
# Running Mantevo Benchmark on a Bare-metal Server

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# Mantevo Benchmark

- A collection of some application performance proxies known as **mini applications (miniapps)**.
- Two advantages of mini apps
  - Encapsulating most important computational operations of a scientific application
  - Consolidating physics capabilities that belongs to a variety of scientific applications

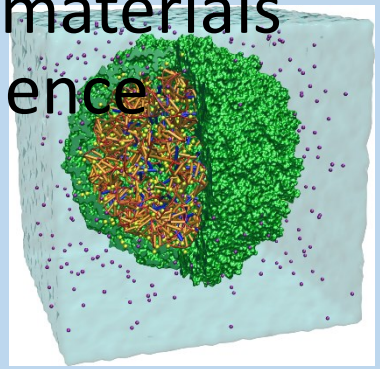
# Mantevo Benchmark – Selected Miniapps

**CloverLeaf**

- a mini-app that solves the *compressible Euler equations on a Cartesian grid*, using an explicit, second-order accurate method.

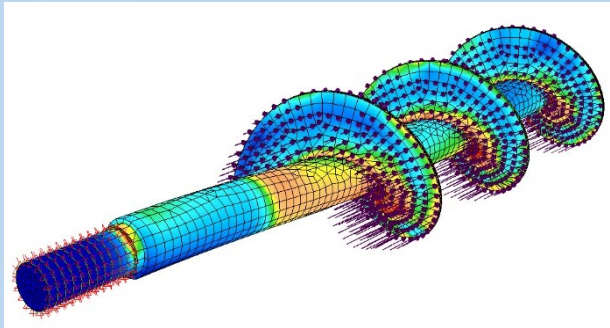
**CoMD**

- *a Classical molecular dynamics* algorithms and workloads as used in materials science.



**MiniFE**

- a proxy application for *unstructured implicit finite element codes*



# Mantevo Benchmark – Selected Libraries

**OpenMP**

- **Open M**ulti-**P**rocessing (OpenMP) is a Application programming Interface (API) that supports multi-platform shared memory multiprocessing programming in C, C++, and Fortran.


**MPI**

- **M**essage **P**assing Interface (MPI) is a standardized and portable message-passing system. Mpicc provides MPI libraries for C programmers.

# Single Node Bare-metal Server Specification

**Linux kernel**

3.10.0-327.4.4.el7.x86_64

**Linux distribution**

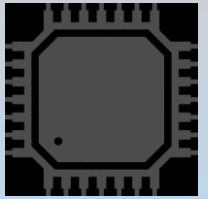
Centos 7 @ 64 bit

**CPU**

Intel Core i5 4 Cores @3.1 GHz

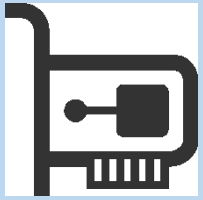

**RAM**

Samsung DDR3 4GB @ 1333 MHz



**Network Interface**

Realtek Gigabit Ethernet Controller @ 1000 Mb/s



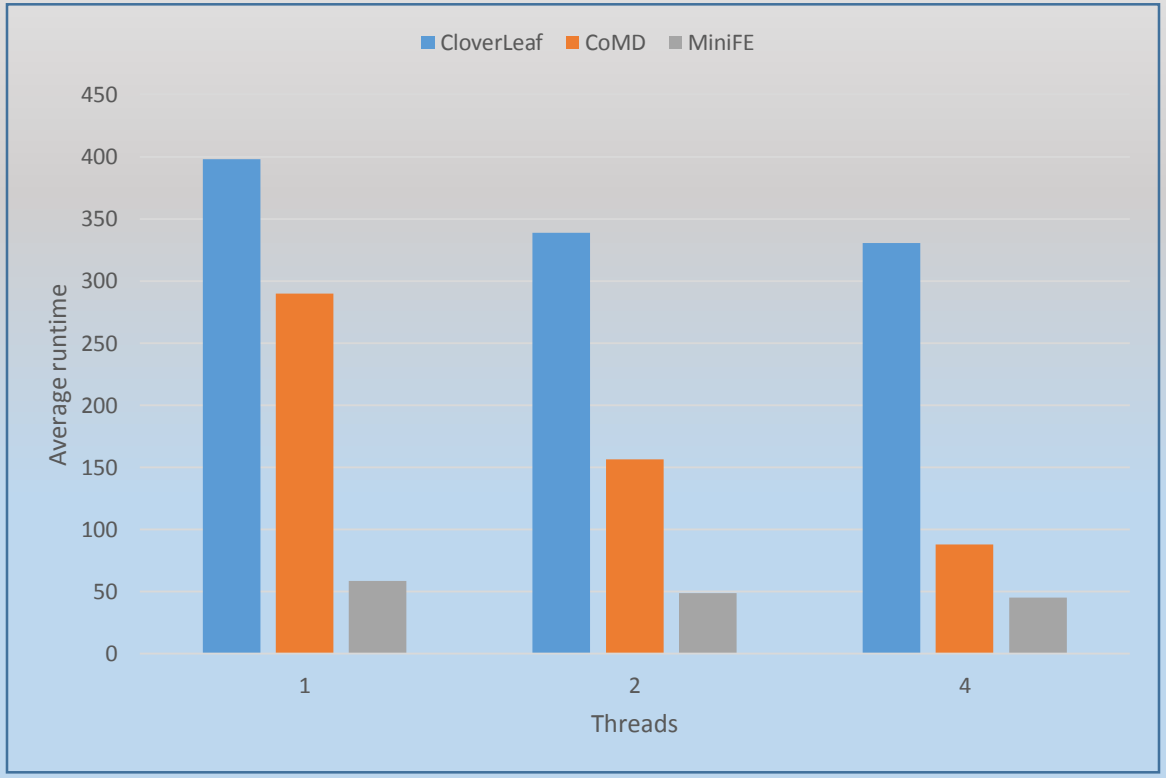
**HDD**

Seagate 1TB serial ATA

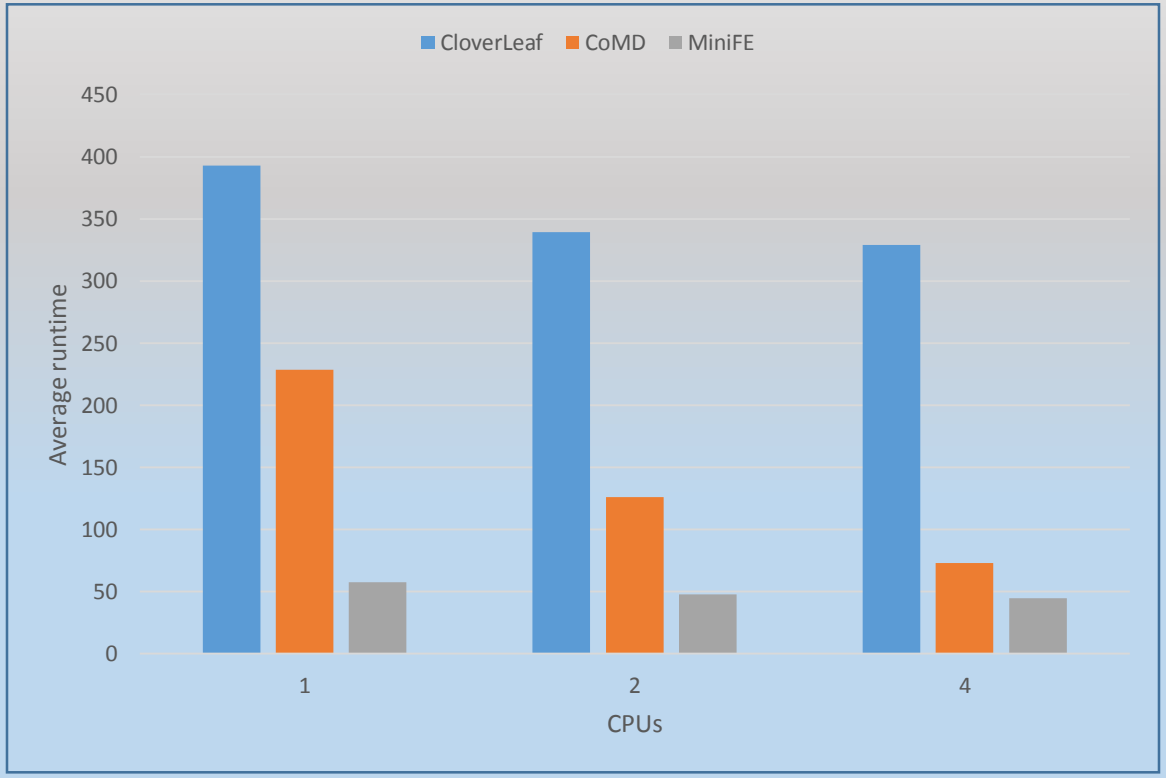
# Results

- Each experiment performs 10 times
- OpenMP implementation of Mantevo runs with 1, 2, and 4 **threads**
- MPI implementation of Mantevo runs with  1, 2, and 4 **CPUs**

# Results - OpenMP



# Results - MPI


CloverLeaf
CoMD
MiniFE
450
400
350
300
250
200
150
100
50
0
Average runtime
1
2
4
CPUs

# What’s done?

- Reading Yuyu’s Supercomputing conference poster
- Centos 7 configuration
- Mantevo installation
- Tweaking the Mantevo script
- Collecting results

# What’s next?

- Extending the experiments
- Introducing Kernel-based Virtual Machine (KVM)
- Installing and configuring KVM (done)
- Installing Mantevo benchmark on a virtual machine (ongoing)
- Running Mantevo benchmark on KVM
- comparing kvm with bare-metal

# References

- Yuyu’s poster in Supercomputing 2015 conference
- Yuyu’s scaletest Github repository
  - https://github.com/yuyuzhou-pitt/scaletest/tree/master/baremetal
- Mantevo benchmark homepage:
  - https://mantevo.org/download/tutorial/