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Final Report: A Test-bed of Secure Mobile Cloud Computing for Military Applications

ABSTRACT

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Enter List of papers submitted or published that acknowledge ARO support from the start of the project to the date of this printing. List the papers, including journal references, in the following categories:

(a) Papers published in peer-reviewed journals (N/A for none)

Received | Paper
--- | ---

TOTAL:

Number of Papers published in peer-reviewed journals:

(b) Papers published in non-peer-reviewed journals (N/A for none)

Received | Paper
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**Graduate Students**

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**Names of Post Doctorates**

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**Names of Faculty Supported**

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Student Metrics

This section only applies to graduating undergraduates supported by this agreement in this reporting period

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The number of undergraduates funded by this agreement who graduated during this period with a degree in science, mathematics, engineering, or technology fields: ...... 6.00
The number of undergraduates funded by your agreement who graduated during this period and will continue to pursue a graduate or Ph.D. degree in science, mathematics, engineering, or technology fields: ...... 1.00
Number of graduating undergraduates who achieved a 3.5 GPA to 4.0 (4.0 max scale): ...... 2.00
Number of graduating undergraduates funded by a DoD funded Center of Excellence grant for Education, Research and Engineering: ...... 0.00
The number of undergraduates funded by your agreement who graduated during this period and intend to work for the Department of Defense: ...... 1.00
The number of undergraduates funded by your agreement who graduated during this period and will receive scholarships or fellowships for further studies in science, mathematics, engineering or technology fields: ...... 0.00

Names of Personnel receiving masters degrees

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Names of personnel receiving PHDs

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Names of other research staff

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Sub Contractors (DD882)
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which can cause information leaking and many other damages.

(3) Summary of the most important results
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The security and privacy of data stored on cloud is an important issue. In this work, we propose a novel scheme that can
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CONTRACT NUMBER: WF911NF-14-1-0518
TITLE: A Test-bed of Secure Mobile Cloud Computing for Military Applications
attacks on mobile phones. The research results have been published in a top journal paper [2] – IEEE Transactions on Vehicular Technology in June 2016.

(c) The important results of detecting mobile malwares are presented in the following.
Mobile devices (e.g., smartphones) continue the popularization worldwide and have become an important part of people’s daily lives. Android is the most popular and the best-selling smartphone operating system (OS), holding over 80% of global smartphone market share [3]. However, security and privacy issues are a widely recognized problem of Android, mainly because it is open source and attackers can find security vulnerabilities from the source code. The security of user interface (UI) is particularly important, since mobile users interact directly with the UIs of the system as well as 3rd-party apps. Specifically, users receive most information visually from the UI, and give their inputs in terms of touch, click, and key entry to the UI as well. The manipulation of UIs can pose huge threats to the interaction between user and the mobile device.

In this work, we focus on mobile clickjacking attacks. Clickjacking attack is also known as “UI redress attack”. It happens when a malicious app inserts an opaque layer (or in very low transparency) on top of the screen, to trick a user to click on a specific position. The click event seemingly going to the top front window actually goes to the target window underneath. If carefully designed, the user may trigger a concealed button or link in the underlying window. Clickjacking attack could cause severe damage to the user’s security and privacy.

In this work, we give a detailed analysis of the potential risks posed by clickjacking. Finally, we propose an automatic, lightweight and effective defense scheme to defeat clickjacking attempts, which is able to overcome the limitations of all existing solutions. All different types of clickjacking attacks and the defense mechanism are implemented on a Nexus 4 smartphone running Android 5.0 system. The effectiveness and overheads of the proposed scheme are evaluated with extensive experiments. The results show that our scheme can effectively prevent clickjacking attacks with only a minor impact to the system.

The research results have been published in a top security conference – the IEEE Conference on Communications and Network Security (IEEE CNS) 2016 [4].

(4) Bibliography

Technology Transfer

N/A
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