



GridOps Management Suite 3.10

File Monitoring Interface

Functional Specification

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1. REFERENCES

#	Title	Description
1.	EcoStruxure GridOps Management Suite 3.10 File Claim Check Interface - Functional Specification	The document describes an out-of-the-box integration adapter designed for importing the files in the EcoStruxure GridOps. It follows the Claim Check integration pattern.
2.	EcoStruxure GridOps Management Suite 3.10 Enterprise Integration Platform - Functional Specification	The document represents a set of common integration principles applied to all baseline integration adapters.
3.	EcoStruxure GridOps Management Suite 3.10 File Monitoring Interface	EcoStruxure GridOps Management Suite 3.10 File Monitor Interface zip file contains essential configuration information.

2. ASSUMPTIONS AND PREREQUISITES

The File Monitoring Integration is developed under the following assumptions:

- External systems have possibility to transfer their data contained in a file to the EcoStruxure GridOps via predefined shared location. Format of the file depends on the type of system that is being integrated. To ensure that all file will be processed there should be time stamp within file name.
- File Monitoring Integration, deployed on DMZ, monitors the external share location and copies file(s) ordered by LastWriteTime, to the share location in DMZ.
- File Monitoring Integration, deployed on Staging, monitors shared location in DMZ, copies file(s) ordered by CreatedDateTime to local share in Staging and invokes Network Import Service:
 - To support import files from external system to EcoStruxure GridOps, File Monitor Integration should be deployed in DMZ and Staging system.
 - Import process also can be supported combining functionalities of Claim Check Adapter in DMZ system, and File Monitor Integration in Staging (for Claim Check adapter please refer to document *EcoStruxure GridOps Management Suite 3.10 File Claim Check Interface - Functional Specification* [1]).
- File Monitor Adapter supports postprocessing through the implementation of appropriate custom plug-ins.
- Housekeeping of remote (external) file share is done by the source system.
- Housekeeping of local file share is done by the File Monitoring Adapter.
- File Monitor Adapter supports configurable housekeeping option for deleting old files from (external) file share. This feature is disabled by default and can be enabled only on active sites.
- File Monitor Adapter supports configurable housekeeping option for deleting processed files from (external) file share. This feature is disabled by default and can be enabled on both active and backup sites.
- Separate remote folder shall be used for each extract type.
- Both SFTP and CIFS (SMB) file share types are supported.
- SFTP authentication can be done using username/password or private key file.
- Default encoding on SFTP server must be UTF-8.
- File Monitor adapter supports configurable digital signature signing and verification.

3. INTRODUCTION

EcoStruxure GridOps Management Suite is a family of solutions designed to help electric utilities in the operations and management of their grid. It is offered as EcoStruxure ADMS, EcoStruxure Grid Operation, EcoStruxure DERMS or EcoStruxure Energy Transmission Operation solutions, which share the same technology platform.

NOTE: The functionality described in this document applies to all solutions.

NOTE: Most images presented in this document are related to the EcoStruxure ADMS solution and should be used as an example. The images for other solutions may differ slightly.

Depending on the quantity of the data being exchanged between integrated systems, there can be three approaches of data transferring, from the source to the destination system:

- In case of the small data quantity, the data is transferred as a payload within the message (it is not a focus of this document).
- In case of the large data quantity, the claim check pattern is used where data is exported to a file and the target system is notified about the file location in the message (it is not a focus of this document).
- If the source side cannot implement claim check pattern, the file monitoring can be used. Data is exported to a file and uploaded to predefined shared location. Target system monitors mentioned location and consumes new files. This process is described in following chapters.

When extract file of potentially large file size needs to be exchanged, it is more efficient to place the file on the shared file location (File Share) and let the EcoStruxure GridOps consume the file by implementing file monitoring solution.

Data can originate from different utility's systems like CIS, GIS, MDMS, etc. and it is intended to be imported in EcoStruxure GridOps. Depending on the business process, files are exchanged and appropriate type of import is invoked on the destination side. Results of the import process are extracts, changesets or some other data format that is understood by the EcoStruxure GridOps system. To support mentioned business process, File Monitoring Adapter is provided and must be deployed in DMZ and Staging systems:

- File Monitor Adapter deployed in DMZ system copies data file(s) from the external shared location to the local share in DMZ.
- File Monitor Adapter deployed in Staging system monitors shared location in DMZ, copies file on local share in Staging and invokes import process.

File Monitor Adapter in DMZ is hosted within DMS Integration Service, while File Monitor Adapter in Staging system is hosted within Network Import Service.

3.1. General Architecture

It is thoroughly described in the *EcoStruxure GridOps Management Suite 3.10 Enterprise Integration Platform - Functional Specification* [2].

The File Monitor Adapter deployed in DMZ system is a separate process hosted inside DMS Integration Service. The File Monitor Adapter deployed in Staging system is a separate process hosted inside Network Import Service.

The general architecture of integration solution is given in Figure 3.1.

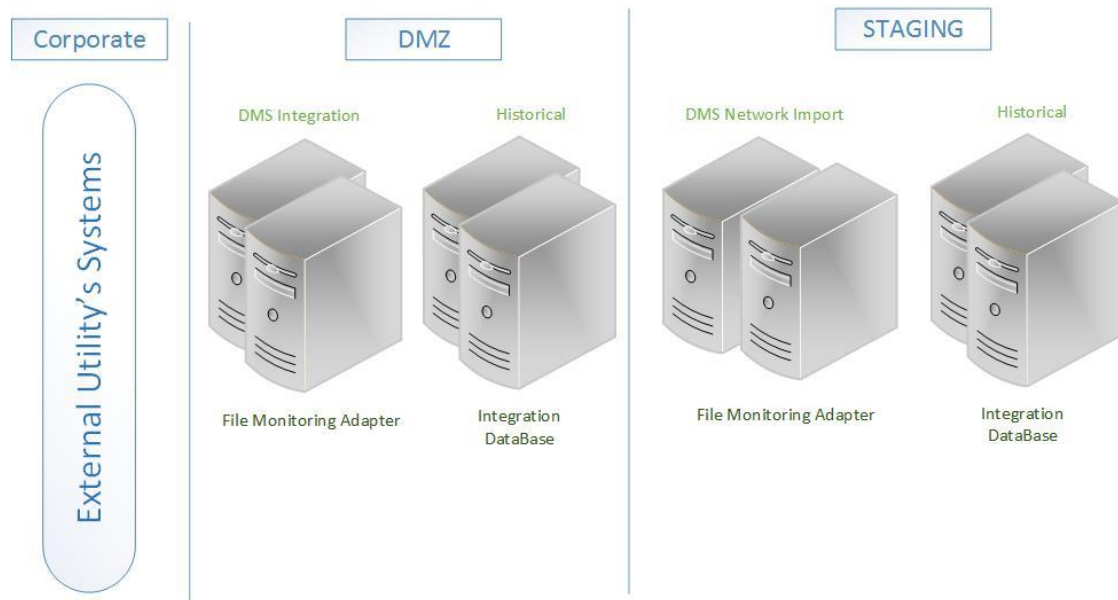


Figure 3.1 – The general architecture

4. INTERFACE OVERVIEW

The File Monitoring Integration is implemented through the File Monitoring Adapter component. The aforementioned adapter implements the file location monitor component which, tracks the record of newly uploaded files to a predefined shared location.

The following chapters provide more details regarding briefly described interface above, along with the service operation, error handling scenarios, etc.

The use case diagram that represents common participants (actors) and users of the aforementioned interface in the File Monitoring Integration is given Figure 4.1.

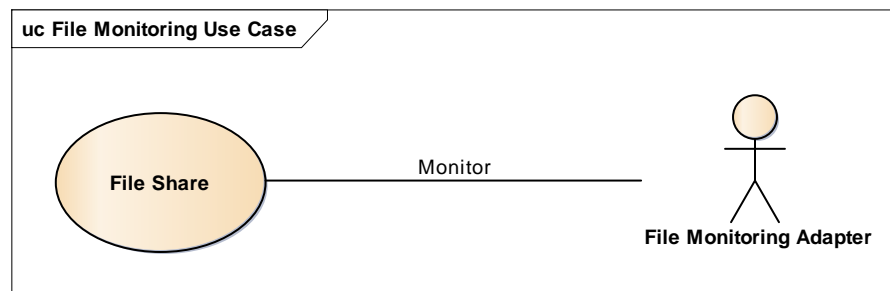


Figure 4.1 – The File Monitoring Integration use case diagram

5. FILEMONITORING SERVICE

5.1. FileMonitor Operation

5.1.1. Overview

There are several steps that need to be covered within the specific share point monitoring approach for exchanging extract files between the client's corporate systems and EcoStruxure GridOps. These steps are the following:

1. Storing extract files to the external file share is performed by the external system. To prevent File Monitor Adapter to consume file until external system finishes the write operation, file(s) should be stored to the external file share in two ways:
 - a. With the temporary file extension.
 - b. File can be uploaded to the temporary folder after which the same file should be moved (cut operation since it is an atomic operation) by external system to the appropriate destination folder that is monitored by the File Monitor Adapter.
2. File Monitor Adapter deployed in the DMZ system:
 - a. Fetches the published extract file from the external file share.
 - b. Check in Integration database in DMZ system if file is already processed, and check dedicated shared repository if file is already copied.
 - c. Stores fetched file into dedicated shared repository of the EcoStruxure GridOps where both adapters (from DMZ and Staging system) have access. File is stored with temporary extension until write operation is finished.
3. File Monitor Adapter deployed in Staging system:
 - a. Monitors shared location where file is stored by the DMZ File Monitor Adapter.
 - b. Check in Integration database in Staging system if file is already processed, and check dedicated local share if file is already copied.
 - c. Copies file to predefined local share in the Staging system. File is stored with temporary extension until write operation is finished.
 - d. Informs Network Import Service about location of the new file that needs to be processed,
4. Network Import Service fetches provided file and starts with processing the file.

To prevent processing same file multiple times, File Monitor Adapter in Staging system stores information about processed file in Integration database in Staging Historical, after Network Import Service is successfully invoked.

In order to accomplish this, the file names need to be unique. Information about processed file is replicated between databases in Staging and DMZ system.

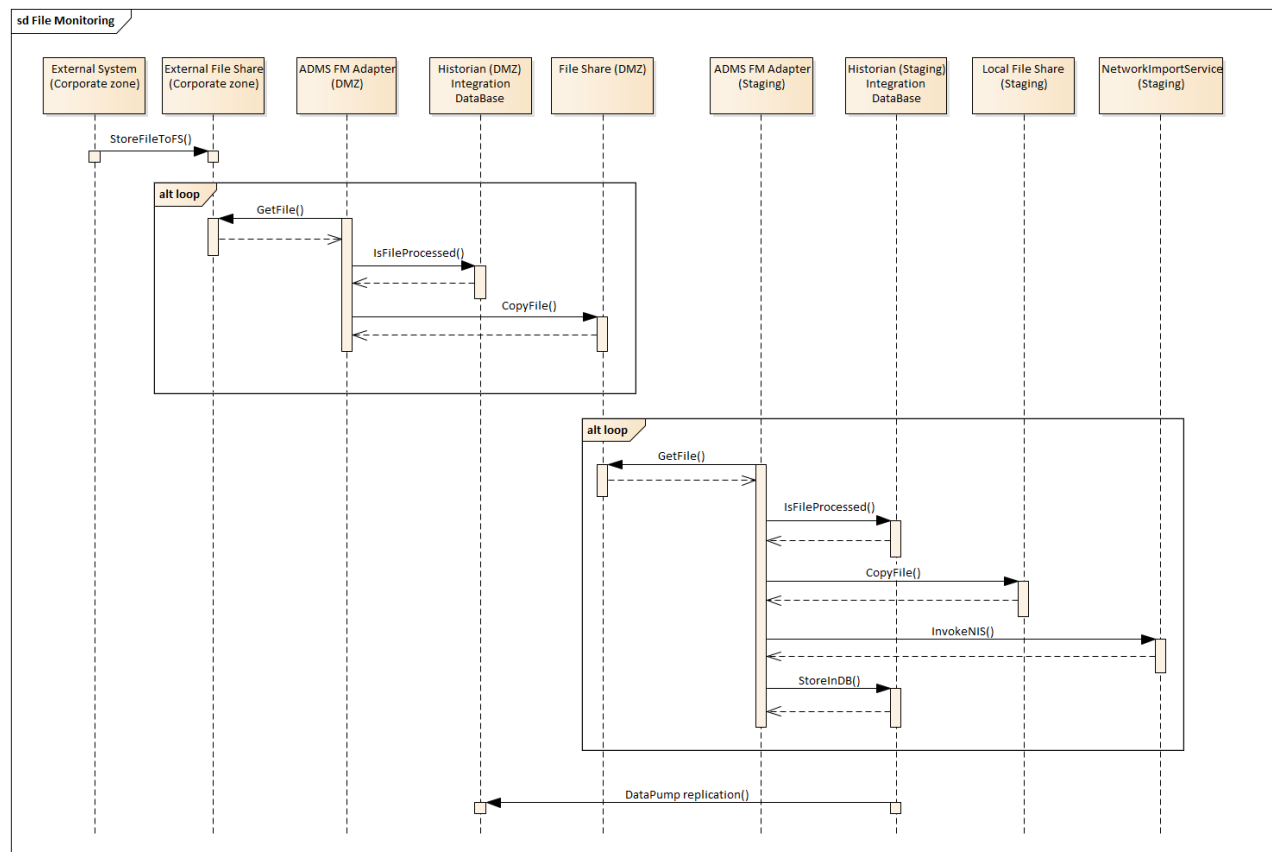


Figure 5.1 – The FileMonitoring operation execution

5.1.2. Use Cases

The list of possible use cases and corresponding faults is given in Table 5.1.

Table 5.1 – The FileMonitoring operation use cases

Use Case	Message Mapping			Action
	Property	Type	Value	
File is successfully copied to shared location in DMZ	Result	String	N/A	File Monitoring Adapter in DMZ successfully access to SFTP and copies file from SFTP to predefined shared location in DMZ. Event is created by adapter.
	Error.code	String	N/A	
	Error.level	String	N/A	
	Error.reason	String	N/A	
	Error.details	String	N/A	
The external File Share is not available	Result	String	N/A	File Monitoring Adapter in DMZ cannot access to the external shared location. After configurable number of try to connect to the external shared location, error is written to a log file and event is sent by File Monitoring Adapter.
	Error.code	String	N/A	
	Error.level	String	N/A	
	Error.reason	String	N/A	
	Error.details	String	N/A	
Cannot access to shared location in DMZ	Result	String	N/A	File Monitoring Adapter in DMZ cannot access to shared location in DMZ. Error is written to a log file and event is sent by File Monitoring in DMZ.
	Error.code	String	N/A	
	Error.level	String	N/A	
	Error.reason	String	N/A	
	Error.details	String	N/A	
Not supported import type	Result	String	N/A	File Monitoring Adapter in Staging tries to process file that has unsupported import type. File Monitoring Adapter logs an error and file won't be copied to local share in Staging.
	Error.code	String	N/A	
	Error.level	String	N/A	
	Error.reason	String	N/A	
	Error.details	String	N/A	
	Result	String	N/A	
	Error.code	String	N/A	

Use Case	Message Mapping			Action
	Property	Type	Value	
Failed to copy extract to local share in Staging system	Error.level	String	N/A	File Monitoring Adapter in Staging system consumes the file from monitored location in DMZ, and tries to copy it locally. As local share in Staging is unavailable, error is written to a log file and event is sent by File Monitoring Adapter in Staging system.
	Error.reason	String	N/A	
	Error.details	String	N/A	
File Monitor Adapter in Staging cannot access to shared location in DMZ	Result	String	N/A	File Monitoring Adapter in Staging system cannot access to shared location in DMZ. After configurable number of try, error is written to a log file and event is sent by File Monitoring in Staging.
	Error.code	String	N/A	
	Error.level	String	N/A	
	Error.reason	String	N/A	
	Error.details	String	N/A	
Import procedure successfully initiated	Result	String	N/A	File Monitoring Adapter in Staging system consumes the file from monitored location in DMZ and copies it locally, after which import procedure is initiated successfully. File Monitor Adapter in Staging stores information about successfully processed file in Integration dataBase in Staging. Note: After file is successfully copied on local share in Staging system and Network Import Service is successfully invoked, adapter rises event and stores information that file is successfully processed in Integration dataBase
	Error.code	String	N/A	
	Error.level	String	N/A	
	Error.reason	String	N/A	
	Error.details	String	N/A	
File is already processed (checking in Staging system)	Result	String	N/A	On shared location in DMZ there is stored file that is already imported. File Monitoring Adapter in Staging system checks in Integration dataBase if file is already processed, and file won't be copied to predefined local share in Staging. Adapter will log an error.
	Error.code	String	N/A	
	Error.level	String	N/A	
	Error.reason	String	N/A	
	Error.details	String	N/A	
File is already processed (checking in DMZ system)	Result	String	N/A	On external shared location there is stored file that is already imported. File Monitoring Adapter in DMZ system checks in Integration dataBase if file is already processed, and file won't be copied to predefined local share in DMZ. Adapter will log an error.
	Error.code	String	N/A	
	Error.level	String	N/A	
	Error.reason	String	N/A	
	Error.details	String	N/A	
Integration database in Staging system is unavailable	Result	String	N/A	File Monitoring Adapter in Staging system cannot access to Integration dataBase to check if file is processed. After configurable number of try, error is written to a log file and event is sent by File Monitoring in Staging.
	Error.code	String	N/A	
	Error.level	String	N/A	

Use Case	Message Mapping			Action
	Property	Type	Value	
	Error.reason	String	N/A	
	Error.details	String	N/A	
Integration database in DMZ system is unavailable	Result	String	N/A	File Monitoring Adapter in DMZ system cannot access to Integration dataBase to check if file is processed. After configurable number of try, error is written to a log file and event is sent by File Monitoring in DMZ.
	Error.code	String	N/A	
	Error.level	String	N/A	
	Error.reason	String	N/A	
	Error.details	String	N/A	
File signature verification in Staging filed	Result	String	N/A	File Monitoring Adapter in Staging system cannot verify file signature added in DMZ. Error is written to a log file and event is sent by File Monitoring in Staging.
	Error.code	String	N/A	
	Error.level	String	N/A	
	Error.reason	String	N/A	
	Error.details	String	N/A	

6. DEPLOYMENT

The File Monitoring Adapter provides integration between the EcoStruxure GridOps and clients external applications such as: GIS, CIS, etc.

The deployment specification is provided in the following table:

Table 6.1 – The deployment specification

Deployment Specification	
Application	FileMonitorAdapter
Critical process	No
OASyS service	OASyS DNA DMS_INTEGRATION Service
Servers	pdmz-int-1, pdmz-int-2, pqa-stg1, pqa-stg2, bdmz-int-1, bdmz-int-2, bqa-stg1, bqa-stg2
Zone	pdmz, bdmz, pqa, bqa
Installation Type	Product
Installation add-on name	Integration Adapters

Figure 6.1 depicts standard deployment configuration for all File Monitoring Integration participants in DMZ system.

Figure 6.2 depicts standard deployment configuration for all File Monitoring Integration participants in Staging system.

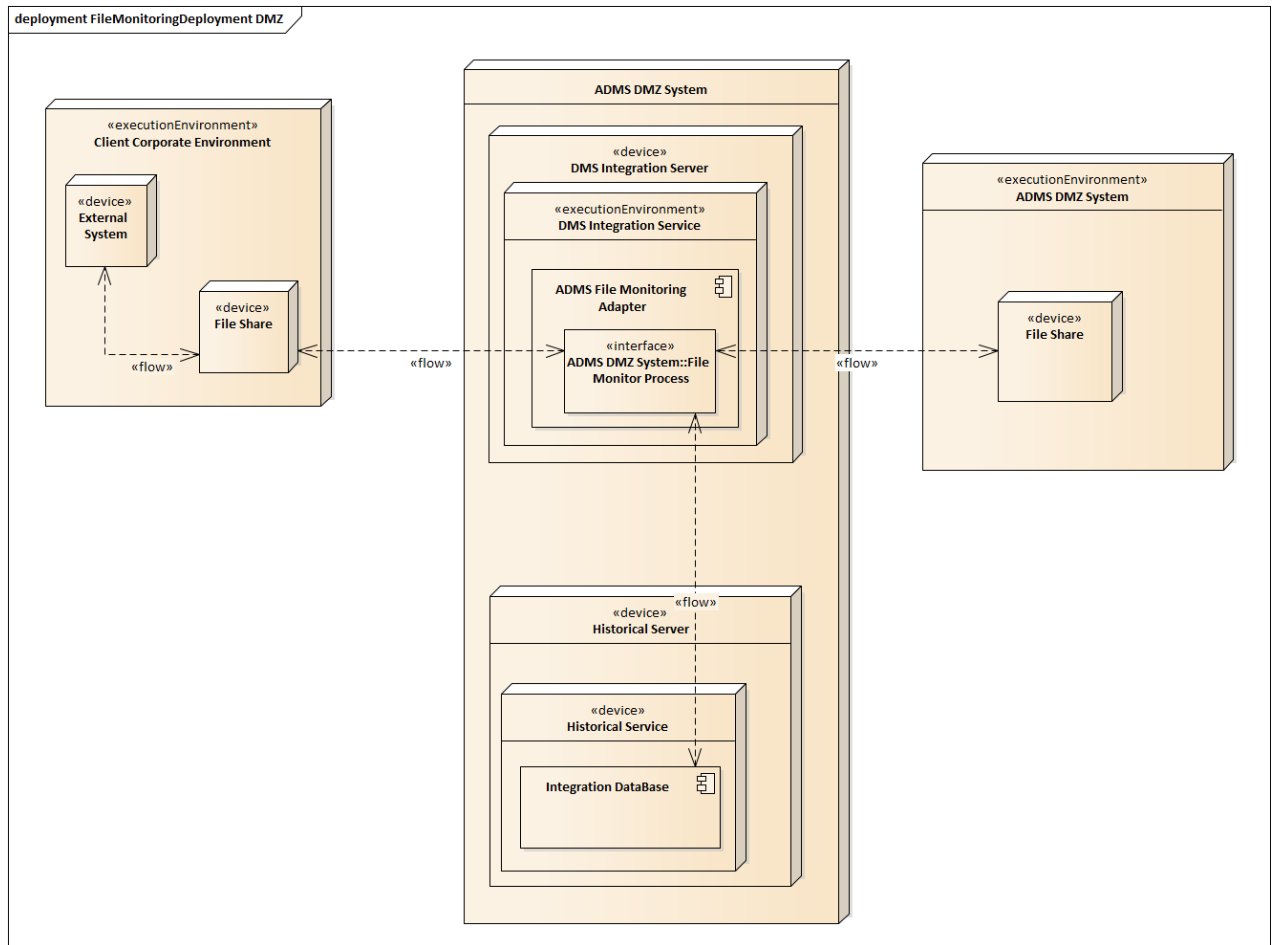


Figure 6.1 – The File Monitoring Integration deployed in DMZ

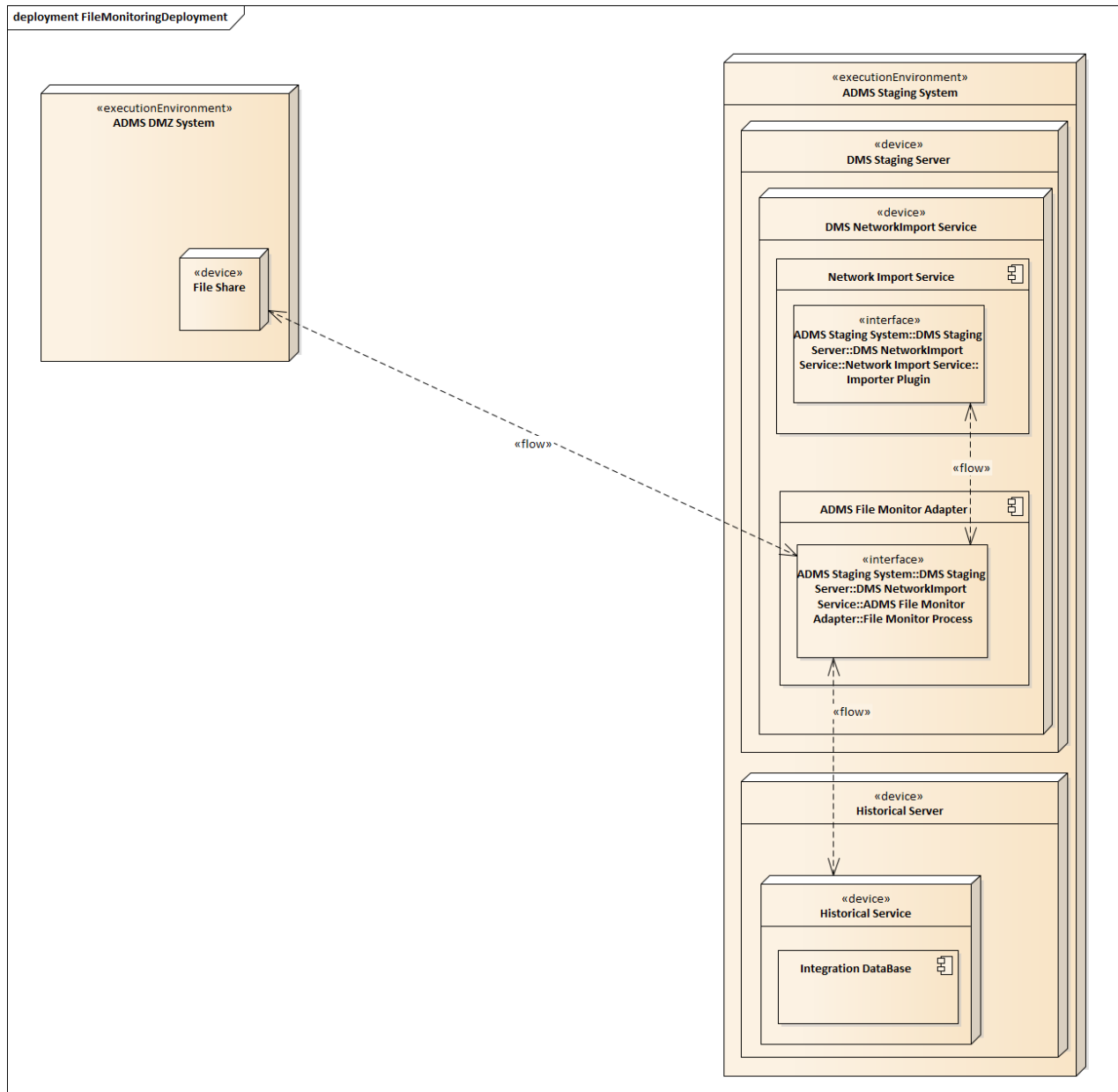


Figure 6.2 – The File Monitoring Integration deployed in Staging System

7. INTERFACE CONFIGURATION

File Monitor adapter provides certain amount of configurability so that smaller adjustments in the functionality can be easily applied to the system, without interface down time. Such feature is provided through dedicated configuration files of the File Monitor adapter. Initially, following configuration files are used the adapter:

Table 7.1 – The configuration files specification

Name of the config file	Configuration File Description
AdapterFileMonitor	Registry configuration xml file
FileTypeConfiguration_FileMonitorAdapter	File type configuration xml file (contains settings for source and destination path, supported file formats and NIS method name)

For more details about adapters configuration files refer to the *EcoStruxure GridOps Management Suite 3.10 Enterprise Integration Platform - Functional Specification* [2].

Detailed content of above-mentioned configuration files is provided within the *Configuration* folder in the *EcoStruxure GridOps Management Suite 3.10 File Monitoring Interface.zip* file [3].

8. RELEASE NOTES

The following new features related to Product File Monitoring Interface were introduced in the software, starting from version 3.8.

8.1. Software Version 3.8.0

Feature	Description
File Monitoring and Claim Check interfaces	In order to enable easier deployment, configuration and maintenance, File Interface was separated into two interfaces: File Monitoring and Claim Check. Functionality was left intact, with small improvements related to more granular configuration of post copying actions.

8.2. Software Version 3.8 SP1

Feature	Description
Increase Security	To increase security during file distribution within the ADMS system, the File Monitor adapters is extended to support configurable digital signature signing and verification.

8.3. Software Version 3.9

Feature	Description
File Monitor Interface – Trigger time validation	Triggering time validation is added. If the user enters a value that is less than 1 min, the value will be defaulted to 1 min.
File Monitor Interface – Housekeeping Extension	File cleanup process is improved and housekeeping enabled on file share locations on inactive sites.
File Monitor Interface – Post-processing Support	File Monitor adapter is enhanced with ability to perform simple, post-processing actions such as invoking some other services and configurable removing of old files on remote (SFTP/CIFS) location.

9. DEFINITIONS AND ABBREVIATIONS

Definition/Abbreviation	Description
ADMS	Advanced Distribution Management System
CIM	Common Information Model
CIS	Customer Information Service
DMD	Dynamic Mimic Diagram
DMZ	Access Service (DMZ) System
ESB	Enterprise Service Bus
LFS	Local File Share
FS	File Share
NIS	Network Import Service
SFTP	SSH File Transfer Protocol
SOAP	Simple Object Access Protocol
WCF	Windows Communication Foundation
WS	Web Service
XML	Extensible Markup Language
XSD	XML Schema Definition