
WHITE PAPER

ENTERPRISE GUIDE TO EMBEDDING WEB VIDEO IN BUSINESS DOCUMENTS

Abstract

The major document authoring tools (e.g., Microsoft Word and Adobe Acrobat) have allowed authors to incorporate web-style video and other rich media in their day-to-day business documents for some time. However, the YouTube phenomenon has proven that informal, ad-hoc video can have important practical uses and be visually acceptable to most viewers.

This whitepaper examines the options, opportunities and potential pitfalls associated with the production, distribution and use of documents that embed web video. The paper draws on iPOV's extensive experience with web video and its specific processes and tools for the production of PDF documents that embed rich media. iPOV makes specific recommendations for the use of the different technologies in a range of common applications. The reasoning is given at length in the paper, but the final recommendations are as follows:

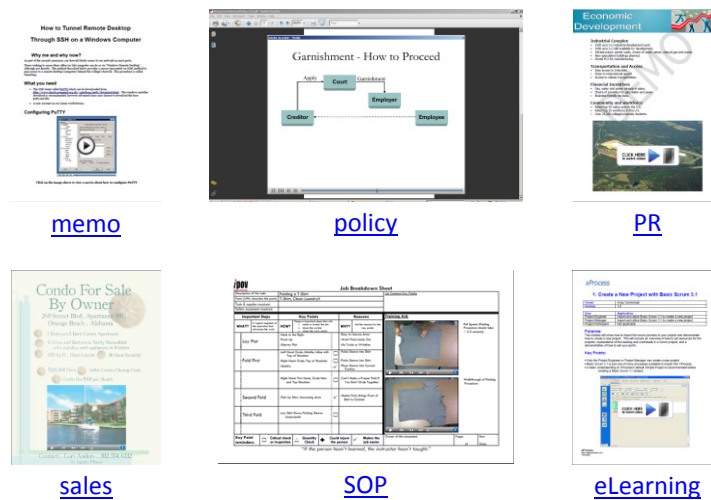
1. To **insert ad-hoc video clips into day-to-day documents**, use the simplest method that you are comfortable with. For many people this will be to embed the video(s) using Microsoft Word. However, all potential authors must know how to compress the various types of video before insertion. Otherwise, authors may inadvertently pollute the IT system with bloated, slow-loading and unplayable documents.
2. To **insert video into documents with business or legal impact**, author a document in Word, save it as a PDF and use Adobe Acrobat Pro to embed the video. Authors will require basic training in the use of Acrobat.
3. To publish **documents with embedded video for PR and marketing purposes**, use a non-linear editing program (e.g., Adobe Premiere) and Adobe Flash to package the video with controls. Use Microsoft Word to author the surrounding document and then use Acrobat Pro to perform the final embedding. Extensive training will be required in order to achieve acceptable video quality. Strong consideration should be given to outsourcing this activity to a qualified commercial production house.
4. To publish **SOP and eLearning documents with embedded video**, the video must be systematically edited and validated for technical accuracy. Organizations can either pay an expert designer and devote a subject matter expert to hand-craft these materials or they can send the raw video and document to iPOV and we will use our production process to deliver a fully validated finished document while minimizing the time that the subject expert must devote to the process.

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EXAMPLES OF DOCUMENTS WITH EMBEDDED VIDEO

(click on the images and captions to view PDFs with embedded video at iPOV's website)



You can view more examples at iPOV's website: <http://www.ipov.net/content/rich-media-pdf>

WHY EMBED VIDEO IN DOCUMENTS?

With companies effectively using video on websites, why would anyone be interested in the fairly challenging task of embedding video directly in Word and PDF documents? In general, there is little need to embed video directly inside of office documents. However, there are situations where embedding may be the best (or only) way to ensure that the documents and video can be viewed together reliably. Some of these situations are common enough that iPOV was motivated to develop special tools and processes to make the task easier. The following scenarios illustrate situations where video-embedded documents might be handy:

- Large company IT departments are pushing employees to store their business documents in secure document management systems like SharePoint or Lotus Notes. These systems enforce enhanced security and offer document control safeguards that are difficult to replicate on standard web servers. Documents with embedded video coexist very nicely with these systems.
- For security reasons, the same IT departments may resist the proliferation of intranet or extranet web server applications. Even if a document could be hosted on a web server, policy restrictions or resource costs may make that difficult for people in business units and non-IT departments. Those individuals can author video-enhanced PDF or DOC files without requiring any special IT support.
- Although this problem is diminishing, companies with highly mobile workforces may still have people operating in places where web connectivity is marginal or nonexistent. Field service crews, overseas offices in developing economies and personnel co-located behind strict client firewalls may not be able to reach key company websites. They can carry a library of video-enabled documents on a hard disk, thumb drive, or CD.
- Most employees in large organizations use Microsoft Word and it would be convenient if all forms of publishing could be done with that tool. However, to work with other programs, Word documents often must be exported to another format. If you add video into the mix, that gets very complicated. One iPOV client found that, by

converting Word originals to PDFs and embedding video, the resulting documents became much more universal. A given PDF document with embedded video can be stored in SharePoint, loaded into the Learning Management System, linked and made viewable online at a website, or emailed to parties outside the company. One file, many uses.

- A similar situation occurred in a global multinational. Divisions around the world each had their own Learning Management System, some of which were old and not standards-compliant. If they published eLearning in the customary SCORM or AICC packaging it would have taken a lot of effort to import it into all of the varied, regional servers. However, every LMS (even the old and non-standard ones) could import and display a PDF. By packaging the video inside the PDF, the courseware effectively became a universal commodity.

GOTCHAS

A fast-moving technology always generates surprises that initially baffle newcomers. These are the surprising limitations and gotchas that dictate what is actually possible. Accordingly, we begin this guide with a list of the key constraints that we have learned to work around:

1. **Can I put a video into a Word Document and have it viewable and playable on the Page?**

No. You can create that impression if you insert a Windows Media ‘object’ into your document, but the video won’t actually be inside the Word file. It will be an external file that the document is linked to, and you must manage this linkage yourself. You **can** put a movie inside the Word file, but it will appear as a small icon that you must click to open. It is theoretically possible that a skilled programmer can write a macro or plugin to make this possible, but IPOV has not seen any developer activity in this area.

2. **Can I put a video into a Word document and then save it as a PDF?**

Not reliably or well. IPOV is not aware of any tool that will reliably export a video-embedded Word document to PDF and have the video play correctly. First, if the video is in a typical, common movie format (MP4, AVI, WMV, MOV, etc.), it should first be converted into a Flash movie – something PDF exporting software won’t do.¹ Second, if the movie embedded in the Word document is already a Flash movie, the resulting embedded movie will have very limited play control (see point #3).

3. **Can I add a Flash video to a PDF using Acrobat Pro?**

You can add a FLV or H.264 video or SWF animation easily enough, but the Flash Player doesn’t supply any play controls (start, stop, pause, tracker bar, volume, etc.). This is a big drawback in business situations where the viewer may want to review a key point or adjust the sound volume. To get good play controls, it is necessary to package the video and play controls together into an SWF file (e.g., using an external editor such as Adobe Flash) and insert the unified SWF file into the PDF.²

4. **Why haven’t I seen more PDFs with embedded video – it looks really cool?**

Acrobat has supported embedding videos since version 6. The problem for business documents comes down to workflow – see answer #2 above. In general if you want to edit the text of a document you will do so in Word and then re-publish it to a PDF. At this point someone must individually re-insert all the videos from the old PDF

¹ Adobe now recommends embedding H.264 or FLV videos for pre-edited movies. You can use non-Flash video in PDFs, but Acrobat will try to find a suitable video player program on the user’s system. If it cannot find a player already installed, it will likely fail.

² The latest version of Acrobat Pro has an alternative way to import linked files, but it is finicky and prone to error. It is also more difficult to debug any broken links once the files have been imported.

into the new PDF. iPOV has developed a set of processes and procedures to help us do this quickly and correctly and we are working on tools to automate the process even more.^{3,4}

5. **Why not put the videos on YouTube and link them to a document?**

YouTube (and most sites like it) caters to people who want wide public distribution for their files. It has a very basic security system and it may be often blocked by corporate firewalls. Sites like these also tend to display ads that may or may not fit with your corporate image.

LINKING VIDEO AND ELECTRONIC BUSINESS DOCUMENTS

The most common approach to using video in business documents is to put the documents on a web server and link the video at the appropriate places in the documents. The media can be inserted one of two ways:

- **Linking** – The media is stored on some web server in a location that can be reached with a URL (e.g., <http://www.companyname.com/media/moviea34.swf>). The main body of the web document contains a hyperlink to that address. In some cases the document may have a triggering image or icon that will open the video (possibly in a new window) when clicked.⁵
- **'Embedding'** – In this context, the term 'embedding' is a bit of a misnomer. The media is not actually integrated into the main document. The media is stored on a web server at a known URL, the same as with linking. However, the web page is authored to display the video fully open and viewable when the page is initially viewed in the user's browser. It looks like the video is 'inside' the document, but in reality the video is being pulled from its storage location and displayed inline in the page.

Since the documents and videos are connected by links and addresses, any change to the server configuration (e.g. moving folders around or changing a server address) will break the links and prevent the videos from being seen. Either the containing document must be edited to retarget the links, or a pre-existing set of URL aliases must be used (e.g. [MyVideoServer/videos/latest/demo1.swf](#) always 'points' to the latest document).⁶

Linking on a web server has a strong appeal when document and version control are business issues. There is only one copy of the master document on the server. Any change to the web copy will be immediately evident to all subsequent viewers the next time they view the web page. There is no possibility that an obsolete copy will be left around and inadvertently relied upon.⁷

EMBEDDING VIDEO INSIDE DOCUMENT FILES

³ When documents are designed for large numbers of end users, it is often easier link to a video on a web server rather than distribute a packaged document.

⁴ Note also that recent security changes have made some old documents no longer playable.

⁵ Flash media suffers from similar issues for embedding – the Flash Player itself doesn't have any player controls, these are added by an intermediary player, which can be difficult to call when using direct links. Many tools will automatically generate well formed code that can be copy and pasted to create an embedded player.

⁶ The W3C (w3c.org) has a well thought out approach to this, but it may be confusing for inexperienced server administrators to setup and maintain.

⁷ The threat of uncontrolled documents remains if the user prints the web page and relies on a paper copy. Incorporating video into the web document may actually deter this failure mode, since the video can't be printed.

Microsoft Word and Adobe Acrobat allow users to place a media file **inside** a DOC or PDF file. It is possible to publish standard DOC or PDF files that **embed** sophisticated media and have that media play when the file is opened for viewing. Since the media is inside the DOC or PDF file, there is only one file to transmit or receive. If the document is write-protected, the integrity of the entire package is preserved, regardless of where or how it is sent and viewed.

It is important to note that local documents can display video without actually embedding the video inside the document. This can be confusing for end-users because the videos look like they are embedded even though they are merely linked. Both DOC and PDF files can be linked to media files on local or network drives.⁸ As with web documents, the external media files are either hyperlinked or displayed in-line on the page. However, the media files are not actually inside the document. They are located at a known address that is typically a subfolder of the document location. To deliver a linked document and video to another physical location (i.e., not reachable on the LAN), the document file and all of its linked media assets must be transferred without altering their positions relative to one another. One way is to zip the containing folder and let the recipient unzip it and put it where they wish.^{9,10} For these and other reasons, the use of local documents with linked media is not very common. The most frequent use occurs in the context of a CD or DVD, where loss or change to the files cannot occur. Generally, if linked media is desirable, it is much better to put the files on a web server.

The production cycle for putting video **inside** a document has four phases: capturing, editing, packaging and embedding. The following sections look at each of these in turn, focusing on Word documents and PDF.

CAPTURING VIDEO FOR BUSINESS DOCUMENTS

Capturing the video is probably the easiest part of using video in business documents. There are several new categories of video tools that are especially handy:

- Point and Share Cameras – These cameras (e.g., [RCA EZ207](#)) cost from \$70 to \$200 and store the video on memory chips. The video is later uploaded to a computer, typically over a simple USB connection.
- Hard Drive Camcorders – These cameras (e.g., [JVC Everio](#)) cost from \$300 to \$900 and have a hard drive instead of the conventional digital tape. The more expensive models have sophisticated video features. They can record hours of video and upload them to a computer using a USB or Firewire connection.
- Screencasting Software – This software (e.g., [BB Flashback](#)) is inexpensive (even free) and records everything that happens on your computer screen as well as any audio recorded by an attached microphone.

With these simple tools, anyone can learn to capture 'YouTube quality' video quickly and easily. The tools' low cost means that businesses can afford to distribute them fairly widely. The only drawback is that, at the moment, the different designs and models produce video output in wide range of formats. That means that the user has to know how to transfer and compress the video content for their specific device or program before they can use it in documentation.

⁸ Recent versions of Adobe PDF Reader have restricted this capability due to security concerns. It is still possible to author documents that play reliably, but it requires special publishing settings.

⁹ This assumes that the links are 'relative' links (e.g. "\subfolder\file.avi") and not 'absolute' links (e.g., "c:\documents\subfolder\file.avi"). Alternatively, links may be made to a 'central' workgroup file server.

¹⁰ The task of moving a collection of files is more prone to human error than transferring a single file. There is also the possibility that an individual video file may be swapped with one of the same name (e.g., an older version) by mistake, or a user may accidentally rearrange or delete a video from their copy of the document if it is not write protected.

EDITING AND ADDING VALUE TO THE VIDEO

Raw camera video from the field is seldom presentable without some form of post-editing. Raw video may be acceptable for ad-hoc notes and memos, but an unedited video presents two long term problems: a) visual and verbal mistakes will be jarring to the viewer, and b) mistakes (even if corrected onscreen) can persist in viewers' memories because visual memories are stronger than verbal or written ones. This can cause confusion and mistakes.

Most applications of video require some type of post-editing process to ensure viewability, validity and accuracy. This guide considers two of those processes: the widely used non-linear editing model and iPOV's unique processing approach.

NON-LINEAR EDITING

The conventional way to edit video is to import the digital video file into a 'non-linear editor.' In the video preparation process, a non-linear editor would be used to take the raw field video and edit it into a final, presentable version. This would typically involve the following tasks:

- Trim, cut and merge video clips to eliminate unnecessary content and to combine content from two or more source video files.
- Record and replace the audio track to provide a validated voiceover or sound track.
- Add subtitles and/or effects to make the video action clearer and more informative.

Most digital camcorders come bundled with a very simple and limited version of this software. However, it seems that every camera comes with a different program. For a business enterprise, it makes more sense to standardize on a mainstream commercial software title so as to minimize the training costs. This class of software requires considerable knowledge, judgment and practice and not everyone will be proficient without help. For the purpose of this guide, we have assumed that Adobe Premiere is a representative choice. It costs about \$800 per license (less if bundled with hardware or other programs such as Flash or Acrobat Pro) and offers enough features and capability to perform any editing chore that a typical company would require.

IPOV PROCESSING

While iPOV does use non-linear editors, our production process differs significantly from the conventional video-editing workflow. iPOV does as little editing as possible in the original video format before converting the material to short clips in the Flash (FLV) format and continuing to work with the Flash files. This process has several advantages.

- By working with smaller clips, if any need to be changed, either in Flash or re-edited from the original, we minimize the amount of rework.
- iPOV's CoSolvent Flash Player Control can be used to apply some types of special effects at run-time;. This improves flexibility and reduces the amount of rework required to make last-minute changes.
- iPOV generally expects to the replace the audio track for most videos that it handles. We have observed that most of the 'errors' in video footage are not in the visual image. Instead, they are mistakes in the background commentary. The video portion of most industrial videos is just fine as long as you clean up the dialog.

iPOV's process for fixing bad dialog is very simple:

- We transcribe the original audio to produce a text transcript and clean up the wording and grammar.
- We ask the expert to review the script and edit to what they wished they would have said – but didn't.

- We take the corrected, validated script and commission a well-spoken voiceover for the new sound track.
- We replace the original audio track with the new, validated audio track and make minor edits to clean up any small timing errors.

This produces a fluid, fully validated video with a well-spoken voice. This is usually more than sufficient for industrial and business applications – much faster and easier than if we relied on a non-linear video editor.

PACKAGING THE VIDEO FOR EMBEDDING

Once you have a well-edited video clip, it can be put into a document fairly easily. Unfortunately, for the movie to be viewed easily, it will need to have a ‘player’ that gives the user the standard controls necessary to manage video operation. Neither Word nor Acrobat will supply these controls directly.

PACKAGING STANDARD VIDEO FOR EMBEDDING IN DOC

To embed a video into a document, you will need to assemble all of the supporting assets into a single file, generally using a video editing tool. Any transcriptions or subtitles will need to be added to the video using the appropriate tools. For some formats such as Windows Media you may have a ‘meta file’ that acts as an intermediary telling the player which file(s) to load. It is also important to export or save (depending on your file format and editor) the video file with the bandwidth and quality settings that you want to use in the target document.

When the video is opened in the document, the document viewer calls a software media player (e.g., Windows Media Player) for the files. The local player supplies the play controls. For this to work, the user must have the correct player installed on their computer. If you ‘link’ to the video, an alternative player may be invoked depending on the user’s default settings. This can cause confusion and the resulting error message tends to be unhelpful.

PACKAGING FLASH VIDEO FOR EMBEDDING IN PDF

To place a Flash movie in a document, you need a single SWF file that contains both the video and the companion control logic and the video/animation. Flash expects the author of the Flash movie to supply the images, buttons and programming logic during video editing and construction. Several commercial tools (e.g., Adobe Captivate) can generate a ‘unified’ player file with all of the required logic and assets. Also, if you are editing in the Flash IDE you’ll need to add a player control¹¹ and save your project as an SWF. If you are working with Flash streaming video (FLV), you will need to import the FLV into the Flash IDE/Editor so that it can be exported as a unified SWF for embedding.

IPOV SWF PACKAGING TOOLS

iPOV has developed two proprietary software tools to help it package videos, along with value-added features, in an automated manner. One tool is a [sophisticated Flash player control](#) that can play a list of Flash video clips as a seamless movie with synchronized subtitles. This allows us to do some simple edits during the packaging process. The other tool is a packaging utility that assembles the video into the iPOV Flash player and publishes them together in a unified SWF file. The resulting file is ideal for insertion into the PDF using Acrobat Pro or similar tool. This gives iPOV the ability to package video in a few minutes, a task that would otherwise require hours of careful work by a competent multimedia designer.

EMBEDDING THE VIDEO IN THE DOCUMENT

The embedding processes for Word and Acrobat are not as easy as just dragging and dropping an image into a document. The requirements for playing media (audio or video) are demanding and they require special handling that is likely to be unfamiliar to most Word or Acrobat authors.

¹¹ The latest versions of the Adobe Flash editor ships with a one such control.

EMBEDDING STANDARD MEDIA IN MICROSOFT WORD DOC FILES

Embedding media in Microsoft Word DOC files varies with the media type and the way in which the author organizes his or her media assets for their projects. In general, there are two common approaches, each requiring the author to perform some simple steps using some of Word's Insert menu tools.

1. **Embed a standard movie as 'clipart'** – If the author has added the movies to their clipart collection, the clipart insertion tool will insert them and place a small icon that can be used to trigger the movie to popup and play.
2. **Embed a standard movie as a simple 'object'** – If the movie is not in a clipart collection, it can be inserted as an 'object' by using the 'create from file' tab on the object insertion wizard. The author then browses to find the movie file and it is imported into the Word document.

These options pose several challenges. First, it is fairly easy to embed a video clip if you know what you are doing, but it is unlikely that most Word users will figure this out on their own as there is little documentation on the proper techniques. Second, to get more features and more control over the appearance of the video, you have to know how videos work, how to access the "Developer" tools in Word, and be prepared to use the Object Properties Editing panel. Finally, the Word embedding process does not apply or prompt the user for any type of video compression. It is very easy to embed an uncompressed video that generates a huge Word file. Unsophisticated authors can easily pollute a corporate document system with gigabytes of bloated Word documents that contain very little useful video content.

Despite their apparent simplicity and users' familiarity with Word, most users will require specific training to use these capabilities safely and effectively.

EMBEDDING FLASH MOVIES IN MICROSOFT WORD DOC FILES

Embedding Flash media in a Word Document is of interest because Flash media is compressed by default and this removes most of the threat of proliferating huge Word files. However, embedding a Flash movie requires a special technique and it also requires a unified, packaged SWF file.

The technique to embed Flash movies in Word documents requires the author to access the 'Developer' menu in Word. This menu item is not visible in the default installed configuration for most Word installations because it is the menu where Word macros are written and tested. The feature is usually present in the installed software and can be activated by changing a few Word settings. If it cannot be activated, it is possible that a risk-averse IT department may have disabled it to prevent users from implementing the Word macro capability.

EMBEDDING FLASH MOVIES IN ADOBE ACROBAT PDF FILES

To embed a Flash movie in an Adobe Acrobat PDF file, you must find software to convert the source document (typically written in Word) into a PDF format. There are a large number of programs and utilities that can do this, but not all of them are capable of inserting and configuring a media file. For example, the "Save As PDF" option in Word will convert text and graphics very well, but embedded video or Flash is ignored during export.

Given the variety of tools available and the varied levels of capability, it is tricky to identify one best method. There might be a better tool available tomorrow, or a currently working tool may be broken in the next software release. The safest approach is to use Adobe Acrobat Pro (approx. \$600) to import a Word document, then insert the Flash video file(s) and re-publish. Since Adobe controls the PDF format and has designed the format to embed video, it will presumably continue to be the most reliable (albeit not the cheapest) tool for the task.

For its part, iPOV has developed a very efficient process to perform this operation. Currently, it relies on a set of well-designed procedures, but we are working on adding software automation to the process. This will speed our process even more and greatly reduce the likelihood of error and rework.

ENTERPRISE BUSINESS DECISION CRITERIA

The decision whether to embed media in documents, and then which method to use, can be tricky. Some of the considerations are technically complex and some are even in possible conflict. For a detailed comparison of the different processing options in Word and PDF, see Appendices 1 and 2, respectively. For a detailed comparison of Word and PDF documents, see Appendix 3.

The ultimate selection requires a careful balance between organizational preferences and document format capabilities. To try to simplify the choice, iPOV has developed the following recommendations for four scenarios that should be of interest to most organizations. Even then, there may be context-specific subtleties and alternatives that merit deeper examination. iPOV encourages and solicits constructive reader comments and discussion.

1. **Ad-hoc video clips in day-to-day documents** – These are documents that are too transient to be worth putting on the web¹² and too informal to be worth an investment in greater quality. We are thinking about situations where a manager may grab a quick video of an issue at their site, craft a supporting memo and email it to one or two interested readers. Once the video is viewed and the memo has been read, the memo has no more value other than archival record-keeping. Our recommendation for this use is the following:
 - Distribute standardized capture tools (cameras, software) **and compression software** and teach the pool of potential authors to use them effectively.
 - Author documents in Microsoft Word.
 - Teach potential authors to embed video in Microsoft Word using simple icons.

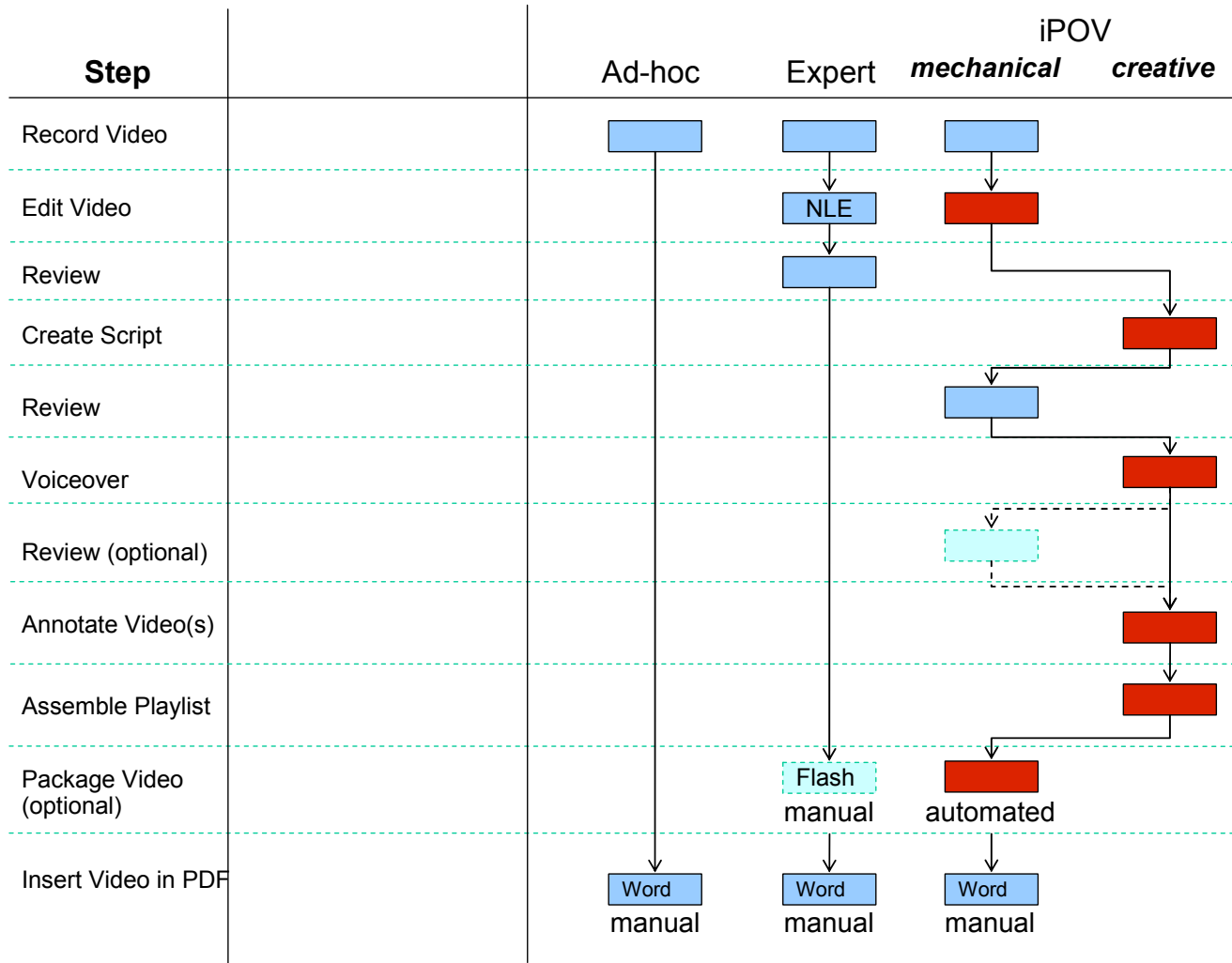
2. **For documents with long term business or legal impact (RFQs, Policy Memos, Sales Data Sheets)** – These are documents that have narrow usage, but they are likely to be referred to from time to time. Examples might include supporting documents for RFQs, departmental policy memos, and similar specific, but meaningful documents. The embedded video doesn't need to be highly polished, but the document itself needs to be reasonably resistant to revision and editing. Our recommendation for this application is as follows:
 - Distribute standardized capture tools (cameras, software) and compression software and teach the pool of potential authors to use them effectively.
 - Author documents in Microsoft Word and export to PDF.
 - Teach a few, key resource staff to package video in Flash for insertion in PDFs (and/or send the tricky ones to iPOV).
 - Teach key staff to embed Flash videos in PDF with Adobe Acrobat.

3. **For PR and marketing documents** – These are documents that might be seen and judged by stakeholders outside the organization. The video in documents like press releases, product data sheets, and communications with investors must meet a higher aesthetic standard.
 - Hire a videographer to record video – or train a staff member to do advanced video work.
 - Send video to skilled video editor for editing into an artistic movie clip or let iPOV process it into good industrial-quality video.
 - Author documents in Microsoft Word and export to PDF.
 - Teach a few, key resource staff to package video in Flash for insertion in PDFs (and/or send the tricky ones to iPOV).
 - Teach key staff to embed Flash videos in PDF with Adobe Acrobat.

¹² Unless the author is practiced using an existing set of tools. In that case, this may be the best solution.

4. **For SOP and eLearning documents** – Documents in this category are typically long-lived, provide important business instruction and may be viewed by a large number of employees. The video doesn't need to be highly artistic, but it must be absolutely, provably correct in what it says and shows. The key is to implement a production process that has the right quality checks, reviews and safeguards – while keeping the cost under control.
- Distribute standardized capture tools (cameras, software) and compression software and teach the pool of potential authors to use them effectively.
 - Capture videos of process, with informal expert commentary (iPOV can provide instructions).
 - Send to iPOV.
 - Edit draft script to replace original commentary and return to iPOV.
 - Take delivery of finished document from iPOV.
 - Pay iPOV \$100 to \$250 per finished minute of video for editing, packaging and embedding. The cost will depend on the amount of post-editing and special effects that are added to the raw video.

APPENDIX 1 - EMBEDDING VIDEO IN MICROSOFT WORD

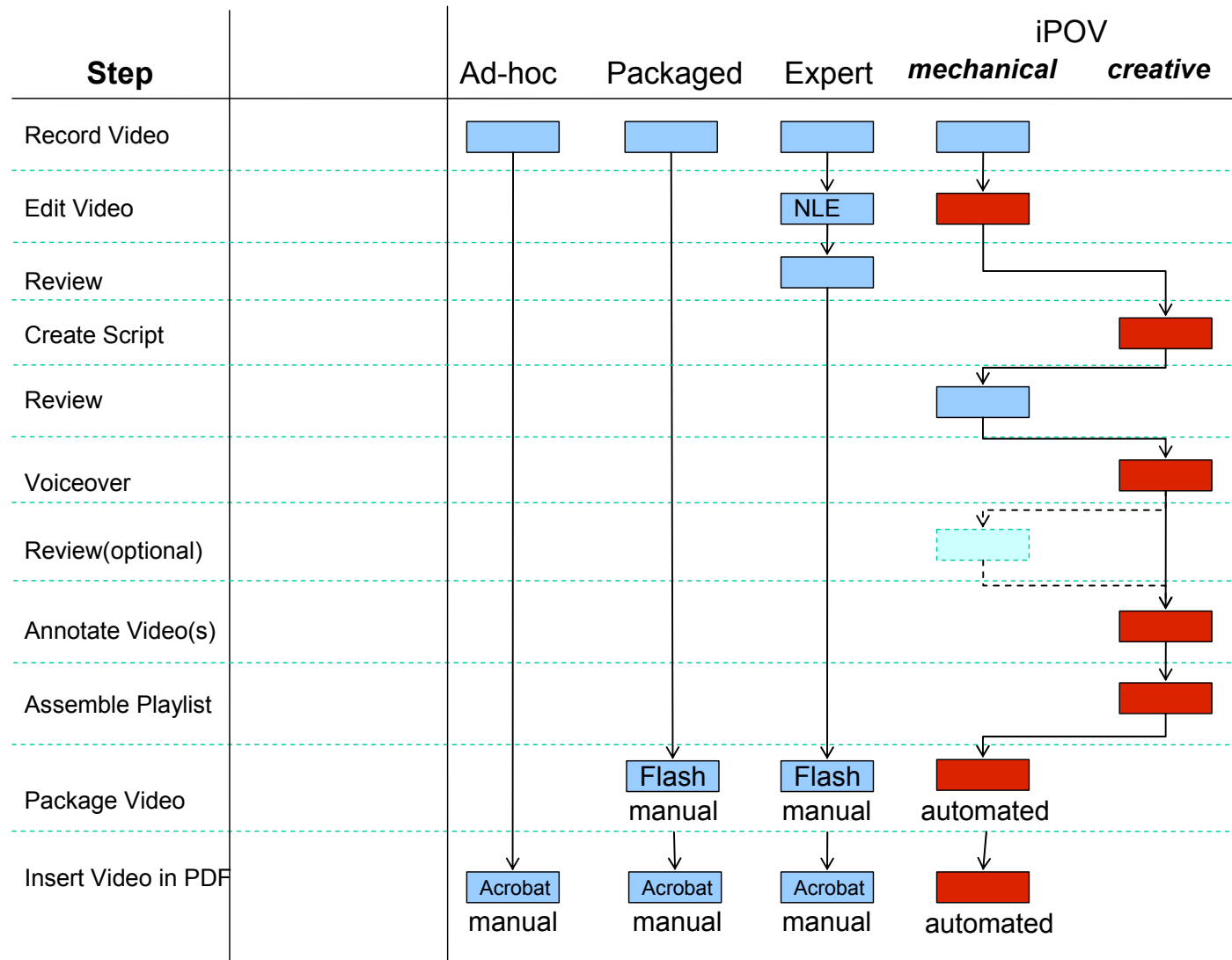


Criteria	Ad-hoc	Expert	iPOV
Process Description	<ul style="list-style-type: none"> • Capture raw video • Compress video • Embed as Windows Media 	<ul style="list-style-type: none"> • Capture raw video • Edit video in editor • Package as Flash or embed as Windows Media 	<ul style="list-style-type: none"> • Send raw video & raw word file to iPOV
Recommended Applications	<ul style="list-style-type: none"> • Ad Hoc Video Memo 	<ul style="list-style-type: none"> • Marketing/PR Video 	<ul style="list-style-type: none"> • Validated Procedure
Strengths	<ul style="list-style-type: none"> • Quick & easy • Requires little skill 	<ul style="list-style-type: none"> • One person (or a small team) does it all • Most of work done in one software tool 	<ul style="list-style-type: none"> • Fully validated • Complete audit trail • Professional voice • Effects on video • Smallest document size
Weaknesses	<ul style="list-style-type: none"> • To change video, must restage & reshoot 	<ul style="list-style-type: none"> • Very time-consuming • Good work requires a lot of skill 	<ul style="list-style-type: none"> • Cost per minute
Options for Rework	<ul style="list-style-type: none"> • Restage and re-reshoot 	<ul style="list-style-type: none"> • Re-edit video • Restage & reshoot 	<ul style="list-style-type: none"> • Re-script & Re-voice • Edit in Playlist • Re-edit Flash effects • Re-edit base video • Restage & reshoot
Software Licenses per Client Developer	<ul style="list-style-type: none"> • MS Word 	<ul style="list-style-type: none"> • MS Word • Adobe Premiere • Adobe Flash (optional) 	<ul style="list-style-type: none"> • MS Word
Software Cost per Developer (excl. MS Word)	<ul style="list-style-type: none"> • \$0 	<ul style="list-style-type: none"> • \$300-1200 	<ul style="list-style-type: none"> • \$0
Skill Requirements for Client Staff	<ul style="list-style-type: none"> • Training on: • How to compress video • How to embed video in Word 	<ul style="list-style-type: none"> • Training on: • Videography • Nonlinear video editing • Flash editing (optional) • How to embed video in Word 	<ul style="list-style-type: none"> • none
Cost Drivers	<ul style="list-style-type: none"> • errors & mistakes (small) 	<ul style="list-style-type: none"> • Salary for expert editor(s) • Software license costs 	<ul style="list-style-type: none"> • minutes of video

Notes:

- To use video in Word, some of the features of the otherwise hidden 'Developer' menu in Word must be enabled and made visible. Prevailing IT security policies may or may not prevent this – it depends on the IT department.
- Users must be instructed on how to access the (generally unfamiliar) menus and how to perform the embedding function. It is unlike the common Word functions that most users are familiar with.
- Word makes it easy to drop any kind of video into a document. That is an invitation for new users to make poor decisions. For example, an untrained user is quite likely to select a raw video file from a camera and embed it without first compressing it. This could easily generate a 200MB Word file for one page and a 10 min. video clip. If properly compressed, the same file should be 5-10MB.

APPENDIX 2 - EMBEDDING VIDEO IN PDF



Criteria	Ad Hoc	Packaged	Expert	iPOV
Process Description	<ul style="list-style-type: none"> • Capture raw video • Compress video • Convert to Flash • Embed in PDF 	<ul style="list-style-type: none"> • Capture raw video • Compress video • Package to Flash object • Embed in PDF 	<ul style="list-style-type: none"> • Capture raw video • Edit video in editor • Package as Flash object • Embed Flash in PDF 	<ul style="list-style-type: none"> • Send raw video & raw Word file to iPOV
Recommended Applications	<ul style="list-style-type: none"> • Ad Hoc Video Memo 	<ul style="list-style-type: none"> • Secure Video Memo 	<ul style="list-style-type: none"> • Marketing/PR Video 	<ul style="list-style-type: none"> • Fully Validated Procedures/eLearning
Strengths	<ul style="list-style-type: none"> • Quick & easy • Requires some training 	<ul style="list-style-type: none"> • Fully playable video in PDF 	<ul style="list-style-type: none"> • One person (or a small team) does it all • Most work done in a few, related software tools 	<ul style="list-style-type: none"> • Fully validated • Complete audit trail • Professional voice • Effects on video • Smallest document size
Weaknesses	<ul style="list-style-type: none"> • Videos have limited play controls • To change video, must restage & reshoot 	<ul style="list-style-type: none"> • Somewhat time-consuming • Good work requires moderate skill 	<ul style="list-style-type: none"> • Very time-consuming • Good work requires considerable skill 	<ul style="list-style-type: none"> • cost
Options for Rework	<ul style="list-style-type: none"> • Restage and re-reshoot 	<ul style="list-style-type: none"> • Restage and re-reshoot 	<ul style="list-style-type: none"> • Re-edit video • Restage & reshoot 	<ul style="list-style-type: none"> • Re-script & Re-voice • Edit in Playlist • Re-edit Flash effects • Re-edit base video • Restage & reshoot
Software Licenses per Client Developer	<ul style="list-style-type: none"> • MS Word • Adobe Acrobat Pro 	<ul style="list-style-type: none"> • MS Word • Adobe Flash • Adobe Acrobat Pro 	<ul style="list-style-type: none"> • MS Word • Adobe Premiere (or equiv) • Adobe Flash • Adobe Acrobat Pro 	<ul style="list-style-type: none"> • MS Word
Software Cost per Developer (excl. MS Word)	<ul style="list-style-type: none"> • \$600 	<ul style="list-style-type: none"> • \$900 	<ul style="list-style-type: none"> • \$1200 	<ul style="list-style-type: none"> • \$0
Skill Requirements for Client Staff	<ul style="list-style-type: none"> • How to convert video to Flash • How to embed Flash in PDF 	<ul style="list-style-type: none"> • Videography • Flash editing • How to embed video in PDF 	<ul style="list-style-type: none"> • Videography • Nonlinear video editing • Flash editing • How to embed video in Word 	<ul style="list-style-type: none"> • none
Cost Drivers	<ul style="list-style-type: none"> • Number of authors • Software license costs 	<ul style="list-style-type: none"> • Salary for editor(s) • Software license costs 	<ul style="list-style-type: none"> • Salary for expert editor(s) • Software license costs 	<ul style="list-style-type: none"> • minutes of video

APPENDIX 3 - COMPARISON OF DOC AND PDF FEATURES AND APPLICATIONS¹³

Most organizations use both Word and Acrobat documents in day-to-day operations. In many cases, format selection is left up to the individual document author. In other cases, the organization may make a policy decision to use one type for a specific application.

However, it is doubtful that many organizations consider the document's ability to embed rich media when they set their policies. The capability is too new and too few are positioned to use it. Hence, for most organizations, the DOC vs. PDF choice will be made on other, more traditional, grounds. The following discussion summarizes the merits of each document type in traditional applications. It is adapted from a blog article by [Michael Cartwright](#). The portions in italics were added by iPOV to adapt the comments to reflect the special considerations associated with embedded media.

WHEN TO USE PDF FORMAT

- **Printing:** When the goal is to produce a high-quality print job in which precise page layout and high resolution images are key, then PDF is the clear choice over DOC.

However, since video won't print, this feature is probably less relevant to a discussion of documents with embedded media.¹⁴

- **Online Content:** PDF is useful for taking high-quality documents (newsletters, catalogues, manuals, technical papers, etc.) and making them available on the internet. Not only can you secure your PDF so that it can only be read and not altered, you can also be sure that it will display correctly every time. In addition, PDFs can have a table of contents, bookmarks, intra-document hyperlinks, and search ability, so you can make your PDF behave like a Web page.
- **Archiving:** When compressed, PDF files can be very compact, so it is ideal for storage. File layout is retained and can be viewed on all platforms. Plus, PDF files are searchable, making archived documents and items much easier to find, categorize, and organize.

Adding video to a PDF will make it a lot bigger. However, the video must be in the Flash format and that compresses fairly well. A PDF with embedded media will be usually be a bit smaller than most other documents with the same embedded media.

- **Business and Legal Documents:** PDF's are essential for business and legal documents and forms that must retain their exact appearance. These important documents must retain their integrity and security. With the PDF format, you can secure your documents so that no one can change the wording of an application or the terms of an agreement.

The combination of PDF and embedded media is probably the most secure and stable way available to send a text and media story.

- **Combining Multiple Formats:** PDF allows you to import text from a Word document, images of various formats, Excel spreadsheets, vector graphics, and more into a single PDF document.

¹³adapted from blog article by [Michael Cartwright](#), CEO, [Solid Documents](#), makers of [Solid Converter PDF to Word](#), September 26, 2008, http://www.planetpdf.com/enterprise/article.asp?ContentID=pdf_word&gid=7754.

¹⁴ In both cases it is possible to insert a static, printable, image as a placeholder for the video. PDF makes this a little easier.

- **Anyone Can View It:** To view a Word document, you must have proprietary software (Microsoft Office) installed on your computer or download and install Microsoft's free Word Viewer. On the other hand, a PDF can be viewed by anyone who has the free Adobe Acrobat Reader, which is easy to download and comes standard on many computers running Windows operating systems. This makes PDF the preferred format for creating a document that many can view.¹⁵

A PDF with embedded media is viewable on Windows, Mac and likely soon Linux. If you have to get your multimedia story to its destination – no matter what – this is the surest way to do it.

- **File Exchange:** PDF is often considered ideal for document exchange between users. Not only is it a fairly compact format, but it can also store metrics and information about its own appearance (layout, fonts, content, color, etc.) within the document itself. This means that it can display well even if the required fonts and settings are not installed on a viewer's computer.

WHEN TO USE WORD (DOC) FORMAT

- **Reusing Images:** Images in a Word document are easy to extract and reuse. This can't be done with a PDF, because its images are embedded.

Embedded videos are not as easily extracted, so this feature may have less value for documents with embedded media.¹⁶

- **Word Processing:** Microsoft Word is a word processor. Adobe Acrobat is not. Therefore, when it comes to written documents such as business letters, memos, etc., Word is much better suited for writing the actual composition. Word documents provide the benefits of spell-checking and grammar-checking, among many other useful writing tools.

Editing Word documents with embedded media adds a level of complexity that may cause discomfort for many day-to-day business users.

- **Editing:** There's no doubt that Word is a powerful document editor. It contains intuitive formatting and compositional tools that allow you to format your document as you create it. Using Word and the DOC format, it is easy to edit large areas of text, change the flow between pages, and change font sizes and styles, among other things. With a PDF file you can only a few words at a time and have very limited editing options. When it comes to editing documents, Word is a much more powerful and pliant format than PDF.

Even if you plan to publish a document as a PDF (with or without embedded media), you will probably author the original document in Word. That may suggest that the task of creating documents with rich media should be split into two distinct tasks – authoring in Word and publishing in either Word or PDF.

¹⁵ There are several 3rd party PDF viewers on the market. Some of these do not display embedded video properly.

¹⁶ There are now some 3rd party tools to extract the images from a PDF.