Scenarios Development and Execution based on BASHYT and gSWATexe

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enviroGRIDS Portal Architecture

[Diagram of the enviroGRIDS Portal Architecture]

- Users: Laptop, Workstation
- Administrator: Data provider, Specialist, Decision maker, Citizen
- BSC-OS Portal:
  - Data Management Application
  - Hydrologic Model Management Application
  - Satellite Data Processing Application
  - Data Visualization and Report Application
  - Decision Maker Application
  - Citizen Access Application

- Web Infrastructure:
  - Data Management Service
  - Hydrologic Model Service
  - Satellite Data Processing Service
  - Data Visualization Service
  - Reports
  - Report Visualization

- Grid Infrastructure:
  - Spatial Data
  - Computing Element
  - Hydrologic Output Data
Basin Scale Hydrological Tool Decision Support System (BASHYT DSS)

- integrated web portal that exposes hydrological application, based on a watershed scale model, to support decision makers
- the storage, management and querying of data collections, visualization of data through the web GIS
- the portal can create reports (graphs, maps, etc) through automatic standardized procedures
- offers a live programming environment and web template features, making the programming and application development available to beginner developers
- is able to use output files of SWAP through Collaborative Working Environment (CWE)
Bashyt – layered architecture

- **Service layer**
  - It is the base system layer. Service layer offers access to different services: web server, application server, database server, GIS server, etc.

- **Interoperability layer**
  - Contains functionalities and protocols for interoperability services

- **Application layer**
  - Supports the user interface
Main features

- Web based application
- GRID based processing
- Able to execute SWAT based scenarios
- Complete scenarios execution management solution

Functionalities

- Create a scenario execution description
- Upload necessary data (model description files)
- Monitor the execution process
- Download results
Bashyt and gSWATex.exe cooperation

- **Advantages**
  - Users will have the ability to develop scenarios using Bashyt functionalities.
  - At execution time gSWATex.exe uses Grid capabilities to speed up the processing for large scenarios.
  - After execution, the results can be visualized using Bashyt dedicated modules.

- **Difficulties**
  - Bashyt and gSWATex.exe are two independent applications.
  - Improve user experience by avoiding large files transfer through the internet (download and upload actions).
Bashyt and gSWATexe interconnection solution

Interconnection scenario 1:

- The applications “work together” through users actions:
  - Define the scenario
  - Download scenario files from Bashyt
  - Upload scenario files to gSWATexe
  - Execute the scenario
  - Download scenarios result data
  - Upload the information into Bashyt
  - Visualize the data
Bashyt and gSWATexe interconnection solution

Interconnection scenario 2:

- The applications “work together” through a common Storage Element and dedicated Web Services
  - The user defines the scenario
  - Bashyt provides an “Export to gSWATexe” functionality
    - The data is transferred to the Storage Element
    - Through the dedicated Web Service the execution environment is customized
- Execute the scenario
  - Scenario execution progress can be monitored directly in Bashyt
- Visualize execution data
  - After the execution is finalized, the results will be available automatically into Bashyt for visualization
Scenario 2 architecture

Create scenario WebService → Export execution (2b) → BASHYT

Check execution status WebService → Check execution status (5) → BASHYT

gSWATex → Export to execution (2a) → Download results (6) → Storage Element (SE)
Conclusions

- It is faster and more reliable to interconnect the two applications providing complementary functionalities than to redevelop one of the solutions into the other.

- The interconnection of the two applications will provide the users with a complete solution for large scale scenarios editing and execution.

- Scenario 2, although requires slight modification of the two programs, leads to a more robust functionality and increased efficiency for the user.
Thanks, Questions

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