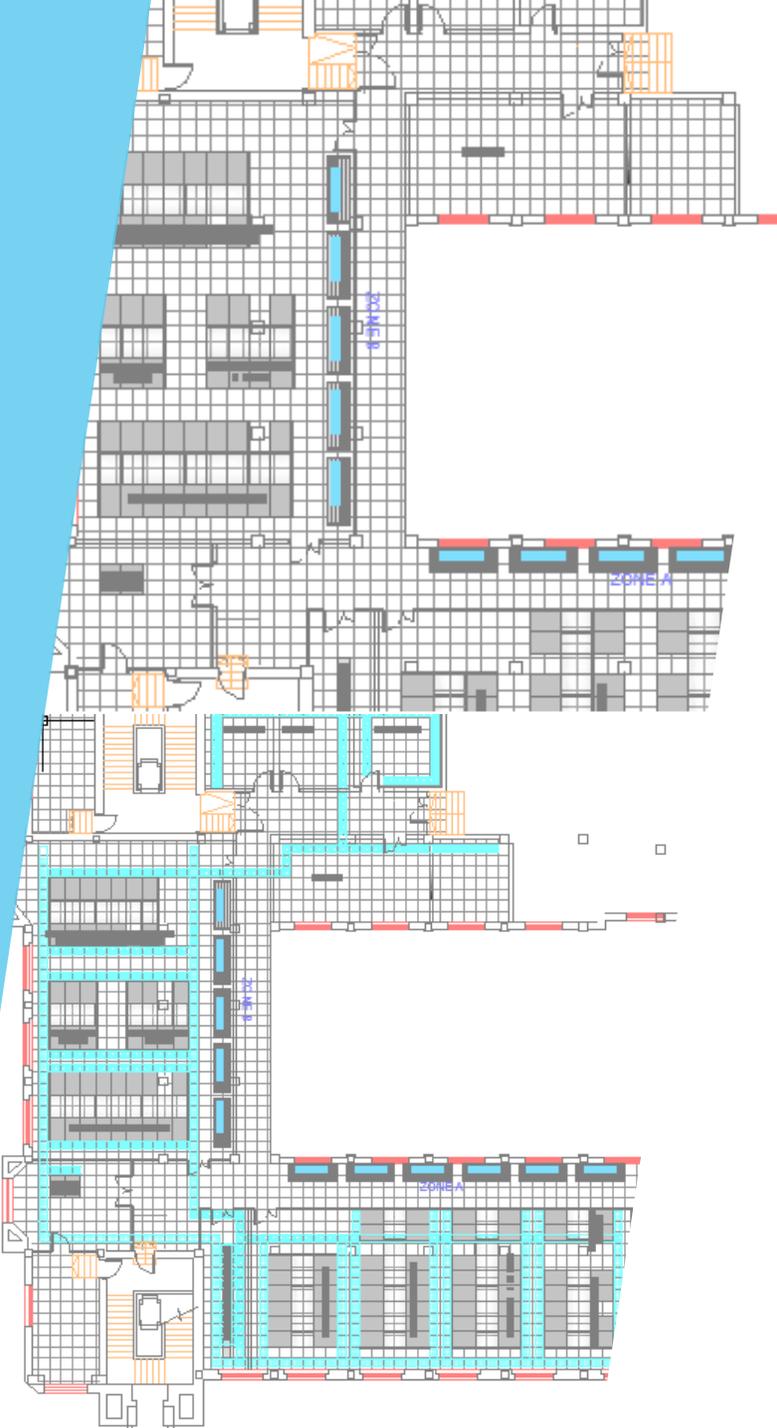




SOU LCO

Data Centre Solutions



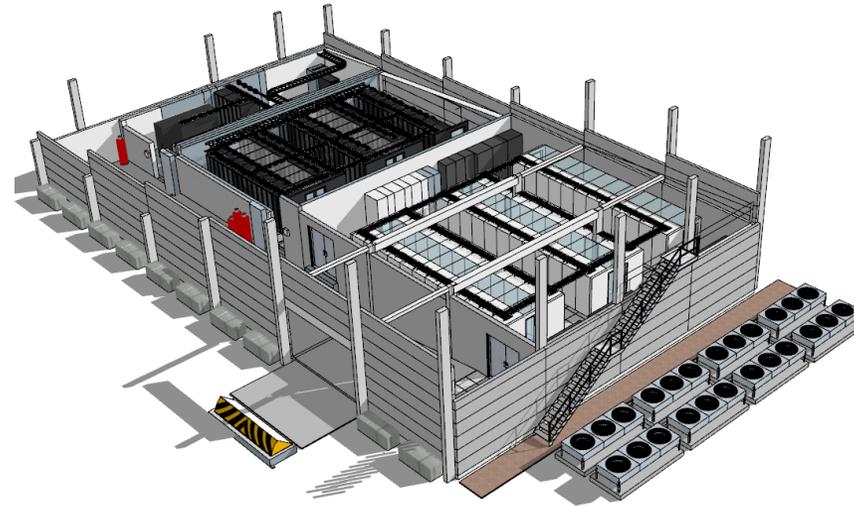
Turnkey Data Centre Design and Implementation

- ▶ Q. *How long has Soulco, as a systems integrator, been implementing data centre solutions?*
- ▶ A. *For as long as we can remember, but they were not always called data centres.*
- ▶ In fact, Soulco, a spin-off of Siemens origin, has the knowledge from a history of building telecommunications central offices for fixed and mobile operators throughout Africa and the Middle East. These equipment rooms required the same facilities as the modern data centre does now, and indeed, the telecommunication industry is now standardising on server technology footprints, which means that we at Soulco have always followed the trend.
- ▶ Modern data centre infrastructure is in constant evolution towards efficiency and economies of scale, and no two data centres are the same.
- ▶ Data centre design requires bringing together the various and distinct disciplines in a harmonious solution that is fit for purpose. Soulco's ability to do this gives us a competitive advantage.

Facilities: disciplines brought together

To many, 'Data centre' means a number of racks housing servers and network equipment. It goes a lot further than that with facilities.

- ▶ Power and backup
- ▶ Cooling, ventilation and humidification
- ▶ Containment & raised floors
- ▶ Fire detection and suppression
- ▶ Access control
- ▶ Data centre Management Systems
- ▶ Structured cabling



During the *design planning and scoping* process, Soulco brings these disciplines together for the preliminary design solution.

Importantly, Soulco sources and integrates all components of the solution.

Power

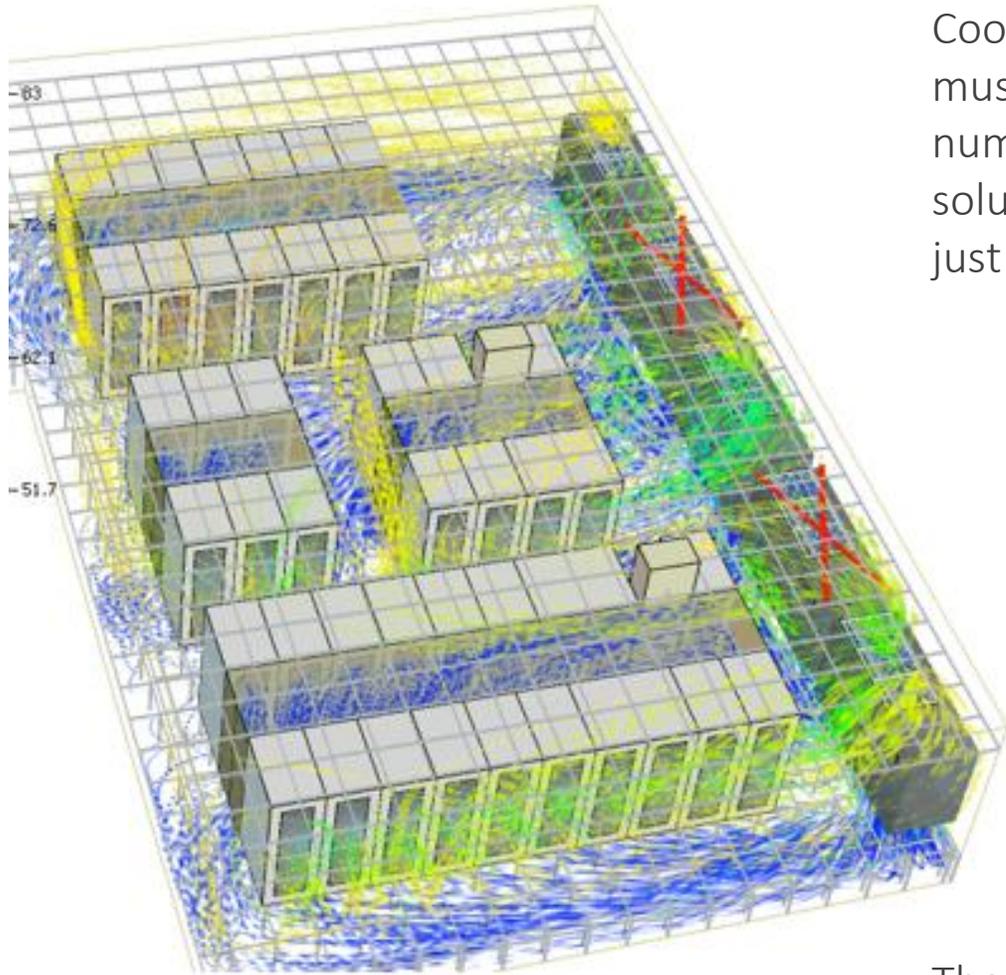
The electrical engineering of a data centre is of extreme importance, and our design covers the path from source to end devices

- ▶ HV/MV transformers and switchgear
- ▶ LV distribution and galvanic isolation transformers
- ▶ Stand-by generators, transfer switches and network synchronisation
- ▶ Uninterrupted Power Supplies
- ▶ Main distribution panels / remote power panels
- ▶ Bus-track (busbar) systems
- ▶ Power Distribution Units
- ▶ Earthing and bonding
- ▶ Lighting and utility

Electrical design is done in accordance with the *tier classification* of the data centre (Uptime Institute™, TIA-942, BICSI) and local regulatory standards.



Cooling, Ventilation, Humidification



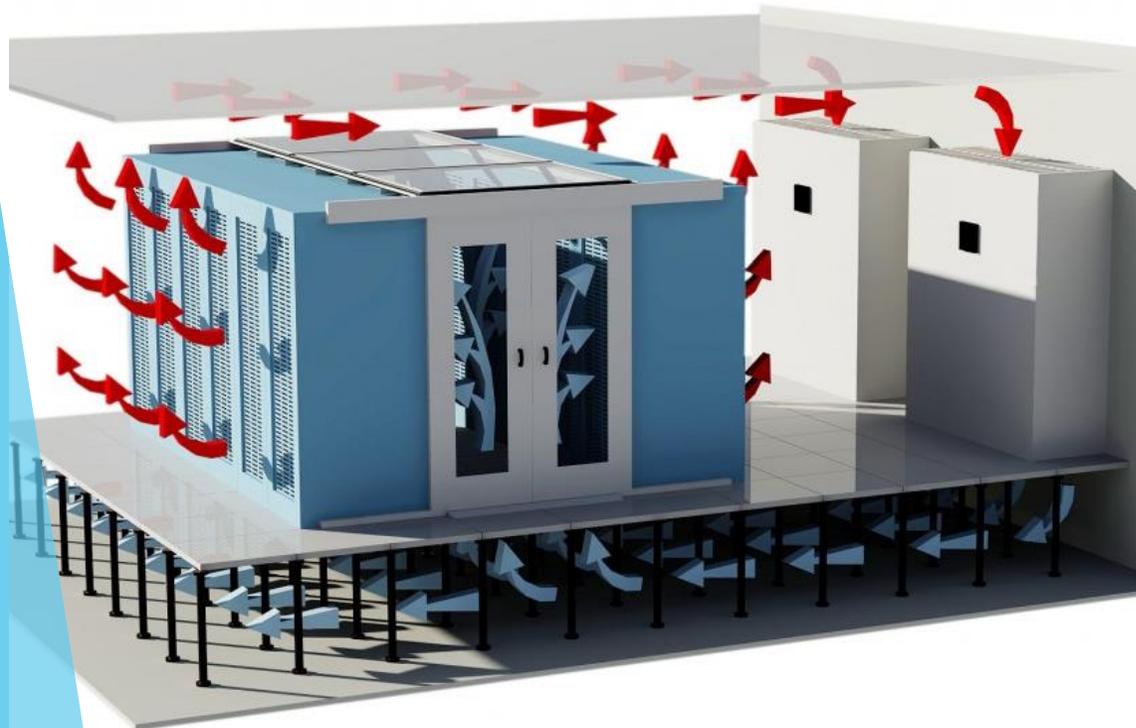
Cooling is of primordial importance in the data centre and its complexity must not be underestimated. The design must take into account a large number of factors, including the data centre location, so that a reliable solution and a low PUE is achieved - the choice of cooling system itself is just part of it.

- ▶ Selection of cooling system: DX, chilled water, evaporative, free-cooling, hybrids..
- ▶ Cooling units: CRAC/CRAH, in-row units, in-cabinet
- ▶ Computational Fluid Dynamics (CFD) modelling
- ▶ Hot/cold aisle containment
- ▶ Airflow/ventilation tiles/scrubbers etc
- ▶ Humidification (steam, ultrasonic..)

The data centre cooling design is done in accordance with the relevant standards (ETSI EN 300 019, ASHRAE TC9.9, EU CoC.)

Containment and Raised Floors

Whether designing a new data centre or expanding or renovating an existing one, hot- or cold-aisle containment is the best solution for efficient cooling. Raised access floors are not an absolute necessity for data centres, though they are still commonly prescribed as cooling plenum and where there is a need to run cables along the cableways on the floor.



- ▶ Selection of the appropriate raised access floor tiles, stringers, pedestals, ventilation tiles, sealing grommets etc
- ▶ Design of the hot- or cold-aisle containment and floor plan
- ▶ Ceiling plenums

Fire Detection and Suppression

VESDA (ASD) systems are the de-facto fire detection system in data centres. The air is sampled through the pipework and passed through a dust filter. The filtered air then enters a chamber where it is sampled by laser using forward light scatter and smoke particles thus detected.

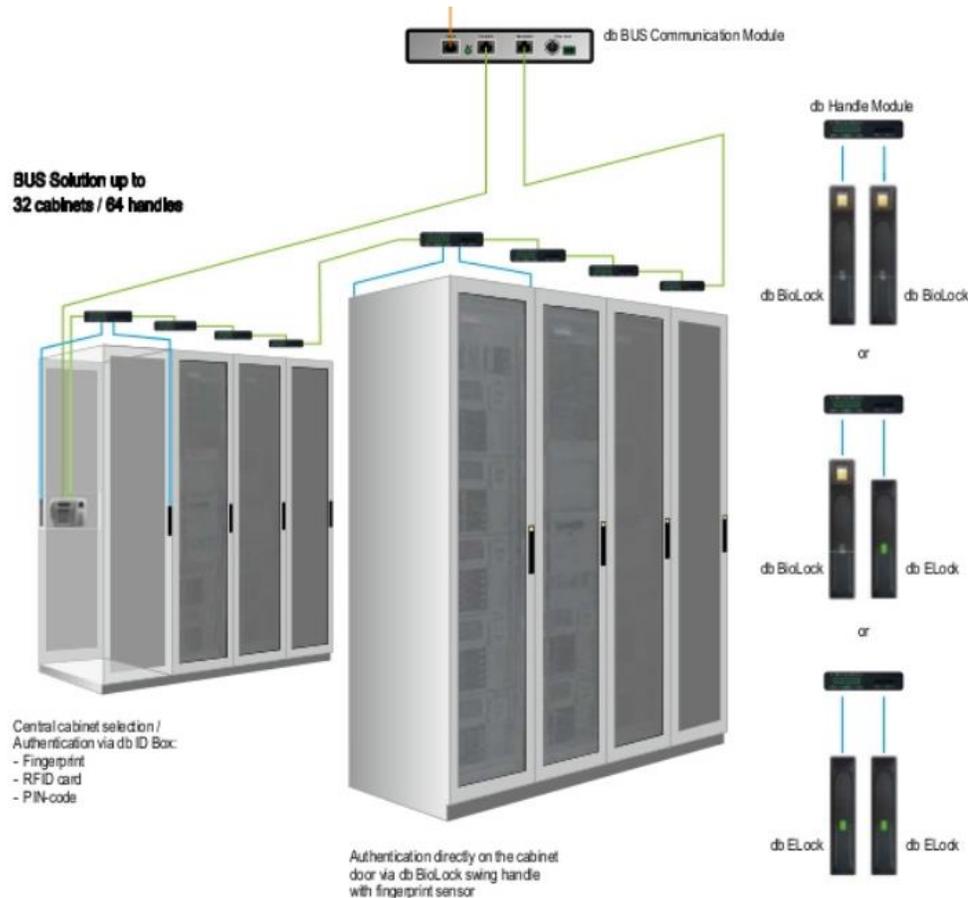
Inert gas fire suppression systems reduce oxygen to below 15%. With oxygen levels at around 15% and below, combustion is not possible. Fire suppressants such as INERGEN, IG55 and IG541 are designed to reduce oxygen levels to below 15% but higher than 12%. This means that it is safe for the occupants of the enclosure to egress safely post discharge. FM200 and Novec 1230 work by reducing heat. Soulco sources from a range of different solutions, including high pressure water mist (HPWM) systems.



- ▶ Design and of the appropriate detection systems – ASD and/or point detectors
- ▶ Design of the appropriate extinguishing solution – oxygen or heat reduction, HPWM.

(HPWM: High Pressure Water Mist)

Access Control



Data centre Security is of extreme importance and it is imperative that you know who is where at any moment.

- ▶ Biometric access control
- ▶ Access level down to cabinet or sub-cabinet if required
- ▶ Full CCTV monitoring
- ▶ Intrusion detection using a variety of detection devices

Data Centre Infrastructure Management

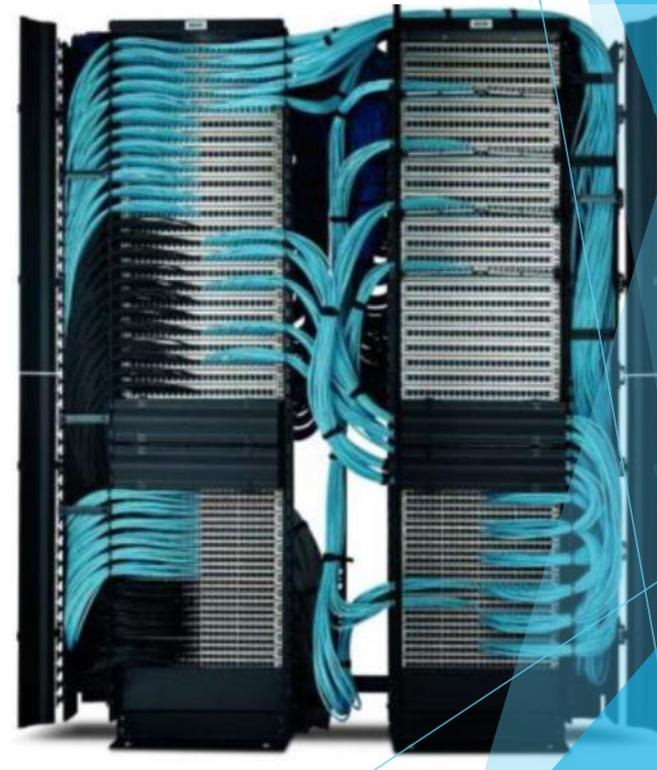
The data centre is a complex environment that requires real-time monitoring of the environmental and IT infrastructure. Traditionally, while the facilities were monitored by a Building Management System (BMS), and the IT infrastructure handled by a variety of network and server management systems, these facilities are coming closer together in the Data centre Infrastructure Management System.

- ▶ Monitoring of Main Distribution Board, generators, UPS, PDUs and metering
- ▶ Monitoring of cooling and ventilation equipment, equipment temperature and humidity, airflow, leak detection, cable temperature
- ▶ Monitoring of fire detection and extinguishing systems and access control/intrusion detection
- ▶ Centralized integrated management of network, storage and computer storage
- ▶ Capacity planning

Structured Cabling

Structured cabling should be well-thought out in advance to avoid serious reconfiguration issues when the data centre is operational, resulting in down-time. First off, the data centre topology must be well thought-out – this defines the distribution in a hierarchical strategy. Consider TIA 942-A where the different spaces and areas are defined (MDA, IDA, HDA), then the bandwidths required between them and the type of connectivity (copper or fibre). Soulco applies the latest ISO and TIA data centre standards when designing the structured cabling, considering:

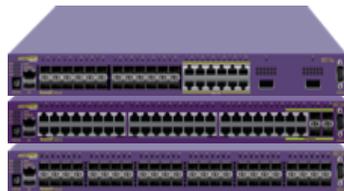
- ▶ Top-of-row or top-of-rack switches
- ▶ Redundant routes
- ▶ 1G/10G/40G copper or 10G/40G/100G fibre
- ▶ Location, distance and type of ODF and patching
- ▶ Capacity planning of cable trays



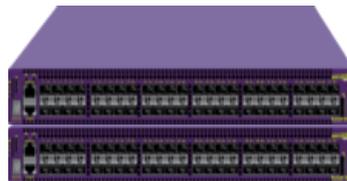
Network

Traditional data centre switching topology normally follows the EIA-942 logical layout architecture and can be differentiated by Access (top-of-rack), Aggregation (end-of-row, top-of-rack) and Core switches. Consideration must be taken of Fibre Channel connections and Fibre Channel over Ethernet (FCoE), which will require a different network (physical or logical) for the SAN. As with server virtualisation, software defined networking (SDN) is another factor to take into account. Soulco is a Platinum Reseller for Extreme Networks and can provide the full range of data centre switches.

- ▶ Extreme X480 top-of-rack switches 24/48 ports 10G/40G
- ▶ Extreme X670 48/64/72 1U with 40Gb uplinks, stackable to 320Gb
- ▶ Extreme 7100 high performance aggregation switches with up to 64 10Gb ports in 1U
- ▶ Extreme K-, S-, X8 (with redundant fabric switch) Series modular chassis core switches



X480



X670



7100



X8

Servers and Storage

The raison d'être of a data centre is to facilitate servers and storage. Whether used for the business needs of enterprise, hosting, colocation or cloud, it will be expected to support a range of server and storage types with different footprints, power densities and network requirements. When designing a data centre, consideration must be taken of legacy equipment and future trends in storage and compute, for instance:

- ▶ 1U – 3U standalone 19" servers with or without on-board HDDs
- ▶ Blade servers
- ▶ Hyper-converged servers and storage
- ▶ Open Compute Project (OCP) hardware
- ▶ Hybrid disk and flash storage arrays
- ▶ Backup appliances and tape libraries



Soulco partners with Fujitsu for servers and storage

Data Centre Standards

Soulco designs Data Centres according to the relevant national and international standards. The most important Data Centre-specific and general standards are:

- ▶ EN 50600 – IT – Data centre facilities and infrastructure
- ▶ EN 50173-5 – IT – Genetic cabling systems, Part 5: Data centres
- ▶ EN 50110 – Operation of Electrical Installations
- ▶ IEC 60364 – Electrical Installations for Buildings
- ▶ TIA 942-A – Telecommunications Infrastructure Standard for data centres
- ▶ ISO/IEC 24764 – IT – Generic cabling systems for data centres
- ▶ BICSI 002 – Data Centre Design and Implementation Best Practices
- ▶ ETSI EN 300019 – Telecommunication Environmental Engineering
- ▶ ASHRAE TC9.9 - Data Center Thermal Guidelines and Best Practices
- ▶ EU Code of Conduct on Data Centres

