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TAU Demonstration

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Reservation of 12,000 cores on Kraken at NICS

- Demonstration of large-scale live online monitoring capabilities via TAU using MPI as a transport layer for performance data
- Time: 5/4/2010 4:15am EDT to 5:15am EDT
- Location: Schloss Dagstuhl Computer Science Research Center, Germany
- Purpose: International gathering of HPC tool developers
- Successfully demonstrated live online analysis of PFLOTRAN application benchmark with 2 billion DoF
- Live performance information generated on 12,000 cores of Kraken and transferred immediately to Dagstuhl for visualization on a laptop

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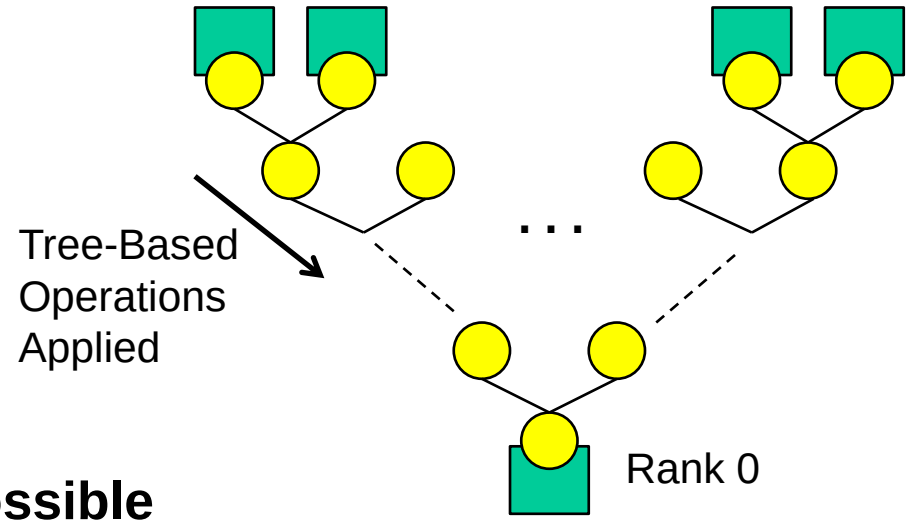
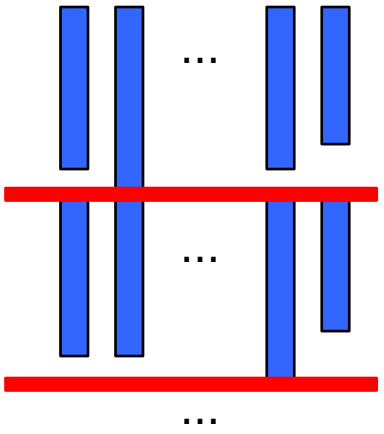
TAUmon with MPI transport layer

- TAUreduce API
  - Called at synchronous points
  - Called at end of execution
- Binnomial tree reduction
  - MPI-based
  - Use MPI reduce calls when possible
- Tree-based analysis operations
  - Event unification
  - Mean, Min, Max, Std Dev statistics of recorded metrics
  - Thread-frequency histograms per metric event





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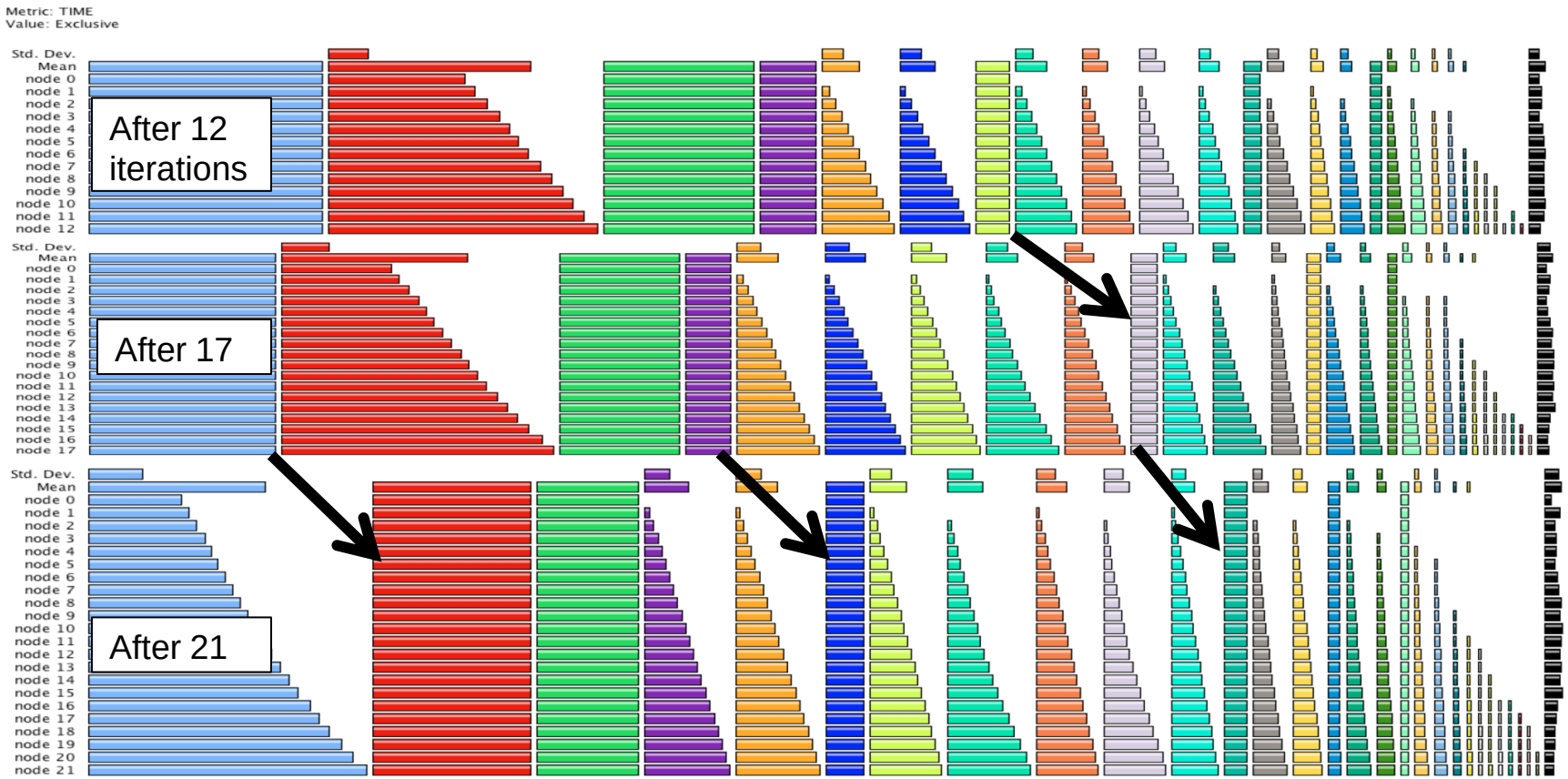
Analysis: Evolution of PFLOTRAN snapshots

- Visualization of live performance information using ParaProf
- Pictures below show 3 snapshots of mean-profile frames after 12, 17, and 21 iterations of the still-running 12k PFLOTRAN execution
- Note shifts in the order of events due to sorting by average value over time



Experiences and conclusions

- Live demonstrations at large scales and over long distances fraught with risks
- Smooth and well-received demonstration of the TAU online monitoring prototype
- Received impromptu informal commendation for “Most Parallel Tool Online Demo” and “bravery” by workshop organizers ☺
- The TAU team would like to express deep appreciation to NICS for the support in making this demonstration possible
- Special thanks go out to Dave McWilliams and Mark Fahey at NICS

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