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A Software Lifecycle Model for Research-to-Production Software Engineering

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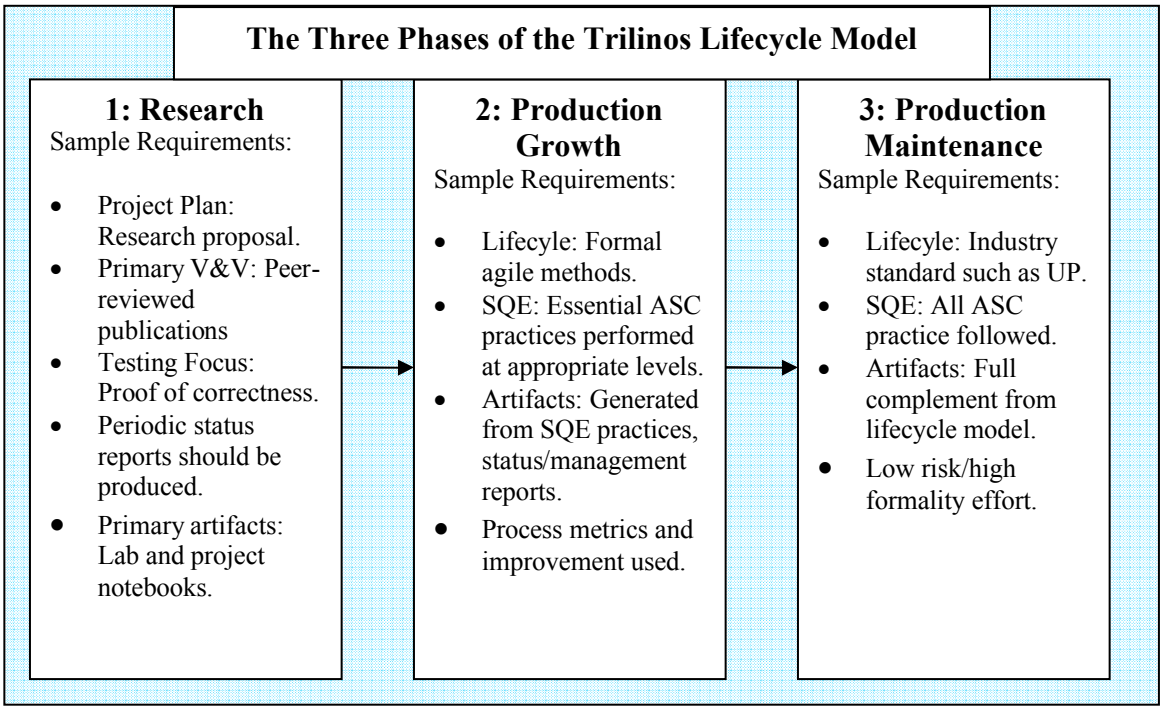
Development of production-quality software that begins as leading-edge scientific algorithms research is the charge of Sandia National Laboratories staff involved in enabling technologies for advanced computer modeling and simulations. In particular, development of solvers—a required element for many high-fidelity simulations—is an area where algorithmic advances are still critically important for future success, and yet any software that encodes these algorithms must eventually be production quality.

In this context, the **Trilinos Lifecycle Model (TLM)** recognizes the changing requirements for solver software engineering as work goes from proof-of-concept to production quality. The TLM is really a meta-model with three phases: (i) research, (ii) production growth and (iii) production maintenance. Each phase contains a set of requirements that allows developers to use the most appropriate tools and metrics for that phase. Furthermore, the TLM specifies a *promotional event* that must be completed in order to transition from one phase to the next.



All Trilinos package start out in the research phase. Presently most packages are in this phase since they are primarily focused on algorithm exploration and development. More mature package such as Epetra, AztecOO and IFPACK are in the production growth phase. No packages are in the production maintenance phase at this point since all are still evolving in design and capabilities, but the TLM lays out the requirements for production quality as packages mature into the production maintenance phase.

The Trilinos Lifecycle Model by J. Willenbring, M. Heroux and R. Heaphy was accepted for publication in the proceedings of the 29th International Conference on Software Engineering to be held in Minneapolis, MN in May 2007.

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