

GPSTEC308

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SaaS Metrics: The Ultimate View of Tenant Consumption

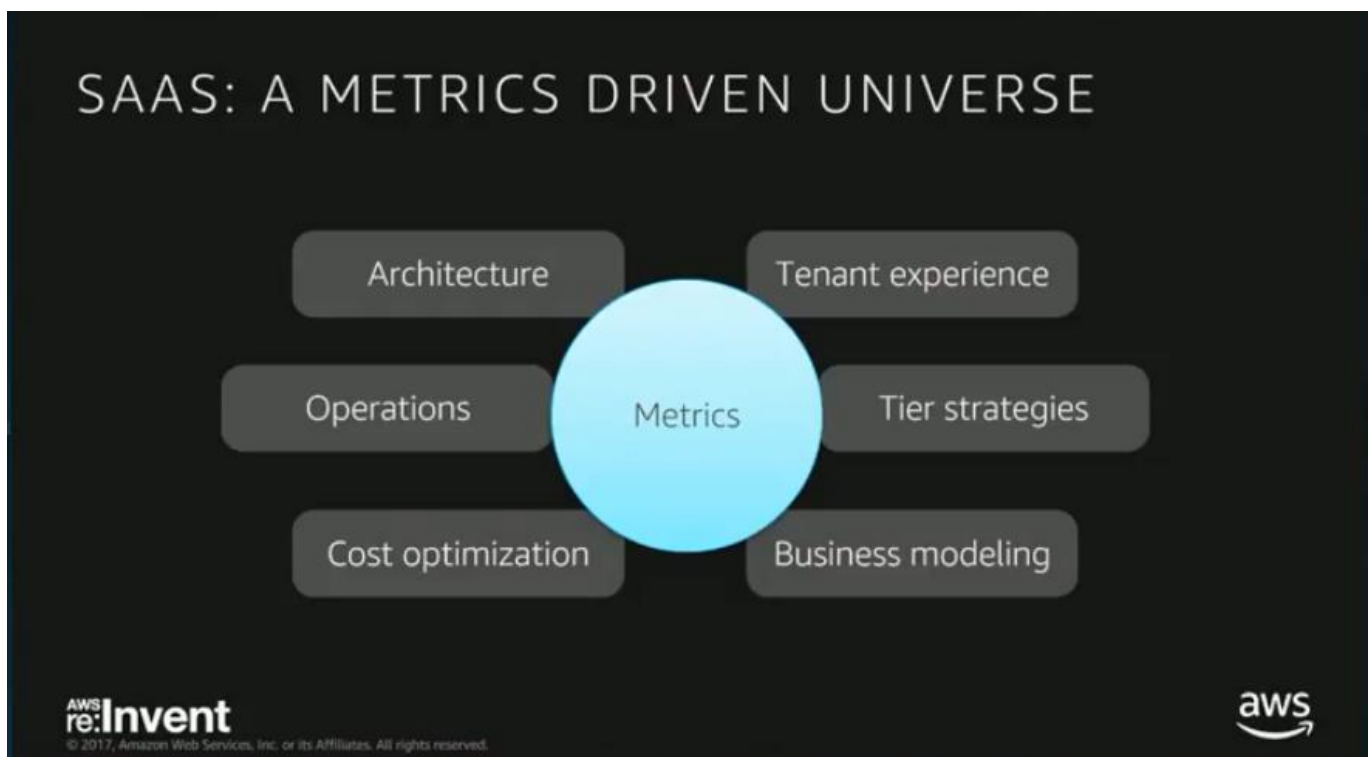
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SaaS architects must always have their finger on the pulse of tenant consumption. Understanding the patterns for tenant consumption provides both business and technical teams the data they need to make sound decisions about product packaging, metering, and tiering. Of course, building a robust model for analyzing and attributing tenant consumption can be tricky. In this session, we look at specific strategies for capturing, aggregating, and associating consumption with tenants in a multitenant, shared resource model. We touch on common patterns and strategies that are used to instrument and publish metrics spanning compute, storage, and so on. We also look at how tools and models that can be used to correlate consumption with AWS spend.



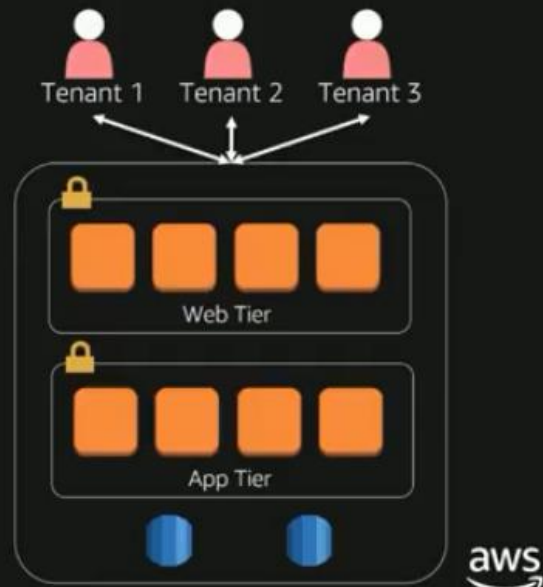
MULTI-TENANT METRICS: A BLESSING AND A CURSE

The Good

- Shared infrastructure enables global view of tenant activity
- One pane of glass to analyze tenant wide consumption

The Bad

- How do you apportion consumption and costs when resources are shared?



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CONSUMPTION VS. METERING

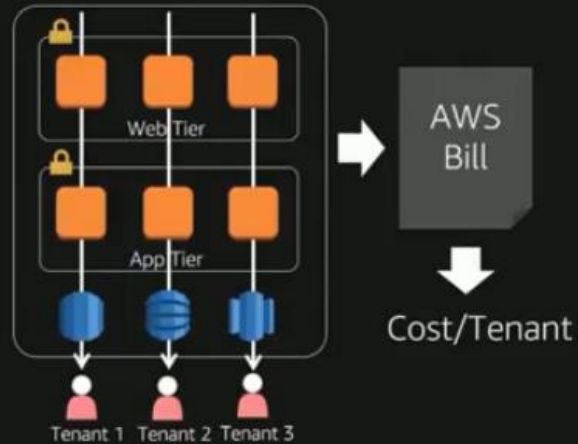
Metering

- Number of users
- Product features
- Contract

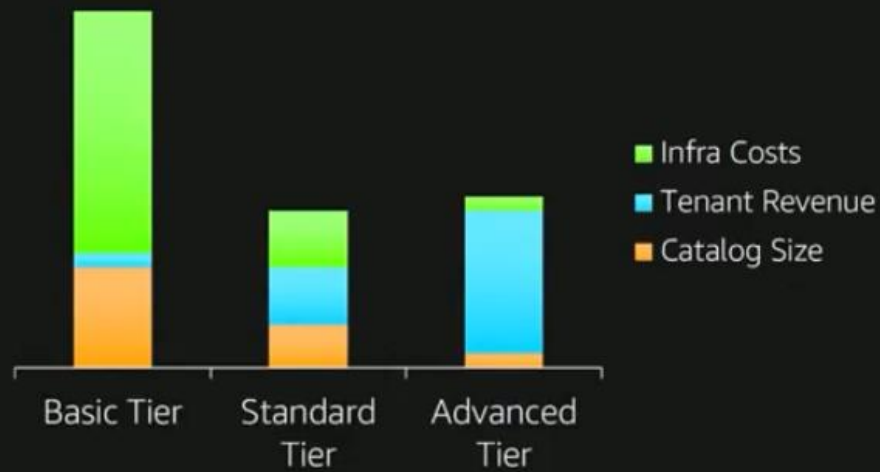
↓
Pricing tiers

↓
Billing System

Consumption



WHY METRICS MATTER

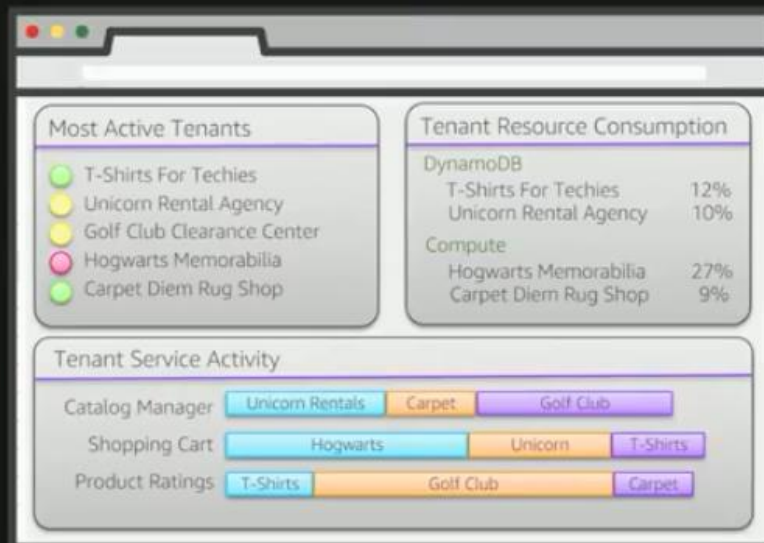


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OPERATIONAL VIEWS OF TENANT CONSUMPTION



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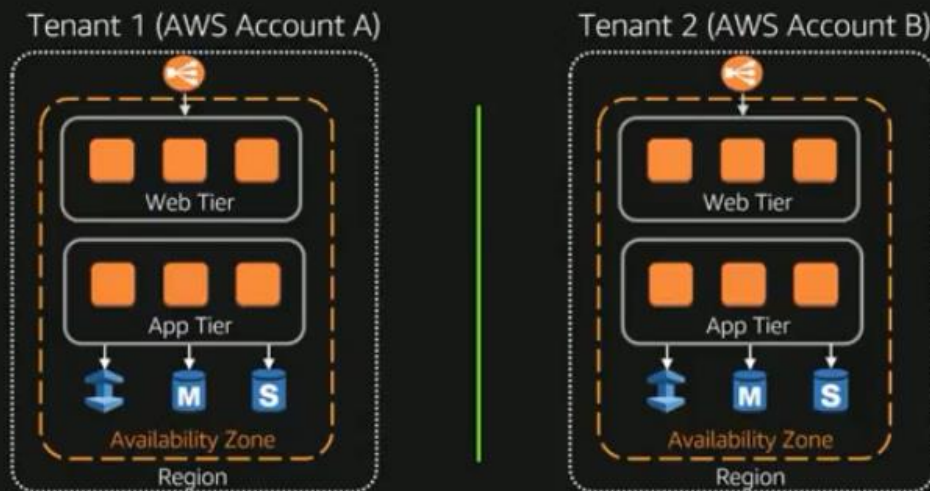
COST METRICS DRIVE TECHNICAL TRADEOFFS

Product manager wants to add video support for catalog items

- Should we charge more for this feature?
- How will it impact our infrastructure costs per tenant?
- Does this impact our tiering strategy?

What metrics do you have to answer these questions?

CONSUMPTION WITH A SILOED ACCOUNT

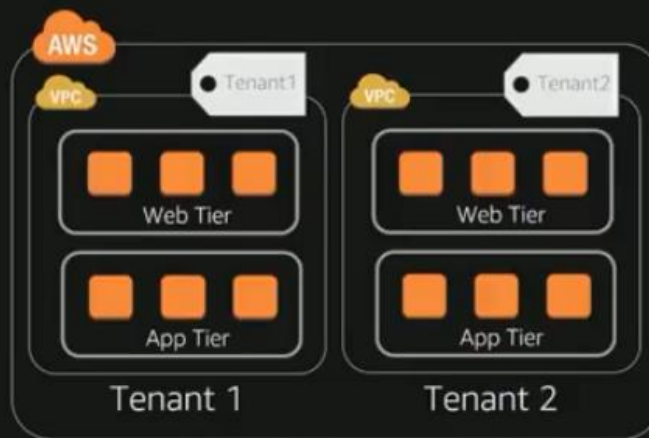


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CONSUMPTION WITH A SILOED VPC



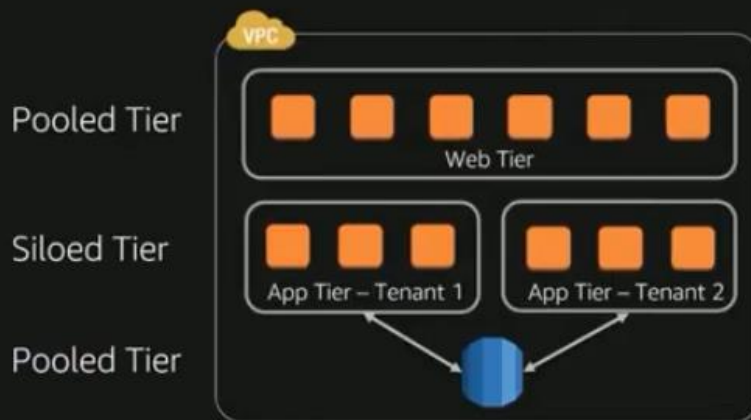
Tag each VPC with tenant identifier

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CONSUMPTION WITH THE BRIDGE MODEL



- Layered isolation requires a hybrid aggregation mode
- Leverages a mix of tagging and allocation

THE CHALLENGE: APPORTIONING CONSUMPTION

What should be measured?

- Request count
- Execution time
- CPU impact
- Memory impact

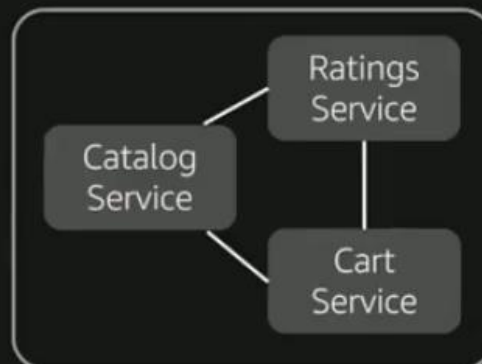


Pooled, Multi-Tenant Resources

ALLOCATION STRATEGIES CAN VARY

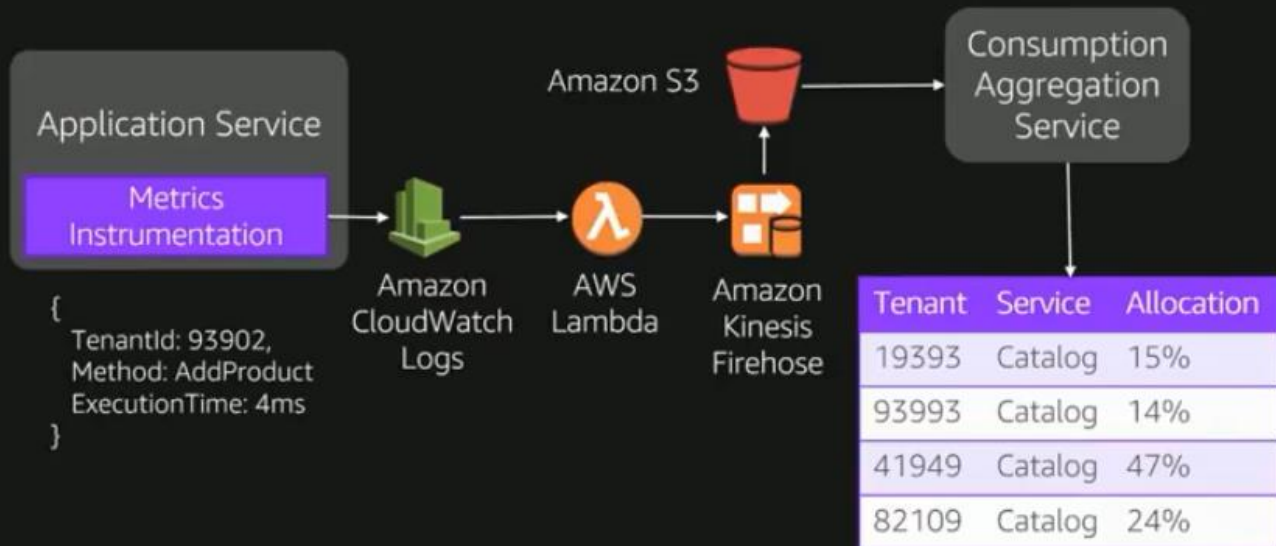


Each AWS service has its own cost dimensions



Each service may have its own consumption allocation model

COMPUTE CONSUMPTION METRICS

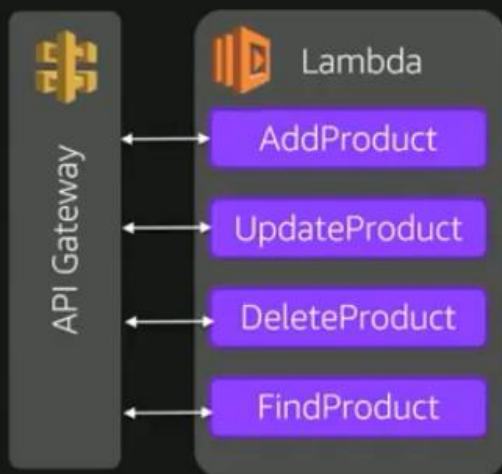


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SERVERLESS: A SIMPLER CONSUMPTION MODEL



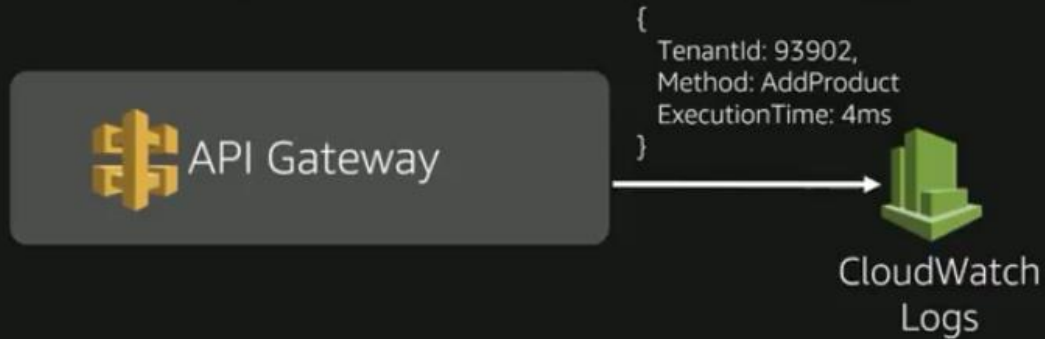
- Tenants don't share compute resources
- Consumption maps more directly to a specific tenant
- Simplifies correlation with AWS billing constructs

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AN API GATEWAY CENTERED APPROACH



- Use API Gateway to meter access to all application services
- Rely exclusively on frequency as the unit of allocation
- Simplifies implementation, but limits specialization

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DERIVING CONSUMPTION FROM AWS X-RAY TRACING



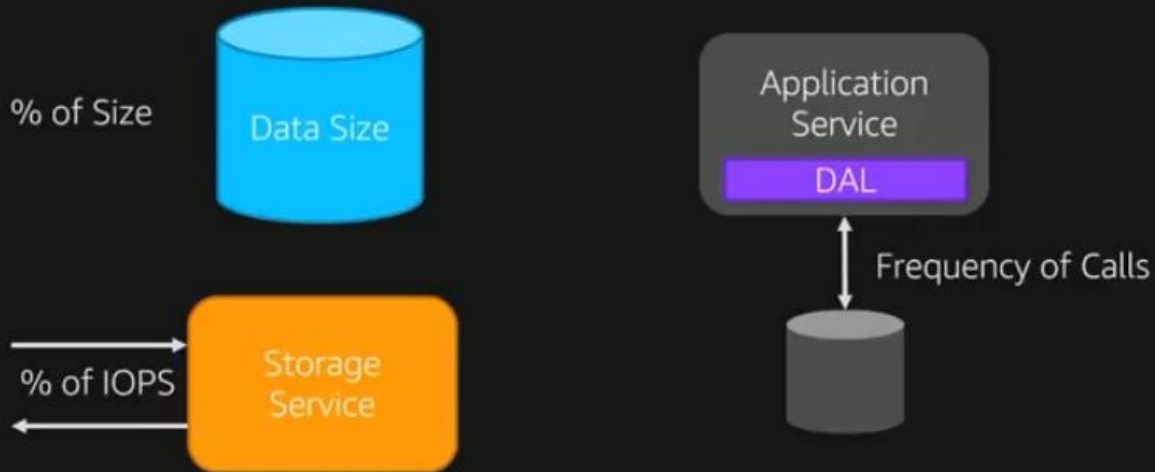
- Use segment tracking and latency to derive consumption
- Instrument annotations with tenant context
- Limits aggregation investment

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STORAGE CONSUMPTION METRICS

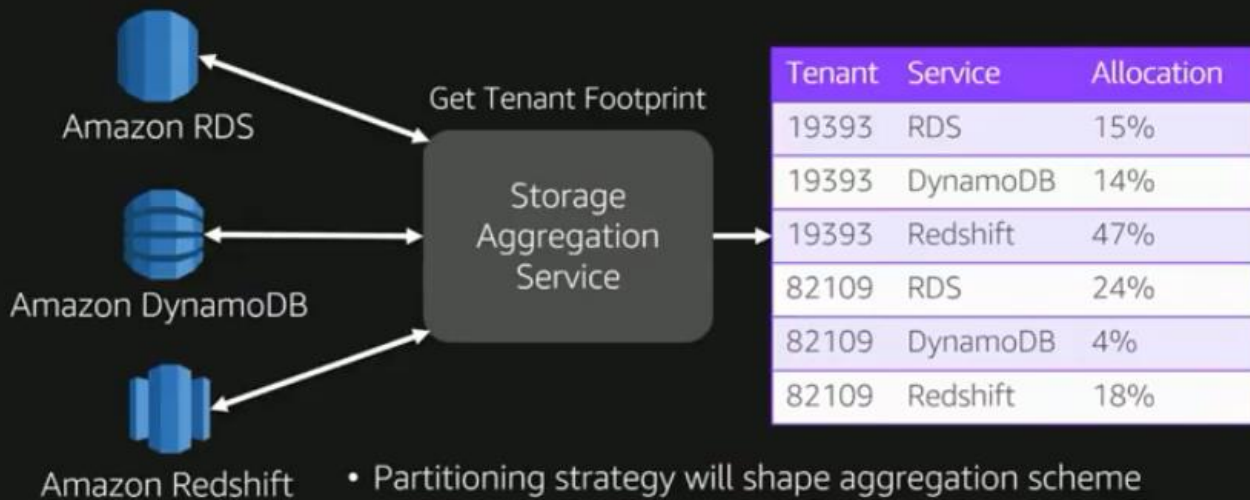


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AGGREGATING STORAGE SIZE



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APPROACH 1: SEPARATE COSTS EACH DIMENSION

Frequency Data

Tenant	Method	Allocation
19393	UpdateProduct	11%
19393	AddProduct	4%
19393	FindProduct	24%
84719	AddProduct	8%
84719	FindProduct	12%

Derived IOPS Allocation

Tenant	Allocation
19393	15%
84179	14%

Data Size Aggregation

Data Size Allocation

Tenant	Service	Allocation
19393	RDS	15%
19393	DynamoDB	14%
19393	Redshift	47%

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APPROACH 2: UNIFIED STORAGE COSTS

Frequency Data

Tenant	Method	Allocation
19393	UpdateProduct	11%
19393	AddProduct	4%
19393	FindProduct	24%
84719	AddProduct	8%
84719	FindProduct	12%

Aggregated Metrics

Tenant	Allocation
19393	15%
84719	14%
19393	47%

A mix of IOPS and size

Tenant Allocation

Tenant	Allocation
19393	15%
84179	14%

Derived IOPS Data

Tenant	Service	Allocation
19393	RDS	15%
19393	DynamoDB	14%
19393	Redshift	47%

Size Data

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A STRATEGY FOR EACH SERVICE



Amazon
Athena



Amazon
QuickSight



Kinesis



EMR



Amazon
SES



Amazon
SNS

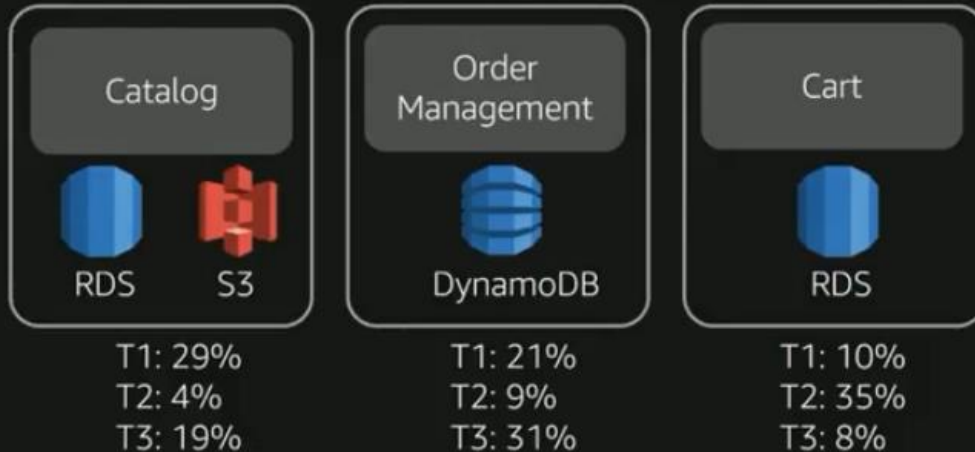


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SQS

- Some services may not have clear ways to isolate tenant activity
- Cost impact may not always warrant metrics instrumentation

CAPTURING PER APPLICATION SERVICE METRICS

Aggregate compute and storage to get service allocation



USAGE + CONSUMPTION METRICS

Action	Timestamp
AddToCart	01122017 08:12
Checkout	01122017 08:12
UpdateQty	01122017 08:12



Tenant	Timestamp	Service	Consumption
19393	01122017 08:12	Catalog	15%
93993	01122017 08:12	Catalog	14%
41949	01122017 08:12	Catalog	47%

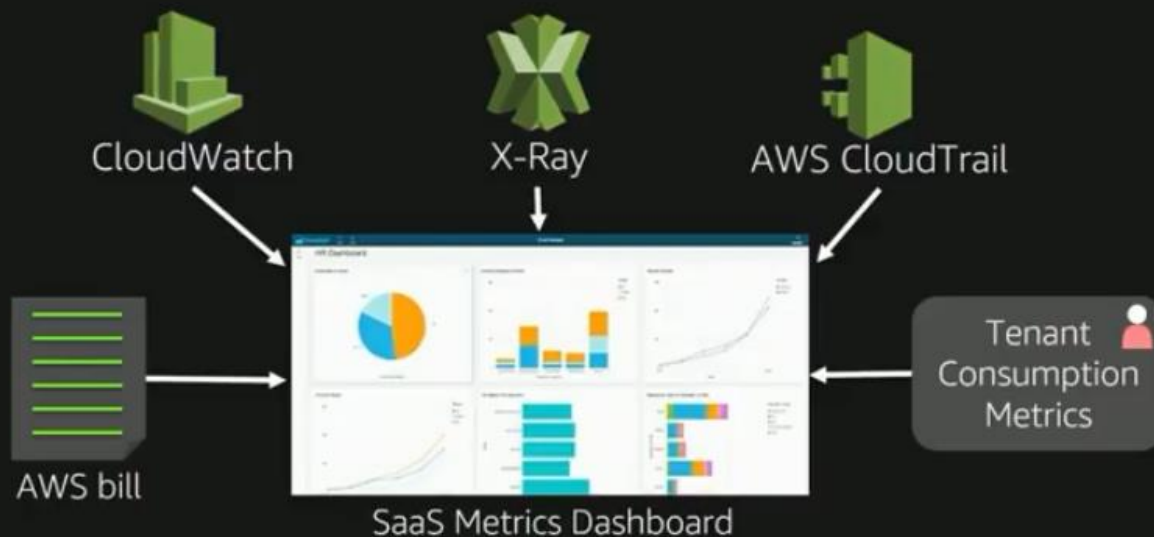
- Determine how individual tenant activity impacts consumption
- Identify hotspots tenant experience is impacting by noisy tenants
- Use this data to refine application flow and service scaling policies

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ADVANCED MODE: THINKING BEYOND COST

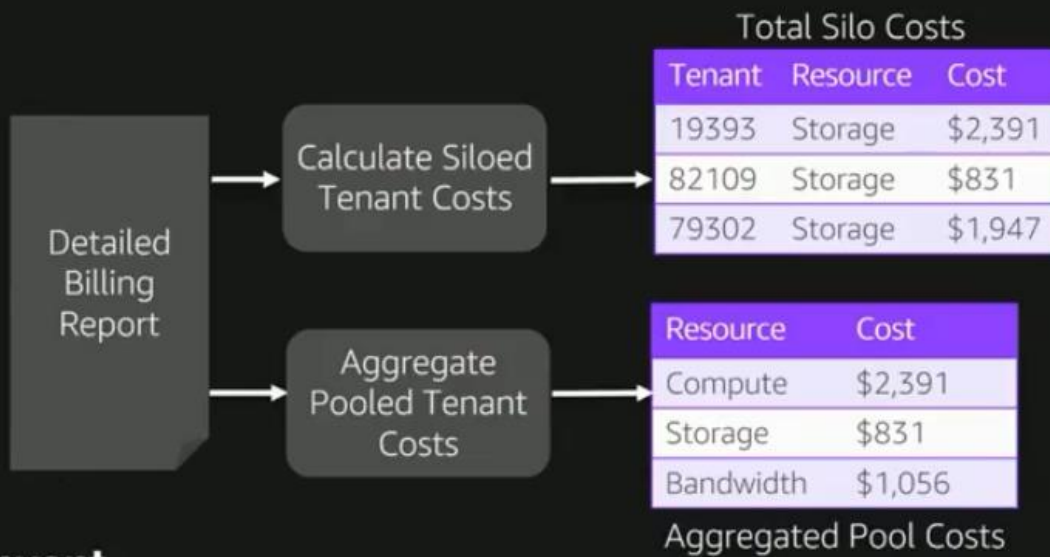


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THE HARD PART: CORRELATING WITH COSTS



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CONNECTING THE DOTS

Aggregated Pool Costs

Resource	Cost
Compute	\$2,391
Storage	\$831
Bandwidth	\$1,056

X

Cost Allocation

Tenant	Percent
19393	48%
82109	21%
79302	31%

=

Pooled Cost/Tenant

Tenant	Percent
19393	\$1,693.44
82109	\$740.88
79302	\$1,093.68

$$(\text{Pooled Costs} + \text{Silo Costs}) / \# \text{ Tenants} = \text{Total Cost Per Tenant}$$

LEVERAGING PARTNER SOLUTIONS

CloudHealth



Cloudability



- Leave the bill ingestion and IP to partner solutions
- Use bill aggregation to feed cost per tenant calculations

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BEING "GOOD ENOUGH"

GENERAL LEDGER			
Account	Debit	Credit	Balance
9892941	\$12.00	\$130.00	\$118.00
1848193	\$41.00	\$0.00	\$77.00
3999314	\$0.00	\$100.00	\$177.00
6892992	\$20.00	\$5.00	\$192.00
4108482	\$40.00	\$60.00	\$212.00
2949230	\$69.00	\$0.00	\$123.00

- You're not an accountant
- Don't confuse metrics with billing
- Aim for a reasonable approximation of cost/tenant
- Balance complexity with value

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TAKEAWAYS

- Metrics are essential to SaaS business and technical strategy
- Consumption \neq Metering
- Tenant-centric metrics have operational and scaling value
- Each resource/service may require a unique metric allocation strategy
- Correlating with billing data can be challenging
- Start small, demonstrate value, and evolve

ADDITIONAL RESOURCES

SaaS Quick Starts

- SaaS Identity and Isolation with Amazon Cognito

re:INVENT Sessions

- SaaS and OpenID Connect: The Secret Sauce of Tenant Identity and Isolation (GPSTEC323)
- Tenant Health in a Multi-Tenant Environment Featuring New Relic (GPSTEC309)
- Deconstructing SaaS: A Deep Dive into Building Multi-tenant Solutions on AWS (ARC407)

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Thank you!

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