
Adessowiki

On-line Collaborative Scientific Programming Platform

<http://www.adessowiki.org>

Wikisym 2009

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Adessowiki – Definition

- Is a collaborative environment for scientific writing and programming
 - Meaning of the word:
 - **Adesso** – Italian word for **now**
 - **Wiki** - Hawaiian word for **fast**
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Problems to solve

- Synchronism between documentation and programming code
 - Book on scientific programming has an accompanying CD (**usually out of sync**)
- **Literate programming** (Donald Knuth, 1984)



Problems to solve

- To reproduce a scientific paper you need:
 - Same data
 - Same code
 - Same programming environment
 - The same applies to benchmark algorithms
 - Fingerprint, face recognition competition, etc.
 - **Reproducible research**
 - <http://www.reproducibleresearch.net>
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Problems to solve

- After few days a scientific paper is written you don't know how to regenerate the figures and tables
 - ❑ The parameters used are lost
 - ❑ Programming code is outdated or not available
 - ❑ Demos require a computer configured with many software packages

 - **Reproducible research**
 - ❑ <http://www.reproducibleresearch.net>
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Problems to solve

- Students deliver a programming code as a lab exercise
 - You may not have the same software environment the student has
 - It takes a lot of time to download, compile, execute and see the results
 - Automatic programming assessment
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Adessowiki – A solution

- Concept
 - It is a wiki, where the programming code can be embedded in the text. It is executed in the server when the page is rendered updating images, figures and output text.
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Adessowiki: 3 main features

1. SaaS – Software as a service;
2. Collaborative;
3. Executable user code.
 - documents or applications.



Collaborative executable documents

- Collaborative Structured Text (like wiki)
 - Allows the insertion of small parts of code (Python, C++) in the text. The graphics, plots, images are displayed as figures in the document
 - Documents can be converted to:
 - PDF
 - Slide show
 - HTML
 - RTF (Word for Windows)
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Advantages

- No software installation or configuration
 - The client requires just a web browser
 - Collaborative as any wiki
 - Centralized server and application. New versions are easier to make and maintain
 - Centralized data base of images
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Possible scenarios

- Teaching

- Software support
- Library of collaborative code and explanations

- Research

- Scientific report, paper, thesis

- Software development

- Client and developers in a collaborative work
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Teaching

- Easy to verify if the code works
 - Possible to compare different solutions to the same problem
 - Prevents plagiarism (wiki log capabilities)
 - Incentives collaboration (intra and inter classes)
 - Solutions are easily recycled as the data, the code and its programming environment are available for all in a centralized manner
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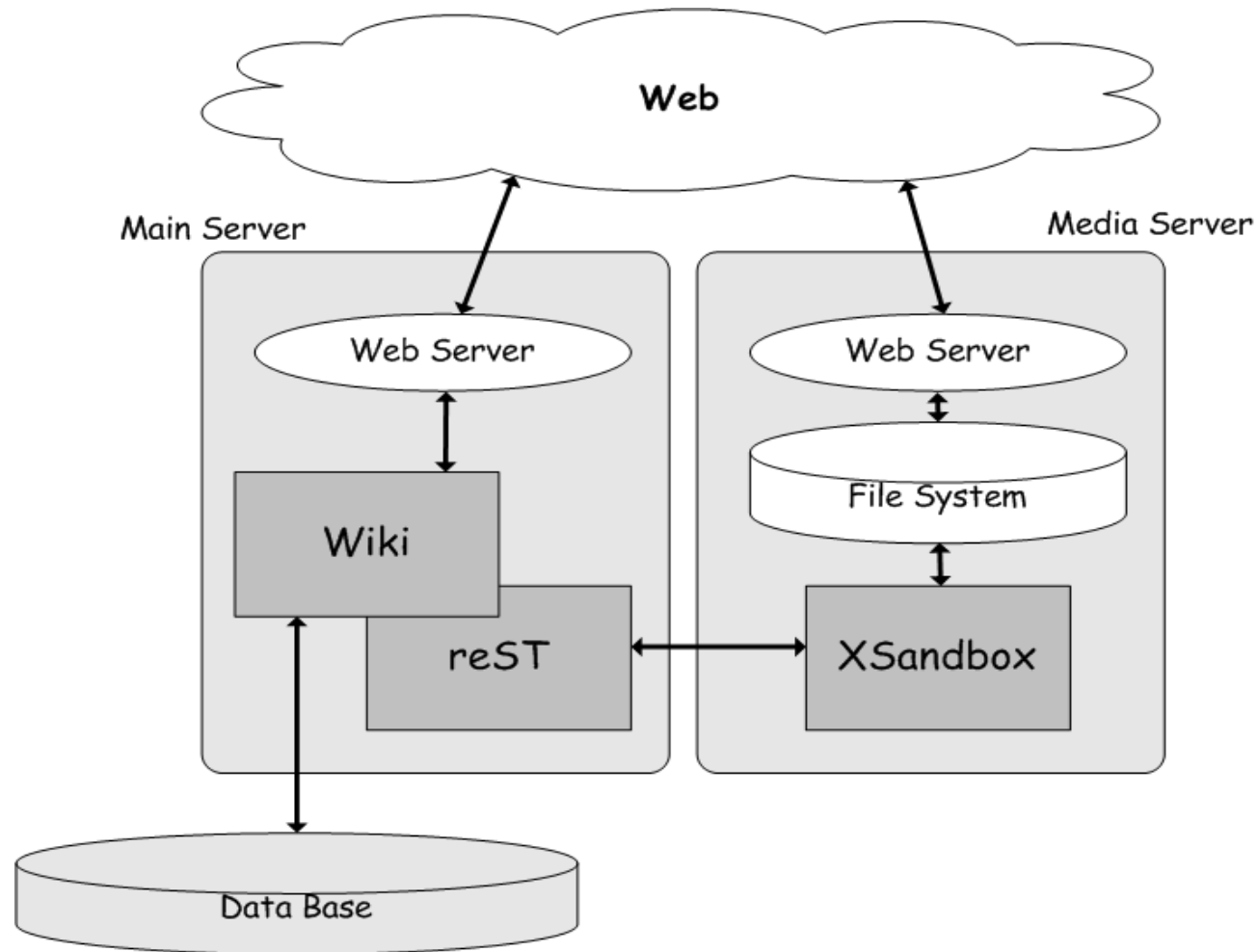
Research

- Scientific experiments can be readily reproduced
 - Documents contain source code, data, equations and descriptions together and synchronized
 - Papers, books, reports, thesis
 - Encyclopedia of algorithms with technical explanations
 - E-book of the future – text, source code and data for reader consumer and collaboration
 - Comparison and assessment of scientific contribution – future of paper reviewing process
 - Competitions for open innovation
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Applications

- Collaborative asynchronous development process among client and developers
 - Client can provide data, problem description
 - Developers (collaborative) provide solutions
 - Client can verify quality of results and give feedback
 - No software installation at the client
 - Software environment are the same for development and deployment
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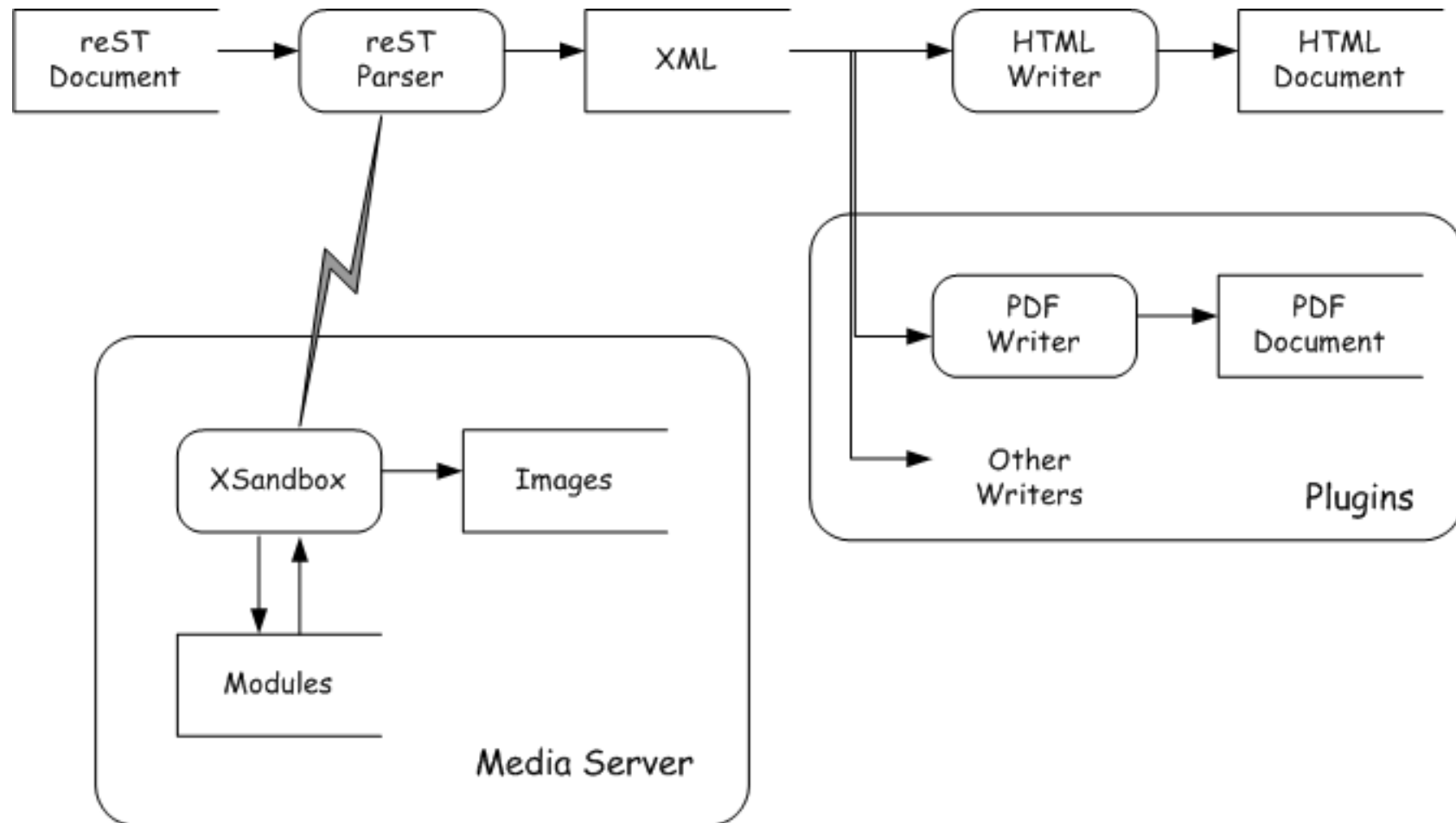
Adessowiki – How it works



Adessowiki – System organization

- The **Wiki**
 - A modern fully-featured wiki
 - The **Markup Language**
 - A powerfull markup language based on *reStructuredText*
 - The **Execution Sandbox**
 - A controlled environment for execution of Python code
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Adessowiki – how it works



Experiences to date (since 2008)

- A whole morphological chapter was written using an earlier version of this tool. Now published Academic Press, 2008.
 - 4 courses in different locations sharing the same environment
 - Image Processing toolbox development
 - Being used as report, demonstrations, paper and thesis writing.
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Difficulties

- Security
 - The code can potentially impact the overall system
 - Requires extensive use of sandbox and virtual machines
 - Upgrading
 - How to keep old documents being generated correctly when software is upgraded?
 - Cloud computing model.
 - User interface, navigation, organization of the documents.
 - System can grow easily and become chaotic and disorganized.
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Possible community project

- Wikipedia of computer algorithms
 - Graph processing
 - Optimization
 - Neural networks
 - Image and signal processing
 - ...



Adessowiki – current developments

- API definition for sandbox creation
 - User can specify and create his own sandbox
 - Sandbox to support GPU hardware
 - Allows collaborative programming using GPU
 - Sandbox to interface with Robotics hardware
 - WebLab concept
 - Cloud computing extension
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Open to collaboration

- If you are interested to use or collaborate:
 - Visit <http://www.adessowiki.org>
 - Main contacts:
 - Roberto Lotufo (lotufo@unicamp.br)
 - Rubens Machado (rubens.machado@cti.gov.br)
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