

Korea@Home:

P2P Distributed Computing Platform

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Overview

- *Korea@Home (KatH) project* :
A Development of Software Platform for Internet-based Distributed Computing using Volunteer Computer Resources
- Features
 - Hybrid Peer-to-Peer Architecture
 - Secure PKI-based Security and Digital Signature
 - Web Services with SOAP messaging

Grid v.s Korea@Home

The ability to dynamically link together *resources* as an *ensemble* to support the execution of *large-scale, resource-intensive, and distributed* applications.

Goal

Grid Computing

- More Definite ownership and management
- More administrative high-performance computing and networking resources

Korea@Home

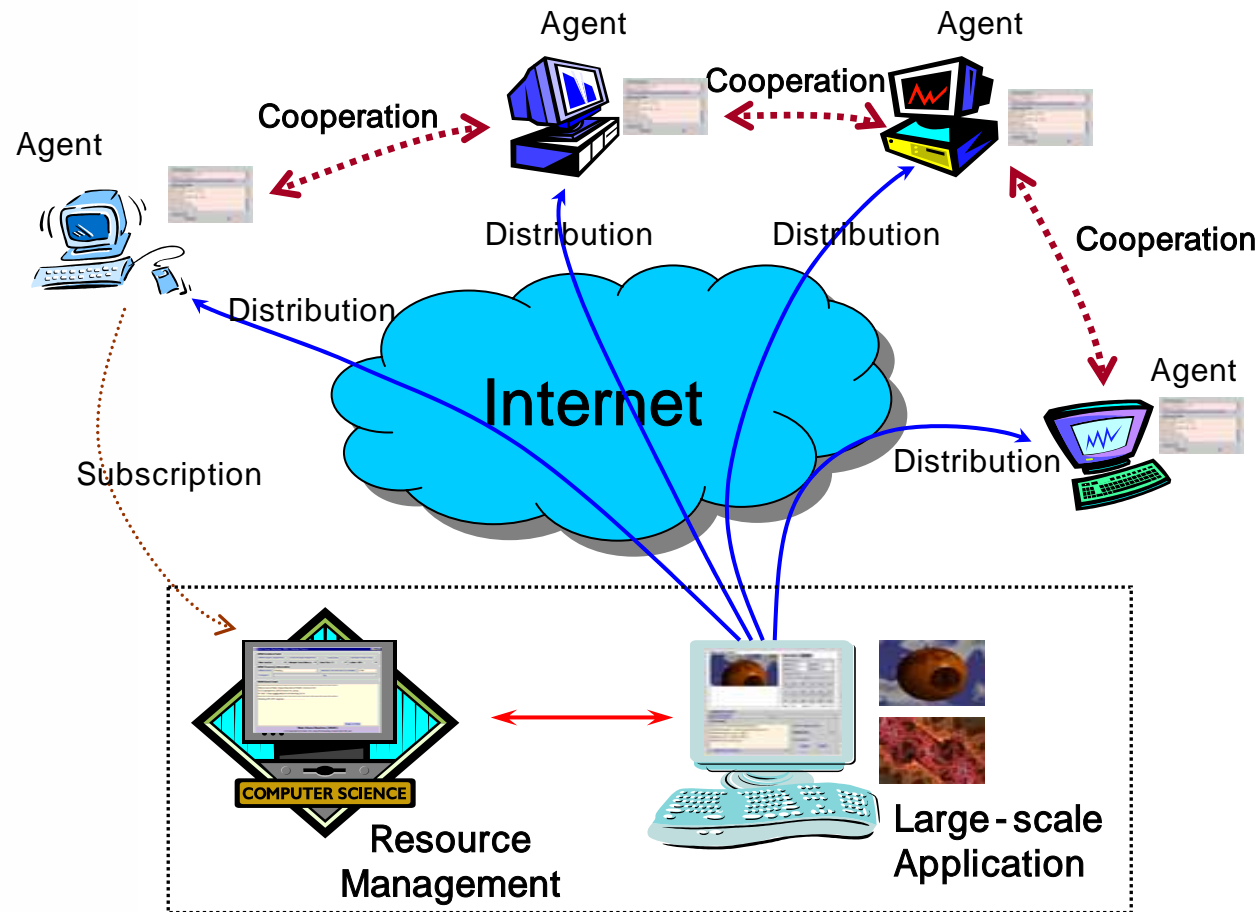
- To utilize unused idle resources
- Independent ownership
- Dynamic and unreliable connection of public internet
- Unpredictable behaviors of resources

Similar Projects

- Science
 - SETI@Home, climateprediction.net
- Life Science
 - Folding@Home, FightAIDS@Home
- Cryptography
 - Distributed.net, RSAttack576
- Mathematics
 - Mersenne Prime Search, Pi(x) Project

- Open-source
 - BOINC (Berkeley Open Infrastructure for Network Computing)
 - GPU (Gnutella Processing Unit)
- Commercial Products
 - DCGrid of Entropia
 - Metaprocessor of United Devices
 - DeskGrid of Info Designs

Architecture



Design Goals

- Application Developers
 - Convenience
 - They should be able to use easily.
 - Their familiar developing methods should be kept without new learning.
 - Flexibility
 - The platform is general enough to be used in various applications.

API for Application Developers

- Intuitive functional libraries
 - Monitoring, Resource Management, Authentication, Job submission/scheduling
 - P2P-enabled communication functions
 - MPI-like functions
- Lessons from various applications
 - Virtual screening and Folding analysis in Life Sciences
 - 3D Image Rendering
 - Global Risk Management for Financial Investment
 - Climate Prediction

Design Goals

- PC agents
 - **Intelligence**
 - PC agents have intelligent, autonomous, and mobile abilities.
 - **Security**
 - It's secure not to make any security and privacy problem.

Agent Features

- Intelligent & Autonomous
 - Agents make most decision based on their circumstances.
 - P2P discovery and communications with required modules and data
- Mobile
 - Discontinued jobs move to other agents with checkpointing.
- Secure
 - PKI-based authentication and digital signing for all objects

Current State and 2005

- About 14,000 volunteer agents and about 350 steady agents with 2 applications
2 Tflops performance
- 100,000 volunteers and 10% steady agents
- Additional 2-3 experimental applications
- Product-level package
- Modularizing as Components with well-documentation
- IPv6 enables

Future works

- Full-featured software development framework with abundant APIs for Intelligent agents including P2P functions
- Extension to apply for User-friendly Ubiquitous Computing

Thanks a lot! ^^

<http://www.KOREAatHOME.org>

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