

PROFUSION 2.0

STATE-OF-THE-ART MICRO MODULAR DATA CENTER FOR THE NEXT GENERATION



UNVEILING THE 21ST CENTURY DATA CENTER

PROFUSION is a micro modular data center that replicates the cooling, power, and security capabilities of a traditional data center, but on a much smaller scale—less than 10sqft/1sqm. It is a self-contained, precision-cooled, high-density, plug-and-play-ready server cabinet with an integrated redundant cooling system (2N, N+1 and N configuration options). The cooling system consists of a pair of hot-swappable and redundant cooling modules that are located at the bottom or the top of the cabinet. Using highly sensitive sensors throughout the cabinet, the cooling system provides accurate cooling for variable densities up to 30kW with 2N redundancy. The system automatically meets the needs of the varying IT loads, thereby relieving IT managers and data center operators of this burden.

PROFUSION's efficiency greatly surpasses that of any traditional data center. It enables high-density computing within the smallest possible footprint and with the lowest possible power consumption while requiring only simple maintenance and minimal operational efforts. Relative to traditional models, the system's unique design and technology allow for a reduction of up to 80% in cooling energy usage and nearly 95% in operational resources. Expenses stemming from the operation of computer rooms, such as the costs of floor management and containment strategies, are minimized or eliminated. The benefits of containerized data centers—most notably rapid deployment—are achieved without the inconvenience of working within a containerized environment. The high CapEx and OpEX associated with traditional data centers are also eliminated.

Redundant 30kW capacity

Redundant embedded access control system

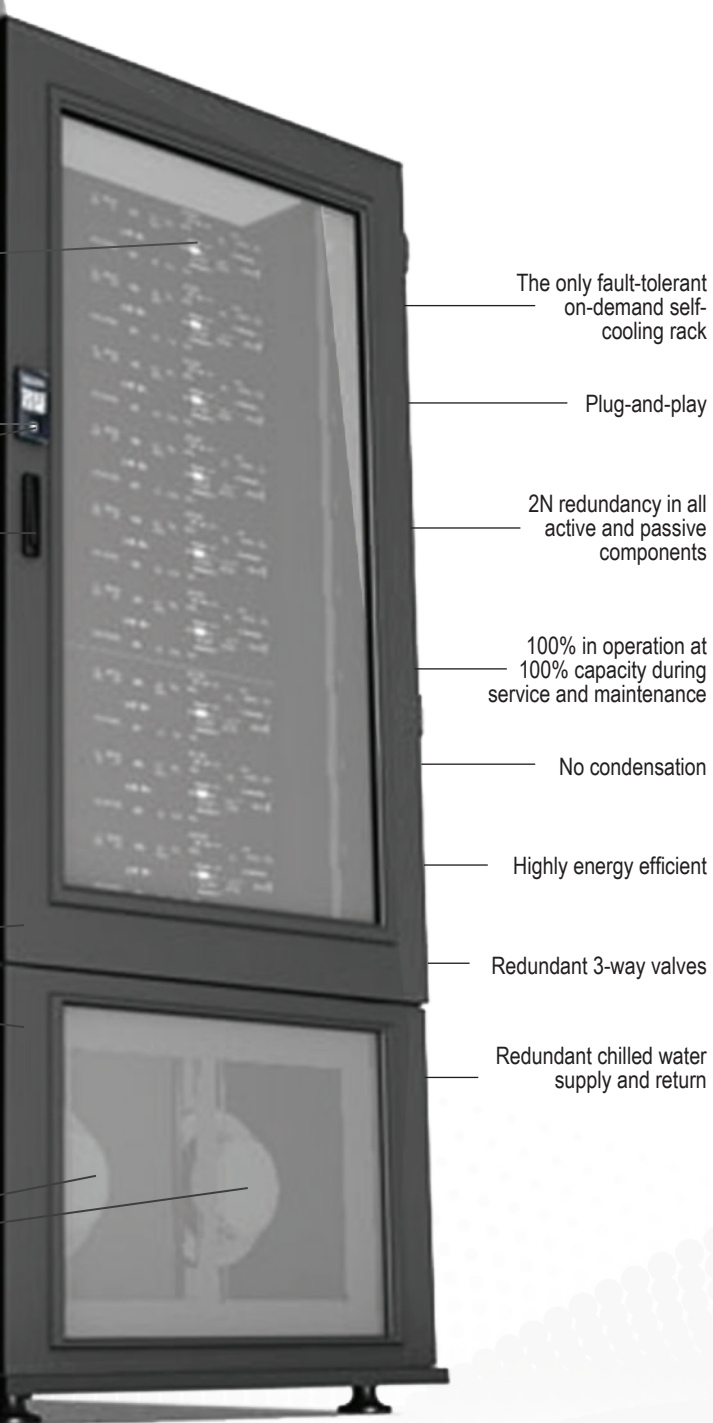
Automatic magnetic rear and front doors

Redundant power supplies

Separate mechanical and IT access

Fully redundant and concurrently maintainable cooling system





The only fault-tolerant
on-demand self-
cooling rack

Plug-and-play

2N redundancy in all
active and passive
components

100% in operation at
100% capacity during
service and maintenance

No condensation

Highly energy efficient

Redundant 3-way valves

Redundant chilled water
supply and return

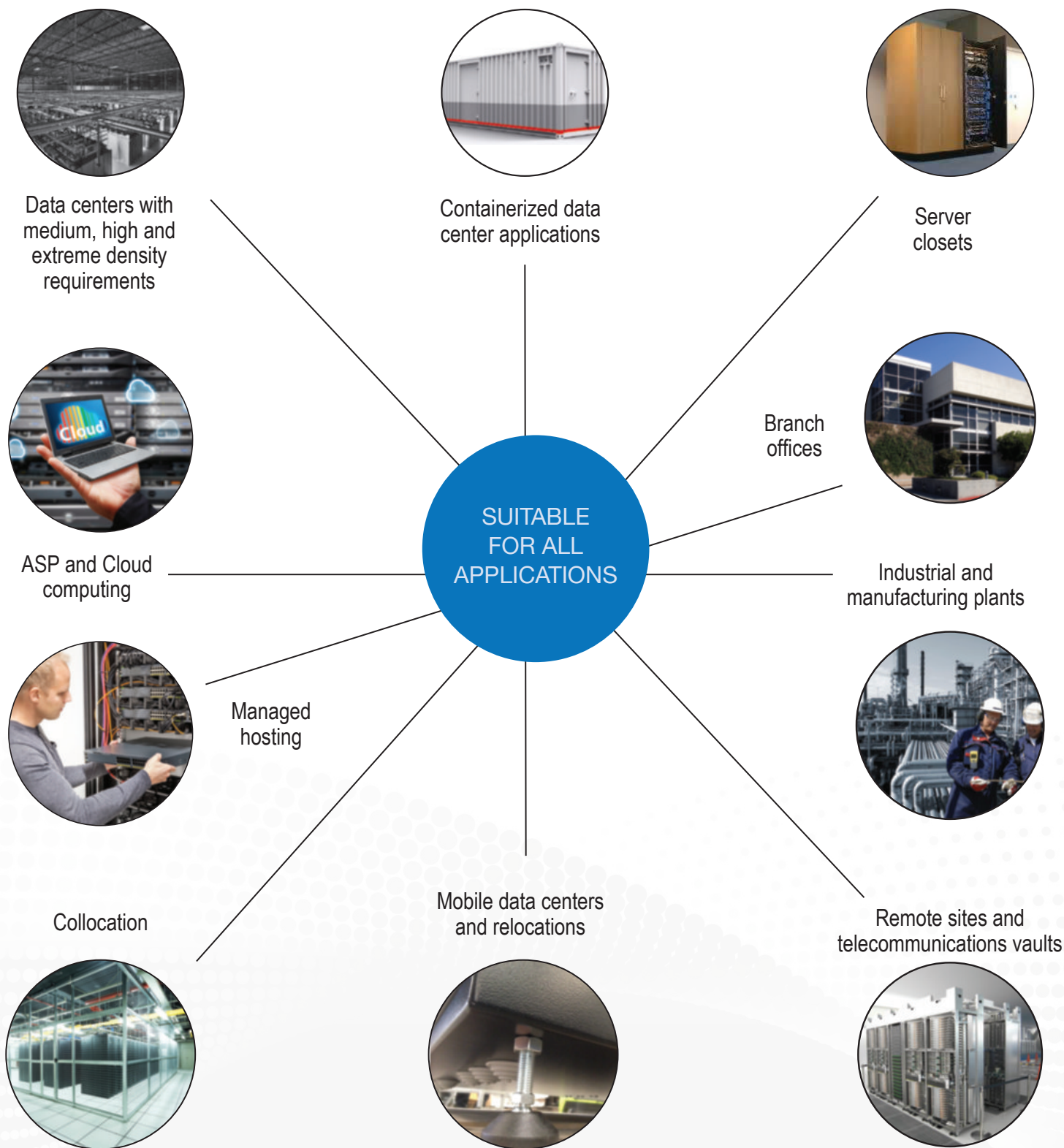
PROFUSION systems are controlled via an intelligent Management & Monitoring System (iMMS) that is composed of redundant controllers and environment management systems. The iMMS monitors and controls smoke detectors, temperature and humidity sensors, PDUs, automatic doors openers, and the cooling units by means of touch screens installed on the doors or via a central network portal. The system can be managed through the SNMP network protocol by any commercial BMS, with the best performance being achieved using the **PROFUSION** Supervisory Software.

The **PROFUSION** cabinet is airtight and water-sealed (IP55 certified) to ensure optimum environmental control and security for IT equipment. This provides an extra layer of protection to the IT equipment and eliminates the need for expensive and time-consuming efforts to seal data center environments. The doors are magnetically latched and controlled by the iMMS. In case of a high temperature alarm, fire, or user command, the latches are released and the doors are opened by a gas spring. An optional built-in fire suppression system is also available.

The **PROFUSION** cabinet has two entirely distinct and isolated compartments: the IT compartment and the Mechanical compartment. All mechanical access and pipe work is safely situated at the bottom of the cabinet, separate from the IT compartment, and mechanical service and IT personnel have restricted access to their respective compartments. This ensures that operational or maintenance routines in one compartment do not interrupt the other.

DIVERSITY OF APPLICATION

The **PROFUSION** system is a fusion of efficiency, density, security, rapid deployment, throughput, high ROI, low TCO, modularity, intelligence, simplicity, and smart engineering for optimum data center implementation and operation. Key system features include:



SIMPLIFIED STATE-OF-THE-ART COOLING

The **PROFUSION** system is the ultimate data center solution that fully supports a diversity of applications in a single environment without wasting energy or resources. The system has the capability of providing various cooling densities to diversely distributed heat-loads across cabinets without affecting one another. The high-density cabinets will not overheat and the low-density cabinets will not over-cool—cooling is provided to meet the exact requirements of the IT equipment in each cabinet without affecting or being affected by other cabinets, clients, departments or room parameters. The need for cold- / hot-aisles or any sort of containment solution is eliminated since the cabinets are self-contained and the closing of the cabinet door is synonymous with closing the door of a computer room.



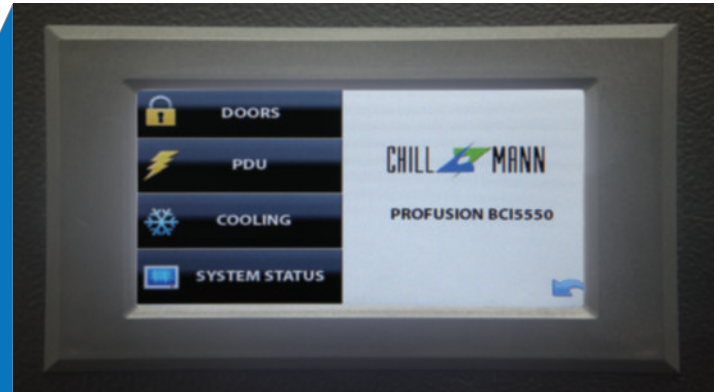
UNPARALLELED ADVANTAGES

LOW COST OF OWNERSHIP

- ▶ Provides up to 95% of energy and operating cost savings compared to traditional designs
- ▶ Modular growth eliminates the need for upfront CapEx and OpEx for anticipated expansion
- ▶ Integrated prefabricated system costs less than purchasing and installing separate components
- ▶ Simple plug-and-play system can grow according to needs
- ▶ Simple installation reduces implementation time and expenses
- ▶ Complete built-in redundancy and optimum availability reduces data and system losses and recovery expenses

HIGH AVAILABILITY

- ▶ 200% of all systems are available within the cabinet
- ▶ Redundant cooling modules ensure all-time availability
- ▶ Redundant cooling elements (active and passive)
- ▶ Redundant cabinet access control
- ▶ Redundant three-way valves and piping with built-in ability to connect each cabinet to redundant A and B chiller banks
- ▶ Redundant network enabled smart switched PDUs
- ▶ Redundant controllers and iMMS
- ▶ Redundant cable management system for structured cabling and electrical path diversity



HIGH SECURITY

- ▶ Intelligent security access to IT compartment eliminates unauthorized access
- ▶ Secured mechanical access eliminates unauthorized access
- ▶ IP55 (with optional IP65) air- and water-tight enclosure protects critical IT load from such hazards as ingress of dust or water leakages
- ▶ Modular format ensures that any fire hazard is localized and suppressed within each cabinet
- ▶ Cabinet's re-enforced steel structure provides highest loadbearing and protection from any load hazards
- ▶ Custom seismically-safe and seismically-operable capabilities
- ▶ Remote access and override control provide ultimate security at the micro cabinet level
- ▶ Full segregation and separation between adjacent cabinets
- ▶ Full isolation and independence from room environments and neighboring operation

IT and mechanical section totally isolated

HIGH MODULARITY

- ▶ Micro-modular implementation
- ▶ Micro-modular operation and growth
- ▶ Implement and operate as low as 3kW cooling; expand to 30,000kW on a seamless modular basis
- ▶ Implement and operate as low as .96sqm / 10sqf; expand to millions of square feet on modular basis
- ▶ Ability to operate as little as one cabinet and expand to tens of thousands of cabinets
- ▶ Automated modular capacity and throughput expansion
- ▶ All internal components are defined as operationally independent modules
- ▶ Operational resources (time, money, construction, energy, space and personnel) are optimally utilized to meet the precise needs of the critical load



Smart network enabled PDU



Hot swappable cooling modules independent of IT section

HIGH EFFICIENCY

- ▶ Provides best possible Power Usage Effectiveness (PUE)
- ▶ Delivers cooling only to the ultimate load (the IT equipment)
- ▶ Reduces cooling plant infrastructure
- ▶ Eliminates need for air handling units
- ▶ Maximizes efficiency of entire cooling circuit
- ▶ Requires least amount of space and footprint
- ▶ Design strategy dramatically reduces deployment time (TTD)
- ▶ Provides efficiency in staff and operations by providing full modularity and administration of parameters accurately and at the micro level

FLEXIBLE IMPLEMENTATION

- ▶ Can be installed in any environmental or physical condition
- ▶ Heavy-duty caster and leveling feet for ease of mobility
- ▶ Dual / multisource cooling (chilled water + chilled water, DX + DX or chilled water + DX)
- ▶ Quick-connect water and refrigerant connections
- ▶ Top or bottom cooling system provides added flexibility for water and refrigerant lines
- ▶ Ability to handle up to 2,200 lbs / 1,000 kg of IT equipment weight load
- ▶ Uninterruptible environment for IT hosting
- ▶ Dual power supply
- ▶ Optional integrated rack-mountable UPS

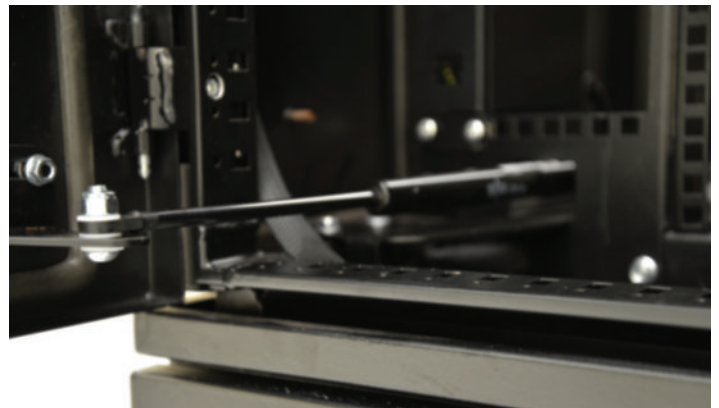
OPTIMUM OPERABILITY



Internal view



Internal view of IT space - front door



Gas spring automated door opening

- ▶ Facilities and IT merge as one system for unified consolidated management
- ▶ Facilities become another IT device on the network and matter of IT asset management
- ▶ Floor management is no longer necessary
- ▶ Data center airflow management is no longer necessary
- ▶ Room cooling and temperature control are no longer necessary
- ▶ Cold / hot aisles no longer exist
- ▶ Cold / hot aisle containment is no longer relevant
- ▶ Over-head cables no longer block airflow and cause inadequate cooling
- ▶ CR facilities and IT systems are separated from one another but under consolidated operation
- ▶ Threat of room contaminants or leakages no longer exists
- ▶ Noise level is brought to the absolute minimum
- ▶ Vibration level is brought to the absolute minimum
- ▶ Engineers and technicians do not need to work in extreme temperatures of cold and hot aisles
- ▶ All essential components are hot-swappable
- ▶ System is concurrently maintainable and fault tolerant
- ▶ New installations and expansions are a matter of plug-and-play
- ▶ Moving infrastructure and changing locations is plug-and-play and eliminates leaving any investments behind
- ▶ Fire and other hazards can be localized to individual cabinets without hampering the entire data center or adjacent racks
- ▶ All monitoring and management can be done from central remote location or at each cabinet
- ▶ Maintenance can be carried out without interrupting operations
- ▶ Simplicity of design makes for easy training of the operators and maintenance personnel

OUTSTANDING FEATURES



FAULT TOLERANCE

2N / N+1 redundant systems

- ▶ Cooling system
- ▶ Path power distribution
- ▶ Mechanical piping and distribution
- ▶ Access control system
- ▶ Intelligent Management & Monitoring System



INTELLIGENT MANAGEMENT & MONITORING

- ▶ Environment management
- ▶ Smoke and leak detection
- ▶ Temperature and humidity monitoring
- ▶ Door status and control
- ▶ Vibration sensing
- ▶ Electromagnetic door lock control
- ▶ Heat exchanger fluid and refrigerant management
- ▶ Cooling system monitoring control to automatically adapt to the actual load



LOCAL ACCESS CONTROL

- ▶ Door mounted 4.3" LCD color screen panels
- ▶ LAN interface (https)
- ▶ Automatic front and rear door opening mechanism
- ▶ Cable management



REMOTE ACCESS CONTROL

- ▶ Network enabled for remote monitoring and control
- ▶ Remote management via tablet / android device
- ▶ Network enabled intelligent switched and metered PDUs
- ▶ Remote door access control



POWER

- ▶ Plug-and-play installation and operation 115/220 V AC / 1 ph / 60/50 Hz operating voltage



HIGH-DENSITY COOLING SYSTEM

- ▶ Up to 30kW fault tolerant (2N) capacity with three cooling options
- ▶ Redundant chilled water (CW+CW)
- ▶ Redundant DX (DX+DX)
- ▶ DX plus chilled water (CW+DX)
- ▶ 3-way or 2-way for chilled water
- ▶ Electronic expansion for DX
- ▶ EC speed control fan



CABINETS

Rack units: 35 horizontal and 15 vertical rack units

Dimensions (w/d/h): 31.5 x 47.24 x 87.79 in /
.8 m x 1.2 m x 2.4 m

Viewing panel: Tempered glass (plexiglass optional)

Color options: Black/gray/white (custom colors available)

Mounting: Vertical

Footprint: 10.12 ft² / .96 m²

Weight: 771 lbs / 350 kg

Load bearing: 2,200 lbs / 1,000 kg

Protection degree: IP55 / IP65



OPTIONS

Power

- ▶ Smart PDUs / real-time metering / intelligent management

System Management

- ▶ Profusion Supervisory Software

Access control

- ▶ Biometric access
- ▶ Manual bypass

Fire suppression

- ▶ In-rack fire prevention system



About Us

CHILLMANN is the world leader in cooling systems. We are known for our unique and advanced data center cooling technologies and IT infrastructure, high standards and consistent quality of service. Built on a legacy of innovation and commitment, we combine outstanding know-how and technology to provide solutions and meet the needs of our clients.



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