

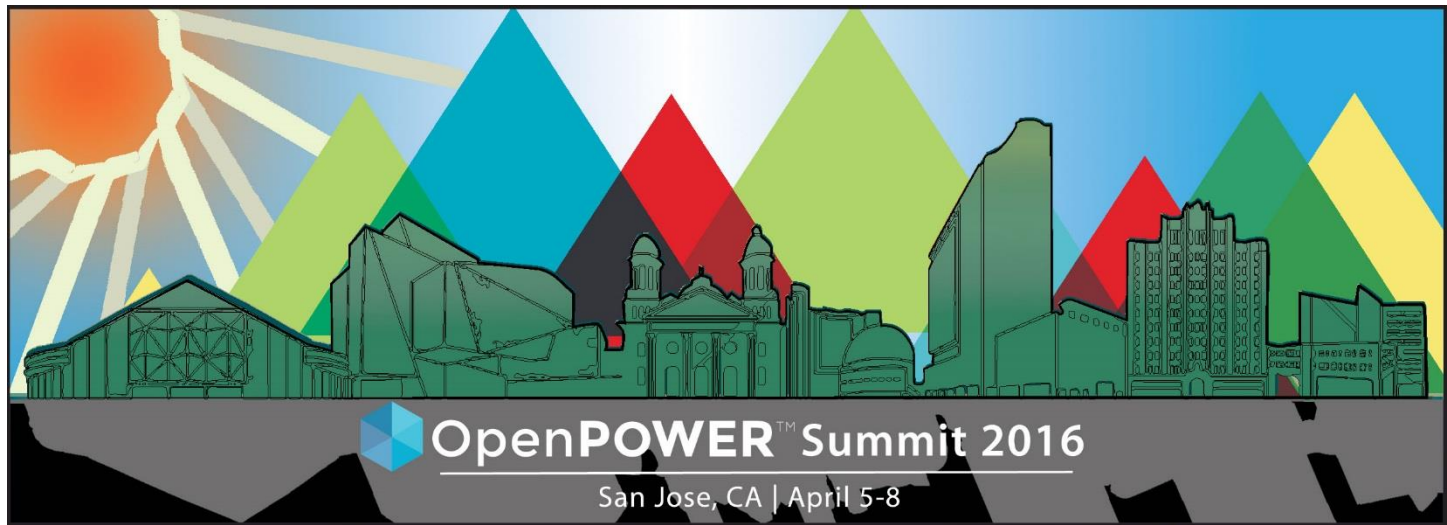


PGI Accelerator Fortran/C/C++ Compilers for OpenPOWER+Tesla

Doug Miles

PGI Compilers & Tools
NVIDIA Corporation

Revolutionizing the Datacenter



Join the Conversation #OpenPOWERSummit

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
- Hundreds or thousands of multi-core and GPU-enabled servers on a dedicated network

PGI Customers – Leaders in HPC



NOAA



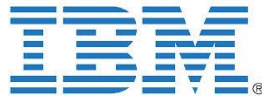
Japan Aerospace Exploration Agency

Raytheon



Rolls-Royce

Schlumberger



TECHNISCHE UNIVERSITÄT DRESDEN



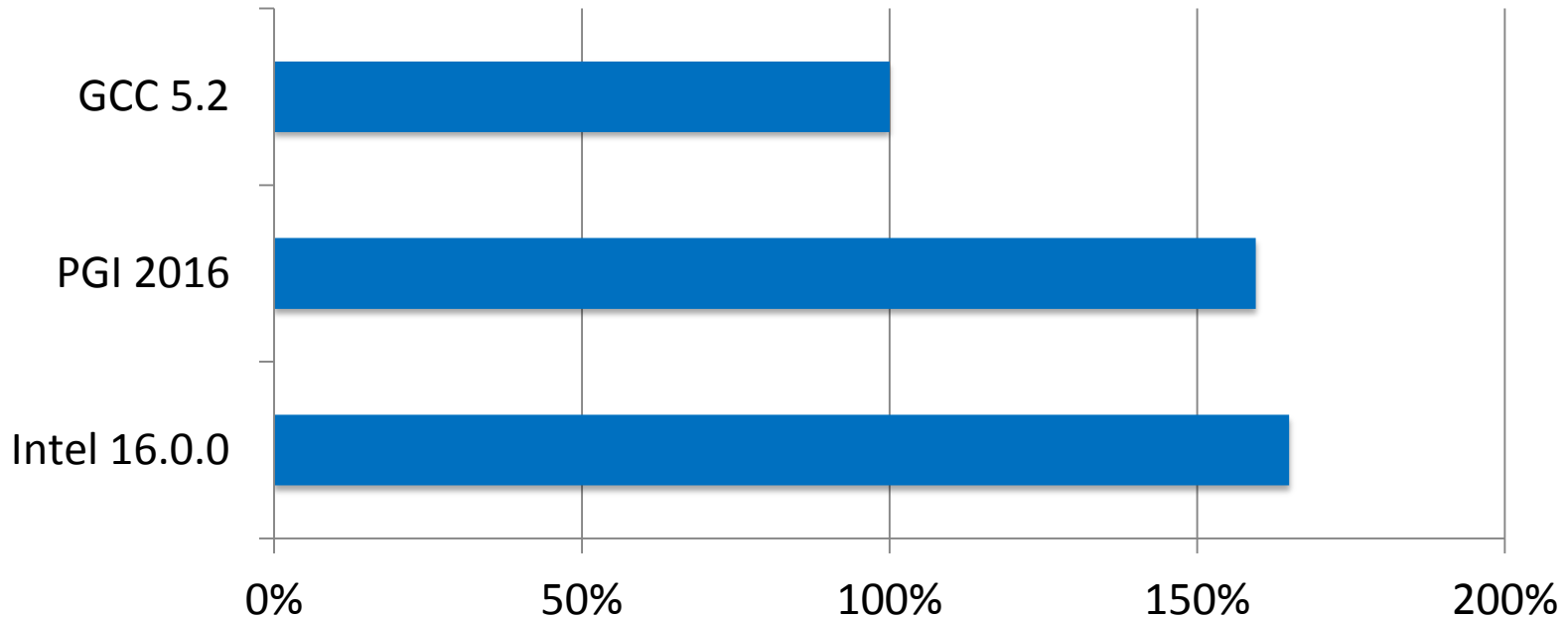
sgi.



National Science Foundation
WHERE DISCOVERIES BEGIN



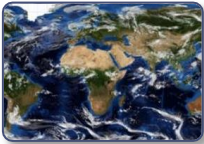
PGI: World-class Multicore Compilers



System: 2 x Intel(R) Xeon(R) CPU E5-2698 v3 @ 2.30GHz (32 cores, 64 threads total) 128GB memory
 SPECompG_base2012 relative performance as measured by PGI during the weeks of Feb. 1 and Feb. 15, 2016.
 SPEComp® is a registered trademark of the Standard Performance Evaluation Corporation (SPEC).

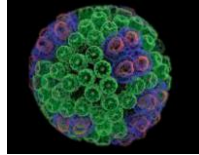
PGI OpenACC: Accelerating HPC Applications

Environment



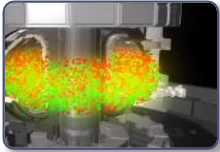
COSMO · NIM · ACME
SAMI - FV3 - COAMPS

Chemistry



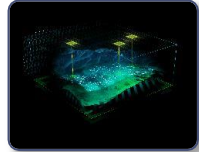
GAUSSIAN · LS-Dalton
VWM · NekCEM

Physics

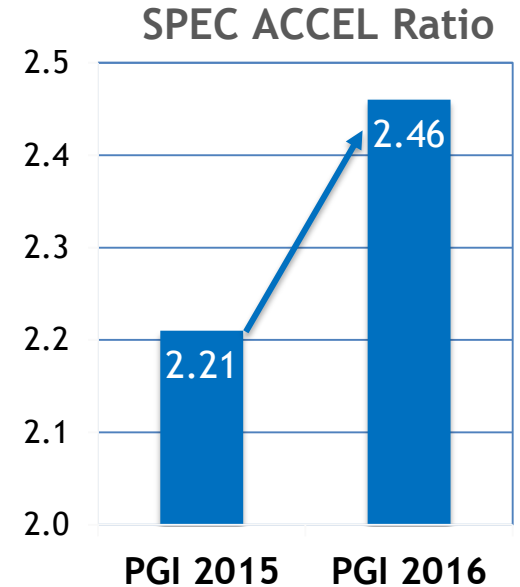
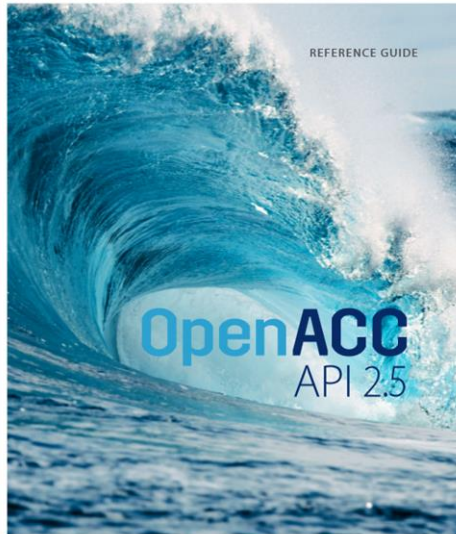


CloverLeaf - GENE

CFD



Fun3D · Fluent · HiPSTAR
INCOMP3D · NUMECA



**Applications-driven
Accelerator Features**

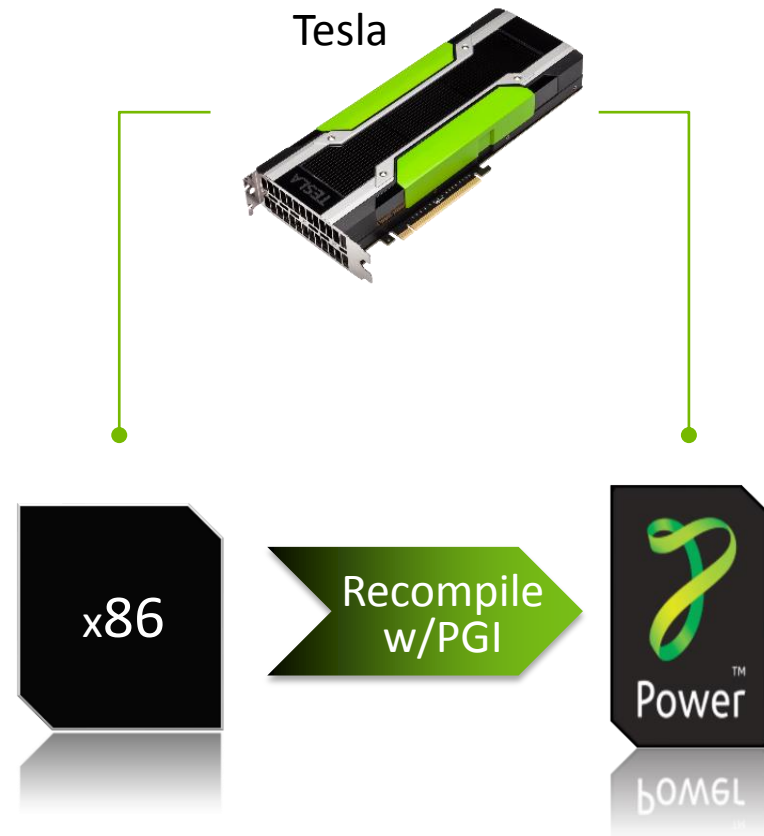
**OpenACC for
Performance Portability**

**Continuous Performance
Improvement**

System: Intel(R) Core™ i7 3930K CPU @ 3.2 GHz (6 cores total) 16GB memory with NVIDIA Tesla K40c GPU @ 745 MHz.
SPECaccl_acc_base relative performance as measured by PGI during the weeks of Feb. 15, 2016. SPEC ACCEL™ is a trademark of the Standard Performance Evaluation Corporation (SPEC).

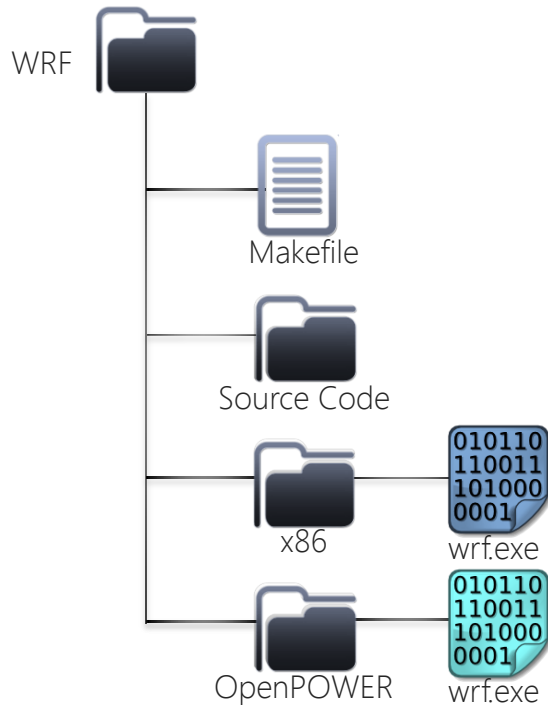
PGI Fortran/C/C++ for OpenPOWER+Tesla

- Feature parity with PGI Compilers on Linux/x86+Tesla
- OpenMP, OpenACC, CUDA Fortran, NVCC host compiler
- Integrated with IBM's optimized LLVM/OpenPOWER code generator
- Beta release in H1 2016, production release later in 2016

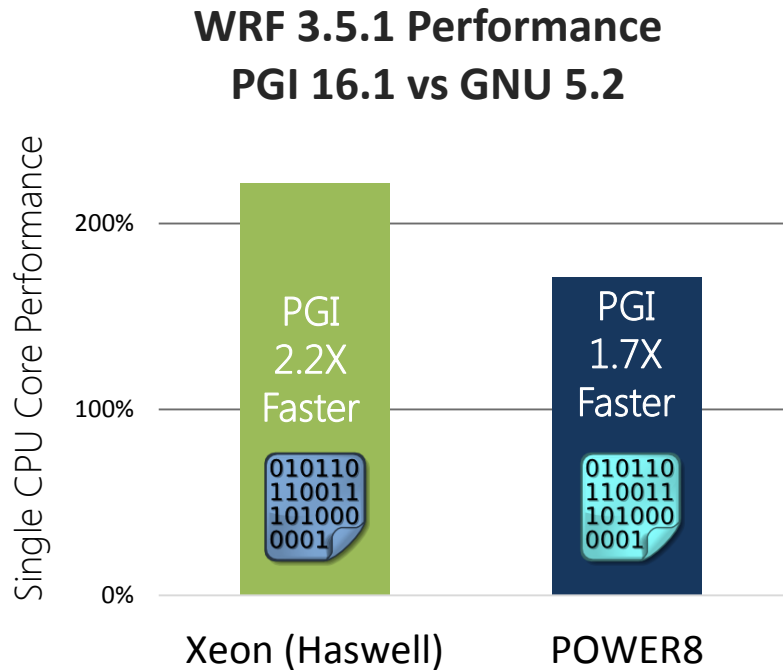


Porting an 800K line HPC Application from x86 to OpenPOWER

Recompile ...



Run ...



X86 CPU: Intel Xeon E5-2698 v3, 2 sockets, 32 cores total
 POWER CPU: IBM 8247-42L POWER8E, 20 physical cores total
 GNU version 5.2; PGI version 16.1

Porting to OpenPOWER with PGI

- HPC End-users and ISVs
 - Validate with PGI compilers on Linux/x86+Tesla today – an easy first step to Linux/OpenPOWER
 - Participate in PGI Beta Releases for OpenPOWER+Tesla
- HPC Centers – A detailed PGI on Linux/OpenPOWER roadmap is available under NDA
- HPC System Builders – PGI is ready to partner on optimizing compiler solutions for your Linux/OpenPOWER HPC products

PGI Contact: douglas.miles@pgroup.com