

Analytics Platform System (APS) Health Check

MetLife

March 16th, 2020

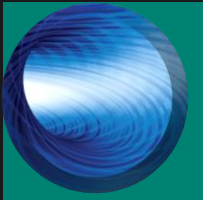
Fargham Butt
Senior PFE



Program Goals



Assess Risks and evaluate health of the specified environment using a powerful suite of data collection and analysis tools, and in-depth operational interview.



Identify key areas where the environment deviates from **Microsoft best practices**, and configuration guidance.



Establish assessment results that can generate a remediation plan used to complete **improvements to the health of the environment** and to resolve or mitigate risks.

Program Phases

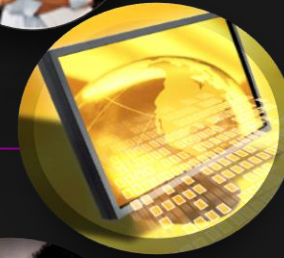
Data Collection

Accredited Microsoft Engineer collects data from the environment focusing on key areas.



Analysis

Engineer analyzes the results to compare against best practices, identify risks and health related problems.



Reporting

Customized report is prepared based on the analysis.



Remediation

Remediation action plan is established to assist in the effort to remediate and stabilize the environment.



Appliance Reviewed

Appliance	FABDOM
Appliance Description	Production
Appliance AU Level	AU5
Appliance Version	10.0.8015.0
Topology	4+2
Appliance OEM	HP

Overall Health Risk Result



Critical



High



Medium



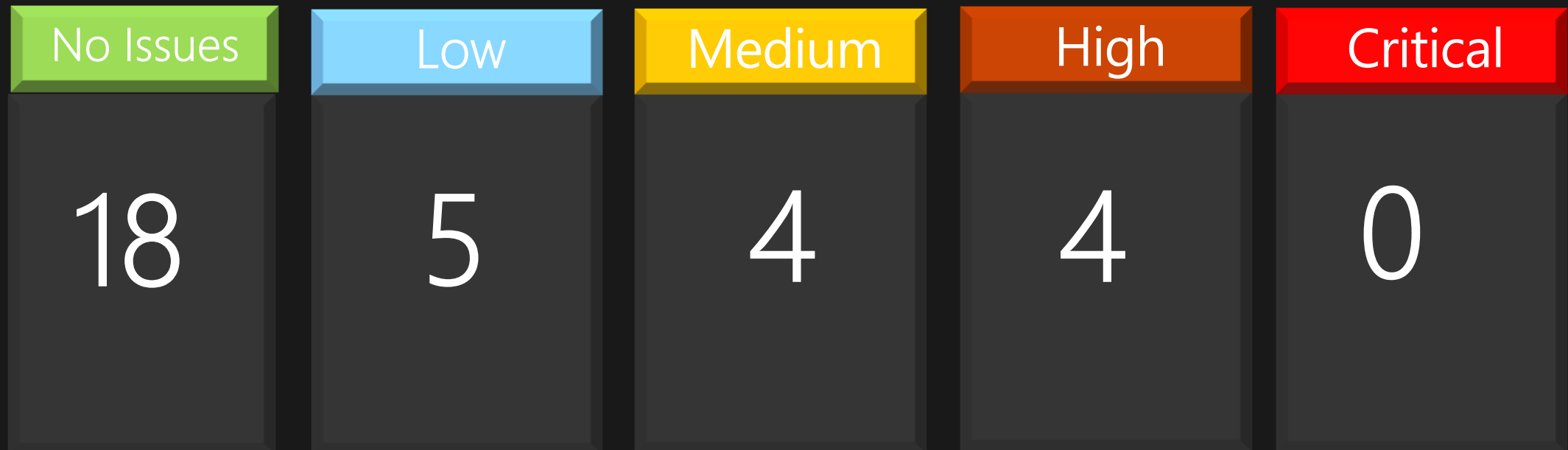
Low

Reasons for "**High**" Result

- No WSUS Patching
- Outdated Statistics
- Failed Backup

Health Score Breakdown by Severity

- This is a quick breakdown of issues discovered on your appliance for each severity.



Scorecard

Category	Health Score
Appliance Configuration	
DNS Configuration	No Issues
Instant File Initialization (IFI) enabled	Low
Integrated Authentication	No Issues
Time Synchronization	No Issues
Appliance Version and Patch Level	Medium
Appliance Health	
BMC Logs	No Issues
Ethernet Switch Logs	No Issues
Infiniband (IB) Switch Logs	No Issues

Scorecard

Category	Health Score
Appliance Health (Continued)	
Database Volume Storage	No Issues
Database Volume Utilization	No Issues
Local Storage Check	No Issues
PDW Logs and System Dumps	No Issues
Windows Event Logs	No Issues
Environment Checks	
PAV Output	No Issues
PDW Alerts	No Issues

Scorecard...Continued

Category	Health Score
Maintenance	
Database Backups	High
MRA Compliance	Medium
WSUS Patch Management	High
Data Health	
CCI Table Health	Medium
Data Skew	High
Failed Data Loads	No Issues
Large Replicated Tables	Medium
Statistics	High

Scorecard...Continued

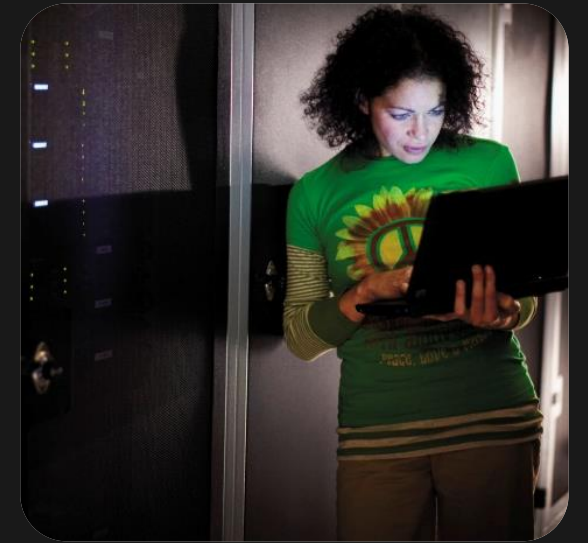
Category	Health Score
Database Configuration	
Database Autogrow	No Issues
Database Space	No Issues
Security	
Logins – Password Expirations	Low
Logins – Password Policy	No Issues
Operational Excellence	
Backups Implemented	No Issues
Disaster Recovery	Low
DW Insight Dashboard	Low
SCOM Monitoring	Low

Consolidated List of Issues Identified

- Instant File Initialization
- Appliance Version and Patch Level
- Database Backups
- MRA Compliance
- WSUS Patch Management
- CCI Table Health
- Data Skew

Consolidated List of Issues Identified

- Large Replicated Tables
- Statistics
- Logins-Password Expiration
- Disaster Recovery
- DW Insight Dashboard
- SCOM Monitoring



Issue Description

Appliance Configuration

✳ Instant File Initialization (IFI)

- Instant file initialization is a SQL Server feature that allows data file operations to run more quickly. Checking the box to turn Instant File Initialization on will improve performance of SQL Server PDW. However, if this poses a security risk for you business, then leave the box unchecked.
- **Issue discovered (Low)** - Instant File Initialization is not enabled.



Appliance Configuration

✳ Appliance Version and Patch Level

- APS is updated in 'Appliance Updates' (AU's), these are roughly analogous to SQL Server Service Packs. We recommend updating to the latest AU + Hotfix, to get all current performance upgrades, new functionality and bug-fixes.
- **Issue discovered (Medium)** – The current version of appliance is AU5. It is recommended to upgrade to the latest AU 7.5 level.

Maintenance

✳ Database Backups

- Database backups are the first line in DR plan. While APS has built-in redundancy and fault tolerance at multiple levels, there is always a possibility that a catastrophic failure will take an appliance offline.
- Issue discovered (High) – One of the database failed to backup.

PDW Backup Report

Appliance: FABDOM
Date: 03/16/2020 13:39:45

name	submit_time	status
Archive_MetStage_09232014	3/9/2020 3:56:25 PM	COMPLETED
Archive_MetStage_2012	3/9/2020 3:36:08 PM	COMPLETED
Archive_MetStage_2013	3/9/2020 3:47:16 PM	COMPLETED
CFDB_PROD	3/15/2020 8:47:25 PM	FAILED
EV_PROD	3/15/2020 7:59:35 PM	COMPLETED
EV_PROD	3/15/2020 1:14:15 AM	COMPLETED
EV_STAGING_PROD	3/15/2020 8:46:23 PM	COMPLETED
EV_STAGING_PROD	3/15/2020 1:41:21 AM	COMPLETED
master	3/15/2020 1:14:15 AM	COMPLETED
MET_ALS1	3/15/2020 7:59:31 PM	COMPLETED
MET_ALS1	3/15/2020 2:50:28 AM	COMPLETED

Maintenance

✧ MRA

- The APS Appliance is governed by a Master Reference Architecture. The MRA specifies the FW Revision levels and Driver versions that should be used in the Appliance. If the FW levels or Driver versions vary from the MRA, the Appliance is considered unsupported, and you may be required to apply the correct versions in order to get support for issues in your Appliance.
- Issues discovered (Low) – Some errors were discovered.

Maintenance

* WSUS – Patch Management

- The Window Update Service (WSUS) is installed on the VMM server as part of the APS factory build process. WSUS is the supported method to patch the infrastructure of the appliance.
- Issue discovered (High) – Pending patches to be applied.

Data Health

✳ Columnstore Clustered Index (CCI) Usage

- This test checks for tables without CCI usage.
- Columnstore Clustered index can provide a 2x improvement in data compression compared to data compression of regular clustered index. Columnstore Clustered index can also speed up your queries significantly.
- Issue discovered (Medium) – Didn't run the test to minimize the load on the appliance.

Data Health

✳ Data Skew

- This test case checks for any data skew in the tables.
- The Data skew is a condition that occurs when the rows of a distributed table are not spread uniformly across all of the distributions. When the number of rows in each distribution varies significantly, this can negatively impact query performance.
- Issue discovered (High) – Some tables have data skew.

Data Health

✳ Large Replicated Tables

- A Replicated table is a table structure that exists as a full copy within each discrete DBMS instance on a single compute node.
 - Small sets of data can be more efficiently stored in full.
 - Certain set operations are more efficient against full sets of data.
- The basic rule of thumb is that replicated tables are typically used for tables less than 10 GB in size whereas distributed tables are used for tables greater than 10 GB.
- Issue discovered (Medium) – Some table sizes is larger than 10GB.

Statistics

✳ Statistics Maintenance

- This test case check for any stale or out of date statistics.
- SQL Server PDW generates statistics on the Control node, and uses them to improve query performance by minimizing the data movement in the distributed query plan.
- **Issue discovered (High)** – Please review “Last Modified Statistics” report for stale stats.

Security



✧ Logins with No Password Expiration

- Checks whether the APS logins created on the appliance are complying by the password policy. It identifies any logins, whose passwords are marked not to be checked.
- If the is_policy_checked column is "0" it means that the policy is not being enforced.
- Issue discovered (Low) – Accounts set with this policy set to off.

Operational Excellence

✧ Disaster Recovery

- This test is based on the questionnaire. This test checks if there is a DR plan. The DR plan should comprise a solution that allows you to recreate your data and processing environment.
- Issue discovered (Medium) – No DR plan.



Operational Excellence

✳ DW Insight Dashboard

- DW Insight Dashboard provides users the vital information related to their databases and tables residing in an Appliance.
- Issue discovered (Low) – No DW Insight dashboard implemented.

Database	Table	Security	APS	Backup & Restore
<ul style="list-style-type: none">• Database Properties• Database Size	<ul style="list-style-type: none">• Large Replicated Table• Table Sizes• Table Skew• Table Statistics• Table List	<ul style="list-style-type: none">• Appliance Security• Database Security	<ul style="list-style-type: none">• Appliances• DWLoader Runs• Errors• Performance	<ul style="list-style-type: none">• Backup & Restore Performance• Database with no backups

Operational Excellence

✧ SCOM Monitoring

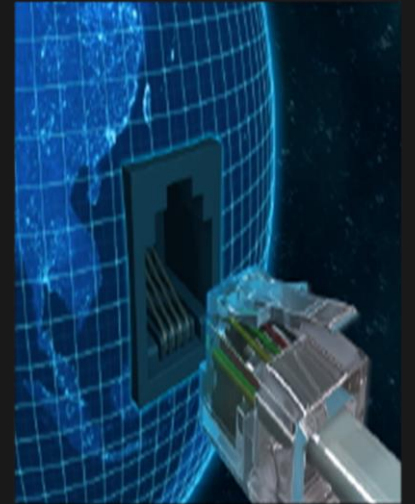
- This test is based on the questionnaire. This test checks if the SCOM monitoring is being implemented or not. SCOM Monitoring gives the ability to surface the alerts across the entire APS appliance related to hardware and software failures and overall system health,
- Issue discovered (Low) – No SCOM monitoring implemented.

Description of all test
performed against the
appliance

Appliance Configuration

* DNS Configuration

- DNS is the service that is used to resolve machine names. As APS is a ring-fenced environment that has no direct visibility out to your corporate environment, DNS Forwarders are used to allow DNS requests to be relayed to DNS Servers in your corporate environment. This allows for AD integration to be implemented. If incorrectly implemented it can cause login failures due to timeouts.
- No issues discovered.



Appliance Configuration

✳ Instant File Initialization (IFI)

- Instant file initialization is a SQL Server feature that allows data file operations to run more quickly. Checking the box to turn Instant File Initialization on will improve performance of SQL Server PDW. However, if this poses a security risk for you business, then leave the box unchecked.
- **Issue discovered (Low)** - Instant File Initialization is not enabled.



Appliance Configuration

* Integrated Authentication

- As an APS security best practice, we strongly recommend the use of Windows Authentication to connect to an APS appliance. Windows Authentication Mode in APS can leverage the organization-wide Active Directory, account, group and password policies, thereby making access more secure.
- No issues discovered.

Appliance Configuration

* Active Directory Time Synchronization

- APS Domain Controllers do not automatically synchronize their time with the customer Active Directory domain. This test check if AD time is being synced with external source outside the appliance.
- No issues discovered.



Appliance Configuration

✳ Appliance Version and Patch Level

- APS is updated in 'Appliance Updates' (AU's), these are roughly analogous to SQL Server Service Packs. We recommend updating to the latest AU + Hotfix, to get all current performance upgrades, new functionality and bug-fixes.
- **Issue discovered (Medium)** – The current version of appliance is AU5. It is recommended to upgrade to the latest AU 7.5 level.

Appliance Health

✳ BMC Logs

- BMC is 'Baseboard Management Console', this is implemented as different technology by Vendor – Dell as iDRAC, HP as iLO. BMC captures and exposes hardware level issues for the physical servers in your Appliance, such as local HDD Failures, RAM or CPU issues, etc.
- No Issues discovered.

Appliance Health

✳ Ethernet Switch Logs

- The APS Appliance has two Ethernet Switches per rack. Errors noted in the Ethernet Switch logs may indicate an issue with the hardware that would require attention.
- No issue discovered.



Appliance Health

✳ Infiniband (IB) Switch Logs

- The APS Appliance has two IB Switches per rack. Errors noted in the IB Switch logs may indicate an issue with the hardware that would require attention.
- No issues discovered.

Appliance Health

✳ Database Volume Storage Checks

- The disks that host the datastore databases on the Compute nodes are checked for health. Excessive latency or elevated Corrected or Uncorrected Read / Write errors are flagged as issues.
- No issues discovered.

Appliance Health

✳ Database Volume Utilization

- This check looks for Database Storage Volumes that are less than 20% free space. If full volumes are identified, and utilization is uneven, you should review the data skew to identify which tables in which databases are causing the uneven utilization. Redistributing the data can reduce uneven space utilization.
- No issues discovered.

Appliance Health

✳ Local Storage Check

- Each physical server hosts two drives, used for the Server OS, and to provide storage for iSCSI drives (these are used for Storage Space stability). The physical drives are mirrored to provide fault tolerance. If one of these drives fail, the server will be at risk with no fault tolerance. If both drives fail, the server will be offline until it can be rebuilt.
- No issues discovered.

Appliance Health

✳ PDW Logs and System Dumps

- PDW logs and System Dumps are checked to identify any issues that occurred on each of the nodes. On APS when a Service 'crash' occurs - either an A/V, assert or some other uncaught code error in DWEngine, DWDMS, or SQL Server service a dump file is created
- No issues discovered.

Appliance Health

✳ Windows Event Logs

- Windows Event Logs are reviewed to identify any issues on the nodes.
- No issues discovered.

Environment Checks

✧ PAV Output

- The SQL Server APS Appliance Validator tool validates the hardware and software configuration of an APS Appliance.
- No issues discovered.

Environment Checks

✱ PDW Alerts

- The APS engine is queried to check for any alerts that have been generated. APS creates alerts for hardware and software issues that need attention.
- No issues discovered.

Maintenance

✳ Database Backups

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- Issue discovered (High) – Some tables have data skew.

Data Health

* Failed Data Load

- This test checks for any failed data loads.
- No issues discovered.

Data Health

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Database Configuration

* Autogrow Configuration

- The default “autogrow” settings will work for you with no tuning on many APS SQL Server systems. However, there are environments where you do not have to turn the settings on or where you may have to adjust the autogrow parameters.
- No issues discovered.

Database Configuration

* Database Space Management

- This rule checks for disk and database space management on the appliance.
- No issues discovered.

Security



* Logins with No Password Expiration

- Checks whether the APS logins created on the appliance are set to expire.
- If the is_policy_checked column is "0" it means that the policy is not being enforced.
- Issue discovered (Low) – Accounts set with this policy set to off.

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- If the is_policy_checked column is "0" it means that the policy is not being enforced.
- No issues discovered.

Operational Excellence

✧ Backups Implemented

- This test is based on the questionnaire. This test checks if the backups are implemented or not.
- No issues discovered.

Operational Excellence

✧ Disaster Recovery

- This test is based on the questionnaire. This test checks if there is a DR plan. The DR plan should comprise a solution that allows you to recreate your data and processing environment.
- Issue discovered (Medium) – No DR plan.



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Next Steps – Stabilization & Remediation





Questions

The Microsoft logo is displayed in a bold, italicized, white sans-serif font. The word "Microsoft" is followed by a registered trademark symbol (®). The logo is centered horizontally on the left side of the slide.