Building
Tomorrow's Enterprise

White Paper

Infosys®

Disaster Recovery for SAP APO

Approach and Best Practices

Prasun Mandal

Abstract

This document would like to provide guidelines about general procedure for SAP APO solution in case of business disruptions or disasters. Starting with the escalation of an incident to a disaster, the main phases and steps that are part of the recovery procedure are depicted along with the recovery options available in the different phases. Disruptions of core business functions may adversely impact success of a company. When business operations are disrupted, a formal manual can help to minimize the impact of disruptions and return to regular operations in a timely manner. Meanwhile, alternate technical and business-level workarounds can provide an interim solution to keep up operations (at least at some minimum level) while regular functionality is being restored.

Sep 2011

Introduction

This perception of the term 'disaster' is often used in the context of Business Continuity Management and is categorized between man-made disasters and natural disaster. Disaster recovery is the process, policies and procedures related to preparing for recovery or continuation of technology infrastructure critical to an organization after a natural or human-induced disaster. Within the scope of this document, a disaster is any event that seriously disrupts business operation beyond the acceptable outage time.

Business disruptions or 'disasters' can be caused by technical failure or logical failure.

- Technical failures of a system component usually affect all business processes that are using the affected component(s). This can range from crashes of individual hardware components to building fires or flooding of an entire computer center.
- Logical failures, on the other hand, often only affect single or few business processes while the systems are still up. Logical failures range from partial data loss or data corruptions inside a single system, to data inconsistencies of data being exchanged between multiple systems of an environment.

This document is focusing only on technical failures e.g. temporarily network down or hardware failure, unexpected failure at liveCache, database corruption of SCM system.

Employees responsible for supporting SAP APO system and Business Users need to follow a structured approach to support the recovery of the system environment within a reasonable timeframe. This document provides information for each phase of a recovery procedure. By giving examples for some typical error situations and recovery approaches, the course of the recovery process becomes clear.

The procedure outlined here can also serve as the basis for an action plan to be set up for coordinating an emergency situation. Since the solution and customization vary for different customers, the approach provided in this document needs to be tweaked based on specific requirement. Final disaster recovery procedure needs to be aligned for the following stakeholders:

- Disaster Recovery Team or SWAT Team that owns execution of the procedure
- Employees supporting business users during down time along with Duty managers / escalation managers
- Business Leaders
- Super Users/Key Users.

SAP SCM System / liveCache

SAP APO uses the liveCache technology compared to relational database as liveCache has got a better performance. The complex algorithms along with high volume of data required by planning processes which are necessary for the APO are not manageable with the conventional technique.

The data access to the liveCache is much faster than the access to standard relational databases. Reading and writing is possible in parallel. The liveCache is also able to aggregate information from OLTP-Databases.

The liveCache can be administrated from an external tool called Database Manager (DBM) and from within the APO system. For normal operation the administration takes place with transaction LC10 which can be found at path: Tools → APO Administration → liveCache/COM Routines → Monitor.

The liveCache has three operation modes:

OFFLINE means that no kernel processes are running, memory areas (caches) are not available. LiveCache kernel processes and caches do not exist.

COLD means that the LiveCache Kernel is active but caches are not yet synchronized with the volumes. Users cannot connect, only administrative tasks are possible.

WARM/ONLINE means that the LiveCache Kernel is active, data and log information is synchronized between caches and volumes and users can connect. This is the normal operation mode.

Integration between SAP SCM System and SAP ECC System

The integration of APO and R/3 system works with the core interface (CIF) in the standard. The CIF communicates via a queued remote function call (qRFC) with APO and it is possible to work with real-time scenarios for APO. Integration Model needs to be created between APO and ECC so as to make sure that two way communications is possible between these two systems.

Prerequisites for a proper recovery

Following are the prerequisites for establishing a Disaster Recovery Process:

- Setup alternate server when the original server is down. Final decision for alternate server will depend on multiple parameters like cost, allowable downtime for liveCache etc.
- Setup Configuration in ECC so that all Planning Processes can take place in ECC and should behave according to disaster policy.
- Back up Standard liveCache, file system and APO DB through SCM basis level jobs daily.
- Ensure internal consistency (APO DB and liveCache) and external consistency (APO system and ECC systems) on a regular (e.g. daily) basis.
- Backup liveCache log and APO DB Log on a regular frequency.
- Verify all backups.
- Setup Planning Area backups on decided frequency (e.g. daily basis) wherever these Planning Areas are used for storing Planning Data e.g. Forecasting, Supply Network Planning and Product Allocation etc. Backup happens onto APO-BW Infocube.
- Conduct regular recovery practice to keep in-house competence high to react a possible incident most efficiently.

Roles during Disaster

During disaster, Emergency Alternate Procedure (EAP) will be revoked. There are two broad roles:

Role of Technical Support Team

Support employees who are responsible for EAP Process from technical side would consist of Functional and Technical consultants. One or multiple incidents would be logged for this disaster. Role of Basis Support remains critical as they are primarily responsible to bring the liveCache up. Appropriate communication needs to be sent by duty managers to the user groups providing regular update and an estimate of the downtime. Support team need to work on these incidents as top priority till the system becomes stable.

Role of Business Users

In general, unless otherwise pro-actively detected by Support employees, it is likely that users in the system from business discover the slowness in response times or messages in the system indicating there is some problem. It is importance for the users thus to raise an incident/ticket to get attention from Support Employees.

Business EAP is applied during downtime. Depending on the timing (e.g. working/non-working) estimated duration of the disaster, APO system would be disconnected by de-activating all Integration Models and Planning process needs to be done in ECC. Key Users/Super Users needs to be trained for these activities and can guide other users during downtime so that business is least impacted.

Activities during Disaster Recovery

Root Cause Determination for Failure

Identify the root-cause of down-time and solve the problem. Some types of failures and restore procedure against these

Type of Failure	Restore Procedure
Single table corrupted	The following two options can be considered: If table contains redundant data only, rebuild it (may need help from SAP) Restore on test system and copy appropriate data to production
Database corrupted	Restore and recover database from database backup; apply all logs
File system corrupted	Restore file system from backup
Hardware failure	Restore file systems from backup; restore and recover database from backup; apply all logs
Network problem	Solve the problem on network layer, no further action is required at SAP SCM system.
liveCache problem	Majority of the liveCache incidents are corrected after restart.

Possible Scenarios

There are two possible scenarios:

a) Scenario 1: Downtime during non-critical/non-working hours and Short duration => no business action, need to wait for APO to be up

b) Scenario 2: Longer Downtime during critical/working hours => Integration Model needs to be de-activated and alternate business process needs to be run in ECC.

Activities can be classified into two categories:

1. During Downtime of liveCache
2. During restoration of normal operation

Following activities are recommended during downtime of liveCache, these may need to be modified based on specific scenario.

Step No	Activity	Detail Activities	Applicable Scenario
1	Identify that LC is down	1) Issues reported by user through an Incident/Ticket 2) Planned Downtime communication 3) Any other error message/means that leads to identify that LC is down	1, 2
2	System Monitoring	1. Monitor documents processing and performance of ECC 2. Get an estimate when LC will be up	1, 2
3	Check Cancelled Jobs	1) Check the entire cancelled jobs in APO and ECC during the time LC was down 2) Prepare the list so that decision on whether to re-run the jobs can be taken once system is up.	1, 2

Step No	Activity	Detail Activities	Applicable Scenario
4	De-activation of Integration Model in ECC	1. If GATP is used, Integration Model for ATP Check needs to be de-activated	2
5	De-schedule the job	1. Find the Batch Jobs that is proposed to run during proposed downtime 2. De-schedule the Batch Jobs	1, 2
6	Stop Outbound scheduler	1. Go to TC: SMQS in ECC Box 2. Select the entry corresponding to ECC Box and click on De-registration button. The type will change from R to U.	1, 2
7	Stop Inbound Scheduler	1. Go to TC: SMQR in GVP 2. Click on De-registration button, type will change from R to U	1, 2
8	Business Activity	1. Execute Business Processes in ECC in lieu of APO	2
9	Delete CIF Queues	1. If the no of queue entries is huge, some lower priority queues needs to be deleted. Else there is a possibility of overloading scheduler.	2

Once LiveCache is up, some steps need to be executed to make ECC and APO in sync. SAP ECC systems are always leading systems in case of any inconsistency. For the found deviations SAP ECC systems is taken as reference. Regardless of the chosen policy during downtime of SCM there will be some differences between the systems. List of activities may vary depending on specific solution.

Step No	Activity	Detail Activities	Applicable Scenario
1	Identifying the cancelled jobs	1. Identify the jobs that was on hold/cancelled during the downtime	1, 2
2	Unlocking RFC Users	Contact ERP team for unlocking RFC users	1, 2
3	Start Outbound scheduler	1. Go to TC: SMQS in ECC 2. Select the entry corresponding to ECC Client and click on Registration button. The type will change from U to R	1, 2
4	Stop Inbound Scheduler	1. Go to TC: SMQR in APO 2. Click on Registration button, type will change from U to R	1, 2
5	Sending CIF Queues in controlled way	1. Start sending CIF Queues from ECC and APO 2. Watch the queues and any SYSFAIL should be separated immediately so that queues can continue to move	1, 2

Step No	Activity	Detail Activities	Applicable Scenario
6	Run Consistency Check Reports	1. Run Report /SAPAPO/SDRQCR21 or /SAPAPO/CIF_DELTAREPORT3 with pre-defined variants in APO	1, 2
7	Run LiveCache Consistency Jobs	Run Report /SAPAPO/OM_SYNC_LC_DB in APO	2
8	Activate Integration Model	If ATP Check IM has been de-activated, activate it	2
9	Run BOP	If GATP has been used, BOP with pre-defined variant needs to be re-run	2
10	Re-schedule the jobs	1. Re-schedule the jobs that have been cancelled or not started during the downtime 2. Run them as per revised schedule and priority e.g. if GATP has been implemented, Batch BOP needs to be run	1, 2
11	Unlock Users	1. Basis/Security team needs to Unlock users in APO	1, 2
12	Verifying Transactional data at random	1. Some Sales Order, STO, Planned Order and Production Order needs to be be checked between ECC and APO at random	1, 2

Specific Approaches for APO GATP

Global ATP is a module in SAP APO under Supply Chain Management (SCM) processes for order management, including the creation of quotations, orders and deliveries (Sales Order, STO etc.) and provides transportation and delivery schedules. In SAP ECC, ATP functionality is limited, slower and it is not possible to trigger by events like stock change. By using GATP it is also possible to check against the actual order network including all constraints or use product allocation functionality or apply rules to alternate locations and/or products. Demand and Receipt information is stored centrally on the APO liveCache. Since GATP requires real time connectivity between ECC and APO system, this requires special attention from Disaster Recovery perspective.

As a general guideline, the following steps are recommended be executed:

a) Basic Configurations under Transfer of Requirement (TOR) and Availability Check that are required to support ATP Check in GATP should be in place as designed in the solution. These configurations is assumed to be implemented as per the business requirement or solution design and not specific to DRP.

b) Disaster Recovery related configurations that require replication of GATP configurations in ECC so that ATP Check can happen and Orders can be processed in absence of an APO system. This includes related configurations in Availability Check (*Path spro -> Sales and Distribution -> Availability Check and Transfer of Requirements -> Availability Check*) like configuration of Checking Group and Check Control. This may also include some other configurations depending on the solution implemented. It is assumed that during disaster, business would only use basic ATP Check and would not execute sophisticated functionalities like Product Allocation and Rule Based ATP.

c) Developments that are dependent on passing control to APO should be modified in such a way that it has an alternate logic to take care of the situation when APO system is not available. This may be achieved in multiple

ways – one approach is to check whether relevant ATP Check Integration Model is inactive, in which case, an alternate logic should be developed to find appropriate data from ECC. One example is where Check Mode determination happens in APO during Sales Order processing based on custom logic.

d) In case of prolonged outage (scenario 2), Order and corresponding delivery creation happens in ECC. This would necessitate de-activation and re-activation of ATP Check IM and running of Batch BOP with pre-defined variants so as synchronize the order scenario between ECC and APO once APO is back.

An Approach to Best Practices

For many organizations, disaster recovery is a part of Business Continuity Management and any disaster recovery plan for SAP systems falls in a larger purview of overall IT strategy. Organizations tend to have a single strategy for all SAP systems in the landscape. While it is important to have an overall disaster recovery guideline, SAP SCM (e.g. APO) systems should have own processes because of the unique liveCache feature. There should be mock drill organized before Go Live and at a pre-defined frequency during post Go-Live period. The steps need to be fine-tuned, approximate time for each step needs to be documented and the detail process should be signed off by business leader and Duty Manager for the support team.

About the Author

Prasun Mandal is a Lead Consultant in Supply Chain Practice in Infosys. He has more than 10 years of experience in Supply Chain including 6 years in SAP APO. He has worked on multiple implementation, roll-out and support projects and has extensive exposure to Demand Planning, Supply Network Planning and Global Available-to-Promise. Prasun has a degree in Civil Engineering from Jadavpur University and an MBA from Shailesh J. Mehta School of Management, IIT Bombay.

Infosys® | Building Tomorrow's Enterprise

For more information, contact askus@infosys.com

About Infosys

Many of the world's most successful organizations rely on Infosys to deliver measurable business value. Infosys provides business consulting, technology, engineering and outsourcing services to help clients in over 30 countries build tomorrow's enterprise.

For more information about Infosys (NASDAQ:INFY), visit www.infosys.com.