

STRUCTURED OUTPUT
ORG:STRACE

MARCH 24th 2016

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TITLE: Structured output from Strace Parser

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ABSTRACT :

I propose to establish/develop a new option for a structured output in JSON or similar parsers used to parse the Strace's output. It is difficult to parse the output that we get from Strace thus JSON provides a well structured output (which is better than the classical). My goal is to make a new feature or try to establish an interface/interconnection to strace that could support the output from JSON to be used readily. By doing so,I would be able to help trace users write less error prone code and make strace easier to adopt.In my method. I will refactor the currently output-related code in strace and then try to develop a interface/feature that could ensure the handling of the output from JSON to be in alignment with the Strace.

SYNOPSIS:

Strace is a diagnostic, debugging and instructional userspace utility for Linux. It is used to monitor interactions between processes and the Linux kernel, which include system calls, signal deliveries, and changes of process state.

I would recommend to work on the STRUCTURED OUTPUT project under the guidance of Philippe Ombredanne.I am proficient in C,C++,Java and have started with Python as well.Apart from knowledge of UI design(Front and Back end),I have experience of working with the Linux systems.I am undertaking a subject of System and Programming lab that adds on to my advantage of working on this project.I have been working on various projects at college level and I am confident to provide a valuable contribution to this project as well.I got to know about Strace when I was studying debugging.

I was fascinated by the working of the Strace and I am extremely interested to work on this project.

I propose to develop an interface/feature for the structured output in JSON to be readily used through Strace so that trace users write less error prone code and make strace easier to adopt. My approach would be to refactor the output code in strace (for example- I would work on this type of

output: <https://aboutthebird.wordpress.com/2013/03/02/interpreting-the-output-of-strace-line-by-line/>) and then develop the feature that supports the output from JSON (refer: <http://json.org/example.html>) or similar parsers being supported by Strace.

For this purpose, I referred these Links:

1. <http://msgpack.org/>
2. <https://sourceforge.net/p/strace/mailman/message/32128252/>

To understand the working of Strace and JSON I have referred these links:

1. <http://www.aboutlinux.info/2006/05/strace-very-powerful-troubleshooting.html>
2. <https://blog.cpanel.com/starting-with-strace/>
3. <http://stackoverflow.com/questions/6334515/how-do-i-interpret-strace-output>
4. <http://json.org/example.html>

For the time being I have started reading the previous code from:

<http://www.google-melange.com/gsoc/project/details/google/gsoc2014/zym0017d/5676830073815040>

Code Sample:

I do not have working (advance) knowledge of Strace and JSON but I have started practising,

For these samples, I referred the internet and implemented them on my system.

1. Trace the Execution of an Executable

a. `$ strace ls`

```
execve("/bin/ls", ["ls"], [/* 21 vars */]) = 0
```

```
brk(0) = 0x8c31000
```

```
access("/etc/ld.so.nohwcap", F_OK) = -1 ENOENT (No such file or directory)
```

```
mmap2(NULL, 8192, PROT_READ, MAP_PRIVATE|MAP_ANONYMOUS, -1, 0) = 0xb78c7000
```

```
access("/etc/ld.so.preload", R_OK)    = -1 ENOENT (No such file or
directory)

open("/etc/ld.so.cache", O_RDONLY)    = 3

fstat64(3, {st_mode=S_IFREG|0644, st_size=65354, ...}) =
```

This

2. Saving the Strace O/P to a file:

a. `$ strace -o output.txt ls`

```
$ cat output.txt
```

```
execve("/bin/ls", ["ls"], [/ * 37 vars */]) = 0
```

```
brk(0)                                = 0x8637000
```

```
access("/etc/ld.so.nohwcap", F_OK)    = -1 ENOENT (No such file or
directory)
```

```
mmap2(NULL, 8192, PROT_READ, MAP_PRIVATE|MAP_ANONYMOUS, -1, 0) =
0xb7860000
```

```
access("/etc/ld.so.preload", R_OK)    = -1 ENOENT (No such file or
directory)
```

```
open("/etc/ld.so.cache", O_RDONLY)    = 3
```

```
fstat64(3, {st_mode=S_IFREG|0644, st_size=67188, ...}) = 0
```

3, Execute Strace

a. `$ ps -C Mohit-bin`

```
PID TTY      TIME CMD
1225 ?        00:16:50 Mohit-bin
```

Also, to display Strace o/p

```
$ sudo strace -p 1725 -o Mohit_1.txt
```

For the JSON O/P

1. Output from JSON

```
a .    {"menu": {
        "id": "file",
```

```

        "value": "File",
        "popup": {
            "menuitem": [
                {"value": "New", "onclick": "CreateNewDoc()"},
                {"value": "Open", "onclick": "OpenDoc()"},
                {"value": "Close", "onclick": "CloseDoc()"}
            ]
        }
    }
}

```

2. Expressed as XML content

```

a. <menu id="file" value="File">
    <popup>
        <menuitem value="New" onclick="CreateNewDoc()" />
        <menuitem value="Open" onclick="OpenDoc()" />
        <menuitem value="Close" onclick="CloseDoc()" />
    </popup>
</menu>

```

More to this is on this link; <http://permalink.gmane.org/gmane.comp.sysutils.strace.devel/3911>

I have started understanding the code of Strace and JSON but require some time to implement it for this project. I will achieve the working knowledge uptill community bonding period or uptill the developmental work starts.

The Project:

Strace lists all system calls done by the process it's applied to. When strace is run in conjunction with a program, it outputs all the calls made to the kernel by the program.

Road Map:

For Project Development, following steps would be followed:

1. **Review:** On acceptance of the proposal for the project I would review the code provided by the Mentor and try to analyse and familiarize with the Data elements being used in the code. **(May 23rd - May 30th 2016)**
2. **Refactor:** After reviewing the code, I will use my skillset for refactoring the code. Thus making the code more efficient and effective in terms of complexity as much as possible. The refactored code would then be depicting the output from Strace in a less complex manner. **(June 2016)**

- 3. Develop:** Parallel to refactoring the code I would deduce(**June 20th-June 27th**) and implement a methodology (**June 28th-July10th**) for making the necessary changes to the code so that the Structured output from JSON and Strace align at one place. The development of the feature that could make the interaction of JSON output and Strace easier. (**June 20th - July 15th 2016**)

Design Strategy:

I would be analysing both the output from JSON and Strace to see if any similarity occurs in between. Developing a bridge tool between the two would help me achieve my goal for this project. I would save the output from the Strace into another file using (`strace -o echo1.txt`) command that could write the output in the echo.txt file then I would try to establish a connection of parsing this output file with that of the JSON/similar parser output files. If I will be able to get a relation it would help me developing the Bridge tool/feature which will solve the problem for this project. I will consistently share the updates with the Mentor. Consistently sharing my changes with the **Mentor** would allow me to keep a check on the changes been done and changes yet to be made.

This approach is advantageous as it would furthermore result in refactoring the existing version of the code and making it more efficient and bug free. Also the interrelation between the JSON output and the Strace's Output would help in deducing a methodology to develop a supporting feature for the project.

- 4. Debug:** This phase would include debugging the developed code so far and then eliminating the presence of any bug in the code. It would require communication with the Mentor(**11th -12th July**) and then implementing the necessary changes so that the **bugs encountered** can easily be debugged. (**15th July-20th July**)

- 5. Reconcile:** On achieving the goal of the Project I would Reconcile the work and provide the Mentor with all possible updates and features of the development with the documentation that enlists the changes been made to the original code and all the capabilities and restrictions of the new feature developed. (**Last week of July- August 2016**)

Conclusion:

When the Project would achieve the goals it would be suitable for implementation to the system. The **feature/bridge tool** developed that could act as solution for the output from JSON to be aligned with Strace so that the users can adopt to the use of Strace more often would work optimally.

Commitments:

Do you have any other commitments during the main GSoC time period, May 23rd to August 23rd?

->I would have few examinations from 1st June uptill 10th June 2016 but I propose to work on daily basis.After 10th June I commit to work with complete determination solely for the project without any interruption.I would require the help of Mentor every now and then and promise to complete my work ethically and following the guidelines for the Project.

Link to resume:

<https://drive.google.com/file/d/0B7RrMabDB-4FU3VURDBMUlprU3M/view?usp=sharing>

University info:

- University Name: JAYPEE INSTITUTE OF INFORMATION TECHNOLOGY
- Major:COMPUTER SCIENCE ENGINEERING
- Current Year and Expected Graduation date: 3rd YEAR & 31-06-2017
- Degree (e.g. BSc, PhD):B.Tech