

The Open initiative for next generation PSA

The Open PSA Initiative

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EDF R&D

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Statement of Purpose

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an initiative launched by *Antoine Rauzy* and *Steve (Woody) Epstein*



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 - and allow the **transportability** of models and methods.

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- Different parts of the models are modeled and assessed in different tools that do **not communicate**



Open and transparent format

User friendly and transparent tools



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- Reduce tool dependency



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- Review and document (existing) models
- Clarify modeling methodologies
- Make the tools communicate and have a complete picture of the models



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Solve complexity issues



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- The size of the models



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- Computational times



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A complete picture



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A complete picture

A coherent workbench



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- Enhance Import/export tools



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- Dynamic and trigger computations



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- Access to analysis results and their diagnosis



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- A more comprehensive *Information System* for a wide pannel of professionals (regulatory perspective)



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- Automated procedures to feed PSA models for some hazards (e.g. Fire, Flooding, Seismic events ...),



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- Check for consistency and accuracy against other information supports (images, videos ...).



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Many new tools



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- IRT SystemX : Altarica Project



Andromeda Prototype: Model Viewer

The screenshot displays the Model Viewer application interface. On the left, a Navigator pane shows a tree structure of model elements, including sequences and attributes. The main area shows a sequence diagram with a horizontal bar divided into red and green segments, and vertical lines representing sequence flow. On the right, a Search (101) pane shows a list of found elements with columns for Name, Type, and L.

Name	Type	L
%LB1	Basic_Event	
%LB2	Basic_Event	Fi
%LB3	Basic_Event	Fi
%LB1	Basic_Event	Fi
%LB2	Basic_Event	Fi
%LB3	Basic_Event	Fi
%LB6	Basic_Event	Fi
%LCA1	Basic_Event	Fi
%LCA2	Basic_Event	Fi
%LCA3	Basic_Event	Fi
%LCA4	Basic_Event	Fi
%LCB1	Basic_Event	Fi
%LCB2	Basic_Event	Fi
%LDB1	Basic_Event	Fi
%LDB2	Basic_Event	Fi
%LE	Basic_Event	Fi
%LE	Basic_Event	Fi
%NAMC0	Basic_Event	T
%NAMC0	Basic_Event	T
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%NAMC0	Basic_Event	T

Figure: Model Viewer

Andromeda Prototype: Model Editor



Andromeda Prototype: Model Editor

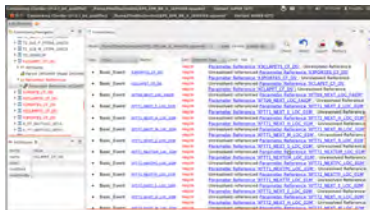


Figure: Model Editor

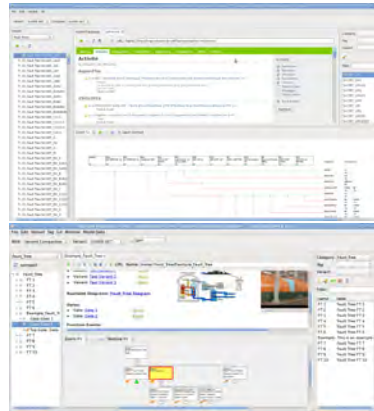
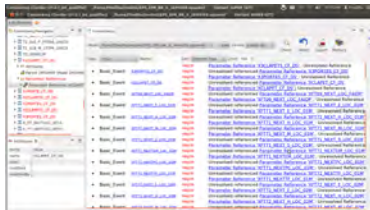
Andromeda Prototype: Consistency Checker and Wiki



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Andromeda Prototype: Andromeda PrototypeModel Comparison

The screenshot displays the Model Comparison tool interface. The top window shows the comparison setup between Model A (EPR2.opsamef) and Model B (EPR2.opsamef). The main area features a 'Comparison Result' table with columns for Type, Element, Severity, and Differences. Below the table, there are 'Compare Diagram' sections for Model A and Model B, showing graphical representations of the models with differences highlighted in red.

Type	Element	Severity	Differences
Fault_Tree	%COEF_CA2CA	MAJOR	show Basic Event Reference '%CA2/CA' removed from Fault Tree '%COEF_CA2/CA'
Event_Tree	#PDS-PSP1	MAJOR	show Fork removed from Event Tree '#PDS-PSP1' (Model B)
Fault_Tree	%COEF_B1AC	MAJOR	show Attribute 'label' of Gate '%COEF_B1AC' changed from 'Fraction of the year in
Fault_Tree	%COEF_CAA/CDE	MAJOR	show Gate Reference '@%COEF_CAA/CDE-1' removed from Fault Tree '%COEF_CAA
Fault_Tree	%COEF_B1B	MAJOR	show House Event Reference '%B1' removed from Fault Tree '%COEF_B1B' (Model
Event_Tree	#PDS-PSP1	MAJOR	show Sequence Reference '#PDS-PSP1.#PDS-LABEL-PSP1' added to Event Tree '#

Figure: Model Comparison

Andromeda Prototype: Variant Management

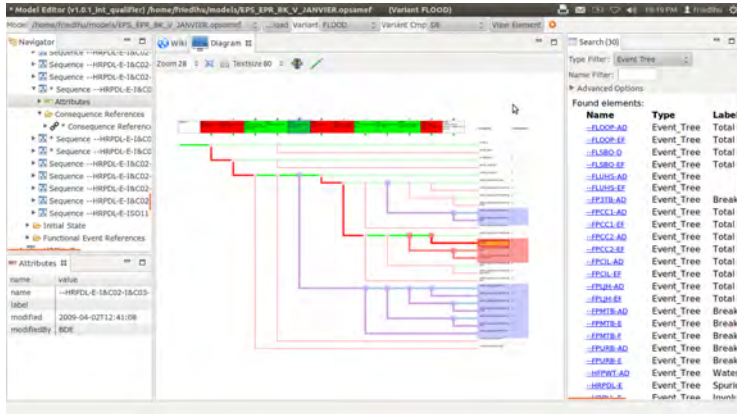


Figure: Variant Management

Andromeda Prototype: Model Converter



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Converters

- From XML RiskSpectrum to Andromeda (OPSAMEF)



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Andromeda Prototype: Model Converter

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- From XML RiskSpectrum to Andromeda (OPSAMEF)
- From Andromeda (OPSAMEF) to XML RiskSpectrum
- From GUI with the Andromeda interface



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- Other export/import operation can be done using script commands for batch procedures



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Extending the format and developping the tools

- Open-PSA Model Exchange Format, version 3



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- Simplification of some constructs of version 2



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Basing safety analysis on a multi model approach



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Multi-model approach and automated generation



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- Basing safety analysis on various models to have a complete picture



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Multi-model approach and automated generation

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- Combine higher and lower level modelling languages to allow zooming in and out in the detail level



Basing safety analysis on a multi model approach

Multi-model approach and automated generation

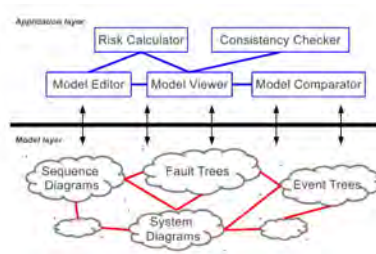
- Basing safety analysis on various models to have a complete picture
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- Generate lower modelling languages from higher ones



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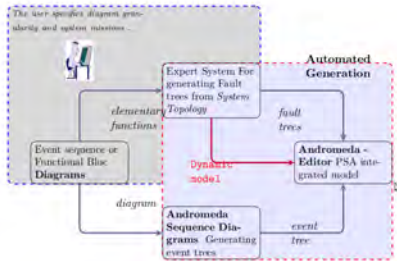
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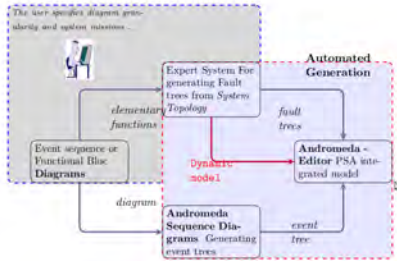
Example of an integrated approach of safety engineering



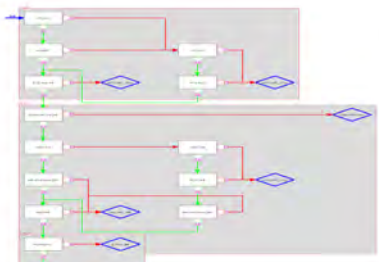
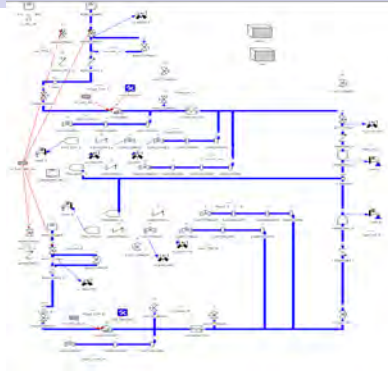
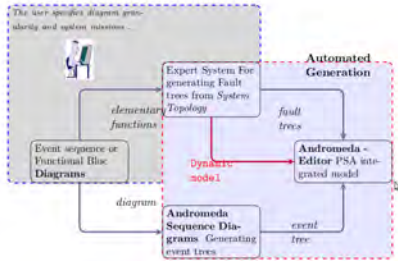
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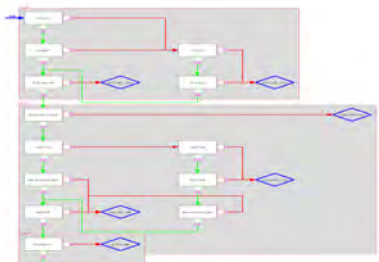
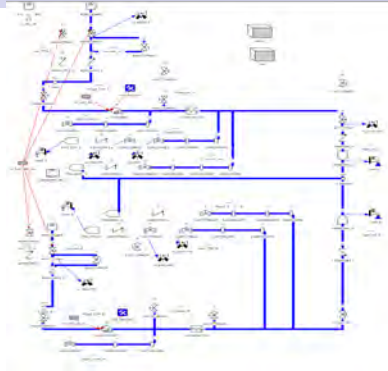
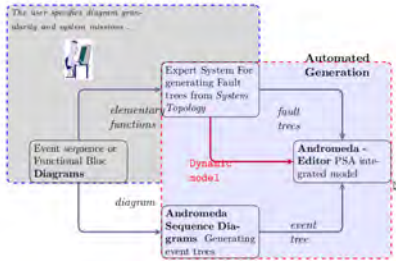
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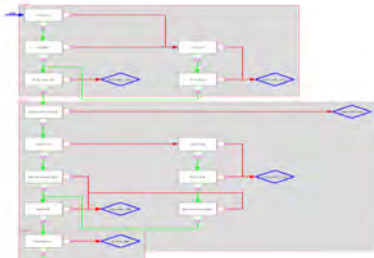
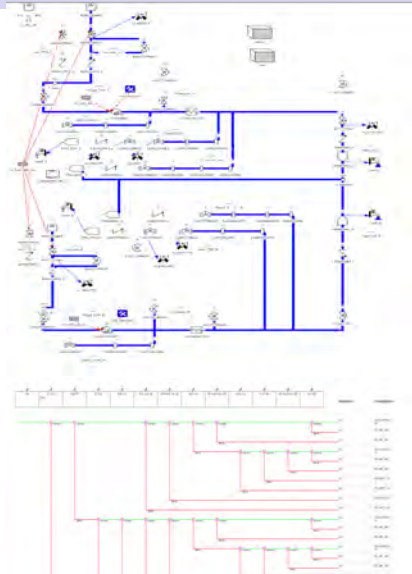
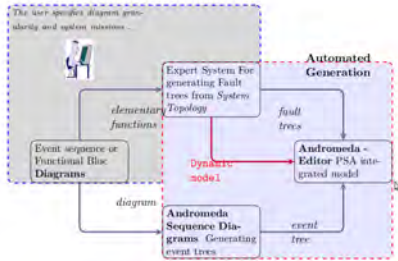
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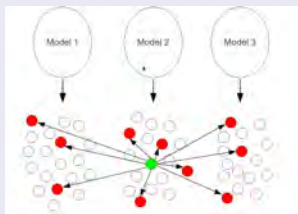
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Scripting over PSA modules

New shell like scripting commands

```
add-config, find, andromeda-install, getattr,  
andromeda-update, import, check, load, convertrs,  
load-variant, cp, ls, create, lsconfig,  
diff-diagram, lsmodel, diff-gui, mkdir,  
diff-model, mv, diff-text, new,  
edit-documentation, open, edit-ext,  
open-preferences, exec, open-wiki,  
exec-cmd, open-workspace, export, rm,  
save, select, setattr, shell, switch-config,  
tag, ...
```



From event sequence diagrams to network metrics

"Open-ended and indeterminate characteristics can be linked to the process-form of the rhizome. Unlike trees or their roots, ... the rhizome connects any point to any other point... It has neither beginning nor end, but always a middle (milieu) from which it grows and overflows, [constituting] linear multiplicities. In contrast to centric or tree-like, hierarchical systems, the rhizome is acentered, non-hierarchical and continually expanding across multiplicitous terrains"

— Gilles Deleuze and Félix Guattari

"A thousand plateaus: capitalism and schizophrenia.
London: Continuum, 1988/1987. Print. "

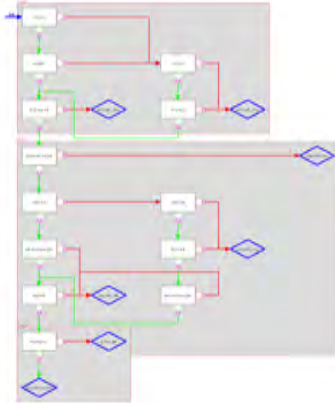


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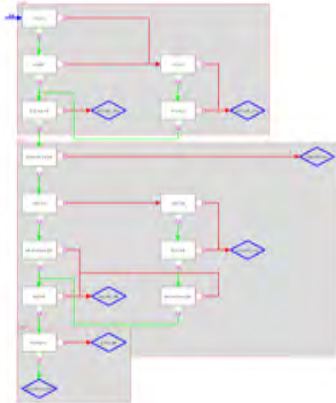


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