

# 12-Factor Apps

## A Scorecard

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# Your App





# The Architecture Diagram of Your App





# Your App



GE Digital Sadly, not from [www.reality.info](http://www.reality.info) but instead from [littleshantyboat.blogspot.com](http://littleshantyboat.blogspot.com)

# Your App in “The Cloud”



# The next 30 minutes

12 Factors to help you **safely** put your app  
in the cloud

# So instead of this



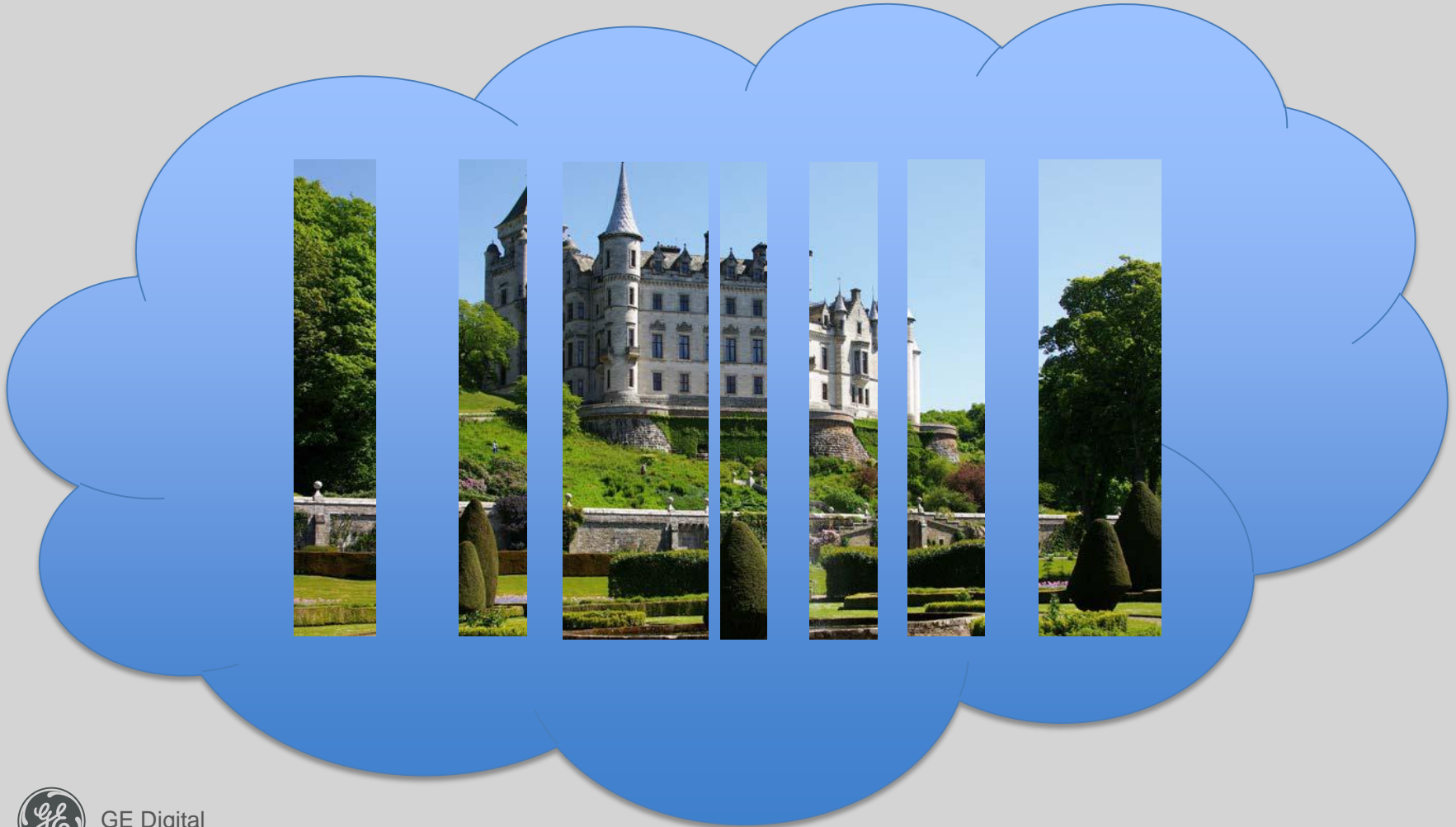


# You get this





# Because microservices



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# Why 12 Factors

- Strange things happen in the “The Cloud”
  - Think: Network explosions, data center explosions, server explosions
- The cloud requires a new way of developing apps
- These 12 factors will help you build your next cloud app safely.

12factor.net



What level is your app?

# 1. Codebase

Level I. Email src zip with different name

Level II. Frequent commits to source control

App lives in one repo

Level III. App is built into system  
is an app in its own repo



## 2. Dependencies

- I. Manually download jars to /lib
- II. Use package manager (mvn, npm)  
Expect tools to be provided (curl)
- III. Use artifact manager (Artifactory)  
Bundle dependencies and tools



# 3. Config

- I. Hardcode URLs, passwords in code  
Use code like: `if (Mode.PROD)`
- II. Use config files  
Multiple config files for different environments
- III. Use config service (Spring Cloud Config, Zookeeper)

# 4. Backing Services

- I. Vendor specific connection libraries  
Hardcode connection strings
- II. Connection parameters live in config files
- III. Resources are found dynamically  
Update backing services independently



redis



riak

RabbitMQ™



GE Digital

# 5. Build, Release, Run

- I. Devs build and deploy code from local  
Production is pushed manually
- II. Use build/release tools (Jenkins, Travis CI)  
Cleanly separate build and deploy steps
- III. Have one click release pipeline  
Each release is versioned and saved for rollback  
No human intervention





# 6. Processes

## I. Sticky session

Write app data to local filesystem

## II. Does not rely on data stored locally

## III. Stateless

Store session data in datastore (redis)

Cache intermediate transaction steps

# 7. Port Binding

- I. Deploy to app container
- II. Standalone, but listens to specific ports
- III. Web server is part of app (node, netty)  
App exports HTTP as a service



# 8. Concurrency

- I. Blocking tasks that must run sequentially
- II. Non-blocking IO server (node, netty)
- III. Scale horizontally  
Small, independent microservices

*Scale out, not up.*

# 9. Disposability

- I. Needs a dev to coordinate reboot
- II. Fast startups
- III. Crashes gracefully
  - Sub 1 second restarts
  - Stores state to quickly recover

*Your servers are cattle,  
not pets.*



brosher.com

# 10. Dev/Prod Parity

- I. Devs have no insight to prod  
Dev is different from prod
- II. Substitute lightweight replacements  
(In-memory H2, SQLite)
- III. Environments are identical

SQLite  $\neq$  Postgres



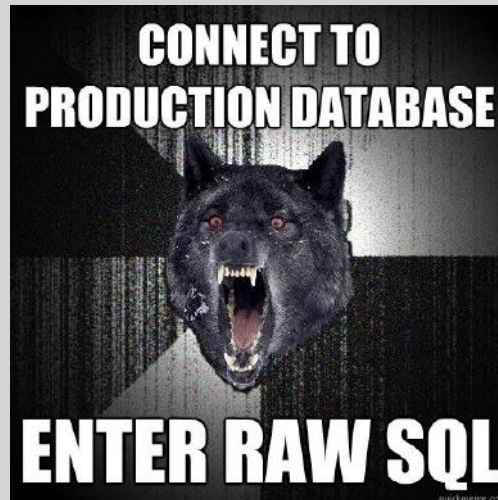
# 11. Logs

- I. `System.out.print()`
- II. Write to log files on web server
- III. Treat logs like a stream (ELK)



# 12. Admin Processes

- I. Edit database entries manually
- II. Store migration scripts in repo
- III. Use framework's tooling



# Thank you!

- Follow these 12 factors
  - Survive explosions
  - Build awesome cloud apps
- 
- [12factor.net](http://12factor.net)
  - Migrating to Cloud Native Application Architectures – Matt Stine



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