

IBM Explorer for z/OS Atlas (Open Toolchain API)  
Technical Preview

*User's Guide*





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**Note**

Before using this information, be sure to read the general information under “Notices” on page 27.

**Second edition**

This edition applies to IBM Explorer for z/OS Atlas Version 0.0.2 and to all subsequent releases and modifications until otherwise indicated in new editions.

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## About this book

This installation guide provides instructions for installing and upgrading IBM Explorer for z/OS Atlas (Atlas).

The following names are used in this manual:

- *IBM Explorer for z/OS Atlas* is called *Atlas*.
- *IBM Explorer for z/OS* is called *z/OS Explorer*.

This document is maintained between product releases. The new changes, and smaller corrections and additions, are indicated by a "|" change bar in the left margin of the page.

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## Who should read this book

This book is intended for system programmers who are installing and configuring Atlas on their workstations. To use this book, you must be familiar with:

- z/OS®
- IBM® z/OS Management Facility (z/OSMF)





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## Chapter 1. Overview

Atlas is a z/OS RESTful web service and deployment architecture for z/OS microservices. Atlas is implemented as a Liberty Profile web application that uses z/OSMF services to provide a range of APIs for the management of jobs, data sets, z/OS UNIX System Services files, and persistent data, and exposes some functions of IBM File Manager for z/OS (File Manager) and IBM Fault Analyzer for z/OS (Fault Analyzer) through its RESTful interface.

Atlas can be used by any client application that calls its RESTful APIs directly.

As a deployment architecture, Atlas accommodates the installation of other z/Tool microservices into its Liberty instance. These microservices can be used by Atlas APIs and client applications.



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## Chapter 2. Installing Atlas

This chapter describes how to install Atlas.

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### Planning the installation

Before you start the installation, review the information about system requirements and other considerations.

#### System requirements

Before you install Atlas, ensure that your workstation meets the following system requirements:

- Atlas must be installed on z/OS version 2.1 or later.
- IBM z/OS Management Facility (z/OSMF) must be installed and running. z/OSMF is a prerequisite for the Atlas microservice.

Atlas uses the RESTFILES and RESTJOBS services of z/OSMF to access data sets, z/OS UNIX System Services (USS) files, and job spool files. Therefore, these services must be correctly configured and available when Atlas is running.

Additionally, Atlas uses z/OSMF configuration by using symbolic links to the z/OSMF bootstrap.properties, jvm.security.override.properties, and the ltpa.keys files. Specifically, Atlas reuses z/OSMF's SAF, SSL, and LTPA configuration; therefore, these configurations must be valid and complete to operate Atlas successfully.

For more information about z/OSMF installation and customization, see the IBM z/OS Management Facility Configuration Guide (SC27-8419).

- (Optional) To enable real-time access to SYSLOG, SDSF must be installed.
- (Optional) To enable direct access to fault entry reports from abending jobs and transactions, Fault Analyzer Version 13.1 or later must be installed.
- (Optional) To enable FM enhanced search function, File Manager Version 13.1 or later must be installed.

#### Pre-installation checklist

Before you install Atlas, make the following decisions:

- The HFS directory where you install Atlas, for example, /var/atlas.
- The HFS directory path that contains a 64-bit Java™ 8 JRE.
- The z/OSMF installation directory /lib that contains derby.jar, for example, /usr/lpp/zosmf/lib.
- The z/OSMF configuration user directory path that contains z/OSMF /bootstrap.properties, /jvm.security.override.properties, and /resources/security/ltpa.keys files.
- The Atlas http and https port numbers. By default, they are 7080 and 7443.
- The user ID that runs the Liberty Atlas started task.

**Tip:** Use the same user ID that runs the z/OSMF IZUSVR1 task, or a user ID with equivalent authorizations.

- (Optional) The SDSF java installation directory, for example, /usr/lpp/sdsf/java.

- (Optional) IBM File Manager high-level qualifier, for example, FMN.V13R1M0.

---

## Installing Atlas

### Procedure

1. Download the Atlas archive from the IBM Mainframe Developer Center. The archive is about 200 MB.
2. Extract the archive on your workstation and transfer the following files to z/OS System:
  - The Atlas PAX archive that contains Liberty Profile binaries and the Atlas application.
  - The Atlas Install script

**Note:** The Atlas Install script is an ASCII file. If the Install script is transferred by using FTP, the Install script is converted into the appropriate format for the server. If the Install script is transferred by using SCP or SFTP, the Install script is not converted, and it should be converted by taking the action specified in the **Important** note below.

Alternatively, transfer the Atlas archive to your z/OS system, and extract the archive. The Atlas archive contains the following files:

- The Atlas PAX archive that contains Liberty Profile binaries and the Atlas application
- The Atlas Install script
- This Installation Guide
- The Readme file

Extracting the archive on the server does not convert the Install script. The Install script should be converted by taking the action specified in the **Important** note below.

**Important:** To convert the Install script from ASCII into the standard EBCDIC code page, use **ICONV**. For example,

```
iconv -f ISO8859-1 -t IBM-1047 atlas-wlp-package-0.0.1.sh > atlas-wlp-package-EBCDIC.sh
```

**Note:** Transfer the PAX archive and the Install script in binary mode to the Atlas installation directory that is chosen during planning, for example, /var/atlas, or wherever you choose to install Atlas.

3. Run the Atlas install script.

The install script must be transferred to the same Atlas installation directory of the Atlas PAX archive. Run the install script in the installation directory with a user ID that has the authority to:

  - Unpack the Atlas PAX archive and install Atlas into the installation directory, for example, /var/atlas. About 205 MB is needed to unpack the archive and more space is needed for Liberty operation and logging.
  - Set the file group ownership to IZUADMIN.
  - Create symbolic links to the files that z/OSMF owns.

Therefore, use super user authority to run the Atlas install script.

4. Change the ownership of Atlas installation directory and files.

The user who runs the Atlas Liberty server needs the access to the Atlas installation directory and files. You can use the same user ID that runs the z/OSMF IZUSVR1 started task to run the Atlas Liberty server. By default, it is the user IZUSVR.

To change the ownership of the Atlas installation directory and files, enter the following z/OS UNIX System Services command from the Atlas installation directory:

```
chown -R IZUSVR *
```

You might need super user authority to run this command. Use an alternative user ID if you chose not to use the default z/OSMF IZUSVR1 started task user.

5. Create a member FEKATLS in your system PROCLIB data set.

The install script creates a file that is called FEKATLS.jcl is created in your Atlas installation directory. Copy this file to a system PROCLIB data set by using the following z/OS UNIX System Services command:

```
cp FEKATLS.jcl "'h1q.PROCLIB(FEKATLS)'"
```

The FEKATLS procedure starts a Liberty profile server running the Atlas microservice application.

6. Configure the FEKATLS started procedure.

To run the FEKATLS procedure as the user IZUSVR, define the procedure to the STARTED class by using RACF® or equivalent, for example:

- RDEF STARTED (FEKATLS.\*) STDATA(USER(IZUSVR) GROUP(IZUADMIN))
- SETR RACLIST(STARTED) REFRESH

Here is an example of the FEKATLS procedure JCL:

```
//*****
//*   Licensed Materials - Property of IBM                               *
//*                                                                              *
//*   5655-EX1                                                            *
//*                                                                              *
//*   Copyright IBM Corp. 2017. All rights reserved.                      *
//*                                                                              *
//*   US Government Users Restricted Rights - Use,                      *
//*   duplication or disclosure restricted by GSA ADP                    *
//*   Schedule Contract with IBM Corp.                                    *
//*                                                                              *
//*****
//*
//* ATLAS WLP PROCEDURE                                                  *
//*                                                                              *
//* This is a procedure to start the Atlas web server platform,          *
//* running on the WebSphere Liberty Profile. This procedure             *
//* requires a WebSphere Liberty Angel procedure is running, such as    *
//* z/OSMF procedure "IZUANG*".                                           *
//*                                                                              *
//* NOTE: THIS JCL IS MODIFIED BY THE ATLAS INSTALLATION PROCESS TO     *
//* SET THE ATLAS INSTALLATION PATH. IF THE INSTALLATION PATH          *
//* CHANGES, MODIFY THE SRVRPATH VALUE ACCORDINGLY.                    *
//*                                                                              *
//*****
//ATLAS PROC
//*-----
//* SRVRPATH - The path to the HFS directory where the Atlas server
//*              was installed.
//*-----
//EXPORT EXPORT SYMLIST=*
//  SET SRVRPATH='${atlaspath}'
//*-----
//* Start the Atlas WebSphere Liberty Profile server
//*-----
//STEP1  EXEC PGM=BPXBATSL,REGION=0M,TIME=NOLIMIT,
```

```
// PARM='PGM &SRVRPATH/wlp/lib/native/zos/s390x/bbgzsrv Atlas'
//WLPUDIR DD PATH='&SRVRPATH/wlp/usr'
//STDOUT DD SYSOUT=*
//STDERR DD SYSOUT=*
//*-----
//* Optional logging parameters that can be configured if required
//*-----
//*STDOUT DD PATH='&SRVRPATH/std.out',
//*      PATHOPTS=(OWRONLY,OCREAT,OTRUNC),
//*      PATHMODE=SIRWXU
//*STDERR DD PATH='&SRVRPATH/std.err',
//*      PATHOPTS=(OWRONLY,OCREAT,OTRUNC),
//*      PATHMODE=SIRWXU
```

7. Add Atlas users to the z/OSMF users group (IZUUSER).

Atlas uses z/OSMF to access data sets, z/OS UNIX System Services files, and job spool files. To use these z/OSMF services, Atlas users must be authorized to z/OSMF resources. For more information, see the IBM z/OS Management Facility Configuration Guide, Appendix A.

To add Atlas users to the z/OSMF IZUUSER group, use RACF or equivalent. For example,

```
CONNECT userid GROUP(IZUUSER) AUTH(USE)
```

8. Start the Atlas server.

To start Atlas manually, enter the **START** operator command:

```
S FEKATLS
```

To start Atlas automatically at IPL, add the **START** command to your active COMMNDxx parmlib member.

9. Optional: Change your language in Atlas by adding the following line to the jvm.options file, for example,

```
-Duser.language=de
```

where de can be replaced with other language codes.

---

## Verifying installation

After Atlas is installed and the FEKATLS procedure is started, you can verify the installation from an internet browser by using the following URL:

```
https://your.server:atlasport/Atlas/api/system/version
```

where *your.server* matches the host name or IP address of your z/OS system where Atlas is installed, and *atlasport* matches the port number that is chosen during installation. You can verify the port number in the `server.xml` file that is located in the Atlas installation directory, which is `/var/atlas/wlp/usr/servers/Atlas/server.xml` by default. Look for the `httpsPort` assignment in the `server.xml` file, for example: `httpPort="7443"`.

**Important:** This URL is case-sensitive.

This URL sends an HTTP GET request to your Liberty Profile Atlas server. If Atlas is installed correctly, a JSON payload that indicates the current Atlas application version is returned. For example:

```
{ "version": "V0.0.1" }
```

**Note:** For the first interaction with the Atlas server, you are prompted to enter an MVS™ user ID and password. The MVS user ID and password are passed over the secure HTTPS connection to establish authentication.

## Verifying the availability of Atlas REST APIs

To verify the availability of all Atlas REST APIs, use the Liberty Profile's REST API discovery feature from an internet browser with the following URL:

`https://your.server:atlasport/ibm/api/explorer`

**Note:** This URL is case-sensitive.

With the discovery feature, you can also try each discovered API. The users who verify the availability must have access to their data sets and job information by using relevant Atlas APIs. This ensures that your z/OSMF configuration is valid, complete, and compatible with the Atlas application. For example, try the following APIs:

Atlas : JES Jobs APIs

`GET /Atlas/api/jobs`

This API returns job information for the calling user.

Atlas : Dataset APIs

`GET /Atlas/api/datasets/userid.**`

This API returns a list of the *userid.\*\** MVS datasets.

---

## Applying services to Atlas

You can monitor IBM Mainframe Developer Center for service availability of Atlas.

When maintenance is available, you can apply the service to Atlas with one of the following options:

- Replace the EAR file only. To do so, take the following steps:
  1. Download the EAR file from the download site as a .zip file.
  2. Extract the EAR package on your personal machine or by using zip utilities on the mainframe.
  3. Stop the existing instance of the Atlas server.
  4. Backup and delete the existing EAR file located at "{server root folder}/wlp/usr/servers/Atlas/apps".
  5. Transfer the new EAR file to the server at the same location "{server root folder}/wlp/usr/servers/Atlas/apps".
  6. Restart the Atlas server.
- Apply the whole service package. To do so, take the following steps:
  1. Transfer the maintenance archive to your z/OS system in binary mode.
  2. Unpack the archive in your Atlas installation directory in z/OS UNIX System Services. Or, run the install script that is provided in the archive if any.
  3. Stop and restart your Atlas Liberty server.

**Note:** By default, Atlas server configuration switches off application monitoring in the Liberty server.xml file. For “hot deploy”, you can remove this setting in the server.xml file to avoid the need to stop and restart your Atlas server. For more information, see WebSphere® Liberty Profile documentation.

After restarting the Atlas server, you can check the version of Atlas installed from the swagger interface, which is `Atlas/api/system/version` under System APIs.

---

## Uninstalling Atlas

### About this task

To uninstall Atlas, take the following steps:

### Procedure

1. Stop your Atlas Liberty server by running the following operator command:  
`P FEKATLS`
2. Delete the FEKATLS member from your system PROCLIB data set.
3. Remove RACF (or equivalent) definitions with the following command:  
`RDELETE STARTED (FEKATLS.*)`  
`SETR RACLIST(STARTED) REFRESH`  
`REMOVE (userid) GROUP(IZUUSER)`
4. Delete the z/OS UNIX System Services Atlas directory and files from the Atlas installation directory by using the following command:  
`rm -R /var/atlas`

### Notes:

- You might need super user authority to run this command.
- You must identify the Atlas installation directory correctly. Running a recursive remove command with the wrong directory name might delete critical files.

---

## Troubleshooting installation

If Atlas REST APIs do not work, check the following items:

- Check whether your Atlas Liberty server is running.  
You can check this in the Display Active (DA) panel of SDSF under ISPF. The FEKATLS task should be running. If the FEKATLS task is not running, start the Atlas server by using the following **START** operator command:  
`S FEKATLS`  
You can also use the operator command `D A, ATLAS` to verify whether the task is active, which alleviates the need for SDSF. If the started task is not running, ensure that your FEKATLS procedure resides in a valid PROCLIB data set, and check the task's job output for errors.
- Check whether the Atlas server is started without errors.  
In the Display Active (DA) panel of SDSF under ISPF, select the FEKATLS job to view the started task output. If the Atlas server is started without errors, you can see the following messages:  
`CWWKE0001I: The server Atlas has been launched.`  
`CWWKF0011I: The server Atlas is ready to run a smarter planet.`  
If you see error messages that are prefixed with "ERROR" or stack traces in the FEKATLS job output, respond to them.
- Check whether the URL that you use to call Atlas REST APIs is correct. For example: `https://your.server:atlasport/Atlas/api/system/version`. The URL is case-sensitive.



- Ensure that you enter a valid z/OS user ID and password when initially connecting to the Atlas Liberty server.
- If testing the Atlas REST API for jobs information fails, check the z/OSMF IZUSVR1 task output for errors. If no errors occur, you can see the following messages in the IZUSVR1 job output:

CWWKE0001I : The server zosmfServer has been launched.

CWWKF0011I: The server zosmfServer is ready to run a smarter planet.

If you see error messages, respond to them.

For RESTJOBS, you can see the following message if no errors occur:

CWWKZ0001I: Application IzuManagementFacilityRestJobs started in n.nnn seconds.

You can also call z/OSMF RESTJOBS APIs directly from your internet browser with a URL, for example,

`https://your.server:securezosmfport/zosmf/restjobs/jobs`

where the *securezosmfport* is 443 by default. You can verify the port number by checking the *izu.https.port* variable assignment in the z/OSMF `bootstrap.properties` file.

If calling the z/OSMF RESTJOBS API directly fails, fix z/OSMF before Atlas can use these APIs successfully.

- If testing the Atlas REST API for dataset information fails, check the z/OSMF IZUSVR1 task output for errors and confirm that the z/OSMF RESTFILES services are started successfully. If no errors occur, you can see the following message in the IZUSVR1 job output:

CWWKZ0001I: Application IzuManagementFacilityRestFiles started in n.nnn seconds.

You can also call z/OSMF RESTFILES APIs directly from your internet browser with a URL, for example,

`https://your.server:securezosmfport/zosmf/restfiles/ds?dslevel=userid.**`

where the *securezosmfport* is 443 by default. You can verify the port number by checking the *izu.https.port* variable assignment in the z/OSMF `bootstrap.properties` file.

If calling the z/OSMF RESTFILES API directly fails, fix z/OSMF before Atlas can use these APIs successfully.

**Tip:** The z/OSMF installation step of creating a valid IZUFPROC procedure in your system PROCLIB might be missed. For more information, see the z/OSMF Configuration Guide.

The IZUFPROC member resides in your system PROCLIB, which is similar to the following sample:

```
//IZUFPROC PROC ROOT='/usr/lpp/zosmf' /* zOSMF INSTALL ROOT */
//IZUFPROC EXEC PGM=IKJEFT01,DYNAMNBR=200
//SYSEXEC DD DISP=SHR,DSN=ISP.SISPEXEC
//          DD DISP=SHR,DSN=SYS1.SBPXEXEC
//SYSPROC DD DISP=SHR,DSN=ISP.SISPCLIB
//          DD DISP=SHR,DSN=SYS1.SBPXEXEC
//ISPLLIB DD DISP=SHR,DSN=SYS1.SIEALNKE
//ISPPLIB DD DISP=SHR,DSN=ISP.SISPPENU
//ISPTLIB DD RECFM=FB,LRECL=80,SPACE=(TRK,(1,0,1))
//          DD DISP=SHR,DSN=ISP.SISPTENU
//ISPSLIB DD DISP=SHR,DSN=ISP.SISPSENU
//ISPMLIB DD DISP=SHR,DSN=ISP.SISPMENU
//ISPPROF DD DISP=NEW,UNIT=SYSDA,SPACE=(TRK,(15,15,5)),
//          DCB=(RECFM=FB,LRECL=80,BLKSIZE=3120)
//IZUSRVMP DD PATH='&ROOT./defaults/izurf.tsoservlet.mapping.json'
```

```
//SYSOUT DD SYSOUT=H
//CEEDUMP DD SYSOUT=H
//SYSUDUMP DD SYSOUT=H
//
```

**Note:** You might need to change paths and data sets names to match your installation.

A known issue and workaround for RESTFILES API can be found at TSO  
SERVLET EXCEPTION ATTEMPTING TO USE RESTFILE INTERFACE.

- Check your system console log for related error messages and respond to them.

---

## Chapter 3. Using Atlas Web UI

A sample web client is included in Atlas for you to see how the APIs can be used to view and manipulate JES, data sets, z/OS UNIX System Services (USS), and system logs.

The following views are available from the Web UI:

### JES viewer

Queries JES jobs with filters and views the related steps, files, and status.

If a job has abended and IBM Fault Analyzer has created an associated history file, use this view to open the fault report directly.

You can purge jobs from this view.

### Syslog

Views the system log by using a web socket. Whenever messages are written, the view is refreshed automatically.

You can also open a JES spool file for an active job and view its content refreshed through a web socket.

### File Manager Search

Searches the file system, file contents, and z/OS assets by using File Manager.

You can open search results in the editor via a pop-up menu.

To use the functions of this view, File Manager must be installed.

### Dataset Explorer

Browses the MVS file system by using a high-level qualifier filter. With Dataset Explorer, you can complete the following tasks:

- Expand data set members and view the content of data set members.
- Submit data sets that contain JCL to start a JES job.
- Open data sets and members in an editor and update the content.
- Create new data sets by entering attributes or by using the allocate like option.
- Delete data sets and members.
- Open a data set in a full screen editor, which gives you a fully qualified link to that file. The link can be opened in any browser.
- Work with an editor that provides basic syntax highlighting and content assist for JCL.

### UNIX file Explorer

Searches and views UNIX files and folders.



---

## Chapter 4. Using Atlas REST APIs

After Atlas is deployed, you can call Atlas REST APIs directly from client applications. Swagger documentation is available from an internet browser with a URL, for example, <https://your.host:atlas-port/ibm/api/explorer>.

---

### Dataset APIs

Review the following table for detailed information about the Dataset APIs.

*Table 1. Dataset APIs*

REST API	Description	Scenario	Prerequisites
GET /Atlas/api/datasets/{filter}	Get a list of data sets by filter.	Use this API to get a starting list of data sets, for example, <b>userid.**</b> .	z/OSMF restfiles
GET /Atlas/api/datasets/{dsn}/attributes	Retrieve attributes of a data set(s).	If you have a data set name, use this API to determine attributes for a data set name. For example, it is a partitioned data set.	z/OSMF restfiles
GET /Atlas/api/datasets/{dsn}/members	Get a list of members for a partitioned data set.	Use this API to get a list of members of a partitioned data set.	z/OSMF restfiles
GET /Atlas/api/datasets/{dsn}/content	Read content from a data set or member.	Use this API to read the content of a sequential data set or partitioned data set member. Or use this API to return a checksum that can be used on a subsequent PUT request to determine if a concurrent update has occurred.	z/OSMF restfiles

Table 1. Dataset APIs (continued)

REST API	Description	Scenario	Prerequisites
PUT /Atlas/api/datasets/{dsn}/content	Write content to a data set or member.	Use this API to write content to a sequential data set or partitioned data set member. If a checksum is passed and it does not match the checksum that is returned by a previous GET request, a concurrent update has occurred and the write fails.	z/OSMF restfiles
POST /Atlas/api/datasets/{dsn}	Create a data set.	Use this API to create a data set according to the attributes that are provided. The API uses z/OSMF to create the data set and uses the syntax and rules that are described in the <i>z/OSMF Programming Guide</i> .	z/OSMF restfiles
POST /Atlas/api/datasets/{dsn}/{basedsn}	Create a data set by using the attributes of a given base data set.	When you do not know the attributes of a new data set, use this API to create a new data set by using the same attributes as an existing one.	z/OSMF
DELETE /Atlas/api/datasets/{dsn}	Delete a data set or member.	Use this API to delete a sequential data set or partitioned data set member.	z/OSMF restfiles

## Job APIs

Review the following table for detailed information about Job APIs.

Table 2. Job APIs

REST API	Description	Scenario	Prerequisites
GET /Atlas/api/jobs	Get a list of jobs.	Use this API to get a list of job names that match a given prefix, owner, or both.	z/OSMF restjobs

Table 2. Job APIs (continued)

REST API	Description	Scenario	Prerequisites
GET /Atlas/api/jobs/ {jobName}/ids	Get a list of job identifiers for a given job name.	If you have a list of existing job names, use this API to get a list of job instances for a given job name.	z/OSMF restjobs
GET /Atlas/api/jobs/ {jobName}/ids/ {jobId}/steps	Get job steps for a given job.	With a job name and job ID, use this API to get a list of the job steps, which includes the step name, the executed program, and the logical step number.	z/OSMF restjobs
GET /Atlas/api/jobs/ {jobName}/ids/ {jobId}/steps/ {stepNumber}/dds	Get dataset definitions (DDs) for a given job step.	If you know a step number for a given job instance, use this API to get a list of the DDs for a given job step, which includes the DD name, the data sets that are described by the DD, the original DD JCL, and the logical order of the DD in the step.	z/OSMF restjobs
GET /Atlas/api/jobs/ {jobName}/ids/ {jobId}/files	Get a list of output file names for a job.	Job output files have associated DSIDs. Use this API to get a list of the DSIDs and DD name of a job. You can use the DSIDs and DD name to read specific job output files.	z/OSMF restjobs
GET /Atlas/api/jobs/ {jobName}/ids/ {jobId}/files/ {fileId}	Read content from a specific job output file.	If you have a DSID or field for a given job, use this API to read the output file's content.	z/OSMF restjobs
GET /Atlas/api/jobs/ {jobName}/ids/ {jobId}/files/ {fileId}/tail	Read the tail of a job's output file.	Use this API to request a specific number of records from the tail of a job output file.	z/OSMF restjobs

Table 2. Job APIs (continued)

REST API	Description	Scenario	Prerequisites
GET /Atlas/api/jobs/ {jobName}/ids/ {jobId}/subsystem	Get the subsystem type for a job.	Use this API to determine the subsystem that is associated with a given job. The API examines the JCL of the job to determine if the executed program is CICS®, DB2®, IMS™, or IBM MQ.	z/OSMF restjobs
GET /Atlas/api/jobs/ {jobName}/ids/ {jobId}/ FaultAnalyzer	Get Fault Analyzer information from a job's output.	If a job has an associated Fault Analyzer fault report, use this API to learn the fault ID and history file to which the report was written.	z/OSMF restjobs Fault Analyzer Fault Analyzer microservice
GET /Atlas/api/jobs/ {jobName}/ids/ {jobId}/ FaultAnalyzer/ report	Get Fault Analyzer fault report for a job.	If you know the history file and fault ID for an abended job, use this API to read the content of the Fault Analyzer fault report.	z/OSMF restjobs Fault Analyzer Fault Analyzer microservice
GET /Atlas/api/jobs/ {jobName}/ids/ {jobId}/ FaultAnalyzer/ report/ {sectionName}	Get a specific Fault Analyzer fault report section for a job.	If you know the history file and fault ID for an abended job, use this API to read a particular section of the Fault Analyzer fault report.	z/OSMF restjobs Fault Analyzer Fault Analyzer microservice
POST /Atlas/api/jobs	Submit a job and get the job id back.	Use this API to submit a partitioned data set member or UNIX file.	z/OSMF restjobs
DELETE /Atlas/api/jobs/ {jobName}/{jobId}	Cancel a job and purge its associated files.	Use this API to purge a submitted job and the logged output files that it creates to free up space.	z/OSMF Running Common Information Model (CIM) server



---

## Persistent Data APIs

Review the following table for detailed information about Persistent Data APIs.

*Table 3. Persistent Data APIs*

REST API	Description	Scenario	Prerequisites
PUT /Atlas/api/data	Update metadata in persistent repository for a given resource and attribute name.	With Atlas, you can store and retrieve persistent data by user, resource name, and attribute. A resource can have any number of attributes and associated values.  Use this API to set a value for a single attribute of a resource. You can specify the resource and attribute names.	None
POST /Atlas/api/data	Create metadata in persistent repository for one or more resource/attribute elements	Use this API to set a group of resource or attributes values.	None
GET /Atlas/api/data	Retrieve metadata from persistent repository for a given resource (and optional attribute) name	Use this API to get all the attribute values or any particular attribute value for a given resource.	None
DELETE /Atlas/api/data	Remove metadata from persistent repository for a resource (and optional attribute) name	Use this API to delete all the attribute values or any particular attribute value for a given resource.	None

---

## System APIs

Review the following table for detailed information about System APIs.

*Table 4. System APIs*

REST API	Description	Scenario	Prerequisites
GET /Atlas/api/system/version	Get current Atlas version	Use this API to get the current version of the Atlas microservice.	None

---

## USS File APIs

Review the following table for detailed information about USS File APIs.

*Table 5. USS File APIs*

REST API	Description	Scenario	Prerequisites
GET /Atlas/api/files/ dir	List USS directory files.	Use this API to get a list of files in a USS directory.	z/OSMF restfiles
GET /Atlas/api/files/ content	Get USS file content.	Use this API to get the content on a USS file.	z/OSMF restfiles

---

## z/OS System APIs

Review the following table for detailed information about z/OS System APIs.

*Table 6. z/OS System APIs*

REST API	Description	Scenario	Prerequisites
GET /Atlas/api/zos/cpu	Get current system CPU usage	Use this API to get the current system CPU usage and other current system statistics.	None
GET /Atlas/api/zos/ parmlib	Get system PARMLIB information	Use this API to get the PARMLIB data set concatenation of the target z/OS system.	None
GET /Atlas/api/zos/ sysplex	Get target system sysplex and system name	Use this API to get the system and sysplex names.	None
GET /Atlas/api/zos/ username	Get current userid	Use this API to get the current user ID.	None

---

## Fault Analyzer APIs

Review the following table for detailed information about Fault Analyzer APIs. To use the Fault Analyzer APIs, Fault Analyzer must be installed.

*Table 7. Fault Analyzer: History File and Fault Entry APIs*

REST API	Description	Scenario	Prerequisites
GET /FaultAnalyzer/api/ historyFiles/ defaultHistoryFile	Get the Fault Analyzer default history file name.	Use this API to get the Fault Analyzer default history data set name that is specified in IDICNFxx parmlib member.	Fault Analyzer  Fault Analyzer microservice

Table 7. Fault Analyzer: History File and Fault Entry APIs (continued)

REST API	Description	Scenario	Prerequisites
GET /FaultAnalyzer/api/ historyFiles/ {historyFile}	Get attributes of a history file.	Use this API to get the attributes of a Fault Analyzer history file.	Fault Analyzer Fault Analyzer microservice
GET /FaultAnalyzer/api/ historyFiles/ {historyFile}/ faultEntries	Get a list of fault entries for a history file.	Use this API to get a list of fault entry member names that reside in the specified Fault Analyzer history file.	Fault Analyzer Fault Analyzer microservice
Delete /FaultAnalyzer/api/ historyFiles/ {historyFile}/ faultEntries/ {faultEntry}	Delete a fault entry.	Use this API to permanently delete a fault entry from a nominated Fault Analyzer history file. Locked fault entries cannot be deleted.	Fault Analyzer Fault Analyzer microservice
GET /FaultAnalyzer/api/ historyFiles/ {historyFile}/ faultEntries/ {faultEntry}	Get attributes of a fault entry.	Use this API to get a set of attributes that are associated with a nominated fault entry in a Fault Analyzer history file.	Fault Analyzer Fault Analyzer microservice
POST /FaultAnalyzer/api/ historyFiles/ {historyFile}/ faultEntries/ {faultEntry}	Generate or refresh a fault entry report.	If the fault entry report is not available or needs to be regenerated, use this API to generate or refresh a report for a nominated fault entry.	Fault Analyzer Fault Analyzer microservice
GET /FaultAnalyzer/api/ historyFiles/ {historyFile}/ faultEntries/ {faultEntry}/report	Get a report for a fault entry.	Use this API to get a Fault Analyzer report or report section that is associated with a nominated fault entry. The report is returned in a JSON object, and can be formatted as TEXT, HTML, or JSON. By default, the full report is returned, but you can use the section query parameter to return a single section of the report if available.	Fault Analyzer Fault Analyzer microservice

## File Manager APIs

Review the following table for detailed information about File Manager APIs. To use the File Manager APIs, File Manager must be installed.

*Table 8. File Manager APIs*

REST API	Description	Scenario	Prerequisites
GET /FileManager/api/collections	Get a list of members from the File Manager Enhanced Search dataset.	Use this API to get a list of the members in the File Manager Enhanced Search index data set. These members represent collections of data sources against which a File Manager enhanced search can be executed.	z/OSMF restfiles
GET /FileManager/api/collections/{name}	Read content from a File Manager Enhanced Search dataset member.	If you know the name of an enhanced search index member, you can read the content and pass it to File Manager Enhanced Search API.	z/OSMF restfiles
PUT /FileManager/api/collections/{name}	Write content to a File Manager Enhanced Search dataset member.	Use this API to update the content of a File Manager Enhanced Search index data set member.	z/OSMF restfiles
POST /FileManager/api/collections/{name}	Create a File Manager Enhanced Search dataset member.	Use this API to create a File Manager Enhanced Search index data set member.	z/OSMF restfiles
DELETE /FileManager/api/collections/{name}	Delete a File Manager Enhanced Search dataset member.	Use this API to delete a File Manager Enhanced Search index data set member.	z/OSMF restfiles
GET /FileManager/api/search	Perform a File Manager Enhanced Search.	Use this API to execute a File Manager Enhanced Search and return the result as JSON content.	IBM File Manager

---

## Chapter 5. Using Atlas WebSocket services

In addition to REST APIs, Atlas provides the following WebSocket services that can be accessed by using the WSS scheme.

*Table 9. Job APIs*

Server Endpoint	Description	Scenario	Prerequisites
/api/sockets/syslog	Get current syslog content.	Use this WSS endpoint to read the system log in real time.	SDSF
/api/sockets/jobs/{jobname}/ids/{jobid}/files/{fileid}	Tail the output of an active job.	Use this WSS endpoint to read the tail of an active job's output file in real time.	z/OSMF restjobs



---

## Chapter 6. Programming Atlas

This section gives examples that demonstrate how to program Atlas REST APIs and WebSocket services.

---

### Programming Atlas REST APIs

#### Sending a GET request in Java

Here is sample code to send a GET request to Atlas in Java.

```
public class JobListener implements Runnable {

    /*
     * Perform an HTTPs GET at the given jobs URL and credentials
     * targetURL e.g "https://host:port/Atlas/api/jobs?owner=IBMUSER&prefix="
     * credentials in the form of base64 encoded string of user:password
     */
    private String executeGET(String targetURL, String credentials) {
        HttpURLConnection connection = null;
        try {
            //Create connection
            URL url = new URL(targetURL);
            connection = (HttpURLConnection) url.openConnection();
            connection.setRequestMethod("GET");
            connection.setRequestProperty("Authorization", credentials);

            //Get Response
            InputStream inputStream = connection.getInputStream();
            BufferedReader bufferedReader = new BufferedReader(new InputStreamReader(inputStream));
            StringBuilder response = new StringBuilder();
            String line;

            //Process the response line by line
            while ((line = bufferedReader.readLine()) != null) {
                System.out.println(line);
            }

            //Cleanup
            bufferedReader.close();

            //Return the response message
            return response.toString();
        } catch (Exception e) {
            //handle any error(s)
        } finally {
            //Cleanup
            if (connection != null) {
                connection.disconnect();
            }
        }
    }
}
```

#### Sending a GET request in JavaScript

Here is sample code written in JavaScript using features from ES6 to send a GET request to Atlas.

```
const BASE_URL = 'hostname.com:port/Atlas/api';

// Call the jobs GET api to get all jobs with the userID IBMUSER
function getJobs(){
    let parameters = "prefix=&owner=IBMUSER";
```

```

    let contentURL = `${BASE_URL}/jobs?${parameters}`;
    let result = fetch(contentURL, {credentials: "include"})
      .then(response => response.json())
      .catch((e) => {
        //handle any error
        console.log("An error occurred: " + e);
      });
    return result;
  }

```

## Sending a POST request in JavaScript

Here is sample code written in JavaScript using features from ES6 to send a POST request to Atlas.

```

// Call the jobs POST api to submit a job from a dataset (ATLAS.TEST.JCL(TSTJ0001))
function submitJob(){
  let payload = "{\"file\":\"'ATLAS.TEST.JCL(TSTJ0001)'\":\"\"}";
  let contentURL = `${BASE_URL}/jobs`;
  let result = fetch(contentURL,
    {
      credentials: "include",
      method: "POST",
      body: payload
    })
    .then(response => response.json())
    .catch((e) => {
      //handle any error
      console.log("An error occurred: " + e);
    });
  return result;
}

```

## Extended API sample in JavaScript

Here is an extended API sample that is written using JavaScript with features from ES62015 (map).

```

////////////////////////////////////////////////////////////////////////////////////////////////////////////////////////////////
// Extended API Sample
// This Sample is written using Javascript with features from ES62015 (map).
// The sample is also written using JSX giving the ability to return HTML elements
// with javascript variables embedded. This sample is based upon the codebase of the
// sample UI (see- hostname:port/ui) which is written using Facebook's React, Redux,
// Router and Google's material-ui
////////////////////////////////////////////////////////////////////////////////////////////////////////////////////////////////

// Return a table with rows detailing the name and jobID of all jobs matching
// the specified parameters
function displayJobNamesTable(){
  let jobsJSON = getJobs("*","IBMUSER");
  return (<table>
    {jobsJSON.map(job => {
      return <tr><td>{job.name}</td><td>{job.id}</td></tr>
    })}
    </table>);
}

// Call the jobs GET api to get all jobs with the userID IBMUSER
function getJobs(owner, prefix){
  const BASE_URL = 'hostname.com:port/Atlas/api';
  let parameters = "prefix=" + prefix + "&owner=" + owner;
  let contentURL = `${BASE_URL}/jobs?${parameters}`;
  let result = fetch(contentURL, {credentials: "include"})
    .then(response => response.json())
    .catch((e) => {
      //handle any error
    })
}

```



```

        console.log("An error occurred: " + e);
    });
    return result;
}

```

---

## Programming Atlas WebSocket services

### Establishing a new WebSocket connection in JavaScript

Here is code sample written in JavaScript using features from ES6 to establish a new WebSocket connection to listen to the syslog output.

```

const BASE_WS_URL = 'hostname.com:port/Atlas/api/sockets';

// Establish a new WebSocket connection to listen to the syslog output
function initWebsocket(){
    const syslogURI = `${BASE_WS_URL}/syslog`;

    this.websocket = new WebSocket(syslogURI);
    this.websocket.onopen = function() {
        //handle socket opening
        console.log("Websocket connection opened");
    }
    this.websocket.onmessage = function(event) {
        //handle receiving of new data
        console.log(event.data);
    }
    this.websocket.onclose = function() {
        //handle socket closing
        console.log("Websocket connection closed");
    }
}

```



---

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