

# Danish Universities Easily Validate Digital Examination App with HPE StormRunner Load

December 6, 2016

Today's Speaker:



Jesper Mortensen  
Project Manager  
aHOC



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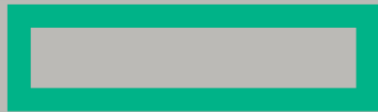


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December 6, 2016



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Slide 1 of 2

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Ask

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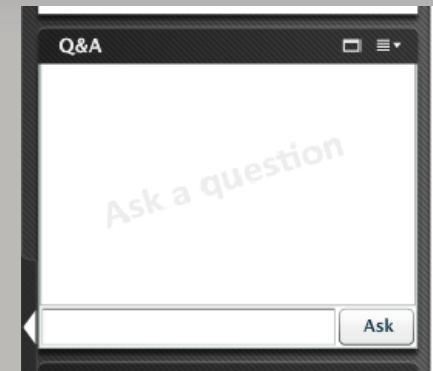
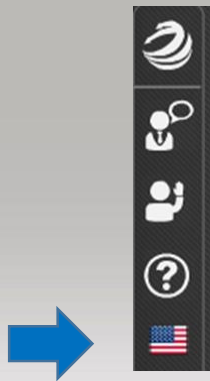
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# DE digital\_ eksamen

Performancetest

Dec 6. 2016

Jesper Mortensen (aHOC)

UNIVERSITY OF COPENHAGEN





# Agenda



1. The Project = The Challenge
2. StormRunner Load = The Tool
3. The story = The Performance test

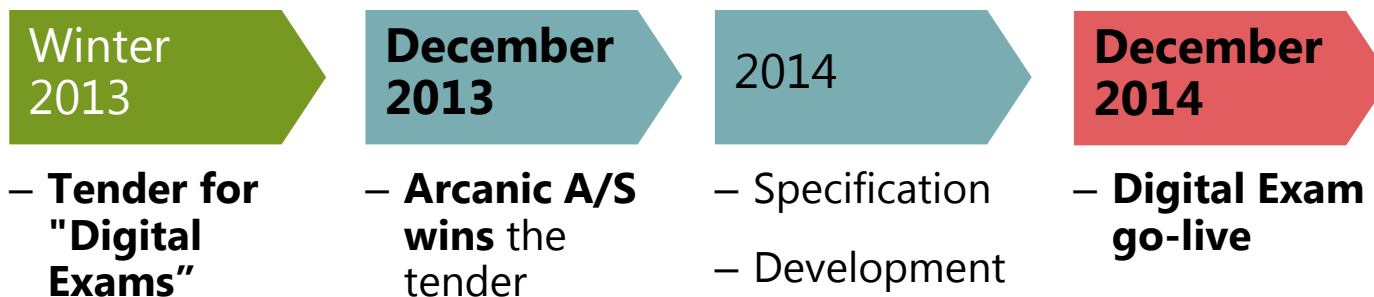
# What is DE about ....



# Background



- Winter 2013 AAU, AU, CBS, KU og RUC opens a tender for a solution for "Digital Exams"
- December 2013 Arcanic A/S wins the tender
- 2014 Specification and development of the solution
- December 2014 Digital Exam go-live



# Where is DE today?



- Development project concluded
- Digital Exam used by 5 universities
  - Around 300.000 exams executed every year. Expected to rise to 500.000/Year
  - 120.000 user (students)
  - More than 10.000 (Teachers/Professors)
- DTU enters the solution as University #6

# About trusting a supplier



- Exams is a core service that cannot be allowed to fail  
In Denmark universities are publicly funded and this funding is based on "passed exams"
  - The supplier states that the solution is tested and there will be no issues
  - But what if it fails ?
    - Lots of students would need to be re-examined
    - Bad internal image among students and staff
    - Frontpage coverage in newsmedia
    - Management questions
- The project do not want to take this risk  
– but also they dont really want to pay for a solution !



# The application



- Can be used from home
- Can be used in exams executed on-premise  
Typically the Universities hires a gymnasium for larger exams with ~1000 students attending at the same time
- Flow
  - Login
  - Open a current exam
  - Download questions
  - *Answer questions outside the application*
  - Upload answers
    - Including attachments

# StormRunner = Cloud = ?



Good	Bad
No / minimal installation	Only standard configuration
Dynamic ressource allocation	Long launch time
Dynamic licensing	
The globe as platform	On-premise elements can be a challenge eg. crossing firewalls, monitoring etc.



# https://saas.hpe.com



The screenshot displays the HPE MyAccount web application interface. The browser address bar shows the URL <https://home.saas.hpe.com/myaccount/TENANTID=0f/myProducts>. The navigation menu includes 'MyAccount', 'Products', 'Support', 'Users', and 'Explore'. The main content area is divided into several sections:

- Quick start:** A green 'Create a test' button.
- Don't have a script?:** Three buttons: 'Create a test using a HAR file', 'Create a REST test', and 'Create a CSV test'.
- Latest runs:** A section with a 'No runs found' message and a link to 'Check out all results.'.
- Recently worked on:** A list of recent tests, including 'Sample Load Test', 'Digital eksamen uplo...', 'Digital eksamen dow...', 'DE Ramp up', and 'Digital eksamen 2 sc...'. Each item has a flask icon.
- What's new:** A section with two items: 'CSV export enhancement' and 'Report enhancement'.
- Get tools:** A section with a 'Scripting' tab and a 'VuGen' button.
- Watch tutorials:** A section with a video thumbnail titled 'How to: Peak perfor...'.

# Creating a Test



The screenshot displays the HPE StormRunner web interface for a load test named "Digital eksamen upload 21112015". The interface includes a navigation menu on the left, a top status bar with test parameters, and a main content area with three charts and a table of test runs.

**Test Parameters:**

- SCRIPTS: 1
- API VUSERS: 5960
- UI VUSERS: 0
- DEV VUSERS: 0
- DURATION: 00:15:00
- API VUH: 1490
- UI VUH: 0
- DEV VUH: 0
- SCHEDULE: OFF

**Charts:**

- Last 5 runs (Duration):** A bar chart showing the duration of the last five runs. The runs are all marked as "Halted".
- Top 3 regressions (Transaction duration):** A line chart showing the transaction duration for the top three regressions across three time periods: 11/21 12:19, 12/12 17:08, and 12/12 18:00.
- Top 3 failing transactions (Fail rate):** A bar chart showing the fail rate for the top three failing transactions across the same three time periods.

**Test Run Table:**

ID	STATUS	START TIME	DURATION	VUSERS	UI VUSERS	API VUSE...	DEV VUS...	BENCHMARK
#22	Halted	12/12/2015 18:00	00:12:26	5960	0	5960	0	○
#21	Halted	12/12/2015 17:08	00:12:26	6000	0	6000	0	○
#16	Halted	11/21/2015 12:19	00:01:16	6000	0	6000	0	○

# Test Ressources



The screenshot shows the StormRunner web interface. The browser address bar displays the URL: <https://stormrunner-load.sas.hpe.com/assets/scripts/?TENANTID=870890038&>. The page title is "HPE Stormrunner". The navigation menu includes "Home", "Load Tests", "Assets", "Results", "Desper Mortensen", and "Get started". The "Scripts" tab is active, showing a list of scripts with columns for NAME, LABELS, USAGE, TYPE, MODIFIED, and AUTHOR. The first script, "Digital eksamen studerende aau", is selected, and its details are shown in the right-hand pane.

NAME	LABELS	USAGE	TYPE	MODIFIED	AUTHOR
Digital eksamen studerende aau		1	Web H...	11/15/2015	J?rgen G...
Digital eksamen studerende aau upload		1	Web H...	11/15/2015	J?rgen G...
Digital eksamen studerende aau downlo...		1	Web H...	11/20/2015	J?rgen G...
Digital eksamen studerende aau downlo...		1	Web H...	11/20/2015	J?rgen G...
Digital eksamen studerende aau upload...		1	Web H...	11/20/2015	J?rgen G...
Digital eksamen studerende aau downlo...		1	Web H...	11/21/2015	J?rgen G...

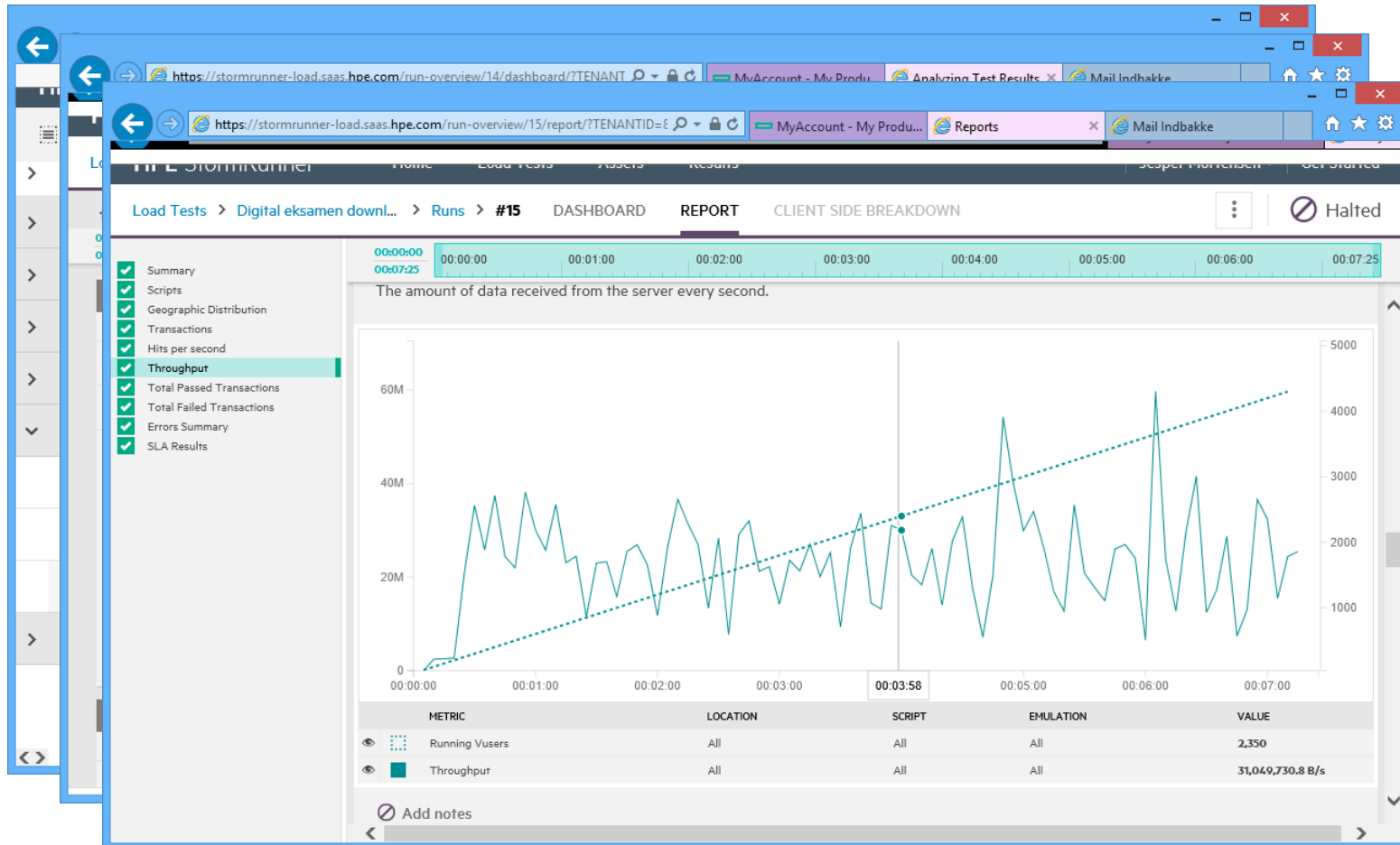
Details for the selected script "Digital eksamen studerende aau":

- Type: Web HTTP
- Author: J?rgen Groskopf
- Creation date: 11/15/2015
- Modified by: J?rgen Groskopf
- Modification date: 11/15/2015 21:16:24

Related tests: Runtime settings

Digital eksamen scriptvalidering

# Runs, Dashboard and Reports



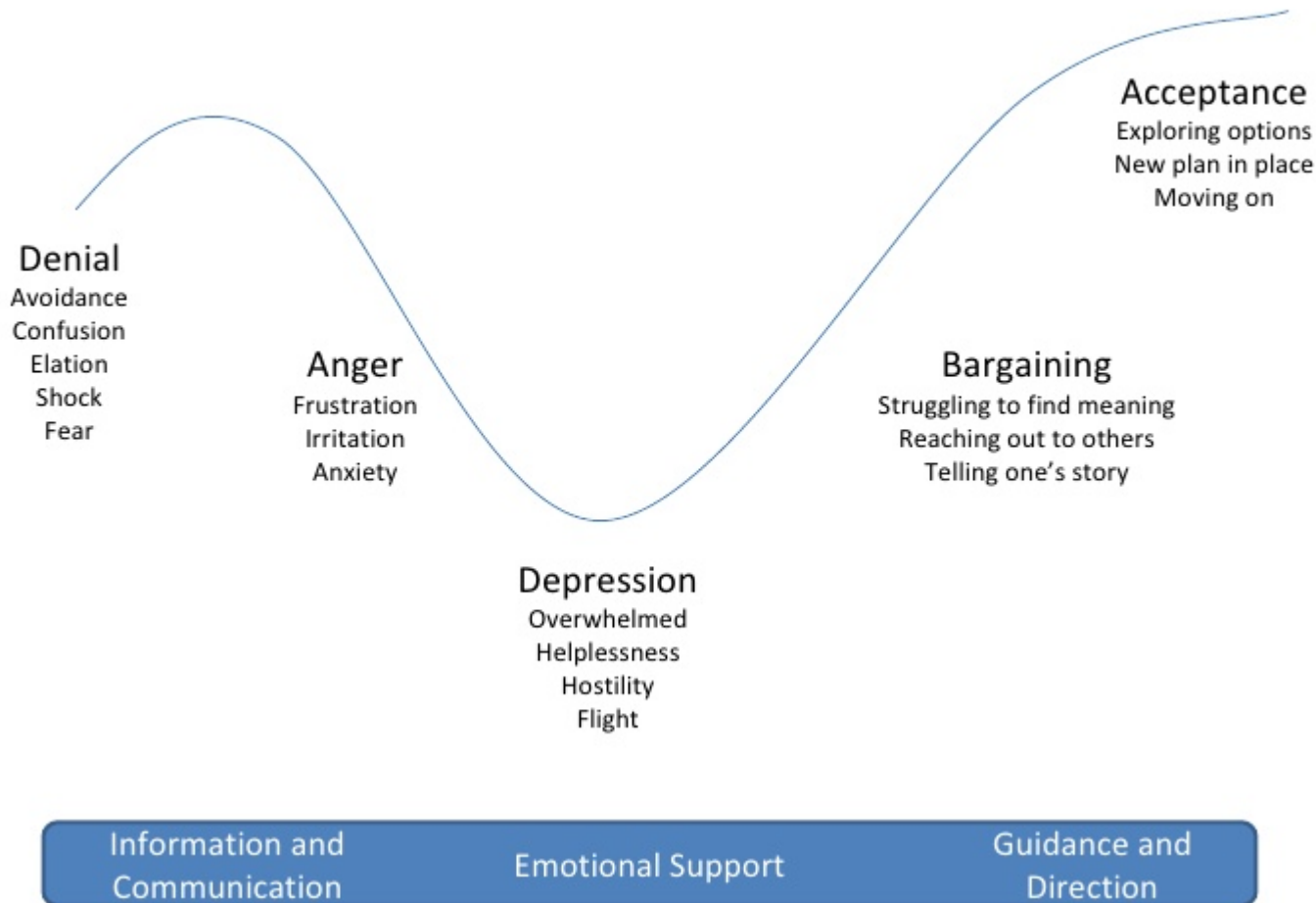
# So what happened ?



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## Kübler-Ross Grief Cycle

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# (Performance) Test strategy and goals



Bussiness goal: Full deployment to 5 Universities

The performance test was based on the goal/assumption that the highest load would be if all 5 universities at the same time executed an on-premise test with 1000 students each.

## Goals:

1. 6000 downloads af exam-questions in 10 minutes without raising response times.
2. 6000 uploads af exam-answers in 15 minutes without raising response times
3. At peak of upload frequency on large file can be uploaded without influencing response time (eg. 1 gb. PDF file)

# The Test



The test was executed **in 2 (testing)days** (two weeks apart):

The testdata was copied from AAU

to a 6th "Test University" on the production system !!

## Day 1.

- Both download and upload failed. The Download issue (a configuration error) was solved right away.
- Front end servers had some optimizations and the upload requirement was changed from 10 to 15 minutes for upload of 6000 exam-answers.

## Day 2.

- Both download and upload passed



# Result / value / outcome



- Without the test and the resulting changes the application would have failed
- Supplier could do necessary changes without touching the code (much)
- The changes could be accepted without redoing the functional test
- The performance test was executed with minimal internal resources
- **Saved 75% of test costs through hourly pay-as-you-go licensing model**

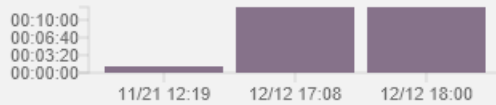
# The result



Tests > Digital eksamen upload 21112015

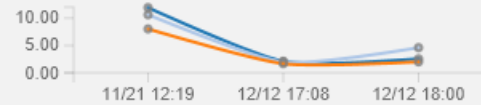
SCRIPTS 1 API VUSERS 5960 UI VUSERS 0 DEV VUSERS 0 DURATION 00:15:00 API VUH 1490 UI VUH 0 DEV VUH 0 SCHEDULE OFF Run Test

Last 5 runs (Duration)



● Halted

Top 3 regressions (Transaction duration)



● Upload hoveddokument...  
● Vaelg\_eksamen\_Transa...

Top 3 failing transactions (Fail rate)



● Studerende EndToEnd ...  
● Upload hoveddokument...

ID	STATUS	START TIME	DURATION	VUSERS	UI VUSERS	API VUSE...	DEV VUS...	BENCHMARK
#22	Halted	12/12/2015 18:00	00:12:26	5960	0	5960	0	
#21	Halted	12/12/2015 17:08	00:12:26	6000	0	6000	0	
#16	Halted	11/21/2015 12:19	00:01:16	6000	0	6000	0	



Q & A

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