

# Object-Databases and Live Development Finding, Managing, and Scripting Millions of Objects

Bachelor Project Proposal, WS 2015/2016 – SS 2016  
Software Architecture Group, Prof. Dr. Robert Hirschfeld

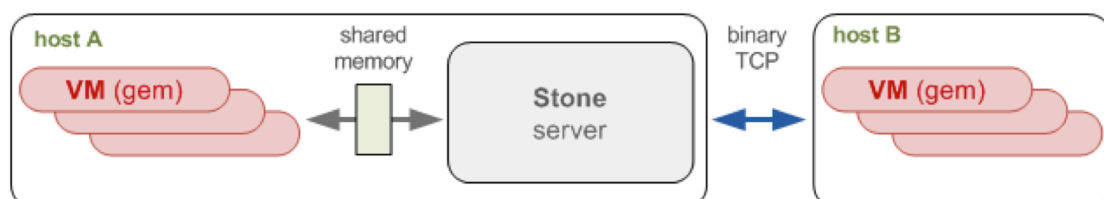
## tODE – the Object-centric Development Environment

tODE (<https://github.com/dalehenrich/tode>) is a command-line interface for keyboard-driven Smalltalk development built around GemStone/S, a high-performance Smalltalk implementation built on top of an object-oriented database. Unlike other Smalltalk implementations like Squeak, GemStone/S does not include a graphical environment. Instead, it uses the tools of another Smalltalk which access the GemStone/S object server through a remote procedure call (RPC).

GemStone/S provides an object-oriented database system with persistence by reachability and supports applications involving terabytes of objects. GemStone/S has been used in production of large scale finance, logistics, and telecommunication applications for 30 years.

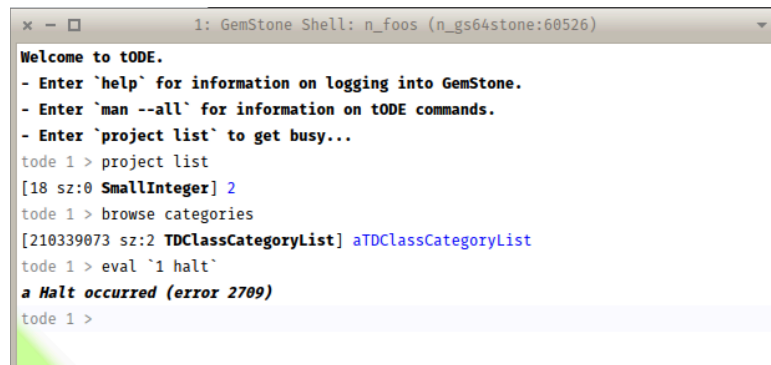
## Working with GemStone/S

The GemStone persistence method is similar to image-based persistence typical for other Smalltalks. At development time, GemStone applications are often developed in another Smalltalk such as Squeak and later deployed to GemStone/S. However, a GemStone/S object server is typically deployed on a dedicated system, which is then accessed through RPC over a wide-area network (WAN). Exploring large numbers of objects over such a connection can be slow. Furthermore, with terabytes of objects to manage, it is necessary to provide fast, lightweight tools that enable developers to work with objects easily. Such tools also need to be easily adapted with scripts to automate application-specific tasks. Finally, the tools should work in Squeak at development time and remotely on GemStone/S after deployment.



*The GemStone VM and Database Architecture*

The goal of this project is to review and advance tODE features from Pharo to Squeak using our own Vivide (<https://github.com/marceltaemel/vivide>) tool scripting environment, which supports low-effort, script-based tool construction. The tODE tools support programmers to develop and review data intensive Squeak and GemStone applications. To deal with gigabytes of live objects, the GemStone object query API should be implemented in Squeak and combined with the Dataflow features in Vivide. In the course of this project, participants will be required to study, implement, and evaluate appropriate tool designs.



```
1: GemStone Shell: n_foos (n_gs64stone:60526)
Welcome to tODE.
- Enter `help` for information on logging into GemStone.
- Enter `man --all` for information on tODE commands.
- Enter `project list` to get busy...
tode 1 > project list
[18 sz:0 SmallInteger] 2
tode 1 > browse categories
[210339073 sz:2 TDClassCategoryList] aTDClassCategoryList
tode 1 > eval `1 halt`
a Halt occurred (error 2709)
tode 1 >
```

The basic tODE command line interface

## Implementation

The implementation of the project will involve programming with the Squeak Morphic framework, the Vivide framework, and the Smalltalk meta-programming facilities. It will also involve learning about both the Squeak VM and the Gemstone object database to implement the query API. An agile, iterative process will be employed for software development.

## Organization

A group of about six to eight (6-8) students may participate in the project. Organization and tasks will be determined by the project participants. The project will be carried out at the Hasso Plattner Institute in Potsdam. Project participants are expected to communicate with our partner via email, chat, or voice on a regular basis. All communication will be conducted in English. In WS 2015/2016, participants will work on porting tODE to Squeak/Smalltalk, extending the Squeak System with features that facilitate interacting with many objects. Main steps in design and implementation of a solution are to be executed in SS 2016. Expected results include a working software accompanied by appropriate documentation.

## Partner & Contact

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