

# Robust and Effective Resource Management in Distributed Desktop Grids

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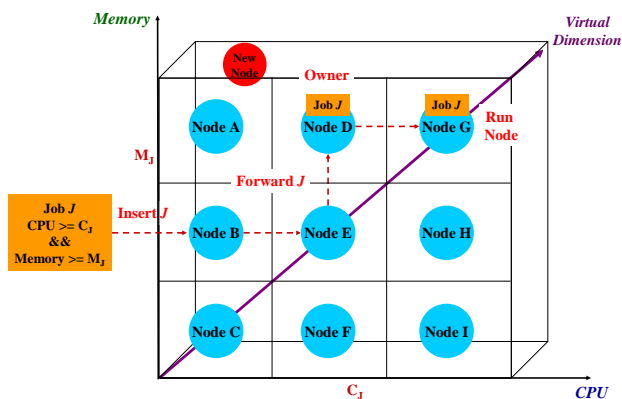


## Hard Problems / Issues

- ❖ Job Submission
- ❖ Matchmaking
  - Expressiveness, Load balance, Parsimony, Completeness, Low overhead
- ❖ Load balance
- ❖ Resilience to failure

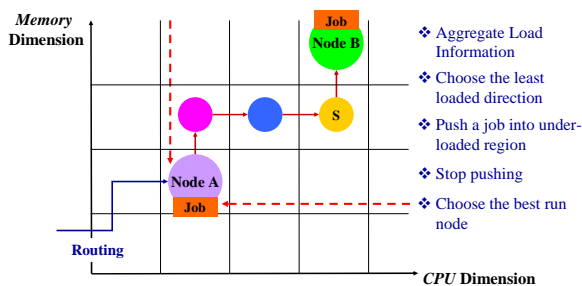
## Content-Addressable Network

- ❖ Formulate the matchmaking problem as a routing problem in a CAN space



## Improving Load Balance

- ❖ Pushing jobs based on dynamic aggregated load information



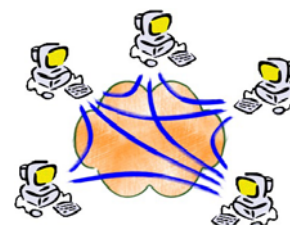
## Combine Desktop Grid and P2P System

From: www.eminerals.org/minigrd/condor.html



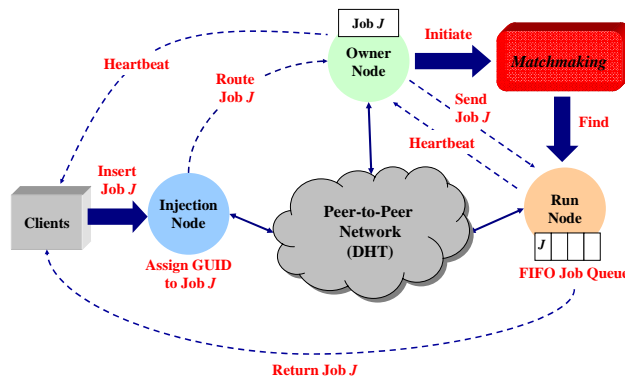
Centralized Server-Client Architecture  
Complex scientific applications

From: www.cs.virginia.edu/~mngroup/hypercast/



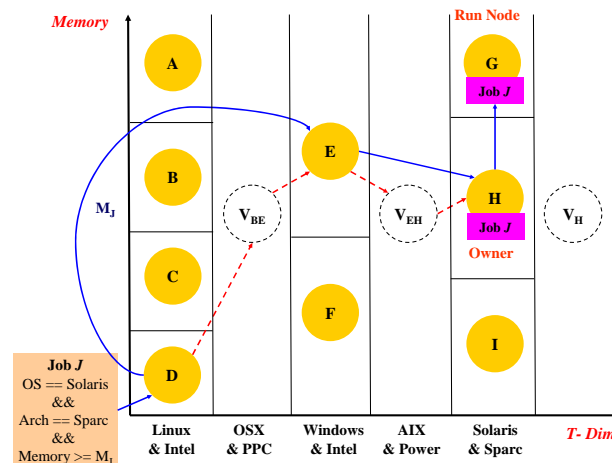
Decentralized Peer Networks  
File Sharing

## System Architecture



## Integrating Categorical Resources

- ❖ Categorical Resources
  - Architecture, Operating system type (version), etc.
  - Exact match
- ❖ Continuous Resources
  - CPU speed, Memory amount, Disk space, etc.
  - Minimum match
- ❖ Virtual peers and 1-dimensional transformation



## Improving the Scalability of Design

- ❖ Problems and Solutions
  - Large message size → Partial Updates
  - Large # messages → Probabilistic Heartbeats

## Current Status

- ❖ Continue to improve CAN-based P2P grid (randomized owner, dynamic load balancing)
- ❖ Prototype CAN-based implementation released to astronomy collaborators, large scale evaluation under way

## Simulation Results (from HPDC 2007)

