

Lego Batman: FX Objects, Variations and Automation - Alternatives to Shot Based FX

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Figure 1: Batman Automated Lava. ©Warner Bros Inc., The LEGO Corporation. All rights reserved.

ABSTRACT

The challenge of producing and increasing repertoire of sophisticated FX to an increasing number of shots has led Animal Logic to redefine the FX department pipeline for *The LEGO Batman Movie*. Whilst increased computing power, new simulation and rendering techniques often reduce FX shot turnaround times the FX and pipeline teams realised an overhaul of FX assets and workflow that promoted re-use and automation would be equally beneficial. The result was to shift the domain of the FX artist at Animal Logic from its historical base of shot driven FX artists (producing shot based FX tasks) into a discipline that could author FX assets for any asset in a show pipeline. The change saw FX promoted to match other standard assets in the Animal Logic pipeline, simultaneously standard assets were extended with the concept of FX variations. The redefinition of FX as objects helped formalise strategies for the FX bidding process, simplified shot FX breakdowns and promoted re-use and automation.

CCS CONCEPTS

•Computing methodologies →Rendering; Computer graphics; Animation;

KEYWORDS

ACM proceedings, Pipeline, FX, Instancing

ACM Reference format:

Aidan Sarsfield, Miles Green, and Matt Ebb. 2017. Lego Batman: FX Objects, Variations and Automation - Alternatives to Shot Based FX. In *Proceedings of SIGGRAPH 2017 Talks, Los Angeles, CA, USA, August 2017*, 2 pages.

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SIGGRAPH 2017 Talks, Los Angeles, CA, USA

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DOI: 10.475/123.4

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1 FROM 'FX TASK' TO 'FX OBJECT'

Before automation and reuse of FX were tackled, FX assets which were previously handled as simple named task categories in shot breakdowns were removed and replaced with a promoted 'FX object'. These FX assets became first class citizens mirroring character prop and set-piece assets. Like other 'object' based assets they could possess global and/or shot cache assets, with a benefit that the FX caches allowed for any number of sub caches which could be of any type/format and optionally time based. A 'rig' asset which captured how the effect was generated also became an asset under the FX Object. Once added to the pipeline the onus for FX leads and seniors tasked with defining show FX was to populate the global cache assets or define a global 'FX Object' rig that could be automated. The 'FX Objects' rig: stored as Houdini digital assets quickly became standardised containing hooks to shot inputs like cameras, sets, character, props and outputs to Cache Delivery systems (Houdini ROPs) that are pre-configured to automatically check in caches and connect them into relevant rendering procedurals. The lava effects in Batman had a well-defined 'FX Object' with both global cache and global rig, the approach to completing the lava shots became: First render the global cache for as many shots as possible, run the global rig on the remaining shot for which inputs had changed, lastly any hero shots requiring key frame or timed events could utilise the automatic rig as a starting point and adjust as needed. Additionally shot based rig adjustments could be published as shot level assets and re-run if upstream departments re-delivered.

2 FX VARIATIONS: ADDING FX TO OTHER OBJECTS:

As part of the asset update all standard objects (characters, props, set-pieces and even lights) were upgraded to allow assignment of one or more 'FX variations'. The 'FX variation' was again a cache and a rig that was for ever tied to the standard asset. This pipeline

change saw traditional FX workflows change as set-pieces became targeted by the FX team as they represented excellent candidates for FX variations because they are likely instanced repeatedly into environments promoting reuse. The Phantom zone in *The LEGO Batman Movie* was one such set containing many of instances of a few pillar set pieces some even added as animated props, with pillars required to be covered in dry ice effects. FX artists built global caches for each pillar and notified the asset team when complete, as the environment team placed set pieces with Animal Logics *Scenery* environment publishing tool, they enabled the FX vars within the set, and set custom time offsets per instance.

3 LIGHTING AND PERFORMANCE FEEDBACK LOOP:

One of the first implications of set pieces carrying 'FX variations' was that the FX assets became available much earlier for many departments when environments published sets, with the previous pipeline the FX Department typically would not start until after animation. FX assets also became available to those departments that are traditionally upstream like layout and animation. Animation artists could now inspect FX elements in proxy form directly in their scenes to see character to FX interaction, with the bonus that every departments render allowed full representation of these final quality FX rendered together with their own department output for final validation. A second implication was that if animation, layout or environment teams made adjustments transforming a pillar: prop or a set piece, no FX department intervention was needed, the FX variation caches just went for the ride with it, allowing many shots to be FX finalled as they completed in animation departments.

4 AUTOMATING FX RIGS:

In a final boost to reduce the burden from the FX artist, many 'FX Object' rigs which were initially triggered manually over a selection of shots became automatically triggered. The triggers were setup to register an interest in upstream department deliveries in the Animal Logic notification tools. Once triggered the rig runs over relevant shots on the farm, and the artist is notified of successful cache publishes and with an automatic render in which the FX have been inserted in-situ with all other aspects of the shot ready for review in the Animal Logic dailies review system.