Managing Massive Datacenters

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Question

Authority

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Puppet: Open Source Systems Management

- You explain to Puppet how you want your infrastructure to look, and it makes it so
- As you change that explanation over time, Puppet updates all machines to match

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Puppet Users

Deploy 1,800 machines in 2 hours
vs. 25 machines per day with HP Opsware

Scaled from 0 to over 10,000 servers
in 2 months without training

287 servers per SysAdmin
vs. 19 for BMC BladeLogic

Over 50,000 systems
managed by Puppet

Financial

TransUnion
BARCLAYS CAPITAL
JPMorgan
D E Shaw & Co
NYSE Euronext

Entertainment

Disney
VIACOM
Turner
PlayStation
FOX

Technology

redhat
DELL
MOTOROLA
Juniper NETWORKS
SIEMENS
rackspace

Defense

LOCKHEED MARTIN
NORTHROP GRUMMAN
Los Alamos NATIONAL LABORATORY

Web

Google
ebay
twitter
digg
zynga

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Managing Datacenters

There's no pattern

- Enterprise vs. growth company
  - E.g., Nokia vs. Zynga
- Technology company vs. startup
  - Twitter today vs. Twitter 2 years ago
- Yours vs. Mine
  - Rackspace vs. Amazon vs. Google
- Big vs. really really big
  - Wal Mart vs. JPMorgan
- Corporate vs. Customer-facing
  - Google Production vs. Google Corporate

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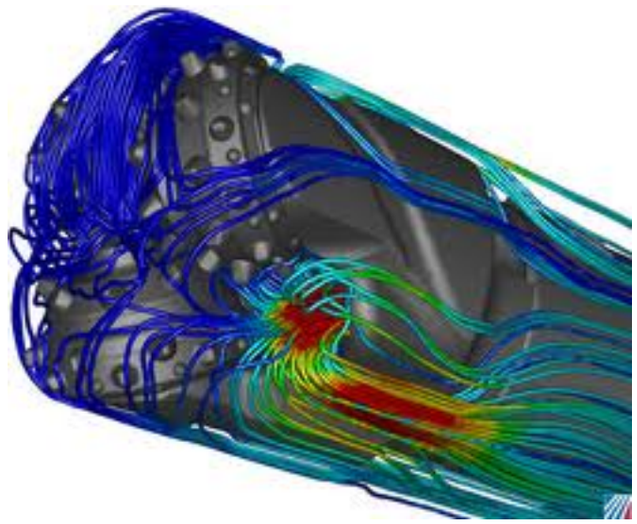
Web ops are cooler, corporate is harder

Web operations looks a lot like HPC



http://www.cfdesign.com/image/legacy/news/2009/tricone-bit-HPC.jpg?w=350&h=288&as=1

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Lots of apps != lots of users

It can feel like Silicon Valley vs. The World

Over time, web ops companies become corporate

How are datacenters managed?

It’s worse than you think

Worse than that

No no - not you

But probably the person next to you

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Technology still can't solve political problems

$25m application with 100s of trivial root exploits

Deployment costing more than development

Six months with no upgrades because they *forgot how*

50-96% of outages caused by human error

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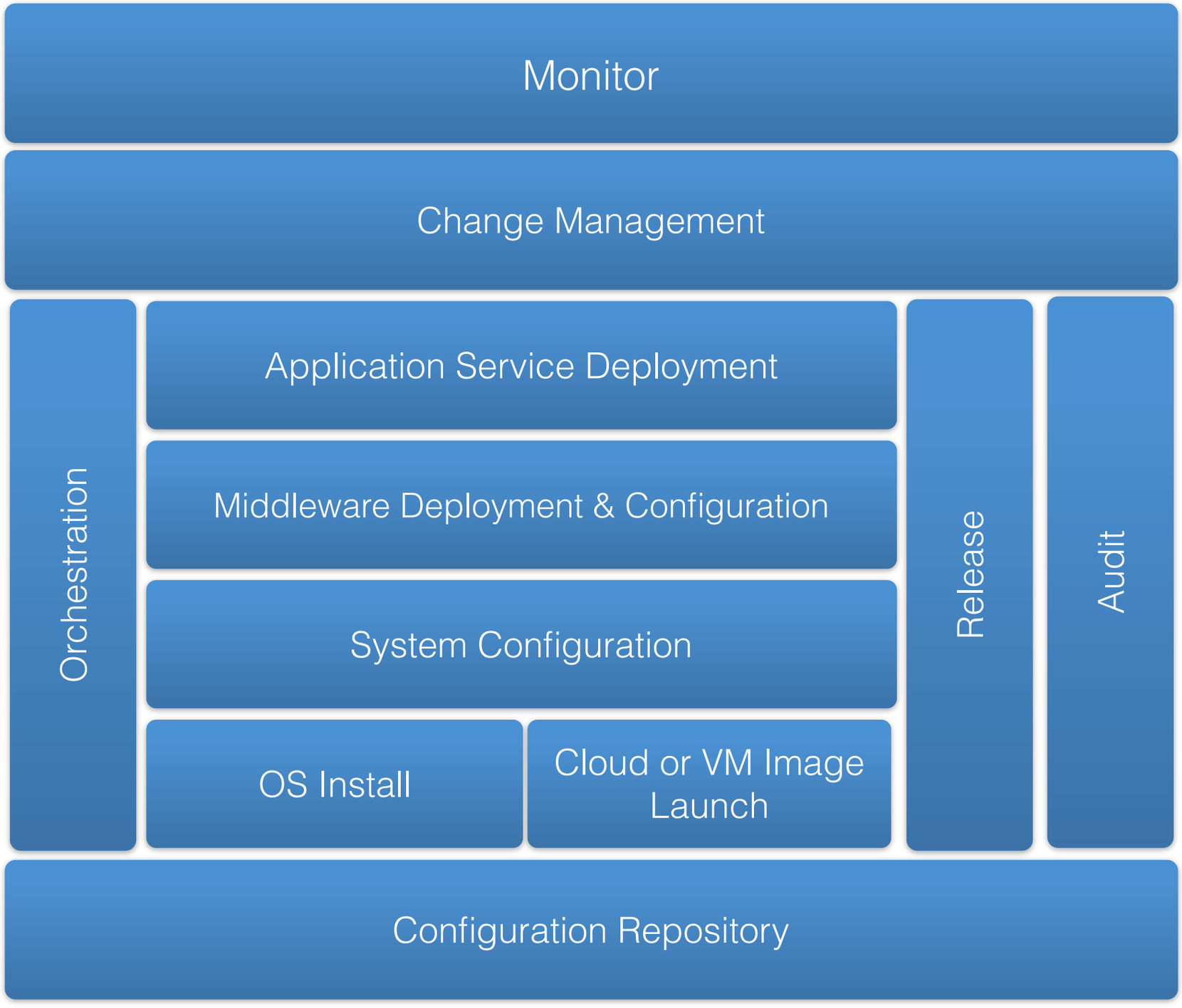
The problem actually is complex



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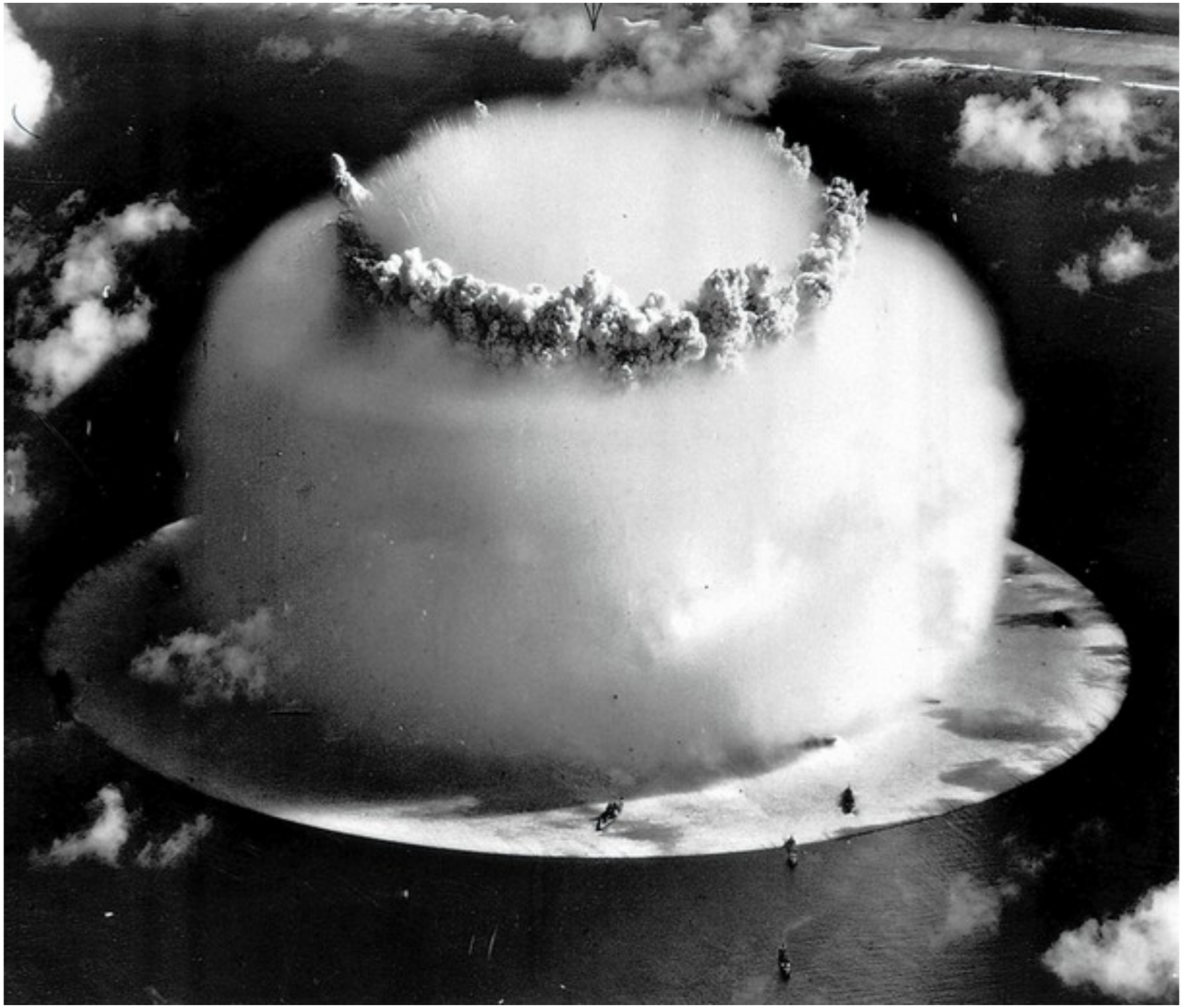
Disaster is constant



Solution: Enterprise-grade management solution

They suck

http://t1.gstatic.com/images?q=tbn:ANd9GcSGbCu2jBwJBMo7iO4IP3CiwSTHkIIVi_ppxWrK2cq5Wjmi2rt24A&t=1

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Built for protection, not productivity

http://www.deviantart.com/download/97345411/Straight_jacket_Joker_by_MasterDrawer.jpg

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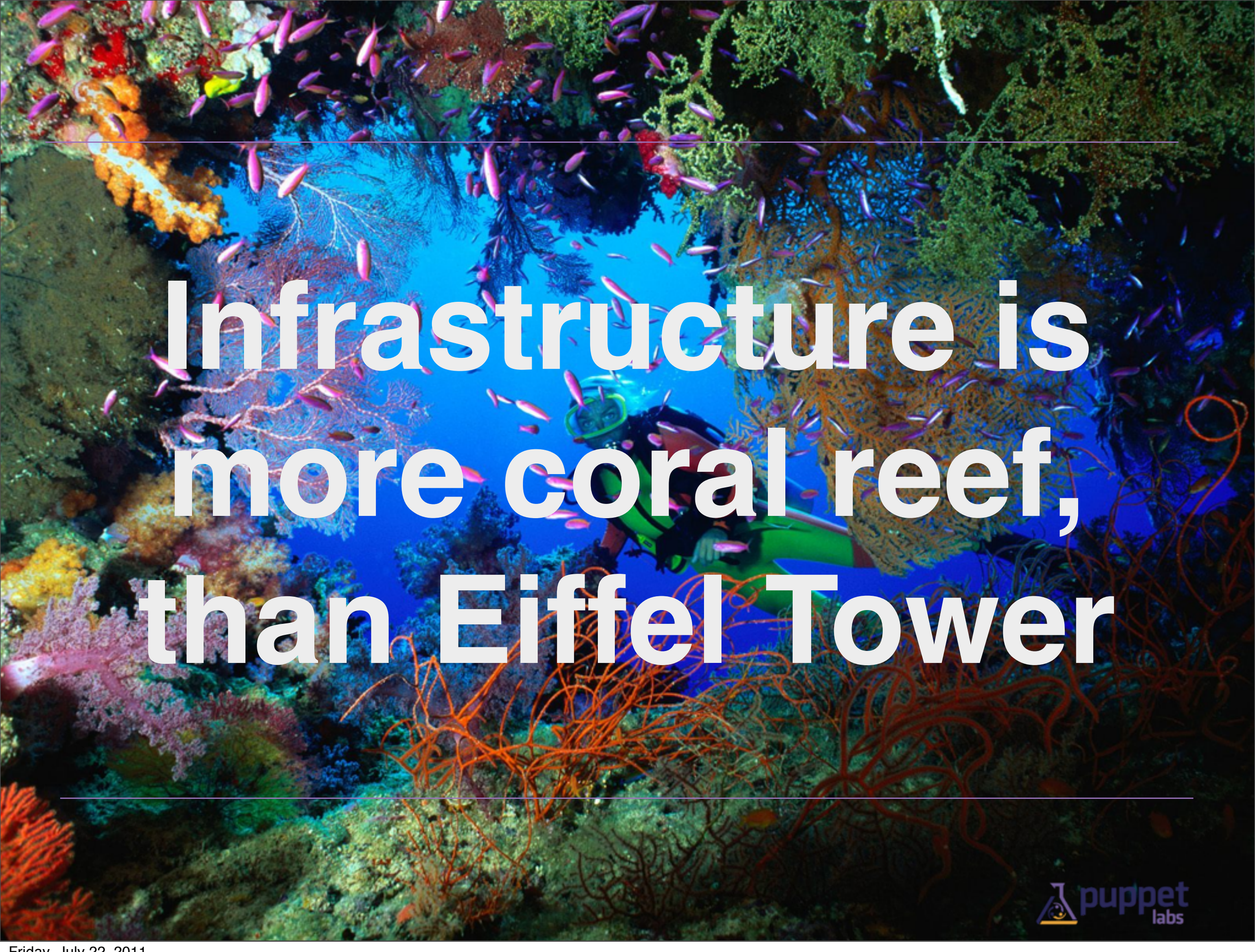
Claim to solve every problem

Reality: Shell scripts and cron jobs

...and you wasted

$15m

...and an exec who bet his career on it


Infrastructure is
more coral reef,
than Eiffel Tower
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Simplicity scales, complexity crumbles

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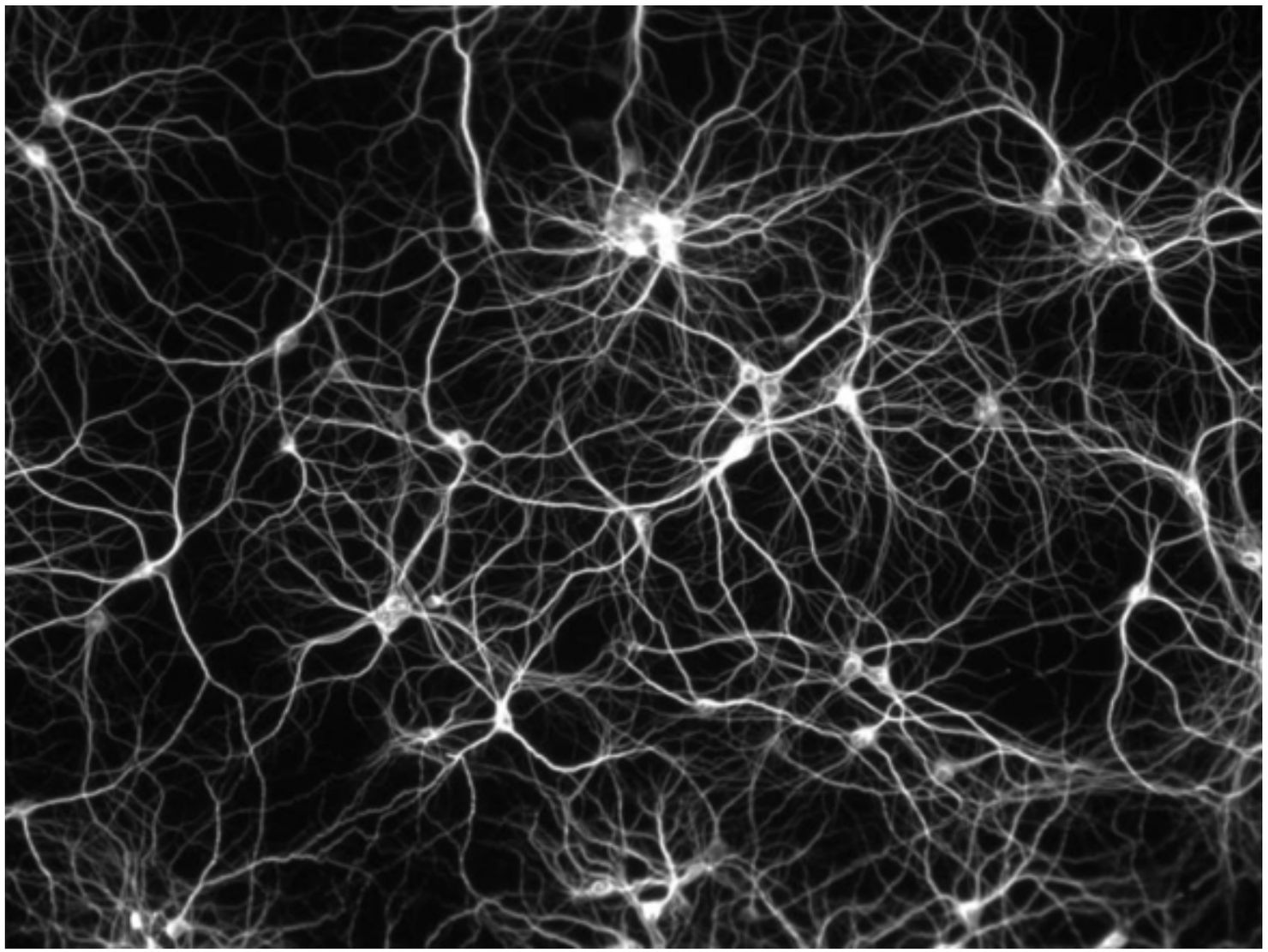
Scalable complexity requires simplicity



http://freeassociationdesign.files.wordpress.com/2010/04/neuron-map1.jpg

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It’s even more so the cloud

Simplicity provides frictionless scale

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High cost, no agility, big resources kill you

How did we get here?

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Jenga administration

http://www.thecolorcurve.com/blog/wp-content/uploads/2011/02/jenga_negativeskew.jpg

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Theory: Deploy, use, decommision

Reality: Deploy, back away slowly

People fear change, rather than enable it

http://www.freefoto.com/images/04/28/04_28_57---Pile-of-Coins_web.jpg

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Poor teamwork

Development produces the world's best app

Ops has no idea how to deploy it

Auditors won't sign off on it

No one's fault, everyone's problem

Consultants are happy to “help”

Devops : Ops ::

Agile : Development

Cultural change takes forever

The best have learned

It can’t go on like this forever

Image source: http://sloblogs.thetribunenews.com/slovault/files/2008/08/pacific-telephone.jpg

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They build their own

amazon.com

ebay™

Google

E*TRADE

Morgan Stanley

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=> Lots of

duplicated effort

And thrown away code

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They're still the exception

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Normal: Purchased, hand-rolled, and broken

Operational Antipatterns

Direct from keyboard to production

Alerts delivered via email

Expecting tools to protect you from incompetence

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Golden Images

Image from http://www.flickr.com/photos/fungep/2516767121/sizes/l_

What you should do instead

Step 1

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Make everyone responsible for operational success

See the change, not the state

Think services, not hosts

Use the stupidest tool that can possibly work

Find where

people's time goes

Solve the simple problems first

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Focus on value/ cost

Only monitor things you care about

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Continuous integration, even in the infrastructure

Keep humans at the console

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Automate tasks,

not decisions

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A little more about

Puppet

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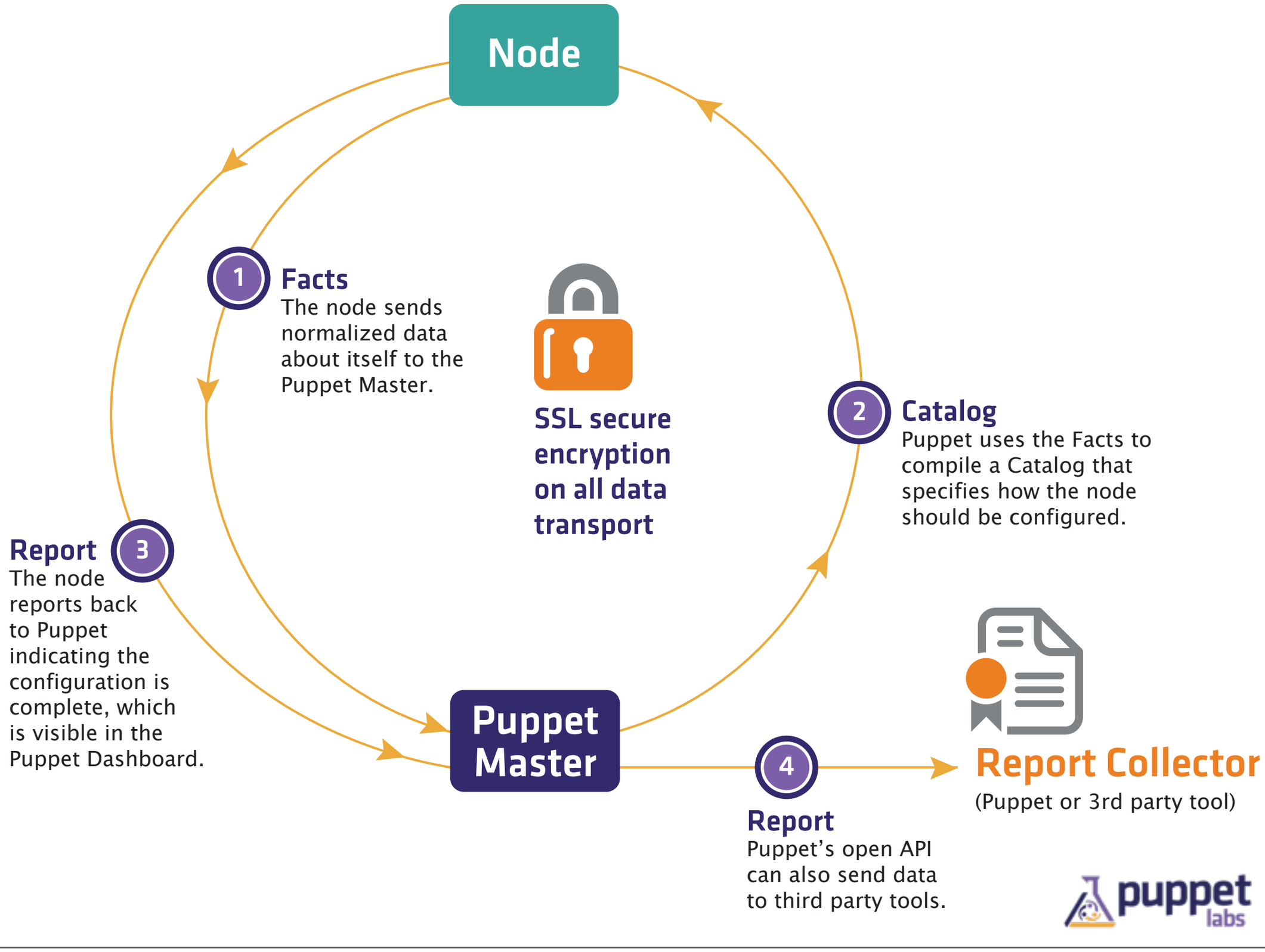
Constant Configuration



Simple Configuration Language

```
class ssh {
    package { ssh: ensure => installed }
    file { sshd_config:
        name => "/etc/ssh/sshd_config",
        owner => root,
        group => root,
        source => "puppet://server/apps/ssh/sshd_config",
        after => Package[ssh]
    }
    service { sshd:
        ensure => running,
        subscribe => [Package[ssh], File[sshd_config]]
    }
}
```

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System Portability with the Resource Abstraction Layer

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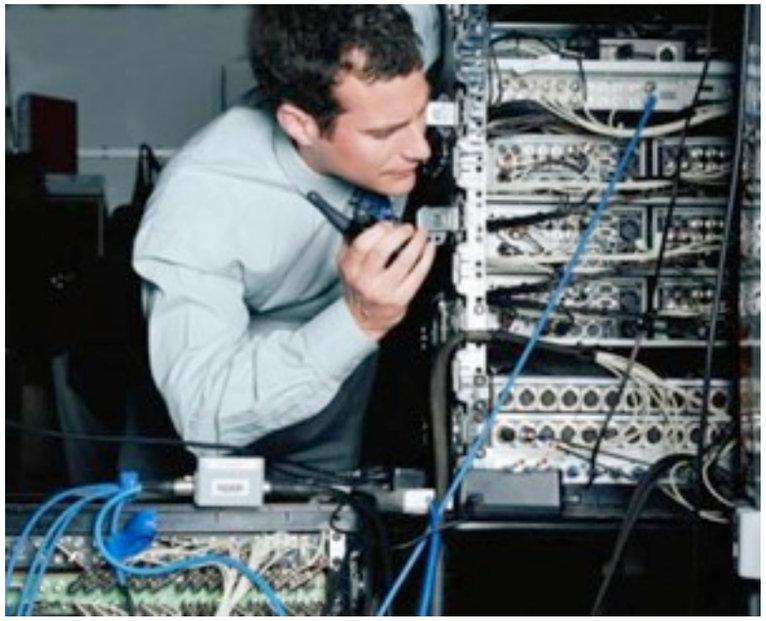
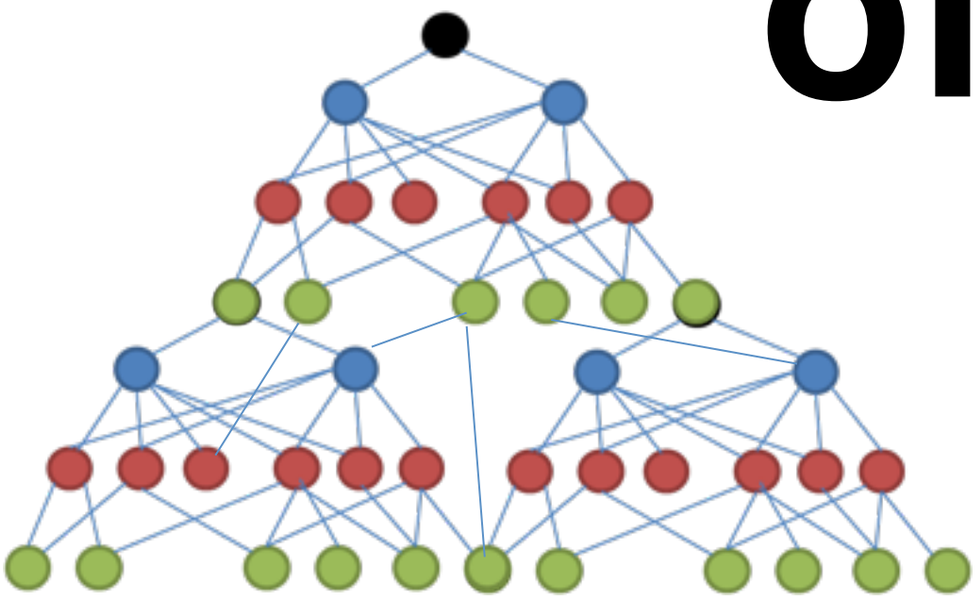
We're building Iron Man, not robots



Usability first, capability second

Separation of specification and execution

Massive amounts of data



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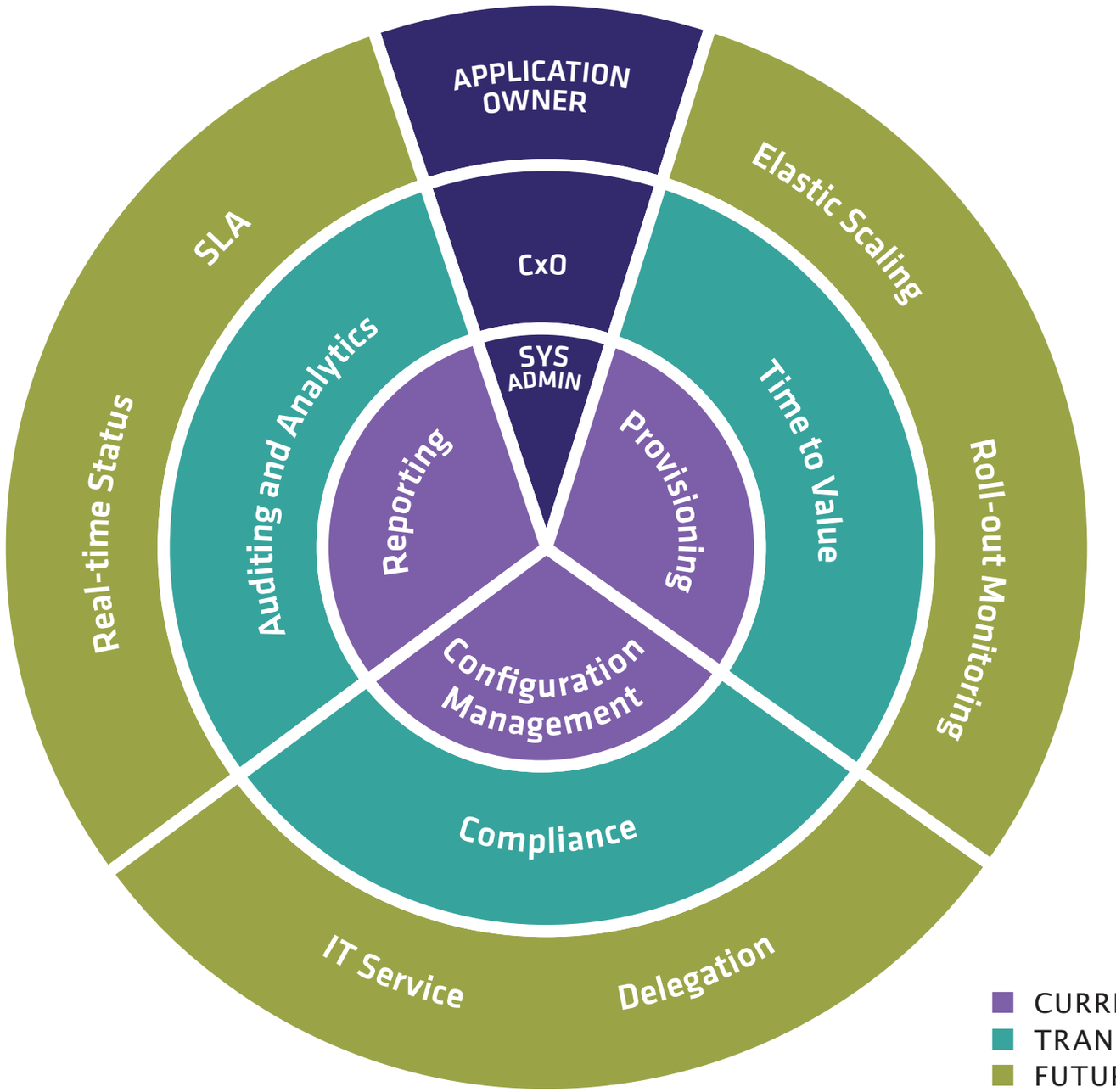
Portability enables DRY Operations

The Future of the Puppet Platform



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Summary

The state of operations is still really bad

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The cloud is making it worse, or better, or something

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Trying to solve it yourself makes you a software company

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But you might have no choice

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So build something simple and be ready to toss it

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Or just use Puppet :)

Questions?