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Enabling Production-Quality Scientific-Discovery Tools with Data and Execution Models

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Successful deployment of production scientific visualization tools like VisIt and ParaView have enabled prolific scientific discovery through advanced computing. As scientists pursue new discoveries using more powerful computers, it is vital that we maintain thoroughly functional visualization tools for the ever-increasing data sizes. The challenges in updating our high-performance tools as we move to extreme-scale computing are greater than ever as we observe fundamental changes in computer hardware, programming models, compiler technology, and system behavior.

Research, funded mostly by DOE initiatives, is well underway to understand new, effective algorithms for scientific visualization at extreme scale. However, it is a long proverbial road from a sparse collection of algorithms to production-ready tools. Our current visualization tools take advantage of a common



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