

IBM Application Discovery for IBM Z V5.1.0

Installation and Configuration Guide



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Chapter 1. Accessibility Features for IBM Application Discovery for IBM Z

Accessibility features assist users who have a disability, such as restricted mobility or limited vision, to use information technology content successfully.

Overview

IBM® Application Discovery for IBM Z® includes the following major accessibility features:

- Keyboard-only operation
- Operations that use a screen reader

IBM Application Discovery for IBM Z uses the latest W3C Standard, [WAI-ARIA 1.0](http://www.w3.org/TR/wai-aria/) (www.w3.org/TR/wai-aria/), to ensure compliance with [US Section 508](http://www.access-board.gov/guidelines-and-standards/communications-and-it/about-the-section-508-standards/section-508-standards) (www.access-board.gov/guidelines-and-standards/communications-and-it/about-the-section-508-standards/section-508-standards) and [Web Content Accessibility Guidelines \(WCAG\) 2.0](http://www.w3.org/TR/WCAG20/) (www.w3.org/TR/WCAG20/). To take advantage of accessibility features, use the latest release of your screen reader and the latest web browser that is supported by IBM Application Discovery for IBM Z.

The IBM Application Discovery for IBM Z online product documentation in IBM Knowledge Center is enabled for accessibility. The accessibility features of IBM Knowledge Center are described in the [Accessibility section of the IBM Knowledge Center help](https://www.ibm.com/support/knowledgecenter/en/about/releasenotes.html) (<https://www.ibm.com/support/knowledgecenter/en/about/releasenotes.html>).

Keyboard navigation

This product uses standard navigation keys.

Interface information

For alternative installation using Command Line Installation (CLI), refer to section [Alternative Installation for ADDI Using CLI](#) in *IBM AD Installation and Configuration Guide*.

The IBM Application Discovery for IBM Z user interfaces do not have content that flashes 2 - 55 times per second.

The IBM Application Discovery for IBM Z web user interface relies on cascading style sheets to render content properly and to provide a usable experience. The application provides an equivalent way for low-vision users to use system display settings, including high-contrast mode. You can control font size by using the device or web browser settings.

The IBM Application Discovery for IBM Z web user interface includes WAI-ARIA navigational landmarks that you can use to quickly navigate to functional areas in the application.

Related accessibility information

In addition to standard IBM help desk and support websites, IBM has a TTY telephone service for use by deaf or hard of hearing customers to access sales and support services:

TTY service
800-IBM-3383 (800-426-3383)
(within North America)

For more information about the commitment that IBM has to accessibility, see [IBM Accessibility](http://www.ibm.com/able) (www.ibm.com/able).

Chapter 2. IBM AD High-Level Architecture Overview

The following diagram illustrates IBM Application Discovery for IBM Z (AD) high-level architecture and the relationships among the different components of the suite.

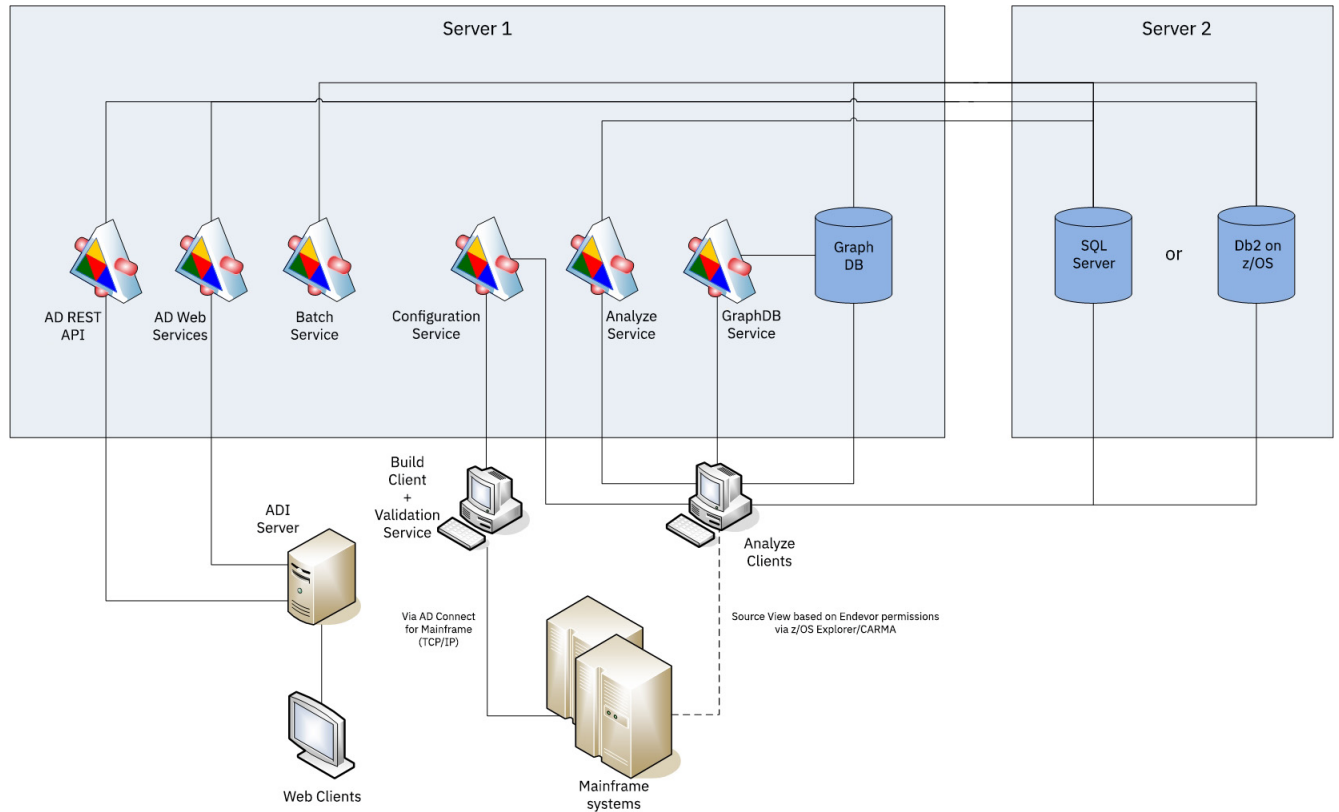


Figure 1: **IBM AD** high-level architecture

Following is a brief description of the relationships among the different components of IBM AD.

IBM AD Configuration Server ensures the consistency of the installation parameters throughout an installation and allows the system administrator to manage user access to workspaces.

IBM AD Build - uses data from mainframe systems to build projects.

IBM AD Build - uses project sources that are brought from z/OS®. Performs a compilation/build process and stores the analysis data to the repository.

IBM AD Validation Service - works with ChangeMan SCM only. Provides coding rule enforcement via synchronization with ChangeMan and upon member staging.

IBM AD GraphDB Service - starts the OrientDB server so that **IBM AD Analyze** can connect to OrientDB repository and use the data found there to generate the graphs.

IBM AD Batch Server - imports data from the relational database repository into the GraphDB (OrientDB) repository. It also automates processes such as report generation and indexing. Manages several critical clients' configurations such as the creation of the annotations database and the reports configuration, which must be performed before starting **IBM AD Analyze Client**.

IBM AD Analyze - analyzes mainframe projects (from **IBM AD Build**) and other types of projects (Java™, C, etc.) and displays the results of the analysis in graphs, in reports, or in **Usage analyses**.

IBM AD Analyze Client - runs as a plug-in on Eclipse or IDz and provides project analysis via graphs reports and usage views. When the analyzed application sources are coming from Endeavor, it allows viewing source code per user based on Endeavor permissions that are checked via z/OS Explorer/CARMA interface.

IBM AD Web Service - collects the data that is provided by **Web Service Metrics** component and prepares it for delivery.

Web Service Metrics - component generates input data for **IBM AD Web Service**.

IBM AD REST API - provides IBM AD data for IBM ADI Business Rule Discovery (BRD).

Chapter 3. Installation Prerequisites

Note: Starting with IBM AD V5.0.4.1, the IBM AD Licensing Server, IBM AD Java Bridge and IBM AD Monitor Service components are no longer used, therefore must be uninstalled from your environment.

Before installing IBM AD components, make sure you install 64bit Java Runtime Environment (JRE) v1.8. Please uninstall any previous version of Java before installing v1.8; failing to do this might result in unexpected IBM AD behavior. JRE can be downloaded from <http://www.oracle.com/technetwork/java/javase/downloads/index.html>. Make sure to use the latest service release of Java v1.8.

Deploying IBM AD in your environment can be logically divided into two phases: *installing* IBM AD and then *configuring* IBM AD. For existing IBM AD installations, please see [Chapter 4, “Upgrading Components from Earlier Versions,” on page 15](#) before deciding on an installation method.

CPU, RAM, and Storage Requirements

For Production Level implementations.

(the minimum recommended hardware requirements for Production-level implementations with multiple users and projects)

- For IBM AD Dedicated Database Server:

Note: The dedicated database server is a server with a running instance of SQL Server, dedicated to IBM AD components. It is recommended that all IBM AD components to be installed on separate machine(s).

- CPU: Intel XEON Dual processor with minimum of 4 cores each, 3 GHz or higher, with Turbo support.
- 32 GB of RAM. To avoid occasional memory reallocation, provide 64 GB of RAM.
- Dedicated hard disk drive for the operating system, minimum 500 GB. Secondary dedicated hard disk drive for data, minimum 2 TB.

- For all the IBM AD components:

Note: SQL Server and all the IBM AD components can be installed on this machine for evaluation / POC purposes only.

- CPU: Intel XEON Dual processor with minimum of 4 cores each, 3 GHz or higher, with Turbo support.
- Minimum 32 GB of RAM.
- Dedicated hard disk drive for the operating system, minimum 500 GB. Secondary dedicated hard disk drive for data, minimum 2 TB.
- 4 GB allocated Virtual Memory.

- For IBM AD Build Client and/or Analyze Client:

- CPU: Intel i5 or equivalent.
- Minimum 8 GB of RAM.
- 20 GB allocated disk space.

For Evaluation / POC implementations.

(the minimum recommended hardware requirements for evaluating the IBM AD in a Windows environment)

- For IBM AD Workstation:

- CPU: Intel Core i5 or equivalent.
- 8 GB of RAM. To avoid occasional memory reallocation, provide 16 GB of RAM.

- 35 GB allocated disk space.

For detailed system requirements, you can find a software product compatibility report at <https://www.ibm.com/software/reports/compatibility/clarity/softwareReqsForProduct.html>.

Supported Platforms and Versions

Supported Operating Systems

IBM AD Analyze Server/Batch Server/Configuration Server can be installed on:

- Windows 10 (64-bit)
- Windows Server 2008/2012/2018
- Linux Red Hat/SUSE/Ubuntu

IBM AD Build/Analyze Client can be installed on:

- Windows 7/8.1/10
- Windows Server 2008/2012/2016

IBM® AD Connect for Mainframe can be installed on z/OS 2.2/2.3.

Note: For more information about the minimum operating system service level, hardware and bitness, see [Supported Operating Systems for IBM Application Discovery](#).

Supported Databases

The following databases are supported:

- Db2® for z/OS version 11.1 and later
- Microsoft SQL Server 2012 and later

Note:

- Only one relational database repository type, either Microsoft SQL Server or Db2 for z/OS, is supported per installed IBM AD Configuration Service instance.
- Microsoft SQL Server Standard or Enterprise Edition is required for IBM Application Discovery Microsoft SQL Server repository support.
- Microsoft SQL Server Express® Edition can be used for IBM AD Suite evaluation purposes only.
- For more information about the minimum prerequisite level that is required for a specific database and version, see [Supported Databases for IBM Application Discovery](#).

Prerequisite Software and Configurations

• **Eclipse Classic / RCP and RAP Developers**

32/64 bit Eclipse Classic (RCP and RAP Developers), minimum supported version v4.4. Eclipse Classic can be downloaded from www.eclipse.org.

• **IBM Rational® Development for z Systems® (RDz)**

Supported versions are v9.1.x to v9.5.x.

• **IBM Developer for z Systems (IDz)**

Minimum supported version is v14.0.0.0.

- The supported Internet browsers (used for accessing the **IBM AD Configuration Server**) are: Google Chrome (recommended), Mozilla Firefox and Microsoft Edge.

Note: Make sure to enable JavaScript on your Internet browser of choice.

Java Runtime Environment

- 64 bit Java 8 Oracle/IBM must be installed before any IBM AD components.
- 32/64 bit Java 8 Oracle/IBM must be installed before any IBM AD Client components.

Note: IBM AD Build Client runs only on the 64-bit JVM.

Please uninstall any previous version of Java before installing the newest version and make sure to use the latest service release of Java v1.8. Failing to do this might result in unexpected IBM AD behavior.

Java can be downloaded from:

- <http://www.oracle.com/technetwork/java/javase/downloads/index.html>.
- <https://developer.ibm.com/javasdk/downloads/>.

Important: Please make sure the path for Java is set in your system as follows: **Start > System > Advanced Settings > Environment Variables > System variables > Path**. The path to the Java installation folder must be set to include the bin folder as in C:\Program Files\Java\jre1.8.0_131\bin.

Shared/Local Folders, Accesses and Best Practices

1. IBM AD Analyze Client.

- a. Local Eclipse and Local Workspace Folders: all the users that access **IBM AD Analyze Client** should have read/write rights for their Eclipse Installation folder and Local Workspace Folder on their Analyze Client machine.

2. IBM AD Analyze Server (Optional)

- a. A shared folder must be created, and referenced in **IBM AD Analyze Server** manager, for the Shared Java Projects, and all the users operating **IBM AD Analyze** must have read/write access rights for it.
- b. The user under which the Windows service / Linux process runs, must have write access rights in the installation folders.

3. IBM AD Build Client shared folders need read/write access rights, for:

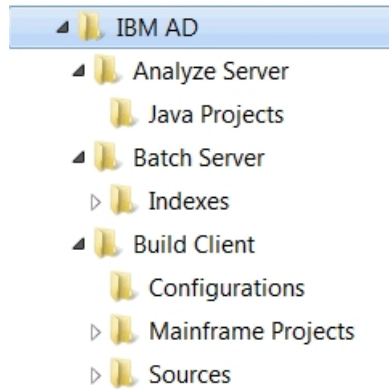
- a. Projects (read/write access for both **IBM AD Build/Analyze** client users)
- b. Configurations (z/OS Connections) (read/write access for **IBM AD Build Client** users)
- c. Sources (write access for **IBM AD Build** and **IBM AD Batch Server** users and read for **IBM AD Analyze Client** users).

Note: If you want to visualize these sources in Endeavor or Changeman, read access to local sources is not required.

4. In order for **IBM AD Batch Server** to run correctly, the user credentials under which the Windows service / Linux process runs, needs to have read/write access rights for the following folders:

- a. Indexes folder. For more information about the Indexes folder, see step 4c in topic [STEP 3. Configuring IBM AD Batch Server](#).
- b. Installation folder.

The following image shows a best practice example of the IBM AD installation folder structure. However, you can customize the structure based on your particular needs.



Note: For the situation when all **IBM AD Build** Components are running on a single machine, so no external **IBM AD Build/Analyze Clients** are used, local paths instead of shared, can be used.

Microsoft SQL Server Configurations

Most IBM AD components connect to an SQL Server by using SQL Authentication. For Microsoft SQL Server 2012/2014/2016/2017, perform the following configurations:

1. Make sure that Microsoft SQL Server instance is configured with a **case-insensitive (CI)** collation.
2. Make sure Microsoft SQL Server Agent service is started.
3. Setting up an SQL user account:
 - a. Start SQL Server Management Studio.
 - b. Expand **Security** > **Logins** then right-click **Logins** and choose **New Login**. Add a login name, select SQL Server Authentication, add a password, and make sure that the default database is set to master. This user is referred to as **IBM AD SQL Identity**.
 - c. Expand **Databases** > **System Databases** > **master** > **Security** > **Users** then right-click **Users** and choose **New User**. Choose the **IBM AD SQL Identity** user and click **OK**.
 - d. Expand **Databases** > **System Databases** > **master** then right-click **master** and choose **Properties**. Go to **Permissions** tab and for the **IBM AD SQL Identity** and make sure that permissions are granted for: **Create database**, **Create function**, **Create procedure**, **Create table**, and **Create view**.
 - e. The following permission must be granted only if the **Rename project** feature is used in IBM AD Build, otherwise it is not needed. Right-click on the **SQL server** instance and then select **Properties**. In the **Server Properties** window select **Permissions**: From the roles list, select the **IBM AD SQL Identity** and then select **Grant** for **Alter any database** permission.
4. Configuring SQL Server to enable it to accept connection over TCP/IP:
 - a. Start SQL Server Configuration Manager.
 - b. Select **SQL Native Client Configuration (32bit)** > **Client Protocols** and then right-click **TCP/IP** and set it to **Enabled**.
 - c. Select **SQL Server Network Configuration** > **Protocols for <Instance ID>** and make sure that **Shared Memory**, **TCP/IP**, and **Named Pipes** are set to **Enabled**.
 - d. Select **SQL Native Client Configuration** > **Client Protocols** and make sure that **Shared Memory**, **TCP/IP**, and **Named Pipes** are set to **Enabled**.
 - e. Close SQL Server Configuration Manager.

Important: SQL Server Configuration Manager writes startup parameters to the registry. They take effect upon the next startup of the SQL Server.

IBM Db2 for z/OS Server Configurations

On workstations where IBM AD Build Client is installed, Data Server Client V11.1 that contains IBM Data Server Provider for .NET must be installed and licensed. The mentioned package is part of Db2 Connect™ V11.1 product.

Note: .NET framework 4.5.1 or higher is prerequisite for IBM AD Build Client.

In case that IBM AD Build Client is intended to be used by a standard user, with no administration privileges, make sure that during Db2 Connect V11.1 installation process the **Enable operating system security** check box is selected.

Note: If you selected the **Enable operating system security** check box, you now have to add users to the *DB2ADMNS* or the *DB2USERS* groups for users that need to run IBM AD Build Client. For more information, see [Adding your user ID to the DB2ADMNS and DB2USERS user groups](#).

Some packages must be bound on the server. The bound files are listed in the *ddcsmvs.lst* file for IBM Z, for example, *C:\Program Files\IBM\SQLLIB_01\bnd\ddcsmvs.lst*.

User permissions

In IBM AD application, a z/OS user account (Authentication ID) is used to work with the Db2 for z/OS repository. The user account must have permissions to perform the following actions:

- Use the storage group that is specified when configuring the Db2 z/OS connection in **IBM AD Configuration Server**.

Note: Make sure that the storage group is initially created.

- Use the SYSDEFLT default storage group.
- Use the default buffer pools.
- Create and use databases, tables, table spaces, indexes, constraints, views, triggers, stored procedures, and user-defined functions.
- Run the SELECT command over system tables (SYSIBM.SYS*).
- Have full control over the databases that are created by the user account.
- GRANT BINDADD, BINDAGENT, CREATEDBA, CREATESG, DISPLAY
- GRANT ALTERIN, CREATEIN, DROPIN ON SCHEMA *
- GRANT CREATE IN COLLECTION *
- GRANT SELECT ON TABLE SYSIBM.SYSROUTINES_SRC
- GRANT SELECT ON TABLE SYSIBM.SYSROUTINES_OPTS

Important: All permissions must be granted directly to the user account (Authentication ID).

IBM AD Connect for Mainframe Prerequisites

IBM AD Connect for Mainframe can be installed on:

- z/OS version 2.2 or later.
- The maximum storage space is 5 cylinders.

Before installing IBM AD Connect for Mainframe on the host machine (mainframe), you need to take the following steps:

1. Authorize to add IBM AD Connect for Mainframe's load library to APF.
2. Authorize IBM AD Connect for Mainframe's listener to run.
3. Authorize to access all libraries specified in the STEPLIB card (see section "Configuring the listener PROC" in *IBM AD Connect for Mainframe Configuration Guide*).
4. Make sure to provide authorization according to the analyzed area:

Analyzed Area	Required Authorization
Adabas	Authorization to issue an ADAREP command
Control-M	Access to the libraries containing the Control-M data
DB2®	Rights to read from the Db2 system tables (SYSIBM)
SMF	Access to the SMF dump files
Libraries and Members	Access to the libraries
Natural	Authorization to issue a Natural batch command and read Access to all Natural libraries (LOGON)
Operator commands	Normal RACF® security to allow the user to issue those commands.
WebSphere® MQ	Authorization to perform PUT and GET from command and reply queues

TCP Port Requirements and Firewall Exceptions

The following table summarizes the TCP ports that need to be allowed by the firewall in order for the Application Discovery Suite to function as intended.

In all cases, communication is bidirectional. The firewall must allow both the incoming traffic, which represents requests, for the mentioned ports, and the outgoing traffic, which represents the answers to these requests.

From (Sender)	To (Listener Component)	Default Listener Port	Note
<ul style="list-style-type: none"> AD Analyze Clients AD Audit Service AD Batch Server AD Build Client AD Build Configuration AD Catalog 	SQL Server	TCP 1433	<p>The port of the SQL Server Database Engine instance that hosts the AD databases. Majority of the AD components use this port to read/write data from/into the SQL databases.</p> <p>The default instance of the SQL Server Database Engine listens on TCP port 1433, but it can be changed via SQL Server admin tools. Ask your database server administrator what port is used by the SQL server instance that is used by AD. Make sure not to use TCP port 1434, which is used by Dedicated Administration Console (DAC).</p>
The computer where the browser session is opened	AD Configuration Server	TCP 8080	<p>The port that is used to access the web interface of AD Configuration Server.</p> <p>The default port is 8080, but it can be changed in the <code>admin-ws.properties</code> file, which is located in the <code>conf</code> folder where AD Configuration Server is installed.</p> <p>If the web interface is accessed only locally on AD Configuration Server, this port does not have to be opened in the firewall.</p>

From (Sender)	To (Listener Component)	Default Listener Port	Note
<ul style="list-style-type: none"> AD Analyze Clients AD Batch Server AD Build Client AD Build Configuration AD Validation Server 	AD Configuration Server	TCP 2181	<p>The port that AD Configuration Server listens on for requests from various AD components that need to obtain the configuration settings from AD Configuration Server.</p> <p>The default port is 2181, but it can be changed in the <code>server.properties</code> file, which is located in the <code>conf</code> folder where AD Configuration Server is installed.</p>
AD Analyze Clients	AD Batch Server	TCP 2424 - TCP 2430	<p>The port of the OrientDB database instance that is hosted by AD Batch Server.</p> <p>AD Analyze Client makes requests to this port for retrieving the data that is related to callgraph analyses.</p> <p>OrientDB uses the first free TCP port in the range 2424 - 2430. This can be changed in the <code>config/orientdb-server-config.xml</code> file under port or IP settings.</p>
AD Analyze Clients	AD Analyze Server	TCP 1099	<p>The port where the Remote Method Invocation (RMI) registry can be found on AD Analyze Server. AD Analyze Clients make RMI-specific requests to this port.</p> <p>The default port is 1099, but it can be changed from AD Analyze Server Manager. To change the setting, click Server Settings > RMI Registry Port.</p> <p>AD Analyze Server is required only when AD Analyze Clients use and run Java-specific analyses, so if AD Analyze Server is not installed, the port does not have to be opened in the firewall.</p>
AD Analyze Clients	AD Analyze Server	TCP 1900	<p>The port that is used by AD Analyze Server for the Remote Method Invocation (RMI) communication. AD Analyze Clients make requests to this port for obtaining various information that is needed for Java analyses.</p> <p>The default port is 1900, but it can be changed from AD Analyze Server Manager. To change the setting, click Server Settings > Export Port.</p> <p>AD Analyze Server is required only when AD Analyze Clients use and run Java-specific analyses, so if AD Analyze Server is not installed, the port does not have to be opened in the firewall.</p>
AD Analyze Server	AD Analyze Client	A random free TCP port, which is allocated	The port that AD Analyze Client listens on for notifications from AD Analyze Server. This port is temporarily used, which is released after the application is closed.

From (Sender)	To (Listener Component)	Default Listener Port	Note
		at run time, in the ephemeral port range 49152 - 65535.	<p>The default port is a random free TCP port, which is allocated at run time, in the ephemeral port range 49152 - 65535, but AD Analyze Client can be configured to use a specific port. To configure the setting, click Window > Preferences > Application Discovery > Local Settings > General Settings > Client Settings in Eclipse, and then set a value in the range 1 - 65535 in the Port field. Value 0 means that a free port on AD Analyze Client is selected at run time in the ephemeral port range 49152 - 65535.</p> <p>AD Analyze Server is required only when AD Analyze Clients use and run Java-specific analyses, so if AD Analyze Server is not installed, the port does not have to be opened in the firewall.</p>
<ul style="list-style-type: none"> AD Build Client AD Build Configuration 	AD Connect for Mainframe	Any available TCP port (no default value)	<p>The port that AD Connect for Mainframe listens on. It is used by AD Build Configuration to retrieve source code information and operational information from the mainframe, and used by AD Build Client to retrieve source code files from the mainframe.</p> <p>For how to set or change the port that is used by AD Connect for Mainframe, see section Configuring the Listener PROC in IBM AD Connect for Mainframe Configuration Guide. There is no default port that is specified. Any available port can be selected. For example, port 6000 or port 46000.</p> <p>After you change this port in AD Connect for Mainframe, the z/OS connection setup needs to be reconfigured to use the new port. To configure the setting, click the zOS tab in the AD Build Configuration tool.</p>
AD Connect for Mainframe	AD Validation Service	Any available TCP port (no default value)	<p>The port that AD Validation Service listens on for validation requests from AD Connect for Mainframe.</p> <p>It can be configured in the <code>ServicePort.txt</code> configuration file that is located in the AD Validation Server installation folder. No default port is set by default. Any available TCP port can be used. For example, port 48000.</p> <p>AD Validation Service is an optional component. If it is not used, this port does not have to be opened in the firewall.</p>
<ul style="list-style-type: none"> AD Analyze Clients AD Batch Server AD Build Client 	AD Audit Service	TCP 9080	<p>The port that AD Audit Service listens on to receive requests from various AD components for logging audit events.</p> <p>The port number can be changed by altering the <code>httpPort</code> value in the <code>server.xml</code> file. The file is located in the folder of the IBM Liberty instance that hosts AD Audit Service. After you change this port,</p>

From (Sender)	To (Listener Component)	Default Listener Port	Note
			<p>make sure to reconfigure the AD components that audit events to use the new port. For more information, see <i>IBM AD Web Services User Guide</i>.</p> <p>The AD Audit and AD Catalog services are optional AD components. They are both hosted by the same WebSphere Liberty instance. If neither of them is used, the port does not have to be opened in the firewall.</p>
<ul style="list-style-type: none"> • AD Analyze Clients • AD Data Collector 	AD Catalog Service	TCP 9080	<p>The port that AD Catalog Service listens on. This port is used by AD Data Collector to push data into AD Catalog, and it is used by AD Analyze Clients to retrieve the data that is needed for displaying API analyses.</p> <p>The port number can be changed by altering the <code>httpPort</code> value in the <code>server.xml</code> file. The file is located in the folder of the IBM Liberty instance that hosts AD Catalog Service. After you change this port, make sure to reconfigure AD Data Collector and AD Analyze Client to use the new port. For more information, see <i>IBM AD Web Services User Guide</i>.</p> <p>The AD Audit and AD Catalog services are optional AD components. They are both hosted by the same WebSphere Liberty instance. If neither of them is used, the port does not have to be opened in the firewall.</p>

Note: Make sure that the firewall does not prevent AD Analyze Client from communicating with AD Batch Server, AD Configuration Server, AD Analyze Server, and the relational database server. Program rules in the firewall might need to be created to allow both the inbound and outbound traffic for the `eclipse.exe` instance on each AD Analyze Client that is located under the installation folder of your Eclipse, IDz, or RDz instance.

Chapter 4. Upgrading Components from Earlier Versions

Upgrading from IBM AD V5.0.5.0 or later

To upgrade from IBM® AD V5.0.5.0 or later versions, you can run the ADDI installer without uninstalling AD components.

Note: After upgrading the IBM AD code to the latest level, take the following steps:

1. Upgrade the repository database to the latest level
2. Perform a full Build of each IBM AD project to correctly populate the repository database and allow the corresponding changes to be propagated to the graph database.

Instructions for upgrading the repository can be found at [Upgrade a repository](#).

Instructions for performing a full Build of the project can be found at [Building projects](#).

Upgrading from IBM AD V5.0.4.2 or earlier

Before upgrading from IBM AD V5.0.4.2 or earlier versions, you must back up the configurations and uninstall the IBM AD components.

Important: Please note that the location of the products you are about to install might be different than the one from previous installations. To maintain the existing configurations, be sure to:

- Back up the configurations before uninstalling the application by following the backup steps described below under each application.
- Once the application is installed, restore the backed-up configurations by manually copying them into the new location.

Before you upgrade to a newer version, follow the steps to keep your old configurations:

IBM AD Configuration Server

- From v5.0.2.x onwards

To back up the data from **IBM AD Configuration Server** (also the projects published by **IBM AD Build Client** in **IBM AD Configuration Server**), please make sure you keep:

- The store folder.
- The conf folder.

Both folders are stored under the **IBM AD Configuration Server** installation folder. To restore these settings copy them from the backup location into the new installation folder.

- From v5.1.0.2 onwards

Please make sure that you reenter the password of **GraphDB** database.

IBM AD Analyze Server

When uninstalling the **IBM AD Analyze Server**, there is an automated process that creates a backup for the `server.properties` and `client.properties` files, renaming them to `server.properties.bak` and `client.properties.bak`. If you want to keep previous settings, please make sure you do not delete these files. They are kept under the installation folder. To restore these settings, copy `server.properties.bak` and `client.properties.bak` from the backup location to the new installation folder and rename them back to `server.properties` and `client.properties`.

IBM AD Batch Server

To back up the data from **IBM AD Batch Server** make sure you don't delete:

- The conf folder. Note that from one version to another, the `server.properties` and the `project.properties` files structure might change. It is better not to overwrite the new files with the old ones, but instead to copy the parameters and their values that were modified by the administrator from the old files into the same parameter/value settings in the corresponding new files.
- The data folder.
- The orientDB folder.

All the folders are kept under the installation folder. To restore these settings copy them from the backup location into the new installation folder.

Details on how to back up the Symbolic Links: The following part describes how to manually move the Symbolic Links to a temporary location depending on the OS used (Windows or Linux System).

1. On Windows. Before uninstalling **IBM AD Batch Server**:

- Go to Start menu under **IBM AD Batch Server** and stop **IBM AD Web Service**, **IBM AD GraphDB Service** and **IBM AD Batch Service**.
- Backup the content of databases folder present under \IBM Application Discovery Batch Server installation folder>\orientdb\orientdb-community-2.1.5_ezpatch1\databases using the following command in a command prompt window:

```
robocopy "path to source folder" "path to the target folder" /S /SL
```

Note: Path to source folder is the path to the databases folder under **IBM AD Batch Server** installation folder. Path to the target folder is the path to a folder created on the disk where the content of the databases folder will be copied. (example: `robocopy "C:\Program Files\IBM Application Discovery Batch Server\orientdb\orientdb-community-2.1.5_ezpatch1\databases" "C:\databases" /S /SL`)

- Once you install **IBM AD Batch Server** use robocopy command to copy from the folder where the symbolic links were saved to the databases folder under \IBM Application Discovery Batch Server installation folder>\orientdb\orientdb-community-2.1.25-ibm1. (Example: `robocopy "C:\databases" "C:\Program Files\IBM Application Discovery Batch Server\orientdb\orientdb-community-2.1.25-ibm1\databases" /S /SL`)

Note: Once the installation of **IBM AD Batch Server** is completed set the password for GraphDB server. For more information, see step 2 in [Configuring IBM AD Batch Server](#).

2. On Linux (from v5.0.4.1 onwards). Before uninstalling **IBM AD Batch Server**:

- Stop **IBM AD Web Server**, **IBM AD GraphDB Server** and **IBM AD Batch Server**.
- Backup the content of databases folder present under \IBM Application Discovery Batch Server installation folder>\orientdb\orientdb-community-2.1.5_ezpatch1\databases using the following command in a terminal:

```
cp -Prv "path to source folder" "path to the target folder"
```

Note: Path to source folder is the path to the databases folder under **IBM AD Batch Server** installation folder. Path to the target folder is the path to a folder created on the disk where the content of the databases folder will be copied (Example: `cp -Prv /home/user/IBM\ Application\ Discovery\ Batch\ Server\orientdb\orientdb-community-2.1.5_ezpatch1\databases/* /home/user/databases`)

- Once you install **IBM AD Batch Server** use the same command to copy from the folder where the symbolic links were saved to the databases folder under \IBM Application Discovery Batch Server installation folder>\orientdb\orientdb-community-2.1.25-ibm1. (Example: `cp -Prv /home/user/databases/* /home/user/IBM\ Application\ Discovery\ Batch\ Server\orientdb\orientdb-community-2.1.25-ibm1\databases`)

Note: Once the installation of **IBM AD Batch Server** is completed set the password for GraphDB server. For more information, see step 2 in [Configuring IBM AD Batch Server](#).

IBM AD Build Client

Important: When upgrading from IBM AD Build **v5.0.1.x to v5.0.4.1**, take the following steps:

1. Uninstall the existing **v5.0.1.x** components.
2. Install **any v5.0.3.x** AD Build Configuration and Client.
3. Install IBM AD Configuration Server **v1.0.6**, which is included with IBM AD **v5.0.3.x**.
4. From **AD Build Configuration Administration** tool, click **Publish Projects**.
5. Once the projects have been published, uninstall the **v5.0.3.x** Build Components and **v1.0.6** IBM AD Configuration Server.
6. Proceed with 5.0.4.1 installation.

Important: When upgrading from IBM AD Build **v5.0.2.x to v5.0.4.1**:

Once the installation of **IBM AD Build Client** is done (on the same machine where previous version of **IBM AD Build Configuration** was installed), a file called `ConfigurationParameters.txt` is automatically generated in the installation folder under the folder `bin`, subfolder `release`. This file contains all information related to the configurations made in **IBM AD Configuration Server** for **IBM AD Build Client**:

- Path for the Mainframe Connection (Path)
- Encoding (Japanese / No Encoding)
- Member Synchronization information (Yes / No and Path)
- Enable Communication Logging (Yes / No)
- Keep communication buffers (Yes/No)

Note: The user must add these configurations in the **IBM AD Build Client** settings page from **IBM AD Configuration Server**. This step is a must to maintain the old configurations.

Chapter 5. Installing IBM AD

You can use the IBM Application Discovery and Delivery Intelligence for IBM Z (ADDI) installer or Command Line Installation to install IBM AD.

Installing with the IBM ADDI Installer

To install IBM AD on Windows or Linux, use the IBM ADDI installer. You can also use the IBM ADDI installer to install IBM Application Delivery Intelligence for IBM Z (ADI).

Procedure

1. To run the IBM ADDI installer, double-click the `IBM_Application_Discovery_and_Delivery_Intelligence_Installer-5.1.0.0.exe` file.
2. On the **Welcome** page, click **Next**.
3. On the **Licensing Agreements** page, click **I accept the terms of this license agreement**, and then click **Next**.
4. On the **Installation Path** page, specify the installation path, and then click **Next**. The default installation path is `C:\Program Files\IBM Application Discovery and Delivery Intelligence`.

If the installation path that you specify does not exist, the target directory is created. Confirm the path, and click **OK** in the **Message** dialog box.

5. On the **Select Installation Components** page, select the components that you want to install, and then click **Next**. The components that are not applicable for the current system cannot be selected.

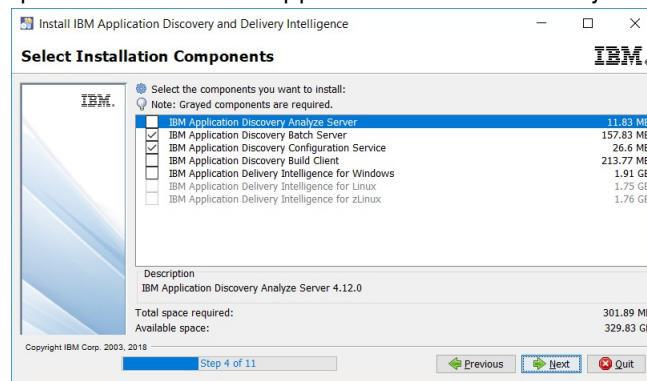


Figure 2: **Select Installation Components** wizard page

6. On the **User Data** pages, specify the settings and click **Next**.
 - a. If the IBM Application Delivery Intelligence (ADI) check box was selected in step 5, you can specify the IBM ADI installation path. The default installation path is `C:\ibm`.
 - b. Specify the configuration service IP address and service port for IBM AD Build Client.
7. On the **Setup Shortcuts** page, select the shortcuts that you want to create, and then click **Next**.
8. Additionally, after the installation is completed choose the **Generate an automatic installation script** option to create an installation script, where the installation parameters are saved in a `*.xml` file, that can be used later for silent installations. A **Save** dialog box is displayed, allowing to choose the location and name of the installation script. By default, the name of the installation script is `auto-install.xml`.

Alternative Installation for IBM ADDI Using CLI

In case you do not have access to a graphic interface, follow this procedure to install IBM ADDI:

1. Navigate to the **IBM ADDI** installation path and open a command line.
2. For regular installation, run the following command:

```
java -jar "<installer name>" -c
```

3. For a silent installation, run the following command:

```
java -jar "<installer name>" -f "<path to install xml file>"
```

Note: To install in silent mode, make sure that an interactive installation was initially performed and that the automatic installation script was generated. For more information, see step 8 in [“Installing with the IBM ADDI Installer”](#) on page 19.

Chapter 6. Configuring IBM AD

After IBM AD is installed, follow the steps to configure the components.

STEP 1. Configuring IBM AD Configuration Server

About this task

The IBM AD Configuration Server component can run with the default settings. If the default settings are not compatible with your environment, you can configure the component and overwrite the default settings.

Procedure

1. Configure the settings in the *IBM_AD_Configuration_Server_Folder/conf/server.properties* file.
 - a) Configure the port that AD Configuration Server listens on by setting the value of the `server.port` parameter.
The default value is 2181.
 - b) Configure the number of the snapshots and the corresponding logs that are retained by AD Configuration Server. To configure the setting, set the value of the `zookeeper.autopurge.snapRetainCount` parameter.
The default value is 4, and the minimum value is 3.
 - c) Configure the time interval in hours for the purge task by setting the value of the `zookeeper.autopurge.purgeInterval` parameter.
The purge task deletes old snapshots and the corresponding log files according to the time interval. The default value of the parameter is 24. To enable the purge task, you must set a value that is greater than 0.
2. Configure the web server settings in the *IBM_AD_Configuration_Server_Folder/conf/webservice.log4j.properties* file.
 - a) Configure the root logger level and the appenders by setting the `log4j.rootLogger` parameter with one of the following values:
 - OFF
 - FATAL
 - ERROR
 - WARN
 - INFO
 - DEBUG
 - TRACE
 - ALL

The default log level is INFO. The default appenders are `file`, which indicates a rolling file appender, and `stdout`, which indicates a console appender.

Example

```
log4j.rootLogger=DEBUG
```

- b) Configure the file roller appender log level by setting the `log4j.appender.file.threshold` parameter with one of the following values:

- OFF
- FATAL
- ERROR
- WARN
- INFO
- DEBUG
- TRACE
- ALL

Note: If you do not set the value of the `log4j.appender.file.threshold` parameter, the file roller appender log level is the same as the root logger level. To set the `log4j.appender.file.threshold` parameter, the value must be lower than or equal to the root logger level.

Example

```
log4j.appender.file.threshold=ERROR
```

- c) Configure the file roller appender location by setting the value of the `log4j.appender.file.File` parameter.

Note: The value of the `log4j.appender.file.File` parameter must be a valid absolute or relative path.

Example

```
log4j.appender.file.File=/home/user/logs/webservice.log
```

- d) Configure the file roller appender minimum number of backup files to keep by setting the value of the `log4j.appender.file.MaxBackupIndex` parameter.

Example

```
log4j.appender.file.MaxBackupIndex=5
```

- e) Configure the file roller appender maximum file size by setting the value of the `log4j.appender.file.MaxFileSize` parameter.

Example

```
log4j.appender.file.MaxFileSize=100M
```

3. Configure the web server settings in the *IBM_AD_Configuration_Server_Folder/conf/admin-
ws.properties* file.

The web server is attached to AD Configuration Server.

- a) Configure the network interface that the web server listens on by setting the value of the `host` parameter.

The default value is `localhost`.

Note: To expose the web server, you must set the `host` parameter with one of the following values:

IP_address

One of the IP addresses that are attached to a network interface on the computer where AD Configuration Server is running.

0.0.0.0

Exposes the web server to all network interfaces.

- b) Configure the port that the web server listens on by setting the value of the `port` parameter.

The default value is `8080`.

Note: If the web server is exposed to the network, the communication on the specified port must be enabled by the firewall.

- c) Configure the path to the configuration file of the logger by setting the value of the log-conf-file parameter.

The default value is *IBM_AD_Configuration_Server_Folder/conf/webservice.log4j.properties*.

4. By default, the HTTP protocol is used to run the web service. To use the SSL/HTTPS protocol, follow the steps:

- a) Generate a self-signed key pair and store it in a Java keystore by using the Java Keytool command line interface. Run the following command:

Note: Java SDK or Java JRE must be installed, and the *JAVA_HOME* and *PATH* environment variables must be configured for the Java SDK or Java JRE.

```
keytool -genkeypair -keyalg RSA -alias {alias}  
-ext SAN=DNS:localhost,IP:127.0.0.1 -dname {dname}  
-validity {validity} -keysize 2048 -keypass {keypass}  
-storepass {storepass} -keystore {keystore}
```

{alias}

The name that is used by the Java keystore to identify the generated key. The name must be unique within the Java keystore.

{dname}

The distinguished name from the X.500 standard. This name is associated with the alias for the key pair in the keystore. Also, the name is used as the value in the "issuer" and "subject" fields in the self-signed certificate.

{validity}

The number of days that the certificate that is attached to the key pair is valid.

{keypass}

The password that is needed to access the key pair within the keystore.

{storepass}

The password for the Java keystore.

{keystore}

The path to the keystore file, which is used to store the generated key pair. If the file does not exist, a keystore file is created.

Example

```
keytool -genkeypair -keyalg RSA -alias my-key-pair  
-ext SAN=DNS:localhost,IP:127.0.0.1 -dname CN="IBM AD"  
-validity 9999 -keysize 2048 -keypass my-key-password  
-storepass my-store-password -keystore C:\my_keystore
```

- b) Configure the web server that is attached to IBM AD Configuration Server to use the SSL/HTTPS protocol. In the *IBM_AD_Configuration_Server_Folder/conf/keystore-config.properties* file, configure the following parameters:

path

Set the value to the path of the Java keystore that is generated in the preceding substep.

storepass

Set the value to the password for the Java keystore.

keypass

Set the value to the password that is needed to access the key pair within the keystore.

- c) In the *IBM_AD_Configuration_Server_Folder/conf/admin-ws.properties* file, set the value of the keystore-conf-file parameter to the path of the keystore configuration file.

STEP 2. IBM AD Configuration Server: Configurations for IBM AD Build Client

About this task

IBM AD Configuration Server ensures that the installation parameters are consistent throughout the different components of IBM AD by storing them in a central location, in a scalable, and fail-safe manner.

IBM AD Configuration Server additionally allows the system administrator to manage the shared resources publishing and to coordinate the access to the shared resources by creating workspaces and user groups.

Procedure

1. Start IBM AD Configuration Server, by selecting **Start > All Programs > IBM Application Discovery Configuration Service > Launch IBM Application Discovery Configuration Service Admin**.
2. Create an environment, on the **IBM AD Configuration Server** main page, by selecting the localhost server. From the available options, select **Environments** then click **Add Environment**. Enter a name and a description for the new environment then click **Save**. Select the newly defined environment. A **Default workspace** is automatically created for the new environment and is attached to it. Also, a **Default blank configuration** is automatically created and attached to the new environment.

Note: The **environment ID** will be later used in **AD Batch Server** and **AD Analyze Client** configurations.

The screenshot displays the 'IBM Application Discovery Configuration Servers Admin' web interface. On the left is a dark sidebar with a navigation menu. The main content area on the right shows the 'Information' tab for a selected environment. The environment's name is 'Production Environment' and its ID is 'f0b0efad-71a3-4e6b-833b-d72ec2b7ddfa', which is highlighted with a red rectangle. Below the ID field is a description field, and at the bottom are 'EDIT' and 'DELETE' buttons.

IBM Application Discovery Configuration Servers Admin	
<ul style="list-style-type: none">> Configuration Servers> localhost:2181> Environments▼ Production Environment<ul style="list-style-type: none">● Information🔒 Locks> Configurations> Workspaces> Projects> Groups> Users> Relational database servers	<h3>Information</h3> <div>Info Default configuration Default workspace</div> <div><p>Name</p><p>Production Environment</p></div> <div><p>ID</p><p>f0b0efad-71a3-4e6b-833b-d72ec2b7ddfa</p></div> <div><p>Description</p></div> <div>EDIT DELETE</div>

3. On the **IBM Application Discovery Configuration Servers Admin** page, click **localhost:2181 > Install Configurations > IBM Application Discovery Build Client**, and configure the following parameters.
 - a) Default Project path: A default path where all **AD Build Client** projects are stored. This must be a shared path(with read/write access rights) so that it can be accessed by any **AD Build, Analyze Clients** and **AD Batch Server**. This default path can be changed while creating a Project in **AD Build Client**.

- b) zOS configuration folder: A default path where the z/OS Connections are stored. This must be a shared path with read/write access rights so that it can be accessed by any **AD Build Client / AD Build Configuration** Administration tool.
- c) Path for the retrieved members: A default path where all the members downloaded from a Mainframe system, are stored. This must be a shared path (with read/write access rights) so that it can be accessed by any **AD Build, Analyze Clients** and **AD Batch Server**.
- Note:** For the situation when **AD Build Client, AD Analyze** and **AD Batch Server** are on the same machine as these paths, and no other external **AD Build / Analyze Clients** are to be installed, this path can be a local one with read/write access rights.
4. To add a relational database server, in **IBM AD Configuration Server** main page, from the available servers, select the localhost server where you defined your environment. From the available options, select **Environments > your Environment** then click **Relational database servers**. Click **Add relational database server** and enter the following parameters:
- **Name:** Enter a name for the relational database server.
 - **Host:** IP or name of the computer where the relational database server is installed.
 - **Port:** The relational database server port. The default port for SQL Server is 1433.
 - **Instance/Location:** The relational database server instance name (if exists).
 - **Username/Password:** User name and password for the **IBM AD SQL Identity** as defined in “Microsoft SQL Server Configurations” on page 8, or for the Db2 for z/OS instance.
5. At this point, you can create new projects in **AD Build Client**.
- Note:** For more information on how to create new projects, please refer to *IBM AD Build User Guide*.
- Note:** In order to activate your IBM AD Build Client copy, follow the procedure described in [Chapter 8, “Activating Your IBM AD,”](#) on page 39.

STEP 3. Configuring IBM AD Batch Server

About this task

Before running **IBM AD Batch Server**, some preliminary configurations must be performed. You need to specify on which projects you want **IBM AD Batch Server** to run the reports, which reports to generate, where to store the generated reports, and so on. Also, you need to specify the parameters for **IBM AD Web Service**.

The configuration parameters are stored in `server.properties` and `project.properties` files, which can be found in the configuration folder.

Below are the instructions on how to perform a minimal configuration in order to have source code analysis in **IBM AD Analyze Client**. For detailed instructions on how to configure **IBM AD Batch Server**, see *IBM AD Batch Server User Guide*.

Note: Under Linux, in case `.sh` files are not executable, navigate to their installation directory, open a terminal and run the following command for flagging them as executable:

```
chmod +x filename.sh
```

Procedure

1. Copy from `<IBM ADDI Installation Folder>\IBM Application Discovery Batch Server\sample-conf` all the configurations files and sub folders to `<IBM ADDI Installation Folder>\IBM Application Discovery Batch Server\Conf`.
2. Go to `<IBM ADDI Installation Folder>\IBM Application Discovery Batch Server\orientdb\orientdb-community-2.1.25-ibm1\bin\` and run `server.bat` on **Windows** or `server.sh` on **Linux**. A command prompt window will open, asking for the **root** user account

password. Fill in a password of your choosing and press **ENTER**. The password is case-sensitive. A message indicating that the service is now active is displayed.

Note: At this point, OrientDB is configured to run with the **root** user name and the password configured above.

3. In `server.properties` file, set the following parameters.

- `ccs.server.host`=<IP / hostname of the machine where the AD Configuration Server resides.>
- `ccs.environment`=<the same environment ID defined in [Configuration Server](#).>

4. The `project.properties` file contains a set of global settings, followed by the specific settings for each type of component. The global settings specify the projects on which the **IBM AD Batch Server** will operate and which components will run on the specified projects. In `project.properties` file, set the following parameters.

- a) Enter an asterisk *****, or a comma-separated list of project names that are the only ones considered for this service. **VERY IMPORTANT:** If no value is set for this parameter, no report is generated; ***** means all projects.

```
projects.whitelist=*
```

- b) Comma-separated list of component names that must be considered for this service. Ex.: **index** must be added as a component.

```
components=index,gdbImport,annUpdate
```

Optional components can be considered for this service.

Table 1: Optional Components	
Component	Description
ruleBased	The Rule Based component generates reports for the resources specified in the configuration files according to the rules and parameters defined in the corresponding configuration files. Note: If the Rule Based component is used, make sure that the <code>ruleBased.properties</code> file is configured. For more information, go to IBM AD Batch Server User Guide, ruleBased.properties File chapter .
reports	The Reports component is used to generate the complexity reports. For more information, go to IBM AD Analyze User Guide, Complexity Reports chapter .
cobolPP	The cobolPP , jclPP , and pl1PP components generate the expanded sources for Cobol, JCL, and PL/I. For more information, go to IBM AD Analyze User Guide, View Expanded Source chapter .
jclPP	
pl1PP	
wsmetrics	The wsmetrics component is needed only if IBM Application Delivery Intelligence for IBM Z (ADI) is used on the system. Note: Additionally, in order for the wsmetrics component to be executed, make sure that the gdbImport component is included in the components list of this service.

- c) The Index component will index the resources of a project so that a Search in resources can be performed in **IBM AD Analyze Client**, using Search in Files analysis.

```
index.indexFolder=\\\\network path\\<Folder>\\Index
```

Note: For the shared path defined in the `project.properties` file, backslashes must be doubled (\\) and spaces in the path must have a single backslash as a prefix.

So, for an index path location of :

```
\\server01\IBM AD\Batch Server\Indexes
```

..the `index.indexFolder` parameter would be set as follows:

```
index.indexFolder=\\\\server01\\IBM\ AD\\Batch\ Server\\Indexes
```

Important: The Index location must be shared with all Analyze Clients, which must have read access rights.

5. On **Linux** only, Open the `mount.properties` file, located under `<installation folder>\IBM Application Discovery Batch Server/conf` folder and specify how the windows shared folders are mounted on the local files system, using the following pattern:

```
\\\\machine IP\\WindowsSharedFolder=/home/user/LinuxFolder
```

Example:

```
\\\\192.168.56.57\\ProjectsSharedPathWindows=/home/user/ ProjectsSharedPathLinux
```

It is mandatory to mount, at least the default shared path for **AD Build Projects** as defined in [STEP 3](#) and the shared path for the Indexes as defined in `project.properties` file (step 5c).

6. Optional step: for integration with ADI only, please follow this procedure to set up the **AD Batch Server Web Service**:
 - a. Go to `<IBM ADDI Installation Folder>\IBM Application Discovery Batch Server\`, and run `authConfigTool.bat` on **Windows** or `authConfigTool.sh` on **Linux**. A command prompt dialog window is displayed. Follow the directions and enter the username and the password that are used by the Web Service then press ENTER. `AuthConfigTool.bat` sets the user and password for Web Service basic access authentication.
 - b. Next, to generate the security certificate for the Web service: Go to `<IBM ADDI Installation Folder>\IBM Application Discovery Batch Server\` and run `keystoreConfig.bat` on **Windows** or `keystoreConfig.sh` on **Linux**. A command prompt dialog window is displayed and the `keystore.jkl` file is generated in the configuration folder.

Note: The path to the Java JRE's `\bin` folder must be in the system PATH environment variable.

What to do next

- Start **IBM AD GraphDB (OrientDB)**.
 - Under Windows: click **Start** and then select **All Programs > IBM Application Discovery Servers \ IBM Application Discovery Batch Server > Start IBM Application Discovery GraphDB Service**. The service can also be started from Windows Services (`services.msc`) by locating **IBMApplicationDiscoveryGraphDBService** and clicking **Start**.
 - Under Linux: Go to `<IBM ADDI Installation Folder>\IBM Application Discovery Batch Server\orientdb\orientdb-community-2.1.25-ibm1\bin\` and run `server.sh`. Make sure this process remains alive.
- Start **IBM AD Batch Server**.
 - Under Windows: click **Start** and then select **All Programs > IBM Application Discovery Servers \ IBM Application Discovery Batch Server > Start IBM Application Discovery Batch Server**. The service can also be started from Windows Services (`services.msc`) by locating **IBMApplicationDiscoveryBatchService** and clicking **Start**.
 - Under Linux: Go to `<IBM ADDI Installation Folder>\IBM Application Discovery Batch Server\`, and run `StartServer.sh`. Make sure this process remains alive.
- (Only in case step 7 from above has been taken) Start **IBM AD Web Service**.

- Under Windows: click **Start** and then select **All Programs > IBM Application Discovery Servers \ IBM Application Discovery Batch Server > Start IBM Application Discovery Web Service**. The service can also be started from Windows Services (services.msc) by locating **IBMApplicationDiscoveryWebService** and clicking **Start**.
- Under Linux: Go to <IBM ADDI Installation Folder>\IBM Application Discovery Batch Server\, and run startWBServer.sh. Make sure this process remains alive.

Note: Make sure to restart **IBM AD Batch Server** after modifying the configuration files.

Important: At this installation and configuration point, everything is put in place for having analysis available in **IBM AD Analyze Client**. To take advantage of the available analysis functionality, you should next install the **IBM AD Analyze Client**, as documented in [“STEP 5. Installing IBM AD Analyze Client” on page 31](#).

For monitoring the **Batch Server** tasks, please check the logs located in the following location: <IBM ADDI Installation Folder>\IBM Application Discovery Batch Server\log\.

The log files have the following name format:

- server.log
- ibmapplicationdiscoverybatchservice -stdout.<date>.log
- ibmapplicationdiscoverybatchservice -stderr.<date>.log
- ibmapplicationdiscoveryweb service -stdout.<date>.log
- ibmapplicationdiscoveryweb service -stderr.<date>.log
- server-daemon.<date>.log
- web service.log
- web service-daemon.<date>.log
- status.log
- ProjectName-projectDBVersion.log
- gdbTool.log
- rb.log

STEP 4. (Optional) Configuring IBM AD Validation Service

About this task

IBM AD Validation Service component is specific only for ChangeMan ZMF users, therefore it is not part of the *must have* components installation.

IBM AD Validation Service is automatically installed during the **IBM AD Build** installation.

IBM AD Validation Service acts like a listener and is linked directly with **IBM AD Connect for Mainframe** component (Mainframe Agents).

After **IBM AD Validation Service** is installed, go to <IBM AD Build Client installation folder>\Bin\Release\IBMApplicationDiscoveryValidationServer\Sample conf.

Select all configuration files and copy them to <IBM AD Build Client installation folder>\Bin\Release\IBMApplicationDiscoveryBuildClientHost_CM_Validation.

Next, perform the following configurations.

Procedure

1. Configure the mapping between the projects that are used to download mainframe members, applications, and subsystems. Set the mapping values in the ProjectsMapping.txt file in the *ProjectName, ApplicationName, SubsystemID* format.

Note: Comparing with the `ProjectsMappingParallelBuild.txt` file, the projects that are specified in the `ProjectsMapping.txt` file do not need to contain the virtual folder that is specified in the `FoldersMapping.txt` file, as they are not used for builds. However, the projects must have a z/OS connection, with IP and port numbers, attached and configured.

Example

```
Project1, App1, Subsys1
```

2. Configure `IncludesOrder.txt` to have a valid input. This is the configuration file for defining the Baseline Libraries types and the order of Cobol Includes locations. This configuration file will be used later on in the process of setting up the path for the Cobol Include folder or folders.

The configuration file must have the following format:

<type>, <type1>, ... <typen> (comma-separated values)

for example:

CPY, CPB

It is important to add the types following the order where the *include* files should be looked after.

3. Configure `FoldersMapping.txt` to have a valid input. This is the configuration file for defining a mapping between a Logical Folder of the project and the type of a member that will be part of the validation process. This configuration file is used during the synchronize phase of the validation process.

The configuration file must have the following format:

<Member Type>, <Logical folder> (comma-separated values)

for example:

COB, zOS Cobol

4. Configure `ServicePort.txt` to have a valid input. This is the configuration file for defining the Service's port.

The configuration file must have the following format:

<Port Number>

for example:

48000

5. Enable or disable sending feedback to the mainframe by configuring the `LoopbackResults.txt` file with one of the following values:

Y

Enables sending feedback to the mainframe according to the weight of rules.

N

Disables sending feedback to the mainframe.

6. Set parallel validation parameters for the maximum-allowed values by configuring the `ParallelValidationParameters.txt` file with values in the *Number_of_validations_in_parallel, Number_of_components_per_validation* format.

Note:

- Do not set the number of validations in parallel greater than the number of CPU cores. Otherwise, the validation process might be unstable.
- Do not set the number of components per validation greater than 20. Otherwise, the performance might be negatively affected.

Examples

4, 10

Allows a maximum of 4 validation instances in parallel, and a maximum of 10 stages or members that are allocated for each instance. You can set these values for a computer with 4 CPU cores.

8,15

Allows a maximum of 8 validation instances in parallel, and a maximum of 15 members that are allocated for each instance. You can set these values for a computer with 8 CPU cores.

7. Configure the mapping between the projects that are used to compile the members to be validated in parallel, applications, and subsystems. Set the mapping values in the `ProjectsMappingParallelBuild.txt` file in the *ProjectName*, *ApplicationName*, *SubsystemID* format.

Note:

- The number of the projects that are mapped to one pair of an application and a subsystem must be greater than or equal to the maximum number of validations in parallel, which is specified in the `ParallelValidationParameters.txt` file. Otherwise, the service cannot start.
- Comparing with the `ProjectsMapping.txt` file, the projects that are specified in the `ProjectsMappingParallelBuild.txt` file do not need to have a z/OS connection attached and configured, as they are used only for builds. However, the projects must contain the virtual folder that is specified in the `FoldersMapping.txt` file.

The following example shows the mapping configurations for 8 validations in parallel:

```
Project1, App1, Subsys1
Project2, App1, Subsys1
Project3, App1, Subsys1
Project4, App1, Subsys1
Project5, App1, Subsys1
Project6, App1, Subsys1
Project7, App1, Subsys1
Project8, App1, Subsys1
Project9, App2, Subsys1
Project10, App2, Subsys1
Project11, App2, Subsys1
Project12, App2, Subsys1
Project13, App2, Subsys1
Project14, App2, Subsys1
Project15, App2, Subsys1
Project16, App2, Subsys1
```

8. Configure completion code for messages by configuring the `CompletionCodeVsMessage.txt` file with values in the *Code* | *Message* format.

Example

```
0|Validation Success
4|Validation Warning
8|Validation Failed
10|NA
```

Each of the numbers in the example reflects the weight of the rule that is specified in the `ruleBased.properties` file.

9. Configure approval request parameters in the `ApprovalRequestParameters.txt` file with values in the *ProjectName*, *AD_ParmLib* format.

Example

```
project,PJ.PROCLIB.S814
```

What to do next

Start **IBM AD Validation Service**: Click **Start** and then select **All Programs > IBM Application Discovery Build Client > Start IBM Application Discovery Validation Service**.

The service can also be started from Windows Services (`services.msc`) by locating `IBMAApplicationDiscoveryValidationServer` and pressing **Start**.

For monitoring the **Validation Service** tasks, please check the logs located in the following location: `<IBM AD Build Client installation path>\bin\Release\IBMAApplicationDiscoveryBuildClientHost_CM_Validation\log\`.

The log files have the following name format:

- ValidationServiceActivity<number>.log: shows all the activity and actions that were executed through the service
- ValidationServiceStatus<date>.log: shows the state of the service (start/stop).

Secondary log file location: <Project Folder>\Validation.

Log files format:

- ValidationThroughPDS_GenerateIncludePaths<date>.log: shows the information about the copybooks path generation.

STEP 5. Installing IBM AD Analyze Client

About this task



Attention: If you wish to install multiple copies of the **AD Analyze Client** software on the same machine or operating system instance, each copy of the **AD Analyze Client** software must be installed into a separate Eclipse/RDz/IDz instance, and also must use a unique workspace that does not already contain the **AD Analyze Client** software's configuration settings. A workspace in use when the **AD Analyze Client** software is installed, and which therefore contains the **AD Analyze Client** software's configuration settings will contain a folder named: <workspace location>\.metadata\.ez\.settings

Procedure

1. To install **IBM AD Analyze Client**: In your Eclipse instance, select **Window > Preferences**.
2. From the Install /Update section to the left of the **Preferences** dialog window select **Available Software Sites**: A list of software sites available for update or install is displayed.
3. To select the location from where **IBM AD Analyze Client** is being installed click **Add**: The Add Site dialog window is displayed.
 - In the **Name** field enter a name for your **IBM AD Analyze Client** installation.
 - If you extracted the installation archive that you received from IBM and you stored it on your computer, use **Local** and point to the Repository folder generated after the extract operation.
 - If you did not extract the installation archive received from IBM, use **Archive** button to select the installation archive stored on your computer.
 - If you did not store the installation archive locally but in a location on your intranet, enter the full path to that location in the **Location** field.

Click **OK**: **IBM AD Analyze Client** will be added to the list of Available Software Sites.

Click **OK** to close the **Preferences** dialog window and proceed to the next step in the installation process.
4. In your Eclipse client select **Help > Install New Software**: The Install dialog window is displayed. In **Work with** field select the **IBM AD Analyze Client** site you have defined in the previous step. After you selected the **IBM AD Analyze Client** site, the corresponding **IBM AD Analyze** components are displayed in the central part of the dialog window. By default, all the components are selected.
 - a) If you are installing **AD Analyze Client** into IBM RDz or IBM IDz, you can choose all the features listed under **IBM AD Analyze**.
 - b) If you are installing **AD Analyze Client** into an Eclipse package that is not IBM RDz or IBM IDz, for example an Eclipse distribution downloaded from eclipse.org, you can choose the features listed under **IBM AD Analyze**, except you should deselect all features that start with *Application Discovery Integration with* to avoid errors during the installation process.
 - c) Once you have selected the correct features to install in your environment, click **Next**.
5. The **Install details** dialog window is displayed.

Select a component from the list to display a detailed description of it in the **Details** section of the dialog window. Click **Next**.

6. The **Review license** dialog window is displayed. Carefully read the License agreement then select **I accept the terms** and press **Finish** to start the installation process.
7. After the installation is completed, Eclipse will prompt you for a restart: Accept the restart operation to see the newly installed features.

STEP 6. IBM AD Configuration Server: Configurations for IBM AD Analyze

About this task

Procedure

1. Start **IBM AD Configuration Server**, by selecting **Start > All Programs > IBM Application Discovery Configuration Service > Launch IBM Application Discovery Configuration Service Admin**.
2. Go to the environment created in “STEP 2. IBM AD Configuration Server: Configurations for IBM AD Build Client” on page 24 procedure step 2 and select **Configurations > Default > Graph Database** and fill in the following details:
 - Host: IP hostname where **IBM AD Batch Server** / OrientDB is installed.
 - Port: 2424.
 - Username: root.
 - Password: The same password declared in [STEP 3. Configuring AD Batch Server, procedure step 1](#).

Note: This is the **root** user's password that was defined using the `server.bat` or `server.sh` file.
3. Optional Step and not necessary unless Java source code will be included in one or more projects in this environment and **AD Analyze Server** is installed and will be configured: Go to **Configurations > Default > Analyze Servers** and fill in the following details:
 - Host: IP / Hostname where **IBM AD Analyze Server** is installed.
 - RMI Registry Port: 1099 (Default).

STEP 7. Configuring IBM AD Analyze Client

About this task

To configure **IBM AD Analyze Client**, follow the instructions below.

Eclipse startup is controlled by the options in `$ECLIPSE_HOME/eclipse.ini`. If `$ECLIPSE_HOME` is not defined, the default `eclipse.ini` in your Eclipse installation directory is used.

Procedure

1. **OS Dependent Configuration:** In case **Analyze Client** is installed on Windows Server (any version) or Windows 8/10, you need to edit the `eclipse.ini` configuration file and add the following line, in the `-vmargs` section. Avoid blank lines in the `-vmargs` section.

```
-Dorg.osgi.framework.os.name=win32
```

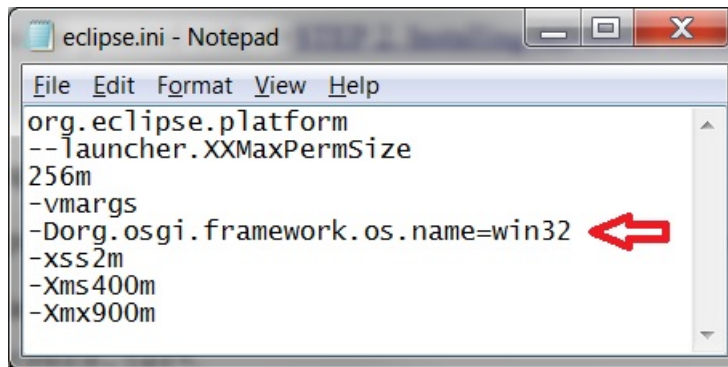


Figure 3: OS Dependent Configuration

2. **Memory Management Configuration:** Eclipse must be configured to allow for optimized memory consumption. To configure Eclipse, edit the `eclipse.ini` file under the Eclipse installation folder and set the minimum memory parameter (marked `-Xms`), the maximum memory parameter (marked `-Xmx`). Following is an example of an `eclipse.ini` file containing parameters for optimized memory consumption.

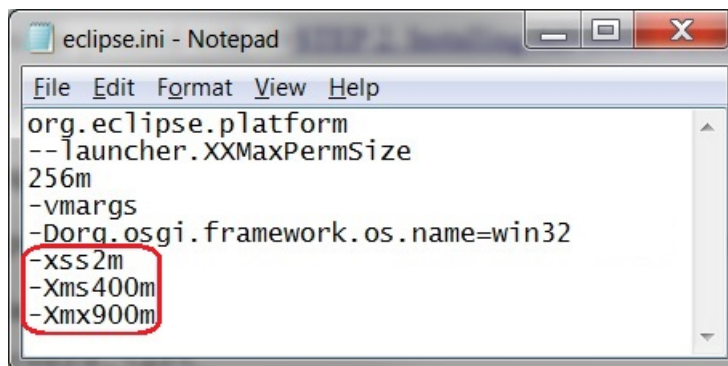


Figure 4: Memory Management Configuration

3. If you are using an AD-supported IBM Java version as the system Java and want to enable TLS V1.2 connection, add the following parameter in the `eclipse.ini` file in the `-vmargs` section. Avoid blank lines in the `-vmargs` section.

```
-Djsse.enableCBCProtection=false
```

4. To use a specific language in the Eclipse interface, add the following parameter before the `-startup` parameter in the `eclipse.ini` file:

```
-nl
language
```

The `-nl` parameter has the following *language* values:

Language value	Language
de	German
es	Spanish
fr	French
it	Italian
ja	Japanese
ko	Korean
pt_BR	Brazilian Portuguese

Language value	Language
zh	Simplified Chinese
zh_HK	Traditional Chinese, Hong Kong
zh_TW	Traditional Chinese, Taiwan

- Go to **IBM AD Analyze Client** main window and select **Window > Preferences > Application Discovery > Environment settings**.

The following Environment identification settings are available:

- **Host**, enter the host name or the IP address of the computer where **IBM AD Configuration Server** is installed.
- **Port**, enter the communications port number for **IBM AD Configuration Server**. If you are using the default port, enter 2181.
- **Unique id**, enter the unique ID assigned by **IBM AD Configuration Server** to the environment you want to work with.



Attention: This ID must be identical to the environment ID declared in “[STEP 2. IBM AD Configuration Server: Configurations for IBM AD Build Client](#)” on page 24, procedure step 2.

- **Name**, enter the name of the environment with which you want to work, as defined in **IBM AD Configuration Server**.



Attention: It is highly recommended that this name is identical to the one declared in “[STEP 2. IBM AD Configuration Server: Configurations for IBM AD Build Client](#)” on page 24, procedure step 2.

- Click **OK** and restart **IBM AD Analyze Client** (**File Menu > Restart**).
- After restarting, a pop-up message displays the configurations defined in “[STEP 6. IBM AD Configuration Server: Configurations for IBM AD Analyze](#)” on page 32.
- In order to see the **Mainframe Analysis** projects, go to [IBM AD Analyze User Guide, Explore Projects Tab](#) chapter.

Notice: At this point, all IBM AD components are up and running and ready for **Analysis**.

STEP 8. (Optional) Configuring IBM AD Analyze Server

Before you begin

This step is optional and not necessary unless Java source code will be included in one or more projects in this environment.

On Linux only, Open the `servermount.properties` file, located under `<installation folder> \IBM Application Discovery Batch Server\conf` folder and specify how the windows shared folders are mounted on the local files system, using the following pattern:

```
\\\\\\machine IP\\WindowsSharedFolder=/home/user/LinuxFolder
```

Example:

```
\\\\\\192.168.56.57\\ProjectsSharedPathWindows=/home/user/ ProjectsSharedPathLinux
```

It is mandatory to mount the Remote Path from **Analyze Server Manager > Server Settings**.

About this task

Following are the configuration steps that are needed after **IBM AD Analyze Server** was installed.

- **Under Windows:** to access the configuration parameters, select **Start > Programs > IBM Application Discovery Analyze Server > IBM Application Discovery Analyze Server Manager**.
- **Under Linux:** to access the configuration parameters, go to <Installation Path>\IBM Application Discovery Servers\IBM Application Discovery Analyze Server and run `manager.sh`.

In the **Server settings** tab, the **Server properties** and **Server arguments** sections display default data that was entered when **IBM AD Analyze Server** was installed and also, information that was entered in the **Analyze Servers** page of **IBM AD Configuration Server**.

To configure **IBM AD Analyze Server**, follow the instructions below.

Procedure

1. Configuring the server database – the Database settings tab:

Select the **Database Settings** tab. In the Location area, fill in the following parameters:

- **Server type** field is completed by default with *SQL server*.
- **Server IP:** Enter the IP of the computer where SQL Server is installed.
- **Server port:** Server port is the access port, by default, 1433 port is used.

Important: Make sure that the IP address and the port number you set here are the same as the ones entered in the **Relational database servers** page of **IBM AD Configuration Server**. For more information, see “[STEP 2. IBM AD Configuration Server: Configurations for IBM AD Build Client](#)” on page 24.

Database instance, this field must be used in case the default database name was not chosen at SQL Server installation time. In the Authorization area, fill in the following parameters:

- **Database name:** Enter a name for the database.
- **User and password:** Give a user and password that can be used to create the database.

After you completed the details of the database, click **Create database** to create the database with the selected parameters. If the database was configured correctly, after **Test database** is clicked, a message with the installed DB version will be displayed. Click **Save** to apply the settings.

You can also select an existing database. If the selected database belongs to an older version of **IBM AD** and the database structure is now obsolete, a message is displayed indicating the current version of the selected database. The user is given the option to upgrade the existing database. Press **Upgrade** if applicable. After the upgrade process was performed, press again **Test database** to make sure that the upgraded database is functional. The version of the upgraded database is presented and **Upgrade** button is no longer available. For incomplete or corrupted databases one of the following messages may be displayed: **Database x is not a valid database** or **Cannot extract relevant data from the database. Database may be nonexistent, obsolete or invalid**.

After modifying the settings in any of the tabs, do not forget to press **Save** to apply them. An asterisk at the beginning of the title of a tab indicates that parameters in that tab were modified but not saved.

2. Specifying allowed **IBM AD Analyze Clients**:

Note: This configuration applies only to Java projects.

- **IBM AD Analyze** clients can be of two types: manager and user.
- **IBM AD Analyze** client of the **manager** type, can create shared projects, build shared projects, and delete shared projects.
- **IBM AD Analyze** client of the “user” type, can only import the shared projects and perform analysis.

Manager and user types are server-related attributes, which means that a server determines the type for a client connecting to that server by looking up the client IP in the configuration files. This means a client can be a manager on one server and a user on another server.

- To add a Manager to the Managers list: Click **Add** in the upper right corner of the **Access Settings** tab: **New Access Data** dialog window is displayed. Enter the IP of the computer of the user who will

access the server as a Manager (the type of owner is selected by default) then press **OK** to add the new manager to the list of Managers. To delete one of the Managers from the list, select it then press **Delete**. If you want to allow access to all the projects on the server to all potential users, do not add any users to the List of Users. If you want to limit the access to the projects to a number of specific users, select **restrict user IP** then add all of them to the List of Users. Only users in the List of Users and List of Managers will have access to the projects shared on the server.

- b) To add a user to the List of Users, click **Add** from the List of Users area of the **Access Settings** tab: the New Access Data dialog window is displayed. Enter the IP of the computer of the user who will access the projects as a User (the type of owner is selected by default) then press OK to add the new user to the list of Users.

What to do next

Under Windows: start **IBM AD Analyze Server**: Click **Start** and then select **All Programs > IBM Application Discovery Analyze Server > Start IBM Application Discovery Analyze Server**.

Alternatively, to start the server: From the Start menu, choose **Programs > IBM Application Discovery Analyze Server > Start IBM Application Discovery Analyze Server Monitor** then go to monitor icon from the taskbar, right-click on the icon, and select **Start service**. When the server is running, the green arrow from **Server Monitor** icon indicates that the server is started.

Under Linux: Go to <Installation Path>\IBM Application Discovery Servers\IBM Application Discovery Analyze Server and run `StartServer.sh`. Please make sure this process remains alive.

Chapter 7. IBM AD Connect for Mainframe Installation and Configuration

After all the steps in the Configuring IBM AD chapter are completed, you can install IBM AD Connect for Mainframe.

- Install **IBM AD Connect for Mainframe** using SMP/E, following the instructions in the [IBM AD Connect for Mainframe Program Directory](#). Instructions for installing additional PTFs provided with the **IBM AD Connect for Mainframe** can be found in the installation package at:

IBM AD v.X Suite\IBM AD Build\IBM AD Connect for Mainframe\Install instructions.

- Configure **IBM AD Connect for Mainframe** by following the instructions in [IBM AD Connect for Mainframe Configuration Guide](#).

Chapter 8. Activating Your IBM AD

A free **IBM AD** version is offered for evaluation purposes. This *for evaluation* version allows you to create a maximum of 5 projects and compile a maximum of 100 programs and 100 JCLs. After you purchase the full version, you will receive an activation tool. Following are the steps you need to take for unlocking the full functionality of IBM AD.

Before you begin

Stop **IBM AD Build Client** and **IBM AD Administration Tool** before using the activation tool and make sure you run it on all machines where **IBM AD Build Client** is installed.

Procedure

1. Double-click the `ADActivation.exe` received from IBM. (Highly recommended to use *Run as Administrator* method)
2. **Application Discovery License Activation** dialog window is displayed. Click **Activate** then click **Exit** to finalize the activation.

Chapter 9. Uninstalling IBM AD Components

Important:

- Before starting the uninstall process, make sure that all IBM AD Build and IBM AD Analyze clients are closed.
- Uninstall the products in the exact order in which they are presented below.
- As a general note, understand that **Force the Deletion** option deletes all the contents of a specific folder, meaning that configurations are lost.
- After **IBM AD Build Client** is uninstalled **make sure to reboot** the workstation.
- In case you are upgrading and need to uninstall first, make sure to backup the configuration information. For more details on upgrading, go to [Chapter 4, “Upgrading Components from Earlier Versions,”](#) on page 15.

1. Uninstall IBM AD:

- **Under Windows:** stop all services related to IBM AD Batch Server, IBM AD Configuration Server and IBM AD Analyze Server:
 - IBM AD Analyze Service
 - IBM AD Batch Service
 - IBM AD Configuration Admin Service
 - IBM AD Configuration Service
 - IBM AD OrientDB Service
- **Under Linux/zLinuxLinux:** stop all the processes related to IBM AD Batch Server, IBM AD Configuration Server, and IBM AD Analyze Server.
- Stop all java processes related to IBM AD Batch Server, IBM AD Configuration Server and IBM AD Analyze Server.
- Under **Windows:** click **Start** and then select **All Programs > IBM Application Discovery and Delivery Intelligence > Uninstall IBM Application Discovery and Delivery Intelligence**.
- Under **Linux/zLinuxLinux:** Go to the installation folder (By default, the installation folder is *Installation Path\IBM Application Discovery and Delivery Intelligence \Uninstall*), execute `uninstaller.sh` and follow the uninstalling steps.
- Under **Windows:** Alternative CLI uninstall: open a command line in *Installation Path\IBM Application Discovery and Delivery Intelligence\Uninstall* and run the following command:

```
java -jar uninstaller.jar -cki
```

- Under **Linux/zLinuxLinux:** Alternative CLI uninstall: open a command line in *Installation Path\IBM Application Discovery and Delivery Intelligence\Uninstall* and run the following command:

```
./uninstaller.sh -cki
```

- #### 2. Uninstall IBM AD Analyze Client:
- To uninstall IBM AD Analyze Client: Go to **Eclipse client > Help > About Eclipse SDK**. In the **About Eclipse SDK** dialog window: Click **Installation Details**. In the Eclipse SDK Installation Details dialog window: From the **Installed Software** tab, select the components that you want to uninstall then click **Uninstall**. The **Uninstall** dialog window presents the list of components that will be uninstalled: Click **Finish** to start the uninstall process.

Chapter 10. Disaster Recovery

Backing Up Steps for Components

I. AD Configuration Server

Note:

- Before you start to back up on Windows, make sure that the IBMApplicationDiscoveryConfigurationAdminService and IBMApplicationDiscoveryConfigurationService services are stopped.
- Before you start to back up on Linux, make sure that the startServer.sh and startWebServerUI.sh files, corresponding to AD Configuration Server, are not running.

Procedure

1. Back up folder <IBM AD Configuration Server Installation Path>\store. The database and data of Configuration Server are stored in the store folder.
2. Back up folder <IBM AD Configuration Server Installation Path>\conf. The configuration files are stored in the conf folder.

II. AD Build Client

Procedure

1. Back up AD Build projects.
 - a. Back up project folders.
 - 1) Include the default path for AD Build projects in the backing up procedure. The default path is defined in the **Default projects path** field. To see the value, click the **AD Build Client** tab in IBM AD Configuration Server. See the following figure for illustration:

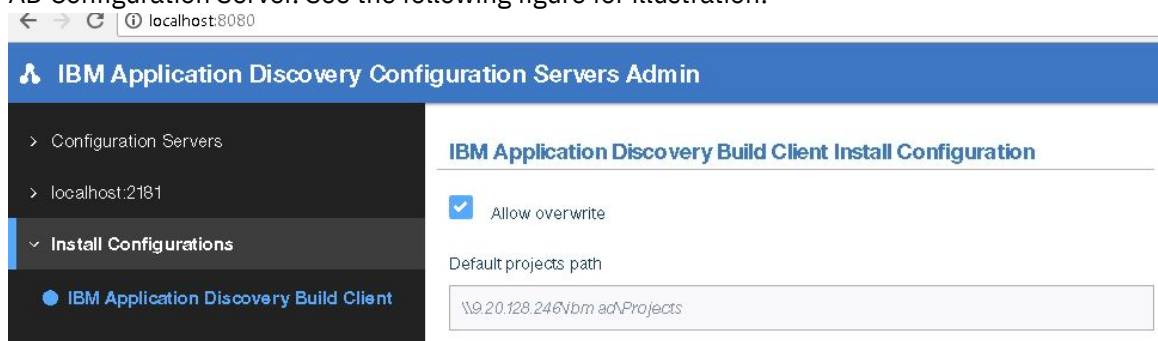


Figure 5: **Default projects path** field

- 2) If project folders exist in the paths that are not the default path for AD Build projects, make sure to include those paths in the backing up procedure. To identify the paths, run the following query on the SQL Server where AD Build projects exist:

```
SET NOCOUNT ON;
DECLARE @t TABLE (DB VARCHAR(100), PathStrFull VARCHAR(1000)) ;
DECLARE @SQL NVARCHAR(MAX);

SELECT @SQL = STUFF(
    SELECT CHAR(13) + 'SELECT ''' + name + ''', PropValue FROM [' + name + '].[dbo].[Pj_ProjectProp] WHERE
    ID_PropType = 27'
    FROM sys.databases
    WHERE OBJECT_ID([' + name + '].[dbo].[Pj_ProjectProp]') IS NOT NULL
    FOR XML PATH(''), TYPE).value('','NVARCHAR(MAX)'), 1, 1, '');
```

```

INSERT INTO @t(DB, PathStrFull)
EXEC sys.sp_executesql @SQL ;

SELECT ProjectsPaths
FROM (
    SELECT DISTINCT
    CASE WHEN CHARINDEX('EZ ', DB) = 1 THEN SUBSTRING(PathStrFull, 1, PATINDEX( '[\]' + SUBSTRING(DB, 4,
    LEN(DB) - 3) + '[\]', PathStrFull))
    ELSE NULL
    END AS ProjectsPaths
    FROM @t t
) sic
WHERE LEN(sic.ProjectsPaths) > 0 ;

```

b. Back up the relational databases of AD Build Client projects.

Every AD Build Client project has its own corresponding relational database. Include all the relational databases with names that start with string "EZ_" in the backing up procedure, and make sure that they can be restored at any time. See the following figure for illustration:

- ⊕ EZ_PREP_1to1_HDC_85
- ⊕ EZ_PREP_1toMany_HDC_85
- ⊕ EZ_PREP_AssemblerPL1_HDC_85
- ⊕ EZ_PREP_AssemblerPL1Extended_HDC_85
- ⊕ EZ_PREP_CaseJapan_HDC_85
- ⊕ EZ_PREP_City_HDC_85
- ⊕ EZ_PREP_FlowChart_HDC_85
- ⊕ EZ_PREP_IncInvolvExp_HDC_85
- ⊕ EZ_PREP_IncludesInvolved_HDC_85
- ⊕ EZ_PREP_JapanExtended_HDC_85
- ⊕ EZ_PREP_JapanEXTEXP_HDC_85
- ⊕ EZ_PREP_MainframeMembers_HDC_85

Figure 6: Relational database examples

2. Back up the source code files that are loaded in AD Build Client.

- a. Include the path where source code files are automatically downloaded from a Mainframe system using AD Connect for Mainframe and stored in the backing up procedure. This path is defined in the **Path for the retrieved members** field. To see the value, click **Install Configurations > IBM Application Discovery Build Client** in IBM AD Configuration Server. See the following figure for illustration:

The screenshot shows the 'IBM Application Discovery Configuration Servers Admin' interface. On the left, a navigation pane lists 'Configuration Servers', 'localhost:2181', and 'Install Configurations'. Under 'Install Configurations', 'IBM Application Discovery Build Client' is selected. The main area displays the 'IBM Application Discovery Build Client Install Configuration' settings. The 'Allow overwrite' checkbox is checked. The 'Default projects path' is set to '\\9.20.128.246\\ibm ad\\Projects'. The 'zOS configuration folder' is set to '\\9.20.128.246\\ibm ad\\Configurations'. The 'Path for the retrieved members' is set to '\\9.20.128.246\\ibm ad\\Sources'. The 'Enable members synchronization' checkbox is checked. The 'Path for members synchronization configuration file' is set to '\\9.20.128.246\\AnalyzeSharedPath\\sync1.txt'.

Figure 7: Path for the retrieved members field

- b. For the source code files that are manually added or loaded in AD Build projects, make sure to include the paths where those files exist in the backing up procedure.
3. Back up AD Build configurations.
 - a. Back up z/OS configurations. The folder where z/OS configurations are stored is defined in the **zOS configuration folder** field. To see the value, click **Install Configurations > IBM Application Discovery Build Client** in IBM AD Configuration Server. See the following figure for illustration:

The screenshot displays the 'IBM Application Discovery Configuration Servers Admin' web interface. On the left, a navigation pane shows the hierarchy: 'Configuration Servers' > 'localhost:2181' > 'Install Configurations' > 'IBM Application Discovery Build Client'. The main content area is titled 'IBM Application Discovery Build Client Install Configuration'. It contains several configuration fields: 'Allow overwrite' (checked), 'Default projects path' (\\9.20.128.246\\bm ad\\Projects), 'zOS configuration folder' (\\9.20.128.246\\bm ad\\Configurations, highlighted with a red box), 'Path for the retrieved members' (\\9.20.128.246\\bm ad\\Sources), 'Enable members synchronization' (checked), and 'Path for members synchronization configuration file' (\\9.20.128.246\\AnalyzeSharedPath\\sync1.txt).

Figure 8: **zOS configuration folder** field

- b. Back up the Synchronization configuration file. This file is used for the mainframe members synchronization process, and is defined in the **Path for members synchronization configuration file** field. To see the value, click **Install Configurations > IBM Application Discovery Build Client** in IBM AD Configuration Server. See the following figure for illustration:

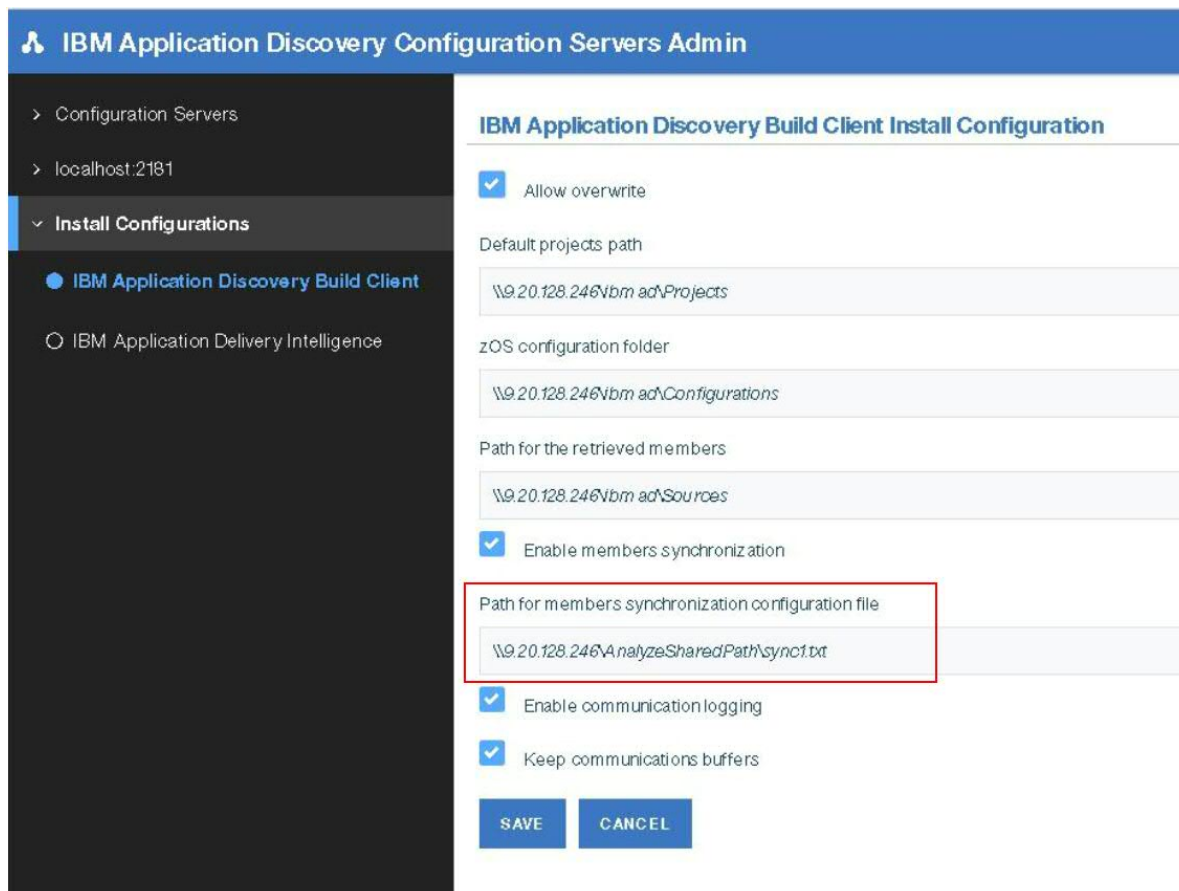


Figure 9: **Path for members synchronization configuration file** field

c. For environments that download assets from Endeavor via IBM AD Connect for Mainframe, back up the following Endeavor configuration files:

- Promotion routes configuration file
- Types list configuration file

The two files are configured for Endeavor source code download. To see the file paths, click the **ENDEAVOR Info** tab in the "zOS configuration" window. See the following figure for illustration:

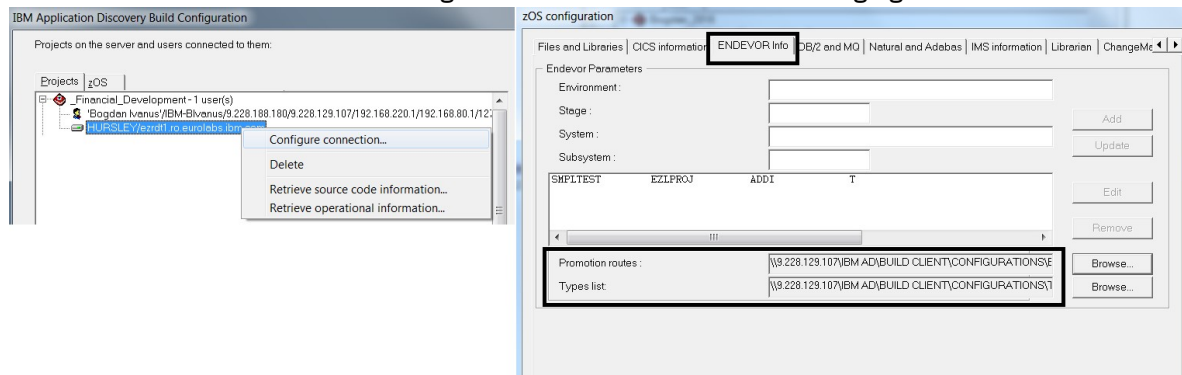


Figure 10: **ENDEAVOR Info** tab

4. Back up the following AD Validation Service configuration files. They are stored in the <IBM AD Build Client InstallationFolder>\IBMApplicationDiscoveryValidationServer folder.

- ApprovalRequestParameters.txt
- CompletionCodeVsMessage.txt
- FoldersMapping.txt

- IncludesOrder.txt
 - LoopbackResult.txt
 - ParallelValidationParameters.txt
 - ProjectsMapping.txt
 - ProjectsMappingParallelBuild.txt
 - ServicePort.txt
5. Back up the `<IBM AD Build Client InstallationFolder>`
`\IBMApplicationDiscoveryValidationServer\ReportsGenerator` folder. By default, the `conf`, `data`, and `tmp` folders are contained by the `ReportsGenerator` folder. If the paths for the three folders are changed in the `server.properties` configuration file, back up accordingly.
 6. If the Rule Based component is used, back up Rule Based reports and queries.
 - a. Back up Rule Based reports.

By default, the rule-based data is generated and stored in the `data` folder, which is already included in the backing up procedure. For more information about the `data` folder, see [Step 5](#).

If the default folders that are related to the Rule Based component are changed in the `project.properties` file, back up the folders as configured. If folders for specific projects are defined, back up the corresponding folders as well.

```
## output folder for rule based reports generated by source based rules. Default, data
folder
ruleBased.reportsFolder=

## output folder for csv files generated by data based rules. Default, data folder
#ruleBased.csvFolder=

## output folder for controlTotals files generated by source based rules. Default, data
folder
## used only if generateTotals is true
#ruleBased.totalsFolder=

## output folder for rule based reports generated by source based rules. Default, data
folder
#project.<projectName>.ruleBased.reportsFolder=

## output folder for csv files generated by data based rules. Default, data folder
#project.<projectName>.ruleBased.csvFolder=

## output folder for controlTotals files generated by source based rules. Default, data
folder
## used only if generateTotals is true
#project.<projectName>.ruleBased.totalsFolder=
```

- b. Back up Rule Based queries.

If you use Rule Based global settings, check the paths where input and queries are stored in the `ruleBasedConfig.properties` file.

If you use Rule Based project settings, check the paths where input and queries are stored in the rule properties file of each project. Also, if the rule properties files are not stored in the `conf` folder, back up the folders where they are stored.

III. AD Batch Server

Note:

- Before you start to back up on Windows, make sure that the `IBMApplicationDiscoveryBatchService`, `IBMApplicationDiscoveryGraphDBService`, and `IBMApplicationDiscoveryWebService` services are stopped.
- Before you start to back up on Linux, make sure that the `server.sh` (corresponding to GraphDB), `startServer.sh` (corresponding to AD Batch Server), and `startWBServer.sh` (corresponding to AD Web Service) files are not running.

- Generally, the data and conf folders that are distributed by the AD Batch Server installation must be included in the backing up procedure. See the following detailed description for the folders.

```
## path to the directory where configuration files are placed
## default: ${install.dir}/conf
conf.dir=<path>\conf

## path to the directory where data files are placed
## default: ${install.dir}/data
data.dir=<path>\data

## path to the directory where temporary data is placed
## default: ${data.dir}/tmp
tmp.dir=<path>\tmp
```

If the default paths for the data, conf, and tmp folders are changed in the `server.properties` configuration file, back up accordingly.

Procedure

1. Back up configurations.

- a. Back up the `<Batch Server Installation Path>\Conf` configuration folder.
- b. Back up the following configuration folders in the tmp folder:
 - `<Batch Server Installation Path>\tmp\mfp`
 - `<Batch Server Installation Path>\tmp\ver`

2. Back up OrientDB databases (graph databases).

Back up the default folder `<Batch Server Installation Path>\tmp\gdb`. The size of this folder might be large, depending on the number and size of AD Build Client projects.

3. Back up the index folders as defined in the `project.properties` configuration file. The indexes that are generated by AD Batch Server and used for Search In Files analysis in AD Analyze Client are stored in these folders. If indexes for specific projects are defined, back up the corresponding index folders as well.

```
## index global settings
## output folder where indexes are stored. (project name will be added by default)
## this setting does not override database entry!
## Note that index folder should be a shared folder in order for all Analyze client to be able to use it
index.indexFolder=\\9.20.128.211\IBM AD\Batch Server\Indexes

### index project settings
## output folder where index for this project is stored. must be unique per project
## this setting does not override database entry!
project.
project.<projectName>.index.indexFolder=\\9.20.128.211\IBM AD\Batch Server\Indexes\\<projectName>
```

4. Back up the `<Batch Server Installation Path>\tmp\wsmetrics` folder. The Web Services data is stored in this folder.

5. If the Rule Based component is used, back up Rule Based reports and queries.

- a. Back up Rule Based reports.

By default, the rule-based data is generated and stored in the data folder, which is already included in the backing up procedure. For more information about the data folder, see the preceding [Note](#).

If the default folders that are related to the Rule Based component are changed in the `project.properties` file, back up the folders as configured. If folders for specific projects are defined, back up the corresponding folders as well.

```
## output folder for rule based reports generated by source based rules. Default, data
folder
ruleBased.reportsFolder=

## output folder for csv files generated by data based rules. Default, data folder
#ruleBased.csvFolder=
```

```

## output folder for controlTotals files generated by source based rules. Default, data
folder
## used only if generateTotals is true
#ruleBased.totalsFolder=

## output folder for rule based reports generated by source based rules. Default, data
folder
#project.<projectName>.ruleBased.reportsFolder=

## output folder for csv files generated by data based rules. Default, data folder
#project.<projectName>.ruleBased.csvFolder=

## output folder for controlTotals files generated by source based rules. Default, data
folder
## used only if generateTotals is true
#project.<projectName>.ruleBased.totalsFolder=

```

b. Back up Rule Based queries.

If you use Rule Based global settings, check the paths where input and queries are stored in the ruleBasedConfig.properties file.

If you use Rule Based project settings, check the paths where input and queries are stored in the rule properties file of each project. Also, if the rule properties files are not stored in the conf folder, back up the folders where they are stored.

6. Back up the annotation database.

In earlier versions of IBM AD, IBM AD Batch Server creates a database that is called EZ#Annotations in Microsoft SQL Server. This database is created on the SQL Server as defined in the server.properties configuration file.

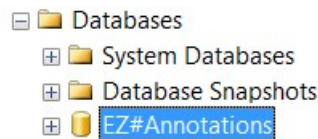


Figure 11: EZ#Annotations database

Starting with IBM AD V5.1.0, IBM AD Batch Server reads the configurations that are made in **IBM AD Configuration Server**, under **Annotations Database** and create the annotations database in the relational database server that is specified there, by using the database name and the schema set by the user.

You can still add EZ#Annotations in database name field, together with dbo schema and associate the relational database server in which the annotation database was created, the one defined in the server.properties configuration file.

Using the configurations set in **Annotations Database** configurations area you can find out the name of your annotations database, the schema and the associated relational database server in order to know what database to back up.

IV. AD Analyze Server

Note:

- Before you start to back up on Windows, make sure that the IBMApplicationDiscoveryAnalyzeService service is stopped.
- Before you start to back up on Linux, make sure that the StartServer.sh file, corresponding to IBM AD Analyze Server, is not running.

Procedure

If the IBM AD Analyze Server component is used, follow the steps to back up:

1. Back up the IBM AD Analyze Server database.

IBM AD Analyze Server creates a database in Microsoft SQL Server. To identify the IBM AD Analyze Server database, start IBM AD Analyze Server, and click the **Database settings** tab. See the following figure for the illustration of the details about the SQL Server location and the database:

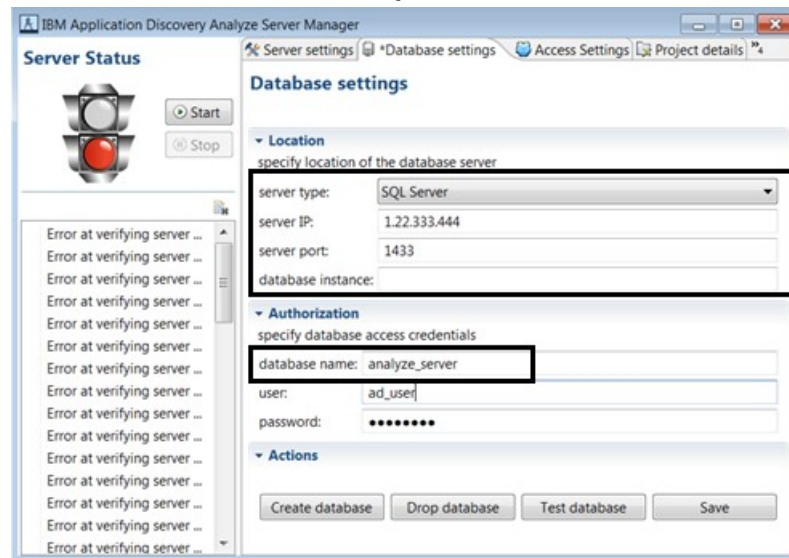


Figure 12: IBM AD Analyze Server database details

2. Back up the following configuration files. These three files are required for IBM AD Analyze Server Service, and they are stored in folder <IBM AD Analyze Server Installation Folder>.
 - server.properties
 - client.properties
 - database.properties

V. AD Analyze Client

Procedure

Back up the Analyze Client workspace. All information about configuration settings is stored in the Analyze Client workspace. To see the workspace location, click **Windows > Preferences > Workspace**.

VI. AD Web Services

Note:

- The IBM AD Catalog, IBM AD Audit and IBM AD BRD web services are deployed on the same IBM WAS Liberty Web Server. Back up the web services together because they are using the same configuration file.
- File server.xml is the only file that is changed and can be configured after the deployment of the IBM AD Catalog, IBM AD Audit and IBM AD BRD web services.

Procedure

1. Back up the IBM AD Catalog, IBM AD Audit and IBM AD BRD databases.

Each AD Web Service requires a database. To back up the databases that are used by the IBM AD Catalog, IBM AD Audit and IBM AD BRD, see the server.xml file and get the database connection details.

- For the Audit web service, search for the following data source:

```
<dataSource id="DefaultDataSource" jndiName="jdbc/datasource" type="javax.sql.DataSource">
```

- For the Catalog web service, search for the following data source:

```
<dataSource id="ADCatRDB" jndiName="jdbc/ad/catalog/relational"
type="javax.sql.DataSource">
```

2. Back up the `server.xml` configuration file.

Add the `server.xml` file in the backup directory for web services. The `server.xml` file is under the web service installation path: `<was_liberty_path>\usr\servers\ad_server`.

3. For the IBM AD Catalog web service, back up the DataCollector configuration files `DC.properties` and `zoscdc.cmd`. The files are stored under the `zosDataCollector` directory in the same location as the IBM WAS Liberty.
4. For the IBM AD BRD web service, back-up the `conf.brd-ws` folder which includes the `theapplication.properties` file.

Restoring Steps for Components

Important:

- All the following components must be installed, and their corresponding services (Windows) and processes (Linux) must be stopped before you start to restore.
- Make sure that you restore in the same order as mentioned in this document. Restoring in a different order might make the components not work properly because the components have dependencies.
- Make sure to maintain the same IP/Hostname values for the AD components and AD SQL Server machines when you restore, considering that AD components are using IP/Hostname values for some of their configurations.

I. AD Configuration Server

Note:

- Before you start to restore on Windows, make sure that the `IBMAApplicationDiscoveryConfigurationAdminService` and `IBMAApplicationDiscoveryConfigurationService` services are stopped.
- Before you start to restore on Linux, make sure that the `startServer.sh` and `startWebServerUI.sh` files, corresponding to AD Configuration Server, are not running.

Procedure

1. Restore the database and data of Configuration Server. For more information about the database and data, see [step 1 in section backing up steps for AD Configuration Server](#).
2. Restore the configuration files. For more information about the files, see [step 2 in section backing up steps for AD Configuration Server](#).

Note: At this point, IBM AD Configuration Server is configured and up and running.

II. AD Build Client

Note: Before you start to restore AD Build Client, AD Configuration Server must be restored, and AD Build Client is highly recommended to be installed.

Procedure

1. Restore AD Build projects.
 - a. Restore the project folders. For more information about the folders, see [substep a of step 1 in section backing up steps for AD Build Client](#).

Note: Make sure to keep the same security/share level for each folder as they were defined.

- b. Restore the relational databases of AD Build Client projects. For more information about the databases, see [substep b of step 1 in section backing up steps for AD Build Client](#).

Note: Make sure to maintain the same ownership for each database as they were defined, and that the owner has all the necessary rights as defined during installation and configuration.

2. Restore the source code files that are loaded in AD Build Client. For more information about the files, see [step 2 in section backing up steps for AD Build Client](#).

Note: Make sure to keep the same security/share level for each folder as they were defined.

3. Restore AD Build configurations. For more information about the configurations, see [step 3 in section backing up steps for AD Build Client](#).

Note:

- Make sure to keep the same security/share level for each folder as they were defined.
 - At this point, IBM AD Build Client is configured and up and running, and all the projects are available and can be used.
4. If AD Validation Service is used, restore AD Validation Service configuration files. For more information about the files, see [step 4 and 5 in section backing up steps for AD Build Client](#).
 5. If the Rule Based component is used, restore Rule Based reports and queries. For more information about the reports and queries, see [step 6 in section backing up steps for AD Build Client](#).

Note: At this point, IBM AD Validation Service is configured, and the corresponding service can be started.

III. AD Batch Server

Note:

- Before you start to restore on Windows, make sure that the IBMApplicationDiscoveryBatchService, IBMApplicationDiscoveryGraphDBService, and IBMApplicationDiscoveryWebService services are stopped.
- Before you start to restore on Linux, make sure that the `server.sh` (corresponding to GraphDB), `startServer.sh` (corresponding to AD Batch Server), and `startWBServer.sh` (corresponding to AD Web Service) files are not running.
- Before you start to restore AD Batch Server, AD Configuration Server and AD Build Client must be restored or up and running.

Procedure

1. Restore the configuration folders. For more information about the folders, see [step 1 in section backing up steps for AD Batch Server](#).
2. Restore OrientDB databases (graph databases).
 - a. Restore the default folder. For more information about the folder, see [step 2 in section backing up steps for AD Batch Server](#).
 - b. To re-create the symbolic links, go to <IBM AD Batch Server Installation folder> and run `recoverGDBSymbolicLinks.bat` on Windows and `recoverGDBSymbolicLinks.sh` on Linux.

Note: Both of the files must be executed with the following two parameter values:

Location of the graph databases

"<IBM AD Batch Server Installation path>\data\tmp\gdb"

Location where the symbolic links must be created

"<IBM AD Batch Server Installation path>\orientdb\orientdb-community-2.1.25-ibm1\databases"


```
Example: recoverGDBSymbolicLinks.bat "<IBM AD Batch Server Installation
path>\data\tmp\gdb" "<IBM AD Batch Server Installation path>\orientdb
\orientdb-community-2.1.25-ibm1\databases"
```

3. Restore the index folders. For more information about the folders, see [step 3 in section backing up steps for AD Batch Server](#).

Note: Make sure to keep the same security/share level for each folder as they were defined.

4. Restore the Web Services data. For more information about the data, see [step 4 in section backing up steps for AD Batch Server](#).
5. If the Rules Based component is used, restore Rules Based reports. For more information about the reports, see [step 5 in section backing up steps for AD Batch Server](#).
6. Restore the annotation database: EZ#Annotations. For more information about the database, see [step 6 in section backing up steps for AD Batch Server](#).

Note:

- Make sure to maintain the same ownership for the annotation database as it was defined, and that the owner has all the necessary rights as defined during installation and configuration.
- At this point, IBM AD Batch Server is configured, and all the corresponding services (Windows) and processes (Linux) can be started.

IV. AD Analyze Server

Note:

- Before you start to restore on Windows, make sure that the IBMApplicationDiscoveryAnalyzeService service is stopped.
- Before you start to restore on Linux, make sure that the StartServer.sh file, corresponding to Analyze Server, is not running.

Procedure

1. Restore the Analyze Server database. For more information about the database, see [step 1 in section backing up steps for AD Analyze Server](#).

Note: Make sure to maintain the same ownership for the Analyze Server database as it was defined, and that the owner has all the necessary rights as defined during installation and configuration.

2. Restore the Analyze Server configuration files. For more information about the files, see [step 2 in section backing up steps for AD Analyze Server](#).

Note: At this point, IBM AD Analyze Server is configured, and all the corresponding services (Windows) and processes (Linux) can be started.

V. AD Analyze Client

Procedure

1. Restore the Analyze Client workspace. For more information about the workspace, see [the procedure in section backing up steps for AD Analyze Client](#).
2. Set the Analyze Client Eclipse to use the backup workspace.

- a. Open the Analyze Client instance.
- b. Click **File > Switch Workspace > Other...**
- c. Select the backup workspace.

Note: At this point, IBM AD Analyze Client is configured and ready to use for analysis.

VI. AD Web Services: Audit and Catalog

Procedure

1. Restore the Audit and Catalog databases. For more information about the databases, see [step 1 in section backing up steps for AD Web Services: Audit and Catalog](#).

Note: Make sure to maintain the same ownership for each database as it was defined, and that the owner has all the necessary rights as defined during installation and configuration.

2. Restore the `server.xml` configuration file. For more information about the file, see [step 2 in section backing up steps for AD Web Services: Audit and Catalog](#).

If the database connection details were changed, edit the `server.xml` file to point to the correct location of the SQL/Db2 server, and change the credentials accordingly.

3. For the Catalog web service, restore the DataCollector configuration files `DC.properties` and `zoscdc.cmd`. For more information about the files, see [step 3 in section backing up steps for AD Web Services: Audit and Catalog](#).

Create a directory `<was_liberty_path>\zoscdDataCollector`, and put the DataCollector configuration files in it.

Note: At this point, IBM AD Audit and Catalog are configured, and all their services (Windows) and processes (Linux) can be started.

Chapter 11. Integration with IBM License Metric Tool

IBM AD generates IBM Software License Metric Tag (SLMT) files. The versions of IBM License Metric Tool that support IBM Software License Metric Tag can generate License Consumption Reports.

Each instance of a running environment generates an IBM Software License Metric Tag file. The USER metrics are monitored. The values are refreshed every 10 minutes.

IBM AD generates an SLMT tag file that records the active user count at 10-minute intervals. The recorded information is:

- USER: containing the name of the system account that started IBM AD Analyze Client.
- INSTANCE: containing the workspace of IBM AD Analyze Client.
- APPLICATION_INSTANCE: a unique identifier of the current workspace of IBM AD Analyze Client.

IBM SLM tag files are found at work/.metadata/.ez/.slmtag for Linux and work\metadata\ez\slmtag for Windows. This is a relative path where work is the name of the workspace used for the IBM AD Analyze Client installation.

Following is an example of the content of an SLM tag file:

```
<SchemaVersion>2.1.1</SchemaVersion>
  <SoftwareIdentity>
    <PersistentId>e1874f9ed93d4a3fb9cda4c1c442b1b1</PersistentId>
    <Name>IBM Application Discovery</Name>
    <InstanceId>/evviewer/workspace/.metadata/.ez/.slmtag</InstanceId>
  </SoftwareIdentity>
  <Metric logTime="2017-11-14T16:02:39+02:00">
    <Type>USER</Type>
    <SubType>adriana</SubType>
    <Value>13</Value>
    <Period>
      <StartTime>2017-11-14T16:02:39+02:00</StartTime>
      <EndTime>2017-11-14T16:02:39+02:00</EndTime>
    </Period>
  </Metric>
  <Metric logTime="2017-11-14T16:02:39+02:00">
    <Type>INSTANCE</Type>
    <SubType>/evviewer/workspace</SubType>
    <Value>13</Value>
    <Period>
      <StartTime>2017-11-14T16:02:39+02:00</StartTime>
      <EndTime>2017-11-14T16:02:39+02:00</EndTime>
    </Period>
  </Metric>
  <Metric logTime="2017-11-14T16:08:10+02:00">
    <Type>USER</Type>
    <SubType>adriana</SubType>
    <Value>13</Value>
    <Period>
      <StartTime>2017-11-14T16:08:10+02:00</StartTime>
      <EndTime>2017-11-14T16:08:10+02:00</EndTime>
    </Period>
  </Metric>
  <Metric logTime="2017-11-14T16:08:10+02:00">
    <Type>INSTANCE</Type>
    <SubType>/evviewer/workspace</SubType>
    <Value>13</Value>
    <Period>
      <StartTime>2017-11-14T16:08:10+02:00</StartTime>
      <EndTime>2017-11-14T16:08:10+02:00</EndTime>
    </Period>
  </Metric>
```


Documentation Notices for IBM Application Discovery for IBM Z

This edition applies to version 5.1.0 of IBM Application Discovery for IBM Z with the corresponding fix packs.

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