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Pilot Applications for Distributed Task Execution in the SPD Online Filter System

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Pilot applications have become essential tools in distributed computing, offering mechanisms for dynamic workload execution and efficient resource management. They are commonly employed in high-performance computing and large-scale scientific experiments due to their flexibility and scalability. Despite their broad adoption, the field still lacks a standardized abstraction and consistent best practices, resulting in a diverse range of implementations with varying degrees of compatibility and effectiveness.

In this talk, we will examine the design and architecture of pilot applications, focusing on their core components and operational models. A particular emphasis will be placed on the concept of late binding, which enables adaptive task assignment and enhanced resource usage. We will present our approach —a two-part system comprising a pilot and a daemon —designed to meet the specific requirements of the SPD experiment. This system leverages multithreading to handle task scheduling, monitoring, and reporting efficiently. The presentation will highlight practical insights from applying pilot applications in distributed environments, with an in-depth look at their role in the SPD experiment.

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