

# Information Services and Resource Discovery

## Seminar Grid Computing 2010

Rick van der Zwet<sup>1</sup>

<sup>1</sup>Department of Computer Science  
LIACS - Leiden University

Grid Computing, 2010

# Outline

- 1 Information Services
  - Resource planning around many players
  - Approches
- 2 Resource discovery
  - Planning the work
  - Basic Ideas for Proofs/Implementations

# Outline

- 1 Information Services
  - Resource planning around many players
  - Approches
- 2 Resource discovery
  - Planning the work
  - Basic Ideas for Proofs/Implementations

## Resource Planning around Many Players

- X Resources with all a unique pattern & Y users with all a unique request
- Resource specific requirements, like ACL listings.
- Spread all around the globe

# No Such Thing As A Free Lunch

- Accounting overhead.
- Communication overhead.
- Planning overhead.

# Outline

- 1 Information Services
  - Resource planning around many players
  - Approches
- 2 Resource discovery
  - Planning the work
  - Basic Ideas for Proofs/Implementations

# P2P Technologies

- Discovery is based on asking questions to your connected neighborhood and waiting till an available resource answers.
- Current protocols (*Grutella*, *FreeNet*) are optimized for anonymity and uniform requests.

## Brooker - Centralized planning

- Discovery is based on asking questions to the master scheduler, which allocates resources for it connected clients.
- No *ZeroConfig* setup, but centralized approach and prone to errors.



# Outline

- 1 Information Services
  - Resource planning around many players
  - Approches
- 2 Resource discovery
  - Planning the work
  - Basic Ideas for Proofs/Implementations

## Just In Time Principe.

- Propose a request, cost factor and deadline.
- Planning matters.
- Starvation of 'cheap' requests.

# Free Riding

- Do not care when it gets done.
- Local Preference Factor?
- Willingness to allow 'free' requests.

# Outline

- 1 Information Services
  - Resource planning around many players
  - Approches
- 2 Resource discovery
  - Planning the work
  - Basic Ideas for Proofs/Implementations

# Exchange Market

- Job requester make request for task on market.
- Provider quotes as well.
- On agreement job is executed with the requested parameters (# CPU, # Memory, # Time, etc).

# Fair Game

- Usefull for sharing unique resources efficiently.
- Match up 'equal' wighted jobs and exchange them.

# Summary

- *Information Services* will be needed to allow proper resource discovery and planning.
- *Resource Discovery* will be needed as resources will needed to be shared.
- *Accounting, Security, Planning* and *Local Preferences* are the main challenges in this field.
  
- Outlook
  - Scalability issues.
  - Massive resource availability.
  - (Commercial) Storage and Computing Grid.

# For Further Reading I

-  Ian Foster, Carl Kesselman  
*A Metacomputing Infrastructure Toolkit.*
-  Rajkumar Buyya, David Abramson, and Jonathan Giddy  
Nimrod/G: An Architecture for a Resource Management and Scheduling System in a Global Computational Grid  
*JIEEE Computer Society Press, USA, 2000.*
-  Adriana Iamnitchi and Ian Foster  
On Fully Decentralized Resource Discovery in Grid Environments