Advanced Science and Technology Letters
Vol.35(Cloud and Super Computing 2013), pp.78-84
http://dx.doi.org/10.14257/astl.2013.35.19

Analysis of National Supercomputing Promotion Act of 2011

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Abstract. High performance computer is one that processes complex large-scale computing tasks in the area of scientific calculations difficult to solve with ordinary computer, which is also called supercomputer. Generally, a high performance computer refers to one within the world's top 500 based on computer performance. Currently, 50 years past since the successful commercialization of CDC6600 with 9MFLOPS (One million times/second) operation processing capability in 1964, developing high performance computers of TFLOPS (One trillion times/second) and PFLOPS (Quadrillion times/second) is in progress and application. The high performance computer can be said to be a public resource the government should develop and provide. To apply the public resource effectively, at the state level, high performance computer related technologies should be promoted such as high performance computer related research and development, effective distribution of the resources and training of professional manpower. Through this, a high performance computer development base should be created and contribute to the people's quality of life improvement and national economy development. By this necessity, South Korea carried out procedures for the enactment of a law for high performance computer related technology development, application and promotion since 2009. Accordingly, in June, 2011, 'National Supercomputing Promotion Act' was enacted. This paper will investigate the trend of the domestic/overseas policies for high performance computer, analyze and sum up the major contents of this law.

Keyword : High Performance Computer, Cyberinfrastructure, Supercomputer, Promotion Act, Computational Science

1 Introduction

High performance computer is one that processes complex large-scale computing tasks in the area of scientific calculations difficult to solve with general computer, which is also called supercomputer or cyberinfrastructure. Generally, a high performance computer refers to one within the world's top 500 based on computer

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ISSN: 2287-1233 ASTL

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The high performance computer is a public resource the government should develop and provide. To apply the public resource effectively, high performance computer related technologies should be promoted such as high performance computer related research and development, effective distribution of the resource and training of professional manpower. At the state level, to promote the high performance computer related technologies, a national high performance computing law is necessary. Through this, a high performance computer development base should be created and contribute to the people's quality of life improvement and national economy development.

By this necessity, South Korea carried out procedures for the enactment of a law for high performance computer related technology development, application and promotion since 2009. Accordingly, in June, 2011, 'National Supercomputing Promotion Act' was enacted. This paper will investigate the trend of the domestic/overseas policies for high performance computer, analyze and sum up the main contents of this law.

According to this act, high performance computing refers to computing, communication and information technology includes application of high-capacity, high-speed computer network using high performance computer or high performance computer technology, establishment and application of special-purpose experiments system, and system software and large amounts of data management. This high performance computing resource is applied to troubleshooting national issues, new drugs and new materials development, creative industry promotion needing calculation of large-scale.

This paper will investigate the trend of the domestic/overseas policies for high performance computer and describe major contents of National Supercomputing Promotion Act.

2 National Supercomputing Promotion Act

2.1 Overview

This law consists of establishing high performance computing environment, developing technologies, training professional manpower and application to various categories. This law includes network-related content as well as computer systems (hardware & software). In addition, its contents consist of installing organizations dedicated at the national level, carrying out businesses such as developing, introducing, operating, managing and applying high performance computer and establishing high performance computing related life cycle ecosystem.

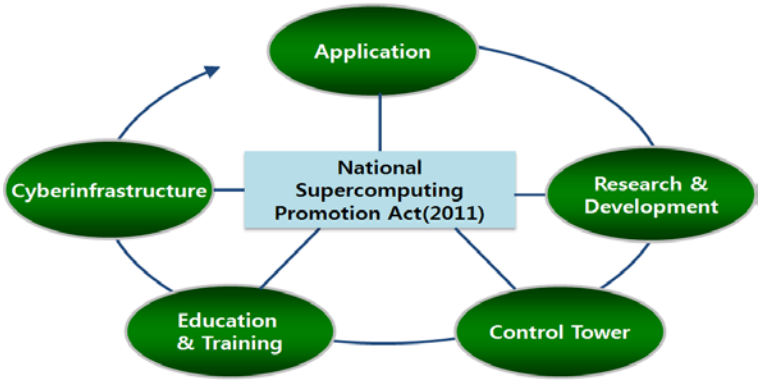

Fig. 1. Promotion of National High Performance Computer Ecosystem

2.2 Composition of the Act (2011)

The 'National Supercomputing Promotion Act' consists of 21 Articles in 4 Chapters including general provisions, national high performance computing promotion/development promoting system, creation of national high performance computing foundation, and national high performance computing activation.

Table 1. Composition of National Supercomputing Promotion Act

Chapter	Article
Chapter 1 General provisions	Article 1 Purpose Article 2 Definitions Article 3 Responsibility of the state Article 4 Relationships with other law
Chapter 2 National high performance computing promotion/development promoting system	Article 5 Establishment of national high performance computing promotion basic planning Article 6 Establishment of action plan Article 7 National high performance computing committee Article 8 Consideration policies for national High performance computing promotion Article 9 National high performance computing center
Chapter 3 Establishment of national High performance computing foundation	Article 10 Expansion of research and development investment Article 11 Development of professional manpower Article 12 Establishment, maintenance, application and improvement of high performance research network Article 13 Collection and supply of technical intelligence Article 14 Investigation of high performance computing research and development activities
Chapter 4	Article 16 Promotion of joint research and development

National High performance computing activation	Article 17 Joint application of high performance computing resources Article 18 Support for industry Article 19 International cooperation Article 20 Practical application of the results of research and development Article 21 Stimulation of application of the national high performance computing

2.3 Analysis of major contents

2.3.1 General Provisions

The enactment of the 'National Supercomputing Promotion Act' aims to promote sustainable application and establish a development base through effective establishment and systematic management of the national high performance computer to contribute to improving the people's quality of life and developing the national economy. The state should establish and enforce comprehensive policies necessary for national high performance computing, and the promotion of the national high performance computing should follow the provisions set up by this act unless there is a special provision in another law.

2.3.2 Master Plan

In accordance with the 'National Supercomputing Promotion Act', the Minister of Science, ICT & Future Planning should establish and promote the master plan for the national high performance computing promotion (hereafter, "master plan") every 5 years consulting with related departments. The master plan should include the following:

Table 2. The major contents of master plan

Classification	Detail
Policy establishment	- Basic direction and goals of the national high performance computing promotion policy - Matters about the security, distribution and joint application of the national high performance computing resources - Matters about the application linkage of the national research and development program to the national high performance computing resource
Budget procurement	- Matters about the investment and procurement of the required materials
Research and development	- Matters about the national high performance computing related research and development - Matters about the stimulation of the international cooperation of the national high performance computing

Training manpower	- Matters about the development and application of the national high performance computing related manpower resources

To promote and stimulate the promotion of the national high performance computing, in accordance with a presidential decree, the national high performance computing center may be established or designated.

2.3.3 Construction of Foundation

The government should make efforts to secure necessary resources to expand the investment in research and development of the national high performance computing. In addition, it should make efforts to secure the high performance computing resources at the level of advanced countries pacing with the changes of demands in the national high performance computing resources and the speed of the technological development.

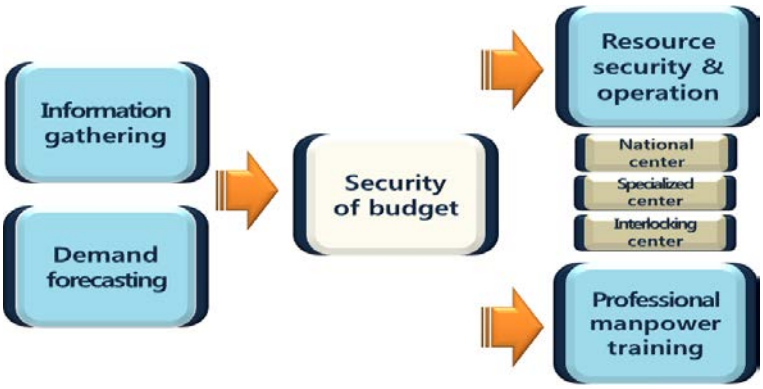

Fig. 2. Process of construction of cyberinfrastructure

2.3.4 Activation of Application

The government may provide necessary support for the industries' activities of the national high performance computing research and development to stimulate and the industrialization of the results of the research and development. The government should make efforts for the promotion of the international cooperation of research and technologies of the national high performance computing and consider an effective plan for the introduction of advanced technologies.

The government should stimulate joint research and development between academia/research institutes and industries for effective promotion of the studies of the national high performance computing and technology development. The government should interlock the domestic high performance computing resources to establish a system of joint application at the state level. The Program in Partnership & Leadership for the Nationwide Supercomputing Infrastructure promoted by the

National High Performance Computing Center is composed and operated as follows:

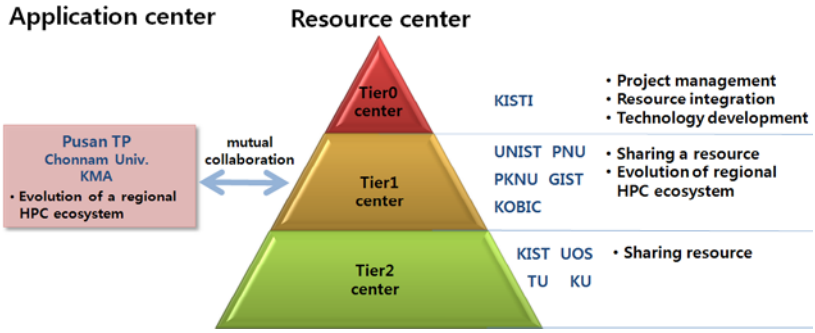

Fig. 3. Building PLSI partnership (2012)

3 Conclusion

High performance computing infrastructure is the essential infrastructure for the development of the national scientific technology, the improvement of the national competitiveness and the promotion of public welfare, which becomes a measure of a country's power. High performance computer is essential infrastructure inevitable for protecting the lives and property of the people, managing crises for the prevention of various disasters and promoting the public welfare. To create creative and fusion knowledge and bring about ICT development through high performance computer, high performance computing infrastructure establishment business should continuously and consistently be promoted. For this purpose, legal and institutional framework corresponding to it should be prevented. Fortunately, South Korea enacted 'National Supercomputing Promotion Act' in June 2011 to prepare a policy foundation for establishing and applying high performance computer resources. Yet, instead of being content to the enactment of the law, the state should actively promote the businesses for the application and promotion of high performance computer such as introducing and establishing high performance computers, establishing pan-departmental joint application network, developing high performance computer related technologies, and training professional manpower.

References

1. TOP 500 Supercomputing site, http://www.top500.org/lists/2013/06/
2. NITRD program, http://www.nitrd.gov/about/about_nitrd.aspx
3. High Performance Computing Act of 1991, http://www.nitrd.gov/congressional/laws/102-194.pdf

4. Cyber Infrastructure Vision for 21st Century Discovery (NSF, 2007)
5. Satoshi Matsuoka, Three issues for global e-infrastructure from the Japanese HPCI viewpoint, ICRI (2012)
6. National University of Defense Technology, http://english.nudt.edu.cn/Articleshow_eng.asp?id=6242
7. National Supercomputing Promotion Act of 2011, http://www.law.go.kr/lsInfoP.do?lsiSeq=136563#0000

