Managing Data Centers

MANAGEMENT TOOLS · MONITORING · SDDC · CHANGE MANAGEMENT · 7 Rs · DECOMMISSIONING

STUDY & REVIEW

01 MUST KNOW

if you remember five things, remember these

01 **Active vs. passive:** a data center is built from **active components** that take part *directly* in operations (network and networking equipment, servers, computers, storage, security, management software, and the **NOC**) and **passive components** that *support* the active ones (facility, site, power, cooling, cabling, physical security, racks, UPS, fire protection, energy production, environment control).

02 **Managers minimize downtime:** data center managers **perform maintenance on all infrastructure**, **prepare floor plans and schematic diagrams**, **use management tools to minimize downtime**, and **act immediately on the alerts and data** the tools produce — monitoring everything from the whole floor to a single outlet on an intelligent power distribution unit (PDU).

03 **SDDC = software-run:** a **software-defined data center** is a data center *fully automated by software* — also called a *virtual data center* — where all hardware, networking, storage, CPU, and memory are delivered **as a service through virtualization**. Benefits: eliminates hardware dependency, simplifies management, adds automation and AI, and enables **proactive** (not reactive) monitoring.

04 **The 7 Rs:** before any change, answer **Raised by · Reason for · Returns · Risks · Resources · Responsibility · Relationships** to build the change management plan. They identify the initiator, purpose, benefit, risks and mitigation, resources and training, the responsible team, and interdependencies.

05 **Decommissioning is harder than building:** replacing or retiring old servers is a **regular IT activity**, but it is *more complicated than building* a data center because of **business-disruption risk** and the sensitive, confidential data involved. It requires professional handling and a formal **decommission plan**.

02 KEY TERMS

TERM	DEFINITION
Active components	Components that take part directly in data center operations — network and networking equipment, servers, computers, storage, security, management software, and the NOC
Passive components	Components that support the active ones — facility, site, power, cooling, cabling, physical security, racks, computing hardware, UPS, fire protection, energy production, environment control
Network operations center (NOC)	First line of support for active components, along with the service desk, incident management, and problem management
Monitoring software	Software that remotely observes the performance of IP-based devices, network services, switches, bandwidth, routers, storage, servers, power, cooling, and IT devices such as CCTV and biometrics
Electrical power management system (EPMS)	Monitors and manages electrical systems for uninterrupted operations and supplies detailed power-quality data to optimize energy use
Building management system (BMS)	Monitors heating and ventilation, plus lighting, security, fire safety, plumbing, and water systems; can flag electrical issues via basic alarm and control
IT service management (ITSM)	A ticketing system with workflows that tracks IT assets and configuration and manages incidents, problems, and changes
Software-defined data center (SDDC)	A data center fully automated by software — a virtual data center where hardware, networking, storage, CPU, and memory are delivered as a service through virtualization
Change management	A systematic approach for transition, transformation, and safety precautions that implements strategies to manage changes involving people, processes, and technologies

TERM	DEFINITION
7 Rs of change management	Raised by, Reason for, Returns, Risks, Resources, Responsibility, and Relationships — the questions answered to build an effective change management plan
Network-critical physical infrastructure (NCPI)	The framework whose three important components are power, cooling, and security
Decommissioning	Replacing or retiring old servers, or removing them from service — a regular IT activity that requires a formal plan

03 DATA CENTER COMPONENTS

role in operations, not power state, is the divider

ACTIVE COMPONENTS

take part directly in operations

- Network and networking equipment (routers, switches)
- Servers and computers
- Storage (SAN, backups, tape storage)
- Security (firewalls)
- Data center management software and applications
- Network operations center (NOC) — first line of support

PASSIVE COMPONENTS

support the active components

- Facility, site, power, cooling
- Cabling system
- Physical security (biometric, access card, iris, palm)
- Racks and computing hardware
- UPS and fire protection
- Energy production (generator), environment control

04 DATA CENTER MANAGEMENT TOOLS

pick the right tool for the purpose

TOOL	WHAT IT MONITORS OR MANAGES
EPMS — electrical power management	Electrical systems for uninterrupted operations; detailed power-quality data to optimize energy use and cut consumption
BMS — building management	Heating and ventilation, lighting, security, fire safety, plumbing, and water; basic alarm and control for electrical issues
Server monitoring	Server performance — CPU usage, memory allocation, and more — to find and fix server issues before they cause downtime
Network monitoring	Networking components (routers, switches, firewalls) for faults and performance; collects uptime and bandwidth data
Storage monitoring	Storage performance, to analyze and resolve issues fast — critical for virtualization and big data workloads
ITSM — IT service management	Ticketing system with workflows: tracks IT assets and configuration; manages incidents, problems, and changes

05 THE 7 RS OF CHANGE MANAGEMENT

answer all seven to build the plan

R	QUESTION IT ANSWERS	IDENTIFIES
Raised by	Who has raised the change?	The initiator
Reason for	What is the reason for the change?	The purpose
Returns	What return or improvement is expected?	The benefit
Risks	What are the risks and the mitigation plan?	Risks and mitigation plans
Resources	What resources or skill sets are required?	Team, skill sets, training needs
Responsibility	Who creates, tests, and implements it?	Team and change ambassadors
Relationships	How does it relate to other changes?	Interdependencies

06 STEPS TO DECOMMISSION A DATA CENTER

operational sequence

01 Finalize an updated **asset map** → **02** Run **tests and simulations** → **03** Create a comprehensive **backup** → **04** **Disconnect** all equipment → **05** **Verify** the documentation → **06** **Disposal**

07 EXAM TRAPS

where the knowledge check gets you

- × "Active vs. passive is about whether a component is powered on." — No. It is about *role*: active components take part **directly** in operations (servers, network, storage, security, NOC); passive components **support** the active ones (facility, power, cooling, cabling, racks, UPS).
- × "The NOC supports passive components." — The **network operations center** is the first line of support for **active** components, along with the service desk, incident management, and problem management.
- × "An SDDC is just a data center with good monitoring software." — An SDDC is *fully automated by software* — a virtual data center where hardware, networking, storage, CPU, and memory are delivered **as a service through virtualization**, not merely watched.
- × "SDDC monitoring is reactive, like legacy tools." — The SDDC turns the **reactive** monitoring of legacy management tools into a **proactive** approach.
- × "Changes should happen only when decommissioning legacy hardware and software." — Changes are **inevitable** and can be required in systems, equipment, process, **or personnel**; every one must be managed to avoid downtime.
- × "Reply, Restore, and Recovery are part of the 7 Rs." — They are not. The seven are **Raised by, Reason for, Returns, Risks, Resources, Responsibility, Relationships**.
- × "For the change team, completing the job faster beats accuracy." — **Accuracy** matters more, because the change must integrate seamlessly. Look for commitment, communication, collaboration, and problem-solving and prioritization skills.
- × "Decommissioning is simpler than building a data center." — It is **more complicated**, because of the risk of business disruption and the sensitive, confidential data involved; it demands professional handling and a decommission plan.

08 SELF-QUIZ

answers are upside-down below

Q1 A data center's components fall into two categories — name them and state what separates them.

Q2 Which function is the first line of support for active components, together with the service desk, incident management, and problem management?

Q3 Name three responsibilities of a data center manager.

Q4 Which management tool is a ticketing system with workflows for tracking IT assets and configuration and managing incidents, problems, and changes?

Q5 Which tool monitors heating and ventilation as well as lighting, security, fire safety, plumbing, and water systems?

Q6 By what other name is a software-defined data center known?

Q7 List the 7 Rs of change management.

Q8 In the 7 Rs, which R identifies the interdependencies between a proposed change and other changes?

Q9 Power, cooling, and security are the three components of which framework?

Q10 State, in order, the five major steps of the decommissioning process.

ANSWER KEY (rotate the page)

Q1 Active (take part directly in operations) and passive (support the active components). **Q2** The network operations center (NOC). **Q3** Any three: perform maintenance on all infrastructure; prepare floor plans and schematic diagrams; use tools to minimize downtime; act immediately on alerts and data. **Q4** IT service management (ITSM). **Q5** The building management system (BMS). **Q6** A virtual data center. **Q7** Raised by, Reason for, Returns, Risks, Resources, Responsibility, Relationships. **Q8** Relationships. **Q9** Network-critical physical infrastructure (NCPI). **Q10** Establish a migration plan → perform migration activities → establish a decommission plan → decommission the old system → perform a post-decommissioning review.