

# Exjobb specification

Suggested title: *Runtime verification "by writing tests" - An analysis of the current research and a prototype for a new framework.*

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**Institute/School:** School of Computer Science and Communication (CSC) at KTH  
**Company** Valtech

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**Supervisor, KTH:** Narges Khakpour khakpour@liacs.nl

**Website:** <http://tgwizard.github.com/thesis/>  
**Repository:** <http://github.com/tgwizard/thesis/>

The suggested topic is runtime verification (RV) of web systems. As suggested by both Erland and Narges, this is of great interest in both the industry and the academic community.

RV is a formal verification technique that is embedded in executing systems and verifies that specified properties holds at certain points in the code and execution. These properties are specified in a constructed language, often a logic/calculus, and a RV framework instruments the system to be monitored with code that verifies these properties. When a property violation occurs, simple actions can be taken (e.g. log the error, send emails), or more complex responses initiated, resulting in a self-healing system.

The exjobb will be split in these parts:

- Background and state-of-the-art "inventory". What is RV? Why does it exist? Research results? How is it applied in practice? How is it used in web contexts?

- Investigation of how RV can be applied to a web system. What specification language fits best? Code instrumentation? (TODO: For what language)
- Implement an RV framework prototype
- Apply implemented RV framework on a project at Valtech. If python, suggested projects: Valtech's intranet. Evaluate and analyse. Do some benchmarking to check on how the RV framework impacts performance.

### **Timeplan/Schedule**

I will work on the exjobb 50% and 50% on projects at Valtech, in periods of two weeks exjobb, two weeks work. This fits well into the iteration planning at Valtech. During the summer I will work more on the exjobb, and use some of my vacation hours for the exjobb.

- Start: **April**.
- Specification done: ? (was **May 7**).
- Final deadline: so that I can graduate in december 2012.

Suggested approximate time plan...

- **One week** writing this specification.
- **Five weeks** of background and research.
- **One week** writing the background part of the report.
- **Four weeks** investigating and evaluating "what to do".
- **One week** writing about the investigation.
- **Three weeks** implementing and evaluating the RV framework.
- **Two weeks** testing and analysing the RV framework on "the project".
- **Three weeks** writing and finishing the report.

(Total: 20 weeks.)

Other required work related to the exjobb, such as opposing another student's work, will take time from the work above and require flexibility in planning.

### **Issues**

- Who will be the examiner?
- Do I need to start the exjobb work at a specific date and time? Do I need to/Should I take part in an exjobb "support group"?
- Do I need finish my remaining courses before I start my exjobb? One exam remains, which I'll do on May 30th, and two reports.
- ...