

# NEWTEK NDI: VENTUZ AND PROFESSIONAL VIDEO OVER IP

**NDI**<sup>™</sup> Network  
Device  
Interface

The new era of live production is here.

How NewTek's Network Device Interface can improve your Ventuz workflow

By David Paniego, Product Marketing Manager  
VENTUZ

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# THE NEED FOR PROFESSIONAL VIDEO OVER IP

One of current bigger trends in the Broadcast and Pro AV markets is the need to distribute professional quality video using standard computer networks, this is often referred as SDI over IP.

There are many reasons that justify the change, but for sure it will result in a small revolution, with both technological and economic implications that can greatly affect existing workflows and infrastructure.

The reasons for the change are quite obvious, but just to name a few:

- Reduced costs, distributing video over existing networks reduces the need for special conversion, routing, and even capture and playback equipment.
- Using standard infrastructure results in less complex workflows, reducing possible bottlenecks and simplifying maintenance – now standard IT networking can be used and maintained by IT personnel.
- Some of the inherent limitations of the SDI protocol, like limited framerates, resolutions and the like, will disappear in a more flexible

environment like SDI over IP. An added benefit is that the distance limitations on computer networks are less restrictive than in standard SDI infrastructure.

- Eases integration of consumer video and video-conferencing applications in professional workflows – for instance it is now easier to integrate video conferencing like Skype, or Youtube videos in broadcast graphics, without the need for special integration systems.

Currently various “Video over IP” protocols, formats and alliances try to become the industry standard, the main ones being NewTek NDI, TICO, ASPEN and AIMS. Besides, there is already a SMPTE standard for video over IP, SMPTE 2022, now in its 6<sup>th</sup> revision.

All this gives an idea of the importance of Video over IP for the future of the industry and why is now one of the bigger trends in this market..



Image property of NewTek

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# WHAT IS NDI?

## NewTek NDI™ is a protocol that allows the distribution of live professional quality video over existing IP infrastructures

NDI stands for Network Device Interface and is a technology developed by NewTek as a natural evolution of their legacy iVGA technology. NDI was announced last fall and went through an extensive beta testing program until its final release last April, during NAB 2016 exhibition in Las Vegas (USA).

NDI, as iVGA, enables the distribution of professional quality video over standard computer networking, and was designed as a way to increase the number of video input channels and output options in NewTek's flagship product, the Tricaster "Channel-in-a-Box" solution.

The main difference is that iVGA quality, although acceptable, was not really meeting the high standards of broadcast production.

Besides, certain advanced features, like the support of synchronous key and fill information, were simply not possible in iVGA or had serious limitations.

Ventuz, as a real-time graphics platform, often requires to output key and fill information independently to external equipment that will overlay them on top of video signals. This technical improvement alone justifies the support of NDI over legacy iVGA that was already supported in previous Ventuz versions.

NDI is now a key part of NewTek's global strategy for professional video, in both pro AV and broadcast markets, so expect a great number of new solutions and workflows based on this exciting new standard during the next months.



Image property of NewTek

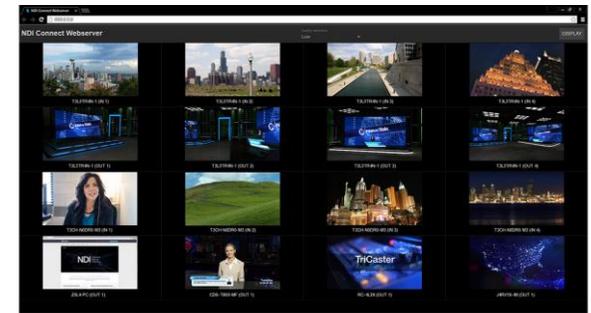
V **Network Device Interface (NDI) is a technology developed by NewTek, that allows the distribution of professional quality video over standard computer networking**

# NEWTEK NDI APPLICATIONS

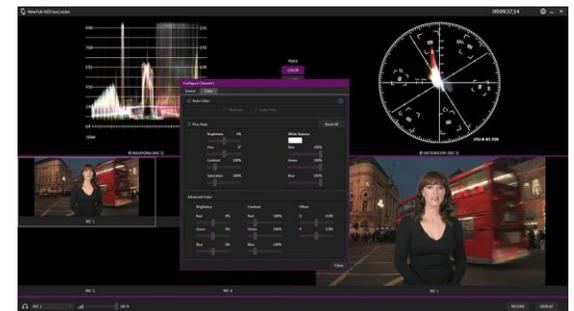
NewTek, as part of their NDI™ commercial policy, offers a range of applications and products, both free and paid, that open a wide variety of possibilities and enable the creation of new and interesting workflows for professional video.

The main NDI applications from NewTek are:

- **NDI Tools Pack:** A free package of various NDI tools, can be downloaded [here](#). It includes:
  - **NDI Scan Converter:** captures a computer screen and streams it over NDI,
  - **NDI Test Patterns:** a set of standard and custom test pattern signals that are streamed over NDI for testing and measurement purposes,
  - **NDI Video Monitor:** an application that can display NDI video streams in a computer,
  - **NDI VLC Plugin:** a plugin for VideoLAN VLC media player that enables streaming VLC playback video over NDI-enabled networks.
- **NewTek Connect Pro:** a paid tool that allows using a computer as a virtual router with 4 configurable NDI I/O channels, interoperability with other SDI over IP standards (ASPEN, SMPTE 2022), integrated signal analysis and video capture from professional boards – [more info](#).
- **NewTek Connect:** a free version of the above that allows receiving 2 NDI video sources.
- **NDI for Adobe Cloud:** a plugin for Adobe CC applications that allow streaming video content over a network infrastructure – [more info](#).
- **NewTek IsoCorder Pro:** a paid tool that allows recording up to 16 NDI video channels. It includes a simple color correction and integrated signal analysis tools - [more info](#).
- **NewTek IsoCorder:** a free version of the above that allows recording 2 NDI video inputs as Quicktime video files.
- **NDI Telestrator:** for drawing over live NDI video input signals, mostly for sport analysis - [more info](#).
- **NDI Transmit:** allows using NDI sources with any software that supports live webcam transmission, for conferences IP transmission, for instance – [more info](#).



NewTek Connect Pro interface  
(image property of NewTek)



NewTek IsoCorder Pro interface  
(image property of NewTek)

# VENTUZ AND NDI

Ventuz software has supported the legacy NewTek technology iVGA for quite a few years now. iVGA had some limitations that are not present in a more mature technology like NewTek NDI™. The most obvious limitation was the lack of a proper Key/Alpha support in iVGA, which is now fully supported in NDI – having transparency information in total sync with color information is quite important for a graphics solution like Ventuz.

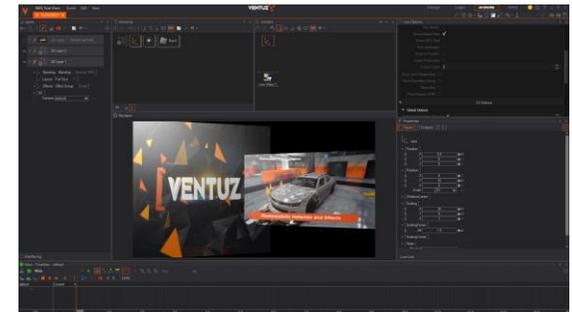
Ventuz has been working on an NDI integration since the final version of the technology was introduced in April 2016. In addition, the latest generation of the software, Ventuz 5, showed increased accessibility and greatly improved video workflows with the addition of layers, blend modes and post production effects in real-time.

The recently released version 5.01 is the first Ventuz version that supports NDI input and output streams. As with all video signals, Ventuz does not charge for video inputs, just for the outputs, so you can use as many NDI inputs as your hardware can support.

NDI video streams can be used as video inputs with no added cost. Ventuz can use NDI on Live Video Layers and add advanced post effects in real-time, like Blur, Color Corrections, Distortions, Transformations, etc...

Furthermore, NDI video inputs can be used as textures in the creation of advanced materials in combination with other textures and/or additional effects. These materials can be mapped onto any 3D object or 2D surface within the 3D world – and combined with other 2D/3D objects, virtual cameras and illumination, reflections, depth of field (DOF) and all Ventuz advanced effects.

On the other hand Ventuz offers optional NDI output licenses, that will allow you not only to integrate external video coming from NDI sources, but also to use NDI infrastructure to distribute the final content, without the need for dedicated, complex and expensive SDI hardware.



Video clip played and streamed from VLC using free NDI VLC Plugin, and displayed as NDI Live video input within Ventuz Designer.



NewTek TriCaster interface displaying Ventuz graphics output as NDI video sources

# SETTING UP NDI IN VENTUZ

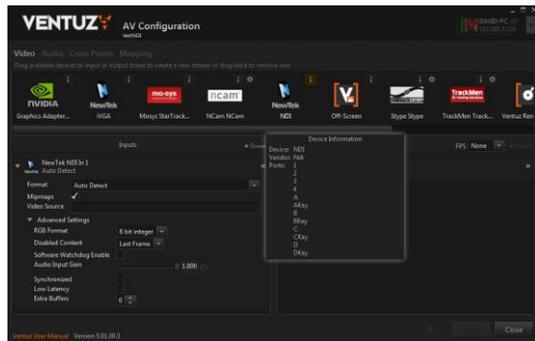


Fig. 1 Ventuz AV Configuration GUI featuring NDI input options

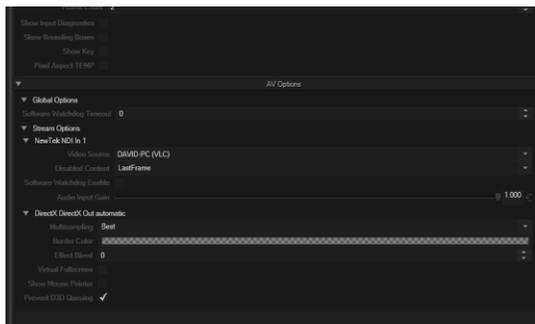


Fig. 2 Ventuz Designer Live AV Options with drop down menu to select available NDI sources in the network

As with all Ventuz video inputs and outputs, NDI input sources are set up using the Ventuz Configuration Editor - just remember that AV Configurations cannot be changed while other Ventuz apps are running.

NDI input is one of the available options and can be selected by dragging and dropping it in the inputs window and tweaking the available options (see Fig. 1). After saving your AV configuration, open the Ventuz Designer and the Live Options Editor will feature an AV section where you can select your specific NDI input from a drop down menu of all the NDI inputs available in your local network (see Fig. 2). Now you are ready to use the selected NDI video input as a live video layer or as part of any material texture set.

For video output, you need to acquire a license for the NDI Out option –contact Ventuz sales for info. Once you have your NDI Out license ready, the NDI Out will be enabled in your Ventuz Configuration Editor, and you can drag it into the Output Window like any other Out Option.

If you click on the semicolon close the NDI icon, you can access a menu with the available NDI Out devices, select the ports, etc... (see fig. 3)

Once added as a valid output, you can access the basic settings like format and other advanced settings like RGB format and synchronization options (see Fig. 4). Now you are ready to output your broadcast graphics, presentation or interactive application via NDI.

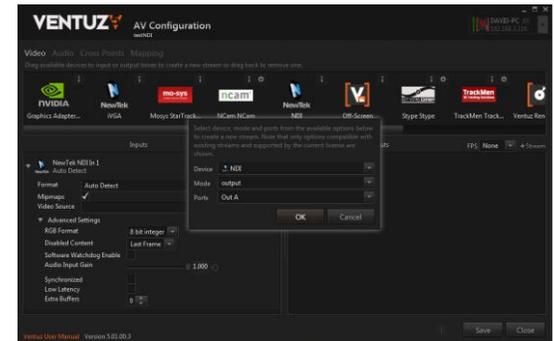


Fig.3 NDI Output devices and ports menu

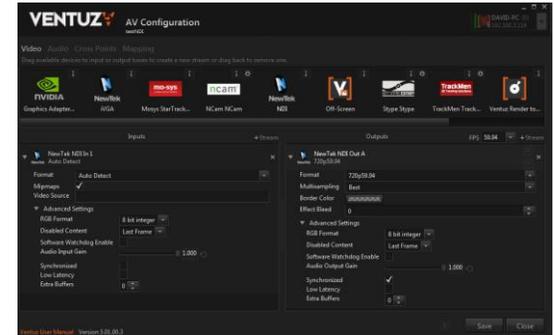


Fig. 4 NDI Output Advanced Settings

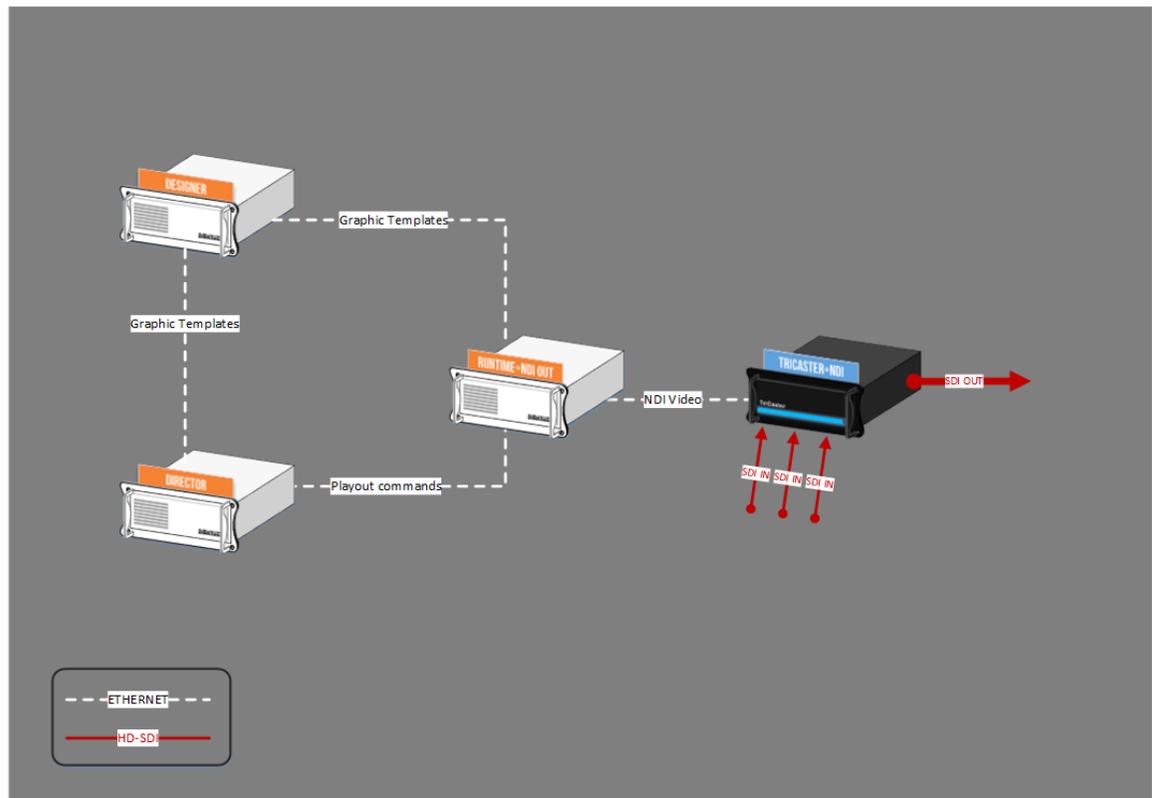
# PROJECT EXAMPLE #1

One of the more obvious uses of NDI technology is adding extra video inputs to NewTek TriCaster systems that feature a limited number of physical SDI inputs. In this particular workflow we use an external Ventuz system to render real-time graphics that will be composited over video signals using TriCaster video mixing capabilities.

As usual with Ventuz, graphic templates are created using Ventuz Designer and passed to both Ventuz Director and Ventuz Runtime systems. Director is the system that will be controlling the graphics management and playout, while Runtime serves as the render engine and will output the real-time graphics using the NDI protocol.

The rendered graphics will be received as NDI inputs inside TriCaster, including alpha, and will be overlaid by TriCaster video mixer on top of other video inputs as needed.

This workflow has the added advantage of freeing available video inputs in TriCaster and using the Ventuz NDI output option, which is noticeably cheaper than SDI output.



The basic workflow using Ventuz graphics on NewTek TriCaster as an additional NDI input

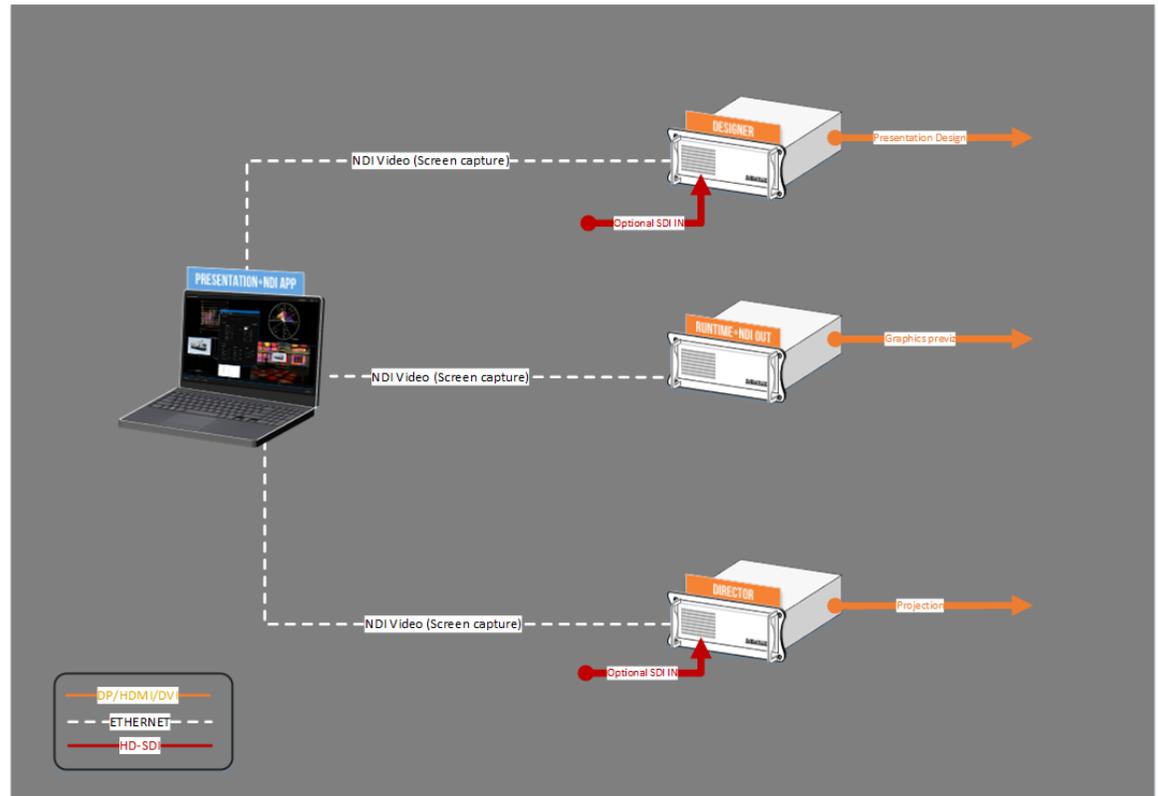
# PROJECT EXAMPLE #2

As we have seen in the first example above, Ventuz NDI option can be added to any Ventuz package to enable NDI output capabilities. But NDI can also be used as an additional Video input source, and this, combined with the various NDI applications from NewTek (see page 4) and other vendors, opens a bunch of new workflow possibilities.

In this particular case we will focus on a very common requirement: integrating standard presentation tools in Ventuz high-end presentations. For this we will use one of NewTek's free NDI apps - **NDI Scan Converter**, that captures a computer screen and transmits it via NDI.

The computer, featuring a 3<sup>rd</sup> party presentation application like Microsoft PowerPoint or Apple Keynote, will also be running NDI Scan Converter that will capture the presentation screen and output it as NDI video over the existing network infrastructure.

NDI inputs can be added to any Ventuz project at no additional cost, therefore you can add as many NDI inputs as required or supported by the hardware. All Ventuz software packages support NDI inputs, so you can use them for project creation (Designer), but also as background for playout control (Director) or as part of the final output (Runtime).



Using NDI Scan Converter to capture Power Point/Keynote presentation screen and integrate it into Ventuz graphics

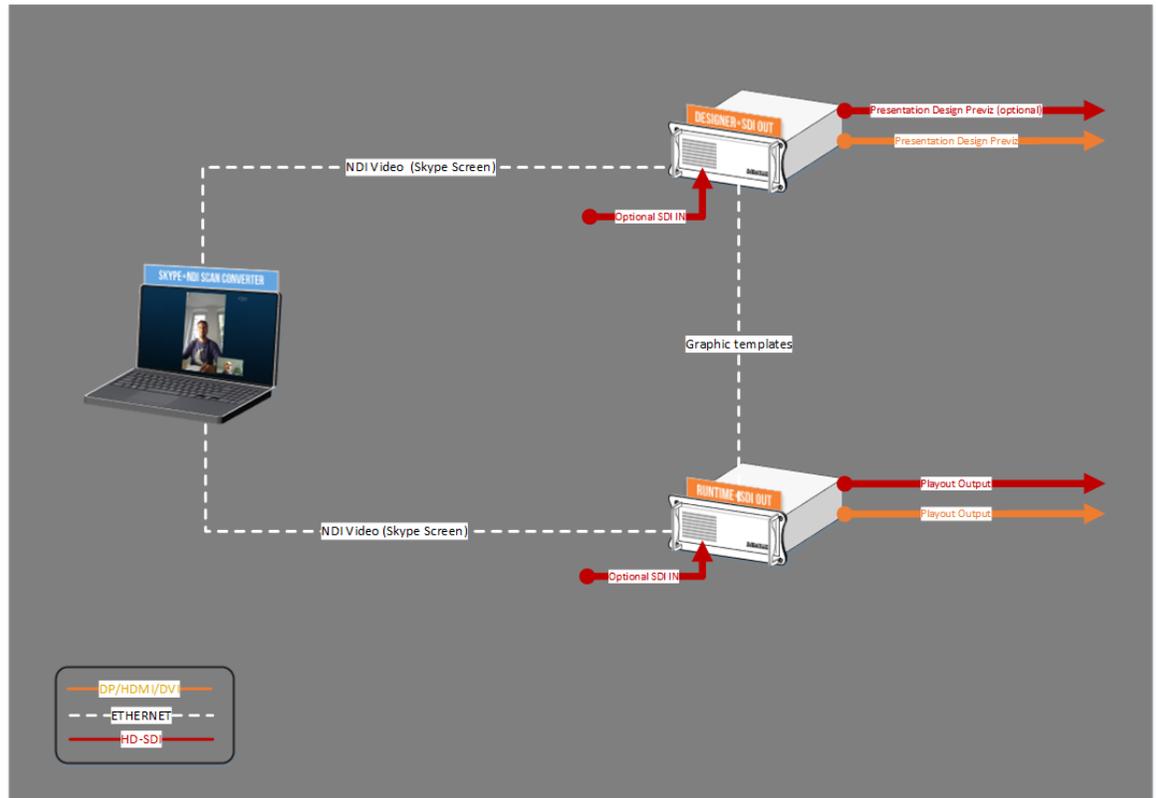
# PROJECT EXAMPLE #3

As mentioned before, NDI opens a great number of new possibilities for your video workflows. The combination of NewTek NDI applications with NDI streaming allows easy solutions for complex workflows that usually require expensive custom solutions.

One example of this is the integration of Skype calls into your graphics. The free Scan Converter application makes it very easy to stream application GUIs, including Skype video calls. The available NDI sources can be selected in the Ventuz Live Options Window from a drop down list of all available NDI sources.

In this example we are running Skype on a different computer in the same network, but it is also possible to stream the Skype screen locally.

As usual within Ventuz, these live video sources can be mapped on layers or used as part of the standard material stages that can be applied to any object or surface in your scene. The advanced IPP effects and material options give you even more creative freedom to use the Skype live call as part of your graphics for broadcast or live events.



*In this case, we use the NDI Scan Converter application to stream Skype calls live into the Ventuz graphics. The SDI Output option is only necessary if the project requires playing out the graphics using SDI infrastructure – i.e. Broadcast Graphics*



**Ventuz Technology AG**

Luttherothstrasse 16a  
20255 Hamburg – Germany

P. +49 40 413 66 09 70

[info@ventuz.com](mailto:info@ventuz.com)  
[www.ventuz.com](http://www.ventuz.com)

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