AQUILA
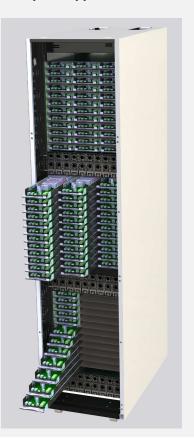
Liquid Cooled Open Compute Platform

FEATURES

- **Industry leading density, energy efficiency, reliability, robustness, and serviceability.**

- **Features Patented TouchCooling™ fixed cold plate cooling from Clustered Systems Company, Inc.**

- **Provides a 5X increase in rack density and an overall power savings of as much as 50% compared to an equivalently equipped air cooled solution**

- **Systems can be custom configured to suit** *any* **development or production INTEL® Xeon® Server application**

- **Industry leading ROI, TCO, reduced CAPEX, and drastically reduced OPEX, providing a competitive edge your CFO can't help but appreciate**

Aquila part No. AQuarius

OVERVIEW

Today, computer and communications infrastructures are under a power strain as resources grow to meet the demand for ever expanding digital content and networked communications. Increasingly, traditional forced air cooling has become a major concern for CIOs, whether looking at expanding current facilities, or planning for new data center resources. Clearly, increasing compute density, while decreasing the cost of cooling has become an industry priority in order to meet current and future power demands for an ever expanding digital ecosystem.

Additionally, CPUs with Thermal Power Dissipation (TPD) ranging from 145 to 300 watts per socket are now common. Attempting to cool these hot chips has become increasingly problematic using traditional forced air cooling. Forced air becomes even more problematic at high altitude, where as much as 35% more air flow is needed to cool systems to thermal operating requirements as measured at sea-level. It is increasingly apparent that the inefficiencies of air cooling are THE limiting factor in meeting the industry's need for vastly increased compute density and higher performance. The industry is coming to grips with the reality that some form of advanced liquid cooling is required to move the bar upward, as cooling with traditional forced air is being acknowledged as unsustainable.

Anticipating this need, AQUILA joined forces with Clustered Systems Company, Inc. and INTEL® to provide an innovative state-of-the-art liquid cooled computing platform. The Aquarius™ system uses Clustered System's TouchIT™ patented cold plate cooling to deliver on the promise of the densest, most cost effective, yet flexible computing platform, while maintaining industry leading cooling effectiveness to total power used ration. In combination with INTEL® Servers, Xeon E5 CPUs, Xeon Phi™ accelerators, and Omni-Path™ (OPA) interconnects, Aquarius™ based compute platforms are ideally suited for High Performance Computing and Hyperscale Data Center applications.

Aquila's Aquarius™ systems provide unparalleled performance coupled with industry leading power efficiency, robustness, density and serviceability. Aquarius™ liquid cooled computing promises to usher in a new era in cost effective, scalable High Performance and hyper-converged computing.

Did we say we are GREEN? Aquarius™ provides up to a 50% overall data center power savings delta over the same server resources cooled by traditional forced air methodologies.

Single Rack System

- **BASE BOARD:** Up to (108) 6.4" x 18" S2600KPX Kennedy Pass motherboards per compute rack with individuals hot swap server trays
- **CPUS:** Up to 216 XEON® E5-26XXV4 CPUs/racks providing up to 3,888 E5 cores/rack
- **AGGREGATE RAM:** Up to 27.7TB/rack using 32G ECC DDR4 2133 mhz DIMMS
- **LOCAL STORAGE:** (2) 2.5" SATA/SAS spinning media or SSD drive per server
- **PCIe Gen3:** (1) available slots per server for 10, 40, 100GbE or other advanced networking options
- **ETHERNET:** Separate management network for IPMI2.0 low level hardware control with (2) additional GbE ports (RJ45)

Server Board Support

- **STANDARD MOTHERBOARD: INTEL S2600KP series** Kennedy Pass Server Baseboard supporting (2) E5-26XXV4 XEON CPUs
- **ACELERATORS (Q3 2016):** Intel Knights Landing on Adams Pass Platform board (COMING SOON)
- **OTHER:** Can support any 6.4" width form factor motherboard from any vendor with some minor mechanical engineering changes (NRE Charge will apply)

Liquid Cooled Server Rack

- **LIQUID COOLED FORM FACTOR:**
- Up to 90"h x 24"w x 48"d
- Supports either 36, 72 or 108 servers (48OU) depending on application's cabling and power restrictions (36 servers per insert)
- Water inflow with manifold can connect directly to standard ASHRAE facility water distribution, CDU systems (preferred method)
- Aquarius™ can connect to the warm water effluent of a chiller door to add capacity with no additional infrastructure

Environment and safety/EMC Regulatory Compliance

- Operating: 10°C to 35°C non operating: -40°C to +70°C
- 0-95% relative humidity non-condensing
- Power supply - UL 60950, CAN/CSA-C22.2 No. 60950-1-03, GR-3160, CE mark, RoHS, REACH
- Mother board- UL – CSA 60950
- This unit conforms to the requirements of FCC Part 15, Subpart B, Class A and EN 300 386, Class A for radiated and conducted noise

Supported Operating Systems

- Centos, RHEL & Red Hat Enterprise MRG Grid O/S
- HPC, Big Data (Hadoop), OpenStack installation and provisioning are supported with *BRIGHT CLUSTER MANAGER, the industry leading single-pane-of-glass cluster management solution*
- Microsoft Enterprise Server

High Speed Networking

- Mellanox InfiniBand: QDR, FDR, EDR options are available and supported
- Intel OPA: Omni- Path 100 Gb/sec low latency, fully compliant with the OpenFabrics Alliance OFED stack
- Connection to Lustre or other parallel file systems are fully supported
- Cost effective Fat Tree or other HSN topologies can be provided for specific tuned applications
- Tightly coupled multi-petaflop Hybrid clusters can be architected on a single switch to minimize latency and jitter.

Server Management

- Out of band BMC- IPMI 2.0 fully supported for remote access to system status, remote power on/off, low level server configuration data, health monitoring and other system utilities.
- Event filtering and monitoring through proactive LAN and mobile devices
- System health indicators and corrective actions including automated power cycling, OS watchdog timer, and fault-resilient booting
- Serial console redirection over LAN via IPMI 2.0
- Centos, RHEL and other Linux HPC middleware and management software are available (with support) through AQUILA

System Cooling & Power

- Warm water cooling loop as supplied by your data center facilities (detailed flow spec by request)
- suggested 30°C (W3) or less at inflow
- Can connect directly to a Cooling Distribution Unit for fine tuned control and added redundancy
- **COOLING CAPACITY: >**100kW of cooling capacity per AQuarius™ liquid cooled rack
- **POWER SUPPLIES: 24kW+ Emerson NetSure™ Redundant Power Conversion:** Converts 480VAC to 12VDC, supplying power to each of three RAILS, and powering up to 36 server systems per 12OU system insert. A maximum of (3) Power supplies per rack powering up to 108 compute nodes.

System Integration

- Aquila can provide fully integrated turnkey HPC cluster systems minimizing your time to production
- Complete HPC ecosystems are delivered with high level technical support for Linux HPC clustering applications
- HPC hardware/software integration and on-site services are available through AQUILA Engineering Services
- Flexible hardware/software SLA support, including 24 hour phone hotline is available
- ***BRIGHT COMPUTING – A BRIGHT CLUSTER MANAGER Advanced HPC One Year Subscription is recommended for Aquarius™ HPC cluster (PLEASE NOTE: Hadoop or OpenStack support require additional licenses)***