Enterprise Container Platform

Evaluation and automation of a cluster deployment

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Initial Situation: For Software-as-a-Service providers who want to run their software in the cloud, provisioning a container orchestration platform can be completed within minutes, whereas deploying such a platform on local hardware remains significantly more complex and requires knowledge across multiple infrastructure layers. This thesis addresses this challenge by developing a minimal viable product (MVP) that automatically deploys an Enterprise Container Platform on bare-metal hardware.

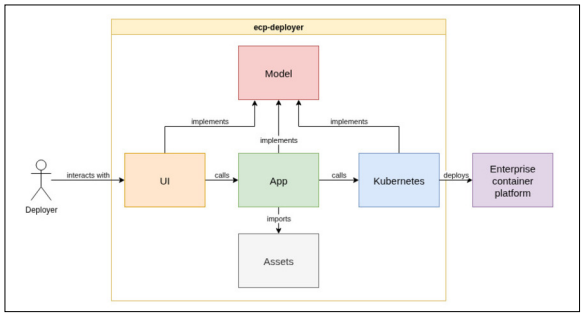
Approach / Technology: In a first step, a conceptual layer model inspired by the OSI stack was designed to identify the required components. The evaluation showed that a combination of Talos, Kubernetes and complementary plugins for networking, storage and observability is well suited for enterprise environments, serving the needs of a wide range of software providers.

Based on these insights, an automation tool was written in Go. Through a terminal-based user interface, the tool collects user input and generates the required configuration files. These files define the desired state of the plugins, which then get deployed automatically.

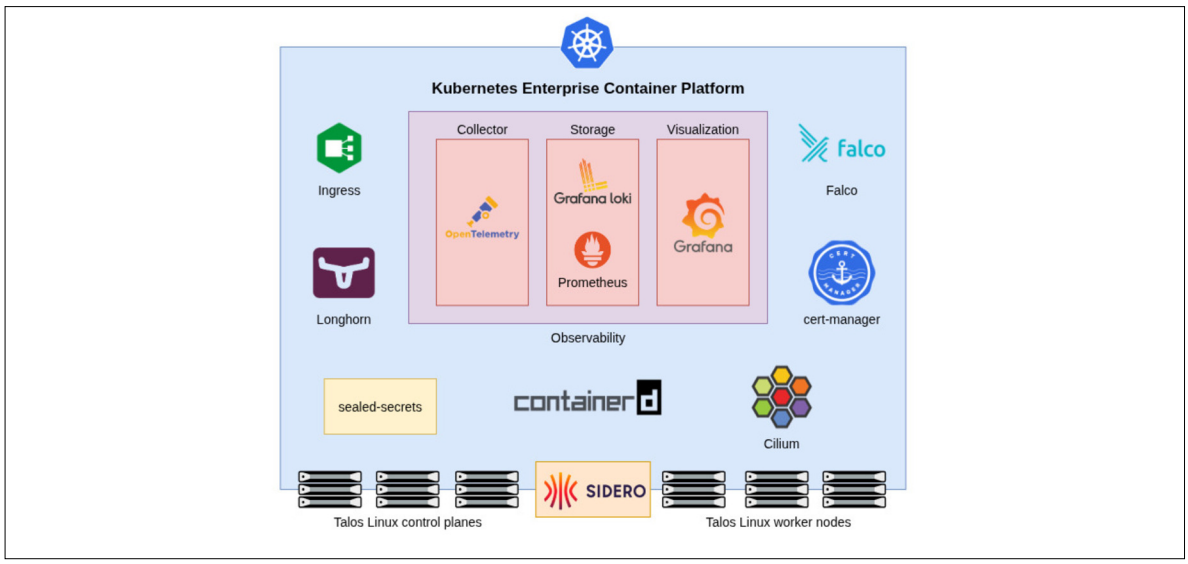
Conclusion: The product of this thesis successfully provisions a complete, functional Kubernetes-based container platform. It allows a cluster to be deployed in a few minutes and without requiring detailed knowledge of the components involved. The tool could be extended by adding support for more components, for example a second network or storage plugin. Additional future work includes integrating lifecycle management features to support clusters throughout their entire operational lifetime.

Terminal-based user interface to enter container platform settings.
Own presentment

Architecture of ecp-deployer.
Own presentment



Components of the Kubernetes cluster after running ecp-deployer.
Own presentment



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Subject Area
Network and Cloud Infrastructure