Winventory: microservices architecture case study

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Overview
Software inventory and communication tool, microservices architecture case study.

The Winventory system gathers user inputs to build a comprehensive inventory of software assets across CERN. The system is built on a microservices architecture pattern, which separates the application into multiple and independently deployable units that can be individually developed, tested and deployed.

Purpose
- Identify systems approaching their end-of-life e.g. Windows Server 2008 R2. Inform the users, gather information about the use cases and help to take appropriate actions.
- Gather statistics about licensed software and facilitate communication with users to understand various use cases and gives the overall license cost.

Data producer
Winventory currently has one data producer - Computer Management Framework (CMF), a custom software installed on every Windows machine that is a member of the CERN domain.

Data is collected once a day. Only data less than three months old is considered. Missing data such as user and responsible are fetched from the network database.

Technology stack
Containerized deployment using Docker and OpenShift Container Platform.

Technology-agnostic system. Two different languages and frameworks: ASP .NET Core services written in C# communicating easily with Flask and Celery services written in Python.

Resilience and fault-tolerance in synchronous communication has been improved by using an open source Polly circuit-breaker library.

The server-side code pushes content to connected web application clients (frontend) as it happens, in real-time using open source library SignalR.

The object-relational mapping (ORM) is implemented using open source frameworks Entity Framework for C# and SQLAlchemy for Python.

DevOps
The GitLab CI/CD pipeline is used to automatically build new Docker images and deploy them to the OpenShift Container Platform after new code is pushed to the Git repository.

To facilitate local development, a Docker Compose is used to build and run the Winventory multi-container application locally on the developer’s computer.