



# MODELING AND ANALYSIS OF WATER SUPPLY SYSTEMS (MSWSS)

# 9. Modeling and Analysis of Water Supply Systems (MSWSS)

## Description

MSWSS is a service for modelling and analysis of Water Supply Systems which integrates the analysis of toxics in drinking-water supply networks with water distribution network simulation. MSWSS service will allow water infrastructure operators and researchers to analyse hazardous events (e.g. toxics propagation within a pipe system) and may be used for preparation of risk management plans for water utilities. The EOSC computing infrastructure and data sharing services enable modelling more complex water supply systems and to increase the number of scenarios for the analysis.

## Architecture

The architecture of the MSWSS service is depicted in figure 29. The MSWSS service uses Galaxy portal where users can share and reuse their workflows with data and prepare their simulation jobs. The computational backend of the MSWSS service is based on an elastic virtual cluster built by EC3 service and managed by the CLUES service and the Infrastructure Manager. EGI Check-in integration allows the use of computational resources available in the EOSC EGI Cloud Compute Service. The resources inside the virtual cluster are managed by the Slurm workload management system. The data produced by computational jobs are stored locally within the MSWSS service and are available to users via Galaxy portal.

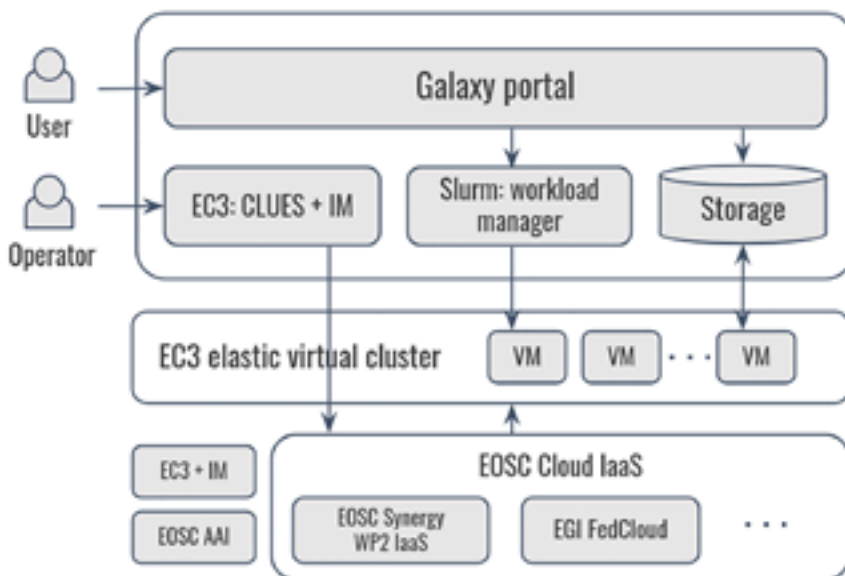


Figure 29 - Architecture of the MSWSS Thematic Service



## EOSC Services

MSWSS thematic service has selected and it is integrating the following services listed in the EOSC marketplace:

- EC3 (Infrastructure Manager, CLUES): is used for creation and management of computational backend based on elastic virtual cluster built from virtual worker nodes.
- EOSC Cloud computing resources: are used to build the elastic virtual cluster for MSWSS service.
- EGI Check-in: it is used by EC3 to authenticate the MSWSS service to EOSC Cloud computing resources.

## Service Endpoint

The first prototype of the MSWSS service is available at the link <https://mswss.ui.savba.sk:8443>. Figure 30 shows the main interface of the MSWSS service which is based on a customised Galaxy portal.



Figure 30 - Screenshot of the main interface of the MSWSS Thematic Service

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After successful login to the service users can upload the input files and submit the simulation to the workload manager of the elastic cluster which runs their jobs in the EOSC Cloud compute resources. Figure 31 shows the EPANET 2 simulation submitted to the workload manager



Figure 31 -Screenshot of the EPANET 2 simulation job submitted to the EC3 cluster

The first prototype of MSWSS service provides only basic functionality, more features are planned to be added after MS18, including the ability to prepare and process parametric simulations consisting of large number (tens of thousands) of jobs, post-processing of the results and the integration with EOSC data repositories (Dataverse and B2SHARE).



## Demonstration Video

The video presents the first prototype of the MSWSS service. It consists of two parts. First part presents the objective and motivation of the thematic service with the list of the EOSC services integrated. The second part demonstrates the interaction with the service from the point of view of service operators and users.



Click the image to view the video

