CS618 Project
Porting Constraint Generation to GCC 5.2.0
..
GCC Resource Center

Anshuman Dhuliya
144050002

November 29, 2015

Contents

1 Introduction

This report documents the work done to port the constraint generation plugin from `GCC 4.7.2` to `GCC 5.2.0`. The constraint generation plugin extracts the pointer based constraints from the GIMPLE IR during LTO (Link Time Optimization) phase of optimization and dumps them in an output file. These constraints are then used for many other pointer analysis based optimizations developed in-house.

The rest of the report documents the general approach followed to port the plugin, then the list of contraints detected by the plugin are listed with test cases, then the pattern of changes observed from `GCC 4.7.2` to `GCC 5.2.0` are listed (although not exhaustive) and at last the future work discusses the work remaining.

2 Approach Followed

This section summarises the approach followed to port the plugin. We believe this might help us to port other (if any) plugins in the future. Some of the methods are specific for this plugin. We tried understanding the code before making changes, but the direct source level changes gave better results. The basic approach is enumerated below:

1. Compilation was the first problem. So we adopted the incremental apporach where we added source code in logical units, files, functions etc. This helpedus tackle small number of issues at a time. The functions were added by following the call hirarchy from the top and including only those functions that were reachable. This helped eliminate many unnecessary functions, and reduced the size of the code drastically.

2. How to change the source code was another problem. Here we compared the tree-ssa-structalias.c in `GCC 4.7.2` and `GCC 5.2.0`, and most of the differences were straight forward to understand. This worked because, the plugin was an adaptation of tree-ssa-structalias.c in `GCC 4.7.2`.

3 Future Work

1. The plugin source has to be logically understood.

2. A C constraint has to added. The C contraint, where a pointer is assigned an arbitrary integer (other than NULL) is not currently detected by the plugin.

3. C++ constraints have to be included.