D 8.1.5 – “Data Simulation Collaboration Platform”

“Sub WP 8.1: Power Plants”

“Work Package 8: Demonstrators”

MODRIO (11004)

Version 1.0

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1. Requirements from MODRIO

Modrio requires a "Collaboration demonstrator" comprised of a "Web based graphical user interface" whereby Siemens and Siemen's customers can work together to agree on an installation of a Gas Turbine, specifically SGT-750 and SGT-800. This agreement will be based on Mathematical Model Simulations of the Gas Turbine and installation generated with the "OpenModelica" modeling platform.

2. Solution Description

Eurostep's Share-A-space software is a proven web based collaboration platform in use in companies around the world. Eurostep has previously worked with "Open Modelica" in other projects with Siemens so much of the previous work and experience can be re-used in this MODRIO project. Using Share-A-space's existing flexible and secure collaboration techniques it will be a very straight forward development for Modrio.

3. ISO Standards

Share-A-space is based on ISO 10303-239 Product Lifecycle Support (PLCS) and ISO 10303-242 Managed model-based 3D engineering. These two standards share the core concepts but support different views of Product defining information needed through the Life Cycle of a product. PLCS applies a Product Lifecycle Management view and ISO 10303-242 a more Design oriented view.

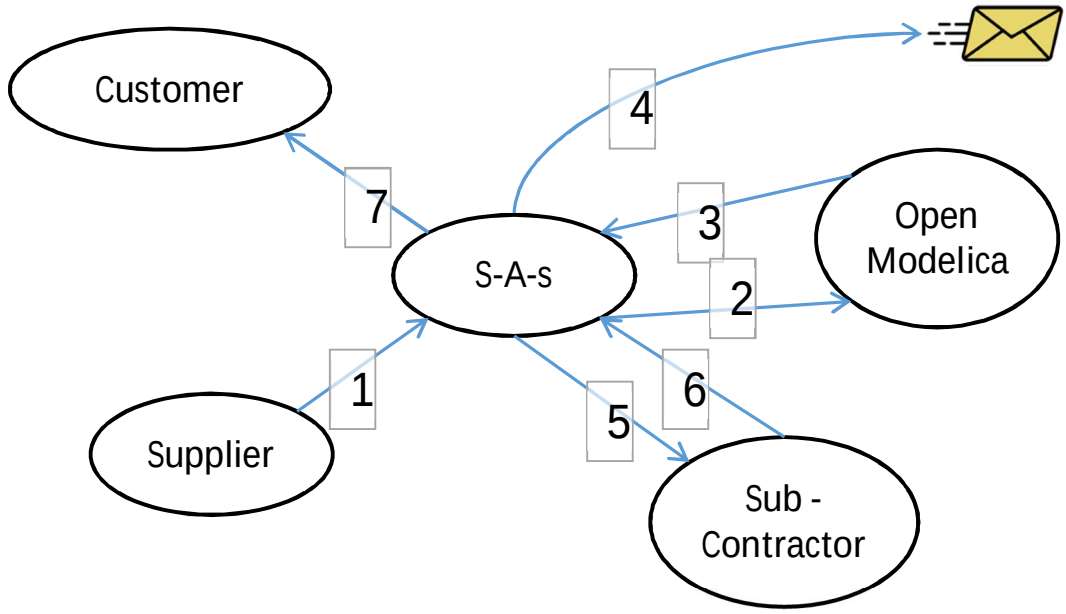
Systems engineering concepts like Requirements, Systems, Functions, Behavior, Verification and Validation is supported by the application of ISO 10303-233 System Engineering standard.

The reference data management is based on ISO 15926 Oil & Gas. This enables the possibility to add on specific semantics to the support system in a standardized way.

To support Information quality control and increase and concepts from ISO 8000-8 Information and data quality: Concepts and measuring is applied.

4. Solution Design

The majority of the Mathematical Modeling work will be done on the Siemens engineer's own workstation.



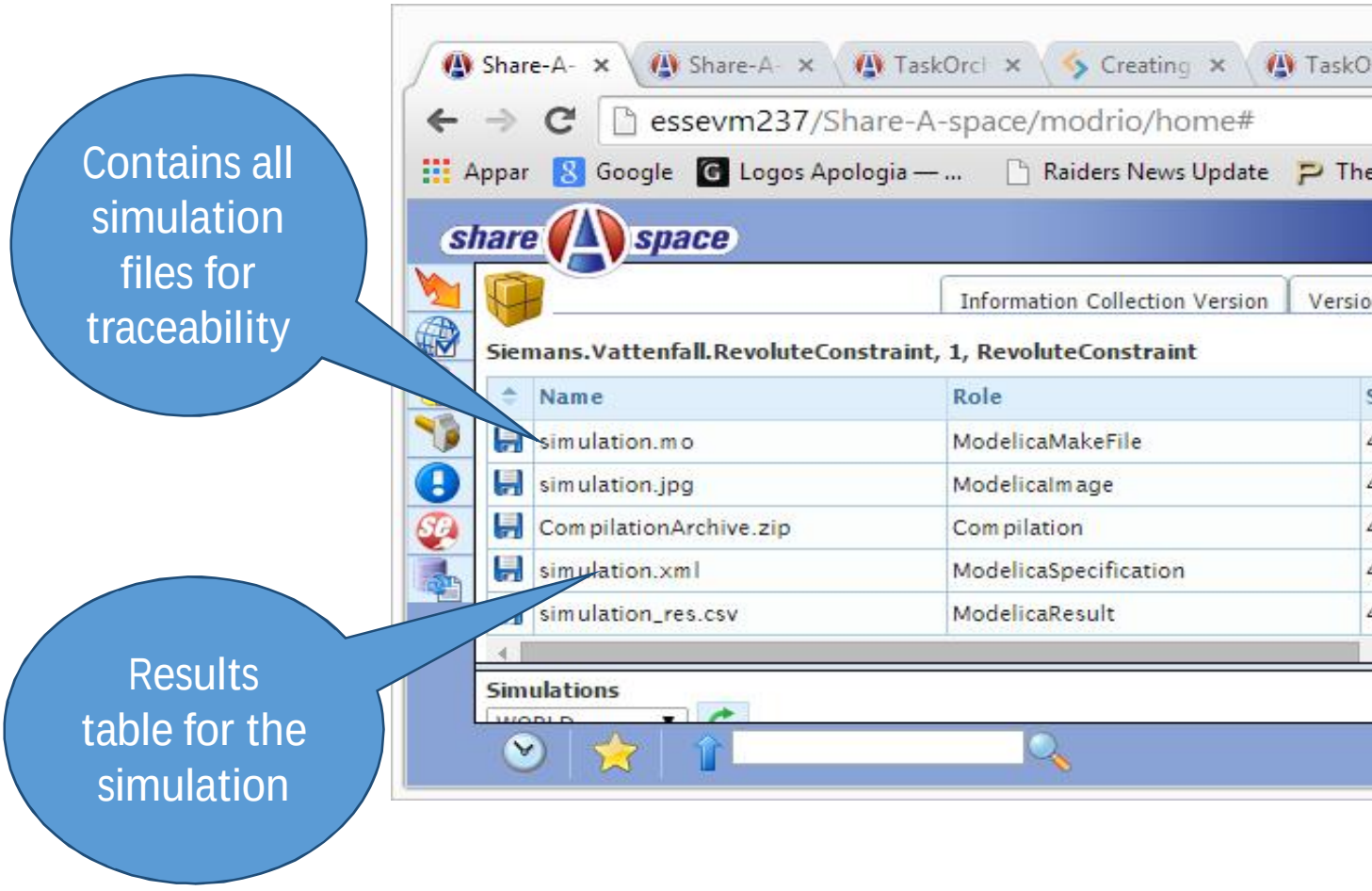
1. A supplier can submit to Share-A-space a mathematical model
2. OpenModelica is used to generate a simulation of the mathematical model.
3. All files used in the simulation are saved in Share-a-space for traceability.
4. If desired, an email can be sent on error or on completion of the simulation.
5. A sub-contractor can monitor the results of the simulation.
6. A sub-contractor can add their own additions to the simulation (collaboration).
7. The customer can monitor the results of the simulation.

When the engineer feels he has a model worth recommending to Siemen's customer then the engineer loads up the model to Share-A-space and Share-A-space will make sure it has all the latest libraries for the mathematical model using the open source program "Apache subversion (SVN)" which is the web standard for versioning.

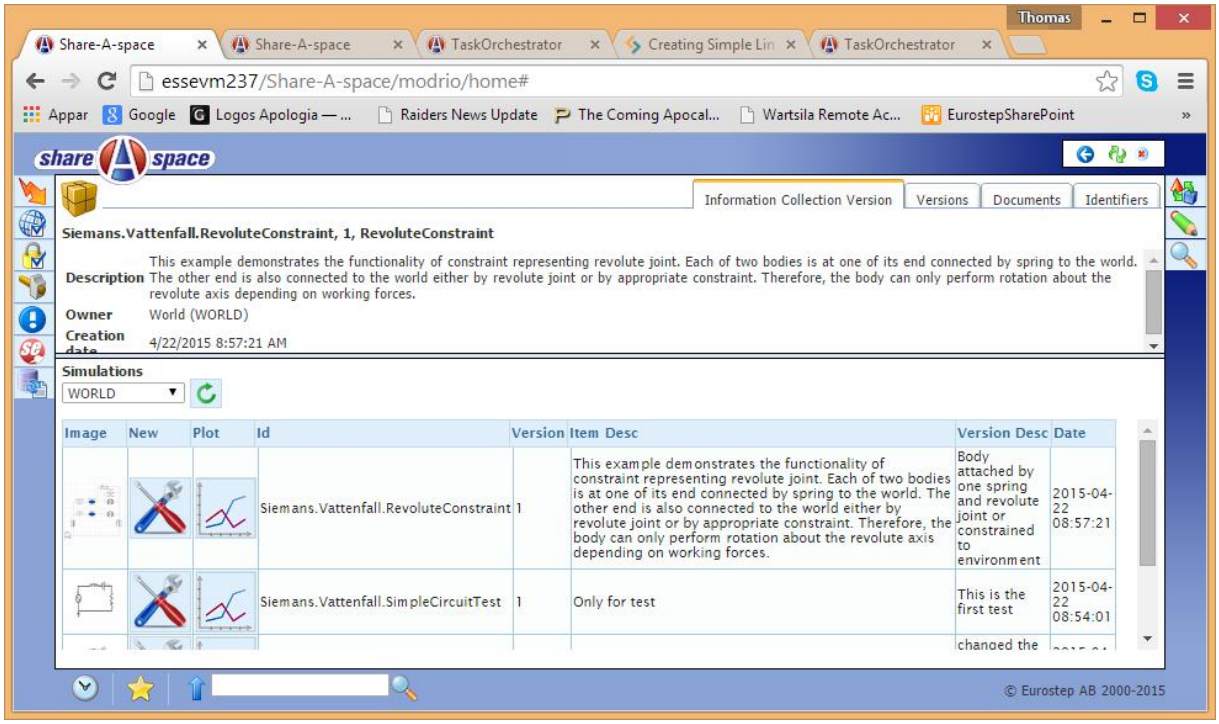
In each Modelica Model submission there are 3 required files:

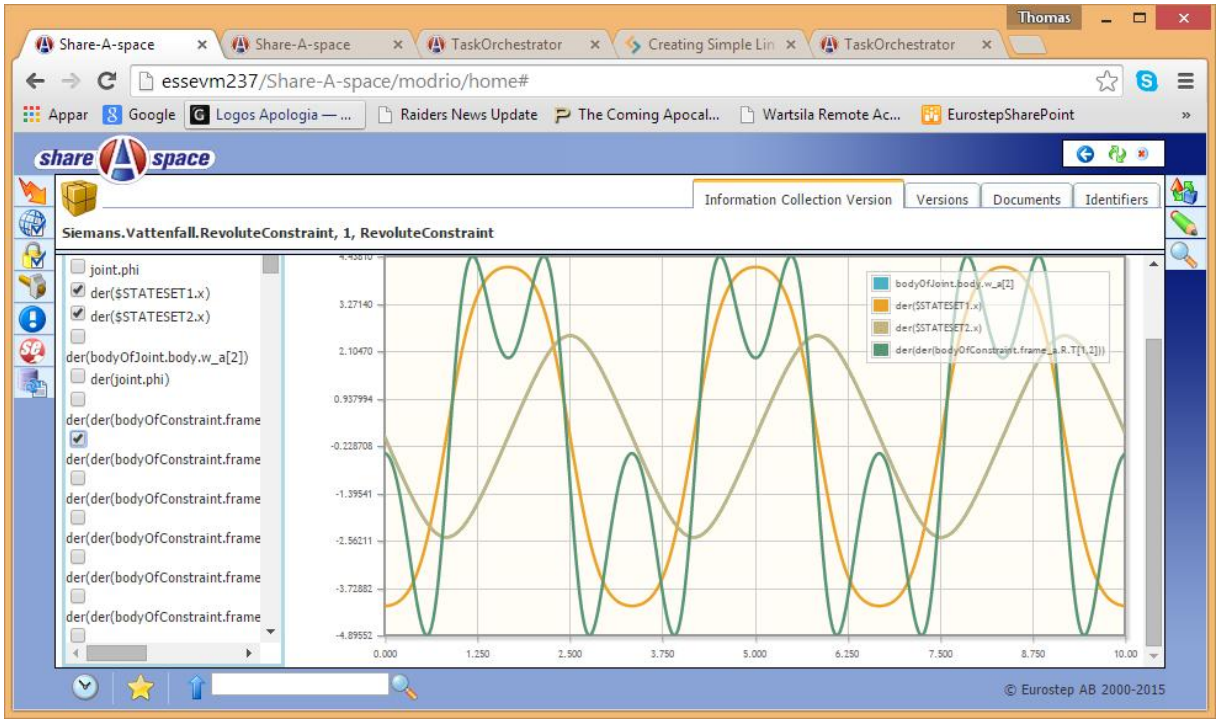
1. Defintion xml
   Describes details of how to run the simulation as well as descriptions and details of the simulation.
2. ModelicaModel
   Standard modelica file often called a ".mo" file which includes a complete definition of the mathematical model
3. Diagram
   An illustration of the item being simulated. Often a schematic

Then Share-A-space will perform the official simulation of the mathematical model using "OpenModelica" and save a snapshot of the entire simulation so that at any time in the future the model can be re-examined.



The engineer can propose specific views of the simulation in Share-A-space for the customer because the simulations are so vast that it is necessary to guide the customer to the important data to view.

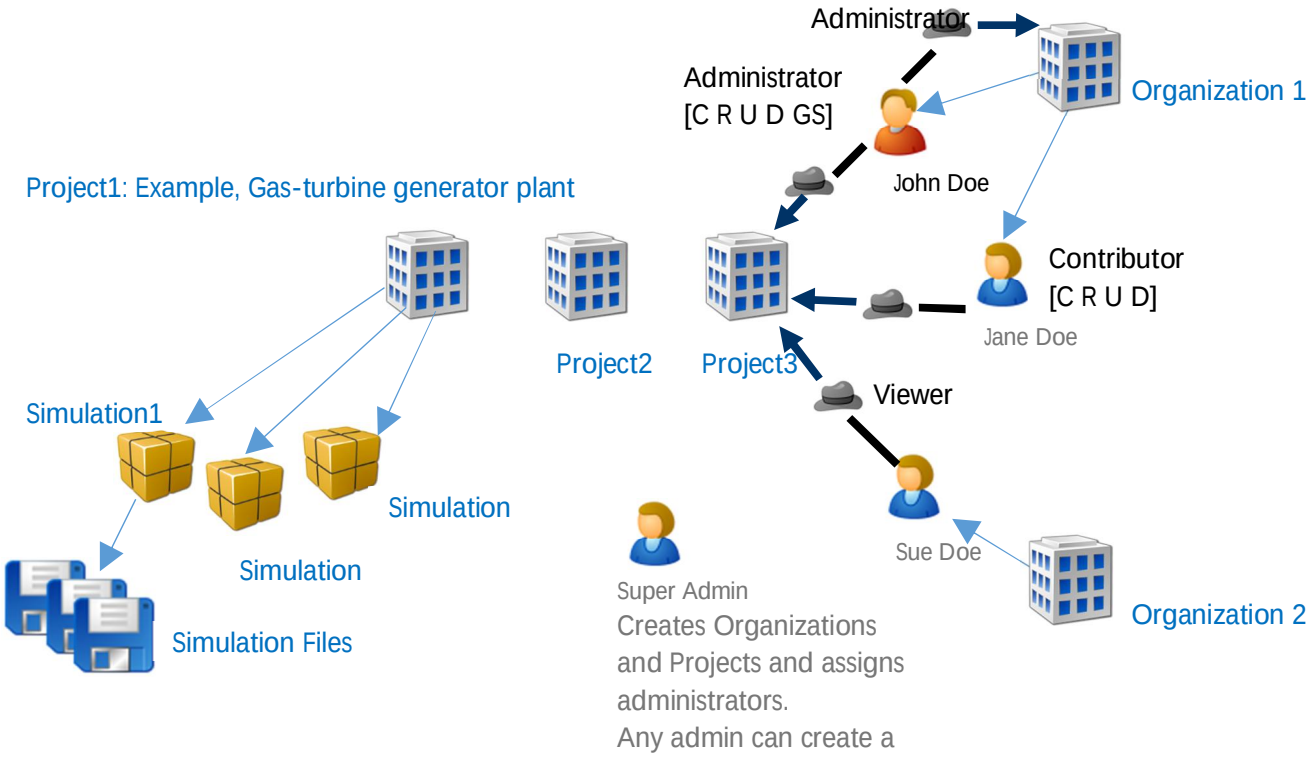




5. Collaboration design

A secure collaboration web design has as its basis in that persons are only allowed to see/edit those objects that he/she has the rights to see/edit. Everyone is NOT allowed to see and do EVERYTHING.

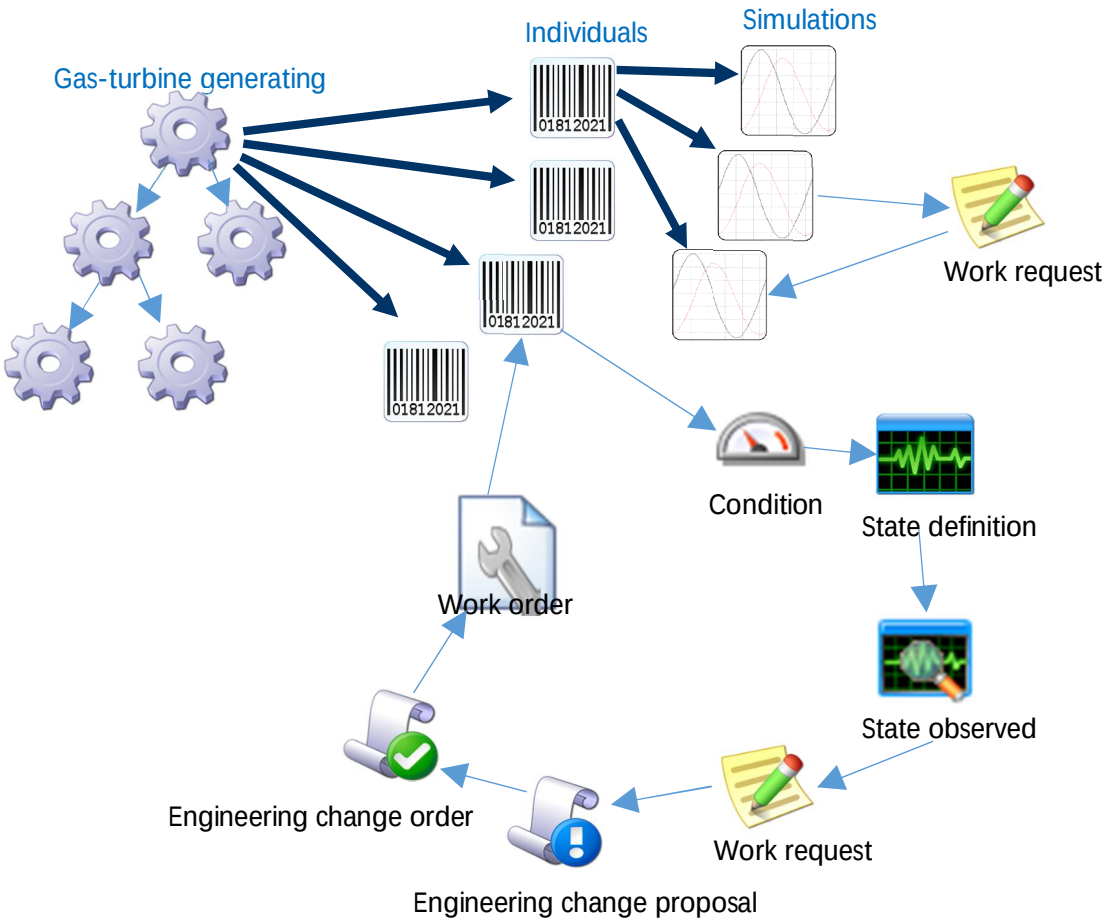
In the design for MODRIO the main grouping of the data will be in "Projects". For instance if you have a project "Gas-turbine generator plant for customer1" then only those persons who are given the rights to view this project will be able to see anything in this project.



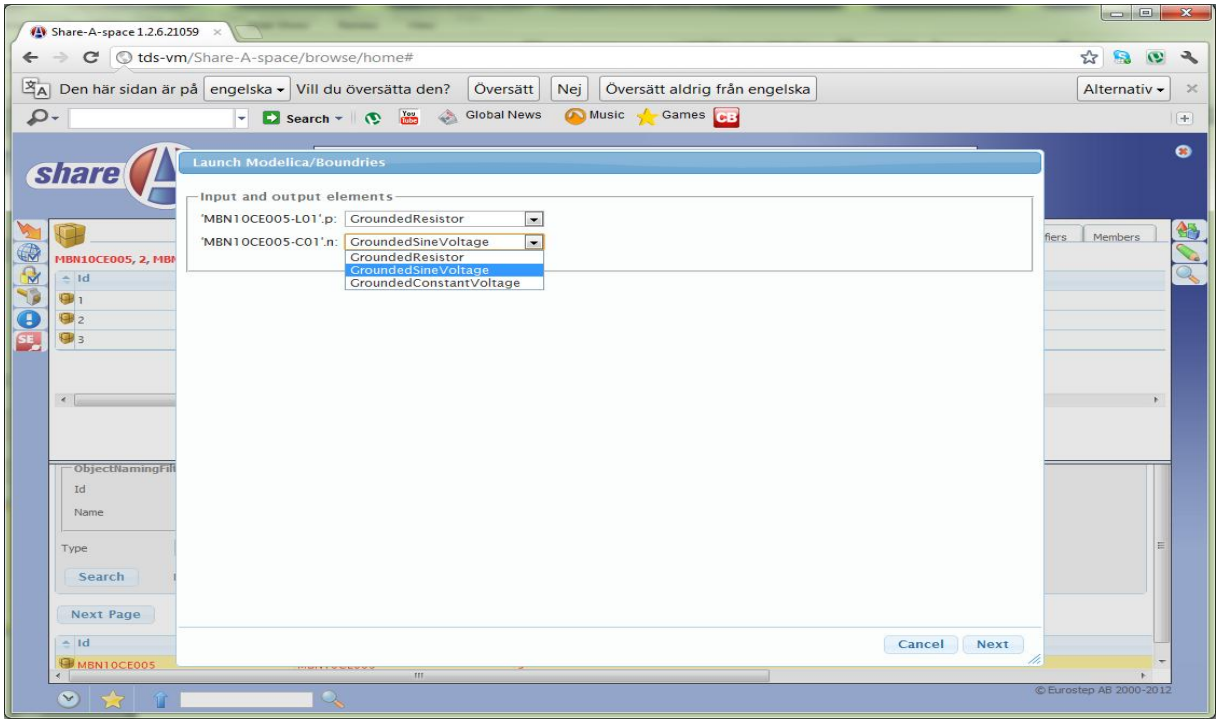
Thereafter, Persons are organized into "organizations" so that for instance, John Doe is a member of the organization "Siemens" and he has the right to see and edit what is in "Project3". John Doe's right to see Project3 has nothing to do with his being a member of "Siemens" but only because he has been given specific rights in Project3.

6. Future Possible Expansions

Since Share-A-space is a proven collaboration platform then far more collaboration can be easily added to the current design. For instance it is easy to create a system for requesting new Simulations based on errors found in previous Simulations.



It is a minor thing to allow changing of parameters for a simulation if desired. This has already been done in Eurostep's previous work within ITEA2/OPENPROD and OpenModelica.



And then General parameters for a simulation: