Choosing the Right Encoding Method and Hardware for Live Webcasts on the Adobe® Flash® Platform Using MediaPlatform® Software
Introduction
To deliver live video to your audience using Adobe® Flash® streaming technology, that video must be encoded into a compressed format, such as H.264 or VP6. The encoding is necessary so that the video can be viewed by remote audience members in video players such as Adobe's Flash Player. However, live video encoding requires intense processing on the CPU, system bus, and memory. Therefore, during a live event, webcast producers performing encoding must have reliable and high performance encoding hardware to deliver quality results that will meet the needs of the customer and ensure a quality experience.

The event parameters will determine the hardware required. For smaller events, such as a single video of a single presenter, encoding is a straightforward matter. The camera cable is connected to the encoding device or capture card and away you go. For larger, high-profile events, webcast producers will often make use of multiple cameras and video switching equipment. In general, encoding occurs “post-switch,” meaning that a single stream is being delivered from the camera or the switcher (usually an analog signal) and that encoded signal is sent to the media servers after all of the video switching has been completed using the video switchers. This paper has been written as an introductory discussion to enable webcast producers to make informed hardware purchases.

Encoding Approaches
There are four high level approaches to encoding live video, each of which has merit. Under each of the following approaches, you will be using Flash Media Live Encoder (FMLE) v. 3.1 or v.3.2 from Adobe as the encoding software to encode your project. The software system is available as a free download from Adobe.

The approaches are:
1. Hardware-based encoding appliances
2. Desktop PC-based approach with a video capture card installed
3. A laptop approach with a PCI-Express slot that will allow you to attach a device that has a PCI express enclosure to which a video capture card will be installed
4. Remote encoding through a company that specializes in performing live encoding as a service

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1 Note: You currently need to select the VP6 method in Flash Media Live Encoder if you plan to create an archive of your live event.
2 Note: Windows Media Encoder is the software for Windows Media events and can be used as well. This paper focuses on events created with Flash technology.
Encoding Cost/Benefits

The following chart is an overview of the high level benefits of each approach:

<table>
<thead>
<tr>
<th>Approach</th>
<th>Performance</th>
<th>Cost</th>
<th>Portability</th>
</tr>
</thead>
<tbody>
<tr>
<td>Encoding Appliances</td>
<td>High</td>
<td>High</td>
<td>High</td>
</tr>
<tr>
<td>Desktop-Based with Capture Card</td>
<td>High</td>
<td>Low</td>
<td>Low</td>
</tr>
<tr>
<td>Laptop-Based with Capture Card &amp; PCIe Chassis</td>
<td>High</td>
<td>Medium</td>
<td>Medium</td>
</tr>
<tr>
<td>Remote</td>
<td>High</td>
<td>Highest</td>
<td>Highest</td>
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</table>

Table 1 – Uses of webcasting and Web conferencing, compared.

Approaches in Detail

1. Encoding Appliances
   
   Many of our customers purchase all-in-one encoding appliances from companies such as ViewCast (www.viewcast.com) and Digital Rapids (www.digitalrapids.com).

   Using an encoding appliance makes encoding a very easy and routine process. Although each manufacturer has its own process and functionality, in general the webcast producer sets up encoding profiles in advance through the device’s interface and the selects which encoding profile to invoke for each event – literally by selecting a button on the front of the device. These profiles will typically include codec selection (i.e.: h.264), bitrate, framerate, video size, audio codecs (i.e.: MP3), volume, etc. These profiles are then associated with a button on the device that will perform encoding based upon the selected profile. In addition, these appliances are self-contained, including the operating system (usually MS Windows XP), encoding software (such as Adobe FMLE), and all other related software.

   While the effectiveness of these solutions is quite high, they can also command large budgets. You should expect to pay between $4,000 and $20,000 for each encoder. Depending on the event, you may need two or more encoders in order to ensure redundancy in the event of a hardware failure.
2. **Desktop Approach with Capture Card (Our Recommended Solution)**

Webcast producers may also choose to use a desktop approach for encoding. This approach requires the purchase of one or more desktop PCs, each with a video capture card installed in the PCIe bus. The advantage of this approach is primarily cost, since a basic dual-core or quad-core machine from any manufacturer may be used. Specifically, there are a few notable requirements when purchasing this type of equipment:

**Desktop Encoding Specifications**
- Low-footprint desktop machine from any manufacturer
- Dual-core or Quad core processor with a minimum 2.0 GHz speed
- Windows XP (for Flash and Windows Media\(^3\) encoding) or Windows 7 for Flash-only encoding. Note: You may purchase a machine with Windows 7 installed and use virtualization software to boot into Windows XP for WM events.
- Minimum of 8 GB of DDR3 RAM (16 GB DDR3 RAM Recommended)
- Minimum of 500 GB hard drive (dependent upon the type of video recording)
- PCI Express (PCIe) Card Bus. This is where the capture card will be installed.
- Video Capture Card. Discussed in detail below.
- High speed Ethernet connection

3. **Laptop Approach with Capture Card and PCIe Chassis**

Essentially the laptop approach is the same as the desktop approach, except that laptops do not have card bus slots. Therefore event producers will need an additional piece of hardware that will allow installation of a video capture card into a PCIe enclosure or chassis. Specifically, there are a few notable requirements when purchasing this type of equipment:

**Laptop Encoding Specifications**
- Low-footprint laptop machine from any manufacturer
- Dual-core or Quad core processor with a minimum 1.73 GHz speed
- Windows XP (for Flash and Windows Media encoding) or Windows 7 for Flash-only encoding
- Minimum of 8 GB of DDR3 RAM (16 GB DDR3 Recommended)
- Minimum of 500 GB hard drive (dependent upon the type of video recording)
- PCI Express (PCIe) Card Bus slot. This is where the PCIe Chassis will connect
- Video Capture Card. Discussed in detail below.
- PCI Chassis. Discussed in detail below.
- High speed Ethernet connection

4. **Remote Encoding**

Remote encoding is the use of a Services Company to provide “offsite” encoding services for your event, typically under a pay-per-event basis. The basic notion is that the Webcasting Producer will deliver a live, unencoded stream via a high-speed Internet connection to the encoding service provider. The Service Provider will provide the actual encoding services and deliver the encoded stream to the media servers. Remote encoding is expensive. Some of our customers use the services of companies such as Arqiva ([www.arqiva](http://www.arqiva)) and Quality Tech ([www.qualitytech.com](http://www.qualitytech.com)) for such services, with excellent results.

\(^3\) Note: Windows Media events can be created with MediaLauncher.
**Video Capture Cards**

A video capture card is required to convert the video/audio signal into a format that can be encoded into a compressed format by the encoder. Cabling from either your camera or from your video switcher (in the case of multiple cameras) is connected to the capture card, which may be installed either in a desktop PC or in a laptop as described above. The type of capture card selected will be dependent upon the type of event you will be creating. Capture cards may support HD or non-HD formats, they may support Windows Media or Flash or both. A capture card is an important purchase for webcasting professional. While the ultimate responsibility to select a capture card rests with you, MediaPlatform customers have had good success using ViewCast Osprey series – specifically the Osprey 230 or the Osprey 240e. Be sure to match the PCI bus on the capture card with your desktop computer PCI bus.

**Other Hardware**

**PCI Express (PCIe) Expansion Chassis for Laptop**

If you plan to use a laptop computer with a capture card, you must have a method to connect those two devices, since laptops do not allow for installation of full size PCIe cards. The solution is to purchase one of a variety of PCIe expansion chassis. These are small footprint devices that will enable you to install a PCIe capture card (like a ViewCast osprey 240e) into the chassis and connect the chassis to the laptop via a connection to the laptop’s PC Card Slot, specifically an Express Card 34 or 54 slot. MediaPlatform customers have had good success using the PCI Express Expansion Systems from Magma. More information may be found at [http://magma.com/pciexpress.asp](http://magma.com/pciexpress.asp).

**A Note about FireWire**

While many consumers and professionals have obtained high quality camera equipment that makes use of FireWire connectivity, MediaPlatform does not recommend using FireWire-connected cameras. MediaPlatform has seen a slightly higher rate of failure with FireWire equipment, though it can be used as a backup.
**MediaPlatform Webcasting Solutions**

MediaPlatform webcasting solutions are considered best-in-class. They power high-impact presentations for lead generation, corporate communications and training. The company offers organizations the ability to take advantage of scalable cloud-based computing, as well as on-premises deployment, to present and manage rich media. With media management tools built on its platform, the company helps clients derive long term archive value from their investment in media content.

MediaPlatform is known for excellence in engineering, with a host of superlatives and “firsts” accompanying our product offerings, including:

- Most scalable webcasting solution, reliably used to stream live video to simultaneous audiences in the tens of thousands.
- Most customizable viewer experience, enabling completely custom branding of the media player and alignment with corporate branding standards.
- Most dynamic and professional-class back-end production management system, with the ability to manage complex live events with multiple live presenters and a large production team assigned separate roles.
- Highest level of potential application integration, realized through a 100% Web services (SOA) approach to solution architecture.
- First pure software-as-a-service enterprise webcasting solution.

**Performance Webcasting**

MediaPlatform’s solutions drive performance webcasting, linking phases of the complete Webcast production process through a series of best-in-class offerings. We call this “performance webcasting.” WebCaster manages the Webcast guest invitation and registration processes with rich customization characteristics. The back-end production control interface allows producers to manage a live or on-demand event with a full complement of professional options, including dynamic survey, poll, and Q&A functionality. The signal streams from the most scalable, redundant infrastructure available on the market today. End users see the presentation on a custom-branded player that can be designed to match corporate branding specifications. Post-event, powerful analytics and reporting tools enable event owners and business stakeholders to gain insight into the success of the event and the return on investment for the production process.

**About MediaPlatform, Inc.**

MediaPlatform, Inc. delivers best-in-class webcasting and media management technology to global enterprises and digital media producers. MediaPlatform’s webcasting software enables high-impact presentations for lead generation, corporate communications and training. The company offers organizations the ability to take advantage of scalable cloud-based computing, as well as on-premises deployment, to present and manage rich media. With media management tools built on its platform, the company helps clients derive long term archive value from their investment in media content.

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