

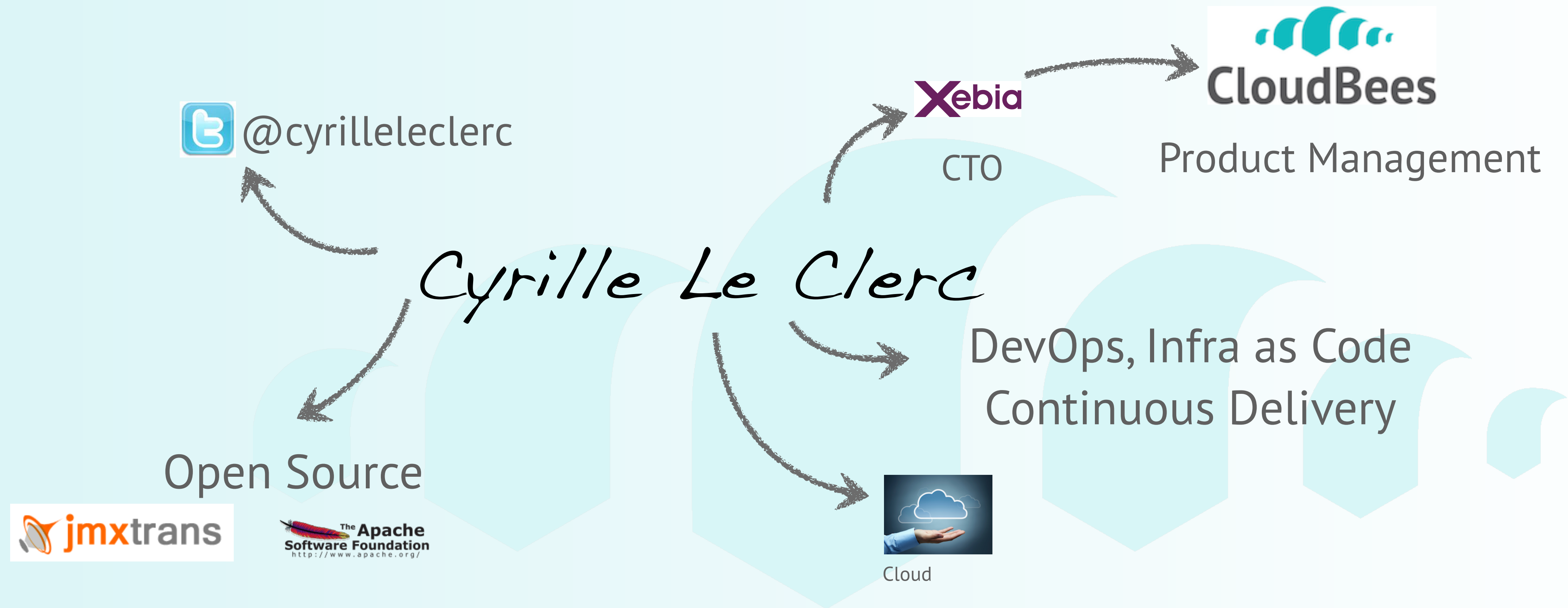


Patterns d'architecture pour le Cloud

Cyrille Le Clerc



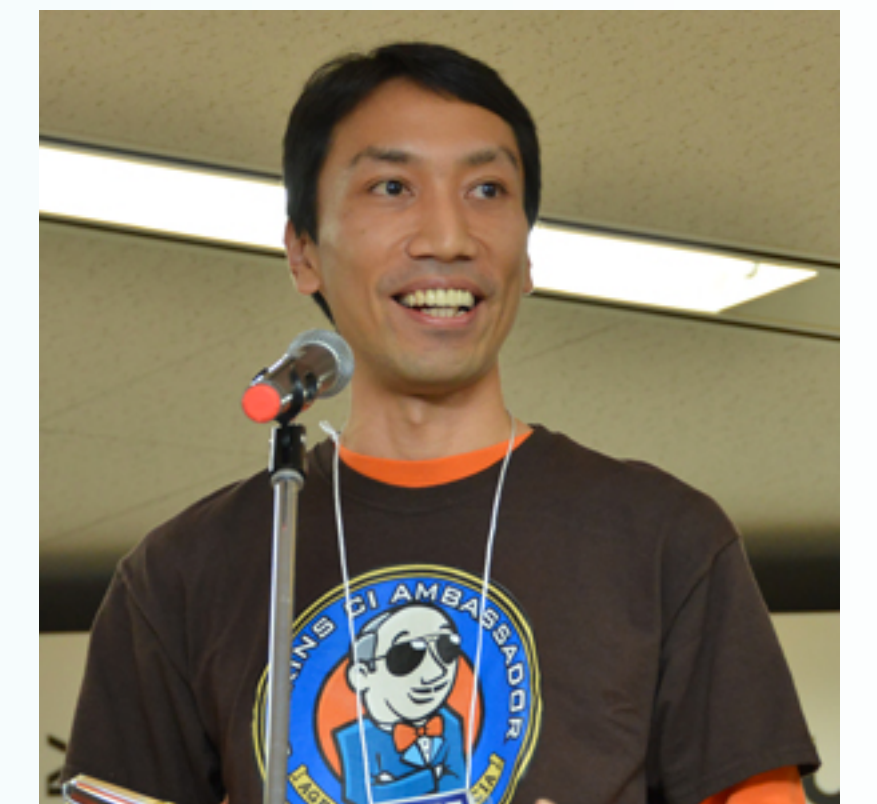
/me



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



heroku add-ons

How it Works | Pricing | Apps | Add-ons

Add powerful functionality to your apps with ease.

Application Services

- Amazon CloudSearch**
 Amazon CloudSearch is a fully-managed search service in the cloud that allows customers to easily integrate fast and highly scalable search functionality into their applications.
- Amazon Simple Workflow Service (SWF)**
 Amazon Simple Workflow Service (Amazon SWF) helps you coordinate the processing steps in your applications and manage distributed execution state.
- Amazon Simple Queue Service (SQS)**
 Amazon Simple Queue Service provides a hosted queue for storing messages as they travel between computers, making it easy to build automated workflow between Web services.
- Amazon Simple Notification Service (SNS)**
 Amazon Simple Notification Service is a web service that makes it easy to set up, operate, and send notifications from the cloud.
- Amazon Simple Email Service (SES)**
 Amazon Simple Email Service is a highly scalable and cost-effective bulk and transactional email-sending service for the cloud.
- Amazon Elastic Transcoder**
 Amazon Elastic Transcoder is a fully managed service that makes it easy to convert media files in the cloud with scalability and at a low cost.

- ### Database
- Amazon Relational Database Service (Amazon RDS)**
 Amazon Relational Database Service (Amazon RDS) makes it easy to set up, operate, and scale a relational database in the cloud.
 - Amazon DynamoDB**
 Amazon DynamoDB is a fully managed, serverless, NoSQL database service in the cloud.
 - Amazon ElastiCache**
 Amazon ElastiCache is a fully managed, serverless, in-memory caching service in the cloud.
 - Amazon Redshift**
 Amazon Redshift is a fully managed, serverless, data warehouse service in the cloud.
 - Amazon Athena**
 Amazon Athena is a serverless data query service that makes it easy to analyze data in Amazon S3.

es, Memcache, op and more. Then se backups, restores, ever again.

Location and Collocation

Fallacies of
Distributed
Computing

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

The Cloud & The Law

I'm not a lawyer!!!



Payment Card Industry Data Security Standard (PCI DSS)



US EU Safe Harbor

HIPAA

ISO 27001

Personally Identifiable Information

SSAE 16



The Cloud & The Law

I'm not a lawyer!!!



Payment Card Industry Data Security Standard (PCI DSS)

Data Privacy



HIPAA

Compliance



Liability

ISO 27001

Personally Identifiable Information

Applicable Law

SSAE 16

Data Portability and Reversibility



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

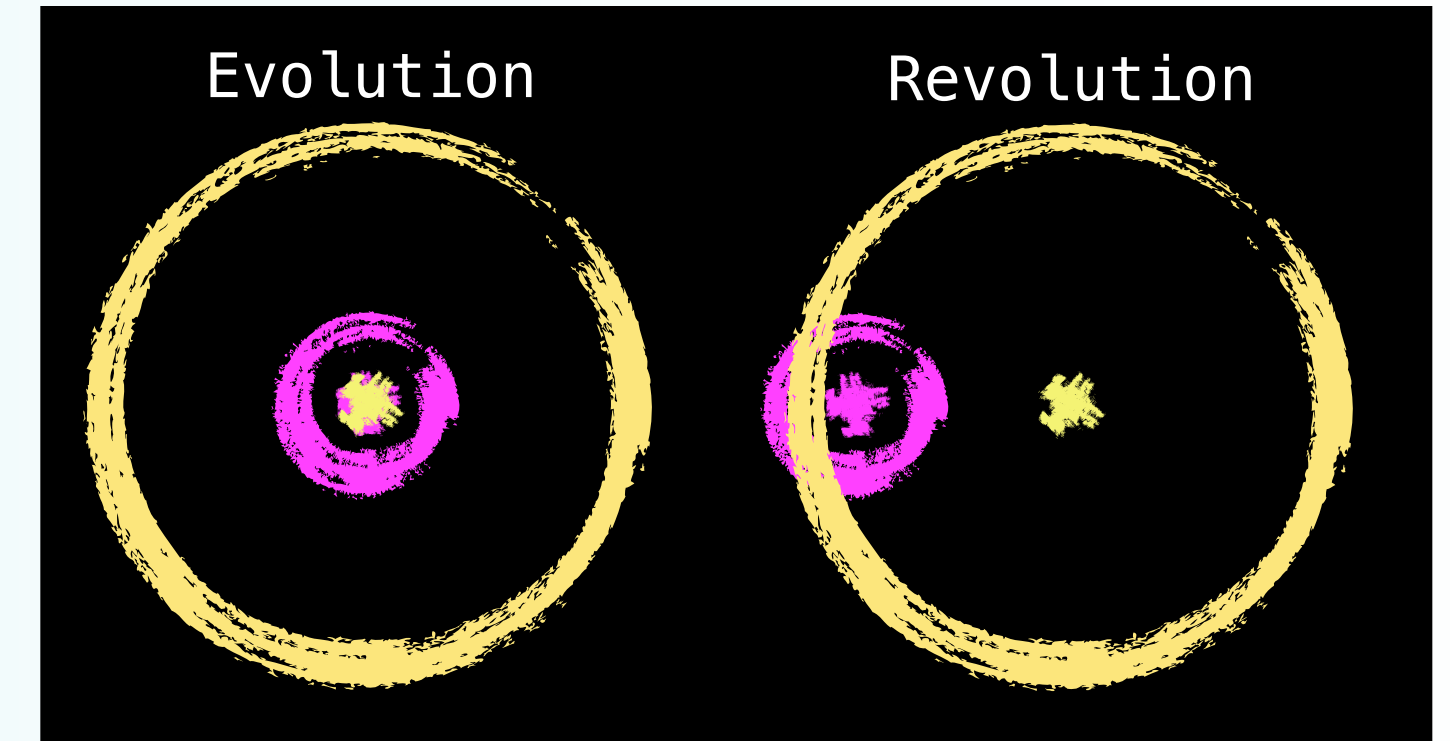
- Location
- Performances
- Reliability
- Legal
- Security
- Pricing model



Design Patterns for the Cloud

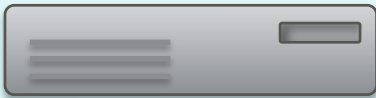


Scale Out



Scale Up

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



M1 Small



M3 Large

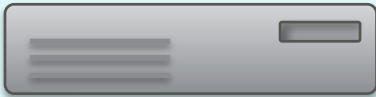


M3 2 XLarge

Then ???

Scale Up

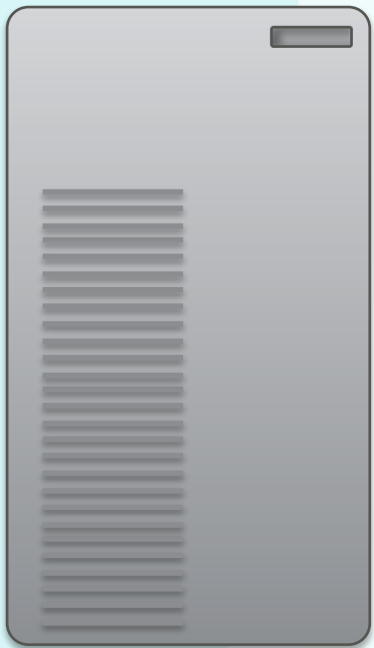
- Still possible, but up to a limit
- Not optimal



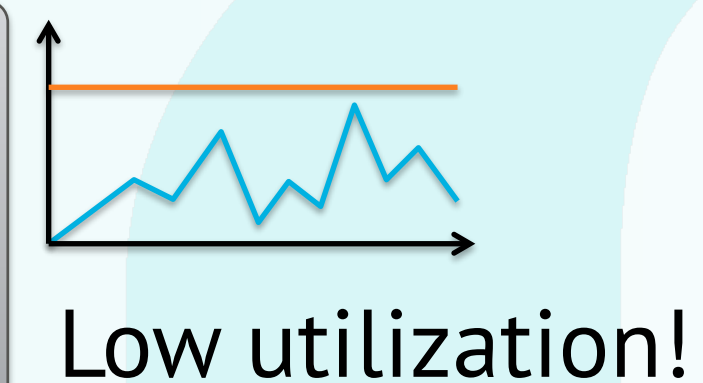
M1 Small



M3 Large



M3 2 XLarge



Then ???

M3 Extra Large

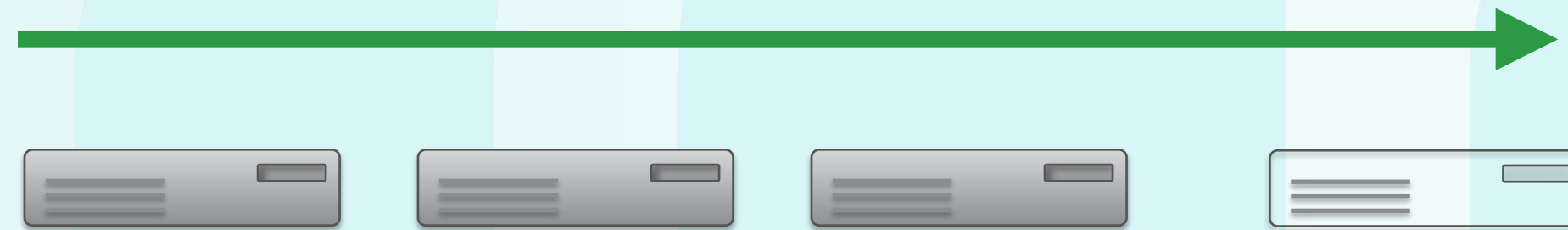
- 15 Gb memory
- 4vCPU (~1/2 Intel® Xeon® Processor E5-2670)
- 2x40 GB SSD HD

- aka « your desktop »

Scale out

Design for clustering

Scale as you need



Pay as you use

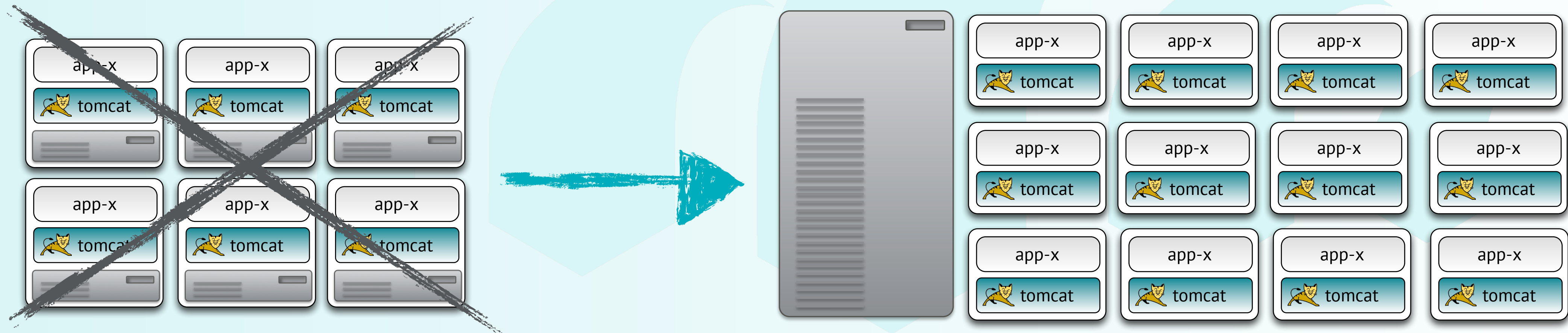
Scale Out

Multi tenancy - PaaS backstage



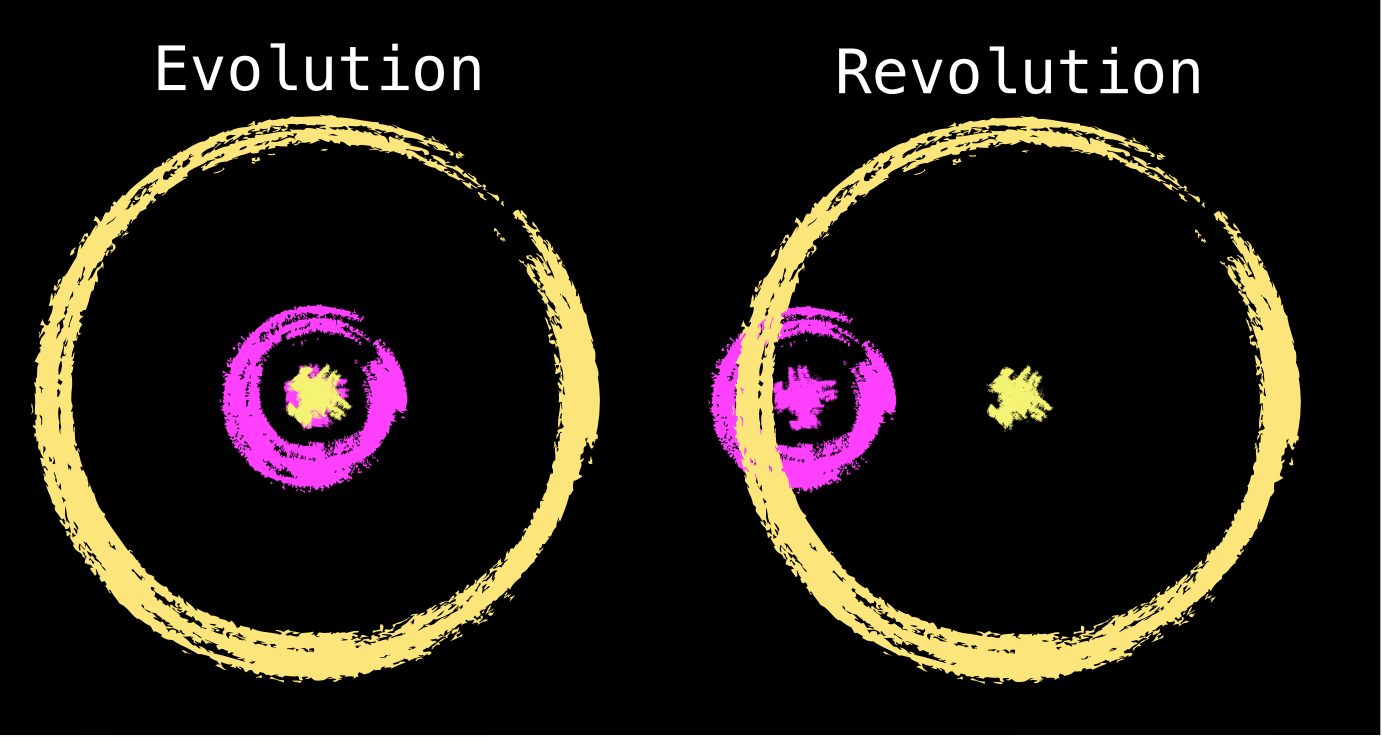
Multi tenancy - PaaS backstage

- 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

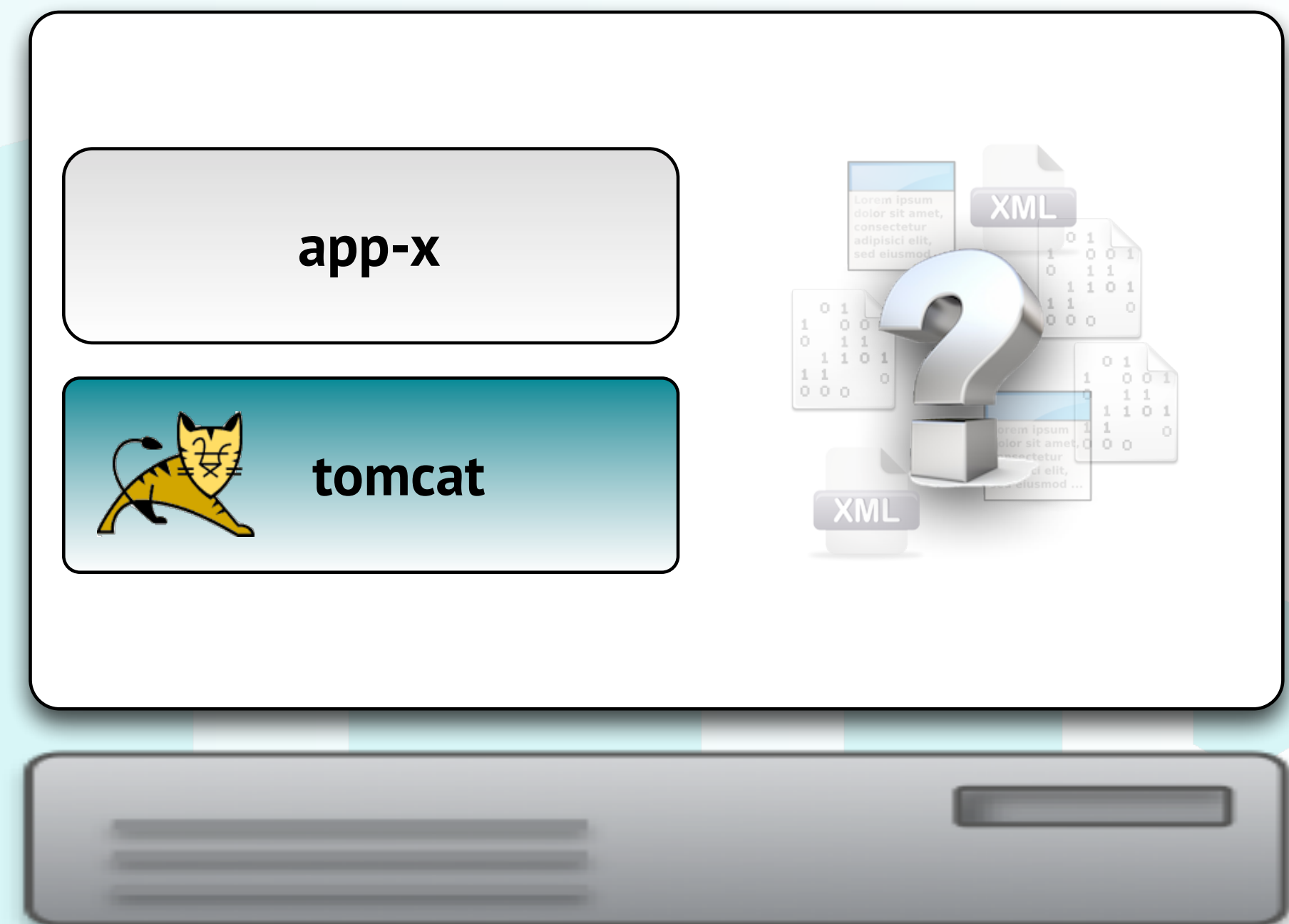
Fear the File System

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

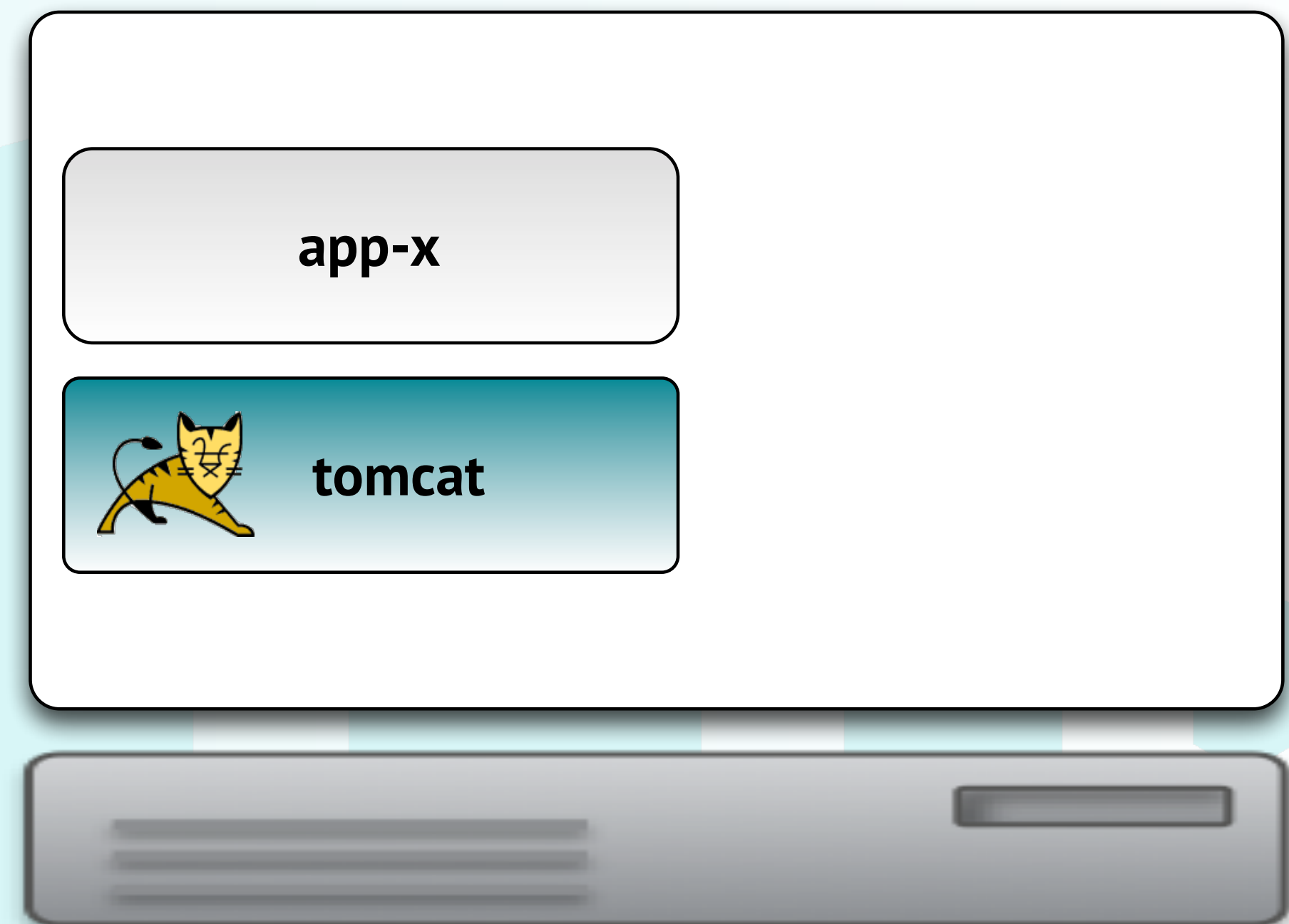
Local file system: ephemeral near-cache or replica

Local File System is Everywhere!

Local file system is everywhere!

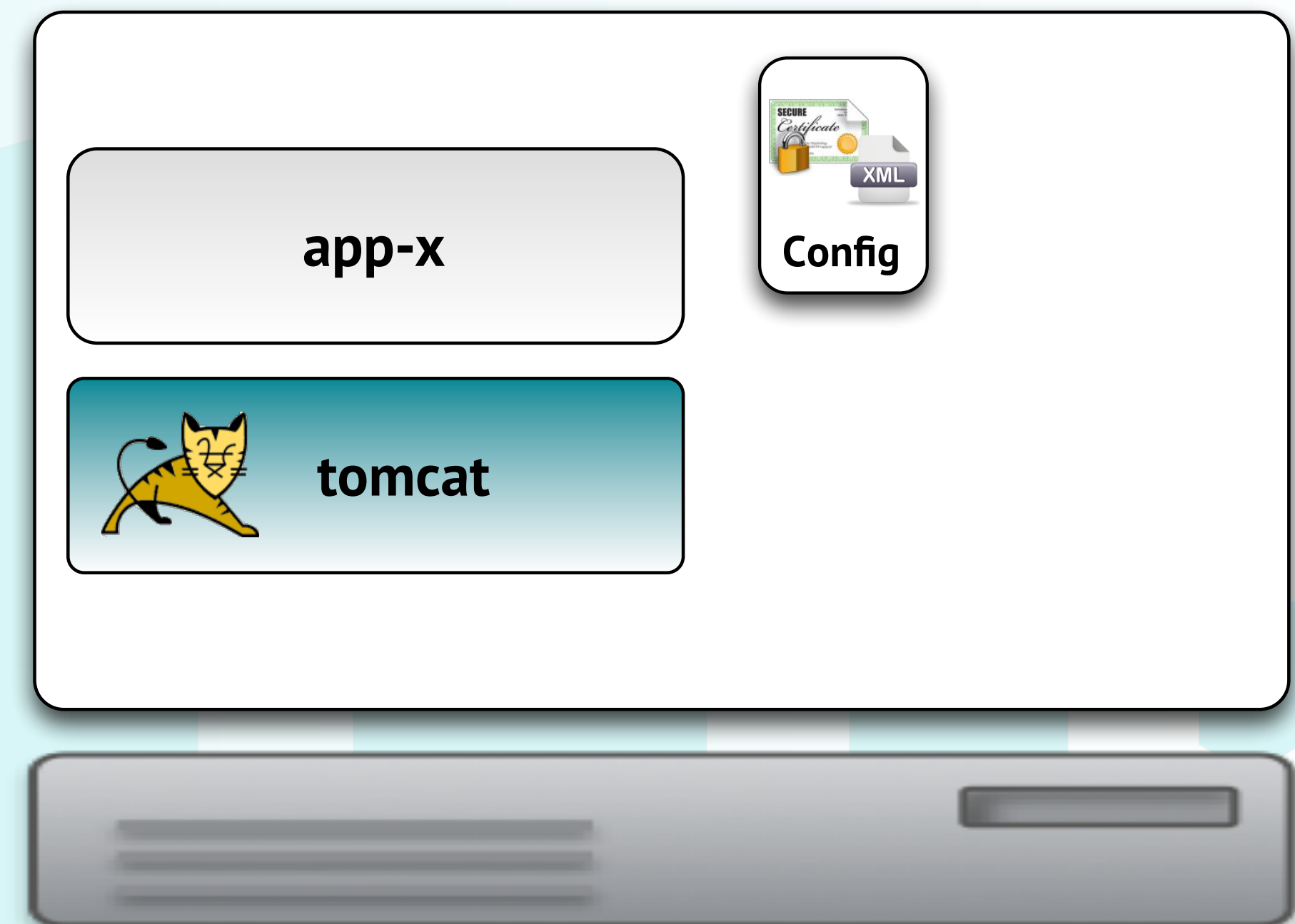


Local File System is Everywhere!



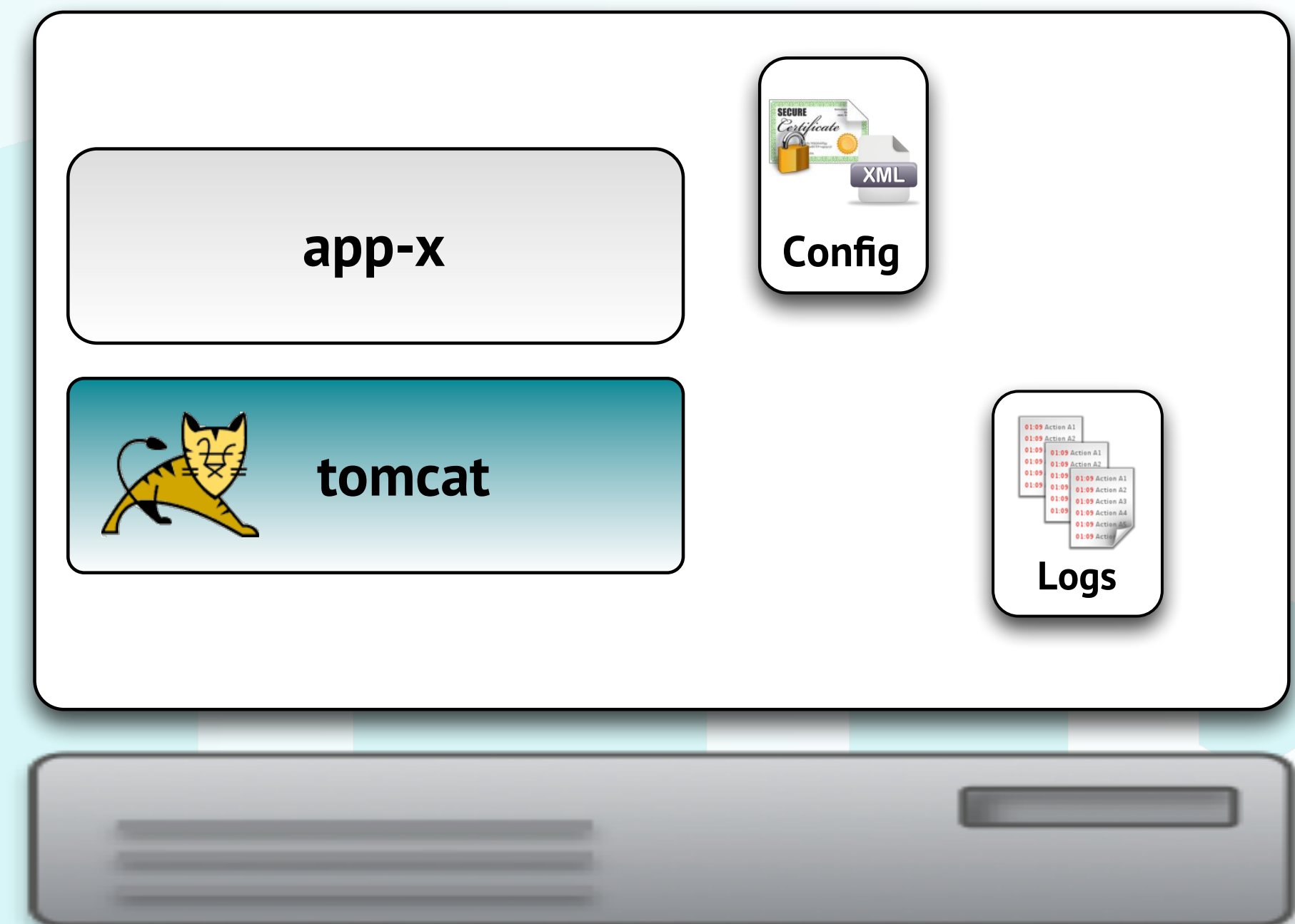
Local File System is Everywhere!

- Configuration files



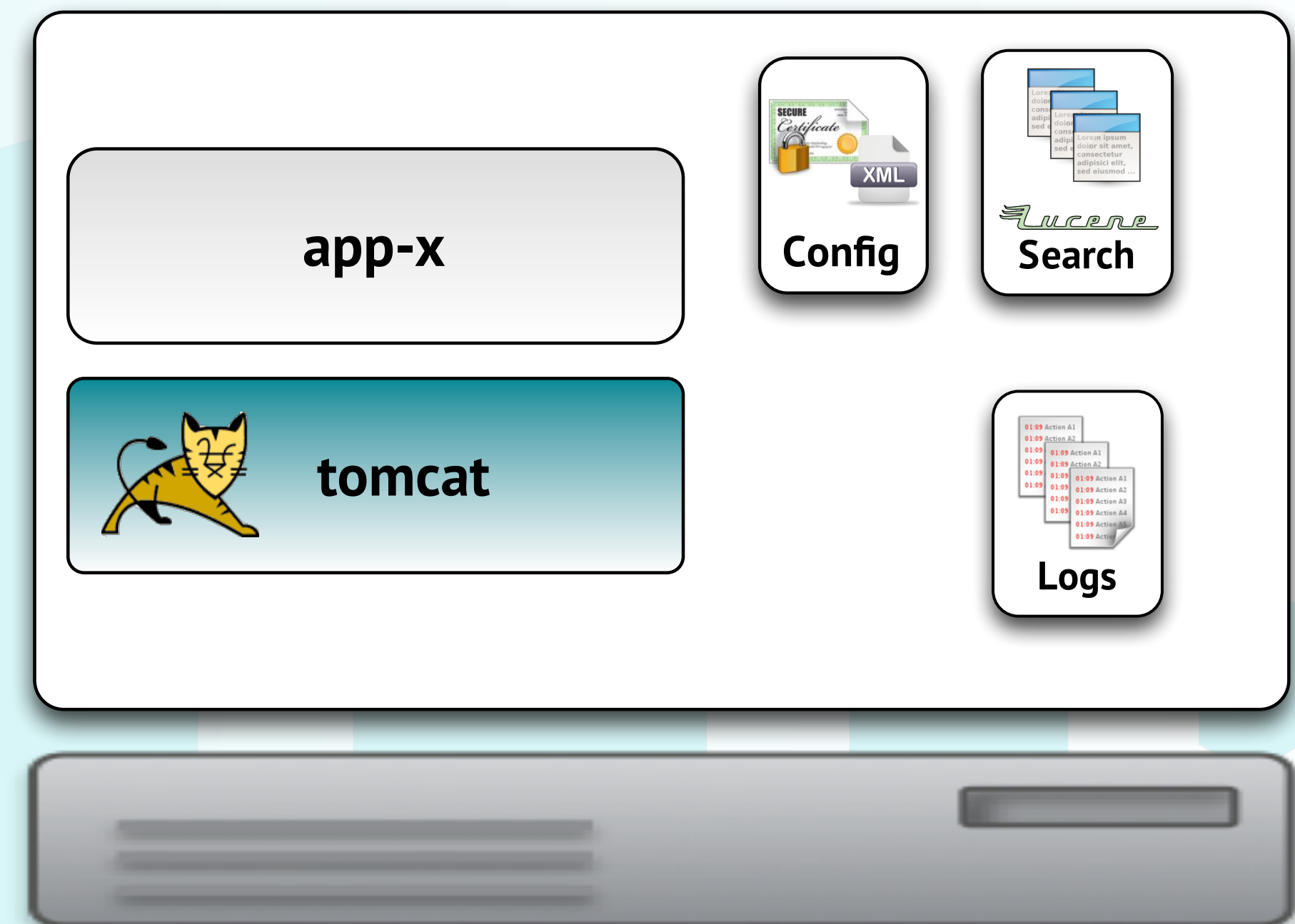
Local File System is Everywhere!

- Configuration files
- Log files



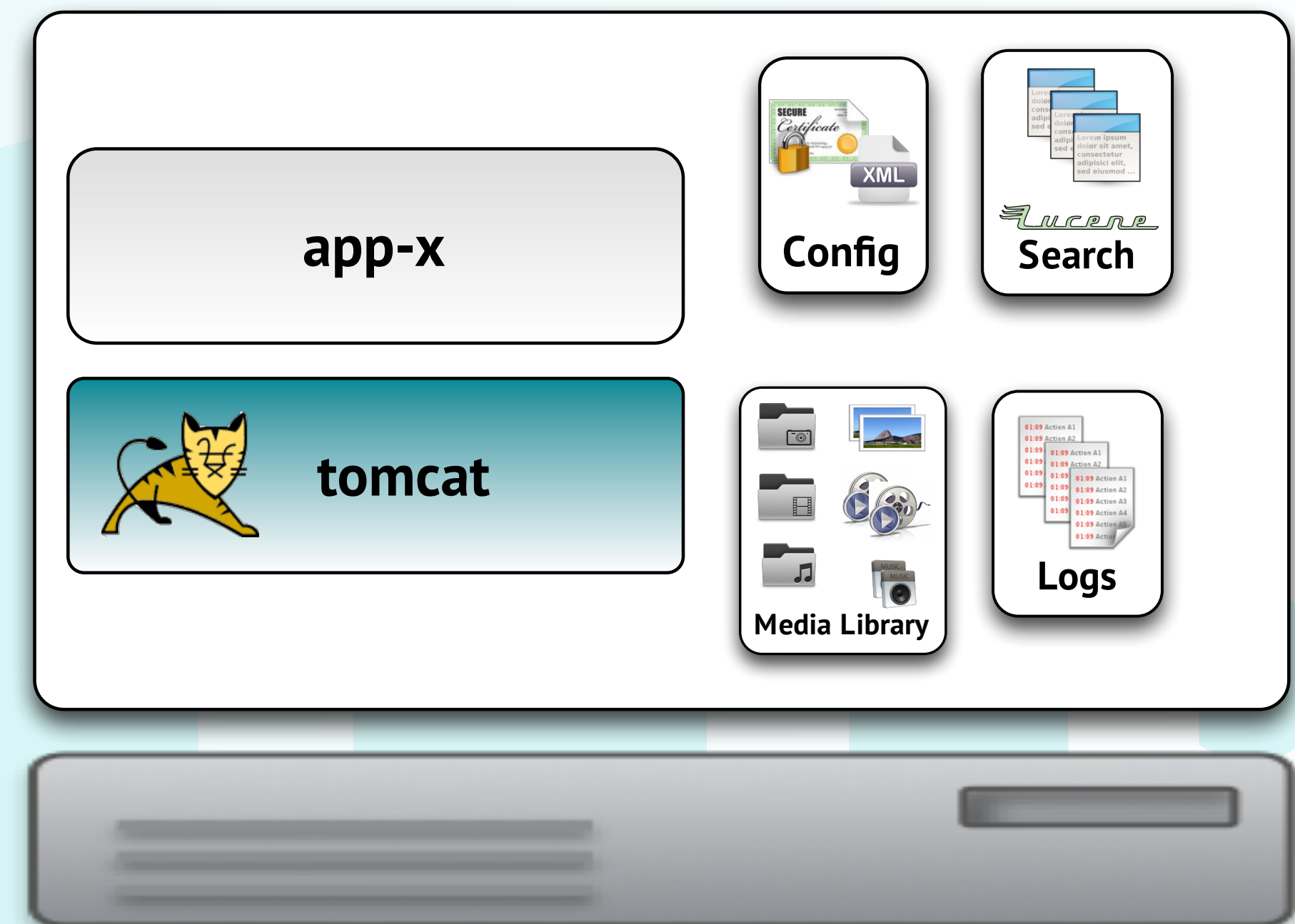
Local File System is Everywhere!

- Configuration files
- Log files
- Full text search

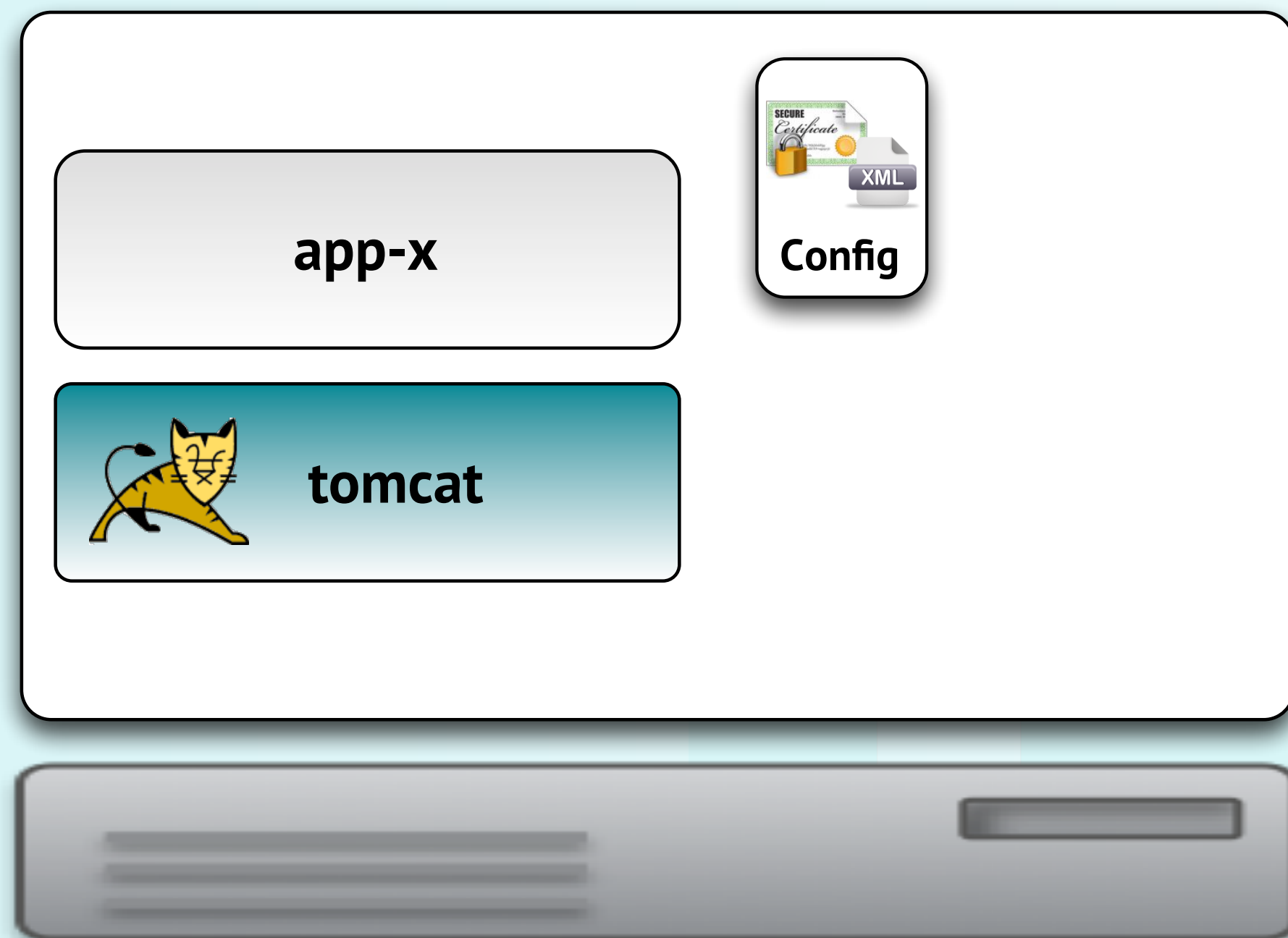


Local File System is Everywhere!

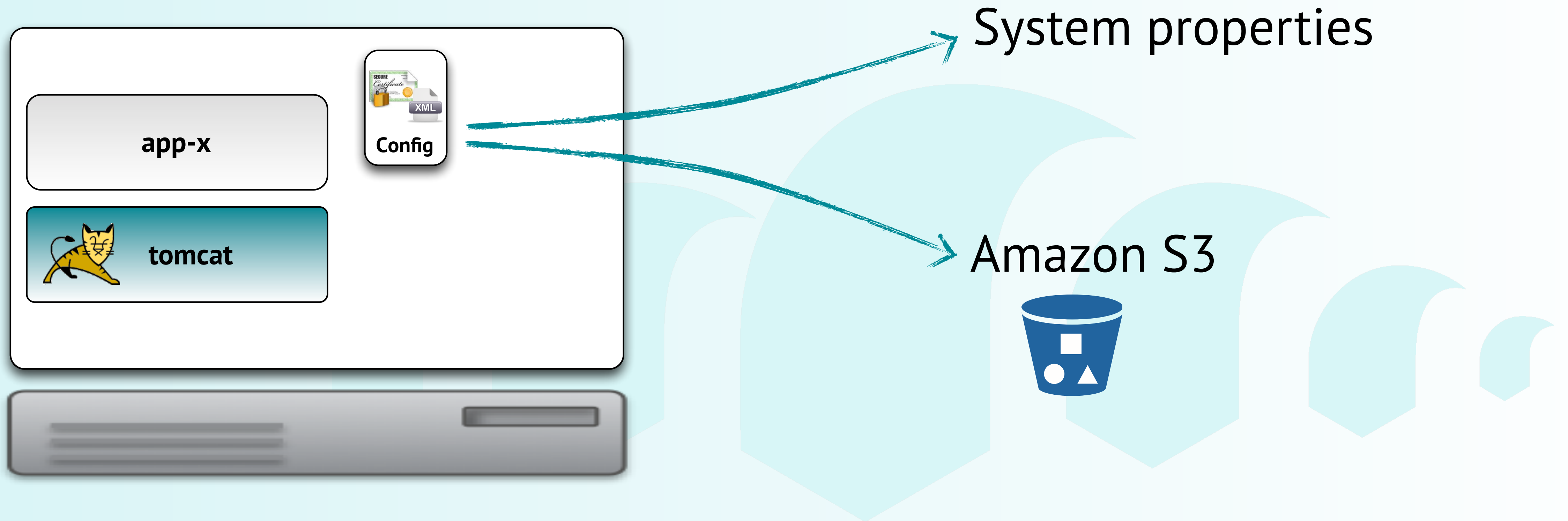
- Configuration files
- Log files
- Full text search
- Media library



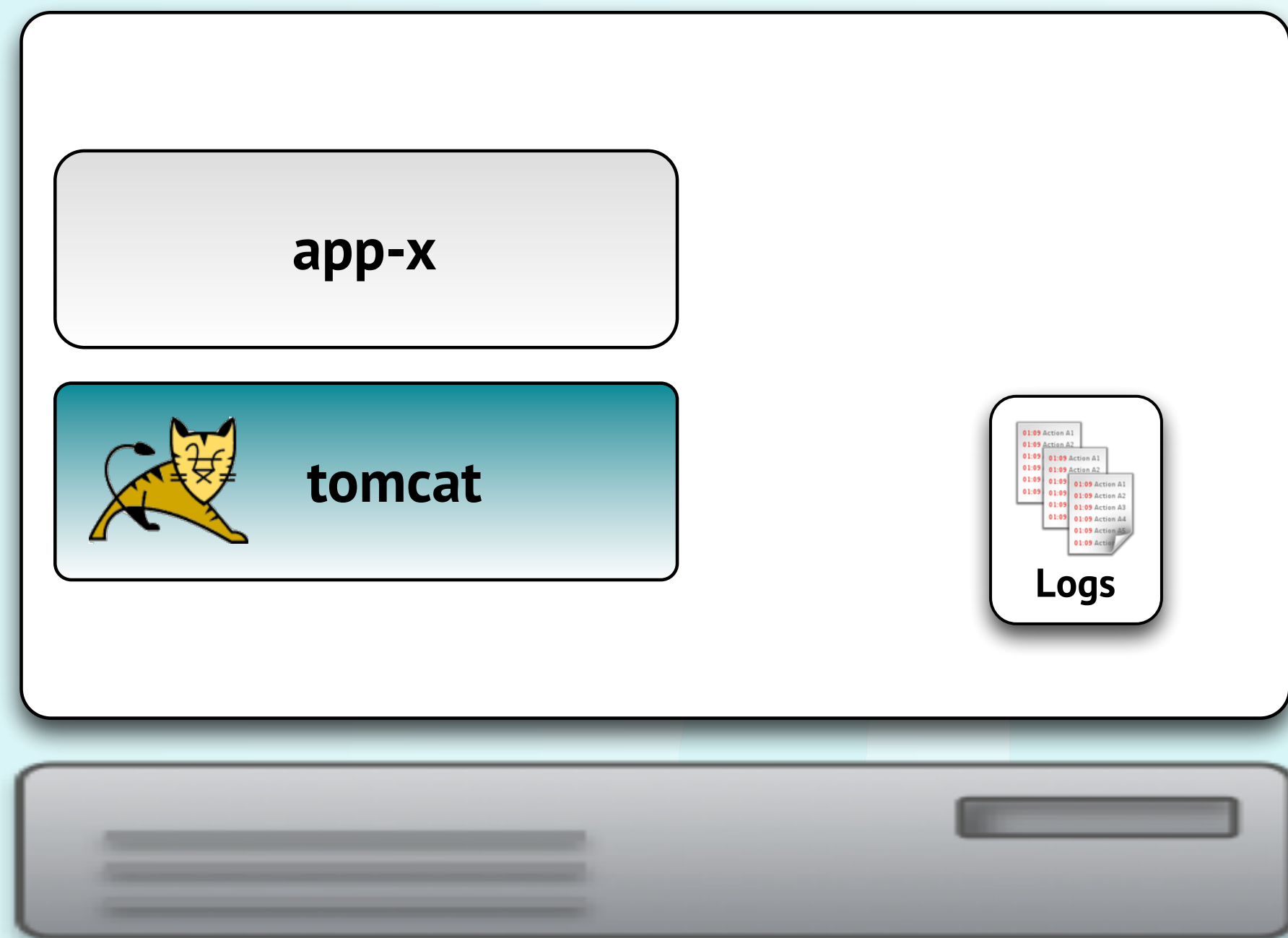
Configuration file



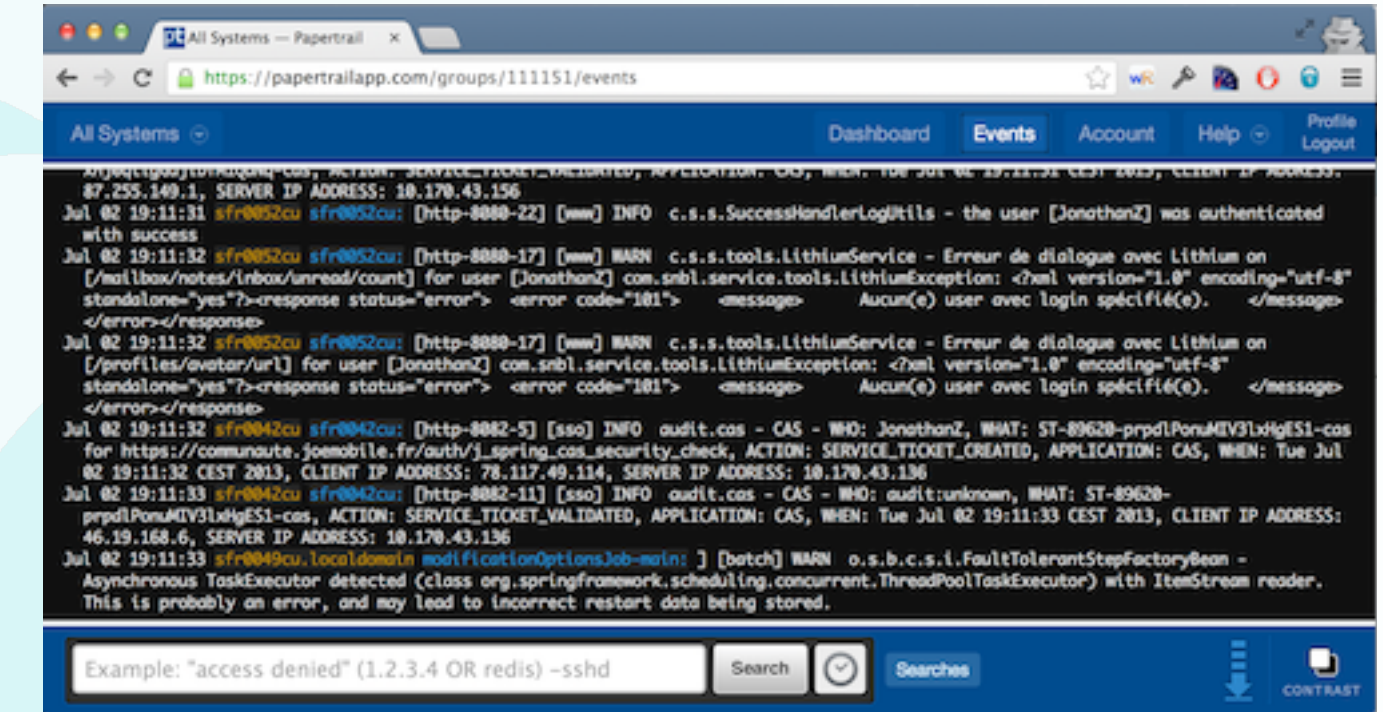
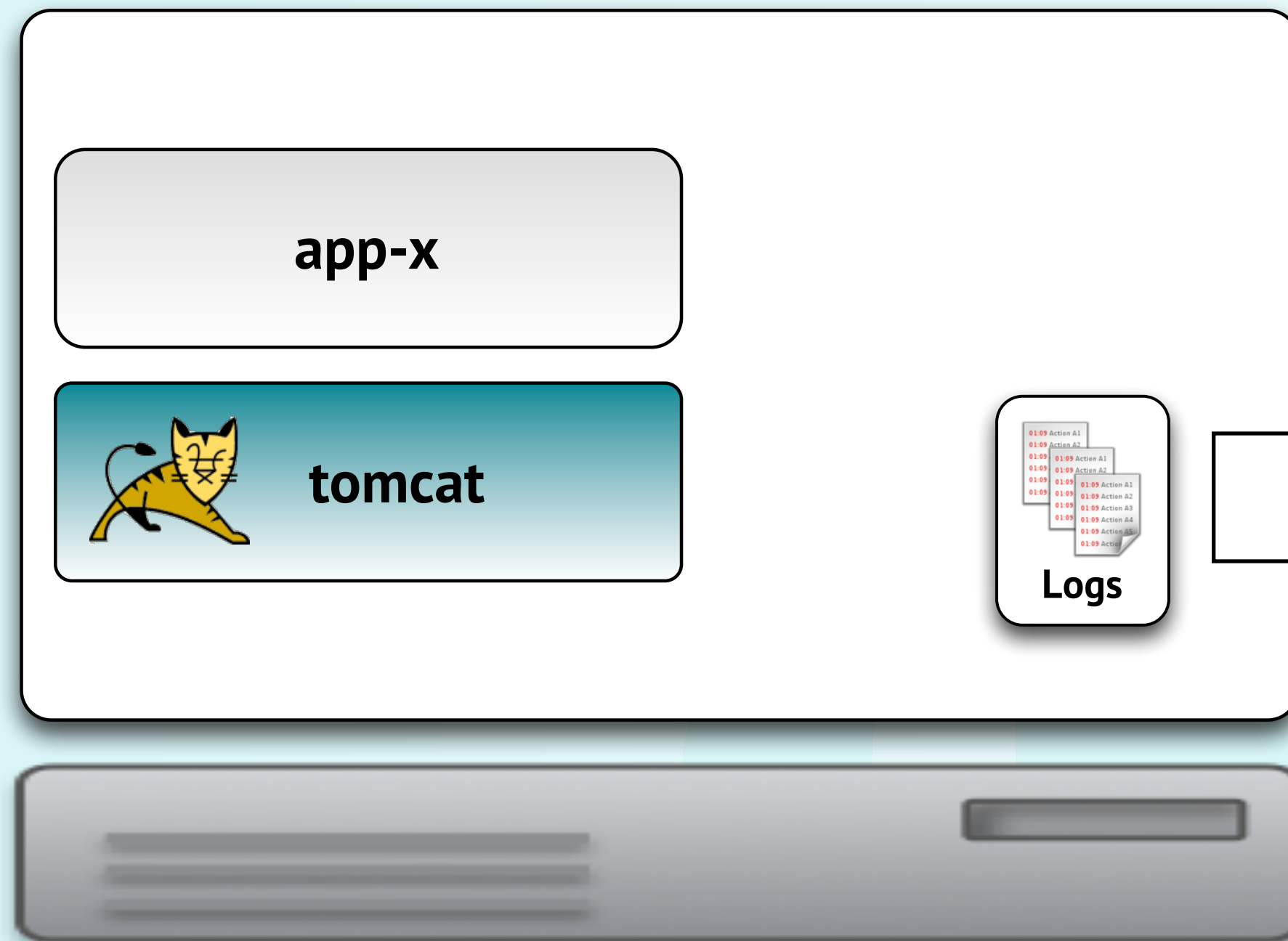
Configuration file



Log files

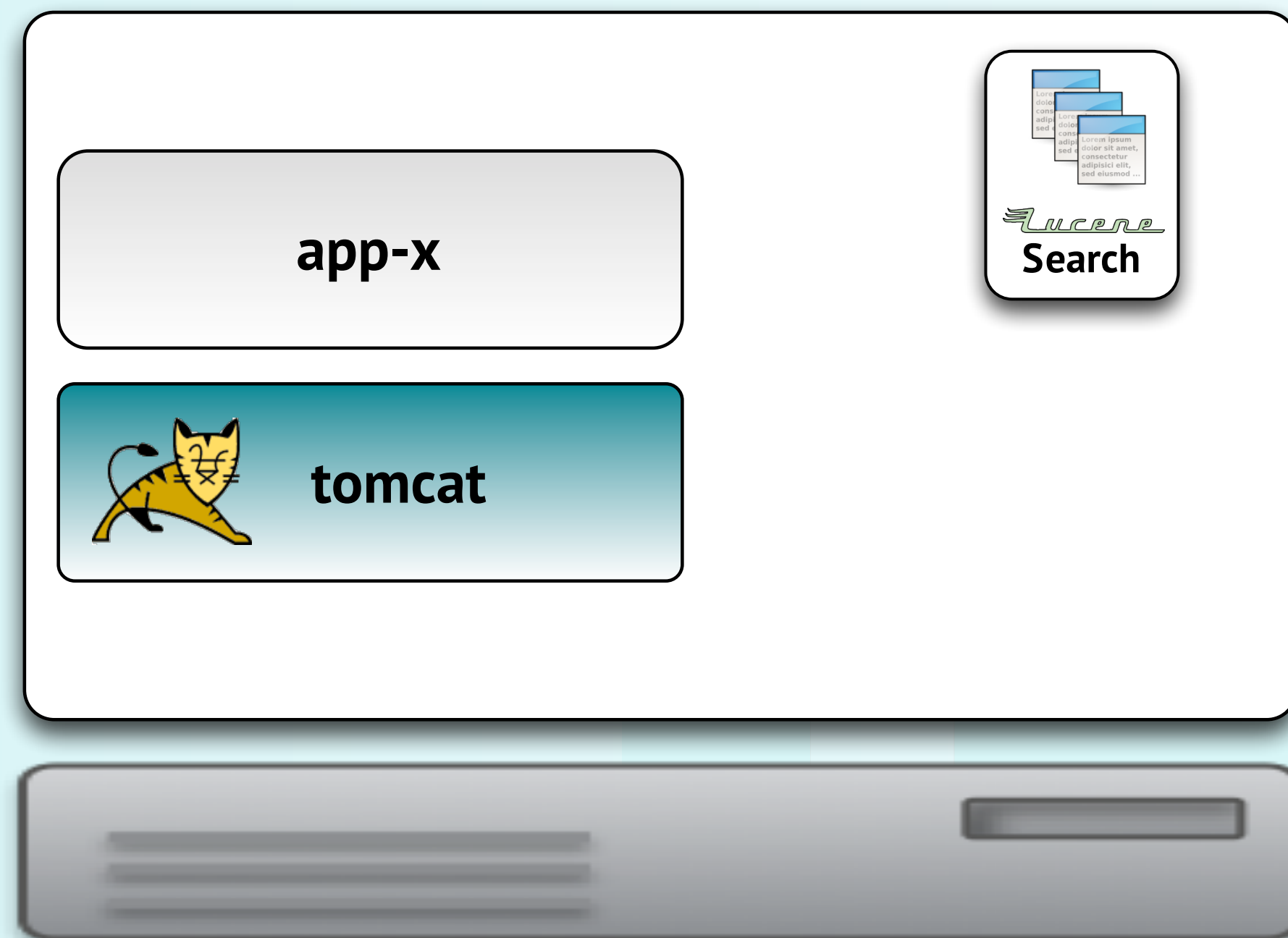


Log files

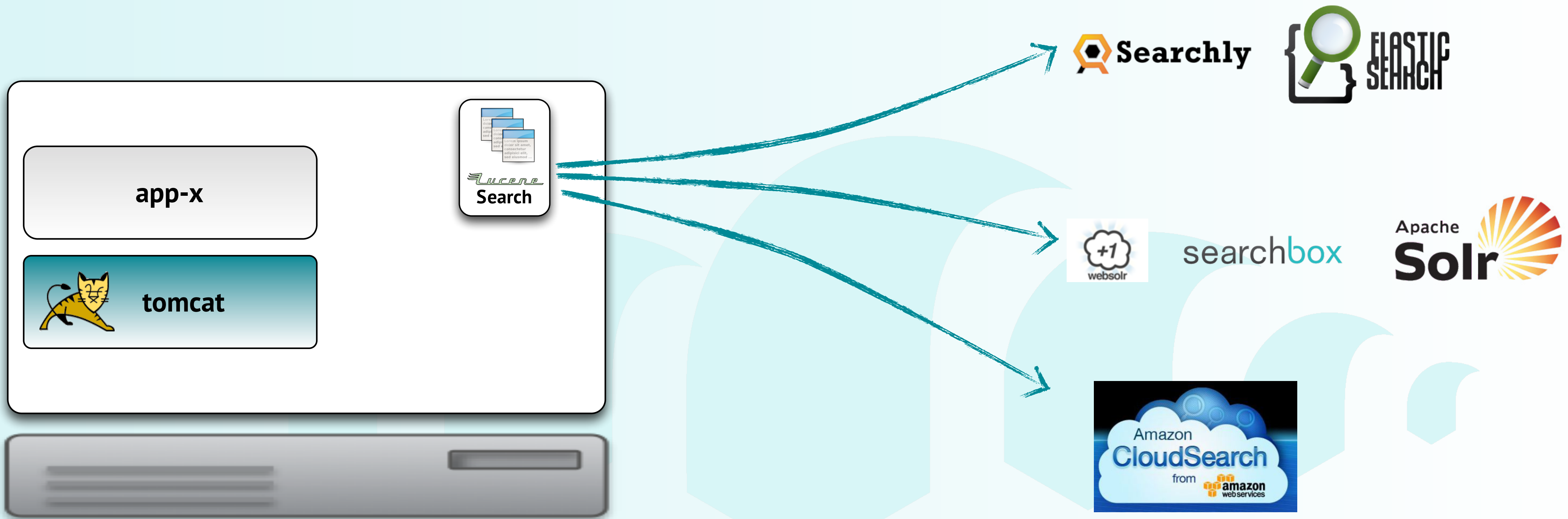


\$35	\$75	\$225
4 GB/month	8 GB/month	16 GB/month
2 weeks search	2 weeks search	2 weeks search
1 year archive	1 year archive	1 year archive
Unlimited systems	Unlimited systems	Unlimited systems
Unlimited users	Unlimited users	Unlimited users
Sign Up	Sign Up	Sign Up

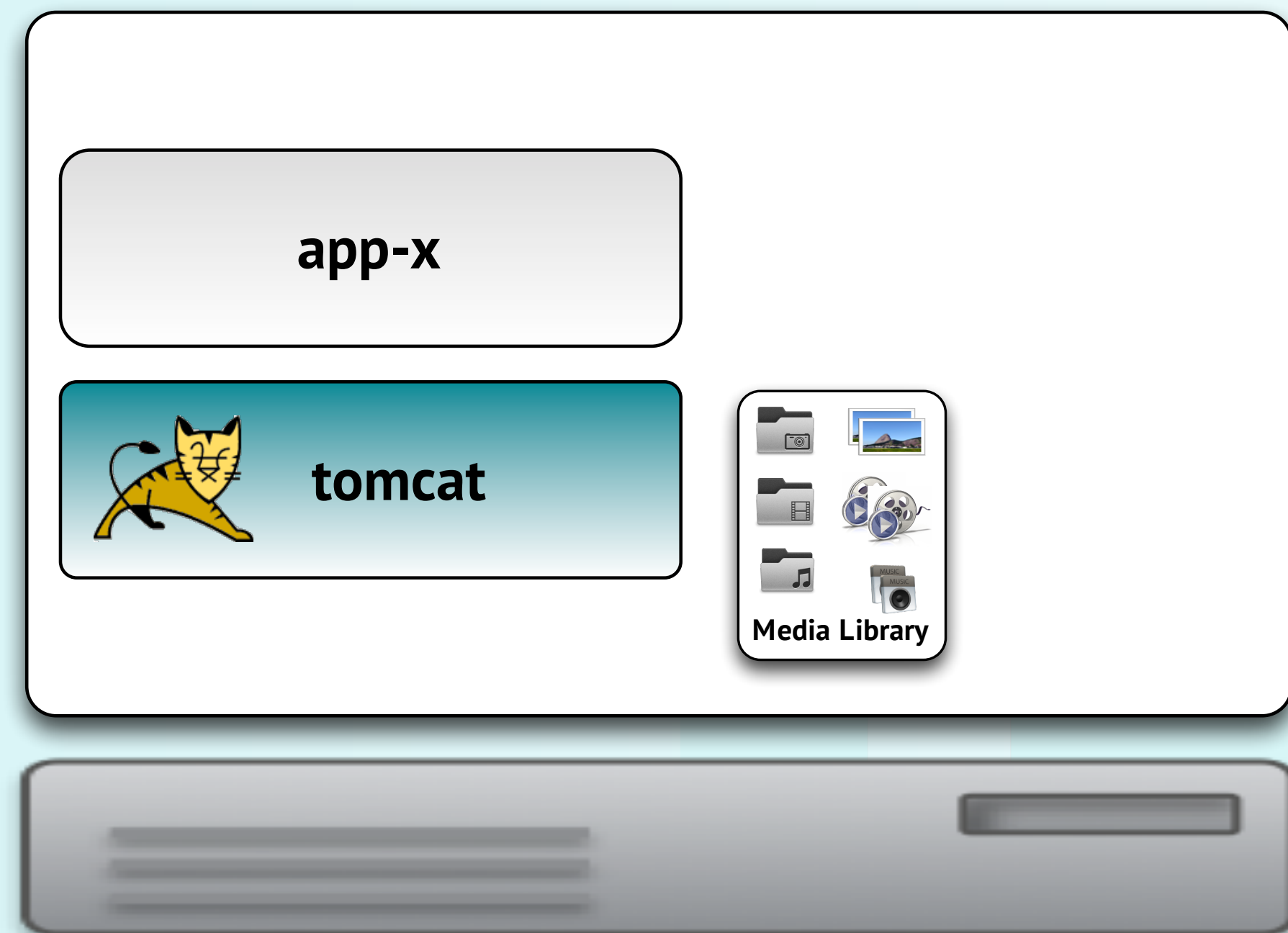
Full Text Search



Full Text Search

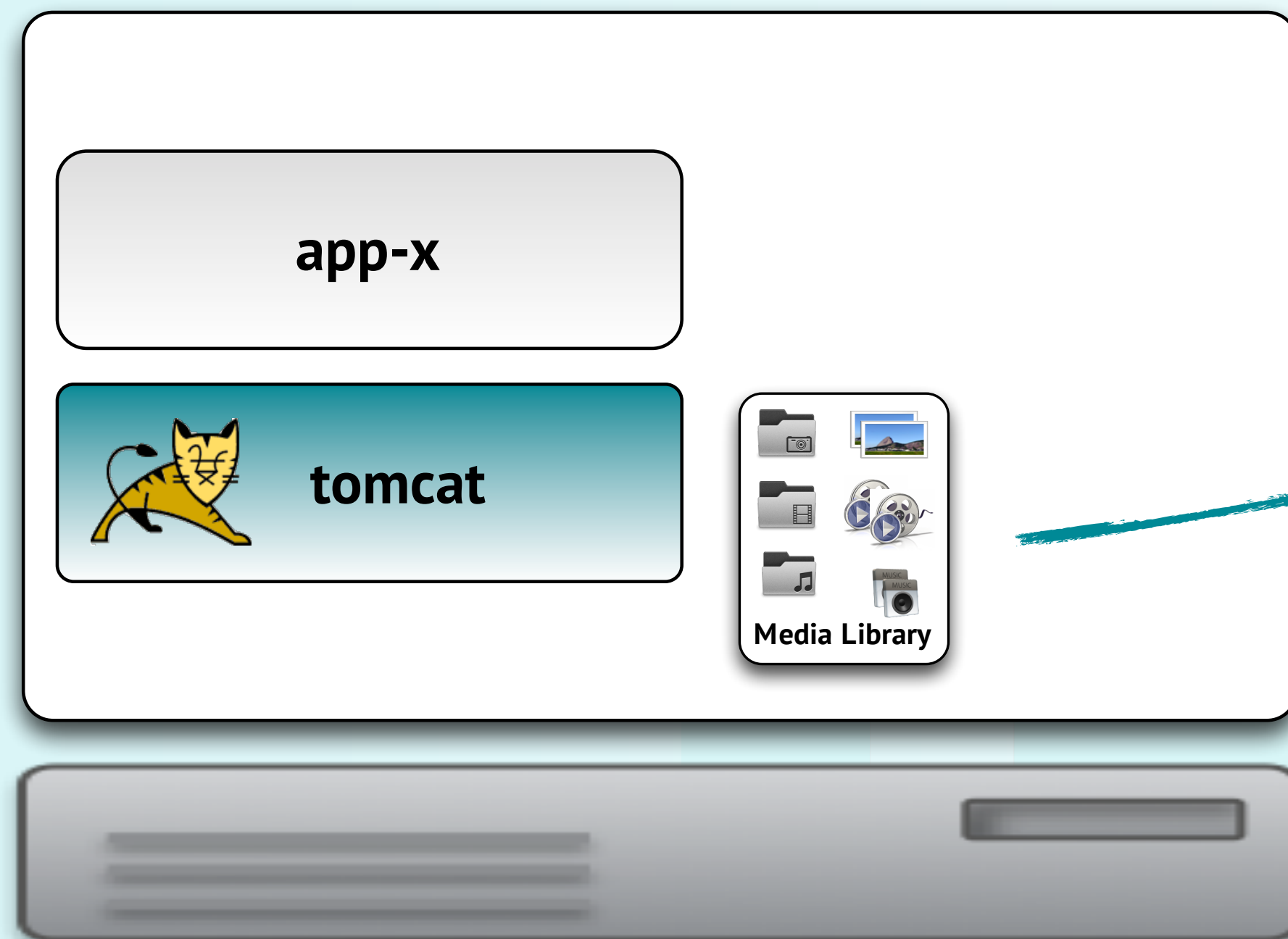
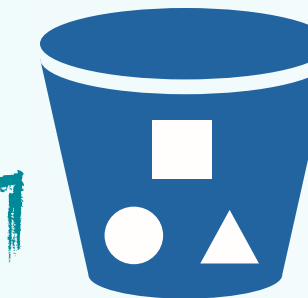


Media Library



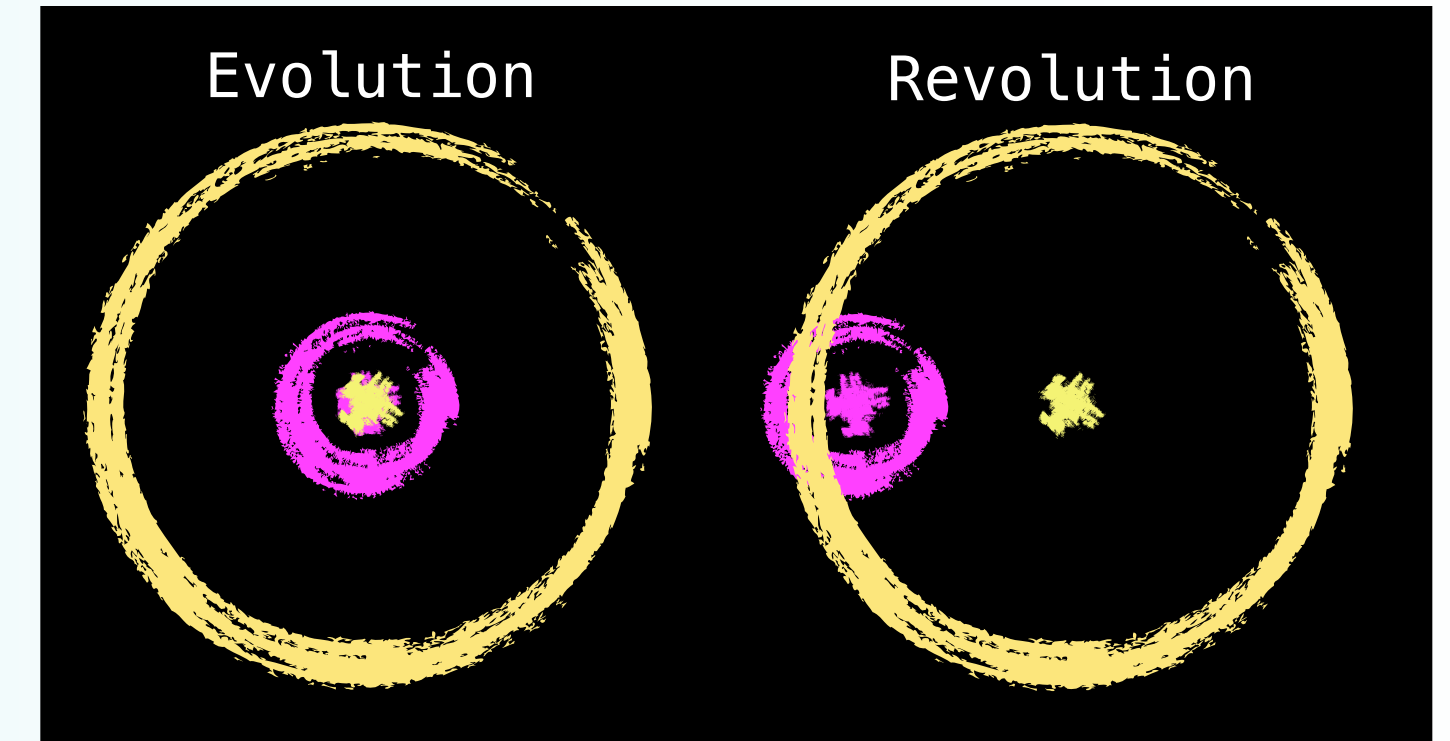
Media Library

Amazon S3



- Direct access from end user
- Amazon S3 Security tokens

Latency matters!



Latency Matters



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

Measure

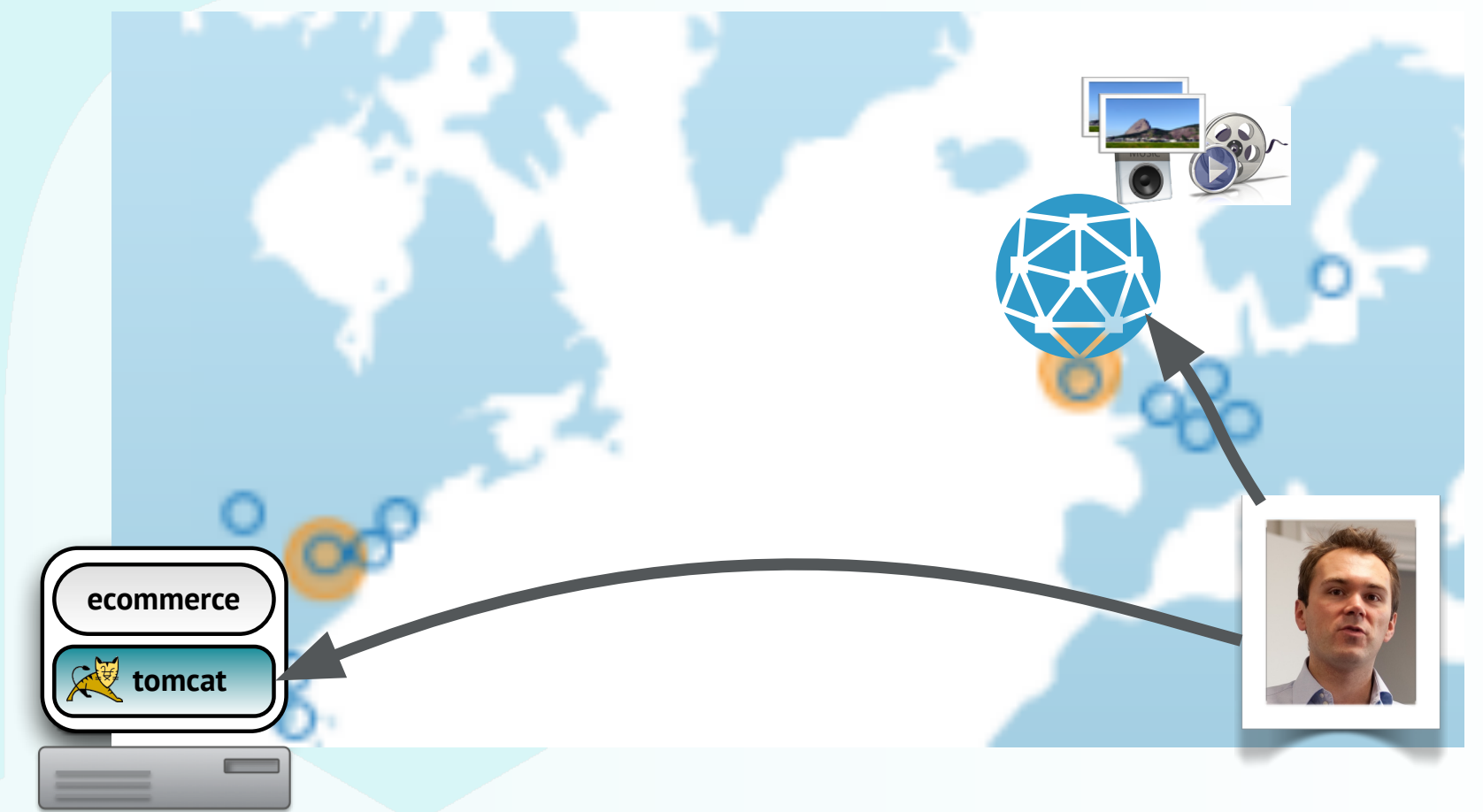
- Chrome Dev Tools
- Google Pagespeed
- YSlow

The screenshot shows a web browser window displaying the Pet Clinic website. The website has a green header with the text "Pet Clinic A Spring Framework Demonstration" and the Spring logo. Below the header is a navigation menu with links for Home, Find owners, Veterinarians, Error, and Help. The main content area features a "Welcome" heading and a photograph of two puppies. Overlaid on the bottom right of the browser window is the Chrome DevTools YSlow performance tool. The YSlow tool shows an overall performance score of 80 and a Grade B. It lists several performance issues, such as "Make fewer HTTP requests" (F), "Use a Content Delivery Network" (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), and "Avoid CSS expressions" (A). The YSlow tool also provides a detailed explanation of the "Make fewer HTTP requests" issue, stating that decreasing the number of components on a page reduces the number of HTTP requests required to render the page, resulting in faster page loads.

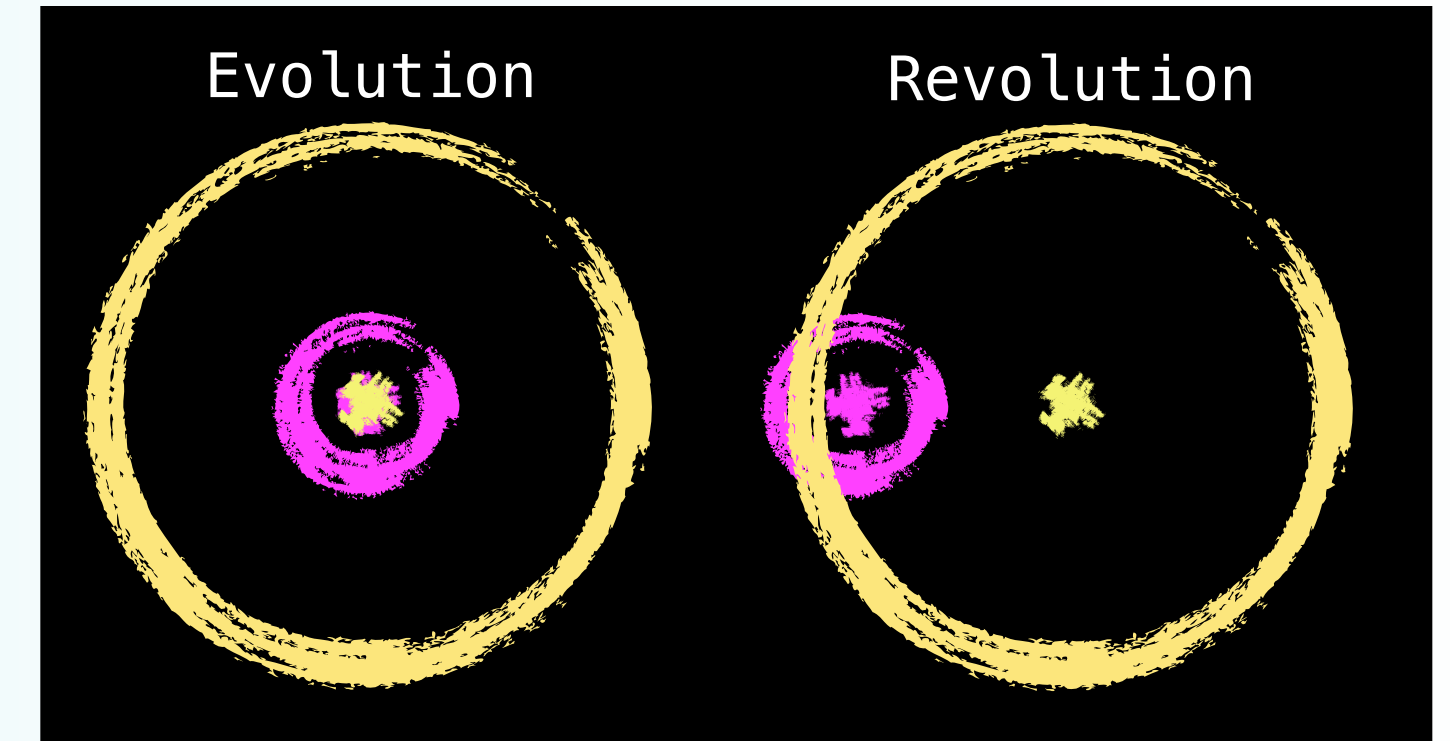
Name	Met...	Status	Type	Initiator	Size	Conter	La...
petclinic.css	GET	200 OK	text/...	petclinic.e...	472 B	133 ...	
jquery.js	GET	200 OK	appli...	petclinic.e...	261 KB	3.26 s	
jquery-ui-1.9.2.c...	GET	200 OK	appli...	petclinic.e...	440 KB	5.82 s	

Improve

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



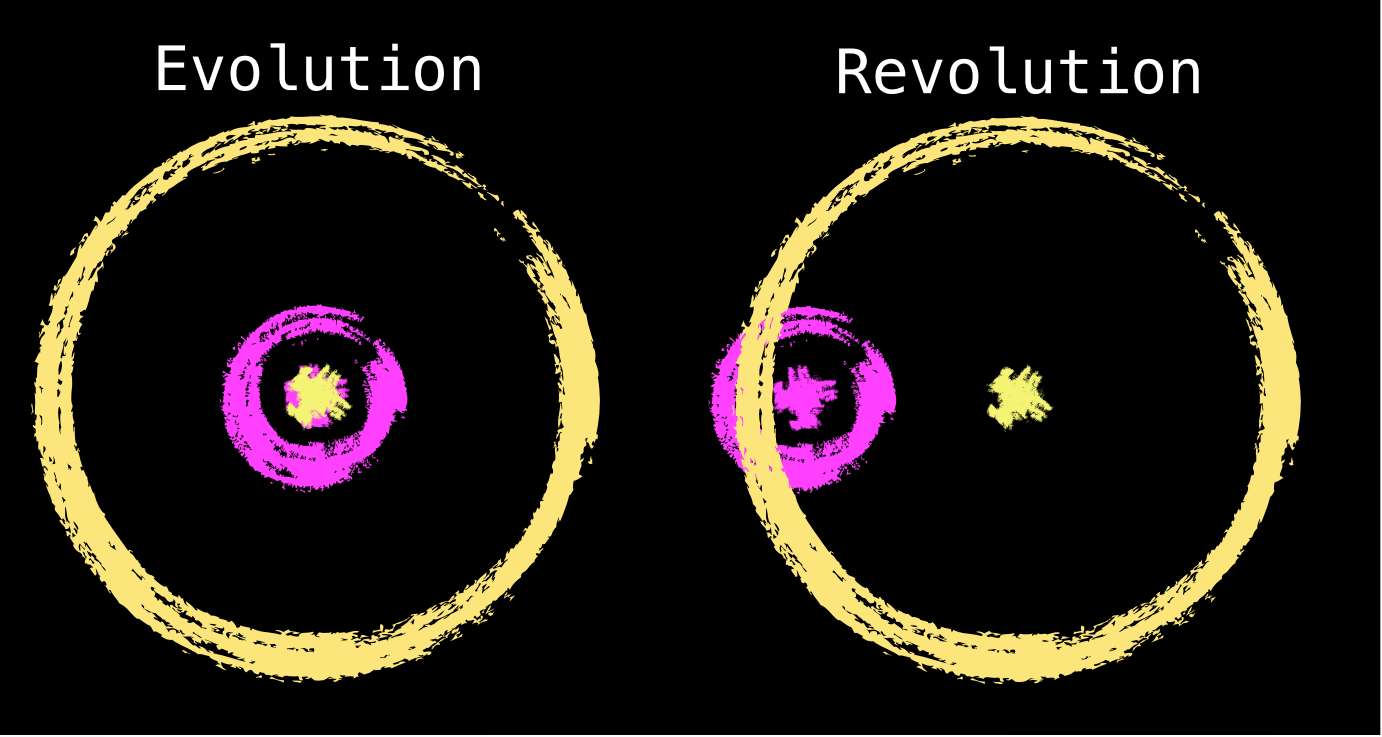
Be stateless ... if you can



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?

