Tian Gao

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Experience

Microsoft, Remote 2022/01 - Present

Senior Software Development Engineer

- Worked on Win32 app isolation as the tech lead, to provide an isolation platform for Win32 apps with appcontainer. Developed the Windows kernel driver as a broker between application and the file system for access control in C.
- Designed the mechanism to keep track of all the files that the user has given access to in memory, enabling the detection of real deletions (when file is not recreated within a short period) for file access cleanup.
- Implemented the opt-in prompt capability for app developers to restrict their apps from prompting for access and the capability to allow apps to access directory without explicit consent if the directory name ends with the publisher id.
- Built the testing framework for devs to create tests with a few lines. Set up a public github repo for docs and feedback.
- Designed the strategy to drive the product from preview to GA, communicated with PM and junior devs of the path.

Green Hills Software, Santa Barbara, CA 2014/02 - 2022/01

Software/Hardware Development Engineer

- Built data pipeline of kernel log prototype that records events in INTEGRITY/u-velosity kernel with STM/ITM on ARM boards, which utilized the CoreSight component to avoid complicated logics in the kernel to save CPU time.
- Developed the GPIO software interface of Green Hills Probe v4. Enabled users to control the GPIOs via telnet prompt or C/Python libraries. Finished with an automated functional test.
- Developed an eye-finder program on SuperTrace Probe to find the correct phase to read trace data, utilizing the FPGA power and the ARM board feature reduced the time to screen the phases from 60+ seconds to 1 to 2 seconds.
- Implemented the program on Green Hills Probe's firmware to support on-chip CoreSight timestamps so the debug information can be timestamped by either Green Hills Probe or on-chip CoreSight timestamp.

CPython 2023/03 - Present

Core Developer

- Contributed > 130 PRs to CPython in areas like tracing, profiling and debugging; served as the maintainer of pdb.
- Implemented PEP 667, which provided a consistent view of namespaces and a write-through mechanism for locals.
- Developed the convenience variable feature in pdb which allows users to create globally accessible temp variables.
- Polished display and alias, added support for multi-line mode and fixed expressions with conflict commands in pdb.
- Re-designed the mechanism for opcode tracing support for sys.settrace with the new sys.monitoring backend.

VizTracer (4.7k+ stars) 2020/08 - Present

Project Owner

- Built an open-source Python debugging, profiling and logging tool that can trace and visualize Python programs.
- Developed core function stack logging mechanics in C to achieve low overhead comparable to cProfile
- Supported multi-thread, multi-process and async syntax by monkey patching the built-in libraries.
- Added optional filters for users to filter out information they are not interested in, based on file name, stack depth, etc.
- Enabled extra info logging like function arguments, garbage collection, or arbitrary variables without source change.
- Displayed the trace in customized Perfetto with source code and supported both command line and VSCode.

watchpoints (400+ stars) - a Python debugging tool that can monitor variable/object changes and trigger a callback

objprint (400+ stars) - a light Python library that prints Python object in human readable format

BiliScope (500+ stars) - a Chrome extension to display detailed info of uploaders and videos on bilibili.com

Education

Cornell University, Ithaca, NY, *M.Eng in Electrical and Computer Engineering* 2012/08 - 2013/12

Tsinghua University, Beijing, China, *Bachelor's in Microelectronics* 2008/08 - 2012/07

Skills

C, C++, Python, HTML/CSS, JavaScript, VHDL, Git, WinDbg, GDB