

# System Requirements & Prerequisites

## risk2value Version 7

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# 1 Server Requirements

## 1.1 Server Hardware Requirements

This chapter describes the minimum hardware requirements which have to be met by your IT environment in order to run risk2value and its components. For additional information regarding server sizing, please refer to chapter [Server Sizing Considerations](#).

Please be aware that additional hardware may be required and added as necessary depending on dynamic factors such as patterns of usage, complexity and requirements of custom features, increasing database size, OLAP cube structure and size, the number of concurrent users and other factors negatively impacting the desired application performance. System monitoring in your environment should determine when additional hardware resources need to be added to the server configuration.

Generally, a single-server installation (=application and database server on the same machine) is **not recommended** for production environments.

Note: risk2value can be run on virtual machines fulfilling the specified requirements.

<b>Application Server (risk2value)</b>	
Processor	Intel Pentium processor or compatible architecture (64-bit)
Memory *)	Minimum 8 GB RAM
Disk storage *)	Minimum 4 GB free disk space for application installation

<b>Database Server (Microsoft SQL Server)</b>	
Processor	Intel Pentium processor or compatible architecture (64-bit)
Memory	Minimum 8 GB RAM
Disk storage	<ul style="list-style-type: none"><li>• Approx. 10 GB free disk space per risk2value instance (depending on Scorecard data)</li><li>• Approx. 10 GB free disk space per Export Database / risk2value instance (depending on Scorecard data)</li></ul> <p>Note: Database growth rate closely correlates with usage patterns, reporting, and custom features. We recommend to handle adjustments by monitoring space usage over time. The initial estimate above is, in our experience, sufficient in the short- to mid-term (~1-1.5 years).</p>

<b>Application Server (risk2value.analytics Web Edition)</b>	
Processor	Intel Pentium processor or compatible architecture (64-bit)
Memory *)	Minimum 8 GB RAM
Disk storage *)	Minimum 4 GB free disk space for application installation

\*) Memory requirements might be higher if the database and/or risk2value.analytics Web Edition run on the same machine.

## 1.2 Server Software Requirements

We recommend using the newest supported operating system and database server version in regard to future updates and maintenance.

### 1.2.1 Application Server (risk2value)

#### Application Server (risk2value)

- |                             |  |
|-----------------------------|--|
| Supported Operating Systems | <ul style="list-style-type: none"><li>• Microsoft Windows Server 2012 (includes IIS 8.0)</li><li>• Microsoft Windows Server 2012 R2 (includes IIS 8.5)</li><li>• Microsoft Windows Server 2016 (includes IIS 10)</li><li>• Microsoft Windows Server 2019 (includes IIS 10)</li></ul> |
| Required Software           | <ul style="list-style-type: none"><li>• Microsoft .NET Framework 3.5 Service Pack 1</li><li>• Microsoft .NET Framework 4.7.2<sup>1)</sup></li></ul>  |

### 1.2.2 Required Server Roles and Features

#### 1.2.2.1 Windows Server 2012 & 2012 R2

#### Add Server Roles:

- ✓ Application Server and add all of the required roles
- ✓ Web Server (IIS)

#### Application Server - Role Services:

- ✓ .NET Framework 3.5 (required for installer)
- ✓ .NET Framework 4.5 (.NET Framework 4.5.1 must also be installed manually)
- ✓ Windows Process Activation Service Support
- ✓ Web Server (IIS) Support and add all of the required role services
  - HTTP Activation

#### Web Server (IIS) - Role Services:

- ✓ Common HTTP Features:
  - Static Content
  - Default Document
  - Directory Browsing
  - HTTP Errors
  - HTTP Redirection
- ✓ Application Development:
  - ASP.NET
  - .NET Extensibility
  - ISAPI Extensions
  - ISAPI Filters
- ✓ Health and Diagnostics:
  - HTTP Logging
  - Logging Tools

- Request Monitor
- Tracing
- ✓ Security:
  - Basic Authentication
  - Windows Authentication
  - Digest Authentication
  - Client Certificate Mapping Authentication
  - IIS Client Certificate Mapping Authentication
  - URL Authorization
  - Request Filtering
  - IP and Domain Restrictions
- ✓ Performance:
  - Static Content Compression
  - Dynamic Content Compression
- ✓ Management Tools:
  - IIS Management Console
  - IIS Management Scripts and Tools
  - Management Service

#### 1.2.2.2 Windows Server 2016

##### **Add Server Roles:**

- ✓ Application Server and add all of the required roles
- ✓ Web Server (IIS)

##### **Application Server - Role Services:**

- ✓ .NET Framework 4.6 Features (.NET Framework 4.7.2 must also be installed manually)
  - .NET Framework 4.6
  - ASP.NET 4.6
  - WCF Services
    - HTTP Activation
- ✓ .NET Framework 3.5 (required for installer)
- ✓ Windows Process Activation Service Support
  - Process Model
  - Configuration APIs

##### **Web Server (IIS) - Role Services:**

- ✓ Common HTTP Features:
  - Static Content
  - Default Document
  - Directory Browsing
  - HTTP Errors
  - HTTP Redirection

- ✓ Application Development:
  - ASP.NET
  - .NET Extensibility
  - ISAPI Extensions
  - ISAPI Filters
- ✓ Health and Diagnostics:
  - HTTP Logging
  - Logging Tools
  - Request Monitor
  - Tracing
- ✓ Security:
  - Basic Authentication
  - Windows Authentication
  - Digest Authentication
  - Client Certificate Mapping Authentication
  - IIS Client Certificate Mapping Authentication
  - URL Authorization
  - Request Filtering
  - IP and Domain Restrictions
- ✓ Performance:
  - Static Content Compression
  - Dynamic Content Compression
- ✓ Management Tools:
  - IIS Management Console
  - IIS Management Scripts and Tools
  - Management Service

### 1.2.2.3 Windows Server 2019

#### **Add Server Roles:**

- ✓ Web Server (IIS)

#### **Application Server - Role Services:**

- ✓ .NET Framework 4.7 Features
  - .NET Framework 4.7
  - ASP.NET 4.7
  - WCF Services
    - HTTP Activation
    - TCP Port Sharing
- ✓ .NET Framework 3.5 (required for installer)
- ✓ Windows Process Activation Service Support

- Process Model
- Configuration APIs

### **Web Server (IIS) - Role Services:**

- ✓ Common HTTP Features:
  - Static Content
  - Default Document
  - Directory Browsing
  - HTTP Errors
  - HTTP Redirection
- ✓ Application Development:
  - ASP.NET 4.7
  - .NET Extensibility 4.7
  - ISAPI Extensions
  - ISAPI Filters
- ✓ Health and Diagnostics:
  - HTTP Logging
  - Optional: Logging Tools, Request Monitor, Tracing
- ✓ Security:
  - Basic Authentication
  - Windows Authentication
  - Digest Authentication
  - Client Certificate Mapping Authentication
  - IIS Client Certificate Mapping Authentication
  - URL Authorization
  - Request Filtering
  - IP and Domain Restrictions
- ✓ Performance:
  - Static Content Compression
  - Dynamic Content Compression
- ✓ Management Tools:
  - IIS Management Console
  - IIS Management Scripts and Tools
  - Management Service

### **1.2.3 Database Server (Microsoft SQL Server)**

Microsoft SQL Server components and properties required by risk2value:

<b>Database Server (Microsoft SQL Server)</b>	
Supported Software	<ul style="list-style-type: none"> <li>• Microsoft SQL Server 2012</li> <li>• Microsoft SQL Server 2014</li> <li>• Microsoft SQL Server 2016 SP1</li> <li>• Microsoft SQL Server 2017</li> <li>• Microsoft SQL Server 2019</li> </ul> <p>Note: Supported Microsoft SQL Server Editions: Standard or Enterprise</p>
Required Services	<ul style="list-style-type: none"> <li>• Microsoft SQL Server - Database Engine</li> </ul>
Required Server and Database Collation	<ul style="list-style-type: none"> <li>• Latin1_General_CI_AS</li> </ul>
Supported Services	<ul style="list-style-type: none"> <li>• Microsoft SQL Server - Reporting Services</li> <li>• Microsoft SQL Server - Analysis Services</li> </ul> <p>Note: Whether installation of these components is required in your environment depends on your choice of reporting methods, e.g. SSRS for static reports or SSAS for reporting via OLAP.</p>

#### 1.2.4 risk2value.analytics Web Edition

risk2value.analytics Web Edition is a reporting application used to serve reports (created in risk2value.analytics Excel Edition) and can be run either on a separate or the same server as the risk2value application.

<b>Application Server (risk2value.analytics)</b>	
Required Software	<ul style="list-style-type: none"> <li>• Microsoft .NET Framework 4.7.2 <sup>1)</sup></li> <li>• Microsoft Visual C++ 2019 Redistributable<sup>2)</sup></li> <li>• Microsoft SQL Server 2012 ADOMD.NET<sup>2)</sup></li> </ul>
Supported Software	<ul style="list-style-type: none"> <li>• Microsoft Access Database Engine 2010 <sup>2)</sup></li> <li>• Microsoft Analysis Services 13.0 OLEDB Provider for Microsoft SQL Server 2016<sup>2)</sup></li> <li>• Microsoft Analysis Services 11.0 ADOMD.NET Provider for Microsoft SQL Server 2012<sup>2)</sup></li> <li>• Microsoft System CLR Types for Microsoft SQL Server 2016</li> <li>• Shared Management Objects for Microsoft SQL Server 2016</li> <li>• Microsoft Analysis Services 13.0 ADOMD.NET Provider for Microsoft SQL Server 2016<sup>2)</sup></li> </ul>

1) Compatible in-place upgrades of Microsoft .NET Framework 4.7.2, such as 4.8 are also supported. You can use the supported versions that are part of your Microsoft Windows Server operating system.

2) Install the x86 or x64 version of this component depending on the version of Windows Server operating system running on the server and the mode the application is run in.

The listed prerequisites are valid for XLCubedWeb Version **10.0.x**. If a different version is in use, please find the detailed prerequisites for the version in use at [https://help.xlcubed.com/XLCubed\\_Web\\_Edition\\_Prerequisites/Versions](https://help.xlcubed.com/XLCubed_Web_Edition_Prerequisites/Versions).



**Important:** By default, the risk2value.analytics Web Edition installer requires an active internet connection and will automatically download and install any of the requirements listed above if they are detected as missing. If your application server is not connected to the internet and/or you wish to selectively install supported but optional software requirements listed under "Supported Software" in the link above, please contact avedos and request a risk2value.analytics Web Edition installer for offline environments.

#### 1.2.4.1 Required Server Roles and Features

##### **Web Server (IIS) - Role Services:**

- ✓ Common HTTP Features:
  - Static Content
- ✓ Application Development:
  - ASP.NET 4.x
  - .NET Extensibility 4.7
  - ISAPI Extensions
  - ISAPI Filters
- ✓ Security:
  - Basic Authentication
  - Windows Authentication
  - Digest Authentication
  - Client Certificate Mapping Authentication
  - IIS Client Certificate Mapping Authentication
  - URL Authorization
  - Request Filtering
  - IP and Domain Restrictions
- ✓ Performance:
  - Static Content Compression
  - Dynamic Content Compression
- ✓ Management Tools:
  - IIS Management Console
  - IIS Management Scripts and Tools
  - Management Service

##### **.NET Framework 3.5 Features:**

- ✓ HTTP Activation

##### **.NET Framework 4.x Features:**

- ✓ WCF Service
  - HTTP Activation

## 2 Client Software Requirements

### 2.1 risk2value

The web browser installed on a client machine allows users to access the functionality of risk2value. We support the two latest versions of each web browser listed. Updating to the latest version will often resolve any browser-specific issues, and thus we highly recommend ensuring your web browser is up to date. Additionally, import/export functionality of risk2value requires Microsoft Excel.

<b>Client (risk2value)</b>	
Supported Web Browsers	<ul style="list-style-type: none"><li>• Internet Explorer 11</li><li>• Edge 25+</li><li>• Firefox 49+ (Windows)</li><li>• Chrome 53+ (Windows)</li></ul>
Required Web Browser Settings	<ul style="list-style-type: none"><li>• JavaScript must be enabled</li><li>• Compatibility View or Enterprise mode must be disabled</li><li>• Browser zoom level 100%</li></ul>
Recommended Web Browser Settings	<ul style="list-style-type: none"><li>• HTML5 Local Storage enabled</li></ul> <p>Note: Browser local storage is used to store user preferences like UI splitter positions or toggle button states. Enabling HTML5 Local Storage is highly recommended for an improved user experience.</p>
Supported Software	<ul style="list-style-type: none"><li>• Microsoft Excel 2010</li><li>• Microsoft Excel 2013</li><li>• Microsoft Excel 2016</li></ul>
Recommended Resolution	<ul style="list-style-type: none"><li>• 1920 x 1080 px</li></ul> <p>Note: Lower screen resolutions may lead to functional restrictions.</p>

### 2.2 risk2value.analytics Excel Edition

risk2value.analytics Excel Edition is a Microsoft Excel Add-in used to create and publish reports to risk2value.analytics Web Edition to make them available to users of the risk2value application. The following client requirements apply:

#### **Client (risk2value.analytics Excel Edition)**

- Required Software
- Microsoft .NET Framework 4.7.2 <sup>1)</sup>
  - Microsoft Visual C++ 2019 Redistributable<sup>2)</sup>
  - Microsoft Excel (for versions, see "Supported Software" below)

## Client (risk2value.analytics Excel Edition)

- Supported Software
- Microsoft Excel 2010
  - Microsoft Excel 2013
  - Microsoft Excel 2016
  - Microsoft Excel 2019
  - Microsoft Office 365 - Excel
  - Microsoft Analysis Services 13.0 OLEDB Provider for Microsoft SQL Server 2016<sup>2)</sup>
  - Microsoft SQL Server 2012 11.0 ADOMD.NET<sup>2)</sup>
  - Microsoft SQL Server 2016 13.0 ADOMD.NET<sup>2)</sup>
  - Microsoft Access Database Engine 2010<sup>2)</sup>

<sup>1)</sup> Compatible in-place upgrades of Microsoft .NET Framework 4.7.2, such as 4.8 are also supported. You can use the supported versions that are part of your Microsoft Windows Server operating system.

<sup>2)</sup> Install the x86 or x64 version of this component depending on the version of Microsoft Office you installed Microsoft Excel with.

The listed prerequisites are valid for XLCubedWeb Version **10.0.x**. If a different version is in use, please find the detailed prerequisites for the version in use at [https://help.xlcubed.com/XLCubed\\_Excel\\_Edition\\_Prerequisites/Versions](https://help.xlcubed.com/XLCubed_Excel_Edition_Prerequisites/Versions).

**Important:** By default, the risk2value.analytics Excel Edition installer requires an active internet connection and will automatically download and install any of the requirements listed above if they are detected as missing. If your application server is not connected to the internet and/or you wish to selectively install supported but optional software requirements listed under "Supported Software" in the table above, please contact us and request a risk2value.analytics Excel Edition installer for offline environments.

## 3 Server Sizing Considerations

To facilitate server sizing, this chapter provides guidance based on avedos' experience with a substantial number of installations. The considerations and examples discussed are not strict rules, but should serve as a good starting point for planning your environment.

### 3.1 Considerations for multiple/staging environments

When deploying multiple environments in parallel for e.g. development, pre-production, testing, education you may choose to plan the hardware configuration of each environment differently to meet business requirements. Widely differing hardware parameters between e.g. production and testing environments impact comparability between the systems and their behavior, which you should take into consideration to decide if this is acceptable for your use case.

**Example:** If only a small fraction of the total number of productive users performs tests in a testing environment, you might consider it acceptable to have a testing environment with less hardware resources. However using a large amount of production data in your testing environment may negatively impact e.g. report generation performance and response times may be longer.

### 3.2 Sizing Examples

The following examples are meant as minimal starting point for new environments.

"**Concurrent users**" refers to the total number of users accessing and working in risk2value **simultaneously**. Please keep in mind when estimating this number that it can be influenced by e.g. varying business hours (day/night, branch offices), different or overlapping assessment/reporting periods of business units or users distributed over multiple time zones.

#### 3.2.1 Demonstration Deployment (single-machine)

This setup is **not recommended** for production environments.

Server role	Cores at least	Memory at least
Application Server (risk2value & risk2value.analytics), SQL-Server	2	16 GB

#### 3.2.2 Small Deployment (up to 50 concurrent users)

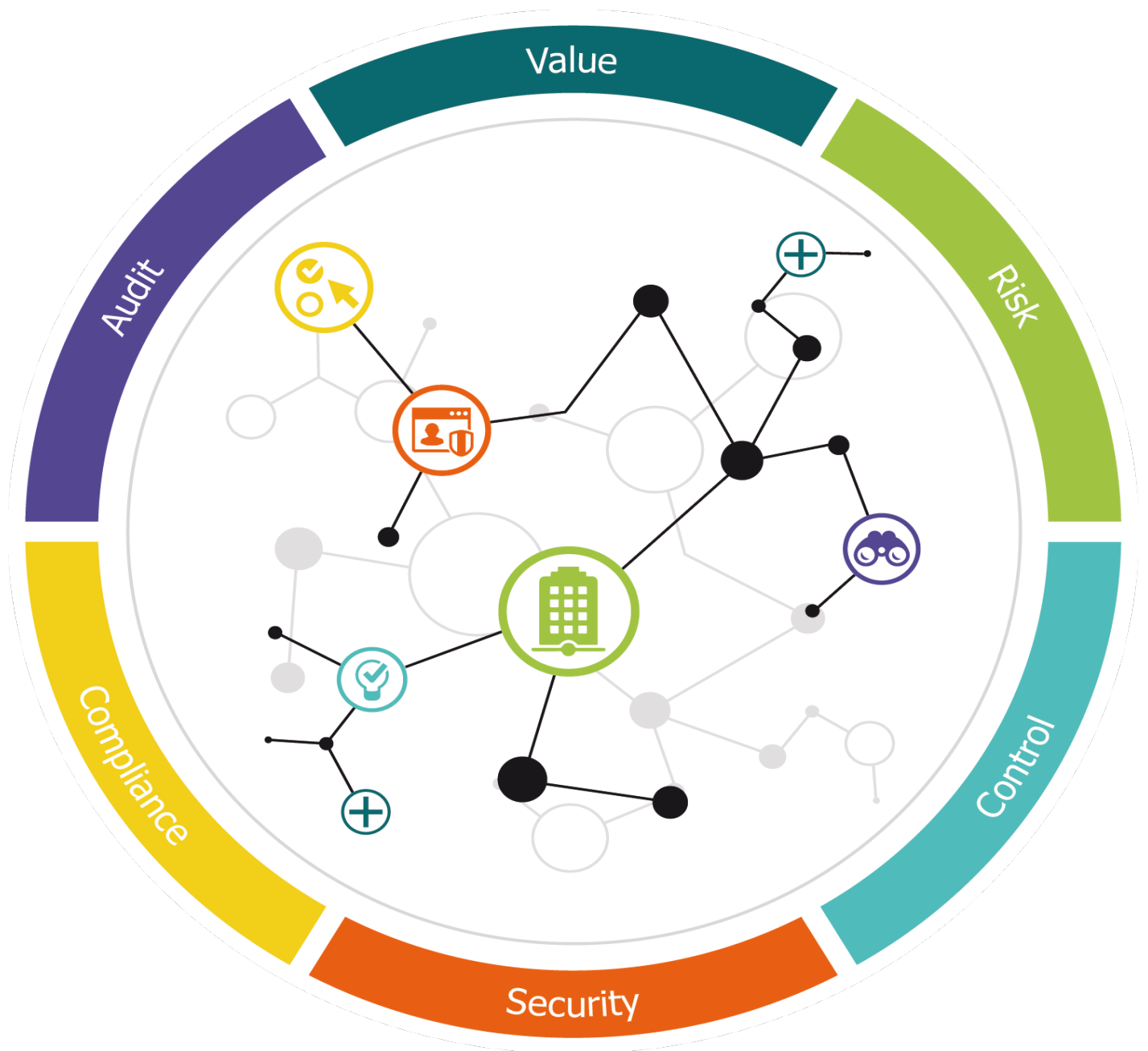
Server role	Cores at least	Memory at least
Application Server (risk2value & risk2value.analytics)	2	8 GB
SQL-Server	4	8 GB

#### 3.2.3 Medium Deployment (up to 100 concurrent users)

Server role	Cores at least	Memory at least
Application Server (risk2value)	4	16 GB
SQL-Server	4	16 GB
Application Server (risk2value.analytics)	4	16 GB

### 3.2.4 Large Deployment (100+ concurrent users)

<b>Server role</b>	<b>Cores at least</b>	<b>Memory at least</b>
Application Server (risk2value)	4	16 GB
SQL-Server - Database Engine	4	16 GB
SQL-Server - Reporting Services	4	16 GB
Application Server (risk2value.analytics)	4	16 GB



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