CloudCenter™ Full Lifecycle Management

An application-centric approach to deploying and managing applications
in any datacenter or cloud environment

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1   Executive Summary

A successful IT strategy requires using a flexible mix of IT service delivery options across datacenter, private cloud, and public cloud environments. To meet the needs of the business, IT needs tools and operating processes that increase speed and agility. But also needs to reduce complexity, and manage strategic, financial, operational, and security risks that results from managing multiple applications across multiple clouds for multiple users.

CliQr CloudCenter is an application-centric management platform that securely provisions infrastructure resources and deploys application components and data across more than 19 datacenter, private cloud, and public cloud environments. CloudCenter improves IT speed and agility while also reducing complexity by separating and optimizing work for users who can quickly and easily model, deploy, and manage applications on any environment, from administrators who get visibility and governance control across boundaries of applications, clouds, and users.

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

With CloudCenter, Enterprise IT organizations can migrate and manage applications starting with a single application on a single cloud, or many applications on multiple clouds. Or, can can automate DevOps and continuous delivery, utilize dynamic capacity augmentation, or use it as an IT as a Service platform.

2   The Application-Centric Advantage

The power of CloudCenter comes from its unique and patented application-centric technology. The solution combines a cloud-agnostic application profile, which defines deployment and management requirements for the application stack, with a cloud-specific orchestrator, which deploys both the infrastructure and the application using the best practices for each environment.

- **CloudCenter Manager** is a centralized management portal that allows users to quickly and easily model, deploy, and manage applications, and gives administrators enterprise-class visibility and governance control of applications, clouds, and users.

- **CloudCenter Application Profile** is a user created model of an application's deployment and management requirements in a portable format. Each application profile is easily created with a simple, visual, drag and drop topology modeler using library of out-of-box or customized services, images, and containers.

- **CloudCenter Orchestrator** is a cloud-specific, multitenant orchestration tier that is transparent to users and is installed in each datacenter private cloud or public cloud environment. It securely deploys both the infrastructure and the application, manages the deployment including run-time policies, and aggregates usage and cost information.

As seen in Figure 1, 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, maximizes application performance, and maintains application portability.

Figure 1. CloudCenter components
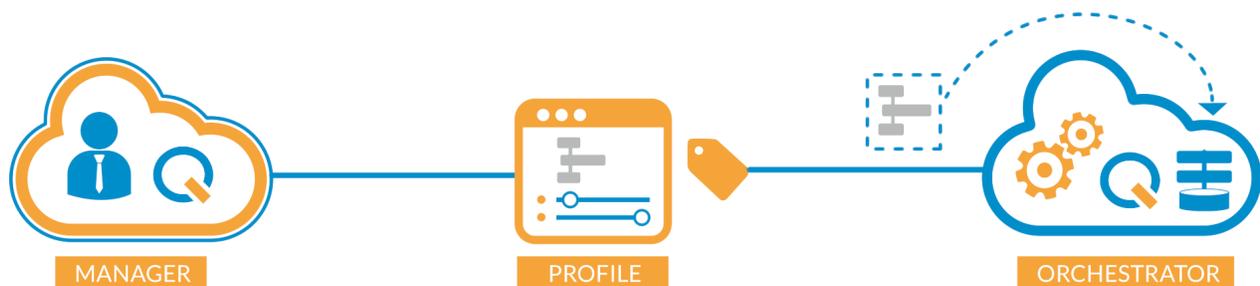
Unlike cloud management solutions that aren't application defined, with CliQr CloudCenter there is no cloud-specific scripting, no writing orchestration workflows, and no modifying application code. There is no cloud lock-in. And with a single platform, IT doesn't need to invest in multiple cloud-specific management stacks and teams.

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

3   Full Lifecycle Management

CloudCenter delivers a full lifecycle approach to deploying and managing applications on any cloud. CloudCenter is carefully designed to optimize work streams and provide users with the power of self-service on demand deployment while minimizing the need to understand nuances of underlying cloud environment.

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

Figure 2. CloudCenter full lifecycle management
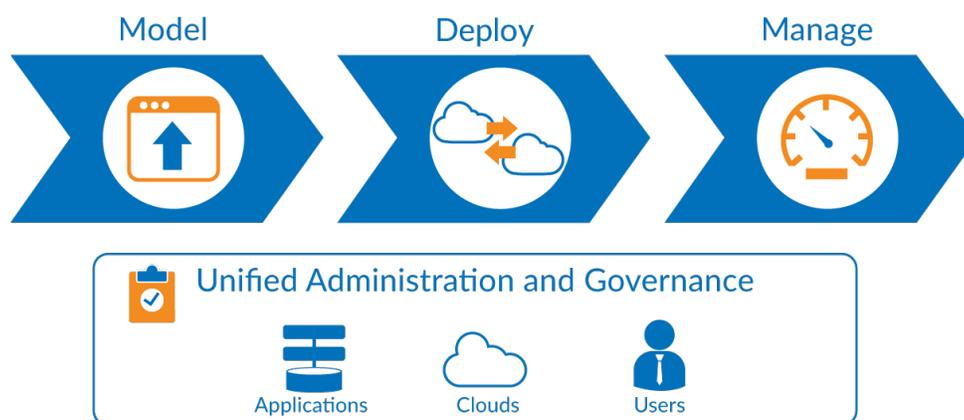
3.1   Model

In this phase, users model a cloud-agnostic application profile. The application profile guides native application deployment to any of more than 19 datacenter, private cloud, and public cloud environments. One profile can be used in any environment without modifying deployment scripts or changing application code.

The application profile defines the deployment and management requirements for the

application in five key 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.

- Run-time policies that guide ongoing management.

CloudCenter provides more than 10 of out-of-box, reusable templates to accommodate multiple starting points. The topology specifies the order of deployment orchestration and eliminates the need to write workflows.

Templates support common application types, including batch, parallel processing, end-point services, and cluster, as well as single virtual machine (VM), multi-tier, or loosely coupled containerized topologies. 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 out-of-box service library into the topology modeler as shown in Figure 3. The service library includes most popular operating systems, databases, middleware, load balancers, message busses, application servers, and front-end caches, that can be easily customized or extended.

Figure 3. Model an application profile
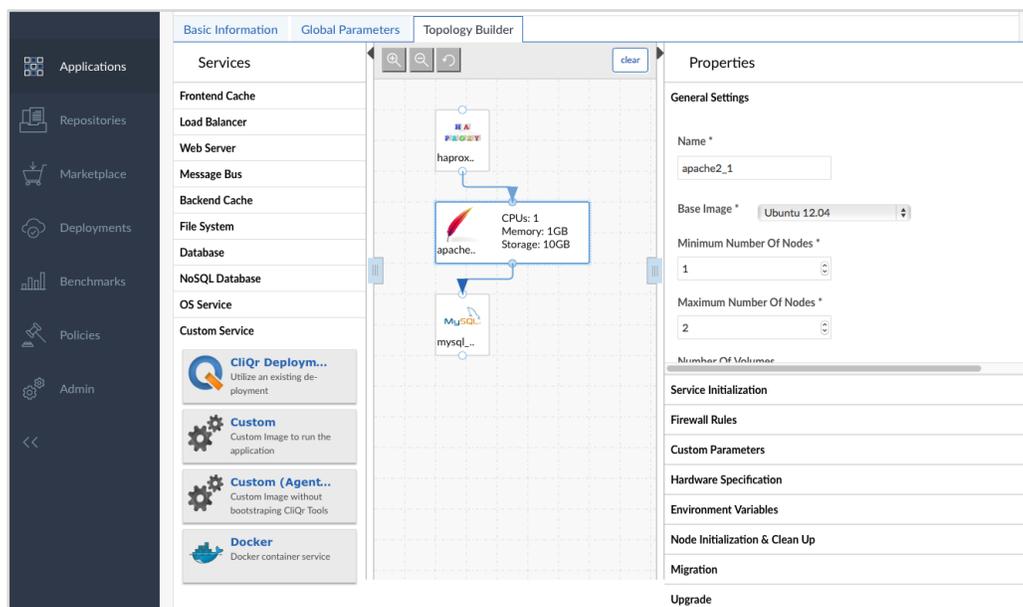
Each application profile references required deployment artifacts in one or more artifact

repositories. Artifacts include images, binaries, files, scripts, and optionally application data that are needed for deployment. Artifact repositories are used by the CloudCenter Orchestrator for initial deployment and for any subsequent migration across deployment environments. CloudCenter supports a wide range of http and https-based repository solutions.

You can easily customize the library of service images by adding OS images or importing applications from other widely used formats such as AWS CloudFormation, OpenStack Heat templates, and TOSCA. You also can import application metadata from discovery engines and configuration management databases (CMDBs) and you can use patent-pending CloudCenter image transformation technology to transform an existing cloud application image intended for one cloud to the proper format for a different cloud. For example, you can transform an Amazon Web Services AMI image to one that runs on vSphere or vCloud Director.

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

3.2   Deploy

In this phase, users deploy the application profile to the target deployment environment of their choice. (See 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. Example 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.

CloudCenter provides out-of-box support for more than 19 environments, including:

- **Datacenter** – Management solutions include Cisco UCS Director, Cisco ACI, VMware vCenter, and other software-defined infrastructure management solutions.
- **Private Cloud** – A wide range of OpenStack implementations, as well as CloudStack and VMware vCloud Director.
- **Public Cloud** – Amazon Web Services, Microsoft Azure, Google Compute Platform, Dimension Data, HP Cloud, IBM SoftLayer, Rackspace, 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 an application-centric management platform by natively deploying the application profile in multiple cloud environments simultaneously, and then monitoring performance before returning price/performance data in a benchmark report. You can also benchmark an application profile in a single cloud across multiple instance sizes in order to find the most cost effective configuration. Each report presents comparative results in easy-to- understand graphical form.

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

After you have selected the target cloud, you can deploy the application profile. (See 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 manually select deployment environment and related security profile or aging policy.

Figure 5. Deploying an application profile

CloudCenter Manager passes the Application Profile to the CloudCenter Orchestrator that is running on the target cloud. The Orchestrator then:

- Provisions and configures cloud infrastructure and services (compute, storage, networking) as defined by the application profile.

- Launches VMs and mounts storage to each.

- Installs the CloudCenter agent in each VM.

- Links to the appropriate artifact repository to access application-specific 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 for scaling in place, hybrid cloud bursting or HA/DR, or to stop the deployment.

Each application profile has a unique identifier and can be easily called by DevOps tools via a RESTful API. For example, the Jenkins plugin integrates CloudCenter with an automated build process in which Jenkins creates a build, and then calls CloudCenter to deploy a fully configured application stack and install the latest build. 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 that may use different datacenter and cloud environments.

3.3   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 that are focused on managing infrastructure, CloudCenter application-centric management integrates the management of the application with management of the underlying cloud resources.

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

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

User run-time lifecycle actions include:

- **Start, stop, or remove** application and related components.
- **Promote** application to another lifecycle phase or group, such as from development to test to production.
- **Migrate** application to a different datacenter, 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/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 pre-notification and approval by the application owner.

4   Unified Administration and Governance

CloudCenter uncomplicates the cloud by providing a single management platform with powerful administration and governance capabilities for datacenter, private cloud, and public cloud environments.

Administrators gain single-pane-of-glass visibility and control that spans all boundaries for applications, clouds, and users. Administrators can manage cloud accounts and permissions, set financial plans, and report on usage and costs. They can also manage tenants and users through federated multitenant management capabilities and role-based access control.

With CloudCenter, admins gain a powerful set of capabilities used to manage:

- **Cloud accounts** – including cloud regions, usable OS images and services, as well as custom pricing. Also create use specific deployment environments.
- **Tenant, groups and users** – granting access rights to tenants, sub-tenants, groups, users, as well as accelerated user activation via activation profiles. Grant access rights and usage plans based on role or specific resource.
- **Financial Controls** – limiting spending with various fixed and variable usage plans and bundles as needed for different groups and users.
- **Usage Reporting** - aggregating granular usage, activity, and cost reports, including chargeback or user invoicing if appropriate.
- **Tag Based Governance Rules** – simplifying and automating user's placement, deployment and run-time decisions.

Detailed and granular role based access control separates respective features and processes, allowing CloudCenter users to model, migrate and manage applications while giving administrator visibility and control across boundaries of applications, clouds, and users.

5   Conclusion

Cloud computing's unprecedented advantages include fast resource provisioning, optimized resource usage, and ready scalability. These advantages present IT with a great opportunity 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 an IT as a Service strategy.

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

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

CliQr Technologies
1732 North First St., Suite 100, San Jose, CA 95112
888.837.2739 • info@cliqr.com • www.cliqr.com