U.S.NRC
United States Nuclear Regulatory Commission
Protecting People and the Environment

Office of Nuclear Regulatory Research

SNAP: The Symbolic Nuclear Analysis Package

Purpose & Requirements

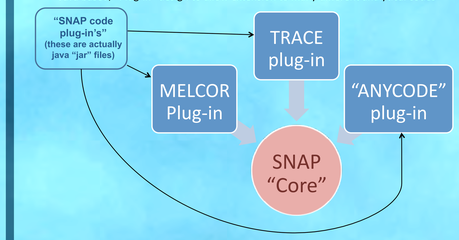
To provide a standard graphical user interface for the various NRC analytical codes

To ease the burden of modeling complex systems

To provide data analysis and visualization tools that can be used to review data from calculations as well as data from experimental programs

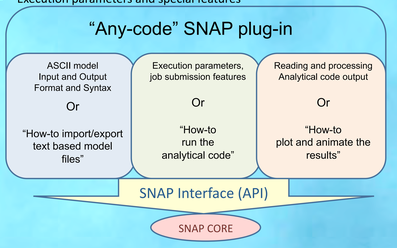
Approach

Java based, "Plug-in" design to allow extension to many different analytical codes

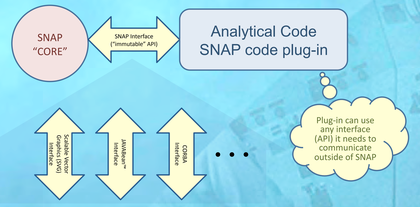


Each SNAP code plug-in encapsulates analytical code requirements:

- Code ASCII file input and output format syntax
- Execution parameters and special features



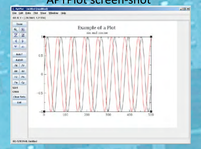
Java based object-oriented design maximizing the use of contemporary industry-standard application interfaces to ensure compatibility current application suites and various operating environments



Applications & Features

- SNAP analytical code plug-ins:
  - **TRACE thermal-hydraulic system code**
  - **MELCOR 1.8.5, 1.8.6 severe accident system code**
  - **RELAP5 thermal-hydraulic system code**
  - **PARCS core kinetics code**
  - **Many more with more to come!!**
- SNAP code plug-ins can also interact with each other, or external applications through the SNAP core interfaces "Feature plug-in" interface
- Some existing SNAP Feature plug-ins:
  - RELAP5 to TRACE model conversion
  - MATLAB support
  - Experimental Data support
  - Auto-Validation (AVF plug-in): Builds "suites" of custom analyses that can be re-run at will.

APTPlot screen-shot



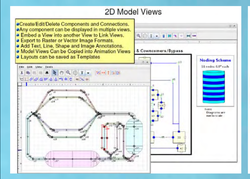
- SNAP provides a plotting package: APTPlot
  - Works with SNAP directly or as a stand-alone plotting tool.
  - Can read output of analytical-codes directly via code-aware plug-in.
  - Outputs Scalable Vector Graphics (SVG), Portable Document Format (PDF), PNG and JPG formats.

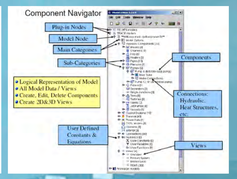
SNAP is "cloud" ready !!

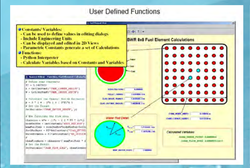
The SNAP execution environment supports job submission to "web service" interfaced environments.

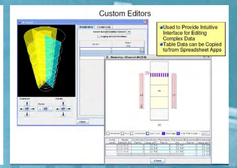
SNAPs job submission interface is extensible and easily adaptable to support most "cloud-like" environments (e.g.: Amazon EC2, Google's AppEngine, Force.com, etc...)

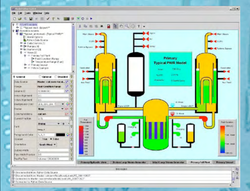
Screen Shots





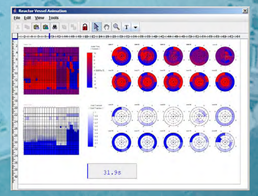






Animation view showing simplified full plant model

Animation view showing "unwrapped" core model of TRACE code



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