

Storage Technologies

IT403

Prepared by
Dr. Ahmed El-Douh

Lecture 8



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Business Continuity and Storage Backup technologies

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Objectives

Upon completion of this module, you will be able to:

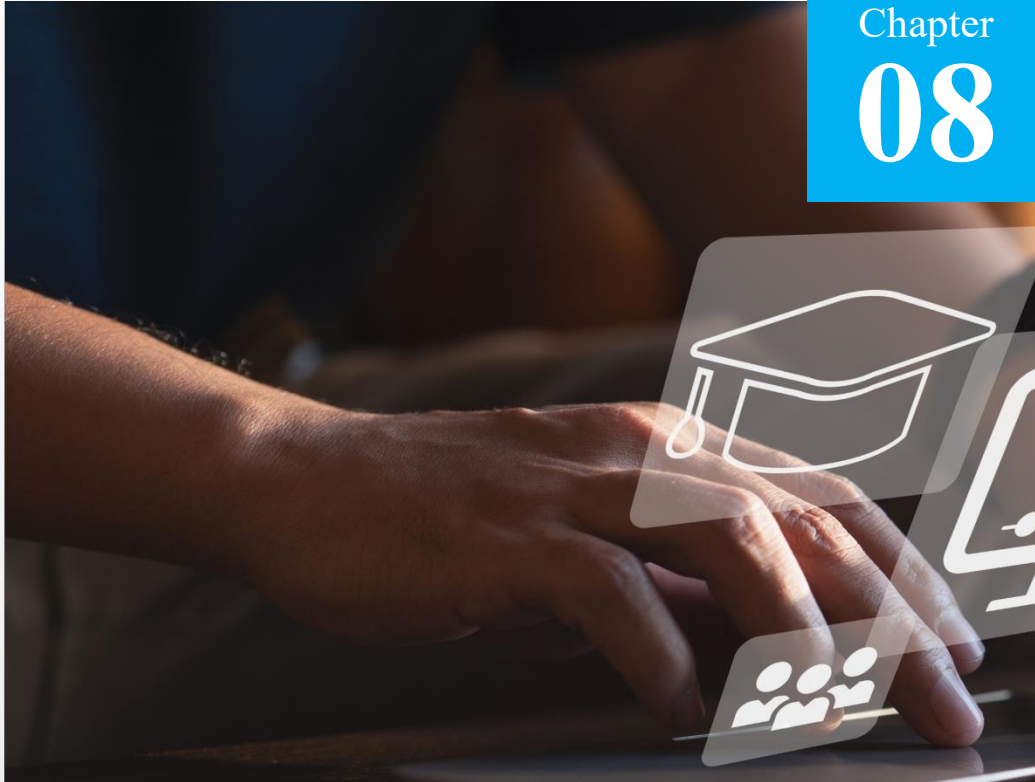
- Understand the importance and challenges of Business Continuity.
- Understand the definition, standards, and the cost–risk relationship.
- Know the common Business Continuity solutions, including Backup vs Disaster Recovery.
- Understand Huawei Business Continuity and Storage Backup technologies in Datacenters.

Outlines

- Challenges of Business Continuity.
- Definition of Business Continuity.
- Overview of Business Continuity Solutions.
- Overview Of Backup Solutions.
- Architecture Of Backup Solutions.
- Common Backup Networks.
- Common Backup Technologies.

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Challenges of Business Continuity



Unpredictable Natural Disasters and Man Made Disasters

Natural Disasters



Flood



Earthquake



Mudflow



Typhoon

Man Made Disasters



Terrorist Attacks



Intentional Destruction



War

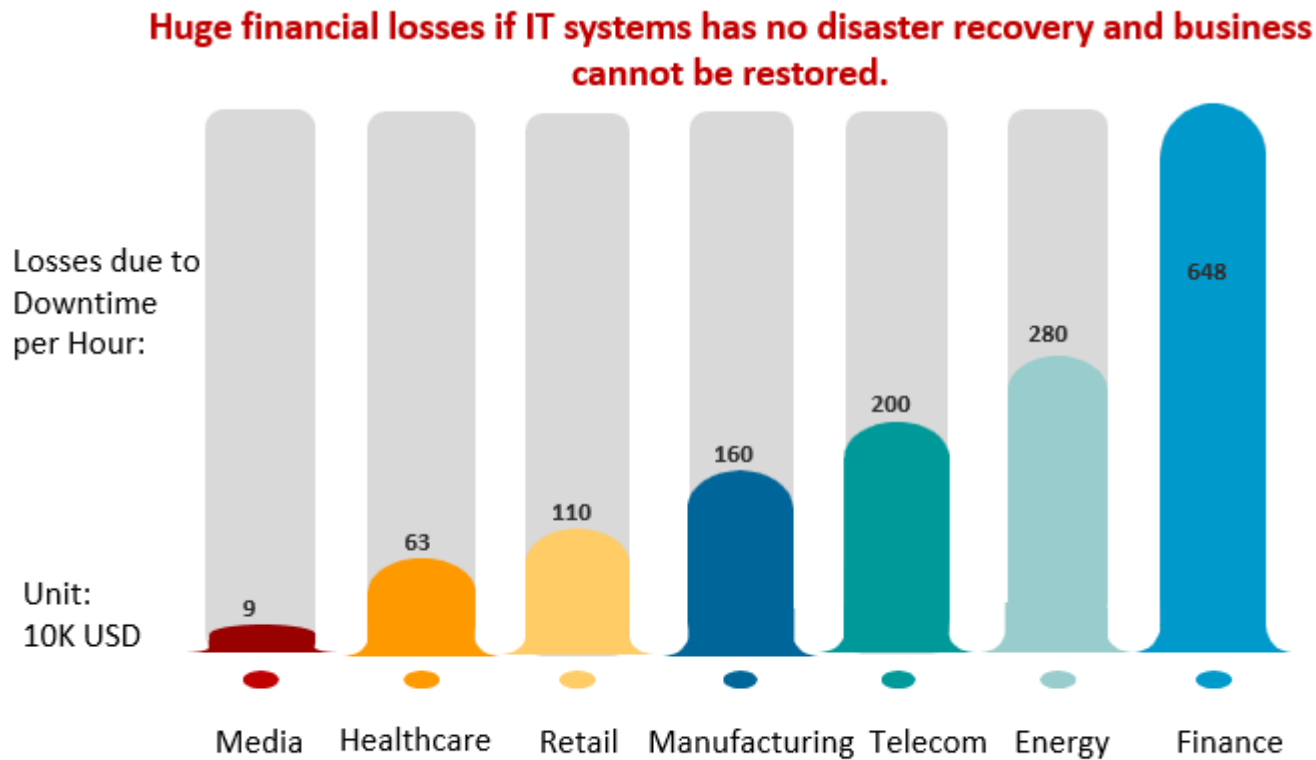


Fire

**Unpredictable
Unavoidable**

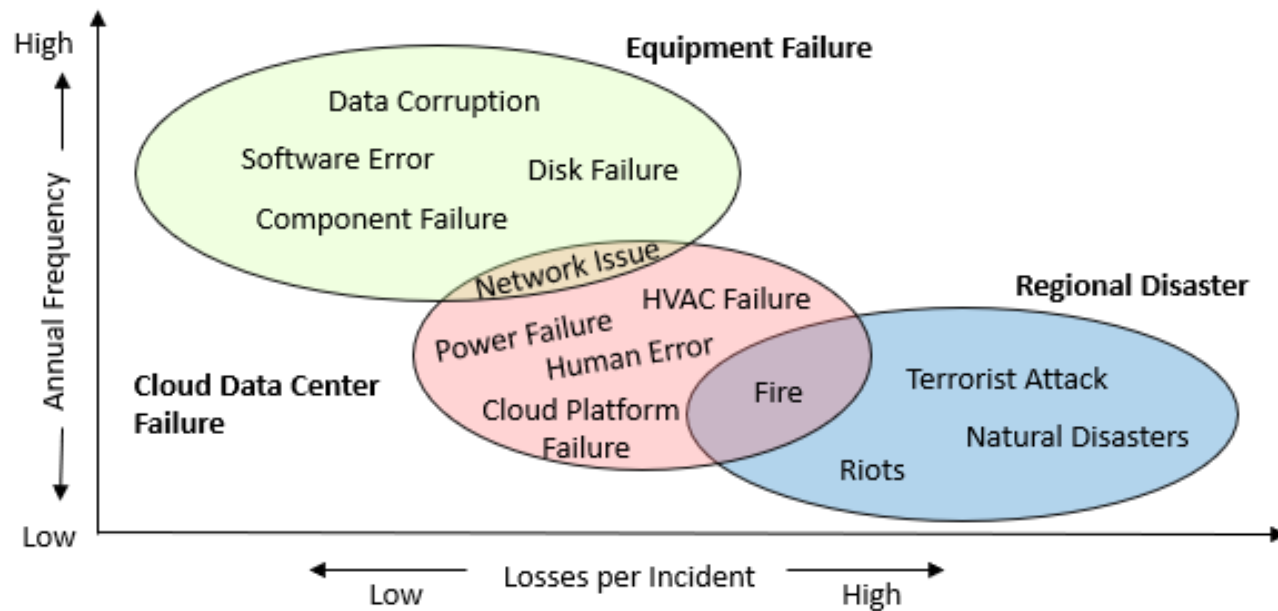
- Disasters are unpredictable, the best protection is to have a good plan when disaster strikes!

Why We Need Business Continuity and Disaster Recovery?



Source : Network Computing, the Meta Group and Contingency Planning Research

Types of Incidents That Affects Business Continuity of IT Systems

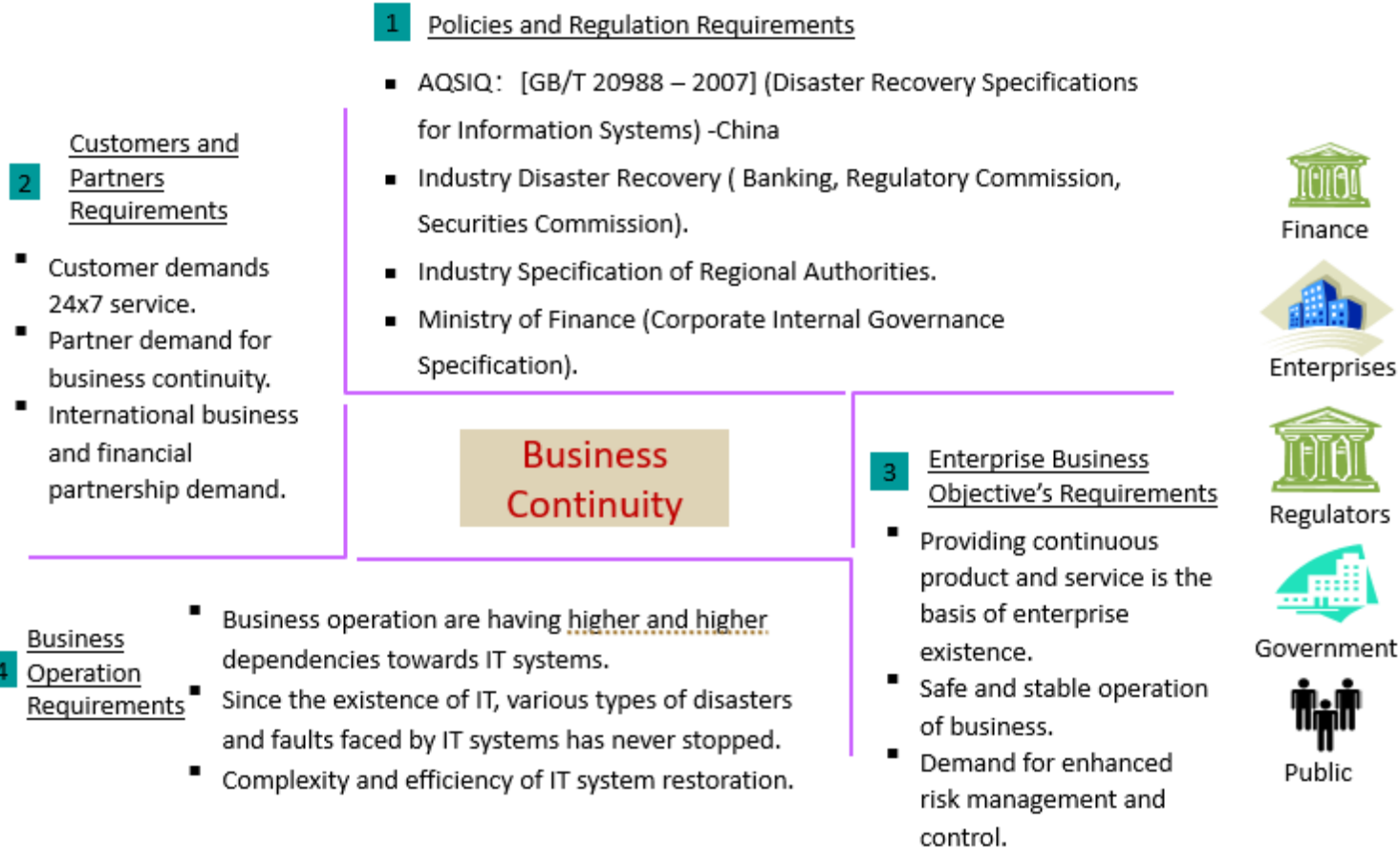


Statistics shows:

- 97% of local failures will lead to interruption of business of the enterprise.
- 3% of global failures will cause enterprise data loss, may even lead to the demise of the enterprise.

- How to effectively face the challenges of faults and disasters towards business continuity--- Building a Cloud Disaster Recovery System.

Requirements of Business Continuity



Challenges Faced By Business Continuity and Disaster Recovery (1)

Complexity of Business



Business Is Always Online



How to solve the complexity of business and ensure that the business is online 24x7?

- How to maximize business continuity and ensuring zero interruption and zero data loss?
- How to minimize the impact towards business production and ensure consistent business experience?
- How to ensure the consistencies and integrity of data in complex businesses?

Traditional DR model has high investment and low utilization rate, so how to improve the input and output ratio?

- DR devices has low utilization rate, how to increase the input output ratio?
- How to better utilize and share the resources within DR center and lower the TCO?
- How to effectively utilize the DR data to gain value?

Challenges Faced By Business Continuity and Disaster Recovery (2)

Complexity of Business



Business Is Always
Online

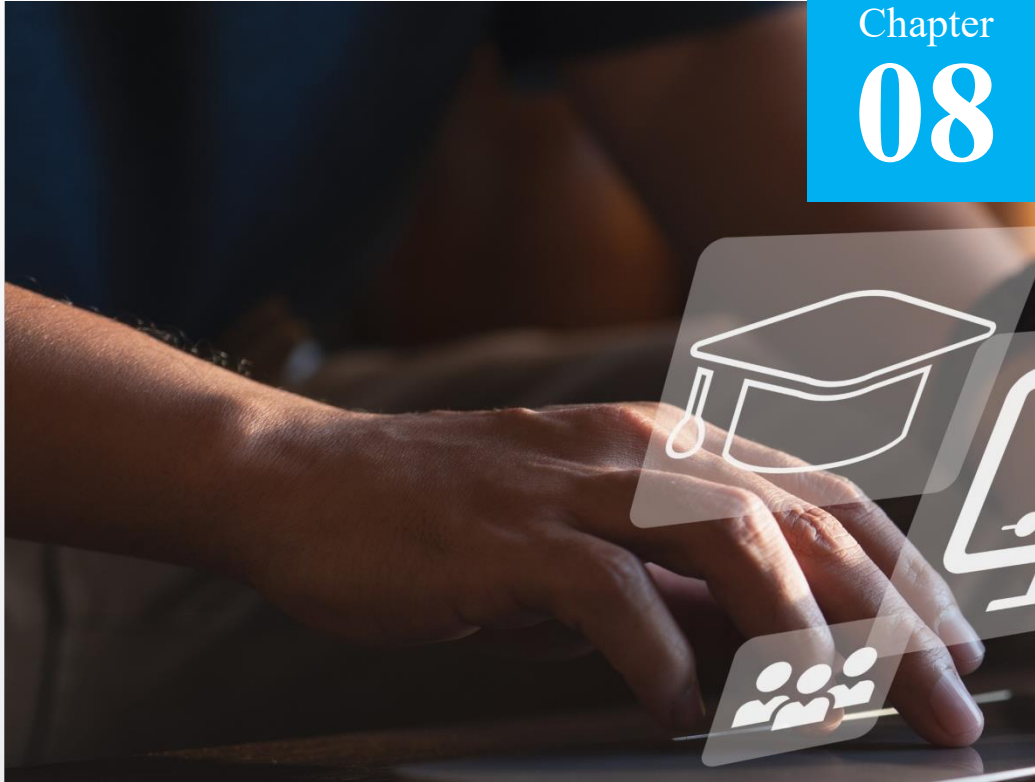


How to simplify the DR system building, wide management areas, and high difficulties of DR ?

- How to effectively complete DR operations with limited manpower to ensure enterprise business continuity?
- How to simplify, and complete the building of DR system that meet the requirements quickly when it consist of a series of steps such as business analysis, risk analysis, solution design, implementation, walkthroughs and process flows.

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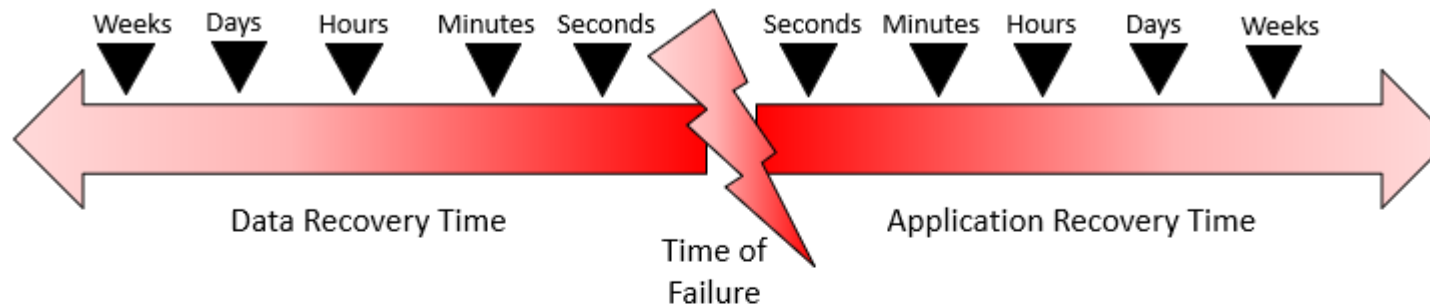
Definition of Business Continuity



What is Business Continuity?

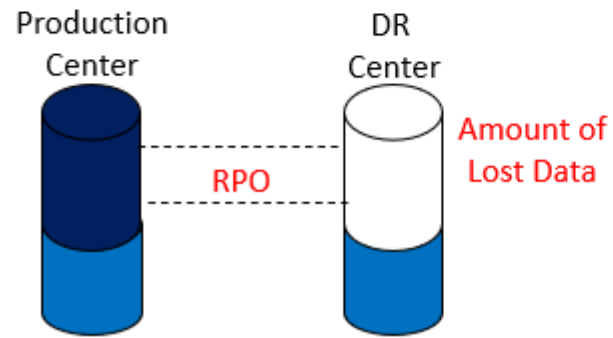
- Business Continuity refers that the enterprise has the capabilities to face risks, has automatic adjustments and quick response in the events of risks to ensure the continuous operations of the enterprise business.
- There are 3 aspects should be covered when business continuity is provided towards important applications and processes within the enterprise:
 - **High Availability:** Refers to capabilities to provide continuous access in the events of local failures no matter if it is a failure in business flows, physical infrastructure or IT software or hardware faults.
 - **Continuous Operation:** Refers to capabilities to ensure continual operation when there is no equipment failures. Customers does not prefer to stop operations just because of the system is undergoing normal backups or maintenance works.
 - **Disaster Recovery:** Refers to the capabilities to restore data in another location in the event of a disaster that destroys the production center.
 - At the same time, all three of the aspects mentioned above are not isolated but instead are interconnected and interrelated.

Key Indicators To Measure Disaster Recovery Systems: RTO and RPO



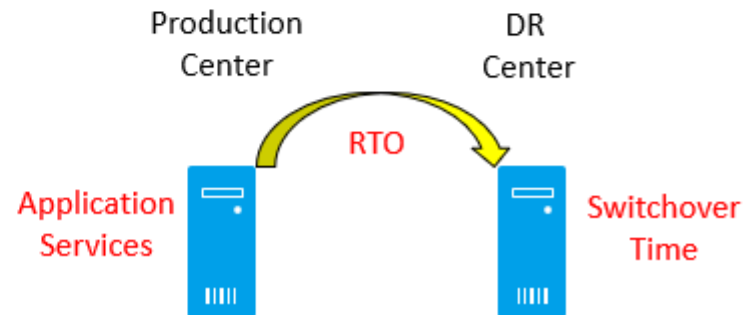
- **Recovery Point Objective (RPO)**

- Focuses on data.
- Tolerates a certain amount of data loss.



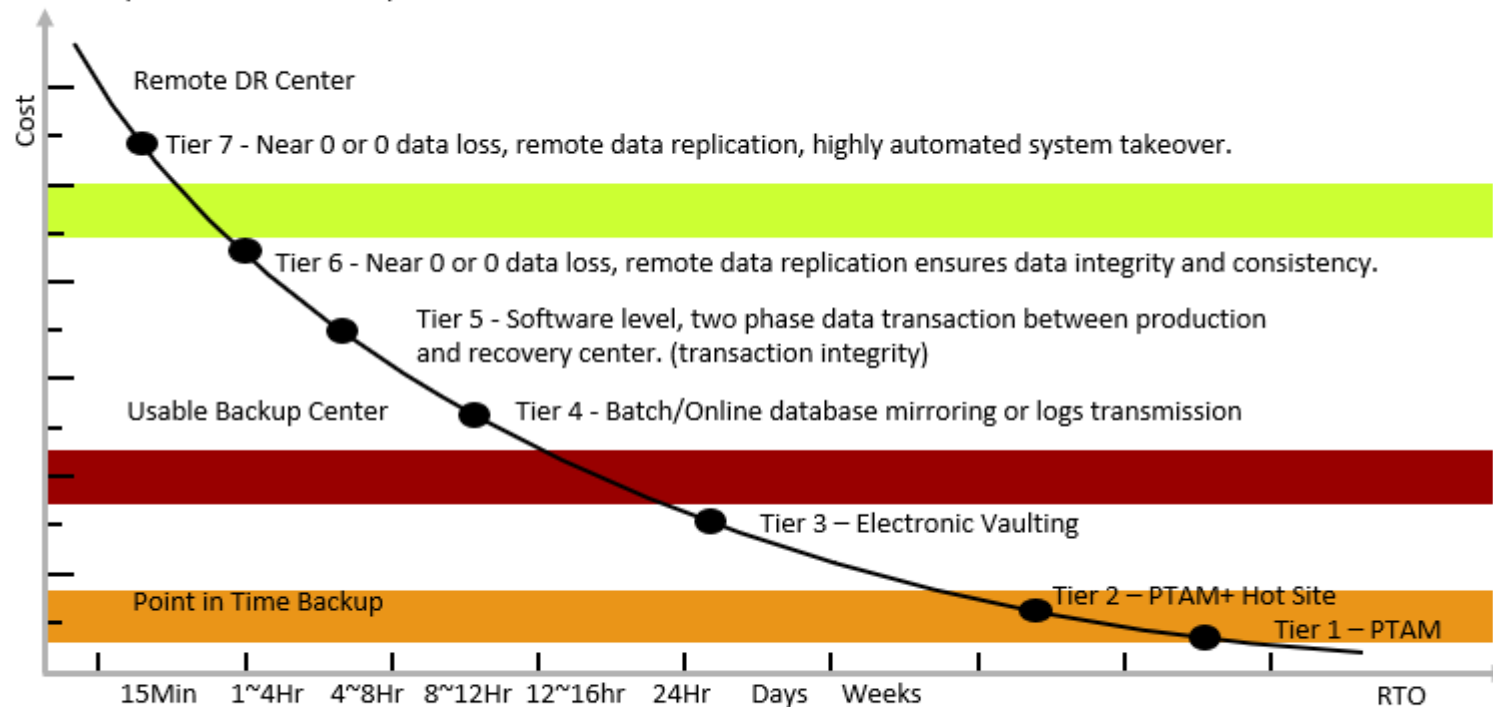
- **Recovery Time Objective (RTO)**

- Focuses on application.
- Tolerates a certain amount of application recovery time.



International Standards For Business Continuity System

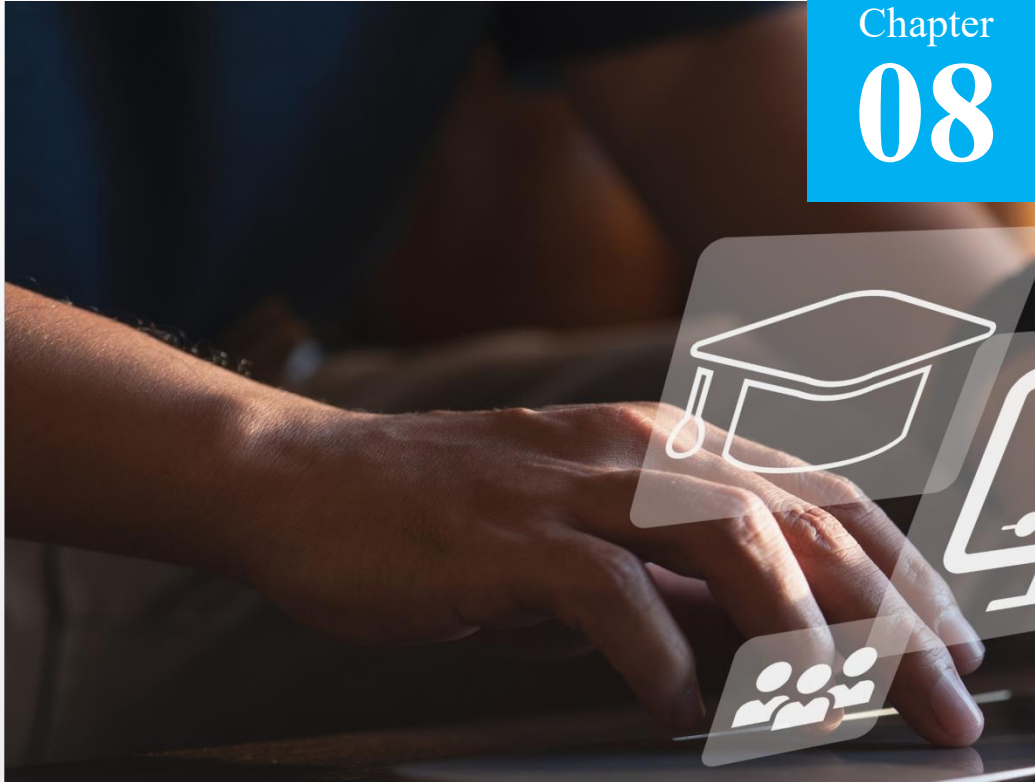
Based on SHARE 78 international organization standards, there are 7 tier of business continuity and disaster recovery level:.



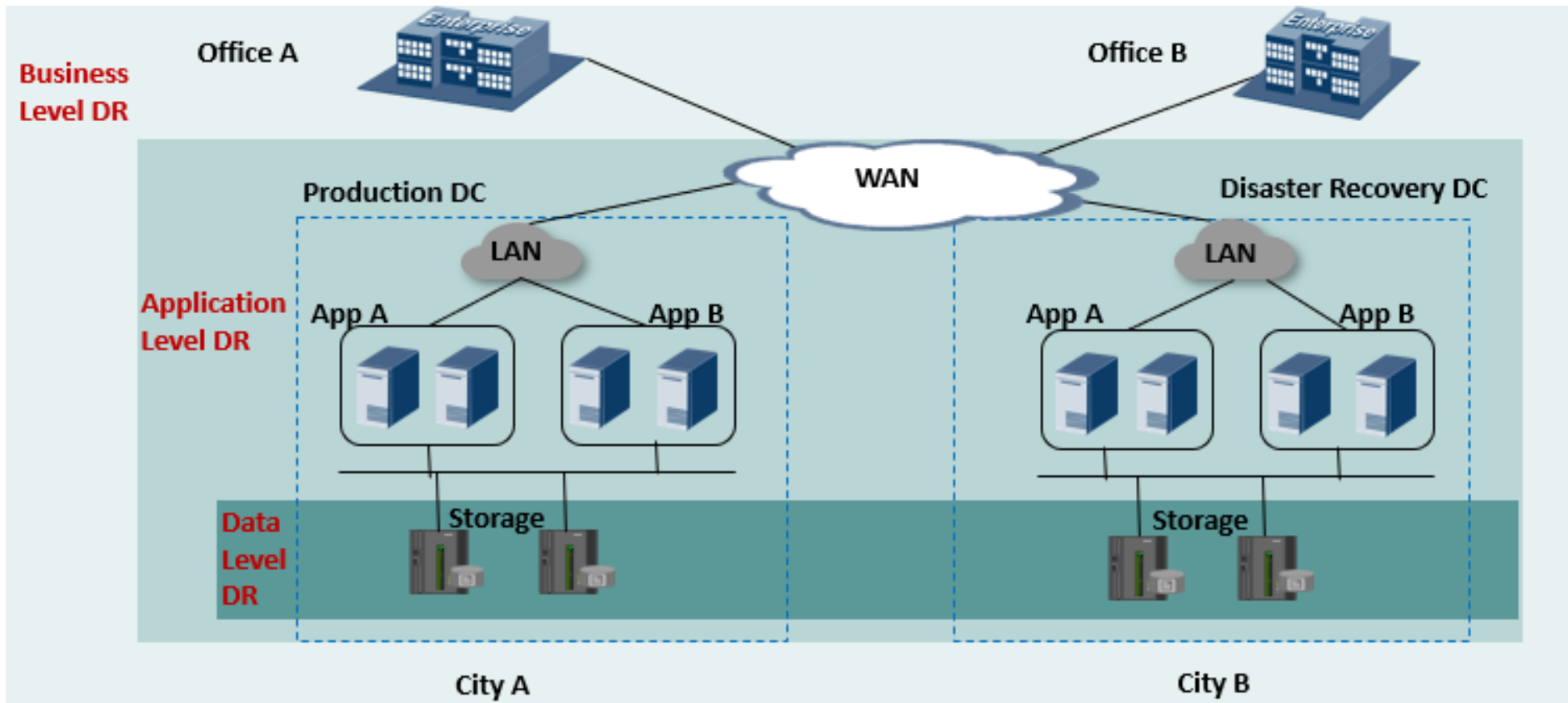
- For enterprises, the higher the requirements (RTO, RPO) for handling risks, the cost invested for business continuity solution will be higher, currently most of the enterprises are heavily invested at Tier 4 – Tier 6 level.

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Overview of Business Continuity Solutions



DR Classification Based on DR Effect

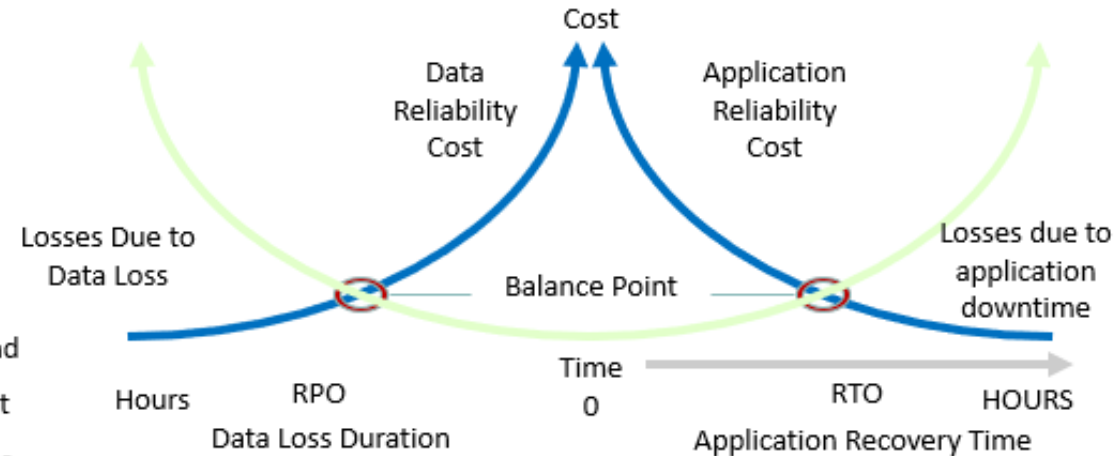


Main Challenges of Building A DR System

Investor Level



- How to balance the investment and the output? How many investment capital needed? What model of the DR built is suitable for our enterprise?

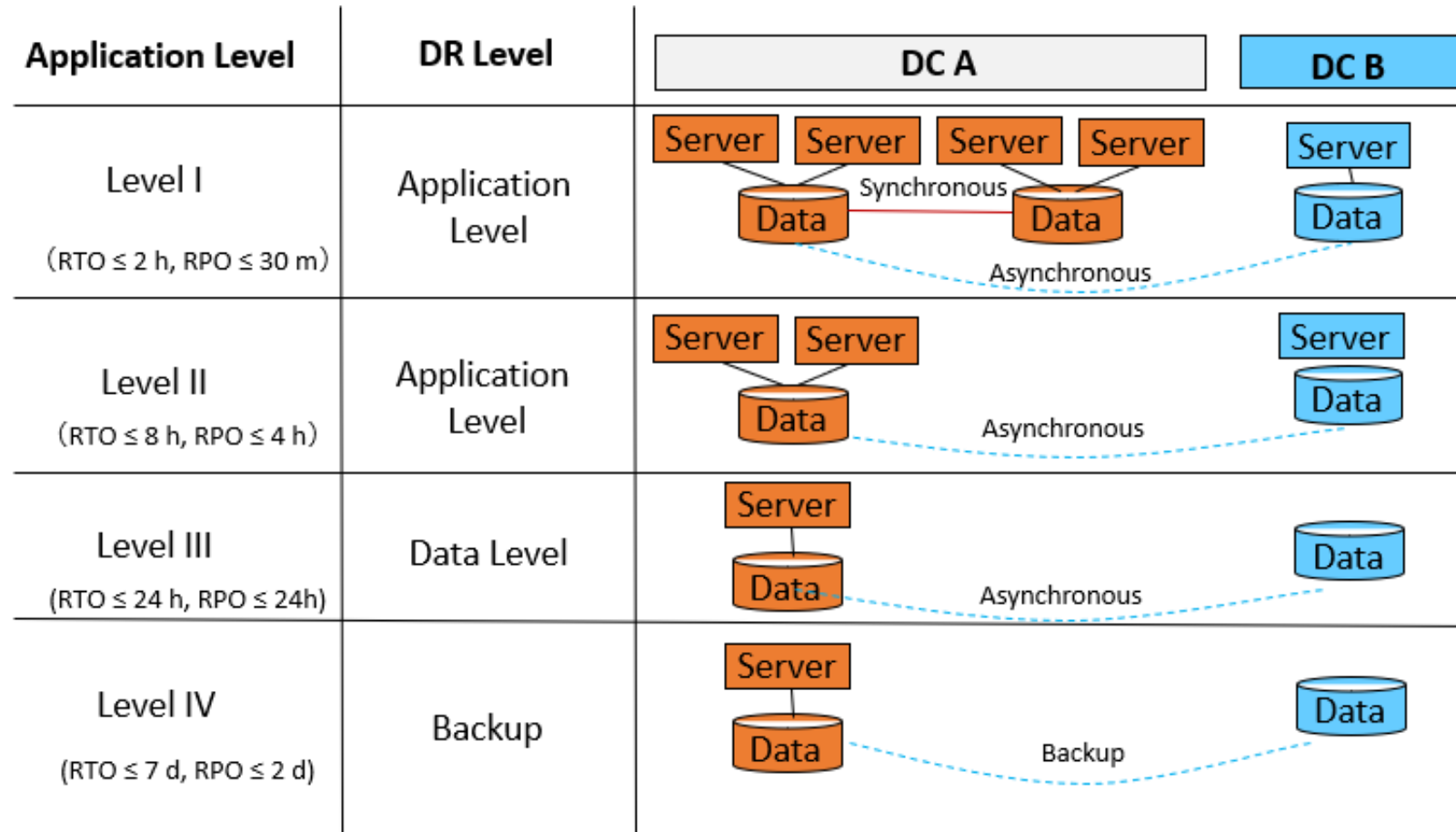


- What technological solution needed to achieve it?
- How to manage and maintain the DR system that consist of servers, network, storage devices, complicated systems, and variety of DR services?



Technical Level

DR Solution Architecture



Continuous Improvement Method for DR Construction



Huawei Integrated End-to-End DR Service

Best Investment



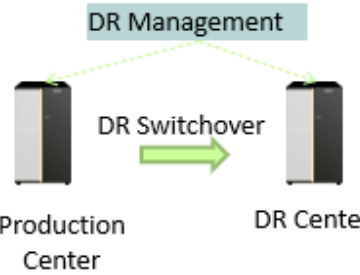
Business Driven Plan:
Reasonable DR strategy based on Huawei Telecom Industry Model Business Impact Analysis (BIA).

Protects Current Investments



Integration of Multi Vendors:
Based on Huawei multi vendor integration capabilities, DR design is compatible with current devices which protects current investments.

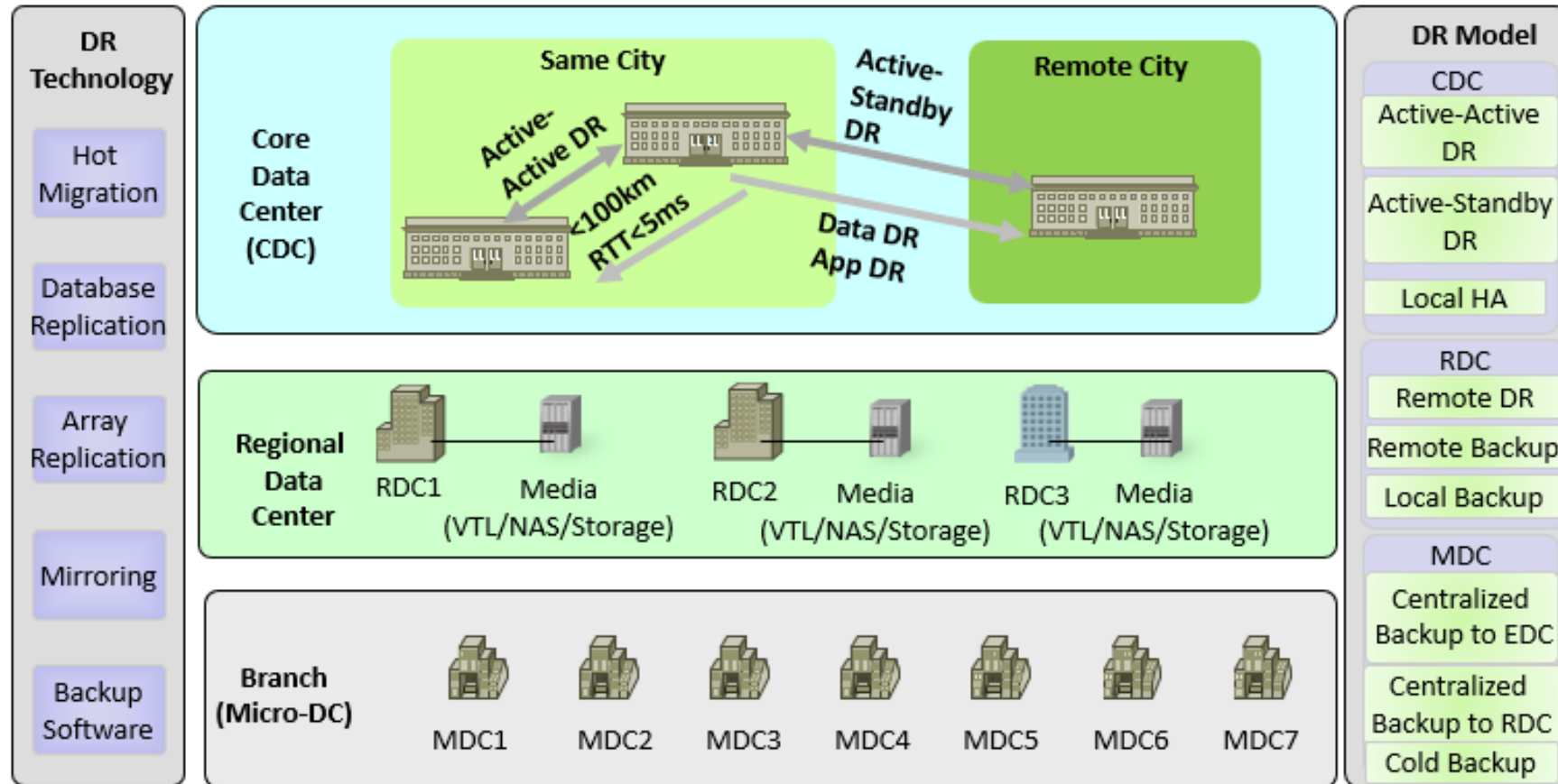
Simplified O&M



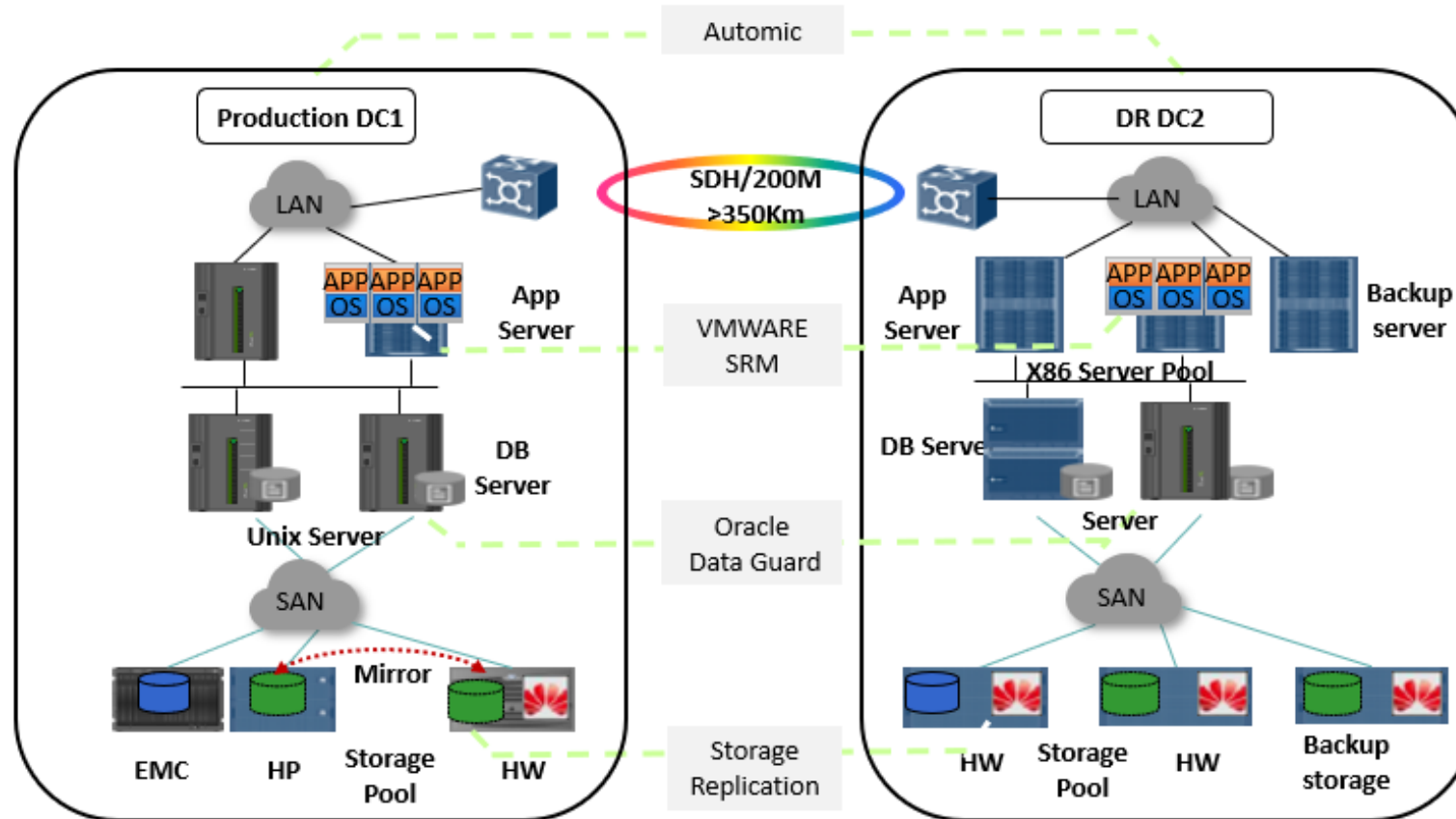
One Click Auto DR Switchover:
DRM based on Huawei script library, provides visual one click DR switchover.

Advisory	Design and Integration			O&M
BIA	DR Management (DRM)		Disaster Recovery Plan (DRP)	DR Drill Practice
Usability Assessments	DR Technological Solution Design	App Recovery Strategy		
		Infra Recovery Strategy		

Panorama Of Huawei Integrated DR Solution

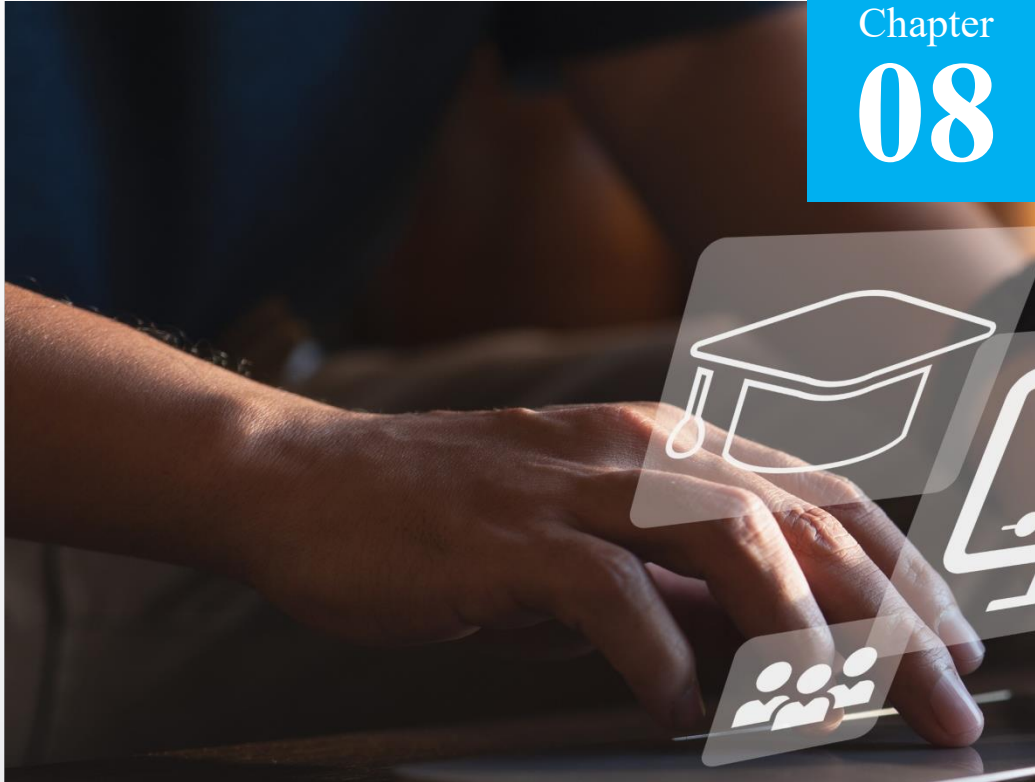


Application Case: Industry Best Practice Combined Multivendor Solution



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Overview Of Backup Solutions



Why Do We Need Backup ?

Data is the lifeline of the business, but risks that threatens the safety of data is everywhere.

Laws and regulations has strict requirements on data protections.

Human Error



System/Hardware Failure



Virus/ Hackers



Natural Disaster

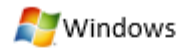


Data backup need to viewed as the basic infrastructure of IT systems. Backups should be done daily and it needs to be done in a way that the data backup is consistent and reliable.

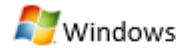
Challenges Faced By Backups: Variety of Data Types

Variety of File System, Operating System and Email System.

File System



Operating System



Email



Many Types of Database to Protect.

Database



SQL Server



Virtualization and Cloud Platform.

Virtualization



Hyper-V



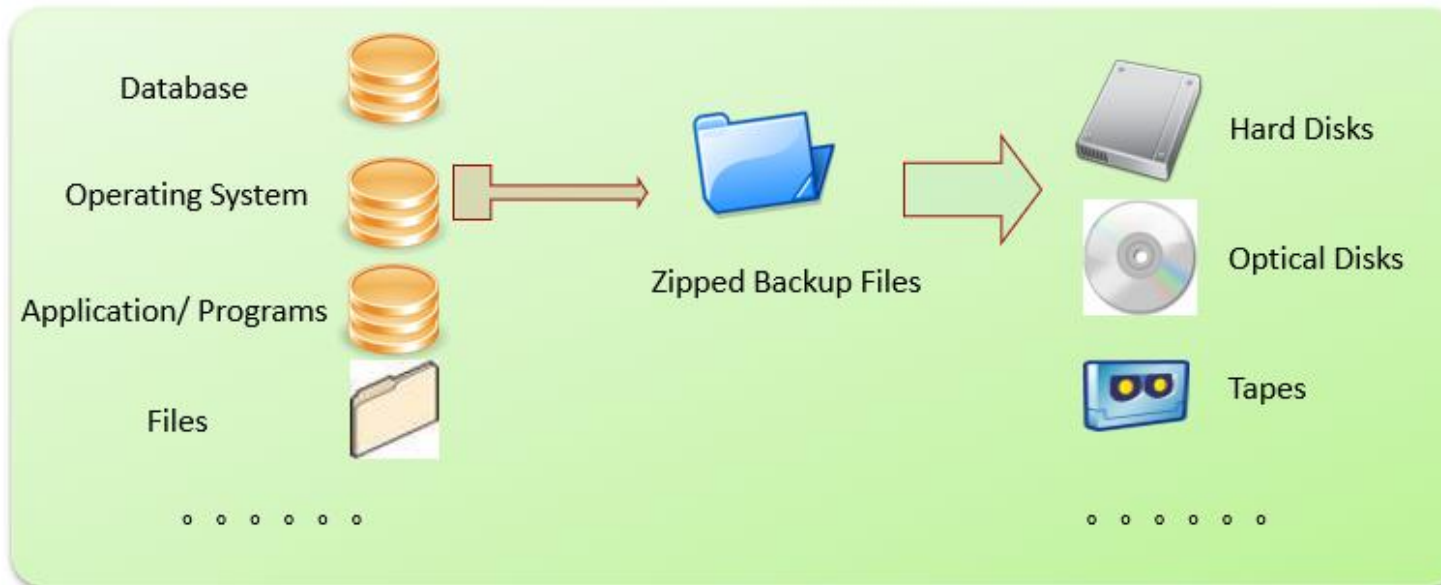
Cloud



- Variety of data types makes backup management complex!
- How to effectively manage the backups of various types of data?

What is Backup ?

- **Backup:** Refers to the replication of data within the file system or database systems. In the event of disaster or wrong operation, can quickly and easily restore the valid data and resume normal operations.



Backup VS Disaster Recovery

Backup	Disaster Recovery
• Solves the recovery problem of lost data. • Solves the recovery problem of corrupted data. • Solves the recovery problem of historical data. • Unable to takeover services directly.	• Unable to solve the recovery problem of lost data. • Unable to solve the recovery problem of corrupted data. • Can restore services to a nearer operating time point that is in good condition. • Can directly takeover services.



Backup focuses on the recoverability of data, while disaster recovery focuses on business continuity.

Backup VS Archiving

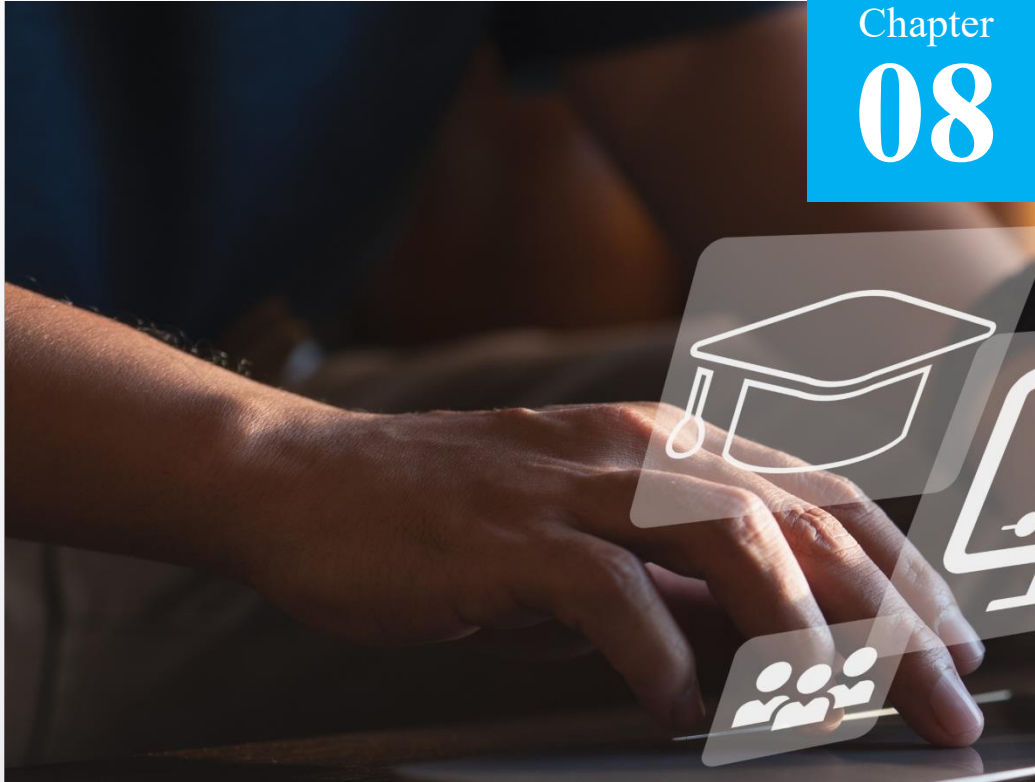
Backup	Archiving
• It is used to recover the faulty systems and data due to data corruption or data loss. • Fulfills the needs of Service Level Agreement(SLA), RTO and RPO. • Serves as the second copy of data, and the original data still resides at the original location.	• It is used to store information for a long period of time. • Fulfills the requirement of laws and regulation, and enterprise efficiency. • Only retains the copies of the data, and the original data is deleted.



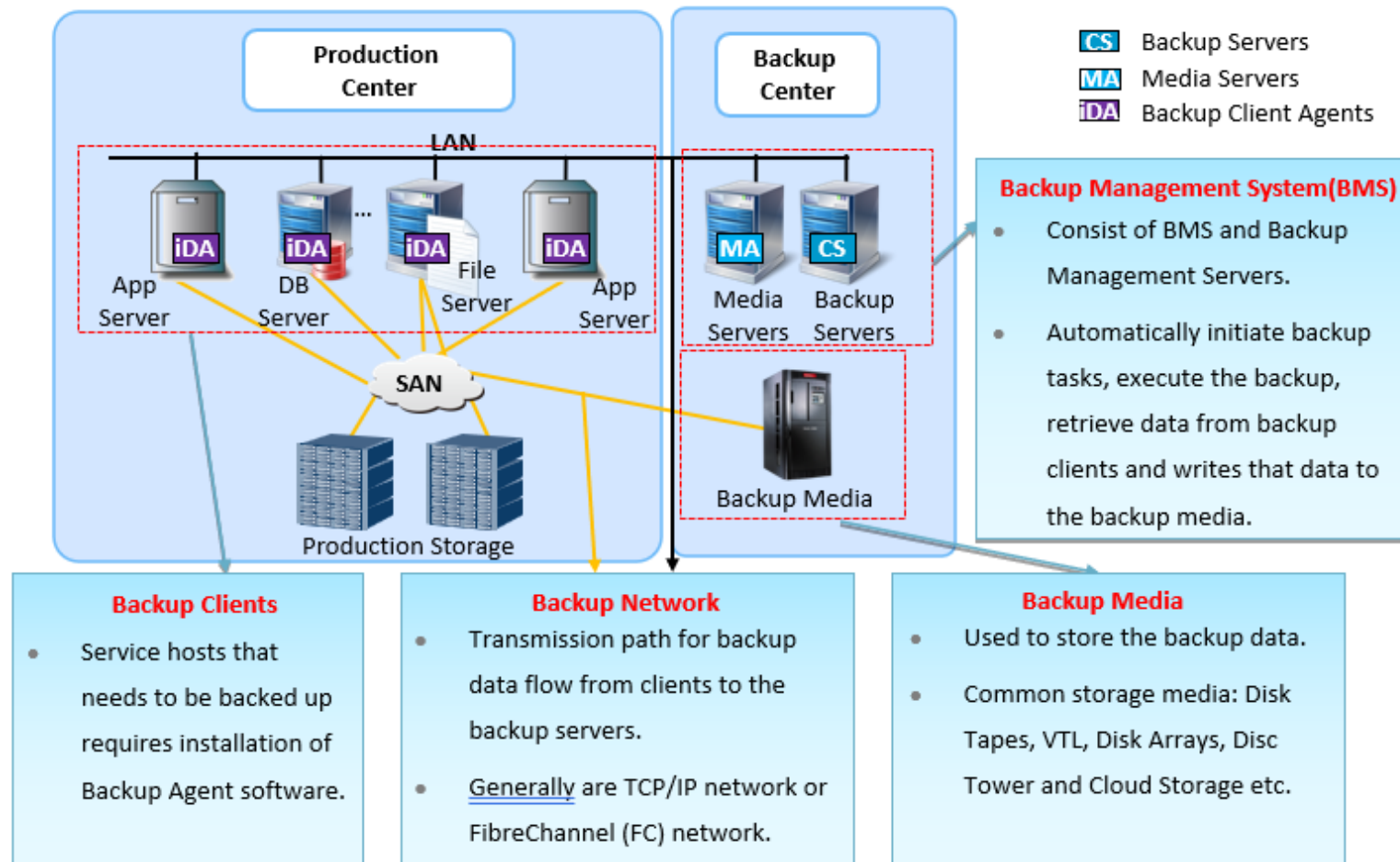
Backup is meant for data recovery, but Archiving is meant for compliance with laws and regulations.

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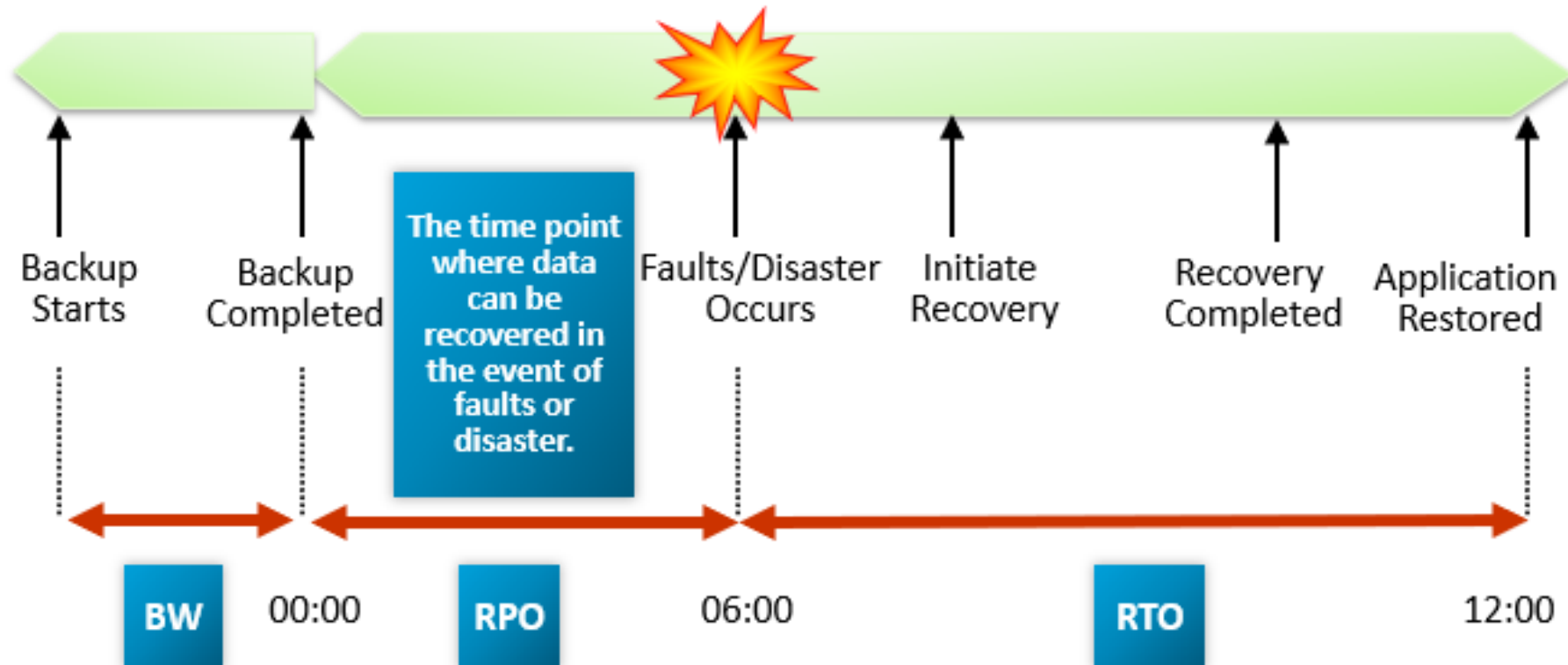
Architecture Of Backup Solutions



Components of Backup Systems



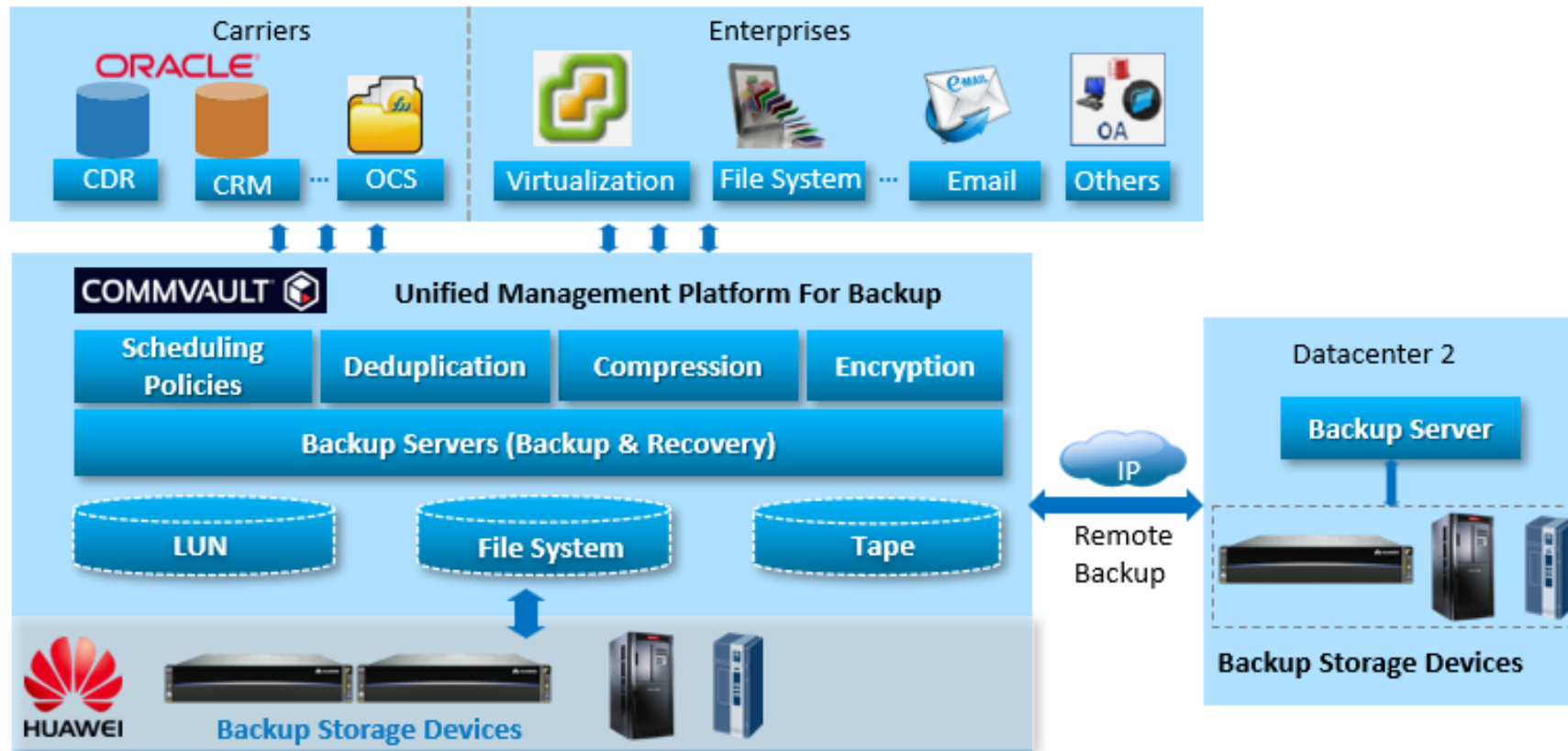
Main Elements Of Backup Systems



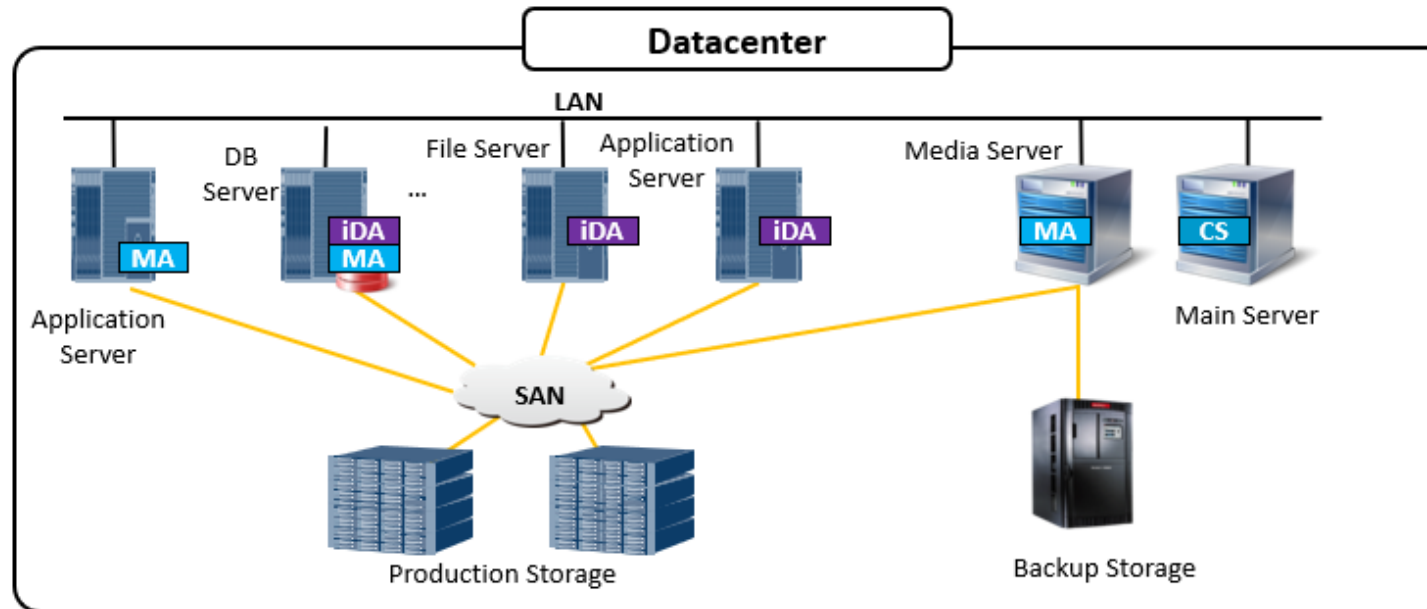
Backup Strategy & Policies

What Data to backup?	Files, Operating System, Databases, Raw Device Backup, Software Logs Backup.
Destination of Backup	Hard Disks, Tapes and Cloud Storage.
Types of Backup	Full Backup, Incremental Backup, Differential Backup.
Deduplication Policies	Source Deduplication, Target Deduplication.
Data Retention Time	1 Month, 1 Year. (Months/Years)
Backup Cycle	Daily Backup, Weekly Backup.
Backup Time Scope(Backup Window)	1 Month, 1 Year. (Months/Years)

Architecture of Backup Solutions

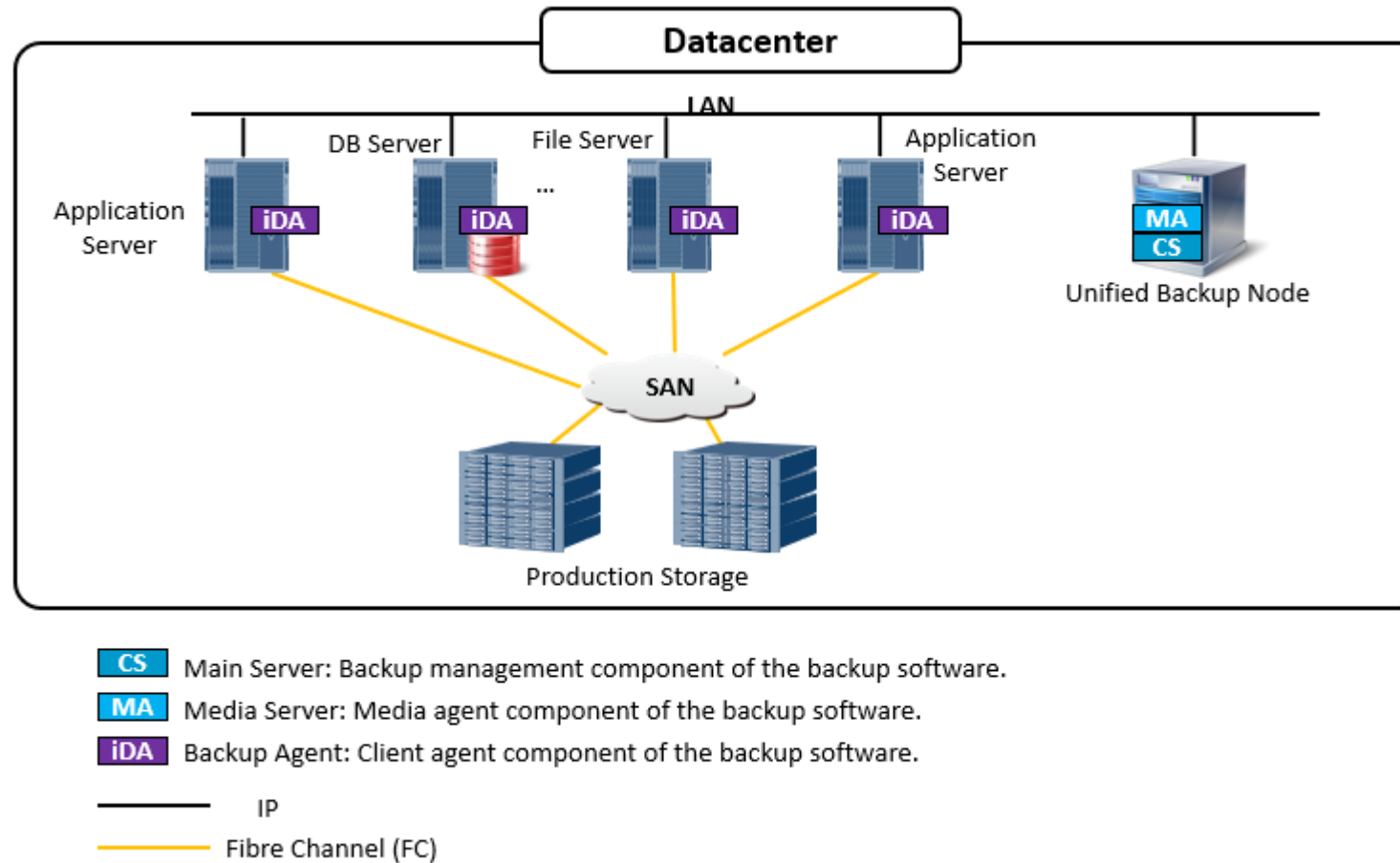


Local Centralized Backup

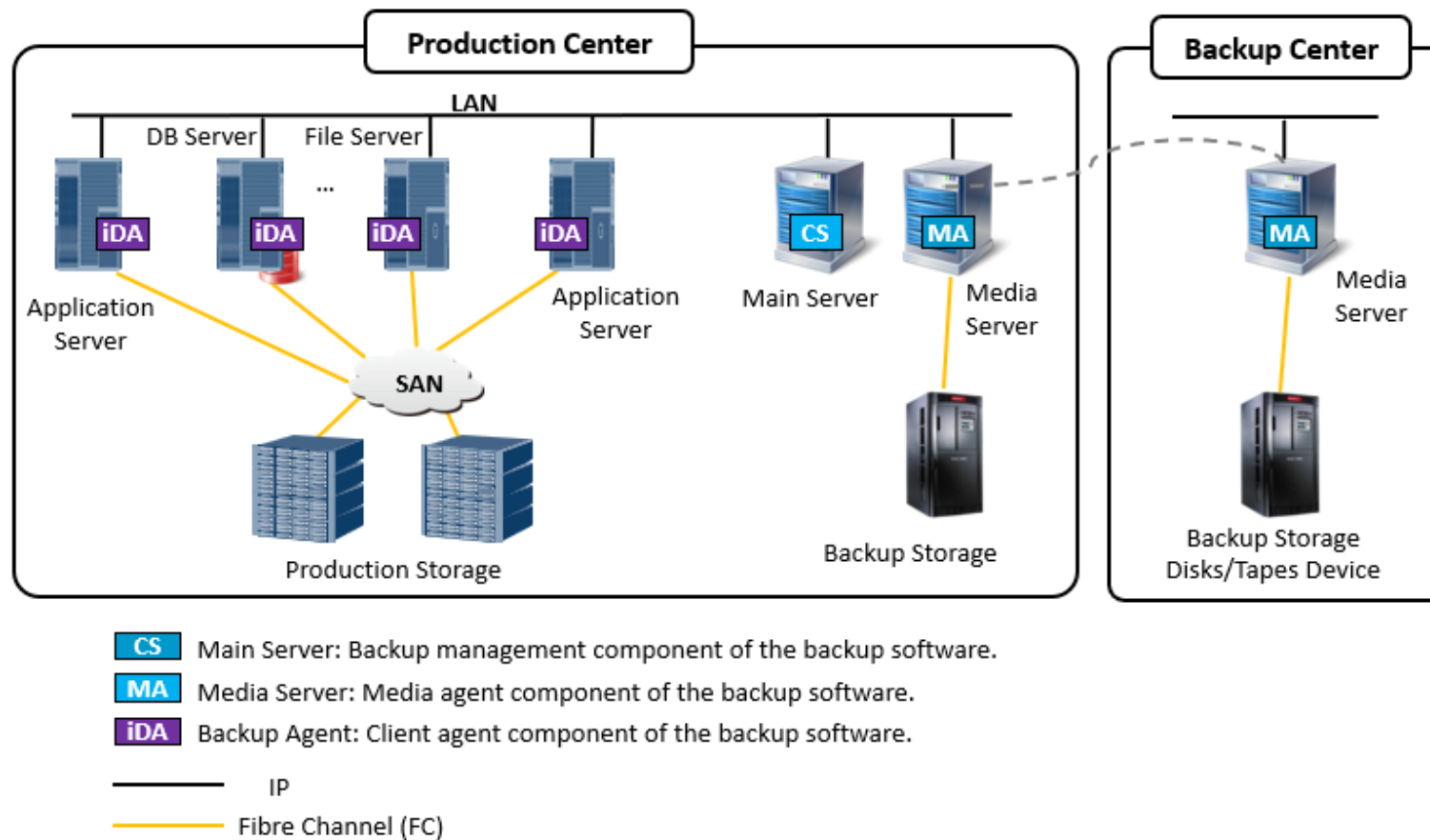


- CS** Main Server: Backup management component of the backup software.
- MA** Media Server: Media agent component of the backup software.
- iDA** Backup Agent: Client agent component of the backup software.
- IP
- Fibre Channel (FC)

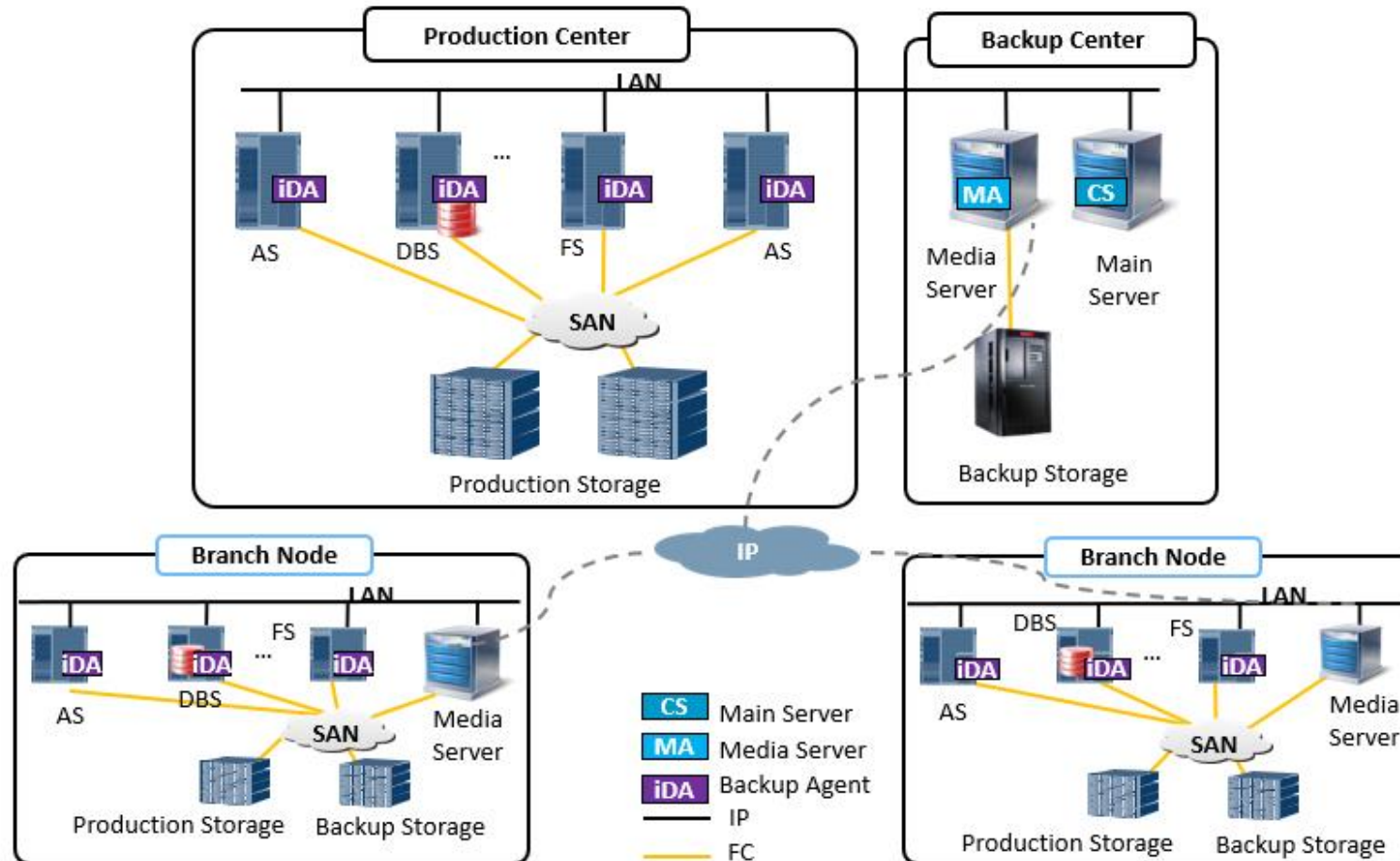
Unified Backup



Local and Remote Centralized Backup

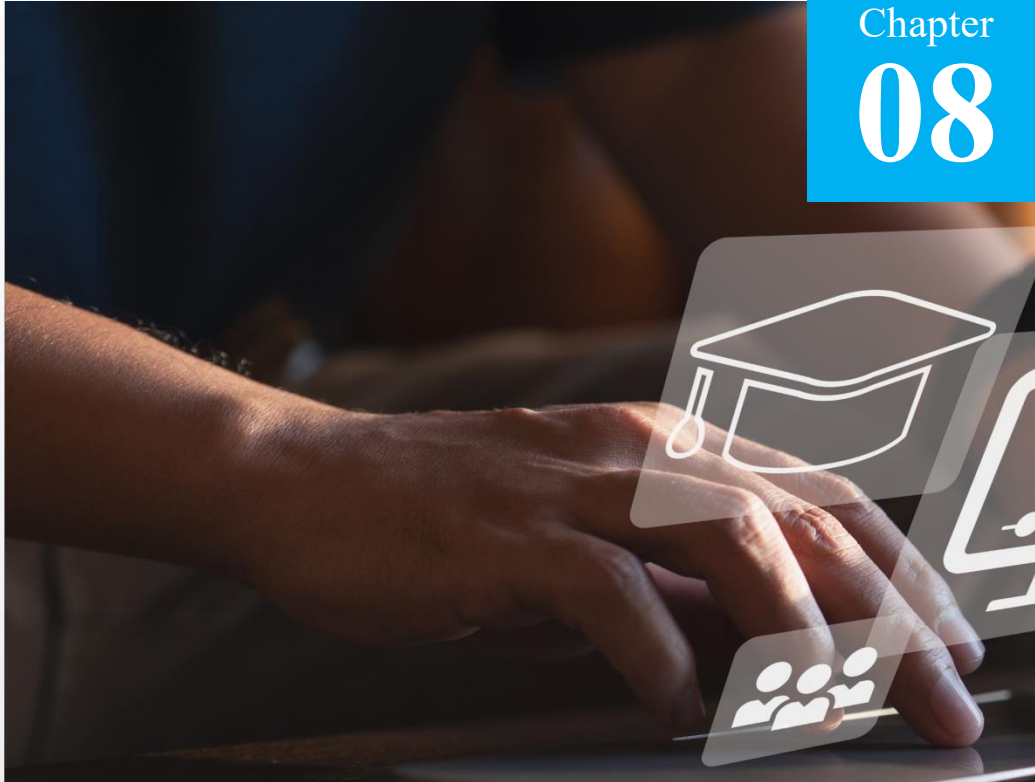


Multi Branch Centralized Backup

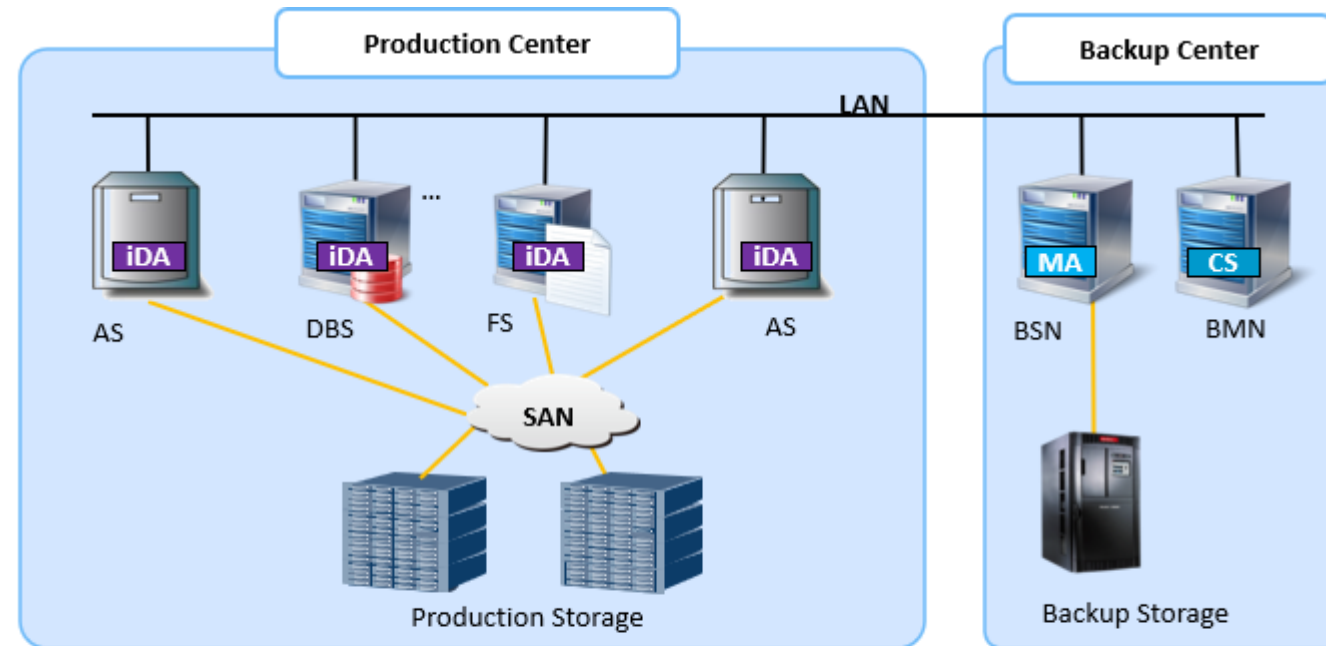


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Common Backup Networks



LAN - Base

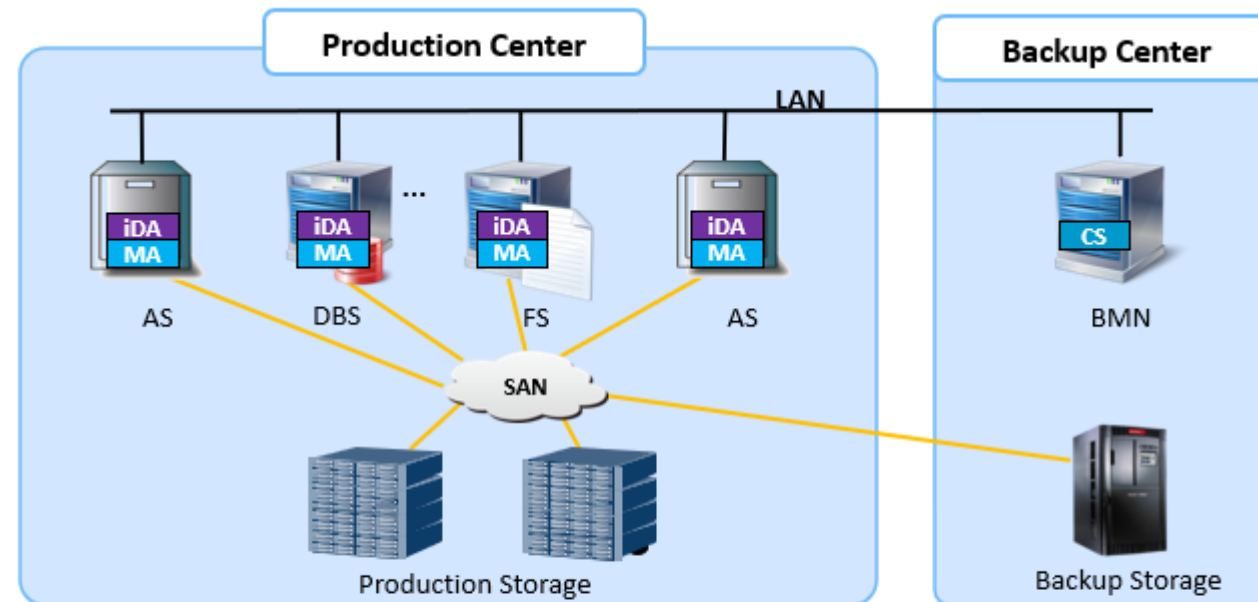


BSN: Backup Service Node.
BMN: Backup Management Node.
AS: Application Server.
DBS: Database Server.
FS: File Server.

CS Main Server: Backup management component of the backup software.
MA Media Server: Media agent component of the backup software.
iDA Backup Agent: Client agent component of the backup software.

— IP
— Fibre Channel (FC)

LAN - Free

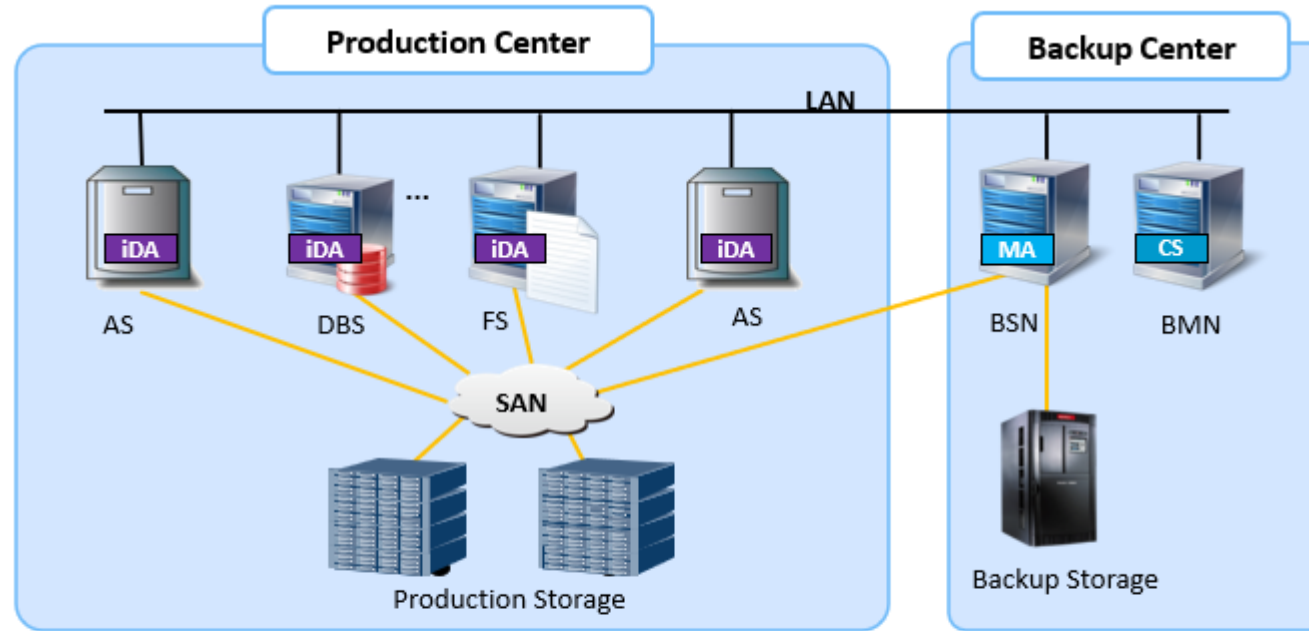


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— IP
— Fibre Channel (FC)

Server - Free

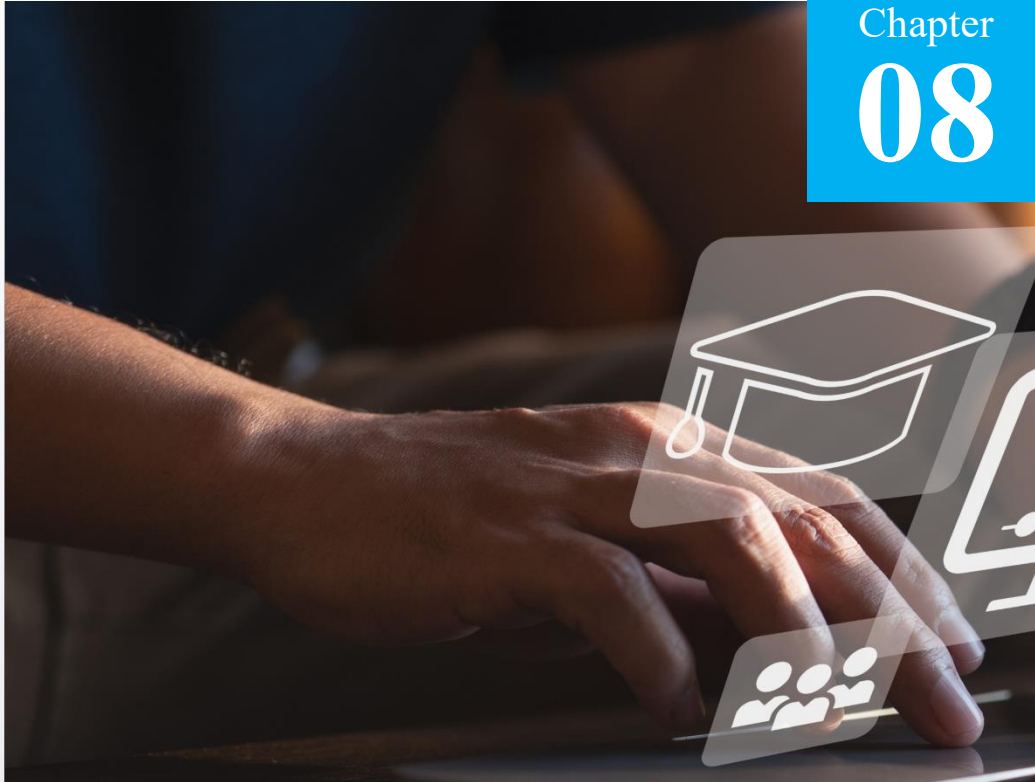


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— IP
— Fibre Channel (FC)

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Common Backup Technologies



The Many Features Of Backup

**End-to-End
Backup Solution**

**Unified
Management**

**Global
Deduplication**

**Highly
Reliable
Systems**

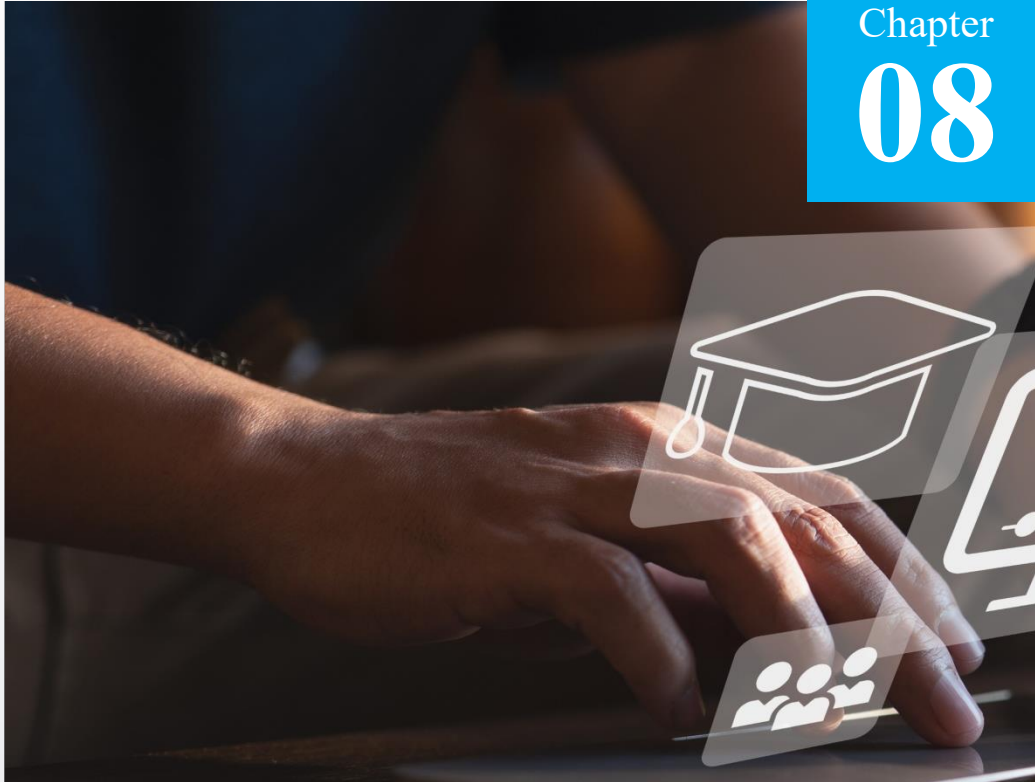
**Easy
Expansion**

**Snapshot
Backups**

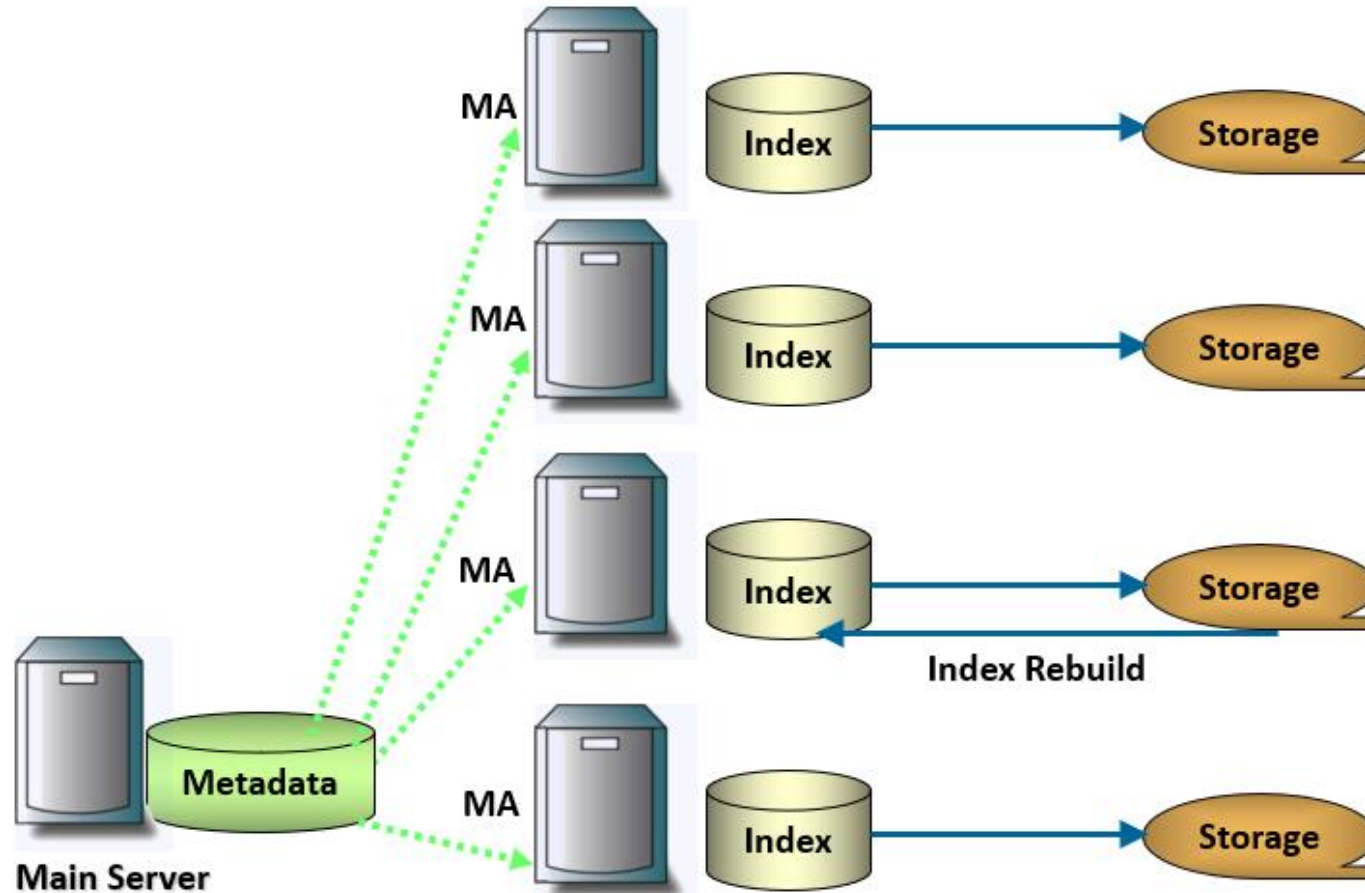
**Wide
Compatibility
Support**

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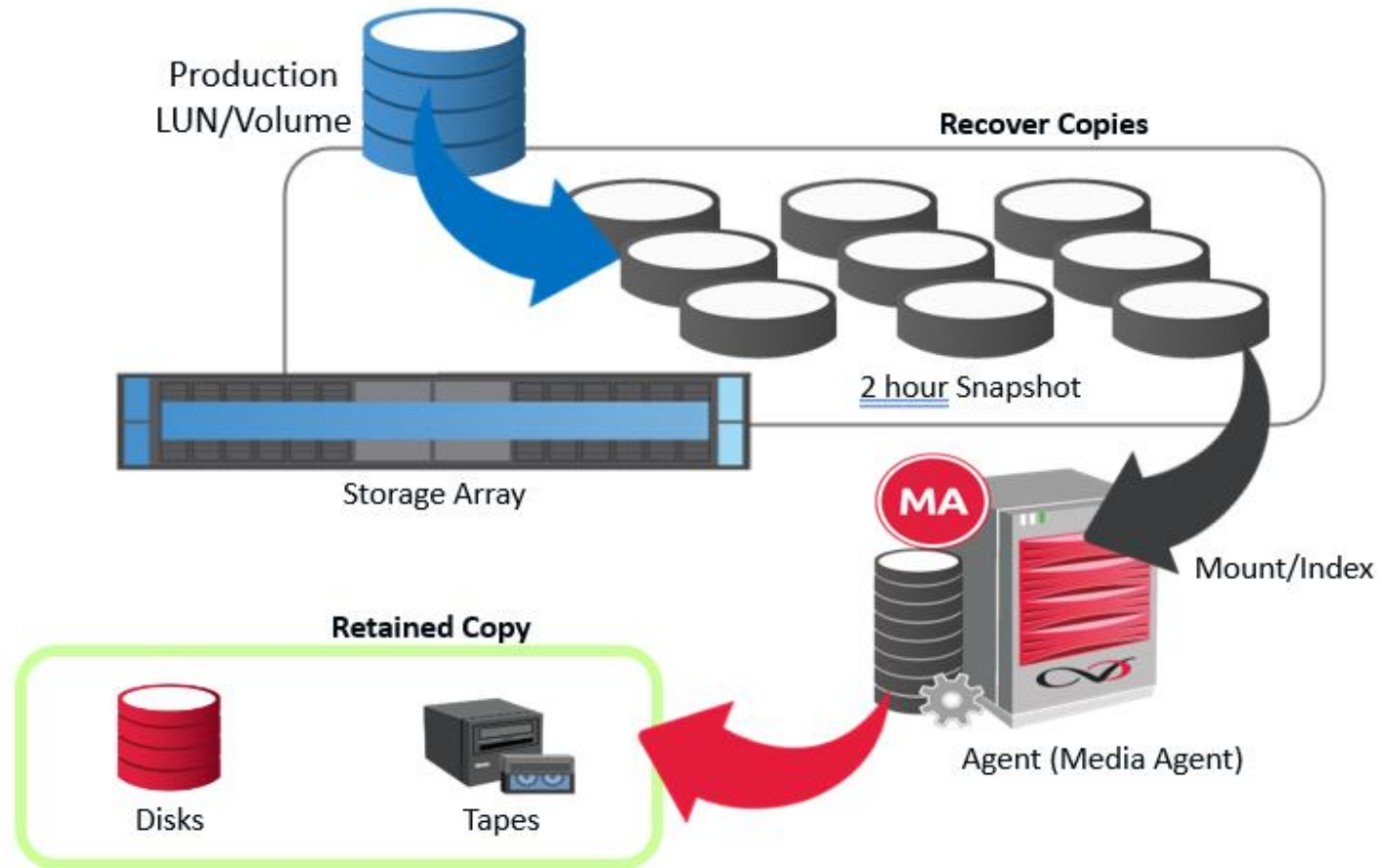
Overview Of Backup Solutions



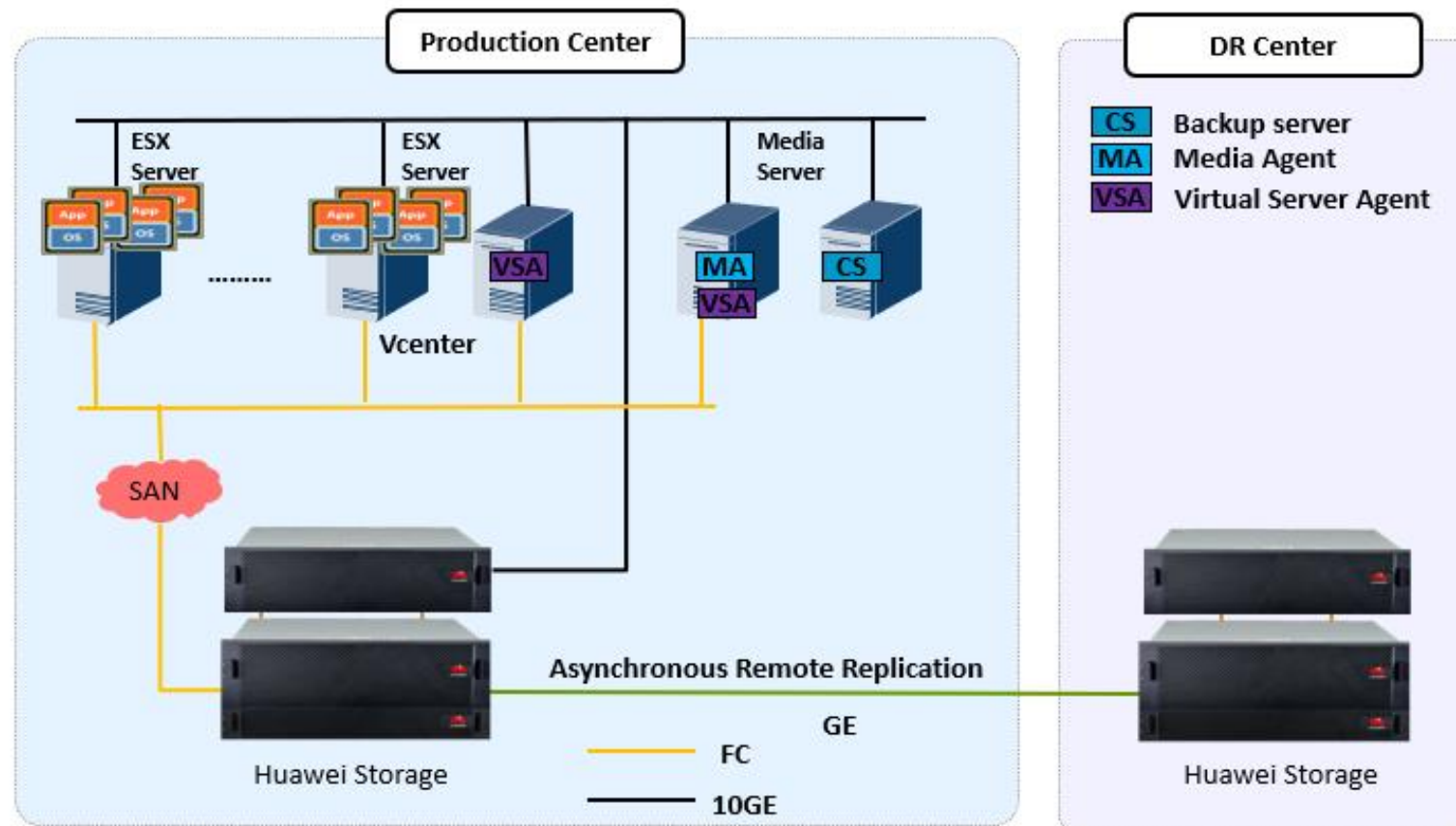
Easy Expansion: Easy Scale Out Expansion For Single Backup Domain



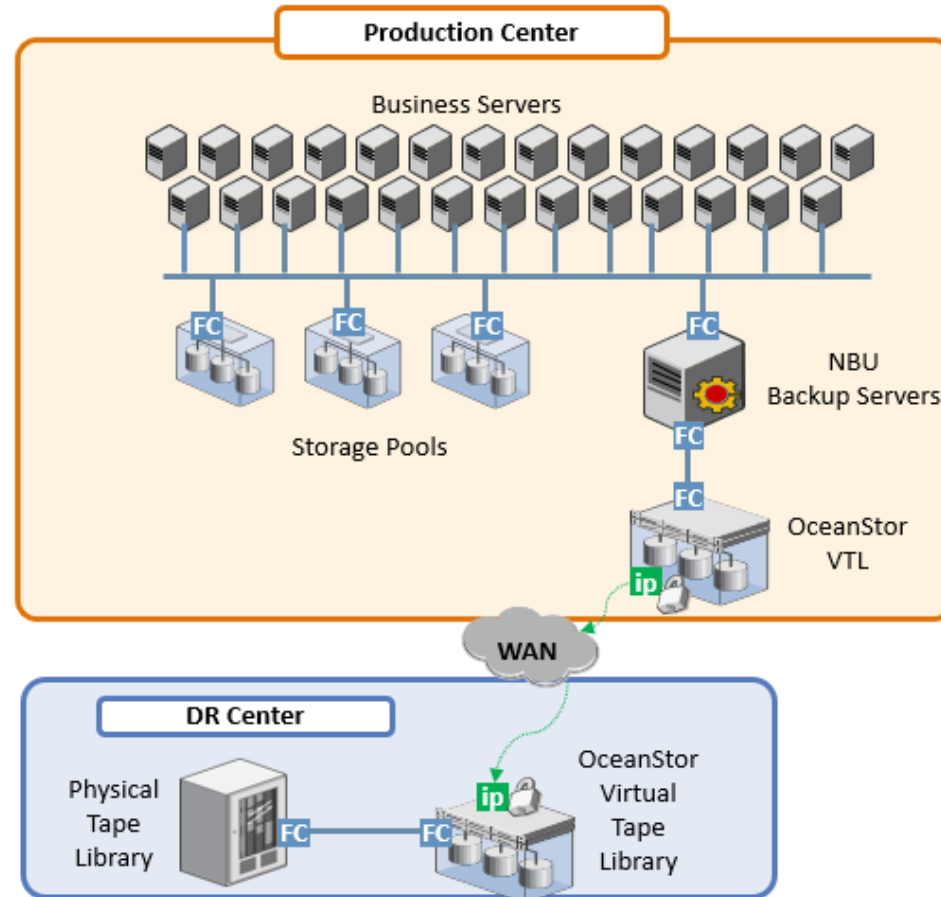
Snapshot Backup



Case 1: Library Backup of XX University



Case 2: XX Remote Backup Solution





Thank You