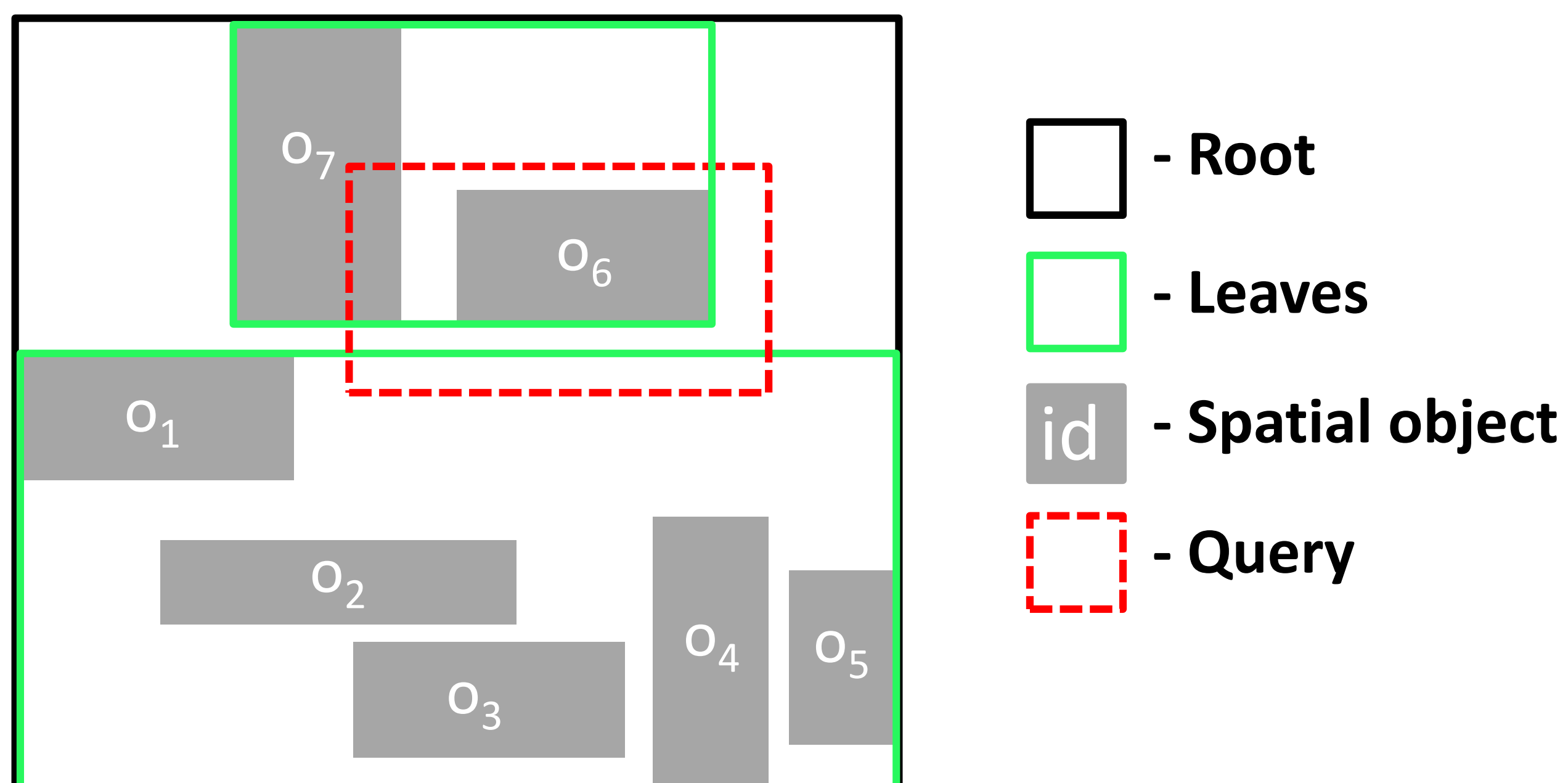


# Improving Spatial Data Processing by Clipping Minimum Bounding Boxes

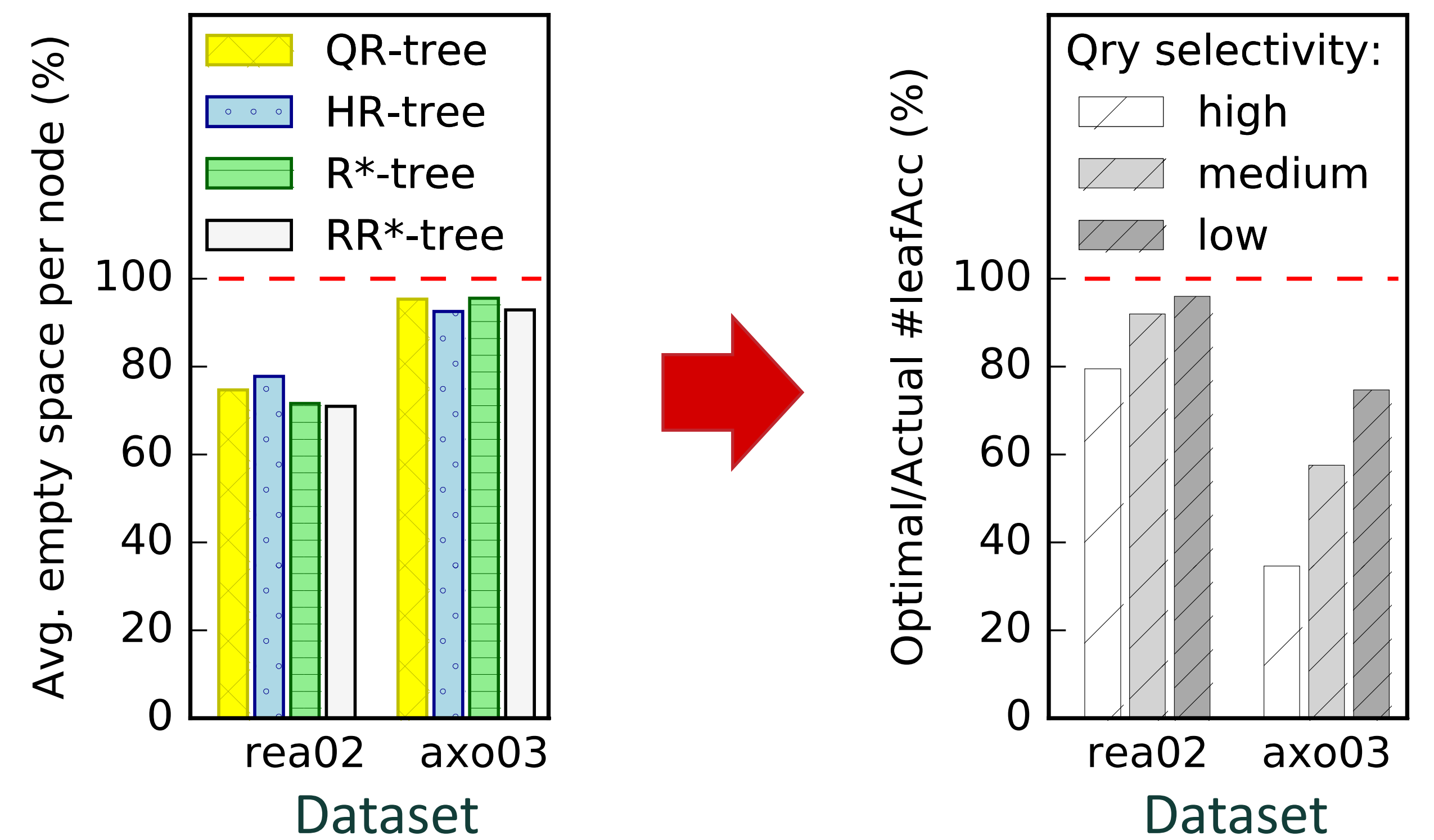
Darius Sidlauskas, Sean Chester, Eleni Tzirita Zacharitou, and Anastasia Ailamaki

## Minimum Bounding Box (MBB) in Spatial Indexing

Hierarchy of MBBs in an R-tree index



Dead space translates into unnecessary I/Os

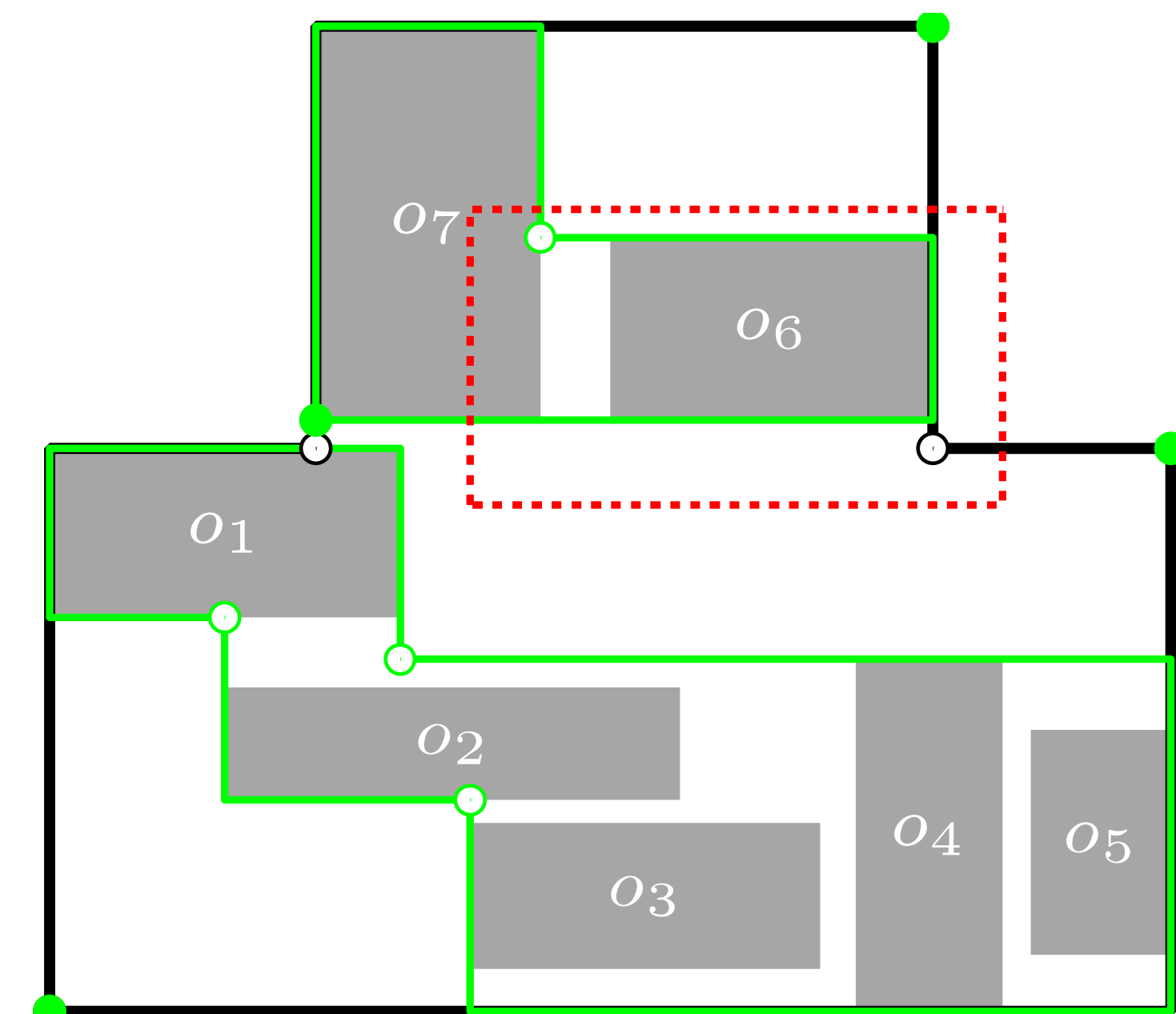
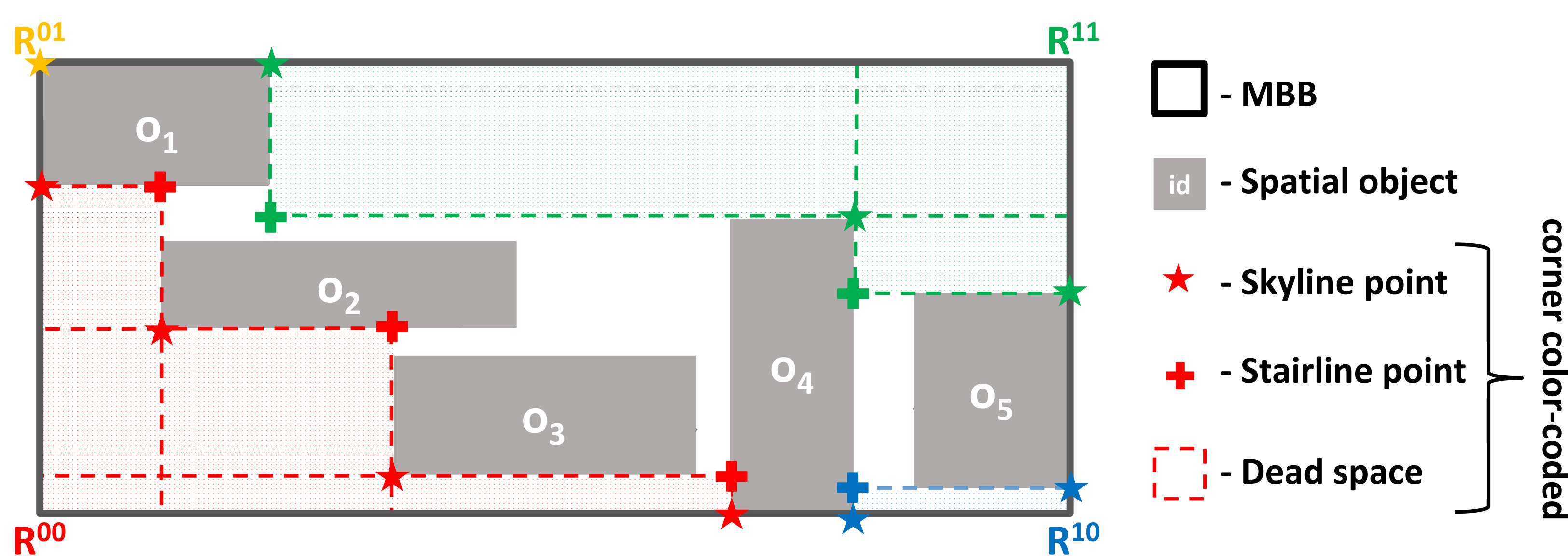


## Clipped Bounding Box (CBB)

### Clipped Bounding Boxes:

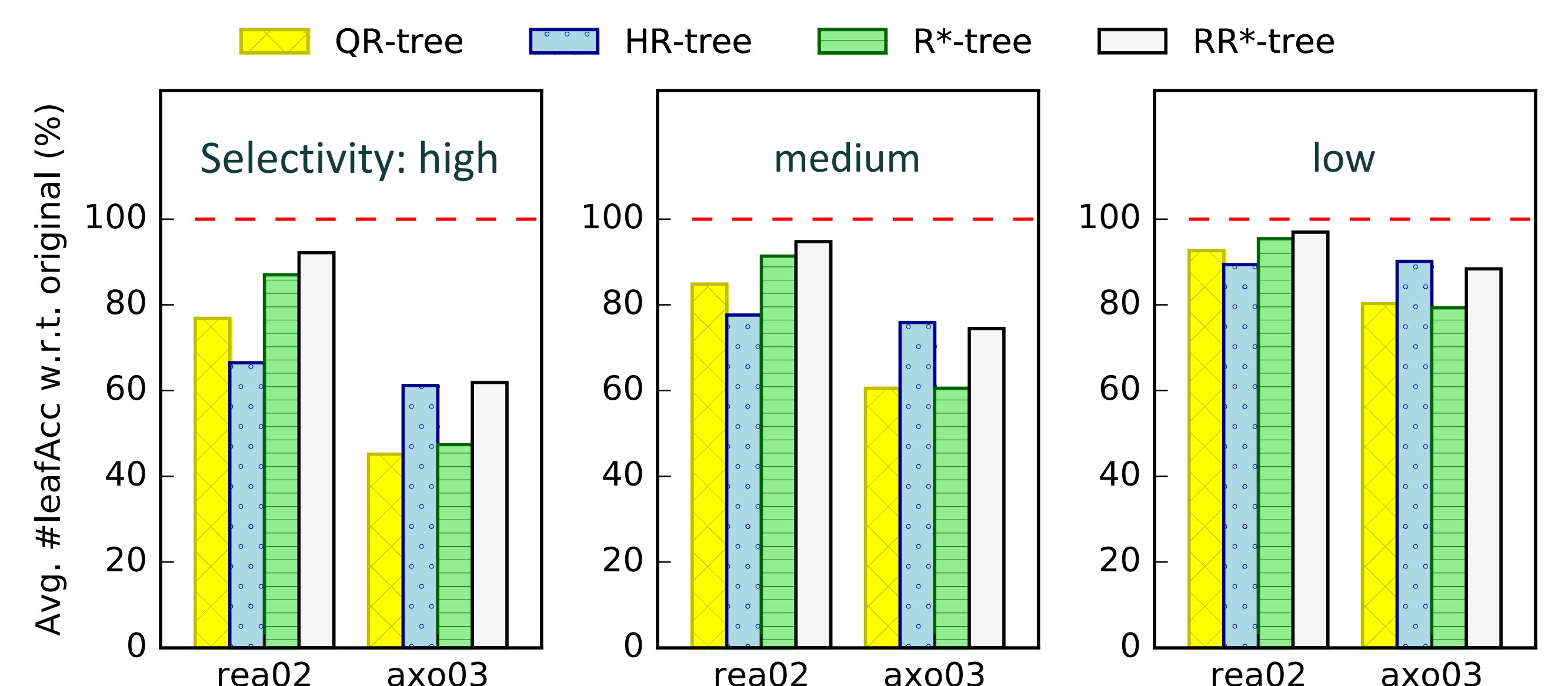
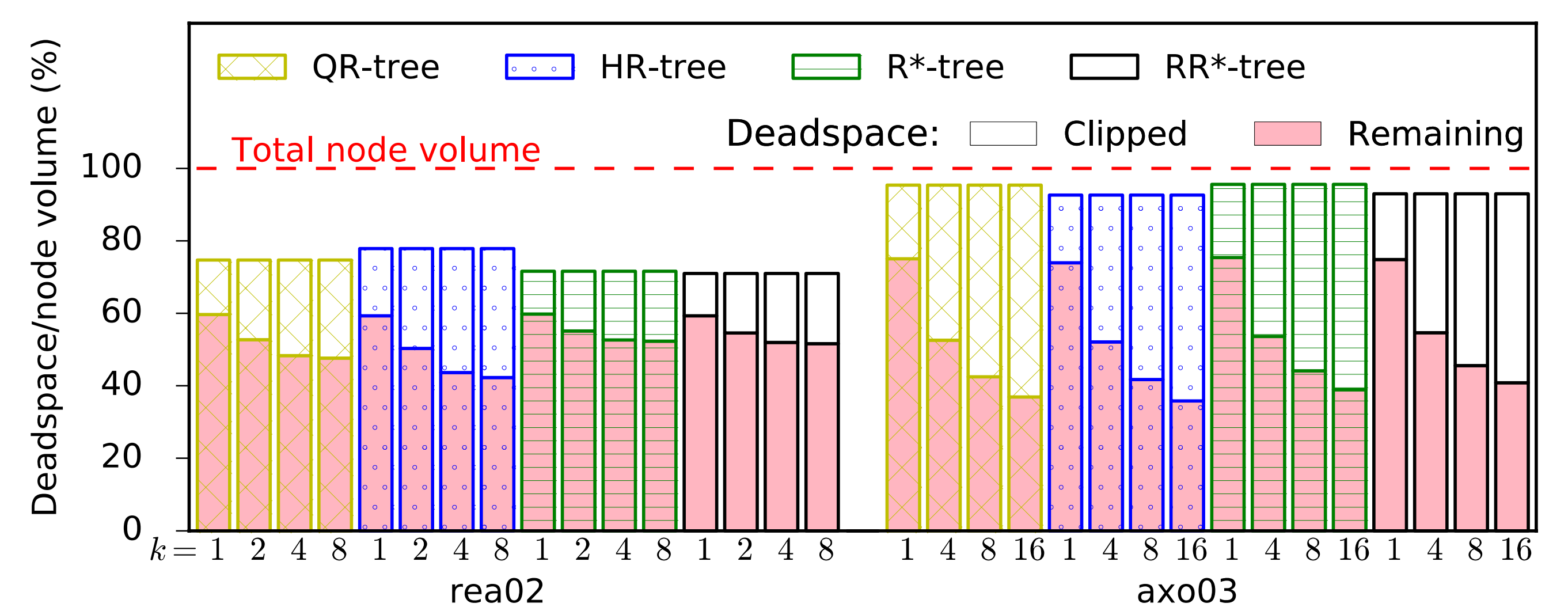
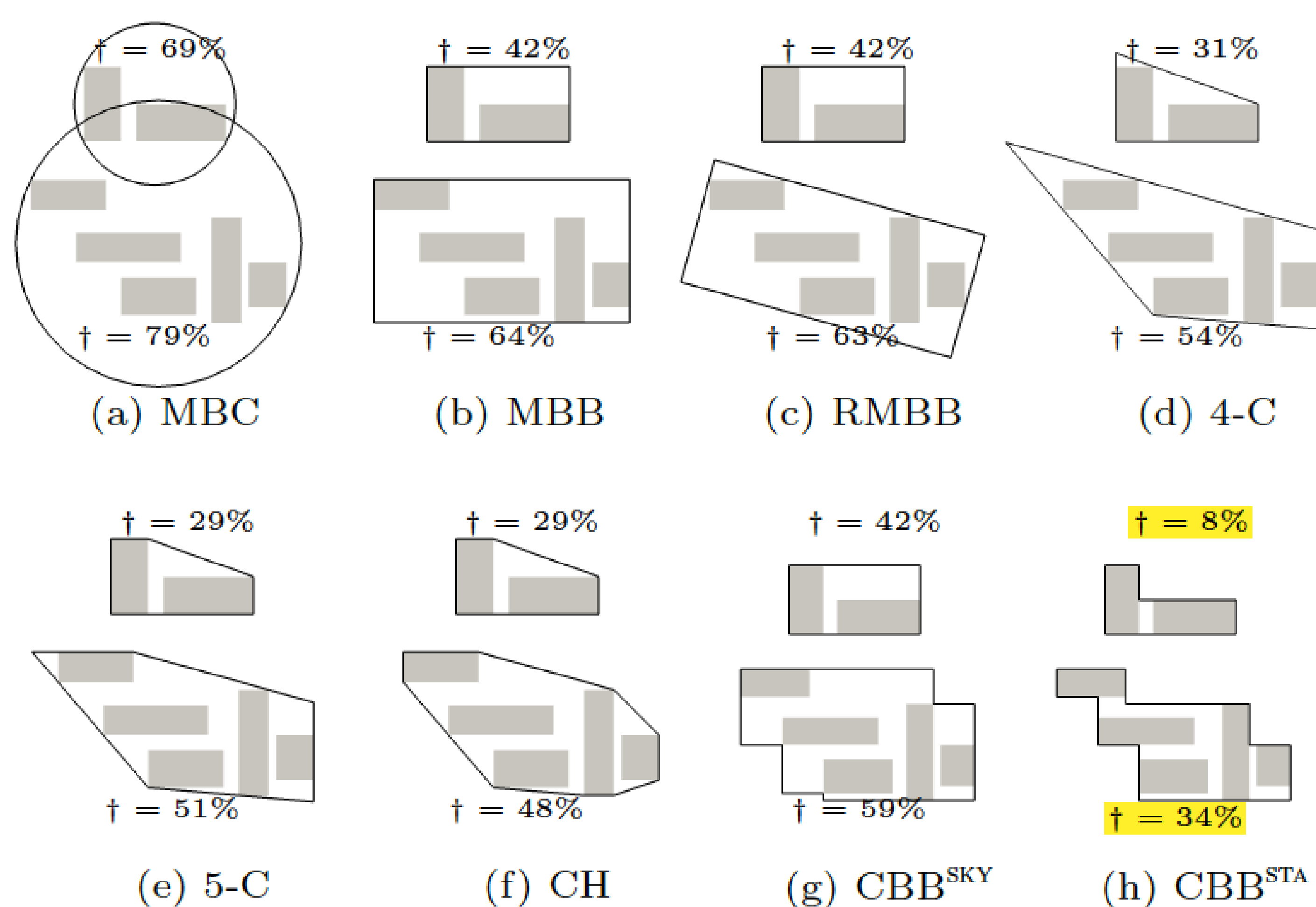
- clip away dead space near the corners of the MBB
- augment MBBs with few pairs of clip points and corner flags

A (stairline) clipped R-tree equivalent to the above



## Empirical Study

Dead space (†) with different bounding methods



Clipped R-trees have 27% - 60% less dead space compared to the original unclipped variants.  
This translates into  $\approx 26\%$  I/O reduction on average across different workloads and R-tree variants.