

DataStations: Ubiquitous Transient Storage for Mobile Users

Sai Susarla and John Carter
{*sai, retrac*}@cs.utah.edu

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School of Computing
University of Utah
Salt Lake City, UT 84112 USA

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Abstract

In this paper, we describe *DataStations*, an architecture that provides ubiquitous transient storage to arbitrary mobile applications. Mobile users can utilize a nearby *DataStation* as a proxy cache for their remote home file servers, as a file server to meet transient storage needs, and as a platform to share data and collaborate with other users over the wide area. A user can roam among *DataStations*, creating, updating and sharing files via a native file interface using a uniform file name space throughout. Our architecture provides transparent migration of file ownership and responsibility among *DataStations* and a user's home file server. This design not only ensures file permanence, but also allows *DataStations* to reclaim their resources autonomously, allowing the system to incrementally scale to a large number of *DataStations* and users.

The unique aspects of our *DataStation* design are its decentralized but uniform name space, its locality-aware peer replication mechanism, and its highly flexible consistency framework that lets users select the appropriate consistency mechanism on a per-file replica basis. Our evaluation demonstrates that *DataStations* can support low-latency access to remote files as well as ad-hoc data sharing and collaboration by mobile users, without compromising consistency or data safety.