An Engineering Application Integration Architecture

Researchers at the NASA Lewis Research Center have devised an object-oriented, generic application architecture in an effort to eliminate the need to repeatedly adapt graphical user interfaces (and other tools) to various experimental and analytical information sources, to bring those sources into a common domain so as to facilitate the easy (and, eventually, automatic) migration of engineering content, and to provide an environment in which the complete engineering design and analysis process can be conducted. This architecture has been implemented in the C++ language and a graphical user interface interacting with the architecture has been developed using the wxWindows tool kit.

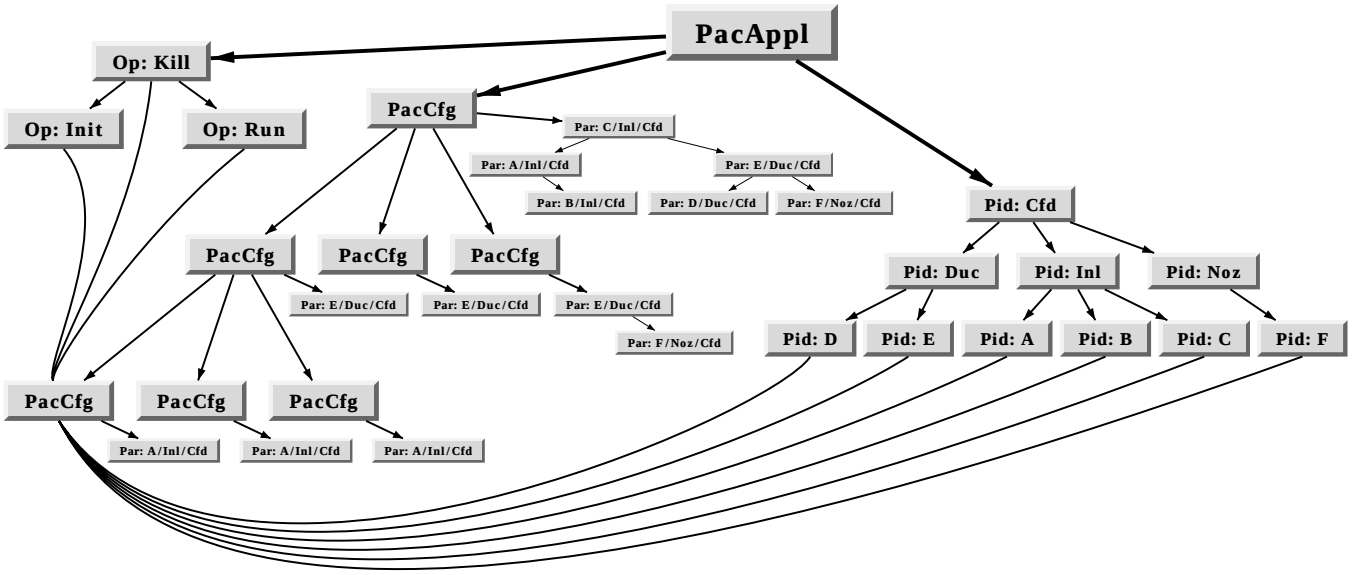
The structure, depicted in the figure below, consists of an application object (labeled *PacAppl* in the figure) from which emanates (1) a tree of data identifications (the *Pid* items to the right), (2) a tree of data configurations (the *PacCfg* items extending toward the lower left), and (3) a map of available operations (the *Op* items to the upper left). The structure of data is revealed by the structure of the identification tree, eliminating the need to replicate data within configurations merely for the purpose of revealing structure. Missing data elements of a configuration are then inherited from the most immediate ancestor. Encapsulated operations, as well as data identifications, operate within the context of a current data configuration, thus being able to refuse operations not supported by the state of the data.

All of the object classes of the architecture derive from a common base class which provides the ability of description. Names, units, annotations, access controls, and the like all can be attached on an object by object basis. Key among these are automatic value change histories and a text description which can be used as a basis for engineering journals.

More information about the generic engineering application architecture is available on the World Wide Web:
http://www.lerc.nasa.gov/WWW/price000/index.html

Lewis Contact:
William.H.Jones@lerc.nasa.gov

Author: Dr. William H. Jones



An Engineering Application Integration Architecture