

# Data Centre Operations and Management

*Data Centre management is a pretty complex task and needs a multidisciplinary, highly skilled team to effectively & efficiently manage it. Larger the data centre the more complex is its management. Well planned operations, monitoring & management are critical to the success of Data Centre.*



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Data Centre Management covers a wide gamut of activities right from supporting delivery of services at agreed levels to providing continuity of services in case of any disaster. Providing scalability to existing applications in data centre to speedy launch of new applications by provisioning data centre resources on demand is another aspect of Data Centre Management. Higher availability requirements of services have also increased the density of Infrastructure in the data centre leading to huge energy costs. Reducing the recurring cost to an optimal level without affecting the service availability & continuity is another challenge in Data Centre.

Management of Data Centre essentially involves Delivery of Services at agreed levels of performance, Provision of DC Infrastructure on demand, Security Management, Optimization of resources, reducing the total cost of Operations, Disaster Recovery to Continuity of Services.

IT Infrastructure Management has become a discipline in itself. ITIL and similar practices recommend detailed procedure for IT infrastructure & service management. They prescribe a detailed methodology consisting of well defined processes right from service strategy formulation to its design, development, transition, operation to assessment & Improvement. Based on the size of data centre, range of services provided, Service levels, legal & constitutional requirements, one has to customize the procedures &

processes to best suit the scenario.

Availability is fundamental to the Data Centre Operations & Management. Availability of physical Infrastructure to Computing Infrastructure to Communication network & last but not the least Availability of Applications delivering the Services. Thus Availability management is a pretty complex task & larger the Data Centre (DC) the more complex it becomes.

## Availability Management

Availability Management aims at ensuring application systems are up and available for use as per the conditions of the Service Level Agreements. Availability management involves understanding the availability requirements of different applications, services hosted in the DC, work out an action plan to achieve the same, monitor it on regular basis. While planning for the availability, one also needs to factor in the maintenance obligations.

Availability of Data Centre services is based on availability of its components. Various factors which contribute to the availability of an IT component are its reliability, serviceability & maintainability. Higher availability requirements generally translate to higher investments in Infrastructure & higher operational costs. Availability requirements for Citizen services & Intra-government applications could be quite different. One needs to assess the requirements and work out an architecture which best suits the situation with optimal deployment of

resources. It is advisable to classify the DC Infrastructure in different levels based on availability such as Mission Critical, Critical, Not so Critical and accordingly monitor & manage them.

### Asset Management

Data centre asset management involves proactively monitoring and managing the uptime, health and connectivity of DC assets through their lifecycle right from its entry into the DC to commissioning, operation & maintenance to even exit from DC. While assets are usually synonymous with inventory, DC assets come with an extra layer of complications; they are dynamic in nature rather than static.

One generally thinks that Data Centre assets are the one which they can physically see, touch or hold such as storage, servers, routers, switches, racks & cables. These are only physical assets. Data Centres also have a whole lot of logical assets, which are equally important, if not more to the successful functioning of Data Centre. LAN, WAN connectivity, Internet access, layout of the space in the data center, Availability of uninterrupted power, cooling required to save the equipment from overheating constitute the logical assets of the data centre and should therefore be quantified and tracked.

DC asset management should make sure that all the physical and logical attributes within the data center are collected and monitored for availability. One is also needed to plan for regular maintenance as well as ad hoc outages. Make sure processes are understood and in place for such situations since ad hoc outages shall require a quick reaction from DC team.

### Change Management

Changes in the ICT infrastructure may arise reactively in response to problems or externally imposed requirements such as legislative changes, change in scope or performance level of a service or through proactive action as a result of regular monitoring & analysis of DC components/assets. The objective of Change Management is to ensure that standardized methods and procedures are used for efficient and prompt handling of all changes to controlled IT infrastructure, in order to minimize the number and impact of any related incidents upon service. Change Management would typically comprise the raising and recording of changes, assessing the impact, fixing the suitable schedule, working out the action plan, obtaining

necessary approvals, coordinating change implementation, monitoring and finally closing the change request. It is recommended that all the controlled assets of DC whether physical or logical should pass through change management. However one can define separate processes for routine & emergency changes to avoid unwanted delay in change implementation.

### Capacity Management

Capacity Management deals with management of resources in data centre in such a manner that they are available to users as and when they require. Capacity management deals with the availability of DC resources right from Rack Space, Power, Cooling to ICT resources such as Storage, Network Ports to Backup & DR capacities. Capacity management is generally carried out in a proactive manner rather than reactive. Data Centre manager has to constantly monitor & analyze the resource utilization. Based on past trends one can plan & upgrade the capacities of DC resources.

Data centre manager shall also interact with the users on regular basis to understand the forthcoming requirements for the services already hosted in data centre or proposed to be hosted in near future. Data Centre should facilitate & expedite the launch of ICT initiatives not the other way. One can also use the present utilization of resources & simulate the future loads to understand and estimate the future resource needs. Infrastructure sizing of applications to ensure required service levels is also an important aspect of Capacity Management.

### Security Management

Security Management in the Data Centre is one of critical & resource intensive activity. To begin with one needs to understand the security requirements, potential threats & vulnerabilities of the systems and work out a comprehensive security management plan comprising of Policies, Procedures & Processes addressing threats at various levels from physical access to cyber space. These shall be further translated in action plans including monitoring, analyzing, assessing & auditing of various assets. One needs to make arrangement for establishing a multi tier security infrastructure as well as position a team for monitoring it on 24x7 basis. Formulation of well defined policy and action plans to address any security incident is also an important aspect of Security management.

Security Management in DC is generally based on the ISO Code of practice for information security management also known as ISO 27001. The primary goal of information security is to guarantee safety of information. When protecting information, it is the value of the information that has to be protected. These values are stipulated by the confidentiality, integrity and availability.

Security Management in DC is addressed from two directions. One is the addressing the security requirements of individual services/ applications as per their service level agreements and other external requirements from underpinning contracts, legislation and associated internal or external policies. Other is towards maintaining base level of security across entire DC infrastructure. This is necessary to provide the baseline security assurance from DC services to all its users. This also makes the process of security management efficient as well as more effective.

### Service Continuity Management

Availability requirements of Services hosted out of Data Centre is generally quite high. Factors like failure of any component right from Servers, Storage, and Communication Infrastructure to even Power & Cooling can bring disruption of services in Data Centre. At the extreme any natural or manmade disaster such as earthquake, flood, and fire could bring down the entire services of data centre. Scheduled & Preventive maintenance, upgrade of firmware on hardware components & patches, service packs at software levels are other factors which could trigger the discontinuity of services. Such situations are quite common with any DC. Therefore to provide services at desired level & avoid any discontinuity of Services, one is needed to understand the availability requirements and work out Service Continuity Plans.

Disaster Recovery, Continuity of Services is generally achieved at a significant cost, whether one sets up a Disaster Recovery Centre in house or outsources to another DC. Moreover these costs are recurring in nature. One has to incur it, year after year even if there was no disaster during that period. Therefore it is essential to make an informed judgment, understanding all aspects and formulate an optimal Service Continuity

Plan. Most of these decisions shall be governed by the criticality of the service under consideration. Different Services in the Same DC may have different Service Continuity Plans.

### Service Desk

Service Desk acts as a Single Point of Contact to meet the communications needs of both Users and IT Service Providers for any issue concerning Data Centre & its services. Any event which is not part of the standard operation of a service and which causes, or may cause, an interruption to, or a reduction in, the quality of that services is classified as an incident. The Service Desk handles incidents and service requests right from their detection, registration, classification, investigation, diagnosis to resolution & closure. Service Desk runs on 24x7 basis and is responsible for all the incidents & service requests till their resolution & closure.

Fundamental objective of Service Desk is to facilitate the restoration of normal operation of a service with minimal impact. Therefore, Incidents that cannot be resolved quickly by the Service desk shall be assigned to specialist Technical Support groups. Communication between the users & IT operations teams is one the fundamental tenet to the success of DC operations. Service desk supports all the communication between IT teams & users right from routine service request, incident management, change management to scheduled maintenance as well as ad hoc outages.

***Highly skilled & experienced multidisciplinary team is the key to successful Operations & Management of a Data Centre. Regular Monitoring, Analysis, Recording & reporting is one of the important functions of Data centre. This not only helps in taking proactive actions in most of the cases to prevent the failure of any DC component, history of past events also make diagnosis & resolution of error situations much faster & simpler. For a small size Data Centre one can manage using excel sheets, however if the Data Centre is large, it is advisable to use software tools. Lot of such tools are available in commercial as well as open source domain. Besides regular monitoring, recording & reporting these tools can also facilitate automated discovery of Assets, their Configuration, Event simulation, modeling as well as correlation.*** 