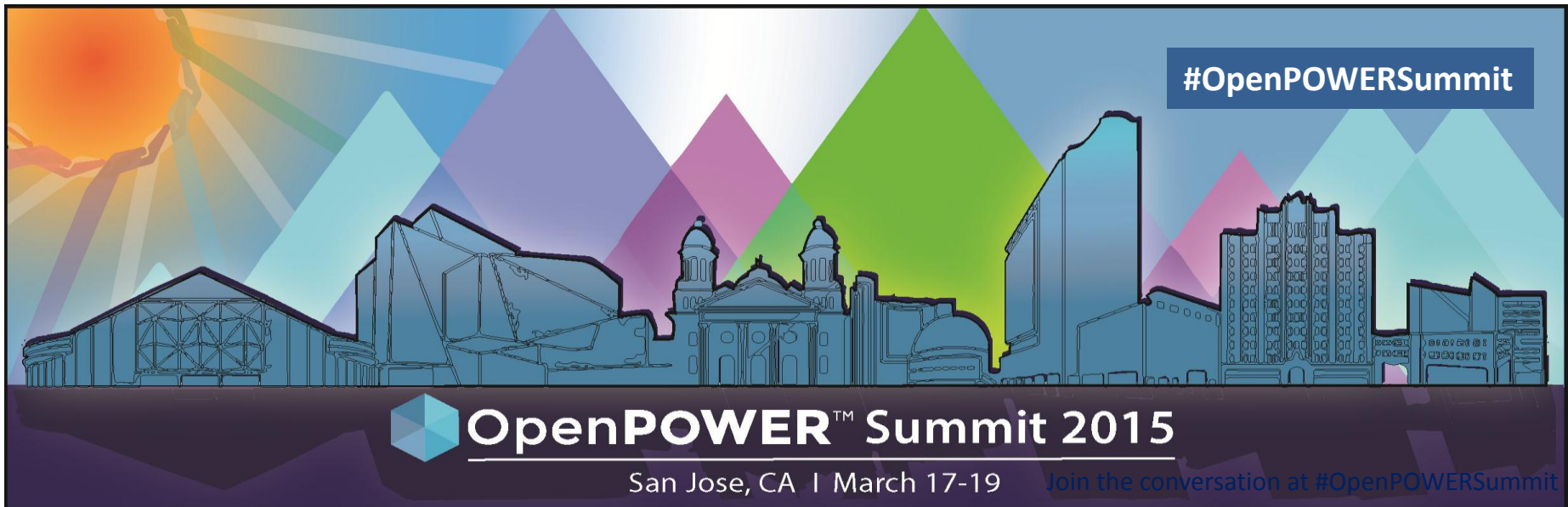




PGI Compilers for OpenPOWER Platforms

Enabling Migration of HPC Applications
from x86 to OpenPOWER

Doug Miles
PGI Compilers & Tools
NVIDIA Corporation



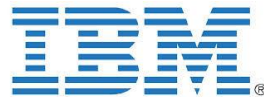
High-Performance Computing (HPC)

- Weather forecasting, Climate modeling, Engineering, Life Sciences, High-energy physics, Oil & Gas, Signal Processing, ...
- Continually evolving custom applications
 - Written primarily in Fortran, C and C++
 - Parallelized for scalable clusters of multi-core servers and GPUs using MPI, OpenMP, CUDA and OpenACC
- HPC HW systems comprised of hundreds or thousands of multi-core servers on a dedicated network

PGI Compilers for HPC

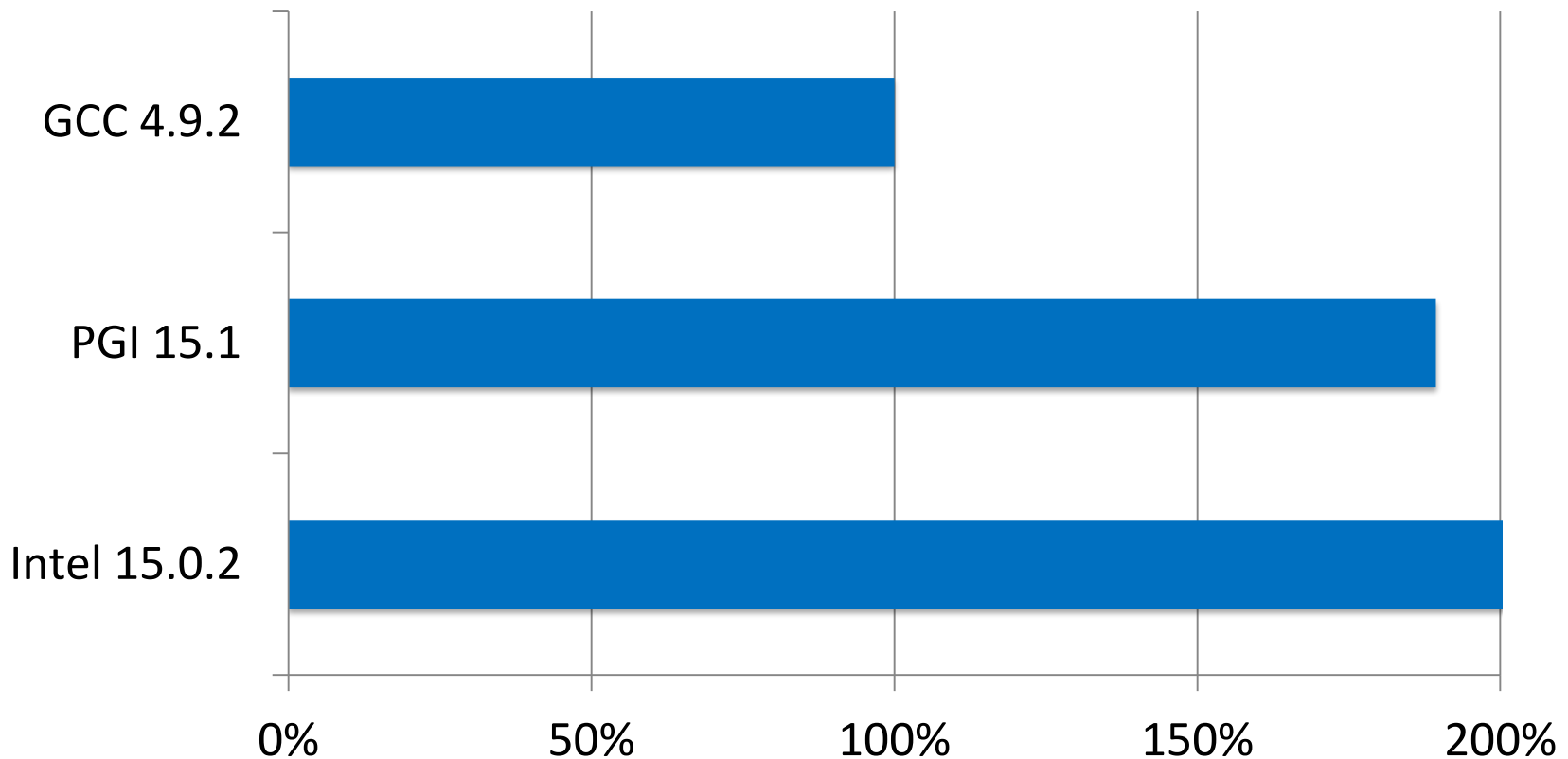
- Fortran, C, and C++ compilers
- Available today on x86+GPU systems running Linux, Windows and OS X
- Highly-optimized for Multi-core and GPUs – SIMD vectorization, parallelization, heterogeneous code generation
- Available for over 25 years, installed at over 5,000 HPC sites, over 25,000 users worldwide

PGI Customers – Leaders in HPC



Join the conversation at #OpenPOWERSummit

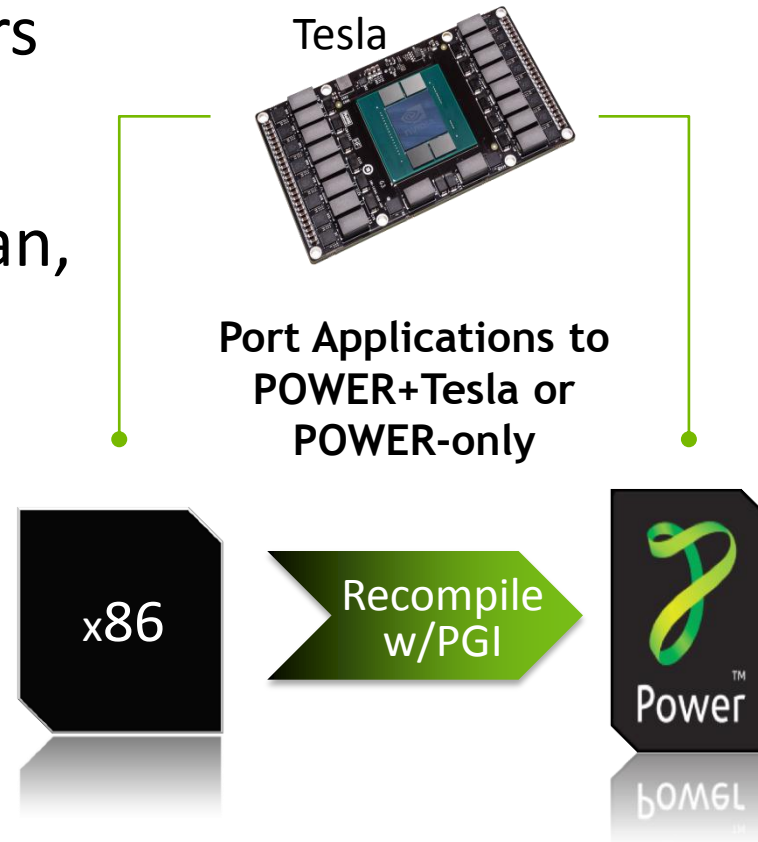
PGI Delivers World-class Performance



SPECompG_base2012 relative performance as measured by PGI on Haswell 2p/36 cores during the weeks of Feb 23 and Mar 2, 2015. The number of OpenMP threads was set to match the number of cores on each system. SPEComp® is a registered trademark of the Standard Performance Evaluation Corporation (SPEC).

PGI Compilers are coming to POWER+Tesla

- Feature parity with PGI Compilers on Linux/x86+Tesla
- OpenMP, OpenACC, CUDA Fortran, NVCC host compiler
- Integrated with IBM's optimized LLVM/POWER code generator
- Limited access in 2015, production in 2016

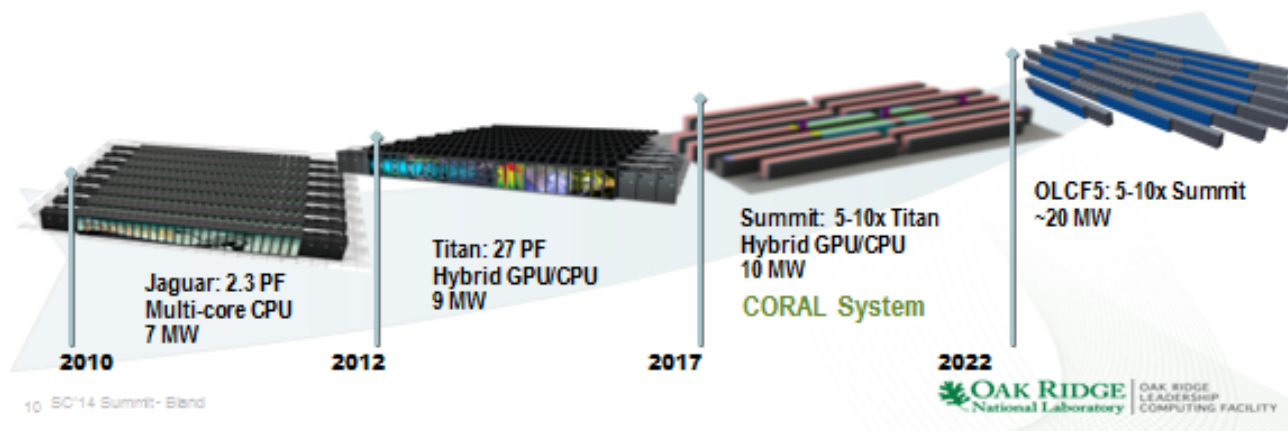


PGI's Lead Customers on POWER: ORNL & LLNL

Our Science requires that we continue to advance OLCF's computational capability over the next decade on the roadmap to Exascale.

Since clock-rate scaling ended in 2003, HPC performance has been achieved through increased parallelism. Jaguar scaled to 300,000 cores.

Titan and beyond deliver hierarchical parallelism with very powerful nodes. MPI plus thread level parallelism through OpenACC or OpenMP plus vectors



“Porting and optimizing production HPC applications from one platform to another can be one of the most significant costs in the adoption of breakthrough hardware technologies. The PGI compiler has been our primary compiler on Jaguar and Titan since 2005. Having the PGI compiler suite available in the POWER environment will provide continuity and facilitate code portability of existing CPU-only and GPU-enabled Titan applications to our next major system.” — *Buddy Bland, Titan Project Director, Oak Ridge National Lab*

Porting to OpenPOWER with PGI

- HPC End-users and ISVs
 - Validate applications with PGI compilers today on Linux/x86 as a first step to Linux/POWER – see pgroup.com
 - Contact PGI to participate in upcoming PGI Beta Releases for Linux/POWER systems
- HPC Centers – A detailed PGI on Linux/POWER roadmap is available under NDA
- HPC System Builders – PGI is ready to partner on optimizing compiler solutions for your Linux/POWER HPC products

PGI Contact: douglas.miles@pgroup.com