

Grid Scheduling and Multithreading

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Applications of Grid Computing

- Life Science
- E-commerce
- CAD/CAM
- Military Application
- Movie Applications (Titanic)

Grid Computing Applications



세종대왕함, 이지스함
: 슈퍼컴퓨터 장착(연합뉴스)

Applications

- **Aegis combat system(wikipedia)**

The **Aegis Combat System** is an integrated naval weapons system developed by the Missile and Surface Radar Division of RCA, and now produced by Lockheed Martin. It uses [powerful computers and radars](#) to track and guide weapons to destroy enemy targets.

Initially used by the United States Navy, Aegis is now used also by the Japan Maritime Self-Defense Force, Spanish Navy, Royal Norwegian Navy, and [Republic of Korea Navy](#). Over 100 Aegis-equipped ships have been deployed in five navies worldwide. The Royal Australian Navy has selected the Aegis system for placement on its new Air Warfare Destroyers.

The word "Aegis" is a reference that dates back to Greek mythology, with connotations of a protective shield, as aegis was the shield(방패) of Athena(여신, 아테나).

참고: wikipedia(aegis combat system) Aegis 함 그림

Applications of Grid Computing

- CFD (Computational Fluid Dynamics)
- 스키복 디자인 (공기저항 계산)

Parall and Cloud Computing

- **CFD(Computational Fluid Dynamics)**

a branch of fluid mechanics that uses numerical methods and algorithms to solve and analyze problems that involve fluid flows.

Computers are used to perform the calculations required to simulate the interaction of liquids and gases with surfaces defined by boundary conditions. With high-speed **supercomputers** better solutions can be achieved. Ongoing research, however, yields software that improves the accuracy and speed of complex simulation scenarios such as transonic or turbulen flows. Initial validation of such software is performed using a wind tunnelwith the final validation coming in flight tests ([wikipedia](#))

참고: [wikepedia\(cfd\)](#), numerical analysis figure

Grid Computing: Middlewares

De-facto standard mw



Object-oriented



P2P



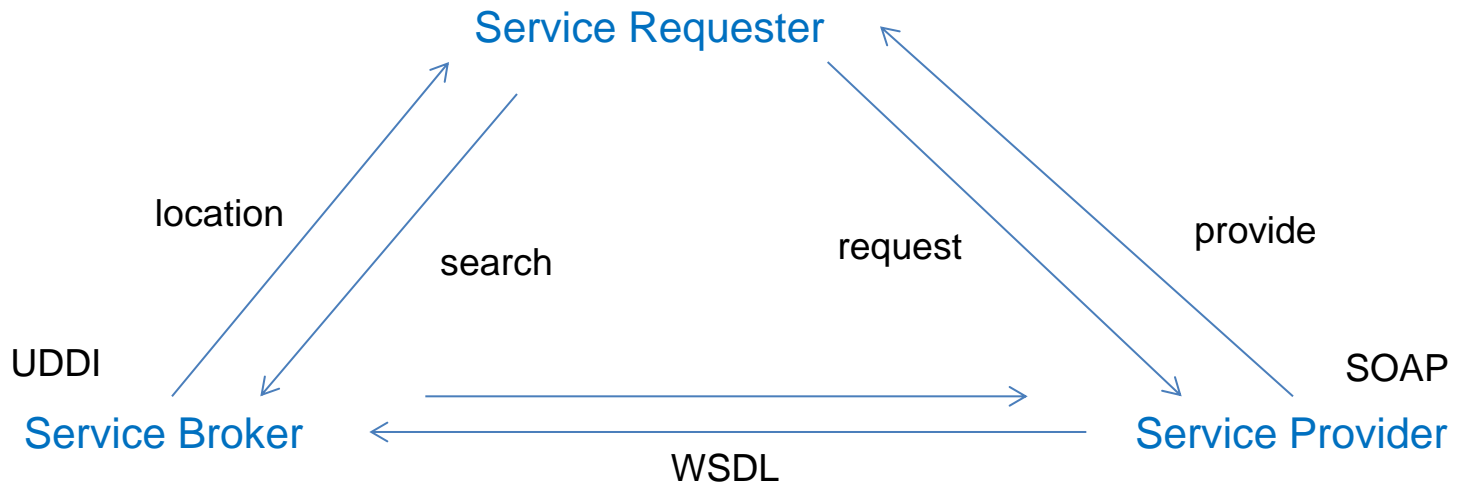
Market/Computational
Economy

참고: Buyya Nimrod-G

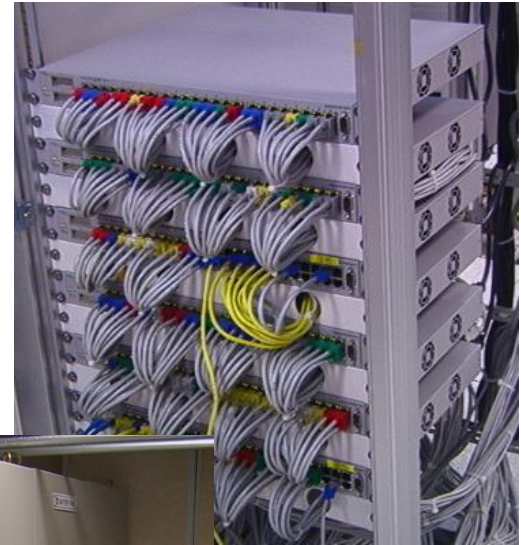
Grid Services

- **Grid Services = Grid Computing + Web Services**
 - Web Services = **WSDL + SOAP + UDDI**
 - WSDL: Web Service Description Language
 - SOAP: Simple Object Access Protocol
 - UDDI: Universal Description Discovery and Integration

Web Service



Cloud/Grid Computer@University of Seoul



Parallel Programming Tech.

- **ray tracing(wikipedia)**

In computer graphics, **ray tracing** is a technique for generating an image by tracing the path of light through pixels in an image plane and simulating the effects of its encounters with virtual objects.

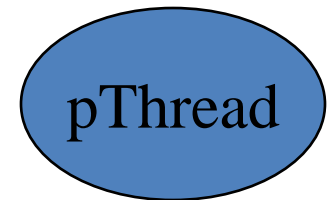
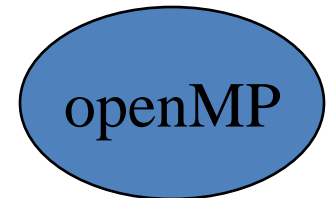
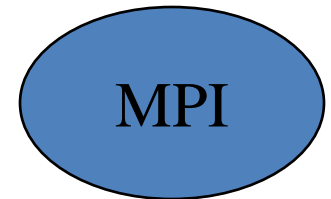
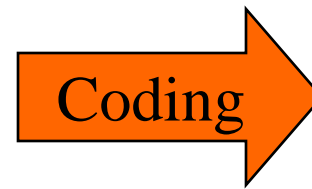
The technique is capable of producing a very high degree of visual realism, usually higher than that of typical scanline rendering methods, but at a greater computational cost.

This makes ray tracing best suited for applications where the image can be rendered slowly ahead of time, such as in still images and film and television special effects, and more poorly suited for real-time applications like video games where speed is critical.

Ray tracing is capable of simulating a wide variety of optical effects, such as **reflection(반사)** and **refraction(굴절)**, **scattering(산란)**, and **dispersion(분산)** phenomena

참고: wikipedia(ray tracing) 구 그림

Parallel Processing



Parallel Programming

- **MPI(wikipedia)**

the **Message Passing Interface**, is a standardized and portable message-passing system designed by a group of researchers from academia and industry to function on a wide variety of parallel computers.

The standard defines the syntax and semantics of a core of library routines useful to a wide range of users writing portable message-passing programs in Fortran 77 or **C**.

Parallel Programming

- **openMP(wikipedia)**

OpenMP (Open Multi-Processing) is an API (Application Programming Interface) that supports multi-platform [shared memory multiprocessing](#) programming in C, C++, and Fortran, on most processor architectures and operating systems, including Linux, Unix, AIX, Solaris, Mac OS X, and Microsoft Windows platforms.

It consists of a set of compiler directives, library routines, and environment variables that influence run-time behavior.

Parallel Programming

- **pThread(wikipedia)**

POSIX Threads is a POSIX standard for threads. The standard, *POSIX.1c, Threads extensions (IEEE Std 1003.1c-1995)*, defines an API for creating and manipulating threads.

Implementations of the API are available on many Unix-like POSIX-conformant operating systems such as FreeBSD, NetBSD, GNU/Linux, Mac OS X and Solaris. DR-DOS and Microsoft Windows implementations also exist