BINGHAMTON UNIVERSITY
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Computer Science

COMPUTER SCIENCE RESEARCH SEMINAR

Debloating Software through Piece-Wise Compilation and Loading

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Abstract: Reusing code is a common and indispensable practice in software development. Commonly, a "one-size-fits-all" methodology is practiced where features are packaged into reusable code modules (e.g., libraries) that are designed to service multiple diverse set of clients (or applications). While this model aids in the development process, it presents a detrimental impact on security and performance as a majority of clients may not use all of the functionalities. For example, the standard C library (libc) is intended to be widely useful, and usable across a broad spectrum of applications although not all features are used by all applications. Yet, these clients must bear the burden of carrying all the features in the code with no way to disable or remove those features. Code in these extraneous features may contain its own bugs and vulnerabilities and therefore broadens the overall attack surface. Additionally, these features add unnecessary burden on modern defenses (e.g., CFI) that do not distinguish between used and unused features in software. Accumulation of unnecessary code in a binary either by design (e.g., shared libraries) or due to software development inefficiencies amounts to code debloating.

This talk focuses on bloating problem in shared libraries, particularly its the prevalence in the wild and a generic inter-modular late-stage debloating framework called piece-wise that combines static (i.e., compile time) and dynamic (i.e., load time) approaches to systematically detect and automatically eliminate unused code from the entire program memory by removing unused and therefore unnecessary code (by up to 90% in some test cases). As a direct impact, piece-wise significantly increases the effectiveness of current software defense by drastically reducing the amount of code they must analyze and protect.

Bio: Anh Quach is a PhD candidate at Binghamton University advised by Dr. Aravind Prakash. Her research focuses on program analysis, binary analysis, and software debloating.

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Refreshments will be provided!