

InfoSphere VDP Tech Brief

IBM InfoSphere Agility Solution Working With Existing Backup Products for Oracle and SQL Server

As more and more enterprises look to speed up the application development using production databases such as Oracle and SQL Server, IBM InfoSphere Agility Solution will often be required to coexist with legacy backup products working off the same production database environments. IBM InfoSphere Agility Solution can co-exist with other products capturing data from production databases, following that the best practices described in this document.

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Database Logs (Oracle Archivelogs and SQL Transaction Logs)

Database logs are used to capture individual transactions in a database, enabling point-in-time recoveries. Most agility use cases center around getting database snapshots on a periodic basis from production. Common frequency ranges from daily to weekly or biweekly, depending on the use case. As a result, application developers do not commonly have the need to position their non-prod instance to a specific point-in-time from the source (production). This usually eliminates the need to capture and manage logs as a part of an IBM InfoSphere Agility Solution.

Requirement	Only one system can manage (capture and/or truncate/purge) logs, either the legacy backup software or VDP.
Best Practice	Continue to allow all log management be performed by the legacy backup software, do not use VDP to protect logs in this environment.
Reason	If VDP is configured to manage (capture and/or truncate/purge) logs, and the legacy backup software is also capturing and/or truncating/purging logs, then one or both systems may end up with an incomplete log chain, making it difficult or impossible to recover the database to a specific point in time.

Oracle Archive Logs

Oracle uses archive logs generated during an RMAN job to ensure the consistency and recoverability of that job. As a result, if archive logs are purged during another RMAN job, that RMAN job will be unrecoverable.

Requirement	Do not allow Oracle archive logs to be purged during a VDP job, and do not allow VDP to purge archive logs during a legacy backup RMAN job.
Best Practice	Configure VDP jobs to disable archive log purge jobs in the legacy backup software at the start of the job, and resume purge jobs at the end.
Reason	If archive logs are purged during an RMAN job, that database backup/image copy will be corrupt and unrecoverable.

Oracle Block Change Tracking (BCT)

One of the common database environments where we need to coexist with legacy backup solutions is for Oracle databases. In addition to the potential conflict with log file handling described in the previous section, we also must be aware of a potential conflict related to Oracle's Block Change Tracking (BCT).

Enterprise Oracle database environments can be configured to track changed blocks between RMAN backups. These changed blocks are tracked using a block change counter. Some RMAN operations, including full backups and incremental merge operations, reset the counters. After a counter reset, the next incremental backup job will need to scan the entire database to determine which blocks have changed, impacting the duration of that job, and performance of the database.

VDP will benefit from BCT when it is enabled, but only if no other operations take place that reset the counters in-between VDP jobs. Likewise, when a VDP job runs, it performs an incremental merge, resetting the BCT counters and impacting the subsequent backup job from any legacy backup system.

Environments that **are** impacted by a possible BCT conflict:

- Any environment where Oracle BCT is enabled, either for legacy backup solutions or for VDP.

Environments that **are not** impacted by a possible BCT conflict:

- Environments running Oracle non-Enterprise - BCT requires Oracle Enterprise
- Environments running Oracle backups from a Data Guard standby database, with non-active Data Guard (only an Active Data Guard license enables BCT on the replica)
- Environments where RMAN is not being used for the legacy backups (i.e. exports or snapshots with hot-backup mode).

Requirement	If the customer relies on BCT with daily incremental backups to meet data protection SLAs, do not configure VDP for daily captures to enable agility use cases. Doing so will result in extended daily backup windows, possibly causing a lack of compliance with their data protection SLAs, and increasing I/O workload on the server during the backup window.
Best Practice	Schedule VDP to capture data from production weekly or less often. If the legacy backup solution performs a weekly full/daily incremental rotation, schedule the VDP update to take place after the last incremental and before the full. The VDP job will perform a full scan of the database to identify the changed blocks, so plan accordingly for job duration and I/O.
Reason	After each VDP job, any subsequent RMAN job (other than another VDP job) will perform a full database scan. For a full backup this is a non-issue, but for an incremental it will cause increased I/O and a longer duration than a typical BCT-enabled job. Additionally, if any RMAN full takes place between VDP jobs, the subsequent VDP job will perform this full scan to identify the changes. This needs to be planned for when scheduling, and anticipated if monitoring I/O levels.

Microsoft SQL Server

Unlike Oracle, Microsoft SQL Server (MSSQL) does not provide a method of tracking changed blocks that can be used to maintain a separate database copy with only incremental-forever block level changes. To achieve this unique ability, IBM InfoSphere has developed a method of performing this Change Block Tracking (CBT). As a result, existing backup solutions leveraging native SQL or other proprietary methods of obtaining the backups will not be impacted by a regularly scheduled VDP data capture job.

The possibility of a conflict with transaction log truncation does still exist. See [Database Logs \(Oracle Archivelogs and SQL Transaction Logs\)](#) on page 1 for details.

Important Scheduling Considerations

For both Oracle and SQL Server, traditional backup jobs can be very I/O intensive. They may have long durations, and may impact performance of the database during the backup windows. While IBM InfoSphere has taken great strides to minimize impact during VDP jobs, even a block-level incremental-forever update must generate some I/O, and must take a little time.

In addition to a possible performance impact, it is possible for concurrently running Oracle RMAN jobs initiated by separate applications to interfere with each other. As a result, Oracle recommends that only a single RMAN job be performed at any given time on a database. IBM InfoSphere has implemented a safety check to help comply with this Oracle recommendation. At the start of an IBM InfoSphere RMAN job, we check for any other active RMAN jobs. If any are found, we will not start the job. However, not all backup software behaves this way. If an IBM InfoSphere RMAN job is active when a legacy backup product initiates another job, it may cause problems for both jobs, and possibly for the database.

Requirement	Do not schedule legacy backup software and VDP to run jobs in a way that would allow any overlap in time.
Best Practice	Schedule VDP Oracle jobs to begin at a time when the legacy backup software should be finished. Do not schedule the legacy backup software to run immediately after a VDP job would normally complete.
Reason	If legacy backup jobs and VDP jobs run concurrently, it may result a serious performance impact on the database server leading to instability and possibly an outage. Additionally, for Oracle, this may result in invalid images for one or both solutions.

Overall Positioning

1. Start with copy data virtualization. Position Resiliency (Backup & DR), Agility (test dev workflow), & Mobility (migration to cloud)
2. If there is resistance to overhaul the entire backup portfolio and they are interested primarily in Agility, position resiliency and agility for just the databases and the dependent servers such as web and app servers.
3. If there is resistance to replacing the backup product for Oracle & SQL databases as well, then position Agility for those databases and explain the constraints and best practices.