

VI-HPS

SOFTWARE



0.00 <<time step loop>>
0.00 updatedt
6.62 updatex
372.85 updateien
0.00 gene
0.00 <<iteration loop>>
293.65 genbc



PRODUCTIVITY

FAST SOLUTIONS

☒ PAPI_L1_DCM
☒ PAPI_L1_ICM
☐ PAPI_L2_DCM
☒ PAPI_L2_ICM
☒ PAPI_L2_TCM
☐ PAPI_L2_TCM

Analysis report examination with CUBE

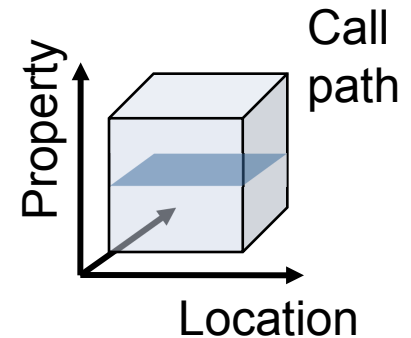
Alexandre Strube

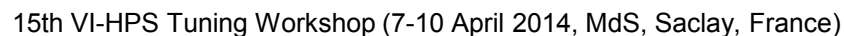
Jülich Supercomputing Centre



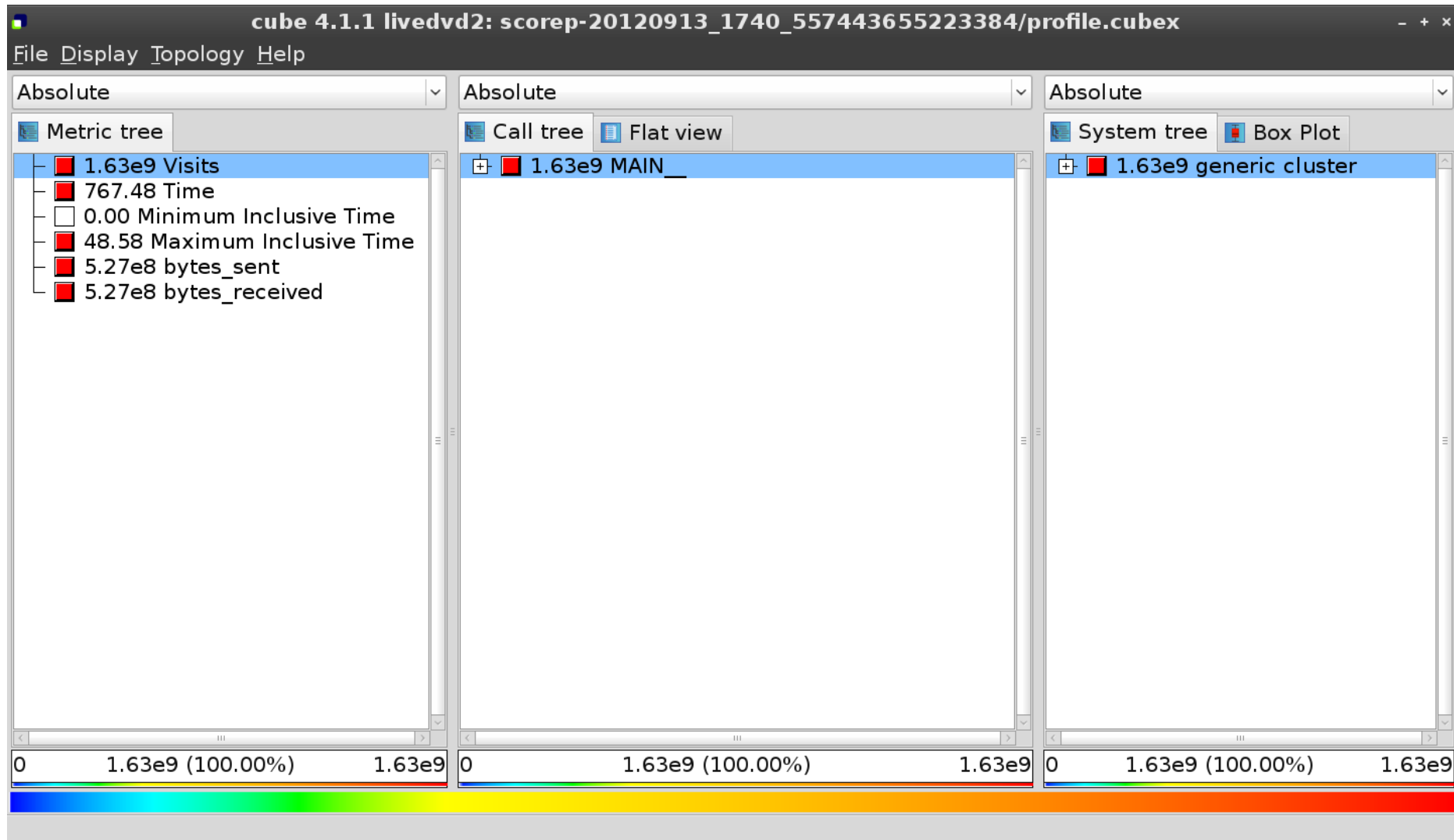
- Parallel program analysis report exploration tools
 - Libraries for XML report reading & writing
 - Algebra utilities for report processing
 - GUI for interactive analysis exploration
 - requires Qt4
- Originally developed as part of Scalasca toolset
- Now available as a separate component
 - Can be installed independently of Score-P, e.g., on laptop or desktop
 - Latest release: CUBE 4.2.2 (February 2014)

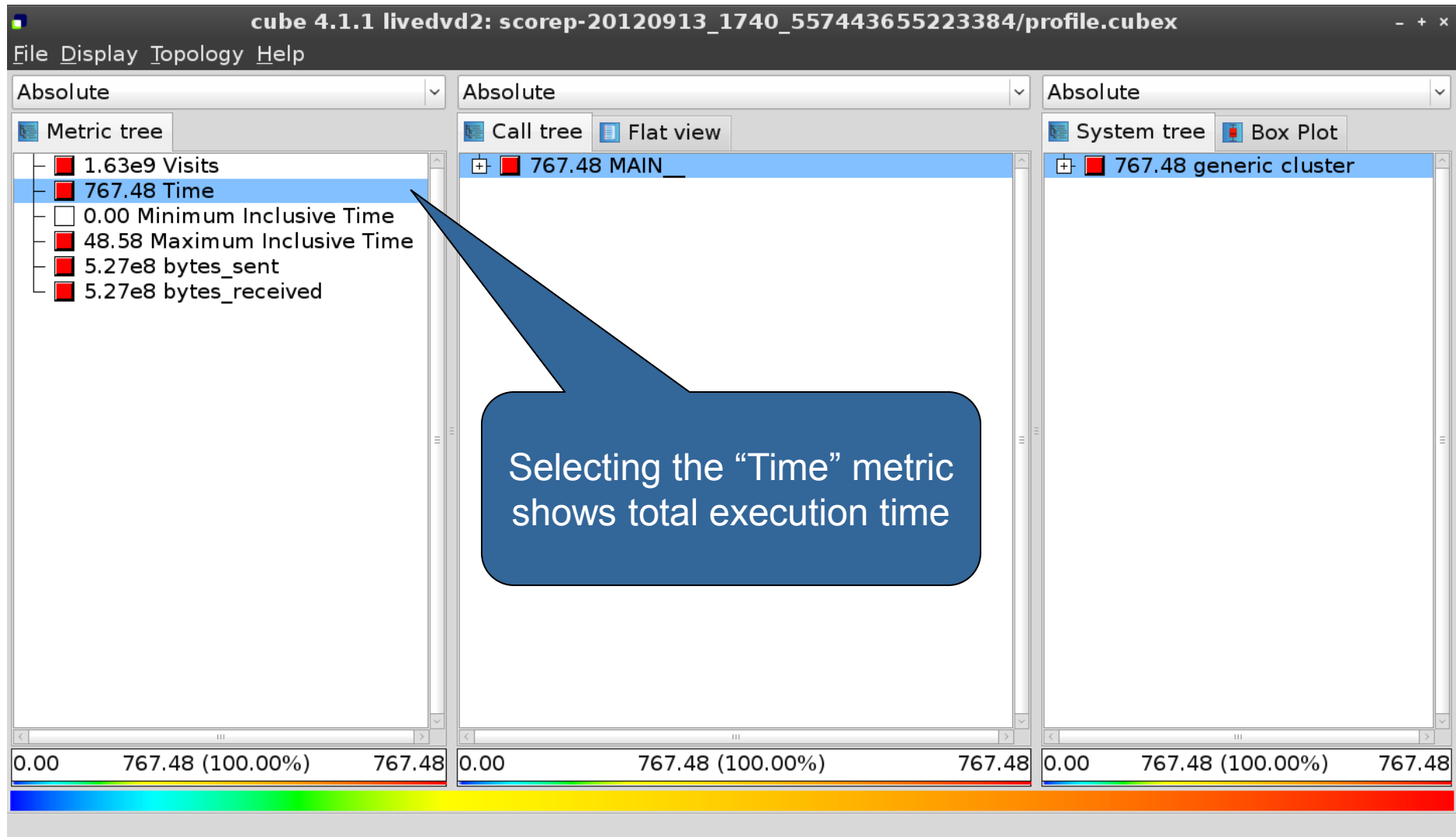
- Representation of values (severity matrix) on three hierarchical axes
 - Performance property (metric)
 - Call path (program location)
 - System location (process/thread)
- Three coupled tree browsers
- CUBE displays severities
 - As value: for precise comparison
 - As colour: for easy identification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



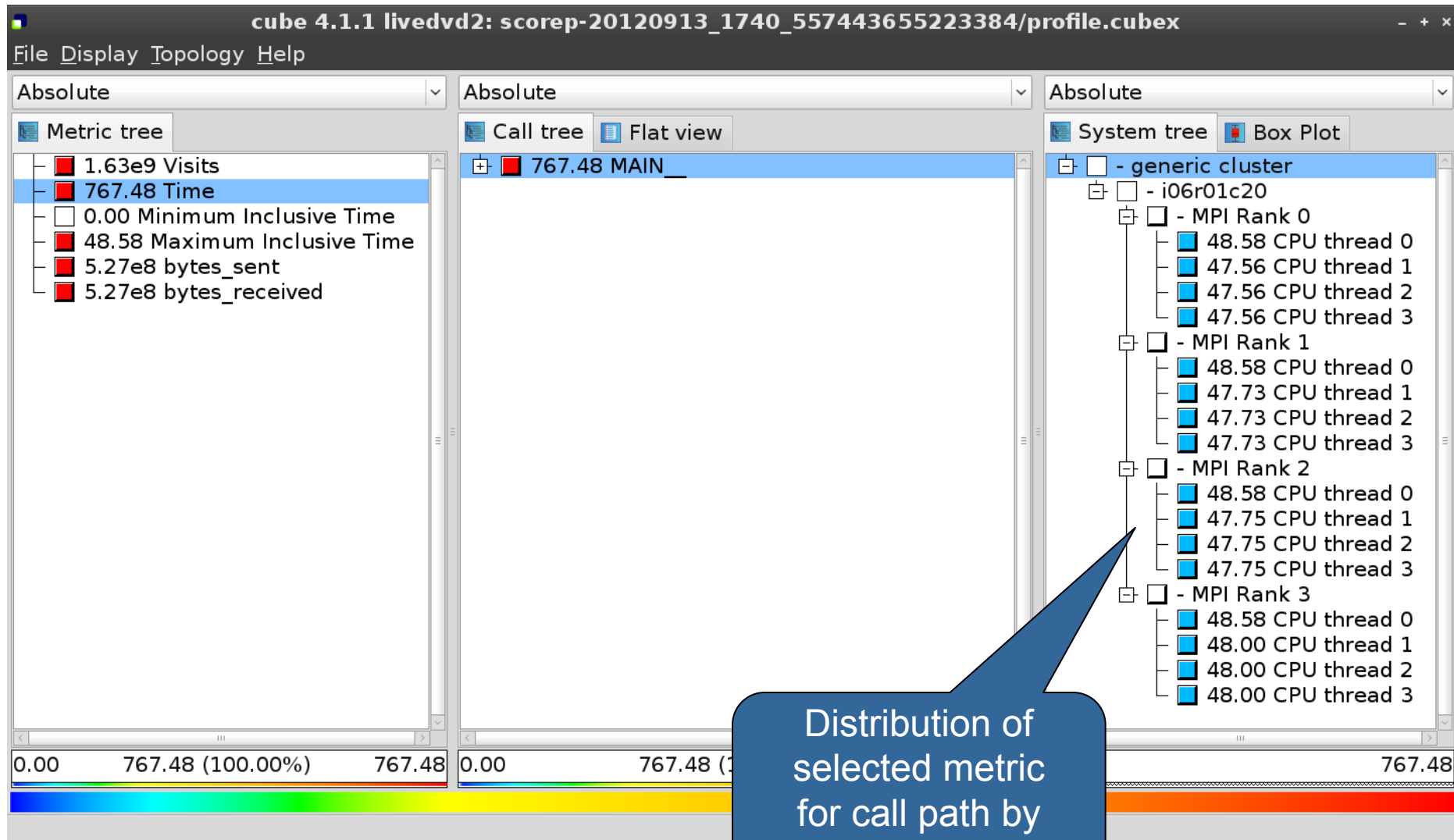


Analysis report exploration (opening view)

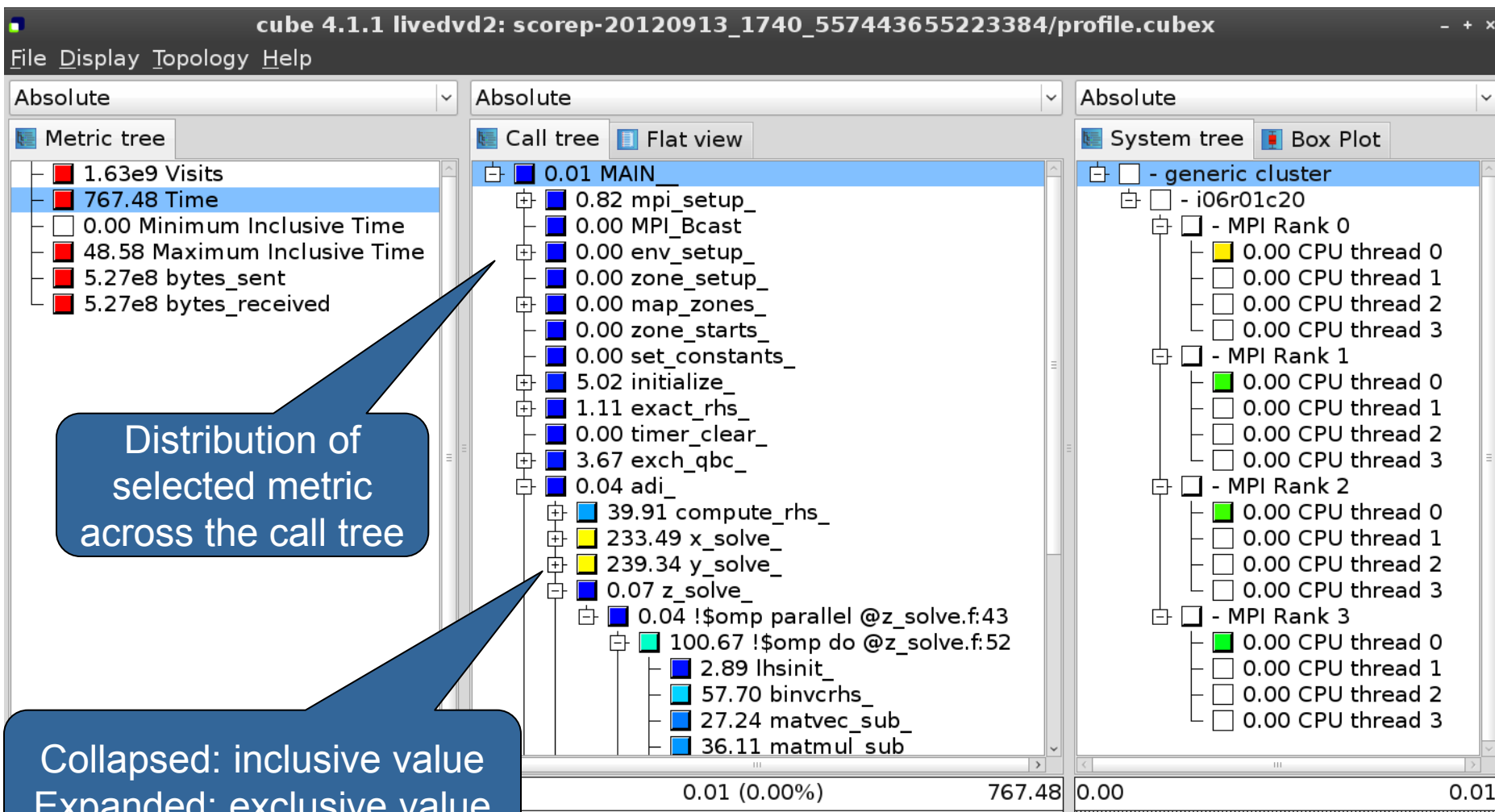




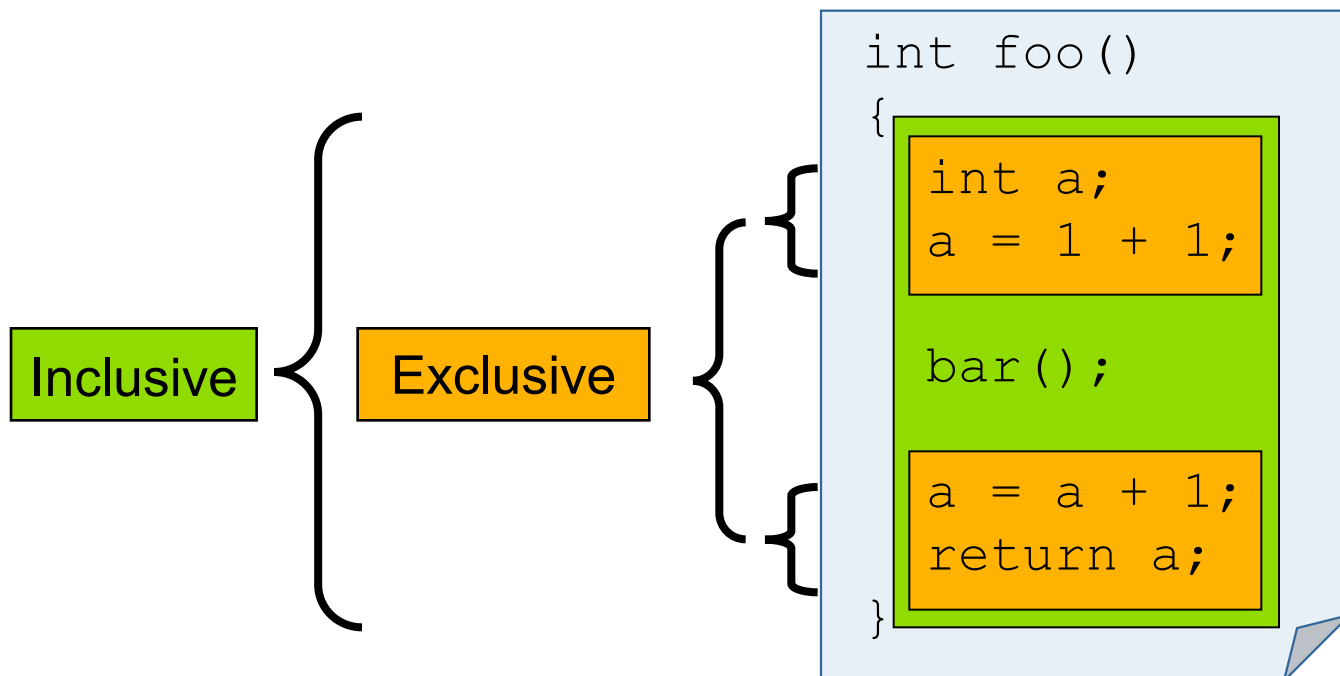
Expanding the system tree



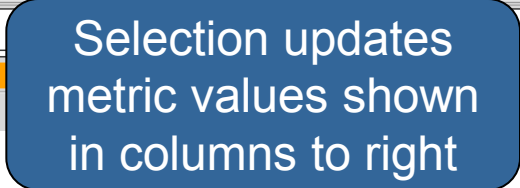
Expanding the call tree



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



VI-HPS

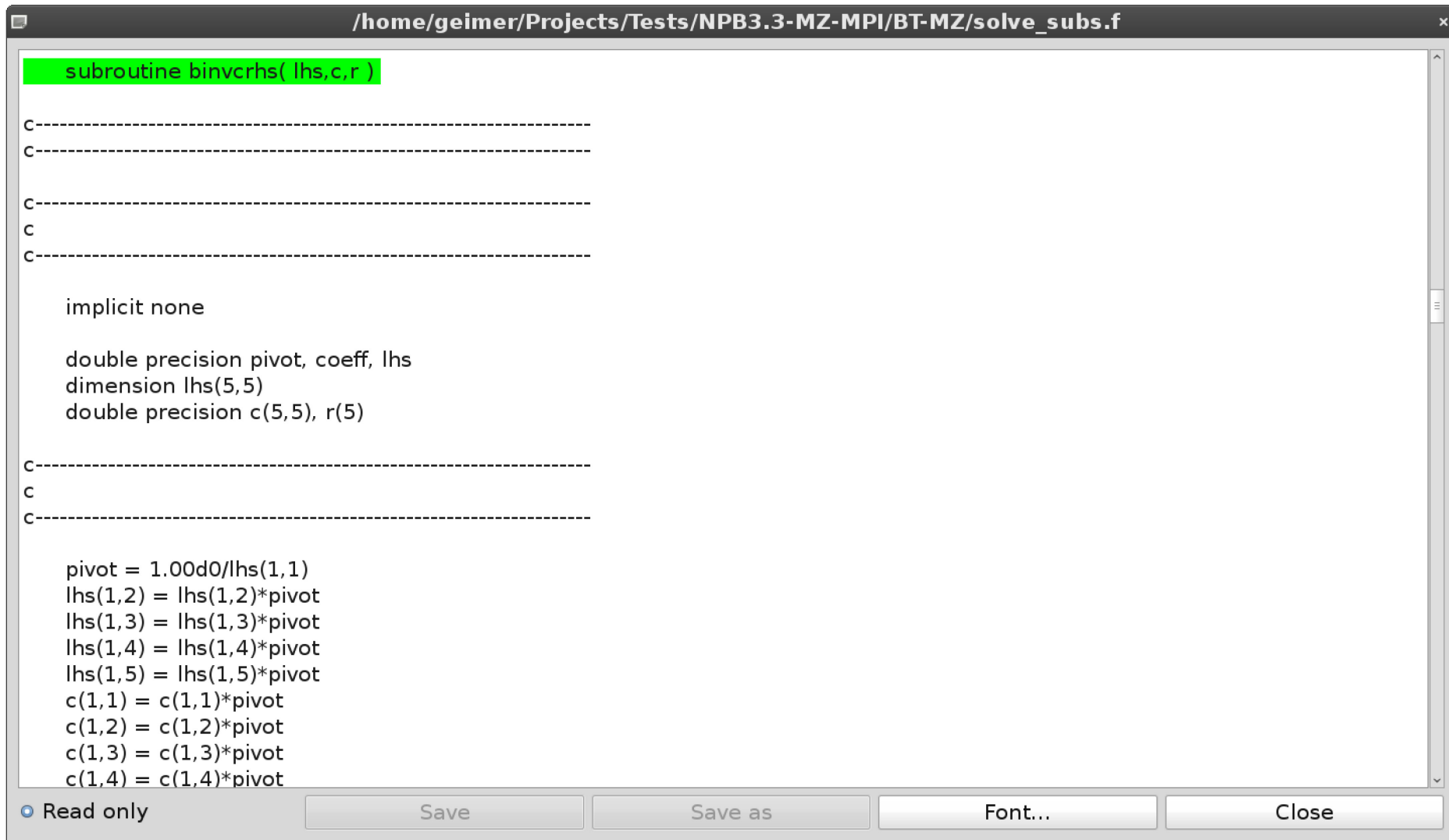


Source-code view via context menu

The screenshot displays the VI-HPS interface with three main panels:

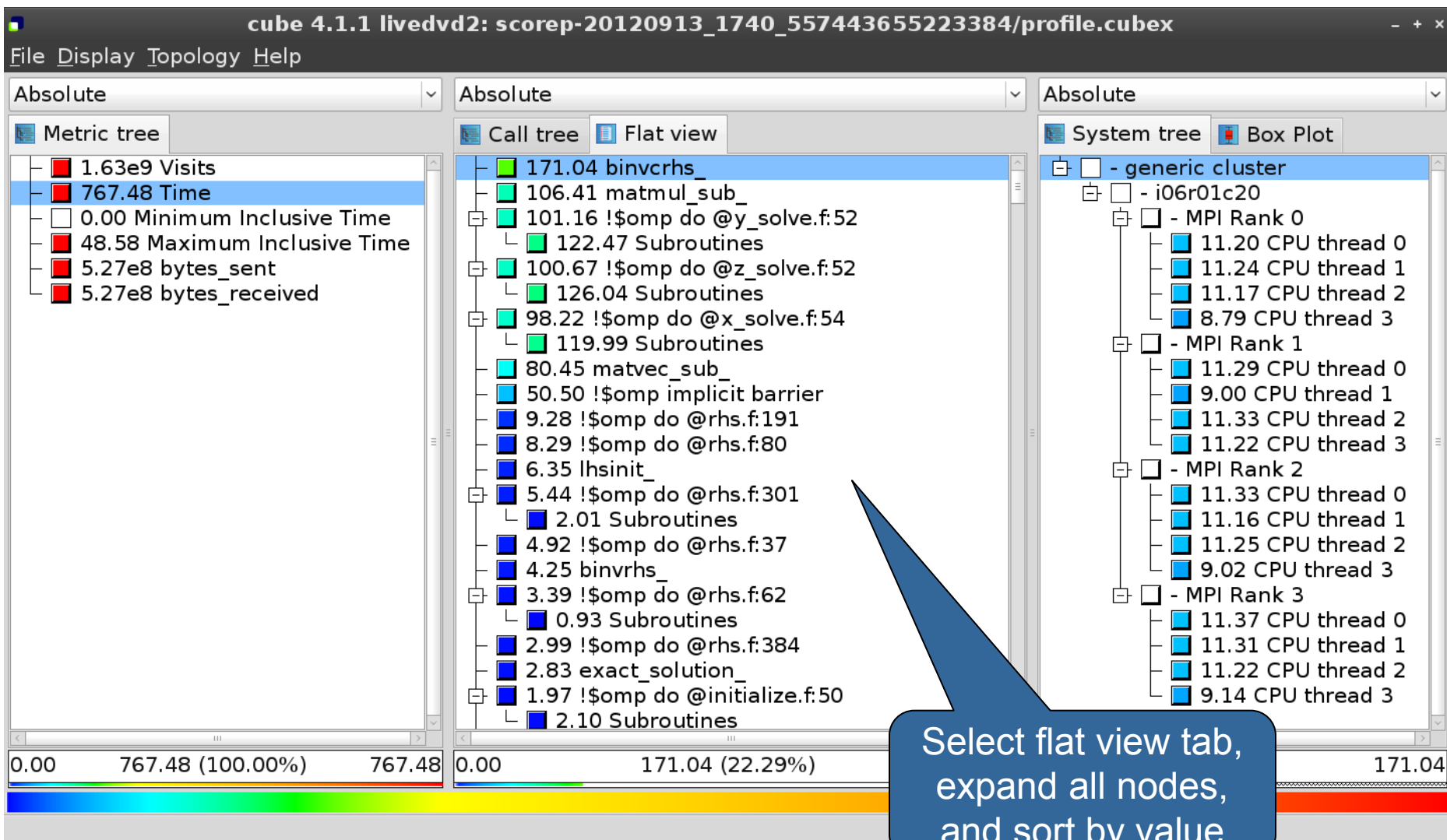
- Metric tree:** Shows various performance metrics such as Visits, Time, Minimum Inclusive Time, Maximum Inclusive Time, bytes_sent, and bytes_received.
- Call tree:** Displays a hierarchical view of function calls. A context menu is open over the '57.70 binvcrhs' node, listing options like 'Call site', 'Called region', 'Expand/collapse', 'Hiding', 'Cut call tree', 'Find items', 'Find Next', 'Clear found items', 'Copy to clipboard', and 'Min/max values'. The 'Source code' option is highlighted.
- System tree:** Shows the system hierarchy, including the generic cluster, i06r01c20, and MPI Ranks 0, 1, 2, and 3, each with associated CPU threads.

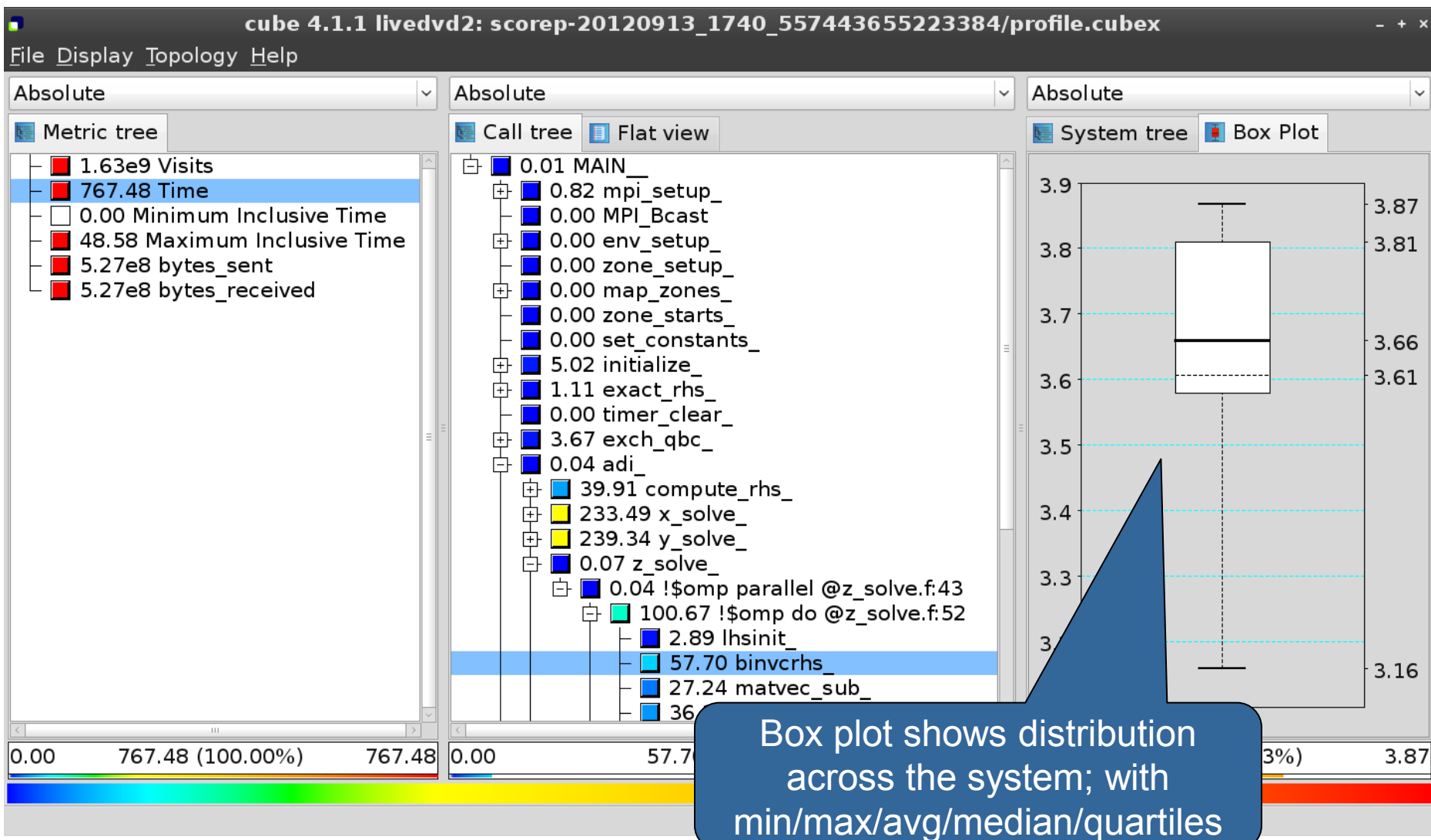
A blue callout bubble points to the context menu with the text: "Right-click opens context menu".

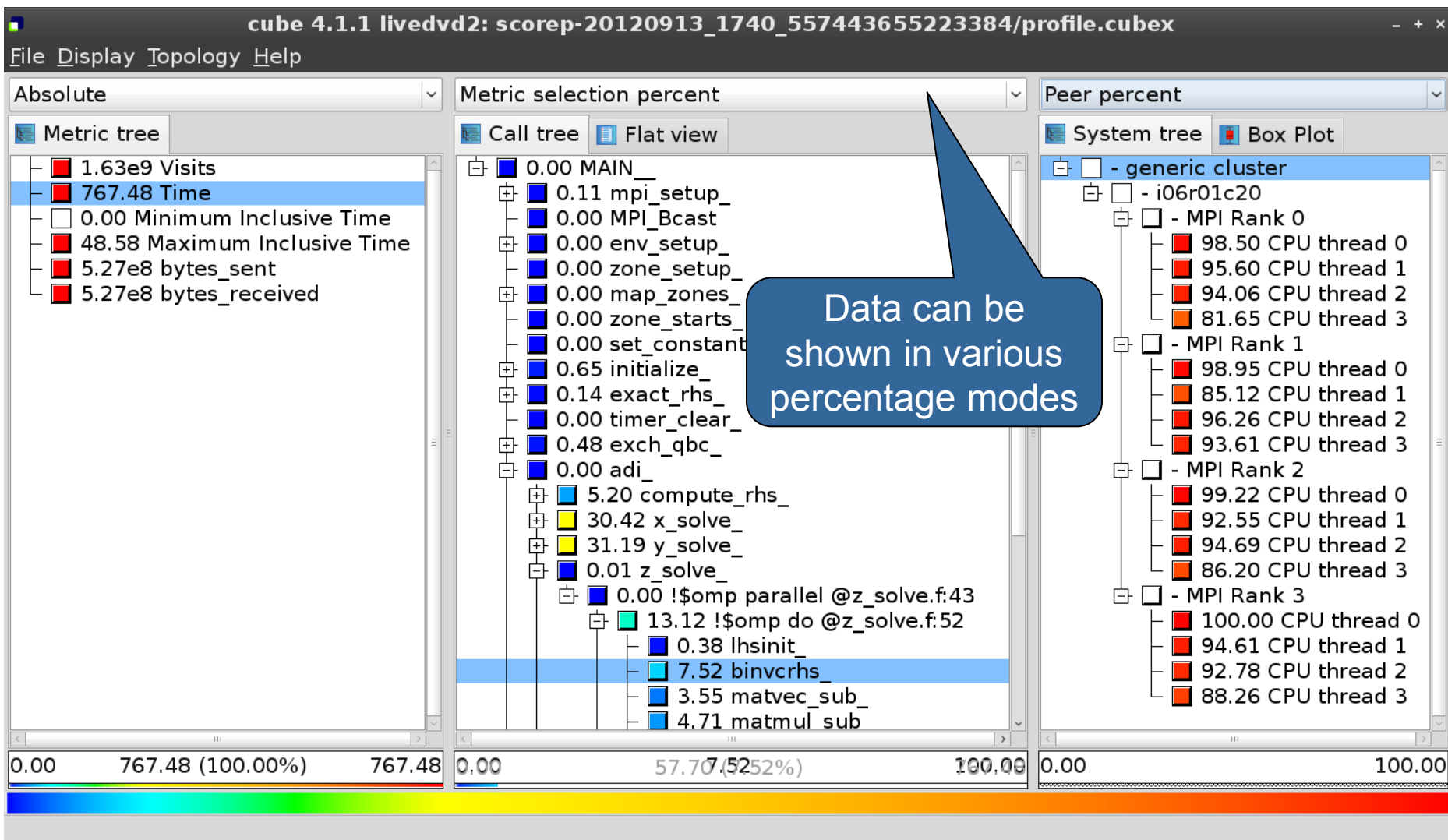


```
subroutine binvrhs( lhs,c,r )  
  
C-----  
C-----  
  
C-----  
C  
C-----  
  
implicit none  
  
double precision pivot, coeff, lhs  
dimension lhs(5,5)  
double precision c(5,5), r(5)  
  
C-----  
C  
C-----  
  
pivot = 1.00d0/lhs(1,1)  
lhs(1,2) = lhs(1,2)*pivot  
lhs(1,3) = lhs(1,3)*pivot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

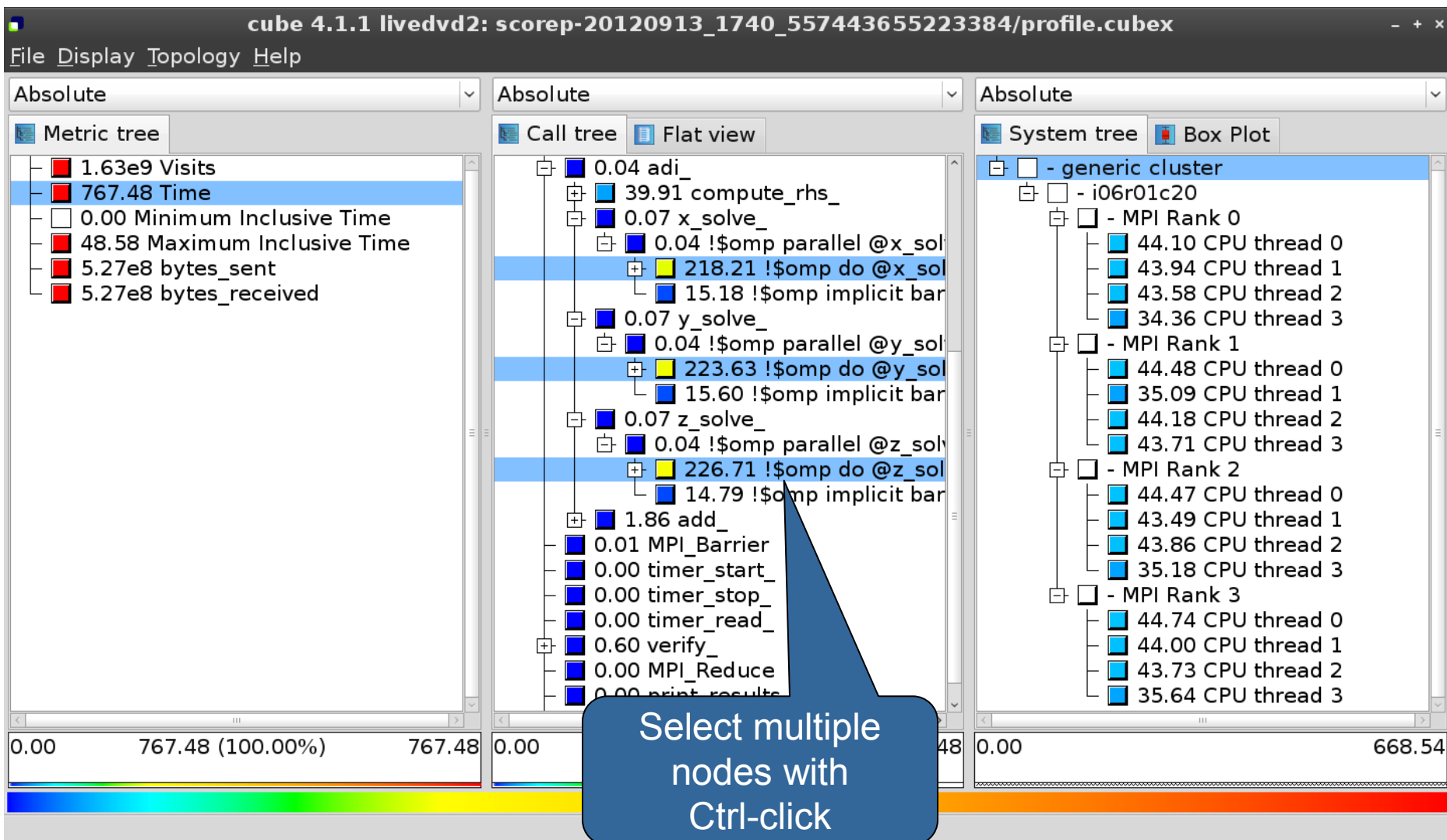






- Absolute
 - Absolute value shown in seconds/bytes/counts
- Selection percent
 - Value shown as percentage w.r.t. the selected node “on the left” (metric/call path)
- Peer percent (system tree only)
 - Value shown as percentage relative to the maximum peer value

Multiple selection



The screenshot displays the VI-HPS application window titled "cube 4.1.1 livedvd2: scorep-20120913_1740_557443655223384/profile.cubex". The interface includes a menu bar with "File", "Display", "Topology", and "Help". The "Help" menu is open, showing 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, containing the text: "Context-sensitive help available for all GUI items".

The main window is divided into three panels:

- Metric tree (Absolute):** Lists metrics with color-coded bars: 1.63e9 Visits (red), 767.48 Time (red), 0.00 Minimum (white), 48.58 Maximum (red), 5.27e8 bytes_sent (red), and 5.27e8 bytes_received (red).
- System tree (Box Plot):** Shows a hierarchical view of the system tree, including "generic cluster", "i06r01c20", and four MPI Ranks (0-3), each with its own set of CPU thread metrics.
- Performance Metrics:** Displays a list of metrics with their values and progress bars. The first three metrics (Visits, Time, Minimum) are highlighted in blue. The Time metric is 767.48 (100.00%). The MPI_Reduce metric is 0.00.

At the bottom, a status bar indicates "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`

