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Agile & DevOps for Complex Enterprise Systems

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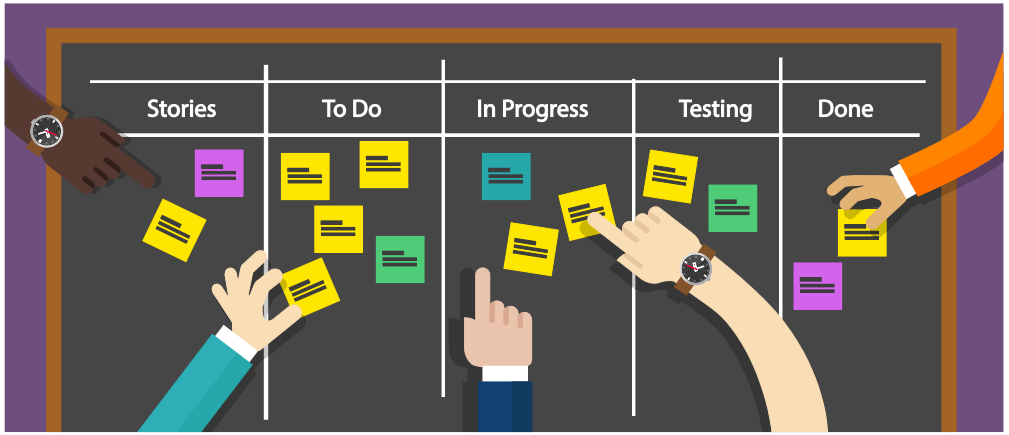
Why Agile?

What does this buzzword really mean?

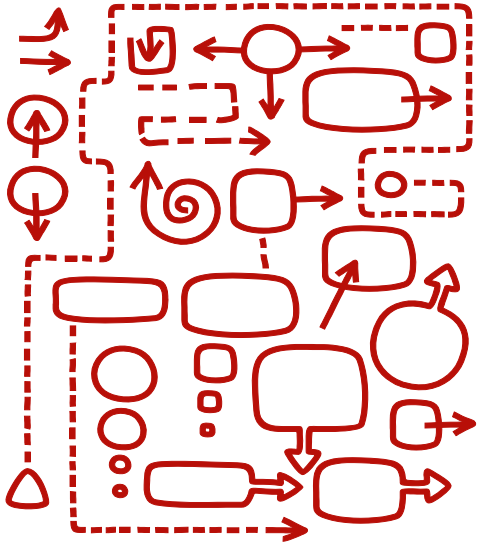
- The 2001 manifesto and principles
- Scrum, Lean, Kanban, SAFe, XP, Crystal
- Frequent, incremental deliveries to realize value
- Testing throughout
- A definition of “done”
- Respond to change over follow a plan



Agile on Complex Enterprise Systems

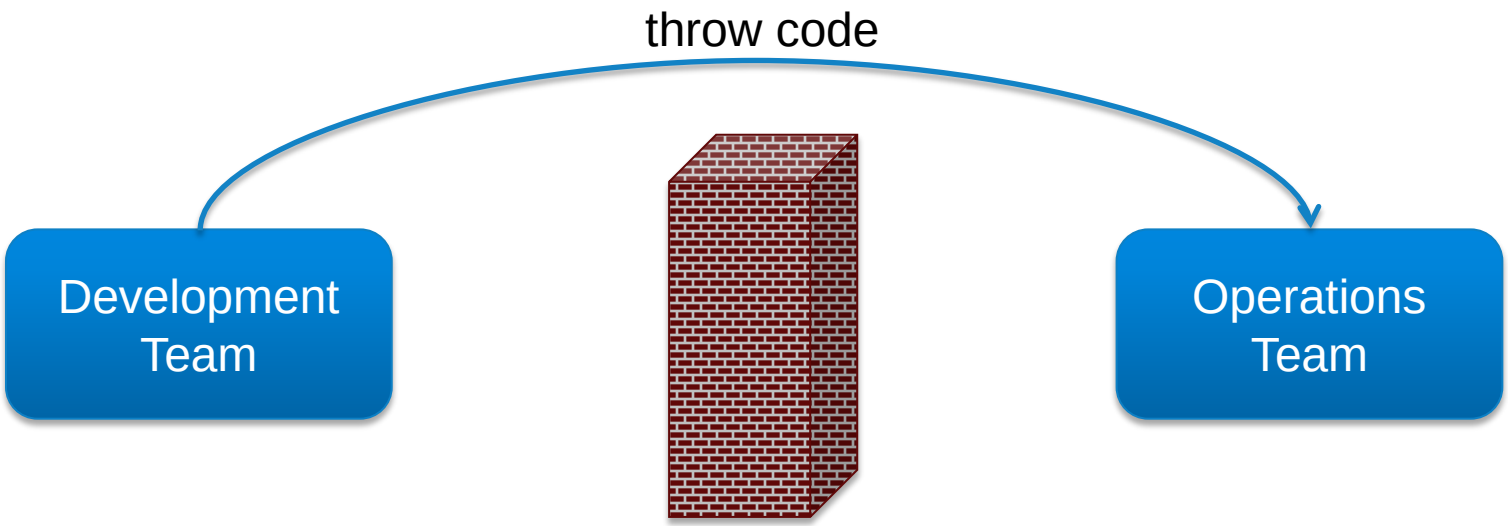
What complications arise?

- Architecture doesn’t support dividing up the work
- Interdependencies between systems and teams
- Teams working at different paces and places
- Teams working for different companies, on different contracts, or reporting to different organizations



Let’s look at DevOps as a way to deal with some of these concerns

Why DevOps?

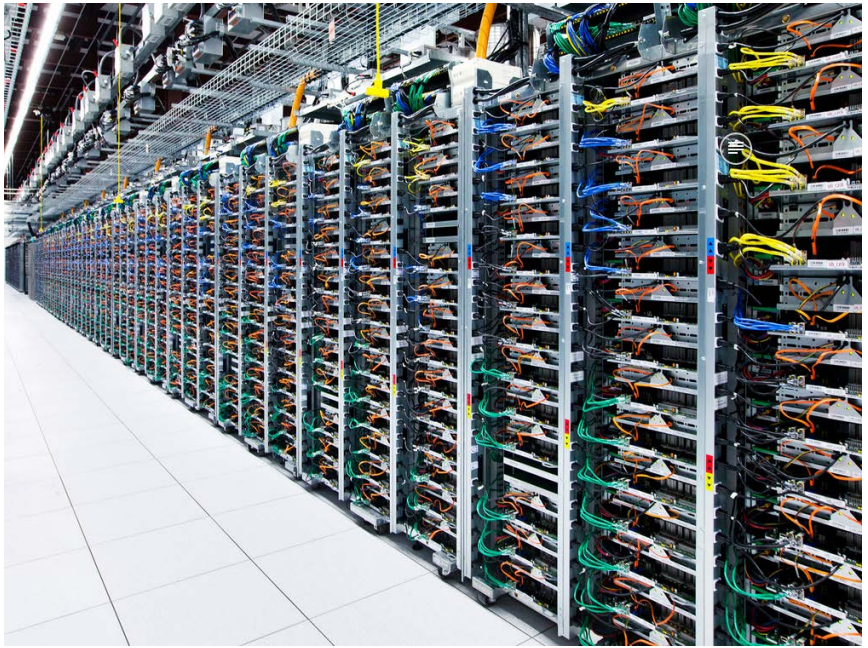


Combine functional Silos

- “Bad behavior arises when you abstract people away from the consequences of their actions. ” –Jez Humble

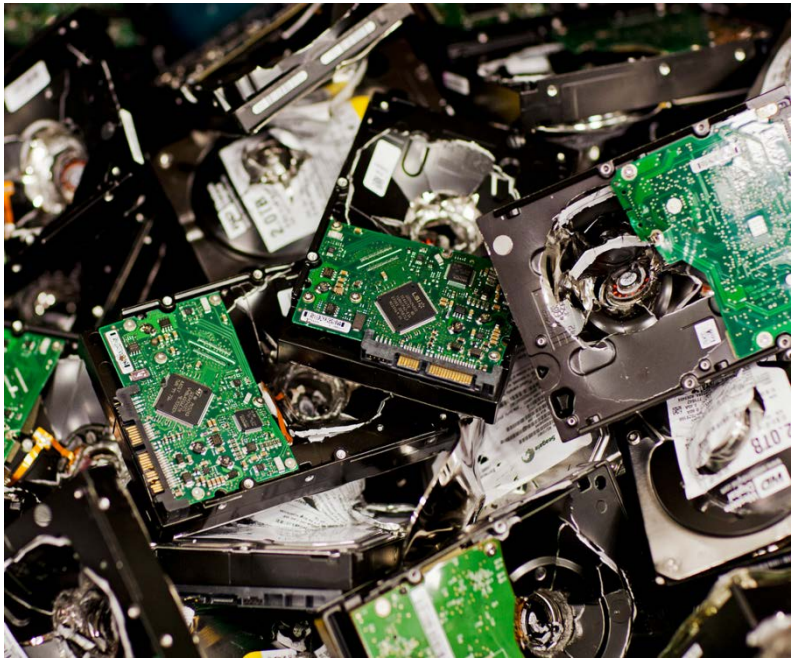
Need practices that scale to large cluster deployments

- New cluster software stacks, such as Hadoop, require coordinated deployments across large numbers of machines
- The deployment itself is complex enough to require significant scripting
- Manual system administration process can’t keep up



Need practices that scale to reliable, fast releases

- Example: rapidly deploy patches for security incidents without reliability impacts
- High-performing IT organizations deploy 30 times more frequently, with 200 times shorter lead times*.
  - 60x fewer failures and 168x faster

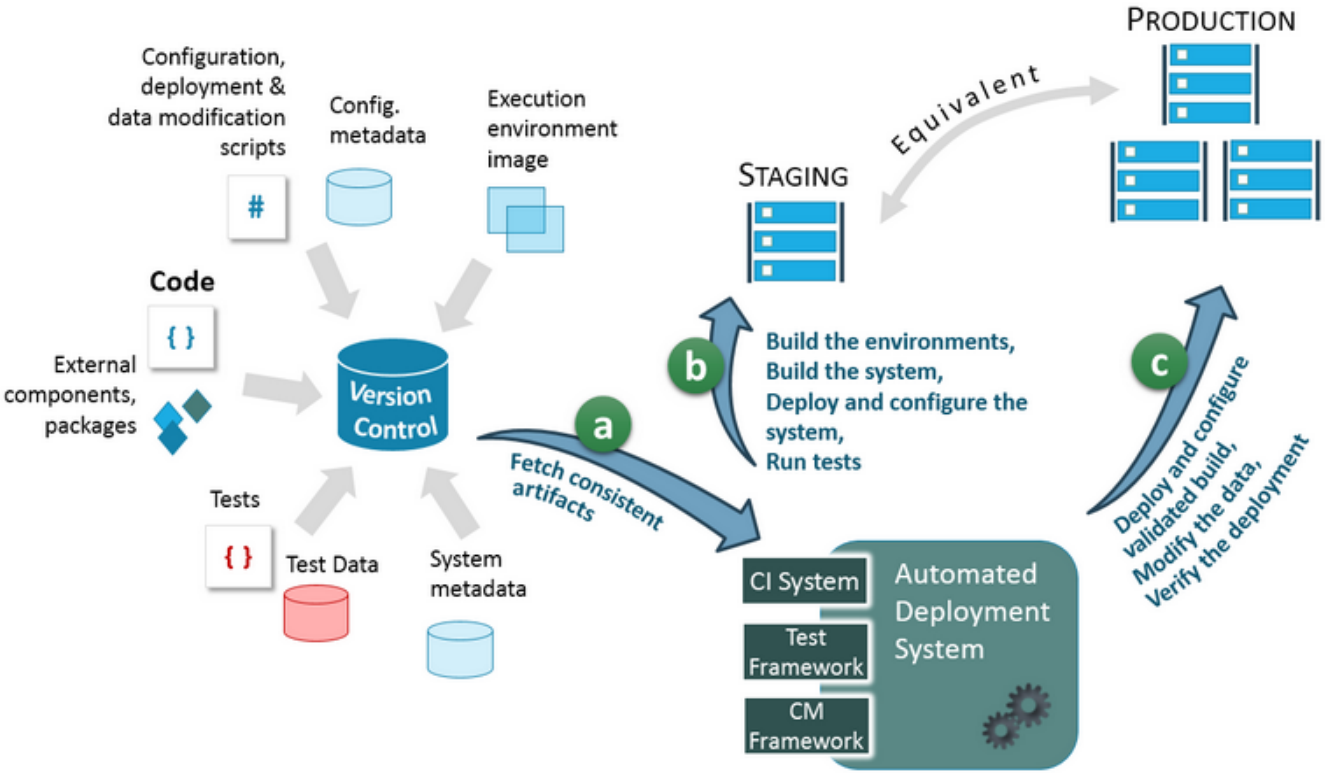


*Puppet Labs 2015 state of DevOps report

Development team needs operational team to:

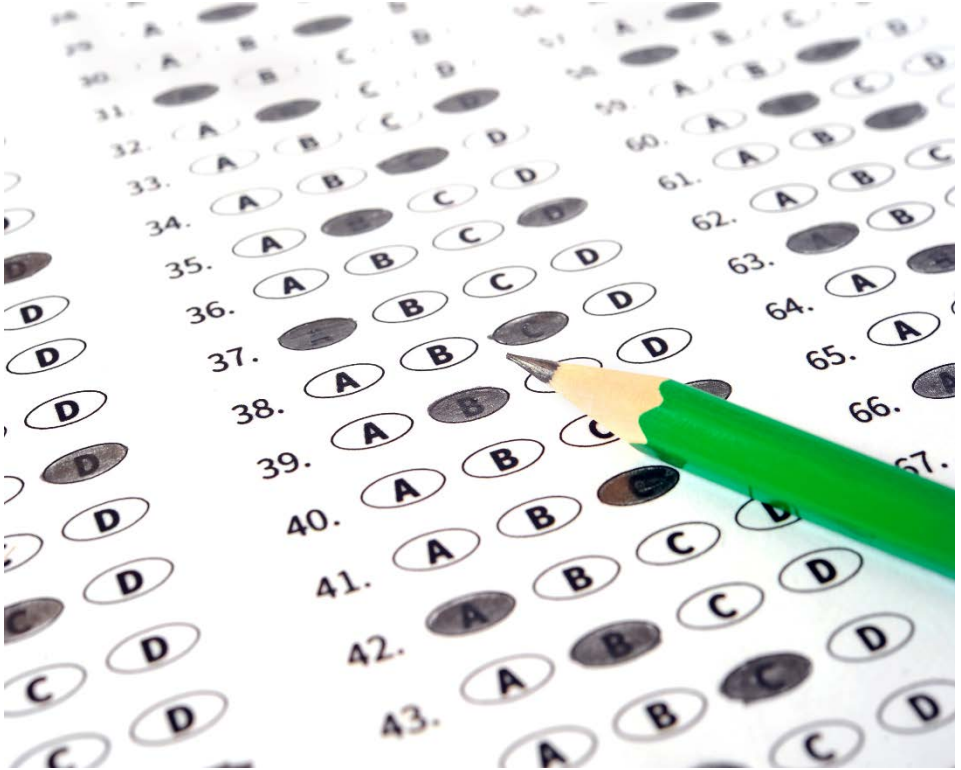
- Development team needs from the operational team:
  - A reliable infrastructure
  - Self-service environments and deployments
- Operational team needs from the development team:
  - Automate the build process
  - Simplify deployment

The SAFe Deployment Pipeline



Automated Testing and QA

- Automate
  - Builds
  - Functional testing
  - Performance testing
  - Security testing



So Should you Create a DevOps Team?

- A team doesn’t have to be the answer, but we need tighter coordination between the functions
- Integrated teams can be composed of individuals from different organizations, as a way of uniting towards a common objective

What has the industry learned from the big guys

- Google: If you buy enough software, something is always breaking. You need processing models that are robust to machine failure (Google File System, BigTable, MapReduce)
- Netflix: You need to aggressively test your systems to be robust to failure. (ChaosMonkey)
- Amazon service testing
- Cloud enabled zero downtime deployments (A/B clusters)
- GSA 18F DevOps went with a container model to “move the vast majority of the security and review burden to the platform itself”

Tools: Deployment

- Automate the steps required to get a version of the application deployed- even when that deployment includes multiple servers
- Prevent local changes that create snowflake servers
- Configuration Management: Ansible, Puppet, Chef, SaltStack, etc.
- Cluster Management: Kubernetes, Mesos, Marathon

Tools: Containers

- Easy deployments assuming
  - Linux has won in the data center
- The best purpose of containers is **not** trying to run multiple machines on one machine- if you want to do that just use VMWare, Xen, etc.
- The purpose is having a pre-installed build of the software that can be immediately dropped on any Linux kernel running the container software
- You avoid the performance penalty of a VM
- The container is smaller than a VM, because it doesn't include the OS, just the components needed by the application
- Look at: Docker, Rocket, LXD, Drawbridge, CoreOS

Real World Takeaways

- DevOps is a new kind of cross-functional role, and/or a new kind of team
  - Need people that understand systems and can script their automated management.
- Automation is a key to dealing with complexity and scale
- Standard containers can allow for verification work at multiple levels of scale
- Not all projects need to be hyper-agile, not all projects need to be hyper-reliable and scalable. Focus your process and energy at the right level.
- Focus on figuring out how to not be the bottleneck in the value stream