



Personal
Power
Plant

P3: Personal Power Plant

Makes over your PCs into power generators on the Grid

P2P Resource Transfer and Aggregation for Distributed Computation

P3 is middleware for high-performance distributed computing that makes effective use of existing PCs. It enables engineers and scientists to harvest PC's compute power in their organization. It also enables contributors on Internet to participate in research projects involving too massive compute power for a single organization to provide. Unlike conventional distributed computing projects, in P3 a "participant" is not only a "resource provider" but also a "resource user" because a participant both provides and uses the power.

Quick and Ad-hoc Aggregation of Heterogeneous and Volatile PCs on intra- and Internet

◆ Quick and ad-hoc aggregation

- Easy installation through web browser
- Automatic update of the middleware
- PCs can join and leave dynamically

◆ LAN and Internet

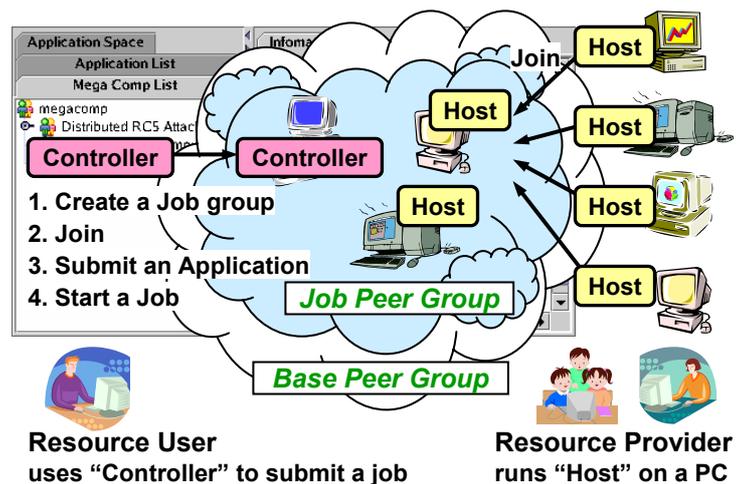
- P3 detects false calculation results from possibly malicious PCs on Internet
- Firewall traversable job/PC discovery and parallel processing

◆ Heterogeneous PCs

- Different kinds of OSes work together

◆ Easy development of application programs

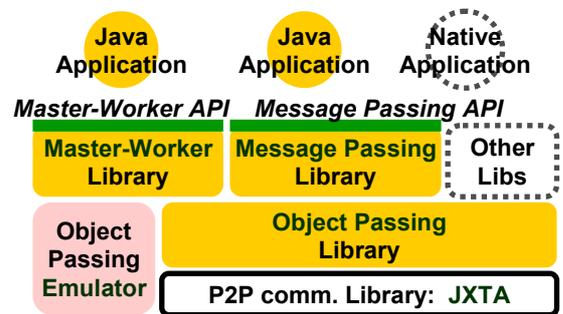
- A programmer has to know only several classes and methods



P2P Concepts

P3 utilizes JXTA, a widely accepted P2P library. P2P concepts efficiently support P3:

- ◆ **Discovery**: PCs dynamically discover each other and jobs without a centralized server
- ◆ **Peer Group**: PCs are grouped into job peer groups, in which PCs carry out code distribution, job control, and group communication for parallel computation
- ◆ **Overlay**: Enables end-to-end communication over NAT and firewall. It supports parallel processing in the message passing model



Libraries and Emulator hosting parallel applications

Acknowledgment: Development of P3 is partly supported by the Information Technology Promotion Agency (IPA) Project "Next Generation Software Development".

Grid Technology Research Center, AIST
<http://p-three.sourceforge.net/>