



Welcome to the Common Component Architecture Tutorial

CCA Forum Tutorial Working Group

<http://www.cca-forum.org/tutorials/>
tutorial-wg@cca-forum.org



Who Are We?

(And Where Did We Come From?)

- ACTS Toolkit Interoperability Effort (Late 1990's)
 - Part of DOE 2000, Many Tool Integration Projects
 - “One-to-One”, Leading to N² Solutions... ☹
- Common Component Architecture Forum (1998)
 - Goal: To Develop a General Interoperability Solution
 - Grass Roots Effort to Explore High-Performance Components for Scientific Software
- SciDAC Center for Component Technology for Terascale Simulation Software (CCTSS, 2001)
 - Part of New DOE Scientific Simulation Program
 - Technology Development in Several Thrust Areas...

The Common Component Architecture (CCA) Forum

- Define Specifications for **High-Performance** Scientific Components & Frameworks
- Promote and Facilitate Development of Domain-Specific **“Standard” Interfaces**
- Goal: **Interoperability** between components developed by different expert teams across different institutions
- Quarterly Meetings, Open membership...

Mailing List: cca-forum@cca-forum.org

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Center for Component Technology for Terascale Simulation Software (CCTSS)

- DOE SciDAC ISIC (\$16M over 5 years)
 - SciDAC = Scientific Discovery through Advanced Computing
 - ISIC = Integrated Software Infrastructure Center
- **Subset** of CCA Forum
- Develop CCA technology from current prototype stage to full production environment
- Increase understanding of how to use component architectures effectively in HPC environments
- Participants: (Funded by the Office of Mathematical, Information and Computational Sciences (MICS))

Lawrence Livermore
National LaboratoryLos Alamos
National Laboratoryornl
Oak Ridge National LaboratoryPacific Northwest
National LaboratorySandia
National
LaboratoriesTHE
UNIVERSITY
OF UTAH

Lead PI: Rob Armstrong, SNL <rob@sandia.gov>

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CCTTSS Research Thrust Areas and Main Working Groups

- **Scientific Components**
 - Scientific Data Objects
Lois Curfman McInnes, ANL (curfman@mcs.anl.gov)
- **“MxN” Parallel Data Redistribution**
Jim Kohl, ORNL (kohlja@ornl.gov)
- **Frameworks**
 - Language Interoperability / Babel / SIDL
 - Component Deployment / Repository
Scott Kohn, LLNL (skohn@llnl.gov)
- **User Outreach**
David Bernholdt, ORNL (bernholdtde@ornl.gov)

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Acknowledgements

- **CCA Forum Tutorial WG**
 - Rob Armstrong, David Bernholdt, Wael Elwasif, Lori Freitag, Dan Katz, Jim Kohl, Gary Kumfert, Lois Curfman McInnes, Boyana Norris, Craig Rasmussen, Jaideep Ray, Torsten Wilde
 - ANL, JPL, LANL, LLNL, ORNL, SNL
- **And many more contributing to CCA itself...**
 - ANL - Lori Freitag, Kate Keahey, Jay Larson, Ray Loy, Lois Curfman McInnes, Boyana Norris, ...
 - Indiana University - Randall Bramley, Dennis Gannon, ...
 - JPL - Dan Katz, ...
 - LANL - Craig Rasmussen, Matt Sotille, ...
 - LLNL - Tom Epperly, Scott Kohn, Gary Kumfert, ...
 - ORNL - David Bernholdt, Wael Elwasif, Jim Kohl, Torsten Wilde, ...
 - PNNL - Jarek Nieplocha, Theresa Windus, ...
 - SNL - Rob Armstrong, Ben Allan, Lori Freitag Diachin, Curt Janssen, Jaideep Ray, ...
 - University of Utah - Steve Parker, ...
 - And others as well ...

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Agenda

Time	Module	Presenter	Length
8:30am	Welcome and Acknowledgements	David Bernholdt	5 min
8:35am	Why Use Components in HPC Software	Craig Rasmussen	40 min
9:15am	CCA Concepts	Craig Rasmussen	45 min
10:00am	Break		30 min
10:30am	A Simple CCA Example	Wael Elwasif	30 min
11:00am	Language Interoperability using Babel	Gary Kurfert	60 min
12:00n	Lunch (catered)		90 min
1:30pm	Writing CCA Components	Wael Elwasif	45 min
2:15pm	How to Create Ccaffeine Components	Wael Elwasif	45 min
3:00pm	Break		30 min
3:30pm	A Look at More Complex CCA Applications	Lori Freitag Diachin	45 min
4:15pm	CCA Status and Plans	Lori Freitag Diachin	30 min
4:45 pm	Q&A and additional examples	All	15 min

Next: The Sausage Grinder Talk