



GV STRATUS Virtualized Systems

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Introduction

Since version 4.5 of GV STRATUS, Grass Valley, a Belden Brand, has given Customers the option of running the GV STRATUS video production & content management system in a virtualized environment on their own COTS hardware. GV STRATUS virtualized systems are ONLY supported in a VMware vSphere (ESXi) environment, delivered in the convenient Open Virtualization Format (OVF), which can easily be deployed onto a vSphere host or cluster. This document provides a comprehensive overview of everything that is required for a successful virtualized deployment of GV STRATUS.

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GV STRATUS VM Hardware Requirements

GV STRATUS Core Servers intensively access the database and file system while GV STRATUS Render Engines (GVRE) process video files at real-time speed or faster. Both require a high performance, low latency environment to function effectively. Therefore, it is essential to pay careful attention to the resource requirements specified throughout this document when designing a vSphere environment into which a GV STRATUS virtualized solution can be deployed.

Servers

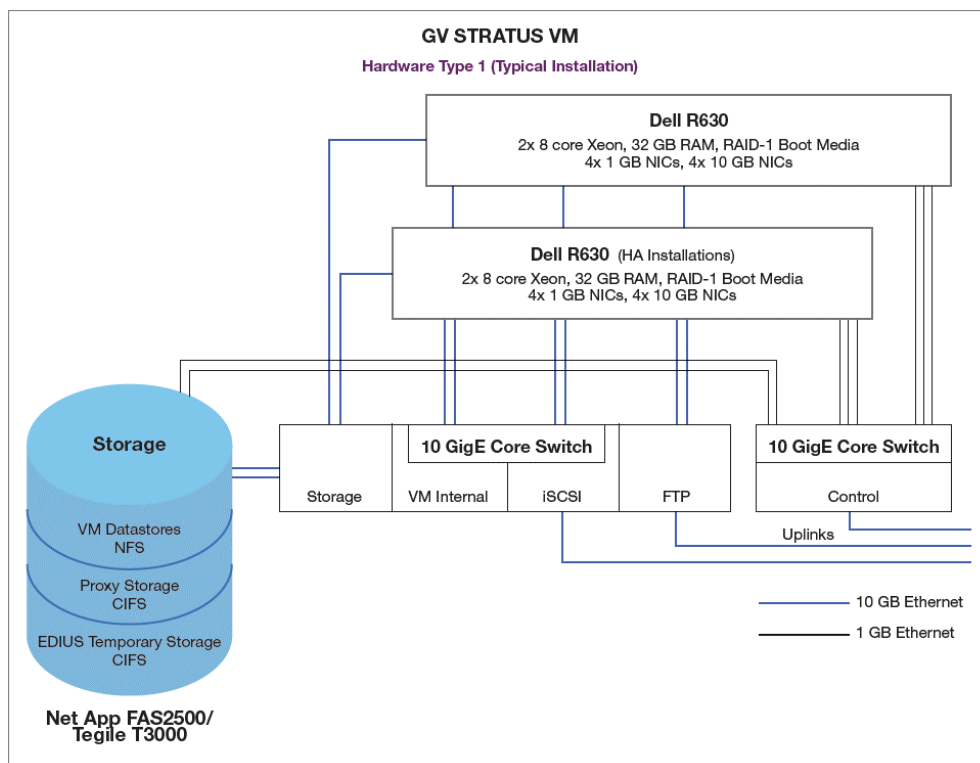
Grass Valley has currently validated two third-party vendor server solutions for virtualized GV STRATUS installations.

- HW Type 1 — Dell rack-mount servers
- HW Type 2 — Cisco UCS Blade servers

Hardware Type 1

Hardware Type 1 uses Dell R630 Servers:

- Supports the following license levels:
 - GV STRATUS VM Express — up to 20 clients, inclusive of EDIUS editors
 - GV STRATUS A1 — up to 50 clients, inclusive of EDIUS editor
- See GV STRATUS VM Compatibility Guide in this application note for minimum hardware requirements
- Two (2) servers are required in a High Availability (HA) environment



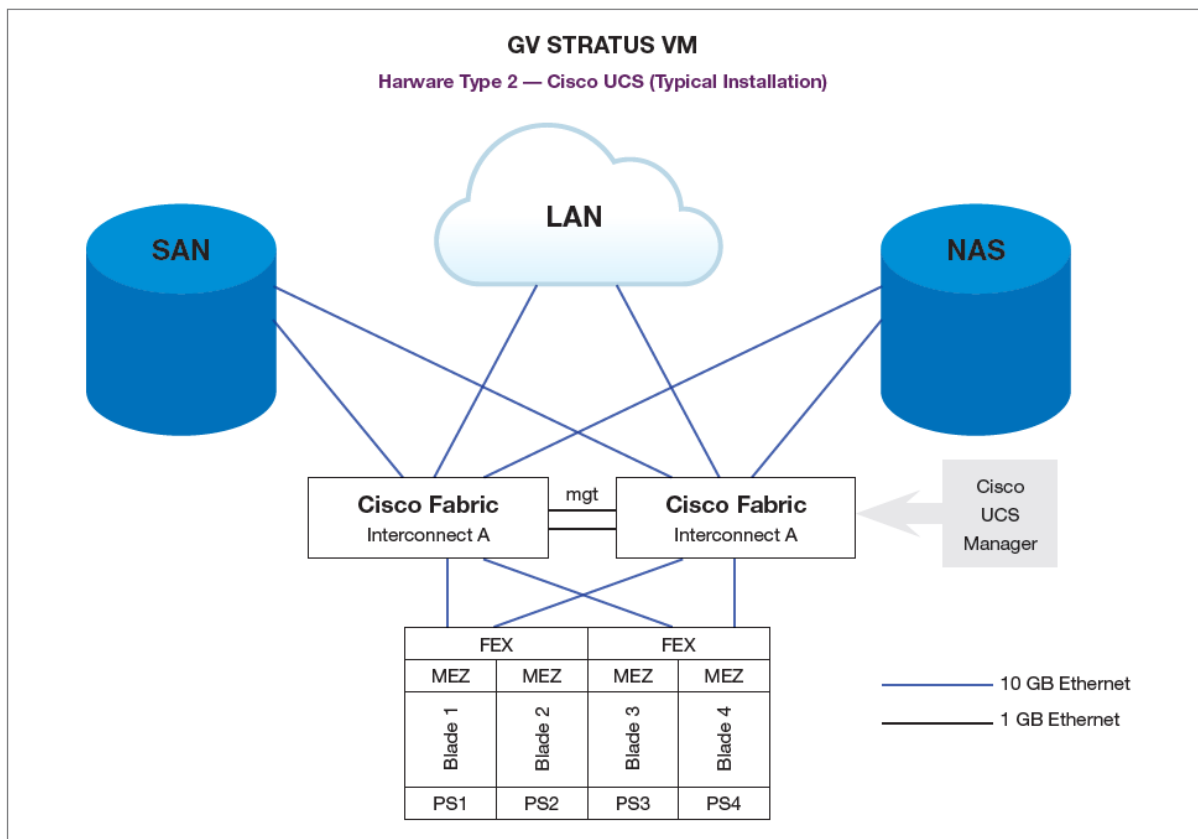
Hardware Type 2

Hardware Type 2 uses the Cisco UCS Blade Server.

Supports the following license levels:

- GV STRATUS VM Express — up to 20 clients, inclusive of EDIUS editors
- GV STRATUS VM A1 — up to 50 clients, inclusive of EDIUS editors
- GV STRATUS VM B1 — up to 100 clients, inclusive of EDIUS editors
- GV STRATUS VM C1 — up to 150 clients, inclusive of EDIUS editors

See GV STRATUS VM Compatibility Guide in this application note for minimum hardware requirements.



Storage

Grass Valley has currently validated two third-party options for storage in GV STRATUS virtualized solutions. These storage configurations have been tested and found to provide the high performance and low latency that GV STRATUS systems require. The following systems have been validated for storing VM images and Proxy media:

- Network Appliance hybrid arrays, with SSD cache enabled
- Tegile hybrid arrays, with SSD cache enabled

Additionally, Grass Valley has validated the following storage *for Media use only* (see detailed sections below):

- GV ION Pro (Isilon)

Storage Best Practice required to achieve acceptable performance:

- Provide a separate, dedicated network path for the vSphere datastores
- Provide a separate, dedicated network path for CIFS storage
- Minimize the number of network hops between the VMware host(s) and the storage system
- GV STRATUS virtualized systems require several different types of data storage:
- Storage for vSphere datastores
- Proxy storage
- Working storage for EDIUS projects
- Temporary storage for GV STRATUS Engines — DME, Transcode, etc.

Storage for vSphere Datastores

vSphere datastores are used to hold the files that comprise the actual virtual machines. The following options for vSphere Datastores have been tested and are supported.

- NFS Datastore on Network Appliance hybrid array, SSD cache enabled
- NFS Datastore on Tegile hybrid array, SSD cache enabled

Proxy Storage

CIFS storage is used to contain the lower resolution versions of the video assets managed by the GV STRATUS system, also known as proxy storage. These files are generated by a K2 Summit client or a GV STRATUS Render Engine and are served by the GV STRATUS Proxy Server. Excellent read and write performance to/from this share is important to maintain good performance of the GV STRATUS system. Additional requirements:

- 10 GB network interface
- Proxy storage share name must be “proxy”

- The service accounts used on the Proxy Server and all K2 Summit clients require read/write access
- The following options for proxy storage have been tested and are supported:
- CIFS share on Network Appliance hybrid array, SSD cache enabled
- CIFS share on Tegile hybrid array, SSD cache enabled
- CIFS share on Grass Valley ION Pro (Isilon) array, SSD cache enabled

Working Storage for EDIUS Projects

EDIUS needs a dedicated CIFS share for storage of projects and temporary files. This share needs to be accessible to all EDIUS clients. Good read/write performance of this share is critical to good performance of the editors. Additional requirements:

- 10 GB network interface
- All EDIUS clients require read/write access
- Must be a separate share from the proxy and engine shares but may be on the same volume
- The following options for working storage for EDIUS projects have been tested and are supported:
- CIFS share on Network Appliance hybrid array, SSD cache enabled
- CIFS share on Tegile hybrid array, SSD cache enabled
- CIFS share on Grass Valley ION Pro (Isilon) array, SSD cache enabled

Temporary Storage for GV STRATUS Engines

The various services that the GV STRATUS system requires use CIFS storage for temporary work space. There should be a dedicated CIFS share for this purpose. Good read/write performance of this share is critical to good performance of the service engines. Additional requirements:

- 10 GB network interface
- The service accounts running the engines require read/write access
- Must be a separate share from the proxy and EDIUS shares but may be on the same volume
- The following options for temporary storage for GV STRATUS engines have been tested and are supported:
- CIFS share on Network Appliance hybrid array, SSD cache enabled
- CIFS share on Tegile hybrid array, SSD cache enabled
- CIFS share on Grass Valley ION Pro (Isilon) array, SSD cache enabled

GV STRATUS VM Networking

A GV STRATUS virtualized system requires the same networking considerations as a physical GV STRATUS system. Depending on the role, or roles, that each GV STRATUS VM server is performing, connections to any of five networks may be required as shown in the table below.

Server Role	VM Storage* ₁	Control	FTP	Media 1	Media 2* ₂
Express Core	Yes, 10 GB	Yes, 1 GB	Yes, 10 GB	No	No
A1 Core	Yes, 10 GB	Yes, 1 GB	Yes, 10 GB	No	No
B1 Core 1	Yes, 10 GB	Yes, 1 GB	Yes, 10 GB	No	No
B1 Core 2	Yes, 10 GB	Yes, 1 GB	Yes, 10 GB	No	No
C1 Core 1	Yes, 10 GB	Yes, 1 GB	Yes, 10 GB	No	No
C1 Core 2	Yes, 10 GB	Yes, 1 GB	Yes, 10 GB	No	No
Proxy Head	Yes, 10 GB	Yes, 1 GB	No	No	No
GV Render Engine (GVRE)	Yes, 10 GB	Yes, 1 GB	Yes, 10 GB	Yes, 10 GB	Yes, 10 GB
Data Mover Engine (DME)	Yes, 10 GB	Yes, 1 GB	Yes, 10 GB	No	No
Workflow Engine (WFE)	Yes, 10 GB	Yes, 1 GB	Yes, 10 GB	No	No

*1 VM Storage on vSphere datastores.

*2 Media 2 network only used in redundant K2 SAN configurations.

Networking Best Practices

For best performance and highest reliability, the following best practices are recommended:

- Be sure that all physical switches are on the vSphere supported equipment list
- Use redundant physical networking whenever possible
- Use multiple vNICs when possible
- Isolate traffic by using separate virtual switches and vNICs for each network
- Use jumbo frames for accessing VM datastores if equipment permits
- Minimize the number of network hops between the VMware hosts, storage and other devices they interact with.

Network Naming Conventions

GV STRATUS VM systems come from the factory with network interface names as shown below.

During deployment you are presented with an opportunity to map each factory network name to a network name found in the vSphere environment at the installation site. The network names at the user installation site may differ from those shown below.

Factory Network Name	Purpose
Control Connection	GV STRATUS control network, database access, access to corporate network
FTP Connection	Reading and writing of media files
Media Connection 1	Access to high-res clips on K2 storage
Media Connection 2	Access to high res clips on K2 storage, only used on redundant K2 systems

Manufacture and Distribution of VMs

Each GV STRATUS VM is manufactured and configured by Grass Valley to the specifications of a customer's order. This ensures that the VM is properly configured and that the Microsoft products on the VM have been correctly licensed with the unique license code sold as part of that VM.

During the manufacturing process, each VM is sized for the specific role it will play in the system, the appropriate GV STRATUS software is installed and configured on each VM, and the requested IP addresses have been put in place. Grass Valley then tests the complete order as a system prior to distribution.

Distribution Method

After manufacturing and testing, each VM is exported to an OVF file and placed on a USB drive(s) that is sent to the customer. Each OVF file represents a single VM, each disk should contain all the VMs related to a single line item on the customer order. If an order includes multiple GV STRATUS VM line items, multiple disks will be shipped. It is important to handle the USB drives with care, if the drive becomes damaged from mishandling and a replacement drive is needed you could lose valuable time in getting your system online. It is also important to be aware that all necessary Microsoft license keys come *pre-installed on GV STRATUS VMs* and the proof of evidence for those licenses is included with each USB drive. Embedded license keys in GV STRATUS VMs are not transferable to other VMs or devices, and must be retained for audit purposes. Please keep your USB drives in a safe place!

On-site Installation Prerequisites and Preparation

The vSphere and network infrastructure at the deployment site must be in place before the GV STRATUS VM components can be deployed. The following should all be in place, be healthy and have sufficient resources to support the GV STRATUS VM system ESXi hosts.

In most cases, the user is responsible for purchasing, installing and configuring the VMware ESXi hosts. Please verify that the ESXi hosts match the supported hardware configurations for a system of the specified size.

Host Licenses

Normally the user is responsible for purchasing and installing the vSphere licenses used on the ESXi host, or on the vCenter server in a multi-host environment. Take care to validate that the vSphere licenses for each host matches a supported version and a supported edition as specified in the GV STRATUS VM Compatibility Guide.

vCenter

In a vSphere environment with more than one ESXi host, a vCenter server is required. vCenter is a crucial part of any vSphere environment that has more than one host — it is the portal used to manage the hosts, virtual networks, storage and virtual machines.

Network

In any VMware environment there are two parts to the network:

- The virtual network defined within the ESXi hosts
- The physical network that connects the ESXi hosts to the other Grass Valley equipment and the rest of the user's network

The system report, which accompanies the order, specifies which servers have interfaces on which networks and what IP each of those interfaces have. It should be verified that:

- All networks that will be used by the VMs have been defined on the virtual switches on each host
- There is a record of the VLAN name for each network

VMs are shipped from the factory with network names that match those shown on the system report. When deploying the VMs, there will be a prompt to map those names to a VLAN name defined on the vSphere infrastructure. Have that information ready before attempting to deploy the VMs.

It is essential to verify that the physical network is correctly built.

All vNICs associated with each VLAN must have the recommended bandwidth and redundancy as specified in the GV STRATUS VM design documentation.

Storage

Proper storage for the VMs, for proxy, EDIUS working files and the GV STRATUS servers is critical for good system performance. All storage should comply with supported storage options specified by Grass Valley.

Identify early in the deployment process the storage that will hold the VMs since this information is required when deploying each VM.

Deploying GV STRATUS VM Images

Multiple Host System With vCenter

Requires the following:

- PC with: Access to the same network as the vSphere host (single host environment) or the users vCenter server (multihost environment)
- An available USB-3 port
- An account on the vSphere environment with the privileges listed below:
 - Virtual machine.Inventory.Create from existing
 - Virtual machine.Configuration.Add new disk
 - Virtual machine.Provisioning.Deploy template
 - Resource.Assign virtual machine to resource pool
 - Datastore.Allocate space
 - Network.Assign network

Do the following to deploy the VMs into an environment managed by a vCenter (also see Appendix 1 for environments with no vCenter):

- Launch vSphere web interface, **do not use the standalone vSphere client**
- Log into the environment with an account with the privileges shown above
- Select Hosts and Clusters
- Select the cluster to deploy the VM
- Right-click and select “deploy OVF Template...”
- Using the browse button to locate the VM to be deployed on the USB drive
- Click the box that says “Accept extra configuration options.” This is necessary to copy resource information needed for the successful operation of GV STRATUS VMs
- Check that the name is correct and select the container to deploy to
- Select the resource pool if appropriate
- Select the disk where the VM is to be stored, select the desired provisioning
- When prompted, map the factory networks to the correct networks for your environment
- Click “Finish”
- Repeat the process for each VM in your order
- Contact the Grass Valley Field Service Team and advise them that the systems are ready for commissioning

Single Host System *Without* vCenter

To deploy the VMs you will need the following:

- PC with: Access to the same network as the vSphere host (single host environment) or the users vCenter server (multi host environment)
- An available USB-3 port
- An account on the vSphere environment with the privileges listed below:
 - Virtual machine.Inventory.Create from existing
 - Virtual machine.Configuration.Add new disk
 - Virtual machine.Provisioning.Deploy template
 - Resource.Assign virtual machine to resource pool
 - Datastore.Allocate space
 - Network.Assign network

Since there is no web interface to a single host not managed by vCenter, use the following steps to deploy the VMs into a single host environment:

- Launch the standalone vSphere client
- Log into the environment with an account with the privileges shown above
- Select “Inventory”
- Select the host
- Go to the file menu and select “Deploy OVF Template...”
- Using the browse button, locate the VM to be deployed on the USB drive
- Click the box that says “Accept extra configuration options.” This is necessary to copy resource information needed for the successful operation of GV STRATUS VMs
- Check that this is the correct VM
- Check that the name is correct
- Select the disk where the VM is to be stored, select the desired provisioning
- When prompted, map the factory networks to the correct networks for the environment
- Click “Finish”
- Set the Latency Sensitivity to high; Repeat the process for each VM in order
- Set the Latency Sensitivity to high on core servers:
 - This step is only necessary on the core server
 - Edit the VM properties
 - Select the “Options” tab
 - Select “Advanced” → “General”
 - Click the “Configuration Parameters” button
 - Locate the “sched.cpu.latenctSensitivity” parameter
 - Change the value from “normal” to “high”
 - Click “OK” to save the settings
- Contact the Grass Valley Field Service Team and advise them that the systems are ready for commissioning

GV STRATUS VM Detailed Descriptions

GV STRATUS VM systems are available in the same system “variants” as physical GV STRATUS systems:

- VM Express
- VM A1
- VM B1
- VM C1

GV STRATUS VM EXPRESS

The GV STRATUS VM Express configuration will support up to 20 clients, inclusive of EDIUS editors.

The GV STRATUS VM Express requires one dedicated physical host of *HW Type 1* or *HW Type 2*. Two dedicated physical hosts of *HW Type 1* are required in a high availability deployment with vSphere HA.

A GV STRATUS VM Express is comprised of three virtual machines — a core virtual machine, a render engine virtual machine, and a proxy server virtual machine. All GV STRATUS core services are installed and run on the core VM.

GV STRATUS Render Engines (GVRE) can be run as required; VM Express systems come with a single GVRE instance VM as part of the the Core server package (run as a separate VM from the Core itself), and support 1 additional GVRE instance if required.

GV STRATUS Core VM

CPU

- 8vCPU – **2 Virtual Sockets with 4 Cores per Socket**
- Shares set to Custom 19000
- **Reservation** set to **19000 MHz**

Memory

- **12288 MB** (12 GB)
- **Shares** set at **Normal**
- **Reservation** set to **12288 MB**

VM Advanced Options

- **Latency Sensitivity** set to **High**

GV STRATUS Render Engine (RE) VM

CPU

- 12vCPU – **2 Virtual Sockets with 6 Cores per Socket**
- **Shares** set to **Normal**
- **No Reservation** or **Limit**

Memory

- **4096 MB** (4 GB)
- **Shares** set to **Normal**
- **No Reservation** or **Limit**

GV STRATUS Proxy Server VM

CPU

- 4vCPU – **2 Virtual Sockets** with **2 Cores per Socket**
- **Shares** set to **Normal**
- **Reservation** set to **9500 MHz**

Memory

- **4096 MB** (4 GB)
- **Shares** set to **Normal**
- **Reservation** set to **4096 MB**

GV STRATUS VM A1

The GV STRATUS VM A1 configuration will support up to 50 clients, inclusive of EDIUS editors.

The GV STRATUS VM A1 requires one dedicated physical host of *HW Type 1* or *HW Type 2*. Two dedicated physical hosts are required in a high availability deployment with vSphere HA.

A GV STRATUS VM A1 is comprised of two virtual machines — a core virtual machine and a proxy server virtual machine. All GV STRATUS core services are installed and run on the core VM.

GV STRATUS Render Engines (GVRE) can be run as required; A1 systems support multiple GVRE instances (no GVRE runs on the Core server image).

GV STRATUS Core VM

CPU

- 12vCPU – **2 Virtual Sockets** with **6 Cores per Socket**
- **Shares** set to **Custom 28000**
- **Reservation** set to **28000 MHz**

Memory

- **16384 MB** (16 GB)
- **Shares** set at **Normal**
- **Reservation** set to **16384 MB**

VM Advanced Options

- **Latency Sensitivity** set to **High**

GV STRATUS Proxy Server VM

CPU

- 4vCPU – **2 Virtual Sockets** with **2 Cores per Socket**
- **Shares** set to **Normal**
- **Reservation** set to **9500 MHz**

Memory

- **4096 MB** (4 GB)
- **Shares** set to **Normal**
- **Reservation** set to **4096 MB**

The GV STRATUS A1 VM core server package does not include a Render server (GVRE), but most systems will include at least 1 GVRE. The following specification needs to be provided for each GVRE VM included in the system:

STRATUS VM RE (Render Engine)

CPU

- 14vCPU – **2 Virtual Sockets** with **7 Cores per Socket**
- **Shares** set to **Custom 33500**
- **Reservation** set to **33500 MHz**

Memory

- **12288 MB** (12 GB)
- **Shares** set at **Normal**
- **Reservation** set to **12288 MB**

GV STRATUS VM B1

The GV STRATUS VM B1 configuration will support up to 100-150 clients inclusive of EDIUS editors.

The GV STRATUS VM B1 requires two dedicated physical hosts of *HW Type 2*. At least three dedicated physical hosts of *HW Type 2* are required in a high availability deployment with vSphere HA.

A GV STRATUS VM B1 is comprised of three virtual machines — two core virtual machines (Core1 & Core2) and a proxy server virtual machine.

The GV STRATUS Workflow Engine, Rules Engine, XcodeControl Engine, and DataMover Engine are installed and run on the Core2 VM.

All other GV STRATUS core services are installed and run on the Core1 VM.

GV STRATUS Render Engines (GVRE) can be run as required; B1 systems support multiple GVRE instances (no GVRE runs on the Core server image).

GV STRATUS Core1 VM

CPU

- 12vCPU – **2 Virtual Sockets** with **6 Cores per Socket**
- **Shares** set to **Custom 28000**
- **Reservation** set to **28000 MHz**

Memory

- **16384 MB** (16 GB)
- **Shares** set at **Normal**
- **Reservation** set to **16384 MB**

VM Advanced Options

- **Latency Sensitivity** set to **High**

GV STRATUS Core2 VM

CPU

- 8vCPU – **2 Virtual Sockets with 4 Cores per Socket**
- **Shares** set to **Custom 18000**
- **Reservation** set to **18000 MHz**

Memory

- **8192 MB** (8 GB)
- **Shares** set at **Normal**
- **Reservation** set to **8192 MB**

GV STRATUS Proxy Server VM

CPU

- 4vCPU – **2 Virtual Sockets with 2 Cores per Socket**
- **Shares** set to **Normal**
- **Reservation** set to **9500 MHz**

Memory

- **4096 MB** (4 GB)
- **Shares** set to **Normal**
- **Reservation** set to **4096 MB**

The GV STRATUS B1 VM core server package does not include a Render server (GVRE), but most systems will include at least 1 GVRE. The following specification needs to be provided for each GVRE VM included in the system:

STRATUS VM RE (Render Engine)

CPU

- 14vCPU – **2 Virtual Sockets with 7 Cores per Socket**
- **Shares** set to **Custom 33500**
- **Reservation** set to **33500 MHz**

Memory

- **12288 MB** (12 GB)
- **Shares** set at **Normal**
- **Reservation** set to **12288 MB**

GV STRATUS VM C1

The GV STRATUS VM C1 configuration will support up to 150-250 clients inclusive of EDIUS editors. The GV STRATUS VM C1 requires two dedicated physical hosts of *HW Type 2*. At least three dedicated physical hosts of *HW Type 2* are required in a high availability deployment with vSphere HA.

A GV STRATUS VM C1 is comprised of four virtual machines — two core virtual machines (Core1 & Core2), a datamover engine (DME) virtual machine and a proxy server virtual machine.

The GV STRATUS Workflow Engine, Rules Engine and XcodeControl Engine are installed and run on the Core2 VM.

All other GV STRATUS core services except for the DME are installed and run on the Core1 VM.

GV STRATUS Render Engines (GVRE) can be run as required; C1 systems support multiple GVRE instances (no GVRE runs on the Core server image).

GV STRATUS Core1 VM

CPU

- 14vCPU – **2 Virtual Sockets with 7 Cores per Socket**
- **Shares** set to **Custom 33500**
- **Reservation** set to **33500 MHz**

Memory

- **32,768 MB** (32 GB)
- **Shares** set at **Normal**
- **Reservation** set to **32768 MB**

VM Advanced Options

- **Latency Sensitivity** set to **High**

GV STRATUS Core2 VM

CPU

- 8vCPU – **2 Virtual Sockets with 4 Cores per Socket**
- **Shares** set to **Custom 18000**
- **Reservation** set to **18000 MHz**

Memory

- **16384 MB** (16 GB)
- **Shares** set at **Normal**
- **Reservation** set to **16384 MB**

GV STRATUS DME VM

CPU

- 4vCPU – **2 Virtual Sockets with 2 Cores per Socket**
- **Shares** set to **Normal**
- **Reservation** set to **9500 MHz**

Memory

- **16384 MB** (16 GB)
- **Shares** set at **Normal**
- **Reservation** set to **16384 MB**

GV STRATUS Proxy Server VM

CPU

- 4vCPU – **2 Virtual Sockets with 2 Cores per Socket**
- **Shares** set to **Normal**
- **Reservation** set to **9500 MHz**

Memory

- **4096 MB** (4 GB)
- **Shares** set to **Normal**
- **Reservation** set to **4096 MB**

The GV STRATUS C1 VM core server package does not include a Render server (GVRE), but most systems will include at least 1 GVRE. The following specification needs to be provided for each GVRE VM included in the system:

STRATUS VM RE (Render Engine)

CPU

- 14vCPU – **2 Virtual Sockets with 7 Cores per Socket**
- **Shares** set to **Custom 33500**
- **Reservation** set to **33500 MHz**

Memory

- **12288 MB** (12 GB)
- **Shares** set at **Normal**
- **Reservation** set to **12288 MB**

GV STRATUS VM Compatibility Guide

This section contains detailed specifications of the components required in order to deploy a GV STRATUS virtualized environment.

VMware

Supported VMware versions: 6.0, 6.5, 6.7

Supported vSphere editions:

License Level	Supported vSphere Editions
Express	Essentials* ¹ , Essentials Plus, Standard, Enterprise, Enterprise plus* ²
A1	Standard, Enterprise, Enterprise plus* ²
B1	Standard, Enterprise, Enterprise plus* ²
C1	Standard, Enterprise, Enterprise plus* ²

*1 Essentials Plus or higher required if vMotion or high availability is required.

*2 vCenter required if more than 1 host and vMotion or high availability is required.

Please note: vCenter 6.0.0 and earlier do not recognize Windows 10 and Windows server 2016 as valid operating systems and there for VM images created with those operating systems may not show the correct operating system when imported on vCenters running those older versions. Upgrading to vCenter 6.5 will solve the problem.

Hosts

Supported host platforms by license level:

License Level	Supported Host configurations
Express	HW type 1, HW type 2
A1	HW type 1, HW type 2
B1	HW type 2
C1	HW type 2

Hardware (HW) Types

Supported hardware configurations (minimum specifications):

HW Type	Vendor	Models	CPU	Memory	Network
1	Dell	R630, R640	2@ 2.6+ GHz 8+ Cores	32GB	4+ @ 1GbE 4+ @ 10GbE
2	Cisco	UCS / UCS Mini	2@ 2.4+ GHz 8+ Cores	64GB Per Blade	4: 20GbE or 40GbE

Storage

Supported storage platforms:

HW Type	Vendor	Models	Protocols	Network
1 and 2	Network Appliance	FAS2500 series Hybrid array	NFS — Datastores CIFS — Proxy/EDIUS	Dedicated 10 GB network required for each protocol
1 and 2	Tegile	HA2100-HA2300 hybrid arrays T3100-T3400 hybrid arrays	NFS — Datastores CIFS — Proxy/EDIUS	Dedicated 10 GB network required for each protocol