COHESITY

Cohesity DataPlatform with MS SQL Server AlwaysOn Availability Group Solution Guide

Abstract
This solution guide outlines the workflow for creating backups with Microsoft SQL Server AlwaysOn Availability Group (AAG) databases and Cohesity Data Platform.

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About this Guide

This paper details the steps for protecting AAG databases.

IT administrators are defined as individuals who have the role of managing storage and data protection of applications (virtual or physical) in a data center. Databases administrators are individuals who have the purpose of managing Microsoft SQL Servers.

Intended Audience

This paper is written for IT administrators and DBAs familiar with managing data protection for Microsoft SQL Server. Cohesity recommends having familiarity with the following:

- **Cohesity DataProtect:** Cohesity DataProtect is an end-to-end data protection solution that is fully converged on Cohesity DataPlatform.
- **Microsoft SQL Server:** Microsoft SQL Server is a relational database management system, which supports a wide variety of transaction processing, business intelligence and analytics applications.
- **Microsoft SQL Server AAG:** Availability Groups is a Microsoft SQL Server database mirroring technique which allows the grouping of user databases that can failover together.

The Microsoft SQL Server referenced in this paper have the following resources

- 3 Node Failover cluster with SQL AlwaysOn Availability Groups.
- 4 vCPU cores
- 8 GB RAM
- 2 x iSCSI disks
- Microsoft SQL Server 2014 (X64) Enterprise Ed.
- Windows Server 2016.

Microsoft SQL Server AlwaysOn

The AlwaysOn Availability Groups feature is a high-availability and disaster-recovery solution that provides an enterprise-level alternative to database mirroring. AlwaysOn Availability Groups maximizes the availability of a set of user databases for an enterprise. An availability group supports a failover environment for a discrete set of user databases, known as availability databases, that failover together. An availability group supports a set of read-write primary databases and one to four sets of corresponding secondary databases[1]. For more information, read AlwaysOn Availability Groups (SQL Server)

Configuration Overview

Cohesity supports backing up MS SQL Server running on VMware and Physical Servers. The Cohesity Cluster captures Full Database Server Backups and can optionally backup database transaction logs, so you can roll forward to any point in time.

To learn more about the relationship between Protection Jobs and Policies, see About Policies and Protection Jobs. For instructions on how to use the Cohesity Dashboard to backup MS SQL Server, see Add or Edit a Protection Job to Protect Microsoft SQL Server.

Service Accounts and Permissions

Cohesity recommends the service account be an Active Directory domain user account and a member of the local administrative group on the MS SQL Windows Server, with logon rights to install the Cohesity Windows Agent. The account must also have the sysadmin server role on the Microsoft SQL Server Instance.

[1] *"AlwaysOn Availability Groups (SQL Server)", Microsoft Corp., https://docs.microsoft.com/en-us/previous-versions/sql/sql-server-2012/hh510230(v=sql.110)*

Installing Cohesity Windows Agent

Download Cohesity Agent

From each node in the SQL AAG cluster, log into the host node with an Administrator level account. Use the internet browser to connect with your Cohesity Cluster. Login into the Cohesity Cluster UI. Navigate to Protection->Sources-> "Download Physical Agent" and download the agent. (see figure 1). For more details please refer to the Cohesity document "Install and Manage the Agent on Windows Servers".

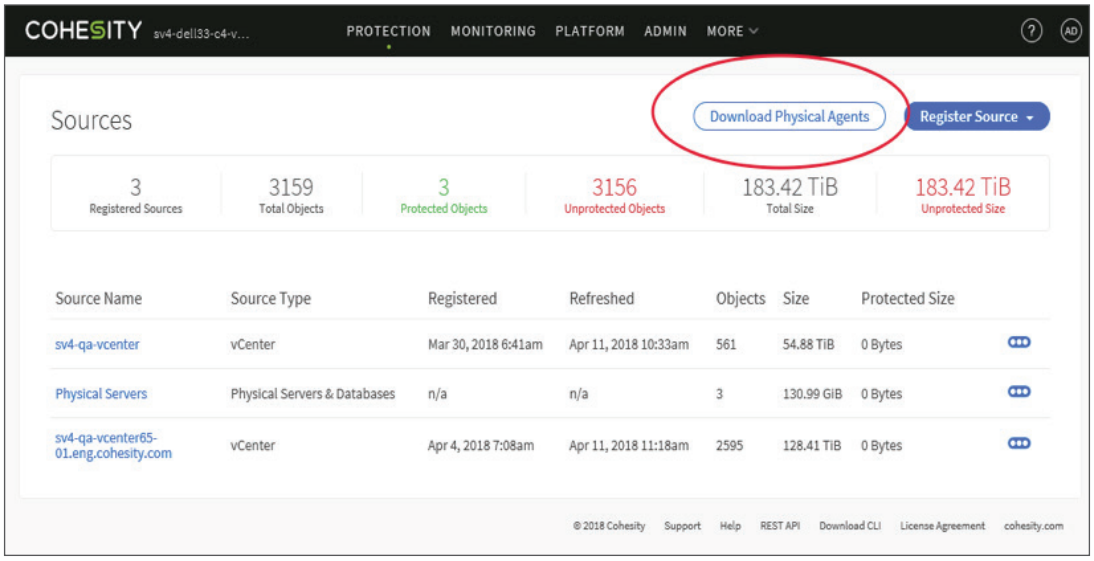

Figure 1 – Download Cohesity Physical Agent

Select Cohesity Windows Agent Type

From the "Download Agents" window, choose the Windows Agent. Ensure the Agent has been downloaded to the Server you want to protect.

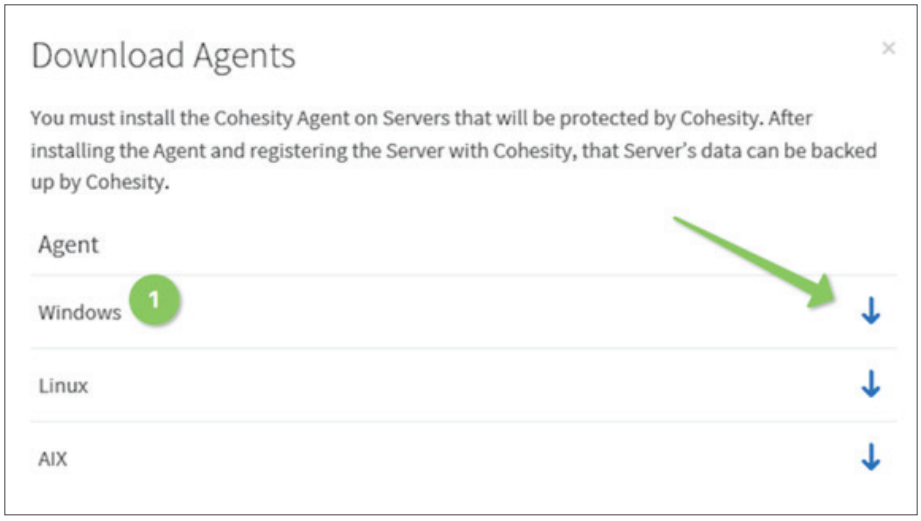

Figure 2 – Cohesity Windows Agent

Install the Cohesity Agent

As an administrator with local system privileges on the Microsoft SQL Server, run the executable and complete the installation wizard.

Figure 3 – Cohesity Agent Setup

Cohesity Agent Setup

Select the components and location of the Cohesity Agent install. By default, the **Volume CBT (Change Blocks Tracker)** component is selected for installation. This component is required to perform incremental backups and requires a reboot to function. Without a reboot, only Full backups can be performed on the Server. You can deselect the Volume CBT component and install only the Agent service, which can be used to perform full backups.

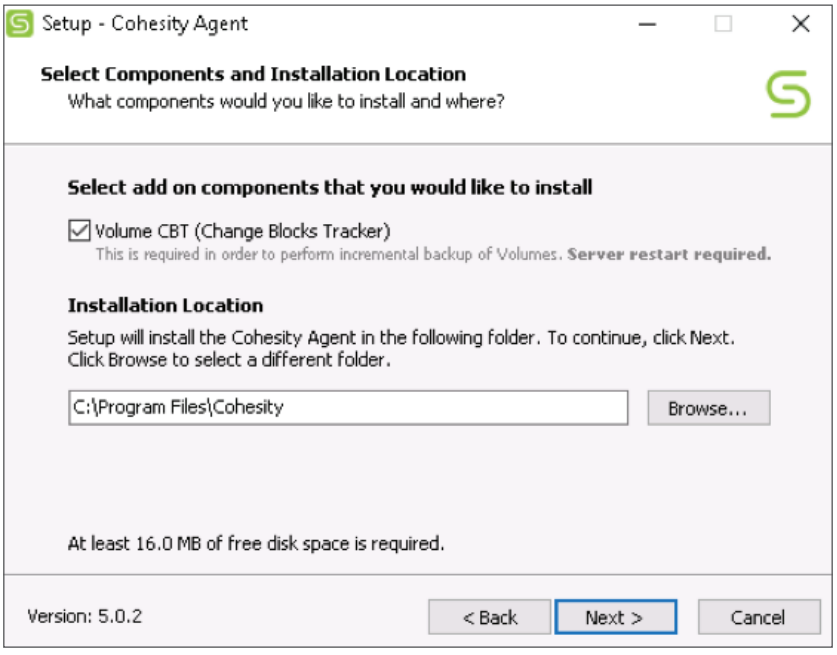

Figure 4 – Cohesity Components

Specify the service account

Cohesity recommends the service account be an Active Directory domain user account and a memberof the local administrative group on the MS SQL Windows Server, with logon rights to install the Cohesity Windows Agent. The account must also have the sysadmin server role on the Microsoft SQL Server Instance.

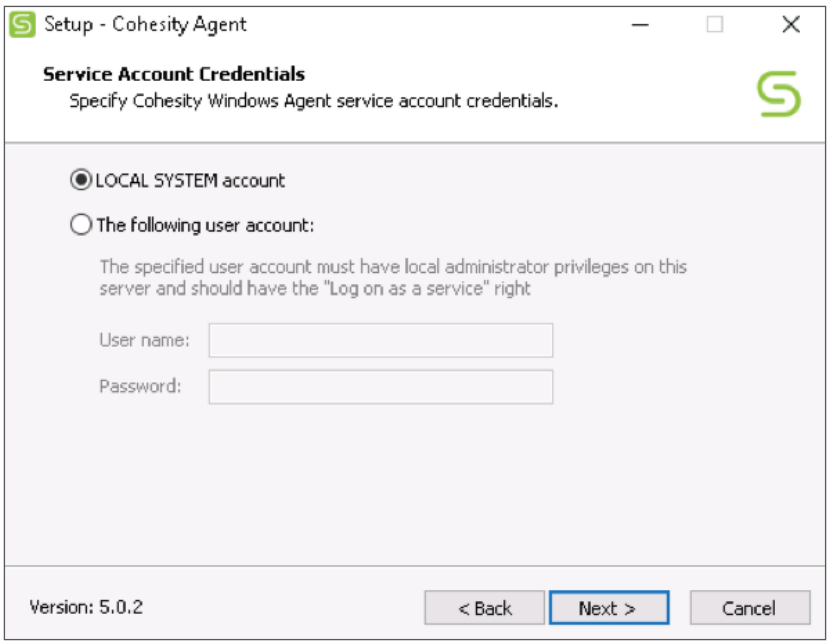

Figure 5 – Specify Service Account

Restart the MS SQL Windows server and verify the Cohesity Agent is running. Repeat the Cohesity Windows Agent Install process on all Microsoft SQL Server AAG nodes that will be protected using Cohesity DataProtect.

Registration of MS SQL Server

Registration of MS SQL Server AAG is a two-step process; Register all the nodes which belong to AAG as a Physical Server on the Cohesity cluster. And secondly, register the MS SQL Server applications.

Register as a Physical Source

Login to to the Cohesity Cluster UI. Navigate to Protection(Tab)->Sources->Register Source->Physical Server.

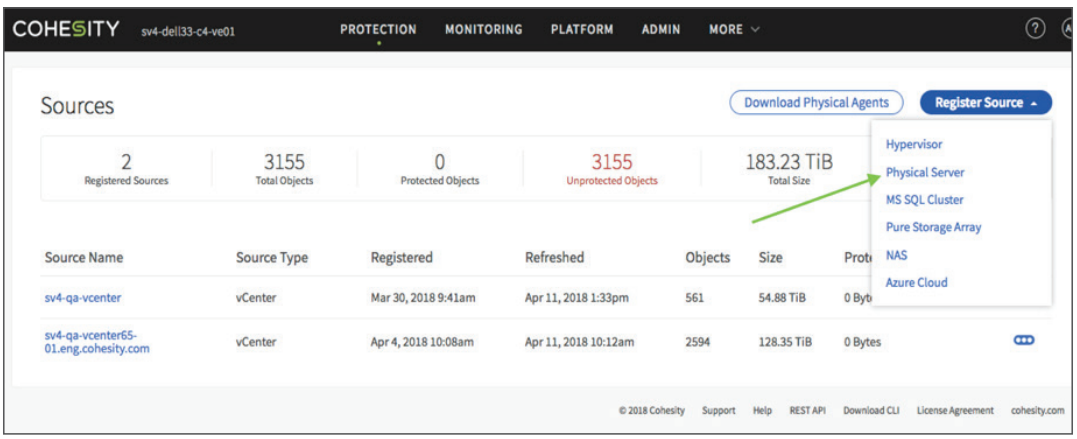

Figure 6 – Cohesity Sources

Cohesity supports registering physical servers by fully qualified domain name (FQDN) or IP addresses. However, it is recommended to register the servers using the FQDN. In this example, 'WIN16SQL14N2.qa01.eng.cohesity.com' is used to register the server as a source.

When Server registration finishes, a new entry appears in the Physical Servers container on the Sources page.

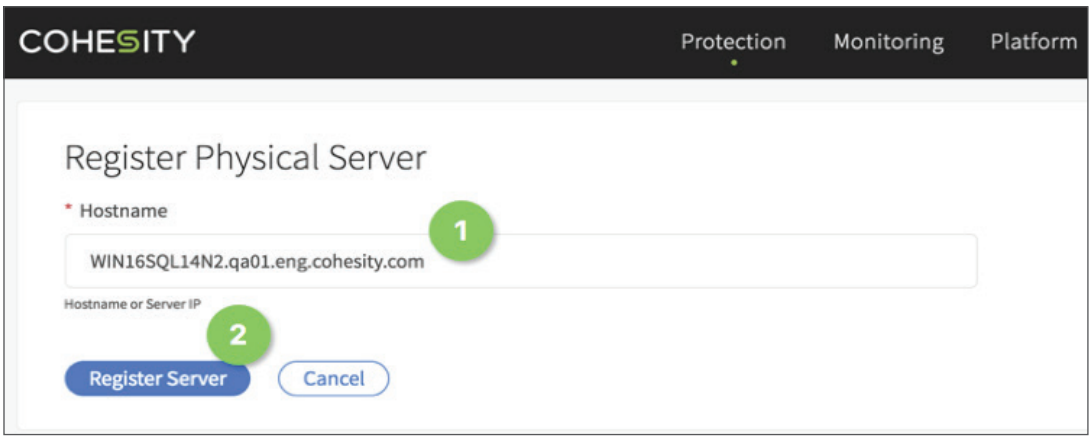

Figure 7 – Using FQDN

Register the server as a MS SQL Server

Now you can register MS SQL Server that is running on the Physical Server with the Cohesity Cluster. Click on the icon and choose "Register as MS SQL Server". Figure 8 shows a MS SQL Server successfully registered as a MS SQL Server Cohesity Source.

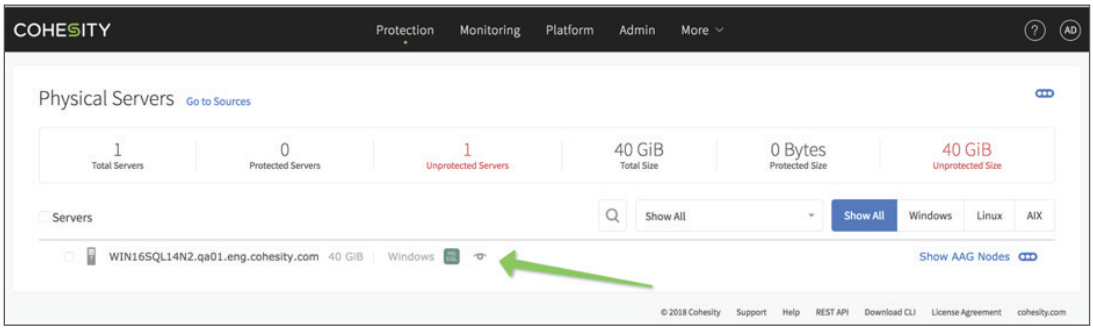

Figure 8 – Cohesity MS SQL Server Source

Click on "Show AAG Nodes", the Cohesity UI will dynamically show all the MS SQL Servers that are part of the Always On Availability Group Nodes. In the drop-down window of the AAG group, the unregistered AAG nodes will also be displayed in red (see figure 9). For all SQL Servers in the AAG group, repeat the previous two steps. More information on registering MS SQL Server as a Cohesity Source can be found in Register or Edit an MS SQL Cluster.

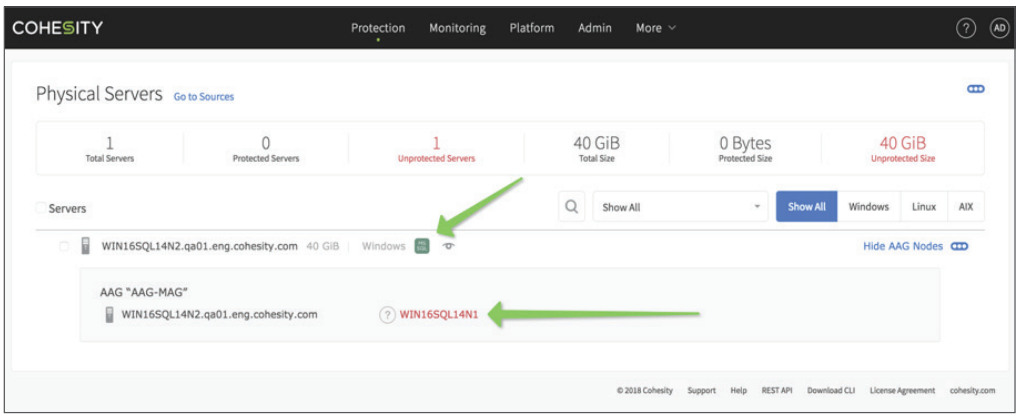

Figure 9 – Cohesity Source with AAG detail

Successful registration

Successful registration of all AAG nodes. Cohesity clearly identifies which nodes are related by AAG. All nodes are now ready to be a source for a Protection Job.

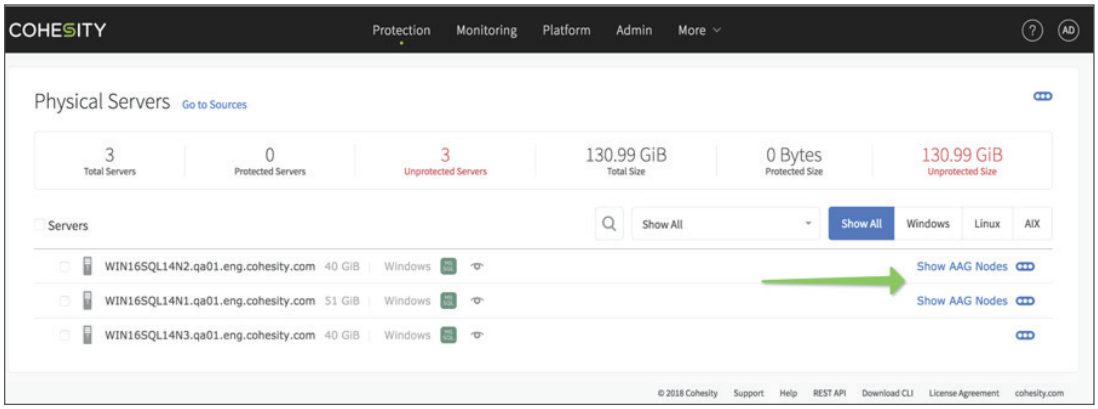

Figure 10 – Cohesity Registration of All AAG nodes

Registration Detail

The registration detail shows the SQL Server Instances which are related by AAG.

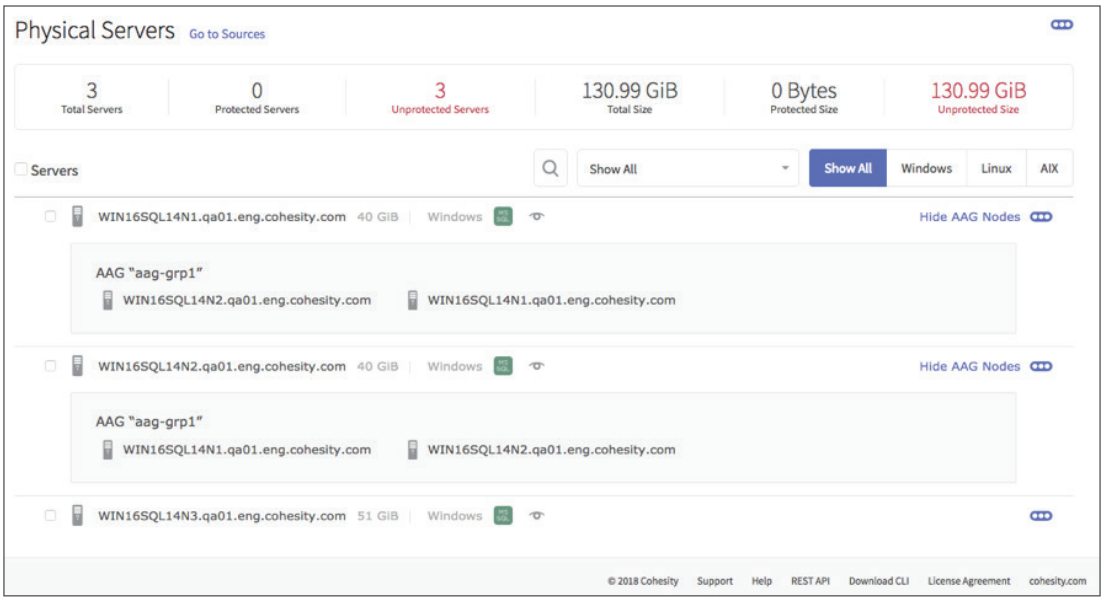

Figure 11 – Cohesity AAG Registration Detail

Create a Protection Job

Create a protection job for your MS SQL AAG servers

Protection Tab

Navigate to Protection(Tab)->Protection Jobs->Create Job->MS SQL Server.

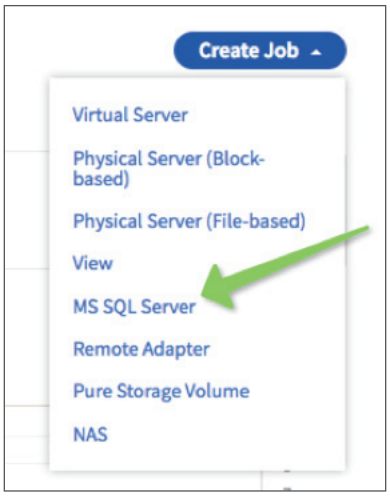

Figure 12 – Cohesity Protection Job Tab

Select a Policy

A Protection Policy is a reusable group of settings that define how and when Virtual and Physical Servers, Views, Database Servers, are protected, replicated and archived. Select an existing protection policy or create a new protection policy and then select Next. Please refer to Cohesity document on "Policy and Protection" for creating a new protection policy.

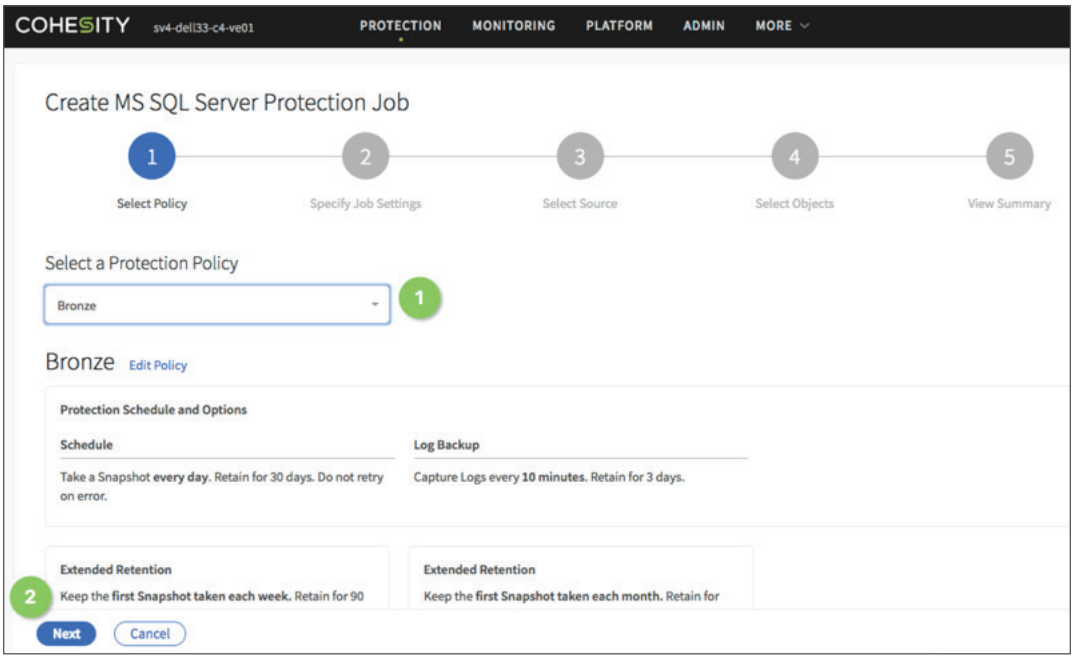

Figure 13 – Cohesity Protection Policy

Specify MS SQL Settings

Click on “MS SQL Setting” to expand it. The MS SQL Settings provides the following options:

User Databases - Select the **User Databases** to backup all user databases.

Systems Databases - Select whether to backup **System Databases**.

AAG Backup Preferences

AAG Backup Preferences determine which replica is used to take a backup.
Cohesity gives you control over which settings to use to to indicate which replica to take a backup from. MS SQL Server Preferences can be used, or Cohesity AAG Backup Preferences can be used by overriding Server Preferences and using AAG Backup Preferences in the Cohesity UI.

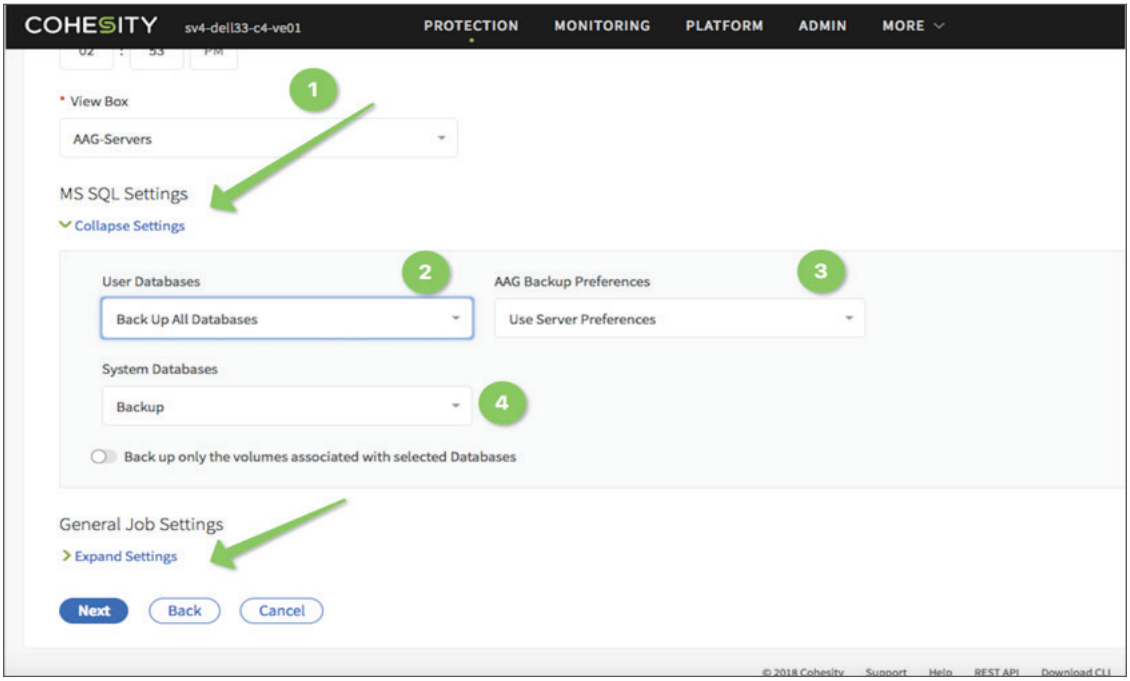

Figure 14 – Cohesity MS SQL Protection Settings

In general, the key to understanding MS SQL Server AAG Backup Preferences includes the following:

- The settings are indicators only. They are logical flags which have no functionality behind them and the logical flags are read by AAG “aware” backup mechanisms such as MS SQL Server Maintenance Plans.
- The terms “Prefer”, “Available”, “Replica” are also important. Prefer means higher priority; Available means a database is in a state that can be backed up; and Replica(s) refers to the databases in an AAG relationship, both Primary and Secondary.

Issuing a MS SQL native BACKUP DATABASE command on any available replica, will execute successfully and produce the desired backup. This is because the MS SQL BACKUP DATABASE native command does not read the MS AAG Backup Preference settings.

Cohesity DataProtect *does read* MS SQL Server preferences. Additionally, this gives you the option of overriding the default MS SQL AAG Backup Preferences and use Cohesity SQL AAG Backup preferences.

There are two AAG Backup Preference options with the Cohesity MS SQL settings:
Cohesity recommends the following MS SQL Server AAG Backup Preferences since these should be familiar to most MS SQL DBAs

- Use Server Preferences

  Cohesity recommends using Use Server Preferences. This option means that Cohesity DataProtect will use SQL Availability Group Properties >> Backup Preferences set within SSMS.

  Please see MS SQL AAG Backup preferences for more information.

- Override Preferences
  There are four Cohesity AAG Override Preferences, see Specify Job Settings for Protecting Microsoft SQL Server. When the Override Preferences is selected, Cohesity DataProtect provides the following backup overrides:

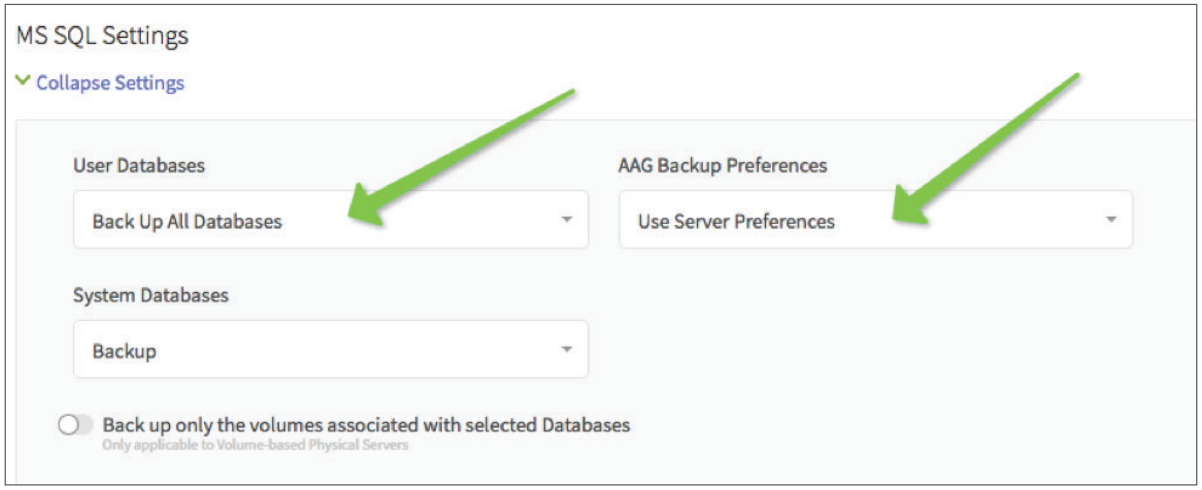

Figure 15 – Cohesity MS SQL AAG Backup Preferences

Primary Only:

This preference stipulates that Cohesity Data Protect will perform the backup using the primary replica.

Primary Replica	Secondary Replica	Backup Taken On
Available	Available	Backup taken on Primary
Available	Not Available	Backup taken on Primary

Table 1 – Primary Only

Secondary Only:

This preference stipulates that Cohesity Data Protect will run backups against the secondary replica, without exception. Even if the Primary is the only replica online, the backup will be skipped.

Primary Replica	Secondary Replica	Backup Taken On
Available	Available	Backup taken on Secondary
Available	Not Available	Backup Skipped

Table 2 – Secondary Only

Preferred Secondary:

This option stipulates that Cohesity Data Protect will run always against the secondary replica, unless all the secondary replicas are unavailable. In this case, it will succeed on the Primary.

Primary Replica	Secondary Replica	Backup Taken On
Available	Available	Backup taken on Secondary
Available	Not Available	Backup taken on Primary
Not Available	Available	Backup taken on Secondary

Table 3 – Prefer Secondary

Any:

This option stipulates that Cohesity Data Protect can use any replica in the AAG group for the backup. Replicas are prioritized based on the MS SQL Server Backup Priorities List.

Primary Replica	Secondary Replica	Backup Taken On
Available	Available	This will take the backup from a Secondary replica based on MS SQL Server Backup Priority List, starting with the highest priority value. If that replica is not available Cohesity will move to the next replica with the next highest value.

Table 4 – Any

Cohesity Source Selection

Select the Source that contains the AAG Servers.

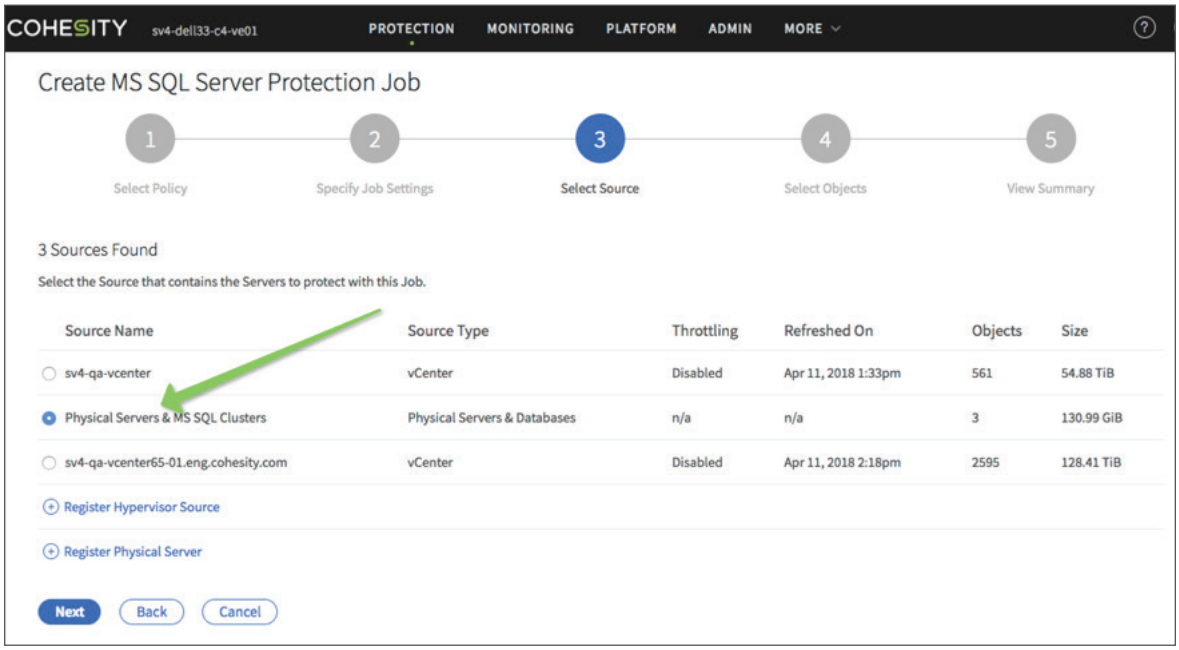

Figure 16 – Cohesity Source Selection

Select servers in the AAG group

Individual servers in the AAG group can be chosen which allows an AAG database to be backed up as a standalone database.

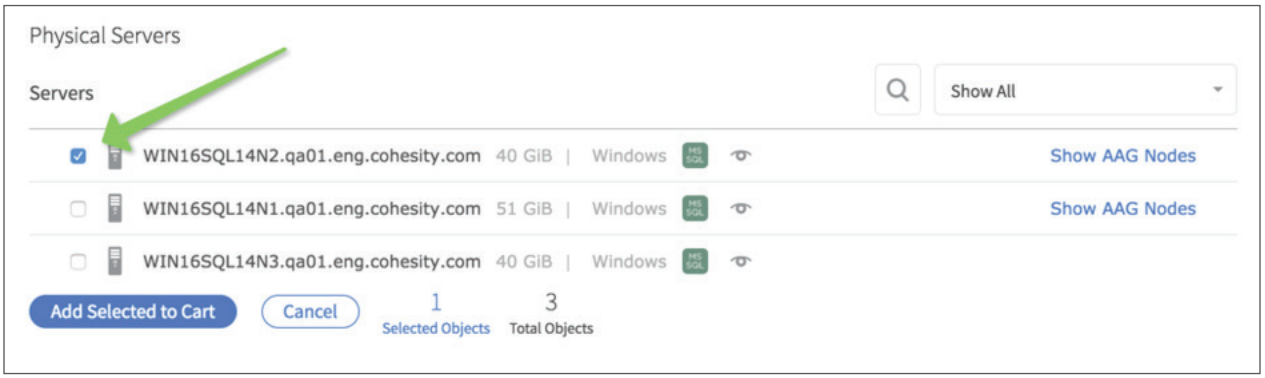

Figure 17 – Individual Source Selection

All the Servers in the AAG group

All the MS SQL Servers in the AAG group can be selected at one time.

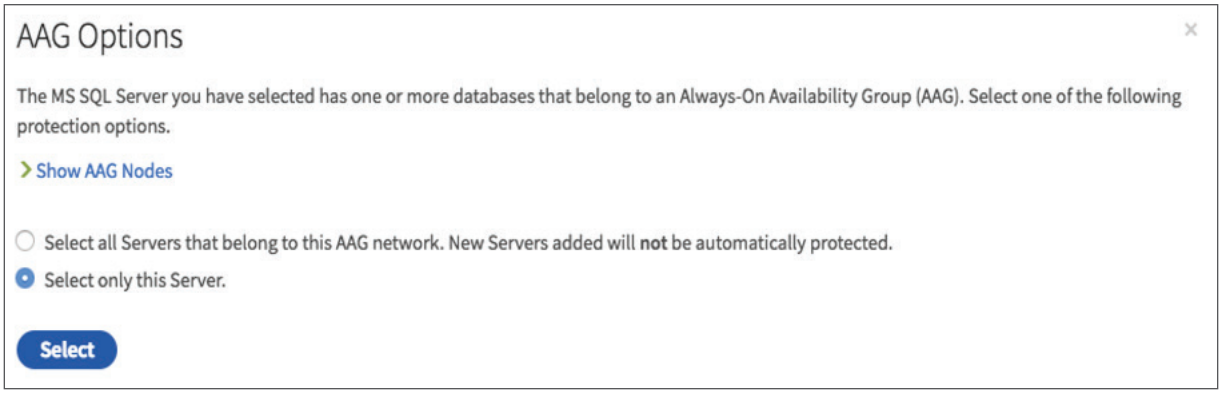

Figure 18 – Cohesity Selection of Servers that belong to the AAG network,

Alternatively, in the example below, each source can be selected individually by using the checkbox.

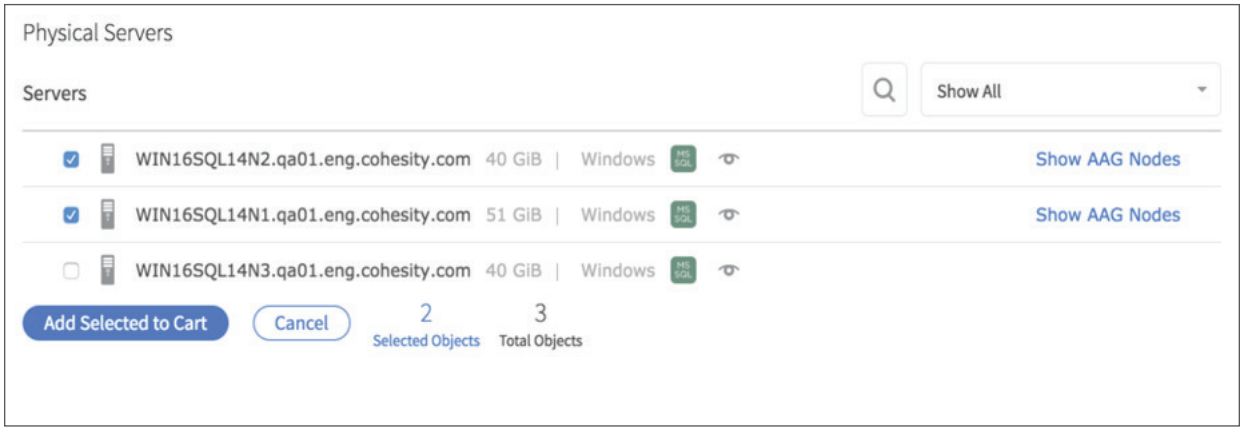

Figure 19 – Cohesity Source Individual Selection

Protection Job Detail

Click the "Create Job" button, and the job is created and will start according to the policy set.

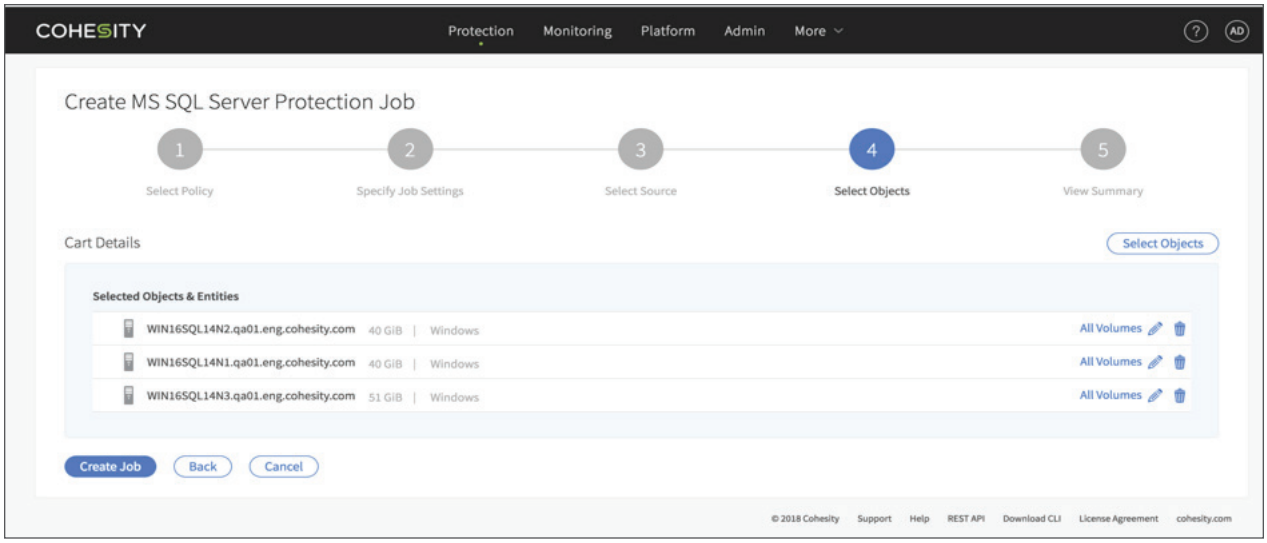

Figure 20 – Cohesity Protection Job

Protection Job Confirmation.

You can view a summary of the options for the current Protection Job and a list of the items to be protected.

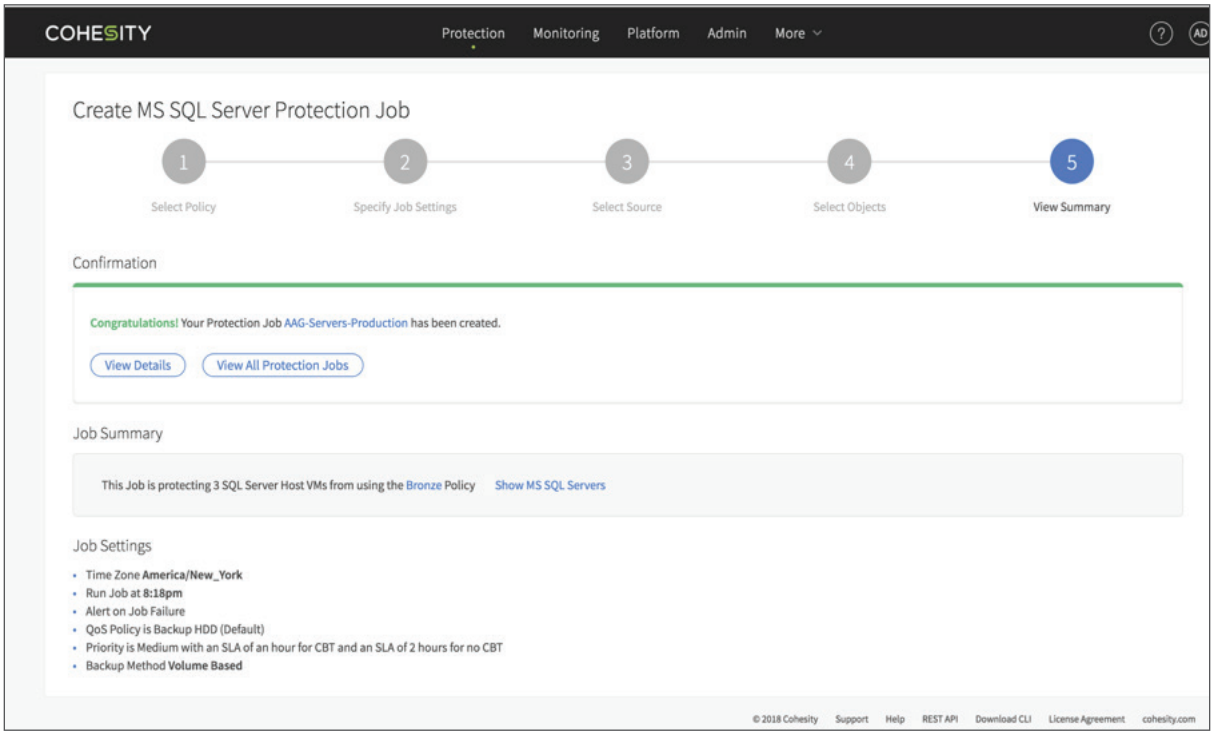

Figure 21 – Cohesity Protection Job Summary

Backup SQL AAG Database Protection Job Run

Once the Protection Job is created, it will run based on its Start Time. Subsequent job executions are listed under Job Runs, and will indicate Duration, Type, and Status. MS SQL Server administrators can also use this page to quickly confirm business-critical databases are protected with Cohesity DataProtect.

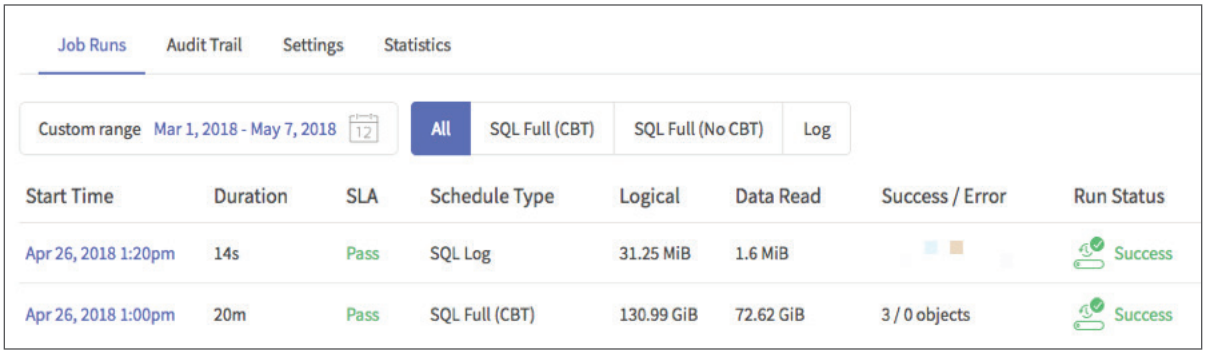

Figure 22 – Cohesity Protection Job Run

Protection Job Run Details

In the Cohesity Cluster UI, the MS SQL Database Protection Job -> Backup Run Details will show all the Microsoft SQL Server databases found and protected by Cohesity DataProtect. It also correctly identifies the AAG databases, and indicates backup success. This is an additional level of detail to confirm that the backup is successful. As an example see figure 23.

Figure 23 – Cohesity Protection Job Run Details

Restore an AAG Database

Cohesity provides the ability to restore the entire SQL Server or individual databases to a specific point in time. MS SQL Server or individual databases can be restored to their original location or an alternate location. There are three general restores:

- Restore Standalone database, see Restore an Individual MS SQL Database
- Clone a database, see Clone an individual MS SQL Server Database
- AAG restore (detailed below).

Add a Database back to an AAG group

Navigate to the Recovery screen. Protection->Recovery->Recovery Button->MSSQL.

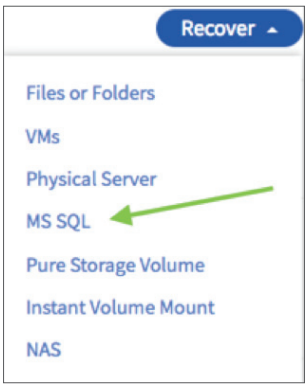

Figure 24 – Cohesity Recovery Menu

Choose a Database

The search and filter options provide a powerful way of finding and selecting databases from backups. Enter characters of the SQL Server or database name and a list of items displays. Select an item from the list. You can optionally specify the wildcard character *. Search results can be narrowed by specifying a filter criteria. Click **Change Filters**, specify a Filter by criteria and click **Add**.

Additionally, clicking the details link will show you the Availability Group Network.

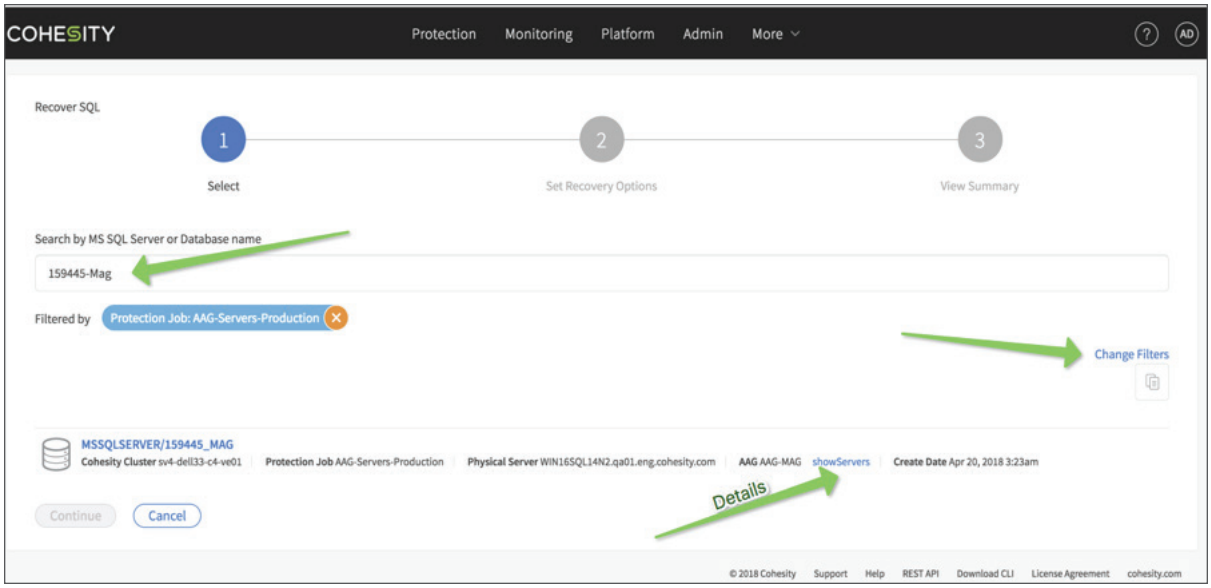

Figure 25 – Cohesity Search and Filter

AAG Detection

In the case of overwriting an existing AAG database, you will receive the Cohesity AAG Overwrite Alert, see figure 26 below. For more details about adding a database back into an AAG group please refer to Microsoft documentation[2]; "Manually prepare database for an Availability Group. Follow the directions, and then continue with the restore of the database.

Cohesity can restore an AAG database out of AAG group using the same restore workflow by giving the database a new name. Once restored, the databases can be manually added to the AAG.

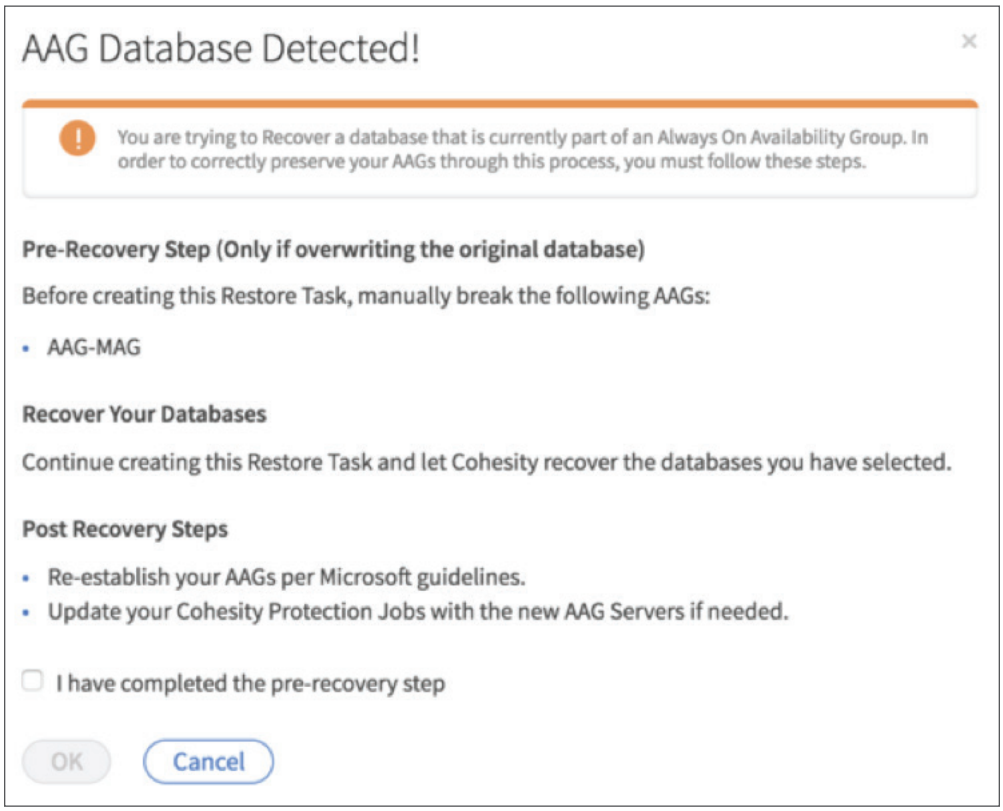

Figure 26 – Cohesity AAG Overwrite Alert

[2] *"Manually prepare a database for an Availability Group (SQL Server), Microsoft Corp., https://docs.microsoft.com/en-us/sql/database-engine/availability-groups/windows/manually-prepare-a-secondary-database-for-an-availability-group-sql-server?view=sql-server-2016*

Restore Options

Cohesity provides several options for databases restores:

A) If restoring to the original SQL Server instance, then toggle **Overwrite Original Database** on, to overwrite the original database with the restored one.

B) To restore log files and primary and secondary data files to different locations, click **Add Alternative Log File and Secondary Data File Locations** and provide locations for each.

C) Provide a **Database Name** for the restored database.

D) You can also provide a specific time to restore to if transaction logs are available.

E) By default, an MS SQL restore WITH RECOVERY is performed.You can optionally turn this off to perform a restore WITH NORECOVERY.

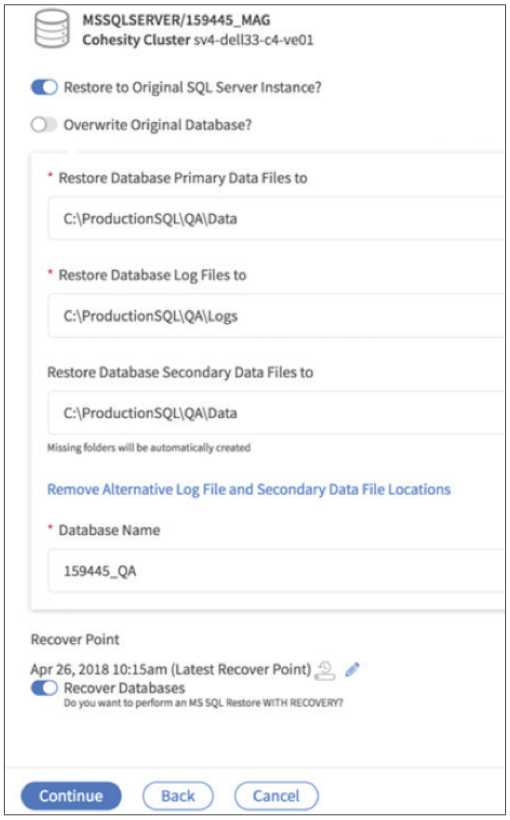

Figure 27 – Cohesity Database Restore Options

Recovery Point

Cohesity "Recovery Point" link provides the ability to recover the database to a particular point in time. (Step #1) choose the recovery point, (Step #2) select the option to specify a point in time.

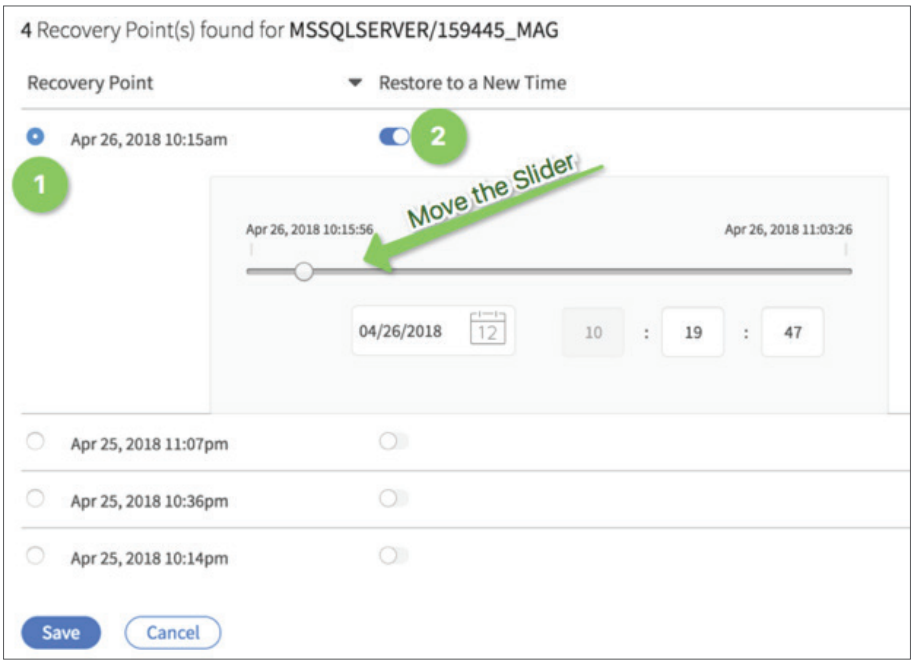

Figure 28 – Cohesity Recovery Point In Time Restore

The Recovery Task is Created. In this step, you can view a summary of the options for the current task and a list of the items to be restored.

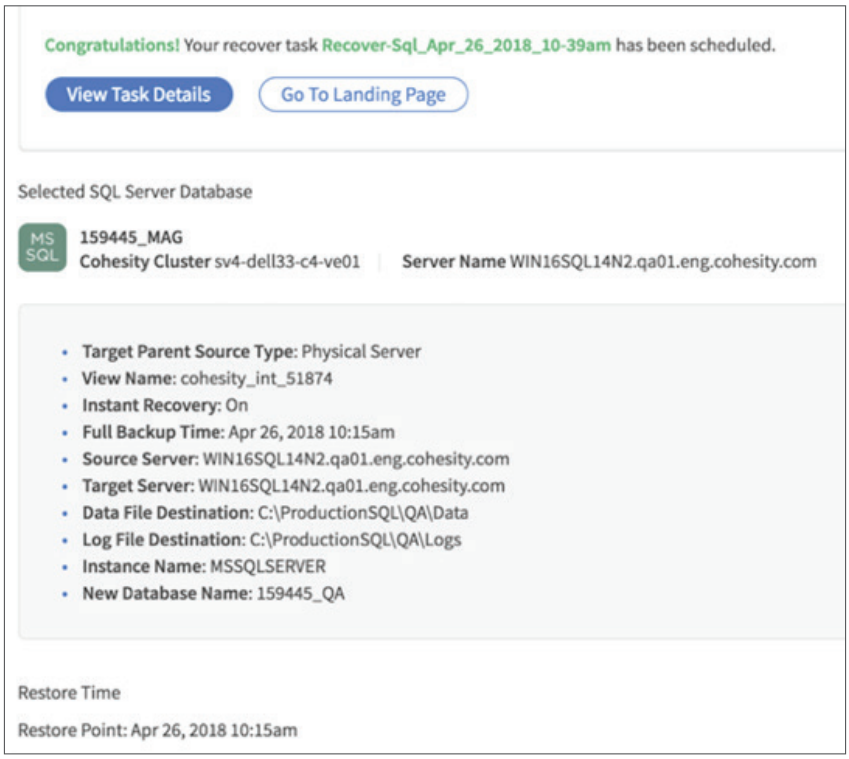

Figure 29 – Cohesity Recovery Task Detail

In the Cohesity Cluster UI, the Show Subtasks button will show subtasks that Cohesity executed in order to complete the restore. It will also show that the Microsoft SQL Server AAG database was successfully restored. See figure 30 below.

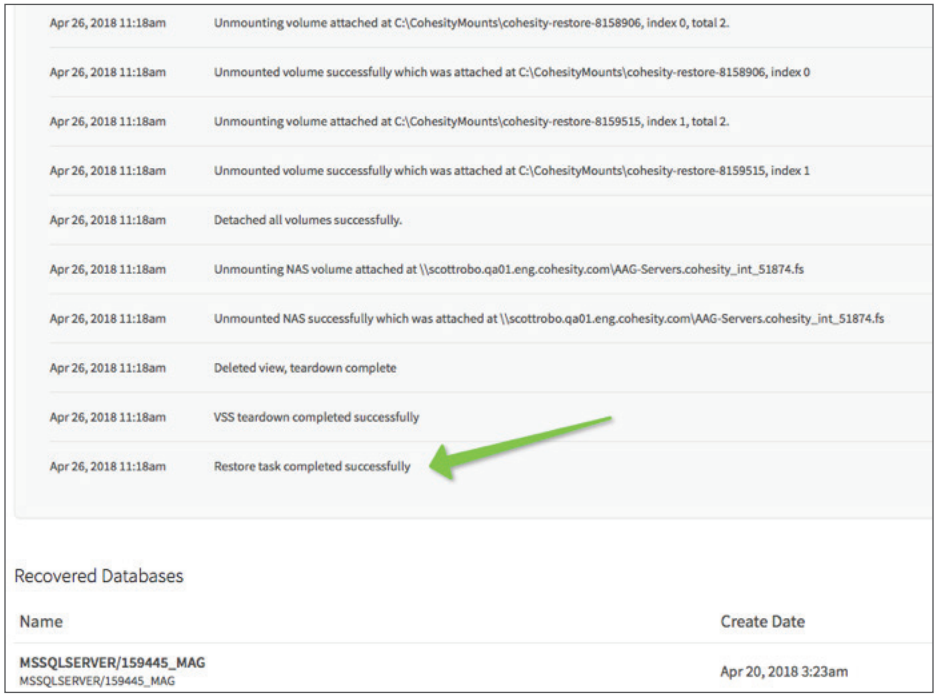

Figure 30 – Cohesity Recovery Task execution detail

Cohesity supports database restores to original or alternate MS SQL Server Instance. Cohesity also supports Cloning. For more information, see Cohesity Clone Document.

Summary

Cohesity DataProtect provides a comprehensive solution to your data center storage requirements. Cohesity DataProtect is uniquely designed to handle MS SQL Server AAG databases; a solution that detects and clearly displays the AAG relationships, allows for AAG backup preferences to suit protection needs, allows for database point in time recovery, and accommodates the restore of MS SQL Server AAG databases to the same or different SQL Server Instances.

This means MS SQL Server AAG databases are quickly identified, and a Protection Job can be created, executed and monitored from a single pane of glass UI. MS SQL Server AAG databases are effectively protected with all your other MS SQL Server databases.

About The Author

Scott Lorenz is a Solutions Engineer at Cohesity. In his role, Scott focuses on business-critical applications, databases, and data protection with Enterprise and Cloud Storage.

Version History

Version	Date	Document Version History
Version 1.0	May 2018	Original Document
Version 2.0	July 2018	Updated to include Cohesity MS SQL AAG Backup Preferences

872018