CodeVice: Using Google Earth for Software Visualization

Project Summary

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Introduction

In software systems it is increasingly difficult to see the forest for the trees. Problems involving the unpredictable interaction of multiple components often lie dormant until late in the development process, requiring high-cost retrofitting and re-engineering. Existing software visualization techniques offer narrow and isolated views of a small portion of a software system.

Web technologies like HTTP and HTML have shown that hyperlinking text documents can be a powerful way to link diverse sources of information. Web-based applications can be integrated through the simple mechanism of hyperlinks, offering users a common frame through which to view the information they care about. Emerging visualization standards technologies inherit the power and flexibility of hyperlinks while allowing sophisticated information display impossible with HTML. This opens a new opportunity to create a visualization framework that offers both a rich visual environment and integration with the rest of a software development tool-chain.

GrammaTech is using these emerging standards and off-the-shelf tools to establish a loosely-coupled visualization framework where users can explore integrated views of diverse aspects of their systems. Data for these views is aggregated from GrammaTech's advanced software analysis technology as well as other engineering tools and artifacts such as issue trackers, configuration management systems and system specification documents.

Figure 1 below shows a diagram of the system that will aggregate data into rich visual and textual documents that can be explored by engineers to better understand their software systems.

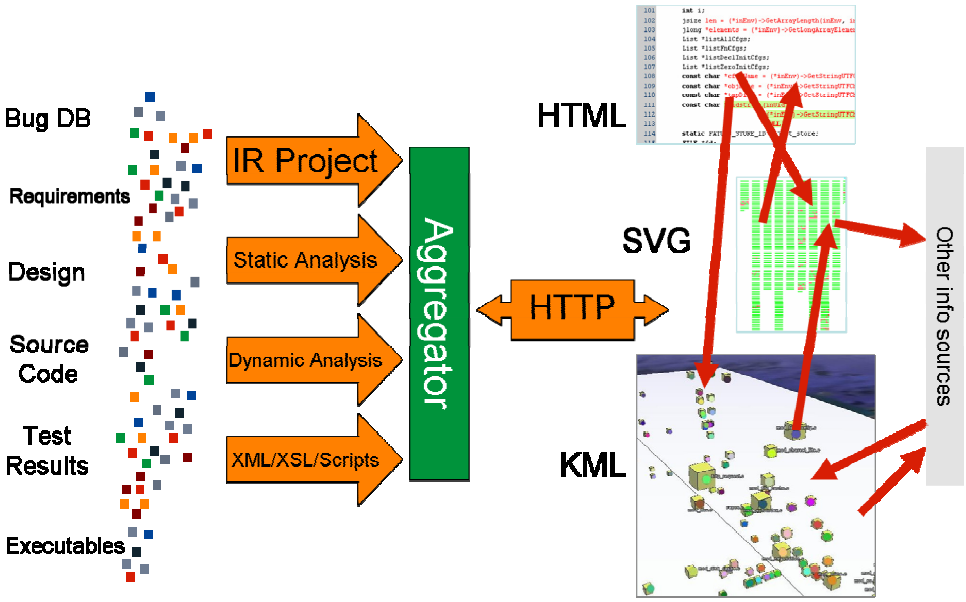

Figure 1. The architecture of the tool under development.

Phase I SBIR Results

Visualization: In Phase I we implemented an Aggregator that generates KML documents, which can be explored in Google Earth. Google Earth is primarily a geographical exploration tool, but can display almost arbitrary 3D scenes. Google Earth supplies easy-to-use navigation controls and supports viewing extremely large data sets.

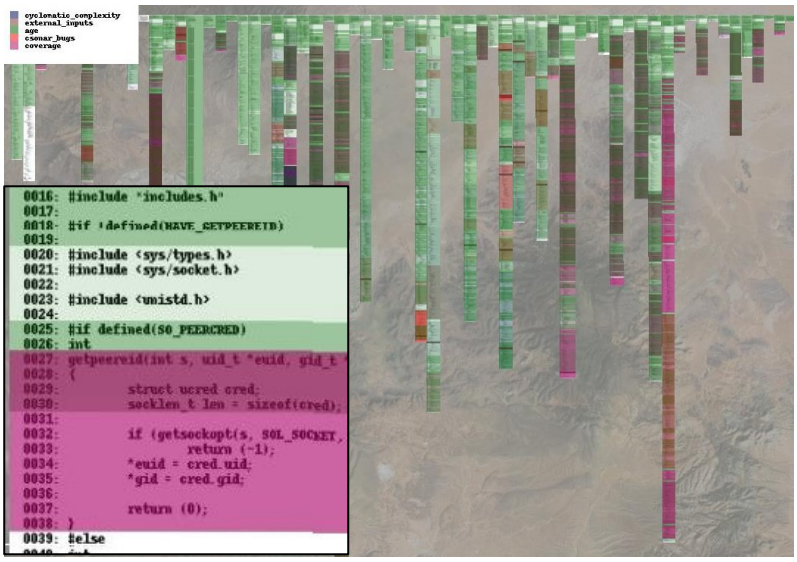

Figure 2. Software artifacts can be viewed up close or from a distance to get an overall view of a project.

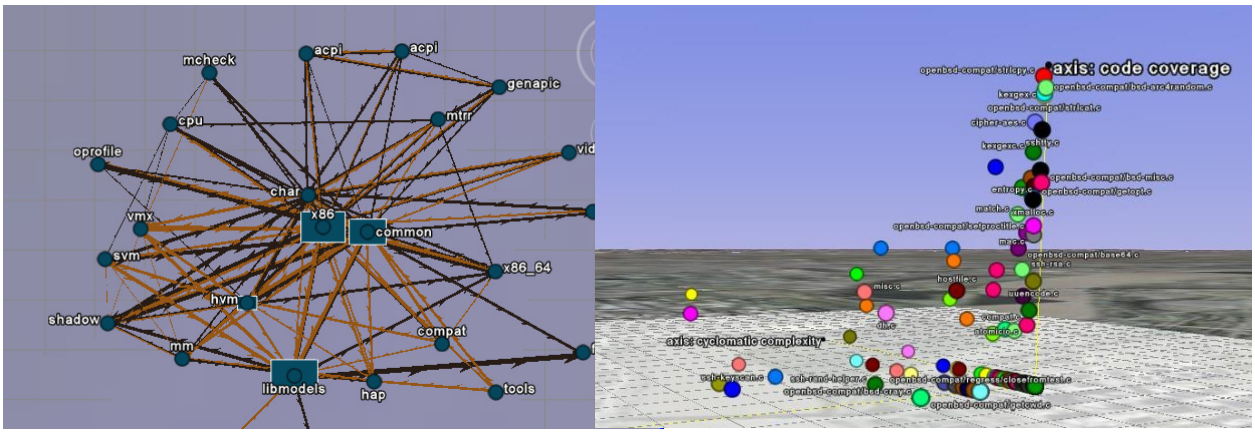

Figure 3. Data can be plotted an explored in a 3D environment.

Commercialization Results

Cisco Systems hired GrammaTech to extend the Phase I prototype to support viewing dependency information for systems of 10,000,000+ lines of code. The system is now in beta use at Cisco and was presented at Cisco Toolapalooza 2009 in San Jose, CA, April 22-23.