


Introduction to Data Center Whitespace

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Schneider
Electric





Reliance on Data Centers is increasing and is driven by these major trends

Digital TRAFFIC

3x Growth of global data center IP traffic over next 5 years

Source : Cisco Cloud Index Report 2015

Internet of THINGS

20.8B connected things by 2020

Source : Gartner, 2016

Data SOVEREIGNTY

Up to **4%** of total annual turnover can be fined for failing to comply with EU's GDPR by 2018

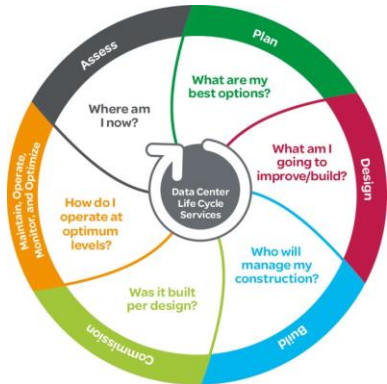
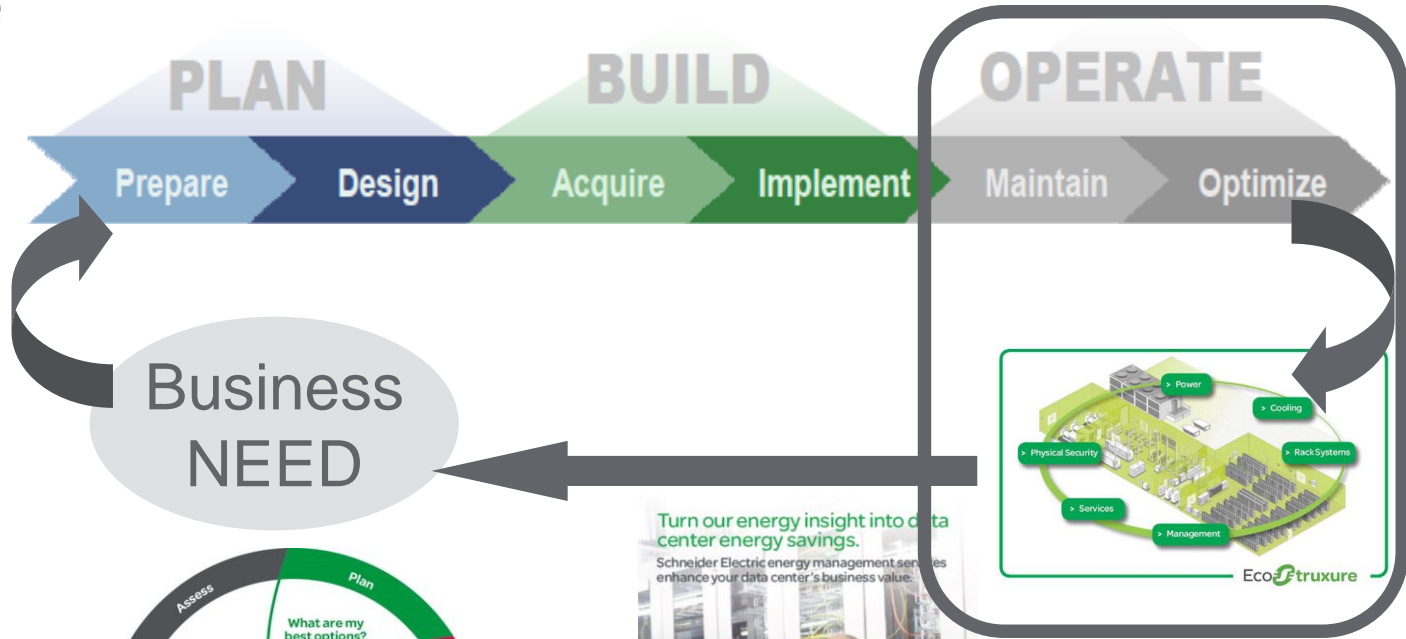
Source: EU Data Protection Reform

Edge COMPUTING

40% of IoT data will be stored, processed, analyzed and acted upon at the edge

Source : IDC WW IoT Predictions, 2015

Title



DataCentre Trends



Average existing Data Centres PUE above 2 will make them obsolete within 5 years, no captive IT loads anymore.

Large Outsourcing DataCentres replacing smaller in-house Data Centres.

Pressure to reduce OpEx while maintaining availability versus **Instable grids** and **higher electricity price**

Virtualization & cloud computing, overall **complexity increase**

In-row cooling gaining from room cooling for **higher efficiency**

Uncertainty on 20 years life cycle and time of deployment
pressure make Modularity & Scalability a MUST for DataCentres



The mix of Trends leads to the need
for Intelligently planned Solutions

Let's step back for one minute on efficiency

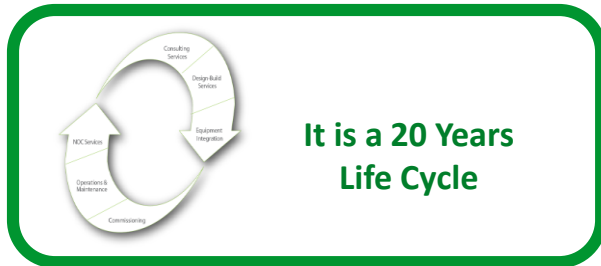
We are **building data center** to support **business strategy**



What are the **criteria** of your datacenter that **best support your Business strategy?**



How confident are you on your **assumptions?**

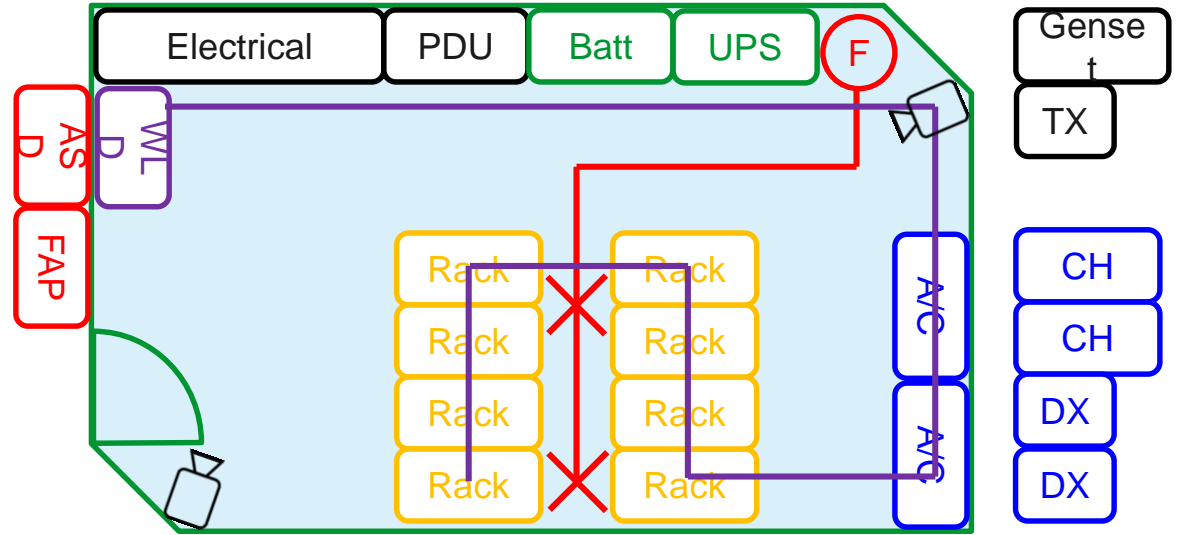


How do we bring all the teams together?
IT Facility, Operations, Business



How to Startup a Simple Server Room?

- Secure Room
- Security Door
- Electrical System
- UPS System
- Server/Network Rack
- Cooling System
- Fire Protection System
- Aspiration Smoke Detection
- Water Leak Detection
- CCTV
- Genset
- Transformer
- Rack Accessories
- Raised Floor
- Etc...



Power Usage Effectiveness Calculation

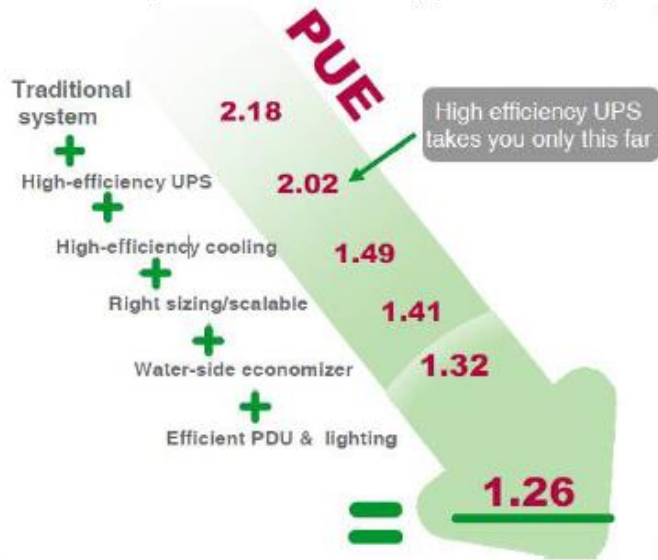
What is PUE??

PUE = Total Facility Load (including IT Load, cooling/lighting and electrical systems) divided by the IT Load.

It is not enough to look at Efficient Components any more...

Figure 25: Optimization of Datacenter components and control can reduce energy consumption substantially

PUE= Power Usage Effectiveness -> electricity pulled down from grid divided by electricity fed into server



Purchasing Criteria went from just
« buying the best UPS »

TO

Total DataCentre Performance,
Cost Efficiency,
Speed & Modularity of
construction ,
Total Cost of Ownership

Source: Schneider Electric.

Automated and Intelligent DC Management





Data Center Environmental Monitoring



Life Is On

Schneider
Electric

Data Center Physical Threats



Power Failure



Humidity



Temperature



Security



Equipment Failure



Water Detection

NetBotz - Security and Environmental Monitoring

“consists of rack mount and wall mount appliances designed to provide a wide range of environmental monitoring and surveillance for sensitive equipment”

Environmental Monitoring Sensors & Signals

Both wired and wireless sensors for monitoring.



Wireless Temperature & Humidity



Wired Temperature & Humidity



Spot Fluid



Dry Contact



Smoke



Rack Access



Door Contact



Beacon

Sensor pods and coordinators

Flexibility in installation and deployment scope



Sensor Pod 150

Connect these sensor pods via A-link to add up to 36 additional wired sensors



Wireless Sensor Pod

Wireless coordinator supporting built in temperature and humidity sensing and up to three additional wired sensors.



Wireless Coordinator and Router

Joins Zigbee network automatically when connected by USB; has a 33m range. Additional coordinators are used as a router to scale installations.

NetBotz - Security and Environmental Monitoring

NetBotz 250



- Small & Medium Area
- Environmental Monitoring
- Rack Access Control (1)
- Supported up to 6 sensor pods
- Supported up to 42 sensors
- Supported up to 47 wireless devices

NetBotz 570



- Large Data Center
- Environmental Monitoring
- Rack Access Control (13)
- Cameras (4 USB, 4 Network)
- Supported up to 12 sensor pods
- Supported up to 78 sensors
- Supported up to 47 wireless devices
- Supported up to 13 rack access pods

An Overall Application Guides

IP NETWORK
A single NetBotz Appliance
requires only one IP
Address



Email /
SMS
Notification

ZIGBEE WIRELESS



Wirelessly manage up
to 50 feet
(47) T and/or TH Sensors



USB

Supporting Up To
(4) USB Cameras



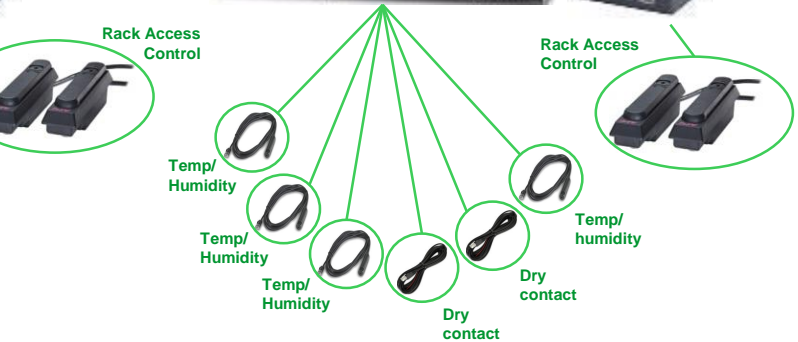
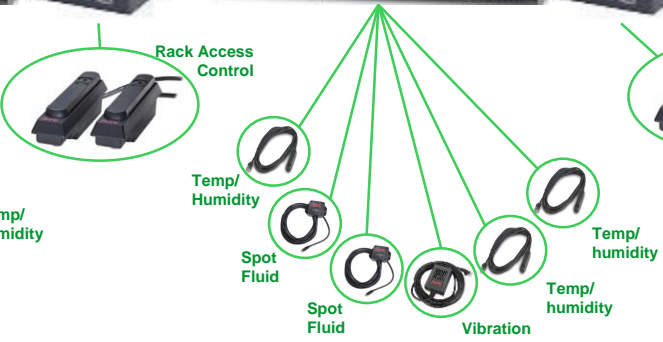
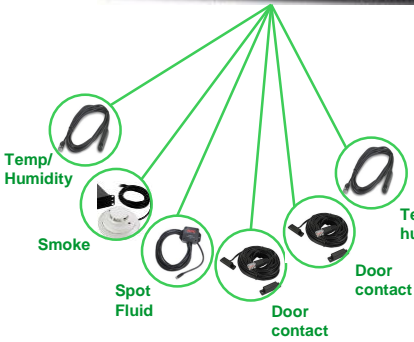
A-LINK



Rope Leak Sensor
(dedicated port)

Beacon Alarm
(dedicated port)

Daisy-chain up to
(12) Sensor Pods
(13) Access Pods



NetBotz - Integration With Third Party Device

- Aspirating Smoke Detection
- Fire Protection System
- Water Detection System
- Card Access System
- Generator
- Mechanical
 - Chiller
 - Pump



StruxureWare Data Center Expert (DCE) Overview

StruxureWare™



HQ



Cloud

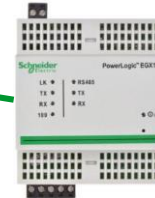
Ethernet Switch



Network Management Card



NetBotz



Modbus Gateway

Remote Site



UPS



InRow

Environmental Monitoring

- Temperature & Humidity
- CCTV
- Dry Contact
- Vibration
- Leak Rope
- Door Access

Third Party Device

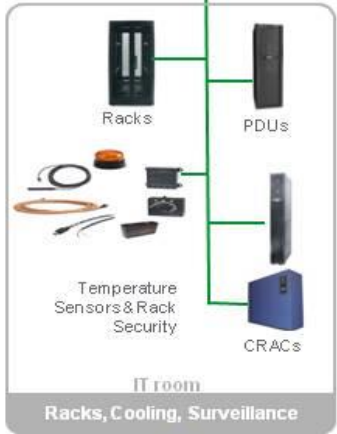
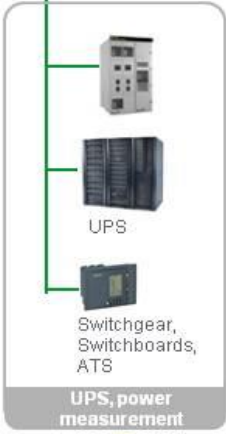
- Chiller
- WDS
- HSSD
- Power Meter
- Switchboard





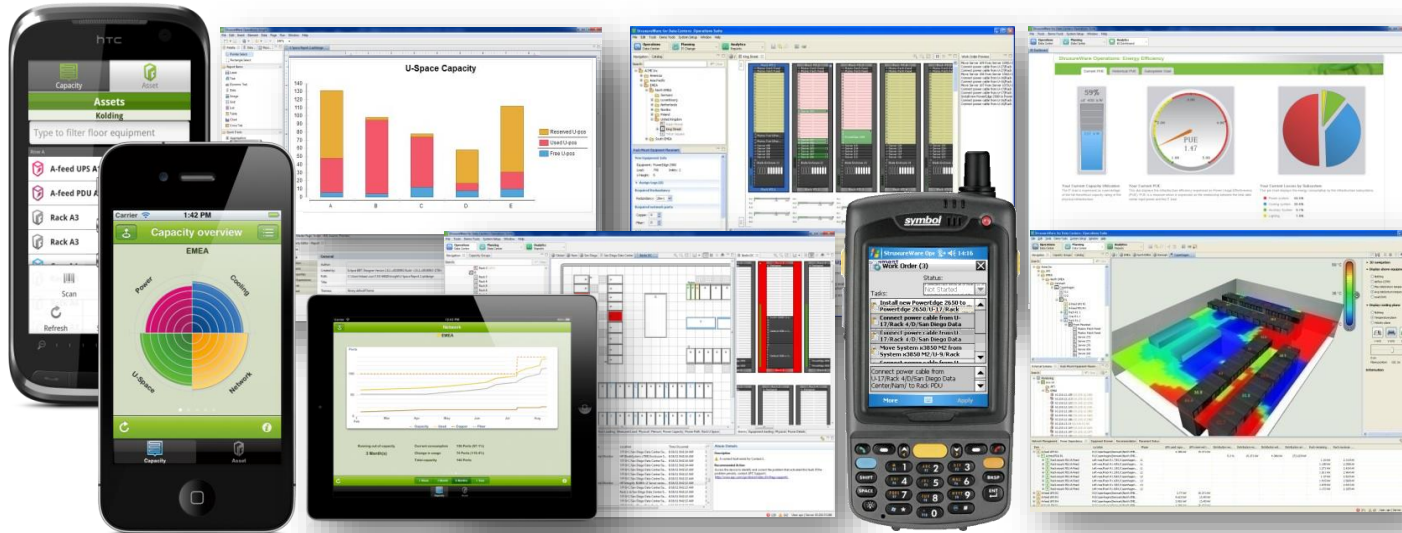
IP network

EcoStruxure



Data Center Infrastructure Management (DCIM)

- Allows the user visibility into the data center assets
- An inventory management device which shows data within the physical layout
- Analyze, design, implement, operate and evaluate data center facilities
- Release the potential for energy savings



Data Center Infrastructure Management (DCIM)

The screenshot displays the TrippList Data Center Operations Suite interface. The main window shows a physical layout of a data center with racks and PDUs. A search bar is located at the top left. The interface is divided into several panes: a left-hand navigation tree showing a hierarchy of racks and PDUs; a central grid representing the physical layout of the data center with red and green highlights; a right-hand pane showing detailed equipment information for a selected rack; and a bottom pane displaying a list of active alarms with columns for description, severity, device type, location, and time. A search bar is visible at the top left.

Description	Severity	Device Type	Location	Time Occurred
A device low load threshold violation exists.	Warning	Rack PDU	1P-W-C/San Diego Data Center/Sa...	6/16/11 9:42:54 AM
A contact fault exists for Con...	Warning	Environmental Monitor	HP BladeSystem c7000 Enclosure S...	6/16/11 9:42:54 AM
A low load threshold violation exists at Outlet 11 (Outlet 11).	Warning	Rack PDU	1P-W-C/San Diego Data Center/Sa...	6/16/11 9:42:54 AM
A low load threshold violation exists at Outlet 1 (Outlet 1).	Warning	Rack PDU	1P-W-C/San Diego Data Center/Sa...	6/16/11 9:42:54 AM
A low load threshold violation exists at Outlet 5 (Outlet 5).	Warning	Rack PDU	1P-W-C/San Diego Data Center/Sa...	6/16/11 9:42:53 AM
A low load threshold violation exists at Outlet 23 (Outlet 23).	Warning	Rack PDU	1P-W-C/San Diego Data Center/Sa...	6/16/11 9:42:53 AM
A low load threshold violation exists at Outlet 7 (Outlet 7).	Warning	Rack PDU	1P-W-C/San Diego Data Center/Sa...	6/16/11 9:42:53 AM
A contact fault exists for Contact 1.	Warning	Environmental Monitor	HP Integrity BL860c G Server system...	6/16/11 9:42:53 AM
A low load threshold violation exists at Outlet 16 (Outlet 16).	Warning	Rack PDU	1P-W-C/San Diego Data Center/Sa...	6/16/11 9:42:53 AM
A low load threshold violation exists at Phase 2.	Warning	Rack PDU	Rack L1/W/San Diego Data Center/S...	6/16/11 9:42:53 AM
Warning! Fault on NERC Integrated Environmental Monitor input contact1 (Int C).	Warning	UPS	1P-W-C/San Diego Data Center/Sa...	6/16/11 9:42:53 AM
A low load threshold violation exists at Outlet 8 (Outlet 8).	Warning	Rack PDU	1P-W-C/San Diego Data Center/Sa...	6/16/11 9:42:53 AM

Alarms within physical layout

Inventory Management

Global Asset Search

Data Center Infrastructure Management (DCIM)

The screenshot displays the StructureWare Data Center Operation interface. On the left, a navigation tree shows a hierarchy from 'Global' to 'Berlin DC' and then to individual racks (A-F). The main area shows a 3D perspective view of a data center floor plan with various server racks represented by colored blocks (green, blue, yellow, red, purple). A table at the bottom provides details for selected equipment.

Stage	Model Name	Serial	Location	Name	Average CPU Utilization	Average 24h Power
Existing	PowerEdge M710		6/PowerEdge M1000E/U-11/Rack ...			
Existing	PowerEdge M1000E		U-11/Rack 2/E/Berlin DC/Berlin/E...			
Existing	Rack PDU, Metered, Zero U, 22kW...		Left-rear/Rack 2/F/Berlin DC/Berlin...			
Existing	PowerEdge T250		U-1/Rack 1/D/Berlin DC/Berlin/E...			
Existing	InRow RC Chilled Water, 230V		E/Berlin DC/Berlin/Emea/		48,5	
Existing	HP Integrity BL860c Server series ...		12/HP BladeSystem c7000 Enclos...			

IT Equipment
Guidance

Available
Capacity

Business
Impact
Schneider
Electric

Data Center Infrastructure Management (DCIM)

StruxWare Data Center Operation

File Edit Tools System Setup Window Help

Operations Data Center Planning Data Center Analytics EE Dashboard

Navigation Genomes 22 Global Berlin DC 22

Search: Clear

Genomes

- Blade enclosures
- Blades
- Cooling Solutions
- Generic
- Internetworking
- Low Density rack
- Medium Density
- Network rack
- Power Distribution
- Racks and Accessories
- Server
- Del

 - PowerEdge 2650
 - PowerEdge 2800
 - PowerEdge 2850
 - PowerEdge 2970
 - PowerEdge 7250

- High Density Rack

- ProLiant DL390 G6
- ProLiant DL380 G6
- ProLiant DL380 G6
- System x850 M2
- System x850 M2

- HP
- IBM
- Supporting Infrastructure
- UPS

Front Front

Sy stem x850 M2

Sy stem ... 12,73 kg

Sy stem ... 12,73 kg

Sy stem x850 M2

43,18 kg

Sy stem x850 M2

43,18 kg

Sy stem x850 M2

43,18 kg

Sy stem x850 M2

43,18 kg

Sy stem x850 M2

43,18 kg

Sy stem x850 M2

43,18 kg

Sy stem x850 M2

43,18 kg

Rack 6 Rack 7

Work Order Editor

New Work Order

Summary: New Work Order

Assigned to: Peter Johnson

Needed by: 18-12-12

Status: Not Started

Priority: Low

Project Code: DCIM01

Comments:

Move System x850 M2 from U-13/Rack 7/F/Berlin DC/Berlin/Emea to U-13/Rack 6/F/Berlin DC/Berlin/Emea to Rack PDU

Status: Not Started

Connect power cable from U-19/Rack 6/F/Berlin DC/Berlin/Emea to Rack PDU

Status: Not Started

Connect power cable from U-19/Rack 6/F/Berlin DC/Berlin/Emea to Rack PDU

Status: Not Started

Save and Close Cancel

Alarms Network Management Power Dependency Work Orders Equipment Browser ITO Discoveries Remedy Change Tickets Recommendation

Associated ID	Work Order Number	Needed by	Status	Priority	Summary	Assigned to	Project Code
	01567	13-12-12	Not Started	Medium	New Work Order	Peter Johnson	
CRQ_CAL_1000004	01566	21-12-12	Not Started	Medium	New Work Order	Bob Tien Anderson	Data Center Site
	01565	13-12-12	Not Started	Medium	New Work Order	apc	ERP Server Install
	01564	20-12-12	Not Started	Medium	New Work Order	apc	
	01563	20-11-12	Not Started	Medium	New Work Order	Matt Carlson	
	01562	20-07-12	In Progress	High	ERP cluster upgrade 106	Martin Heinze	DELTA
	01561	17.06.13	Cancelled	Low	ERP cluster upgrade 145	Peter Johnson	DELTA

*1000 of 1569 work orders shown.

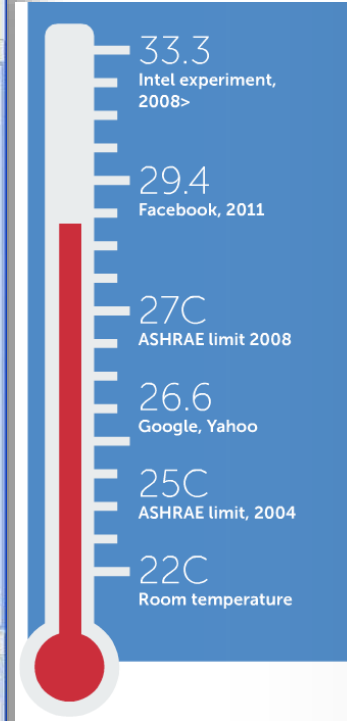
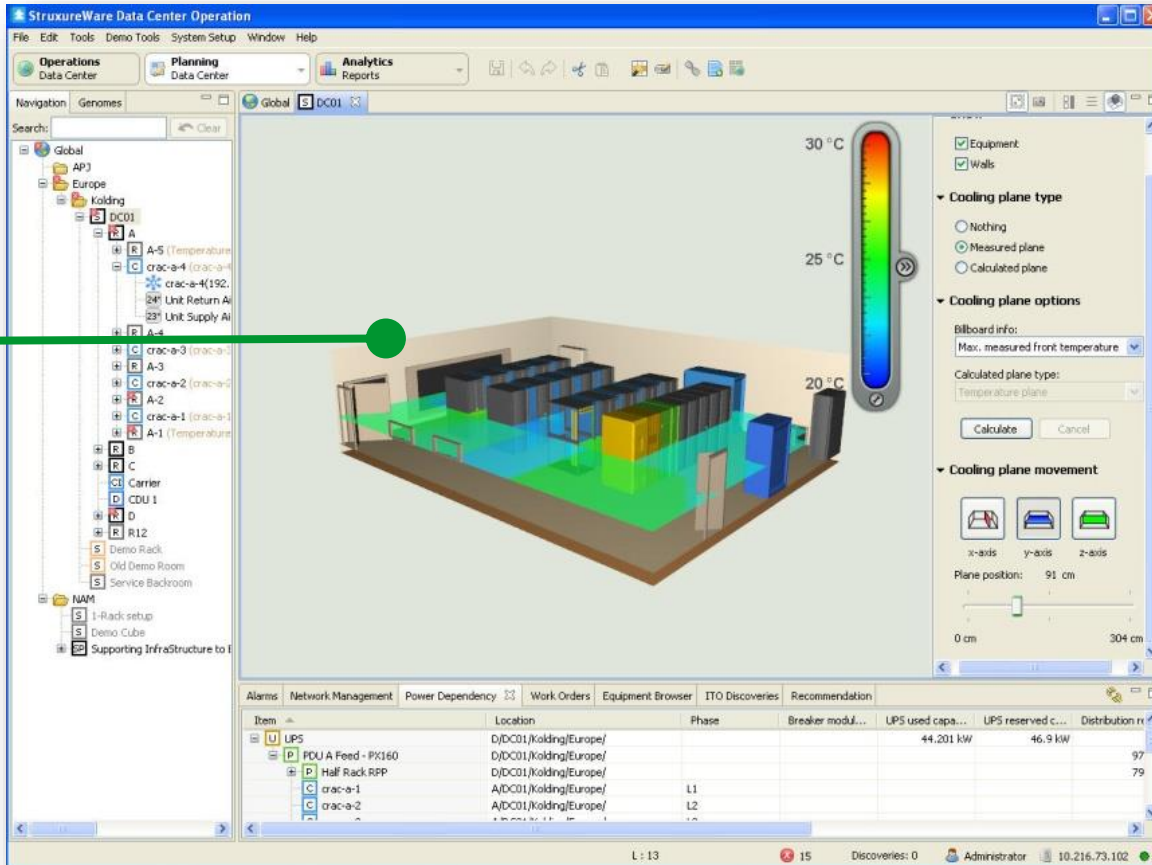
Discoveries: 3 User: apc | Server: 192.168.56.101

Schedule Change

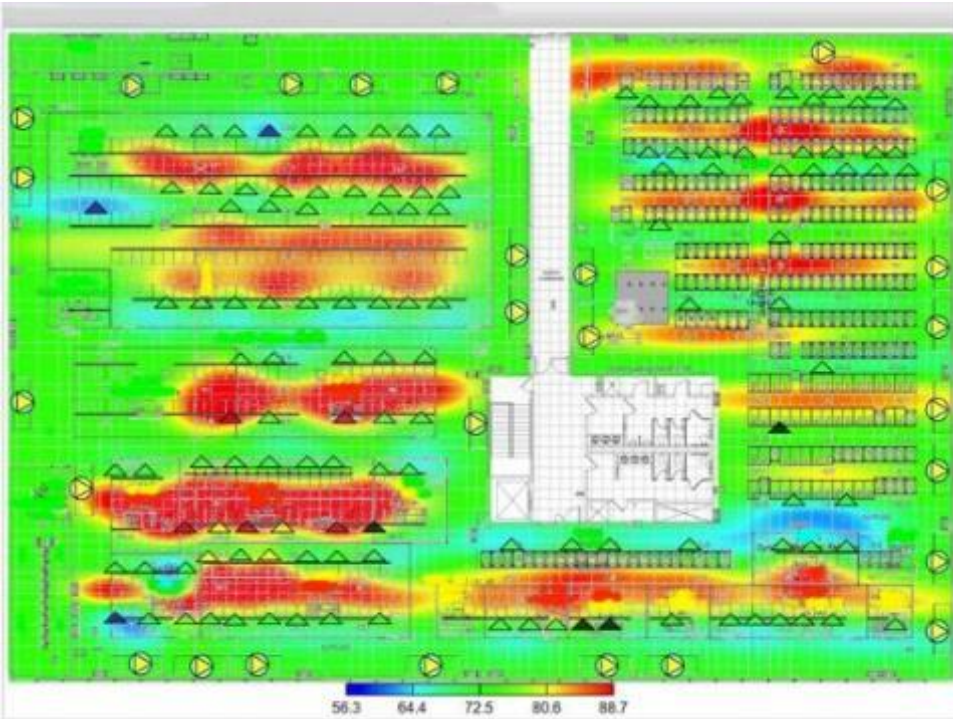
Rack Space Reservation

Data Center Infrastructure Management (DCIM)

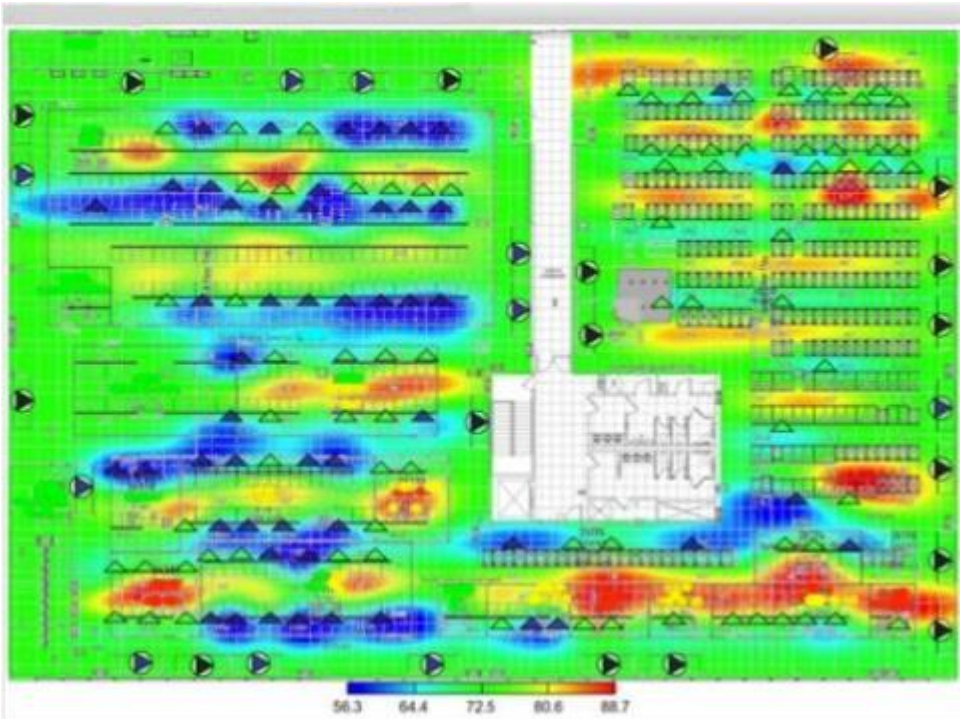
3D Airflow Simulation



Data Center Infrastructure Management (DCIM)



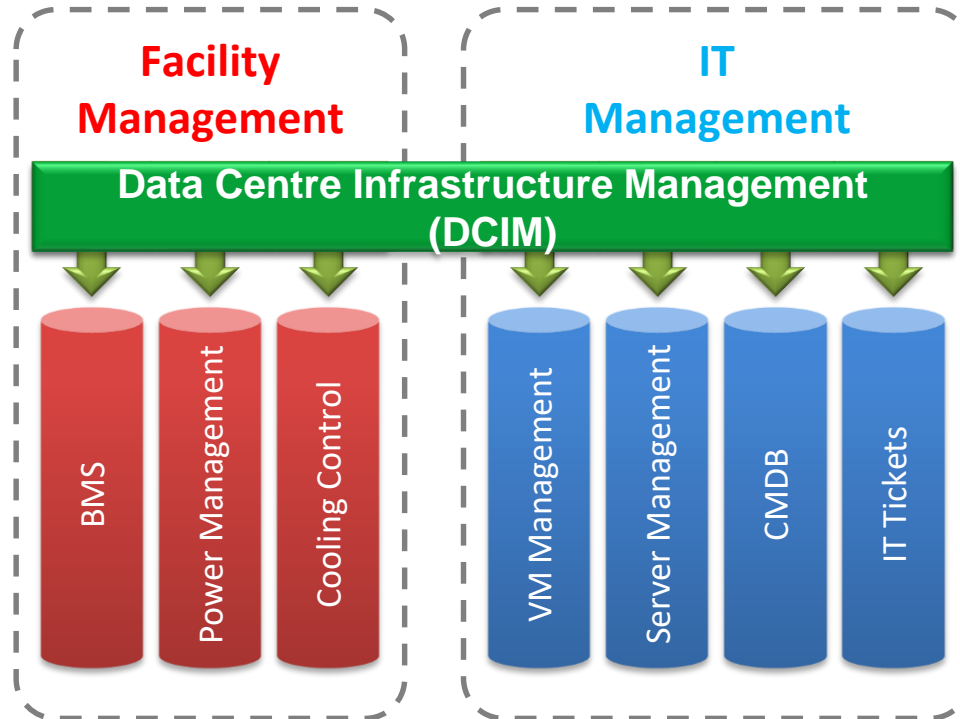
Before Cooling Optimize



After Cooling Optimize

Data Center Infrastructure Management (DCIM)

“bridge the gap between facility and IT”



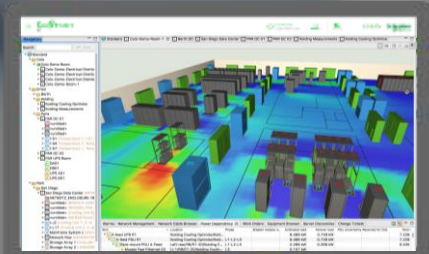


EcoStruxure™ IT Advisor

Data center infrastructure planning and modeling solution

September 2020

EcoStruxure IT Advisor is ...



“

... a data center infrastructure planning and modeling solution that provides Data Center Managers in large enterprises and colocation data centers with full insights into their infrastructure to improve profitability, efficiency and availability”

Planning and modeling software

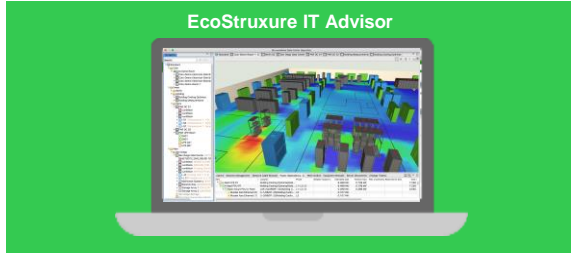
Automation that unlocks new business models and HUGE POTENTIAL for Data Center managers and system integrators in four key areas



EcoStruxure IT Advisor: Measurable Benefits for Data Centers

More specifically as an EcoStruxure PAC it integrates with other innovative interoperable products at every level to ...

Apps,
Analytics
& Services



Edge Control

Connected
Products



Optimize temperatures & asset lifespan

Achieve a three year ROI of 180%* by adjusting the temperature in the data center to the ideal setting.



Reduce power consumers

Identify and eliminate zombie servers to save up to 30% on power, cooling, maintenance and license cost.



Limit risk of downtime

25% of all data centers have experienced an outage within the last year** – reduce the downtime by understanding your UPS and data center capacity constraints

Top 3 problems solved by EcoStruxure IT Advisor

Delayed server deployment



Capacity optimization

Assures that your physical infrastructure provides the redundancy, backup time and availability required.

Downtime



Proactive simulation of changes

Analyzes data center infrastructure and highlights redundancy vulnerabilities through impact simulation

Location, location, location



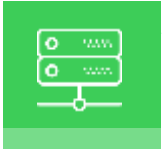
Inventory management

Provides an overview of the physical location of assets as well as its relation to the environment for full visibility into your data center.

Stay on top of everything

IT Advisor enables...

IT Advisor is available
cloud-based and
on-premise



Capacity planning

Know where to place the next server by **planning and analyzing the infrastructure.**



Change management

Reduce human error and deploy best practice across all moves, adds, and change with **workflow automation.**



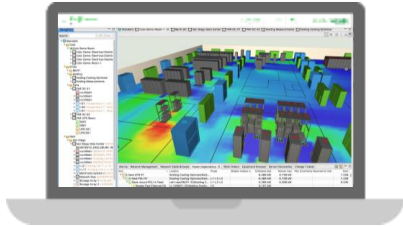
Risk planning

Can you safely shut down a device or do you need to reduce the IT load first? **The Impact Analysis report** indicates how incidents may impact your devices and infrastructure.



Colocation

Understand the current state of your colocation infrastructure. IT Advisor offers **floor view** with areas, cages and racks, and IT assets colored according to status, along with **detailed floor and rack utilization reports.**





The power of the Cloud

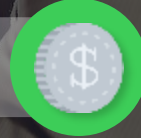
Why moving to the cloud?

The Cloud solves convenient challenges

Scalability



Capex VS Opex



Scheduled back-up and upgrade



Scheduled security patches downloads



The power of the cloud

“ *The biggest challenge is keeping everything good (normal operating status) because it's not just monitoring the alarm, the alerts, etc., it's resolving them.* ”

Customer – 451 Research, 2017

Easy to
get started



Access from
anywhere,
at anytime



Pay as
you grow



Maintenance
free



Up-to-date
cyber security



Automatic
software updates
and backup



Components


EcoStruxure IT Advisor

Operations Management

Data center optimization

- Floor and rack management
- CAD import
- Asset management
- Change management
- Capacity planning
- Risk planning
- Reporting
- Energy cost
- Advanced power setups
- Server Usage Optimization
- High availability
- Cage management
- Customer info
- Energy consumption tracking
- Tenant Portal

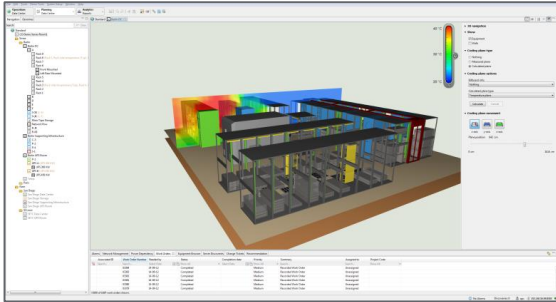
Manage data center assets, operational and capital costs

Features	Benefits
Inventory management	Shows device data within the physical layout for instant access to device details and asset attributes, and overview of data center operations. Integrates with HP OneView and HP uCmdb (available on-premise only) 
IT equipment guidance / change and capacity	Instant server placement recommendation through real-time analysis of available data center capacity, including power, cooling, u-space, network and power ports, capacity strategies, weight limits and more.
Automated work order process	Create work orders and automatically generate tasks to move, add or change IT and infrastructure equipment. Schedule, assign and track the status of itemized tasks to implement changes in the data center.
Consolidated data center dashboard	Gain transparency to data center key performance indicators through easily configured web dashboards, displaying customizable management-level information
Audit trail	Track all IT and facility equipment changes over the data center lifecycle, ensuring transparency and easy identification of maintenance requirements.
Web client	Allows the user visibility into the data center assets, power usage and power capacity using any modern web browser

IT Advisor: Capacity

Simulation, planning, and optimization of infrastructure capacities to right-size the data center

Available cloud-based
and on-premise



Features

Benefits

IT equipment guidance

Instant server placement recommendation through real-time analysis of available data center capacity.

Available capacity

Global view of available capacity within an organizational context, providing an instant calculation of actual space, power and cooling consumption, power and network port availability and floor and rack weight limits against overall data center capacity constraints

Business impact

Shows the consequence of device failure on data center infrastructure equipment for instant identification of critical business application impacts.

3D airflow analysis

Track all cage and facility equipment changes over the data center lifecycle, ensuring transparency and easy identification of maintenance requirements.

Virtualization capabilities

Integrations with VMware vSphere and HP OneView from the IT layer and the physical infrastructure layer, enabling data center managers to automatically migrate their impacted virtual machines from an impacted host server to a healthy host server (available on-premise only).

Predicted Power

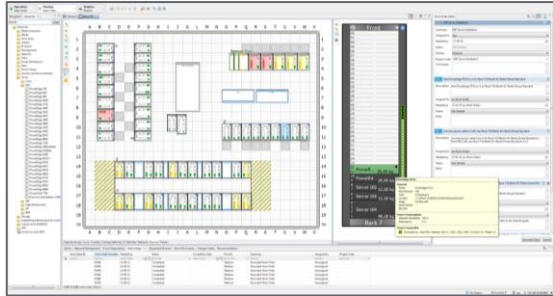
Provides rack and breaker level capacity planning and provides the potential to unlock stranded capacity as estimated load values are automatically derived from actual power measurements.



IT Advisor: Change

Fully integrated workflow management for your IT physical infrastructure

Available cloud-based
and on-premise

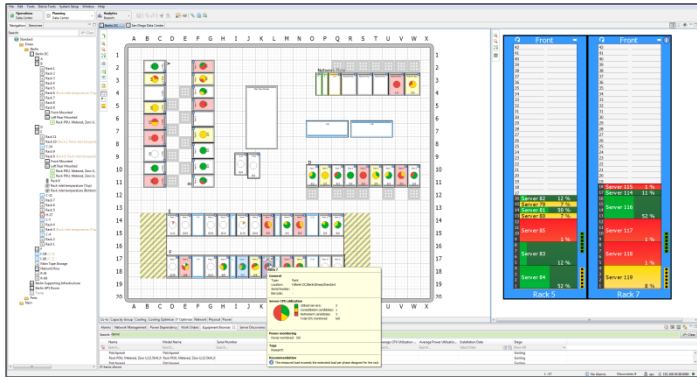


Features	Benefits
Automated work order process	Create work orders and automatically generate tasks to move, add or change IT and infrastructure equipment.
Advance workflow template	Users can now design, allowing them to set up both parallel and sequential workflows and the dependencies between the individual tasks
Asset audit trail	Track asset moves, adds and changes by date/time, owner and work orders for view, print and export.
Change management overview	Interactive interface showing past and pending changes to assist with resource and workload balancing, avoiding scheduling conflicts.
Link tickets to work orders	Associate BMC Remedy change tickets: Change work orders, as well as view and filter BMC Remedy tickets for an overview of current work load.

IT Advisor: IT Optimize

Available on-premise

In-depth optimization of server utilization for increased data center performance and reduced IT system energy usage



Features

Benefits

IT power and utilization monitoring

Determine the business usefulness for all IT assets helps eliminate underutilized servers and maximize IT capacity at the rack, row and room level.

Track underutilized servers

Reduce costs by eliminating unnecessary servers and maximize efficiency and rack capacity.

Server usage chargeback

Enables businesses to capture and assign IT costs to individual departments for accurate billing support down to the physical or virtual server level.

Genome™ library

The continuously growing asset library enables the software to determine power consumption without the aid of hardware sensors.

Power / CPU utilization

Provides auto-discovery of assets managed by Cisco UCS Manager, enabling data center managers to monitor the CPU/power utilization along side utilization at the physical infrastructure.

Module comparison of ITA on-premise / ITA cloud-based

Module	Product	ITA ON-PREMISE	ITA CLOUD-BASED
Base software		IT Advisor <i>(Formerly known as Colo in StruxureWare Data Center Operation)</i>	IT Advisor <i>(Formerly known as Colo in StruxureWare Data Center Operation)</i>
Capacity <i>Simulation, optimization, and planning of infrastructure capacities</i>		✓	✓
Change <i>Change management with fully integrated workflow automation</i>		✓	✓
Energy Cost <i>Cost calculation for running specified equipment for charge back and efficient budgeting</i>		✓*	✓*
High Availability <i>Cluster environment management</i>		✓*	✓*
IT Optimize (ITO) <i>Solution for integration with external IT systems</i>		✓	✗

* Merged into the base module and no longer appears as a separate module. It is included in the cost of the base software.



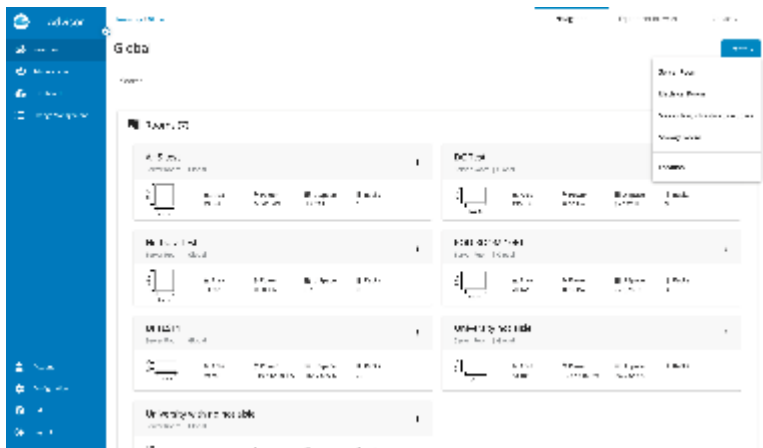
Simplify and speed up your on-site visits with the **EcoStruxure IT Advisor** web app

Accessible from any modern web browser



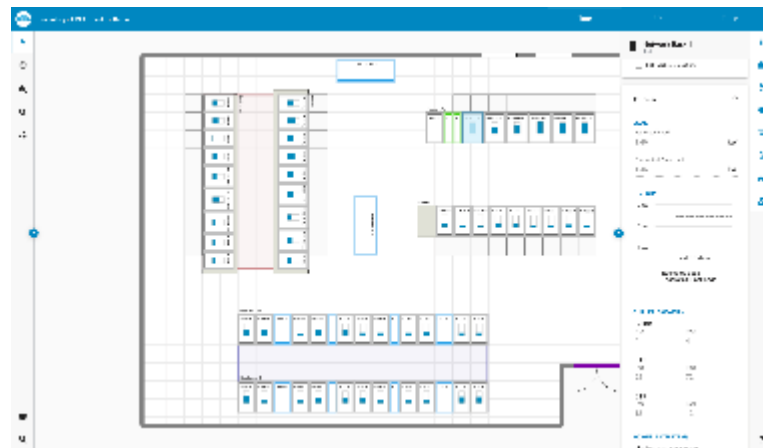
Simplify and speed up your on-site visits with the **EcoStruxure IT Advisor web app**, accessible from any modern web browser

Available now



Create rooms and locations

Model your data center on the go. Create a server room, an electrical room, a supporting infrastructure space, a storage room or a location. Give it a name and define its shape and properties.



Floor properties

Access a wide range of information about your data center floor in one single view. It includes general, physical, power, labels, audit trail, sensors, custom properties and customer information.

Simplify and speed up your on-site visits with the **EcoStruxure IT Advisor web app**, accessible from any modern web browser

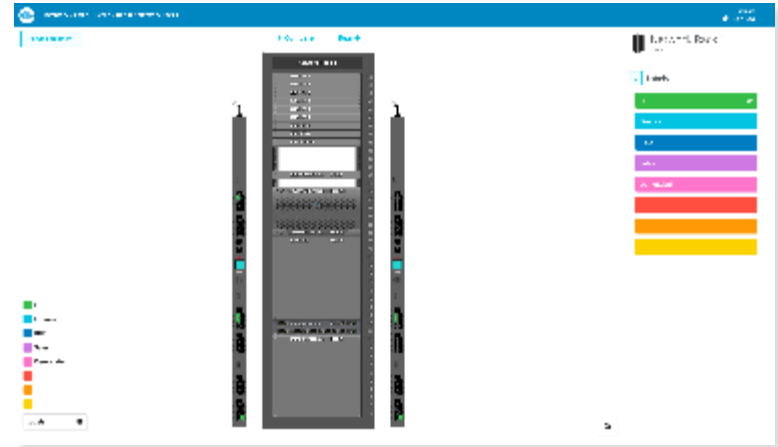
Available now



Network

Reduce connectivity complexity:

- See network connections in the web client
- Easily see the full network path of a specific port
- Editing, cable visualization and more coming soon

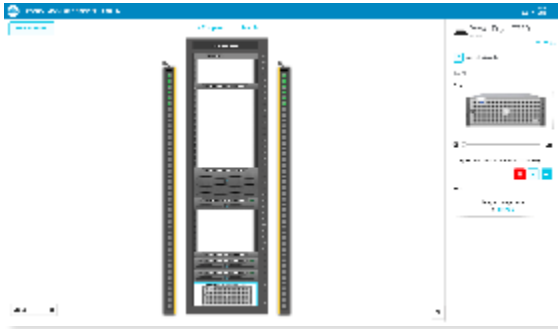


Asset coloring

Set a label with a color for floor and rack-mounted asset for easy identification.

Simplify and speed up your on-site visits with the **EcoStruxure IT Advisor web app**, accessible from any modern web browser

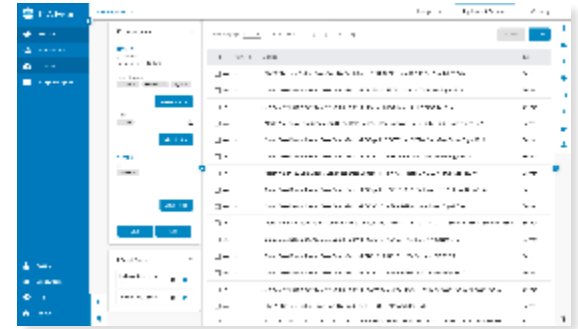
Available now



Asset visuals
Upload front and rear asset visuals



3D view (preview)
A modern, high-performing 3D view that includes visualization of power cables within the rack



Asset search (equipment browser)
Quickly locate equipment:

- Global search across all rooms and locations
- Multi-edit properties in the web client
- Export the data to Excel
- Co-lo feature: Search for a specific customer

Thank you!