Is my State System Fast Yet?

Progress Report Meeting
May 5, 2016

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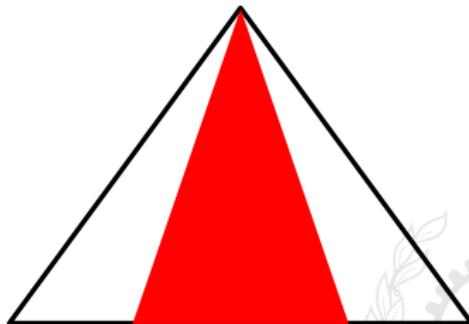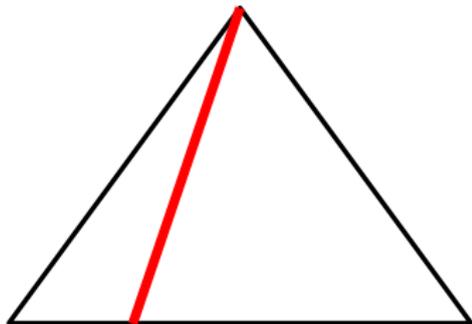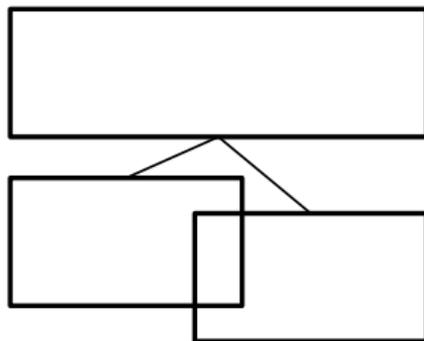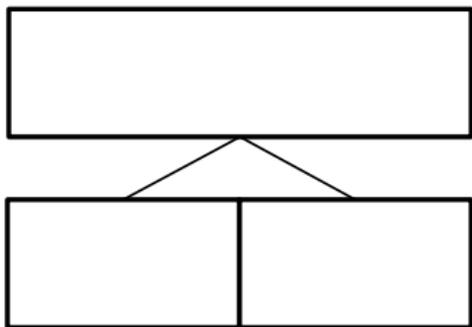
École Polytechnique de Montréal
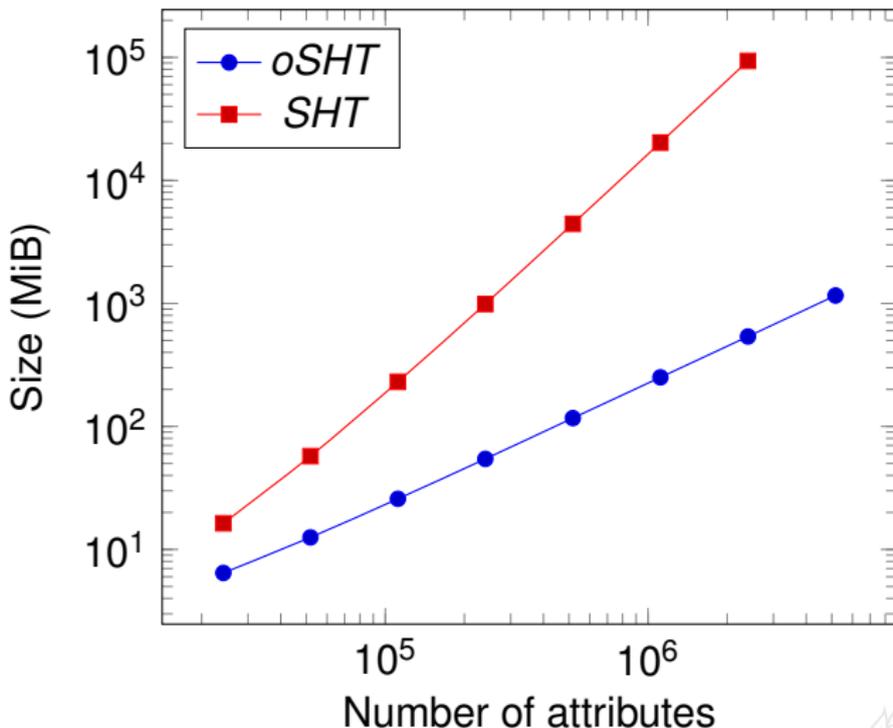Laboratoire **DORSAL**

Table of Contents

SHT for 10k threads

Full Core Node   Empty Core Node   Full Leaf Node
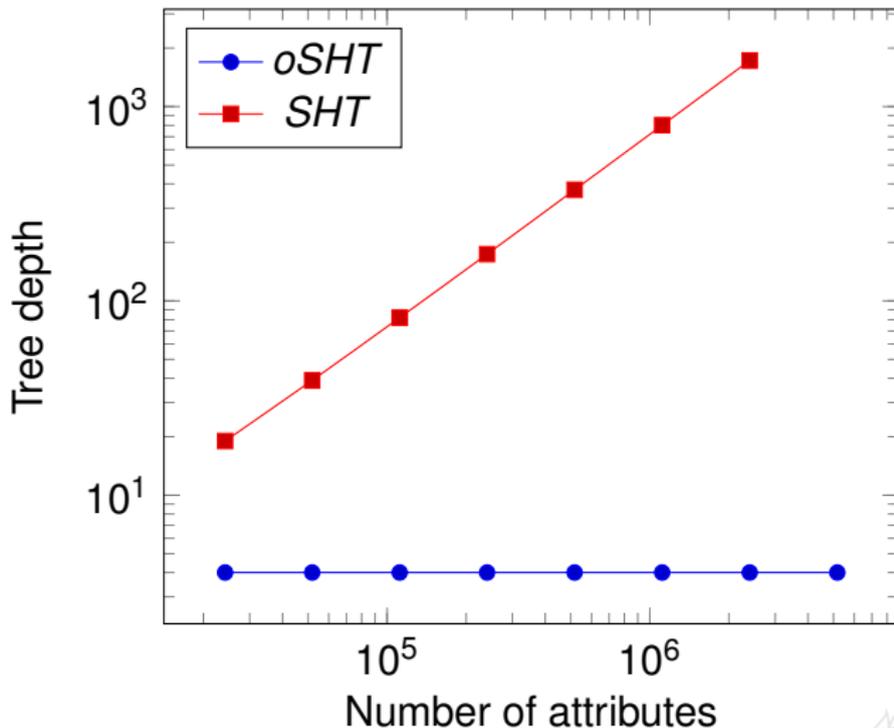
SHT vs. overlapping SHT

SHT and Overlapping SHT size on disk

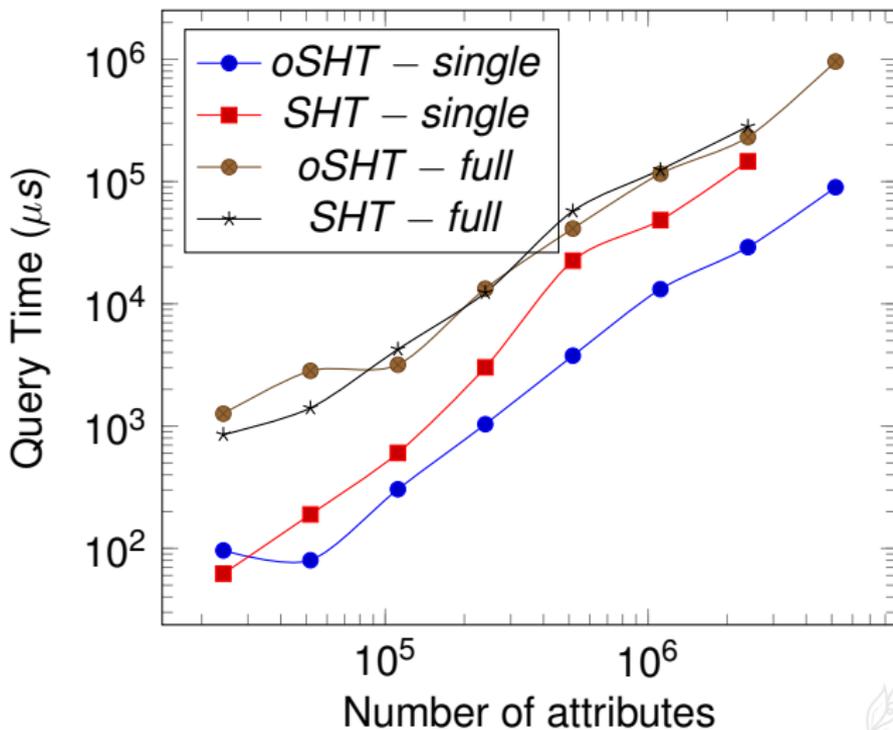$$SHT_{size} \propto nA^2, \quad oSHT_{size} \propto nI$$
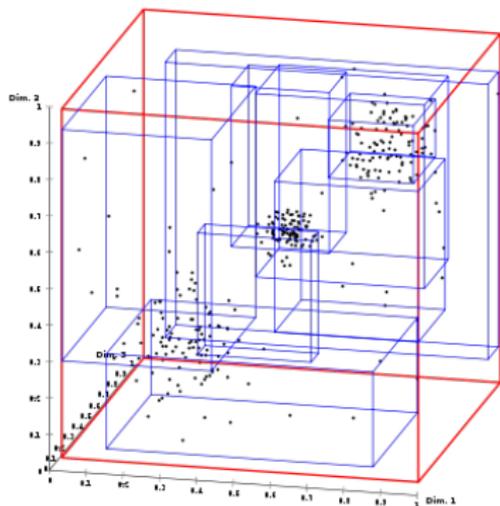
SHT and Overlapping SHT depth

$SHT_{depth} \propto nA$, $oSHT_{depth} \propto log_c(nI)$

SHT and Overlapping SHT query times
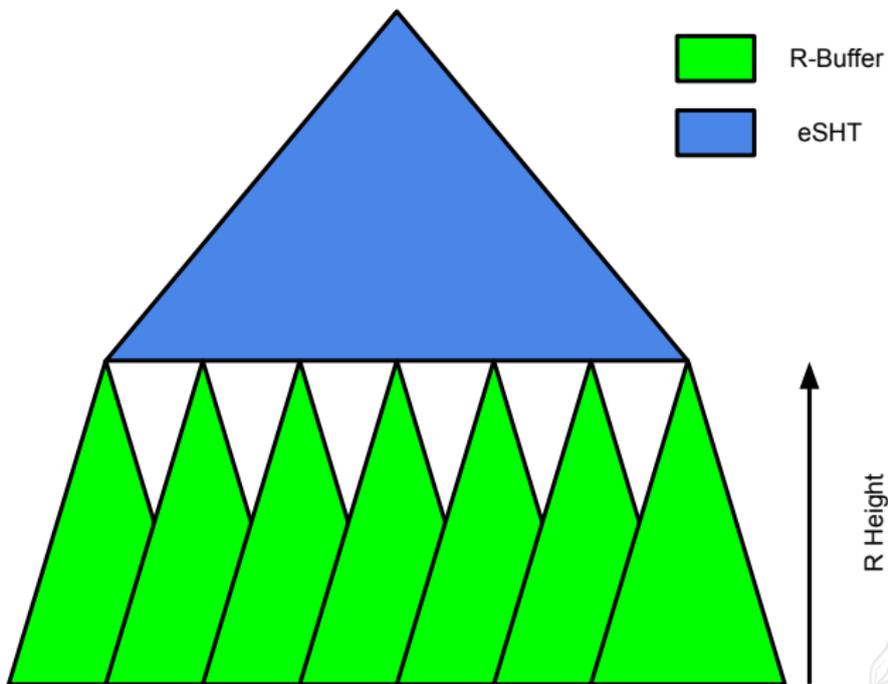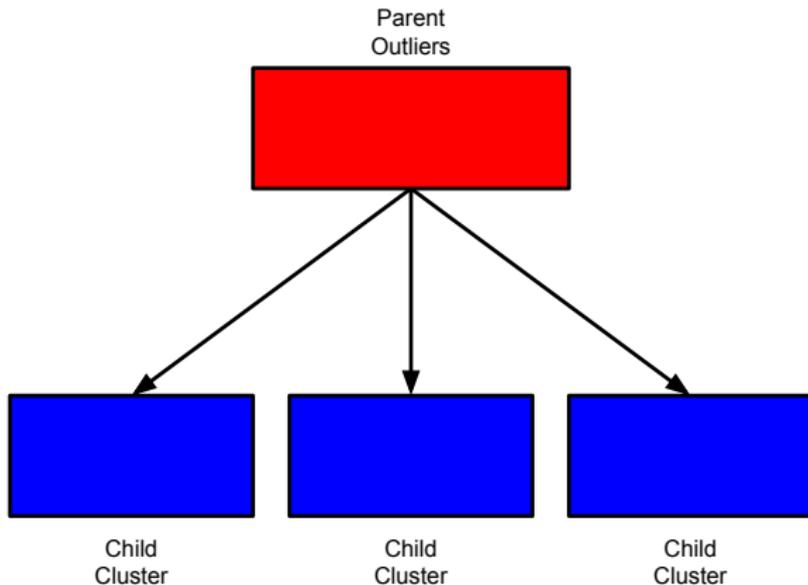
R-Trees

- Multi-Dimensional Data Structure
- Every node has bounding hyper-rectangles
- Child node's bounds are included in parent node's bounds
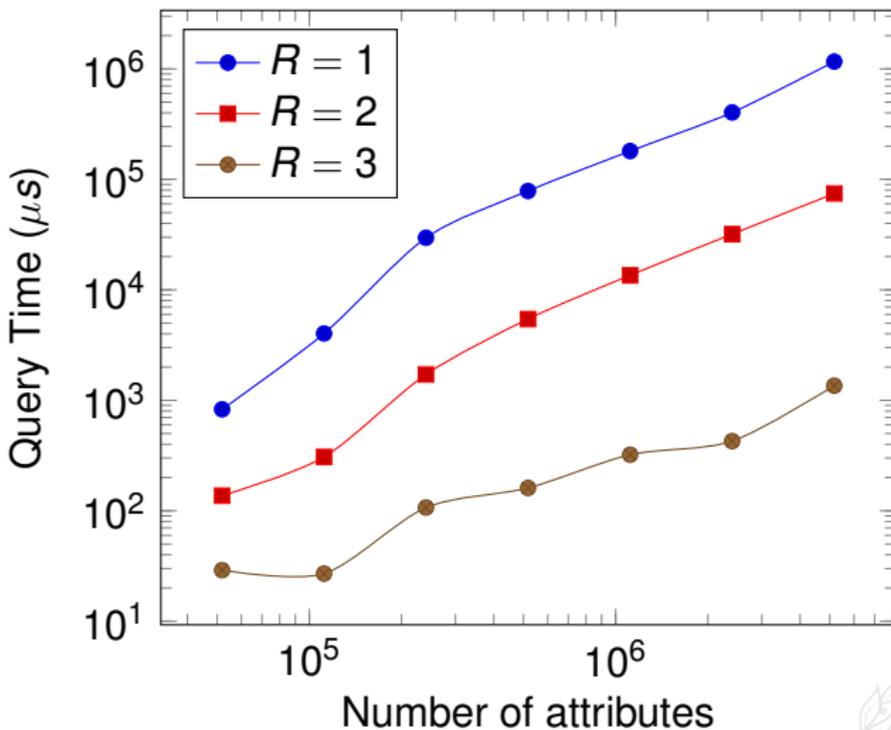- Minimize hyper-rectangles' volumes or overlap

R-SHT : a ST-LT with R-Trees and Overlapping SHT

R-Buffer

eSHT

R Height

R-SHT : Build Algorithm - To disk

R-SHT : Range Query Scalability

Case Study: Control Flow View

Case Study: Control Flow View

Current Way:
AbstractStateSystemTimeGraphView

Perform full queries for every vertical pixel:

- Queries information on threads that are not displayed
- Some intervals are returned by several full queries
- Nodes searched $= resolution \times SHT_{height} = 395\,520$
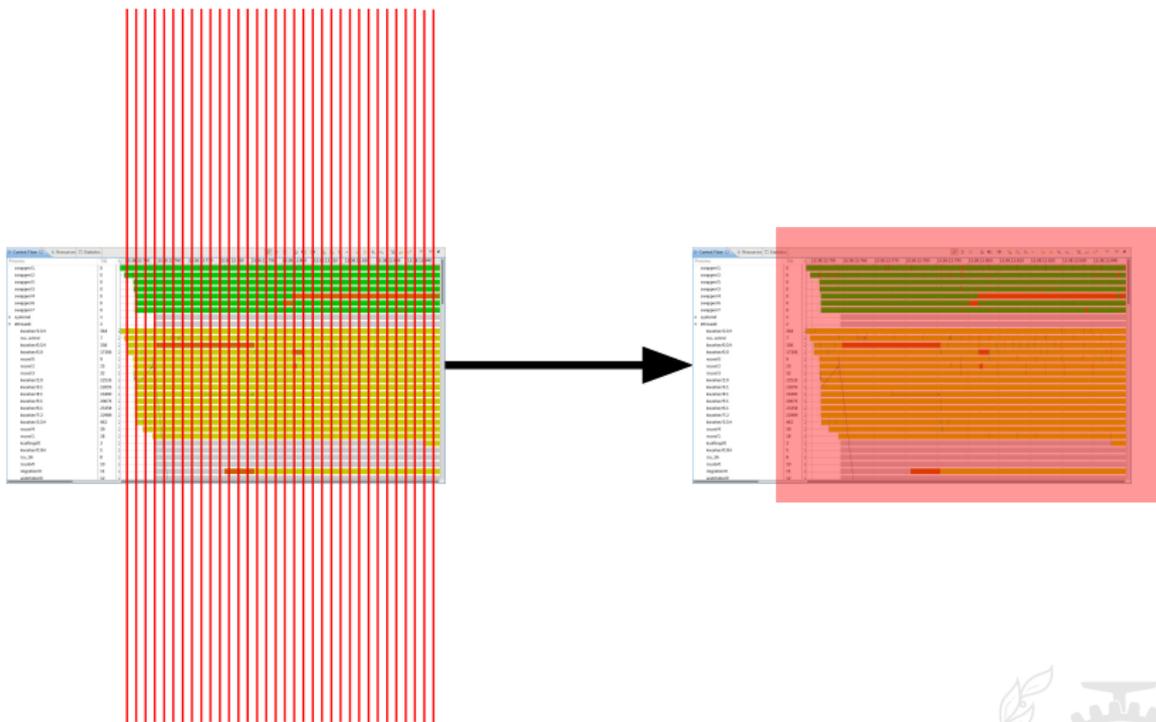
Case Study: Control Flow View

Suggested Way:
AbstractVisibleTimeGraphView

Perform **2D query** on visible Items (threads):

- Items visible on screen with buffer below and above
- Single, RSHT-optimized query, in one pass.
- Nodes searched $\leq 270 \ll 395\ 520$
- Refresh on scroll / zoom.

Case Study: Control Flow View

Future Work

- Integrate into Trace Compass
  - ss: Allow nodes to overlap
    https://git.eclipse.org/r/61062
  - ss: add quark dimension to narrow down search queries and rsht.
    https://git.eclipse.org/r/70903
- Investigate and upgrade State System usage

Questions?

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