



# RIC 2011

## Recent developments in SNAP and SNAP Uncertainty Analysis Capabilities

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## Outline

- General SNAP and Plug-in Improvements
- New functionality in SNAP 2.0
  - Work-Flows (Job Streams)
  - Restart Case Support
  - Engineering templates
- Uncertainty Analysis Plug-in
- Summary

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## SNAP Improvements

- **Job control application redesigned**
  - Job status now accessible from the model editor
  - Now easier to get to frequently used tools
  - Underlying code communications now faster and more robust
  - Currently Supported in TRACE, RELAP5 & MELCOR Plug-ins.
- **Performance Improvements**
  - Many underlying graphics rendering and animation improvements
  - Supports larger models
- **New animation objects for enhanced visualization**

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## SNAP Improvements New Animation components

- New components include:
  - Pipe & Elbow Segment
  - Linear Dial
  - Circle Pump
  - Control Rod
  - Command Button
  - Check Valve
  - H2 Deflagration
  - Core Degradation
  - BWR Power Flow Map
  - Strip Chart (Redesigned)
  - Plot definitions
  - Playback Controls (scalable)

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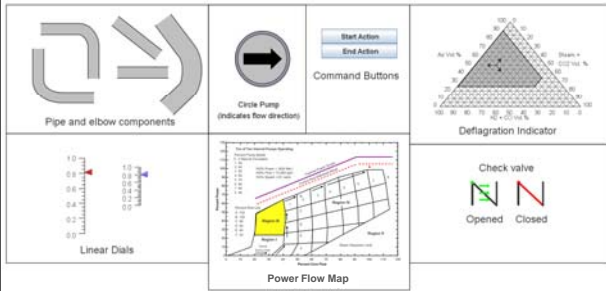
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## SNAP Improvements New Animation components



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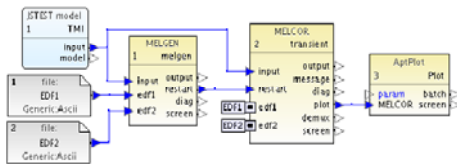
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## SNAP 2.0: Workflows (Job-Streams)

- Graphically construct sequences of job steps to be executed.
- A Model can contain one or more workflows (job-stream objects).
- Complex analysis processes can be automated and simplified using workflows



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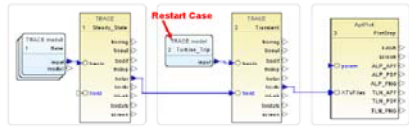
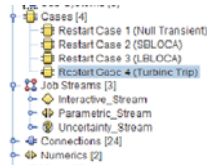
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### Restart Cases

- Model can define and manage one or more Restart Cases
- Cases can be used directly in Job Streams.



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### Engineering Template Plug-in

- Similar to word-processor templates in that certain aspects of a template document are available for modification.
- The Engineering Template Plug-in used to create input templates to constrain modifications to one or more source models.
- The Engineering Template Plug-in interacts with the Job Stream plug-in to produce sets of parametric runs.

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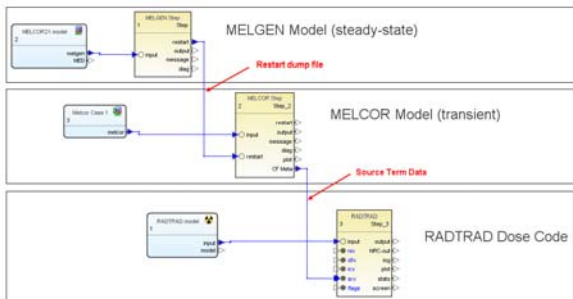
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### Engineering Template Plug-in



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## Uncertainty Analysis

- Purpose is to quantify and understand the sensitivity of code results to input parameter uncertainties.
- The current SNAP uncertainty quantification plugin integrates with the DAKOTA analysis tool to perform the actual parameter sampling and statistical analysis and reporting.
  - PDF Types: Normal, Log-normal, Uniform, Triangular, Beta.
  - Monte-Carlo and Latin Hypercube Sampling
- DAKOTA generated random values can be applied as factors or as additive values to model parameters.
- Currently limited to parameters that can be represented through a SNAP numeric variable.

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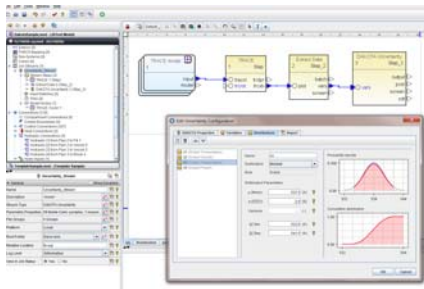
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## Uncertainty Analysis



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## Summary

The **SNAP 2.0** framework provides foundation for new features:

- Workflows
- Automated Sensitivity capabilities
- Uncertainty Quantification
- Enhanced interface to computational resources (clusters, clouds)

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