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**TEXAS**

The University of Texas at Austin

# Lmod Star Meeting

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# Introduction



- ▶ Features and History
- ▶ Advanced Topics
- ▶ Future work?

# Features

- ▶ Current version is Lmod 8.7.13
- ▶ Reads for TCL and Lua modulefiles
- ▶ One name rule.
- ▶ Support Software Hierarchy (but not required!)
- ▶ Spider Cache: fast `$ module avail`
- ▶ Properties (gpu, mic)
- ▶ family(“compiler”) family(“mpi”) support
- ▶ Optional Tracking: What modules are loaded?
- ▶ Many other features: ml, collections, hooks, extended default, nag ...
- ▶ Google analytics report about 2000 user read docs.

# Recent Feature of Lmod 8+

- ▶ The TCL interpreter is now (optionally) embedded with Lmod.
- ▶ `depends_on()`
- ▶ New Function: `extensions("numpy/1.16.4  
scipy/1.4")`
- ▶ Checking your module tree 8.4.3+

# depends\_on()

- ▶ Modules X and Y depends on Module A
- ▶ ml purge; ml X; ml unload X;  $\Rightarrow$  unload A
- ▶ ml purge; ml X Y; ml unload X;  $\Rightarrow$  keep A
- ▶ ml purge; ml X Y; ml unload X Y ;  $\Rightarrow$  unload A
- ▶ ml purge; ml A X Y; ml unload X Y ;  $\Rightarrow$  keep A

# extensions() function

- ▶ `extensions()`: Tells users that a module has extensions
- ▶ E.G: python has `numpy` and `scipy`
- ▶ `extensions("numpy/1.16.4, scipy/1.4")`

# extensions() function (II)

- ▶ Users can use spider to find extensions.
- ▶ Users can use avail to list extensions base name

# Checking your module tree 8.4.3+

- ▶ New command added:  
`$LMOD_DIR/check_module_tree_syntax`
- ▶ Reports syntax errors across the entire `$MODULEPATH`
- ▶ Report which modules have multiple marked defaults sets
- ▶ Precedent order: default symlink, `.modulerc.lua`, `.modulerc`, `.version`
- ▶ Does not check `SYSTEM MODULERCFILE` for defaults.

# Lmod 8.6+ Features

- ▶ New Features now reported:  
[https://lmod.readthedocs.io/en/latest/025\\_new.html](https://lmod.readthedocs.io/en/latest/025_new.html)
- ▶ `module overview`
- ▶ `module -d avail`
- ▶ New config file: `/etc/lmod/lmod_config.lua`
- ▶ `LMOD_QUARANTINE_VARS`
- ▶ updates to `sh_to_modulefile`
- ▶ `source_sh()`: source a shell script inside a modulefile

# module overview

```
% module overview
```

```
----- /opt/apps/modulefiles/Core -----  
StdEnv   (1)  hashrf   (2)  papi     (2)  xalt     (1)  
ddt      (1)  intel   (2)  singularity (2)  
git      (1)  noweb   (1)  valgrind (1)  
  
----- /opt/apps/lmod/lmod/modulefiles/Core -----  
lmod (1)  settarg (1)
```

# \$LMOD\_QUARANTINE\_VARS

- ▶ A module at TACC turn-off \$LMOD\_PAGER
- ▶ This#%& module made me mad.
- ▶ Tmod has a new feature kinda like this.
- ▶ \$LMOD\_QUARANTINE\_VARS was invented.

# \$LMOD\_QUARANTINE\_VARS (II)

- ▶ `export LMOD_QUARANTINE_VARS=LMOD_PAGER:LMOD_REDIRECT`
- ▶ This means that a module can't change those variables.
- ▶ This only works with regular env. vars.
- ▶ You can't quarantine PATH like variables.
- ▶ A user sets this variable in their `~/.bashrc` or similar file.
- ▶ This obviously won't work for modules loaded during the processing of `/etc/profile.d/*.sh` files
- ▶ Use <https://github.com/TACC/ShellStartupDebug> support users.

# /etc/lmod/lmod\_config.lua configuration file

- ▶ This file is evaluated during Lmod startup.
- ▶ This location is the default during configuration.
- ▶ A site can change this location at configuration.

```
-- Example /etc/lmod/lmod_config.lua
require("strict")
local cosmic = require("Cosmic"):singleton()

cosmic:assign("LMOD_SITE_NAME", "XYZZY")
local function foo()
    ...
end
sandbox_registration { foo = foo }
```

# Sourcing shell scripts inside a modulefile w/ `source_sh()`

- ▶ This was first implemented in Tmod 4.7
- ▶ Xavier told me that he did this during Covid Lockdown in France.
- ▶ Lmod 8.6 re-implements this feature in a similar way.
- ▶ It knows about env. vars and shell functions and aliases.

# source\_sh() Implementation

- ▶ It captures the env. vars/functions/alias before and after the running the shell script.
- ▶ It computes the difference and saves it into the ModuleTable in env.
- ▶ It can be safely unloaded, shown.
- ▶ script path and arguments must not change between load and unload.
- ▶ `module refresh` works
- ▶ Obvious points:
  - ▶ It is better to use `sh_to_modulefile` and convert once.
  - ▶ But `sh_to_modulefile` is not dynamic (e.g. `$HOME`)
  - ▶ Can't have run the script in the user environment before loading the script.

# ml -mt

```
_ModuleTable_ = {
  MTversion = 3,
  mT = {
    wrapperSh = {
      fn = "/home/user/w/lmod/rt/sh_to_modulefile/mf/wrapperSh/1.0.lua",
      fullName = "wrapperSh/1.0",
      loadOrder = 1,
      mcmdT =
        ["/home/user/w/lmod/rt/sh_to_modulefile/second.sh arg1"] = {
          "setenv(\"SECOND\", \"FOO_BAR\")",
        },
        ["/home/user/w/lmod/rt/sh_to_modulefile/tstScript.sh"] = {
          "setenv(\"MY_NAME\", \"tstScript.sh\")",
          "prepend_path(\"PATH\", \"/home/user/w/lmod/rt/sh_to_modulefile/bin\")",
          "set_alias(\"fooAlias\", \"foobin -q -l\")"
          , [[set_shell_function("banner", " \
local str=\"$1\";\
local RED='\27[1;31m';\
local NONE='\27[0m';\
echo \"\$RED$str\$NONE\" \
" )]],
        },
      },
    },
  },
}
```

# Lmod Monthly Zoom Mtg

## ▶ Previous Topics

1. Lmod Hooks Discussion
2. Debugging Modulefiles
3. Lmod 8.6 new features
4. Settag and integrating Lmod with build system
5. How Module collections works

## ▶ Future Topics:

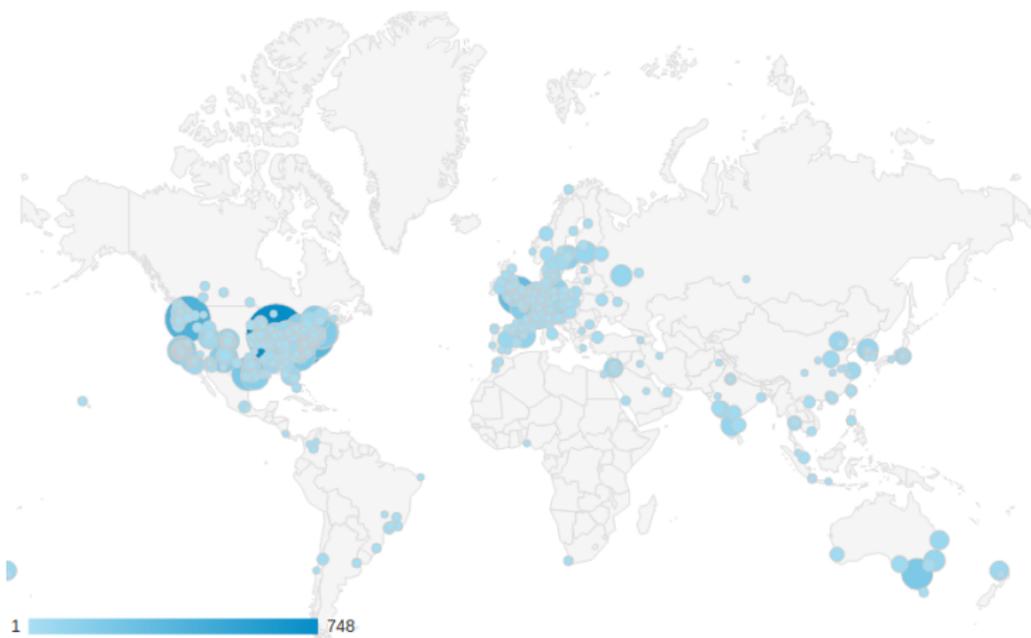
1. How to get current module info into hooks
2. How Lmod testing works

▶ Zoom Mtg Usually 1st Tuesday at 15:30 UTC (9:30 US Central)

▶ See Mailing list or <https://github.com/TACC/Lmod/wiki> for details

▶ Next Meeting Oct 4th at 15:30 UTC (9:30 US Central)

# Lmod Doc usage by City



# Future Work

- ▶ Lmod can optionally track usage.
- ▶ Future: Make it easier to not remember loads after 1 year.
- ▶ A monthly discussion group? (YES!!)

# Conclusions: Lmod 8+



- ▶ Latest version: <https://github.com:TACC/lmod.git>
- ▶ Stable version: <http://lmod.sf.net>
- ▶ Documentation: <http://lmod.readthedocs.org>