
Going to the
CLOUD!

DISCLAIMER:
This talk is about work in progress. Completeness and accuracy aren't guaranteed beyond best effort

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- Developers are on call for production application issues

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- Software design
  - Observability must be built into the software

Vendor Choices

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- Moving from Mesos to Kubernetes was easy
- This made Google's Cloud offering a slightly better choice than Amazon
  - Google being cheaper helped a bit
- Neither was cheaper than running our own hardware
  - Savings mostly come from the lack of a dedicated operations group, and from being able to avoid some HA requirements

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- Focus on two main areas:
  - How to manage infrastructure manually at the vendor
  - Tooling and automation

Why manual work?

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  - Terminology

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- Concepts

Why manual work?

- Familiarisation
  - Terminology
- Concepts
- **Discover limitations**
  - There are a lot of those
  - Some more interesting than others (load balancing, IPv6, DNS, ...)

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- Terraform
  - The best of the lot
    - It has improved a lot since this slideset was first made

Configuration management

- Stateless systems implemented in a 12-factor style are best put in containers and managed via Kubernetes
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  - Alternatively, use what Google calls managed groups and spin up VMs automatically in case of crashes
- We still need configuration management for systems which aren't in a container
- Puppet was the obvious choice, because we were already using it
  - It doesn’t matter which specific tool you use, but use one.

Inventory

- There isn't a nice CMDB out there yet, which can automagically provision VMs in the cloud and provide information to config-mgmt and orchestration tools
  - We currently hack our way around this by using tags and the Google API

Moving into high speed

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  - Three people
  - Thirty minutes

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- Decided on goals for a proof of concept
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  - Fixed target application for a test deployment
- Took us about three months of full time effort to wrap up the PoC

Tools of choice

- Terraform
  - This is a pretty fast moving tool
  - They have good documentation
    - For some value of good.
  - Getting your first bits and pieces working are harder than they should be, but the rest then follow pretty easily

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- Puppet
  - New Puppet repo, ignoring a lot of legacy.
  - Jumped Puppet version
  - Discarded large parts of the module approach recommended in Puppet documentation

Terraform

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- Google metadata is used to tie together Puppet and Terraform

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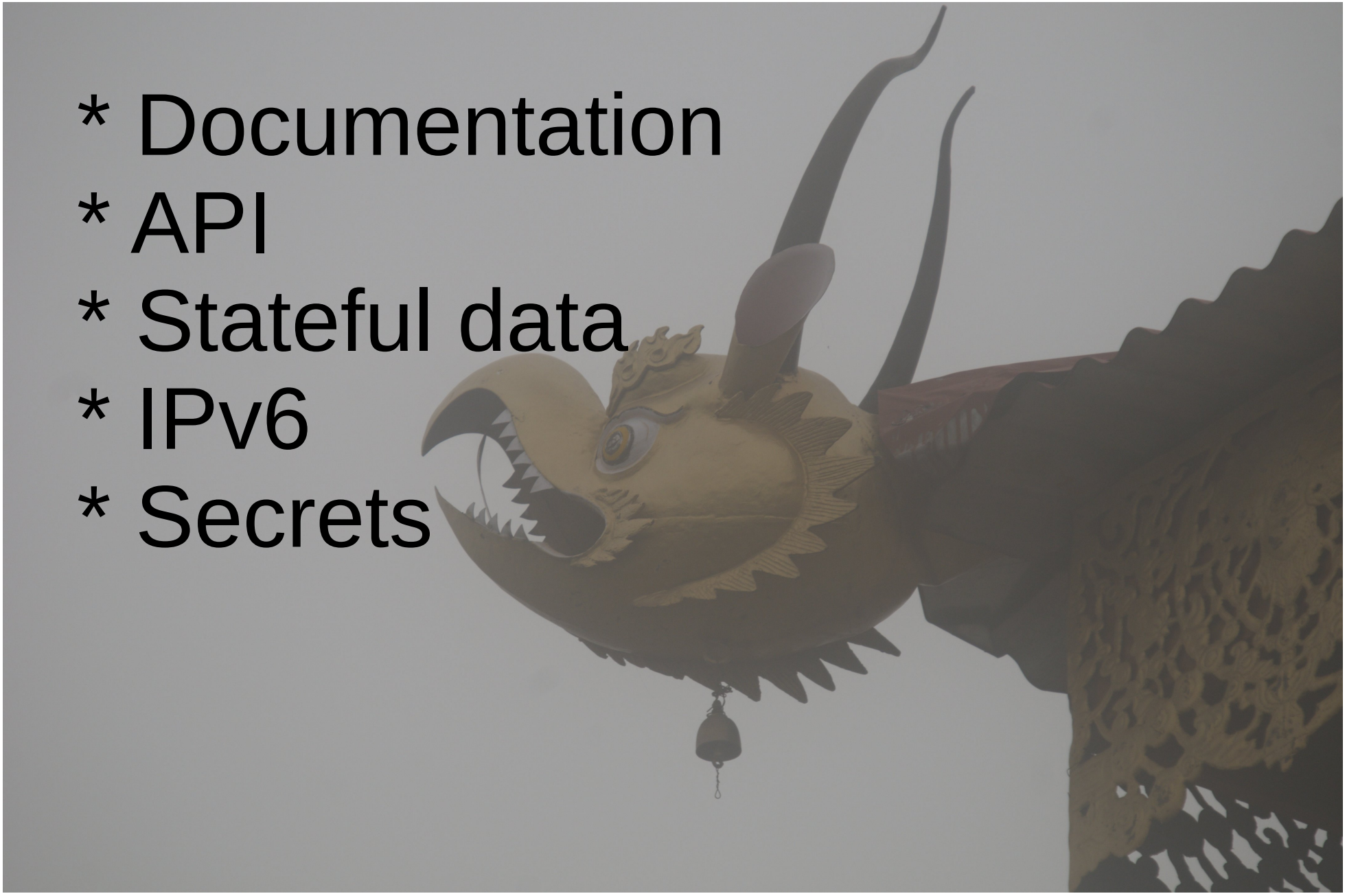
- We then spent a few days very carefully refactoring this into per project state, with the shared state being remote in a cloud storage bucket.
  - https://charity.wtf/2016/03/30/terraform-vpc-and-why-you-want-a-tfstate-file-per-env/ is a pretty good horror story of what could go wrong


* Documentation
* API
* Stateful data
* IPv6
* Secrets

Google Cloud Documentation

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- Lags behind software
- Is often inconsistent
- This has not changed in about three years
  - This is not limited to Google though.

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API

- Quite inconsistent in some regards
  - Particularly about referencing other properties
  - Name or reference?
- Needs actual examples
  - A lot of examples
    - This has not really improved since I first wrote this talk

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- Maintenance can cause outages
  - automatic failover for CloudSQL needs a whole zone to fail, so a maintenance can cause an unexpected outage
- You may need to run your own database systems for more reliable access to structured data

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- We started off by routing IPv6 traffic to our loadbalancers in the legacy environment and then proxying to IPv4 in Google
  - This is no longer needed

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- We tested hiera-vault, but performance was terrible

Loadbalancing

- Google’s load balancer offering is limited in some ways as compared to more advanced tools like F5s, etc
- We chose to replace the hardware LBs with simple IP based load balancer + nginx proxies
  - Note that code which tracks IP addresses or does geolocation needs to change to handle this.

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  - It has quite a few retention limitations
  - New pricing makes it cheaper to run an ELK stack, depending on log volume
- Stackdriver is a good replacement for the ELK stack, but not for high quality analytics/monitoring
- There isn't a really good alternative to running your own time-series database
  - Especially if you use that data for alerting

Legacy code

- Plan on migrating it wholesale
  - Even if you plan to rewrite it
    - Rewrites will take longer than you plan for
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- Plan on migrating it wholesale
  - Even if you plan to rewrite it
    - Rewrites will take longer than you plan for
  - Even your planned migrations will take longer than expected, because of environmental assumptions.
- This does not benefit from moving to the cloud
  - You are just running it in an environment with different assumptions on latency and reliability

Spectre/Meltdown impact

- CPU utilisation doubles
  - We are currently on rather over-provisioned hardware, so actual impact is minimal
- Anything which does a lot of system calls is slowed quite a bit
  - Large data import went from 26 hours to 56

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- Choosing which provider to go with often involves small differences based on your existing stack
- The tooling available is still very raw, and we are still discovering operational design patterns
- Migrating to the cloud may require a wholesale change in process
  - If you are in a large ITIL shop, that will require a huge change.