WIGLAF

A Web Interface Generator and Legacy Application Façade

The Need for Computational Resources ...

- Scientific Data Processing
- Large data sets
- Real-time results
- Physics-based Models
  - High-fidelity results
    - Large memory
    - Long runtimes

One Solution: Commodity Clusters

- Beowulf cluster-class computers leverage
  - Commodity PCs
  - Internet switching and networking
  - Open source software
- Performance proportional to # of PCs
  - Just-in-time procurement
    - Packed cpu, RAM & disc sizing
  - Extensible as needed
- Cost to requirements
  - Roughly $2K per node average
    - Add for memory, disc farms, opti...

One Solution: Commodity Clusters (Cont'd)

- New generations in supercomputing

But Software (Applications) is still the Issue ...

- Cost and availability of hardware is [illegible]
  - But ...
- Applications need to utilize hardware
  - Task Farms: schedule jobs to [illegible] processors
    - Data processing, computation may [illegible]
  - Simple Parallelization: execute same [illegible] parameters on processors
    - Open source, commercial software [illegible]
  - Complex Parallelization: distribute memory [illegible]
    - Requires coordinating memory, messaging

Motivation

- Legacy applications are [illegible]
  - Input files must be formatted [illegible]
  - Output files must be located [illegible]
  - Knowledge of the specific [illegible] needed
- *The difficulty is due to incom[illegible]*

Overview

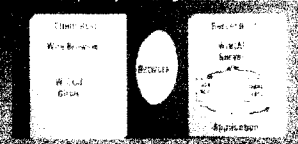
- WIGLAF is a framework suitable for applications engineering
  - On the local computer
  - On a remote computer cluster
- Any networked Java-enabled computer can [illegible]
- Users and developers benefit:
  - Application developers need not [illegible] application
  - Application developers need not [illegible]
  - Users need not know about the [illegible]
  - Users need not install new software
- Users see input and output in a consistent way [illegible]

WIGLAF: Integration Levels

- Simple integration:
  - No [illegible] in the application
  - Input [illegible] in the application generated by XML
  - Input and output [illegible] within a week
- Nirvana level integration:
  - Application [illegible] XML based files
- Application developer / integrator
  - Provides structured XML for application
    - Description
      - Application [illegible] location
      - Input files
      - Output files
      - Application [illegible] location
  - If application does not read XML files
    - [illegible] XML data [illegible] is needed
      - [illegible] application is [illegible]
      - [illegible] application [illegible]

WIGLAF: Goals and Approach

- Web-based GUI framework for applications [illegible]
  - Access to parallel / remote [illegible]
  - Independent of applications and remote [illegible]
- Java, browser applets and networking
- XML: data portability and tools - generation of [illegible]



Technologies

- Java is a simple object oriented, [illegible] independent multithreaded, dynamic language
  - Provides
    - [illegible]
    - [illegible]
    - [illegible]
- XML: The Extensible Markup Language
  - XML is a method for putting structured data in a [illegible]
  - Looks a lot like HTML but isn't HTML
  - Is text, but is not meant to be read
  - License-free, platform independent and [illegible]
  - XML is a family of technologies (XML, [illegible])

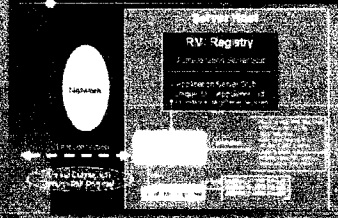
WIGLAF: Current Features

- Full web integration
  - XML DTD for application description
  - Client Server implementations of Application Server and Client Applet
  - Pre existing application integrated without [illegible]

WIGLAF: Tasks Completed

- Renew XML data for user input
- Edit input data
- Save modified input data in XML structure
- Launch application and look for output
- Monitor output files and render output data for user
  - Text
  - 2D Plot
- Stop, restart, or switch application

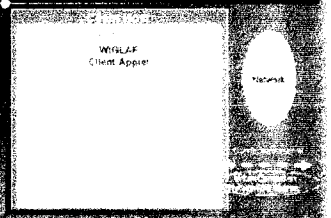
Application Server process



Application Server

- The Application Servers duties are
  - Query a list of available applications [illegible] available applications XML file (overview [illegible]) which contains the app names and [illegible] XML files
  - Check if each application XML file exists
  - Perform DTD validation on each application [illegible]
  - Save valid application names and XML [illegible] for quick access
  - Spawn application processes when requested by client
  - Destroy processes when requested by client

Application Client Applet components



Application Client Applet

- Authentication Dialog
  - Username and password entry
  - Upon authentication, connect to the Application Server specified by the connection ID through the [illegible]
  - Display Application Chooser
- Application Chooser
  - Queries the Application Server and displays a [illegible] application that the user has permission to [illegible]
  - Requests application XML file from Application Server when user chooses an application
  - Passes application XML file to Input Explorer
- Input Explorer
  - Displays application XML file in a tree and [illegible]
  - Allows for editing and saving of application input parameters

Application Client Applet cont.

- Output Explorer
  - Displays outputs specified in the application XML [illegible]
    - File: text display of a file
    - 2D plot of ordered pairs, 3D graph from [illegible]
    - Stream: [illegible] of binary dump of an output stream
- Help Explorer
  - Displays help information associated with an application [illegible] as
    - Help data included in the application XML file
    - Help text file for application specified by XML file
    - Help text file specified by the application XML file
- Application Monitor
  - Displays current state of selected application
    - Stopped, Running or Not Responding, etc.
  - Provides user with interface to start and stop the selected application

WIGLAF: Tasks Needed

- More sophisticated data visualization (3-D)
- Interaction with queue management [illegible]
- Security: Access to remote clusters
- Application control
  - Model native interface with cluster applications
  - Possibly simulation steering
- Data management
  - Transfer input/output data to and from server

WIGLAF: Status

- Application Server
- Application Client Applet
- Authentication Server
- Admin Server
- Server Admin Applet

JPL