

Datacenter Clarity LC Tech sheet

Overview

As part of the Integrated Data Center Management Suite (IDCMS), Datacenter Clarity LC™* provides tools for operating and optimizing data centers. This includes:

- Asset management combined with real-time values
- Connections management
- Change management
- Computational fluid dynamics (CFD)

Using state-of-the-art engineering software and product lifecycle management tools, Datacenter Clarity provides data center operators with the information they need to make informed, timely decisions. This helps optimize equipment placement and improve the longevity and availability of data center infrastructure. Datacenter Clarity LC can help organizations:

- Get clear insights into all mission-critical systems.
- Prevent problems by properly forecasting capacity issues.
- Use real-time data and forecasting to find, analyze and resolve problems.
- Optimize operational KPIs for greater efficiency and reduced cooling costs.
- Integrate with existing data center management frameworks, including COBIT and ITIL®.

* Datacenter Clarity LC™ is a trademark owned and licensed by Maya Heat Transfer Technologies Ltd.

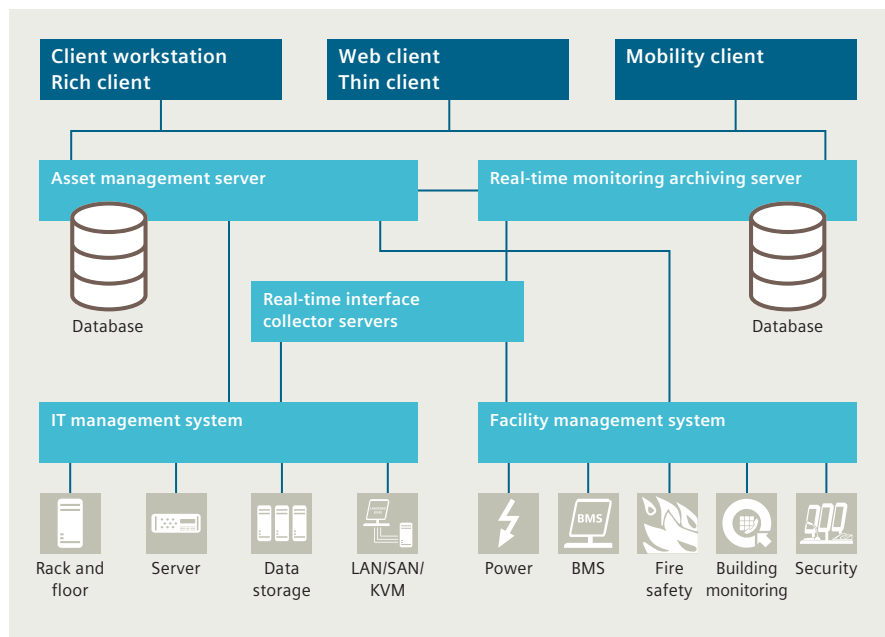
System architecture

Datacenter Clarity LC provides flexible client-server architectures configured to meet the needs of each organization, including:

1. High-performance distributed architectures for environments where performance is key.
2. Highly available architectures for environments that are especially sensitive to downtime.
3. Scaled-back architectures for sandbox and testing environments.

Datacenter Clarity LC is fully scalable and vendor agnostic. It supports all standard protocols on the market and comes with more than 800 proprietary protocols.

Pictured below:
Datacenter Clarity LC
high-level architecture.



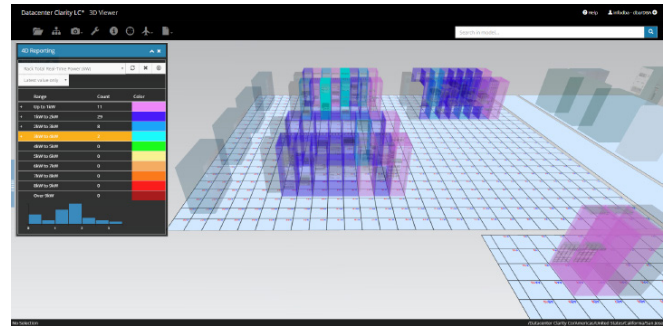
Key features

Web client

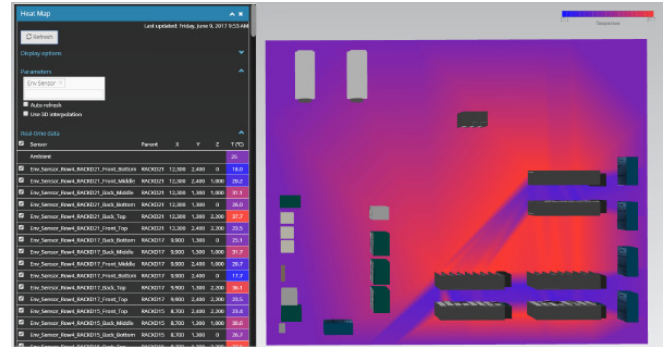
The Datacenter Clarity Web client is an HTML-5-based collaborative platform accessible from any device of the user's choosing. It provides tools to manage inventory, connections and processes; view real-time alarm information; and generate reports. Tools are made available according to access rights and can be restricted based on individual users as well as different roles. This gives organizations the flexibility to efficiently segregate data.

High-resolution asset visualization

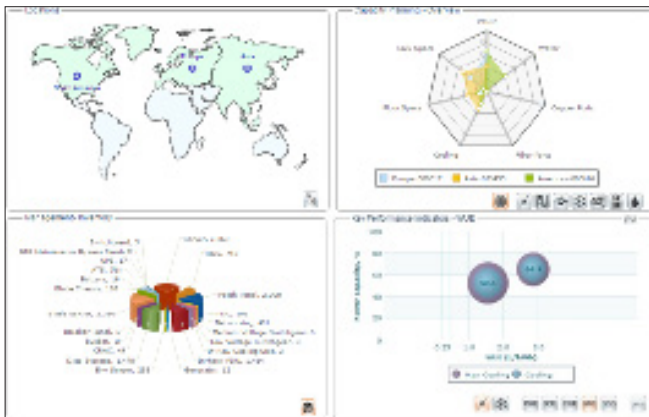
- High-definition, fully integrated, browser-based 3-D modeling environment.
- Clarity Index reports optimize asset placement based on the availability of U space, real-time power, ports, and more.
- Create, modify, move, and delete assets from within the 3-D environment.
- Visual, intuitive and customizable reporting capabilities.
- Temperature-mapping capability for the early identification of hot spots.



Pictured above: Datacenter Clarity LC 4-D reports.



Pictured above: Datacenter Clarity LC temperature map.



Pictured above: High-level dashboard.

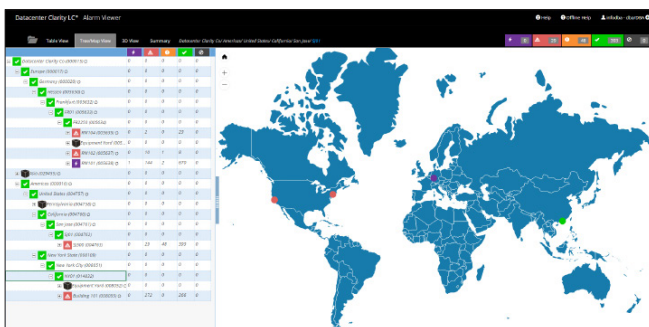
Real-time monitoring

Dashboards

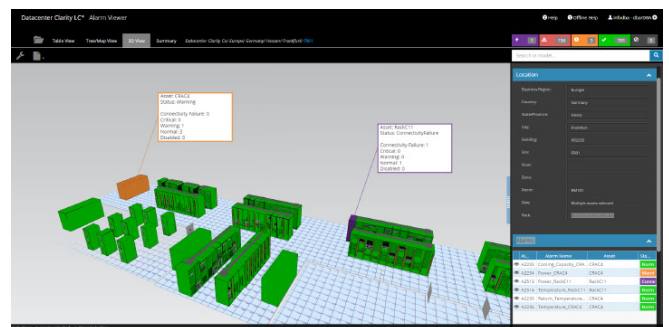
- Creation of customized dashboards to display real-time device data.
- Pivot tables help users organize and analyze data on-the-fly.
- High-level dashboards report on key performance metrics (PUE, WUE and more), which facilitates well-informed planning decisions.

Alarms and event feed

- Web-based alarm feed, map, and 3-D visualization.
- Custom SMS and e-mail alarm notifications.
- Automatic triggering of workflows and task assignments.



Pictured above: Alarm viewer map and 3-D view.



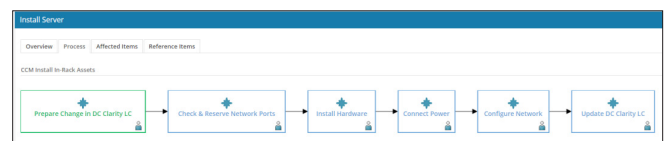
Infrastructure lifecycle management

- Inventory management and reporting in CSV and HTML formats.
- Robust and comprehensive access control configurable down to the port level.
- Regularly updated equipment library with thousands of IT and facilities assets from all major vendors to which users can add as required.
- Ability to map to existing customer data and leverage and/or integrate with existing tools.
- 3-D model creation using standard modelling and recording tools, including AutoCAD drawings, Excel spreadsheets, STEP, IGES, and Parasolid.

Process management

Datacenter Clarity LC's comprehensive change and process management modules provide visibility into all aspects of data center operations.

- Facilitate collaboration between all project stakeholders.
- Create customized workflows to match standard procedures.
- Manage project schedules, planning, and resources.
- Submit change requests and monitor their status from the Web client interface.
- Assign users or groups to specific tasks in the workflow.
- Automatically generate and attach custom, task-specific work orders.
- Forward and re-assign tasks as necessary.



Pictured above: Sample workflow.

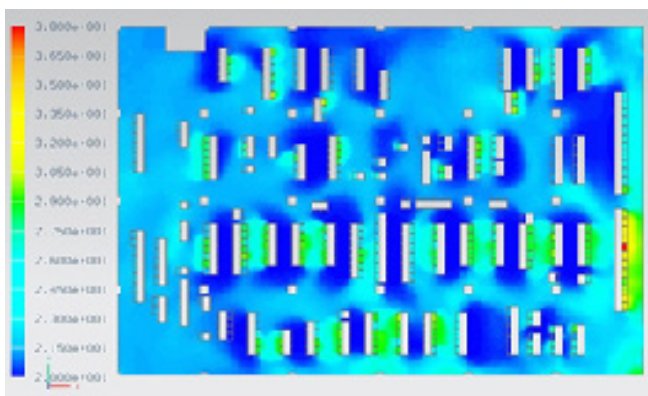
Power and network management

- Use Datacenter Clarity LC's Web-based connections management modules to create, modify and manage network and power connections.
- 2-D visualizations show the end-to-end power and network layouts, allowing for quick identification of upstream and downstream assets and diagnosis of configuration issues such as lack of redundancy or missing connections.

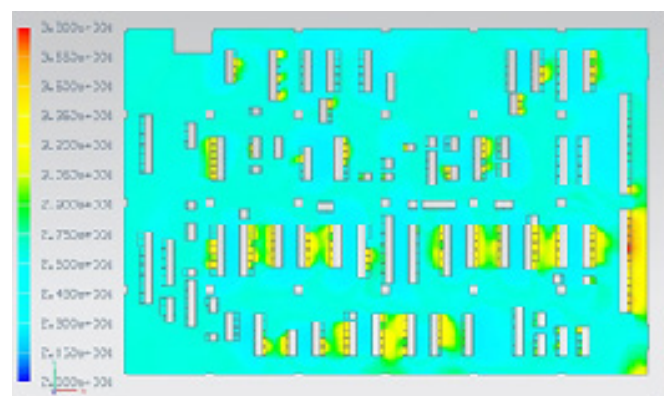
Computational fluid dynamics (CFD)

Maya HTT's industry-leading CFD software assesses airflow and cooling strategies and is fully embedded in Datacenter Clarity LC. This enables organizations to:

- Optimize energy usage.
- Predict temperatures and airflows throughout the data center.
- Identify inefficient devices and hot-spots.
- Evaluate tile flow distribution and under-floor obstructions.



Pictured above: CFD analysis before optimization.



Pictured above: CFD of a data center post airflow optimization.

System requirements

The hardware and software requirements vary depending on the total number of points and users. The tables below contain high-level recommendations. Specific requirements will be provided during the first phase of alignment during commissioning.

Datacenter Clarity sample server hardware configuration

data center size		Small	Medium	Large	Extra-large
# of racks		50	250	1000	2,000
# of real-time points		2,000	15,000	100,000	1,000,000
# of viewers		1	4	10	100
# of experts		1	2	5	20
# Servers		1	3	4	6
Asset management server	Processor cores	4	4	8	16
	RAM (GB)	16	16	32	64
	Storage ¹	300-GB RAID5 HDD or solid-state drive (read/write >250 MB/s)	300-GB RAID5 HDD or solid-state drive (read/write >300 MB/s)	500-GB RAID5 HDD or solid-state drive (read/write >400 MB/s)	Dedicated SAN storage ² (read/write >650 MB/s)
Real-time monitoring server	Processor cores	Part of asset management server configuration	6	16	16
	RAM (GB)		32	32	64
	Storage ¹		300-GB RAID5 HDD or solid-state drive (read/write >300 MB/s)	3-TB RAID5 HDD or solid-state drive (read/write >400 MB/s)	Dedicated SAN storage ² (read/write >650 MB/s)
Database server	Processor cores		4	4	4
	RAM (GB)		32	32	64
	Storage ¹		400-GB RAID5 HDD or solid-state drive (read/write >300 MB/s)	300-GB RAID5 HDD or solid-state drive (read/write >400 MB/s)	Dedicated SAN storage ² (read/write >650 MB/s)
Operating system		Windows Server 2014 R2 standard x64	Windows Server 2014 R2 standard x64	Windows Server 2014 R2 standard x64	Windows Server 2014 R2 standard x64
Java development kit	Asset management server	1.7.0 u80	1.7.0 u80	1.7.0 u80	1.7.0 u80
Database	Asset management server	Microsoft SQL 2014 Standard or Professional edition	Microsoft SQL 2014 Standard or Professional edition	Microsoft SQL 2014 Standard or Professional edition	Microsoft SQL 2014 Standard or Professional edition
	Real-time monitoring server		Microsoft SQL 2014 Standard or Professional edition	Microsoft SQL 2014 Standard or Professional edition	Microsoft SQL 2014 Standard or Professional edition
Other software	Real-time monitoring server	Microsoft Excel	Microsoft Excel	Microsoft Excel	Microsoft Excel
Network bandwidth between servers and clients		1 Gbps or above	1 Gbps or above	1 Gbps or above	1 Gbps or above

1 Assumes an online data time range for real-time monitoring of 12 months.

2 Dedicated SAN storage for asset management system is recommended for large numbers of users.

Datcenter Clarity sample collector hardware configuration

data center size	Small	Medium	Large	Extra-large
Processor cores	4	4	4	4
RAM (GB)	4	8	16	16
Storage	110 GB	250 GB	300 GB	300 GB
Operating system	64-bit operating systems including Windows 7 SP1 or later, Windows Server 2012 SP2, and Windows Server 2012 R2 64-bit operating systems running in 32-bit emulation mode are supported 64-bit operating systems running in 32-bit emulation mode only	64-bit operating systems including Windows 7 SP1 or later, Windows Server 2012 SP2, and Windows Server 2012 R2 64-bit operating systems running in 32-bit emulation mode are supported 64-bit operating systems running in 32-bit emulation mode only	64-bit operating systems including Windows 7 SP1 or later, Windows Server 2012 SP2, and Windows Server 2012 R2 64-bit operating systems running in 32-bit emulation mode are supported 64-bit operating systems running in 32-bit emulation mode only	64-bit operating systems including Windows 7 SP1 or later, Windows Server 2012 SP2, and Windows Server 2012 R2 64-bit operating systems running in 32-bit emulation mode are supported 64-bit operating systems running in 32-bit emulation mode only

Datcenter Clarity sample rich client hardware configuration

User role	Team expert and team member	Team viewer
Processor	4 cores	4 cores
Disk space	150 GB	100 GB
Memory	16 GB	8 GB
GPU	Certified GPU is required to check with Maya HTT	N/A
Operating system	Windows 7 x 64 Professional or Enterprise	Windows 32-bit or 64-bit
Browser	Browser that supports HTML5, CSS3, and WebGL, such as Chrome™	
Java run-time environment	1.7.0 u80	

Open interface and protocol support

Real-time monitoring

More than 800 standard and proprietary interfaces provide connectivity to any facility devices, BMS, EPMS, IDS, fire and alarm systems, SCADA/DCS, PLC/instrument systems, LIMS systems, IT devices, and other business information systems through the following communication protocols/interfaces:

- OPC
- Modbus
- Bacnet
- HTML
- UFL
- DNP3
- Advanced IT monitoring interfaces:
 - SNMP Trap, Windows EventLog, SyslogStandard Manufacturing Control Network (MCN) Health Monitor interface
- Other IT/facilities monitoring interfaces/protocols

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The information in this document contains general descriptions of technical options available, which do not always have to be present in individual cases. The required features should therefore be specified in each individual case at the time of closing the contract.