NoteNet

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Demo proposal for MobiSys 2006

Introduction

We will demonstrate an implementation of an information system providing data associated with geographical locations. This application is by no means new - the novelty instead lies in the underlying structure of the system, which is based on an overlay network. Information can be provided by anyone with access to the DHT, which opens up for interesting usage scenarios in contrast to services provided by companies.

In our system, data is not provided by a specific company or server but by a DHT-based overlay network. Addresses in the overlay include geographical location with high precision. This makes it possible to locate information associated with a keyword at a specific location or area.

We envision an open system similar to OpenDHT[3] available to anyone with Internet access. The strength is the potential to handle large amounts of information provided by, and available to, anyone with access to the system. In cellular networks, operators can provide access to the system as a commercial service without having to provide the information service itself.

Technical details

The storage system used is a Bamboo DHT[2], modified to support location-aware range queries. This is achieved by including the location in the identifiers. Due to the structure of the identifiers, a two-dimensional geographic area maps to an arc in the DHT identifier space using a z-linearization as illustrated in figure 1. This technique was used in a DHT-based application in [1] where they built a system on top of openDHT. Our approach instead modifies the underlying DHT by providing support for range queires as well as making it z-linearization aware.

The demo

We will demonstrate both the front-end and the back-end of our system. The front-end consists of portable devices running a graphical client that present results from queries to the system. In the demo Nokia 770 devices will be used but the client is not device specific. When queries are made from the handheld device they are based on GPS input and keywords provided from the user. The answer from the system is presented to the user on a zoomable map or aerial photo.

We will also demonstrate a web interface to the system using Google maps which can be used by conference attendees to query the system for local information related to the conference. The different clients are not only able to query information but also able to insert information into the system. During the demo, conference attendees will be able to experiment with queries and updates.

We illustrate what is happening within the DHT on a separate screen. By continuously monitoring the participating nodes in the DHT, we are able to visualize events throughout the demo. The information presented on
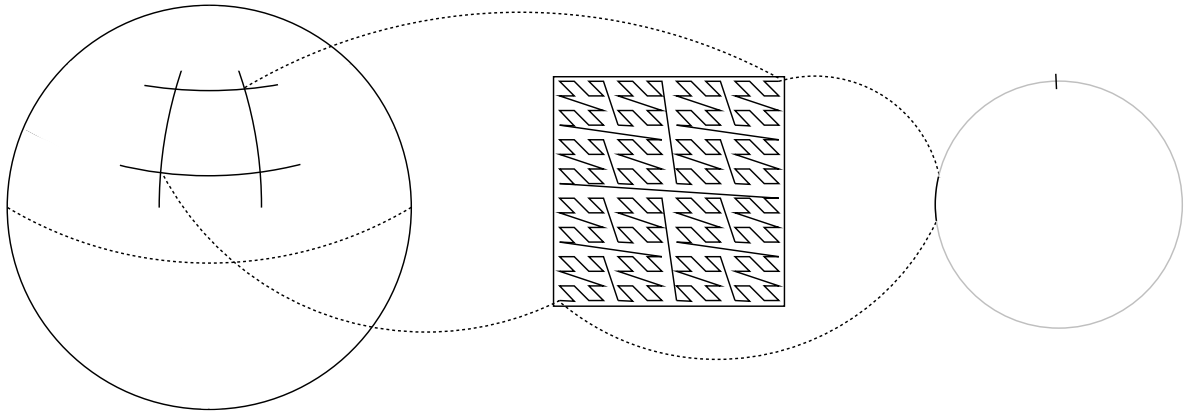
Figure 1: A geographical area is mapped to an arc of the DHT address space using a z-linearization

the separate screen will give an understanding of how the back-end of the system functions, as well as how the mapping between world coordinates and identifier space work.

Beside a table or booth, we need wireless Internet connectivity using 802.11b for the demo.

References

[1] Yatin Chawathe, Sriram Ramabhadran, Sylvia Ratnasamy, Anthony LaMarca, Scott Shenker, and Joseph Hellerstein. A case study in building layered dht applications. In *SIGCOMM '05: Proceedings of the 2005 conference on Applications, technologies, architectures, and protocols for computer communications*, pages 97–108, New York, NY, USA, 2005. ACM Press.

[2] S. Rhea, D. Geels, T. Roscoe, and J. Kubiatowicz. Handling churn in a dht, 2004.

[3] Sean Rhea, Brighten Godfrey, Brad Karp, John Kubiatowicz, Sylvia Ratnasamy, Scott Shenker, Ion Stoica, and Harlan Yu. Opendht: a public dht service and its uses. In *SIGCOMM '05: Proceedings of the 2005 conference on Applications, technologies, architectures, and protocols for computer communications*, pages 73–84, New York, NY, USA, 2005. ACM Press.