CSC2231 – Internet Systems and Services

Paper Review – Tiger
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Date: Nov. 30th, 05

Bolosky et al. present the design and architecture for a video file-streaming cluster. Briefly, their system consists of a cluster of disks on which video files are stored using a variant of RAID1+0 (striping across mirrors). The mirrored copies of a stripe are further "declustered" and split across multiple disks. The disks themselves are assigned in essentially round-robin fashion to "cubs" (cluster-head systems). A central controller coordinates and schedules the cubs.

This paper presents an interesting approach to building a video file-streaming cluster. Their variation on RAID1+0 was interesting in the way it used the same set of disks for mirroring, which saves physical resources. Although it's unclear whether this approach is necessary today since the cost (and capacity) of disks has increased dramatically since the time of the paper's writing – especially since this method provides slightly less fault tolerance than pure RAID1+0. More interesting is their design of a distributed schedule to reduce load on the main controller. They chose this method presuming that extra communication was a reasonable sacrifice in order to achieve scalability (reducing size of schedule being maintained at each cub). However, the communication overhead itself may also limit scalability and no analysis was provided to investigate this possibility.

The authors also acknowledge that the configuration is difficult to expand – resulting in a need to restripe all the files. At the time the paper was written, they used only 2.5/4.5GB disks (which is small compared to today's standards). The need to restripe would be considered a serious problem with the large capacities of today's disks. A more modular architecture that can be expanded without interrupting services would be preferred over a single monolithic cluster that needs to be reconfigured.

Overall, it seems that the authors propose a convincing design. However, the specs of the hardware on which their tests were performed were very low. This makes it unclear who the consumer of these video streams is supposed to be. The majority of home users were probably still on dial-up at the time of the paper's writing.