Test Automation:
A Project Management Perspective

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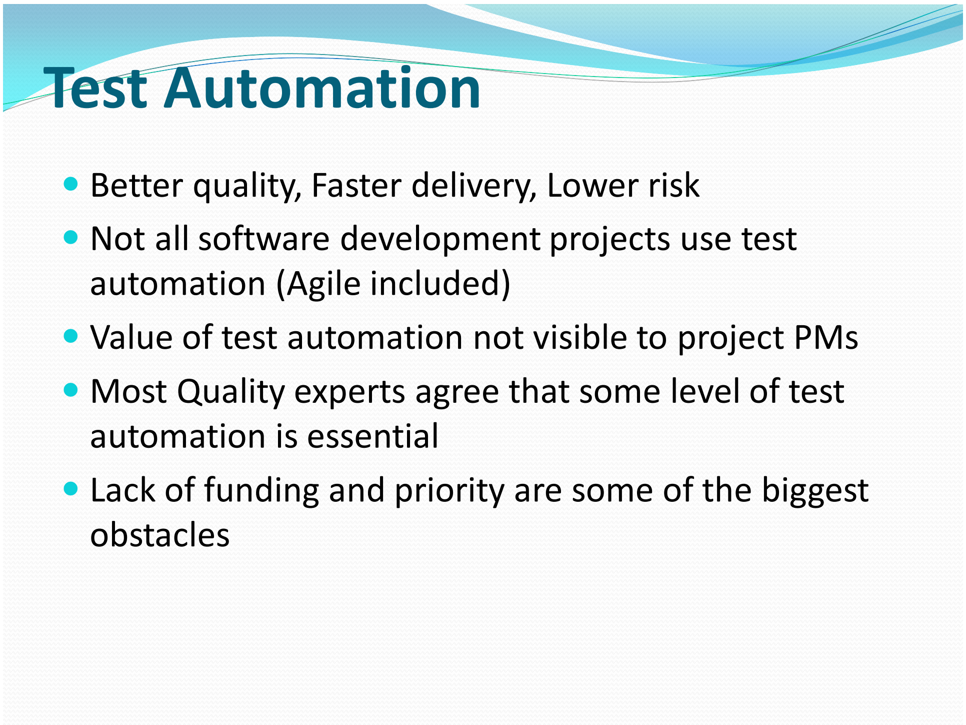
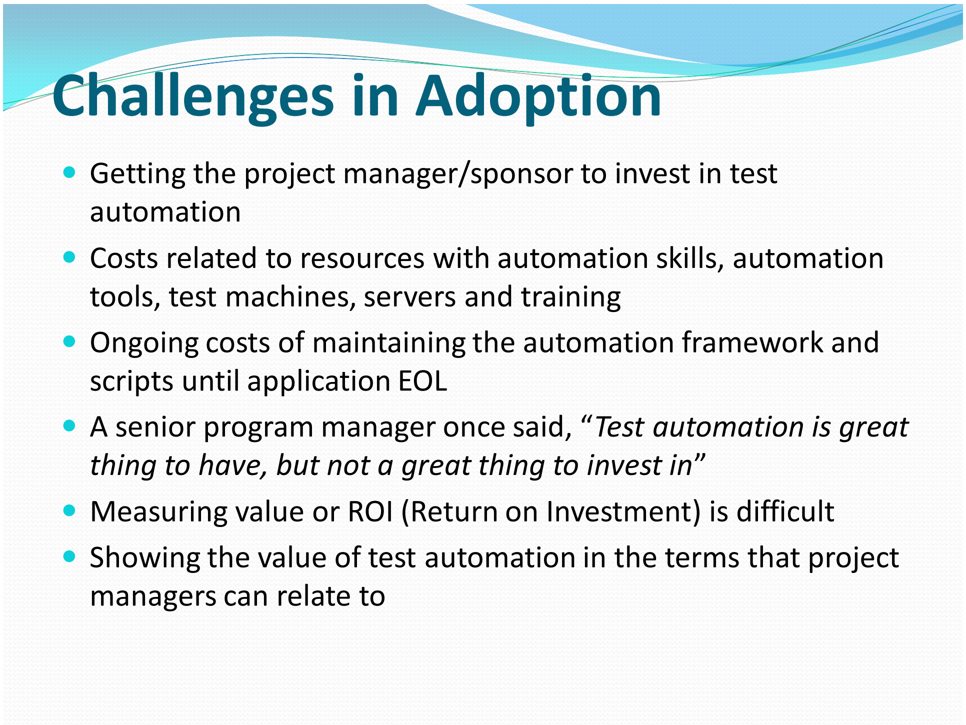
Introduction

- *QA Manager at Intel*
- *Involved in software testing strategies and processes*
- *Works on sales and marketing projects/applications*
- *Worked with XP, Scrum and Scaled Agile Framework*
- *Got PMP, CSTE in 2006 and CSM in 2012*



Test Automation

- Better quality, Faster delivery, Lower risk
- Not all software development projects use test automation (Agile included)
- Value of test automation not visible to project PMs
- Most Quality experts agree that some level of test automation is essential
- Lack of funding and priority are some of the biggest obstacles



Challenges in Adoption

- Getting the project manager/sponsor to invest in test automation
- Costs related to resources with automation skills, automation tools, test machines, servers and training
- Ongoing costs of maintaining the automation framework and scripts until application EOL
- A senior program manager once said, “*Test automation is great thing to have, but not a great thing to invest in*”
- Measuring value or ROI (Return on Investment) is difficult
- Showing the value of test automation in the terms that project managers can relate to

Project Management Constraints

- **Scope:** Product Scope
- **Cost:** Resources + dollars
- **Schedule:** Amount of time to complete
- **Quality:** Product defects, Stability
- **Risk:** Project failure, Not meeting user expectations

- Direct correlation between project variables and investing in test automation is missing
- Usually reluctant to invest in test automation
- Translating investments and ongoing costs into positive impact on project attributes
- Individual metric for projects' attributes to shows tangible and measurable value

Project Management Constraints

- **Scope:** No impact
- **Cost:** Investing in test automation can have an initial spike in project costs, ROI should move to positive territory at some point
- **Schedule:** Can clearly show positive impact, duration for regression test cycles will shrink
- **Quality:** Allows multiple regression cycles for same project schedule, team to improve overall quality and increase the users' confidence
- **Risk:** More test coverage means better understanding of application behaviors and defects

Test Automation and Quality

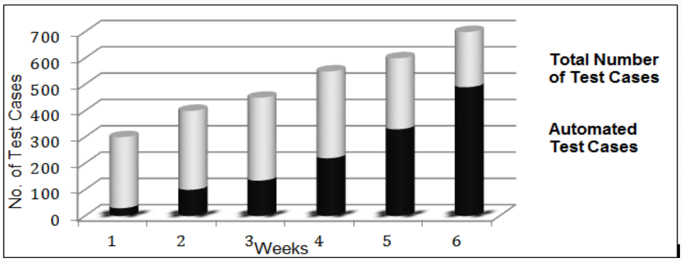
- **Regression Testing**
  - Ensures that previously working functionality is not altered or impacted
  - All or a subset of existing test cases that need to be run depending on the application or platform
  - Running them manually can take days or weeks to complete
- **Test-Fix-Test Cycles**
  - Better testing or test coverage is not enough
  - Needs series of Test-Fix-Test cycles until defect counts are reduced to below thresholds
  - Run several regression cycles to ensure the defect numbers are below acceptable levels

Metrics and Measures

- **Test Automation Coverage**

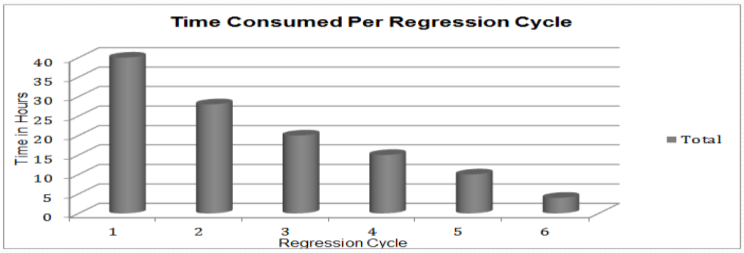
  Number of test cases automated Vs. total number of automatable test cases

$$TAC = \frac{\text{No. of Automated Test Cases}}{\text{No. of Test Cases that can be automated}}\ x\ 100$$



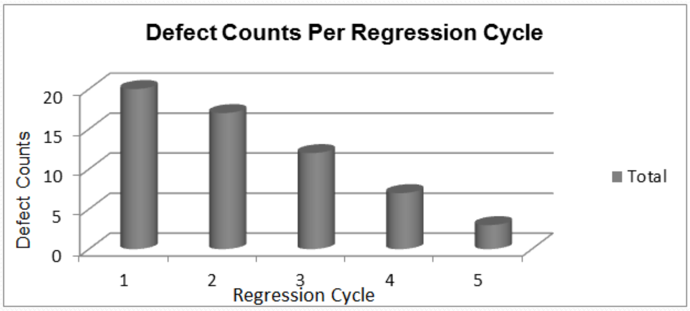
Time Gain per Regressing Cycle

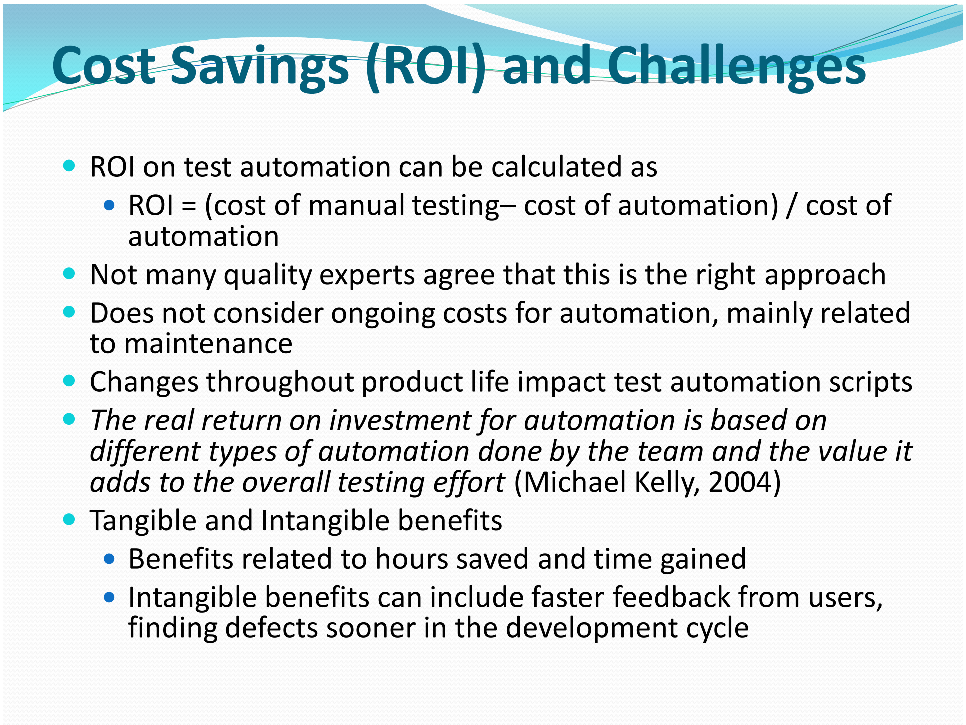
- Time it takes to run the regression cycle manually Vs. running it using automation tool
- The time gain/effort reduced per cycle means cost saving
- Need fewer testers as manual execution declines
- Initial cost of automation is high
- There is certain cost saving per regression cycle, it will add up to the initial cost of automation eventually
- ROI on test automation efforts moves into positive territory



Defects Found per Regression Cycle

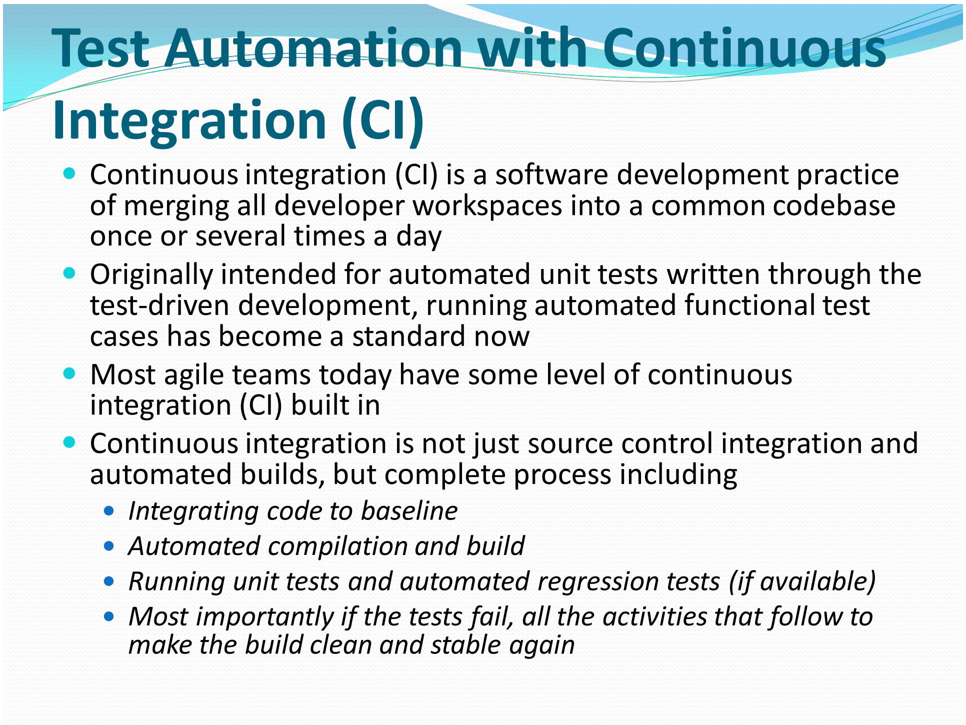
- Tells the team about the quality of the application
- Shows effectiveness of the test automation
- Defects found per regression cycle are a good indicator of quality
- As defects counts trend downwards over a series of regression cycles, it builds the confidence of the stakeholders





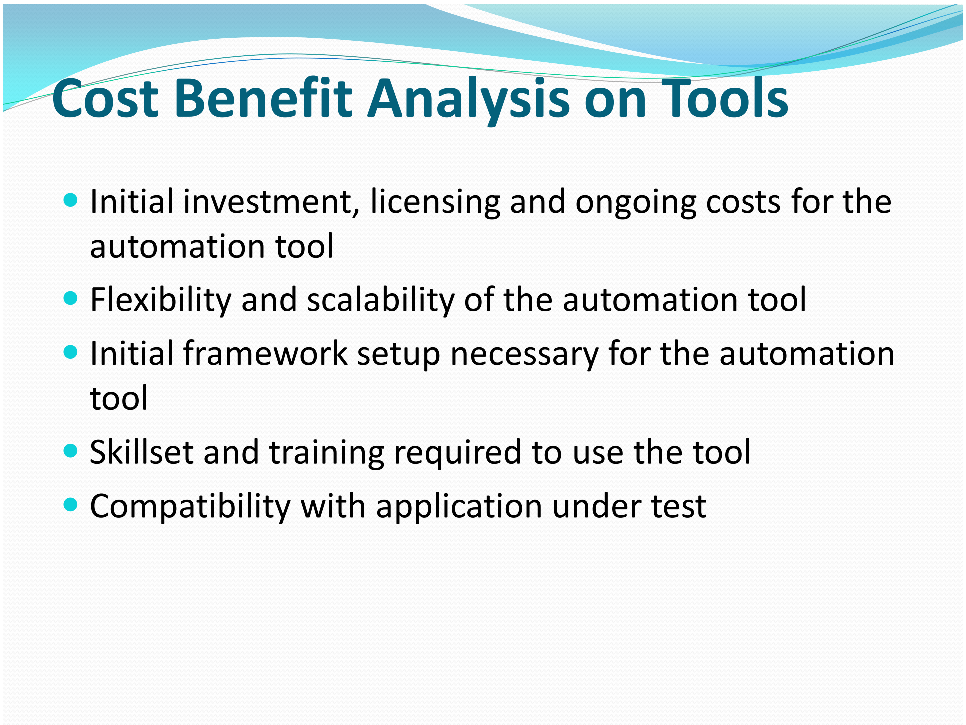
Cost Savings (ROI) and Challenges

- ROI on test automation can be calculated as
  - ROI = (cost of manual testing– cost of automation) / cost of automation
- Not many quality experts agree that this is the right approach
- Does not consider ongoing costs for automation, mainly related to maintenance
- Changes throughout product life impact test automation scripts
- *The real return on investment for automation is based on different types of automation done by the team and the value it adds to the overall testing effort* (Michael Kelly, 2004)
- Tangible and Intangible benefits
  - Benefits related to hours saved and time gained
  - Intangible benefits can include faster feedback from users, finding defects sooner in the development cycle



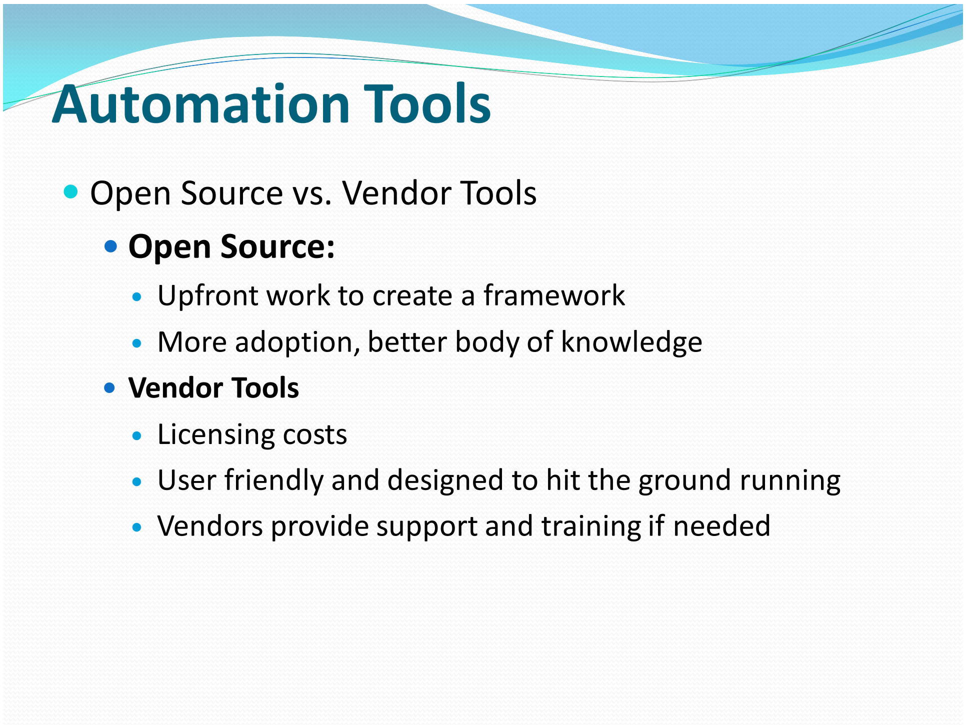
Test Automation with Continuous Integration (CI)

- Continuous integration (CI) is a software development practice of merging all developer workspaces into a common codebase once or several times a day
- Originally intended for automated unit tests written through the test-driven development, running automated functional test cases has become a standard now
- Most agile teams today have some level of continuous integration (CI) built in
- Continuous integration is not just source control integration and automated builds, but complete process including
  - *Integrating code to baseline*
  - *Automated compilation and build*
  - *Running unit tests and automated regression tests (if available)*
  - *Most importantly if the tests fail, all the activities that follow to make the build clean and stable again*



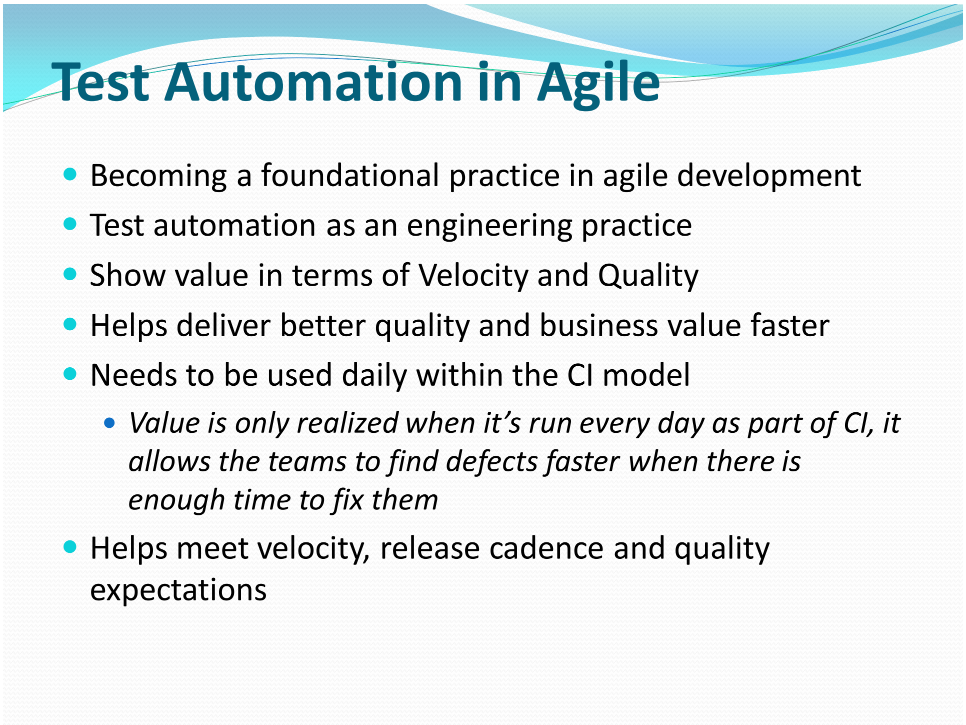
Cost Benefit Analysis on Tools

- Initial investment, licensing and ongoing costs for the automation tool
- Flexibility and scalability of the automation tool
- Initial framework setup necessary for the automation tool
- Skillset and training required to use the tool
- Compatibility with application under test



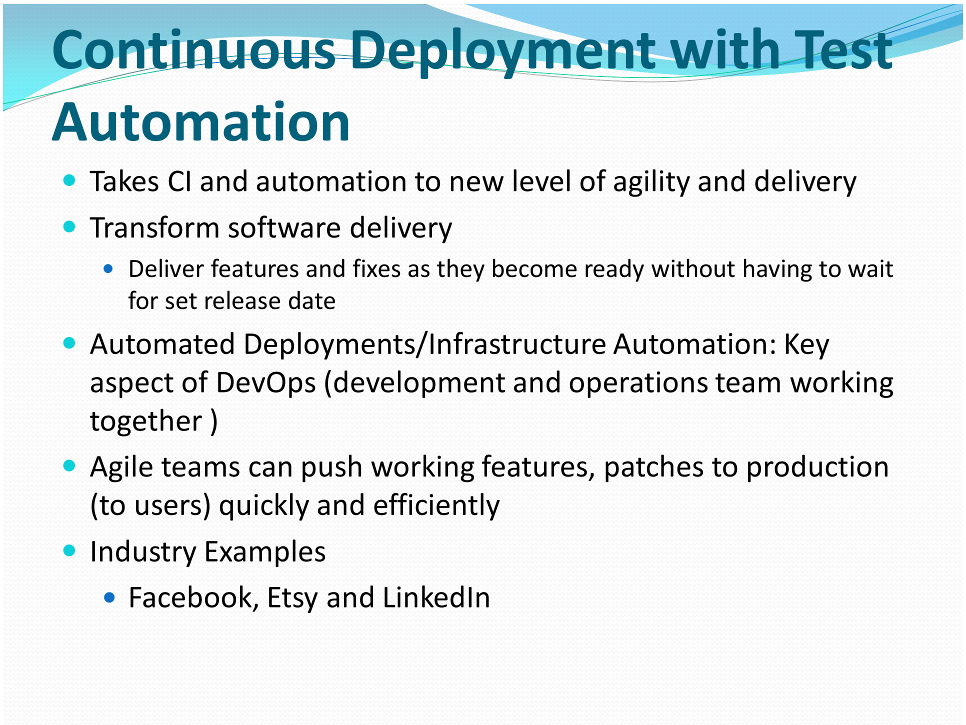
Automation Tools

- Open Source vs. Vendor Tools
  - **Open Source:**
    - Upfront work to create a framework
    - More adoption, better body of knowledge
  - **Vendor Tools**
    - Licensing costs
    - User friendly and designed to hit the ground running
    - Vendors provide support and training if needed



Test Automation in Agile

- Becoming a foundational practice in agile development
- Test automation as an engineering practice
- Show value in terms of Velocity and Quality
- Helps deliver better quality and business value faster
- Needs to be used daily within the CI model
  - *Value is only realized when it's run every day as part of CI, it allows the teams to find defects faster when there is enough time to fix them*
- Helps meet velocity, release cadence and quality expectations



Continuous Deployment with Test Automation

- Takes CI and automation to new level of agility and delivery
- Transform software delivery
  - Deliver features and fixes as they become ready without having to wait for set release date
- Automated Deployments/Infrastructure Automation: Key aspect of DevOps (development and operations team working together)
- Agile teams can push working features, patches to production (to users) quickly and efficiently
- Industry Examples
  - Facebook, Etsy and LinkedIn

Conclusion

- Project managers or stakeholders sometimes may not see the value of test automation and benefits it offers
- Understand impediments to investing in and prioritizing test automation efforts
- Influence the decision to invest in automation by showing the value in terms of positive impact to key project management attributes
- Show the value of test automation in terms of positive effect on project's schedule, cost and quality (aspects that project managers and stakeholders most care about)

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