Is my State System Fast Yet?

Progress Report Meeting
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SHT for 10k threads
SHT vs. overlapping SHT
SHT and Overlapping SHT size on disk

\[ SHT_{size} \propto nA^2, \quad oSHT_{size} \propto nl \]
SHT and Overlapping SHT depth

\[ SHT_{\text{depth}} \propto nA, \quad oSHT_{\text{depth}} \propto \log_c(nI) \]
SHT and Overlapping SHT query times

Query Time (µs) vs. Number of attributes

- oSHT – single
- SHT – single
- oSHT – full
- SHT – full
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-SHT : Build Algorithm - To disk
R-SHT : Range Query Scalability

![Graph showing query time vs number of attributes for different ranges](image-url)
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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