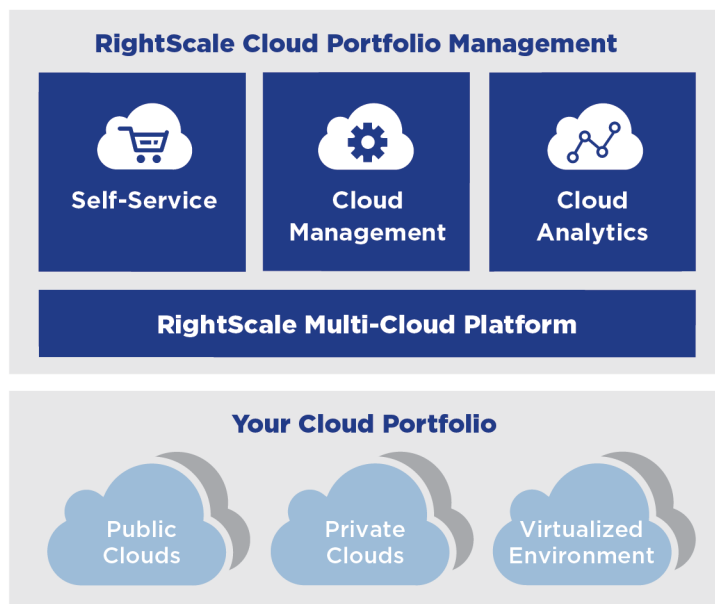# TECHNICAL OVERVIEW

The Cloud Imperative

Cloud computing offers companies the opportunity to accelerate innovation, expand market reach, and drive IT costs down. To leverage these benefits, CIOs are looking to offer centralized hybrid cloud services — incorporating multiple public and private cloud options — to developers and business units throughout the organization. As a result, IT teams are seeking efficient ways to manage, govern, and optimize heterogeneous cloud environments that span public clouds and private clouds as well as virtualized environments.

RightScale Cloud Portfolio Management

In order to deliver the significant business value the cloud can provide while ensuring the necessary level of governance, enterprises require new approaches. RightScale Cloud Portfolio Management (CPM) is a new type of solution designed to help companies capitalize on this growing array of cloud technologies. RightScale Cloud Portfolio Management provides a single pane of glass to manage, govern, and optimize usage across a portfolio of clouds. RightScale enables companies to choose the right cloud — public or private — for each application and to move applications among clouds as circumstances change.

RightScale CPM is an on-demand suite of products encompassing three main applications — Self-Service, Cloud Management, and Cloud Analytics — all built on the RightScale Multi-Cloud Platform.

Together these applications enable enterprises to leverage cloud resources successfully, securely, and profitably.

RightScale Cloud Portfolio Management

Self-Service	Cloud Management	Cloud Analytics

RightScale Multi-Cloud Platform

Your Cloud Portfolio

Public Clouds — Private Clouds — Virtualized Environment

RightScale Self-Service is an easy-to-use portal for developers, application teams, and business users to quickly provision applications and technology stacks into cloud environments.

RightScale Cloud Management is a comprehensive management solution that enables IT teams to manage applications in the cloud and create policies that govern the use of cloud resources across the enterprise.

RightScale Cloud Analytics provides an intuitive dashboard for technical, business, and financial users to visualize, forecast, and optimize cloud spend.

RightScale Multi-Cloud Platform is the foundation of RightScale CPM, providing a single connection point and API that spans a wide variety of public and private clouds as well as virtualized environments.

The RightScale Multi-Cloud Platform

Enterprises today are planning and implementing multi-cloud strategies. They are combining on-premises resources with public cloud services to create a flexible and cost-optimized IT environment. However, managing these heterogeneous clouds creates new challenges for IT teams as they seek to span a portfolio of clouds with unique characteristics. RightScale CPM abstracts these differences while avoiding a least common denominator approach, allowing organizations to operate seamlessly across public and private cloud as well as virtualized environments.

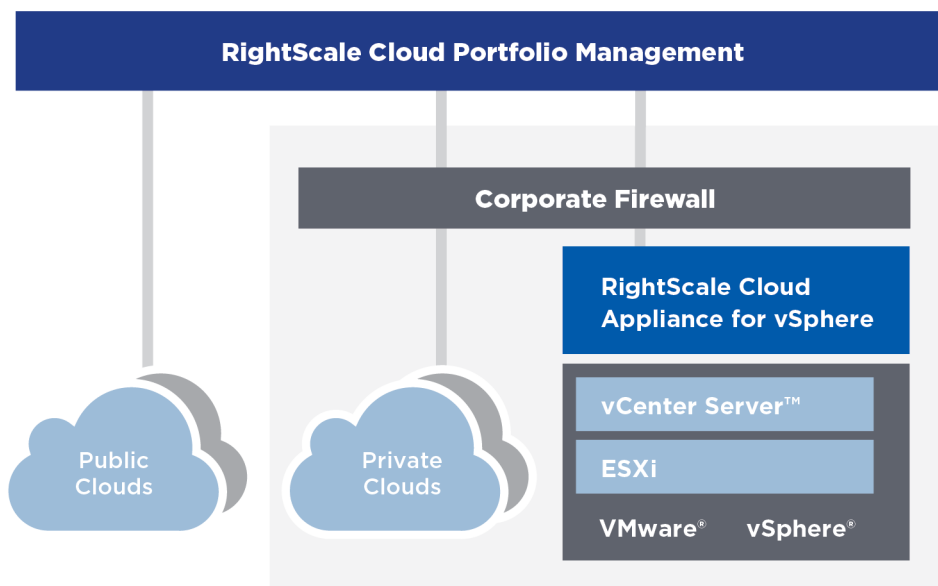## Abstracting Clouds: Public, Private, Virtualized

The RightScale Multi-Cloud Platform abstracts both the common and unique capabilities of each cloud to provide a single multi-cloud management interface and a single multi-cloud API. The RightScale Multi-Cloud Platform supports the most popular public and private clouds, as well as virtualized environments such as VMware® vSphere® .

In order to help IT teams deliver cloud services based on vSphere environments, RightScale offers the RightScale Cloud Appliance for vSphere. This lightweight, virtual software appliance is installed on-premise and provides an easy way to connect to vSphere and extends vSphere with critical cloud capabilities. As a result, organizations can leverage existing or new virtualized infrastructure in their cloud portfolios.

Beyond Least Common Denominator

RightScale has pioneered cloud-specific gateways that leverage the unique API of each cloud for common cloud functions. However, RightScale avoids the "least common denominator approach" by also abstracting cloud capabilities that are unique to a particular cloud — such as support for AWS EC2 Instance Tags, Windows® Azure availability sets or Rackspace® RackConnect®.

RightScale users can also maintain cloud portability by leveraging open source server-based options, such as substituting HAProxy load balancers for cloud-specific services for example. By leveraging these abstractions, organizations avoid lock-in to a particular cloud provider and maintain portability to other cloud providers as they offer comparable capabilities.

Why You Need a Multi-Cloud Platform: Eleven Differences between Clouds

The RightScale Multi-Cloud Platform abstracts both the common and unique capabilites of each cloud to provide a single multi-cloud management interface and a single multi-cloud API. RightScale cloud-specific gateways let you leverage the unique capabilities of each cloud while avoiding lock-in to any one cloud vendor.

1 **API**

Each cloud provider, public or private, will provide a different API to access cloud services.

2 **Behaviors**

There are many differences in how clouds behave for common actions or under certain circumstances. For example, some clouds automatically provision storage upon launch of a server or instance, while others do not.

3 **Resource Sizes and Types**

Each cloud provider will offer different sizes and types of compute, storage, and network resources.

4 **Operating System Images**

Each cloud provider will provide a unique and likely proprietary set of operating system images. Most cloud providers have created unique "tuned" versions of common Linux distros.

5 **Hypervisors**

Each cloud provider leverages different, and sometimes proprietary, hypervisor options.

6 **Application Stacks**

Some cloud providers may provide a selection of common, pre-configured application stacks (such as LAMP or Java or .NET).

7 **Add-On Services and Features**

Each cloud provider will offer extra add-on services and features above and beyond basic compute, network, and storage resources. These may include load balancing, application servers, analysis tools, or databases.

8 **Security Capabilities**

Although each cloud will provide some level of access control, the capabilities will vary across cloud providers.

9 **Network Capabilities**

Each cloud offers different ways to define subnets, security groups, and network gateways.

10 **Billing and Pricing**

Each cloud provider offers unique pricing models and options as well as different billing capabilities.

11 **Geography**

Each cloud provider will offer data centers in different locations. Some cloud providers have a global footprint, while others are limited to specific regions.

Workload Portability with ServerTemplates: Deploy Anywhere, Move Anywhere

The RightScale Multi-Cloud Platform goes beyond API abstraction to enable workload portability and avoid cloud lock-in. RightScale ServerTemplates™ form the foundation for workload portability by providing a fully functioning blueprint to automatically provision an identical server on any cloud.
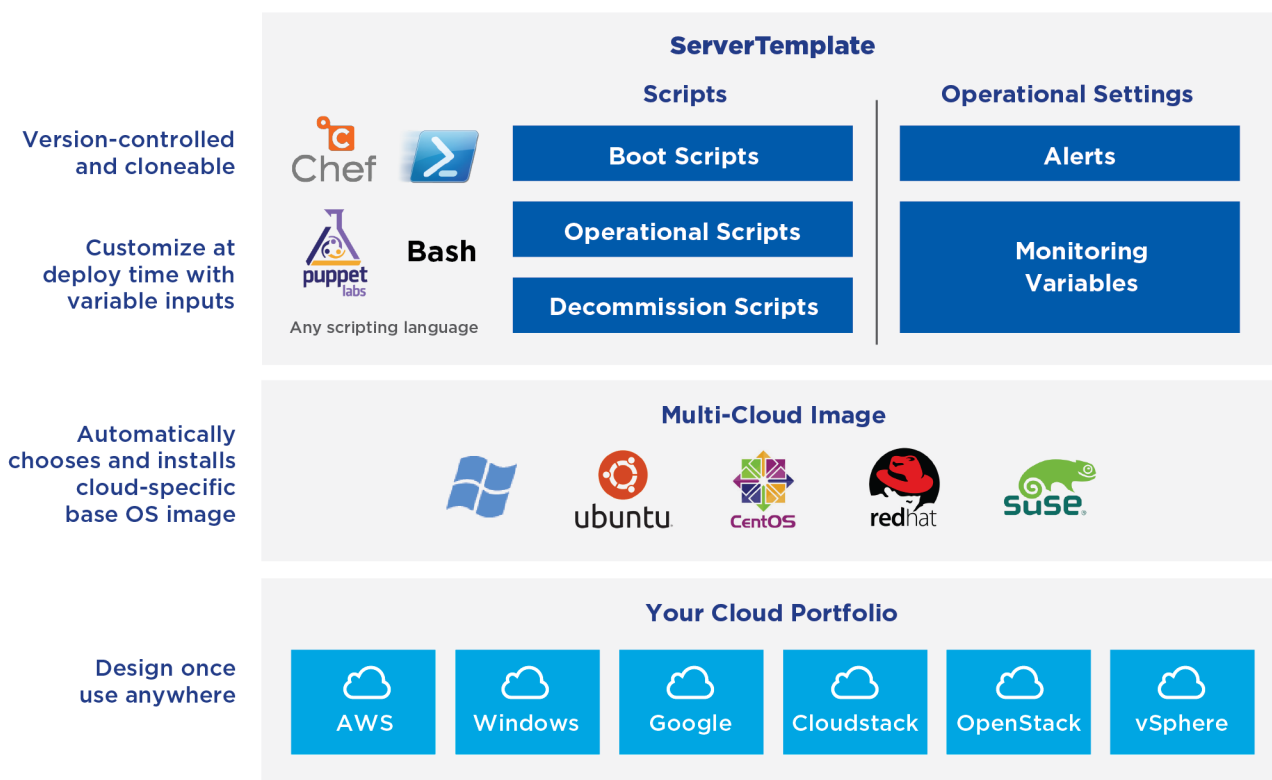
ServerTemplates are lightweight and modular representations of your reference configuration. They include a set of scripts to dynamically provision, configure, operate, and decommission a cloud-based server. They start with a RightScale Multi-Cloud Image™ that dynamically selects and provisions the right base image based on the cloud and operating system that you choose. Next, ServerTemplates leverage scripts (Chef™, Bash, PowerShell®, Puppet, or any other scripting language) to install and configure the software components of your application. You can dynamically alter the configuration or behavior of your

cloud servers using variable input parameters to avoid managing sprawling libraries of static cloud images. Lastly, ServerTemplates include scripts to automate operational tasks on running servers, such as ad hoc data backup and restore; updating software across one or multiple servers; updating firewall rules; and failover from a master to a slave.

"I was attracted to RightScale because of ServerTemplates™ and the ability to operationally define our deployments. RightScale's orientation to this whole world was right on the money for us."
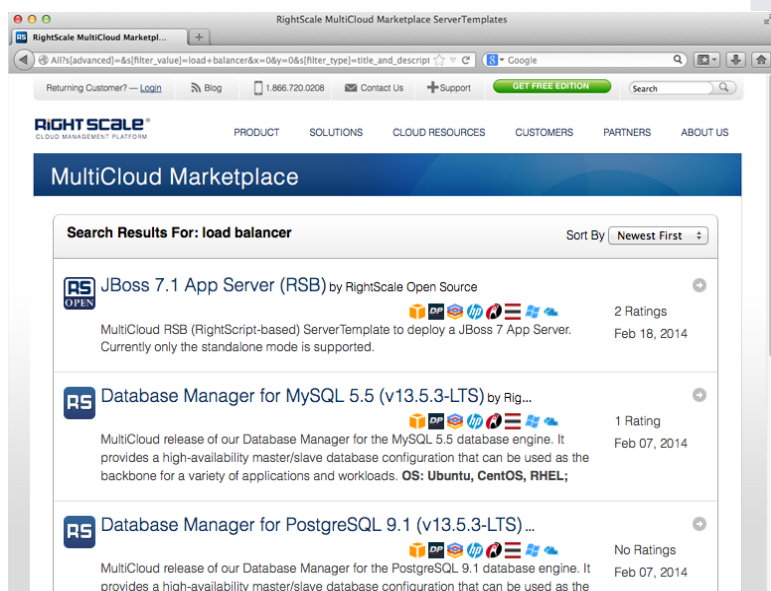
- Andy West
Director of Architecture
Technical Architect, Pearson

Start with an Extensive Library of Blueprints

RightScale provides a marketplace with hundreds of pre-built cloud-agnostic ServerTemplates for common components, such as such as load balancers and web, application, database, and cache servers across Linux and Windows environments. RightScale partners also provide complementary, value-added ServerTemplates that deliver unique capabilities for security, networking, load testing, HPC, and more. You can modify these out-of-the-box ServerTemplates to meet your specific needs with the appropriate versions, patches, and configuration settings that match your corporate standards. You can also create your own ServerTemplates from scratch to address your unique requirements.

Supporting Agile and DevOps

Many enterprises are combining cloud services with new agile and DevOps models in order to innovate more quickly. RightScale can help you incorporate agile and DevOps alongside traditional development methodologies by integrating IT resource provisioning directly into the software build process. RightScale provides:

- Fast access to cloud infrastructure for rapid iteration.

- Automation of configuration management to reduce errors.

- Standardized development environments.

- Consistency between development, QA, staging, and production.

- Version control to manage changes.

- Shared visibility between dev and operations to improve collaboration.

- Use of RightScale API to provision resources and integrate with build automation and continuous integration (CI).

The Benefits of On-Demand

RightScale Cloud Portfolio Management (CPM) is an on-demand, software-as-a-service (SaaS) solution that enables companies to quickly and easily access the benefits of cloud computing.

Instant access

With RightScale CPM, companies gain instant access to manage, govern, and optimize resources across a portfolio of clouds. You don't need to provision hardware, so there are no hidden costs or long lead times. With RightScale, no lengthy installation process is required, so you can immediately begin reaping the benefits of cloud computing.

The RightScale SaaS platform only requires public or private cloud credentials to get started. You log in, test a proof-of-concept, and deploy applications in minutes versus months with traditional on-premises distribution. As you roll out RightScale to more users in the enterprise, they also gain instant access to your cloud services.

Auto-upgrades

Because RightScale is an on-demand, SaaS solution, the burden of deploying and maintaining the cloud management system infrastructure is on RightScale, not on you.

Cloud technologies are rapidly changing, with new services, features, and vendors appearing every week. The RightScale SaaS platform enables rapid access to a majority of the most popular innovations, in some cases the same day as the feature or service is released.

In addition to cloud-related improvements, RightScale adds new platform features every 8-12 weeks. Auto-upgrades keep you current with the latest and greatest version and give you instant access to new features. As a result, you don't have to divert scarce IT resources to expensive and time-consuming migration projects.
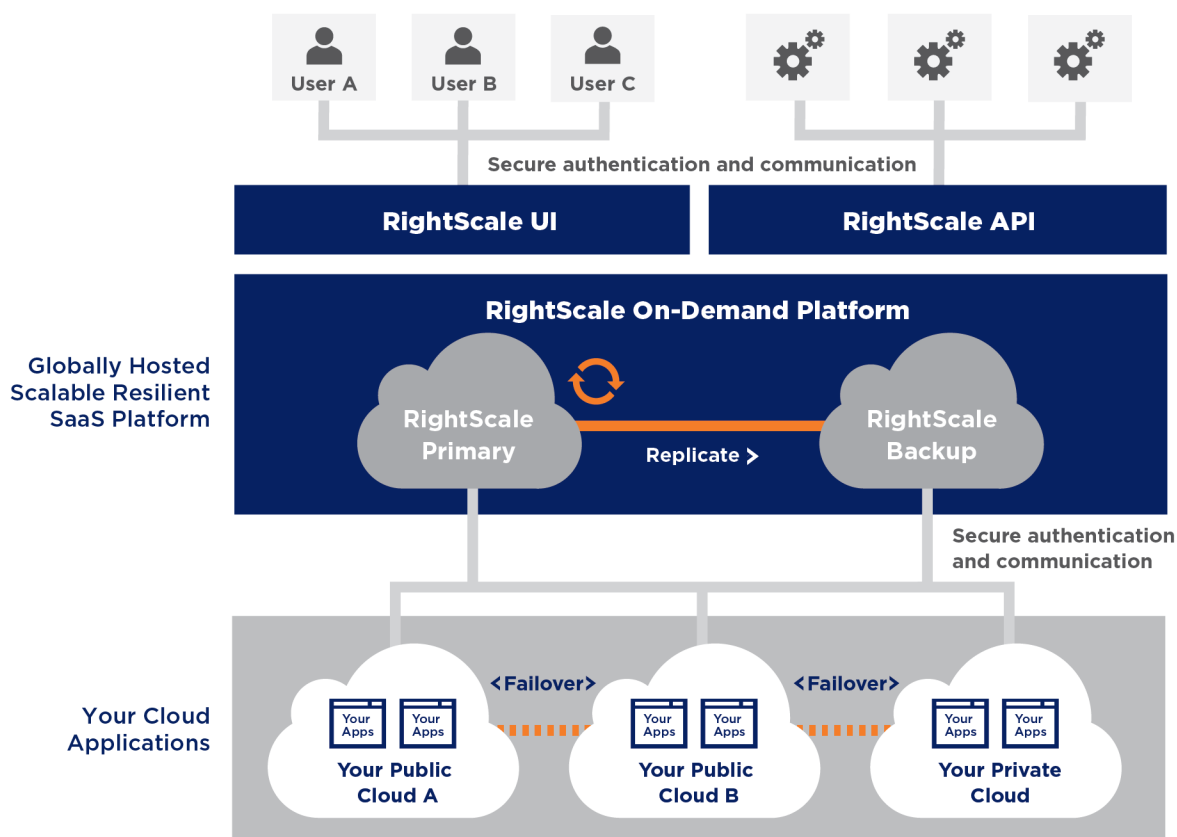
Rock-Solid Distributed Architecture

RightScale helps you keep your applications running even when you experience cloud outages. Built on a global, redundant architecture, RightScale delivers the scalability and high availability you need for your critical enterprise applications.

The RightScale SaaS platform distributes services globally to enable low latency and high availability for users and clouds around the world. The RightScale platform is architected as a set of highly available, loosely coupled services that are designed to automatically scale up to meet demand and provide maximum functionality in the event of a variety of failure modes. RightScale has completed the self-certification for U.S. Department of Commerce Safe Harbor and is listed on both U.S.-EU Safe Harbor and U.S.-Swiss Safe Harbor Lists. RightScale is in the process of obtaining an SSAE16 Type II certification.

In the event of a data center or cloud outage, it is best to have a management and control plane that is independent of your cloud and cloud-based applications. This prevents the cloud management system and the managed resources and applications from failing at the same time, which would compromise the triage and recovery process. The best place to locate a cloud management system is outside the data center or cloud being managed.

Because RightScale is an on-demand solution, it provides a data-center independent management plane. RightScale enables you to monitor the health of your cloud and, in the case of a service outage, to move workloads around freely and execute disaster recovery procedures. With RightScale, you can be confident that you will have the management controls you need to respond to and weather a cloud outage.

RightScale Security and Governance

Like other industry-leading SaaS solutions, RightScale has implemented multiple layers of security to protect sensitive data. These include industry-standard authentication and access controls as well as encryption of data at rest and in transit.
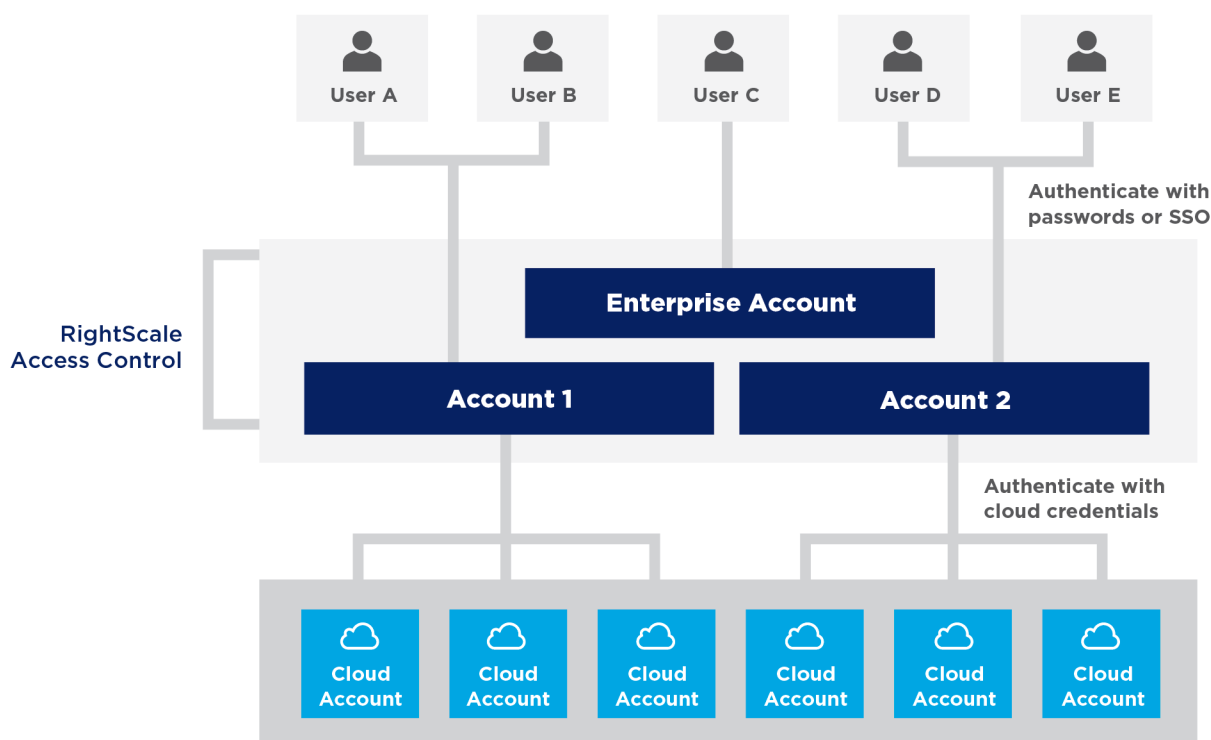
Controlling Access

RightScale supports integration to corporate single sign-on services using SAML and OpenID or authentication directly to RightScale using usernames and passwords.

RightScale provides a hierarchical account structure, consisting of parent and child accounts, that lets you control on a granular level which users have access to which cloud accounts. This account structure can be used to segment applications as well as development vs. QA vs. production deployments. RightScale users are subject to a set of role-based access-controls that determine which resources, actions, and data they can interact with across clouds.

RightScale authenticates with public and private cloud APIs using cloud credentials provided by you. This abstraction between cloud accounts and RIghtScale accounts protects cloud credentials. Rather than sharing cloud credentials with developers and individual users, you simply give them access to the appropriate RIghtScale accounts.

RightScale Authentication to Instances

RightScale provides a RightLink™ agent that runs on your cloud-based instances and is used for communicating with the RightScale SaaS Platform. Instances with RightLink go through an enrollment process that includes mutual authentication with the RightScale SaaS platform. This enrollment process includes an encrypted key exchange during which RightLink receives its own private key in addition to public keys for the RightScale infrastructure nodes with which it will exchange traffic. All traffic between the RightLink agent and the RightScale SaaS platform is encrypted.

Data Security

It is important to first note that RightScale is a cloud management platform that is independent from your cloud-based applications and your cloud-based databases. As such, RightScale does not access code or data for your application. Data stored in RightScale is, instead, metadata relevant to the configuration and operation of your cloud infrastructure. RightScale uses database encryption to ensure the confidentiality and integrity of sensitive data we store on behalf of our customers.

The RightScale application itself uses private network connections provided by cloud providers for all intra-cloud communications between the server instances in that cloud. Sensitive communications that cross public network connections use SSL or TLS to encrypt the transport or application-level encryption of the payload.

Supporting Your Compliance Processes

RightScale also provides functionality to support your own governance and compliance processes. RightScale provides standardization, visibility, and auditability of cloud-based applications.

- Single pane of glass gives you complete visibility and control over all cloud applications.

- Version control of ServerTemplates ensures that all your applications are configured to corporate standards.

- Operational scripts help you install security patches and make necessary configuration changes.

- RightScale audit logs track all changes made to any application across all your clouds and cloud accounts.

- Network management capabilities help you manage and audit network security settings.

Connection-Ready: Integrating RightScale and your Ecosystem

RightScale is designed to fit seamlessly into your existing IT processes and ecosystem. RightScale Cloud Portfolio Management provides a robust API for integration as well as a variety of other integration points throughout the product that make it easy to integrate with development tools, ITSM, identity, security, monitoring, logging, and financial systems.

RightScale API

The RightScale API provides for programmatic access to cloud management features and capabilities.

This API abstracts the clouds that RightScale supports, so instead of writing different commands to launch a server for each cloud in its native API, you can write a single command with the RightScale API that is portable across multiple clouds.
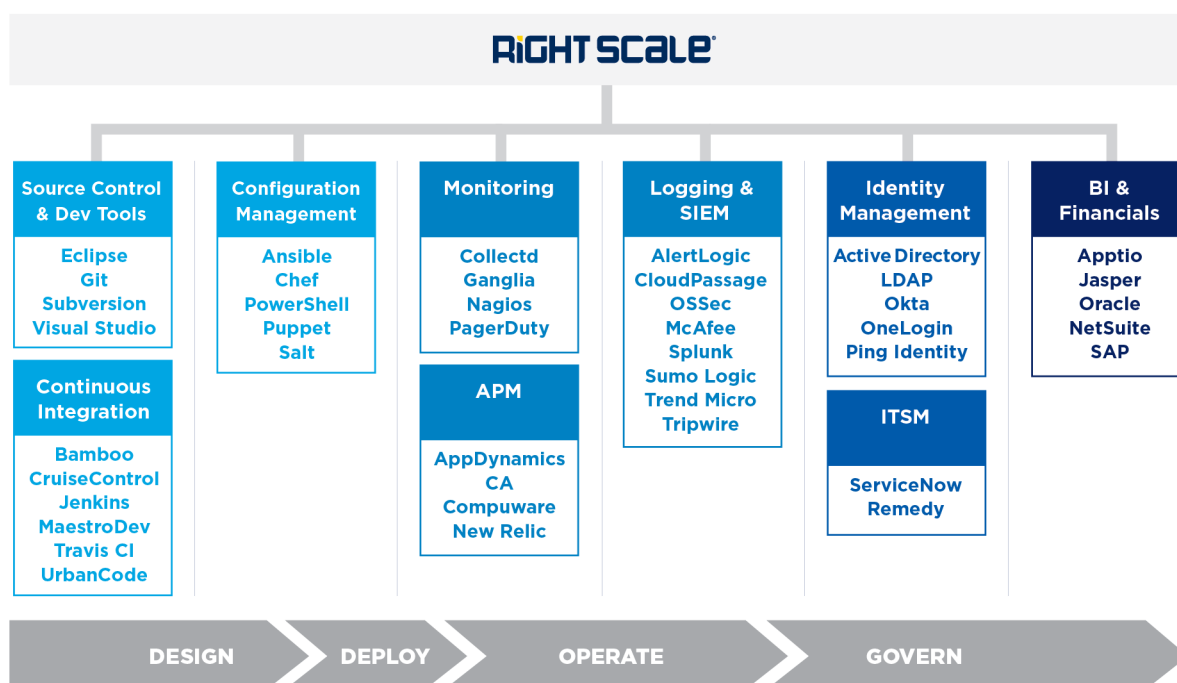
The RightScale API also provides for programmatic access to a wide variety of data such as audit logs, alerts, and monitoring data.

Self-Service API

The RightScale Self-Service application includes a web portal for developers, QA, and business users to easily provision applications and technology stacks to cloud infrastructure. Some customers want to connect their own web portal to the RightScale multi-cloud service catalog and provisioning capabilities. The RightScale Self-Service API makes it easy to integrate with any ITSM or ticketing system, including ServiceNow®, BMC Remedy, and Jira.

Export Usage and Cost Reports

RightScale also provides scheduled and ad hoc reports on cloud usage and costs across all of your clouds and cloud accounts. These reports breakdown usage by user, application, departments, cloud accounts, or any other tags you specify. The data can be exported to CSV format and sent via email or placed into an AWS S3 bucket. This structured file can then be used with spreadsheet or BI tools or imported into financial systems for chargebacks.

Cloud Success with RightScale

RightScale provides a comprehensive platform to manage, govern, and optimize your portfolio of cloud services. RightScale enables you to deliver the agility, efficiency, and flexibility that provides value to your business while ensuring visibility and control over your critical applications. Built on a multi-cloud platform, RightScale provisions workloads to the cloud of your choice, public or private, and can move workloads over time as your requirements change. This provides flexibility in your infrastructure investments and avoids lock-in to any single cloud vendor.

Because RightScale is delivered as a software-as-a-service platform, you will have instant access to cloud services. No hardware to procure. No installation. No upgrades. No maintenance. Simply log in and start reaping the benefits of RightScale and cloud. Our proven, rock-solid architecture supports high-availability architectures and will ensure that your applications continue to function through cloud outages or service disruptions.

At RightScale, we understand that cloud computing is just one piece of your IT ecosystem. The RightScale platform is designed to integrate with existing systems and processes through our robust API and pre-built connectors. Whether you need to integrate with legacy back-end systems or the latest development tools, RightScale has it covered.

About RightScale

RightScale® enables leading enterprises to accelerate delivery of cloud-based applications that engage customers and drive top-line revenue while reducing risk of outages and optimizing costs. RightScale Cloud Portfolio Management provides a single pane of glass to manage, govern and optimize applications in public, private and hybrid clouds. In addition, RightScale Consulting provides deep cloud expertise to help companies develop cloud strategies, deliver cloud projects, and optimize cloud usage. Since 2007, RightScale has been helping create the Cloud-Enabled Enterprise:

- 7 years
- 10 public and private clouds
- 50,000 users
- 6 million servers

To find out more visit our website at www.rightscale.com

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