
AWS
re:Invent

MGT303

Turbocharging cost optimization with Amazon CloudWatch metrics

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AWS

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Agenda

Cost management tools

Metrics and telemetry

Collecting metrics

Example use cases



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Cost management tools



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AWS Cost Explorer



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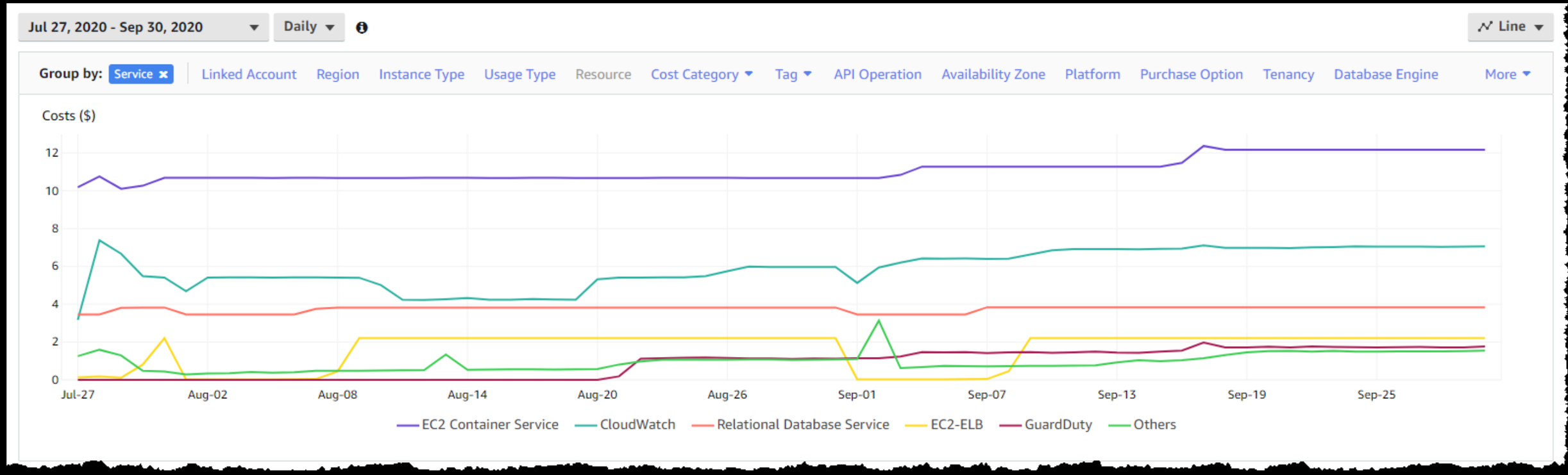
AWS Cost Explorer overview

WHAT IS AWS COST EXPLORER?

- Free tool to view your AWS costs based on your usage
- AWS Cost Explorer helps you to monitor and optimize your spending within AWS
- Filter and group costs by service, tag, and usage type
- Generate AWS Cost Explorer reports based on tags

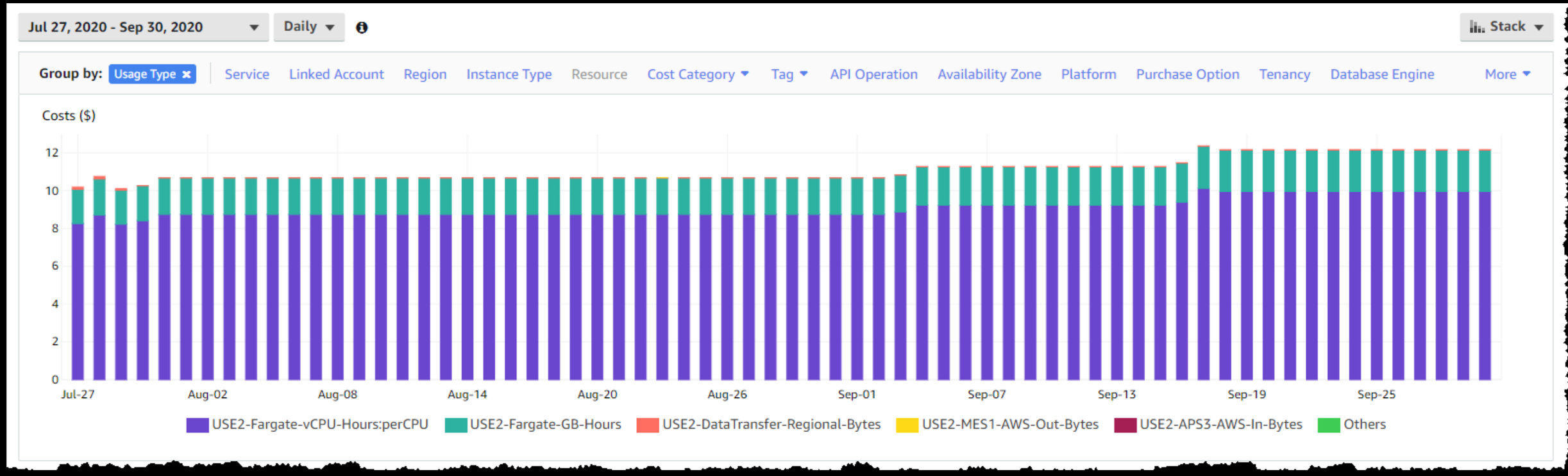
AWS Cost Explorer

GROUP BY SERVICE COST



AWS Cost Explorer

GROUP BY USAGE TYPE



https://www.wellarchitectedlabs.com/cost/100_labs/100_5_cost_visualization/

AWS Cost & Usage Report



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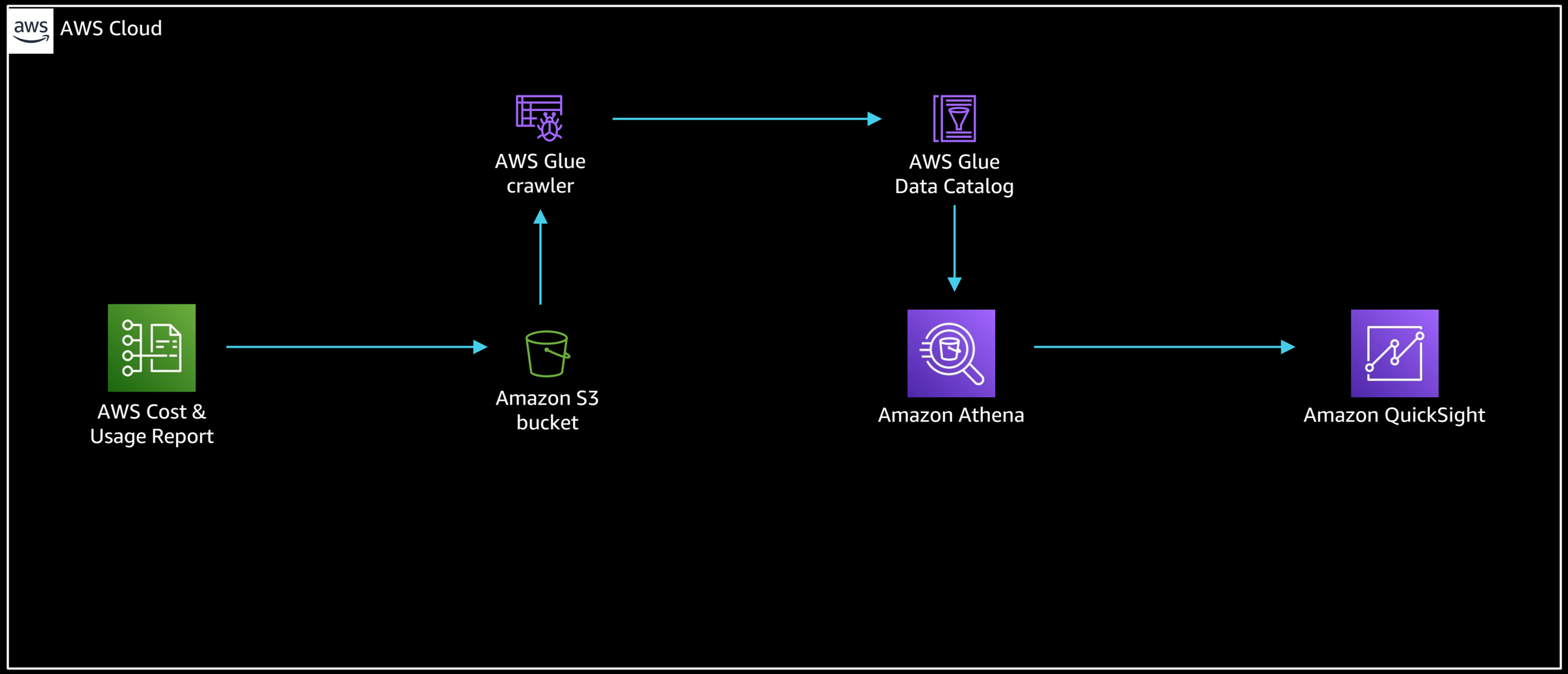
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AWS Cost & Usage Report – Overview

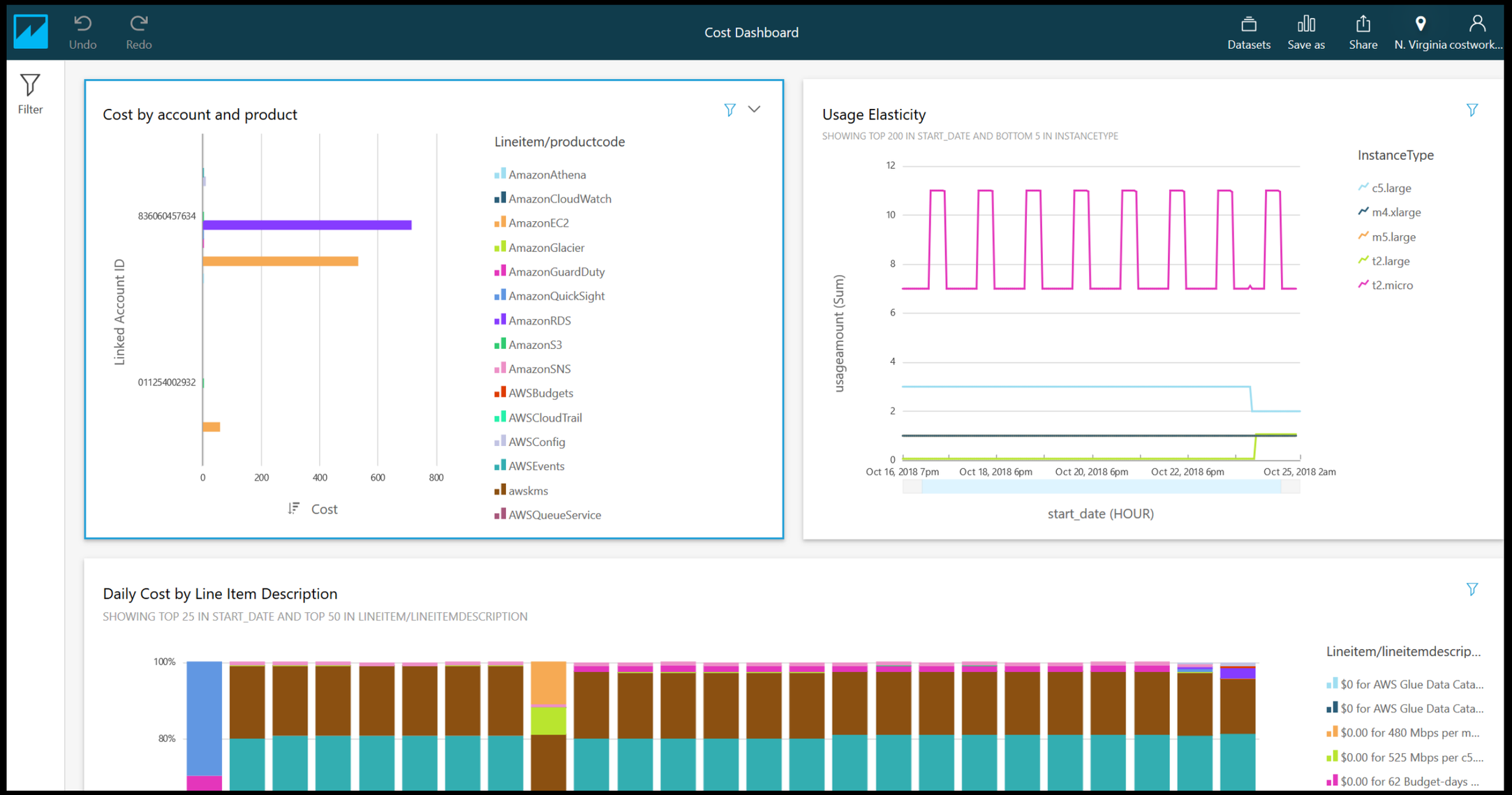
WHAT IS THE AWS COST & USAGE REPORT?

- Deliver report files to your Amazon Simple Storage Service (Amazon S3) bucket
- Line item details
- Hourly granularity
- Includes resource IDs
- Used with Amazon QuickSight, Amazon Redshift, or other business intelligence tools

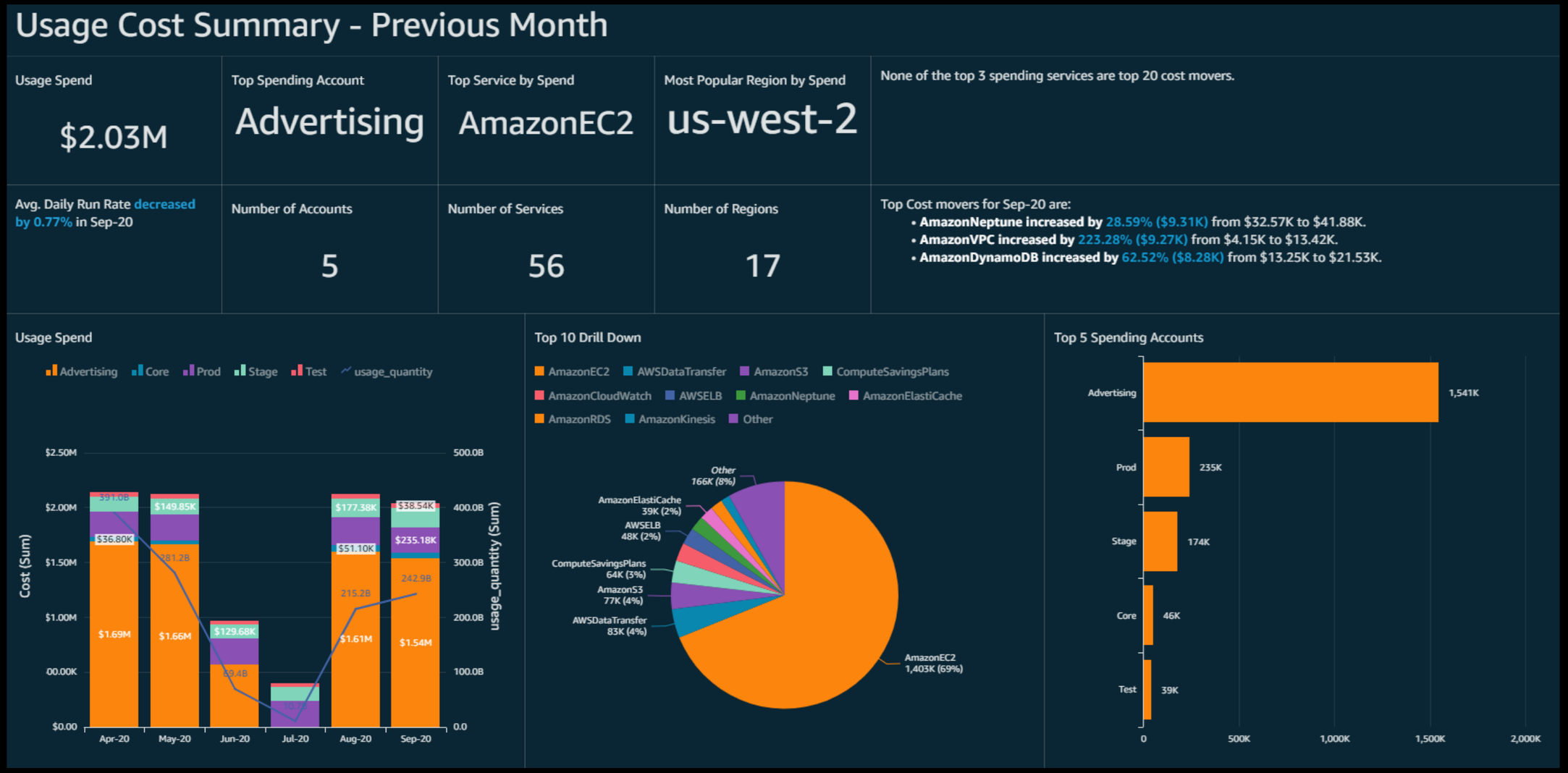
AWS Cost & Usage Report with QuickSight



AWS Cost & Usage Report with QuickSight



AWS Cost & Usage Report with QuickSight



https://www.wellarchitectedlabs.com/cost/200_labs/200_enterprise_dashboards/

AWS Cost & Usage Report with QuickSight



https://www.wellarchitectedlabs.com/cost/200_labs/200_enterprise_dashboards/

Usage and telemetry



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Usage versus telemetry

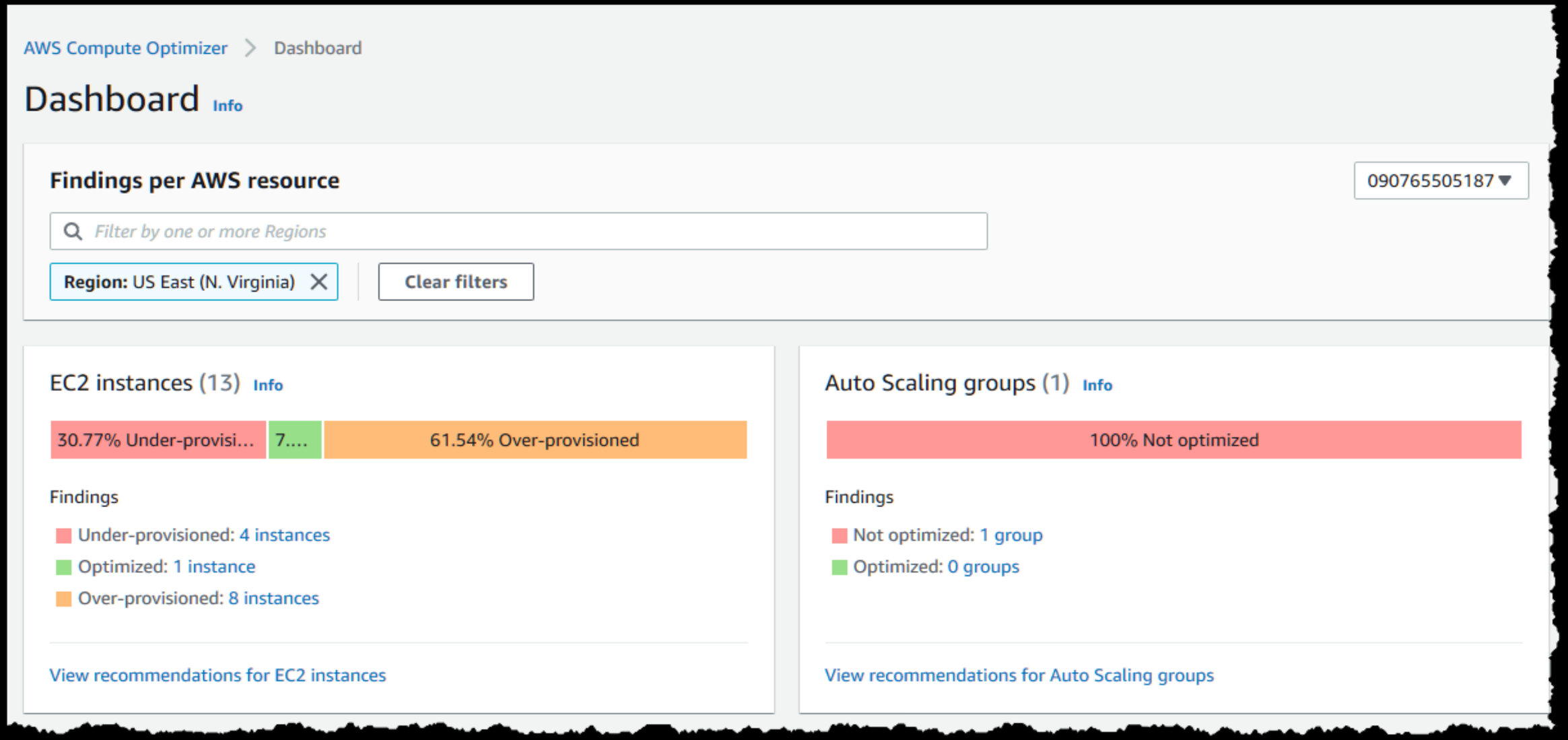
What is usage?

- Resource consumption
- How much we used
  (e.g., 7,500 hours of m5.xlarge)

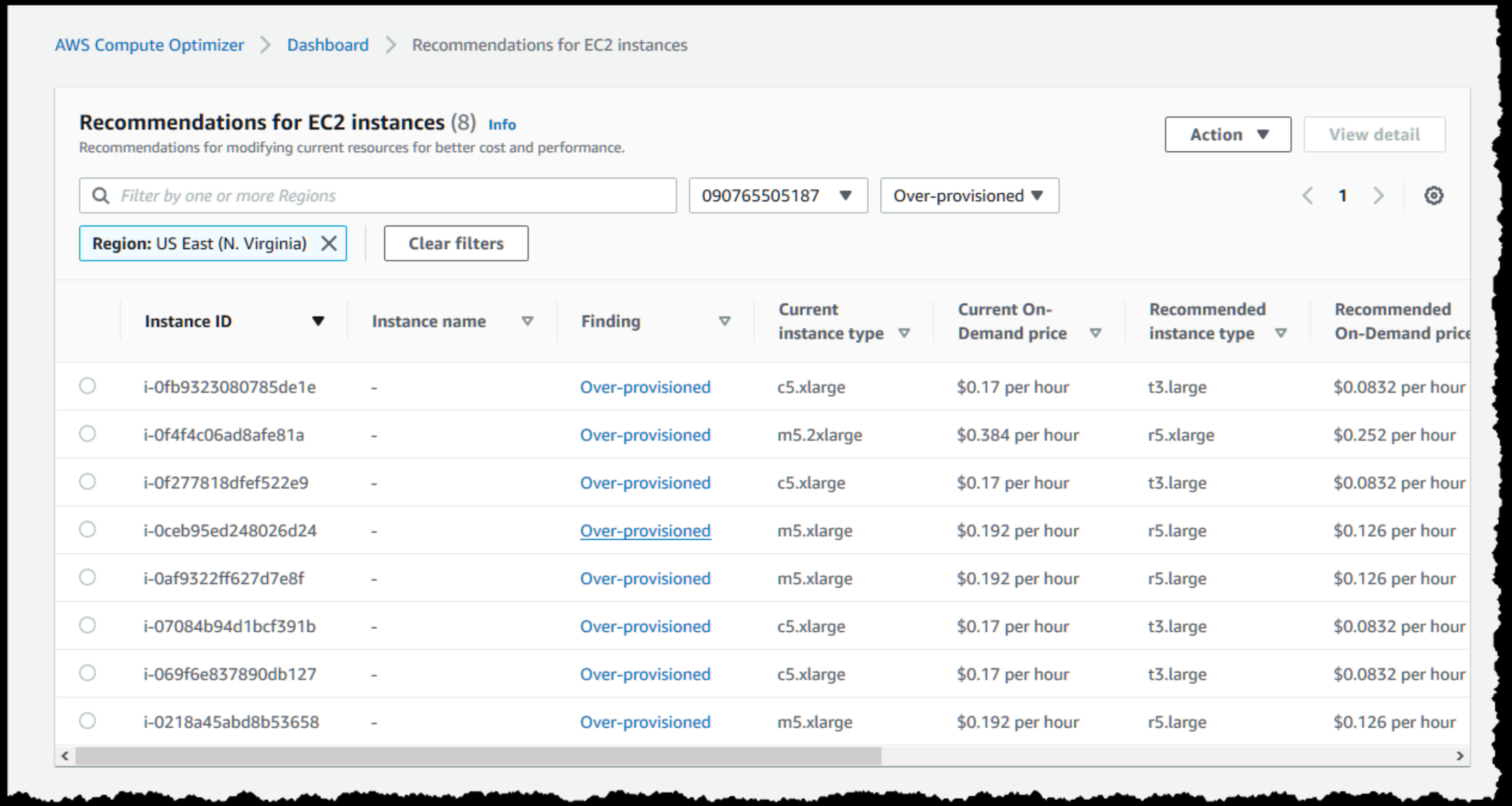
What is telemetry?

- Metric data
- Think of utilization
  (e.g., 50% average CPU usage)

AWS Compute Optimizer



AWS Compute Optimizer



Collecting CloudWatch Metrics



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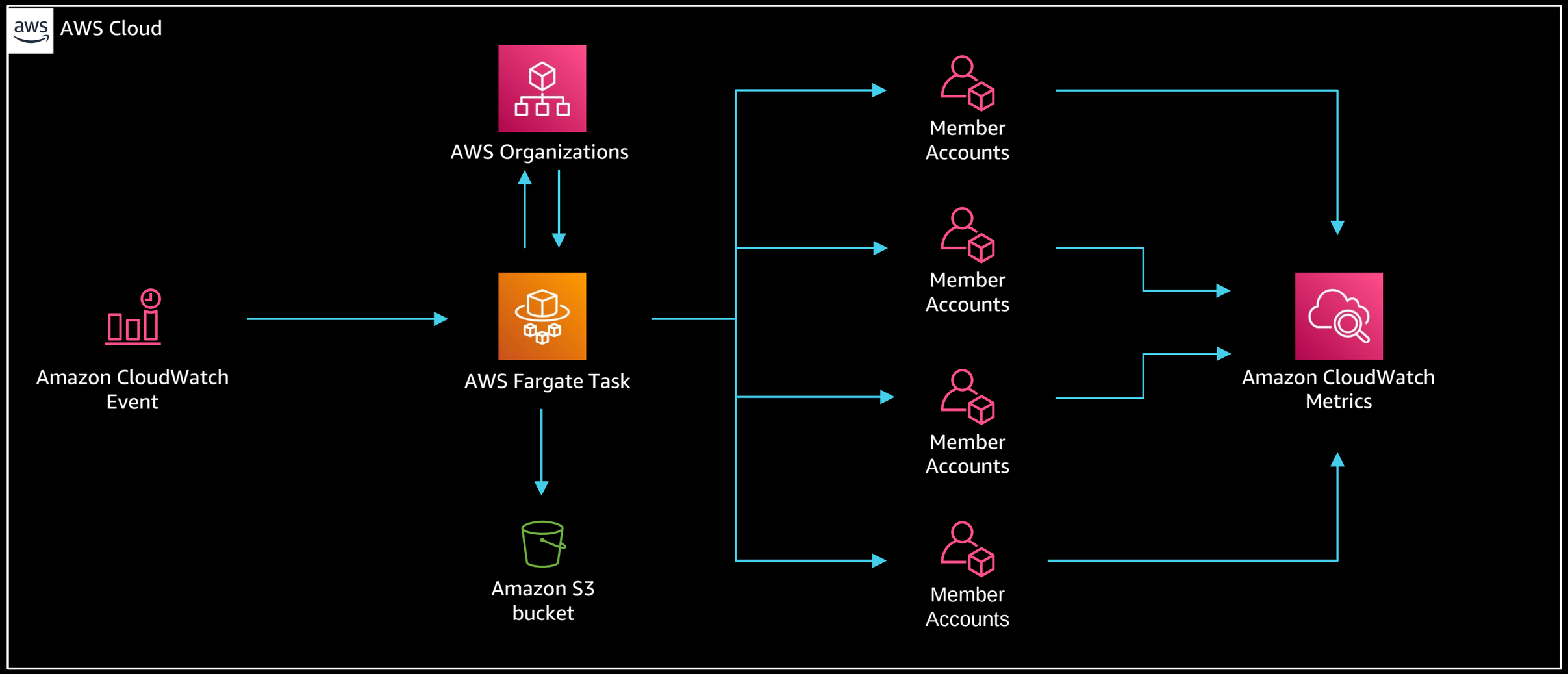
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Collecting CloudWatch Metrics

WHAT METRICS AND HOW FREQUENTLY DO WE WANT TO COLLECT THEM?

- Hourly metric periods
- Collect once daily or more frequent
- Collect from all linked accounts
- Collect all metrics or a subset of metrics

Collecting CloudWatch Metrics



Use Systems Manager for Region List

```
# Initialize AWS Systems Manager boto3 client
ssm_client = boto3.client('ssm')

region_list = []
ssm_paginator = ssm_client.get_paginator('get_parameters_by_path')
ssm_page_iterator = ssm_paginator.paginate(
        Path='/aws/service/global-infrastructure/regions‘
        )
ssm_filtered_iterator = ssm_page_iterator.search("Parameters[].Value")

for region in ssm_filtered_iterator:
    region_list.append(region)
```

Assuming roles across the org

```
# Initialize AWS Organizations boto3 client
orgClient = boto3.client('organizations')

# Build list of account IDs in the Org
paginator = orgclient.get_paginator('list_accounts')

# Create a PageIterator from the Paginator
page_iterator = paginator.paginate()
for page in page_iterator:
     for Account in page['Accounts']:
          # # Assume appropriate role
          assumed_role_object = sts_client.assume_role(
               RoleArn = "arn:aws:iam::" + account['Id']+ ":role/MetricCollector",
               RoleSessionName = "Session-" + account['Id'],
               DurationSeconds = 3600 # 3600s = 1h
          )
```

List Metrics

```
# # Function to collect a list of Metrics in Every region for every account
def collectMetrics(cw_client, region):

    # # Paginate over List Metric Results using local Region and Account
    paginator = cw_client.get_paginator('list_metrics')
    metrics = [];

    # # Use All Metrics - However we can opt to collect spefific metric names, or
      namespaces such as cw_paginator.paginate(Namespace='AWS/ECS'):
    for response in paginator.paginate():
       metrics = metrics + response['Metrics'];

    # # Send the metric list to get processed
    processMetricResults(cw_client, metricList)
```

Get Metric Data

```
for metric in metrics:
    metricNum = metricNum+1
    metricDataQueries.append(
        {
            'Id': "m" + str(metricNum),
            'MetricStat': {
                'Metric': {
                    'Namespace': metric["Namespace"],
                    'MetricName': metric["MetricName"],
                    'Dimensions': metric["Dimensions"],
                },
                'Period': metricPeriod,
                'Stat': 'Average'
             },
        }
       );
gmdPaginator = cw_client.get_paginator('get_metric_data')
```

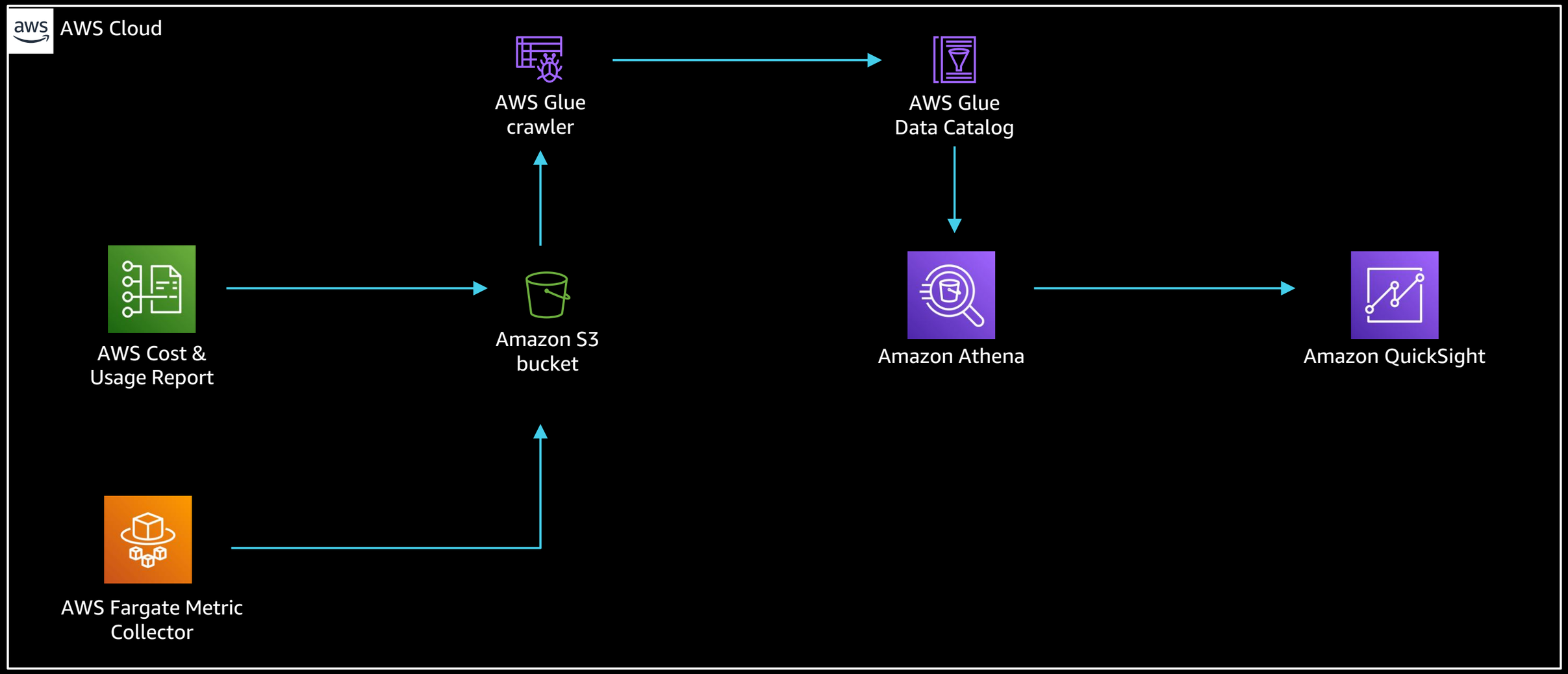
CloudWatch metrics and AWS Cost & Usage Report



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AWS Cost & Usage Report with QuickSight



AWS Cost & Usage Report with QuickSight

Memory per Task -

2 GB

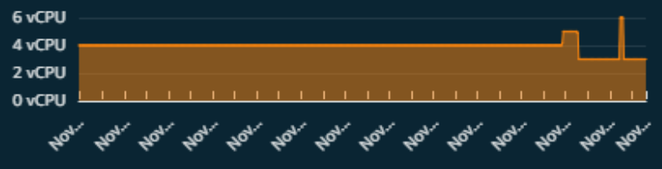
CPU per Task

1 vCPU

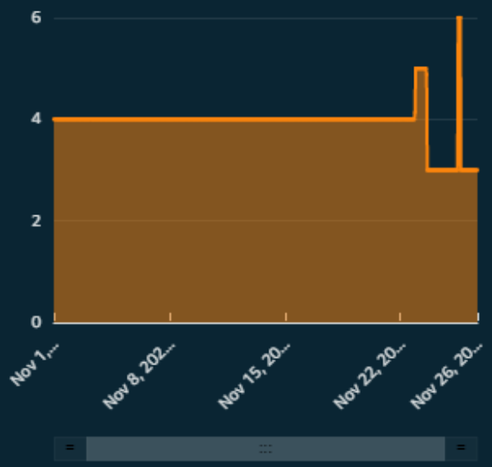
CPU vs Memory Cost



vCPU Hours



Running Tasks



Total Cost - MoM

Nov 2020	Oct 2020
$119.55	$76.09

$43.46 ↑

Memory Utilization - WoW

Nov 22, 2020	Nov 15, 2020
10.49%	10.29%

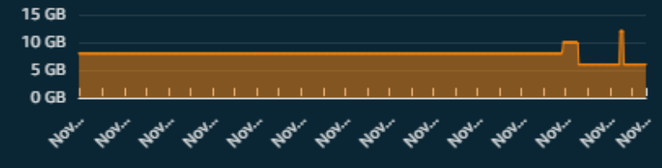
0.21% ↑

CPU Utilization - WoW

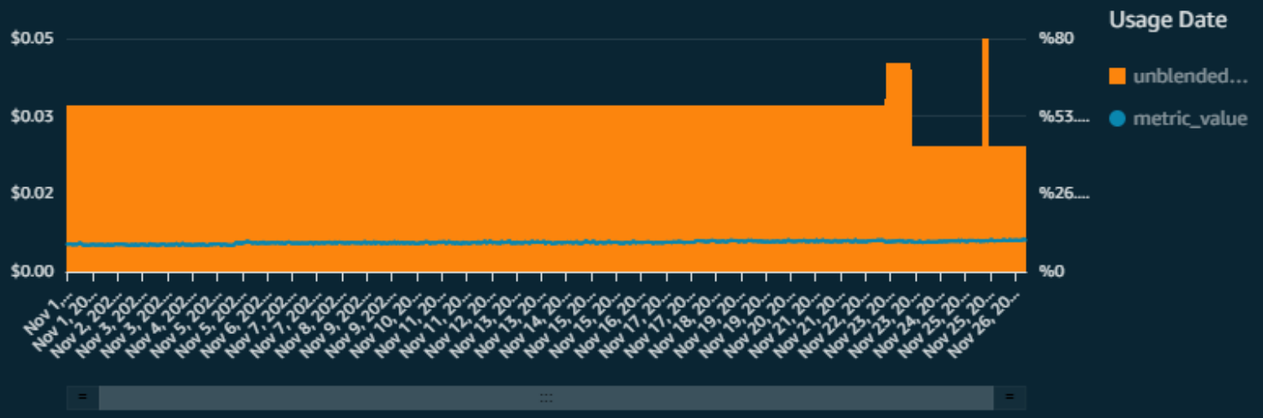
Nov 22, 2020	Nov 15, 2020
0.80%	0.50%

0.30% ↑

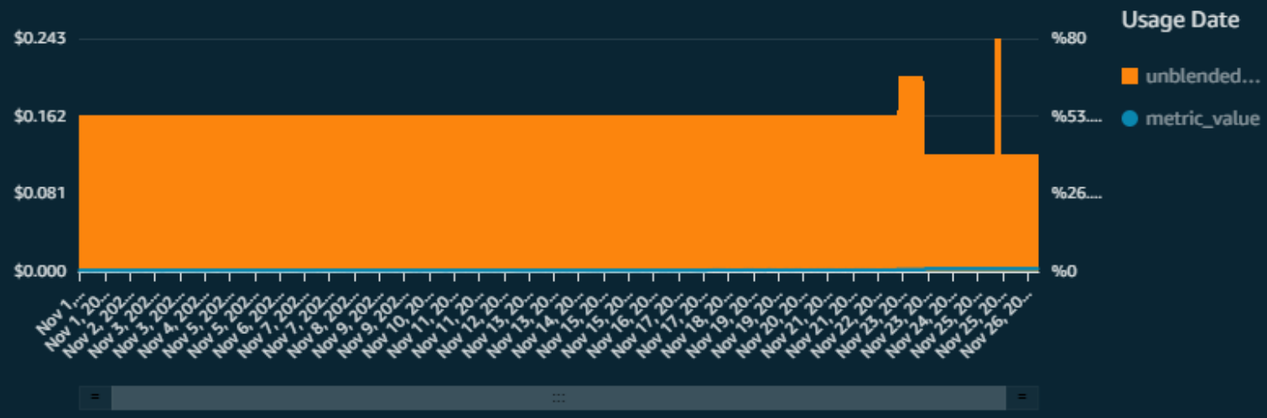
Pet Search - Memory GB Hours used



Memory vs Memory Utilization



CPU Cost vs CPU Utilization



AWS Cost & Usage Report with QuickSight

Memory per Task -

1 GB

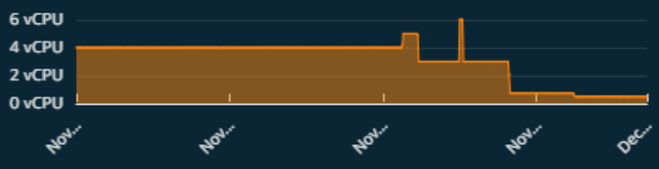
CPU per Task

0.25 vCPU

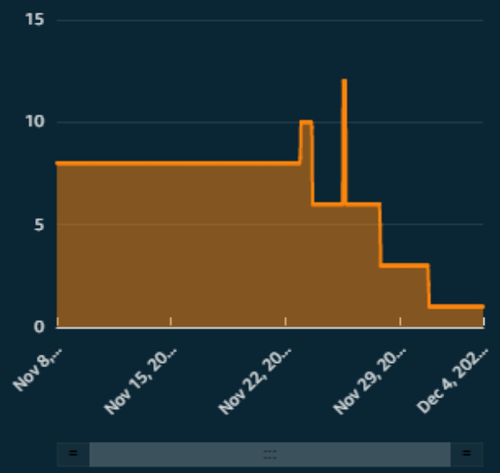
CPU vs Memory Cost



vCPU Hours



Running Tasks



Total Cost - Wow

Nov 29, 2020	Nov 22, 2020
$3.79	$25.18

-$21.39 ↓

Memory Utilization - WoW

Nov 29, 2020	Nov 22, 2020
31.55%	11.44%

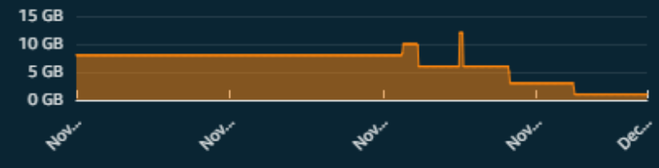
20.11% ↑

CPU Utilization - WoW

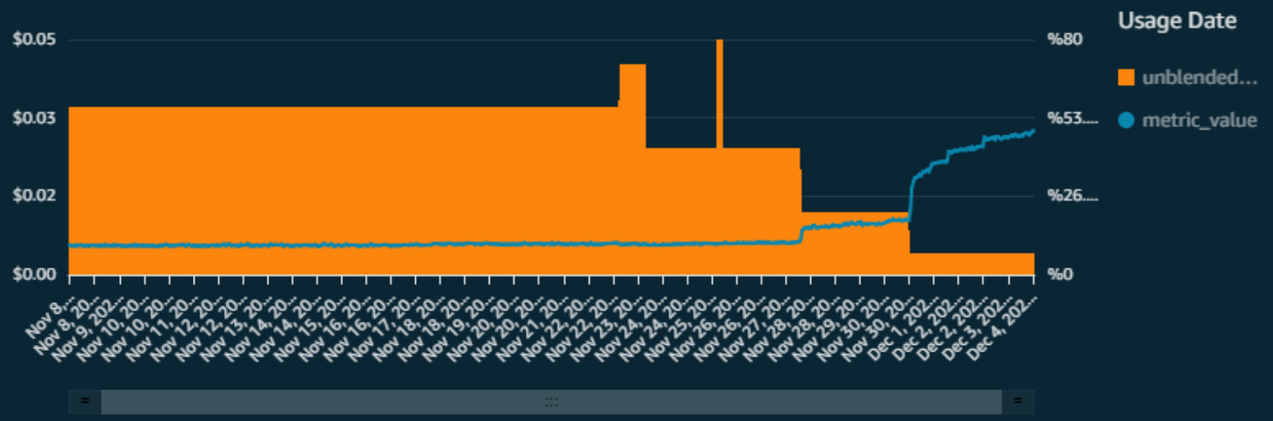
Nov 29, 2020	Nov 22, 2020
10.32%	1.18%

9.14% ↑

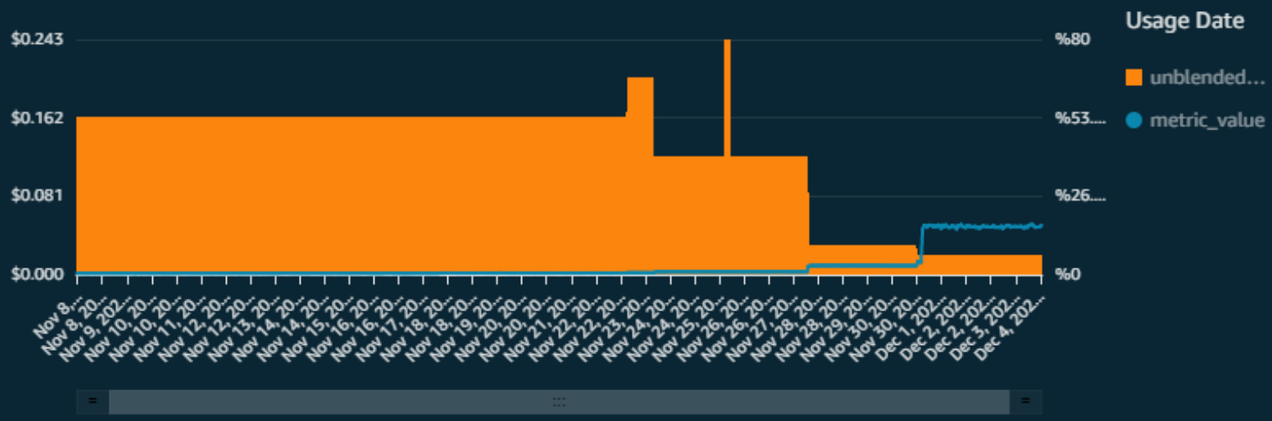
Pet Search - Memory GB Hours used



Memory vs Memory Utilization



CPU Cost vs CPU Utilization



Cost-saving use cases

- Charging and allocating cost for a multi-tenant infrastructure
- Combine resource telemetry with business metrics
- Amazon Redshift utilization and sizing
- Kinesis data shards optimization
- Amazon Elastic Container Service (Amazon ECS)
  AWS Fargate optimization

Thank you!

Bobby Hallahan

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