AWS re:Invent

CMP207-R

Manage, control, and optimize costs with native AWS products, ft. Intuit

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Amazon Web Services

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Intuit

Agenda

Let’s have an interactive conversation about how AWS creates your cost and usage data and dive into how you can use native AWS offerings to manage your AWS expenditure

AWS Billing

- How does AWS create my billing data?
- What products can I use to save costs?
- What can I expect to be included in my billing data?

AWS Cost Management

- What cost data are available to me?
- How do I access these AWS cost data?
- How do I understand the drivers of those costs?
- How do I identify my savings opportunities?
- What can I do to manage and monitor my AWS costs and usage?

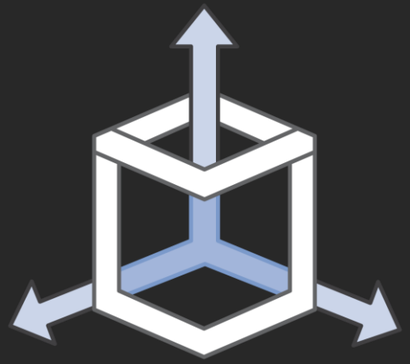
Case study: Hear from Intuit about how they use AWS Cost Management products

AWS Billing

How AWS Billing works

Service teams meter usage (e.g., Amazon Elastic Compute Cloud (Amazon EC2), Amazon Relational Database Service (Amazon RDS))

AWS Billing marries usage to prices and produces bills



AWS Insights enriches the data with resource, tag, and product information

Delivers Cost and Usage Reports

Powers Cost Explorer and AWS Budgets

Generates optimization recommendations

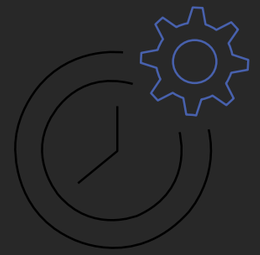
Capacity Reservations overview

What is it?

Capacity Reservations enables you to reserve capacity for your EC2 instance in a specific Availability Zone for any duration

Ensure access to Amazon EC2 capacity for as long as you need, whenever you need it

Use your regional Reserved Instances (RIs) with your capacity reservations to benefit from billing discounts



How it works

When you create a Capacity Reservation, you specify the Availability Zone, the number of instances, and the instance attributes in the EC2 console

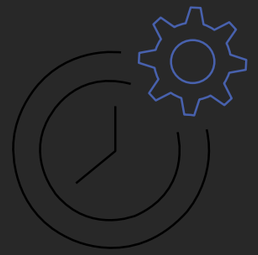
Capacity Reservations owners can share their reserved capacity with other AWS accounts or within an AWS organization

When Capacity Reservation is active, you are charged the equivalent of On-Demand Instances

Savings Plans overview

What is it?

A new flexible pricing model which helps you save up to 72% on Amazon EC2 and AWS Fargate usage. Customers simply commit to a consistent amount of usage (e.g., $10/hour) over one or three years, and in exchange they receive a discount for that usage



How it works?

Every type of compute usage has an On-Demand rate and a Savings Plans rate. If a customer commits to $10/hour of compute usage, then they will get Savings Plans rates on all usage up to $10

Any usage beyond the commitment will be charged at regular On-Demand rates

Types of Savings Plans

Compute Savings Plans

Offer the greatest flexibility, up to 66% discounts (same discounts as Convertible RIs)

Flexible across

- ✓ Instance family: e.g., Move from C5 to M5
- ✓ Region: e.g., change from EU (Ireland) to EU (London)
- ✓ OS: e.g., Windows to Linux
- ✓ Tenancy: e.g., switch dedicated tenancy to default tenancy
- ✓ Compute options: e.g., move from Amazon EC2 to Fargate

EC2 instance Savings Plans

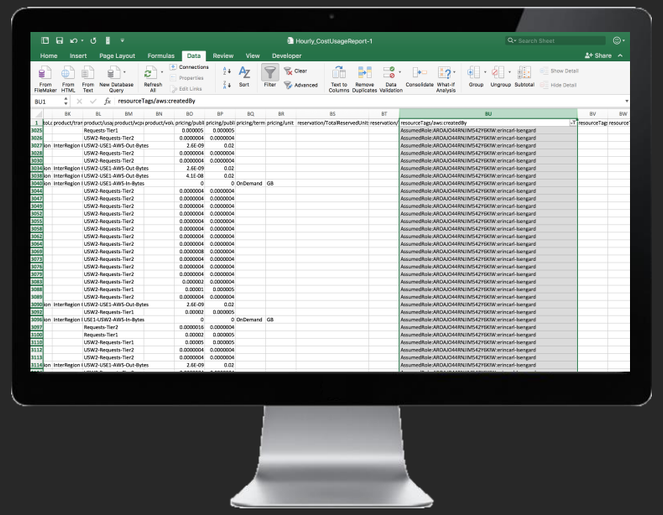
Provide the deepest discounts, up to 72% (same as Standard RIs) on the selected instance family (e.g., C5 or M5), in a specific AWS Region

Flexible across

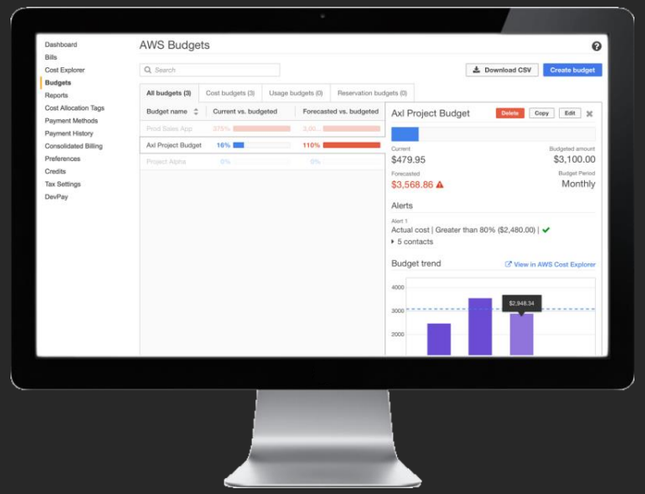
- ✓ Size: e.g., move from m5.xl to m5.4xl
- ✓ OS: e.g., change from m5.xl Windows to m5.xl Linux
- ✓ Tenancy: e.g., modify m5.xl dedicated to m5.xl default tenancy

AWS Cost Management

AWS Cost Management products

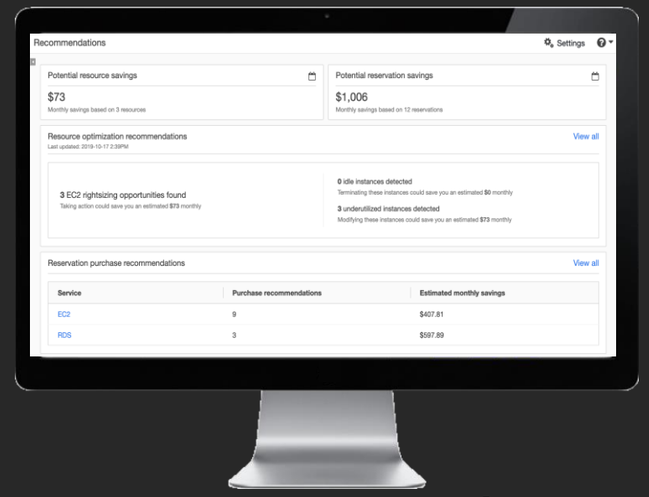


AWS Cost & Usage Report



AWS Budgets

AWS Cost Explorer



AWS Recommendations

AWS Cost & Usage Reports

Most detailed information

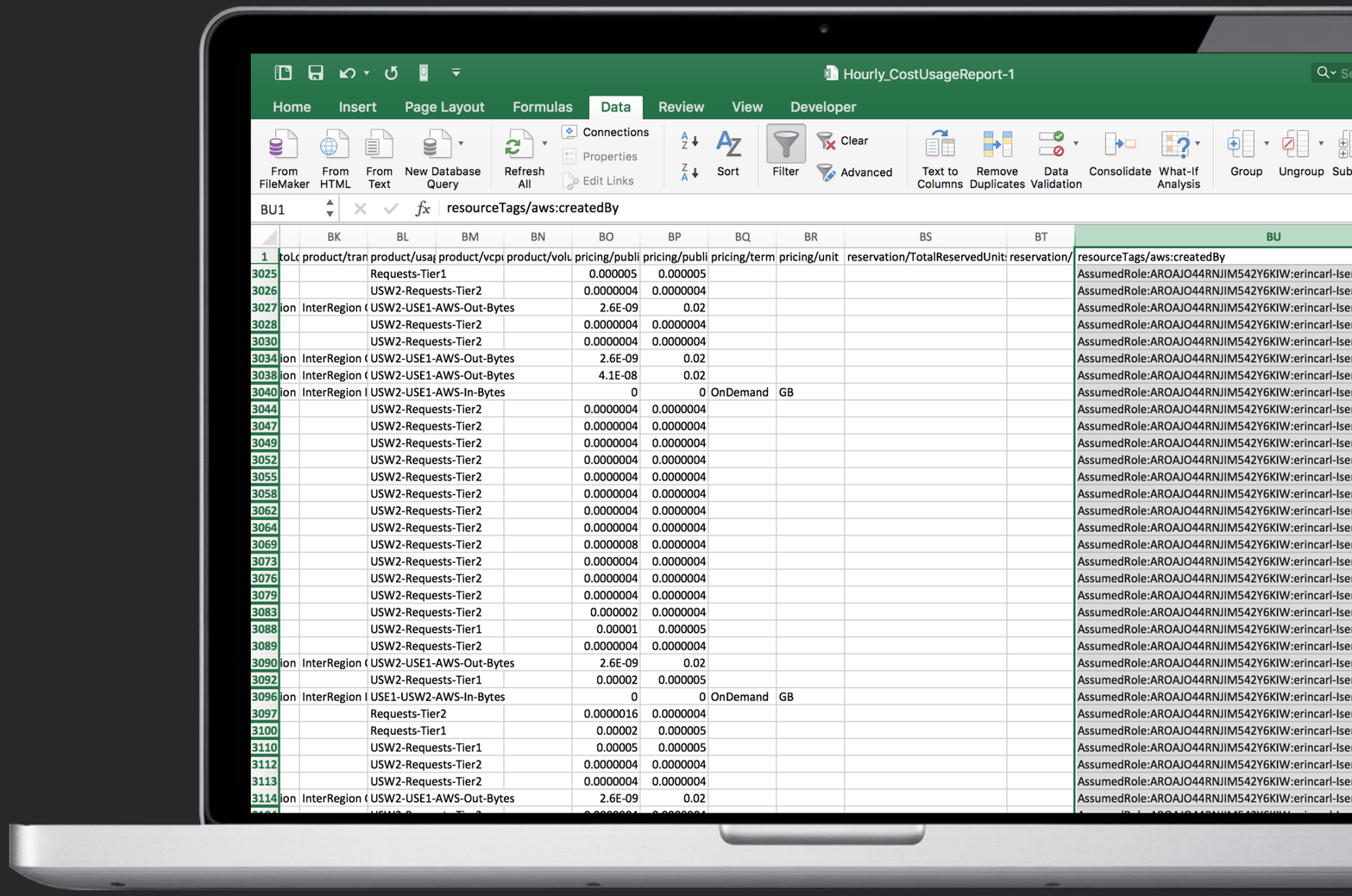
Get in-depth (e.g., resource and tags), hour-by-hour information on all your usage across all AWS services

Delivered multiple times a day

Run your business with up-to-date cost and usage information throughout the month

Build custom queries and reports

Deliver Cost and Usage Reports (CURs) to an Amazon S3 bucket and leverage native integration with Amazon Redshift, Amazon Athena, and Amazon QuickSight



AWS Cost Explorer

Comprehensive dashboards

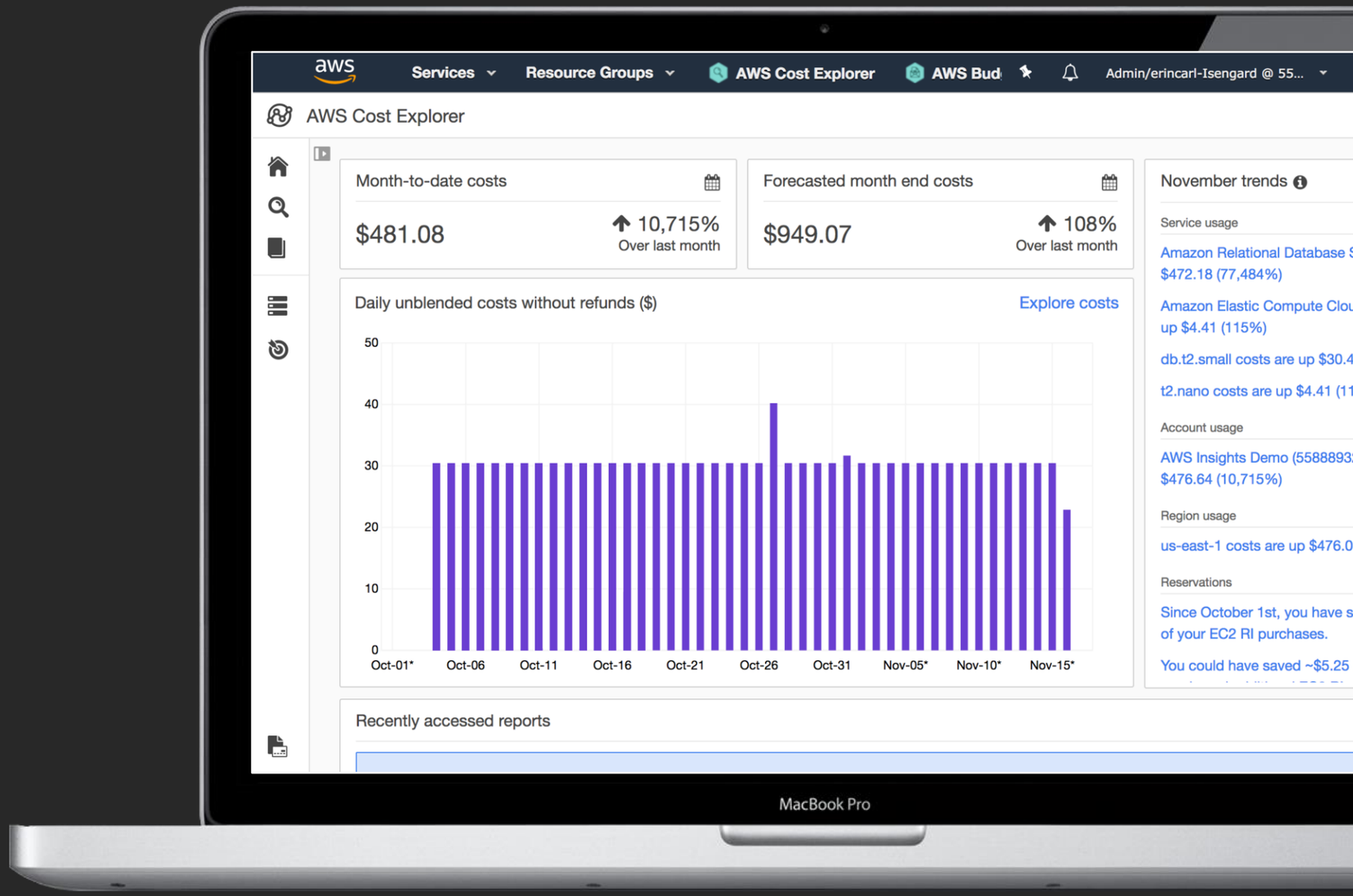
Gain a summary view of key cost details, including month-to-date costs, month-end forecasted costs, and saved reports

Automated trend analysis

Identifies anomalous cost and usage events across your account(s) based on historical patterns

Optimized user experience and programmatic access

Users of all levels of expertise in your organization can quickly onboard and feel confident using AWS Cost Explorer and Cost Explorer API to address their cost management needs



AWS Budgets

User experience

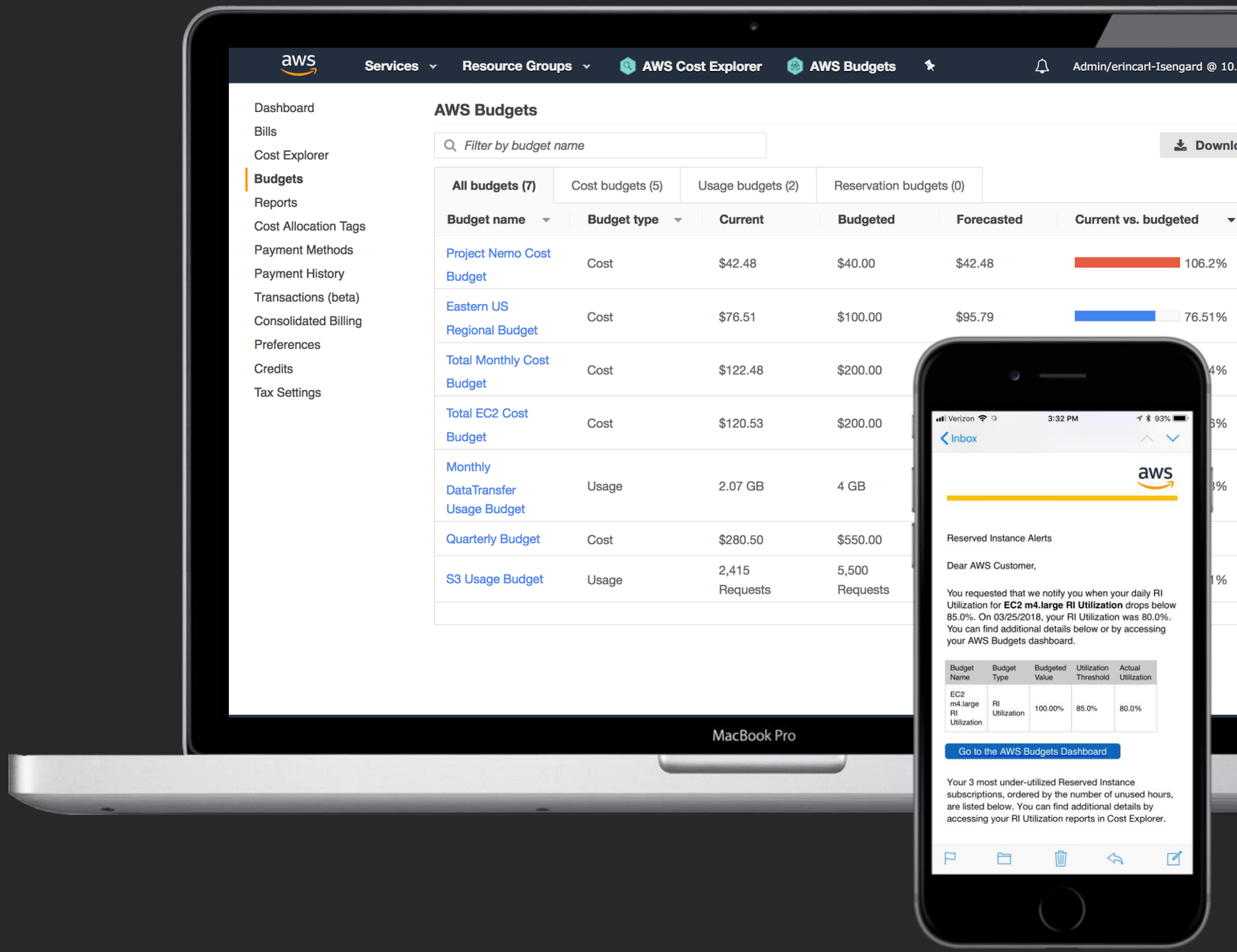
Simplified workflows make it easier to create and manage budgets

Cost Explorer integration

AWS Budgets is now integrated with Cost Explorer, providing contextually relevant data to help you set budgets appropriately

Review budget performance

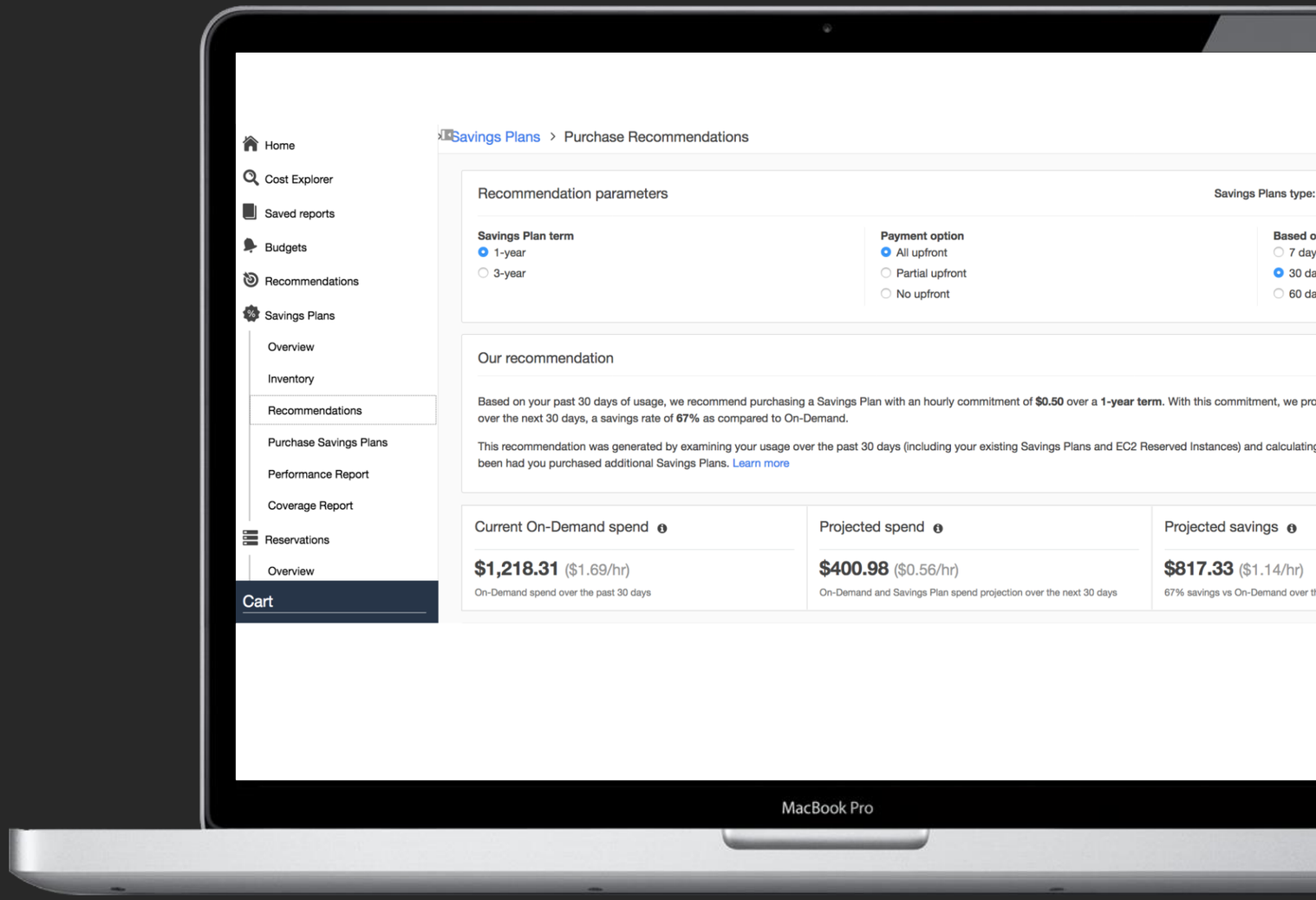
View how your actuals have performed against your budgeted amounts historically



AWS Recommendations

Get recommendations to run your business more efficiently

- **Reserved Instance –** Receive RI purchase recommendations at a payer or linked account level
- **Savings Plans –** Receive Savings Plans purchase recommendations
- **Rightsizing –** Identify opportunities to modify underutilized EC2 instance sizes



CMP207

Intuit Cloud Cost Optimization

Dieter Matzion

Intuit
Technology Finance

Agenda

- Who am I?
- How FinOps is structured in our org
- FinOps reporting capabilities
- Enable Spot on Kubernetes
- Tag-based chargeback contracts
- ML driven Forecasting
- Cost per virtual core - cost optimization KPI examples

Who is Dieter?

Dieter Matzion
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http://lnkd.in/jakW2a
http://matzion.com

Masters of Science in Computer Science
Immigrated to the US after graduation
Started US career working with data
IT Operations Manager at PayPal
Technical Program Manager at Google
Cloud Architect at Netflix
Business Systems Analyst at Intuit

PayPal
Google
NETFLIX
intuit


intuit MISSION
Powering Prosperity
Around the World


intuit
turbotax
quickbooks
mint
Who we serve
Consumers
Small businesses
Self-employed

Recognized as one of the world's leading companies:

2004 - 2019

Most Admired: Computer Software

2002 - 2019

100 Best Companies to Work For

2019

Most Innovative Companies

2019

Companies Best Positioned For Breakout Growth

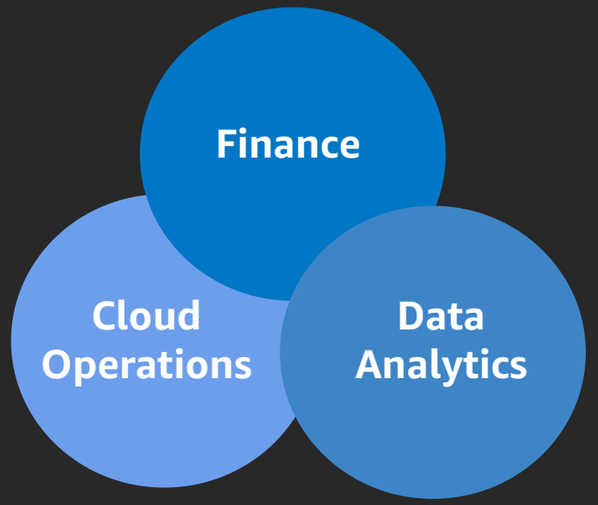
Under Our Cost Optimization Management

Cost & Utilization Report	**4+ billion rows**
Prepaid Services	**60% of total spend**
Program Cost Avoidance	**Efficiency goal of 95%**

How FinOps is structured in our organization

Our Approach

- Executive Sponsorship (CTO, CFO)
- Mission-based team (cross-functional)
- Mission Statement
- Prioritization Principle (resolve conflicting goals)
- Key Performance Indicators (KPIs)
- Regular cadence for updates



Our Mission

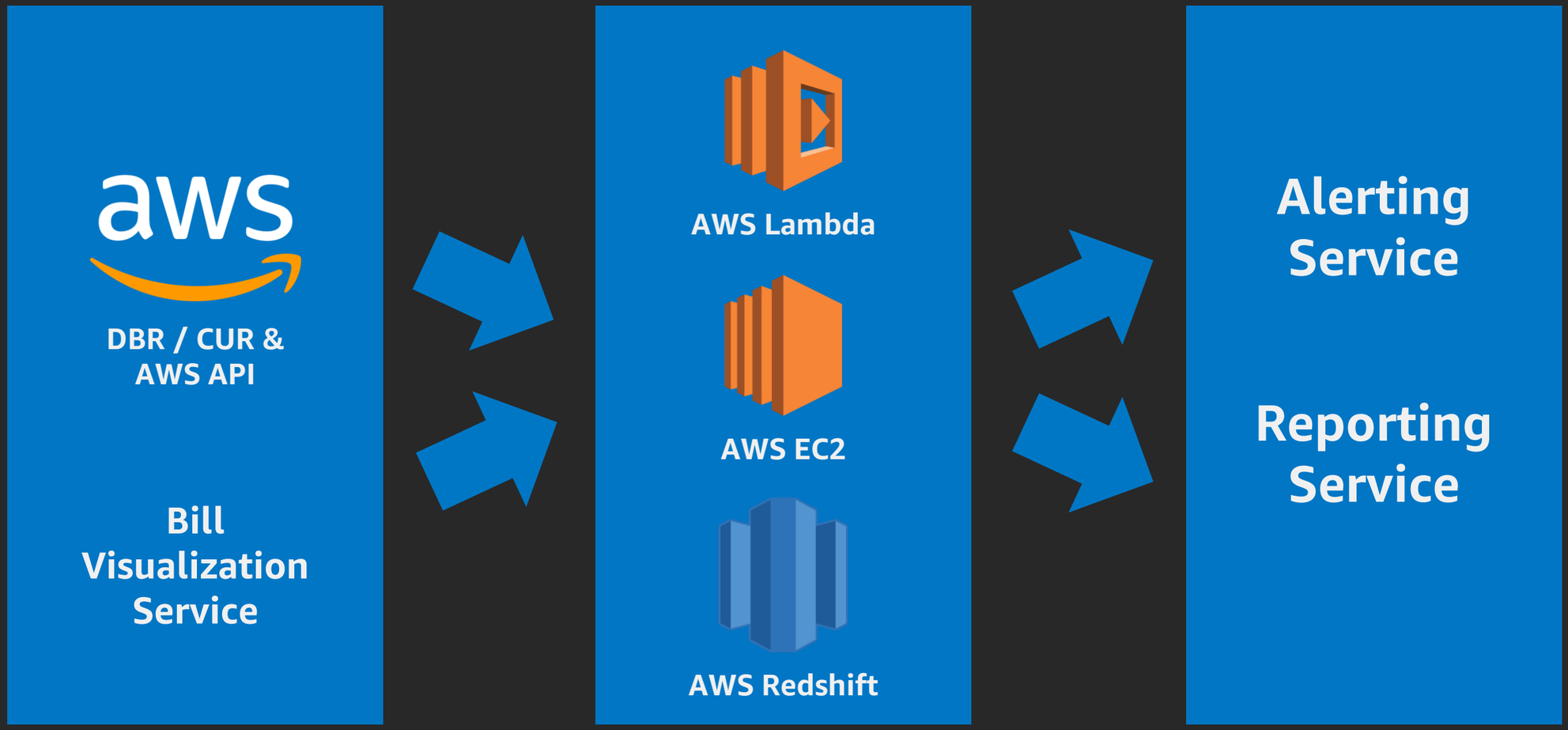
Empower the organization to become informed and responsible stewards accountable for cost savings and cost management in the cloud.

Prioritization Principles

Enablers: The program's highest priority is building out foundational capabilities that enable cost management and operational efficiencies.

Cost Savings: Identify and pursue initiatives that maximize savings and optimization opportunities across Intuit.

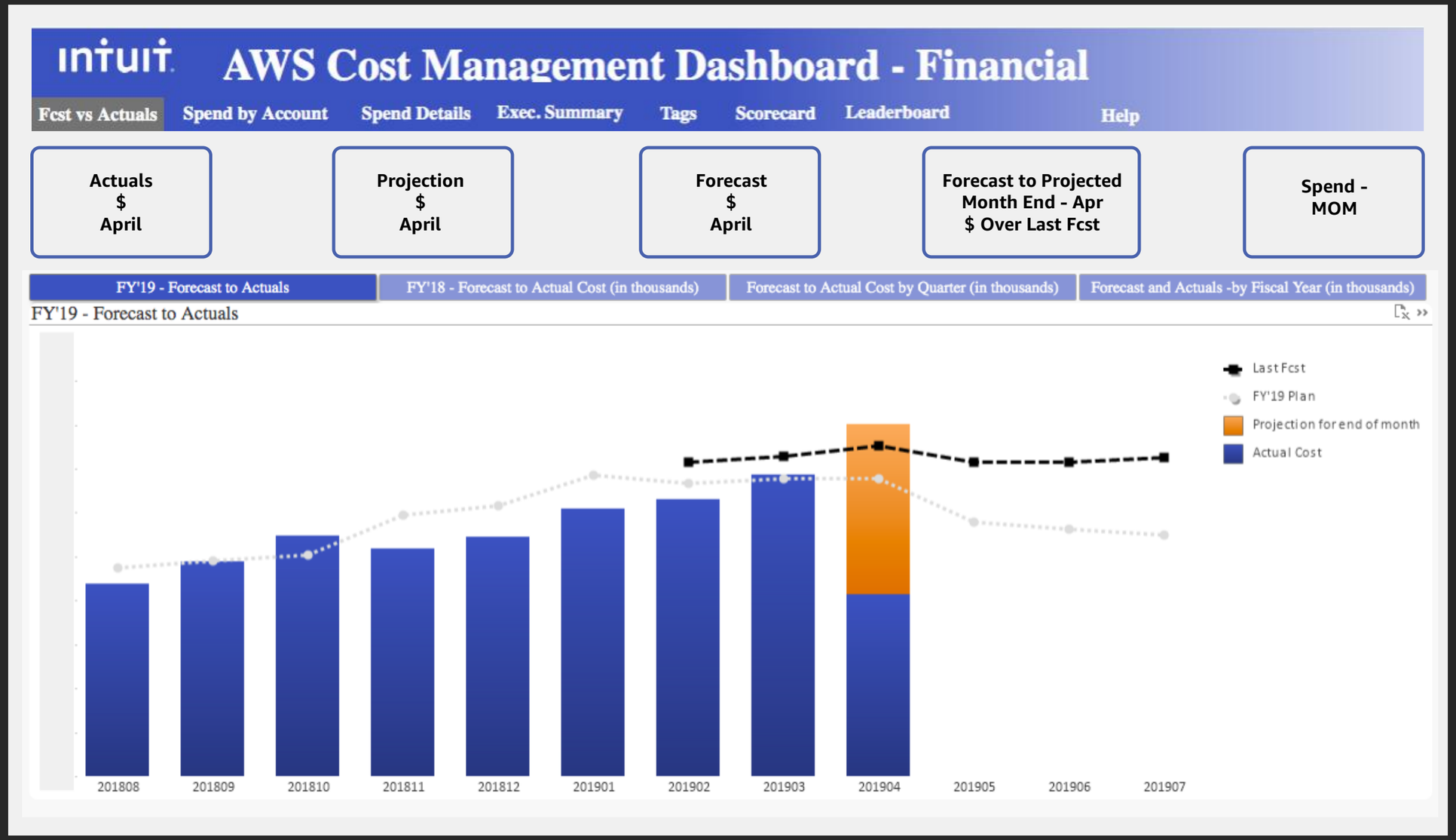
Billing Data Warehouse



Jason Rhoades at AWS re:Invent 2018: Modern Cloud Data Warehousing (Intuit): Optimize Analytics Practices (ANT202): https://youtu.be/owJ-ipdTbko

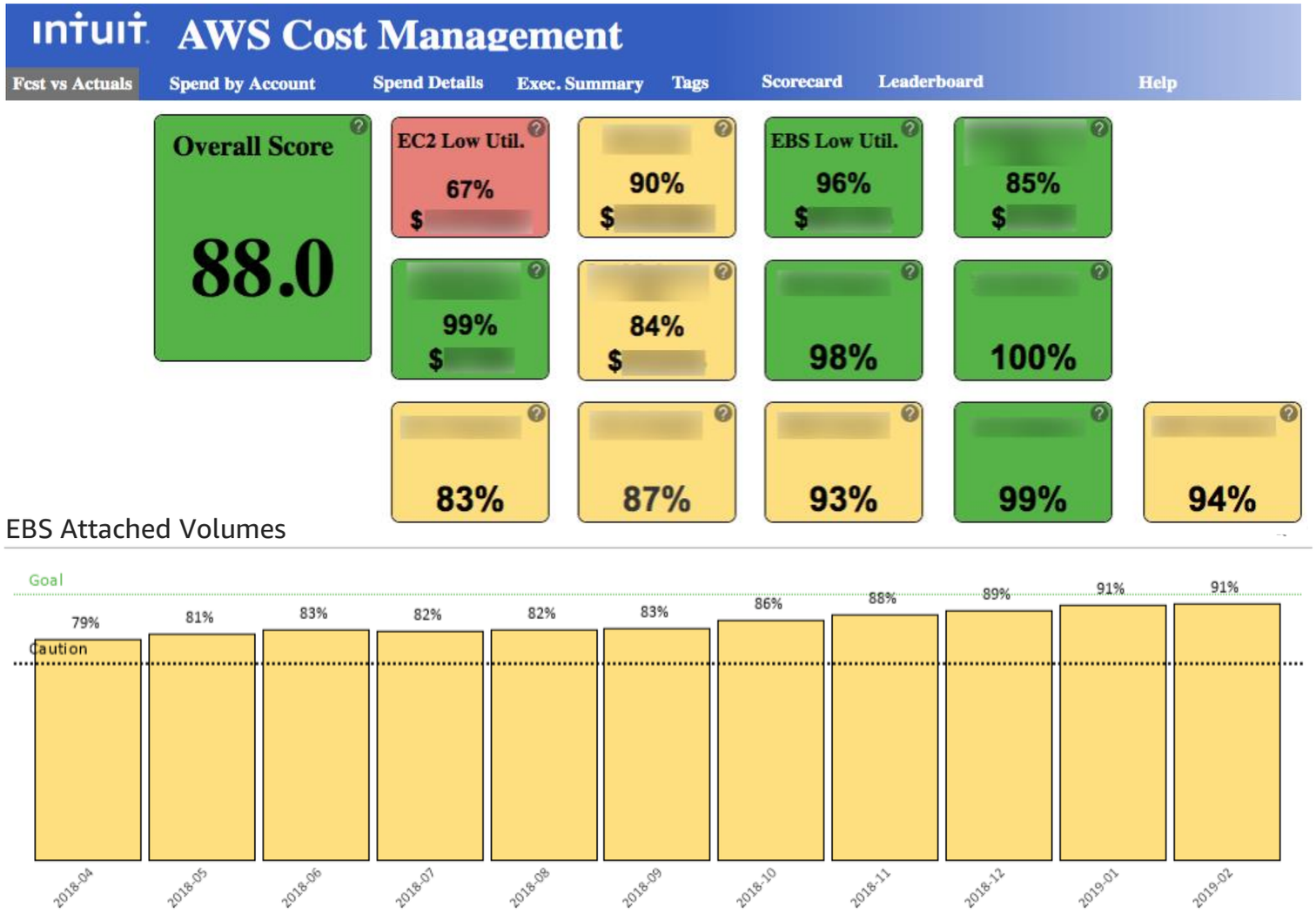
Actuals vs. Budget

Key Metrics at a glance (latest month's date)



Scorecard and Benchmarking

Key Scorecard Metrics



Leaderboard

BUFG Drill-down Leaderboard

intuit **AWS Cost Management**

Fcst vs Actuals | Spend by Account | Spend Details | Exec. Summary | Tags | Scorecard | Leaderboard | Help

* Calculation: Percentage of EC2 spend on well-utilized instances (CPU utilization >10% or network I/O >5MB in the last 14 days)

Search BUFG, Application, Account Name

This tab is based on Operator BUFG.

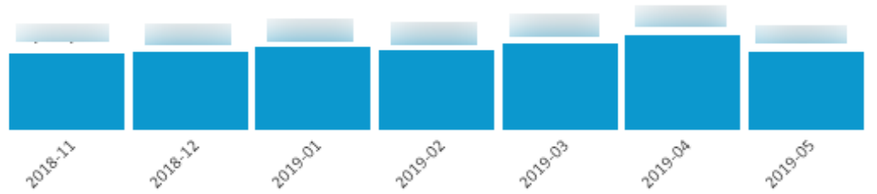
BUFG Drill-down Leaderboard

BUFG L2	EC2 Utilization*	EC2 Utilization $$*								Overall Score
	72%		100%	100%	100%	95%	94%	100%	100%	93.92
	-		-	-	-	-	-	-	100%	-
	92%		100%	100%	100%	66%	100%	100%	100%	91.58
	40%		100%	100%	100%	93%	99%	100%	99%	88.33
	77%		100%	98%	96%	79%	93%	100%	93%	90.20
	60%		75%	100%	99%	89%	92%	100%	93%	85.79
All BUFGs	**67%**		**83%**	**99%**	**98%**	**87%**	**93%**	**100%**	**94%**	**88.08**

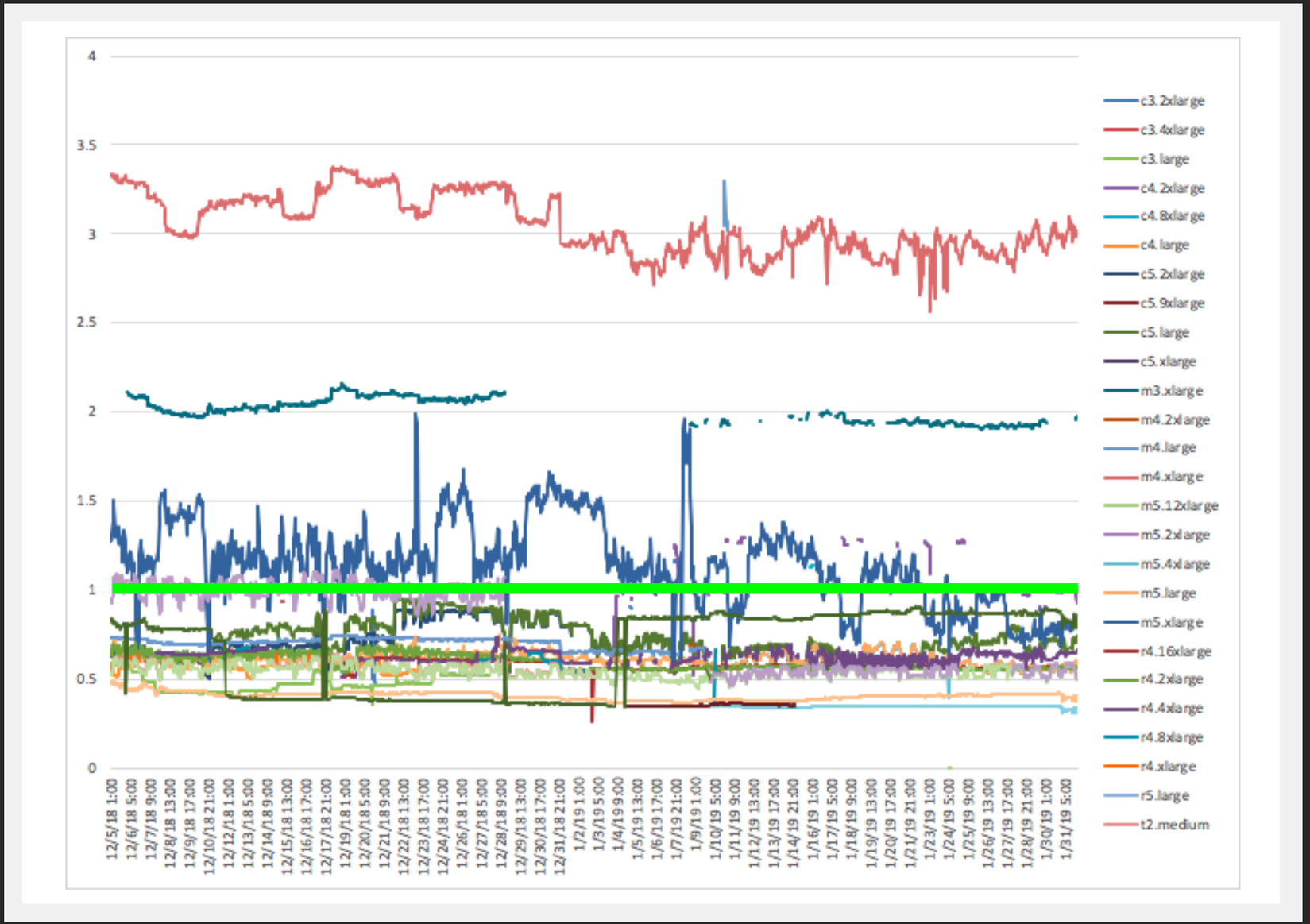
How To Right-Size EC2 Instances

1. Filter the dataset to your accounts by clicking through the BU name in the table above, or using the filters at left.
2. Click on the instanceID in the detail table to be taken to the EC2 console. (Must first be logged in to the appropriate account)
3. Proceed through the accompanying EC2 remediation flow chart. (below)
4. Data is updated once daily so remediation actions won't be reflected in dashboard till next day.
5. Status changes to green when 95% of EC2 compute spend is well-utilized (not underutilized)

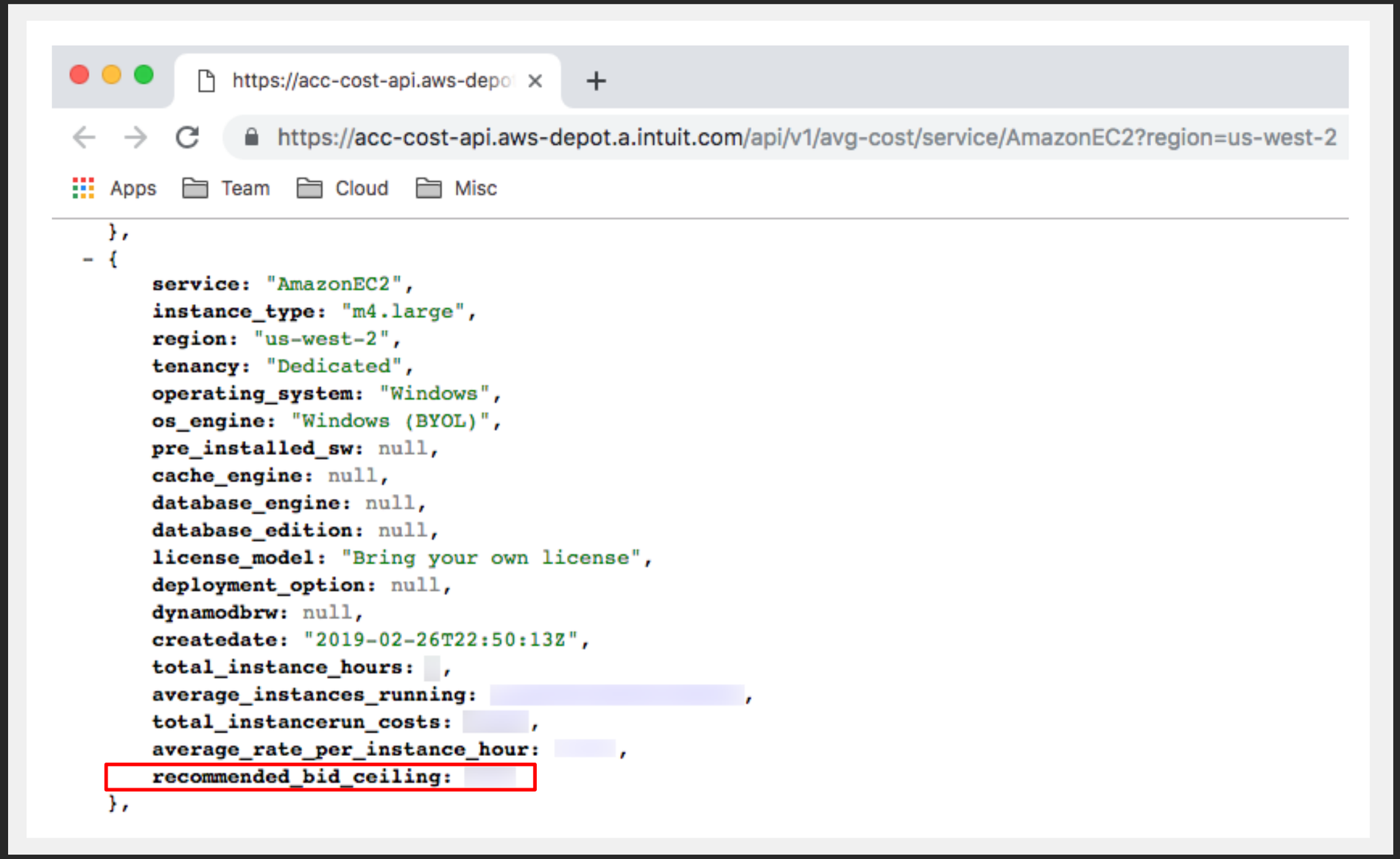
EC2 Low Utilization



Determine Spot Price Feasibility



Build Pricing APIs



Enable Spot on Kubernetes

Progression click buttons

INTUIT SPECIFIC K8s LAUNCHER

Instance Group Operations

Create instance group for the namespace

Instance Group

Min Size *

Max Size *

Machine Type

Select...

Additional Security Groups

Select...

Use spot instance

INTUIT API EXPOSES SPOT BID CEILING

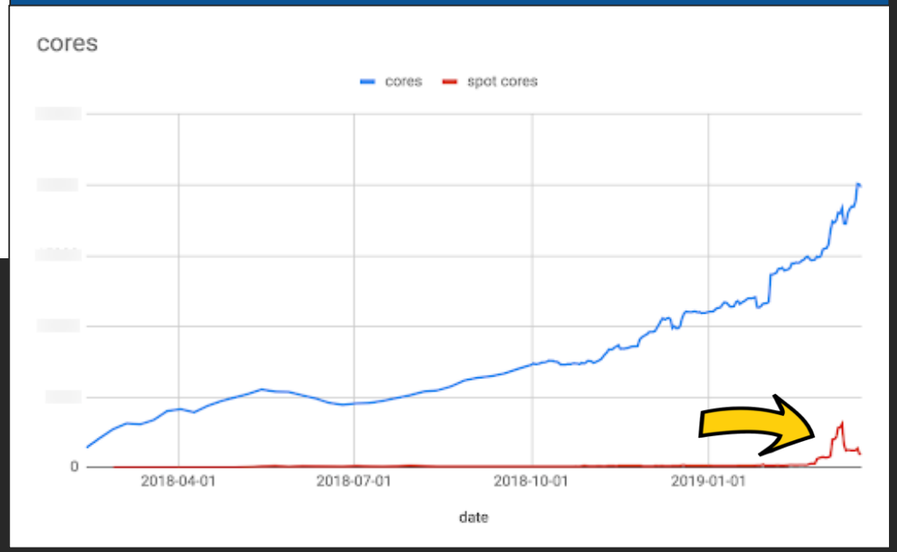
https://acc-cost-api.aws-depo

https://acc-cost-api.aws-depot.a.intuit.com/api/v1/avg-cost/service/AmazonEC2?region=us-west-2

Apps Team Cloud Misc

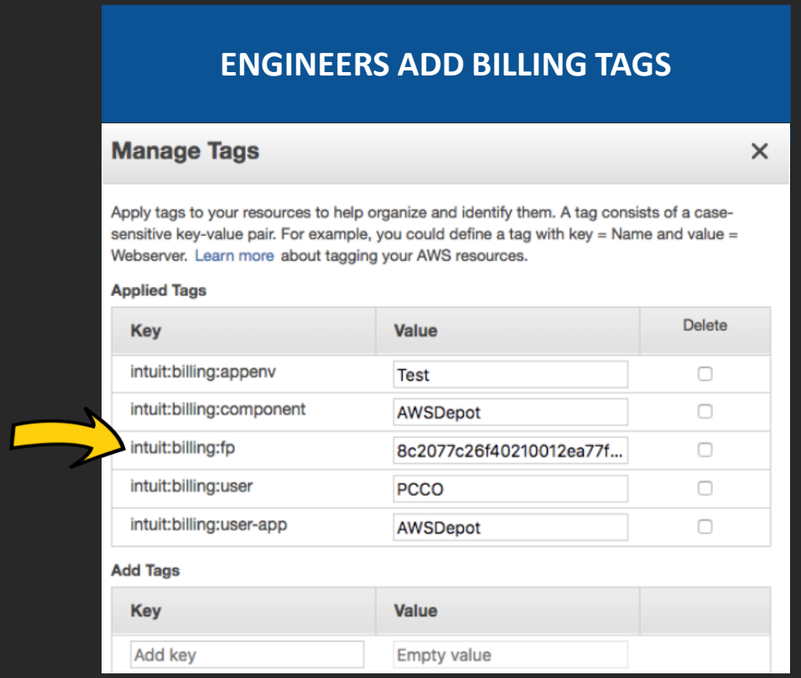

```
  },
- {
    service: "AmazonEC2",
    instance_type: "m4.large",
    region: "us-west-2",
    tenancy: "Dedicated",
    operating_system: "Windows",
    os_engine: "Windows (BYOL)",
    pre_installed_sw: null,
    cache_engine: null,
    database_engine: null,
    database_edition: null,
    license_model: "Bring your own license",
    deployment_option: null,
    dynamodbrw: null,
    createdate: "2019-02-26T22:50:13Z",
    total_instance_hours:  ,
    average_instances_running:  ,
    total_instancerun_costs:  ,
    average_rate_per_instance_hour:  ,
    recommended_bid_ceiling:
  },
```


INTUIT K8s AUTOMATICALLY MOVES IN AND OUT OF SPOT BASED ON FAVORABLE PRICING

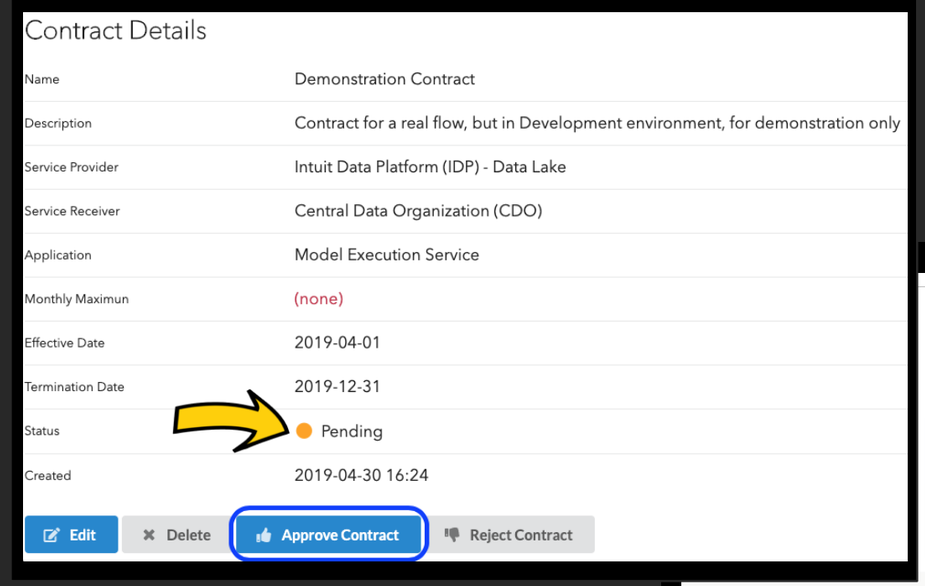


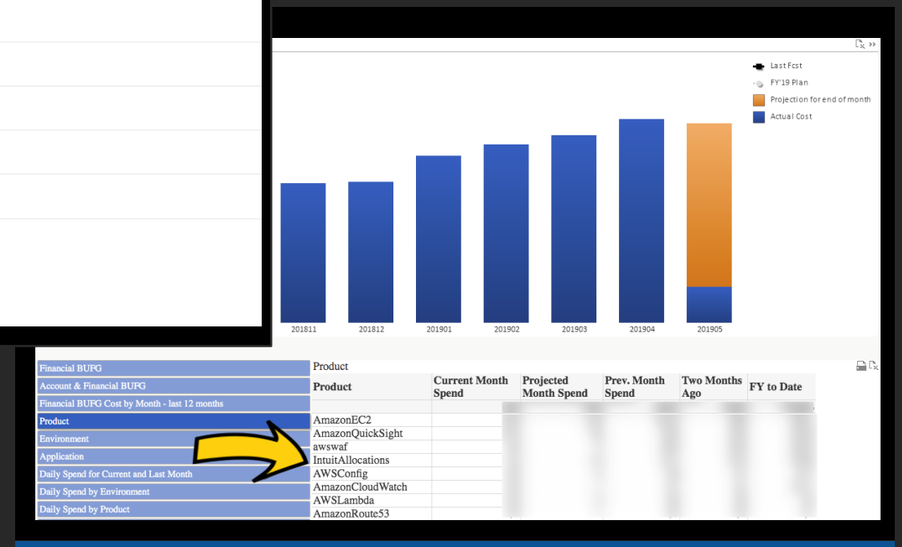
Tag-based Chargeback Contracts

ENGINEERS ADD BILLING TAGS



BUDGET MANAGERS CREATE & APPROVE CHARGEBACK CONTRACTS

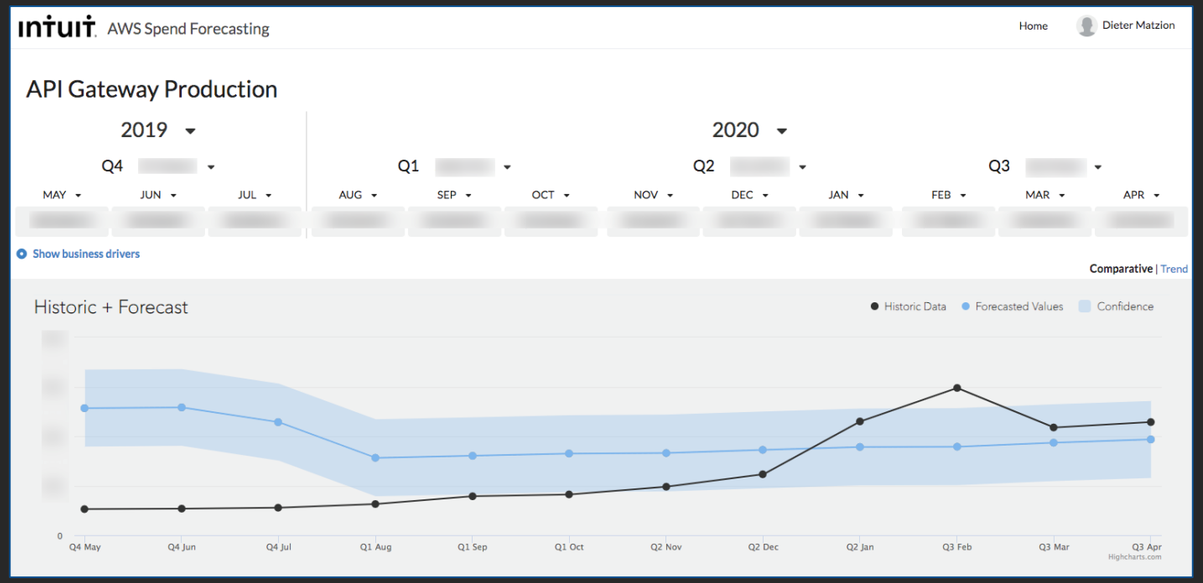


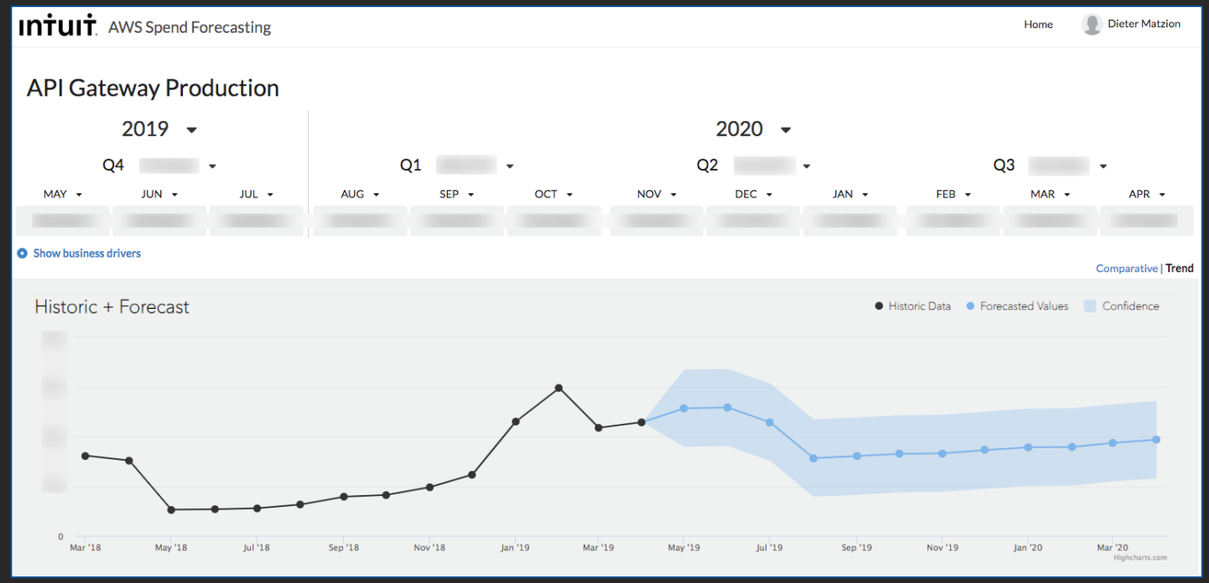


CHARGEBACKS SHOW AS “INTUIT ALLOCATIONS” ON AMORTIZED COST DASBOARD

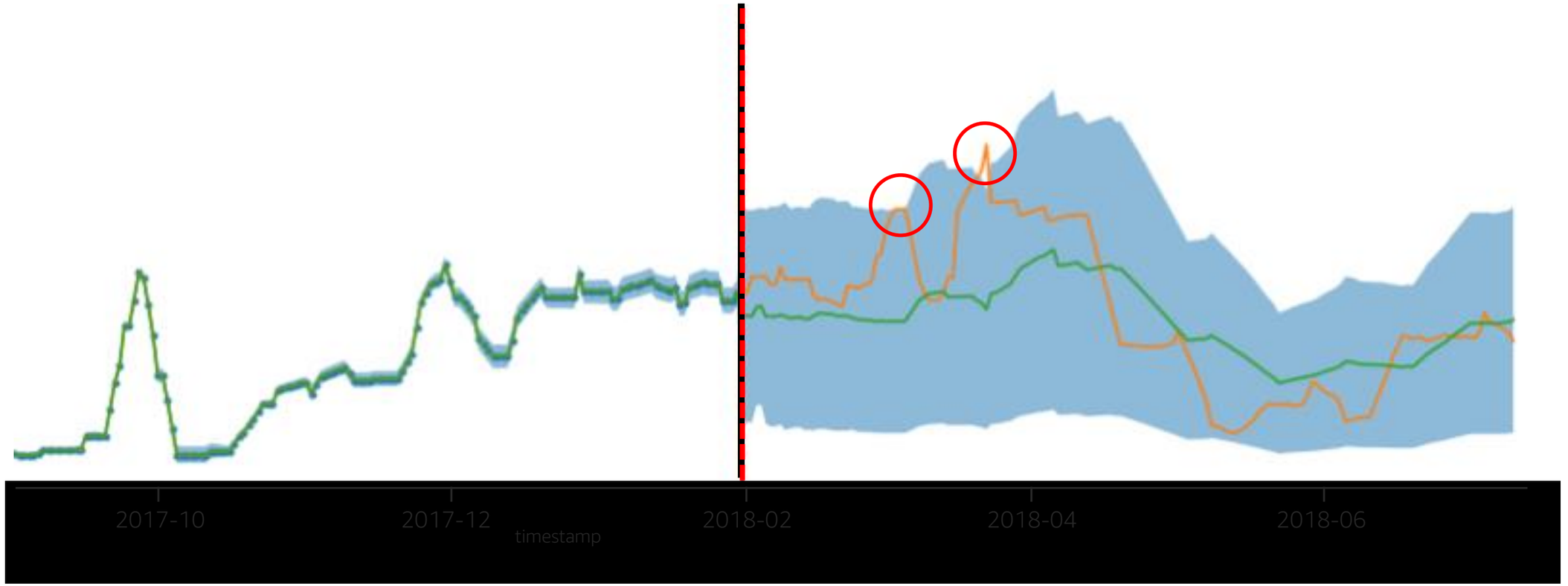
Use ML to Forecast and Allow Owners to Update

The machine learning model produced a variance of 7-9% compared to manual forecasting that has a 20-70% variance.





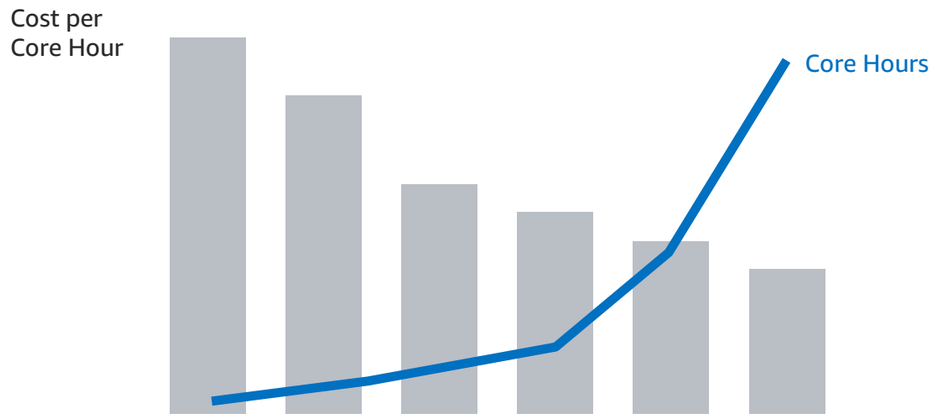
Detect Runaway Spend



Cost Optimization KPI Example - Sample Data

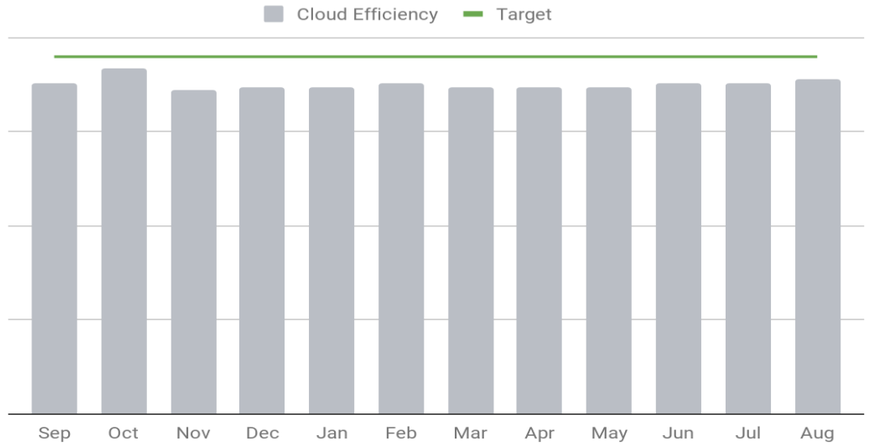
1

Total Usage Cost per Total Core Hours



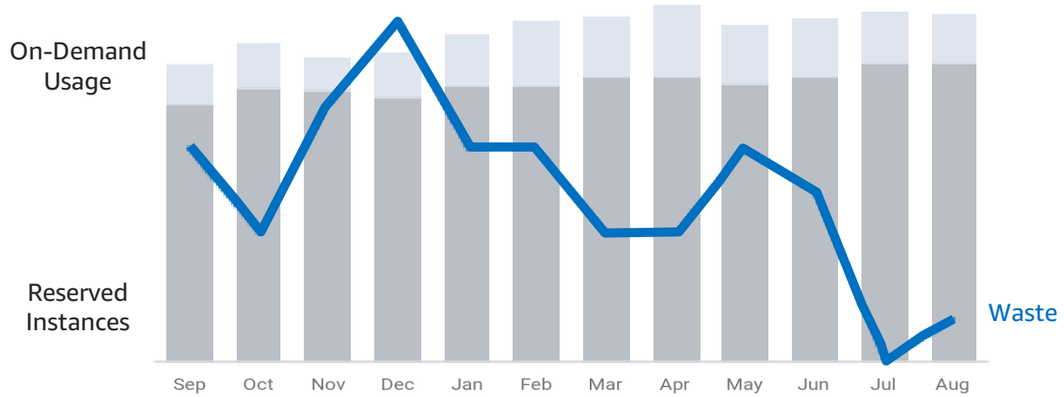
2

Cloud Efficiency & Target



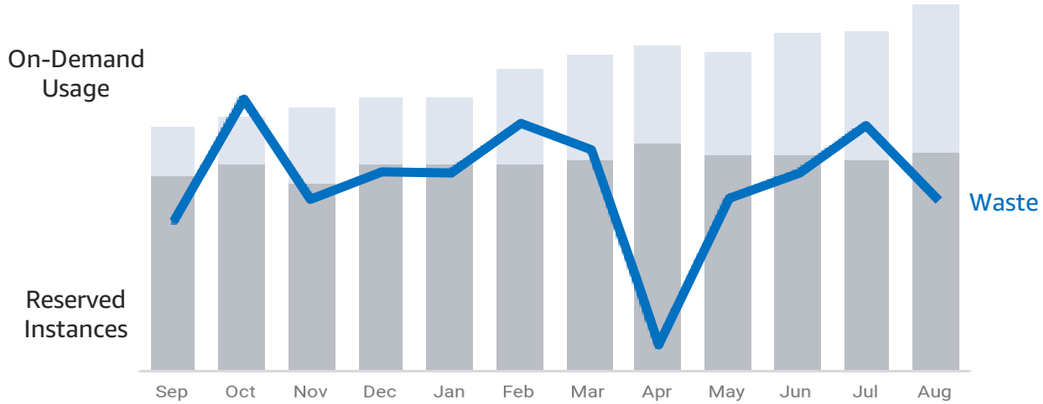
3

EC2 RI Coverage & Waste



4

RDS RI Coverage & Waste



Thank you!

Dieter Matzion

Intuit
Technology Finance

Please complete the session survey in the mobile app.

Thank you!

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AWS re:Invent

aws

Please complete the session survey in the mobile app.