

MetaComputing



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Overview

What is MetaComputing

- discussion.....

MetaComputing Requirements and Purpose

- Distributed Computing needs?
- Parallel Computing needs?
- Super Computing needs?
- Dealing with Heterogeneity of everything?

Overview

Subtopics

- Communications and Networking
- Naming
- Interfaces
 - RPC
 - Component based
 - ONC/DCE, Corba, JavaBeans
- Problem Solving Environments

Overview

Subtopics (cont)

- Resource Management and Scheduling
- Security and Authorisation / Authentication
- Do we have all it takes to make a MetaComputing system?

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Specific Systems

- DCE
- Corba
- Netsolve
- Globus
- Legion
- APPLES and NWS
- SNIPE
- HARNESS

Lecture 11

Specific Systems

- Webflow / Gateway

Case Study: Interoperating MPI applications

- PVMPI / MPI_Connect
- PACX
- mpich-g (Globus MPICH)

Lecture 11

More on file handling

Parallel File Systems

- ROMEO
- MPI-2 Parallel IO
- VIPIOS

What is MetaComputing

Is it distributed computing?

Is it SuperComputing ?

Is it High Performance Computing (HPC)

Is it all of the above?



MetaComputing Requirements and Purpose

“MetaComputing is used to support the solving of problems by the integration of multiple applications, computational resources, data stores (and maybe real-time sensors)”

- Air Traffic control, weather/climate forecasting and modeling , particle track analysis..

MetaComputing Requirements and Purpose

Requirements

- To handle heterogeneous computers
 - I.e. interfaces, standards, communications, portable data exchange...
 - multiple run-times systems
 - synchronization (or compute resources)
- To handle wide area distribution
 - networks, fault tolerance (temporary and long term)
 - replicated resources, scheduling (synchronization!)

MetaComputing Requirements and Purpose

Requirements

- To handle heterogeneous data
 - real time, static, network mounted, archive formats, SDDF, ... contexts, views, schemas (from DB systems)
 - Ownership, non-symmetric access rights
- To handle multiple user identities
 - different user ids on each system, co-operating users
- To handle multiple security systems and methods

MetaComputing Requirements and Purpose

Solutions

- Systems that support specific systems
 - e.g. Problem Solving Environments (PSEs)
- Tool kits
 - use collections of common Distributed Computing (DC) tools and utilities to build environments/frameworks
- Provide one massive complete system
 - Object orientated systems / Distributed OSs

MetaComputing Requirements and Purpose

How are these systems built and what is needed to build them?

- Most of the problems they have to handle are already *known* problems.
- Solutions exist in the form of the many Distributed Computing (DC) systems that currently exist..
 - Although MetaComputing is less narrow in scope than most DC systems.