An architecture for the integration of different functional and structural plant models

Qinqin Long[1], Winfried Kurth[1], Christophe Pradal[2], Vincent Migault[3], Benoît Pallas[3]

[1]Institute of Computer Science, University of Göttingen, Göttingen, Germany; [2] CIRAD, UMR AGAP INRIA, Virtual Plants, [3]INRA, UMR AGAP, Montpellier, France

ABSTRACT

Functional Structural Plant Models (FSPMs) have limitations due to resource constraints. To allow FSPMs to abstract complex plant systems beyond a single model's limitation, the integration that compound different FSPMs could be a possible solution. However, the integration involves many technical dimensions and a generic software infrastructure for all integration cases is not possible. In this paper, we analyze the requirements of the integration with all the technical dimensions. Instead of an infrastructure, we proposed a generic architecture with specific processes components as a logical level solution by combining an ETL based sub architecture and a C/S based sub architecture. Which allows the integration of different FSP models hosted on both different and same FSP modeling platforms in a flexible way. We implemented the architecture for the integration of two specific platforms based FSPMs, and we demonstrate several running examples of the integrated FSPMs to illustrate the usability of the architecture.

Keywords

Functional and structural, FSPM, simulation, multiscale, MTG, OpenAlea, GroIMP.

Qinqin Long, Winfried Kurth
Institute of Computer Science
University of Göttingen
Göttingen, Germany
lqinqin@uni-goettingen.de

Christophe Pradal
CIRAD, UMR AGAP
INRIA, Virtual Plants
Montpellier, France

Vincent Migault, Benoît Pallas
INRA, UMR AGAP
Montpellier, France