What is Stackrox (Red Hat Advanced Cluster Security for Kubernetes)?

Posted May 17, 2021 by Adrian Wyssmann - **6 min read**

k8s stackrox rhacs

At my current employer we use a container security platform called Stackrox, which recently was acquired by RedHat. But that is it exactly and for what is it good?

What is Stackrox/RHACS?

StackRox is a full-lifecycle Kubernetes security solution, which allows you do detect, manage and mitigate security risks (e.g. wrong configuration), as well as vulnerabilities (CVEs). It offers you not only **a comprehensive view** of security policy violations but also enables you to **create and modify policies**, that help you to minimize risks based on configurations, vulnerabilities, and other factors and help you to implement security and DevOps best practices. It also integrates with other tools including your CI system.

This Youtube Video gives a very nice introduction on what it does, and how it works.

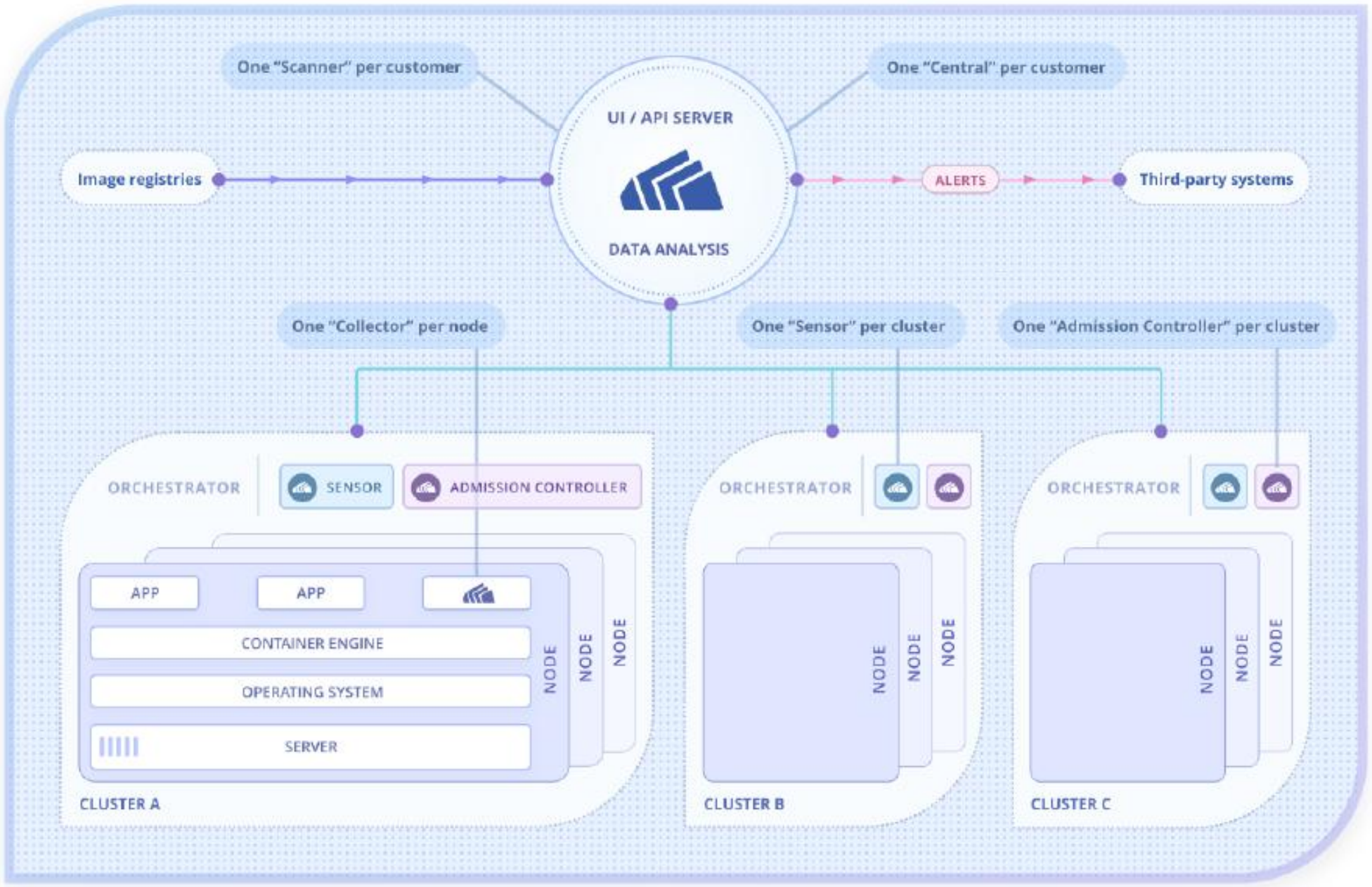
> ***RHACS***
>
> *Since RedHat acquired Stackrox, they also start re-branding the tool zo Red Hat® Advanced Cluster Security for Kubernetes (RHACS)*

The best thing of that is that since version 3.0.58.0 all licensing restrictions have been removed. There are some plans to have an OSS version, plus and Enterprise version

Architecture

Stackrox contains of several components:

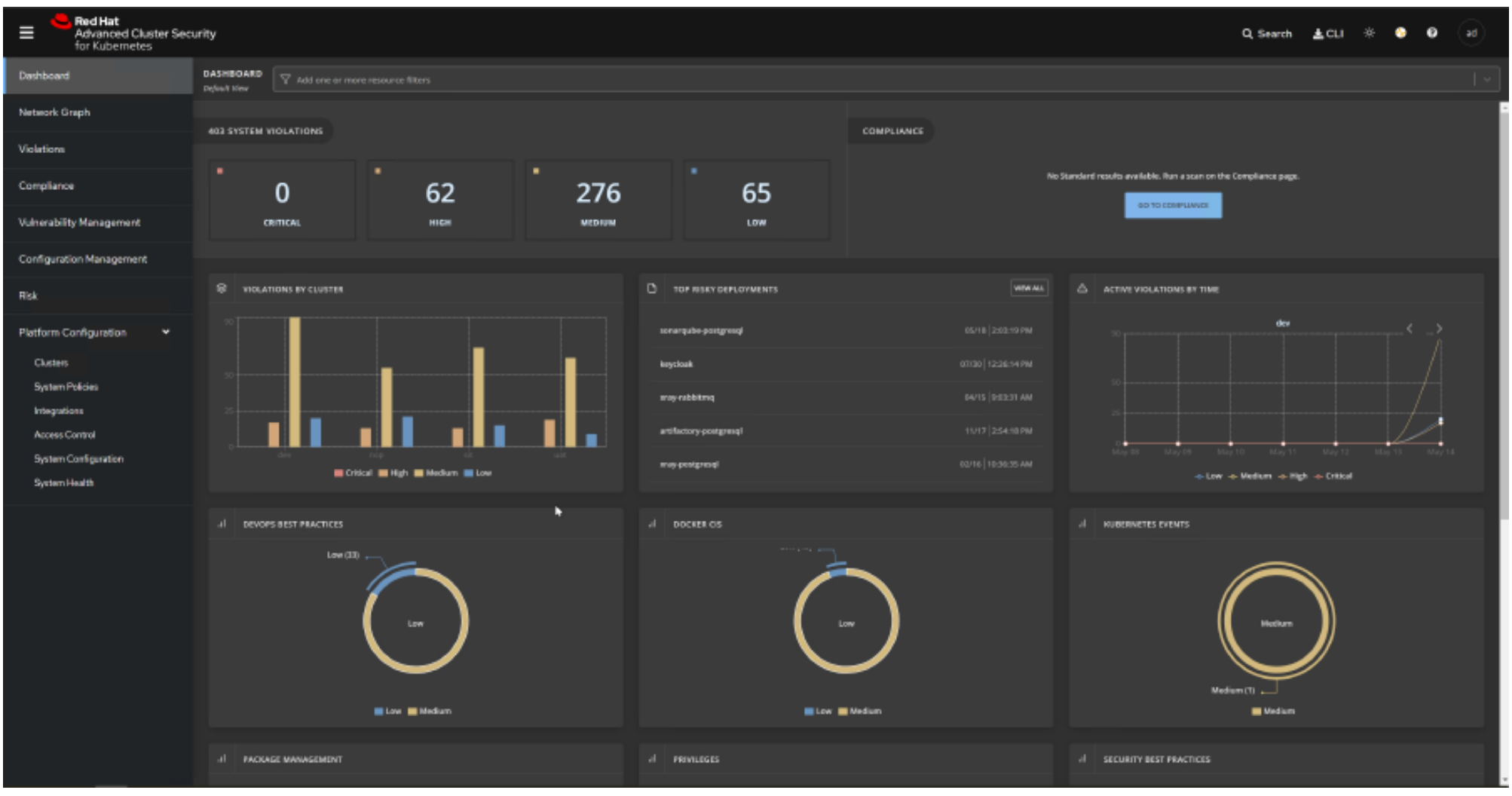
Component	Description	Quantity
Central	Main component, gathers and displays information from other components. Handles data persistence, API interactions and UI access.	1 for multiple clusters.
Sensor	Monitors the cluster: Collects and augments data from the Collector.	1 for each cluster.
Scanner	Scans images for vulnerabilities. It analyzes all image layers to check for known vulnerabilities from the Common Vulnerabilities and Exposures (CVEs) list. Scanner also identifies vulnerabilities that are installed by package managers and language-level dependencies.	1 for multiple clusters.
Collector	Collects and monitors container activities (container runtime and network activity)	1 on each node.
Admission controller (optional)	Interacts with Kubernetes API server and prevents creating workloads that don't adhere to security policies.	1 for each cluster.



Architecture of Stackrox (RHACS)

What can you do with Stackrox?

Well there are a bunch of stuff. A nice dashboard is the entry point



RHACS dashboard

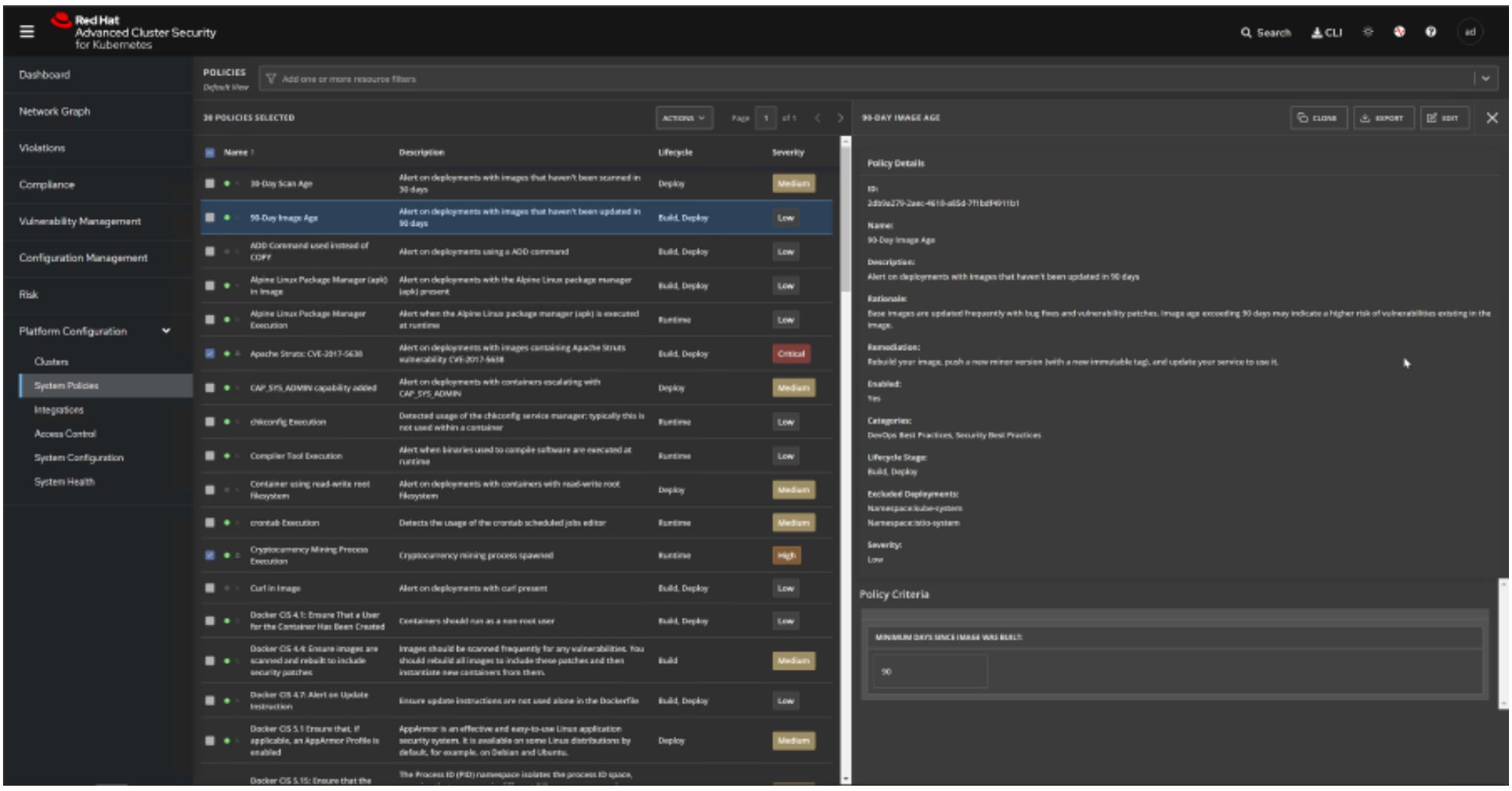
Manage security policies

Support me

You can define security policies - or use pre-defined ones - to prevent high-risk service deployments. A policy checks for certain aspects e.g. container does not run in privileged mode or check for container not updated for 30+ days. Each policy has a Severity - Critical, High, Medium or Low - and is applied to one or more of the following stages:

- **Build** - Fails your continuous integration (CI) builds when images match the conditions of the policy.
- **Deploy** - Blocks creation of deployments that match the conditions of the policy. In clusters with admission controller enforcement, the Kubernetes (or OpenShift) API server blocks all noncompliant deployments. In other clusters, the StackRox Kubernetes Security Platform edits noncompliant deployments to prevent pods from being scheduled.
- **Runtime** - Kills all pods that match the conditions of the policy.

There are a lot of policy criteria which can be configured. By default policy violations are reported, but not enforced. One however enabling the admission controller enforcement by turing on the Admission Controller Webhook, which then ensures the policies are met or otherwise blocks deployments or kills pods.



RHACS system policies have different rules and severity

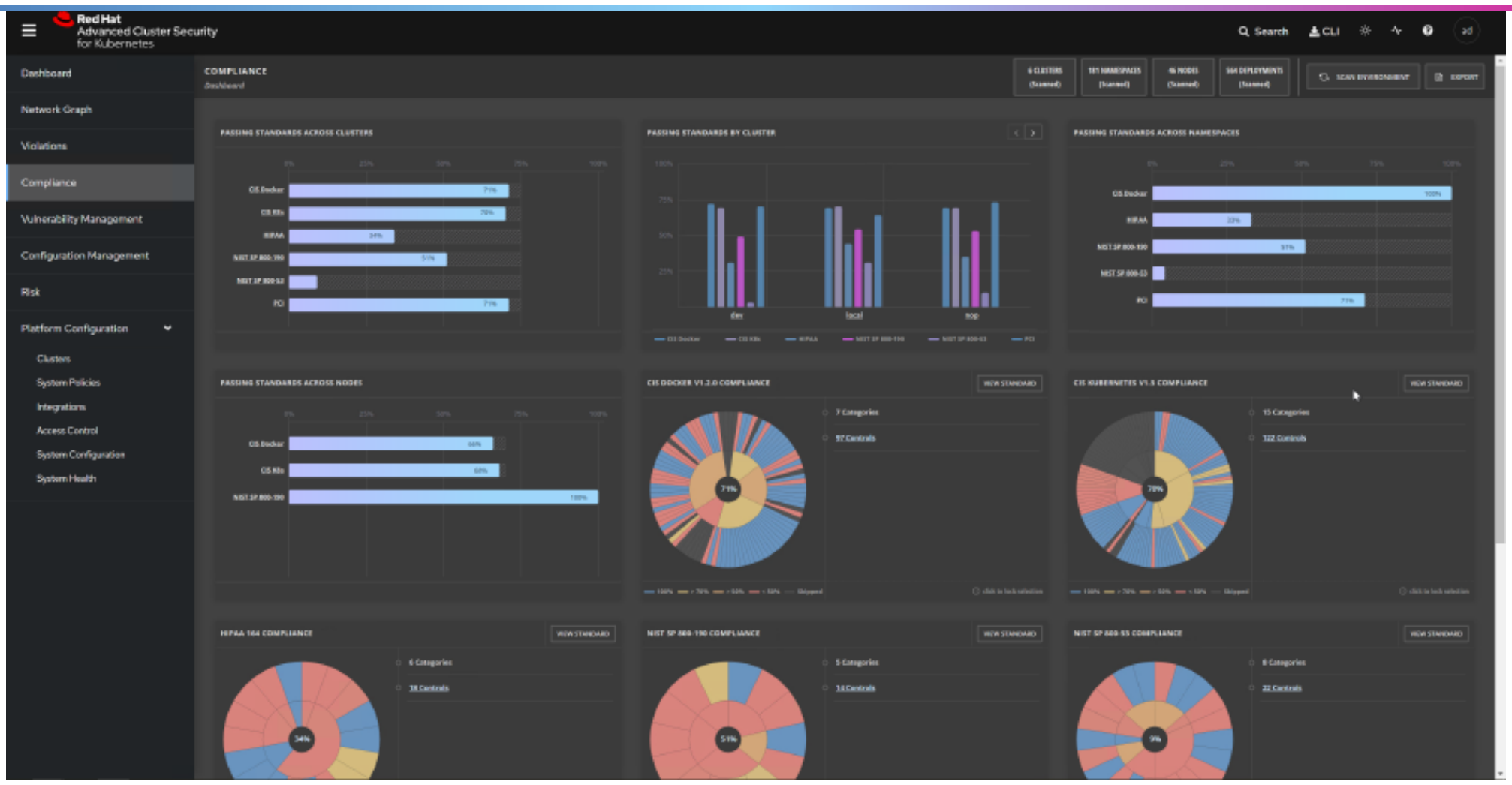
> ***Breakglass***
>
> *The admission controller enforcement can be by-passed, by adding `admission.stackrox.io/break-glass` annotation to your configuration YAML.*

Manage compliance

Stackrox allows automated check and validation of compliance for the different industry standards:

- **CIS Benchmarks** (Center for Internet Security) for Docker and Kubernetes,
- **HIPAA** (Health Insurance Portability and Accountability Act),
- **NIST Special Publication 800-190** and **800-53** (National Institute of Standards and Technology), and
- **PCI DSS** (Payment Card Industry Data Security Standard).

The scanning allows you to evaluate and harden your infrastructure (Docker Engine, Kubernetes orchestrator) to be compliant with these standards.



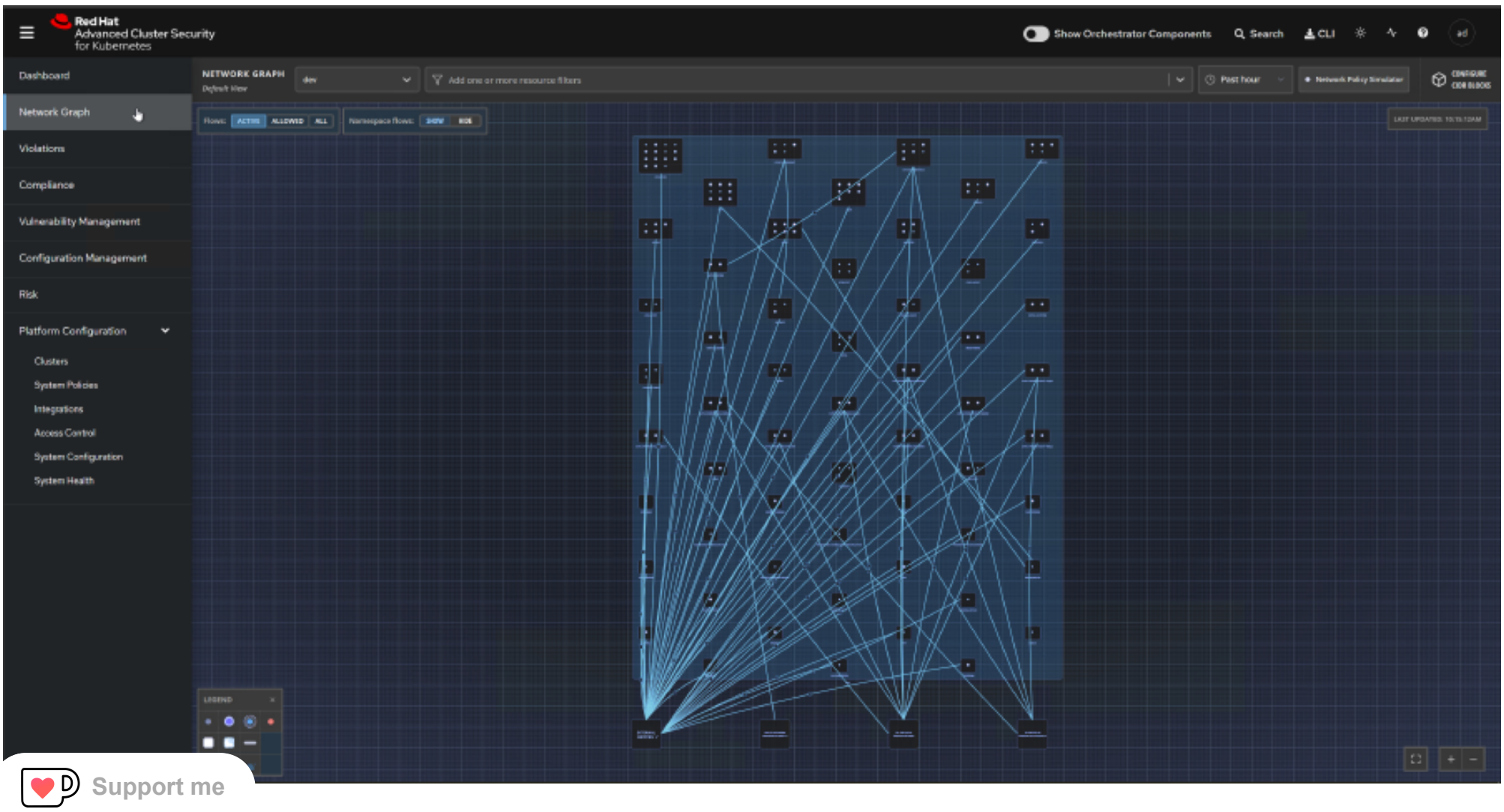
RHACS system compliance status for the different standards

Manage network policies

This feature allows you to visualize existing network policies, simulate proposed policies, and generate new policies based on actual traffic.

> *A Kubernetes network policy is a specification of how groups of pods are allowed to communicate with each other and other network endpoints. These network policies are configured as YAML files.*

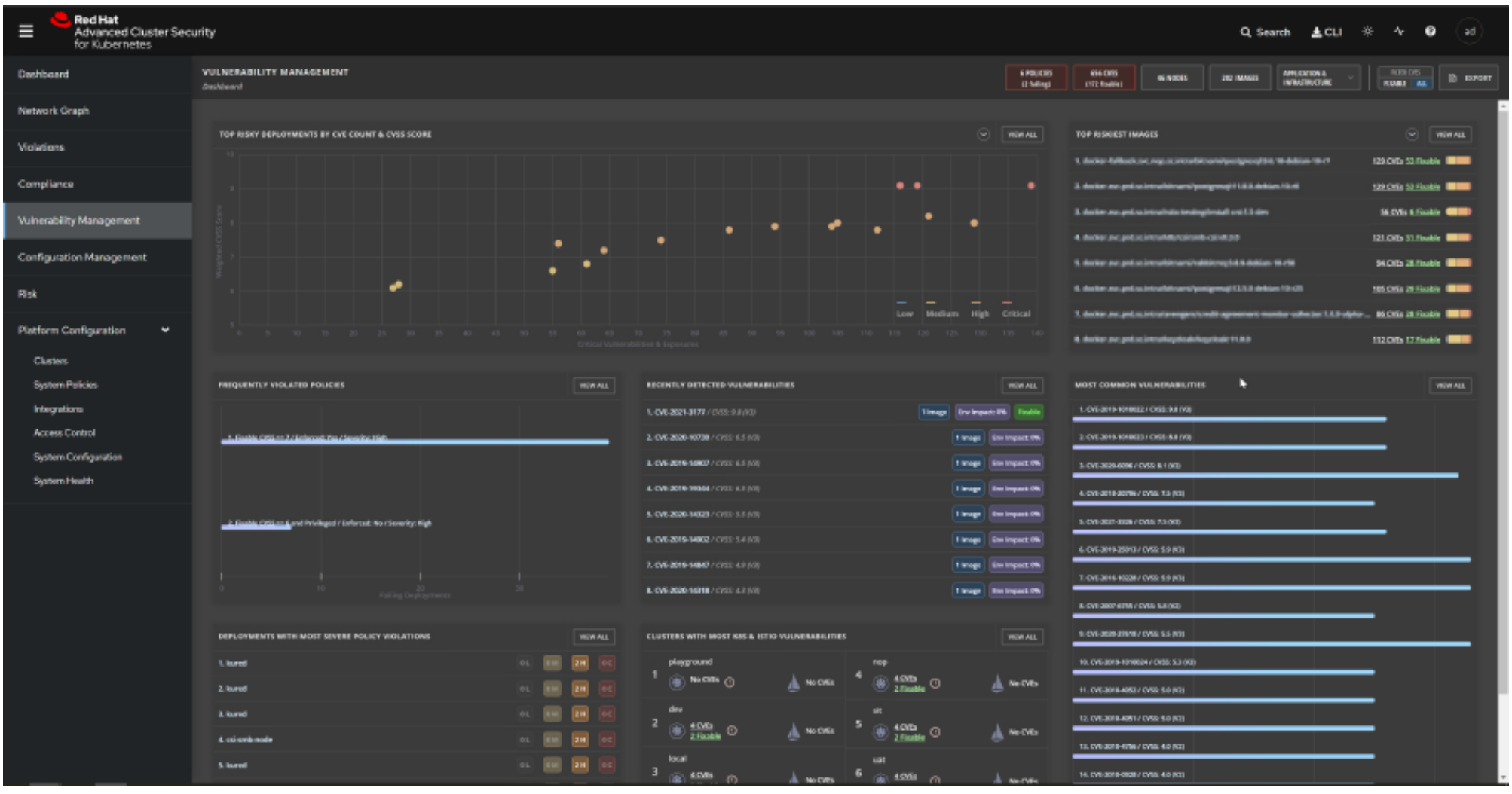
- Network graph: **Visualize** allowed **network connections** and active communication paths among namespaces and deployments
- Network policy simulator: **upload** new network policy configuration files, and **preview** the network policies visually
- Network policy generator: **Generate a network policy configuration file** (YAML) based on the network communication flows in your environment within a specified period



Vulnerability management

Stackrox detect vulnerabilities (CVEs) and them mitigation by enforcing actions defined in the [policies]((#manage-security-policies)
Also can Stackrox analyze docker images for vulnerabilities, where all image layers are analyzed for known vulnerabilities (CVEs)

> *StackRox Central submits image scanning requests to StackRox Scanner. Upon receiving these requests, StackRox Scanner pulls image layers from the relevant registry, checks the images, and identifies installed packages in each layer. Then it compares the identified packages and programming language-specific dependencies with vulnerability lists and sends information back to StackRox Central.*



RHACS vulnerability management shows all vulnerabilities found and if they can be fixed

How to install?

Helm charts for the StackRox Kubernetes Security Platform offers helm-charts for installing stackrox. Since version 3.0.50.0 there is also a `central-services` chart, which was not available before. The official documentation offers a detailed how-to on the installation process.

Ensure that the remote docker repo for `stackrox.io` is setup. Alternatively `registry.redhat.io` could be used but it requires authentication

Install `central-services`

Installation Instructions can be found here

1. Install helm chart

```
helm install  stackrox-central-services  remote/stackrox-central-services --values values.yml -n stackrox
```

2. You can test the central dashboard by forwarding the port 18443

```
kubectl -n stackrox port-forward svc/central 18443:443
```

3. Create ingress to central

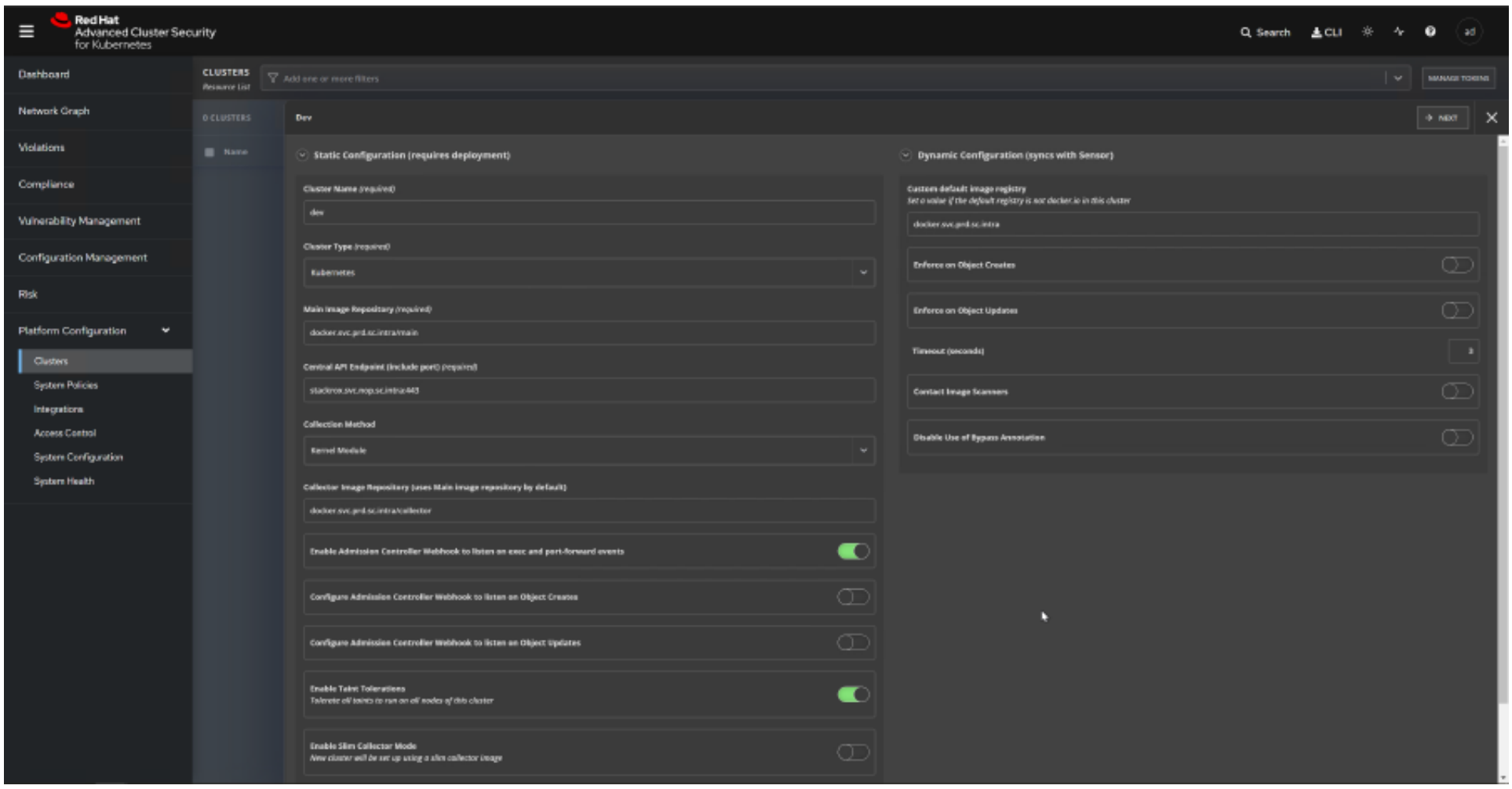
Install Sensors

Support me ...ral, we have to install the sensors in each cluster following this guideline

1. Register (create) a cluster in Stackrox central

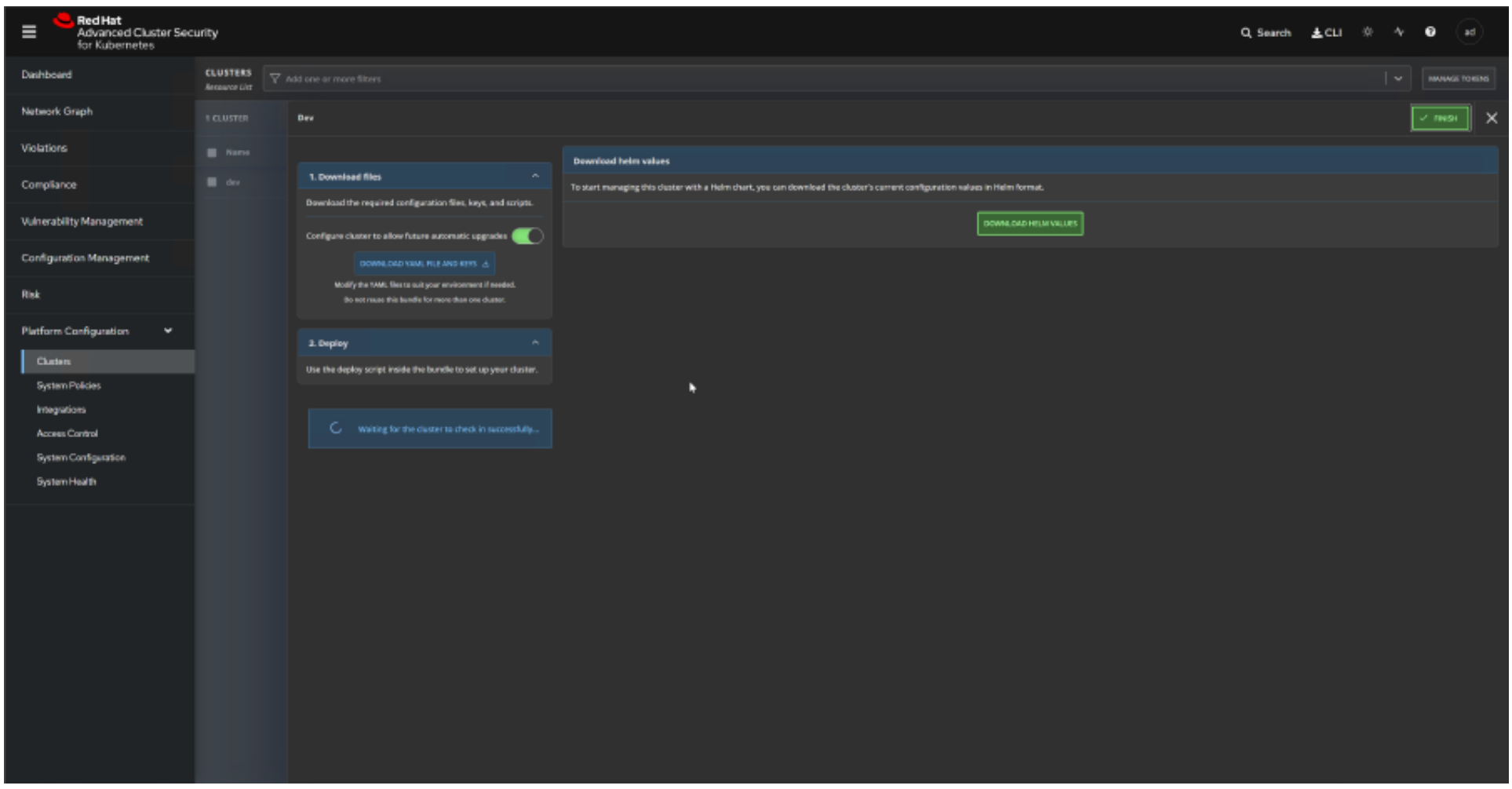
   You should provide configurations according to your environment e.g. providing a custom registry for sensor and collector images

2. On the StackRox portal, navigate to `Platform Configuration` > `Clusters`.
3. Select `+`.
4. Specify configuration: Replace your endpoints and docker repos according to your setup



Before installing the sensors, one has to setup a cluster

5. Click `Next` to apply the sensor configuration.
6. Click `Download Yaml File and Keys` to continue with sensor setup. This creates a zip file.



RHACS creates a zip file which contains all necessary config and script files

7. Unzip zip file to `./sensors/` e.g. `./sensors/sensor-dev`

 in the correct cluster and run `sensor.sh` which can be found under the recently extracted folder

```
cluster=dev
export KUBE_COMMAND="kubectl --context $cluster" && \
./sensors/sensor-$env/sensor.sh
```

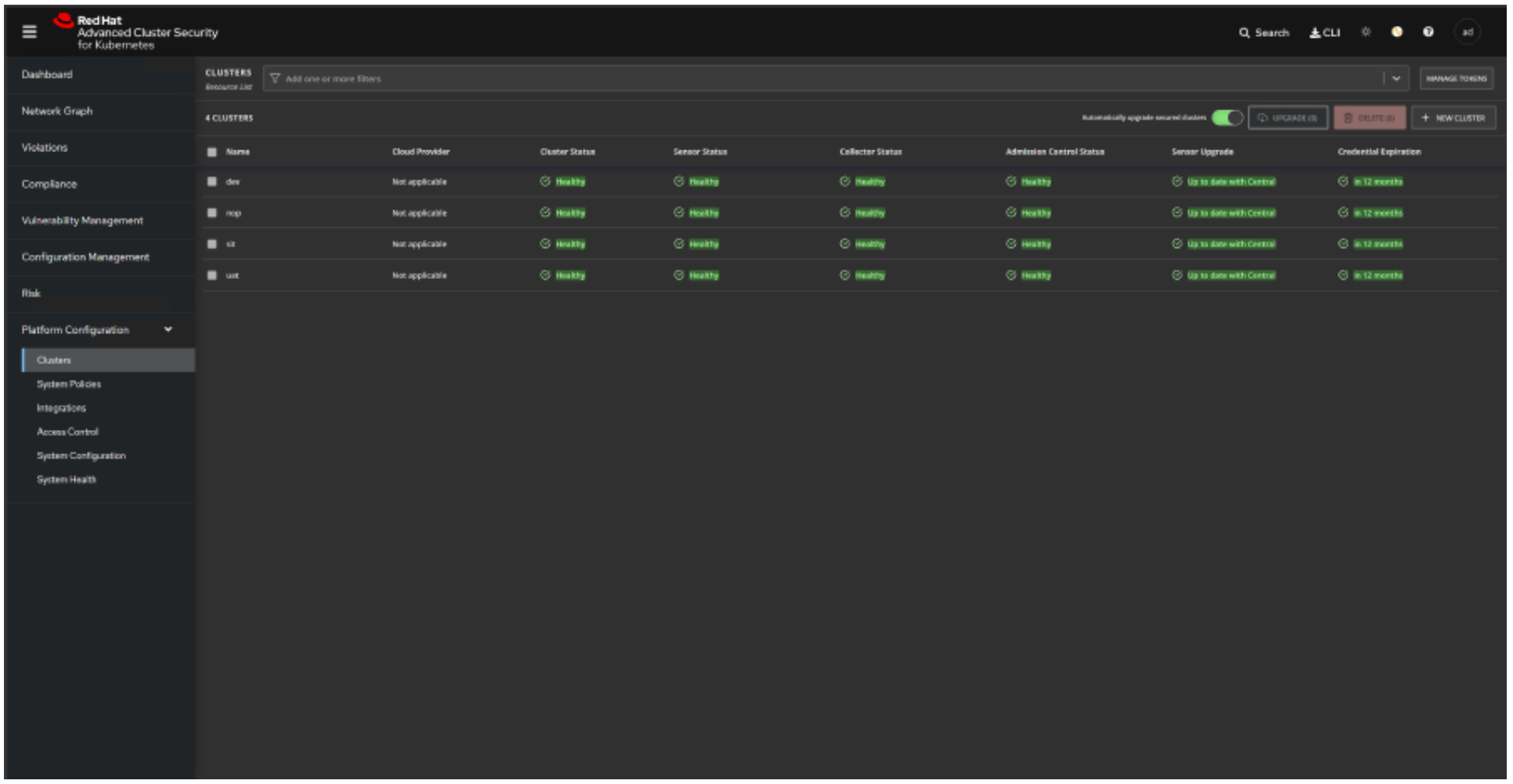
Remarks

Running the `sensor.sh` under Windows failed while the script tried to create the registry credentials:

```
$ ./sensor.sh
Using authentication token for docker.intra from ~/.docker/config.json.
error: error parsing STDIN: error converting YAML to JSON: yaml: line 5: could not find expected ':'
```

I actually fixed that by creating the necessary `docker-registry` secrets `stackrox` and `collector-stackrox` manually:

```
kubectl --context $cluster -n stackrox create secret docker-registry stackrox `
--docker-server=$registry_url `
--docker-username=$username `
--docker-password=$password `
--docker-email="null@stackrox.io"
```



RHACS shows an overview of all clusters and their status

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