|  |
| --- |
| IP-Camera MJPEG HTTP Web-Server Emulator |
| Manual |
| Tool for emulating IP-Camera MJPEG HTTP Web-Server. Input source can be folder with images, wmv file, avi file, Web-Camera. |

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Contents

[Purpose 2](#_Toc360126781)

[License 2](#_Toc360126782)

[Support 3](#_Toc360126783)

[Setup 3](#_Toc360126784)

[Software Requirements 3](#_Toc360126785)

[Create IpCamEmu Configuration (Configuration.xml) 3](#_Toc360126786)

[Service Declaration 3](#_Toc360126787)

[Folder with Images 4](#_Toc360126788)

[Video Input Device (Web-Camera) 5](#_Toc360126789)

[AVI and WMV Files 6](#_Toc360126790)

[Defining Multiple Services 8](#_Toc360126791)

[Configure Windows Firewall 8](#_Toc360126792)

[Automated Application Registration 8](#_Toc360126793)

[Manual Application Registration 8](#_Toc360126794)

[Pass Configuration as Command Line Argument 9](#_Toc360126795)

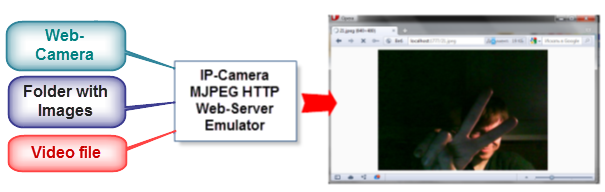
[View 9](#_Toc360126796)

[QA Data 9](#_Toc360126797)

[Browsers 9](#_Toc360126798)

[Code 10](#_Toc360126799)

[Compile & Deployment Requirements 10](#_Toc360126800)



# Purpose

- turn web-camera into IP-camera with mjpeg streaming and access it over network(!),

- usage of i-Lids (Imagery Library for Intelligent Detection Systems) http://www.homeoffice.gov.uk/science-research/hosdb/i-lids/ ) and other data for surveillance systems development.

Camera part is implemented as console and GUI (for demos) applications. Console part is called “IpCamEmu Console” and GUI emulator wrapper is called “IpCamEmu GUI”. WPF application is gray upon startup, when it activates its color is changed to yellow or red(if any errors occur). Errors you can see in log.



# License

MS-PL

This is public domain open source software is a gift for people with similar needs. No guaranties, warranties and responsibilities.

# Support

Support: <http://ipcamemu.codeplex.com/WorkItem/Create>

E-mail: [cuchuk.sergey@gmail.com](mailto:cuchuk.sergey@gmail.com)

Logs: %temp%\HDE\IpCamEmu

# Setup

## Software Requirements

Ensure that following Microsoft .Net Frameworks are installed and enabled in Windows Features.

[Microsoft .Net Framework 3.5 SP1](http://www.microsoft.com/download/en/details.aspx?id=22)

[Microsoft .Net Framework 4 Full Profile](http://www.microsoft.com/download/en/details.aspx?id=17851)

**NOTE:** if you’re running Windows XP/2003, some features will be unavailable.

## Create IpCamEmu Configuration (Configuration.xml)

### Service Declaration

|  |
| --- |
| ...  <Server Type="MJpeg">  <Uri>http://+:1777/</Uri>  <FrameDelay>10</FrameDelay>  <Source ...  </Source>  </Server>  ... |

Pay attention that if you declared service as http://+:1777/ it will be visible in all networks you connected to.

Settings:

|  |  |
| --- | --- |
| **Setting** | **Description** |
| Uri | Place where server should be listening to. Specified uri should be allowed as specified above by administrator to user under which service will be executed. |
| FrameDelay | Delay in milliseconds between frames that can be accessed from server. For development of image processing software minimum expectations: 6 or above for 1.3 megapixel frame. |
| Source | Source of data to send via |

### Folder with Images

Folder is the source of image files. Subdirectories are watched else (except .svn folders).

Following input images extensions are supported: \*.jpg, \*.gif, \*.png, \*.bmp, \*.jpe, \*.jpeg, \*.wmf, \*.emf, \*.xbm, \*.ico, \*.eps, \*.tif, \*.tiff, \*.g01, \*.g02, \*.g03, \*.g04, \*.g05, \*.g06, \*.g07, \*.g08.

Show order. Full paths with images are ordered by alphabetically.

So it is desired that input files will be

file0001.jpg, ... file0011.jpg, not file1.jpg, .. file11.jpg.

Sample:

|  |
| --- |
| ...  <Source Type="folder" Name="Folder Source Friendly Name" >  <Folder>..\qa\Images\Set A</Folder>  <InstanciateMode>InstancePerClient</InstanciateMode>  <Format>Jpeg</Format>  <BufferFrames>1000</BufferFrames>  <RegionOfInterest FromLine="20" FromColumn="20" Width="200" Height="200" />  </Source>  ... |

Description:

|  |  |
| --- | --- |
| **Setting** | **Description** |
| Folder | Folder to image data. Relative paths are resolved relatively to current path. |
| Format | Image format. For MJPEG server must be **Jpeg**. |
| BufferFrames | Amount of files to buffer. Static buffering significantly reduces CPU and I/O usage. However memory usage increases. Buffering is performed on server start up.  Buffering is especially important for InstancePerClient InstantiateMode. |
| InstanciateMode | Possible values:  **InstancePerServer** – one source instance is created at server. Different clients get the same data.  **InstancePerClient** – one source instance per client connection is created. Each client receives sequence of data from the very beginning.  Buffering is not affected by **InstantiateMode**. |
| RegionOfInterest | Optional setting.  When setting is missing entire frame is sent. Otherwise part of frame with specified borders is sent. |

### Video Input Device (Web-Camera)

Sample:

|  |
| --- |
| ...  <Source Type="webcam" Name="Web-Camera Source Friendly Name">  <InputVideoDeviceId>0</InputVideoDeviceId>  <Format>Jpeg</Format>  <ReadSpeed>20</ReadSpeed>  <CameraRealWidth>640</CameraRealWidth>  <CameraRealHeight>480</CameraRealHeight>  <RotateY>true</RotateY>  <RegionOfInterest FromLine="20" FromColumn="20" Width="200" Height="200" />  </Source>  ... |

Settings:

|  |  |
| --- | --- |
| **Setting** | **Description** |
| InputVideoDeviceId | Source input video device No. If you have one web-camera, you can just use 0. |
| Format | Format of output frames.  For **MJPEG** streaming it must be **Jpeg**. |
| ReadSpeed | Amount of frames server gets from input video device per second (frame rate).  Amount of frames server gives away is regulated by **FrameDelay** of server. If speed is very high some frames will be repeated.  Good value for local browsing is 20 with FrameDelay=20. |
| CameraRealWidth | Real width of images produced by web-camera. |
| CameraRealHeight | Real height of images produced by video input device. |
| RotateY | Indicates whether each frame must be rotated. |
| RegionOfInterest | Optional setting.  When setting is missing entire frame is sent. Otherwise part of frame with specified borders is sent. |

Because there’s no chance to cache camera data, you can manipulate with read speed (and don’t forget to set then server’s **FrameDelay**=1000/Desired FPS). Usually it’s ok to get 6 frames per second from server for image processing tasks with 1.3 megapixel frames.

### AVI and WMV Files

Sample:

|  |
| --- |
| ...  <Source Type="videoFile" Name="Video File Source Friendly Name">  <File>..\qa\Videos\REC\_01\_2011.avi</File>  <InstanciateMode>InstancePerServer</InstanciateMode>  <Format>Jpeg</Format>  <BufferFrames>15</BufferFrames>  <TimeStart>0:00:00:00.0000</TimeStart>  <TimeEnd>1:00:00:00.0000</TimeEnd>  <TimeStep>0:00:00:01.0000</TimeStep>  <RotateY>true</RotateY>  <RegionOfInterest FromLine="20" FromColumn="20" Width="200" Height="200" />  </Source>  ... |

Settings:

|  |  |
| --- | --- |
| Setting | Description |
| File | Path to AVI file to play. |
| InstanciateMode | Shows how it is needed to play AVI video sequence.  **InstancePerClient** – from the beginning for each connected client (high resource usage)  **InstancePerServer** – from the current position (low resource usage, all clients are getting same frames).  Buffering is not affected by **InstanciateMode**. |
| Format | Desired format type.  It must be **Jpeg** for MJPEG streaming. |
| RotateY | Indicates whether image must be rotated. |
| BufferFrames | Amount of frames from video sequence to cache. Buffering significantly increases performance and decreases CPU usage. |
| TimeStart | Play start time in format **<DAY>:<2 digits HOUR>:<2 digits MINUTE>:<2 digits SECOND>.<4 digits MSEC PART>**. |
| TimeEnd | Play end time in format **<DAY>:<2 digits HOUR>:<2 digits MINUTE>:<2 digits SECOND>.<4 digits MSEC PART>** specifying from which position to repeat playing entire sequence.  When time end is larger than length of video, length of video will be used instead of it. |
| TimeStep | Desired time difference between frames in format **<DAY>:<2 digits HOUR>:<2 digits MINUTE>:<2 digits SECOND>.<4 digits MSEC PART>**. |
| RegionOfInterest | Optional setting.  When setting is missing entire frame is sent. Otherwise part of frame with specified borders is sent. |

Avi files are played via DexterLib.

### Defining Multiple Services

You can specify more then one service in configuration file. See sample below:

|  |
| --- |
| <?xml version="1.0" encoding="utf-8" ?>  <Configuration>  <Servers>  <Server Type="MJpeg">  <Uri>http://+:1777/</Uri>  <FrameDelay>10</FrameDelay>  <Source ...  </Source>  </Server>  <Server Type="MJpeg">  <Uri>http://+:1776/</Uri>  <FrameDelay>10</FrameDelay>  <Source ...  </Source>  </Server>  </Servers>  </Configuration> |

## Configure Windows Firewall

There’re two ways of application registration in firewall:

* Automated
* Manual.

### Automated Application Registration

When configuration is ready (Configuration.xml) please launch ***Configurator.exe*** under administrative account, click **Configure**.

### Manual Application Registration

Also you can register application manually

Suppose desired URL of your web service will be

**http://127.0.0.1:1777**

User under which you will start service will be for instance local user

**drweb86**

located on computer with name

**comp**

#### Run in the administrative mode cmd.exe and execute command in it

|  |
| --- |
| **netsh http add urlacl url=http://+:1777/ user=comp\drweb86 listen=yes** |

(If user belongs to domain use domain name instead of computer name)

To execute **cmd.exe** in administrative mode in **Windows 7** please follow next steps:

1. Press **Windows** button;
2. Type **cmd**;
3. Open context menu on first item and click **“Run with Administrative Privileges”**.

## Pass Configuration as Command Line Argument

You can place configuration in separate files in non-standard locations. It can be done for various purposes. Main purpose is to test application with different small data sets binded on the same port, reduce memory usage, store settings and launch scripts in application repository.

The following command line is supported by all applications including configurator.

Relative paths are resolved relative to current directory.

|  |
| --- |
| **"path to exe" "-Configuration=full path"**  **"path to exe" "-Configuration=relative path"** |

# View

## QA Data

To see QA data, you can download and compile source code, follow the instructions in configuration.xml and execute it. If you don’t need any source data you can comment it out.

## Browsers

Safari, Google Chrome, Opera - natively

Internet Explorer - need external plugins

Firefox - does not support.

If your page is targeted to http://+:1777/ you can just paste http://localhost:1777 in browser.

**Opera and low resource consumption**

When you try to open same MJPEG HTTP address in several Opera tabs, it won’t create another connection to server, it will share the same stream of data between tabs or processes. To make Opera open another connection you should add something to uri (http://localhost:1777/test).

## Code

AForge.Net MJpegStream!

And <http://www.codeproject.com/KB/audio-video/cameraviewer.aspx>

# Compile & Deployment Requirements

Visual Studio 2010

ZipSolution 5.9

InnoSetup 5.4.1 Unicode

X64 environment (for deployment scripts)