

# Demo: Here&Now – Data-centric local social interactions through opportunistic networks

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## ABSTRACT

Many of today’s popular online social networks are disconnected from their users’ immediate social and physical context, which makes them poorly suited for supporting transient, on-purpose social communities of co-located users. We introduce the idea of a local dataspace that can mediate social interactions via freely user modifiable shared content. We demonstrate this concept via an opportunistic experience sharing application *Here&Now*.

## CCS Concepts

•Networks → Location based services; Peer-to-peer protocols;

## Keywords

opportunistic networking; mobile social networks

## 1. INTRODUCTION

Today’s popular social networking applications are disconnected from the users in time and space – a photo uploaded to Instagram, or a post made to Facebook, will reside in a faraway server permanently accessible anywhere on the Internet. While this form of social networking has been hugely successful, the disconnect from the users’ immediate social and physical context – the *here and now* – makes them poorly suited for supporting transient, on-purpose social communities of co-located users. A group gathered to attend a concert, conference, or another event may be generating a large amount of content, all of which gets locked up and fragmented in the various social networking silos, easily discoverable to only those that have an existing social relationship with the creator. In essence the group is sharing their experience with their friends all across the world, but not with each other.

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To better support social interactions within transient social communities, we introduce the idea of an open, local *dataspace*. This dataspace is composed of the content created by the users and opportunistically shared directly between them using their mobile devices. The social interactions are not mediated by the usual mechanisms of uni/multi/broadcasting messages between the users, but rather via the collaborative creation, mutation and remixing of the content itself. We give an initial demonstration of this idea through an opportunistic networking application – *Here&Now* – which lets nearby users share experiences by jointly modifying a shared dataspace.

## 2. LOCAL SOCIAL DATASPACE

Our goal is to build a *dataspace* that acts as the primary medium of communication between the users. The dataspace is populated by content items that are created, mutated, and remixed by the users. This way the content acts as the medium for social interactions, in contrast to the messaging or publishing systems that make up the popular existing social networking services.

We envision the dataspace to be strongly connected to the physical space, adding another dimension to the physical world. That is, the modifications of the content in the dataspace should propagate only within a bounded geographic area from its origin – covering the immediate physical and social context of the user. The dataspace is also time-variant, due to the constantly changing content.

Our design builds on three main concepts. First, we apply *data-centric* networking principles, where the central abstraction is not the communicating end-points, but rather the content of the communication [4]. Second, we use opportunistic networking to disseminate the content directly between users’ devices, and to geographically bound the spreading [1]. Finally, we deploy mutable content mechanisms to allow concurrent modifications of the content in the dataspace by multiple users [2].

## 3. HERE&NOW APPLICATION

The interface of the Here&Now Android application – shown in Figure 1 – provides the user with a view into the content of the local dataspace. Two different views are provided: 1) trending content, i.e., content that has been liked by other users, and 2) fresh content, i.e., content that has been recently created or modified. The user is able to mod-

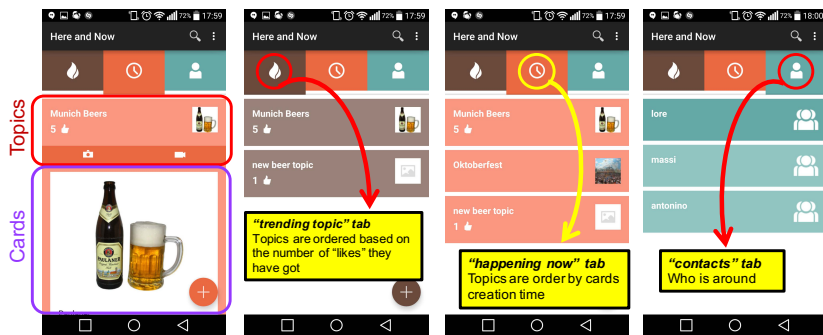


Figure 1: User interface of the Here&Now Android application.

ify the content by adding to it, commenting on it or liking it, and the modifications made by other users appear instantaneously in the interface. In addition, the user may create a profile and view see profiles of other nearby users.

The data-model used by Here&Now is made up of *topics*, *cards*, *comments*, and *likes*. Topics are the highest level “container” structure, into which cards can be attached (left of Figure 1). The dataspace is made up of all the topics accessible at the current location. Each card can contain media – photo or video – along with text, and other users can add comments and likes to the cards.

Each H&N application instance creates a local data model – a view of the dataspace – based on the content received from the underlying opportunistic network and modifications done by the local user. The result is a dynamic dataspace where users interact by modifying the shared topics.

## 4. SYSTEM DESIGN

Our system design builds on the Scampi [3] opportunistic networking platform, which provides a direct device-to-device data dissemination service and a publish-subscribe API to applications. This not only gives us the mechanisms needed to make the data available and discoverable in the proximity of the user, but also makes it available to any Scampi application, not just Here&Now. This makes the resulting dataspace truly open and freely accessible to any user or application in the physical proximity, rather than a closed silo like most online social networking systems.

We support two main deployment modes for the system – *controlled* and *uncontrolled* – each with distinct underlying topology and use cases, shown in Figure 2.

The uncontrolled mode requires no support from the infrastructure or operators. Instead Scampi creates an opportunistic forwarding mesh over the underlying communication network (typically a venue Wi-Fi network), which then forms the dataspace. Note that the dataspace is not necessarily constrained to a single Wi-Fi segment, but the opportunistic dissemination can carry messages multiple hops to other segments depending on the routing algorithms – e.g., separate conference venue and hotel Wi-Fi segments can form a single dataspace.

In the controlled mode, the operator installs an *anchor node* that serves any nodes that connect to it. Instead of creating an opportunistic forwarding mesh, the topology is organized as a star with the anchor node in the middle. This mode is advantageous in purposefully organized scenarios, such as workshops, where the organizer wants to provide

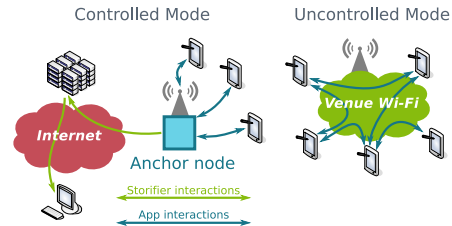


Figure 2: H&N deployment modes.

a shared dataspace to the attendees. There are multiple benefits to the controlled mode: 1) the anchor node runs a Scampi instance which will retain copies of all the content, 2) the anchor node can be seeded with content before the event, 3) the star topology enables efficient use of the wireless medium, 4) the anchor node can publish a static view of the content after the event (we demonstrate this via a *Storifier* component that creates a website out of the content published at the event).

## 5. CONCLUSIONS

In this paper we presented the idea of a shared, local dataspace composed of user modifiable content. The dataspace is location and time dependent, strongly linking it to the users’ physical and social context. We demonstrate this concept via an opportunistic experience sharing application, Here&Now. The application presents a first step towards a general dataspace, and we intend to study extensions and more complex data model and shared content editing mechanisms in the future.

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