



# COMPANY PROFILE





The name C-sulTe Consulting (C-sulTe) was inspired to reflect the company's mission in providing Consultancy services that appeals to the decision authorities at the CXO or C-Suite level.

Almost all decisions for expanding, constructing, purchasing, upgrading, demolishing, or even retrofitting any building, especially in the mission critical industry is signed off or approved by a few or at least one representative of the C-Suite level.

The challenge most consultancies in the market face is mostly due to the very technical pitch and approaches that do not cater for the varying background or specialty of an entire C-Suite at the client end.

C-sulTe Consulting is not only focused on IT related services, although the emphasis of the letters 'IT' is intentional to illustrate that in this era, all mission critical facilities host critical IT services in one form or another, whether that is in terms of services access or data storage.



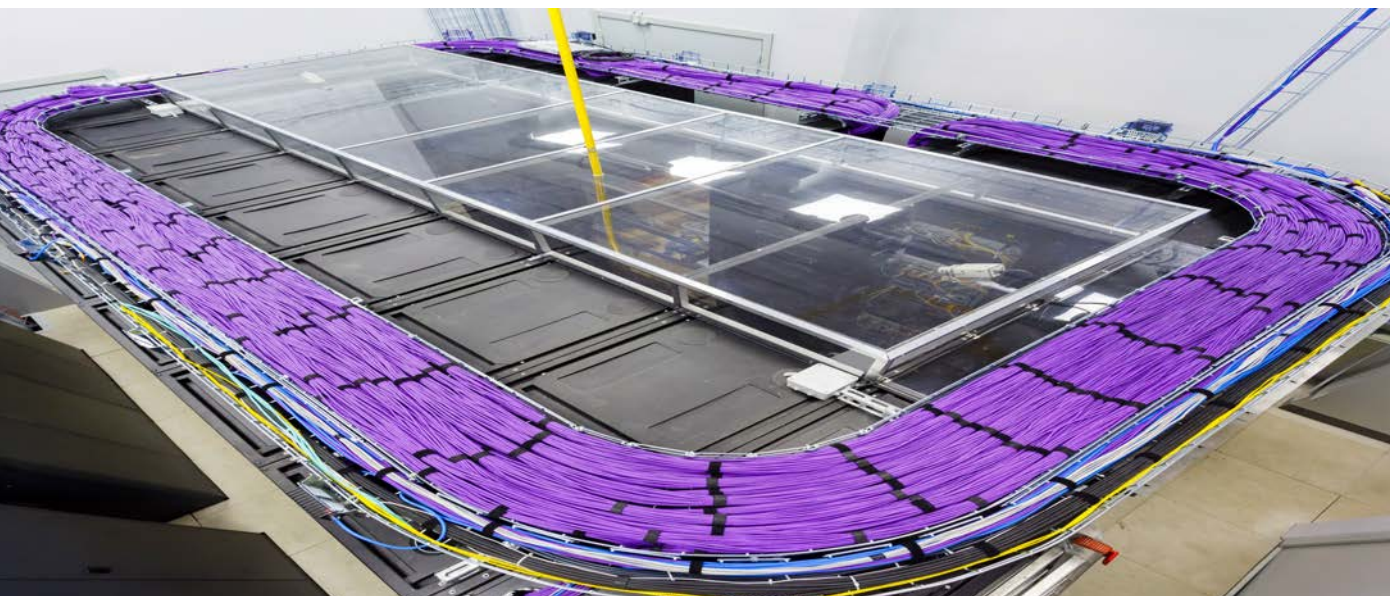
## ABOUT C-SUITE



The mission critical facilities that are currently identified and fall under C-sulTe Consulting scope of services includes, but is not limited to:

- Data Centres
- Command Centres
- Switching Centres
- Trading Environments
- Hospitals/Clinics
- Medical Storage

Another perspective for the name C-sulTe comes from the software term of 'Suite' that commonly refers to a package of software or computer tools. At C-sulTe Consulting we believe that state-of-the-art Consulting must be unique, and one of the ways we guarantee that is by the use of our own in-house developed Suite of tools that amalgamates the vast experience gained in the mission critical services globally.







C-sulTe has been founded by UK Chartered Engineers; Dr. Hussein Shehata, and Mohammed Shehata, whom are experts in the Mechanical and Electrical field for mission critical industries. Their experience in start-ups started in Tokyo, Japan in 2004, and they managed to grow the team globally, and expand their client base around the world. During that period, they both created multiple tools to aid in selecting Data Centres, and also to provide Capacity Analysis.

## **DR. HUSSEIN SHEHATA, CEng, BA, PHD, PGDip, MASHRAE, MIET, MCIBSE, ATD, ATS**

Dr. Shehata worked at Uptime Institute as EMEA Technical Director, delivering training courses globally, and presented in multiple global conferences. Prior to Uptime, Hussein was Vice President & Head of APAC DC Engineering, Architecture & Strategy Head at JP Morgan in Japan. He started his career as a Researcher & Lecturer in the University of Nottingham, where he completed a Post-Graduate Diploma in Teaching in Higher Education.



## **MOHAMMED SHEHATA, BEng, Msc., CEng, MIET**

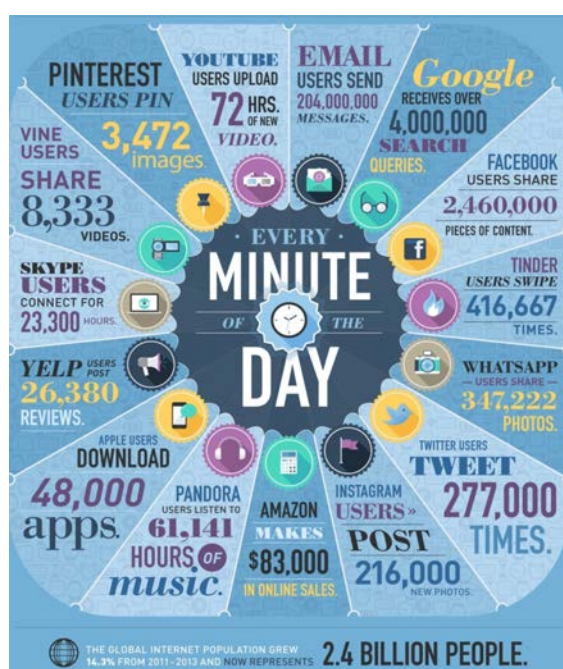
Mohammed Shehata is a specialist in mission critical environments, with extensive global experience. He spearheaded a number of projects for major trading floors and data centres. Working for blue-chip companies as well as government entities in global location from the APAC region through to the Americas and EMEA. Coupled with his excellent engineering skill-sets, his business strategy advisory has helped numerous stakeholders with key investments of over US\$200M.



## STRATEGIC ADVISORY SERVICES

C-sulTe Consulting (C-sulTe) offers strategic advisory services, with a focus on critical infrastructure, which is crucial for a mission critical company, and often make up a large part of the budget. As businesses seek a competitive advantage in the globalisation reality of today, the key to business success is being at the technological forefront.

With the ever changing and evolving technologies, it is of paramount importance that the strategy devised is both aligned with the business needs and the dynamic technology environment.



As can be seen from the graphic, data never sleeps and neither do the mission critical environments supporting it. Strategies are no longer cast in stone and as the Greek philosopher Heraclitus quoted, "the only constant is change", thus strategies need to be more agile to adapt to both business and technology changes.

At C-sulTe we understand this and use our in-depth technical knowledge coupled with our wealth of experience in dealing with a variety of major blue chip organisations, to create Dynamic Strategies. Our strategy advisory services include but not limited to:-

- Business infrastructure strategy
- Infrastructure investment advice
- Asset evaluation



## ENGINEERING CONSULTING SERVICES

C-sulTe offers Engineering Services, with a focus on critical infrastructure, which is crucial for a mission critical company, and often makes up a large part of the budget. It can be challenging and expensive to find experienced, expert engineers to deliver, manage and control these specialist services and systems.

C-sulTe specialises in assisting companies to mitigate their risks through project and client understanding and good design principles to ensure minimal downtime.

The C-sulTe Engineering Services team has a wide variety of capabilities, including: amalgamation of the IT and engineering services for 'mission critical facilities', ensuring a seamless transitional process throughout the whole of the design and implementation phase. Our consultants have vast experience and are specialised in the The C-sulTe Engineering Services team has a wide variety of capabilities, including: amalgamation of the IT and engineering services for 'mission critical facilities', ensuring a seamless transitional process throughout the whole of the design and implementation phase.





The C-sulTe Engineering Services team has a wide variety of capabilities, including:

- Audit and Due Diligence Reviews
- Capacity Management (utilising unique in-house software tools)
- Computational Fluid Dynamics (CFD) Analysis
- Concept and Strategy Consultancy
- Critical Systems Management Consultancy
- Data Management, Data Gathering & Benchmarking
- Detail Design Consultancy
- Discrimination and Protection studies
- Energy Audits
- Fault finding and troubleshooting
- Infrastructure Classification and Reviews
- Operations and Facilities Management Consulting
- Peer Review Consultancy
- Post-Occupancy Commissioning Optimisation (POC<sup>X</sup>)
- Project Management
- Risk and Single Points of Failure (SPoF) analysis
- Site and Building Selection (utilising unique in-house software tools)
- System and Services Implementation
- Testing & Commissioning Management







## **SCHEMATIC / CONCEPT DESIGN**

The purpose of the concept report is to provide the client with a clear understanding of the design intent, providing a number of options for design configurations clearly analysed and explained, enabling the client to make informed decisions as to which direction the design strategy should take. The report will provide a preliminary design intent sign-off and sets the direction for the scheme and detailed design following on from the concept phase. Some tools utilised during the conceptual design phase include CFD modelling and discrimination studies.

## **DETAILED / DOUBLE LINE DESIGN**

The detail design phase shall follow on from the strategy phase, encompassing client comments to ensure the correct design is interpreted into final finished tender and construction documentation. The contractor(s) must be able to understand the design intent and take this into construction/installation with minimal issues. The detail design will have been fully coordinated with all other disciplines such as the architectural, structural, IT, utility and interior design requirements to enhance the construction phase thus reducing wastage or prolongation due to site construction coordination issues.





## **SINGLE POINTS OF FAILURE ANALYSIS**

During the site selection or a due diligence inspection; detailed analysis of potential single points of failure (SPoFs) on the mechanical, electrical or control networks that support the critical systems are documented. Electrical network analysis will incorporate discrimination and coordination studies on protective devices using software programmes both under main and standby power support. Equally, mechanical systems are reviewed in detail including all duty/standby configurations.



## **DISCRIMINATION STUDIES**

The first step to achieving electrical stability is recognition that selective coordination specific to the critical environment is a cornerstone to data centre resilience. Discovery, investigation, modelling, analysis, selective coordination, implementation and validation are the progressive elements. Discrimination studies require knowledge of both the electrical power system, the system's electrical protection, and the connected critical electrical/mechanical systems. It can be considered a continuation of the short circuit and coordination aspects of a power system.



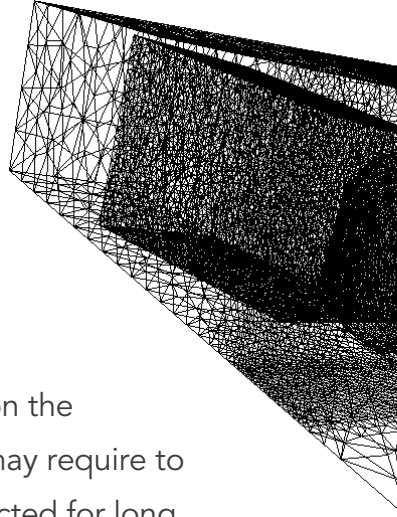
*"Coming together is a beginning; staying together is progress; working together is success"*  
- Henry Ford











## TENDER PREPARATION AND EVALUATION

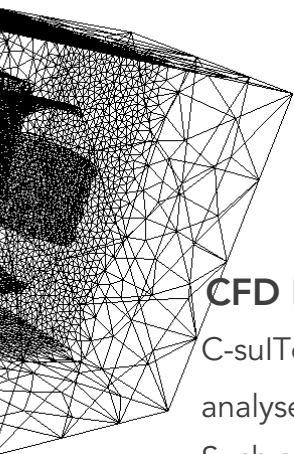
The process followed for the preparation of tender varies depending on the procurement strategy and project timescales, as some items of plant may require to be expedited to meet project milestone dates. This is generally conducted for long lead items such as generators, that require long manufacturing periods. The tender packages comprises of:

- Detailed specification, including testing requirements
- Detailed design drawings
- Commercial specification
- General and technical preliminaries

C-sulTe has experienced resources to prepare all documentation, ensuring the engineering requirements are covered as well as all the commercial aspects. The procurement method most relevant for a particular product or service will vary according to a number of factors, such as timescales, the requirement for a competitive tender, the desire to work with a global partner or the need to re-use existing equipment.







## CFD MODELLING

C-sulTe's team offers Computational Fluid Dynamics (CFD) as a design aiding tool to analyse the resilience of the integrated IT and M&E services with respect to cooling. Such analysis usually includes:

- Air distribution integrity
- Power load distribution (hence cooling requirements)

C-sulTe uses 'high definition' grid meshing in all of its CFD modelling projects, where the cabinet is created of internal server heat loads according to design requirements, as opposed to inaccurate commercial tools that treat the cabinet as a black box. CFD modelling may impact even the cabinet utilisation of IT equipment.

## 3D WALKTHROUGH

Architectural, construction, and consultancy firms worldwide offer 3D walkthroughs ranging from residential, to commercial, to industrial. C-sulTe has taken another step, by working closely with the CFD teams to offer a unique walkthrough that encompasses M&E analysis that provides any or all of the following parameters:

- Temperature
- Humidity
- Airflow
- Illumination
- Noise





## TESTING AND COMMISSIONING (T&C)

### PRODUCT SYSTEMS VERIFICATION

C-sulTe provides full verification and on site examination of sourced mechanical and electrical products that are part of the critical systems design schedule. This includes witness testing Factory Acceptance Tests (FAT) and Site Acceptance Tests (SAT):

#### FAT

During witness testing Factory Acceptance Tests (FAT) the team specialises in examining CRAC units, UPSs, STS', etc., ensuring all strict requirements of the intended facility and client's needs are met. This can be performed before delivery to site to eradicate any unforeseen problems leading to delays, and C-sulTe can send an experienced examiner worldwide, ideally at the manufacturing site.

#### SAT

Site Acceptance Tests (SAT) usually follows a FAT, and is conducted on site. All components such as CRAC units, UPSs, STS', etc., are visually checked on delivery for finishing, and main components check. Functionality, safety interlocks, and settings are verified and concluded with Operator's training

### FUNCTIONAL TESTING

Following a SAT, Functional Testing is required to verify that each of the components are performing to their documented specifications.





## **INTEGRATED SYSTEMS TESTING & VERIFICATION MANAGEMENT**

An Integrated Systems Test (IST) is usually performed after the general T&C of the M&E plant has been completed. This would involve a series of planned simulated scenarios of plant failure on the mechanical, electrical and control systems. This is to assure that in the event of an unplanned incident, be it a mains power failure, a fire in the facility, loss of airconditioning etc., that the redundant or back-up systems both integrate and function together automatically to ensure that the business operation supported by the critical systems is inherently stable.

The IST would ensure all systems integrate correctly bringing the incident under control without impacting on the business of the facility.





## OTHER TESTS

### HEAT LOAD TESTS

C-sulTe performs full heat load testing and commissioning, and commissioning management. Putting the data centre through its paces, the C-sulTe team performs full cooling operations as per design requirements under full heat load conditions. This crucial procedure is essential to the implementation and commissioning of the critical cooling methodologies and equipment installed. This testing provides key information for temperature rate of rise, critical load performance, fault finding, hot spot identification, rotation schedules, and failure analysis.

### AIR BALANCING

C-sulTe is capable of delivering full air balancing to data centre and trading floor (or office) environments. C-sulTe performs air balancing exercises successfully at complex environments where multiple cooling methodologies could be employed as with varying load distributions. The team successfully brings into balance cooling requirements as per design conditions whilst maintaining rigorous conditions and recommendations set by globally recognised professional bodies such as the American Society of Heating, Refrigerating and Air-Conditioning Engineers (ASHRAE) and the Chartered Institute of Building Services Engineers (CIBSE).





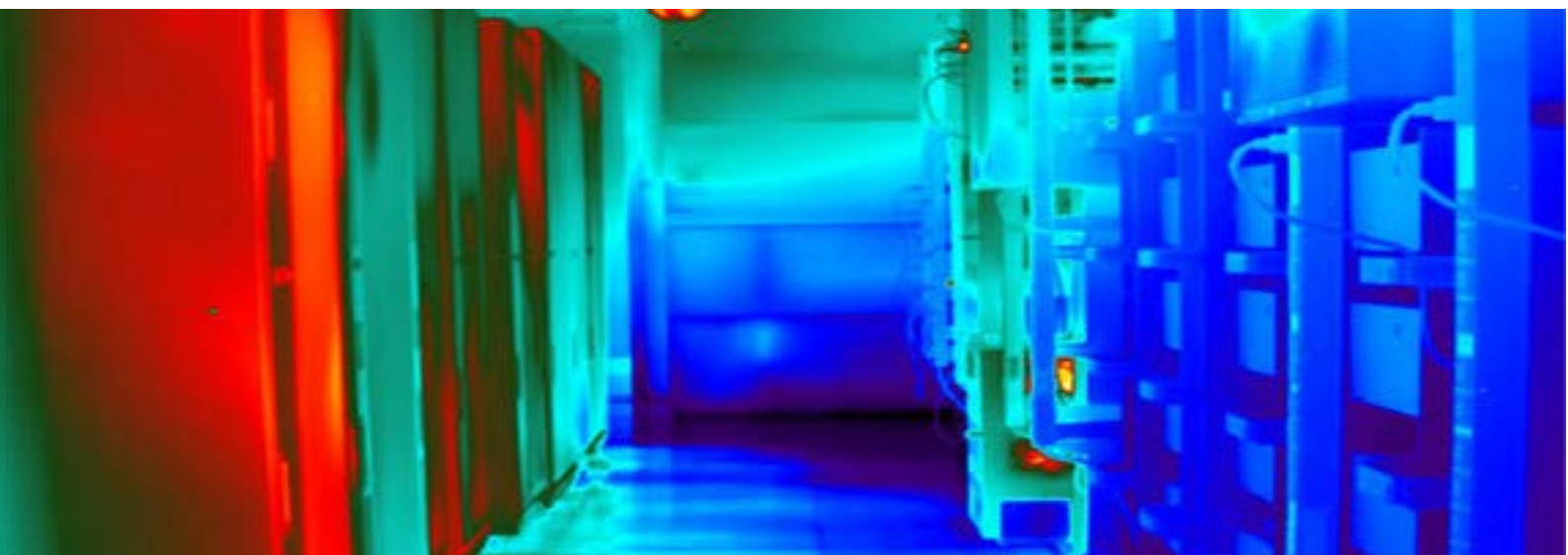


## THERMAL IMAGING (TESTING & ONGOING MAINTENANCE)

Thermography (or Thermal Imaging), detects heat patterns or temperature changes in objects allowing the discovery of problems prior to costly downtime, or monitor developing problems so preventative maintenance can be scheduled.

Typical applications include;

- Predictive maintenance: Identify M&E problems before failure.
- Energy Audits: Increase thermal efficiency of buildings by scanning for heat loss or exfiltration, moisture invasion, concrete integrity & heat ventilation problems.
- Moisture/Mould Remediation Control: Accurately detect moisture issues behind exterior/interior walls, ceilings or floors that may otherwise go undetected.







## POST-OCCUPANCY COMMISSIONING & OPTIMISATION

Following the completion of the construction phase commissioning work, post-occupancy commissioning and optimisation (POCX) becomes essential. POCX is proposed to:

- ✓ **Optimise Operation:**  
Establish smooth and reliable operation of all mechanical and electrical (M&E) components, inclusive of Building Management Systems (BMS) and Building Energy Management Systems (BEMS)
- ✓ **Increase Energy Efficiency:**  
Identify and propose opportunities for increased efficiency and other operational improvements
- ✓ **Reduce / eliminate Sick Building Syndrome (SBS):**  
Sick Building Syndrome is the chronic ill-health of occupants, e.g., headache, sore throat and other cold-like symptoms – associated with their presence in a particular building.





C-sulTe offers a dual approach of providing services and tools utilised to improve your environment and reduce costs, as well as offering Training to enhance the knowledge of end-users from day-to-day basics to long-term operational initiatives.

### **THERMAL COMFORT SURVEY**

To maximise productivity, a thermal comfort survey is recommended to ensure all parameters related to Occupational Health meet globally recognised standards. This survey includes field measurements for:

- Temperature
- Humidity
- Noise
- Air speed
- Lighting
- CO<sub>2</sub>

The above parameters (along with job satisfaction) are major contributors to SBS.

### **TECHNICAL AND ENVIRONMENTAL TRAINING**

Educate staff on:

- ✓ Energy saving solutions (consequently cost-reduction)
- ✓ Effects on global, local environment and social and corporate responsibilities
- ✓ Thermal Comfort





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