

Java Grande



Concurrency and Applications Working Group Report

Outline



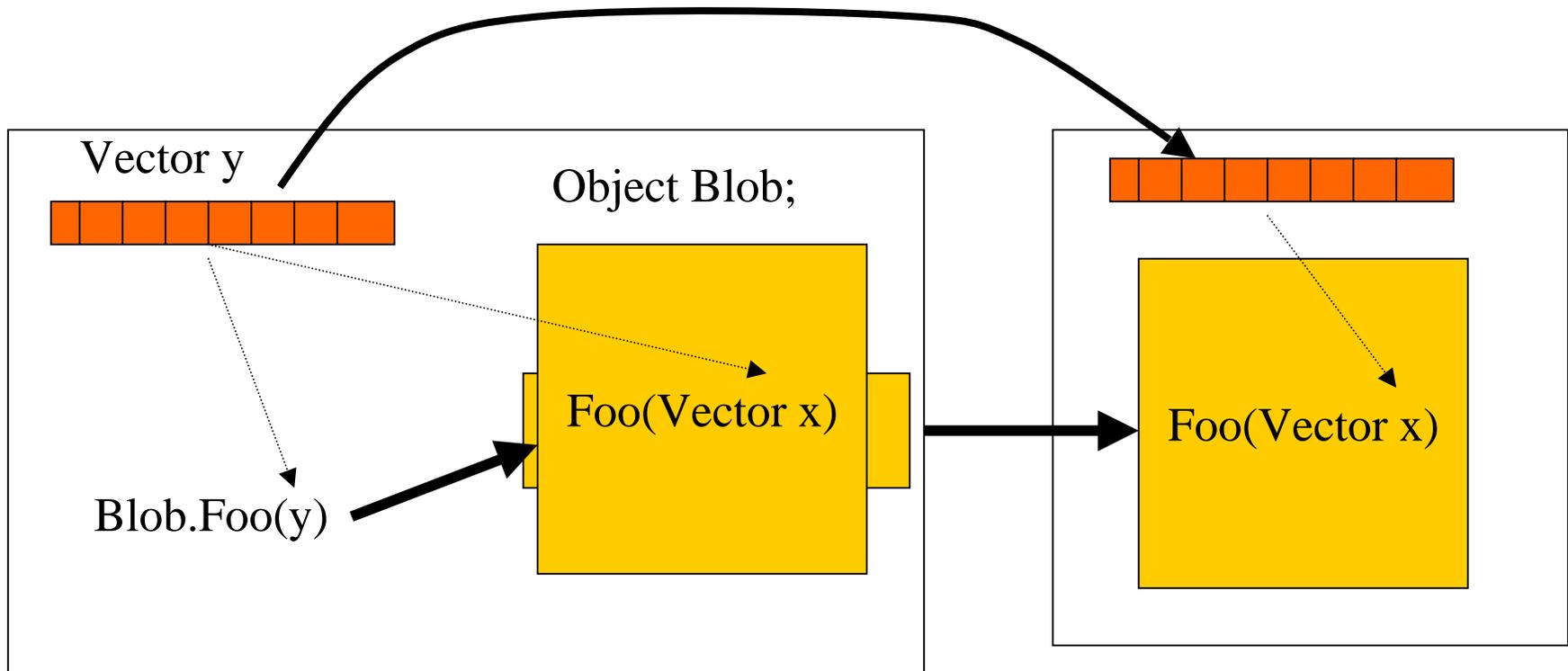
- Critical JDK Issues
 - Remote Method Invocation
- Benchmarks
- Seamless Computing
- The Future

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Critical JDK Issues: Serialization and RMI

- What is it and why do we care?



So what's the problem?



- Serialization is powerful and complex
 - linked heterogeneous data structures
 - current implementations too slow!!!
 - Too much type information explicit on the wire
 - floats and doubles are not handled very efficiently
 - Reflection uses too many copies
- RMI Issues
 - Resources Consumption
 - Too many threads, inefficient use of ports

What do we need?



- Support for Custom Transport
 - we need implementations that go beyond the TCP/IP socket model.
- Customizable Serialization
 - Large scale scientific apps use lots of arrays of simple types.
 - Move lots of floats and doubles.

Benchmarks



- Low Level Operations

- array ops, exceptions, mem/GC, casting, object creation/instantiation, threads/sync, IO scalability, RMI

- Kernels

- FFT, Numerical Integration, SOR, LU, Sparse Matrix, Video/Audio, Search, Sort

Benchmarks



- Large Scale Parallel Application
 - Parallel Geophysics (Karlsruhe)
 - Monte Carlo Simulation (EPCC)
 - Discrete Event Simulation (INRIA/EPCC)
 - Gravitational N-Body (Indiana)
 - Computational Fluid Dynamics (Syracuse)

Seamless Computing



- Desktop Access to Remote Resources (DAToRR)
 - to design a Java API to the services that would enable users to submit “job” to remote computing Grids using a seamless, standard interface
 - like Java relational database interface standard
 - Initial Working Group meeting at Argonne.
 - BOF at this meeting

The Future



■ Message Passing Interface

■ A standard Java binding for MPI.

- | Several candidate proposals exist.

- | A Draft Spec exists.

- | Actions

 - 100% pure implementation to be made available

 - Test suite & benchmarks

■ An Advanced Java MPI

- | Learn from the MPI/RT efforts

- | Create a truly Object Oriented extension

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The Future



- The Impact of Jini
 - A collection of standard Java services with major implications for Metacomputing.
 - | Discovery of resources
 - | Distributed Event management
 - | Brokering and Transaction
 - | Java Spaces
 - What is the role of Jini in large scale “Grid” environments?