

# Megatest/Logpro Training

Using the Megatest Regression & Automation Engine and the Logpro log file analysis tools to do robust QA and automation.

Matt Welland, 2013

# Megatest Information

- **Main development site:**  
<http://chiselapp.com/user/kiatoa/repository/megatest>
- **Mirror**  
<http://chiselapp.com/user/kiatoa/repository/megatest>
- **SourceForge Page**  
<http://sourceforge.com/projects/megatest>

# Training Overview

- Background on Megatest
- Getting started
  - Running tests and managing runs
  - Creating a Megatest area
  - Creating tests/tasks
  - Getting information about runs and tests
  - How to write Logpro files
- Advanced Megatest topics
- Future Megatest development

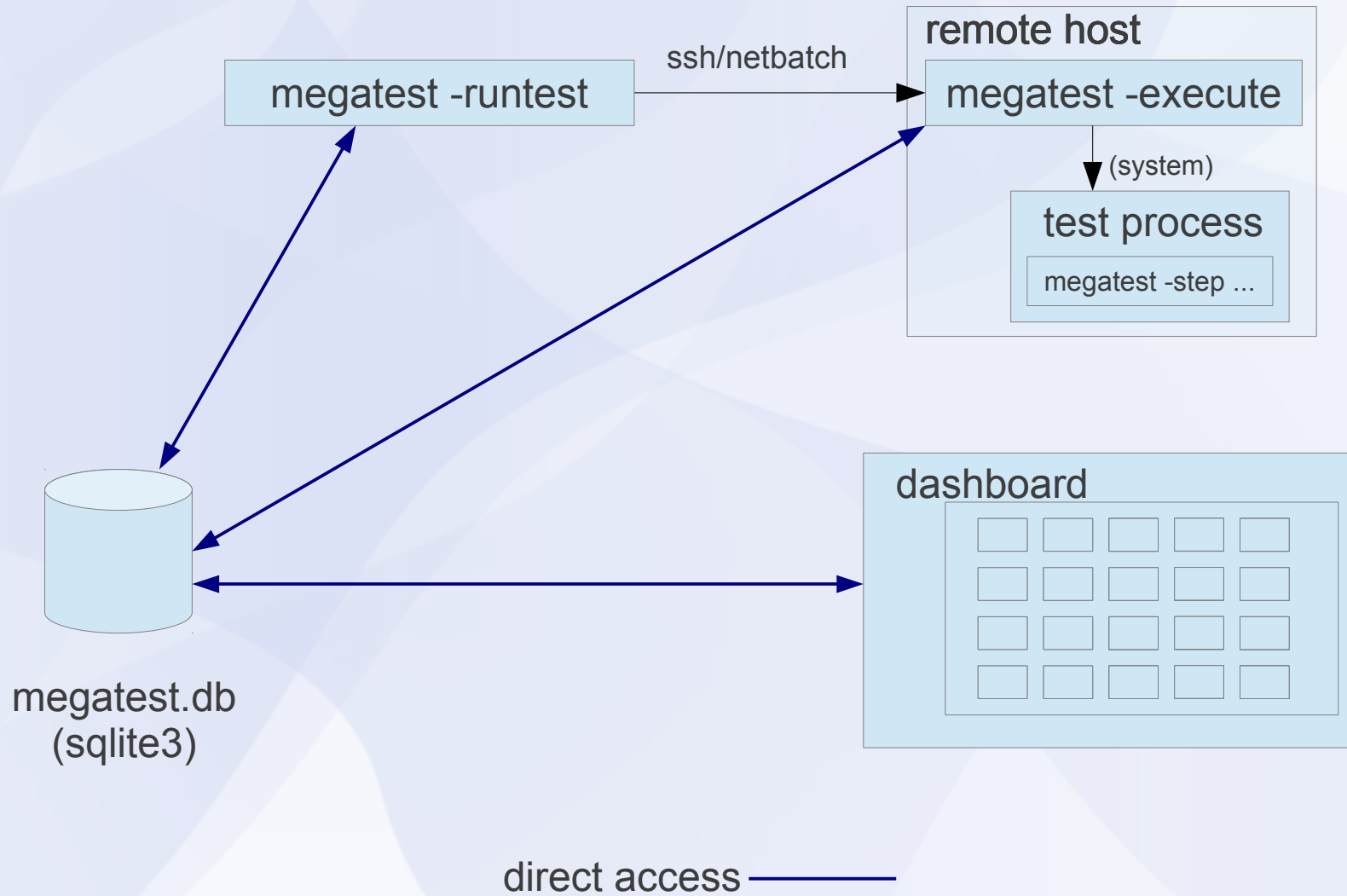
# What Can Megatest Do?

- Run tests with
  - one or many steps
  - dependencies on other tests
  - on multiple hosts
- Report, record and roll up
  - PASS, FAIL, WARN, CHECK
  - Test generated data details

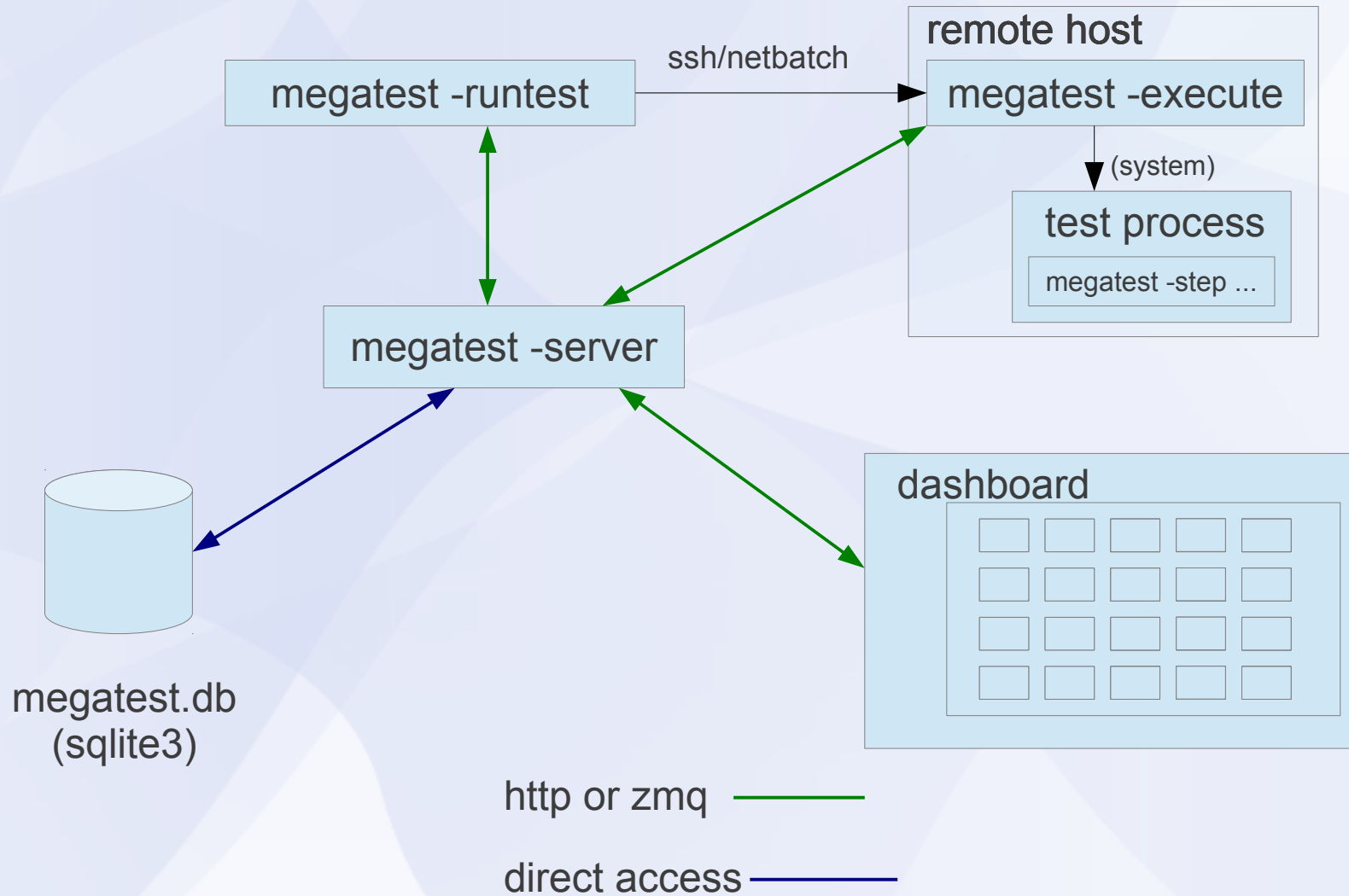
# Megatest Architecture

- config files
  - megatest.config
  - runconfigs.config
  - tests/<testname>/testconfig
- SQL database
  - megatest.db
- Tools
  - megatest (command line), dashboard (gui), and logpro (log file analysis via rules)

# How it Works



# How it Works (server mode)



# Terminology

target	one or more “keys” separated by “/”, used to organize runs hierarchically; examples include host, platform, stage (e.g. development, final QA, alpha, beta) and so forth. E.g target = x86/centos/dev where the keys are ARCHITECTURE, OS, and RELEASE
run name	a unique name (within a single target grouping) for a run, a common idiom is to use week and day numbers: date +%V.%u
run	a group of tests run under a single target and run name
test or task	a self-contained area with scripts and data to achieve some testing or automation goal
iterated test	a single test run multiple times with variables iterated over a range of values
state	the state of a test; NOT_STARTED, RUNNING, COMPLETED etc.
status	the current status of this test given its state; PASS, FAIL, n/a



# Megatest Design Philosophy

<b>D</b> eployable	anyone on the team, at any site, at any time can run the tests
<b>I</b> mmutable	once this test is run it cannot be easily overwritten or accidentally modified.
<b>R</b> epeatable	this test result can be recreated in the future
<b>S</b> elf-checking	strive for directed or self-checking test as opposed to delta based tests
<b>T</b> raceable	environment variables, host OS and other possibly influential variables are captured and kept recorded.
<b>E</b> ncapsulated	the area where the test was run is self-contained and all inputs and outputs to the test can be found in the test run area.
<b>R</b> elocatable	the test area can be checked out and the tests run anywhere

Wisdom is knowing when it is ok to bend or break the rules.

Megatest strives to make it straightforward to do things right but still possible to get the job done when the rules must be bent or broken.

(yes, it is true, the highlighted letters don't spell anything meaningful!)

# A Day in The Life

test control panel  
(in background)

run progress seen in xterm

The terminal window shows the following output:

```
matt@xena:/mfs/matt/data/sysmaint
total size is 3558 speedup is 0.92
Launching /mfs/matt/data/sysmaint/linktree/xena/normal/ww12/nodep-eggs/4.8.0/cs
v-xml
sending incremental file list
./
install.logpro
install.sh
testconfig

sent 3787 bytes received 72 bytes 2572.67
total size is 3558 speedup is 0.92
Launching /mfs/matt/data/sysmaint/linktree/
c
sending incremental file list
./
install.logpro
install.sh
testconfig

sent 3787 bytes received 72 bytes 7718.00
total size is 3558 speedup is 0.92

/mfs/matt/data/sysmaint/runs/xena/normal/ww12/ch
make: *** No targets specified and no makefile fo
cat install.sh >install
chmod a+x install
You may need to add /mfs/pkgs/xena/xena/chicken/4
file can be found in the current directory which should work for setting up to run chicken4x

=====LOGPRO SUMMARY=====
Trigger: Chicken Build End FAIL, count=0
Trigger: Chicken Build Start FAIL, count=0
Trigger: Body OK, count=1
Trigger: LogFileBodyStart OK, count=1
Expect: Error in Body FAIL, expected = 0 of ERROR, got 2
Expect: Warning in Body OK, expected = 0 of WARNING, got 0
Expect: Ignore in Body OK, expected < 2 of Ignore warning on not found regex, got 0
Expect: Ignore in Body OK, expected < 99 of Ignore scheme files with error in name, got 0
Expect: Ignore in Body OK, expected < 99 of Ignore install-other-files error, got 0
Expect: Ignore in Body OK, expected < 99 of Ignore (setup-error-handling), got 0
Expect: Ignore in Body FAIL, expected = 1 of Ignore CD native window driver warning, got 0
Expect: Ignore in Body OK, expected < 99 of Ignore redefinition of imported value bindings, got 0
Expect: Ignore in Body OK, expected < 99 of Ignore references to srfi-4-errors, got 0
Expect: Ignore in Body OK, expected < 99 of Ignore references to type-errors, got 0
Expect: Ignore in Body OK, expected < 99 of Ignore references to check-errors, got 0
Expect: Ignore in Body OK, expected < 99 of Ignore HAVE_STRERROR, got 0
```

The Megatest dashboard shows the following test results:

Test Name	Status
4.8.0.1/awful	PASS
4.8.0.1/apropos	RUNNING
4.8.0.1/"test"	PASS
4.8.0.1/"regex-ca"	PASS
chicken	PASS
4.8.0.1	PASS
4.8.0	PASS

logpro output

dashboard

# dashboard

runs filter

a "run"

a "test"

a "test item"

tests filter

The screenshot shows a web application window titled "Megates dashboard". It features a table with columns for "ORG", "RUNTYPE", "runname", and test results. The table is filtered to show two columns of test results. Below the table is a control panel with a filter input, a "hide" section with checkboxes for various test statuses, and buttons for "Sort", "HideEmpty", "Refresh", "Quit", and "Monitor".

ORG	test	test							
%	test	test							
%	normal	normal							
%	ww10b	ww10a							
	tsyncdirs	PASS	PASS						
	tosh/optchicke	PASS	PASS						
	tosh/local	PASS	PASS						
	tosh		DELETED						
	packages	PASS	PASS						
	tosh	PASS	PASS						
	hosts	PASS	PASS						
	tosh	PASS	PASS						
	groups	PASS	PASS						
	tosh	PASS	PASS						
	accounts	PASS	PASS						
	tosh	PASS	WARN						

filter test and items  
%  
Sort HideEmpty Refresh  
Quit Monitor

hide  
 PASS  FAIL  WARN  CHECK  WAIVED  STUCK/DEAD  n/a  
 RUNNING  COMPLETED  INCOMPLETE  LAUNCHED  NOT\_STARTED  KILLED  DELETED

# test control panel

Controls  
(debug,  
run &  
state/status)

### Megatest Run Info

sysname ubuntu  
fsname nfs  
datapath none  
runname w12.7.15.37\_b  
run-id 1

**run info**

### Test Info

Testname: runfirst  
Item path: b/2  
Current state: COMPLETED  
Current status: PASS  
Test comment: This  
Test id: 22

**test info**

### Test Meta Data

Author: matt  
Owner: bob  
Reviewed: 1/1/1965  
Tags: first,single  
Description:  
This test must be run before the other tests

**meta data**

### Remote host and Test Run Info

Hostname: xena  
Uname -a: Linux 3.2.0-38-generic-pae #61-Ubuntu SMP Tue Feb 19 12:39:51 UTC 2013 i686 i386 GNU/Linux  
Disk free: -2147483648.0  
CPU Load: 8.0  
Run duration: 49s  
Logfile: wasting\_time.html

**remote host info**

### Actions

View Log Start Xterm Run Test Clean Test Close

Execute!

### Set fields

Comment: This

STATE: **COMPLETED** NOT\_STARTED RUNNING REMOTEHOSTSTART KILLED KILLREQ

STATUS: **PASS** WARN FAIL CHECK n/a WAIVED

### Test Steps

Stepname	Start	End	Status	Time
wasting_time	15:39:30	15:39:39	0	9.0s

**step records**

### Test Data

Category	Variable	Value	Expected	Tol	Status	Units	Type	Comment
as	iout	1.2	1.9	>	fail	Amps	meas	
	var	val	exp	comp	status	units	type	Comment
	bar	10.0	8mA		0		0	this is
	abl	1.2	1.3	0.1	pass	0	0	
	alb	1.2	1.2	<=	pass	Amps	0	This is
	bal	1.2	1.2	>	fail	0	0	Check
	bar	1.2	1.9	>	fail	0	0	
	bla	1.2	1.9	<	pass	0	0	
	bra	1.2	pass	silly stuff0	0	0	0	
	rab	1000000000.0	010000000000.0	010000000000.0	fail	0	0	

**Test data**

# Run Management

- Launching runs
  - command line: “megatest -runtests %”
  - test control panel: push “run” then “execute”
- Removing runs
  - “megatest -remove-runs”
- Rolling up runs
  - “megatest -rollup”

note: all these commands require the use of additional selector parameters such as -target and :runname

# Task/Test Management

- Killing jobs
  - In the gui set status to “KILLREQ” and the job will be killed.
  - Command line example:

```
megatest -set-state-status KILLREQ,FAIL -target ubuntu/nfs/none \  
:runname w10.2a -testpatt %/% :state RUNNING
```

- Changing state and status of tests
  - Use -set-state-status, see example above.
- Add “-rerun FAIL” to your launch command line to force the re-run of failed jobs

# Test Selectors

- `-testpatt testpatt/itempatt`
  - “%” is wild card
  - “%” is synonymous with “%/”
  - comma separate multiple patterns (OR)
  - “%/” is tests with no items

# Getting information

- -list-runs pattern
  - lists runs with runname matching pattern.
- -extract-ods
  - creates an open-document spreadsheet
- Miscellaneous queries
  - list-disks
  - list-targets
  - list-db-targets
  - find-files, -find-paths



# Config File Syntax

The config file syntax was designed to be:

- simple and forgiving to syntax mistakes
- easy to understand and trace where values originated
- expressive enough for complex needs.

	Example	description of the example
Sections	[setup]	Variables defined on subsequent lines will be in the “setup” section
Variables	ABC 1	Variable “ABC” will have the value “1”
[ ] directives	[include a.txt]	include file “a.txt”, see manual for all directives
{ } text substitutions	{shell ls \$PWD}	replace the { ... } with the output of the ls \$PWD command. Note that newlines are replaced with spaces.

# Config File Text Substitutions

NOTE: [ ] substitutions can be deferred by megatest and executed just before launching a test but #{ } substitutions are done as each line is read.

[include filename]	Includes filename. Ignores if filename does not exist
[system command]	replaced with output from command
#{shell command}	replaced with output from command
#{system command}	replaced with the exit code of command
#{scheme schemecode}	replaced with the result of schemecode
#{getenv VAR}	replaced with the value of environment variable VAR
#{get section var}	replaced with the value of var from section

# Creating a Megatest Area

- Required Config files
  - megatest.config
  - runconfigs.config
- Tests
  - testconfig
  - How to write a test

# Setup Megatest Area (configs)

- Config files
  - megatest.config
    - Target A/B/C ...
      - One or more “keys” (the “A”, “B” and “C”)
      - Choose carefully! They cannot be changed after your megatest.db is created
    - links area (the link tree to all your tests)
    - runs disk (can add more over time)
      - Lowest space used first
      - Link tree symlinks point into run areas
  - runconfigs.config
    - can be empty initially

# Required Config Files

## megatest.config

```
[fields]
PLATFORM TEXT
OS       TEXT

[setup]
# Adjust max_concurrent_jobs to limit parallel jobs
max_concurrent_jobs 50

# This is your link path, best to set it and then not change it
linktree #{getenv PWD}/linktree

# Job tools control how your jobs are launched
[jobtools]
useshell yes
launcher nbfind

# You can override environment variables for all your tests here
[env-override]
EXAMPLE_VAR example value

# As you run more tests you may need to add additional disks
# the names are arbitrary but must be unique
[disks]
Disk0 #{getenv PWD}/runs
```

## runconfigs.config

```
[default]
ALLTESTS see this variable

# Your variables here are grouped by targets [SYSTEM/RELEASE]
[SYSTEM_val/RELEASE_val]
ANOTHERVAR only defined if target is SYSTEM_val/RELEASE_val
```

# Setup Megatest Area (tests)

- Tests
  - tests/<yourfirsttest>/testconfig
- Can use the helper “wizards”
  - megatest -gen-megatest-area
  - megatest -gen-megatest-test

# Example testconfig

## testconfig

```
# Add additional steps here. Format is "stepname script"
[ezsteps]
step1 step1.sh
step2 step2.sh

# Test requirements are specified here
[requirements]
waiton setup
priority 0

# Iteration for your tests are controlled by the items section
[items]
COMPONENT parser datastore transport analyzer

# test_meta is a section for storing additional data
# on your test
[test_meta]
author matt
owner matt
description An example test
tags tagone,tagtwo
reviewed never
```

# Writing a Test “checkspace”

- Write a test that checks for available space
  - tests can “waiton” this test before running.
- Our test will use this simple script, `checkspace.sh`:

```
#!/bin/bash -e
freespace=`df -k $DIRECTORY | grep $DIRECTORY | awk '{print $4}'`
if [[ $freespace -lt $REQUIRED ]];then
    echo "ERROR: insufficient space on $DIRECTORY"
    exit 1
else
    echo "There is adequate space on $DIRECTORY"
fi
```

Note: Files for this example can be found in “example” dir in Megatest distribution



# Writing a Test “checkspace”

- Commands to create test “checkspace”
  - `mkdir -p linktree runs tests/checkspace`
  - `cd tests/checkspace`
  - `vi checkspace.sh`
  - `chmod a+x checkspace.sh`
  - `vi testconfig`

```
# Add steps here. Format is "stepname script"  
[ezsteps]  
checkspace checkspace.sh  
  
# Iteration for your tests are controlled by the items section  
[itemstable]  
DIRECTORY    /tmp    /opt  
REQUIRED     1000000 100000
```

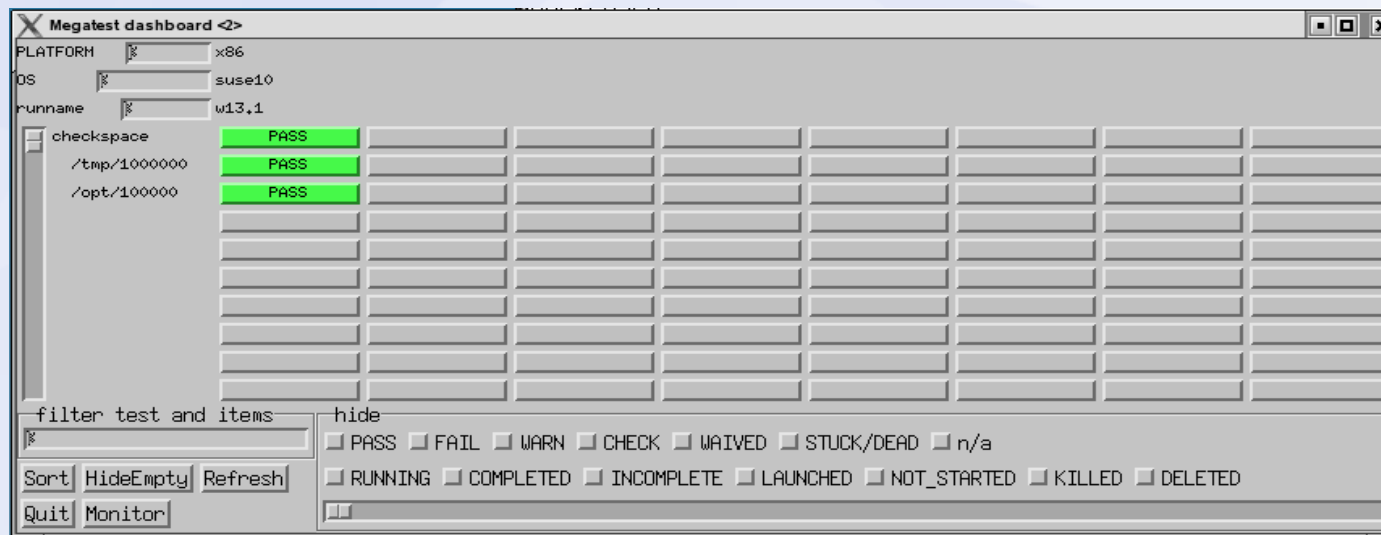
# Writing a test “checkspace”

- Write a logpro file to analyze your results

```
(expect:error in "LogFileBody" = 0 "Any error" #/err/i)  
(expect:required in "LogFileBody" = 1 "Sucess signature" #/adequate space/)
```

## Run your test

```
megatest -runtests % -target x86/suse10 :runname w`date +%V`  
%u`
```



# Setup for Run “Flavors”

- `runconfigs.config`  
[default]  
VARS here are inherited by all runs  
  
[some/target]  
VARS here inherited in some/target runs
- NB// the last specified definition overrides prior definitions.

# Setup Tests/Tasks

- A test or task is a set of scripts and data designed to do something or test something.
- Create in tests directory
- Test name limitations
  - No spaces or special characters
  - [a-zA-Z0-9\_] and “-” are ok.

# The testconfig file [setup]

- [setup]

runscript scriptname.sh

- The script must exist in the testconfig directory and be executable
- Output from the script is NOT captured by Megatest directly
- The script can be an executable or written in any scripting language

# The testconfig file [ezsteps]

- [ezsteps]

step1 script1.sh

- The script “script1.sh” will be executed and its output redirected to the file step1.log.
- If a logpro file step1.logpro exists it will be used to process the logfile step1name.log and generate the PASS/FAIL/WARN status.

# The testconfig file [items]

[items]

VAR1 value11 value12 value13 ...

VAR2 value21 value22 value23 ...

- This will iterate this test with all possible combinations of VAR1 and VAR2 values.

- Results:

- value11/value21, value11/value22, value11/value23, value12/value21, value12/value22, value12/value23 ...

# The testconfig file [itemstable]

[itemstable]

VAR1 value11 value12 ...

VAR2 value21 value22 ...

- This will iterate over the test with only aligned value combinations.
- Result:
  - value11/value21, value12/value22 ...

NOTE: You can combine items and itemstable but they work independently and the result may not be what you expect.



# The testconfig file [requirements]

[requirements]

waiton <testname ... >

- this test will not be launched until the listed tests are COMPLETED and PASS, WAIVE or SKIP.

jobgroup <groupname>

- this test will be added to the named job group and the relevant max concurrent jobs will apply

mode toplevel

- this test will proceed once all it waiton tests are completed with any status.

# The testconfig file[test\_meta]

- author matt
- owner bob
- description The description can run to multiple lines but subsequent lines must be indented with spaces.
- tags first,single
- reviewed 09/10/2011, by Matt

# Megatest Calls in Tests

- **-step stepname**
  - mark the start or end of a step
- **-test-status**
  - set the state and status of a test
- **-setlog logfname**
  - set the path/filename to the final log relative to the test directory.
- **-set-toplog logfname**
  - set the log for a series of iterated tests

# Other Megatest calls

- **-summarize-items**  
for an itemized test create a summary html  
(usually called automatically)
- **-m comment**  
insert a comment for this test, can be used  
with any of the above calls but only one  
comment is stored per test
- **-test-files or -test-paths**  
Use the database to search for files or  
paths in the test run area

# Example Megatest in-test calls

- **-step**

```
$MT_MEGATEST -step step1 :state start :status  
running -setlog step1.html
```

- **-test-status**

(Mark a test as completed and trigger a rollup to the parent test of overall status)

```
$MT_MEGATEST -test-status :state COMPLETED :status  
AUTO
```

- **-test-path**

```
export EZFAILPATH2=`$MT_MEGATEST -test-paths -target  
$MT_TARGET :runname $MT_RUNNAME -testpatt  
runfirst/a%`
```

# Additional Features

- Run locking
  - Prevents removing or adding tests to a run
    - lock
    - unlock

# Logpro

- Logpro syntax

Logpro uses scheme calls directly and the full power of scheme is available. However 99% of logpro rule files will not need anything other than the base logpro rules.

Rule	Example	Purpose
expect:error	(expect:error in "Logf" = 0 "Err desc" #/err1/i)	Flags errors matching the pattern err1
expect:ignore	(expect:ignore in "Logf" < 10 "Err desc" #/err2/i)	Ignore errors matching the pattern err2
expect:warning	(expect:warning in "Logf" = 0 "Desc" #/warn1/i)	Lines matching pattern warn1 flagged as warning
expect:required	(expect:required in "Logf" = 1 "Desc" #/reqrd/i)	Line matching pattern reqrd must exit in log file
expect:waive	(expect:waive in "Logf" = 0 "Err desc" #/err3/i)	Waive error matching pattern err3
expect:value	(expect:value in "Logf" 10 1 "Err desc" #/(\d+)/i)	The number matched must be 10 +/- 1
trigger	(trigger "start" #/Start logfile/)	Set trigger " <b>start</b> " on line with "Start logfile" string.
section	(section "Logf" "start" "end")	Section <b>Logf</b> starts at trigger <b>start</b> , ends at <b>end</b>
hook:add	(hook:add "err1" "err1.pl #{msg}" )	On err1 call the err1.pl script with msg as param

# Advance Logpro Usage

- Data collection
  - Capturing with logpro
  - Rolling up with Megatest



# Direct Access to Megatest Functions

- `-repl`
  - This will start a read-eval-print loop allowing you to directly call Megatest calls.
- `-load test.scm`
  - This will load the scheme source code and execute it in the Megatest context.

# Future Megatest Development

The screenshot displays the Megatest Control Panel interface, which is used for managing and monitoring test runs. The interface is divided into several sections:

- Runs browser:** A table listing test runs with their status. The 'lineitem\_fail' test is highlighted in red, indicating a failure, while others are green for 'PASS'.
- File Tree:** A hierarchical view of the test configuration files, showing folders for different test runs and their sub-components.
- Terminal:** A window showing the output of the 'testconfig' command, including details about the test run configuration and the launch of various tests.
- Test Details:** A section for viewing the details of a specific test run, including fields for Run ID, Target, Runname, Run Start Time, Test ID, Testname, Itempath, State, Status, Test Start Time, Comment, Hostname, Host info, Disk Free, CPU Load, Run Duration, Author, Owner, Last Reviewed, Tags, and Description.
- Test Steps:** A table for viewing the steps of a test run, with columns for Step Name, Start, End, Status, and Log File.

Run	Status
all_toplevel	PASS
priority_10_waiton_1	PASS
aa	PASS
ab	PASS
ac	PASS
ad	PASS
ae	PASS
af	PASS
ag	PASS
ah	PASS
sqlitespeed	PASS
ai	PASS
test_mt_vars	PASS
1	PASS
2	PASS
3	PASS
4	PASS
5	PASS
singletest2	PASS
lineitem_fail	FAIL
lineitem_pass	PASS
exit_0	PASS

```
./  
testconfig  
sent 668 bytes received 34 b  
total size is 564 speedup is  
Launching /mfs/natt/data/mega  
.7.15.37_b/all_toplevel  
INFO: (1) All tests launched  
matt@xena:/mfs/natt/data/mega
```

# Advanced Topics