HPC SYSTEMS

People and Computing Power

HPC Systems Inc.

Company Introduction

February, 2023

Company Profile

Philosophy

Contribute to the world peace with the power of people and computing

Mission

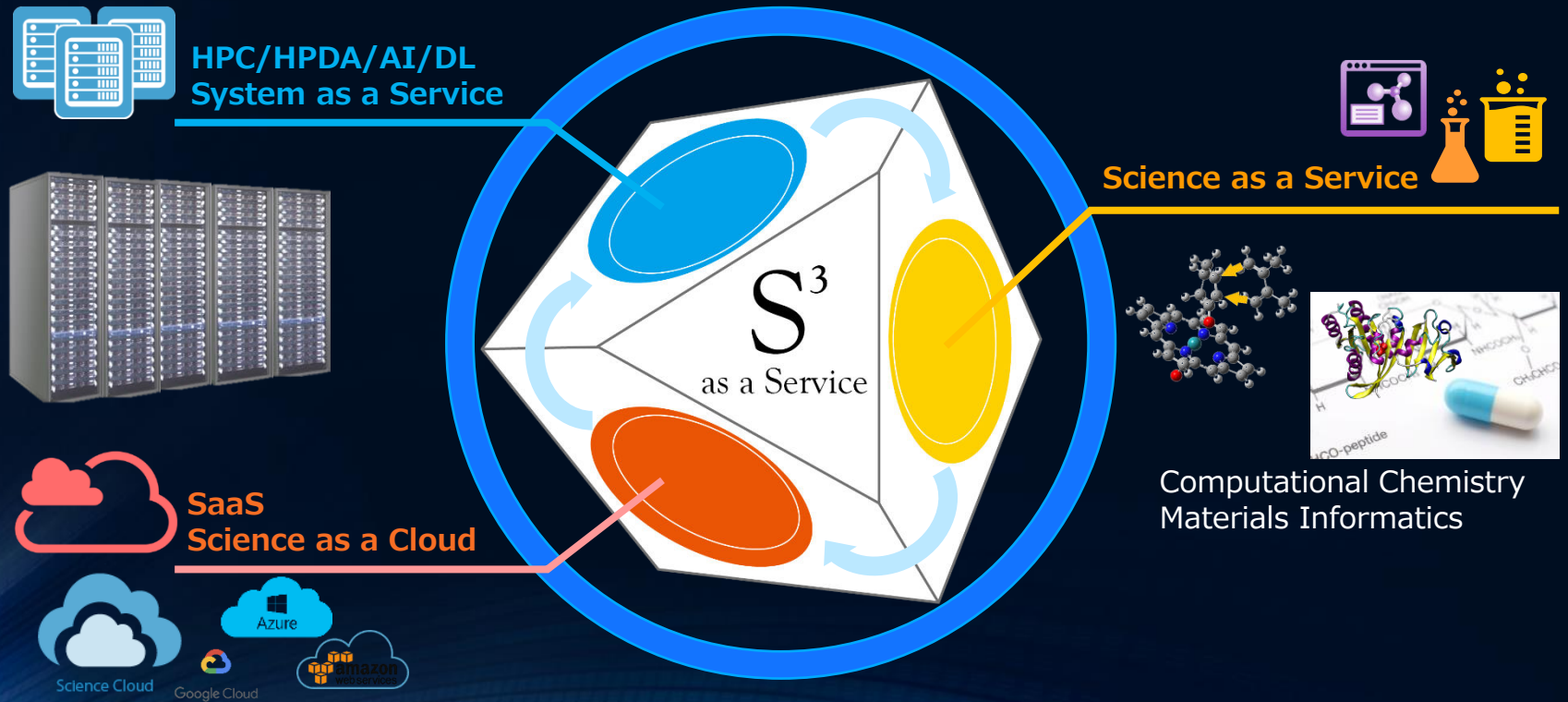
Our mission is to Empower Scientist and Engineer to Accelerate Innovation

Company Name	HPC Systems Inc.
Head Quarter	8F Loop-X, 3-9-15 Kaigan, Minato-ku, Tokyo 108-0022, Japan
Established	July 2006
Capital	JPY 200 Millions
Stock Exchange	TYO: 6597
President	Teppei Ono
# Employees	130
Segment	High Performance Computing, Industrial/ Edge Computing

R&D Center	Life Science Building, 3-11-5 Nihonbashi, Chiyoda-ku, Tokyo, Japan
West Office	Karasumadori, Shimogyou-ku, Kyoto-shi, Kyoto, Japan
Nagoya Office	Nagoya, Japan
Factory	174-1 Node, Sosa-shi, Chiba 289-3181 Japan
Oversea	4F.-4, No.92, Baozhong Rd., Xindian Dist., New Taipei City 231, Taiwan, ROC
	16F Daeha Business Center, 360 Kim Ma Str., Ba Dinh Dist., Ha Noi, Viet Nam

about HPC Systems Inc.

We provide S³ Solution as a Service, such as High-Performance Computing system integration, Deep Learning AI System Integration, simulation software development and Computational Chemistry consulting services, SaaS Science Cloud Services, Edge Computing hardware for Machine Vision and IoT to variety of industries, Government Institutions and Universities.



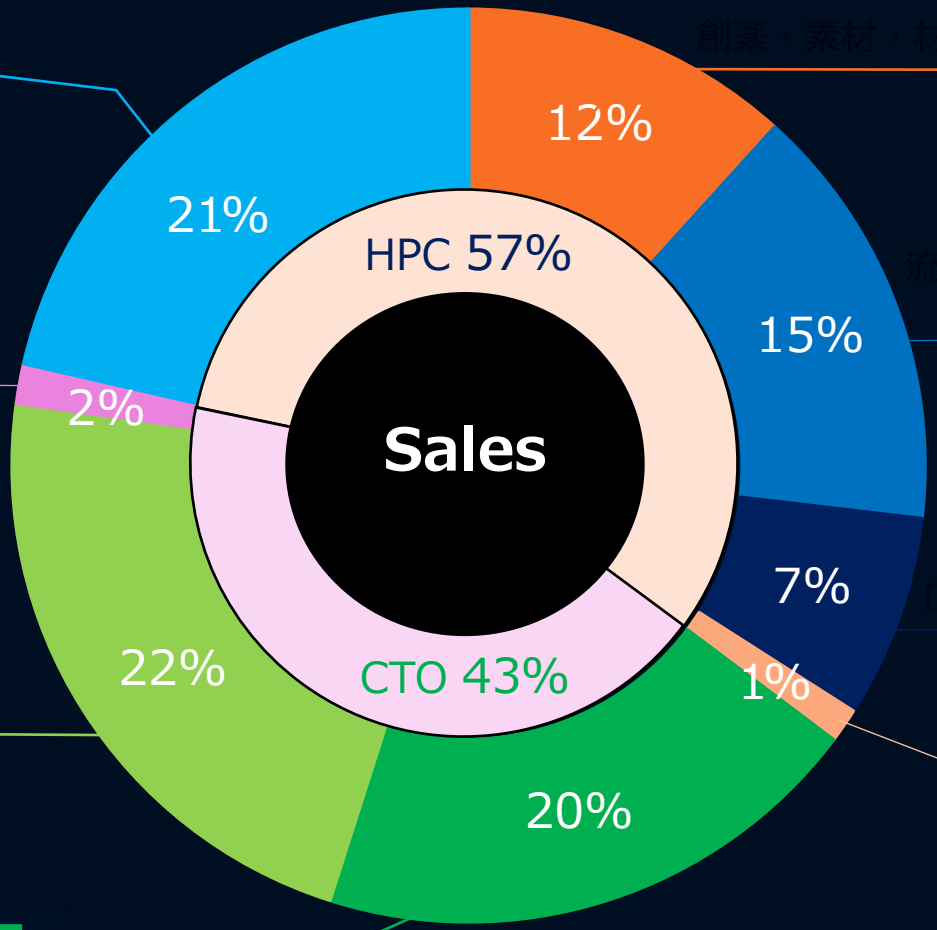
Diversified sales

CSS
Universities/public research institutes/ministryNatural Science, Applied Science, Comprehensive Science

Edge AI
Infrastructure monitoring/Security equipment, edge inference terminal, AI-OCR equipment, etc.

Smart Factory
Appearance inspection, manufacturing equipment for semiconductors, etc.Industrial computer for factory equipment

Edge IoT
Computers for non-manufacturing industries such as medical equipment and amusement



CCS
Comprehensive chemistry, derivatives, electronic materials, petrochemicals, pharmaceuticals, food, cosmetics

CAES
Automobiles, general electrical equipment, optical equipment, precision equipment, information communication equipment, mechatronics, air conditioning equipment, electronic parts, heavy electrical equipment, electric power equipment, heavy industry

DSS
Machine learning and AI research and development in industrial field

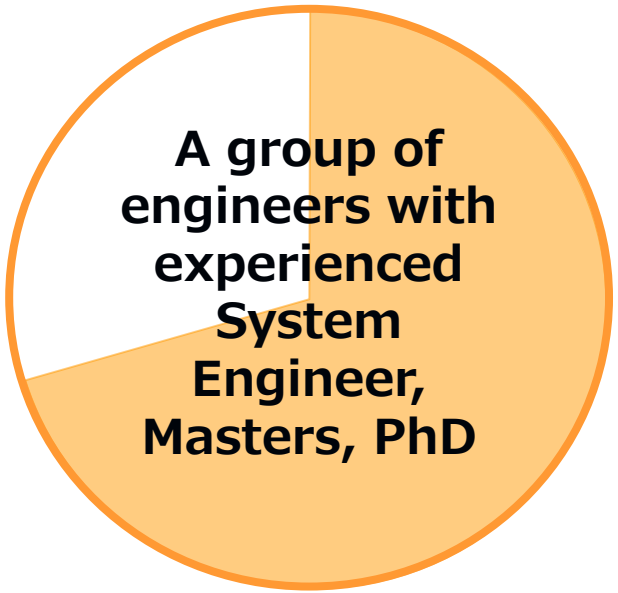
HPCI
Infrastructures

CSS (Computer Science Solution)	Edge IoT
CCS (Computational Chemistry Solution)	Smart Factory
CAES (Computer Aided Engineering Solution)	Edge AI
DSS (Data Science Solution)	
HPCI (HPC Infrastructure)	

R&D Team

A group of engineers in a wide range of specialized fields that support cutting-edge research and technological development

Experienced and diverse group of engineers



Ph.D. Graduate School of Engineering (Specialty: Theoretical Chemistry) Doctor of Science (Specialty: Chemistry) Doctor of Science (Specialty: Organic Synthesis) Ph.D. Graduate School of Human Informatics (Specialty: Physics / Molecular Distribution) Ph.D. Graduate School of Systems Engineering (Specialty: Organic Synthesis / Physical Chemistry) Doctor of Environment and Information Studies (Specialty: Fluid simulation) Ph.D. Information Science (Specialty: Data Mining) Ph.D. Graduate School of Information Systems (Specialty: Parallelization Program) Ph.D. Graduate School of Science (Specialty: Physics) Doctor of Medicine Graduate School of Medicine Master's Graduate School of Information Science and Engineering (Specialty: Computational Science) Master of Science (Specialty: Chemistry / Machine Learning) Master of Science (Specialty: Physics, Deep Learning) Master's Department of Material Creation Science (Specialty: Material Creation) Master of Engineering Graduate School of Engineering (Specialty: Information Science / Deep Learning) Master of Science (Specialty: Chemistry)

Our Technology Milestone & Strategy

Member of Supercomputer Fugaku Cloud Project

Industrial use (Manufacturing company)

QM software Research & Development on Quantum Computing

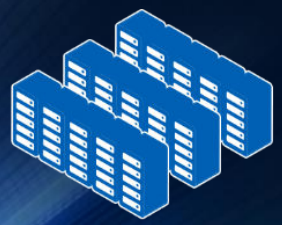
Materials Informatics AI Algorithm Development

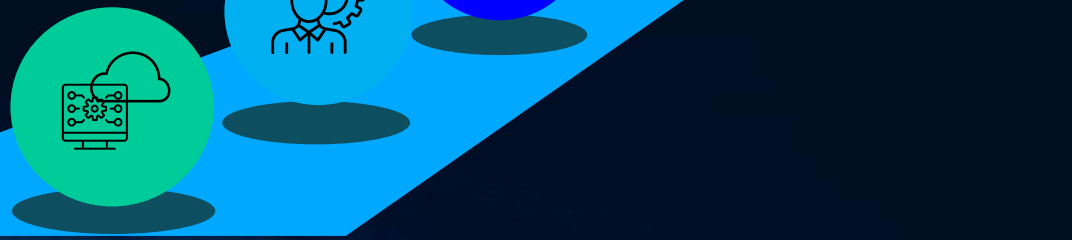
Chemical Reaction Simulation Software & Consulting

HPC/AI Deep Learning System Solutions

CAES: Computer Aided Engineering Solution,
CCS: Computational Chemistry Solution,
DSS: Data Science Solution,
CSS: Computer Science Solution,
HPCI: HPC Infrastructure

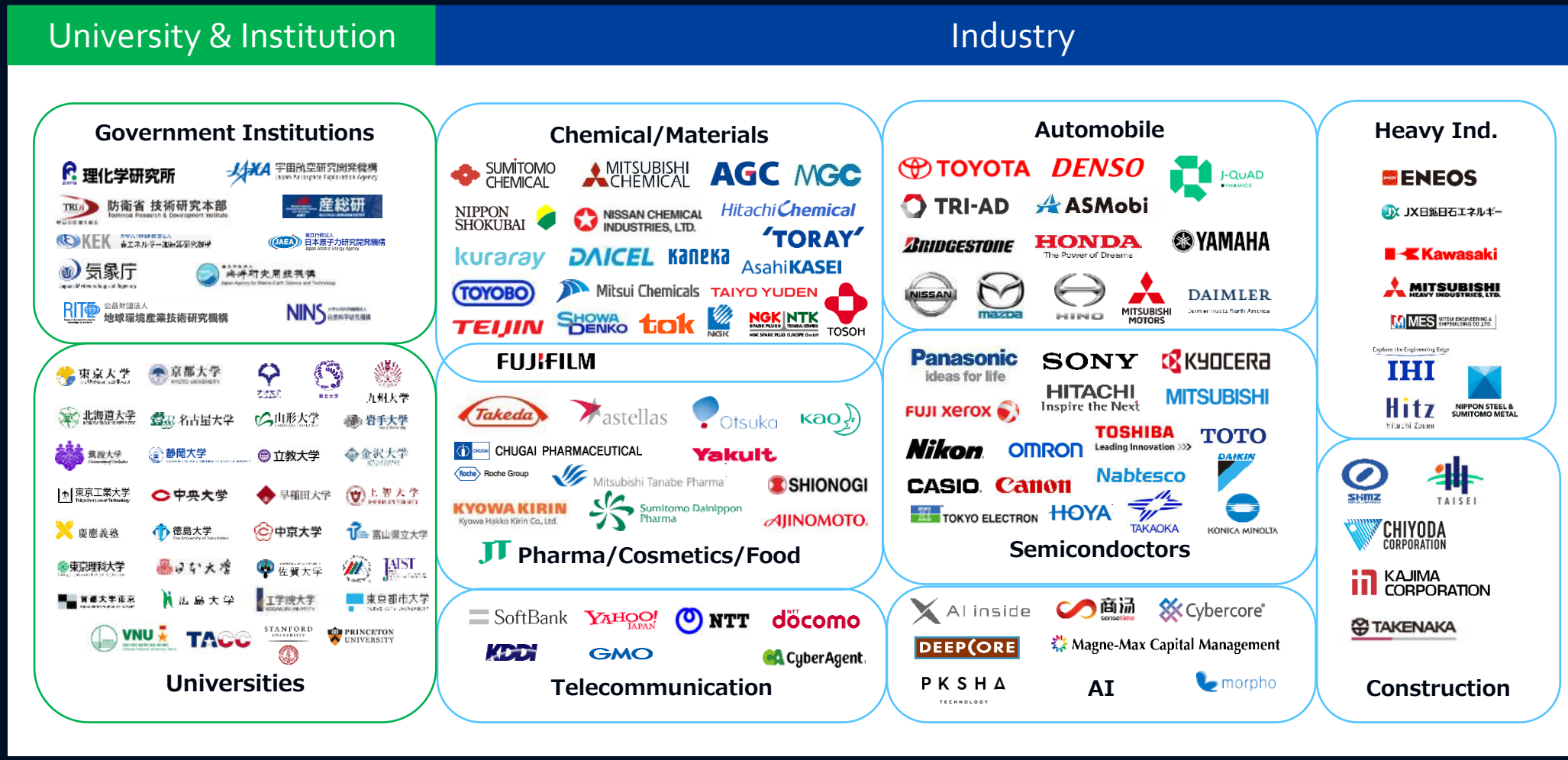
HPC AI On-Premises System/ SaaS Cloud Services





Our Clients: Academic and Industries

Covers a wide range of industries and has a strong customer base



HPC Solutions

HPC・HPDA System Integration

Computational Chemistry・MI

Science Cloud SaaS

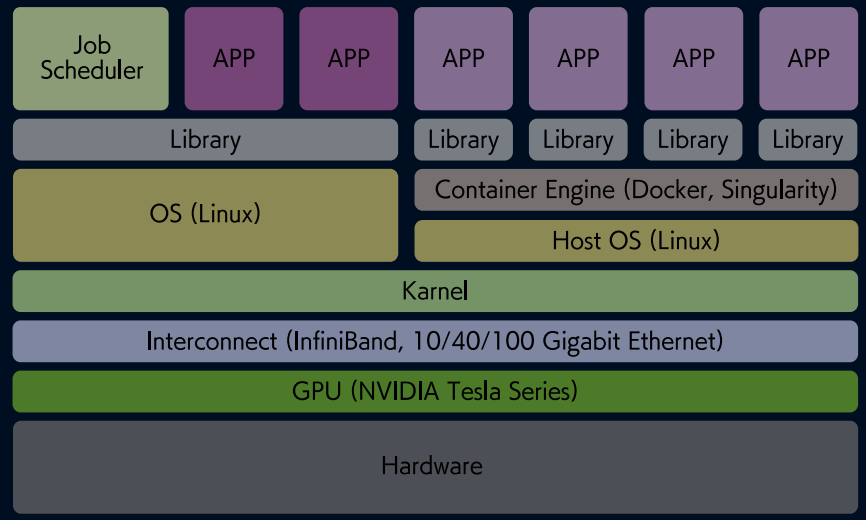
Deep Learning AI System Integration

HPC : High Performance Computing　HPDA : High Performance Data Analysis　MI : Materials Informatics

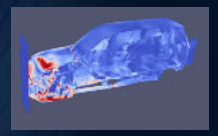
System as a Services – HPC AI System Integration

HPC System Integration

- Ser up OS
- Container Set up
- Network Set Up
- Job Scheduler (LSF, PBS Pro, UGE)
- NIS Settings (Centralized user management)
- NFS Settings Data Sharing
- Application Set up
- NTP Settings time synchronization
- Compiler Settings Dev Environment
- MPI Settings (Parallel computing environment)
- RAID Settings
- Accelerator Settings (CUDA)
- System redundancy settings
- Option Settings InfiniBand, etc.

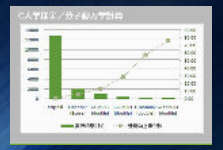


Program Acceleration Turning



Multi-GPU, 20 million particles, 100,000 steps car collision analysis, Several months ⇒ shortened to about 2 weeks

MPI parallelization of many-body electronic state calculation Achieved 61 times faster with 64 cores



GPGPU coding of Molecular Dynamics calculation achieves 76 times faster

Frameworks

Caffe, Caffe2, Chainer, Microsoft CNTK, mxnet, PYTORCH, TensorFlow, torch

Deep Learning SDK

cuBLAS, cuDNN, cuSPARSE, DeepStream SDK, NCCL, TensorRT

Libraries

Keras, OpenCV, theano

OS Dev Environment

ubuntu, NVIDIA CUDA, NVIDIA DIGITS, docker, HAILO

Orchestration

kubernetes, docker SWARM, slurm, grid engine

System as a Services – HPC Applications

Support a wide range of scientific software, nano scale to macro scale

Quantum Chemistry	Solid state physics	Molecular Dynamics	Structure/ Fluid, Analysis		Electromagnetics	Statistics/ Data Analysis
Gaussian	VASP	AMBER	CFX	Star-CCM+	HFSS	Mathematica
Gaussview	Wien2k	GROMACS	Easy5	SCRYU/Tetra	Femtet	Maxima
Reaction plus Pro	SIESTA	QMMM plus	Front Flow	STREAM	JMAG	Matlab
Reaction plus	Quantum ESPRESSO	Solutionplus for AMBER	Fluent	OpenFOAM	SILVACO	R
GaussRun	Open MX	Solutionplus for GROMACS	Adams	Marc		
QM plus	CASTEP	NAMD	ABAQUS	Dytran		
Visomin	ABINIT	DL_Poly	Star-CD	Nastran		
GAMESS	ABINIT-MP	SYBYL	Patran	COMSOL		
Molpro		Lammps	Phoenics			
PAICS		CPMD				
Spartan						
Q-Chem						
MOLCAS						
NWChem						

Original Software

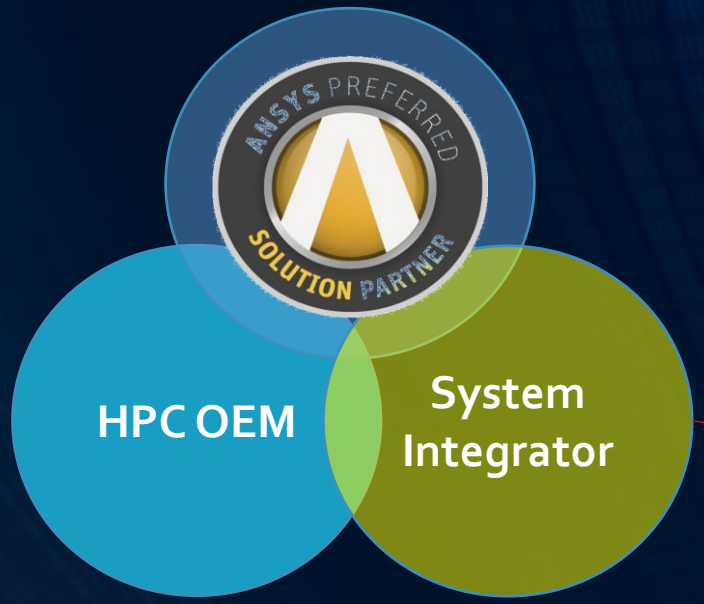
OS	Compiler	JOB Management	Monitoring
Red Hat Enterprise Linux	Intel Composer	IBM Platform LSF	ganglia
Cent OS	PGI Composer	LAVA	Zabbix
Ubuntu OS		PBS Pro	JobMap
Windows		Grid Engine	



System as a Services – CAE ANSYS Partner

HPC Cluster Appliance Program

HPC Systems Inc. provides turn-key HPC system solutions for computation with ANSYS products. HPC Systems Inc. supports computer clusters using either RHEL/CentOS or Windows, while optionally supporting RSM for easy-to-use scalable cluster system. About 20 years, HPC Systems Inc. has provided HPC system consultation and turn-key HPC system solutions.



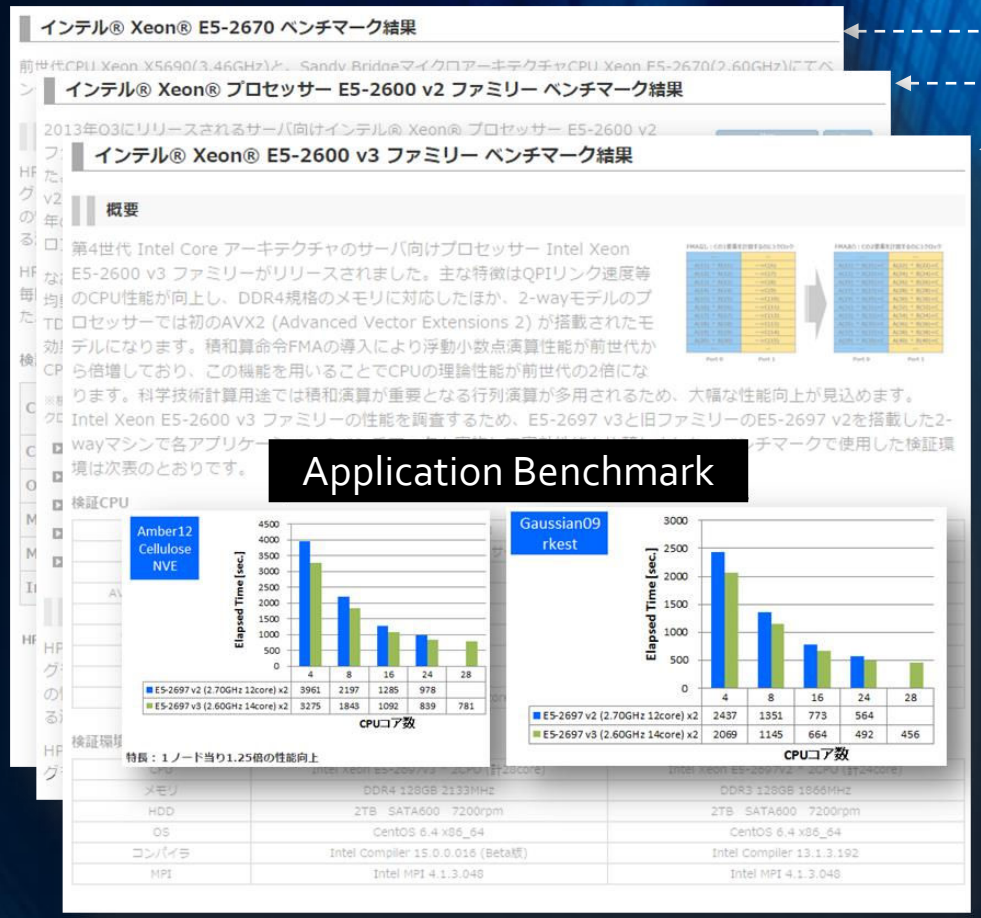
ANSYS High-Performance Computing Partners

- Advania
- Advanced Micro Devices (AMD)
- (ATI) AMD
- BOXX Technologies
- Bull SAS
- Cray Inc.
- Cycle Computing
- Dalco
- Dasher Technologies
- Dell Inc.
- E4 Computer Engineering SpA
- Fujitsu
- HP
- HPC Systems
- Hewlett Packard Enterprise
- Huawei Technologies Co., Ltd.
- IBM
- Intel Corporation
- Lenovo
- Mellanox Technologies
- MicroConsult GmbH
- Microsoft
- Microsoft Azure
- NICE
- Northern Computer Technologies, Inc. DBA Nor-Tech
- NVIDIA Corporation
- OCF plc
- OpenText Corporation
- Oracle
- PADT, Inc
- Panasas, Inc
- Platform Computing
- Rave Computer
- RedHat
- TotalCAE
- Univa Corporation
- X-ISS

https://www.ansys.com/About-ANSYS/partner-ecosystem/high-performance-computing-partners

System as a Services – Application Benchmarks

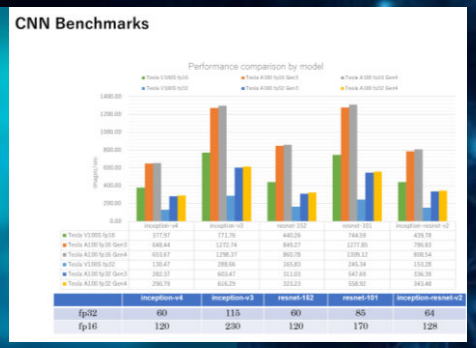
Provide Benchmarks on Performance comparison on DL model, GPUs model

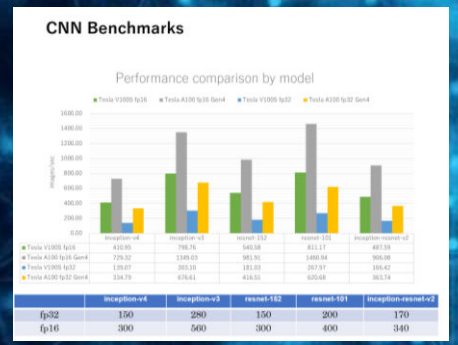


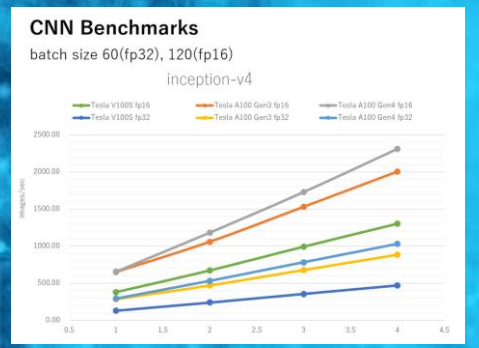
2012	Sandy Bridge
2013	Ivy Bridge
2014	Haswell
2015	Broadwell
2016	Skylake, Knights Landing NVIDIA Pascal…….
2017	NVIDIA Volta, ThunderX2
2018	AMD MI25, HiSilicon1616, Cascade Lake, etc.
2019	HiSilicon Kunpeng, AMD Rome
2020	A100, arm A64FX, Ice Lake, Graphcore IPU
2022	MI250, H100, Genoa,

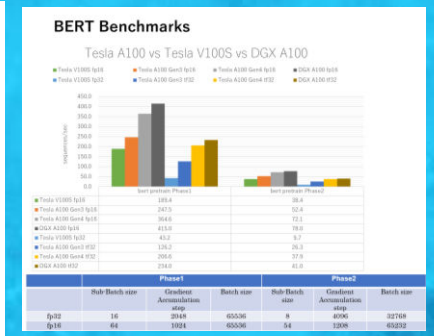
System as a Services – Deep Learning Benchmarks

Provide Benchmarks on Performance comparison on DL model, GPUs model

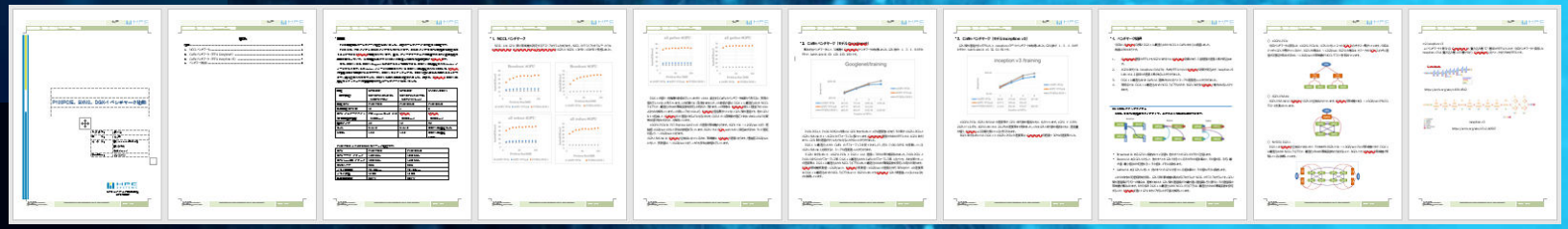




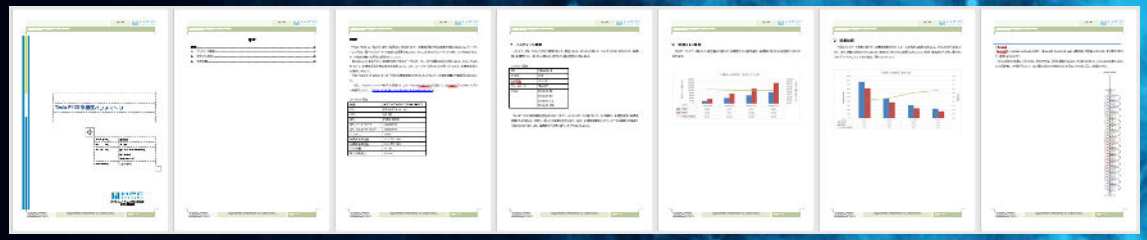




Tesla P100 PCIe, P100 SXM2,3 V100, DGX-1, DGX-2 DGX-A100, H100



Double, Single precision floating point



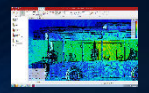
System as a Services – Case Study

Automotive clients

Edge HPC (PoC)

5G

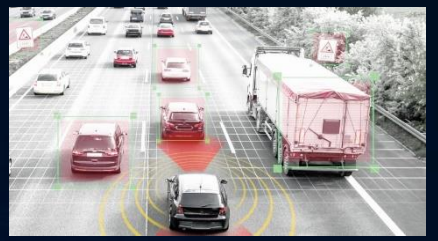
Electronic magnetics
HPC Cluster System



LiB Material
Development
Simulation System

ADAS Algorism Development
Autonomous Algorism
Deep Learning R&D System
Antenna and frequency
Analysis System

Autonomous driving algorithm
Engineering Workstation



Science as a Services – Consulting

Chemistry Software

Making chemical calculation easier, more convenient

Computation Support

Computational Chemistry support on Customer Application

Computation Software Support

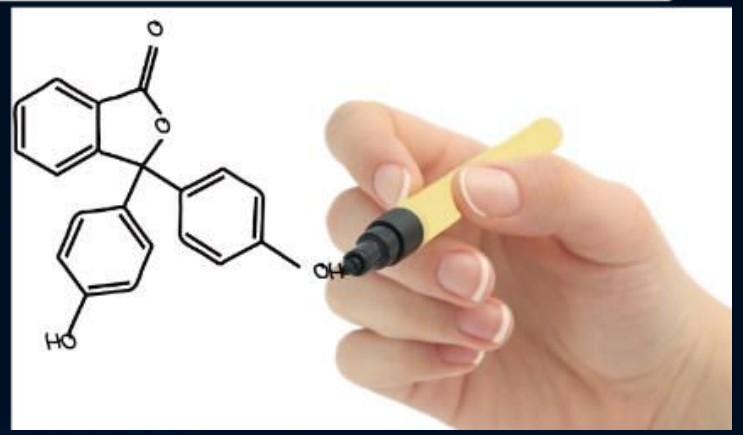
Supports software usage and error handling

Chemistry Seminar

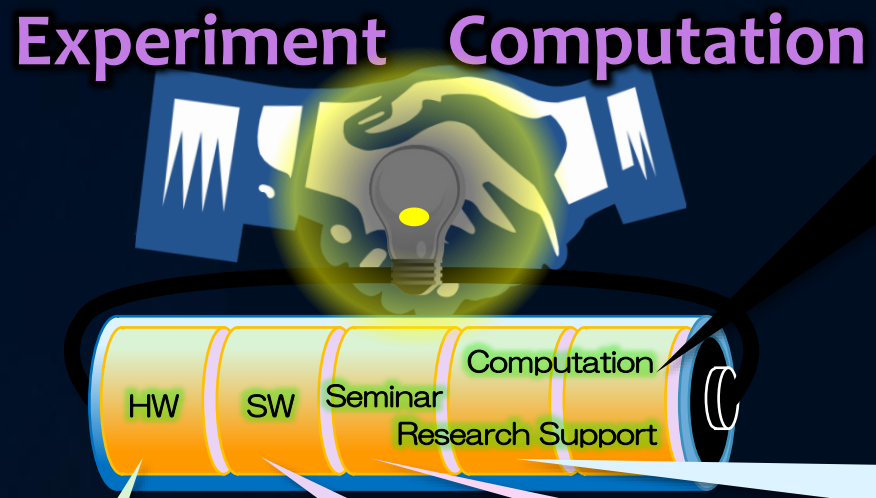
Support from introduction to application methodology

R&D Consulting

Support R&D and research theme



Science as a Services – Solutions

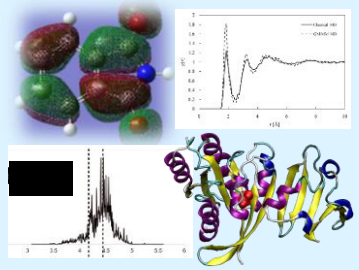


Consulting and Technical Support

- Technical Support
- Computation error handing
- Problem Solving
- Joint research
- Software Development

Computation Support

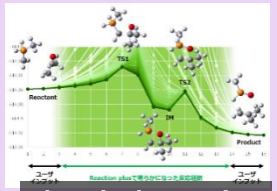
- Molecular structure optimization
- HOMO/LUMO Analysis
- Raman spectrum
- NMR spectrum
- Reaction path analysis
- Excitation state calculation



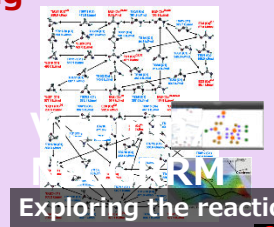
HPC Systems

- Rackmount Server
- Workstation
- GPU
- Storage
- Network switch
- Cloud service
- HPC/DL System Integration
- Application Optimization
- Middleware
- Job Monitoring

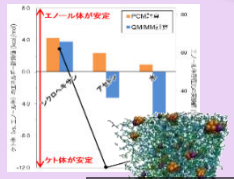
Chemistry Simulation Software Development Software Turning



Chemical Reaction

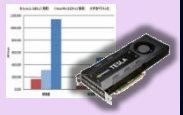


Exploring the reaction path



Evaluation of solvent effect

		Original
Gaussian	GROMACS	Reaction plus
GAMESS	AMBER	QMMM plus
NWChem	LAMMPS	GaussRun
		Visomin/GRRM



Computational Chemistry

Closed Seminar format

- S101
  Calculation Method
- S102
  How to use Application
- S103
  How to select methods and basic function
- S303
  etc

Science as a Services – Consulting

Body Materials: Solid Physics
VASP, WIEN2k, CASTEP

Batteries: Molecular Dynamics
Amber, NAMD, Gromacs
Battery additive material

Room Inside:
Electromagnetic Field Analysis
HFSS, JMAG

Tire Strength:
Transient Response Analysis
ABAQUS

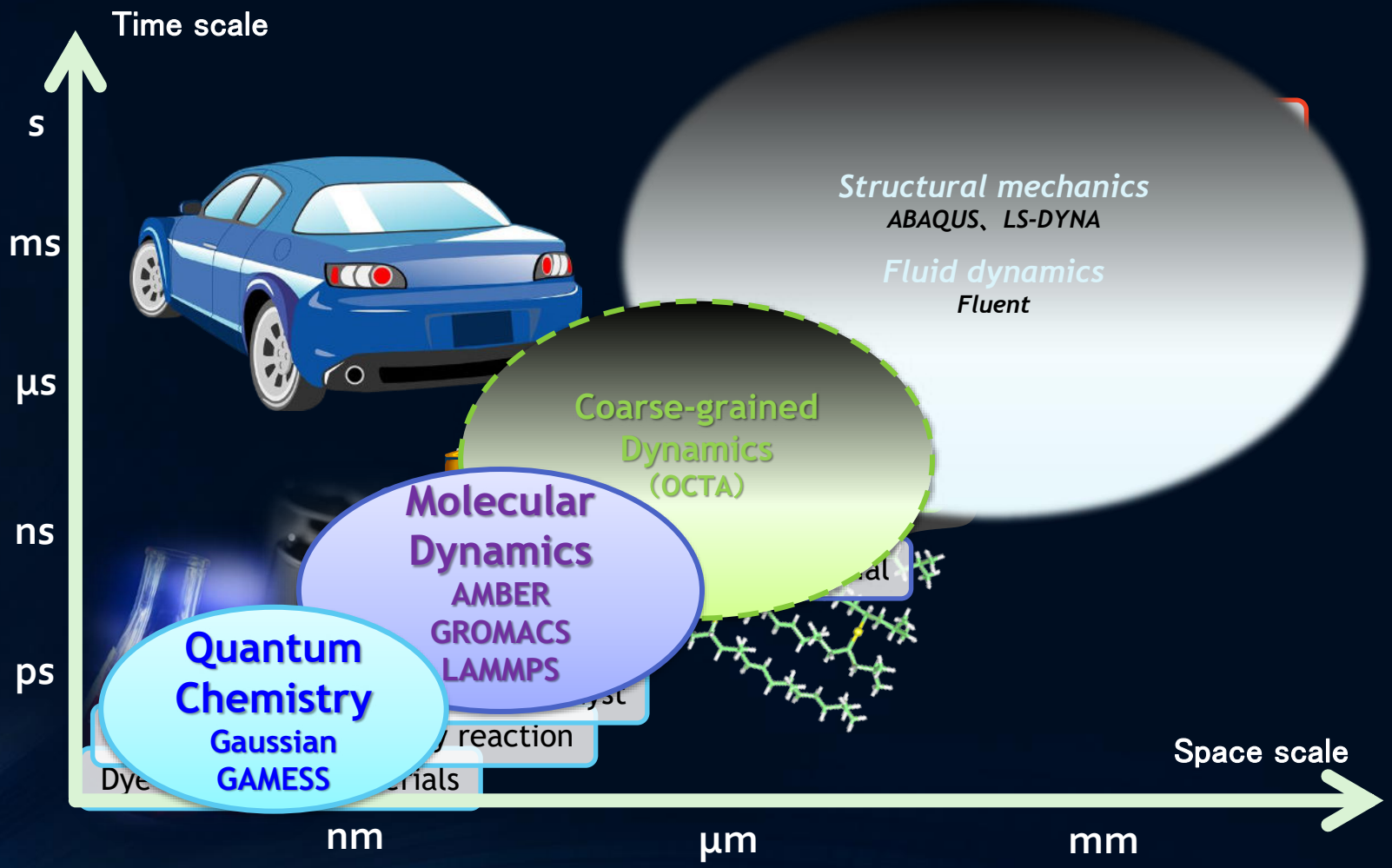
Shape: Fluid Mechanics
Fluent, OpenFOAM, STAR-CD/CCM

Crash Simulations: Time History Response Analysis
LS-DYNA

Muffler Filters: Quantum Chemistry
Gaussian, GAMESS
Catalytic reaction

Science as a Services – Consulting

Simulation World in Automotive Industry

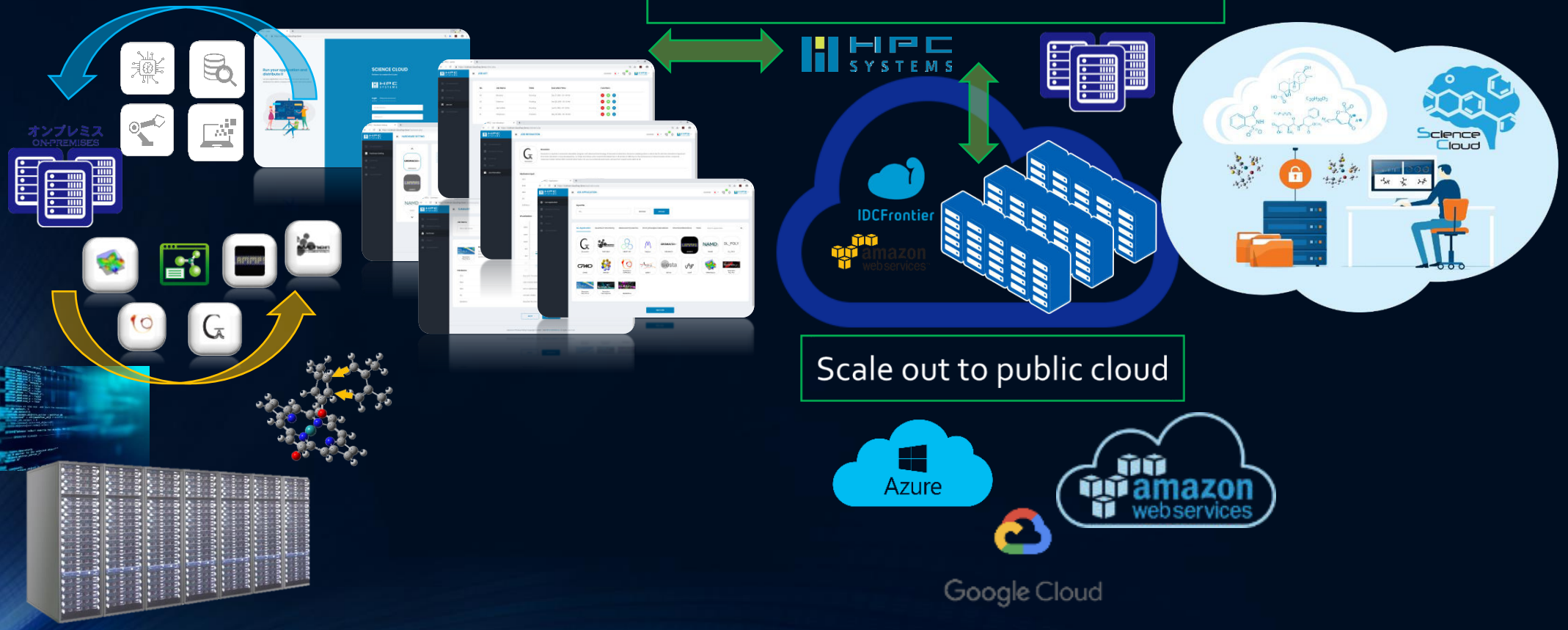


Science as a Cloud – Science Cloud Service

Providing SaaS (Software as a Service on Computational Chemistry Simulation)

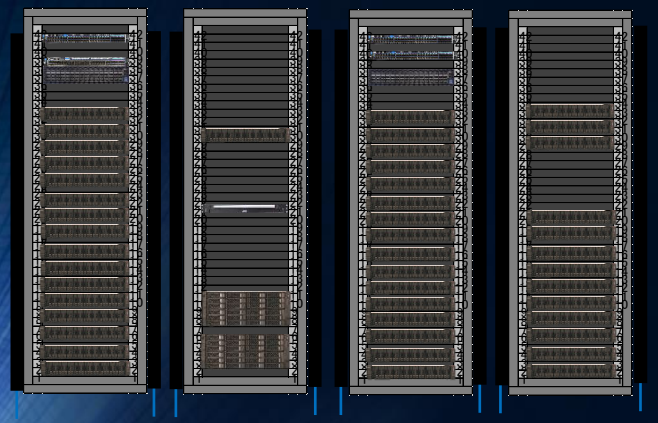
On Premise HPC System

Providing an HPC system optimized for each Chemistry Application

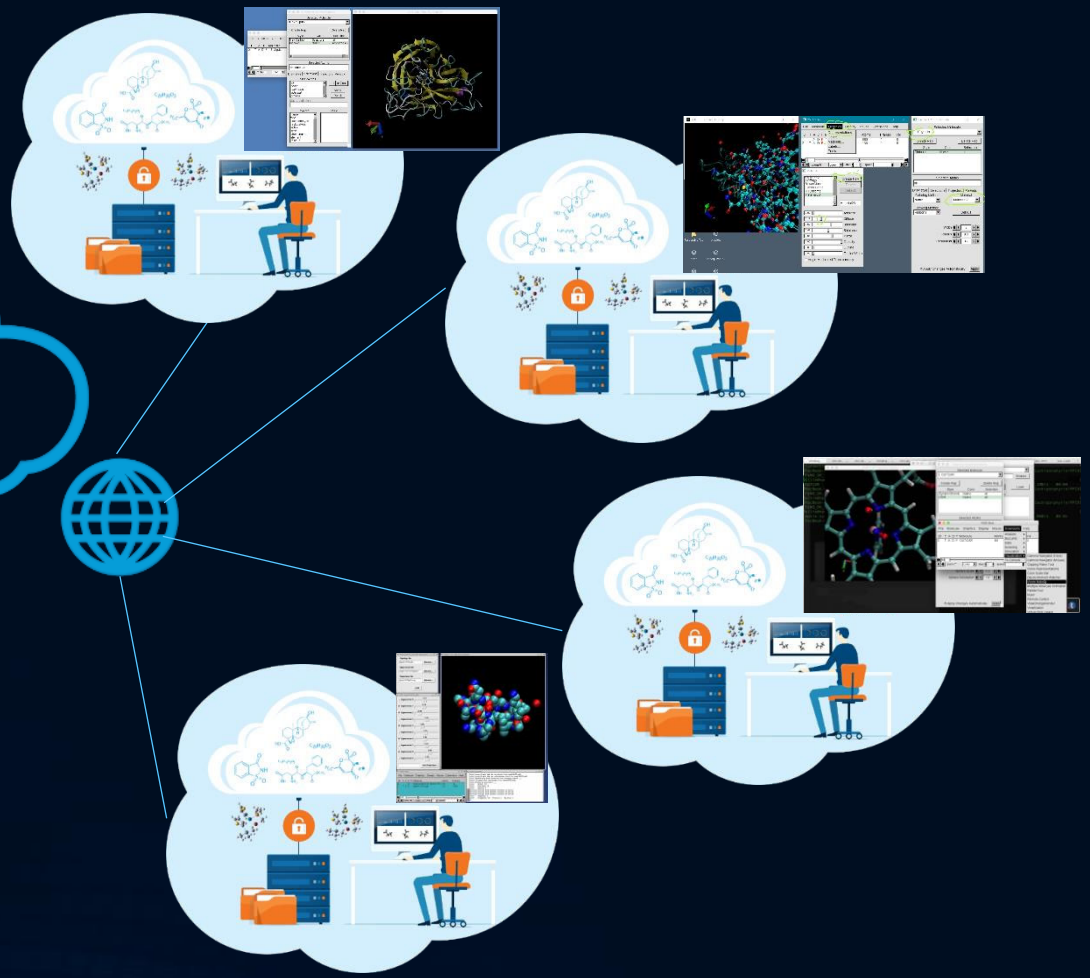


Science as a Cloud – Science Cloud Service

Providing SaaS (Software as a Service on Computational Chemistry Simulation)



HPC Science Cloud Hardware Platform

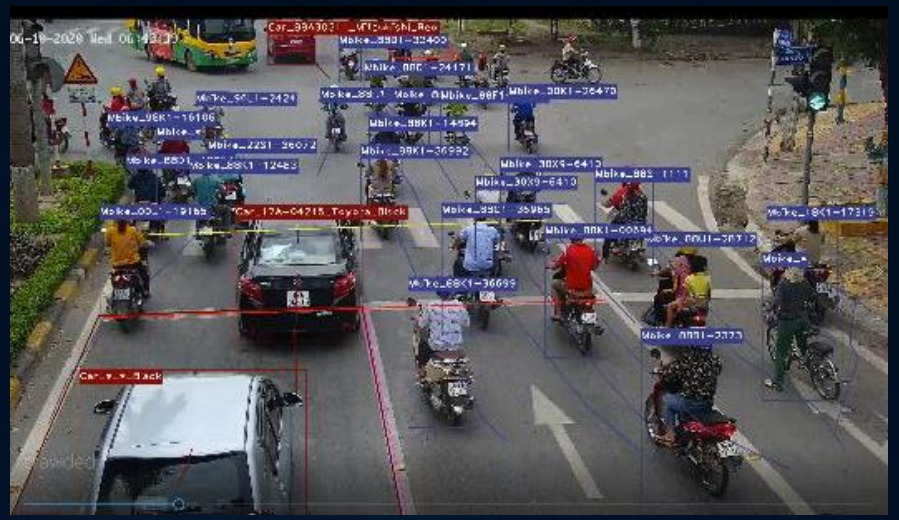


Science as a Services – Consulting

INTEGRATION OF INTELLIGENT TECHNOLOGIES

INT2 bring the power of data science and artificial intelligence to every business.

Only-One company in Viet Nam which capable to provide Integration of large high-performance computing (HPC) systems, high-performance data analysis (HPDA) with special focus on very-large parallel file systems (peta-scale), HPC AI software stack one stop services.



Security Monitoring System for Traffic Violation and Control

COVID19 Track Monitoring System

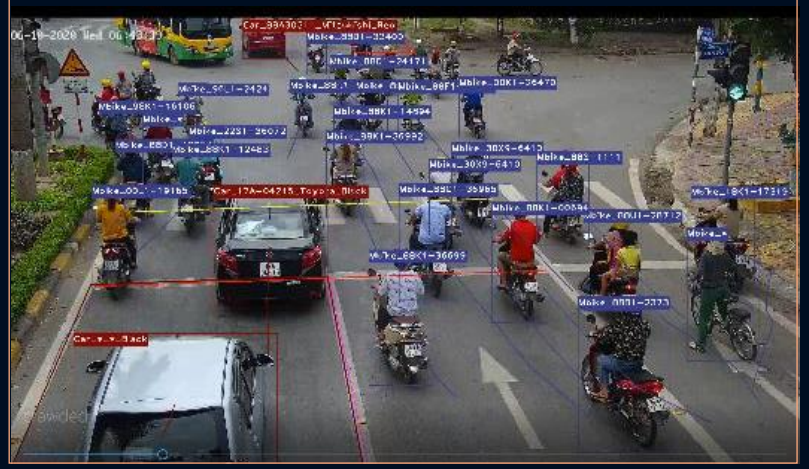
Science as a Services – Complex SI

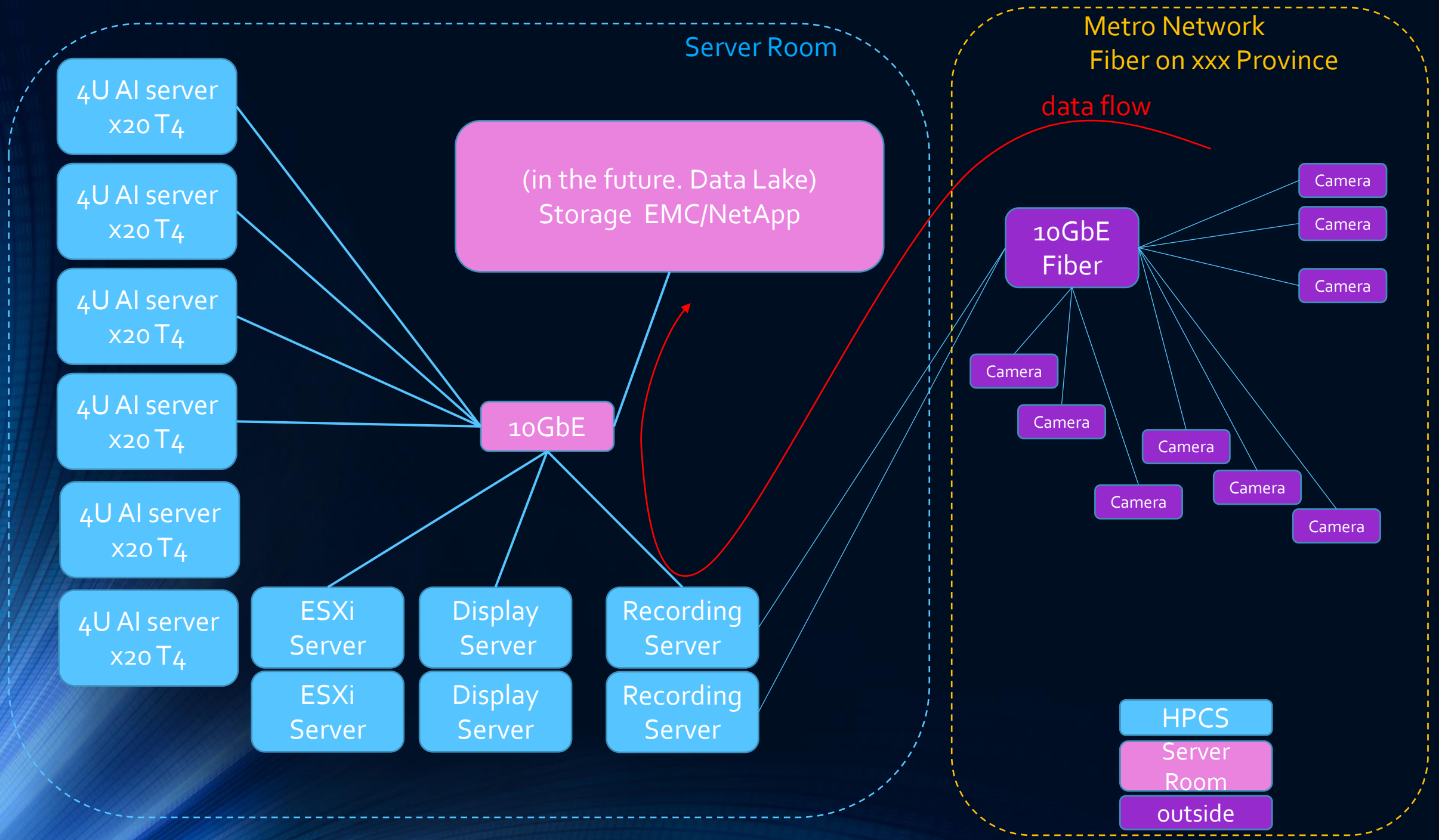
VAST. Vietnam Academy of Science and Technology

Vietnam National University Hanoi College of Technology Institute for Artificial Intelligence

Phenikaa University

Applying HPC-AI system integration technology, advanced high-speed inference data analysis system for traffic management police department in Vietnam




Server Room
4U AI server x20 T4
4U AI server x20 T4
4U AI server x20 T4
4U AI server x20 T4
4U AI server x20 T4
4U AI server x20 T4
(in the future. Data Lake)
Storage EMC/NetApp
10GbE
ESXi Server
ESXi Server
Display Server
Display Server
Recording Server
Recording Server
Metro Network
Fiber on xxx Province
data flow
10GbE Fiber
Camera
Camera
Camera
Camera
Camera
Camera
Camera
Camera
Camera
HPCS
Server Room
outside

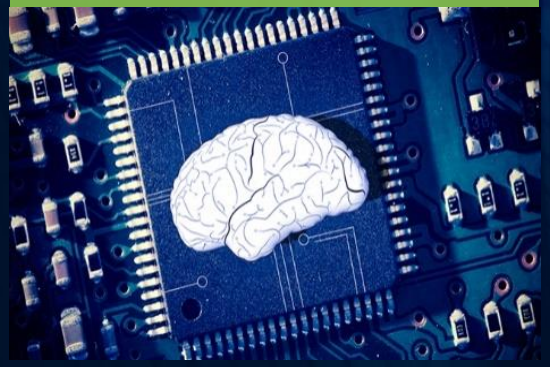
System as a Services – CTO/Edge Computer Solution

Custom made hardware to meet customer needs
CTO business focus market and applications

Machine Vision

Production machine
Testing machine

Deep Learning AI



Edge AI IoT Device
Deep Learning system

Smart Factory Industrial IoT

Industrial IoT Software
Production Control
Rugged Tablet

Edge IoT

Medical Equipment
Digital Signage
Video Surveillance & Security

HPC SYSTEMS

People and Computing Power