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DevOps - Basic

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WHAT IS DEVOPS ?

Some History

- DevOps movement really started with a Session in Velocity Conference in 2009

- Session was
  "**10+ Deploys Per Day: Dev and Ops Cooperation at Flickr**"
  by John Allspaw and Paul Hammand

- Video

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Dev Vs Ops Conflict

Its Not my Code, its your machines

Its not my machine, its your code.

Traditional Thinking

Dev's job is to add new features

Op's job is to keep site stable and fast

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But something's wrong here.

Ops Job is to '**Enable**' business

That's Dev's Job too.

But

Business **Requires CHANGE**

But Change is root cause of most outages

Choice !!!

Discourage change in the interest of stability

OR

Allow change to happen as often as it needs to

Is there way to achieve stability and still allow change ?

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Enter '*DevOps*'

DevOps

is a way to **lower** the **risk of 'Change'**

with **TOOLS** and **CULTURE**

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DEVOPS – KEY PRACTICES AND CULTURE

Key DevOps Practices

1. Automated Infrastructure
2. Shared Version Control (between Dev and Ops)
3. One Step Build
4. One Step Build and Deploy
5. Change Tracking – Who, When, What ?
6. Small Frequent Changes and Deploy
7. Feature Flags
8. Shared Metrics
9. ChatBots – IRC/IM Robots

-- ***John Allspaw and Paul Hammand, Velocity Conf. 2009***

Culture

- Respect for One Another (Dev, QA, Ops)
- Trust
- Shared Runbook and Escalation Plans
- Healthy Attitude About Failure
  - Fail Fast
  - Assume Operation Failures will occur and plan for fast recovery
- Avoid Blame

DevOps is NOT EASY

Its easier to continue shouting at each other

However, DevOps is much more rewarding

Fast Changing World of DevOps

2009

- 10+ Deploys per Day in Flickr

2012

- **Amazon – 23,000 deploys/day**
- Google – 5,500 deploys/day
- Netflix – 500 deploys/day
- **Typical Enterprise – ONCE every Nine Months**

Business Value of DevOps

Why Companies are suddenly SO interested in DevOps ????

Data shows that Companies who use DevOps have

- 30X more frequent code deploys
- 8000x faster code deployment lead times
- 2x change success rate
- 12x faster MTTR (Mean Time to Repair)
- **2x more likely to succeed in profitability, market share and productivity goals**

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Let me ask you a Question

How long it takes for your team to deploy a change that involves one single line of code ??

(rephrasing the quote from Mary Poppendiek, Lean Software Deveopment Guru)

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DEVOPS - CONFUSIONS

Projects

We are doing ‘project’, our customer’s operations team (or another vendor) does a deploy. Now

- Customer wants all vendors to do DevOps
- We claim that we are doing DevOps.

Desktop Applications

We develop a desktop app and release it to our Customers/End Users.

- So we are the ‘Devs’ but then who is our ‘Ops’ ?
- How do we do DevOps then ?

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Lets Review Definition of DevOps

DevOps

is a way to

LOWER the **risk of 'Change'**

with

TOOLS and **CULTURE**

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Want to lower the 'risk' of change ?

KEY – Find out what kind of change you are afraid of

THEN Just do the kind of 'change' more often.

- For example, deploy everyday rather than holding up a list of features for end of month deploy
- Develop tools to roll back a deploy if things go wrong

Key DevOps Practices

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What are you doing to 'Lower the Risk of Change' ??

- If you are , then you are following 'spirit' of DevOps
- Lets list some of these practices/tools that you are using ?

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BEING *AGILE* BY FOLLOWING *DEVOPS*

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Agile/DevOps/Kanban/LEAN

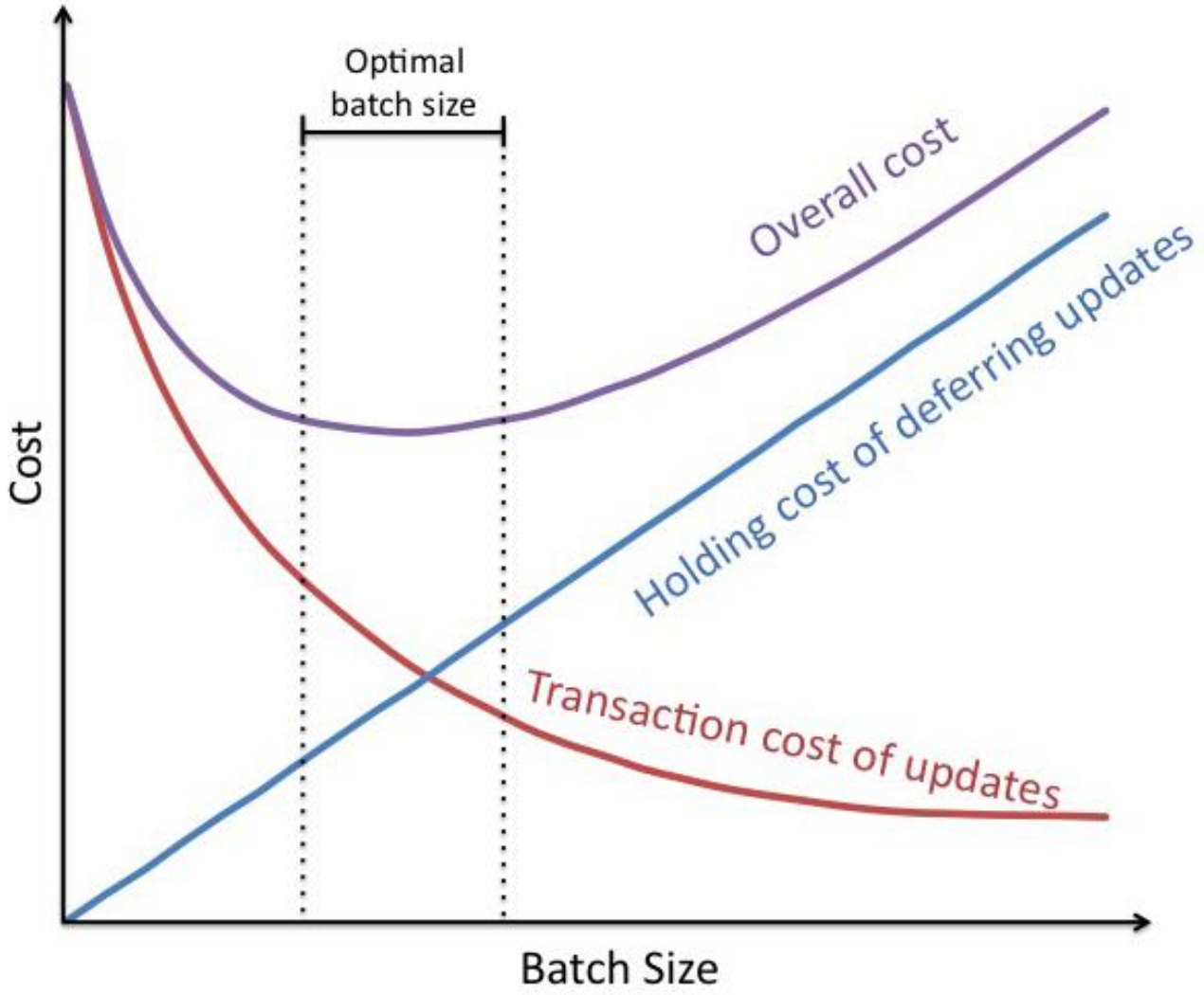
Agile/DevOps are applying Concepts of 'FLOW' from Toyota Production System /TQM /LEAN to Software

- Reduce Batchsize to reduce WIP
- 'Push' vs 'Pull' production systems
- Left to Right Flow

Just do the same kind of ‘change’ more often.

Reduce the ‘batch size’ and do more batches/releases/deployments with smaller number of features/changes/bug fixes

Reduce WIP by reducing batch sizes



Reduce WIP by reducing batch sizes

- Timeboxed short sprints
  - Remember 1 month Sprint has 2x ‘WIP’ than 2 week sprint and hence can double the ‘overall cost’.
- Ultimately leading to continuous delivery (or Single Piece Flow)
- *WIP – Work In Progress Inventory*

Achieving Early ROI

Monthly/Quarterly Releases - Worst ROI	Daily Shippable Build – Better ROI	Continuous Integration – Even Better ROI	Continuous Delivery – BEST ROI
• Integrated build prepared on developer desktop and tested. • Manual work.	• Automated binary creation • Automation of static analysis, unit tests, etc	• Prepare binaries and run tests on every commits • Really low regression bugs	• Best releases are in end users hands immediately • No more Periodic Major releases.

Visual Control

- Current status of Project is Visible to EVERYONE
- HOW ?
  - Burndown charts
  - Daily Build Status
  - Status of Automated Tests (Success/Failures)

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Continuous Improvements and Automation

- Always Ask
  - What can I automate ?
  - What can be improved (in quality, in speed/performance, etc etc)
  - What mistakes can be prevented by automation ?

Automation - Remember

Most powerful tool that we have as developers is “Automation”
– Scott Hanselman

If you Automate a ‘mess’, you get ‘automated mess’
– Rod Michael

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Mistakes WILL Happen – Hence Fail Fast

- Same as Toyota's Principle of "*Anyone Can Stop Assembly Line*".
- Mistakes WILL Happen
  - How to reduce the impact of mistakes ?
  - How to detect mistakes early ?
- How ??
  - Static Code Analysis
  - Zero Warnings Code
  - QA Picks up installable ONLY after all Automated Tests Pass

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PRACTICES FOR LOWERING RISK OF CHANGE IN PROJECTS

Two Key Practices

- There are two key practices you have to have.

- Excellent Configuration Management Practices
  - This is more than just I know ‘commit/update’ and Hence I am an expert of ‘version control’

- A Build Server
  - A Build Server is a ‘center of the universe’ for software development team.
  - Daily Build, Continuous Integrations, Automated Tests, static analysis, build packaging etc etc. ALL happens on Build Server

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Excellent Configuration Management Practices

- Do you have separate branches for baseline, release, bug fixes in past releases ?
- Do you have ‘documented/defined’ branching strategy ? Is every member of the team know this document ‘by heart’ ?
- Do you merge code bases regularly across branches using ‘svn merge’ or other version control merge tools and NOT WinMerge or Araxis Merge ?
- Do you tag every release sent to customer ?
- Do you have ‘defined’ tagging convention ?
- Do you regularly review and delete ‘dead branches’ ?
- Do you take ‘update’ and ‘commit’ at least twice a day ?

Build Server

- Do you have a ‘build server’ ?
- Does your QA Engineer Pickup Build ONLY from Build Server ?
- Every release package sent to customer is ‘compiled/prepared’ on build server and NOT on developer machine.
- Do you have a ‘one click’ build (and a scheduled daily build)
- Do you have automated tests running on the build ?
- Can you prepare a ‘complete’ release package in one click ?
  - Checkout and compile
  - Release tagging
  - Installer creation
  - Deploy/upload to FTP etc
  - Notify to users that a new build is available
  - Fully or partially auto generated ‘release notes’
- Does developers give HIGHEST priority to ‘build break’ ?
  - Do team check every day for Build Success And Target 99.9% build success rate ?

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PRACTICES FOR LOWERING RISK OF CHANGE IN DESKTOP APPS

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DEVOPS FOR PLM (AND OTHER ENTERPRISE APPS)

PLM Upgrades

Traditional Approach - Point Upgrades

- Long upgrade timelines - associated costs and risks (version jumps)
- The upgrades are taken up on longer intervals (3-5) years
- H/W and S/W obsolescence reducing the "useful" life
- Increased maintenance costs
- Poor visibility on the cost drivers
- Misaligned IT and Business

Periodic Upgrades

- Shorter upgrade cycles
- Upgrades on regular intervals
- Lower development and maintenance costs
- Increased functionality to users periodically
- Increased window periods for aligning with IT and Business

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- **THANK YOU !!!**

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References

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- Practical Science of Batch size (*https://yow.eventer.com/yow-2012-1012/the-practical-science-of-batch-size-by-don-reinertsen-1269*)
- http://www.innolution.com/blog/agile-documentation-and-the-economics-of-batch-size

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Unix Philosophy

1. Make each program do one thing well. To do a new job, build afresh rather than complicate old programs by adding new features.
2. Expect the output of every program to become the input to another, as yet unknown, program. Don't clutter output with extraneous information. Avoid stringently columnar or binary input formats. Don't insist on interactive input.
3. **Design and build software, even operating systems, to be tried early, ideally within weeks. Don't hesitate to throw away the clumsy parts and rebuild them.**
4. **Use tools in preference to unskilled help to lighten a programming task, even if you have to detour to build the tools and expect to throw some of them out after you've finished using them.**

Doug McIlroy, [McIlroy78] The Bell System Technical Journal. Bell Laboratories. M. D. McIlroy, E. N. Pinson, and B. A. Tague. "Unix Time-Sharing System Forward". 1978. 57 (6, part 2). p. 1902.