Novo-G Reconfigurable Supercomputer
NSF CHREC Center

Novo-G System Architecture

52+1 Linux servers in a cluster

- 448 user FPGAs (Stratix-III, IV, V)
- With 3.5 TB of FPGA-attached RAM
- InfiniBand, Ethernet, FPGA networks
- Supported by multicore Intel Xeons
- Supported by NVidia GPUs

48 GiDEL PCIe x8 ProcStar-III

- 4 FPGAs/board; 4x4.25GB RAM/bd
- 2 boards/server (24 servers)
- 192 Altera Stratix-III E260 FPGAs

48 GiDEL PCIe x8 ProcStar-IV

- 4 FPGAs/board; 4x8.5GB RAM/bd
- 4 boards/server (12 servers)
- 192 Altera Stratix-IV E530 FPGAs

64 GiDEL PCIe x8 ProcE-V

IN DEVELOPMENT

- 1 FPGA/board with 16GB+ RAM/bd
- 4 boards/server (16 servers)
- 64 Altera Stratix-V D8 FPGAs

Novo-G Reconfigurable Supercomputer

- Most powerful reconfigurable computer in R&D world (448 user FPGAs)
- For some apps & uses, among the fastest computers of any kind in world!
  - Yes, 1000s of times less cost, size, power, cooling, etc. than high-end conventional supercomputers
- Supports a broad range of apps, tools, and systems research tasks in CHREC and globally
  - App acceleration
  - RC architectural studies
  - Hardware emulation
  - Exascale studies

2012 Schwarzkopf Prize
CHREC & Novo-G recognized with 2012 Alexander Schwarzkopf Prize for Technology Innovation @ NSF

Reconfigurable Interconnect

3D (4x4x4) Torus or 6D Hypercube
40 Gb/s per link, Stratix-V FPGAs