

VAST View™

Finance: Cloud Best Practices



POWERED BY **CloudHealth**

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The Evolving Role of Finance in the Age of Cloud Computing

The introduction of public cloud computing has brought many benefits to companies looking for improved agility and lower costs. However, it has left many in Finance roles with the monumental task of tracking and managing cloud computing costs. Additionally, many Finance organizations struggle to align their metrics and data with engineering and operations teams due to different focuses in the business. These best practices are designed to help provide easier reporting and visibility into your business's infrastructure spend based on tasks performed by Finance organizations on a recurring schedule, while allowing engineering and operations teams to understand the data being presented by finance in ways they may also interpret it. The best practices outlined below can be used to perform analysis and communicate with Cost Center Owners in a clear and concise manner.

Introduction to VAST View™ Best Practices for Finance Professionals

VAST View provides visibility across your entire cloud ecosystem to optimize resources and define governance policies for ongoing management. Without a focus on cost optimization, businesses could be overspending on cloud costs by more than 70%.¹ Cloud optimization hinges on analyzing and managing data efficiently.

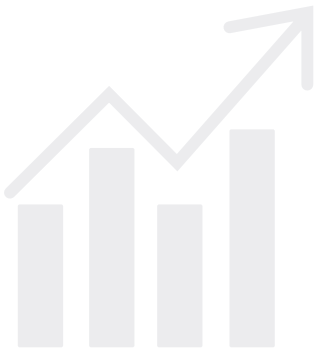
VAST View Finance: Cloud Best Practices looks at what Finance organizations across industries analyze on a daily, weekly and monthly basis. The best practices are focused on reporting, analysis and metrics used by Finance professionals, and how VAST View can assist in these responsibilities. Under each task below in the best practices, VAST View references reporting that you can integrate into other financial reports. Use these to provide Cost Center Owners visibility into their cost and usage trends, as well as policies to monitor and alert on these trends.

¹ Gartner, *Three Moves for CIOs to Lower Business Costs With Cloud*. 24 March 2017 by Ron Blair

Administrative Best Practices

The following best practices focus on reporting from an overall account view, as well as the best practice of looking at spend per cost center and per split between COGS and OpEx environments, when applicable. If your business reports on spend in other ways, a perspective based on this method will need to be created, as well. In order to achieve these views, a Cost Center and a COGS/OpEx perspective needs to be created using the following setup directions here. This requires that you have existing cost center tags in place, or a way of allocating assets by this method, as well as have accounts or tags in place to separate Production assets (COGS) from Non-Production assets (OpEx).

In various sections of the best practices, VAST View recommends sending reports and policies to Cost Center Owners based on filtering data by perspective. With this, it's a best practice to create these users in VAST View with custom roles that limit the capabilities within the product.



Budgeting Best Practices

Setting budgets is an integral part of financial and monthly analysis. Through setting a monthly forecast in total and by cost center, VAST View can monitor a team's spend throughout the month, send alerts when projected and/or actual spend is exceeding these budgets, and allow the business to evaluate accurate forecasts through past actual spend comparisons versus budget.

Set Budgets in Total

VAST View **Budgets** feature gives Finance the opportunity to input monthly budgets as a total spend to compare actual spend versus budget, as well as be alerted through Policies when actual spend is reaching or exceeding the budget. Budgets can be set in the main organization, as well as in sub-organizations for Cost Center Owners to manage their own environments.

Annual Budget

	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	TOTAL
Budget	130000	151200	163296	176359	190468	205705	222162	239935	259130	279860	302249	326429	\$ 2,646,793

Set Budget by Cost Center

Creating **Budgets** by a cost center allows Finance to put the accountability back on the Cost Center Owners. This feature gives visibility into what cost centers are budgeted for on a monthly basis, to allow Cost Center Owners to compare their spend throughout the month versus their budget, make future decisions based on their cost trends and business needs, and remain accountable for their spend through improved visibility.

Categorize By

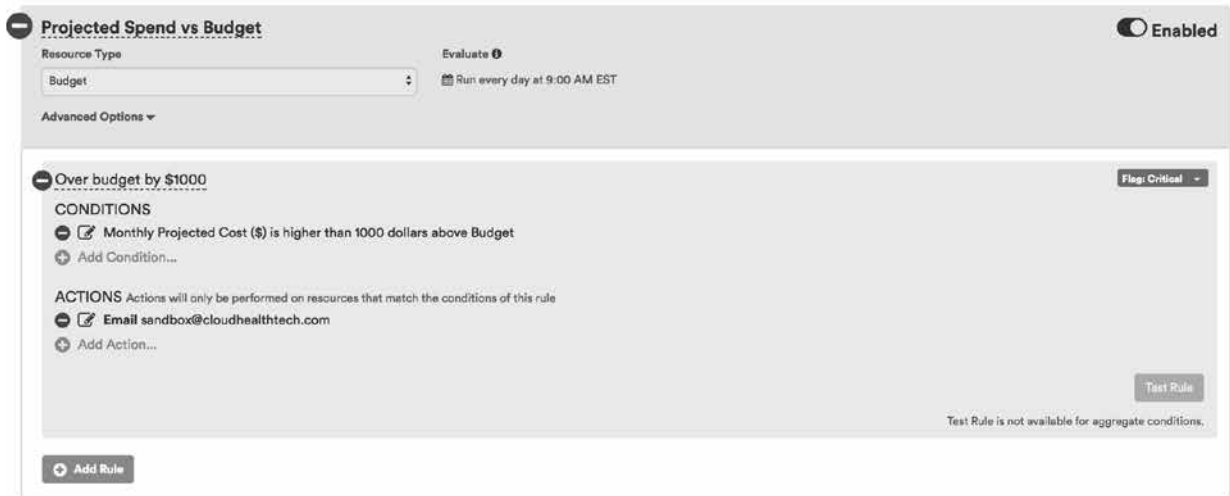
Cost Center

Add Budget For Group

	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	TOTAL
⊙ 100021	75000	75000	75000	75000	75000	75000	75000	75000	75000	75000	75000	75000	\$ 900,000
⊙ 100002	20000	20000	20000	20000	20000	20000	20000	20000	20000	20000	20000	20000	\$ 240,000
⊙ 100004	17030	17030	17030	17030	17030	17030	17030	17030	17030	17030	17030	17030	\$ 204,360
⊙ 100010	19000	19000	19000	19000	19000	19000	19000	19000	19000	19000	19000	19000	\$ 228,000
⊙ 100013	5000	5000	5000	5000	50000	5000	5000	5000	5000	5000	5000	5000	\$ 105,000
⊙ 100009	1200	1200	1200	1200	1200	1200	1200	1200	1200	1200	12000	1200	\$ 25,200
⊙ 100003	21000	21000	21000	21000	21000	21000	21000	21000	21000	21000	21000	21000	\$ 252,000
⊙ 100001	7085	7085	7085	7085	7085	7085	7085	7085	7085	7085	7085	7085	\$ 85,020
	\$ 165,315	\$ 165,315	\$ 165,315	\$ 165,315	\$ 210,315	\$ 165,315	\$ 165,315	\$ 165,315	\$ 165,315	\$ 165,315	\$ 176,115	\$ 165,315	\$ 2,039,580

Create policies to track projected spend vs budget

Using simple straight-line forecasting, VAST View can project spend based on the previous 30 days. Finance should set up **Policies** to alert themselves, as well as Cost Center Owners, when projected spend is reporting higher than the set budget. This should be done on a holistic level and for each Cost Center perspective group to allow teams to be aware of their spending trends before the month ends.



Conditions for Total Trend:

- Resource type = Budget
- Evaluate interval = Daily
- Conditions = While \$1,000 over budget is our recommended condition, determining what is possible for your business should be the condition set here. Percentages could be use in the condition rather than dollar based depending on the organization's preference
- Actions = Email Finance users

Conditions for Cost Center Trend:

- Perspective = Cost Center and choose a cost center from the groups dropdown
- Resource type = Budget
- Evaluate interval = Daily
- Conditions = While \$1,000 over budget is our recommended condition, determining what is possible for your business should be the condition set here. Percentages could be used in the condition rather than dollar based depending on the organization's preference
- Actions = Email Cost Center Owners

Create policies to track actual spend vs budget

Finance should set up **Policies** to alert themselves, as well as Cost Center Owners, when actual spend has reached their budget. This should be done on a holistic level and for each Cost Center perspective group to allow teams to be aware of their spending trends compared to their targets for the month.



Conditions for Total Trend:

- Resource type = Budget
- Evaluate interval = Daily
- Conditions = While 110% (10% over the budgeted amount) of budget is our recommended condition, determining what is possible for your business should be the condition set here. Dollar based conditions can be set in place of the percentage condition depending on the organization's preference.
- Actions = Email Finance users

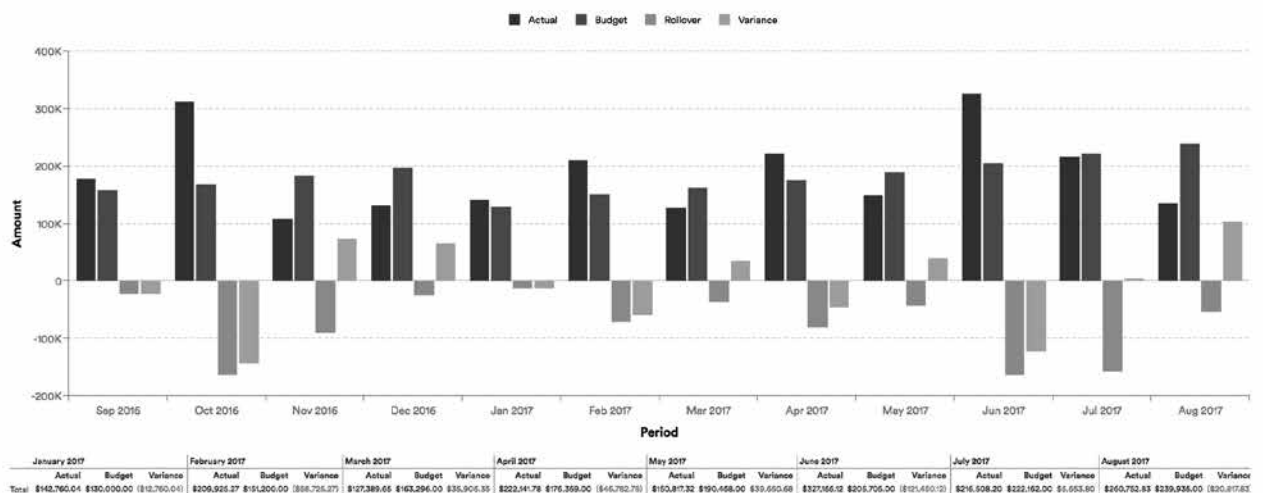
Conditions for Cost Center Trend:

- Perspective = Cost Center and choose a cost center from the groups dropdown
- Resource type = Budget
- Evaluate interval = Daily
- Conditions = While 10% over budget is our recommended condition, determining what is possible for your business should be the condition set here. Dollar based conditions can be set in place of the percentage condition depending on the organization's preference.
- Actions = Email Cost Center Owners

Comparing Actuals vs Budget Best Practices

VAST View **Budget versus Actual** reporting allows Finance to use previously set budgets, and subscribe themselves on a monthly basis to reports on actual spend and variances to the budget, as well as have the option for budgets to rollover from previous months to see variance on a year-to-date level. Similar reporting should be created for Cost Center Owners to be subscribed to on a monthly basis, or used for monthly reporting by the Finance team.

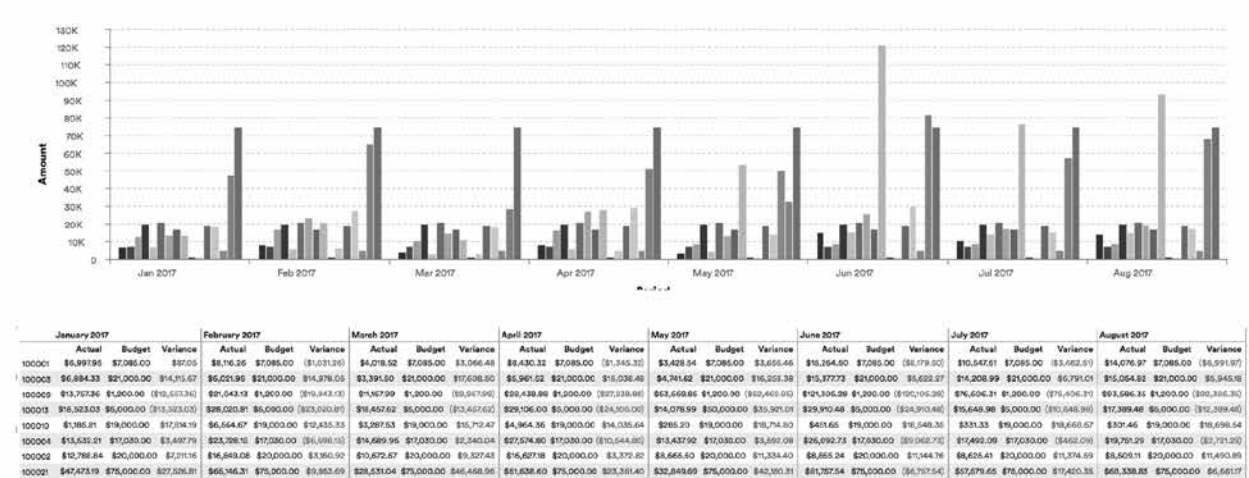
Total Budget vs Actual



Conditions:

- Category = Total
- Date range = From beginning of the year to last month
- Choose Rollover in the chart options to give visibility into YTD cumulative budget vs actual metrics

Budget vs Actual by Cost Center



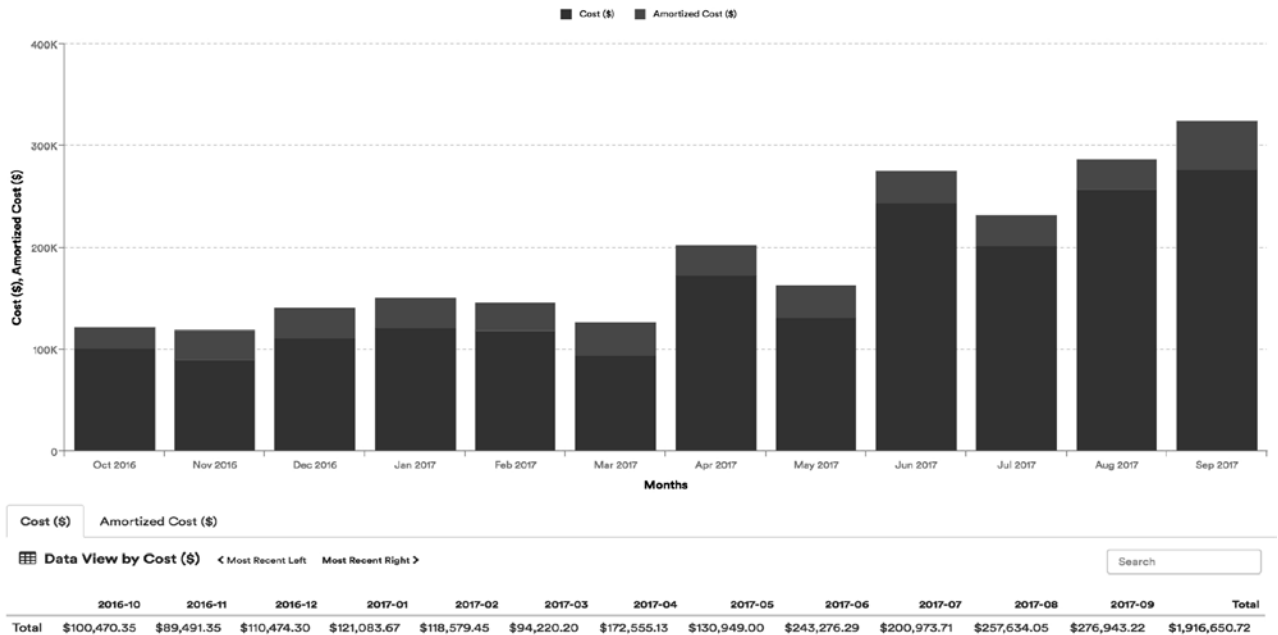
Conditions:

- Category = Total
- Date range = From beginning of the year to last month
- Choose Rollover in the chart options to give visibility into cumulative budget vs actual metrics

Chargebacks and Accruals Best Practices

While AWS finalizes the month-end bill throughout the first week of a month, CloudHealth can use the most recent cost provided by AWS to report on 'monthly spend in total and by Cost Center. As AWS updates the bill each day, VAST View will process this in the **Amortized Cost** report so accruals can be booked until the bill is finalized. The same amortized cost report can be broken down by cost center to view amortized used by each cost center, as well as the usage charges incurred by each.

Total Accrued Cost by Month

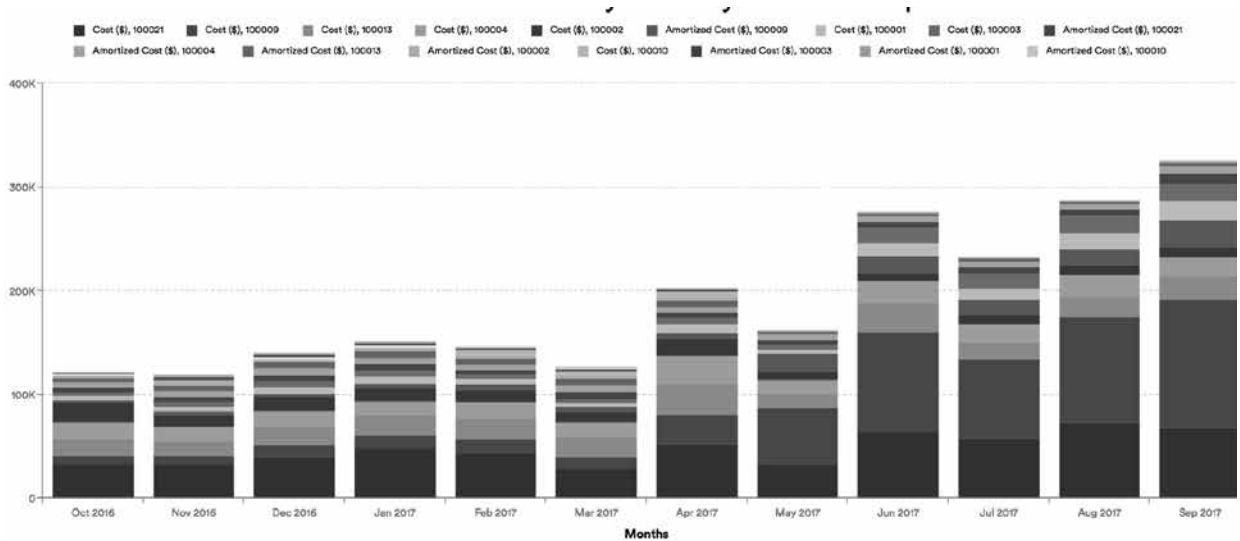


Conditions for Total Accrual:

- Interval = Monthly
- Y-Axis = Cost, Amortized Cost
- Category = Cost Center Perspective
- Chart Type = Stacked Bar

Total Chargeback Cost by Cost Center

Once spend is finalized for the previous month, VAST View **Amortized Cost** report can provide visibility into spend per Cost Center. This report should be subscribed to on a monthly basis and Cost Centers should be charged back the amortization based on who used the reservations as to accurately identify trends in spend.



Cost (\$) Amortized Cost (\$)

Data View by Cost (\$) < Most Recent Left Most Recent Right >

Cost Center	2016-10	2016-11	2016-12	2017-01	2017-02	2017-03	2017-04	2017-05	2017-06	2017-07	2017-08	2017-09	Total
100021	\$31,473.27	\$31,938.85	\$39,904.49	\$47,473.19	\$42,178.79	\$28,631.04	\$61,638.60	\$32,849.69	\$64,001.99	\$57,610.07	\$73,482.08	\$68,004.71	\$668,986.75
100009	\$8,863.88	\$8,202.20	\$11,137.23	\$13,767.36	\$14,205.82	\$11,157.59	\$28,438.88	\$53,669.85	\$95,545.04	\$76,606.31	\$100,666.74	\$123,591.65	\$545,842.93
100013	\$16,114.81	\$14,466.34	\$17,833.11	\$18,523.03	\$20,703.03	\$19,457.62	\$29,106.00	\$14,079.49	\$27,807.18	\$15,649.98	\$19,725.50	\$22,086.91	\$234,553.00
100004	\$16,404.54	\$13,754.69	\$15,127.46	\$13,559.57	\$15,763.86	\$14,726.59	\$27,591.10	\$13,438.57	\$21,036.73	\$17,492.61	\$20,932.89	\$17,989.82	\$207,818.44
100002	\$19,211.67	\$11,565.18	\$12,894.97	\$12,789.34	\$12,167.97	\$10,673.07	\$16,627.68	\$8,666.10	\$8,338.66	\$8,625.91	\$9,938.12	\$10,137.04	\$141,635.72
100001	\$4,990.76	\$4,233.97	\$6,246.03	\$6,911.03	\$5,176.36	\$3,994.86	\$8,226.99	\$3,218.47	\$12,273.93	\$10,548.51	\$16,094.61	\$18,635.28	\$100,550.82
100003	\$2,352.86	\$4,165.85	\$6,287.69	\$6,884.33	\$4,223.47	\$3,391.50	\$5,961.52	\$4,741.62	\$13,904.06	\$14,208.99	\$16,470.46	\$16,150.56	\$98,743.91
100010	\$1,058.58	\$1,163.28	\$1,043.32	\$1,185.81	\$4,160.15	\$3,287.53	\$4,964.36	\$285.20	\$368.70	\$331.33	\$323.65	\$347.24	\$18,519.16
Total	\$100,470.35	\$89,491.35	\$110,474.30	\$121,083.67	\$118,579.45	\$94,220.20	\$172,555.13	\$130,949.00	\$243,276.29	\$200,973.71	\$257,634.05	\$276,943.22	\$1,916,650.72

Conditions:

- Interval = Monthly
- Y-Axis = Cost, Amortized Cost
- Category = Cost Center Perspective
- Chart Type = Stacked Bar

Analyzing Month-over-Month Variances Best Practices

VAST View provides summary Pulse Reports to group similar reporting needs in one executive level report. The **Cost Pulse** Report shows month-to-date spend compared to the same point in time as the previous month, the projected spend versus the previous month, as well as the configured budget. The trend indicator gives a simple view with deltas and projected spend per cost center, as well as the services that are contributing the most to the growth or decline in spend. Subscribing Finance and Cost Center Owners to the Cost Pulse Report on a weekly basis will allow users to track their spend as the month progresses, as well as view their cost center's spend by other business views, such as environment, product or customer. This can be further filtered to individual cost centers so that each Cost Center Owner receives a service breakdown of their spend, as well as projected spend compared to their individual budget as well.

MONTH TO DATE COST for AUG Int - AUG 29th						O \$19,000.00	\$221,523.80
Last Month at This Time: \$130,443.49							
PROJECTED MONTH COST for AUGUST 2017						O \$20,458.00	\$306,966.88
Last Month Total Cost: \$296,508.80							
BUDGET VS. PROJECTED for AUGUST 2017						O \$149,652.00	\$166,316.00
TOP 15 PROJECTED COST BY GROUP							
Perspective Group	MTD	Last Month	Projected	Projected Δ	% Δ		
100009	\$79,333.61	\$76,606.31	\$107,875.36	\$31,369.05	40.9 %		○
100021	\$67,977.60	\$67,679.65	\$80,034.75	\$12,555.10	39.2 %		○
Assets Not Allocated	\$19,633.38	\$16,657.92	\$29,883.99	\$14,446.07	93.2 %		○
100004	\$17,276.83	\$17,492.09	\$23,720.04	\$6,227.95	35.6 %		○
100015	\$14,350.42	\$16,648.96	\$20,911.64	\$4,192.68	38.5 %		○
100005	\$12,036.73	\$14,208.99	\$18,186.25	\$3,906.26	27.5 %		○
100001	\$12,072.23	\$10,647.81	\$16,449.24	\$4,901.73	66.0 %		○
100002	\$7033.93	\$8,626.41	\$10,348.78	\$1,517.37	17.6 %		○
100010	\$62.83	\$31.33	\$38.81	\$32.48	15.8 %		○
TOP 15 PROJECTED COST BY SERVICE							
Service	MTD	Last Month	Projected	Projected Δ	% Δ		
EC2	\$196,203.76	\$184,844.66	\$270,947.62	\$85,102.66	46.6 %		○
S3	\$11,994.87	\$11,266.71	\$11,248.33	\$963.22	6.0 %		○
Amazon Elasticsearch Service - Direct	\$3,745.83	\$3,694.54	\$5,220.06	\$1,523.52	41.3 %		○
Amazon Cloudwatch	\$3,620.06	\$5,005.13	\$5,066.66	\$60.53	1.2 %		○
AWS CloudTrail	\$2,021.42	\$2,242.31	\$2,387.83	\$545.72	15.6 %		○
Elastic MapReduce	\$1,732.56	\$1,633.09	\$2,419.47	\$906.59	55.5 %		○
ElasticCache	\$1,376.68	\$1,435.24	\$1,838.32	\$413.58	29.0 %		○
RDS	\$402.87	\$230.41	\$470.66	\$240.25	104.3 %		○
AWS Config	\$388.78	\$289.93	\$272.70	\$26.28	-8.3 %		○
DynamoDB	\$163.89	\$164.01	\$230.90	\$66.89	40.8 %		○
Amazon Elastic File System	\$95.31	\$16.20	\$16.83	\$100.55	617.6 %		○
Amazon EC2 Container Registry (ECR)	\$71.15	\$49.84	\$63.33	\$13.49	7.0 %		○
CloudFront	\$27.87	\$29.42	\$39.56	\$10.14	34.5 %		○
Route 53	\$10.90	\$12.39	\$16.05	\$3.66	29.6 %		○
Simple Notification Service	\$2.74	\$4.42	\$3.57	-\$0.43	-10.2 %		○

Conditions:

- Interval = Monthly
- Category = Cost Center
- Display Budget = Enabled
- Non-Recurring Cost = Enabled

Once the books are closed for the previous month, analyzing the variances month-over-month, and by Cost Center, is vital in adjusting future forecasts and making business decisions to improve trends. Using the **Cost History** report to compare month-over-month spend as a dollar or percentage variance, will allow the business to use these numbers for input into forecast models, month-end reporting, and VAST View Policy conditions for abnormal growth trends. It's recommended to subscribe Finance and Cost Center Owners to these reports on a monthly basis so that the numbers are available easily without additional manual manipulation.

Total Variance (\$)

	2017-07 Δ	2017-07	2017-06 Δ	2017-06	2017-05 Δ	2017-05	2017-04 Δ	2017-04	2017-03 Δ	2017-03	2017-02 Δ	2017-02	2017-01 Δ	2017-01
Total	-33.82%	\$216,508.20	116.92%	\$327,155.12	-32.11%	\$150,817.32	74.38%	\$222,141.78	-39.32%	\$127,389.65	47.05%	\$209,925.27	7.39%	\$142,760.04

Conditions:

- Interval = Monthly
- Y-Axis = Cost
- Category = None
- Options = Show Values as Change over Time
- Chart Type = Bar-grouped

Total Variance (%)

	2017-07 Δ	2017-07	2017-06 Δ	2017-06	2017-05 Δ	2017-05	2017-04 Δ	2017-04	2017-03 Δ	2017-03	2017-02 Δ	2017-02	2017-01 Δ	2017-01
Total	-33.82%	\$216,508.20	116.92%	\$327,155.12	-32.11%	\$150,817.32	74.38%	\$222,141.78	-39.32%	\$127,389.65	47.05%	\$209,925.27	7.39%	\$142,760.04

Conditions:

- Interval = Monthly
- Y-Axis = Cost
- Category = None
- Options = Show Values as % Change over Time

Variance by Cost Center (\$)

Cost Center	2017-08 Δ	2017-08	2017-07 Δ	2017-07	2017-06 Δ	2017-06	2017-05 Δ	2017-05	2017-04 Δ	2017-04	2017-03 Δ	2017-03	2017-02 Δ
100021	\$23,876.59	\$91,456.24	\$-24,777.88	\$57,579.65	\$48,907.85	\$61,757.54	\$-18,788.90	\$32,849.69	\$23,107.56	\$51,638.60	\$-36,055.27	\$28,531.04	\$17,673.12
100009	\$33,973.95	\$110,580.26	\$-44,698.96	\$75,606.31	\$67,635.43	\$121,305.28	\$25,230.97	\$53,669.85	\$17,280.89	\$28,438.88	\$-9,885.14	\$11,157.99	\$7,285.77
Assets Not Allocated	\$13,170.38	\$28,638.31	\$-12,717.24	\$16,467.92	\$8,315.19	\$28,185.16	\$-29,733.48	\$19,869.98	\$15,396.88	\$49,603.46	\$-1,367.04	\$33,206.57	\$12,869.38
100013	\$4,770.46	\$20,419.42	\$-14,261.50	\$16,548.98	\$15,831.49	\$29,910.48	\$-15,027.02	\$14,078.99	\$10,648.38	\$29,105.00	\$-9,663.19	\$18,467.62	\$9,497.76
100004	\$5,277.66	\$22,769.75	\$-8,600.64	\$17,492.09	\$12,654.81	\$26,092.73	\$-14,135.88	\$13,437.92	\$12,884.83	\$27,574.80	\$-9,038.19	\$14,689.96	\$10,195.94
100002	\$1,492.43	\$10,117.83	\$-229.83	\$8,625.41	\$189.64	\$8,855.24	\$-7,961.58	\$8,665.60	\$5,954.51	\$16,627.18	\$-6,176.51	\$10,672.57	\$4,060.24
100001	\$6,70.39	\$17,257.90	\$-4,671.80	\$10,547.51	\$12,000.84	\$15,219.31	\$-5,008.52	\$3,218.47	\$4,232.13	\$8,226.99	\$-3,982.69	\$3,994.86	\$1,066.53
100003	\$2,597.31	\$17,206.30	\$-1,168.74	\$14,208.99	\$10,636.11	\$15,377.73	\$-1,219.39	\$4,741.62	\$2,570.02	\$5,961.52	\$-2,630.46	\$3,391.50	\$-862.38
100010	\$17.28	\$348.61	\$-120.32	\$331.33	\$166.45	\$451.65	\$-4,679.16	\$285.20	\$1,676.83	\$4,964.36	\$-3,277.14	\$3,287.53	\$5,378.85
Total	\$92,286.43	\$308,794.63	\$-110,646.92	\$216,508.20	\$176,337.80	\$327,155.12	\$-71,324.46	\$150,817.32	\$94,752.13	\$222,141.78	\$-82,535.62	\$127,389.65	\$67,165.23

Conditions:

- Interval = Monthly
- Y-Axis = Cost
- Category = None
- Options = Show Values as Change over Time

Variance by Cost Center (%)

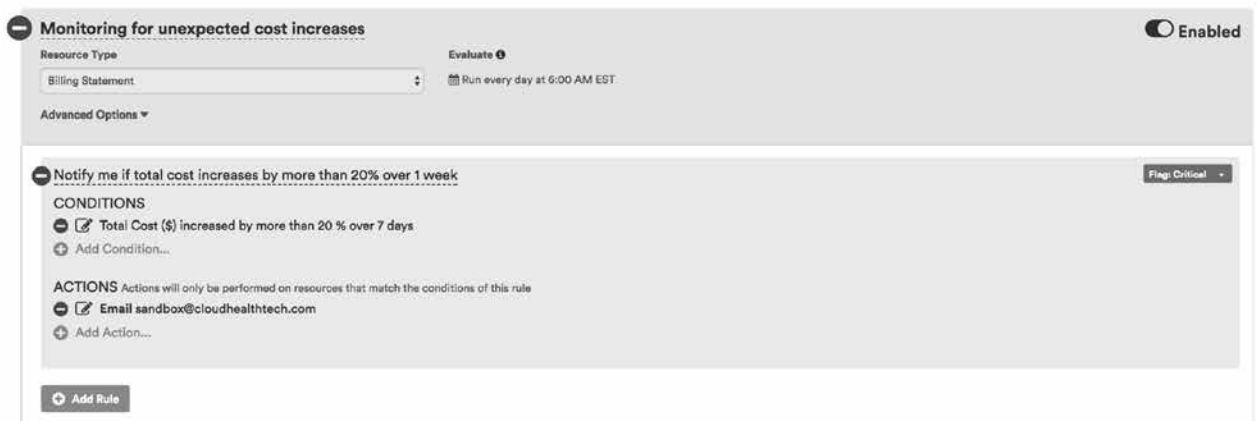
Cost Center	2017-08 Δ	2017-08	2017-07 Δ	2017-07	2017-06 Δ	2017-06	2017-05 Δ	2017-05	2017-04 Δ	2017-04	2017-03 Δ	2017-03	2017-02 Δ	2017-02
100021	41.47%	\$61,456.24	-29.57%	\$57,579.65	148.88%	\$81,757.54	-36.39%	\$32,849.69	80.99%	\$51,638.60	-56.20%	\$28,531.04	37.23%	\$55,146.31
100009	44.35%	\$110,580.26	-36.85%	\$75,606.31	126.02%	\$121,305.28	88.72%	\$53,669.85	154.87%	\$28,438.88	-46.98%	\$11,157.99	62.96%	\$21,043.13
Assets Not Allocated	85.15%	\$28,638.31	-45.12%	\$15,467.92	41.85%	\$28,185.16	-59.94%	\$19,869.98	49.38%	\$49,603.46	-3.95%	\$33,206.57	69.29%	\$34,673.61
100013	30.48%	\$20,419.42	-47.68%	\$15,648.98	112.45%	\$29,910.48	-51.63%	\$14,078.99	67.69%	\$29,105.00	-34.13%	\$18,467.62	61.28%	\$28,020.81
100004	30.17%	\$22,769.75	-32.96%	\$17,492.09	94.17%	\$26,092.73	-51.27%	\$13,437.92	87.71%	\$27,574.80	-38.09%	\$14,689.96	76.35%	\$23,728.15
100002	17.30%	\$10,117.83	-2.60%	\$8,625.41	2.19%	\$8,855.24	-47.88%	\$8,665.60	55.79%	\$16,627.18	-36.66%	\$10,672.57	31.75%	\$16,849.08
100001	63.62%	\$17,257.90	-30.70%	\$10,547.51	372.87%	\$15,219.31	-60.88%	\$3,218.47	105.94%	\$8,226.99	-49.92%	\$3,994.86	15.43%	\$7,977.56
100003	21.09%	\$17,206.30	-7.60%	\$14,208.99	224.31%	\$15,377.73	-20.46%	\$4,741.62	75.78%	\$5,961.52	-43.68%	\$3,391.50	-12.53%	\$6,021.95
100010	5.21%	\$348.61	-26.64%	\$331.33	68.56%	\$451.65	-94.26%	\$285.20	61.01%	\$4,964.36	-40.92%	\$3,287.53	453.60%	\$6,564.67
Total	42.62%	\$308,794.63	-33.82%	\$216,508.20	116.92%	\$327,155.12	-32.11%	\$150,817.32	74.38%	\$222,141.78	-39.32%	\$127,389.65	47.05%	\$209,925.27

Conditions:

- Interval = Monthly
- Y-Axis = Cost
- Category = Cost Center Perspective
- Options = Show Values as Change over Time

Create Policies to Alert on Large Cost Increases

You can have greater control over your costs by benchmarking the cost of each Cost Center, or in total, month over month. If you have a large number of Cost Centers, this task can become overwhelming. A best practice is to manage by exception by identifying those cost centers that have changed by more than 20% and leveraging Perspectives and **Policies**. Using the variance reports above with a daily interval, Finance can create a baseline of growth per day and use that value or percentage as the condition for the following Policy.



The screenshot displays a policy configuration window titled "Monitoring for unexpected cost increases" with an "Enabled" toggle. The "Resource Type" is set to "Billing Statement" and the "Evaluate" interval is "Run every day at 6:00 AM EST". Under "Advanced Options", a rule is defined with the title "Notify me if total cost increases by more than 20% over 1 week" and a "Flag: Critical" status. The rule includes one condition: "Total Cost (\$) increased by more than 20 % over 7 days" and one action: "Email sandbox@cloudhealthtech.com".

Conditions:

- Resource type = Billing Statement
- Evaluate interval = Daily
- Conditions = The percentage increase should be determined from a baseline found in the variance reporting in the section above
- Actions = Email Finance users

Managing Reservations Best Practices

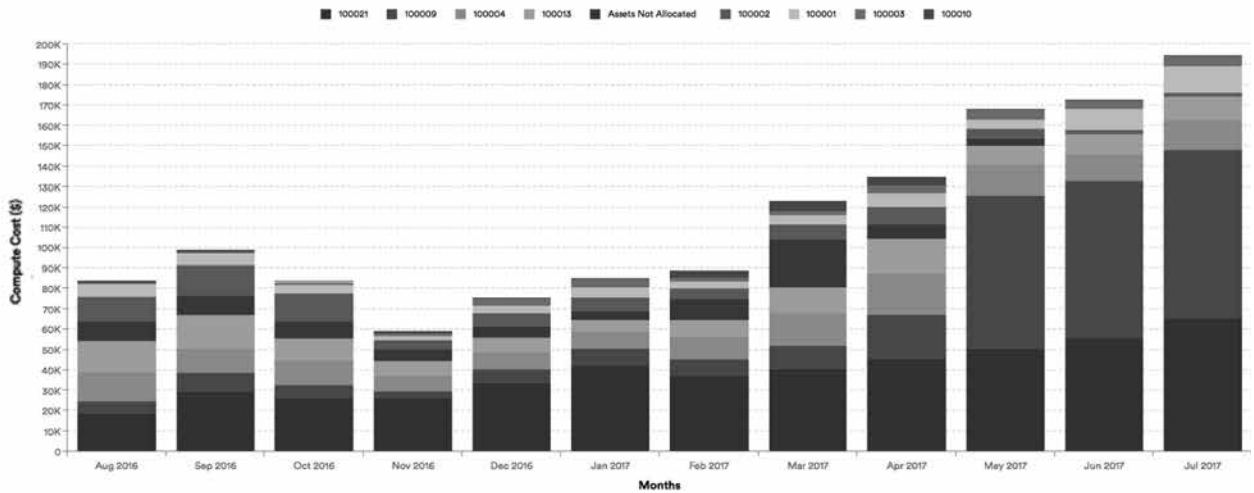
Reservations allow you to make an upfront monetary commitment in return for a discount on your compute cost. By having customers commit to the usage of specific infrastructure, cloud providers can better manage their capacity and therefore pass these savings to their customers. For more information on what reservations are and how to leverage these for future optimizations, see our Help Center article here. Best practice is to cover at least 70% of your infrastructure with reservations.

Once reservation purchases are completed, monitoring and managing these RIs on a daily basis is important for recognizing the full value of the large investment made. Through Policies and reporting recommendations in VAST View, Finance can be alerted when reservations are underutilized, when reservation purchases are expiring and will need to be repurchased, as well as take actions on some of these underutilized reservations on your behalf. Finance should work with their IT Operations or Engineering counterparts to manage reservations and determine what can be done to optimize the reservation purchases.



EC2 On Demand Cost by Cost Center

Running the **EC2 Instance Cost** report will give Finance and IT Ops visibility into what cost centers are spending the most on unreserved EC2 instances. This information can be used to filter reservation recommendations from VAST View EC2 RI Optimizer, and to identify what areas within the cost center can be reserved, such as by environment, product or customer. It's recommended to make reservation purchases on a monthly cadence and subscribe the business to these reports monthly to monitor the trends of on demand cost.



Conditions:

- Interval = Monthly
- Y-Axis = Compute Cost
- Category = Cost Center
- Filters = Reservation Type "On Demand"

Optimal EC2 RI Recommendation

The VAST View **EC2 RI Optimizer** evaluates your AWS instances to determine if you can benefit from the use of Reserved Instances. During the evaluation, the Optimizer analyzes your previous usage and identifies the optimum purchase for a given budget.

VAST View uses a constraint-based algorithm that analyzes hourly on-demand usage over a time period. The algorithm compares options until it finds the most efficient option for a reservation purchase that fits within your budget constraints. The aim is to provide the best recommendations for your specified constraints such as budget, purchase date, and filters.

Conditions:

- Choose Time Period to Analyze = Last 30 days
- Preferred Time = 1 year; however, 3 year RIs give you larger discounts if your organization's forecasted usage is more stable.
- Target Coverage = 100%. VAST View recommends up to 100% while only recommending the reservations that are cost-beneficial to reserve. The best practice is to be at least 70% reserved.
- Budget = Max budget provides optimal RI recommendations; adjust this to the amount of upfront capital your business can provide, or to see different scenarios at different budget points.
- Estimated Purchase Date = Setting this in the future will take into account RIs that expire between now and that date. Set this to the date that you would like to purchase for to ensure you're including all active RIs at the time. If you set the Purchase Date to a future date, VAST View will alert you if there are reservations expiring by that purchase date and include them in the recommendation. There is also an option below the Purchase Date to recommend only the expiring RIs if you do not wish to purchase additional RIs.
- Offering Types = Best practice is to allow the RI Optimizer to choose the most optimal RI type. Choose the type that accommodates your business's upfront payment ability if certain types are not feasible, but, in most cases, Partial Upfront RIs provide very similar benefits to All Upfront RIs.
- Reservation Types = There are reservation type options to the right of the Offering Types to select for analysis. By default, VAST View will recommend regional, size-flexible reservations.
- Filters = If an overall RI purchase is not an option for the business, picking the cost centers that spend the most on compute cost will allow you to make an impact on reducing your monthly spend without making such a large commitment. By utilizing the filters in the RI Optimizer, specific accounts can be selected to analyze the usage and reservations needed to cover more stable usage.

Once finalized, quotes can be saved and sent to business owners for approval before purchasing. Purchases can be made through VAST View, using approval processes set by the business, or can be exported and sent to an AWS rep to purchase on your behalf.

OPTIONS ▾

Time Period To Analyze: Last 30 Days | Preferred Term: 1 Year | Target Coverage: 100 % | Set Your Budget (Max: \$673,852): \$0

EXTENDED OPTIONS ▾

Estimated Purchase Date: 03/20/2018 | Billing Account: AWS CHT Sandbox | Purchase Account: AWS CHT Sandbox

Offering Types: All Upfront, Partial Upfront, No Upfront

Choose Lower Prepay Res Type if Savings < 3 %

Run Optimizer

Recommendation Summary

INSTANCES	RESERVATIONS TO BUY	COVERAGE	UPFRONT COST	BREAK EVEN	SAVINGS	MONTHLY SAVINGS	ANNUAL SAVINGS
1,483	386	95%	\$573,692	6.3 mo	15%	\$42,651	\$511,813

Recommendations by Location

LOCATION	INSTANCE TYPE	ACCOUNT	OS	TENANCY	INSTANCES	INSTANCES (NORMALIZED)	CURRENT	BUY	UPFRONT	COVERAGE	CURRENT	PROJECTED MONTHLY	CURRENT	PROJECTED ANNUAL		
us-east-1					1,483	15587.5	1042	386	\$573,692	95%	\$285,471	\$242,820	\$42,651	\$3,425,652	\$2,913,839	\$511,813
	c3 size flexible	AWS CHT Sandbox	Linux/UNIX	default	157	2380	151	3	\$4,564	98%	\$27,423	\$27,061	\$361	\$329,073	\$324,737	\$4,335
	c4 size flexible	AWS CHT Sandbox	Linux/UNIX	default	40	1208	3	33	\$134,821	96%	\$21,238	\$13,641	\$7,597	\$254,852	\$163,694	\$91,159
	i3 size flexible	AWS CHT Sandbox	Linux/UNIX	default	362	4392	188	135	\$229,066	85%	\$110,592	\$93,656	\$16,936	\$1,327,106	\$1,123,677	\$203,228
	m3 size flexible	AWS CHT Sandbox	Linux/UNIX	default	388	1910	354	31	\$30,722	99%	\$33,936	\$31,654	\$2,282	\$407,236	\$379,851	\$27,385
	m4 size flexible	AWS CHT Sandbox	Linux/UNIX	default	149	1180	72	74	\$37,736	98%	\$17,180	\$12,981	\$4,199	\$206,166	\$155,777	\$50,389
	m5 size flexible	AWS CHT Sandbox	Linux/UNIX	default	47	380	0	46	\$46,159	98%	\$6,647	\$4,047	\$2,600	\$79,764	\$48,565	\$31,200
	r4 size flexible	AWS CHT Sandbox	Linux/UNIX	default	317	4064	265	53	\$88,074	99%	\$67,319	\$58,899	\$8,420	\$807,831	\$706,793	\$101,038
	t2 size flexible	AWS CHT Sandbox	Linux/UNIX	default	23	73.5	9	11	\$2,560	87%	\$1,135	\$879	\$257	\$13,623	\$10,544	\$3,079
Total					1,483	15587.5	1042	386	\$573,692	95%	\$285,471	\$242,820	\$42,651	\$3,425,652	\$2,913,839	\$511,813

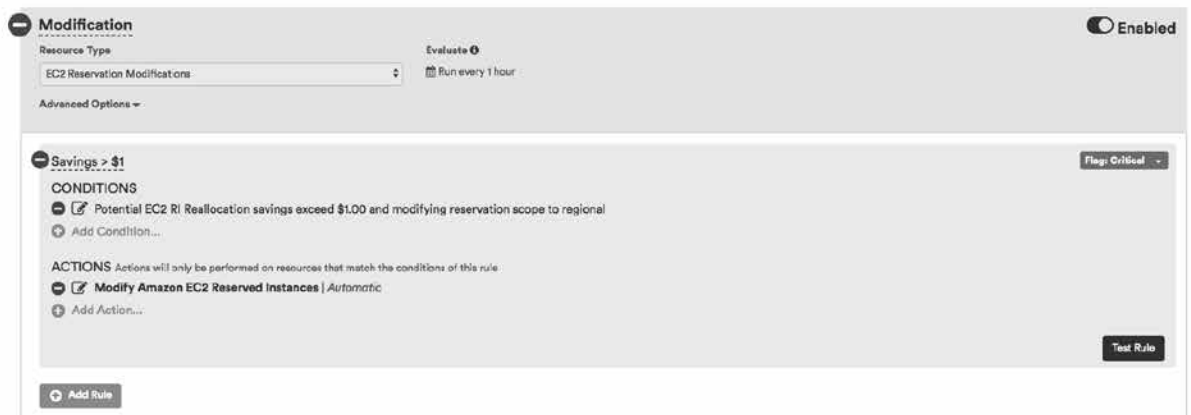
EC2 Reservation Management

EC2 RI Modifications

VAST View gives you the ability to modify coverage for all instances tied to your reservation, or just a subset, in one or more of the following ways:

- Switch availability zones within the same region
- Change between EC2-VPC and EC2-Classic
- Change the instance type within the same instance family

The **EC2 RI Modifier** analyzes your Reserved Instances as well as your instance usage, and makes cost-saving modification recommendations to consider. Creating an hourly automated policy, like below, will reduce the need to manually modify these through the report.



Conditions:

- Resource type = EC2 Reservation Modifications
- Evaluate interval = 1 hour
- Conditions = Savings exceeds \$1 for modifying reservations scope to regional. Note that moving standard AZ reservations to a regional reservation is best practice, but can be changed to maintain scope by editing the policy condition if reserving capacity is necessary for your organization.
- Actions = Modify Automatically

Underutilized EC2 RIs

Ensuring that Reservations are utilized every hour will help maximize the benefit of your purchases. Having policies alert when Reservations are unused for more than 1 hour will give you the opportunity to review changes that can be made in your infrastructure to better utilize these RIs, or identify opportunities for you to sell, modify or convert your existing Reservations.



The screenshot shows the AWS CloudWatch Events console for an event rule named "Underutilized EC2 Reservations". The rule is currently "Enabled". The "Resource Type" is set to "EC2 Reservation". The "Evaluate" frequency is "Run every day at 6:00 AM EST". The rule has one condition: "Under Utilized RIs MTD Hours is higher than 1 hours". The action is "Email sandbox@cloudhealthtech.com". There is a "Test Rule" button and an "Add Rule" button at the bottom.

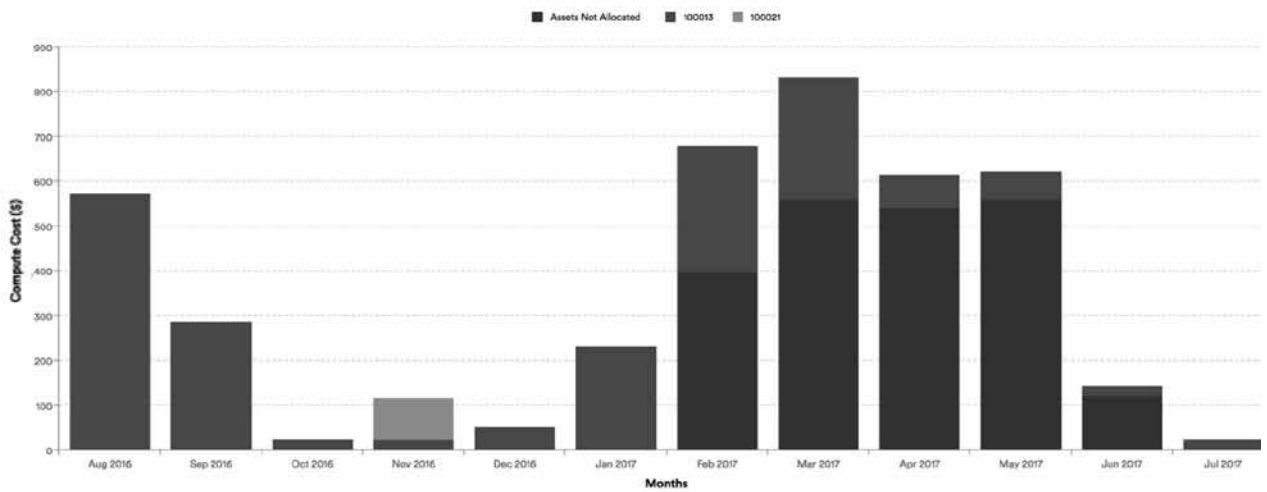
Conditions:

- Choose Time Period to Analyze = Last 30 days
- Preferred Time = 1 year but 3 year RIs will give you larger discounts if your organization's forecasted usage is stable
- Budget = Max budget will give optimal RI recommendations but adjust this to the amount of upfront capital your business can provide
- Estimated Purchase Date = Setting this in the future will take into account RIs that expire between now and that date. Set this to the date that you would like to purchase for to ensure you're including all active RIs at the time.
- Offering Types = Best practice is to allow the RI Optimizer to choose the most optimal RI type. Choose the type that accommodates your business's upfront payment ability if certain types are not feasible.
- Filters = Cost Center Perspective should be filtered to the cost center that had the largest spend in the RDS Instance Cost report above.

RDS On Demand Cost by Cost Center

Similar to analysis done for EC2 in the sections above, unreserved RDS instances can be analyzed through the **RDS Instance Cost** report.

Subscribe to this report on a monthly basis to track the trend of unreserved RDS instances before making RDS reservation purchases.



Conditions:

- Interval = Monthly
- Y-Axis = Compute Cost
- Category = Cost Center
- Filters = Reservation Type equals On Demand

Optimal RDS RI Recommendation

Using the **RDS RI Optimizer**, similar to the EC2 RI Optimizer, VAST View can analyze the on demand usage in your environment to determine the most optimal RI purchases.

OPTIONS ▾

Choose Time Period To Analyze <input type="text" value="Last 30 Days"/>	Choose Preferred Term <input type="text" value="1 Year"/>	Set Your Budget (Max: \$2,420) ⓘ <input type="text" value="\$0"/> \$2,420
---	---	--

EXTENDED OPTIONS ▾

Estimated Purchase Date <input type="text"/>	Billing Account AWS CHT Sandbox Andi Abes testshane73017	Purchase Account <input type="text" value="AWS CHT Sandbox"/> Andi Abes testshane73017	Reservation Types <input checked="" type="checkbox"/> All Upfront <input checked="" type="checkbox"/> Partial Upfront <input checked="" type="checkbox"/> No Upfront Choose Lower Prepay Res Type if Savings < <input type="text" value="3"/> % ⓘ <input type="text" value="FILTERS: ▾"/>
--	--	--	---

Run Optimizer

Save \$28,832 per month (\$345,981 per year) by purchasing 2 All Upfront and 99 Partial Upfront reservations for a total upfront price of \$129,380

The Effective Cost Savings including the amortized upfront price will be \$18,050 per month (\$216,601 per year)

The projected reservation rate is 66.9% and the payback period is 4.5 months

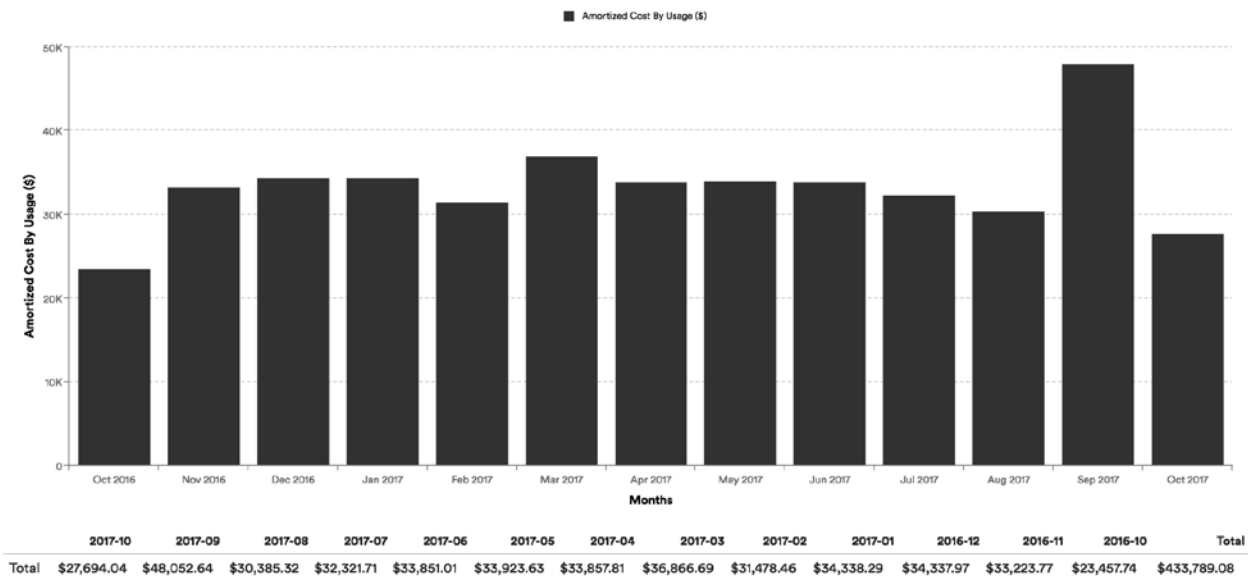
Conditions:

- Interval = Monthly
- Y-Axis = Compute Cost
- Category = Cost Center
- Filters = Reservation Type equals On Demand

Reporting Amortization Best Practices

VAST View reports on amortization by which account purchased the reservations, as well as which account or cost center used the reservation. This can help with the chargeback process by purchasing reservations at the consolidated payer level, and charging back cost centers based on what they used. This reduces cases where accounts or cost centers may have purchased reservations, but didn't receive the benefit of these reservations due to floating under the consolidated account. For more information on Reservations under consolidated billing, see AWS documentation here.

It is recommended to subscribe finance to the **EC2 RI Amortization** on a monthly basis for month-end reporting, as well as subscribe Cost Center Owners to a filtered view of their cost center amortization.

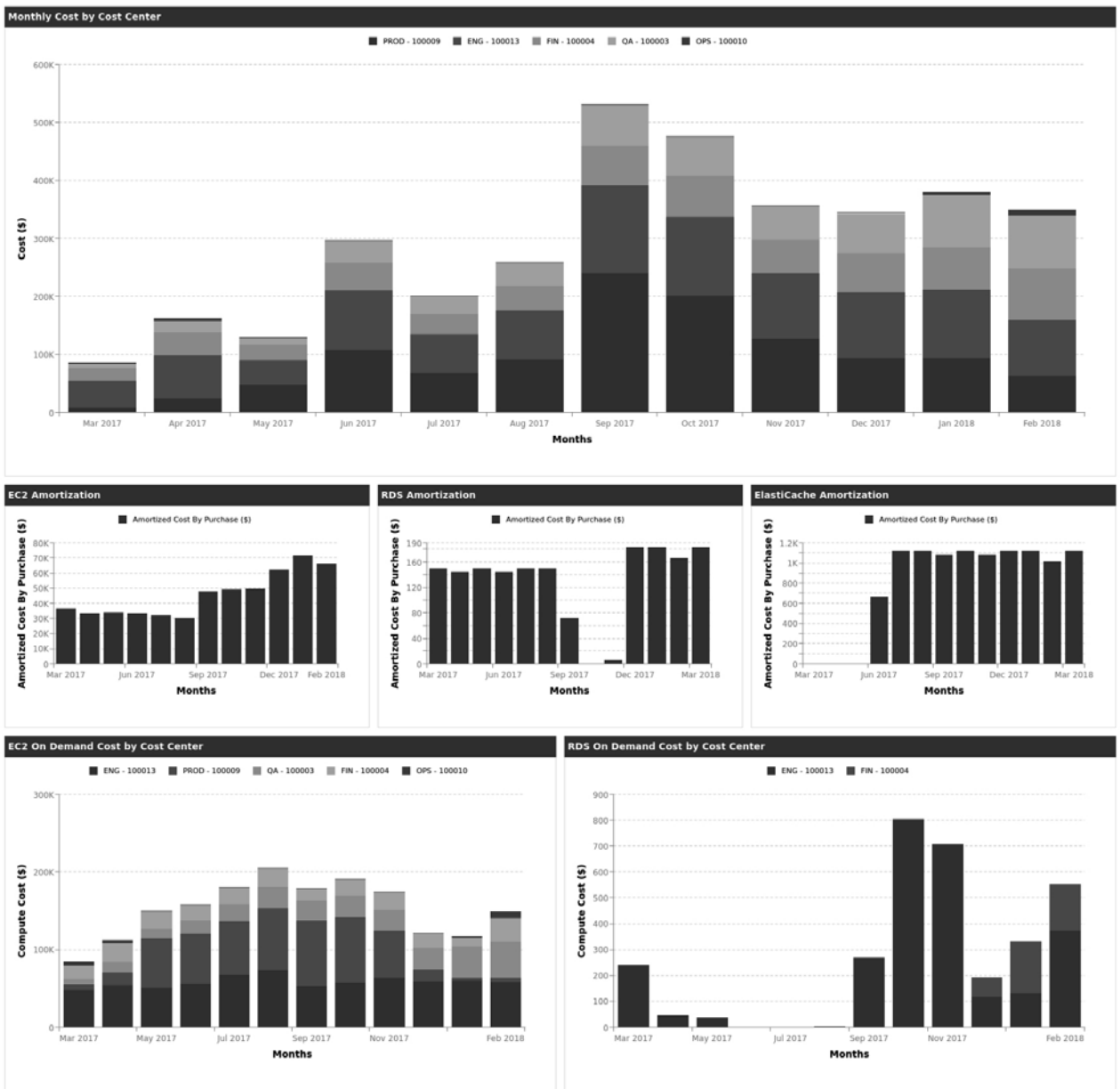


Conditions:

- Interval = Monthly
- X-Axis = Months
- Y-Axis = Amortized Cost by Usage
- Category = None
- Filters = None
- Chart Type = Bar

Executive Reporting Best Practices

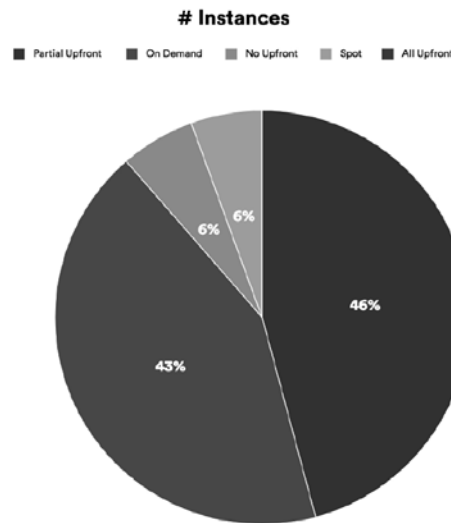
Dashboards allow Finance to create executive and cost center views to provide visibility to various teams. By grouping the best practice interactive charts seen in the above sections into one central dashboard, users can be provided these reports in one view when they log in, or be subscribed to it on a weekly or monthly basis. It's recommended to make a dashboard per role, and a dashboard per cost center, based on the descriptions and recommendations in the reporting sections above.



Key Performance Indicators and Metrics

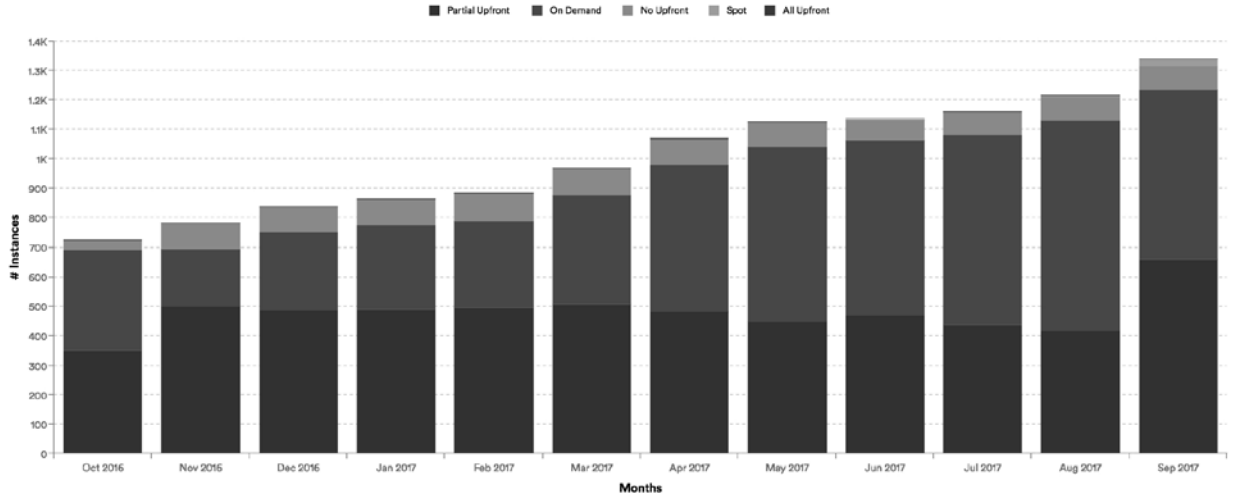
Reserved Capacity Percentage

Reserving capacity for your infrastructure is a quick way to lower spend each month. Looking at the **EC2 Instance Usage** pie chart below to see the split between on-demand and reserved capacity can help you create a strategy for reserving at least 70% of your usage. The bar chart below shows this split over time using the EC2 Instance Usage report, or similarly, the **RDS Instance Usage** report.



Conditions:

- Interval = Monthly
- X-Axis = # Instances
- Y-Axis = Reservation Type
- Category = None
- Filters = Months set to Current Month
- Chart Type = Pier



Reservation Type	2017-09	2017-08	2017-07	2017-06	2017-05	2017-04	2017-03	2017-02	2017-01	2016-12	2016-11	2016-10	Total
Partial Upfront	661.70	417.76	436.53	471.00	449.39	481.30	506.91	495.54	491.17	488.32	498.43	349.33	5,747.37
On Demand	575.30	710.80	645.02	593.97	593.99	499.62	372.08	294.80	282.46	262.72	196.64	344.17	5,371.57
No Upfront	77.81	80.77	76.50	69.34	81.99	86.92	88.82	92.64	90.97	86.33	85.82	30.49	948.41
Spot	25.80	6.80	3.04	0.00									35.66
All Upfront	0.69	0.69	0.73	0.95	2.11	2.18	2.40	3.00	2.27	2.00	1.72	0.16	18.89
Total	1,341.29	1,216.82	1,161.82	1,135.25	1,127.47	1,070.02	970.22	885.99	866.87	839.37	782.61	724.15	12,121.89

Conditions:

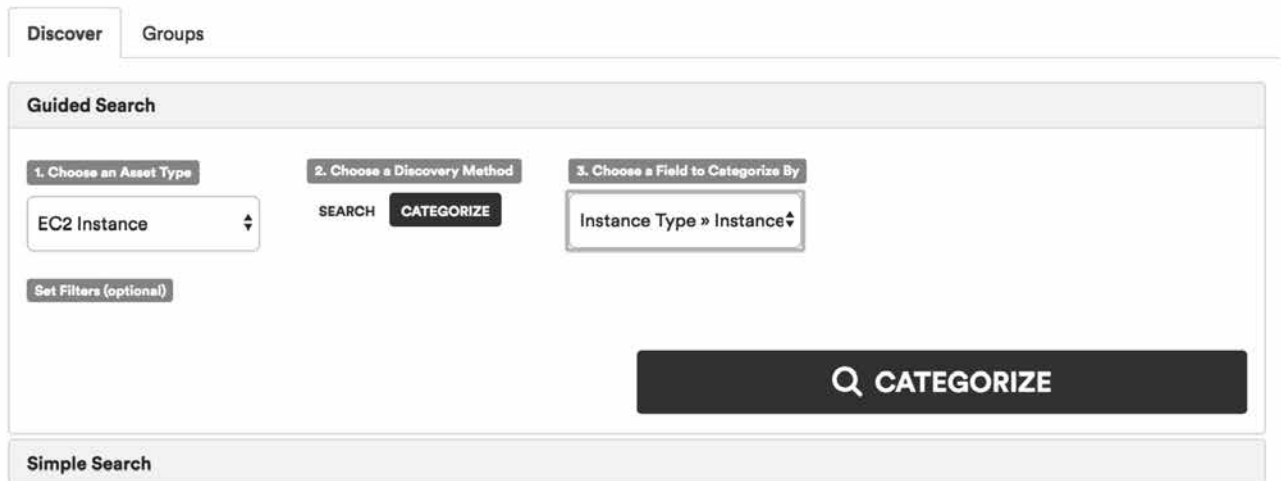
- Interval = Monthly
- X-Axis = # Instances
- Y-Axis = Months
- Category = Reservation Type
- Chart Type = Bar

EC2 Cost per Instance Hour

Most customers find EC2 to be the largest component of their spend. Tracking this spend by instance hour allows the business to ensure they are moving in the right direction with reservations, while considering this by instance family to limit the number of variables impacting their spend. This requires looking at instance hours by family, as well as the spend per instance family. To create this analysis, you'll need to have a perspective by instance family, using the instructions below to set this up. You'll then combine the outputs from the following instance usage report and instance cost report to mimic the calculations below.

Perspective by Instance Family

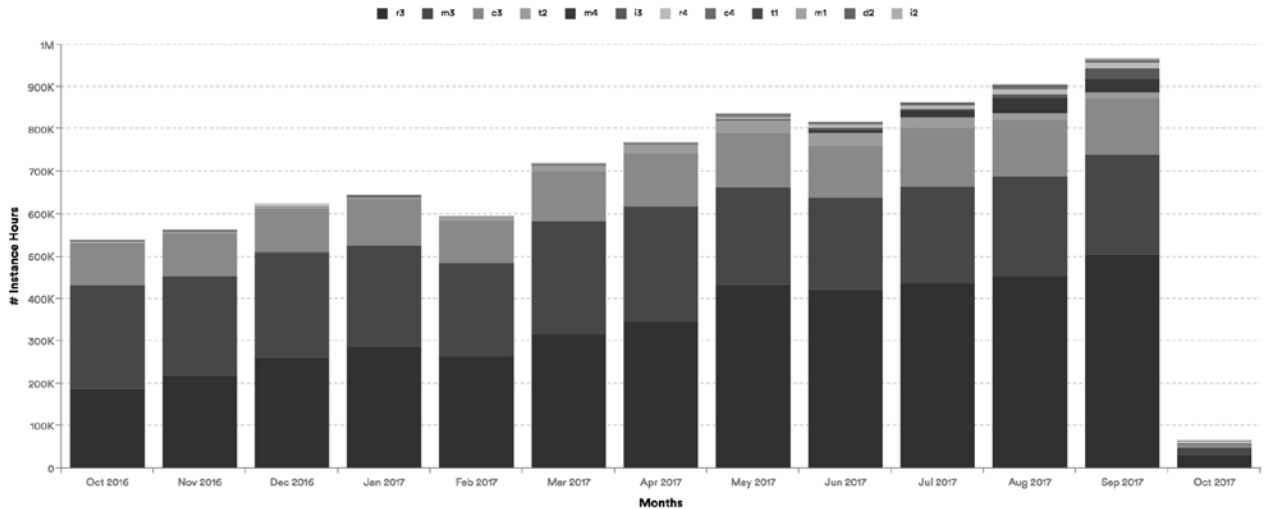
Set up an Instance Family perspective using the asset type "EC2 Instance" and categorizing by Instance Type > Instance Family. Add all results as a dynamic group to reduce maintenance when new types are used.



The screenshot shows the VAST interface with two tabs: "Discover" and "Groups". The "Discover" tab is active. Below the tabs is a "Guided Search" section. It contains three numbered steps: "1. Choose an Asset Type" with a dropdown menu showing "EC2 Instance"; "2. Choose a Discovery Method" with "SEARCH" and "CATEGORIZE" buttons; and "3. Choose a Field to Categorize By" with a dropdown menu showing "Instance Type » Instance". There is also a "Set Filters (optional)" button. A large "CATEGORIZE" button with a magnifying glass icon is positioned at the bottom right of the guided search area. Below the guided search is a "Simple Search" section.

Instance Usage Report

Create an **Instance Usage** report with the following conditions below to look at the number of instance hours by instance family.



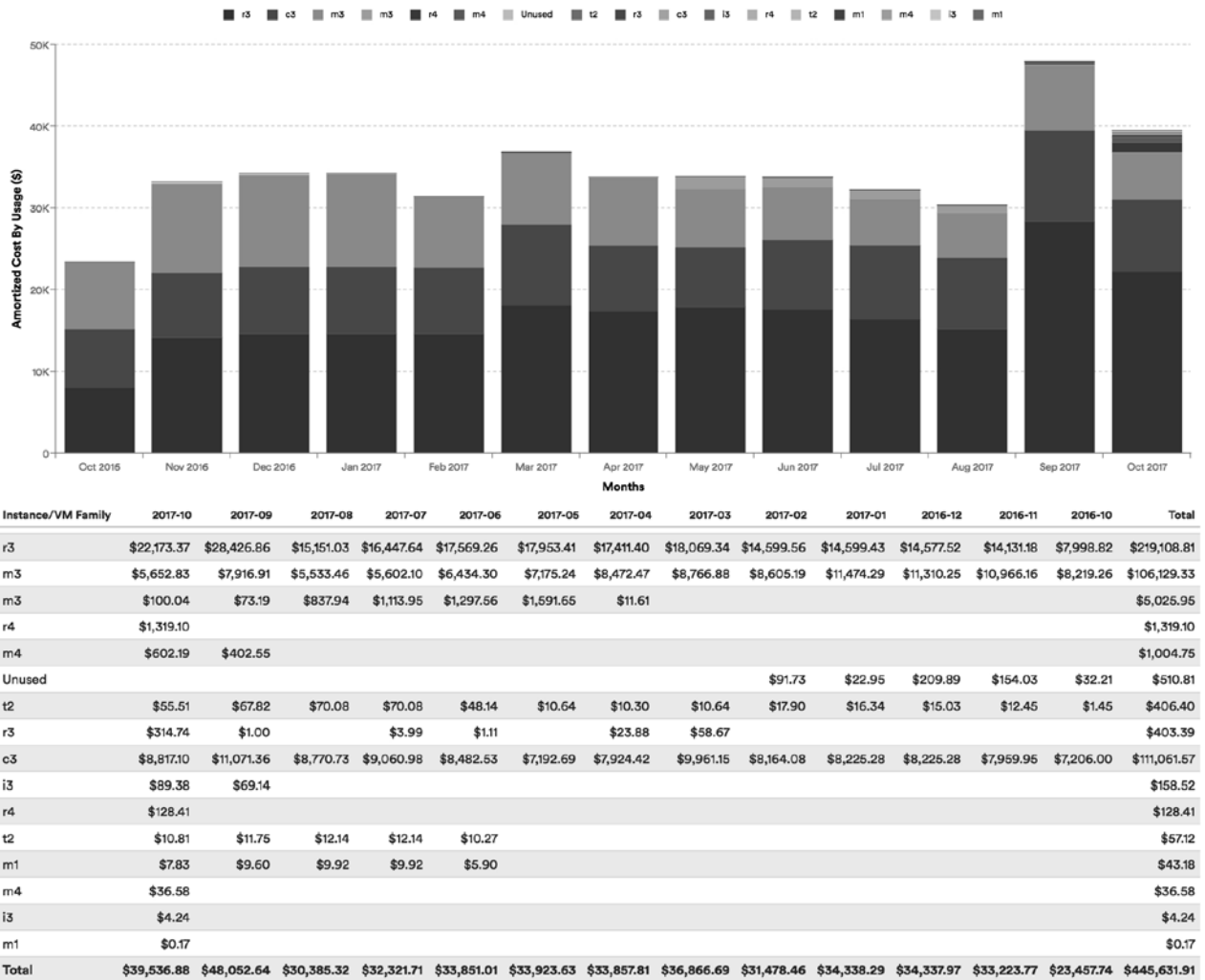
Instance Type Families	2017-10	2017-09	2017-08	2017-07	2017-06	2017-05	2017-04	2017-03	2017-02	2017-01	2016-12	2016-11	2016-10
r4	519.00	12,382.47	11,695.00	8,929.00	8,235.00	1,593.00	720.00	722.00					
r3	32,414.56	504,362.38	451,795.65	436,452.00	420,770.00	433,168.00	342,990.00	316,143.00	264,598.00	286,232.00	261,278.00	219,162.00	187,012.00
c3	8,326.00	130,867.00	134,804.90	139,882.00	124,214.00	127,214.00	123,763.00	118,530.00	101,240.00	109,322.00	105,255.00	101,871.00	99,892.00
t2	877.69	14,547.00	15,174.00	24,079.00	29,962.00	32,816.00	22,155.00	15,594.00	7,831.00	7,644.00	7,455.00	6,517.00	3,738.00
m4	2,576.00	34,560.95	36,388.01	14,326.00	5,607.00	1,701.00	216.00						22.00
i3	3,875.00	22,625.00	8,489.00	4,696.00	6,288.00	4,085.00	724.00	725.00					
m3	14,939.09	236,131.70	236,731.97	227,476.00	215,562.00	229,740.00	275,134.00	266,409.00	218,928.00	238,771.00	247,480.00	233,046.00	245,593.00
c4	635.61	8,022.00	8,409.00	7,355.00	5,506.00	5,548.00	1,620.00			3.00			
t1	47.00	721.00	341.00		519.00	2,232.00	2,160.00	2,232.00	2,016.00	2,233.00	2,278.00	2,160.00	1,752.00
m1	45.00	720.00	744.00	744.00	720.00	744.00	935.00	1,488.00	769.00	744.00	744.00	720.00	762.00
d2	45.00	720.00	744.00	456.00									
i2		72.00											
Total	64,299.94	965,731.50	905,316.53	864,395.00	817,383.00	838,841.00	770,417.00	721,843.00	595,382.00	644,949.00	624,490.00	563,476.00	538,771.00

Conditions:

- Interval = Monthly
- X-Axis = Months
- Y-Axis = # Instance Hours
- Category = Instance Type Families

EC2 Amortization Report

Create an **EC2 Amortization** report using the instance family perspective you just created. This will be used in combination with the instance cost report data to get a total cost per instance family.



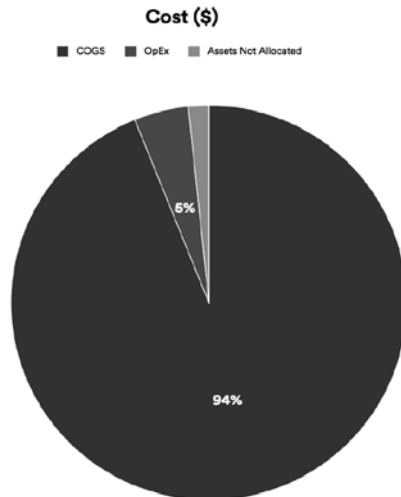
Conditions:

- Interval = Monthly
- X-Axis = Months
- Y-Axis = Amortized Cost by Usage
- Category = Instance Family Perspective

Cost per Instance	2017-10	2017-09	2017-08	2017-07
r3	\$ 37.47	\$ 39.81	\$ 10.69	\$ 6.62
c3	\$ 1.02	\$ 1.06	\$ 1.08	\$ 0.94
m3	\$ 0.10	\$ 0.09	\$ 0.09	\$ 0.09
r4	\$ 1.01	\$ 0.40	\$ 0.36	\$ 0.27
m4	\$ 0.19	\$ 0.20	\$ 0.19	\$ 0.19
t2	\$ 0.03	\$ 0.03	\$ 0.03	\$ 0.03
r3	\$ 37.47	\$ 39.81	\$ 10.69	\$ 6.62

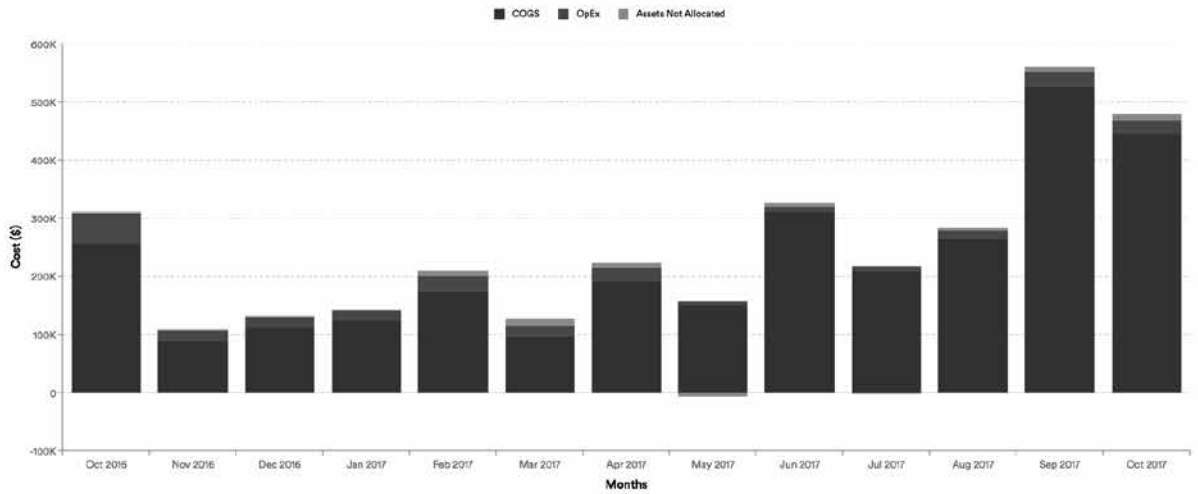
COGS/OpEx Allocation

To understand the split between your COGS and OpEx environments, a perspective can help allocate your cost and usage to these two environments to monitor the trends of your spend, as well as use these in P&L calculations. Looking at the current split of COGS vs OpEx spend in the pie chart below allows the business to make decisions on the current performance, but the trend below that helps analyze this split over time using the **Cost History** report.



Conditions:

- Interval = Monthly
- X-Axis = COGS/OpEx Perspective
- Y-Axis = Cost (\$)
- Category = None
- Chart Type = Pie
- Filters = Month equals Current Month



Conditions:

- Interval = Monthly
- X-Axis = Months
- Y-Axis = Cost (\$)
- Category = COGS/OpEx Perspective
- Chart Type = Bar – Stacked

Frequency of Reports and Policies

STAKEHOLDERS				
	Financial Analyst	Controller	Cost Center Owner	CFO
Monthly	<ul style="list-style-type: none"> • Budget vs Actual • Chargebacks & Accruals • M-o-M Variance • EC2/RDS On Demand Cost • Reservation Analysis 	<ul style="list-style-type: none"> • Budget vs Actual • Chargebacks & Accruals • M-o-M Variance • Reservation Analysis • Amortization Reporting 	<ul style="list-style-type: none"> • Budget vs Actual • Chargebacks & Accruals • M-o-M Variance • Budget vs Actual • Budget vs Actual 	<ul style="list-style-type: none"> • Budget vs Actual • Chargebacks & Accruals • M-o-M Variance
Weekly	<ul style="list-style-type: none"> • Cost Pulse Report • Executive Dashboard 	<ul style="list-style-type: none"> • Executive Dashboard 	<ul style="list-style-type: none"> • Cost Plus Report • Executive Dashboard 	<ul style="list-style-type: none"> • Executive Dashboard
Daily	<ul style="list-style-type: none"> • Projected Cost vs Budget • Actual Cost vs Budget • Cost Increase Policy • EC2 RI Modifier • Underutilized RI Policy • Expiring Reservations 		<ul style="list-style-type: none"> • Projected Cost vs Budget • Actual Cost vs Budget • Cost Increase Policy 	

- Policy
- Report

CONCLUSION

It's important to remember that these best practices are not meant to be one-time activities, but ongoing processes. Because of the dynamic and ever changing nature of the cloud, cost optimization activities should ideally take place continuously.

Learn more about how you can help you automate the continuous optimization by visiting www.vastITservices.com

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