

Detailed Outline of Tutorial M5

1. Introduction to Components
 - a. Different lines of evolution in scientific and business computing
 - b. How component technology can address the complexity of both
 - c. Why do we need components?
 - d. What are components?
 - e. How do we make components?
2. CCA Concepts
 - a. Features of the Common Component Architecture
 - b. Ports, interoperability, and reuse
 - c. Frameworks
 - d. Components and component lifecycle
 - e. Maintaining high performance: direct connection and parallelism
 - f. MxN parallel data redistribution
 - g. Language interoperability
 - h. A brief comparison of CCA with other component approaches
3. A Simple CCA Component Application (primarily live demonstrations)
 - a. Integrator example background
 - b. Building applications from components
 - c. Details of Monte Carlo Integrator component
 - d. Details of composing and running the integrator example application
 - e. Live demonstration
4. Language Interoperable CCA Components via Babel
 - a. Introduction: Babel history, and what do we mean by “language interoperability”
 - b. Babel basics
 - c. Babel and CCA
5. Writing Components (primarily live demonstrations)
 - a. Example application
 - b. Interface definitions: ports
 - c. Component implementation
 - d. Compiling
 - e. Live demonstration
6. Introduction to the Ccaffeine Framework (primarily live demonstrations)
 - a. What is a CCA framework and what is Ccaffeine?
 - b. How can I slip my own component into Ccaffeine?
 - c. How do I run Ccaffeine?
 - d. Convenience scripts
7. A Look at More Complex Component-Based Applications (live demonstrations if time permits)
 - a. Computational Facility for Reacting Flow Simulation
 - b. Quantum Chemistry
 - c. Climate Modeling
 - d. Performance considerations
 - e. Standardizing interfaces: TSTT Mesh example
 - f. “Best practices” for architects and developers
8. CCA Status and Plans
 - a. Active scientific component and interface development efforts
 - b. MxN parallel data redistribution
 - c. CCA frameworks and tools
 - d. User outreach and applications integration