HighGear Installation Requirements and Readiness Checklist

Client / End User Requirements

HighGear is a browser application where processing load is minimal on the client. HighGear requires one of the following browsers in order to function correctly:

- Firefox 114 and later
- Safari 16.5 and later
- Chrome 114 and later
- Microsoft Edge 114 and later

Server requirements

Software / Operating System Requirements

Minimum

Windows Server 2016 and later are supported. The IIS server component of Windows must be installed, as well as .NET Framework 4.8 or later. The IIS 6 Management Compatibility components and other prerequisites must be installed.

In addition, HighGear requires Microsoft SQL Server 2014 or later. SQL Server Express Edition is supported. SQL Server must be configured to support mixed-mode authentication. The web server(s) must be able to connect to port 1433 on the database server(s).

Instructions for installing prerequisites on Windows 2012+

Optimal

Windows Server 2019 and 2022 are recommended. The IIS server component of Windows must be installed, as well as the .NET Framework version 4.8 or later. The IIS 6 Management Compatibility components and other prerequisites must be installed.

We recommend Microsoft SQL Server 2019 or 2022. We recommend either Standard or Enterprise Edition, depending on your performance and replication requirements. SQL Server must be configured to support mixed-mode authentication. The web server(s) must be able to connect to port 1433 on the database server(s).

Instructions for installing prerequisites on Windows 2012+

Database Server Hardware Requirements

A moderate-load use case involves users who perform 5-10 task changes per hour, workflows that perform 3-5 actions per user change, and integrations that perform actions like human users.

A heavy-load use case involves users who perform task changes more than 20 times per hour, workflows that loop repeatedly or perform 10+ actions per user change, and/or integrations that transfer large amounts of data or create many changes at once.

If your system will have more than one million open (non-archived) tasks, integrations that update large volumes of data frequently, and/or reports that frequently load large data sets during business hours, your system requirements may be different from those listed below. Please contact us to discuss configuration options to optimize your system's performance and scalability.

The HighGear server provides the ability to store various forms of digital data within the HighGear system. The size of these file attachments may dictate the necessity to consider more robust storage hardware. For instance, if you expect each HighGear task to include about 1MB of attached files and your organization expects to receive 100 tasks per day, then you will need to allow 100MB of storage per operational day. If your organization works 5-day weeks, then you will need 2GB per month, or 24GB per year.

Database Server Specs for Moderate Load

- **CPU:** One processor core for every 500 simultaneous users (minimum of 2 cores)
- **RAM:** 16GB RAM per 500 simultaneous users (minimum of 8GB RAM)
- **Storage:** Low-latency SSDs providing at least 2000 IOPS per 500 simultaneous users

Database Server Specs for Heavy Load

- **CPU:** One processor core for every 250 simultaneous users (minimum of 2 cores)
- **RAM:** 16GB RAM per 250 simultaneous users (minimum of 8GB RAM)
- **Storage:** Low-latency SSDs providing at least 2000 IOPS per 250 simultaneous users

Web Servers

A moderate-load use case involves users who perform 10-20 task changes per hour, workflows that perform 3-5 actions per user change, and integrations that perform actions like those performed by users.

A heavy-load use case involves users who perform task changes more than 30 times per hour, workflows that loop repeatedly or perform 10+ actions per user change, and/or integrations that transfer large amounts of data or create many changes at once.

If your system will have more than one million open (non-archived) tasks or integrations that update hundreds of records in real time, your system requirements may be different from those listed below. Please contact us to discuss configuration options to optimize your system's performance and scalability.

Web Server Specs for Moderate Load
- **CPU:** One processor core for every 500 simultaneous users (minimum of 2 cores)
- **RAM:** 2GB RAM per 500 simultaneous users (minimum of 4GB RAM)
- **Storage:** At least 128GB of storage

Web Server Specs for Heavy Load
- **CPU:** One processor core for every 250 simultaneous users (minimum of 2 cores)
- **RAM:** 2GB RAM per 250 simultaneous users (minimum of 4GB RAM)
- **Storage:** At least 128GB of storage

Appendix: Common Reasons to Add Resources to Your Servers

Reports that load large data sets, whether in HighGear's BI Module or a third-party reporting tool, can cause SQL Server to remove frequently-used data from its buffer pool cache. When this happens, HighGear performance will decrease significantly until the buffer pool cache reloads the frequently-used data. If those reports run often enough, HighGear performance will be consistently poor. The best solution to this problem is to use SQL Server AlwaysOn Availability Groups to create a read-only replica server. Report queries can be offloaded to that server so they don't hurt application performance. If that is not possible, adding RAM to the database server may increase the size of the buffer pool cache enough to handle the extra data load.

If workflows or API clients frequently update many tasks in fast loops, record locking may cause performance issues across the HighGear system. In these cases, the most effective solution is often to redesign the workflow or API client to reduce its update volume. It may also be possible to increase the performance of individual updates by adding CPU and/or RAM to the servers.

Appendix: Common Metrics to Monitor for System Performance

Database Servers

These four disk performance monitors can indicate performance issues in the storage subsystem. If they increase significantly above baseline, you may need to increase storage IOPS or decrease storage latency. Note that these two monitors are not fully reliable, so HighGear support has some advanced

tools to diagnose storage performance. If you believe you may have storage performance issues, please contact HighGear Support.

- PhysicalDisk(*)\Avg. Disk sec/Read
- PhysicalDisk(*)\Avg. Disk sec/Write

This CPU performance monitor can indicate insufficient processor resources. If it frequently reaches a maximum value and stays there, you may need to add additional CPU cores to your server, even if the maximum value is less than 100%.

- Processor(_Total)\% Processor Time

This SQL Server performance monitor can indicate insufficient memory. SQL Server always uses as much RAM as it can claim from the OS, so the normal memory monitors are not reliable. If the buffer cache hit ratio decreases significantly below 100% for an extended time, you may need to add RAM to your server.

- SQLServer:Buffer Manager\Buffer cache hit ratio

Web Servers

These two memory performance monitors can indicate insufficient RAM on your web servers. If Available Mbytes decreases significantly from baseline or Page Faults/sec increases significantly from baseline, you may need to add RAM to your server.

- Memory\Available Mbytes
- Memory\Page Faults/sec

This CPU performance monitor can indicate insufficient processor resources. If it frequently reaches a maximum value and stays there, you may need to add additional CPU cores to your server, even if the maximum value is less than 100%.

- Processor(_Total)\% Processor Time

Operational and Installation Readiness Checklist
Hardware Readiness

1. _____ GB available disk space on Database Servers

2. _____ GB memory installed on Database Servers

3. _____ (Quantity) _____ GHZ (Speed) processors installed on Database Servers

4. _____ GB available disk space on Web Servers

5. _____ GB memory installed on Web Servers

6. _____ (Quantity) _____ GHZ (Speed) processors installed on Web Servers

Software / Platform Readiness

1. Operating System version and edition: _____

2. IIS and prerequisites installed? [Yes/No]: _____

3. .NET Framework 4.8+ installed? [Yes/No]: _____

4. ASP.NET support configured? [Yes/No]: _____

5. SQL Server installed? _____

6. Name of IIS website to install HighGear under: _____

7. Folder to install HighGear into: _____

   (HighGear can be installed to the root of a website, so that you can access it via a basic Internet URL like http://www.myserver.com, or an intranet link like http://myserver. Alternately, you can install it to a subfolder - access via http://www.myserver.com/HighGear.)

8. IP address: _____-_____-_____-_____

9. DNS name: _____