

## Comparative Analysis Framework for Cloud Cost Management (CCM) Tooling

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### ABSTRACT

Cloud adoption offers flexibility and potential cost savings, but expenses can quickly escalate without careful management. Cloud Cost Management (CCM) tools are crucial for modern businesses seeking to rein in cloud costs and fully realize the return on their cloud investments. Effective CCM solutions provide a consolidated view of costs across complex multi-cloud environments, breaking down spending by project, department, and resource type. They offer deep visibility, historical trend analysis, and AI/ML-powered insights to understand usage patterns, pinpoint inefficiencies, and forecast future spending. Selecting the right CCM tool is vital. The VIA (Visibility, Insights, and Actions) framework helps organizations evaluate potential tools, prioritizing features for granular cost tracking, actionable recommendations, and optimizing tasks. This guide also delves into the 'build vs. buy' decision, weighing factors like in-house expertise, urgency, budget, and customization. For many, third-party CCM tools provide the ideal balance of features, speed of implementation, and ongoing support. By effectively implementing a CCM strategy, businesses can optimize cloud resource usage, eliminate waste, and drive continuous improvement in their cloud ROI.

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### Introduction

CCM tools offer a valuable solution for businesses seeking to gain control over their cloud spending. With a well-defined tagging strategy, a CCM tool can provide detailed visibility into cloud costs, breaking them down by environment, project, department, or other relevant categories. CCM solutions often store historical cost data, allowing you to analyze trends, spot spikes or seasonality in spending, and identify potential areas for cost savings. Additionally, you can set up proactive cost alerts based on thresholds or unusual spending patterns associated with your tags. Many CCM tools go beyond reporting, offering features for cost optimization, budgeting/forecasting, internal chargeback/showback, and even compliance support. Choosing the right CCM tool for your needs is important, and we'll cover a framework for making that decision in the next section.

### Significance of Selecting the Right CCM Tool

While the built-in cost reporting tools from Cloud Service Providers (CSPs) might work for smaller organizations with simple setups, larger companies and those heavily using Kubernetes environments will find great value in a specialized third-party CCM tool. The limited capabilities of CSP consoles become especially apparent when trying to manage cost complexity at scale. CCM tools go far beyond basic reporting, providing sophisticated features specifically designed to optimize cloud spending. These features help you make informed decisions that

can lead to significant cost savings and offer deeper insights into how your cloud resources are being used.

### Choosing the Right CCM Tool is Crucial

Owing to the growing prevalence of cloud computing, managing cloud expenses has become increasingly important to enterprises. The cloud's on-demand resource model offers flexibility and possible cost savings, but a lack of visibility and control can quickly result in unplanned expenses.

In Right Scale's 2019 State of the Cloud research, respondents named optimizing cloud spending as the largest cloud difficulty. By addressing these problems, you may maximize your cloud return on investment by selecting the right CCM tool:

### Lack of Visibility: The Problem

Public cloud providers (AWS, Azure, Google Cloud) offer a pay-as-you-go pricing model, which provides immense flexibility. However, this model can also create challenges in understanding your true cloud expenses. Costs can quickly spiral as your business expands, with multiple accounts, subscriptions, projects, and business units each consuming resources. Without a centralized way to see where your money is going, it becomes hard to manage cloud spending effectively.

### Inefficiencies and Waste: Optimizing through Visibility

The first step to reducing cloud costs is seeing where your resources are being allocated and how usage aligns with actual needs. CCM tools bring together usage data and billing information across even complex multi-cloud environments. By analyzing this

data, they highlight areas of potential waste. This might include underutilized resources, orphaned instances, or opportunities to right-size services based on actual usage patterns. Armed with these insights, you can make informed decisions to optimize your cloud infrastructure and reduce unnecessary spending.

### **Effective CCM Solutions**

Effective CCM solutions offer a centralized platform that simplifies cloud cost complexity, making it easy to understand where your money is going. They integrate seamlessly with your cloud environment, analyze usage and billing data, and provide actionable insights. These solutions deliver granular cost visibility (down to the individual resource level), historical trend analysis for forecasting and budgeting, and customizable alerts to prevent unexpected spending surges. Advanced CCM tools also empower users with optimization recommendations, right-sizing suggestions, chargeback/showback features to improve accountability, and even support for maintaining cloud compliance.

### **Consolidated Visibility**

Effective CCM solutions break down silos between different cloud deployments. They allow you to view and analyze costs holistically across public, private, and hybrid cloud environments this is crucial for organizations leveraging multi-cloud strategies to manage costs with a unified approach.

### **Cost Monitoring and Analytics**

CCM tools provide deep insights into resource usage, spending trends, and forecasts. These often go beyond basic reporting – you can track amortized costs, set up custom reports, and analyze your reservation usage. Advanced analytics powered by AI/ML pinpoint inefficiencies, suggesting changes to how resources are utilized for optimal cost savings.

### **Optimization and Automation**

A powerful CCM solution doesn't just provide insights, it enables action. These tools can automate tasks such as shutting down idle resources, resizing instances based on need, and scheduling resource usage for optimal cost savings. This real-time optimization delivers continuous improvements in cloud efficiency.

### **Unified Platform**

The best CCM solutions create a single control point for managing costs across your entire cloud landscape. This consolidated platform eliminates the challenges of managing costs across different cloud environments, improves governance, and offers a cohesive view for decision-making.

### **Flexibility**

Effective CCM solutions should seamlessly integrate into your existing workflows, processes, and infrastructure. To make your CCM solution work with your other tools, look for flexible deployment options, the ability to customize data collection, and API integrations.

### **Usability**

CCM solutions must be approachable to a variety of stakeholders. Intuitive dashboards built for different users, self-service access to relevant data, alerts, and actionable recommendations drive adoption and ensure the valuable insights reach the right people at the right time.

### **CCM Tools Boost Cloud ROI**

CCM tools boost cloud ROI through a multifaceted approach.

They offer granular visibility into cloud costs across environments, breaking down expenses for informed decision-making. By pinpointing idle or underutilized resources, CCM tools help eliminate waste. They optimize resource choices, suggesting better instance fits and scheduling for maximum cost efficiency. These solutions also promote accountability with chargeback/showback models and enforce governance with budget monitoring and policy enforcement. Finally, CCM tools empower accurate forecasting for optimized budget planning and offer ongoing cost optimization recommendations and automation, ensuring a continued focus on maximizing cloud investment returns. Right CCM Tools Boost Cloud ROI by:

### **Providing Granular Visibility**

CCM tools go beyond surface-level reporting, breaking down cloud costs by project, team, resource type, and more. This deep visibility lets engineering teams understand exactly where money is going, enabling well-informed decisions that support cost optimization efforts.

### **Eliminating Waste**

Overprovisioned resources, forgotten instances, and inefficient configurations are common sources of cloud waste. CCM tools pinpoint these areas, highlighting opportunities to either eliminate unnecessary resources or resize them for better cost efficiency.

### **Optimizing Resources**

A good CCM solution helps optimize cloud resources in several ways. It can suggest more suitable instance types, find underutilized workloads that could be better scheduled, and identify where reserved instances would be more cost-effective than on-demand pricing.

### **Enforcing Governance**

CCM tools can enforce cost-related policies across the organization. They can help set and monitor budgets, prevent unauthorized spending, and ensure resources adhere to predefined standards. This keeps cloud costs aligned with business goals.

### **Promoting Accountability**

Chargeback and showback models, made easy with CCM tools, make teams directly accountable for their cloud usage. This increased awareness often leads to more judicious choices and a heightened focus on cost savings at a team level.

### **Forecasting and Planning**

CCM tools use historical cost trends and usage patterns to predict future cloud spending. This is essential for accurate financial planning, ensuring that cloud budgets are appropriately sized to support project and infrastructure needs.

### **Ongoing Optimization**

The cloud is dynamic, and cost optimization shouldn't be a one-time activity. Effective CCM tools come with features like automated actions and recommendations. They continuously analyze your cloud environment, suggesting optimizations, and sometimes even implementing those optimizations for a truly hands-off approach to maximizing cloud ROI.

### **Selecting the Right Tool: VIA (Visibility, Insights, and Actions) Criteria**

The following VIA (Visibility, Insights, and Actions) factors should be taken into account while assessing possible CCM systems to make sure you select the one that best suits the unique requirements

of your company:

### Visibility

Visibility refers to the tool's ability to provide a comprehensive view of your cloud spending across all environments. This includes breakdowns by account, project, department, resource type, and even custom tags. The deeper the visibility, the better you can understand where your cloud expenses originate.

### Cloud Service Level

A good CCM tool should provide clear cost overviews for the different cloud services you use. This means visibility into spending on compute resources, storage, networking, databases, monitoring tools, and more. Breaking down costs by service lets you see where the bulk of your cloud budget is going.

### Tag Level

Tagging resources is essential for cost allocation, and your CCM tool should work seamlessly with your tagging strategy. It must provide visibility into spending at the tag level, enabling you to see exactly how much projects, departments, or other categories are costing you. This fosters accountability across teams.

### Hierarchy Needs

Every organization is structured differently. Your CCM solution should be flexible enough to map your company's hierarchy, allowing accurate cost attribution across teams, divisions, and business units. This is key for implementing chargeback/showback models and aligning cloud spending with organizational structure.

### Drill-Down

It is crucial to be able to drill down from high-level cost summaries to finer details. The CCM tool should let you analyze expenses at various levels—accounts, projects, regions, specific cloud services, teams, and even individual resource IDs when needed. This granular control allows you to pinpoint the root causes of cost variances.

### Trend Analysis

Tracking historical costs is essential for spotting spending patterns and potential issues. Look for a CCM tool that provides robust trend analysis, helps you identify spikes or seasonal trends, and forecasts future spending to inform budgeting decisions.

### Container/Microservice Visibility

Cost visibility at the container and microservice levels is critical for organizations using containerized environments. Your CCM tool should be able to track resource consumption within these environments, ensuring accurate costs are attributed to the relevant teams or projects.

### Multi-cloud Single Pane of Glass

If you use multiple cloud providers, a CCM tool that consolidates costs across all your environments is a huge value-add. A single platform that gives you oversight of spending on AWS, Azure, GCP, and others simplifies cost management and enables unified optimization efforts.

### Insights

Insights delve beyond basic reporting. Look for a tool that analyzes historical data to identify trends, predict future costs, and pinpoint areas of potential waste. Advanced features might include AI/ML-powered analytics that uncover hidden inefficiencies in resource utilization.

**Unit Economics:** CCM tools can go beyond overall costs and help you calculate costs per unit (such as per user, customer, project, or transaction). Understanding these unit economics helps you track trends, calculate net profits, and make informed decisions about resource allocation and pricing strategies.

**Resource Utilization:** Over-provisioned or idle resources are a major source of cloud waste. A robust CCM tool will analyze your resource utilization, showing you where instances are underutilized or not used. With this, you can optimize your cloud infrastructure by either removing unneeded resources or resizing them to better align with actual needs.

**Container Optimization:** In containerized environments, monitoring resource usage at the container level is essential. Your CCM tool should provide insights into container-specific CPU and memory utilization, enabling you to fine-tune resource allocation and improve the cost-efficiency of containerized applications.

**Budgeting:** Setting clear budgets is key to controlling cloud costs. Good CCM platforms allow you to define granular budgets and provide alerts when thresholds are exceeded. This keeps teams accountable and lets you address unexpected spending before it spirals out of control.

**Forecasting:** Accurate cost forecasts are vital for financial planning. Look for a CCM tool that analyzes historical data and future usage patterns to predict future spending. This informs budget allocation, enables renegotiation of discounts with cloud providers, and ensures resources are in place to support upcoming projects.

**Customizable Dashboards:** Different stakeholders need different levels of data. Look for a CCM tool that empowers users with customizable dashboards tailored to their roles. This ensures that everyone, from engineers to executives, sees the cost insights most relevant to their responsibilities.

**Cloud Cost Alerting:** Proactive cost management is essential. CCM solutions should provide customizable alerts for budget overruns, sudden cost spikes, or other unusual spending patterns. These timely alerts allow you to identify and address potential issues quickly.

**Waste Identification:** CCM tools are waste detectives! They meticulously analyze your cloud usage to pinpoint potential sources of wasted spending, such as idle resources, orphaned instances, or underutilized infrastructure, enabling you to recover these wasted costs.

**Recommendations:** Advanced CCM tools offer proactive guidance on cost optimization. They might recommend right-sizing instances, adjusting configurations, or leveraging reserved or spot pricing models to save money.

**Anomaly Detection:** Unusual spikes or dips in cloud spending can signal potential issues. A CCM tool with anomaly detection capabilities flags these unexpected changes, allowing you to investigate and mitigate problems promptly.

### Actions

Actions empower you to take control of your cloud spending. The ideal CCM tool will offer features for automation, such as right-sizing underutilized resources or automatically shutting

down idle instances. Additionally, look for tools that provide recommendations and guidance for cost optimization, allowing you to manage your cloud expenses proactively.

**Automation:** One of the major benefits of CCM tools lies in their ability to automate cost optimization actions. Look for features like auto-scheduling the shutdown of non-production instances outside of business hours, right-sizing resources based on actual usage patterns, and automatically applying tags to cloud resources for easier cost tracking. Automation reduces manual effort and ensures consistent cost savings.

**Integrations:** A CCM tool shouldn't exist in a silo. Integration with your existing ticketing systems (like Jira, ServiceNow, etc.) can streamline the implementation of recommended optimizations and track progress in a structured way. This also helps with team accountability and improves cross-team collaboration.

**Integration with Collaboration Tools:** Connecting your CCM tool with your communication platforms (Slack, Teams, etc.) allows you to share cost insights, alerts, and recommendations with relevant stakeholders directly within their familiar workspace. This fosters quick discussion and timely action on cost-saving opportunities.

**Training and Support:** Choosing a CCM vendor with thorough training and ongoing support is crucial for maximizing the tool's value. Look for comprehensive documentation, tutorials, and access to knowledgeable support staff to ensure your team can fully utilize the platform and address any issues that might arise.

**Advanced Optimization Features:** As you become more proficient in CCM, explore advanced optimization features some tools offer. These may include automated reservation planning and purchase, enhanced cost optimization algorithms for Kubernetes environments (like bin packing), and smart utilization of spot instances for significant cost reductions.

Through the utilization of a strong CCM solution and adherence to the VIA (Visibility, Insights, and Actions) standards, enterprises may get the essential knowledge and authority to maximize their cloud investment, optimize their return on investment, and guarantee cost effectiveness all along the way.

## Build vs. Buy considerations for a CCM tools

### Building Your Own

#### Pros

- **Ultimate Customization:** If you have very specific requirements that off-the-shelf solutions can't meet, building in-house gives you full control over the tool's design and functionality.
- **Ownership:** Building the tool means you own it outright – no third-party dependencies or concerns about potential vendor changes down the line.

#### Cons

- **Initial Investment:** Building a custom CCM solution is a significant undertaking. Expect lengthy development time, resource allocation, and the potential for cost overruns in the development phase.
- **Maintenance and Updates:** Cloud providers consistently release new services and features. To keep up, your tool will need continuous updates and maintenance by a dedicated team.

- **Opportunity Cost:** The time and resources spent building a CCM tool could be diverted toward your core business initiatives.

## Purchasing a Pre-Built Solution

### Pros

- **Faster Time-to-Value:** Pre-built CCM tools are ready to use. Implementation is much faster than building from scratch, allowing you to start analyzing costs and realizing savings sooner.
- **Expertise:** CCM vendors specialize in this area. They invest in research, development, and staying updated with cloud provider changes, giving you access to that expertise without internal investment.
- **Support:** Most vendors offer dedicated support, easing the burden on your internal teams and helping you resolve issues promptly.

### Cons

- **Limited Customization:** While many CCM tools offer some configuration options, the level of customization will likely be lower than that of an in-house build.
- **Recurring Costs:** CCM tools usually involve subscriptions or licensing fees, adding to your ongoing operational expenses.
- **Vendor Reliance:** You become reliant on the vendor's roadmap and their continued support and development of the tool.

**The Decision:** The right choice depends on your organization's specific needs and resources. Consider these factors:

- **Expertise:** Do you have the in-house engineering talent to build and maintain a complex tool?
- **Urgency:** How quickly do you need a solution in place?
- **Budget:** Can you justify the upfront development costs of building vs. the ongoing costs of a third-party tool?
- **Unique Requirements:** Do you have extremely specialized needs that existing CCM platforms likely won't meet?

Many organizations find that a pre-built CCM tool offers a good balance of features, speed, and cost-effectiveness for long-term CCM [1-3].

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