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New York State Information Technology Policy	**No:** NYS-G07-002
Best Practice Guideline: Webcasting Open Meetings	**Effective :** 04/11/2009 **Issued By:** NYS CIO/OFT State Chief Information Officer Director Office for Technology **Published By:** Enterprise Strategy & Acquisitions Office

1.0 Purpose and Benefits of the Guideline

The purpose of this best practice guideline is to provide guidance to *state agencies and public authorities* with regard to producing webcasts of open meetings, as required by Executive Order 3 (www.state.ny.us/governor/executive_orders/exeorders/3.html).

2.0 Scope of the Guideline

This guideline covers a number of options and suggestions for *state agencies and public authorities* to choose from depending upon the number of meetings that the *state agency or public authority* may have to webcast and the resources it has available. Centralized contract information for webcasting is addressed in Purchasing Memorandum CL-686 issued by the Office of General Services (www.ogs.state.ny.us/purchase/spg/pdfdocs/CL686.pdf). The required webcasting standards, which state agencies and public authorities must follow, are found in standard S07-001, Webcasting Open Meetings (www.cio.ny.gov/policy/S07-001/index.htm).

For purposes of this best practice guideline the definition of *state agencies and public authorities* as defined in Executive Order 3, is as follows:

> "Agency" shall mean any state agency, department, office, board, commission or other instrumentality of the State, other than a public authority.

"Public authority" shall mean a public authority or public benefit corporation created by or existing under any State law, at least one of whose members is appointed by the Governor (including any subsidiaries of such public authority or public benefit corporation), other than an interstate or international authority or public benefit corporation.

3.0 Guidelines

3.1 Webcasting Introduction

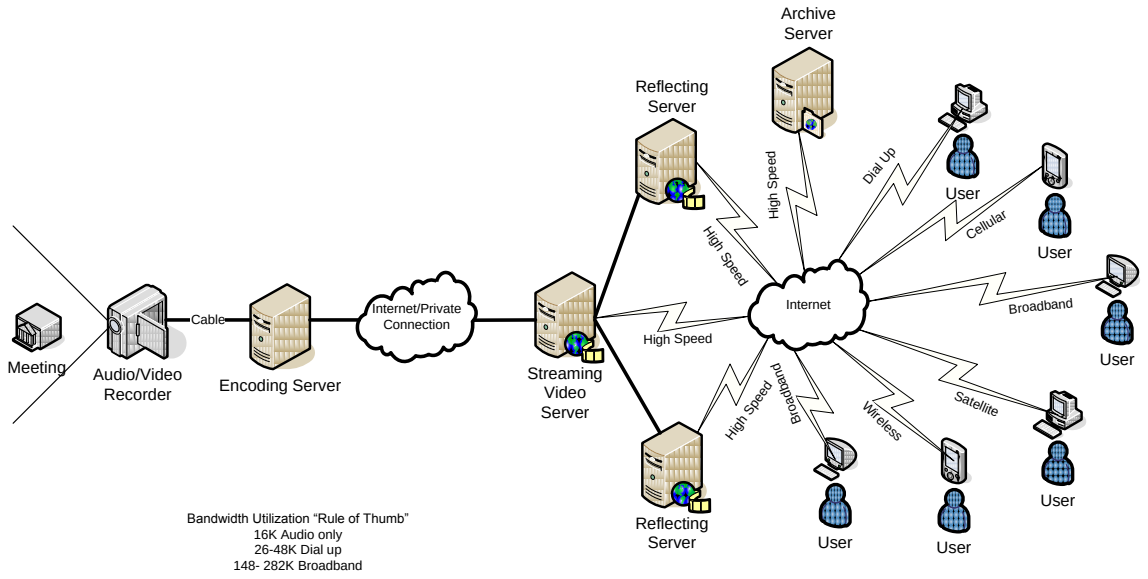
A webcast is produced in one location and is transmitted to any PC or video-capable device connected to the Internet. A webcast is broadcast over the Internet to anyone, or over an intranet to a specific group of people. Webcasts of open meetings may consist of a combination of digital media, such as audio, video and presentations in different formats (e.g. PowerPoint slides, spreadsheets, and graphics).

There are various stages in the webcast production process:

- **Planning** – the meeting logistics, location, equipment and crew
- **Production** – audio and video feeds and any additional data types, such as PowerPoint slides
- **Capture** – converting the raw media into formats that can be streamed to the web; also includes *encoding* and captioning
- **Distribution** – streaming the encoded data over the Internet
- **Viewing** – connecting the public to the meeting webcast

Webcast quality will vary depending on a number of factors, including: suitability of the meeting location; type and amount of equipment available; staff resources and skill level; instructions to meeting participants; and availability of technical resources.

A graphic representation of the webcasting process is shown below.



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3.2 Planning

Planning is the most critical ingredient for a successful webcast. Three factors that impact planning are: 1) what type of webcast will be produced 2) determining the video production environment that is most suitable to the meeting type, budget and desired quality and 3) the suitability of the meeting venue for webcasting.

3.2.1 Types of Webcasts

There are essentially two kinds of webcasts: (1) live (real-time) and (2) on-demand. Each has different attributes. All webcasts of open meetings must be made available on-demand. Open meetings are required to be webcast live where possible (where broadband is available to do so). Standard S07-001, Webcasting Open Meetings, defines these requirements.

3.2.1.1 Live (Real-Time) Webcasts

In a live webcast, the meeting appears on the screen in real-time.

Attributes of a Live Webcast:

- ✓ Video and audio occur in real-time
- ✓ Viewers must watch at an appointed time
- ✓ There is little room for production errors
- ✓ Technical support is essential
- ✓ Captioning is less expensive (capture and synchronization are done along with the webcast when captioning in real-time - see the section on captioning)
- ✓ Captions may have inaccuracies
- ✓ Captions are delayed by 1 – 4 seconds
- ✓ If the meeting is being conducted at multiple locations, each location will require an Internet connection and central coordination and control point is needed

3.2.1.2 on-Demand Webcasts

On-demand webcasts are pre-recorded. On-demand webcasts may also have been streamed live. These webcasts are stored and may be retrieved and viewed on-demand, whenever the viewer chooses.

Attributes of an On-Demand Webcast:

- ✓ Viewers can see the webcast at their own convenience
- ✓ Information discussed at the meeting may no longer be timely when viewed at a later date
- ✓ Captioning can be error-free with post recording editing
- ✓ Captioning is more expensive (captioning after a meeting requires capture, editing and then synchronization – see section on captioning)
- ✓ Adjustments can be made to improve the video and audio (e.g. lighten or darken, increase sound volume)
- ✓ Recording meeting segments are delivered to a central location for *encoding,* storage and streaming
- ✓ Meeting webcasts can be segmented into multiple clips, indexed, categorized and subject to search (particularly useful for very long meetings)

3.2.2 Selecting the Right Video Production Environment

There are essentially three production environments available and a hybrid mix of these three. The production quality and cost will vary depending on the environment selected.

3.2.2.1 Dedicated On-Site Studio Facilities

Dedicated studios offer all of the equipment and technical staff to produce and stream a webcast. These studios have professional-grade cameras, lights, sets and screens.[1]

Attributes of a Dedicated On-Site Studio Facility:

- ✓ Professional quality production handled by experienced technicians
- ✓ Can be used to produce a live webcast
- ✓ Fixed location
- ✓ Currently not available in every area of the State
- ✓ Scheduling must be done in advance and may be difficult
- ✓ May have limited size and seating capacity

3.2.2.2 Using a Webcast Production Crew at a Meeting Site

Webcast production crews can come directly to the site to produce the webcast. The site must have sufficient power. If the meeting is to be webcast live, an out-going broadband Internet access point is needed. If real-time captioning is to be done, two phone lines need to be available (one must be a modem line).

Attributes of Using a Broadcast/Webcast Production Crew at a Meeting Site:

- ✓ Professional quality production handled by experienced technicians
- ✓ Flexible location
- ✓ Sites do not always have the proper set up for a webcast
- ✓ The entity must coordinate the meeting site logistics

3.2.2.3 Using In-House Staff and Equipment at a Meeting Site

Entities can produce their own webcasts. The quality and cost will vary depending on staff experience and equipment quality and quantity. Cameras, lighting, microphones, *sound mixers*, *encoders,* hardware and software will need to be purchased.

Attributes of Using In-house Staff and Equipment at a Meeting Site:

- ✓ *Agencies and public authorities* that produce webcasts on a frequent basis can keep costs down over time

[1] Within New York State government, the State University of New York, New York Network, has a dedicated studio facility available for *agencies and public authorities* to use in the Empire State Plaza in Albany as well as providing broadcast/webcast production crews to meeting sites. The Office of General Services is investigating equipping selected state meeting rooms for webcasting. Vendors also provide these services.

- ✓ As in-house expertise is built over time, production logistics become easier and routine
- ✓ Dedicated staff and training are required
- ✓ Initial investment can be costly
- ✓ Productions are subject to a variety of technical problems so trained technicians are a must
- ✓ In-house webcasting resources and expertise can be used for numerous purposes beyond open meetings
- ✓ Quality of the webcast is based on quality and quantity of equipment and experience of staff

3.2.2.4 Hybrid Using a Mix of In-House and Vendor Resources

A number of hybrid approaches using a mix of in-house and vendor resources can be used.

For meetings that are being webcast live, in-house staff and equipment can be used to capture and *encode* the audio and video and then transmit the encoded files to a distribution provider who would stream the live webcast over the Internet.

For meetings that are not being webcast live, in-house staff and equipment can be utilized to capture the meeting video and audio. These files can then be sent, either electronically or manually delivered, to a content delivery provider. *Encoding* can occur either before or after the data is delivered to the provider. The provider would handle storage for on-demand viewing.

Attributes of Hybrid Approach:

- ✓ As in-house expertise is built over time, production logistics become easier and routine
- ✓ Requires some in-house staff and training
- ✓ Initial investment in equipment is required
- ✓ Equipment and expertise can be used for numerous purposes beyond open meetings
- ✓ Quality of the webcast is based on quality and quantity of equipment and experience of staff
- ✓ Agency does not need to purchase or handle streaming equipment, hardware, software and bandwidth requirements

Additional Attributes of Live Hybrid Approach:

- ✓ Agency needs to purchase *encoding* software and have expertise using it
- ✓ Sufficient outgoing broadband bandwidth from the meeting site is required

Additional Attributes of On-Demand Only Hybrid Approach:

- ✓ Agency does not need to purchase encoding equipment, hardware and software or have that technical expertise

3.2.3 Meeting Venue Considerations

The location traditionally used for a meeting may or may not be suitable for webcasting. Some important factors for successful webcasting to consider in selecting or changing a meeting location, if possible, include:

3.2.3.1 Internet Connectivity

- Broadband Internet connection such as T1 or higher, cable and DSL access is required at the meeting site to send captured audio and video directly to a distribution network service provider and/or to broadcast a live webcast. Mobile satellite connections are possible, but may be an expensive option.
- Quality of Service (QOS) for the upstream webcast connection (to the Internet) is desirable. QOS are control mechanisms that can provide different priority level to different users or data flows, or guarantee a certain level of performance for a data flow. QOS guarantees are important if network capacity is limited, so that live webcast streams can be assigned a high priority.
- The firewall at the meeting site must be configured to allow webcast data to pass through.
- Sufficient power is needed for all equipment.
- Two phone lines are needed if real-time captioning is to be done (one must be a modem line).

3.2.3.2 Lighting

- Poor lighting will cause poor video quality.
- Generally, if the lighting at the location supports good quality video conferencing, then the lighting should support good quality webcasting.

3.2.3.3 Acoustics

- Room acoustics are important. Pronounced echo may make audio unintelligible.
- In a large room, multiple microphones may be required to capture audio from all presenters.

- If audio conferencing works well in the room, then webcasting audio quality should be acceptable.

3.3 Production

There are a number of factors to consider when producing a webcast. The quality of the audio and video capture equipment will have a large effect on the webcasting quality. Better quality webcasts will have trained and experienced staff recording and coordinating.

3.3.1 Equipment

3.3.1.1 Recording Equipment

- **Webcams** – High-end PC/USB-based (universal serial bus) webcams or desktop videoconference equipment on a fast PC will provide marginal quality video for meetings that have one or two presenters. Wide-angle lenses on webcams are not adequate for capturing large groups.

- **Digital Video Camera** - Digital camcorders with firewire or video capture card connectivity to a PC or server will produce good video depending on the room size, lighting and number of presenters. The captured video stream can be uploaded to a content delivery provider using a web browser plug-in or as a video conference. Although a digital video camera may have a lower pixel capture ability, the quality of the capture is usually much better than a webcam because of the higher quality lenses, optical zoom, and the light collecting ability of the better lenses. Use external microphones, instead of the audio on the camera, for good sound quality.

- **IP Videoconferencing equipment** – Newer versions of IP videoconferencing equipment with face tracking may be adapted to webcasting. This equipment may come with multiple cameras and microphones for a more sophisticated presentation and clear sound quality. The presentation site establishes a video conference with a service provider who then encodes and streams the meeting over the Internet. Some videoconferencing equipment does not accommodate captioning. Most videoconferencing equipment produces lower quality images than digital video cameras.

- **Professional Webcast Equipment** - For large meetings with multiple presenters, professional quality production equipment and trained staff may be needed.

3.3.1.2 Audio/Microphones

Sound quality is very important in meeting webcasts. Decide which types of microphones best suit the situation. Built-in microphones on webcams and digital video cameras will not adequately capture the audio from a meeting. External microphone(s) deliver better sound results.

There are a variety of external microphones available, such as hand-held, lapel microphones (lavaliers) and table microphones. The more lapel microphones you have, the better the sound will be. The more independent sound channels you have, the better you can control the sound.

Use a *sound mixer* to control the volume, equalization, feedback, and echo, as well as to accommodate multiple speakers.

3.3.1.3 Camera Use

Small meetings may only require one camera, but most meetings will require at least two. When producing video for webcasts, it is very important to use a camera tripod to control motion. Panning, zooming-in and cutting frequently from one camera to another should be avoided. Do not pan unless it is necessary to keep the speaker in the frame. Panning, zooming-in and cutting also increase the workload for the encoder (the files are larger and will require more bandwidth). The potential result is a compromised stream quality. If it is necessary to cut from one camera to another, try to leave at least ten seconds between cuts.

Because most viewers will be watching on smaller screens, at a reduced screen resolution, frame the subject as tightly as possible.

White balancing is a technique that ensures that images look natural in all settings. When a room has various light forms, (i.e. halogen, fluorescent, incandescent) pay special attention to white balancing the cameras. *White balance* all the cameras at the location, using the lighting that will part of the production. This will assure that the cameras offer up the colors accurately.

Shutter speeds and exposure settings on all cameras should be the same. Vendors employ people whose sole job is to monitor the cameras to make sure they produce a consistent look. At a minimum, use consistent settings on all the cameras.

3.3.1.4 Lighting

Be sure there is enough light and that the lighting can be controlled. Unless there is a good reason to use existing light sources, try to eliminate all the existing light sources, with the possible exception of newer fluorescent lighting. Older fluorescent lighting can cause flicker in the video. A

portable lighting kit can suffice for small locations. For larger areas, consider hiring a lighting professional. The best way to determine if the lighting is adequate is through testing with the equipment to be used for video capture.

Cameras produce higher-quality images in brightly lit situations. Some cameras can record in low-light conditions, but the results may be low quality. Poor lighting translates to the need for higher bandwidth because settings with lots of shadows and contrast do not compress well in the *encoder*.

3.3.1.5 Staffing and Resources

Assign a meeting coordinator and experienced technical staff. Better quality webcasts will require a meeting coordinator and technical staff experienced in all aspects of the production. Generally these will consist of two competencies: one A/V focused (lights, cameras, sound) and one IT-focused (*encoding*, bandwidth, latencies, etc.).

Have enough staff available. There needs to be enough staff responsible for every aspect of the meeting and they should be capable of communicating with everyone else involved.

Have extra equipment at the meeting site. Have extra microphones and at least one backup camera (depends on how many cameras being used). Also, extra *sound mixers* and *encoders* will improve the quality of the webcast and assure a smooth production.

Testing at the site should be performed well before the meeting. Have as many people as possible participate in a dry run, including the meeting participants.

Assign production responsibilities to people with experience in editing video. Large organizations typically assign the responsibility for producing webcasts to in-house media or communications personnel who normally are responsible for video productions.

Ensure that there is IT staff managing the technology behind the scenes. IT staff should ensure that connections are working appropriately and monitoring bandwidth usage during live webcasts.

The Meeting Presenter(s) and Participants:

- Dark clothing colors are best; striped or plaid clothing may be distracting.
- Too much "shiny" jewelry can reflect lighting.
- The presenter or the meeting planner should provide a laptop, if necessary, for any presentation that may be included in the meeting.
- If there are multiple presentations, it is best if they are all on the same laptop.
- Arrive at the meeting 20-30 minutes prior to the start time. This allows for a microphone sound test and connection of the laptop with any presentation materials.

The Presentation:

- **Consider the webcast viewers when moving around**. While movement may be fine for the audience present in the room, it is not desirable for webcasts. A constantly panning camera can be a distraction for remote viewers.
- **Consider the webcast viewers when planning the lighting**. The audience in the room may prefer to view presentations with lower lighting. However, remote viewing is better if the presentation is done in bright lighting. Try and light the presenters or meeting members from behind. This puts a focus on them instead of the background.
- **Consider the webcast viewers when preparing and presenting PowerPoint presentations**. Design slides for a small screen. Sometimes font sizes or a graphics that are appropriate on a large screen in an auditorium are too small to see clearly in a webcast. Font size on displayed materials should be at least 24 pt. Keep slides simple and focused. While special effects, e.g., flying text, fade in/out, animated images, may capture the attention of the audience in the room, the effects are not captured for remote viewers and can cause problems with automated slide-advance controls. Pay attention to the mouse/pointer location during a presentation. The pointer is part of the screen shot relayed to remote viewers, so the pointer could appear to emphasize a word or could cover part of the screen display.
- **Advise speakers to look into the camera from time to time.**
- **All speaking must be directly into a microphone**. Meeting speakers should be reminded of this before the start of the meeting webcast. For example, speakers should not sit back away from the microphone, turn the head or body away from the microphone while speaking, or start speaking until in front of a microphone.

A Checklist for Multiple Sites:

If there are multiple sites, acknowledge that these sites are on-line and establish communication with each, one-by-one, using the following procedures:

- Introduce appropriate facilitators, guests, contacts, etc. at each site and verify two-way communication with them.
- Make sure that all meeting participants can hear and see all sites clearly. Specifically ask that the video from each site be displayed full-screen (as opposed to a quad-split) while communication with each site is in progress.

After clear communication with every site has been established, define the "ground rules":

- Announce to the meeting participants that all microphones are "on" and will remain active throughout the entire session. Extraneous noise at any site such as shuffling paper, eating food, tapping pens, or talking to neighbors will be heard by all sites and will interfere with effective communication.

- If any site begins to have audio or video trouble, request that the site notify the originator of the session immediately so that the problem may be corrected as soon as possible. Request that anyone speaking during the meeting identify both who they are and from which site they are participating.

3.4 Capture

There are two major steps in preparing the captured audio and video content for the Internet audience: (1) *encoding* and (2) adding captions.

3.4.1 Encoding

Encoding is the process of preparing the webcast for streaming to viewers. In the *encoding* process, the audio and video is converted to a format that matches the chosen distribution technique and attributes, and is also compressed. The programming can then be sent across the Internet to multiple computers, without the need for dedicated circuits or equipment.

Audio and video *encoding* may take place at the meeting site or the acquired audio and video streams may be sent to a webcasting or streaming service for *encoding*.

3.4.2 Delivery Bitrates

It is very important to consider the public and how they connect to the Internet when *encoding* a meeting webcast. Viewers will be using a dial-up connection, DSL or broadband. It is crucial to select *bitrates* that allow the end user to access the content in real-time. Internet bandwidth is usually stated in thousands of bits per second (kbps). The higher the bit rate delivered, the better the video and audio quality for a given *encoding* format. For example, if you select a *bitrate* that is too large, the video will likely stop, start and/or freeze if dial-up viewers try to watch - making the content virtually inaccessible to them. However, if you only provide a small *bitrate*, DSL and broadband users will not be able to enjoy the higher quality video and (possibly) larger screen size they can access due to their wider connection. A minimum of two delivery rates should be supported for webcasts, one for dial up users and one for broadband users. There are many bit rates possible and each format has its own options.

Ultimately, the total cost for bandwidth usage is directly related to the number of viewers (how many are watching the meeting at the same time) and the *bitrate* of the live streams (how large the file is), so it is important to choose only the appropriate size *bitrates*, potentially saving money.

It is also important to choose a screen size, or resolution, that is appropriate for the *bitrate* and the type of content that is being webcast. For example, it would not be advisable to deliver content in a small *bitrate*, full-screen. The content would be very grainy, fast movement would become a blur and small items would be barely visible. In general, be conservative with the

encoding settings translating to the *bitrate*. It is better that screen size be small and viewable, rather than large and inaccessible.

The higher the *bitrate* is then the better the sound quality (and size) of the resulting file will be. Lower the *bitrate*, and the sound quality goes down, and the file size goes down too. Audio quality is more important than video quality for the viewer experience, so prioritize the audio over the video, if necessary.

There are many types of *encoders* on the market. Standard S07-001, Webcasting Open Meetings, not only requires that a meeting be streamed to dial-up users, it requires it be streamed using multiple file types (such as Windows Media, RealPlayer®, Flash, QuickTime and the equivalent). It is important that the *encoder* or service provider can encode at least two types of files. This will allow the webcast to reach more viewers with varying types of players.

3.4.3 General Guidelines for Bitrates

Three factors should be considered:

1) ***Data size per second***, or the amount of data being encoded per viewing second (the higher the number, the more information);
2) ***Frames per second***, or how many frames of video will be seen in one second (the higher the number, the better the quality); and
3) ***Screen size***, or how big the viewing window will be on the end user's computer.

Bitrate Guidelines*			
Connection	Dial-up	DSL	Broadband
Data size per second	26-48 kbps	128-148 kbps	148-282 kbps
Frames per second	15 fps	15 fps	29.97 fps
Screen size	160 x 120	320 x 240	320 x 240
Notes	This will create a small enough file to be streamed smoothly. **	This will create a larger file, about 50% screen size, with fairly grainy video.	This will create the same screen size as DSL, but with a higher quality image.

** These recommendations are only meant as a guide. Often it is necessary to experiment with the frames per second and screen size to create the desired result.*

*** It should be noted that, because of the poor quality of the video image possible with a bitrate this small, open captioning, or captioning that is part of the video image, will be hard to read. Closed captioning technology, or captioning that is a separate, in-sync, data stream, is in its infancy for live webcasts. Therefore, it may be preferred to only provide captioning on the on-demand webcast and not provide captioning on the live webcast at this bitrate (for more information see Captioning section).*

3.4.4 Captioning

Without captioning, people who are unable to hear will find multimedia presentations to be inaccessible.

Captions are on-screen text that display a webcast's dialogue, identify speakers, and describe other relevant sounds that are otherwise inaccessible to people who are deaf or hearing-impaired. Captions are synchronized with the video image so that viewers have equivalent access to the content that is originally presented in sound, regardless of whether they receive that content via audio or text.

Synchronized captioning or synchronized text captioning is required for all open meetings per standard S07-001, Webcasting Open Meetings.

3.4.5 The Difference between Open and Closed Captions

Captions can be either *open* or *closed*. Currently, closed captioning for live webcasts is in its infancy and may be difficult or costly to achieve.

Open captions are always in view and cannot be turned off. In contrast, closed captions can be turned on and off by the viewer.

Closed captions appear only when the viewer agent (e.g., a media viewer player) supports them. At least one version of most major media viewer software now supports closed captions. Some of these products may support captions in the stand-alone client versions but not in browser-embedded or handheld versions of the products.

Delivering webcasts with closed captions places responsibility on the viewer to understand how to turn captions on in their media player software. To relieve the viewer of this burden, some people prefer delivering webcasts with open captions. Open-captioning has universal design benefits for people other than those with hearing impairments (e.g., people in noisy locations or people whose equipment does not have sound capability).

Open captions are an actual part of the webcast stream. Closed captions exist as a separate text stream, synchronized with the webcast. Open captions, unlike closed captions, are subject to loss of quality when the encoded video is compressed after the captions have been added.

3.4.6 Option 1: Real–Time Captioning

Real-time captioning (live captioning) is the process of creating and transmitting captions for live video. During a live webcast of an open meeting, specially trained court reporters, called real-time captioners, provide captions that match the audio portion, word for word. Real-time captioners have extensive training on captioning techniques; they have to perform at an accuracy rate of at least 98 percent.

Delivery time and method: Open captions scroll 3 lines at a time. Translation and text display are 1 – 4 seconds behind the speaker.

How Captured: A stenographer types assisted by a computer-aided translation from stenographic transcript to captions. After *encoding*, captions then go to a video transmitter for recording or out to a broadcaster/web stream. The whole process can be done remotely through modem technology. The text is available immediately in an unedited ASCII file.

Equipment Needed: Stenographic keyboard, computer, modem, captioning software, two monitors, headphones, *encoder*, and video source.

What is captured: verbatim discussion

Attributes of Real-Time Captioning:

- ✓ Captioning is provided to the audience at the same time as the real meeting. It can be done from a distance.
- ✓ Planning is required. For a quality production, the stenographer(s) will need to be provided with handouts, overheads, speaker names and vocabulary lists ahead of time. Words can get distorted.
- ✓ Captions may have inaccuracies.
- ✓ Captions are delayed 1-4 seconds.
- ✓ As soon as the text equivalent of the audio has been generated, that text must be delivered to the end viewer so it can be synchronized with the audio stream. Unfortunately, few real-time multimedia technologies have native support for captioning. At this time, only RealPlayer® supports the delivery of real-time captions. Thus, the real-time captions must usually be delivered through a different technology running parallel to the multimedia software or hardware. This is often done through dedicated applications or through clients that are built into a web page and run in a web browser.

Cost: Cost will vary depending on the meeting time of day and whether done live or remotely. 9 a.m. to 5 p.m. is usually the lowest cost per hour. Work after 5 p.m. is usually about 20-30% more expensive. This does not include: a text transcript; overhead projectors; screens; video hookups; large format displays; or other equipment that may be needed for a particular meeting or location.

3.4.7. Option 2: Off-line Captioning

Off-line captioning is the process of adding captions to previously recorded video.

Delivery time and method: Delivery time varies depending on vendor.

Best Use: For on-demand viewing over a period of time.

How Captured: Captioners listen to the videotape and transcribe the dialogue, breaking the transcript into captions. These captions are timed, synchronized with the video, and positioned on the screen, and the resulting data is ready to be "encoded" into the video signal.

There are two styles of off-line captioning:

Pop-on style is similar to movie subtitles. Captions appear on the screen all at once. Captions can be anywhere, but usually near the person who is speaking. These captions appear one line at a time. They are time coded to match video changes so as not to interfere with the action. They appear in synch with the audio.

Roll-up style is often used in news captioning. Captions are again time coded, and scroll up a line at a time from the bottom or top of the screen, usually filling three full rows. As each new row rolls up, the top row disappears.

Equipment Needed: Provided by the vendor

What is Captured: transcript of live discussion which has been synchronized, edited and formatted

Attributes of Off-line Captioning:

- ✓ Text is formatted.
- ✓ Captions can be error-free.
- ✓ Is more expensive than real-time captioning (real-time captioning is done in one process and off-line captioning has 3 processes – capture, editing and time-synchronization).
- ✓ People with hearing impairments must wait until the meeting is captioned before they have full access to the information.

Cost: Approximately 30-50% higher per hour than real-time captioning. Roll-up captions are less expensive to produce than pop-up captions.

3.5 Distribution

Streaming technology enables an audio or video file to be played while it is being downloaded from the Internet, instead of waiting for the entire file to download before it can be viewed or heard. Streaming concepts are quite technical. When considering distribution questions, bandwidth is the most important topic. Bandwidth refers to the size of the pipe (T1, T3 ISDN PRI lines etc.) necessary to connect the webcast stream to the Internet.

3.5.1 Live Webcast Using a Hosting Vendor

For meeting webcasts that are streamed live and hosted by a vendor, the pipe must be at least large enough to handle a webcast stream for the combination of each file type and *bitrate* being used. These files will be streamed to the vendor as the meeting occurs. The vendor will receive the files and then stream them for the end user. In essence, the vendor receives one set of files; pushes it through their server, and then makes the webcast available to concurrent users through a larger pipe (the size of this pipe will be determined based upon the number of simultaneous viewers).

A quick method to determine the bandwidth requirement is to add together the ***Data size per second*** quantities, based on the types of users being served (i.e. dial-up, DSL or broadband) times the number of Media Files you intend to use (minimum of 2 required per standard S07-001, Webcasting Open Meetings) for a total ***Data size per second***, or ***Access speed*** for the entire webcast.

Example:

An agency streams 2 types of Media files for both dial-up and for broadband) users.

Media File #1

dial-up file =	48 kbps +
broadband file =	282 kbps +

Media File #2

dial-up file =	48 kbps +
broadband file =	282 kbps =
TOTAL	660 kbps

As the figures indicate, to stream this webcast live, the minimum bandwidth needed from the meeting site for this webcast is 660 kbps.

Live Webcast Using Agency Hosting

In order to host or maintain the file of a live webcast, the *agency or public authority* may need to purchase hardware and pay a monthly fee for a pipe with enough bandwidth to connect the webcast meeting content to the Internet.

To determine the amount of bandwidth needed, the number 660 kbps noted in the example above, is multiplied by the number of expected viewers. If, for example, the number of expected viewers is forty (40), then the bandwidth required is 40 x 660 kbps, or 26,400 kbps.

Agencies and public authorities need to account for other Internet traffic on their network when planning and allocating bandwidth for streaming a live webcast. A large file moving across the network in the middle of a webcast could result in disruption to the live webcast if the necessary bandwidth capacity is not available to handle both. Traffic can be prioritized so that webcast traffic is prioritized over other Internet traffic to avoid live webcast disruptions.

3.5.2 On-Demand Webcast Using Agency Resources and a Hosting Vendor

As mentioned in the Hybrid option for the video production environment, an entity can record a meeting with in-house resources and then engage a provider to host and stream it.

To transmit the files to the vendor, the files can be e-mailed or recorded onto a CD and mailed to the hosting vendor.

3.5.3 on-Demand Webcast Using Agency Hosting

In order to host or maintain the files of on-demand webcasts, the agency may need to purchase hardware and pay a monthly fee for a pipe with enough bandwidth to connect the webcast meeting content of all meetings available at one time to the Internet.

To determine the amount of bandwidth needed, a user's requirement (282 kbps for a broadband user in the example above), is multiplied by the number of expected simultaneous viewers of any of the available webcasts. If, for example, the average number of webcasts available at one time is two (2) and the number of expected simultaneous viewers for both of these is twenty (20) (it does not matter if 10 are watching each one or 20 are watching one), then the bandwidth required is 20 x 282 kbps, or 5640 kbps.

3.6 Viewing

The audience views a webcast by using a software application called a "player." Players allow the viewer to open and view the webcast file. Standard S07-001, Webcasting Open Meetings, requires webcast meetings to support multiple software clients. This requires the webcast to be saved in a separate file type for each (software clients/file type examples include Windows Media Player, RealPlayer®, Flash, QuickTime and any equivalent). The two most common ways to use these players for end user viewing are: (1) to have a player embedded in the Internet browser or (2) link to a player resident on the end user's computer.

Always provide clear guidance about what technologies and plug-ins are required to view the webcast. This guidance should be found on the webpage where the webcast link appears. To assist potential viewers in having the appropriate player downloaded, configured and tested on their respective PCs prior to accessing the webcast link, provide instructions on what is needed to successfully watch the webcast. Place links to appropriate technology download pages. A troubleshooting or "Frequently Asked Questions (FAQ)" page is always a good idea.

Comply with general requirements for live video feeds including LAN/firewall configuration, Internet connectivity and individual work stations, as needed.

Make the webcast easy to find on the website. Additionally, the Office for Technology and the Governor's Communications Office will be working with entities to provide access to webcast meetings from the State Portal.

3.6.1 Embedded Players

Embedded players refer to media players, video, audio or both. Embedded players are plug-ins for the Internet browser that are automatically downloaded on first use and remain loaded each time the browser is launched. Embedded players offer the viewer an experience where the video and/or sound is integrated right into the webpage being viewed. There is no "pop-up" window. The file launches once the page loads. The "Flash Players" are by far the most common type of embedded player and require no downloading of a player by the end user.

Attributes of Embedded Players:

- ✓ Most web browsers since the early 1990's were shipped with a "Flash" plug-in. This means the end user will not be required to have an additional player available on their computer, or be required to download one from the Internet.
- ✓ "Flash" takes less time to load than other players.

- ✓ If a newer software version is used to create the webstream, some older browsers may not be able to play this newer file (i.e. it will not be "backward compatible") and the user will be prompted to download a newer version.
- ✓ These players still struggle with accessibility. For instance, there is less immediate control over some operator functions, such as volume, with embedded players. These accessibility issues can be overcome through proper labeling and by using JavaScript to add keyboard shortcuts for playback controls.

3.6.2 Linking to a Player on the End User's Computer

When an end user clicks on the link to view a webcast meeting, a message is sent from the file back to that person's computer seeking out the appropriate player. If the appropriate player is not found, an option should be made available to guide the end user to download a player, for free, from the Internet. Windows Media Player, QuickTime and RealPlayer® are the most common types of players that normally work in this fashion, or any other equivalent.

Attributes:

- ✓ Can offer a number of file types and allows the end user to choose the player.
- ✓ Accessibility is good with these players. Controls are readily available for the end user, particularly in Windows Media Player and RealPlayer®.
- ✓ If using a newer software version to create the webcast file, some older browsers may not be able to play this newer file (i.e. it will not be "backward compatible"), similar to an embedded player, and the user will be prompted to download a newer version.

4.0 Definitions of Key Terms

A complete listing of defined terms for NYS Information Technology Policies, Standards, and Best Practice Guidelines is available in the "NYS Information Technology Policies, Standards, and Best Practice Guidelines Glossary" at: (http://www.cio.ny.gov/policy/glossary.htm).

The following defined terms are used in this guideline.

Bitrate	In digital multimedia, bitrate is the number of bits used per unit of time to represent a continuous medium such as audio or video after source coding (data compression). In this sense it corresponds to the term digital bandwidth consumption. While often referred to as "speed," bitrate does not measure distance/time but quantity/time.

Encoder

A device used to change a signal (such as a bitstream) or data into a code. The code may serve any of a number of purposes such as compressing information for transmission or storage, encrypting or adding redundancies to the input code, or translating from one code to another. This is usually done by means of a programmed algorithm, especially if any part of the code is digital.

Encoding

The process of preparing content for sending to viewers. Audio and video is converted to a format that matches the chosen distribution technique and attributes, and is also compressed.

Sound Mixer

A device which takes two or more audio signals, mixes them together and provides one or more output signals.

Synchronized text captioning

Text transcript that is synchronized or coordinated in time with the audio and video track (also referred to as synchronized text captions).

White balance

A setting in a camera that compensates for the differences in color temperature of the surrounding light. In both analog and digital electronic cameras that use CCD and CMOS sensors to capture the image, the *white balance* must be adjusted to ensure that all colors in the scene will be represented faithfully. It can be adjusted automatically by the camera, by selecting presets (tungsten, fluorescent, etc.) or by aiming the lens at a totally white surface (the white card) and selecting "lock *white balance*." Alternatively, a gray card with 18% gray is sometimes used.

7.0 CIO/OFT Contact Information

Submit all inquiries and requests for future enhancements regarding this policy to:

Attention: CIO/OFT Enterprise Strategy and Acquisitions Office
Enterprise Strategy and Governance Services
New York State Office of the Chief Information Officer and Office for Technology
State Capitol, ESP, P.O. Box 2062
Albany, NY 12220
Telephone: 518-473-0234
Facsimile: 518-473-0327

Email: oft.sm.policy@cio.ny.gov

The State of New York Enterprise IT Policies may be found at the following website:
http://www.cio.ny.gov/policy/technologypolicyindex.htm

8.0 Revision Schedule and History

Date	Description of Change
04/11/2007	Original Guidelines Issued.
10/19/2009	Reformatted and updated to reflect current CIO, agency name, logo and style.