

# Know Your Costs

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**IoT on AWS**  
A Philly Cloud Computing Event

**CHARIOT**  
SOLUTIONS





# “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

Amazon Web Services Simple Monthly Calculator - Mozilla Firefox (Private Browsing)

File Edit View History Bookmarks Tools Help

Amazon Web Services Simple M... X

https://calculators3.amazonaws.com/index.html

aws SIMPLE MONTHLY CALCULATOR

Language: English

Need Help? [Watch the Videos](#) or [Read How AWS Pricing Works](#) or [Contact Sales](#)

Get Started with AWS: [Learn more about our Free Tier](#) or [Sign Up for an AWS Account](#)

FREE USAGE TIER: New Customers get free usage tier for first 12 months

Reset All

**Services** Estimate of your Monthly Bill (\$ 0.00)

Choose region: US East (N. Virginia)

Inbound Data Transfer is Free and Outbound Data Transfer is 1 GB free per region per month

Clear Form

**Amazon EC2**  
Amazon Elastic Compute Cloud (Amazon EC2) is a web service that provides resizable compute capacity in the cloud. It is designed to make web-scale computing easier for developers. Amazon Elastic Block Store (EBS) provides persistent storage to Amazon EC2 instances.

**Compute: Amazon EC2 Instances:**

Description	Instances	Usage	Type	Billing Option	Monthly Cost
<a href="#">Add New Row</a>					

**Compute: Amazon EC2 Dedicated Hosts:**

Description	Number of Hosts	Usage	Type	Billing Option
<a href="#">Add New Row</a>				

**Storage: Amazon EBS Volumes:**

Description	Volumes	Volume Type	Storage	IOPS	Baseline Throughput	Snapshot Storage
<a href="#">Add New Row</a>						

**Compute: Amazon Elastic Graphics:**

Description	Number of Elastic Graphics	Usage	Elastic Graphics Size and Memory
<a href="#">Add New Row</a>			

**Additional T2/T3 Unlimited vCPU Hours per month:**

For Linux, RHEL and SLES:

For Windows and Windows with SQL Web:

**Elastic IP:**

Enter values below  Calculate

Total time the additional Elastic:

**Common Customer Samples**

- Free Website on AWS
- AWS Elastic Beanstalk Default
- Marketing Web Site
- Large Web Application (All On-Demand)
- Media Application
- European Web Application
- Disaster Recovery and Backup



# 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

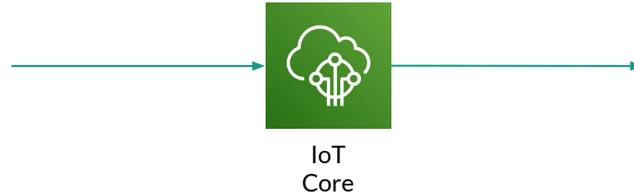
1 record/second/sensor = 271 MiB/month

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)

# The Front Door



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

# 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

# Transformation using Kinesis Analytics

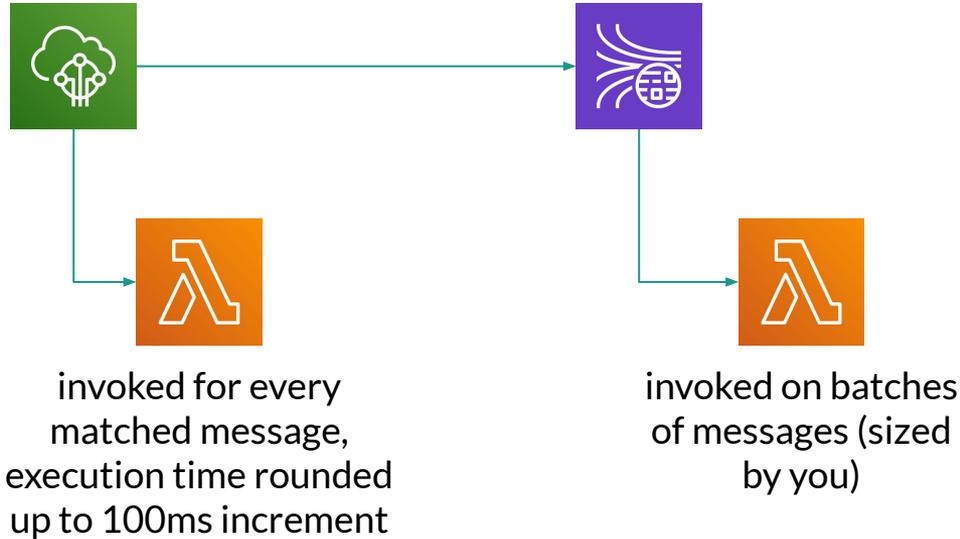


\$0.11 / "KPU hour"

typical SQL transforms  
use 1 KPU

= \$80.52 / month

# Invoking Lambda from Kinesis vs IoT Core

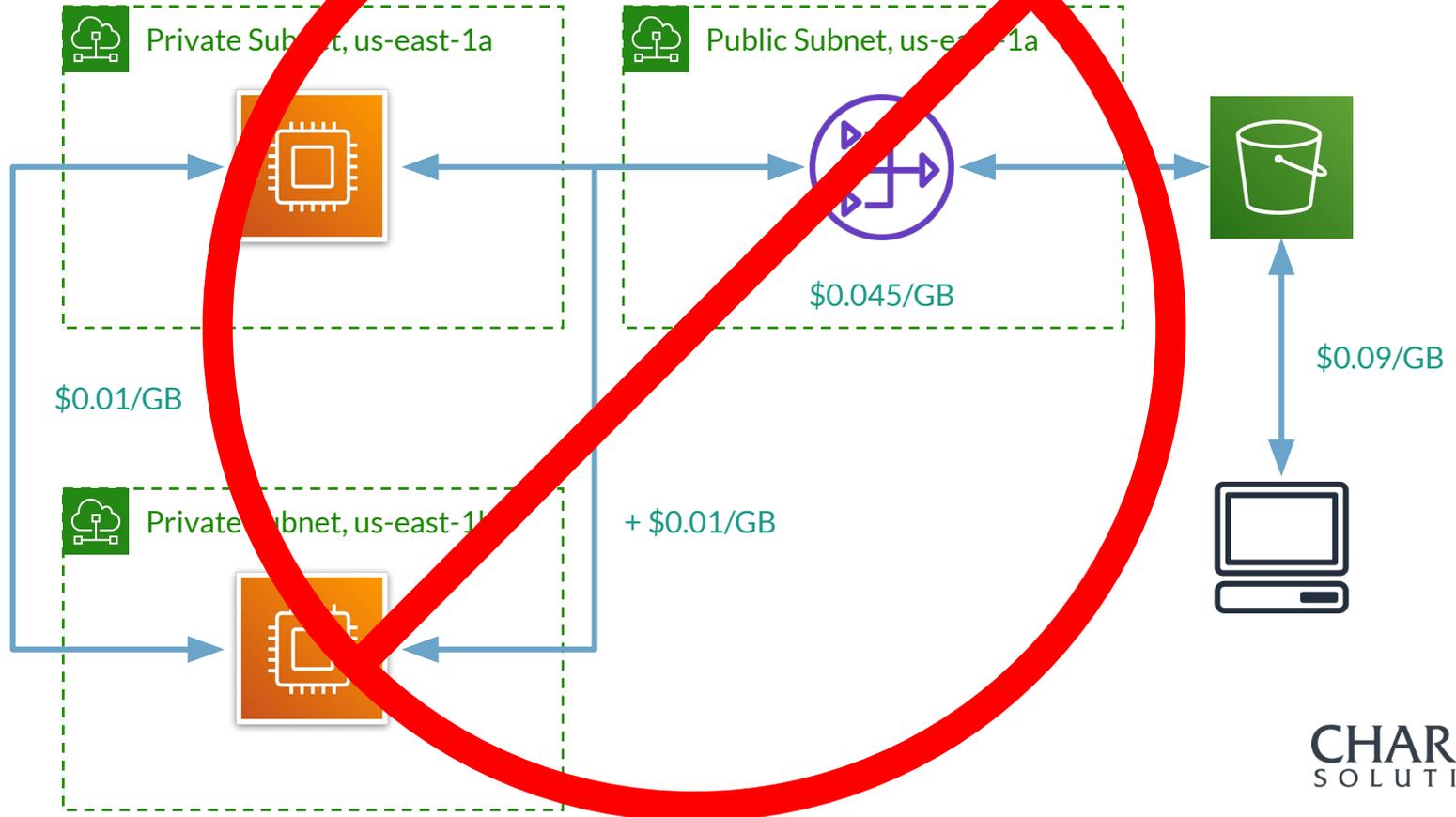


1,000 sensors @ 1 message/second  
= \$527 / month for invocations  
= \$549 / month for execution time

# 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

# The “Invisible” Charge: Data Transfer



# Cost-Conscious Architecture Tips

**Reduce message frequency**

This will propagate to almost every other cost metric

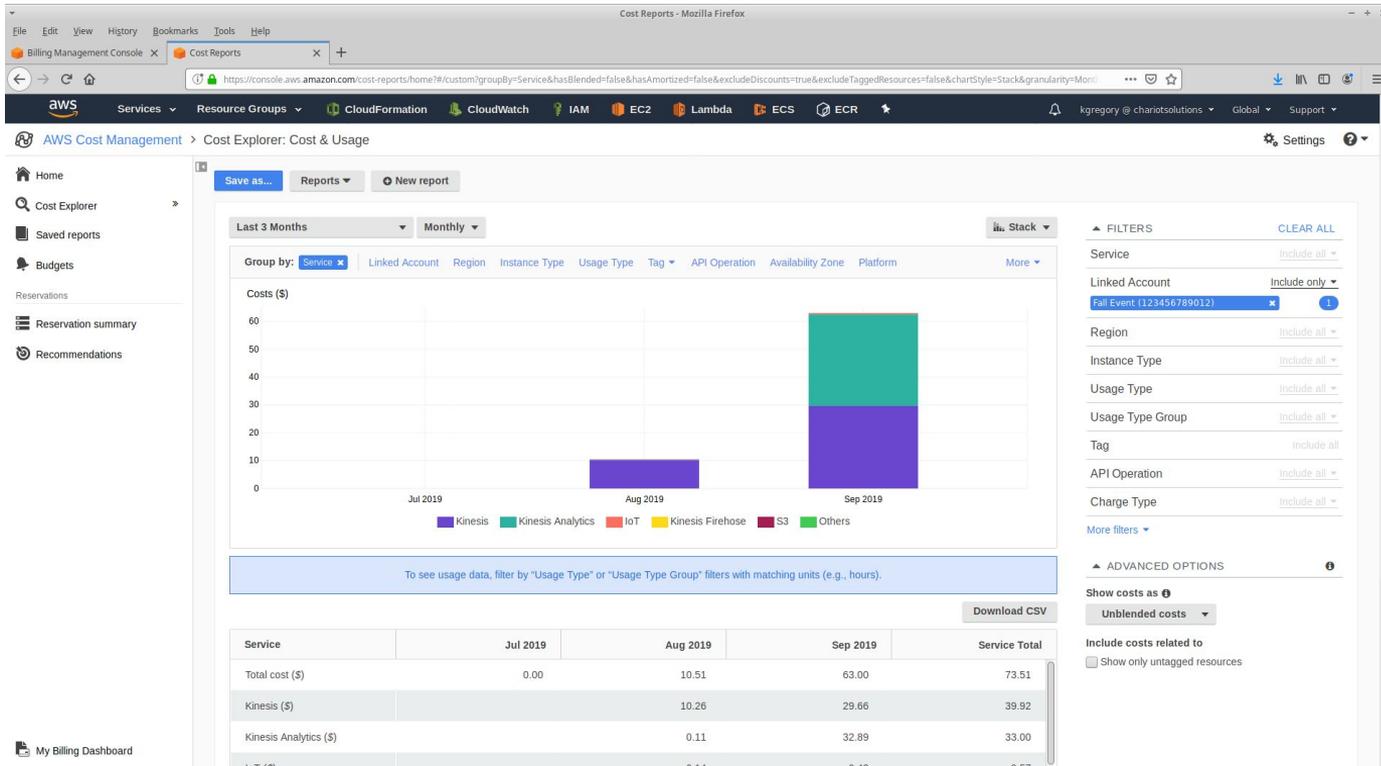
**IoT Direct Ingest avoids messaging charges (but not rule/action)**

**Aggregate/compress files before uploading to S3**

**Use VPC endpoints where appropriate**

**Don't move data across a NAT!**

# 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>