System Requirements and Architecture Guide

7.3.0 Release

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Introduction

The purpose of this document is to provide an overview of OneStream's architecture and system requirements while giving guidance in choosing the proper deployment environment for a given user base. The anticipated audience is both those in Finance and Information Technology who make decisions on financial application deployment, desired functionality, security and support.

> **NOTE:** While some concepts in this document apply to any OneStream deployment, this document focuses on customers who choose to implement OneStream **on premise**. For a list of the hardware and software components for each customer's OneStream Cloud Service on Microsoft Azure, see the *Cloud Architecture and Managed Services* document.

OneStream supports a Rich Internet Application (RIA) that utilizes a Service-Oriented Architecture. It is architected in such a way to be highly scalable to support thousands of users. Engineered from the ground up as a native 64-bit application, OneStream allows you to take advantage of true 64-bit technology, including performance benefits, broader scalability, and a lower cost of ownership. At the heart of OneStream is a powerful in-memory, 64-bit financial analytic engine with sophisticated algorithms and caching technology that reduces database traffic and provides for an extremely flexible multi-dimensional model with enhanced calculation capabilities.

The *Installation and Configuration Guide* and other documentation can be downloaded from MarketPlace.

Technology Summary

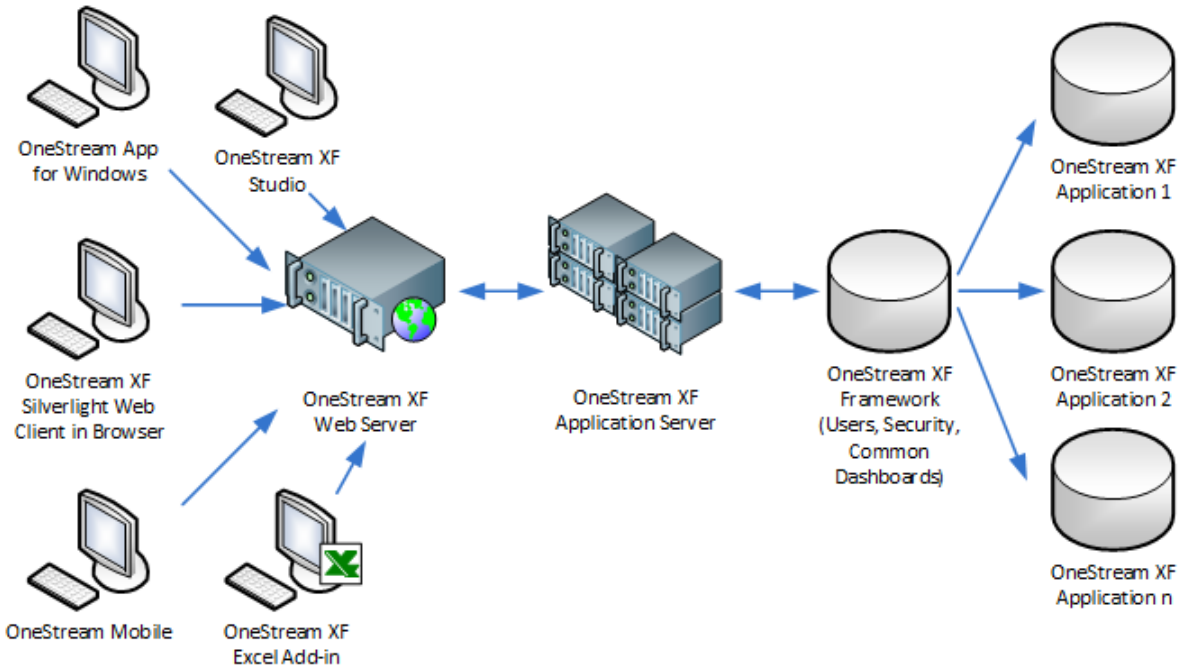
The following provides an overview of the major technology components involved in an on-premise OneStream deployment.

Technology Overview

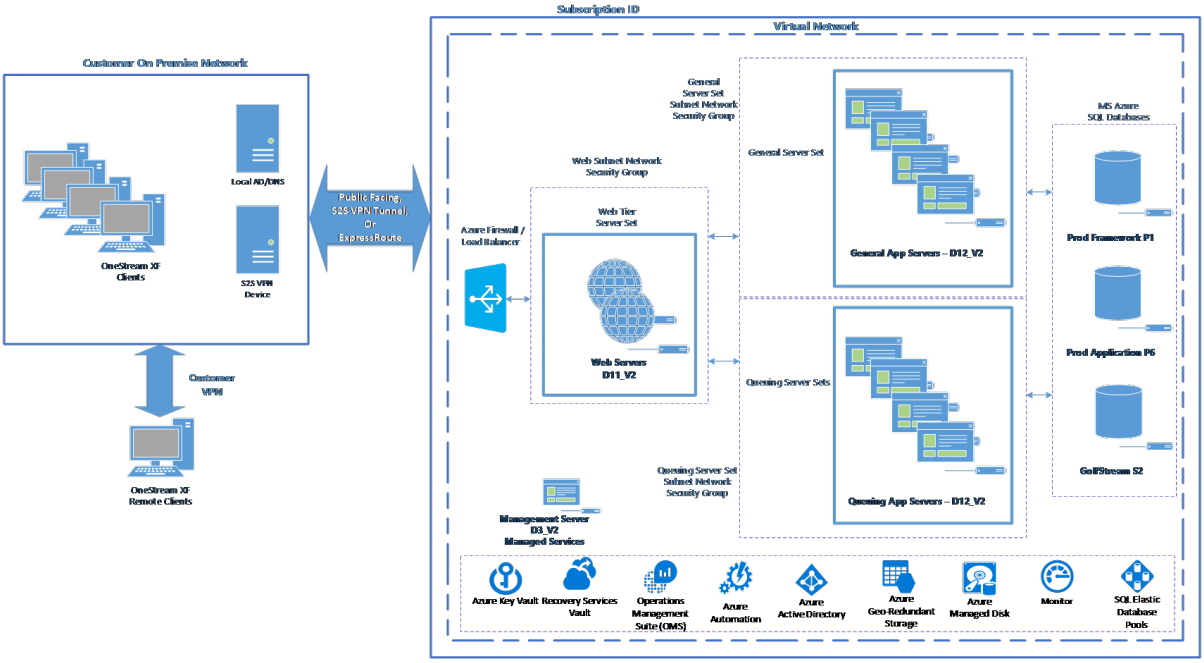
OneStream is a Microsoft .NET application that incorporates major components of a Corporate Performance Management (CPM) system including Data Quality, Financial Consolidation, Budgeting, Planning, Forecasting, Modeling, Reporting and Analysis. The user interface features RIA web-based technologies to provide a browser-based and finance-focused experience that does require custom deployment or manual installation by end users. OneStream also provides a sophisticated Microsoft Office add-in that integrates data and workflow activities in Excel for additional analysis.

Architecture

OneStream's architecture is built for the enterprise. It supports fault tolerance and unlimited scalability with its inherent ability to support multiple web servers and application servers using a stateless 64-bit architecture. This is an example of a standard customer deployment:



This is an example of a customer deployment on a private Azure subscription:



Web Client Overview

OneStream Windows App

OneStream Windows App is a browserless web application. OneStream Windows App provides a Spreadsheet feature with the potential to eliminate the need for an Excel Add-in which requires administrative rights to install on a user's desktop. It uses all firewall-friendly communications to OneStream web servers using Microsoft Windows Communication Foundation (WCF) technology. All client to server connectivity is based on SOAP and REST web services over HTTP/HTTPS. This is safely deployed with a signed SSL certificate. Microsoft ClickOnce technology is provided for true web-based deployment ease and is supported on all versions of Windows which are currently under mainstream support by Microsoft.

OneStream Mobile

OneStream offers a mobile user interface alternative (HTML5-based) via a separate URL accessible by most web browsers, including mobile browsers. Its main functions include data analysis consumption of rich reporting content and monitoring capabilities for administrators. Users simply go to a standard website deployed via OneStream on their desktop or mobile browser. Mobile users would either access a public facing OneStream mobile instance or employ a mobile-based VPN solution. No native mobile app is required.

OneStream Excel Add-in

The OneStream Excel Add-In client should be installed for any user that will need the ability to perform Excel-based analysis on OneStream financial model data. The OneStream Excel Add-In is an Excel COM add-in that securely connects to the OneStream servers through the OneStream web services.

OneStream

The OneStream client is recommended for users that need to create specialized report layouts. OneStream is a Windows client that securely connects to the OneStream servers through the OneStream web services.

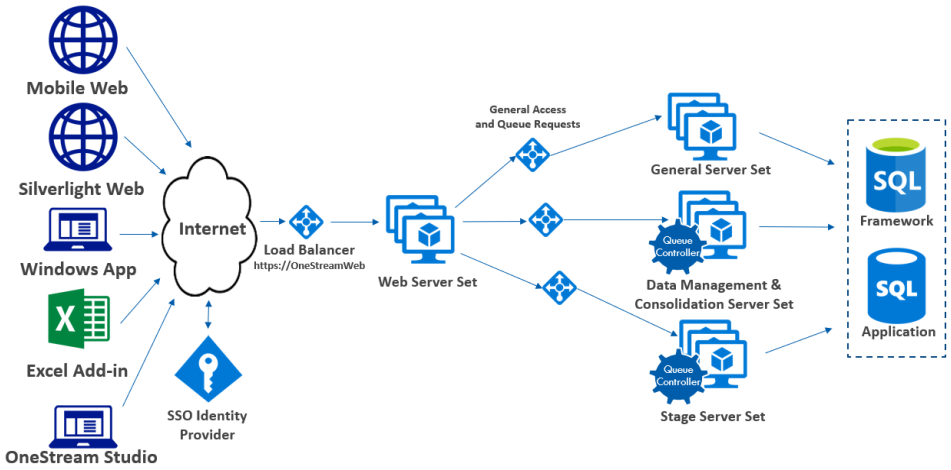
Web Server Overview

OneStream supports multiple web servers running in Microsoft Internet Information Services (IIS) to provide fault tolerance and scalability. The web server(s) are accessed by end users' Excel clients using Windows Communication Foundation (WCF) Web Services technologies. All WCF communications between the client and web servers utilize firewall friendly and secure HTTPS/SOAP protocols. After a request is received, the web servers forward the information to one or more application servers. Then they process the data for efficient transfer over the internet and return the resulting information to the client. The interaction between OneStream's clients and web servers is purposely designed to minimize internet traffic while providing a rich user experience. Since the software is built as a stateless architecture, access via the internet can be distributed to multiple web servers using a standard load balancing appliance (e.g., Cisco).

Application Server Overview

OneStream supports multiple application servers running in Microsoft IIS. The application servers represent the heart of the system and are designed for high scale processing and many concurrent requests. They are accessed via the web servers over a local area network (LAN) using WCF technology. The application servers can be configured for optimal communications performance using TCP/IP transport protocols or they can be configured for firewall friendly interaction with the web servers via a DMZ using HTTP(S) protocols. Since a broad range of capabilities is offered that require varying processing requirements, application servers can optionally be segregated according to the type of processing request. Specifically, each application server can be configured to support processor intensive consolidations, data intensive integration, and/or general transactions for end-user navigation.

The web servers utilize a proprietary load balancing algorithm to direct client requests to the appropriate application servers. For larger tasks such as data loads via OneStream's Stage, Consolidation and Data Management Sequences, the application servers utilize queuing and smart load balancing to run that task on the appropriate application server. For these types of server tasks, the request is written to a queue in the common Framework database. To prevent overloading certain application servers while others are idle, these types of servers regularly will check the queue as well as check the status of peer servers before accepting a task. The result is that the most capable server will pull this task from the queue to execute it. See *Data Management & Consolidation Server Set* and *Stage Server Set* in the diagram below. For assigning more general tasks to be executed, such as visualizing data via Cube Views, the web servers utilize a proprietary approach. See *General Server Set* in the diagram below.

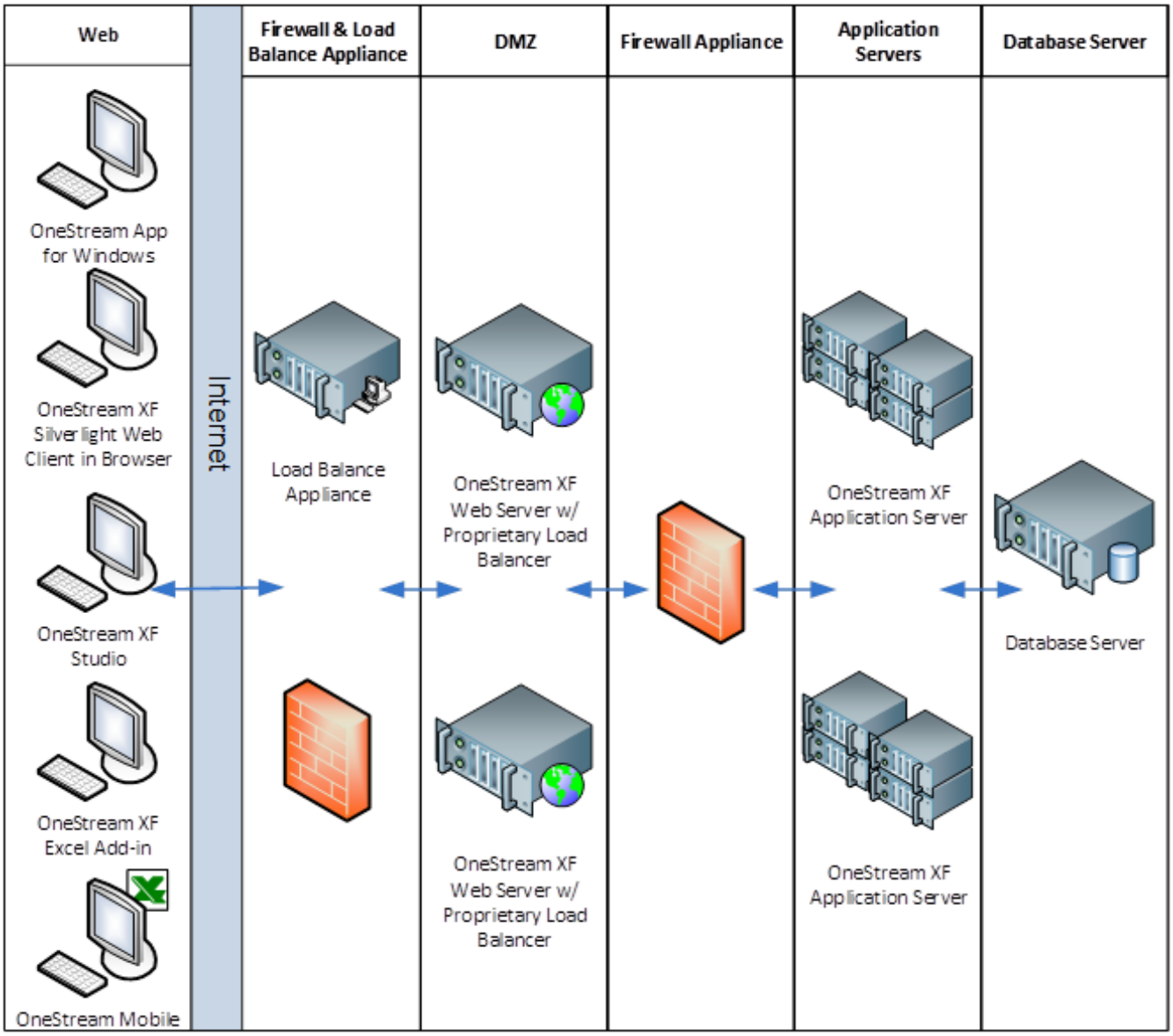


Database Server Overview

OneStream utilizes Microsoft SQL Server for all data storage. There are separate databases for each OneStream application and one Framework database containing shared metadata such as security, reports, logs, and other artifacts for use by all applications. OneStream supports SQL Server Standard Edition, however, to ensure expected performance, it is required for customers of any reasonable size to utilize a SQL Server version that supports Table Partitioning, such as Enterprise, Azure or SQL Server Standard version 2016 SP1 or higher. The “State” database is created automatically by the reporting engine. Since all application data and metadata are stored in a relational database, backup and recovery is accomplished using standard database administration functionality. The State database does not need to be backed up, as it will recreate itself if absent. All critical data required for financial and audit purposes are stored in the application databases.

Deployment Environment

OneStream's web based, N-tier architecture allows for unlimited users in a secure DMZ environment. A common configuration includes a load balancer appliance (e.g. F5 Load Balancer), one or more web servers, one or more applications servers and one database server. Specific CPU-intensive processes such as consolidation can be restricted to specific application servers to distribute or concentrate loads as desired. Accommodating additional users can be achieved by adding more web servers or application servers. Recommended server load is indicated in the Hardware and Software Requirements later in this document.



Application Folder Permissions

The OneStream application folder structure is used to store user logs and acts as the Application Server's workspace. The Application Server identity specified in the OneStream Configuration Tool requires full access to this folder structure, wherever it may reside.

Hardware and Software Requirements

The tables below identify the hardware and software required for each OneStream component. Suggested server load is also indicated.

Server configurations are intended to provide guidance only since actual production requirements may vary based on system use (number of dimensions, number of dimension members, number of concurrent users and so on. The versions listed below are recommended, given testing. Other versions may work but may not have been comprehensively tested.

Web Server Recommendations	
Supported Operating Systems	• Windows Server 2022 (Recommended) • Windows Server 2019 • Windows Server 2012 R2 • Windows Server 2016
Recommended Hardware	• 2 x64 Intel or AMD64 processors* • 8 GB RAM
Hard Disk Space	• 60 GB
Required Software	• Internet Information Server (IIS) 7.0 or higher • Windows Process Activation Service (WAS) • Microsoft .NET Framework 4.8
Recommended Network	• 10 Gbps between all OneStream Servers

Application Server Recommendations	
Supported Operating Systems	• Windows Server 2022 (Recommended)

Application Server Recommendations	
	• Windows Server 2019 • Windows Server 2012 R2 • Windows Server 2016
Recommended Hardware	• 8 or more x64 Intel or AMD64 processors* • 32 GB RAM or higher
Hard Disk Space	• 60 GB
Required Software	• Internet Information Server (IIS) 7.0 or higher • Windows Process Activation Service (WAS) • Microsoft .NET Framework 4.8
Recommended Network	• 10 Gbps between all OneStream Servers

Data Server Recommendations	
Supported Operating Systems	• Windows Server 2022 (Recommended) • Windows Server 2019 • Windows Server 2016 • Windows Server 2012 R2
Recommended Hardware	• 8 x64 Intel or AMD64 processors* • 128 GB RAM
Hard Disk Space	• 1 TB - Depends on size of OneStream application
Required Software	• SQL Server SQL Server 2014, 2016, 2017, or 2019 Enterprise Edition (Recommended) ◦ Required for larger, more complicated deployments (i.e. 50+ users, complex consolidation and calculations)

Data Server Recommendations	
	• SQL Server ,SQL Server 2014, 2016, 2017, or 2019 Standard Edition ◦ Acceptable for smaller, more simple deployments • SQL Server 2014 or Higher ◦ Required for BI Blend
Recommended Network	• 10 Gbps between all OneStream Servers
Client Workstation Recommendations	
Supported Operating Systems	• Windows 11 • Windows 10 • Windows 8
Recommended Hardware	• Exceed the minimum requirements for Operating System, and browser. • 64-bit Architecture • 8 GB RAM or higher
Required Software	• Microsoft Office 2013 64-bit • Microsoft .NET Framework 4.8 • Microsoft Edge WebView2 Runtime Control (for features that embed external web content inside the OneStream Desktop application)
Recommended Software	• 64-bit Windows OS • 64-bit Microsoft Office Excel version 2013 or higher (for optional Excel Add-in)

Note:

- OneStream and MarketPlace solutions often display multiple data elements. For optimal rendering, set screen resolution to a minimum of 1920 x 1080.
- Titanium processors are not supported for OneStream servers.

- OneStream may still work on Microsoft applications that have been ended, but our official support must follow Microsoft's mainstream support.

Minimum Environment Requirements

OneStream will provide guidelines and suggestions for your environment's minimum configuration, which is customized based on your anticipated use and complexity. The following requirements represent a minimum for most environments of an approximate size.

Minimum Development System Infrastructure Requirements

Virtual Machine - Guest Servers

This table identifies the requirements for 1 VM guest configured for Web and Application servers, to perform user web request, general, stage, and reporting consolidation.

Total Logical CPUs Processing	Total Logical CPUs	Memory	Total Memory	Storage	Total Storage
8	8	32 GB	32 GB	60 GB	60 GB

This table identifies the requirements for 1 VM guest hosting a database server:

Total Logical CPUs Processing	Total Logical CPUs	Memory	Total Memory	Storage	Total Storage
8	8	32 GB	32 GB	500 GB	500 GB

Application Server Hardware Sizing Recommendation

Basic configuration providing balanced performance for both user workloads and standard analytic processing is supported. However, OneStream Software may recommend changes based on customer application design and technical infrastructure.

We recommend using 2 general storage servers and 1 consolidation server for every 75 concurrent users. This is the basic configuration guideline providing balanced user workload and standard analytic processing. However, this recommendation may vary depending on the type of concurrent use. Consult the OneStream infrastructure group to evaluate your environment and usage pattern for optimal performance.

> **NOTE:** Many customers use their production or existing SQL Server instance to house development databases, instead of dedicating a separate SQL Server for OneStream development.

Small Environment Size Estimate (1 – 75 Concurrent Users)

Minimum Production System Infrastructure Requirements

For application server hardware sizing, we recommend 2 general storage servers and 1 consolidation server for every 1-75 concurrent users. This is the recommended basic configuration guideline providing balanced user workload and standard analytic processing. However, this recommendation may vary depending on the type of concurrent use. While we are confident in this recommendation, consult the OneStream Software infrastructure group to evaluate your environment and usage pattern for optimal performance.

Virtual Machine - Guest Servers

Web Server Processing User Web Requests

This table identifies the recommendations for 1 Virtual Machine (VM):

Total Logical CPUs	Total Logical	Memory	Total Memory	Storage	Total Storage

Processing	CPUs				
2	2	8 GB	8 GB	60 GB	60 GB

Application Server Performing General Processing

This table identifies the recommendations for 1 VM:

Total Logical CPUs Processing	Total Logical CPUs	Memory	Total Memory	Storage	Total Storage
8	8	32 GB	32 GB	60 GB	60 GB

Application Server Processing Stage/Reporting

This table identifies the recommendations for 1 VM:

Total Logical CPUs Processing	Total Logical CPUs	Memory	Total Memory	Storage	Total Storage
8	8	32 GB	32 GB	60 GB	60 GB

Application Server Processing Consolidations

This table identifies the recommendations for 1 VM:

Total Logical CPUs Processing	Total Logical CPUs	Memory	Total Memory	Storage	Total Storage
8	8	32 GB	32 GB	60 GB	60 GB

Database Server

This table identifies the recommendations for 1 VM handling SQL database server processing:

Total Logical CPUs Processing	Total Logical CPUs	Memory	Total Memory	Storage	Total Storage
8	8	128 GB	128 GB	1000 GB	1000 GB

Fileshare

For 1 machine configured to perform temporary workspace for application server processing, data extracts and batch file processing, ensure 10-20 GB of storage.

Medium Environment Size Estimate (75 - 150 Concurrent Users)

Minimum Production System Infrastructure Requirements

For application server hardware sizing, we recommend 2 general storage servers and 1 consolidation server for every 1-75 concurrent users. This is the recommended basic configuration guideline providing balanced user workload and standard analytic processing. However, this recommendation may vary depending on the type of concurrent use. While we are confident in this recommendation, consult the OneStream Software infrastructure group to evaluate your environment and usage pattern for optimal performance.

Virtual Machine - Guest Servers

Web Servers Processing User Web Requests

This table identifies the recommendations for 2 Virtual Machines (VMs):

Total Logical	Total	Memory	Total	Storage	Total

CPUs Processing	Logical CPUs		Memory		Storage
2	4	8 GB	16 GB	60 GB	120 GB

Application Servers Performing General Processing

This table identifies the recommendations for 2 VMs:

Total Logical CPUs Processing	Total Logical CPUs	Memory	Total Memory	Storage	Total Storage
8	16	32 GB	64 GB	60 GB	120 GB

Application Servers Processing Stage/Reporting

This table identifies the recommendations for 2 VMs:

Total Logical CPUs Processing	Total Logical CPUs	Memory	Total Memory	Storage	Total Storage
8	16	32 GB	64 GB	60 GB	120 GB

Application Servers Processing Consolidations

This table identifies the recommendations for 2 VMs:

Total Logical CPUs Processing	Total Logical CPUs	Memory	Total Memory	Storage	Total Storage
12	24	32 GB	64 GB	60 GB	120 GB

Database Server

This table identifies the recommendations for 1VM guest hosting an SQL database server:

Total Logical CPUs Processing	Total Logical CPUs	Memory	Total Memory	Storage	Total Storage
8	8	256 GB	256 GB	1000 GB	1000 GB

Fileshare

For 1 machine configured to perform temporary workspace for application server processing, data extracts and batch file processing, ensure 20-30 GB of storage.

Large Environment Size Estimate (150 - 225 Concurrent Users)

Minimum Production System Infrastructure Requirements

For application server hardware sizing, we recommend using 2 general storage servers and 1 consolidation server for every 1-75 concurrent users. This is the recommended configuration guideline providing balanced user workload and standard analytic processing. However, this recommendation may vary depending on the type of concurrent use. While we are confident in this recommendation, consult the OneStream Software infrastructure group to evaluate your environment and usage pattern to ensure optimal performance.

Virtual Machine - Guest Servers

Web Servers Processing User Web Requests

This table identifies the recommendations for 3 Virtual Machines (VMs):

Total Logical	Total	Memory	Total	Storage	Total

CPUs Processing	Logical CPUs		Memory		Storage
2	6	8 GB	24 GB	60 GB	180 GB

Application Servers Performing General Processing

This table identifies the recommendations for 3 VMs:

Total Logical CPUs Processing	Total Logical CPUs	Memory	Total Memory	Storage	Total Storage
8	24	32 GB	96 GB	60 GB	180 GB

Application Servers Processing Stage/Reporting

This table identifies the recommendations for 3 VMs:

Total Logical CPUs Processing	Total Logical CPUs	Memory	Total Memory	Storage	Total Storage
8	24	32 GB	96 GB	60 GB	180 GB

Application Servers Processing Consolidations

This table identifies the recommendations for 3 VMs:

Total Logical CPUs Processing	Total Logical CPUs	Memory	Total Memory	Storage	Total Storage
12	36	32 GB	96 GB	60 GB	180 GB

SQL Database Server

This table identifies the recommendations for 1 VM:

Total Logical CPUs Processing	Total Logical CPUs	Memory	Total Memory	Storage	Total Storage
16	16	512 GB	512 GB	1000 GB	1000 GB

Fileshare

For 1 machine configured to perform temporary workspace for application server processing, data extracts and batch file processing, ensure 20-30 GB of storage.

Enterprise Environment Size Estimate (225+ Concurrent Users)

Minimum Production System Infrastructure Requirements

For application server hardware sizing, we recommend 2 general storage servers and 1 consolidation server for every 1-75 concurrent users. This is the recommended basic configuration guideline providing balanced user workload and standard analytic processing. However, this recommendation may vary depending on the type of concurrent use. While we are confident in this recommendation, consult the OneStream Software infrastructure group to evaluate your environment and usage pattern for optimal performance.

Virtual Machine - Guest Servers

For concurrency levels exceeding 225 users, the number of Virtual Machine hosts and guests will be multiples of those shown in the following sections.

Web Servers Processing User Web Requests

This table identifies the recommendations for 4 Virtual Machines (VMs):

Total Logical CPUs Processing	Total Logical CPUs	Memory	Total Memory	Storage	Total Storage
2	8	8 GB	32 GB	60 GB	240 GB

Application Servers Performing General Processing

This table identifies the recommendations for 4 VMs:

Total Logical CPUs Processing	Total Logical CPUs	Memory	Total Memory	Storage	Total Storage
8	32	32 GB	128 GB	60 GB	240 GB

Application Servers Performing Stage/Reporting Processing

This table identifies the recommendations for 4 VMs:

Total Logical CPUs Processing	Total Logical CPUs	Memory	Total Memory	Storage	Total Storage
8	32	32 GB	128 GB	60 GB	240 GB

Application Servers Performing Consolidation Processing

This table identifies the recommendations for 4 VMs:

Total Logical CPUs Processing	Total Logical CPUs	Memory	Total Memory	Storage	Total Storage
12	48	32 GB	128 GB	60 GB	240 GB

Database Servers Performing General Processing

This table identifies the recommendations for 4 VMs:

Total Logical CPUs Processing	Total Logical CPUs	Memory	Total Memory	Storage	Total Storage
8	32	32 GB	128 GB	60 GB	240 GB

Physical Machine - Database Server

For 1 machine processing SQL database server activity, ensure:

- 32 logical CPUs for processing
- 512 GB -1 TB of memory
- 1 TB of storage

Fileshare

For 1 machine configured to perform temporary workspace for application server processing, data extracts and batch file processing, ensure 30-40 GB of storage.

System Infrastructure Guidelines

Basic configuration providing balanced performance for both user workloads and standard analytic processing.

> **NOTE:** OneStream Software may recommend changes to this configuration based on customer application design and technical infrastructure.

As OneStream is horizontally hardware scalable, a generalized way to approach application server hardware sizing is that for approximately every 75 concurrent users, 2 General/Stage servers and 1 Consolidation server are required. This recommendation will vary from customer to customer depending on the type of concurrent usage. These are meant to be general guidelines and are historically accurate environment starting points. Each customer environment and usage pattern should still be evaluated against these recommendations with the OneStream infrastructure group. We are confident in the environmental recommendations, but they are not absolute and may change based on customer usage.

Database Configuration Requirements

- Transaction logs and data at a minimum should be stored on separate drives to spread I/O across drives. For more advanced configurations and improved throughput, create additional File Groups to spread I/O across devices.
- Scheduled SQL Server Maintenance Plan: Back up of the database and transaction log files. Re-Index: Reorganizes the data on the data and index pages by rebuilding indexes.

IIS Configuration Requirements

- No OneStream AppPool Timeout: All OneStream AppPool timeout and recycle settings should be set and remain at "0". IIS should never be triggered to recycle itself other than after the default period of inactivity.
- Ping Enabled "False": OneStream AppPool's settings should be set with "Ping Enabled" to False. Under times of high server resource utilization, IIS can potentially recycle itself if it does not receive and expected response because the server is too busy.

Network Configuration Requirements

- App Server & DB Server On Same Segment: OneStream Servers should all be located behind the same network switch and within close proximity to each other.
- Consistent NIC Card Speed: OneStream Servers should all have the same NIC card throughput speeds to prevent any backups or bottlenecks.
- Load Balancer Appliance (No Retry): Whether software or hardware load balancer, nothing should be attempting to manage timeout or retry requests on behalf of OneStream.

Virtualized Environments

Hardware virtualization software lets you run multiple operating systems and application instances at the same time on a single server. This provides significant flexibility and efficiencies in the use of a company's hardware resources. OneStream Software is virtualization optimized across all tiers of the environment; database, application and web.

- For optimal performance, OneStream recommends running the OneStream virtual guest servers on a dedicated host with completely dedicated CPU and RAM.
- OneStream recommends that OneStream virtual servers be housed on servers that only contain OneStream virtual servers and not those that house other applications. OneStream virtual servers and physical servers holding them should not be included within a shared or pooled virtual machine to ensure they receive the proper resources required.
- OneStream virtual machines should not be set to automatically move (live migration/VMotion) from one physical server to another except during maintenance or as the result of a server fault due to the inability of the host servers to keep up with the active in-memory object synchronization across the network. If the corporate network and/or infrastructure cannot keep up with the synchronization of the server objects in memory during a live migration under heavy processing or if a live migration causes the server to pause, a failed application process will result.
- Over committing or over subscribing of the CPUs will cause significant performance impact. Due to the highly multithreaded nature of the application architecture and depending on the process, significant performance impacts will be observed during processes like data loading, calculations or consolidations if over committing is employed.

- Dynamic memory management by the VM Host is not recommended. RAM usage can escalate extremely quickly and if the VM guest does not have the committed RAM immediately available then significant performance impacts will be observed.
- Consolidations and certain calculations can significantly tax the I/O demands of the data server, applying contentious demands to what is ultimately one virtual file, in a virtualized data server environment. If virtual environments are used, application and data servers must be configured with adequate RAM and CPU cores.
- OneStream does not test or support our software running together with non-OneStream applications running in the same virtual environment. It is therefore recommended that software running in a virtual machine be limited to OneStream applications and other resources required to support our application environment.

Third-Party Component Technology

OneStream is constructed using both proprietary and third-party tools in the authoring, installation and running of our supported products. See *Hardware and Software Requirements* for supported version information.

Client

Third-party developer components include Developer Express (aka DevExpress; for user interface controls and reporting), Telerik (User Interface controls), and ActiPro Software (Syntax Editor). OneStream customers are not required to purchase these developer tools.

OneStream Windows App
Rich Internet Application developed using Microsoft Windows Presentation Foundation (WPF) technologies. Third-party developer components include DevExpress (for user interface controls and reporting), Telerik (User Interface controls), and ActiPro Software (Syntax Editor). OneStream customers are not required to purchase these developer tools.

Other Windows Clients
OneStream Server Configuration Utility and OneStream Database Configuration Utility are used for initial setup and updates. Both are developed using Microsoft .NET technologies. OneStream customers are not required to purchase these developer tools.

Microsoft Office
OneStream Excel Add-in (optional) is developed using Microsoft .NET technologies. In order to use the optional OneStream Excel Add-in, OneStream customers must have the Excel component of a supported version of Microsoft Office and be up to date with the required version of .NET Framework.

OneStream Code
Developer Express compression libraries are used to implement data compression for reducing network traffic. It is also used to create Zip files when extracting an entire application.

Web Server
Developed using Microsoft Internet Information Services (IIS) and the Microsoft .NET Framework.

Mobile Web
Mobile interface developed using Microsoft MVC. This is a HTML5-based user interface for data consumption. Third-party developer components utilized include Bootstrap, jQuery and Newtonsoft.json.

Application Server
Developed using Microsoft Internet Information Services (IIS) and Microsoft .NET Framework. For integration with SAP sources, Theobald ERPConnect45.dll libraries are made available during the OneStream Application Server installation.

Database Server

Microsoft SQL Server

Other Embedded Components
IdentityModel is utilized for OpenID Connect 2.0 and OAuth based authentication. RestSharp client is used for connecting to REST and HTTP authentication APIs.

In the security layer, Microsoft OWIN for the IAppBuilder startup interface is embedded. To compile business rules, the Microsoft .NET compiler platform "Roslyn" is used.

Installation Tool
OneStream's installation tool was developed using third-party software.

Supported Legacy Authentication Providers

- OneStream native
- MSAD
- LDAP
- Azure AD
- Okta
- PingFederate
- SAML 2.0

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MIT LICENSE

Bootstrap is distributed in connection with OneStream Mobile MVC HTML5 UI.

https://github.com/twbs/bootstrap/blob/v4.0.0/LICENSE

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Copyright (c) 2011-2018 The Bootstrap Authors

JQuery is distributed in connection with OneStream Mobile MVC HTML5 UI.

https://github.com/jquery/jquery/blob/master/LICENSE.txt

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IdentityModel (Security Layer: OpenID Connect 2.0 client helper libect & OAuth)

https://github.com/IdentityModel/IdentityModel/blob/master/LICENSE

Microsoft.OWIN is distributed in connection with OWIN IAppBuilder startup interface.

https://github.com/tomi85/Microsoft.Owin/blob/master/LICENSE.txt

RestSharp is distributed in connection with authentication for REST and HTTP API client

https://github.com/restsharp/RestSharp/blob/master/LICENSE.txt

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The following packages are included in this distribution that relate to cryptography:

- `openssl`: The OpenSSL Project is a collaborative effort to develop a robust, commercial-grade, full-featured, and Open Source toolkit implementing the Transport Layer Security (TLS) and Secure Sockets Layer (SSL) protocols as well as a full strength general purpose cryptography library.
- `pycrypto`: A collection of both secure hash functions (such as SHA256 and RIPEMD160), and various encryption algorithms (AES, DES, RSA, ElGamal, etc.)
- `pyopenssl`: A thin Python wrapper around (a subset of) the OpenSSL library.

- `kerberos`(krb5, non-Windows platforms): A network authentication protocol designed to provide strong authentication for client/server applications by using secret-key cryptography.
- `cryptography`: A Python library which exposes cryptographic recipes and primitives.