

GCC/OpenACC Short Update

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GCC 12



- GCC 12

- **OpenACC 2.6 (C, C++, Fortran)**

- **Code offloading to:**

- AMD GPUs (GCN: gfx803, gfx900, gfx906, CDNA 1: gfx908)
 - Nvidia GPUs (nvptx)

- **New OpenACC features in GCC 12:**

- OpenACC worker parallelism for AMD GPUs
 - Data privatization/sharing at the OpenACC gang level
 - GCN: Uses LDS (local data share)
 - NVIDIA: Uses nvptx **.shared** memory
 - Seamless interactive OpenACC host/device code debugging with ROCGDB (AMD)
 - Initial support for sm_53, sm_70, sm_75, and sm_80 features (NVIDIA)
 - Routine bug-fixing and performance enhancements

GCC Development Cycle



• GCC mainline

- Transition to stage 3 – November
 - Stabilization phase
- Transition to stage 4 – January
 - Bug-fixing phase
- GCC 13 Release – April/May of 2023
- Will include OpenACC offloading to AMD GPUs (CDNA 2: gfx90a)



• Development Branch (OG12)

- Staging area for patches destined for mainline
- Allows for ongoing availability of new functionality
- Example: OpenACC 'kernels' performance improvements

Next steps

- Ongoing mainline submissions from the OG12 branch
- The OpenACC 2.7 Implementation
- Prebuilt Binary Toolchain based on GCC 12 supporting OpenACC Offloading for AMD GPUs
- Download: www.siemens.com/embedded

Thanks!

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