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2007 Winter – Advanced OS
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13 February 2007

A. Bharambe, J. Pang and S. Seshan, Colyseus: A distributed architecture for online multiplayer games,
In Proc. of Networked System Design and Implementation, May 2005

Summary:

Colyseus is a system for distributing multiplayer game state across multiple servers, purportedly increasing the scalability of those games that had originally been designed for the traditional client/server model.

Important ideas:

Area of interest is leveraged to determine locality as well as allow optimal object node placement to minimize latency. Interesting objects are discovered using a distributed multi-attribute range query system, Mercury, which returns all interesting objects within logarithmic time. One primary copy of an object is maintained on a particular node, determined by its locality in the game. Replicas of the primary copy are transferred to interested nodes, but are not vigilantly updated.

Flaws:

I have two issues with this paper. First, I think that object inconsistency is more of a problem than they would like to admit. Second, I think that the performance measurements are confusing; one part of the paper reports that each message is almost seven times larger than the native Quake II messages, but later, significantly lower bandwidth requirements for the Colyseus implementation are presented.

I had hoped to see an implementation allowing for synchronized object migration between two nodes, perhaps where a copy is replicated and changes to the state are made in lock-step while the copy is being created.

Relevance:

I think that this research will be useful in designing new scalable games. However, object inconsistencies and the inability to efficiently migrate primary replicas of objects need to be addressed.