



IDT Collaboration: RapidIO

CERN openlab open day

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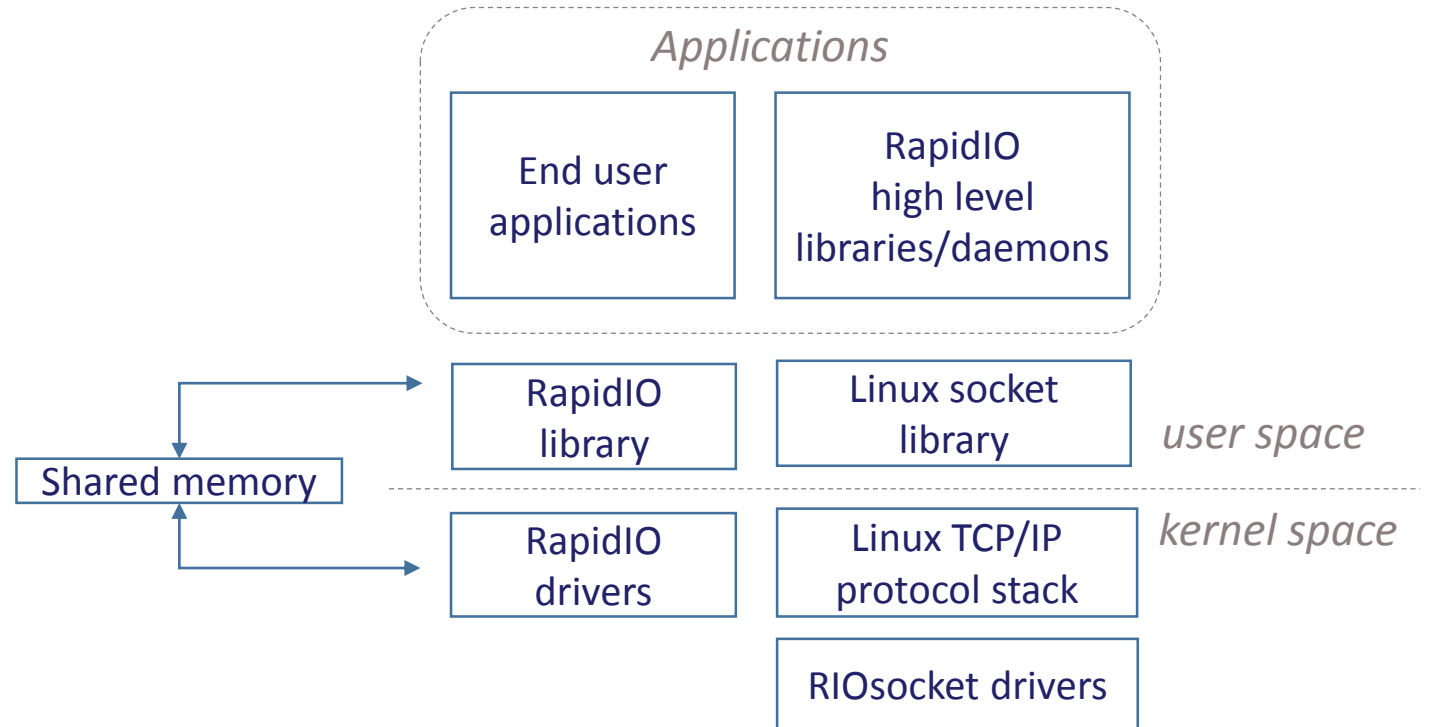
CERN openlab partner: IDT

- American chip manufacturer
- CERN openlab partner since 2015
- ~1500 employees
- Products target hard real time systems

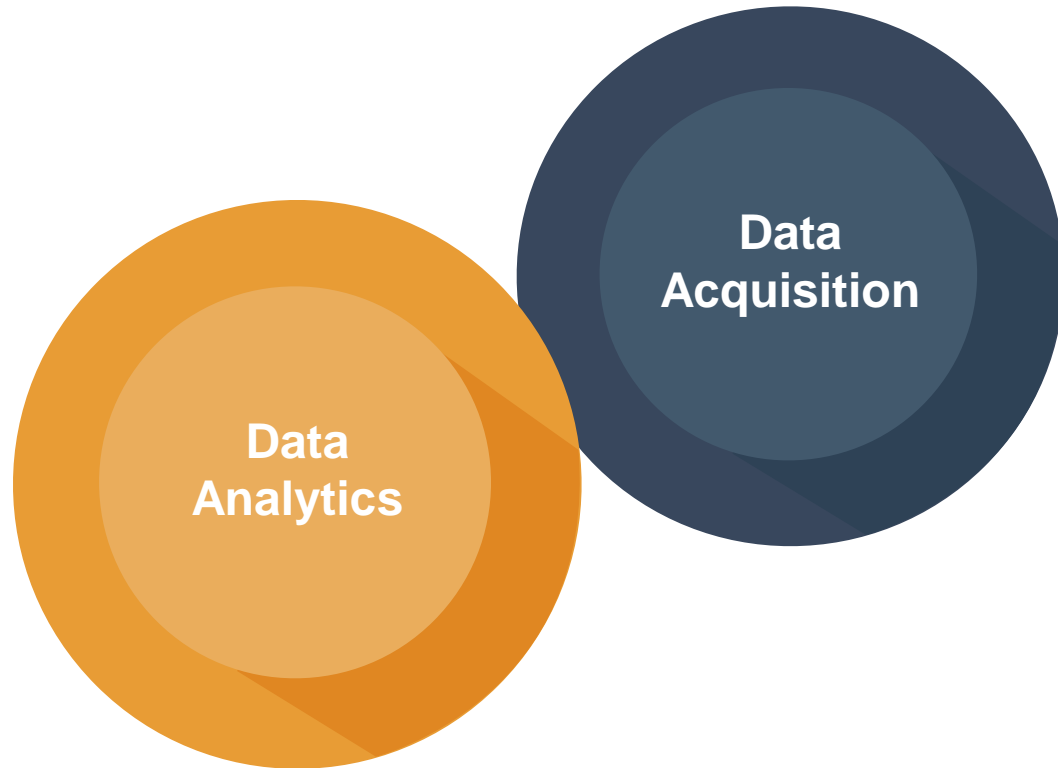


Technology introduction: RapidIO

- Open standard – rapidio.org
- Low latency
- CPU offloading
- True zero copy
- TCP/IP over RapidIO using RIOsockets
- 15 million switches shipped
- 90 million ports



Project Goals And Use Cases



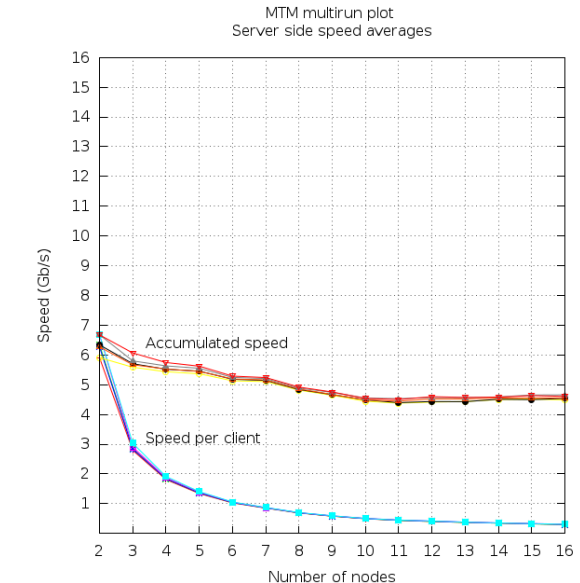
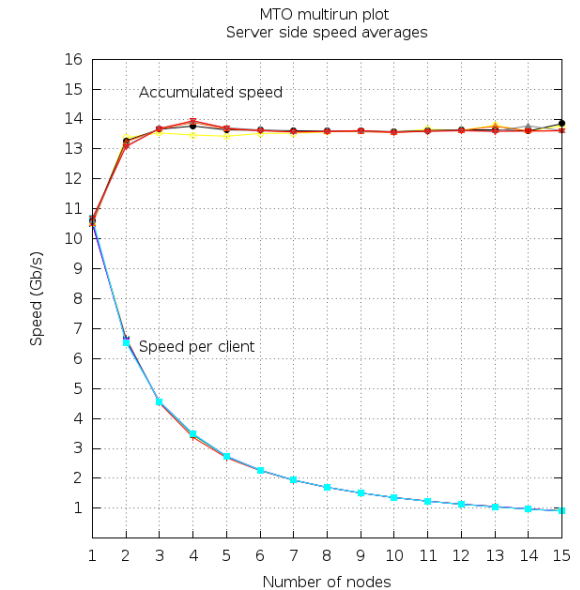
- Explore technology
- Investigate functionality
- Evaluate suitability
- 2 years
- Technology under development
- Close collaboration with IDT engineers

Achievements

- Porting and benchmarking
 - ROOT data analysis framework
 - DAQPIPE interconnect benchmark
 - ZeroMQ messaging framework
- Deployment of Hadoop over RIOsockets
- Iperf benchmarking over RIOsockets
- Presentations at RT2016 and CHEP2016
- Publication in IEEE Transactions on Nuclear Science
- 3 Summer Students
 - Explore API and functionality through a file transfer application
 - Understand RapidIO multicast through a real time chat
 - Cluster monitoring and management tool
- 1 Technical Student
 - Master's Thesis on ZeroMQ over RapidIO

Findings

- Promising technology
- Paradigm and APIs are important
 - Streaming based vs messaging based
 - Standard APIs vs Custom APIs
 - Standard APIs valuable and simplifying (socket library)
 - Implementing your application with paradigm independence gives more long term flexibility
- Scales well in certain scenarios
 - Investigations needed for speed drop in many to many case



Summary



2 year collaboration project with big chip manufacturer



Big efforts on porting and benchmarking relevant applications



Promising technology with many interesting features (zero copy, CPU offloading, low latency)



Lessons learned on APIs and paradigm dependency



Explore, investigate and evaluate in close collaboration with partner engineers



A lot of « R » - plenty of room for further investigations