



RIC 2009

**Symbolic Nuclear Analysis Package -
SNAP version 1.0:
Features and Applications**

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SNAP: Overview

Background!

- Briefly: What it is, what it does, and how it does it.

Version 1.0

- SNAP "Core" interface finalized.
- Application Programming Interface (API) published.

Features and Applications

- Notable features.
- Examples of how SNAP is used.

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SNAP: Background

Standard Graphical User Interface designed to simplify the use of USNRC analytical codes

SNAP provides:

- Graphical User Interface for constructing and editing input models
- Tool for visualization of code outputs and data
- Runtime Job Control
- Job organization features; keeps track of your input and output files
- Easy access to analytical code documentation

SNAP Consists of Several Applications:

- Model Editor
- Configuration Tool
- Job Status Tool
- APTPlot (Plotting Tool)

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SNAP: Background Model Editor

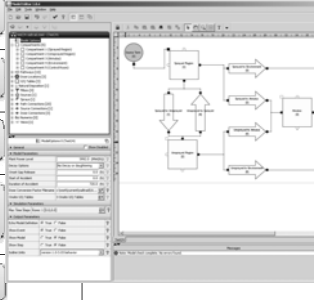
Graphically create or edit a visual representation of an input model.

Groups of components can be placed in logically separate views

Component connections are easily visualized and edited.

Helps the user to avoid common input deck formatting problems. The SNAP Model Editor can import and export models as ASCII decks.

SNAP does error checking! Visual warning messages help user quickly locate potential modeling problems.



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SNAP: Background Configuration Tool

Configures SNAP to use various analytical codes.

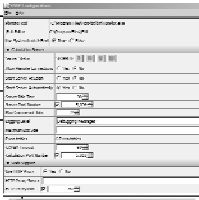
- Physical location of codes.
- Command line arguments.
- Interactive features (simulation mode).

Establishes parameters for job-execution services.

- Local versus remote execution of jobs – i.e.: cluster and/or cloud support.
- Establishes and manages public/private digital keys for security.

Configures various internal aspects of SNAP system.

- "Look and Feel" of windows.
- Location of plotting tools and text editors.
- Log file parameters and IP port numbers used by SNAP.



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SNAP: Background Job Status Tool

Provides general job control.

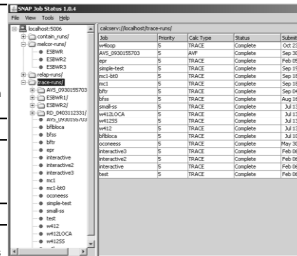
- Jobs can be stopped, paused, and deleted.
- Job Status can be viewed and console output (normal screen output) can be examined.
- Previously run job data can be loaded into memory for faster access by the visualization tools.

Jobs can be directly submitted through this tool.

- Bypasses the need to load a model into the Model Editor when a user just wants to run a job but not edit the model.

Helps the user organize input and output files.

- Some analytic codes need multiple input files and support files.
- Input and output files may exist on different machines (servers) – this tool provides easy access to such data across networks.



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USNRC SNAP: Background Plotting Tool

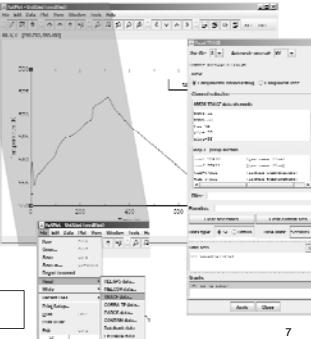
The ApiPlot plot tool is integrated with SNAP

- ApiPlot to read and plot data from SNAP supported codes.
- ACS plug-in also provides Steam Table look-up data

Can also read and plot "raw" data directly, or used to generate simple data sets.

- Built-in math functions and scripting features.
- Spreadsheet style direct data input also possible.

Produces publication quality output (postscript, PDF, SVG, etc...)

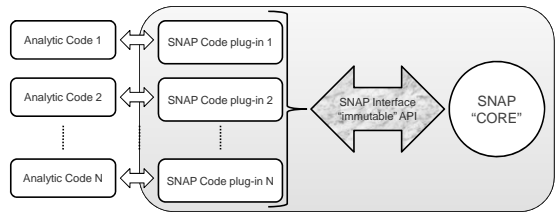


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USNRC SNAP: Background Architecture

Key aspects of SNAP code design

- Java based – therefore supported by all popular operating systems
- Well tested object-oriented design
- Uses contemporary industry-standard application interfaces
- "immutable" application Interface – new development won't break existing plug-ins!



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USNRC SNAP: VERSION 1.0

SNAP "Core" code now ready for release!

- SNAP "Core" and it's application interface (API) have been under development and testing since late 2002.
- Design has been used to develop SNAP plug-ins for many codes.
- The API is well tested and has been used by several organizations to develop their own SNAP plug-ins.
- The API is "immutable"; no changes to any existing interface methods may be made.
- However, additions to the core API are allowed.

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SNAP: VERSION 1.0 DOCUMENTATION

NUREG/CR-6974 in publication

- "Symbolic Nuclear Analysis Package (SNAP): Common Application Framework for Engineering Analysis (CAFEAN) Preprocessor Plug-in Application Programming Interface," is in the publication process.
- Published in 3 volumes
- Volume 1 provides "how-to" documentation explaining how to use the API to write your own SNAP plug-in.
- Example code for a simple plug-in is provided on the main SNAP web distribution site.
- Volumes 2 and 3 contain the printed "JavaDoc" of the API specification.

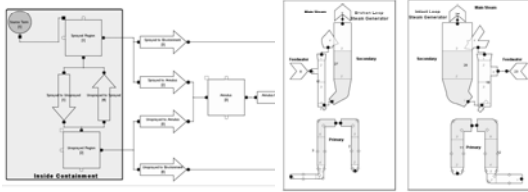
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SNAP: FEATURES Model Editor

Model Annotation

- Users may add graphics and useful text to the graphics of a model view
- Helps organize and "visualize" a complex model.



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SNAP: FEATURES Model Editor

Model Notes

- Users may embed notes directly into a SNAP model
- Notes can be collected in a printable report; possible use as a quality assurance tool.



SNAP: APPLICATIONS

SNAP is used extensively in-house at the NRC

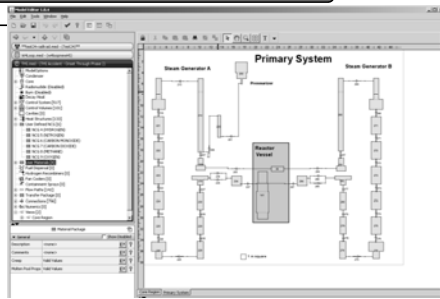
- Primary use at the NRC is currently for TRACE model development.
- SNAP's use for MELCOR applications is increasing (SNAP support for MELCOR 2.1 is currently in beta-testing phase)
- A new version of the RADTRAD code is in development. The new RADTRAD is tightly coupled with SNAP.
- Some RELAP5 usage; primarily as a conversion mechanism to TRACE models.

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SNAP: APPLICATIONS

MELCOR support:

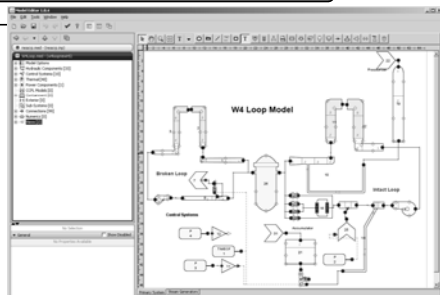


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SNAP: APPLICATIONS

TRACE support:

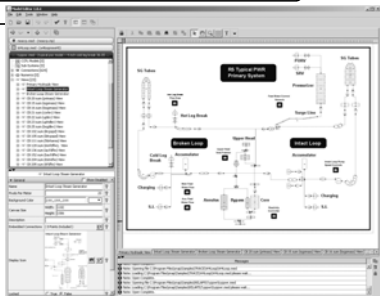


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SNAP: APPLICATIONS

RELAP5 support:



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