PDL Packet Spring Update

NEWSLETTER ON THE PARALLEL DATA LABORATORY • SPRING 2002

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RECENT PUBLICATIONS: ABSTRACTS

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Examining Semantics In Multi-Protocol Network File Systems

Hogan, Gibson & Ganger

Carnegie Mellon University Technical Report CMU-CS-02-103, January 2002.

Network file systems provide a robust tool that can be used by many physically dispersed clients. They provide clients with a means of permanent storage and communication. In order to exploit the resources available on a network file system server, a client must use the protocol of the server's file system. Although the goal of any protocol is to guarantee that the client and server can communicate, the introduction of new protocols divides clients into incompatible sets. Soon clients can no longer cooperate and share because they are using different protocols. In addition, each network file system is constructed with a different set of semantics. The result is that it is increasingly difficult to provide a single storage solution that supports all of these clients. Although difficult, it is extremely desirable to build a multi-protocol network file system, that is, a storage solution that can be used simultaneously by clients of different protocols and semantic sets. A semantic mismatch is a major complexity in building a multi-protocol network file system. These are situations that arise when the normal behavior of a server, expected by a client using a particular semantic set, does not occur because of the effects of a client from a separate semantic set. To achieve the goal of building a multi-protocol file system, the file system semantic sets of the targeted file systems must be carefully examined to determine where semantic mismatches will occur. Next, the possible means of resolving a semantic mismatch can be analyzed for their particular trade-offs. Finally, data from file system traces can be used to determine the frequency of possible semantic mismatches. The data collected from the file system traces, when examined in the context of a cost-benefit analysis, can provide designers of multi-protocol network file systems with important information for examining and resolving semantic differences.

Blurring the Line Between OSes and Storage Devices

Ganger

Carnegie Mellon University Technical Report CMU-CS-01-166, December 2001.

This report makes a case for more expressive interfaces between operating systems (OSes) and storage devices. In today's systems, the storage interface consists mainly of simple read and write commands; as a result, OSes operate with little understanding of device-specific characteristics and devices operate with little understanding of system priorities. More expressive interfaces, together with extended versions of today's OS and firmware specializations, would allow the two to cooperate to achieve performance and functionality that neither can achieve alone.

PDL NEWS

February 2002
PDL paper named Best Student Paper at FAST 2002

The program committee of the US-ENIX Conference on File and Storage technologies (FAST'02) awarded Best Student Paper to PDL researchers Jiri Schindler, John Linwood Griffin, Christopher R. Lumb, and Gregory R. Ganger for their paper "Track-Aligned Extents: Matching Access Patterns to Disk Drive Characteristics." The conference included 21 papers (three of which were PDL submissions) chosen from a pool of 110 submissions.

January 2002
PDL Receives Intel Equipment Grant

The PDL would like to thank Intel Corporation for its generous donation of equipment in support of our research. The PDL received 3 fully equipped 1.7 GHz WS530 Xeon DP Workstations and 100 PIII 850 MHz boxed processors. Included with the donation is three years of product support.

January 2002*
PDL Graduate Student Awarded Microsoft Research Fellowship

Microsoft Corporation has chosen Shimin Chen, a CS/PDL Ph.D. student, to receive a Microsoft Research Fellowship. Awarded to 13 of 52 applicants, the fellowship offers financial support for two years, including 100 percent of CMU tuition and fees; a stipend for living expenses of up to $20,000; a conference and travel allowance; a laptop computer complete with Microsoft software; and a $1,000 donation to the students' advisor, Todd Mowry, Associate Professor of CS and ECE. Chen also has the opportunity to participate in a 12-week paid internship, allowing him to interact with Microsoft Researchers and work in areas relevant to his own research.

December 2001**
PDL Student receives Honorable Mention in CRA Outstanding Undergraduate Awards

Cory Williams, a CS/Math Sciences senior and PDL member, received Honorable Mention when the Computing Research Association selected the recipients of their Outstanding Undergraduate Awards for 2002. Nominees were from universities across North America and it is a significant honor for Cory to have been selected for honorable mention from this group.

Cory's work focuses on Computer forensics and Intrusion detection, and the benefit achieved if system logs continued to be accurately recorded after a system compromise. Specifically, he is working on how to use these accurately recorded system logs and what should be recorded if accurate logging is expected.

November 2001
Congratulations to CMU's ACM Programming Contest Winners

A CMU team consisting of Cory Williams (PDL), Tom Murphy and Eric Heutchy received 4th place in the East Central North American Region in the 2001 ACM programming contest. In regional competition, they competed at Ashland University, where they placed first.

November 2001**
Goldstein Participates in ICCAD 2001 Nanotechnology Panel

Seth Goldstein, Assistant Professor of Computer Science and ECE, was one of six panelists to address the question "Will Nanotechnology Change the Way We Design and Verify Systems?" at the International Conference on Computer-Aided Design panel session on November 7. The panel was part of a conference for EE CAD professionals, held in San Jose, CA.

Goldstein predicted that nanotechnology systems would be reprogrammable and designers would use nanotechnology chips' reconfigurability to detect and avoid defects.

*ECE News
**SCS Today

RECENT PUBLICATIONS

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This report consists of the technical content of an NSF proposal submitted in January 2001 and funded in June 2001 under the Information Technology Research (ITR) program. The only divergence from the original proposal is the removal of non-technical content (e.g., budgets, biographies, and results from prior NSF support).

Happy PDL Grad Students

Andy looks to his horizons.