APLEONA

The solution for Data Centers and Critical Environments

4P Critical Engineering Framework

Realising Potential.

Index

Foreword

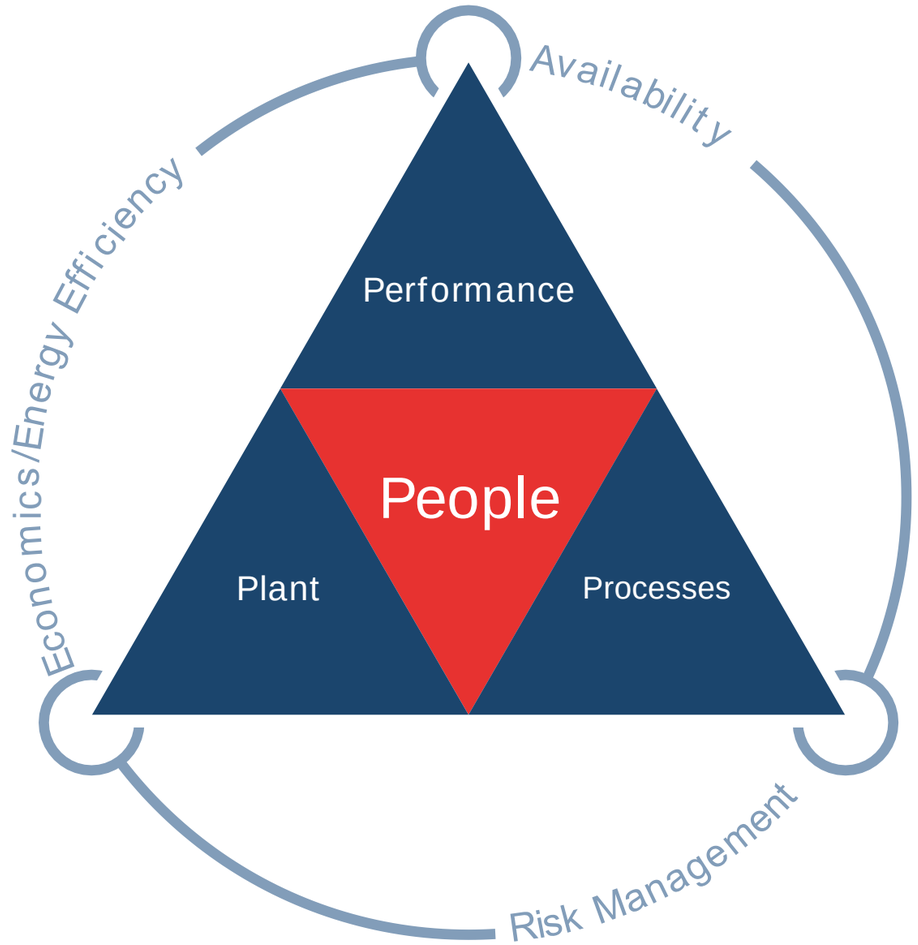
As a service provider, it is our job to deliver real added value for our customers. We assume responsibility for ensuring that our customers‘ facilities and operations run smoothly. Premium services are not an empty promise for us: on the contrary, what sets us apart is the fact that we turn words into deeds in order to meet the demands and requirements of our customers.

The area of data centers and critical systems is equally delicate and demanding: the focus here is on data, security and a high degree of functionality. The provision of “the usual” services is not sufficient, they must be supplemented with factors such as reliability, availability and technical competence. For our services in the area of maintenance and operation of critical systems, we rely primarily on our qualified technicians who have both extensive experience and a precise understanding of the facilities that we manage. In addition, we have developed and applied a range of proven processes which also take effect and provide support in the case of unexpected inci- dents. Our employees are very familiar with their areas of expertise and have a shared understanding of our perfor- mance expectations.

These principles form the foundation of our daily activities. The entire framework is supported on four pillars: people, performance, plant and processes. Because without our people, established processes, our performance and fully-functional plants and processes, we could not guarantee the quality that we want to offer our customers. We call this recipe for success the “4P Critical Engineering Framework”. With this in mind, I present this informative insight into our service offerings in the area of data centers and critical systems.

Apleona
General Information

4P Critical Engineering Framework for Managing Data Centers and Critical Environments



Apleona group vision statement

We create real added value

- We develop and implement solutions which generate real added value for our clients – be it commercial, technical, procedural or financial.
- Focused on efficiency and the long term and driven by the high quality standards of “German engineering”.

We put great emphasis on individuality

- No “off the shelf” offers; instead individual solutions tailored to the client.
- Our “people’s business” thrives thanks to characters and personalities – shaped by trust, attentiveness and reliability.

We inspire and motivate

- We strive to be an inspirational, enriching and motivating partner.
- Characterised by a solution-orientated approach, imagination and creativity as well as proactive, passionate dedication and forward thinking.

Critical services engineering vision statement

We are best in class at delivering services to business-critical facilities where an interruption to service or infrastructure would have major consequences and could damage the brand. The business is underpinned and supported by the unique culture that can only come from a German engineering company.

In line with the Apleona Vision Statement, our principles for the operation and maintenance of critical environments are:

Our proven Critical Services experience enables us to understand critical environments.	We deliver best practices and growth in all our critical businesses through industry-specific relationships and networks.	We will shape the future through innovation.
Our proven Critical Services experience and detailed learning processes enable us to continuously improve our risk management strategies.	We commit to actively engaging with the client across all regions and will break down barriers to further reduce risk across all businesses.	We will create a business environment where people are treated with respect, so learning happens in a constructive manner resulting in risk reduction for customers.
Our staff will undertake human factors training where leadership and crisis management will be explained so role models become clear.	We will have the autonomy to deliver a best-in-class critical services engineering-led solution.	We will commit to reductions in energy usage and social schemes making sure all solutions are in line with our accreditations.

“Data center operations are highly sensitive, and almost no other property is under as much pressure to succeed in terms of availability and performance data with the lowest possible energy consumption and overall costs. For logical reasons, the operational management expertise required for this can only be assembled internationally, since operational management‘s international networking and experience exchange represent the most important element to successfully develop the services further and become ‘best in class’. From this perspective, in Austria we were very pleased to receive this support from our Data Centers / Critical Systems Center of Competence in an uncomplicated, direct manner and to the necessary extent, which was one of the crucial factors for winning the R-IT Raiffeisen IT contract".

Gerhard Schenk
Apleona Austria

Introduction of the 4P Critical Engineering Framework

Introduction of the 4P Critical Engineering Framework

The risk of business interruption caused by failures to business-critical facilities can be reduced or eliminated wherever possible by applying effective risk management techniques such as Apleona's 4P Critical Engineering Framework.

According to studies conducted by European and US Information Technology (IT) analysts, the average cost per minute of IT equipment downtime is about $7,900, depending on the sector the company is active in. The average reported incident length is 86 minutes, resulting in an average cost per incident of approximately $690,200.

One of the examples where an operator error led to data center downtime was a case at an American hosting website in 2012. An engineer who was conducting preventive maintenance on an Uninterruptible Power Supply (UPS) system at the company's data center made an error, operating the breakers out of sequence. This led to the shutdown of the UPS system and resulted in the loss of critical power to one data center suite within the facility. This in turn crashed the website, and brought its services grinding to a halt, resulting in the loss of potential profits for the duration of the downtime.

This situation is an example of the lack of proper knowledge of the procedures for maintaining equipment, as well as probably fatigue, bad mood, insufficient skills and a lack of familiarity with this type of equipment. Millions are invested in engineering systems that provide resilience within organizations and prevent service failure. The high complexity of modern buildings and the impact of operational outages requires an approach to managing the engineering services that goes further than a traditional maintenance strategy.

Businesses that rely on technology for their day-to-day operations cannot afford to risk even a few seconds of downtime, let alone an extended outage.

Many factors can contribute to the loss of critical services. A highly structured approach is needed; one that considers all the individual elements and brings them together as a consolidated system.

Apleona's objective is to identify and eliminate potential failures within our client's infrastructure and processes, improving resilience across systems deemed critical to their core business.

The 4P Critical Engineering Framework is a highly structured risk management concept that can be applied to the operation and management of engineering systems to ensure the maximum possible uptime of critical facilities. The 4P Critical Engineering Framework is an industry-leading approach that can help ensure uptimes that go beyond industry norms.

We are rapidly approaching a time where risk management within critical environments is no longer optional, but essential to the defense of a company's operations, integrity and profitability. The potential benefits to be gained from having robust engineering processes in place via the application of the 4P Critical Engineering Framework methodology are substantial.

Customers that demand 24/7 availability will appreciate how our coordinated approach to People, Processes, Performance and Plant gives them total peace of mind.

Overview of the 4P Critical Engineering Framework

Apleona's unique approach to the 4P Critical Engineering Framework is based on a number of distinct layers, each of which contributes to the defense of our clients' integrity and business operations. This framework is underpinned and supported by the unique culture that can only come from a German engineering company.

There are currently three layers to the 4P Critical Engineering Framework process:

01 Framework Document

02 Management Processes

03 Operating Procedures

Framework	Vision, Mission, Objectives			
Management Processes	People	Processes	Performance	Plant
Operating	Best Practices for managing people (see page 54)	Best Practices for managing processes (see page 54)	Best Practices for managing performance (see page 55)	Best Practices for managing plant (see page 55)

The management processes which are presented in this document highlight a clear approach to the key areas of:

– People

– Processes

– Performance

– Plant

The operating procedures are in a clear consistent format across the Apleona critical services business, allowing for implementation in a timely manner, based on the client's exact risk profiles.

Objectives

We have created the 4P Critical Engineering Framework to enable us to successfully look after critical environments, ensuring that the processes are appropriate and applicable to the facilities. Processes may need to be adapted to suit each site and each organization but the core principles are formally documented and will help to ensure compliance. Our approach has been developed to be industry-leading and is an integral element of our service offering.

We developed this management strategy to support both our business needs, and also the business needs of existing and future clients. Our approach was developed with clients' critical environments in mind and by listening to what our customers were telling us. One of the main findings was the desire to have true visibility of the management and operational status of the infrastructure supporting their business and critical environments. This was the foundation of the 4P Critical Engineering Framework approach, and will form part of the embedded culture within our business.

Our specific approach to critical engineering is to have a number of distinct processes or 'elements', with each of these contributing to the defense of our clients' integrity and business operations. A number of core elements make up the main 4P Critical Engineering Framework package that is viewed as essential and should form the backbone of our procedures and processes on-site.

The procedures describe in detail the processes that must be followed in order to ensure successful operation of a critical environment. Following these processes will increase uptime for our customers. Adopting the 4P Critical Engineering Framework methodology can raise the benchmark for maintaining critical facilities.

The philosophy and main objectives of the 4P Critical Engineering Framework approach are to ensure that:

- Operational risk of incidents is significantly reduced
- The culture of risk-awareness and risk-reduction is reinforced
- Risks of business interruption from work on critical engineering systems or in critical areas are adequately assessed
- Effective controls are put in place to mitigate the risks of business interruption
- Assets are maintained and monitored to the right level, depending upon their criticality
- Personnel carrying out work on critical engineering systems or in critical areas are aware of the criticality and potential implications for business operations
- Effective and properly tested procedures are in place for operating critical engineering systems and for managing unexpected events affecting critical engineering systems or occurring in critical areas
- Spare parts for critical engineering systems are effectively managed so that no business interruption is experienced because of a lack of or shortage of spare parts
- There is improved visibility of the risks and potential threats to business
- There is a consistent approach throughout the company, through specified, clearly defined processes
- Continual learning takes place through constant review and feedback processes

Purpose

The purpose of this framework is to raise awareness and provide an overview of the 4P Critical Engineering Framework allowing all staff working in critical environments to be fully aware of the expectations of Apleona and its customers.

The purpose of the 4P Critical Engineering Framework is to ensure minimum disruption or interruption to business-critical operations is caused by failures.

The 4P Critical Engineering Framework will ensure:

- Consistency to applied systems/processes
- Comprehensively enforced compliance
- High degrees of risk visibility
- Continuous feedback and learning
- Risk reduction

Why is the 4P Critical Engineering Framework so important?

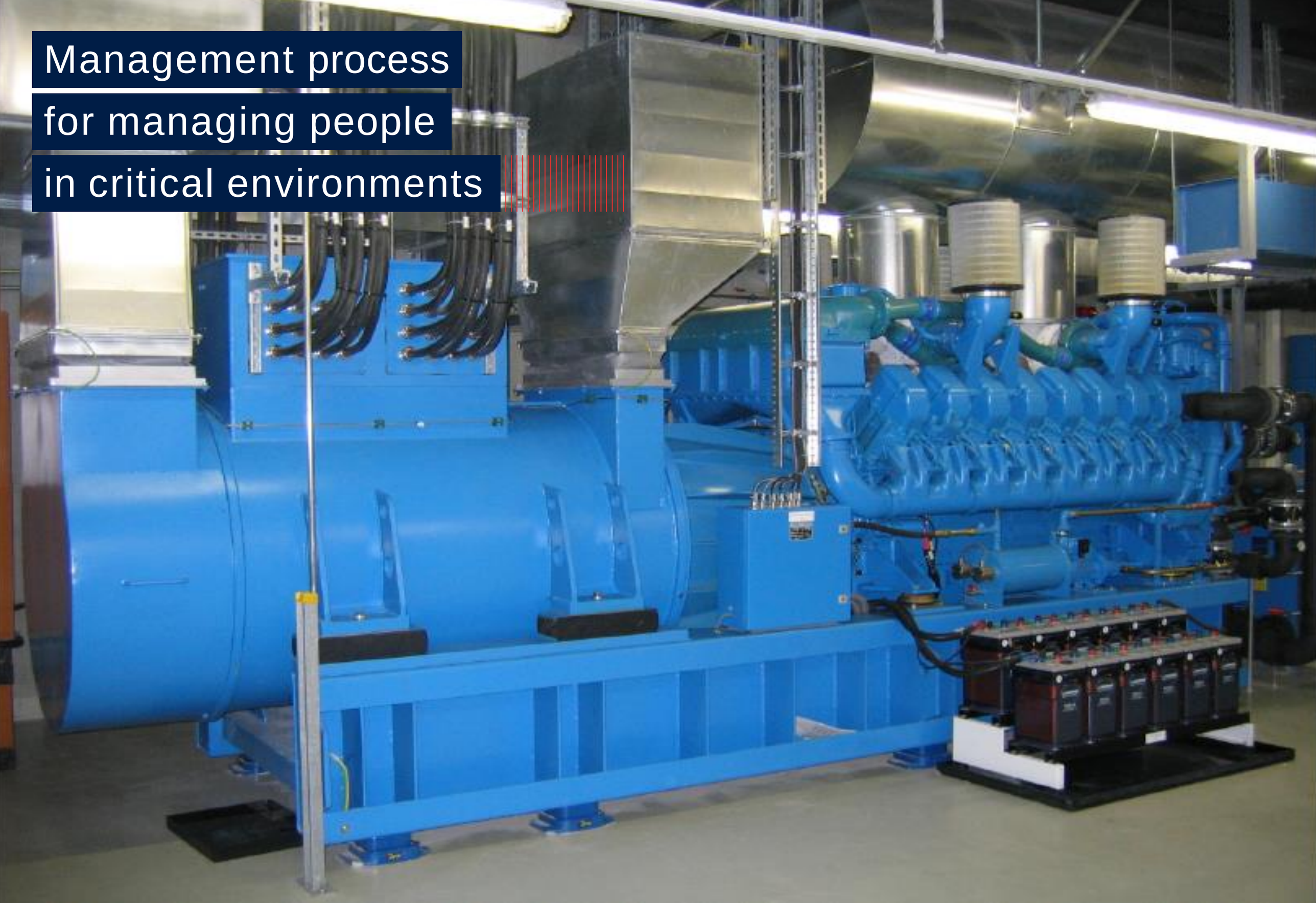
No power or cooling → No communication or IT services → No business

4P Critical Engineering Framework

People / Processes / Performance / Plant

"Engineers making the difference"

Management process for managing people in critical environments



Management process for managing people in critical environments

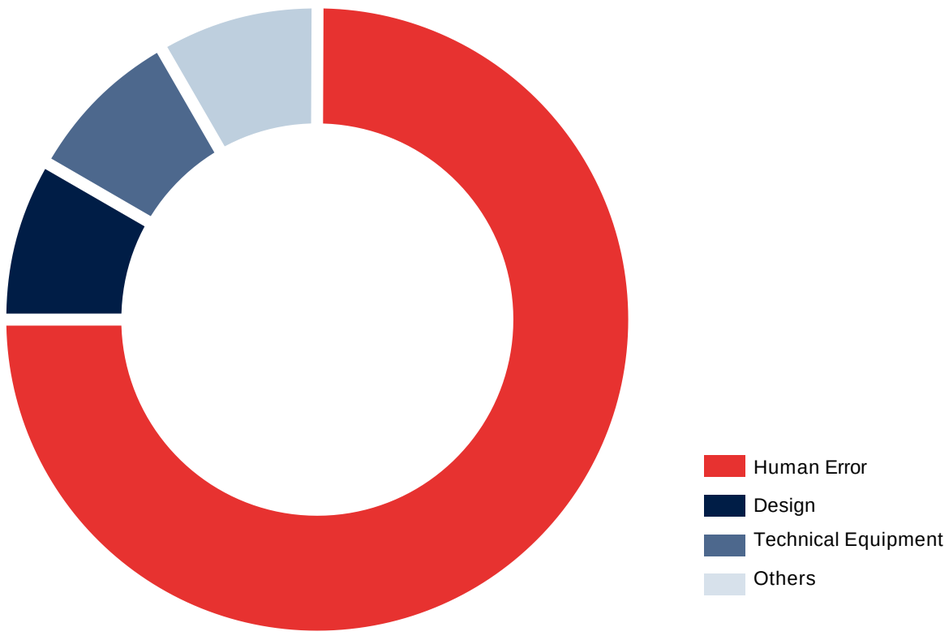
Industry research has shown that up to 75% of critical incidents and system downtime can be traced back to fundamental failures in people and/or processes reliant on human input and interaction. The ‘human error’ element may occur at any stage, including planning, design, construction or operations, and is a major source of systemic infrastructure failure. An example is a poorly trained or poorly inducted staff member working in a critical area who, with good intentions, pushes the wrong button at a crucial time, thus shutting down the facility unnecessarily.

As mentioned above, 75% of equipment failure can be attributed to the human factor. Factors leading to human error include:

- Lack of knowledge of documentation
- Lack of knowledge of proper procedures
- Low level of training
- Improper placement of equipment and switches
- Lack of motivation
- Understaffing
- Fatigue
- Poor subcontractor management
- New employee

Data center risks

According to 451 Research, 75% of all data center downtime is caused by Human Error.



Objectives

To summarize, the main objectives of this management process are to:

- Ensure that our people have the necessary skills to mitigate and highlight risks to both internal and external customers
- Develop a detailed process for interviewing potential engineering staff
- Make risks associated with people in critical competencies visible, with a view to mitigation and contingency
- Identify skills shortages and highlight the training required to mitigate them
- Increase job satisfaction, morale and motivation among employees, thus positively impacting staff retention
- Increase the capacity of our people to adopt new technologies and methods, and to have the skills to adequately assess the risk of business interruption
- Allow long-term strategic planning of training needs.

Purpose

The purpose of this process is to raise awareness and provide an overview of the management process for people in critical environments, allowing all staff working in critical environments to be fully aware of the expectations of Apleona and its customers.

The purpose of the management process for people is to ensure minimum disruption or interruption to business-critical operations is caused by failures.

The management process will ensure:

- Consistency of training standards in critical environments
- Comprehensively enforced compliance
- High degree of risk visibility
- Continuous feedback and learning
- Risk reduction

Realising your data center potential

Developing people

Communication is an important part of work and one that is often taken for granted. Almost everything we do calls for good communication. This is a key success factor for the 4P philosophy and all our people must be aware of the importance of effective communication in critical environments.

Good communication of the 4P philosophy will help to:

- Reduce risk
- Aid and accelerate the implementation process of the 4P Critical Engineering Framework model
- Help overcome resistance to change
- Positively impact culture and behavior
- Create an open, creative environment allowing for risks to be highlighted and managed
- Solve problems effectively

It is imperative that all personnel have an in-depth knowledge of the critical areas and associated infrastructure they are responsible for, and a clear understanding of the operational requirements and the potential impact to the business.

Highly technical and complex critical environments require skilled people to operate them; however, even the best people need guidance and a management framework to adhere to. The 4P process will help our people to achieve the aim of maintaining 100% uptime.

Taking best practice from all areas of our business, we have developed our system to be focused on reducing the risks associated with the human factor. Encouraging and sustaining the correct culture throughout our organization is fundamental to the success of our 4P Critical Engineering Framework approach.

The training of staff – as well as keeping them motivated – is essential to achieving high standards of engineering excellence, reinforced by individual and team evaluations including soft and hard elements such as communication skills and technical ability.

Training increases staff retention, which is a significant factor in ensuring that we can meet the high standards for critical engineering that we have set for ourselves.

Training will increase the quality and flexibility of our business delivery by ensuring:

- Reduced risk profiles
- The right culture and behavior required for 4P Critical Engineering Framework to be effective
- Good engineering working practices
- Gaps in skills are clearly visible and can therefore be addressed quickly, mitigating risks to the business
- There is transparency in the reporting of the skills of site engineers
- Training requirements can be planned to cause the least possible interference with clients‘ operations
- Training is delivered in a structured and consistent manner
- Increases staff retention, which is a significant factor in ensuring that we can meet the high standards for engineering that we have set for ourselves
- Customer satisfaction and business reputation is increased, making Apleona an employer of choice for all potential critical engineering employees

On-site training is considered particularly effective. Knowledge will be gained on equipment, not in isolation, but as part of the system it forms. This local knowledge will reduce the risks to the clients' critical engineering systems on-site.

It is vital that the subcontractor's personnel are introduced to, and trained on, the critical facility they are working in, as they present a considerable risk to these facilities. The training schedule for subcontractors should be documented and reviewed at a regular agreed interval.

Challenge: Qualified employees strengthen the company‘s competitive position

Apleona Academy, Group Training Institute

Vocational Training Programs and Training Centers (locally)

Employee training / qualification

Our own Headquarter (HQ) Training Center for Data Center (DC) Technicians

Employee Certification for Data Centers

- Basic theoretical training
- Advanced theoretical training
- Practical exercises
  - Emergency power supply, UPS systems
  - Power supply
  - Security, Fire alarm systems
  - Heating, Ventilation and Air Conditioning (HVAC) / Cooling systems

Basis for employee certification, performed by CoC DC corporate function


APLEONA

Zertifikat

Herr Max Mustermann

Apleona HSG Facility Management

„Data Center Operator"

Inhalt der Zertifizierung:

Theoretischer Teil

Praktischer Teil

Realising Potential

Management process for managing processes in critical environments

Management process for managing processes in critical environments

The 4P Critical Engineering Framework is a highly structured risk management framework that consists of key processes that can be applied to the operation and management of engineering systems to ensure the maximum possible uptime of critical facilities. Due to the highly technical nature of today's critical environments and the significant business impact of downtime, it is important that we offer a service that is very process-compliant.

We are rapidly approaching a time where risk management within critical environments is no longer optional. The reduced risk profile from having robust engineering processes in place through the application of the 4P Critical Engineering Framework is the key to the ongoing operation of a critical environment.

A major and crucial element of managing critical environments is making sure that the critical environment is controlled and operated efficiently in a structured and consistent manner with the relevant and supporting processes.

Having the right personnel, trained to work in critical environments, along with processes designed to ensure operational sustainability, are essential elements in identifying and resolving such problems in a timely manner.

It should be mentioned that any critical environment, no matter how well designed or built, will only be reliable and efficient if the appropriate processes and procedures are in place to support it, with staff who are fully trained and aware of how to utilize the correct processes.

Many factors can contribute to the loss of critical services, and to ensure that all risks are covered, a highly structured approach is required, that considers all the individual elements needed and brings them together as a consolidated system. Our objective is to identify and eliminate potential failures within our client's infrastructure and processes, improving resilience across systems deemed critical to their core business.

The number one priority for many organizations is uptime. In order to maximize uptime and minimize any chance of disruption, it is necessary to provide a reliable infrastructure managed by the relevant processes.

Systems must be installed with the correct redundancy and single points of failure must be identified and resolved in a manner that is very visible and which allows for defined processes to be put in place to eliminate or mitigate risk.

Maintenance and reactive situations must be performed on the critical building services systems to sustain a reliable operation and to maintain asset value. Therefore, a clearly defined process that minimizes the risk of failure of the critical systems is necessary.

Objectives

To summarize, the main objectives of this management process are to ensure:

- A consistent approach throughout the company, through specified, clearly defined processes
- Effective controls are put in place to mitigate the risks of business interruption through clear and consistent processes
- Operational risk of incidents is significantly reduced
- The culture of risk-awareness and risk-reduction is reinforced throughout the business
- Risks of business interruption from work on critical engineering systems or in critical areas are adequately assessed
- Assets are maintained and monitored to the right level, depending upon their criticality
- Personnel carrying out work on critical engineering systems or in critical areas are aware of the criticality and potential implications for business operations
- Effective and properly-tested processes are in place for operating critical engineering systems and for managing unexpected events affecting critical engineering systems or occurring in critical areas
- Continual learning takes place through constant review and feedback processes
- All the necessary information is in place to allow the plant to be managed appropriately regarding its risk profile
- All plant information is shown gathered in a format that is easily understood by people at all levels
- A consistent and process-focused approach for critical engineering is established
- Plant failure caused by unplanned events is minimized

Purpose

The purpose of this process is to raise awareness and provide an overview of the management process for critical environments, allowing for all staff working in critical environments to be fully aware of the expectations of Apleona and its customers.

The purpose of the management process is to ensure minimum disruption or interruption to business-critical operations caused by failures.

The management process will ensure:

- Clear and consistent process standards throughout the business
- Strictly enforced compliance of these processes
- High degrees of risk visibility brought about by a robust process framework
- Continuous feedback and learning

Process management

The operating procedures and processes included within the 4P Critical Engineering Framework are based on Engineering best practice. In some cases, processes will clearly need to be customized to make them site-specific. We would use the processes as a guide and modify the templates provided so that we can ensure that local working practices and operating rules are integrated into the procedures.

Our operating processes will be constantly reviewed and revised to ensure that they are relevant to the specific environment, and will be subject to an audit process to ensure consistency and compliance across the business.

Highly technical and complex critical environments require skilled people to operate them, but even the best trained people need guidance and an operational procedure to adhere to. The 4P Critical Engineering Framework operating processes will help direct their skills and experience towards maintaining 100% uptime.

The supporting efforts and compliance standards are just as important as the operating processes for ensuring that people have really understood them and that they are embedded into the business.

The operating processes utilized in the 4P Critical Engineering Framework describe in detail the processes that should be followed to provide for the successful operation of a critical environment. Following these processes will help ensure success and improved uptime for our customers.

Auditing and supporting of these processes is an essential element to ensure that they are understood and embedded. This must be supported by a culture of openness allowing for any challenges or problems to be raised in a safe and secure environment.

Areas such as documentation, processes and training of employees are extremely important because the critical infrastructure is an environment that does not forgive lack of proper knowledge of equipment operation. In order to reduce the risk of errors, enough time and financial resources should be made available to properly train staff on all key procedures during a mobilization phase or as part of a new employee's induction.

The 4P processes have been developed by a team of key people within our organization, each of whom has many years of experience working in critical environments.
By following our processes, risk levels will be reduced and ultimately this will result in reduced downtime.

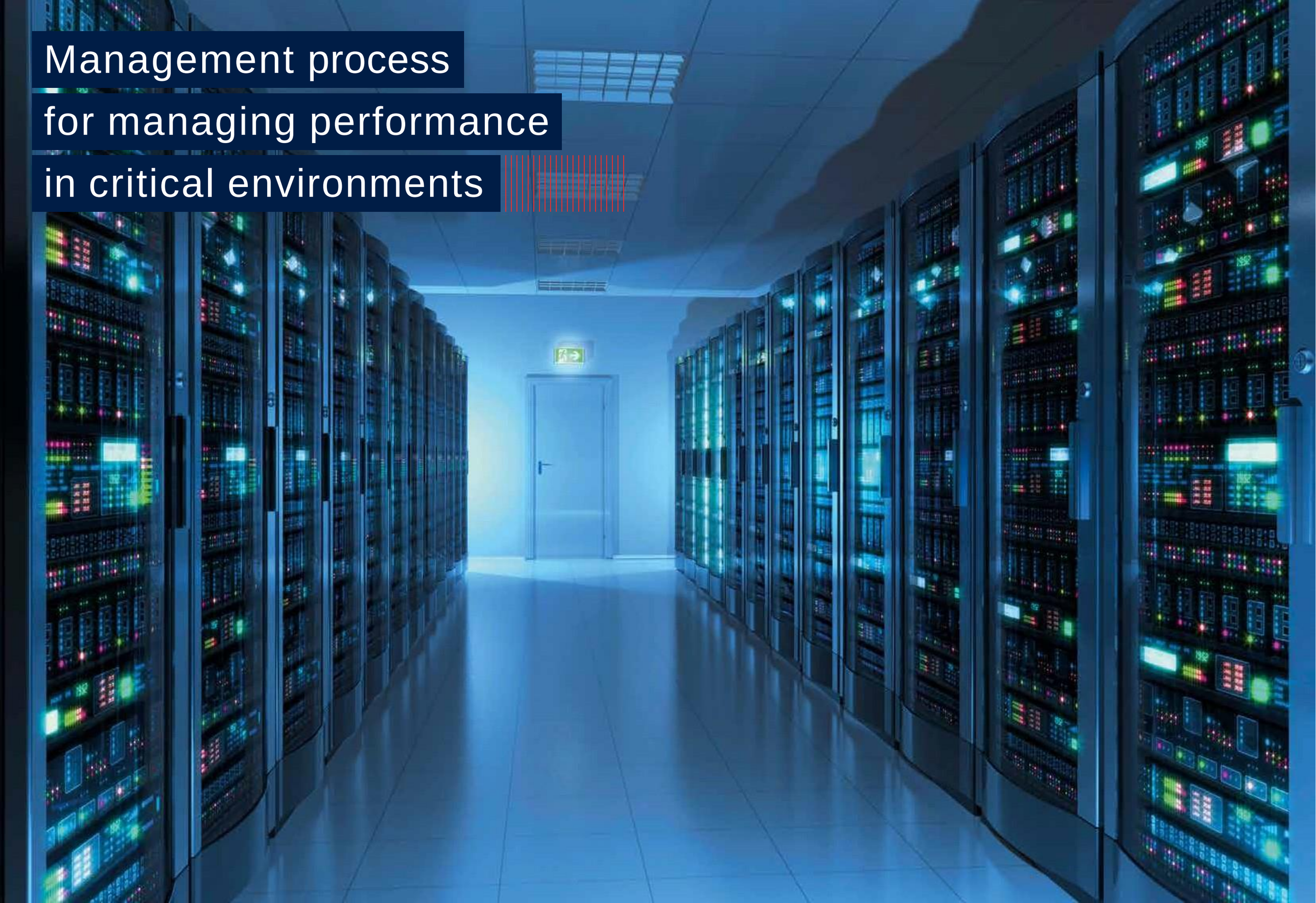
Apleona will always seek to continually improve by taking lessons from all activities and events. When an unplanned event occurs on-site, which it inevitably will, a well-trained team working with robust, comprehensive procedures can make sure that a catastrophe is avoided and normal conditions are resumed as quickly as possible.

Our processes will be constantly reviewed and revised if required to suit the changing needs of our customers. We also commit to continual improvement, where suggestions from people making critical decisions day-in, day-out are discussed, shared and incorporated into the processes used.

The 4P processes have been compiled and structured so that each one can be individually implemented on-site as required. However, there is a core group of procedures that we would expect to see in place at all sites.

The aim of Apleona's processes is to ensure that working environments and critical operations are controlled and any planned works are managed to avoid risks to business.

Management process for managing performance in critical environments



Management process for managing performance in critical environments

Reliability, availability and maintainability are the essential properties of critical systems when it comes to determining the number of outages and Mean Time Between Failures (MTBF) respectively. Therefore it is imperative to track, evaluate and optimize these system characteristics.

During installation and fit-out, huge sums of money are often spent on sophisticated standby electrical equipment, with the aim of ensuring that building systems have adequate resilience to cope with almost any situation, but the challenge is that client growth often results in changing operating parameters that are not monitored correctly. This can result in lost resilience or infrastructure that can no longer be maintained.

By understanding the full requirements and capabilities of the critical systems, we are able to minimize the likelihood and impact of plant failures. Effective management of the Mechanical and Electrical (M&E) infrastructure helps to ensure the reliable operation of building services throughout the lifecycle of the asset and building.

Apleona's procedures help to ensure that equipment performs to its design criteria throughout its service life, minimizing the risk of unplanned downtime.

Critical systems performance monitoring should involve a cooperative approach between Apleona and the customer, which will ensure that a balanced view is given to the performance targets that are set.

Many organizations now rely heavily on their critical infrastructure to provide core elements of their business. Therefore, these systems have to be closely monitored to ensure the integrity and longevity of a facility that is capable of sustaining and protecting core business activities.

In simple terms, if either the electrical or the cooling capacity of the facility (including resilience) is reached, the business is at risk. Additionally, growth within the facility will be restricted until additional infrastructure can be provided.

It is the responsibility of the engineering teams to ensure that clear measures are in place to effectively analyze capacity as well as provide clear measurements for the infrastructure and staff providing the service.

Critical facilities need to run continuously. This is why energy usage in mission-critical facilities is a key focus and a clear performance target. Measures must be agreed and embedded into the team.

"Many thanks to you and the entire Apleona* team, both those in attendance and those additional people who supported this FMECA* / RAM** project. It's clear from the extensive detail and data analysis that this tool has something unique to offer from a design perspective.

Excellent piece of work!"

Colm Shorten
IBM Real Estate Site Organization (RESO) Manager, UK & I, Nordics

since February 2017 Apleona

* FMECA Failure Mode, Effects and Criticality Analysis
** RAM Reliability, Availability, Maintainability

Objectives

To summarize, the main objectives of this management process are to:

- Ensure that our people have the necessary skills to understand the performance measures that are in place for the critical environment
- Make risks associated with people in critical competencies visible with a view to mitigation and contingency
- Allow full visibility of the true capacity of the facility
- Allow long-term strategic planning of critical infrastructure
- Adequately assess the risk of business interruption utilizing input-based availability measurements
- Eliminate or mitigate the risk of overload and failure of critical plant to an acceptable level, thus reducing risks to business operations
- Ensure that all the necessary information is in place to allow for reductions in energy usage to be monitored
- Make the information gathered available in a format that is easily understood by people at all levels

Purpose

The purpose of this process is to raise awareness and to provide an overview of the management process for performance in critical environments, allowing for all staff working in critical environments to be fully aware of the expectations of Apleona and its customers.

The purpose of the performance management process is to ensure minimum disruption or interruption to business-critical operations is caused by failures.

The management process will ensure:

- Clear and consistent performance indicators in critical environments
- Strictly enforced compliance of performance indicators
- High degree of risk visibility brought about by a robust performance indicator review process
- Continuous feedback and learning
- Risk reduction due to increased awareness

Performance measures drive behavior

Typical input Key Performance Indicator (KPI)

- Training Hours
- Scenario Training Hours
- Staff Competence
- Engineering - Potential Incidents
- Engineering Risk Status
- Attrition
- Avg. Length of Service
- Process Compliance
- Optimum Operating Conditions

Typical output Key Performance Indicator (KPI)

- Planned Preventive Maintenance Completion (PPM)
- Reactive Completion
- Reactive Numbers
- Breakdowns
- Downtime
- Mean Time Between Failures (MTBF)
- Incidents
- Energy Usage

Developing performance indicators

Traditionally the industry uses measures that give an indication of past performance. These measures often have little influence on the success of the critical processes that are undertaken in a critical facility and only record information after the event.

Although these measures are important and must still be monitored, the focus should be on driving input measures; measures which facilitate reductions in energy usage and will reduce the risk of outages.

Input measures are the drivers that ensure the successful operation of a mission-critical facility and it is therefore essential they become part of a detailed system of measures. These should be tangible and formalized and should form the backbone of a formal measure to enable a clear and consistent approach.

It is crucial that the measures are formally presented and reviewed at regular intervals agreed with the customer. Moreover, it is of utmost importance that the measures become part of the everyday culture and behavior while operating a critical environment.

A formal audit can also be carried out by an independent body to allow for a complete overview of the facility. This ensures all critical engineering activities and measures, along with the critical processes that support them, are effective and embedded into the business and customers‘ critical environments with the added benefit of providing key stakeholders with peace of mind.

Apleona's key standards for managing performance in critical environments are:

- DIN EN 9001
- DIN EN 14001
- DIN EN 50001
- OHSAS 18001
- GEFMA 730

Management process for managing plant in critical environments

Effectively managing plant

Planned Preventive Maintenance is the minimum that should be done to support critical systems and in certain critical facilities it is crucial that there are enhanced maintenance strategies that are targeted and developed against the specific risk profile of the plant.

An important feature in minimizing business-critical downtime is the approach taken to reactive repair or undertaking maintenance of the critical engineering systems. The processes that support these activities are crucial to ensure that the plant is repaired and brought back on-line in a safe and efficient manner.

Critical spare parts management is required to ensure that parts for critical systems are readily available when they are needed most – during a breakdown. Any delay in expediting spare parts can significantly impact the business.

Full inventory and stores management procedures are required to allow immediate spare parts to be issued to the front line, as well as transparent stock usage and real-time data.

The main objectives of critical spare parts management are to ensure that:

- The potential for critical systems downtime is reduced
- The correct critical spare parts are on hand
- The correct quantities of each spare part are on hand
- The usage of spare parts is adequately monitored and tracked
- Spare parts are reordered as soon as stock is low

The availability of critical spare parts is therefore an essential element in plant management.

The continued availability and reliability of the environmental infrastructure and those critical system loads that they physically support is dependent on proactive management, control and regular monitoring of those loads, something that is often overlooked. It is important to be in a position of knowing whether system capacities are at risk of being exceeded, thus compromising system reliability, and also that reserve power and cooling capacities are available to support the client's future and often dynamic growth requirements throughout the lifecycle of their building.

It should be pointed out that a well-maintained facility will not completely prevent outages, and while a well-maintained facility will help reduce many risks, it does not prevent incidents resulting from human error.

The training and embedding of these specific plant management processes is a vital factor, and leads to the risk of failure being reduced by a significant factor, making it an important part of the scenario training program that all engineers will undertake.

Realising your energy potential

Management process for managing plant in critical environments

A major and crucial element in managing critical environments is making sure the plant is operating efficiently via a structured and consistent maintenance strategy.
In buildings where the infrastructure is becoming increasingly more business-critical, the reliability and availability of the critical building services support system is vital if continuity of the business-critical operations is to be maintained.

Maintenance must be performed on the critical building services plant systems to sustain reliable operation and to maintain asset value. Therefore, a clearly defined and prioritized maintenance strategy that minimizes the risk of failure of the critical systems is necessary.

One effective strategy that reduces system downtime is to carry out Planned Preventive Maintenance (PPM) aimed at extending service life as well as reducing the risk of infrastructure failure.

The number one priority for many organizations is uptime – the availability of the business operational systems. In order to maximize uptime and minimize any chance of disruption, it is necessary to provide a reliable infrastructure. Therefore, systems must be installed with the correct redundancy, and single points of failure must be identified, communicated to the customer and resolved in a manner that is very visible and which allows for defined processes to be put in place to eliminate or mitigate the risk.

With our full understanding of the requirements and capabilities of the critical systems, we are able to minimize the likelihood and impact of plant failures.

Effective management of the M&E infrastructure helps to ensure the reliable operation of the critical environment and our 4P procedures ensure that equipment performs to its design criteria throughout its service life, minimizing the risk of unplanned downtime.

Objectives

To summarize, the main objectives of this management process are to:

- Make risks associated with plant in critical environments visible, with a view to mitigation and contingency planning
- Allow full visibility of the true infrastructure and plant of the facility
- Allow long-term strategic planning of critical infrastructure maintenance
- Adequately assess the risk of business interruption utilizing leading-edge maintenance techniques
- Ensure that all the necessary information is in place to allow for the plant to be managed appropriately in relation to its risk profile
- Make all plant information gathered available in a format that is easily understood by people at all levels
- Improve reliability and availability of critical infrastructure
- Establish a consistent approach for critical engineering maintenance
- Minimize plant failure caused by unplanned events
- Put an appropriate critical spare parts strategy in place
- Ensure plant is optimized and managed effectively to allow plant to operate efficiently

Purpose

The purpose of this process is to raise awareness and provide an overview of the management process of plants in critical environments allowing for all staff working in critical environments to be fully aware of the expectations of Apleona and its customers.
The purpose of the plant management process is to ensure minimum disruption or interruption to business-critical operations caused by failures.

The management process will ensure:

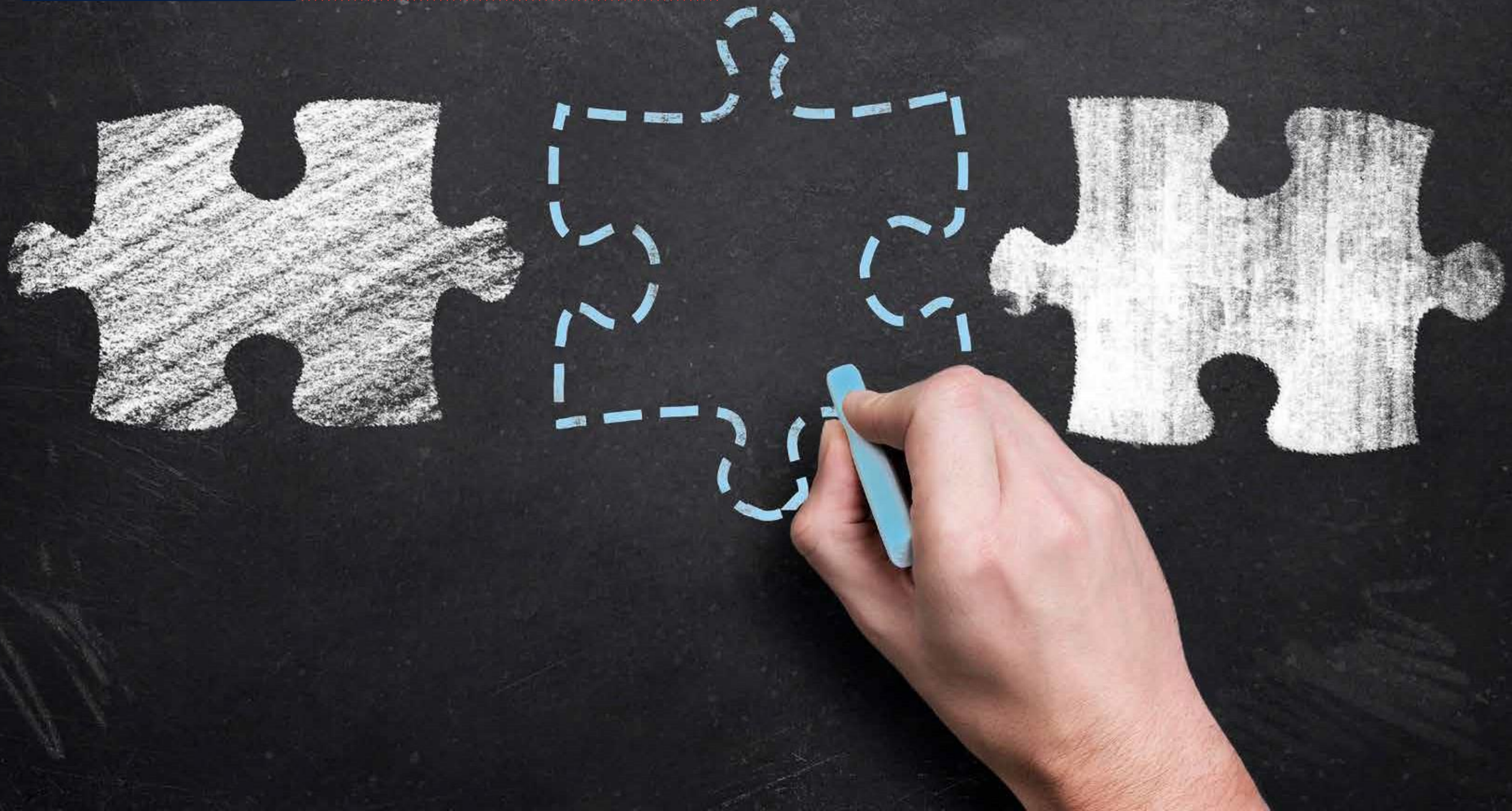
- Clear and consistent maintenance standards
- Strictly enforced compliance of these standards
- High degree of risk visibility brought about by a robust performance
- Optimization allowing for an efficient plant

Realising your Data Center potential

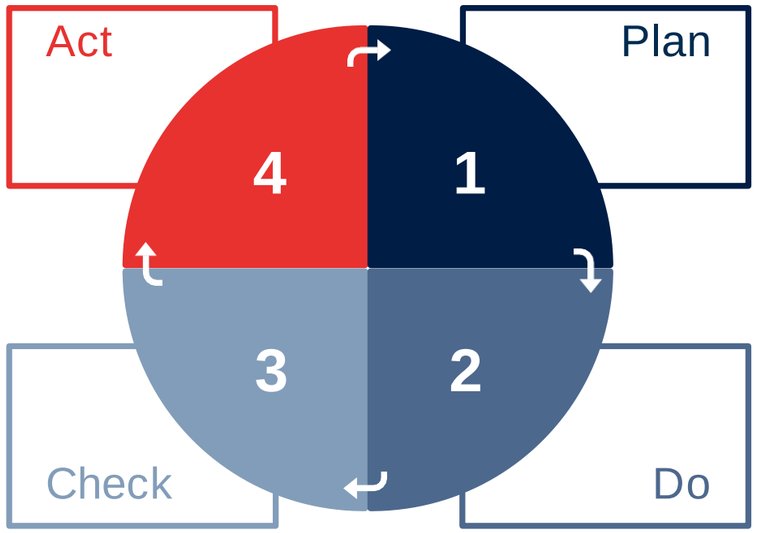
Certification
Spare Parts Management
Risk Management
Critical Environment
Best Practices
Critical Engineering
Real Estate
Maintenance & Operation
Availability & Reliability

Alternative Power Solutions
Energy Management
Employee Training
Design & Build
Change Management
Projects
Start Up
Load Tracking Analysis
Commissioning & Acceptance

Method for implementing the 4P Critical Engineering Framework



Method for Implementing the 4P Critical Engineering Framework



01 Plan

Our 4P Critical Engineering Framework is based on dynamic Best Practice procedures with focus on People, Performance, Plant and Process. These documents form the basis for our operational units to create detailed working instructions and processes. The implementation of the 4P Critical Engineering Framework is carried out by our Center of Competence for Data Centers and Critical Systems (CoC DC).

02 Do

Our operational business units provide the services based on the contractual requirements, internal standards (e.g. ISO 9001, 14001, 50001, OHSAS 18001, GEFMA Integrated process responsibility (Ipv) etc.) and the 4P Critical Engineering Framework.

03 Check

In order to ensure a sustainable operation, we established a Self-Assessment methodology in combination with 4P reviews and audits through our corporate departments. The results of 4P Critical Engineering Framework compliance are based on a questionnaire and will be shown via dashboards to the management.

04 Act

Identified deviations are tracked in a site-specific action plan. New insights from different client contracts as well as changes in industry standards are collected by our CoC DC and incorporated into the 4P Critical Engineering Framework Best Practices. With this method, we ensure continuous quality improvement.

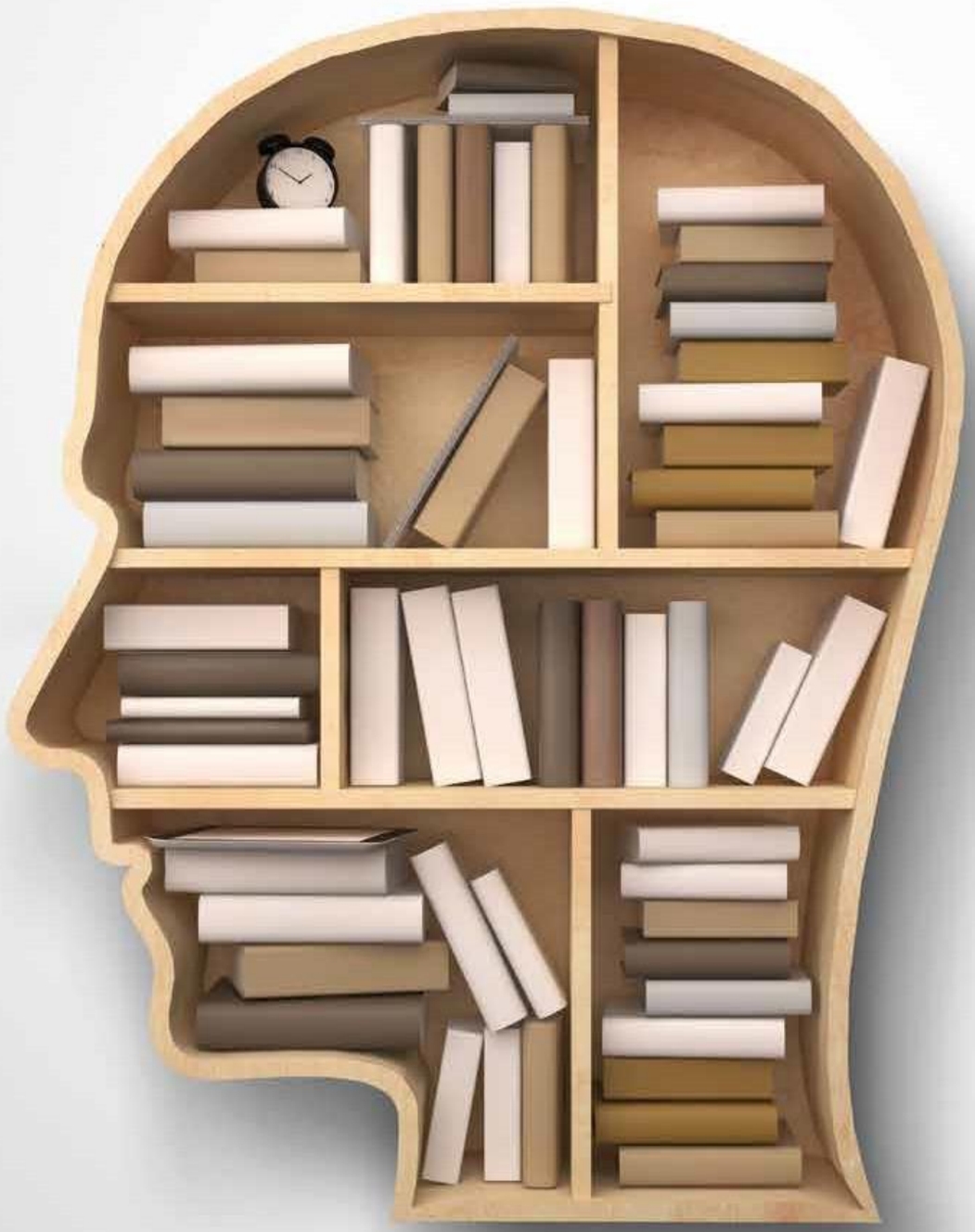
FM implementation of a brownfield Data Denter in Romania within 12 weeks.

“The contribution of the Data Centers / Critical Systems Center of Competence (CoC DC) team to setting up the Facility Management framework of the IBM Managed Services Data Center in Romania was essential. The CoC DC has helped the IBM Romania Business Continuity and Resiliency Services (BCRS) team to manage all the aspects of the FM services during all the phases of the project development, until the end of the transition phase. Punctual at each step of the process, inventive and very well organized. Apleona# is our business partner of choice for this type of service.“

Theodor Stanescu
IBM Romania

since February 2017 Apleona

Best practice Library



Best practice library

People

- Staffing, Induction and Training for Data Center
- Definition of responsiblities
- Organization of electrical engineering

Performance

- Monitoring Critical Alarms
- Legal requirements
- Risk Management
- Capacity load management
- Self Assessment and reviews
- Plant and emergency training
- Grab packs for critical systems
- Shift handover
- Access control

Processes

- Incident Management and Reporting
- Change Management
- Emergency Management
- Critical Documents
- Quality improvement cycle
- Data Center operation manual
- Critical works approval
- EOP, SOP, MoP
- Labeling of critical systems
- Working with subcontractors

Plant

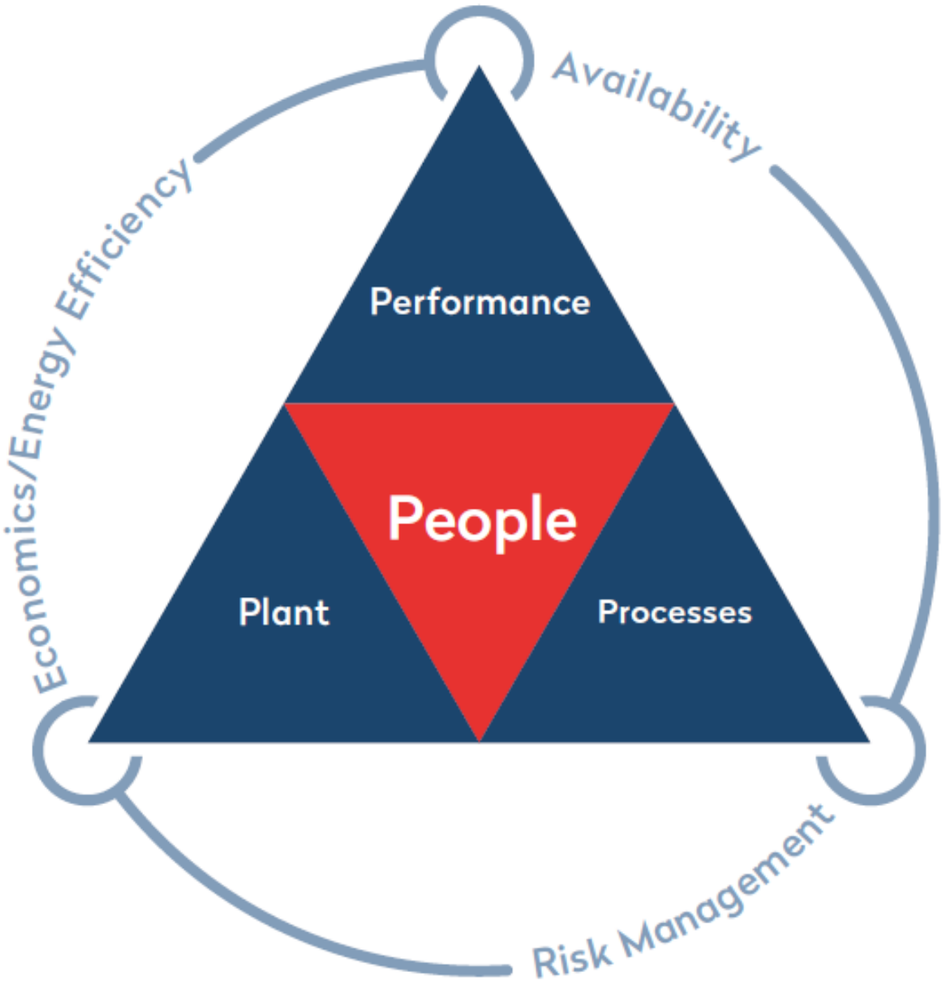
- Preventive Maintenance
- Critical Maintenance tracking
- Testing, commissioning and handover
- Weak point analysis
- Asset evaluation
- Plant checks
- Installation work in IT-rooms
- Data Center raised floor

Realising your Data Center potential

Promise

Ambition	Our engineers, their qualification and experience, a clear understanding of the plants, a suite of well-established processes and excellence performance are common understanding of our expectations.		
Values	We carry out innovative ideas and concepts to product maturity. WE CREATE STANDARDS	We are ambitious and constantly working on new products and concepts. WE DEVELOP	We bring ideas, concepts and market standards together. WE BUNDLE KNOWHOW
Mission	Delivering service excellence based on our 4P Critical Engineering Framework for managing Data Centers and Critical Environments.		

4P Critical Engineering Framework



Abbreviations

451Research	451 Research is a preeminent information technology research and advisory company
4P	4P Critical Engineering Framework
BCRS	IBM Business Continuity and Resiliency Services
CoC DC	Data Centers / Critical Systems Center of Competence
DC	Data Center
EOP	Emergency Operating Procedure
FMECA	Failure Mode, Effects and Criticality Analysis
GEFMA	German Facility Management Association
Grab Pack	Short description of a process
HQ	Headquarter
HVAC	Heating, Ventilation and Air Conditioning
ISO 14001	International Organization for Standardization – Environmental Management
ISO 50001	International Organization for Standardization – Energy Management
ISO 9001	International Organization for Standardization – Quality Management
IT	Information Technology
KPI	Key Performance Indicator
M&E	Mechanical and Electrical
MOP	Maintenance Operating Procedures
MTBF	Mean Time Between Failures
OHSAS 18001	Occupational Health and Safety Assessment Series
PPM	Planned Preventive Maintenance
RAM	Reliability, Availability, Maintainability
RESO	Real Estate Site Organization
R-IT	Raiffeisen IT
SOP	Standard Operating Procedures
UK	United Kingdom
UPS	Uninterruptible Power Supply

Realising your Data Center potential

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CoC Data Center & Critical Systems

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Realising Potential.