

REPORT REPRINT

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Is container management and orchestration poised for the polyglot effect?

JAY LYMAN

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Kubernetes is clearly the leader here, but we've consistently seen significant use of other container management and orchestration software, making a standard far from settled in this early market.

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As we saw with PaaS, container management and orchestration may be undergoing a polyglot effect, whereby customer demand, open source software and integration drive a market with a variety of prominent technologies and players. This segment may also represent a continuation of the diversity of software components that characterize polyglot programming, with greater variety at the application, infrastructure and container layers of enterprise software stacks.

Kubernetes gets the lion's share of attention in the space, and rightfully so, given its innovation, vendor backing and buzz. However, enterprise organizations frequently have a somewhat different perspective that involves a mix of software options that includes Swarm, Mesos, Rancher and Nomad.

Our previous and current survey data also indicate a mixed-use container management and orchestration market, with Kubernetes leading a variety of software that is rapidly making its way into production use.

THE 451 TAKE

Some people in the industry are ready to declare Kubernetes the de facto standard for container management and orchestration. But there continues to be significant use of several different options and combinations. It's much more difficult to become the standard in frameworks than to become, say, the standard for container engines - Docker is a more basic and limited software component. Also, the Cloud Native Computing Foundation, the nonprofit organization backing Kubernetes and other technologies, is overall more committed to open source and flexibility than to setting standards. Bottom line, based on the history of enterprise systems management software (including BMC, CA Technologies, HP, IBM and, more recently, Chef, Puppet, Ansible and Salt) and its current implementation among enterprise organizations, container management and orchestration software is a mixed-use market, and will remain so for the foreseeable future. Kubernetes may indeed emerge as the standard, but it is not yet there today.

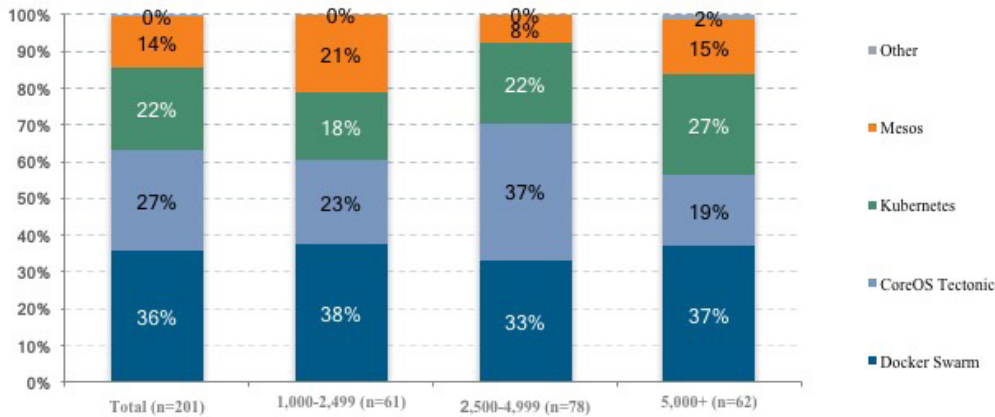
A MIXED-USE MARKET

Our conversations with vendors, end users and investors indicate the container management and orchestration space is a mixed-use market characterized by the deployment of multiple software options and combinations in the enterprise today. Previous and recent survey results provide further validation of this mixed-market reality, and are also indicative of a market in the early stages, when enterprises are still evaluating various options and combinations.

While developer surveys have consistently identified Kubernetes as the leader, our surveys of enterprise IT decision-makers at C-level and director-level positions indicate more of a mixed-use situation among enterprises. In our Voice of the Enterprise: Software-defined Infrastructure, Workloads and Key Projects 2016 survey, Swarm led at 25%, followed by Amazon EC2 Container Service at 16%, Kubernetes at 10%, Mesos/Mesosphere at 4% and CoreOS Tectonic at 2%.

A more recent survey, conducted in April-May 2017 of 201 C-level and director-level decision-makers at organizations that were using containers, indicated a similar case of mixed use. Of those asked to identify their primary container orchestration platform, 36% said Swarm, 27% CoreOS Tectonic, 22% Kubernetes and 14% Mesos. It should be noted that the study was sponsored by CoreOS, so we asked about its Tectonic software, but it integrates Kubernetes, so the combined Kubernetes share is a leading 49%. Nevertheless, the data still indicates significant use of other options.

Primary Container Orchestration Platform by Company Size



Q. Which of these would you say is your primary container orchestration platform?



Our most recent study also indicates that container management and orchestration software is moving rapidly beyond early uses, and winning production deployment. We've seen container applications go beyond testing and development, and pilot projects, to production use for at least the last two years; but software was a different story. Two years ago, our Voice of the Enterprise: Cloud Computing, Q3 2015 survey of 534 enterprise IT decision-makers indicated that fewer than 10% were using a container orchestration tool at all.

In our more recent survey with CoreOS in April-May 2017, more than half of respondents at organizations using containers said that container management and orchestration tools were in initial or broad production use. Given the software is only three years old in the enterprise, that figure highlights the speed at which it is gaining acceptance and use.

CURRENT OFFERINGS AS EVIDENCE

Further evidence of this mixed market can be seen in vendor offerings such as Amazon Web Services, Microsoft's Azure Container Service and Google Container Engine, all of which support multiple options that include not only Kubernetes, but also Swarm, Mesos, Rancher and HashiCorp's Nomad.

While Kubernetes undoubtedly enjoys the broadest number of vendors supporting it, there are vendors backing other container management and orchestration options. Cisco acquired ContainerX in August 2016, integrating its container management and orchestration software with Swarm. Mesosphere, backer of the Mesos and Mesosphere DCOS container management and orchestration software, won a reseller agreement with Hewlett Packard Enterprise earlier this year.

We also see growing enterprise interest and support for Rancher, a container management and orchestration option from Rancher Labs that has been integrated and supported by a number of larger vendors, including SunGard Availability Services.

TECHNICAL REASONS FOR MIXED USE

Technical factors are further contributing to this mixed use. One factor is that the software being considered actually has three components: scheduling, management and orchestration. In some cases, there are distinct reasons for the use of certain container management and orchestration software.

For example, Docker Swarm is integrated with the popular Docker container runtime software and may be ideal for initial uses. Mesos has long been used to manage big-data applications and software such as Cassandra, Hadoop and Spark, and therefore may be a preferred option for those applications. Mesos is also connected to the popular Marathon scheduler. Furthermore, there are a number of additional vendors and projects providing enterprises with container management and orchestration software, including: Apcera, Apprenda, Cisco, Cloud 66, Heptio, Huawei, IBM, Iron.io, Kontena, Pivotal, Red Hat, Robin Systems, Shippable, SUSE, Univa with Navops and WaveMaker.

Kubernetes has won users and fans for its scaled-up container cluster support, and the fact that it represents Google's experience running containers at massive scale. The open source project etcd, a distributed key-value store for Kubernetes storage, helps fuel CoreOS Tectonic, which integrates Kubernetes. Rancher is frequently used with Kubernetes, as well as on its own, or with other software.

We've also seen containers appeal to a broad spectrum of stakeholders, including developers, IT operations teams and combined DevOps teams. In line with DevOps trend, which involves collaboration from both developers and IT operations teams, many of the organizations we recently surveyed said they gain speed and time benefits from containers throughout the application release process.

The rest of the respondents were fairly evenly split between gaining speed and time advantages from production deployment, developer onboarding and productivity, and deployment early in the application release process. This indicates continued growth and adoption of containers, which benefit an array of stakeholders at different points in the application-release process – including development and testing, IT operations, production deployments and anywhere in between. This may also contribute to a mixed-use container management and orchestration market.

ENTERPRISE SYSTEMS MANAGEMENT - ALWAYS A MIXED BAG

The use of a variety of software is consistent with what we've seen historically in enterprise systems management software. For example, when the open source systems management challengers (GroundWork, Hyperic and Zenoss) addressed the enterprise market 10 years ago, they had to integrate with all of the major enterprise suites, including BMC, CA, HP and IBM.

The current container management and orchestration space reminds us of the infrastructure automation and DevOps vendors such as Ansible, Chef, Puppet and SaltStack, which are open source and accustomed to seeing and supporting one another in enterprise environments, even after adoption.

Furthermore, given the number of teams and divisions across large enterprises, systems management has always been a mixed bag of software. With all those different teams and divisions, it's not surprising to see multiple container management and orchestration software options make their way inside organizations.

VENDOR LOCK-IN AND OPEN SOURCE IMPACT

Nearly all container management and orchestration software is open source or built on open source components, and the products are mostly meant to work with one another. The exception would be Kubernetes and Docker Swarm, which seem to be the most competitive of the bunch. In addition, open source software and avoiding vendor lock-in are key tenets of the Cloud Native Computing Foundation, which generally seems more interested in open source, community, flexibility and interoperability than in setting standards.

The open source community around Kubernetes is reminiscent of the open source Cloud Foundry PaaS software and project. Cloud Foundry is a widely used PaaS software, with commercial offerings from HPE, IBM and Pivotal, but it certainly isn't the only standard for enterprise PaaS. Cloud Foundry-based PaaS offerings have to compete with Red Hat OpenShift, Apprenda, Oracle and others. We would not be surprised to see a similar scenario emerge around Kubernetes, whereby it is broadly used in the industry, but not necessarily the standard.

Based on vendor backing, community and momentum, it appears Kubernetes is in the lead. But we would reiterate that the market continues to draw upon numerous software options, and we don't yet see Kubernetes as the main standard the way Docker was for containers.

This may also be a matter of different software components and frameworks. It could be more difficult for container management and orchestration software – which is often referred to as scheduling – to become a standard because its scope is broader.

This certainly holds true when compared to the Docker container format and engine, which is more accurately defined as a software component. Kubernetes and the other container management and orchestration software frameworks are more broadly intended to effectively manage cloud-native and distributed applications, thus making establishment of a standard less straightforward.