I took a slightly different approach to this task by using it as an opportunity to look at how a data-structure technology is used at scale: Redis. At its core, Redis is a very simple technology- it stores data in memory using the widely popular key-value data structure (Redis, n.d.). However, Redis is not limited to using strings for keys, as is typical with key-value stores, rather, it can use other types, such as lists, binary values, and more.

Hulu uses Redis to support a large-scale feature of their stream service: watch history (Bloom, 2013). Hulu keeps track of a user's watch time so that if a user closes the video before completing it, the next time a user opens it, they can resume watching from the time when they closed the video. This information is stored in Redis, and in 2013, Redis stored approximately 4 billion records related to this functionality, and the information could be retrieved at a low latency since key-value stores provide fast lookup times. In the article, an engineer at Hulu briefly explained how they use data structures to store this information: they make use of a Redis hash, which makes it possible to store all information related to one object using a single key. This structure is applied at Hulu by mapping a user\_id to video\_ids, which in turn contain information on the time that a user has stopped watching.

What I take away from this article is a focus on simplicity. Data structures are a fundamental computer science topic, and in the case of Hulu, all that was needed to store watch history is something functionally equivalent to a hashmap. Using Redis to implement this structure was only necessary to help them meet specific constraints (i.e. having fast response times, easy scaling, etc).

**References**

Bloom, A. (2013) Case Study: How Hulu Scaled Serving 4 Billion Videos Using Redis. Available from: [https://tanzu.vmware.com/content/blog/case-study-how-hulu-scaled-serving-4-billion-videos-using-redis](https://tanzu.vmware.com/content/blog/case-study-how-hulu-scaled-serving-4-billion-videos-using-redis%5C) [Accessed 21 March 2022].

Redis. (n.d.) Data types tutorial. Available from: <https://redis.io/docs/manual/data-types/data-types-tutorial/> [Accessed 21 March 2022].