

Hardware Configuration for SkylineGlobe Servers

This article provides information for SkylineGlobe Server (SGS) configuration. It discusses various considerations to take into account when setting up and configuring the different server components.

REQUIREMENTS - SKYLINEGLOBE SERVER

Hardware Requirements

System Memory	8 GB RAM (16 GB or more recommended)
Processor	4 cores (8 or 16 cores recommended)

SkylineGlobe Server for Windows Server

Operating System	Windows Server 2016 / 2019 / 2022 (64-bit)
User Privileges	Administrator privileges required for installation and configuration
Additional Software	Microsoft IIS8.5, IIS10 with Net 4.8 and ASP.Net

SkylineGlobe Server for Windows – Click & Go

Operating System	Windows 10 / 11 , Windows Server 2019 / 2022
User Privileges	Administrator privileges required for running the service

SkylineGlobe Server for Linux

Operating System	Ubuntu
Additional Software	Wine v7 and up, .Net 4.8

Scalability and Redundancy

You can set up several servers behind a load balancer. Usually these servers share a central storage for the configuration database, upload folders, and other data. Any hardware or software load balancer solution is supported.

User Session

The configuration described below is based on an average of 15 minutes/ user session. Applications with longer sessions will reduce average user data consumption per second from the data services. In general, during short sessions the user zooms into high quality areas & navigates around (peak consumption) in higher frequencies. In longer sessions, after initial browsing, the user focuses on an area of interest and therefore pulls less data from the SkylineGlobe servers. The nature of the application determines user browsing behavior & thus the average bandwidth & storage requirements.

Processing

The processor and system memory recommended above are capable of handling nearly all SGS processing requirements, such as conversion of feature layers to WFS, raster to WMS, and mesh layers to 3D Tiles. Even in DirectConnect projects, fuser processing requirements are kept to a minimum through data optimization and caching. During TerraBuilder's publishing process, optimized MPT resolution pyramids are created for each of the native sources. This eliminates the need for fuser processing except in terrain areas with overlapping MPT sources. Since over 97% of block requests are from non-overlapping sources, minimal fuser processing is required.

Caching further reduces the necessity for fuser processing. When a block is requested for the first time, it is processed by a fuser and then cached. Future requests for this block are delivered from the cache (MPT) and require no fuser processing. Thus, within just a few days, almost all required fuser processing will be completed. Currently the only way to determine the ratio between fuser requests and cache requests is by performing a small-scale test of the project.

Caching Mechanisms

Few of the more CPU intensive SGS services can benefit from the SGS caching mechanism that stores the output blocks in the required format and reuse them in future requests. This mechanism optimizes the CPU and memory utilization but may consume additional storage space.

Note that only the first request for a specific block queried from the external database/server is processed. The resulting block is cached so any future requests for this block are delivered from the cache and require no processing. Thus, within just a few days, many requests will no longer need to be queried from the external server and processed.

Services that have caching mechanism:

- DirectConnect terrain service - Optimized projects with imagery and elevation layers in MPT formats, only the fused blocks, up to 3% of the data, are saved in the cache. For DirectConnect projects, with imagery and elevation layers in non-optimized MPT format, the caching mechanism may store up to 100% of the data.
- Feature layer streaming from databases and remote servers. Feature streaming for published layers, stored in GeoPackage format, is optimized and doesn't require caching
- 3D mesh services for 3D Tiles and SLPK. Streaming 3DML format to TerraExplorer Desktop is optimized and doesn't require caching

Bandwidth and IOPS Allocation

This section describes the I/O and bandwidth requirements by the server to support an average SkylineGlobe user. It is important to verify that the Load Balancer can handle the traffic load.

- I/O requests per second (IOPS)
- I/O read/write size (Mbytes per second)
- Network bandwidth required (Mbit per second)

Maps and Terrain Services

For a smooth navigation experience for Internet applications, it is recommended to allocate 400 Kbits per second for each concurrent user. This will satisfy the average bandwidth requirements of an average viewing session that includes periods of panning (requiring higher bandwidth) and periods in which the camera is zoomed in on a specific area (requiring lower bandwidth).

400 Kbits represents an average of 3 data blocks per second, with each block approximately 15 KB. The block size will vary during a viewing session depending on whether the camera is in motion. When the user is panning and zooming around in the 3D View, TerraExplorer usually requests small blocks (128x128 pixels of around 8 KB per block). When the camera is static, zoomed in on a particular area, with only one block required per second, TerraExplorer usually sends requests for large blocks (256x256 pixels of around 40 KB per block).

In fast Intranet environments, it is possible to allocate higher bandwidth and IOPS per user for an even smoother, more seamless viewing experience.

Bandwidth and IOPS Allocation

3D Mesh Service

For a reasonable and smooth 3DML streaming experience for TerraExplorer application, it is recommended to allocate 9 Mbit per second for each concurrent user during average consumption, and 36 Mbit per second during peak consumption. The bandwidth is the average of a complete flight session. This bandwidth takes into account the periods when the user navigates around and consumes higher bandwidth and the periods the user is looking at a specific place and stops requesting 3DML blocks. The 36 Mbit represent an average of 20 blocks per second (about 200Kbyte per block).

Feature Service

To calculate the recommended bandwidth and IOPS allocation for the Feature Service, the number of feature layers the application displays, and the complexity of each layer must be taken into account.

In a fairly complex environment, the Feature Service's bandwidth requirement generally parallels that of the Terrain Service. The average bandwidth requirement for an entire flight session of 5 feature data blocks per second (each block approximately 10 KB) is 450 Kbits per second for each concurrent user.

Case Study

This study describes an optional architecture for 50 active users of a SkylineGlobe Internet server:

Bandwidth

(Terrain Service + Feature Service + 3D mesh layers) * 50 users = (400 Kbit + 450 Kbit + 9 Mbit) * 50 = 490 Mbit per second.

Terrain Storage IOPS

3 blocks per user * 50 users = 150 data requests per second (average of 15 KB per request)

Note: DirectConnect projects require additional IOPS for processing the merged blocks

Feature Storage IOPS

5 blocks per user * 50 users = 250 data requests per second (average of 10 KB per request)

3D Mesh Storage IOPS

5 blocks per user * 50 users = 250 data requests per second (average of 200 KB per request)

For additional information, check out the [SkylineGlobe Server](#) section and [TerraExplorer Fusion](#) section of our knowledge base.



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