



Cisco CloudCenter Solution: Gain the Hybrid IT Advantage

Executive summary

A successful hybrid IT strategy requires delivery of a flexible mix of IT service options across data center, private cloud, and public cloud environments. To meet the needs of the business, IT needs tools and operating processes that increase speed and agility and allow workloads to be managed in the optimal environment. But IT also needs to reduce complexity and manage strategic, financial, operational, and security risks that result from managing multiple applications across multiple environments for multiple users.

Cisco CloudCenter™ is an application-centric hybrid cloud management platform that securely provisions infrastructure resources and deploys applications across more than 19 data center, private cloud, and public cloud environments.

Cisco CloudCenter improves IT speed and agility, optimizing work for users, who can quickly and easily model, deploy, and manage applications on any environment. And Cisco CloudCenter delivers IT control for administrators, who gain visibility and governance across boundaries of applications, clouds, and users.

Cisco CloudCenter provides a single-platform solution with unique hybrid cloud technology that abstracts the application from the underlying cloud environment and helps ensure that the infrastructure adapts to meet the deployment and management needs of each application.

With Cisco CloudCenter, IT organizations can start with one application in one cloud or manage multiple applications across multiple environments. It works with a simple virtual machine or with complex, multitier application stacks. With an application-centric management platform, enterprise IT organizations can pursue a range of powerful use cases such as on-demand hybrid IT as a service (ITaaS), automated DevOps and continuous delivery, capacity augmentation including bursting and high availability and disaster recovery, and permanent application migration.

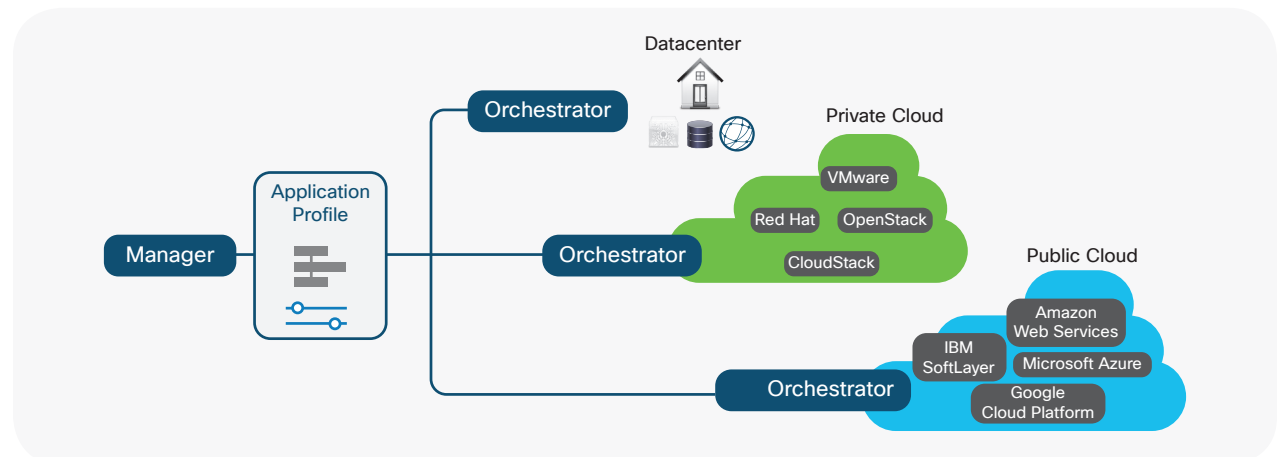
Unique hybrid cloud management solution

The power of the Cisco CloudCenter solution comes from its unique, patented technology. The solution combines a cloud-independent application profile, which defines deployment and management requirements for the application stack, with a cloud-specific orchestrator, which abstracts the unique aspects of the environment and provisions infrastructure and deploys and configures application components in a way that is optimized for that environment's infrastructure and cloud services.

- Cisco CloudCenter Manager is a centralized management portal that allows users to quickly and easily model, deploy, and manage applications. It also gives administrators enterprise-class visibility and governance control of applications, clouds, and users.
- The Cisco CloudCenter application profile is a user-created model of an application's deployment and management requirements in a portable and cloud-independent format. Each application profile is easily created with a simple, visual, drag-and-drop topology modeler using a library of ready-to-use or customized services, images, and containers.
- Cisco CloudCenter Orchestrator is a cloud-specific multitenant orchestration tier that is transparent to users and is installed in each data center private cloud or public cloud environment. It interprets the needs of the application; provisions infrastructure resources; deploys the application components and, optionally, data; manages the deployment, including run-time policies; and aggregates use and cost information.

As shown in Figure 1, Cisco CloudCenter users can create and deploy an application profile to the target cloud environment. The cloud-specific multitenant orchestrator natively deploys the application profile in a way that optimizes security, increases application performance, and maintains application portability.

Figure 1. Cisco CloudCenter components



Unlike other infrastructure-focused cloud management solutions, Cisco CloudCenter is cloud independent. You don't need to provide cloud-specific scripts, write orchestration workflows, or modify application code. There is no cloud lock-in. And with a single platform, your IT organization doesn't need to invest in multiple cloud-specific management stacks and teams.

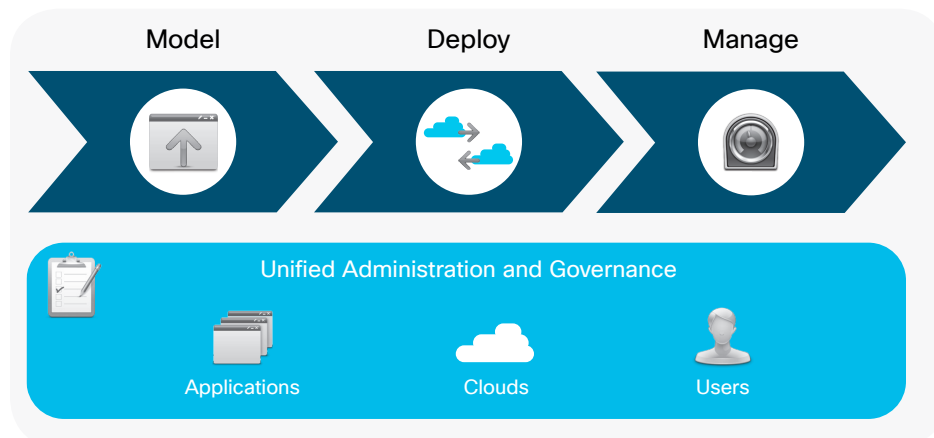
Cisco CloudCenter can be delivered either as a Software-as-a-Service (SaaS) solution or as a traditional on-premises packaged application. Deployment of both Cisco CloudCenter Manager and Cisco CloudCenter Orchestrator is simple and straightforward and does not require a long professional services engagement.

Full lifecycle management

Cisco CloudCenter delivers a full lifecycle approach to application deployment and management on any cloud. The solution is carefully designed to optimize work streams and provide users with the power of self-service on-demand deployment while reducing the need to understand the nuances of the underlying cloud environment.

As shown in Figure 2, the approach includes three phases that empower users to quickly and easily model, deploy, and manage application stacks on demand. The solution also gives administrators enterprise-class visibility and governance control across boundaries of applications, clouds, and users.

Figure 2. Cisco CloudCenter full lifecycle management



Model

In the model phase, users model a cloud-independent application profile. The application profile guides native application deployment to any of more than 19 data center, private cloud, and public cloud environments. One profile can be used in any environment without the need to modify deployment scripts or change application code.

The application profile defines the deployment and management requirements for the application in five main areas:

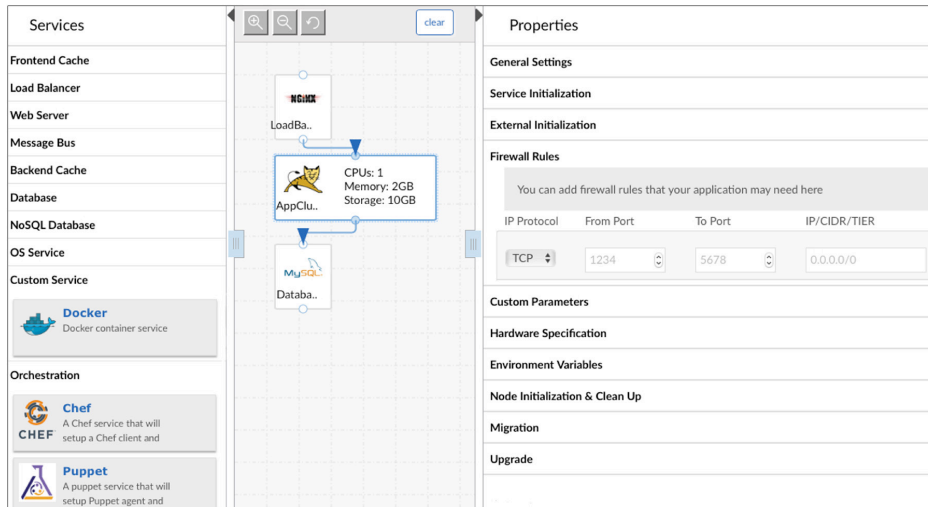
- Application topology and dependencies
- Infrastructure resource and cloud service requirements
- Description of deployment artifacts: packages, binaries, scripts, and optional data
- Orchestration procedures needed to deploy, configure, and secure services
- Run-time policies that guide ongoing management

Cisco CloudCenter provides more than 12 of ready-to-use, reusable templates to accommodate multiple starting points. The specific topology guides orchestration and eliminates the need to manually write orchestration workflows.

Templates support common application types, including batch, parallel processing, endpoint services, and clusters, as well as single-virtual machine, multitier, and loosely coupled containerized topologies. Cisco CloudCenter supports all popular application technologies, including Java, .NET, LAMP, Ruby on Rails, and Hadoop.

To model an application profile, simply drag and drop service images from the preinstalled service library into the topology modeler (Figure 3). The service library includes most popular operating systems, databases, middleware, load balancers, message busses, application servers, and front-end caches, which can easily be customized or extended.

Figure 3. Modeling an application profile



Each application profile references required deployment artifacts in one or more artifact repositories. Artifacts include the images, binaries, files, scripts, and (optionally) application data needed for deployment. Artifact repositories are used by the Cisco CloudCenter Orchestrator for initial deployment and for any subsequent migration across deployment environments. Cisco CloudCenter supports a wide range of HTTP- and HTTPS-based repository solutions.

Cisco CloudCenter supports the use of containers as part of an all-container or composite container topology, which can include containerized and noncontainerized components side by side. Cisco CloudCenter also works with leading configuration management tools such as Chef and Puppet to deploy specific tiers, and it can use existing investments in recipes and manifests.

Users can save and then share application profiles with other users. Users can also publish profiles to public and private Cisco CloudCenter marketplaces or to third-party service catalogs for broad availability. Access to profiles is based on user credentials, tenancy, and governance rules related to such factors as intended use, geography, security level, and compliance requirements.

Deploy

In the deploy phase, users deploy the application profile to the target deployment environment of their choice (Figure 4). Each deployment environment provides shared access to one or more cloud zones that have been allocated for specific purposes and are controlled by a specific account and financial plan.

Figure 4. Sample deployment environments

Deployment Environments	
Name	Description
Dev	Any dev. No approval required.
Test	An environment for test workloads, requires approval.
Staging	Pre-production testing. Approval required.
Production Phoenix	HIPPA compliant. Approval Required.
Production AWS	Not PCI or HIPPA
You have 5 Deployment Environments. Add Another?	

You can associate different deployment environments with different clouds based on intended use as determined by your organization's governance policies. For example, for a specific project, you can deploy an application profile to a deployment environment linked to a cloud service account with a fixed budget plan. Using the same application profile, you can deploy to a production environment with a different service account and billing plan.

Cisco CloudCenter provides preinstalled support for more than 19 environments, including:

- Data center: Management solutions include Cisco UCS® Director, Cisco® Application Centric Infrastructure (Cisco ACI™), VMware vCenter, and other software-defined infrastructure management solutions.

- Private cloud: A wide range of OpenStack implementations, as well as CloudStack, VMware vCloud Director, Microsoft Azure Pack, and Bracket Computing Cells are supported.
- Public cloud: Supported services include Amazon Web Services (AWS) and AWS GovCloud, Microsoft Azure and Azure Government cloud, Google computing platform, Dimension Data platform, IBM SoftLayer, Rackspace platform, and VMware vCloud Air, among others.

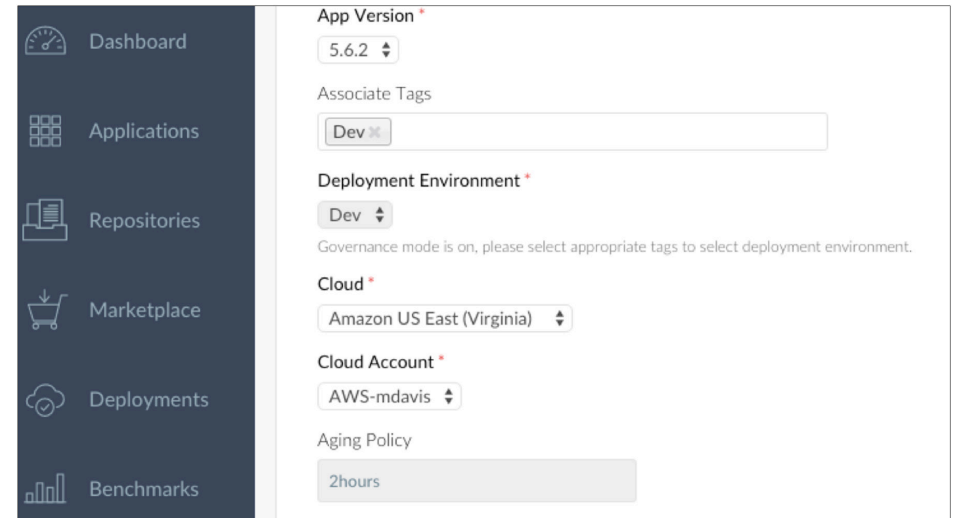
Before you deploy an application profile, you can benchmark it to determine the optimum execution venue. The benchmark demonstrates the power and flexibility of the Cisco CloudCenter platform by natively deploying the application profile in multiple cloud environments simultaneously and then monitoring performance before returning price-to-performance data in a benchmark report. Each report presents comparative results in easy-to-understand graphical form.

A Cisco CloudCenter benchmark is not a simulation or estimate based on cloud service provider rate cards. It is an actual native deployment of the application, with performance monitored in each cloud environment.

You can also benchmark an application using multiple combinations of instance sizes in a single cloud. After testing multiple variations in a single cloud, you can select the combination that optimizes price and performance for you, delivering significant savings on your monthly cloud bill.

After you have selected the target cloud, you can deploy the application profile (Figure 5). This fully automated deployment process replaces time-consuming and error-prone manual work. Users can associate tags with each deployment to simplify placement, deployment, and run-time decisions, or they can manually select the deployment environment and the related security profile or aging policy.

Figure 5. Deploying an application profile



The screenshot displays the Cisco CloudCenter interface for configuring an application profile. On the left is a dark sidebar with navigation icons and labels: Dashboard, Applications, Repositories, Marketplace, Deployments, and Benchmarks. The main content area is light gray and contains several configuration sections:

- App Version ***: A dropdown menu showing '5.6.2'.
- Associate Tags**: A text input field containing 'Dev'.
- Deployment Environment ***: A dropdown menu showing 'Dev'. Below it, a note reads: 'Governance mode is on, please select appropriate tags to select deployment environment.'
- Cloud ***: A dropdown menu showing 'Amazon US East (Virginia)'.
- Cloud Account ***: A dropdown menu showing 'AWS-mdavis'.
- Aging Policy**: A text input field containing '2hours'.

Cisco CloudCenter Manager passes the application profile to the Cisco CloudCenter Orchestrator that is running in the target cloud. The orchestrator then:

- Interprets the infrastructure needs of the application and provisions and configures cloud infrastructure and services (computing, storage, and networking) to meet the needs of the application
- Launches virtual machines and mounts storage for each
- Installs the Cisco CloudCenter agent in each virtual machine
- Links to the appropriate artifact repository to access applicationspecific packages, data, and scripts, and (optionally) data
- Deploys each application component (different tiers in a multitier application) and orchestrates application services in the proper order as specified by the application profile topology
- Applies appropriate security policies to configure port settings and firewall rules at the application level and individual tier level

- Monitors a range of performance metrics and triggers automated run-time policies to enable scaling in place, provide hybrid cloud bursting or high availability and disaster recovery, or stop the deployment

Each application profile has a unique identifier and can be easily called by DevOps tools using a representational state transfer (REST) API. For example, the Jenkins plug-in integrates Cisco CloudCenter with an automated build process in which Jenkins creates a build and then calls Cisco CloudCenter to deploy a fully configured application stack and install the latest build. Cisco CloudCenter plays a foundational role in an integrated tool chain by automating the deployment of builds and environments at multiple steps in a continuous delivery flow, which may use different data center and cloud environments.

Manage

After applications are deployed, users can monitor the applications and use a range of lifecycle management actions or specify automated responses using preconfigured policies. Unlike many cloud management platforms, which focus on managing infrastructure, Cisco CloudCenter application-defined management integrates the management of the application with the management of the underlying cloud resources.

The Cisco CloudCenter agent in each deployed virtual machine monitors and meters application tiers and offers a wide range of management options. An agentless option is available for scenarios in which dynamic bootstrapping is not desirable or in which Java cannot be installed in the virtual machine image. This option provides a subset of management functions offered by the Cisco CloudCenter agent.

You can monitor applications by using key metrics such as CPU utilization, memory utilization, network throughput, and disk use. You also can define notifications that alert users or operations staff when certain thresholds are exceeded, which provides early warning of potential problems.

User run-time lifecycle actions include the following:

- Start, stop, or remove the application and related components.
- Promote the application to another lifecycle phase or group, such as from development to test to production.

- Migrate the application to a different data center, private cloud, or public cloud environment.
- Upgrade or patch a specific tier or component within a tier.

The application profile also defines run-time policies that monitor resources and trigger automated response such as:

- Horizontal scaling policies: Guide deployment and removal of additional application instances in the same cloud environment based on a performance trigger, up to preset cluster limits.
- Bursting policies: Guide deployment of additional application instances in a different cloud environment based on predefined triggers.
- High-availability and disaster-recovery policies: Guide application and data failover to a different cloud environment in the event of a catastrophic infrastructure failure.
- Aging policies: Specify lease duration and guide end-of-life actions with optional prenotification and approval by the application owner.

Unified administration and governance

Cisco CloudCenter provides a single management platform with powerful administration and governance capabilities for data center, private cloud, and public cloud environments.

Administrators gain single-pane visibility and control that spans all boundaries for applications, clouds, and users. Administrators can manage cloud accounts and permissions, set financial and use plans, and report on use and costs.

They can also manage tenants and users through federated multitenant management capabilities and Role-Based Access Control (RBAC).

With Cisco CloudCenter, administrators gain a powerful set of capabilities for managing:

- Cloud accounts: Manage cloud regions, usable OS images and services, and custom pricing. Also create use-specific deployment environments.

Conclusion

Cloud computing's extraordinary advantages include fast resource provisioning, optimized resource use, and ready scalability. These advantages present IT with an excellent opportunity to use a hybrid IT strategy to bring business innovation and agility to the organization. But managing multiple applications across multiple clouds with multiple users introduces complexity and risk that can jeopardize a hybrid cloud.

Cisco CloudCenter facilitates the migration of applications to the cloud and simplifies management of their full lifecycles. Cisco CloudCenter provides a single solution that provides visibility and control across data center, private cloud, and public cloud environments.

Cisco CloudCenter's application-defined technology offers an exceptional solution that gives enterprise IT organizations a way to start simple and grow as their use of the cloud evolves.

- Tenant, groups, and users: Grant access rights to tenants, subtenants, groups, and users and accelerate user activation with activation profiles. Grant access rights and use plans based on the role or specific resource.
- Financial controls: Limit spending with various fixed and variable use plans and bundles as needed for different groups and users.
- Usage reporting: Aggregate precise use, activity, and cost reports, including chargeback and user invoicing if appropriate.
- Tag-based governance rules: Simplify and automate user placement, deployment, and run-time decisions.

Detailed and precise RBAC separates features and processes, allowing Cisco CloudCenter users to model, migrate, and manage applications, while giving the administrator visibility and control across application, cloud, and user boundaries.