Adding XDP support to Open Nic Driver

Alexandru Gabriel Bradatan, Marco Molè

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Contents

1 Project data

- Project supervisor(s): Gianni Antichi & Sebastiano Miano

- Describe in this table the group that is delivering this project:

Last and first name	Person code	Email address
Alexandru Gabriel Bradatan	0101010	alexandrugabriel.bradatan@mail.polimi.it
Marco Molè	10676087	marco.mole@mail.polimi.it

- Describe here how development tasks have been subdivided among members of the group, e.g.:

  - Most of the code was written in pair programming sessions.
    * We found the pair programming approach really useful to delve into the XDP API, which is documented a bit poorly.
  - Bradatan worked on a eBPF testing suite that was not deemed necessary at the end.

- Links to the project source code: `https://github.com/marcomole00/open-nic-driver/tree/xdp-support`
Note: our work is in the **xdp-support** branch

2 Project description

2.1 Project goals

The goal of this project is to implement the *eXpress Data Path* (XDP) for the driver of the **AMD OpenNIC project**.

XDP is a high-performance data path for network packets present in the Linux kernel since version 4.8. It enables users to install packet processing programs in the kernel before the invocation of the standard network stack.

These programs are written and executed in eBPF which is a language/runtime for extending operating systems.

2.2 Importance to the AOS course

This project is relevant to the Advanced Operating System course because it involves extending the functionality of a Linux driver, which is an argument of the course.

2.3 Design and implementation

3 Project outcomes

3.1 Concrete outcomes

Describe the artifacts you've produced, if possible by linking to repo commits. For those who choose to work on an open source project, please put here the **URL to your final pull request**.

Those that have chosen to present a paper can include a link to the slides.

3.2 Learning outcomes

What was the most important thing all the members have learned while developing this part of the project, what questions remained unanswered, how you will use what you've learned in your everyday life? Please also indicate which tools you learned to use.

Examples:

- Foo learned to write multithreaded applications, he's probably going to create his own startup with what she has learned. She also learned how to debug with gdb.

- Bar learned how to interact with the open source community, politely answering to code reviews and issuing pull requests through Git.

3.3 Existing knowledge

What courses you have followed (not only AOS) did help you in doing this project and why? Do you have any suggestions on improving the AOS course with topics that would have made it easier for you?

3.4 Problems encountered

What were the most important problems and issues you encountered? Did you ever encountered them before?

- Foo encountered a problem with some critical sections. He ended up rewriting existing lock implementation.

4 Honor Pledge

(**This part cannot be modified and it is mandatory to sign it**)

I/We pledge that this work was fully and wholly completed within the criteria established for academic integrity by Politecnico di Milano (Code of Ethics and Conduct) and represents my/our original production, unless otherwise cited.

I/We also understand that this project, if successfully graded, will fulfill part B requirement of the Advanced Operating System course and that it will be considered valid up until the AOS exam of Sept. 2022.

Group Students' signatures