Son Le
Sales Manager

Overview

Founded: 1971

World's Leader in Switching Power Supplies and DC Brushless Fans

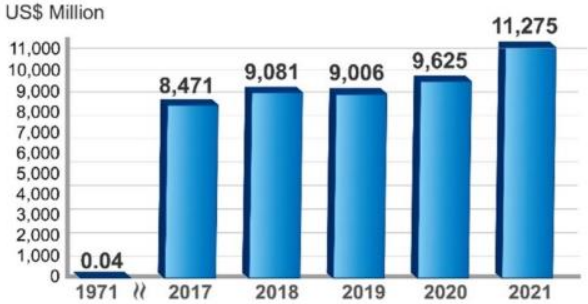
Dedicated to Providing:

- Telecom Power Systems
- Industrial Automation
- Passive and Magnetic Components
- Networking Products
- Visual Displays
- Datacenter Infrastructure
- Renewable Energy and Energy Storage
- EV Charging Infrastructure

Bruce Cheng
Founder and Honorary Chairman

Yancey Hai
Chairman

Worldwide Revenues



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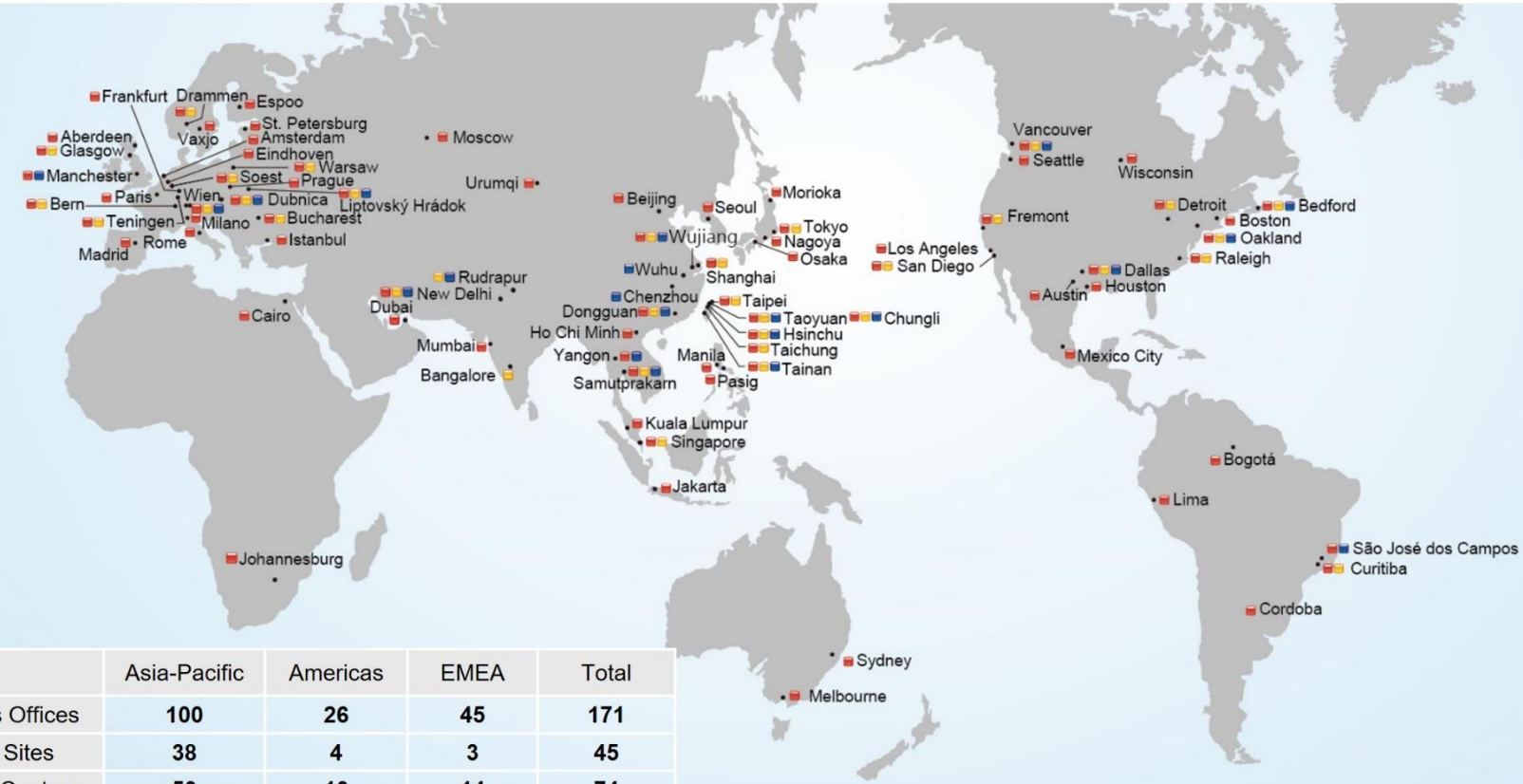
Global Operations



	Asia-Pacific	Americas	EMEA	Total
Sales Offices	**100**	**26**	**45**	**171**
Plant Sites	**38**	**4**	**3**	**45**
R&D Centers	**50**	**10**	**14**	**74**

Delta Electronics

The World's No. 1 Merchant Power Supply Manufacturer

World's No. 1 in Switching Power Supplies, DC Brushless Fans and Telecom Power Systems

171 sales offices and **45** manufacturing facilities worldwide

8% of annual sales revenues invested in R&D with over **9,000** engineers in **74** R&D centers worldwide

Awarded **10,119+** patents and received **47** internationally recognized design awards including iF, Reddot, and the Taiwan Excellence awards.

Worldwide No. 1 supplier of merchant power supplies

The Total Merchant Power Supply Market 2020 Revenue		
Ranking	**Company Name**	**Sales (M/USD)**
1	Delta Electronics	$ 5,636
2	Schneider Electric	$ 3,500
3	Sungrow Power Supply	$ 2,715

Source: Micro-Tech Consultants, 2020

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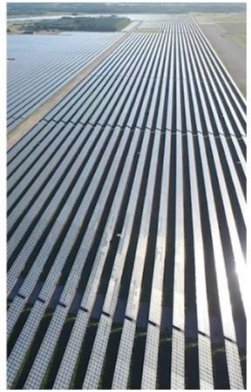
Brand Promise

Business Categories









Power Electronics

- Components
- Embedded Power
- Fans & Thermal Management
- Automotive Electronics
- Merchant & Mobile Power

Innergie

Automation

- Industrial Automation
- Building Automation

Infrastructure

- ICT Infrastructure
- Energy Infrastructure & Industrial Solutions

vivitek

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Green Solutions

Industrial Automation and Smart Manufacturing

Building Automation

Datacenter

Telecom Energy

Renewable Energy

EV Charging

Display and Monitoring

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Infrastructure in Data Center

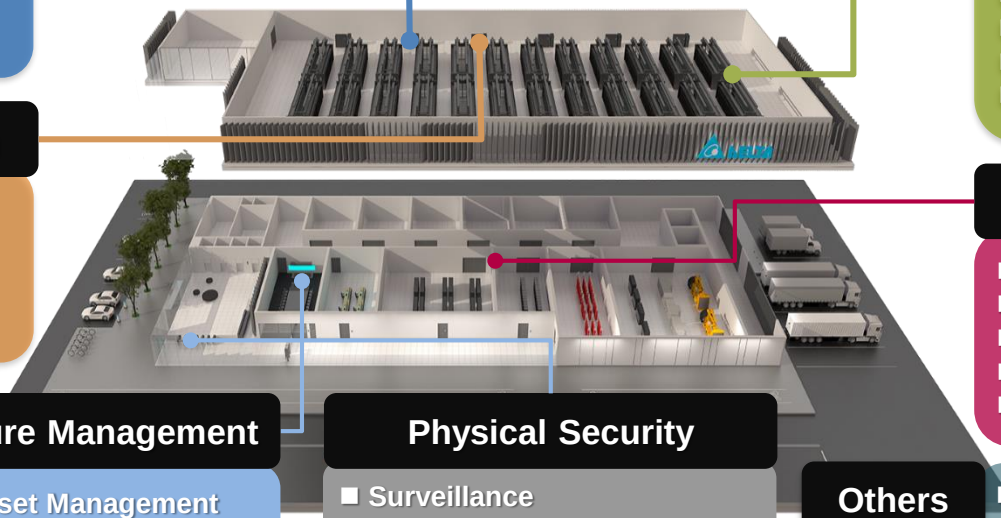
Precision Cooling

- RoomCool
- RowCool
- Adiabatic Cooling
- Immersion Cooling
- Rear Door Heat Exchanger

- Chiller
- Piping

Power Distribution

- MV/LVSB
- PQC
- Generator
- Transformer
- Busway
- ATS
- STS
- PDU
- rPDU



Rack & Accessories

- Server rack
- Network rack
- OCP rack
- Containment
- rack PDU
- rack STS

Power Supply

- AC UPS
- HVDC
- OCP Power
- Battery
- Battery Monitoring System

Data Center Infrastructure Management

- Data Center Operation
- Facility Management
- Energy Management
- Asset Management
- Capacity Management
- IT Optimization

Physical Security

- Surveillance
- Access Control

Others

- Raised Floor
- Fire Suppression
- Lighting Control
- Cabling

Product and Solutions

Product | **Solution** | **Turnkey**

IT / Data Center

Back-Up Power

Communication Network

IT Room

Power Shelf 12V/48V

OCP Rack

RPP

Rack

rPDU

rRPP

rSTS

BBU Shelf 12V/48V

Agema Switch

Network Room

48V DC module

Cooling Room

RoomCool

RowCool

L-series 60/205/400K

DCIM

Power Room

Prefab : Power Skid

Prefab : Power Container

POD

PDU

STS

Busway

DPM 500~1500kW

DPS 500-1500kW

DPH 500/600kW

HVDC 150/300kW

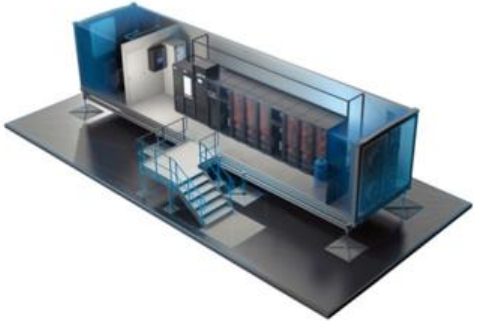
- General Construction
- Server & Storage
- Power Supply System
- Electrical & Mechanical System
- Security & Monitoring System
- Network Infrastructure

Components Introduction

UPS & Datacenter Infrastructure

Micro Datacenter

Modular Datacenter



Containerized Datacenter

Power Container

Datacenter Infrastructure Management (DCIM)

AC Power

DC power system

Precision Cooling

Power Shelf

Racks

Power Distribution Units (PDU)

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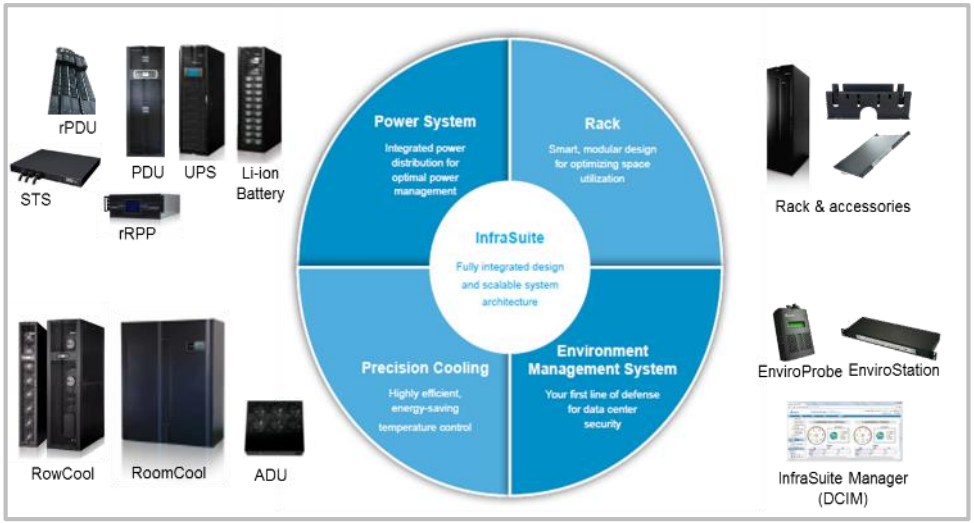
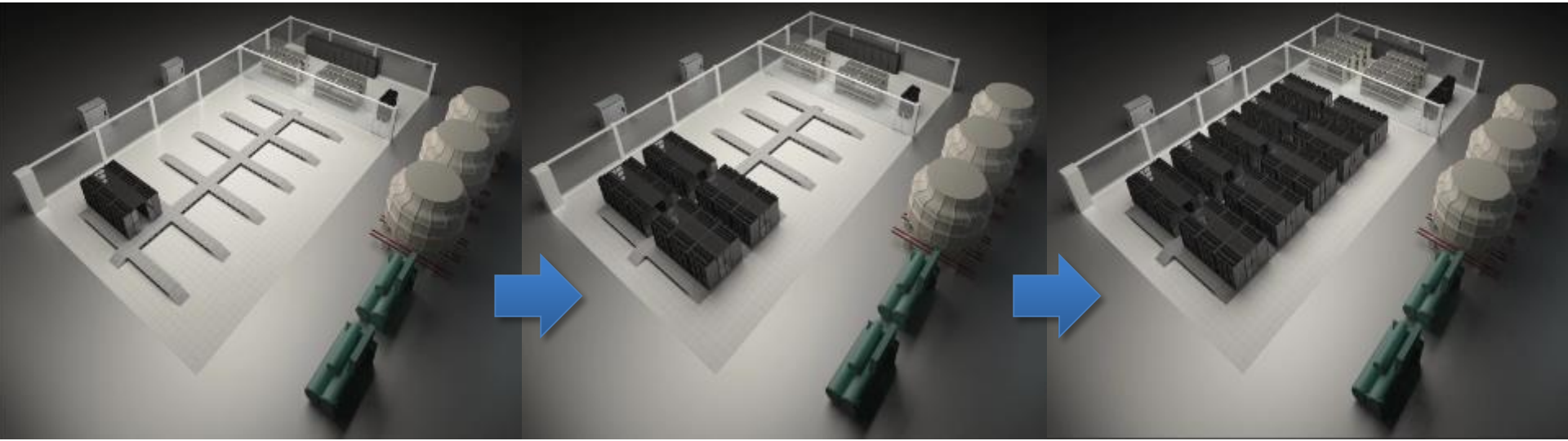
POD – Tier III Ready- Solution as a Product
One Stop Shopping

- The prefabricated modular data center is fully in-house designed, configured and pre-tested with Delta's engineering excellence.
- All subsystems, such as modular UPS, power distribution, battery, cooling, containment, DCIM and more, are highly integrated, standardized and reliable.
- Three standard configurations for quick selection and optional customization according to customer needs



Pay as you grow

- Standard building blocks. Highly scalable.
- Flexible and scalable with only a few weeks or months for deployment



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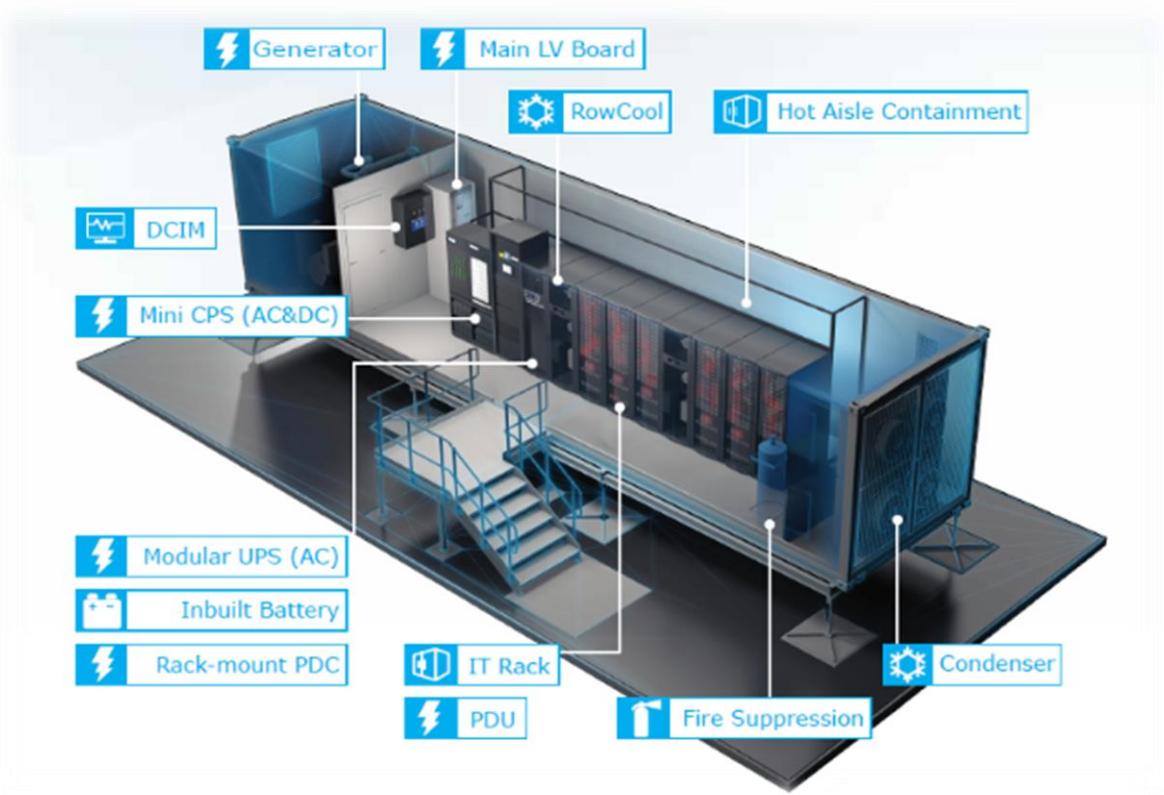
All-in-one Containerized
Data Center Solutions
Quick deployment for edge computing in the IoT world

All-in-one CDC – Tier III Ready



UPS & Power Management

Precision Cooling

Server Rack

DCIM

Fire Suppression

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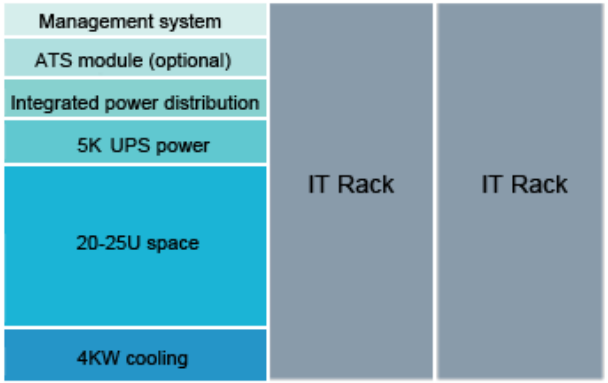
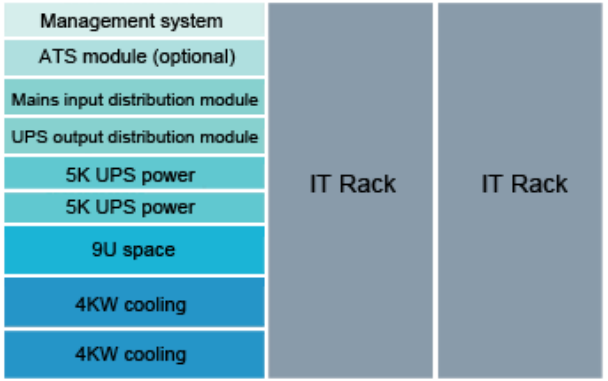
Micro Data Center



Class C architecture configuration diagram



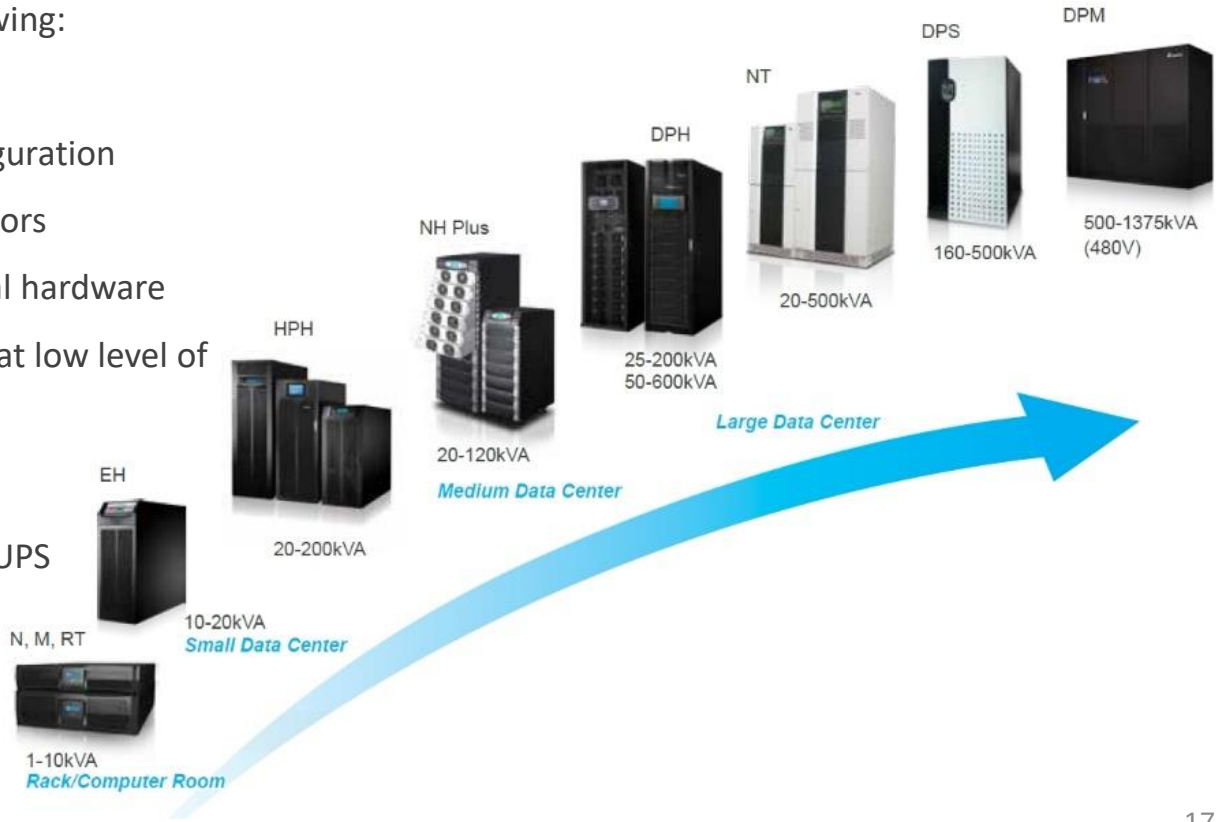
Class A/B architecture configuration diagram

UPS System

Delta UPS Solutions

Delta UPS systems feature the following:

- Leading AC-AC Efficiency
- Fully redundant design and configuration
- High input and output power factors
- Easy expansion without additional hardware
- Supports to seamless operations at low level of total cost of ownership (TCO)
- Warranty up to 3 years
- Excellent Manageability via Free UPS Management Software



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New Modulon DPH Series UPS

Largest Power in 3U Space

Highest Power Density

96.5%

Leading Energy Efficiency

Key Component Failure Prediction

Most Power
50kW / 3U

Up to 6 Power Modules

New

300 kVA

w/ four breakers

Up to 9 Power Modules

500 kVA

w/ bypass switch
(Optional switch cabinet)

Up to 12 Power Modules

New

600 kVA

w/ four switches

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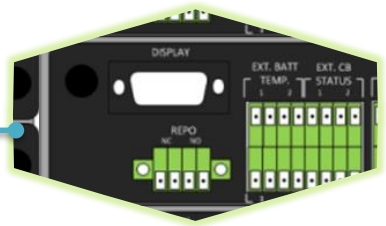
Modular UPS Configuration

10” touch panel

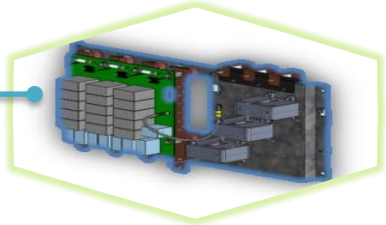
4U hot-swap 20kW
Power module

Inbuilt
Breakers



1U CSU with
hot-swap controller

hot-swap
STS
module



Filter & fuse
Fully front access maintenance

Cooling Solution

Precision Cooling Solutions

	RoomCool	RowCool
Chilled Water (CW)	**HE-CW series** *40-160kW*  **L series** *60-180kW* 	**CW series** *35/43kW* *70/95kW* *120,260kW* 
Direct Expansion (DX)	**HE-DX series** *20-90kW*  **HA-DX series** *20-100kW*  **F series** *20-100kW* 	**DX series** *30kW* *35kW* 

Delta Precision Cooling Solutions

Rack Power Density

3~8kW

> 8kW

25kW and above

Low power density

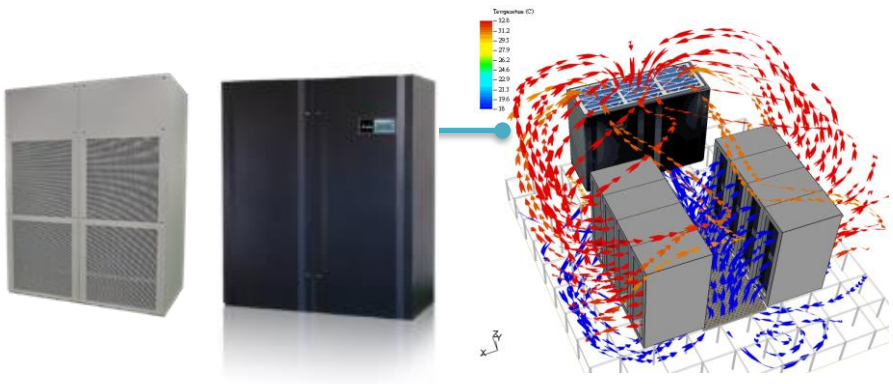
Mid or high power density

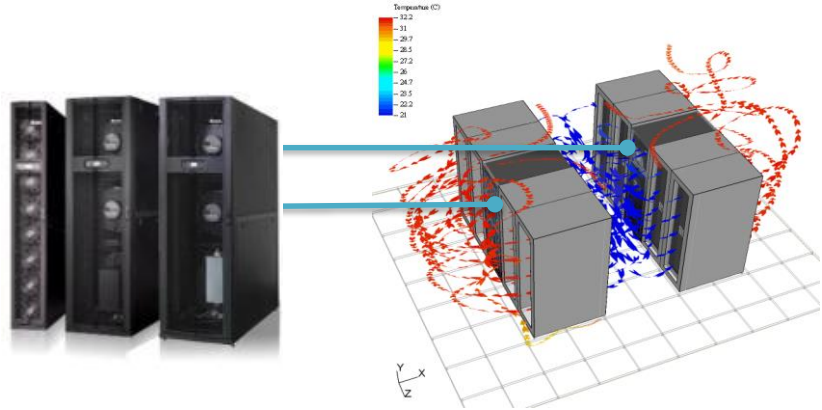
RoomCool Series

Upflow, downflow and frontflow type

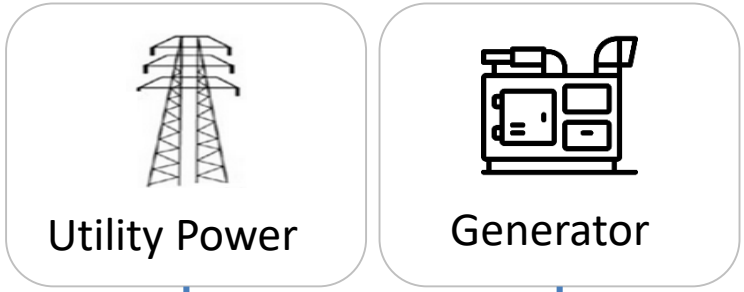
RowCool Series

Close to hot spots. Horizontal airflow for high density applications





Support Dual Input



Dual input function

When a power failure occurs, the built-in ATS will automatically switch to another power feed to keep cooling unit running.

Tier 3, 4 compliant

Built-in dual power supply design can help customers to easily design a data center that comply Tier 3 or Tier 4
Provide continuous cooling, don't need extra UPS for cooling power.

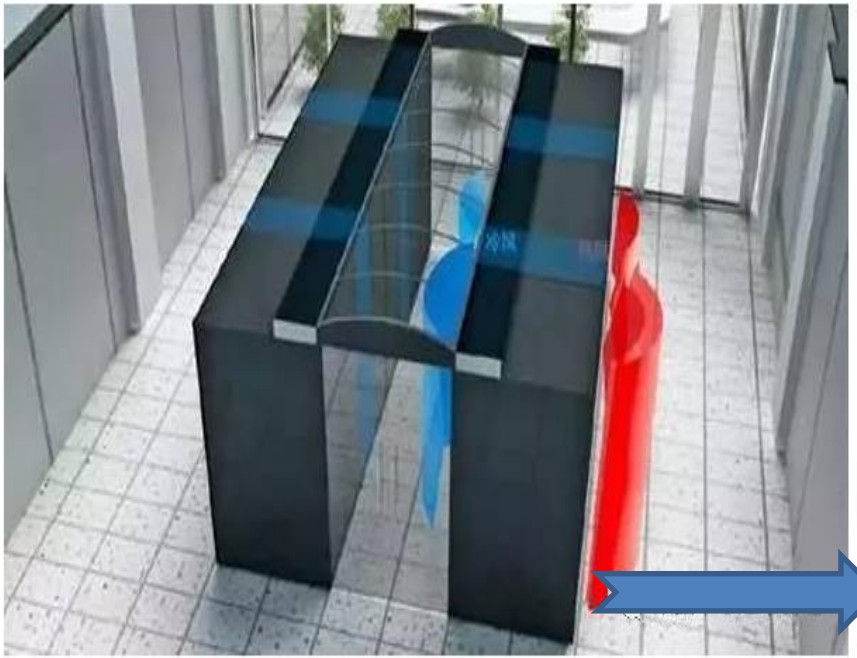
Auto start after power recovery

If cooling unit is single input model, it still equipped with auto restart function. When the power is recovery, the cooling unit will automatically start and run at previous operating state instantly.

*Depends on selected model

How to Achieve Low PUE?

Adopting Horizontal Air Supply Scheme



- Disadvantage
  - ✓ High initial investment cost

- Advantage
  - ✓ The cold and hot air is separated from the air to avoid turbulence. The utilization ratio of cold source is increased by 20%.
  - ✓ Precision air conditioning refrigeration efficiency is high.
  - ✓ Close to IT equipment, refrigeration, high efficiency and energy saving
  - ✓ Solving the heat dissipation problem of high density rack

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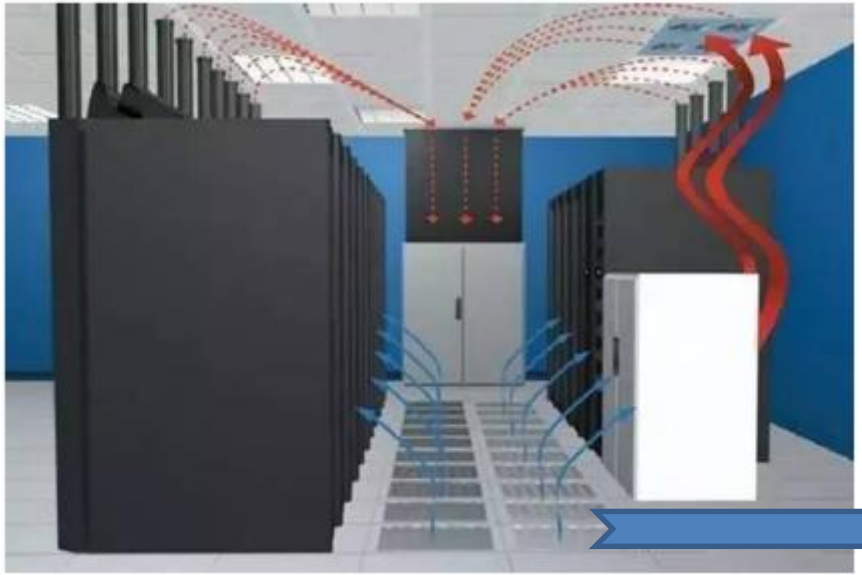
How to Achieve Low PUE?

Adopting Down Flow Air Supply Scheme



- Advantage
  - ✓ Low initial investment cost
  - ✓ Low density (less than 5kw) heat dissipation needs can be solved.

- Disadvantages
  - ✓ Short circulation of hot and cold air and low utilization ratio of cold source
  - ✓ There is a gradient problem between air supply temperature and air volume
  - ✓ Can not solve the heat dissipation demand of high-density equipment
  - ✓ The air conditioning efficiency is low

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Turnkey Solution Offering

Data Center Services & Solutions

Full Life Cycle Services

Before
- Design
- Site Selection
- Permits
- Project Master Plan

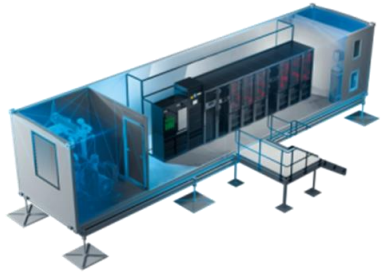
During
- Detailed Design
- Construction
- Installation
- Project Management
- Start up
- Commissioning
- Handover
- Training

After
- Maintenance/Service
- Annual Inspection
- Upgrades
- Expansions

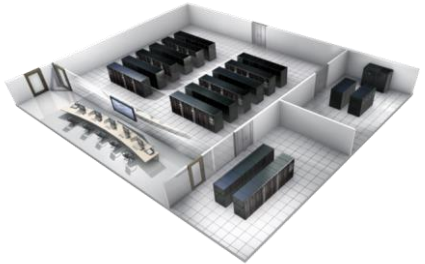
Turnkey Solutions

- Raised floor / lowered ceiling
- Electrical installation including switchboards
- UPS
- Generator
- Network cabling copper & fiber
- Server racks and rPDU
- Fire suppression and detection
- Precision Cooling
- Cold / Hot Aisle Containment
- DCIM
- Access control
- CCTV
- Project Management
- Service and maintenance

Prefabricated data centers



Traditional data centers



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Tier Uptime Certificate

What is Tier Uptime: Uptime Institute's Tier Standard is the globally recognized standard for data center reliability and overall performance

Tier Level:

Item	Definition	Scoring data center tiers on uptime
Tier 1 (Basic Capacity)	A Tier I data center is the basic capacity level with infrastructure to support information technology for an office setting and beyond	Tier 1 DCs have a 99.671% uptime percentage per year. Maximum total yearly downtime = 1729.2 minutes or 28.817 hours each year
Tier 2 (Redundant Capacity)	Tier II facilities cover redundant capacity components for power and cooling that provide better maintenance opportunities and safety against disruptions	Tier 2 DCs have a 99.741% uptime percentage per year. Maximum total yearly downtime = 1361.3 minutes or 22.688 hours
Tier 3 (Concurrently maintainable DC)	A Tier III data center is concurrently maintainable with redundant components as a key differentiator, with redundant distribution paths to serve the critical environment.	Tier 3 DCs have a 99.982% uptime percentage per year. Maximum total yearly downtime = 94.6 minutes or 1.5768 hours
Tier 4 (Fault Tolerance)	A Tier IV data center has several independent and physically isolated systems that act as redundant capacity components and distribution paths. The separation is necessary to prevent an event from compromising both systems. The environment will not be affected by a disruption from planned and unplanned events.	Tier 4 DCs have a 99.995% uptime percentage per year. Maximum total yearly downtime = 26.3 minutes or 0.4 hours

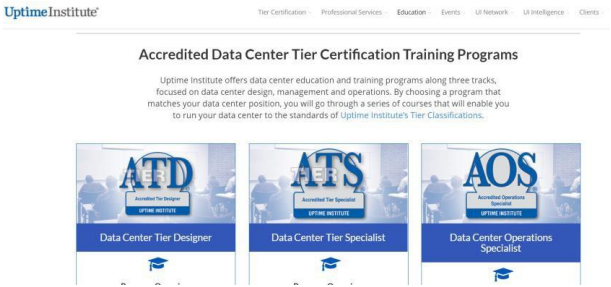
Tier Uptime Certificate

Tier Certificate:

Certificate	Definition	Remark
Tier Certification of Data Center Design Document (TCDD)	Evaluate if the design of Data Center can comply with Tier Uptime or not.	
Tier Certification of Constructed Data Center Facility (TCCF)	Evaluate if the Implementation of Data Center can comply with Tier Uptime and follow design or not	
Tier Certification of Data Center Operational Sustainability	Comprehensive assessment of Tier-Certified facility management and operations practices	

Note: In Vietnam, only 05 Data centre got TCDD and 02 Datacenter got TCCF Tier III (HTC, CMC)

Professional Team



Accredited Data Center Tier Certification Training Programs

Uptime Institute offers data center education and training programs along three tracks, focused on data center design, management and operations. By choosing a program that matches your data center position, you will go through a series of courses that will enable you to run your data center to the standards of Uptime Institute's Tier Classifications.

Turkey Data Center Requirements

- Green Data Center, Uptime certified 2N Tier 3 TCDD & TCCF data center

  - Total Capacity: 150 IT racks, 750KW
  - Total Land Area for DC Building：500 m2 (Generator, fuel storage, Power Transformers)
  - Construction Area：300 m2 (for Data center, NOC room , Battery, UPS, AC Main switchgear)
  - Construction Class： Class III (Tier III) for Data center Building.
  - Backup time: 15min
  - Fire fighting system design and certificate
  - PUE < 1.45

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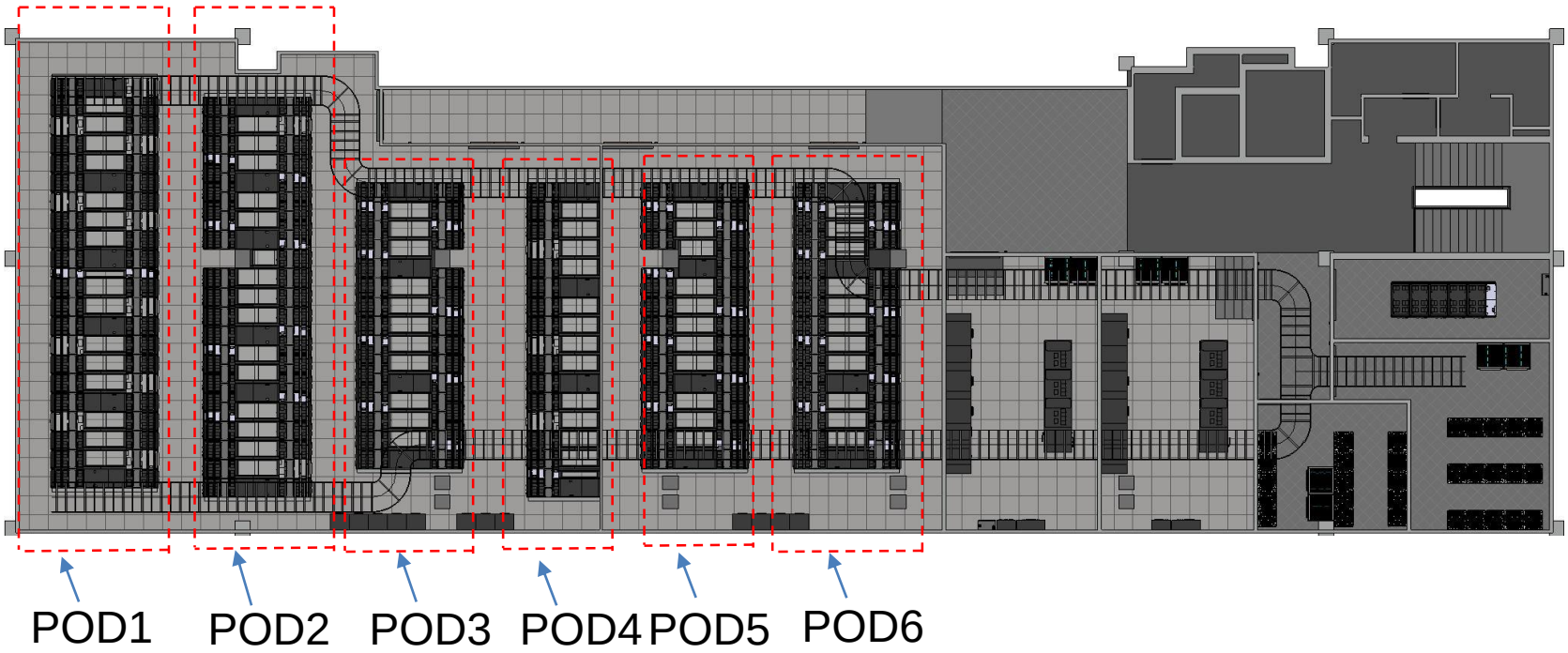
3D Model Master Top Layout View



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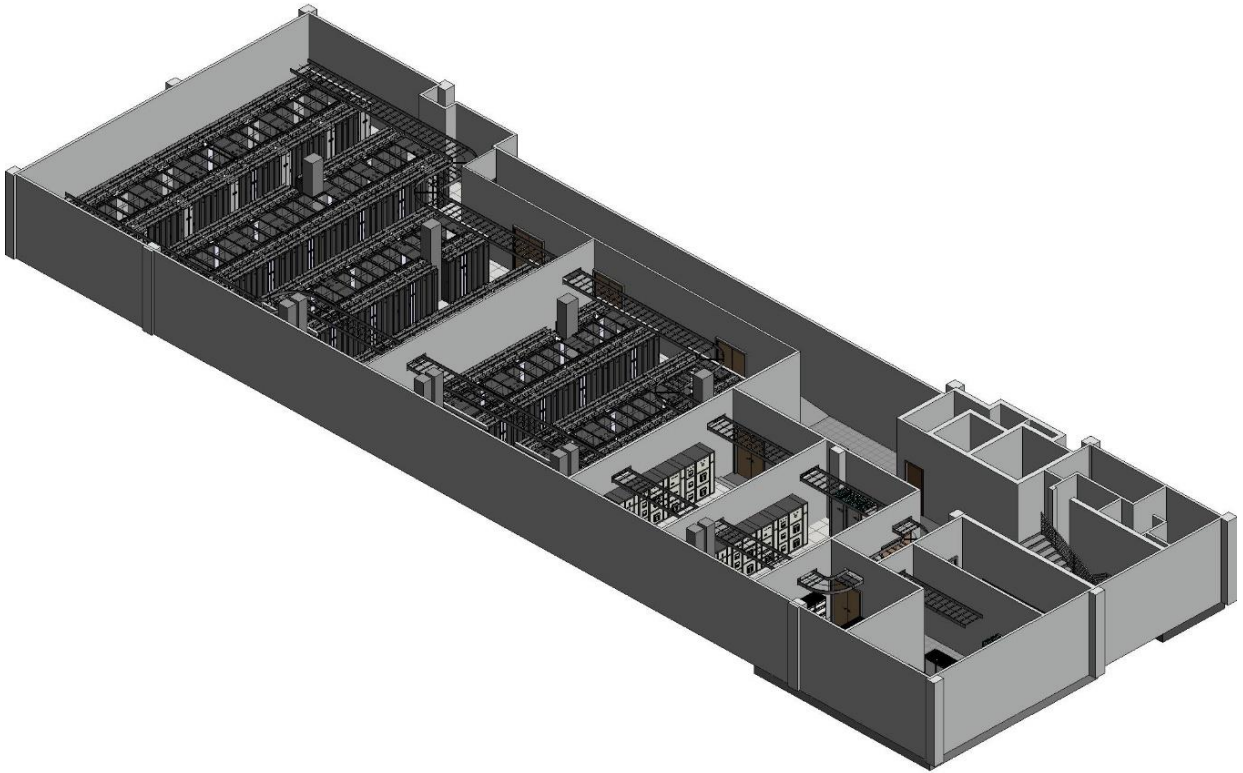
3D Model Close Top View Layout



Smarter. Greener. Together.

To learn more about Delta, please visit www.deltaww.com