Microservice API Gateways

with NGINX

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Geoff Filippi

Senior Architect

DISH Network

Oildex

A cloud service company for oil and gas

- 2 years

Formerly:

Time Warner Cable (Now Charter)

- 12 years

Experience

DISH Projects

- Microservices
  - Spring Boot
- Continuous Delivery
- Domain Driven Design
- Client Side Components

Experience

Oildex Projects

- Rewrite 10+-year-old apps
- Angular 2
- Typescript
- Microservices
- NoSQL
    - Mongo

Experience

☎

- Worked on streaming media (Voice over IP), 6 years
- 5 million phone customers

Experience

📹

- Worked on video and streaming video, 4 years

Projects

twctv.com

- Video streaming website
  - backbone.js
- Video streaming Set-Top Box (STB) web application

We will cover

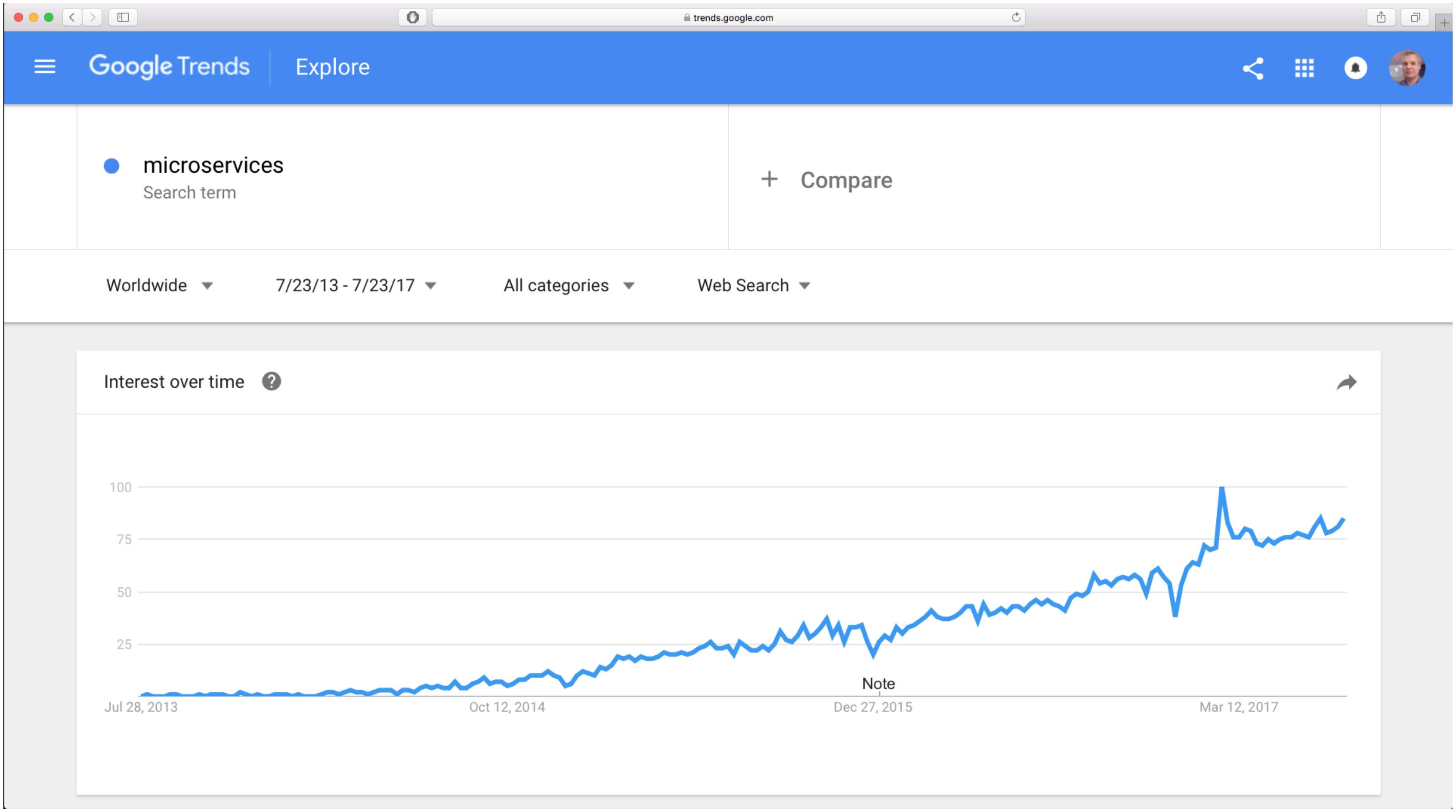
- Microservice Architectures
- API Gateways
- NGINX

Microservice Architectures

Decoupling is the Primary Benefit of Microservice Architectures

- Development
- Deployment
- Dependencies

Interest Over Time



microservices
Search term

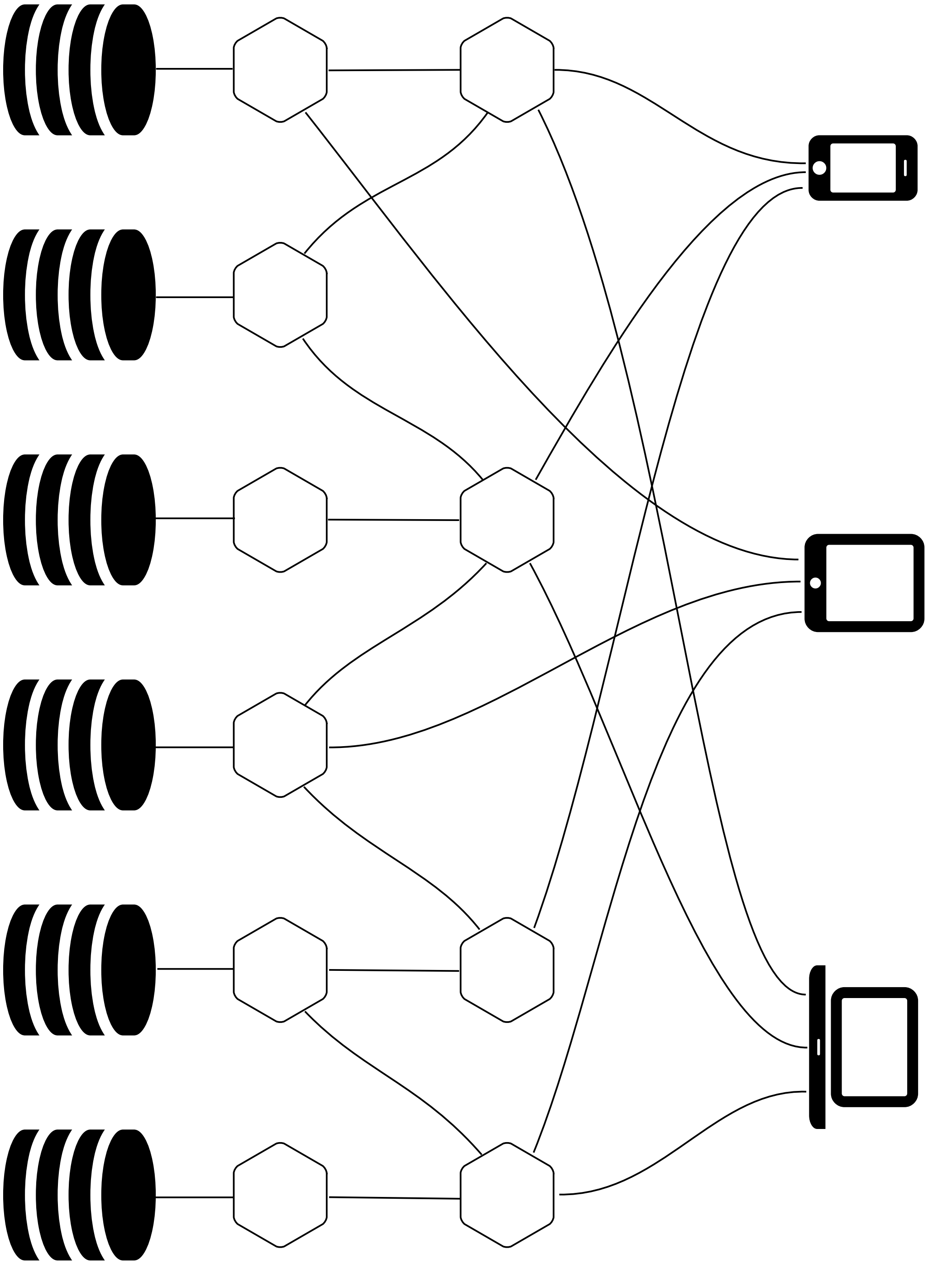
Worldwide ▾ 7/23/13 - 7/23/17 ▾ All categories ▾ Web Search ▾

Interest over time

Client Challenge

- Keeping track of what to call

Microservice Architecture Before API Gateway



API Gateways

API Gateways replace tight coupling with loose coupling

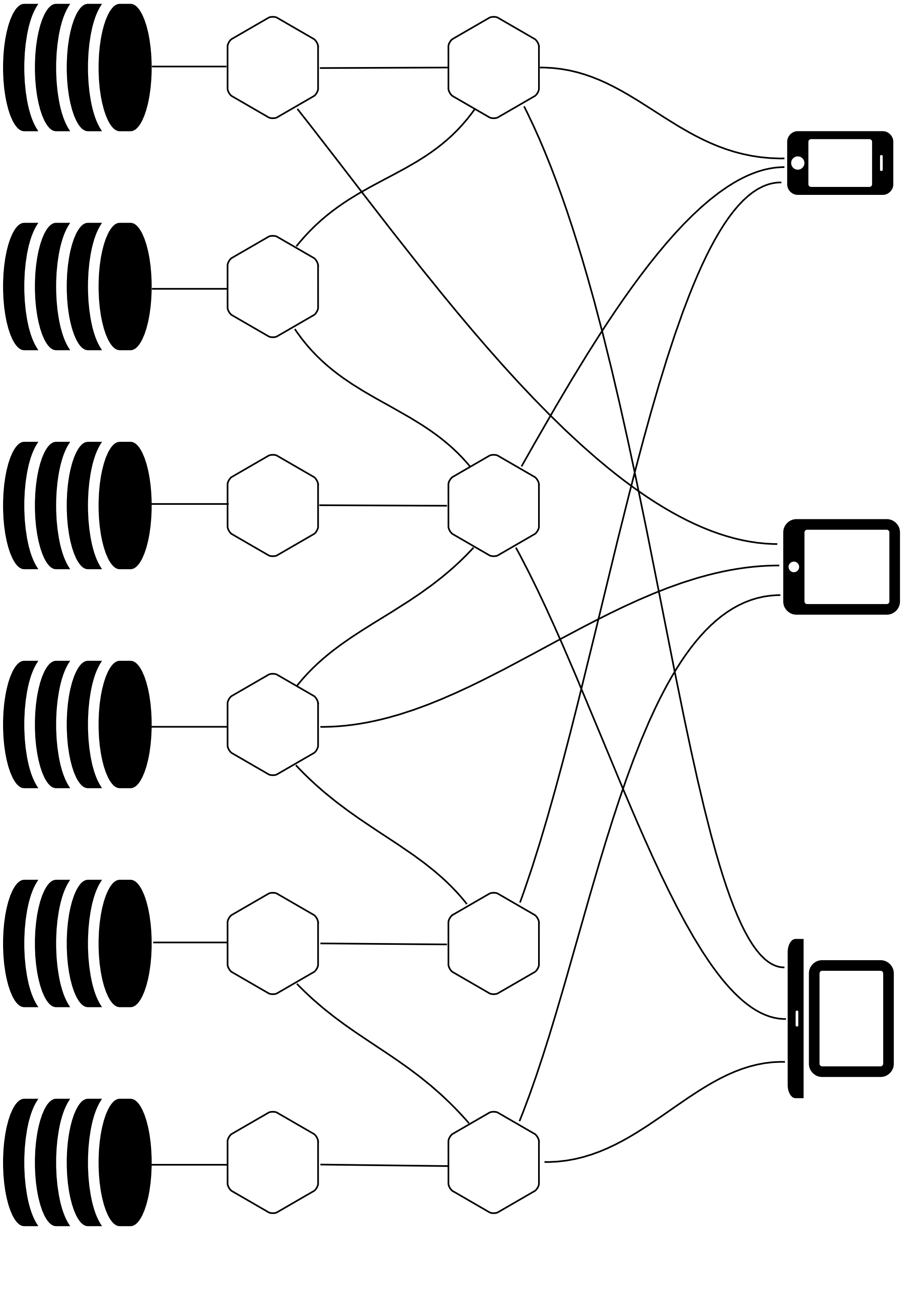
- Help manage large numbers of microservices
- Hide infrastructure complexity from clients

Reverse Proxy

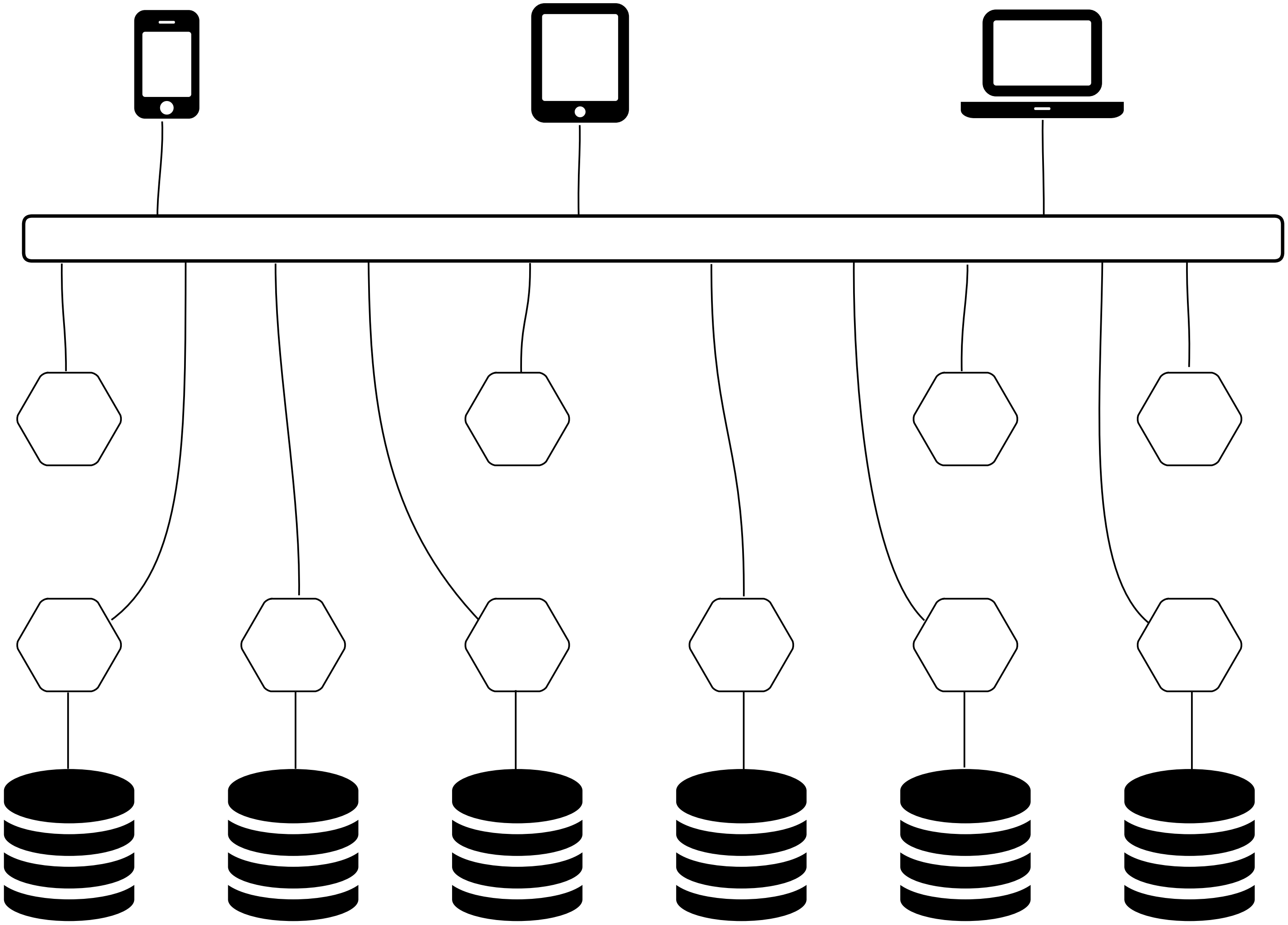
- Handles incoming requests from clients
- Calls a service to get the data to satsify the request
- Returns the data to the client

An API Gateway is a Reverse Proxy

Microservice Architecture Before API Gateway



Microservice Architecture After API Gateway



API Gateway Implementations

Open Source

- NGINX
- Netflix Zuul
- Kong
  - Built on NGINX

API Gateway Implementations

"Open Source-Based" Enterprise Offering

- NGINX-plus
- Mashape
  - Built on KONG/NGINX

API Gateway Implementations

Cloud Services

- Amazon API Gateway
- Google Cloud Platform - Cloud Endpoints
- Azure API Management

API Gateway Implementations

Proprietary

- Apigee
  - Owned by Google
- MuleSoft
- Mashery
- CA API Gateway
- Oracle API Gateway
- IBM Bluemix API Gateway
- 3scale by Red Hat

NGINX

NGINX

- API Gateway
- Load Balancer
- Content Cache
- Web Server

NGINX is Open Source

- NGINX source code
  - NGINX source code - GitHub mirror
- Contributing to NGINX
- License

NGINX has a Commercial Offering

- NGINX-plus

We will not cover the commercial features

Some Companies That Use NGINX

- Netflix
- Hulu
- Pinterest
- GitHub
- Heroku
- MaxCDN

NGINX Getting Started

Install

- OS Package
  - Red Hat/CentOS
  - Debian/Ubuntu
  - Win32 Binary
- Build from source

NGINX Getting Started

Docker

NGINX Getting Started

- Mac Homebrew

NGINX Documentation

NGINX Concepts

- Modules
- Directives
- Contexts
- Events
- Upstreams

NGINX Architecture

- Multiprocess vs. Multithread
  - One master process
  - Multiple worker processes

Modules

- ngx_http_proxy_module

Directives

Contexts

- `main`
- `http`
- `server`
- `upstream`
- `location`
- `mail`

Variables

NGINX Configuration

nginx.conf

```
worker_processes  1;

events {
    worker_connections  1024;
}

http {
    include       mime.types;
    default_type  application/octet-stream;

    sendfile        on;
    keepalive_timeout  65;

    server {
        listen       8080;
        server_name  localhost;
```

NGINX Reverse Proxy Configuration

```
server {
    listen       8080;
    server_name  localhost;

    location /server-a/ {
        proxy_pass http://127.0.0.1:3002;
    }

    location /server-b/ {
        proxy_pass http://127.0.0.1:3004;
    }
}
```

Common NGINX Configuration Mistakes

Questions?

References

- NGINX
- NGINX Wiki
- NGINX Docker
- NGINX source code
- NGINX source code - GitHub mirror
- Contributing to NGINX
- NGINX - Andrew Alexeev

7:15 - 8:15pm - Microservice API Gateways with NGINX - Geoffrey Filippi

(NGINX is pronounced "engine x".)

Microservices are a popular architectural solution. Clients of microservices may experience some difficulty keeping track of the various instances and endpoints they have to call. An API gateway can help manage large numbers of microservices and hide the infrastructure complexity from your clients. We will review a microservice architecture before and after the addition of an API gateway.

An API gateway is a reverse proxy. A reverse proxy handles incoming requests from clients and calls a service to get the data to satisfy that request. The reverse proxy returns that data to the client. Many developers write these proxies by data to the client. Many developers write these proxies by hand in custom code, not realizing there better solutions available. We will mention a number of popular solutions, some open source and some cloud-based services. For this talk, we will focus on NGINX, a popular open source reverse proxy and API Gateway. (NGINX also sells an enterprise offering, NGINX Plus, but this talk will only cover the features available in the open-source version.)

We will show how to set up NGINX as an API Gateway. We will dive into the configuration and operation of NGINX.