vitalcenter

GALEN HEALTHCARE SOLUTIONS

VitalCenter Server Requirements

The following requirements and recommendations represent ballpark recommendations for “average” 100 provider and 300 provider groups, with 20/patients/provider/day with a rolling window of 35 days of appointments. Please contact us for recommendations specific to your use of VitalCenter.

Server Hardware Requirements

Item	**100-Provider Group**	**300-Provider Group**
Processor	8 Cores* at 2.8Ghz (Intel Xeon E5560 or comparable)	12 Cores* at 2.66Ghz (Intel Xeon X5650 or comparable)
Memory	32 GB	64 GB
Storage	**VitalCenter has four primary storage needs:** **Database Data Files:** The data files hold all of the VitalCenter configuration and EHR clinical data. These two data files require the highest performing storage, and a large amount of storage relative to the other data needs. The data file containing EHR clinical data will be approximately 1/6th the size of the Allscripts EHR data file. Ex: Works.mdf = 200GB, VitalCenter_EHRData.ndf = 33.3GB. The VitalCenter database will grow at approximately the same rate as Allscripts EHR. **Database Log Files:** The log files are used by SQL server when processing information. Each extract (ETL) of EHR data will cause the log files to grow. The initial ETL and any subsequent "full" ETLs will grow the logs to approximately the same size as the data files. The log file should be on high performing storage, and will have equivalent needs to the Data files for storage volume. The log files will be approximately 1/6th the size of the Allscripts EHR data file. Ex: Works.mdf = 200GB, VitalCenter_log.ldf = 33.3GB. **Application Files:** The VitalCenter application files (EXEs, DLLs, etc). These files are relatively small - in the megabytes - and only require normal storage speeds - RAID 1.	

<table>
<tr><td></td><td colspan="2">Documents (VitalCharts and Scans):

- The Documents that VitalCenter generates are stored on the server. RAID 1 is sufficient here as well.
- VitalCharts have a relatively small storage need, though this depends on your configuration of VitalCenter and number of providers. 5gb per 100 physicians is a good rule of thumb for storage size, though actual size generally runs 1-3gb per 100 providers.
- Scanned Images will vary. The three primary drivers will be the average size of the images, the number of images pulled for each appointment and the number of appointments with scanned images. 15gb per 100 physicians is a good rule of thumb for storage size.

Backup Files: We recommend backing up each database to disk before archiving to your own enterprise backup system. The Backup Files will be approximately the size of the Database Data Files, plus Log Files.</td></tr>
<tr><td></td><td colspan="2">Note: Clients that utilize a SAN for VitalCenter database and document storage should consider utilizing RAID 10 arrays for both the VitalCenter_EHRData.ndf and the VitalCenter_log.ldf and the VitalCenter_log.ldf files. VitalCenter documents can be stored on a RAID 1 array or similar.

Global hot spare highly recommended for internal storage configurations.</td></tr>
<tr><td></td><td>• OS: RAID 1 - 10k RPM SAS or similar.
• Application, Documents and Backup Files: RAID 1 - 10k RPM SAS or similar.
• Database Data: FusionIO SLC
• Database Logs: FusionIO SLC</td><td>• OS: RAID 1 - 10k RPM SAS or similar.
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• Backup Files: RAID 1 - 10k RPM SAS or similar.</td></tr>
<tr><td>Networking</td><td>Dual Embedded Gigabit NICs</td><td>Dual Embedded Gigabit NICs</td></tr>
<tr><td>Operating System</td><td>Windows Server 2008 R2 x64 Standard (5 CAL)</td><td>Windows Server 2008 R2 x64 Enterprise (25 CAL)</td></tr>
</table>

Other Software	• SQL Server 2008 R2 x64 Standard (5 CAL). If server has more than 64GB of RAM, the Enterprise edition of SQL Server is recommended in order to utilize the memory space past 64GB. • IIS 7.0 (Basic Authentication, Windows Authentication, ASP.NET) • MSMQ (HTTP Support) • .Net 3.X (WCF with everything)
Fusion IO	As you will see, Galen recommends a newer drive technology with the FusionIO drives. These drives provide the right combination of performance and space requirements that we look for with VitalCenter. These drives are NAND memory-based drives that connect though PCI Express slots. These drives provide higher read/write speeds, higher IOPS and lower access times than even the highest-end SANs, let alone a 5 or 10 drive RAID array. With internal drive arrays, we would also be creating RAID arrays with a majority of the available storage to be left unused. You may find more information on their website: http://www.fusionio.com/products/iodrive/, or contact us with any questions.
* Cores	Cores are defined as physical cores. With hyper threading a single physical core is one core, not the two cores it may appear as in Windows or virtualization. With virtualization, to achieve the same number of cores, hyper threading must be turned off, or the number of cores doubled for proper comparison.

VitalCenter Server Appliance

The following server appliances are pre-built to meet the specific needs of VitalCenter. The appliance needed for any specific group will be based on a number of factors, including Allscripts database size, group size and projected growth. The following examples are ballpark estimates based on the number of providers.

Providers	Server Configuration
50	**VitalCenter 1000 Appliance** **CPU:** (2) Quad-core Intel Processors **Memory:** 24GB RAM **Drive 1 – OS, Application, Document and Backup:** (4) 146 GB 10k SAS disks in a

	RAID 5 array. **Drive 2 – SQL Data and Logs:** (2) 50 GB SSD **OS:** Window Server 2008 R2 x64 Standard (5 CAL) **SQL:** SQL Server 2008 R2 x64 Standard (5 CAL) **Warranty:** 3-year 4-hour response warranty **Estimated Cost:** $8,550
100	**VitalCenter 2000 Appliance** **CPU:** (2) Hex-core Intel Processors **Memory:** 36GB RAM **Drive 1 – OS, Application, Document and Backup:** (4) 146 GB 10k SAS disks in a RAID 5 array. An additional disk available as global hot spare. **Drive 2 – SQL Data and Logs:** 80GB FusionIO ioDrive SLC **OS:** Window Server 2008 R2 x64 Standard (5 CAL) **SQL:** SQL Server 2008 R2 x64 Standard (5 CAL) **Warranty:** 3-year 4-hour response warranty **Estimated Cost:** $13,350
300	**VitalCenter 3000 Appliance** **CPU:** (2) Hex-core Intel Processors **Memory:** 72GB RAM **Drive 1 – OS:** (2) 146 GB 15k SAS disks in a RAID 1 array. **Drive 2 – Application, Document and Backup:** (3) 146 GB 15k SAS disks in a RAID 5 array. An additional disk available as global hot spare. **Drive 3 – SQL Data and Logs:** 160GB FusionIO ioDrive SLC **OS:** Window Server 2008 R2 x64 Enterprise (25 CAL) **SQL:** SQL Server 2008 R2 x64 Standard (5 CAL) **Warranty:** 3-year 4-hour response warranty **Estimated Cost:** $25,650
>300	Groups with more than three hundred physicians may require an appliance with upgraded FusionIO storage, or a custom-built server for VitalCenter.

PC Hardware Requirements

Item	Minimum Configuration
Processor	2.0 GHz or higher
Memory	1 GB
Storage	Storage: 2gb available disk space generally recommended. A conservative estimate is 25kb per appointment without scanned images, and 325kb per appointment with a configuration of showing the last three scanned images.
Networking	A 100mbps Ethernet connection to your network, with access to the VitalCenter server via HTTP and HTTPS
Operating System	Supported operating systems: • Windows XP Professional, SP2 or higher • Windows Vista Business, Enterprise and Ultimate • Windows 7 Professional, Enterprise and Ultimate
Monitor	17" or larger monitor with 1024x768 resolution
Other	You may install VitalCenter on existing PCs that are used to access the EHR.
	Security and access to PCs is the responsibility of the client, though all communications run over secure SSL connections, and the PDFs on each PC are encrypted and all access is audited and reportable from the VitalCenter server.

Other Requirements

Connectivity

Galen uses Enexity's SecureLink product for access to the VitalCenter server. A SecureLink Gateway must be installed on the VitalCenter server to provide access during the implementation of VitalCenter, and for ongoing support. This will be a separate SecureLink Gatekeeper from any Gatekeepers used by Allscripts.

Support Account

A Windows account for the support of the VitalCenter server must be provided to Galen.

- This account must either:
  - Always be active and unlocked, password changes provided to Galen 24 hours in advance of the change, or when changed if advanced notice is not possible, or
  - The Client provide documented procedures for the use of the account and these procedures are approved by Galen
- This account must be:
  - An Administrator on the VitalCenter server.
  - In the sysadmin role in SQL Server on the VitalCenter Server

Service Account

VitalCenter utilizes a Windows Service Account to run many of its components, including Windows Services, IIS Application Pools and Domain Authentication for Access Control. This account must be a user on the Active Directory Domain.

The user does not need to be an administrator – neither on the domain nor locally on the VitalCenter Server.

The user will be granted limited access to local resources, including local folders and VitalCenter application files during the VitalCenter server installation. We recommend naming this user VitalCenterService, though any login name may be used.

Encrypting File System (EFS)

For clients using an Active Directory Domain, it is required that EFS be enabled and a valid certificate be present. The purpose of EFS is to enable file-level security with access controlled by the domain.

* See Microsoft KB for more information: http://support.microsoft.com/kb/937536

Access to VitalCenter Update Server

Our VitalCenter Update Server communicates updates from Galen to be available for your environment, which you will choose to apply at your own schedule. We also gather basic utilization statistics regarding usage of the product.

- The VitalCenter Server at your site must have access to the Galen VitalCenter Update Server via HTTP/HTTPS.
- The current Galen VitalCenter Update Server is vc-updates.galenhealthcare.com.

SQL Server 2008 R2 x64

- Standard or Enterprise – see Server Hardware Requirements above
- SQL Server Integration Services (SSIS)
- SQL Server Reporting Services (SSRS)
- Client Components (Management Studio)
- Mixed Mode Authentication
- Galen recommends Microsoft Best Practice of one Temp DB file per processor core
- Do NOT set the SQL Option of Boost SQL Server Priority

Connection to the EHR database

- Connection: A persistent network connection from the VitalCenter Server to the Allscripts Enterprise EHR Database must exist allowing for the ETL to extract data from the database. We recommend a 1 gigabit connection, with a 100mbit minimum. Latency over the connection must be low; ideally less than 10ms per round trip.
- SQL Server Database
    - The login:
        - Preferred: A new SQL login can be created on the Allscripts Enterprise EHR database server named "VitalCenterUser". Your VitalCenter implementation technician will provide a SQL Script to create this login.
        - Alternative: Provide Galen with the login and password of the login that you would like VitalCenter to use for data access.
    - Schema changes:
        - A handful of indexes will be added to the Works Database. Your VitalCenter implementation technician will provide these indexes during the implementation.
            - IX_VitalCenterHelper: improve data extract speeds over all of the patient-centric ETL data sets. This index will require roughly 1 GB of disk space for every 40 million rows in the dbo.AUDIT_LOG table.
            - IX_VitalCenterHelper2: improve data extract speeds over all of the patient-centric ETL data sets. This index will require roughly 1MB for every 100,000 rows in the dbo.Person table.
            - IX_VitalCenterHelper3: improve data extract speeds for the extract of Task data. This index will require roughly 240MB for every 1 million rows in the dbo.IDX_Task_Audit table.

Ports

- VC Server to Allscripts EHR DB Server
    - Port 1433 for SQL
- VC Clients – VC Server

- Ports 443 and 80 for:
  - Terminal client communication (manifests, settings, documents, etc).
  - Management site
  - Microsoft Message Queuing (MSMQ)

Thank You

We set the above requirements to allow us to best serve you as a client of ours. We use firm language above in our requirements and policies to help convey the importance of these requirements and policies in allowing VitalCenter to operate at peak levels with limited impact on the EHR. This creates an environment in which Galen can best support this product. If you have specific concerns with any of these requirements or policies, please let us know and we'll do our best to work with you to find an acceptable solution.