XSEDE Service Provider Call 2/17/2022

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Ookami - 狼

• Ookami is Japanese for wolf
  - Homage to the origin of the processor and the Stony Brook mascot
• A computer technology testbed supported by NSF
• Available for researchers worldwide
  (excluding ITAR prohibited countries & restricted parties on the EAR entity list)
• Usage is free for non-commercial and limited commercial purposes
First machine to be fastest in all 5 major benchmarks:

- Green-500
- Top-500 – 415 PFLOP/s in double precision – nearly 3x Summit!
- HPCG
- HPL-AI
- Graph-500

https://www.r-ccs.riken.jp/en/fugaku
## Ookami

### Node
- **Processor**: A64FX
- **#Cores**: 48
- **Peak DP**: 2.76 TOP/s
- **Memory**: 32GB@1TB/s

### System
- **#Nodes**: 176
- **Peak DP**: 486 TOP/s
- **Peak INT8**: 3886 TOP/s
- **Memory**: 5.6 TB
- **Disk**: 0.8 PB Lustre
- **Comms**: IB HDR-100
What is Ookami

- 176 Fujitsu **A64FX** compute nodes each with 32GB of high-bandwidth memory and a 512 Gbyte SSD
  - Same as in currently fastest machine worldwide, Fugaku
  - First deployment outside Japan
  - HPE/Cray Apollo 80
- Ookami also includes:
  - 1 node with dual socket AMD Rome (128 cores) with 512 Gbyte memory and 2 NVIDIA V100 GPU
  - 1 node Intel Skylake Processors (32 cores) with 192 Gbyte memory
  - 2 nodes with dual socket Thunder X2 (64 cores) each with 256 Gbyte memory
- Delivers ~ 1.5M node hours per year
A64FX NUMA Node Architecture

- Arm V8-64bit
- Supports high calculation performance and low power consumption
- Supports Scalable Vector Extensions (SVE) with 512-bit vector length
- 4 Core Memory Groups (CMGs)
  - 12 cores (13 in the FX1000)
  - 64KB L1$ per core - 256b cache line
  - 8MB L2$ shared between all cores - 256b cache line
  - Zero L3$
- 32 (4x8) GB HBM @ 1 TB/s
- PCIe 3 (+ Tofu-3) network
What else

- CentOS 8 operating system
- DUO Authentication
- High-performance Lustre file system (~800TB of storage)
- Slurm workload manager
- Compilers: GNU, Arm, Cray, Fujitsu, Intel, Nvidia
- Continuous growing stack of preinstalled software
  - MPI implementations
  - Math libraries
  - Performance analysis & debugging:
    (Arm Forge, Cray, GNU, TAU, ..)
Project Timeline

2019
- Procurement
- Installation
- System burn-in

2020
- Early user access

2021
- System open for testbed projects

2022
- System open for testbed & production projects
- XSEDE integration (Level 2 SP)
Allocations

- Currently all allocations through Stony Brook
- Accounts have to be renewed every year
- Ookami is in the process of becoming an XSEDE level 2 service provider
- From October 2022 onwards 90% of allocations will be through XSEDE
- Current testbed projects will still have access though at reduced priority
Projects

- Total: 211 users & 71 projects
- 90% projects from within the US
- 10% from Europe
- 93% from academia
- Complete list of projects:
  
  https://www.stonybrook.edu/ookami/projects/
Get in Contact

- [https://www.stonybrook.edu/ookami/](https://www.stonybrook.edu/ookami/)
- Ticketing system: [https://iacs.supportsystem.com/](https://iacs.supportsystem.com/)
- [Ookami_computer@stonybrook.edu](mailto:Ookami_computer@stonybrook.edu)
- Bi-weekly office hours (Tue 10am – noon, Thu 2 – 4pm EST)
- Slack Channel