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Building a cloud-native ATLAS Tier 2 on Kubernetes

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The University of Victoria operates an Infrastructure-as-a-Service scientific cloud for Canadian researchers, and a Tier 2 WLCG site for the ATLAS experiment at CERN. Over time we have taken steps to migrate the Tier 2 grid services to the cloud. This process has been significantly facilitated by basing our approach on Kubernetes. We have exploited the batch capabilities of Kubernetes to run grid computing jobs and replace the conventional grid computing elements by interfacing with the Harvester workload management system of the ATLAS experiment. We have also adapted and migrated the APEL accounting service and Squid caching proxies to cloud-native deployments on Kubernetes, and are prototyping a Kubernetes-based grid storage element. We aim to enable fully comprehensive deployment of a complete ATLAS Tier 2 site on a Kubernetes cluster via Helm charts. We also describe our experience running a high-performance self-managed Kubernetes ATLAS Tier 2 cluster at the scale of 8,000 CPU cores for several years, and compare with the conventional setup of grid services.

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