



The Common Component Architecture (CCA) Forum and the Center for Component Technology for Terascale Simulation Software (CCTSS)

CCTSS Tutorial Working Group
<http://www.cca-forum.org/tutorials>

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Sciences (MICS) Program of the U.S. Dept. of Energy, Office of Science.



Contributors

- *Rob Armstrong, SNL (Presenter)*
- David Bernholdt, ORNL



Groups Behind the CCA

CCA Forum

- Set specifications for CCA components & frameworks
- Promote and facilitate development of domain-specific “standard” interfaces
- Meeting quarterly since 1998
- Open membership
 - Superset of CCTSS

CCA = Common Component Architecture

CCTSS = Center for Component Technology for Terascale Simulation Software

SciDAC = Scientific Discovery through Advanced Computing

ISIC = Integrated Software Infrastructure Center

CCTSS (DOE SciDAC ISIC)

- Develop CCA technology from current prototype stage to full production environment
- Increase understanding of how to use component arch. effectively in HPC environment
- Participants:
 - Argonne, Livermore, Los Alamos, Oak Ridge, Pacific Northwest, and Sandia National Laboratories;
 - Indiana University, and University of Utah



CCA Forum Working Groups

- Component Deployment (Scott Kohn, LLNL)
 - Build environment, component repository
- MxN (Jim Kohl, ORNL)
 - Develop specifications for MxN parallel redistribution port
- Scientific Data Components (Lori Freitag, ANL)
 - Basic Scientific Data Object (David Bernholdt, ORNL)
 - Raw Data, Local Arrays, Distributed Array Descriptors, Distributed Arrays
 - Unstructured Mesh (Lori Freitag, ANL)
 - Collaboration with SciDAC TSTT Center
 - Structured AMR (Phil Colella, LBNL)
 - Collaboration with SciDAC APDEC Center
- Tutorials (David Bernholdt, ORNL)



CCTSS Research and Development Agenda (1/2)

- **Frameworks** (*Lead: Scott Kohn, LLNL*)
 - Integration of prototype frameworks
 - Language interoperability tools
 - Component deployment
- **Scientific Components** (*Lead: Lois McInnes, ANL*)
 - Abstract interfaces and component implementations
 - Scientific data; Linear, nonlinear, and optimization solvers; Steering and visualization; Multi-threading and load redistribution; Fault tolerance
 - Quality of service research



CCTSS Research and Development Agenda (2/2)

- **MxN Parallel Data Redistribution** (*Lead: Jim Kohl, ORNL*)
 - Basic MxN interface and component implementation
 - Higher-level coupling (units, grid interpolation, etc.)
 - “Automatic” MxN via framework, parallel RMI
- **Outreach and Applications Integration** (*Lead: David Bernholdt, ORNL*)
 - General education and awareness
 - Strong liaison with adopting groups
 - Chemistry and Climate work within CCTSS

CCA Common Component Architecture		Center for Component Technology for Terascale Simulation Software (CCTSS)		
<i>Institution</i>	<i>Frameworks</i>	<i>Parallel Components</i>	<i>MxN</i>	<i>Applications</i>
	Scott Kohn, LLNL	Lois McInnes, ANL	Jim Kohl, ORNL	David Bernholdt, ORNL
ANL Lois Curfman McInnes	Low-level services	Data Components Optimization Nonlinear Solvers		Climate
Indiana Dennis Gannon	Distributed Framework	Linear Solvers		
LANL Craig Rasmussen			Component	
LLNL Scott Kohn	Language Interoperability Component Repository		Framework	
ORNL David Bernholdt, Jim Kohl		Fault Tolerance Visualization and Steering	Component	Climate Liaison
PNNL Jarek Nieplocha		Data Components		Chemistry
SNL Rob Armstrong (Lead PI)	SCMD Framework	Data Components		Chemistry
Utah Steve Parker	Builder Service Thread Safety	GUI Component	Framework	
10 April 2002		CCA Forum, Townsend, TN		7

CCA
Common Component Architecture

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Information Pointers

- <http://www.cca-forum.org>
- <http://www.cca-forum.org/cctss>
- Mailing list: cca-forum@cca-forum.org (to join visit <http://www.cca-forum.org/mailman/listinfo/cca-forum/>)
- Lead PI: rob@sandia.gov
- All Pis: cca-pi@z.ca.sandia.gov
- Your local PI
- Focus Area Lead
- Working Group Chair

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8