Failure Trace Archive

- Repository of availability traces of parallel and distributed systems, and tools for analysis
- Facilitate design, validation and comparison of fault-tolerance algorithms and models
Status

• 15 data sets retrieved and permission granted
• Preliminary format decided
• Web site created and public
  • all raw data sets made available, 3 formatted
  • svn repository for tools and scripts
Data Sets

• Differ in:
  • Usage (p2p, supercomputer, grids, desktop PC’s)
  • Type (network, IO, host, cpu availability)
  • Scale (50-240,000 hosts)
  • Volatility
  • Detail (reason for failure)
  • Resolution (wrt failure detection)
Format

• Balance between completeness and sparseness
• Extensibility
• Event-based
• Codes for failure reasons derived from LANL (network, software, IO, user, etc.)
• Do not have specific tables for monitoring data (just generic event_state)
• Evaluation
  • Us, SimGrid group, and others
FTA Format
DATASETS

The FTA provides trace data sets using a common format. This format is described in detail on the FTA format page. Each trace data set is made available in raw format, tabbed-delimited format, and mysql format.

A table summarizing each trace data set follows. Also included are links for the data set downloads.

<table>
<thead>
<tr>
<th>System</th>
<th>Type</th>
<th># of Nodes</th>
<th>Target Component</th>
<th>Period</th>
<th>Year</th>
</tr>
</thead>
<tbody>
<tr>
<td>SUIT@home</td>
<td>Desktop Grid</td>
<td>226,200</td>
<td>CPU</td>
<td>1.5 years</td>
<td>2007-2009</td>
</tr>
<tr>
<td>Overnet</td>
<td>P2P</td>
<td>3,000</td>
<td>host</td>
<td>2 weeks</td>
<td>2003</td>
</tr>
<tr>
<td>Microsoft</td>
<td>Enterprise</td>
<td>51,563</td>
<td>host</td>
<td>15 days</td>
<td>1995</td>
</tr>
<tr>
<td>LANL</td>
<td>HPC Clusters</td>
<td>3578</td>
<td>host</td>
<td>9 years</td>
<td>1995-2005</td>
</tr>
<tr>
<td>HPC2</td>
<td>HPC Clusters</td>
<td>256</td>
<td>IO</td>
<td>2.5 years</td>
<td>1996-2005</td>
</tr>
<tr>
<td>HPC4</td>
<td>Supercomputers</td>
<td>152016</td>
<td>every thing</td>
<td>~1 year</td>
<td>2004-2006</td>
</tr>
<tr>
<td>PNNL</td>
<td>HPC Cluster</td>
<td>980</td>
<td>CPU, IO, memory</td>
<td>4 years</td>
<td>2003-2007</td>
</tr>
<tr>
<td>NERSC</td>
<td>HPC Clusters</td>
<td>NA</td>
<td>IO</td>
<td>5 years</td>
<td>2001-2006</td>
</tr>
<tr>
<td>Skype</td>
<td>P2P</td>
<td>4000</td>
<td>host</td>
<td>1 month</td>
<td>2005</td>
</tr>
<tr>
<td>Web site</td>
<td>Web servers</td>
<td>129</td>
<td>host</td>
<td>6 months</td>
<td>2001-2002</td>
</tr>
<tr>
<td>DNS</td>
<td>DNS servers</td>
<td>62,201</td>
<td>host</td>
<td>2 weeks</td>
<td>2004</td>
</tr>
<tr>
<td>PlanetLab</td>
<td>P2P</td>
<td>200-400</td>
<td>host</td>
<td>1.5 year</td>
<td>2004-2005</td>
</tr>
<tr>
<td>Grenouille03</td>
<td>DSL</td>
<td>4800</td>
<td>host</td>
<td>1 year</td>
<td>2003</td>
</tr>
<tr>
<td>Grenouille05</td>
<td>DSL</td>
<td>4800</td>
<td>host</td>
<td>1 year</td>
<td>2005</td>
</tr>
<tr>
<td>EGEE</td>
<td>Grid</td>
<td>2500 queues</td>
<td>CE queue</td>
<td>1 month</td>
<td>2007</td>
</tr>
</tbody>
</table>
## DOWNLOAD

All data sets appear in this [download directory](#). Alternatively, you can download individual data sets below:

<table>
<thead>
<tr>
<th>System</th>
<th>Creator</th>
<th>Cite</th>
<th>Download</th>
</tr>
</thead>
<tbody>
<tr>
<td>SETI@home(*)</td>
<td>D. Anderson</td>
<td>(ja_ko_mascots09)</td>
<td>raw tabbed [mysql]</td>
</tr>
<tr>
<td>Overnet</td>
<td>R. Bhagwan</td>
<td>(ttps_bhagwan)</td>
<td>raw tabbed mysql</td>
</tr>
<tr>
<td>Microsoft</td>
<td>J. Doorem</td>
<td>(farsite)</td>
<td>raw tabbed mysql</td>
</tr>
<tr>
<td>LANL</td>
<td>LANL team</td>
<td>(gibson_deno06)</td>
<td>raw [tabbed][mysql]</td>
</tr>
<tr>
<td>HPC2</td>
<td>LANL team</td>
<td>(gibson_fast07)</td>
<td>raw [tabbed][mysql]</td>
</tr>
<tr>
<td>HPC4</td>
<td>J. Stearley</td>
<td>(ollner_deno07)</td>
<td>raw [tabbed][mysql]</td>
</tr>
<tr>
<td>PNNL</td>
<td>EMLS team</td>
<td></td>
<td>raw [tabbed][mysql]</td>
</tr>
<tr>
<td>NERSC</td>
<td>A. Mokhtarani</td>
<td></td>
<td>raw [tabbed][mysql]</td>
</tr>
<tr>
<td>Skype</td>
<td>S. Guha</td>
<td>(guha_ipps06)</td>
<td>raw [tabbed][mysql]</td>
</tr>
<tr>
<td>Web sites</td>
<td>M. Bakaloglu</td>
<td>(bakk_02)</td>
<td>raw [tabbed][mysql]</td>
</tr>
<tr>
<td>DNS</td>
<td>J. Peng</td>
<td>(pang_iom04)</td>
<td>raw [tabbed][mysql]</td>
</tr>
<tr>
<td>PlanetLab</td>
<td>J. Strobl</td>
<td>(planetlab)</td>
<td>raw [tabbed][mysql]</td>
</tr>
<tr>
<td>Grenouille03</td>
<td>Georges De Costa</td>
<td>(costa_grenouille)</td>
<td>raw [tabbed][mysql]</td>
</tr>
<tr>
<td>Grenouille05</td>
<td>Georges De Costa</td>
<td>(costa_grenouille)</td>
<td>raw [tabbed][mysql]</td>
</tr>
<tr>
<td>EGEE</td>
<td>Marios Dikalakos</td>
<td>(marios_fallrank)</td>
<td>raw [tabbed][mysql]</td>
</tr>
</tbody>
</table>

(*) The tabbed data is post-processed of the raw data in which the 150 seconds unavailability intervals after 5-day availability intervals have been removed. See (ja_ko_mascots09) for more details.
FAILURE TRACE ARCHIVE

FOR IMPROVING THE RELIABILITY OF DISTRIBUTED SYSTEMS

AUG 24, 2009

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PUBLICATIONS

Here we list which data sets have been used in which publications. Publications are grouped by the data sets used. In cases where authors use multiple data sets, the publications are cited again.

- SETI@home

- Overnet

- Microsoft

- LANL
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PARSING

Below are several scripts for parsing the raw data and putting it into the FTA format. Alternatively, you can check out the latest versions of all scripts from the svn repository with the following command:

svn checkout svn://scm.gforge.inria.fr/svn/fta/scripts

We first parse the raw data and format it with tabs. Then from the tabbed format, we convert it into other formats like mysql. The format is defined as centrally as possible in the perl module FTA\_Format.pm.

- Overnet
  - *overnettab.pl*: perl script to convert overnet raw data into tabbed FTA format.

- Microsoft
  - *microsofttab.pl*: perl script to convert microsoft raw data into tabbed FTA format.

MYSQL SCRIPT

- *tab2mysql.pl*: perl script to add tabbed FTA format into mysql database.
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PROCESSING

Some useful processing scripts are provided here.

- `tab_event_trace_read-print.py` python script to return a few information about event_trace.tab file of the tabbed FTA format.
## Failure Trace Archive

For improving the reliability of distributed systems

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<thead>
<tr>
<th>AUG 24, 2009</th>
<th>OTHER</th>
</tr>
</thead>
<tbody>
<tr>
<td>ABOUT</td>
<td>Other</td>
</tr>
<tr>
<td></td>
<td>• Simulators</td>
</tr>
<tr>
<td></td>
<td>• Singgrid Simulation Toolkit</td>
</tr>
<tr>
<td></td>
<td>• Failure-injection tools</td>
</tr>
</tbody>
</table>

**Tools**

- Parsing
- Processing
- Other

**Links**

- Other Resources

**Search**

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FOR IMPROVING THE RELIABILITY OF DISTRIBUTED SYSTEMS

AUG 24, 2009
OTHERRESOURCES
- Computer Failure Data Repository
- Repository of Availability Traces
- Grid Workload Archive
- Parallel Workload Archive
- Grid Observatory

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CHANGES
GROUP RECENT
CHANGES

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BACK LINKS
Plan

• More formatting (need help :) )
  • Format library is in SVN
• Purchase server?
• Announcement
  • EuroPar, MASCOTS, email colleagues, create call for traces
• Host possibly at USENIX
• Relation to Grid Observatory (Cecile Germain)
Overview Paper

- compare and contrast basic stats of each data set
- definitions/types of availability, taxonomy of failures
- the comparison and cross-validation of fault-tolerant model or algorithm across identical trace data sets
- the analysis of the evolution of availability in different systems across long timescales
- the evaluation of the generality of a model or algorithm across different types of resources (in terms of reliability or user base, for example)
- the evaluation the generality of a failure trace, i.e., to determine whether measurements are biased to particular platform or middleware
- the determination of which trace data set is most interesting or applicable for a given algorithm or model