



## SÉMINAIRE du département 1 “Systèmes Large Echelle”

**Lieu :** Salle Aurigny, Bât 12 D165 Campus de Beaulieu - Rennes

**Date & heure :** Mardi 21 février, à 14h

**Présentation :** Maria Gradinariu Potop-Butucaru

**Title:** Physical expander in virtual tree overlays

**Abstract:** We present a new construction of constant-degree expanders motivated by their application in P2P overlay networks and in particular in the design of robust tree overlays. Our key result can be stated as follows. Consider a complete binary tree  $T$  and construct a random pairing between leaf nodes and internal nodes. We prove that the graph obtained from  $T$  by contracting all pairs (leaf-internal nodes) achieves a constant node expansion with high probability. The use of our result in improving the robustness of tree overlays is straightforward. That is, if each physical node participating to the overlay manages a random pair that couples one virtual internal node and one virtual leaf node then the physical-node layer exhibits a constant expansion with high probability. We encompass the difficulty of obtaining this random tree virtualization by proposing a local, self-organizing and churn resilient uniformly-random pairing algorithm with  $O(\log 2n)$  running time. Our algorithm has the merit to not modify the original tree virtual overlay (we just control the mapping between physical nodes and virtual nodes). Therefore, our scheme is general and can be applied to a large number of tree overlay implementations. We validate its performances in dynamic environments via extensive simulations.

Ce travail, publié dans DISC 2011, est en collaboration avec Taisuke Izumi (Nagoya Institute of Technology) and Mathieu Valero (LIP6, UPMC) : "Physical expander in virtual tree overlays".

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