

Migrating a TV station to free software

A case study from Bangladesh

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Sysnova Information Systems

(www.sysnova.com)

Introduction to Deepto TV

- Deepto TV (www.deepto.tv) is a satellite/cable TV channel in Bangladesh, which started broadcasting in 2015.
- This means that all broadcast equipment had to be ordered in the beginning of 2014 to give time for manufacturing, shipment, set-up and training.
- Deepto TV ordered equipment from Grass Valley, a major international vendor.

Unpredictability of proprietary solutions

- March 2014: Selected equipment vendor Grass Valley merged with competitor Miranda.
- Many of the Grass Valley products ordered by Deepto TV were discontinued
- Many new, expensive proprietary systems would soon be unsupported by merged Grass Valley
- Could these be replaced by free software?

Background of Sysnova

- Focuses on free ERP implementation services in Bangladesh (www.sysnova.com)
- Also provided free software migration support to
 - 50+ desktops of Central Womens University
 - 130+ desktops of Dhaka Tribune newspaper
 - 1,000+ desktops of Kazi Farms (poultry company)
 - 10,000+ desktops of Pran foods / RFL retail company

Experience at Dhaka Tribune

- Dhaka Tribune is a national English daily newspaper in Bangladesh
- Sysnova helped
 - 110 journalists / editors / office users migrate to LibreOffice/Ubuntu
 - 20 Photographers to migrate to GIMP/Ubuntu
- 20 Print layout / ad designers had to stick to proprietary solutions (Adobe Illustrator / InDesign)
 - Printers needed CMYK colour separation (still not available in free software like GIMP which has focused on electronic media rather than print)
 - Ad clients all used Adobe file formats which had to be rendered perfectly
 - Turns out that file format support of free software can be a deal breaker in media

The search for free alternatives

- Sysnova had already implemented a free ERP system at Deepto TV, and helped it to migrate office desktop users to LibreOffice and Ubuntu GNU/Linux
- Deepto engaged Sysnova to implement free alternatives for various TV systems:
 - Media Asset Management (MAM) server
 - TV playout server with Character Generator (CG)
 - Scheduling system for ads and programs
 - Billing system for ads
 - News production by journalists
 - News editing in News Room Control System (NRCS)
 - Program production (video editing) and dubbing (sound editing)

Others had already thought of using free software for TV since 2011

The screenshot shows a Mozilla Firefox browser window displaying a blog post. The browser's address bar shows the URL: blog.eltrovemo.com/364/diy-broadcast-how-to-build-your-own-tv-channel-with-open-source-other-goodies/. The main content of the page is a large, colorful diagram titled "DIY BROADCAST" that illustrates a workflow from pre-production to final playback. The diagram includes various stages and tools:

- Pre-Production:** celix, Lightworks, 3D, NLE, DaVinci Resolve Lite, Color correction.
- Live Production:** Vision mixer, OpenPlayOut, Graphics, CasparCG, Multicam Ingest, TeleKast, Prompter.
- Asset Management:** Archive Storage, BACKBLAZE, Tape Archiving, Ingest, DAM, EnterMedia.
- Final Playback:** IPTV Encoding, Open Broadcast Encoder, OTT Encoding, Expression Encoder, Open Broadcast Encoder, Final Playback, Workflow, Kaltura, Final Playback.

Below the diagram, the article title is repeated: "DIY BROADCAST : How to build your own Internet TV Channel with Open-Source & other goodies". The date "SEPTEMBER 30, 2011" and tags "BROADCAST, FRAMEWORKS, OPEN SOURCE, TOOLS" are visible. To the right, there is a "Tweets by @NicolasWell" section with a tweet from @erlyvideo mentioning @NicolasWell, @GPAC Licensing, and @Akamai.

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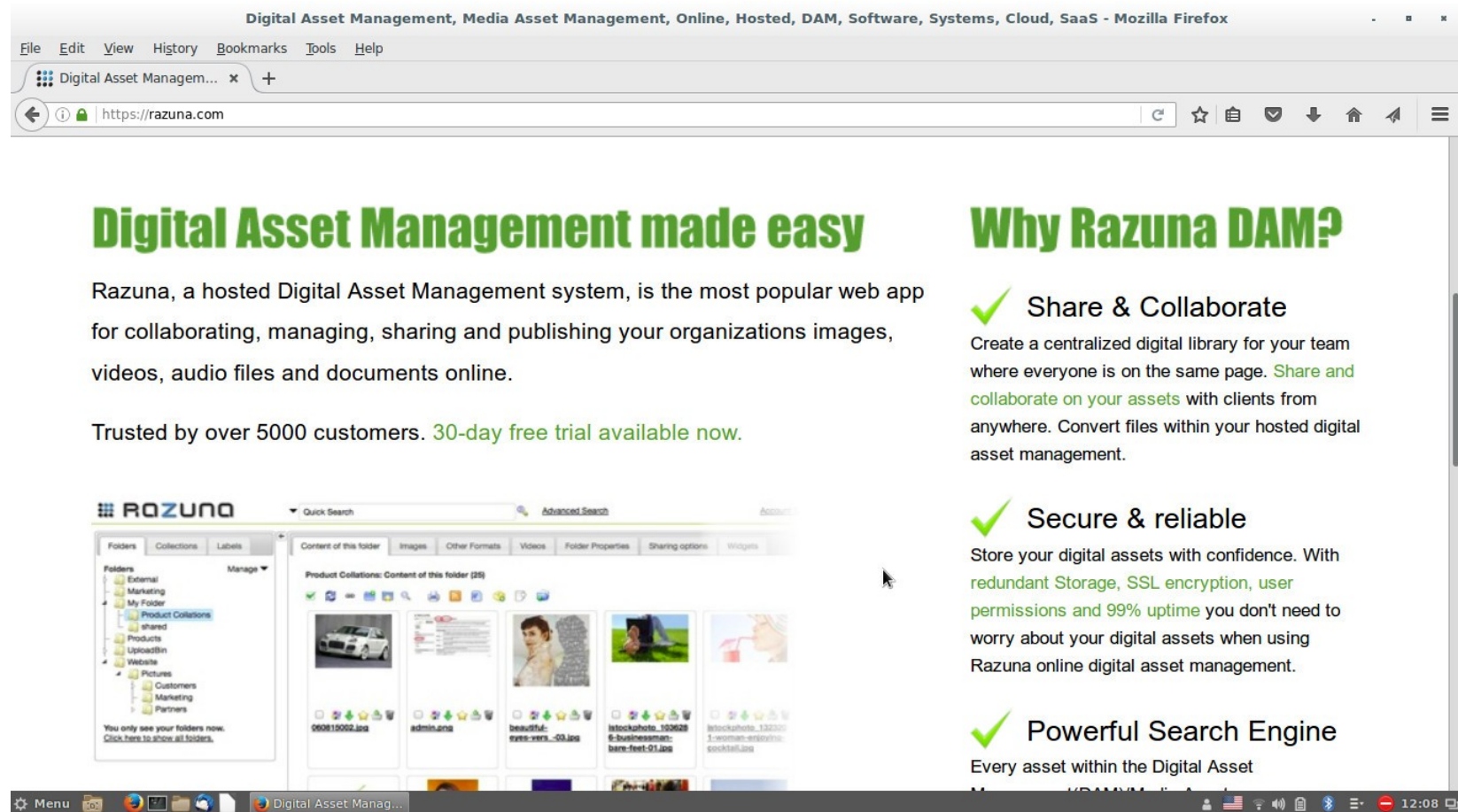
TV media file format compatibility

- TV industry has many audio/video media file formats
- To ensure interoperability, industry has standardized cameras, video editing software and video servers around MXF (Media Exchange Format) files
- To work with various other equipment, free software needs to support MXF
- Fortunately, free software supports MXF!

Media Asset Management

- The 'assets' of a TV channel are its video clips (programs and ads)
- Assets have to be managed as MXF files
 - Preserved, retrieved, viewed
 - Searched by title / episode number / actor / director / other key words
 - Fortunately, there are free software products that can do this
 - Razuna (www.razuna.com) was tested and found to work.
 - Free version does everything Deepto needed

Razuna Asset Management



Digital Asset Management made easy

Razuna, a hosted Digital Asset Management system, is the most popular web app for collaborating, managing, sharing and publishing your organizations images, videos, audio files and documents online.

Trusted by over 5000 customers. [30-day free trial available now.](#)

Why Razuna DAM?

- ✓ **Share & Collaborate**
Create a centralized digital library for your team where everyone is on the same page. [Share and collaborate on your assets](#) with clients from anywhere. Convert files within your hosted digital asset management.
- ✓ **Secure & reliable**
Store your digital assets with confidence. With [redundant Storage, SSL encryption, user permissions and 99% uptime](#) you don't need to worry about your digital assets when using Razuna online digital asset management.
- ✓ **Powerful Search Engine**
Every asset within the Digital Asset

The screenshot of the Razuna web interface shows a sidebar with a folder tree including 'External', 'Marketing', 'My Folder', 'Product Collections', 'Products', 'UploadBin', 'Website', and 'Pictures'. The main content area displays a grid of asset thumbnails with titles like '060815002.jpg', 'admin.jpg', 'beautiful-women-03.jpg', 'intockphoto_150628', and 'intockphoto_150628'. The interface includes search bars, navigation tabs, and various icons for asset management.

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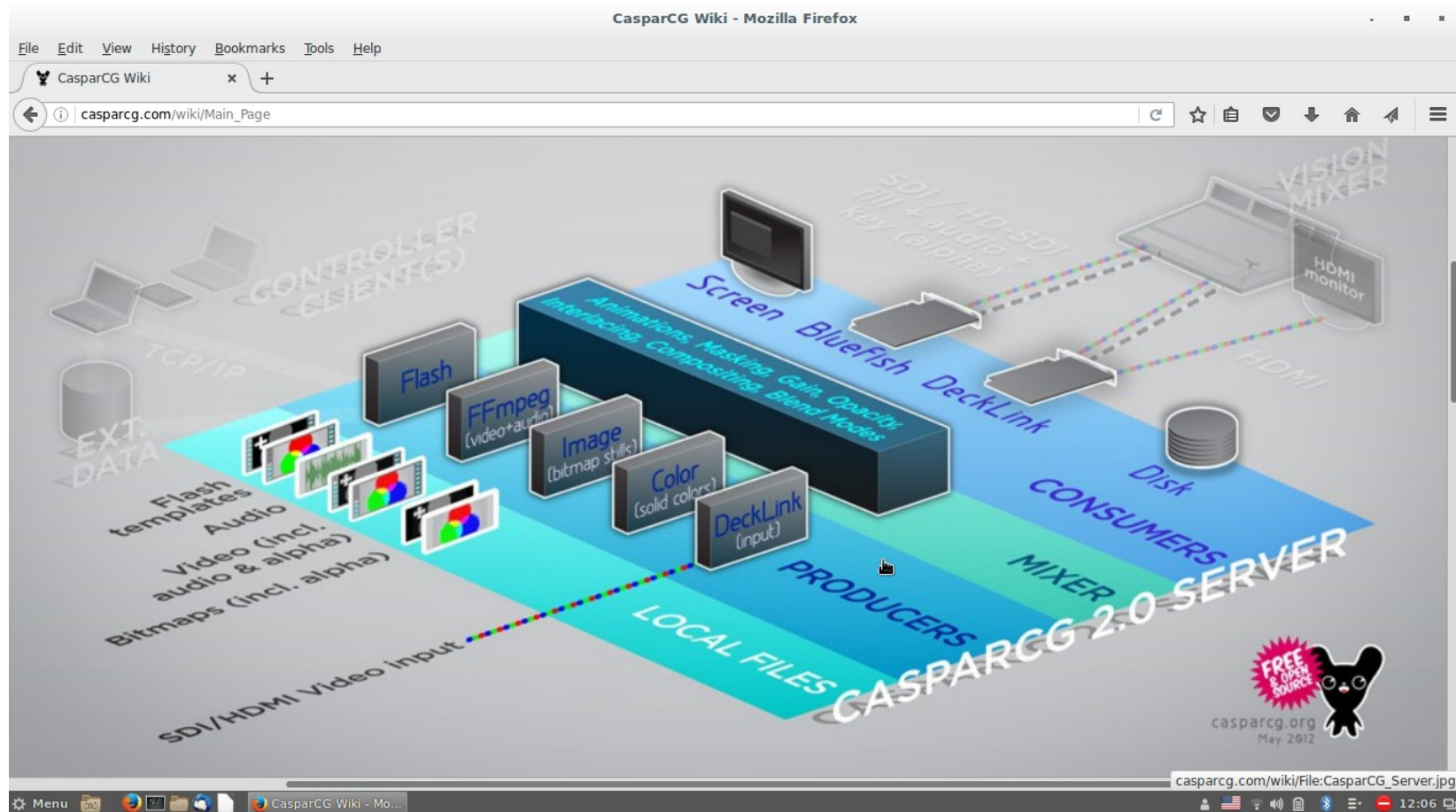
Play-out server and Character Generator

- TV stations have to play-out their media assets continuously
- This requires a 'Play-out' server, which needs a 'character generator' to insert text graphics such as
 - Channel branding logo
 - News text scroll during news
 - Various kinds of pop-up ads/announcements (eg. 'coming up next') which need to appear on screen

CasparCG free play-out server

- Swedish state TV created and released CasparCG as a free play-out server
- (www.casparCG.com)
 - ‘CG’ of CasparCG is short for ‘character generator’
 - CasparCG supports MXF files
 - Uses HTML5 to add text/graphics layer on top of video assets being played out
 - 2 components;
 - CasparCG server (still requires Windows as previously the required OpenGL video hardware support wasn’t available in GNU/Linux)
 - CasparCG client (runs on GNU/Linux)

CasparCG Play-out Server



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Scheduling programs and ads

- 2 pieces of puzzle solved:
 - Razuna free Media Asset Management server
 - CasparCG free Play-out server
- These two need to be connected by a scheduler
 - Scheduler needs to specify Razuna video clip ID and time of playout in CasparCG
 - Before playout, scheduler needs to copy video clips from Razuna into CasparCG play-out folder
 - Needs to enforce various rule like maximum number of ad minutes per hour
- Sysnova created free CasparPlay project on GitHub and contributed a free PHP-based scheduler (<https://github.com/CasparPlay/CGScheduler>)

CasparPlay Scheduler

Commercial Schedule Status Hour: 0-1

Validate Hour:

Validate Rate Agreement

scheduler main display, you can search for asset from DAM using the Search link. you can switch dates clicking on arrows.

19 Sep 2016

Back to Home Today [Left Arrow] [Right Arrow] Logout

Start Time	Program Name	End Time	Duration	Remarks
0:0:0	NCA_TSKHM_TALKSHOW_KHOLA_MONCHO_31072016_EP37_PART_01.MXF	0:28:39:17	0:28:39:17	Remarks:
0:28:39:17	GFX_UWC_Kholamoncho_WV_6s.MXF	0:28:45:19	0:0:6:2	Remarks:
0:28:45:19	COM_KFIL_Bellissimo_Torko_Cholbel_50s_1001.mxf	0:29:35:19	0:0:50:0	Remarks:
0:29:35:19	COM_SERP_SYSONOVA_ERP_UP_30s.mxf	0:30:5:19	0:0:30:0	Remarks:
0:30:5:19	COM_KFIL_Bellissimo_Supremo_10s_1001.mxf	0:30:15:19	0:0:10:0	Remarks:
0:30:15:19	PROMO_DeepTo_Krishi_GEN_NEWTIME_UP_35s.MXF	0:30:50:21	0:0:35:2	Remarks:
0:30:50:21	COM_KFIL_Kazi_Farms_Kitchen_30s.mxf	0:31:20:21	0:0:30:0	Remarks:
0:31:20:21	COM_CWUB_NEW_2016_44s.mxf	0:32:4:20	0:0:43:24	Remarks:
0:32:4:20	COM_KFIL_Bellissimo_Torko_Cholbel_01m_1001.mxf	0:33:4:20	0:1:0:0	Remarks:
0:33:4:20	GFX_UWC_Kholamoncho_WV_6s.MXF	0:33:37:22	0:0:33:2	Remarks:
0:33:37:22	NCA_TSKHM_TALKSHOW_KHOLA_MONCHO_31072016_EP37_PART_02.MXF	0:54:57:15	0:21:19:18	Remarks:
0:54:57:15	GFX_GOVT_Awareness_TO_LET_TVC_01m38s.MXF	0:56:35:15	0:1:38:0	Remarks:
0:56:35:15	GFX_GOVT_AWARENESS_Toward_Peace_2m27s.MXF	0:59:2:21	0:2:27:6	Remarks:
0:59:2:21	GFX_UPNEXT_DEEPTO_KRISHI_6s.MXF	0:59:10:23	0:0:8:2	Remarks:
0:59:10:23	PROMO_CARTOON_MARATHON_NEWTIME_UP_20s.MXF	0:59:31:3	0:0:20:5	Remarks:
0:59:31:3	PROMO_PALKI_Montage_NEWTIME_13s.MXF	0:59:44:3	0:0:13:0	Remarks:
0:59:44:3	StationID_UP_GFX.mxf	1:0:28:20	0:0:44:17	Remarks:
1:0:28:20	PGM_DKRSH_ACI_DEEPTO_KRISHI_EP_37_PART_01.MXF	1:9:27:1	0:8:58:6	Remarks:
1:9:27:1	GFX_WC_DEEPTO_KRISHI_6s.MXF	1:9:34:3	0:0:7:2	Remarks:
1:9:34:3	COM_KFIL_Bellissimo_Torko_Cholbel_50s_1001.mxf	1:10:24:3	0:0:50:0	Remarks:
1:10:24:3	COM_SERP_SYSONOVA_ERP_UP_30s.mxf	1:10:54:3	0:0:30:0	Remarks:

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Adempiere ERP system implementation

- Sysnova core business is customizing free ERP software for clients (www.adempiere.com)
- Sysnova previously implemented ERP for Dhaka Tribune newspaper, which is a similar business of selling ad space
 - Ads played out are products being sold
 - Big advertisers negotiate bulk purchases and discounts from normal price (different rate agreements for each advertiser)
 - Each ad has a normal price determined by popularity/ratings of show and peak/off-peak show timing
- Initially, Deepto TV billing was manual (based on counting occurrences of an ad in an ad scheduling spreadsheet)
 - Ad scheduling spreadsheet had to be manually reconciled with ads in playout server logs, which was tedious and error-prone

Automated billing for Deepto

- Adempiere ERP stores rate agreements (ad price list by show, time and customer) for each advertiser
- When ads are placed in PHP Scheduler, customer can be sent an ERP sales order to book ad
- When CasparCG playout schedule is complete (based on PHP Scheduler), customer can be sent ERP invoice (once ad playout is delivered)
- Integration with ERP enabled automated billing
 - Saving labour and reducing billing errors

CasparPlay Entry Form

The screenshot displays the CasparPlay Scheduler interface within a Mozilla Firefox browser window. The main window title is "Scheduler - Mozilla Firefox" and the address bar shows "https://github.com/CasparPlay/CGScheduler". A secondary window titled "Scheduler" is open at "172.16.9.211:8081/select.php".

The "ScheduleEntryWindow" form is the central focus, containing the following fields and controls:

- Server Reference:** PGM
- Rate Agreement Info:** Rate Agreement No. (text input), Agency Name (text input)
- Program Info:** Program Name (text input): NCA_TSKHM_TALKSHOW_KHOLA_MONCHO_31072016_EP37_PART_01.MXF
- Asset ID:** FF9F334AD24845E78AB894003F38D0B1
- Time period:** Start Time (calendar icon): 2016-09-19, Hour: 0, Minute: 0, Second: 0, Frame: 0; Duration: Hour: 0, Minute: 28, Second: 39, Frame: 17; End Time (text input): 2016-9-19 0:28:39:17; BONUS
- Remarks:** (text input)
- Input:** 0
- Buttons:** Save, Cancel, Delete, Validate Rate Agreement, Today, Logout

On the left, the "Commercial Schedule Status" table shows a list of program entries with columns for Start Time and Program Name. On the right, a "Remarks" column is visible with several entries.

The browser's address bar at the bottom shows the URL: <https://github.com/CasparPlay/CGScheduler/blob/master/html/imgs/ScheduleEntryWindow.png>

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TV journalist news production

- Journalists shoot video at news location with camera
- Edit newsreader text for story/website on laptop
 - Use LibreOffice for story editing
- Edit video on laptop with video editing software
- Need to insert 'Aston' text graphics ((usually name/designation of person being interviewed at bottom of news screen)
 - Aston text previously required a special machine developed by Aston Systems in UK

Need for off-line video editing

- Problem: High Definition/HD video editing too graphics intensive for low-powered journalist laptops
- Commercial ‘Media Asset Management servers’ handle this as follows:
 - MAM servers create low-resolution ‘proxy’ files for each HD video file.
 - Video editors perform editing with low-resolution ‘proxy’ file. Since HD files are not used, this can be done on low-powered journalist laptop.
 - MAM then reapplies the low-resolution editing commands to the HD files
 - This workflow is called ‘off-line video editing’ and allows journalists to edit video on cheaper laptops without high-end graphics cards

KDEnlive for news video editing

- KDEnlive is a free video editing software
 - [Www.kdenlive.org](http://www.kdenlive.org)
 - KDEnlive can create low-resolution proxy files for off-line HD video editing on low powered journalist laptop!
 - Journalists can also use KDEnlive to add 'Aston' news graphics

Superdesk for TV news editors

- After journalists type in their story text, editors have to edit it (accept, modify or reject)
- Editors also need to see the accompanying video to check that the text is appropriate for the video.
- This sharing and approval workflow of text and video is normally done on proprietary News Room Control Systems (NRCS)
- However, Superdesk (www.superdesk.org) is now providing a free alternative for news editors
 - Already deployed at Norwegian state TV
 - Still no stable release (Release Candidate available)
 - Set up and training in progress at Deepto

Superdesk live in Norway

Superdesk News | Superdesk goes live across NTB's newsroom - Mozilla Firefox

File Edit View History Bookmarks Tools Help

Superdesk News | Sup... x +

https://www.superdesk.org/news/ntb-rolls-out-superdesk

Superdesk SOURCEFABRIC

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> About the author

Superdesk goes live across NTB's newsroom

NTB journalists at work.

With a staff of 80 journalists, NTB produces 200-300 stories per day while continuously adding to an image database of 80 million-plus photos and videos via its NTB scanpix division.

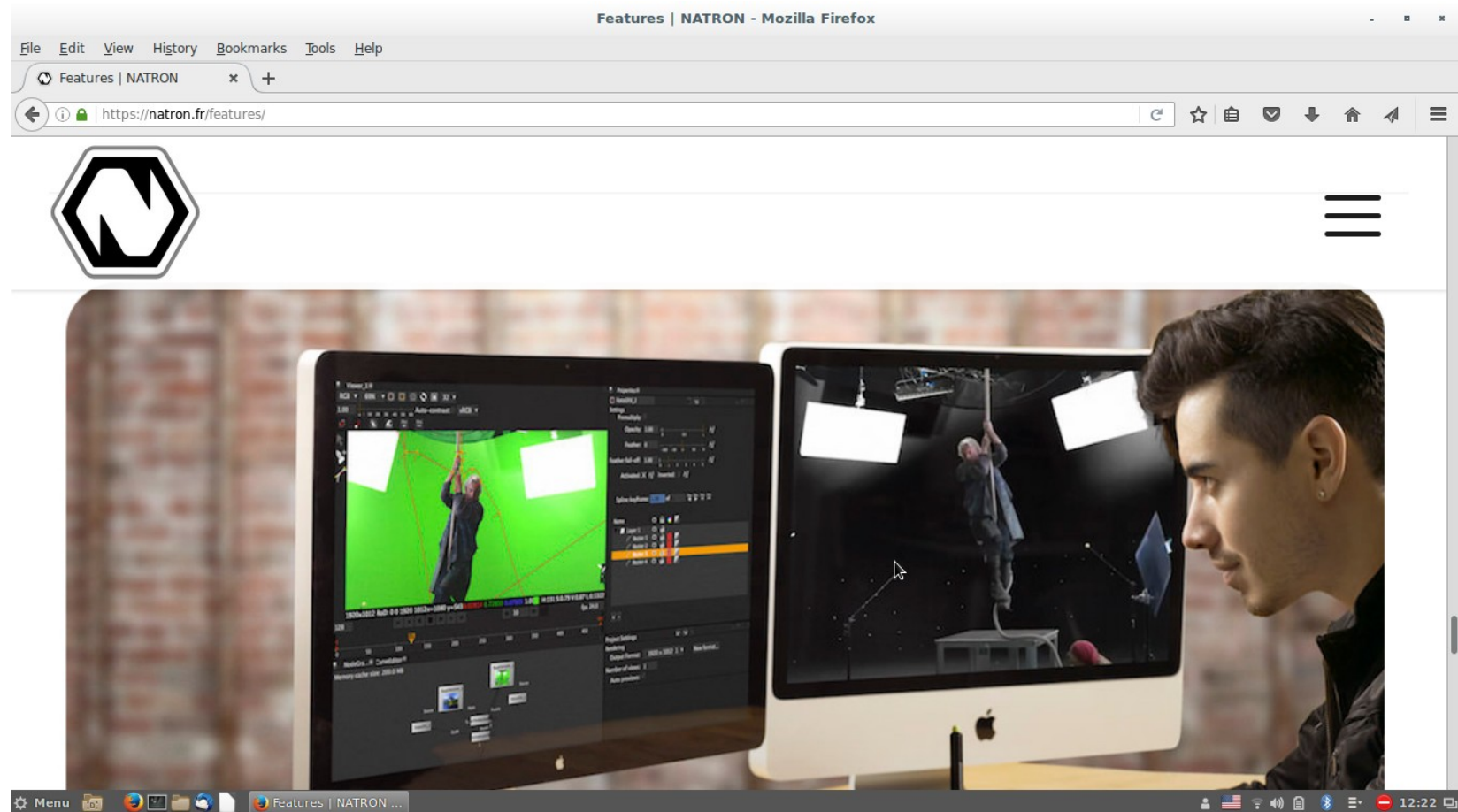
Menu 100 Superdesk News | S... 11:59

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Other production solutions

- Also need to create nice static title graphics
 - (www.gimp.org)
- Sometimes need 3D graphics for station branding / logo
 - (www.blender.org)
- Sometimes need to add special effects using free video compositing software
 - (www.natron.fr)

Natron video compositing effects



Migrating a TV Channel to free software

TV Program Video Editing limitations

- Deepto's own programs are shot in-house
- Multiple studio cameras means multiple video files have to be edited together
 - KDElive project is working on multiple timeline editing
- Multiple microphones means multiple audio files have to be edited together
 - Free video editing software can edit multiple audio streams
 - (www.shotcut.org)
 - But workflow not as polished/efficient as proprietary alternatives

Future KDenlive development planned:

- Professional video editors at Deepto prefer KDenlive to Shotcut
- Shotcut has better support for editing multiple audio sources/microphones
- Sysnova is working on migrating Shotcut audio editing code to KDenlive
 - Both based on free MLT video editing framework (www.mltframework.org)

Future CasparCG development planned

- CasparCG playout server is only component of free software implemented at Deepto TV which still requires proprietary operating system
- However, current beta version of CasparCG server 2.10 has a GNU/Linux port
- Sysnova is helping to test and debut
- Soon, a TV channel based on completely free software from the ground up will be a reality

Conclusion

- Deepto TV has been the top-rated TV channel in Bangladesh for the past year, running largely on free software solutions
 - Old proprietary solutions now mainly used as backup for free solutions
 - Some improvements needed in video editing, which are in progress
- It's amazing what can be accomplished with free software!
- A big thank you to everyone involved in all the projects involved.