COGILITY™
SOFTWARE

Cogility Studio™
Model Driven Implications to Verification

WHITE PAPER

Cogility Studio is a model driven development environment for Composite Applications (applications that include a high degree of integration with existing or external applications). Cogility Studio is unique in providing direct execution of the model without generation of an intermediate editable representation. This characteristic ensures that what the model represents is what is executing. This allows verification and validation activities to be performed on the model rather than on a lower level executable artifact, or though exhaustive testing efforts. This can greatly reduce formal verification and information assurance efforts for applications constructed using Coglity Studio.

Model Verification Through Consistency Checks

The base Cogility Studio product includes many consistency checks to ensure the consistency and correctness of the model of an application. The stock consistency checks come from both the logical intent of the modeling constructs, and from the product development team's over 100 years of building model based solutions. It is not possible with Cogility Studio to deploy an application that violates hard consistency. In addition to hard consistency checks, soft consistency checks have been implemented to provide modeling guidance reducing training time and improving model quality.

Extensibility

In addition to those consistency checks that are built into the base product, consistency checks can be added at several levels. Frameworks which are add-ons supporting specific verticals or problem domains can add to the body of consistency checks to increase the fidelity and incorporate domain specific guidance and constraints. Projects can create project specific metamodels which extend the modeling environment; including the addition of consistency checks that are applicable to the project itself.

Implications

The combination of a top-to-bottom model based execution platform, and extensible consistency checks has great implication for information assurance, security, and governance within client organizations. Project or framework metamodels can be created to embody client organization requirements for verification. These organization specific consistency checks can ensure that no application is released from development to test that does not meet information assurance or other requirements. Because the entire executable logic of the application is resident in the application and can be analyzed by the consistency check system, many access control and information constraints can be statically verified before the application is ever placed under test.

Because the model is directly executed the higher level semantic of the model can be used for logical analysis and verification of security and information assurance activities because the executing system cannot violate the information flow and logic in the model. The model incorporates asynchronous processes using state extended state machines that are very well understood and can be audited. The leaf level logic is performed using the OMG Action Semantics standard, which is a flow-based model of computation also good for analysis and verification.
This results in an environment that can cut pre-deployment verification activities significantly and ensure audited and verified applications are produced from the development organization rather than iterating between development and test, reducing test times and resources.

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