

ONAP Operations Manager / ONAP on Containers

Draft. - Withdrawn as a standalone project. Will be handled as a Sub project of OOM

Project Name:

- Proposed name for the project: ONAP Operations Manager / ONAP on Containers
- Proposed name for the repository: oom/containers

Project description:

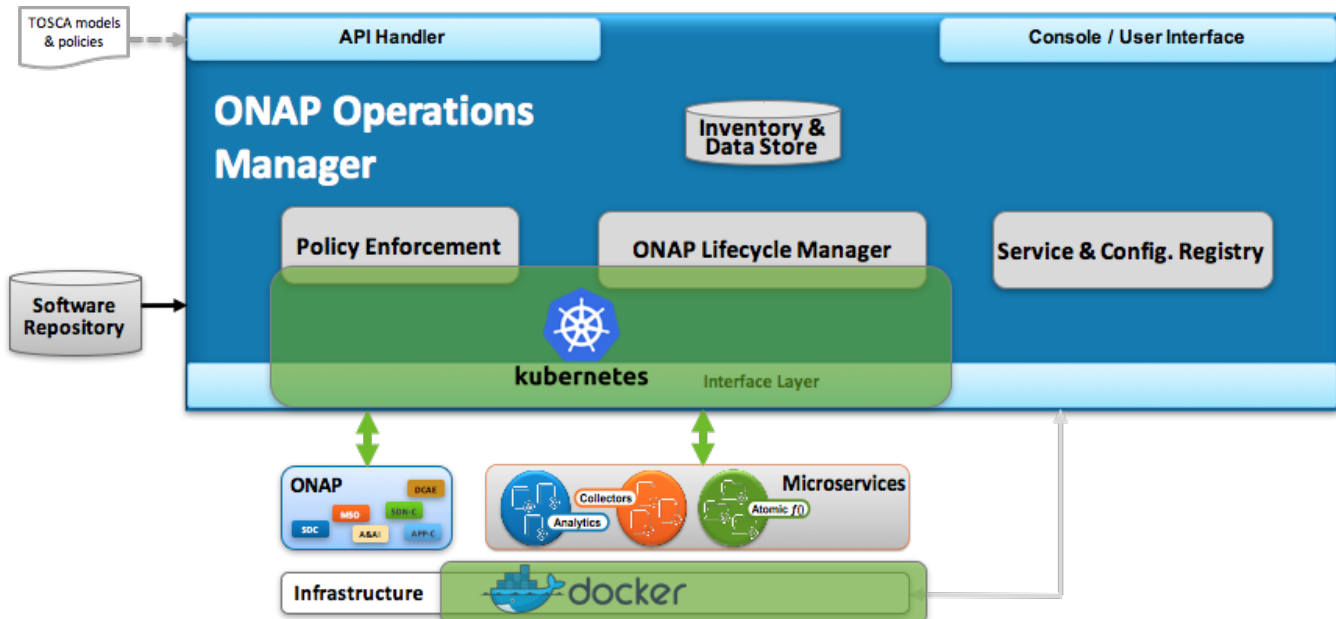
This project describes a deployment and orchestration option for the ONAP platform components (MSO, SDNC, DCAE, etc.) based on Docker containers and the open-source Kubernetes container management system. This solution removes the need for VMs to be deployed on the servers hosting ONAP components and allows Docker containers to directly run on the host operating system. As ONAP uses Docker containers presently, minimal changes to existing ONAP artifacts will be required.

- The primary benefits of this approach are as follows:
 - **Life-cycle Management.** Kubernetes is a comprehensive system for managing the life-cycle of containerized applications. Its use as a platform manager will ease the deployment of ONAP, provide fault tolerance and horizontal scalability, and enable seamless upgrades.
 - **Hardware Efficiency.** As opposed to VMs that require a guest operating system be deployed along with the application, containers provide similar application encapsulation with neither the computing, memory and storage overhead nor the associated long term support costs of those guest operating systems. An informal goal of the project is to be able to create a development deployment of ONAP that can be hosted on a laptop.
 - **Deployment Speed.** Eliminating the guest operating system results in containers coming into service much faster than a VM equivalent. This advantage can be particularly useful for ONAP where rapid reaction to inevitable failures will be critical in production environments.
 - **Cloud Provider Flexibility.** A Kubernetes deployment of ONAP enables hosting the platform on multiple hosted cloud solutions like Google Compute Engine, AWS EC2, Microsoft Azure, CenturyLink Cloud, IBM Bluemix and more.

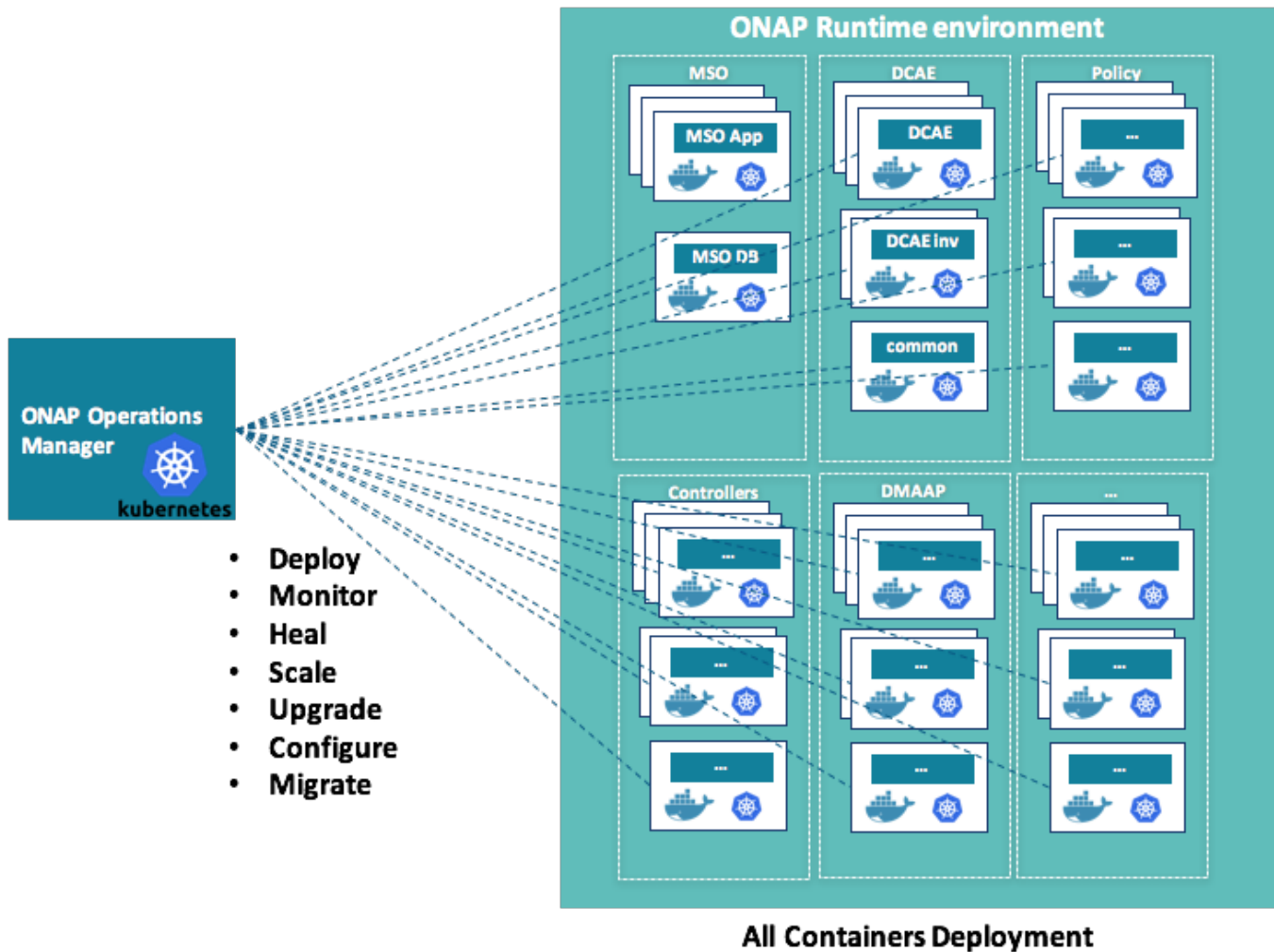
In no way does this project impair or undervalue the VM deployment methodology currently used in ONAP. Selection of an appropriate deployment solution is left to the ONAP user.

The ONAP on Containers project is part of the ONAP Operations Manager project and focuses on (as shown in green):

- Converting ONAP components deployment to docker containers
- Orchestrating ONAP components life cycle using Kubernetes



As part of the OOM project, it will manage the lifecycle of individual containers on the ONAP runtime environment.



Challenges

Although the current structure of ONAP lends itself to a container based manager there are challenges that need to be overcome to complete this project as follows:

- **Duplicate containers** – The VM structure of ONAP hides internal container structure from each of the components including the existence of duplicate containers such as Maria DB.
- **DCAE** - The DCAE component not only is not containerized but also includes its own VM orchestration system. A possible solution is to not use the DCAE Controller but port this controller's policies to Kubernetes directly, such as scaling CDAP nodes to match offered capacity.
- **Ports** - Flattening the containers also expose port conflicts between the containers which need to be resolved.
- **Permanent Volumes** - One or more permanent volumes need to be established to hold non-ephemeral configuration and state data.
- **Configuration Parameters** - Currently ONAP configuration parameters are stored in multiple files; a solution to coordinate these configuration parameters is required. Kubernetes Config Maps may provide a solution or at least partial solution to this problem.
- **Container Dependencies** – ONAP has built-in temporal dependencies between containers on startup. Supporting these dependencies will likely result in multiple Kubernetes deployment specifications.

Scope:

- In scope: ONAP Operations Manager implementation **using docker containers and kubernetes**, i.e.
 - **Platform Deployment:** Automated deployment/un-deployment of ONAP instance(s) / Automated deployment/un-deployment of individual platform components using docker containers & kubernetes
 - **Platform Monitoring & healing:** Monitor platform state, Platform health checks, fault tolerance and self-healing using docker containers & kubernetes
 - **Platform Scaling:** Platform horizontal scalability through using docker containers & kubernetes
 - **Platform Upgrades:** Platform upgrades using docker containers & kubernetes
 - **Platform Configurations:** Manage overall platform components configurations using docker containers & kubernetes
 - **Platform migrations:** Manage migration of platform components using docker containers & kubernetes
- Out of scope: support of container networking for VNFs. The project is about containerization of the ONAP platform itself.

Architecture Alignment:

- How does this project fit into the rest of the ONAP Architecture?
 - Please Include architecture diagram if possible
 - What other ONAP projects does this project depend on?
 - [ONAP Operations Manager \(OOM\)](#) [Formerly called ONAP Controller]: The ONAP on Containers project is a sub-project of OOM focusing on docker/kubernetes management of the ONAP platform components
 - The current proposed "System Integration and Testing" (Integration) Project might have a dependency on this project - use OOM to deploy/undeploy/change the test environments, including creation of the container layer.
 - This project has also a dependency on the LF infrastructure (seed code from ci-management project)
- How does this align with external standards/specifications?
 - N/A
- Are there dependencies with other open source projects?
 - Docker
 - Kubernetes

Resources:

- Primary Contact Person: David Sauvageau (Bell Canada)
- Roger Maitland (Amdocs)
- Jérôme Doucerain (Bell Canada)
- Marc-Alexandre Choquette ((Bell Canada)
- Alexis De Talhouët (Bell Canada)
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- Éric Debeau (Orange)
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- Alon Strikovsky (Amdocs)
- Yury Novitsky (Amdocs)
- Eliyahu Noach (Amdocs)
- Elhay Efrat (Amdocs)
- Xin Miao (Futurewei)
- [Josef Reisinger](#) (IBM)
- [Jochen Kappel](#) (IBM)
- Jason Hunt (IBM)
- Earle West (AT&T)
- Hong Guan(AT&T)

Other Information:

- link to seed code (if applicable)
Docker/kubernetes seed code available from Bell Canada & AMDOCS - Waiting for repo availability.
[aai/aai-data](#) AAI Chef environment files
[aai/logging-service](#) AAI common logging library
[aai/model-loader](#) Loads SDC Models into A&AI
appc/deployment APPC docker deployment

ci-management - Management repo for Jenkins Job Builder, builder scripts and management related to the CI configuration.

dcae/apod/buildtools - Tools for building and packaging DCAE Analytics applications for deployment

dcae/apod/cdap - DCAE Analytics' CDAP cluster installation

dcae/operation - DCAE Operational Tools

dcae/operation/utlis - DCAE Logging Library

dcae/utlis - DCAE utilities

dcae/utlis/buildtools - DCAE utility: package building tool

mso/chef-repo - Berkshelf environment repo for mso/mso-config

mso/docker-config -MSO Docker composition and lab config template

mso/mso-config - mso-config Chef cookbook

ncomp/docker - SOMF Docker Adaptor

policy/docker - Contains the Policy Dockerfile's and docker compose script for building Policy Component docker images.

sdnc/oam - SDNC OAM

More seed code on docker deployments and kubernetes configurations to be provided by Bell Canada/Amdocs shortly.

- Vendor Neutral
 - if the proposal is coming from an existing proprietary codebase, have you ensured that all proprietary trademarks, logos, product names, etc., have been removed?
- Meets Board policy (including IPR)

Use the above information to create a key project facts section on your project page

Key Project Facts

Project Name:

- JIRA project name: ONAP Operations Manager / ONAP on Containers
- JIRA project prefix: oom/containers

Repo name: oom/containers

Lifecycle State: Incubation

Primary Contact: David Sauvageau

Project Lead: David Sauvageau

mailing list tag oom-containers

Committers (Name - Email - IRC):

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*Link to TSC approval:

Link to approval of additional submitters: [Jochen Kappel](#)