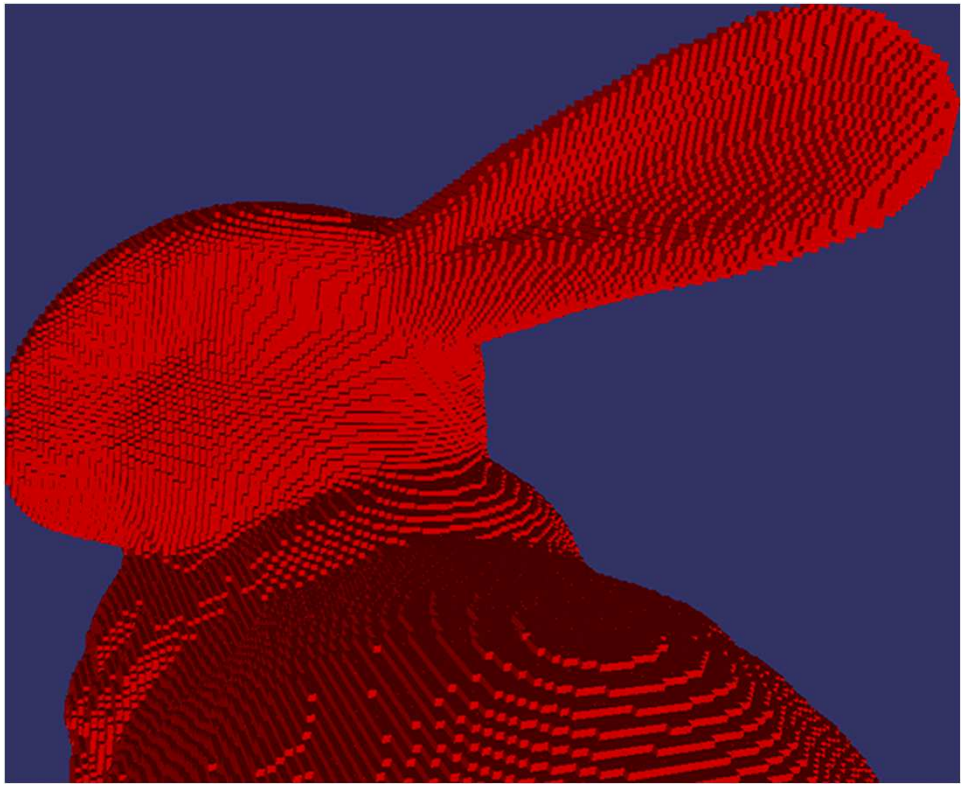
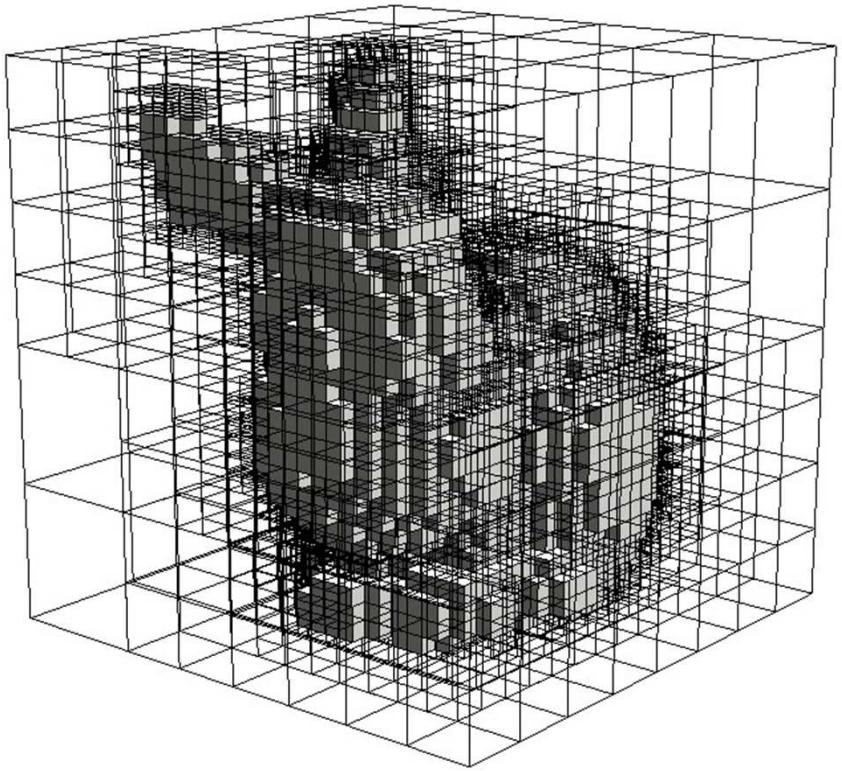
Octrees

Carlos Andujar

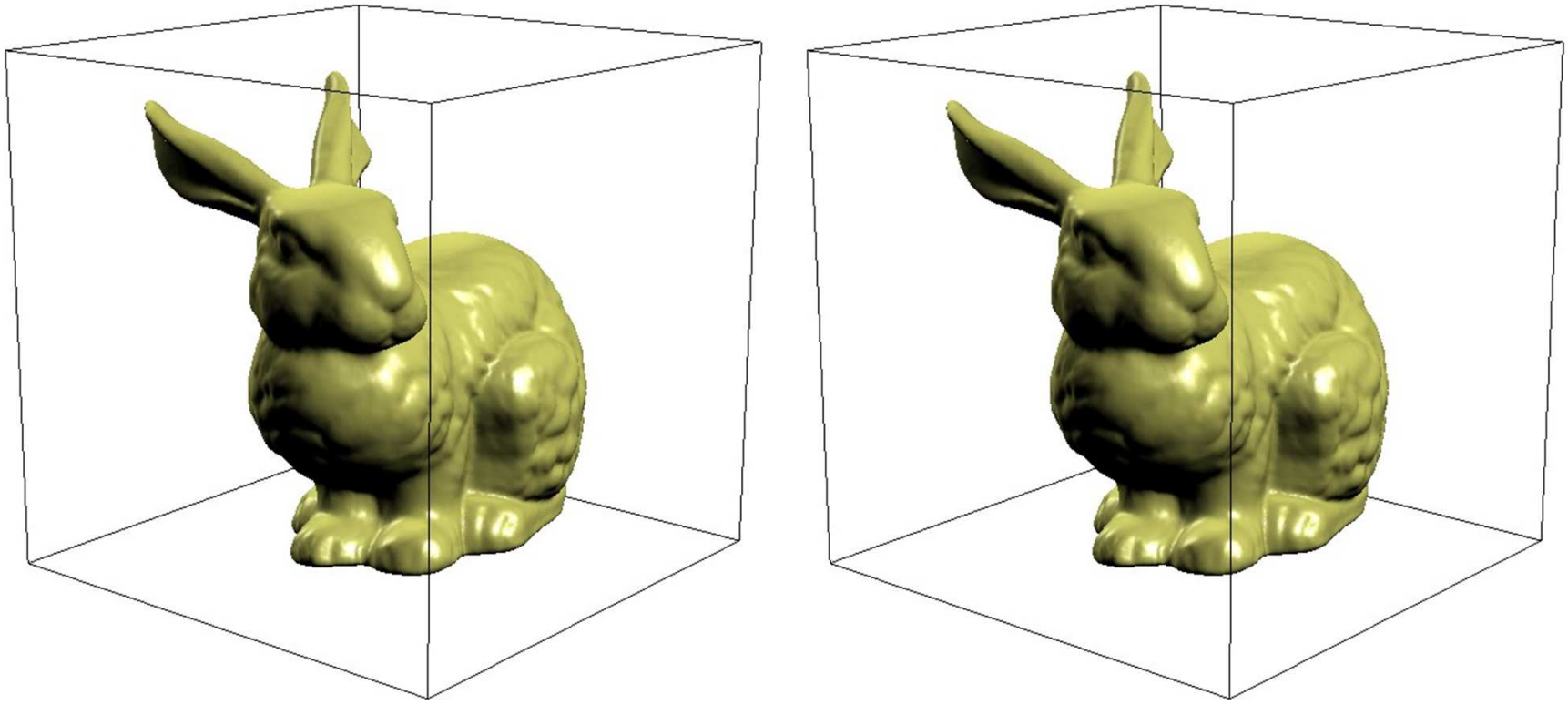
October 2013

Uniform grids vs octrees





Octrees: space subdivision



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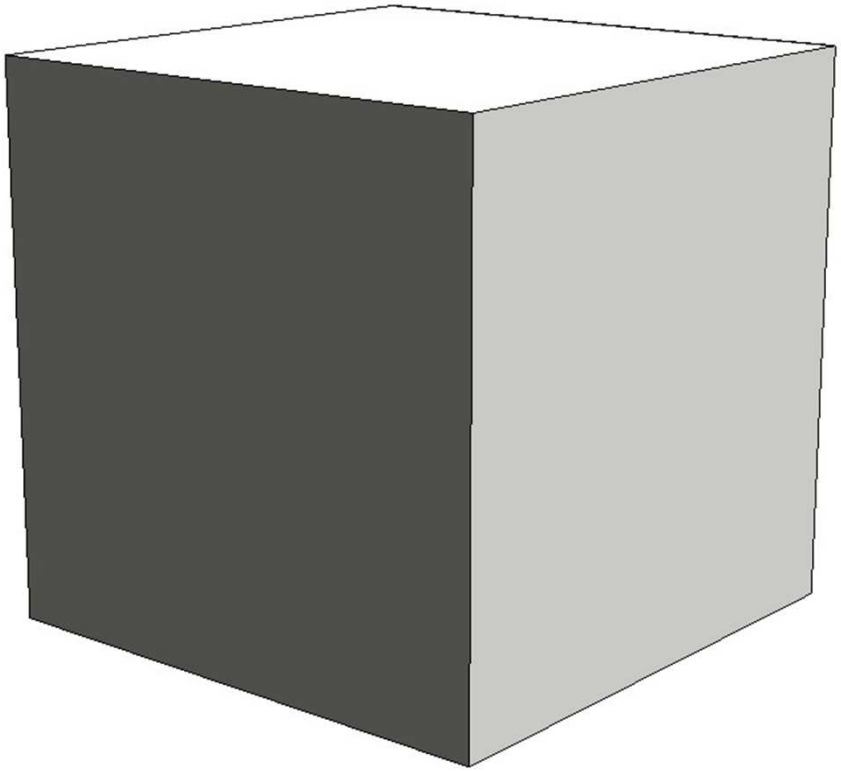

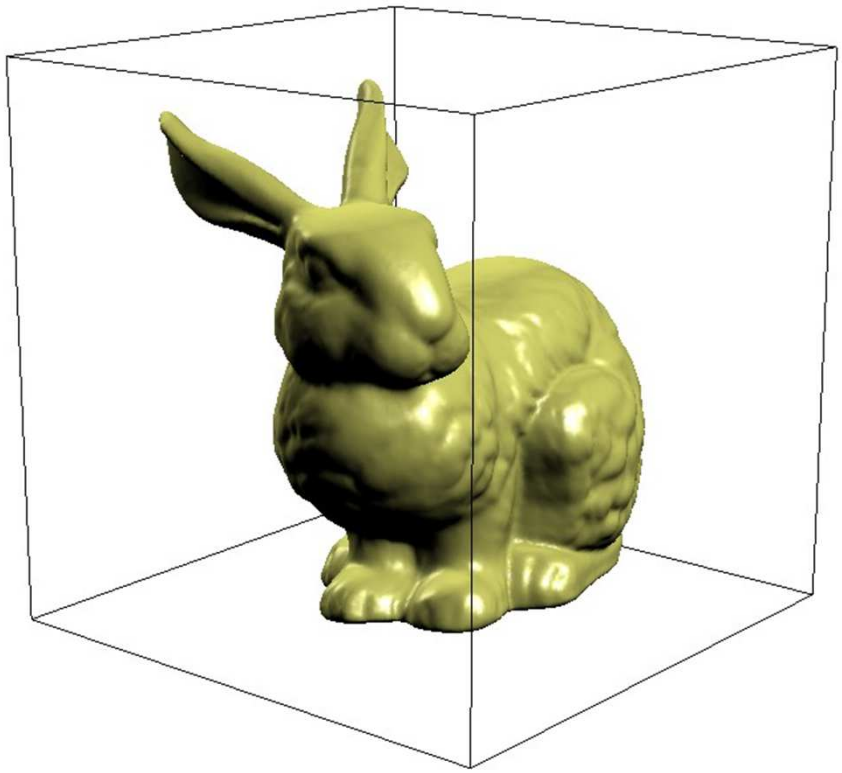

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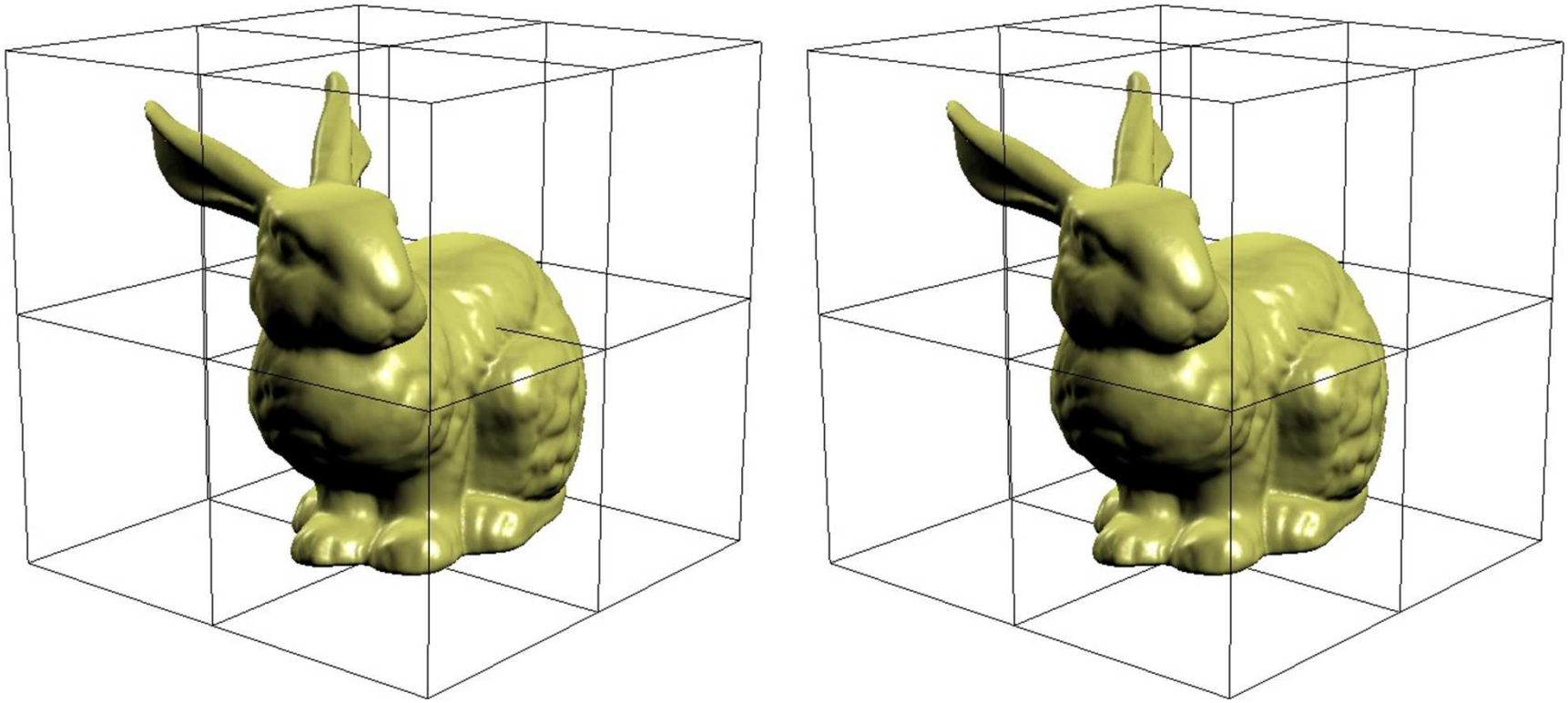

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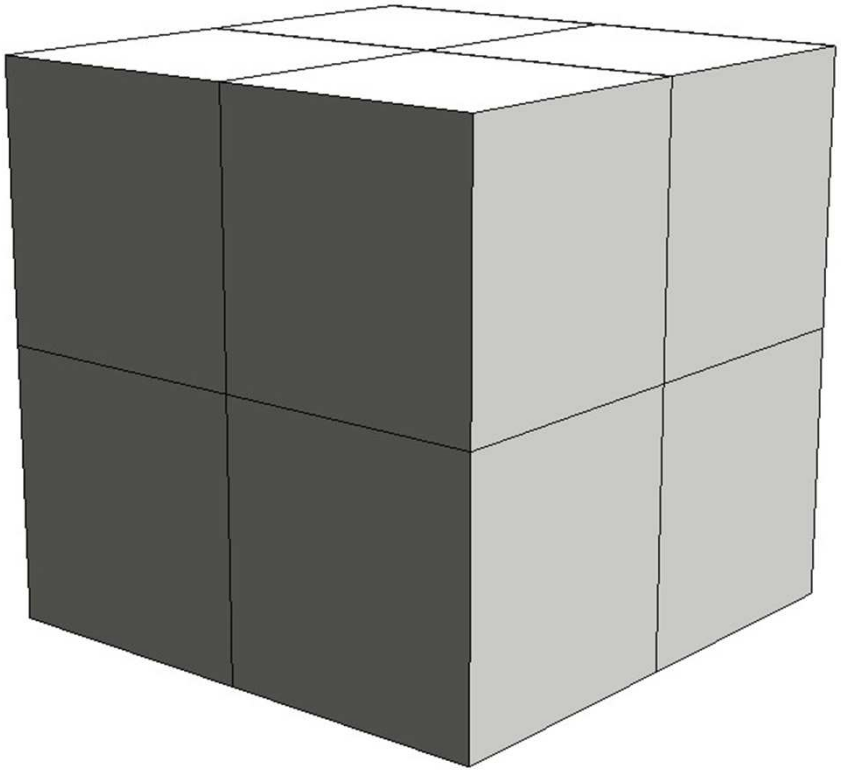

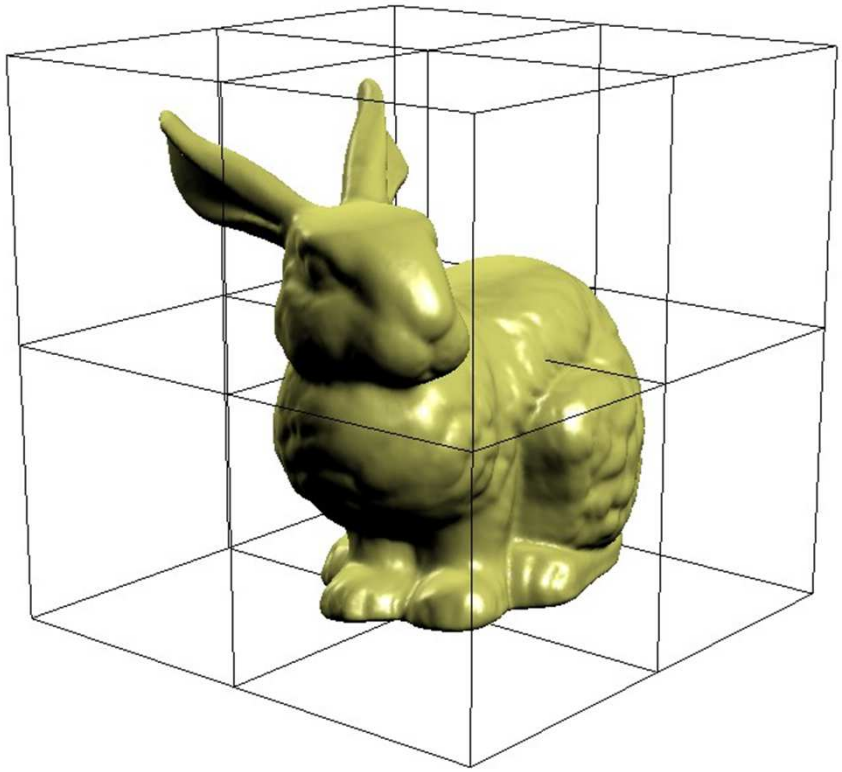

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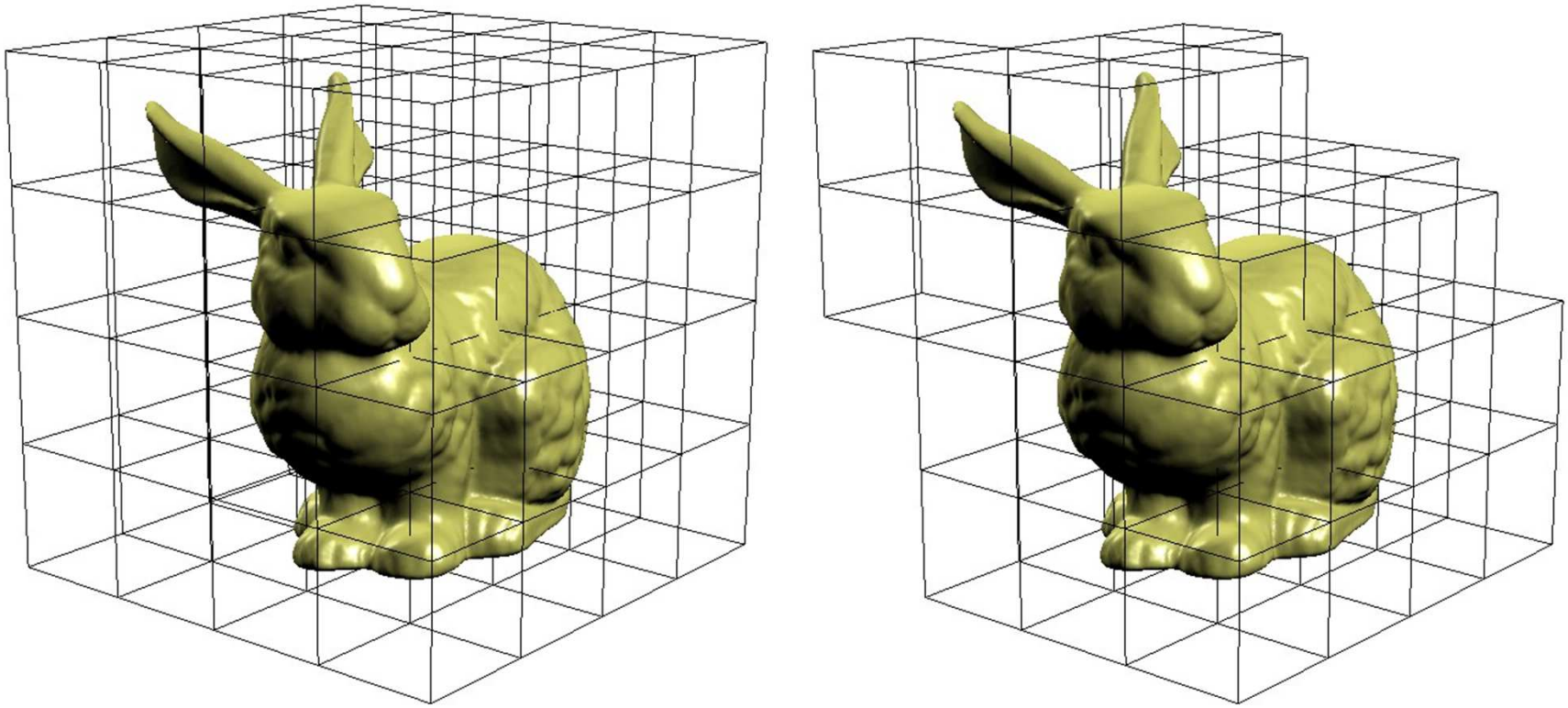

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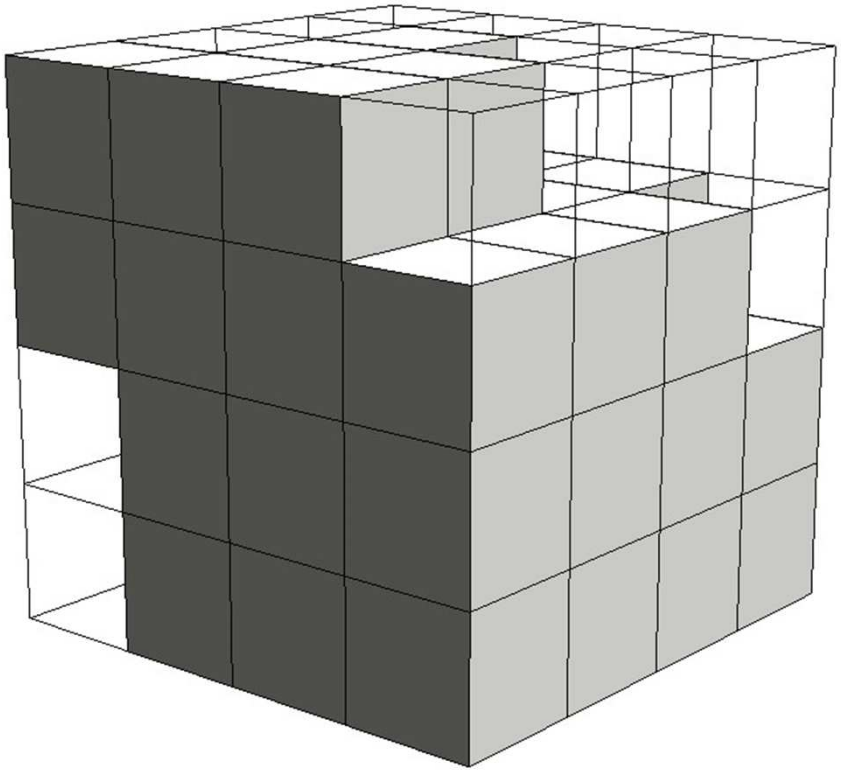

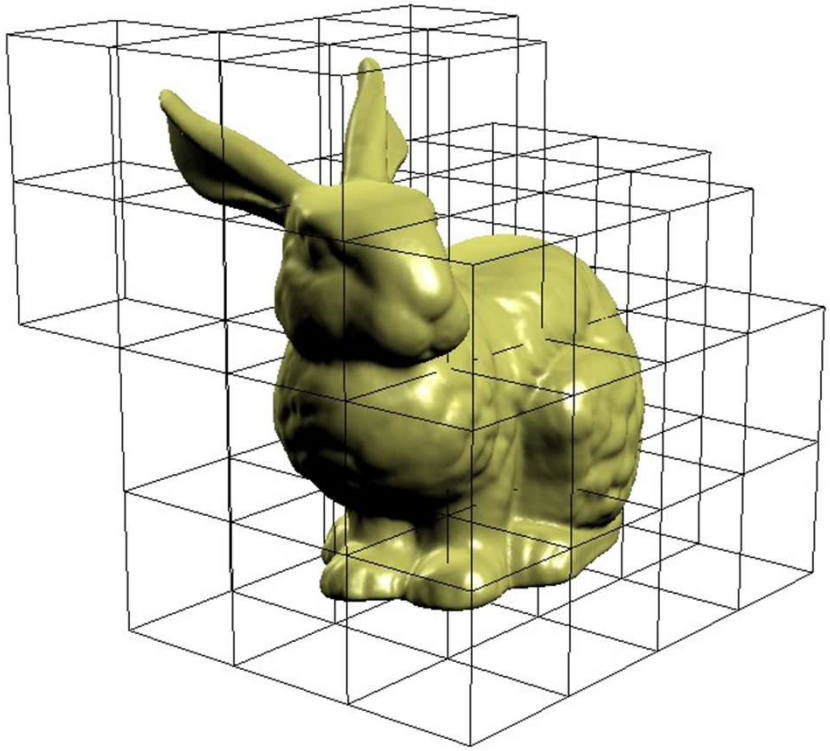

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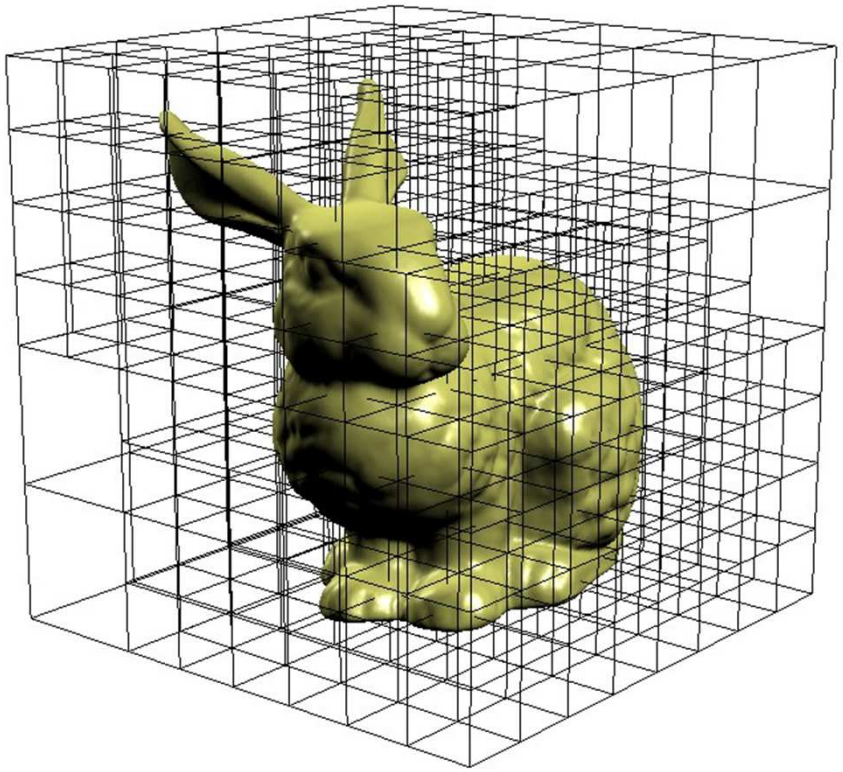

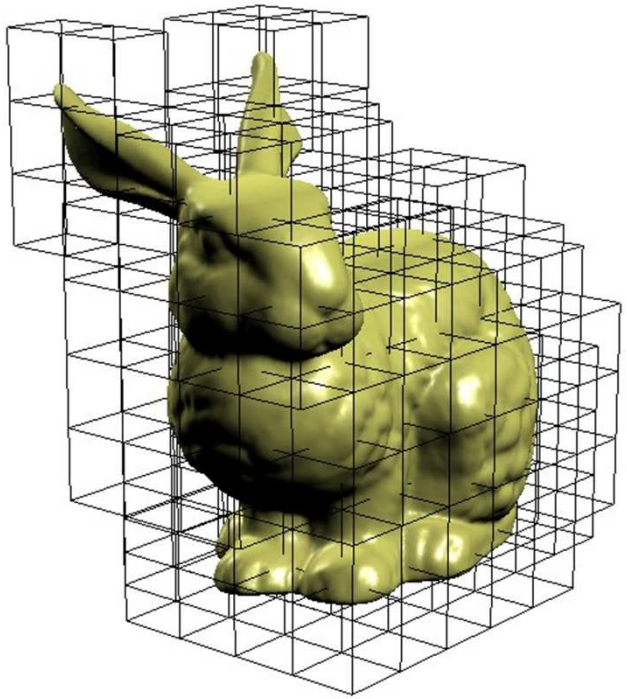

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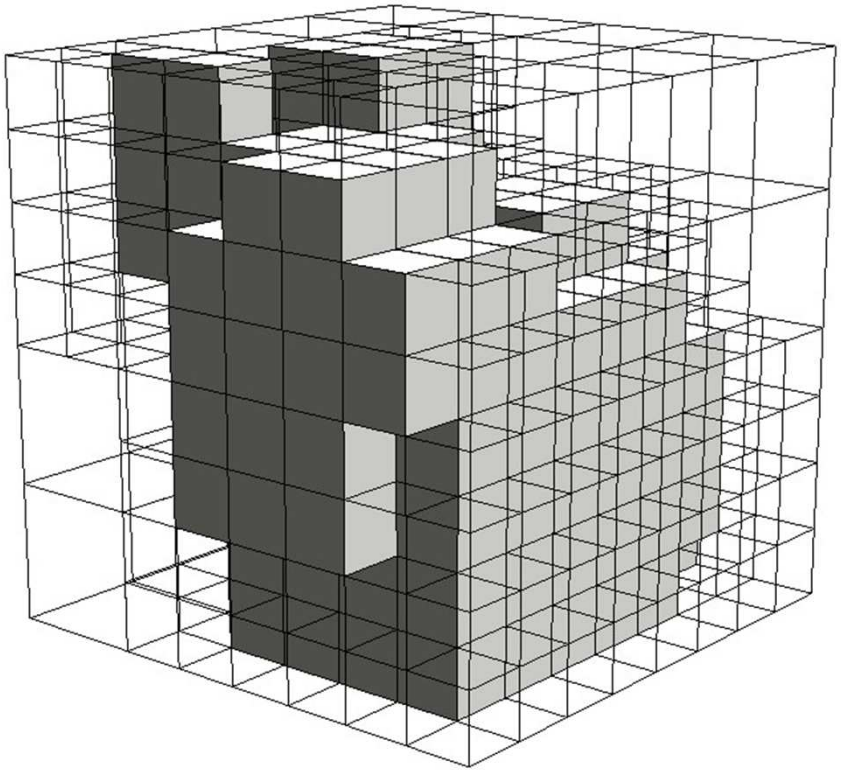

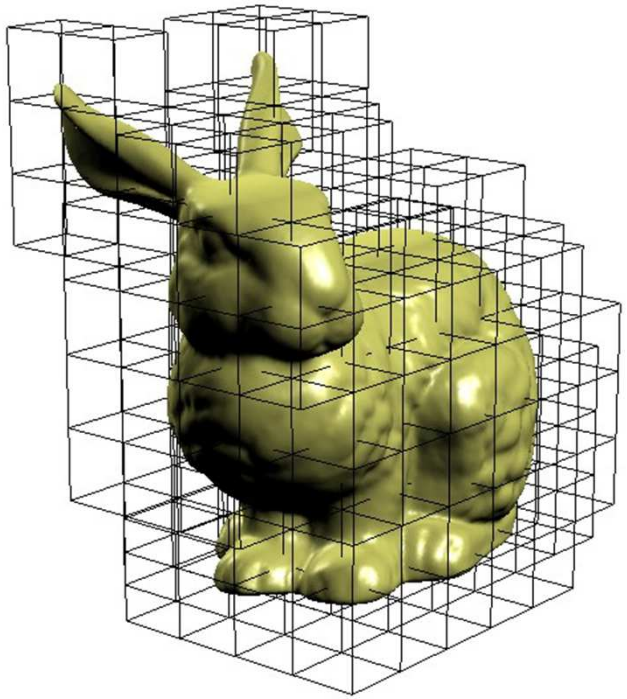

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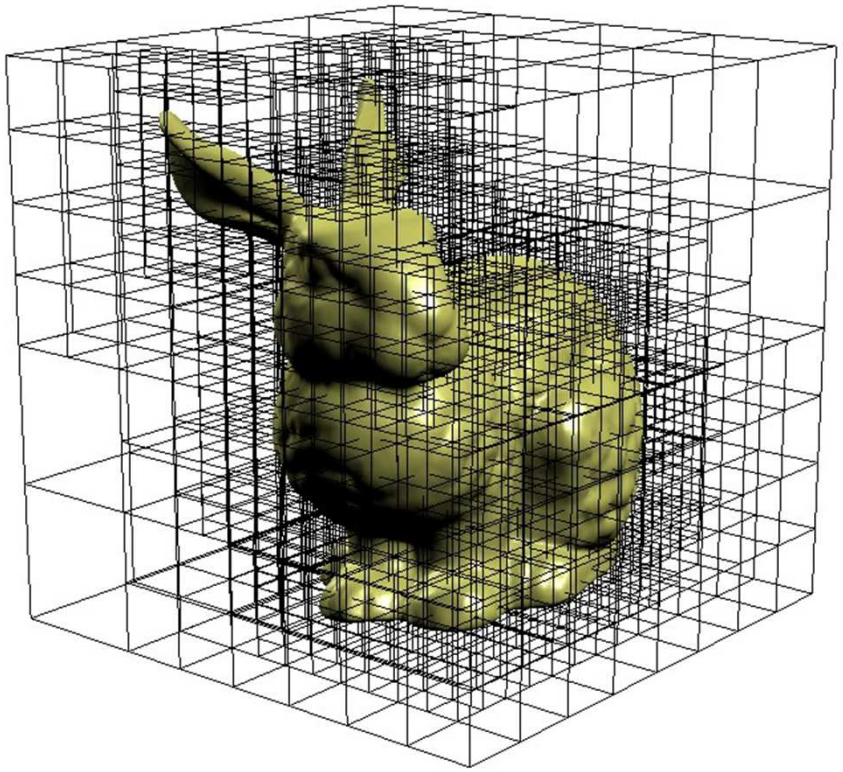

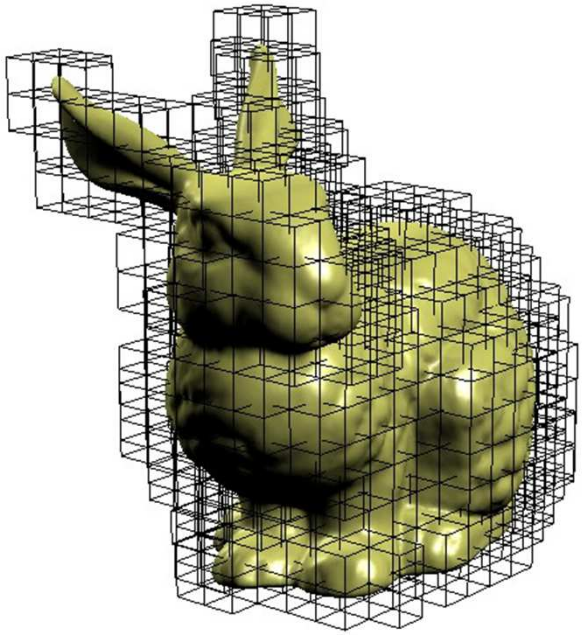

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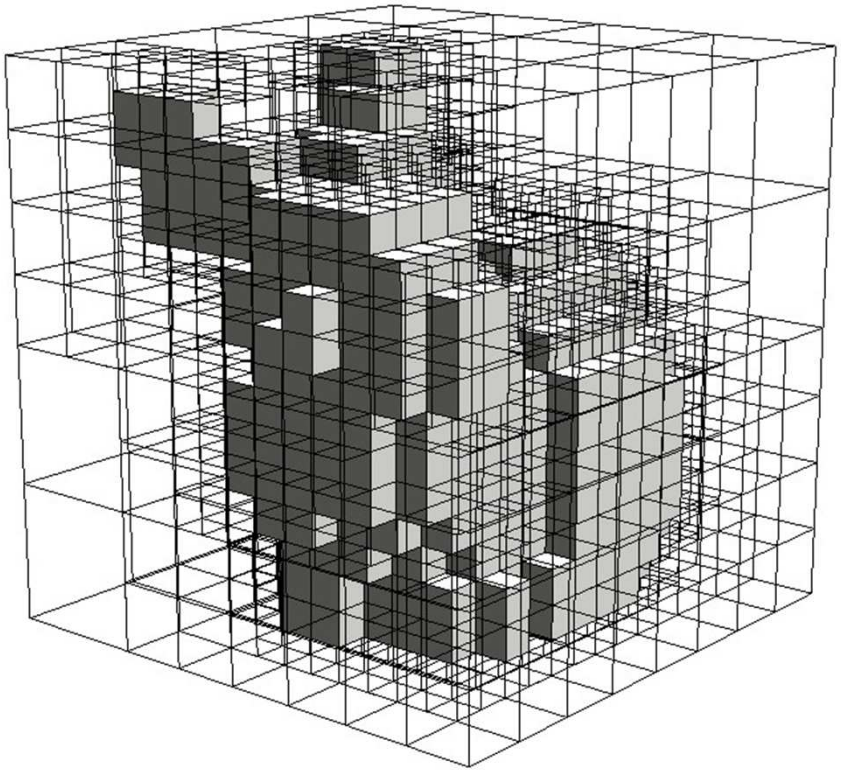

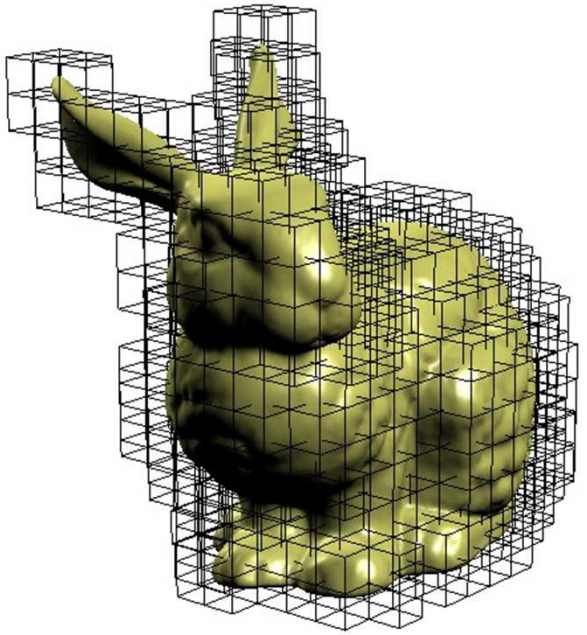

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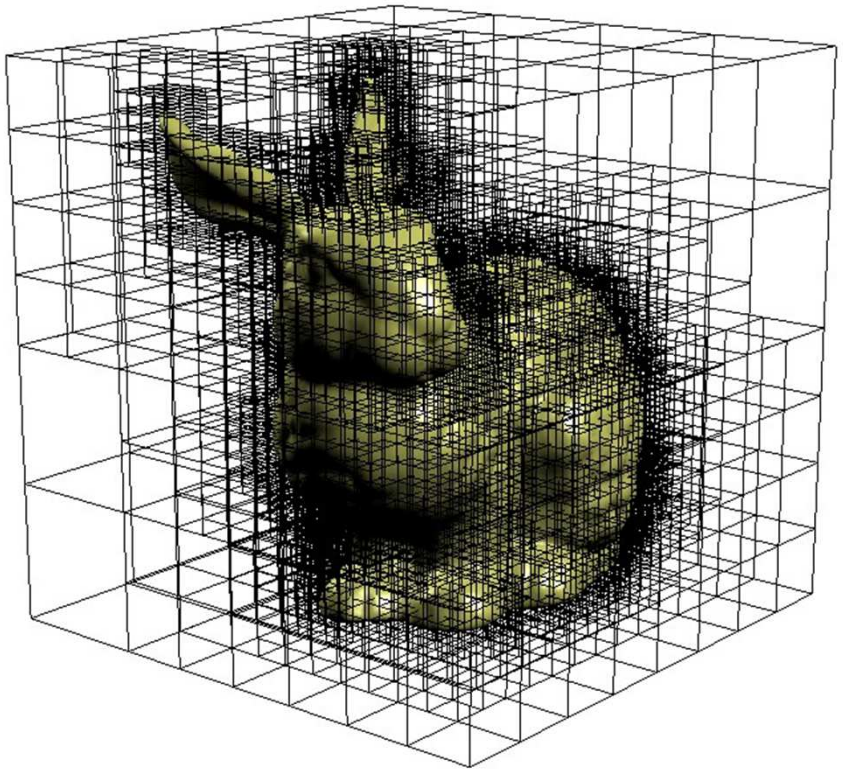

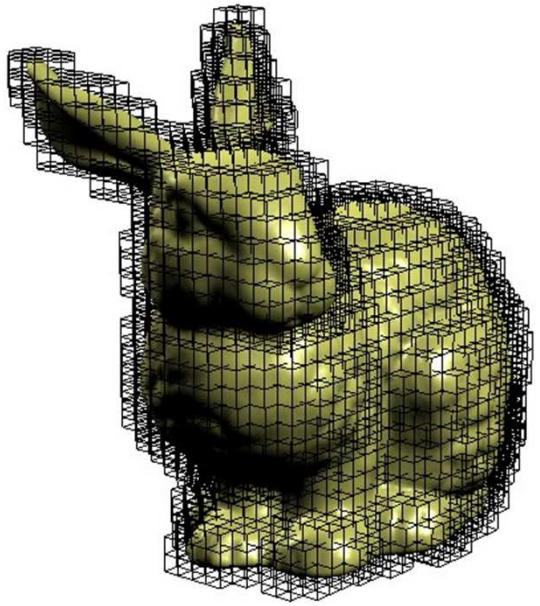

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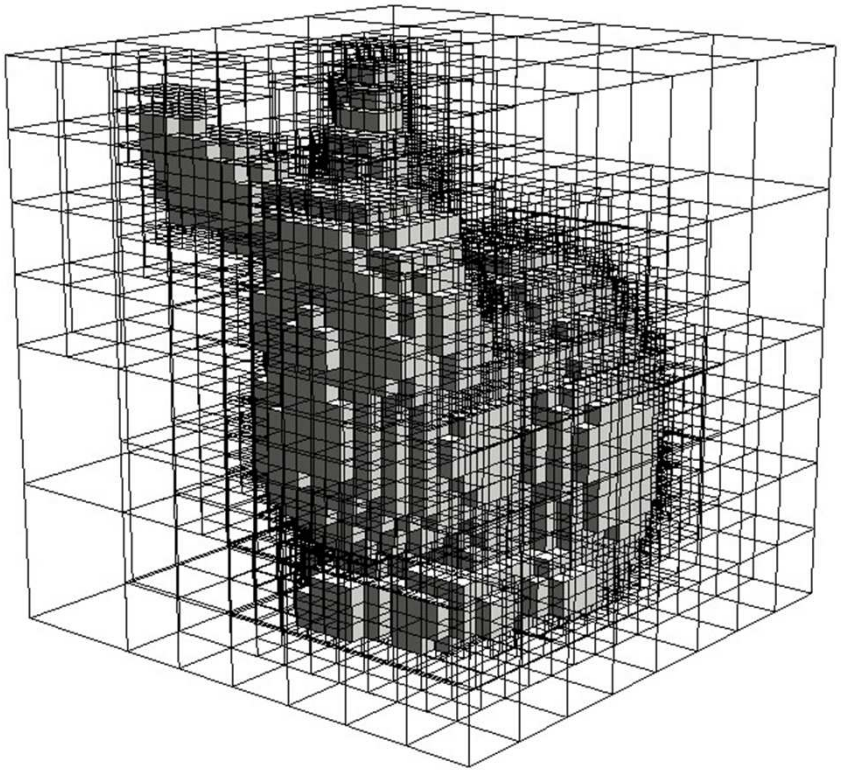

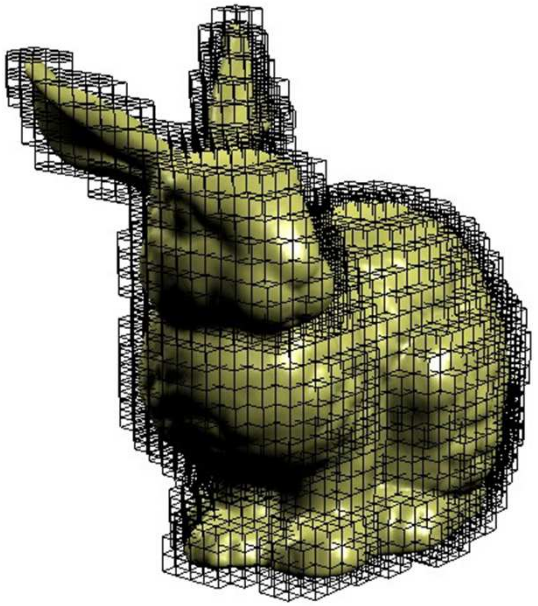

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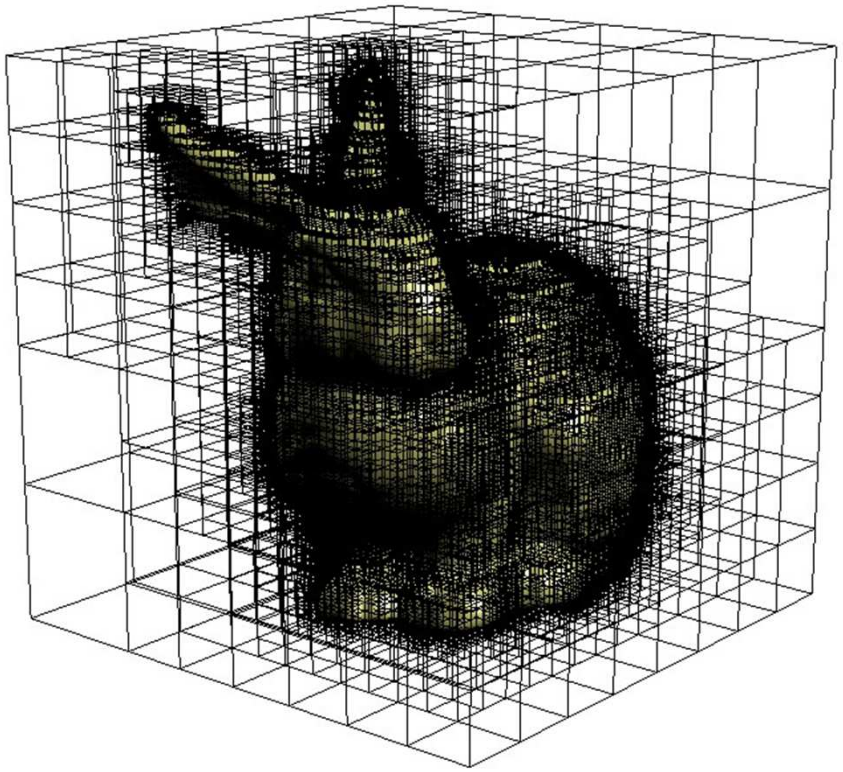

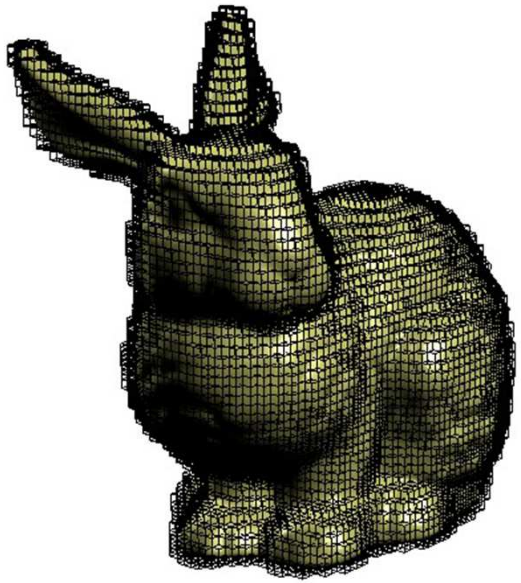

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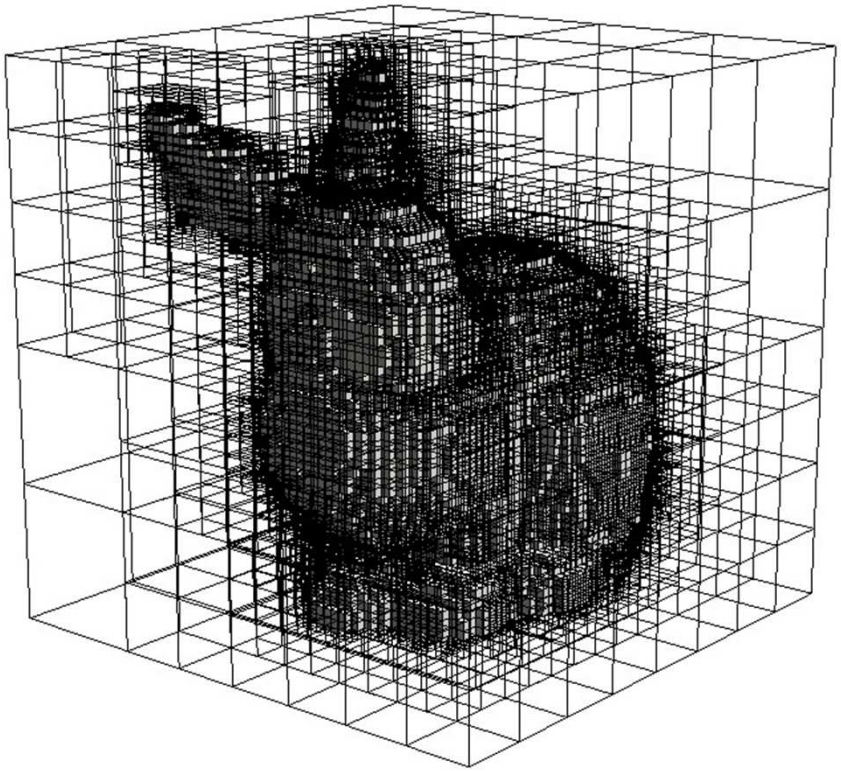

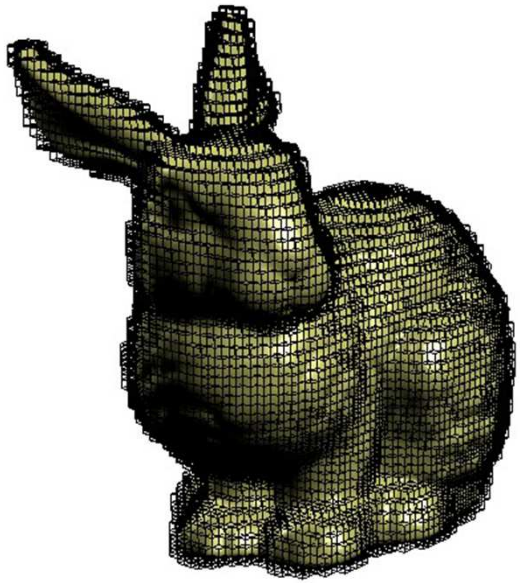

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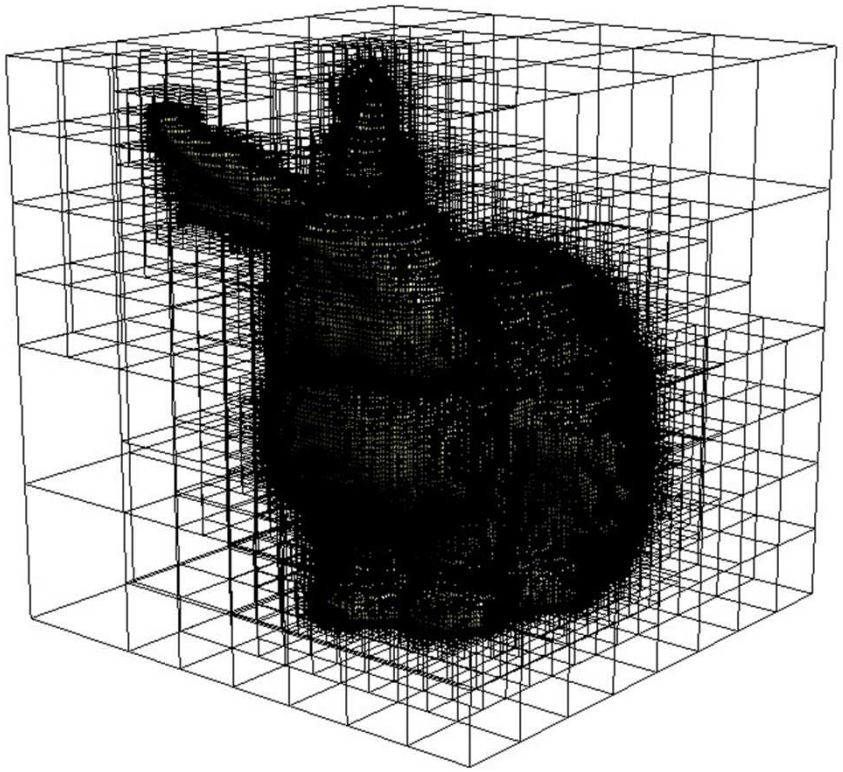

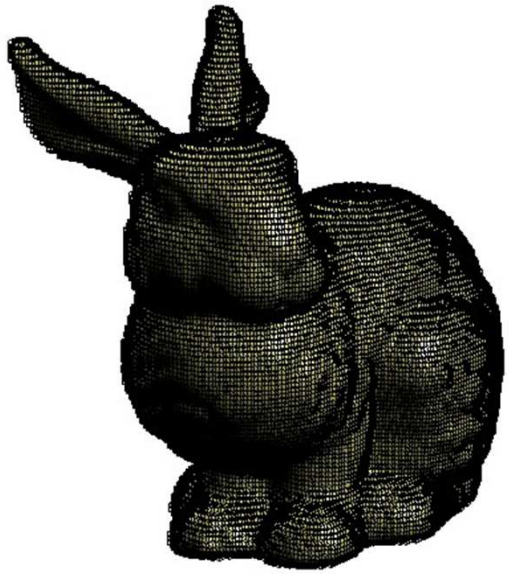

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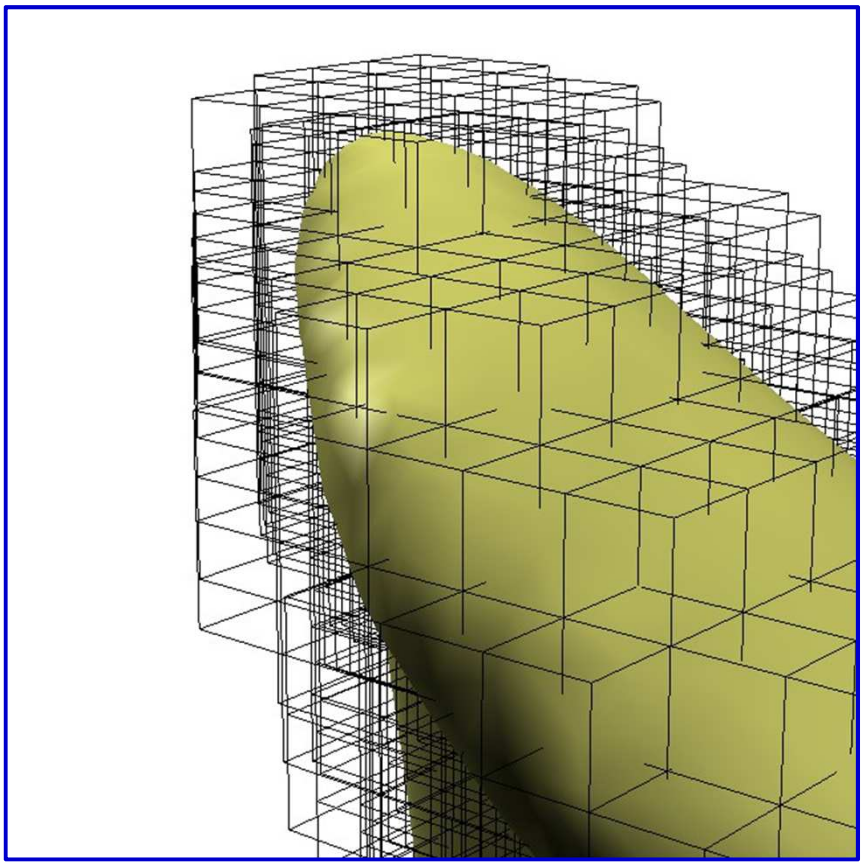
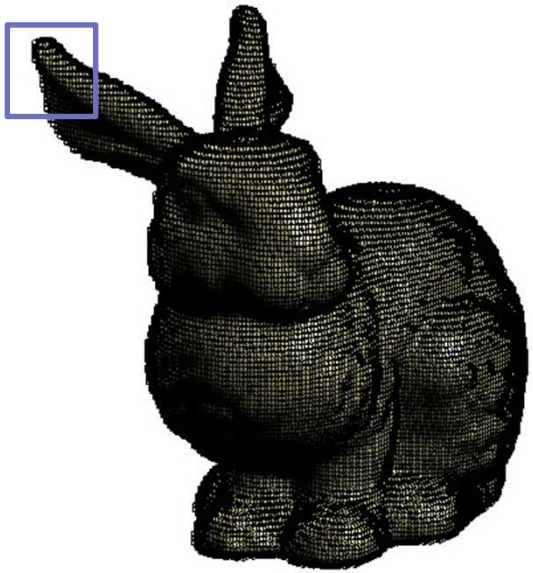
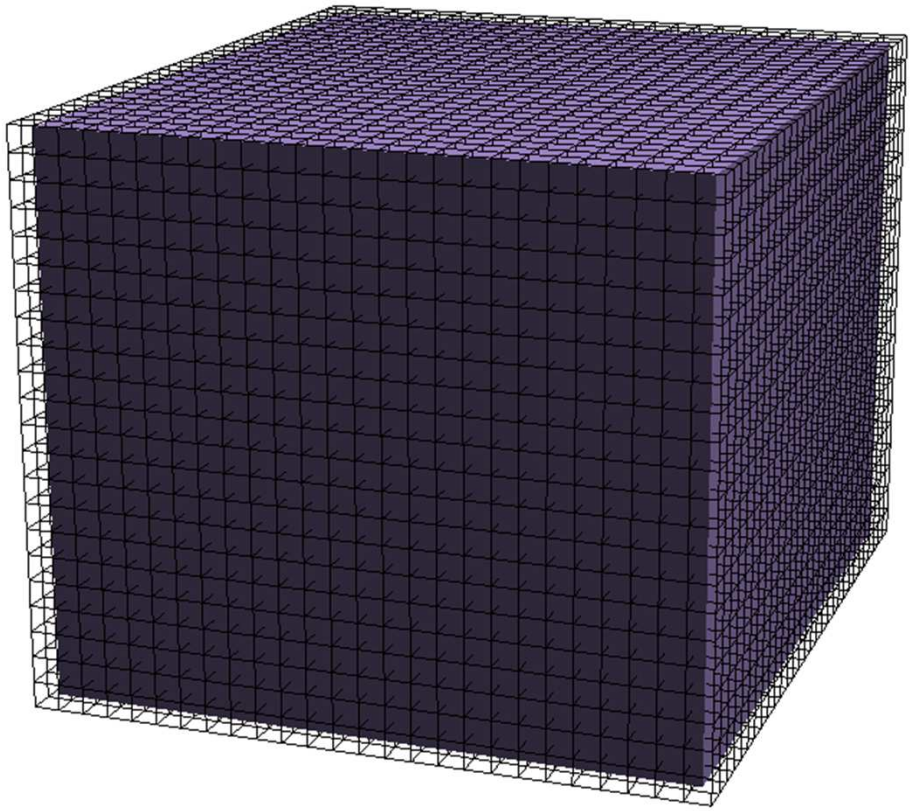




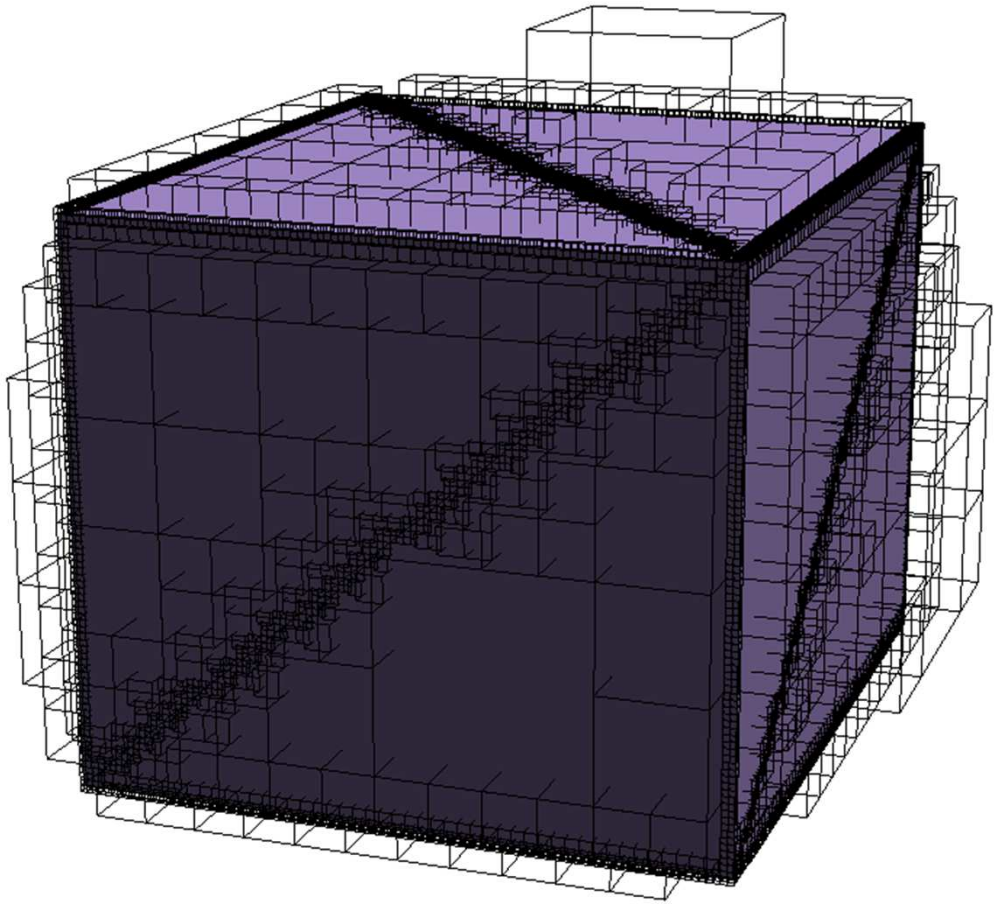
Classic octree

- Only terminal gray nodes are shown



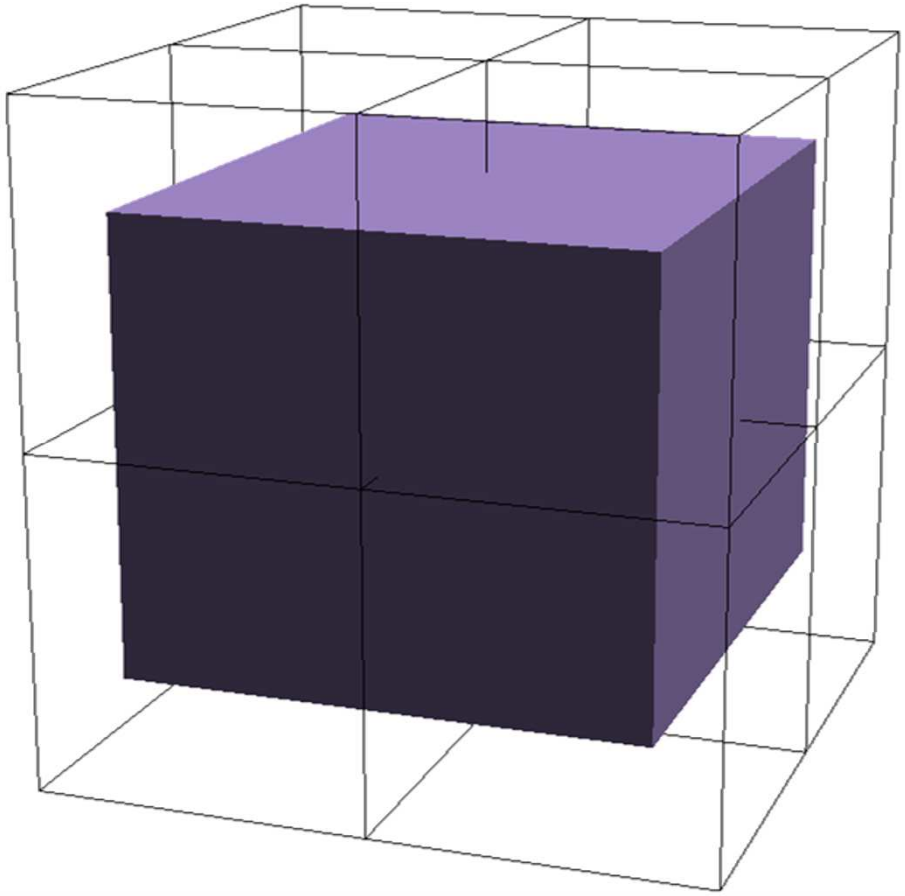
Face octree

- Only face nodes and TG nodes are shown.

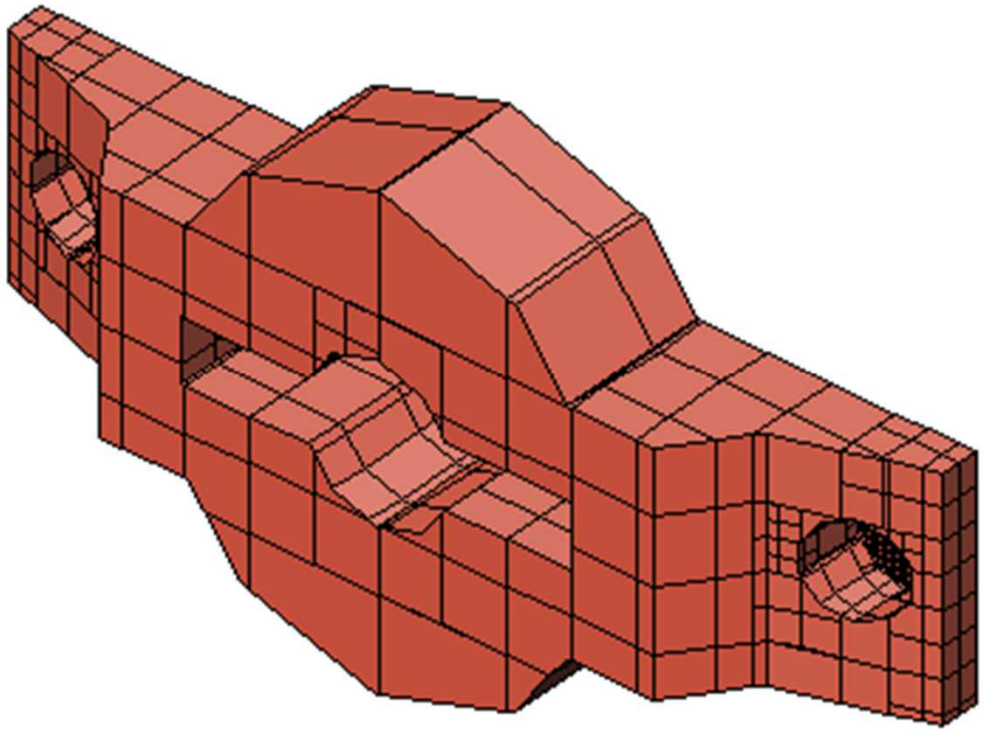


Extended octree

- Only face,edge,vertex and TG nodes are shown.



Extended octree



Octrees: representation

```
class OctreeNode
{
    ...
    char type;  // W,B,G…
    OctreeNode* children[8];
};
```

Bibliography

- Ayala, D., Brunet, P., Juan, R., and Navazo, I. (1985). *Object representation by means of nonminimal division quadtrees and octrees*. ACM Transactions on Graphics, 4 (1) (Jan. 1985), 41-59 http://portal.acm.org/citation.cfm?doid=3973.3975#

- Brunet, P. and Navazo, I. (1990). *Solid representation and operation using extended octrees.* ACM Transactions on Graphics, 9(2) (Apr. 1990), 170-197. http://portal.acm.org/citation.cfm?id=78959