Anycast in ”The Cloud”

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NOMINET

Agenda

- Introduction
- Short history of our DNS Infrastructure
- Expansion and Cloud choices
- Anycast in the cloud, simple/cost effective
- Problems don’t give me no problems
- Futures, where do we go from here

Introduction

Who are Nominet
- .uk and GTLD registry operator
- RSP for c80 GTLDs

Who am I
- Brett Carr, Manager DNS Team

Who was involved
- DNS Team:
  - Karl Dyson
  - Paul Harris
  - Alberto Lopez
  - James Richards
  - Arife Vural Butcher

Nominet's DNS Infra

- Up to 2015 – 7 unicast nodes
  Physical Infrastructure
- 2015 – 8 Anycast nodes UK/EU/US
  4 Nameservers
  On premise virtual Infrastructure
- 2018 – Expansion ??

Expansion

- Building more nodes is expensive
- Using other peoples computers is cheap(er)
- Cloud Choices
  AWS
  Azure
  Google
  Others?

Anycast in the Cloud

- AWS selected as the most potentially suitable
- Issues
  Support for using your own ip space?
  Load balancers do not support UDP
- Search for help?
- Netactuate/Amazon Direct Connect

Netactuate

- Plenty of experience in Anycast.
- Infra in 25+ Locations globally (more than AWS)
- Solid experience with other DNS providers
- API Access
- Pricing as good as AWS
- Built in DDOS Protection.

VM’s in netatcuate

- 4 Locations selected
  DFW, GRU, HKG, SYD
- One VM in each location serves all zones
- 8 Vcpu 32gb Memory
- Exabgp (peering with netactuate)
- Health Checker
- dnsdist
- nsd
- Turing collector

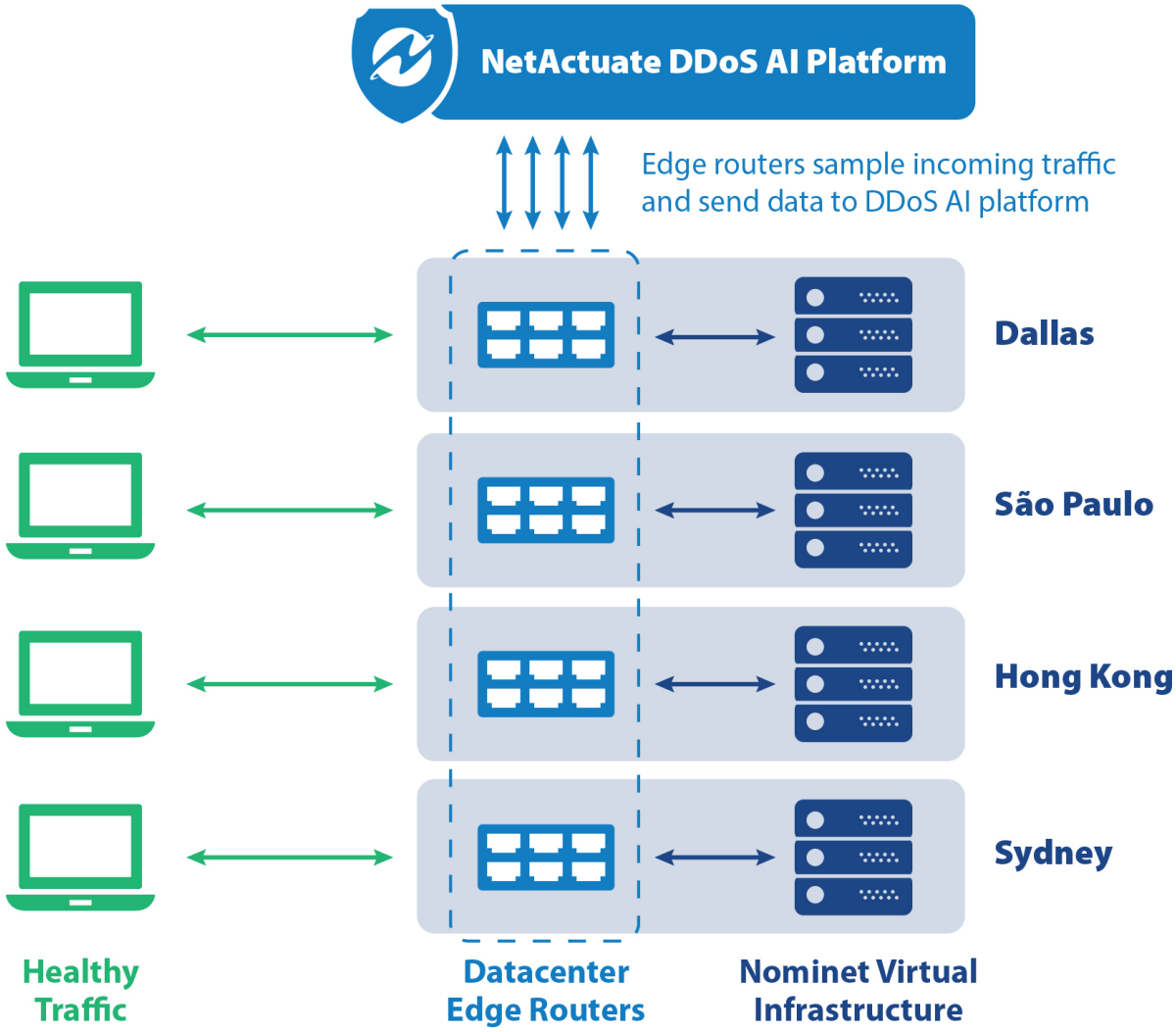
Kittens vs Cattle

- Immutable Infrastructure
- Built using combination of:
  Single Image
  Ansible roles/playbooks
- Only maintain the image
- Birth/Use/Kill/Rebirth

Normal Routing and Monitoring

No Threat Present

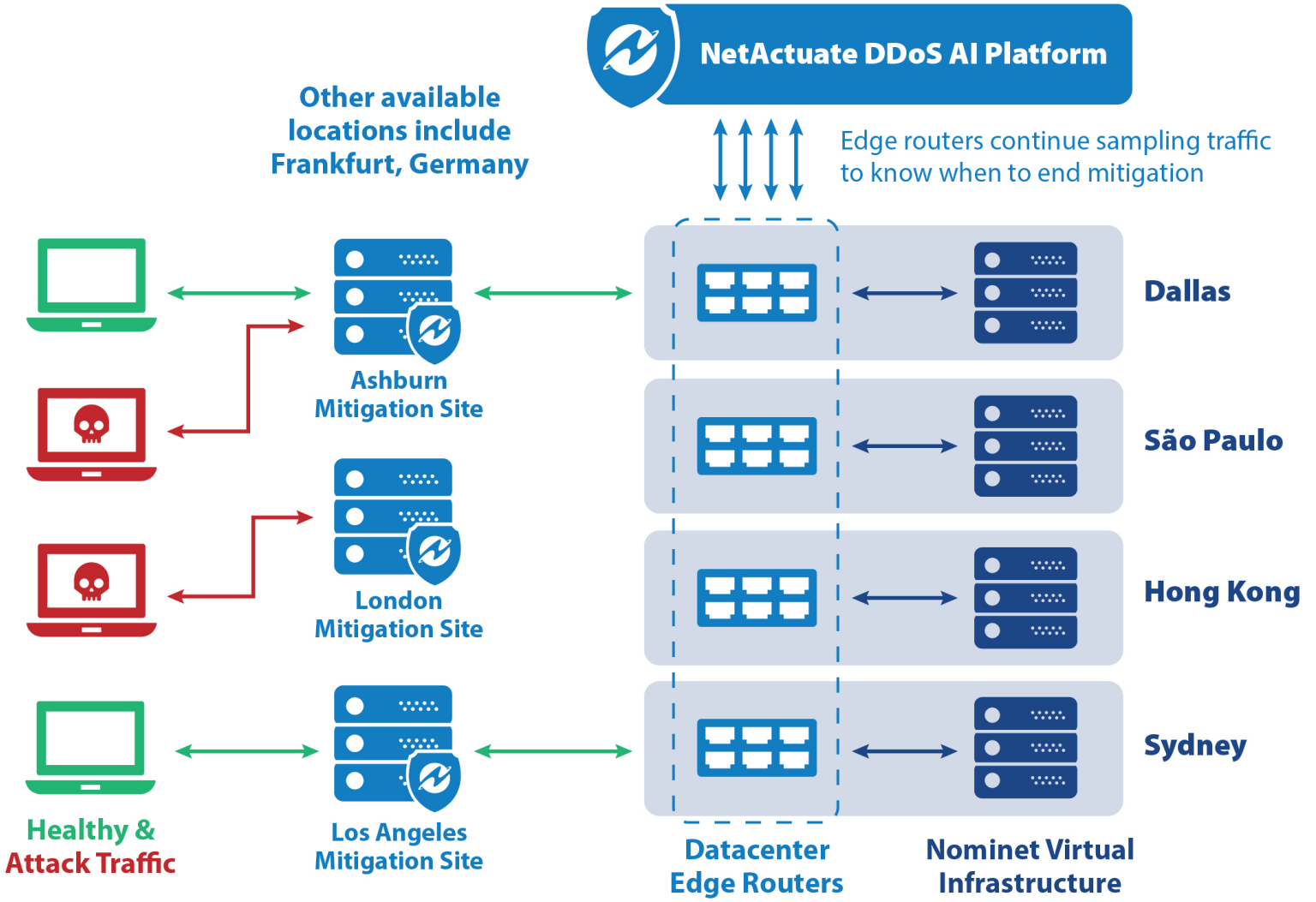
NetActuate's custom-built DDoS AI platform examines all traffic entering Nominet's network. The DDoS AI platform is continually learning Nominet's unique traffic patterns for smarter ongoing protection against attacks.



DDos Mitigation Active

Threat Detected

When suspicious activity is detected at Nominet's network perimeter, incoming traffic is rerouted to the closest of NetActuate's four global locations for the fastest possible mitigation. These mitigation sites can handle attacks up to 1.2 TB in size.



Problems

- Less traffic than expected
  Tweaks made in routing policy by providers
  Tweaks made in BGP Config by us
- Global sites can do 500K QPS +
- Cloud sites around 100K QPS
- Care needs to be taken in a DDOS
- TCP Offload needs to be disabled in VM

Nominet DNS Engineering Futures

- Dedicated DNS Team for operations and research
- Further roll out into new sites Global and Cloud
- Use similar infrastructure for recursive platforms


Thanks for Listening
Questions?