Slide 1

CCA
Common Component Architecture

Welcome to the
Common Component Architecture Tutorial

ACTS Workshop
8 August, 2003

CCA Forum Tutorial Working Group
http://www.cca-forum.org/tutorials/
tutorial-wg@cca-forum.org

JPL · Lawrence Livermore National Laboratory · Los Alamos · NASA · ornl · Sandia National Laboratories

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Slide 2

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 N^2 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 (CCTTSS, 2001)
  - Part of New DOE Scientific Simulation Program
  - Technology Development in Several Thrust Areas…

Slide 3

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*

http://www.cca-forum.org/

Slide 4

Center for Component Technology for Terascale Simulation Software (CCTTSS)

- 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 Laboratory · Los Alamos · ornl · Pacific Northwest National Laboratory · Sandia National Laboratories · THE UNIVERSITY OF UTAH

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

http://www.cca-forum.org/ccttss/

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
    Gary Kumfert, LLNL (kumfert@llnl.gov)
- User Outreach
  David Bernholdt, ORNL (bernholdtde@ornl.gov)

5

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, Sameer Shende, Torsten Wilde, Shujia Zhou
  - ANL, JPL, LANL, LLNL, NASA/Goddard, ORNL, SNL, U Oregon

- **And many more contributing to CCA itself…**
  - ANL - 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, …
  - NASA/Goddard – Shujia Zhou
  - 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 Oregon – Allen Maloney, Sameer Shende, …
  - University of Utah - Steve Parker, …
  - And others as well …

6

Agenda

Module	Presenter	Length
Welcome and Acknowledgements	David Bernholdt	5 min
1 Overview of Components and CCA	David Bernholdt	40 min
2 CCA Applications	Jaideep Ray	45 min
Break		*30 min*
3 CCA Concepts	David Bernholdt	30 min
4 A Simple CCA Example	Rob Armstrong	30 min
5 Language Interoperability using Babel	Tom Epperly	60 min
Lunch		*60 min*
6 Writing CCA Components	Rob Armstrong	45 min
7 How to Create Ccaffeine Component	Rob Armstrong	60 min
8 CCA Status and Plans	Jim Kohl	15 min
Break		*30 min*
Main program continues with Hands-on TAU		

7