The Collage Authoring Environment: from proof-of-concept prototype to pilot service

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Outline

- Motivation is to bring reproducibility to scientific papers
- Problem is how executable papers should be supported by technology
- Proposed solution is Collage Authoring Environment
- Result is a Special Issue of “Computers & Graphics” journal
- Conclusions is what and how one can benefit from Collage now and in the future
Motivation

- Increasing interest of the community in bringing reproducibility and reusability to scientific publishing
  - “R dimension” of research (vide: David De Roure)
  - “Science” special issue on data replication and reproducibility (December 2011)
  - “Science as an open enterprise” report by the Royal Society (June 2012)
- Intelligent openness of science induced by
  - Recent IT breakthroughs
  - Growth of the Internet
  - Changing social and political environment (preservation, data management plans, audits, sustainability policies etc.)
- Publishers seek new ways of overcoming limitations in the scholarly communication process
  - Elsevier “Article of the future” umbrella project
  - Executable Paper Grand Challenge
  - [video](http://www.youtube.com/watch?v=FQ5FaeHcdwo)
Problem

Propose a solution by which the primary data upon which scientific research is based, as well as the computational methods used in the course of scientific research, become first class citizens of the resulting publication, so that publications regain the ability to stand on its own merits, just as they did when the notion of scientific publications was first conceived.

Manifested in a set of specific objectives of the Elsevier Executable Paper Grand Challenge:

- Executablity
- Compatibility
- Validation
- Licensing
- Computational Access
- Data Access
- Collaborative development support
- Multi-actor environment
- Evolutionary Approach
- Security
- Interoperability
- Customizability
- Extendability
- Adaptability
Towards Solution

- GridSpace2 distributed computing platform
  - Developed since 2008
  - Web-oriented
  - Interactive workflow management system
  - Generic platform, specific applications accommodated as light “experiments” over it

- Collage prototype
  - Winner of the Executable Paper Grand Challenge in June 2011
  - Based on GridSpace2 platform
  - Publications associated with GridSpace2 experiments
  - Demo executable paper

- Collage pilot
  - Used by 3D object retrieval community for authoring first executable papers since May 2012
  - Full journal article life-cycle: submission, peer review, corrections and press in May 2013
  - Go-live on Elsevier ScienceDirect portal and articles made available to readers in May 2013

- GridSpace2 still used in the scope of other projects
  - MAPPER – Multiscale Applications on European e-Infrastructures since 2010
    [http://www.mapper-project.eu/](http://www.mapper-project.eu/)
  - PL-Grid/PL-Grid+ - Polish National Grid Initiative since 2008
    [http://www.plgrid.pl](http://www.plgrid.pl)
GridSpace2/Collage: Concept
GridSpace2/Collage: “Science as a Service” Architecture
GridSpace2/Collage: User Interfaces

• Authoring (up) and previewing/reviewing (right) through a dedicated web platform: Authoring Workbench

• Access to article through ScienceDirect portal via Collage SciVerse App (video)

The Collatz Conjecture
ecepiela, DOI: 10.0000/1358511059290

The experiment was released by ecepiela on Fri Jan 18 13:10:69 CET 2013 in the private scope. No, below is not an article. It’s only generated text with injected labels that navigate to particular experiment items to show you how in-text links work.


Data 1: Arguments

Code 1: Computing sequences for given arguments

Data 1 (your copy): Computing sequences for given

var i = 1;
var data = [1, 3, 5, 7, 9];

Data 2: Raw results to be visualized afterwards

Code 2: Generating plots

Data 2 (original): Raw results to be visualized

Data 3: Number of iterations

Code 3: Generating plots

Data 3 (your copy): Number of iterations

Data 4: The biggest number (high water mark) reached when iterating

Code 4: Generating plots

Data 4 (your copy): The biggest number (high water mark) reached when iterating

Data 5: Value in last iteration

Code 5: Generating plots

Data 5 (your copy): Value in last iteration

Save experiment

Reset
Results

• Technology: web platform interoperable on presentation (http) and computational back-end (SSH, Grid, Cloud, …) layers, based on Java EE platform

• Collage Authoring Environment pilot service on https://collage.elsevier.com

• “Computers & Graphics” Special Issue on 3D object retrieval (open access)
## Conclusions

**From computational experiment to e-publication**

- Scientific relevance
- Originality
- Reproducibility
- Verifiability
- Transparency
- Primary data and results availability
- Support for review process
- Publication factors
- Publishing medium

**From computational experiment to service**

- Integration with common e-infrastructure
- User access management
- Respected intellectual property rights
- Cataloging, indexing
- Accessibility
- Reusability
- Experiment availability
- Documentation availability
- Examples availability
- Monitoring
- Accounting
- Maintenance
- User support
- Quality assurance
- Security assurance
Further information

• Check out Special Issue of “Computers & Graphics” on

• Read more and sign in for trial account on
  https://collage.elsevier.com

• Tell us what you think on
  http://www.surveymonkey.com/s/DCWL2FV

• Contact us through
  eryk.ciepiela@cyfronet.pl

• More about us on
  http://dice.cyfronet.pl
Thank You

• Elsevier team: Ann Gabriel, Hylke Koers, Gail Rodney, Rebecca Capone, Beate Specker
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• Distributed Computing Environments Team (DICE) in Cyfronet led by Marian Bubak
• All authors and reviewers having contributed to the Special Issue of “Computers & Graphics” on 3D object retrieval
• And You for your attention!
13rd international meeting

Cracow '13
Grid Workshop

Kraków, Poland
November 4-6, 2013

TOPICS
- eScience, system level science and collaborative applications
- models, methods and tools for collaborative applications development
- virtual laboratories and problem solving environments
- distributed computing infrastructures, grids and clouds
- knowledge in eScience and DG systems
- virtual organizations and security aspects
- resource management and scheduling
- monitoring and information management
- software engineering aspects
- industrial and social implications

TUTORIAL
"Cloud Platform for VPH Applications"

DEADLINES
- Sep 29, 2013 - short paper submission
- Oct 4, 2013 - acceptance notification
- Oct 16, 2013 - early registration
- Nov 25, 2013 - extended paper submission

MORE INFO  www.cyfronet.krakow.pl/cgw13/

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