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Power ICT in a Smart Way

Huawei Data Center Facilities Solutions

HUAWEI TECHNOLOGIES CO., LTD.

HUAWEI

With the rapid development of cloud computing and mobile Internet businesses, the growth of IT density and energy consumption are bringing a lot of challenges to the traditional data center. Traditional data centers are suffering from long construction periods, low efficiency, high TCO and inefficient management.

To comply with the requirements of cloud computing and virtualization in future, as well as improving the efficiency of data centers and reducing the TCO, HUAWEI has launched the data center facilities solution. It is a new generation data center solution with complete integration of cabinets, power supply and distribution systems, cooling systems, cabling systems, management software, and much more. HUAWEI data center facilities solution can help customers win in the “Cloud” era through fast deployment, flexible expansion, high efficiency & reliablility and intelligent management.

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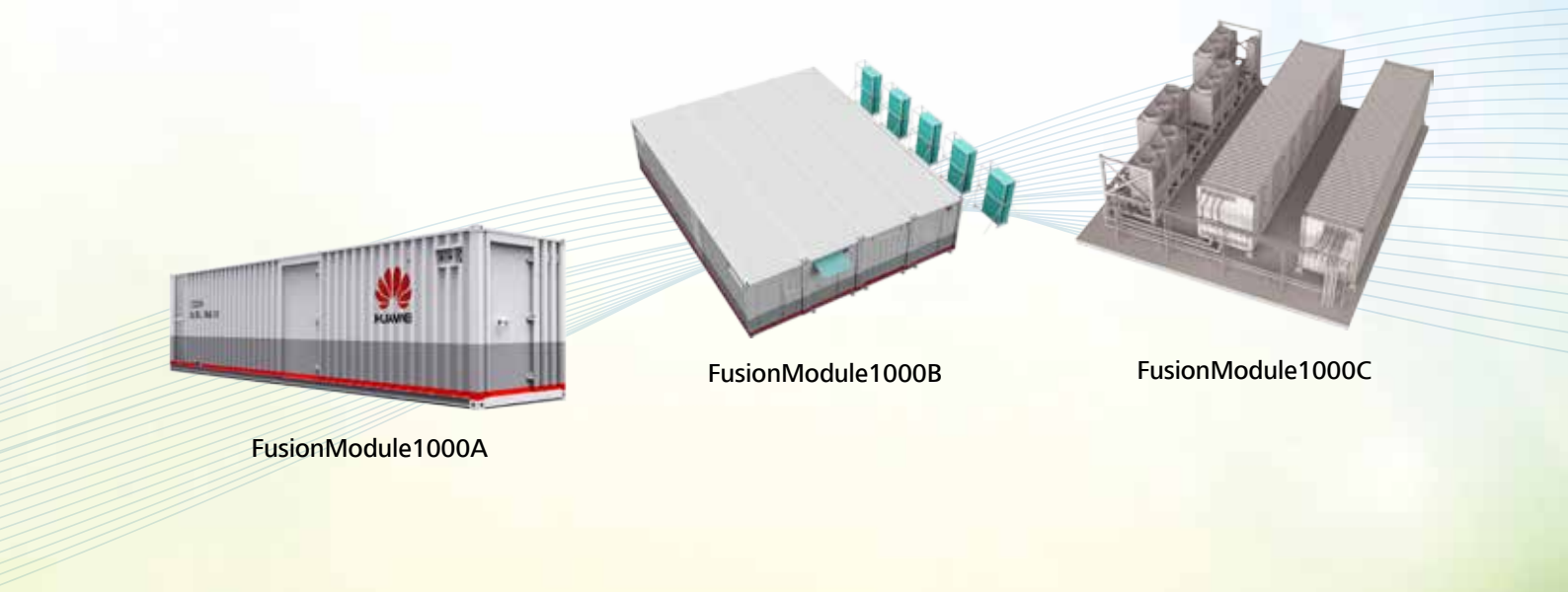

FusionModule1000A

FusionModule1000B

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Smart Date Center, Reliable, Efficient, Simple

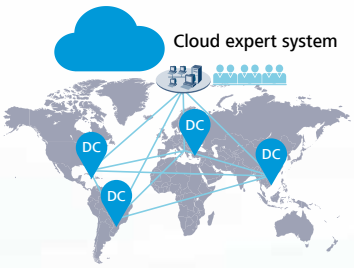
Digital

Digital management
for facility components

Lifespan

Networked

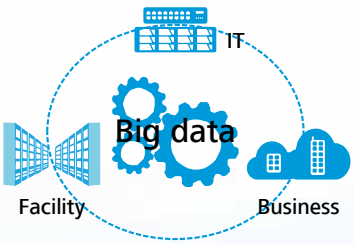
Multi-DCs networked
and Centralized
Management



O&M
efficiency

Smart

Facility /IT interaction
iPower+iCooling



Energy
consumption

Modular Data Center

FusionModule2000 Smart Modular Data Center

Introduction

HUAWEI FusionModule2000 is a new generation smart modular data center solution with complete integration of cabinets, power supply and distribution systems, cooling systems, cabling systems, management software, and other subsystems. It supports flexible deployment with single or dual row, cold or hot aisle containment. The maximum IT power can be up to 21kW/rack.

FusionModule2000 (Dual-row)

Application Scenarios

- Single module is applied to small or medium data center (total IT load≤128kW, area≤500m^2), also applied to large data center for branch office of big enterprise.
- Multiple modules can be used to construct a large data center to meet large enterprise data center requirements, such as government, education, healthcare, finance, telecom industries data center etc.

FusionModule2000 (Single-row)

Features & Value

Reliable

- Dehumidifying at low load rate down to 10%, ensuring the safe operation of IT equipment
- Excellent environment adaptability, stable operations under extreme conditions
- Pre-alarm of circuit breaker terminal with temperature monitoring, batteries auto-shutdown for fire protection, power-off rate reduced by 50%

Efficient

- Closely coupled cooling, efficient power system, PUE down to 1.45 (Real test in Shenzhen)
- Aisle containment, separated hot and cold air, eliminating hotspots
- Integrated high efficiency UPS power system

Simple

- Standardized devices, modular architecture, on-demand deployment
- Integrated power supply and distribution, space saving by 1~2 IT racks
- Remote and local intelligent management, mobile O&M, simple and convenient

Specifications

Item	Specifications	
System	Dimension	Single-row with aisle containment (L×W×H): L×2400×2000mm, L≤15 m L×2300×2000mm, L≤15 m L×2400×2200mm, L≤15 m
		Dual-row with aisle containment (L×W×H): L×3600×2000mm, L≤15 m L×3400×2000mm, L≤15 m L×3600×2200mm, L≤15 m
	Cabinet number per module	Single row: 2~24; Dual row: 6~48
	Power supply	380/400/415Vac, 50/60Hz, 3Ph+N+PE
	IT power consumption per module	N+1 maximum support 112kW 2N maximum support 128kW
	Maximum power per rack	21kW/R
	Operation condition	T1 condition: outdoor-40°C~+45°C (indoor5°C~45°C) T3 condition: outdoor-20°C~+55°C (indoor5°C~45°C)
	Availability	Tier II or Tier III (up to Tier IV)
	Altitude	0~1000m (derating above 1000m)
	Installation	Installing on concrete floor or raised floor
Cabinet	Dimensions (H×W×D)	2000mm×600mm×1200mm 2000mm×600mm×1100mm 2200mm×600mm×1200mm
	Space available	42U/47U
	Protection level	IP20
Air-cooled In-row air conditioner	Cooling capacity	25kW/35kW
	Dimensions (H×W×D)	2000mm×300mm×1100mm 2000mm×600mm×1100mm
	Power supply	25kW air conditioner: 380V AC~415V AC 50/60Hz, 3Ph+N+PE 35kW air conditioner: 380V AC~480V AC 50/60Hz, 3Ph+N+PE
	Refrigerant	R410A
Chilled water In-row air conditioner	Cooling capacity	30kW
	Dimensions (H×W×D)	2000mm×300mm×1200mm
	Power supply	200~240V (1Ph, 50/60Hz)
	Refrigerant	Water/Ethylene Glycol
Integrated UPS (UPS inside)	Input voltage	380/400/415Vac, 50/60Hz, 3Ph+N+PE
	Input power factor	Full load > 0.99, Half load > 0.98
	Rated capacity	40~160kVA
	Efficiency	≥ 96%
	AC SPD	20kA, 8/20μs
Integrated power distribution cabinet (UPS outside)	Input voltage	380/400/415Vac, 50/60Hz, 3Ph+N+PE
	Rated capacity	IT: 250A, Air conditioner: 160A
	AC SPD	20kA, 8/20μs

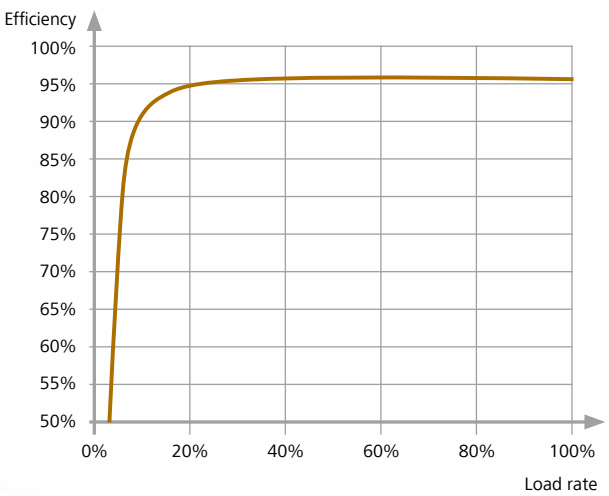
Integrated UPS

Introduction

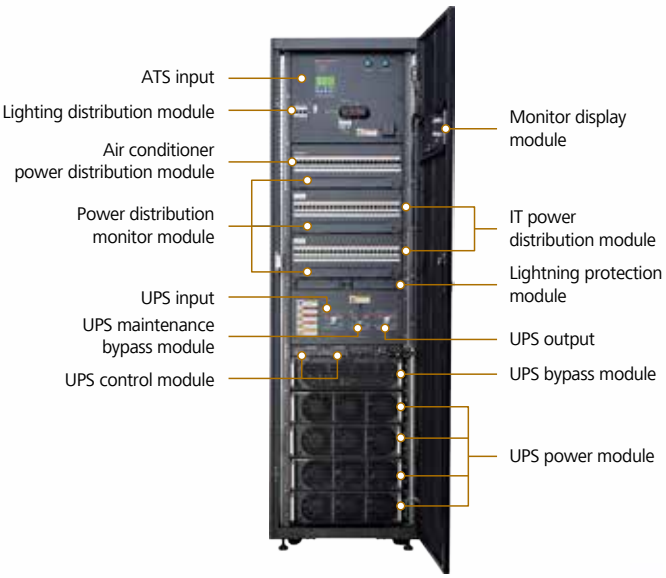
Integrated UPS developed by Huawei is a new generation of high integration power system in a cabinet which is suitable for modular data center. It includes UPS power, IT power distribution, air conditioner power distribution, lighting power distribution, ATS, UPS input power distribution and UPS output power distribution. And it features easy to maintenance, high reliability and high efficiency.

Features & Value

- 160kVA integrated UPS power system, leading power density in industry
- UPS and PDF are merged in one cabinet, shorten the installation time by 50%, compact design, space saving by 1~2 IT racks
- Intelligent detection of brand circuit, improving the ability of continuous power supply
- Sensible temperature of switch wiring terminal, proactive prevention of local hot spot
- Pre-alarm of circuit breaker terminal with temperature monitoring, batteries auto-shutdown for fire protection, power-off rate reduced by 50%



UPS Efficiency curve



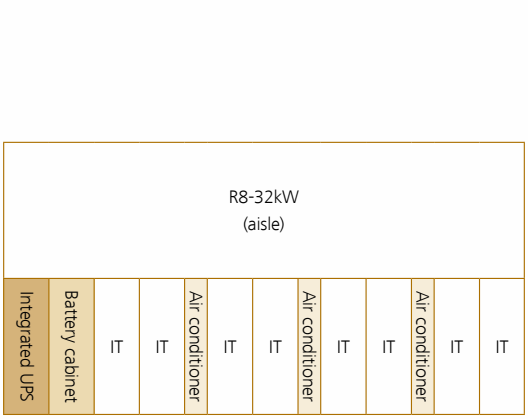
Specifications

Item	Specifications			
Input	Rated input voltage	380/400/415Vac, 50/60Hz, 3Ph+N+PE		
	Input voltage range	80V AC~280V AC (single phase) (80VAC~176V AC, load linear derating)		
	Input frequency range	40Hz~70Hz		
	Input power factor	Full load > 0.99, Half load > 0.98		
Output	Rated voltage	380/400/415Vac, 50/60Hz, 3Ph+N+PE		
	Voltage distortion (linear load)	THD ≤ 1%		
	Voltage distortion (nonlinear load)	THD ≤ 4%		
	Power factor	1		
	Maximum load peak factor	3:1 (meet IEC 62040-3)		
System	Efficiency	≥ 96%		
	Module current imbalance index	Parallel current imbalance < 5%		
	Connection mode	Upper inlet and upper outlet		
	AC SPD	20kA, 8/20μs		
Configuration	Rated capacity	40-160kVA		
	Input mode	MCCB/ATS, single route or double route		
	Input specification	160A	250A	400A
	IT power distribution	40A/1P×18; 63A/1P×6	40A/1P×18×2; 63A/1P×6×2	
	Air conditioner power distribution	40A/3P×3; 63A/3P×1	40A/3P×6; 63A/3P×2	
	Lighting power distribution	10A/1P×3		
Dimensions	2000mm×600mm×1100mm			

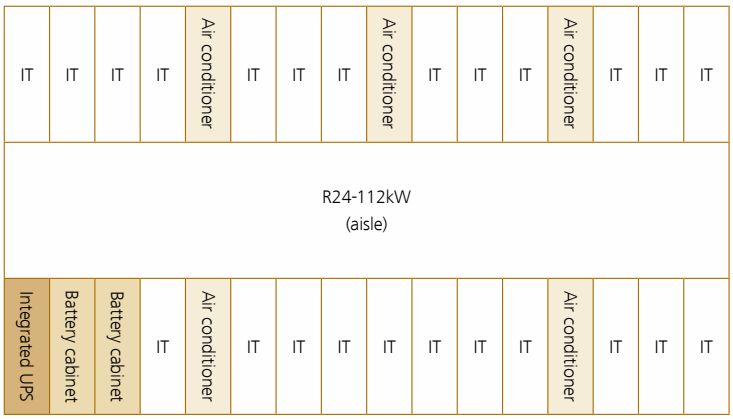
Typical Configurations——UPS Inside

Single-row cabinet scenario

Dual-row cabinet scenario



R8 single row module typical layout



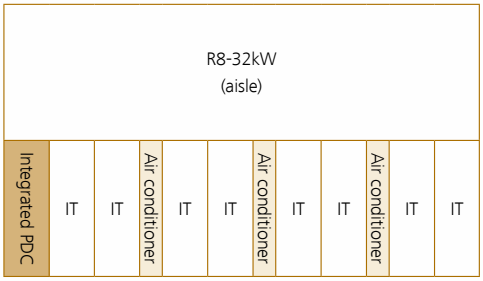
R24 dual row module typical layout

IT power (kW)	Qty of IT racks	Max. power density (kW)	Qty of air conditioner	Redundancy	Aisle width (mm)
20	5~11	4	25kW×2	N+1	1200
40	5~11	7	25kW×3	N+1	1200
60	5~23	7	25kW×4	N+1	1200
80	7~23	7	25kW×5	N+1	1200
100	9~23	7	25kW×6	N+1	1200
112	12~24	7	35kW×5	N+1	1200

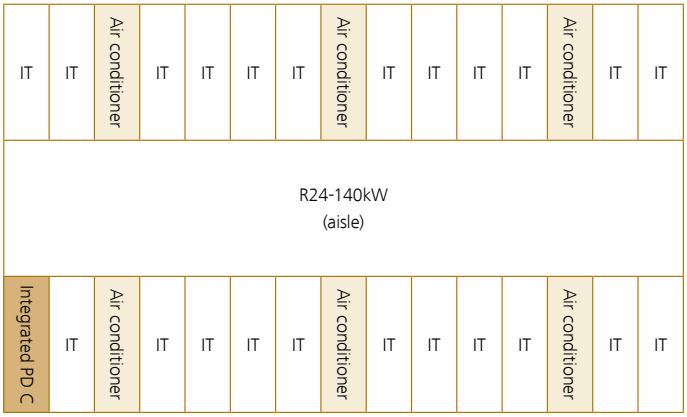
Typical Configurations——UPS Outside

Single-row cabinet scenario

Dual-row cabinet scenario



R8 single row module typical layout



R24 dual row module Typical layout

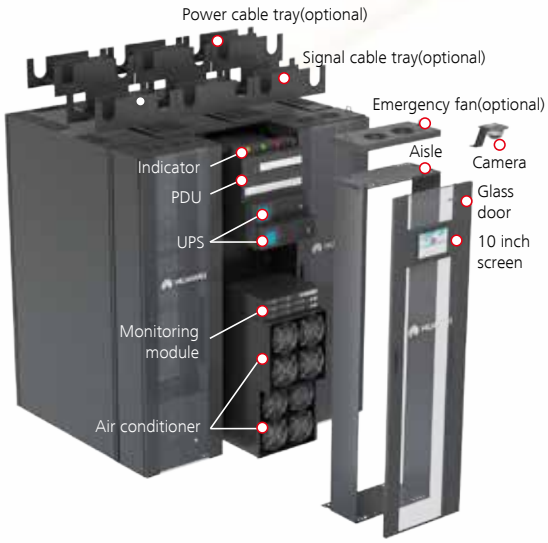
IT power (kW)	Qty of IT racks	Max. power density (kW)	Qty of air conditioner	Redundancy	Aisle width (mm)
20	5~23	4.2	25kW×2	N+1	1200
40	5~23	7	25kW×3	N+1	1200
60	5~23	7	25kW×4	N+1	1200
80	7~23	7	25kW×5	N+1	1200
100	9~23	7	35kW×6	N+1	1200
112	12~24	7	25kW×5	N+1	1200
140	13~23	7	35kW×6	N+1	1200

Modular Data Center

FusionModule800 Smart Small Data Center

Introduction

FusionModule800 Smart Small Data Center is a new-generation data center solution. It is integrated with PDU, UPS, monitoring system, cooling system, and cabinet system in a comprehensive cabinet. A DC facilities integrated cabinet is integrated with power distribution, UPS, rack AC, monitoring, etc. to save room. IT cabinet has flexible expansion on both sides with a single module supporting max. 8 cabinets, the IT load equal to or lower than 15kW and max. power density up to 7kW/R. A 250mm cold or hot aisle alongside single-row cabinets is configured.



Three cabinets with contained cold aisle

Application Scenarios

- Application in branch banks or their subsidiaries, education, medical, or public security organizations, small and medium-sized enterprises, and retail merchandising
- Indoor modular data center
- Tier I or Tier II construction

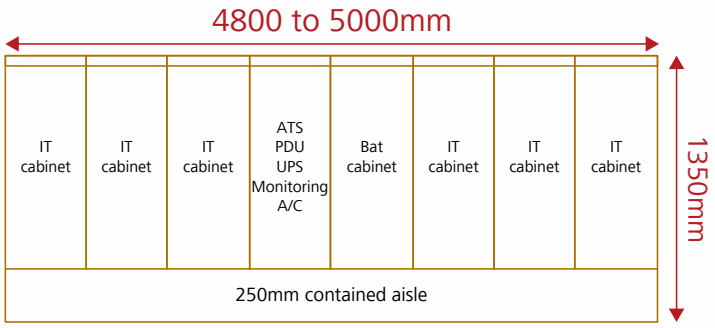
Features & Value

Simple

- PDU, UPS, monitoring and air conditioner are integrated in a cabinet, preassembly, only need cabinet combination. Deployment time only need 4 hours
- Mobile phone APP, SMS alarm, remote web platform control, Network centralized monitoring, realizing unattended operation

Efficient

- In-rack air conditioner, saving at least one cabinet installation space
- Frequency conversion refrigeration, aisle containment, superior PUE 1.37*



Maximum configuration

Reliable

- Dehumidifying at min. 10% IT load, solving the condensation risk at low-load and high humidity situation
- Battery overheating intelligent shutdown to prevent the fire
- Key component redundancy design, improving reliability of the system

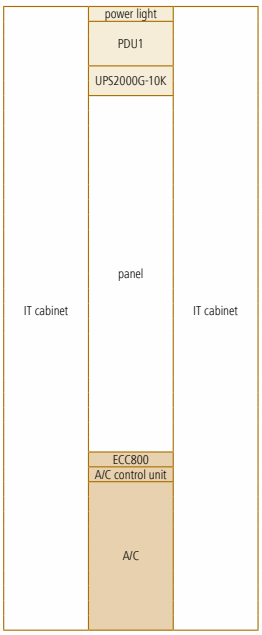
Remarks: Average value in Beijing

Specifications

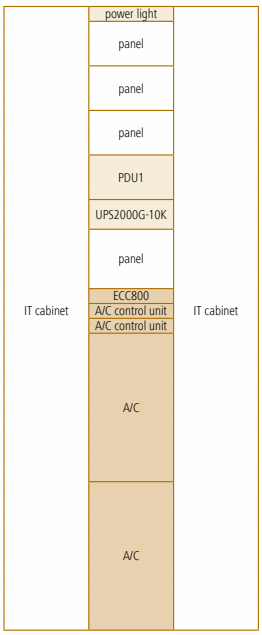
Overall Solution		
Maximum quantity of cabinets supported by a single module	8	
Quantity of IT cabinets	0 to 6	
Aisle type	Single-row hot/cold aisle	
Maximum IT power consumption	15kW	
Maximum power density of a single cabinet	7kW	
Battery deployment mode	Battery pack, battery cabinet, or battery rack	
Backup power	15 min/30 min	
Installation mode	Concrete floor or raised floor	
Power system	380/400/415Vac, 50Hz, 3Ph+N+PE	
System protection level	IP20	
Ambient temperature	-20°C to 45°C	
Cooling System		
Power supply mode	220/230/240Vac, 50Hz, 1Ph+N+PE	
Refrigerating capacity of air conditioners	11kW	
Air conditioner configuration	1+0, 1+1, 2+0, 2+1	
Cooling mode	Direct expansion air-cooled	
Sensible heat ratio (sensible cooling capacity/total cooling capacity)	≥ 0.99	
Installation mode of the air conditioner	Mounted to a rack	
Air volume (of a single air conditioner)	2600m³/h	
Air supply mode	Front supply, rear return	
Air conditioner specifications	11 U	
Power Supply and Distribution System		
AC SPD	In 20kA, Imax 40kA, 8/20μs	
Power input	Single or dual inputs	
UPS capacity	10kVA	20kVA
UPS configuration	N, N+1, 2N (N=1)	
UPS rated input voltage	380/400/415Vac, 50Hz, 3Ph+N+PE	
UPS	138~485Vac, 50Hz, 3Ph+N+PE	
UPS output power factor	0.9	
UPS rated output voltage	220/230/240Vac, 50Hz, 1Ph+N+PE	380/400/415Vac, 50Hz, 3Ph+N+PE
UPS system efficiency	94.5%	95%
UPS language	Chinese and English	
Maintenance bypass support	Supported	
Monitoring System		
Monitoring system host	Remote access to the Web UI	
Local UI	10-inch large screen display	
Water detection cable	Supported	
Smoke sensor	Supported	
Door status sensor	Supported	
UPS/Air conditioner monitoring	Supported	
Temperature and humidity sensor	Supported	
On-spot Wi-Fi communication	Supported	
Mobile O&M	Mobile APP	

Typical Configurations

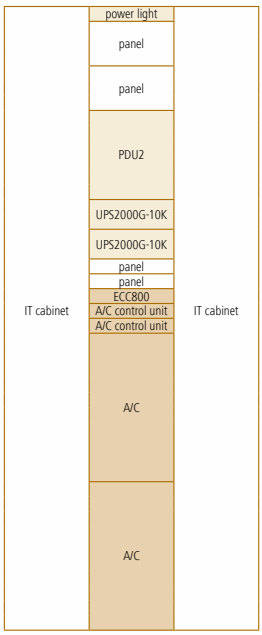
IT load ≤ 7.5 kW



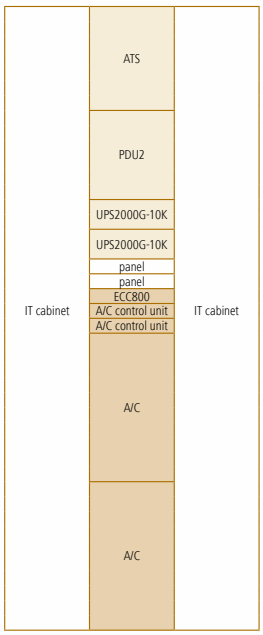
Typical configuration 1



Typical configuration 2



Typical configuration 3



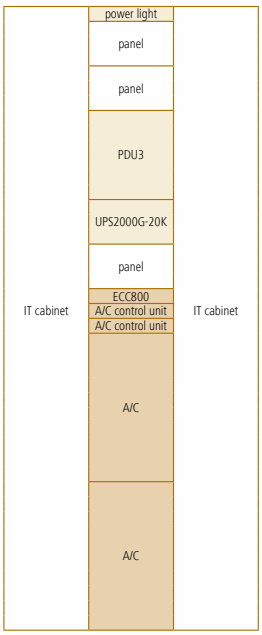
Typical configuration 4

IT load	IT load7.5KW			
Typical configuration	Typical configuration 1*	Typical configuration 2	Typical configuration 3	Typical configuration 4
Aisle type	Cold aisle			
UPS configuration (KVA)	10	10	10+10	10+10
A/C configuration	1+0	1+1	1+1	1+1
Power input	single	single	single	dual
Rpdu quantity	1	1	2	2
UPS output quantity	4	4	14	14
Standard configuration	Temperature and humidity sensor, smoke sensor, short message alarm, mobile phone APP			
Optional	Door magnetic switch, water sensor, video system, backup power			

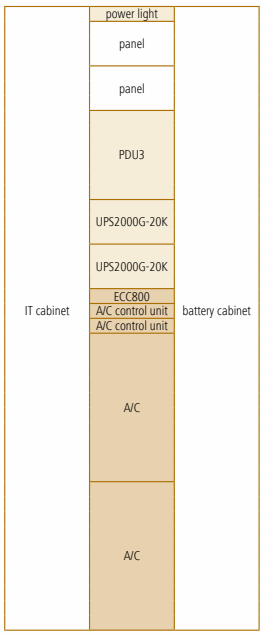
Note: Two to four cabinets are recommended.
Typical configuration 1 is only applicable to Tier 1 construction level

Typical Configurations

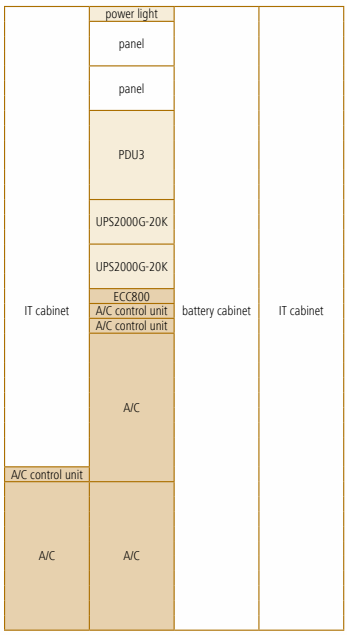
7.5 kW < IT load ≤ 15 kW



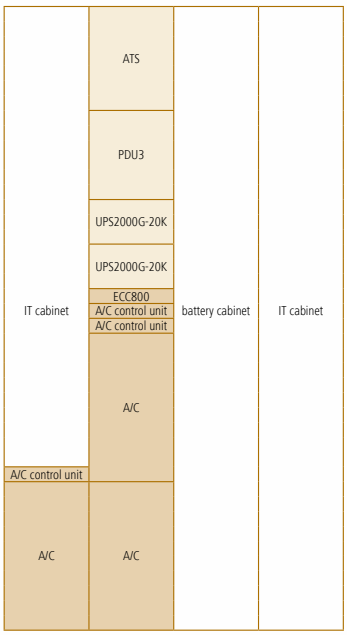
Typical configuration 5



Typical configuration 6



Typical configuration 7



Typical configuration 8

IT load	IT load15KW			
Typical configuration	Typical configuration 5*	Typical configuration 6*	Typical configuration 7	Typical configuration 8
Aisle type	Cold aisle			
UPS configuration (KVA)	20	20+20	20+20	20+20
A/C configuration	2+0	2+0	2+1	2+1
Power input	single	single	single	dual
Rpdu quantity	1	2	2	2
UPS output quantity	14	14	14	14
Standard configuration	Temperature and humidity sensor, smoke sensor, short message alarm, mobile phone APP			
Optional	Door magnetic switch, water sensor, video system, backup power			

Note: Four to eight cabinets are recommended.

Typical configuration 5 and Typical configuration 6 are only applicable to Tier 1 construction level

Prefabricated Data Center

FusionModule1000A Prefabricated All-in-One Data Center

Introduction

The prefabricated all-in-one data center solution functions as a foundation for cloud computing in enterprise data centers. It meets the requirements for environmental protection, saving energy, and fast deployment. In addition, it has distinct advantages in scenarios such as disaster relief operations, oil exploration, and enterprise data management.

FusionModule1000AM

Application Scenarios

- IT load≤48kW per container
- Fast deployment and movable scenarios

FusionModule1000AS

Features & Value

Simple

- Prefabricated and pre-tested
- Highly integrated, one container is an entire data center facility
- Easy on-site work, saving 80% deployment time

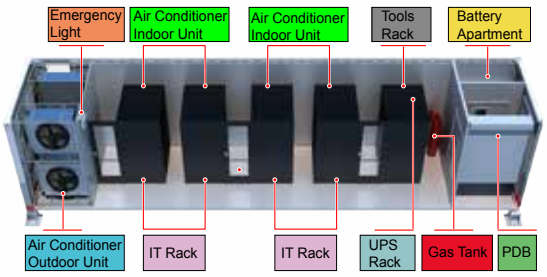
Efficient

- High energy efficiency, PUE down to 1.5
- High efficiency O&M, saving 30% OPEX

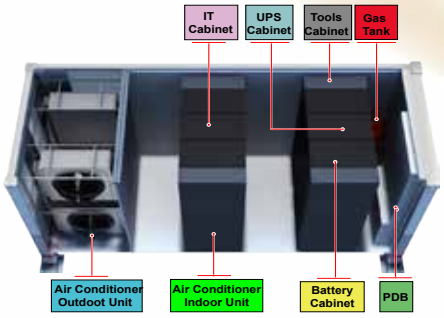
Reliable

- High environment adaption helps business operate stably
- IP55 external protection level and 9 degree anti-seismic intensity performance

Specifications



FusionModule1000AM



FusionModule1000AS

Item	Sub Feature	FusionModule1000AM	FusionModule1000AS
Power	Input power	380/400/415Vac, 50/60Hz, 3Ph+N+PE; 480Vac, 60Hz, 3Ph+N+PE	
	Lightningproof level	60kA(PDB)	
	Power density per rack	6kW per rack	
	UPS mode	HUAWEI UPS 2000G, 20kVA rack mounted UPS	
	UPS redundancy	3+1 redundancy	2+1 redundancy
	BAT backup time	7~10 mins	10 mins
Cooling	Technology	DX (Direct Expansion) type air-conditioner units	
	Containment	Hot and cold aisle isolation	
	Cooling capacity	20kW per unit, 3+1 redundancy	20kW per unit, 2+1 redundancy
	Refrigerant	R410A	
	Humidity	Build-in humidification function	
Environmental requirements	Operation temperature	-15°C ~ +52°C*	
	Operation humidity	5% to 100% relative humidity	
	Altitude	<3000m	
Fire control	Type	Automatic fire detection & suppression system c/w emergency release function	
Size	Dimensions (L x W x H)	12192mm x 2438mm x 2896mm	6058mm x 2438mm x 2896mm
	Total IT load	48kW	24kW
	Typical rack capacity	8 IT racks, 360U	4 IT racks, 180U

* -40°C ~ -15°C conditions should use low temperature air conditioner, some parameters will change.

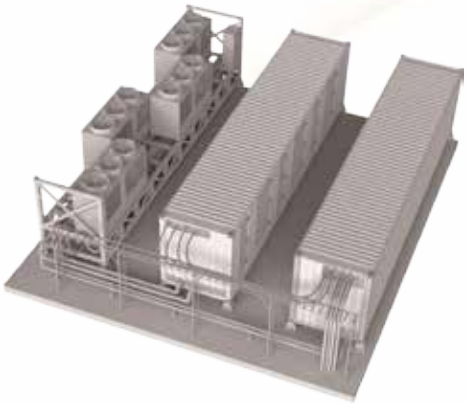
Prefabricated Data Center

FusionModule1000C Prefabricated Modular Data Center

Introduction

Traditional data centers suffer from long construction periods, high energy consumption and high initial investment. To help resolve these issues, HUAWEI has launched the FusionModule1000C outdoor data center solution, which has a highly integrated power system, environmental monitoring, cooling systems, racks, cabling, fire control, security and other infrastructure facilities.

This solution complies with the diverse business needs of customers today.



FusionModule1000C

Application Scenarios

- IT load≤270kW
- Fast deployment, staged deployment scenario

Features & Value

FusionModule1000C

Simple

- Prefabricated and pre-tested
- Modular structure realizes fast & on-demand deployment
- Intelligent management makes unattended operation

Efficient

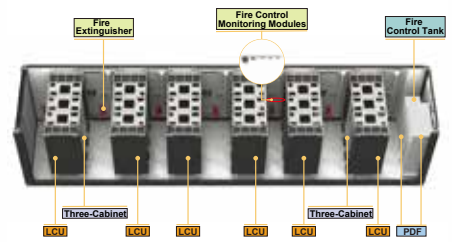
- High energy efficiency, PUE down to 1.2
- High density and saving 80% footprint

Reliable

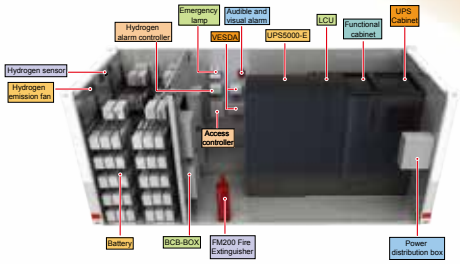
- Component/device/system triple reliable design
- IP55 external protection level and 9 degree anti-seismic intensity performance
- Operable from -40°C to +55°C

Specifications

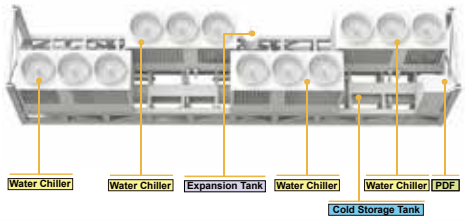
IT Equipment container



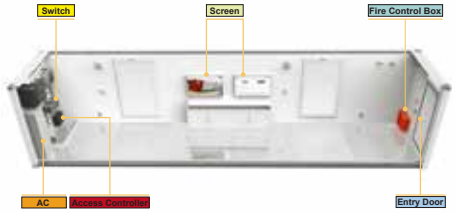
Power container (20ft)



Cooling container



Central control container



Component	Features	
Power	Input power	380/400/415Vac, 50/60Hz, 3Ph+N+PE
	Power density per rack	3kW~15kW
	UPS capacity	40kVA~320kVA
	UPS redundancy	2N or N+X
	Battery backup time	10mins
Cooling- Chilled water	Technology	Outdoor unit: Four 100kW chillers for 3+1 backup Indoor unit: twelve 30kW units for 9+3 backup
	Containment	Hot and cold aisle isolation
	Total cooling capacity	300kW
	Indoor unit capacity	30kW
	Indoor unit size (H x W x D)	2100mm x 300mm x 1000mm
	Refrigerant	R410A or R134a
	Fan type	EC Fans
	Compressor	Scroll compressor
	Humidity control	20%~80%
Design operation Parameters	Temperature	-40°C ~ +55°C*
	Relative humidity	10%~100%
Size	IT container (L x W x H)	12192mm x 2438mm x 2896mm
	Cooling container (L x W x H)	12192mm x 2438mm x 2896mm
	Power container (L x W x H)	6058mm x 2438mm x 2896mm
	Rack	45U/rack, 18 IT racks

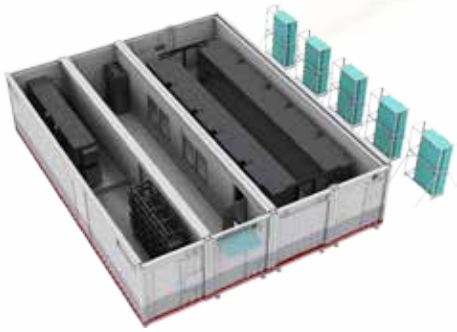
* +45°C ~ +55°C tropical conditions should use high temperature air conditioner, -40°C ~ -15°C conditions should use low temperature air conditioner, some parameters will change.

Prefabricated Data Center

FusionModule1000B Prefabricated Modular Data Center

Introduction

HUAWEI FusionModule1000B is an advanced, modular designed and prefabricated data center infrastructure facility solution to house, power and manage modern IT and CT equipments with simple, green and reliable power & environment system. HUAWEI FusionModule1000B Prefabricated Modular Data Center includes an integrated power system for both AC and DC, energy-saving water-cooled or air cooled in-row cooling system, automatic fire detection & suppression system and intelligent management system for infrastructure facilities, becoming a superior alternative to traditional data center structures.



FusionModule1000B Air-cooled DX Application

Application Scenarios

- IT Scenario: Modular UPS and water cooled or air cooled cooling system to house IT equipments
- CT Scenario: Rectifier and air cooled cooling system to house CT equipments
- IT-CT Co-existence Scenarios: one site with and air cooled cooling system to house both IT and CT equipments.

FusionModule1000B Chilled Water-cooled Application

Features & Value

Simple

- HUAWEI core components; standard solutions 8 weeks lead time
- A prefabricated solution, deploy time shortened by 60%.
- ISO shipping container dimensions, and transportation cost reduced by 50%

Efficient

- Standard density up to 15kW/rack and maximum 30kW/rack customizable
- Free cooling technology supported with PUE≤1.2
- Multiple scenarios supported: IT, CT and IT-CT co-existence.

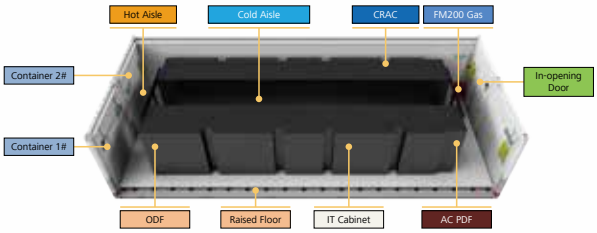
Reliable

- 25-year service life; IP55 water and dust proof
- Unique NEBS GR63 Zone3 anti-seismic (equivalent to 9 degree anti-seismic intensity) and 120-minute fire rating
- Comply with UPTIME TIER and TIA942 topology

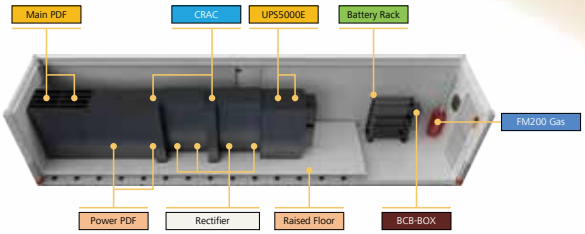
FusionModule1000B IT-CT Co-existence Scenarios

Specifications

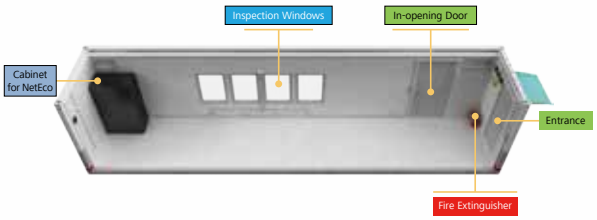
Equipment Container



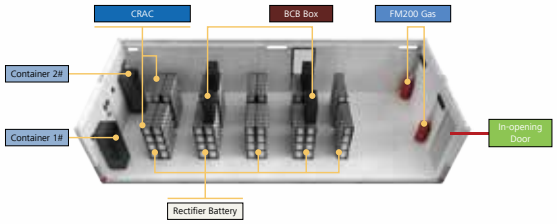
Power Container



Central Control Container



Battery Container (Optional)



Component	Features	
Power	Input power	380/400/415Vac, 50/60Hz, 3Ph+N+PE
	Power component	IT: HUAWEI UPS5000E; CT: HUAWEI TP48 Series Rectifier
	Power density per rack	Air cooled cooling: 3kW~10.5kW; Chilled water cooling: 3kW~15kW
	Battery Management	Optional HUAWEI iBattery
Cooling- DX System	Cooling Technology	HUAWEI NetCol5000A air-cooled in-row air conditioner, N+1
	Structure	Cold/hot aisle containment
	Cooling capacity per unit	NetCol5000A020: 20kW; NetCol5000A035: 35kW
	Size (H x W x D)	NetCol5000A020: 2000mm x 300mm x 1000mm NetCol5000A035: 2000mm x 600mm x 1000mm
	Fan type	EC Fans
	Refrigerant	R410A
Cooling- Chilled Water System	Cooling technology	HUAWEI NetCol5000C chilled water in-row air conditioner, N+1
	Structure	Cold/hot aisle containment
	Cooling capacity per unit	30kW
	Size (H x W x D)	2000mm x 300mm x 1000mm
	Fan type	EC Fans
	Refrigerant	R134A
	Compressor	Scroll Compressor

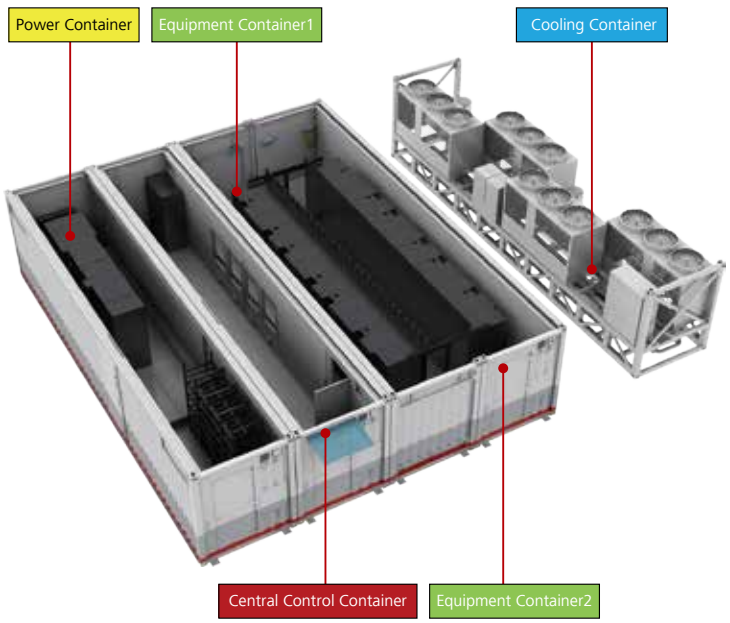
Specifications

Component	Features	
Design Operation Parameters	Water and Dust Proof	IP55
	Temperature	-40°C~+52°C*
	Relative Humidity	10%~100%
	Altitude	Maximum 3000m
Dimensions	Equipment Container (L x W x H)	12192mm x 2438mm x 2896mm
	Cooling Container (L x W x H)	12192mm x 2438mm x 2896mm
	Power Container (L x W x H)	12192mm x 2438mm x 2896mm
	Central Control Container (L x W x H)	12192mm x 2438mm x 2896mm
	Battery Container (L x W x H)	12192mm x 2438mm x 2896mm
	Rack	IT Equipment Container: 19′ 42U racks
		CT Equipment Container supports third party racks
Fire Detection & Suppression	Fire Extinguishing Agent	Standard: FM200; Optional: Novec1230
	VESDA	Standard in Equipment Container, Power Container and Battery Container
	Hydrogen Detection and Discharge System	Standard in Power Container and Battery Container
	Insulation	100mm Rockwool Sandwich Panel
	Fire Rating	120 minutes
Security	Container Access	Standard IC card access, customizable multifunction (fingerprint, password and IC card) access
	Rack Access	Customizable IC card access
	Video Surveillance	HUAWEI HR IP Camera, connected to HUAWEI NetEco
Availability	IT Scenarios	Optional between 2N and N+X
	CT and IT-CT Co-existence	Standard: 2N
	Standard Compliance	Comply with UPTIME TIER and TIA942 Topology

*+45°C ~ +52°C tropical conditions should use high temperature air conditioner, -40°C ~ -15°C conditions should use low temperature air conditioner, some parameters will change.

Specifications

Chilled water cooling, UPS Power



Two Equipment Container Solution

Four Equipment Container Solution

Six Equipment Container Solution

Chilled Water Cooling, UPS Power, 2N Scenarios Configuration

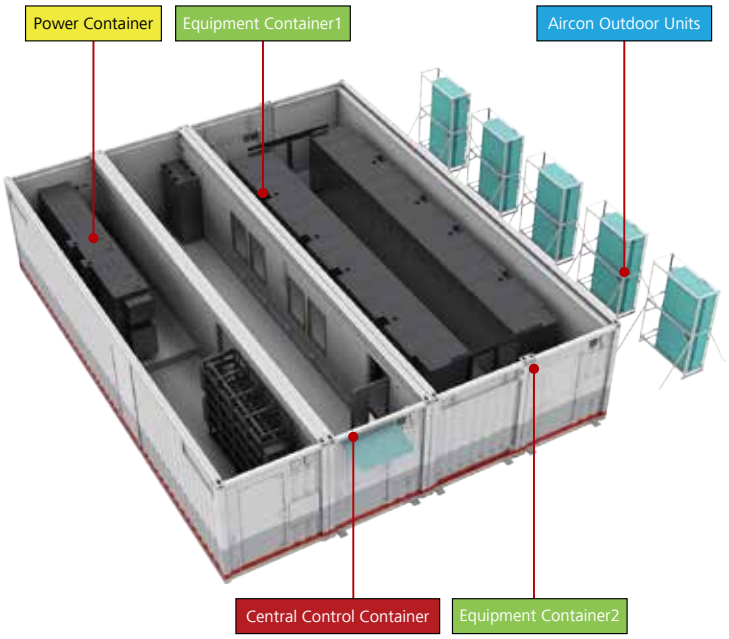
Scenario Category	Equipment Container	Power Container (2N)	Central Control Container	Cooling Container	Qty of Racks	Maximum Power Density, kW
Chilled Water Cooling IT-2N	2	1	1	1	18	15
	2	1	1	1	24	9
	4	1	1	1	52	6
	6	1	1	1	84	3.5

Chilled Water Cooling, UPS Power, N+X Scenarios Configuration

Scenario Category	Equipment Container	Power Container (N+X)	Central Control Container	Cooling Container	Qty of Racks	Maximum Power Density, kW
Chilled Water Cooling IT-N+X	2	1	1	1	18	15
	2	1	1	1	24	9
	4	1	1	1	52	6
	6	1	1	1	84	3.5

Specifications

Air-cooled DX Cooling, UPS Power



Tow Equipment Container Solution

Three Equipment Container Solution

Four Equipment Container Solution

Six Equipment Container Solution

Air-cooled Cooling, UPS Power, 2N Scenarios Configuration

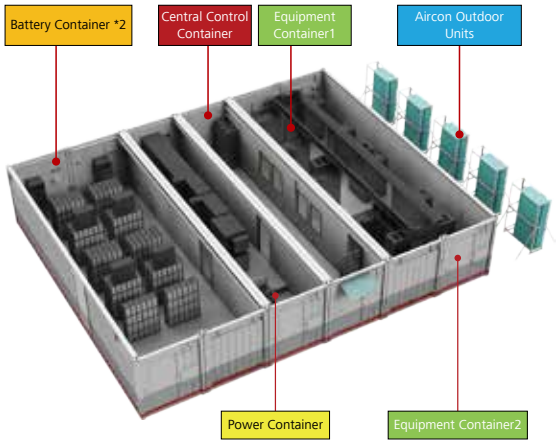
Scenario Category	Equipment Container	Power Container (2N)	Central Control Container	Qty of Racks	Maximum Power Density, kW
Air-cooled DX Cooling IT-2N	2	1	1	20	10.5
	3	1	1	34	6.5
	4	1	1	44	6.5
	4	1	1	20+24	10.5+3
	4	1	1	48	5
	6	1	1	78	3

Air-cooled Cooling, UPS Power, N+X Scenarios Configuration

Scenario Category	Equipment Container	Power Container (N+X)	Central Control Container	Qty of Racks	Maximum Power Density, kW
Air-cooled DX Cooling IT-N+X	2	1	1	20	10.5
	4	1	1	44	6.5
	4	1	1	48	5
	6	1	1	78	3

Specifications

Air-cooled Cooling, Rectifier Power



Two Equipment Container Solution

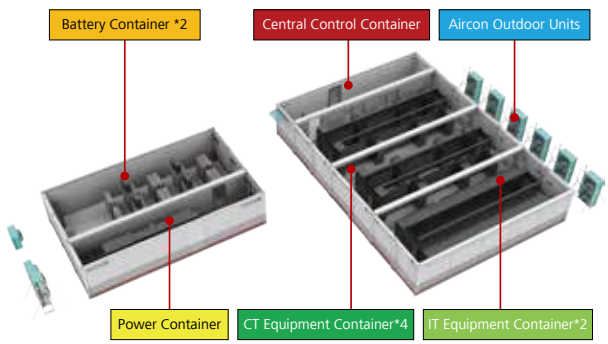
Four Equipment Container Solution

Six Equipment Container Solution

Air-cooled DX Cooling, Rectifier Power, 2N Scenarios Configuration

Scenario Category	Equipment Container	Battery Container	Power Container (2N)	Central Control Container	Qty of Racks	Maximum Power Density, kW
Air-cooled CT-2N	2	2	1	1	22	6.5
	4	2	1	1	48	3
	6	2	1	1	72	3

Air-cooled DX Cooling, Rectifier and UPS Power



Air-cooled Cooling, Rectifier and UPS Power, 2N Scenarios Configuration

Scenario Category	Equipment Container	Battery Container	Power Container (2N)	Central Control Container	Qty of Racks	Maximum Power Density, kW
Air-cooled ICT-2N	6	2	1	1	72	3

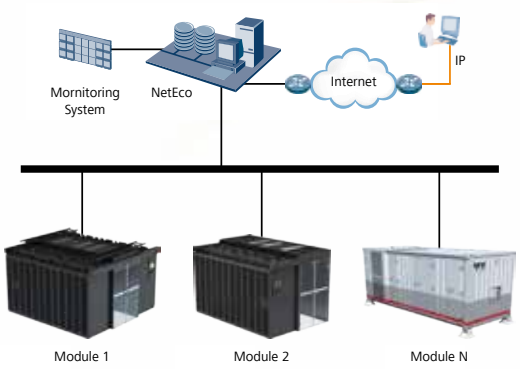
Intelligent Management System

NetEco

Introduction

NetEco is a new generation data center management system launched by HUAWEI. It manages the real-time data and status of data center infrastructures, including power, environment, video, door status and generates alarms if any fault occurs.

NetEco could support remote management and local mobile O&M by PAD, give you convenience and good experience.



Application Scenarios

Apply to contained data center and modular data center solutions

Features & Value

Simple

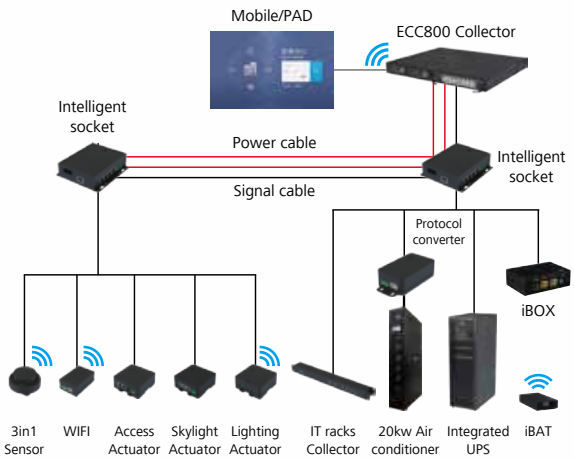
- Simple Delivery
  Pre-installation, automatically upload devices' parameters, reduce 90% debugging time
- Simple Usage
  UI design based on scenarios, simple web interface & APP, simple operation
- Simple Expansion
  Online expansion

Efficient

- Efficient Resource Usage
  Asset life-cycle management, balanced planning of power, cooling and space, full utility of capacity resource in data center
- Efficient O&M
  Remotely update device software, automatically filter invalid alarms, guide maintenance process, automatically push maintenance report

Reliable

- Reliable Data Center
  Collect data every second, pre-alarm for component, fast fault location
- Reliable System
  Data encryption during analysis, transmission and storage, reinforcement design of OS and DB, anti-virus and vulnerability scanning test



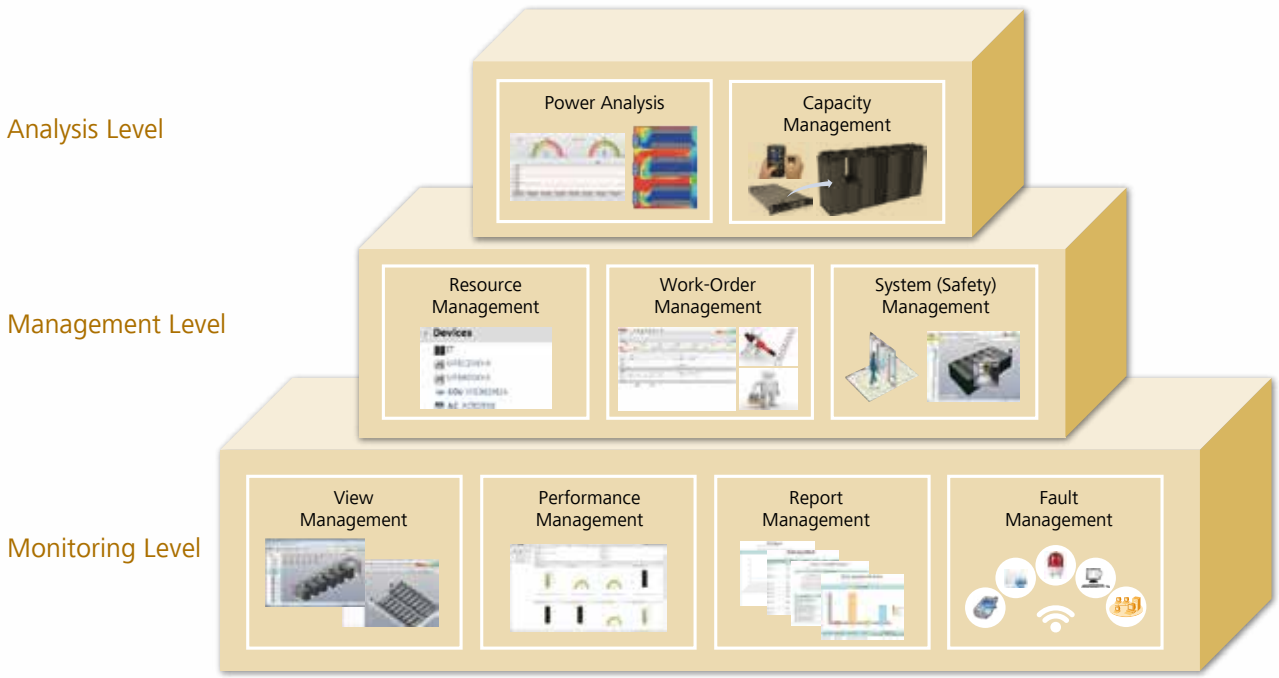
Technical Specification

Monitoring Systems

NetEco data center infrastructure management system can support industry standard protocol, such as Modbus, SNMP, can implement the underlying access port rapidly, can also be used for non-standard customized development. NetEco can monitor the underlying device contains power subsystem, cooling subsystem, environment subsystem, etc.

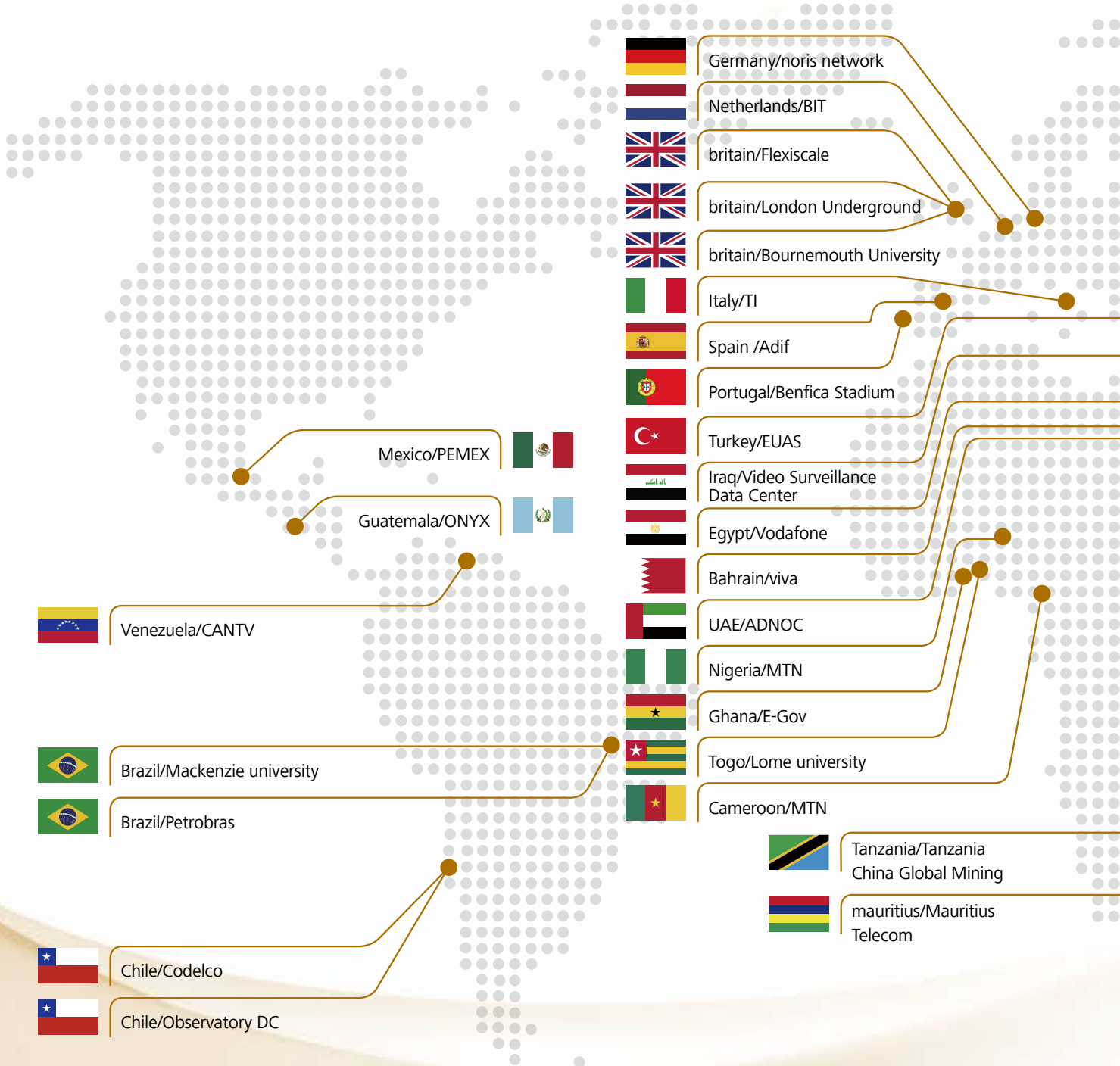
Functions

NetEco provides comprehensive functions for managing data center infrastructures.



Global Applications

The offerings in the Huawei data center facilities solutions have been successfully applied in China Unicom Guian IDC, Myanmar Telenor, London Underground, Mexico PEMEX, etc.



More than 10-year data center service experiences, more than 660 data centers (including 255 'Cloud' data centers) all around the world.