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## SIMULATIONiQ™ Enterprise

*Cloud IT Guidelines*

### **Education Management Solutions, LLC**

436 Creamery Way, Suite 300

Exton, PA 19341

Phone: 877.EMS.5050 (877.367.5050)

[www.SIMULATIONiQ.com](http://www.SIMULATIONiQ.com)

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SharpZipLib	<a href="https://www.nuget.org/packages/SharpZipLib/">https://www.nuget.org/packages/SharpZipLib/</a>
FFDSHOW	<a href="http://ffdshow-tryout.sourceforge.net/">http://ffdshow-tryout.sourceforge.net/</a>

## 1 Welcome

The purpose of this document is to provide Education Management Solutions’ (EMS) client IT Groups with a broad understanding of the Enterprise application deployment environment and the expectations placed on IT for successful implementation. The IT group is an important partner for EMS to provide assistance in network configurations and policy compliance for the Enterprise application solution in the client environment. This document presents the application architecture, along with IT and network needs, to allow efficient project planning and proper implementation of a successful solution.

## 2 Enterprise

### 2.1 Introduction

Enterprise is a distributed web-based application solution that includes programs and database servers communicating with other AV and computing devices. Enterprise product suites consist of two major software applications hosted across numerous computer servers. The following table provides the breakdown of the server and other component needs:

Product Name	Web Server	Database Server	DVCS / DVR Server	Storage	Workstation/ Laptop
Enterprise	✓	✓			✓
Enterprise AV	✓	✓	✓	✓	✓
Enterprise Cloud	Cloud	Cloud	Cloud/ Cloud Appliance	Cloud	On Premises

**Note:** The number of Digital Video Recorder (DVR) and Workstation/Laptops depend on the user requirements.

### 2.2 Applications

The Enterprise Solution is made up of two applications. One is Enterprise that is a web-based application to support the needs of Standardized-patient (SP) based training and evaluation and mannequin-based learning. All audio-video digital recording and streaming is part of the second application called Enterprise AV.

#### 2.2.1 Enterprise

The Enterprise software integrates, automates and manages the complete clinical skills and simulation training and exam process including:

The solution is web-based and supports the learning and operational needs of a clinical skills learning center and a simulation center. The system creates a centralized database for SP and student information, history, statistics and data analysis and easily integrates with SAML. The system supports multiple departments or outside users and supports satellite or remote facilities and connections. When integrated with Enterprise AV, the system can perform fully automated recorded sessions for your students.

In addition, it can interface with mannequin-based patient simulators from third-party vendors, such as Laerdal, Gaumard, and METI. Please note the level of this integration, in terms of information access and sharing, is dependent on the interface protocol provided by simulator manufacturer. In simulation

environments, Enterprise AV records audio and video from the simulation rooms as well as captures patient monitor display information and event logs from the simulators themselves, providing a complete recording of the simulation session.

### **2.2.2 Enterprise AV**

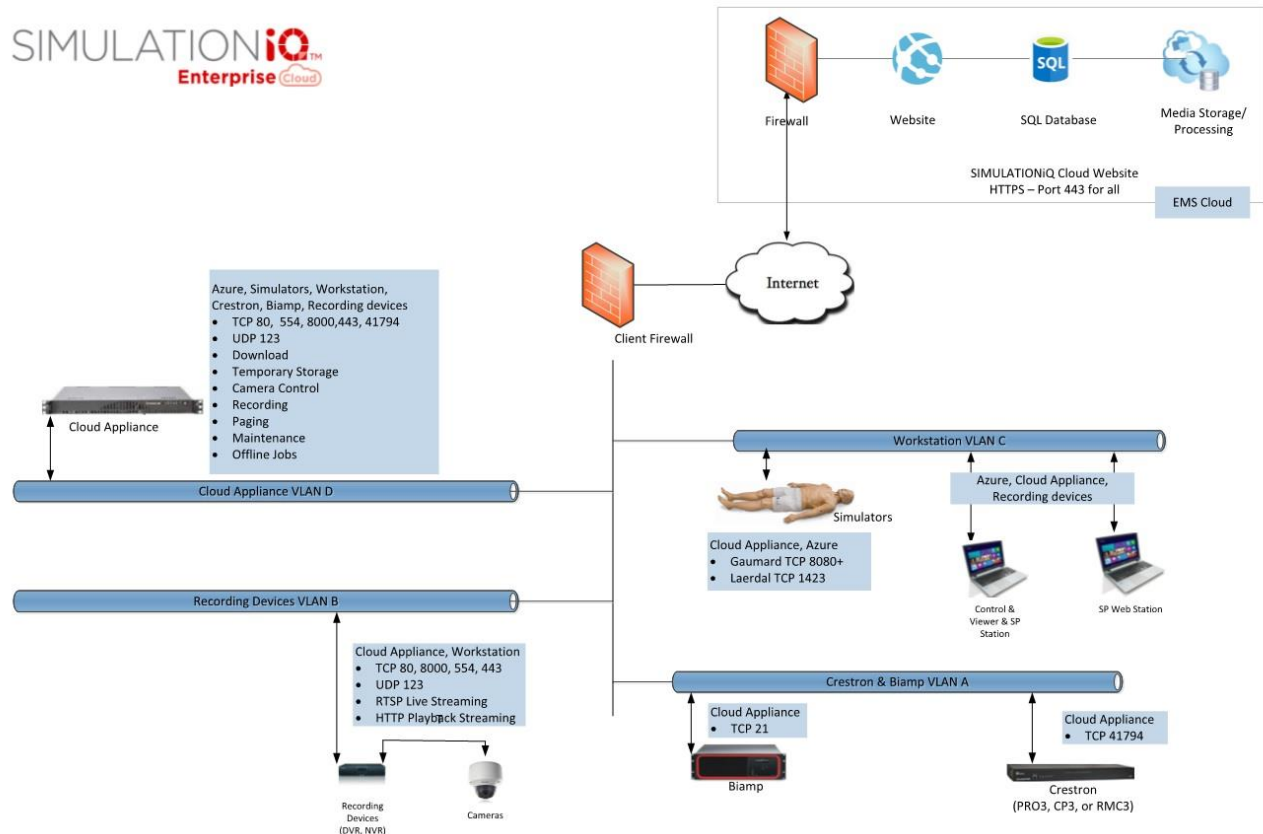
Enterprise AV has a number of hardware and software components. It allows the user in a clinical skills environment to manage and support the digital recording and announcements in the rooms as well as control the camera pan, tilt and zoom capability. Enterprise AV provides a completely automated and integrated solution for the center. It automates remote access of the video through a web-enabled environment for both live and recorded videos. Enterprise AV automates the complete backup process for digital video recordings and provides flexible and secure access for students, faculty, or other users through an integrated streaming server.

### **2.2.3 Enterprise Cloud**

In addition to on-premises, SIMULATIONiQ Enterprise solution can also be deployed in Cloud environment. Web based software application is delivered from Cloud which integrates with on-premises deployment of AV components. Cloud appliance connects with client's dedicated SIMULATIONiQ Enterprise Cloud Instance using secure transmission of data. SIMULATIONiQ Enterprise Cloud automates the complete backup process for digital video recordings and provides flexible and secure access for students, faculty, or other users through an integrated streaming server.

## 2.3 Architecture

The distributed architecture of the SIMULATIONiQ Enterprise Cloud solution appears below:



The Enterprise IT components include:

1. **Recording Devices** – These servers host the video recording and provide the secondary storage of the video recordings. The quantity is determined by the scope of the project as designed by EMS design engineers.
2. **Cloud Appliance** – Links the local Audio Video equipment to the client's dedicated SIMULATIONiQ Enterprise Cloud instance. The Cloud Appliance requires HTTPS (Port 443) connectivity to the Client's dedicated Cloud instance.
3. **Streaming Server (ESS)** – This server provides cross-browser support for low-latency live streaming of audio and video from the recording devices over the network.
4. **Control Station** – This desktop hosts the Enterprise AV Control Station application. An EMS-provided PC (optional) is located in the central control room for center-wide management. Multiple control stations are sometimes proposed as determined by the scope of the project.
5. **Viewer/Debrief Station(s)** – These desktops/laptops host the Enterprise AV Viewer and AV Debrief application. Multiple stations are sometimes proposed as determined by the scope of the project.
6. **SIM Client** – This is an Enterprise AV Simulator interface application that is installed on the simulator control workstations and allows automated connectivity for information transfer between simulators and the Enterprise AV system. Please note the extent of this information access and sharing depends on the interface protocol defined by the simulator manufacturer.

7. **SP Room Stations\*** – These desktops/laptops are provided in Clinical Patient rooms for patients to complete their learner evaluations. Multiple stations are proposed as determined by the scope of the project.
8. **Student Post Encounter Stations\*** – These desktops/laptops are provided outside clinical patient rooms for learners to complete their patient evaluation. Multiple stations are proposed as determined by the scope of the project.
9. **Faculty/Office Stations\*** – These stations are client users who can access the Enterprise website using their computer workstations.
10. **Web Viewer Stations\*** – These stations are client users who can access the Enterprise website using their computer workstations.
11. **Video Display Panel** – This application enables the Control Room operator to monitor all camera views on a large display (screen size ranges from 22” to 42”). Please note that this functionality can also be made available using a multiplexer or racks of 4” Video Monitors.
12. **AV Hardware Controller** – This is an external AV controller from Crestron, AMX, etc., that allows control of AV hardware, including cameras, matrix switchers, audio DSP, etc., using IP protocols. The solution is part of Enterprise AV and the quantity of these units is based on the solution requirements – number of rooms, cameras etc.

**SIMULATIONiQ Enterprise Companion apps:** The following applications and mobile apps deliver mobility and enhanced workflows for SIMULATIONiQ Enterprise:

13. **SimCheckIN™ app** – This product is a tablet-based participant check-in system that captures data through customized workflows to help you analyze center utilization and accurately track simulation and clinical skills session attendance. SimCheckIN can be integrated with SIMULATIONiQ™ Enterprise and a badge scanner option is available to enable learners, educators, standardized patients, and visitors to check in at your facility and register for available sessions quickly and efficiently. *Please contact your EMS Customer Success Manager for more information.*
14. **SimINVENTORY™ app** – This product is a mobile app for iOS and Android to manage inventory using barcodes within SIMULATIONiQ™ Enterprise. The SimINVENTORY app also allows inventory to be assigned to events and rooms. *Please contact your EMS Customer Success Manager for more information.*
15. **DashboardKPI™** – This product is a web-based system to monitor SIMULATIONiQ™ Enterprise and AV usage trends and provides a variety of charts using key performance indicators. *Please contact your EMS Customer Success Manager for more information.*
16. **VideoCAPTURE™** – This product is a mobile app for iOS and Android to record, playback, bookmark, and annotate videos. Recorded videos are automatically uploaded to SIMULATIONiQ Enterprise for video management within cases, scenarios, and sessions. *Please contact your EMS Customer Success Manager for more information.*
17. **SimREGISTER™** – This product enables registered and guest users to use a QR code to check-in for sessions and events. **IMPORTANT!** Contact the EMS TotalCAREiQ team for the License Key to enable the link to the SimREGISTER app.

**\* EMS only supports the Windows 8.1 operating system or above.**

**\* EMS supports Microsoft Office 2007 and above.**

Additional AV and IT-related hardware items may be required based on the unique design needs of the user. A few examples include UPS battery support, video teleconferencing, data backup solutions, etc.

## 2.4 Hardware Requirements

A Gigabit network is required to support all workstations that are part of the SIMULATIONiQ Enterprise solution, including all switches that are part of the infrastructure supporting the SIMULATIONiQ Enterprise solution.

### 1. Control and Debrief Stations

**IMPORTANT!** Control/Debrief stations require dedicated IP addresses and cannot be dynamic. Zones and microphone mapping will be lost if the IP address changes.

Control Station workstation is the central control for the AV solution. The station provides complete real-time control and monitoring of video preview and recording. The minimum hardware specifications for the workstation are below.

Debrief Stations host the AV viewer application that allows users to access and playback video recordings. These workstations can be configured for dual monitor setup with the second monitor being a large display panel or projector, thereby allowing group viewing. The minimum hardware specifications for the **desktop/laptop** workstations are:

- Intel® Core™ i7 or higher
- 16 GB RAM or higher
- 512 GB SSD for media or higher
- 1000 Mbps Network Interface or higher
- Windows 10 & Windows 10 Pro (64-bit) or higher
- 19" or bigger LCD monitor with minimum screen resolution support 1280 x 1024
- Video Display Card: MSI NVIDIA® GeForce GT 620 2GB DDR3 (1xDVI, 1xHDMI, 1xVGA) {or equivalent}
- USB Keyboard and Mouse



## 2. SP Room Stations

These workstations are placed in the clinical or simulation room and used for user data entry and video review. The participants in the clinical encounters use these stations to evaluate the learner. The stations are required for Enterprise SP and are optional for Enterprise SIM. The minimum hardware specifications for these workstations are:

- Intel® Core™ i5 or higher
- 8 GB RAM or higher
- 500 GB Hard Drive or higher
- 1000 Mbps Network Interface or higher
- Windows 10 & Windows 10 Pro (64-bit) or higher
- 19" or bigger LCD monitor with minimum screen resolution support 1280 x 1024
- Video Display Card: MSI NVIDIA® GeForce GT 620 2GB DDR3 (1xDVI, 1xHDMI, 1xVGA) {or equivalent}
- USB Keyboard and Mouse

**IMPORTANT!** For SP workstations with Video Wall, see the Control and Debrief Stations specifications above.

## 3. Student Encounter Stations

These workstations are placed outside the clinical or simulation room and are used for data entry. The learners in the clinical encounters use these stations to complete their patient evaluation and provide feedback on the clinical experience. The stations are required for Enterprise SP and are optional for Enterprise SIM. The minimum hardware specifications for these workstations are:

- Intel® Core™ i5 or higher
- 8 GB RAM or higher
- 500 GB Hard Drive or higher
- 1000 Mbps Network Interface or higher
- Windows 10 & Windows 10 Pro (64-bit) or higher
- 19" or bigger LCD monitor with minimum screen resolution support 1280 x 1024
- Video Display Card: MSI NVIDIA® GeForce GT 620 2GB DDR3 (1xDVI, 1xHDMI, 1xVGA) {or equivalent}
- USB Keyboard and Mouse

#### 4. Faculty/Office and Web Viewer Stations

These user workstations are used to access the Enterprise website for individual use at office desks and observation stations. EMS does not provide these workstations but recommend the following minimum hardware specifications for optimal application performance.

- Intel® Core™ i7 or higher
- 16 GB RAM or higher
- 512 GB SSD for media 1000 Mbps Network Interface or higher
- Windows 10 & Windows 10 Pro (64-bit) or higher
- 19" or bigger LCD monitor with minimum screen resolution support 1280 x 1024
- Video Display Card: MSI NVIDIA® GeForce GT 620 2GB DDR3 (1xDVI, 1xHDMI, 1xVGA) {or equivalent}
- USB Keyboard and Mouse

#### 5. Cloud Appliance

This server-based appliance links the local Audio Video equipment to the client's dedicated SIMULATIONiQ Enterprise Cloud Instance. The Cloud Appliance requires HTTPS (Port 443) connectivity to the Client's dedicated Cloud Instance. EMS recommends the following minimum hardware specifications for optimal application performance.

- 2 x Eight-Core Intel® Xeon® Processor E5-2620 v4 2.10GHz 20MB Cache (85W)
- 8 x 8GB PC4-19200 2400MHz DDR4 ECC Registered DIMM
- 2 x 960GB Intel® SSD D3-S4510 Series 2.5" SATA 6.0Gb/s Solid State Drive
- Intel Dual X540 and 10GBase-T Ethernet LAN

#### 6. Streaming Server (ESS)

This server provides cross-browser support for low-latency live streaming of audio and video from the recording devices over the network. EMS recommends the following minimum hardware specifications for optimal application performance:

- Quad-Core Processor 3.30GHz 8MB Cache
- 16GB RAM 2400MHz DDR4 DIMM or higher
- 960GB Solid State Drive or equivalent
- Minimum 1GBase-T Ethernet LAN

### 2.5 IP Network Specifications

This section describes the needs and requirements for the network to be available and configured for optimal performance of the application. The Enterprise solution is configured under the user LAN and requires a minimum 1000BASE-T network. The specific needs and considerations for the network are detailed in the following sub-sections.

### 2.6 Network Connectivity

All IP-enabled components included in Enterprise require network connectivity using industry standard RJ-45 Ethernet connectors. The network cabling should at least meet Cat 5e specification. EMS recommends Cat 6 cabling for new and remodeled labs.

For user workstations, the network connectivity can be both wired as well as wireless (minimum IEEE 802.11n). EMS recommends wired connectivity on most frequently used workstations for video viewing.

iPads using the Mobile Viewer application will need access to a WIFI network (802.11n) to communicate with the local DVR or Cloud solution (Depends on deployment model).

## 2.7 Network Type

The Enterprise solution requires a LAN that is open for access (network space) within the limits of its component. All access to the system is validated against user-authentication and network security placed and configured on the user network. The solution can be configured under a VLAN (Virtual Private LAN) as desired by the user; however, it is not recommended as access to the information will be restricted within the VLAN.

The cloud solution requires a managed switch or external firewall to be configured to provide port based forwarding for requests from the Cloud Application. Network Security

The Enterprise solution is based on message communications between its components, the network security needs to be configured with respect to Firewall and Transport Layer Security (also referred to as SSL). The Enterprise solution requires specific ports to be opened for its components.

All Enterprise applications installed on the workstation need to be included in the firewall exception list on the local machine to ensure proper functioning of the system.

Enterprise web services can be configured for TLS security. The TLS security certificate is required and needs to be supplied by the user. EMS will configure the system with the supplied certificate. This information is gathered during the project design process in consultation between EMS and the client.

All servers in the EMS cloud will use an Enterprise Anti-Virus application. Windows updates and patches will be installed during our standard patching schedule.

EMS Port Exception Listing			
<u>Source</u>	<u>Destination</u>	<u>Port</u>	<u>Protocol</u>
Cloud Appliance, Simulators, Control, Viewer & SP Stations	EMS Cloud	443	TCP
Cloud Appliance	Crestron	41790-41797	TCP
Crestron	Cloud Appliance	53, 123	UDP
Cloud Appliance	Biamp	21, 80	TCP
Biamp	Cloud Appliance	53, 123	UDP
Cloud Appliance	Simulators	80, 8080, 3243, 3389	TCP
Cloud Appliance	Simulators	137-138, 3389	UDP
Simulators	Cloud Appliance	80, 8080, 3243, 3389	TCP
Simulators	Cloud Appliance	53, 123, 137-138, 3389	UDP
Cloud Appliance	Control, Viewer & SP Stations	139, 445, 3389	TCP
Cloud Appliance	Control, Viewer & SP Stations	137-138, 3389	UDP
Control, Viewer & SP Stations	Cloud Appliance	80, 139, 443, 445, 554, 3389, 5050, 8000-8002, 8080, 41790-41797	TCP
Control, Viewer & SP Stations	Cloud Appliance	53, 123, 137-138, 3389	UDP
Cloud Appliance	Recording Devices (DVR/NVR)	80, 443, 554, 5050, 8000-8002, 8080	TCP
Recording Devices (DVR/NVR)	Cloud Appliance	80, 139, 443, 445, 554, 3389, 5050, 8000-8002, 8080	TCP
Recording Devices (DVR/NVR)	Cloud Appliance	53, 123, 137-138	UDP
Control, Viewer & SP Stations	Recording Devices (DVR/NVR)	80, 8080, 554, 443, 5050, 8000, 8001, 8002, 8080	TCP

## 2.8 Web Browser Compatibility

EMS web application is tested and verified for the following versions of the computer operating systems and internet browser:

- Internet Explorer 11.0
- Microsoft Edge 44 or higher
- Google Chrome 83 or higher
- Firefox 78 or higher
- Safari 13 is the supported and recommended browser for Mac OS

**Note:** EMS continues to test its application against the commonly used browsers. Release Notes are provided with the software updates.

## 3 User Access Requirements

### 3.1 User Authentication

The SIMULATIONiQ Enterprise platform supports single sign-on based user authentication using SAML, ADFS, Okta etc. in order for institutions to leverage their existing infrastructure and to enforce consistent customer password policies. Available authentication methods are:

- SAML
- EMS
- Single sign-on

Upon successful installation, users can access the Enterprise solution using the client application or website. All users are authenticated against a user-directory for access and role-permission to use the application. The system provides built-in authentication services, where the username and passwords are encrypted and stored within the application. The system administrator manages the list. The system allows the system administrator to bulk-upload the user list using Excel or text-based spreadsheets.

In order to support SAML, customers provide metadata link or file and **Identity Provider (IDP)** link. Sample metadata is published at <https://saml.simulationiq.com/Shibboleth.sso/Metadata>

EMS supports the following identify providers for Single Sign On in SIMULATIONiQ Enterprise. Even though we support almost all identify providers in the market, we can only confirm the integration after testing with a test account.

- Azure AD
- Google G Suite
- ADFS
- Shibboleth
- Okta

What we need from the client:

- Sign In Service URL
- Logout Service URL (optional)

- Identity Provider Trust URL
- Partner Certificate (.cer file) to decrypt assertion information
- Test Account

After that, we will provide our metadata file to the client to authorize SIMULATIONiQ for single sign on using the client's identify provider.

## 4 Maintenance and Support

### 4.1 Remote Support

To provide high level customer support, EMS requires that the client provide remote access to local system (Control stations, etc.) The access protocol/options are based on the local IT policies of the client and need to be validated with EMS IT for compliance. The remote access can be via VPN, RDP, etc. All access, if configured by EMS, is password protected and initially the client is informed before any EMS personnel connect to the system.

### 4.2 Software Updates

As part of system support and maintenance, EMS provides all system updates and patches for Enterprise through a software update policy. The updates are done by the EMS Customer Support team in consultation with the end-user.

### 4.3 Backup and Restore

SIMULATIONiQ Enterprise Cloud is backed up twice a day to ensure ample recovery points.

### 4.4 Availability

SIMULATIONiQ Enterprise Cloud offers two High Availability tiers. The tiers are a non-clustered configuration and cluster configuration. SLAs differ between the two tiers and are located in the SLA for SIMULATIONiQ Enterprise Cloud.

### 4.5 Video Archiving

Clients are able to set video archiving policies of their choice. All cloud DVCS integrated (Optional) systems will store video files in the EMS Cloud and stream from the cloud for video playback.

### 4.6 System Monitoring

The Enterprise solution provides real-time system monitoring from the client application – Enterprise AV Manager. In Enterprise AV Control, an Enterprise user can click the System Monitor button at the top of the page to perform a health-check on the system as well as reset the system as required. EMS performs real-time monitoring of the EMS Cloud to ensure all SIMULATIONiQ Cloud environments are accessible and perform as expected.

## Third-Party Integration Requirements

### 4.7 AV Controller

EMS uses industry standard Audio-Video Control systems from Crestron Electronics Inc. ([www.crestron.com](http://www.crestron.com)) to provide reliable communication and control between applications and AV hardware. The control systems are IP enabled and thus require network access. **Static IP** addresses are required for these devices and are requested by EMS project manager at the time of project design and documentation.

### 4.8 Simulator Integration

The Enterprise solution interfaces with all commonly used medical simulators (e.g. Laerdal, Gaumard, and METI) as well as with medical task trainers. These interfaces depend on the feature/functions available on the simulators. In order to provide seamless automation to these interfaces, the simulator's instructor and/or vital monitor computer needs to be part of the same network as EMS solutions. **IMPORTANT!** Simulators may be on a different VLAN or Subnet, but must be on the same network. This also includes any telemetry display system used with the simulator. **Static IP addresses are required** for these devices and are requested by the EMS project manager at the time of project design and documentation.

### 4.9 Simulator Instructor Laptop Specifications

- Intel® Core™ i5
- 8 GB RAM
- 250 GB Hard Drive
- Minimum 802.11g Wireless Network Card
- Windows 8.1 Professional or above
- 17" or larger screen size