

# Towards a Platform for Urban Games

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## ABSTRACT

Pervasive games are engaging experiences that are typically location-based, but may also tackle issues of temporal or social expansion. Many pervasive games are suited to urban settings, with their dense populations and supporting infrastructure, hence urban games. This paper describes ongoing work within the Horizon Hub, anchored by a commission to develop a new urban game, “Exploding places”, which explores how people define their own urban landscape in terms of territory, history and community. Informed by the piloting of this new game we are developing a platform for urban games (and similar ubicomp experiences) which includes: a scalable experience “lobby” service, a runtime game engine with supporting graphical tools for authoring and testing, and a complementary social/streaming media facility. This platform is being released under an Open Source license (AGPL v3), and the project is also being used to explore the creative, collaborative and innovation challenges of projects of this kind.

## Keywords

Urban games, pervasive games, experience development

## 1. INTRODUCTION

Pervasive games [1] are engaging experiences that are typically location-based [2], but may also tackle issues of temporal or social expansion [3]. These experiences are most effectively deployed “in the wild”, that is outside of the laboratory, in everyday settings and with “ordinary” users. Pervasive games can be effective in engaging members of the public, and give benefits and insights both to the artists, who are able to develop their practice using new ubiquitous technologies, and to the developers, who gain a unique public platform with which to deploy and evaluate new tools and technologies in use. Many pervasive games are suited to urban settings, with their dense populations and supporting transport and communications infrastructures, and such urban games are the focus of this work.

In relation to the digital economy we suggest that urban games are

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an important class of future “service”. Urban games also have the potential to engage people with their urban environment in fresh and stimulating ways. The use of historical data such as Census data can enhance the richness of and engagement with mobile experiences, and in turn enhance public appreciation of national data assets. Finally, urban games provide a setting in which to consider emerging concepts and technologies for personal data management such as the Horizon Hub’s work on Personal Containers.

This paper describes ongoing work within the Horizon Hub, anchored by a commission from StreamArts for Active Ingredient to develop a new Urban Game, “Exploding places”, in collaboration with Horizon, which was piloted publicly in Woolwich on 24<sup>th</sup> July 2010. With this new experience as an initial driving activity, and building on the wealth of experience with pervasive games in the Mixed Reality Lab at the University of Nottingham are:

- Using mobile urban gaming as a (relatively well-understood) exemplar to explore the technical issues and opportunities in moving from fixed-provisioned in-house service/experience hosting (as in our previous games) to the cloud-based service provision envisioned by Horizon.
- Clarifying the relationship between the creative design of the game and its implementation, extending work to date on enabling “non-technical” creative staff to author and tailor experiences, and in particular to understand and mitigate some of the technical barriers which currently inhibit the exploitation of these emerging technologies, services and experiences.

## 2. EXPLODING PLACES

The new game, “Exploding Places” (a multiple reference to its pilot venue, Woolwich, and its virtual community game mechanic), explores how people define their own urban landscape in terms of territory, history and community.

The game is a multi-player experience, played using a hand-held device (an Android mobile phone) which incorporates GPS position-tracking and 3G networking. Players meet at a central venue for an introduction and are then sent out onto the streets for the game proper. Taking the aspect of an immigrant to Woolwich at the start of the 20<sup>th</sup> century, they each create and oversee an evolving virtual community, layered over the present-day urban landscape. Over the course of 60 minutes the player experiences glimpses of the last 120 years of Woolwich’s history, and the effects are felt by their virtual community, which ebbs and flows as the years pass. At the end of the game time the players return to

the hosting venue, where a projected display has also been revealing their virtual communities and the communities' interactions to spectators.

The game concept and historical events have been developed in collaboration between Active Ingredient, Stream Arts and local school and community groups, and draw on extensive local research and archive data. Players who meet certain goals within the game also have the opportunity to contribute their own stories and events, to be experienced by subsequent players (subject to moderation). Thus the game also presents an opportunity to explore with community groups and members of the public elements of social and cultural perspectives on ubiquitous computing.

### 3. TOWARDS A PLATFORM FOR URBAN GAMES

The July pilot of Exploding Places was based on the established EQUIP2 server platform [4]. However we have also started work on a replacement platform and supporting infrastructure, to which we are migrating Exploding Places. There are currently four technical strands to this activity.

First, we are developing a cloud-based lobby service for urban games and other ubicomp experiences of this kind. While sharing some characteristics with online game lobby services and mobile application stores, experiences of this kind introduce additional requirements such as: location-specific constraints (e.g. you have to be in Woolwich to play the Exploding Places pilot); integration with ticketing (e.g. for physical venue elements of games and performances); and diverse client devices and player roles (e.g. "runners" on the streets with mobile devices playing against on-line players in Can You See Me Now [2]).

This lobby provides the key scalability and extension point in the planned architecture, though which a multitude of diverse experiences may be accessed and managed.

Second, we are refining and packaging the developed Exploding Places game engine/server, mobile client and supporting configuration and authoring tools into a reusable game "template". This can then be adopted, tailored (e.g. re-skinned) and deployed to support similar game experiences in other settings and with other content. While this is possible in a stand-alone manner, one facet of the lobby service would provide specific support for this, including automatic provisioning of cloud-based servers and automated game server management. Exploiting the cost-structuring possibilities of cloud hosting we hope to be able to offer these capability with usage-based pricing that scales *down* to a few GBP per year for small applications (e.g. for a private individual or a local community group) but is also financially self-supporting with extremely large numbers of users and/or large geographical scale.

Third, drawing inspiration from HPLabs now-discontinued MScape tool<sup>1</sup>, we are prototyping graphical authoring and testing environments alongside a new runtime engine (and a default/generic mobile client) which we hope will support a range of authoring perspectives of varying complexity and flexibility. Ideally, this would open up the creation of new *kinds* of mobile game/experience to less technically skilled users than is currently the case.

Finally, we envisage a social media facility that would sit alongside the game engine and complement the core game experience with communication and coordination support through messaging and streaming media. In particular live and near-live video form an ideal complement to the locative and performative character of urban games.

Following Horizon's standard policy all software developed within the Hub is being released under the AGPL v3 Open Source license (a strong copy-left license), with the option of simultaneous licensing under other licenses. Public code hosting is provided by github<sup>2</sup>. Initial mobile client support will target the Android platform, while Google App Engine is the default cloud platform for those service elements that fit within its constraints (currently the lobby service), while VM offerings such as Amazon EC2 and memset miniserver are required to host more specialized services such as the current game engine.

In addition to the technical and experience development work, a key aspect of this ongoing work is to document and understand the creative relationships and potential value chains of relevance to activities of this kind: with the turn to cloud computing and the movement of high-capability mobile devices into the mass market the challenges of scalability for urban games are shifting from technical problems to become challenges of content creation, community development and financial sustainability.

### 4. ACKNOWLEDGEMENTS

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### 5. REFERENCES

- [1] C., Cheok, A. D., Mandryk, R. L., and Nilsen, T. 2005. Pervasive games: bringing computer entertainment back to the real world. *Comput. Entertain.* 3, 3 (Jul. 2005), 4-4. DOI= <http://doi.acm.org/10.1145/1077246.1077257>
- [2] Benford, S., Crabtree, A., Flintham, M., Drozd, A., Anastasi, R., Paxton, M., Tandavanitj, N., Adams, M., and Row-Farr, J. 2006. Can you see me now?. *ACM Trans. Comput.-Hum. Interact.* 13, 1 (Mar. 2006), 100-133. DOI= <http://doi.acm.org/10.1145/1143518.1143522>
- [3] Flintham, M., Giannachi, G., Benford, S., and Adams, M. 2007. Day of the figurines: supporting episodic storytelling on mobile phon. In *Proceedings of the 4th international Conference on Virtual Storytelling: Using Virtual Reality Technologies For Storytelling* (Saint-Malo, France, December 05 - 07, 2007). M. Cavazza and S. Donikian, Eds. Lecture Notes In Computer Science. Springer-Verlag, Berlin, Heidelberg, 167-175.
- [4] Chris Greenhalgh, Steve Benford, Adam Drozd, et al. 2007. Addressing Mobile Phone Diversity in Ubicomp Experience Development. In *Proc. UbiComp 2007: Ubiquitous Computing*. 447-464. DOI - 10.1007/978-3-540-74853-3\_2

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<sup>1</sup> <http://www.hpl.hp.com/downloads/mediascape/index.html>

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<sup>2</sup> <http://github.com/mdf/exploding> and other linked repositories