Component based Problem Solving Environments using CORBA

This article may be found at
http://www.soton.ac.uk/~cedc/posters.html

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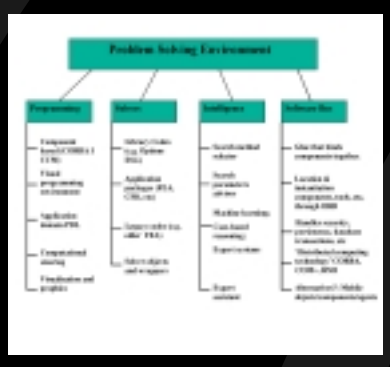
CEDC UTP for design

Why Problem Solving Environments (PSEs)

To enhance engineering insight, reduce development costs and improve product quality design studies are increasingly using sophisticated analysis packages together with optimisation tools. This combined approach requires a high level of systems integration and the ability to exploit clusters of networked workstations to achieve efficient and re-usable design systems.

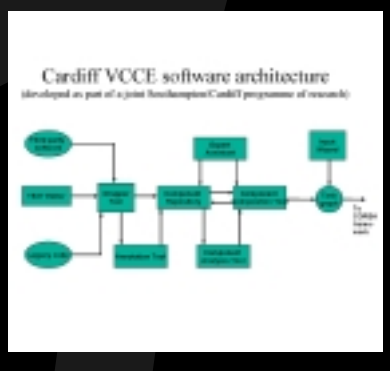
What is a PSE

"A PSE is a computer system that provides all the computational facilities needed to solve a target class of problems." (J. Rice - Purdue University)
The main PSE sub-systems include visual-programming environments for graphically Composing, steering and



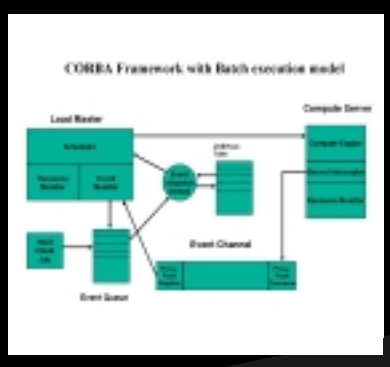
monitoring applications, various component wrapped analysers and solvers, an integrating software bus (CORBA) and optionally one or more AI systems to assist the user formulate a computational strategy.

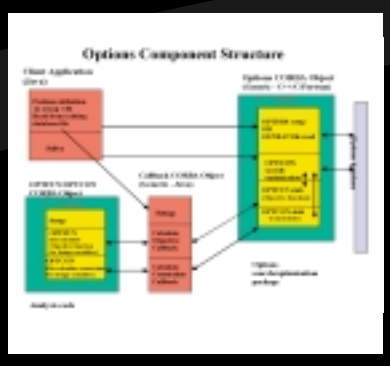
Examples of PSE architecture:

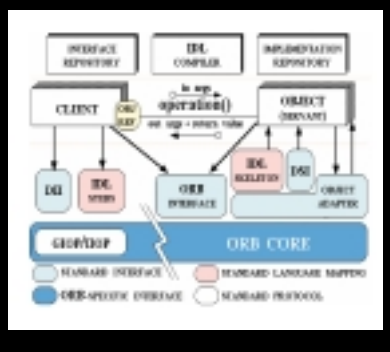


Components are dragged from the Component Repository on the left column of a sketchpad display and dropped onto the canvas of the Component Composition Tool on the right of the display. Components can then be joined together if their interfaces are compatible.

CORBA 2 offers interoperability between distributed objects/ applications over networks of different computer architectures and operating systems. However, in CORBA 2, there is no standard way to distribute components i.e., to install, activate/de-activate or connect components in a particular ORB.
There are also no facilities for handling component transactions, security and persistence.

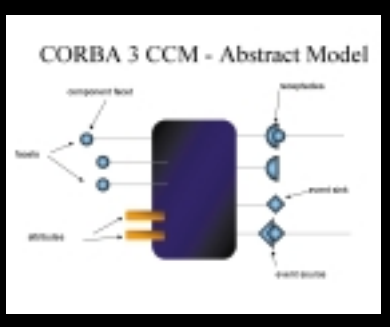


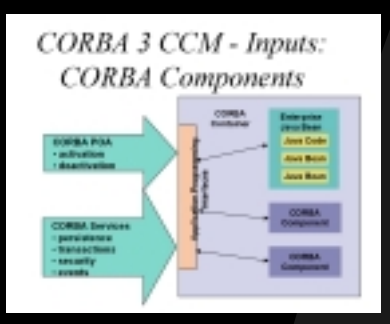


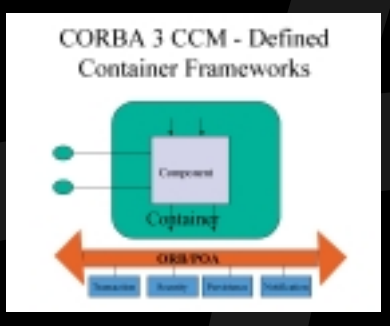


CORBA 3 Component Model (CCM):

In CCM, a component is a new CORBA meta-type offering server side components based on container technology developed in and compatible with Enterprise Java Beans (EJBs). CCM provides a framework to implement all aspects of components including deployment, configuration and aggregation.







Future work:

Future work will concentrate on the use of the CORBA 3 Component Model to implement a PSE structure similar to the Cardiff PSE above, extending the visual programming environment with computational steering capabilities, fully integrating our Options optimisation suite with various analysis programs, develop the PSE scheduling side to exploit network clusters and incorporating improved results visualisation methods.

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