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Summary:

Twenty+ years of experience in design, implementation, debugging, testing and architecture for kernel software (networking and I/O) and OS bypass (RDMA) application development for bare-metal and Virtual Machines (zones, kernel zones, and LDOMs). Extensively worked on Infiniband framework and its related protocols such as IPoIB, and also implemented SCSI, Fibre Channel, USB and InfiniBand device drivers. Experience in developing embedded software for RAID storage controller.

- Highly focused, motivated and hard working engineer always met the targets.
- Experienced in working with large & multiple organizations.
- Member of Solaris Platform Architecture Committee (PSARC)
- Represented Sun at RNIC-PI standards specification development
- Member of InfiniBand specification development working groups
- InfiniBand SPOC (Security Point of Contact) – responsible for ensuring no security holes for IB stack.

Skill Set:

Languages: C, Shell scripting.

Protocols : InfiniBand, IPoIB, SDP, OFUV, RoCE, RNIC-PI, RDMA, OS-Bypass Technologies, TCP/IP, PCI-E / PCI-X, SCSI, Fiber Channel, USB, SR-IOV, VLAN, VXLAN

Debuggers: mdb, adb, and SCSI analyzer

Hardware : SPARC and Intel platforms

Work Experience

Oracle Corporation - Senior Principal Engineer – since March 2011

- **OpenStack** Support for InfiniBand. Responsible to investigate how InfiniBand can be used in the Solaris OPC (Oracle Public Cloud) and scope the changes required to add IB support to OPC.
- **IPoIB:** Reduce memory consumption and improve memory allocation mechanism for Receive Queue buffers. Responsible for designing, implementing and integrating the changes into Solaris 12
- **RoCEv2 Enhancements in Solaris**

Identified the gaps in Solaris IB stack to support RoCE (RDMA over Converged Ethernet) and provided initial plan.
- **Virtualization: I/O Resiliency Support.** Architected and lead the team to support InfiniBand I/O Resiliency feature. and also designed HA framework to provide fail over across IB adapters

- **Virtualization: DIOV (Dynamic IOV) Support**

Designed, implemented, and lead a team to support hot removing/hot inserting of a SR-IOV VF from/to a running LDOM (VM).

- **SDP: Cross HCA fail over Support**

SDP specification **does not** support cross HCA fail over and hence designed a new extensions to the SDP specifications to support cross HCA fail over support.

- Designed a dynamic memory allocation algorithm to reduce the memory consumption by the IPoIB driver (IB NIC driver) without impacting the performance.

- **Virtualization:** Guided and lead the project to add support Live Zone reconfiguration support for IB VFs

- **Virtualization:** Designed and implemented IPoIB Virtual NICs (VNICs)

Sun Microsystems - Senior Staff Engineer – December 1999 to February 2011

- **Virtualization:** Support for Exclusive IP Zones for IPoIB

IPoIB RFE supports creating one IPoIB data link per per per PKEY. This limitation is major issue to support Exclusive IP zones support as multiple zones needs exclusive IPoIB links. I came up new design which extends the IPoIB RFC to support multiple IPoIB links per port per pkey. The new solution does not affect interoperability with Linux. Worked with Solaris network team to get the changes needed to enable this feature.

- ZFSSA: Designed and implanted new administration model for IPoIB to be used by the Oracle ZFSSA. Enabled to create virtual IPoIB partition dynamically as and when needed.

- ROF (RDMA Offload Framework)

Enables support for RDMA protocols on Ethernet. Designed and prototyped the solution by implementing a SoftRDMA. Lead a team of 10 people (development and QE).

- IPoIB-CM: IP Data Integrity without IP Checksum

InfinBand RC protocol supports 32 bit CRC 32 bit which is stronger than 16 bit IP Checksum and guarantees corruption free packet delivery. Defined an extension to IPoIB RFC to avoid IP checksum calculation. Worked with Linux team to make the necessary changes in the Linux UEK.

- Guided and lead the projects to add support for features such as observability, improve debugging mechanism, hotplug support, checksum by-pass etc in IPoIB

- InfiniBand Transport Framework

Designed, implemented, and lead the team to provide InfiniBand device framework

Designed, implemented and lead the team to provide framework for hot adding and hot removing an IB adapter

Designed and implemented support for booting over IPoB and IB IOC devices

- Designed and implemented a USB Generic Driver (UGEN). This driver provides framework to access USB devices by writing an application (without needing to write a device driver)
- Designed and implemented Solaris device driver for Intel USB host adapter.

Project Lead - BFL Software Ltd, India – March 1995 to November 2011

- Designed and implemented a firmware for Compaq RAID controller
- Designed and implemented a device driver for Compact Fiber adapter for Solaris Operating system
- Designed and implemented a device driver for Compaq SCSI adapter for Solaris Operating system
- Designed and implemented a SNMP agent which provides the status of the Compaq storage controllers on SCO Unix
- Implemented a GUI that displays status of the storage controller – Banyan vines operating system

Education: Bachelor of Technology - Jawaharlal Technological University, India