



EchoSystem 5.5 Documentation
Device Monitor User Guide

August, 2015

Echo360 is continually updating the documentation. This manual is a snapshot as of the date above. Check the Echo360 documentation wiki for the most current version: <http://confluence.echo360.com/display/55/EchoSystem+Welcome+and+FAQs>

Deployment Guide

In this section:

- [Overview](#)
- [Who Should Read This Guide?](#)

Overview

This document provides guidance to those preparing for an EchoSystem deployment within an institution. It discusses core system requirements and functionality, server configuration, classroom and faculty-based capture options, and other deployment considerations. It is designed as a high-level overview for institutions planning an initial deployment of the EchoSystem platform.

There are several major aspects to consider when planning an EchoSystem deployment, including:

- Personnel to manage EchoSystem
- Project management
- System design and sizing requirements
- Server infrastructure
- Classroom equipment, audiovisual setup and classroom wiring
- Software installation on classroom and faculty computers
- Integration with existing systems and infrastructure
- Planning for growth

Who Should Read This Guide?

EchoSystem is a network-dependent application with multiple components that run across a number of different computers and devices within an institution. Integrating EchoSystem into a new or existing infrastructure requires the participation and cooperation of several personnel sets within the institution. If you are responsible for installing and/or maintaining classroom technologies, managing server infrastructure or client services, or administering course management system(s), you should read this document to learn what an EchoSystem deployment requires within your institution. The list below provides some common personnel sets and related EchoSystem components. Responsibility for some components may be shared among the groups listed or perhaps other groups as well.

Instructional Technology

Personnel responsible for the instructional environment within the classroom.

Needs to consider

The EchoSystem features two classroom-capture component types. Each of these components requires network connectivity to communicate with the EchoSystem Server, receive schedules, and transfer raw files for publication. The software-based option may also require operating system configuration:

- EchoSystem capture appliances (EchoSystem Capture Appliance and EchoSystem SafeCapture HD) - Dedicated all-in-one capture devices for audio, video, and external VGA capture. Provides schedule-based or faculty-driven capture, and is typically installed in an AV rack or podium.
- Classroom Capture - Windows application for audio and local screen capture. Provides schedule-based or faculty-driven capture, and is typically installed on a podium or lectern PC.

Faculty based capture components:

- Personal Capture - Windows or Mac application for audio, screen, and webcam video capture. Provides faculty-driven capture, and is typically installed on laptop or tablet computers.

Audio/Visual

Personnel responsible for the installation and maintenance of audiovisual equipment within the classroom.

Needs to consider

EchoSystem capture appliance deployment in the classroom requires that the appropriate audio, video, and VGA sources be properly routed and connected to the device inputs. External amplification may also be required to achieve the necessary audio levels for successful capture.

Programmers may also use the Capture Appliance API to integrate capture appliance operation into the room control system (e.g., AMX or Crestron). For details see [API Documentation](#).

Information Technology

The group that is responsible for managing and maintaining the server infrastructure and/or client services across an institution. This group might include systems administrators for web, network, and streaming infrastructure, the help desk or support staff, CMS administrators, or iTunes U administrators.

Needs to consider

There are various networking, bandwidth, storage, and firewall considerations for EchoSystem Server and supporting servers, classroom or faculty-based capture components, and publishers (or CMS/LMS/VLE integrations).

Servers:

1. EchoSystem Server (ESS) - Central web-based management component running on the Window or Linux operating systems.
2. EchoSystem Media Processor(s) - Media processing components running on Windows or Linux.
3. Web and Streaming Server(s) - Bundled as part of the ESS, but may be separated to accommodate system scale or pre-existing infrastructure.
4. File Transfer Server - Bundled as part of the ESS, but may be separated to accommodate system scale or pre-existing infrastructure.
5. Database Server - Bundled as part of the ESS, but recommended to be separated onto pre-existing infrastructure and/or to accommodate system scale.

Capture Components:

See Instructional Technology above.

Publishers (CMS/LMS/VLE):

- LTI-Based Publishing for Blackboard, Canvas, Desire3Learn, Moodle, and Sakai Learning Management Systems.
- Includes Blackboard Learning System Enterprise, Blackboard Learning System CE/Vista, Moodle, and Angel Learning Management Suite.
- May also include custom integrations
- The individuals or group responsible for these systems will need to assist with integration between the ESS and the CMS/LMS/VLE.
- The ESS communicates with the CMS/LMS/VLE used by the student to view course materials.

iTunes U:

- The ESS provides integration with iTunes U by automatically uploading content to the iTunes U repository or serving RSS feeds to iTunes U. The personnel responsible for maintenance of this system will need to assist with the integration of the ESS and iTunes U, primarily by providing authentication token(s).

Programmers:

- EchoSystem includes APIs for integration with existing technologies such as scheduling systems, room control systems (e.g., AMX or Crestron), and publishers (see above). See [API Documentation](#).

Deployment Planning

In this section:

- [Understand EchoSystem](#)
- [Organizational Planning Considerations](#)
- [Supported Technologies](#)
- [System Planning Considerations](#)
- [Copyright Considerations](#)

Understand EchoSystem

EchoSystem is a computing platform specifically designed to meet lecture capture and instructional production needs for educational institutions of any size worldwide. Designed to scale campus-wide over time, the system consists of specialized computing components which together form a comprehensive solution providing for all aspects of lecture and instructional capture.

Facilitating the management and monitoring of EchoSystem is the central EchoSystem Server (ESS) component. The ESS centrally manages production workflows, EchoSystem capture components and presentation production, all of which are explained below. The ESS is a Java-based, modular server application which can provide, or be integrated with, other applications servicing the data infrastructure necessary to facilitate campus-wide deployment. Initial deployment of this data infrastructure is a key discussion in this document.

Automating instructional content production is core to the EchoSystem feature set. The EchoSystem employs both schedule-driven and faculty-driven automated workflows. Both are made simple to encourage lecture and instructional capture adoption. For details, see [Workflow](#).

Organizational Planning Considerations

EchoSystem is designed to meet the lecture and instructional capture needs for institutions of any size. Any EchoSystem deployment requires proper planning, both to meet current demands and to provide for growth. This planning must include certain organizational considerations, such as those outlined below.

Appropriate Personnel

A successful EchoSystem deployment includes involvement of many groups within your institution. For a discussion of the EchoSystem components and their respective groups, see [Deployment Guide](#). We recommend that you include the following groups in deployment planning:

- A/V Technicians
- Classroom Technology / Instructional Technology
- System Administrator (Server Management)
- Network Security (Firewall Management)
- Project Manager(s)
- CMS/VLE System Administrators (e.g. Blackboard, iTunes U)
- Programmers (System Integration)

Turnaround Time

EchoSystem processes (or packages) the media for students to view as a part of the automated workflow. This takes a certain amount of time after the recording is completed. The amount of time varies based on daily capture hours and media processing infrastructure. It is important to determine the acceptable time lapse between capture and student viewing. Consider the manageability of turnaround time: Students will come to expect presentation availability according to this policy and actual turnaround time.

Echo360 engineers can recommend a deployment design to meet the turnaround time expected at your institution.

Data Retention Policies

Capturing lectures and other instructional materials creates a large data set of valuable media assets. Some materials may only be suited for presentation to students during the current term. Others may have value for many years. Consider the value of the materials created as you develop data retention policies so you provide the best materials to students and minimize storage costs.

Your institution or central IT group may also enforce certain data retention policies enforced by the institution or central IT. Considering these factors will ensure you plan for storage appropriately.

Backup

Data backup is a critical consideration for every system deployment. Backup planning for the EchoSystem includes database, media, and application backup. Media backup policies directly affect storage planning.

Supported Technologies

For a discussion of support policies, see the [Supported Technologies](#) page.

When advising faculty on using Media Import, consult the list of [supported tools and formats for Media Import](#).

System Planning Considerations

At a system level, meeting capture needs for institutions of any size is accomplished by two key aspects of the system architecture. The EchoSystem includes all necessary system services to begin capture production, offering quick setup for pilot and initial deployments. Additionally, the EchoSystem architecture is modular, allowing it to utilize core services located on other systems. This architectural approach accommodates for a flexible, scalable computing infrastructure and seamless expansion as instructional material demand grows.

EchoSystem deployment typically follows a phased approach. A common adoption pattern for most institutions is to perform a small pilot, such as initial rollout to early adopters, followed by incremental growth as demand rises. This document is intended to provide guidance for initial deployment, with a view to future system growth. Echo360 Solutions and Deployment Engineers can assist with larger or more advanced deployments.

The sections below provide information about the various components of EchoSystem. Each of these components should be considered as you plan initial deployment.

EchoSystem Server (ESS)

The ESS is a Java-based server application. Consistent with server applications, ESS depends on other application services and supporting infrastructure to function.

Bundled Applications

An ESS installation includes bundled applications for each required service. Utilizing the bundled applications, with the exception of the database, is generally recommended for most initial deployment scenarios. The majority of these services can also be provided by third-party applications running on other systems. Please see below for a list of these services and the native ESS application supporting them. [Supported Application Servers](#) covers deployment of these services on other systems.

- **Java Application Server:** ESS bundles Jetty as its native Java application service. This service cannot be

provided on other systems.

- **Database Server:** You must use a third-party database server. For a list of supported third-party database servers see [Supported Third-Party Components](#).
- **Web Services:** ESS uses Jetty for native web services. In this context Jetty primarily provides for content delivery. Other web servers, such as Apache or IIS can be configured to provide this service. If you use an external Apache or IIS web server, see [External Web Server Configuration for Live Chat](#) for a configuration change that may be required.
- **Flash Media Streaming Services:** ESS supports the use of Wowza Media Server (Wowza) and Adobe Flash Media Streaming Server (Adobe FMS) for streaming of on-demand and live content.
- **File Transfer Services:** ESS bundles Maverick SSHD for native secure file transfer (SFTP) services. Other SFTP or FTP servers may also be used.

Establishing Temporary Storage

See [Establish a Temporary Storage Location](#).

Supporting Application Servers

During initial deployment it is important to consider expected growth of capture, processing and student review. This process may lead to the consideration of deploying some (or all) of the computing services required by ESS on other systems. Echo360 refers to these other systems as *Supporting Application Servers*. Considerations during initial deployment may include:

- Deploying a supported external database server during initial deployment removes the complexities of migrating data when growth warrants a more scalable database. In addition, institutional policy may require the use of existing database infrastructure. In cases such as these, consider running ESS with one of the supported third-party database applications. If future growth is the driver for using a third-party database, consider installing it on the same computer as the ESS at initial deployment time. It can be moved to another server at a later time if necessary. The [Server Installation Guide](#) provides details for installing and configuring the ESS for use with third-party databases.
- Flash streaming infrastructure may already be provided by a central or department IT, or your institution may install Wowza Media Server or Adobe FMS for streaming of ESS content. In these cases, consider utilizing the preferred Flash streaming infrastructure for EchoSystem streaming services. The [Administration Guide](#) provides details for configuring the ESS to use alternate Flash streaming services.
- Presentation review volume may warrant separating the viewable media from the ESS. This will include utilizing a separate web server and Flash streaming server. This can be done during initial deployment or at a later time when demand increases.
- Captured media is transferred over the network to a file system accessible by the ESS for processing. Raw presentation files can tend to be large. Deployments with a consistent capture load through the day will benefit from moving file transfer operations to another server. Alternatively, the bundled file transfer server can be configured to run on a dedicated network interface. Such considerations are also covered below in [Network Bandwidth](#).

Media Processing

EchoSystem licenses include an unlimited number of EchoSystem Media Processors. Media Processors package raw audio or audiovisual data from instructional capture into playback formats for students. Typically, one or more Media Processors will be deployed in an EchoSystem implementation to increase system scalability, performance

and turnaround time for presentations. The application is supported on Windows and Linux computers. Media Processor installation on the same server as the ESS is not supported.

Media Processor deployment planning is primarily based on calculating the amount of capture hours per day and deciding on an acceptable (and reasonable) amount of time to make instructional content available to students after capture. Planning for initial deployment will generally be based on standard expectations. Capture appliances and Classroom Capture software devices upload captures for processing immediately after capture. It should be noted that network bandwidth will also affect turnaround time and is covered in a dedicated section below. The Personal Capture software differs from the other devices by allowing faculty to upload capture content at any time. The amount of processing required for Personal Capture content must be considered but might not be accurately predicted.

The physical (or virtual) hardware for each Media Processor is another key factor for planning. Transcoding, or video encoding in general, is CPU intensive. Faster processors (CPUs), more CPU cores, and larger L2 cache in the Media Processors greatly affects the speed at which instructional content is made available for viewing. Making informed hardware and deployment size choices in these early stages of implementation ensures better system performance and support for future growth.

As a general rule, processing will take up to 75% of the capture duration (or 3/4 real-time) for EchoPlayer processing when running on a dedicated CPU core. Vodcast encodings will take up to 50% of the capture duration (or 1/2 real-time). Media Processor deployment planning should consider a capture-to-core ratio to achieve desired results. More concurrent captures running on a dedicated core results in longer turnaround time. Less concurrent captures running on a dedicated core results in shorter turnaround time. This approach enables an initial deployment of a moderately specified Media Processor to handle expected capture volume while allowing for expansion, either by installing a more capable Media Processor computer or adding additional Media Processors, as demand increases.

Storage

Storage planning is vital to deployments of all sizes. Initial deployments should consider the advantages and disadvantages of using local storage or network attached storage. The EchoSystem produces large media files at various stages in the workflow. Media files can be grouped into three categories. Sizing information in this section is generalized for the purpose of storage planning. Actual sizes may vary in production environments.

- **Raw Media Files:** These are the high-quality source (master) files captured by EchoSystem capture devices. The size of this set varies based on capture device type. Capture appliances generate raw media files ranging from 300-600 MB per capture hour. Capture software generates raw media files ranging from 100-200 MB per hour. Personal Capture generates raw media files ranging from 500-1500 MB per hour.
- **Podcast Media Files:** These are the podcast and vodcast output format files, generally the smallest of the three categories. When produced together, these files range from 60-140 MB per capture hour.
- **EchoPlayer Files:** These are the files supporting the rich media playback experience in the EchoPlayer. EchoPlayer files range from 150-250 MB per capture hour.

The EchoSystem supports automated deletion of raw media files. Deleting raw media files will disable content editing. Therefore, media retention policies should be carefully planned and implemented at deployment time. The [Administration Guide](#) provides more information about automated raw file deletion and editing.

Network Bandwidth

File transfer and content service are both bandwidth consuming operations. File transfer occurs from capture devices to the network storage location and also from the storage location to Media Processor(s) and back. Media service occurs from the ESS (or supporting servers) to each student client computer. Networking best practices, such as network teaming, should always be adhered to.

Initial deployments may not produce the CPU or memory load to require supporting servers for the services

mentioned here. However, when the ESS and related services are deployed on a single computer, network bandwidth may quickly pose a challenge for these services. In this case, the ESS can be configured to use different network interfaces for each service provided. Alternatively, supporting servers can also be implemented.

Refer also to the information provided in [Bandwidth Requirements for Capture and Media Formats](#).

Capture

See [Capture Options and Requirements](#) and the sections on each capture device for deployment details.

Virtualization

A virtualized environment gives the flexibility to run multiple "virtual" machines rather than dedicated physical hardware for each server. Other benefits, based on virtualization licensing, can include the ability to move a running virtual machine from one physical server to another and leverage memory during file transfer within virtual machines. Virtual machines are more sensitive to disk IO, CPU and memory issues since numerous devices access the same physical machine. Consult individual virtualization documentation for best practices within your environment. Echo360 engineers can also assist in planning virtualized EchoSystem environments.

Other

Other considerations include:

- Firewall planning for web, file transfer, and streaming services.
- Echo360 and Automatic Sync Technologies (AST) have teamed up to provide automated closed captioning and transcription services through EchoSystem. An account with AST and configuration of a publisher in ESS is required to enable this workflow. ESS web services must be open to the Internet for AST to make connection back to ESS.
- Echo360 provides a hosted indexing service to enable the search feature in EchoPlayer. ESS web services must be opened to the Internet to enable this workflow.

Copyright Considerations

Customers retain ownership of Echoes and have the responsibility of adopting and implementing copyright policies for any such content.

The EchoSystem allows you to specify a copyright statement that is included in each Echo. See [Branding](#).

Supported Technologies

In this section:

- [Overview](#)
- [Support for Older Versions of the EchoSystem Server](#)
- [Existing Customers](#)
- [Supported Operating Systems](#)
- [Supported Third-Party Components](#)
- [Browsers](#)
- [Mobile Platforms](#)
- [Hardware Requirements](#)
- [File Transfer Servers](#)
- [Media Import Supported Tools and Formats](#)

Overview

It is nearly impossible for Echo360 to replicate all possible variants of the many environmental conditions in our customer networks. Instead, we develop and test our products in a reasonable subset of core environments (focusing on primary industry standards) and share that information with you, our customers. We want you to understand what we have tested, and to understand the risks associated with deviation from those tested environments.

To ensure operational effectiveness, every attempt should be made by Echo360 customers to comply with the environmental standards contained herein. Echo360 understands that our customers are faced with many factors when choosing IT infrastructure and respects the business decisions of our audience. The intent here is not to forcibly drive those business decisions, but instead to establish a framework within which risk is understood. Should a customer decide to deviate from the aforementioned standards, it is agreed that the customer assumes the operational risk and at some point Echo360 might not be able to resolve a reported technical problem.

Support for Older Versions of the EchoSystem Server

As a general rule, Echo360 supports the currently released version of the EchoSystem Server (ESS) along with the previous version.

- You can always contact Technical Support for help with old versions of software.
- We will suggest that you migrate to the newest release if we know that upgrading will resolve the issue.

Existing Customers

All of the supported technology information shown on this page applies to new and existing customers.

Supported Operating Systems

The following table lists the operating systems supported for the installation of the ESS, Media Processor, as well as Classroom Capture and Personal Capture.

This product...	Is supported on these operating systems...
ESS	<p>Windows:</p> <ul style="list-style-type: none"> • Windows Server 2012 R2 (SQL Server 2008) - Standard, 64-bit. Pen/touch input was not tested. • Windows Server 2008 (and R2) - Standard or Enterprise Only, 64-bit. <p>Linux:</p> <ul style="list-style-type: none"> • RHEL Server release 6 and 7, 64-bit. • CentOS 6.5, 32/64-bit.

Media Processor	<p>Windows:</p> <ul style="list-style-type: none"> • Windows Server 2012 - Standard, 64-bit. Pen/touch input was not tested. • Windows Server 2008 (and R2) - Standard or Enterprise Only, 64-bit. <p>Linux:</p> <ul style="list-style-type: none"> • RHEL Server release 6 and 7, 64-bit. • CentOS 6.5, 32/64-bit.
Personal Capture for Windows or Classroom Capture	<p>Windows: Either Personal Capture or Classroom Capture.</p> <ul style="list-style-type: none"> • Windows 7 • Windows 8.1 <p>For additional information on supported cameras and input devices, Supported Cameras and Input Devices for Capture</p>
Personal Capture for Mac	<p>Macintosh: Mac OS X, 10.9 and 10.10 (Yosemite)</p> <p>NOTES:</p> <ul style="list-style-type: none"> • Personal Capture will not run properly on a Mac with Retina display when there is an external monitor attached. This is a known issue and will be addressed in a future release • Personal Capture for Mac is supported on Mavericks (Mac OS X 10.9), however <i>upgrading</i> to Mavericks may cause corruption in an existing PCAP installation. Captures will work fine but publishing the capture will get stuck in the "Transcode Pending" state. If this happens, save any un-published captures, then uninstall and reinstall PCAP. <p>For additional support information, see System Requirements for Personal Capture Mac</p> <p>For additional information on supported cameras and input devices, Supported Cameras and Input Devices for Capture</p>

Supported Third-Party Components

The following table lists the supported third-party components.

i Database Clustering is Not Supported

Database clustering is not officially supported and Echo360 does not perform QA regression testing on a clustered environment. You can use clustering by tweaking the Hibernate configuration, however the issue is that upgrading on a clustered environment is blocked by the installer. This will limit the ability to upgrade without the assistance of professional services.

Technology	Version	Comments
<i>Database servers</i>	MySQL Community/Enterprise 5.5-5.6, 32/64 bit <div style="border: 1px solid #0070C0; padding: 5px; margin: 10px 0;"> <p>i MySQL 5.0 Not Supported</p> <p>ESS installation will stop if you attempt to install or upgrade the ESS with MySQL 5.0, and you will receive an error message regarding the unsupported version of MySQL.</p> </div>	<ul style="list-style-type: none"> InnoDB table support required UTF-8 character set for ESS database required We strongly recommend customers using MySQL 5.1 to upgrade to at least 5.5 before upgrading to EchoSystem 5.4
–	Microsoft SQL Server 2008-2012 - Standard or Enterprise (MS and Linux platforms)	SQL Server Authentication is the only authentication mode supported.
<i>Web servers</i>	Jetty	–
–	Microsoft IIS 7	May require server configuration file change if using the chat feature of live webcasting. See External Web Server Configuration for Live Chat .
–	Microsoft IIS 6	May require server configuration file change if using the chat feature of live webcasting. See External Web Server Configuration for Live Chat .
–	Apache	May require server configuration file change if using the chat feature of live webcasting. See External Web Server Configuration for Live Chat .

<i>Streaming Servers</i>	Wowza Media Server (Wowza) v3.5, 3.6, 4.0 and 4.1.	<p>New customers should refer to Configure the Flash Media Streaming Server and Configure an External Wowza Media Server.</p> <p>Existing customers using an Internal configuration of Wowza can continue to do so. However, these Customers are strongly encouraged to upgrade to Wowza v4 and convert to an External Wowza server.</p>
–	Adobe Flash Media Streaming Server	<p>New customers should refer to Configure the Flash Media Streaming Server and Configure an External Adobe Media Server.</p>

Browsers

Our general goal is to support the last two versions for the major browsers for each platform (Windows, Mac, or Linux) at the time of initial deployment, as shown below.

Operating System	Internet Explorer 9+ (including IE 11)	Firefox 28+	Chrome 34+	Safari 6.0+
Windows 7 and 8.1	Supported	Supported	Supported	Not Supported
Mac OS X 10.9	Not Supported	Supported	Supported	Supported
Linux Red Hat 6	Not Supported	Supported	Not Supported	Not Supported

We develop using industry standards so other browsers may work, but we do not fully test or support them. We also understand that on-going updates in browsers and integrated components (Java, Flash) may introduce issues. We will respond to these issues in later releases.

Variable speed playback (VSP) is supported by newer browsers that adhere to the HTML5 standard, as shown below.

VSP is supported only for Audio/Display (A/D) and Audio/Display/Display (A/D/D) inputs. Video input is not supported. An asterisk (*) indicates that the browser is not supported or has not been tested by Echo360. A double asterisk (**) indicates that the operating system does not support the feature.

Operating System	Internet Explorer 9+ (including IE 11)	Firefox 28+	Chrome 34+	Safari 6.0+
Windows 7	Supported	Supported	Supported	Not Supported
Mac OS X 10.8	Not Supported	Not Supported**	Supported	Supported

Linux Red Hat 6	Not Supported	Not Supported*	Not Supported*	Not Supported
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Mobile Platforms

The **EchoCenter** is supported on the mobile platforms listed below.

Platform	Comments
Apple iOS 6+	Fully supported on iPad and iPhone
Google Android 4.1-4.3	Fully supported on Default browser and Chrome browser

The **EchoPlayer** is supported on the mobile platforms listed below.

Platform	Comments	Live Streaming
Apple iOS 6+ (iPod Touch, iPhone and iPad)	Uses HTML5 and HTTP Streaming	Yes
Google Android versions through 3.0 (Honeycomb). Supports phones and tablets.	Default browser is best experience. Requires Flash with true Streaming.	no
Google Android versions 4.0+. Supports phones and tablets.	Default browser or Chrome is best experience. Uses HTML5 and HTTP Pseudo-streaming.	no
Amazon Kindle Fire HD and newer	Default Amazon Silk Browser. Uses HTML5 and HTTP Pseudo-streaming.	no

Hardware Requirements

The hardware recommendations listed below are designed to serve a basic initial server deployment scenario, with modest growth:

- Up to 10 classrooms,
- 25 Personal Capture users,
- 10-50 hours of capture per day, and
- up to 250 concurrent student views

These requirements are provided for the EchoSystem Server and the EchoSystem Media Processor, for additional information, please see [Server Requirements](#). Refer directly to vendor documentation for supporting server hardware recommendations.

Minimum Recommended EchoSystem Server Hardware

- 4 Physical Core CPUs or 4 virtual CPUs (see note below)
- 8GB RAM
- 80GB HDD minimum, providing space for the OS, the ESS application, plus additional storage for content (200 GB or more is recommended)
- Two dedicated 1 Gbit or higher network interfaces (one for ESS, streaming, and HTTP content; one for file

transfer)

Minimum Recommended EchoSystem Media Processor Hardware

- 4 Physical Core CPUs or 4 virtual CPUs
- 8GB RAM
- 160GB HDD minimum, providing space for the OS, the application, and data (200GB or more recommended)

With respect to Media Processor recommendations, here are a few things to keep in mind:

- More CPUs = More concurrent processing jobs = Larger disk requirement. With 4 CPUs, 160GB is a *minimum* space recommendation.
- With respect to CPU's, while it is possible to use virtual CPU's, the media processing generates very high CPU and disk I/O, making it a bad candidate for virtualization. Where possible, use physical CPU's for EchoSystem Media Processors.
- Windows allows you to specify a separate data directory from the application files (where the processing is done); Linux does not. If you maintain the media processor application and the data on the same drive (the main partition), be sure there is sufficient space for everything.
- Processing long recordings, and especially editing long recordings, consumes a lot of temporary space on the media processor. As a result, be sure your configuration allows for **at least 32 GB of free space on the main partition at all times** (the partition onto which the media processor application is installed).
- For a large production system, calculate space based on 40GB per CPU core. In addition, if the media processor server contains 8 cores or more, we strongly suggest that you specify the data directory to be 2 or more RAID 0 SAS drives. The reason is that without the RAID, the disk I/O for the processing becomes a bottle neck, wasting the additional core processing capability. Using a RAID for data also allows you to plan for future growth and to scale the system appropriately.

File Transfer Servers

EchoSystem has a built-in file transfer capability using either SFTP with blowfish encryption or SFTP without encryption. You can also use a file transfer server with any of the following protocols:

- SFTP with blowfish encryption
- SFTP with encryption "none"
- FTP

Media Import Supported Tools and Formats

See the [Tools and Formats Supported](#) section of the [Import Other Media for Academic Staff](#) page.

The following table lists the currently tested and supported combination audio and video file types.

Tool	Video File Format	Video Codec	Audio Codec
Camtasia Studio 7 (PC)	AVI	CVID, TSCC	PCM
–	FLV	VP6F	MP3
–	M4V	H.264	AAC
–	MP4	H.264, AVC1	AAC

–	MOV	H.264, MPEG-4 (mp4v), DV	AAC, MPEG-4 (mp4a)
–	WMV	WMV9	WMA
Apple QuickTime	MOV	H.264, MPEG-4	AAC
–	MP4	H.264, MPEG-4	AAC
–	M4V	H.264	AAC
Apple iMovie	M4V	H.264	AAC
Adobe Premier	AVI	DV	PCM
–	MOV	H.264, CVID	AAC, PCM
Microsoft Expression Studio 4	WMV	WMV9, VC1	WMA9
Flip Video - Mino HD	MP4	H.264	AAC
Logitech Web Cam Software (PC)	WMV	WMV2	WMA2
Cam Studio (PC)	AVI	CVID	PCM

Initial Server Deployment

In this section:

- [Overview](#)
- [Initial Recommendations](#)
- [Diagram](#)

Overview


EchoSystem Server (ESS) deployment requirements are dependent on the factors covered in the previous section and are therefore unique to each institution. Most initial deployments will follow similar usage and sizing patterns. The recommendations and diagram in this section are provided as an example of a common initial deployment scenario. These recommendations are suited for deployments consisting of 1-10 capture appliances (or Classroom Capture devices) and 25 Personal Capture users generating up to 50 hours of capture per day, total. They also consider the likelihood of capture growth and server expansion.

Echo360 engineers can discuss specific deployment and server sizing needs.

Initial Recommendations

This example deployment scenario requires the following system configuration:

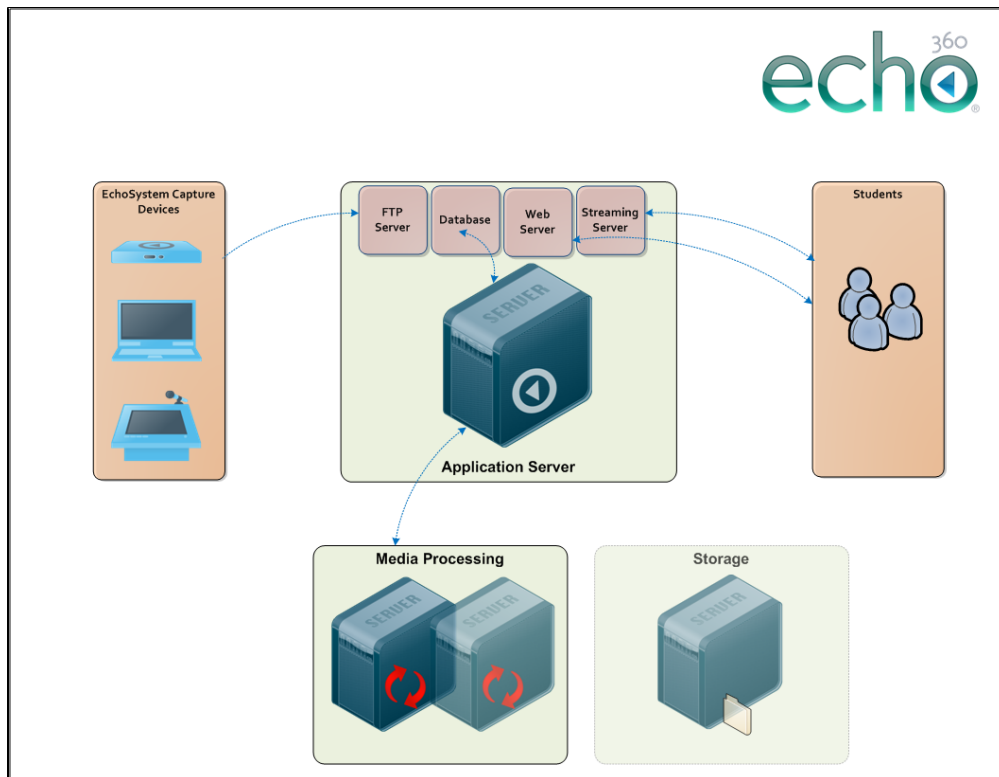
- One ESS computer meeting the recommended requirements with a configuration according to these suggestions:
 - Supported third-party database server on the ESS computer
 - ESS native web services on primary network interface
 - ESS native streaming services on primary network interface
 - ESS native file transfer services on secondary network interface
- One EchoSystem Media Processor computer meeting the recommended requirements based on daily capture hours and desired turnaround time as follows:
 - 25 daily capture hours with same day turnaround time
 - 50 daily capture hours with next day turnaround time
- Local ESS storage, Network Attached Storage (NAS) or a Storage Area Network (SAN). Initial storage capacity depends on data retention policies, discussed in [Deployment Planning](#). Plan for storage capacity at 500 GB to 4 TB for the first two semesters or terms.

 Initial deployments expecting more than 50 daily capture hours should consider two media processors. For faster turnaround time, consider more CPU cores or an additional media processor computer.

Diagram

The illustration below shows a common initial deployment scenario. It consists of the following:

- Capture devices
- An EchoSystem Server (ESS)
- One or more media processing servers
- An optional (but recommended) storage server



Click for larger image

Respond to Demand

In this section:

- [Expansion Planning](#)
- [Capture or Venue Expansion](#)
- [Student Viewing](#)
- [Turnaround Time](#)
- [Redundancy and High Availability](#)

Expansion Planning

In most cases EchoSystem deployments grow within one or two semesters, responding to demand from faculty and students. [Deployment Planning](#) and [Initial Server Deployment](#) explain EchoSystem design and architecture and assume demand for growth. This section discusses common reasons for system growth and considerations when responding to demand for growth.

Capture or Venue Expansion

The most common growth scenario after initial deployment is capture expansion. Capture expansion may take place within an existing venue (classroom or auditorium) or into new venues. It is also quite common for institutions to plan for EchoSystem capture in new buildings as they become operational. Additionally, growth may occur by additional faculty requesting Personal Capture licenses.

Growing EchoSystem capture beyond the initial deployment must include planning for additional media processors and storage. For example, your initial deployment may consist of five capture appliances capturing 15 hours per day. Next term you will double capture volume in those venues to 30 hours per day and add an additional five venues at 15 hours per day. In this case, you will certainly need at least one additional media processor to keep up

with the increased volume and expected turnaround time. You will also need to add storage capacity as the additional capture hours will increase the storage requirements.

As you expand, you may also require additional network bandwidth to handle the concurrent media file transfers from the capture devices. Consider installing additional network interfaces in the EchoSystem Server (ESS) computer and employing network teaming, or moving to a dedicated file transfer server.

In most cases, increased capture results in increased student views.

Student Viewing

Increasing concurrent student view capacity is primarily a function of network bandwidth and, secondarily, a function of delivery server load. In other words, you will most likely reach network bandwidth limitations before server capacity limitations. Network bandwidth requirements are higher when supporting concurrent EchoPlayer views. This is due to the consistent bandwidth usage by the EchoPlayer (inherent in media streaming). By contrast, media file download, such as vodcast and podcast file download, consumes a fair amount of bandwidth for a short time, until the file is fully downloaded.

Bandwidth needs can be calculated by assuming the average network bandwidth scenario per student and calculating how many concurrent views the network interface will support. The average bandwidth requirement for the EchoPlayer is about 400 kbps. When concurrent student views near the amount of bandwidth available to the network interface(s) on the ESS computer, consider installing additional network interfaces and employing network teaming. You could also move to a dedicated web and streaming server.

If you are primarily providing podcast media for student review, network bandwidth may not be a concern during early growth. If it does cause concern, consider additional network interfaces in the ESS computer.

Server capacity can be determined using native operating system tools and best practices to measure CPU, RAM and disk I/O usage at peak usage times. When server capacity nears the maximum acceptable limit, plan on moving to a dedicated web and streaming server with capacity to accommodate for continued growth.

You should also plan on using dedicated, load balanced web and streaming servers when student demand is such that you must support thousands of concurrent connections.

Turnaround Time

Another possible response as initial deployment takes off may be the demand to decrease media availability time. Such demands immediately require additional media processors and may also require increased network bandwidth.

Alternatively, you can also employ a less secure file transfer method by changing to the "SFTP w/o Encryption" option in the ESS configuration or to a standard FTP service. These options increase file transfer time from capture appliances to the ESS by a factor of 10.

Redundancy and High Availability

Redundancy and high availability may be imperative. In these cases, all supporting application services should be moved to external systems, each with its own support for redundancy. ESS redundancy should be discussed with your Echo360 engineer.

Capture Options and Requirements

In this section:

- [Capture Devices](#)
- [Lecture Capture \(in the Classroom\)](#)
- [Personal Capture \(Outside the Classroom\)](#)

Capture Devices

EchoSystem provides three capture options to encompass a diverse set of institutional capture needs. Each capture option is uniquely suited to certain capture venues and use models, some inside the classroom, some outside. The options are:

- [Capture appliances \(EchoSystem Capture Appliance and EchoSystem SafeCapture HD\)](#)
- [Classroom Capture](#)
- [Personal Capture](#)

Lecture Capture (in the Classroom)

The capture appliance and Classroom Capture options are best suited to capture inside the classroom. They both provide scheduled-driven capture essential for automated workflows and minimal faculty interaction. Each is unique in terms of supported capture sources and suitable deployment models.

Capture Appliances

The capture appliances are dedicated, all-in-one devices for the richest capture experience of all EchoSystem devices, capturing audio, video, and external VGA display sources. See [Capture Appliance Deployment](#) for detailed specifications and deployment considerations.

Capture Appliances



The EchoSystem Capture Appliance (also called the first generation capture appliance or 1G capture appliance) was placed into service in May 2008. It is no longer in production.



The EchoSystem SafeCapture HD (also called the SafeCapture HD, second generation capture appliance, or 2G capture appliance) was placed into service in June 2011. It is in active production.

The generic term "capture appliance" refers to either or both appliances.

Classroom Capture

Classroom Capture is a Windows-only application suited for audio, video, and local screen capture from a dedicated podium or lectern PC inside the classroom.

See [Classroom Capture Software](#) for details.

Personal Capture (Outside the Classroom)

The [Personal Capture application](#) is designed for installation on faculty or staff laptops (Windows and Mac). It provides a user-driven capture model inherent to a personal application. It cannot be scheduled like the other capture options and is therefore not recommended for installation within the classroom. Capture options include audio, webcam video and local screen. See [Administer Personal Capture](#) for detailed specifications and deployment considerations.

Capture Appliance Deployment

In this section:

- [Which Capture Appliance are You Deploying?](#)
- [Best Practices During Capture Appliance Installation](#)
- [Troubleshooting the SafeCapture HD](#)

Which Capture Appliance are You Deploying?

Echo 360 supports two capture appliances:

- The EchoSystem SafeCapture HD (also called the SafeCapture HD, second generation capture appliance, or 2G capture appliance) was placed into service in June 2011. It is in active production. See [EchoSystem SafeCapture HD Product Specifications](#) for more details.



- The EchoSystem Capture Appliance (also called the first generation capture appliance or 1G capture appliance) was placed into service in May 2008. It is no longer in production. See [EchoSystem Capture Appliance Product Specifications](#) for more details.



The generic term "capture appliance" refers to either or both appliances.

Best Practices During Capture Appliance Installation

- Run some test displays on the laptop and any other devices (notebooks, document cameras) that might be used. Use a range of signal resolutions and configurations.
- For the SafeCapture HD appliance, if your VGA signal does not appear, ensure your VGA to DVI adapter type is DVI-I.
- If you are using a Distribution Amplifier (DA), ensure the input and output resolutions are correct.
- Ensure that the devices remain at their optimal settings. You might want to demonstrate good and bad settings to Instructors, show distorted Echoes, or tape a note on the device itself.
- Contact [Echo360 technical support](#) if any of the displays is faulty. We will work with you to detect and correct the specific factor.

Troubleshooting the SafeCapture HD

Some common issues are described below.

If Content Is Not Captured

The SafeCapture HD does not record high definition content that is protected by HDCP (High-bandwidth Digital Content Protection).

If Display is Not Captured

This issue arises **only** with the EchoSystem SafeCapture HD and occurs when an Instructor is using a laptop with both VGA and HDMI output ports. Specifically this is a known issue with the Dell Latitude E6430 laptop, but may apply to other models.

Problem: If you connect the laptop to the SafeCapture HD (on Primary Display) via a VGADVI-A cable, the laptop will begin to output on the digital port and not the VGA / Analog port. This causes a loss of capture.

Solution: Customers using laptops with both analog and digital video outputs should connect to the SafeCapture HD via HDMI (digital), which should output as expected.

While we have not yet identified other laptops with this issue, we presume the problem is not limited to the E6430. Our hypothesis is that newer laptops with both analog and digital video outputs may exhibit this problem. If you identify other laptops with this behavior, please contact [Echo360 support](#) and let us know.

If Content Is Distorted

This issue occurs most often when an Instructor is using a personal laptop and has specified a custom (non-standard) display resolution. The laptop does not communicate its display resolution correctly to the SafeCapture HD and distortions may result.

Several factors can cause a display resolution to be miscommunicated:

- The laptop uses the obsolete GTF video standard
- The laptop has a non-standard aspect ratio
- The laptop uses flat panel scaling algorithms
- The laptop's signal is subject to distribution amplifier effects

If this happens, urge Instructors to use a tested [Classroom Capture](#) installation on the podium PC rather than their own laptops, to capture the classroom lecture.

If Content Has "Curtains"

This issue arises **only** when you have specified the widescreen aspect ratio. See [When Using the Widescreen Aspect Ratio on the Display Input](#).

Additional Deployment Considerations

In this section:

- [Ground the Capture Appliance](#)
- [Networking Requirements](#)
- [Firewall Requirements](#)
- [Presentation Authentication](#)
- [Playback Requirements](#)

Ground the Capture Appliance

Follow these best practices:

- Be sure to use the 3-prong power cable provided to plug the capture appliance into a grounded (3-prong) socket. Using a 3-prong cable ensures that your appliance is properly grounded.
- If you must use a 2-prong socket, then you must also ground the appliance. Attach one end of a ground wire to any of the chassis screws on the back of the appliance. Attach the other end to a natural earth ground.

If you do not properly ground the capture appliance, you may introduce electrical issues.

Networking Requirements

Basic Networking

A fully qualified domain name or dedicated IP address for the EchoSystem Server (ESS) is required. An active Internet connection is required during the licensing step. The ESS should be accessible by all capture appliances and Classroom Capture software devices. External access to the ESS from Personal Capture devices may be restricted by requiring VPN, or be subject to firewall policies.

Student Access

The ESS application and content base URLs provide student access to presentations. If you need to provide student access outside of the campus LAN, these URLs must be accessible from the Internet.

Networking Support for Publishers

The EchoSystem provides two publishers (referred to as workflow publishers) for automated closed captioning and search indexing. These workflow publishers require the ESS application base URL access from the Internet. By default, this is configured using SSL on port 8443.

Firewall Requirements

See [Firewall Requirements for Installation](#).

Presentation Authentication

ESS has the ability to integrate with an LDAP authentication server to secure presentation links. The LDAP authentication supports LDAP v3 and has been tested with Microsoft Active Directory, OpenLDAP and OpenDirectory authentication servers.

To successfully configure LDAP authentication, you will need to obtain the following information from the administrator of your authentication server:

- LDAP URL: The link to the LDAP server that the ESS will use. (i.e., ldap://server.domain.com:389)
- Manager DN and password: The Distinguished Name (DN) and password of the user that can query the LDAP tree. (i.e., CN=Admin,CN=Users,DC=Domain,DC=edu)
- LDAP access hierarchy: Group Attribute Name and Value, Base Group DN. (i.e., OU=Law,OU=university,DC=SchoolDomain,DC=edu)

Playback Requirements

EchoSystem will be transparent to your students. Students will access presentations either via a publisher plugin (e.g., Blackboard, Moodle), RSS (podcast) feed, or even public-facing web page, depending on your publication configuration. EchoPlayer presentations, or *Echoes*, are played back from a standard web browser. Downloadable files such as podcast and vodcast formats are played back on supported media players.

For EchoPlayer presentation in the browser, the Adobe Flash Player plugin (9.0.0 or greater) must be installed.

Supported Browsers by Operating System

See [Supported EchoPlayer \(Student Player\) Browsers](#).

Minimum Bandwidth Requirements

- "High Bandwidth" EchoPlayer with video streaming is approximately 300 kbps
- "High Bandwidth" EchoPlayer with audio streaming is approximately 112 kbps
- "Low Bandwidth" EchoPlayer is approximately 56 kbps

Podcast Playback Requirements

EchoSystem produces two different types of podcast formats for student review. Below are the playback requirements for each format:

- **Podcast Audio (MP3)** - typically downloaded by students through CMS/LMS/VLE via RSS feeds provided by ESS or iTunes U. Playable on any MP3 player.
- **Vodcast (M4V)** - typically downloaded by students through CMS/LMS/VLE or via RSS feeds provided by ESS or iTunes U. Playable on a computer using QuickTime and Windows Media Player. Portable playback on iPod or Zune.