

# ROADMAP TO DEFINE A BACKUP STRATEGY FOR SAP APPLICATIONS

Helps you to analyze and define a robust backup strategy

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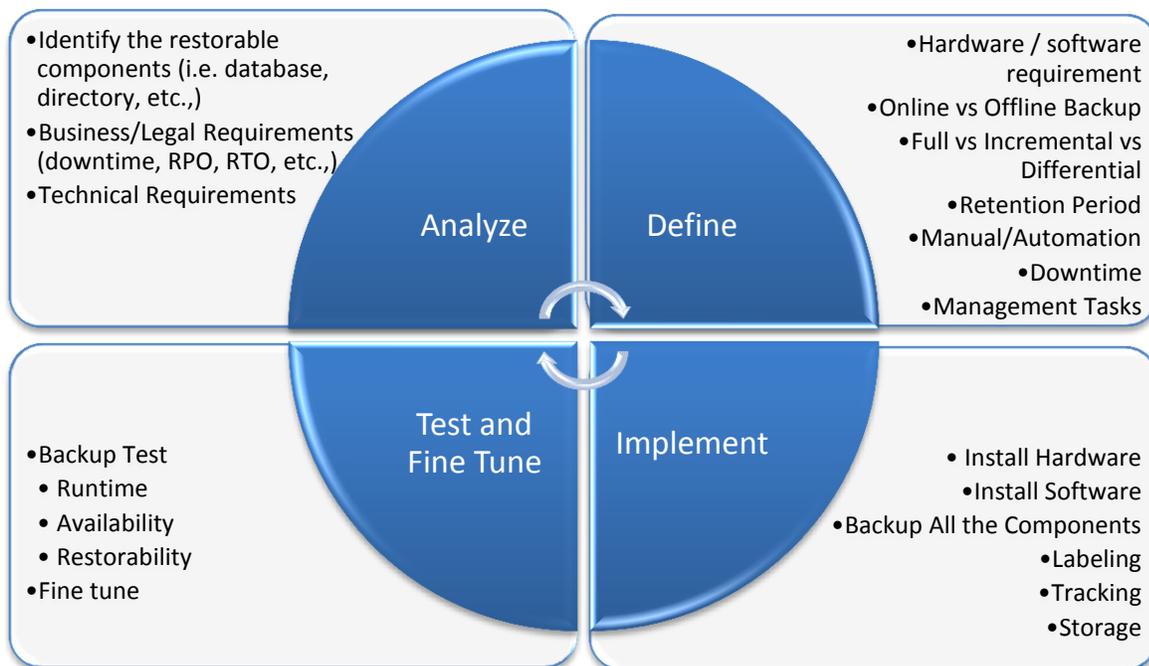
## 1. Introduction

This paper describes various aspects to be considered while defining a backup strategy for an SAP system. Backup and Recovery strategy is one of the most important aspect of any SAP implementation and must be defined as uncomplicated as possible, the same helps to ensure that the defined procedures can be implemented without any difficulties during the critical situations.

## 2. Roadmap that I follow to define a backup strategy

In my opinion, below are the preliminary steps involved in devising a backup strategy, it basically contains four main steps:

- Analyze
- Define
- Implement
- Test and Fine Tune



This document is focused on the Analyze phase which is a key to define and implement the backup strategy. The phases like define, implement and test are out of scope of this article; rather it provides an insight over how an analysis phase must be handled in a preparation phase.

### 3. Analyze

In the analyze phase, as mentioned above, in order to define a robust backup and recovery strategy, a detailed assessment must be done on technical requirements, business requirements, architectural requirements, etc., Below table lists few important questions to be asked when analyzing backup strategy, the output of the analyze phase will be the input for the definition phase.

This is the phase in which business and technical requirements will be documented along with the solution to fulfill the requirements.

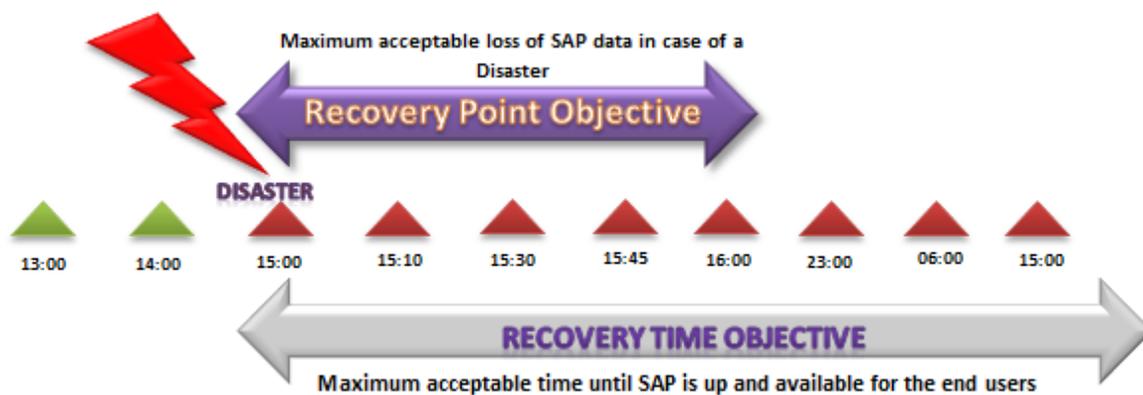
Checklist for defining a Backup Strategy	
Question	Relevancy
SLA Requirements on Recovery Time Objective	This is very important to define how long an SAP system can be unavailable without severe negative impact
SLA Requirements on Recovery Point Objective	RPO constitutes an important criterion for recovery of a component; it defines the acceptable data loss during recovery of a component when restoring a backup.
Are there any downtime restrictions?	Understanding the downtime requirement is essential to decide upon the software/hardware requirements
Which component of the database to be backed up?	Helps you to understand the components such as database, file system, associated components, etc.,
Time and Frequency of the backup for each of the components involved?	This is more relevant when you define the downtime and SLA requirements
To what storage media it should be backed up?	Depends on the SLA requirements
Will the backup be performed manually / automatically	To understand the Resource Requirements
How long a backup should be retained in the tape pool?	SAP's general recommendation is to keep 27 days of the backup in the tape pool, this is to ensure better protection against physical tape errors and logical database errors
How many days a backup must be retained?	There are legal requirements to retain a backup, hence retention period is something to be discussed with the legal department to understand the government regulations.

We will be discussing about each of the questions in detail in the following sections

### 3.1. Recovery Point Objective (RPO) and Recovery Time Objective (RTO)

RPO and RTO are the most important factors which play a major role in deciding the backup frequency and types of backups to be taken on any given database. For example, in case of MS-SQL, if the RPO is 30 minutes, then it is recommended to take the full back up on a daily basis along with the transaction log backup every 30 minutes. With this approach, in a worst case scenario, you will be able to recover the database with 30 minutes (or) less of data loss from the crash point.

Similarly when it comes to RTO, it is the base to decide upon the frequency, type of backup, size of transaction log file, backup/restore read/write speed, backup solution, etc., For example, If the RTO is just 6 hours in your environment, then you should have a robust solution (i.e. Network, Backup Infrastructure, Skilled Resources, etc.,) to bring the system back up and running in 6 hours of time.



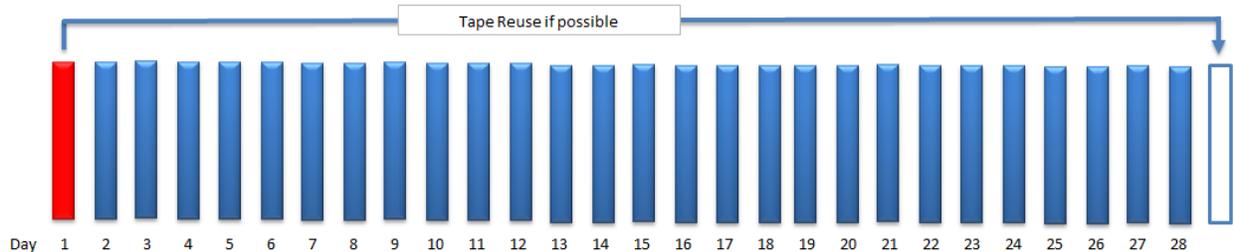
### 3.2. Downtime/Runtime Requirement

This is an important element to be defined by reviewing the business requirement; this is another key factor to decide the backup type, hardware and software. If the SAP system is supporting global operations, then downtime may not be affordable by the business which will lead to choose online backup.

### 3.3. Retention Period

There are legal requirements that must be taken into account while defining retention period, it is generally recommended to have a workshop with the legal team to understand the federal, state and local data retention requirements.

The technical side of the retention is that you must be in a position to restore a database backup with at least one copy of the backup taken in the recent days, hence several generation of backups have to be available to be able to deal with the faulty backups. SAP's general recommendation is that you maintain the backup of 28 days (4 weeks); consequently 27 backups are available in the event of database failure as indicated in the graphic below.



Retention period is not just about daily backups, the same rule applicable for the backups like month-end, quarter-end, year-end backups must also be retained according to legal/business requirements.

### 3.4. Various Components To Be Backed Up

This chapter discusses the various components to be backed up for the SAP products like AS ABAP, AS JAVA, Portal, APO, Business Objects and MDM. The reason for choosing these products is that they are unique in nature. The specific details of each of these products are covered in the following sections.

#### 3.4.1. Basic Components (Applicable for any application)

As a general rule, below are the few important components to be considered for the backup for any SAP application.

- Database
- Log files
- Operating System Files
- Connected Systems (i.e. BW, SCM, non-SAP applications, etc.,)
- Any other component that is integrated and updated on daily basis

#### Database

*Why should this be backed up?*

This is the core of any SAP system and your data. Without the database backup, it is impossible to recover the system in case of crash.

*When should the backup to take place?*

The frequency of the full database backup determines how many days back in time you must go to begin the restore:

- If a daily backup is done, in case of a crash today, you will need yesterday's full backup. This option reduces the number of logs that needs to be applied in case of a crash, subsequently reduces the risk of not getting a current state of the database because of a bad/damaged log file.
- If a weekly backup is done, you will need last week's backup and you may have to apply all the log files created since the last successful backup.

As mentioned in the above sections, frequency is something needs to be carefully validated after defining the recovery point and time objective.

### **Transaction Log / Offline Redo Log files**

*Why should this be backed up?*

Log files are critical to database recovery in any RDBMS (i.e. oracle, MSS, DB2). These files contain the changes made to the database which is used to roll forward or back operations. It is very important to have a complete chain of the log backups. During the restore, if one of the log file is corrupted, then the subsequent log files and changes cannot be recovered.

*When should the backup to take place?*

The frequency of the log backup is again a business decision on :

- RPO / RTO
- Transaction Volume
- Critical Period for the system
- Resource requirement to perform the backups and transfer them offsite

### **Operating System Level Files**

*Why should this be backed up?*

Operating system files are dependent on specific application, Data Archiving related files

1. Spool files (if stored at OS using `rspo/storage_location=G`)
2. Transport Management Files (DIR\_TRANS)
3. System and Network Configuration
4. Other OS Level files

*When should the backup to take place?*

If these application specific operating system level files (outside the database) are to be kept in sync with R/3, they must be backed up at the same frequency as the log backup files. Below are few examples of the operating system level files.

## Connected Systems

*Why should this be backed up?*

In any given SAP environments, there will be additional components such as Content Server, SAP BW which needs to be in sync with AS ABAP. It is imperative to take the backup of these components as well to keep every data is in sync with each other components.

*When should the backup to take place?*

This is something to be treated as same as operating system level files, please refer above.

### 3.4.2. AS Java Specific Components

In addition to the backup contents mentioned above, there are few java specific components which are to be backed up.

- SDM Repository
- UME Store (either AS ABAP/LDAP/Local DB)

### 3.4.3. Portal Specific Components

Below is the list of components to be considered while designing the backup strategy for Enterprise Portal.

- TREX Indices
- Portal Archive
- Content Server
- Associated Components

### 3.4.4. Exchange Infrastructure Specific

Below components are specific to PI/XI (along with AS Java).

- SLD Database
- Exchange Profile
- Interface Files

### 3.4.5. APO Specific

Below components are specific to APO/SCM.

- Live Cache Database
- Live Cache Log files

### 3.4.6. MDM Specific

Below components are specific to MDM.

- MDM Log files
- MDM distribution port data
- MDM Configuration Files (mds.ini, mdss.ini, mdls.ini and mdis.ini)

### 3.4.7. Business Objects Specific

Below components are specific to Business Objects Enterprise Platform.

- CMS Database
- Audit Database
- Local / Central / Profiler Repository Database
- %LINK\_DIR%\bin\DSConfig.txt
- %LINK\_DIR%\log folder
- The current data services release install files
- Input / Output File Repository Server
- Operating System Level files

## 3.5. Backup Type

Every RDBMS has different types of backups, in the below sections, we will be discussing about the various database backup types used in SAP environment.

### Full Database Backup

Entire database backup is taken in this type.

#### *Advantages:*

The entire database is backed up at once, it makes the restore of the entire database easier and faster. There are less log files that need to be applied to bring the restored database to current.

#### *Disadvantages*

Takes longer to run depending upon the database size

### Incremental/Differential Backup

Incremental Backup terminology differs between various RDBMS, for example, incremental backup is linked to transaction log backup in MS-SQL whereas in Oracle, it indicates the backup of all blocks changed after the most recent successful full backup (in MS-SQL the same logic is applied when the differential backup (changed blocks) is taken). Depending on the RDBMS used, above mentioned differential/incremental backup logics to be understood before defining the strategy.

## **How the backup is taken?**

### **Offline Backup**

When an offline backup is chosen, the application, database and all the services accessing the backup components should be stopped.

#### *Advantages:*

- Faster than online backup
- During the backup, there is no issue with database changing in the database

#### *Disadvantages:*

- SAP system is unavailable during offline backup
- Database and Application Buffers are flushed

### **Online Backup**

An online backup is taken when the database and the application is running.

#### *Advantages:*

- Application is available to users during the backup
- Buffers are not flushed

#### *Disadvantages*

- An online backup is slower than offline backup
- Application performance is degraded during the online backup
- Data may get changed during the online backup, hence it is important to have the transaction log backup

### 3.6. Backup Management Tasks

**Monitoring:** Backup must be monitored on a regular interval, the same to be defined in the backup strategy along with the roles and responsibilities for each of the database backup components (i.e. database, transaction log, operating system, etc.,).

**Tape Management:** Tape management activities such as Labeling, Tracking, Handling and Retaining are to be defined in the backup strategy to enable the tape management team to handle the tapes efficiently.

**Verifying Backup/Integrity check:** Backups must be verified following a regular schedule (once in the retention period), only then you will know that you have a valid backup that can be restored when it is needed.

**Storage:** Once the successful backup is taken, the tapes must be transferred to offsite to protect them from disaster. This is one of the key items to be defined in the backup strategy.

**Backup Test:** The backup and recovery must be tested and validated before rolling out the backup procedures to production. In addition to backup/recovery test, performance must also be tested to identify the potential bottlenecks.

## 4. Key Points to Take Home

- Backup and Restore Strategy should be defined as uncomplicated as possible
- Each and Every RDBMS has to be dealt differently
- Every SAP Product has different flavor in it, hence the backup strategy must be designed according to the products used
- SLA (RTO/RPO) requirements are to be considered while choosing the backup solution
- Workshops must be conducted with business/legal departments to understand the requirements in detail and to set the expectation from the technical perspective.

## 5. Reference / Additional Information

Below URLs and notes contain additional information on the backup strategy.

[http://help.sap.com/saphelp\\_nwpi711/helpdata/en/d1/21714b7d3a11d288ec0000e8200722/content.htm](http://help.sap.com/saphelp_nwpi711/helpdata/en/d1/21714b7d3a11d288ec0000e8200722/content.htm)

<https://websmp130.sap-ag.de/sap/bc/bsp/spn/sapnotes/index2.htm?numm=319331>

<https://websmp130.sap-ag.de/sap/bc/bsp/spn/sapnotes/index2.htm?numm=44449>

<https://websmp130.sap-ag.de/sap/bc/bsp/spn/sapnotes/index2.htm?numm=1572469>

<https://websmp130.sap-ag.de/sap/bc/bsp/spn/sapnotes/index2.htm?numm=1297986>