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# Theme-D-Intr User Manual

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## Introduction

Theme-D-Intr is a software library allowing the use of the introspected GObject modules in Theme-D.

## Installation

### Debian-based Systems using Guile 3.0

- Install G-Golf. See <http://www.iki.fi/tohoyng/g-golf-debian/> [<http://www.iki.fi/tohoyng/g-golf-debian/>].
- Download `theme-d-intr_0.13.0-1_all.deb` [`theme-d-intr_0.13.0-1_all.deb`] and `theme-d-intr-dev_0.13.0-1_all.deb` [`theme-d-intr-dev_0.13.0-1_all.deb`] and install them with commands

```
sudo dpkg -i theme-d-intr_0.13.0-1_all.deb
sudo dpkg -i theme-d-intr-dev_0.13.0-1_all.deb
```

- Ensure that your Guile installation file `~/ .guile` contains the following lines:

```
(use-modules (oop goops))
(default-duplicate-binding-handler
 '(merge-generics replace warn-override-core warn last))
```

## Debian-based Systems using Guile 2.2

- Install G-Golf. See <http://www.iki.fi/tohoyn/g-golf-debian/> [<http://www.iki.fi/tohoyn/g-golf-debian/>]. You have to build the G-Golf package for Guile 2.2.
- Create a directory for the build and copy `theme-d-intr-0.13.0.tar.xz` [`theme-d-intr-0.13.0.tar.xz`] and `theme-d-intr_0.13.0-1.debian.tar.xz` [`theme-d-intr_0.13.0-1.debian.tar.xz`] there. Change into the directory and give the following commands:

```
tar xvf theme-d-intr-0.13.0.tar.xz
ln -s theme-d-intr-0.13.0.tar.xz theme-d-intr_0.13.0.orig.tar.xz
cd theme-d-intr-0.13.0
tar xvf ../theme-d-intr_0.13.0-1.debian.tar.xz
```

Change `GUILF_VERSION` from 3.0 to 2.2 and `GUILF_VERSION2` from 3.0.8 to 2.2.0 in `debian/rules`. Change `guile-3.0` to `guile-2.2` in `debian/control` and remove (`>= 3.0.8`). Give commands

```
dpkg-buildpackage --no-sign -b
cd ..
sudo dpkg -i theme-d-intr_0.13.0-1_all.deb
sudo dpkg -i theme-d-intr-dev_0.13.0-1_all.deb
```

- Ensure that your Guile installation file `~/ .guile` contains the following lines:

```
(use-modules (oop goops))
(default-duplicate-binding-handler
'(merge-generics replace warn-override-core warn last))
```

## Other UNIX Systems

- Install the G-Golf library. See <https://www.gnu.org/software/g-golf/install.html> [<https://www.gnu.org/software/g-golf/install.html>].
- Unpack package `theme-d-intr-0.13.0.tar.xz` into some directory.
- Change to the subdirectory `theme-d-intr-0.13.0` and give commands

```
./configure --with-guile=VERSION
make
sudo make install-complete
```

where `VERSION` is the Guile version you use (either 3.0 or 2.2).

- Ensure that your Guile installation file `~/ .guile` contains the following lines:

```
(use-modules (oop goops))
(default-duplicate-binding-handler
 '(merge-generics replace warn-override-core warn last))
```

## Using Theme-D-Intr without Installing

It is possible to use the software without installing it. First give the following commands in the subdirectory `theme-d-intr-0.13.0`:

```
./configure --with-guile=VERSION
make
```

where `VERSION` is the Guile version you use (either 3.0 or 2.2). Modify the file `~/guile` as in a normal installation (see the previous section). Now you can launch the uninstalled environment by giving command

```
./uninstalled-env bash
```

in subdirectory `meta`. You also have to take care that the Theme-D module search path (option `-m` for the Theme-D compiler and linker) contains the directory `xxx/theme-d-intr-0.13.0/theme-d-code`. See Theme-D User Guide for a description of the module search path.

## Example Programs

The example programs `hello`, `hello2`, `hello3`, `calc`, and `theme-d-intr-demo` are located in directory `/usr/share/doc/theme-d-intr/examples/theme-d-intr-examples` and in directory `theme-d-intr-examples` in the source package. You can build the example programs with command `make -f user.mk` and run them with command

```
GUILE_LOAD_PATH=../..:$GUILE_LOAD_PATH run-theme-d-program <program-name>
```

where `<program-name>` is the name of the target `.go` file of the program. For program `hello` the command is

```
GUILE_LOAD_PATH=.:$GUILE_LOAD_PATH run-theme-d-program hello.go
```

If you have a Debian-based Linux operating system you have to ensure that package `gir1.2-gtk-3.0` is installed in your system.

## Writing Programs using Theme-D-Intr

It is recommended you create a new directory for your program. First you have to list the G-Golf classes and functions you use in file `intr-imports.scm`. Its format is:

```
(intr-entities
  (version namespace ver)
  ...
  (classes
    (namespace class)
    ...)
  (functions
    (namespace function)
    ...)
  (rejected-methods
    name ...)
  (overridden-functions
    (name (argument-type ...) result-type attributes)
    ...)
  (strip-boolean-result
    name ...))
```

Namespace is the library where the definitions are imported, such as `Gtk`. Class names are given in format `MyClassName`. Note that the namespace is not include in the class or function name (`Widget` instead of `GtkWidget`). Methods belonging to a class are imported automatically when the class is imported and they must not be listed in the `functions` section. Rejected methods are generic function names for which we do not generate methods. There are two main reasons for rejecting a method:

- The method name overlaps a nongeneric function name, e.g. `append`.
- The methods of some name violate the covariance rule, see Theme-D Language Manual.

The purpose of `overridden-functions` is to handle functions overridden in G-Golf. The argument types, the result type and the attributes are given in Theme-D format. The `version` specifies the version used for a namespace. The version must be enclosed in double quotes. The boolean function result of a function can be stripped by listing it under `strip-boolean-result`. See G-Golf documentation for this feature. Here is an example import file:

```
(intr-entities
  (version Gtk "3.0")
  (classes
    (Gtk Widget)
    (Gtk Window)
    (Gtk Button))
  (functions
    (Gtk init)
    (Gtk main)
    (Gtk main_quit))
  (rejected-methods
    append map get-style activate compare copy)
  (overridden-functions
    (gtk-container-child-get-property (<gtk-container>
      <gtk-widget> <string>)
      <object> nonpure)
    (gtk-container-child-set-property
      (<gtk-container> <gtk-widget> <string> <object>)
      <none> nonpure)))
```

The following three files are generated from the definition file:

- Interface file `_intr-imports.thi`
- Body file `_intr-imports.thb`
- Target module `_intr-imports-target.scm`

The program and modules using G-Golf should import the module `_intr-imports`. In case you have a multiple part program name, such as `(myexamples myprogram)`, module `_intr-imports` has a multiple part name too, e.g. `(myexamples _intr-imports)`. File `_intr-imports-target.scm` is used by the linked program to provide access to the introspected libraries.

The following commands are used to generate Theme-D-Intr files:

- `generate-intr-interface`
- `generate-intr-body`
- `generate-intr-target-module`

If you use a multiple part program name you must give the `-m` option for these commands. The option argument is the imports module name for the first two commands, e.g. `-m "(myexamples _intr-imports)"` and the setter module name for the fourth command, e.g. `-m "(myexamples _intr-imports-target)"`.

When you link a program using Theme-D-Intr you have to give the following options to the Theme-D linker:

- `-x "(g-golf)"`
- `-x "(guile-theme-d-intr support)"`
- `-x "<target-module>"`
- `--duplicates="merge-generics replace warn-override-core warn last"`

Here `<target-module>` is the Theme-D name of the generated target module. For a program with a single part name it is `(_intr-imports-target)`. If you use the extra support module give also option `-x "(guile-theme-d-intr support2-gtk3)"` or `-x "(guile-theme-d-intr support2-gtk4)"`.

You have to ensure that you have the introspection files for the external libraries your program uses (with G-Golf) installed in your system. If your program uses GTK and you have a Debian-based Linux system this can be ensured by having package `gir1.2-gtk-3.0` (for GTK 3.0) or `gir1.2-gtk-4.0` (for GTK 4.0) in your system.

See also the `user.mk` makefiles of the example programs `hello`, `hello2`, `calc`, and `theme-d-intr-demo`. Example program `hello` has a single part program name and the other example programs a multiple part program name.

When you run programs using Theme-D-Intr the environment variable `GUILLE_LOAD_PATH` has to contain the root directory of your program. If you use a single part program name this is the directory of your program.

## Distributing Programs using Theme-D-Intr

If you use a Debian-based operating system the following packages are required to run compiled (built) Theme-D programs using Theme-D-Intr:

- `theme-d-rte`
- `th-scheme-utilities`
- `libthemedsupport`
- `theme-d-intr`

If you have a non-Debian operating system see the Theme-D User Guide for the files required to distribute a compiled Theme-D program. In addition to those, you need file `support.scm` from the Theme-D-Intr source package. If you use files `support2-gtk3.scm` or `support2-gtk4.scm` you need distribute that, too. These files have to be installed in subdirectory `guile-theme-d-support` somewhere in the Guile library search path. In UNIX systems this path usually contains directory `/usr/share/guile/site/3.0/` or `/usr/share/guile/site/2.2/`.