Guidance and Usage Scenarios for Implementers and Users of Software Identification Tags

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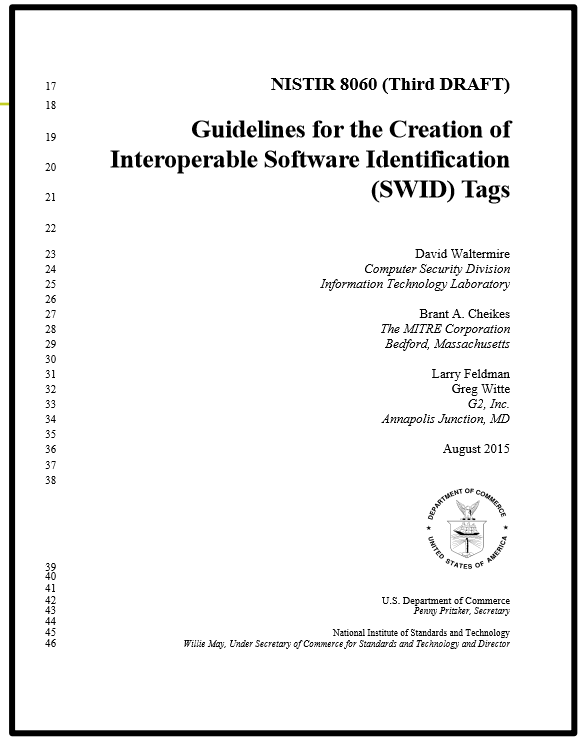
9 September 2015



NISTIR 8060 (Third DRAFT)

Guidelines for the Creation of Interoperable Software Identification (SWID) Tags

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U.S. Department of Commerce
Penny Pritzker, Secretary

National Institute of Standards and Technology
Willie May, Under Secretary of Commerce for Standards and Technology and Director

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Today's Objectives

- **What's a software identification (SWID) tag?**
- **Cybersecurity value of SWID tags**
- **NIST's commitment**
- **Overview of NIST Interagency Report 8060 (3rd Public Draft)**
  - Purpose
  - Audience
  - Document Organization
  - Guidelines and Usage scenarios
- **Open Issues and Next Steps**
- **Concluding Remarks**

What's a SWID Tag? Problem Statement

- **Software is critical infrastructure**
- **Software Asset Management (SAM) is a critical business function**
  - control and protection of software and related assets
  - control and protection of information needed to control and protect software assets
- **Critical challenges:**
  - Installation media are hard to verify
  - Once installed, software applications are hard to *discover*, *identify*, and *characterize*
    - Patches and upgrades too!
  - Relationships among software applications, components, libraries, files, and other system resources are unclear

What's a SWID Tag? The Elevator Speech

An XML Document – Conforms to ISO/IEC 19770-2:2015

```
<SoftwareIdentity
  name="ACME Roadrunner Detector 2013 Coyote Edition"
  tagId="com.acme.rrd2013-ce-sp1-v4-1-5-0" version="4.1.5">
  <Entity name="The ACME Corporation"
          regid="acme.com" role="tagCreator softwareCreator"/>
  <Entity name="Coyote Services, Inc."
          regid="mycoyote.com" role="distributor"/>
  <Link rel="license" href="www.gnu.org/licenses/gpl.txt/">
  <Meta activationStatus="trial" product="Roadrunner Detector"
        colloquialVersion="2013" edition="coyote"/>
  <Payload>
    <Directory root="%programdata%" location="rrdetector">
      <File name="rrdetector.exe" size="532712"
       SHA256:hash="a314fc2dc663ae7a6b6bc6787594057396e6b3f569cd50fd5ddb4d1bbafd2b6a"/>
      <File name="sensors.dll" size="13295"
       SHA256:hash="54e6c3f569cd50fd5ddb4d1bbafd2b6ac4128c2dc663ae7a6b6bc67875940573"/>
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What's a SWID Tag? The Elevator Speech

Minimal Requirements for a Basic Tag

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```

Most Elements and Attributes are Optional

What's a SWID Tag? The Elevator Speech

Created by Authoritative Sources (Ideally) or Third Parties

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```


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What's a SWID Tag? The Elevator Speech

Uniquely Identifies the Product

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What's a SWID Tag? The Elevator Speech

Associates the Product with Tag Creator, etc.

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What's a SWID Tag? The Elevator Speech

Associates the Product with Related Information Sources

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What's a SWID Tag? The Elevator Speech

Provides Descriptive Metadata

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What's a SWID Tag? The Elevator Speech

Characterizes the Product in Detail

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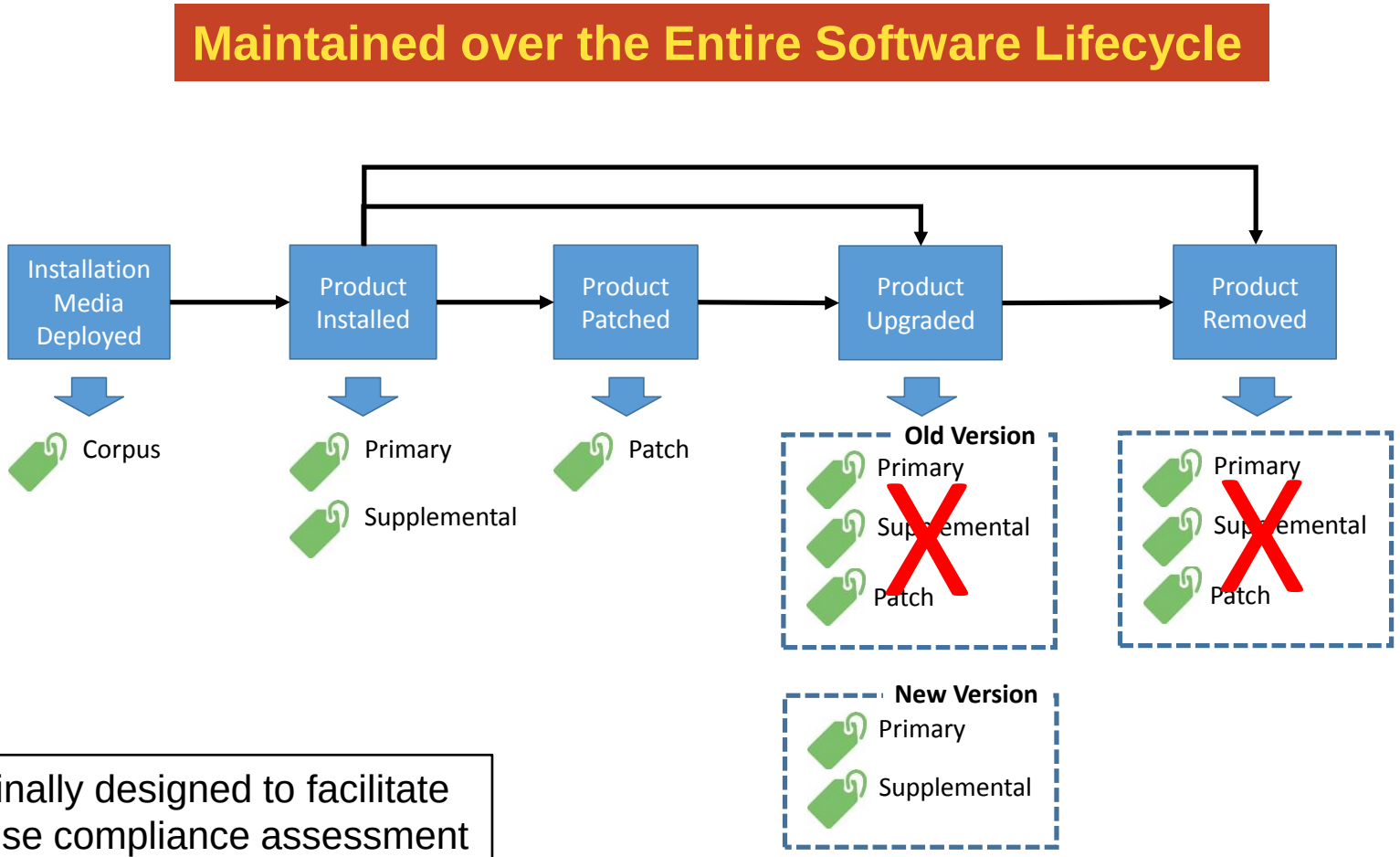

Originally designed to facilitate license compliance assessment

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Potential Cybersecurity Value of SWID Tags

- **Simplifies software discovery**
  - Helps you know what's out there running on the network
- **Enhances interoperability**
  - Cybersecurity products and services can exchange information about software in a standard format
- **Supports automated continuous monitoring services**
  - Changes to endpoint software inventories may be rapidly detected
  - Tags contain data useful for correlating with security advisories, vulnerability reports, and threat intelligence

NIST's Commitment to SWID Tags

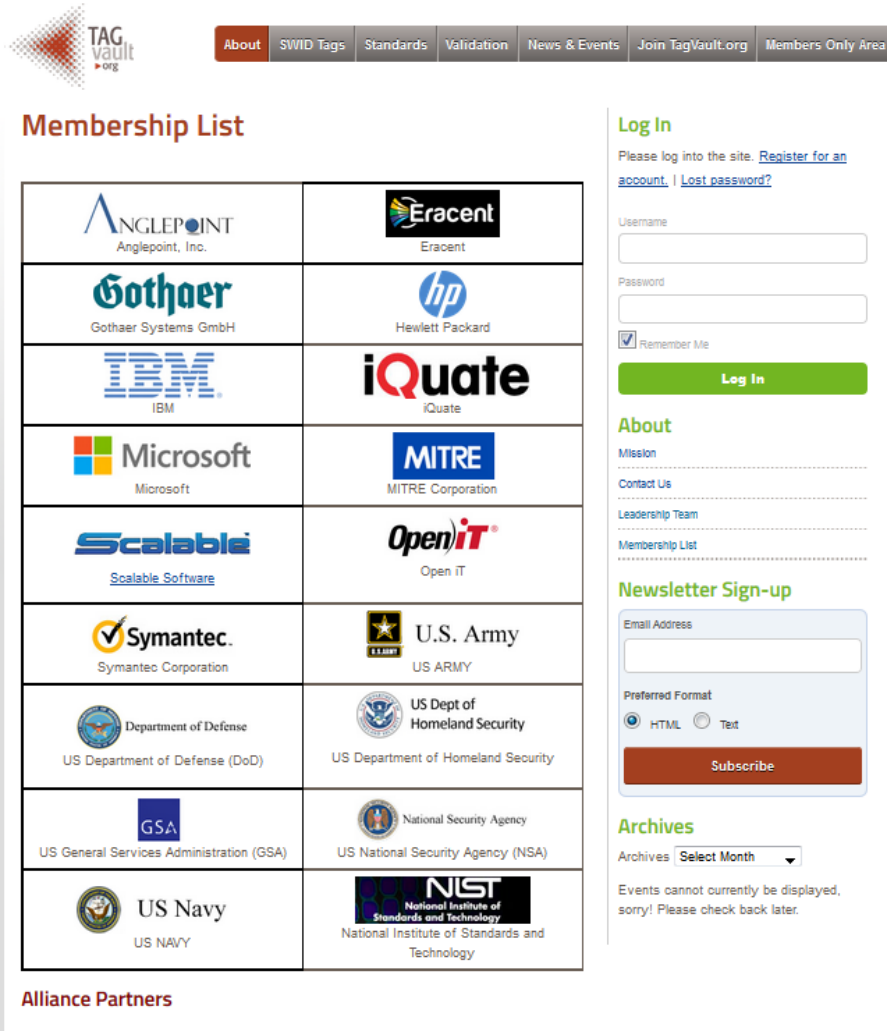
- **Supports SWID tags as eventual replacement to Common Platform Enumeration (CPE) names**

- **Seeks to promote industry adoption by:**
  - Promulgating implementation guidance and best practices
  - Publicly releasing reference implementations and support tools
  - Integrating support for SWID tags into the National Vulnerability Database (NVD)
  - Working with industry and agency partners to maintain and refine the standard over time
  - Promoting interoperability of SWID tags with other standards (e.g., SCAP)

- **NIST Interagency Report 8060 is first public step**
  - *Guidelines for the Creation of Interoperable Software Identification (SWID) Tags—Third Public Draft*
  - Comment period ends 21 September!

TagVault.org

- **Neutral not-for-profit certification authority for software tagging**
- **Industry evangelist for the adoption, use and evolution of interoperable, internationally-accepted standards software identification standards and processes**



NIST IR 8060: Purpose

- **Provide a high-level description of SWID tags in order to increase familiarity with the standard**

- **Provide tag implementation guidelines that supplement the ISO/IEC SWID tag specification**
  - Some guidelines in SWID specification are *strengthened*
  - New guidelines added to increase clarity and reduce ambiguity
  - Guidelines intended solely to extend and not to conflict with any guidelines provided by the SWID specification
  - Guidelines may support future Government acquisition requirements

- **Present a set of operational usage scenarios illustrating how SWID tags conforming to these guidelines can be used to achieve a variety of cybersecurity goals**

NIST IR 8060: Audience

- **Software Providers**
  - Individuals and organizations that develop, license, and/or distribute commercial, open source, and custom software products
- **Providers of Inventory-Based Products and Services**
  - Individuals and organizations that develop tools for discovering and managing software assets
- **Software Consumers**
  - Individuals and organizations that install and use commercial, open source, and/or in-house developed software products

NIST IR 8060: Document Organization

- **Section 2 – SWID Tag Overview**
  - SWID Tag Types and the Software Lifecycle
  - SWID Tag Placement
  - Basic Tag Elements
  - Authenticating SWID Tags (preliminary)
- **Section 3 – Implementation Guidance for all Tag Types**
  - Authoritative vs. Non-Authoritative Tag Creators
  - Implementing <Entity> Elements
  - Implementing <Payload> and <Evidence> Elements
  - Implementing Digital Signatures (preliminary)
  - Referring to and Updating Tags
- **Section 4 – Implementation Guidance Specific to Tag Type**
  - Implementing Corpus, Primary, Patch, and Supplemental Tags
- **Section 5 – Usage Scenarios**

NIST IR 8060: Guidelines—Key Objectives

- **Enhance utility of tags for cybersecurity usage scenarios**
  - Globally-unique tag identifier usable as proxy ID for tagged product
  - Product version information furnished and allows version comparison to distinguish “before” and “after”
  - Metadata furnished for targeted search and correlation
  - Detailed file manifests furnished with cryptographic hashes
- **Clarify tag maintenance processes**
  - General updating when needed to correct errors
  - Properly reflecting patches and upgrades in tags
  - Properly linking tags to one another
  - Properly signing tags (in progress)

NIST IR 8060: Usage Scenarios—Overview

- **Minimizing Exposure to Publicly-Disclosed Software Vulnerabilities**
  - US 1 - Continuously Monitoring Software Inventory
  - US 2 - Ensuring that Products Are Properly Patched
  - US 3 - Correlating Inventory Data with Vulnerability Data to Identify Vulnerable Endpoints
  - US 4 - Discovering Vulnerabilities Due to Orphaned Software Components
- **Enforcing Organizational Software Policies**
  - US 5 - Preventing Installation of Unauthorized or Corrupted Software Products
  - US 6 - Discovering Corrupted Software and Preventing Its Execution
- **Controlling Access to Enterprise Networks**
  - US 7 - Preventing Potentially Vulnerable Endpoints from Connecting to Network Resources

Open Issues

- Patching vs. upgrading
- Implementing digital signatures
- Associating corpus tags with installation packages
- Tagging products that are accessible from a device (e.g., via network-attached storage) rather than installed on local storage
- Normalizing tag data
- Multi-language issues

Next Steps

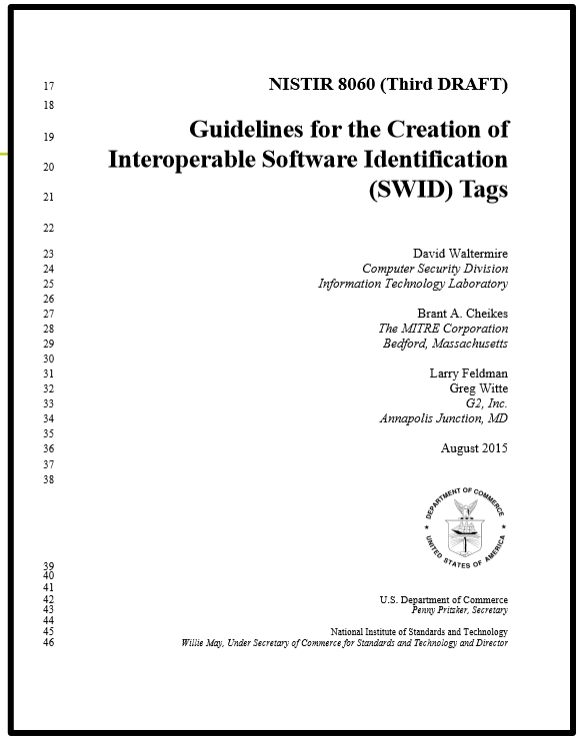
- **Finalize NIST IR 8060**
  - Address digital signatures
  - Ensure consistency with final draft of 19770-2:2015
- **Release a reference implementation for digitally signing SWID tags**
  - Simplify conformance to guidance
- **Release a reference implementation for CPE name generation**
  - Maintain interoperability with SCAP 1.x
- **Release a tag validation tool that checks conformance to IR 8060 guidelines**
  - Enable self-testing for conformance to guidance

Concluding Remarks

- **SWID tags offer many benefits to software providers, software consumers, and providers of inventory-based products and services**
- **Broad adoption is key to success—need to promote a "virtuous cycle"**
- **NIST IR 8060 is a first step—promoting awareness, providing implementation guidance and motivating usage scenarios**

You Can Help!

- **PLEASE REVIEW AND COMMENT!!**
- **E-Mail NIST IR 8060 comments to:**
  - nistir8060-comments@nist.gov



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- **See also:**
  - http://standards.iso.org/iso/19770/-2/2015/schema.xsd
  - http://tagvault.org/standards/swid_tagstandard/
  - http://www.iso.org/iso/catalogue_detail.htm?csnumber=53670
  - https://en.wikipedia.org/wiki/ISO/IEC_19770

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