

LazyTown: From Director's Vision to Commercial Reality

For those adults struggling to convince their children that fitness can be fun, the idea that television can be part of the solution seems unlikely.

And yet, *LazyTown*, one of the fastest selling children's programs in history, is doing just that. Syndicated to 103 countries in a mere 18 months, *LazyTown* is reaching a global audience with an entertaining yet educational message about the importance of exercise and nutrition.

Featuring a stunning blend of live action, animation, and puppetry, *LazyTown* is the brainchild of creator/director Magnus Scheving, a former aerobics champion from Iceland. Each show is a half-hour tale that follows the adventures of the live-action, super-hero Sportacus (played by Scheving), who competes for the healthy hearts and minds of *LazyTown's* impressionable youth with Robbie Rotten, the lazy, snack-eating villain of the piece.

The show may be a creative tour-de-force, but putting it together has been a major technological challenge. "It's the most ambitious project I've been involved with," says *LazyTown's* executive producer Raymond Le Gué.

So what has made it such a challenge? There have been several contributing factors, including the combination of production styles, Scheving's desire for full creative control on every cut, and shooting the series in high definition (HD) video.

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- Raymond Le Gué, Executive Producer, LazyTown

High Standards

Scheving's vision was to create a show with the highest production standards possible. While he may not have had a television background, he knew he wanted final say on every shot. "Magnus wants to do it now, immediately, and not in any other way," says Le Gué. "He's like a child who has no pre-knowledge of what is possible, only that he wants it. He can drive us crazy but it's rewarding!"



Choosing to shoot *LazyTown* in Iceland with its limited television infrastructure pushed the production toward using an HD workflow. "We considered using film on *LazyTown*, but as the nearest film lab is in London the prospect of sending overnights by plane wasn't realistic," says Le Gué.

Once the show aired in 2004 with a full season of 34 episodes, it proved to be a great success. Still, the creative team struggled to meet deadlines for each episode. Working with unprecedented volumes of HD images and real-time CGI composites required an innovative workflow, and *LazyTown's* crew, which consisted of more than 60 people with mostly traditional film experience, had to learn how to use digital systems in a live environment.

Understandably, mistakes were made. Technical manager Gunnar Kristján Steinarrsson explains, "When an editor moves from a local station to editing tapeless on a network, there are huge workflow issues in terms of educating people. They need to move away from their previous mindset into having a more flexible view of the technology."

"I know I am demanding of my team. I won't accept that something is not technically possible. I will push them and the machines."
- Magnus Scheving, Creator/Director, LazyTown

Learning on the Job

For season two, Le Gué realized that the show's numerous production bottlenecks needed to be resolved and, as a result, some aspects of the show's workflow had to change. He began talking to a number of manufacturers about developing a more sophisticated workflow before selecting Avid Technology, Inc., as the show's key partner in January 2005. "With a lack of experienced editors in Iceland it made no sense to further limit our options by choosing an obscure system when Avid has the widest user base. I also needed sustainability. Without external support and the knowledge that a company is going to be around in the future to evolve with your production, you are asking for trouble," says Le Gué.



Having invested millions of dollars in Iceland, where there is no indigenous post-production market, the company's goal was to create a facility that minimized the need for further training and, importantly, could offer professional resources to third-party producers to encourage additional revenue-generating opportunities. "From the point of view of sustainability and stability only one company could give us that," says Le Gué.

A New Solution

The Avid Professional Services team worked with *LazyTown's* creative team to analyze the existing workflow and design a new one based around working in real-time HD. *LazyTown* and Avid arrived at a solution calling for a dual workflow that integrated the show's existing equipment, such as the Viper HD cameras and Ultimatte keyer, while introducing an editing process at the point of acquisition. Avid engineers also demonstrated the capabilities of the Avid DNxHD codec - an encoding format that significantly reduces HD file sizes while maintaining image quality, enabling editors to work efficiently with HD material in real time.



LazyTown executives visited Avid's offices in London for a "proof of concept" demonstration and hands-on input. Then, Avid's engineering division built a test installation as a model for the new workflow.

"*LazyTown* was shown, step by step, the actual equipment that would be installed in Reykjavik because they had to know it would work straight out of the box," says Miguel Ferros, Avid European market development manager.

With no time for a pilot run in Iceland – the system had to work from day one - and to ensure a smooth transition, the Avid Support function was migrated from London to Avid's Norwegian office in Oslo, which offered a closer geographical location for providing on-site support if required. The benefits of the new systems have been felt immediately.

"During season one, I couldn't see the changes I wanted on the studio floor, and that was very frustrating. As a director, I wanted to make a change and see immediately how it would look. Now I can move a background, and we don't have to wait for post to fix it. That's very liberating," says Scheving, who can now view composites and selected takes on set in the control room.

For Scheving, *LazyTown* could be a rehearsal for even grander television or feature film projects. Director Quentin Tarantino recently visited the facility and was reportedly impressed.

"I know I am demanding of my team," Scheving admits. "I won't accept that something is not technically possible. I will push them and the machines." This persistent striving for perfection may be a challenge for his staff, but it has certainly paid off with the success of *LazyTown*, which is now in the planning stages of its third season.

Dynamic HD Workflow Supports the Complex *LazyTown*

LazyTown's pioneering mix of live action, puppetry, and animation has proved to be a major technological challenge. For everyone involved in capturing, managing, and editing the show's HD footage, *LazyTown* - a popular children's show aired in more than 100 countries worldwide and now entering its third season - has pushed a variety of boundaries. Learning on the job during season one, there were a number of significant bottlenecks to overcome.

The production shot full resolution 10-bit RGB 4:4:4 material at 24p (1920x1080, 23.976fps) on a Grass Valley Viper FilmStream with live keying from an Ultimatte HD engine. Aside from the live keying and virtual set, the production route was conventional. Clips were stored on disk and edited offline before finishing, conforming, and output to tape. Yet throughput of each episode's average of 10 TB of data (combined with four or more additional episodes stored in

the pipeline at various stages of completion) was causing severe problems. The schedule called for five-day shoots, up to 30 daily setups, and an eight-week per episode turnaround.

“It was taking up to 24 hours to conform an episode,” says executive producer Raymond Le Gué. “Then if Magnus Scheving [the creator] wanted to change even one frame of the output, we had to re-conform. The pipeline was very shaky. We had the quality, but we were pushing way beyond capacity in terms of throughput. We had no flexibility.”



Le Gué, a virtual set pioneer who created the virtual set system Scenario-XR and produced more than 2,000 hours of virtual set programming for the Dutch-based production company Endemol, joined *LazyTown* two months after the start of season one. He was immediately tasked with solving the bottlenecks for season two's 18 episodes.

The first decision was straightforward – keep the Viper camera and the Ultimatte keyer. “It was taking 20 minutes to swap between the virtual and the hard sets, so to cut that down we acquired a second Viper,” says Le Gué. “The challenge was to enable Magnus to make creative decisions on the fly and then to manage the throughput of the DPX files [captured from the camera and used for mastering the show] while keeping to schedule.”

***“The beauty of the system is that we can work offline or online at any time.”
- Paul Boots, Post-production Supervisor, LazyTown***

A Dual Workflow

Le Gué explored system scenarios with a number of manufacturers before selecting Avid systems. Working together with Avid, he arrived at a solution which called for a dual workflow. This integrated existing equipment, such as the Viper HD cameras and Ultimatte engine, while introducing an editing process at the point of acquisition. To do this, Avid demonstrated the capabilities of the Media Composer Adrenaline system with the Avid DNxcel card and the Avid DNxHD codec, which enables editors to work with top-quality HD images in real time using significantly reduced file sizes.

“We tested the quality of uncompressed HD with Avid DNxHD [encoding] and found it so good that we could finish the material within the edit environment for television purposes and keep the raw footage as source material for the 400 to 600 visual effects shots.” says Le Gué.



In the revised workflow, the Viper's 4:2:2 stream is sent to a control room adjacent to the set, where it feeds a Media Composer Adrenaline system equipped with the Avid DNxcel card for immediate logging and editing before recording onto an Avid Unity MediaNetwork system with 15 TB of shared storage. The second dual 4:4:4 stream is recorded to a DVS SAN network with 30 TB of storage maintained as DPX files used for DI conforming and mastering. Dailies are backed up on data tape.

"Pre-editing is one way of limiting the amount of material we're processing," says post-production supervisor Paul Boots. "Each frame is 10 MB, so every frame we trim and don't store is vital. We've probably saved a third of our storage space this way." It also meant that the director – usually Scheving himself – could immediately see the results of any changes on set, viewing composites and selected takes in the control room. Moreover a rough cut of each episode would be available by the end of the week's shoot, speeding up the post process.



This workflow not only accommodates on-set interactivity, it also means there is far less matching of shots in post. The thousands of elements comprising the show's virtual backgrounds are generated live by the XR-Gen4 virtual set system. When Scheving wants to change a graphic, such as recoloring the sky or repositioning a tree, the production can make the adjustment on the fly and on the floor while preparation for the shot continues. Shooting of the adjusted scenes takes place within minutes.

The camera head and crane are motion controlled with each axis encoded so the movement (focal length, tilt, and camera height) are matched exactly to the backgrounds. "Whenever the camera and backgrounds match the animatic, we accept the shot and send the data to the visual effects department," says Ultimatte operator Richard Welnowski. Additional code has been written that splits the metadata into chunks for more efficient management.

“What we’ve done is unprecedented in terms of integrating film craft processes with television.”
- Raymond Le Gué, Executive Producer, LazyTown

Online and Offline

The offline project from the Media Composer Adrenaline system is stored on an Avid Unity system using the Avid DNxHD codec and can be accessed by operators using the Symphony Nitris system for finishing. “The beauty of the system is that we can work offline or online at any time,” says Boots. “We’ve cut promos on the Symphony Nitris system without touching the DPX.” Color correction and conform of the graphics files are handled with the Avid DS Nitris system, which also has the ability to manage DPX metadata to streamline the offline-to-online DI workflow. Graphics are also swapped as Avid DNxHD files to the Avid DS Nitris system within a QuickTime wrapper.

“Color correction itself is fairly simple because we’re dealing with a primary color palette,” explains Welnowski. “We adjust the contrast and brightness a little in post and tweak the gamma. The main thing during capture is to ensure that the pink, blue, and yellow, which are *LazyTown’s* signature colors, stand out.”



LazyTown’s complex audio requirements also posed significant challenges. As well as blending thousands of sound effects in each episode with dialogue and song, *LazyTown* also wanted to synchronize audio and video editing so that both could be done at the same time. They chose the Digidesign Pro Tools| HD system for the audio post-production side of the project due to its unparalleled integration with Avid systems, such as the Avid Unity MediaNetwork shared-storage solution.

Despite all of these modifications the pipeline is still being pushed to its limits. Avid Interplay, Avid’s nonlinear workflow engine which was under development at the time that *LazyTown’s* decisions were made, might be integrated for future productions to ensure a smoother tracking of assets, possibly to log clips (currently this is done manually) and to recall the vast library of footage. “*LazyTown* has an extremely luxurious 11:1 shooting ratio, with all material stored as DPX files,” says Le Gué. “Magnus might want to use a stunt we shot and rejected for season one, episode 24. Any delay in searching and playing that material is costly to us.”

“It’s the most ambitious project I’ve been involved with,” says Le Gué. “What we’ve done, I believe, is unprecedented in terms of integrating film craft processes with television. We’ve brought post production into the pre-production stage so that it’s even more deconstructed than normal TV production.”