




C-DAC's Technology Training Programme
GRId Programming and Some Indications
GRIPSI-2007

Technical Programme




Venue: CDAC, JNTU Campus, Hyderabad

Date: November 19-22, 2007



Day 1: November 19, 2007 (Monday)


Time (Hrs)	Activity
0915 ~ 0930	Registration & Inaugural Session
0930~1015	Introduction to Grid Computing: What is grid computing? What is Grid Middleware ? What is Globus Tool Kit? Who is using the Globus Toolkit? How to enable my application using Grid computing? Types of Grid Computing: Computational, Data, Science, Access, and knowledge
1015 ~ 1100	An Overview Globus Toolkit 2.X and Layered Grid Architecture (Ideal Grid Architecture) : What is in the Globus Tool kit 2.X ? An overview of Globus Toolkit 2.X/4.X, GRAM (Globus Resource Allocation Manager); GSS (Global Security Services); Monitoring & Discovering Service (MDS); Description of Five layered Grid Architecture - Fabric, Connectivity, Resource, Collective and Applications; Definitions - Grid Services
<div style="display: flex; justify-content: space-between;"> <div style="background-color: #e0f0ff; padding: 5px;">C Lang & Globus APIs</div> <div align="center">  <p>Tea & Refreshments Break: 1100 ~1115 Hrs</p> </div> </div>	
1115 ~ 1200	Basic Globus Commands and GridFTP: Grid Security Infrastructure- GSI (Proxy Check, Authentication, Authorization); Globus Resource Allocation Manager -GRAM (The globusrun commands and associated APIs; Resource Specification Language (RSL); the Gatekeeper Daemon; the Job Manager; Dynamically -Updated Request online Collocator (DUROC)); GIS (Grid Information Service); GIS is called as Monitoring and Discovery Service (MDS); MDS- Grid Resource Information Service (GRIS); Grid Index Information Service (GIIS)); GridFTP – GridFTP server and Client; An overview of DUROC;
1200 ~ 245	C Language and Globus API's : An Overview of Programming Environment - Globus Lic APIs; C Language and Globus API's; Writing C Programs using Globus Components; Grid FTP : GridFTP server and client; GridFTP basic third-party transfer; URL Copy; submitting a Job (Shell Commands, Remote execution); Example of accessing MDS; GASS Examples; Algorithms to mimic the application characteristics – Matrix computations; Gathering large data files from different source sites to destination site; transferring the data files in Circular fashion from one site to the all other sites in Grid Environment
1245 ~ 1300	An Overview of Grid Laboratory: Description of Grid Computing Infrastructure Components and Grid Programming Environment
<div style="display: flex; justify-content: space-between;"> <div style="background-color: #e0f0ff; padding: 5px;">C++ Lang & Globus APIs</div> <div align="center">  <p>Lunch Break: 1315 ~1400 Hrs</p> </div> </div>	
1400 ~ 1600	Hands-on Session: Globus 2.X Demonstration; Example programs on C Lang & Globus APIs; Assignment-I Questions An Overview of Grid Laboratory: An Overview of Grid Laboratory: Description of Grid Computing Infrastructure Components and Grid Programming Environment Example Programs using the globusrun command;
<div align="center">  <p>Tea & Refreshments Break: 1600 ~1630 Hrs</p> </div>	
1630 ~ 1730	Grid Programming:C++ language and Globus APIs : Overview Programming Environment : C++ Language and Globus API's; Writing C++ Programs using Globus Components; GSI/Proxy; Example programs using GRAM; MDS - Example of accessing MDS; Grid FTP – GridFTP server and client; GrdFTP basic third-party transfer; GASS -Batch GASS Example; Interactive GASS example; Algorithms to mimic the application characteristics ; Matrix computations; Gathering large data files from different source sites to destination site; transferring the data files in Circular fashion from one site to the all other sites in Grid Environment
1730 ~ 1830	Hands-on Session: Example programs on C++ Language and Globus API's (GSI/Proxy); GRAM; MDS; GridFTP; GASS); Example Programs on computation sand communication involving different sites;

Day 2: November 20, 2007 (Tuesday)




Time (Hrs)	Activity
0930~ 1015	Introduction to CoG Kits An overview of Commodity Grid Tool Kits; Why CoG Kits required ? Services provided to Access Grid Services and Advanced Services through commodity technology; Language specific CoG kits (Java Python, Perl); Globus Tool Kit Functionality and Interfacing with Glibus Toolkit components
1015 ~ 1100	Python CoG Kit Python CoG Kit and Globus API's: An overview of Python (Using Python Interpreter; Data Structures; Errors & Exceptions); Implementation of programs using Python-based GSI, GridFTP, GRAM client; Additional functionality; Workflow scripts; Example programs to mimic the application characteristics
 CoG Kits (Java, Python) & Globus APIs Tea & Refreshments Break: 1100 ~1115 Hrs	
1115 ~ 1215	An Overview of Java CoG Kit An Overview of Java CoG Kit and Globus API's: The implementation of Java-based GSI/Proxy; Creating a Proxy; Grid FTP, GRAM client implementations; RSL-Resource Specification and Job execution; MDS-Resource Searching; GridFTP-Data Management; GASS-Data Management; Example programs
1215 ~ 1315	Hands-on Session: Python CoG Kit; (Proxy Check Test, Gram Authentication Test , Remote to Local site Data Transfer Test , Local to Remote site Data Transfer Test , Ping Pong Data Transfer Test, Batch Job Submission Test); Assignment-I Answers and Assignment-II Questions
 Lunch Break: 1315 ~1400 Hrs	
1400 ~ 1600	Hand-on Session: Java CoG Kit - Globus API's & Assignment Questions (Example Programs on Create, Destroy and getting Information about grid proxy; GRAM Authentication, Submit RSL scripts to remote sites, Gather data transfer using third party File transfer.)
 CoG Kits & Globus APIs /Applications Tea & Refreshments Break: 1600 ~1615 Hrs	
1615~1700	Classification of Grid Applications - Issues and Challenges: Classification of Grid applications - Issues and Challenges: Classification of Grid applications – Distributed, Collaborative, Data-Intensive, On-demand; Category of applications - Loosely Coupled, Pipelined, Tightly Synchronized, Widely Distributed; Compute and Data Intensive Applications- Application Characteristics
1700~1830	Hands-on Session: Example programs on C/C++ Language and Globus API's; Java CoG Kit & Python CoG Kit

Day 3: November 21, 2007 (Wednesday)

Time (Hrs)	Activity
0930 ~ 1015	Introduction to Web Services Introduction to Web Services & platform Elements: An overview of Web services and Web services components like WSDL(Web Service Description Language), UDDI (Universal Description, Discovery and Integration), SOAP(Simple Object Access Protocol) protocol, XML(Extensible Mark-UP Language).
1015 ~ 1100	An Overview of Globus 4.0 and Web Services Key concepts An overview of Globus 4.0 architecture, Open Grid Service Architecture (OGSI); WSRF (Web Services Resource Framework), web service invocation
 Web & Grid Services/ (Perl CoG Kit) Tea & Refreshments Break: 1100 ~1115 Hrs	
1115~ 1215	Perl CoG Kit and Globus API's: An overview of Perl (Implementation of programs using GSI, GridFTP, GRAM client; Additional functionality; Workflow scripts; Example programs to mimic the application characteristics; Example source codes on Perl CoG kit API's
1215 ~ 1315	Hand-on Session: Java CoG Kits; Globus API's & Assignment Questions (Example Programs on Create, Destroy and getting Information about grid proxy; GRAM Authentication, Submit RSL scripts to remote sites, Gather data transfer using third party File transfer.) Web Services –(XML, SOAP; WSDL; Scripts)
 Lunch Break: 1315 Hrs ~1400 Hrs;	
1400~1600	Hands-on Session: Perl CoG Kit & Grid Services and Web Services (Proxy Check Test , Gram Authentication Test , GridFTP- Remote to Local site Data Transfer GridFTP-Local to Remote site Data Transfer Test, Batch Job Submission Test); Globus 4.0- Grid Services & Web Services ; Example Programs; Example Programs Assignment-I, II Answers;

GARUDA Integration Test Scripts		 Tea & Refreshments Break: 1600 ~1615 Hrs
1615~1700	Grid Integration Test Scripts - Issues and Challenges: Grid Computing - Basic Grid Services Test Scripts; Grid Interoperability Test Scripts; Grid Programming Environment Test Scripts; Grid Portal Test Scripts; Grid Performance Test Scripts	
1700~1830	Hands-on Session: Example programs Java CoG Kit; Python CoG Kit; Perl CoG Kit & Example Program on Globus 4.0 & Web Services	

Day 4: November 22, 2007 (Thursday)

Time (Hrs)	Activity	
0930 ~ 1015	GARUDA Overview GARUDA : Grid Architecture; An Overview of Communication Fabric; GARUDA Programming Environment; GARUDA Middleware Tools; GARUDA Portal	
1015 ~ 1100	Grid Probes: An overview of Grid Low Level Benchmarks; Turnaround time and throughput; Performance of Data Transfer through GridFTP; Algorithms implementation - Grid Probes using Globus 4.0	
GARUDA Overview & Grid Probes		 Tea & Refreshments Break: 1100 ~1115 Hrs
1115 ~ 1300	Hand-on Session: Performance Issues: Perl, Python, Java CoG Kits & Grid Probes Demonstration Performance Issues - Perl / Python / JAVA CoG Kit on GARUDA & Grid Probes Demonstration	
Current Trends: Grid Prog		 Lunch Break 1300 Hrs ~1400 Hrs
1400 ~ 1500	Current Trends in Grid Computing - Middleware An overview of Globus 4.0; Introductory concepts of service-oriented grid architecture; OGSA and OGSi; GT4 architecture; Grid Middleware - UNICORE, Legion, GridBus; Tuning & Performance of GridFTP - Trends	
1500 ~1530	Feedback and Conclusions; Closing Ceremony	
1530 ~ 1600	 High Tea & Refreshments	
1600~1730	Hands-on Session: Example programs Java CoG Kit; Python CoG Kit; Perl CoG Kits & Example Programs on Globus 4.0 & Web Services	