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Using a shared conceptualisation and data platform to facilitate integrated socio-economic environmental modelling.

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Abstract: Developing, sharing and using models to address socio-environmental problems requires both a common vocabulary and agreement on the scope of the modelled domain. One approach to this is the use of a single, shared conceptual model and a centralised data store where the inputs and outputs of each submodel are stored. For network-based models, the Pynsim python library facilitates this structure by allowing modellers to build a shared network structure using object-oriented design, and allowing submodels to be 'plugged-in' to a Pynsim simulation. Building a shared conceptual model can be difficult if collaborators work remotely or some collaborators are inexperienced in software architecture design. By combining Pynsim with a web-based collaborative tool, some of these difficulties can be addressed. The Hydra Platform is a web-based data management system for network structures and data. Using templates, a shared structure can be developed where all the nodes, links, institutions (groupings of nodes & links) and their associated attributes can be defined. Using this template, a network topology can then be defined and its attributes parameterised. This network acts as the common conceptualisation and as the storage facility for input and output data. Using the a web interface, the template and network can be managed visually and shared visually amongst users, allowing all users to have a visual reference to the shared conceptualisation. Using web requests, a client can extract the network from Hydra Platform and create a Pynsim network, thereby creating an input for the shared simulation. Once complete, results are pushed back to Hydra Platform for analysis either through the web UI's built-in analysis tools or for download by the collaborators.

Keywords: Network Simulation, Collaboration, Integrated Modelling, Model Coupling