

Finding the best tradeoff between multiresolution content reproduction quality and multiresolution content distribution efficiency

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Plan

Requierements

OVE

Future work

Conclusion

Requierevements

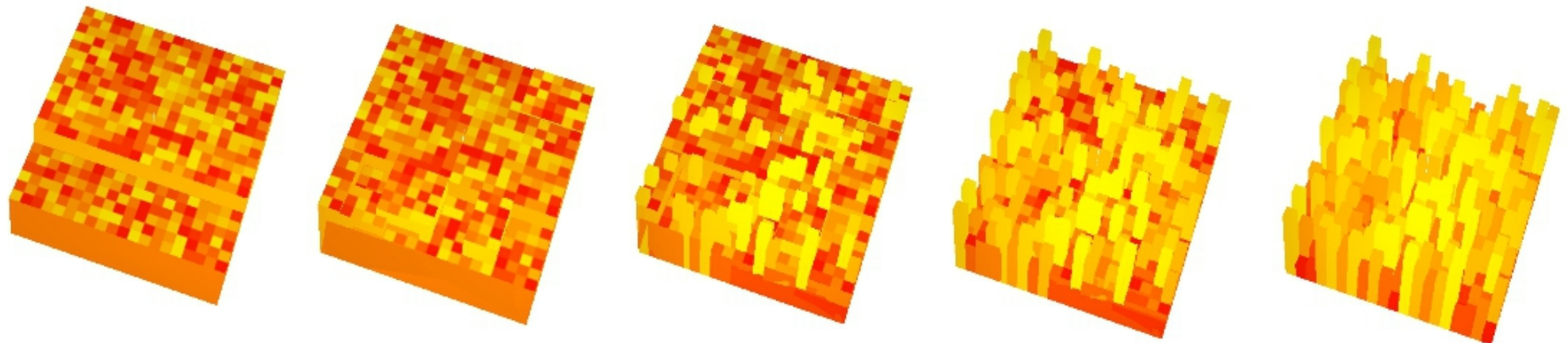
- 1 - A networked multiresolution 3D content
- 2 - Various distributed connectivity strategies
- 3 - Distributed emulation platform

OVE : Objectives

- 1** - Providing a framework that allows various networked content multiresolution reproduction (including data chunks organization)
- 2** - Providing a framework that allows single or multiple distributed connectivity strategies implementation and reproduction (network exchanges and connectivity relations in centralized, hybrid or peer-to-peer)

Generally = Providing a framework that allows the implementation and experimentations of various multiresolution content distribution and reproduction strategies

OVE : Multiresolution histogram



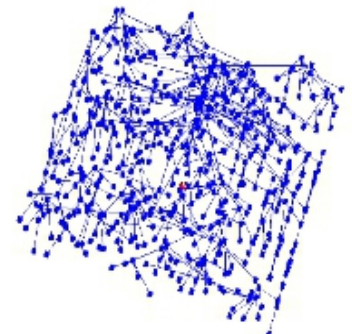
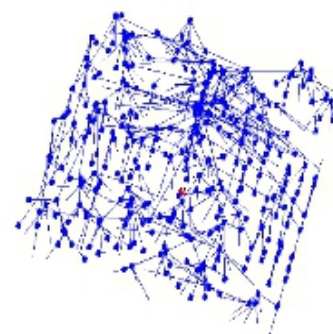
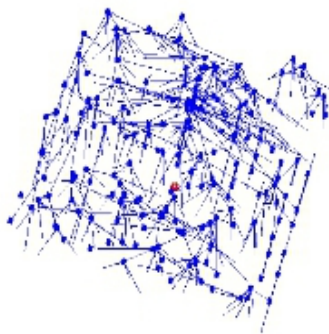
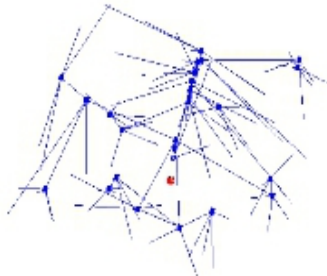
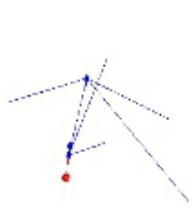
~ 100 Vertexes

~ 500 Vertexes

~ 3500 Vertexes

~ 5500 Vertexes

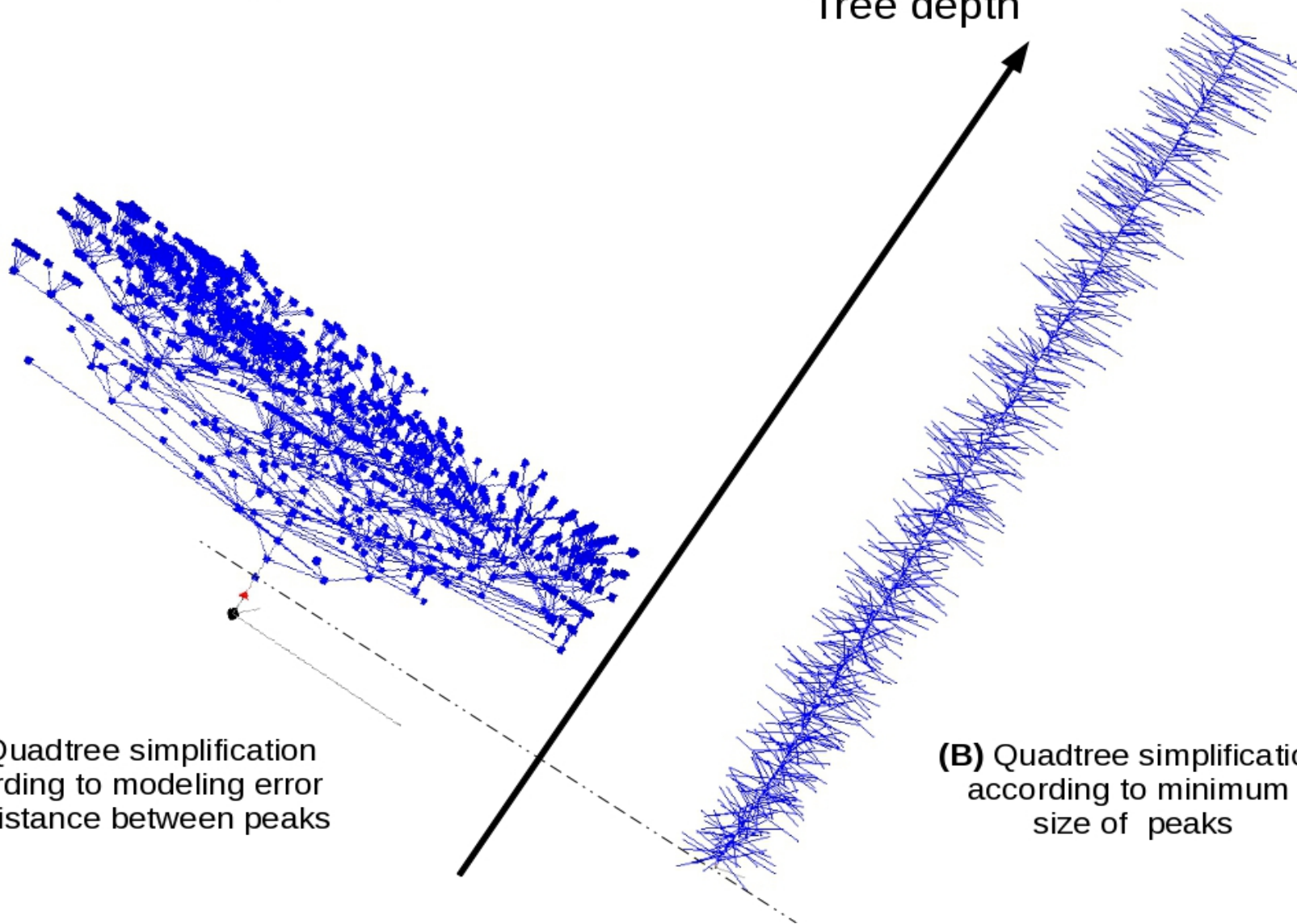
~ 8000 Vertexes



OVE : Multiresolution histogram

Same 30x30 histogram

Tree depth



(A) Quadtree simplification according to modeling error and distance between peaks

(B) Quadtree simplification according to minimum size of peaks

OVE : Multiresolution histogram reproduction

Video 1 (32s)

Histogram 15x15

Quadtree simplification according to modeling error and distance between peaks

<http://www.youtube.com/watch?v=ZTIHV0r5Fws>

OVE : Distributed connectivity

2D Voronoi / Delaunay distributed connectivity

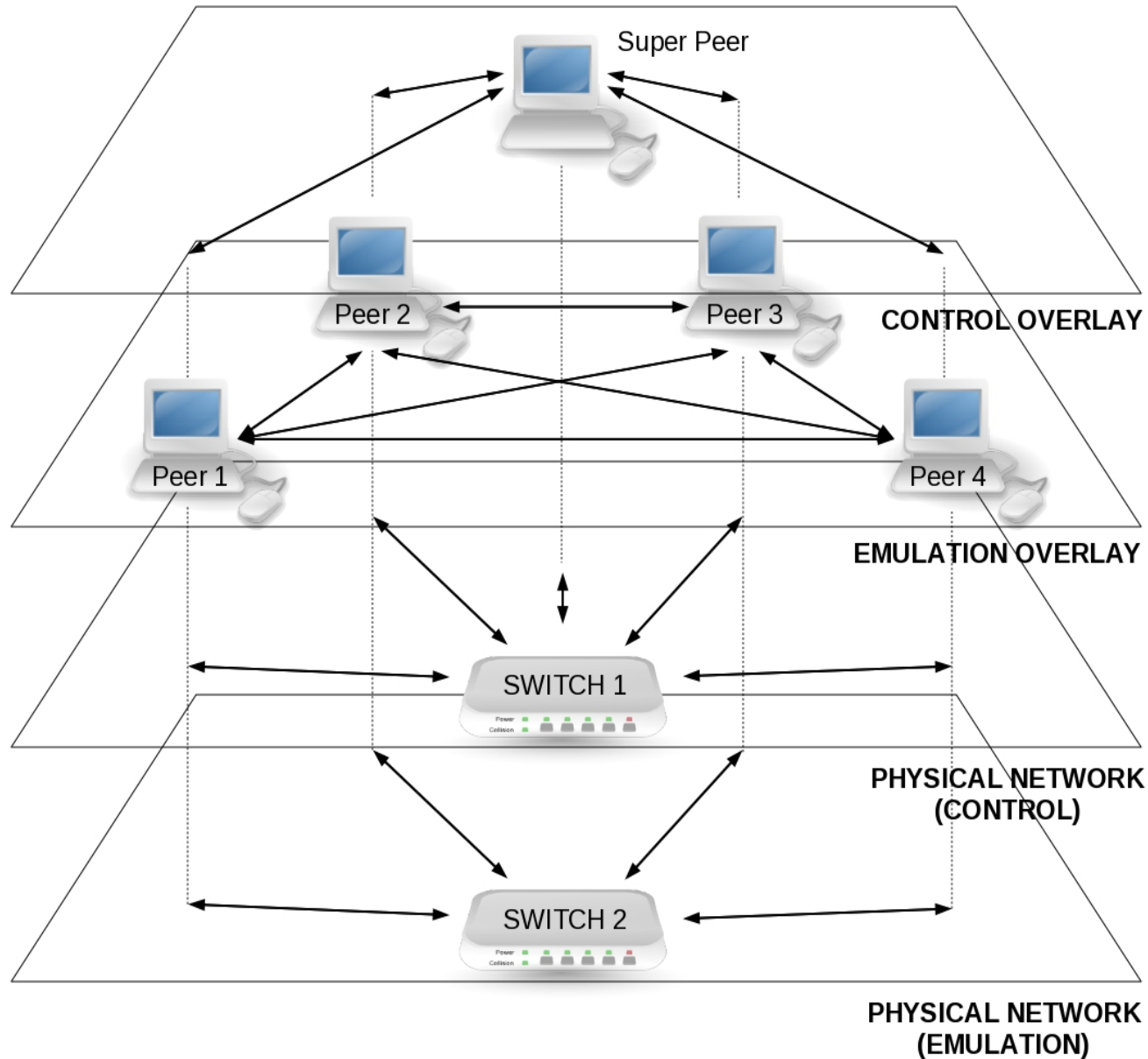
Shun-Yun Hu, Jui-Fa Chen and Tsu-Han Chen, VON: A scalable peer-to-peer network for virtual environments, IEEE Network, vol. 20 no. 4, pp. 22-31, Jul./Aug. 2006.

Triangulation relaxed connectivity

Efficient Triangulation for P2P Networked Virtual Environments, E. Buyukkaya and M. Abdallah Proc. ACM SIGCOMM Workshop on Network and Systems Support for Games (Netgames), Worcester MA,USA, October 2008.

Centralized nD proximity

OVE : Network architecture



OVE : Screenshot

The screenshot displays the SEmulator interface, which is used for visualizing and simulating network topologies. The central part of the interface shows a 3D visualization of a network structure, consisting of numerous blue nodes connected by lines, forming a dense, roughly spherical cluster. The nodes are labeled with IP addresses, and some are highlighted in red. The network is viewed from a perspective that allows for a 3D understanding of its structure.

The interface is divided into several functional areas, each marked with a red number (1) through (20):

- (1)**: Navigation controls for the 3D view, including buttons for 'Use X', 'Next X', 'Use Y', 'Next Y', 'Use Z', and 'Next Z', along with labels for 'X [D1] - VW WIDTH', 'Y [D2] - VW DEPTH', and 'Z [D3] - VW HEIGHT'.
- (2)**: A 3D coordinate system (X, Y, Z) and a 'Frame' button.
- (3)**: A 'Ground' button.
- (4)**: 'Virtual World' and 'Real World' buttons.
- (5)**: 'Add Histo' and 'Rem Histo' buttons.
- (6)**: A 'RECORD' button and a status display showing coordinates: X: 48426, Y: -140300, Z: 141402, and 'time ratio : 8.000'.
- (7)**: A 'RECORD' button and a status display showing coordinates: X: 48426, Y: -140300, Z: 141402, and 'time ratio : 8.000'.
- (8)**: A toolbar with buttons for 'Conn. error', 'Neigh. error', 'Pos. error', 'Free', and 'Plot'.
- (9)**: A 'Qty. conn' button.
- (10)**: A 'Plot' button and a small graph showing a line plot with a green line and a red line, labeled '1.00' and '0' on the y-axis and 't' on the x-axis.
- (11)**: A 'Description' button.
- (12)**: A 'Data Level' button.
- (13)**: A 'Visibility' button.
- (14)**: A 'Culling' button.
- (15)**: A 'Transfers' button.
- (16)**: A 'DSG bounds' button.
- (17)**: A 'DSG links' button.
- (18)**: A 'OVE / DSG' button.
- (19)**: A 'DSG' button.
- (20)**: A 'DSG' button.

At the bottom of the interface, there is a footer with the text: "The Open Virtual Environment project (GPL v3), Copyright (C) 2011 LIP6-CNRS, Pierre and Marie Curie University, France, <http://openvirtualenvironment.lip6.fr>".

OVE : Interface

- 1.The current Cartesian reference frame (1, 2 or 3D with selected dimensions).
- 2.Visualize a 3D model of the Cartesian reference frame.
- 3.Visualize a ground or a earth model and the movements boxes.
- 4.Change quickly the Cartesian reference frame to the real or the virtual world.
- 5.Add or remove a multiresolution 3D histogram.
- 6.Your viewpoint location in the distributed emulation with the time ratio.
- 7.Start, stop, pause, resume, slow down or speed up the distributed emulation.
- 8.Select the information you want to get from registered peers.
- 9.Free all collected data or plot them using gnuplot.
- 10.Visualize in real-time the data collected by the super peer.
- 11.A graph that represents the local resources used by the considered process.
- 12.Visualize a description of all nodes and network messages exchanged.
- 13.Visualize the data level of each content (i.e., if a detail equiv. many chunks).
- 14.Tune the rendering using theses commands.
- 15.Visualize the contents, their data distribution, their corresponding bounds and the real-time data transfers.
- 16.Increase or decrease the global reproduction quality (you can also use the mouse scroll).
- 17.An authority model that corresponds to a user viewpoint.
- 18.A data transfer between two authorities in the considered Cartesian reference frame.
- 19.The nodes/chunks distribution of the loaded multiresolution 3D histogram.
- 20.The description of the message exchanged between two authorities.

OVE : Distributed connectivity experimentation

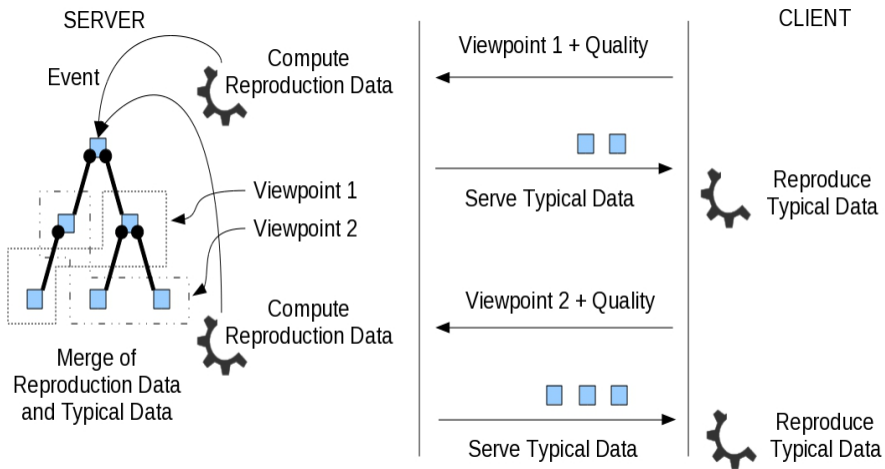
Video 2 (57s)

1 super peer
1 seed and 5 peers
VON connectivity

http://www.youtube.com/watch?v=o-rOk_dPjJ8

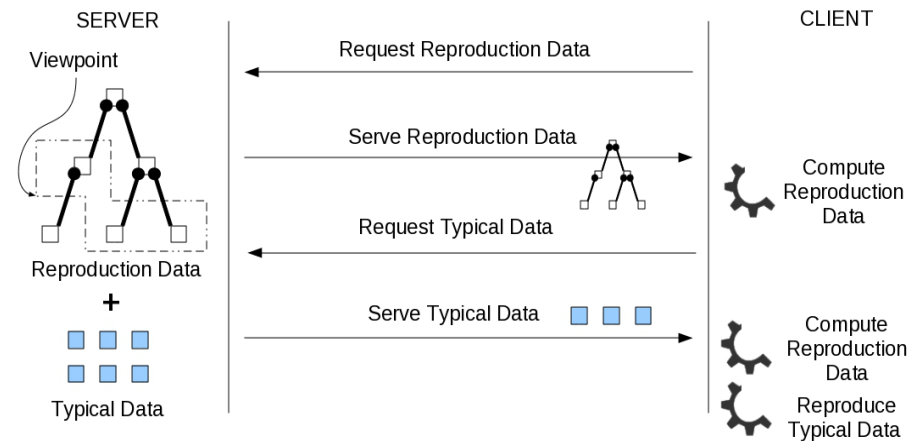
Future work

PUSH



VS

PULL



Ideal mixing strategy on top of efficient distributed connectivity strategy ?

Strategy different for each content ? Strategy different for each usage ?

OVE possibly allows the mixing of contents !

OVE possibly allows the mixing of strategies !

A collaborative research platform ?

Many connectivity strategies
Many contents/states in DVE
Many contexes and usages
Many experimentations

Thanks !
Questions ?

<http://openvirtualenvironment.lip6.fr>