
AWS
re:Invent
NOV. 28 – DEC. 2, 2022 | LAS VEGAS, NV

COM305

Automate & manage AWS Outposts capacity across a multi-account AWS setup

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Program Manager
Morningstar

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Challenges

- Enable cloud-native migrations
- Support self-service deployments
- Manage Outposts usage
- Track team migrations
- Spend as little as possible on maintenance

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Margaret Valtierra

AWS Community Hero

Chicago AWS user group

Program Manager, Morningstar



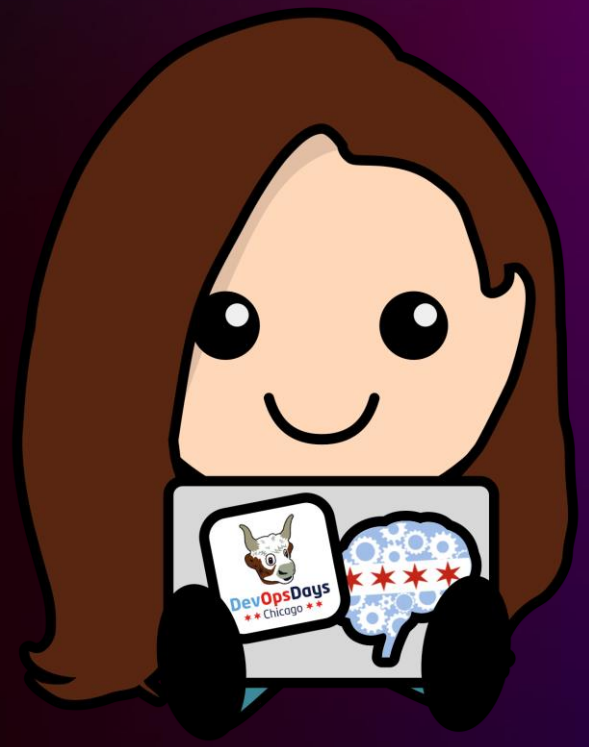


Image by @sosplush

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Agenda

Outposts and our migration goals

Quota iterations: excel and chaos

Moving the quota to AWS

Automating, tracking, and managing

Lessons learned

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Outposts and our migration goals

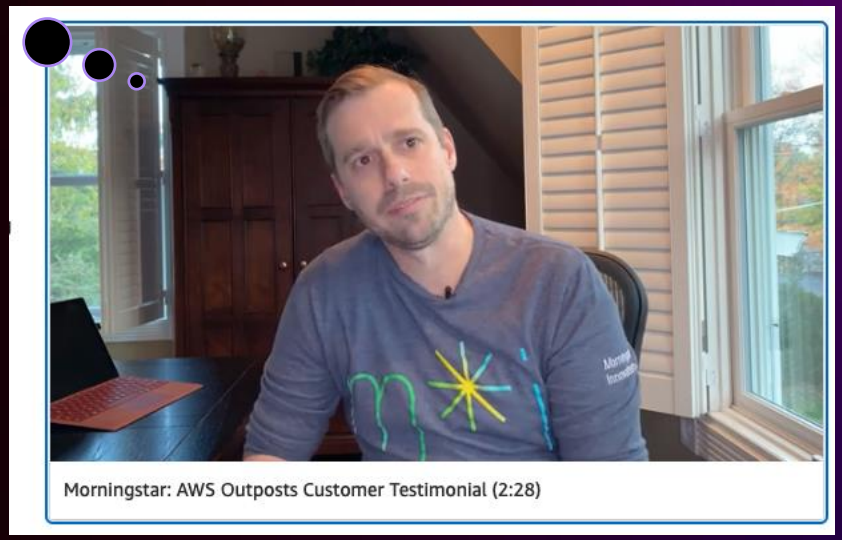
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Back in 2019

Key technology goals

- Go all in on AWS
- Move out of data centers by 2025
- Target EOL and unused servers
- Hands-on training to use cloud





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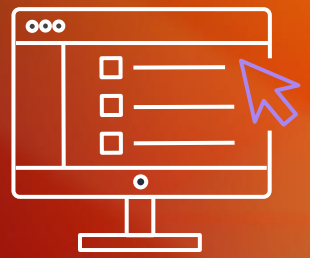
Outposts in 2019



Same AWS designed infrastructure as AWS data centers (built on AWS Nitro System)



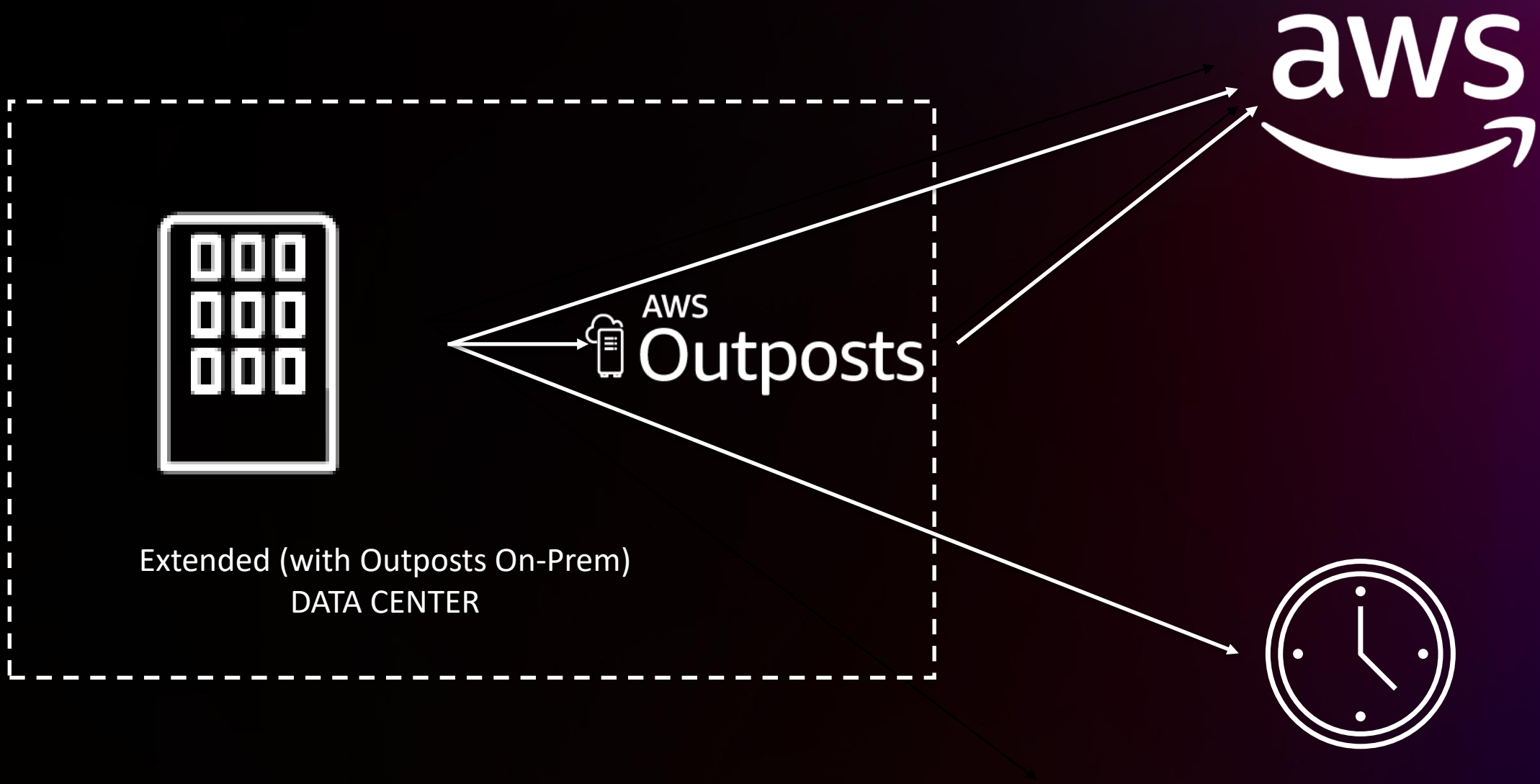
Fully managed, monitored, and operated by AWS as if in AWS Regions



Single pane of management in the cloud providing the same APIs and tools as in AWS Regions

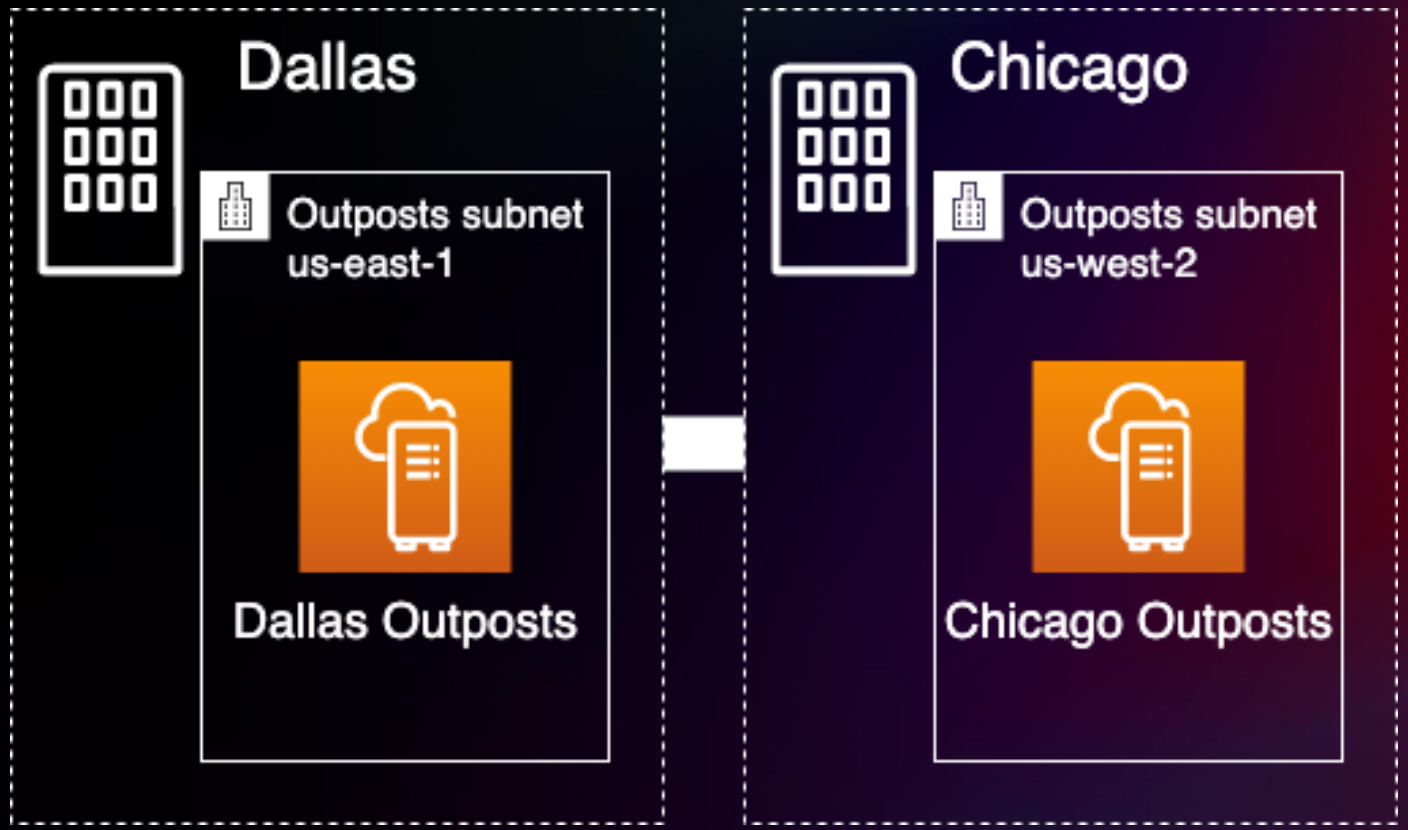
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Outposts goals



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Outposts at Morningstar

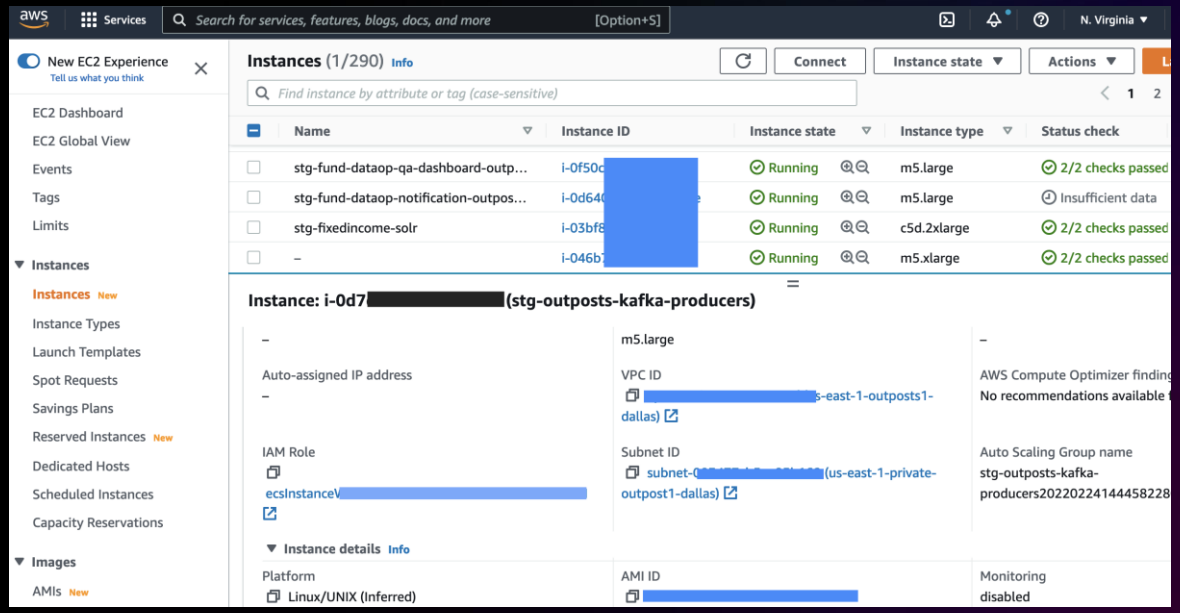


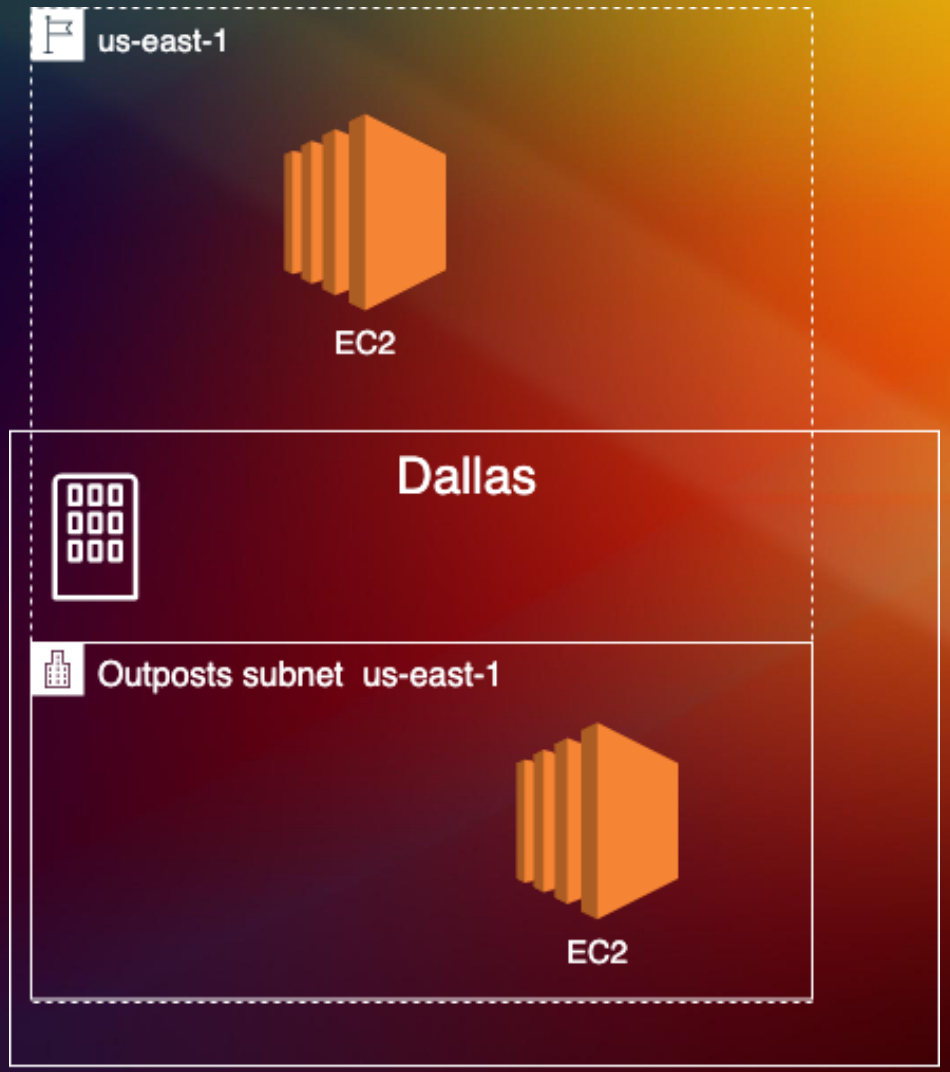


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Outposts in AWS





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Account boundaries at Morningstar

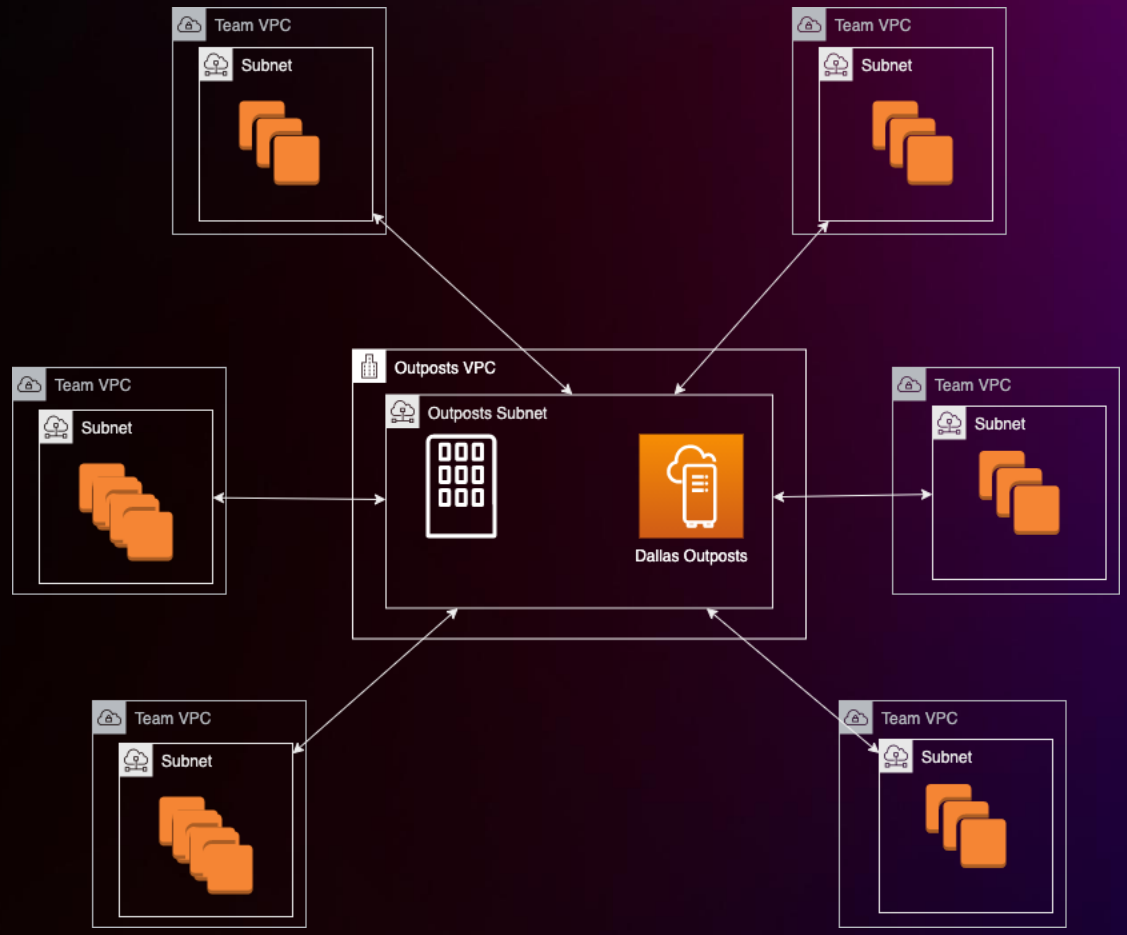


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Sharing Outposts with teams

- AWS Resource Access Manager (AWS RAM)
- Segment resources between Outposts and in-region
- Easy for teams already using AWS



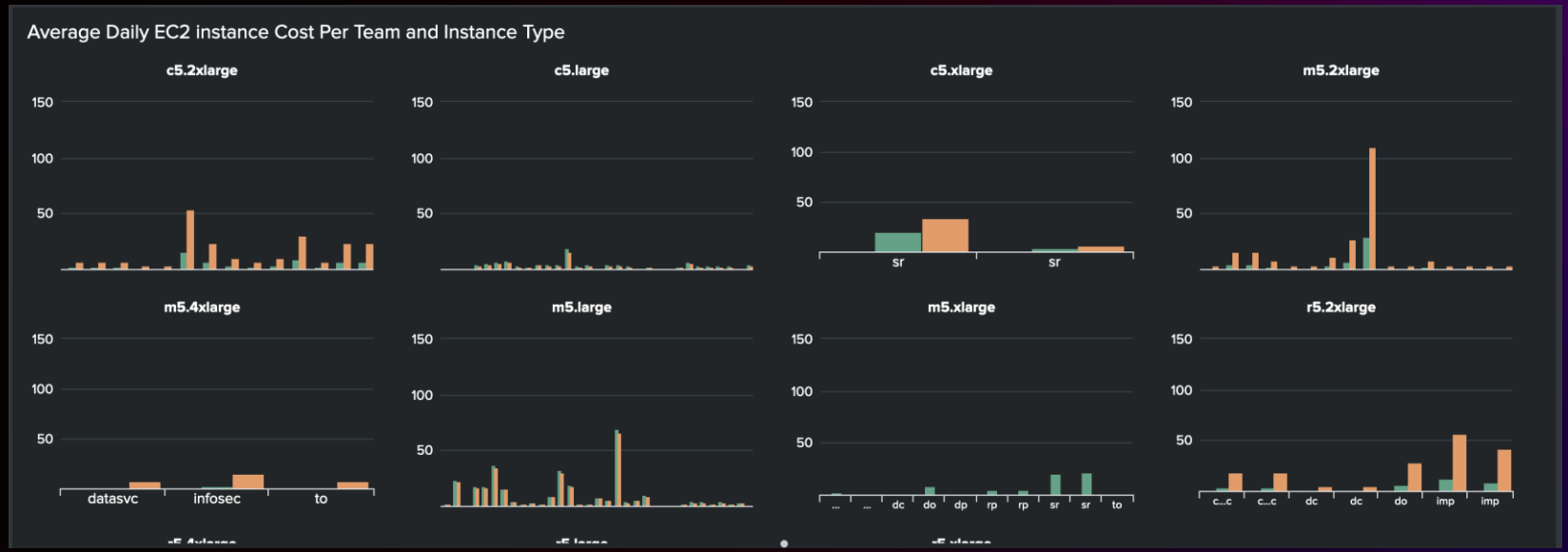
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Solution iterations: Excel and chaos

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Tracking usage and capacity

- Predicting capacity at onboarding
- Estimating EC2 needs
- Tracking usage across teams and accounts



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The quota system: Version 1

Data Center Name	instance family	turbo instan	Values Count of Nam	Sum of vCPU
Chicago	c5	c5.large	57	114
	m5	m5.large	6	12
	r5	r5.large	16	32
		r5.xlarge	15	
Chicago Total			94	
Dallas	c5	c5.large	1	
		c5.xlarge	6	
		c5.2xlarge	19	
	m5	m5.large	5	
		m5.xlarge	4	
		m5.2xlarge	8	
	r5	r5.large	2	
Dallas Total			45	
Grand Total			139	

	B	C	D	E	F
	Dallas Outposts	Total	Available	Used	% in use
	c5.large	245	172	73	0.298
	c5.xlarge	23	20	3	0.1304
	c5.2xlarge	33	10	23	0.697
	m5.large	220	90	130	0.59091
	m5.xlarge	22	22	0	0
	m5.2xlarge	36	6	30	0.83333
	m5.4xlarge	3	3	0	0
	r5.large	120	120	0	0
	r5.xlarge	20	19	1	0.05
	r5.2xlarge	26	22	4	0.1538
	r5.4xlarge	3	3	0	0
	Chicago Outposts	Total	Available	Used	% in use
	c5.large	115	76	39	0.3391
	c5.2xlarge	43	4	39	0.907
	m5.large	272	118	154	0.56618
	m5.xlarge	32	27	5	0.15625
	m5.2xlarge	48	0	48	1
	m5.4xlarge	6	1	5	0.83333
	r5.large	132	132	0	0

servers | DASHBOARD | DASHBOARD - OUTPOSTS | vlookup | Account mapping | Paste Insight

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The quota system: Version 2

QUOTAS 6/21/2021

Dallas Outposts	Total	Available	Used	% in use
c5.large	245	172	73	0.298
c5.xlarge	23	20	3	0.13
c5.2xlarge	33	10	23	0.697
m5.large	220	90	130	0.59091
m5.xlarge	22	22	0	0
m5.2xlarge	36	6	30	0.83333
m5.4xlarge	3	3	0	0
r5.large	120	120	0	0
r5.xlarge	20	19	1	0.05
r5.2xlarge	26	22	4	0.154
r5.4xlarge	3	3	0	0
Chicago Outposts	**Total**	**Available**	**Used**	**% in use**
c5.large	115	76	39	0.339
c5.2xlarge	43	4	39	0.907
m5.large	272	118	154	0.56618
m5.xlarge	32	27	5	0.15625
m5.2xlarge	48	0	48	1
m5.4xlarge	6	1	5	0.83333
r5.large	132	132	0	0
r5.xlarge	30	30	0	0
r5.2xlarge	20	16	4	0.2
r5.4xlarge	2	1	1	0.5

Oct - Feb 2022

DALLAS	available	used	total	% in use
c5.large	22	100	122	82%
c5.xlarge	2	21	23	91%
c5.2xlarge	53	13	66	20%
m5.large	63	165	228	72%
m5.xlarge	1	21	22	95%
m5.2xlarge	12	24	36	67%
m5.4xlarge	0	2	2	100%
r5.large	13	27	40	68%
r5.xlarge	0	20	20	100%
r5.2xlarge	31	15	46	33%
r5.4xlarge	1	2	3	67%
CHICAGO	**available**	**used**	**total**	**% in use**
c5.large	1	55	56	98%
c5.2xlarge	28	30	58	52%
m5.large	38	216	254	85%
m5.xlarge	0	35	35	100%
m5.2xlarge	6	45	51	88%
m5.4xlarge	3	3	6	50%
r5.large	26	46	72	64%
r5.xlarge	5	25	30	83%
r5.2xlarge	13	22	35	63%
r5.4xlarge	1	1	2	50%

May-22

DALLAS	available	used	total	% in use	change from fe
c5.large	31	83	114	73%	-8
c5.xlarge	12	23	35	66%	12
c5.2xlarg	58	28	86	33%	20
m5.large	7	125	232	54%	4
m5.xlarg	8	28	36	78%	14
m5.2xlar	32	20	52	38%	16
m5.4xlar	0	2	2	100%	0
r5.large	21	27	48	56%	8
r5.xlarge	5	19	24	79%	4
r5.2xlarg	39	15	54	28%	8
r5.4xlarg	1	2	3	67%	0
r5.24xlar	1	0	1	0%	1
CHICAG	**available**	**used**	**total**	**% in use**	
c5.large	101	47	148	32%	92
c5.xlarge	2	0	2	0%	-56
c5.2xlarg	21	37	58	64%	-196
m5.large	74	196	270	73%	235
m5.xlarg	12	39	51	76%	0
m5.2xlar	7	44	51	86%	45
m5.4xlar	4	2	6	33%	-66
m5.24xla	1	0	1	0%	1
r5.large	66	30	96	31%	66
r5.xlarge	35	27	62	44%	27
r5.2xlarg	13	22	35	63%	33
r5.4xlarg	0	3	3	100%	3

SERVER STATUS	Active

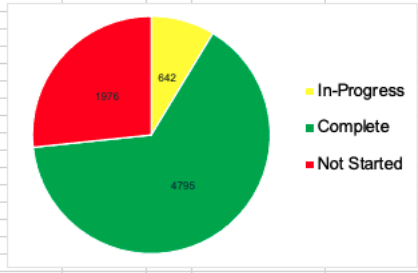
Count of Server	Column Labels			
Row Labels	Planned AWS Migr	Planned	Planned Retirement	Grand Total
2022 Q1	146	858	363	1367
2022 Q2	347	504	333	1184
Grand Total	**493**	**1362**	**696**	**2551**

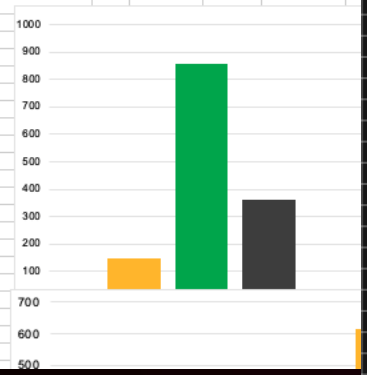
MIGRATION PLAN	(All)
MIGRATION TIMELINE	(All)
SERVER STATUS	(Multiple Items)

Row Labels	Count of Server
In-Progress	642
Complete	4795
Not Started	1976
Grand Total	**7413**

SERVER STATUS	Active
MIGRATION TIMELINE	(All)
MIGRATION PLAN	(All)

Count of Server	Column Labels		
Row Labels	AWS	Outpost Retire	Grand Total



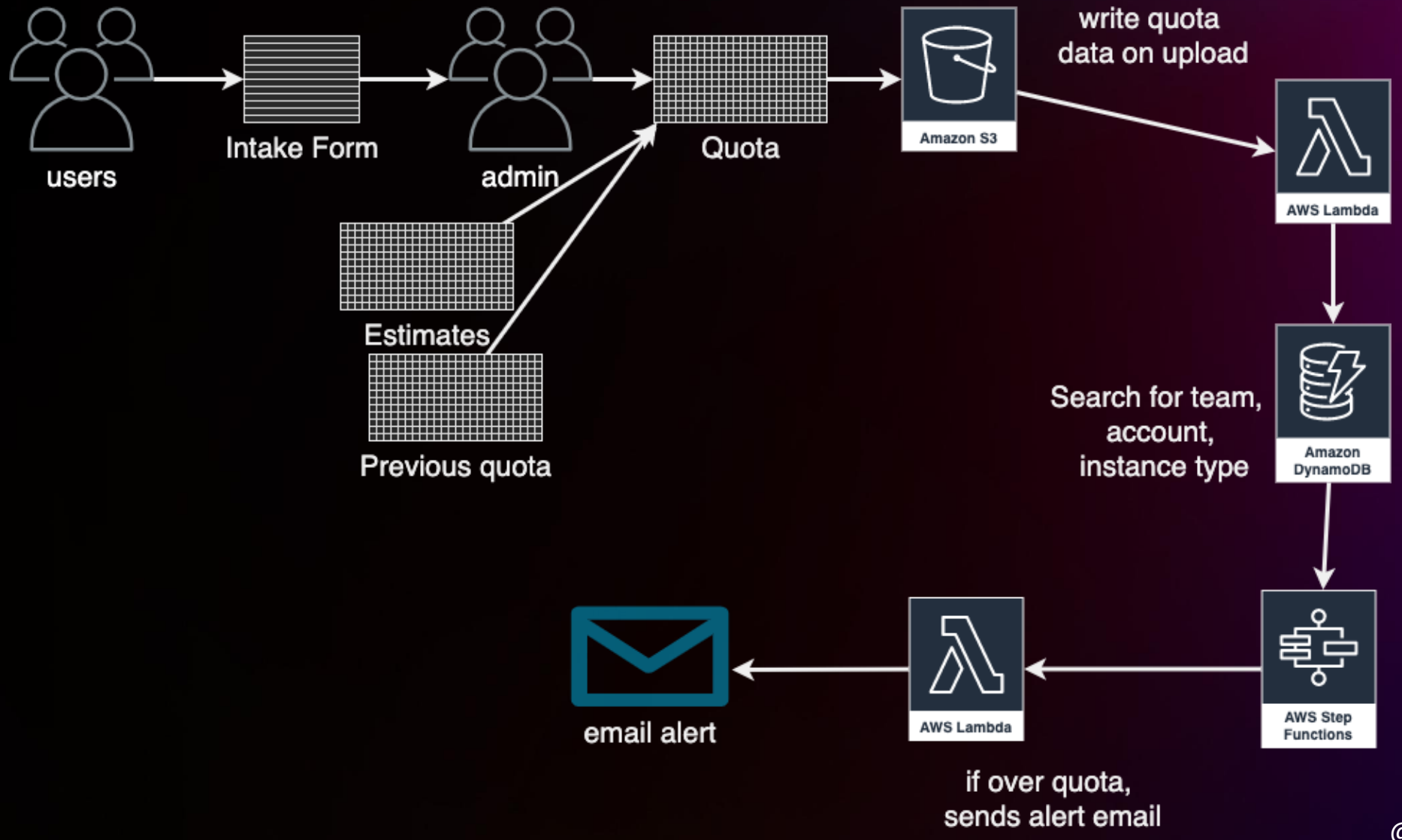


	A	B	C	D	E	F	G
1	row_num	account_id	tid	env	region	instance_t	threshold
2	1001	913	ade	non-prod	us-east-1	c5.large	0
3	1002	913	ade	non-prod	us-east-1	c5.xlarge	0
4	1003	913	ade	non-prod	us-east-1	c5.2xlarge	0
5	1004	913	ade	non-prod	us-east-1	m5.large	0
6	1005	913	ade	non-prod	us-east-1	m5.xlarge	0
7	1006	913	ade	non-prod	us-east-1	m5.2xlarge	0
8	1007	913	ade	non-prod	us-east-1	m5.4xlarge	0
9	1008	913	ade	non-prod	us-east-1	r5.large	0
10	1009	913	ade	non-prod	us-east-1	r5.xlarge	0
11	1010	913	ade	non-prod	us-east-1	r5.2xlarge	0
12	1011	913	ade	non-prod	us-east-1	r5.4xlarge	0
13	1012	913	ade	non-prod	us-west-2	c5.large	0
14	1013	913	ade	non-prod	us-west-2	c5.2xlarge	1
15	1014	913	ade	non-prod	us-west-2	m5.large	0
16	1015	913	ade	non-prod	us-west-2	m5.xlarge	0
17	1016	913	ade	non-prod	us-west-2	m5.2xlarge	0
18	1017	913	ade	non-prod	us-west-2	m5.4xlarge	0
19	1018	913	ade	non-prod	us-west-2	r5.large	1
20	1019	913	ade	non-prod	us-west-2	r5.xlarge	0
21	1020	913	ade	non-prod	us-west-2	r5.2xlarge	0
22	1021	913	ade	non-prod	us-west-2	r5.4xlarge	0
23	1022	470	ade	prod	us-east-1	c5.large	0
24	1023	470	ade	prod	us-east-1	c5.xlarge	0
25	1024	470	ade	prod	us-east-1	c5.2xlarge	0
26	1025	470	ade	prod	us-east-1	m5.large	0
27	1026	470	ade	prod	us-east-1	m5.xlarge	0
28	1027	470	ade	prod	us-east-1	m5.2xlarge	0
29	1028	470	ade	prod	us-east-1	m5.4xlarge	0
30	1029	470	ade	prod	us-east-1	r5.large	0
31	1030	470	ade	prod	us-east-1	r5.xlarge	0
32	1031	470	ade	prod	us-east-1	r5.2xlarge	0
33	1032	470	ade	prod	us-east-1	r5.4xlarge	0
34	1033	470	ade	prod	us-west-2	c5.large	0
35	1034	470	ade	prod	us-west-2	c5.2xlarge	0
36	1035	470	ade	prod	us-west-2	m5.large	0
37	1036	470	ade	prod	us-west-2	m5.xlarge	0
38	1037	470	ade	prod	us-west-2	m5.2xlarge	0
39	1038	470	ade	prod	us-west-2	m5.4xlarge	0
40	1039	470	ade	prod	us-west-2	r5.large	0
41	1040	470	ade	prod	us-west-2	r5.xlarge	0
42	1041	470	ade	prod	us-west-2	r5.2xlarge	0
43	1042	470	ade	prod	us-west-2	r5.4xlarge	0
44	1043	968	as	non-prod	us-east-1	c5.large	0
45	1044	968	as	non-prod	us-east-1	c5.xlarge	0
46	1045	968	as	non-prod	us-east-1	c5.2xlarge	0
47	1046	968	as	non-prod	us-east-1	m5.large	1
48	1047	968	as	non-prod	us-east-1	m5.xlarge	0
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50	1049	968	as	non-prod	us-east-1	m5.4xlarge	0
51	1050	968	as	non-prod	us-east-1	r5.large	0
52	1051	968	as	non-prod	us-east-1	r5.xlarge	0
53	1052	968	as	non-prod	us-east-1	r5.2xlarge	0
54	1053	968	as	non-prod	us-east-1	r5.4xlarge	0
55	1054	968	as	non-prod	us-west-2	c5.large	1
56	1055	968	as	non-prod	us-west-2	c5.2xlarge	0

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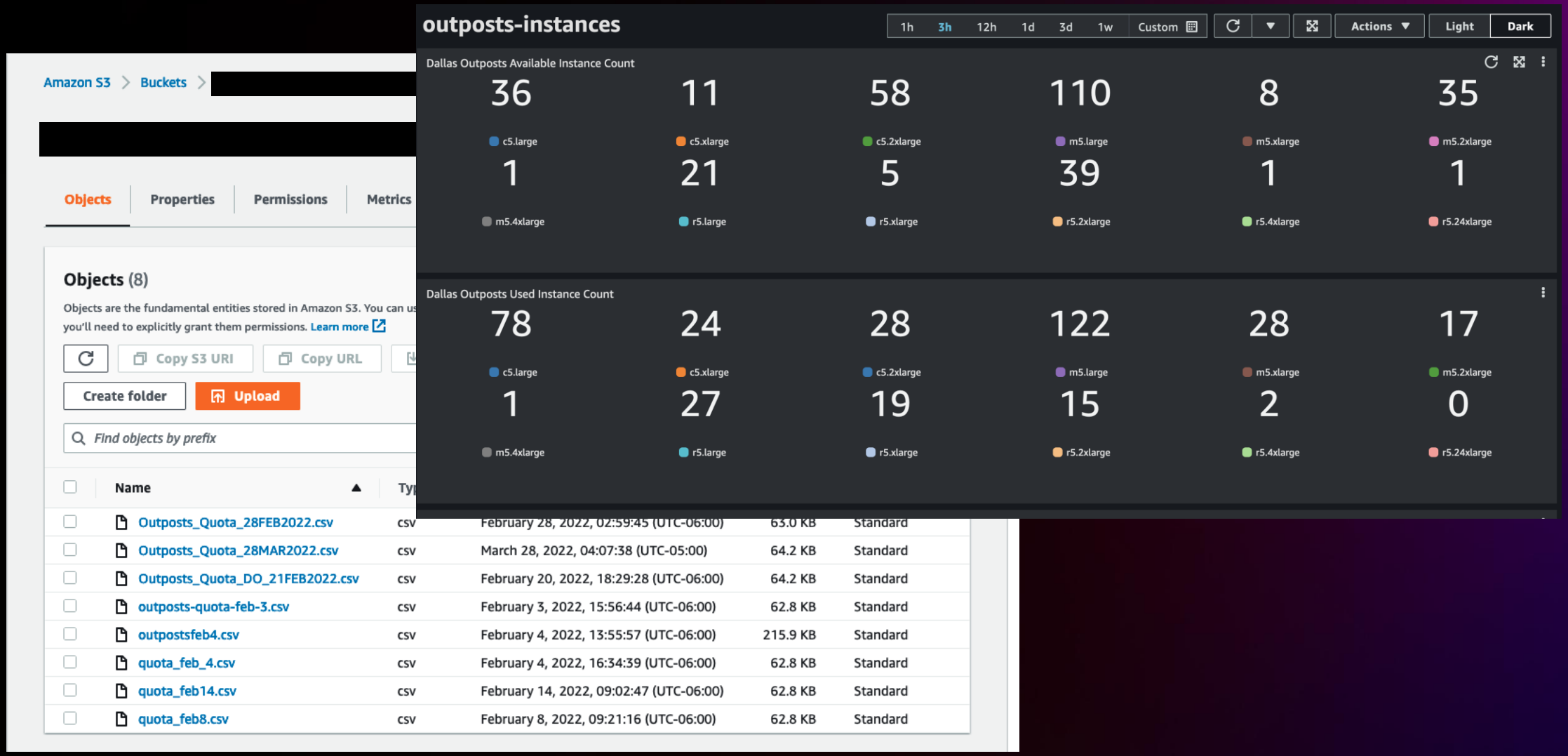
The quota system: Version 2



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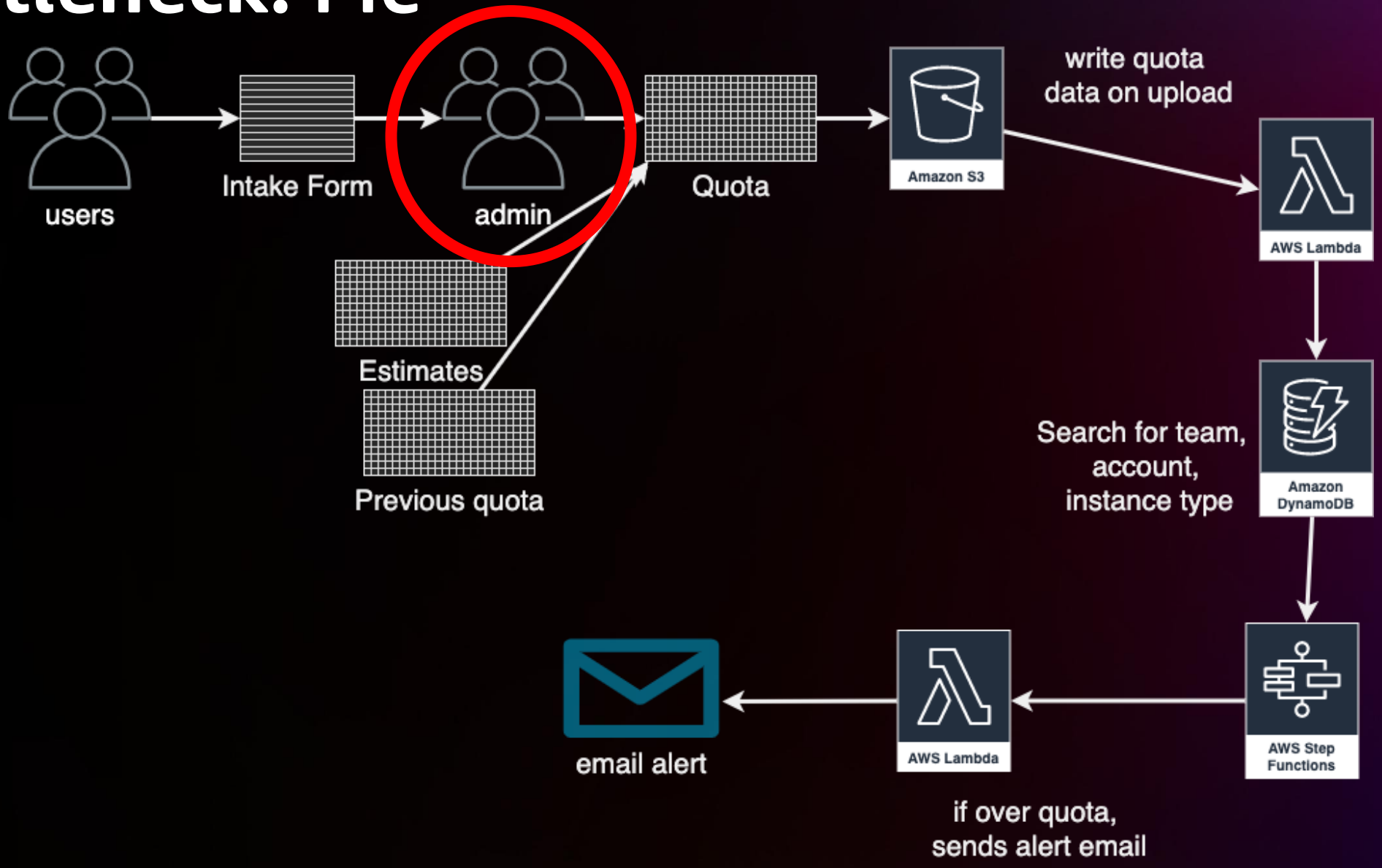
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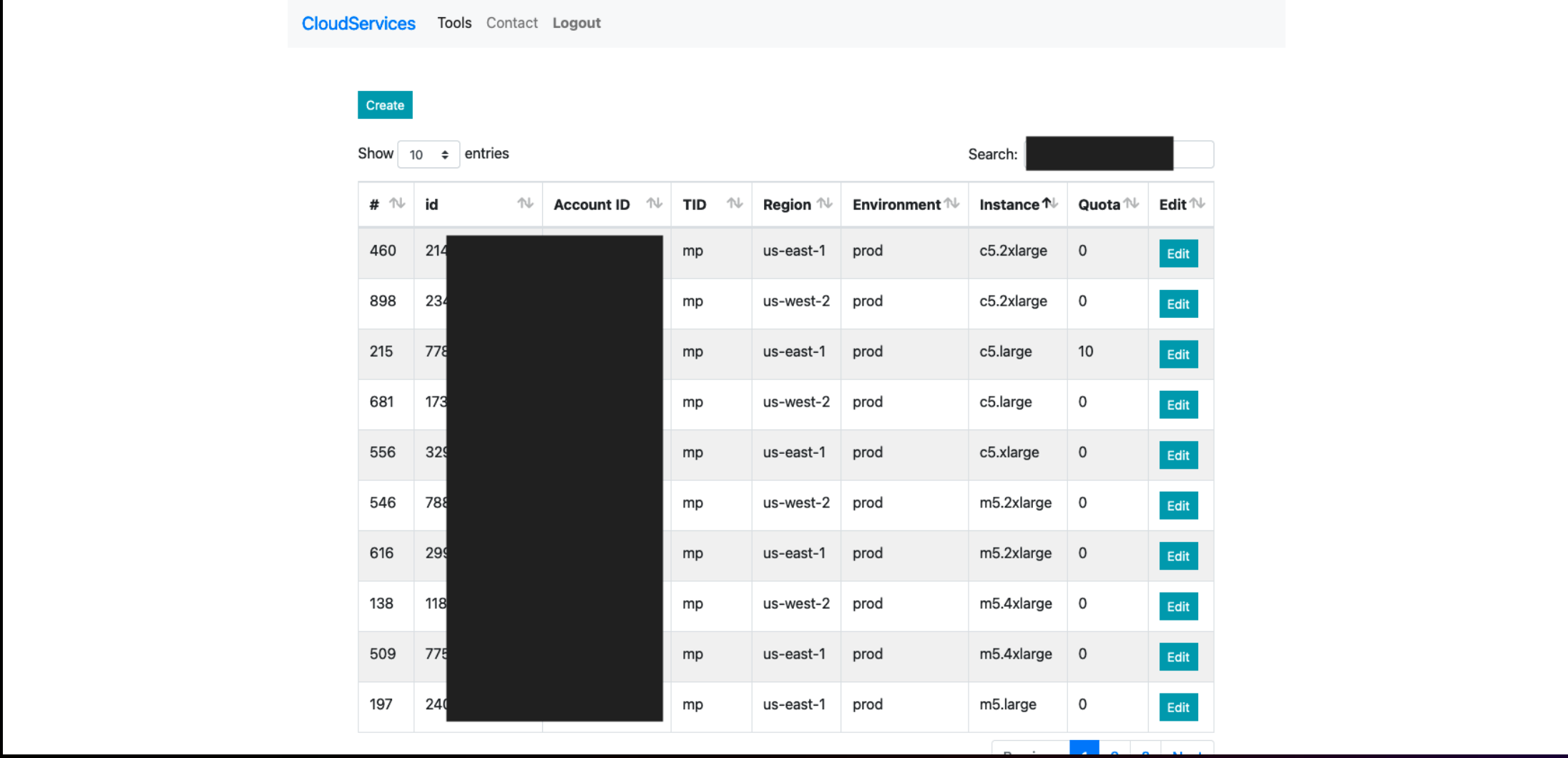
Bottleneck: Me



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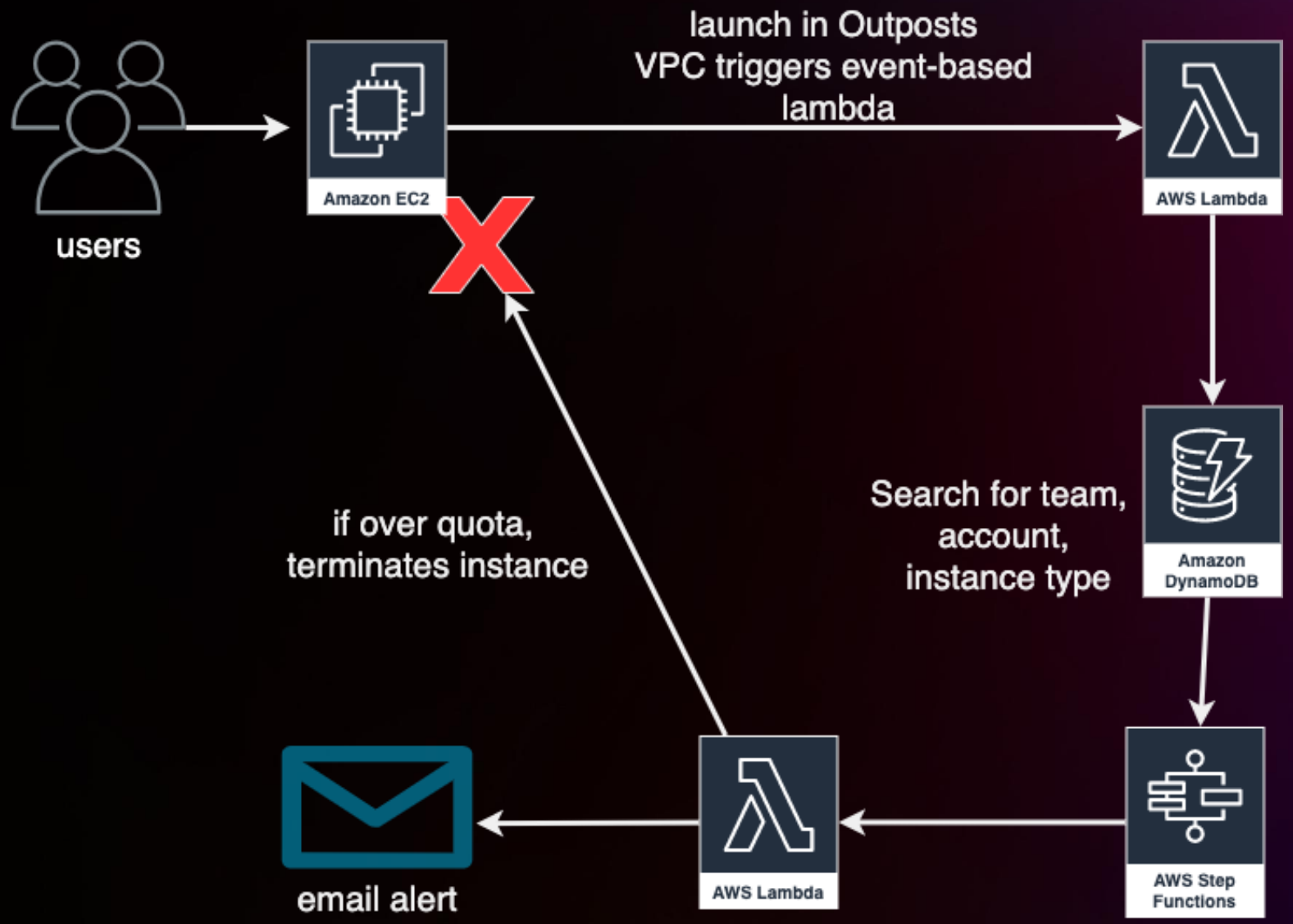
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The quota system: Version 3



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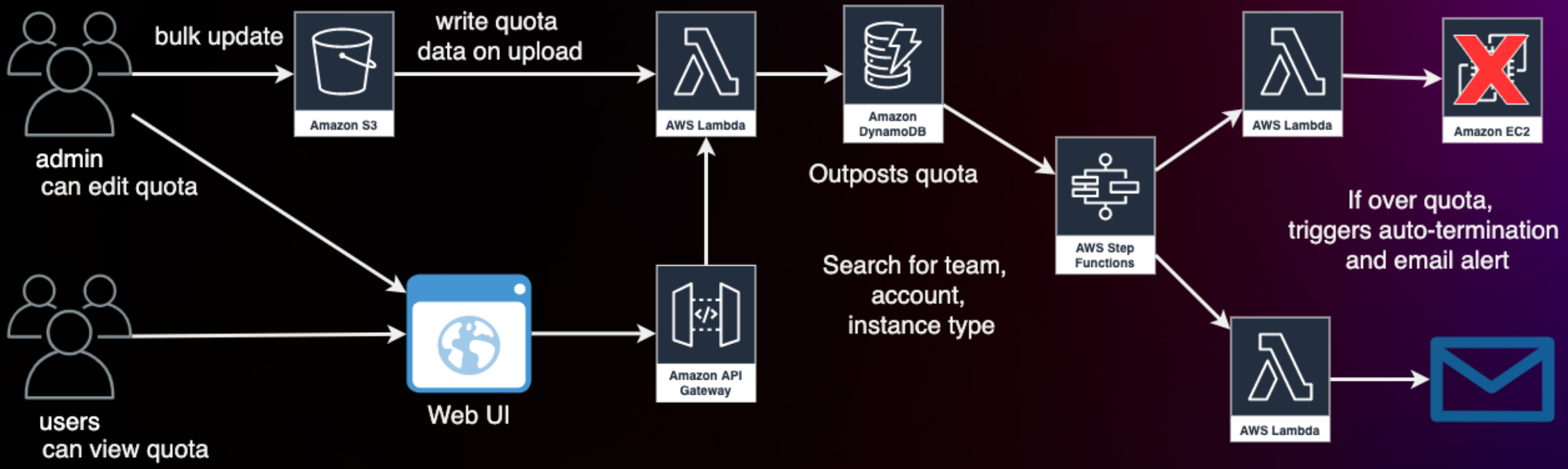
Trust, but auto-terminate



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The quota system: Version 3



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User view

CloudServices Tools Contact Login

Show 100 entries Search:

#	id	Account ID	TID	Region	Environment	Instance	Quota
1	1921475	[redacted]	mob	us-east-1	prod	m5.xlarge	0
2	3173116		indiv	us-west-2	non-prod	r5.2xlarge	0
3	3363272		imp	us-west-2	prod	r5.2xlarge	0
4	3293235		rp	us-east-1	non-prod	r5.4xlarge	0
5	2806709		sr	us-west-2	non-prod	r5.large	0
6	7040461		mi	us-west-2	non-prod	m5.2xlarge	1
7	1682937		cloudsvc	us-east-1	non-prod	r5.2xlarge	0
8	1212766		corpsys	us-west-2	prod	r5.2xlarge	0
9	2953843		ept	us-east-1	non-prod	r5.2xlarge	0
10	1355893		baa	us-east-1	prod	r5.xlarge	0
11	1357189		to	us-west-2	non-prod	r5.2xlarge	1
12	2568989		datasvc	us-west-2	non-prod	r5.4xlarge	2
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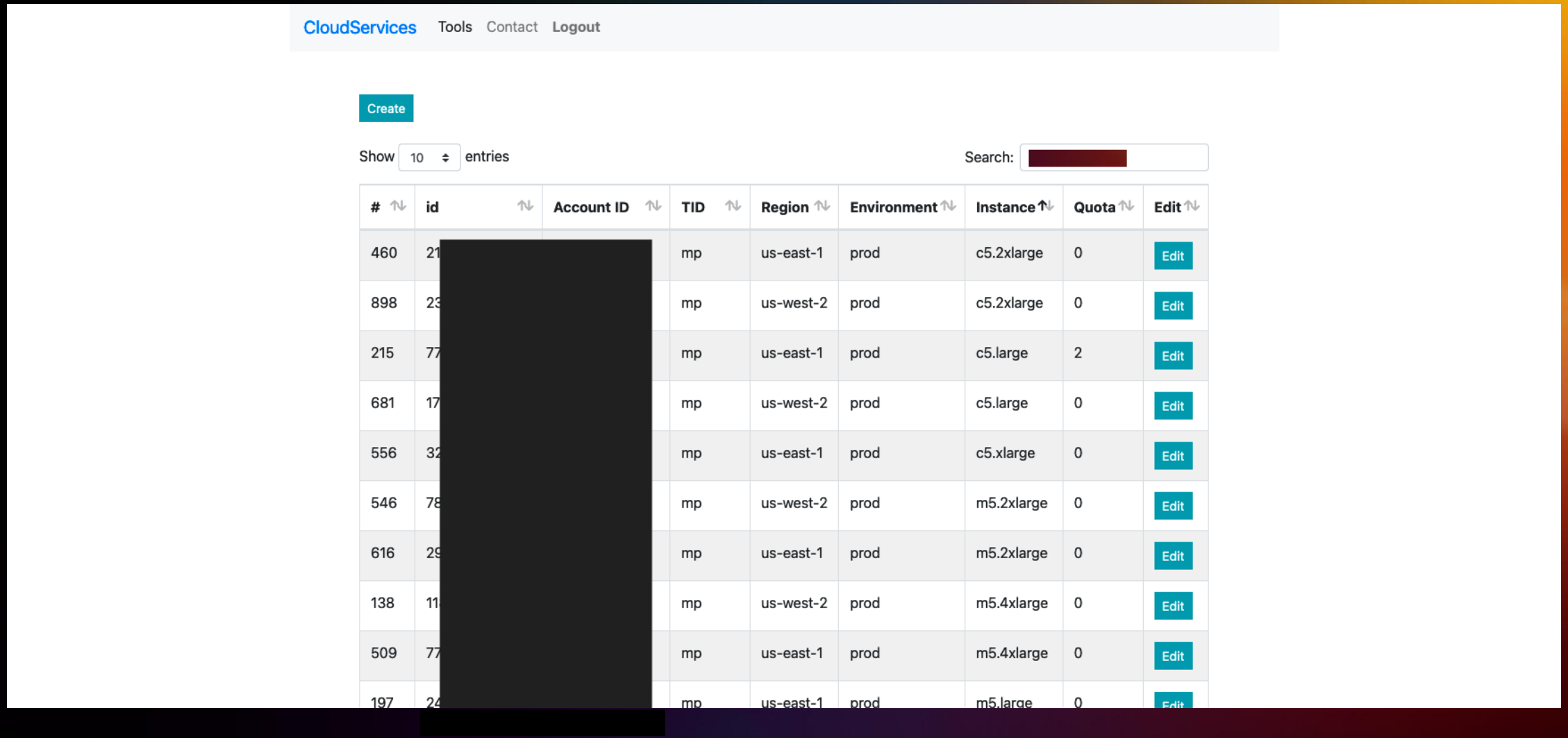
aws
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Log in



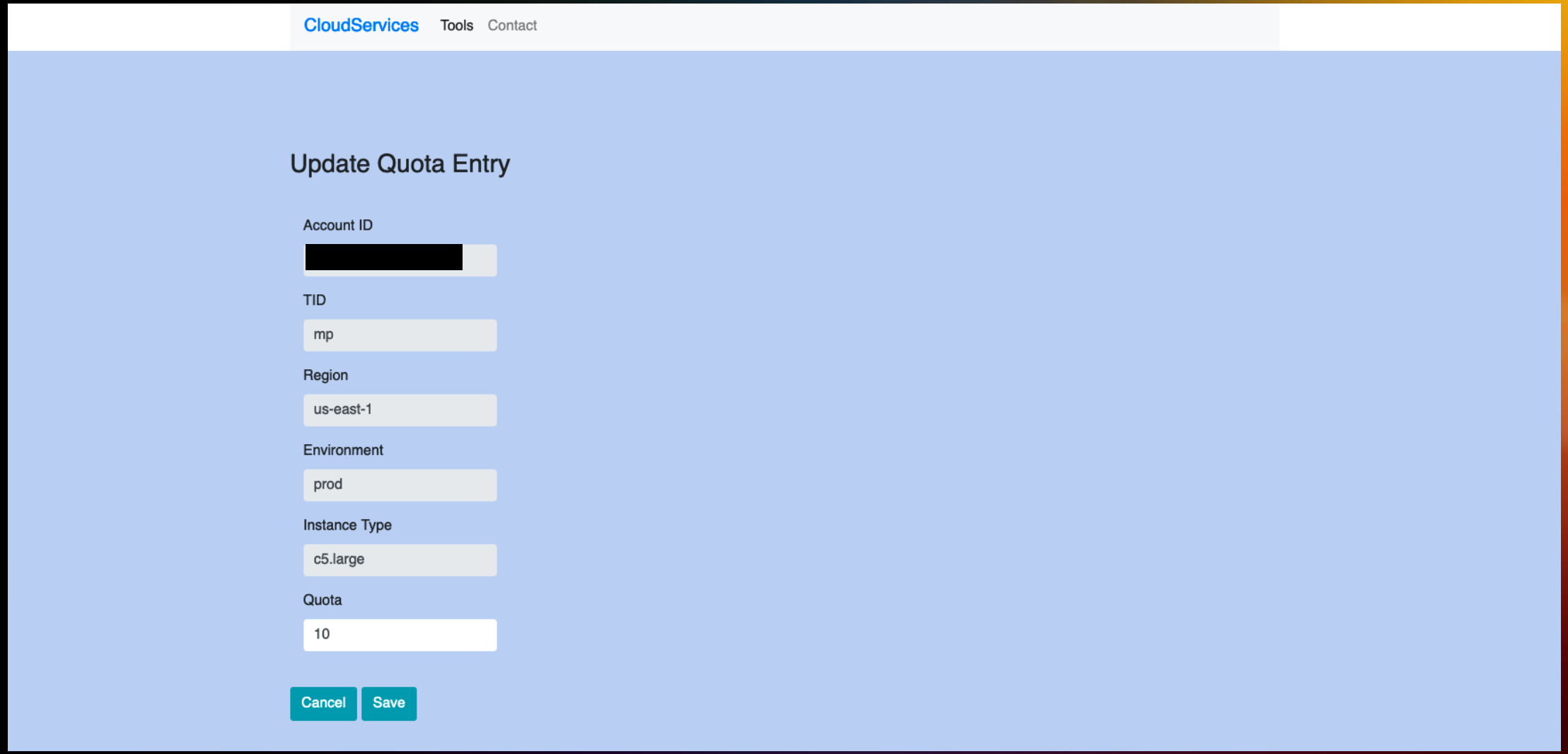
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Filter by account, region, or instance



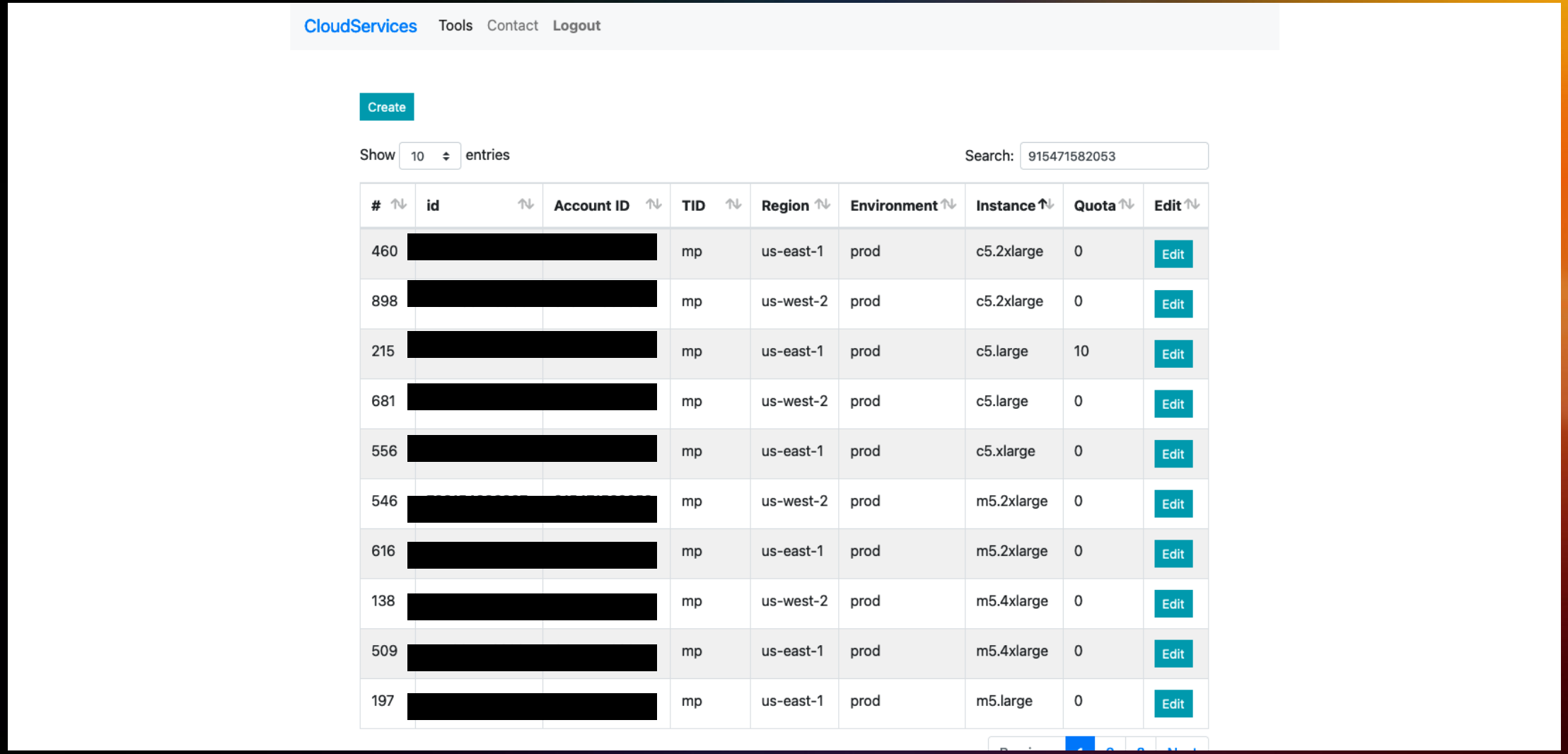
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Update quota



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View updated total



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Lessons learned

Key technology goals

- Plan your capacity
- Track utilization
- Set quota by account



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