

800 W to 4500 W, Tier 1, Local Edge Solution, 50 Hz

DESIGN OVERVIEW

Eight Micro Data Center Reference Designs

Target Availability
Tier 1

Data Center Overall Space
0.65 m² to 1.33 m²

Regional Voltage and Frequency
230 V, 50Hz

ABOUT THIS DESIGN

Eight Micro Data Center Reference Designs for Local Edge Computing Infrastructure for Europe Region

Includes hardware infrastructure, physical security and monitoring software (EcoStruxure IT)

Flexible Designs with the ability to add and/or remove items within the Reference Designs to address specific customer needs

Physical Security: NetBotz suite provides enclosure door locks & surveillance along with variety of environmental monitoring

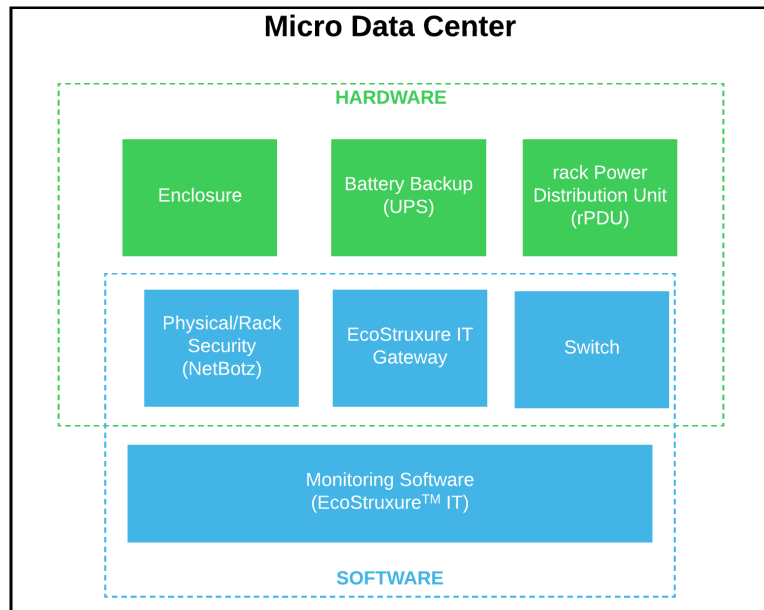
Monitoring Software package Available.

Introduction

APC by Schneider Electric provides physical infrastructure and monitoring software to support Local Edge Computing. Micro Data Center Reference Designs are hardware and software solution that can be used as a starting point to design customers' Local Edge Computing Infrastructure. The Reference Designs can be customized by adding or deleting items off from the architecture to address specific customer needs.

Micro Data Center Reference Designs consist of an enclosure, a battery backup (UPS), rack Power Distribution Unit (rPDU), cooling, physical security (temperature and humidity sensor, rack door access, and/or camera), monitoring software (*EcoStruxure™ IT*).

Micro Data Center Reference Designs are in the Local Edge Configurator (LEC) in the APC by Schneider Electric's Design Portal website. The Design Portal is currently accessible to certified partners and Schneider Electric internal employees (Sales rep) only. This design summary showcases the architecture of eight Micro Data Center Reference Designs that are specifically designed for Europe and other areas with 50 Hz electrical frequency system.

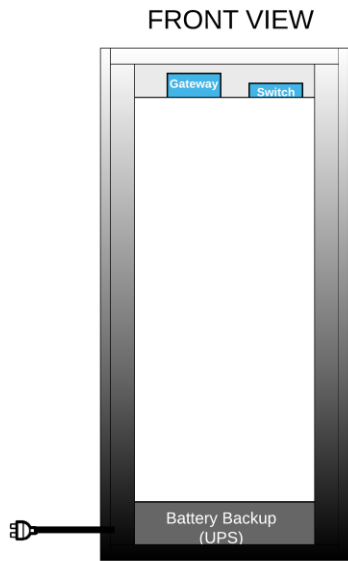


Micro Data Center System Overview

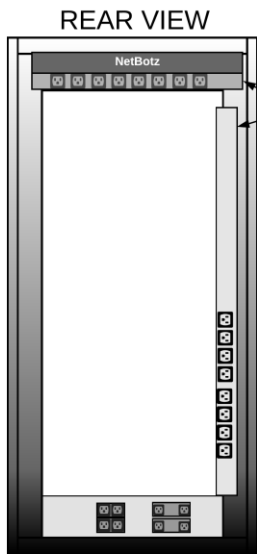
Micro Data Center consists of hardware and software components to support the Local Edge Computing Infrastructure.

The physical infrastructure includes an enclosure, battery backup (UPS), rack Power Distribution Unit (rPDU), as well as NetBotz to support physical/rack security and additional hardware such as EcoStruxure IT Gateway appliance/hardware and 8-port switch to support the monitoring software (EcoStruxure IT Expert).

Note: The 8-port unmanaged switch should be purchased separately. Recommended third party switch: Netgear F108NA and purchase according to each country's electrical system specifications.



Outlet Plug



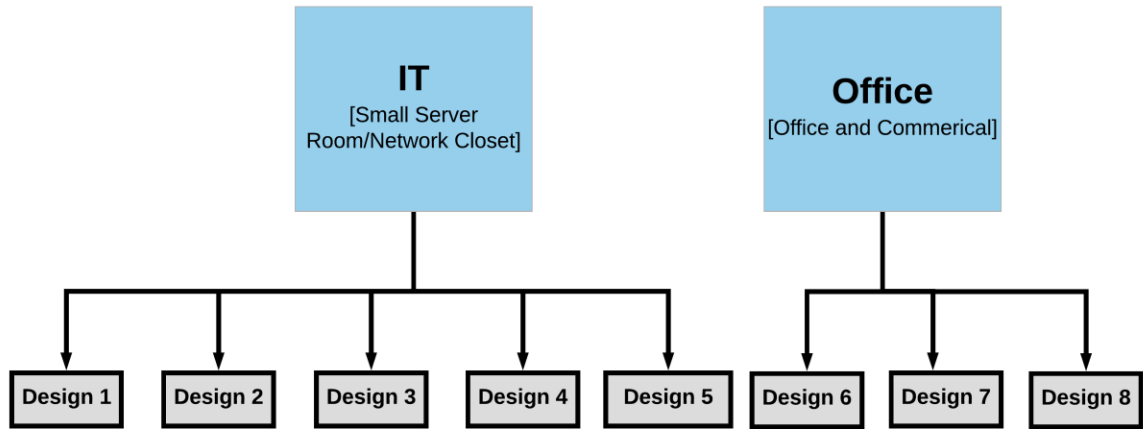
Eight Micro Data Center Reference Designs

There are eight different Micro Data Center Reference Designs that have been designed specifically for Europe and other areas with a 50 Hz electrical frequency system. These Reference Designs vary by enclosure type, enclosure size, battery backup (UPS) size, and cooling capacity. For all the designs, the same package for the physical security (NetBotz), monitoring software (EcoStruxure) are offered.

One of the advantages of a Micro Data Center Reference Design is its flexibility. Items within the Reference Designs can be removed, increased in quantity, or new items be added to address specific customer needs.

See next figure on how each Reference Designs vary from each other.

Micro Data Center Enclosure Layout



ENCLOSURE	Type	STANDARD ENCLOSURE (SX)					SOUNDPROOF ENCLOSURE (CX)		
	Height	24 U		42 U			12 U	18 U	24 U
	Shock Packaging	No							
BATTERY BACKUP [UPS]	Power	1.5 kVA	3 kVA	3 kVA	5 kVA	5 kVA	1.0 kVA	1.5 kVA	3 kVA
	Lead-Acid Option	Yes							
	Lithium-Ion Option	Yes	Yes	Yes	No	No	Yes	Yes	Yes
rPDU	Type	Switched							
COOLING	Included	No	No	No	No	Yes	Yes		
	Type	No	No	No	No	In-row	Passive Cooling (fans) [included in the enclosure]		
PHYSICAL SECURITY (NETBOTZ)	STANDARD	NetBotz 250 + Rack Door Access + Temp/Humidity Sensor							
	ADVANCED	NetBotz 750 + Rack Door Access + Temp/Humidity Sensor + Camera							
MONITORING SOFTWARE	End-user or Partner	ECOStruxure IT Gateway + ECOStruxure IT Expert							



"IT" Category SX Enclosure



"Office" Category CX Enclosure

Categories for Micro Data Center Reference Designs

The Micro Data Center Reference Designs have been divided into two categories:

- IT Category (Network Closet/Small Server Room)
- Office Category (Office and Commercial Space)

Within each category, different reference designs are offered varying in enclosure size, power size (battery backup/UPS) and cooling capacity.

IT Category (Network Closet/Server room)

Micro Data Center Reference Designs within the “IT” category are recommended for the network closet and server room. These environments can be found anywhere from corporate headquarters to retail stores to warehouses. In these use cases, the room or environment that Micro Data Centers are in should be temperature controlled 24 hours a day, 7 days a week per ASHRAE standards.

Office Category (Office and Commercial)

Micro Data Center Reference Designs within the “Office” category is recommended for office and/or commercial usage. For example, these environments can be in a retail store front, bank branch, manager’s office, or IT office. In these use cases, the room or environment where the Micro Data Center will be located in might not be temperature controlled 24 hours 7 days a week per ASHRAE standards or might be a quiet zone that requires low noise levels, therefore, the soundproof enclosure (CX) is preferred. Additionally, these use cases will be in areas that require the Micro Data Center to provide enhanced physical security since it is located in a public space.

Market Segments

Some of the market segments for Micro Data Center Reference Designs are IT, Healthcare, Education, Finance, Retail, and Industrial customers which require local edge computing infrastructure.



MDC (24 U) with Lead-Acid UPS



MDC (13U Wall mount) with Lithium-Ion UPS

Power

Protected power to the Micro Data Center is provided by the Uninterruptible Power Supply (UPS).

The UPS helps to provide protection for electronic equipment from utility power blackouts, brownouts, sags, surges, small utility power fluctuations and large disturbances. The UPS also provides battery backup power for connected equipment (IT servers, switch, etc) until utility power returns to acceptable levels or until the batteries are completely discharged.

Some end-users/customers prefer longer runtimes; therefore, they can load the UPS at lower load to gain higher run time or all UPS selected in MDC are extended runtime capable. Meaning, they are compatible to add more batteries to gain higher run-time.

In addition, the customer/end-user also has capability to gracefully/safely shutdown IT equipment and servers in case of prolong power outage to protect them. An additional free software needs to be downloaded to customize the time until shutdown the equipment. The software program is called “Power Chute” by APC by Schneider Electric.

To download the “Power Chute” software, please visit: [Power Chute](#)

Criteria for Selecting UPS for Reference Design

The criteria for UPS selected in these reference designs are network connect ability (to connect to cloud or remote monitoring software), extended runtime capable, high power factor and minimum rack u-height space.

Battery Options

For specific power, there are two options of UPS per reference design: UPS with a lead-acid battery or lithium-ion battery.

Lead-acid: Lead-acid is traditional battery type used in UPS. By default, for all designs except Wall-Mount reference design has a UPS with lead-acid batteries.

Lithium-Ion: For some UPS, there is an option to upgrade to UPS with Lithium-Ion battery. Currently, in Europe, 1.5 kVA UPS is the only one able to upgrade to UPS Lithium-ion battery. However, as more options for UPS with different power level are released in NAM, they will come available in these reference designs.

Benefits of UPS with lithium-ion battery are low maintenance cost and fewer on-site services, longer battery life span (~10 years) versus lead-acid (3-5 years), smaller size and lighter weight, faster recharging time and it operates at higher temperatures without degradation compared to lead-acid battery.

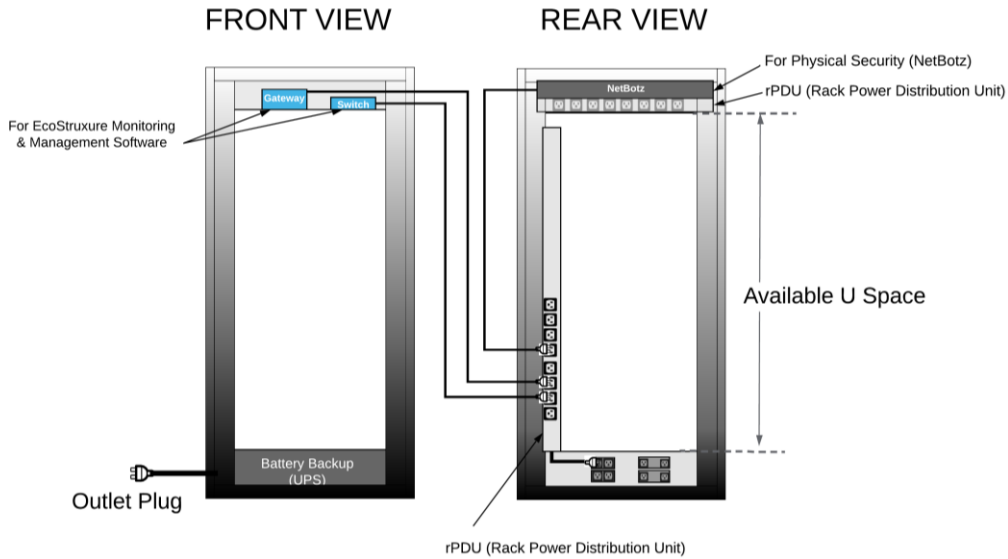
For more information about Lithium-Ion visit [Overview on Benefits of Lithium-Ion UPS](#)
[White Paper on Battery Technology: Lead-Acid vs. Li-ion](#)

Electrical One-line Diagram

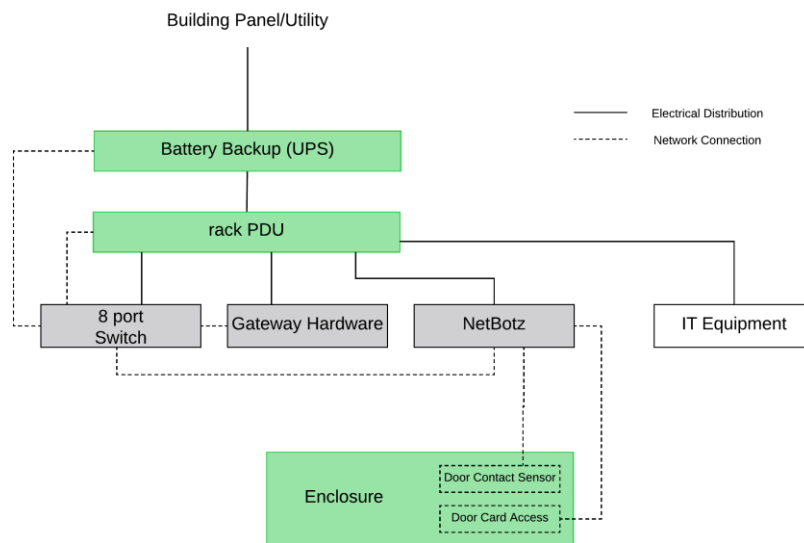
The two figures below show the electrical distribution and the network connection in the Micro Data Center.

The rack Power Distribution Unit (rPDU) plugs to the battery backup (UPS). All the other devices and equipment such as NetBotz, the EcoStruxure IT gateway, the network switch, and the IT equipment will plug into the rPDU.

Note: There is only 1 rPDU per Micro Data Center reference design. There are two types of rPDU that can be found in Micro Data Center Reference Designs, either a 0 U (vertical) or 1 or 2 U (rack-mount) rPDU.



The Electrical Distribution in a Micro Data Center



One-line Electrical Diagram for Micro Data Center

Cooling



For most of the Micro Data Center Reference Designs, cooling the IT equipment will rely on the building HVAC system or existing cooling units in the room. These designs provide perforated doors and/or fan ventilation to keep a uniform airflow through the enclosure. The passive fan cooling is included within the enclosure itself, in case of the *NetShelter CX* line of enclosures.

One of the Micro Data Center Reference Designs has an active cooling unit attached to it called InRow cooling. This system uses a specifically designed air containment system to provide active, precision cooling to the IT equipment. The InRow system has many benefits, including energy efficiency and ability to cooling higher density deployments.

To learn more about Micro Data Center with in-row & Air containment unit: [InRow SC System](#) (or visit APC website and search SKU# RACSC112E)

Calculation of Maximum IT Load (Watt)

For Micro Data Center Reference Designs with no passive or active cooling, the maximum total IT load is calculated using the battery backup (UPS) output power capacity (Watts). 200 W was reduced from the UPS output power capacity to calculate the total maximum IT load to compensate for the power usage by the physical security hardware (NetBotz) and monitoring software hardware (EcoStruxure IT gateway and the switch).

For Micro Data Center Reference Designs with passive cooling (fan) or InRow cooling, the maximum total IT load is limited by either:

1. The maximum heat rejection by cooling (passive or InRow cooling)
2. The output power capacity of the battery backup (UPS).

From those two scenarios, the lowest number was used to the calculate maximum total IT load.

200 W was reduced from the UPS output power capacity to calculate the total maximum IT load to compensate for the power usage by the physical security hardware (NetBotz) and monitoring software hardware (EcoStruxure IT gateway and the switch).



Physical Security (NetBotz)

NetBotz from APC by Schneider Electric protects the Micro Data Center from physical threats such as high temperature, humidity, and both malicious and unintentional access events.

In Micro Data Center Reference Designs, there are two packages for Physical Security (NetBotz):

- Standard
- Advanced

The standard physical security includes a keycard access control to the enclosure, a temperature/humidity sensor, door contact alarm sensors, and the NetBotz 250 intelligent device.

The advanced physical security includes a keycard access control to the enclosure, a temperature/humidity sensor, door contact alarm sensors, High Definition camera monitoring, and the NetBotz 750 intelligent device.

To learn more about NetBotz products go to
NetBotz Introduction Video: [Introduction to the NetBotz Product Line](#)
Detail on NetBotz 250 & sensors: [NetBotz 250 Brochure](#)
Detail on NetBotz 750, sensors, camera: [NetBotz 750 Brochure](#)



Standard Physical Security



Advanced Physical Security

Monitoring (EcoStruxure™)

Along with physical security, the end-user/customer can also purchase a monitoring software as well as management solution.

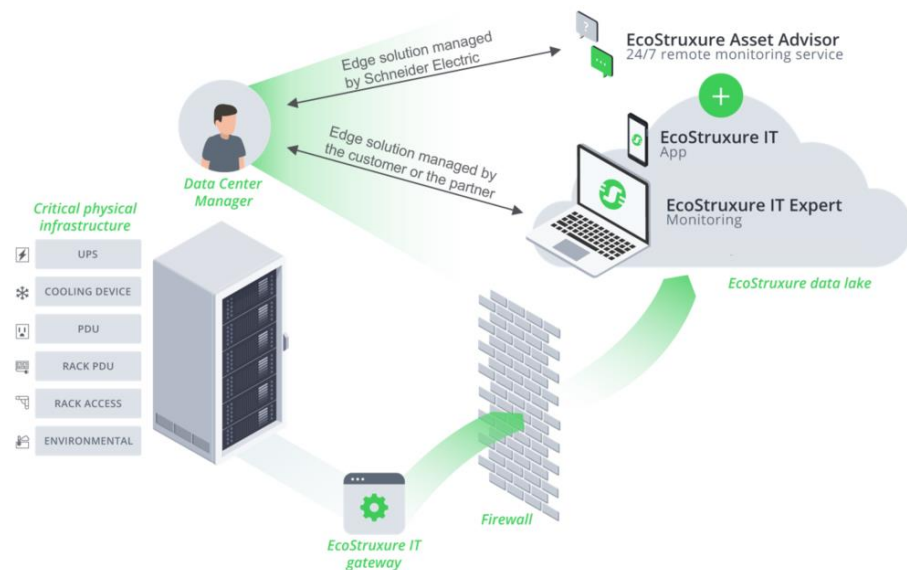
What is the Monitoring Software Offered by Schneider Electric?

For Edge solutions, the monitoring software by Schneider Electric is called “EcoStruxure IT Expert”. EcoStruxure IT Expert is a web interface software that can provide the end-user/customer with real-time monitoring, incident management, analysis and asset utilization.

To learn more about the advantages and features of **EcoStruxure IT Expert** please visit: <https://ecostruxureit.com/ecostruxure-it-expert/>

Monitoring Software Managed by

Depending on who uses the monitoring software or manages the Edge Infrastructure (Micro Data Center), the end-user/customer has few options



EcoStruxure Monitoring Management Architecture

End-user: If the end user chooses to manage their Micro Data Centers themselves, they will need to purchase EcoStruxure IT gateway and license for a software subscription for “**EcoStruxure IT Expert**”. The software subscription can be purchased on yearly basis.

Partner: If the end-user/customer wants to hire a partner to manage their Micro Data Center for them, the same package as the end-user needs to be purchased. The Micro Data Center devices are connected through the EcoStruxure IT gateway and the partner version of the EcoStruxure IT Expert manages the Micro Data Center for them.

Schneider: For Europe, managed by Schneider option will not be available.



Local vs Cloud-Based Web Interface

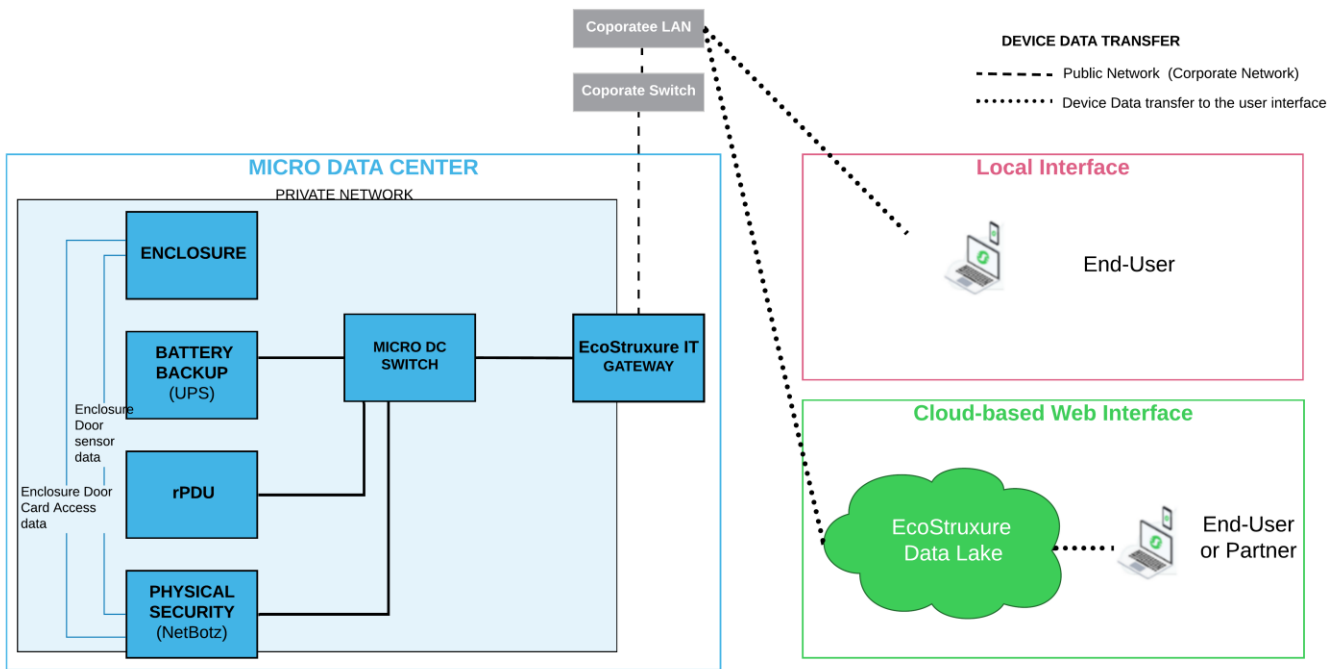
All the Micro Data Center’s devices such as power UPS, rack power distribution unit (rPDU), NetBotz (physical security), are connected to a small switch so it can transfer the device data to the EcoStruxure IT Gateway hardware/appliance.

Any unmanaged 5-8 port 10/100 Mbps switch can be used. However, once a switch is selected, it cannot be used for any other purpose while it is serving as Micro Data Center switch. The Micro Data Center switch needs to be purposed separately.

Recommended third party switch: Net gear F108NA.

Once the switch is connected to the gateway, it then connects to the company’s network (Corporate LAN Network). From there, the customer/end-user has an ability to view MDC through two UI: local interface (EcoStruxure IT Gateway) or Cloud-based web interface (EcoStruxure IT Expert).

Each Micro Data Center reference design includes EcoStruxure IT gateway hardware/appliance. However, EcoStruxure IT gateway appliance is not purchased, the EcoStruxure IT gateway software can also be installed on another server. For more details visit: [Setting up EcoStruxure IT Gateway](#)



Local Interface: EcoStruxure IT Gateway Interface

Once the Micro Data Center's EcoStruxure IT gateway hardware is connected to the corporate network, the end-user/customer can access EcoStruxure IT gateway's software to view the Micro Data Center device status and information. The end-user/customer can only view this EcoStruxure IT gateway software if they are in the same network as the Micro Data Center's EcoStruxure IT Gateway.

Example: The Micro Data Center can be connected in a lab and the end-user/customer can access/view the Micro Data Center's device's status and information from their desk.

Cloud-based Web Interface: EcoStruxure IT Expert Web Interface

The end-user/customer can also purchase a yearly software subscription for a cloud-based web software called EcoStruxure IT Expert. EcoStruxure IT Expert software uses the EcoStruxure IT gateway to pull the Micro Data Center devices' information and display it in a website interface in EcoStruxureit.com. The software subscription is structured around the number of devices that the end-user/customer owns or wants to monitor.

If the end-user/customer has multiple Micro Data Center in multiple locations, EcoStruxure IT Expert is ideal as it aggregates all Micro Data Center device information using the EcoStruxure IT gateway from different locations and display in one web interface.

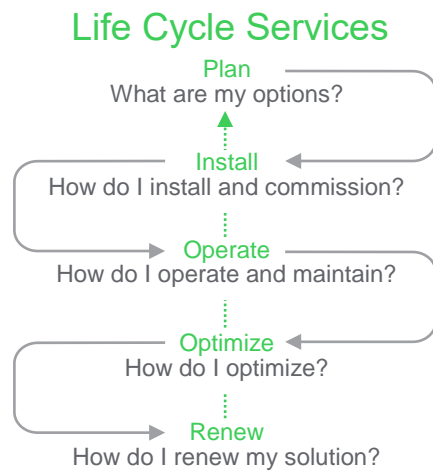
Advantage of EcoStruxure IT Gateway (private and public ports)

The EcoStruxure IT gateway has two connections/ports: a private port and a public port. All the Micro Data Center devices are connected to the private port, and the corporate switch/corporate LAN are connected to the public port.

The advantages of the EcoStruxure IT gateway having a private and public ports are two folds. One, the customer/end user only need one IP address per Micro Data Center instead of having multiple IP addresses for each Micro Data Center devices. Two, it created additional security for the Micro Data Center devices as now it can only be accessed through the EcoStruxure IT gateway.

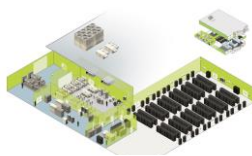
To learn more about EcoStruxure IT Platform such as EcoStruxure IT Expert visit: [What-Is-EcoStruxure-IT](#)
To learn more about EcoStruxure IT Gateway: [Online Help Center for EcoStruxure IT Gateway](#)

Schneider Electric Life-Cycle Services

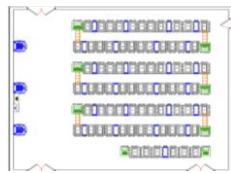


- 1** Team of **over 7,000 trained specialists** covering every phase and system in the data center
- 2** Standardized, documented, and validated **methodology** leveraging automation tools and repeatable processes **developed over 45 years**
- 3** **Complete portfolio of services** to solve your technical or business challenge, simplify your life, and reduce costs

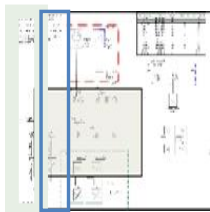
Get more information for this design:



3D spatial views



Floor layouts



One-line schematics



Bill of materials

Engineering Package

Every reference design is built with technical documentation for engineers and project managers. This includes engineering schematics (CAD, PDF), floor layouts, equipment lists containing all the components used in the design and 3D images showing real world illustrations of our reference designs.

Documentation is available in multiple formats to suit the needs of both engineers and managers working on data center projects.

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Email

referencedesigns@se.com

to receive the Engineering Package for this design

Design Attributes

		DESIGN 1	DESIGN 2	DESIGN 3	DESIGN 4	DESIGN 5 ¹	DESIGN 6	DESIGN 7	DESIGN 8	
Enclosure	Enclosure Type	STANDARD ENCLOSURE (SX)					SOUNDPROOF ENCLOSURE (CX)			
	Enclosure Height	24 U		42 U		42 U	12U	18U	24 U	
Battery Backup (UPS)	Power (kVA)	1.5 kVA	3 kVA	3 kVA	5 kVA	5 kVA	1.0 kVA	1.5 kVA	3 kVA	
Cooling	Type	N/A	N/A	N/A	N/A	In-row Cooling	Passive Cooling (Fans)			
Physical Foot Print	Width-Depth-Height mm ³	600 x 1070 x 1198 mm ³	600 x 1070 x 1198 mm ³	600 x 1070 x 1991 mm ³	600 x 1070 x 1991 mm ³	900 x 1477 x 1991 mm ³	690 x 930 x 700 mm ³	750 x 1130 x 1015 mm ³	750 x 1130 x 1275 mm ³	
Electrical Spec	Input Power Voltage (V)	230 V								
	(Lead-Acid) Runtime (minutes) at max kW	5.8 mins @ 1200 W	6.3 mins at 2700 W	6.3 mins at 2700 W	4 mins @ 4500 W	4 mins @ 4500 W	8.1 mins @ 800 W	5.8 mins @ 1200 W	6.3 mins at 2700 W	
	(Lithium-Ion) Runtime (minutes) at max kW	21.3 mins @ 1350 W	10.5 mins at 2700W	10.5 mins at 2700W	-	-	35.4 mins @ 800 W	21.3 mins @ 1350 W	10.5 mins at 2700W	
	Input Connection Type to power MDC	IEC-320 C14 ²	British BS1363A, & IEC-320 C20, & Schuko CEE 7 / EU1-16P	British BS1363A, & IEC-320 C20, & Schuko CEE 7 / EU1-16P	Hard Wire 3 wire (1PH+N+G)	Hard Wire 3 wire (1PH+N+G)	IEC-320 C14 ²	IEC-320 C14 ²	British BS1363A, & IEC-320 C20, & Schuko CEE 7 / EU1-16P	
IT Equipment Spec	Available U Space (U)	20	20	38	37	37	8	14	20	
	Total Maximum IT Load (Watt) ³ [with Lead-acid UPS]	1000	2500	2500	4300	4300	600	1000	2200	
	Total Maximum IT Load (Watt) ³ [with Lithium-Ion UPS]	1150	2500	2500	-	-	600	1000	2200	
	Maximum Depth for IT Equipment (mm)	915 mm	915 mm	915 mm	915 mm	915 mm	675 mm	840 mm	840 mm	

¹ To look up assembly drawing of MDC Self-containment unit with in-row cooling visit: APC website & search SKU: RACSC112E or check drawing

² Additional input power connection type might need to be purchased depending on the specific country in Europe and the outlet type.

³ For calculation on Total Maximum IT load, please look in *Calculation of Maximum IT Load (Watt)* in the *Cooling* section.