



# **TR-4891: SAP HANA disaster recovery with Azure NetApp Files**

## **NetApp Solutions**

Dorian Henderson, Ivana Devine  
July 21, 2021

This PDF was generated from [https://docs.netapp.com/us-en/netapp-solutions/ent-apps-db/saphana-dr-anf\\_data\\_protection\\_overview\\_overview.html](https://docs.netapp.com/us-en/netapp-solutions/ent-apps-db/saphana-dr-anf_data_protection_overview_overview.html) on August 03, 2021. Always check docs.netapp.com for the latest.

# Table of Contents

- TR-4891: SAP HANA disaster recovery with Azure NetApp Files ..... 1
  - Business application requirements ..... 1
  - High availability ..... 2
  - Logical corruption ..... 2

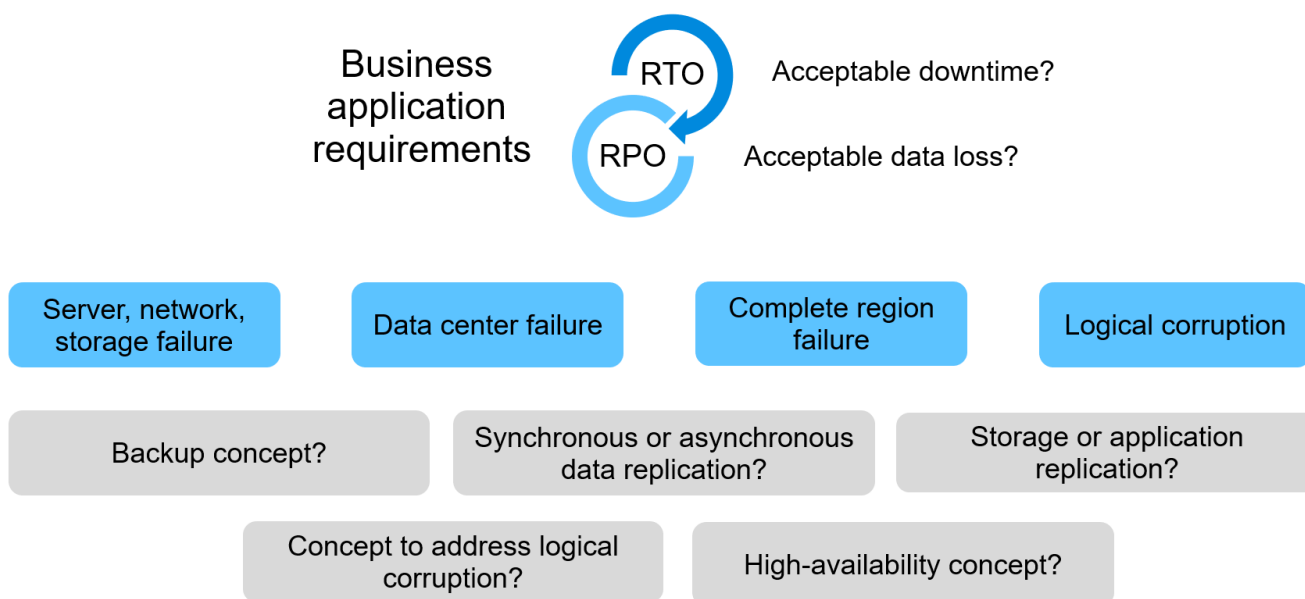
# TR-4891: SAP HANA disaster recovery with Azure NetApp Files

Nils Bauer, NetApp  
Ralf Klahr, Microsoft

Studies have shown that business application downtime has a significant negative impact on the business of enterprises. In addition to the financial impact, downtime can also damage the company's reputation, staff morale, and customer loyalty. Surprisingly, not all companies have a comprehensive disaster recovery policy.

Running SAP HANA on Azure NetApp Files (ANF) gives customers access to additional features that extend and improve the built-in data protection and disaster recovery capabilities of SAP HANA. This overview section explains these options to help customers select options that support their business needs.

To develop a comprehensive disaster recovery policy, customers must understand the business application requirements and technical capabilities they need for data protection and disaster recovery. The following figure provides an overview of data protection.



## Business application requirements

There are two key indicators for business applications:

- The recovery point objective (RPO), or the maximum tolerable data loss
- The recovery time objective (RTO), or the maximum tolerable business application downtime

These requirements are defined by the kind of application used and the nature of your business data. The RPO and the RTO might differ if you are protecting against failures at a single Azure region. They might also differ if you are preparing for catastrophic disasters such as the loss of a complete Azure region. It is important to evaluate the business requirements that define the RPO and RTO, because these requirements have a significant impact on the technical options that are available.

# High availability

The infrastructure for SAP HANA, such as virtual machines, network, and storage, must have redundant components to make sure that there is no single point of failure. MS Azure provides redundancy for the different infrastructure components.

To provide high availability on the compute and application side, standby SAP HANA hosts can be configured for built-in high availability with an SAP HANA multiple-host system. If a server or an SAP HANA service fails, the SAP HANA service fails over to the standby host, which causes application downtime.

If application downtime is not acceptable in the case of server or application failure, you can also use SAP HANA system replication as a high-availability solution that enables failover in a very short time frame. SAP customers use HANA system replication not only to address high availability for unplanned failures, but also to minimize downtime for planned operations, such as HANA software upgrades.

# Logical corruption

Logical corruption can be caused by software errors, human errors, or sabotage. Unfortunately, logical corruption often cannot be addressed with standard high-availability and disaster recovery solutions. As a result, depending on the layer, application, file system, or storage where the logical corruption occurred, RTO and RPO requirements can sometimes not be fulfilled.

The worst case is a logical corruption in an SAP application. SAP applications often operate in a landscape in which different applications communicate with each other and exchange data. Therefore, restoring and recovering an SAP system in which a logical corruption has occurred is not the recommended approach. Restoring the system to a point in time before the corruption occurred results in data loss, so the RPO becomes larger than zero. Also, the SAP landscape would no longer be in sync and would require additional postprocessing.

Instead of restoring the SAP system, the better approach is to try to fix the logical error within the system, by analyzing the problem in a separate repair system. Root cause analysis requires the involvement of the business process and application owner. For this scenario, you create a repair system (a clone of the production system) based on data stored before the logical corruption occurred. Within the repair system, the required data can be exported and imported to the production system. With this approach, the productive system does not need to be stopped, and, in the best-case scenario, no data or only a small fraction of data is lost.



The required steps to setup a repair system are identical to a disaster recovery testing scenario described in this document. The described disaster recovery solution can therefore easily be extended to address logical corruption as well.

# Backups

Backups are created to enable restore and recovery from different point-in-time datasets. Typically, these backups are kept for a couple of days to a few weeks.

Depending on the kind of corruption, restore and recovery can be performed with or without data loss. If the RPO must be zero, even when the primary and backup storage is lost, backup must be combined with synchronous data replication.

The RTO for restore and recovery is defined by the required restore time, the recovery time (including database start), and the loading of data into memory. For large databases and traditional backup approaches, the RTO can easily be several hours, which might not be acceptable. To achieve very low RTO values, a

backup must be combined with a hot-standby solution, which includes preloading data into memory.

In contrast, a backup solution must address logical corruption, because data replication solutions cannot cover all kinds of logical corruption.

## **Synchronous or asynchronous data replication**

The RPO primarily determines which data replication method you should use. If the RPO must be zero, even when the primary and backup storage is lost, the data must be replicated synchronously. However, there are technical limitations for synchronous replication, such as the distance between two Azure regions. In most cases, synchronous replication is not appropriate for distances greater than 100km due to latency, and therefore this is not an option for data replication between Azure regions.

If a larger RPO is acceptable, asynchronous replication can be used over large distances. The RPO in this case is defined by the replication frequency.

## **HANA system replication with or without data preload**

The startup time for an SAP HANA database is much longer than that of traditional databases because a large amount of data must be loaded into memory before the database can provide the expected performance. Therefore, a significant part of the RTO is the time needed to start the database. With any storage-based replication as well as with HANA System Replication without data preload, the SAP HANA database must be started in case of failover to the disaster recovery site.

SAP HANA system replication offers an operation mode in which the data is preloaded and continuously updated at the secondary host. This mode enables very low RTO values, but it also requires a dedicated server that is only used to receive the replication data from the source system.

[Next: Disaster recovery solution comparison.](#)

## Copyright Information

Copyright © 2021 NetApp, Inc. All rights reserved. Printed in the U.S. No part of this document covered by copyright may be reproduced in any form or by any means-graphic, electronic, or mechanical, including photocopying, recording, taping, or storage in an electronic retrieval system-without prior written permission of the copyright owner.

Software derived from copyrighted NetApp material is subject to the following license and disclaimer:

THIS SOFTWARE IS PROVIDED BY NETAPP "AS IS" AND WITHOUT ANY EXPRESS OR IMPLIED WARRANTIES, INCLUDING, BUT NOT LIMITED TO, THE IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE, WHICH ARE HEREBY DISCLAIMED. IN NO EVENT SHALL NETAPP BE LIABLE FOR ANY DIRECT, INDIRECT, INCIDENTAL, SPECIAL, EXEMPLARY, OR CONSEQUENTIAL DAMAGES (INCLUDING, BUT NOT LIMITED TO, PROCUREMENT OF SUBSTITUTE GOODS OR SERVICES; LOSS OF USE, DATA, OR PROFITS; OR BUSINESS INTERRUPTION) HOWEVER CAUSED AND ON ANY THEORY OF LIABILITY, WHETHER IN CONTRACT, STRICT LIABILITY, OR TORT (INCLUDING NEGLIGENCE OR OTHERWISE) ARISING IN ANY WAY OUT OF THE USE OF THIS SOFTWARE, EVEN IF ADVISED OF THE POSSIBILITY OF SUCH DAMAGE.

NetApp reserves the right to change any products described herein at any time, and without notice. NetApp assumes no responsibility or liability arising from the use of products described herein, except as expressly agreed to in writing by NetApp. The use or purchase of this product does not convey a license under any patent rights, trademark rights, or any other intellectual property rights of NetApp.

The product described in this manual may be protected by one or more U.S. patents, foreign patents, or pending applications.

RESTRICTED RIGHTS LEGEND: Use, duplication, or disclosure by the government is subject to restrictions as set forth in subparagraph (c)(1)(ii) of the Rights in Technical Data and Computer Software clause at DFARS 252.277-7103 (October 1988) and FAR 52-227-19 (June 1987).

## Trademark Information

NETAPP, the NETAPP logo, and the marks listed at <http://www.netapp.com/TM> are trademarks of NetApp, Inc. Other company and product names may be trademarks of their respective owners.