WFT - SAP Disaster Recovery Solution Brief

Planning and Automating an SAP Landscape Remote Recovery Procedure

Abstract
This Solution Brief discusses how WFT Disaster Recovery Services helps a customer create and implement a remote SAP Application Recovery

NOTICE:

Motivation

Over the years many companies have seen the need and benefits of implementing an Enterprise Resource Planning System (ERP). These systems allow for the automation of critical business processes such as Material Resource Planning, Just-in-Time Inventory Control, Financial Management (i.e. Order to Cash), etc… Leading the charge in this complex software development is SAP Corporation.

Just as business has evolved, streamlined and increased productivity, so has the SAP Product Suite. From the beginnings of R/2 and R/3, SAP has added a large amount of business process automation to their portfolio. This includes such areas as Supply Chain Management (SCM), Customer Relations Management (CRM) and Business Intelligence/Warehouse (BI/BW).

As companies and individual departments/users within an organization become familiar with SAP, each segment within the business begins to rely on SAP for its core functionality. So much so, that many SAP users will have a hard time functioning on a day-to-day basis without the availability and use of their SAP system. To add fuel to this availability need, SAP has been integrated into the complex process of supplier/vendor relations and direct customer access. This makes the SAP application not only integral to day-to-day business processing, but also acts as the direct portal to the external world.

In the age of instant accessibility, it is no longer a viable option to have SAP unavailable for an extended period of time. This unavailability would have dramatic affects to not only internal requirements, but would also directly impact a company's suppliers, vendors and customer. Not to mention, affect the public prestige of an organization (which could lead to direct equity impact).

These factors have made it clear to all SAP users that the need for Disaster Recovery for the SAP Landscape is no longer a future request, but a real and current requirement.

The Recovery Problem

Now companies around the world are trying to answer the question on how to remotely recover their SAP Landscape. Everyone is realizing that the benefits of the tight integration of SAP with all of their core business processes and outside contacts leads directly to the complexity of recovering SAP within a remote datacenter.

This complexity stems from several areas. Some of these areas are outlined below:

Internal Integration

SAP Corporation has spent years developing tight integration between its functional modules, such as the tight integration between Financials, Customer Relations and Supply Chain. This integration is dependent on the synchronization of each individual module with the others. Therefore, recovery of the SAP Landscape needs to account for existing SAP integration.

External Interfaces

As mentioned earlier, SAP has become the entry point for the outside world. This is true for not only direct human interactions (such as placing an order), but also for outside systems. These interfaces could range from credit card transactions, point-of-sale interfaces, raw material orders and/or shipping and distribution. The recovery of the SAP Landscape needs to account for all of these

external interfaces. Each one of these interfaces has their own requirements that affect the basic operations of a companies internal SAP Landscape.

<u>User Access</u>

The successful recovery of SAP is not complete with interface access or system integration alone. Recovering SAP within a remote datacenter also needs to account for all of the direct user access. This direct access is usually occurring from multiple locations scattered among multiple time zones and countries. This access may be direct through the use of the SAP GUI or externally through the use of the SAP Portal. Issues such as user security controls and access controls are critical to ensure the successful restart of SAP.

<u>Open Technology</u>

One of the other areas that can cause complexity for organizations running SAP is caused by the requirement that SAP run on multiple technologies. To SAP Corporation's credit, they have developed a software suite that can run on multiple Operating Systems ranging from Mainframe, UNIX, and Windows (at the same time). Furthermore, SAP can also use multiple databases, such as ORACLE, DB2/UDB and SQL. This flexibility gives each customer flexibility on how they set-up and configure their specific infrastructures, but also causes complexity on recovery. Recovery needs to take into account the specific requirements generated by each component of the infrastructure, which also includes the network.

<u>Human Dependency</u>

The largest variable in all types of recovery planning is the need and requirement of human interaction. This dependency not only extends the recovery time line (Recovery Time Objective) but also can introduce errors into the recovery process. Disaster Recovery for any business is a stressful situation and normally occurs at the worst possible moment. Furthermore, individuals will and should worry about personal and family responsibilities first.

Solution

It is now apparent that the recovery of SAP is critical for companies, but is also a complex problem that needs to be addressed. As with all complex issues of this scale the solution needs to occur in specific steps. The remote recovery of SAP needs to account for multiple areas of focus. WFT outlines these areas in the following manner:

<u>Data Recoverability:</u> The ability to have quick and secure access to all of your SAP data (with limited to zero transaction/data loss) located in a secondary datacenter.

<u>Infrastructure Recoverability:</u> The ability to recover/restart key infrastructure components and allow remote access to these components located in a secondary datacenter.

<u>Application Recoverability:</u> The ability to recover/restart the SAP Production Landscape taking into account all of the dependencies and priorities that have been dictated by SAP's internal dependencies, external interfaces and user access.

<u>Business Recoverability:</u> The ability to recover interrupted business processes and reconcile individual transactions that have been affected.

WFT has been integrating technologies within the SAP Landscape for many years and has developed an approach for planning and deploying a recovery architecture that will handle SAP Data, Infrastructure and Application Recoverability. WFT's focus allows for simplified Business Recovery requirements, by reducing the amount of data loss (Recovery Point Objective) and reducing the Recovery Time Objective. Furthermore, WFT looks to automate a majority of the steps within the recovery process. This automation removes the dependency of human interaction and human delays.

WFT has developed a multi-phased approach for these types of projects. The approach is outlined below:

Approach

The goal of the following outlined approach is to take tangible steps within each phase of deployment, yet mitigate all possible risk by establishing clear and achievable milestones. Experience has shown that not setting achievable short term goals and deliverables undermines the importance and direction of undertaking this type of complex project.

Before any specific architecture(s) can be developed, WFT will spend the first two phases understanding the current SAP Production Landscape and the desired Remote Recovery requirements looking to be achieved. *It is vital that the recovery scenarios are identified and documented up front.* These recovery scenarios will not only dictate the desired architecture, but will also be used to outline and create the test and acceptance criteria. This test and acceptance criteria are the safe guards in place to ensure that the implemented solution meets all design goals and can be successfully executed.

It is also important that all technical and business owners are engaged and involved during this project. This ownership and participation are not only requirements to the successful completion of this project, but also for the long term viability of the plan and technology.

Phase 1: SAP Application/Landscape Assessment

Scope and Objectives:

The assessment phase concentrates on establishing and identifying a baseline inventory of all SAP critical components within the Production SAP Landscape. Working directly with the identified technical and business owners, WFT will review all existing documentation of the SAP environment. Gaps within the documentation will be identified and specific interviews and/or workshops will be undertaken to collect the missing information.

Assessment collection areas of focus:

- Current Infrastructure Layout (Servers, Database, Network, etc…)
- Current SAP Module Landscape
- Current SAP Integration Points and Components (i.e. SAP Bolt-ons)
- Current User Security Policies and Procedures
- User Authentication Infrastructure (Active Directory, SAP Central User Administration, LDAP, etc…)
- Printer Use, Definition and Allocation
- Legacy Data Interfaces to SAP
- Batch Processing and Scheduling

- Application and Infrastructure Monitoring
- Workflow Integration (i.e. e-Mail)
- Environmental Requirements
- Backup/Recovery (On-line, Off-Line & Off-Site)
- Application and Infrastructure Change Management
- Primary Datacenter Shutdown/Restart Procedure

Deliverables:

- High-Level Power Point Presentation to Review all Collected Information
- Inventory Documentation
- Logical Visio representation of the SAP Landscape within the Primary Datacenter

Benefits:

The overall benefit of Phase 1 is that all teams involved have a clear documented understanding of the current environment. This is important in SAP environments, due to the fact that a several teams are involved in operating and using this Landscape.

Key stakeholders involved in this process are:

- Infrastructure Team
- Database Administrators
- BASIS/NetWeaver Architect Team
- Functional Business Analysts
- Functional Business Owners

This base line will be used as input for phase 2 of the process. A clear understanding of the dependencies and interfaces is a necessary component to successfully planning for achievable recovery targets. Furthermore, it is likely that all of the required information is not centrally located this phase gives all stakeholders a central review and decision point.

Phase 2 - Recovery Definitions and Targets (RTO/RPO)

Scope and Objectives:

Working directly with the identified technical and business owners, WFT will create/review and document each specific Remote Recovery Scenario. Each scenario will have a corresponding set of Recovery Point and Recovery Time Objectives (RPO/RTO). Furthermore, each scenario will have a set of criteria that needs to be met before that recovery process is undertaken.

Defining the criteria for executing a remote recovery scenario is important. During some recovery scenarios time will be wasted debating the use of Local Recovery plans versus the use of Remote Recovery. This type of analysis needs to occur during the planning sessions and not during an actual outage. This type of upfront planning will drastically reduce the response time to each outage and allow all identified resources to act quickly and according to plan.

Examples of Remote Recovery Scenarios are as follows:

- Complete SAP Landscape fail-over (i.e. flood, fire, power outage, etc…)

- Component failure (i.e. cluster failure, circuit breakers, human error, data corruption, etc…)
- Failback Recovery back to the primary datacenter
- Recovery Testing while Primary datacenter is still active
- Recovery Testing while Primary datacenter is not active

Deliverables:

- Logical Visio diagram(s) of the proposed architecture
- Infrastructure Business Impact Analysis Report outlining the infrastructure requirements needed to support the SAP Production Landscape
- Documented Remote Recovery Scenarios with corresponding recovery procedures
- Documented Recovery Objectives

Benefits:

The greatest benefit of Phase 2 is to get a documented agreement from all key stakeholders. Such as:

- Defined achievable recovery targets
- Infrastructure requirements outlined directly to Business Impact
- Documented Recovery Scenarios that can be used as baseline for Standard Operating Procedures (SOP)

This agreement will not only play a vital role in the successful implementation of the Recovery Architecture, but will also facilitate future architectural direction.

Phase 3 - Overall Recovery Design (Data, Infrastructure, Application)

Scope and Objectives:

Taking the deliverables of the previous phase, WFT will work with the identified NetWeaver Architects and IT resources to design the overall recovery architecture. This architecture will need to handle each recovery scenario identified and outline the process on how the recovery will be achieved. Therefore, each scenario will have the prescribed procedure on how it will be initiated and executed. Furthermore, these procedures will be used as the official Test and Acceptance Plan that will be executed during the implementation phases.

One key aspect to the design is taking into account not only the successful implementation and execution of identified recovery scenarios, but also the day-to-day operational support needs of an SAP environment. These operational needs cannot be overlooked, since they will impact the success or failure of running SAP in not only the primary datacenter, but also the secondary data center.

With this in mind, WFT looks to implement the same operational procedure in both the primary and secondary datacenters. Having the same procedure in both datacenters allows for seamless production operations during fail-over mode (active production running within the secondary datacenter).

Operational areas of focus are normally comprised of the following:

- Local Recovery Process (Backup and Recovery)
- High Availability

- SAP System Copies
- On-Going Performance Optimization
- Provisioning and Allocation

WFT's unified design incorporating not only remote recovery, but also day-to-day operations as local recovery and system copies, not only allows the IT organization to continue to execute on a defined process but also facilitates a well trained staff.

Deliverables:

- Overall design document
- Physical layout of the required infrastructure
- Bill of Material for needed infrastructure components
- Network Recovery Design
- Processing Recovery Design
- Server Repurposing Design
- Storage Recovery Design
- Client Architecture
- Application Recovery Design
- Application Restart Dependencies and Procedure
- Secondary Datacenter Backup and Recovery Design
- Workflow and Plan for SAP Fail-over
- Recommendations for SAP Local Recovery Architecture
- Recommendations for SAP System Copy Architecture
- Recommendations for SAP High Availability Architecture

Benefits:

Phase 3 outlines the actual plan and architecture that will be implemented in the following phases. WFT will incorporate all of the known SAP Infrastructure best practices into this overall design.

By building the baseline in Phase 1, getting agreement of Recovery Requirements in Phase 2, the results of Phase 3 will meet all of the key stakeholder's requirements.

It is recommended that the overall design documentation stays as an open document that can be modified as part of the Change Management Process. This will ensure that the created architecture and assumptions remain up to date and viable for future Recovery Testing.

Phase 4 - Data Recovery Implementation

Scope and Objectives:

This phase will concentrate on setting up the baseline infrastructure needed to implement the rest of the solution. WFT will concentrate on achieving data replication between the two identified datacenters. This replication will take into account the complexities of the SAP Landscape (the need for a consistent image/replica of the entire production landscape, i.e. "Federated Data Model") and the need for operational support of both sites.

Deliverables:

- Working data replication between primary and secondary data centers
- Modification of monitoring software or creation of monitoring environment to ensure the proper status of the replication link
- Testing and analysis of network connectivity and affectiveness
- Documentation on the replication methodology and implementation
- Successful data fail-over test
- Implementation of a secondary "master" copy of production data at secondary site
    - Will ensure data integrity on fail-over
    - Used as data fail-over testing environment

Benefits:

First phase of the delivery is now completed. SAP now has a consistent and recoverable copy of all key components housed within the secondary datacenter.

Recovery Point Objective is now achieved. Data replication will ensure that the target RPO is continuously active and monitored. If a failure occurs after this phase, SAP data will not be lost, however, Recovery Time is still extensive.

Phase 5 - Infrastructure Recovery Implementation

Scope and Objectives:

Now that data recovery and data replication is in place, ensuring a consistent RPO, Infrastructure Recovery begins the process of configuring and automating the recovery time (RTO). Infrastructure recovery will implement all of the identified and architected components of the infrastructure that are needed to successfully re-start the SAP Landscape.

This phase begins by setting up routines/jobs that will capture and store the existing configuration of the secondary datacenter. A necessary step to ensure that after the production environment fails-back to the primary datacenter, the secondary datacenter can return to normal operations.

As each component of the infrastructure is modified and/or implemented, WFT will look to automate all possible aspects of the re-configuration. Re-configuration will occur in the following areas:

- Network Infrastructure
- Server/Processing Infrastructure
- Storage Infrastructure

The implementation of this phase is complete when the secondary datacenter can assume the identity of the primary datacenter. All key SAP infrastructure components are prepared for the SAP Re-Start Procedure to begin.

Deliverables:

- Capture and store existing configuration information for fallback on secondary datacenter
- Network Configuration Changes
    - Firewall
    - DNS
    - Domain Names

- o   Sub-nets
- Server Configuration Changes
    - o   Cluster Configuration
    - o   Server Repurpose (Non-Production)
    - o   Operating System Configuration and Host Name
    - o   Printer Allocation
- Storage Configuration Changes (SAN/NAS)
- Authentication Configuration Changes
    - o   Active Directory
    - o   LDAP
- Operational Configuration Changers
    - o   Local Recovery
    - o   SAP System Copies
    - o   High Availability

Benefits:

At the completion of Phase 5, the secondary datacenter and infrastructure are ready for the SAP Landscape. All external and internal links have been re-established and IT resources can now begin normal infrastructure operations.

All re-configuration activities that can be automated are now in place and tested. Change Management will be in place to ensure that all production datacenter changes are cross implemented within the secondary datacenter.

Phase 6 - Application Recovery Implementation

Scope and Objectives:

This phase will look to configure and automate, where possible, the recovery of the SAP Production Application Landscape. Application recovery will start with the Database. Database processing will occur to ensure that each SAP instance has gone through crash recovery procedures and are stable.

Re-start will then move through the SAP Central Instance and Application/Batch Servers. Order dependency has been set during the planning phases. Once the core SAP components are on-line and re-connected, the re-start procedure will move through the support applications such as the bolt-ons and batch scheduler.

Once all of the applications are on-line and accessible the recovery has been completed and business/user testing can now begin.

Deliverables:

- Validation of all NFS Mounts
- Database Configuration, Recovery and Automation
- SAP Central Instance Restart and Automation
    - o   Services
    - o   Ports
    - o   Listeners
    - o   Etc…

- SAP Application and Batch Server Restart and Automation
- SAP Bolt-on Restart and Automation
- SAP Scheduler Restart
- SAP and Infrastructure Monitoring Software Restart
- External Interface Restart and Check
- User/Server Certificate Re-authentication

Benefits:

The SAP Production Landscape is now recovered and re-started! Automation is in-place to limit the amount of human intervention and limit the potential for human error.

Recovery Time Objectives have been executed and completed.

Phase 7 - D/R Testing

Scope and Objectives:

Designing and implementing a robust recovery architecture for the Production SAP Landscape does not complete the overall recovery process. Testing of the Remote Recovery needs to occur on a continuous basis.

The Production SAP Landscape is not a static environment. Changes occur within the application and supporting infrastructure with a high level of frequency. Change Management is in place to ensure that all changes are properly replicated within both datacenters, but testing will need to occur to validate the changes.

The D/R Testing Phase is a scheduled event, most likely on an annual or bi-annual basis. Each test should have multiple objectives:

- Ensure change management has not affected recovery automation
- Modify re-start procedure dependent on additional interfaces, modules and/or bolt-ons
- Look for processing efficiencies in the re-start process or business/end-user testing

At the completion of each test, lessons learned will be documented and acted upon.

Deliverables:

- Test of complete recovery /re-start process
- Documented lessons learned of each test
- Recommendations on how the process can be modified to accommodate for lessons learned

Benefits:

No Remote Recovery process is complete and/or successful with-out continuous testing. Testing will not only ensure a properly working process and technology, but will also give customer personnel real-life experience on how to execute and manage the process.

Summary

It is not uncommon for companies to invest as much as 45% to 65% of the total IT budget in implementing and supporting their SAP Landscape. SAP becomes part of the everyday business process. This integration drives the need for availability and data protection.

However, all of this does come at a price. That price is the complexity of the overall landscape. WFT's goal is to bring proven methodologies and best practice architectures to simplify and automate the SAP Disaster Recovery Process. Integrating key infrastructure and application technologies and having a defined, repeatable recovery process is the corner stone to a successful recovery.

In summary, WFT has the experience to help design and implement a robust SAP Disaster Recovery Solution that can be continuously tested and refined as the SAP Landscape evolves over time.

Who to Contact

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