ABI Compatible Performance Improvement in the Chronokernel

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Purpose

This series of experiments set out to see if applications could realize the potential of the Chronokernel without the need to modify their existing code.

Conclusion

Shortcutted applications were able to realize their benefits on a local scale however networked applications saw less consistent results and are in need of more experimentation.

Background Information

Chronokernel:
An experimental kernel designed by Tommy Unger that allows threads to dynamically "elevate" and "lower" to and from Supervisor to User Mode during execution.
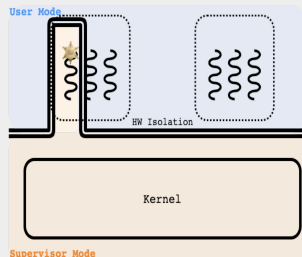
Methods

Local Experiments

- Compile `test.c` with `gcc`
- Run `perf stat -sh -c "$TEST_OPTIONS" > OUTPUT_FILE`
- Graph with `ABI_compatibility_graphs.ipynb`

Network Experiments

- Start network application server on target machine
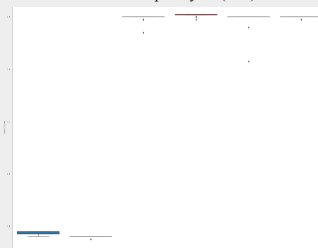- Stress server with `memcached`
- Graph with `latency-graphs.ipynb`

Experimental Results

Local Experiments

CPU power comparison (Joules)

Instructions per Cycle (IPC)

Network Experiments

Note: Local experimentation graphs show, from left to right, dynamically linked unchanged, statically linked unchanged, dynamically linked edited, statically linked edited, interposed with shortcut tool, and interposed without shortcut tool

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