



GoGo

A Go compiler written in Go (... and assembly)

Michael Lippautz Andreas Unterweger

Compiler Construction Course, Summer 2010

June 24, 2010

Responsibilities

Michael Lippautz	Andreas Unterweger
Scanner	I/O library
Parser	Memory/string management
Multiplication/Division	Addition/Subtraction
Conditionals	Assignments
Loops	Address/offset calculations
Test suite	Symbol table

What is GoGo?

- A self-compiling Go compiler
- Input language: A subset of the Go language ¹
 - C-like syntax with additional keywords
 - Reduced feature set through EBNF
- Output language: Plan9 x64 assembly
 - Output in text form, not binary form
 - Requires Plan9 assembler for binary form
 - Requires Plan9 linker for ELF executables

What is so special about GoGo? (1/2)

- Advanced **string** management
 - More memory allocated than initially needed
 - "Spare" memory for future concatenations
 - Drastically reduces memory consumption
- Implementation of **pointers**
 - Implicit dereferencing on structure access
 - No explicit dereferencing possible (EBNF)
 - Address operator (&) complicates assignments
- **Namespaces**: One package hierarchy level

What is so special about GoGo? (2/2)

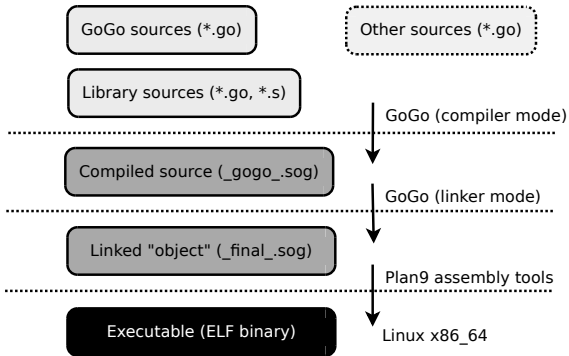
- **Lazy evaluation** over multiple expression levels
 - Merging of positive and negative labels (if appropriate)

Example:

```
if (done!=1) && (((a<1) && (b<2)) || ((c<3) && (d<4))) { ... }
```

- Self-contained **library**
 - I/O functions
 - Memory and string management
 - Lists, stacks, etc.
- Explanatory **comments** in assembly output
 - Source file and line included
 - Option to disable (debug level reduction)

Building



Demo

- Recursive self-compilation
- Advanced Fibonacci example