

UNIVERSITAS SCIENTIARUM SZEGEDIENSIS

**UNIVERSITY OF SZEGED**  
*Department of Software Engineering*



# Intro to #u-szeged





# PROJECT AND TEAM

# The Project

- ▶ Goal is to improve several aspects of WebKit
- ▶ Work started in May, 2008
- ▶ In cooperation with
  - Nokia
  - ARM



# Areas of Interest

- ▶ Performance improvements
- ▶ Memory consumption improvements
- ▶ Qt-specific activities



## Current Team (in alpha order, with IRC nicks)

- ▶ Róbert ÁGOSTON / spongyabob
- ▶ **András BÉCSI / bbandix**
- ▶ Péter GÁL / electro
- ▶ **Zoltán HERCZEG / zherczeg**
- ▶ **Renáta HODOVÁN / reni**
- ▶ **Zoltán HORVÁTH / zoltan**
- ▶ Balázs KELEMEN / kbalazs
- ▶ **Ákos KISS / akiss**
- ▶ Gábor LÓKI / loki04
- ▶ **Csaba OSZTROGONÁC / ossy**
- ▶ **Gábor RAPCSÁNYI / rgabor**
- ▶ Tamás SZIRBUCZ / sztamas
- ▶ Péter VARGA / stampo





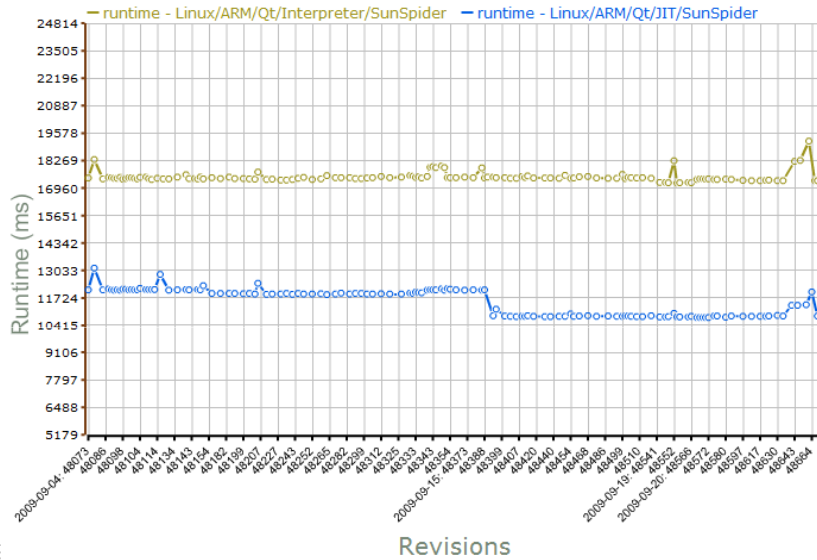
# PERFORMANCE

# Leading Topic 1: ARM JIT

- ▶ Work started early 2009
- ▶ First approach was an implementation completely independent from Apple's JIT
- ▶ Then, rewritten for MASM
- ▶ Accepted and landed during August and September



# Leading Topic 1: ARM JIT



► Results on Sep 22, 2009

- SunSpider: 59.4% speedup
- V8: 222.97% speedup
- WindScorpion: 71.83% slowdown ☹️



# Leading Topic 2: Regexp

- ▶ Current regexp engine unoptimal
  - email address recognition terribly slooow
  - 2-fold slowdown on ARM
  - 10-fold slowdown on x86
- ▶ Thomson NFA-based implementation ongoing



# Other Topics

- ▶ Interpreter optimizations
  - Classic compiler optimizations: negligible result
- ▶ NanoJIT integration
  - research experiment
- ▶ Execution parallelization
  - Google Gears Workers
  - Multithreading inside JSC, WebCore, ...?
- ▶ Programming guidelines – verification of existing guidelines on WebKit
- ▶ Profiling with OProfile





# MEMORY CONSUMPTION

## Leading Topic: Custom Allocation Framework

- ▶ On Linux/Qt, global operator new and delete cannot be overloaded
- ▶ This prevents using custom allocators (like TCmalloc or JEmalloc)
- ▶ A solution has been accepted by the community (needs modifications scattered around the whole code base)
  - Applied to JavaScriptCore
  - WebCore is close to be done



# Other Topics

- ▶ Investigating memory consumption
  - Looking for memory leaks
  - Logging memory consumption by capturing allocations and deallocations
  - Using Valgrind
  - Investigating how Qt, WebCore, etc contributes to the memory usage

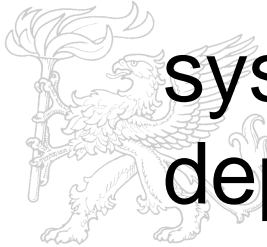




# QT-SPECIFIC ACTIVITIES

# Leading Topics: Building WebKit

- ▶ Build bot(s)
  - X86/Linux/Qt – gone public
  - ARM/Linux/Qt – currently, works locally
  - X86/Windows/Qt – planned
  - ARM/Linux/Gtk – planned
- ▶ Rewriting the current QtWebKit build system that does not handle dependencies in generated files correctly



# Leading Topics: Layout

- ▶ Layout tests:
  - Qt test are/were in a bad shape
    - 2nd place in the contest of longest skip lists?
  - Fixing lots of font size problems
  - Found others as well: right-aligned lists, Ahem fonts, Ruby annotation
- ▶ Enhancement to DRT are ongoing as well







# WEBSITE

# WebKit Apocrypha

- ▶ [webkit.sed.hu](http://webkit.sed.hu)
  - Blog
    - Aggregated at [planet.webkit.org](http://planet.webkit.org)
  - Benchmarking
    - Performance, memory consumption, x86, ARM, Linux, Mac, ...
  - Build bots
    - Currently a quicklink to [build.webkit.org](http://build.webkit.org)
    - Might be a home for some buildbots if they are not good enough for the official site





**THANKS...**

... and with questions, you can turn to

- ▶ ARM JIT: ZHERCZEG
- ▶ Regexp: RENI
- ▶ Custom allocator framework: ZOLTAN
- ▶ Buildbots: RGABOR, OSSY, BBANDIX
- ▶ QtWebKit build environment: OSSY
- ▶ Layout tests: RENI, BBANDIX
- ▶ Dump render tree: BBANDIX
- ▶ Look for the #u-szeged T-shirts :)

