ED STIC - Proposition de Sujets de Thèse

pour la campagne d'Allocation de thèses 2011

Titre du sujet : Complex geospatial data processing in mobile overlay networks.

Mention de thèse : Informatique

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Description du sujet :

Geospatial data is becoming a prominent aspect of Future Internet Applications,
spanning from real world data (i.e. spatial publish/subscribe, localized search results) to
virtual worlds data.

The modeling of virtual worlds over Peer-To-Peer Overlays has been studied in the
attempt of addressing several issues that appear in massive On-Line Virtual Worlds,
such as consistency and scalability. In massive virtual worlds like "Second Life" or
"World of Warcraft", the aforementioned issues become critical as the system scales up.
Peer-To-Peer Virtual World models must also address the critical issue of "range queries"
or "area of interest" within the neightborhood of a certain peer in the network in order
to avoid flooding the Real-Time Virtual World with requests (3D P2P streaming [Shun-Yun 2010]).

In this scenario, the usage of a Virtual World Model [Shun-Yun 2004] could lead to an improved

representation of a real world geo-located environment on top of an overlay network with peers, both static and mobile, capable of handling complex geospatial data, such as itineraries, proximity lists, social links, variable traffic conditions etc.

Peers mobility is also a key aspect to be considered when designing such system, addressing issues like
data handover when a mobile peer moves from one area to another.

The candidate will investigate P2P architectures specifically designed to model Virtual Worlds
such as Walkad [Matteo 2009] or VON [Shun-Yun 2006] and develop a novel overlay protocol for real world
geospatial data capable of efficiently routing, in a content-based fashion, complex queries
such as itinerary queries, proximity publish/subscribe paradigm with moving peers, social links etc.

References:

Shun-Yun 2004 - Scalable peer-to-peer networked virtual environment, NetGames '04 Proceedings of 3rd AMC SIGCOMM workshop on Network and system support for games.
Shun-Yun 2006 - VON: A scalable peer-to-peer network for virtual environments, IEEE Network vol. 20 no. 4, Jul./Aug. 2006, pp. 22-31
Matteo 2009 - A walkable Kademlia Network for Virtual Worlds Iptps'09, Boston, USA, April, 2009
Shun-Yun 2010 - Peer-to-Peer 3D Streaming, IEEE Internet Computing, vol. 14, no. 2, March/April 2010, pp. 54-61.

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English version: