# Journal of **Engineering Research**

# BACKUPS AS A BACKUP AND RECOVERY MECHANISM OF DIGITAL INFORMATION

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**Abstract:** The importance of data is critical for any company or organization. The main objective of this article is to apply database backups with a service approach based on the good practices of ITIL v4.0. Backups as a recovery strategy are an easy, useful and automated technology to prevent catastrophic loss of information. The study proposes a procedure for the effective implementation of the backup and recovery mechanism, as well as a validation instrument for the correct implementation of the service. Finally, the use of an emerging technology stands out, Microsoft SQL Server 2019, a recognized and widely used database management system for database administration. In this manager, backup copies can be used in all versions, including the express version, which does not involve any financial cost. In short, a valuable contribution to minimize information losses, a technology that has transcended over time for its flexibility.

**Keywords:** Recovery media, Backups, Microsoft SQL Server 2019.

## INTRODUCTION

Today, data is the most important asset of any company or organization. It is evident that a strategy is required that provides the possibility of recovering or restoring a damaged or corrupt database.

In the real world there is an imminent need to implement technologies that allow data recovery at the time of a failure. All large, medium or small companies face the decision of choosing what technology to use? how much to invest? who will manage it? What percentage of data recovery does it guarantee? In this sense, economic solutions are sought that guarantee recovery and are also easy to manage. Backups, better known as backups, are a technological strategy that enables partial or total data recovery, minimizing the risk of catastrophic data loss and that does not require significant training for its administration.

The Database Administrator (DBA) is responsible for ensuring the integrity, availability and security of the database. It is for this reason that it requires implementing a technology or tool to backup and recover a database reliably and in the minimum amount of time possible. Reliable use of backup management for information recovery requires a strategic plan to maximize data availability and minimize data loss, taking into account the needs and characteristics of the company.

The central hypothesis of this research is stated as:

- "A self-managed backup strategy within the Microsoft SQL Server 2019 database management system is efficient as a backup and recovery mechanism."

Backups are a technology that has transcended time; this study proposes an innovative approach that guarantees the quality of the process and its efficiency. For its part, recovery after a failure consists of restoring the database to its correct state. There are many types of failures that affect the processing of a database. Some failures only affect main memory, while others involve disk storage or backup storage devices. Among the most common causes are the following:

- Natural physical disasters, such as fires, floods, earthquakes or power failures.

- Sabotage, contamination or intentional destruction of data, hardware or software.

- Carelessness, destruction or unintentional contamination of data or equipment by operators or users.

- Disk breakdowns, such as dropped heads, defective disks, or unreadable sections, causing loss of stored data.

- System crashes due to hardware breakdowns, which cause the loss of main memory or cache.

- Software system errors, resulting in abnormal termination or corruption of the database management system.

- Errors in application software, such as logic failures in the program that accesses the database. (Ricardo, 2009).

## METHODOLOGY

The study decided to use applied research, under the implementation of backup copies as a security mechanism in databases.

In this document we will analyze backups as a service, laying the foundations for a proposed procedure based on the ITIL v4.0 good practice framework and exhibiting a new, unexplored point of view. It is important to emphasize that the design of the service must facilitate the introduction of the service into the supported environment, ensuring its quality and customer satisfaction, maintaining at all times a profitable service that requires minimal improvement throughout its useful life.

Before applying the backup mechanism in the case study, a procedure aligned with the ITIL v4.0 service foundations described in the Theoretical Framework is defined. Table 1 shows the proposed Procedure for the implementation of Security Copies or Backups.

| Sequence of activities defined for the Implementation Procedure of a Backup or Backup Strategy. |
| --- |
| 1. 1. Home |
| 2. Identify the database or sensitive information. |
| 3. Identify and document the IT Infrastructure that hosts the database or sensitive information. |
| 4. Analyze and document performance and data loads for short, medium and long periods of time. |
| 5. Design the strategic backup plan aligned with the previously documented information. |
| 5.1. Define software or tool to perform backups. |
| 5.2. Define type of backup to make. |
| 5.3. Define backup schedule. |
| 5.4. Make a backup. |
| 5.5. Validate and verify the generated backup file. |
| 5.6. Choose the backup media and make the backup. |
| 5.7. Label the backup media of the generated backup. |
| 5.8. Document the backup generated in the Backup Log. |
| End |

Table 1 Proposed procedure for the implementation of Backups aligned to ITIL v4.0

Consultation Source: Own source.

## RESULTS

Backups are a service that provides the user with the ability to back up information and have it available for recovery in the event of a loss. The ITIL good practices framework in its latest version, in short, is an excellent opportunity to manage this strategy, providing added value to its use.

On the other hand, it is important to mention the following strengths of the Microsoft SQL Server 2019 database management system:

- It has a graphic Wizard that guides the user in creating backup files and restoring information.

- It is easy to use, you do not need to be a specialist.

- Backup and restore tools are available in all versions of the management system, including the free ones.

- It allows the use of Maintenance Plans to automate the generation of backup copies.

- It enables integrity verification of generated backup files.

- It allows you to choose the storage location for backup files.

According to the official Microsoft site, designing an effective backup and restore strategy requires great care in planning, implementation and testing. It is mandatory to carry out tests. You will not have a backup strategy until you have successfully restored backups in all combinations included in your restore strategy. You must take several factors into account. Among them, stand out:

- The organization's production objectives for databases, especially availability requirements and protection of data from loss.

- The nature of each of the databases: size, usage patterns, nature of content, among others.

- Resource constraints, such as hardware, personnel, space to store backup media, and physical security of stored media.

Finally, Table 2 presents, as a proposed instrument for evaluating the strategy, a checklist with the activities of the designed procedure.

| Activities defined for the Implementation Procedure of a Backup or Backup Strategy according to ITIL v4.0 | In compliance. (YES OR NO) |
|---|---|
| 1. Identify the database or sensitive information. <br> 2. Identify and document the IT Infrastructure that hosts the database or sensitive information. <br> 3. Analyze and document performance and data loads for short, medium and long periods of time. <br> 4. Design the strategic backup plan aligned with the previously documented information. <br> 5. Define software or tool to make backup copies. <br> 6. Define type of backup to make. <br> 7. Define backup schedule. <br> 8. Make a backup. <br> 9. Validate and verify the generated backup file. <br> 10. Choose backup media and make the backup. <br> 11. Label the backup media of the generated backup. <br> 12. Document the backup generated in the Backup Log. | **1.** ( ) <br> **2.** ( ) <br> **3.** ( ) <br> **4.** ( ) <br> **5.** ( ) <br> **6.** ( ) <br> **7.** ( ) <br> **8.** ( ) <br> **9.** ( ) <br> **10.** ( ) <br> **11.** ( ) <br> **12.** ( ) |

Table 2: Results Analysis Checklist.

Consultation Source: Own source.

Without a doubt, the result is that the proposed procedure is applicable to implement Backup Copies strategies as a service aligned with the ITIL v4.0 Good Practices Framework.

After highlighting the backup mechanism as a recovery strategy, it is appropriate to highlight that its implementation is not limited to the use of the Microsoft SQL Server database management system, which is only used in this document as an available software tool. and viable for the case study. However, any database management system provides an efficient way to back up information and provides tools for verification and automation. The technological tools available that allow carrying out the activities proposed in Table 1. Procedure for Implementation of a Backup Strategy will be at the discretion and evaluation of the database administrator depending on the context in question. In this area, an opportunity for future studies may be, precisely, the comparison of the use of

different technological tools in the procedure proposed here.

## CONCLUSIONS

In this article, a support mechanism has been presented considering the importance of the information. The various situations that put the consistency and availability of data at risk are sufficient justification to consider tools or mechanisms to prevent losses in the event of any failure or damage to a database. Using a case study, it illustrates how to implement a strategic backup plan. Particularly, the different alternatives that can be used in backup copies as a recovery strategy are detailed and highlighted.

There is no doubt, in the near future database management systems, including Microsoft SQL Server, will provide various backup and recovery strategies. Therefore, it is important to analyze and choose the mechanisms and tools that adapt to the needs of each company.

There is a wide field of research in the area of backup and recovery, not only with different technologies, but also with different database management systems using information not included in the scope of this document.

## THANKS

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