

Intel Software on Xeon and MIC at CERN

CERN openlab, Feb 29 2012
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Intel Software tool usage at CERN

- **Pool of licenses within the openlab agreement**
 - Parallel Studio for Linux and Windows
 - C++ and Fortran compilers for Mac
 - Cluster Toolkit
- **Alpha and Beta testing**
- **Non-standard software**
- **Newly purchased licenses for CERN-wide usage**
 - Suggestion, expertise and setup came out of openlab
 - Prompted by growing demand
 - Linux, Windows, Mac covered

openlab activities of SSG interest (1)

- **Alpha and Beta evaluations:**
 - ICC
 - Weekly feedback directly to developers as well as through QUAD (several open issues every month)
 - Amplifier and Inspector
 - Several month long program with iterating feedback given directly to developers and TMEs (feedback items in the dozens)
 - Some of our suggested features and improvements made it to the tool
 - First Amplifier training held at openlab
 - Result: “The first tool that actually works with our software out of the box” – senior physicist at CERN

openlab activities of SSG interest (2)

- **Involved with ArBB when it was still called “Ct”**
 - Reviewed specs and issued recommendations before release
 - Tested initial alpha versions
 - Supplied physics code for porting (ported by Intel, demoed later at IDF 2011)
- **Limited involvement with OpenCL**

openlab activities of SSG interest (3)

- Daily usage: mostly ICC and Amplifier
- Training hundreds of programmers (also using Intel software)
 - Regular CERN workshops 4x per year
 - Special CERN workshops ~2x per year
 - Tutorials at international computing schools and conferences
 - CERN School of Computing
 - ESC
 - Tutorial at ISPA'12
 - other

Interfacing with Intel experts

- **Collaboration on teaching**
 - Jeff Arnold, Martyn Corden, John Gustafson, Tim Mattson
- **Dissemination: numerous talks and seminars organized at CERN. Some of our guests were:**
 - Craig Barrett (“Inspiring Innovation”)
 - **Herbert Cornelius (MIC)**
 - **Klaus-Dieter Oertel (MIC)**
 - **Levent Akyil (Amplifier)**
 - **Jeff Arnold (compilers, benchmarking, floating point, Parallel Advisor)**
 - **Martyn Corden (compilers, floating point)**
 - **David Levinthal (performance tuning, PTU)**
 - **Kath Knobe (Concurrent Collections)**
 - John Gustafson (floating point)
 - Raj Hazra (exascale)
 - Pradeep Dubey (massive computing)
- **Numerous Intel experts visiting CERN and interfacing with physicists**
- **Visits in Santa Clara**
 - Focus: ICC, emerging technologies

“off the beaten track”

- **Extensive Intel PTU and SEP usage**
 - includes physics community using SEP in batch mode
 - The concepts behind PTU influenced some of our internal activities
- **Experiments with**
 - PBA
 - SDE and XED
 - PIN

Our KNF experience

- One of the first Intel customers to be engaged – started with ISA reviews
- In-depth feedback on the OS, drivers and Xeon/KNF toolchains
- Ported and optimized 3 large representative benchmarks
 - Ongoing activities
- Looking forward to dissemination and KNC

KNF software testimonials

- ISC'10 w/ Intel VP Kirk Skaugen
- IDF'11 w/ Intel CTO Justin Rattner



Kirk B. Skaugen
Vice President, Intel Architecture Group &
General Manager, Data Center Group, USA
HPC Technology Scale-Up & Scale-Out
[International Supercomputing Conference
2010 / 30.05.2010]



Internal activities focused on performance monitoring

- **Building home-grown tools for analysis and batch reporting**
 - Two separate non-openlab collaborations on PTU front-ends (CMS experiment)
 - Numerous other smaller performance monitoring tools
 - Recent efforts focused on most recent CPU features (some of the original concepts and support came from Intel, HP and Google)
 - Looking forward to performance tuning API/SDK toolkits
 - Planning to employ SEP for performance monitoring counting in parallel to OSS Linux solutions

THANK YOU

Q & A

BACKUP

About openlab

- CERN openlab is a framework for evaluating and integrating cutting-edge IT technologies or services in partnership with industry:
<http://cern.ch/openlab>
- We are the Platform Competence Center (PCC) of the CERN openlab, working closely with Intel since 11 years ago and addressing:
 - many-core scalability
 - performance tuning and optimization
 - benchmarking and thermal optimization
 - teaching