Example workloads for networking applications

Pravin Shinde

Contents

Chapter 1

Plan

This chapter will record current plan and future direction.

1.1 What we need

We need a system which can answer following question:

Question Given current status of NIC, what this card can do (for new flow)?

Answer Possible answer to this question can be

- (validatePacket and filterPacket and DMAPacket and notifyCore)
- OR (validatePacket and DMAPacket and notifyCore)
- OR (DMAPacket and notifyCore)
- OR (DMAPacket)

1.2 What we have

Question we currently answer:

Question Given a packet and configuration, what what will happen to the packet?

Answer For given packet, following information is computed:

- Validity of the packet
- Destination queue
- Core to be notified

1.3 Problems

- I am not sure if I am modeling the system. It seems more like modeling particular behavior.

- I don't know how to reach from **What we have** to **What we want**.

1.4 Ideas

This section will describe some ideas that I am toying with.

1.4.1 Using contracts

Idea inspired from *Composing contracts: an adventure in financial engineering* [1].

1.4.2 Summary

Financial contracts will be assembled by connecting different basic combinators. System provides set of basic combinators and operations to combine them. System also understands how to valuate basic combinators and how to analyze the combinators which are assembled using defined operations. This system needs following things to be defined:

- Basic blocks (combinators)

- Operations on basic blocks

- Valuation of basic blocks

- Valuation of operations

1.4.3 Applying to Network stack

We can view the network stack as **contract between NIC and network stack** and **contract between network stack and application**

- What will be the basic blocks?

- What operations will be needed? (and, or, ...)

- How to put valuation on them? (latency, throughput, memory, CPU-time)

Basic blocks

- ValidatePacket
- FilterPacket
- DMAPacket
- NotifiyCore
- CopyToApplication
- NotifyApplication
- ...

Bibliography

[1] PEYTON JONES, S. Composing contracts: an adventure in financial engineering. In *Proceedings of the International Symposium of Formal Methods Europe on Formal Methods for Increasing Software Productivity* (2001), Springer-Verlag, p. 435.