InfiniBand Basics I

- Network Technology developed in 1999
- Is used for **high performance computing** and in enterprise datacentres
- Features are:
  - High Throughput
  - Low Latency
  - Quality of Service
  - Failover

InfiniBand creates a channel directly connecting an application in its virtual address space to an application in another virtual address space.

An application does not need to rely on the operating system to transfer messages.
InfiniBand Basics II

Queue Pair (Send & Receive Completion Queue)

- Sender and Receiver communicate by exchanging messages
InfiniBand

Question: - Why?
   - What to do with ICCLab / Cloud Computing?

Answer: - Is part of the KIARA project (transport stack)
   - Idea came from project-partner DFKI* which has an InfiniBand cluster available

* Deutsches Forschungszentrum für Künstliche Intelligenz aus Saarbrücken
KIARA InfiniBand Functionality

Initial Situation:
• Not much information on InfiniBand resp. on how to write an InfiniBand application
• The only good tutorial (http://thegeekinthecorner.wordpress.com/) not usable
  • due to usage of RMDA Connection Manager (not working on Saarbrücken-Testbed)

Done:
• Built ‘Basic Example’ out of ‘rdma_bw’ InfiniBand Perftest-Application (C)
• Expanded ‘Basis Example’ to simple ‘Client-Server Example’ (C)
• Integrated functionality of ‘Client-Server Example’ into KIARA Transport-Stack (C++)
• Wrote 2 performance-test applications
  • 1 sends a lot of small messages
  • 1 sends bigger messages
KIARA InfiniBand
High Level Workflow

Client

send()

connect()

Create TCP Connection

Exchange IB Information (TCP)
LID, QPN, PSN

Server

bind()

callback()
recv()

From User

Send RDMA Details (IB)
rkey, vaddr, buffer size

To User

To User

recv()

disconnect()

RDMA Read

Send RDMA Details (IB)
rkey, vaddr, buffer size

From User

send()

unbind()
Plan / ToDo:

• Adapt application to support more realistic / complex messaging-functionality:
  • Needs Discussion within ZHAW-KIARA-Team
• Write detailed description of how application works (Blogpost / Tutorial)
  • Wrote 1 Blog-Post. Maybe 2nd follows

Possible Problems:

• Saarbrücken InfiniBand-Testbed not available anymore from April 2014
  • so far the servers are still working

Additional Information:

• Introduction Blog to InfiniBand
• Overview of KIARA InfiniBand Functionality
Demo