HIVE

Solutions for Big Data

3 Modules:

- **CORE for Processing**
- **NET for Communication**
- **DATA for Storage**

… one scalable solution

Reference configurations Acquifer HIVE Data Platform

The following configurations of Acquifer HIVE Data Platform Systems can be used as reference for three levels of performance requirements. Other combinations of the modules are possible as well.

HIVE Configuration 1:
Entry level HIVE with professional graphics and sufficient computing performance for a large range of imaging and microscopy applications, small storage. Single network and no UPS.

HIVE Configuration 2:
Entry level HIVE with professional graphics and sufficient computing performance for a large range of imaging and microscopy applications, small storage, good network-integration.

HIVE Configuration 3:
Provides extensive storage, network, graphics and computing performance for a typical multi-user microscopy environment. Graphics upgrades are possible within certain limits.

HIVE Configuration 4:
This high-end HIVE configuration provides extra large storage capacity combined with highest performance graphics, both for visualization of very large image data sets and GPU-enhanced data processing, network, and computing performance for a large multi-user microscopy environment with advanced applications.

All configurations can be easily expanded in storage volume and network capacity by plug-n-play storage and network modules in 10 Gbit technology.

For a quote of a dedicated configuration for your application please contact enquiry@saneasia.com.

SANE
European Imaging Solutions

HIVE - The solution for professional, highly efficient and secure storage and processing of large image data.

The ACQUIFER HIVE Data Platform is a most efficient IT infrastructure platform to handle and master the rapidly growing data streams of new microscopy methods and modern imaging technologies in biomedical applications and the life sciences. In particular, the HIVE is optimally suited to receive, store and process the data in High Content Screening Projects, in Microscopy Core Facilities and Multi-User Microscopy Laboratories. It can cope with the challenging data rates of modern Light Sheet Fluorescence Microscopes, Confocal and Super Resolution Microscopes, Spinning Disc Confocal or Electron Microscopes to name a few. The HIVE is suitable to serve many imaging systems just as well as single microscopes and can be configured to address the needs of common routine experiments and advanced research applications.

Data safety, fast data transfer within the possibilities of existing network infrastructure and fast data storage, efficient image processing and visualization, project and user administration, secure remote login for safe data access in research collaborations are the most important features of the HIVE Data Platform.

The stackable Modules of the HIVE are designed for super-silent operation in common office- or laboratory environments. The operation of the well-known Windows user interface requires only minimal IT knowledge.

The most important system properties are:

1) The HIVE Platform is modular: Each module comes in its own housing. The modules are all of the same size and stackable. The measures of a single module are 61 x 64 x 27 cm (width x depth x height). 2) The modules are:
    a. HIVE CORE: High Performance Workstation for fast and secure storage and processing and high performance visualization of large image data.
    b. HIVE DATA: Storage volume for fast data access and data safety
    c. HIVE NET: Network module to integrate 13 microscopes and image analysis systems.
2) A basic system includes 1x HIVE CORE, 1x HIVE DATA and 1x HIVE NET. A HIVE CORE can connect up to 6 HIVE DATA modules. This allows up-scaling of the platform with additional HIVE CORE and HIVE DATA modules to Petabyte volume.
3) The noise level of a typical HIVE system is under 50 db and can reach a maximum of 55 db under heavy processing stress (measured in 1 meter distance after 3 minutes of operation). This value can vary depending on configurations. The specification for individual components is typically around 20 db. Specifications for a configuration can be provided upon request.
4) HIVE systems are operated with Windows Server 2012 R2 64-bit. Important features are the support of server grade file systems for data security and multi-user login. Furthermore, Windows Server 2012 R2 supports Hyper-V virtualization and thereby the load-balancing of hardware resources for concurrently logged in users.

Please Note:
ACQUIFER does not recommend operating a HDD array, like the data volumes on HIVE CORE and HIVE DATA without stabilized and independent power supply such as the safety battery pack in the HIVE NET module. ACQUIFER will not be responsible and cannot be held liable for any damage to the RAID array or loss of data that might be caused by power fluctuations. The secure HIVE DATA modules are designed for fast intermediate storage and do not replace a professional data backup or data archive solution.

HIVE Configuration 1:

The HIVE M configuration provides professional graphics and sufficient computing performance for a large range of imaging and microscopy applications, extensive storage, single network integration and no UPS.

1 x HIVE CORE M, 1x HIVE DATA 52

HIVE CORE M 8 GB Graphics, 128 GB RAM, 1x 8 core CPU	Workstation for processing and visualization of large 3D data sets (CPU and CUDA GPU) - CPU and Memory: Intel Dual CPU (1x 8 core), 128 GByte ECC RAM - 10 TB fast and secure local storage volume, data access rate of up to 400 MByte/s - Graphics for demanding 3D visualization, also via remote desktop CUDA GPU processing: NVIDIA Quadro P4000 (8 GB) - 2 x 10 Gbit/s Ethernet adapter (RJ45 copper interfaces)
HIVE DATA 52: HIVE secure and fast data storage module with 52 TeraByte capacity	15 Server grade high performance Hard Disc Drives (HDDs) Nominal Volume 52 Terabyte Server file format for data safety (RAID 6) incl. 1 spare HDD Data access rate from HIVE CORE Modules over internal SAS Bus at up to 800 MByte/s

HIVE Configuration 2:

The HIVE M configuration provides professional graphics and sufficient computing performance for a large range of imaging and microscopy applications, small storage and fast network-integration.

1 x HIVE M, 1x HIVE Net 16

HIVE CORE M 8 GB Graphics, 128 GB RAM, 1x 8 core CPU	Workstation for processing and visualization of large 3D data sets (CPU and CUDA GPU) - CPU and Memory: Intel Dual CPU (1x 8 core), 128 GByte ECC RAM - 10 TB fast and secure local storage volume, data access rate of up to 400 MByte/s - Graphics for demanding 3D visualization, also via remote desktop CUDA GPU processing: NVIDIA Quadro P4000 (8 GB) - 2 x 10 Gbit/s Ethernet adapter (RJ45 copper interfaces)
HIVE NET 16: 10 Gbit networking module for supporting up to 13 connected devices	Networking Module for up to 13 connected devices with true 10 Gbit/s Optional: Router, DHCP Service, Firewall protecting all connected devices Uninterruptable power supply (UPS)

HIVE Configuration 3:

The HIVE L configuration provides extensive storage, network, graphics and computing performance for a typical multi-user microscopy environment.

1 x HIVE L, 1x HIVE DATA 52, 1x HIVE Net 16

HIVE L 16 GB Graphics, 256 GB RAM, 2x 8 core CPU	High end workstation for processing & visualization of large 3D data sets (CPU, CUDA GPU) - CPU and Memory: Intel Dual CPU (2x 8 core), 256 GByte ECC RAM - 10 TB fast and secure local storage volume, data access rate of up to 400 MByte/s - Graphics for demanding 3D visualization, also via remote desktop CUDA GPU processing: NVIDIA Quadro P5000 (16 GB) - 2 x 10 Gbit/s Ethernet adapter (RJ45 copper interfaces) - The HIVE CORE has been tested and approved at Acquifer to execute the following
HIVE DATA 52: HIVE secure and fast data storage module with 52 TeraByte capacity	15 Server grade high performance Hard Disc Drives (HDDs) Nominal Volume 52 Terabyte Server file format for data safety (RAID 6) incl. 1 spare HDD Data access rate from HIVE CORE Modules over internal SAS Bus at up to 800 MByte/s
HIVE NET 16: 10 Gbit networking module for supporting up to 13 connected devices	Networking Module for up to 13 connected devices with true 10 Gbit/s Optional: Router, DHCP Service, Firewall protecting all connected devices Uninterruptable power supply (UPS)

HIVE Configuration 4:

The high-end HIVE provides extra large storage capacity combined with highest performance graphics, both for visualization of very large image data sets and GPU-enhanced data processing, network, and computing performance for a large multi-user microscopy environment with advanced applications:

1 x HIVE CORE XL, 2x HIVE DATA 78, 1x HIVE Net 16

HIVE CORE XL 24 GB Graphics, 512 GB RAM, 2x 22 core CPU	Ultra-High end workstation for processing and visualization of very large 3D data sets (CPU,CUDA GPU) - CPU and Memory: Intel Dual CPU (2x 22 core), 512 GByte ECC RAM - 10 TB fast and secure local storage volume, data access rate of up to 400 MByte/s - Graphics for most demanding 3D visualization, also via remote desktop, CUDA GPU processing: NVIDIA Quadro P6000 (24 GB) - 2 x 10 Gbit/s Ethernet adapter (RJ45 copper interfaces) - redundant power supply
2x HIVE DATA 78: HIVE secure and fast data storage module with 156 TeraByte capacity	2x 15 Server grade high performance Hard Disc Drives (HDDs) Nominal Volume 156 Terabyte Server file format for data safety (RAID 6) incl. 2 spare HDD Data access rate from HIVE CORE Modules over internal SAS Bus at up to 800 MByte/s per DATA module
HIVE NET 16: 10 Gbit networking module for supporting up to 13 connected devices	Networking Module for up to 13 connected devices with true 10 Gbit/s Optional: Router, DHCP Service, Firewall protecting all connected devices Uninterruptable power supply (UPS)