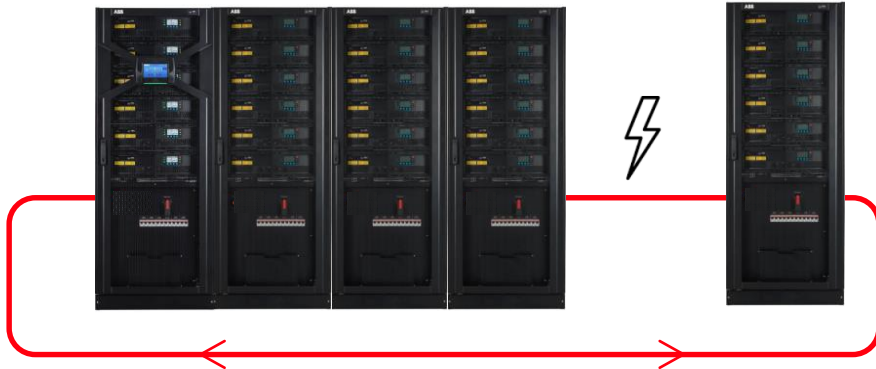
Digital on systems

Future of data center digital infrastructure

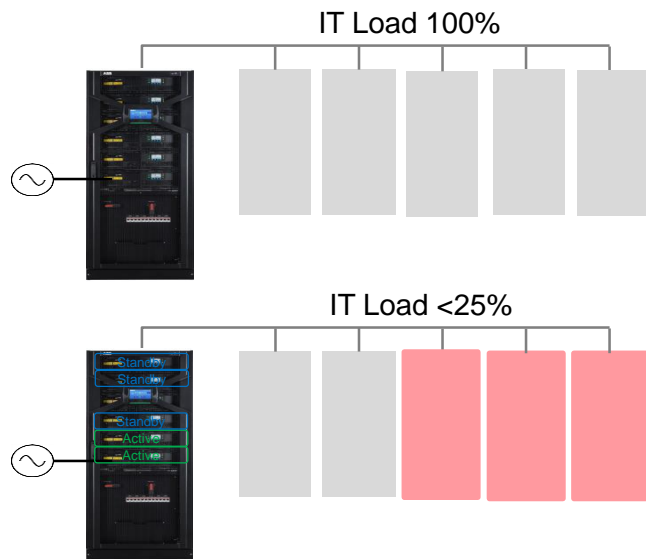
Digital ecosystems

Digitally enabled modular UPS for continuity of service

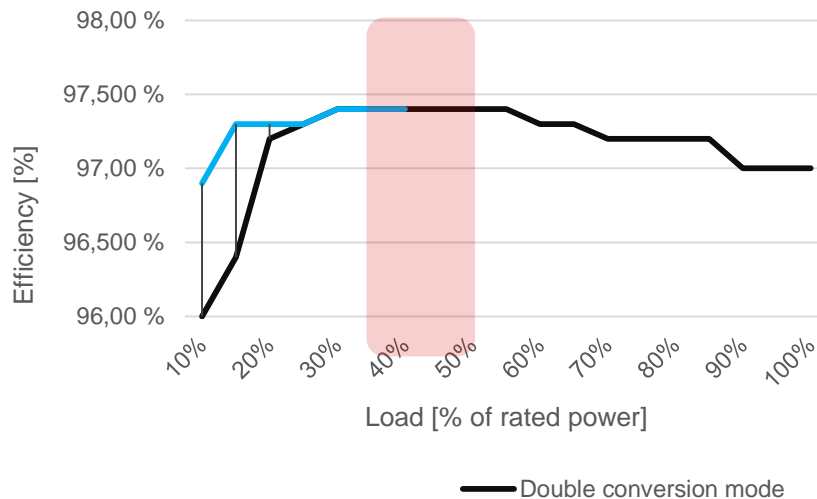
- Decentralized parallel architecture minimizes points of failure and maximizes reliability
- Thanks to the fast information exchange UPS is able to isolate the failure without any impact to the load



Digitally enabled modular UPS for maximum energy efficiency



From 96% to **97.4%** UPS energy efficiency improvement in double conversion mode



Load	125	kW
Redundant configuration	N+1	
Electricity cost	0.10	EUR/kWh
Total saved energy cost over 10 years	16.395	EUR

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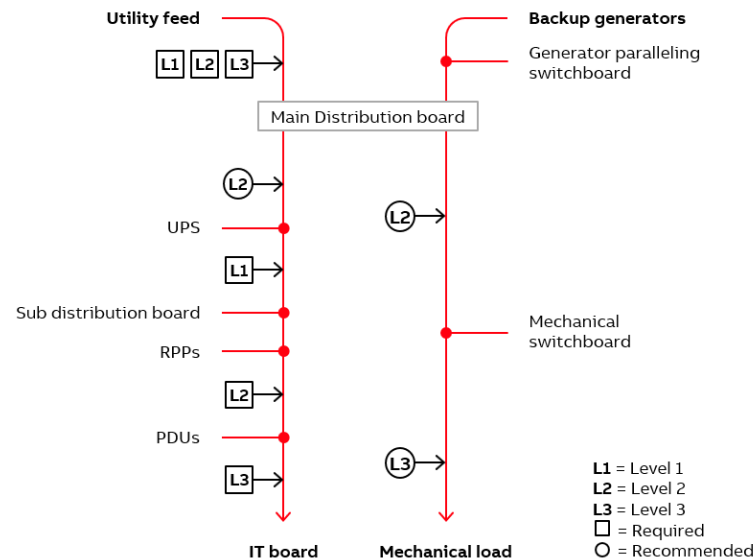
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Energy Efficiency – Measurement levels

Three levels of the PUE measurement

Measurement		Total facility energy	IT equipment energy	Measurement interval
Level 1 (L1) Basic	Required	Utility input	UPS output	Monthly
	Recommended	Utility input	UPS output	Weekly
Level 2 (L2) Intermediate	Required	Utility input	PDU outputs	Daily
	Recommended	Utility input UPS input / output Mechanical inputs	PDU outputs	Hourly
Level 3 (L3) Advanced	Required	Utility input	IT equipment input	15 minutes
	Recommended	PDU outputs	input	15 minutes or less

Placement of the measurement equipment



Energy Efficiency - Standards

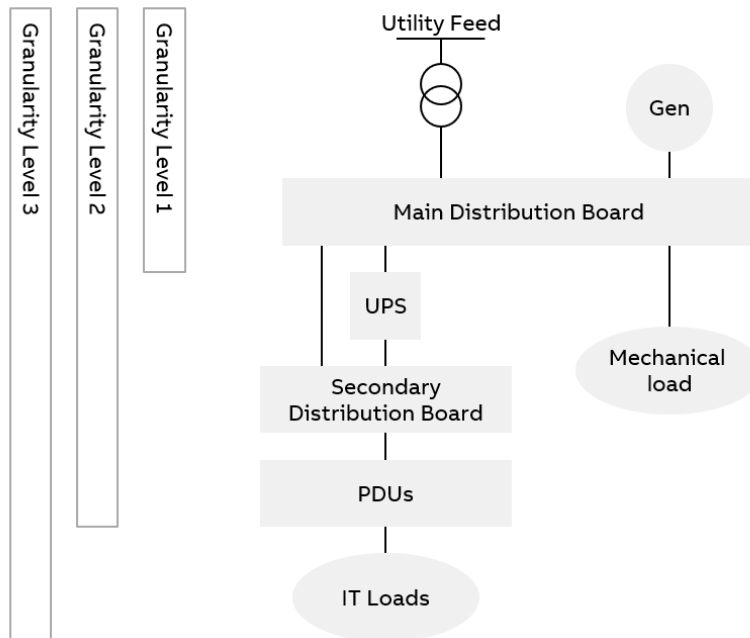
EN 50600-2-2 (2014)

Required:

Measurement of V, I, PF, E with accuracy: class 1 ($\pm 1\%$) of EN 60044-1:1999 for non-billing purposes. Additionally kVA and kWh shall be monitored

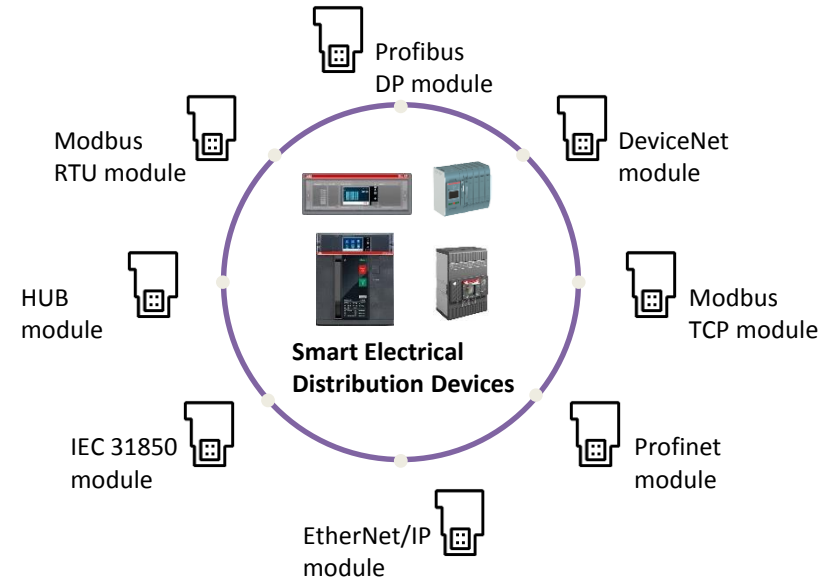
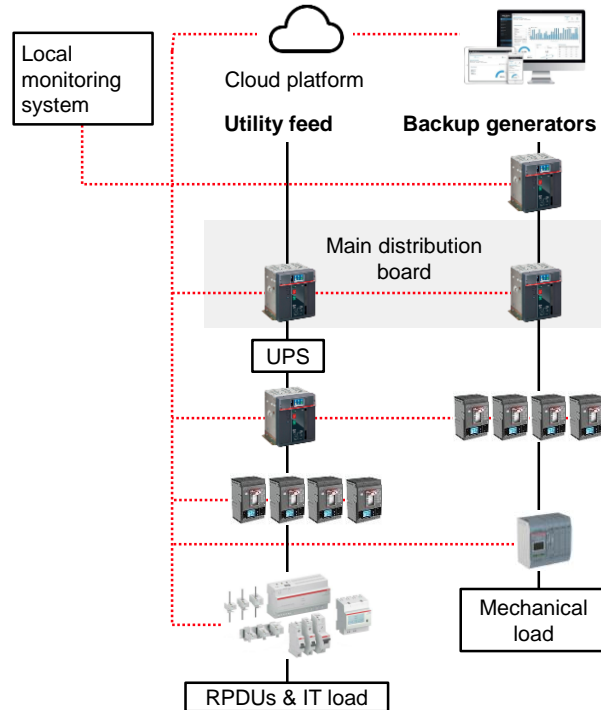
Recommended:

Measurement of total harmonic current distortion (THCD) total harmonic voltage distortion (THVD)

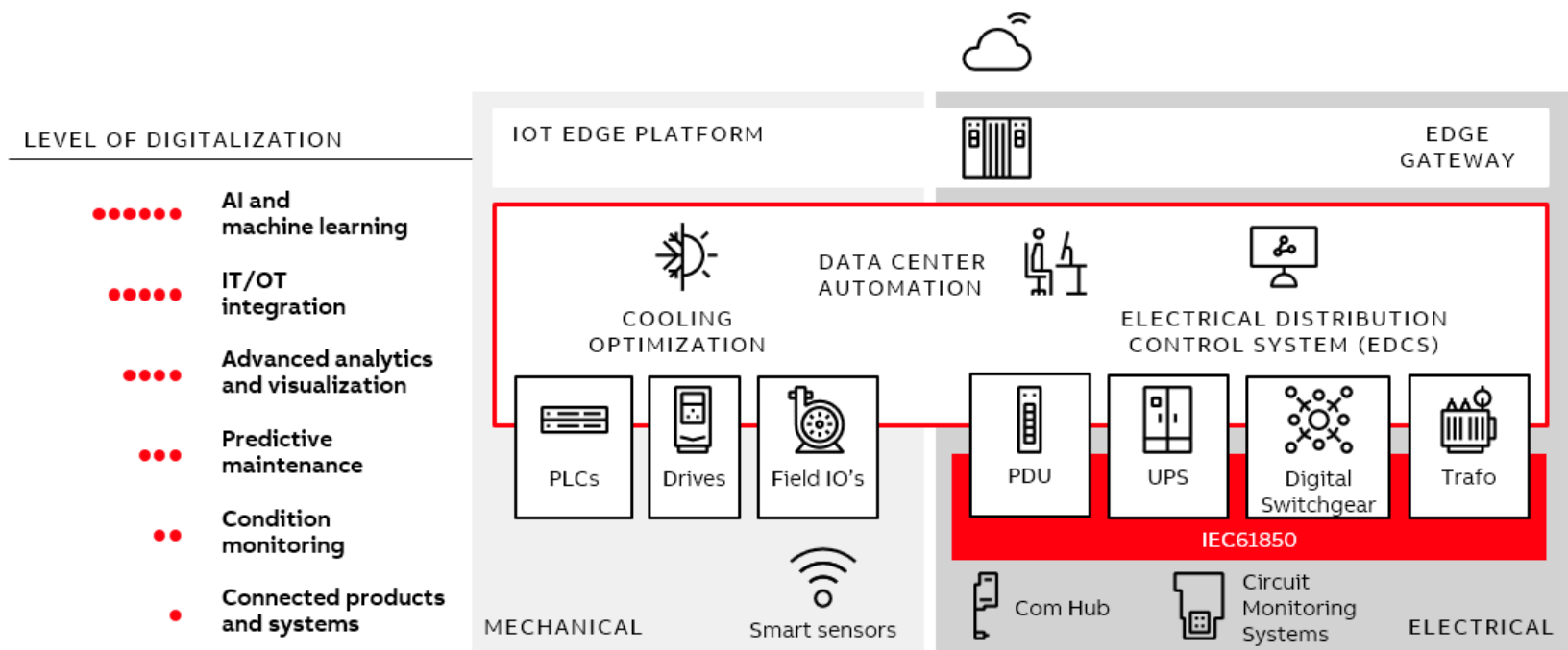


Low Voltage Smart Solutions

- Embedded metering and connectivity electrical distribution devices with high measurement accuracy
- Ready to go 10 minutes cloud connection for data center monitoring
- Further energy efficiency and reliability improvements
- Flexible solution to fit any installation and all requirements



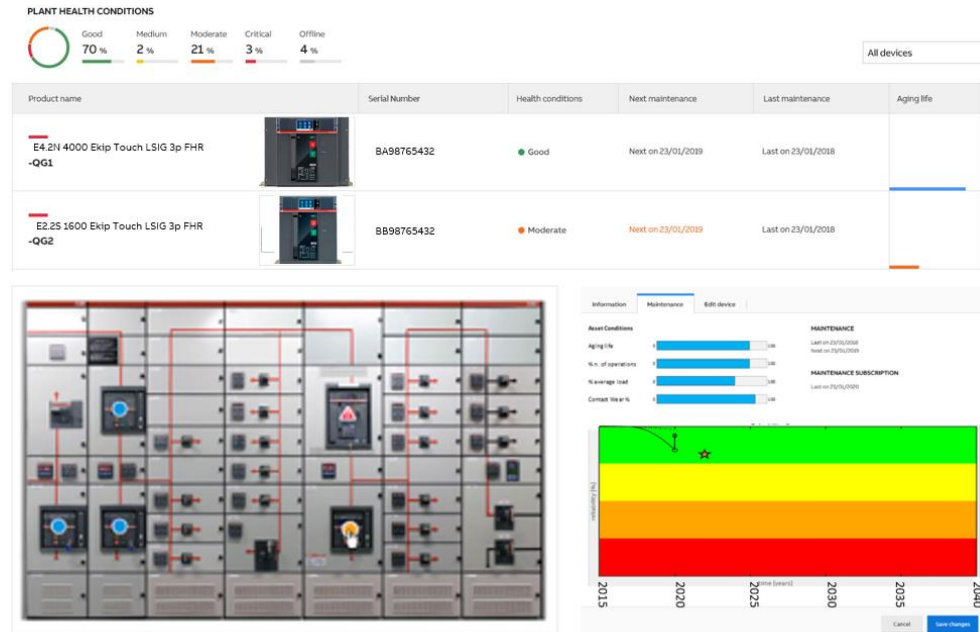
Digital Data Center Operations Architecture



New cloud based advanced technologies

Predictive Maintenance

- Overall data center health conditions
- Smart visualization (traffic light) to monitor the system at a glance, with proactive alerts
- Operation and Maintenance cost saving thanks to optimized maintenance schedule
- Reduced downtime
- Based on an algorithm that considers:
 - Environmental conditions
 - Utilization conditions
 - Circuit breaker Aging
 - Measures (humidity/vibration/temperatures)



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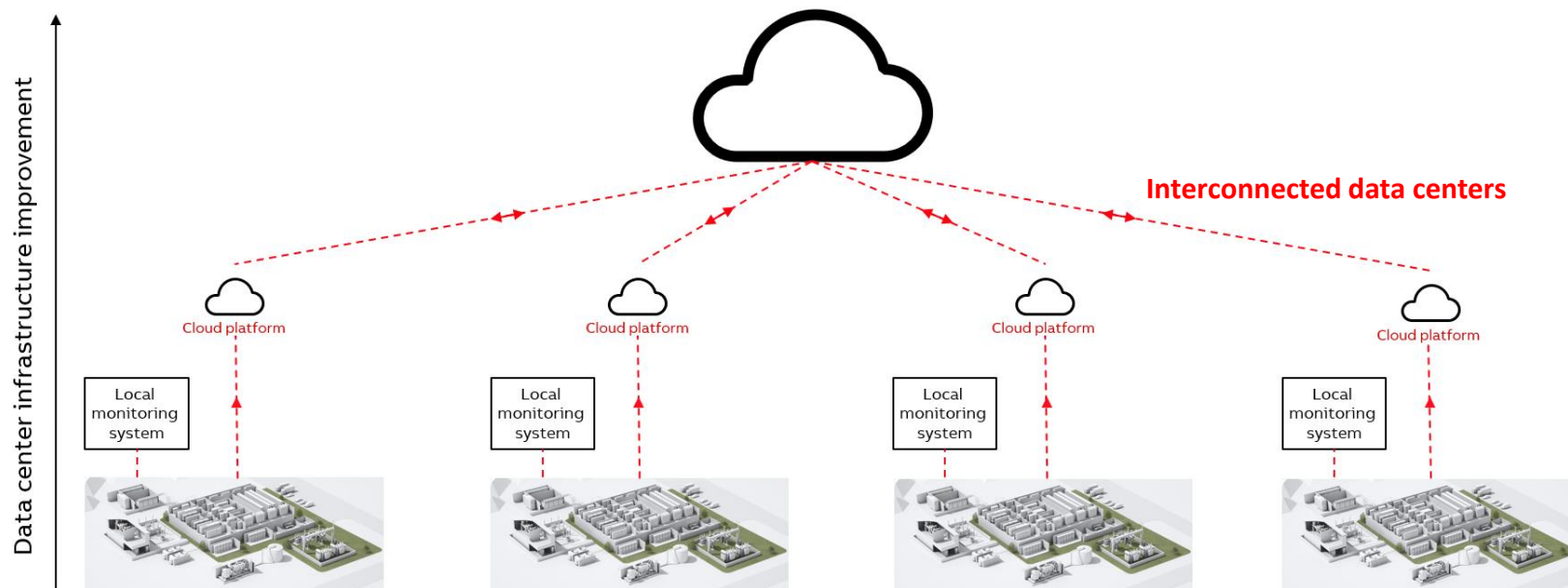
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Future of digital data center infrastructure



Closing Note

Know more

Utilize your data through sensors, devices and software to know more in real-time

Do more

Monitor, control and manage your devices, processes and operations on-site or remotely


Do better

Simulate, predict and optimize through tools, insights and analysis

Together

Work hand-in-hand with our experts and engineers anywhere around the globe for business transformation

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