

Adhocracy: Location-based, Ad Hoc Information Storage

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INTRODUCTION

Intelligent environments (IEs) can be broken into three classes defined as *Client-Server*, *Peer-Peer* and *Hybrid*.

The Client-Server model involves fixed infrastructure providing services to mobile devices. An example is that of a lecture theatre with a projector used to present slides from a lecturer's PDA.

The Peer-Peer model involves no fixed infrastructure. All storage and computation is intrinsic to mobile devices that communicate without centralised coordination.

The Hybrid model simply combines the two. E.g. communication between mobile devices may be Peer-Peer but devices may use a central directory service to find other devices with desired services.

ADHOCRACY

An *adhocracy* is a style of IE that allows the storage of location-relevant information in such a way that it cannot be controlled or censored by a minority of individuals. This is achieved by storing the information not in centrally administered servers but across a multitude of mobile devices, using concepts similar to robust distributed file systems such as Freenet [1].

The core concept is democratisation of information by keeping it in a physical location without any fixed storage infrastructure.

The implications of this concept are several, but a primary use of adhocracies is envisioned to be the tagging of physical locations without the possibility of censorship. Since there are no centralised servers storing the information, it cannot be easily modified or removed.

Building a location-based ad hoc information storage service requires at least two major elements: a way of determining mobile devices' locations, and a way of storing information.

Since the concept of location itself is fundamentally fixed, some sort of fixed infrastructure is highly desirable to determine a mobile device's location. Wi-Fi triangulation, GPS and Bluetooth beacons are some examples of fixed infrastructure that could be used either individually or in concert. (These technologies, though often controlled by individual corporations in practice would not be involved in the actual storage of information in an adhocracy.) Various sensor data could be

combined or *fused* to improve the accuracy of the location estimate. In fact, the actual method of determining location is relatively unimportant, providing it can be transformed to some canonical representation suitable for the system.

In contrast to the problem of physical location determination, storing information in an adhocracy does not necessarily require any fixed infrastructure, only an identifier tying it to a particular location.

A sample scenario of an adhocracy involves a shop that sells inferior products. After several customers have discovered this fact for themselves, they may like to leave a piece of 'digital graffiti' on the shop-front informing other adhocracy users. Since the graffiti is stored on the devices that pass through the area near the shop, there is no way for the shop owner to censor the opinions. However they may be able to jam or spam the location with irrelevant information which is an issue worthy of attention.

The adhocracy concept is an Hybrid IE. It relies on fixed infrastructure to help mobile devices determine their locations, but information in the system is stored across the mobile devices themselves.

BIOGRAPHY AND RESEARCH INTERESTS

I completed my first class honours degree in Computer Science at the University of New South Wales in 1998 with a thesis related to single address space operating systems. In April 2003 I began a Ph.D. at the University of Sydney working with the Smart Internet CRC.

I am primarily interested in identity management as it relates to the intelligent environment but also context-awareness (particularly location context) and using augmented reality as a means of visualising aspects of the intelligent environment.

REFERENCES

- [1] Clarke, I., Sandberg, O., Wiley, B. and Hong, T.W., Freenet: A Distributed Anonymous Information Storage and Retrieval System. *In Proceedings of ICSI Workshop on Design Issues in Anonymity and Unobservability*, Berkeley, California, June 2000.