11 May 2020

To whom it may concern:

This dissertation includes material presented at several academic conferences:


Within the dissertation, I have indicated the places where this material is used. Specifically, at the beginning of each chapter, I include a paragraph labeled “Statement of Attribution” which cites the appropriate paper(s). Some of this material is used verbatim, although I have modified text and figures throughout to shape the overarching story of the dissertation.

As indicated above, this material appears in the proceedings of conferences that were organized by the ACM, the IEEE, and USENIX. I retained the copyright to all but #3. The copyright to that publication is held by the IEEE, but their operations manual states in section 8.1.4.B that (emphasis added), “In return for the transfer of authors’ copyrights, the IEEE shall grant authors and their employer’s permission to make copies and otherwise reuse the accepted versions of their articles under terms approved by the Board of Directors.”

In the remainder of this document, I have included the copyright statements associated with each of these documents, as well as the IEEE operations manual.

Sincerely,

James Davis
ACM Publishing License and Audio/Video Release

Title of the Work: The Case of the Poisoned Event Handler: Weaknesses in the Node.js Event-Driven Architecture

Author/Presenter(s): James Davis: Virginia Tech; Gregor Kildow: Virginia Tech; Dongyoon Lee: Virginia Tech

Type of material: Full Paper

Publication and/or Conference Name: EuroSec'17: 2017 European Workshop on Systems Security Proceedings

1. Glossary

2. Grant of Rights

(a) Owner hereby grants to ACM an exclusive, worldwide, royalty-free, perpetual, irrevocable, transferable and sublicensable license to publish, reproduce and distribute all or any part of the Work in any and all forms of media, now or hereafter known, including in the above publication and in the ACM Digital Library, and to authorize third parties to do the same.

(b) In connection with software and "Artistic Images and "Auxiliary Materials, Owner grants ACM non-exclusive permission to publish, reproduce and distribute in any and all forms of media, now or hereafter known, including in the above publication and in the ACM Digital Library.

(c) In connection with any "Minor Revision", that is, a derivative work containing less than twenty-five percent (25%) of new substantive material, Owner hereby grants to ACM all rights in the Minor Revision that Owner grants to ACM with respect to the Work, and all terms of this Agreement shall apply to the Minor Revision.

☐ A. Grant of Rights. I grant the rights and agree to the terms described above.

☐ B. Declaration for Government Work. I am an employee of the national government of my country and my Government claims rights to this work, or it is not copyrightable (Government work is classified as Public Domain in U.S. only)

Are any of the co-authors, employees or contractors of a National Government?
☐ Yes ☐ No

3. Reserved Rights and Permitted Uses.

(a) All rights and permissions the author has not granted to ACM in Paragraph 2 are reserved to the Owner, including without limitation the ownership of the copyright of the Work and all other proprietary rights such as patent or trademark rights.

(b) Furthermore, notwithstanding the exclusive rights the Owner has granted to ACM in Paragraph 2(a), Owner shall have the right to do the following:

   (i) Reuse any portion of the Work, without fee, in any future works written or edited by the Author, including books, lectures and presentations in any and all media.
ACM Publishing License and Audio/Video Release

Title of the Work: The Impact of Regular Expression Denial of Service (ReDoS) in Practice: An Empirical Study at the Ecosystem Scale
Submission ID: fse18main-id4-p
Author/Presenter(s): James C. Davis; Christy A. Coghlan; Francisco Servant; Dongyoon Lee
Type of material: Full paper

Publication and/or Conference Name: ESEC/FSE '18: 26th ACM SIGSOFT Joint European Software Engineering Conference and Symposium on the Foundations of Software Engineering Proceedings

1. Glossary

2. Grant of Rights

(a) Owner hereby grants to ACM an exclusive, worldwide, royalty-free, perpetual, irrevocable, transferable and sublicenseable license to publish, reproduce and distribute all or any part of the Work in any and all forms of media, now or hereafter known, including in the above publication and in the ACM Digital Library, and to authorize third parties to do the same.

(b) In connection with software and "Artistic Images and "Auxiliary Materials, Owner grants ACM non-exclusive permission to publish, reproduce and distribute in any and all forms of media, now or hereafter known, including in the above publication and in the ACM Digital Library.

(c) In connection with any "Minor Revision", that is, a derivative work containing less than twenty-five percent (25%) of new substantive material, Owner hereby grants to ACM all rights in the Minor Revision that Owner grants to ACM with respect to the Work, and all terms of this Agreement shall apply to the Minor Revision.

☐ A. Grant of Rights. I grant the rights and agree to the terms described above.

☐ B. Declaration for Government Work. I am an employee of the national government of my country and my Government claims rights to this work, or it is not copyrightable (Government work is classified as Public Domain in U.S. only)

Are any of the co-authors, employees or contractors of a National Government?
☐ Yes ☐ No

3. Reserved Rights and Permitted Uses.

(a) All rights and permissions the author has not granted to ACM in Paragraph 2 are reserved to the Owner, including without limitation the ownership of the copyright of the Work and all other proprietary rights such as patent or trademark rights.

(b) Furthermore, notwithstanding the exclusive rights the Owner has granted to ACM in Paragraph 2(a), Owner shall have the right to do the following:

(i) Reuse any portion of the Work, without fee, in any future works written or edited by the Author, including books, lectures and presentations in any and all media.
AUTHORIZATION AND LICENSE TO PUBLISH

A major mission of the USENIX Association ("USENIX") is to provide for the creation and dissemination of new knowledge. In order to facilitate this process, USENIX allows authors to retain ownership of the copyright in their works, requesting only that USENIX be granted the right to publish that work. Therefore, the parties agree as follows:

1. Grant of Rights to Publish. You hereby grant to The USENIX Association ("USENIX"), the right to publish and re-publish the paper provisionally entitled:

   Paper Title: A Sense of Time for JavaScript and Node.js: First-Class Timeouts as a Cure for Event Handler Poisoning

   (the "Paper") in printed form, electronically, and in audiovisual formats (the "Rights"). USENIX's rights are non-exclusive, worldwide, perpetual and irrevocable, but also non-sublicensable and non-transferable. Among the rights you hereby grant to USENIX is the right to be the first publisher of the Paper. USENIX initially plans to publish the Article in the following publication: Proceedings of the 27th USENIX Security Symposium (the "Original Publication") and to mount the files permanently for display on the USENIX website, but may also otherwise disseminate the Paper, as well as the oral presentation of the Paper, on media, as a live broadcast, and in any other electronic or audiovisual format chosen by USENIX.

2. Posting. You retain all rights in the Paper subject to the non-exclusive rights granted to USENIX in Section 1 above.

3. Notice Request. USENIX will include the following notice on the first page of the Original Publication: "Copyright to this work is retained by the author[s]."

4. Subsequent Publication by Author. You must include a notice of original publication by USENIX in any subsequent publication of the Paper or a revised version of the Paper.

5. Warranties. You warrant that:
   a. You are the sole author and owner of the Paper and the rights pertaining thereto or, if the Paper is a work of joint authorship, that all of the owners of the Paper have signed and submitted a copy of this document. If the Paper is owned by your employer, you warrant that you have obtained permission to enter into this agreement and to grant the rights herein described to USENIX.
   b. USENIX does not need the permission of any other party to exercise the rights granted herein.
   c. The Paper does not contain any defamatory or other unlawful content.
   d. The Paper does not infringe upon the rights of others.
   e. The Paper and its contents are original to you.
   f. The Paper is not currently submitted for publication elsewhere and has not been previously published elsewhere.
   g. If the Paper contains significant excerpts from other copyrighted materials, written permission from all of the copyright owners of those materials have been obtained, copies of such permissions are attached to this document, and proper credit and attribution has been given in the Paper itself.

6. Right to Withdraw Access. USENIX reserves the right to remove content and publications under its control from public access at any time for any reason. Occasionally, USENIX receives notices alleging that the content on its website, in its own publications, or in the papers and conference proceedings it publishes may infringe third party rights or may otherwise violate some law or regulation. USENIX does not usually take a position on the merits of these allegations. However, when this happens, USENIX will inform the authors of the allegations and may remove the identified content or publication from public access. USENIX may restore the material, at its discretion, when it deems appropriate. USENIX may also send the notice containing the allegations to Lumen (lumendatabase.org).

USENIX Code of Conduct Guidelines

Speakers are responsible for the content of their presentations, but USENIX requests that speakers be cognizant of potentially offensive actions, language, or imagery, and that they consider whether it is necessary to convey their message. If they do decide to include it, USENIX asks that they warn the audience, at the beginning of the talk, and provide them with with the opportunity to leave the room to avoid seeing or hearing the material.

Your signature below grants USENIX the right to publish and also indicates that you have read the USENIX Event Code of Conduct and Guidelines for Speakers available at www.usenix.org/conferences/coc.

Date: 06/27/2018

Signature of Author(s) _____________________________________________________________________________________________________

Printed Name(s) of Author(s) ______________________________________________________________________________________________

Authorized Signature for USENIX ____________________________________________________________________________________________
ACM Publishing License and Audio/Video Release

Title of the Work: Why Aren’t Regular Expressions a Lingua Franca?
Submission ID: fse19main-id13-p
Author/Presenter(s): James C. Davis; Louis G. Michael IV; Christy A. Coghlan; Francisco Servant; Dongyoon Lee
Type of material: Full paper
Publication and/or Conference Name: ESEC/FSE’19: Joint Meeting of the European Software Engineering Conference and the ACM SIGSOFT Symposium on the Foundations of Software Engineering Proceedings

1. Glossary

2. Grant of Rights

(a) Owner hereby grants to ACM an exclusive, worldwide, royalty-free, perpetual, irrevocable, transferable and sublicensable license to publish, reproduce and distribute all or any part of the Work in any and all forms of media, now or hereafter known, including in the above publication and in the ACM Digital Library, and to authorize third parties to do the same.

(b) In connection with software and "Artistic Images and "Auxiliary Materials, Owner grants ACM non-exclusive permission to publish, reproduce and distribute in any and all forms of media, now or hereafter known, including in the above publication and in the ACM Digital Library.

(c) In connection with any "Minor Revision", that is, a derivative work containing less than twenty-five percent (25%) of new substantive material, Owner hereby grants to ACM all rights in the Minor Revision that Owner grants to ACM with respect to the Work, and all terms of this Agreement shall apply to the Minor Revision.

(d) If your paper is withdrawn before it is published in the ACM Digital Library, the rights revert back to the author(s).

A. Grant of Rights. I grant the rights and agree to the terms described above.

☐ B. Declaration for Government Work. I am an employee of the national government of my country and my Government claims rights to this work, or it is not copyrightable (Government work is classified as Public Domain in U.S. only)

Are any of the co-authors, employees or contractors of a National Government? ☐ Yes ☐ No

3. Reserved Rights and Permitted Uses.

(a) All rights and permissions the author has not granted to ACM in Paragraph 2 are reserved to the Owner, including without limitation the ownership of the copyright of the Work and all other proprietary rights such as patent or trademark rights.

(b) Furthermore, notwithstanding the exclusive rights the Owner has granted to ACM in Paragraph 2(a), Owner shall have the right to do the following:

(i) Reuse any portion of the Work, without fee, in any future works written or edited by the Author, including books, lectures and presentations in any and all media.

(ii) Create a "Major Revision" which is wholly owned by the author
IEEE COPYRIGHT AND CONSENT FORM

To ensure uniformity of treatment among all contributors, other forms may not be substituted for this form, nor may any wording of the form be changed. This form is intended for original material submitted to the IEEE and must accompany any such material in order to be published by the IEEE. Please read the form carefully and keep a copy for your files.

Testing Regex Generalizability And Its Implications: A Large-Scale Many-Language Measurement Study
James C. Davis, Daniel Moyer, Ayaan M. Kazerouni, Dongyoon Lee
2019 34th IEEE/ACM International Conference on Automated Software Engineering (ASE)

COPYRIGHTTRANSFER
The undersigned hereby assigns to The Institute of Electrical and Electronics Engineers, Incorporated (the "IEEE") all rights under copyright that may exist in and to: (a) the Work, including any revised or expanded derivative works submitted to the IEEE by the undersigned based on the Work; and (b) any associated written or multimedia components or other enhancements accompanying the Work.

GENERAL TERMS

1. The undersigned represents that he/she has the power and authority to make and execute this form.
2. The undersigned agrees to indemnify and hold harmless the IEEE from any damage or expense that may arise in the event of a breach of any of the warranties set forth above.
3. The undersigned agrees that publication with IEEE is subject to the policies and procedures of the IEEE PSPB Operations Manual.
4. In the event the above work is not accepted and published by the IEEE or is withdrawn by the author(s) before acceptance by the IEEE, the foregoing copyright transfer shall be null and void. In this case, IEEE will retain a copy of the manuscript for internal administrative/record-keeping purposes.
5. For jointly authored Works, all joint authors should sign, or one of the authors should sign as authorized agent for the others.
6. The author hereby warrants that the Work and Presentation (collectively, the "Materials") are original and that he/she is the author of the Materials. To the extent the Materials incorporate text passages, figures, data or other material from the works of others, the author has obtained any necessary permissions. Where necessary, the author has obtained all third party permissions and consents to grant the license above and has provided copies of such permissions and consents to IEEE.

You have indicated that you DO wish to have video/audio recordings made of your conference presentation under terms and conditions set forth in "Consent and Release."

CONSENT AND RELEASE

1. In the event the author makes a presentation based upon the Work at a conference hosted or sponsored in whole or in part by the IEEE, the author, in consideration for his/her participation in the conference, hereby grants the IEEE the unlimited, worldwide, irrevocable permission to use, distribute, publish, license, exhibit, record, digitize, broadcast, reproduce and archive, in any format or medium, whether now known or hereafter developed: (a) his/her presentation and comments at the conference; (b) any written materials or multimedia files used in connection with his/her presentation; and (c) any recorded interviews of him/her (collectively, the "Presentation"). The permission granted includes the transcription and reproduction of the Presentation for inclusion in products sold or distributed by IEEE and live or recorded broadcast of the Presentation during or after the conference.
2. In connection with the permission granted in Section 1, the author hereby grants IEEE the unlimited, worldwide, irrevocable right to use his/her name, picture, likeness, voice and biographical information as part of the advertisement, distribution and sale of products incorporating the Work or Presentation, and releases IEEE from any claim based on right of privacy or publicity.
SECTION 8  
Subsections 8.1.3 & 8.1.4

2. Reasonable efforts should be made to provide for adequate and timely presentations of differing viewpoints. This may be accomplished either by planned simultaneous presentations or by presentation of one side of an issue, clearly identified as such, with provision for prompt, subsequent presentation of representative audience discussion and rebuttal.

(See also Subsection 8.2.2 – The Review Process)

Revisions to Subsection 8.1.3 – Nontechnical Material, as contained in this manual, require the review and approval of the IEEE Board of Directors, using the process in accordance with IEEE Bylaw 1-300.4(5).

8.1.4 IEEE Copyright Policy and Procedures

<table>
<thead>
<tr>
<th>IEEE Policies, Section 6.3.1 - IEEE COPYRIGHT POLICIES</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>A. General Policies.</strong> In order to maximize the value of IEEE publications to authors, users and the IEEE, the following IEEE copyright policies shall be applied throughout the IEEE:</td>
</tr>
<tr>
<td>1) IEEE shall serve and protect the interests of its authors and their employers.</td>
</tr>
<tr>
<td>2) All technical, educational and professional publications of the IEEE, except newsletters, but including Society and Technical Council Newsletters, are required to be copyrighted by the IEEE.</td>
</tr>
<tr>
<td>3) Copyright shall be held by the IEEE and not any of its organizational units.</td>
</tr>
<tr>
<td>4) The Intellectual Property Rights Office is responsible for the administration of all IEEE copyright matters under these policies and the procedures which shall be specified in the PSPB Operations Manual. This includes obtaining the copyright registration, handling reprint and republication requests, maintaining copyright records, and administering fees when appropriate. The Intellectual Property Rights Office may, at its discretion, delegate some or all of its copyright implementation responsibilities to other IEEE departments if they have significant publishing activity, subject to procedures approved by a member of the IEEE staff, as designated by the Executive Director.</td>
</tr>
<tr>
<td>5) Third-Party Rights to Reuse IEEE-Copyrighted Material. Licenses and permissions to use IEEE copyrighted material (abstracts, full text, etc.) for commercial or other non-IEEE related purposes may be granted under terms approved by the IEEE Publication Services and Products Board.</td>
</tr>
<tr>
<td>6) Fees for the reuse of IEEE material are appropriate for contributing to the cost of original publication, especially where the reuse involves the republication of material, or any commercial uses.</td>
</tr>
<tr>
<td>7) Prior to publication by the IEEE, all authors or their employers shall transfer to the IEEE in writing any copyright they hold for their individual papers. Such transfer shall be a necessary requirement for publication, except for material in the public domain or which is reprinted with permission from a copyrighted publication.</td>
</tr>
<tr>
<td>8) In return for the transfer of authors’ rights, the IEEE shall grant authors and their employers’ permission to make copies and otherwise reuse the material under terms approved by the Board of Directors which shall be specified in the PSPB Operations Manual.</td>
</tr>
<tr>
<td>9) After IEEE accepts the work for publication and the copyright has been transferred, changes or revisions to the work shall not be made without further review and approval.</td>
</tr>
<tr>
<td>10) For jointly sponsored conferences, which might require special copyright arrangements, those arrangements shall be made in accordance with the procedures which shall be specified in the PSPB Operations Manual.</td>
</tr>
<tr>
<td>11) Copyrighting Electronic Information shall follow the electronic information...</td>
</tr>
</tbody>
</table>
Procedures in regard to IEEE copyright policies are specified in this subsection, including A. General Principles of the policies and procedures, B. Ownership and Rights of IEEE copyrighted material, and Implementation of IEEE policy. 

A. GENERAL PRINCIPLES OF IEEE COPYRIGHT POLICIES AND PROCEDURES

1. Enhancing the accessibility, distribution and use of information is a major objective of the IEEE publication program, limited only by the requirements of viability and professional propriety.

2. To meet this objective and control the use of its good name, the IEEE is obligated to secure copyright ownership of the material it publishes.

3. In exercising its rights under copyright, the IEEE recognizes that it is acting in part to serve and protect the interests of its authors and their employers.

4. Fees for the reuse of IEEE material are appropriate for contributing to the cost of original publication, especially where the reuse involves a license to copy, or allows resale, or is of a magnitude that would tend to reduce subscription or other sales income.

5. Copyright policies shall be consistently applied throughout IEEE.

B. OWNERSHIP AND RIGHTS OF IEEE COPYRIGHTED MATERIAL

1. Copyright is held by IEEE itself and not any of its organizational units.

2. All technical, educational and professional publications of the IEEE, except newsletters, but including Society and Technical Council Newsletters and e-Newsletters, are required to be copyrighted by the IEEE.

3. Prior to publication by the IEEE, all authors or their employers shall transfer to the IEEE in writing any copyright they hold for their individual articles. Such transfer shall be a necessary requirement for publication, except for material in the public domain or which is reused from a copyrighted publication or which is submitted under a Creative Commons Attribution (CC-BY) license.

4. In return for the transfer of authors’ copyrights, the IEEE shall grant authors and their employer’s permission to make copies and otherwise reuse the accepted versions of their articles under terms approved by the Board of Directors.

5. In the case of jointly sponsored conferences, IEEE recognizes the right of another qualified sponsor to hold the copyright and administer all copyright matters on behalf of the IEEE and its author, provided, however, that such right shall be the subject
of a written agreement between IEEE and the qualified sponsor. A conference is not considered a sponsor and may not hold a copyright to IEEE material, except in the case of a conference which is incorporated and maintains its own permanent administrative office.

6. Licenses and permissions to copy or republish IEEE material may be granted under terms approved by PSPB.

C. IMPLEMENTATION OF IEEE COPYRIGHT POLICY

1. The Editor-in-Chief or conference publication committee chair shall be responsible for obtaining the written transfer of author rights and for forwarding appropriate confirmations to the Intellectual Property Rights Office. A form for effecting the interchange of rights with the author per Subsections 8.1.4.B.3 and 8.1.4.B.4 shall be supplied by PSPB or its authorized representative. The wording used on the form shall be approved by PSPB or its authorized representative.

2. For journals and conference publications, an appropriate copyright notice shall appear on the first page or in close proximity to the article abstract of each technical contribution.

3. Should the need for isolated exceptions to any of the above policies and procedures arise, PSPB or its authorized representative is authorized to deal with them on a case-by-case basis.

8.1.5 Guidelines for Use of IEEE Logo and “IEEE”

IEEE Policies, Section 6.3.2 - Guidelines for Use of IEEE Logo and “IEEE”

The following are guidelines on the use of the IEEE logo, i.e., the diamond-shaped emblem which is registered with the U.S. Patent and Trademark Office as the trademark of the IEEE, and on the use of “IEEE,” the recognized abbreviation of The Institute of Electrical and Electronics Engineers, Inc.

A. The IEEE logo should be used on IEEE’s wholly owned publications and also on meeting notices, programs and other promotional literature and products. On any of these, the logo should be displayed prominently at least once accompanied by the registration mark, i.e., the R in a circle (®) shown at the lower right of the emblem. On publications, it is recommended that the logo appear on the front cover and title page, if any.

B. When used with a logo of an organizational unit within IEEE, the IEEE logo should be at least the same size as the other logo, preferably larger or in a more prominent position. In publications produced in cooperation with groups outside the IEEE all logos should be the same size. (It may be acceptable to use logos in different sizes to reflect unequal participation.)

C. In every use, the integrity of the logo must be preserved. For example:

(1) Only the complete, official logo in either solid or outline form may be used. (Hand drawn or deformed versions are not permitted.)

(2) Neither the whole nor recognizable parts may be incorporated into another logo whether designed by an IEEE organizational unit or not.

(3) The logo may be printed in any color with another color as background, but should not be printed in several colors.

(4) The logo should not be obscured by any other design, lettering, etc.

(5) The logo should not be used frivolously.