12-Factor Apps

A Scorecard

Matt Momont – Software Architect, GE Digital
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Your App
The Architecture Diagram of Your App

www.escapereality.info
Your App

Sadly, not from www.reality.info but instead from 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
12-Factor Apps

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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

Level III. App is broken into system. Each piece is an app in its own repo

App lives in one 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:
   ```java
   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
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.*
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 ≠ 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
- Migrating to Cloud Native Application Architectures – Matt Stine
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