

VI-HPS



Analysis report examination with CUBE

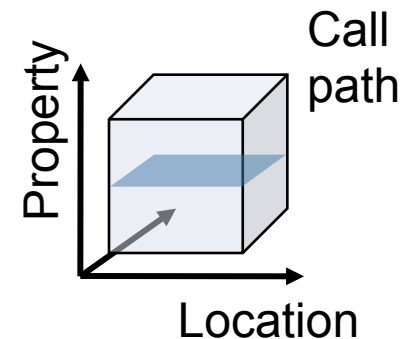
Marc-Andre Hermanns

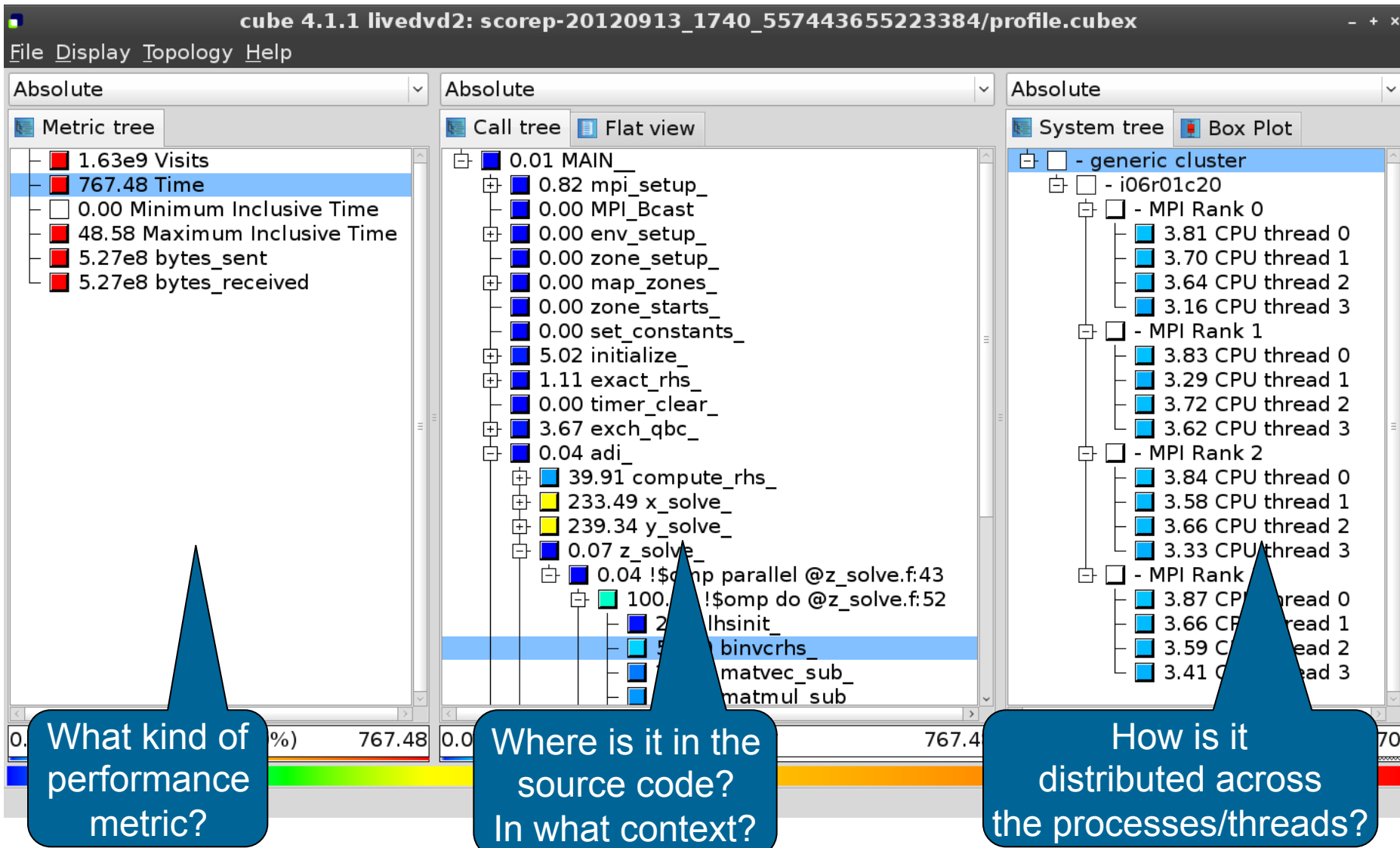
JARA-HPC, RWTH Aachen University



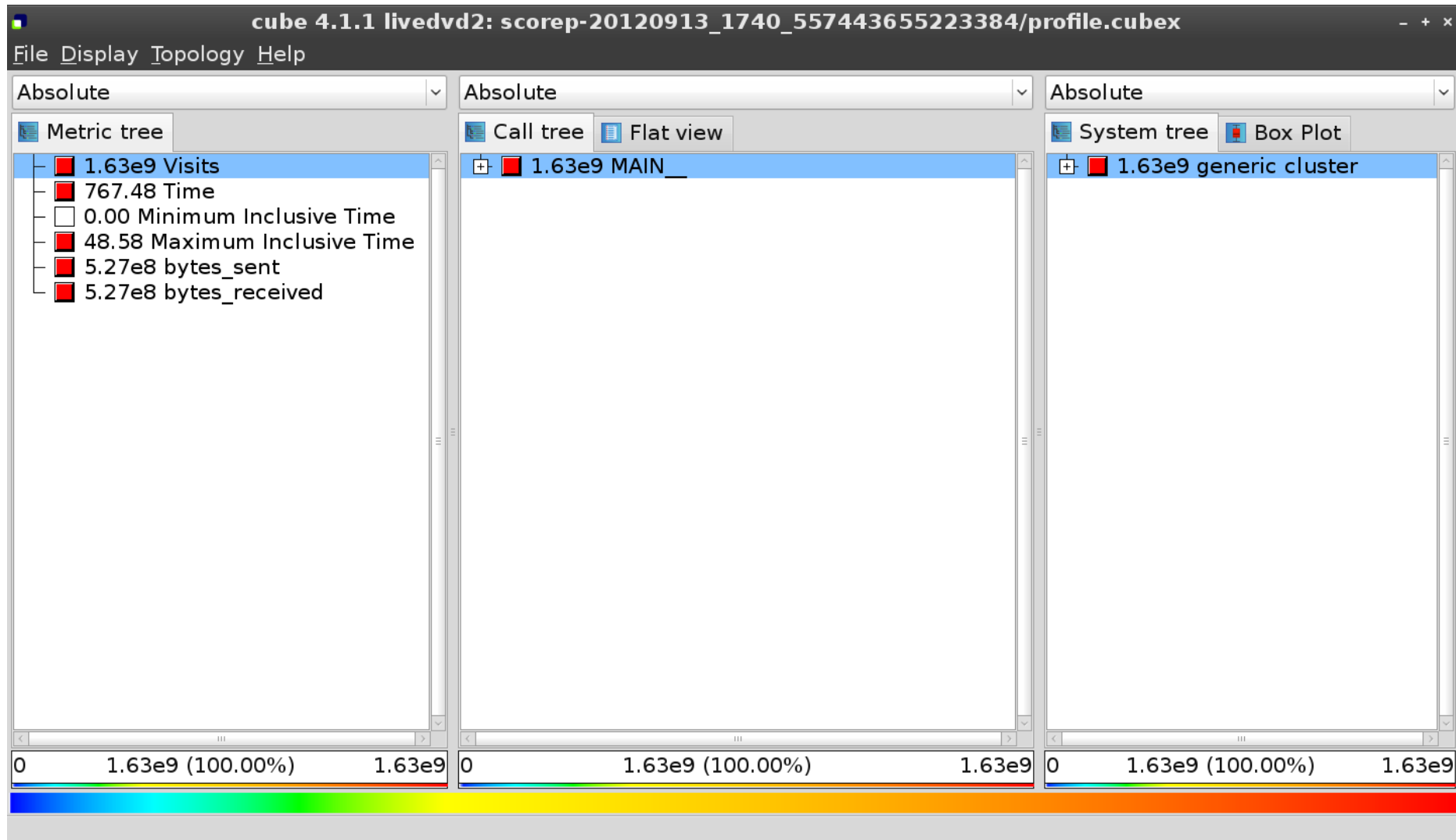
- Parallel program analysis report exploration tools
 - Libraries for XML report reading & writing
 - Algebra utilities for report processing
 - GUI for interactive analysis exploration
 - requires Qt4
- Originally developed as part of Scalasca toolset
- Now available as a separate component
 - Can be installed independently of Score-P, e.g., on laptop or desktop
 - Latest release: CUBE 4.2.3 (June 2014)

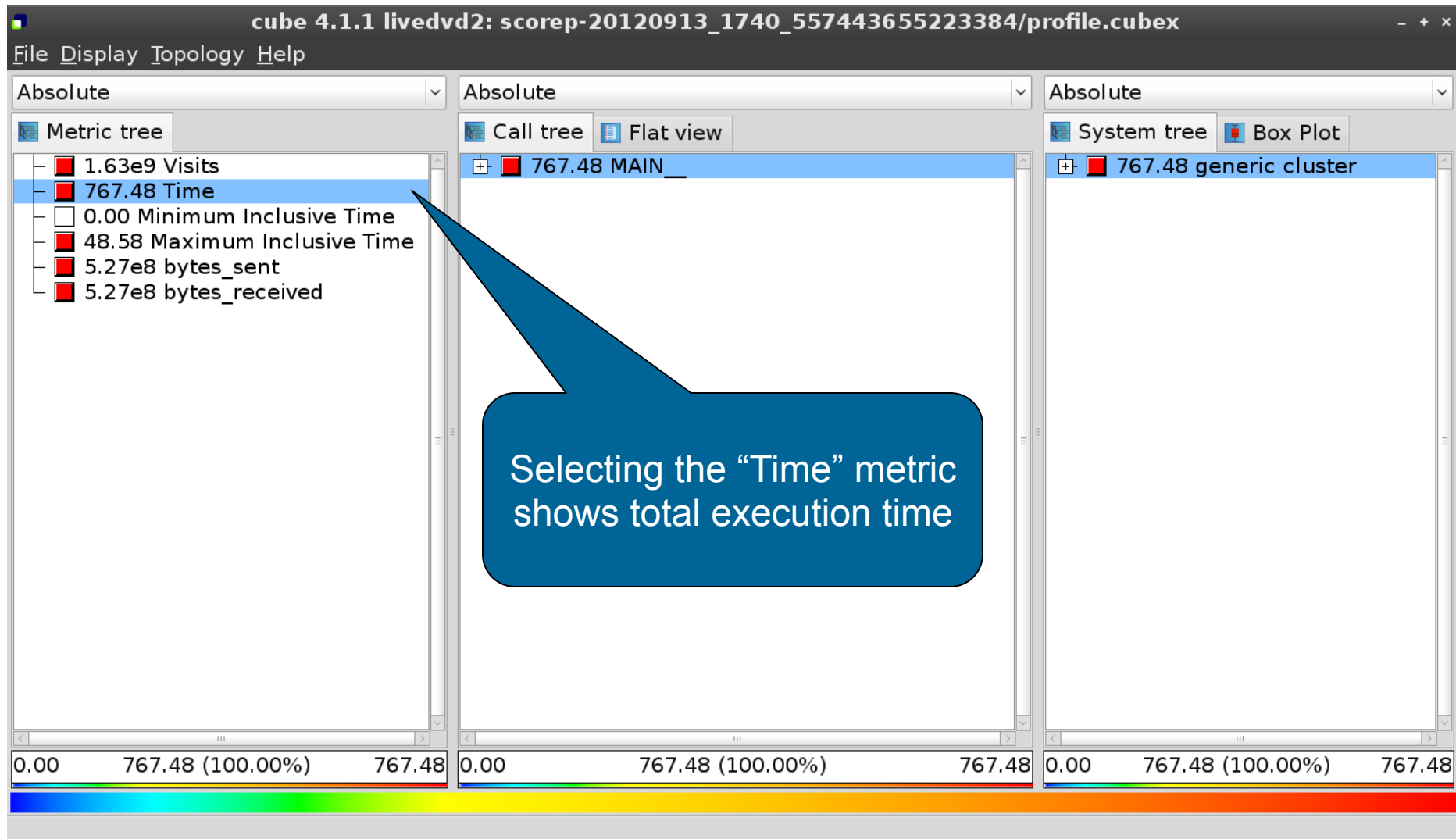
- Representation of values (severity matrix) on three hierarchical axes
 - Performance property (metric)
 - Call path (program location)
 - System location (process/thread)
- Three coupled tree browsers
- CUBE displays severities
 - As value: for precise comparison
 - As colour: for easy identification of hotspots
 - Inclusive value when closed & exclusive value when expanded
 - Customizable via display modes



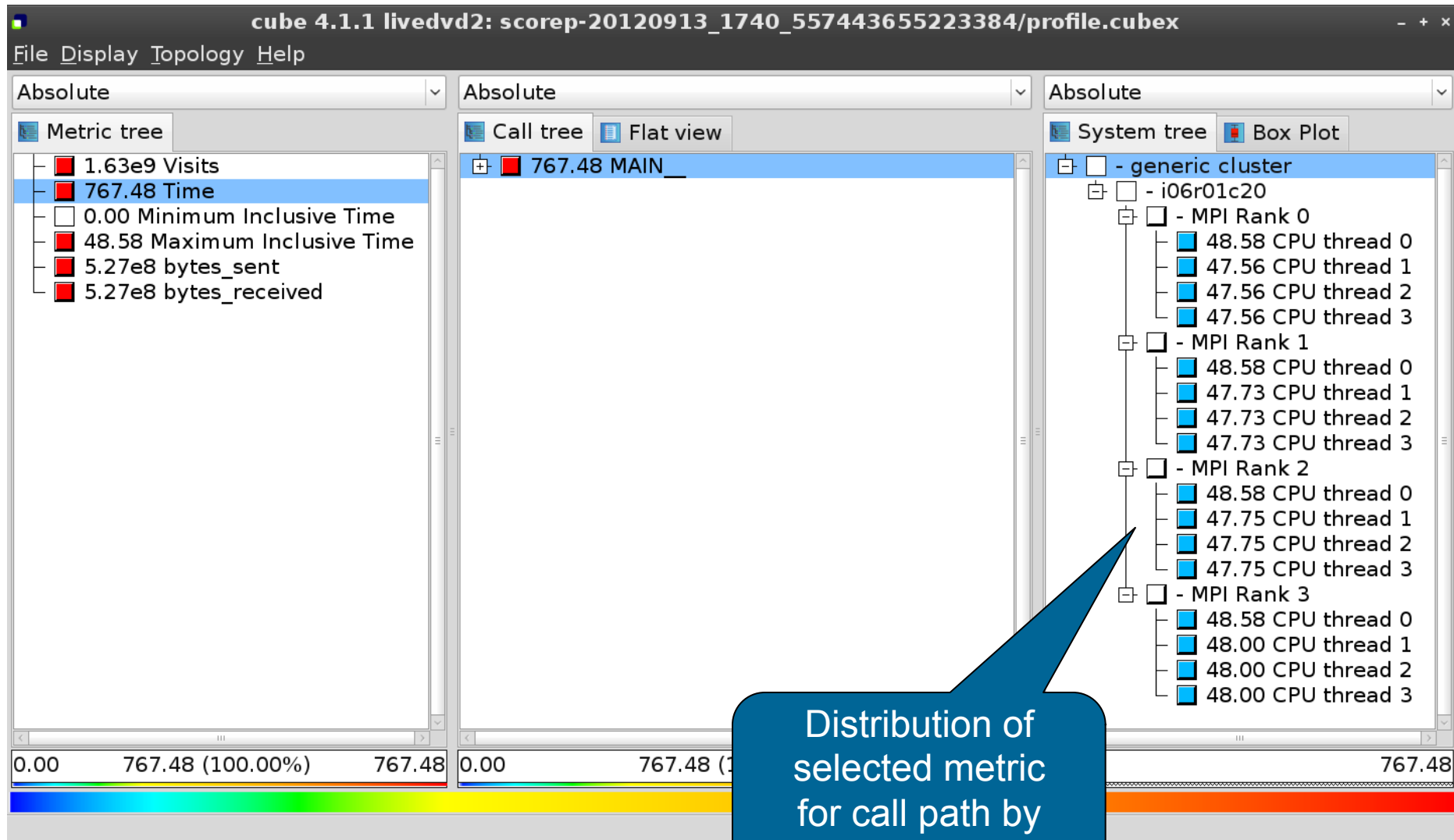


Analysis report exploration (opening view)

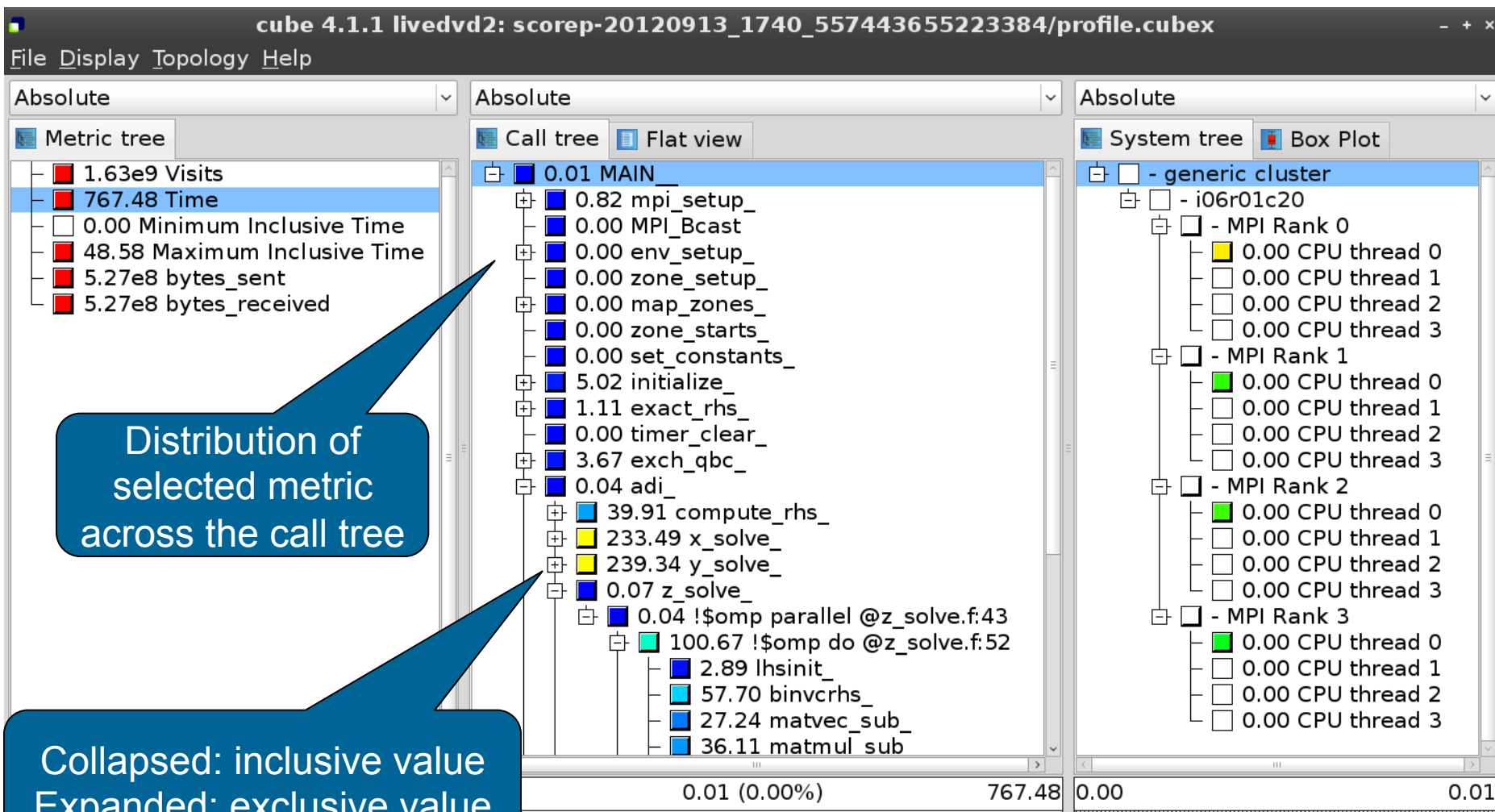




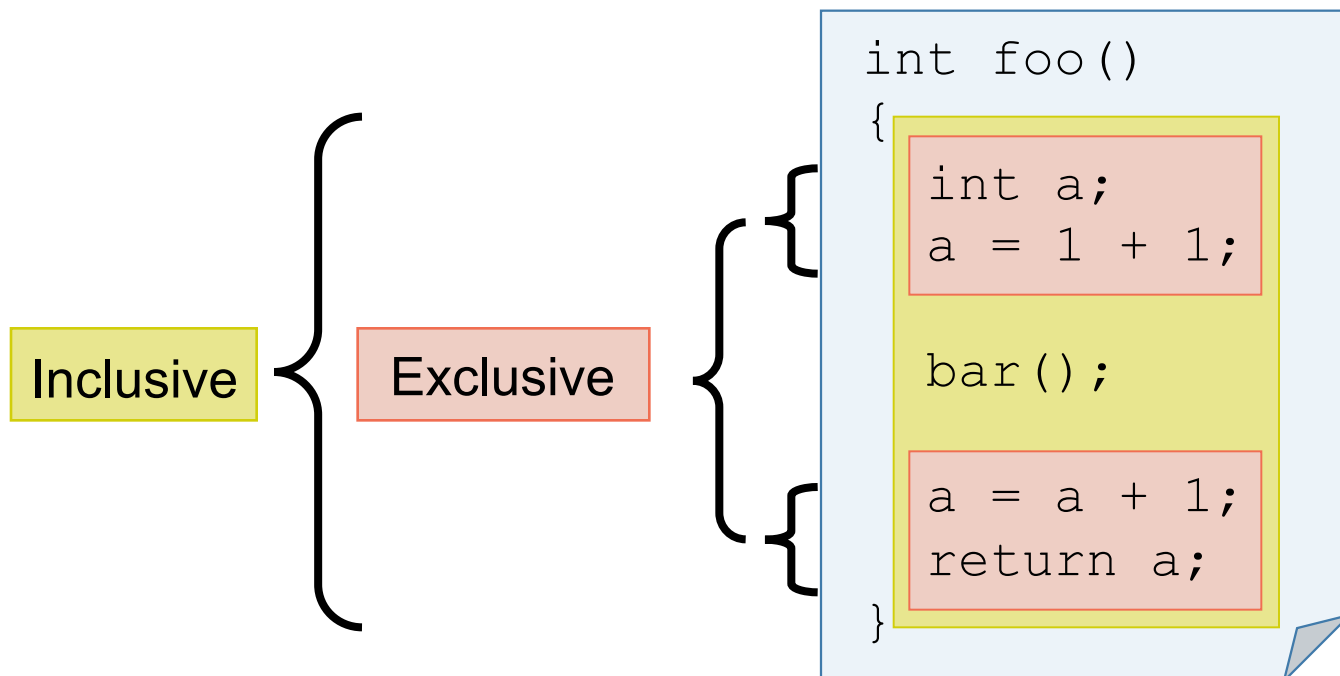
Expanding the system tree



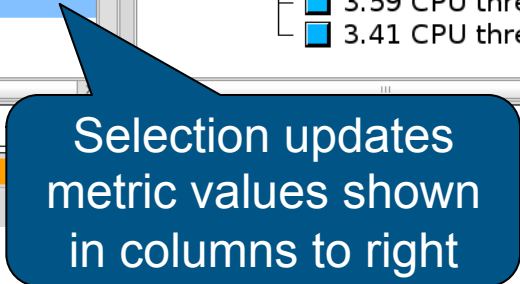
Expanding the call tree



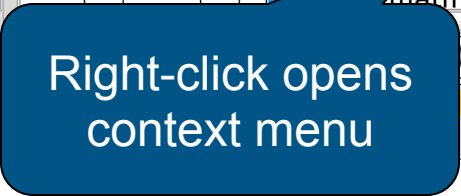
- Inclusive
 - Information of all sub-elements aggregated into single value
- Exclusive
 - Information cannot be subdivided further

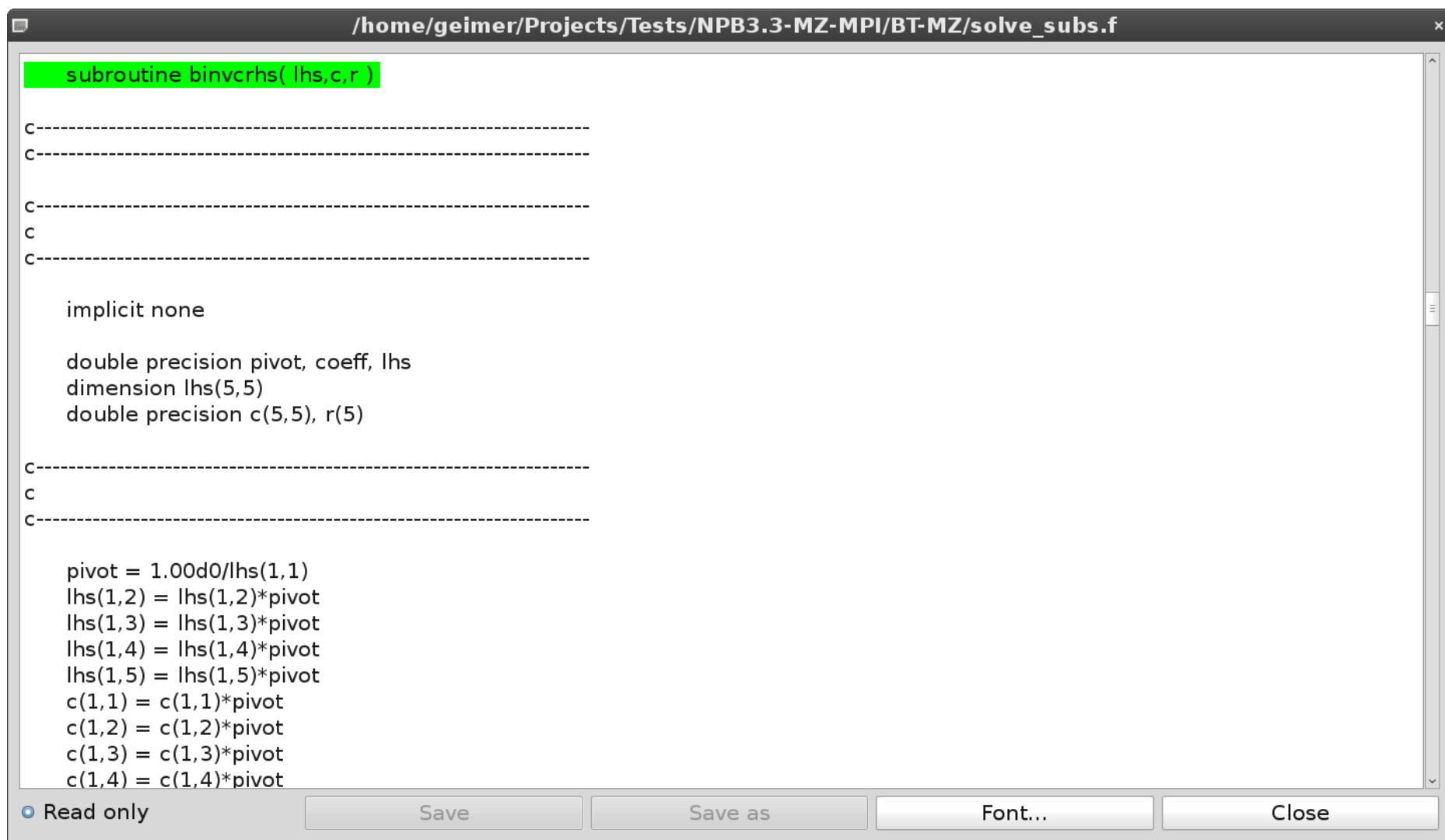


V-HPS



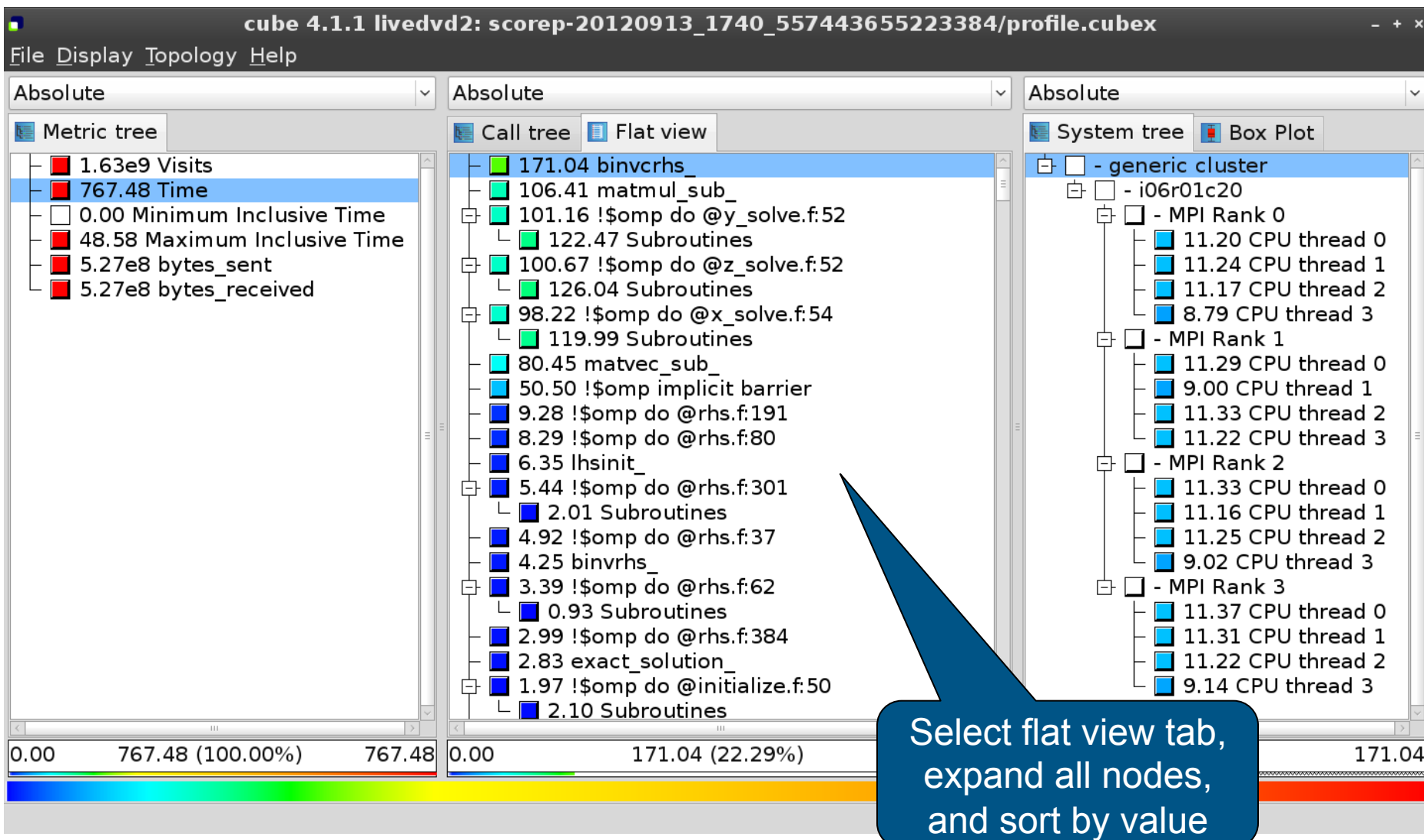
V-HPS

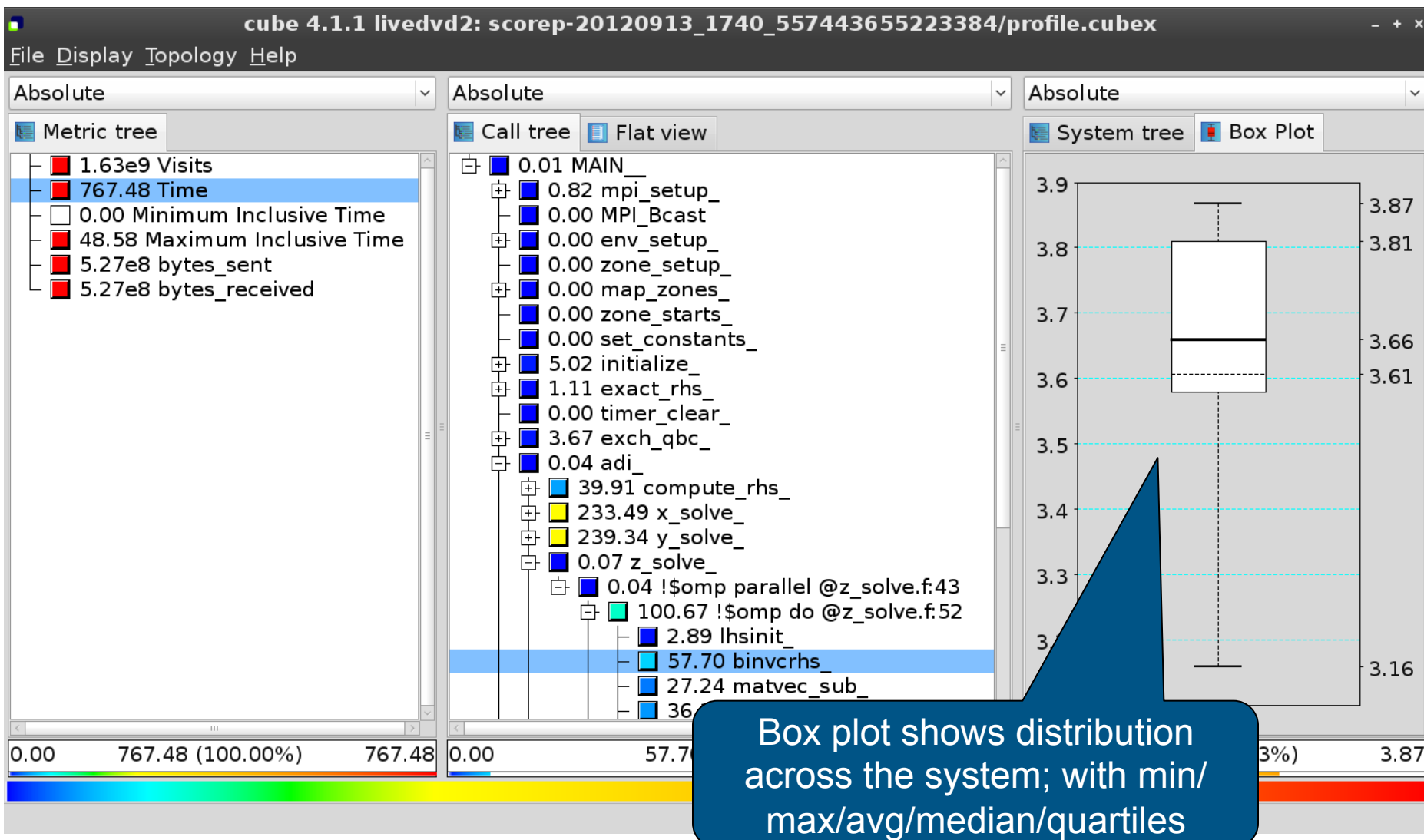


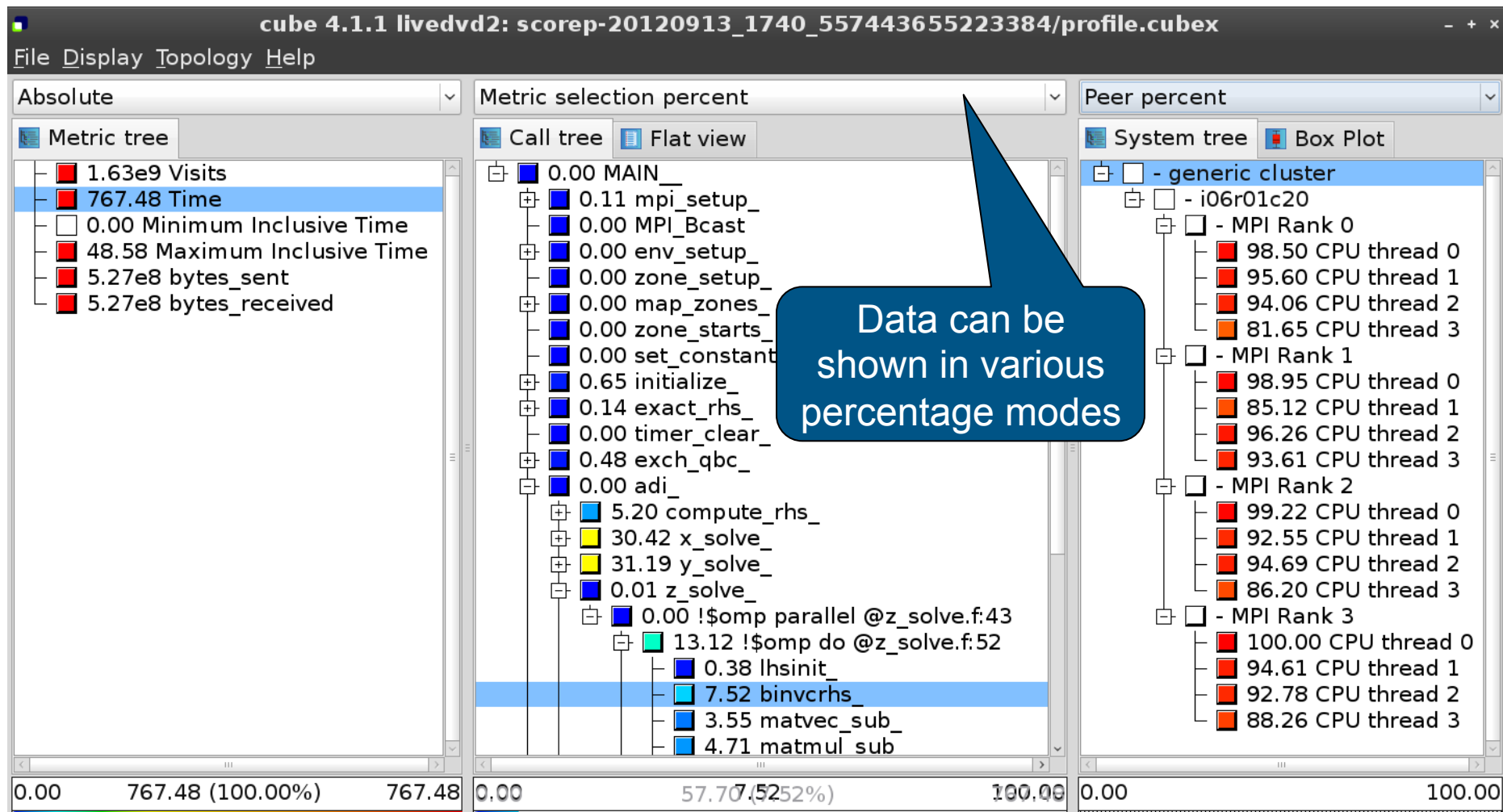


```
subroutine binvrchs( lhs,c,r )  
  
C-----  
C-----  
  
C-----  
C  
C-----  
  
implicit none  
  
double precision pivot, coeff, lhs  
dimension lhs(5,5)  
double precision c(5,5), r(5)  
  
C-----  
C  
C-----  
  
pivot = 1.00d0/lhs(1,1)  
lhs(1,2) = lhs(1,2)*pivot  
lhs(1,3) = lhs(1,3)*pivot  
lhs(1,4) = lhs(1,4)*pivot  
lhs(1,5) = lhs(1,5)*pivot  
c(1,1) = c(1,1)*pivot  
c(1,2) = c(1,2)*pivot  
c(1,3) = c(1,3)*pivot  
c(1,4) = c(1,4)*pivot
```

Read only Save Save as Font... Close

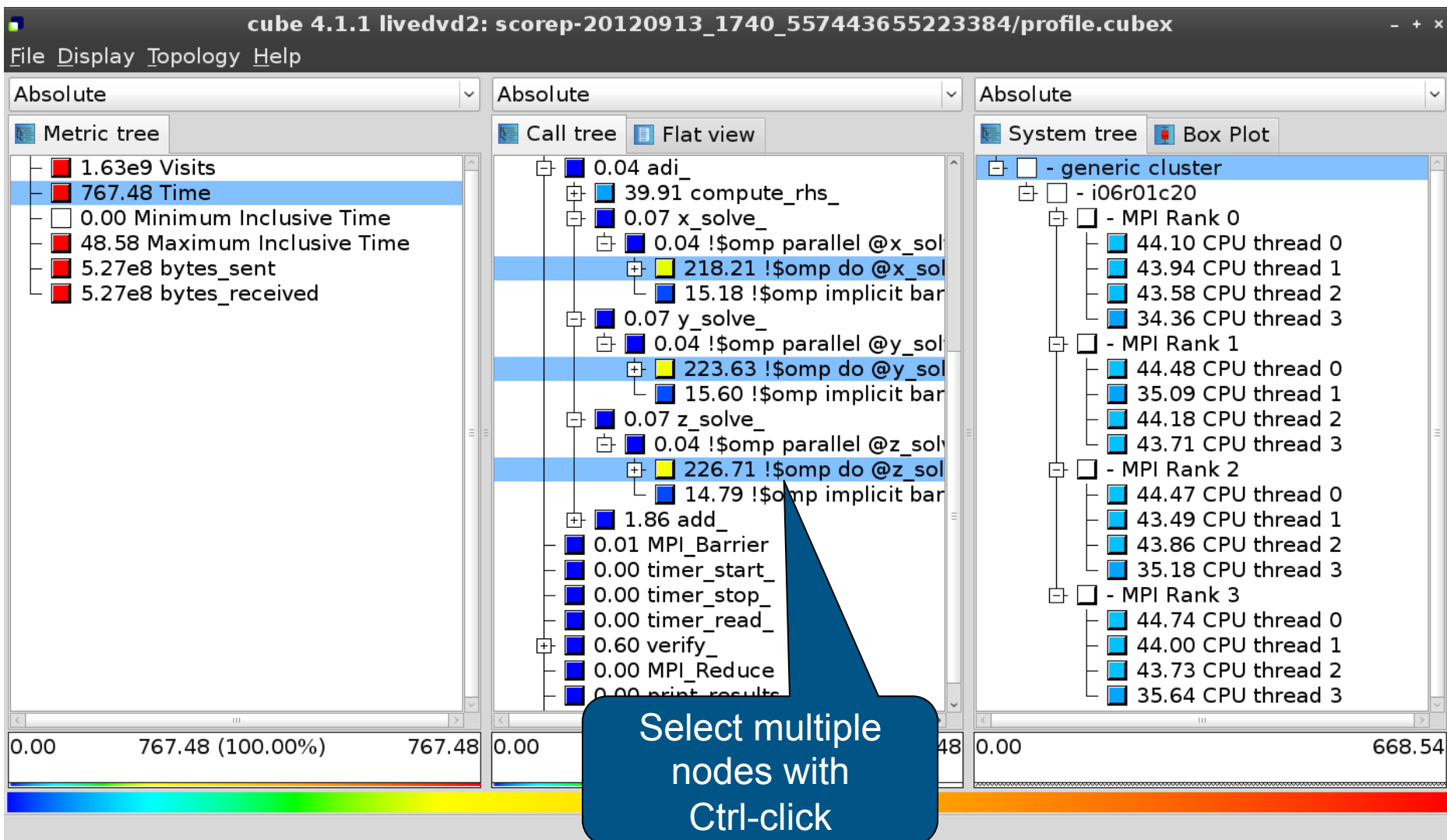






- Absolute
 - Absolute value shown in seconds/bytes/counts
- Selection percent
 - Value shown as percentage w.r.t. the selected node “on the left” (metric/call path)
- Peer percent (system tree only)
 - Value shown as percentage relative to the maximum peer value

Multiple selection



The screenshot shows the cube 4.1.1 application window titled "cube 4.1.1 livedvd2: scorep-20120913_1740_557443655223384/profile.cubex". The "Help" menu is open, displaying options: "Getting started", "Mouse and keyboard control", "What's This? (Shift+F1)", "About", "Selected metrics description", and "Selected regions description". A blue callout bubble points to the "What's This?" option with the text: "Context-sensitive help available for all GUI items".

The main window displays three panels:

- Metric tree (Absolute):** Shows a list of metrics with color-coded bars. The first two metrics are highlighted in red: "1.63e9 Visits" and "767.48 Time".
- System tree (Box Plot):** Shows a hierarchical view of the system components. The "generic cluster" is expanded, showing "i06r01c20" and its four MPI Ranks (0, 1, 2, 3). Each rank shows a box plot of CPU thread performance.
- Performance Summary:** At the bottom, three progress bars show the relative performance of different components. The first bar is at 100.00% (767.48), the second at 87.11% (668.54), and the third at 87.11% (668.54).

At the bottom of the window, a status bar reads: "Change into help mode for display components".

- Extracting solver sub-tree from analysis report

```
% cube_cut -r '<<ITERATION>>' scorep_bt-mz_W_4x4_sum/profile.cubex  
Writing cut.cubex... done.
```

- Calculating difference of two reports

```
% cube_diff scorep_bt-mz_W_4x4_sum/profile.cubex cut.cubex  
Writing diff.cubex... done.
```

- Additional utilities for merging, calculating mean, etc.
 - Default output of `cube_utility` is a new report `utility.cubex`
- Further utilities for report scoring & statistics
- Run utility with “-h” (or no arguments) for brief usage info

- CUBE
 - Parallel program analysis report exploration tools
 - Libraries for XML report reading & writing
 - Algebra utilities for report processing
 - GUI for interactive analysis exploration
 - Available under New BSD open-source license
 - Documentation & sources:
 - <http://www.scalasca.org>
 - User guide also part of installation:
 - ``cube-config --cube-dir`/share/doc/CubeGuide.pdf`
 - Contact:
 - `mailto:scalasca@fz-juelich.de`

