

Migration between Kubernetes versions doesn't have to be error-prone

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Service Mesh – static analysis of $\bigcup_{=}$ ORACLE service dependencies

- We look at many different tools and things
- Part of the project was:
 - Investigation what we can use or do
 - Develop something together with Oracle
- And we concluded that Kubernetes (K8s) is good target



Specific case: Migration/Service Mesh in 🛞 kubernetes

- Kubernetes is the main tool used in our CERN's group to application deployment
- Allows our applications (placed in containers) to talk and communicate with each other
- Popular worldwide and in various industries
- Available in public clouds, private clouds, hybrid solutions, on-premise, etc.

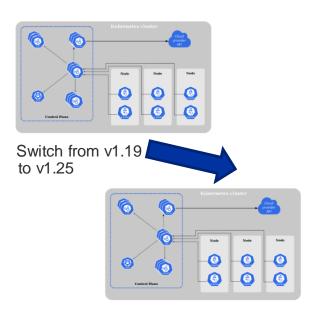


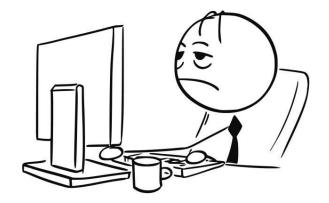


Migration in K8s – current process of work

Typical step-by-step scenario:

- Manually checking release notes and should, but not usually no one does every templates (possibly thousands of files)
- Trying to re-deploy (re-use) all existing definitions in new cluster version
- Getting feedback only after everything has happened
- Unmeasured amount of work and verifications to be done, <u>unestimable</u> plans due to lack of feedback



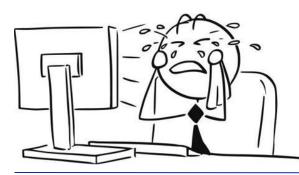




Typical annual migration – to err is human

At least once per year:

- 1. a new version of the cluster has been announced
- 2. a few thousand definitions? Let's check it 1:1
- 3. any omission or unforeseen behavior: a chance that some critical systems will not work temporarily, which means abandoning live or professional plans ones in favor of maintenance.
- 4. if we miss something in testing environment, then most critical apps like Access Control, impact.cern.ch, phonebook.cern.ch <u>may work unstable</u> or <u>be unavailable</u>





A way to improve

Let's automate our work! Why bother a man when a machine can do it for him?

- automatically validate things
- feedback <u>before</u>, not surprise after

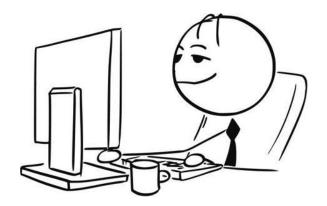


- on-the-fly conversion
- catch potential changes and divergences



Our local world after the changes

- Daily work planned without surprises
- Reduced errors you can spend time safely with friends or family, not on the phone or at the laptop
- More time doing smart things at work and less time reading schematics that machines/computers should read;
- Let's leave creative work to people





Results

Technicalities:

- 51+ supported K8s kinds
- Full integration with K8s cluster API (kubeconf settings file)
- Integration also local templates/resources storage
- Simple deprecated/removed API versions view

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Plans for the future & features

Challanges:

- Incoming support for CRDs (custom resource definitions)
- Possible integration with some kind of pipeline/s (like gitlab stages or jenkins jobs)
- Create plugin based application (e.g. as an extension for VS Code)
- Scrapping validation rules directly from K8s server codebase
- Licensing spreading the idea to the open source world
- Your suggestions... 🙂







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