

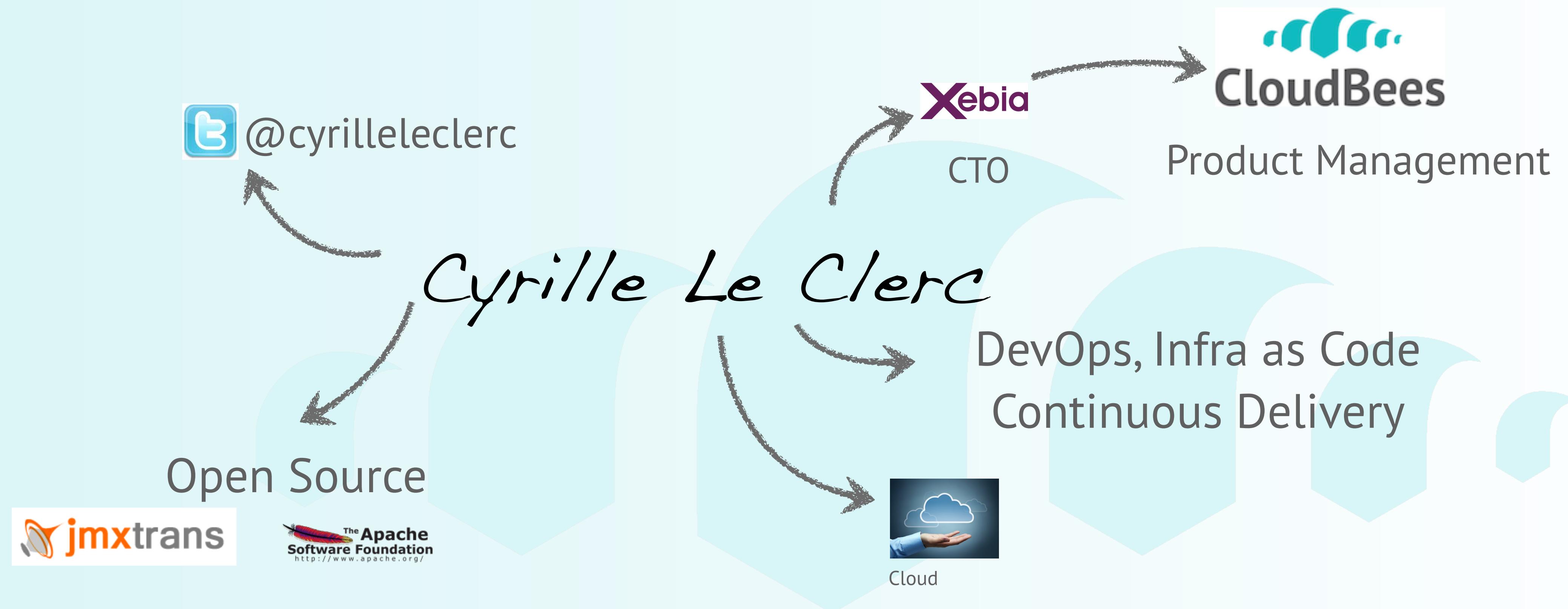


# Patterns d'architecture pour le Cloud

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Cyrille Le Clerc

# /me



# CloudBees

- Premier provider of Jenkins services and support
- Java PaaS
- CEO: Sacha Labourey
- CTO: Kohsuke Kawaguchi



# You ?



Dev? Ops? Cloud?

# Agenda

- Paradigm Shift: Cloud Services Oriented Architecture
- Design Patterns for the Cloud
- Conclusion

# Paradigm Shift

## Cloud Services Oriented Architecture

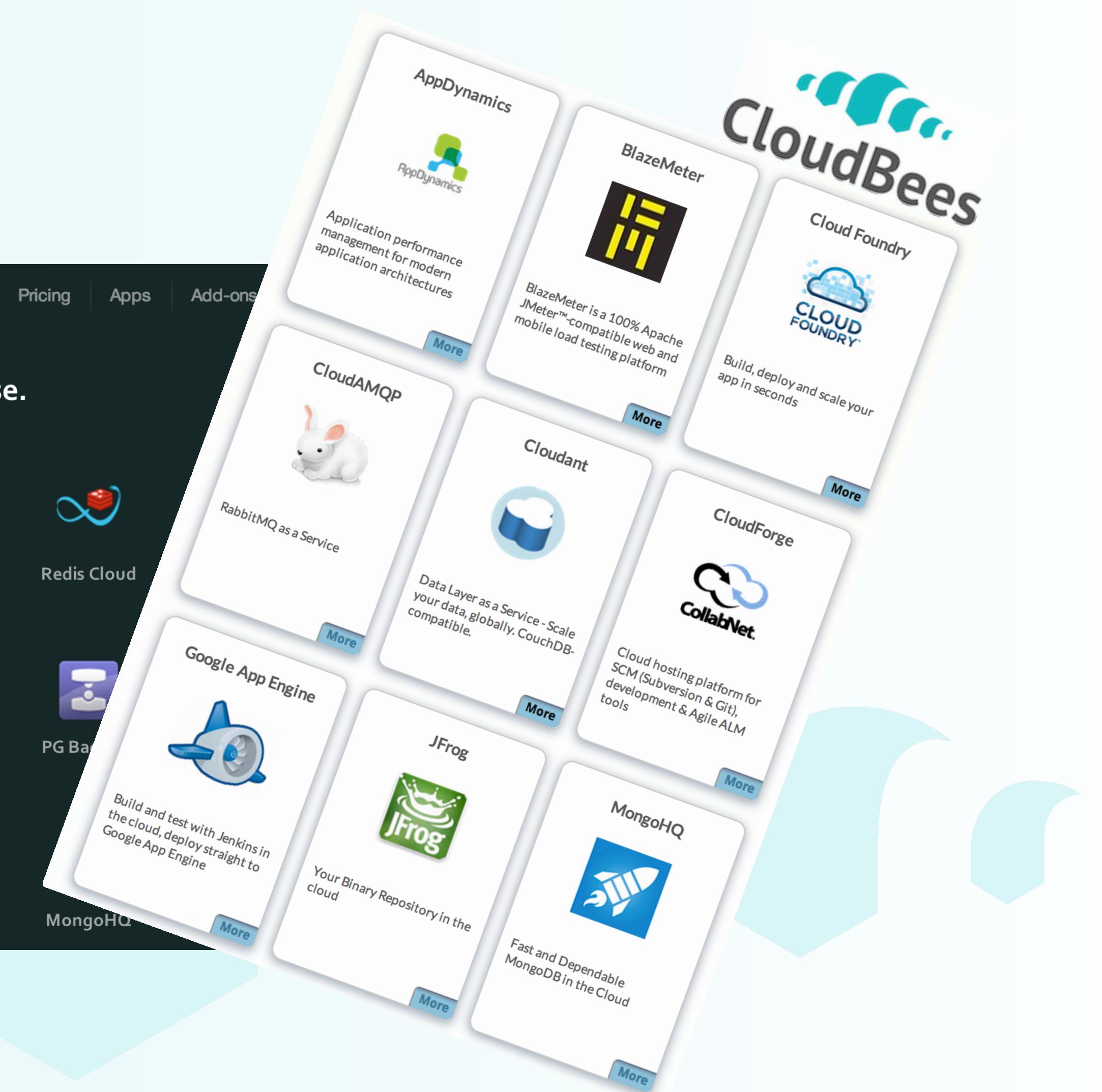
# \*aaS Ecosystem

- \*aaS is about service, not software
- Integrate services, don't try to setup your own infrastructure
- Amazon AWS: the place to be for \*aaS

# \*aaS Ecosystem

The screenshot shows the Heroku Add-ons page with a dark header. On the left, there's a sidebar for Amazon Web Services with sections for Application Services, Database, and others. The main content area has a heading "heroku add-ons" and a sub-heading "Add powerful functionality to your apps with ease." Below this are several cards for different services:

- openredis**: Redis Cloud
- GRIDBLAZE alpha**
- Heroku Postgres**
- MongoHQ**: Your Binary Repository in the cloud
- Google App Engine**: Build and test with Jenkins in the cloud, deploy straight to Google App Engine
- JFrog**
- CloudAMQP**: RabbitMQ as a Service
- Cloudant**: Data Layer as a Service - Scale your data, globally. CouchDB-compatible.
- CloudForge**: Cloud hosting platform for SCM (Subversion & Git), tools
- AppDynamics**: Application performance management for modern application architectures
- BlazeMeter**: BlazeMeter is a 100% Apache JMeter™-compatible web and mobile load testing platform
- Cloud Foundry**: Build, deploy and scale your app in seconds



# Location and Colocation

Fallacies of  
Distributed  
Computing

- Collocate application and databases
- Some systems can be distant
- Choose your cloud according to the services you require

I'm not a  
lawyer!!!

# The Cloud & The Law



Payment Card Industry Data Security Standard (PCI DSS)



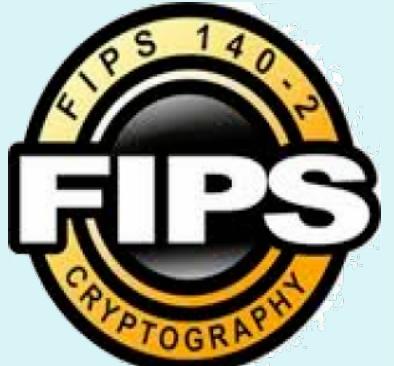
US EU Safe Harbor

HIPAA

ISO 27001

Personally Identifiable Information

SSAE 16



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lawyer!!!

# The Cloud & The Law



Payment Card Industry Data Security Standard (PCI DSS)



Data Privacy

HIPAA

Compliance

Personally Identifiable Information

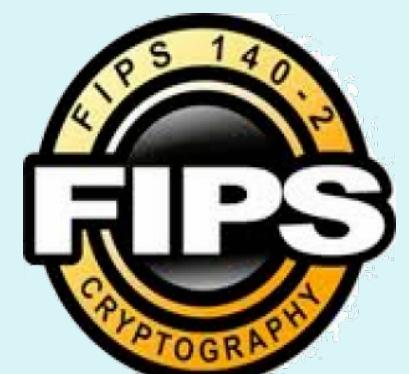
Liability

ISO 27001

Data Portability and  
Reversibility

Applicable Law

SSAE 16



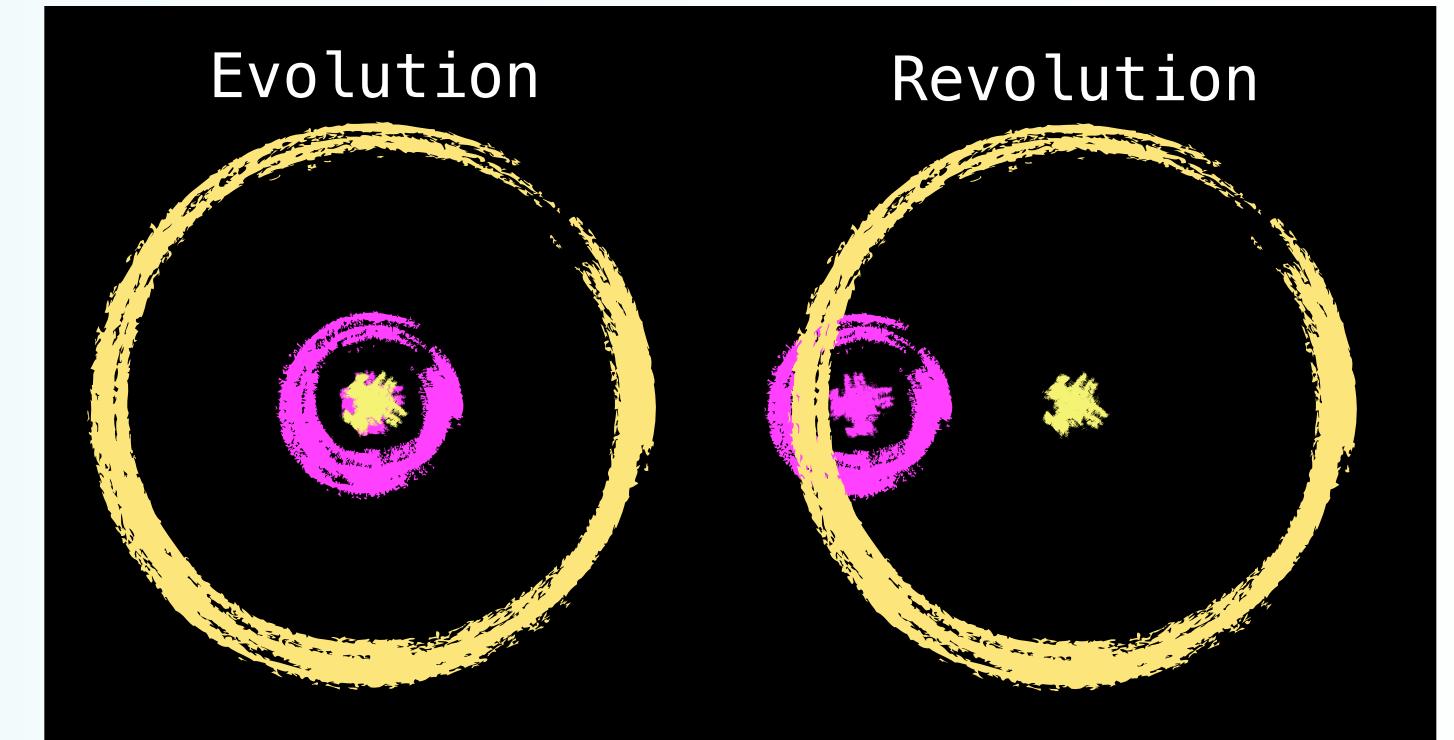
# Pricing Model

- Pay-per-use vs. fixed price
- Beware of unbounded pricing models
- Prepare a credit card
- Pay-per-use vs budget

# Selection Criteria for a Service Provider

- Location
- Performances
- Reliability
- Legal
- Security
- Pricing model

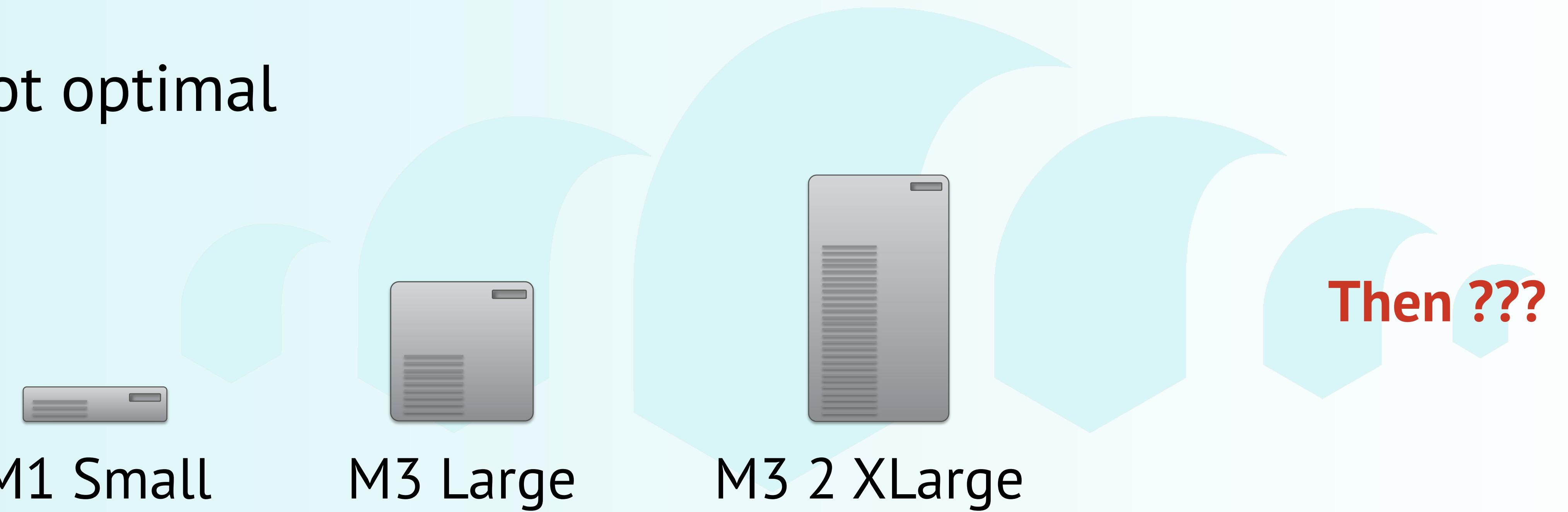
# Design Patterns for the Cloud



# Scale Out

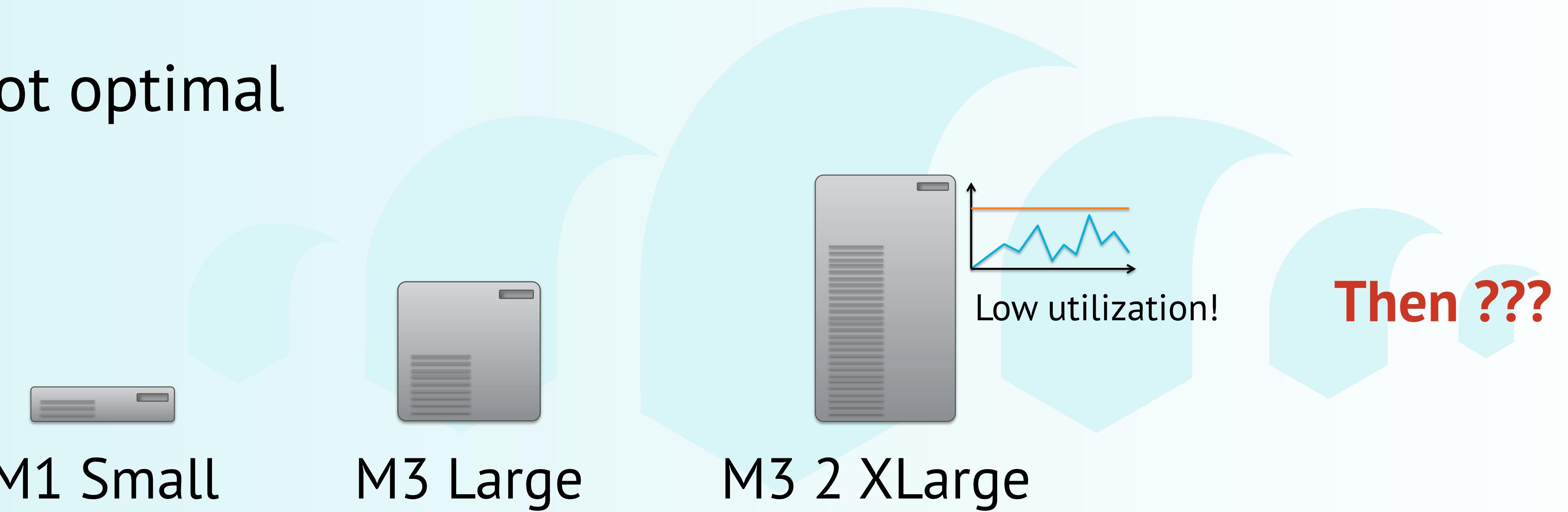
# Scale Up

- Still possible, but up to a limit
- Not optimal



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- Not optimal



# M3 Extra Large

- 15 Gb memory
- 4vCPU (~1/2 Intel® Xeon® Processor E5-2670 )
- 2x40 GB SSD HD
- aka « your desktop »

# Scale out

Design for clustering

Scale as you need



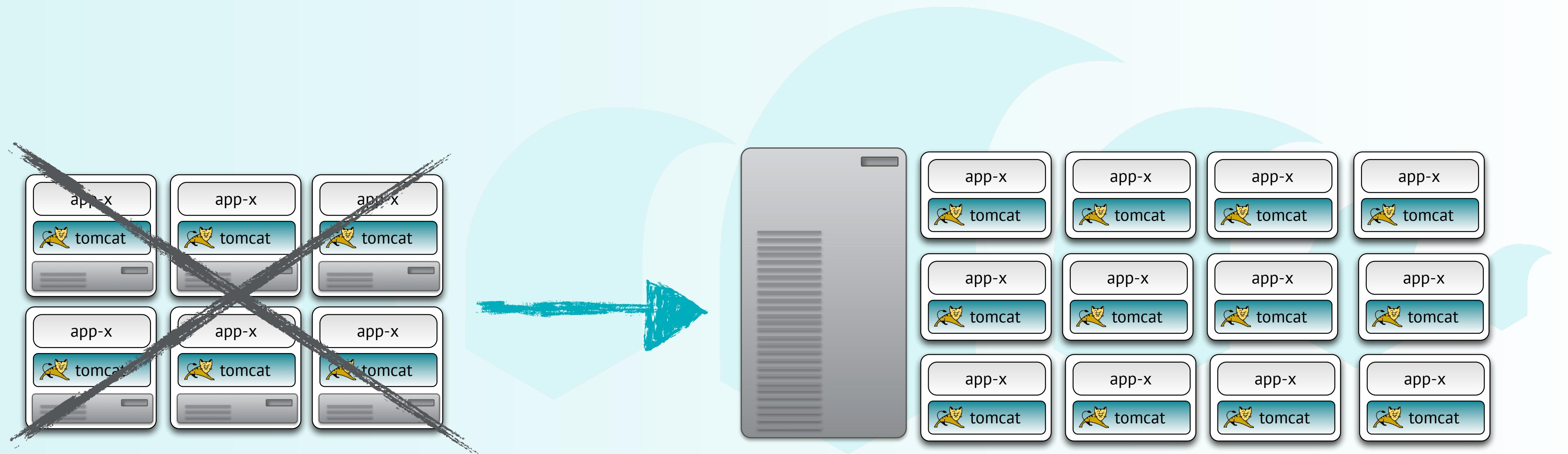
Pay as you use

# Scale Out

Multi tenancy - PaaS backstage

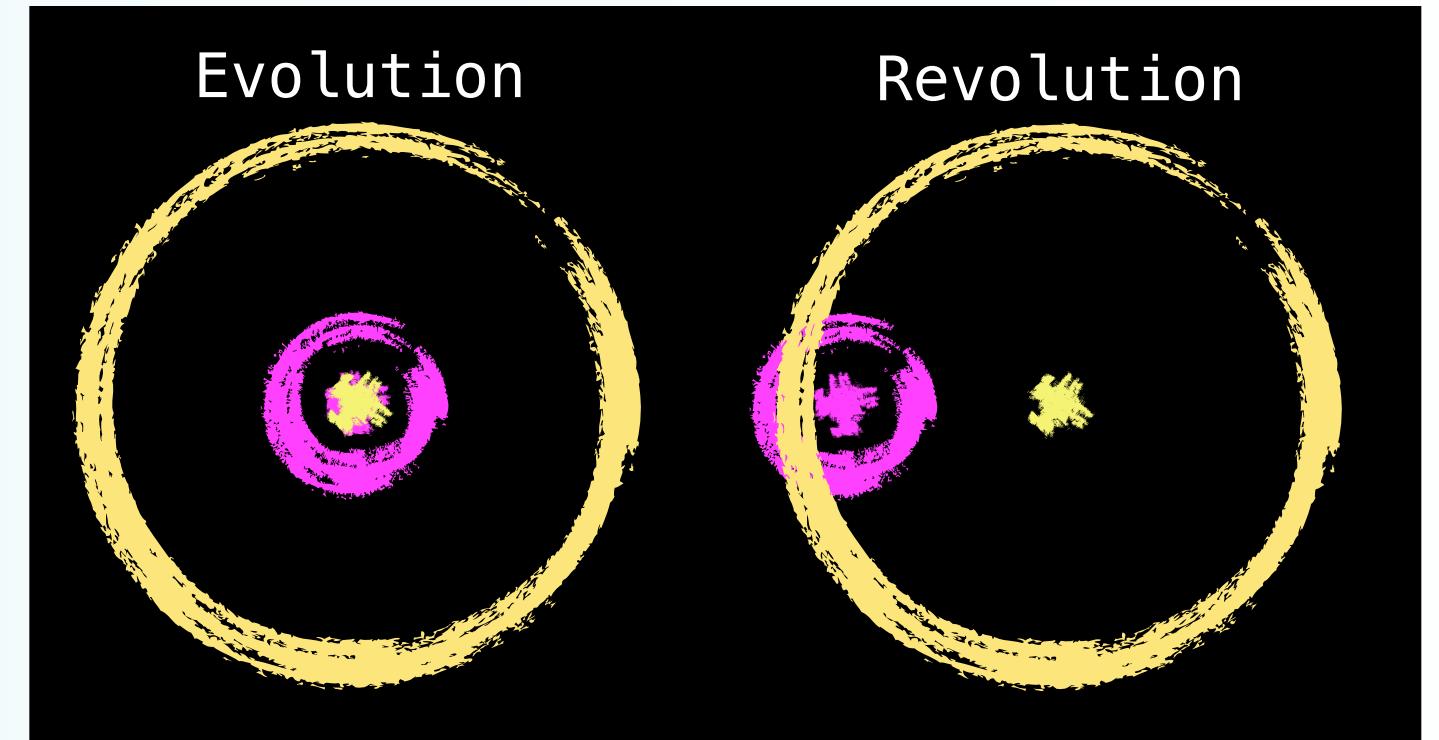
# Multi tenancy - PaaS backstage

- Multi tenancy at the app level, not at the OS level
- Slice big servers into slices



# Multi Tenancy

- OS level (hypervisor): IaaS
- OS virtualization (cgroups, LXC, Docker): PaaS
- Middleware ?  
Java 9 to be multi-tenant ?
- Application: SaaS



# Fear the File System

# Fear the File System

- Think multi instance
- Shared file system is difficult
- Best practice for any automated deployment

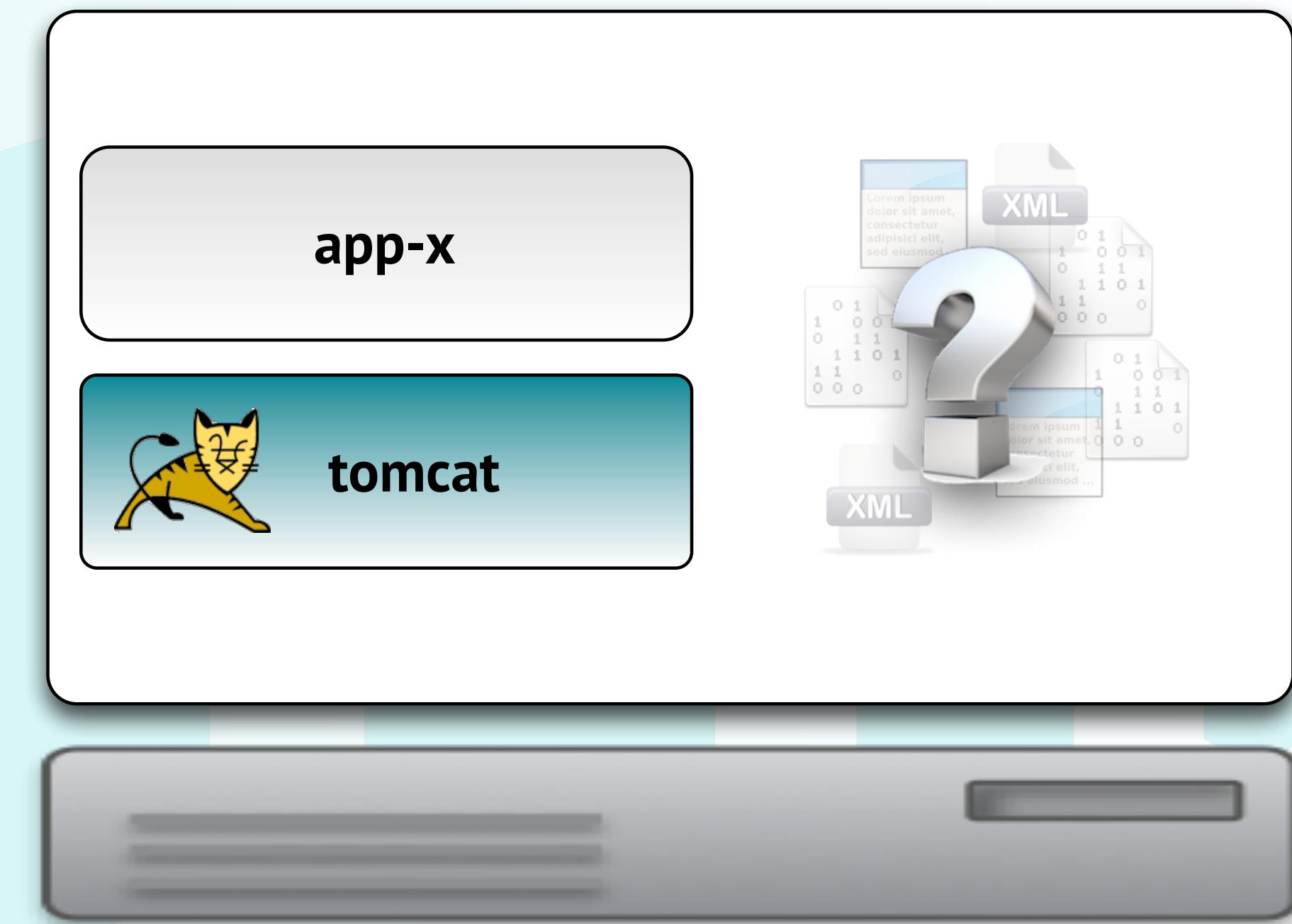
# Fear the File System

- Think multi instance
- Shared file system is difficult
- Best practice for any automated deployment

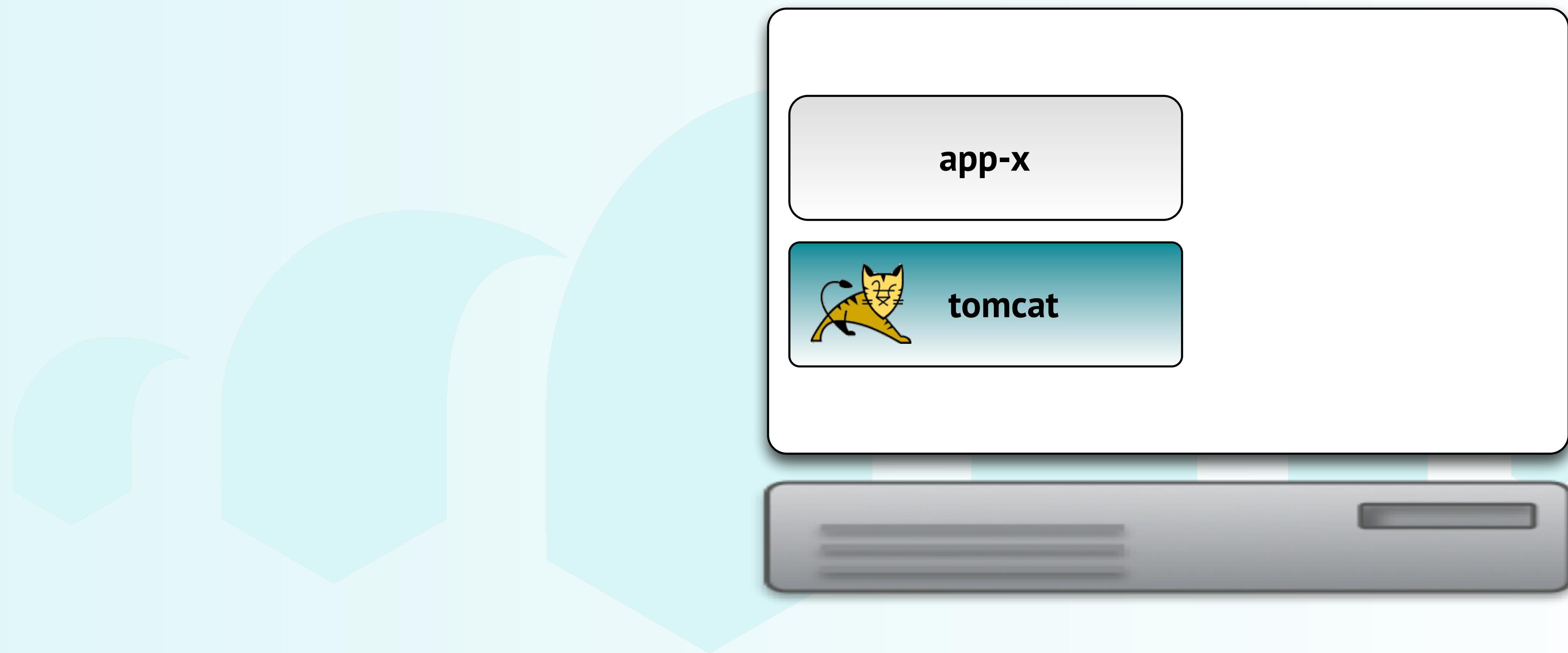
**Local file system: ephemeral near-cache or replica**

# Local File System is Everywhere!

Local file system is  
everywhere!

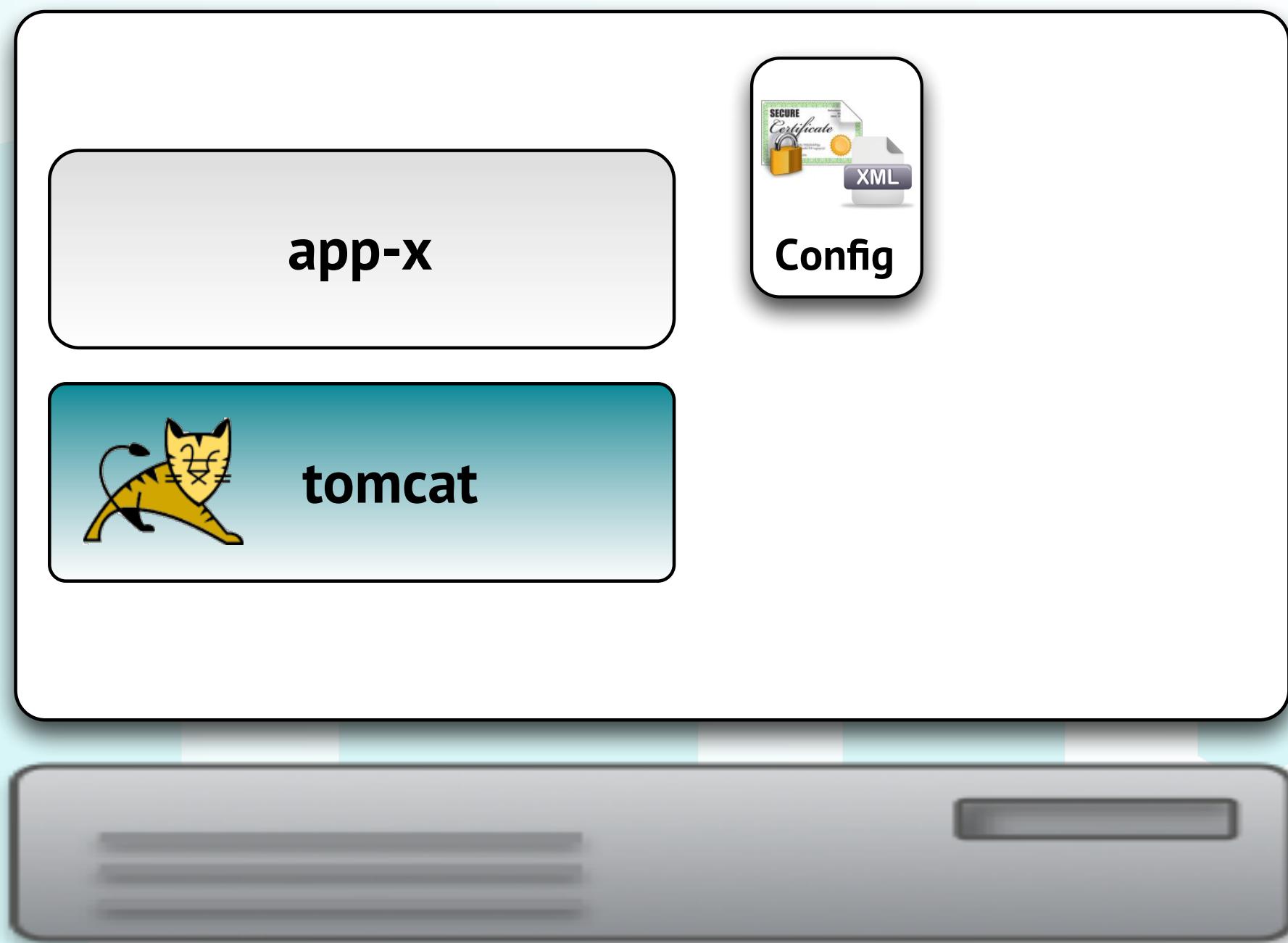


# Local File System is Everywhere!



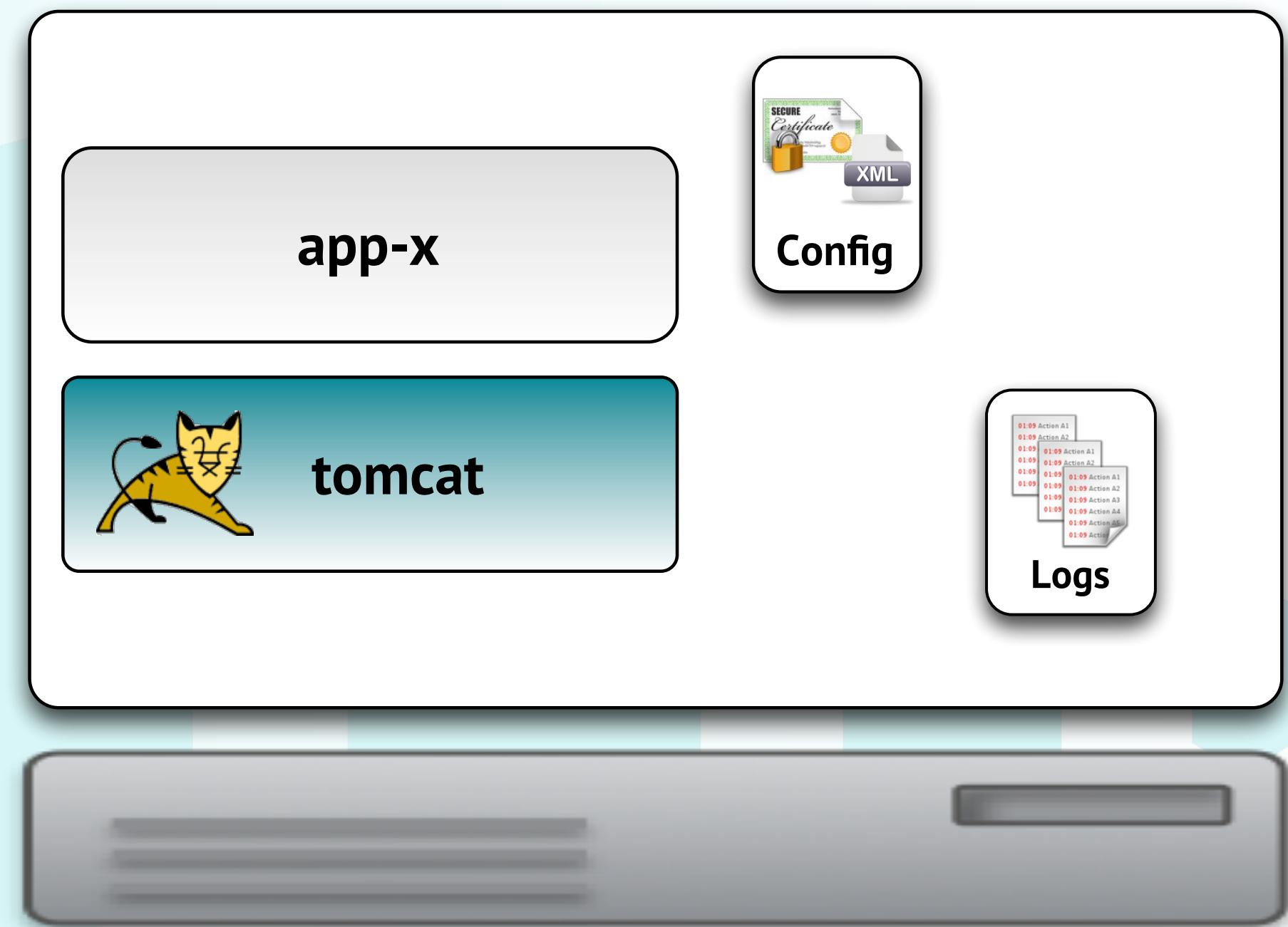
# Local File System is Everywhere!

- Configuration files



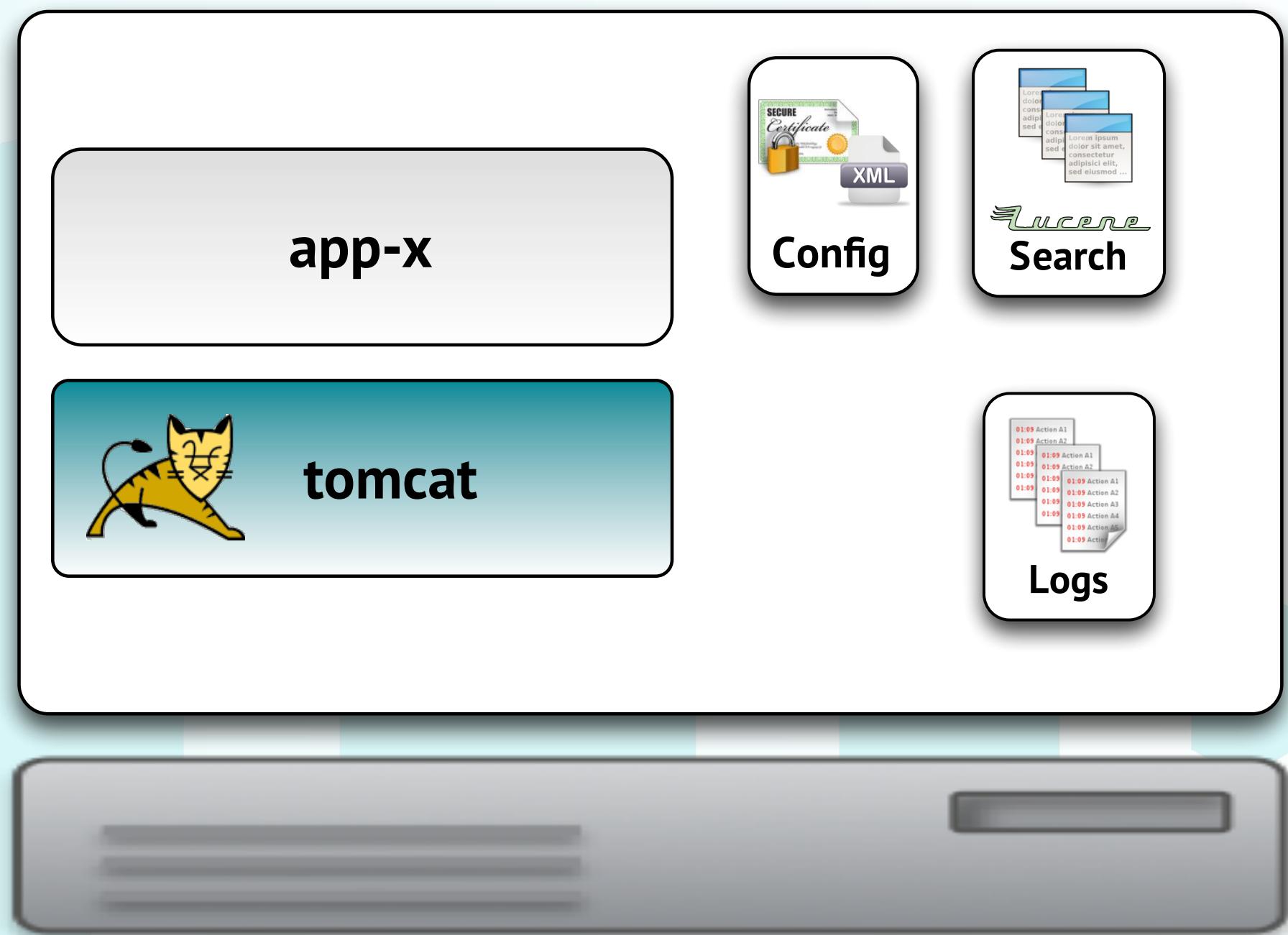
# Local File System is Everywhere!

- Configuration files
- Log files



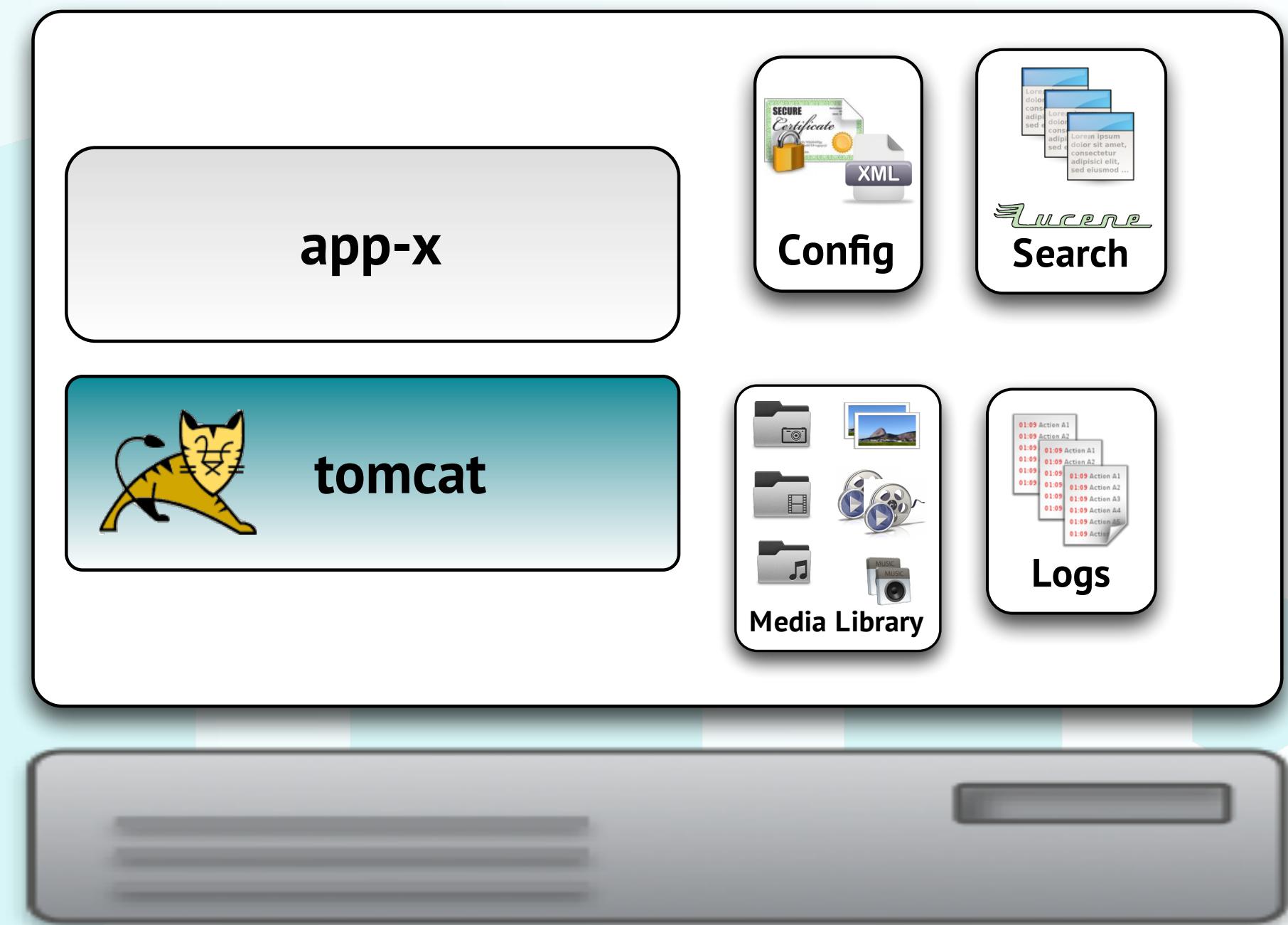
# Local File System is Everywhere!

- Configuration files
- Log files
- Full text search

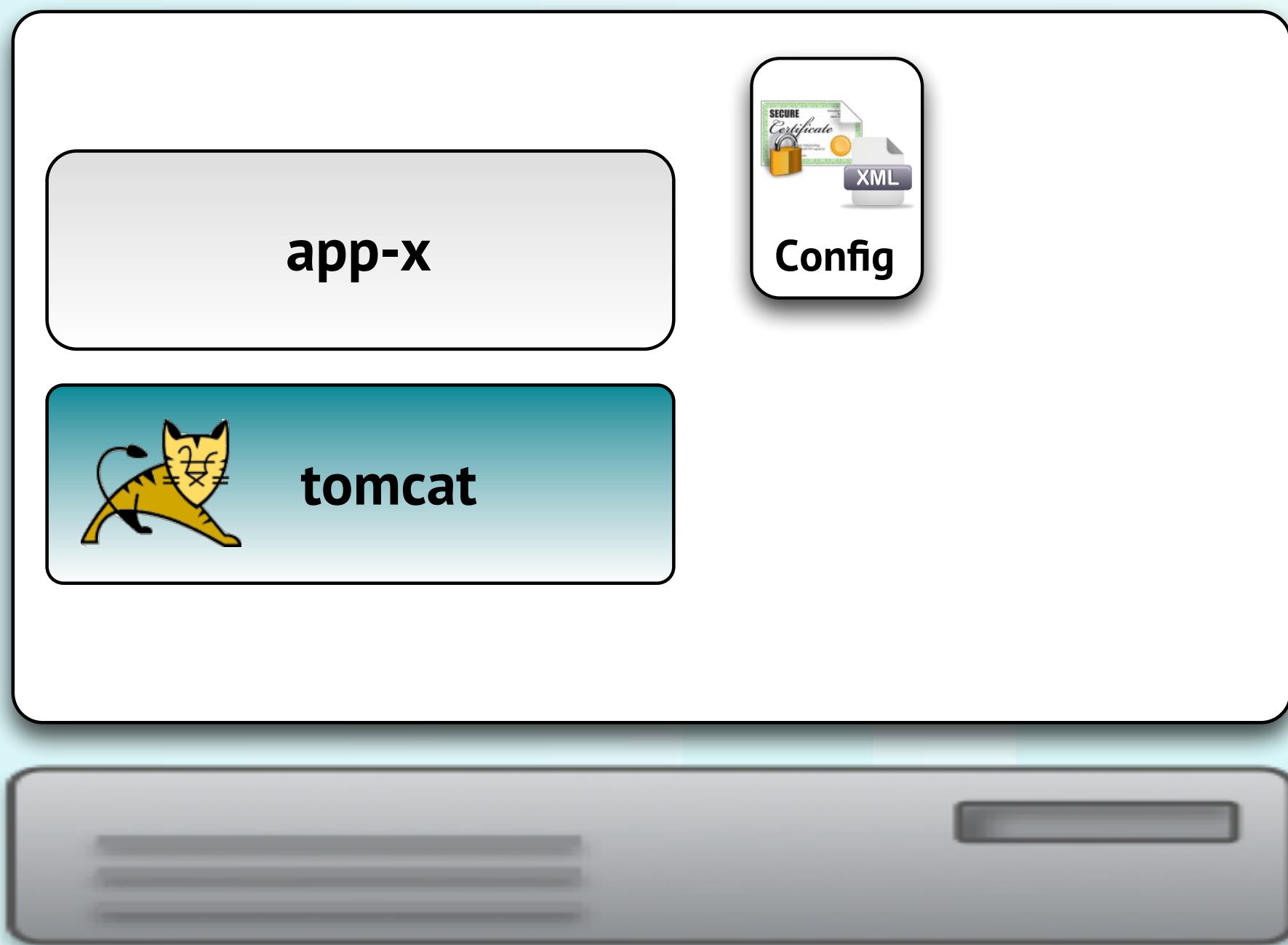


# Local File System is Everywhere!

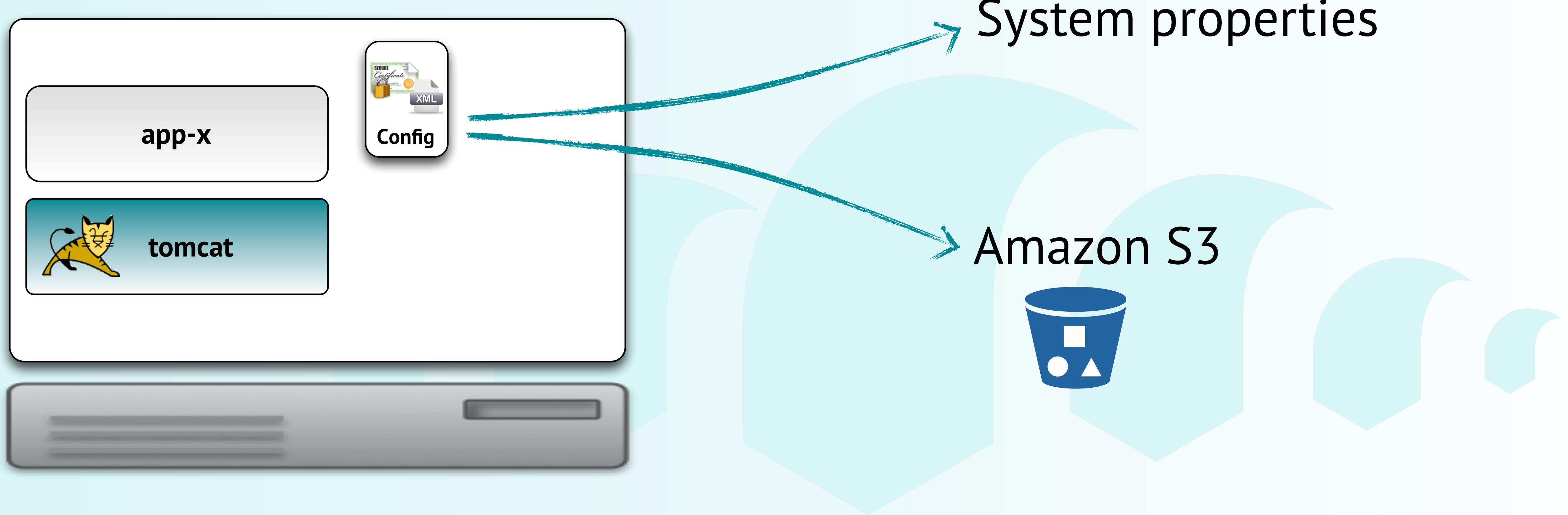
- Configuration files
- Log files
- Full text search
- Media library



# Configuration file



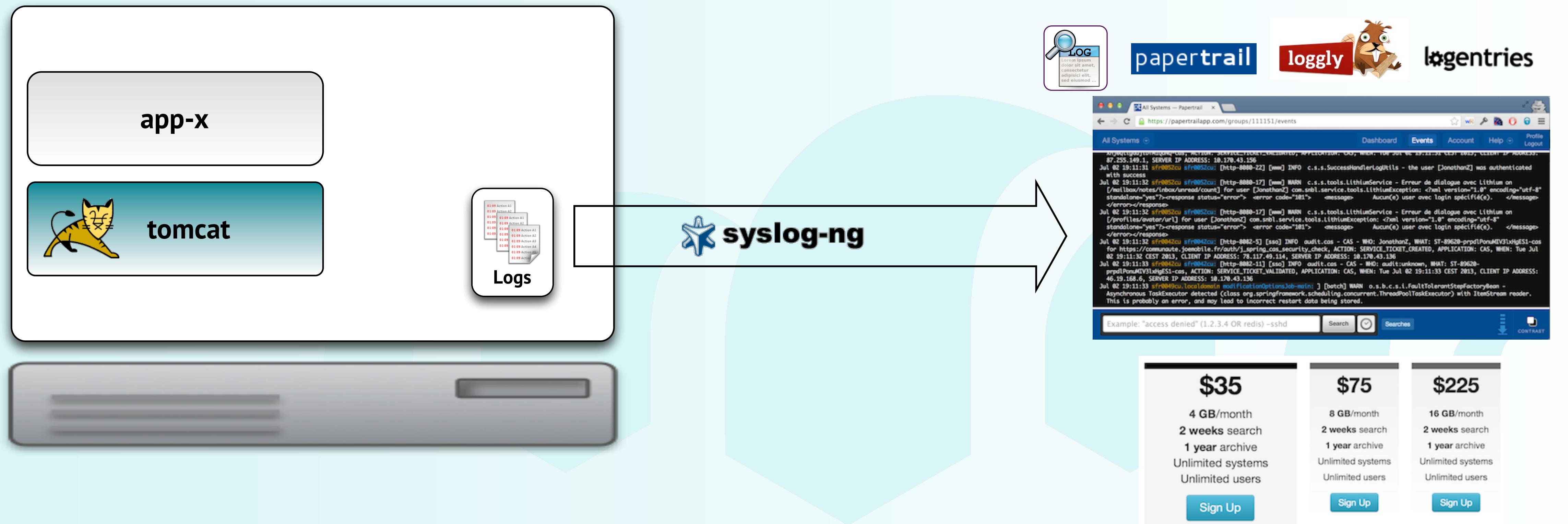
# Configuration file



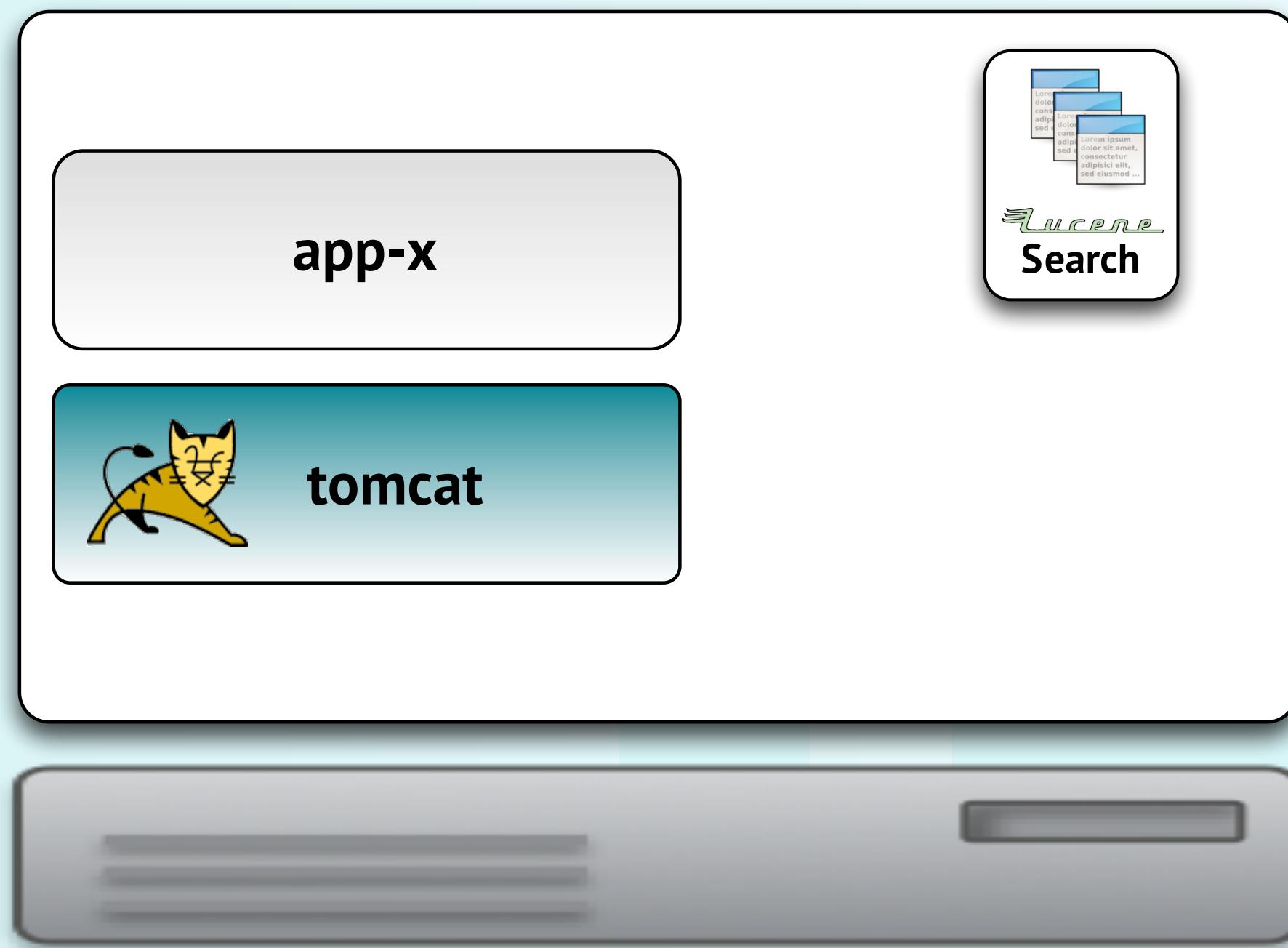
# Log files



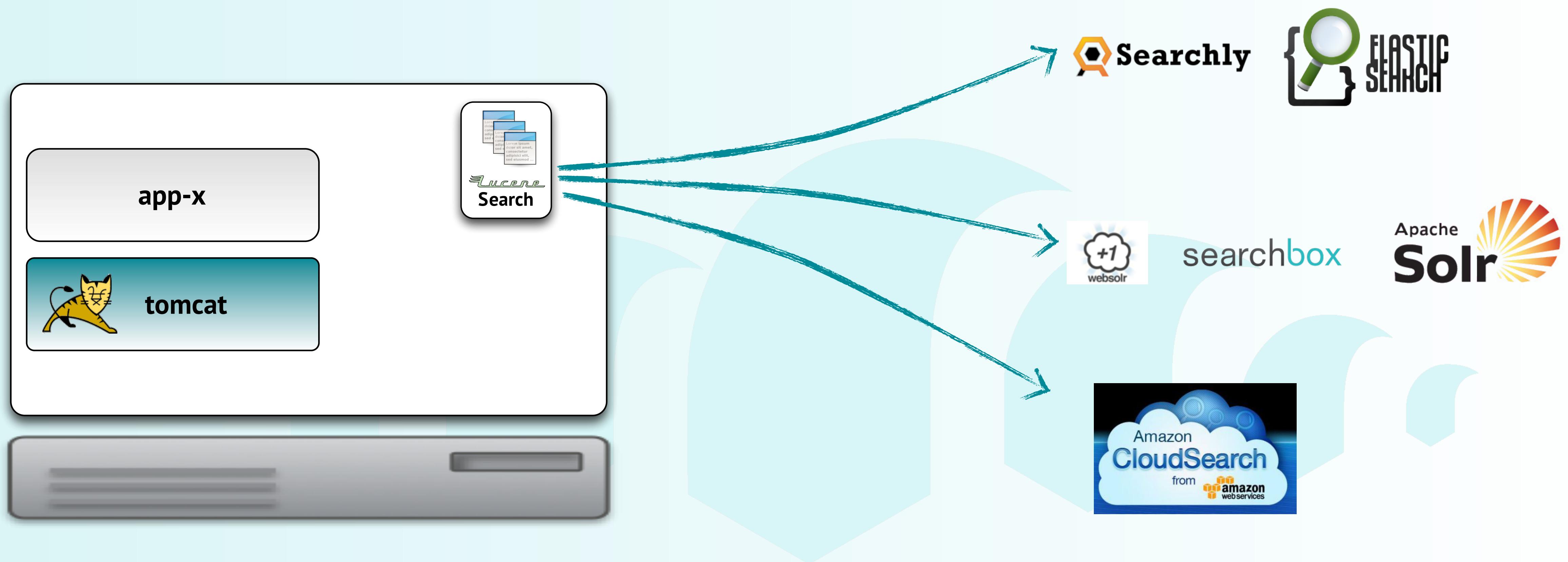
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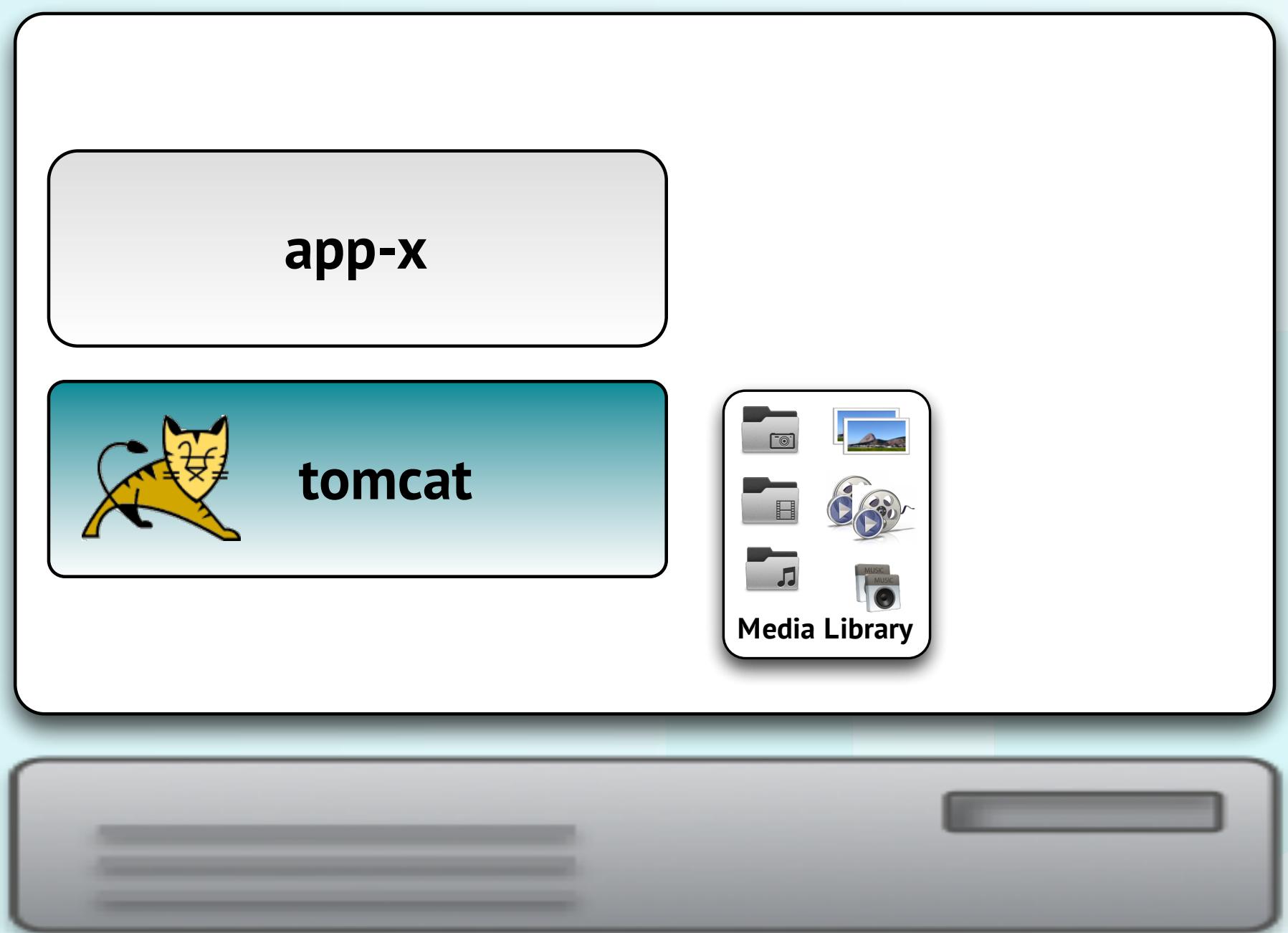
# Full Text Search



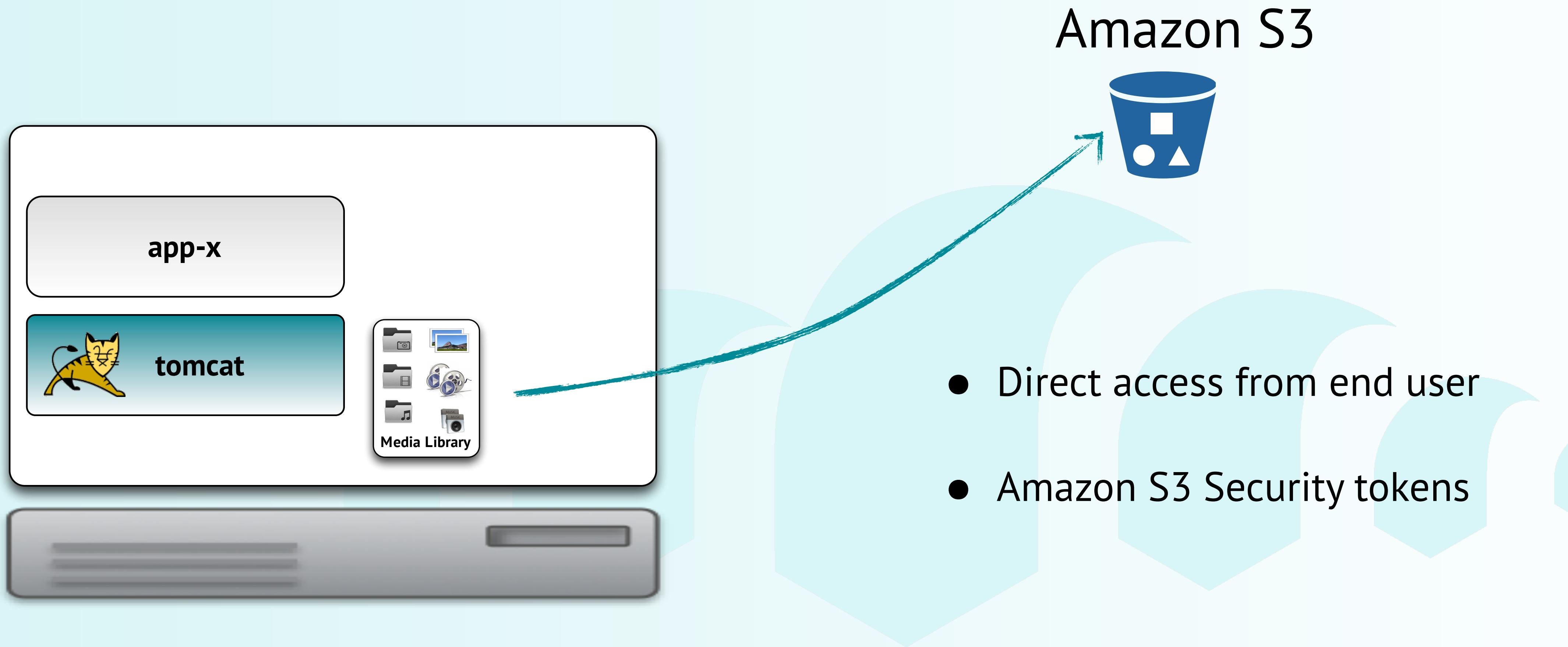
# Full Text Search

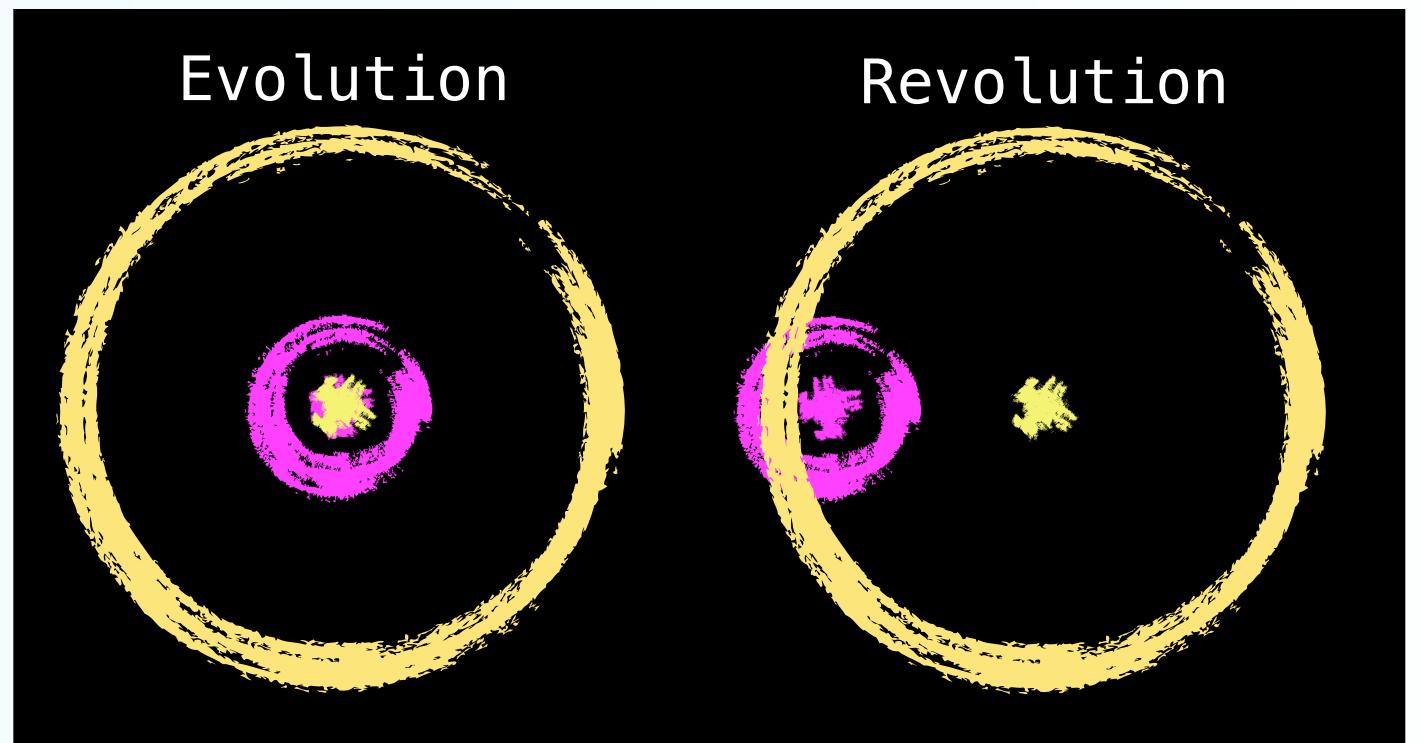


# Media Library



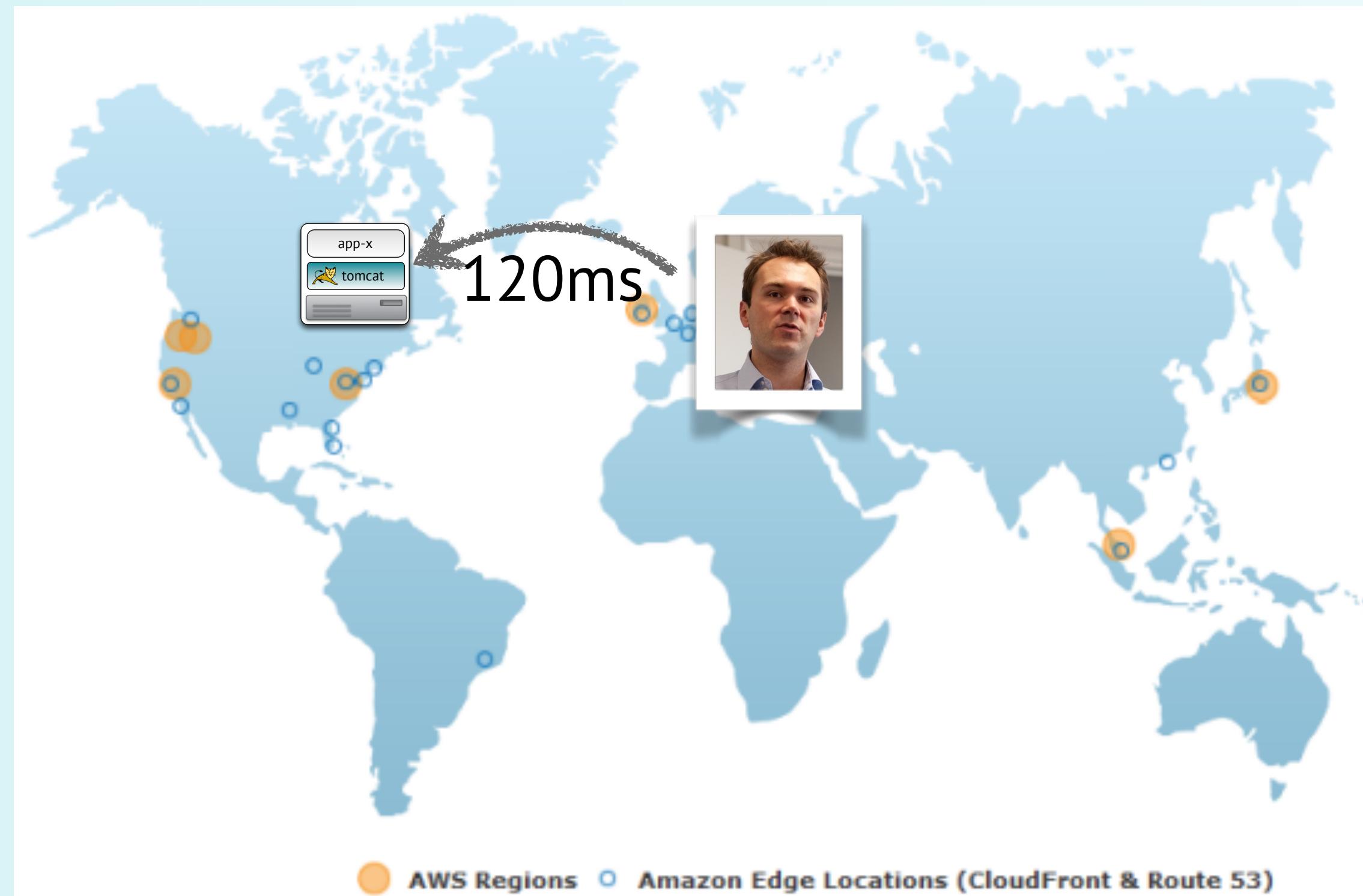
# Media Library





# Latency matters!

# Latency Matters



- Inter Continental is common
- EU to us-east-1 latency: 120ms

# Measure

- Chrome Dev Tools
- Google Pagespeed
- YSlow

The screenshot shows a web browser window with the URL [petclinic.examples.cloudbees.net](http://petclinic.examples.cloudbees.net). The page title is "Pet Clinic A Spring Framework Demonstration". The main content area displays a "Welcome" message with two cute animals (a puppy and a kitten). Below the message is a table of network requests:

Name Path	Met... Status Text	Type	Initiator	Size Counter	Last
petclinic.css /resources/css	GET 200 OK	text/...	petclinic.e...	472 B	133 ms
jquery.js /webjars/jquery/1.9	GET 200 OK	appli...	petclinic.e...	261 KB	3.26 s
jquery-ui-1.9.2.c... /webjars/jquery-ui/	GET 200 OK	appli...	petclinic.e...	440 KB	5.82 s

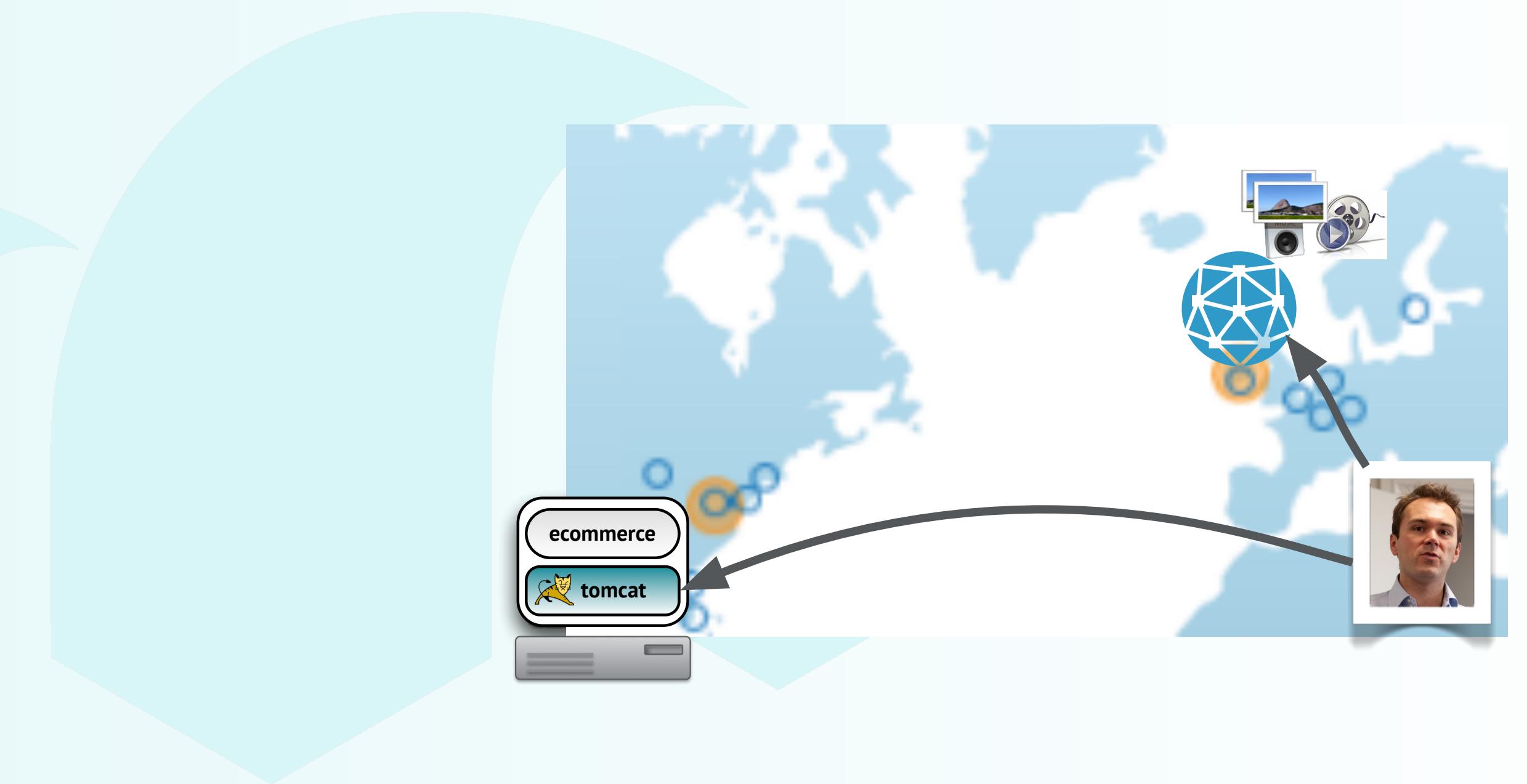
A YSlow extension window is overlaid on the browser, showing a grade of B. It lists several performance recommendations:

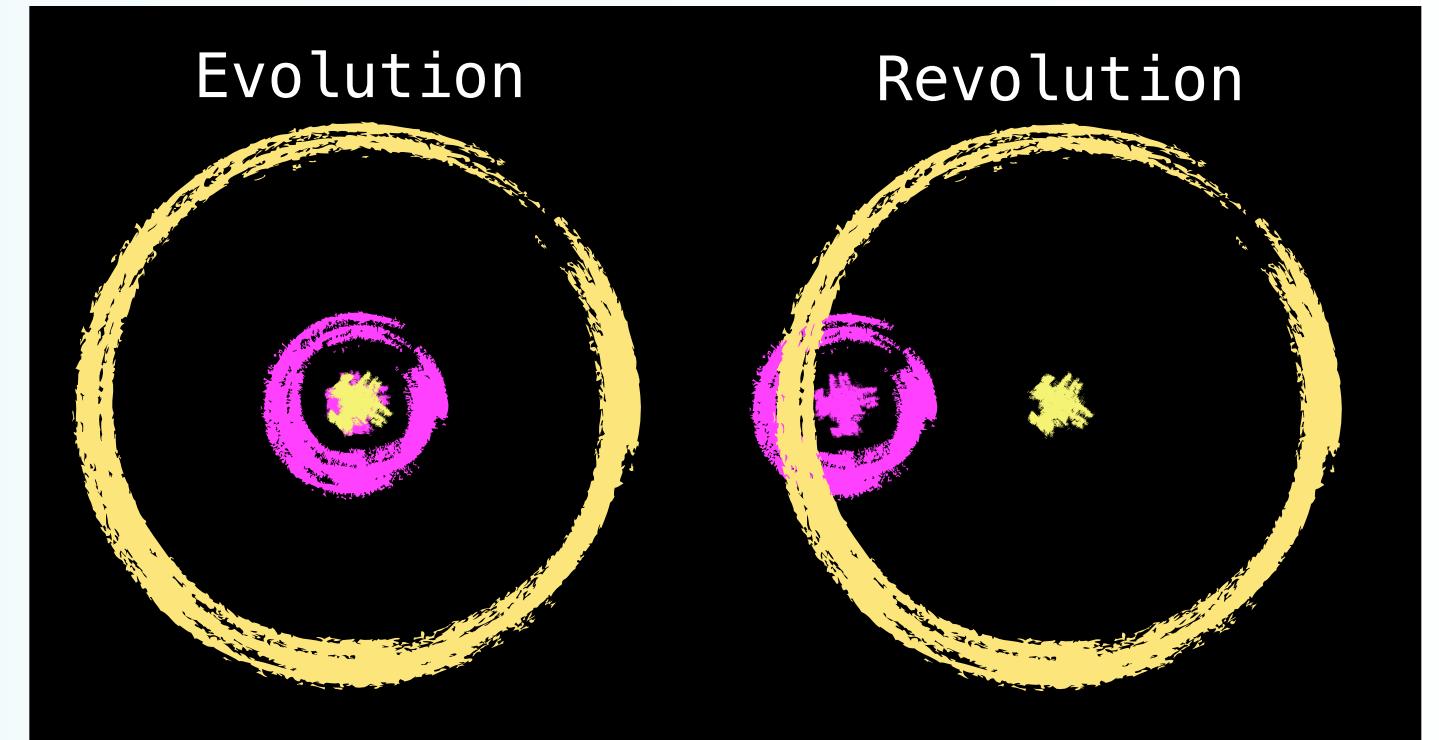
- A Make fewer HTTP requests
- F Use a Content Delivery Network (CDN)
- A Avoid empty src or href
- F Add Expires headers
- F Compress components with gzip
- A Put CSS at top
- A Put JavaScript at bottom
- A Avoid CSS expressions

The extension also provides some detailed analysis and links to further reading.

# Improve

- HTTP Headers: Expires & Cache Control
- Content Delivery Network: AWS CloudFront, CloudFlare ...



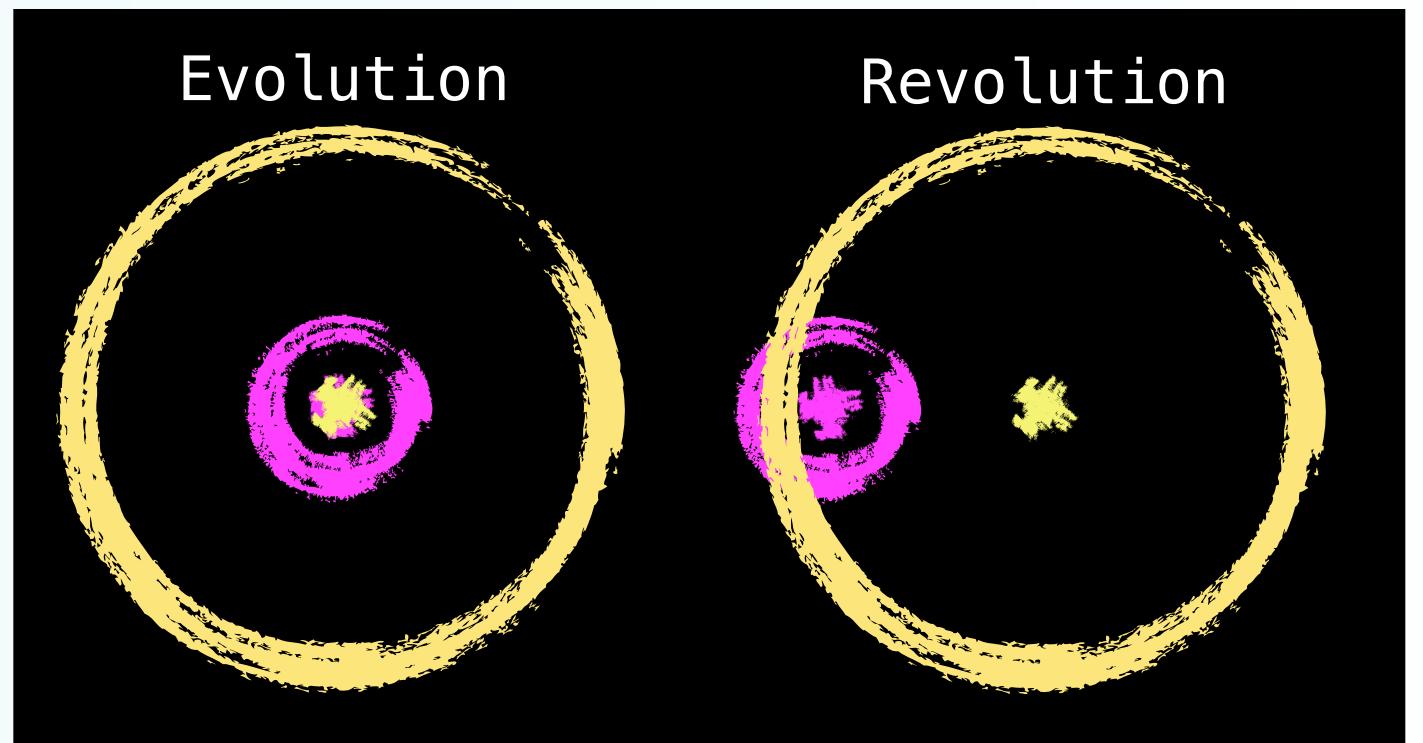


# Be stateless ... if you can

# Be stateless ... if you can

- Stateless design is ideal
  - Scalability, high availability ...
- But state is everywhere
- Http Session just works
- Stateless & Web Sockets?

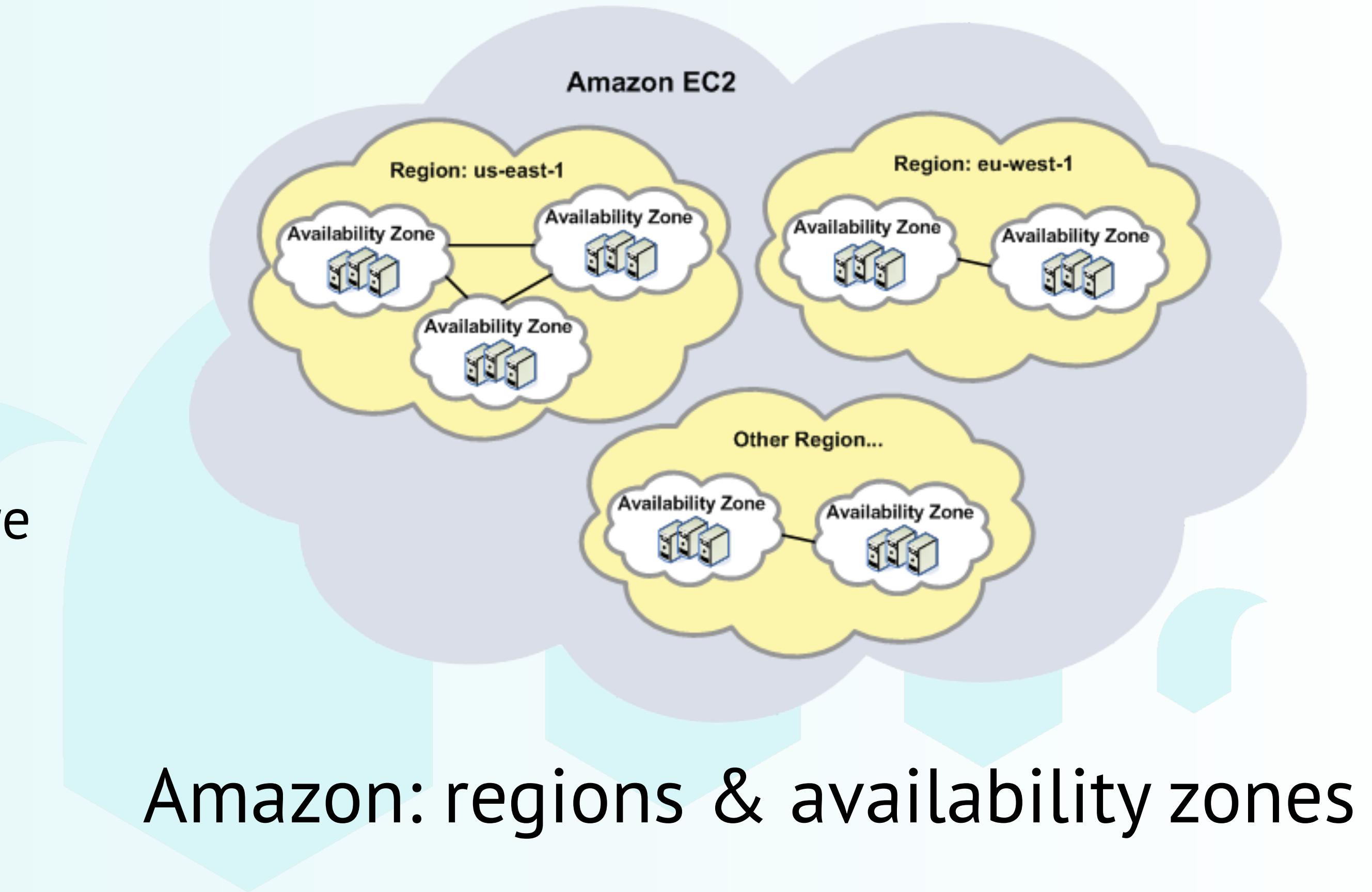




# New High Availability Rules

# New High Availability Rules

- SAN is slow & not shareable
- Fast disk is “ephemeral”
- Multiple data centers are everywhere
- Servers and storage are infinite



# Conclusion

# Conclusion

- Cloud Services Oriented Architecture: **big change**
- Design patterns for the Cloud: mostly **engineering best practices**

# Ready for the Cloud!

## Questions?