ENVIRONMENTAL DATA CUBE SUPPORT SYSTEM

PRODUCTION CAPABILITIES ARCHITECTURE

The EDCSS Production Capabilities Architecture is the construct that facilitates the generation of correlated sets of customer-specified products from a single physically consistent environment representation. Depicted in Figure 1, the architecture was designed to be agnostic with respect to specific data or modeling resources thereby allowing maximum flexibility for providers to add new capabilities to the system. This is achieved by fully separating the customer's view of the system from the provider's view. The former is driven by end-user requirements for product and scenario details, while the latter is driven by the details of the data, modeling, and product generation capabilities – the two views come together in the product and resource specification that ultimately define the contract for production of an end-users project.

Currently the EDCSS web application is available via edcss.net, and is enabled by the EDCSS Project Workflow Manager. The primary functionality of this site is the definition and execution of EDCSS Projects, which encapsulates all details of an end-user request and ultimately results in a completed package of end-user products ready for use to support a simulation or training event activity. The key elements of a Project definition are: the area of interest (AOI), the EDCSS Products to be generated, and the scenario requirements. Based on the end-user defined AOI and Product list, EDCSS will provide the user with a list of the most appropriate environmental resources available to support those requirements. Within EDCSS each resource is really a SME defined set of correlated atmosphere, ocean, terrain, and/or space resources that are validated for use together in one production request. The SME can assist with which resources should be used depending on end-user requirements. A user ID and password are required for use of the web application and are available on request.

Once a Resource is selected as the basis for production, the user can define their scenario requirements as either a specific date range or a set of scenario constraints expressed as either system (or mission) impacts, or direct specification of required environmental conditions. The EDCSS then performs a search of the historical archives to identify candidate dates that best meet these requirements and presents them for review to the end-user. The end-user is able to interactively drill down with temporal and spatial visualization to decide which dates best meet their requirements, and ultimately select the dates to be used for production.
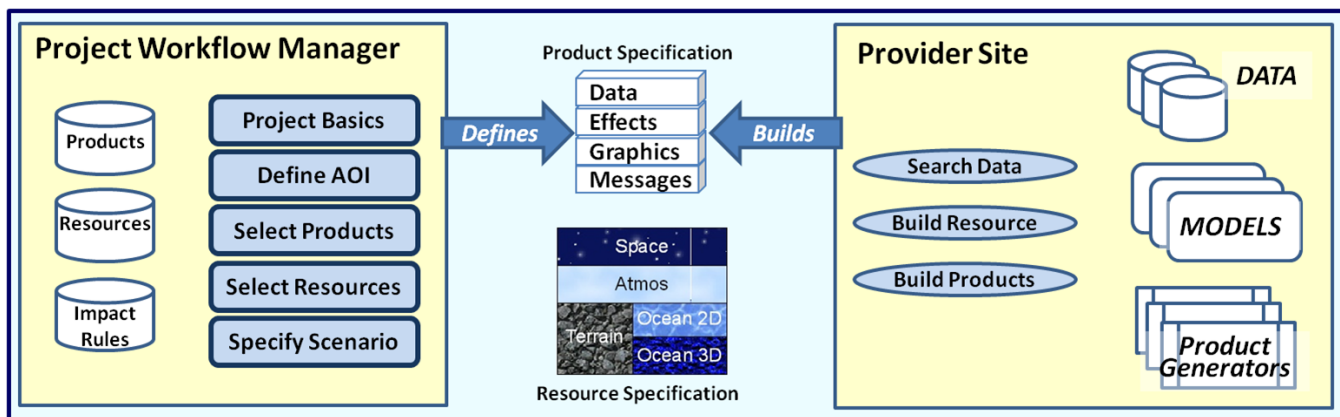

Figure 1:EDCSS Production Architecture

Given a fully specified Project (which includes the production resource(s) utilized, the AOI, date range, and Product list), the EDCSS then the generation process begins through multiple calls to one or more EDCSS Provider Sites. The Project Workflow Manager then sends each applicable EDCSS Provider Site the list of required Products, the resource to be used for production, and the AOI and date range information. Figure 2 depicts the domain-neutral process that each EDCSS Provider Site executes in response, leveraging their own locally maintained unique data, model, and product generation capabilities. The resource specified in the request will dictate whether the Provider Site can directly access the base representation (Step 1 in Fig. 2) or must invoke a model to generate the base representation (Step 2). Regardless of how the base representation is obtained, Step 3 is the performance of value-added processing on that base representation to prepare it for use in the product generation capabilities in Step 4.
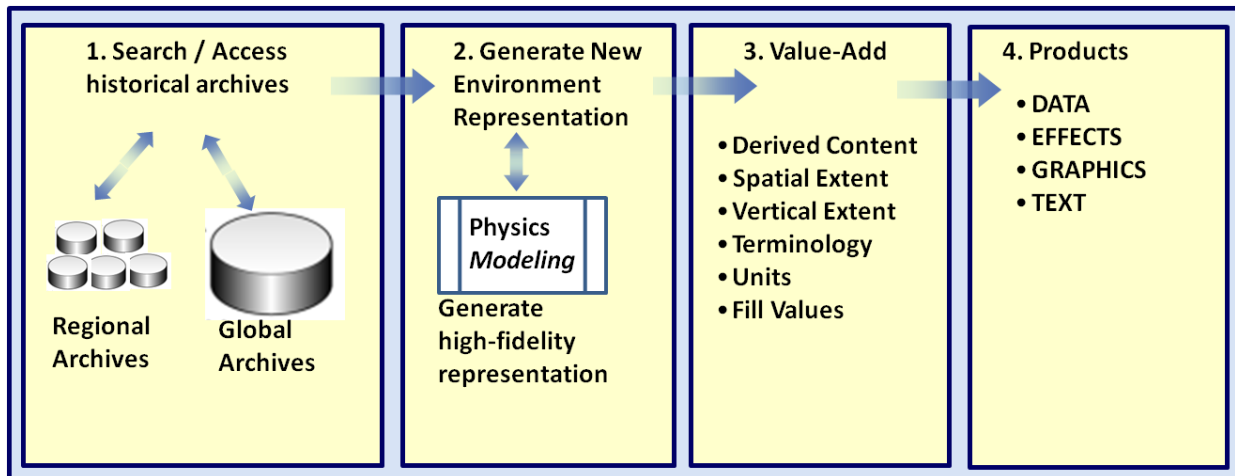

Figure 2: EDCSS Production Sequence (domain neutral)

Finally, regardless of how many Provider Sites or resources are involved in the execution of a Project, the end result is a single integrated Project Review site, accessible by the end-user from the Project Workflow Manager. From this site the user can review all products generated, download individual Product files for testing, and/or download the entire support site as either a packaged HTML site or an EDCSS Distributor package.

The EDCSS Provider Site now also provides additional functionality to include more generalized resource query, browse, and ordering capabilities that allow direct use of the sites without going through the EDCSS Project Workflow Manager. This is important for two reasons: (1) it allows for more advanced users to drill down directly to the resources backing EDCSS and provides a platform for more advanced data analysis functions in the future; (2) it provides for EDCSS resource discovery and access functionality to be readily integrated by other systems as enterprise services.