

# High Performance Computing Laboratory at the Sofia Tech Park

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<http://nestum.phys.uni-sofia.bg/mission/>

The mission of the HPC laboratory is to deliver reliable, sustainable computing resources and services to facilitate the use of high-performance computing and to meet the small scale and midrange computational demands of the scientific research community in the academic institutions and high-tech SMEs located all over the country and the region.

## The Nestum HPC cluster

consists of 24 computing nodes based on Fujitsu Primergy RX2530 M1 servers with two Intel Xeon E5-2698v3@2.3 GHz processors.

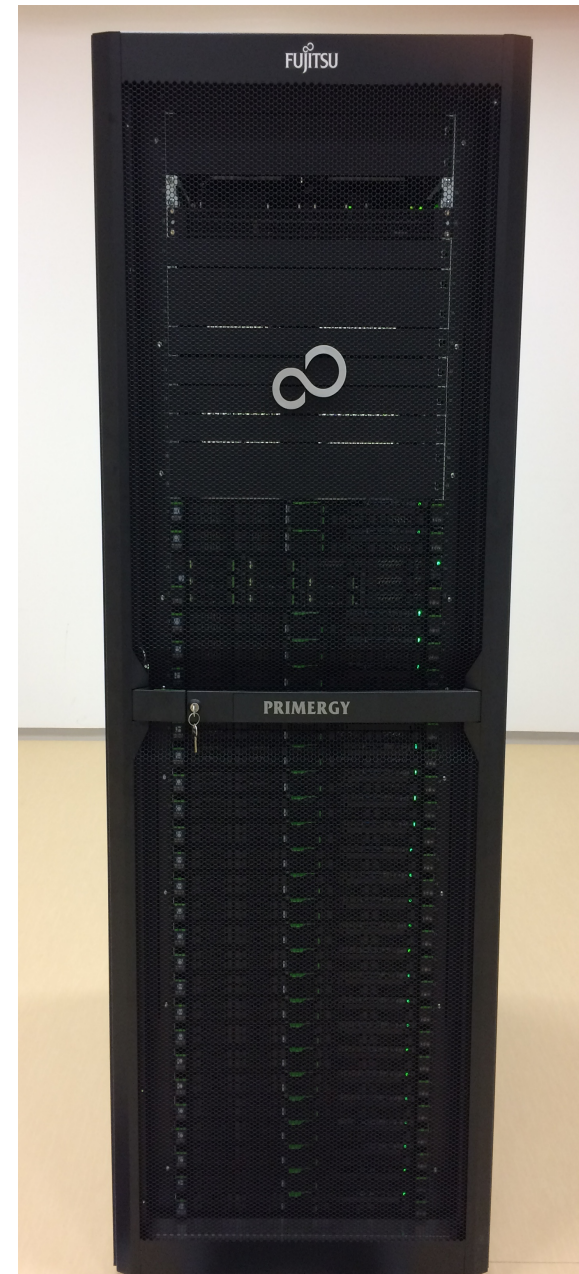
128 GB system memory

128 GB SSD hard drive

2 x 1 Gbps Ethernet controllers

1 x 56 Gbps FDR Infiniband controller

1 x iRMC Ethernet controller



# Infrastructure – the second fastest parallel computer in BG

## hardware

Each Intel Xeon E5-2698v3 processor consists of 16 cores and supports AVX2 instruction set and can perform 16 flop/cycle with base frequency 1.9 GHz.

The storage subsystem is based on one Fujitsu Primergy RX2530 M1 with  $8 \times 1$  TB SAS hard drives running FreeBSD 10.3 OS with 3.94 TB total storage RAIDZ2 pool.

## hardware

The memory/core ratio is 4 GB/core

In addition the file server has two 128 GB SSD hard drives for cache operations. The file system is shared with NFSv4 via infiniband subnetwork.

# HPC cloud-based simulation services

Designing high tech products such as aircraft wings or turbines involve simulations that require knowledge of modelling and simulation technologies in combination with high power computing (HPC) resources.

To have and maintain an HPC data centre with a mainframe computer is not affordable for SMEs.

Europe has a good coverage of HPC centres which have the computing power required for complex simulations.

Access to those **HPC** facilities needs **specialised knowledge** and software – **major fear to use them**

# Available Software

The base operation system is Ubuntu 16.04 LTS.

The additional software components are available via module.

The HPCL team provides consultancies, advices, courses for users

## **Usage for:**

Quantum information

Weather forecast

Big Data analysis

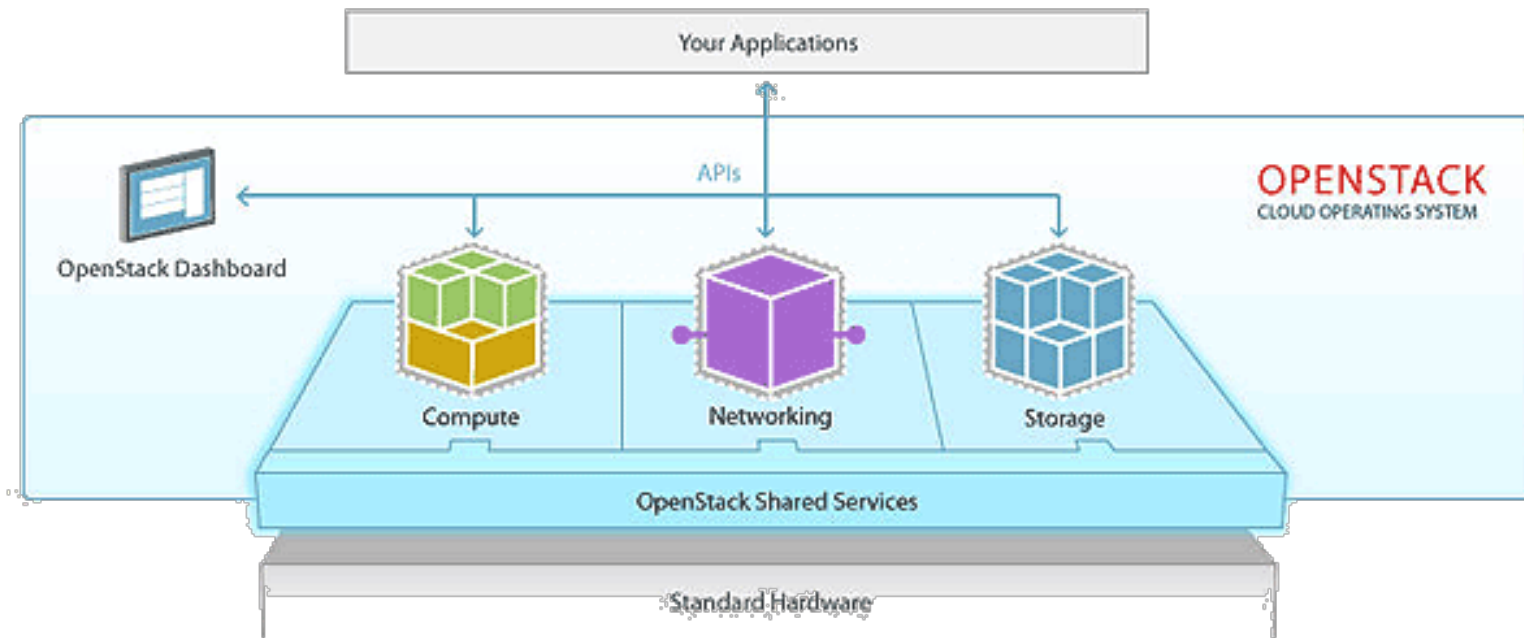
Nano-structures  
optimization

Surface coating – new  
materials

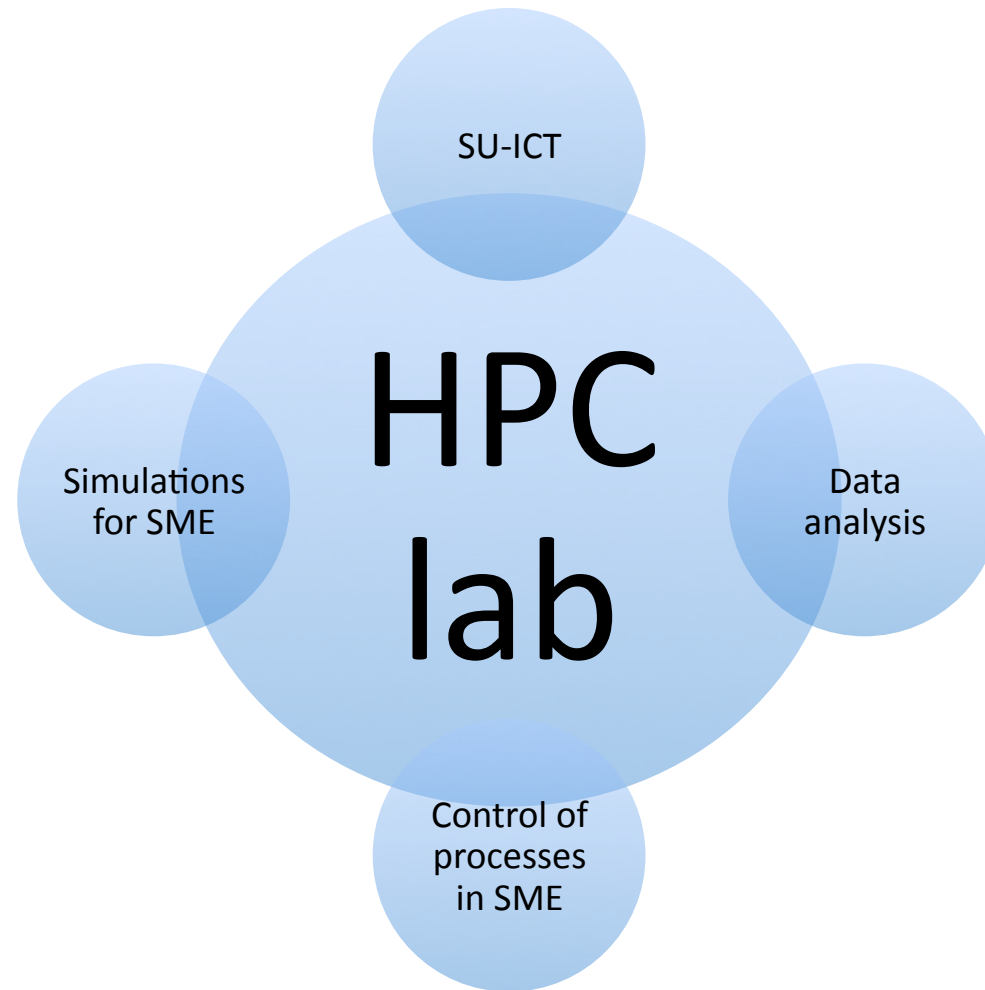
Bioinformatics

# HPCL

- Access via the cloud technology *OpenStack*
- Personal cluster concept
- Extra resources (available on demand via the network)



# HPCL: an affordable pay-per-use cloud-based HPC simulation service for the SMEs





Thank you for your attention!

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