ElasticIntel

Scalable Threat Intel Aggregation in AWS

Obligatory Who I Am slide..

Presenter: Matt Jane

- Builder/Automator
- I put things in clouds
- Open Source Advocate
- <Insert credential alphabet soup here if it makes you feel better>

The ideas and opinions expressed in this talk….

Are not those of my employer, my imaginary friend, or anyone else

Warning: There will be Memes

The slide before the other slides…

Backstory and why I started this project

Current status of the project

Goals

Future plans

Why Build Elastic Intel?

- Researched products and services that could provide “Threat Intelligence”
- The findings we really bleak
- REALLY expensive
- The automation possibilities for most solutions were BAD

Value of threat intelligence (Stolen from Scott Roberts)

1. Your own incidents
2. Vendor Reports
3. Honeypots
4. Peers/Sharing Communities
5. 3rd Party Paid Intelligence

Most vendor’s “Threat Intelligence” was just IOCs

Most IOCs were just recycled open-source feeds

Roughly 5-10% of IOCs produced by vendors were original material

IOCS
IOCS EVERYWHERE
LIGHTYEAR
memes.com

“Intelligence”

- IOCs. JUST IOCs
- Occasionally we get WHOIS info
- Sometimes even LOSE what little context may have been available

“Intelligence”

Goodbye, context

- BotScout SSH brute force → “Malicious Activity”
- Phishing URL targeting O365 → “Credential Harvesting”

Targeted Intelligence!

Turns out to be a string search for some keywords

- Limited to 5 or 10 keywords
- Searches only across certain types of IOCs
- Google search results….
- Marketing campaigns…

What if we charged for EVERYTHING!

Entry cost

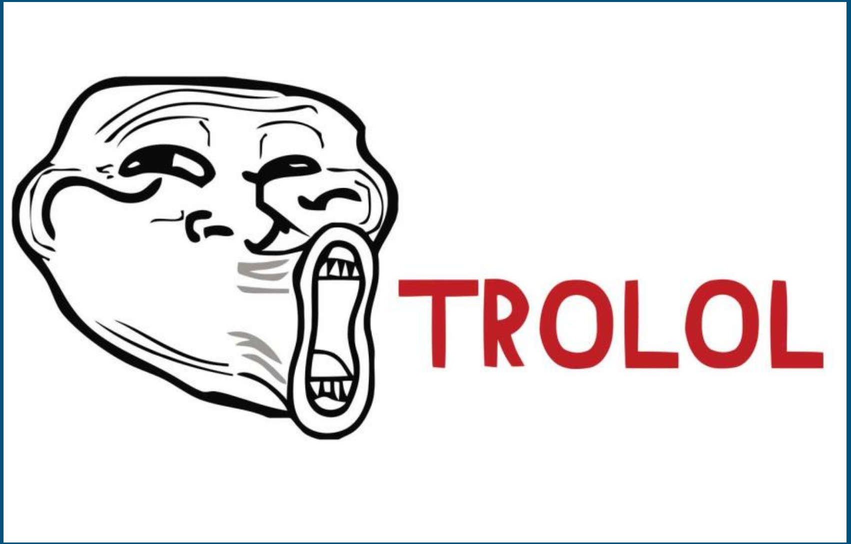
Ranged between $100k - $400k

Gets you...

A (Sometimes) pretty web GUI
Ability to make basic queries through web UI
Limited # of users (usually 1-5)

Pay To Play Model

- Want API access? $$
- Want more users? $$
- Want to add a feed? $$
- Want more contextual searches? $$$
- Want BULK api access? That's your first born + $$$
- Want a chat bot? LOLOLOLOLOL



Automation & Integrations

We have an API but....

- You can only query it for single indicators
- You can only query it once a minute
- You can only query it 20 times a day (seriously)
- If you want more than 1 result in a list, you need to query it for every result
- If you want more than 50 queries, you can buy packs of 50/day for $10k

Well...

There’s Got to be a Better Way!

ElasticIntel

- Primary component is Elasticsearch
- Aggregates Threat Feeds (IOC feeds)
- Provides API for automating searches
- Slack bot for quick search
- Low Barrier to Entry (stand up with one command)

GOALS

- Gather roughly the same data (minus the 5-10% of custom data)
- Make it cost effective (I run a personal version)
- Make it performant (1k queries/min or better).

Continued...

- Make it usable
- Make it valuable regardless of company size
- Zero Maintenance (Or as close as possible)
- API as a first class citizen

“Serverless”

- Don’t worry about patching
- Do worry about credentials and sensitive information

AWS Services

- Elasticsearch service
- Lambda
- SNS
- API Gateway
- S3
- Cloudwatch
- KMS
- IAM

Elasticsearch service

Managed Elasticsearch Cluster

Lambda

Serverless compute: You give it code, it runs it for you

SNS

Simple Notification Service – Pass Message and signals between resources

API Gateway

Acts as a RESTful proxy to Lambda

KMS

Key Management Service - Store access keys securely

IAM

Identity and Access Management - Permissions

S3

Storage

Cloudwatch

Logging

Code!

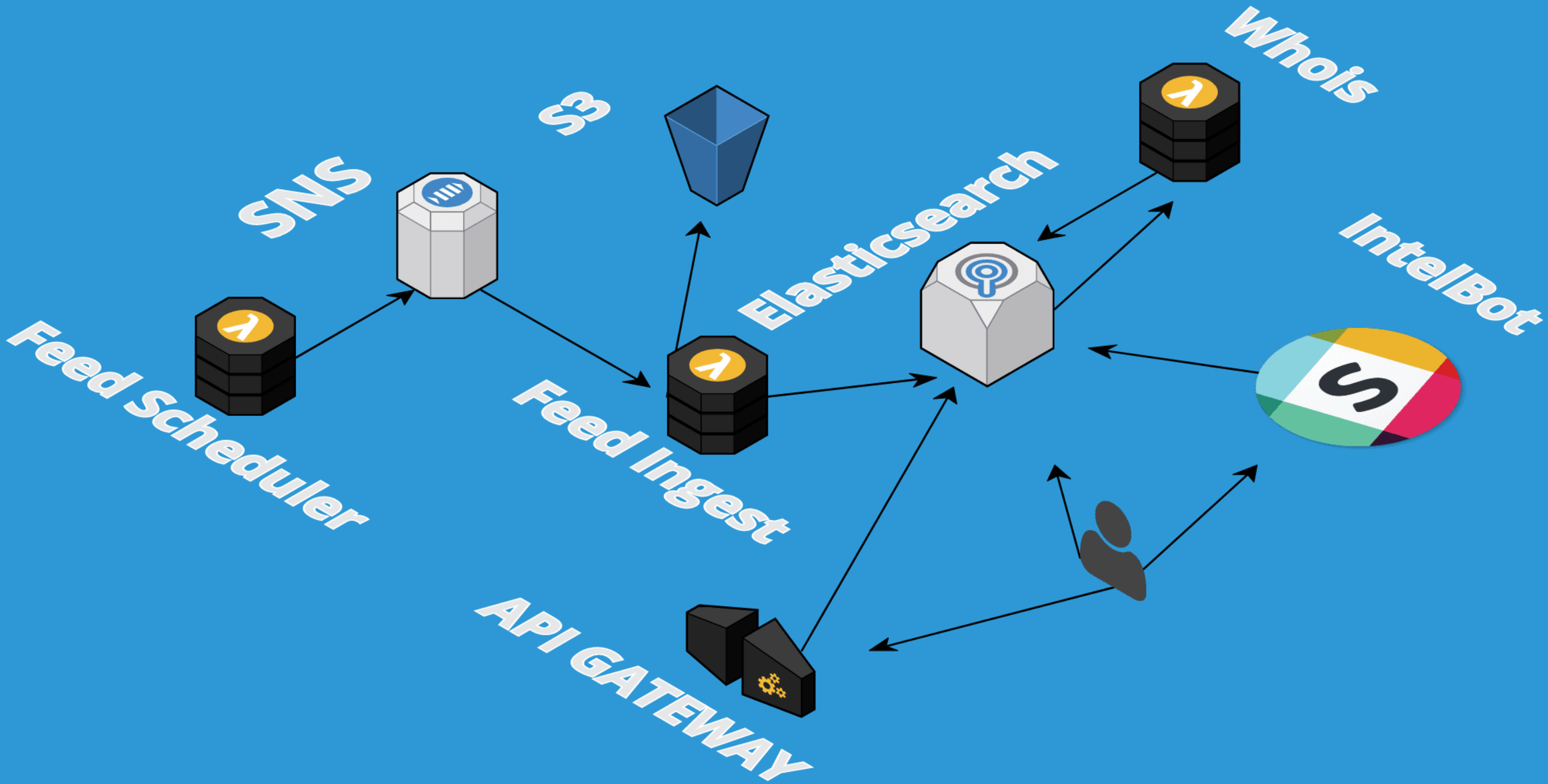
EVERYTHING is written in Python3

Please stop writing things in Python2

No really, stop it.

Infrastructure as Code

- Infrastructure is code too
- Terraform controls everything
- Python wrappers around Terraform abstract all actions


SNS
S3
Elasticsearch
Whois
IntelBot
Feed Scheduler
Feed Ingest
API GATEWAY

Feed Scheduler Lambda

- Runs once an hour
- Checks the schedule of all defined feeds
- If a feed if scheduled to be retrieved, it publishes a message to the SNS topic

Ingest Lambda Function

- Subscribed to SNS Topic
- Triggers on SNS Topic message publish
- Retrieves the data from the specified feed URL
- Parses the feed based on its type (txt, csv, etc.)
- Uploads to Elasticsearch Service

Lambda Performance

- Lambda’s are time bound (5m max)
- You only pay for used time
- Therefore….

Lambda optimization

- Whatever you’re trying to do, it better finish within 5 minutes
- The less time it takes your lambda to run, the cheaper it will be

Lambdas and Threading

- Threading is still a thing
- Its just…slightly harder
- Process Pools and Thread Pools not available
- Named pipes still work just fine though!

Sauce: https://aws.amazon.com/blogs/compute/parallel-processing-in-python-with-aws-lambda/

IO bound tasks can still be Parallelized in Lambda

- You just have to try a little harder
- (PS, WHOIS lookups are pretty good candidates for this ☺)

Let’s talk performance…

- What’s the difference between:
- Making 100 queries
- Making 10 queries for 10 documents each

TCP/IP overhead is a real thing

- It doesn’t matter much when making a few requests
- When you make 5-10k in a few seconds…

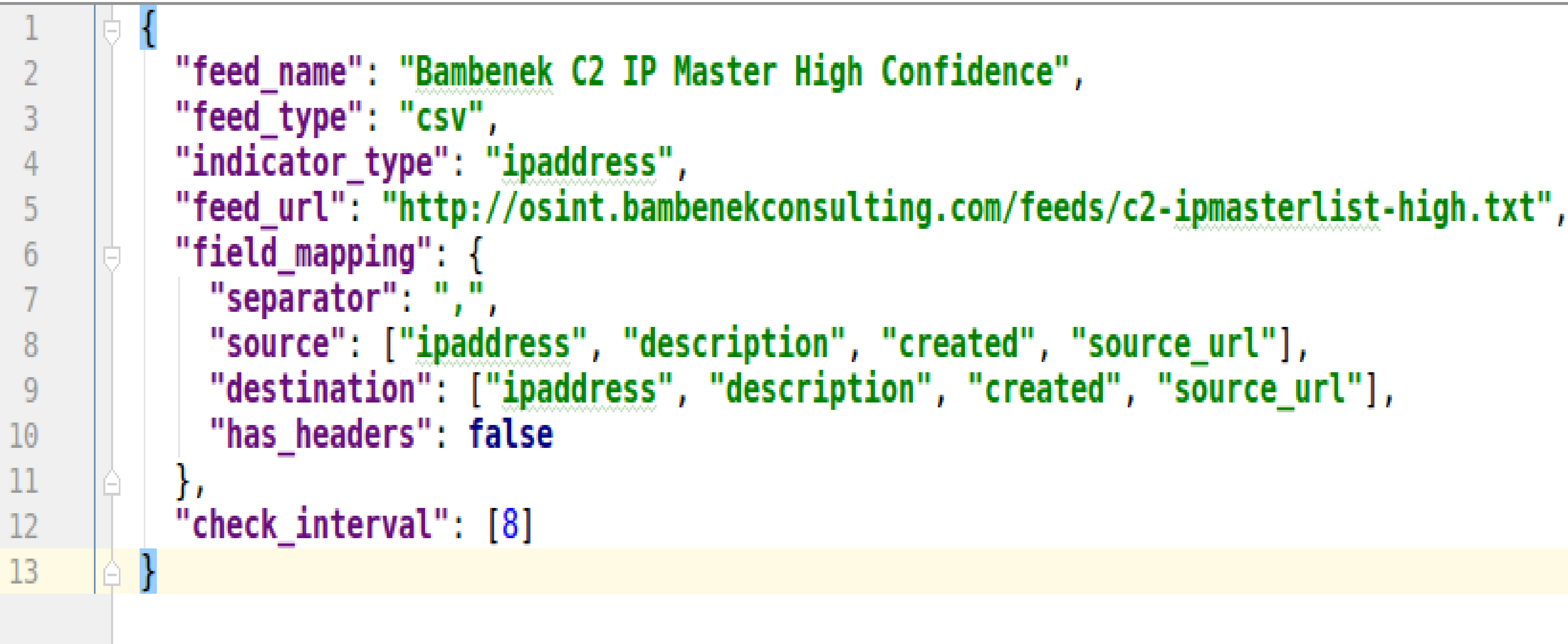
Whois Lambda

- Runs every 3 minutes, across 15 different regions
- Grabs all IP addresses without WHOIS information
- Retrieves the whois information for them
- Updates the IOC in Elasticsearch with the whois data

Feeds and Feeds.d/

- All feeds are described as json blobs
- The json files representing feeds are all located in the feeds.d/ directory of the project
- Adding a feed is as simple as adding to an existing json file, or creating one in the directory

Example Feed



```
{
  "feed_name": "Bambenek C2 IP Master High Confidence",
  "feed_type": "csv",
  "indicator_type": "ipaddress",
  "feed_url": "http://osint.bambenekconsulting.com/feeds/c2-ipmasterlist-high.txt",
  "field_mapping": {
    "separator": ",",
    "source": ["ipaddress", "description", "created", "source_url"],
    "destination": ["ipaddress", "description", "created", "source_url"],
    "has_headers": false
  },
  "check_interval": [8]
}
```

End Result

- 37 feeds = 250k IOCs/day
- TCO = (roughly) $1,600/yr.
- (Personal = $40-$50/month)
- Unlimited API access
- 10k+ queries/min
- Full-text search

Contributing (in order of difficulty)

Get your feet wet

- Add more feeds
- Build some Dashboards in Kibana
- Submit Feature Requests for ChatBot

Go for a brisk swim

- Work on API-based feed handlers
- Write unit tests
- Add a new integration like Shodan or Pastebin!

Contributing Continued...

- Don’t see anything up there that appeals to you or that you feel comfortable with? No problem!
- Feature requests are very welcome. Just tag with [feature request] in the issue title on GitHub.
- Questions? Hit me up on twitter or drop me an email

Links

Repo: https://github.com/securityclippy/elasticintel
Blog: https://blog.securelyinsecure.com/
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Email: SecurityClippy@securelyinsecure.com