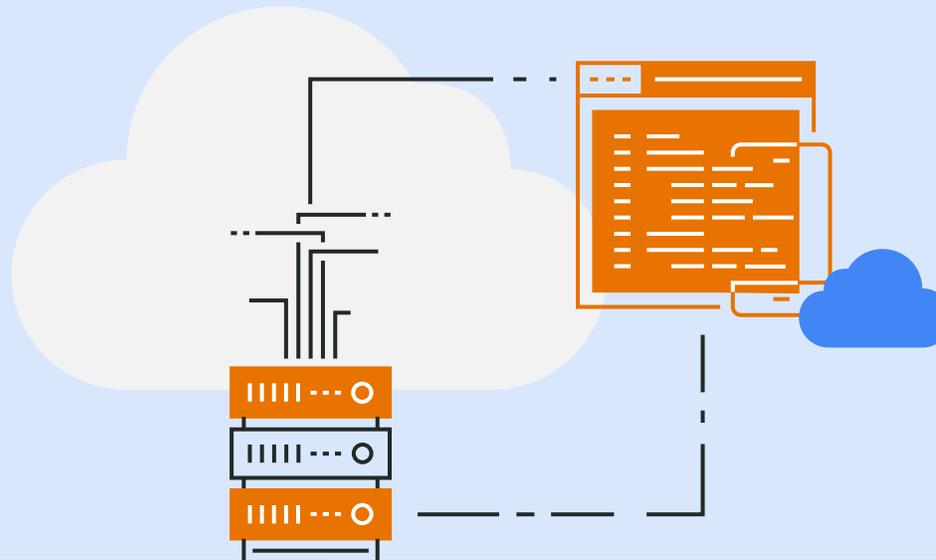


THE ENTERPRISE GUIDE TO HYBRID- CLOUD WITH ANTHOS



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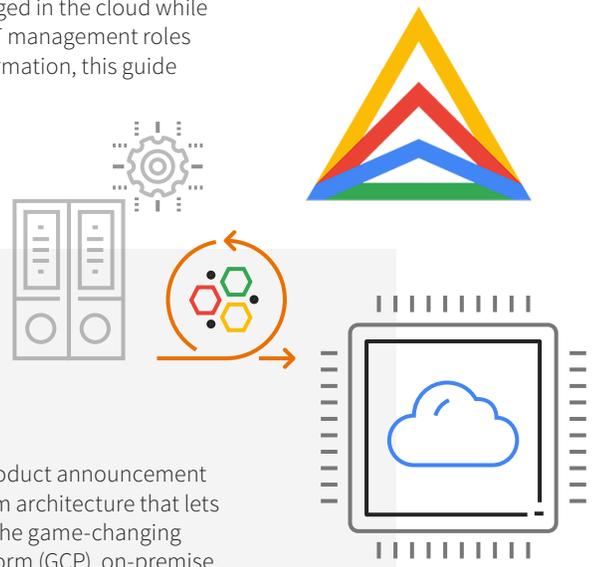


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The enterprise IT community has been talking about the shift away from on-premise environments for years, and now the days of single-vendor cloud architectures are numbered, as well. Gartner predicts¹ that by next year, fewer than 5% of enterprise workloads will operate in on-prem private clouds. Instead, public cloud spending continues to rise, with an anticipated jump of 17.5% between 2018 and 2019 alone. And when Gartner recently surveyed public cloud users, the firm found that more than 80% of respondents were leveraging two or more cloud providers.²

It's hard to argue with the benefits of the public cloud: scalability, flexibility, cost optimization, better security options, and more. To take it a step further, a hybrid approach allows enterprises to optimize their IT environments and take advantage of the best of both worlds, which is especially important for highly regulated industries, while multi-cloud computing has the added benefit of skirting vendor lock-in. To define what we're discussing here, a hybrid cloud environment uses a mixture of on-premise, private cloud, and public cloud to manage data and applications. A multi-cloud strategy, which falls under the hybrid cloud umbrella, simply involves leveraging more than one cloud provider.

The reality is that most of today's modern enterprises need a hybrid- or multi-cloud strategy to effectively manage their infrastructure. They typically have some applications built and managed in the cloud while other applications continue to run on-premise. For decision-makers in enterprise IT management roles weighing the options for hybrid and multi-cloud and looking toward digital transformation, this guide provides a comprehensive overview of what Anthos has to offer.



What is Anthos?

Anthos entered the hybrid-cloud scene in April 2019 as Google's game-changing product announcement during Google Cloud Next '19. Simply put, Anthos is a comprehensive cloud platform architecture that lets you build, deploy and manage hybrid applications across multiple environments. The game-changing platform enables enterprises to run containerized workloads in Google Cloud Platform (GCP), on-premise, or even in other cloud environments, such as Amazon Web Services (AWS) and Microsoft Azure. Anthos transforms your architectural approach, so you can focus on innovation and move faster than ever without compromising security or increasing complexity.

Anthos is a milestone product for a few reasons. It represents Google's first entry into the enterprise data center space. It also enables a seamless hybrid-cloud experience across environments, all managed from a single control panel, for the first time ever.

The Kubernetes-powered development, deployment, and IT-monitoring platform also greases users' multi-cloud wheels, allowing them to easily migrate applications between on-premise and cloud platforms via containerization. Before the launch of Anthos, building multi-cloud strategies required substantial custom development, while Anthos works "out-of-the-box" with very little configuration required. Also, in a bold move by Google, Anthos facilitates the continued use or even expansion of

¹ Laurence Goasduff, "Modernize IT Infrastructure in a Hybrid World," <https://www.gartner.com/smarterwithgartner/modernize-it-infrastructure-in-a-hybrid-world/>, (March 5, 2019).

² Laurence Goasduff, "Why Organizations Choose a Multicloud Strategy," <https://www.gartner.com/smarterwithgartner/why-organizations-choose-a-multicloud-strategy/>, (May 7, 2019).

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competing technologies, such as Azure or Amazon Web Services (AWS). Plus, Google is working with more than 35 software, hardware, and system integration partners (such as VMware) to ensure that the project is open and flexible.³

BENEFITS TO ENTERPRISES

- Simplified operations, with a single view and insights across all environments, both on-prem and in the cloud
- Enables you to spend less time managing your applications and get greater awareness, consistency, and control
- Modernizes applications that will increase business agility, gets products to market faster, and maximizes resource utilization
- Future-proofs technology investments by building on top of a platform that is already designed to run where you need it to (with consistent controls across environments)
- Supports migration of non-Kubernetes workloads into GKE via Velostrata
- No vendor lock-in - use one platform to migrate to any cloud provider
- Operational consistency, which helps to streamline security and monitoring efforts⁴

The Anthos Components

Below is a summary of each building block that helps to power Anthos:



Google Kubernetes Engine (GKE): at the heart of Anthos is this managed, production-ready environment for deploying containerized applications in Google's infrastructure



GKE On-Prem: a solution that enables companies to use Kubernetes and cloud technology within their own on-premise data centers, managed through Google Cloud Console



Anthos Config Management: a solution that enables companies to create a common configuration for all administrative policies (including deployment artifacts, configuration settings, network policies, secrets and passwords) across hybrid Kubernetes deployments

³ Arun Ananthampalayam and Tariq Islam, "5 frequently asked questions about Google Cloud Anthos," <https://cloud.google.com/blog/topics/hybrid-cloud/5-frequently-asked-questions-about-google-cloud-anthos>, (June 20, 2019).

⁴ Scott Carey, "Everything you need to know about Google Cloud Anthos," <https://www.computerworld.com/article/3428034/everything-you-need-to-know-about-google-cloud-anthos.html>, (April 10, 2019).

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GCP Marketplace: applications with prebuilt deployment templates that can run on Kubernetes and take advantage of all the features of Anthos



Anthos Service Mesh: the Istio-based service mesh used to discover, connect, monitor and secure microservices



Migrate for Anthos: the industry's first VM-to-Kubernetes (V2K) migration tool, derived from Google's 2018 acquisition of Velostrata, enabling one-step migration from on-premise VMware to GKE



Stackdriver: centralized monitoring, logging, tracing, and observability for services and containers



GCP Cloud Interconnect: delivers high-speed low-latency connectivity between the enterprise data center and Google Cloud

All of these components come together to create a solution for infrastructure modernization. For enterprises that currently run their operations on-premise but would like to move to the cloud over time, Anthos helps them migrate their workloads in a safe and controlled manner. For companies that already have applications running both on-premise and in the cloud, Anthos provides a way to centralize management. In both cases, Anthos makes it easier for developers to build and manage applications without needing to maintain multiple, separate environments.

Also included in the solution is Migrate for Anthos, which helps companies take their physical servers or VMs on-premise and convert them to containers that can be incorporated into an Anthos-managed cluster. Creating clusters in GKE is central to using Anthos, so Migrate for Anthos moves existing systems into containers to ease the migration process.

During Google Cloud Next 2019, Google also announced the beta launch of Cloud Run, a serverless managed compute platform that manages and automatically scales stateless containers in deployment. The new platform blends the simplicity and speed of serverless with the flexibility of containers, allowing developers to build applications with flexibility and ease. Cloud Run is built on the open source KNative project, so your workloads are also portable across both Anthos and non-Anthos platforms. Knative provides the flexibility to move workloads across environments and run containers with Cloud Run or GKE.⁵

Cloud Run comes in two product flavors: fully managed Cloud Run, and Cloud Run for Anthos. The Anthos variant allows access to advanced networking features in GCP and to Anthos Service Mesh. Cloud Run is not restricted to particular language, operating system or binaries: you can even bring your own binaries to Cloud Run and benefit from the automated provisioning and scaling of infrastructure to support your

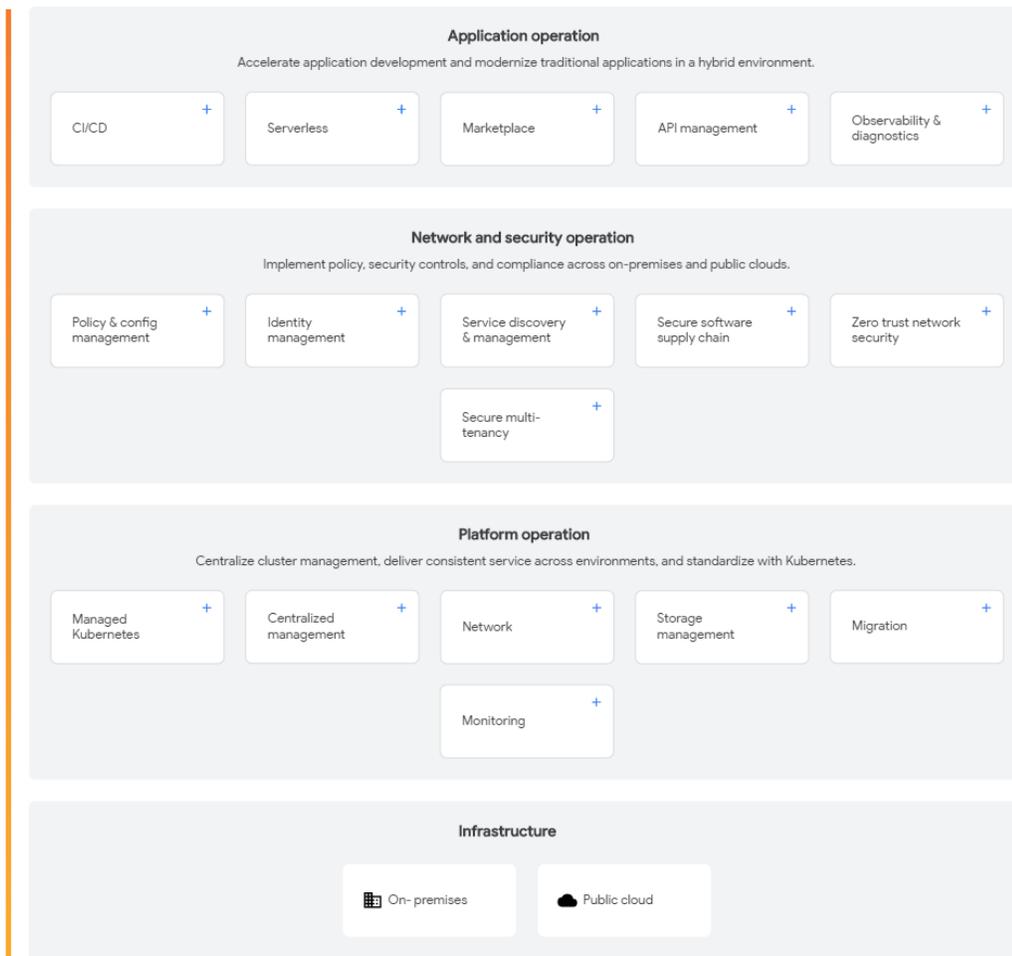
⁵ Emil Protalinski, "Google announces Cloud Run for open and portable serverless compute," <https://venturebeat.com/2019/04/09/google-announces-cloud-run-for-open-and-portable-serverless-compute/>, (April 9, 2019).

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business applications. This allows you to focus on business needs while leaving the automation to Google. The developer environment can take many forms: any workload that can be containerized (using Anthos Migrate or otherwise) can run in Anthos. But for an Anthos-native development environment which makes best use of stateless containers in a scalable environment, Google recommends Cloud Run.

We should point out that Anthos is only one of several options for enterprise hybrid and multi-cloud management. Microsoft, Amazon, and VMware all offer their own solutions. One key differentiator with Anthos, though, is that the solution is entirely software-based, so there's no explicit tie to hardware involved. Also, all of the Anthos building blocks are derived from open source software that's either well-established industry code or Google-invented. At Maven Wave, we consult with our clients at length in any given situation before recommending the best solution for their specific requirements.

Anthos Platform



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The DevOps View

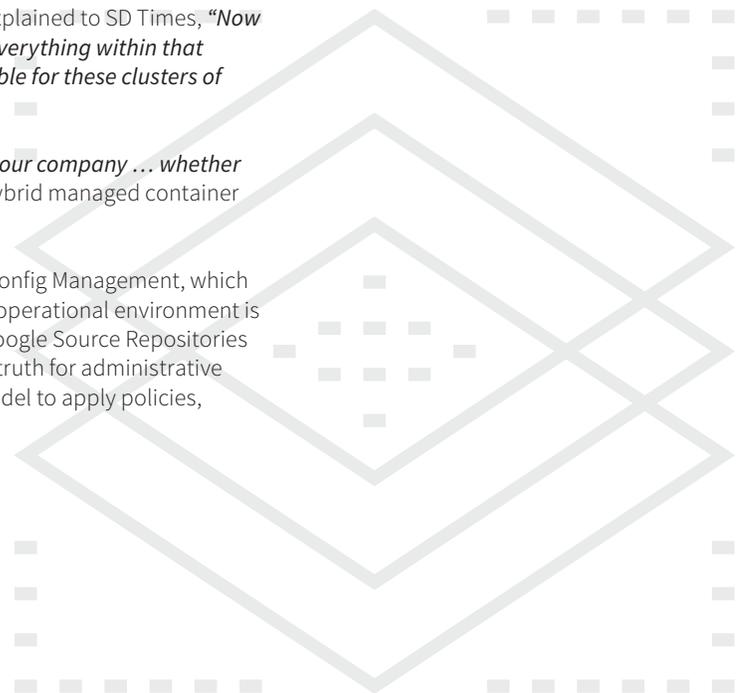
So far we have talked mostly about the migration and deployment phases of Anthos. But the Anthos vision is most complete when the entire DevOps chain is included in the plan; in fact, one of its main differentiators is the ability to manage the whole DevOps lifecycle for teams that prefer to be less hands-on. This means going all the way back to code repositories. Let's take a closer look at how Anthos addresses DevOps issues for both developers and IT managers.

For development teams that are siloed and working on small containers projects throughout the development tool chain, having access to a single platform that's standards-based, open source and multi-cloud compatible is a monumental win. For years, the message to developers has been to avoid containerizing monolithic legacy IT environments and moving them to the cloud, but if you're migrating all of an enterprise's workloads to the cloud, this is nearly impossible. While some forward-thinking companies have avoided brownfield mistakes, most enterprises are looking to modernize massive stacks in pieces, over time. Anthos is the umbrella and the bridge that allows for these colossal, slow but steady IT migrations. And unlike other hybrid cloud platforms on the market, Anthos is "developer-first" instead of being "infrastructure-first," and focuses on helping developers become more productive.⁶ The deployment, management, and monitoring of Anthos workloads is the responsibility of the Operations side of DevOps. Google Cloud's new platform simplifies IT management, as well, allowing teams to modernize infrastructure and spend more time on optimizing operations.

As Google Cloud explains in a [recent blog](#), Anthos speeds up application modernization with Cloud Run and automation. *"With Anthos, you can take existing applications and deploy them anywhere - without changing a single line of code. From there, Anthos lets you define custom workflows for building, testing, and deploying across those multiple environments,"* the blog states.⁷ Anthos also helps enterprises prep for a DevOps model, by automating infrastructure and modernizing procedures so teams can become hyper productive. As Adam Seligman, Google's VP of Developer Relations, explained to SD Times, *"Now [app dev teams] have this really awesome container infrastructure, where everything within that container world is managed by the cloud provider... [They are] not responsible for these clusters of containers, they're responsible for their app, and delivering a service."*

"Managed containers is the new water line for application development in your company ... whether it's cloud or on-premises," he added. Now, DevOps teams have a modern, hybrid managed container platform to bring them to the next stage in their cloud journey.⁸

Moving on to the Ops of DevOps, the operational heart of Anthos is Anthos Config Management, which enables centralized control and enforcement of policies that can ensure an operational environment is set up securely and stays that way. Configuration definitions are stored in Google Source Repositories (or optionally in another Git-compatible store), so there is a single source of truth for administrative and security policies ("Policy-as-Code"). Furthermore, with a declarative model to apply policies, configurations can be continuously monitored to enforce compliance.



⁶ Mary Branscombe, "Anthos: Kubernetes Infrastructure to Make Developers More Productive," <https://thenewstack.io/anthos-kubernetes-infrastructure-to-make-developers-more-productive/>, (April 11, 2019).

⁷ Arun Ananthampalayam and Tariq Islam, "5 frequently asked questions about Google Cloud Anthos," <https://cloud.google.com/blog/topics/hybrid-cloud/5-frequently-asked-questions-about-google-cloud-anthos>, (June 20, 2019).

⁸ Jeffrey Schwartz, "Google developer relations lead discusses GCP, Anthos, Cloud Run," <https://sdtimes.com/devops/google-developer-relations-lead-discusses-gcp-anthos-cloud-run/>, (May 1, 2019).

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Status of Anthos Today

Since the big Anthos announcement in April 2019, Google Cloud has been steadily rolling out updates, including a follow-on announcement of serverless compute and microservice management in September⁹. Enterprises can get started today to get “Anthos-ready.”

Customers can begin planning to migrate their workloads into an Anthos-enabled hybrid-cloud today. For example, Migrate for Anthos can be used today to convert en masse from VMs on-premise to containers ready to put into the Kubernetes environment.

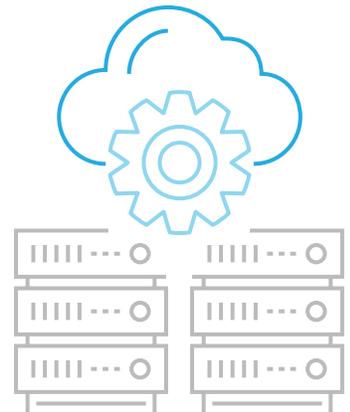
The following components are GA (generally available) as of November 2019:

- Migrate for Anthos
- Google Kubernetes Engine (GKE)
- GKE On-Prem
- Cloud Run
- Cloud Run for Anthos

The following are still in development, currently being tested by alpha and beta customers:

- Anthos Connect
- Anthos Config Management
- Anthos Service Mesh
- GKE in other clouds

Even though some of the Anthos components are yet to be released for production use, the approach outlined in this paper for getting started with Anthos can still be followed. Migrating, Containerizing and Automating today will put you in a strong position to deploy and manage an Anthos hybrid cloud in production with confidence.



How Can Maven Wave Help?

For clients who want to tackle hybrid- or multi-cloud the Anthos way, Maven Wave is the clear choice of partner, given our expertise and reputation as a longtime Google Cloud Premier Partner. [We hold eight total Google Cloud Partner Specializations](#), including Cloud Migration, Application Development and Infrastructure. We've been [named Google Cloud North America Services Partner of the Year](#) for the past two years.

MAVEN WAVE CAN HELP YOU TAKE ADVANTAGE OF THE BENEFITS OF ANTHOS IN SEVERAL WAYS:

- We help clients plan where and how to take advantage of hybrid-cloud and multi-cloud environments.
- We work with you to develop an infrastructure that allows you to securely deploy Anthos and connect various data sources to your applications running on Kubernetes.
- We can migrate your applications to containers that allow them to work in this new environment.

⁹ Larry Dignan, “Google Cloud adds microservices management, serverless to its Anthos platform,” <https://www.zdnet.com/article/google-cloud-adds-microservices-management-serverless-to-its-anthos-platform/>, (September 16, 2019).

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WE OFFER SEVERAL SERVICE ENGAGEMENTS FOCUSED ON ANTHOS,
INCLUDING:



Anthos Introductory Workshop (4-8 hours)

- An introduction to Anthos technologies, an exploration of how Anthos can work in your environment, and identification of an application use case for Anthos evaluation



Anthos Readiness Assessment (10-20 days)

- A more detailed consultative approach to preparing for hybrid cloud
- Business and technical stakeholders are consulted
- Output is a detailed plan for implementing a full Anthos stack and migrating workloads



Anthos Foundations Engagement (6-8 weeks)

- Comprehensive service to set up a secure, scalable GCP environment for Anthos, including Infrastructure-as-Code automation



Anthos Migration Services (2-12 months)

- Execution of the migration plan
- Phased approach to minimize disruption
- Includes project management

Just as Anthos leads you from development to deployment, so, too, does Maven Wave. We deliver expertise from application development to infrastructure deployment to support Google's most exciting new product of 2019.

Interested in learning more about how Anthos can boost
your hybrid- or multi-cloud strategy?

Reach out to the Maven Wave team.



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