DATA CENTRE DESIGN

Certification Training

DOCENDO DCD DISCIMUS

"Probably the only Data Centre Design training given by real practising Data Centre Designers & Auditors."

CAPITOLINE

DATA CENTRE DESIGN AND TRAINING

KiTS Technologies

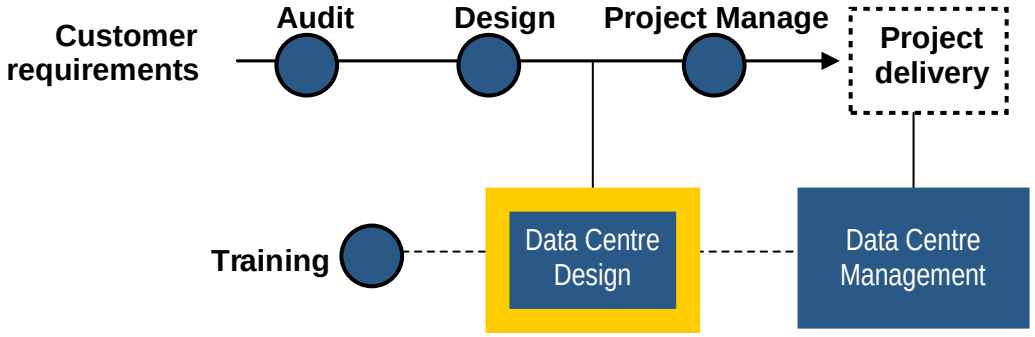
...your kitted ICT partner

www.kits.ng

Table of Content

DCD - Best practice for design and layout of a data centre or computer room

Using the practical experience derived by Capitoline LLP, UK from auditing and designing computer rooms and data centres comes this 3-day course that focuses on the best practices in the specification, sizing and design of computer rooms and data centres.



Every two weeks, somewhere in the world, a major data centre suffers a major breakdown and loss of availability with an average downtime of 16 hours.

- You will learn how to layout your Data Centre in the most energy efficient way.
- Find out how better design can reduce failures.
- You will leanr howto translate your IT requirement into an environmental specification including room sizes, cooling capacity, UPS sizing, Generator sizing and Power requirements.
- Reference will be made through to international standards including;
  - TIA 942
  - EU Code of Conduct on data centres
  - Payment Card Industry security
  - EU Disability Discrimination Directive
  - ASHRAE
  - The UpTime Institute
  - BICSI 002
  - EN 50173
  - EN 50174
  - EN 50310

Synopsis

- The original data centre design course.
  This was the 1st. Many have followed in our footsteps but none have bettered it.

- Based on real project experience
  Using the practical experience derived by Capitoline from designing and auditing computer rooms and data centres this 3-day course focuses on the best practices in the specification, sizing and design of data centres.

- What will you learn?
  This comprehensive course covers everything from defining the best rack layout for your computer room to understanding the size of the UPS and generator required to provide back-up power.

  You will learn how cooling systems work, which cooling system is best for your facility and what capacity it needs to be.

  We guide you through the design process as only a data centre designer can. Data centre design and auditing is what our instructors do when they are not training. If you have a question they will have the answer.

- Simply the best learning experience
  The course is packed with practical exercises to guide you through the steps of data centre design. If you want someone to just read the slides to you then try one of our competitors. If you want a real learning experience come to us.

  Our classes are interactive which means you can learn not only from the instructor's practical experience and real project examples but also from the experience of fellow delegates.

  The course is kept continuously up to date and explains in detail the relevance of US, UK, European and International standards and how to apply them. Our instructors are actively involved in the committees developing European data centre standards.

> *"Matt has delivered a fantastic training course on Data Centre Design in Entebbe, Uganda. Very professional with answers on every question asked, wonderful presentation skills, fulfilled completely my expectations"* - ArmendAliaga, United Nations

Training benefits at a glance.

- Level 5 European Qualification. Also recognised by BICSI and the Chartered Institute of Building Services Engineers (CIBSE).
- BICSI continuing education credits (21)
- All the relevant standards are discussed including TIA 942, The Uptime Institute, The new EN50600 European Data Centre Standard, EU code of Conduct, BICSI 002 and more.
- Comprehensive information packed into 3 days. Don't be fooled by courses with more days there is no additional information just higher costs. (not just the fees but your employees time away from their work)
- Practical exercises are used to improve understanding. Delegates will learn how to calculate the size of electrical equipment and cooling systems and how to lay out the data centre and more.
- We partners wrote the first ever data centre training and have continually developed it to match best practice and the latest standards ever since.
- Delegates will gain a comprehensive understanding of the critical issues affecting design.
- Interactive discussion is encouraged.
- Examples and images from real data centres are used to illustrate points.
- Searchable electronic copy of the training materials to use for future reference.

> "The course brought to fore critical issues often at blind spots."
>
> *- Oyewusi Abayomi, Mobil Producing Nigeria*

DCD | Data Centre Design - DCD

Course focus

- Introduction, including understanding Tier definitions and associated costs. TIA 942, BICSI 002, ASHRAE and other Standards
- Designing for Energy efficiency (DCiE and PUE) Sizing and defining the right data centre space
- Specifying raised access floors
- Optimising room layouts including hot aisle/cold aisle formats
- Sizing and designing a resilient power supply system including UPS and generator selection. N, N+1 and 2N models
- IT grade earthing, grounding and bonding
- Sizing and designing air conditioning plus modern low energy options
- Fire detection and suppression techniques appropriate to data centres
- Building Management and Physical Security requirements
- Data cable selection, copper and fibre, and ideal interconnect models.

Also take a look at our 2-day Data Centre Operational Management course (DCOM). Do both;

DCD + DCOM = Data Centre Expert

Who should attend

- IT managers and directors
- Data centre managers and directors
- Facilities managers
- Engineers and consultants involved in data centre specifications

Contact us if you would like this course delivered at your premises.

*Min numbers apply

Prerequisites

There are no formal prerequisites for the course but attendees must be familiar with general IT and engineering practices

> "This is the most relevant course I have ever attended. It is going to enhance my performance in my job."
>
> *- Adeogun Israel, Chevron Nigeria*

Learning outcomes

- Understand the method of translating an IT requirement e.g. number of racks and servers etc., into a data centre space and size plan.
- Understand how to size an air conditioning system in an N or N+1 format
- Understand how to size a data centre UPS, generator and power supply in an N, N+1 and 2N format
- Understand that the basics of successful data centre design require correct location, air conditioning, power and cable interconnection planning and a focus on energy efficiency and resilience.

Assessment Criteria

- Demonstrate an ability to take a list of customer requirements and a list of IT equipment by planning and sizing the spaces of a data centre example project.
- Size an example project when given inputs of IT load, UPS heat, lighting and solar gain.
- Size an example project when given inputs of IT load, resilience model and customer expansion plans.
- Obtain a mark of at least 60% in the multiple choice test of 40 questions.

> "It has given me the knowledge to understand how proper planning can help increase the IT innovative and general knowledge in operational management of Data Centre"
>
> *- Babatunde Bodunde, Vodacom Nigeria*

Instructors

Matt and Barry are the founding partners of Capitoline, each with over 30 years' experience in the IT industry. They are both Chartered Engineers (CEng) with Engineering degrees (BSc(Hons)), Uptime Institute Accredited Tier Designers (ATD), Registered Communications Distribution Designers (RCDD) and Masters of Business Administration (MBA)

Since 2005 Matt and Barry have been exclusively involved in helping customers improve data centre designs and operational management systems. When they are not training they are actively involved in real data centre design and operations management projects.

More details of Matt and Barry's experience and qualifications can be found on the next page.

Capitoline is the only Data Centre training provider which offers you the benefit of this experience.

There is an exam at the end of the 3 day DCD course and again at the end of the 2 day DCOM course. A DCE (Data Centre Expert) certificate is provided to individuals passing both courses. Certificates are also provided for the DCD and DCOM course to those individuals who only attend one of them.

Dates for training courses will be by mutual agreement. The further in advance you are able to advise us then the easier it will be to accommodate your requirements.

> "Honestly speaking, for a novice and even somebody that is a bit informed, if you come for this course, you will gain a great deal."
>
> Onanuga Babafemi- Enterprise Bank Nigeria

Instructor Profile

Name: Matt Flowerday
Job Title: Partner/Director
Qualifications: MBA BSc (Hons), C.Eng, MIET, DCE, DCDC, RCDD, RTPM

Qualifications

- BSC (Hons) Electrical and Electronic Engineering
- MBA
- Chartered Electrical Engineer (IET)
- Capitoline DCE
- BICSI DCDC
- BICSI RCDD
- BICSI RTPM

History

Matt is a founding partner of Capitoline LLP. Originally an electronic and electrical design engineer, Matt has over 29years experience in the IT industry. Working from the very start of the networking industry Matt has consistently worked in leading edge IT roles educating clients in new technologies and their implementation.

Matt was previously CEO and owner of IT infrastructure provider Trescray Ltd. for 18 years. During this time he was Involved in the design and oversight of ICT implementation in a broad range of projects from major co-location data centres to network infrastructures for stadia and corporations.

Matt is actively involved in auditing physical data centre infrastructures including power cooling, communications and locations and layouts etc. and is also involved in assessing and improving data centre.

Experience

In addition to designing and auditing data centres Matt develops and delivers Capitoline's unique data centre design and operations training to clients across Europe, Africa, Middle East and Asia and has devised and delivered custom workshops for clients worldwide. Examples include;

- Auditing and design for data centre development for Gulf University of Science and Technology in Kuwait and 26 data centres for a mobile phone operator in Saudi Arabia.
- Development and delivery of bespoke training to Aegide, a data centre equipment manufacturer in the Netherlands and for collocation companies and various corporations.
- Development of AMS-IX standard and auditing of collocation Data Centres for the Amsterdam Internet Exchange
- Design and Oversight for Arsenal Emirates Stadium IT infrastructure to support multimedia IP services from HVTV to ticketing systems.
- Design and Oversight for Heathrow Terminal 5 fire systems fibre optic network backbone.

Instructor Profile

Name	Barry Elliott
Job Title	Partner
Qualifications	MBA, BSc(Hons), C.Eng, MIET, MCIBSE, DCE, RCDD

Qualifications

- BSC (Hons) Communications Eng.
- MBA
- UpTime Institute Accredited Tier Designer
- Chartered Electrical Engineer (IET)
- Chartered Building Services Engineer (CIBSE)
- Capitoline DCE
- BICSI RCDD

History

With over 25 years' experience in the IT industry Barry has worked for BICC, Ferranti, Civil Aviation Authority, Brand-Rex, Novar plc and Honeywell. Barry was one of the founders of the Capitoline consultancy group.

Barry is one of the few engineers in Europe to be qualified as a chartered electrical engineer (IET) and chartered building services engineer (CIBSE). Barry specialises in IT infrastructure and has developed Europe's first qualification in the subject. He is also a past chairman of the cabling trade organisation, BICSI. Barry is the first CIBSE Low Carbon Consultant to apply this qualification the computer room environment and also one of the first TUI (UpTime Institute) Accredited Tier designers in Europe.

Barry wrote the very first data centre training course and Capitoline have continuously developed this to keep up with best practices and the latest data centre standards.

Experience

- Design and project oversight for Abu Dhabi Judicial Department, Abu Dhabi data centre design, procurement assistance and technical supervision.
- Design and project oversight for Allianz Insurance, 60 Gracechurch St, London, relocation project. ICT and A/V infrastructure for 8 floor building plus data centre
- Design and project oversight for Cheshire County Council data centre. 800 m2 green field site data centre
- Design and project oversight for University of Kent data centre rebuild project. 200 m2 computer room
- Design and project oversight for Anglesey County Council computer room rebuild project
- Design and project oversight for American University of Sharjah new build project for two new data centres

Course Content

DAY 1 Session	Contents	Class activities
Introduction Day 1 0900 - 1045	What is a Data Centre? Limiting factors on design Technical Standards What will it cost? Tiers and Classes for reliability Data Centre Efficiency - PUE	
Data Centre spaces Day 1 1045 - 1300	Ideal locations Engineered spaces needed for a data centre Architectural requirements Sizing the computer room from an IT requirement Calculating floor strength Room heights Access and DDA requirements Fire escapes and emergency lighting Other facilities management issues	Exercise 1 *Biochem plc* location issues
Raised access floors Day 1 1400 - 1530	Calculating floor strength Distributed and point loads Standards Correct sealing Calculating floor heights Zinc whisker contamination	Exercise 2 *Biochem plc* space planning exercise
Racks and location Day 1 1545-1700	Hot and cold aisle concept 7 and 8 tile pitch models Server and communications racks 2 and 4 post designs Bad layout examples	Exercise 3 *Biochem plc* optimal rack layout in computer room

DAY 2		
Session	Contents	Class activities
Cooling IT equipment Day 2 0900 - 1200	• Air conditioning and cooling principles • Laws of thermodynamics • Precision v comfort cooling • Available technologies • DX v central chiller options • Dry cooler • ASHRAE, TIA and CIBSE requirements • Low humidity problems • Ventilation and filtration requirements • New TUI Tier definitions of cooling • Energy saving techniques e.g. dry cooler, air economiser, water economiser • Solar thermal gain • How to calculate heat loads and aircon sizing • kW v tons v BTU of cooling • How much heat comes from IT equipment • Hot aisle/cold aisle options • Enclosed cold and hot aisles • Other rack cooling options • Side to side cooling for large Cisco switches • Water cooled racks • CO2 cooled racks • Spot cooling • Air flow calculations • TUI Tiering requirements • CFD analysis	Exercise Calculate cooling requirement of a typical computer room and plan N+1 cooling model
Power Day 2 1300 - 1600	• BICSI and TIA N, N+1 and 2N power models • EU Code of Conduct requirements • AC v DC • Power, kW and kVA • Power factor issues • Single v 3 phase distribution • Tier 1 -4 models • How to calculate power requirements, UPS and generator sizing • UPS options: Off-line, on line dual conversion, delta, transformerless, • Battery and kinetic energy systems • Emergency Power Off requirements • Power Distribution units	Exercise Calculate power requirements of a typical computer, size UPS and generators and plan an N+1 UPS model
IT grade earthing and bonding Day 2 1600 - 1700	• European, USA and world standards • EN 50310 and TIA 607 • Grounding bars • Equipotential bonding • Signal reference grids	Exercise Biochem plc. Calculate number of racks and power requirements from a list of IT equipment

DAY 3		
Session	Contents	Class activities
Cable containment 0900 - 0930	• Separation of services to EU and USA standards • Calculating fill factors • Cable containment options • Affect of different cable sizes • Fire stopping	
Fire 0930 - 1000	• Fire safety plans • Fire detection methods • Aspirating smoke detection (VESDA) • Integrating fire, BMS, HVAC and power systems • Fire suppression techniques • Inert gas v halocarbon techniques • Water mist and low oxygen (hypoxic) methods	
Low risk fire cabling 1000 - 1030	• American plenum, riser and general purpose cables • European low smoke zero halogen cables • Relative costs	
Structured cabling intro 1045 - 1130	• Evolution of computers, LANs and cabling • International cabling standards • Definitions of Cat 3, Cat5, Cat6, Cat6A and Cat 7	
Selecting cable components 1130 - 1215	• Latest requirements of 10GBASE-T • Defining screened and unscreened (shielded and unshielded) cables • Cable sizes • Copper & Fibre connectors and patch panels • Preterminated cabling solutions	
Optical cable systems 1315 - 1400	• Matching LANs to cables • Defining optical fibres e.g. OM!, OM3 etc • Latest OM4 and OS2 fibres • Advantages of optical fibre • Value engineering cable and LAN plant	
Cable systems 1400 - 1500	• 2, 3 and 4 connector systems • The ISO 11801 hierarchical model • Intelligent patching options • Tier 1 -4 requirements • Different cabling models e.g. zone cabling, centralised cabling • Best generic designs • US v EU standards and terminology	
Security and BMS 1500 - 1530	• Integrating systems with BMS • Facilities management systems • IP v industrial protocols • CCTV methods • Access control • Room, rack or site monitoring • Tier 1 -4 requirements	
Business continuity 1545 - 1600	• Business continuity and disaster recovery • Why data centres fail • Process and operational management	

Summary, Final exam and feedback - 1505 -1700

Get Certified

- The course includes exercises and a final multiple online choice examination
- All delegates attending the training and successfully completing practical exercises and passing the exam are awarded a DCD certificate
- All DCD certified individuals are provided with the DCD – Data Centre Designer logo in recognition of their achievement
- Successful delegates gets BICSI continuing education credit (21)
- All delegates who attend both DCD and DCOM and pass the exams are awarded a Data Centre Expert (DCE) certificate and logo.
- CIBSE continuing professional development certificate

CIBSE The Chartered Institution of Building Services Engineers

CIBSE CPD - Continuing Professional Development

European Qualifications Framework

Capitoline's DCE is a European Level 5 qualification

Bicsi CONTINUING EDUCATION CREDIT PROVIDER

21 BICSI CECs awarded for the DCD course

> "The course is a must for IT Companies and Banks"
>
> Ayomwam G.A-Mobil Producing Nigeria

Feedback from delegates

"I have got a very good overview of Data Centre, Very good information on power and avoiding failures in Data Centres and different types of cooling systems." - *Okon Daniel, NAFDAC*

"The training is superb, educative and highly impacting. The training is explicit and improves ones knowledge on general Data Centre and infrastructure."
- *Akin Ayeni, Zenith Bank*

"The training is excellent, innovative and commendable."
- *Aina S.B, Southfield Communications*

"The training has exposed me to some of the international standards that must be considered in the design and implementation of Data Centre."
- *Ijei Samuel, Inlaks Computer*

"An interesting course with international standard" - *Eboh Paul, CITS, UNILAG*

"The instructor is well grounded and his lectures will surely open your eyes on Data Centre Management." - *Obinna Egwuonwu, Fidelity Bank*

"An excellent course that gives a detailed and knowledge of Data Centre set-up."
- *Olanrewaju Shorunke, Shell Nigeria Exploration Company*

"It has given me the knowledge to understand how proper planning can help increase the IT innovative and general knowledge in operational management."
of Data Centre - *Babatunde Bodunde, Vodacom Nigeria*

"This is the most relevant course I have ever attended. It is going to enhance my performance in my job." - *Adeogun Israel, Chevron Nigeria*

Market leader in training & auditing

- We developed the AMS-IX data centre business continuity standard for the Amsterdam Internet exchange, the largest internet exchange in the world and we are the data centre design consultants for Cisco Middle East and Africa.
- We are contributing authors to the EU Standard EN 50600 data centre standard.
- We are the data centre training and audit partners to the United Nations Logistics organisation.

> "We areis the undisputed market leader in data centre auditing with over 150 data centre audits completed covering over 100,000 m2 of floor space"

AMS-IX Official auditor

Often a seemingly complex ICT challenge...

has a very simple solution; working with KITS will help you find the easiest approach (technology & budget) to solve your challenges.

CONNECTIVITY

- Fiber Connectivity
- Wireless Connectivity
- Satellite Connectivity
- VPN - Branch Office

COMMUNICATION

- PABX | IP-PABX
- Video Conferencing
- TV Broadcasting
- Marine Communication

SECURITY

- CCTV | IP CCTV
- Access Control
- UTM | Firewall
- Content Filtering

INFRASTRUCTURE

- Data Centre
- Fiber Optics Project
- Structured Cabling
- Computer Rooms

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