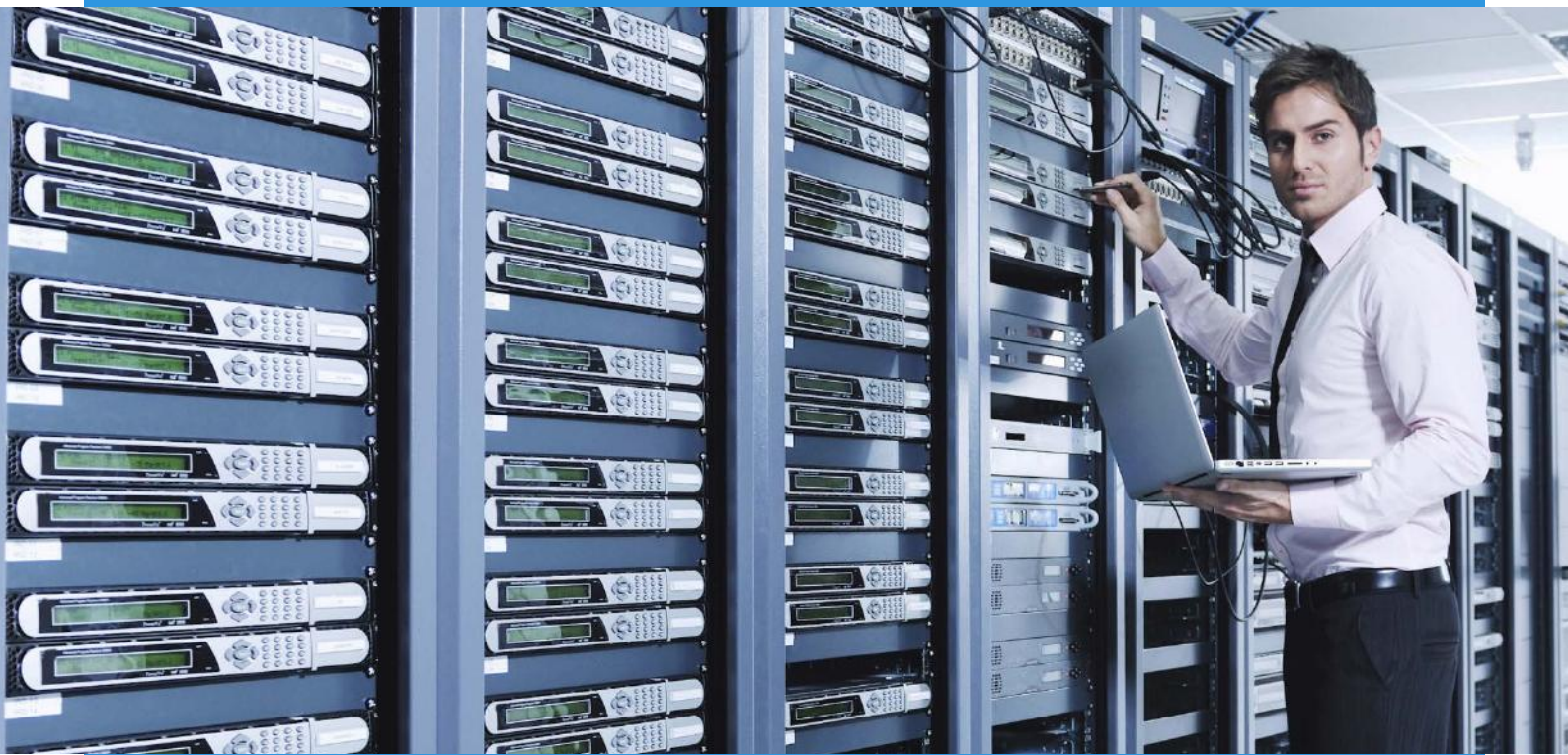




# Certified Data Center Professional

16 Hours | Classroom Training



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# CERTIFIED DATA CENTER PROFESSIONAL

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# Introduction

With few exceptions, enterprises today rely heavily on Information Technology for the delivery of business-critical services – often directly to the end-consumers.

It is therefore vital that the mission critical data centers are designed, maintained and operated with hi-availability and efficiency in mind. However, most Data Centers do not meet the full availability, capacity, safety or efficiency requirements often demanded. The ever changing technologies put even more pressure on Data Center managers along with the faster pace at which these changes are required. This 2-day Certified Data Center Professional (CDCP) course is designed to expose ICT, Facilities, or Data Center Operations professionals working in and around the Data Center to understand its key components. It will address how to setup and improve key aspects such as power, cooling, security, cabling, safety, etc. to ensure a hi- available Data Center.

It will also delve on the key operations and maintenance aspects. CDCP is the first series of four courses developed to provide knowledge and competency-based certifications for Data Center Professionals.



Innovation is the lifeblood of the technology industry, and the data centers are no exception.



Contegix



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APEX Global is the learning solutions arm of ECCI—the leading process improvement solutions provider in Southeast Asia.

Our sole aim is to promote performance excellence among professionals. We help our customers achieve greater success through effective, experiential and results oriented training delivery.

Applying the experience of training over 100,000 professionals in the last decade, a strong pool of expert trainers and facilitators with expertise in a niche array of domains and a strong regional presence, we provide an extensive portfolio of high-quality industry specific and functional programs coupled with high quality training materials to deliver our ultimate “promise”—the R.E.A.L. learning experience.



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EPI offers a variety of data centre services enabling businesses worldwide to optimize the client's data center to achieve full potential and success.

Their services range from Data Center set-up, all the way to auditing based on international standards.

As a registered Certifying Body, EPI follows standard methods and procedures when auditing and certifying clients. EPI is required to review by clients ensuring the services EPI delivers are fair and objective. EPI's certification is well-known in the industry and looks after the credibility of end-users for all industries in both sectors.

**APEX Global is the sole authorized training provider of all EPI Courses throughout the Philippines.**

## Our clients continue to grow

Employees from various institutes continue to take part in our training programs.

The logo for aboitiz, featuring the word "aboitiz" in a bold, red, sans-serif font.The logo for accenture, featuring the word "accenture" in a black, sans-serif font with a red chevron above the 'e', and the tagline "High performance. Delivered." below it.The logo for AEGIS, featuring the word "AEGIS" in a bold, black, sans-serif font with a red and orange star-like symbol to the right.The logo for Ayala, featuring a stylized blue and orange 'X' symbol followed by the word "Ayala" in a bold, orange, sans-serif font.The logo for BPI, featuring a gold crown icon above the letters "BPI" in a white, bold, sans-serif font, all set against a red rectangular background.The logo for eastwest, featuring a purple diamond icon with a white 'X' inside, followed by the word "eastwest" in a purple, sans-serif font.The logo for FUJITSU, featuring the word "FUJITSU" in a red, sans-serif font with a stylized red infinity symbol above the 'i'.The logo for GENTING, featuring a red circular icon with a white 'G' inside, followed by the word "GENTING" in a red, sans-serif font and the tagline "City of Entertainment" below it.The logo for Globe, featuring a blue globe icon with white hands holding it, followed by the word "Globe" in a bold, blue, sans-serif font.The logo for Indra, featuring a colorful circular icon with dots, followed by the word "Indra" in a bold, blue, sans-serif font.The logo for citi, featuring the word "citi" in a blue, sans-serif font with a red arc above the 'i'.The logo for Nanox, featuring the word "Nanox" in a blue, italicized, sans-serif font.The logo for NorthgateArinso, featuring the word "NorthgateArinso" in a blue, sans-serif font with a red arc above the 'i'.The logo for PLDT, featuring a red and grey circular icon with a white 'P' inside, followed by the letters "PLDT" in a bold, red, sans-serif font.The logo for P&G, featuring the letters "P&G" in a blue, italicized, sans-serif font.The logo for Smart, featuring a green and blue circular icon with a white 'S' inside, followed by the word "Smart" in a bold, green, sans-serif font.The logo for TOSHIBA, featuring the word "TOSHIBA" in a bold, red, sans-serif font with the tagline "Leading Innovation" and three red chevrons below it.The logo for Transitions, featuring the word "Transitions" in a blue, sans-serif font with a stylized blue 'i'.The logo for TREND MICRO, featuring a red circular icon with a white 'T' inside, followed by the words "TREND MICRO" in a bold, black, sans-serif font.The logo for HERSHEY'S, featuring the word "HERSHEY'S" in a white, bold, sans-serif font inside a dark red rectangular background.The logo for ANZ, featuring the letters "ANZ" in a bold, blue, sans-serif font with a stylized blue 'A'.The logo for Sacombank, featuring a yellow and blue circular icon with a white 'S' inside, followed by the word "Sacombank" in a bold, blue, sans-serif font and the tagline "NGÂN HÀNG SÀI GÒN THƯƠNG TÍN" below it.

# Course Overview

## Who is this course for?

CDCP course is primarily aimed at any IT, facilities or data center professional who works in and around the data center and who has the responsibility to achieve and improve the availability and manageability of the data center, specifically:

- **IT Professionals/Practitioners**
- **Facilities/Data Center Operations professionals**
- **IT Security practitioners and professionals**
- **Business Managers and Consultants**

## What can you expect?

Through a combination of instructor-led lectures and practical implementation of the concepts discussed within the training, you will acquire a hands-on learning experience that will enable you to create and improve various Data Center aspects.

After completion of the course, participants will take the certification examination. The CDCP certificate will be awarded to those who passed the examination.

## What will you learn?

APEX Global has teamed up with EPI to provide technical information in the training.

**Upon completion of the Certified Data Center Professional training, you will be able to:**

- Gain knowledge of the standards and best practices of a Data Center Professional.
- Understand the infrastructure of Data Center.
- Identify possible threats towards the Data Center and find solutions against such challenges.
- Understand techniques to enhance the efficiency of Data Center
- Perform maintenance work on Data Center.
- Learn and apply safety and security practices.



Data Centers older than 7 years old are obsolete. The average Data Center is 9 years old.



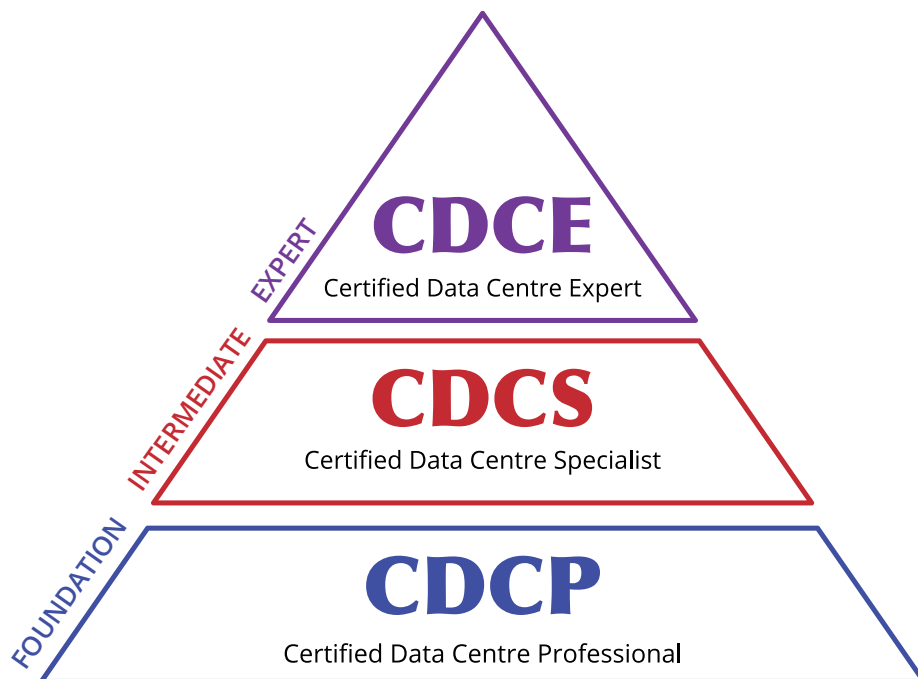
International Data Corporation



# Career Path

## Data Centre Design/ Build Track

**CDCP** is a 2-day course designed to expose participants to the key components of the data center. It will address how to setup and improve key aspects such as power, cooling, security, cabling, safety, etc., to ensure a hi-available data center. It will also address key operations and maintenance aspects.

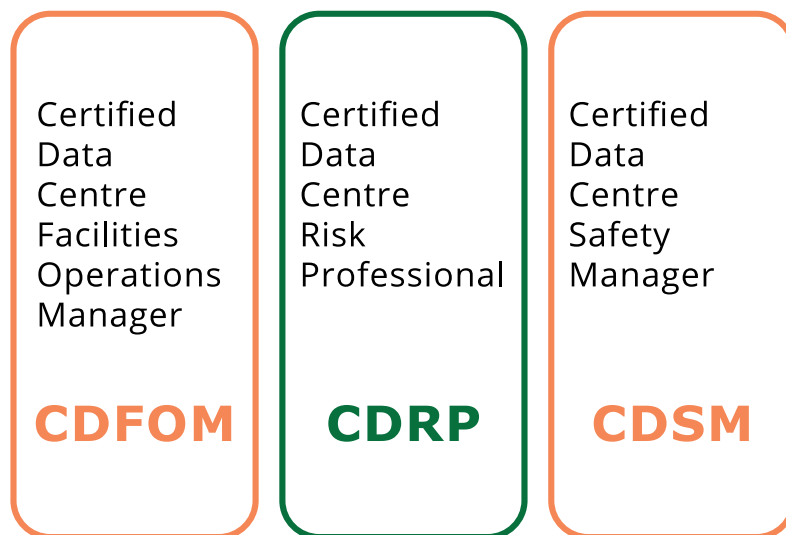


**CDCS** is the advanced level Data Center Professionals. This 3-day course will further increase attendees to a level being a compatible sparring partner with suppliers and they will be able to verify offers provided by vendors for correctness, effectiveness and efficiency. Participants must hold a valid CDCP certificate in order to be able to register for the CDCS class. CDCS itself is a pre-requisite for persons wishing to achieve the CDCE status.

**CDCE** is the highest level for Data Center Specialist. This 5-day course is designed to prepare participants to analyze a given business case and perform technical evaluation for a project plan and a set of designs for implementation of a mission critical data center

## Data Centre Design/ Governance Track

**CDFOM** is a 3-day course designed to expose participants to in-depth knowledge in managing data center operation which includes the following key subject matters: capacity planning, latest green initiatives, how to properly commission equipment, compliance to safety standards, statutory compliance and international standards, and managing people.



**CDRP** is a 2-day course designed to expose attendants to the overall risk management process. Focus is on both the data centre infrastructure and the physical data centre facility and equipment; the attendant will learn how to identify and quantify risk in their organization, creating the ability to reduce the risk to a level acceptable for the organization.

**CDSM** is a 2 day course that exposes attendants to the requirements for safety in data centre operations. The course is based on the ISO/IEC 18000 (OHSAS 18000) standard and covers Occupational Health and Safety Management Systems in order to enable the businesses to be confident it is doing all it can to protect their employees. It also allows the business to ensure it is operating according to the stated health and safety policies.

# Course Content

APEX Global, thru EPI, has collaborated with data center experts to design and develop a structured syllabus and complementary learning materials.

**This training program has 19 modules followed by the certification exam:**

1. The Mission Critical Site
2. Data Center Standards
3. The Data Center Location, Building and Construction
4. Raised Floor / Suspended Ceiling
5. Light
6. Power Infrastructure
7. Electro Magnetic Fields (EMF)
8. Equipment Racks
9. Cooling Infrastructure
10. Water Supply
11. Designing a Scalable Network Infrastructure
12. Fire Suppression and Safety
13. Data Center Monitoring
14. Operational Security and Safety Practices
15. Labeling
16. Documentation
17. Cleaning Practices
18. MTBF/ MTTR/ MTTF
19. SLAs / OLAs / Maintenance Contracts



“

Wikipedia was offline after an overheating problem at one of its data centers. It was pretty bad. For a while there, people had nowhere to go for phony, inaccurate information.

”

Jay Leno

## MODULE 1

# The Mission Critical Site

In this module, participants will learn why the mission critical site is important, its different elements, and the several causes of downtime. You will also better understand Data Centers as the foundation of any organization and how having high performance ICT resources on hand is essential if business processes are to work to achieve corporate goals. Moreover, participants will be made aware that problems in the Data Center could lead to the business, incurring substantial loss to the point of total closure.

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Most downtime is caused by Power, Environmental, EMF conditions and/or Human Errors. This further tackles that planning for the data center facility itself has to be considered when planning new IT projects. You have to carefully evaluate if the Data Center can hold new technology since a common issue for Data Centers is that they are not ready for deploying new technologies that consume more power and need more cooling capacity.

## MODULE 2

# Data Center Standards

The Data Center is a dedicated space that houses the most important information, and organizations rely on it being safe and accessible. Best practices ensure that you are doing everything possible to keep it that way. The Data Center Standards module will provide you awareness that in spite of not having a worldwide-recognized standard, there are best practices/ 'semi-standards' that serve as Data Centers' basis. You will also learn that there are standards for the sub-components that exist within the Data Center, such as electrical, earthing, EMF,

environmental, raised floors, networks, fire protection, etc. Typically, these standards are generic and are not always Data Center-specific. Specific requirements might need to be given to suppliers and contractors. Moreover, participants will know that the majority of local standards are based on international standards that are typically more generic as they have a desire to be applied in all countries around the world. Local standards are more important and has to be complied at the least.

## MODULE 3

# The Data Center Location, Building and Construction

Location and site selection is critical for the long-term success of a mission critical site. Site selection is often compromised due to other business factors such as cost, marketing, prestige, convenience of location, etc. This module will provide you knowledge on the criteria for the selection of Data Center location and facility site/ building, and the various parts of a Data Center and its supporting facilities and their respective functions.

Participants will know what the various parts of Data Center and its supporting facilities and specific functions are. You will realize that various areas of the Data Center facility should work in harmony.

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## MODULE 4

# Raised Floor/ Suspended Ceiling

The Raised Floor/ Suspended Ceiling module will provide participants with knowledge on the two main types of raised floors: Die-formed Welded Steel Construction and Die-formed Welded Steel Shell with Cementitious Core. You will also know what the most common among the various international standards for raised floors is.

You will understand that calculation of point and uniform loading needs to be performed in order to determine the selection of the appropriate floor and point loading takes precedence over uniform loading factors. Furthermore, this module will tackle the general rules for raised floors and the reasons for using suspended ceilings, as well as their various functions.

## MODULE 5

# Light

At the end of the discussion of this module, participants will be able to understand that Light must help to keep staff awake and ensure that if there are dangerous situations, these can be clearly recognized. The various standards that exist for lights will also be discussed. You will learn that in computer room, it is recommended to have a minimum of 500 lux available – the requirement to make the data center safe to work in and to make sure that mistakes are minimized.

You will realize how important it is to place adequate light in both the front and back of the racks for proper and safe operations. Also, more emergency lights need to be installed to make the Data Center safer. In case of power failures or unforeseen circumstances, one needs to rely on emergency lights.

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## MODULE 6

# Power Infrastructure

In this module, participants will learn that Power is extremely critical for a Data Center and therefore needs to be highly flexible and resilient. Various ways of proper distribution within the Data Center are available, each with its own merits and limitations. Also, you will learn that IP protection grades are defined and need to be applied in accordance with the requirements of the environment, and power quality guidelines should be adhered to – to ensure proper functioning of equipment within the Data Center.

This module will help you further understand that there are various UPS technologies available for providing backup power, various battery and battery monitoring systems are available depending on the requirements of the Data Center, and thermo graphics help in pro-actively determining potential hazardous electrical systems.

## MODULE 7

# Electro Magnetic Fields (EMF)

The EMF module will aid participants in understanding what EMF is and what its two main types are, units of measurement, and norms and best practices. This also tackles what the various sources of EMF are, and the effects on equipment, human health and safety. Participants will be made aware that EMF, EMI, TEMPEST & HEMP are serious threats to the stability, security and safety of mission critical sites and humans.

Shielding with approved materials will reduce EMF to acceptable levels. You will also realize that EMF is often not taken into account into Mission Critical Facilities. It's invisible and only audits by qualified personnel can reveal issues.

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## MODULE 8

# Equipment Racks

In this module, participants will know the various standards available detailing the requirements for the construction of the racks that are commonly used within the Data Center and that there is a large variety of depths to choose from and one has to review the physical dimensions of the ICT equipment and then choose a rack to match. The difference between 2-post and 4-post racks, as well as rack types with their different cooling capacity

and limitations, will also be tackled in this module. You will also learn that several security measures are available on racks since having many racks in a single computer room could end up in challenges to manage all the keys appropriately. Moreover, participants will know that there are many choices for power rails/ strips from which one can choose depending on the business requirements.



## MODULE 9

# Cooling Infrastructure

Cooling is the number one issue in today's data centers. Temperature and humidity are the factors creating a major part of the problems for reliability of electronics. Cooling is very important for Data Centers and their availability, but very little understanding is present. In this module, you will learn that ASHRAE TC9.9 sets the recommended and allowable temperature on a regular basis. This module will also help you become familiar with the present and future cooling requirements.

Through exhaustive discussions, participants will have better understanding of various cooling systems that are available from which a selection needs to be made based on various criteria. You will know that both raised and non-raised floors setups can be used – each having their own pro's and con's. Finally, this module will tackle that various supplemental cooling options are available. Hot and cold aisle containment can improve cooling effectiveness and efficiency, but fire suppression needs to be addressed appropriately

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## MODULE 10

# Water Supply

This module teaches that having water supply in the Data Center facilities is crucial to the operations. It is not only required to ensure proper working of the fire suppression infrastructure based on sprinklers but also required to ensure that toilets, water taps, and other parts of the facilities can operate. Not having a proper water supply could result in serious issues, such as shortage of cooling; hence, the result may cause downtime.

You will also learn that backup water is almost as important as power and cooling for a Data Center. Backup water facilities should be created for emergency services such as fire suppression but also for normal sanitary facilities, as well as cooling infrastructure. Furthermore, participants will be made aware that various backup water supply options exist, such as water storage tanks, well water, and retention pond. Each has its own pro's and con's and abilities depending on the location of the Data Center.

A portrait of Mark Zuckerberg, the CEO of Facebook, is shown from the chest up. He has short brown hair and is looking directly at the camera with a slight smile. The image is overlaid with a semi-transparent blue filter. In the bottom right corner, there is a vertical URL.

“

Advanced data centers are basically giant machines that make up the technical infrastructure for our community. It takes a lot of computing power to support our community, so we're going to keep building new data centers around the world.

”

Mark Zuckerberg

## MODULE 11

# Designing a Scalable Network Infrastructure

All the ICT equipment in the Data Center environment is linked together via the Network Infrastructure cabling. How this is done varies per site but the basic structure is typically the same and following the TIA-942 model. In this module, participants will understand that the network is a crucial part of the whole Data Center environment in terms of availability. The network creates the connectivity between end-user and all the IT equipment.

This further explains the various copper and fiber optic network technologies, cabling complexity of Storage Area Networks (SANs), helps you achieve network diversity and redundancy and building-to-building connectivity, know various network connections, installation best practices, testing and verification methods and network monitoring system requirements.

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## MODULE 12

# Fire Suppression and Safety

Module 12 discusses that in a data center most of the time, fires are caused by an electrical source – cables overheating, dust, loose connections, etc. Should a fire occur, it is most important, after securing the safety of personnel, to ensure that equipment suffers a minimum of damage. Unfortunately, most Data Centers staff never really know if their fire suppression is working or not because they don't do proper testing after installation works are completed.

The importance of handheld extinguishers and carefully selecting the correct type to be used, and the signage and safety measures to ensure a safe working environment will be explained. In this module, participants will also know the various fire detection and suppression systems available depending on needs and local regulations. Regulatory requirements and best practices with regard to fire suppression will also be tackled.

## MODULE 13

# Data Center Monitoring

This module lets participants comprehend that ensuring that the Data Center environment is overseen 24 hours a day for events that are 'extraordinary' is critical in Data Center monitoring. Module 13 discusses what the Data Center monitoring requirements are. System integration may help to assist staff in getting the bigger picture during an alarm situation, having the capability to see the possible effect of one failure affecting other areas.

You will also be able to differentiate the two common types of systems for Data Center monitoring (Environmental Monitoring System & Building Management System) and know that remote monitoring is possible for Data Centers which spread over multiple geographical locations. Finally, participants will understand that careful consideration needs to be given to the selection of what to monitor and that notification and reporting options should be aligned with the business requirements.

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## MODULE 14

# Operational Security and Safety Practices

In this module, participants will understand that in order to secure the Data Center environment, you need to know first what it is that you are trying to protect, then determine what potential threats there are that can bring your Data Center down, and finally, what the likelihood of these threats to happen is as well as the potential cost impact these can cause. This will also enable you to learn that security is ideally implemented at three levels.

These levels are supposed to work in conjunction and are supported by the organizations' security policies and procedures. Ultimately, participants will recognize that security can be achieved via technology but is foremost controlled via enforcement and proper execution of security policies. Safety policies and plans need to be created, tested, evaluated and improved on a continuous basis.

## MODULE 15

# Labeling

Here, you will learn that Labeling is important in Data Centers because it helps to find and identify assets. It should be kept simple and consistent. This module discusses that numbering schemes, such as grid location numbering using combination of numeric characters and grid location numbering for large equipment – with pick bottom-left as identifier, can be used to identify rack locations. Numbering of equipment in racks is easiest achieved by taking bottom-corner locations.

Moreover, you will be able to realize that it is essential to label all components, including cable and power sockets in the electrical distribution system. Labeling of network can be achieved via color coding of cables in combination with labeling.

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## MODULE 16

# Documentation

Upon the completion of this module, participants will understand that proper documentation is the most important communication tool in your data center. But all too often, it is the first tool neglected. You will be made aware that some of the essential documentation elements are design plans and layouts, equipment/ asset lists, maintenance contracts and service records, policies, procedures and work instructions, forms, and test plans, test results and action plans.

Also, this module will enable you to understand that lack of discipline is key issue on document management. It will be discussed that all documents must be under a document control system, maintenance contracts and schedules need to be followed upon closely, and service reports need to be examined.

## MODULE 17

# Cleaning Practices

Whether your data center is just a closet or a mega-center, it needs to be cleaned to maintain the health of the equipment, the health of the personnel and the environmental aesthetics. The general rules in Data Center Cleaning Practices, such as the importance of performing regular spot checks for (excessive) dust underneath the raised floor, at the exhaust fans of the equipment, on top of the equipment racks and on top of the suspended ceiling, and checking the filters of air conditioners,

will be thoroughly explained during the discussion of this module. Moreover, you will learn that special vacuum cleaners should be used to clean under the raised floor and above the ceiling. The raised floor should be cleaned with dedicated material and non-aggressive chemicals. Overall, you will absorb that the general rules to keep the Data Center clean should be adhered to

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## MODULE 18

# Mean Time Between Failure (MTBF)/ Mean Time To Failure (MTTF)/ Mean Time To Repair (MTTR)

After the discussion of this module, participants will be able to define and differentiate MTBF, MTTF and MTTR. You will find out that MTBF is the mean (average) time between failures of a system, MTTF is the period of time measured from the first power on until the first time it fails, and MTTR is the moment a system fails and goes under repair until the moment it comes back online. MTBF is made up from MTTR plus MTTF.

You will be able to learn more about it in this module. Furthermore, you will be able to familiarize yourselves with the difference between Reliability and Availability – as defined by IEEE-90, MTBF calculation models and the value of MTBF. Overall, participants will have better understanding that MTBF and MTTR are two common used terms to describe availability while MTBF is a theoretical model and does not represent service life.

## MODULE 19

# Service Level Agreement (SLA), Operational Level Agreement (OLA) & Maintenance Contracts

This module aims to make participants aware that Service Level Agreement (SLA) and Operational Level Agreement (OLA) are essential to protect the interest of end-users. They do not differ so much as they both describe service levels. SLA is an agreement with an external party where money changes hands while OLA operates in a similar way with the major difference this is an internal agreement with the IT department and the internal customer and is based on 'a gentleman agreement'. You will also learn that maintenance contracts are an example of an SLA.

They preferably should cover everything that is critical to support the business and therefore commonly involves items such as power and electronics, security and safety. They are key components to reduce downtime. Well-defined maintenance contracts can save money and improve service levels. Lastly, participants will know that they have to be aware of maintenance service during the warranty period. Warranty conditions are different from maintenance contracts and are most of the time limited in terms of response time.



If those data centers go down and you swipe your card at the grocery store, the teleprompter will say, 'Sorry, can't process,' and you can't get milk or food for dinner.



Christine Mackay





## Course Assessment

**A multiple-choice paper-based certification exams (40 questions, 1-hour 'closed book')** will be administered at the end of the last day of the program. The exam is designed to measure individuals' knowledge and proficiency following their completion of the course.

Results of the exam, whether pass or fail, will be communicated to the participants within four weeks after the examination. Participants who pass the exam will receive the official "Certified Data Center Professional" certificate.

The course certification is delivered by EPI and its experts and recognized by BICSI for continuous educational credits.

*Note: Retakers will be charged. Participants who fail the exam are allowed to do 2 retakes which need to be done within a maximum of 6 months period after the 1st exam.*



# Subject Matter Experts

Delivered by our established in-house experts, global network of trainers, speakers and facilitators through established processes, this certification course will introduce you to the most relevant and practical aspects of data centers.

APEX Global Expert Council (AGEC) works closely with leading industry experts to consistently create, review and update the certification learning objectives. This ensures that what our clients learn is instantly applicable to any role and aligned to the needs of respective industries.

We collaborate with reputable partners on the design and development of course materials, so your learning is shaped by practical experience, expert insights and valuable case studies.



## For more information

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