Cloud Computing with Amazon Web Services and the DevOps Methodology

Who am I?

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Systems Developer at Cloudreach

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@whiskyweb

Who are Cloudreach?

- Multi-platform cloud integrator for the enterprise.
- Top tier partner with
  - Amazon Web Services
  - Google
  - Heroku
  - SalesForce


News International


funkypigeon.com


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WORLDWIDE SERVICE
ChipsAway
We paint the chips - not the car


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BELLVILLE RODAIR


SCREWFIX


BARR
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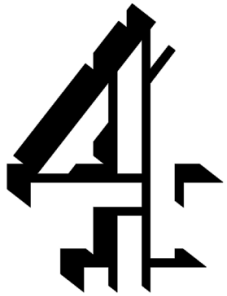
shop
direct
group



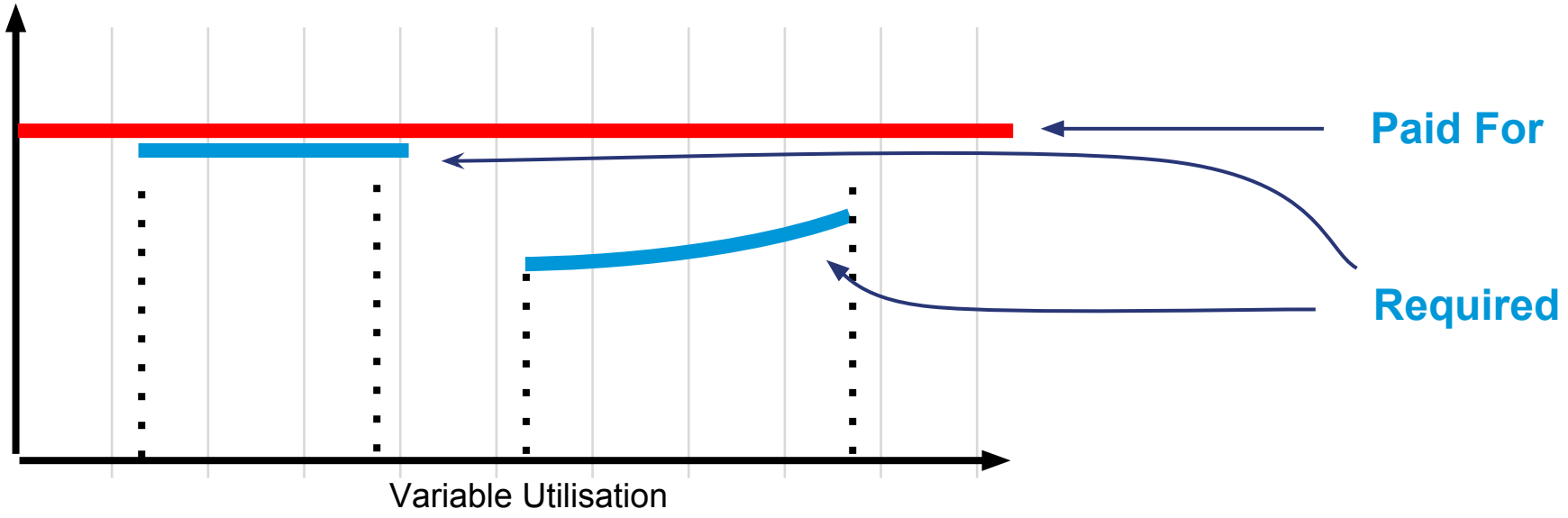

BURBERRY

What do Cloudreach do?

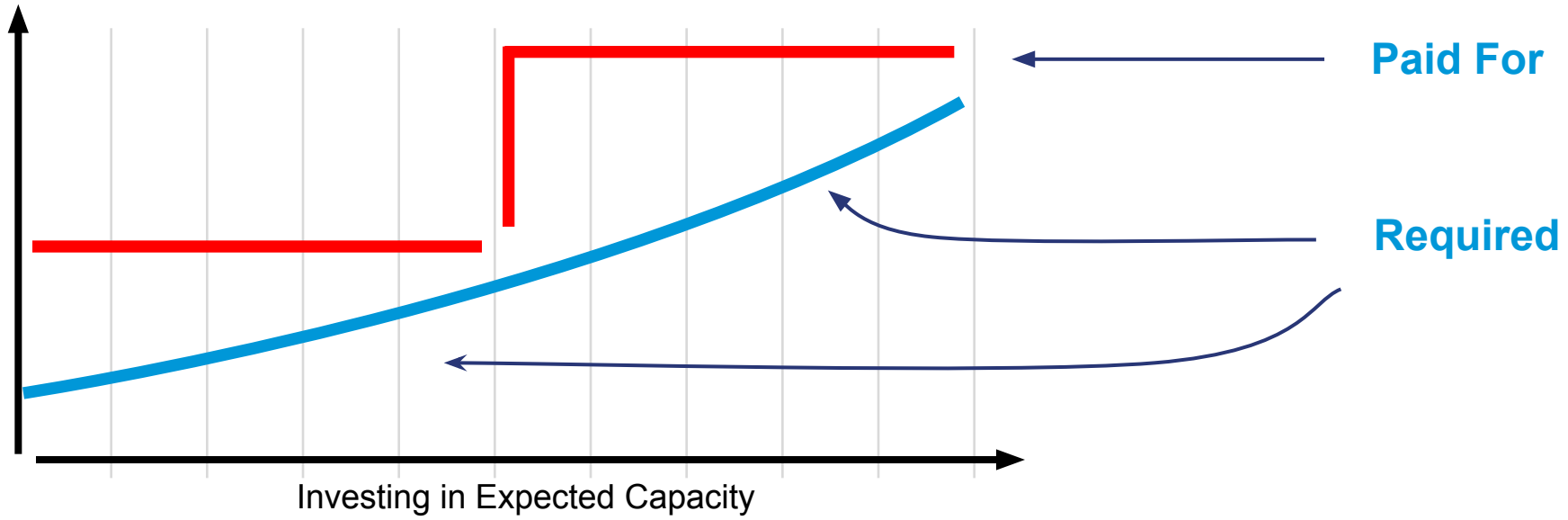
- Consultancy Services
- Migration Services
  - Moving platforms to the cloud
  - Migrating business to Google Apps
- Application Development
  - Mobile development - Android/iOS
  - SalesForce integration
- Managed Services
  - 24/7 Monitoring
  - Break/Fix
  - Business As Usual / Keeping lights on

- Amazon Web Services
  - Cloud computing platform
- Chef
  - Configuration management
- Splunk
  - Data collection
  - "Big data" Analytics
- Zenoss
  - Monitoring and alerting
- Jira
  - "Agile" issue tracker & team management

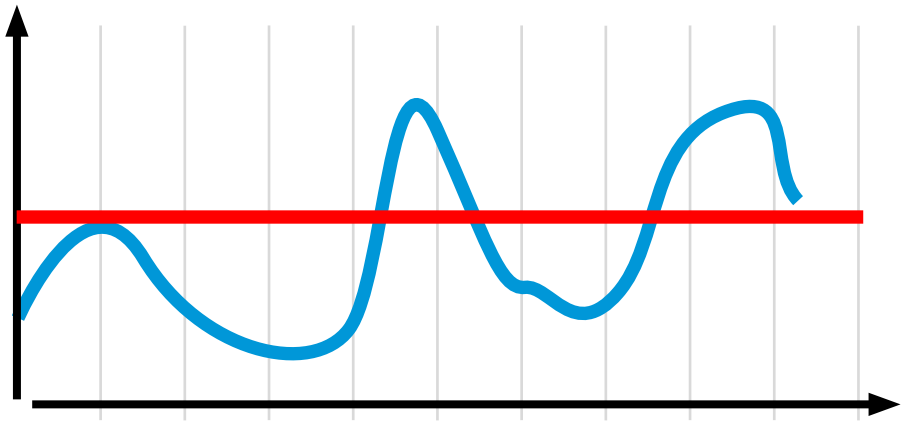
What is Cloud Computing?



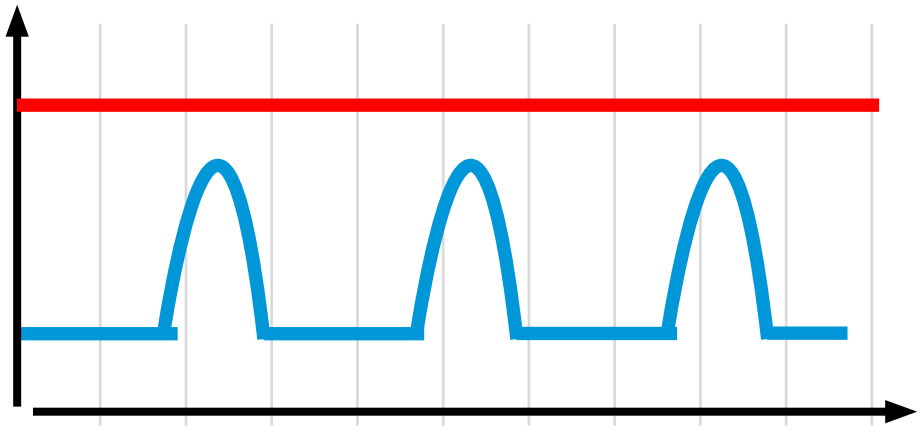
- Traditionally pay for fixed capacity
  - VPS / co-location
  - Not always on
  - Underutilised



- Traditionally pay for fixed capacity
  - Stepwise expansion
  - Underutilised



Unexpected Peaks



Expected Peaks

- Traditionally pay for fixed capacity
  - Underprovisioned
    - Lost revenue at peaks
  - Overprovisioned
    - Underutilised

Wouldn't it be nice if the red line more closely followed the blue line?

With the cloud and Amazon Web Services, it can; and you only pay for what you use.

- Traditional infrastructure
  - Physical racks in data centres
  - Manually replace faulty hardware
  - Scaling up
    - Provision and install new hardware
  - Scaling down!?

- Elasticity
  - Scale up in response to spikes
  - Scale down afterwards
  - No CapEx
  - Pay as you go

- Elasticity
  - Disk space on demand
  - Networking on demand
  - CPU on demand
  - RAM on demand

- Virtualised infrastructure
- Abstracted hardware detail
- Still need physical hardware
- Managed reliably by someone else

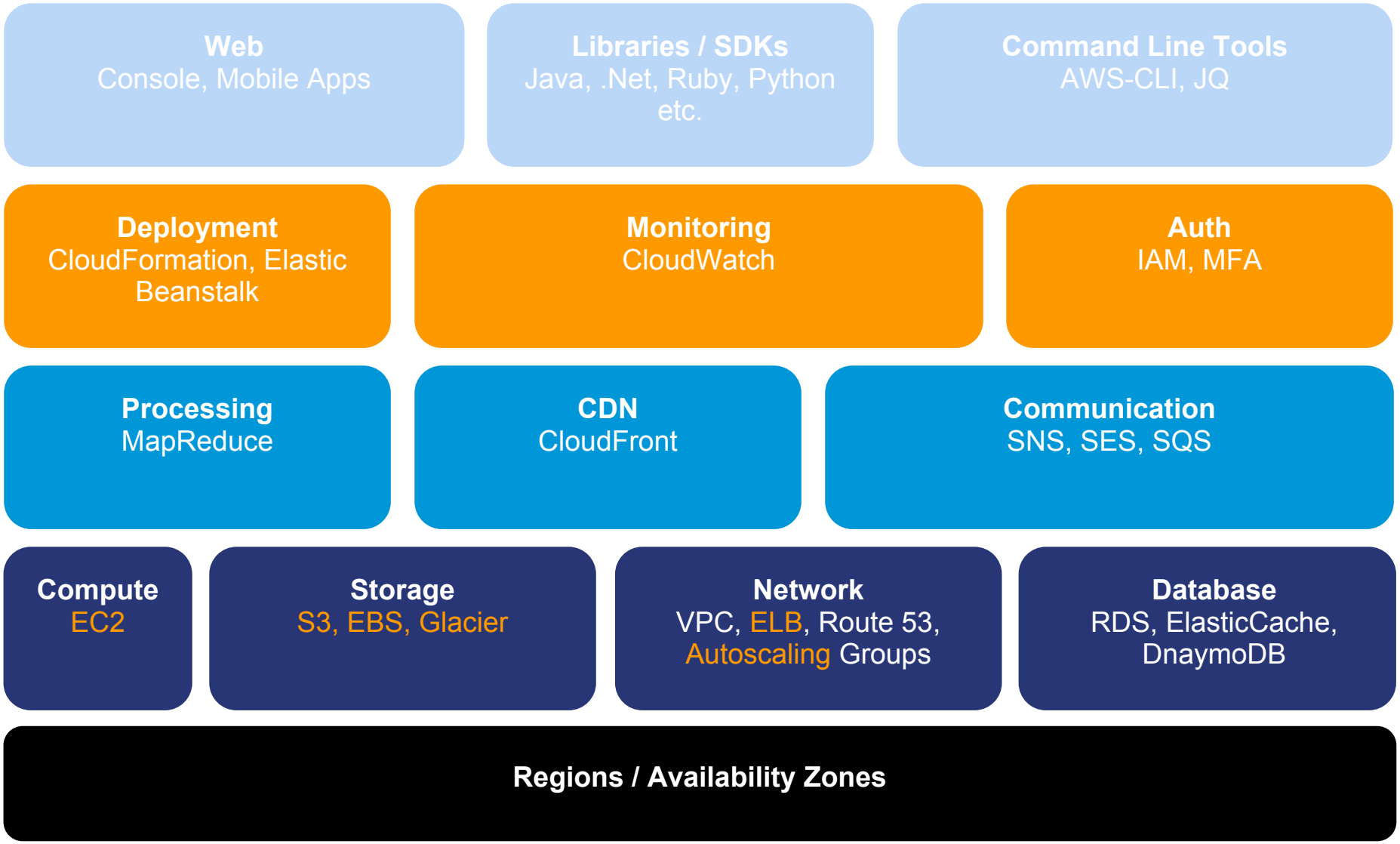
- Agile
  - Try new things without heavy investment
  - Scrap ideas without significant overhead.
- "Just In Time"
  - Expecting increased traffic, spin up new temporary resource.
- Typically HTTP API to cloud resources

- X as a Service
  - Application
  - Infrastructure
  - Platform
  - Network
  - Storage
  - Database
  - Etc.

Amazon Web Services

- Amazon.com not just a retailer
- Amazon.com built on top of AWS
- Built to be resilient
- Geographic diversity

- Multiple interfaces to API
  - Command line tools
  - HTTP API
  - Web Console
  - SDKs (Ruby, Java, Python etc.)


Web
Console, Mobile Apps
Libraries / SDKs
Java, .Net, Ruby, Python etc.
Command Line Tools
AWS-CLI, JQ
Deployment
CloudFormation, Elastic Beanstalk
Monitoring
CloudWatch
Auth
IAM, MFA
Processing
MapReduce
CDN
CloudFront
Communication
SNS, SES, SQS
Compute
EC2
Storage
S3, EBS, Glacier
Network
VPC, ELB, Route 53, Autoscaling Groups
Database
RDS, ElasticCache, DnaymoDB
Regions / Availability Zones

- Regions
  - us-east-1, us-west-1, us-west-2
- Availability Zones
  - eu-west-1a, eu-west-1b
  - Diverse network, bandwidth
  - Isolated from other AZs

Elastic Compute Cloud (EC2)

- On demand compute power
- Basically a Virtual Machine with extras
- Based on AMIs
- Different instance sizes
  - Micro ~ 512Mb RAM, 1 CPU
  - Cluster 8 XL ~ 244Gb RAM, 88 CPU
- Boot a new instance in minutes
- Public DNS and IP address

- Choice of OS
  - Linux, Windows, FreeBSD, OpenSolaris
- CloudWatch monitoring
- Snapshots / Backups
- Build AMIs for VM templates
- Choice of pricing model
  - On Demand, Reserved, Spot

Storage Solutions (EBS, S3, Glacier)

- Elastic Block Store
  - Analogous to traditional hard disks
  - Commonly used as primary instance storage
  - Block level device access

- Simple Storage Service
  - Geographically distributed for redundancy
  - Can be used in conjunction with Route 53 to host static sites!
  - Useful for backup purposes
  - Currently > 1.3Tn objects

- Glacier
  - Very low storage cost
  - Designed for infrequent retrieval
  - Retrieval time of several hours
  - Not for servicing real time requests
  - Long term backup solution e.g. for data retention compliance

Elastic Load Balancer (ELB)

- Distribute load across many back-end instances
- Multiple AZ support
- Complemented by Autoscale Groups

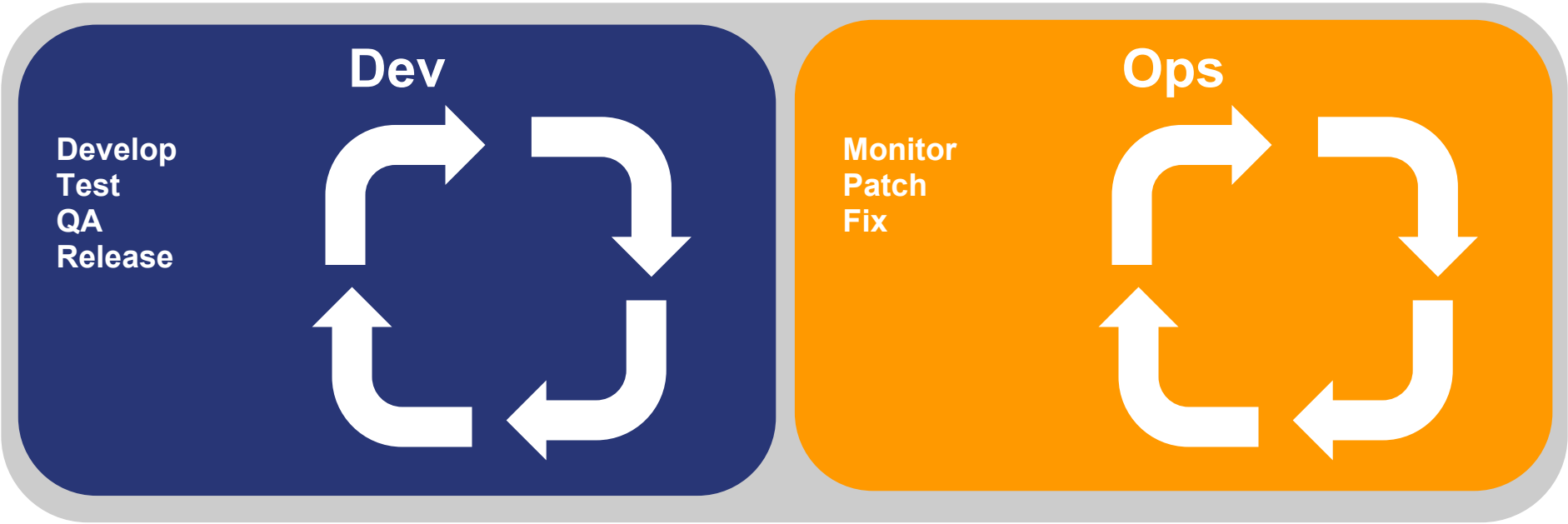
Demo - AWS Console

What is DevOps?

- Buzzword
- Mindset
- Social Perspective
- Technical Perspective

Social Perspective

- Invisible fence between Devs and Ops
- Both throw things over the fence and call it a day
- Not about stable code or stable infrastructure, but a stable business
- All on the same team



- Devs create change
- Ops enforce stability
- Fundamentally opposing goals
- Key is to work together for the benefit of the whole

- Continuous delivery
  - Devs don't release to Ops
  - Ops don't release to Devs
  - Devs + Ops release to the business

Technical Perspective

- Humans make mistakes
- Testing
  - Mitigate risk
  - Don't release broken code
- Monitoring
  - Know when things go wrong (because they will!)
- Automation
  - Address issues quickly and efficiently
  - Only write it once

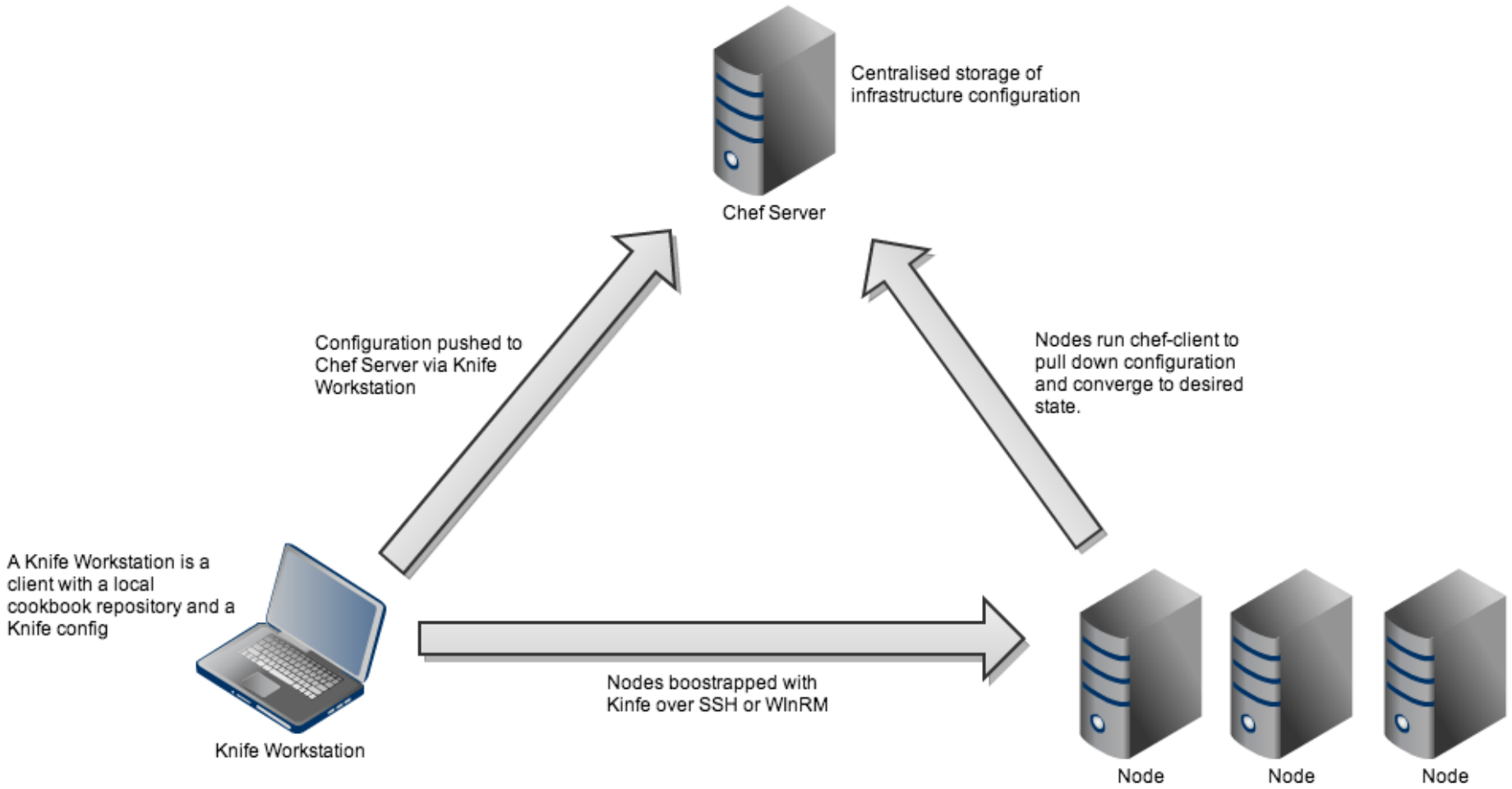
- ~~*"...If you're not nervous deploying to production, you haven't understood the gravity of the situation..."*~~
- Devops done correctly:
  - Confident deployment
  - Confident rollback
  - Confident team

- Code is in source control, so why not infrastructure?
- Define infrastructure as code
- Rebuild entire infrastructure
  - Infrastructure Code +
  - Application Code +
  - Data

Chef

- Configuration management
- System integration
- Infrastructure as code
- Your estate in an API

- Clients communicate with Chef Server and receive their configurations
- Configurations managed via a Knife Workstation (also a Client)
- Clients configure themselves by executing Ruby and converge to the required state
- Hierarchical configuration



Demo - AWS Bootstrap with Chef

Thank you
Any questions?

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