LAIKA's Digital Big Boards

Jeff Stringer
jstringer@laika.com
LAIKA, Hillsboro, OR

Owen Nelson
onelson@laika.com
LAIKA, Hillsboro, OR

Tony Aiello
taiello@laika.com
LAIKA, Hillsboro, OR

Figure 1: The traditional paper based Big Boards and the new Digital Big Boards.

ABSTRACT

To manage the increased complexity in its hybrid stop-motion/CG animated features, LAIKA built a custom production scheduling system, converting the traditional tactile and laborious approach of planning a stop-motion shooting schedule on a big board into a fully digital, live and interactive experience connecting the entire crew.

CCS CONCEPTS

• **Human-centered computing** → **Graphical user interfaces**; Web-based interaction; • **Hardware** → Touch screens;

KEYWORDS

Animated feature film production; scheduling

ACM Reference format:
Jeff Stringer, Owen Nelson, and Tony Aiello. 2017. LAIKA's Digital Big Boards. In *Proceedings of SIGGRAPH '17 Talks, Los Angeles, CA, USA, July 30 - August 03, 2017,* 2 pages.
https://doi.org/10.1145/3084363.3085034

1 INTRODUCTION

Managing the production of LAIKA's animated feature films is an enormously complex logistical operation. The animation itself is extremely painstaking and difficult. Unlike a full CG film where you can iterate on animation performances while digital assets and environments are being developed, stop motion filmmaking requires the assets (props, sets, puppets, costumes, practical effects) all to be delivered for the animation to begin. These assets and rigging systems have to be tested and camera-ready the day a shot is launched. So the production team must schedule shot specific tasks like set dressing, lighting, camera move programming and rigging, in coordination with the delivery of assets from our design and fabrication shops in order to launch dozens of separate stages each day. Building and managing the schedule involves every department and everyone has to be able to see and contribute to the process.

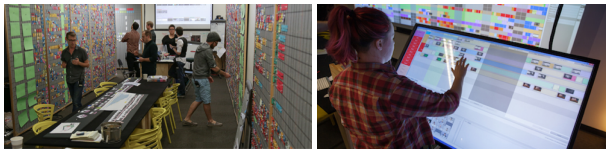

Figure 2: (left) Production office with traditional Big Boards. (right) The Planner App running on touchscreen station.

To support this collaborative planning, stop motion movies have traditionally relied on Big Boards. Like everything in stop motion, it's a very tactile, physical process. Cards representing tasks for shots for the entire film are organized on a pin board to show the daily shooting schedule on every unit. These Big Boards drive every element of the production; they tell the shops when they have to deliver a set, puppet or prop, the stage crew knows what has to be lit, dressed and framed for the animators, and the VFX team knows when they can expect the turnover of plates. Crew can meet in front of the boards independently throughout the day to plan, resolve conflicts and keep the animators on schedule. The system works; it is visual and easy to understand. It's also public, centrally located and encourages collaboration between departments. But the Big Boards don't scale well. As our films grew in complexity, with most shots requiring multiple passes and visual effects elements, our Big Boards became too big and difficult to keep current.

SIGGRAPH '17 Talks, July 30 - August 03, 2017, Los Angeles, CA, USA

ACM ISBN 978-1-4503-5008-2/17/07…$15.00
https://doi.org/10.1145/3084363.3085034

It was also a problem that the shoot schedule driving asset delivery was not linked to the asset schedule. We had been using Shotgun for asset scheduling, but with the shooting tasks maintained on an analog Big Board, it was difficult to maintain connections between fabrication departments and the stage due dates. We needed a digital solution but we didn't want to give up the tactile and visual method of building the schedule, or the collaborative interactions of departments around the Big Boards.

2 RESEARCH AND DESIGN

Critical to the success of Digital Big Boards was to understand the primary use-cases and their step-by-step details. A guiding principle was that any approach to digitizing the planning and scheduling process had to be at least as fast and easy to use as the analog. Working closely with the production scheduling team over the second half of our last film, we were able to tease out the details, which had become intuitive tribal knowledge for the schedulers. Initially we developed a basic iPad app that mimicked the operations of updating a shot schedule on the board. We used this app in production, in a hybrid analog + digital scheduling process to enter changes made on the big board and save them to Shotgun. This lightweight app allowed us to develop a shared language and collaborative relationship between engineers and production users, and helped us settle on interface elements while testing front and back-end software technologies to see what would scale to the display sizes and performance response-times needed.

From that research we identified 3 unique systems needed: a single-user planning station with touch interaction to support multiple pre-publish plan scenarios; a centralized large display of the schedule for group interaction supporting playback and note-taking; and many read-only kiosks distributed to the production areas with tailored local and always-live information.

The Planner presented the most complex UI challenge. The scheduler needed easy access to several types of operations at the same time, so we divided the UI into three sections. At the bottom is a collection of palettes where one can select shots, puppets, sets, and crew. In the middle, an editing area where one combines the resources and shots to lay them out in the desired shooting order. At the top is the live schedule where one can drag the edited tasks to a stage unit and publish them. The key to the display systems was maintaining the visual language of the cards from the original Big Boards. The color and shape of each task card was maintained in the digital version making the new boards instantly readable. For interactivity we experimented with various remote and portable technologies such as air mice, miniature keyboards, gyroscopic and Kinect-like systems, but ultimately we concluded that pens and direct finger contact were the best modalities for our needs. Touch interface is intuitive and simple for users, but the limited interaction created more challenges for the software engineers.

3 DEVELOPMENT AND ENGINEERING

The design of the Planner app, with its three different interacting systems, was approved before we really knew how we would engineer it. Building this rich feature set, with some operations as complex as non-linear editing, for a 55" touch screen tabletop was a challenge. We progressed through a range of software technologies, tailoring for the use-cases. Starting from HTML and JavaScript for the iPad app, the Planner app became a native client written in Scala for higher performance.

The Planner reads the state of the live schedule on demand, allowing the operator to enact a push/pull model over their data. Changes to assets, durations, and crew assignments can be made in The Planner, with all changes "staged" in the app on local disk waiting to be published back to Shotgun when desired. Additionally "scenario" data, broad strokes task sequencing or proposed schedule changes, can be published to a dedicated database owned by our web service (not Shotgun). Scenarios can then be lifted from the service database into the live schedule at a later time once the user is happy with the new schedule plan.

As tasks are published from The Planner, messages detailing the changes are generated by Shotgun and echoed to RabbitMQ. By leveraging RabbitMQ, the display apps listen to the schedule changes via STOMP (a websocket-style connection), allowing us to live-update these displays across the studio in near real-time.

The interactivity in these apps allows crew members to drill into a single task for details specific to their role, or zoom out and see the entire shooting schedule for the movie. They can also filter for a particular asset or assigned crewmember, view the animatic, and leave notes for other departments. The apps are designed to work on desktops and tablets as well, making the schedule available everywhere.

Both the Planner and the Display applications require reading from and writing to Shotgun. Currently Shotgun only provides API access through a Python client. Since neither of our applications are written in Python, we developed our own Python web service and we are able to expose Shotgun's client capabilities via REST mechanics. This intermediate service (MITM) strategy allows us to send and receive JSON over HTTP thus permitting all manner of clients to safely access and modify the schedule data. This service has opened the door to more custom web app development and gives us the ability to tailor tools for very specific use cases while keeping everyone working on the same verified dataset.

4 CONCLUSIONS AND FUTURE WORK

Preserving the tactile and visual aspects of the paper big boards was worth it. It made the transition to a digital system easier for the crew by using the consistent visual language and maintained the interdepartmental communication that comes with large public displays. But having a live connection via a web service backend that connects central planning with department-based workflows has been a game changer. We plan to continue developing web apps specifically targeting the mobile workflows of the stage crew and to develop similar, tactile and visual, digital scheduling tools for puppet and set fabrication teams.