

MSL Regression Testing Status Info

Presented by Leo Gall

82nd Modelica Design Meeting, Lund, 2014-03-14

Thanks to contributors:

Adrian Ahne, Martin Sjölund, Dietmar Winkler, Ibrahim Yenin

This work is partially funded by Modelica Association.

URL of this document:

https://svn.modelica.org/projects/ModelicaDesign/trunk/MeetingMinutesMaterial/min_82_2014_Lund/Slides-and-Documents/MSLRegressionTesting.pptx

Goal:

Automatically generated Overview Table

Idea: Re-use and adapt FMI cross check framework

https://fmi-standard.org/results_FMI_1.0_ModelExchange_win32

Status of Regression Testing for MSL 3.2.1:

- Martin Otter is performing tests using Dymola ModelManagement
- Free MapleSim Parser is used
- Dietmar Winkler checks/corrects library structure and HTML info
- Tool Vendors and Library Developers test MSL (“implicitly” tested)

Planned Process

- Modelica Association (**MAP-LIB**) provides **reference results** for
 - all examples of the Modelica Library and
 - all test cases of the ModelicaTest Library.
- Participating **tool vendors**
 - perform test runs in their specific tool,
 - use the public reference results in order to solve tool issues and
 - upload result files in order to support the MSL development.
- Modelica Association (MAP-LIB)
 - runs the CSV-comparison tool on submitted result files,
 - generates an overview table, similar to FMI Cross Check (showing all participating tools and test cases) and
 - arbitrates between tool vendors and library developers.

Related Documents

- Order from MA to BAUSCH-GALL GmbH
<https://svn.modelica.org/projects/ModelicaDesign/trunk/Modelica-Association/Calls/2013-12-20-Order-for-MSL-RegressionTesting.pdf>
- Ticket for discussion: Specify setup for MSL Regression Testing
<https://trac.modelica.org/Modelica/ticket/1392>
- OpenModelica Ticket: „simulation results. How to handle the first data point?”
<https://trac.openmodelica.org/OpenModelica/ticket/2534>
- Compare tool tickets:
<https://trac.modelica.org/Modelica/query?status=accepted&status=assigned&status=closed&status=new&status=reopened&component=--CSV-compare--&desc=1&order=id>

Assigned Tasks (from MA order)

1. **Check compare.exe** (csv comparison tool developed by ITI).
2. **Generate csv reference files** for MSL 3.2.1 (including ModelicaTest) and document how this was created.
3. **Implementing** a basic test setup and running compare.exe (**specifying flags, adapting FMI cross check etc.** with support from Dietmar Winkler).
4. **Coordination with Martin Sjölund** who will adapt the OpenModelica scripts to this format (might require adapting variable names. Dymola: “a.der(x)”; OpenModelica: “der(a.b)”. Best would be according to FMI naming).
5. **Perform regression testing** of MSL 3.2.1 (including ModelicaTest) maintenance branch (versus MSL 3.2.1 release version) with Dymola and OpenModelica.

Two folders to be stored on MA web

Folder Name	Description
ReferenceResults	<p>Folder containing reference result files (“base”), to be provided by MAP-LIB (probably Library Officers). As an initial step, Leo Gall is going to generate reference result files for MSL 3.2.1 using Dymola. For the future, MAP-LIB has to decide what information is required and who is going to maintain the reference results.</p>
ToolResults	<p>Contains new result files, to be provided by Tool Vendors. Additionally, it contains comparison flags and comparison reports, generated by CSV-compare-tool on MA server. As an initial step, Leo Gall is going to perform a comparison on his local PC.</p>

Process Overview

- DRAW HERE
- CSV generation according to FMI Cross Check rules
- CSV save for Dymola?
- CSV can be opened in Dymola
- Working time: Estimated 64h, Now 116h

What needs to be provided by a tool vendor?

A minimum set of files for each test model:

- **ModelName.csv**
- **creation.txt**
- **simulate_*.log** (where * has to be replaced by passed or failed)

It would be nice to have (additionally):

- **ModelName.mat**
(a full result file, in tool specific format. Does not need to be .mat)
- **translate_*.log**
(translation diagnostics, if not included in simulation log)

Remark: The Tool Vendor decides for which parts of the library he wants to upload results.

File Sizes and Online Storage

Package Name	No. of test models	Models without state variables	Size of MAT files	Size of CSV files
Modelica	270	16	1.9 GB	220 MB
ModelicaTest	430	169	1.8 GB	800 MB

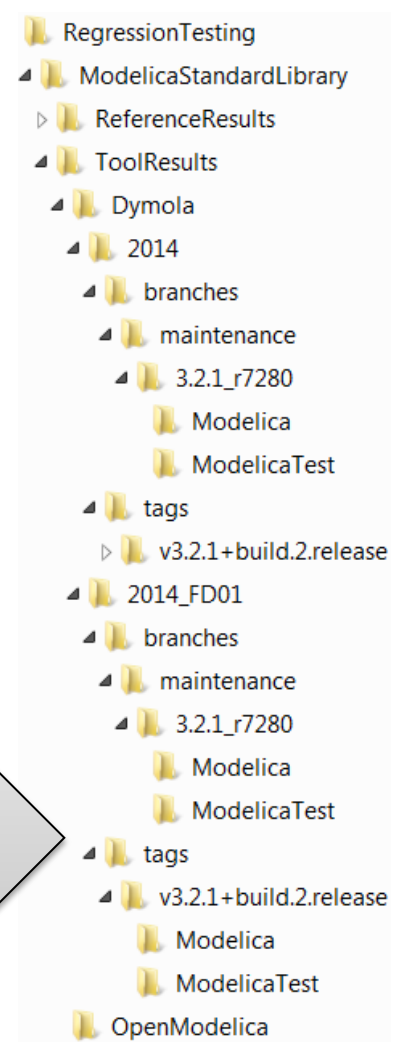
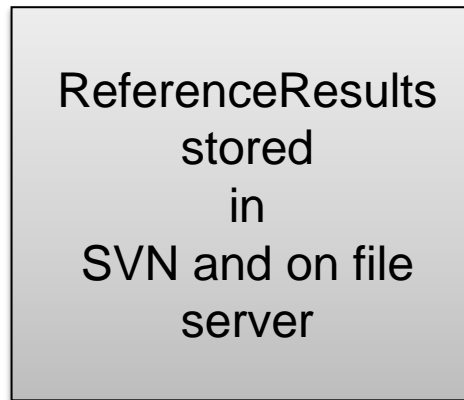
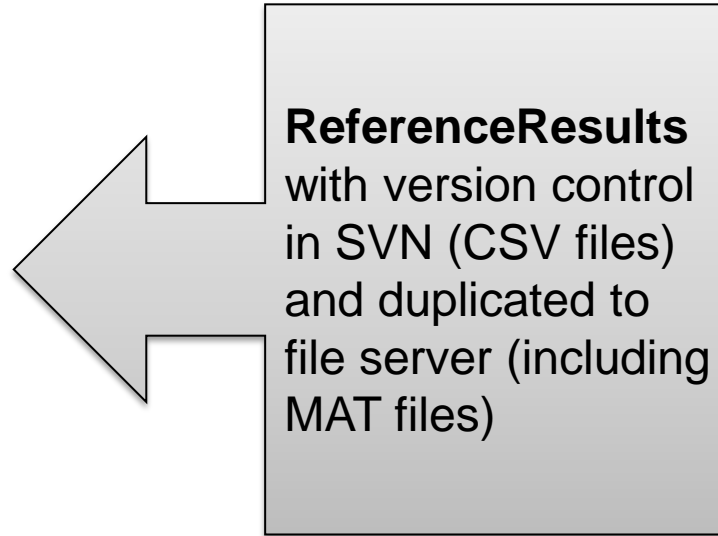
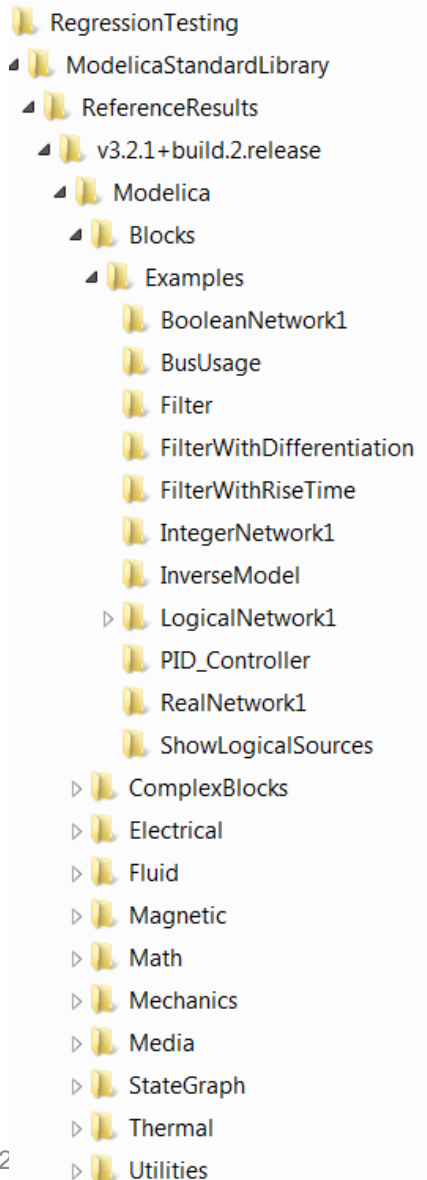
File sizes hold for double precision storage. MAT files include all non-protected variables.

CSV files include only defined comparison signals.

Online Storage

- SVN repository for ReferenceResults
- File server (SSH) for ToolVendors
- Tried Google Drive and Dropbox (but decided for SSH server instead)

Folder Structure



Simulation settings for reference generation

Proposed **solver**: Dassl (Dymola default).

Proposed way of setting **solver tolerance**, automatically:

- If the model has Tolerance set in the experiment annotation, use reduce by one order of magnitude ($\text{toleranceToUse} = \text{Tolerance} * 0.1$)
 - If simulation with $\text{Tolerance} * 0.1$ fails, try again with Tolerance
 - If simulation with Tolerance fails, treat as if it didn't have a tolerance annotation (see next bullet point)
- If the model has no Tolerance set in the experiment annotation, use $1e-6$
 - If simulation with $1e-6$ fails, try again with $1e-5$
 - If simulation with $1e-5$ fails, try again with $1e-4$ (Dymola default)

Proposed way of setting **output interval**, automatically:

- If the model has an Interval set in the experiment annotation, divide this in halves
- If the model has no Interval set in the experiment annotation, aim for 5000 output points and calculate the interval : $(\text{StopTime} - \text{StartTime}) / 5000$.

Define Comparison Signals

- States
- Whitelist
- Blacklist
 - No parameters
- Manually:
 - Sensors

- `comparisonSignals.txt`

creation.txt -

Be able to reproduce simulations

- The creation log file is intended to document the test setup.
- By reading the creation log, it should be possible to reproduce reference or test results.
- Ideally, the section of tool-specific experiment settings is a script which can be used to reproduce the results, exactly. For the reference results from Dymola, this are mos-script commands.
- See Editor

Compare Issues (Dymola vs. OpenModelica)

- **time=0**
OpenModelica is storing events during initialization.
Dymola has only one output point at time=0.
- **Init** of Modelica.Mechanics.MultiBody.Examples.Loops.Fourbar1

Compare Tool

- Current version: CSV Compare Version 1.1.0.7267 (Amd64)
- Example call:

```
compare.exe --mode csvTreeCompare --tolerance 2e-3 --delimiter "," --verbosity 2  
C:\Work\ToolResults\OpenModelica\2014-01-23\v3.2.1+build.2.release\Modelica  
C:\Work\upload\RegressionTesting\MSL\ReferenceResults\v3.2.1+build.2.release\Mod  
elica --logfile log.txt --comparisonflag --reportdir 07_r7267_Modelica
```

- Open Issues
 - A lot of email exchange between ITI and B-G
 - Known limitations
 - Huge HTML reports
 - I'm going to file tickets
 - Bug:

Open issues

- **File Structure:**
 - ReferenceResults: Do they need a trunk/tag/branches structure?
 - ToolResults: Should we have a „current“ folder, in order to prepare for nightly testing?
- Is ITI willing to fix and improve the **compare tool**?
 - Fast and cheap solution: Work Meeting in Dresden or Munich
 - New call/contract for ITI?
 - Tool Vendors provide their derived work and fixes?
- Who is going to **maintain the regression testing framework**?
 - MAP-LIB?
 - Dietmar?
 - Other paid work?
 - Tool Vendors?

Summary: Status of Assigned Tasks

1. **Check compare.exe** (csv comparison tool developed by ITI).
2. **Generate csv reference files** for MSL 3.2.1 (including ModelicaTest) and document how this was created.
3. **Implementing** a basic test setup and running compare.exe (**specifying flags, adapting FMI cross check etc.** with support from Dietmar Winkler).
4. **Coordination with Martin Sjölund** who will adapt the OpenModelica scripts to this format (might require adapting variable names. Dymola: “a.der(x)”; OpenModelica: “der(a.b)”. Best would be according to FMI naming).
5. **Perform regression testing** of MSL 3.2.1 (including ModelicaTest) maintenance branch (versus MSL 3.2.1 release version) with Dymola and OpenModelica.

Next step:

All Tool Vendors are invited to participate!

- Improve quality of MSL
- Show that Modelica works in a tool neutral way
- You don't need to supply results for parts of MSL which you don't support, currently.

Proposed improvements

1. Fix compare.exe
2. Add **comment flag** for tool vendors, so that they can explain issues.
Add ticket references.
3. Add **overview table for Modelica Compliance Test Suite?**
(i.e. joint effort of MAP-LIB and MAP-ML)
4. Work on **class coverage** and **condition coverage**
 - Measure it
 - Create at least one test case for each non-partial model/block/function
 - Improve existing test cases for better condition coverage
5. Add Continuous Integration tool (e.g. Hudson, Jenkins)
6. Incorporate new test cases to ModelicaTest for **MSL additions**
 - QuasiStatic?
 - PowerConverters?
 - Modelica_Synchronous