# Adaptive HPC & AI Converged System

Meet Your Productivity and Efficiency Demands

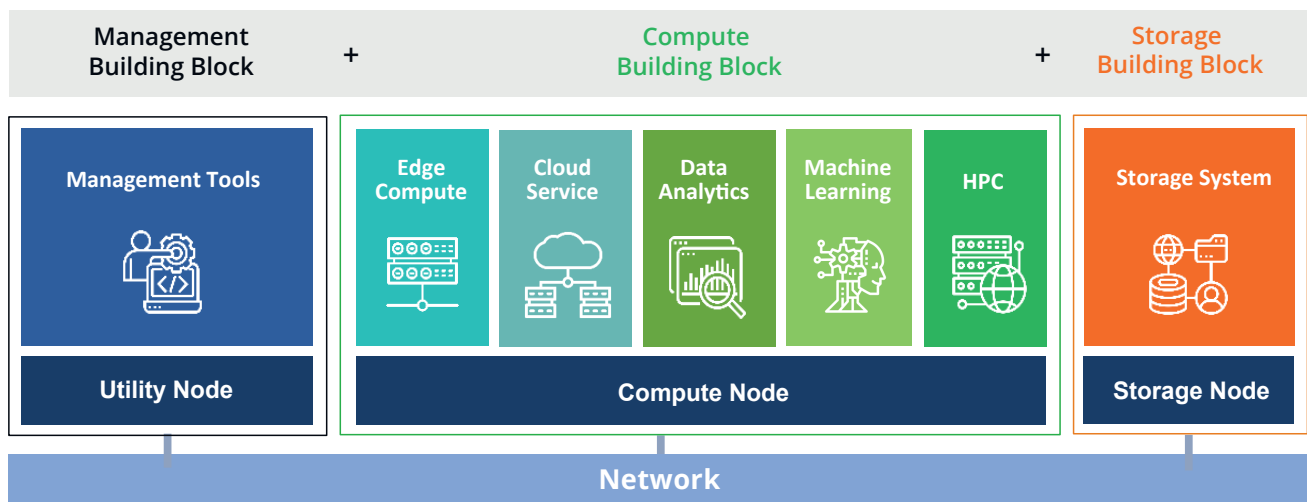# Flexible Workload-driven Systems to Power Your Business

Nowadays, the implementation of HPC and AI workloads is increasing in enterprises and institutions. Users and organizations often need to run complicated models and simulations to get insights in a shorter time frame. Scalable storage and management systems have also become more important than ever.

QCT Platform-on-Demand (QCT POD) is an on-premises rack-level solution customized for specific workloads in High-Performance Computing (HPC), Artificial Intelligence (AI), and Data Analytics. With a building block design, QCT POD is highly flexible and scalable, meeting the demands of various workloads with highly efficient performance delivered by an optimal integration of hardware and software.

QCT POD is pre-validated and pre-configured, saving time and resources during implementation and ensuring quick deployment. It provides integrated storage solutions and a comprehensive computing infrastructure that can handle ever-growing data. Furthermore, it supports both cloud-native and bare-metal environments, allowing organizations to optimize their use of resources by leveraging the benefits of both environments.

To cater to the specific requirements of HPC and AI workloads, QCT POD supports different types of network connections, such as low-latency, high-bandwidth InfiniBand for large-scale computing and data exchange, and ethernet for data analytics and AI workloads.

These solution attributes help enterprises and institutions reduce the complexity of system design and shorten the deployment process, allowing them to effectively handle a wide range of HPC and AI applications, accelerating their time-to-value.

| Management Building Block | + | Compute Building Block | + | Storage Building Block |
|---|---|---|---|---|

| Management Tools | Edge Compute | Cloud Service | Data Analytics | Machine Learning | HPC | Storage System |
|---|---|---|---|---|---|---|

| Utility Node | Compute Node | Storage Node |
|---|---|---|

**Network**

Powered by 4th gen Intel® Xeon® Scalable Processors

# QCT POD Improves IT infrastructure Cost-effectiveness and Performance

QCT POD software stack simplifies the administrative tasks for the IT staff and features a workload package that supports a robust development environment.

## Optimized investment with best-fit system design

- Web-based dashboard to ease monitoring and management burdens for administrators
- Comprehensive development environment to streamline workflows for developers
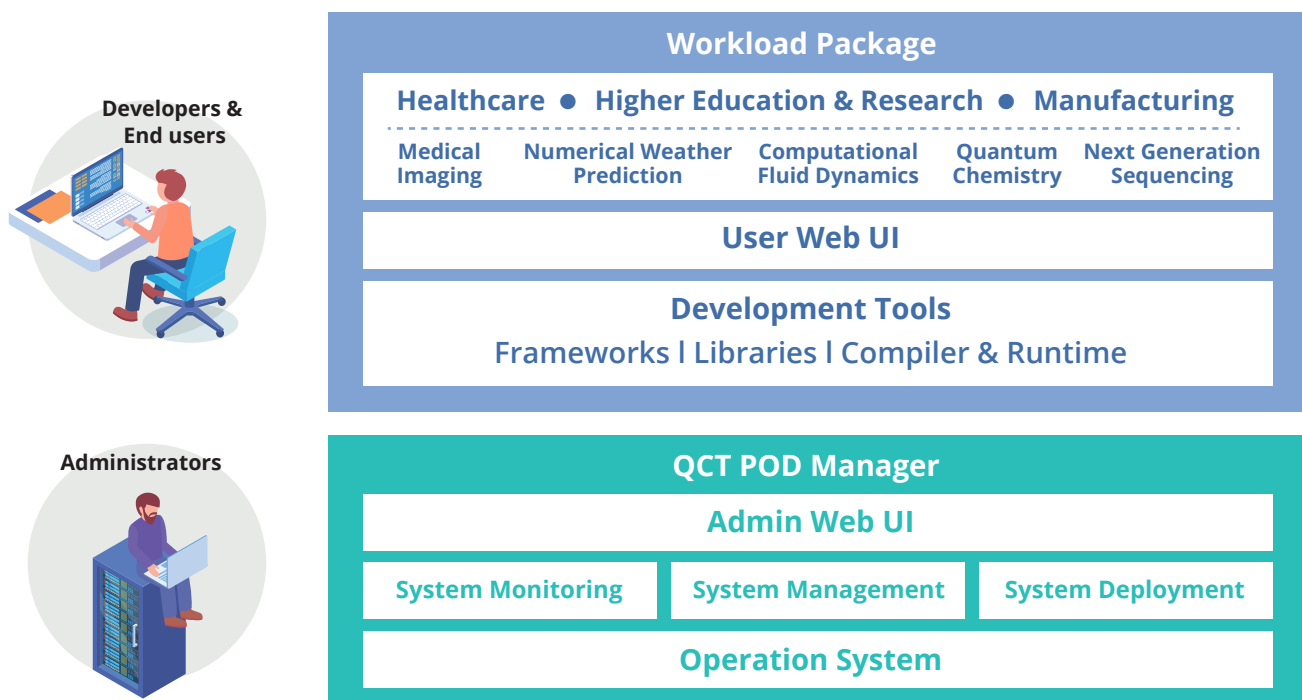
## Simplified management and development process

- Best-practice solution with a building block design to deliver excellent workload performance
- Server level systems with converged HPC/AI computing resources to avoid system silos and improve system utilization

## Short time-to-value

- Turnkey solution with a rapid deployment tool to accelerate your time-to-value
- Pre-configured and pre-validated HPC & AI runtime environment with relevant libraries, frameworks, and compiler tools

## QCT POD Software Stack

**Developers & End users**

### Workload Package

**Healthcare ● Higher Education & Research ● Manufacturing**

| Medical Imaging | Numerical Weather Prediction | Computational Fluid Dynamics | Quantum Chemistry | Next Generation Sequencing |

**User Web UI**

**Development Tools**

**Frameworks l Libraries l Compiler & Runtime**

**Administrators**

### QCT POD Manager

**Admin Web UI**

| System Monitoring | System Management | System Deployment |

**Operation System**

QCT POD introduces new features of data management and a CLI tool for cloud-native scheduling called Qbatch, which enables enterprises to gain deeper insights from their data. The cloud-native scheduler and Qbatch streamline job scheduling for compute-intensive workloads in cloud-native environments, while the data management tool resolves the challenge of data silos and enables effective data management.

## Ease your cloud native scheduling job submission effort

QCT POD features built-in cloud-native schedulers, Kubernetes and Volcano to improve resource management and job scheduling. Furthermore, QCT has developed the Qbatch command-line interface (CLI), enabling users to submit jobs through the command line in a more intuitive way. This approach eliminates the need to write complex YAML files, simplifying the process for HPC users to submit jobs and manage resources efficiently.

✓ Reduce the learning curve to submit jobs in container environment.

✓ Support log streaming & output.

✓ Real time monitoring on job status.

## Simplify data management

QCT POD simplifies data management by automatically moving data to pre-defined tiers based on its value change through integration with iRODS. The implementation workflow of iRODS is streamlined and automated with QCT's pre-defined script. The integration optimizes the storage efficiency and significantly reduces storage costs, while enabling users to drive an efficient end-to-end workflow with data security and metadata integrity.

✓ Pre-defined deployment script that reduces manual efforts in iRODS deployment.

✓ Offer a playbook to simplify the storage integration process.

# Realize Industrial Workload Demands

The QCT POD is a flexible and scalable solution designed to address varying workload demands, including Next Generation Sequencing (NGS), Molecular Dynamics, Computation Fluid Dynamics (CFD) and more. Its high flexibility allows it to provide customized configurations based on the specific workload requirements of different industries. This helps customers overcome challenges associated with limited IT resources and rapidly growing data volumes, as well as data protection requirements, ultimately accelerating time-to-value for customers.

# QCT POD Solution Portfolios

The table below provides reference solution configurations for AI and HPC workloads. For different workloads, QCT offers expertise in infrastructure to assist customers in fulfilling their workload demands in various domains.

| Components | | QCT POD for AI workload | QCT POD for HPC workload |
|---|---|---|---|
| Compute | CPU | 4th Intel® Xeon® Scalable processors | 4th Intel® Xeon® Scalable processors |
| | Accelerator | 2 ~ 8 GPUs | 2 ~ 8 GPUs |
| Networking | Ethernet | 10GbE \| 25 GbE | 25GbE \| 100 GbE |
| | InfiniBand | 100Gb \| 200Gb | 200Gb \| 400Gb |
| Storage | Unified Storage System | Ceph | Ceph |
| | Parallel File System | N/A | BeeGFS \| Lustre |
| | Hierarchical Storage Management | iRODS | N/A |
| Management | One-key System Deployment | Rocky Linux 9 \| RHEL 9 | Rocky Linux 9 \| RHEL 9 |
| | Operating Environment | Bare Metal \| Container | Bare Metal \| Container |
| | Resource Management and Job Scheduling | Kubernetes w/ Volcano and Qbatch | Kubernetes w/ Volcano and Qbatch \| SLURM |

# QCT Comprehensive Hardware Platform
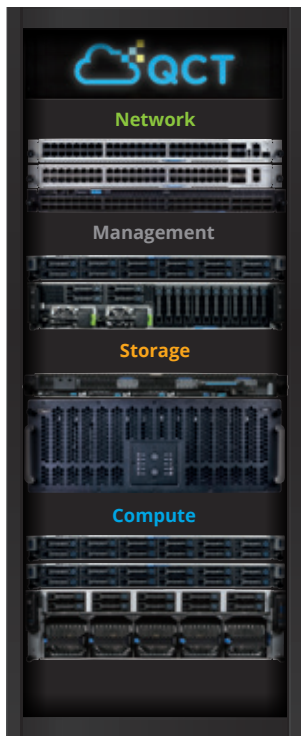
**Networking**

QuantaMesh T1048-LB9M

QuantaMesh T1048-LY4R

QuantaMesh T4048-IX8D

**Management**

QuantaPlex T43Z -2U

QuantaGrid D54X-1U

**Storage**

QuantaVault JB4603-4U

QuantaPlex S24P-5U

QuantaGrid S54S-1U

**Compute**

QuantaGrid D54X-1U

QuantaGrid D54Q-2U

QuantaGrid D54U-3U

QuantaGrid D74H-7U

### National Cheng Kung University for AI Data Center

*"QCT provides a holistic HPC & AI converged solution that not only greatly benefits our research, but also paves the way for our digital transformation."*

*Chair Prof. Jason Yi-Bing Lin,*
*Director, Quanta-NCKU Joint AI Research Center*

### Academia Sinica Institute of Astronomy and Astrophysics (ASIAA) HPC System Implementation

*"QCT supported ASIAA in developing a unified solution for High-Performance Computing for astronomy and astrophysics."*

*Min-Kai Lin,*
*Associate Researcher, ASIAA*

## About QCT

Quanta Cloud Technology (QCT) is a global data center solution provider. We combine the efficiency of hyperscale hardware with infrastructure software from a diversity of industry leaders to solve next-generation data center design and operation challenges. QCT serves cloud service providers, telecoms and enterprises running public, hybrid and private clouds.

Product lines include hyperconverged and software-defined data center solutions as well as servers, storage, switches and integrated racks with a diverse ecosystem of hardware component and software partners. QCT designs, manufactures, integrates and services cutting-edge offerings via its own global network. The parent of QCT is Quanta Computer, Inc., a Fortune Global 500 corporation.

For more information, visit the QCT website at www.QCT.io.

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