

LFX: The Linux Foundation Mentorship

Project:

RISC-V: Porting Spidermonkey to RISC-V

Mentor:

Wei Wu

Mentees:

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Linked Documents:

- [JIT Documentation](#)
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Pre-Tasks:

Week 1 Task-Assignments:

- Native build spidermonkey on riscv64 and run regression tests. Log the results. (one)
- Cross-build spidermonkey (host=x86 target=riscv64) and run regression tests on riscv64. Log the results. (one)
- Get familiar with the codebase. Find out how the baseline compiler works. Write your understanding to a google doc. (all)
- Say hello and introduce yourself in Mozilla's chat room. (all)
- figure out a suitable time slot for the weekly meeting. (all)

Tried Adding:(TO MOZCONFIG) (Problem Fixed)

Problem with :

```
ac_add_options --target=riscv64 --host=x86_64
```

Solution:

```
ac_add_options --target=riscv64
```

On build error coming:

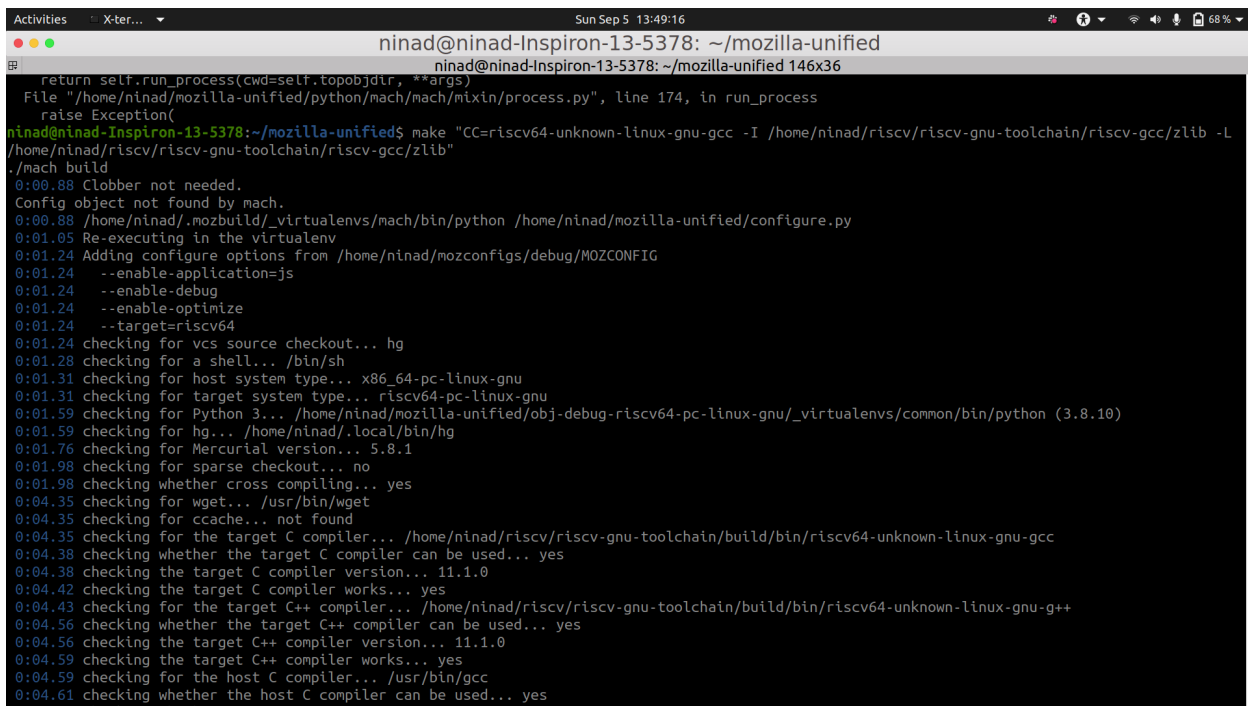
```
mozboot.mozconfig.MozconfigFindException: MOZCONFIG environment variable  
refers to a path that does not exist in any of /home/ninad/mozilla-unified
```

Installing mozregression

```
Activities  X-terminal-emulator  Sun Sep 5 12:38:56
ninad@ninad-Inspiron-13-5378: ~/mozilla-unified
ninad@ninad-Inspiron-13-5378: ~/mozilla-unified 158x37
ninad@ninad-Inspiron-13-5378:~/mozilla-unified$ ./mach mozregression
Collecting mozregression
  Downloading mozregression-4.0.18-py3-none-any.whl (69 kB)
    | 69 kB 140 kB/s
Requirement already satisfied: requests>=2.21.0 in ./third_party/python/requests (from mozregression) (2.25.1)
Requirement already satisfied: redo>=2.0.2 in ./third_party/python/redo (from mozregression) (2.0.3)
Collecting beautifulsoup4>=4.7.1
  Downloading beautifulsoup4-4.9.3-py3-none-any.whl (115 kB)
    | 115 kB 2.1 MB/s
Collecting colorama>=0.4.1
  Downloading colorama-0.4.4-py2.py3-none-any.whl (16 kB)
Collecting configobj>=5.0.6
  Downloading configobj-5.0.6.tar.gz (33 kB)
Requirement already satisfied: six in ./third_party/python/six (from configobj>=5.0.6->mozregression) (1.13.0)
Collecting glean-sdk>=31.1.3
  Downloading glean_sdk-40.1.1-cp36-abi3-manylinux_2_17_x86_64.manylinux2014_x86_64.whl (1.1 MB)
    | 1.1 MB 2.2 MB/s
Requirement already satisfied: glean-parser==3.6.0 in ./third_party/python/glean_parser (from glean-sdk>=31.1.3->mozregression) (3.6.0)
Collecting cffi>=1.13.0
  Using cached cffi-1.14.6-cp38-cp38-manylinux1_x86_64.whl (411 kB)
Requirement already satisfied: yamllint>=1.18.0 in ./third_party/python/yamllint (from glean-parser==3.6.0->glean-sdk>=31.1.3->mozregression) (1.23.0)
Requirement already satisfied: Click>=7 in ./third_party/python/Click (from glean-parser==3.6.0->glean-sdk>=31.1.3->mozregression) (7.0)
Requirement already satisfied: appdirs>=1.4 in ./third_party/python/appdirs (from glean-parser==3.6.0->glean-sdk>=31.1.3->mozregression) (1.4.4)
Requirement already satisfied: diskcache>=4 in ./third_party/python/diskcache (from glean-parser==3.6.0->glean-sdk>=31.1.3->mozregression) (4.1.0)
Requirement already satisfied: jsonschema<4,>=3.0.2 in ./third_party/python/jsonschema (from glean-parser==3.6.0->glean-sdk>=31.1.3->mozregression) (3.2.0)
Requirement already satisfied: Jinja2>=2.10.1 in ./third_party/python/Jinja2 (from glean-parser==3.6.0->glean-sdk>=31.1.3->mozregression) (2.11.3)
Requirement already satisfied: setuptools in ./obj-x86_64-pc-linux-gnu/_virtualenvs/common/lib/python3.8/site-packages (from jsonschema<4,>=3.0.2->glean-parser==3.6.0->glean-sdk>=31.1.3->mozregression) (51.0.0)
Requirement already satisfied: attrs>=17.4.0 in ./third_party/python/attrs (from jsonschema<4,>=3.0.2->glean-parser==3.6.0->glean-sdk>=31.1.3->mozregression) (19.1.0)
Requirement already satisfied: six in ./third_party/python/six (from configobj>=5.0.6->mozregression) (1.13.0)
Collecting MarkupSafe>=0.23
  Using cached MarkupSafe-2.0.1-cp38-cp38-manylinux_2_5_x86_64.manylinux1_x86_64.manylinux_2_12_x86_64.manylinux2010_x86_64.whl (30 kB)
Collecting mozdevice<5,>=4.0.0
  Downloading mozdevice-4.0.3-py3-none-any.whl (37 kB)
Collecting mozfile>=2.0.0
  Downloading mozfile-2.1.0.tar.gz (5.9 kB)
Requirement already satisfied: six in ./third_party/python/six (from configobj>=5.0.6->mozregression) (1.13.0)
```

```
(base) djshah11@djshah11:~/mozilla-unified$ export MOZCONFIG=$HOME/mozconfigs/debug/MOZCONFIG
(base) djshah11@djshah11:~/mozilla-unified$ ./mach build
checking for vcs source checkout...
hg
Adding configure options from /home/djshah11/mozconfigs/debug/MOZCONFIG
--enable-application=js
--enable-debug
--enable-optimize
--enable-target=riscv64
--enable-host=x86
checking for host system type...
Executing: `sh /home/djshah11/mozilla-unified/build/moz.configure/./autoconf/config.sub x86`
Unknown OS: none
1: (base) djshah11@djshah11:~/mozilla-unified$
```

Running Native Build on riscv64(Error)



```
ninad@ninad-Inspiron-13-5378: ~/mozilla-unified
ninaad@ninad-Inspiron-13-5378: ~/mozilla-unified 146x36
return self.run_process(cwd=self.topobjdir, **args)
File "/home/ninad/mozilla-unified/python/mach/mach/mixin/process.py", line 174, in run_process
    raise Exception(
ninad@ninad-Inspiron-13-5378:~/mozilla-unified$ make "CC=riscv64-unknown-linux-gnu-gcc -I /home/ninad/riscv/riscv-gnu-toolchain/riscv-gcc/zlib -L
/home/ninad/riscv/riscv-gnu-toolchain/riscv-gcc/zlib"
./mach build
0:00.88 Clobber not needed.
Config object not found by mach.
0:00.88 /home/ninad/.mozbuild/_virtualenvs/mach/bin/python /home/ninad/mozilla-unified/configure.py
0:01.05 Re-executing in the virtualenv
0:01.24 Adding configure options from /home/ninad/mozconfigs/debug/MOZCONFIG
0:01.24 --enable-application=js
0:01.24 --enable-debug
0:01.24 --enable-optimize
0:01.24 --target=riscv64
0:01.24 checking for vcs source checkout... hg
0:01.28 checking for a shell... /bin/sh
0:01.31 checking for host system type... x86_64-pc-linux-gnu
0:01.31 checking for target system type... riscv64-pc-linux-gnu
0:01.59 checking for Python 3... /home/ninad/mozilla-unified/obj-debug-riscv64-pc-linux-gnu/_virtualenvs/common/bin/python (3.8.10)
0:01.59 checking for hg... /home/ninad/.local/bin/hg
0:01.76 checking for Mercurial version... 5.8.1
0:01.98 checking for sparse checkout... no
0:01.98 checking whether cross compiling... yes
0:04.35 checking for wget... /usr/bin/wget
0:04.35 checking for ccache... not found
0:04.35 checking for the target C compiler... /home/ninad/riscv/riscv-gnu-toolchain/build/bin/riscv64-unknown-linux-gnu-gcc
0:04.38 checking whether the target C compiler can be used... yes
0:04.38 checking the target C compiler version... 11.1.0
0:04.42 checking the target C compiler works... yes
0:04.43 checking for the target C++ compiler... /home/ninad/riscv/riscv-gnu-toolchain/build/bin/riscv64-unknown-linux-gnu-g++
0:04.56 checking whether the target C++ compiler can be used... yes
0:04.56 checking the target C++ compiler version... 11.1.0
0:04.59 checking the target C++ compiler works... yes
0:04.59 checking for the host C compiler... /usr/bin/gcc
0:04.61 checking whether the host C compiler can be used... yes
0:04.61 checking whether the host C compiler can be used... yes
```

Command:

```
make "CC=riscv64-unknown-linux-gnu-gcc -I
/home/ninad/riscv/riscv-gnu-toolchain/riscv-gcc/zlib -L
/home/ninad/riscv/riscv-gnu-toolchain/riscv-gcc/zlib"
```

ERROR:

```
0:07.45 DEBUG: Creating `/tmp/conftestteyp924sq.rs` with content:
0:07.45 DEBUG: | pub extern fn hello() { println!("Hello world"); }
0:07.45 DEBUG: Executing:
`/home/ninad/.rustup/toolchains/stable-x86_64-unknown-linux-gnu/bin/rustc
--crate-type staticlib --target=riscv64gc-unknown-linux-gnu -o
/tmp/conftestiaq_wawe.rlib /tmp/conftestteyp924sq.rs`
0:07.45 DEBUG: The command returned non-zero exit status 1.
0:07.45 DEBUG: Its error output was:
0:07.45 DEBUG: | error[E0463]: can't find crate for `std`
0:07.46 DEBUG: | |
0:07.46 DEBUG: | = note: the `riscv64gc-unknown-linux-gnu` target may
not be installed
0:07.46 DEBUG: |
0:07.46 DEBUG: | error: aborting due to previous error
0:07.46 DEBUG: |
0:07.46 DEBUG: | For more information about this error, try `rustc
--explain E0463`.
0:07.46 ERROR: Cannot compile for riscv64-pc-linux-gnu with
/home/ninad/.rustup/toolchains/stable-x86_64-unknown-linux-gnu/bin/rustc
0:07.46 The target may be unsupported, or you may not have
0:07.46 a rust std library for that target installed. Try:
0:07.47 rustup target add riscv64gc-unknown-linux-gnu
```

Achieved:

- 0:01.98 checking whether cross compiling... yes
- 0:01.31 checking for host system type... x86_64-pc-linux-gnu
- 0:01.31 checking for target system type... riscv64-pc-linux-gnu
- 0:05.04 checking for the assembler...
/home/ninad/riscv/riscv-gnu-toolchain/build/bin/riscv64-unknown-linux-gnu-gcc
- 0:04.43 checking for the target C++ compiler...
/home/ninad/riscv/riscv-gnu-toolchain/build/bin/riscv64-unknown-linux-gnu-g++
- 0:04.56 checking whether the target C++ compiler can be used... yes

Configuration options were added by:

```
0:01.24 Adding configure options from /home/ninad/mozconfigs/debug/MOZCONFIG
0:01.24 --enable-application=js
0:01.24 --enable-debug
0:01.24 --enable-optimize
0:01.24 --target=riscv64
```

Added riscv64gc-unknown-linux-gnu

```
rustup target add riscv64gc-unknown-linux-gnu
```

Ran build again:

- Build Failed

Ran the command

```
make "CC=riscv64-unknown-linux-gnu-gcc -I
/home/ninad/riscv/riscv-gnu-toolchain/riscv-gcc -L
/home/ninad/riscv/riscv-gnu-toolchain/riscv-gcc"
```

The error comes during building

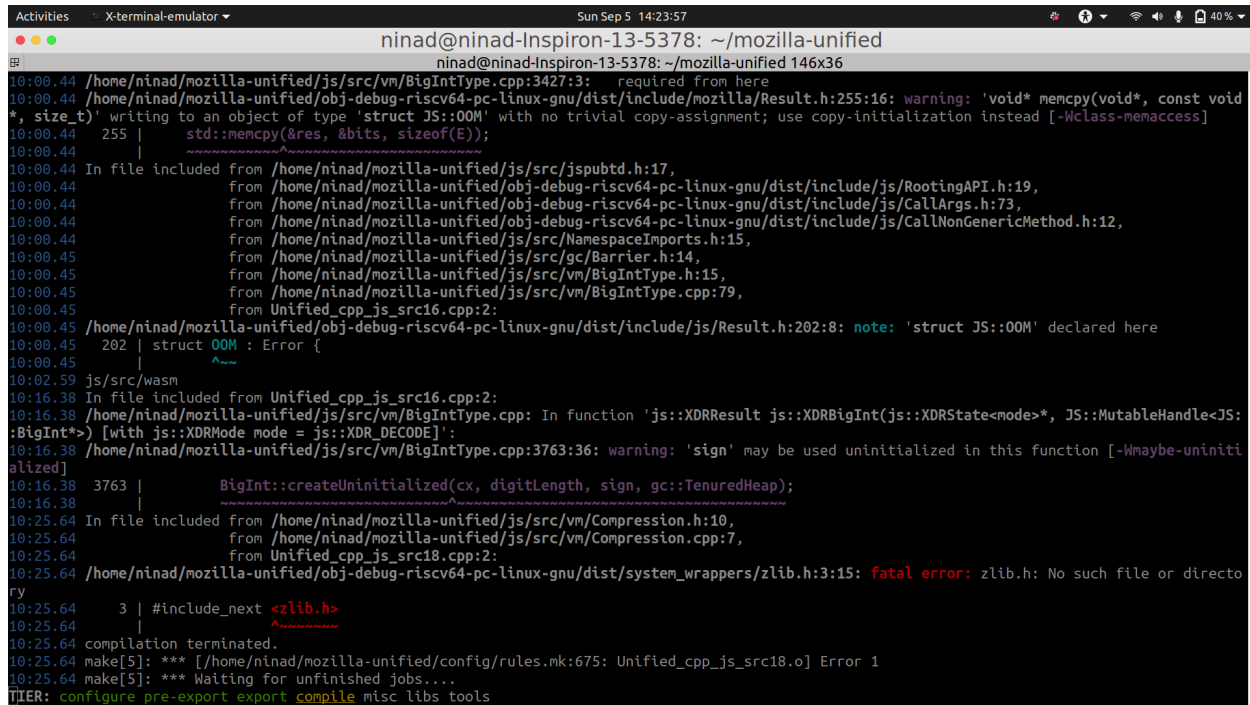
```
12:34.82 /home/ninad/mozilla-unified/js/src/wasm/WasmIonCompile.cpp: In
function 'bool EmitBodyExprs({anonymous}::FunctionCompiler&)':
12:34.82
/home/ninad/mozilla-unified/js/src/wasm/WasmIonCompile.cpp:3768:12:
warning: 'srcMemIndex' may be used uninitialized in this function
[-Wmaybe-uninitialized]
12:34.82 3768 |     uint32_t srcMemIndex;
12:34.82      |               ^~~~~~
```

```

12:34.82
/home/ninad/mozilla-unified/js/src/wasm/WasmIonCompile.cpp:3767:12:
warning: 'dstMemIndex' may be used uninitialized in this function
[-Wmaybe-uninitialized]
12:34.82 3767 |     uint32_t dstMemIndex;
12:34.82      |                  ^~~~~~
12:34.82 /home/ninad/mozilla-unified/js/src/wasm/WasmIonCompile.cpp:299:46:
warning: 'i64' may be used uninitialized in this function
[-Wmaybe-uninitialized]
12:34.82 299 |     MConstant* constant = MConstant::NewInt64(alloc(), i);
12:34.82      |                                     ~~~~~^~~~~~
12:34.82
/home/ninad/mozilla-unified/js/src/wasm/WasmIonCompile.cpp:2358:11: note:
'i64' was declared here
12:34.82 2358 |     int64_t i64;
12:34.82      |             ^~~
12:34.82 In file included from
/home/ninad/mozilla-unified/js/src/jit/LIR.h:22,
12:34.82                  from
/home/ninad/mozilla-unified/js/src/jit/shared/CodeGenerator-shared.h:16,
12:34.82                  from
/home/ninad/mozilla-unified/js/src/jit/none/CodeGenerator-none.h:10,
12:34.82                  from
/home/ninad/mozilla-unified/js/src/jit/CodeGenerator.h:28,
12:34.82                  from
/home/ninad/mozilla-unified/js/src/wasm/WasmIonCompile.cpp:26,
12:34.82                  from Unified_cpp_js_src_wasm3.cpp:2:
12:34.82 /home/ninad/mozilla-unified/js/src/jit/MIRGraph.h:194:64: warning:
'value' may be used uninitialized in this function [-Wmaybe-uninitialized]
12:34.82 194 |     void setSlot(uint32_t slot, MDefinition* ins) {
12:34.82      |                                slots[slot] = ins; }
12:34.82 In file included from Unified_cpp_js_src_wasm3.cpp:2:
12:34.82
/home/ninad/mozilla-unified/js/src/wasm/WasmIonCompile.cpp:2784:16: note:
'value' was declared here
12:34.82 2784 |     MDefinition* value;
12:34.82      |             ^~~~~~
12:43.15 make[3]: *** [/home/ninad/mozilla-unified/config/recurse.mk:34:
compile] Error 2
12:43.15 make[2]: *** [/home/ninad/mozilla-unified/config/rules.mk:358:
default] Error 2
12:43.15 make[1]: *** [client.mk:65: build] Error 2
12:43.15 0 compiler warnings present.

```

```
12:43.20 /usr/bin/notify-send --app-name=Mozilla Build System Mozilla Build
System Build failed
make: *** [GNUMakefile:9: build] Error 2
```



```
Activities X-terminal-emulator Sun Sep 5 14:23:57
ninad@ninad-Inspiron-13-5378: ~/mozilla-unified
ninad@ninad-Inspiron-13-5378: ~/mozilla-unified 146x36
10:00.44 /home/ninad/mozilla-unified/js/src/vm/BigIntType.cpp:3427:3: required from here
10:00.44 /home/ninad/mozilla-unified/obj-debug-riscv64-pc-linux-gnu/dist/include/mozilla/Result.h:255:16: warning: 'void* memcpy(void*, const void
*, size_t)' writing to an object of type 'struct JS::OOM' with no trivial copy-assignment; use copy-initialization instead [-Wclass-memaccess]
10:00.44 255 |     std::memcpy(&res, &bits, sizeof(E));
10:00.44 |
10:00.44 In file included from /home/ninad/mozilla-unified/js/src/jspubtd.h:17,
10:00.44 from /home/ninad/mozilla-unified/obj-debug-riscv64-pc-linux-gnu/dist/include/js/RootingAPI.h:19,
10:00.44 from /home/ninad/mozilla-unified/obj-debug-riscv64-pc-linux-gnu/dist/include/js/CallArgs.h:73,
10:00.44 from /home/ninad/mozilla-unified/obj-debug-riscv64-pc-linux-gnu/dist/include/js/CallNonGenericMethod.h:12,
10:00.44 from /home/ninad/mozilla-unified/js/src/NamespacingImports.h:15,
10:00.44 from /home/ninad/mozilla-unified/js/src/gc/Barrier.h:14,
10:00.44 from /home/ninad/mozilla-unified/js/src/vm/BigIntType.h:15,
10:00.44 from /home/ninad/mozilla-unified/js/src/vm/BigIntType.cpp:79,
10:00.44 from Unified_cpp_js_src16.cpp:2:
10:00.44 /home/ninad/mozilla-unified/obj-debug-riscv64-pc-linux-gnu/dist/include/js/Result.h:202:8: note: 'struct JS::OOM' declared here
10:00.45 202 | struct OOM : Error {
10:00.45 |
10:02.59 js/src/wasm
10:16.38 In file included from Unified_cpp_js_src16.cpp:2:
10:16.38 /home/ninad/mozilla-unified/js/src/vm/BigIntType.cpp: In function 'js::XDRResult js::XDRBigInt(js::XDRState<mode>*, JS::MutableHandle<JS:
:BigInt*>) [with js::XDRMode mode = js::XDR_DECODE]':
10:16.38 /home/ninad/mozilla-unified/js/src/vm/BigIntType.cpp:3763:36: warning: 'sign' may be used uninitialized in this function [-Wmaybe-uniniti
alized]
10:16.38 3763 |         BigInt::createUninitialized(cx, digitLength, sign, gc::TenuredHeap);
10:16.38 |
10:25.64 In file included from /home/ninad/mozilla-unified/js/src/vm/Compression.h:10,
10:25.64 from /home/ninad/mozilla-unified/js/src/vm/Compression.cpp:7,
10:25.64 from Unified_cpp_js_src18.cpp:2:
10:25.64 /home/ninad/mozilla-unified/obj-debug-riscv64-pc-linux-gnu/dist/system_wrappers/zlib.h:3:15: fatal error: zlib.h: No such file or directo
ry
10:25.64 3 | #include_next <zlib.h>
10:25.64 |
10:25.64 compilation terminated.
10:25.64 make[5]: *** [/home/ninad/mozilla-unified/config/rules.mk:675: Unified_cpp_js_src18.o] Error 1
10:25.64 make[5]: *** Waiting for unfinished jobs....
TIER: configure pre-export export compile misc libs tools
```

- Reference Link to fix
 - <https://stackoverflow.com/questions/36374267/how-to-fix-fatal-error-zlib-h-no-suc-h-file-or-directory>
 - <https://github.com/swig/swig/issues/1805> for Zlib error
 - https://gcc.gnu.org/bugzilla/show_bug.cgi?id=70129

[Build till configuration is working!](#) (justpasteit, terminal dump)

Error in cross-compiling:

```
(base) djshah11@djshah11:~/mozilla-unified$ make "CC=riscv64-unknown-elf -I /home/djshah11/riscv/riscv-gnu-toolchain/riscv-gcc -L /home/djshah11/riscv/riscv-gnu-toolchain/riscv-gcc"
./mach build
0:00.87 Clobber not needed.
/home/djshah11/mozilla-unified/obj-x86_64-pc-linux-gnu/config.status is out of date with respect to /home/djshah11/mozilla-unified/obj-x86_64-pc-linux-gnu/.mozconfig.json
0:00.88 /home/djshah11/.mozbuild/_virtualenvs/mach/bin/python /home/djshah11/mozilla-unified/configure.py
0:01.07 Re-executing in the virtualenv
0:01.31 Adding configure options from /home/djshah11/mozilla-unified/mozconfig
0:01.31 --enable-application=js
0:01.31 --disable-debug
0:01.31 --enable-optimize
0:01.31 checking for vcs source checkout... hg
0:01.36 checking for a shell... /usr/bin/sh
0:01.41 checking for host system type... x86_64-pc-linux-gnu
0:01.41 checking for target system type... x86_64-pc-linux-gnu
0:01.72 checking for Python 3... /home/djshah11/mozilla-unified/obj-x86_64-pc-linux-gnu/_virtualenvs/common/bin/python (3.8.10)
0:01.72 checking for hg... /home/djshah11/.local/bin/hg
0:01.89 checking for Mercurial version... 5.8.1
0:02.12 checking for sparse checkout... no
0:02.12 checking whether cross compiling... no
0:04.36 checking for wget... /usr/bin/wget
0:04.37 checking for ccache... not found
0:04.37 Using target sysroot in /home/djshah11/.mozbuild/sysroot-x86_64-linux-gnu
0:04.37 Using host sysroot in /home/djshah11/.mozbuild/sysroot-x86_64-linux-gnu
0:04.37 checking for the target C compiler... not found
0:04.37 DEBUG: _cc: Looking for riscv64-unknown-elf
0:04.37 ERROR: Cannot find the target C compiler
Error running mach:

    ['build']

The error occurred in code that was called by the mach command. This is either a bug in the called code itself or in the way that mach is calling it. You can invoke |./mach busted| to check if this issue is already on file. If it isn't, please use |./mach busted file build| to report it. If |./mach busted| is
```

This error is mainly due to the use of different cross compiler **(SOLVED)**

Currently using: **riscv64-unknown-elf-gcc** cross compiler **(BAREMETAL)**

To use: **riscv64-unknown-linux-gnu-gcc** cross compiler **(LINUX)**

Fix: For setting up Linux GNU gcc Compiler on Linux, after configuring one needs to run

```
$ make linux
```

But running the above command (even with root access) is producing the following errors in the spidermonkey make build on riscv

Ref - <https://github.com/riscv/riscv-gnu-toolchain>

<https://colatkinson.site/linux/riscv/2021/01/27/riscv-qemu/>

Solution - run the following command using root access and then run make linux

```
$ mkdir -p stamps/ && touch stamps/build-gdb-linux
```

```
$ make linux
```

```

root@djshah11:/home/djshah11/riscv/riscv-gnu-toolchain# mkdir -p stamps/ && touch stamps/build-gdb-linux
root@djshah11:/home/djshah11/riscv/riscv-gnu-toolchain# su djshah11
(base) djshah11@djshah11:~/riscv/riscv-gnu-toolchain$ make build
make: Nothing to be done for 'build'.
(base) djshah11@djshah11:~/riscv/riscv-gnu-toolchain$ make linux
make: Nothing to be done for 'linux'.
(base) djshah11@djshah11:~/riscv/riscv-gnu-toolchain$ source ~/.bashrc

```

```

missing-prototypes -Wshadow -Wstack-usage=262144 -I/home/djshah11/riscv/riscv-gnu-toolchain/riscv-gdb/bfd/./zlib -g -O2 -MT elfxx-riscv.lo -MD -MP -MF .deps/elfxx-riscv.Tpo -c -o elfxx-riscv.lo /home/djshah11/riscv/riscv-gnu-toolchain/riscv-gdb/bfd/elfxx-riscv.c
libtool: compile: gcc -DHAVE_CONFIG_H -I. -I/home/djshah11/riscv/riscv-gnu-toolchain/riscv-gdb/bfd -DBINDIR=\"/opt/riscv/bin\" -DLIBDIR=\"/opt/riscv/lib\" -I/home/djshah11/riscv/riscv-gnu-toolchain/riscv-gdb/bfd -I/home/djshah11/riscv/riscv-gnu-toolchain/riscv-gdb/bfd/./include -DHAVE_riscv_elf64_vec -DHAVE_riscv_elf32_vec -DHAVE_elf64_le_vec -DHAVE_elf64_be_vec -DHAVE_elf32_le_vec -DHAVE_elf32_be_vec -W -Wall -Wstrict-prototypes -Wmissing-prototypes -Wshadow -Wstack-usage=262144 -I/home/djshah11/riscv/riscv-gnu-toolchain/riscv-gdb/bfd/./zlib -g -O2 -MT elfxx-riscv.lo -MD -MP -MF .deps/elfxx-riscv.Tpo -c /home/djshah11/riscv/riscv-gnu-toolchain/riscv-gdb/bfd/elfxx-riscv.c -o elfxx-riscv.o
mv -f .deps/elfxx-riscv.Tpo .deps/elfxx-riscv.Plo
/bin/bash ./libtool --tag=CC --mode=compile gcc -DHAVE_CONFIG_H -I. -I/home/djshah11/riscv/riscv-gnu-toolchain/riscv-gdb/bfd -DBINDIR=\"/opt/riscv/bin\" -DLIBDIR=\"/opt/riscv/lib\" -I/home/djshah11/riscv/riscv-gnu-toolchain/riscv-gdb/bfd -I/home/djshah11/riscv/riscv-gnu-toolchain/riscv-gdb/bfd/./include -DHAVE_riscv_elf64_vec -DHAVE_riscv_elf32_vec -DHAVE_elf64_le_vec -DHAVE_elf64_be_vec -DHAVE_elf32_le_vec -DHAVE_elf32_be_vec -W -Wall -Wstrict-prototypes -Wmissing-prototypes -Wshadow -Wstack-usage=262144 -I/home/djshah11/riscv/riscv-gnu-toolchain/riscv-gdb/bfd/./zlib -g -O2 -MT elf32.lo -MD -MP -MF .deps/elf32.Tpo -c -o elf32.lo /home/djshah11/riscv/riscv-gnu-toolchain/riscv-gdb/bfd/elf32.c
libtool: compile: gcc -DHAVE_CONFIG_H -I. -I/home/djshah11/riscv/riscv-gnu-toolchain/riscv-gdb/bfd -DBINDIR=\"/opt/riscv/bin\" -DLIBDIR=\"/opt/riscv/lib\" -I/home/djshah11/riscv/riscv-gnu-toolchain/riscv-gdb/bfd -I/home/djshah11/riscv/riscv-gnu-toolchain/riscv-gdb/bfd/./include -DHAVE_riscv_elf64_vec -DHAVE_riscv_elf32_vec -DHAVE_elf64_le_vec -DHAVE_elf64_be_vec -DHAVE_elf32_le_vec -DHAVE_elf32_be_vec -W -Wall -Wstrict-prototypes -Wmissing-prototypes -Wshadow -Wstack-usage=262144 -I/home/djshah11/riscv/riscv-gnu-toolchain/riscv-gdb/bfd/./zlib -g -O2 -MT elf32.lo -MD -MP -MF .deps/elf32.Tpo -c /home/djshah11/riscv/riscv-gnu-toolchain/riscv-gdb/bfd/elf32.c -o elf32.o
mv -f .deps/elf32.Tpo .deps/elf32.Plo
/bin/bash ./libtool --tag=CC --mode=compile gcc -DHAVE_CONFIG_H -I. -I/home/djshah11/riscv/riscv-gnu-toolchain/riscv-gdb/bfd -DBINDIR=\"/opt/riscv/bin\" -DLIBDIR=\"/opt/riscv/lib\" -I/home/djshah11/riscv/riscv-gnu-toolchain/riscv-gdb/bfd -I/home/djshah11/riscv/riscv-gnu-toolchain/riscv-gdb/bfd/./include -DHAVE_riscv_elf64_vec -DHAVE_riscv_elf32_vec -DHAVE_elf64_le_vec -DHAVE_elf64_be_vec -DHAVE_elf32_le_vec -DHAVE_elf32_be_vec -W -Wall -Wstrict-prototypes -Wmissing-prototypes -Wshadow -Wstack-usage=262144 -I/home/djshah11/riscv/riscv-gnu-toolchain/riscv-gdb/bfd/./zlib -g -O2 -MT elf.lo -MD -MP -MF .deps/elf.Tpo -c -o elf.lo /home/djshah11/riscv/riscv-gnu-toolchain/riscv-gdb/bfd/elf.c
libtool: compile: gcc -DHAVE_CONFIG_H -I. -I/home/djshah11/riscv/riscv-gnu-toolchain/riscv-gdb/bfd -DBINDIR=\"/opt/riscv/bin\" -DLIBDIR=\"/opt/riscv/lib\" -I/home/djshah11/riscv/riscv-gnu-toolchain/riscv-gdb/bfd -I/home/djshah11/riscv/riscv-gnu-toolchain/riscv-gdb/bfd/./include -DHAVE_riscv_elf64_vec -DHAVE_riscv_elf32_vec -DHAVE_elf64_le_vec -DHAVE_elf64_be_vec -DHAVE_elf32_le_vec -DHAVE_elf32_be_vec -W -Wall -Wstrict-prototypes -Wmissing-prototypes -Wshadow -Wstack-usage=262144 -I/home/djshah11/riscv/riscv-gnu-toolchain/riscv-gdb/bfd/./zlib -g -O2 -MT elf.lo -MD -MP -MF .deps/elf.Tpo -c /home/djshah11/riscv/riscv-gnu-toolchain/riscv-gdb/bfd/elf.c -o elf.o
mv -f .deps/elf.Tpo .deps/elf.Plo
/bin/bash ./libtool --tag=CC --mode=compile gcc -DHAVE_CONFIG_H -I. -I/home/djshah11/riscv/riscv-gnu-toolchain/riscv-gdb/bfd -DBINDIR=\"/opt/riscv/bin\" -DLIBDIR=\"/opt/riscv/lib\" -I/home/djshah11/riscv/riscv-gnu-toolchain/riscv-gdb/bfd -I/home/djshah11/riscv/riscv-gnu-toolchain/riscv-gdb/bfd/./include -DHAVE_riscv_elf64_vec -DHAVE_riscv_elf32_vec -DHAVE_elf64_le_vec -DHAVE_elf64_be_vec -DHAVE_elf32_le_vec -DHAVE_elf32_be_vec -W -Wall -Wstrict-prototypes -Wmissing-prototypes -Wshadow -Wstack-usage=262144 -I/home/djshah11/riscv/riscv-gnu-toolchain/riscv-gdb/bfd/./zlib -g -O2 -MT elflink.lo -MD -MP -MF .deps/elflink.Tpo -c -o elflink.lo /home/djshah11/riscv/riscv-gnu-toolchain/riscv-gdb/bfd/elflink.c
libtool: compile: gcc -DHAVE_CONFIG_H -I. -I/home/djshah11/riscv/riscv-gnu-toolchain/riscv-gdb/bfd -DBINDIR=\"/opt/riscv/bin\" -DLIBDIR=\"/opt/riscv/lib\" -I/home/djshah11/riscv/riscv-gnu-toolchain/riscv-gdb/bfd -I/home/djshah11/riscv/riscv-gnu-toolchain/riscv-gdb/bfd/./include -DHAVE_riscv_elf64_vec -DHAVE_riscv_elf32_vec -DHAVE_elf64_le_vec -DHAVE_elf64_be_vec -DHAVE_elf32_le_vec -DHAVE_elf32_be_vec -W -Wall -Wstrict-prototypes -Wmissing-prototypes -Wshadow -Wstack-usage=262144 -I/home/djshah11/riscv/riscv-gnu-toolchain/riscv-gdb/bfd/./zlib -g -O2 -MT elflink.lo -MD -MP -MF .deps/elflink.Tpo -c /home/djshah11/riscv/riscv-gnu-toolchain/riscv-gdb/bfd/elflink.c -o elflink.o

```

```

(base) djshah11@djshah11:~/mozilla-unified$ make "CC=riscv64-unknown-elf-gcc -I /home/djshah11/riscv/riscv-gnu-toolchain/riscv-gcc -L /home/djshah11/riscv/riscv-gnu-toolchain/riscv-gcc"
./mach build
0:01.44 Clobber not needed.
Config object not found by mach.
0:01.44 /home/djshah11/.mozbuild/_virtualenvs/mach/bin/python /home/djshah11/mozilla-unified/configure.py
0:01.73 Re-executing in the virtualenv
0:02.08 Adding configure options from /home/djshah11/mozconfigs/debug/MOZCONFIG
0:02.08 --enable-application=js
0:02.08 --enable-debug
0:02.08 --enable-optimize
0:02.08 --target=riscv64
0:02.08 checking for vcs source checkout... hg
0:02.14 checking for a shell... /usr/bin/sh
0:02.20 checking for host system type... x86_64-pc-linux-gnu
0:02.20 checking for target system type... riscv64-pc-linux-gnu
0:02.72 checking for Python 3... /home/djshah11/mozilla-unified/obj-debug-riscv64-pc-linux-gnu/_virtualenvs/common/bin/python (3.8.10)
0:02.72 checking for hg... /home/djshah11/.local/bin/hg
0:02.99 checking for Mercurial version... 5.8.1
0:03.36 checking for sparse checkout... no
0:03.36 checking whether cross compiling... yes
0:07.00 checking for wget... /usr/bin/wget
0:07.00 checking for ccache... not found
0:07.01 checking for the target C compiler... /usr/local/bin/riscv64-unknown-elf-gcc
0:07.05 checking whether the target C compiler can be used... no
0:07.05 DEBUG: <truncated - see config.log for full output>
0:07.05 DEBUG: | %KERNEL "SunOS"
0:07.05 DEBUG: | #elif _WIN32 || __CYGWIN__
0:07.05 DEBUG: | %KERNEL "WINNT"
0:07.05 DEBUG: | #elif _wasi
0:07.05 DEBUG: | %KERNEL "WASI"
0:07.05 DEBUG: | #endif
0:07.05 DEBUG: | #if __ANDROID__
0:07.05 DEBUG: | %OS "Android"
0:07.05 DEBUG: | #endif
0:07.05 DEBUG: | #if __BYTE_ORDER__ == __ORDER_LITTLE_ENDIAN__

```

```

File "/home/djshah11/mozilla-unified/python/mozbuild/mozbuild/controller/building.py", line 1528, in con
figure
    status = self._run_command_in_objdir(
File "/home/djshah11/mozilla-unified/python/mozbuild/mozbuild/base.py", line 845, in _run_command_in_obj
dir
    return self.run_process(cwd=self.topobjdir, **args)
File "/home/djshah11/mozilla-unified/python/mach/mach/mixin/process.py", line 174, in run_process
    raise Exception()

Sentry event ID: 3b3aeffff1c544eaa84e37f0c76719ba
Sentry is attempting to send 0 pending error messages
Waiting up to 2 seconds
Press Ctrl-C to quit
make: *** [GNUmakefile:9: build] Error 1
(base) djshah11@djshah11:~/mozilla-unified$

```

```

0:07.05 DEBUG: | %ENDIANNESS "little"
0:07.05 DEBUG: | #elif __BYTE_ORDER__ == __ORDER_BIG_ENDIAN__
0:07.05 DEBUG: | %ENDIANNESS "big"
0:07.05 DEBUG: | #endif
0:07.06 DEBUG: Executing: `/usr/local/bin/riscv64-unknown-elf-gcc -I /home/djshah11/riscv/riscv-gnu-toolc
chain/riscv-gcc -L /home/djshah11/riscv/riscv-gnu-toolchain/riscv-gcc -std=gnu99 /tmp/conftest.ozvh5e83.c -
E`

```

```

0:07.06 DEBUG: COMPILER = gcc
0:07.06 DEBUG: VERSION = 10.2.0
0:07.06 DEBUG: STDC_VERSION = 199901L
0:07.06 DEBUG: CPU = riscv64
0:07.06 DEBUG: ENDIANNESS = little
0:07.06 ERROR: Target C compiler target kernel (unknown) does not match --target kernel (Linux)
Error running mach:

```

```
['build']
```

The error occurred in code that was called by the mach command. This is either a bug in the called code itself or in the way that mach is calling it. You can invoke `|./mach busted|` to check if this issue is already on file. If it isn't, please use `|./mach busted file build|` to report it. If `|./mach busted|` is misbehaving, you can also inspect the dependencies of bug 1543241.

If filing a bug, please include the full output of mach, including this error message.

The details of the failure are as follows:

```
Exception: Process executed with non-0 exit code 1: ['/home/djshah11/.mozbuild/_virtualenvs/mach/bin/pytho
n', '/home/djshah11/mozilla-unified/configure.py']
```

```

File "/home/djshah11/mozilla-unified/python/mozbuild/mozbuild/build_commands.py", line 153, in build
    return driver.build()
File "/home/djshah11/mozilla-unified/python/mozbuild/mozbuild/controller/building.py", line 1144, in bui
ld
    config_rc = self.configure(
File "/home/djshah11/mozilla-unified/python/mozbuild/mozbuild/controller/building.py", line 1528, in con
figure

```

```
(base) djshah11@djshah11:~/mozilla-unified$ make "CC=riscv64-unknown-linux-gnu-gcc -I /home/djshah11/riscv/riscv-gnu-toolchain/riscv-gcc -L /home/djshah11/riscv/riscv-gnu-toolchain/riscv-gcc"
./mach build
0:01.23 Clobber not needed.
Config object not found by mach.
0:01.23 /home/djshah11/mozbuild/_virtualenvs/mach/bin/python /home/djshah11/mozilla-unified/configure.py
0:01.50 Re-executing in the virtualenv
0:01.81 Adding configure options from /home/djshah11/mozconfigs/debug/MOZCONFIG
0:01.81 --enable-application=js
0:01.81 --enable-debug
0:01.81 --enable-optimize
0:01.81 --target=riscv64
0:01.82 checking for vcs source checkout... hg
0:01.87 checking for a shell... /usr/bin/sh
0:01.92 checking for host system type... x86_64-pc-linux-gnu
0:01.92 checking for target system type... riscv64-pc-linux-gnu
0:02.37 checking for Python 3... /home/djshah11/mozilla-unified/obj-debug-riscv64-pc-linux-gnu/_virtualenvs/common/bin/python (3.8.10)
0:02.37 checking for hg... /home/djshah11/.local/bin/hg
0:02.62 checking for Mercurial version... 5.8.1
0:02.95 checking for sparse checkout... no
0:02.95 checking whether cross compiling... yes
0:06.50 checking for wget... /usr/bin/wget
0:06.50 checking for ccache... not found
0:06.50 checking for the target C compiler... /opt/riscv/bin/riscv64-unknown-linux-gnu-gcc
0:06.55 checking whether the target C compiler can be used... yes
0:06.55 checking the target C compiler version... 11.1.0
0:06.57 checking the target C compiler works... yes
0:06.57 checking for the target C++ compiler... /opt/riscv/bin/riscv64-unknown-linux-gnu-g++
0:06.59 checking whether the target C++ compiler can be used... yes
0:06.59 checking the target C++ compiler version... 11.1.0
0:06.62 checking the target C++ compiler works... yes
0:06.62 checking for the host C compiler... /usr/bin/gcc
```

Zlib error: <https://pastebin.com/agGVqVbc>

This error occurs in the build

```
11:25.80 js/src/jsapi-tests
11:40.76 js/src/shell
11:44.02 In file included from /home/djshah11/mozilla-unified/js/src/vm/Compression.h:10,
11:44.02 from /home/djshah11/mozilla-unified/js/src/shell/js.cpp:167,
11:44.02 from Unified_cpp_js_src_shell0.cpp:38:
11:44.02 /home/djshah11/mozilla-unified/obj-debug-riscv64-pc-linux-gnu/dist/system_wrappers/zlib.h:3:15: fatal error: zlib.h: No such file or directory
11:44.02     3 | #include_next <zlib.h>
11:44.02       |             ^~~~~~
11:44.02 compilation terminated.
11:44.06 make[5]: *** [/home/djshah11/mozilla-unified/config/rules.mk:675: Unified_cpp_js_src_shell0.o] Error 1
11:44.06 make[4]: *** [/home/djshah11/mozilla-unified/config/recurse.mk:72: js/src/shell/target-objects] Error 2
11:44.06 make[4]: *** Waiting for unfinished jobs....
11:50.76 make[4]: *** [/home/djshah11/mozilla-unified/config/recurse.mk:72: js/src/target-objects] Error 2
12:03.55 In file included from /home/djshah11/mozilla-unified/js/src/vm/Compression.h:10,
12:03.56 from /home/djshah11/mozilla-unified/js/src/jsapi-tests/testScriptSourceCompression.cpp:34,
12:03.56 from Unified_cpp_js_src_jsapi-tests15.cpp:29:
12:03.56 /home/djshah11/mozilla-unified/obj-debug-riscv64-pc-linux-gnu/dist/system_wrappers/zlib.h:3:15: fatal error: zlib.h: No such file or directory
12:03.56     3 | #include_next <zlib.h>
12:03.56       |             ^~~~~~
12:03.56 compilation terminated.
12:03.56 make[5]: *** [/home/djshah11/mozilla-unified/config/rules.mk:675: Unified_cpp_js_src_jsapi-tests15.o] Error 1
12:03.57 make[5]: *** Waiting for unfinished jobs....
12:20.37 make[4]: *** [/home/djshah11/mozilla-unified/config/recurse.mk:72: js/src/jsapi-tests/target-objects] Error 2
12:20.37 make[3]: *** [/home/djshah11/mozilla-unified/config/recurse.mk:34: compile] Error 2
12:20.37 make[2]: *** [/home/djshah11/mozilla-unified/config/rules.mk:358: default] Error 2
12:20.37 make[1]: *** [client.mk:65: build] Error 2
12:20.37 0 compiler warnings present.
12:20.44 /usr/bin/notify-send --app-name=Mozilla Build System Mozilla Build System Build failed
make: *** [GNUmakefile:9: build] Error 2
(base) djshah11@djshah11:~/mozilla-unified$
```

```

(base) djshah11@djshah11:~/mozilla-unified$ ./mach build
0:00.97 Clobber not needed.
/home/djshah11/mozilla-unified/obj-debug-riscv64-pc-linux-gnu/config.status is out of date with respect to /home/djshah11/mozilla-unified/obj-debug-riscv64-pc-linux-gnu/.mozconfig.json
0:00.97 /home/djshah11/.mozbuild/_virtualenvs/mach/bin/python /home/djshah11/mozilla-unified/configure.py
0:01.18 Re-executing in the virtualenv
0:01.44 Adding configure options from /home/djshah11/mozconfigs/debug/MOZCONFIG
0:01.44 --enable-application=js
0:01.44 --enable-debug
0:01.44 --enable-optimize
0:01.44 --target=riscv64
0:01.44 CC=riscv64-unknown-linux-gnu-gcc
0:01.44 NSS_SSL_ENABLE_ZLIB=
0:01.44 checking for vcs source checkout... hg
0:01.50 checking for a shell... /usr/bin/sh
0:01.54 checking for host system type... x86_64-pc-linux-gnu
0:01.54 checking for target system type... riscv64-pc-linux-gnu
0:01.87 checking for Python 3... /home/djshah11/mozilla-unified/obj-debug-riscv64-pc-linux-gnu/_virtualenvs/common/bin/python (3.8.10)
0:01.87 checking for hg... /home/djshah11/.local/bin/hg
0:02.08 checking for Mercurial version... 5.8.1
0:02.32 checking for sparse checkout... no
0:02.32 checking whether cross compiling... yes
0:04.64 checking for wget... /usr/bin/wget
0:04.65 checking for ccache... not found
0:04.65 checking for the target C compiler... /opt/riscv/bin/riscv64-unknown-linux-gnu-gcc
0:04.68 checking whether the target C compiler can be used... yes
0:04.69 checking the target C compiler version... 11.1.0
0:04.71 checking the target C compiler works... yes
0:04.72 checking for the target C++ compiler... /opt/riscv/bin/riscv64-unknown-linux-gnu-g++
0:04.73 checking whether the target C++ compiler can be used... yes
0:04.73 checking the target C++ compiler version... 11.1.0
0:04.76 checking the target C++ compiler works... yes
0:04.76 checking for the host C compiler... /usr/bin/gcc
0:04.80 checking whether the host C compiler can be used... yes
0:04.80 checking the host C compiler version... 9.3.0
0:04.83 checking the host C compiler works... yes
0:04.83 checking for the host C++ compiler... /usr/bin/g++
0:04.86 checking whether the host C++ compiler can be used... yes
0:04.86 checking the host C++ compiler version... 9.3.0
0:04.89 checking the host C++ compiler works... yes

0:13.26 /home/djshah11/mozilla-unified/obj-debug-riscv64-pc-linux-gnu/dist/system_wrappers/zlib.h:3:15: fatal error
S: zlib.h: No such file or directory
0:13.26 3 | #include_next <zlib.h>
0:13.26 | ^~~~~~
0:13.26 compilation terminated.
0:13.26 make[5]: *** [/home/djshah11/mozilla-unified/config/rules.mk:675: Unified_cpp_js_src18.o] Error 1
0:13.26 make[4]: *** [/home/djshah11/mozilla-unified/config/recurse.mk:72: js/src/target-objects] Error 2
0:13.26 make[4]: *** Waiting for unfinished jobs....
0:15.71 Finished dev [optimized + debuginfo] target(s) in 2.87s
0:15.91 make[3]: *** [/home/djshah11/mozilla-unified/config/recurse.mk:34: compile] Error 2
0:15.91 make[2]: *** [/home/djshah11/mozilla-unified/config/rules.mk:358: default] Error 2
0:15.91 make[1]: *** [client.mk:65: build] Error 2
0:15.91 0 compiler warnings present.
make: *** [GNUmakefile:9: build] Error 2

```

#include_next does **not** distinguish between **<file>** and **"file"** inclusion, **nor** does it check that the **file** you specify has the same name as the current **file**. It simply looks **for** the **file** named, starting **with** the directory **in** the search path **after** the one where the current **file** was found.

The **use of** **'#include_next'** can lead **to** great confusion. We recommend it be used only **when** there **is** no other alternative. **In** particular, it should **not** be used **in** the headers belonging **to** a specific program; it should be used only **to** make global corrections along the lines **of**

```
fixincludes.
```

Fix: Add the following lines to the mozconfig

```
ac_add_options --without-system-zlib  
# add a flag -lz in CFLAGS
```

BUILDING JUST THE JS/SRC i.e. Just Spidermonkey

(Invariably building just the js/src or mozilla altogether leads us to the same result)

Prereq:

Add to ~/.bashrc

```
alias makeaway="cd /home/ninad/mozilla-unified && make && cd -"
```

CHANGED TO

```
alias makeaway="cd /home/ninad/mozilla-unified && make  
"CC=riscv64-unknown-linux-gnu-gcc"
```

Command

```
ninad@ninad-Inspiron-13-5378:~$ makeaway "CC=riscv64-unknown-linux-gnu"
```

```
Activities
Sun Sep 5 20:17:54
ninad@ninad-Inspiron-13-5378: ~
ninad@ninad-Inspiron-13-5378: ~ 158x37
bash: /opt/ros/melodic/setup.bash: No such file or directory
bash: /home/ninad/catkin_ws/devel/setup.bash: No such file or directory
bash: /opt/ros/melodic/setup.bash: No such file or directory
bash: /opt/ros/melodic/setup.bash: No such file or directory
bash: /opt/ros/melodic/setup.bash: No such file or directory
bash: /home/ninad/catkin_ws/devel/setup.bash: No such file or directory
ninad@ninad-Inspiron-13-5378:~$ makeaway "CC=riscv64-unknown-linux-gnu"
./mach build
0:00.83 Clobber not needed.
/home/ninad/mozilla-unified/obj-x86_64-pc-linux-gnu/config.status is out of date with respect to /home/ninad/mozilla-unified/obj-x86_64-pc-linux-gnu/.mozconfig.json
0:00.83 /home/ninad/.mozbuild/_virtualenvs/mach/bin/python /home/ninad/mozilla-unified/configure.py
0:01.00 Re-executing in the virtualenv
0:01.18 Adding configure options from /home/ninad/mozilla-unified/mozconfig
0:01.19 --enable-application=js
0:01.19 checking for vcs source checkout... hg
0:01.22 checking for a shell... /bin/sh
0:01.25 checking for host system type... x86_64-pc-linux-gnu
0:01.25 checking for target system type... x86_64-pc-linux-gnu
0:01.54 checking for Python 3... /home/ninad/mozilla-unified/obj-x86_64-pc-linux-gnu/_virtualenvs/common/bin/python (3.8.10)
0:01.54 checking for hg... /home/ninad/.local/bin/hg
0:01.69 checking for Mercurial version... 5.8.1
0:01.89 checking for sparse checkout... no
0:01.89 checking whether cross compiling... no
0:03.96 checking for wget... /usr/bin/wget
0:03.96 checking for ccache... not found
0:03.96 Using target sysroot in /home/ninad/.mozbuild/sysroot-x86_64-linux-gnu
0:03.96 Using host sysroot in /home/ninad/.mozbuild/sysroot-x86_64-linux-gnu
0:03.96 checking for the target C compiler... /home/ninad/.mozbuild/clang/bin/clang
0:04.00 checking whether the target C compiler can be used... yes
0:04.00 checking the target C compiler version... 12.0.1
0:04.02 checking the target C compiler works... yes
0:04.02 checking for the target C++ compiler... /home/ninad/.mozbuild/clang/bin/clang++
0:04.05 checking whether the target C++ compiler can be used... yes
0:04.05 checking the target C++ compiler version... 12.0.1
0:04.07 checking the target C++ compiler works... yes
0:04.07 checking for the host C compiler... /home/ninad/.mozbuild/clang/bin/clang
0:04.11 checking whether the host C compiler can be used... yes
0:07.22 Creating config.status
0:07.39 Reticulating splines...
0:07.53 0:00.15 File already read. Skipping: /home/ninad/mozilla-unified/build/unix/moz.build
0:07.93 Finished reading 72 moz.build files in 0.13s
0:07.93 Read 0 gyp files in parallel contributing 0.00s to total wall time
0:07.93 Processed into 351 build config descriptors in 0.08s
0:07.93 RecursiveMake backend executed in 0.28s
0:07.93 271 total backend files; 0 created; 269 unchanged; 0 deleted; 9 -> 43 Makefile
0:07.93 FasterMake backend executed in 0.04s
0:07.93 4 total backend files; 0 created; 1 updated; 3 unchanged; 0 deleted
0:07.93 Total wall time: 0.55s; CPU time: 0.51s; Efficiency: 93%; Untracked: 0.02s
Configure complete!
Be sure to run [mach build] to pick up any changes
0:08.08 Adding make options from /home/ninad/mozilla-unified/mozconfig
MOZ_OBJDIR=/home/ninad/mozilla-unified/obj-x86_64-pc-linux-gnu
OBJDIR=/home/ninad/mozilla-unified/obj-x86_64-pc-linux-gnu
FOUND_MOZCONFIG=/home/ninad/mozilla-unified/mozconfig
export FOUND_MOZCONFIG
0:08.08 /usr/bin/make -f client.mk -s
0:08.25 Elapsed: 0.00s; From dist/private: Kept 0 existing; Added/updated 0; Removed 0 files and 0 directories.
0:08.26 Elapsed: 0.00s; From dist/public: Kept 0 existing; Added/updated 0; Removed 0 files and 0 directories.
0:08.31 Elapsed: 0.07s; From dist/include: Kept 486 existing; Added/updated 0; Removed 0 files and 0 directories.
0:08.35 Elapsed: 0.00s; From dist/bin: Kept 3 existing; Added/updated 0; Removed 0 files and 0 directories.
0:08.39 Elapsed: 0.13s; From _tests: Kept 496 existing; Added/updated 30; Removed 0 files and 0 directories.
0:08.52 config
0:08.65 config/nsinstall real
0:08.81 config/external/icu/data/icu_data.o
0:08.81 js/src/rust/force-cargo-library-build
0:08.95 intl/components
0:09.25 config/external/icu/common
0:09.32 config/external/icu/i18n
0:11.42 Finished release [optimized] target(s) in 2.60s
0:25.30 js/src/debugger
0:54.39 js/src/editline
0:55.43 js/src/frontend
1:00.43 js/src/irregexp
TIER: configure pre-export export compile misc libs tools
```

SPIDERMONKEY BUILT ON x86 only

```
12:30.72 ./spidermonkey_checks.stub
12:32.34 TEST-PASS | check_spidermonkey_style.py | ok
12:32.59 TEST-PASS | check_macroassembler_style.py | ok
```

```

12:32.65 TEST-PASS | check_js_opcode.py | ok
12:32.86 0 compiler warnings present.
12:33.21 Overall system resources - Wall time: 752s; CPU: 99%; Read bytes:
85401600; Write bytes: 2388353024; Read time: 2790; Write time: 45373
12:33.21 Swap in/out (MB): 0.0/0.87109375
12:33.49 /usr/bin/notify-send --app-name=Mozilla Build System Mozilla Build
System Build complete
To view resource usage of the build, run |mach resource-usage|.
12:33.92 Your build was successful!
To take your build for a test drive, run: |mach run|
bash: cd: too many arguments

```

Terminal Dump

- Debugging meet (GMeet chat dump): <https://justpaste.it/6pmjo>
- <https://wontfix.blogspot.com/2021/07/firefox-on-linuxriscv64.html> used this ->

```

19:41.25         from /home/djshah11/mozilla-unified/js/src/jit/MIR.h:22,
19:41.26         from /home/djshah11/mozilla-unified/js/src/jit/MIR.cpp:7,
19:41.26         from Unified_cpp_js_src_jit8.cpp:2:
19:41.26 /home/djshah11/mozilla-unified/objdir/dist/include/js/Value.h: In member function 'virtual js::jit::M
Definition* js::jit::MSignExtendInt32::foldsTo(js::jit::TempAllocator&)':
19:41.26 /home/djshah11/mozilla-unified/objdir/dist/include/js/Value.h:435:47: warning: 'res' may be used unin
itialized in this function [-Wmaybe-uninitialized]
19:41.26 435 |         return fromTagAndPayload(JSVAL_TAG_INT32, uint32_t(i));
19:41.26         |                                         ^~~~~~
19:41.26 In file included from Unified_cpp_js_src_jit8.cpp:2:
19:41.26 /home/djshah11/mozilla-unified/js/src/jit/MIR.cpp:3592:13: note: 'res' was declared here
19:41.26 3592 |         int32_t res;
19:41.26         |         ^~~
19:41.58 /home/djshah11/mozilla-unified/js/src/jit/MIR.cpp: In member function 'virtual js::jit::MDefinition*
js::jit::MSignExtendInt64::foldsTo(js::jit::TempAllocator&)':
19:41.58 /home/djshah11/mozilla-unified/js/src/jit/MIR.cpp:3623:31: warning: 'res' may be used uninitialized i
n this function [-Wmaybe-uninitialized]
19:41.59 3623 |         return MConstant::NewInt64(alloc, res);
19:41.59         |                                ^~~~~~
19:43.26 In file included from /home/djshah11/mozilla-unified/js/src/jit/IonTypes.h:19,
19:43.26         from /home/djshah11/mozilla-unified/js/src/jit/IonAnalysis.h:15,
19:43.26         from /home/djshah11/mozilla-unified/js/src/jit/RangeAnalysis.h:19,
19:43.26         from /home/djshah11/mozilla-unified/js/src/jit/RangeAnalysis.cpp:7,
19:43.26         from Unified_cpp_js_src_jit9.cpp:2:
19:43.27 /home/djshah11/mozilla-unified/objdir/dist/include/js/Value.h: In member function 'virtual bool js::j
it::RSignExtendInt32::recover(JSContext*, js::jit::SnapshotIterator&) const':
19:43.27 /home/djshah11/mozilla-unified/objdir/dist/include/js/Value.h:435:47: warning: 'result' may be used u
ninitialized in this function [-Wmaybe-uninitialized]
19:43.27 435 |         return fromTagAndPayload(JSVAL_TAG_INT32, uint32_t(i));
19:43.27         |                                         ^~~~~~
19:43.27 In file included from Unified_cpp_js_src_jit9.cpp:11:
19:43.27 /home/djshah11/mozilla-unified/js/src/jit/Recover.cpp:310:11: note: 'result' was declared here
19:43.27 310 |         int32_t result;
19:43.27         |         ^~~~~
20:38.72 make[2]: *** [/home/djshah11/mozilla-unified/config/recurse.mk:34: compile] Error 2
20:38.72 make[1]: *** [/home/djshah11/mozilla-unified/config/rules.mk:358: default] Error 2
20:38.72 make: *** [client.mk:65: build] Error 2
20:38.73 0 compiler warnings present.
20:38.86 /usr/bin/notify-send --app-name=Mozilla Build System Mozilla Build System Build failed
(base) djshah11@djshah11:~/mozilla-unified$

```

Regression Tests on x86: (using mozregression)

```
4.0.10
(base) djshah11@djshah11:~/mozilla-unified$ mozregression
*****
You should use a config file. Please use the --write-config command line flag to help yo
u create one.
*****

0:00.36 INFO: No 'bad' option specified, using 2021-09-05
0:00.36 INFO: No 'good' option specified, using 2020-09-05
0:01.89 WARNING: Skipping build 2021-09-05: Unable to find build info for 2021-09-05
0:06.92 INFO: Testing good and bad builds to ensure that they are really good and bad..
.
0:06.92 INFO: Downloading build from: https://archive.mozilla.org/pub/firefox/nightly/2
020/09/2020-09-05-09-37-24-mozilla-central/firefox-82.0a1.en-US.linux-x86_64.tar.bz2
===== Downloaded 100% =====
0:27.10 INFO: Running mozilla-central build for 2020-09-05
0:35.51 INFO: Launching /tmp/tmps50zvh35/firefox/firefox
0:35.51 INFO: Application command: /tmp/tmps50zvh35/firefox/firefox -profile /tmp/tmpb_
p0xxbk.mozrunner
0:35.52 INFO: application_buildid: 20200905093724
0:35.52 INFO: application_changeset: b0507b479019c340e537363fc443b2fec7e79225
0:35.52 INFO: application_name: Firefox
0:35.52 INFO: application_repository: https://hg.mozilla.org/mozilla-central
0:35.52 INFO: application_version: 82.0a1
Was this nightly build good, bad, or broken? (type 'good', 'bad', 'skip', 'retry' or 'ex
it' and press Enter): good
0:53.67 INFO: Using local file: /tmp/tmpsp7n29h9/2021-09-04--mozilla-central--firefox-9
3.0a1.en-US.linux-x86_64.tar.bz2 (downloaded in background)
0:53.67 INFO: Running mozilla-central build for 2021-09-04
1:03.49 INFO: Launching /tmp/tmppsnylaeq/firefox/firefox
1:03.49 INFO: Application command: /tmp/tmppsnylaeq/firefox/firefox -profile /tmp/tmpf5
ya4yui.mozrunner
1:03.50 INFO: application_buildid: 20210904215148
1:03.50 INFO: application_changeset: 1546185c8149b2e5ebb3eae1bc293de0aca41632
1:03.50 INFO: application_name: Firefox
1:03.50 INFO: application_repository: https://hg.mozilla.org/mozilla-central
1:03.50 INFO: application_version: 93.0a1
Was this nightly build good, bad, or broken? (type 'good', 'bad', 'skip', 'retry' or 'ex
it' and press Enter): good
1:20.75 ERROR: Build was expected to be bad! The initial good/bad range seems incorrect
```

Errors:

1. Error in Mozilla Documentation to build Spidermonkey: [Export command](#)

```
# Enable optimizations as well so that the test suite runs much faster. If
# you are having trouble using a debugger, you should disable optimization.
ac_add_options --enable-optimize

# Use a dedicated objdir for SpiderMonkey debug builds to avoid
# conflicting with Firefox build with default configuration.
mk_add_options MOZ_OBJDIR=@TOPSRCDIR@/obj-debug-@CONFIG_GUESS@
```

To activate a particular `MOZCONFIG`, set the environment variable:

```
export MOZCONFIG=$HOME/mozconfigs/debug
```

Building

Once you have activated a `MOZCONFIG` by setting the environment variable you can then ask `mach`, located in the top directory of your checkout, to do your build:

```
$ cd <path to mozilla-central>
$ ./mach build
```

Sol - 1. Create Separate directory for debug and optimised production builds in `$HOME/mozconfigs` (directory structure)
|--- debug

```
|-- MOZCONFIG
|--- optimized
|-- MOZCONFIG
```

DEBUG - For testing local changes

OPTIMIZED - For production level testing and optimized results

2. Export the MOZBUILD variable depending on the type of build required

```
export MOZCONFIG=$HOME/mozconfigs/debug/MOZCONFIG
```

OR

```
export MOZCONFIG=$HOME/mozconfigs/optimized/MOZCONFIG
```

Baseline compiler

Summary (of our understanding):

So looking back at Spidermonkey from a historical standpoint, the main driving forces behind it were Jaegermonkey and Ionmonkey. Both of them are JITs. They work in limits sort of sense where Jaegermonkey is the soft limit and the Ionmonkey is the hard limit. Any code that becomes too much to compile for Jaegermonkey is then sent to Ionmonkey.

In a very basic sense, the Jaegermonkey JIT was used as a makeshift baseline compiler for Spidermonkey. But as it was not developed with Ion as a reference point, it is inefficient in providing a baseline for it.

Earlier Flow: Code → Interpreter → (hot) → Jaegermonkey → (hot) → Ion → (func change) → back to Interpreter

Enter baseline compiler,

- 10-100 times faster
- Using inline cache collects more information
- Midway between an interpreter and a JIT
- Optimises for higher JITs

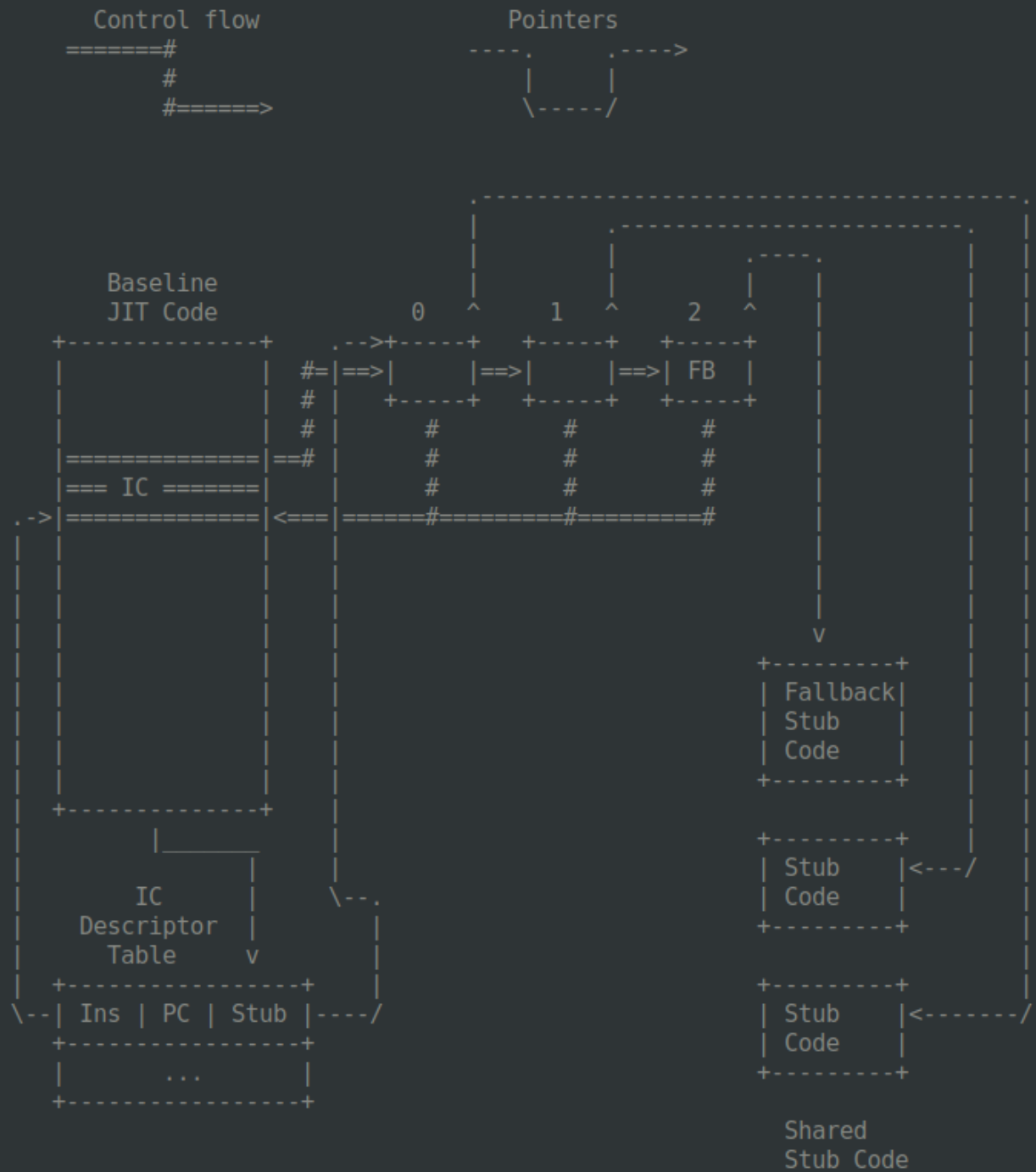
Tried studying its code from js/src/jit

Mainly,

- BaselineIC.h
- BaselineJIT.cpp

From BaselineIC.h (Control Flow)

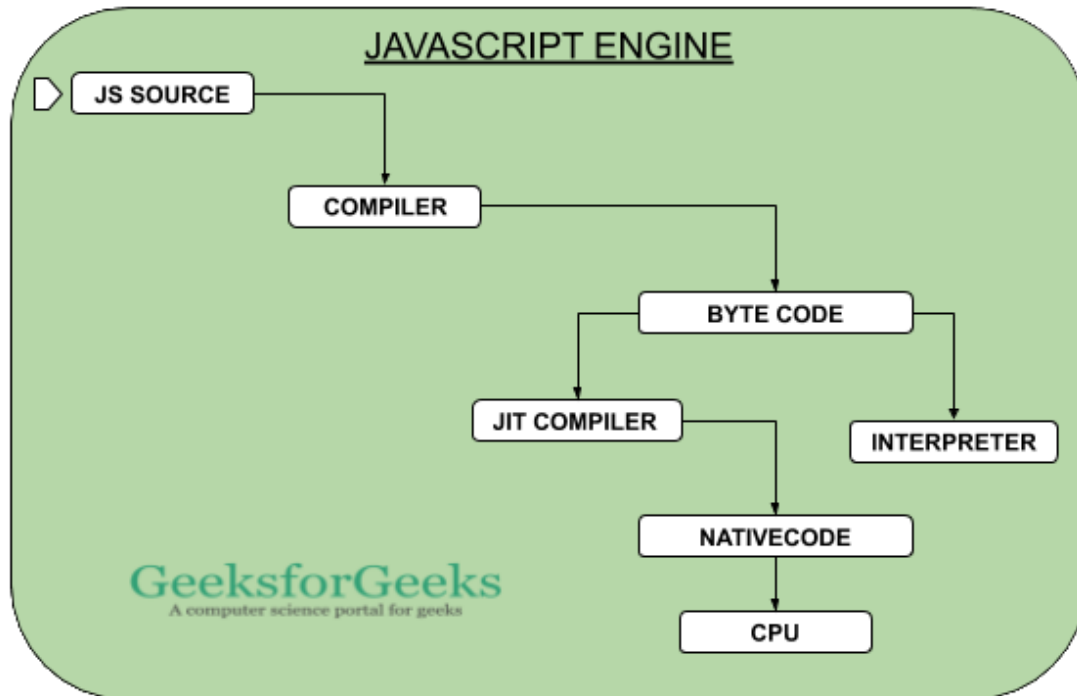
A diagram:



Week 2-3 Tasks Assignments:

- Read the Baseline Compiler Code ([Documentation](#))
- Document Document Document
- Try to Copy a CPU into new folder and build for that

BASICS OF SPIDERMONKEY



The Spider Monkey converts the main JS code into the byte code through the compiler, after that the byte code goes into two sections Interpreter and JIT Compiler.

Mozilla's SpiderMonkey Engine three things are important which are as follows:

- Interpreter: It is used as a switch statement to jump to the appropriate chunk of code for the current instruction. The JS-to-JS function call pushes a JavaScript stack frame without growing the C stack. But since JS-to-C-to-JS call stacks are common, the interpreter is re-entrant.
- IonMonkey JIT Compiler: It is mainly used for optimization of code.

JavaScript Parser:

- Spidermonkey Javascript code contains two types of data:
 1. JS::Object
 2. JS::Value (Subset of JS::Object)
- Spidermonkey uses the javascript parser to parse the code and generates bytecode..
- Instead of a simple parser which generally parses all the code at one time, it uses the technique of **syntax or lazy parsing**.
- To understand **lazy parsing**: A page code contains a lot of functions which are not all utilized or called in the program.
- Full byte code generation/compilation is not done.
- Hence unlike normal parsing, lazy parsing compiles a function only if it is referenced or called in the driver program/main code, so as to reduce loading and compilation time of a webpage.

JavaScript Interpreter:

- Bytecode generated by the Javascript Parser acts as an input to the Interpreter.
- The interpreter is written in C++.
- It handles the Garbage Compiling process(GC heap) and calls(invokes) the native functions of the host(driver) code.

JavaScript JITs:

- JIT - Just In Time
- A series of JITs are used for faster compilation and speeded execution of bytecode to generalized machine code (arm, x86, risc v)
- Although it requires more time in compiling (eliminating hot portions of code), it does give a better and faster execution speed and performance.

Baseline Interpreter:

- The Baseline Interpreter is a hybrid interpreter/JIT that interprets the bytecode one opcode(machine cycle) at a time, but attaches small fragments of code called Inline Caches (ICs) that rapidly speed-up executing the same opcode the next time (if the data is similar enough).

Baseline Compiler:

- The Baseline Compiler uses the same *Inline Caches mechanism* from the Baseline Interpreter but additionally translates the entire bytecode to native machine code.

- Other than baseline interpreters function it also performs local minor optimizations. This machine code still calls back into C++ for complex operations. The translation is very fast but the BaselineScript uses memory and requires [mprotect](#) and flushing CPU caches.

WarpMonkey:

- The WarpMonkey is a JIT and successor of the former IonMonkey engine .
- It is the highest level of optimization for the most frequently run scripts.
- We translate the bytecode and Inline Cache data into a **Mid-level Intermediate Representation** (Ion MIR) representation.
- The Intermediate Representation (IR) varies depending on the type of device architecture (x86, arm, riscv64).
- This IR is further converted into machine code depending on the machine type.
- The cache and bytecode graph is transformed and optimized before being lowered to a Low-level Intermediate Representation (Ion LIR). This LIR performs register allocation and then generates native machine code in a process called Code Generation.
- The Baseline JITs are essential to success here because they generate ICs that match observed data. If after a script is compiled with Warp, it encounters data that it is not prepared to handle it performs a bailout. The bailout mechanism reconstructs the native machine stack frame to match the layout used by the Baseline Interpreter and then branches to that interpreter as though we were running it all along. Building this stack frame may use a special side-table saved by Warp to reconstruct values that are not otherwise available.

WebAssembly:

In addition to JavaScript, the engine is also able to execute WebAssembly (WASM) sources.

WASM-Baseline (RabaldMonkey):

This engine performs fast translation to machine code in order to minimize latency to first execution.

WASM-Ion (BaldrMonkey):

This engine translates the WASM input into the same MIR form that WarpMonkey uses and uses the IonBackend to optimize. These optimizations (and in particular, the register allocation) generate very fast native machine code.

Crane Lift:

This experimental alternative to BaldrMonkey is an optimizing WASM compiler written in Rust. This is currently used on ARM64-based platforms (which do not support BaldrMonkey).

Code documentation and explanation:

BaselineJIT.cpp

Header Comments:

(<https://searchfox.org/mozilla-central/source/js/src/jit/BaselineJIT.cpp>)

```
/* -*- Mode: C++; tab-width: 8; indent-tabs-mode: nil;
c-basic-offset: 2 -*-
* vim: set ts=8 sts=2 et sw=2 tw=80:
* This Source Code Form is subject to the terms of the Mozilla
Public
* License, v. 2.0. If a copy of the MPL was not distributed with
this
* file, You can obtain one at http://mozilla.org/MPL/2.0/. */
```



I'm working on a project with all source files appended with this vim formatting rule `-- vim: et:sw=4:ts=8:sts=4:tw=80`. Is there a way to make Emacs setup the correct indentation for me automatically?

4



The indentation options of vim are described at <http://vimdoc.sourceforge.net/html/doc/options.html>.



There follows a rough description of the used options:



- `et` / `expandtabs` means to insert whitespaces instead of tabs. It should at least be similar to `(setq indent-tabs-mode nil)`
- `sw` / `shiftwidth` is the number of spaces to use for each indent
- `sts` / `softtabstop` Number of spaces that a counts for while performing editing operations, like inserting a or using . It "feels" like s are being inserted, while in fact a mix of spaces and s is used. This is useful to keep the `~ts~` setting at its standard value of 8, while being able to edit like it is set to `~sts~`.
- `tw` / `textwidth` corresponds to `fill-column` in emacs

Include Headers:

```
#include "jit/BaselineJIT.h"

#include "mozilla/BinarySearch.h"
#include "mozilla/CheckedInt.h"
```

```

#include "mozilla/DebugOnly.h"
#include "mozilla/MemoryReporting.h"

#include <algorithm>

#include "debugger/DebugAPI.h"
#include "gc/FreeOp.h"
#include "gc/PublicIterators.h"
#include "jit/AutoWritableJitCode.h"
#include "jit/BaselineCodeGen.h"
#include "jit/BaselineIC.h"
#include "jit/CalleeToken.h"
#include "jit/JitCommon.h"
#include "jit/JitRuntime.h"
#include "jit/JitSpewer.h"
#include "jit/MacroAssembler.h"
#include "js/friend/StackLimits.h" // js::AutoCheckRecursionLimit
#include "vm/Interpreter.h"
#include "vm/TraceLogging.h"

#include "debugger/DebugAPI-inl.h"
#include "gc/GC-inl.h"
#include "jit/JitScript-inl.h"
#include "vm/GeckoProfiler-inl.h"
#include "vm/JSScript-inl.h"
#include "vm/Stack-inl.h"

```

[Assertions](#) are used to handle errors owing to check of an uneventful condition causing the execution to stop at runtime on occurrence of that condition.

Errors while building RISC-V Version of jsshell

```

24:51.16 js/src/build/libjs_static.a
24:51.16 js/src/build/libmozjs-94a1.so
26:53.39 collect2: fatal error: ld terminated with signal 11 [Segmentation
fault], core dumped
26:53.39 compilation terminated.
26:53.39

```

```
/usr/lib/gcc-cross/riscv64-linux-gnu/9/../../../../riscv64-linux-gnu/bin/ld
: /usr/local/lib/libz.a(libz_a-deflate.o): relocation R_RISCV_HI20 against
`_length_code' can not be used when making a shared object; recompile with
-fPIC
26:53.40
/usr/lib/gcc-cross/riscv64-linux-gnu/9/../../../../riscv64-linux-gnu/bin/ld
: /usr/local/lib/libz.a(libz_a-inflate.o): relocation R_RISCV_HI20 against
`zcfree' can not be used when making a shared object; recompile with -fPIC
26:53.40
/usr/lib/gcc-cross/riscv64-linux-gnu/9/../../../../riscv64-linux-gnu/bin/ld
: /usr/local/lib/libz.a(libz_a-inftrees.o): relocation R_RISCV_HI20 against
`a local symbol' can not be used when making a shared object; recompile
with -fPIC
26:53.40
/usr/lib/gcc-cross/riscv64-linux-gnu/9/../../../../riscv64-linux-gnu/bin/ld
: /usr/local/lib/libz.a(libz_a-trees.o): relocation R_RISCV_HI20 against `a
local symbol' can not be used when making a shared object; recompile with
-fPIC
26:53.40
/usr/lib/gcc-cross/riscv64-linux-gnu/9/../../../../riscv64-linux-gnu/bin/ld
: /usr/local/lib/libz.a(libz_a-zutil.o): relocation R_RISCV_HI20 against `a
local symbol' can not be used when making a shared object; recompile with
-fPIC
26:53.40
/usr/lib/gcc-cross/riscv64-linux-gnu/9/../../../../riscv64-linux-gnu/bin/ld
: /usr/local/lib/libz.a(libz_a-crc32.o): relocation R_RISCV_HI20 against `a
local symbol' can not be used when making a shared object; recompile with
-fPIC
26:53.40
/usr/lib/gcc-cross/riscv64-linux-gnu/9/../../../../riscv64-linux-gnu/bin/ld
: /usr/local/lib/libz.a(libz_a-inffast.o): relocation R_RISCV_HI20 against
`a local symbol' can not be used when making a shared object; recompile
with -fPIC
26:53.40 make[4]: *** [/home/ninad/gecko-dev-riscv64/config/rules.mk:545:
libmozjs-94a1.so] Error 1
26:53.40 make[4]: *** Deleting file 'libmozjs-94a1.so'
26:53.50 make[3]: *** [/home/ninad/gecko-dev-riscv64/config/recurse.mk:72:
js/src/build/target] Error 2
26:53.50 make[2]: *** [/home/ninad/gecko-dev-riscv64/config/recurse.mk:34:
compile] Error 2
26:53.50 make[1]: *** [/home/ninad/gecko-dev-riscv64/config/rules.mk:358:
default] Error 2
26:53.50 make: *** [client.mk:54: build] Error 2
```

26:53.50 0 compiler warnings present.

Command

```
/usr/bin/riscv64-linux-gnu-g++ -std=gnu++17 -U_FORTIFY_SOURCE
-D_FORTIFY_SOURCE=2 -fstack-protector-strong -Wall -Wempty-body
-Wignored-qualifiers -Wpointer-arith -Wsign-compare -Wtype-limits
-Wunreachable-code -Wno-invalid-offsetof -Wduplicated-cond
-Wimplicit-fallthrough -Wno-error=maybe-uninitialized
-Wno-error=deprecated-declarations -Wno-error=array-bounds
-Wno-error=coverage-mismatch -Wno-error=free-nonheap-object
-Wno-multistatement-macros -Wno-error=class-memaccess
-Wno-error=deprecated-copy -Wno-error=unused-but-set-variable -Wformat
-Wformat-security -Wformat-overflow=2 -Wno-psabi -fno-sized-deallocation
-fno-aligned-new -fPIC -fPIC -fno-rtti -fno-exceptions -fno-math-errno
-pthread -pipe -g -freorder-blocks -O3 -fno-omit-frame-pointer
-funwind-tables -shared -Wl,-z,defs -Wl,-h,libmozjs-94a1.so -o
libmozjs-94a1.so
/home/ninad/gecko-dev-riscv64/obj-debug-riscv64-unknown-linux-gnu/js/src/bu
ild/libmozjs-94a1_so.list -lpthread -Wl,-z,noexecstack -Wl,-z,text
-Wl,-z,relro -Wl,-z,nocopyreloc -Wl,-Bsymbolic-functions
-Wl,--build-id=sha1 -fstack-protector-strong
-Wl,-rpath-link,/home/ninad/gecko-dev-riscv64/obj-debug-riscv64-unknown-lin
ux-gnu/dist/bin -Wl,-rpath-link,/usr/local/lib
/home/ninad/gecko-dev-riscv64/obj-debug-riscv64-unknown-linux-gnu/riscv64gc
-unknown-linux-gnu/debug/libjsrust.a -Wl,--version-script,symverscript
-lm -ldl -lz -lm -ldl
```

References:

Research Papers:

- <https://static.googleusercontent.com/media/research.google.com/en//pubs/archive/43216.pdf>

Links:

BASICS and OVERVIEW:

- Required skills and possible Firefox Contributions: https://firefox-source-docs.mozilla.org/contributing/contributing_to_mozilla.html
- Mozilla Documentation: <https://firefox-source-docs.mozilla.org/js/index.html>
- Work on v8 engine: <https://www.youtube.com/watch?v=j-KvrPhXA5Q&t=204s>
- Building Firefox: https://wiki.mozilla.org/Building_Firefox/SURE

SPIDERMONKEY:

- **Source code repo for Spidermonkey:** <https://hg.mozilla.org/mozilla-central>
- **Spidermonkey Documentation:** <https://spidermonkey.dev/docs/>
<https://searchfox.org/mozilla-central/source/js/src/jit/>
- **Spidermonkey Garbage Collector:**
<https://firefox-source-docs.mozilla.org/js/gc.html>
- Building reference:
https://wiki.mozilla.org/JavaScript:New_to_SpiderMonkey#Build_the_js_shell
- Benchmarks:
https://wiki.mozilla.org/JavaScript:New_to_SpiderMonkey#Benchmark_your_changes
- Octane: <https://svn.webkit.org/repository/webkit/trunk/PerformanceTests/Octane/>
- Kraken: <https://wiki.mozilla.org/Kraken>
- SunSpider: <https://webkit.org/perf/sunspider/sunspider.html>
<https://svn.webkit.org/repository/webkit/trunk/PerformanceTests/SunSpider/>

Regressions: (mozregression)

- **Mozregression:** <https://mozilla.github.io/mozregression/>

RISC-V:

- **RISC-V:** <https://twilco.github.io/riscv-from-scratch/2019/03/10/riscv-from-scratch-1.html>
<https://saveriomiroddi.github.io/Quick-riscv-cross-compilation-and-emulation/>
<https://wiki.debian.org/RISC-V>
- **RISC-V SiFive:** <https://www.sifive.com/boards>

Baseline JIT:

- **A crash course on JIT compilers: Series of articles**
<https://hacks.mozilla.org/2017/02/a-crash-course-in-just-in-time-jit-compilers/>
- **Mozilla Developer Guides:**
<https://youtube.com/playlist?list=PLo3w8EB99pqJVPhmYbYdInBvAGarDavh->
- BaselineJIT.h: <https://searchfox.org/mozilla-central/source/js/src/jit/BaselineJIT.h>
- BaselineJIT.cpp: <https://searchfox.org/mozilla-central/source/js/src/jit/BaselineJIT.cpp>

QEMU:

- **QEMU** : <https://www.qemu.org/download/>
<https://colatkinson.site/linux/riscv/2021/01/27/riscv-qemu/>
<https://youtu.be/AAfFewePE7c>
- QEMU and RISC-V toolchain setup:
<https://twilco.github.io/riscv-from-scratch/2019/03/10/riscv-from-scratch-1.html>
<https://saveriomiroddi.github.io/Quick-riscv-cross-compilation-and-emulation/>
<https://risc-v-getting-started-guide.readthedocs.io/en/latest/linux-qemu.html>

MOZCONFIGS:

- <https://gist.github.com/EricRahm/23d8f486f7d8bc6369a7d240df7ce572>
- <https://wiki.ubuntu.com/CompileFirefoxNewVersion>
- <https://wontfix.blogspot.com/2021/07/firefox-on-linuxriscv64.html>

Cross compiled Spidermonkey on riscv64:

- [1] <https://github.com/makotokato>
- [2] <https://wontfix.blogspot.com/2021/07/firefox-on-linuxriscv64.html>
- [3] <https://github.com/felixonmars/archriscv-packages/pull/139>
- [4] <https://twitter.com/felixonmars/status/1442140779955191812>

Zlib:

- <http://www.zlib.net/>
- <http://webcache.googleusercontent.com/search?q=cache:S8HLazolv7kJ:mozilla.6506.n7.nabble.com/NSS-and-NSPR-compilation-error-ssl3con-c-36-18-fatal-error-zlib-h-No-suc-h-file-td359855.html+&cd=20&hl=en&ct=clnk&gl=in&client=ubuntu>
- https://bugzilla.mozilla.org/show_bug.cgi?id=763651
- <https://bugzilla.mozilla.org/attachment.cgi?id=673561&action=diff>
- <https://doc.dpdk.org/guides/compressdevs/zlib.html>

Baseline Compiler and Interpreter:

- **Baseline Interpreter:**
<https://hacks.mozilla.org/2019/08/the-baseline-interpreter-a-faster-js-interpreter-in-firefox-70/>

WebAssembly:

- Web Assembly, Implementation: <https://webassembly.org/>
<https://webassembly.org/docs/faq/#will-webassembly-support-view-source-on-the-web>
- ECMAScript: <https://tc39.es/ecma262/>
- Web Assembly(WASM) vs asm.js: (Web Assembly is generic n faster than asm.js)
<https://hacks.mozilla.org/2017/03/why-webassembly-is-faster-than-asm-js/>
- **1- A Cartoon Intro to Web Assembly:**
<https://hacks.mozilla.org/2017/02/a-cartoon-intro-to-webassembly/>

Miscellaneous:

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<https://google.github.io/iree/building-from-source/riscv/>

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<https://colatkinson.site/linux/riscv/2021/01/27/riscv-gemu/>

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https://passlab.github.io/CSCE513/notes/lecture04_RISCV_ISA.pdf

MIPS64:

<http://homepage.divms.uiowa.edu/~ghosh/1-28-10.pdf>

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