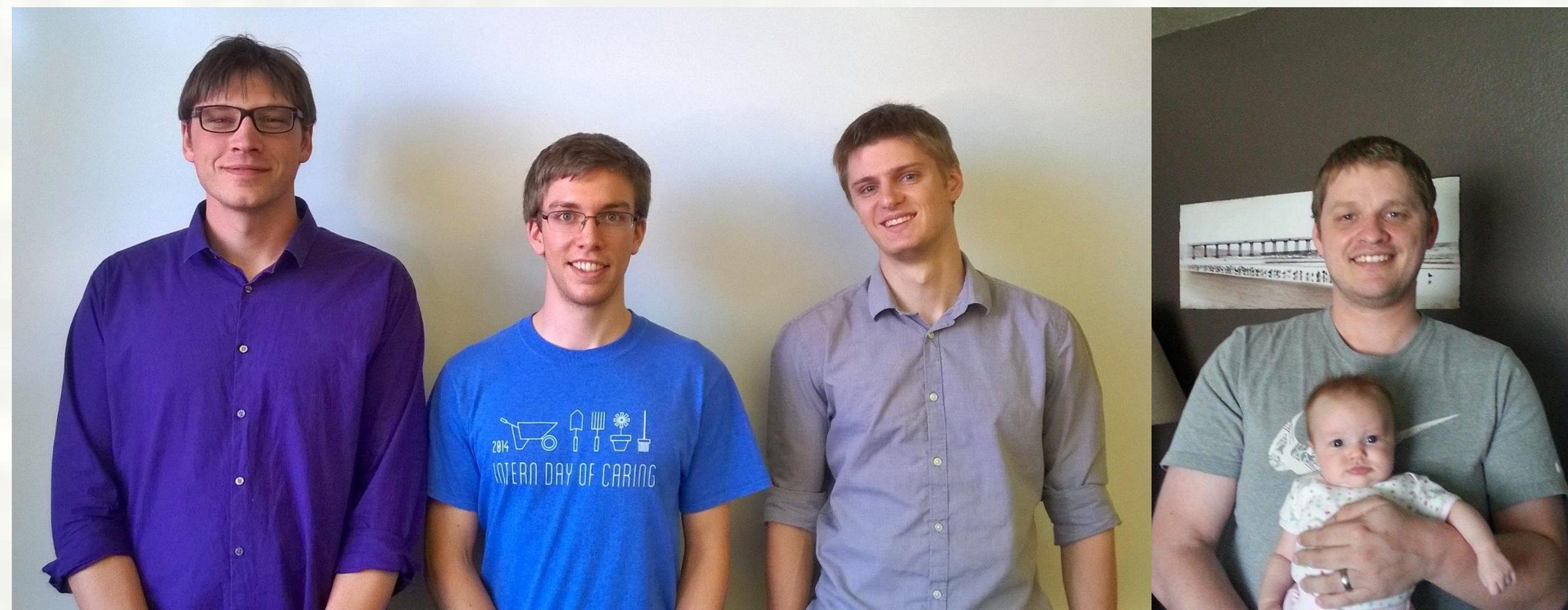


Microsoft Hyper-V Ethtool Support



The Project

This project was sponsored by the Microsoft Linux Integration Services team. Our goal was to support configuration of virtual Receive Side Scaling (vRSS) for system administrators through the Linux command-line tool, ethtool.



Background

Hypervisor - Host-based software providing support for virtualization of virtual machines (VMs).
Hyper-V - Microsoft's bare-metal hypervisor.
Virtualization - A software abstraction of a computer that enables a host machine to run multiple VMs.
Ethtool - The Linux command-line tool for modifying network interface card settings.
Operating System (OS) - The software that manages computer hardware and software resources.
Linux - The ubiquitous open source OS.
Kernel - The core part of the OS that interfaces the hardware with the user's software.
Virtual Machine (VM) - A guest machine with its own OS running on the host's hypervisor.
Linux Integration Services (LIS) - Microsoft's kernel drivers enabling support of Linux VMs on Hyper-V.
Virtual Receive Side Scaling (vRSS) - Microsoft's technology for parallel processing of VM's network traffic.

Problem Statement

A Linux virtual machine running on Hyper-V has a set of drivers (LIS) for its virtual hardware. We are concerned with the Linux kernel driver hv_netvsc, the virtual driver for the machine's network card. Supporting ethtool means patching the driver with callback functions for each ethtool command, in particular "show-channels" and "set-channels" for vRSS.

Our Work

We wrote two patches for the Linux kernel:
 The first implements retrieving the number of vRSS queues on the guest, and the maximum allowed on the host. *(99 lines)*
 The second implements setting the number of vRSS queues on the guest between a single queue and a queue for each virtual processor. *(266 lines)*

Show Channels

```
$ ethtool --show-channels eth0
Channel parameters for eth0:
Pre-set maximums:
RX:                0
TX:                0
Other:             0
Combined:          64
Current hardware settings:
RX:                0
TX:                0
Other:             0
Combined:         4
```

Set Channels

```
$ ethtool --set-channels eth0 combined 1
$ ethtool --set-channels eth0 combined 1
combined unmodified, ignoring
no channel parameters changed, aborting
current values:
      tx 0 rx 0 other 0 combined 1
$ ethtool --set-channels eth0 combined 0
Cannot set device channel parameters:
Invalid argument
```

Confirm Channels

```
$ ethtool --show-channels eth0
Channel parameters for eth0:
Pre-set maximums:
RX:                0
TX:                0
Other:             0
Combined:          64
Current hardware settings:
RX:                0
TX:                0
Other:             0
Combined:         1
```

Hyper-Tux

Sponsors

Haiyang Zhang
K.Y. Srinivasan

Advisor

Bruce Bolden

Members

Andrew Schwartzmeyer
Justin Hall
Keith Drew
Eric Doman