Cloud computing has become a very popular platform to deploy data-intensive scientific applications, but this process faces its own set of challenges. Given the complexity of the application execution environment, routine tasks on the cloud such as monitoring, performance analysis, and debugging of applications become tedious and complex. These routine tasks often require close interaction and inspection of multiple layers in the cloud, which traditional performance monitoring tools fail to account for. In addition, many of these tools are designed for real-time analysis and only provide summaries of historical data. This makes it difficult for a user to trace the runtime performance of an application in the past.

We present a new monitoring framework called All-Monitor Daemon (Almond). Almond keeps close tabs on cloud inventory by communicating with a cloud resource manager (such as VMware vCenter for a VMware private cloud). Almond then connects to each individual physical host in the inventory and retrieves performance metrics through the hypervisor. Examples of metrics include CPU, memory, disk and network usage. Almond is also designed to collect performance information from the Guest OS, allowing the retrieval of metrics from the application platform as well. Almond was designed from the ground up for enhanced scalability and performance. The framework uses a Time Series Database (TSD), and a decentralized monitoring architecture allows for fast performance queries while minimizing overhead on the infrastructure. Almond collects performance data from all the layers of the software stack, and collected data remains persistent for future analysis. As a result of our performance enhancements, our preliminary results indicate a 70% improvement in hypervisor query response time through these enhancements as compared to our previous monitoring solution, VOTUS.

Almond is a work in progress, and will feature an intuitive web-based interface that allows system administrators and cloud users to view and analyze resources on the cloud. Once completed, Almond promises to be a highly scalable, fast performing and dynamic cloud resource monitor.