Collabora Productivity

Online: Unit Testing

Michael Meeks

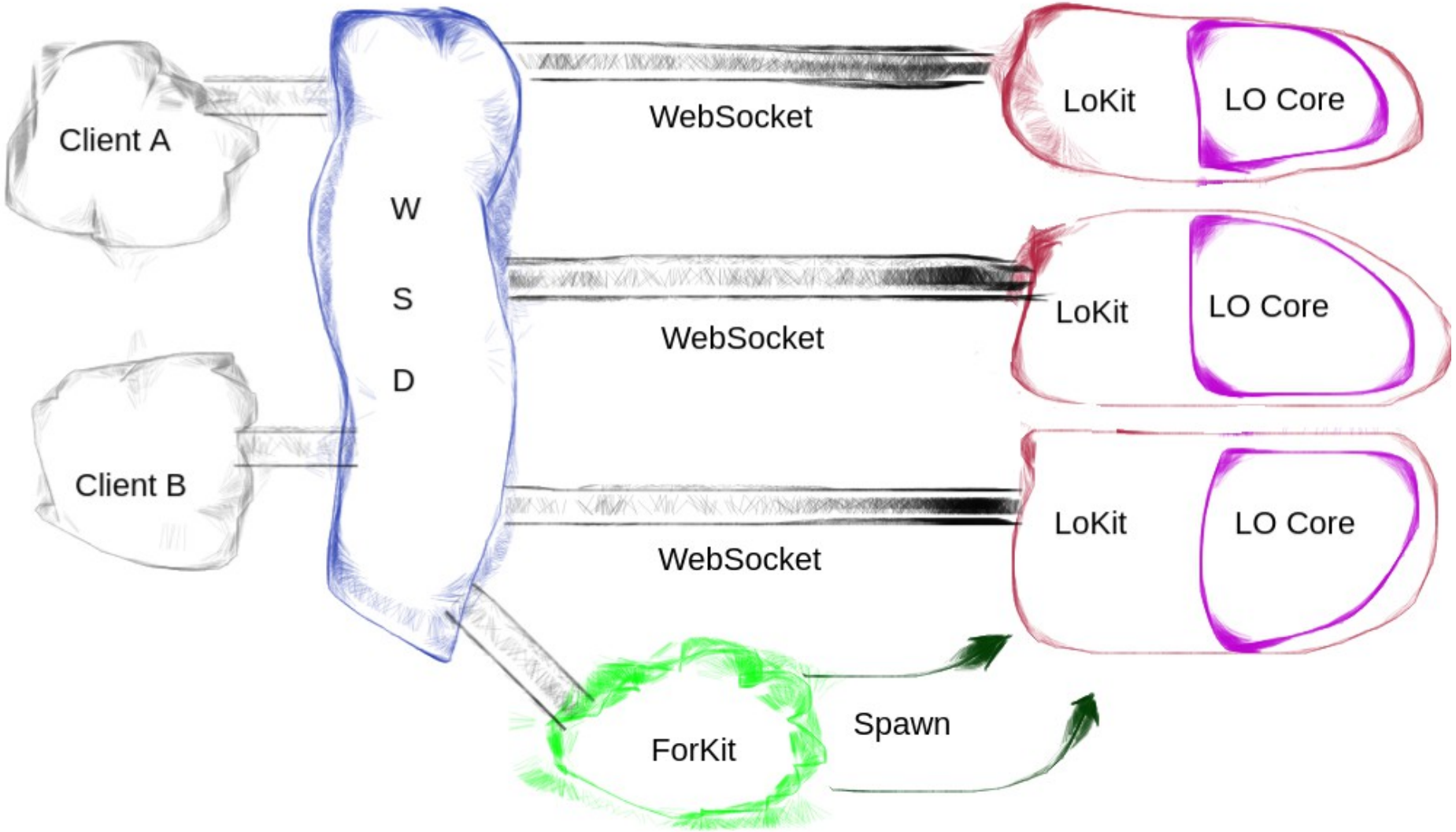
<michael.meeks@collabora.com>

mmeeks / irc.freenode.net

@mmeeks +mejmeeks

"In his great mercy he has given us new birth into a living hope through the resurrection of Jesus Christ from the dead" - 1 Peter 1:3

First - Terms & Architecture



Online: Unit Testing & Quality

Vital

- Allows us to create complexity & maintain it.
- Gives us confidence in our source releases

Hard

- Networking setup / latency etc. is tough.
- Code is split between processes – WSD, Forkit, Kit – with different permissions & capabilities
- Code is split between modules & abstracted behind LibreOfficeKit API

Harder: browsers

- Who wrote the front-end in Javascript ?
- Browsers are quirky & different …
- Visual / inspection of pixels is a horror …

But: easier → Linux Only !

What tests do we have ?

During Build – low dependency bits.

- TileCacheTests & WhiteBoxTests
  - Queue & preview priorities, tile combining, invalocation / page size pieces
  - Tokenizer, Regex matcher, Rectangle intersecter

New style

- Preforking, OAuth interactions, TileCache tweaks, Fuzzing plugin.
- Plus - the old-style tests (wrapped in a new-style test)

Old style

- Everything else:
  - Kit crash & recovery, Failed document load, Bad requests
  - load torture testing, save on disconnection(s), text selection
  - Copy/paste, password protection, slideshow, calc row/column
  - Graphic Selection, User Alerts, Repair-Document / Undo Conflicts ...

In-Browser - bit-rotted

- loleaflet/spec – runLoadTest.sh & other leaflet tests ...

Old vs. New comparison

	Old Style	New Style
Concurrency	Test + WSD + Kit* Multi-thread	WSD + Kit*, Multi-thread
Debug-ability	Multi-process	Single Process
Logging	Multiple log streams	Console output
Performance	Lots of sleeps	Zero sleeps
Transparency	Acts like a normal client	Code injection & hooks everywhere
Reliability	Opaque failures if WSD / test owns ports 9984 &9985 Has to have SSL enabled	No dedicated ports required; Theoretically parallelizable; Certain of code run
Framework	CPPUNIT	Custom

Unit Testing tips.

- Ensure that SSL is enabled (for old-style)
- configure with –enable-debug – or some tests fail.
- Before running make check:

  $ sudo pkill -9 -f lool # dung out existing wsd / kits.
- Worth checking disk-space too: we warn and fail early.
- forkit has capabilites (cf. Root)
  - While these are dropped – you still can't attach

  $sudo gdb # is your friend
- sudo strace – but first patch:

  - if (geteuid() == 0)
  - throw std::runtime_error("Do not run as root …"
- #define KIT_IN_PROCESS - Collapses whole architecture to one process.
- trace[@enable] and tools/Replay, tools/Stress …

How New tests work

The flow

- test/Makefile.am

  unit_prefork_la_SOURCES = UnitPrefork.cpp

  TESTS = unit-prefork.la ...

  - Add your test to TESTS

  $ make check

  - Watch the test fail: this is good ...
- test/run_unit.sh –test-name *unit-prefork.la*
  - generated from run_unit.sh.in by configure / config.status
  - runs tests & logs to stderr
- test/run_unit.sh --help

Writing your test

Bare bones of a new unit-test:

- Magic entry point:

```
UnitBase *unit_create_wsd(void) // Called in WSD
{
    return new UnitFuzz();
}
UnitBase *unit_create_kit(void) // Called in Kit
{
    return new UnitKitFuzz();
}
```

- Sub-class common/Unit.hpp
  - UnitWSD & UnitKit
- Sample hooks – easy to add more:

```
/// Main-loop reached, time for testing
virtual void invokeTest() {}
/// When admin notify message is sent
virtual void onAdminNotifyMessage(const std::string& /* message */)
…
exitTest(TestResult::OK | Failed | TimedOut); ...
```

Bare bones of a probe ...

- Add it to Unit.hpp – UnitBase / UnitWSD / UnitKit
  - Filter pattern allows us to inject changes to the control flow:

```
/// Trap and filter alerting all users
virtual bool filterAlertAllusers(const std::string & /* msg */)
{
    return false;
}
```

- Invoke the filter and act on its output where you like:

```
void DocumentBroker::alertAllUsers(const std::string& msg)
{
    if (UnitWSD::get().filterAlertAllusers(msg))
        return;
```

WSD: What hooks do we have ?

I/O bits:

handleHttpRequest(const Poco::Net::HTTPRequest&req,

std::shared_ptr<StreamSocket>&socket)

- Filter any incoming HTTP request

filterHandleRequest(TestRequest type (Prisoner or Client),

SocketDisposition &disposition, WebSocketHandler &handler)

- Allow filtering of raw WebSocket protocol inputs

filterSessionInput(Session *, const char *buffer, length, std::unique_ptr< std::vector<char> > &replace)

- Filter or mutate parsed data from the WebSocket

Misc / Warnings

- **filterCheckDiskSpace**, **filterAlertAllUsers**
- **configure** → allow clobbering any configuration items
- **onChildConnected**

TileCache → onTileCacheHit / Miss / Subscribe

What other hooks do we have ?

Admin

- **onAdminNotifyMessage / onAdminQueryMessage**
  - Filter / test incoming / outgoing Admin Console traffic.

Kit bits

- FilterKitMessage – allows hooking Kit specific messages via old LOOLWebSocket
- launchedKit – hook just after we fork to initialize the child.

ForKit

- InvokeForKitTest – run only in the forkit process
- launchedKit(int pid) – when we've launched a kit

Summary

- Unit testing is vital
- You should write tests
- There are several ways to do it
- Use the ‘new’ way if you can
  - Add probes / instrumentation to the code as you go to test.
  - More (reliable) automated tests are always appreciated
- Poke me – if you need help writing a test.

Oh, that my words were recorded, that they were written on a scroll, that they were inscribed with an iron tool on lead, or engraved in rock for ever! I know that my Redeemer lives, and that in the end he will stand upon the earth. And though this body has been destroyed yet in my flesh I will see God, I myself will see him, with my own eyes - I and not another. How my heart yearns within me. - Job 19: 23-27