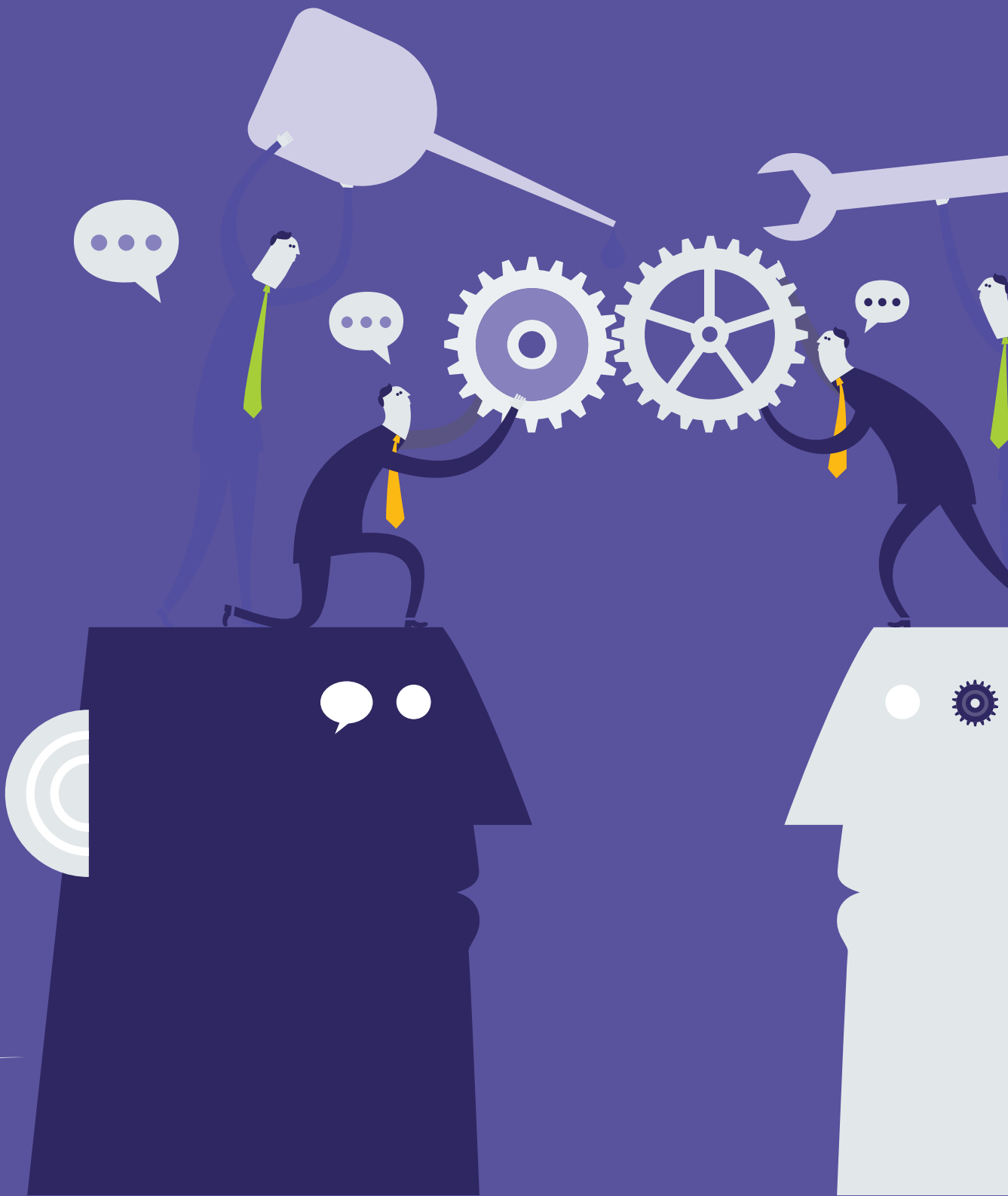
ACL Services Ltd.

ACL Analytics Exchange Technical Brief

AX Version 5.x



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Overview

ACL™ Analytics Exchange (AX) is a robust Java-based platform designed to support a full range of processes from data analysis to enterprise continuous monitoring.

Key features include:

- Schedule, automate, and access data from multiple sources – AX enables users to schedule and automate data extraction at off-peak hours and by-pass the need to request data from the IT department.
- Administer roles and access permissions – Manage which users have access to certain repositories and who can schedule data extraction.
- Use a centralized repository in a team environment – The server provides a centralized repository for all analytic tests and collections, which is shared among team members. This will help ensure standardization and repeatability of analytics.
- Boost security – All sensitive data is housed on the server, eliminating the risk of data being stolen or lost.
- Conduct deeper ad-hoc investigation on analytic results – After identifying exceptions using analytic tests, users may perform further analysis on data results. Users may leverage the web client or Add-ins for Microsoft Office® Excel to investigate the results. Also, ACL Analytics can be used to conduct ad-hoc investigations previously unidentified transactional anomalies, errors and discrepancies.

AX is built using the best of open source technologies adhering to industry standards. This document is intended to provide technical details of the AX platform, including its components and underlying technical processes, for IT departments to assess their implementation, upgrade, and maintenance requirements.

Release Notes

Data visualizations and interpretations

The completely redesigned AX Web Client allows you to create and share beautiful visualizations of your data to powerfully illustrate the value of your analysis. Interactive filters and drill-down capabilities empower visual exploration.

Updated terminology

To improve consistency and usability throughout the ACL product suite, Analytics Exchange 5 includes updated terminology. These new terms better represent how analytics and tests are organized.

ACL Analytics Exchange 5.0	Earlier versions of ACL Analytics Exchange
Collection	Engagement
Folder	Activity
Analysis App	Analytic project
Analytic	Analytic script

Maintenance mode

Administrators can enable maintenance mode in AX Server, temporarily suspending all scheduled analytics. Analytics will run at their next scheduled time after maintenance mode is disabled.

Enhanced access logging

To better support HIPAA compliant organizations, a new access log that records all instances of users viewing data in any table, or downloading any file, using AX Client, AX Web Client, or the ACL Add-in, has been created in this release.

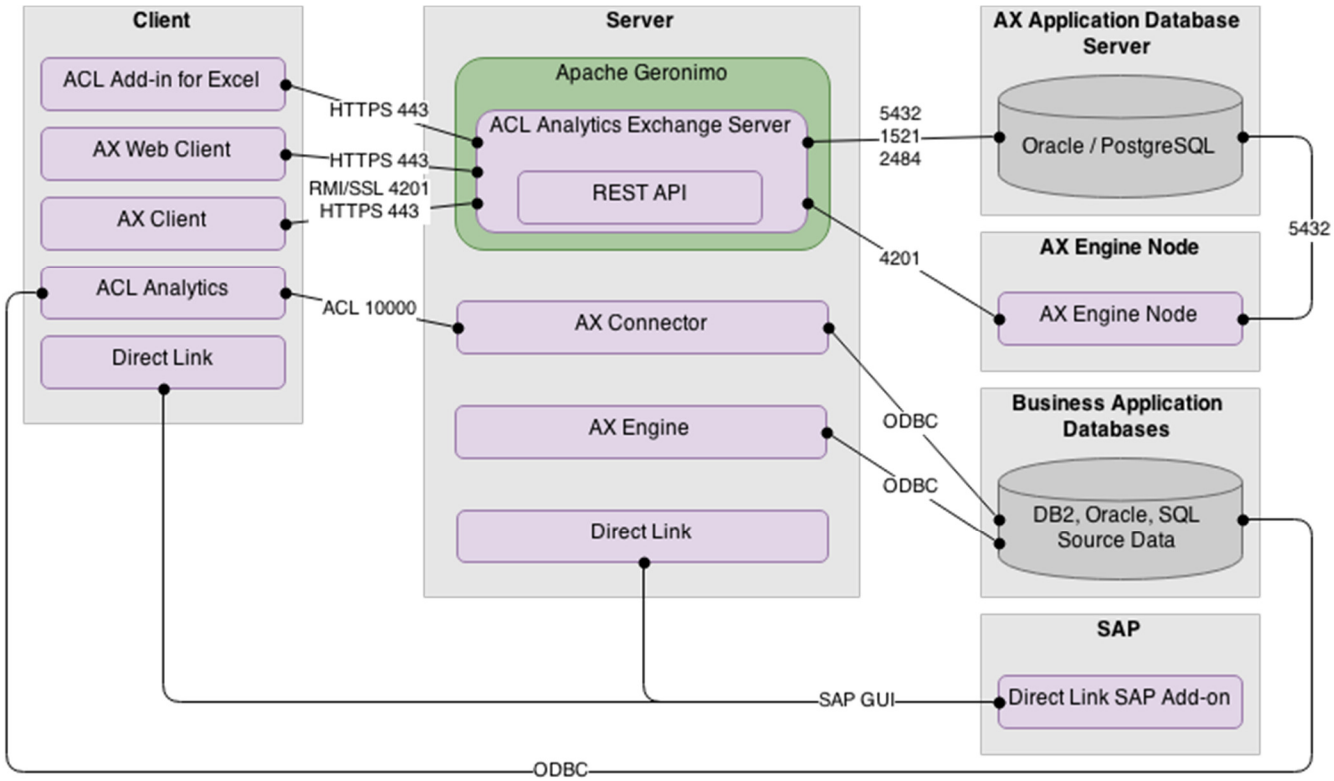
New architectural features for IT to consider

The following architectural updates have been made in Analytics Exchange 5:

- AX Server now uses standard HTTP (80) and HTTPS (443) ports by default. Analytics Exchange systems upgraded from earlier versions continue to use previously configured ports.
- The ACL Add-in is available

Component Overview

Diagram



Server Components

AX Server is the hub of the ACL server-based data analytics platform. AX Server has two main components – a database and an application server – and several additional components, depending on your organization's needs. The database can be hosted on either a PostgreSQL database server or an Oracle database server. The Geronimo application server includes a web server, security management functionality, and internal communications capabilities. AX Server stores and manages all audit content, regardless of file type, including associated audit documents. Leveraging server security and speed, AX Server provides powerful analytic processing capabilities and the ability to schedule and automate analysis in a secure environment.

AX Server (application server)

AX Server is central to the AX platform, providing the following services:

- AX repository – The repository provides storage and retrieval of analytics, tables, ACL projects, data files, and any associated audit documents, such as Microsoft Word (.doc, .docx), Excel (.xls, .xlsx), .pdf, or other media files.
- AX user management – User management includes account creation and managing permissions on repository content
- Scheduler – The Quartz scheduler is used by AX Server to schedule and run AX analytics for automation and continuous audit and monitoring.

- Central Authentication Service (CAS) – CAS is used by AX Server to provide your choice of form-based or integrated Windows® user authentication.

AX Server database

The AX Server database contains the AX Server repository content and metadata. ACL data files (.fil files) are stored outside the database due to their potential size and to allow AX Connector and the AX Engine direct access. AX supports either PostgreSQL or Oracle as the AX Server database. For PostgreSQL, the PostgreSQL server and the AX Server database can be installed and configured by the AX Server installer. For organizations that require Oracle, an Oracle DBA must first create a schema for AX to use. The DBA will provide database connection information that the AX Server installer can use to create AX Server database tables, stored procedures, etc.

Note: Oracle Instant Client (OIC) is required on the server if Oracle is used as the AX Database. OIC is installed with AX.

The repository items and metadata stored in the AX database include, but are not limited to:

- AX repository structure including the names, IDs, and hierarchy of audit items such as collections and folders
- The access rights to assigned to each collection and folder
- Analytics, related files, table layouts, result sets, and log files
- Analytic parameter sets and values
- User security identifiers (SID)
- Scheduling information such as schedules, history, and schedule status, etc.

AX Engine

AX Engine is based on the same source code as ACL Analytics but with no user interface allowing analytics to run without requiring user intervention. The AX Engine executes commands, functions, and scripts which can be scheduled using AX Client while the source data remains secure on the server.

AX Connector

The AX Connector enables communication between AX Server and the ACL Analytics client interfaces, using the aclse.exe executable.

When AX data tables, ACL projects, or AX analytics are exported from AX Server, the default behavior is for data files (.fil files) to remain on the server, although exporting data files for offline work is supported. Using the ability of ACL Analytics to connect to AX Connector, AX Server allows remote access to data files residing in the repository. Sensitive data files remain on the server. This scenario might be preferred by your audit or IT department to meet your organizational or regulatory security policy.

The AX Connector supports direct access to Oracle, DB2® and SQL Server™ databases using native, RDBMS vendor-provided drivers.

Geronimo application server

Apache Geronimo is an enterprise Java application server that provides database connection pooling, transaction support, logging, application management, and application/interface authorization. AX Server, AX Web Client, AX Client, and AX Server Configuration all run within the Geronimo application server.

AX Server Configuration

AX Server Configuration provides remote access to configuration settings, including Active Directory details, email notification details, and AX Engine Node settings. This console is accessed using a web browser.

AX Server communication ports

AX Server uses the following default ports for connections between modules and clients.

Default Port	Component - Protocol	Encryption	Remote Connectivity Required?
4201	Geronimo EJB - Remote Method Invocation (RMI)	SSL	Yes - AX Client
5432	PostgreSQL Database – custom	Supported	No
1521	Oracle Database	Non-SSL	Yes
2484	Oracle Database	SSL	Yes
443	Geronimo Web Server – https	SSL	Yes - AX Web Client, AX Client
10000	ACL server – custom	TwoFish 128bit	Yes – ACL Analytics
1527	Geronimo System Database - custom	None	No
8009	Geronimo Web Server – AJP	None	No
80	Geronimo Web Server – http	None	No
9999	Geronimo Management – JMXMP	None	No
61613	Geronimo Messaging – Stomp	None	No
61616	Geronimo Messaging - Open Wire	None	No

Note: Your IT team will stipulate which port is required when Oracle is used as the AX Server database server. The port can be changed after the installation is completed, if necessary.

AX Engine Node

AX Engine Node is an optional add-on component that can be installed on one or more servers dedicated to processing analytics. AX Engine Nodes allow you to move analytic processing off of the AX Server, and all but the smallest of audit departments with light audit usage should consider deploying this distributed server in their hardware architectural configuration. By configuring one or more AX Engine Nodes, you can schedule multiple long running, data intensive analytics, or even run analytics during working hours, without negatively affecting the AX Server. By moving analytic processing to AX Engine Nodes, AX Server can dedicate its resources to handing end user requests from AX Web Client and AX Client, providing increased productivity and a better user experience.

AX Engine Nodes are easily installed and configured. No separate license is required, allowing users to install and configure any number of AX Engine Nodes. The AX Server administration console provides the ability to add, remove, and configure each node. Each node can be configured with a maximum number of concurrent analytics, allowing each node to be configured based on capability and performance. If the analytic nodes are processing their maximum number of concurrent analytics, any further analytics are automatically queued by AX Server until an available AX Engine Node becomes available.

Analytics Exchange REST API

The Analytics Exchange REST API is an optional add-on that can be used to administer users, collections, folders, analytics, and archive and restore tasks independent of AX Client. The REST API is useful for developers and administrators who need to integrate AX functionality with custom scripts or external applications that can access the API using the HTTPS protocol. Any programming language, framework, or system that supports the HTTPS protocol can use the API.

For more information about the AX API, see the *ACL Analytics Exchange REST API Guide*.

Client Components

Client components are used by your data analyst team to allow them to effectively interact with AX Server components.

AX Client

AX Client is a thin client Java application that provides the user interface for managing the content, security, and users of AX Server. It comes with its own Java Runtime Environment (JRE), so a separate JRE need not be installed on each user's workstation.

ACL Analytics

ACL Analytics runs on a user's workstation, where it provides a user interface and analytic engine for ad hoc or remote data analysis. ACL Analytics is also the environment for developing analytics that can be packaged and distributed as analysis apps, or scheduled and run in AX Server.

When accessing server-side data and performing ad hoc desktop analysis or running scripts locally, ACL Analytics accesses server resources using AX Connector over TCP/IP, using default port 10000. The data remains on AX Server, providing optimal security, and ACL Analytic commands are processed server-side, using server resources. This is also the recommended method of using existing ACL Analytic scripts without the necessary conversion or migration to AX analytics if not required for distribution to other users or for automation.

AX Web Client

AX Web Client is a web-based application installed on the AX Server where your organization's audit content is centrally and securely managed and stored. AX Web Client is designed for non-technical specialists such as staff auditors and audit executives who need to view and interact with audit content in AX Server, but who do not require the administrative functionality available in AX Client. AX Web Client supports Chrome, Firefox, Safari, and Internet Explorer 9+, to run analytics and analysis apps on the AX Server, and to create and save data visualizations and interpretations. The web browser connects to AX Server using https (http over SSL). The web server is embedded and installed in AX Server.

ACL Add-in for Excel

The ACL Add-in can be used with either Microsoft Office Excel 2013 or Microsoft Office Excel 2010. The Add-in provides secure access to audit items stored in the Working directory of AX Server directly from within Microsoft Excel. Using the Add-in, you can open and edit existing files, save new files, insert links to AX Server items, run analytics, and view analytic status. You can use the Add-in functionality in Microsoft Excel on its own, or in conjunction with AX Client.

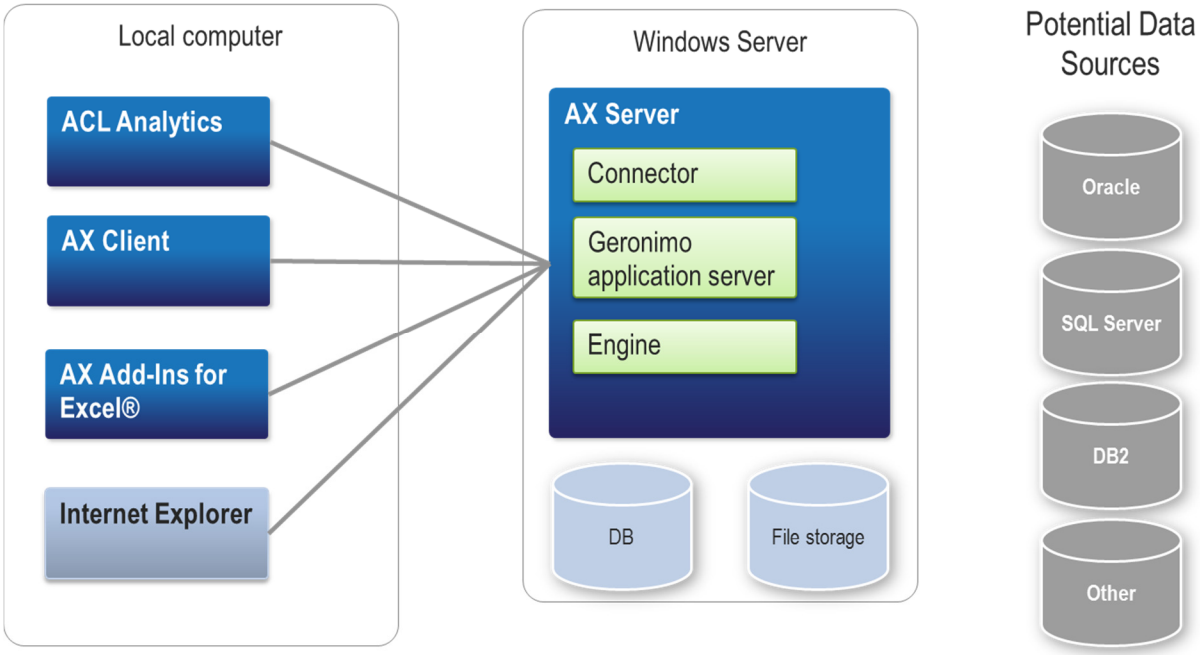
Server Configuration Architecture

System performance is impacted by the size and volume of data to be analyzed, frequency and complexity of analysis, concurrency usage of system clients and, finally, hardware configuration. Since each of these factors can greatly vary by customer, the following configurations are meant as a guide only and may need to be adjusted according to each organization's detailed usage scenarios. Without knowing these specifics, it is difficult for ACL to recommend a specific configuration. This document provides a starting point for planning, and further consultation with your ACL representative is recommended before committing to a configuration.

AX allows different configuration options depending on your requirements. While it is possible to install all recommended ACL components on a single physical server, you may want to consider using several servers for larger deployments.

Single server configuration

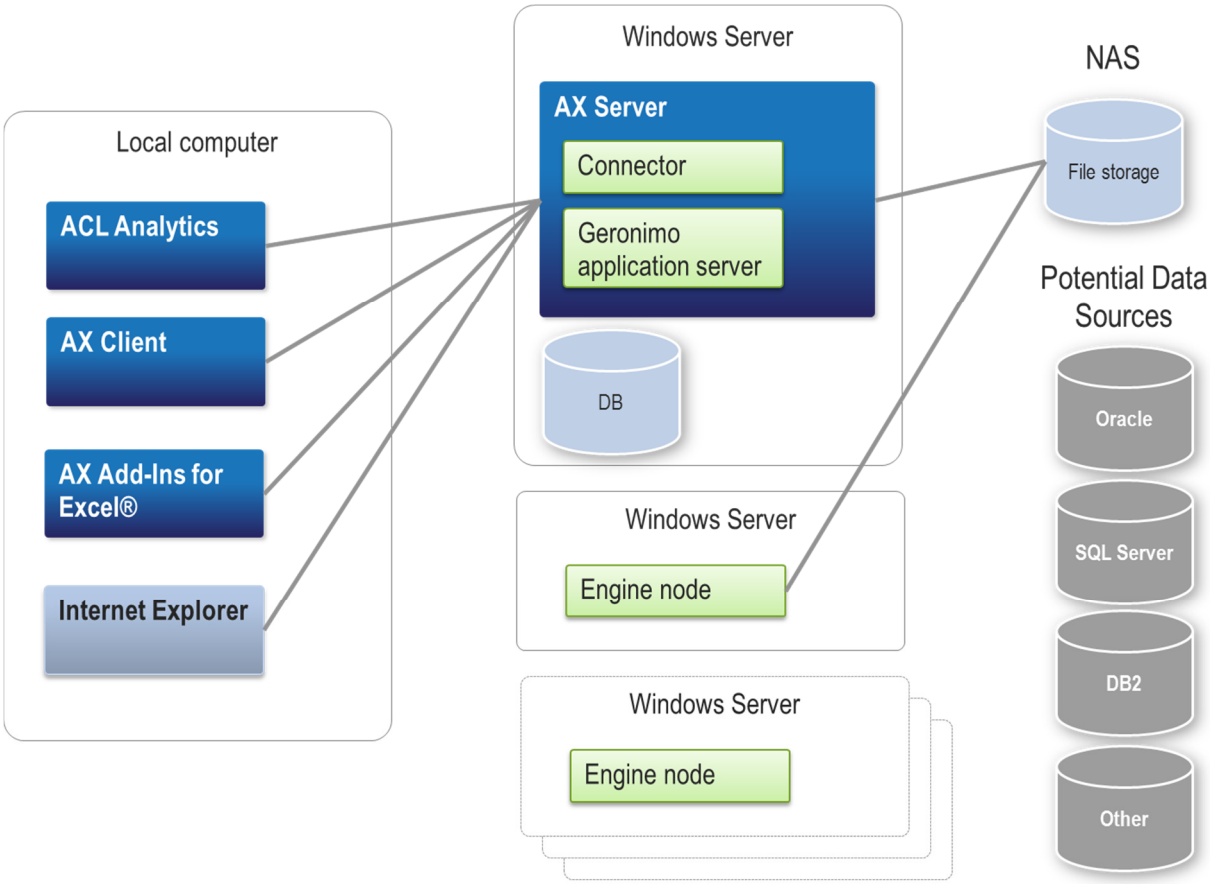
For smaller implementations, AX can be configured with all required components installed on a single server. This is recommended for environments with a low number of concurrent users and few scheduled analytics.



Multi-tier server configuration

Load balancing for analytics is handled by AX Server randomly allocating jobs to one of the available analytic engine nodes until the maximum available concurrent analytics have been reached. When this happens, AX Server will queue the analytics until an engine node is ready. The number of AX Engine Nodes required depends on the number of concurrent analytics expected to run. A minimum of one AX Engine Node is required for this configuration. Additional AX Engine Nodes can be added at any time.

Note: In this configuration the AX file storage is moved off the primary server to a shared location. However, this file storage can remain on the primary server provided that the Engine nodes can access this file storage through a UNC path.



Sizing and Performance Considerations

Solid state drive (SSD) versus hard disk drive (HDD)

AX Engine performance testing shows that solid state drives provide significant performance improvements over hard disk drives. Tests show that sorting the same 1 GB data file is 90% faster on SSD versus HDD.

Performance tests were conducted on systems with the following specifications:

Operating system	Windows 7, 32-bit
CPU	Intel Core 2 Quad processor
Drives	Samsung 830 Series SSD
	Western Digital 160 GB HDD

SSD specifications differ by manufacturer and are improving for every new model. Disk intensive Analytic Engine operations, such as sort, will benefit more from SSD than other operations, but SSD typically improves overall performance.

Memory and CPU cores

Because AX Engine is single-threaded 32-bit application, increasing memory or number of CPU cores in the OS does not improve the performance of AX Engine. However it may improve the stability of the OS, especially when running many concurrent jobs.

32-bit versus 64-bit

Although it is a 32-bit application, running AX Engine on a 64-bit OS does provide a performance advantage over running on a 32-bit OS when running scripts against large data files. For example, there is a 50% increase in performance when running the Count command on 30GB (35 million records) data file on a 64-bit OS versus a 32-bit OS.

Sizing considerations

Performance of the AX platform is affected by the following conditions:

Location of AX Engine, repository, and job folders

AX stores data files in a flat file format in a Windows directory that is accessible by the AX Server. The location of this directory can be configured and supports local folders and shared folders. As users are analyzing the data interactively or through an analytic the speed in which the analytic engine can access this data can become the largest bottleneck in server performance. Therefore, the data throughput and disk I/O become the most significant system hardware constraint. For efficiency and reliability when accessing data files on a single AX Server configuration ACL recommends storing data files locally on the AX Server. In a multi-tier configuration environment, storing data files in NAS, SAN, or local drives will be equally valuable for AX Server performance. Your organization's network administrator will decide which is the most reliable and efficient storage location based on your specific network environment.

The following table summarizes data throughput performance options:

Configuration	**Performance**
ACL data files stored in a remote folder with poor bandwidth.	Poor
ACL data files stored in a local folder on the same disk drive.	Good
ACL data files stored in a remote folder in a high performance NAS with good bandwidth.	Better
ACL data files stored in a local high performance solid state drive.	Best

Number and size of related files stored in repository

Non-ACL data files, for example Excel files, PDFs, and Word documents, are stored in the AX database. Files that are generated by analytics, such as result files, are also stored in the database. The number and size of these files are an important factor in sizing your AX database. Related files and non-ACL result files cannot exceed 2 GB per file.

Latency of connections between servers

There are a number of important connections between systems that can suffer from high latency. The most important connection is the connection between the AX Server and the database. Because the AX Server makes numerous calls to the database while users are browsing the repository, a latency of even 50ms can cause significant delays in the interface.

Network bandwidth between systems

As with latency the network bandwidth between systems can also cause performance issues. Since ACL allows access to virtually any size data file it can be common for large data transfers of 5GB – 500GB to occur between source systems and the AX Server. The size of these files varies significantly between organizations and should be investigated to determine the requirements for your environment.

Complexity and impact of scheduled analytics

AX Server has the capability to run scheduled analytics on a continual basis. The number and complexity of these analytics varies greatly between customers and can range from a few analytics running every couple of weeks to hundreds of analytics running daily. Analytics consume resources on the server and can slow down other processes. Two recommended methods for avoiding slow performance on an AX Server are:

1. Schedule analytics to run during off peak hours
2. Configure a separate server as an AX Engine Node to process analytics

Impact of concurrent users

AX performance is affected by the number of concurrent users connected to the system and the processing required by their activities. Performance is also impacted by system configuration choices, for example if the AX Database is running on a separate server, impact of other applications running on the AX server and the hardware specifications of the server. ACL has tested up to 30 concurrent users.

The following table illustrates how AX infrastructure can be impacted by the various user activities available within the AX application.

User action	**CPU**	**Memory**	**Disk space**	**Data throughput**	**Network latency**	**Database size**
Running an analytic	High	Medium	Variable*	High	Medium	Variable
Downloading an ACL table	Med	Low	Low	High	Med	Low
Working with a server table	High	Medium	Variable	Low	High	Low
Working with a database table	High	Medium	Low	Medium	Medium	Low
Archiving or restoring	High	Medium	Variable	High	Medium	Variable
Browsing AX repository	Low	Low	Low	Medium	High	Low
Uploading ACL tables	Medium	Medium	Variable	High	High	Low
Uploading related files	Medium	Medium	Medium	Medium	High	Variable

* Variability depends on the size of the relevant files or database tables.

Example Server Configurations

Below are three usage scenarios and recommended initial configurations for each scenario. Because each customer's IT environment and usage patterns is unique, users can access and place loads on the system in many different ways. Server sizing should be re-evaluated against current and future needs once AX is in production in your environment.

Temporary Storage: When running analytics, AX creates a temporary data file to execute commands against. If processing a 1GB data file, 2GB of storage is used during execution. For example, if you are running 10 concurrent analytics against 1GB data files, you will require 20GB of free space to execute the analytics. The temporary file is deleted upon completion.

Configuration I: Small team with light analytics usage

This configuration is recommended for small audit teams:

- 20+ audits per year
- 20 person team with concurrency limited to a maximum 10 users or analytics
- Small data size of less than 1GB (10MB – 100MB typically)
- Infrequent analytics with no more than 1 - 2 running concurrently, but could be up to 24 total
- Server hardware – Recommended server from AX System Requirements or equivalent VMWare® server
- Server configuration – All components may reside on one single physical box, including:
- Mandatory components: AX Server; AX Database
- Optional components: Direct Link™
- Processors: 4 cores
- RAM: 8GB RAM
- Storage: 100–250 GB

Configuration II: Medium team with medium analytics usage

This configuration is only recommended for medium-sized audit teams:

- 30+ audits per year
- 50+ person team with concurrency limited to max 20-30 users or analytics
- Medium data size of less than 2GB (100MB typically)
- Infrequent analytics with no more than 2 – 5 running concurrently, but could be up to 36 total
- Server hardware – Recommended server from AX System Requirements or VM server
- Server configuration – Recommend multi-tier server configuration:
- Processors: 4 cores
- RAM: 8GB RAM
- Storage: 200–500 GB

Configuration III – Large team with heavy analytics usage

This configuration is recommended for large audit teams

- 50+ audits per year
- 100+ person team with concurrency limited to 50 users and more than 50 analytics
- Medium data size of less than 2GB
- Frequent analytics
- Server configuration – Recommended to multi-tier server configuration:
    - AX Server:
        - Server: high performance with scalable processor
        - Processors: 8 Cores
        - RAM: 8GB
        - Storage: 250GB
    - AX Server database
        - Use a Tier 1 SAN with Fibre Channel if available. If you do not have a SAN, alternative solutions exist where IT can maximize throughput with multiple Gigabit Ethernet connections.
        - Storage: 50GB
        - Oracle 10g/11g or PostgreSQL
    - AX Server Data files
        - Use a Tier 1 NAS device with Fibre Channel if available. If you do not have a NAS, alternative solutions exist where IT can maximize throughput with multiple Gigabit Ethernet connections.
        - Storage: 250GB
        - Needs to be accessible for AX Server, ACL Analytics, and AX Datasource
    - AX Server Engine Node
        - Class of Server: high performance with scalable processor
        - Processors: 8 Cores
        - RAM: 8GB
        - Storage: 250GB

Other Configuration Considerations

Remote Desktop access to server

While all required functionality for AX Server can be accessed through the various clients described above, in some instances you may want to consider providing remote desktop access to the server for a few select individuals responsible for the management of the AX Server. This optional access can be useful in troubleshooting server issues with the assistance of our ACL Support Services team.

Shared folders

In some cases, providing users with access to the AX file storage location may assist in some scenarios where large data files need to be manually transferred and managed on the server.

Direct Link

The optional Direct Link solution provides AX and ACL Analytics users direct and secure access to SAP® ERP data when it's needed without having to rely on busy IT resources. Direct Link has achieved SAP interface certification designation for all SAP ERP releases. Direct Link requires the installation of a Direct Link SAP Add-on component on the SAP system(s), and a Direct Link client on the AX Server and on the client workstation.

AX Security

User accounts

AX Server user authentication is supported via Microsoft Active Directory. A user must be a valid Windows domain user. AX Server supports forests of trusted Active Directory domains. Users can then be added to the AX Server user list. AX Server does not store any user passwords in the database and authentication is confirmed via the Windows API each time a user attempts to login to the system.

If your organization does not employ Active Directory as your network authentication system, AX Server supports using local user accounts.

User authentication

AX Server integrates with the Central Authentication Service (CAS), which is installed with AX Server, and can be configured for either form-based or integrated Windows authentication.

Form-based authentication is a basic type of authentication where users are presented with a login page when authentication is required. The same login page is presented whether they are logging in to AX Client, or AX Web Client. The user is required to authenticate their account information by entering their username and password each time a new session starts. A new session is created each time the AX Client is started, or when an AX web application is accessed in a new browser window.

Silent authentication does not require the user to enter a username or password. It uses integrated Windows Authentication and Kerberos to validate the user who is accessing an AX application. The same user account that is logged into the PC is also the user account which is silently authenticated to access AX. Only Active Directory users are able to use silent authentication, and CAS must be registered on the Active Directory domain controller as a Service Principal Name (SPN). If silent authentication is configured, local user accounts can still be used, but they will require username and password entry.

You are required to choose the type of authentication you are going to use when you set up AX Server, but you can switch between the two authentication options at any time. For more information, see the *ACL Analytics Exchange Server Administrator Guide*.

Encryption

AX Server uses encryption in multiple areas, both storing the information and during communications.

Application	**Encryption**
ACL Analytics – AX Server	Twofish 128-bit
AX Server – AX Client/AX Web Client	SSL. SHA1 with RSA Public Key encryption
Database passwords	RSA with 1024-bit key length. The AX Server database password is stored encrypted in aclDatabase.xml. Analytics passwords are stored encrypted in a table in the AX database.

Application security

Security is maintained centrally in the AX Server for the entire AX platform. Application security has two components:

Role-based security – There are two primary roles for AX Client users and one role for AX Web Client users. Users can either be an Administrator or a User of the AX system. Administrators are able to see and manage all collections and their contents within the AX Server repository. Users are only able to access collections or associated folders for which they have been granted permissions. Users can also create their own collections and folders in the Working area and grant permissions to others.
Collection and folder security – AX Server provides permissions for collections and folders (application permissions), which control what audit content logged-in users can access.

Full: Includes permission to create, modify and delete content or structure within a particular collection or folder. This includes the ability to run and schedule any Analytics within the folder. Users with full permission to the collection can grant additional users permission to that collection.

Read Only: Includes permission to view all content within the collection or folder. Read only permission does not include the ability to run Analytics.

When a collection is created, the creator has Full permissions by default. The creator must add any additional users to the collection to share it with other users. Users that are added at the collection level will automatically inherit the same permissions for all folders within the collection. These permissions can be modified at the folder level.

Only Administrators are able to create new collections within the Library. They may subsequently grant additional users (non-Administrators) either Full or Read Only permission to the collections within the Library. For more information, see the *ACL Analytics Exchange Client User Guide*.

Password security

For login and authentication, AX relies on the Windows operating system to validate user credentials. AX uses the LogonUser() Windows API for form-based authentication and Kerberos for silent authentication. AX does not store usernames and passwords in the database for the purpose of authentication and user names are recorded in the change log as actions within the application. Session tokens are never written to disk. In the browser, session tokens are stored in an in-memory cookie and the server only keeps them in-memory.

AX system accounts

The following system accounts are required by AX Server. If they do not already exist, they can be during the AX Server installation:

- An AX database service account for PostgreSQL
- A PostgreSQL user account, if PostgreSQL is used as the AX database

The table below notes which AX Server system performs specific background actions:

Action	**Performed by**
Schedule AX Analytic	Geronimo service account
"Run Now" AX Analytic	Geronimo service account
AX Connector session (initiated by ACL Analytics)	Logged-in user

AX Frequently Asked Questions

Q: Is error handling performed within the application, database, or both?
A: Both application and database.

Q: Our company has a product that secures our Intranet, will AX work with this environment?
A: Products like Evidian SSO Watch, Siteminder and IBM Webseal control access to resources within the corporate network. While we have had customers successfully use AX within these environments we do not perform any testing nor do we investigate all of the different ways these environments can be configured and therefore cannot guarantee AX will work properly.

Q: What versions of Oracle, DB2 and SQL Server do you support for Direct Database connections?
A: Oracle 11g, SQL Server 2008 and 2012, DB2 V9.7

Q: Do you support Oracle Real Application Clusters (RAC) as a backend database for AX?
A: No, AX does not support Oracle RAC at this time.

Q: Can I use the same Oracle server instance and user for AX Server?
A: You can use the same Oracle server instance but you must use separate Oracle users.

Q: Which AX components are supported in localized environments?
A: English versions of AX Client and the ACL Add-in can be installed and are supported in localized environments.

Q: Can I use a NAS disk to store the AX repository?
A: Yes, we are aware of customers who are using NAS disks with AX.

Q: Can I use SAN storage with AX?
A: Yes, we are aware of customers who are using SAN storage with AX.

Q: Can I run AX on a virtual machine?
A: Yes, recommended server from AX System Requirements or equivalent VMWare® server

Q: Is ACL ISO 9000/9001 Certified?
A: ACL is not ISO 9000/9001 certified and has no current plans to become so.

Q: How much compression can I expect from the Archive feature?
A: Results can vary but 80-90%, that is, compression of 100MB down to 10MB is common.

Q: Can I use an external scheduling application to run analytics on the AX Server?
A: Yes. AX 5 includes an API that allows an external scheduler to initiate analytics on the AX Server.

Q: What are the file size limitations?
A: All data is processed by the AX Engine using ACLScript and is subject to certain limits:

- Index files can be up to 2GB in size - the Unicode edition of ACL Analytics supports far fewer indexed records than non-Unicode, due to the greater space required by Unicode data to encode each character.
- Each log file produced by the AX Engine has 2GB limit.
- Each AX project file has a 2GB limit.
- The AX Engine can process a maximum of 2 billion records as a single file.
- AX related files and non-ACL result files have a 2GB limit.

Q. What logging/auditing capabilities are available in AX Server?
A. AX Server records all collection, folder, and permissions events in the database.

Q: Can your solution consume web services provided by other applications?
A: Not directly. Extracts from a web service can be imported into our solution.

Q: Can I upgrade PostgreSQL that shipped with AX?
A: No.

Q: Can I upgrade Geronimo that shipped with AX?
A: No.

Q: Can I upgrade the Java Runtime Environment that AX uses?
A: No.

Q: Where are data files stored in the AX repository?
A: Data files used by the AX Engine are stored in the following locations in the repository:

1. The default location for AX tables is the Data\repository\datafiles folder on the server where AX Server is installed.
2. The default location for AX Connector files the Data\aclse folder where AX Server is installed.

Q: Can AX encrypt data tables stored in the repository?
A: No. AX does not encrypt data natively. There are a number of other solutions available for data encryption:

- Microsoft EFS
- Microsoft Bitlocker
- Truecrypt
- Protegrity

Q. What is the recommended size for the AX database?
A. The storage requirements of the AX repository database depend on usage. More specifically, it depends on the total size of the files saved in the repository, such as ACL Project files, related files, and result files. The rest of the repository is metadata with small storage needs. Note that ACL table data files (.FIL files) are not stored in the database, so they do not count toward database storage needs.

10GB is a low starting point, but to leave room for future growth, 50-100GB is better, but the number can be any appropriate value based on usage expectations.

Q: Can you use a certificate with SHA256 encryption in AX Server?
A: Yes, SHA256 encryption can be used for an AX Server certificate.

Additional Resources and References

Administrator, user, and installation guides are available at docs.acl.com

About ACL

ACL delivers technology solutions that are transforming audit and risk management. Through a combination of software and expert content, ACL enables powerful internal controls that identify and mitigate risk, protect profits, and accelerate performance.

Driven by a desire to expand the horizons of audit and risk management so they can deliver greater strategic business value, we develop and advocate technology that strengthens results, simplifies adoption, and improves usability. ACL's integrated family of products—including our cloud-based audit and compliance management solution and flagship data analytics products—combine all vital components of audit and risk, and are used seamlessly at all levels of the organization, from the C-suite to front line audit and risk professionals and the business managers they interface with. Enhanced reporting and dashboards provide transparency and business context that allows organizations to focus on what matters.

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