

# The StoryPlaces Authoring Tool: Pattern Centric Authoring

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**Abstract.** Building authoring environments for constraint-based interactive narratives (sculptural hypertexts) is challenging, as dealing directly with functions and variables is alien to many authors and requires them to think at a lower level than story structure. We propose an approach that uses higher level constructs based on common structural patterns, which are then translated behind the scenes into a set of constraints for a sculptural engine. We present the StoryPlaces authoring tool that applies this idea with the patterns of Locking and Phasing and allows for the creation of constraint-based locative hypertext fiction. Our work shows how the poetics of interactive narratives can be used in the software design process to create more accessible authoring tools.

## 1 Introduction

There are a range of tools for creating interactive narratives that follow a traditional node and link structure (Calligraphic Hypertexts [1]) with some examples, such as Twine, attracting significant communities of users due to their accessibility and ease of use. However, an alternative way to create an interactive narrative is use a constraint-based approach, where instead of authoring explicit links, constraints and behaviors are attached to text or reader actions - and are parsed at run time to derive potential narrative links or options (Sculptural Hypertext [1]). Authoring tools for these sorts of story systems have to help users overcome a more significant technical barrier, as creating the story logic is more akin to programming than traditional writing. Sculptural hypertext is a good approach for locative narratives as location can be modeled as another constraint, but the extra locative element increases the authoring challenge [6].

StoryPlaces (website: <http://storyplaces.soton.ac.uk>) is a project to explore the poetics of locative narrative, as part of this goal the project has identified a number of sculptural patterns that locative authors use in their work [6]. In this paper we explain how we have used some of these patterns in the design of a pattern-centric authoring tool, that can be used to create complex structures, and locative stories on the desktop and in-situ.

## 2 Background

Locative literature has its routes in the digital tour guides created in the 1990s [3]. But over the last twenty years, alongside an improvement in location sensing and device capability, there has been a far broader range of applications. There are a number of frameworks authors can use to publish tour guides, including HIPS which was used for the Louvre tour [3]. Educational tools focus on the process of learning about a place, and might therefore be considered a natural extension of a guide - this includes edutainment systems such as Geist [7]. We have also seen locative narrative applied in a gaming context, such as Viking Ghost Hunt [9] or University of Death [4]. Finally locative technology is also used to deliver locative interactive fiction such as The iLand of Madeira [5], and San Servolo, travel into the memory of an island [10].

Interactive fiction is served by a variety of authoring tools from both research and industry that explore a range of different approaches from the text heavy language of inform (<http://inform7.com/> as of 19/9/2017), to the more visual approach of twine (<https://twinery.org/> as of 19/9/2017), and inkewriter (<https://www.inklestudios.com/inkewriter/> as of 19/9/2017) which lies somewhere in between. The Hypertext research community has also explored authorship - such as the work on StorySpace by Bernstein [2]. However there is substantially less provision for locative interactive fiction where the patterns of authorship and technical requirements substantially differ [6].

Storyplaces is a project exploring the poetics and impact of locative narrative in a broad context [6]. It has delivered multiple story deployments at three separate sites (Southampton, Bournemouth, and London in the UK) and has developed its own generic locative narrative framework and authoring tool for the creation of locative narratives. With our own authoring tool we have attempted to avoid complicated domain specific languages or complex visual interfaces in favour of a pattern centric approach. The difference in the formal models of authors, readers and system has been called the Semantic Gap [8], and our pattern-centric approach follows closely a sum-to-zero profile, where both the author and reader work at a less formal level than the underlying computational system.

## 3 Pattern Centric Authoring

In our work on sculptural hypertext and patterns we noted the challenges for authors writing at the level of individual constraints; creating a complex interactive story in this way is more similar to programming than traditional story planning, with the author having to translate the behavior they desire into variables and operations on those variables. However, we suggested that if we could identify the higher level patterns that writers used within their work, we could incorporate those into an authoring tool. Allowing authors to use high level narrative constructs as the building blocks for their story, with the authoring tool undertaking the effort of translating those into functions and constraints for export to a reader. This was the philosophy that we applied to the StoryPlaces

authoring tool. Our goal was to create a tool that would emphasize ease-of-use, picking important and popular patterns and providing simple ways to create them, attach content, and link them to locations.

We were also aware from our work with so many novice locative authors (during the Southampton StoryPlaces deployment) that they were not familiar or comfortable with complex interactive story structure. So an additional goal was to create a tool that is only as sophisticated as it needs to be to serve the author's current ambitions (e.g. it allows novice users to create open tours trivially, or build simple linear routes), but unfolds to be much more powerful as the user grows in confidence and explores new levels of interactive complexity.

### 3.1 Participatory Design Sessions and Outcomes

In our design work we drew on our experiences with the story projects at Southampton and Bournemouth to brainstorm initial design ideas, using wire-frame sketches to rapidly propose, discuss, alter and (if needed) reject alternative ideas. During these sessions we identified two key patterns to support:

- *Locking*: in which one node cannot be read until another has been read. As well as being a key pattern in its own right, locking is also an important building block for several other patterns (for example, *gating* and *threading*).
- *Phasing*: where nodes are grouped together into a phase, and can only be seen by a reader who has entered that phase. Phasing helps control narrative pace (e.g. by modeling the Acts of a story as phases), and allows authors to scope their stories and work on different parts independently.

We then undertook participatory design, working with three writers. In our first workshop we gave the writers a storyboard presentation using the wire-frames, taking them through an example authoring process. We then set them a paper based authoring activity, providing story content, but allowing them to freely structure that content and link it to locations by playing activity cards to represent the functionality available through the proposed design.

Based on their feedback we developed a beta version of the tool, which we asked a second group of participants to review in a second session where we gave them a simple authoring task (to create a simple campus tour) which they undertook on a mobile device in-situ, and then completed using a desktop. This was then followed by a discussion of successes, challenges and new ideas.

As a result of these workshops we altered our vocabulary, in particular *nodes* became *pages*, and *phases* became *chapters*. These terms imply a way in which nodes and phases should be used (i.e. implying a length for nodes, and the use of phases for managing story progression) but it was felt that this would help new authors, who could discover more novel uses as their skills developed (e.g. using phases to manage alternative points of view). We kept the term *locking* but reduced the logical power of locks to AND and OR (whereas the reader can manage complex logical combinations and comparison operators). In the interface, pages are unlocked by 'One of' or 'All of' a list of other pages.

Note that we chose to make pages 'unlocked' by other pages, rather than specifying that this page 'unlocks' another. This means that the logical relationships point backwards rather than forwards. This has the advantage of making logical combinations easier to express, but the disadvantage of being at odds with the order in which authors construct the pages. Writers also struggled to understand that any pages with no constraints would be the defacto starting point of their stories, so we decided that new stories should be created with an initial page already in place, with no constraints, called 'Start Page' with some simple instructions in the text body that could be renamed and overwritten.

## 4 The StoryPlaces Authoring Tool

The StoryPlaces authoring tool is a web app, built using the Auriela javascript framework. It maintains a JSON copy of the story on the server (in MongoDB), with transactions queued and synched whenever connectivity is available - making it resilient to intermittent connection. Figure 1 shows the tool being used to create a story. The tool has three tabs. The Pages tab (shown here) gives an overview of all the pages in the system, and can be filtered by Chapter. The tool is designed to be used in-situ or in a desktop context. Responsive CSS alters the layout according to screen size (all figures here are the desktop layout).

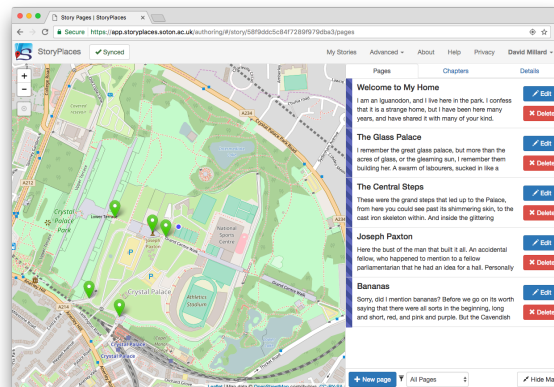


Fig. 1. Authoring Tool: Overview of Pages

Figure 2 shows editing a Page, the left screenshot shows the upper edit controls (title, contents, and location) while the right shows the lower controls (logic: locking and chapter membership). For simplicity we allow authors to attach a single image to each page. This image can come from the device's camera or storage. Locations are hotspots with a radius, and can be selected on the map

(for desk based) or created in the current location (for in-situ). The logical controls (labeled 'narrative constraints') allow the author to create a list of other pages which unlock this one. Two toggle switches set whether the page can be read more than once or finishes the reading of the story.

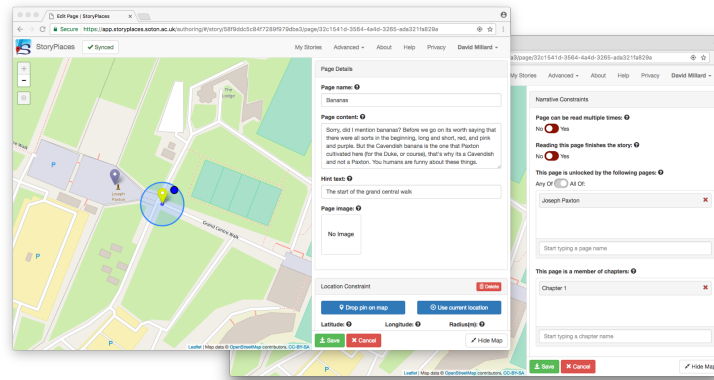


Fig. 2. Authoring Tool: Editing a Page

The Chapter tab gives an overview of the story structure, showing each chapter, and the pages within it. Selecting one of the chapters will filter the pages shown on the map. A special 'loose pages' section at the top of the list shows any pages that are not in a chapter, meaning they are visible throughout the story (assuming that they other logical and location constraints are met).

The edit controls for a Chapter allow the author to change the chapter name and add or remove pages. It also gives access to the logic for the chapter in the form of a list of pages which unlock this chapter. Finally, the 'Details' tab allows authors to set the metadata for the whole story (e.g. name and description). It also allows them to submit the story for publication or generate a URL to a read once-only version of their story that they can use for testing.

## 5 Conclusions and Future Work

We have used the authoring tool in our final workshop at Crystal Palace with fifteen writers who were introduced to the toolkit and the tool, used the tool in the field, and were then encouraged to develop a full story after the event. We have not yet analyzed their feedback, but on the day all were able to use the tool, and four of them later created stories that we were able to publish at a festival event. We also ran a simple System Usability Scale (SUS) test with the authors who stayed with us for the full day, and the software received a score of 76 (n=9), which is above the score of 68 generally viewed as usable.

Although our analysis is not complete our initial observations were that authors tended to use the tool sparingly in-situ, but that being briefed on the tool before exploring the park allowed them to begin conceptualizing their stories externally to the tool, and then later to realize it on the desktop version. We also noted a number of challenges for authors. In particular, that planning and writing are two separate activities, and that our tool is stronger for writing than planning. If we were to include this stage it would probably require a graphical representation of the logical structure.

We also note that in more complex stories it becomes very challenging to spot bugs in the logical structure (for example, dead ends, or orphaned nodes). In future we intend to explore the role that analytics might play in supporting the author in spotting structural problems, or even flagging to them occasions where they are not aligned with the advice we have developed for our toolkit. We would also like to extend the tool with other patterns. The most obvious being *concurrent nodes* (which give authors an easy way to create branching points) or *alternative nodes* (an easy way to create different versions of the same page).

The StoryPlaces authoring tool is Open Source, and we are also exploring how to support more open publication on our server in order to remove the approval bottleneck and allow easier experimentation by a wider group of authors.

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