Analyzing Contents of a Computer Cache

The Cache Contents Estimator (CCE) is a computer program that provides information on the contents of level-1 cache of a PowerPC computer. The CCE is configurable to enable simulation of any processor in the PowerPC family. The need for CCE arises because the contents of level-1 caches are not available to either hardware or software readout mechanisms, yet information on the contents is crucial in the development of fault-tolerant or highly available computing systems and for realistic modeling and prediction of computing-system performance. The CCE comprises two independent subprograms: (1) the Dynamic Application Address eXtractor (DAAX), which extracts the stream of address references from an application program undergoing execution and (2) the Cache Simulator (CacheSim), which models the level-1 cache of the processor to be analyzed, by mimicking what the cache controller would do, in response to the address stream from DAAX. CacheSim generates a running estimate of the contents of the data and the instruction subcaches of the level-1 cache, hit/miss ratios, the percentage of cache that contains valid or active data, and time-stamped histograms of the cache content.

This program was written by John Beahan, Garen Khanoyan, Raphael Some, and Leslie Callum of Caltech for **NASA's Jet Propulsion Laboratory**. *Further information is contained in a TSP (see page 1). This software is available for commercial licensing. Please contact Don Hart of the California Institute of Technology at (818) 393-3425. Refer to NPO-30669.*

Discrepancy Reporting Management System

Discrepancy Reporting Management System (DRMS) is a computer program designed for use in the stations of NASA's Deep Space Network (DSN) to help establish the operational history of equipment items; acquire data on the quality of service provided to DSN customers; enable measurement of service performance; provide early insight into the need to improve processes, procedures, and interfaces; and enable the tracing of a data outage to a change in software or hardware. DRMS is a Web-based software system designed to include a distributed-database and replication feature to achieve location-specific autonomy while maintaining a consistent high quality of data. DRMS incorporates commercial Web and database software. DRMS collects, processes, replicates, communicates, and manages information on spacecraft data discrepancies, equipment resets, and physical equipment status, and maintains an internal station log. All discrepancy reports (DRs), Master discrepancy reports (MDRs), and Reset data are replicated to a master server at NASA's Jet Propulsion Laboratory; Master DR data are replicated to all the DSN sites; and Station Logs are internal to each of the DSN sites and are not replicated. Data are validated according to several logical mathematical criteria. Queries can be performed on any combination of data.

This program was written by Tonja M. Cooper of Caltech, James C. Lin of Chase Computing International, and Mark L. Chatillon of BAE Systems, Australia, for **NASA's Jet Propulsion Laboratory**. *Further information is contained in a TSP (see page 1).*

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