Moving Towards a Tool chain for Automated Operations

Velocity 2010 - Alex Honor, Lee Thompson - DTO Solutions

Your presenters

- Lee Thompson
  - From Texas
  - Likes rivers
  - Likes Zs
  - Many years designing, developing and operating large scale mission critical online financial and industrial systems

twitter: stagr.lee
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Your presenters

- Alex Honor
  - From California
  - Likes pools
  - Likes 914s
  - Specializes in life cycle optimization, tool building, several open source projects

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email: ahonor@users.sourceforge.net

What’s a tool chain?

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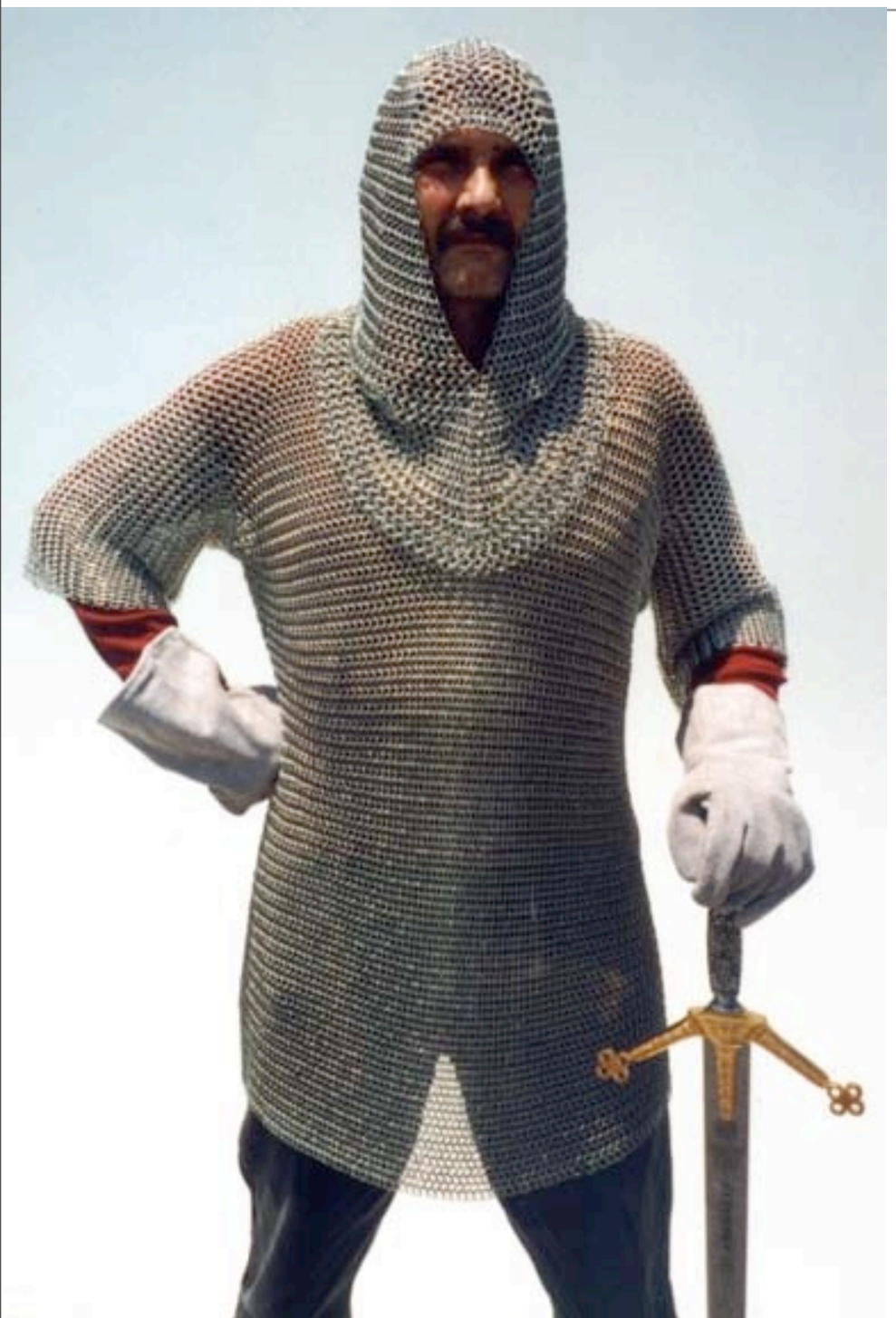

What's a tool chain?

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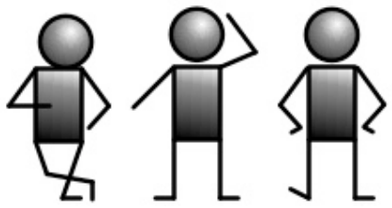
Which tools should you use?

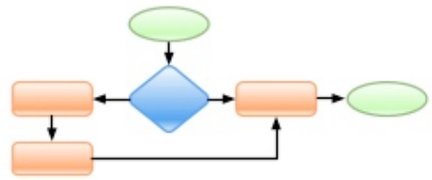
Which tools should you use?

- This is the last question you should ask

Which tools should you use?



People

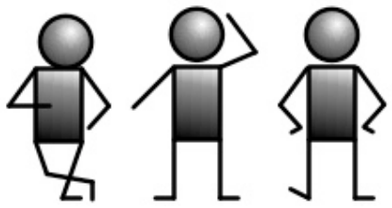


Process

- This is the last question you should ask

Tools

Which tools should you use?



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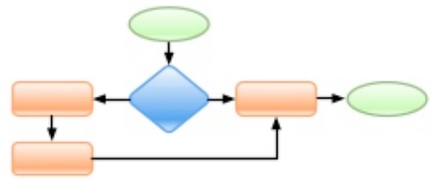


Process

- This is the last question you should ask

last thing

Tools

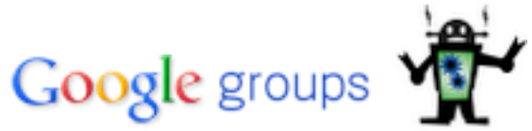
Collaboration efforts around tool chain concept

- Fully automated provisioning paper: Oct 2009
- OpsCamp Austin: Jan 2010
- O'Reilly Velocity Online: Mar 2010
- Google group "devops-toolchain": Mar 2010
- OpsCamp SF: May 2010

‘devops-toolchain’ group members

Google groups

‘devops-toolchain’ group members



- Cross section of people:
  - System administrators
  - Application developers
  - Open source software tool developers
  - Software product managers
  - Generalists and process methodologists

‘devops-toolchain’ group members

Google groups 

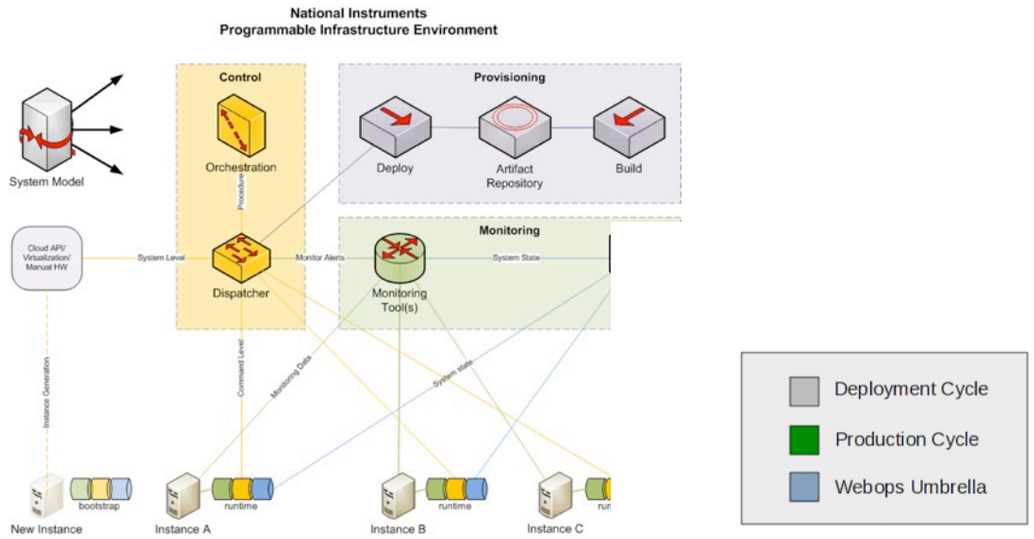
- Cross section of people:
  - System administrators
  - Application developers
  - Open source software tool developers
  - Software product managers
  - Generalists and process methodologists
- Cross section of organizations:
  - E-Commerce
  - Search
  - Social media
  - Gaming
  - Industrial process
  - Financial
  - Commercial / OSS ISVs

‘devops-toolchain’ activity

Google groups

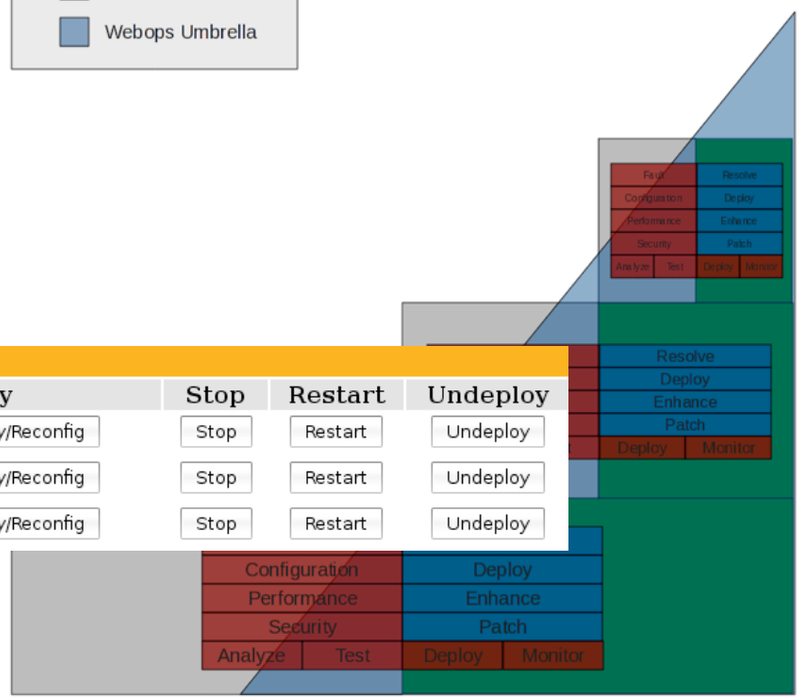
Lots of interesting contributions and topics ...

Ernest’s



Scott Mcarty’s

Webops Responsibilities

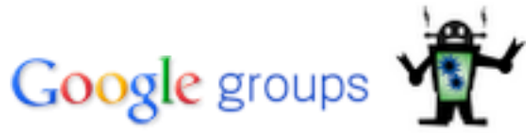


Vlad’s case study

dev (bc)

Product	Server	Config	Version	Deploy		Stop	Restart	Undeploy
	qaweb9	View Config	3.9.4	3.9.4	Deploy/Reconfig	Stop	Restart	Undeploy
location	qaweb10	View Config	0.0.0	2.0.2	Deploy/Reconfig	Stop	Restart	Undeploy
messaging	qaweb10	View Config	DOWN	1.8.2	Deploy/Reconfig	Stop	Restart	Undeploy

‘devops-toolchain’ discussion topics



- Unix Like Tool Chains
- Open questions on unified pipe architecture
- Taxonomy (still TBD!)
- Distribution methods: package vs file, rscyn/murder vs yum/rpm vs DFS
- Configuration management: RPMs vs puppet/cfengine/chef tool?
- Rollback methodologies for package and config mgt tools
- Sizing a Devops team (what is a devops team?)
- Controlling and timing package release and config mgt tools
- Log management (aggregating, crunching, charting)
- Change detection
- Scripting language choices

Conceptual models we borrowed

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- Brent Chapman’s Incident Command System

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- Industrial control automation

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- Brent Chapman's Incident Command System
- Industrial control automation
- Unix tool chain

Brent's Incident Command System

http://en.oreilly.com/velocity2008/public/schedule/detail/1525

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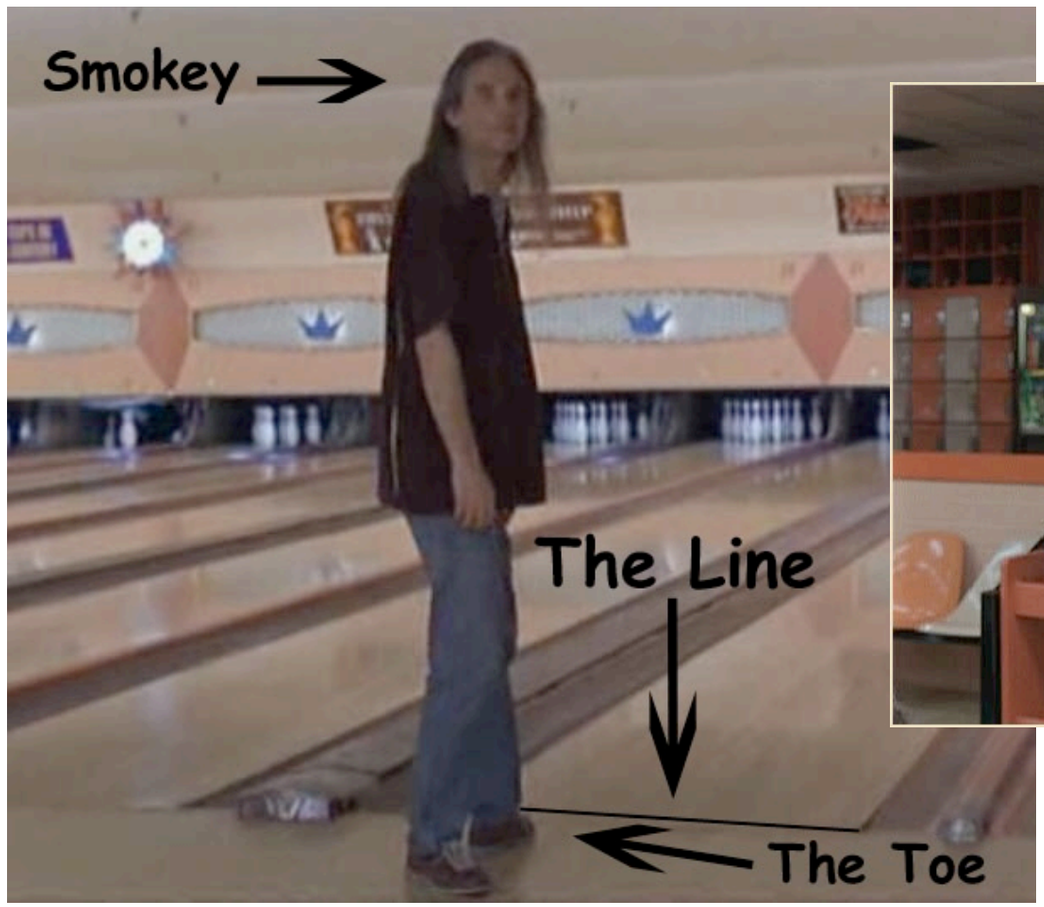

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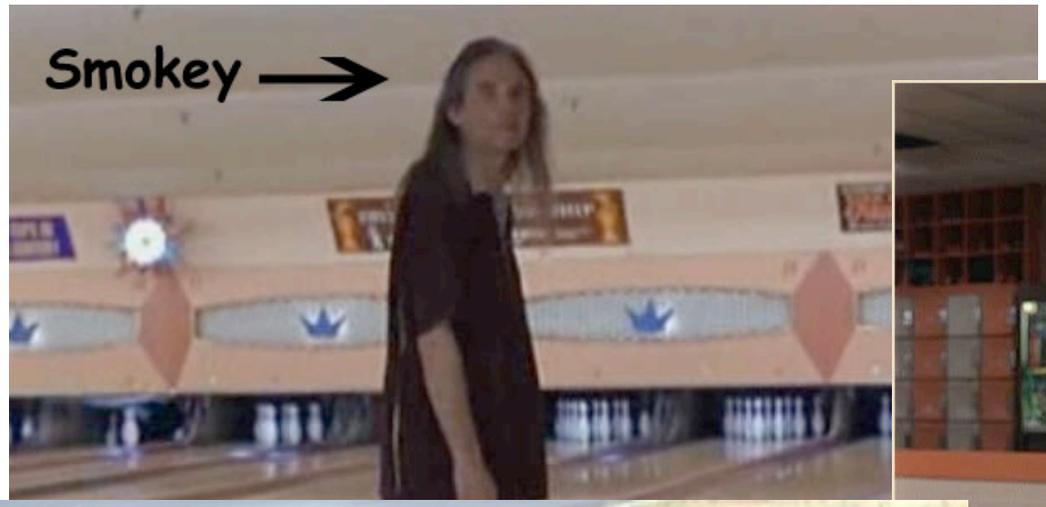
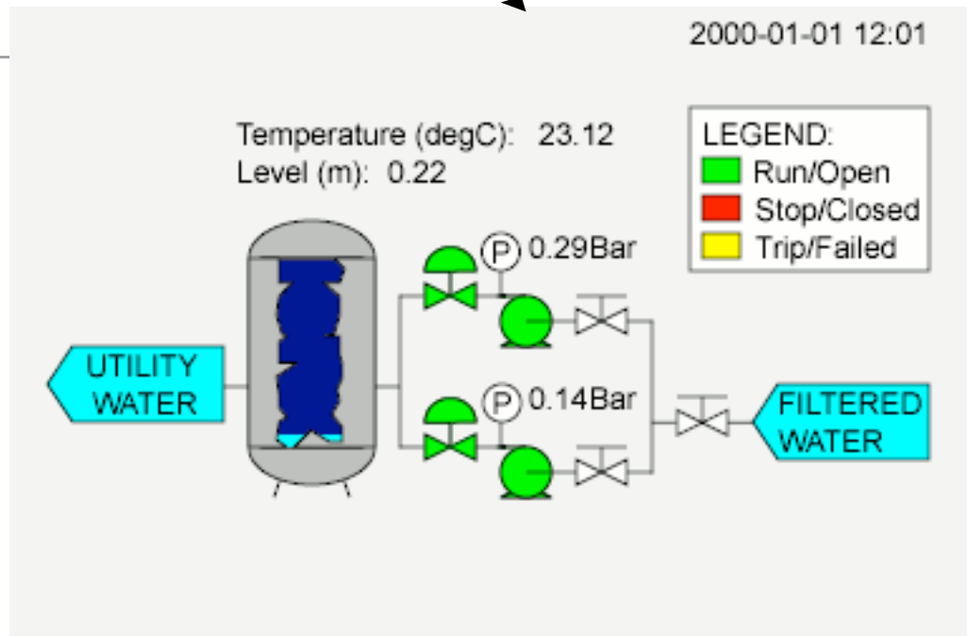


http://en.oreilly.com/velocity2008/public/schedule/detail/1525

Industrial control automation

industrial process

- 60 years of experience in industrial automation of physical plants



- Despite being virtual, web operations automation is similar in goals and techniques

- Industrial automation systems are layered architecture and tool chain oriented

Runbook Automation

Control

Eventing, Alarm Mgmt

Charting, History, SPC

Measurement Instrumentation

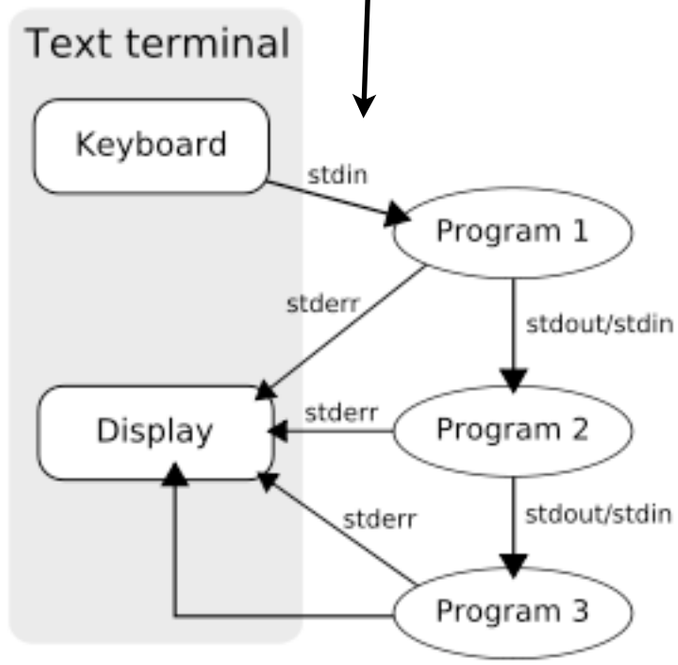
System

Unix tool chain

- Durable design pattern for software systems
  - Divide and conquer, separation of concerns
- Thanks Douglas McIlroy !

Doug

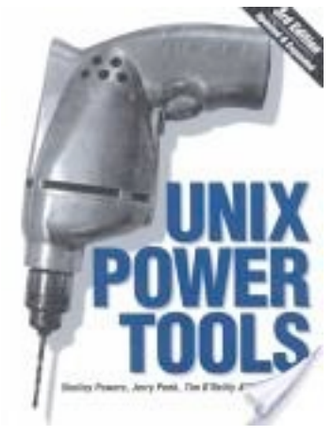
I/O model



pipeline

```
curl "http://en.wikipedia.org/wiki/Pipeline_(Unix)" | \
sed 's/[^a-zA-Z ]/ /g' | \
tr 'A-Z ' 'a-z\n' | \
grep '[a-z]' | \
sort -u | \
comm -23 - /usr/share/dict/words
```

- Unix Power Tools - “An operating system loaded with decade’s worth of nifty ad-on utilities”

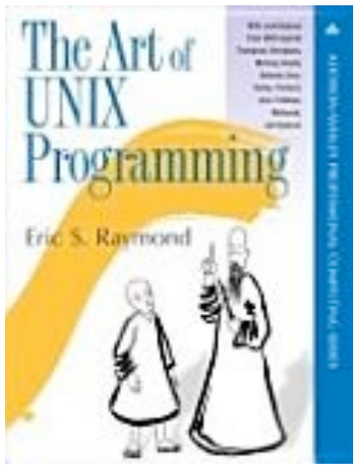


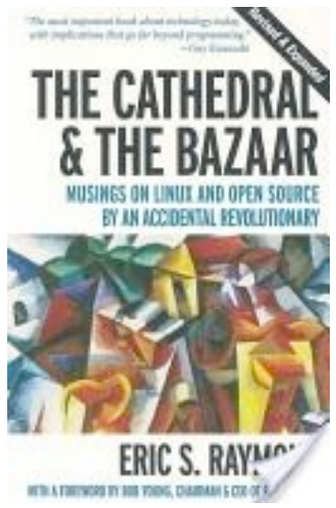
[1] http://doc.cat-v.org/unix/pipes/

Eric's rules

Guns are tools?

- Eric Raymond's The Art of Unix Programming (a must read!)





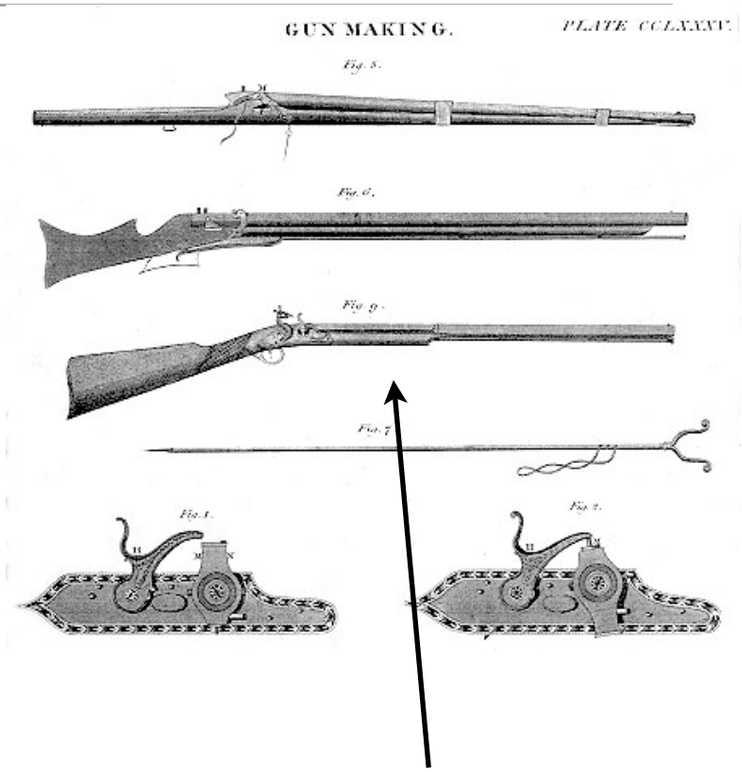
- "Design programs to be connected with other programs. " - appears again in Cathedral and Bazaar,

- Emphasizes small, clean, and orthogonal interfaces—another trait that produces flexibility in depth.

Interchangeable parts

- 1778, Honoré Blanc began producing some of the first firearms with interchangeable parts.

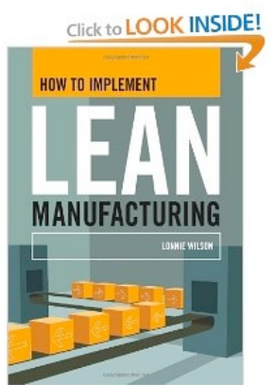
- One part of the same type can freely replace another, without any custom fitting

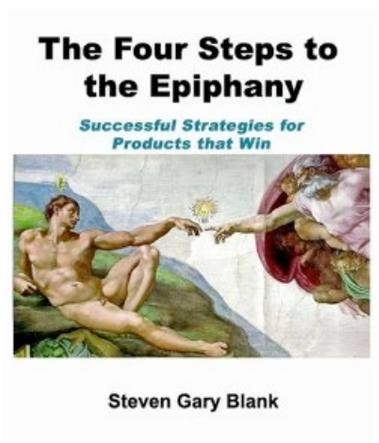


- Basis of modern production techniques

  - Lean manufacturing

  - Lean startup





Speaking of manufacturing ...

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Don’t make the product.

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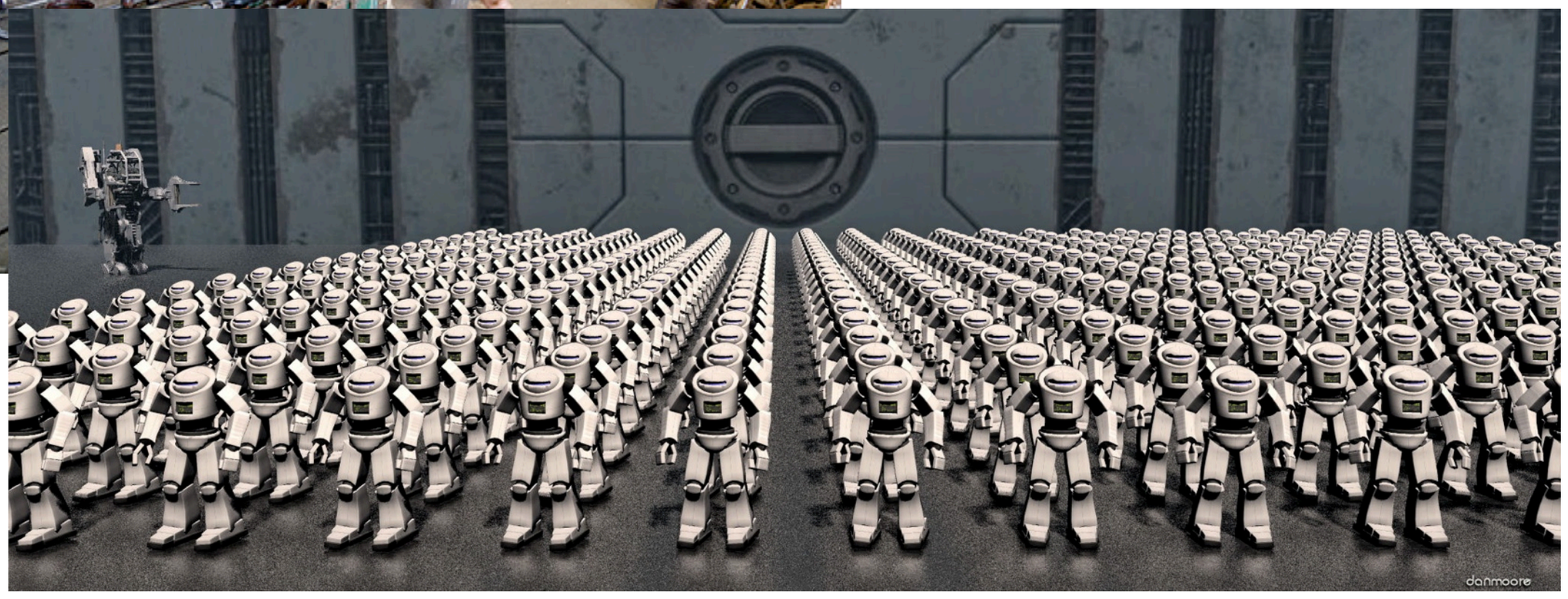


Make the machines that make the product.

Why tool chains now?

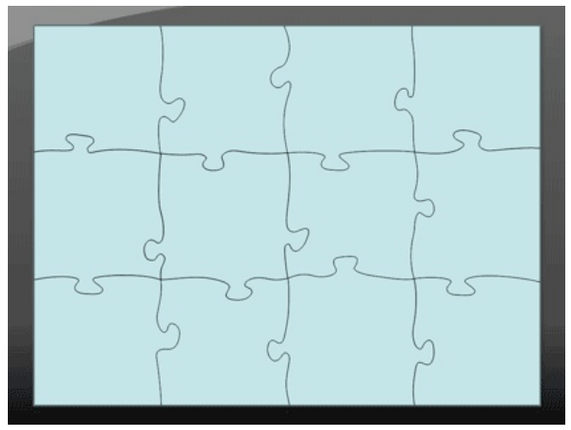
- Projects are failing due to handoff issues
    - Automation and tools decrease cycle time and error rate
- Software operation is a requirement of the development process!
    - Release and operation is a vital *nonfunctional* requirement

Why tool chains now?

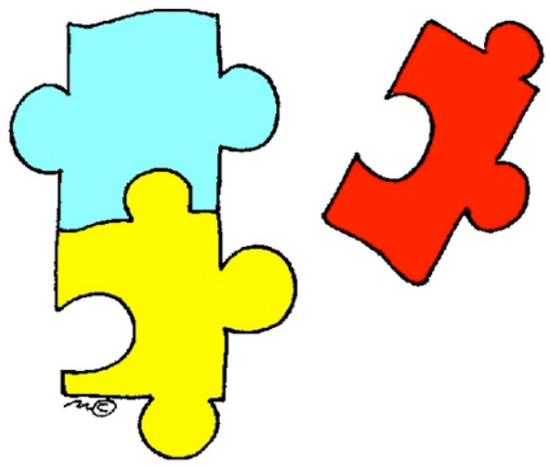
- Rapidly increasing number of applications under management
    - LAMP/RoR/SOA/Composite architectures
- Cloud deployment adding to this effect
    - Racking servers no longer holding back schedules

Integrated vs “integrate-able” tools

- Integrated tools (less flexible)
    - Turn key solution that provides end to end functionality for the problem domain



- Integrate-able tools (more flexible)
    - Chosen set of complementary independent parts than can be joined to solve a problem domain

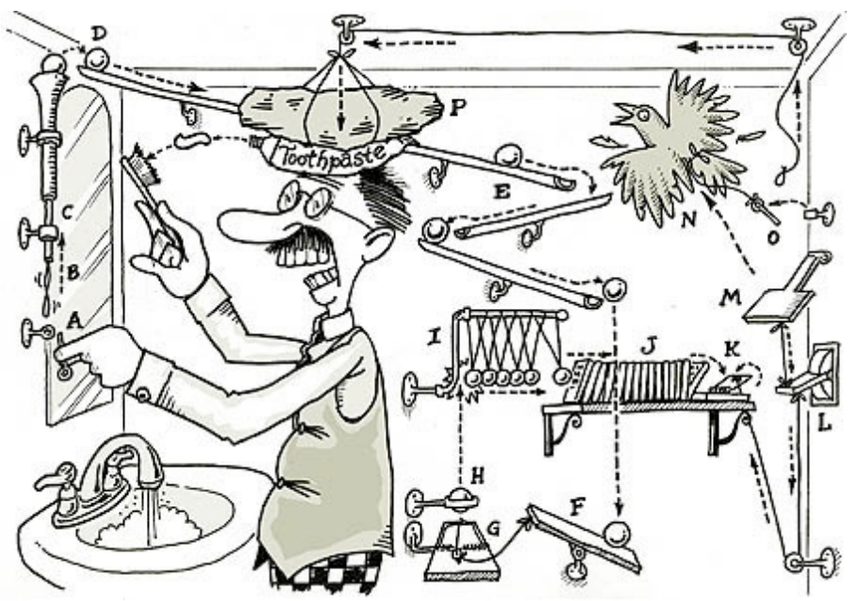


Commercial and OpenSource software differences

- Commercial bundled software
  - Provides an integrated set of features
  - Usually end to end functionality
  - Upfront financial commitment
  - Can be considered a black box or silo solution

Commercial and OpenSource software differences

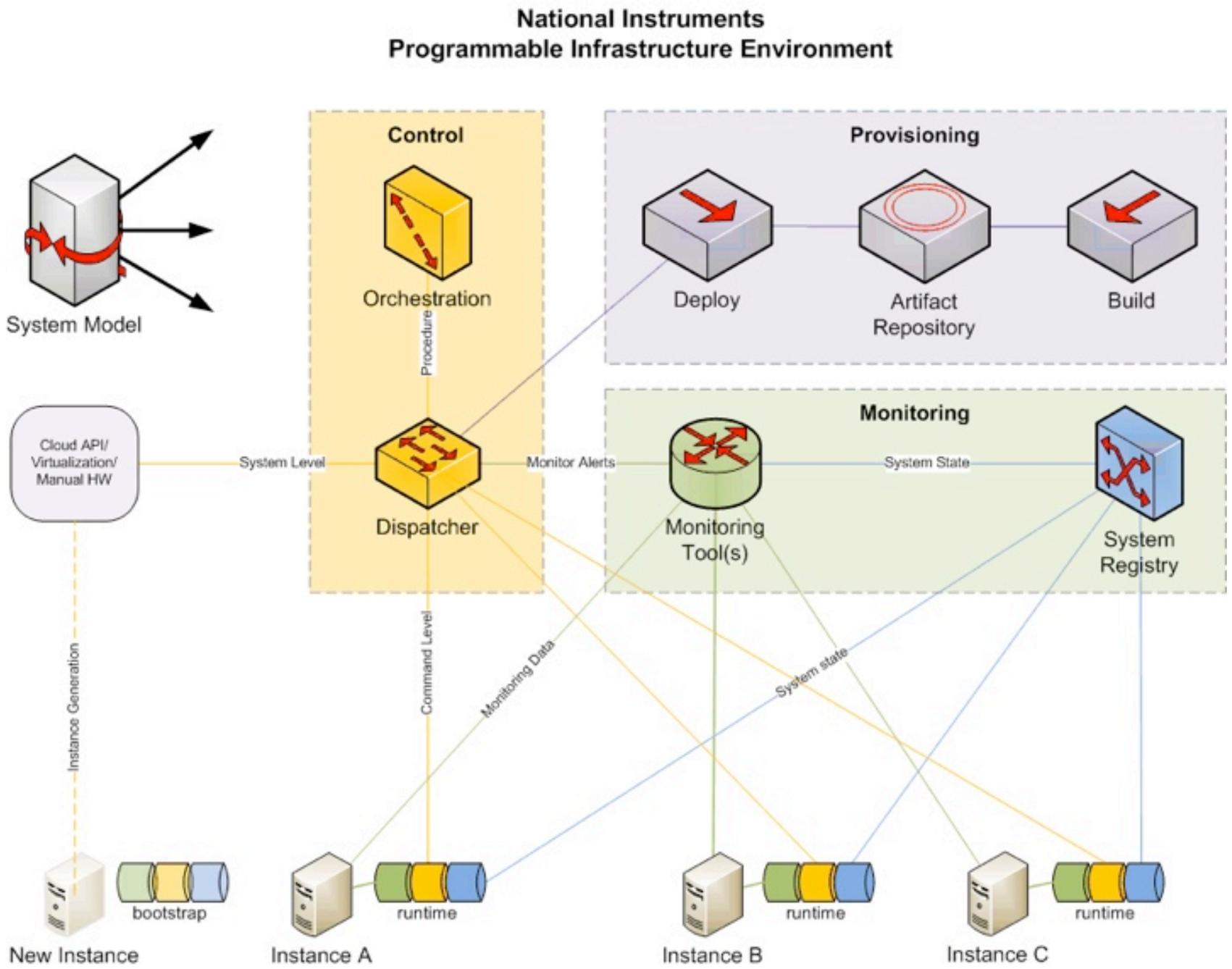
- Open source software
  - Lots of individual parts that are not integrated
  - Sold in lab, not at golf course
  - Transferrable skill set *is* an ROI
  - Might leave gaps
  - Done wrong, is confused and complicated
  - Iterative approach applies too



Tool chain case studies

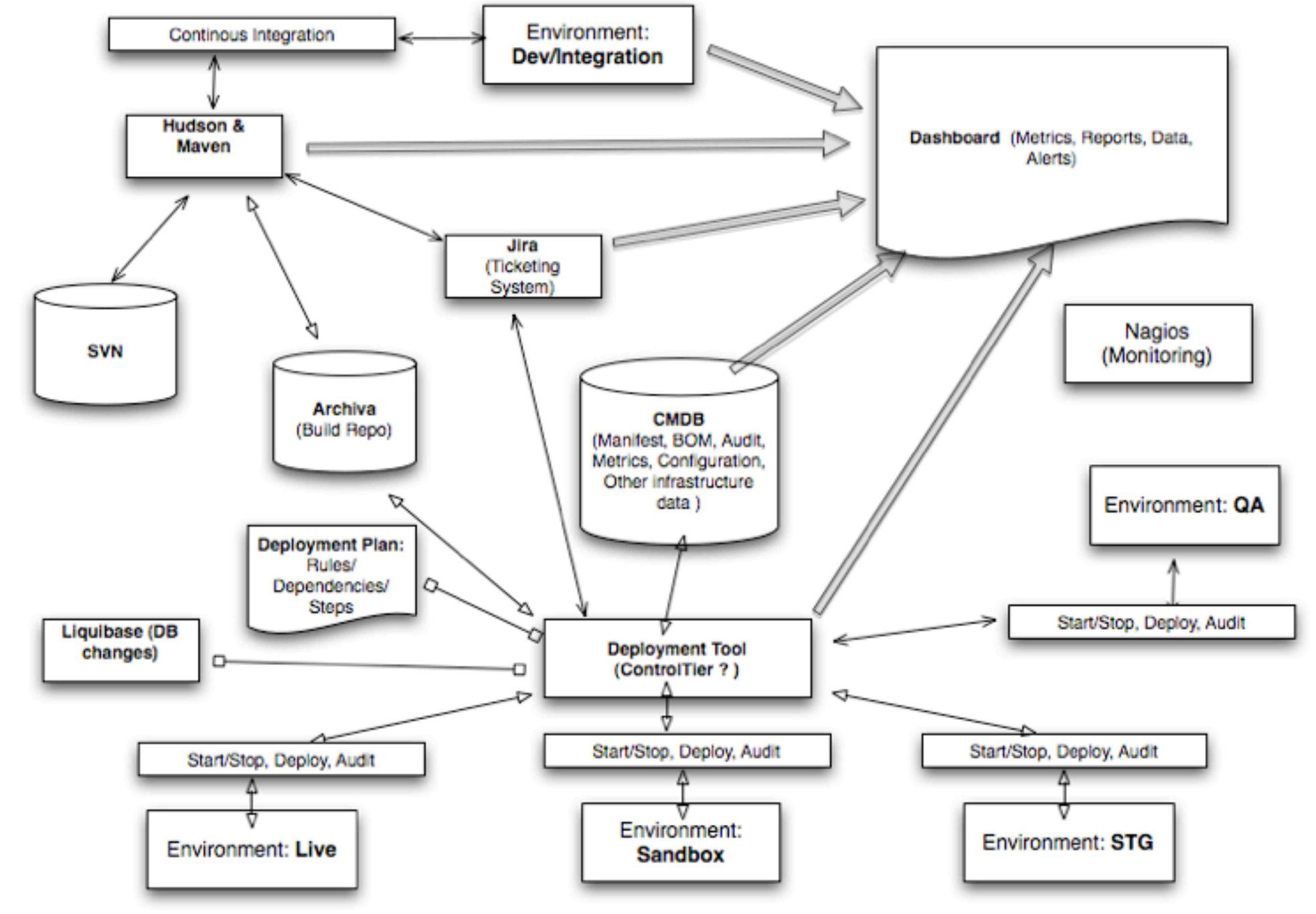
- Architectures
- Release management
- Monitoring and control
- Provisioning
- Hard won lessons

Example: “Programmable Infrastructure Environment”



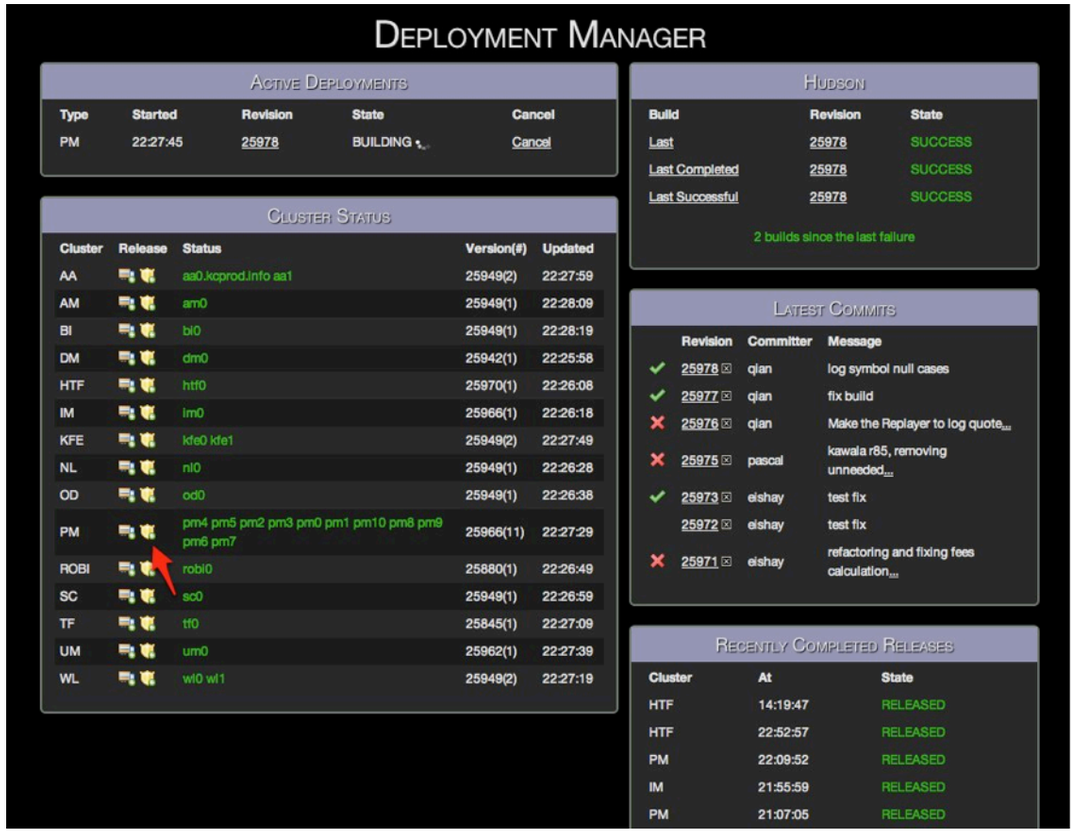
http://www.webadminblog.com/

Example: Game operator's framework



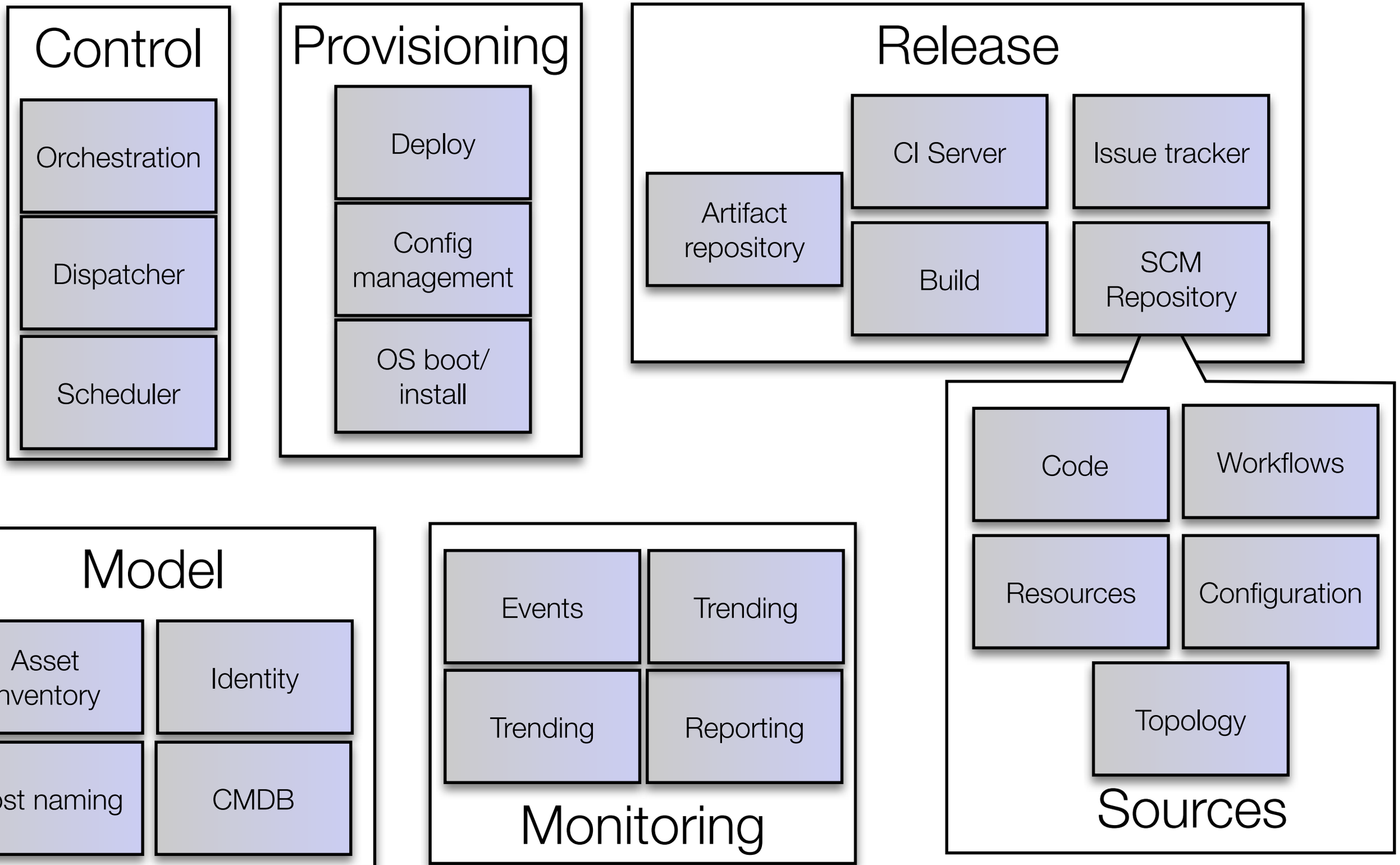
Example: KaChing's continuous deployment

- Tool chain
  - Monitoring: nagios, jcollectd, rrd, jmx
  - Deployment: Custom app, rpm/yum
  - Build: Hudson, SVN, ant
- "Release is a marketing concern"
- "Business immune system"

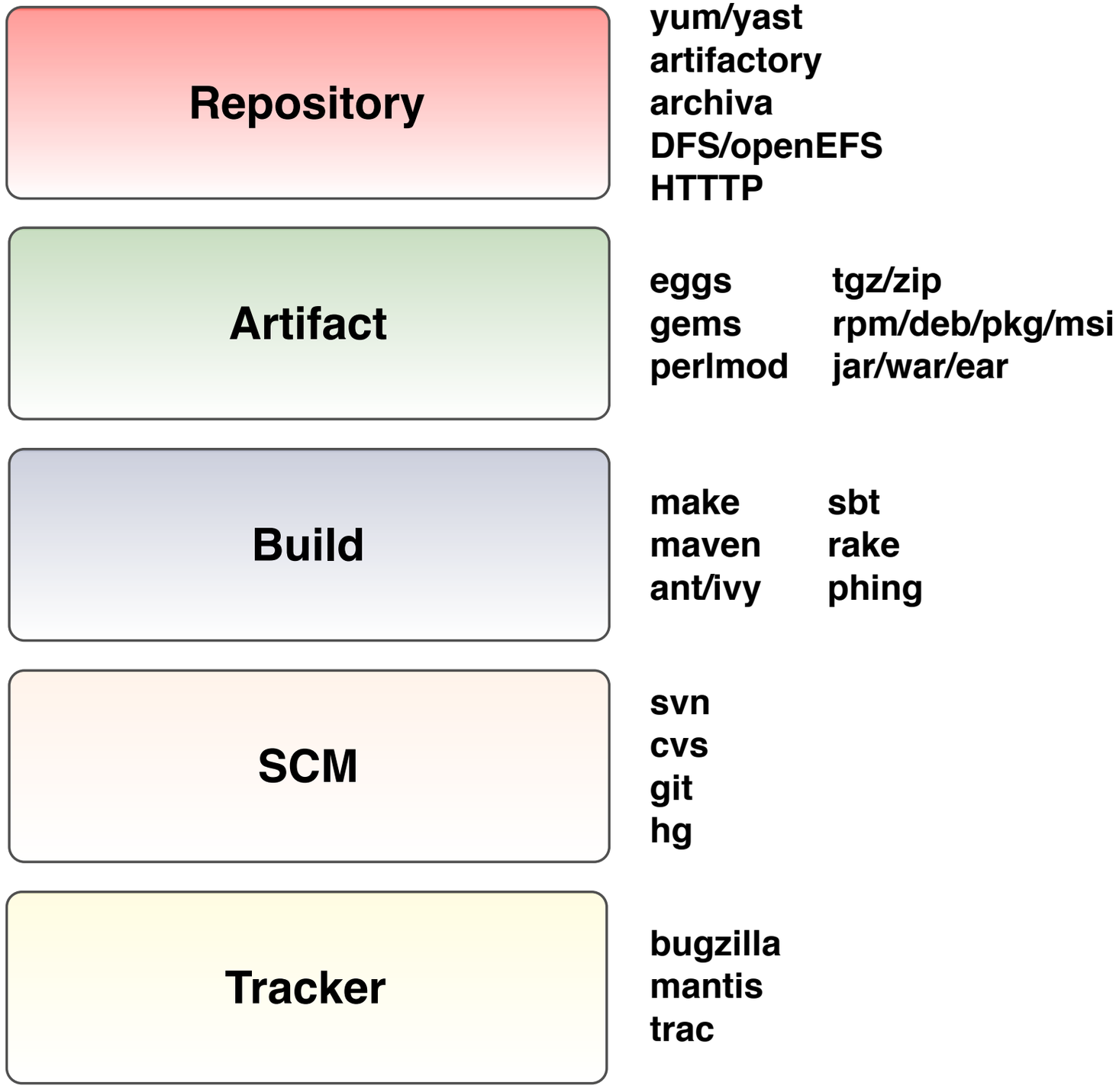


http://eng.kaching.com/2010/05/applied-lean-startup-ideas-continuous.html

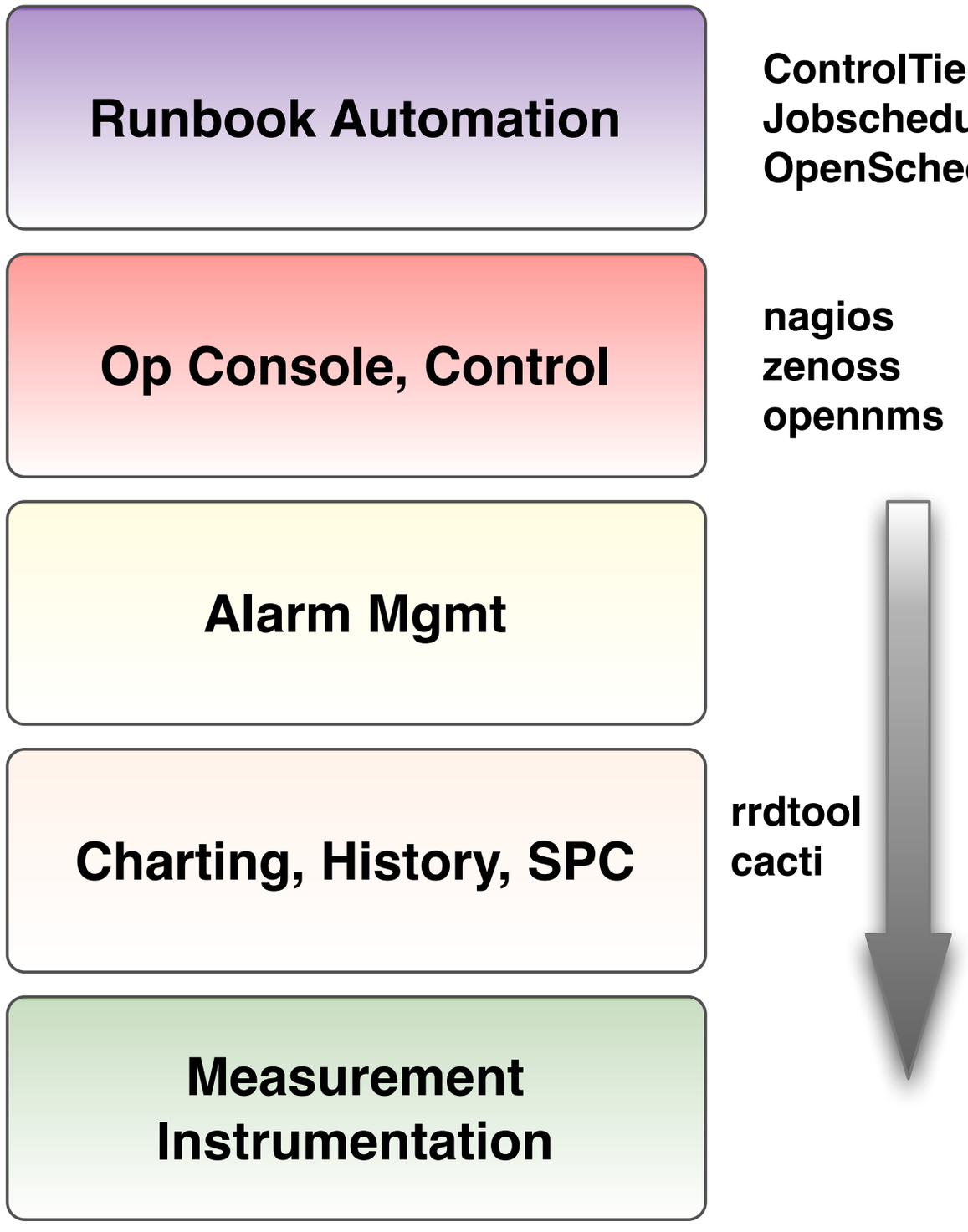
Generalized architecture



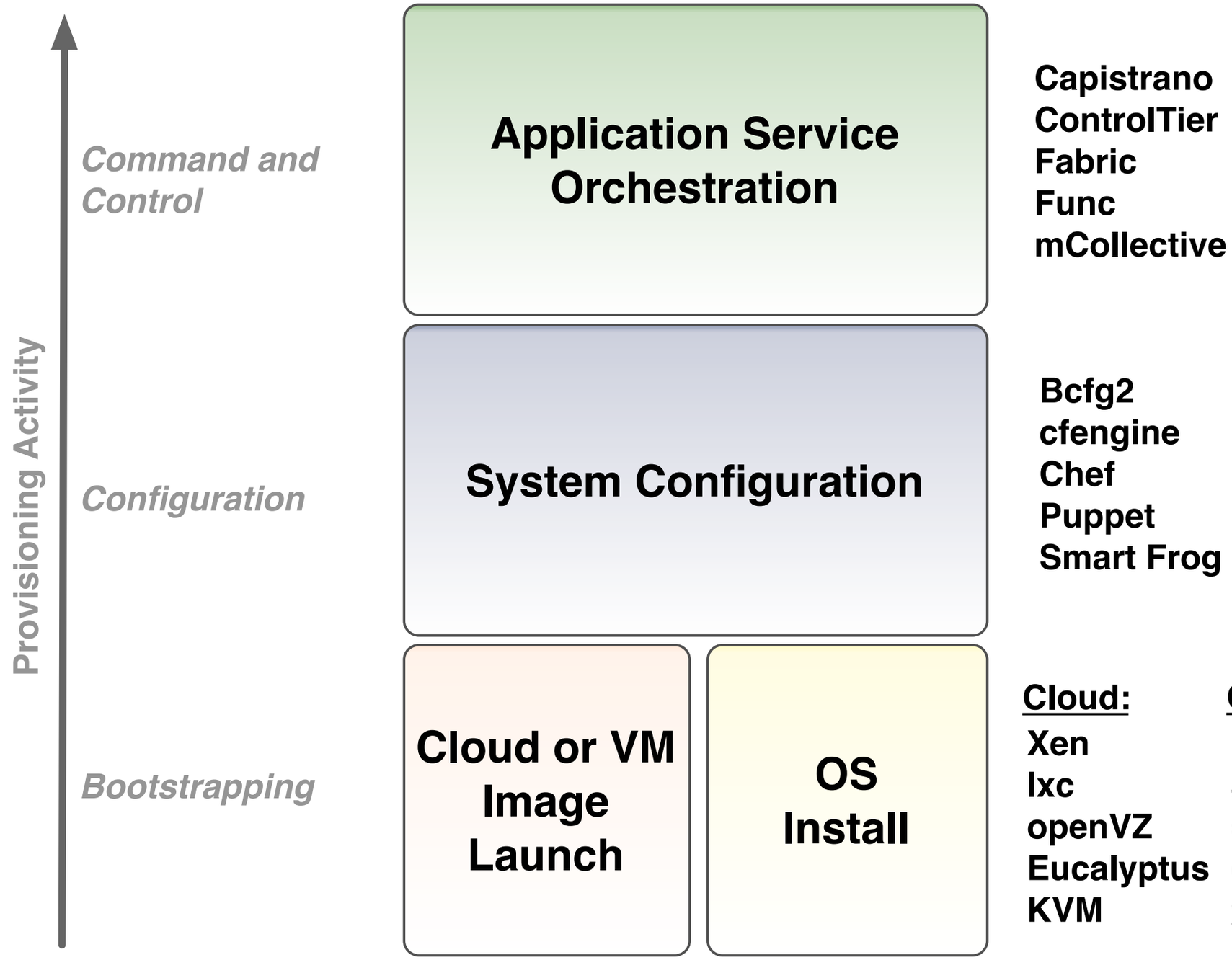
Release management



Monitoring and control



Provisioning



Hard won lessons

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- Tool projects fail if the process and people are not aligned.

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- Your boss pays you to have headaches

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- Design your tool chain with interchangeability in mind

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- Your boss pays you to have headaches

- Design your tool chain with interchangeability in mind

- Adopt an SDLC for any tool you develop

Hard won lessons

[1] http://www.gnu.org/prep/standards/standards.html

Hard won lessons

- Separate developer release process from package process [1]

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- Don’t accept a “one size fits all” mentality

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Hard won lessons

- Separate developer release process from package process [1]

- Lack of interchange formats between tools

- Don’t accept a “one size fits all” mentality

- Communication is the number one ingredient for success !!!

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- Open source tools already a big part of tool chains in many organizations

- Gun give away after -- all calibers, family welcome !

Call to action

- Join the devops-toolchain list Google groups

  http://groups.google.com/group/devops-toolchain

- Help us:

  - Define missing tool chains
  - Fix tool lists
  - Keep working on taxonomy
  - Document and share experience about your tool chain