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Luna Imaging's *insight*[®] Software Feature Description

Luna Imaging's new generation of Insight client/server software allows organizations to manage, access, and use image collections over the Internet. Any of Insight's search modes may be used to find images, from simple point and click select lists, to keyword searching, to full Boolean searching. Unique to Luna software, Insight combines retrieval and display of text information with an equally rich set of tools for viewing, comparing, and organizing images. Users may zoom and pan images and create and save image groups. Insight offers a complete visual environment for working with images. Image access may be restricted to local intranets, or expanded to access collections from almost anywhere. Insight technology has been developed to deliver maximum quality and response. Insight enables practical storage and use of images at virtually any resolution. Images on the Web suggest the potential; Luna's Insight client/server fulfills the promise of image quality, performance and user features on the Internet.

Insight Software Interfaces

The Insight client is the user side of the Insight system, and enables users to perform searches, organize and group images, view text information about them, and work with high-resolution images in Insight's visual environment. There are two types of Insight clients, each responding to different organization and user needs:

- **Insight JVA**
- **Browser Insight**

insight[®] JVA

Insight JVA is an application written in Java and installs on a user's workstation. Insight JVA offers all of the performance, rich feature set, movable images, and powerful interface previously available in Luna's LAN-based software, and moves these capabilities onto the Internet. Insight JVA is intended for users who want the leading performance and functionality Insight software has to offer.

A list of Insight JVA user functions is provided below:

Group Window

- Multi-media support: images, audio, and video
- Multi-lingual support (unicode compliant)
- Browse collection by viewing thumbnails
- View related data about images (in native data standard and also in various public data standards: VRA Core, Dublin Core, CIMI, CDWA, etc.)

- Support for diacritics (index, search, and display)
- Hyperlinked data fields that can invoke external web pages
- Select thumbnails for further review/inspection
- Show all thumbnails selected
- Select All/None of the thumbnails in the collection
- Save selected thumbnails to a working group called an Image Group
- Save Image Groups to folders with controlled access (i.e. student folder, faculty folder)
- Open existing Image Group(s) to see images of interest without searching again
- Make changes to a saved Image Group, and Save Group As to make a new Image Group
- Export selected images in .jpeg format at various resolutions (this feature available based on user privileges)
- Export selected images in pre-formatted HTML templates
- Print thumbnails, image data, or half screen sized image with data
- Sort thumbnail images on up to four fields of data
- Change thumbnail data labels using up to four fields of data
- Create presentations that include side-by-side image comparisons, preset zoom levels, automatic data display, and more...
- Select images to be included in a multi-view image (a multi-view is a sequence of images that can be played in order; a 3-D object, for example)
- Display help or go to the on-line tutorial

Coming Soon:

- Option to save presentations locally (no need for an Internet connection)
- Native display of QTVR files with visible “hotspots” to click into a high resolution image
- Multi-Page document support
- Re-sizeable data display window

Search

- Search across multiple collections with disparate metadata schemas by using data standards mapping (VRA Core, Dublin Core, etc.). Each collection’s object data is mapped through the public data standards, which becomes the cross-reference for relating to one another.
- Search across multiple, physically distributed (images & data), collections on disparate platforms (Sybase, Oracle, MS SQL / NT, UNIX, etc.)
- Hierarchical search support
- Searching from drop-down select lists of values
- Select multiple values (using Ctrl and/or Shift key) from select lists creating automatic “or” statements in query criteria
- Keyword searching with wildcard character support
- Fielded Boolean searching (with "contains" text search)
- Simple queries
- Advanced queries

Coming Soon:

- Fuzzy date (date range) searching

Image Workspace

- Maximize/minimize image(s)
- Lightbox functionality; drag image(s) to any position on the screen
- Zooming: point and click for incremental zoom levels, or drag box for quick zoom
- Pan around zoomed image for close inspection
- Create links to related images/media on a specific point on the image
- Create links to related web pages on a specific point on the image
- Create text annotations on a specific point on the image
- Measure distance and/or area between two points on an image
- Measure and scale objects in relation to one another or to actual size

- Print half screen size image and related data
- Display related data in user-selected data standard (institutional standard, VRA Core, Dublin Core, etc.)
- Display help or go to the on-line tutorial

Coming Soon:

- Re-sizeable data display window

Insight JVA Client System Requirements

Ideal System Requirements:

Pentium II 400 MHz or faster - OR -Mac G4 (or comparable)
 128MB RAM free
 60 MB free hard disk space
 24 bit graphics adapter (8MB) supporting
 20" or larger non-interlaced monitor (1,024x 768)
 Ethernet Card w/Internet Connection
 Windows 95, 98, 2000, NT;
 Mac OS 8.0+
 Mouse

Minimum System Requirements:

Pentium 166 MHz or faster processor (or comparable)
 16 MB RAM - Win95 & Win98
 64Mb RAM - WinNT & MacOS
 60 MB free hard disk space
 16 bit graphics adapter supporting
 15" or larger non-interlaced monitor (800 x 600)
 Ethernet Card w/Internet connection
 Windows 95, 98, 2000, NT;
 Mac OS 8.0+
 Mouse

Ideal Projector Requirements:

Resolution – 1024 x 768 Pixels

Minimum Projector Requirements:

Resolution – 800 x 600 Pixels

Browser *insight*[®]

Browser Insight operates through a standard Web Browser, and downloads JavaScript to provide Insight user interaction. Browser Insight does not require installation on the user's computer, and becomes active when the Browser links to an Insight-enabled Web page. Browser Insight provides many of the features of Insight JVA, but is naturally limited by the constraints of the Web browser environment. Browser Insight is available for Netscape and Internet Explorer 4.0+, both PC and Macintosh.

A list of Insight Browser user functions is provided below:

Browser Insight Group Window

- Browse collection by viewing thumbnails
- View related data about images in native data standard
- Select thumbnails for further review/inspection
- Save thumbnails to a working group called an Image Group
- Open saved Image group to see images of interest without searching again
- Make changes to a saved Image Group, and Save Group As to make new group
- Create remote launch string (URL) that can be embedded in other applications (MARC 856 field, for example). The URL will launch Browser Insight with the image(s) selected by the remote-launch creator in view.
- Print thumbnails, image data, or half screen sized image with data
- Display help or go to the on-line tutorial

Search

- Search collection(s) (Note: searching in browser is limited to one collection at a time.)
- Searching from drop-down select lists of values

- Keyword searching
- Fielded Boolean searching (with "contains" text search)
- Simple queries
- Advanced queries

Image Workspace

- Maximize/minimize image(s)
- Zooming: point and click for incremental zoom levels
- Quick-Pan around zoomed image using navigation box
- Print half screen size image and related data
- Display related data in collection's native data
- Display help or go to the on-line tutorial



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insight Server Component Features

The Insight server manages users, data, and images, and delivers associated services to Insight clients. Some of its main features include:

Data Storage.

Descriptive information about images and their content, and data used by Insight to manage images and user sessions are stored in a relational database. Insight communicates to the relational database through the industry standard, ODBC (JDBC) interface. Luna software is compatible with the full range of database products conforming to a relational model and ODBC connection. All of the major names in database technology, from Microsoft Access, to Sybase and Oracle are suitable platforms. Luna also can work with non-relational databases with defined programming interfaces. This flexibility means that organizations are able to maintain their investment in existing text databases and enterprise applications, even as they add Insight's image management and user capabilities. The relational database may be upgraded or replaced without revising the contents or structure of information.

Image Management.

The Insight server supports multiple resolutions and formats of the same image. The same image may have multiple combinations of formats and resolutions in parallel to serve different applications and user needs. Advanced compression formats are available for high quality/file size storage and for additional performance.

References to images are segmented into storage locations (i.e., different devices, different servers), logical hierarchies (i.e., sub-collections, production batches), and naming conventions. Users are given profiles, assigning them specific collections, storage locations, resolutions, and rights. To balance demand or mirror image collections, different users may be assigned different access locations.

Scalability.

Luna's system architecture allows several paths of expansion as collection size and user demands grow. Supporting applications such as the relational database or web server for Browser Insight can be distributed over multiple CPU's. The Insight Server, itself, consists of highly modular services, and its sub-components can be segmented over several machines on any platform (NT, Unix, Linux). Luna's image management and association with user profiles offer another powerful tool for distributing demand.

Interoperability.

Luna's Browser Insight software can be launched from within any other web-enabled application by using a remote launch string. The remote launch string is a URL that opens Insight and passes parameters that determine both the opening state of the software (thumbnail view or full image-size view), and the image(s) to be viewed. Common uses of the remote launch string include institution websites, library catalog systems, or museum collections management systems.

insight® Server Components System Requirements

The Insight server software has the following components:

1. Database
2. Media Server
 - a. MrSID Server
 - b. Multi-media file storage & delivery
3. Insight Collection Manager
4. Insight User Manager
5. Browser Insight
6. LunaPro Image Processor

Each one of these components can be placed independent of one another but in general our current client base has chosen to keep all of these items on a single machine. As end-user demand for each one of these items grows, the components can be separated out on multiple machines to adequately balance the load.

1) Database (*database product license not included with Insight*)

*licensing of your selected database product and JDBC drivers must be arranged directly with the commercial database vendor

Server: Any Relational Database

Comm: JDBC, ODBC

Platform*: MS SQL Server, DB2, Oracle, Sybase, MS Access

*this list represents working installations of Insight performed thus far. Insight was designed, however, to work with any ODBC/JDBC compliant database product

The database used in Insight® can be any ODBC/JDBC compliant database running on Unix, Linux, NT, or Windows 2000 Server. The most common installation thus far as been Microsoft SQL Server, but to date, there have also been installations on Oracle, Sybase, MS Access, and DB2 databases.

One of the key questions to answer when determining database server system requirements is the estimated load you expect to be placed on your system. Do you expect 10 users an hour, 100 users an hour, 1000 or more? The application is database driven and the load you place on it will determine what level of machine you need. As your demand grows the database will need to grow to meet those demands.

Any strong workstation machine will handle 10 users (Pentium III 800, 256MB memory). For an estimated load of 100 users an hour, a dual processor (Pentium III 800 or Xeon) with at least a gig of memory is recommended at the minimum. For an estimated 1000 users an hour you would need to load balance the database servers and look into enterprise level database strategies.

For Unix based systems the same guidelines should be followed. A Sun SPARC ultra 10 with 256MB memory will handle 10 users an hour. The larger the expected load the larger the machine will need to be.

2) Media Server (*no additional licensing required*)

The **Media servers'** needs should be broken down into two categories:

- a) MrSID Server
- b) Multi-Media file storage & delivery

2a) **MrSID Server** *(included in the bundled On-Site & APEX solutions)*

Server: Apache, IIS

Platform: NT, Solaris, Linux, any Web Platform

The MrSID Server is a software component that must exist on every server that contains images. The MrSID Server decompresses and delivers sub-regions of a SID image to a client machine. These transactions only occur when you are viewing images larger than 1536 pixels on the long side of the image. If your collection is mostly viewed with images that fit within the screen area of a monitor, then these MrSID images will be rarely accessed. On the other hand if your collection has fine detail (like maps, for example), then these files will be accessed in greater frequency. The extraction process for these images is of very short duration about a fraction of a second. Depending on your load and content you will need to make considerations for this.

2b) **Image/Multi-Media Storage**

Server: Apache, IIS

Platform: NT, Solaris, Linux, any Web Platform

Image storage. The image files (4 jpg files and 1 compressed .sid file per source image) are stored outside of the database on a regular file system. They can be stored on either an IIS or Apache web server, and can follow any directory or file naming convention you want. In the event that a specific directory structure is not identified we use our default directory structure, which breaks out the image files into "size folders".

Size 0 – 96 pixel long side

Size 1 – 192 pixel long side

Size 2 – 384 pixel long side

Size 3 – 768 pixel long side

Size 4 – 1536 pixel long side

SID - all higher resolutions are pulled from the .sid file (decompressing on the server side, and sending to the client as a .jpeg. This prevents the need to download a SID viewer on the client machine).

Additionally, image and/or other media files can be distributed over multiple web servers or mirrored across multiple web servers for optimal responsiveness. The server from which a user retrieves an image file can vary on a user-by-user and/or image-by-image basis. For example, all United States based users pull image files from the web server located in the US, whereas European users pull from the server located in Europe

A number of factors go into how you architect your multi-media file storage. You may want to use internal mirrored hard drives or a raid or some other storage method. We don't have any specific recommendations in this regard. Each Institution will need to evaluate how big the collection will grow and plan accordingly. Keep in mind that the media files are not required by the software to be locked into a permanent location. They can easily be relocated to another server, or mirrored across multiple servers without the user knowing the difference.

Here are some basic guidelines to determine image storage requirements:

Since Images in insight are stored in multiple resolutions for ease of access and delivery, there are generally 6 separate files for each image. The first 5 (in jpeg format) take up about 1 – 1.5 MB in total. The 6th one, the SID file will vary. Normally a 18mb tiff file will compress 20-25:1 so it will take about 800k to a 1mb each. A 70mb file will store in about 4mb. So a collection of 5000 images of 18mb tiffs would use about 10gb of storage.

3) **Insight Collection Manager** *(Unlimited number of Collection Manager software instances on one hardware machine* included with On-Site and APEX bundled solutions - additional licenses available at \$15,000 per hardware machine)*

*up to quad processor

Server: JAVA

Comm: JDBC, CORBA, ODBC, RDO, ADO
Platform: NT, Solaris, Linux

The Collection Manager is used to define access parameters and overall look/feel/data structure of each collection. It is also the main server software that acts as a “broker” of requests from the end-user to the database and multi-media server(s). One Insight Collection Manager is required per image collection. Multiple Collection Managers can reside on one machine, or an extended license will allow Collection Managers to reside on multiple hardware servers. The advantage of having Collection Managers on separate machines is simply the multi-processing power. When performing a search on multiple collections, the query can search the collections in parallel when the Collection Managers are distributed over multiple processors. When they all reside on one processor, the query will access the collections serially. Benchmark tests performed at Luna Imaging produced keyword search results in 10 seconds when searching 8 collections on the same processor.

4) Insight User Manager (Included in On-Site & APEX bundled solutions - \$5,000 per add'l software instance)

Server: JAVA
Comm: JDBC, CORBA, ODBC, RDO, ADO
Platform: NT, Solaris, Linux

The Insight User Manager is used to authenticate users when they logon to Insight. It is also used to add users, user groups (group-based privileges) and user folders (rights restricted folders where Image Groups are stored). Most institutions will need only one Insight User Manager, but additional User Managers may be desirable for independent administration at different locations. Luna is also currently enhancing the User Manager to integrate with 3rd party authentication applications to make use of existing institution-wide authentication schemes.

The Insight Collection Manager and Insight User Manager responsiveness is dependent on the responsiveness of the database. The faster the database responds to requests the more efficient the servers will be. The Insight Collection Manager generally uses about 40-60mb of memory per collection instance. Depending on the load and the collection size this number may vary.

5) Browser Insight (Included in On-Site & APEX bundled solutions - \$5,000 per add'l software instance)

Server: IIS
Platform: NT

The current version of Browser Insight is Microsoft ASP (Active Server Pages) driven. We will be developing a Java Server Pages (JSP) version of Browser Insight that will afford more functionality, and also platform independence (Apache or IIS).

Browser Insight interacts with the same database and image files as the Collection Manager. For some of our hosted clients, we have it running on a Dual Pentium III 500, 512MB RAM. This machine also contained all other Insight components, and still handled thousands of Insight Browser users in a day. The load varies from 60 to 90 percent of the processor.

Image delivery will put a minimal load on the server but may put a larger demand on bandwidth. Most strong workstations can far out perform any demand that 10BaseT network can deliver and handle most 100 BaseT networks.

6) LunaPro Image Processing Software (Included in On-Site & APEX bundled solutions - \$5,000 per add'l software instance)

LunaPro image processing software runs on Windows workstations and provides monitoring and batch processing of derivative images. Its main purpose is to generate sets of image derivatives, which may be configured for different image sizes and for several input and out formats (most commonly used for preparation of images for incorporation into Insight®). Among its output formats are wavelet images produced from source files up to 500MB. LunaPro also automatically names and organizes derivative images under directories and generates data tables for upload into the Insight® server database. LunaPro currently supports the following file formats; BITMAP, JPEG, LUNA, PCX, PICT, RASTER, SID, TARGA and TIFF.

Other features of LunaPro include:

- Automatic naming of derivative image files;
- Automatic organization of derivative images into folder hierarchies;
- Automatic recognition of image long and short sides, essential for sampling images to prescribed dimension boundaries;
- Support of popular and specialized formats for source and derivative images;
- Flexible directory and media access for both source and derivative image access;
- Selection of specific source images within directories for inclusion within production runs;
- Simple operator controls and job monitoring

LunaPro has been incorporated into Collection Building software which allows Insight administrators to process images and index data content. Collection Building software is automatically included in Insight On-Site and APEX bundled software solutions.

LunaPro: Minimum configuration

Pentium II 400Mhz

256MB RAM (100MHz SDRAM)

9GB local drive (18GB preferred)

4MB graphics accelerator

15" Monitor (19" if Q/C will be performed)

32X+ CD-ROM reader

Windows 95, 98 or NT

3.5 inch floppy drive

Mouse

White Paper: Audio & Video Support in *insight*® JVA

With Insight version 3, users may now search and play additional rich media in Insight's user environment. Offering the same flexibility for audio and video that Insight provides for image management, both these media types use Insight's distributed reference scheme for deploying content from anywhere on the Internet. Video will show a reference frame from the stream and will have the same accessibility as images. When brought into the Image Workspace, the same remote tool used for other "media in series" content is available for video. Audio has no image reference, and so uses a placeholder image as a visual cue.

Features of video and audio support

- Drag-and-drop or copy-and-paste audio and video files between groups.
- Search for all files of a particular media type from the Group Window.
- Use the remote tool to play, pause, or view the media file frame-by-frame. Drag the icon on the progress bar to go to a specific point in the video/audio file. Dual timers provide immediate reference to current and full length playing times. Easily move to the beginning or end media file with the respective media remote tool buttons.
- Play multiple media files simultaneously.
- Move and resize media windows while playing.
- View descriptive data about the content using Insight's existing data window.
- Support for a wide range of media formats

Streaming Media Technology in Luna's Insight JVA

The ability to display video and audio media in addition to static images is a significant new feature in Insight v3. This document provides an introduction to the main considerations for playing media over the Internet. A list of supported formats is provided at the end.

Media Data Serving: Choosing a delivery paradigm

The simplest way to transfer media files to the client is by having the client download them fully and then play them. This allows for high quality playback, but can make for very long download waits. To get around this long download wait, there are two ways to "stream" the contents of a media file over to the client, such that the client can play the media file without having to download the entire file first.

The two ways of streaming media data over the Internet are: true streaming and progressive downloading. An example of true streaming is RealNetwork's RealPlayer. An example of progressive downloading is QuickTime (where you see the download progress meter racing the playback head to download the entire movie before playing that part of the movie). True streaming works by highly compressing the media stream and then transmitting it using UDP, a non-error-checking transmission protocol. This is in contrast to what is used for progressive downloading (as well as most Internet traffic), TCP/IP, which guarantees that every data packet sent will (eventually) arrive at the destination.

If the media data were compared to water and the client were a cup, UDP (which is used for true streaming) would be like filling the cup with a garden hose from twenty feet away. Not all the water would get in the cup, but enough would get in the cup to give a pretty good approximation of what the media stream was like. Network traffic would not cause the media to playback any slower, rather the quality of the stream would degrade. Generally the user can view the media file in the same amount of time as it takes to play. Also, with true streaming the cup would not hold water, meaning the client would not be able to cache the incoming stream, only play it as it arrives and then discard it. True streaming is good for live broadcasts or exceptionally long media files that would be impractical to store on the client machine.

Following the water analogy, TCP/IP (which is used for progressive downloading) would be like running the garden hose all the way to the cup and pouring the water directly in. This time the cup can hold water, too. Network traffic could kink the hose, and halt playback, but eventually the cup (local cache) would be filled and the media data could be played in its original quality.

True streaming is somewhat more complicated to serve on the Internet. RealNetworks has streaming media server software for sale. It does not run on the Macintosh. Apple has a different technology that operates on the same principles called QuickTime Streaming Server. This is a free product, and while it only runs on Macintosh, it uses the same code base as the Darwin Streaming Server, which can run on WindowsNT/2000, Linux, FreeBSD, and Solaris. For all of the true streaming servers, there is an element of complication in both the setup of the server and the preparation of the media files.

Progressive downloading requires no server changes from the way that images are presently hosted on the Internet. As far as the server knows, it is delivering a file in the normal matter. It is the client that creates the illusion of streaming by being able to play the media data as it is being downloaded. For the release of Insight 3.0, progressive (and including simple file download) will be implemented first to attain the best quality, with other true streaming formats to follow. Although true streaming is especially effective at lower bandwidth, some of the recent progressive codecs are nearly as good in performance with significantly better quality.

Media Playback on the Client: Java APIs

Sun has developed a multimedia API extension to Java called the Java Media Framework (JMF). Insight uses the JMF for multimedia playback on the client because of the features and capabilities offered by the JMF coupled with the reassuring fact that it is developed by the creators of Java.

The JMF comes in three varieties. The first is the fully cross-platform, all-Java version. The disadvantage with the all-Java version is that it has rather limited playback abilities. The second version of the JMF includes the Windows expansion pack. This offers much greater playback abilities, but only works on Windows systems. The third version of the JMF is for Solaris machines.

The limitations imposed by merely using the cross-platform, all-Java JMF are significant. Only the lowest quality of video codecs are supported. (A video codec is the format in which video data is stored/compressed into a file) It can play avi (Windows movie files) as well as mov (QuickTime movie files) but not in any of the higher-quality codecs. A wide variety of audio formats are playable, but the audio playback quality of the all-Java JMF is at mono, 8K ulaw. So the sound quality is poor. Essentially, the multimedia capabilities of the all-Java JMF are not of acceptable for high-quality presentation of media files.

The JMF with the Windows expansion pack offers much better performance, but only on Windows machines. Specifically, it allows full quality audio playback as well as playback of MPEG-I encoded videos. MPEG-I videos look very good. Playing MPEG-I videos is processor-intensive and so better suited to faster machines, but machines made in the last couple years should not present a problem. Besides the fact that the JMF with the Windows expansion pack only works for Windows and not Macintosh, it also requires installation on a Windows machine, where it puts some DLLs in the system directory in addition to providing the JAR files.

In addition to the expansion packs, Apple provides the QuickTime for Java API. The advantage this offers is full compatibility of the client for both Windows and Macintosh, with more support for good audio and video codecs. In particular this allows the playback of audio at better than 8-bit mono, so MP3s sound good, and use of better video codecs, such as Sorenson. This codec is similar in quality to MPEG-I, but can only be decoded (played) with QuickTime. MPEG-I encoded movies can be played with QuickTime on the Macintosh and with the JMF Windows Expansion pack for Windows operating systems.

The use of QuickTime for Java also requires the installation of QuickTime on Windows machines. Also, QuickTime for Java is an option on installation, and so is not necessarily present even on an up-to-date installation of QuickTime. So even users with QuickTime already installed may have use the QuickTime Updater to install QuickTime for Java.

Insight uses the JMF w/Windows Expansion Pack on Windows and QuickTime for Java on both Windows & Mac. Utilizing the best of both worlds (JMF & QuickTime), Insight can play high audio/video quality, MPEG-1, and Sorenson encoded movies on both Windows & Mac.

Supported Media Formats:

AIFF (.aiff)

- 8-bit mono/stereo linear
- 16-bit mono/stereo linear
- G.711 (U-law)
- A-law
- IMA4 ADPCM

AVI (.avi)

- Audio: 8-bit mono/stereo linear
- Audio: 16-bit mono/stereo linear
- Audio: G.711 (U-law)
- Audio: A-law
- Video: Cinepak
- Video: Indeo (iv31 and iv32)
- Video: JPEG
- Video: RGB
- Video: YUV

MIDI (.mid)

MPEG-1 Video (.mpg)

MPEG Layer II Audio (.mp2)

MPEG Layer III Audio (.mp3)

QuickTime (.mov)

- Audio: 8 bits mono/stereo linear
- Audio: 16 bits mono/stereo linear
- Audio: G.711 (U-law)
- Audio: A-law
- Audio: GSM mono
- Audio: IMA4:1
- Video: Cinepak
- Video: H.261
- Video: H.263
- Video: Sorenson
- Video: Intel Indeo (iv31 and iv32)
- Video: JPEG (411, 422, 111)
- Video: Planar RGB

Sun Audio (.au)

- 8 bits mono/stereo linear
- 16 bits mono/stereo linear
- G.711 (U-law)
- A-law

Wave (.wav)

- 8-bit & 16bit mono/stereo linear
- GSM mono
- G.711 (U-law) & A-law

Characteristics of common media formats:

The following tables identify some of the characteristics of common media formats. When selecting a format, it's important to take into account the characteristics of the format, the target environment, and the expectations of the intended audience. For example, if you're delivering media content via the web, you need to pay special attention to the bandwidth requirements. The CPU Requirements column characterizes the processing power necessary for optimal presentation of the specified format. The Bandwidth Requirements column characterizes the transmission speeds necessary to send or receive data quickly enough for optimal presentation.

Common Media formats:

<u>Format</u>	<u>Content Type</u>	<u>Quality</u>	<u>CPU Requirements</u>	<u>Bandwidth Requirements</u>
Cinepak	AVIQuickTime	Medium	Low	High
MPEG-1	MPEG	High	High	High
H.261	AVI	Low	Medium	Medium
H.263	QuickTimeAVI	Medium	Medium	Low

JPEG	QuickTimeAVI	High	High	High
Indeo	QuickTimeAVI	Medium	Medium	Medium
Sorenson	QuickTime	High	Medium	Medium

Common Video Formats:

<u>Format</u>	<u>Content Type</u>	<u>Quality</u>	<u>CPU Requirements</u>	<u>Bandwidth Requirements</u>
PCM	AVIQuickTime	High	Low	High
MPEG-1	MPEG	High	High	High
MPEGLayer3	MPEG	High	High	Medium
GSM	WAV	Low	Low	Low
G.723.1	WAV	Medium	Medium	Low

Please note that any media type not natively supported within Insight can be referenced by a URL in a data field and the media type can be invoked in an external player.



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White Paper: **insight**[®] Supported File Types

Supported Image Formats (for processing into Insight): BITMAP, JPEG, LUNA, PCX, PICT, RASTER, SID, TARGA and TIFF

Natively Supported Image Formats in Insight: JPEG and SID

Natively Supported Media Formats within Insight:

AIFF (.aiff)

- 8-bit mono/stereo linear
- 16-bit mono/stereo linear
- G.711 (U-law)
- A-law
- IMA4 ADPCM

AVI (.avi)

- Audio: 8-bit mono/stereo linear
- Audio: 16-bit mono/stereo linear
- Audio: G.711 (U-law)
- Audio: A-law
- Video: Cinepak
- Video: Indeo (iv31 and iv32)
- Video: JPEG
- Video: RGB
- Video: YUV

MIDI (.mid)

MPEG-1 Video (.mpg)

MPEG Layer II Audio (.mp2)

MPEG Layer III Audio (.mp3)

QuickTime (.mov)

- Audio: 8 bits mono/stereo linear
- Audio: 16 bits mono/stereo linear
- Audio: G.711 (U-law)
- Audio: A-law
- Audio: GSM mono
- Audio: IMA4:1
- Video: Cinepak
- Video: H.261
- Video: H.263
- Video: Sorenson
- Video: Intel Indeo (iv31 and iv32)
- Video: JPEG (411, 422, 111)
- Video: Planar RGB

Sun Audio (.au)

- 8 bits mono/stereo linear
- 16 bits mono/stereo linear
- G.711 (U-law)
- A-law

Wave (.wav)

- 8-bit & 16bit mono/stereo linear
- GSM mono
- G.711 (U-law) & A-law

Please note that any media type not natively supported within Insight can be referenced by a URL in a data field and the media type can be invoked in an external player.