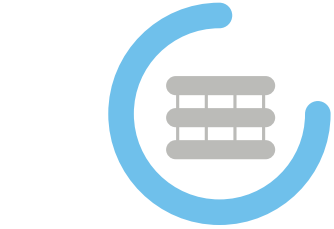

Meeting of the Technical Steering Committee (TSC) Board

Wednesday, April 08th, 2020
11:00am ET

Meeting Logistics

- https://zoom.us/j/556149142

- United States : +1 (646) 558-8656
  - Meeting ID: 556 149 142

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THE LINUX FOUNDATION

Agenda/Updates

- Announcements:
  - ISC in-person event cancelled – will be a digital event instead
    - have not heard anything yet regarding our accepted BoF
- Upcoming deadlines:
  - SC'20
    - Tutorials?: Due ~~April 16, 2020~~, Extended to April 30 – *Adrian leading a submission)
    - BoFs: Due July 31, 2020
- ARM compiler build setback…

- PEARC'20 tutorial/cloud working group updates (csim)
- Ganglia – netdata review?
- Nagios – plugins discussion update
- Revisit Singularity discussion
- Alternate build flag support
- Recipe updates: ip vs ifconfig
- Warewulf: vmlinuz changes
- Additional component deprecation
- 2.0 build status
- intel compiler –qnextgen option
- tech preview release

OHPC Cloud Working Group Updates (csim)

- Agreed to give PEARC Tutorial via web conference if needed
- Chris Downing's initial implementation is in our hands
- Currently in a private GitHub
- First goal is to document what is there
- Second goal is to strip it down to make it as simple as possible while still retaining advanced features as options
- Still no official CentOS 8 AMI; exploring making our own

Nagios update

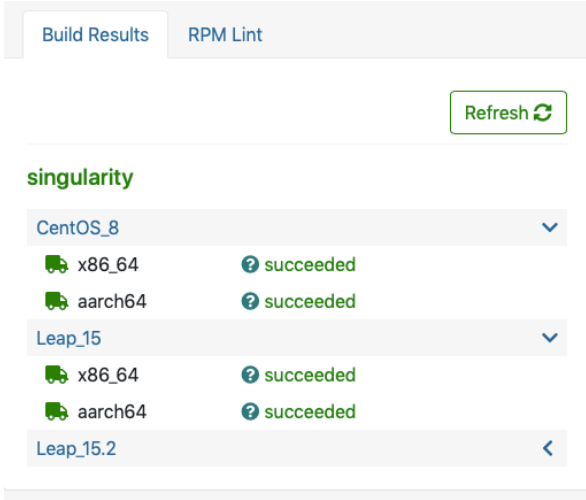
- Last time we talked about availability of nagios-plugins we have been building in ohpc 1.3.x
- EPEL for CentOS8 has large number of plugins available
- Update from Craig (SUSE)
  - turns out Leap does indeed have plugins available
  - they have been renamed to avoid conflict with enterprise packaging from Nagios Enterprises
  - packages that were named nagios-plugins-* are now simply named monitoring-plugins-*.
- OS available versions:
  - Leap 15.1
    - nagios v4.3.4
    - 82 plugins available (monitoring-plugins-*)
  - CentOS 8.1:
    - nagios v4.4.5
    - 59 packages available (nagios-plugins-*)
- Our example setup in current recipes is very basic:
  - CI setup to check a web service
  - have confirmed we can do the same with OS provided nagios/plugins with minor tweaks to test
  - folks comfortable with dropping our nagios build in favor of installing distro version?

```
[sms019:/home/ohpc-test/tests/admin # ./nagios.new
 ✔ [nagios] check for RPM
 ✔ [nagios] test nagiostats
 ✔ [nagios] test check_http

3 tests, 0 failures
```

Revisit Singularity discussion

- Last time we talked about potentially dropping our singularity build and rely on distro version instead
  - an issue here is that current Leap 15.1 version is old (2.x series)
  - but, expecting Leap 15.2 soon with updated version
- I explored using current distro version on CentOS8 and was reminded additional benefits of our packaging
  - potential for co-installation of multiple versions
  - similar dev environment access for users a la "module load singularity"
  - *installation into non-default path allows for easy sharing across smaller clusters*
    - a la an NFS export of /opt/ohpc/pub like we use in all current recipes
    - otherwise, need to also pack singularity into compute image for WW and xCAT in order to resolve runtime dependencies
- Consequently, went back and sorted out go dependencies for our OBS builds and have a new'ish version built now (v3.4.2)
  - latest is v3.5.3 but requires go v1.13
- Q: Folks ok with continuing to maintain a separate singularity build?



Alternate build flag support

- Recall discussion from last year regarding tweaks to our macro builds and .spec files to allow easier override of compiler flags
- Baseline changes discussed previously landed in 2.0 branch that introduce additional macros for end-user customization
  - OHPC_CFLAGS
  - OHPC_CXXFLAGS
  - OHPC_FCFLAGS
  - OHPC_F77FLAGS
  - OHPC_CUSTOM_DELIM
- The OHPC_*FLAGS variables have a default set of compiler flags (per compiler variant) which can be overridden
  - these are subsequently exposed to build environment via standard CFLAGS, CXXFLAGS, FCFLAGS, etc.
- Intent of OHPC_CUSTOM_DELIM is to give end-user the ability to append a delimiter to the package so it can be co-installed with default ohpc version (and exposed as a different module name); envisioned usage:

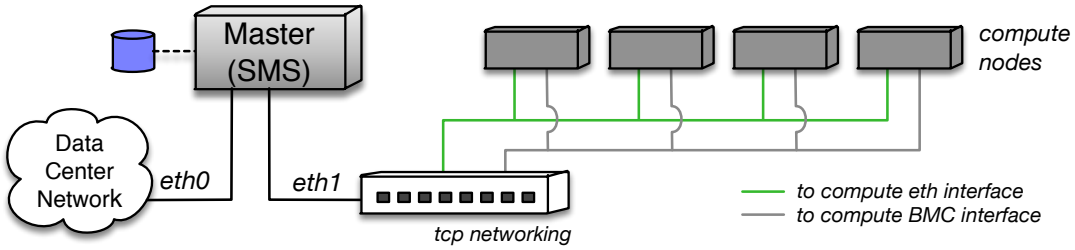
```
# rpmbuild -bb --define 'OHPC_CFLAGS "-O0 -g"' --define "OHPC_CUSTOM_DELIM nonzippy" example.spec
```

- Review of current default flags:

```
if [ "$toolset" == "gcc" ];then
    DEFAULT_OPTS="-O3 -g -pipe -Wall -fexceptions -fstack-protector-strong -grecord-gcc-switches -mtune=generic"
    if [ "$arch" == "x86_64" ];then
        DEFAULT_OPTS="$DEFAULT_OPTS -m64"
    fi
elif [ "$toolset" == "intel" ];then
    DEFAULT_OPTS="-O3 -g -m64 -Wall -fexceptions -fstack-protector-strong -grecord-gcc-switches -mtune=generic"
elif [ "$toolset" == "arm" ];then
    DEFAULT_OPTS="-O3 -g -Wall -fexceptions -fstack-protector-strong -grecord-gcc-switches -mtune=generic"
fi
```

- If we are good with these, final step is to update relevant development-oriented package .spec files (*packages housed in serial-libs and parallel-libs of repo*)

Warewulf recipe updates



- Have had an outstanding request to use **iproute** tools instead of **net-tools** for network interface related commands (https://github.com/openhpc/ohpc/pull/600)
- Initial attempts to change this over with a direct replacement did not work in our CI environment
  - recall we suggest in recipes to leverage two interfaces on SMS host
    - one for external access
    - one for internal cluster access (and this is our provisioning interface)
  - our CI systems are not all wired with multiple interfaces so we have historically relied on an alias interface for internal provisioning

    ```
    # ifconfig ${sms_eth_internal} ${sms_ip} netmask ${internal_netmask} up
    ```

    where ${sms_eth_internal}=eth0:0
- While you can certainly setup an IP alias using the "ip" command, you do not get the same standalone interface visible (ie. no eth0:0)
  - this prevents Warewulf from being able to ascertain the current network for provisioning
- So, in order to use newer ip commands, our CI test environment is updated to not use separate interfaces (so our internal/external interface is the same)
- Recipe command now looks like the following (with ${sms_eth_internal}=eth0):

  ```
  # ip link set dev ${sms_eth_internal} up
  # ip address add ${sms_ip}/${internal_netmask} broadcast + dev ${sms_eth_internal}
  ```

Warewulf bootstrap issue

- Recall from last time, I encountered issue when trying to get CentOS8.1 bootstrap kernel to work in Linaro's CI hosted environment in the UK
  - Using the cross architecture aarch64 shell that Fujitsu created (we saw demo of this previously)
  - Very convenient if you have an x86_64 host that you want to use to provision an aarch64 host
  - https://github.com/NaohiroTamura/cross-sms-aarch64.sh

- Upon more inspection, there was a combination of issues and one gotcha is related to creating a Warewulf bootstrap image from a kernel installed into a chroot
  - Warewulf is expecting to find the relevant vmlinuz file in /boot (same goes if the kernel RPM is installed into chroot)
  - With CentOS8, you will not get the file installed in $CHROOT/boot if you only install the kernel
  - Instead, you need to install "grub2-common" first in order to have the tools necessary for the kernel install scriptlet to correctly install a copy of vmlinuz in /boot
  - two potential permanent fixes:
    - patch WW to search for vmlinuz files in $CHROOT/lib/modules as well as this is where the kernel package installs the file
    - patch WW to include grub2-common during baseline chroot creation for the CentOS8 template

- With this (and getting necessary qlogic firmware into the Warewulf bootstrap image), I am now able to provision CentOS8 aarc64 hosts from an x86_64 server in Linaro hosted environment

Additional component deprecation

- We discussed deprecation of Ganglia last time
- Would like to discuss doing the same for two additional packages:
  - Open Community Runtime (ocr)
    - according to https://01.org/open-community-runtime, this project is **currently archived and is no longer supported**
    - links to relevant project pages no longer work
    - no new releases
  - mpiP
    - no releases since 2014
    - newer MPI has alternate profiling API (PMPI)

2.0 Build Status

- Have enabled a good number of packages in 2.0 Factory
  - introduction of arm1 compiler variant means 10 compiler/MPI permutations for MPI-based builds

Administrative Tools

Package	Built?	Notes
conman	✓	
docs	✓	
examples	✓	
~~ganglia~~		
genders	✓	
lmod-defaults	✓	added (3/10/20)
losf	✓	
mrsh	✓	fixed (3/8/20)
nagios	✓	3/25/20
nagios-plugins	X	3/25/20
ndoutils		
nhc	✓	added (3/10/20)
nrpe		(related to nagios)
pdsh	✓	
prun	✓	
test-suite	✓	

Compiler Families

Package	Built?	Notes
gcc9	✓	
intel-compatibility	✓	
arm-compatibility	✓	
llvm		

Development Tools

Package	Built?	Notes
easybuild	✓	
autoconf	✓	
automake	✓	
cmake	✓	
hwloc	✓	
libtool	✓	
python-mpi4py	※	3/24/20 – arm1 failures
python-numpy	※	3/24/20 – arm1 failures
python-scipy	※	3/19/20 – arm1 failures
spack	✓	[still targets root usage though]
valgrind	✓	

MPI Families

Package	Built?	Notes
impi-compatibility	✓	no longer requires install of intel compat. package
mpich	✓	
mvapich2	✓	
openmpi4	✓	

Serial Libs

Package	Built?	Notes
R	✓	
GSL	✓	
metis	✓	
openblas	✓	
plasma	※	need tweaks for arm1/intel blas
superlu	✓	arm1 fixed (3/9/20)

※ = partial builds success
✓ = all builds complete
X = all builds fail

2.0 Build Status (cont.)

Parallel Libraries

Package	Built?	Notes
boost	※	intel error
fftw	✓	build fixed
hypre	※	intel/arm1 blas issue
mfem	※	needs deps
mumps	※	arm1/impi issue
opencoarrays	※	leap/openmpi4 failures
petsc	※	intel/arm1 issue
scotch	✓	arm1 fixed (3/9/20)
scalapack	✓	arm1 fixed (3/9/20)
slepc	※	waiting on petsc deps
superlu_dist	※	2 Leap 15.1 failures
trilinos	※	Intel/ARM failures (4/8/20)

Performance Tools

Package	Built?	Notes
dimemas	X	need some boost builds, suse failures
extrae	※	arm1 failures
geopm		Adrian built subset ok
imb	※	
likwid	✓	(4/7/20)
msr-safe		
omb	✓	3/4/20
papi	✓	
paraver	✓	added 3/5/20
pdtoolkit	※	intel/leap failure (3/5/20)
scalasca	※	need scorep deps (3/5/20)
scorep	※	variety of issues (3/5/20)
tau	※	need pdtoolkit on intel/leap and arm1 (3/24/20)

Resource Management

Package	Built?	Notes
PBS Pro	※	need libical-devel on aarch/centos
pmix	✓	
slurm	✓	

Runtimes

Package	Built?	Notes
charliecloud	✓	3/23/20
ocr		
singularity	✓	updated to use newer go version (4/6/20)

※ = partial builds success
✓ = all builds complete
X = all builds fail

2.0 Build Status (cont.)

I/O Libraries

Package	Built?	Notes
adios	※	intel failures (and deps)
hdf5	※	Leap/arm1 failures
netcdf-cxx	※	Leap/arm1 failures
netcdf-fortran	※	Leap/arm1 failures
phdf5	※	arm1 failures
pnetcdf	✓	
sionlib	※	arm1 failures

Provisioning

Package	Built?	Notes
warewulf	✓	starting to run in CI (3/10/20)

※ = partial builds success
✓ = all builds complete
X = all builds fail

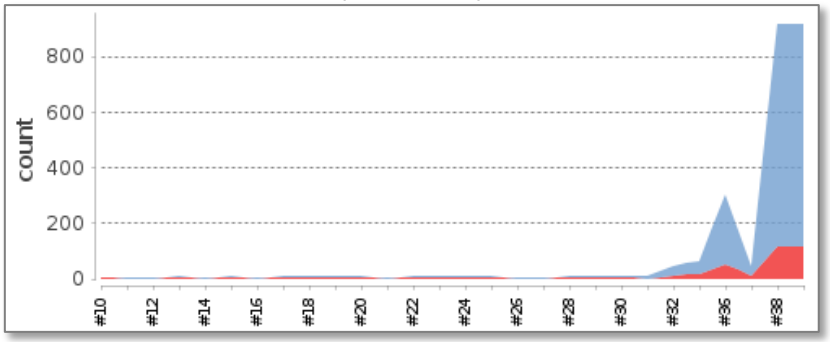
2.0 Build Status (cont)

- Current package counts:
  - ~~800 RPMs as of 3/11/2020~~
  - ~~905 RPMs as of 3/25/2020~~
  - 982 RPMs as of 4/8/2020

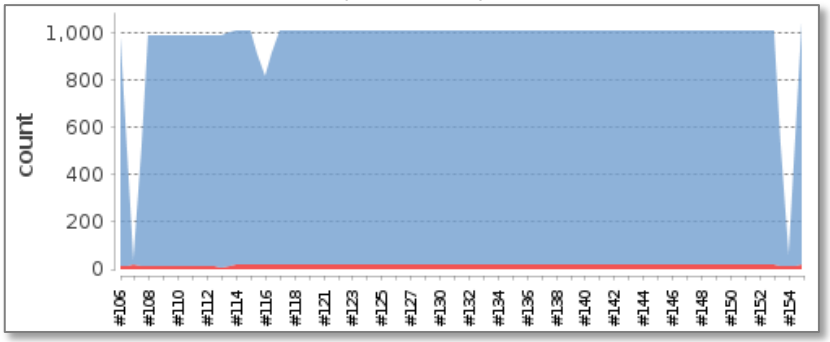
Base OS	aarch64	x86_64	noarch
CentOS 8	166	310	29
Leap 15	163	285	29

2.0 (cont.) – CI updates

centos8.1/x86/WW/slurm (3/10/2020)

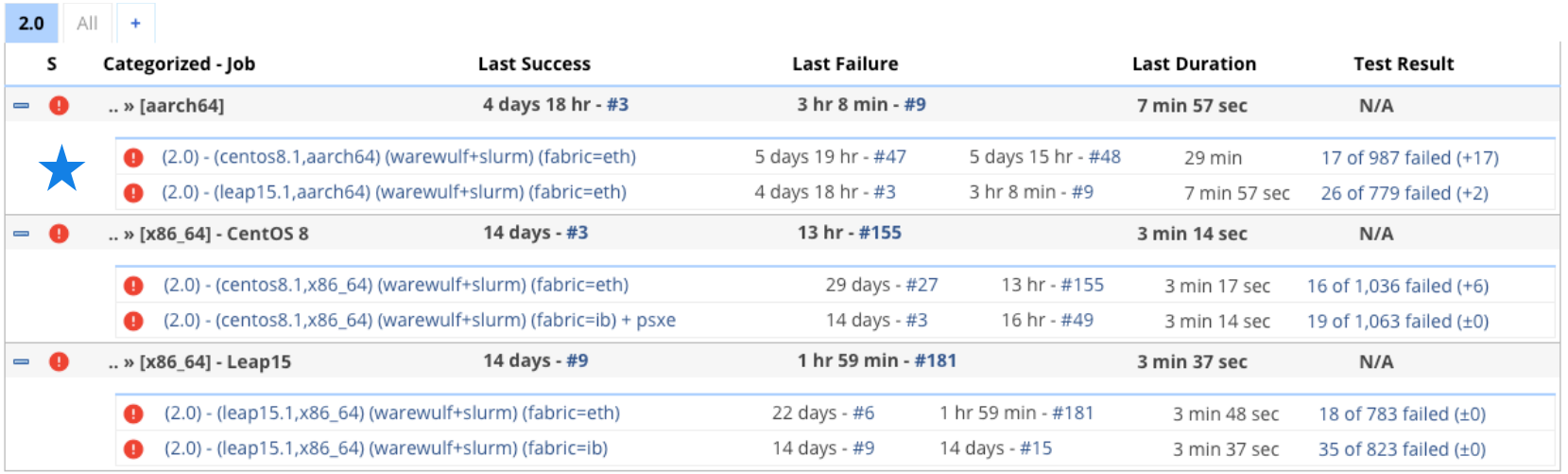


centos8.1/x86/WW/slurm (4/08/2020)



- From last time (3/10):
  - ~~610 user-level tests passing~~
- As of 3/25:
  - ~~910 user-level tests passing~~
- As of this morning (4/08):
  - 982 user-level tests passing

2.0 (cont.) – CI updates



2.0 | All | +

S	Categorized - Job	Last Success	Last Failure	Last Duration	Test Result
	.. » [aarch64]	4 days 18 hr - #3	3 hr 8 min - #9	7 min 57 sec	N/A
	(2.0) - (centos8.1,aarch64) (warewulf+slurm) (fabric=eth)	5 days 19 hr - #47	5 days 15 hr - #48	29 min	17 of 987 failed (+17)
	(2.0) - (leap15.1,aarch64) (warewulf+slurm) (fabric=eth)	4 days 18 hr - #3	3 hr 8 min - #9	7 min 57 sec	26 of 779 failed (+2)
	.. » [x86_64] - CentOS 8	14 days - #3	13 hr - #155	3 min 14 sec	N/A
	(2.0) - (centos8.1,x86_64) (warewulf+slurm) (fabric=eth)	29 days - #27	13 hr - #155	3 min 17 sec	16 of 1,036 failed (+6)
	(2.0) - (centos8.1,x86_64) (warewulf+slurm) (fabric=ib) + psxe	14 days - #3	16 hr - #49	3 min 14 sec	19 of 1,063 failed (±0)
	.. » [x86_64] - Leap15	14 days - #9	1 hr 59 min - #181	3 min 37 sec	N/A
	(2.0) - (leap15.1,x86_64) (warewulf+slurm) (fabric=eth)	22 days - #6	1 hr 59 min - #181	3 min 48 sec	18 of 783 failed (±0)
	(2.0) - (leap15.1,x86_64) (warewulf+slurm) (fabric=ib)	14 days - #9	14 days - #15	3 min 37 sec	35 of 823 failed (±0)

v1.3.9 totals

1,166 tests
1,166 tests

1,237 tests
2,510 tests

1,203 tests
1,549 tests

- CI on aarch64 now running under our Jenkins instance in the UK:
  - resolved the CentOS8.1 kernel bootstrapping issue per previous slides

intel/boost -qnextgen and Boost

- From last time:
  - intel –qnextgen option proposed as way to get around build failure with Boost
  - did update our .spec with patches which allowed Boost/intel to build
- Unfortunately, our CI detects issues when compiling boost regex example with normal flags and linking to Boost built with –qnextgen option
  - Can see example linkage failure at https://github.com/openhpc/ohpc/pull/1166
  - Does not seem to be a current path forward for this on CentOS8
  - Intel compiler folks point to open gcc bug: https://gcc.gnu.org/bugzilla/show_bug.cgi?id=91085
- Seem to be stuck for the time being without Boost/intel builds
  - presumably only fixed by newer gcc when a fix lands upstream

Moving forward with a preview release

- Given where we are at, how do folks feel about moving forward with an incomplete preview release?
  - would have to work thru an updated release and test process as the public packages will be pushed to repos.openhpc.community
  - would have to start with a subset of recipes
  - document known issues and packages currently unavailable
- Can maintain upgrade path thru 1 or more tech preview releases
  - ie, if folks are willing to try what we make available currently, they can upgrade to newer package versions and final 2.0 release
- What would we want to tag the release as?
  - 2.0RC1, 2.0RC2, ….etc
  - 2.0alpha1, 2.0alpha2,…
  - 2.0preview1, 2.0preview2,…