Testing in Production

Good, Bad or Ugly idea

Jos van Rooyen
Agenda

• Introduction
• Reasons to test in production
• Definition
• Forms of testing in production
• Areas of application
• Risks
• QA and production testing
• Pros and cons
• Examples
• Future work
• Employed at Identify as partner / principal consultant
• 30 years in software testing & quality management
• Co-author TestGrip, TestFrame, Project de Baas, Quality Supervision, Textbook; “Aan de slag met software testen”, Cleantxt, Test Automation Architecture
• Test expert online magazine Computable
• Publication areas; Test process Improvement, BI-testing, Test automation, Test Education, Risk Based Testing, Quality Supervision
• Visiting lecturer Universities of Applied Science
• Member advisory board Hogeschool Utrecht
• Board member of Dutch Testing Society
Introduction

• Up until a few years ago testing in production was almost not allowed. The test methods used didn’t stimulate it
• The idea was, it was too risky. The impact could not be overseen
• Testing doesn’t stop anymore by go live
• Bitter necessity
• It is not a taboo anymore
Challenges in software testing

• Systems are getting much more complex
• Too expensive to create a test environment
• Impossible to validate systems in development environment only
• Specific data situations are not available
• Historic data is not always available. Testing in the past is not possible
Reasons to test in production

- Time to market
- Complexity of the software is increasing. Much more components, interfaces are involved
- Too expensive to create a special test environment. Not really a quality issue but a budget issue
- Preparation for a new product or service
- Determine customer behaviour
- Not able to create the necessary circumstances
- Required test data not available in the test environment
Definition

Execution of test scenarios for specific situations in production because conditions could not be fulfilled during development process(es). Based on a risk assessment and limited to certain branches or applications.
Types of testing in production

Feedback in production
- Monitoring and alerting
- Analytics events
- Logging
- Customer feedback

Test practices in production
- A/B testing
- Beta testing
- Monitoring as testing

Exposure control
- Canary release
- Staged rollout
- Dogfooding
- Dark launching
Areas of application

• Not always applicable due to several reasons:
  – Risk factor
  – Mission critical environment

• Applicable to:
  – Testing of workspace hardware
  – Automotive situations
  – Data input situations
  – Validation of customer behaviour
Risks of applying testing in production:

- Immature quality of the system
- Uncertainty of the chain. Not everything is foreseen
- Roll back is not possible
- Accidents or people get harmed
- No fallback scenario available
QA and production testing

- Execute risk assessment with all stakeholders
- Determine the situations for production testing
- Start testing during development
- Start with a small group (pre pilot, pilot, department, etc.)
- Scale up when possible but be aware of the risks
- Differences with a regular test process:
  - Real life situations are used
  - Negative testing is not possible. Only happy flow can be applied
  - Risk analysis upfront with all stakeholders and participants
  - Suppliers must be available 24/7
  - Focus on functional testing instead of also Non Functional Testing
  - Production testing is an extension to the test process
Pros and cons

• Pros:
  – Extra quality measures before implementation
  – Insight of impact several choices
  – Secured and staged rollout
  – Fast feedback loop

• Cons:
  – Too much risk
  – High costs
  – Context of the situation
  – Think about the environmental issues
## Migration Citrix to O365 workspace

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<tbody>
<tr>
<td><strong>No. Of workspaces</strong></td>
<td>800</td>
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<tr>
<td><strong>No. Of applications</strong></td>
<td>220 (SAP, cloud etc.)</td>
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| **Challenges**         | Lack of knowledge of the applications  
                        | Keyusers are brand new  
                        | Sources not always available  
                        | Usage not always clearly |
| **Solution**           | Test in production by hand of a new device  
                        | Citrix enviroment still in place as a back up |
| **Results**            | 250 bugs found and solved  
                        | Succesful migrations all 18 locations |
## Examples

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<th>Innovation centre</th>
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<tr>
<td>No. Of workspaces</td>
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### Upgrade anti virus software

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<td>Challenges</td>
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<td></td>
<td>Too expensive to organize a test project</td>
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<td>IT team classify the risk as very low</td>
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<td>No testscripts available</td>
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<tr>
<td>Solution</td>
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<td>Test by hand of 2 groups:</td>
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<td>It team test the software during a week just</td>
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<td>during normal business</td>
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<td>Next step is during a month with 60 users just</td>
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<td>doing there regular work</td>
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<td>When all these steps are successful the whole</td>
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<td>organization will work with the new antivirus</td>
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<tr>
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<td>software</td>
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<td>Results</td>
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Applying the SAFe model

### Case Study: Air France-KLM

**Challenge:** Air France - KLM sought to scale Agile practices companywide to improve time to market and efficiency, but must contend with specific contexts and regulations in the different businesses of the airlines.

**Benefits:**
- More frequent releases
- Increased engagement
- Faster time-to-market
- Improved customer satisfaction

**Technical Debt Down 60 Percent**
- More frequent releases: Major releases come out 9X more often, from 4 to 19 in a year.
- Increased engagement: People are more engaged, connected with each other, and willing to help others.
- Faster time-to-market: Each ART team delivers on its promises every three weeks. Since moving to SAFe, the company released 17 times in the five environment in seven months compared to every six months previously.
- Improved customer satisfaction: SAFe KLM has been able to boost its vision three times in the past year, allowing the company to tap into new business opportunities much more quickly and easily.

**Case Study: Deutsche Bahn**

**Challenge:** After privatizing the company, Deutsche Bahn faced new market forces, along with increased competition from new transportation players.

**Benefits:**
- Improved customer satisfaction
- Faster time-to-market
- Improved service quality

**Technical Debt Down 60 Percent**
- More frequent releases
- Increased engagement
- Faster time-to-market
- Improved customer satisfaction

**Case Study: Cerno**

**Challenge:** Delivers custom solutions faster and with higher quality for clients.

**Benefits:**
- Faster time-to-market
- Improved customer satisfaction

**Technical Debt Down 60 Percent**
- More frequent releases
- Increased engagement
- Faster time-to-market
- Improved customer satisfaction

**Case Study: Mures**

**Challenge:** With its MX.3 platform in use across the globe, Mures sought to maintain and build upon its market-leading position while continuing to respond rapidly to support the changing needs of clients and global regulatory demands.

**Benefits:**
- Faster production-like testing
- Tested and upstream/downstream interface validation dropped from five days to just one hour, making it possible to get the full suite to customize each new customer configuration.

**Technical Debt Down 60 Percent**
- More frequent releases
- Increased engagement
- Faster time-to-market
- Improved customer satisfaction

**References:**
- More frequent releases
- Increased engagement
- Faster time-to-market
- Improved customer satisfaction
Costs & Benefits in euros

• No figures available yet from our own projects
• No figures available on the internet
• Companies don’t like to share this kind of data
• Special research must be set up for this
Conclusions

• Testing in production is a powerful tool but an extension to the test process
• Necessary in the modern development methods. We have to speed up delivering software
• But think before acting. It could be very risky
• Not applicable to all areas
• Fast feedback loop of a product into the market
• Extra assurance before using a product on a large scale
Future work

• Determine more situations to apply testing in production
• Gain more experience
• Identify standard risks
• Estimate the costs of testing in production in relation to testing during development
• Collect metrics about the benefits of testing in production
• Develop standard monitoring approach