Orchestrating a brighter world

NEC

SX-Aurora TSUBASA

Brand-new Vector Supercomputer

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Global Platform Division
NEC Corporation

Orchestrating a brighter world

NEC brings together and integrates technology and expertise to create the ICT-enabled society of tomorrow.
We collaborate closely with partners and customers around the world, orchestrating each project to ensure all its parts are fine-tuned to local needs.

Every day, our innovative solutions for society contribute to greater safety, security, efficiency and equality, and enable people to live brighter lives.

Market Trend

- Continuous increase in demand for computing power to advance science and social life
- Explosive increase in data volume / type
- Open environment by Linux

e.g. High-precision financial Simulation

Simulation

High Accuracy

Systemization

e.g. A Whole aircraft simulation

Computing Power Demand
Data Explosion
Open environment

e.g. Recommendation depend on preference

Complication

Scale Up

AI/Machine Learning /Big Data analysis

e.g. Explosive increase of data

New value combining HPC Simulation and AI/Big Data analysis

Combining HPC Simulation and AI/Big Data to solve new tasks

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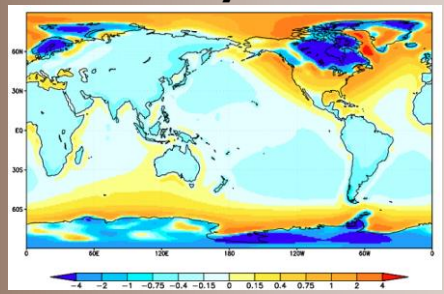
Prediction by simulation



- ✓Modelling creation
- ✓Unexist data creation
- ✓Proof of hypothesis

Combining

Analysis by AI/ Big data

- ✓Optimization for simulation results
- ✓Data learning
- ✓Hypothesis by studied data

Advanced Decision Support

Reference: Japan Meteorological Agency HP (http://www.data.jma.go.jp/kaiyou/shindan/a_1/sl_trend/sl_ref/GIA_Japan.html)

SX-Aurora TSUBASA's features

New platform for HPC Simulation/AI/Big data analysis

SX-Aurora TSUBASA

POINT 1 High Memory Bandwidth

POINT 2 Easy to Use

POINT 3 Open Environment

New applicable targets

NEC will support the development of science and industries with vector computing!

Retail

Finance

Biotechnology

Security

Energy

Statistical Analysis

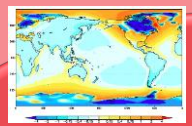
Image Analysis

Acoustic Analysis

Gene Analysis

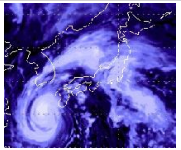
Manufacturing

Fluid Analysis



Earth Science

Disaster Prevention



Structural Analysis

Simulation (HPC)

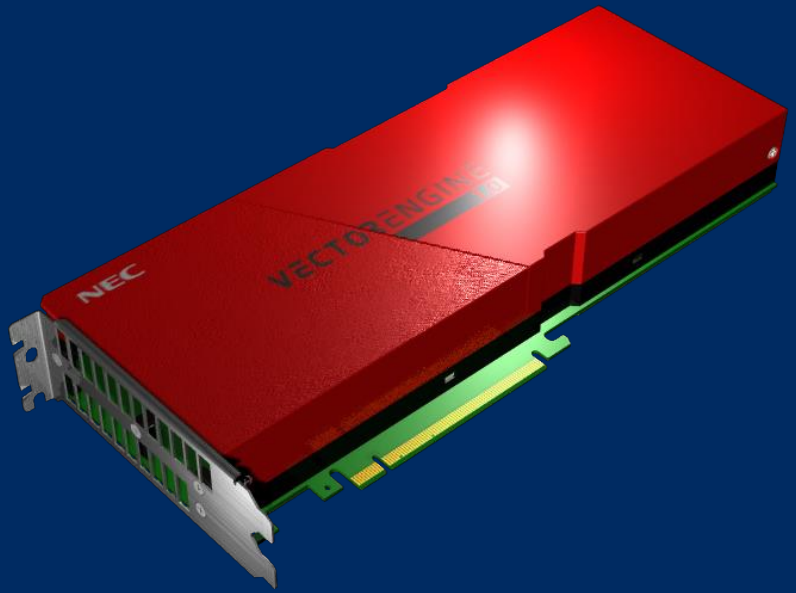
AI

Big data analysis

Meteorology

Vector Computing

Vector Engine(VE)



- New Developed Vector Processor
- PCIe card implementation, but not an accelerator
- Normal programing with Fortran/C/C++
- 8 cores / processor
- 2.45TF performance
- 1.22TB/s memory bandwidth

The fastest vector engine in the world

Processor

No.1

- **The fastest core in the world**
  - 307GFlops (DP)
  - 614GFlops (SP)

  By NEC's research, Oct, 2017
- **The fastest data access performance**
  - 1.22TB/s

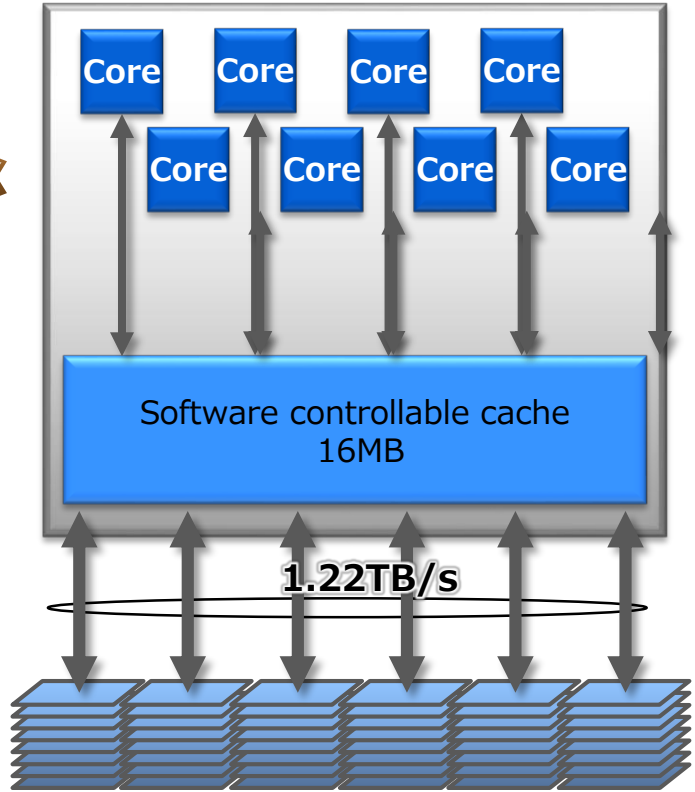
  By NEC's research, Oct, 2017

No.1

- **Technology**
  - World's first implementation of 6 HBM2 memories

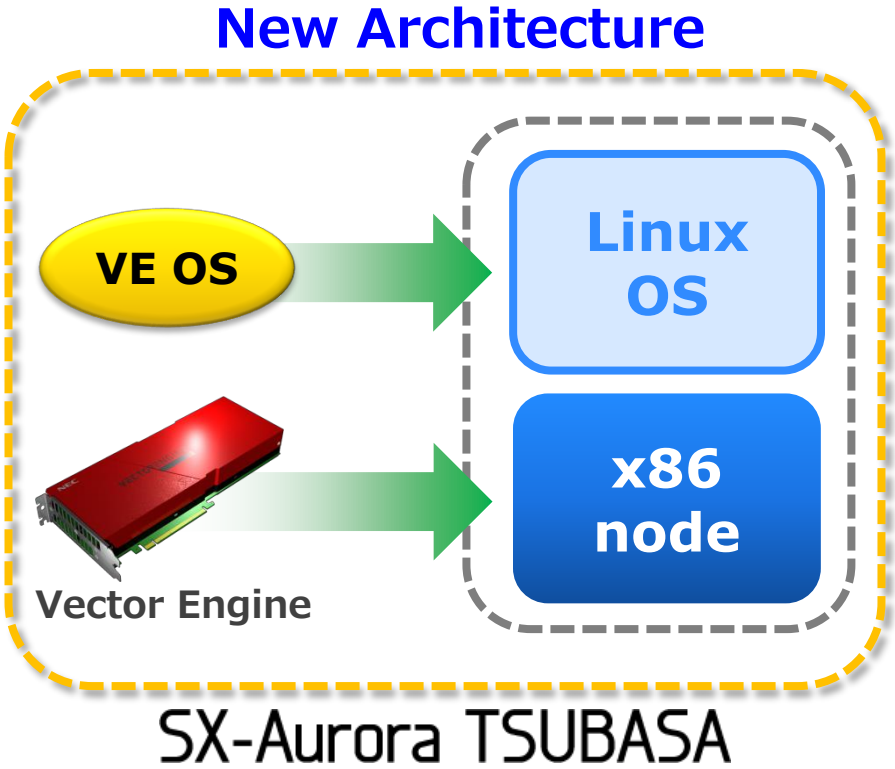
World's First

Vector CPU



HBM2 memory x6

Linux, C & C++ and Automatic Vectorization



Product

- VE + x86 node

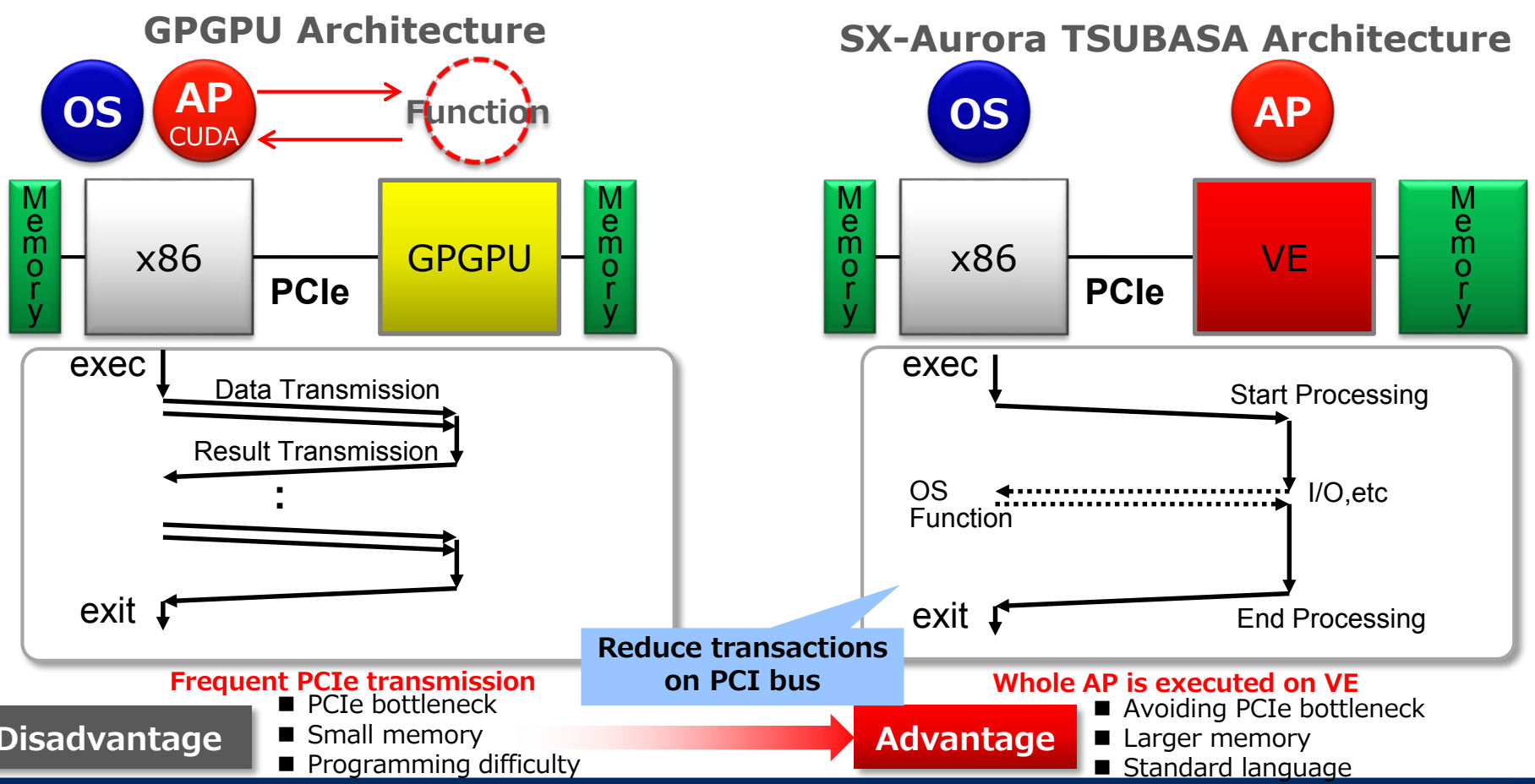
SW Environment

- x86 Linux OS
- Fortran/C/C++
- Automatic vectorization by proven vector compiler

Interconnect

- InfiniBand for MPI

New Architecture



Wide range of product line up

1. Supercomputer for data center
2. For a server room
3. For an office or a laboratory room

Supercomputer Model

- Huge data processing for data center/ computer center
  E.g. Large-scale AI/ Big data analysis,
  Scientific computing
- High performance, high scalability,
  low running cost

Rack Mount Model

- Simulation for Manufacturing, AI/Big Data analysis
  E.g. Large-scale demand forecast, structural analysis, fluid analysis
- Flexible system configuration

Tower Model

- Edge computing for AI/ Big data, Individual researcher
  E.g. Demand forecast, image processing
- Easy to implement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