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The Forrester Wave™: Hybrid Cloud Management Solutions, Q1 2016

Tools And Technology: The Cloud Computing Playbook

by Dave Bartoletti
January 8, 2016

Why Read This Report

In Forrester's 32-criteria evaluation of hybrid cloud management solution vendors, we identified 11 significant software providers — BMC Software, Citrix, CliQr Technologies, Dell, Hewlett Packard Enterprise, IBM, Microsoft, Red Hat, RightScale, Scalr, and VMware — in the category and researched, analyzed, and scored them. This report details our findings about how each vendor fulfills our criteria and where they stand in relation to each other to help infrastructure and operations (I&O) professionals select the right partner for their hybrid cloud management needs.

Key Takeaways

Seven Hybrid Cloud Management Vendors Lead The Pack
Forrester's research uncovered a market in which RightScale, Scalr, CliQr Technologies, Dell, IBM, VMware, and Red Hat lead the pack. Hewlett Packard Enterprise, BMC, and Microsoft offer competitive options. Citrix lags.

I&O Pros Are Looking For Developer Enablement Plus Operational Control
The hybrid cloud management solutions market is mature and growing because more developers and I&O professionals see it as a way to address the needs of a growing multi-cloud portfolio. These solutions help developers build cloud apps faster and more easily while giving I&O pros the governance and control they need to enforce usage and cost policies.

Choice, Templates, APIs, Cost Control, And Governance Are Key Differentiators
As the use of hybrid clouds expands, the leading vendor solutions will offer developers a rich library of app and infrastructure templates, APIs, and a choice of multiple public and private clouds. They will also give I&O pros strong policy-based automation, orchestration, and governance tools. The best will do both equally well.

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by Dave Bartoletti
with Glenn O'Donnell, Lauren E. Nelson, and Michael Caputo
January 8, 2016

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Forrester conducted demo-based product evaluations in August 2015 and interviewed more than 30 vendor and user companies. Customer references are anonymous and confidential.

Related Research Documents

Justify Your Hybrid Cloud Future With A Solid Business Case

Predictions 2016: The Cloud Accelerates

Vendor Landscape: Hybrid Cloud Management Solutions

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Expanding Cloud Portfolios Demand Hybrid Cloud Management

Cloud computing is a key element of a BT agenda, driving rapid growth in enterprise demand for and adoption of multiple public and private cloud platforms. Behind this expansion is a need to develop and deploy new and innovative software faster so companies can more effectively win, serve, and retain customers. Developers and DevOps pros increasingly turn to multiple cloud platforms to find the infrastructure and services they need to quickly build and transform customer-focused web and mobile apps. To encourage business adoption and use without losing the visibility, governance, or operational control enterprises require, I&O pros need tools that:

› **Manage expanding portfolios of public and private cloud platforms.** According to Forrester's Global Business Technographics® Infrastructure Survey, 2015, 29% of I&O enterprise decision-makers have adopted and manage public cloud, 33% use hosted private cloud, and 43% use an internal private cloud. Sixty-five percent say they already use more than one public and/or private cloud platform, indicating that the hybrid cloud is a reality today.[1]

› **Enable developers to build and run apps on multiple clouds.** Our developer survey shows that 34% of enterprise developers have built software for elastic cloud platforms in the past two years.[2] Developers usually prefer to start with public cloud for modern, elastic, customer-facing applications, so the need for tools to help developers consume multiple public cloud platforms is especially strong.[3]

› **Help tech managers deliver, govern, and optimize multiple cloud platforms.** Cloud presents a fundamental challenge for I&O pros: Developers want self-service and fast access to cloud infrastructure and other services, but I&O will eventually be held responsible for how those services perform, what they cost, and how well they conform to company and regulatory policies. I&O pros can no longer afford to slow down cloud adoption until they can retrofit cloud services into existing on-premises infrastructure management processes and tools — they need to encourage adoption and manage usage simultaneously.

Enterprise Buyers Want Both: Developer Productivity And Cloud Infrastructure Control

At its heart, a hybrid cloud management solution (HCMS) helps companies balance the competing demands and responsibilities of cloud developers and technology managers. Today, it's unlikely that any single cloud platform (public or private) will give developers everything they want. As they build different types of apps on different clouds — and legacy platforms — developers will consume different types of infrastructure and services, but they don't want to be responsible for finding the best ones or monitoring, governing, or controlling them. They want frictionless access to multiple clouds, and I&O pros can enable that with an HCMS that addresses two primary use cases:[4]

› **Accelerate hybrid cloud application development and delivery.** An HCMS must accelerate and simplify developer access to and productivity across multiple cloud platforms at once by offering self-service consumption and application programming interfaces (APIs) for cloud app and

infrastructure services. These capabilities remove friction, increase developer productivity, make more frequent releases possible, drive consistency across deployments, and make it easier for developers to explore new and improved services wherever they can find them.
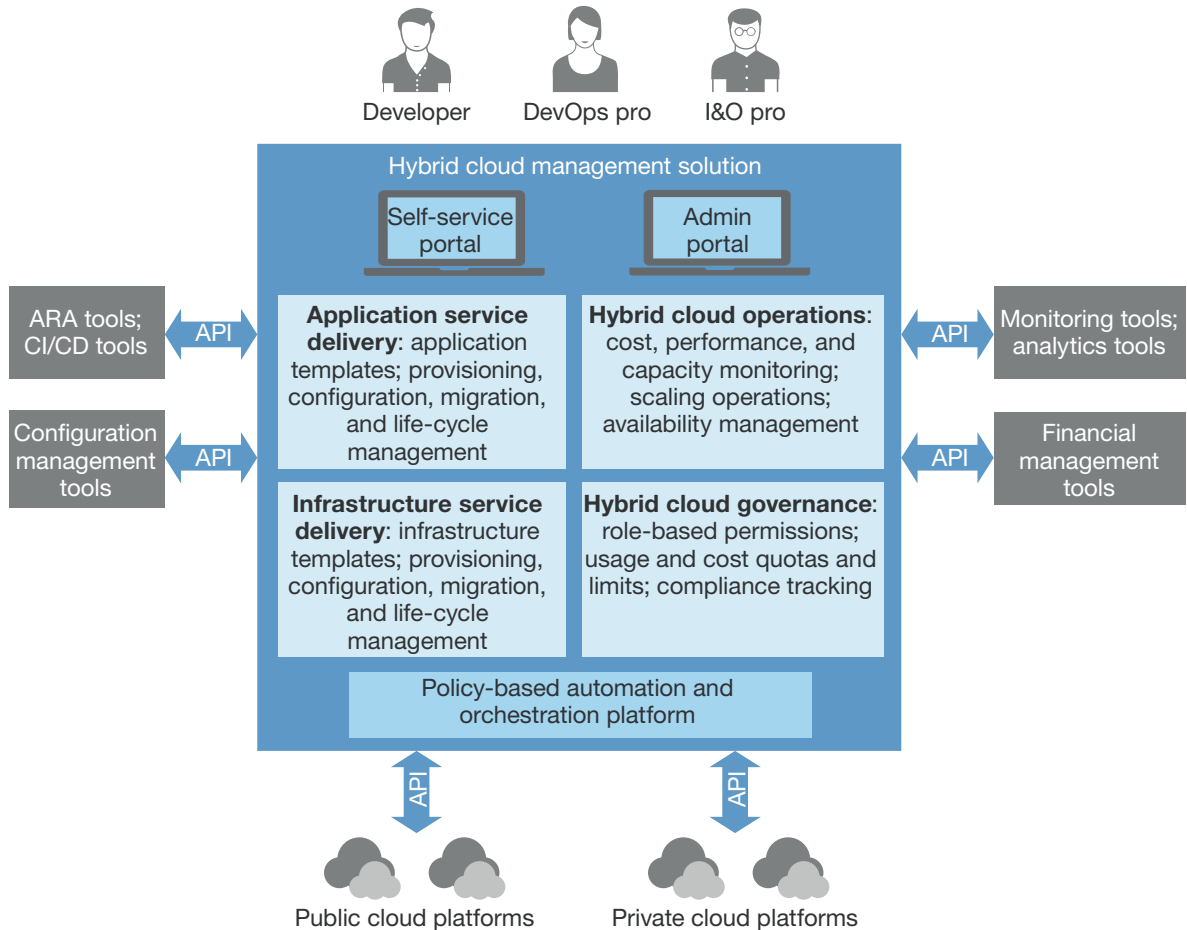
› **Deliver, govern, and optimize the use of hybrid cloud infrastructure.** Equally as important, an HCMS must allow I&O pros to deliver, govern, and optimize both basic cloud infrastructure services (compute, storage, network, etc.) and advanced services (database, integration, messaging, etc.) throughout their entire life cycle, from request to decommissioning. These capabilities improve monitoring visibility, speed up provisioning times, enforce standard configurations, apply governance and usage rules, and establish consistent-usage policies.

Policy-Based Orchestration Plus Strong APIs Lay The Foundation For HCMS

At their core, hybrid cloud management solutions are automation and orchestration platforms. They automate manual or scripted tasks to request, change, or deploy standardized cloud services, and they orchestrate the execution of these tasks across a range of cloud platforms, often leveraging other automation tools like configuration management or provisioning. Every evaluated solution provides capabilities that Forrester believes are critical requirements for a leading HCMS (see Figure 1).

FIGURE 1 A Reference Model For Hybrid Cloud Management Solution Capabilities

Developer   DevOps pro   I&O pro

Hybrid cloud management solution

Self-service portal   Admin portal

ARA tools; CI/CD tools ←API→

Application service delivery: application templates; provisioning, configuration, migration, and life-cycle management

Hybrid cloud operations: cost, performance, and capacity monitoring; scaling operations; availability management

←API→ Monitoring tools; analytics tools

Configuration management tools ←API→

Infrastructure service delivery: infrastructure templates; provisioning, configuration, migration, and life-cycle management

Hybrid cloud governance: role-based permissions; usage and cost quotas and limits; compliance tracking

←API→ Financial management tools

Policy-based automation and orchestration platform

←API→   ←API→

Public cloud platforms   Private cloud platforms

Hybrid Cloud Management Solutions Evaluation Overview

To assess the state of the hybrid cloud management solutions market and see how the vendors stack up against each other, Forrester evaluated the strengths and weaknesses of 11 leading cloud management solutions vendors. We looked at the depth of their capabilities across six categories of current offering features that technology managers (cloud infrastructure managers) and developers (cloud infrastructure consumers) need.

Evaluated Vendors All Have Functional Depth But Varying Hybrid Focus And Maturity

After examining past research, several years of client inquiries on user needs, and vendor and expert interviews, we developed a comprehensive set of evaluation criteria. We evaluated vendors against 32 criteria, which we grouped into three high-level buckets:

› **Current offering.** Our analysis looked for providers that showed the most balance between feature breadth and depth across multiple public and private cloud platforms. We looked for: 1) strong current capabilities in six hybrid cloud management feature categories; 2) proven support capabilities and strong customer support experience; and 3) pricing for both pilot and large-scale deployments (see Figure 2). Pricing was not used to calculate current offering scores.

› **Strategy.** To assess strategy, we examined each vendor in terms of the following: 1) product vision — a compelling picture of planned enhancements and how they will extend and improve the solution's usefulness for managing a growing hybrid cloud portfolio; 2) execution road map — the vendor's track record for delivering road map items on time along with its organizational and financial commitment to hybrid cloud management solutions; 3) market approach — how the vendor views the evolution of the hybrid cloud landscape (more clouds, more user types, more use cases) and how it plans to serve these expanding needs; and 4) partner ecosystem — the extent of existing partnerships, partner programs, and partner solutions, and the vendor's participation in open source communities developing complementary or supporting technologies to ease hybrid cloud management.

› **Market presence.** To evaluate market presence, we analyzed three areas: 1) number of paid customers with a license or support relationship with the vendor; 2) product revenue for the previous 12 months generated from the solution under evaluation; and 3) the average deal size for the solution under evaluation.

FIGURE 2 Six Hybrid Cloud Management Feature Categories That Developers And I&O Pros Need

Current offering features	Description
Cloud platform resources supported	To manage a hybrid, multi-cloud portfolio, existing cloud platform resources must first be discovered and onboarded. Strong solutions include support for managing a broad range of compute, storage, network, and advanced resources across both public and private cloud platforms.
Automation and orchestration	Users must be able to provision infrastructure and application services to multiple platforms, configure those services once deployed, and control life-cycle operations (start, stop, etc.) through a workflow design interface. Automated actions (scaling, expiration, etc.) should be available based on monitoring data.
Cloud service administration and consumption	Administrators create and manage multi-cloud app and infrastructure templates and manage the overall environment via an administrative portal. Consumers select templates from a self-service portal for deployment and use. Leading solutions have a broad and deep collection of prebuilt templates and strong templating tools.
Cloud governance	Governance and control features enable administrators to define roles and permissions hierarchies, integrate with enterprise and public cloud directory and authentication services, set and enforce cost and other quotas and limits, and track change history using tagged resources to enforce compliance policies.
Cloud operations	Administrators and consumers alike need cost visibility, performance monitoring, and utilization reports to optimize ongoing multi-cloud operations. Cost forecasting, expiration dates, and performance/usage analytics for both app and infrastructure elements not only help control use, but guide consumers to the best cloud platforms.
Integrations and APIs	Control of both app and infrastructure elements via APIs is important to both cloud administrators and developers. Strong APIs abstract cloud platform differences and expose all solution control features. Third-party integrations simplify the use of complementary IT service management tools and products.

Evaluated Vendors Broadly Tackle Hybrid Cloud Management Challenges

Forrester included 11 vendors in the assessment: BMC, Citrix, CliQr, Dell, Hewlett Packard Enterprise (HPE), IBM, Microsoft, Red Hat, RightScale, Scalr, and VMware. To determine the set of examined vendors, we fielded an open survey in July 2015 and reviewed the submissions of more than two dozen vendors.[5] Each of these vendors has (see Figure 3):

› **Support for a range of public and private cloud platforms.** We excluded from this evaluation vendors focused on a single private or public cloud platform or those without a strong multi-cloud management strategy. We included standalone, cloud-agnostic management solutions sold to enterprise customers.

› **Support for infrastructure management and developer enablement across clouds.** We required vendors to offer administrative functions for I&O pros who primarily manage cloud infrastructure services themselves, plus strong self-service capabilities for developers and DevOps pros who build and operate applications that run on multiple clouds.

› **Proven customer adoption.** We required at least three references from customers actually using the solution and augmented our customer experience ratings with inquiry feedback from Forrester clients where possible. These conversations heavily influenced the portal usability, cloud operations, and customer support experience ratings.

› **A generally available solution.** While the hybrid cloud management market is changing rapidly, clients need a product they can order and deploy today, a solution they've constructed themselves from beta or limited release products. All the solutions we reviewed were generally available as on-premises installed software or via subscription as of July 1, 2015. Enhancements delivered after this date are not reflected in this evaluation.

FIGURE 3 Evaluated Vendors: Product Information And Selection Criteria

Vendor	Product evaluated	Version release date
BMC Software	Cloud Lifecycle Management 4.5 TrueSight Capacity Optimization 10.3	May 2015 July 2015
Citrix	Citrix Lifecycle Management	May 2015
CliQr Technologies	CliQr CloudCenter 4.0	June 2015
Dell	Dell Cloud Manager 11.0	June 2015
HPE	HPE CloudSystem Enterprise Suite: HPE Cloud Service Automation 4.5 HPE Operations Orchestration 10.2 HPE Helion CloudSystem Add-On Modules	July 2015 July 2015 December 2014 July 2015
IBM	IBM Cloud Orchestrator v2.4 IBM UrbanCode Deploy with Patterns v6.1.1.3 PureApp Software v2.1.0.1	October 2014 May 2015 June 2015
Microsoft	Microsoft Azure Pack Microsoft OMS	October 2013 May 2015
Red Hat	CloudForms 3.2	June 2015
RightScale	RightScale Cloud Portfolio Management	July 2015
Scalr	Scalr 5.8	July 2015
VMware	vRealize Automation 6.2.2 vRealize Application Services 6.2.0 vRealize Business Standard vRealize Orchestrator 6.0.2 vRealize Operations 6.0.1	June 2015

FIGURE 3 Evaluated Vendors: Product Information And Selection Criteria (Cont.)

Vendor selection criteria

Support for a range of public and private cloud platforms. We excluded from this evaluation vendors focused on a single private or public cloud platform or those without a strong multi-cloud management strategy. We included standalone, cloud-agnostic management solutions sold to enterprise customers.

Support for infrastructure management and developer enablement across clouds. We required vendors to offer administrative functions for I&O pros who primarily manage cloud infrastructure services themselves, plus strong self-service capabilities for developers and DevOps pros who build and operate applications that run on multiple clouds.

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Evaluated Solutions Show Depth But Target Different Buyers

Our evaluation of the 11 selected vendors validates our analysis that the hybrid cloud management solutions market is very active, mature, and served by vendor products that fall into two general categories. The first are standalone, public-cloud-focused, purpose-built solutions aimed at developers and DevOps teams that build applications to run across multiple cloud platforms. The second are bundled suites spawned from preexisting provisioning and service management products to manage private cloud infrastructure (with public clouds added later). This latter set focuses primarily on I&O pros and offers deep insight into cloud infrastructure. Neither group has cornered this market, and both include mature, robust hybrid solutions. The evaluation uncovered a market in which (see Figure 4):

› **RightScale, Scalr, CliQr Technologies, Dell, IBM, VMware, and Red Hat lead the pack.** In this first hybrid cloud management solutions Forrester Wave evaluation, four vendors stood out for their strict focus on developer productivity and self-service across clouds, and their purpose-built cloud-agnostic hybrid solutions prioritizing application life-cycle management over infrastructure life-cycle management (CliQr, Dell, RightScale, and Scalr). The solutions achieved their positions through intuitive, simple GUI designs, powerful developer-friendly APIs, strong templating and automation features, support for the broadest range of cloud platforms, advanced cost monitoring, and highly positive customer references. They are top choices for developer and DevOps teams concerned mainly with building applications that run across multiple clouds, with a strong preference for public cloud platforms.

The second cluster of Leaders (IBM, Red Hat, and VMware) have battled for years in the enterprise infrastructure and virtualization management market, and they continue to battle for differentiation in the hybrid cloud solutions market. These very strong solutions are primarily used by I&O pros who both build and manage cloud infrastructure (and view hybrid as an extension of private cloud). They have a similar look and feel and stand out with enhancements that are more attractive to cloud developers. These Leaders offer deep and broad support for prebuilt application and infrastructure templates, powerful provisioning and configuration management, role-based controls, and rich cost, performance, and capacity management features.

› **HPE, BMC, and Microsoft are Strong Performers.** BMC's admin portal, cost monitoring, and configuration management features are much improved over previous releases, and BMC continues to be a top choice for customers with a large investment in the vendor's other management products, though public cloud references and developer experience are both lacking. HPE's approach to hybrid cloud is to enable I&O pros to build a complete OpenStack-based private cloud on-premises and offer management extensions to support cloud-native developers. Microsoft combines good developer enablement with its popular configuration management and automation tools to create consistent experiences across its own on-premises and public cloud platforms. Our analysis shows that each of these solutions is well suited to being the centerpiece of an enterprise hybrid cloud management strategy.

› **Citrix is a Contender.** The youngest solution in our evaluation, Citrix Lifecycle Management, is a visually appealing, multi-cloud management tool aimed primarily at managing Citrix's own CloudPlatform (a commercial distribution of Apache CloudStack) and other Citrix applications and third-party virtualization platforms. Lack of broad public cloud support, governance features, partner ecosystem, and experienced reference customers kept Citrix out of the Strong Performer cohort, but we expect the solution to improve with additional investment.

This evaluation of the hybrid cloud management solutions market is intended to be a starting point only. We encourage clients to view detailed criteria descriptions and especially to adapt our criteria weightings to fit their individual needs through the Forrester Wave Excel-based vendor comparison tool.
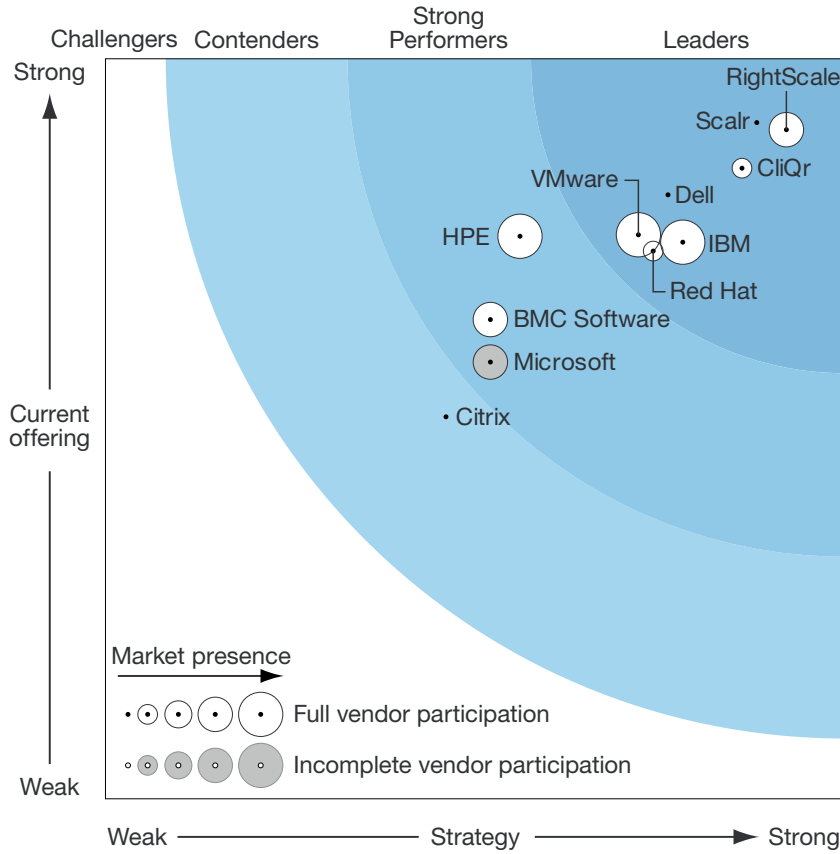
FIGURE 4 Forrester Wave™: Hybrid Cloud Management Solutions, Q1 '16

FIGURE 4 Forrester Wave™: Hybrid Cloud Management Solutions, Q1 '16 (Cont.)

	Forrester's Weighting	BMC Software	Citrix	CliQr	Dell	HPE	IBM	Microsoft	Red Hat	RightScale	Scalr	VMware
CURRENT OFFERING	50%	3.24	2.58	4.26	4.08	3.80	3.76	2.95	3.70	4.52	4.57	3.81
Cloud platform resources supported	15%	3.70	2.50	4.70	5.00	3.10	3.60	3.30	2.90	4.70	4.70	3.00
Automation and orchestration	15%	3.80	4.00	4.60	3.40	4.40	4.20	3.40	3.80	4.40	4.20	4.20
Cloud service administration and consumption	15%	2.75	2.75	4.75	3.75	4.50	4.50	3.25	3.00	4.25	4.75	3.50
Cloud governance	15%	3.20	0.85	3.90	4.25	3.40	3.35	3.15	3.90	4.00	4.45	4.30
Cloud operations	15%	4.00	1.20	3.40	3.60	3.80	3.20	1.20	4.20	4.60	4.40	5.00
Integrations and APIs	15%	2.00	3.75	4.50	4.50	4.00	4.75	3.25	4.75	5.00	4.75	3.25
Support services	10%	3.20	3.20	3.80	4.00	3.20	2.20	3.20	3.20	4.80	4.80	3.20
Pricing	0%	3.00	0.00	4.00	5.00	1.00	2.00	0.00	5.00	3.00	5.00	2.00
STRATEGY	50%	2.60	2.30	4.30	3.80	2.80	3.90	2.60	3.70	4.60	4.40	3.60
Product vision	30%	2.00	2.00	4.00	4.00	3.00	4.00	2.00	4.00	4.00	5.00	4.00
Execution road map	30%	3.00	3.00	4.00	4.00	3.00	3.00	3.00	3.00	5.00	4.00	3.00
Market approach	30%	3.00	2.00	5.00	4.00	2.00	5.00	3.00	4.00	5.00	5.00	4.00
Partner ecosystem	10%	2.00	2.00	4.00	2.00	4.00	3.00	2.00	4.00	4.00	2.00	3.00
MARKET PRESENCE	0%	3.25	0.25	1.75	1.00	5.00	5.00	3.55	1.25	3.25	1.80	5.00
Number of customers	40%	3.00	0.00	1.00	1.00	5.00	5.00	5.00	1.00	3.00	3.00	5.00
Product revenue	35%	3.00	0.00	1.00	1.00	5.00	5.00	3.00	1.00	3.00	1.00	5.00
Average deal size	25%	4.00	1.00	4.00	1.00	5.00	5.00	2.00	2.00	4.00	1.00	5.00

All scores are based on a scale of 0 (weak) to 5 (strong)

Vendor Profiles

Leaders

› **RightScale.** The RightScale Cloud Portfolio Management suite includes a self-service portal, a cloud management module, and a cloud analytics (cost management) module, all offered as software-as-a-service (SaaS). RightScale was one of the earliest independent cloud management vendors and created the ServerTemplate and, later, the Cloud Application Template format. ServerTemplates are in wide use, and though customers now report that RightScale should update its prebuilt ServerTemplates, those we interviewed claim they still trump any competitor's template formats. RightScale led the pack with support for many different cloud platform basic and advanced services, the broadest breadth and depth of available cross-cloud templates, very

mature governance capabilities, embedded cost analytics, and the most widely used and praised hybrid cloud APIs and external tool integrations. Customers are very loyal, praise the vendor's support staff, and repeatedly called out its market-leading developer-friendly APIs and unwavering cloud-agnostic strategy ("they don't compete at the platform layer"). A GUI refresh would address most of the customer usability complaints.

› **Scalr.** Scalr offers its Scalr Cloud Management Platform in three editions: Open Source Scalr, Hosted Scalr, and its on-premises Scalr Enterprise Edition. Scalr offers among the most impressive number of cloud platforms and resources. Equally impressive are its configuration management and application life-cycle automation, decision-trigger automations for autoscaling, admin and developer portals, quotas and limits settings, cost management capabilities, and platform APIs. Scalr has carved out a leadership spot with its relentless focus on the needs of cloud-native development teams and DevOps pros. Despite the company's small size and customer base, its reference customers were universally happy, telling us that upgrades were smooth and that Scalr offers the strongest hybrid cloud APIs on the market. A low entry price and open source code base were also attractive to cloud-native developers.

› **CliQr Technologies.** CliQr CloudCenter is available as SaaS or on-premises deployment. Founded in 2010, the company's sole focus is on building a cloud management platform. CloudCenter leads in the number of different public and private cloud platforms and services it supports, its configuration management and workflow design interface, decision-trigger automations, the breadth and depth of the application and infrastructure templates it includes, and its quotas and limits settings, cost monitoring capabilities, and platform APIs. Reference customers called out the powerful multi-cloud strategy, including CloudCenter's ability to dramatically simplify workload migration across clouds and its cloud-agnostic templates (called application profiles). CliQr is responsive and provides the level of support expected by a young vendor, but support options are limited according to multiple reference customers, and API changes must be made less disruptive.

› **Dell.** Dell Cloud Manager is available as SaaS or on-premises. Cloud Manager lost some market momentum after it was acquired by Dell but remains one of the most capable hybrid cloud managers for cloud-native developers. It is now the centerpiece of Dell's hybrid cloud management strategy. Dell leads in the number of different public and private cloud platforms and services it supports, automation features, user management, quotas and limits, cost monitoring, and platform APIs. Both admin and self-service developer portals are intuitive and hide complexity. Largely due to this simplicity, reference customers were universally delighted. Customers called out painless upgrades (they like the SaaS delivery model), powerful cross-cloud account management, powerful and well-documented APIs (one reference commented, "We use them all the time, every day"), and impressive support.

› **IBM.** IBM Cloud Orchestrator (ICO) has two editions: basic and enterprise. ICO Basic includes licenses for multiple products, and ICO Enterprise includes ICO Basic plus SmartCloud Cost Management and IBM Monitoring, which were required to demonstrate the requisite current

offering categories in our evaluation.[6] ICO is integrated and leverages common templates with UrbanCode Deploy with Patterns and PureApp Software (a cloud application platform), but we only examined the UrbanCode features that were integrated with ICO. IBM demonstrated powerful resource discovery and onboarding, configuration management, depth and breadth of available templates (patterns), role-based controls, and platform APIs. IBM needs to reduce the complexity across the wide range of products in this suite and unify its user interfaces. Tight integration with developer-focused tooling gave IBM an edge, though its reference customers were relatively weak, mentioning shaky integrations between components, and difficult installation and upgrades.

› **VMware.** The vRealize Suite includes vRealize Automation, Application Services, Business Standard, Orchestrator, and Operations.[7] The combined products work well together and offer solid cloud resource discovery and onboarding, deep configuration and automated provisioning, and integrated cost and performance optimization. VMware's on-premises vSphere-based cloud governance and operations features led the pack, but a lack of a graphical template designer (recently addressed), developer-friendly APIs, and breadth of cloud platform support limit the solution's appeal to cloud-native developers with a preference for public platforms. Building on its leadership in on-premises virtualization, VMware has invested heavily in attracting users of non-VMware platforms but needs to add more developer-friendly APIs and simplify the upgrade process to make vRealize customers happier.

› **Red Hat.** Red Hat CloudForms is an open source solution built on the proprietary product that ManageIQ developed, which Red Hat acquired in 2012. Red Hat showed very powerful resource discovery and provisioning features, one of the most intuitive yet feature-rich admin portals, fine-grained role-based controls, and extensive APIs and external tool integrations. Customers liked the combination of a robust orchestration platform and fully configurable dashboards and reports, all at a low entry price. While CloudForms is weaker in developer-enablement and application life-cycle automation features, its integrations with a wide range of infrastructure platforms made customers happy, as did the company's "very stable product" and first-class support.

Strong Performers

› **Hewlett Packard Enterprise.** HPE Helion CloudSystem includes HPE Cloud Service Automation (CSA), HPE Operations Orchestration (OO), and HPE Helion CloudSystem Add-On Modules.[8] To review its hybrid cloud operations features (capacity planning, monitoring, cost analytics) and developer-focused capabilities, we included several add-on modules available for the CloudSystem Enterprise 8.1 version (Data Center Automation, CloudOptimizer, and Codar). This is a large suite of products (new and existing) and is tightly aligned with HPE's overall OpenStack-based private cloud strategy. HPE Helion CloudSystem offers strong discovery and onboarding, infrastructure provisioning, and templating features, plus intuitive yet robust admin and self-service consumer portals. Reference customers had multiple private clouds, and they liked HPE's self-service catalog interface, integration with HPE hardware, and extensibility, but thought the solution overall was too heavyweight — too many different tools — and that its cost management features need work.

› **BMC Software.** BMC's Cloud Lifecycle Management (CLM) includes TrueSight Capacity Optimization functionality called Capacity Aware Placement Advice (part of the CLM license) to help guide workload placement based on available capacity. CLM evolved from private cloud management to hybrid by adding provisioning and life-cycle automation for public clouds. Given BMC's heritage in IT service management (ITSM), it's not a surprise that CLM is tightly integrated with a broad range of BMC tools, from Remedy to Server Automation to the Atrium CMDB. CLM is strongly focused on the technology management buyer looking for deep infrastructure management and control, but BMC has added additional database services and containers to its available service blueprints, broadening its appeal to developers. No release automation integrations are yet available, but they are planned. Reference customers (who were all heavily invested in BMC's ITSM portfolio) provided little hybrid cloud insight, did not use the APIs provided, and complained about difficult upgrades.

› **Microsoft.** Microsoft's Windows Azure Pack installs and runs on top of System Center and integrates with Windows Server and SQL Server to both create and help manage a private or hybrid cloud that is based on and consistent with Azure. It is typically used to manage hybrid-clouds-based Windows, Hyper-V, and Azure together, and inquiry customers report high levels of satisfaction for Windows-focused developers as well as I&O pros looking for a single way to manage an expanding Microsoft-based cloud portfolio. The Microsoft Operations Management Suite (OMS) extends System Center for hybrid cloud operations management. Together these tools offer good resource discovery and onboarding, configuration management via PowerShell, extensible prebuilt automations, and role-based controls. Microsoft did not fully participate in the research for this report, so Forrester based its findings on past briefings, product demos, and client inquiries.

Contender

› **Citrix.** Citrix Lifecycle Management is based on the ScaleXtreme technology, which Citrix acquired in 2014, rebranded and reworked, and offers as SaaS. It includes application blueprints, deployment workflows, monitoring, alerting, and auto scaling to help I&O pros optimize delivery of Citrix applications (XenDesktop, XenMobile, and Workspace Suite) plus a range of public cloud platforms. Citrix's hybrid cloud strategy centers on managing Citrix applications, including Citrix's own CloudPlatform (commercial distribution of Apache CloudStack). As the youngest solution in our evaluation, Lifecycle Management lacks mature cloud governance, cost management, or external tool integrations, but its self-service developer portal is intuitive and easy to use. Customers were not making heavy enough use of the product to offer detailed feedback.

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Supplemental Material

Online Resource

The online version of Figure 4 is an Excel-based vendor comparison tool that provides detailed product evaluations and customizable rankings.

Data Sources Used In This Forrester Wave

Forrester used a combination of four data sources to assess the strengths and weaknesses of each solution:

› **Vendor surveys.** Forrester surveyed vendors on their capabilities as they relate to the evaluation criteria. Once we analyzed the completed vendor surveys, we conducted vendor calls where necessary to gather details of vendor qualifications.

› **Product demos.** We asked vendors to conduct demonstrations of their product's functionality. Forrester mandated that vendors follow the provided demo script that includes four sections lasting 55 minutes. Demos were recorded and referred to throughout the evaluation process.

› **Strategy survey.** To ensure that the same core information was collected from each vendor, vendors also had to complete a 10-question strategy survey.

› **Customer reference calls.** To validate product and vendor qualifications, Forrester also conducted reference calls with three of each vendor's current customers.

The Forrester Wave Methodology

We conduct primary research to develop a list of vendors that meet our criteria to be evaluated in this market. From that initial pool of vendors, we then narrow our final list. We choose these vendors based on: 1) product fit; 2) customer success; and 3) Forrester client demand. We eliminate vendors that have limited customer references and products that don't fit the scope of our evaluation.

After examining past research, user need assessments, and vendor and expert interviews, we develop the initial evaluation criteria. To evaluate the vendors and their products against our set of criteria, we gather details of product qualifications through a combination of lab evaluations, questionnaires, demos, and/or discussions with client references. We send evaluations to the vendors for their review, and we adjust the evaluations to provide the most accurate view of vendor offerings and strategies.

We set default weightings to reflect our analysis of the needs of large user companies — and/or other scenarios as outlined in the Forrester Wave document — and then score the vendors based on a clearly defined scale. These default weightings are intended only as a starting point, and we encourage readers to adapt the weightings to fit their individual needs through the Excel-based tool. The final scores generate the graphical depiction of the market based on current offering, strategy, and market presence. Forrester intends to update vendor evaluations regularly as product capabilities and vendor strategies evolve. For more information on the methodology that every Forrester Wave follows, go to http://www.forrester.com/marketing/policies/forrester-wave-methodology.html.

Integrity Policy

All of Forrester's research, including Forrester Wave evaluations, is conducted according to our Integrity Policy. For more information, go to http://www.forrester.com/marketing/policies/integrity-policy.html.

Survey Methodology

Forrester's Global Business Technographics Infrastructure Survey, 2015, was fielded to 3,592 business and technology decision-makers located in Australia, Brazil, Canada, China, France, Germany, India, New Zealand, the UK, and the US from companies with two or more employees. This survey is part of Forrester's Business Technographics and was fielded from May 2015 to June 2015. ResearchNow fielded this survey on behalf of Forrester. Survey respondent incentives include points redeemable for gift certificates. We have provided exact sample sizes in this report on a question-by-question basis.

Forrester's Business Technographics provides demand-side insight into the priorities, investments, and customer journeys of business and technology decision-makers and the workforce across the globe. Forrester collects data insights from qualified respondents in 10 countries spanning the Americas, Europe, and Asia. Business Technographics uses only superior data sources and advanced data-cleaning techniques to ensure the highest data quality.

We have illustrated only a portion of the survey results in this document. To inquire about receiving full data results for an additional fee, please contact data@forrester.com or your Forrester account manager.

Endnotes

[1] Source: Forrester's Global Business Technographics Infrastructure Survey, 2015.

Are you ahead of your competitors or falling behind on cloud adoption? To understand the current state of cloud adoption and the impact on enterprise technology infrastructures, see the "Benchmark Your Enterprise Cloud Adoption" Forrester report.

[2] Source: Forrester's Business Technographics Global Developer Survey, 2015.

[3] Business technology and technology management professionals use a wide variety of public cloud platforms, and they take several forms, including those providing basic infrastructure-as-a-service up through those providing full or partial platform services and tools. Each of these types of platforms is best suited to a distinct type of application development and delivery (AD&D) pro within your ranks. The following report evaluates the leading providers and details how well each vendor fulfills our criteria and is suitable for a range of developers within your organization. See the "The Forrester Wave™: Enterprise Public Cloud Platforms, Q4 2014" Forrester report.

[4] Before engaging with vendors, you can arm yourself with a solid understanding of what hybrid cloud management is, what problems you expect it to solve, and the key capabilities you require for your particular mix of cloud services and deployment models. Forrester's clients often have trouble navigating the wide array of vendor solutions that are labeled "cloud management platforms," "cloud management," or, increasingly, "hybrid cloud management." To avoid confusion, ignore the labels, and instead define your challenges. For more information, please see the "Vendor Landscape: Hybrid Cloud Management Solutions" Forrester report.

[5] We narrowed the list down from the vendors surveyed in our hybrid cloud management solutions vendor landscape to include only software vendors targeting both the developer enablement and infrastructure life-cycle use cases. We did not include solutions sold as cloud brokerage enablers or for a specific use case such as cloud disaster recovery or one-time workload migration. For an overview of the capabilities of vendors we did not include here, please see the "Vendor Landscape: Hybrid Cloud Management Solutions" Forrester report and see the "Vendor Landscape: Cloud Strategies Of Leading Global Infrastructure Outsourcing Providers" Forrester report.

[6] ICO Basic includes licenses for Cloud Manager with OpenStack, DB2 Enterprise Server Edition, Business Process Manager, Tivoli System Automation (Multiplatforms and Application Manager), and Endpoint Manager for Patch Management.

[7] VMware released version 7 during this evaluation.

[8] HPE released version 9 during this evaluation.

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