

Tutorial

Title: CORBA : As a Cluster Middleware

Presenter(s):

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Tutorial Abstract:

In today's commercial and academic environments, the availability of high performance desktop workstations and servers has become more and more commonplace. In these environments, parallel processing is provided by squeezing the most out of available computer resources. This type of environment is commonly referred to as a workstation cluster. A cluster can be defined as a collection of computers on a network that can function as a single computing resource. Clustering software provides mechanisms to effectively control job and system resources, to load balance across the network, and to exploit idle CPU cycles. A heterogeneous cluster consists of some number of computers of different architectures running different operating systems. To be useful in today's open computing environments, a cluster system must support many different architectures and operating systems.

Common Object Resource Broker Architecture (CORBA) is the standard based on Object Oriented (OO) model supporting application software development in distributed and heterogeneous environment. The main objective of CORBA is to provide transparency at three different levels, i.e. Network, Operating System and Programming language. To reap the benefits of OO and Client Server (C/S) model, CORBA combines both technologies. One of the useful aspects of CORBA is that it applies equally across the entire market segment, such as, Finance, Telecommunication, Education, Transportation and E-Commerce. With the growth of Internet and WWW, CORBA is gaining mainstream appeal. as a Middleware. The tutorial attempts to combine the two powerful concepts i.e. CORBA and clustering in order to develop heterogeneous cluster

The proposed tutorial, evaluates policies and mechanisms for supporting CORBA as a middleware for heterogeneous cluster. First, the tutorial reviews CORBA as middleware for distributed object computing. The requirement and necessity of the cluster middleware, in a heterogeneous cluster, is then discussed. Third, the tutorial highlights the limitations of the CORBA as a cluster middleware and specifies how to overcome it. The tutorial, defines new facilities and services required to be added needed for managing a heterogeneous cluster. The tutorial concludes by giving a prototype for cluster middleware based on CORBA for heterogeneous cluster.

Outline:

1. Cluster Computer Architecture
2. CORBA: Architecture, Services and Facilities
3. Requirement and design issues for cluster middleware
4. GLUnix : As cluster middleware
5. Policies and mechanisms for cluster middleware
6. A prototype for cluster middleware based on CORBA

Schedule:

Part 1 (10%):

Part 2 (20%):

Part 3 (20%):

Part 4 (10%):

Part 5 (20%):

Part 6 (20%):

Note - % indicates the percent of overall time dedicated to each topic.

Duration:

Full day tutorial.

Expected audience:

The tutorial is for all those who are interested in distributed object and cluster computing with an exposure to OO fundamentals.

Presenter's profile:**Arvind W. Kiwelekar**

DR. B. A. Tech. University, India

Arvind W. Kiwelekar is presently working as Head of Computer Engg. Dept. of Dr. Babasaheb Ambedkar Technological University, Lonere, India. He did his M. E. (1998) from Mumbai University(India) and B. E. (19991) from Marathwada University (India). For a short period he has worked in the System Administration group of C-DAC. His areas of research include Distributed Systems, Databases and Computer Network.

Professional Experience (Total Eight years)

- Lecturer, From Jan. 1998 to -: Working as Lecturer in the Department of Computer Engineering, Dr. Babasaheb Ambedkar Technological University, Lonere.
- Project Assistant, From March 1997 to Jan 1998: Worked as Project assistant in System Administration group of Center for Development of Advanced Computing (C-DAC), Pune.
- Lecturer, From Nov. 91 to June 1996, Worked as a Lecturer in the Department of Computer Engineering, Dr. Babasaheb Ambedkar Technological University, Lonere.

Teaching Experience:

- Subjects taught: As a lecturer in Computer engineering taught the undergraduate students of B. Tech. (Computer Engineering) subjects like E-Business, Data Base Management System, Operating System and Distributed Object Computing.
- Project guidance: Guided the final year B. Tech. Project like – 1. System monitoring for

network of Linux workstation. 2. Device driver writing for Linux system. 3. Implementation of Kerberos system for Linux.

- Curriculum Development: Worked as member secretary for the Board of Studies which has framed the syllabus for Diploma, Degree and Post Graduate courses in Computer Engineering conducted by the Dr. Babasaheb Ambedkar Technological University. Also worked as member of Academic Council for the same University.
- Networking: Responsible for designing, implementing, and maintenance of a Campus wide network for Dr. Babasaheb Ambedkar Technological University, to which 200 terminal are attached with internet connectivity through VSAT.

Research/article Publications:

1. A paper titled, "Accounting System for Linux based Network of Workstation", has been accepted for 1st National Conference on Recent Trends in Advanced Computing (NCR-TAC-2000) to be held from 10/02/2000 to 11/02/2000 in M. S. University, Thirunelveli, INDIA.
2. Conducting a tutorial on, "Distributed Object Computing using CORBA", in the 7th International conference on Advanced Computing (ADCOM-99) to be held from 20/12/1999 to 22/12/1999 organized by University of Roorkee.
3. Presented a paper titled, "Accounting System for MPP class machine based on cluster computing", in the 6th International Conference on Advanced Computing (ADCOMP-98) organized by C-DAC, Pune.
4. Published a article in a scientific supplement of Marathi NewsPaper "SAKAL", on CD-ROM.

Conference/workshop/seminar Participation:

1. Attending the 7th International Conference on Advanced Computing (ADCOM-99). Also chairing a technical session on Object oriented Databases.
2. Attended the 6th International conference on Advanced computing (ADCOM-98)
3. Attended the, three day Workshop on Databases organized by Persistent Systems Pvt. Ltd for promoting and formulating Database Research activities in India
4. Undergone a four-day course on SYNERGOGY, for improving teaching and learning skills, conducted by Scientific Methods, USA and organized by Dr. Babasaheb Ambedkar Technological University.

Present research activities:

Involved in the research and development activities conducted by the Computer Engineering department of Dr. Babasaheb Ambedkar Technological University – 1. Developing a Cluster of Linux based Workstation. 2. Developing a framework for E-business supporting electronic information product. 3. Implementing CORBA services and Facilities for Orbit a Linux based CORBA implementation. Also involved in curriculum development for PostGraduate course in Computer Engineering to be started by the University.

Computer Skill Summary

Languages :	C/C++, perl/TK
Operating System:	Windows, Linux, Solaris
Networking:	Knowledge of TCP/IP, ATM, FDDI, and SNMP

Middleware: CORBA, orbit

Educational Qualification

- M. E. (Computer) Mumbai University (VJTI) 1999 First Class
- B. E. (Computer) Marathwada University 1991 Distinction

PERSONAL INFORMATION

- Date of Birth 11 April 1970
- Passport Number k394962

References

1. Prof. V. R. Deshpande, Vice chancellor, Dr. Babasaheb Ambedkar Technological University, Lonere-402 103 Raigad. India, vrdeshpande@hotmail.com
2. Dr. Prdeep Kumar Sinha, Project Coordinator, HPCC group, Center for Development for Advanced Computing, Pune, India pksinha@cdac.ernet.in
3. Dr. Anand S. Deshpande, Managing Director, Persistent Systems Pvt. Ltd, Panini, Senapati Bapat Road, Pune, India, anand@pspl.co.in