

LAB15: Enable and run SQL Server best practices assessment

Best practices assessment provides a mechanism to evaluate the configuration of your SQL Server. After you enable best practices assessment, an assessment scans your SQL Server instance and databases to provide recommendations for things like:

- SQL Server and database configurations
- Index management
- Deprecated features
- Enabled or missing trace flags
- Statistics
- & more

Student Lab Manual

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Exercise 1 - Carry out SQL Server Best Practices Assessment

Objective

In this exercise you will set up and execute SQL Server Best Practices Assessment for your Arc-enabled SQL Server.

Estimated Time to Complete This Exercise

30 minutes

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Task 1: SQL Server Best Practice Assessment Prerequisites

1. [] Make Sure that your SQL Server instance is connected to Azure Arc. From Azure portal go the *Azure Arc* page and select *SQL Server instances*. You should see the *ArcBox-SQL* SQL server connected.

The screenshot shows the Azure Arc | SQL Server instances page. On the left, there's a sidebar with categories like Service principals, Private link scopes, Infrastructure (Machines, Azure Arc virtual machines (preview), Azure Stack HCI, Kubernetes clusters, VMware vCenters, SCVMM management servers), Data services (SQL Server instances, PostgreSQL (preview), SQL managed instances), Application Services (API management (preview), App services (preview), Event Grid topics (preview)), and a search bar at the top. The main area displays a table with one record:

Name	Resource group	Location	Status	ESU Expiration	Type
ARCBOX-SQL	ArcBox	East US	Connected	Not Applicable	SQL Server - Azure Arc

2. [] Make sure that you have a Log Analytics workspace deployed in your resource group so that you can upload assessment results to it. The set-up scripts for this workshop should have set up one for you already in your lab resource group.

The screenshot shows the ArcBox Resource group page. On the left, there's a sidebar with categories like Overview, Activity log, Access control (IAM), Tags, Resource visualizer, Events, Settings (Deployments, Security, Deployment stacks, Policies, Properties, Locks), Cost Management (Cost analysis, Cost alerts (preview), Budgets, Advisor recommendations), Monitoring, and Insights (preview). The main area displays a table of resources:

Name	Type	Location
ArcBox-Win2k12	Machine - Azure Arc	East US
ArcBox-Win2K19	Machine - Azure Arc	East US
arcboxux3zeowldeic	Storage account	East US
ARCWS	Log Analytics workspace	East US
ChangeTracking(ARCWS)	Solution	East US
d1cb141c-ca04-5166-b33d-ca76d2a6bc0f (OS Performance and Capacity)	Azure Workbook	East US
Heartbeat Missed	Metric alert rule	Global
Heartbeat Missed	Log search alert rule	East US
LogicalDisk Avg. Disk sec per Read	Metric alert rule	Global
LogicalDisk Avg. Disk sec per Read	Log search alert rule	East US
LogicalDisk Avg. Disk sec per Write	Metric alert rule	Global

3. [] Make sure that you, as a lab user (the Azure username listed in the Resources section of the lab environment), have the following roles enabled and active **on the Resource Group Level**: *Monitoring Contributor, Log Analytics Contributor and Azure Connected Machine Resource Administrator*. If these roles are not enabled then go to the *_Access Control (IAM)* tab on the Resource Group page and enable them **making sure to set the Assignment Type to Active**.

Role	Description	Scope	Group assignment	Condition
Azure Connected Machine	Can read, write, delete and re...	This resource	--	None
LOD Owner	Grants full access to manage all ...	Subscription (Inherited)	--	None
Log Analytics Contributor	Log Analytics Contributor can re...	This resource	--	None
Monitoring Contributor	Can read all monitoring data an...	This resource	--	None

Task 1 has been completed

Click **Next** for the next exercise or [Go back to the main table of content](#)

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Task 2: Enable and run SQL Server best practices assessment

1. [] Go to your Arc-enabled SQL Server resource and click on the *Best Practices Assessment* under the *Setting* menu. If you are asked for a license type then follow the portal instructions and assign a PAYG license.

ARCBOX-SQL SQL Server - Azure Arc

Resource group : ArcBox

Status : Connected

Location : East US

Subscription : [Subscription ID]

Tags (edit) : Add tags

Properties Capabilities

SQL Server configuration

License type	Pay-as-you-go
ESU subscription	N/A
Automated patching	Disabled

Azure extension for SQL Server

Version	1.1.2512.104
Provisioning state	Succeeded
Enable automatic upgrade	true
DPS upload status	OK
Status last updated	05/12/2023, 23:59:29 GMT

Azure Connected Machine agent

Agent status	Connected
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2. [] Select the log analytics workspace that you have in the same subscription as your Arc-enabled SQL Server resource and click on *Enable Assessment*.

ARCBOX-SQL | Best practices assessment

Best practices assessment

The best practices assessment continuously scans all your SQL Server instances and databases on the host machine and evaluates the configurations for SQL Server best practices. [Learn more](#)

Assessment status: Disabled

Log Analytics Workspace: ARCWS

Assessment schedule frequency: None: Enable assessment to schedule.

Enable assessment

Assessment results

The results of previous assessments

Start date	Status
No results.	

3. [] Wait until Best Practice Assessment is enabled which might take few minutes. Once the deployment of the best practice assessment is completed you can either start the assessment manually or you can use the Configuration option to either schedule or disable the assessment. Examine the Configuration

settings **but do not click Schedule assessment** as you will use the manual option in this lab. Close the Configuration settings.

- Click **Run assessment** to manually start the assessment. You should see the progress indicator after a couple of minutes. Note that the assessment will take a bit of time to complete and you might need to refresh the page to see the results.

Task 2 has been completed

Click **Next** for the next exercise or [Go back to the main table of content](#)

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Exercise 2 - Work with Best Practices Assessment results

Estimated Time to Complete This Exercise

45 minutes

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Task 1: View and resolve assessment issues

- Once the assessment is completed, click on the assessment to move to the results screen.

Start date	Status
2023-12-10 08:00 AM UTC	Scheduled
2023-12-06 01:21 PM UTC	Completed

- On the Results page, if there are several assessments that are completed, you can choose from *Collected at* dropdown menu. The Results page reports all the issues categorized based on their severity. The recommendations are organized into All, New and Resolved tabs. The tabs can be used to view all the recommendations from the currently selected run, the newer recommendations compared to the previous run, and the resolved recommendations from the previous runs respectively. The tabs help to keep track of the progress between the runs.

Home > ARCOBOX-SQL | Best practices assessment >

ARCOBOX-SQL

⟳ ⏴ Auto refresh: Off

Results Trends

SQL best practices assessment results

All Issues New Issues (46) Resolved Issues (0) Insights

Total Issues

Instance name: MSSQLSERVER Collected at: 2023-12-06 01:22 PM UTC

Category

393

Administration: 264 General: 109 System: 15 Application: 5

Name: All Severity: All Tags: All Check Id: All

The first grid shows you each recommendation and the number of instances your environment hit that issue. When you select a row in the first grid, the second grid lists all the instances for that particular recommendation. If there is no selection in the first grid, the second grid shows all recommendations. Note that the results are limited to the first 100 instances per recommendation. You can use the drop downs above the grid to filter the results. You can also use "Export to Excel" and "Open the last run query in the Logs view" options by selecting the small icons on the top right corner of each grid.

Recommendation Summary

Severity	Tags	Check Id
High	DBConfiguration, Performance	InstantFileInitialization
Medium	Index, Performance	UnusedIndex
Medium	DBCC, Performance, DataIntegrity	DbIntegrity
Medium	Index, Performance	IndexFragmentation

Recommendation Details

Target	Name	Severity	Message
Server	ARCOBOX-SQL	High	Enable instant file initialization
Server	ARCOBOX-SQL	Medium	Update SQL Server and install service packs and cumulative updates. Current product version
Server	ARCOBOX-SQL	Medium	Set strong passwords for logins: sa
Server	ARCOBOX-SQL	Medium	Enable 'Optimize for ad hoc workloads' option on heavy OLTP ad-hoc workloads to conserve

3. [] To filter the issues by high severity, click on "High" on the Total Issues chart. To clear the filter click on high once again. Filtering can be applied by categories as well.

Home > ARCOBOX-SQL | Best practices assessment >

ARCOBOX-SQL

⟳ ⏴ Auto refresh: Off

Results Trends

SQL best practices assessment results

All Issues New Issues (46) Resolved Issues (0) Insights

Total Issues

Instance name: MSSQLSERVER Collected at: 2023-12-06 01:22 PM UTC

Category

393

Administration: 264 General: 109 System: 15 Application: 5

Name: All Severity: All Tags: All Check Id: All

The first grid shows you each recommendation and the number of instances your environment hit that issue. When you select a row in the first grid, the second grid lists all the instances for that particular recommendation. If there is no selection in the first grid, the second grid shows all recommendations. Note that the results are limited to the first 100 instances per recommendation. You can use the drop downs above the grid to filter the results. You can also use "Export to Excel" and "Open the last run query in the Logs view" options by selecting the small icons on the top right corner of each grid.

Recommendation Summary

Severity	Tags	Check Id
High	DBConfiguration, Performance	InstantFileInitialization

Recommendation Details

Target	Name	Severity	Message
Server	ARCOBOX-SQL	High	Enable instant file initialization

4. [] To view details for a recommendation, in the recommendation summary menu click on the high severity issue, then in the *Recommendation Details* table click on the message item.

Details

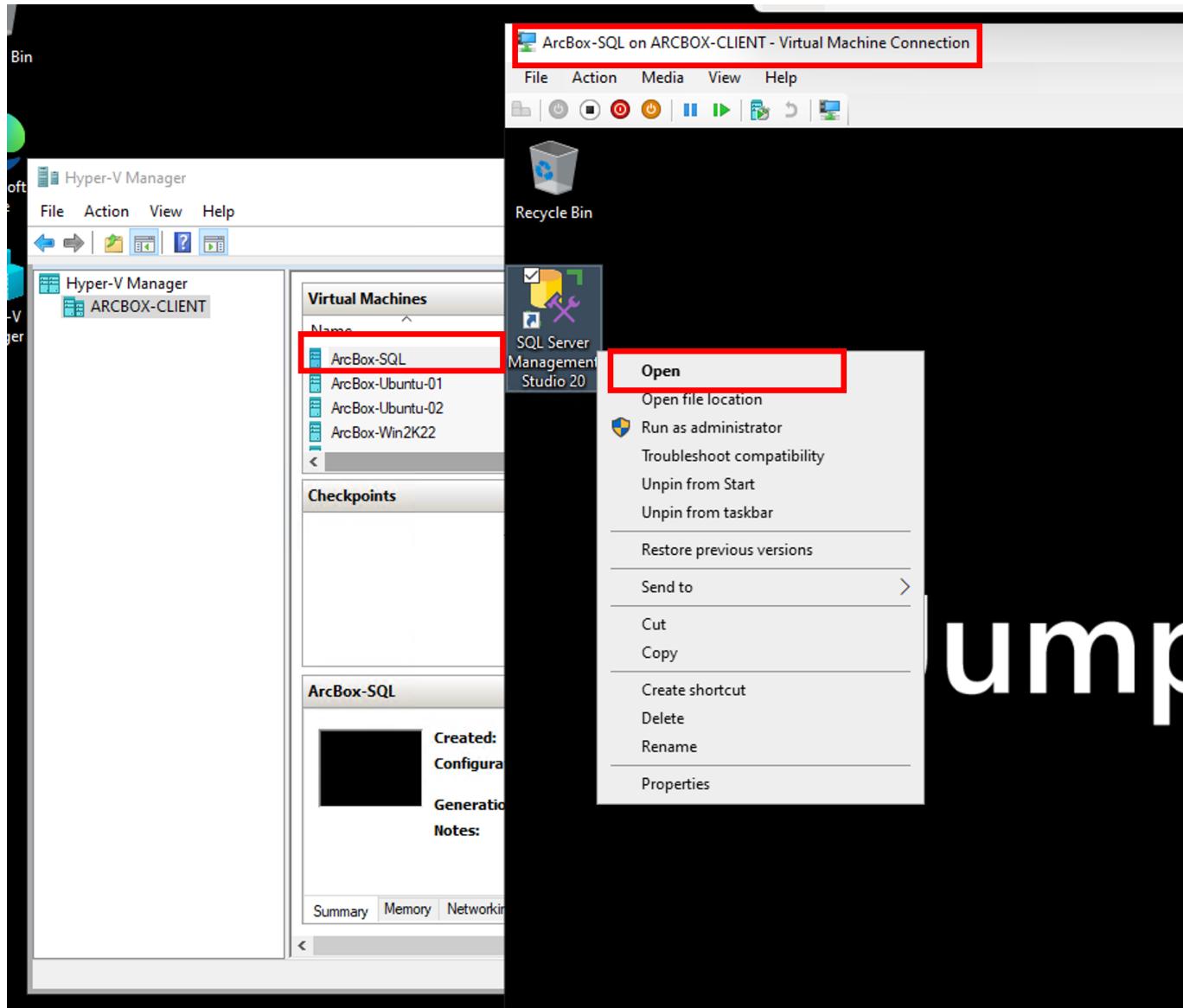
TargetType: Server
TargetName: ARCBOX-SQL
Severity: High
Message: Enable instant file initialization
Tags: DBConfiguration, Performance
CheckId: InstantFileInitialization
Description: Instant file initialization (IFI) allows for faster execution of the previously mentioned file operations, since it reclaims used disk space without filling that space with zeros. Instead, disk content is overwritten as new data is written to the files.
HelpLink: <https://docs.microsoft.com/en-us/sql/relational-databases/databases/database-instant-file-initialization>

5. [] You are going to address a specific recommendation now. Remove any filters and scroll through the *Recommendation Details* table (or use the associated search field) to find the issue "Turn on 'Auto_Create_Statistics' and 'Incremental' options" for the *AdventureWorks* database.

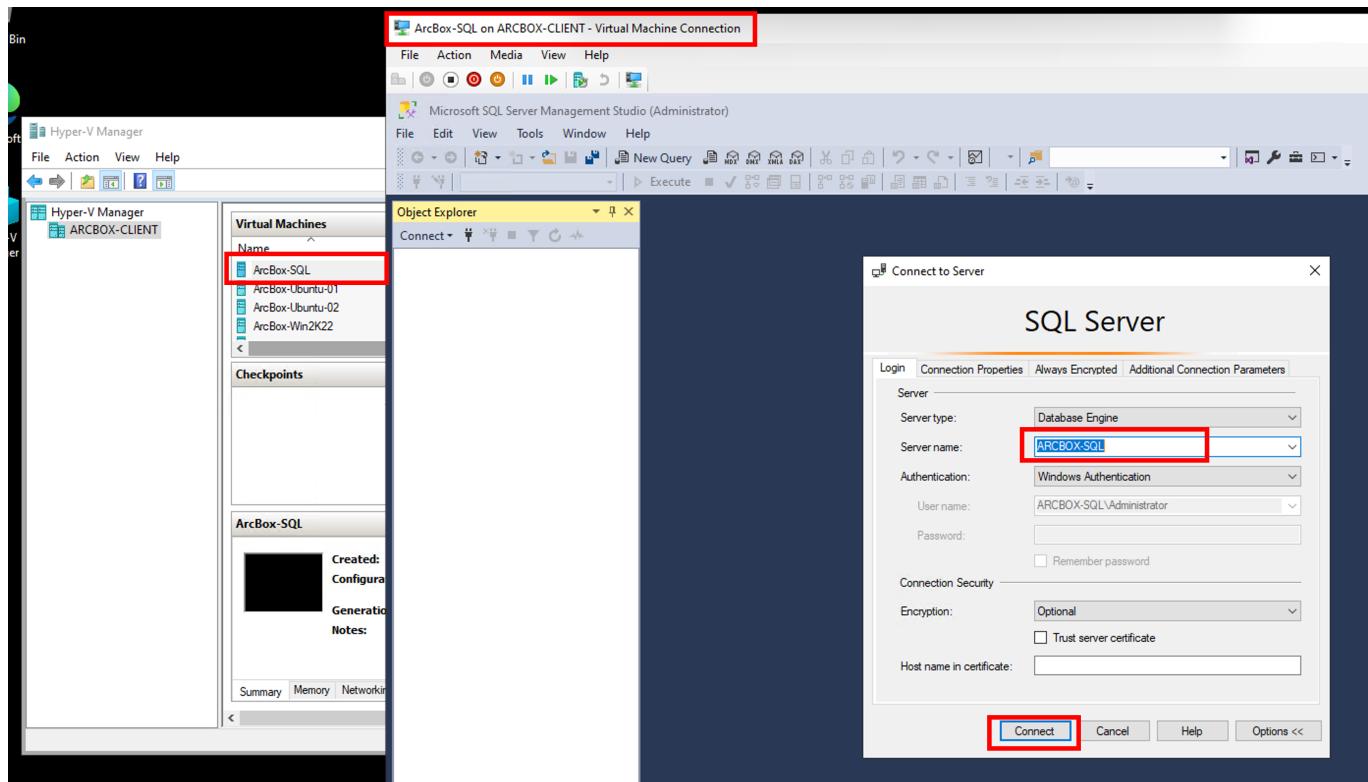
Recommendation Details

Target	Name	Severity	Message
Database	ARCBOX-SQL:AdventureWorksLT2019	Low	Turn on AUTO_CREATE_STATISTICS and INCREMENTAL options
Database	ARCBOX-SQL:model	Low	Turn on AUTO_CREATE_STATISTICS and INCREMENTAL options

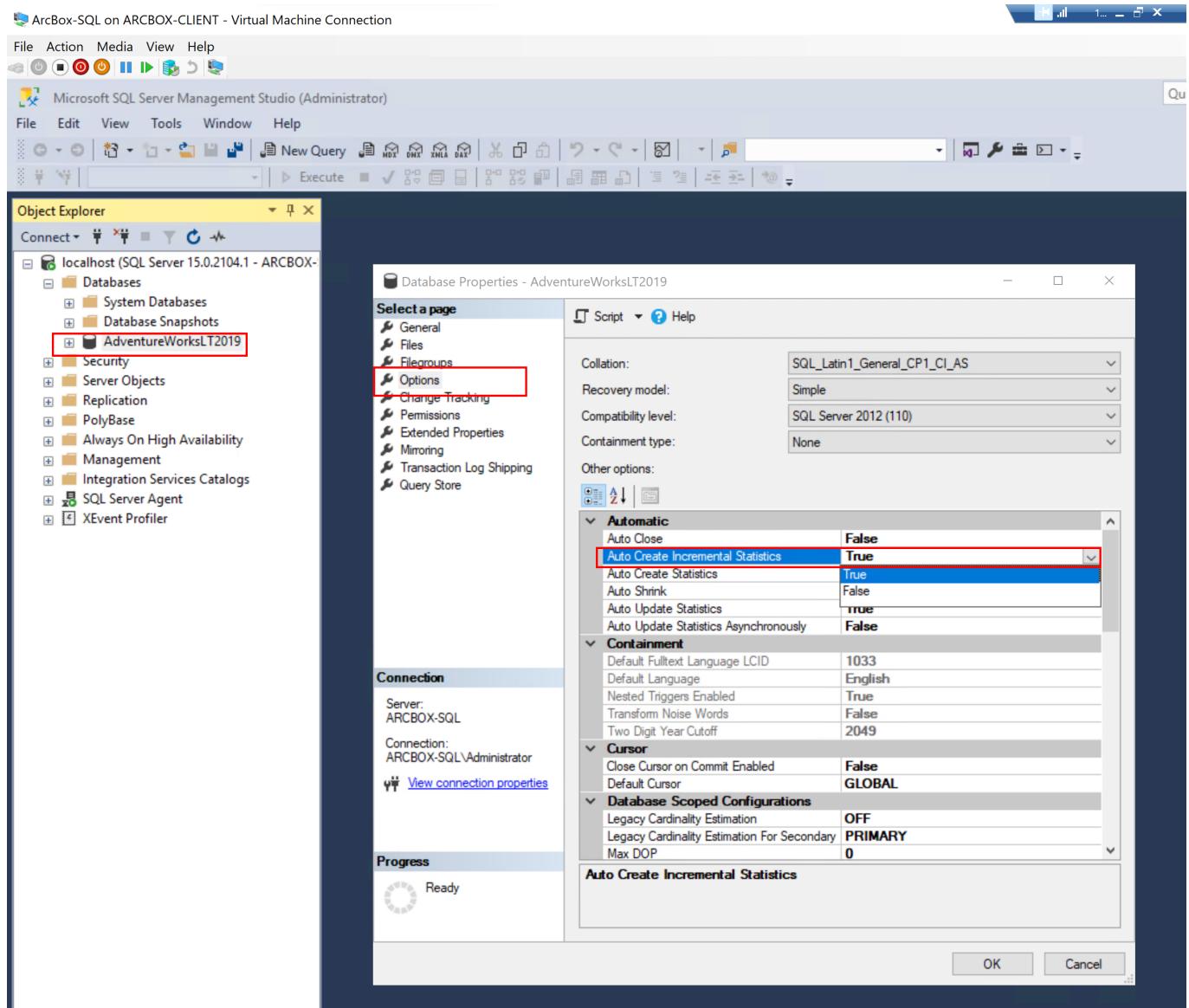
6. [] To Fix the issue "Turn on 'Auto_Create_Statistics' and 'Incremental' options", logon to the ArcBox-Client_machine and connect to ArcBox-SQL from the Hyper-V console (password JS123!!). Start the SQL Server Management Studio application and connect to the SQL Server instance.



7. [] Connect to the SQL Server instance



8. [] Right-Click on the *AdventureWorksLT2019* database and select the *Properties* then *Options*. Find the *Auto Create Incremental Statistics* option and change it from False to True. Confirm your action by clicking *OK*.



9. [] Rerun assessment and check the resolved issues. (To re-run the assessment, go to the *Best practices assessment* page on the Arc-enabled SQL Server in the Azure portal as you did in the previous exercise). Once the new assessment is complete, go the *Resolved Issues* tab and check that your issues has been resolved.

The screenshot shows the Azure portal's 'SQL best practices assessment results' page. The 'Resolved Issues (3)' tab is selected. A pie chart indicates 3 Low and 1 Medium issue. Below the chart, a table lists three resolved issues:

Target	TargetName	Severity	Message	Tags	CheckId
Server	ARCBX-SQL	Medium	Enable 'Optimize for ad hoc workloads' option on heavy OLTP ad-hoc workloads to conserve res...	Performance, QueryOptimizer	PlansUseRatio
Server	ARCBX-SQL	Low	Use actual features for SQL Server version 15.0.2104 instead of found deprecated features: sysdat...	Deprecated, Security, UpdateIssues, Performance	DeprecatedFeatures
Database	ARCBX-SQLAdventureWorksLT2019	Low	Turn on 'AUTO_CREATE_STATISTICS' and 'INCREMENTAL' options	DBConfiguration, Statistics, Performance	AutoCreateStatsIncremental

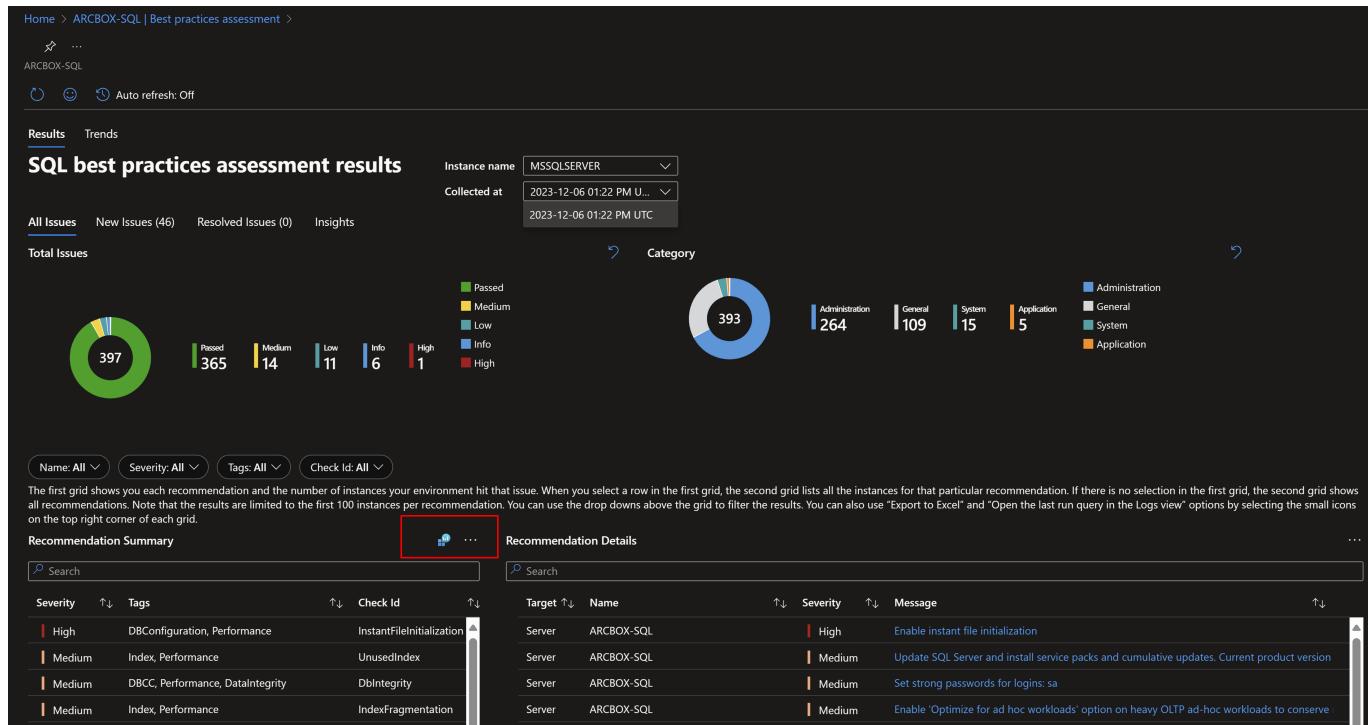
Task 1 has been completed

Click **Next** for the next exercise or [Go back to the main table of content](#)

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Task 2: Use Log Queries with Assessment results

1. [] You can get more detailed insights using Log Analytics Queries. Click on *Query logs* on the top of the grid in assessment results, this will take you to query editor.



2. [] Click *Select scope* and then Select the specific "Log Analytics workspace" used for uploading assessment data from Arc-enabled SQL Server and click *Apply*.

The screenshot shows the Azure portal interface. On the left, the 'Logs' blade for 'ARCWS' is open, displaying a query results table. A red box highlights the 'Select scope' button at the top of this blade. To the right, a modal window titled 'Select a scope' is displayed. It has tabs for 'Browse' and 'Recent'. A warning message says 'You may only choose items from the same resource type.' Below are dropdowns for 'Resource group' (set to 'All resource groups'), 'Resource types' (set to 'All resource types'), and 'Locations' (set to 'All locations'). A search bar is present. The main list shows various resources under 'Scope', including 'Arcbox-Ubuntu-01', 'ArcBox-VNet', 'ArcBox-Win2k12', 'ArcBox-Win2k19', 'arcboxu3zfeowideic', 'ARCWS' (which is selected and highlighted with a red box), 'ChangeTracking(ARCWS)', 'd1cb141c-ca04-5166-b33d-ca76d2a6bc0f', 'master', 'model', 'msdb', 'Security(ARCWS)', and 'SecurityInsights(ARCWS)'. The 'Resource type' and 'Location' columns provide details for each item. At the bottom of the modal, there's a section for 'Selected scopes' with '1 log analytics workspace' listed, followed by a list of selected items: 'ARCWS' and 'Log Analytics works... East US'. Buttons for 'Apply' (highlighted with a red box) and 'Cancel' are at the bottom.

3. [] Query the logs to gain more insights into your SQL Server environment. For example, you can use the following query to identify all unused indexes in a specific instance. Enter the Subscription Id and Resource group name in the forth line of the query then paste the query into the Query pane and click the Run button. Then view the results of your query.

```
let selectedCategories = dynamic([]);
let selectedTotSev = dynamic([]);
SqlAssessment_CL
| where _ResourceId =~
"/subscriptions/XXXXXXXXXXXX/resourcegroups/XXXX/providers/Microsoft.HybridCompute
/machines/ArcBox-SQL"
| extend asmt = parse_csv(RawData)
| extend AsmtId=tostring(asmt[1]), CheckId=tostring(asmt[2]),
DisplayString=asmt[3],
Description=tostring(asmt[4]), HelpLink=asmt[5], TargetType=case(asmt[6] == 1,
"Server", asmt[6]
== 2, "Database", ""), TargetName=tostring(asmt[7]),
Severity=case(asmt[8] == 30, "High", asmt[8] == 20, "Medium", asmt[8] == 10,
"Low", asmt[8] == 0,
"Information", asmt[8] == 1, "Warning", asmt[8] == 2, "Critical", "Passed"),
Message=tostring(asmt[9]), TagsArr=split(tostring(asmt[10]), ","), Sev =
toint(asmt[8])
| where CheckId == "UnusedIndex"
| project
TargetType,
TargetName,
Severity,
Tags=strcat_array(array_slice(TagsArr, 1, -1), ','),
CheckId,
Message
| distinct *
```

The screenshot shows the Azure Log Analytics interface. On the left, there's a sidebar with 'Logs' selected, followed by 'ArqSqlWS', 'Select scope', 'Time range: Last 24 hours', and other navigation options like 'Feedback', 'Queries', and 'Format query'. Below this is a search bar and a 'Filter' dropdown. The main area has sections for 'Tables', 'Queries', 'Functions', and 'Favorites'. A message says 'You can add favorites by clicking on the star icon'. Under 'Tables', there's a 'Results' tab showing a table with columns: TargetType, TargetName, Severity, Tags, CheckId, and Message. The table lists five rows for 'Database' type targets, all with 'Medium' severity and 'Index_Performance' tags. The 'Message' column contains detailed log entries. A red box highlights the 'Time range' dropdown and the 'Results' tab.

Task 2 has been completed

Click **Next** for the next lab or [Go back to the main table of content](#)