



Migration and Building of Data Centers into CenturyLink Cloud with the RackWare Management Module

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WHITE PAPER





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Advantages of CenturyLink Cloud (CLC) and RackWare Together

CenturyLink Cloud offers customers the advantage of migrating and building complex environments into their infrastructure. RackWare allows these customers to build, configure and replicate these complex environments easily and quickly. When these environments need to be customized, customers can simply punch in those desired changes into the RMM tool during replication to allow complex, yet customized migrations and expansions to occur.

Relationship between RackWare and CenturyLink

RackWare and CenturyLink have had a successful partnership since 2011. RackWare has invested in integration efforts with CenturyLink Cloud features and has jointly sold with CenturyLink to help support many customers such as Blue Shield, Coke, IHS, Crayola, ZS Associates, Whitewave Foods, Proctor & Gamble, Vivint, WJ Bradley and others.

About the RackWare Management Module (RMM)

RMM is a software product that decouples the application stack from the underlying platform allowing it to be ported to any new platform. RMM includes discovery, analysis and automation features allowing the migration process to be fast, easy and error-free. Hundreds of customers have moved thousands of workloads between platforms and between internal and cloud environments using RMM. RMM also offers replication, sync and monitoring features that permit cost-effective Cloud DR deployments.

How Enterprises can Leverage CenturyLink Cloud as an Extension of their Internal Environments

RMM 3.0 provides out-of-the-box integration with CLC's APIs as well as their unique features such as Groups, Snapshots, Containers, Blueprints and Subnets to enable customers to provision complex workloads with push button simplicity and tremendous acceleration.

Popular Use Cases for RMM and CLC

1. Migration of complex workload environments to CLC - Advantage: dramatic reduction in complexity as well as speed of migration – from 20 weeks to 3 days



- Expansion of environments within CLC - Advantage: with the help of Gold Images and CLC's features such as containers and blueprints, RMM rapidly replicates servers into new environments to help with speedy and error-free expansion

Real-world ROI Calculation for a Data Center Migration by RackWare

Number of Servers Migrated	Hours Taken Without RMM	Hours Taken With RMM	Hours Saved	\$\$ saved in admin costs (\$125/hour)
50	800 (20 weeks)	40 (5 days)	760	\$95,000.00
			RMM License costs for 50 servers (\$500 per server)	\$25,000.00
Time saved in migrating 50 servers	760 hours		Total \$\$ savings in migrating 50 servers	\$70,000.00
Migration time saved by RMM	<u>15.2 hours per server</u>		\$\$ saved by RMM	<u>\$1400.00 per server</u>

CLC and RMM Integrations for fast and convenient migrations and expansions

RMM AND CLC FEATURES	BENEFITS
RMM'S ABILITY TO MIGRATE COMPLEX ENVIRONMENTS IN BULK WITH PUSH-BUTTON SIMPLICITY	Reduce time involved in migrating environments from 20 weeks to 5 days for 50 servers; increased convenience from automating complex manual tasks
RMM'S INTEGRATIONS WITH CLC API	Automated bulk provisioning of multiple devices – servers, applications, load balancers, networks, DHCP, firewalls, etc. View into status of various actions in the provisioning queue



RMM'S INTEGRATION WITH CLC GROUPS	This allows RMM to configure groups of machines rather than individual machines one at a time
RMM'S INTEGRATION WITH CLC SNAPSHOTS	This allows RMM to clone entire environments – servers, network, load balancers, DHCP and routing across data centers
RMM'S INTEGRATION WITH CLC CONTAINERS	RMM can provision entire environments encapsulated in a container - servers, applications, load balancers, firewalls, DHCP, etc.
RMM'S INTEGRATION WITH CLC BLUEPRINTS	Automated provisioning of customizable higher level CLC security and management features such as anti-virus and make managed images to enable monitoring, alerts and patching, etc.
RMM'S INTEGRATION WITH CLC SUBNETS	RW can automatically configure and provision an entire subnet with a pool of IP addresses

The use cases above will become clearer with the customer example below that highlights step by step what the processes for datacenter migration to CLC are.

Customer Example: Company A Migrates 50 Servers to CLC

Company A is a customer that with legacy onsite infrastructure consisting of 50 servers and needs to migrate to CLC without any downtime. Customer, partners and employees use the web application to collaborate with each other using a mobile API's and a rich web interface. As monthly sales are announced, demands generates large amounts of traffic to the site resulting in latency in the customers' experience.

Application Architecture

Using a standard 3-tier application architecture, Company A deploys a frontend hardware-based load balancer, which manages traffic across two Apache web servers. The application is running behind a company firewall (DMZ) and uses standard SSL encryption. The backend business logic is implemented in Java, and leverages Tomcat as the application container and application server, and three Tomcat servers power the website. The application also has a database layer which consists of one master MySQL server and a slave server for greater performance.



RackWare's CLC Migration Plan & Execution Steps for Company A

Cloud Assessment

During the technical assessment, RMM software performed a discovery of the entire CompanyA.com technology stack to determine the most efficient migration process to CLC.

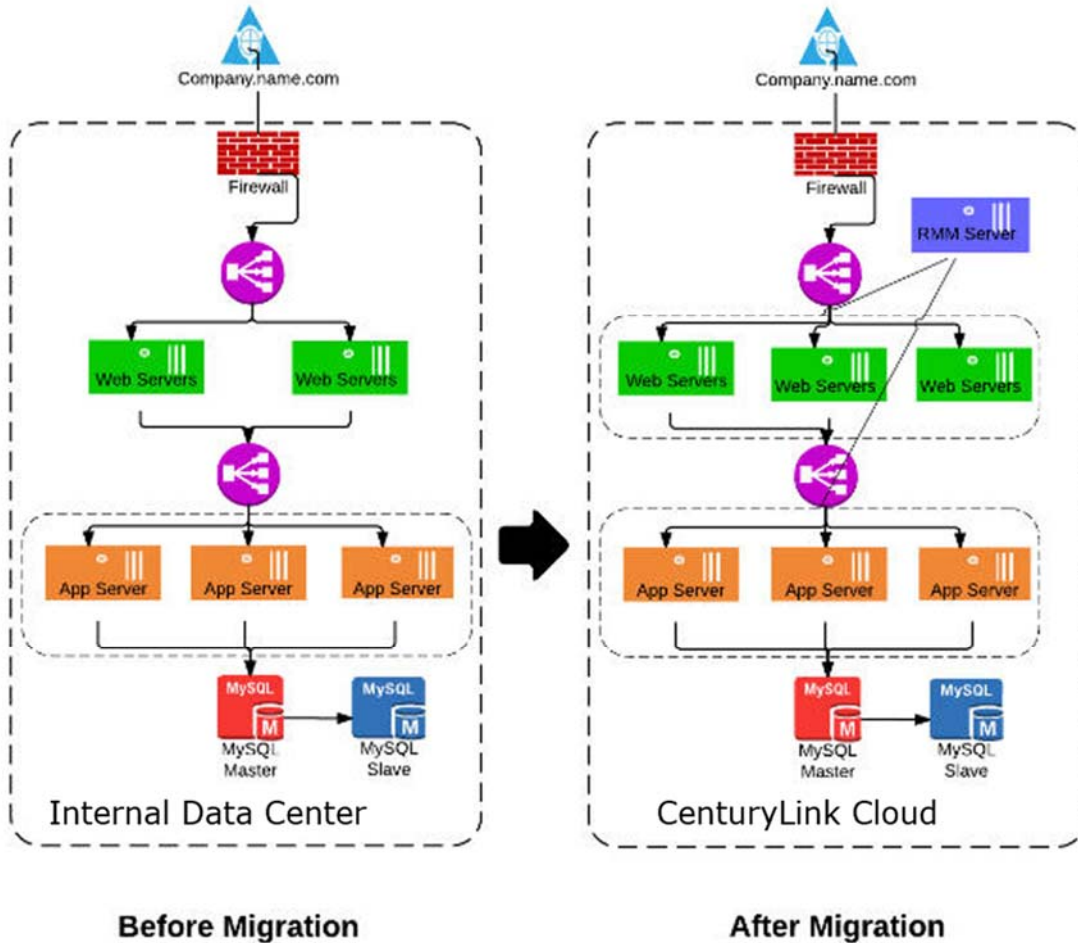


Figure 1

Discovery

The migration team ran RMM's **agentless** discovery services to map the relationships CompanyA.com ecosystem between firewalls, load balancers, web servers, application servers and MySQL DB. The dependence mapping was able to show ports as well as the number of connections between tiers. RackWare's RMM discovery engine was able to monitor performance over time to make recommendations on target sizing.



Capture

RMM has file capture technology, supporting Windows or Linux, application, web and DB x86 architectures, without an agent. The **agentless live capture** was achieved without taking the workload off-line or installing software. RMM captured the complete operating system, application stack and data in single or multiple images. During the capture, RMM removed all source hardware dependences. By removing source dependences including network address and hardware drivers, RMM allows the source workload to be migrated to any new target environment.

Cloud Onboarding

RMM for CLC includes pre-built integrations with CLC to support **automatically creating CLC containers** from the requirements gathered during the discovery of the target resources. RMM gives users the option to modify the images prior to its creation. The automation removes all manual steps with creating a portable server image prior to migrations. Rackware can inherit the target network addresses during the Onboarding processing. Inheriting target networks addresses allows for rapid transition into CLC. RMM's instrumentation can build CLC Load Balancers and security groups from within the RMM interface.

Assigning

RMM is a point to point migration technology. The technology only requires a single configurable port to be used during migration. Once the target images have been assigned to the CLC target, Rackware is able to overwrite the CLC destination image with the source Image. During this overwrite RackWare is able to inject drives into the captured image and inherit target network addresses. Rackware has pre and post plugin's that can be executed to automate IP's connections with CLC load balancers and automate adding host names to CLC directory services.

Replication and Sync

RMM has a built in **live replication and delta syncing** technology with scheduling and policy assignments. This will allow the target to remain running during the sync, with no disruption to service. Individual sync policies enable users to setup sync for DB, application and web tiers on distinctive schedules. The delta engine enable fast migration of only the changed files. Additionally, users can granular select files of directory to select for sync or not to sync. It's recommended to setup a sync policy to insure source and target at kept current.

Phased Migration

During the migration phase Company A has migrated copies of web and application to CLC. Company A has a **phased migration strategy**. The configuration of the on-premise hardware



load balancer was modified to send traffic to send request to the new instances in the cloud. After verifying that the servers in the cloud were performing at required levels. The onsite servers were dismissed one by one.

Cut Over

With the nightly sync policy the final cutover was accomplished in a short change window. This change window can be live with the source web site still operational or can be taken off line.

Summary: CLC allows customers to migrate entire data center environments into their infrastructure. RackWare allows these customers to build, configure and replicate these complex environments easily and quickly. When these environments need to be customized, customers can simply punch in those desired changes into the RMM tool during replication to allow complex, yet customized migrations and expansions to occur.

Conclusion

By investing in RMM for CLC Company A was able to:

- Successfully migrate an existing web application to the CLC with zero downtime to their current production environment and shaved weeks off their original manual schedule.
- Save on an average of 15.5 hours per server during the migration process.
- Save on an average of \$940.00 per server during the migration process.

Using a phased approach, the migration team was able to resolve all the financial, technical and business concerns.



About RackWare

RackWare allows enterprises to use the public cloud as just another resource for their internal infrastructure — for disaster recovery, as well as scaling purposes. With its unique ability to be platform and cloud agnostic, RackWare’s flagship solution, the RackWare Management Module (RMM), allows workloads to be ported between any platform, virtual or physical, and any cloud. RackWare has moved thousands of workloads for hundreds of customers and has partnerships with large Service Providers and VARs. RackWare was founded in 2009 and is based in Santa Clara, California. For more information, go to: www.rackwareinc.com.