Verification and Validation

Linda Northrop

SEI Fellow

lmn@sei.cmu.edu

Software Engineering Institute
Carnegie Mellon University
Pittsburgh, PA 15213

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2

Verification and Validation (V&V)

Capabilities needed by the DoD take too long to field, in large part because V&V and certification take too long.

Traditional V&V approaches are inadequate for the scale, complexity, and ubiquity of today's software reliant systems.

V&V is especially problematic for

- big data systems
- safety-critical systems
- autonomous systems
- distributed, adaptive, real-time systems

DoD recognizes the challenges

- **Reliance 21 Communities of Interest (C4I, Autonomy, and Engineering Resilient Systems)**

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3

The SEI and V&V Research

The SEI

- has set lifecycle assurance as a strategic focus, with a commitment to applying the first principles of information science

- working with CMU, is noted for advances in

  - formal verification (software model checking, static analysis)

  - software architecture and architecture design and analysis languages (AADL, Acme)

- works closely with CMU and other researchers in big data systems, autonomy, adaptive systems

- is connected with DoD and international efforts aimed at improved V&V (Systems Architecture Virtual Integration [SAVI] Aerospace Industry Initiative, DARPA HACMS, DoD Autonomy COI)

Today's Verification & Validation Session

- Parallel Software Model Checking (Sagar Chaki)

  - Use parallelization to address the scalability issues of software model checking

- Runtime Assurance for Big Data Systems (John Klein)

  - Monitor big data systems during run time to assure capability delivery

- Incremental Lifecycle Assurance of Critical Systems (Peter Feiler)

  - Provide architecture-centric, model-based evidence incrementally throughout the life cycle

- Verifying Distributed Adaptive Real-Time (DART) Systems (Sagar Chaki)

  - Create a sound engineering approach for producing high-assurance distributed, adaptive, real-time systems