Know Your Costs

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IoT on AWS
A Philly Cloud Computing Event

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"Pay only for the resources you consume"

A simple proposition, but not so simple in implementation

Some services charge by time, some by data volume, some by request counts, some by all three

Data transfer is often a hidden cost

This is the "Simple" Cost Calculator

Ratios to Remember

1 request per second = 2,635,200 requests per month

1 request per minute = 44,000 requests per month

The "Obvious" Concern: Storage

```
{"device": "7c1b256e6c2f4eefa872d866a533b2bf", "timestamp": 1571781231211,
"temperature": 67.70513141396604}
```

1 record = 108 bytes

1 record/second/sensor = 271 MiB/month

x 1000 sensors = 265 GiB/month (3.1 TiB/year)

Cost to store in S3 standard access: $73 per year

GZip will reduce to approximately 400 GiB ($9.20/year)

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The Front Door

IoT Core
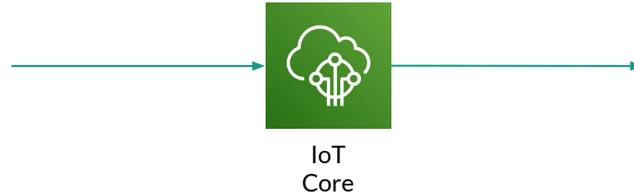
Connectivity: $0.042 / device / year
Messaging: $1.00 / million msgs
Device Shadow: $1.25 / million ops

Rules Engine: $0.15 / million msgs
                            $0.15 / million actions

1,000 sensors @ 1 message/second = $2,635 / month

1,000 sensors @ 1 message/minute = $44 / month

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The Pipeline

approx $0.50 / day / shard
standard retention

approx $0.75 / day / shard
extended retention

$0.029 / GB ingested

calculated by multiplying
number of records by
record size, min 5 KB

1,000 sensors @ 1 message/second
= $365 / month

1,000 sensors @ 1 message/minute
= $6 / month

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Transformation using Kinesis Analytics

$0.11 / "KPU hour"

typical SQL transforms
use 1 KPU

= $80.52 / month

Invoking Lambda from Kinesis vs IoT Core


invoked for every
matched message,
execution time rounded
up to 100ms increment

invoked on batches
of messages (sized
by you)
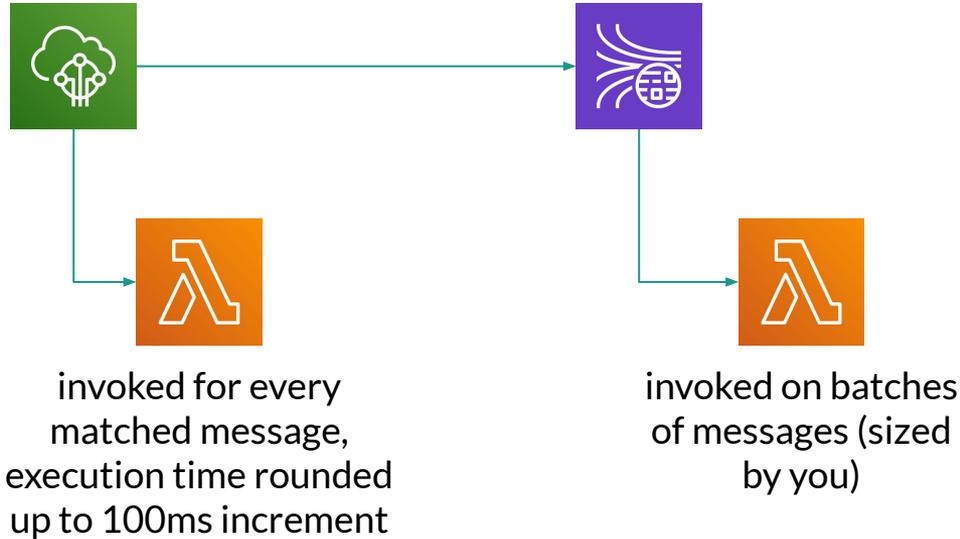
1,000 sensors @ 1 message/second
= $527 / month for invocations
= $549 / month for execution time

Analysis Platforms

Redshift	Athena	Spark on EMR
Relational database with distributed storage, parallel queries	Executes SQL-like queries over structured data stored in S3	Distributed application written in Java / Scala / Python
Used for: ad hoc queries, especially with joins; user-facing dashboards	Used for: ad hoc queries, data transformation	Used for: machine learning, production data analysis
Cost depends on node type, number of nodes; 4-node dc2.large cluster provides 650 GB, costs $732/month (unreserved)	$5/TB scanned	Cost depends on node type, number of nodes, time running, cross-region data access; a small (16-node) cluster might cost $5/hour

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The "Invisible" Charge: Data Transfer
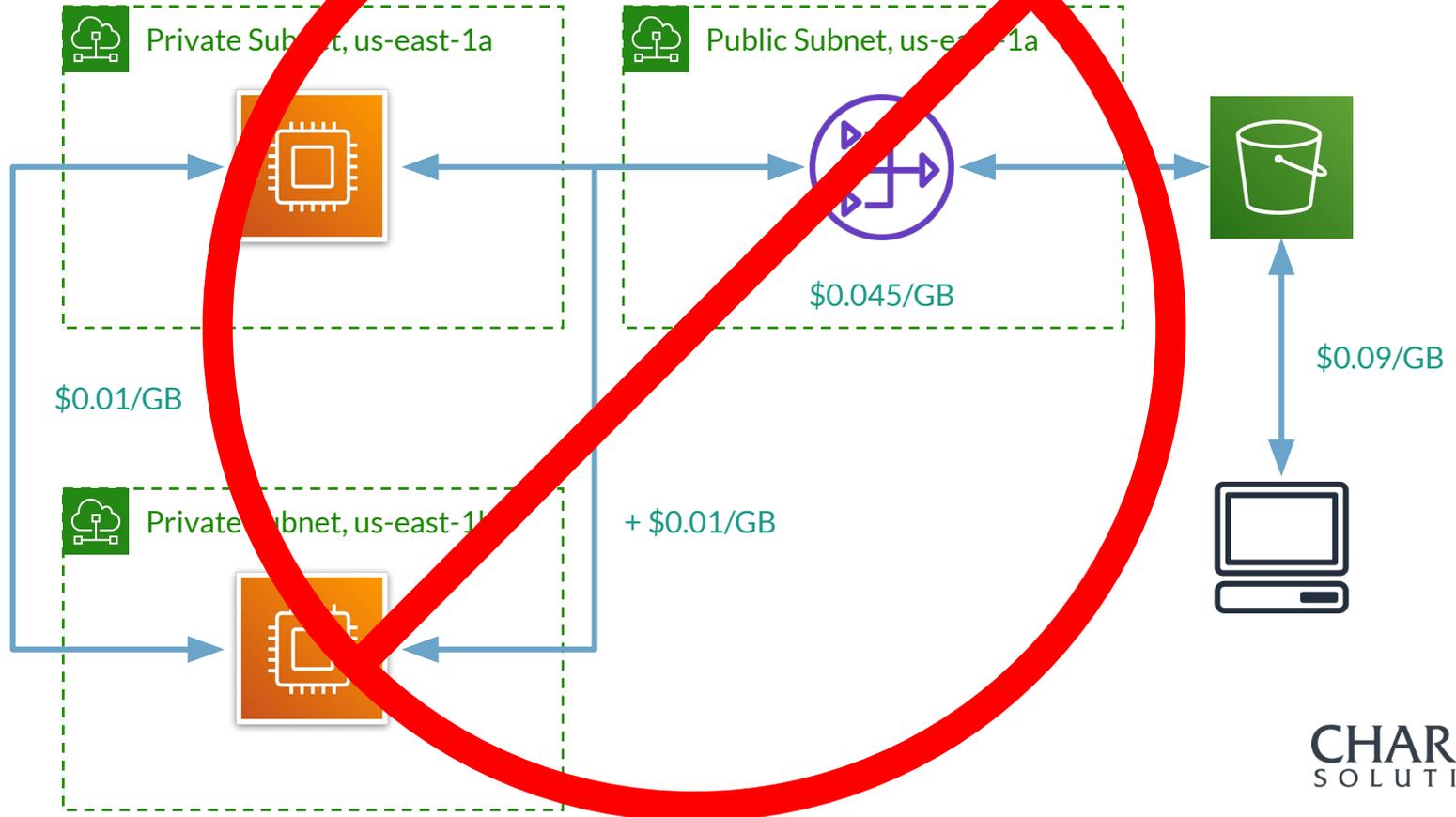
Cost-Conscious Architecture Tips

Reduce message frequency

>   This will propagate to almost every other cost metric

IoT Direct Ingest avoids messaging charges (but not rule/action)

Aggregate/compress files before uploading to S3

Use VPC endpoints where appropriate

Don't move data across a NAT!

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Cost Explorer is Your New Best Friend
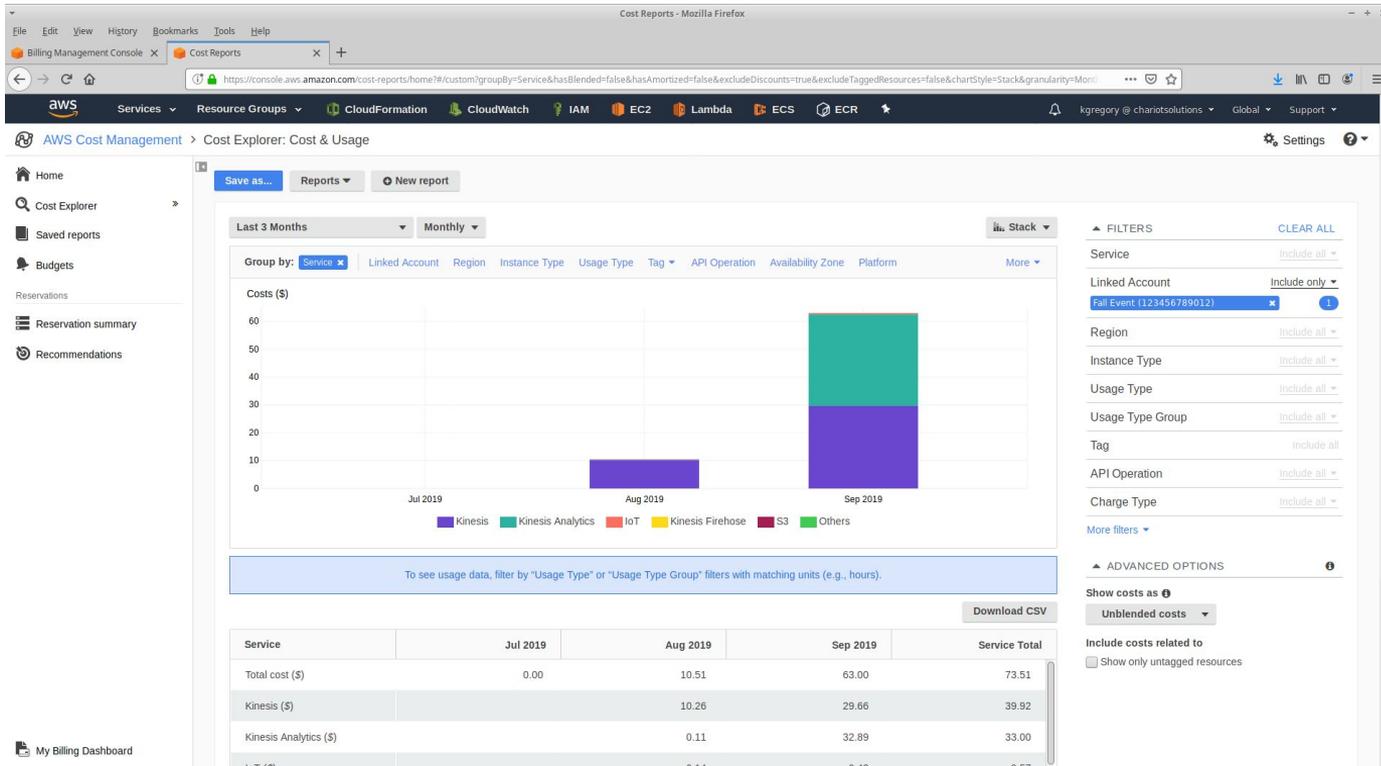
References

IoT Core Pricing
https://aws.amazon.com/iot-core/pricing/

EC2 Pricing (includes data transfer)
https://aws.amazon.com/ec2/pricing/on-demand/

Cost Explorer
https://docs.aws.amazon.com/awsaccountbilling/latest/aboutv2/ce-what-is.html

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