Cyclops-64 Development S/W

User Application

SHMEM
TNT
ANSI C

GCC-4.1
Assembler
Linker

libc.a
libm.a
libtnt.a
libshmem.a

FAST
Mrs. Clops
C64 Chip
Cyclops-64 Development S/W

- GCC 3.2, 4.0, 4.1 compilers
- GNU binary utilities
  - Assembler
  - Linker
  - Objdump, Addr2line, etc.
- Functional simulator (FAST)
- GDB source-level debugger
- TNT Multithreading Library
  - Thread creation
  - Thread IDs
  - Thread synchronization
- Newlib (C and math libraries)
  - Thread safe library
  - Multithreaded memory allocator
  - Modified to support SRAM & DRAM
  - Optimized string functions
- SHMEM library
- C64 microkernel/RTS
  - Thread management
  - Fault-tolerant I/O
- Regression Test (Polyphemus)
- Performance tool (profiling)
Cyclops-64 System

Admin Node
- Job Scheduling
- Software Monitoring
- Hardware Monitoring

Front-End Nodes
- Program Development (Compilation, Debugging, Simulation)
- Launch Jobs onto C64 Compute Engine

Cyclops-64 Compute Engine
- User Applications

Cluster

Partition 1
Partition 2
Partition 3
A Closer Look

Front End Cluster

Admin Node

Job Manager
SWRAS

TCP

Front-End Node

Batch Launcher
Int. Launcher
RMEM Program
File I/O Daemon

TCP

TCP

I/O Proxy

Cyclops-64

Process Manager (Kernel)
RMEM Daemon
User Application

TCP
Usage

• Log into a front end node on the cluster

• Develop a program
  ▪ Typically SPMD programs are written, however, our software allows any number of thread units to be reserved as “helper threads” → Explicit thread creation can be used here

• Compile, Assemble, Link, [ Simulate ], [ Debug ]

• Launch program onto a C64 Partition
  ▪ Request job size and shape
  ▪ Jobs can be batch submitted, or launched interactively