Net-X-Code

User Guide v6.x

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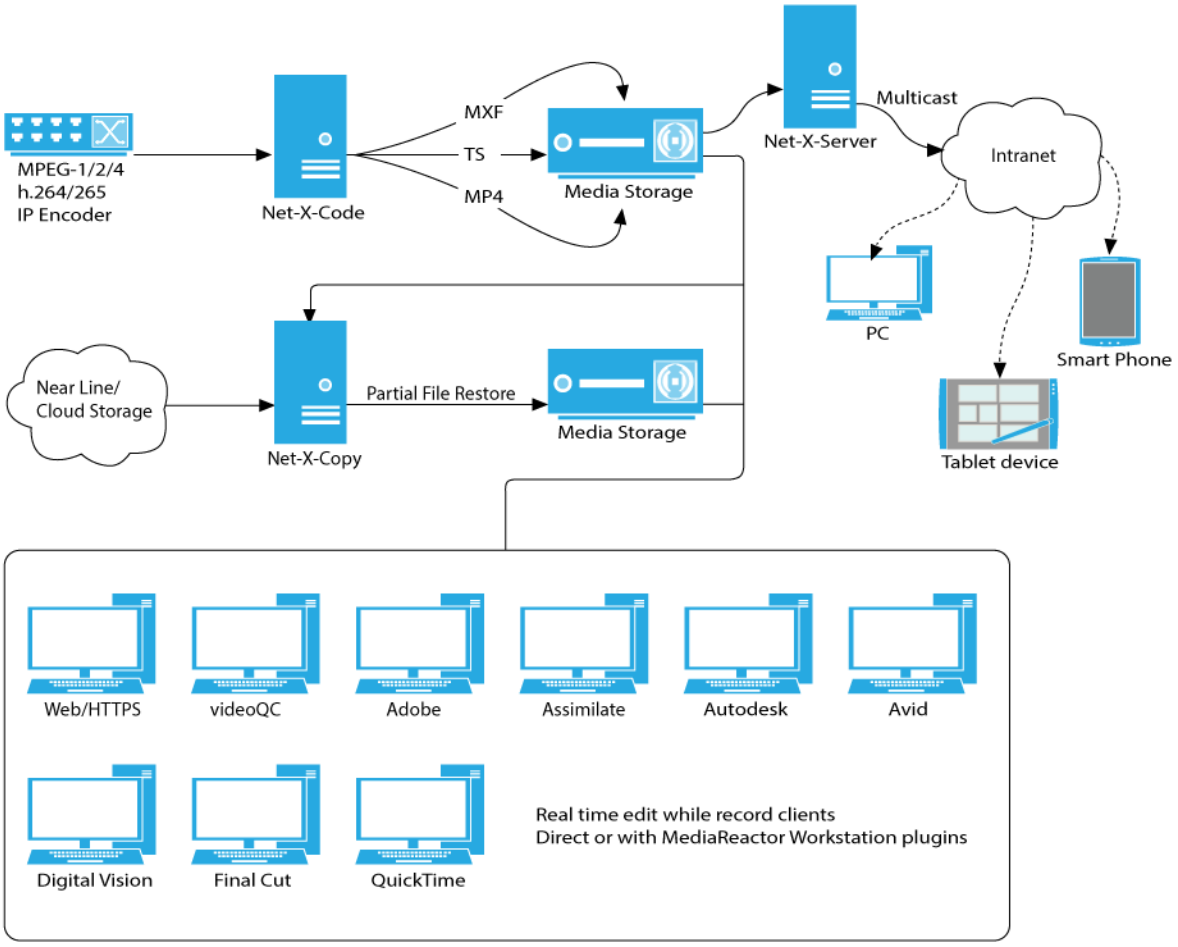
Introduction

Net-X-Code is a series of interconnected applications (Net-X-Code, Net-X-Cmd, Net-X-Copy, Net-X-Streamer, videoQC and MediaReactor Workstation plugins) for IP based video capture, output and conversion. The various applications auto-detect and join user-defined enterprise groups on one or more servers within a network. Once connected, the controller/user can configure the system in real time via the HTTP/RESTful interface. The major components are diagrammed and listed below:



For the latest Net-X-Code information, please see:

http://www.net-x-code.com

Theory of Operation

Net-X-Code is a distributed capture and conversion system. It can be run on one or more servers and be controlled from one, central interface. This section of the manual will give an overview of how the various parts of Net-X-Code interact to make it easier to design deployments and implement controllers using the API described in the next section.

Net-X-Code is made up of a number of servers, programs, and plugins:

Net-X-Cmd: This component provides the central connection for all the other components. It uses a Bonjour-like protocol to auto-sense components within its group in the network, and provides the HTTP/RESTful/HTML API

Net-X-Code: Provides capture from network IP video sources to TS, MP4, fMP4, ISM, MXF, etc. files. A Net-X-Code server can capture 1 or more groups of up to 10 streams per group. Files can also include DASH, HLS and Smooth Streaming sidebar files. These recorded files can be stored locally or anywhere else on the network

Net-X-SDI: Multi channel, multi standard 4k, HD and SD playback and capture, supporting QHD, HD-SDI, 3G, SDI and HDMI as well as network protocols including NDI, SMPTE 2022, and SMPTE 2110. Capture and playback multi formats like MXF, MOV, AVI, TS, MPG and codecs including uncompressed, XDCam, AVCi, ProRes, DNxHD, h.264, DVHD, and many more.

Net-X-Server: Can take recording or pre-recorded network IP video streams from disk anywhere in the network, and re-stream them via RTP or UDP back out to the network. Net-X-Server also has a complete scheduling system for starting records, playbacks, ip captures/streams and conversion

Net-X-Copy: Provides a real time video translator, real time clipping engine and partial file restore system. Any recording stream can be used as a source while it is still recording, or near line/tape backup files can be restored, only accessing the part of the file required for the restore. Sources include drive, tape, local network, private cloud, Google cloud and Amazon AWS S3.

Net-X-Player: A HTML5 based web player that can play time coded, frame accurate files, including RTIN real time files during record. Net-X-Player can also send clipping commands directly to Net-X-Base.

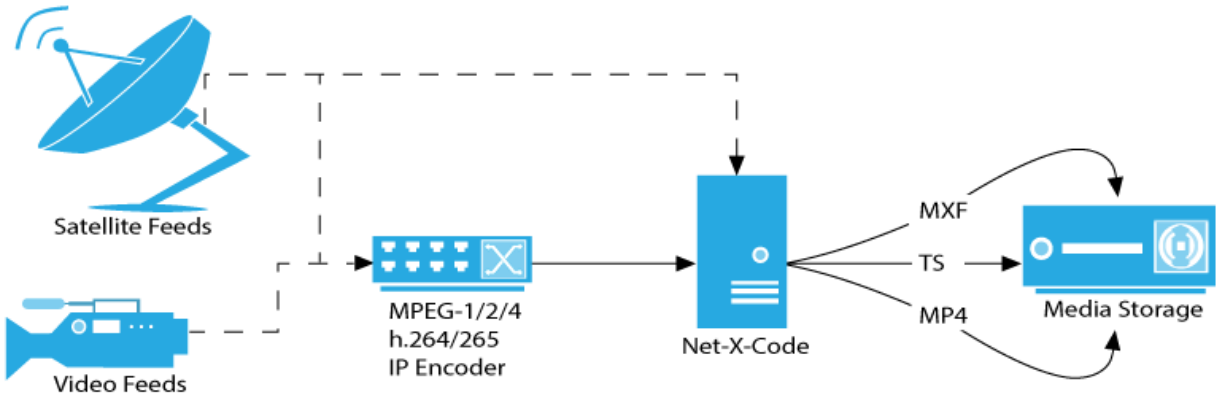
videoQC: Video preview is available from on disk, live recording and network video sources. videoQC provides video waveform, vector scope, histogram and metadata displays, along with clipping and conversions.

MediaReactor Workstation: This series of plugins allow professional editing and finishing systems to access all the file types created by the Net-X-Code system and access the real time recording files, while they are still growing. MediaReactor Workstation is built into

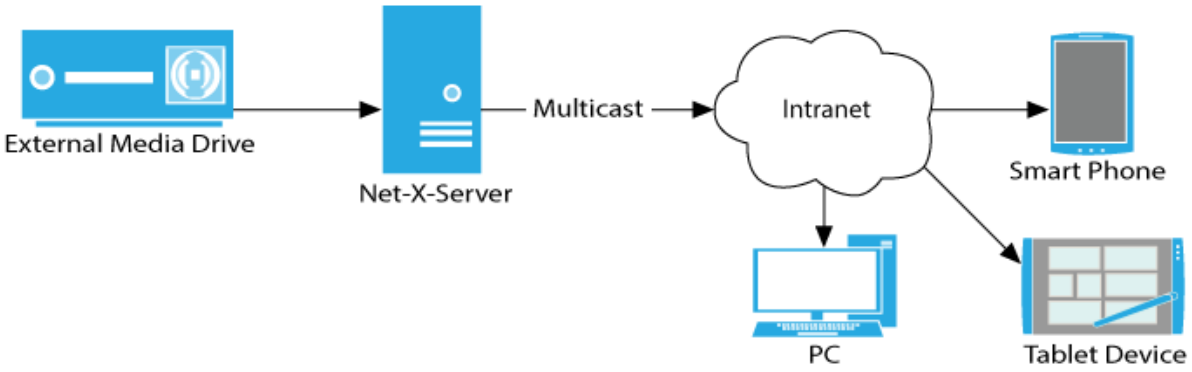
software like Assimilate and Nucoda, and available as an option for other systems like Adobe, Avid, Autodesk, Quantel, Final Cut, and even QuickTime compatible apps.

Typical Applications

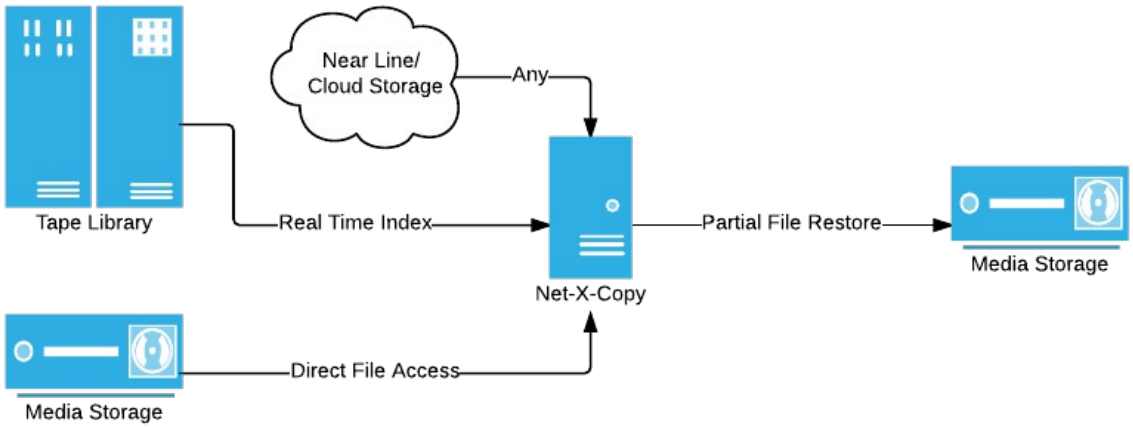
Net-X-Code IP Video Capture



Net-X-Code IP Video Streaming


External Media Drive
Net-X-Server
Multicast
Intranet
Smart Phone
PC
Tablet Device

Net-X-Code Partial File Restore, Conversion and Proxy



CentOS 6.5/7.5 Installation – Quick Start

Net-X-Code is a self contained set of services that can be run on a bare metal 64 bit Linux system. It does rely on certain OS functionality, so we recommend using CentOS or Red Hat 6.5 or greater, but it has been run on Ubuntu and other modern OSes. For the most flexible install, we also recommend installing a LAMP stack that can run the test/setup pages to control the Net-X-Code system. This document will list the basic setup of a Net-X-Code server.

Installing CentOS + LAMP

Install CentOS 7.4+ x64 for version 6
Make sure it is up to date
sudo yum update

Install Apache

sudo yum install httpd
Make sure the documentroot is the default /var/www/html/

Apache requires some changes in its config to support reaching our REST API at port 1080 from the web pages on port 80. The headers_module/mod_headers and rewrite_module/mod_rewrite must be enabled. Also, in the config section that points to the document root, the following must be added:

```
      Header always set Access-Control-Allow-Origin "*"
      Header always set Access-Control-Allow-Methods "POST, GET, OPTIONS, DELETE,
PUT"
      Header always set Access-Control-Max-Age "1000"
      Header always set Access-Control-Allow-Headers "x-requested-with, Content-
Length, Content-Type, origin, authorization, accept, accept-language, if-none-
match, client-security-token, X-Auth-Token"
      RewriteEngine On
      RewriteCond %{REQUEST_METHOD} OPTIONS
      RewriteRule ^(.*)$ $1 [R=200,L]
      AddType application/x-httpd-php .html .htm
      AddType application/x-mpegURL .m3u8
      AddType video/MP2T .ts
```

The Access-Control-Allow-Origin should be changed to only allow connection from your expected sources.

Install MySQL

sudo yum install mysql-server
Set MySQL to run at boot and secure it
sudo service mysqld start
sudo /sbin/chkconfig --levels 235 mysqld on

Install PHP

sudo yum install php php-pear
sudo yum install php-mysql
Create a log dir for PHP/Apache
sudo mkdir /var/log/php
sudo chown apache /var/log/php

Restart Apache

sudo service httpd restart
Make sure Apache auto starts
sudo chkconfig --level 345 httpd on
Where 3,4, and 5 are the levels you want to run at.

Install extra required packages:

sudo yum -y install SDL OpenEXR e2fsprogs log4cplus openldap libidn xz gstreamer gstreamer-plugins-base compat-libtiff3 libGLU xcb-util xcb-util-renderutil xcb-util-image xcb-util-keysyms xcb-util-wm mesa-libGL

Centos 7+ also requires
sudo yum install xcb-util-render-util xcb-util-wm
ftp://ftp.pbone.net/mirror/pkgs.repoforge.org/libstatgrab/libstatgrab-0.15-1.el6.rf.x86_64.rpm
Note: If you are planning on using the browser on the server to play back files, you will need to upgrade it. The Firefox version shipped with 6.5 does not support the MSE required to play back the RTIN in HTML5. Installing Google Chrome is recommended. If you are using browsers on machines connected to the server, this step is unnecessary.

SELinux

Security-Enhanced Linux (SELinux) is a security mechanism implemented in the kernel. In enforcing mode, SELinux blocks Apache from loading content outside of default directories. By default under a strictly enforced setting, everything is denied and then a series of exceptions policies are added to allow access.

To allow access to Apache's document and its subdirectories:

sudo chcon -R -t httpd_sys_content_t /var/www/html/

Installing Net-X-Code

Download the latest Net-X-Code for Linux installer package from our web site. This will reside here:

http://www.drastic.tv/downloads/net-x-code/Net-X-Code-Linux-x86_64-Install_6_1.zip

Inside that zip is the installer. Unpack it in a temporary directory and set its executable bit:

chmod u+x

The installer can be run in GUI or command line mode. To run it in GUI mode, double click on it. To run it in command line mode, use the following command:

./Net-X-Code-Linux-x86_64-Install_6_1_### --mode console

Once installed, some systems may require a:

sudo ldconfig

The installer will install into the following directories
/opt/drastic/ (shared objects)
/usr/local/Net-X-Code/ (applications/servers)
/var/html/www/ (web gui)
/root/.config/Drastic/ (config files)

If you are going to use Net-X-Code as a user, please copy the default configs from /root/ to your user directory /home/<user>/

sudo cp root/.config/Drastic/NetXBase.conf ~/.config/Drastic
sudo cp root/.config/Drastic/NetXCmd.conf ~/.config/Drastic

You may need to make ~/.config/Drastic. You will probably also want the demo media installed, if you are testing for the first time. Download the demo from:

http://www.drastic.tv/downloads/test_media/NetXCodeDemoMedia.zip

and unpack it to /var/www/html/ so it creates the /var/www/html/video directory. If you are going to capture as a user, you will also need to add yourself to the permissions for the /var/www/html/video director and subdirectories (especially the 'live' subdirectory). For quick tests you can use sudo chmod -R a+w /var/www/html/video, but this is not recommended for production machines.

Setting Up Net-X-Code

By default, CentOS/Red Hat's networking does not allow some of the connections Net-X-Code requires. For production machines, please see the Firewall section of the Net-X-Code manual. For initial testing, make sure your server is not connected to any insecure networks, and turn off the Firewall temporarily

CentOS 7:
sudo systemctl stop firewalld

Also, to enable multicast, change the following setting:
/etc/sysctl.conf
net.ipv4.conf.default.rp_filter = 2

CentOS 6 & 7:

For Apache, some of the sample files use php within the HTML. By default, this is disabled. To enable it, edit

/etc/httpd/conf/httpd.conf
AllowOverride All

For all instances of AllowOverride in that file. Then, rename the supplied php.htacces

cd /var/www/html
mv php.htaccess .htaccess

The Net-X-Base and Net-X-Cmd server should also be set to auto run. Please note, the server should be set up with a static IP. If it is using a DHCP allocated address, the address may not be set before the services run. If that happens, they will not attach, and that will not allow them to run properly. If this happens, both services will need to be restarted. To add the services:

sudo chkconfig --add netxbase
sudo chkconfig --add netxcmd

sudo chkconfig --level 345 netxbase on
sudo chkconfig --level 345 netxcmd on

To start and stop the services, run:

sudo /usr/local/Net-X-Code/NetXBase stop
sudo /usr/local/Net-X-Code/NetXBase start

sudo /usr/local/Net-X-Code/NetXCmd stop
sudo /usr/local/Net-X-Code/NetXBase start

A restart of the server will cause Net-X-Base and Net-X-Cmd to start. They may need to be restarted, if the Firewall is not disabled, after disabling it with ‘sudo /etc/init.d/iptables stop’.

By default, the servers run ‘headless’, or without any user interface. For testing, it is often useful to show the GUIs for the components. Changing

[general]
forcegui=1

In the config file for any component (stored in /home/%user%/.config/Drastic/) will cause it to display its interface on the local display.

Windows x64 Installation – Quick Start

Net-X-Code should be installed on Microsoft Windows Server 2008 R2 64 Bit but also can be installed on Windows 7 x64 or 10 x64. You will also need to install a UwAmp server to host the web pages. This document will list the basic setup of Net-X-Code in Windows.

Install OS and Net-X-Code

- Install Windows 64 bit OS.

- Download and install UwAmp
  - http://www.uwamp.com/en/?page=download
  - Open the UwAmp application. This will automatically start up the server.
  - Navigate to localhost in a browser and confirm that the Apache server is running.

- Download and unpack Net-X-Code:
  - http://www.drastic.tv/downloads/net-x-code/SetupNet-X-Code_x64_6_1.zip
  - This will install the Net-X-Code servers to: C:\Program Files\Net-X-Code_6\
  - It will also install the web pages into UwAmp: C:\UwAmp\www\

- Download NetXCodeDemoMedia.zip
  - http://www.drastic.tv/downloads/test_media/NetXCodeDemoMedia.zip
  - Unzip it to C:\UwAmp\www\
  - (see next page for more information on this zip)

- License: You must get at least a trial license for Net-X-Code to function. Run 'License Net-X-Code', fill in the user and email, generate the code and email it to authorization@drastictech.com with a request for temporary license for Net-X-Code to test with. There is more information on licensing available here:
  - http://license.drastictech.com

- If you are using RTP/UDP streams over 10 mbs, you should modify Windows buffers for higher multicast buffer sizes. In 'HKEY_LOCAL_MACHINE\SYSTEM\CurrentControlSet\Services\AFD\Parameters' change or add the DWORDs 'DefaultReceiveWindow = 6679200' and 'DefaultSendWindow = 6679200'.

- Restart the system.

Configure and startup Net-X-Base & Net-X-Cmd

- Included as part of the installer is a “DemoConfig.reg” file located in C:\Program Files\Net-X-Code_#. Double-click on it and choose “yes” to import the configuration file to registry editor.

- Start up NetXCode Master Control (netxbase.exe) and NetXCode Daemon (netxcmd.exe) (C:\Program Files\Net-X-Code_6).
  - You should see 3 groups in Net-X-Base if the configuration was successful.
  - Note: Turn off firewall or allow access for Net-X-Base & Net-X-Cmd.

- Open the UwAmp application to start Apache.

- Open a browser and navigate to your network address (fully qualified domain name, or dotted IP address like 192.168.0.100)

Note: Net-X-Base and Net-X-Cmd can be launched automatically on system start-up by adding shortcuts to the applications to the Startup folder in: C:\Users\user\AppData\Roaming\Microsoft\Windows\Start Menu\Programs\Startup

Server Demonstration – Quick Start

If you have followed the quick start setup above, your server is now ready to demonstrate all the major features of the Net-X-Code tool set. The easiest way to to do this is to install the demo media zip, and follow the steps below.

The demo media zip should be unzipped in the http root, so the file folder structure is correct:

http://www.drastic.tv/downloads/test_media/NetXCodeDemoMedia.zip
cd \var\www\html
unzip NetXCodeDemoMedia.zip

This will put the following files on your system:

video\streamTS\ABR.ts
video\streamTS\LBR.ts
video\streamTS\HBR.ts
video\media\sourceLBR.mp4
video\media\sourceABR.mp4
video\media\sourceHBR.mxf
video\dash\dashABR.mdp/m4v/m4a
video\hls\hlsABR.m3u8/ts

video\archive\archiveHBR.mxf
video\archive\archiveHBR.rtin
video\archive\archiveLBR.mp4
video\archive\archiveLBR.rtin
video\live\

The subdirectories under video are meant to represent different storage systems available to Net-X-Code in your facility. The directories and their meanings are:

\video\streamTS – source video IP streams to stream out to the network
\video\media – the main media store for editing/production and receiving clips
\video\dash – a storage system holding DASH files for external playback
\video\hls – a storage system for holding HLS files for IOS/Android external playback
\video\archive – a slower HD, tape or cloud storage for archive files
\video\live – the storage to capture video IP streams to

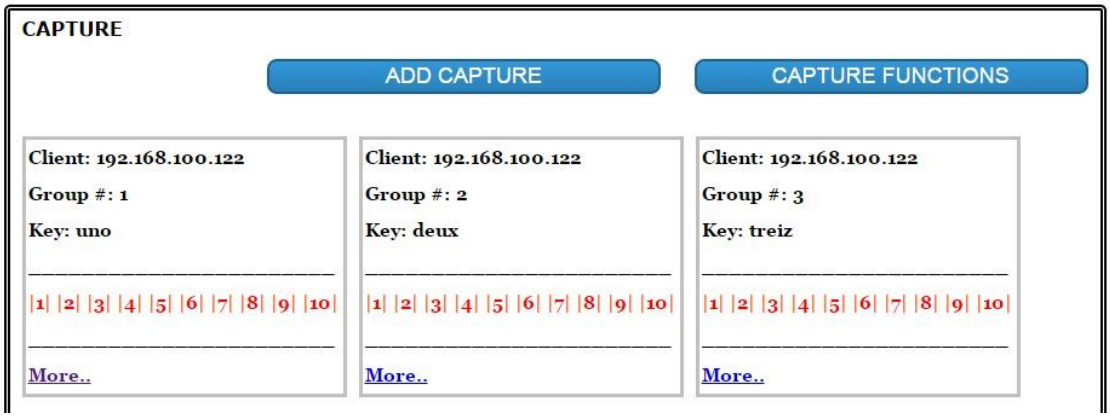
Start Streams

This starts and stops the RTP streaming of the HBR (high bit rate), LBR (low bit rate) and ABR (web level bit rate) files. Channels 0, 1 and 2 in Group 2 have been pre-configured for streaming at 239.254.30.30, 239.254.30.31 and 239.254.30.32 respectively. Simply click on start/stop functions to stream.

The Re-stream section allows a user to restream a live capture. Simply configure the stream and specify the Net-X-Code client and target stream address and port.

Start Capture

The next section in the homepage is the Capture section. This provides a snapshot of the status of all Net-X-Code groups. The channels for each group are also denoted in ‘green’ when there is an active capture or ‘red’ otherwise. “More”, will provide detailed information on the group and its channels. Additionally, ‘Net-X-Base Status’ tab at the top-right of the web page also provides more information about Net-X-Code.



In the Capture Section, there are two main areas: Add Capture & Capture Functions.

Add Capture
This allows a user to create a new Net-X-Code client. In order to create a new client, a unique key name for the group is required. There are 2 ways to create a new client:

1. Enter a unique group name and add settings for each channel (or leave default values) and click on the Submit button.
2. Add settings for all channels, click on Apply to Channels and Submit.

In both instances an HTTP request is sent to Net-X-Base with the parameters used to create the group.
Return Messages:

- Empty field: Missing parameters
- SUCCESS: Group Created.
- FAIL: key already in use.
- ERROR: Net-X Connection Refused.

Capture Functions
This opens a dialog box with Net-X-Code functions such as start, stop, restart and delete capture functions.
Return Messages:

- FAIL: Could not complete operation.
- SUCCESS

Restream

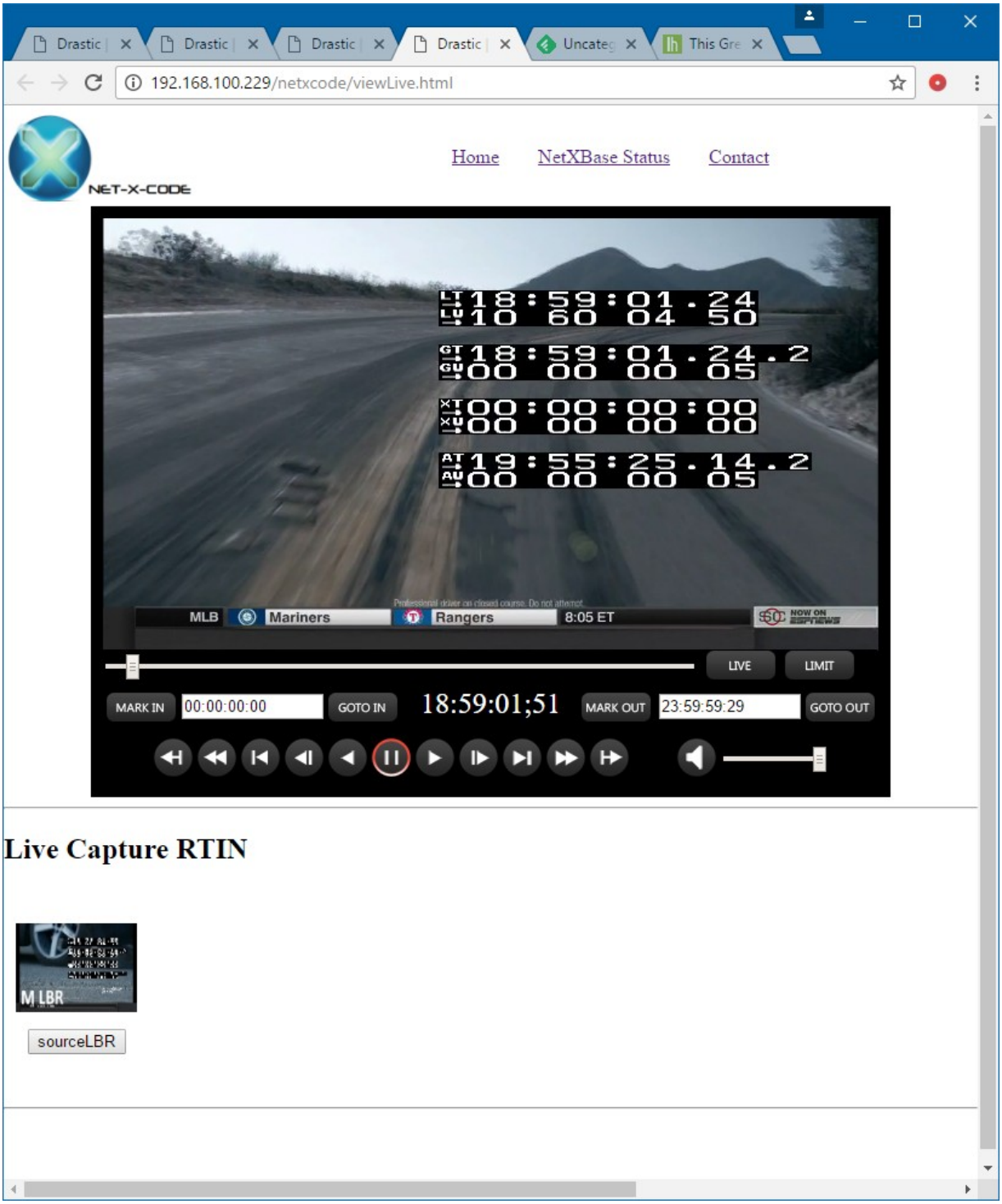
This starts streaming the live captures back out as RTP. Please note, the capture channels must be set to .TS for the restream to work. Contact support@drastictech.com for more information on this feature.

File Workflows

This section demonstrates both the live, playback and partial file restore functions.

View Live Captures

This button brings up a Net-X-Player instance and allows you to select and view any proxy or ABR level live streams being captured using their RTIN files. Clicking on the thumbnails or the name buttons will load the file. The transport controls can be used to move around the file, and the LIVE button will play at the head of the record.

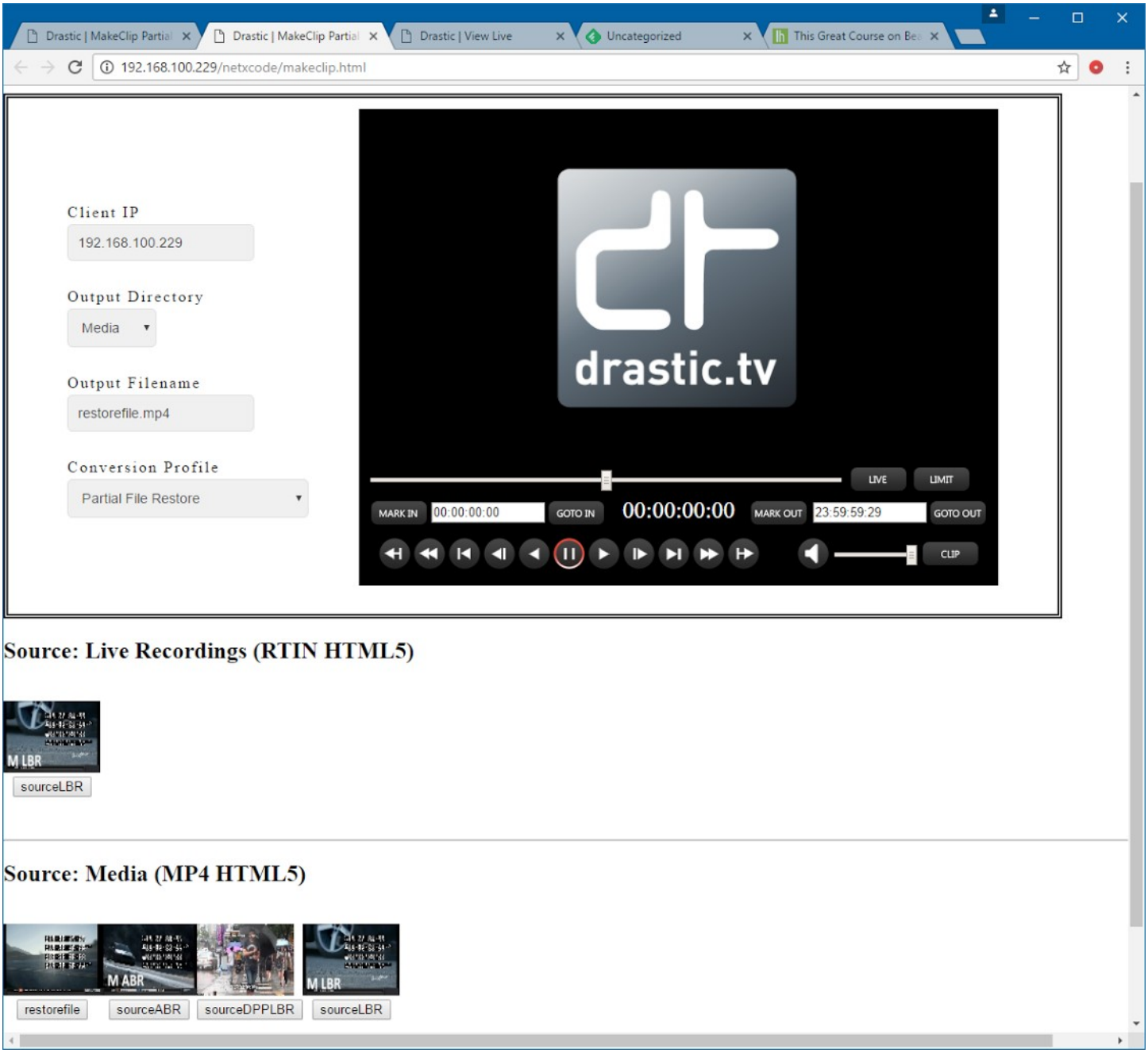

192.168.100.229/netxcode/viewLive.html
NET-X-CODE
Home
NetXBase Status
Contact
MLB
Mariners
Rangers
8:05 ET
LIVE
LIMIT
MARK IN
00:00:00:00
GOTO IN
18:59:01;51
MARK OUT
23:59:59:29
GOTO OUT
Live Capture RTIN
sourceLBR

Make A Clip

This button will bring up a Net-X-Player in a new window and allow you to select a live recording RTIN or MP4 from the media folder. Once loaded, time code based in and out points can be set. The Net-X server IP to be used can be set along with an output directory, output file name and output type. The output types include:

- Copy File – copy the entire file
- Create RTIndex – make an RTIN file for later partial file restore
- Partial File Restore – extract an audio/video/TC/CC section of a file and create a new file of the same type without recompressing the video/audio
- QuickTime MOV Uncompressed – full or partial file conversion
- QuickTime MOV DVHD – full or partial file conversion
- QuickTime MOV h.264/AVC1 – full or partial file conversion
- QuickTime MOV ProRes 4:2:2 – full or partial file conversion
- QuickTime MOV ProRes HQ – full or partial file conversion
- MXF OP1a DVCPro 720p HD – full or partial file conversion
- MXF OP1a DVCPro 1080i HD – full or partial file conversion
- MXF Sony XDCam 720p – full or partial file conversion
- MXF Sony XDCam 1080i – full or partial file conversion
- MXF OP1a XDCam 32 audio – full or partial file conversion
- MXF HDR XDCam 50 4:2:2 – full or partial file conversion
- MXF AS-11 DPP HD AVCi100 – full or partial file conversion
- MXF AS-11 DPP SD IMX 50 – full or partial file conversion
- MXF AS-02 10 bit h.264 50 – full or partial file conversion
- MXF OP1a JPEG-2000 10 bit 150 – full or partial file conversion

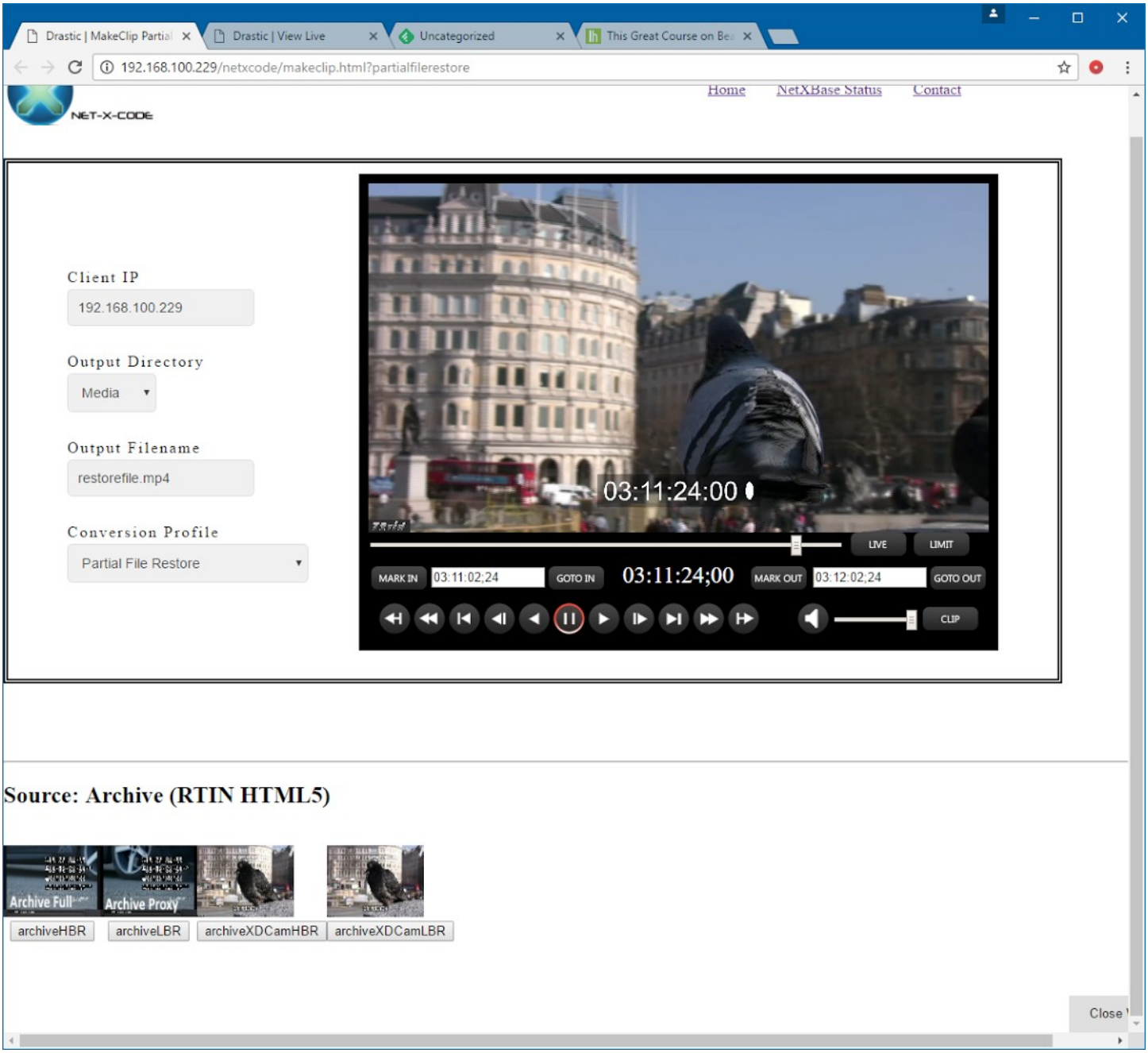
Once the conversion is setup, clicking the 'Clip' button in Net-X-Player will create the new file.



Partial Restore From Archive

This button demonstrates a partial file restore workflow. Loading the LBR or ABR clip from the archive files at the bottom of the page will load Net-X-Player so in and out points can be set. Like the Make Clip button (see above), this 'Clip' button on the Net-X-Player will cause a new file to be made, but in this case it will use the HBR file as the source for the conversion. This is conceptually how a partial file restore archive system would work, where the user loads MP4/RTIN files from a web store, and

once the section of the file is selected, the command is set up to use the original, high quality file on tape, slow storage or cloud storage by replacing the source file and using the matching time codes.



Move Files Live/Media/Archive

The move files area is an example of how to use the Net-X-Code server system to move arbitrary files between the storage available to it.

Live Recordings (RTIN HTML5)

LBR-Live LBR-Live_000

Source: Media (MP4 HTML5)

restorefile sourceABR sourceLBR

Source: Archive (RTIN HTML5)

In order to copy or move a clip:

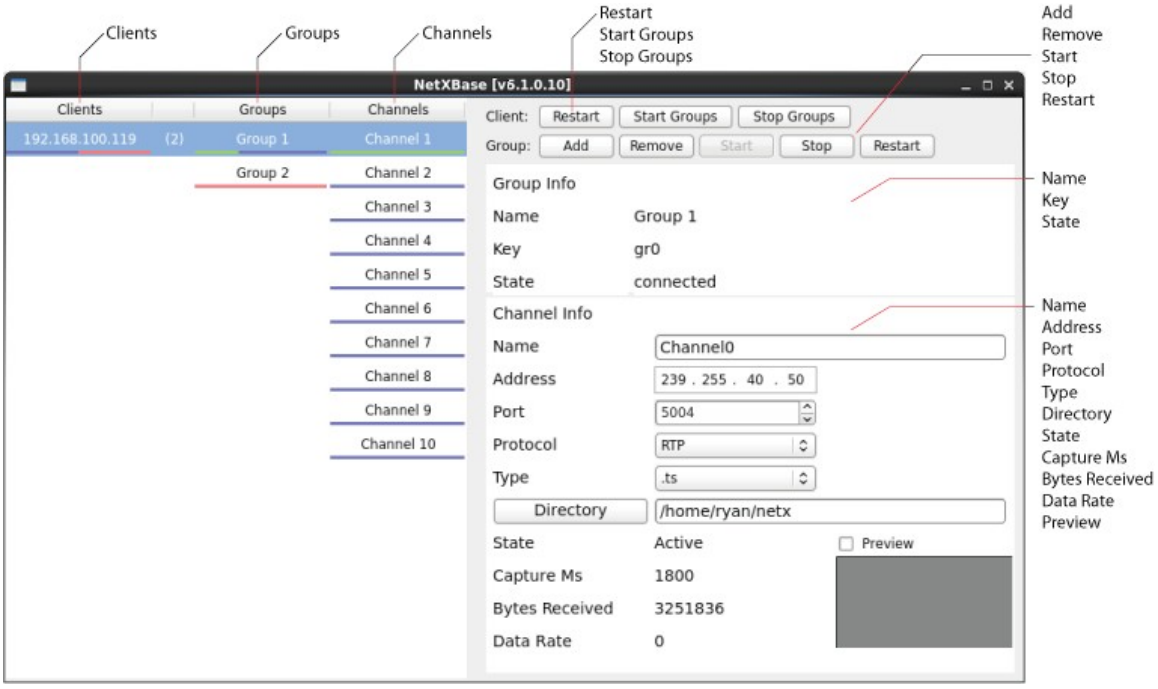
Double-click video thumbnail to get the file path.
Select target directory (Media, Live or Archive) from the drop-down box.
Enter target filename.
Click ‘Submit’ to copy/move clip to target destination.

Controls and Displays

Net-X-Code server components are normally run 'headless' (without any graphical user interface) on Linux servers. GUIs are available for each component, and they are outlined here.

Net-X-Base Window

The Net-X-Base component of Net-X-Code is installed on a workstation separate from the servers being used to record.



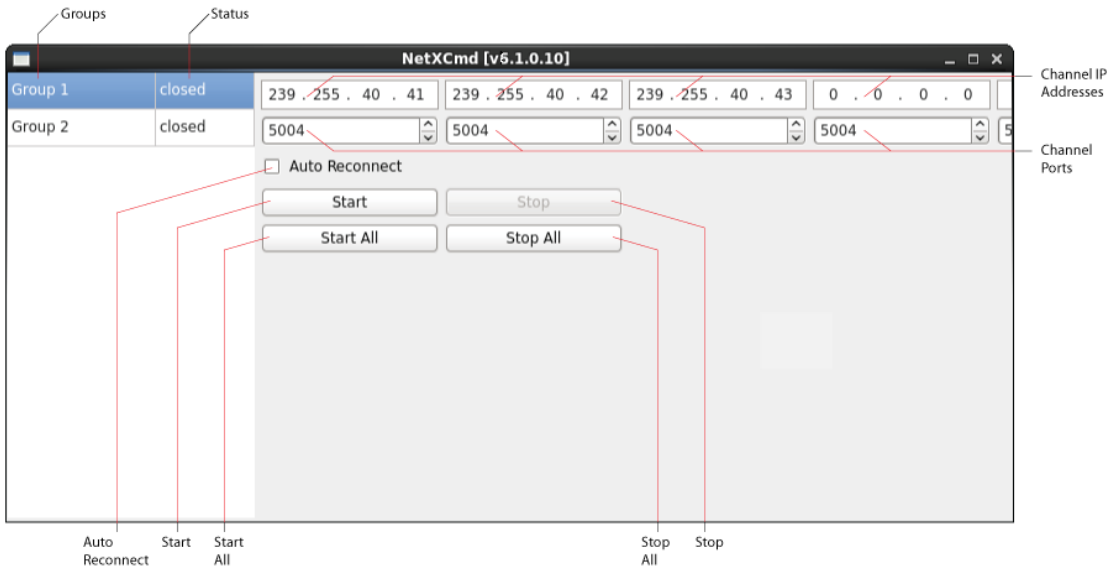
Clients column	This column displays all clients on the network. Each client represents a separate server running Net-X-Code software. Selecting a client by clicking on it allows the user to select any groups running on the client.
Groups column	This column displays all groups that are running on the client. Each group represents an instance of the Net-X-Code window running on the server capable of performing a multichannel capture. Selecting a group by clicking on it allows the user to select a capture channel, to display its state and change any adjustable parameters.
Channels column	This column displays all channels that are in each group. For example each group might run 3 channels of capture; (1) a HBR, or high bit rate stream, (2) a native stream, and (3) an LBR, or low bit rate stream. Selecting a channel by clicking on it allows the user to display its state and change any adjustable parameters. The color under each channel indicates its state: Red means inactive (stopped),

		Green means active and recording, and Blue means active but not recording; this can be either because no data is being received from the chosen address/port or because the chosen type is incompatible with the data being received.
Client	Restart button	Select a client that has stopped recording, and press the Restart button to resume the capture.
	Start Groups button	Select a client and press the Start Groups button to begin a capture on all the channels on that client.
	Stop Groups button	Select a client and press the Stop Groups button to stop a capture on all the channels on that client.
Group	Add button	Press the Add button to add a group into Net-X-Base.
	Remove button	Select a group and press the Remove button to remove it from Net-X-Base.
	Start button	Select a group and press the Start button to begin a capture on that group.
	Stop button	Select a group that is recording and press the Stop button to stop a capture on that group.
	Restart button	Select a group that has stopped recording and press the Restart button to resume a capture on that group.
Group Info	Name	Displays the name of the group
	Key	Displays the key associated with the group
	State	Displays the network state of the group, i.e. whether it is connected or not
Channel Info	Name display	Displays the name of the selected channel.
	Address display	Displays the IP address of the selected channel.
	Port control	Displays the port for the selected channel, and allows the user to select another port by clicking on the up/down arrows.
	Protocol setting	Displays the network protocol for the selected channel
	Type pulldown menu	Displays the file type for the selected channel. Clicking on the pulldown menu allows the user to select between available file types for the channel to record.
	Directory button and display	Pressing the Directory button opens a browser which allows the user to browse to and set a record directory for the selected channel.
	State display	Displays the capture state of the selected channel, i.e. whether active or not.

	Capture Ms display	Displays the millisecond at which the last frame was captured. This field should update during capture.
	Bytes Received display	Displays the amount of bytes received during capture. This field should update during capture.
	Data Rate display	Displays the data rate setting for the capture, if applicable
	Preview checkbox and display	Clicking to select the Preview checkbox enables a mini confidence monitor for the selected channel in the Preview window

Net-X-Cmd Window

The Net-X-Cmd component of Net-X-Code is installed on a server, designed to communicate with Net-X-Base and to control each group being run on the server.

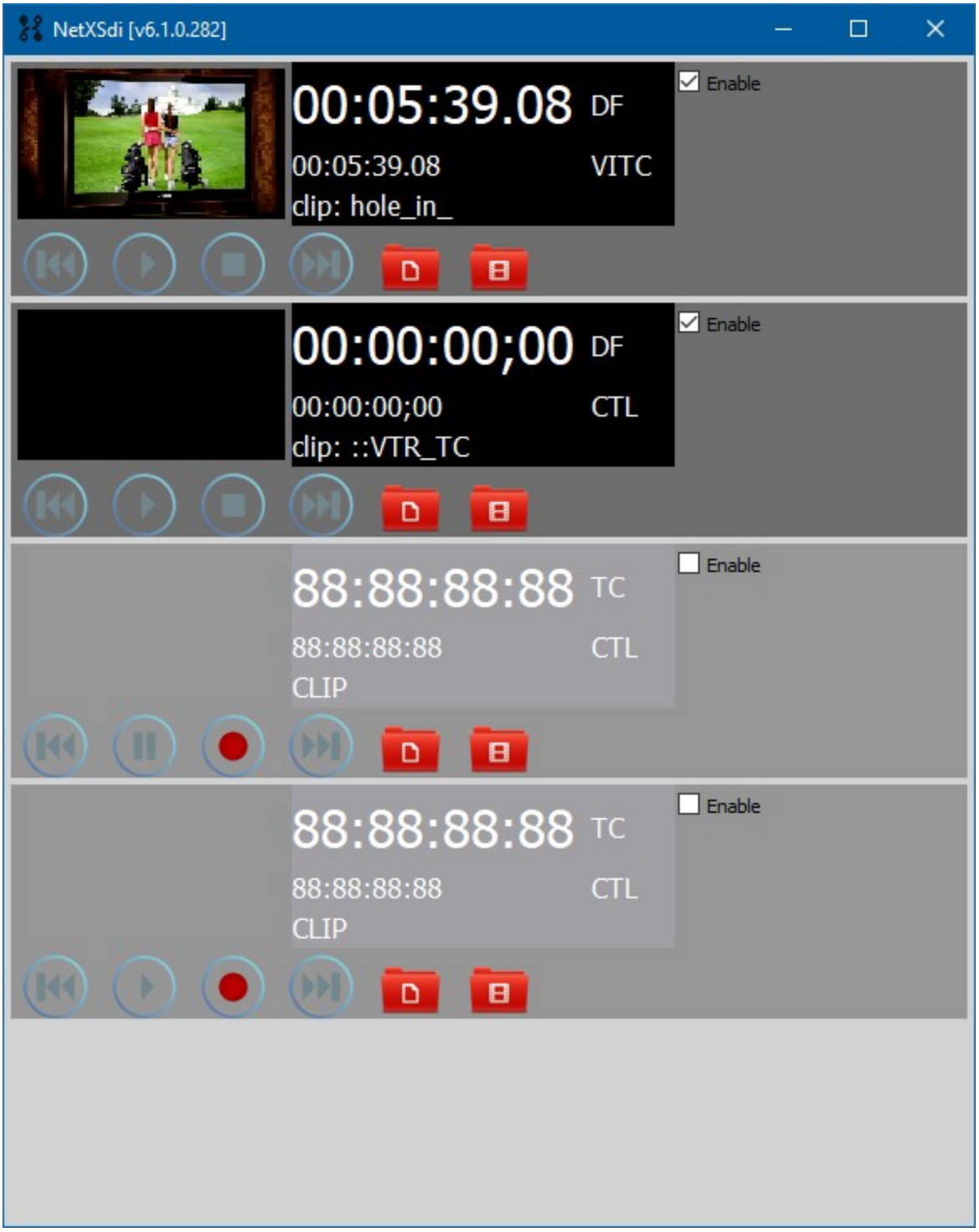


Group column	Each group is displayed in this column, and may be selected by clicking on the button. Selecting a group allows the user to start or stop recording for that group, and to enable or disable auto reconnect.
Status column	Displays whether the group is connected or closed.
Channel IP address display	Displays the IP address setting for the each channel of capture.

Channel Port display	Displays the port for each channel of capture, and offers up/down arrows the adjust the setting
Auto Reconnect checkbox	Click to enable automatic reconnection for the selected group. Where this has been enabled, Net-X-Cmd will attempt to restore any connections that may be dropped.
Start button	Click to start capture on the selected group.
Start All button	Click to start capture on all groups on the server.
Stop All button	Click to stop capture on all groups on the server.
Stop button	Click to stop capture on the selected group.

Net-X-SDI Window

The Net-X-SDI component of Net-X-Code is run automatically on any Net-X-Cmd server. It supports up to 10 channels of SDI, HDMI, 3G/6G/12G, NDI or SMPTE 2110/2022 capture and playback, depending on the hardware.



There are some basic controls on this windows available when the enable check box is set. For full control, see the web based browser GUI below. The NetXSDI component of NetXCode server allows for multiple channels of SDI baseband capture. Configuration depends on hardware, but typical configuration include either one channel of 4k, or four channels of SD/HD capture. Each high resolution capture also captures a proxy version at the same time, with frame accurate timecode, multichannel audio, closed

captions and metadata. NetXCodes built in HTML5 web player can play the proxy file while recording, as well as mark and clip both the high res and proxy files while it is still recording. If the recording is set to OpenMXF format, then the high res version can be edited while still be recording in Adobe Premiere, Avid MediaComposer and other editors. Other formats like MOV, AVI, and other forms of MXF can be edited while recording using the Drastic **MediaReactor Plugins**.

NetXSDI also support VTR control for frame accurately capturing older tapes. Scheduled captures are also fully supported form the NetXCode calander web interface.

A variety of hardware and softwar capture is supported including:

- •Aja Kona, CorVid, Kona IP
- •BlueFish444 Epoch and Khronos
- •BlackMagic DeckLink, Intensity
- •Matrox SDI and IP
- •NewTek NDI® Sources
- •10/25G NIC for SMPTE 2022 and 2110

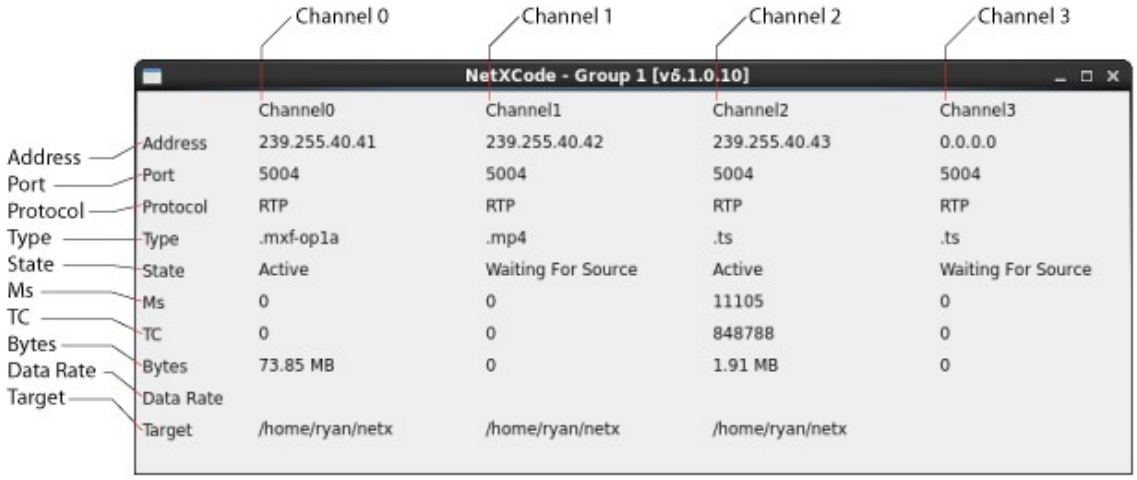
The proxy file will be an MPEG-4 with timecode, captions, multi track audio and RTIN file for play while record.

The high resolution file can be any of the following

- •OpenMXF, OP1a MXF, AS-02 MXF, HDF, Sony MXF
  - •XDCam, AVCi, XAVC, DVHD/50/25, IMX, JPEG-2000, DNxHD
- •MOV, MP4
  - •MPEG-2, XDCam, h.264, RGB, AVCi, Uncompressed 8 and 10 bit, HQX, CineForm, ProRes, DNxHD
- •AVI
  - •Uncompressed, DVHD/50/25, HQX, CineForm
- •TS (transport stream)
  - •MPEG-2, h.264
- •YUV
  - •Uncompressed 8 and 10 bit

Net-X-Code Window

The Net-X-Code component of Net-X-Code is installed on a server, designed to perform the captures on the server.

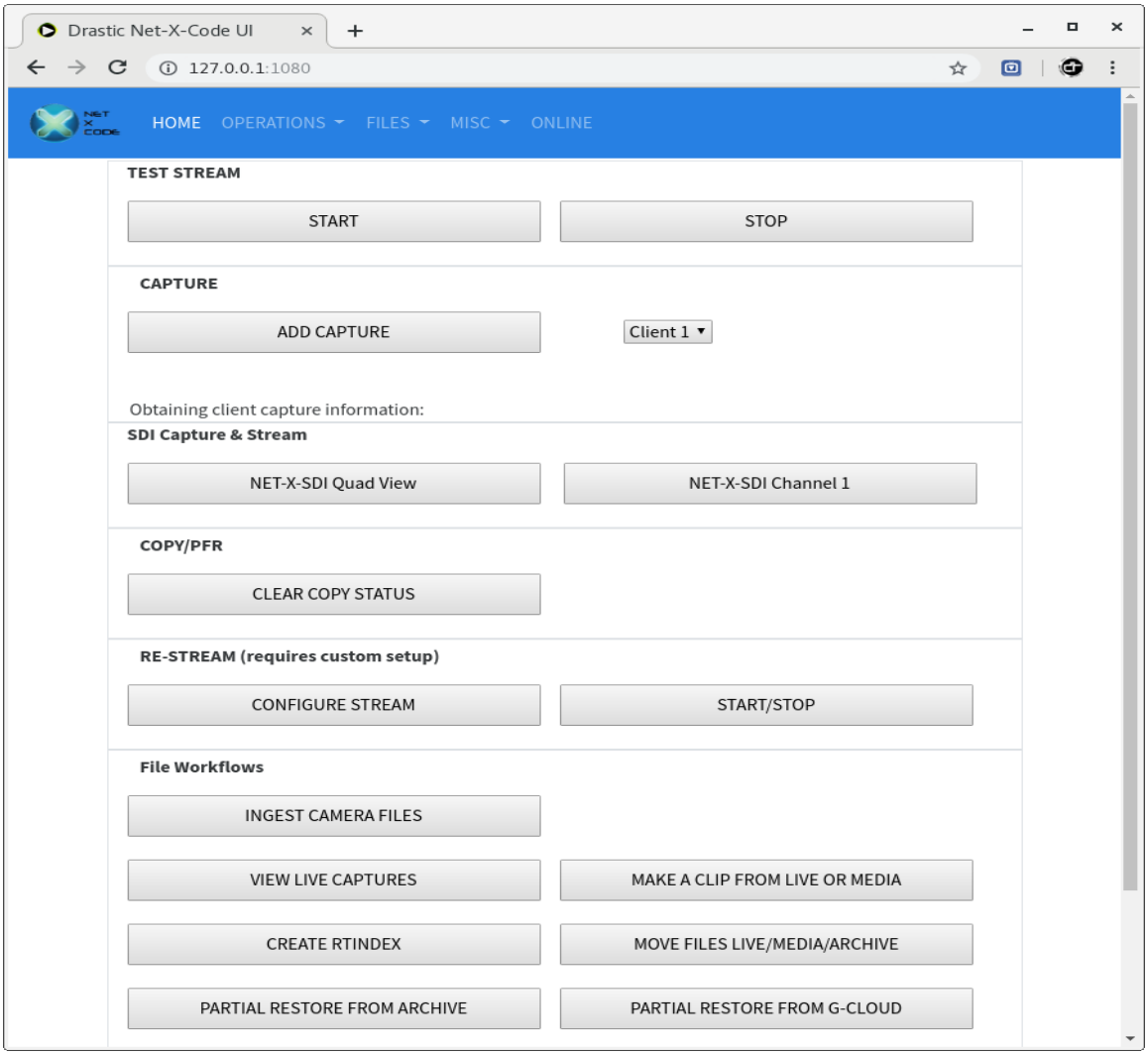


Channel 0 column	Displays information about the first channel in the group.
Channel 1 column	Displays information about the second channel in the group.
Channel 2 column	Displays information about the third channel in the group.
Channel 3 column	Displays information about the fourth channel in the group.
Address display	Displays the IP address assigned to each channel.
Port display	Displays the port setting for each channel.
Protocol display	Displays the network protocol setting for each channel.
Type display	Displays the file type each channel is set to capture.
State display	Displays the current state of the channel, i.e. whether “Active”, “Waiting for Source”, etc.
Ms display	Displays the number of milliseconds since the capture began
Bytes display	Displays the number of bytes captured so far.
Data Rate display	Displays the data rate setting for each channel, if applicable
Target display	Displays the record folder for each capture channel.

HTML/Web UI

Net-X-Base includes an HTTP server that can be used to control the Net-X-Code system, and also includes a remote status page that uses that API to display the current state of the system. You can access the main UI by going to:

http://<server-ip-or-name>



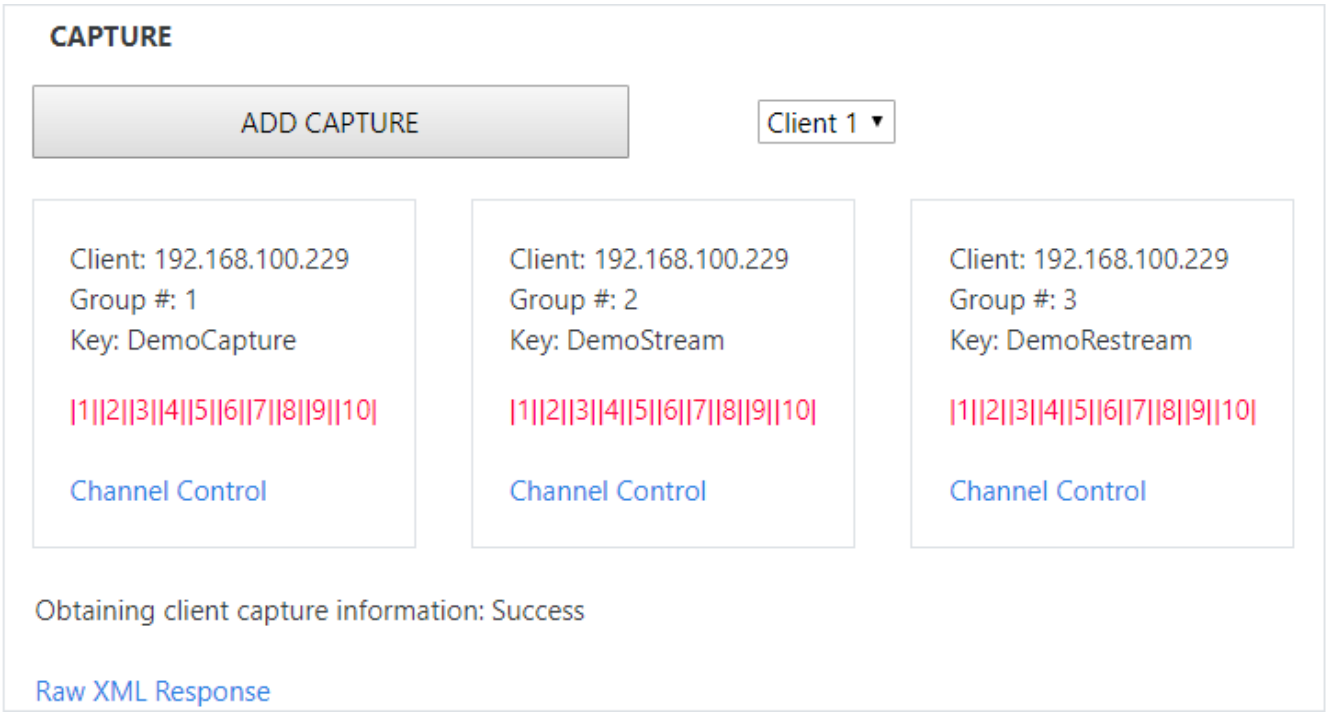
And you should see the default UI that is installed with Net-X-Code.

The major sections of this UI are:

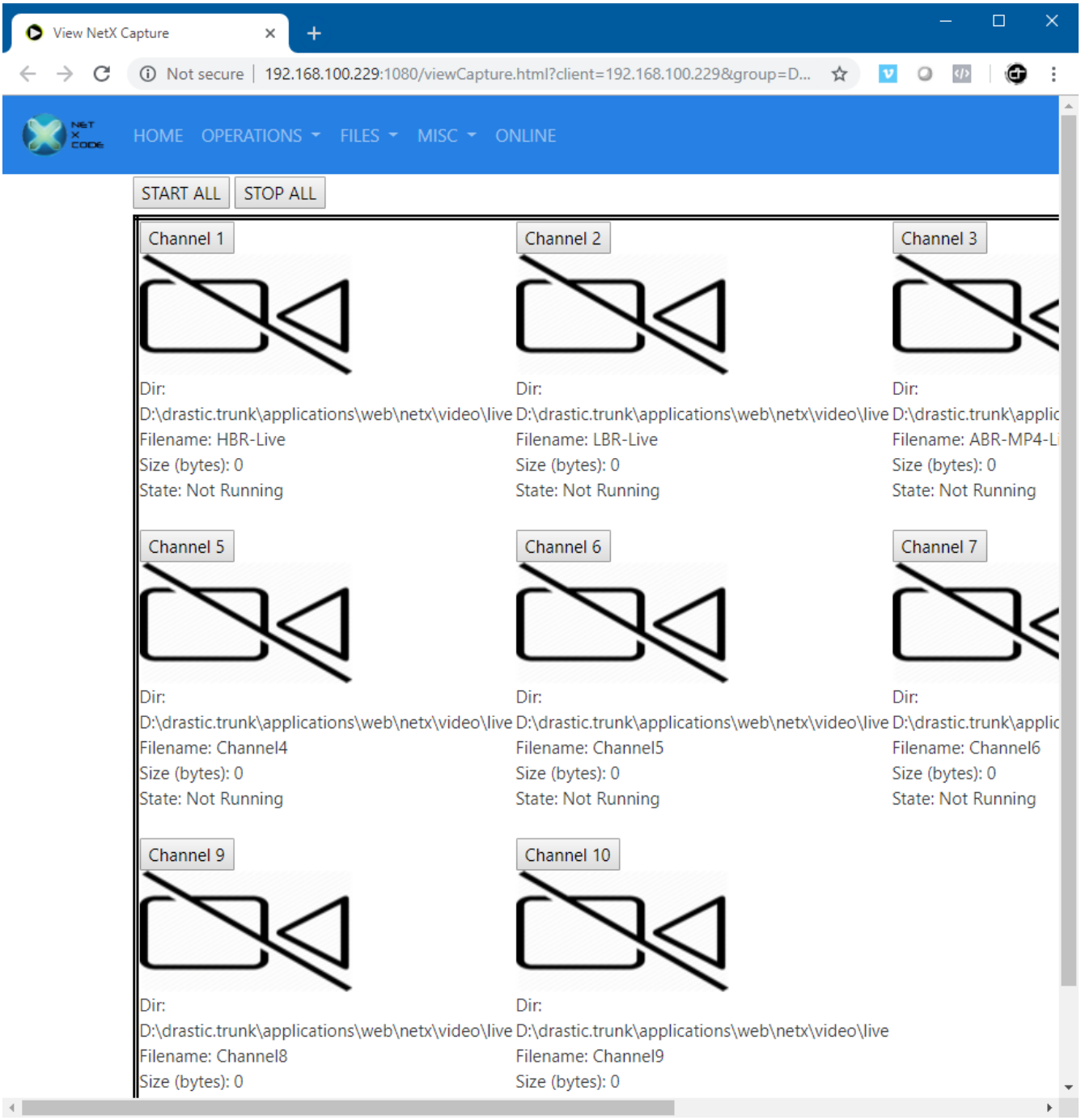
Test Stream

This will start and stop the streams configured in Group #2 / DemoStream. By default, these will be video/streamTS/HBR.ts, video/streamTS/LBR.ts, and video/streamTS/ABR.ts.

Capture/Status



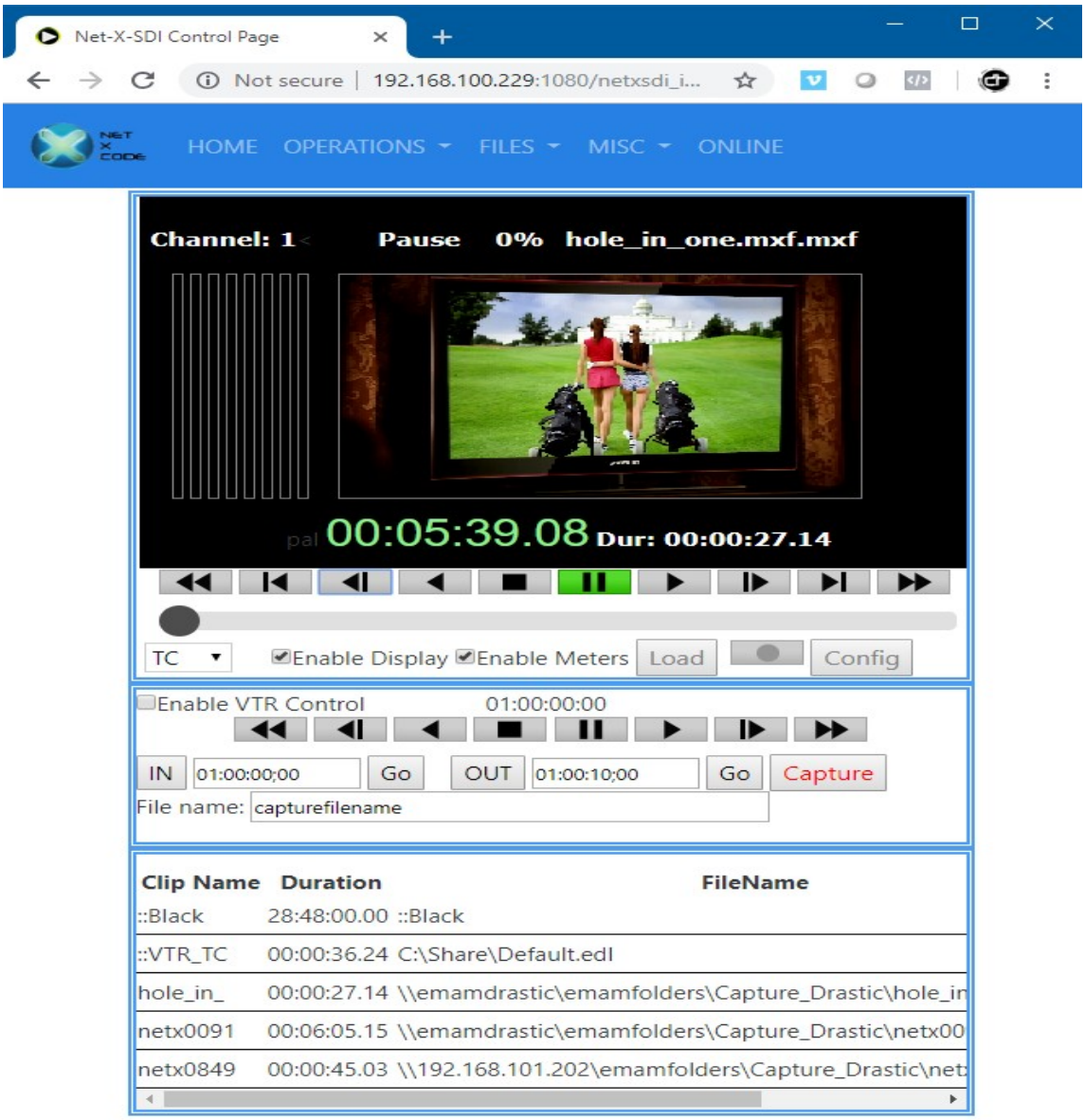
This area lets you add captures and control the state of the capture Group #1 / DemoCapture. There is also one status box for each of the groups, capture, stream and re-stream.


View NetX Capture
Not secure
192.168.100.229:1080/viewCapture.html?client=192.168.100.229&group=D...
HOME
OPERATIONS
FILES
MISC
ONLINE
START ALL
STOP ALL
Channel 1
Dir:
D:\drastic.trunk\applications\web\netx\video\live
Filename: HBR-Live
Size (bytes): 0
State: Not Running
Channel 2
Dir:
D:\drastic.trunk\applications\web\netx\video\live
Filename: LBR-Live
Size (bytes): 0
State: Not Running
Channel 3
Dir:
D:\drastic.trunk\applic
Filename: ABR-MP4-L
Size (bytes): 0
State: Not Running
Channel 5
Dir:
D:\drastic.trunk\applications\web\netx\video\live
Filename: Channel4
Size (bytes): 0
State: Not Running
Channel 6
Dir:
D:\drastic.trunk\applications\web\netx\video\live
Filename: Channel5
Size (bytes): 0
State: Not Running
Channel 7
Dir:
D:\drastic.trunk\applic
Filename: Channel6
Size (bytes): 0
State: Not Running
Channel 9
Dir:
D:\drastic.trunk\applications\web\netx\video\live
Filename: Channel8
Size (bytes): 0
Channel 10
Dir:
D:\drastic.trunk\applications\web\netx\video\live
Filename: Channel9
Size (bytes): 0

Re-Stream

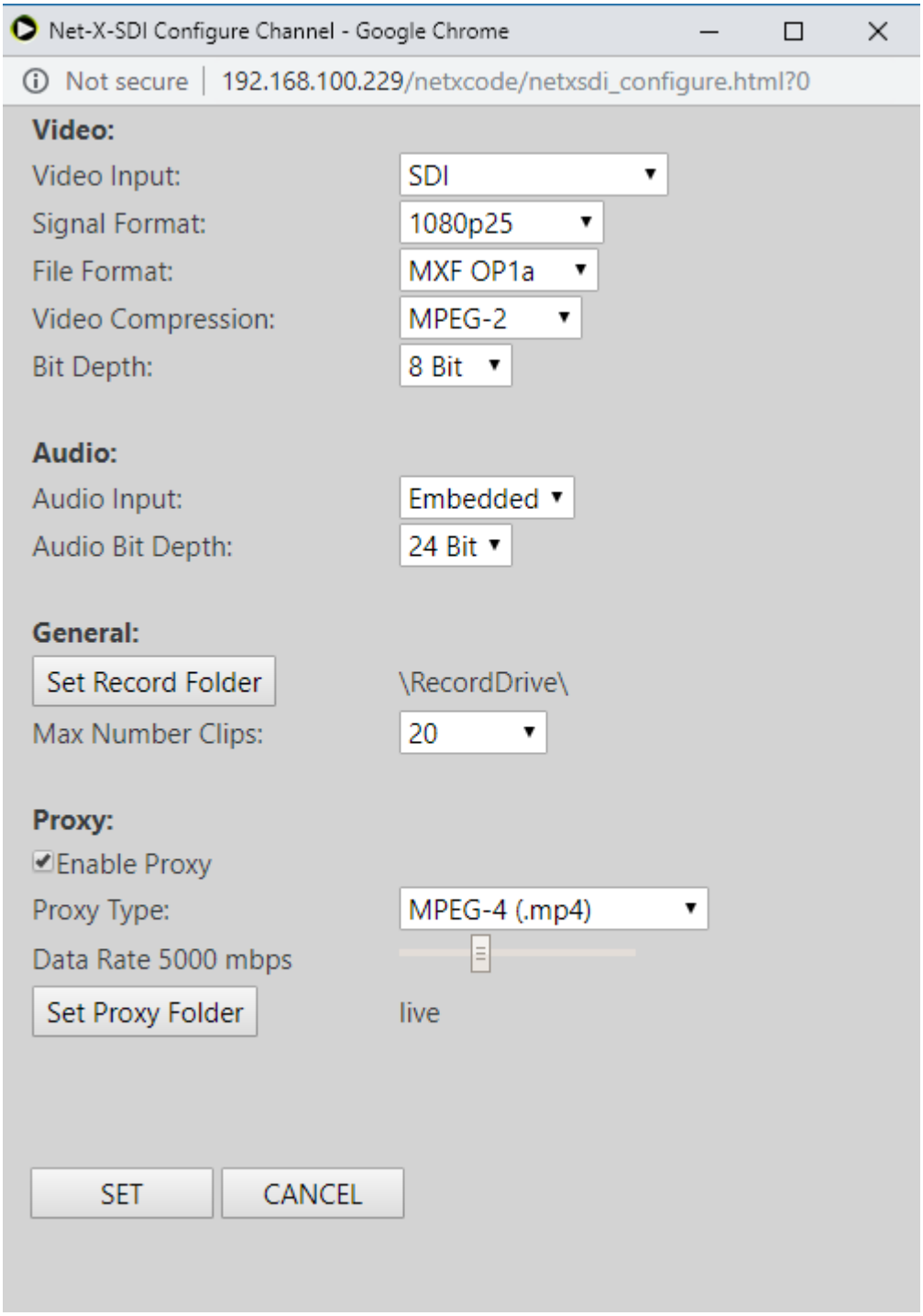
By default, this is not set up for the demo. If the capture has an HBR, LBR and/or ABR TS stream added to the capture streams, then this section can be used to restream those files as a time delay, back out to the network.

Net-X-SDI – Capture and Playback

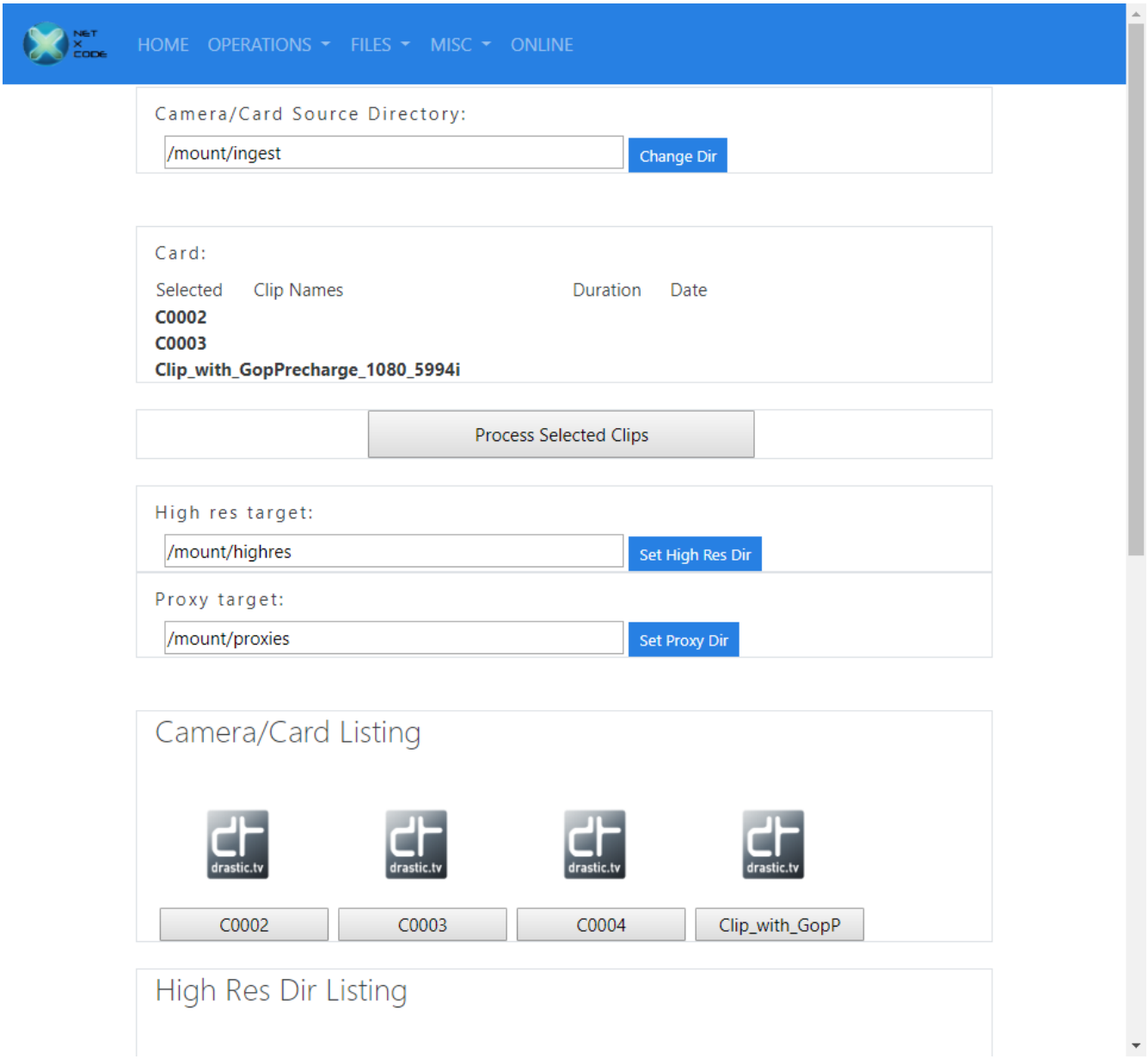


Net-X-SDI's web interface has a preview video window and audio meters showing what is coming into (in stop or record), or going out of (in pause or play) the video hardware.

Net-X-SDI Configuration



File Workflows – Ingest Camera Card

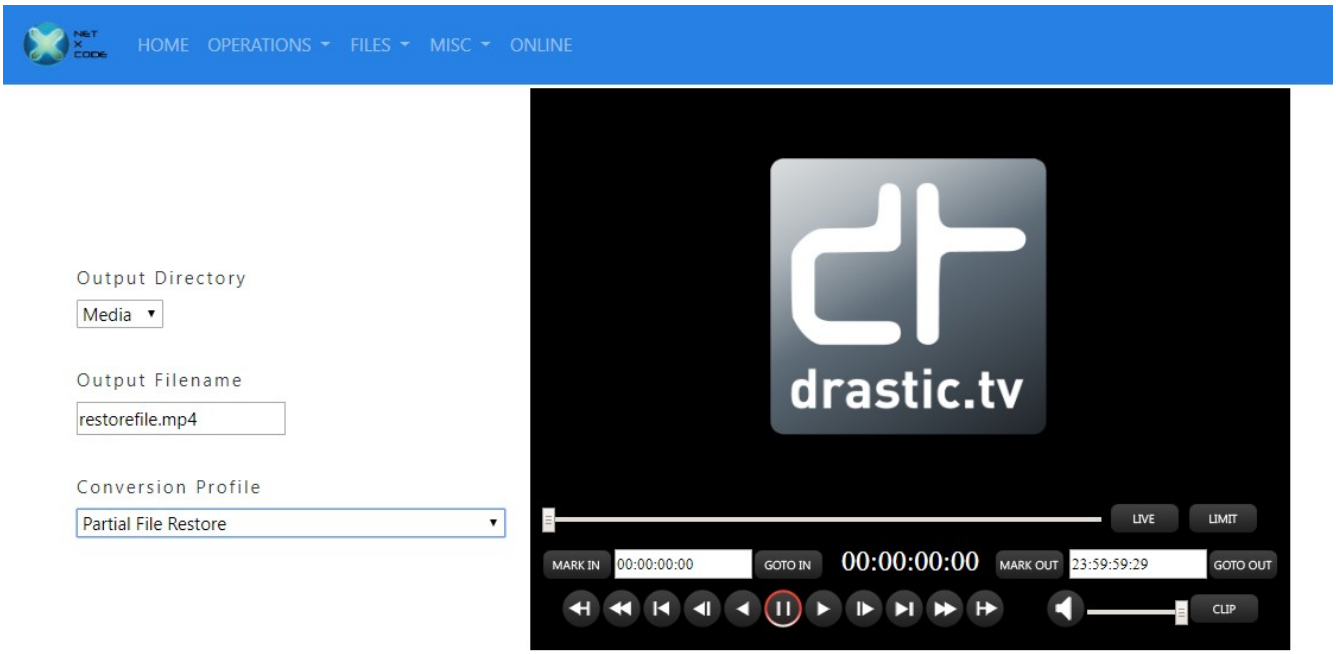


The ingest camera card page allows you to see an incoming camera card, or the directory it was copied to, as a series of recording (clips) rather then the native directory structure of the camera. These clips can be selected and then re wrapped into a single MXF, MP4 or other file, including all stitching for media elements, separate files for tracks and even spanning cards.

File Workflows – View Live Captures

This button brings up a Net-X-Player instance and allows you to select and view any proxy or ABR level live streams being captured using their RTIN files. Clicking on the thumbnails or the name buttons will load the file. The transport buttons can be used to move around the file, and the live button will play at the head of the record.

File Workflows – Make Clip From Live Or Media



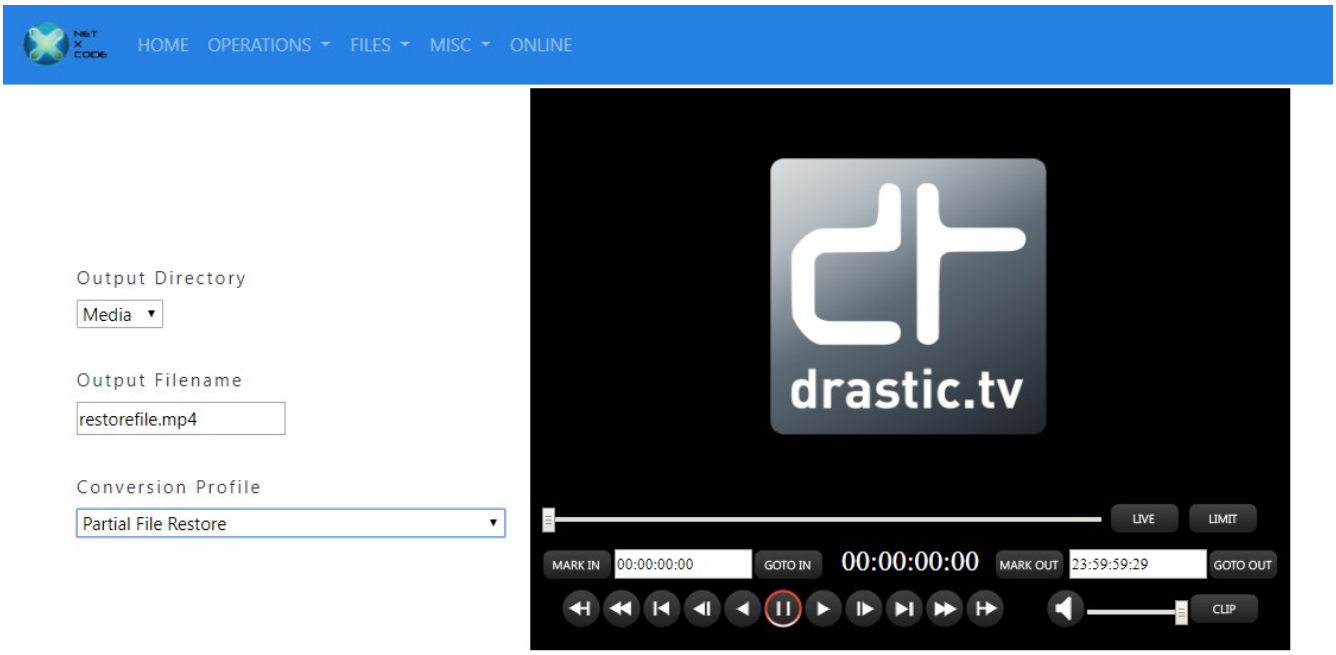
This button will bring up a Net-X-Player in a new window and allow you to select a live recording RTIN or MP4 from the media folder. Once loaded, time code based in and out points can be set. The Net-X server IP to be used can be set along with an output directory, output file name and output type. The output types include:

- copy - copy the whole file
- wrap - re wrap file or part of a file
- index - create an RTIndex for a file
- getCopyInOut - get the extents required for a pfr, or use them with a temp file
- mp3-128kbps - Audio MP3 file
- mov-YCbCr8Bit - QuickTime MOV 8 bit uncompressed YcbCr file
- mov-dvcprohd - QuicktTime MOV DVCPro HD (1080/720)
- mp4-h264 - MPEG-4 h264 AAC Audio
- mxf-xdcam-720p - True XDCam MXF 8 channel audio
- mxf-dvcprohd-720p - MXF DVCPro HD 720p
- mxf-xdcam-1080i - True XDCam MXF 1080i 8 channel audio Net-X-Code API 27

- mxf-dvcprohd-1080i - MXF DVCPro HD 1080i 29/25 fps
- mxf-OP1a-MPEG - OpenMXF XDCam MPEG-2 16 channel audio
- mxf-OP1a-h264 - MXF h.264
- mxf-OP1a-HDF - MXF MPEG-2 HDF Standard
- mxf-as-11-sd-pal-dpp - MXF AS-11 SD PAL DPP
- mxf-as-11-sd-ntsc-dpp - MXF AS-11 SD NTSC DPP
- mxf-as-11-hd-dpp - MXF DPP AS-11 AVCi HD
- mov-proreshq - QuickTime MOV ProRes HQ
- mov-proreslt - QuickTime MOV ProRes LT
- mov-prores422 - QuickTime MOV ProRes 422
- mov-prores444 - QuickTime MOV ProRes 444(4)
- scaledown2000k - MP4 264 960x540, 2mbs, AAC
- scaledown500k - MP4 264 480x272, 0.5mbs, AAC
- hd1080-5000kbs - MP4 HD 1080 with a target bitrate of 5 mbs
- hd720-2500kbs - MP4 HD 720p with a target bitrate of 2.5 mbs
- hd360-1250kbs - MP4 HD 360p with a target bitrate of 1.25 mbs
- h264-7500kbs - MP4 Any resolution with a target bitrate of 7.5 mbs
- Proxy-h264-5000kbs - MP4 high quality proxy for web
- LBR-h264-10000kbs - Low bit rate, high quality local MP4
- mxf-OP1a-JPEG2K - Samma style JPEG2000 YCbCr
- mxf-AS-02-h264-10 - 10 bit 50 Mbs h.264 in AS-02 MXF
- DASH-MP4-Mutibitrate - Multi bitrate MP4s with DASH files
- HLS-TS-Mutibitrate - Multi bitrate TS streams with M3U8 files
- TS-TR-01-JPEG-2000 - TR-01 JPEG-2000 transport stream
- TS-MPEG2 - MPEG-2 4:2:0/passthrough transport stream
- TS-h264 - h.264 4:2:0/passthrough transport stream
- OP1a_HBR_50 - OP1a MXF h264 4:2:2 10 bit
- mp4-XAVC-S_4_2_0 - MP4 Sony XAVC-S 4:2:0
- mp4-XAVC-S_4_2_2 - MP4 Sony XAVC-S 4:2:2
- aces - ACES image files
- dnxhd-mxf-720p - DNxHD 720p 50, 59, 60
- dnxhd-mxf-1080p - DNxHD 1080p 25, 29
- dnxhd-mxf-1080i - DNxHD 1080i 25, 29
- dnxhr-mxf-10-hq - DNxHR High Quality 10 bit
- dnxhr-mxf-8-hq - DNxHR High Quality 8 bit
- dnxhr-mxf-sq - DNxHR Standard Quality
- dnxhr-mxf-lq - DNxHR Low Quality

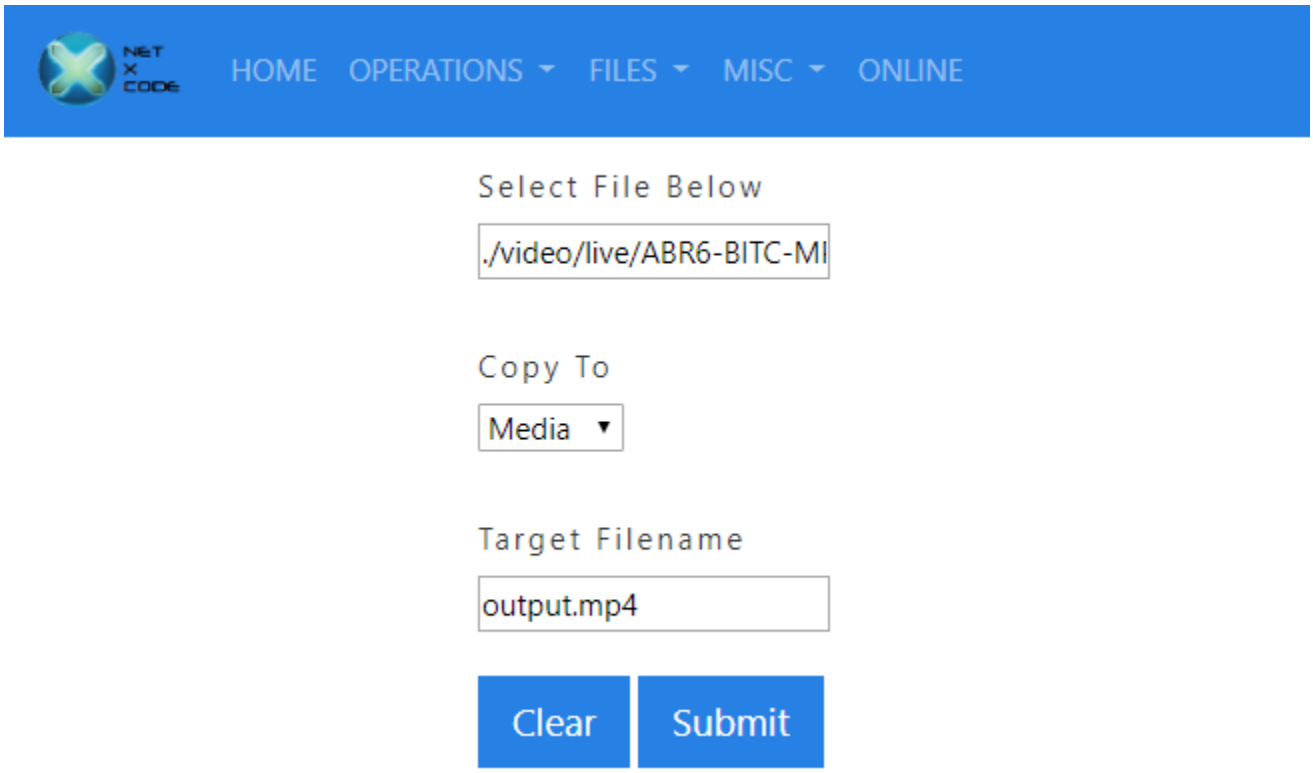
Once the conversion is setup, clicking the 'Clip' button in Net-X-Player will create the new file.

File Workflows – Partial File Restore From Archive



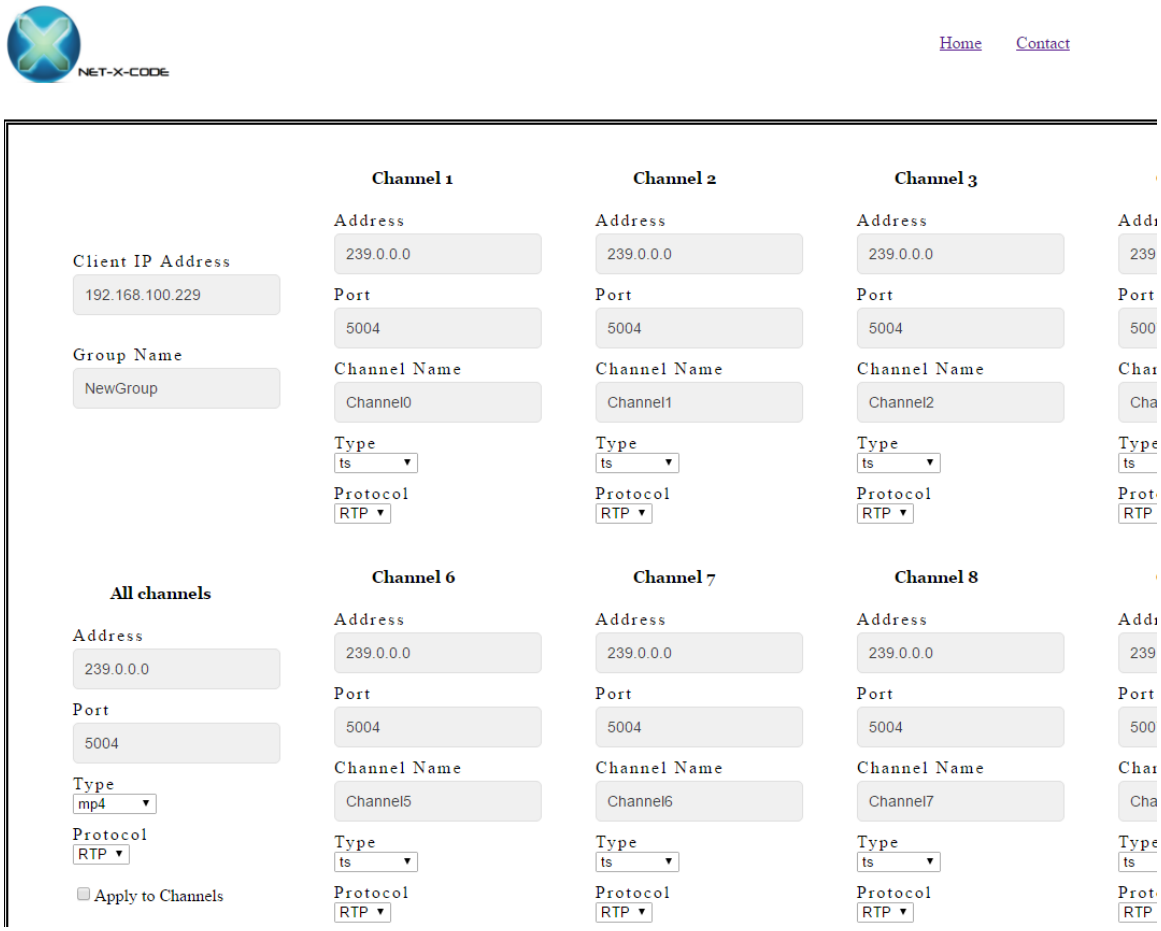
This button demonstrates a partial file restore workflow. Loading the LBR or ABR clip from the archive files at the bottom of the page will load Net-X-Player so in and out points can be set. Like the Make Clip button (see above), this 'Clip' button on the Net-X-Player will cause a new file to be made, but in this case it will use the HBR file as the source for the conversion. This is conceptually how a partial file restore archive system would work, where the user loads MP4/RTIN files from a web store, and once the section of the file is selected, the command is setup to use the original, high quality file on tape, slow storage or cloud storage by replacing the source file and using the matching time codes.

File Workflows – Move Files



The move files area is an example of how to use the Net-X-Code server system to move arbitrary files between the storage available to it.

Net-X-Code Config Page



Net-X-Base Status

The Net-X-Base status page can be used to check the status of a multi server streaming system. It is available as a menu in the default UI page, or at this address:

http://<server-ip-or-name>/netxpage.html

If you are not running a web server on the Net-X-Base server, the page should also be available directly from the Net-X-Base at:

http://<server-ip-or-name>:1080/netxpage.html

Operations Guide

This section describes how to use Net-X-Code.

Theory of Operation

Net-X-Code is a distributed capture, stream, restore, and conversion system. It can be run on one or more servers, and still be controlled from one, central interface. This section of the manual will give an overview of how the various parts of Net-X-Code interact to make it easier to design deployments and implement controllers using the API described in the next section.

Net-X-Code is made up of a number of servers and programs:

Net-X-Code – this program does the actual capture, transcode and saving of up to three incoming network streams to MP4, fragmented MP4, ISM smooth streaming, MOV, TS/HLS or MXF. It is launched by Net-X-Cmd on a server with the parameters it needs to capture up to three streams. Once it has launched, it creates a TCP socket on port 7630.

Net-X-Streamer – this program exists within Net-X-Code and allows RTP and UDP streaming of transport streams, or groups of transport streams, back to the network.

Net-X-SDI – Optionally capture or playback files via SDI, HDMI, NDI or SMPTE 2110/2022. Requires storage for capturing or playing back files. Supports RTIN and most standard broadcast files including MXF, MOV, AVI, TS, DPX, DNG, etc.

Net-X-Copy – this program is called to index (RTIN), clip, restore, re-wrap and convert files on disc, tape, cloud or other sources to local or network storage.

Net-X-Cmd – this program is a daemon that runs on a capture server. It launches, and then communicates with Net-X-Code programs that do the actual capture. When Net-X-Cmd launches, it immediately initiates any Net-X-Code captures that have been set up on the system. It does not require interaction with any other program, as it stores this information locally. Once it has launched and connected with the Net-X-Code program(s), it joins a multicast group on address 230.7.7.7:57000. This allows Net-X-Base to see it and connect to it for command and control.

Net-X-Base – this program is a single instance controller and API provider for the entire network. It may run on the Net-X-Cmd/Net-X-Code systems, or anywhere else on the local network. When it runs, it looks for members of the 230.7.7.7:57000 multicast group. Once it finds a new member (on start up or while running) it makes a TCP connection for status and commands on port 5800## where ## is the channel number (58001, 58002, etc). This connection uses the same protocol as the main API, but with a direct connection, as opposed to the HTML/Rest protocol that the main API uses. It should be noted that this protocol is order sensitive, and it should never be used directly. For controller applications, the HTML/Rest version is more robust, well defined and automatically creates a network level control instead of just a server level control.

Net-X-Timecode – this program is used to distribute system clocks, from network or SMPTE source, as a TCP/IP stream for browser components to use. As most browsers do not support UDP, this is the most efficient way to use time of day directly in them.

Net-X-Player – is an HTML5 web video based player that allows frame accurate time code playback of proxy assets and can be used to send clipping commands for the proxy or original video files.

Physical Setup

First, set up a workstation (to run Net-X-Base). Connect the workstation to a network.

Second, set up one or more servers (to run Net-X-Cmd and any instances of Net-X-Code which become the “groups”), also connected to the same network.

The workstation and each server will need the software installed, and all of the systems will need to be licensed on a per-system basis.

Installing Net-X-Code

Installing Net-X-Code in Windows

GUI: Double click on the installer
Cmd: installer.exe --mode silent

Installing Net-X-Code in OS X:

GUI: Double click on the installer

Installing Net-X-Code in Linux:

Because the installer requires administrative rights, it must be started from the command line, even in GUI mode:

GUI: sudo ./Net-X-Code-Linux-x86_64-Install_#_#_###
Cmd: sudo ./Net-X-Code-Linux-x86_64-Install_#_#_### --mode console

Licensing

Each system running Net-X-Code will need to be licensed to enable all the features of the software.

Licensing - Command Line (Linux only)

To license the system from the command line, run ddrsetup with name/email to get a site code.

Sudo ddrsetup -l -n "First Last" -e first@last.com

This will dump the site code out to the terminal. Send the site code to authorization@drastictech.com. When you get the response, apply it as follows:

sudo ddrsetup -l -n "First Last" -e first@last.com -r "jdfigjewiofj8ut2348rtjweighefughdf"

Configuration

The configuration files/settings are stored in different places for different operating systems:

App Specific Configuration

Windows:
Registry
\HKEY_CURRENT_USER\Software\Drastic\NetXBase
\HKEY_CURRENT_USER\Software\Drastic\NetXCmd
\HKEY_CURRENT_USER\Software\Drastic\NetXCmd\Groups
\HKEY_CURRENT_USER\Software\Drastic\NetXCopy

Linux:
~/.config/Drastic/NetXBase.conf
~/.config/Drastic/NetXCmd.conf
~/.config/Drastic/NetXCopy.conf
NOTE: If you are running the netxbase/netxcmd services, the config will exist in the root user
/root/.config/Drastic/NetXBase.conf
/root/.config/Drastic/NetXCmd.conf
/root/.config/Drastic/NetXCopy.conf

OS-X:
${HOME}/Library/Preferences/com.drastic.NetXBase.plist
${HOME}/Library/Preferences/com.drastic.NetXCmd.plist
${HOME}/Library/Preferences/com.drastic.NetXCopy.plist

General Configuration

Windows:
C:\ProgramData\Drastic\config.xml
Alt - C:\Documents and Settings\<username>\Drastic\config.xml

Linux:
/etc/Drastic/config.xml
Alt - /Home/<username>/Drastic/config.xml

OS-X:
/Library/Applications Support/Drastic/config.xml
Alt - /Home/<username>/Drastic/config.xml

Cloud / OAuth 2.0 Configuration

For oauth 2.0 access, the oauth access file should be placed in the same directory as the general configuration (config.xml) file. They should be named with their access identifier (e.g. google cloud would be www.googleapis.com.oauth). This file should security protected so that only the server components can read them. The format of the file is the same as the Oauth 2.0 JSON return:

www.googleapis.com.json

```
{
  "access_token":
"WRQmiEJiibDX3XYrIV4wfKNkg1h70hfnWQZbJYibxdkkeyGu4tSbUFIpSBTLsr9ADCy7K_U",
  "token_type": "Bearer",
  "expires_in": 3600,
  "refresh_token": "hpOe0hALfn2RdnS5bSkwr8zL7lACVatZ-A"
}
```


For cloud access, the BASE64 encoded secret and client_id must also be added to the config.xml at /MediaReactor/oauth2/<name of access point> (e.g. /MediaReactor/oauth2/www.googleapis.com)

For more information, see: http://www.drastic.tv/support-59/supporttipstechnical/273-cloud-api-oauth-2-net-x-code-pfr

Net-X-Code Ports

Net-X-Code makes use of a number of TCP and UDP ports for discovery, connection and capture. All of these connections must be allowed to pass through any firewall or other network protection for Net-X-Code to work. The main ports Net-X-Code uses include:

80/443 – TCP - Apache server for standard HTML and Net-X-Player
1080 – TCP – Net-X-Code RESTful API port (http)
20/21 – TCP - Optional vsFtp for file access

7630 – TCP – Net-X-Cmd/Net-X-Code server command port
57500-57XXX – UDP = Communications server port
58500 – UDP – Net-X-Base multicast server port
58500 – TCP – Net-X-Cmd→Net-X-Base communication port (outgoing)
59000->50### – TCP – Net-X-Base<-Net-X-Cmd communications port, where ### is the max number of channels (incoming)

By default, Net-X-Base uses this multicast address to join all of its components. Please note, this can be changed in the configuration to allow multiple Net-X-Code groups to exist on the same network.

230.7.7.7 – Net-X-Code system discovery multicast address
The individual streams being captured or transmitted also use multi or unicast addresses, along with UDP or TCP ports. These are user configured, but by default, RTP and UDP traffic often use port 5004 (default for RTP) or port 1234 (the experimental port).

The basic connection process for the whole system is:

- Net-X-Base hosts multicast at 230.7.7.7:58500 UDP for Net-X-Cmds to connect to
- Net-X-Cmd joins 230.7.7.7:(57500 +offset) and sends a message to Net-X-Base
- Net-X-Base responds back through multicast
- Net-X-Cmd receives the message and gets the Net-X-Base IP from the messages
- Net-X-Cmd makes a TCP connect from Net-X-Cmd <ip>:58500 to Net-X-Base <baseip>:59000-50###
- Net-X-Code is spawned, it connects back to the local Net-X-Cmd on port 7630

To enable the multicast, you may have to change

/etc/sysctl.conf
net.ipv4.conf.default.rp_filter = 2

Using Multiple Network Interfaces

Net-X-Code supports servers with more than one network interface. This is commonly set up this way to allow a video IP network, and a separate command and sharing network to be bridged. By default, Net-X-Code components use the first network interface found. To specify the network interface to use, the IP can be specified in the NetXBase.conf and NetXCmd.conf (or registry areas). To specify the interface to capture video on, you need to set the videoip setting in the main area of the Net-X-Cmd config:

videoip – string – IP address of the interface for Net-X-Code to capture network video streams on

To change the network interface the commands and connections will be made on, the commandip must be set int the main area of the Net-X-Cmd and Net-X-Base configs.

commandip – string – IP address of the interface for Net-X-Cmd/Base to communicate on

For more information on configuration, see the Configuration section of the Net-X-Code API manual.

Multiple Net-X-Base/Net-X-Cmd Groups

Net-X-Base initiates communications with the Net-X-Cmd daemons using a shared group address. By default, this is 230.7.7.8. If you need to have different groups of Net-X-Base/Net-X-Cmd, this can be changed to any 230.7.7.# value. For Net-X-Base to find the Net-X-Cmd daemons, it has to be changed on all the servers that Net-X-Base needs to communicate with, as well as on the Net-X-Base system. The change must be made in the configuration file (in the location described above) as multicast = “230.7.7.7”

where the “230.7.7.7” is the new IP address. Deleting this setting will return it to the normal group address.

Running GUI Mode

Normally, Net-X-Cmd and Net-X-Code run 'headless', so they do not have a GUI that can be used to check their operation. To enable the GUI for debugging, the 'forcegui=1' setting must be set. To set this on Windows, run RegEdit and go to:

HKEY_CURRENT_USER\Software\Drastic\NetXCmd\

Add a new DWORD (if it is not already there) called 'forcegui', without the quotes, and set it to 1.

For OS-X, the configuration file is stored here

$HOME/Library/Preferences/com.Drastic.NetXCmd.plist

For Linux, the configuration file is stored here

$HOME/.config/Drastic/NexXCmd.conf

Under [general] add 'forcegui=1' on a new line without quotes.

Linux – SysLog Output

To set up syslog output, add the following lines to /etc/rsyslog.conf:

#route all dt messages to custom log
:app-name, isequal, "dtlog" /var/log/dtlog.log

and then create that file

sudo touch /var/log/dtlog.log

There is also an optional syslog output for Windows. Please contact support@drastictech.com for more information.

ACK(R) Files

After capturing or converting files, Net-X-Code generally creates an ACK or ACKR file that contains information on the file's source, video and audio parameters, length, time code, UUID and other metadata information. Internally, it is an XML file. For more information on its format, please see the Net-X-Code_API manual.

RTIN (real time index) Files

While Net-X-Code is capturing it will create an RTIN file alongside the actual media file. These files contain metadata for the media files as well as information on the locations of video and audio data within the media file. This allows Net-X-Player to play the files while they are being captured. They also allow for more efficient access to the files for editing.

Net-X-Code HTML/XML API

Please see the Net-X-Code_API.pdf for more information on this protocol.

Net-X-Player HTML API

Please see the Net-X-Player.pdf for more information on this component.

MediaReactor Workstation

For more information on editing live, recorded and offline files in Avid, Adobe, Assimilate, Nucoda, Autodesk, QuickTime and other products, please see:
http://www.mediareactor.ws

videoQC

For reviewing, checking and clipping live, recorded and offline files from Windows, OS-X and Linux, including full waveform, vector scope, video and audio tools, please see:
http://www.videoqc.com

Setting up Cloud (OAuth 2.0) Access for Drastic software

Drastic software supports direct access to cloud resources using http, http2, ftp and other file sharing methods. For cloud providers like Google, an authentication system is also required to access the stored files. All of Drastic's version 6 or greater software supports authenticating via OAuth 2.0 across an https transport. This is most useful for Net-X-Code's partial file restore system, but can also be used from videoQC, MediaNXS or MediaReactor. Accessing these resources requires a second level of setup, beyond the basic software setup, and this article provides an overview on that process.

Cloud file access - Direct

The simplest way to setup access to a cloud is to use a file system redirector (If this is not possible in your scenario, please see the next section of this article). In the case of Google, the easiest way to do this is with their FUSE file system add on. For more information on setting this up, please see:

https://cloud.google.com/storage/docs/gcs-fuse

Cloud file access - https

As an example, this section will go over the steps required to set up access to a Google cloud 'bucket' from Drastic software. The steps are operating system independent, other than the directories in which the access files are stored. With the access file, they should be set up to be read only by the Drastic software, as they will contain sensitive information that could be used to access your cloud files. For the purposes of this article, you will need to use one of the following directories:

Windows:
C:\ProgramData\Drastic\
Alt - C:\Documents and Settings\<username>\Drastic\

Linux:
/etc/Drastic/
Alt - /Home/<username>/Drastic/

OS-X:
/Library/Applications Support/Drastic/
Alt - /Home/<username>/Drastic/

In order to set up OAuth 2.0, you will need to get information and data from your cloud account. In this case, we will use Google's cloud service as an example.

First you need to authorize and get the application credentials' json. Using the gcloud command from the Google cloud SDK is the easiest way to do this. Run this command on your server:

gcloud auth application-default login

Alternately, you can create this json file from Google's developer API at:

https://console.developers.google.com/apis/credentials

This will let you log into the Google OAuth server, and then save a 'application_default_credentials.json' on your system. It should have data similar to this in it:

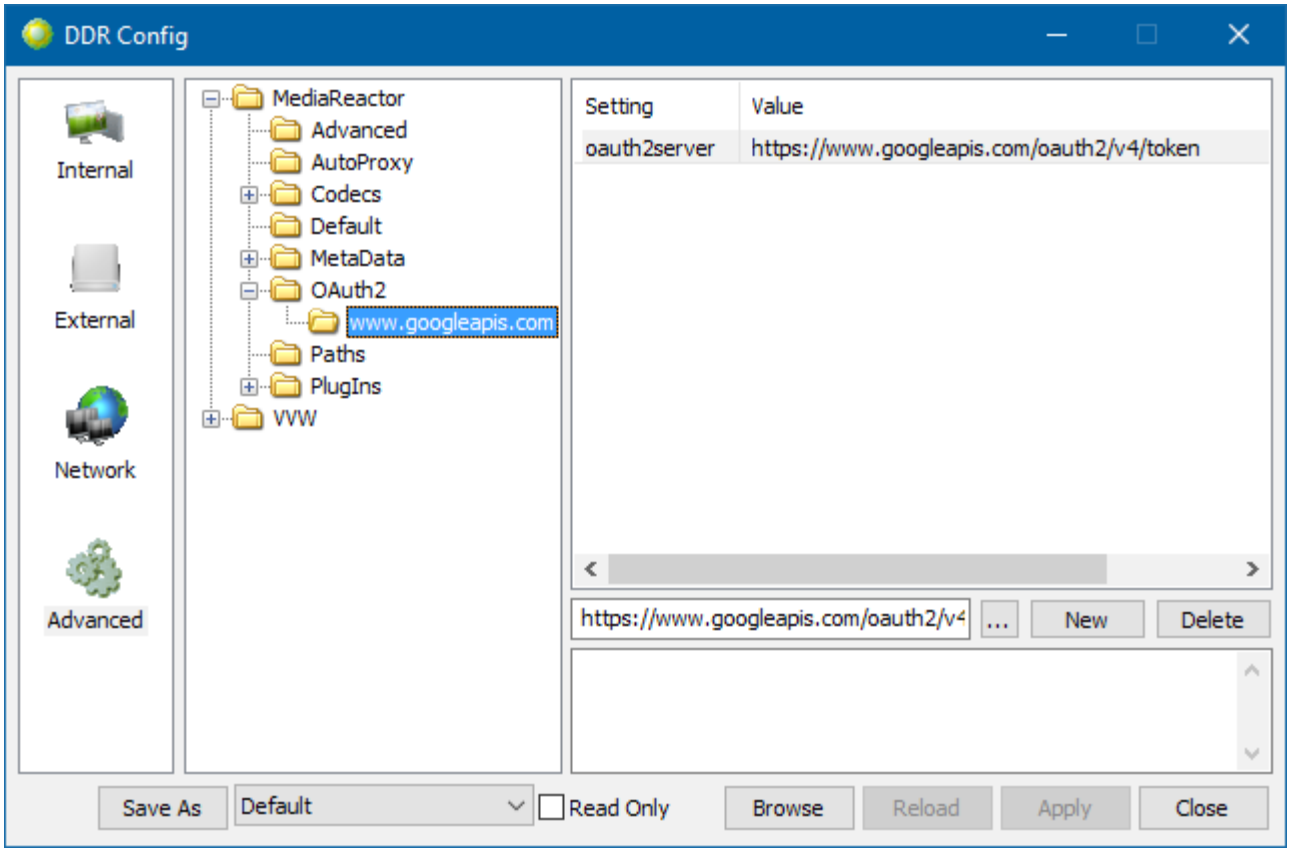
```
{
 "client_id": "dasdsa850-6qr4p6gpi6hnwe654yrtjuq83di341hur.apps.googleusercontent.com",
 "client_secret": "mgfei9jgf19q7MsssTy",
 "refresh_token": "fw98jsduTmScuUjavQzchmf8wssssu5y5f85mAmcvaa",
 "type": "authorized_user"
}
```

This file needs to be copied to the correct directory above, and renamed:

www.googleapis.com.json

Once you have the correct json file, you will also need to specify which OAuth 2.0 authentication server to use. This is done in the config.xml, normally with the DDRConfig utility. For each json file, there should be a matching folder under \MediaReactor\OAuth2\. Within that folder should be an oauth2server entry with the URL of the server you want to use, For Google cloud, this would normally be

\MediaReactor\OAuth2\www.googleapis.com\oauth2server =
"https://www.googleapis.com/oauth2/v4/token"



Drastic software will use this config to create and refresh the access as needed so that it can access your OAuth 2.0 protected files. To access them, simply specify them as URLs. For a bitbucket on Google called 'netxcode-pfr' with a file called 'sourceABR.mp4', the file URL to send would look like:

https://www.googleapis.com/storage/v1/b/netxcode-pfr/o/sourceABR.mp4?alt=media

The alt=media is recommended but optional in most cases. Not including it will cause a secondary request to be sent, based on the JSON return from google. Other cloud systems' URLs will vary, but the basic structure will be similar to this.

Setting up Amazon S3 AWS Access for Drastic software

Drastic software supports direct access to cloud resources using http, http2, ftp and other file sharing methods. For cloud providers like Amazon, an authentication system is also required to access the stored files. All of Drastic's version 6 or greater software supports authenticating directly with Amazon via AWSAccessKeyId/SecretKey through an https transport. This is most useful for Net-X-Code's partial file restore system, but can also be used from videoQC, MediaNXS or MediaReactor. Accessing these resources requires a second level of setup, beyond the basic software setup, and this article provides an overview on that process.

Amazon S3 Cloud file access - https

As an example, this section will go over the steps required to set up access to an Amazon S3 Cloud 'bucket' from Drastic software. The steps are operating system independent, other than the directories in which the access files are stored. With the access file, they should be set up to be read only by the Drastic software, as they will contain sensitive information that could be used to access your cloud files. For the purposes of this article, you will need to use one of the following directories:

Windows:

C:\ProgramData\Drastic\

Alt - C:\Documents and Settings\<username>\Drastic\

Linux:

/etc/Drastic/

Alt - /Home/<username>/Drastic/

OS-X:

/Library/Applications Support/Drastic/

Alt - /Home/<username>/Drastic/

In order to access Amazon, you will need to generate a rootkey.csv with the AWSAccessKeyId and AWSSecretKey, and save it in the OS specific directory above. The file should look something like this:

```
AWSAccessKeyId=MGIEOWJDSIONGFSUIGNW
AWSSecretKey=djJFASjfowjgwof8473sdjhHFDJSHFSO
```

Once that file is present, Drastic software will use it whenever access to Amazon S3 AWS is attempted. This does mean it will not be able to access public resources when the key is in place. If you need to access public S3 data, then simply rename or delete the rootkey.csv.

To generate the key, log into aws.amazon.com. Under your username at the top right, select 'My Security Credentials'. On that page, expand the 'Access keys (access key ID and secret access key)'. There you can create new access key(s) and save them to rootkey.csv on your server.

Running Net-X-Code In The Cloud

Net-X-Code can be run on a LAN or on VM instances in the cloud. When running on a LAN, Net-X-Code uses a multicast group address to all the various servers to find the correct base server to work with. When running in a cloud VM, multicast is disabled as there is no actual local network for it to be limited to. When running in the cloud, each work server must be configured to tell it where its base server is, so that it joins the right group. To do this, set the value of **netxbaseip** equal to the address of the netxbase server for that servers group in the NetXCmd.conf, registry or plist. When this is set, the server will reach out directly to the base when it runs. The mode can also be used for LAN implementations, removing the need for a group address.

This manual has been compiled to assist the user in their experience using Net-X-Code software. It is believed to be correct at the time of writing, and every effort has been made to provide accurate and useful information. Any errors that may have crept in are unintentional and will hopefully be purged in a future revision of this document. We welcome your feedback.

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