

Quilt: Interactive Publications

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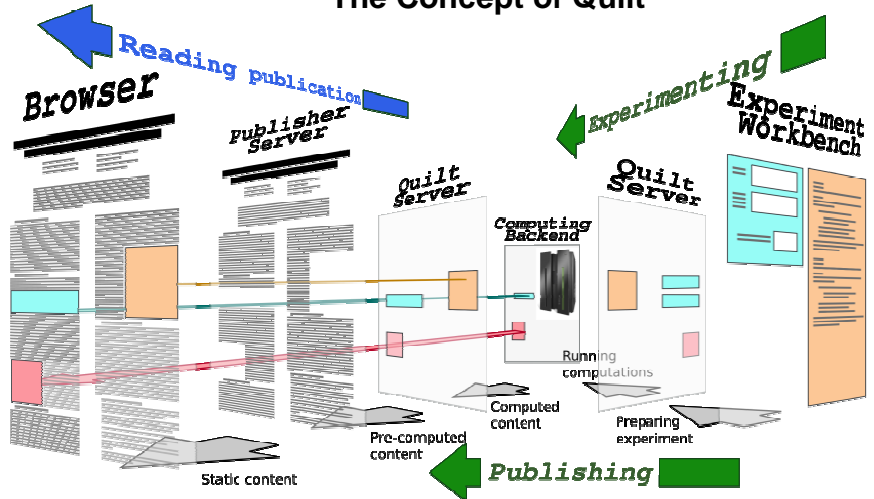
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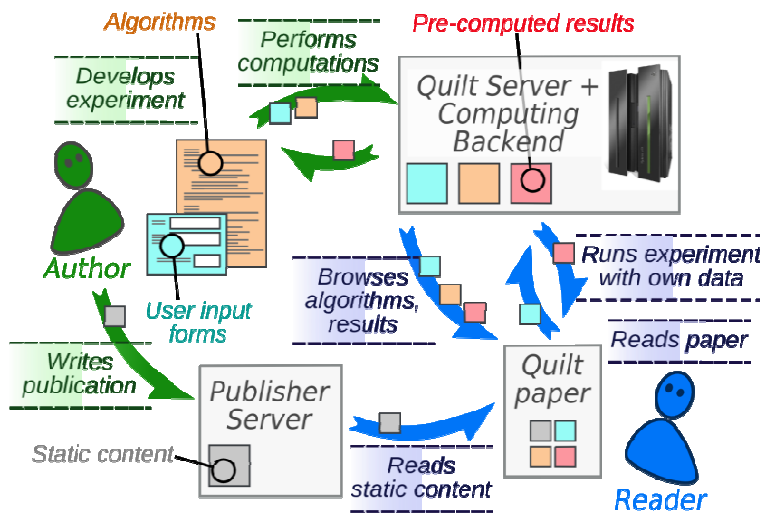
Quest for innovative technologies:

- facilitate collaborative development and publication of scientific experiments with the use of distributed computing resources;
- retroactively process existing publications to render them interactive, with the ability to “inject” dynamic executable content;
- instantiate scientific papers with dynamic content in a reader-friendly way, with interactive input which can be manipulated by end users;
- directly interface scientific databases and libraries of research data (e.g. OpenAIRE);
- enhance the peer review process by enabling reviewers to validate results of computational research by reenacting experiments using arbitrary input data.

The Concept of Quilt



The Quilt Experimentation Cycle



- A research paper is authored by the **Author** in the form of a HTML document, capable of being rendered by a browser;
- Where applicable, the author may insert dynamic content into the publication (as simple HTTP links to so-called Quilt assets (input forms, output images, pieces of executable code), produced using the Experiment Workbench (via explorative experimentation));
- Assets can be interacted with by the **Reader**, who can, in effect, rerun the experiment with custom input, browse/download primary datasets as well as read the static content of the publication;
- The **Quilt Server** reenacts the experiments according to the algorithms specified by the **Author**;
- The Quilt Server can delegate computing tasks to the **Computing Backend** (HPC resources).

Quilt End-User Interfaces

existing to be developed

Experimentation

- Used by the **Author** to write, test and deploy scientific experiments
- Supports a number of programming languages and can access HPC infrastructures
- Supports collaboration within goal-oriented research teams
- Web interface based on GridSpace
- Interfaces Cloud computing stacks

Authoring

- Used by the **Author** to prepare the interactive publication
- Extended with the ability to publish and manage interactive assets generated by the experimentation UI
- Requires no programming knowledge
- Based on Wiki/blogging tools
- Integration with arbitrary content management systems (CMS)

Reading

- Used by the **Reader** to interact with the publication
- Can visualize the publication and provides access to interactive content
- Can schedule computations on resources contributed by the reader
- Providing fine-grained security
- Preserving partial results of long-term computations

1. M. Baez, et al.: Addressing information overload in the Scientific Community; IEEE Internet Computing 14 (6) 31-38, 2010

2. M. Bubak et al., Virtual Laboratory for Collaborative Applications, In: M. Cannataro (Ed.) Handbook of Research on Computational Grid Technologies for Life Sciences, Biomedicine and Healthcare, Chapter 27, pp. 531-551, 2009, IGI Global

