National Institute of Standards and Technology
U.S. Department of Commerce

SCAP™

The National Vulnerability Database

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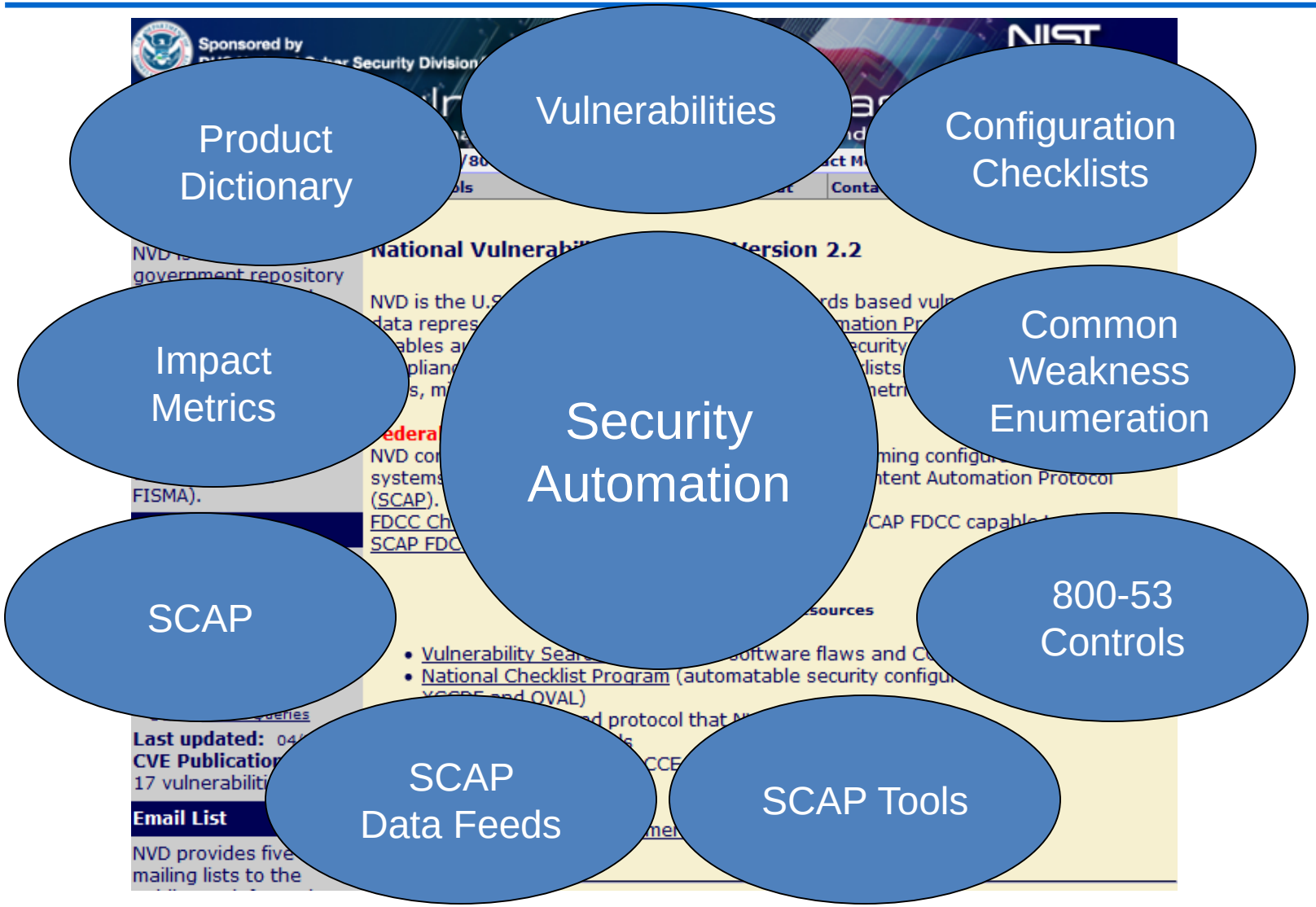
Agenda

- Introduction and Overview of the National Vulnerability Database (NVD)
- Introduction to NVD Resources
- CVE
- CVSS
- Vulnerability Taxonomy
- Q&A - Feedback

NVD: A Collection of Resources



NVD Overview

Vulnerabilities	Product Names	Checklists	New Vulnerabilities	SCAP Checklists
72,000+	105,000+	290+	6,000+	80+
• Over 72,000 CVE entries	• Product dictionary containing over 105,000 unique CPE based product names	• Over 290 Checklists posted.	• The NVD Analysis Team evaluates over 6,000 vulnerabilities a year	• 80+ in SCAP Format (Tier III or Tier IV).

NVD Data Feeds

Vulnerabilities

Configuration to 800-53 Controls

Checklists

Software Products

Security Content Automation Protocol (SCAP)

Languages

Means of providing instructions

- Community developed
- Machine readable XML
- Reporting
- Representing security checklists
- Detecting machine state

Metrics

Risk scoring framework

- Community developed
- Transparent
- Metrics
  - Base
  - Temporal
  - Environmental

Enumerations

Convention for identifying and naming

- Community developed
- Product names
- Vulnerabilities
- Configuration settings

Integrity

Conventions for applying existing and emerging XML signature standards and best practices to sign and verify content

What are SCAP Validated Products?

- Products validated by the SCAP Validation Program
- The SCAP Validation Program
  - Provides product conformance testing for Security Content Automation Protocol (SCAP)
  - Provides end users with assurance that SCAP validated tools conform to SCAP and should be capable of processing well-formed SCAP expressed checklists

How do I use SCAP Validated Products?

- End users purchasing a tool from the validated products list has assurance that the product has met the test requirements defined in NIST IR 7511 and should process SCAP expressed checklists.
- http://nvd.nist.gov/scapproducts.cfm

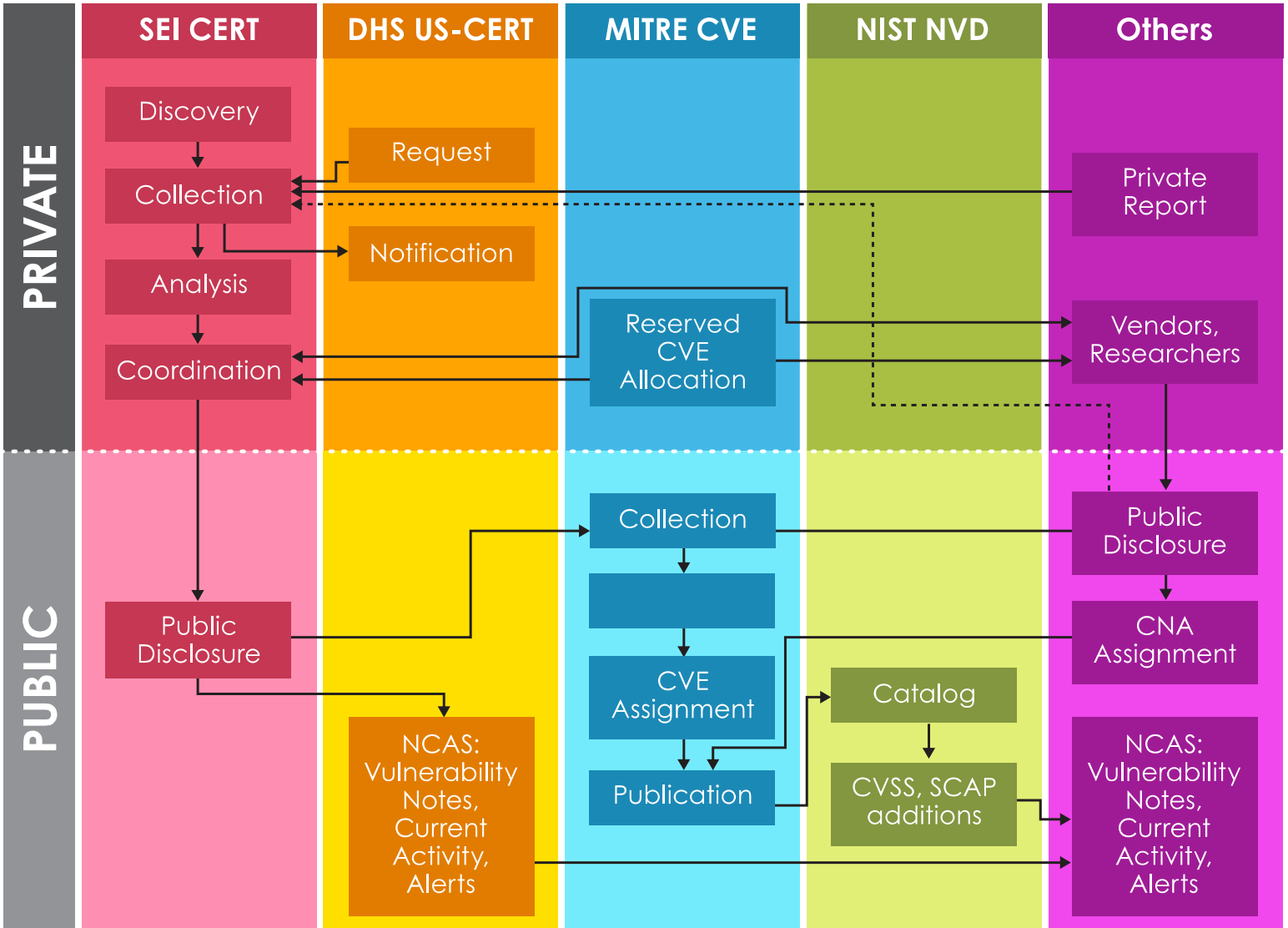
What is CPE?

- Structure naming scheme for information technology systems, software, and packages
- Includes formal name format, method for checking names against a system, and a description format for binding text and tests to a name
- The Official Common Platform Enumeration (CPE) Dictionary
  - http://nvd.nist.gov/cpe.cfm

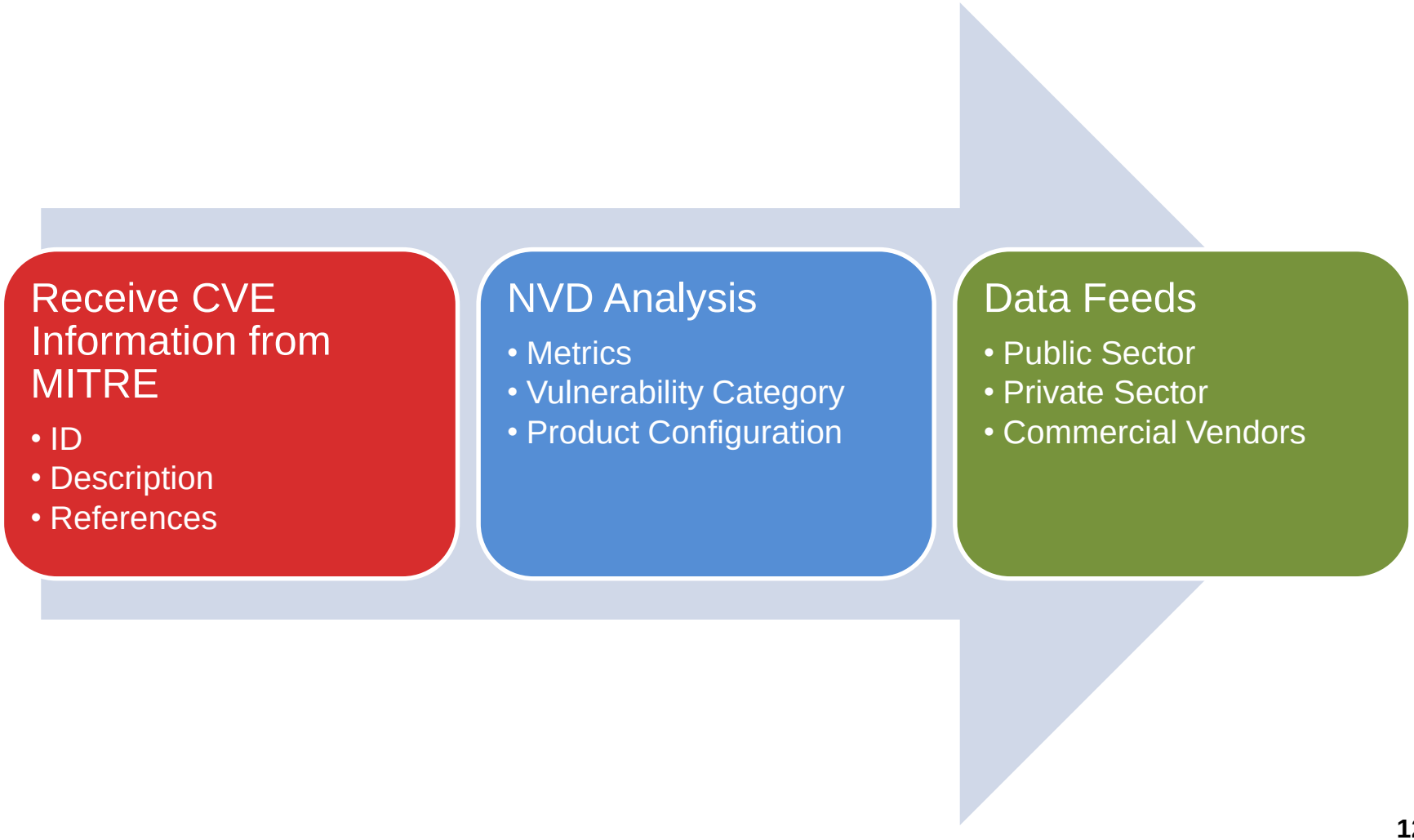
Common Vulnerabilities and Exposures (CVE)

- A dictionary of publicly known vulnerabilities
  - Predominately for, but not exclusive to, software used within the United States
  - MITRE maintains editorial control
    - Abstraction of Vulnerabilities
    - Duplication
- CVE is composed of:
  - Identifier => CVE-2013-1234
  - Description
  - References

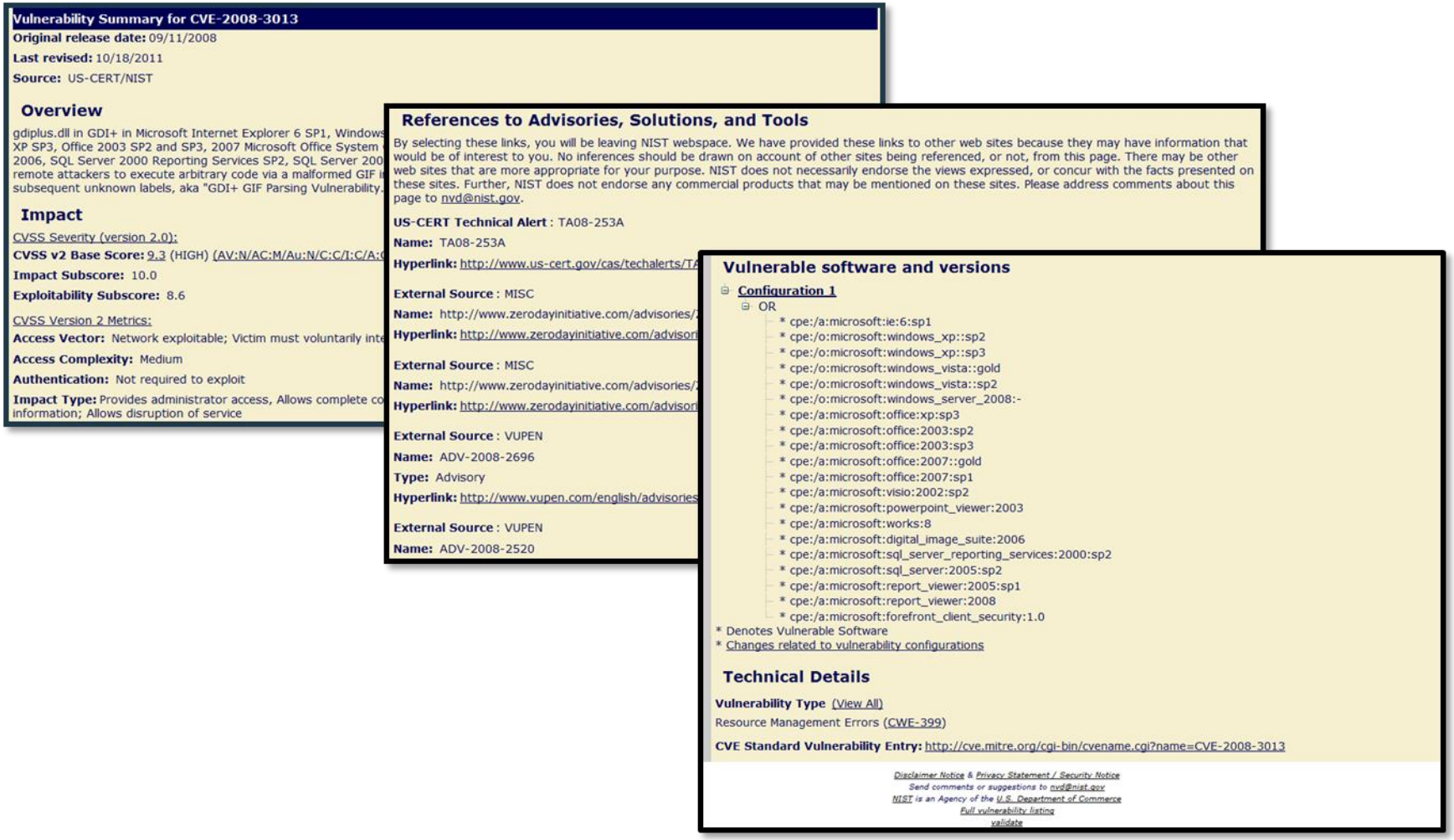
CVE/NVD (US) Ecosystem



National Vulnerability Database Role



CVE Detail for NVD



Vulnerability Summary for CVE-2008-3013

Original release date: 09/11/2008

Last revised: 10/18/2011

Source: US-CERT/NIST

Overview

gdiplus.dll in GDI+ in Microsoft Internet Explorer 6 SP1, Windows XP SP3, Office 2003 SP2 and SP3, 2007 Microsoft Office System 2006, SQL Server 2000 Reporting Services SP2, SQL Server 200 remote attackers to execute arbitrary code via a malformed GIF i subsequent unknown labels, aka "GDI+ GIF Parsing Vulnerability.

Impact

CVSS Severity (version 2.0):

CVSS v2 Base Score: 9.3 (HIGH) (AV:N/AC:M/Au:N/C:C/I:C/A:C

Impact Subscore: 10.0

Exploitability Subscore: 8.6

CVSS Version 2 Metrics:

Access Vector: Network exploitable; Victim must voluntarily inte

Access Complexity: Medium

Authentication: Not required to exploit

Impact Type: Provides administrator access, Allows complete co information; Allows disruption of service

References to Advisories, Solutions, and Tools

By selecting these links, you will be leaving NIST webspace. We have provided these links to other web sites because they may have information that would be of interest to you. No inferences should be drawn on account of other sites being referenced, or not, from this page. There may be other web sites that are more appropriate for your purpose. NIST does not necessarily endorse the views expressed, or concur with the facts presented on these sites. Further, NIST does not endorse any commercial products that may be mentioned on these sites. Please address comments about this page to nvd@nist.gov.

US-CERT Technical Alert : TA08-253A

Name: TA08-253A

Hyperlink: http://www.us-cert.gov/cas/techalerts/TA

External Source : MISC

Name: http://www.zerodayinitiative.com/advisories/

Hyperlink: http://www.zerodayinitiative.com/advisori

External Source : MISC

Name: http://www.zerodayinitiative.com/advisories/

Hyperlink: http://www.zerodayinitiative.com/advisori

External Source : VUPEN

Name: ADV-2008-2696

Type: Advisory

Hyperlink: http://www.vupen.com/english/advisories

External Source : VUPEN

Name: ADV-2008-2520

Vulnerable software and versions

Configuration 1

OR

* cpe:/a:microsoft:ie:6:sp1
* cpe:/o:microsoft:windows_xp::sp2
* cpe:/o:microsoft:windows_xp::sp3
* cpe:/o:microsoft:windows_vista::gold
* cpe:/o:microsoft:windows_vista::sp2
* cpe:/o:microsoft:windows_server_2008:-
* cpe:/a:microsoft:office:xp:sp3
* cpe:/a:microsoft:office:2003:sp2
* cpe:/a:microsoft:office:2003:sp3
* cpe:/a:microsoft:office:2007::gold
* cpe:/a:microsoft:office:2007:sp1
* cpe:/a:microsoft:visio:2002:sp2
* cpe:/a:microsoft:powerpoint_viewer:2003
* cpe:/a:microsoft:works:8
* cpe:/a:microsoft:digital_image_suite:2006
* cpe:/a:microsoft:sql_server_reporting_services:2000:sp2
* cpe:/a:microsoft:sql_server:2005:sp2
* cpe:/a:microsoft:report_viewer:2005:sp1
* cpe:/a:microsoft:report_viewer:2008
* cpe:/a:microsoft:forefront_client_security:1.0

* Denotes Vulnerable Software

* Changes related to vulnerability configurations

Technical Details

Vulnerability Type (View All)

Resource Management Errors (CWE-399)

CVE Standard Vulnerability Entry: http://cve.mitre.org/cgi-bin/cvename.cgi?name=CVE-2008-3013

Disclaimer Notice & Privacy Statement / Security Notice
Send comments or suggestions to nvd@nist.gov
NIST is an Agency of the U.S. Department of Commerce
Full vulnerability listing
validate

CVSS Overview

- Common Vulnerability Scoring System (CVSS)
- A universal way to convey vulnerability severity and help determine urgency and priority of responses
- 20+ new vulnerabilities a day for organizations to prioritize and mitigate
- A set of metrics and formulas
- Solves problem of incompatible scoring systems
- Under the custodial care of FIRST CVSS-SIG
- Open, usable, and understandable by anyone
- Version 2 released in June 2007, adopted by SCAP
- Version 3 released in June 2015

CVSS v2.0 Base Metrics

Exploitability

Access Vector (AV)
- Local (L)
- Adjacent Network (A)
- Network (N)

Access Complexity (AC)
- Low (L)
- Medium (M)
- High (H)

Authentication (Au)
- None (N)
- Single (S)
- Multiple (M)

Impact

Confidentiality (C)
- None (N)
- Partial (P)
- Complete (C)

Integrity (I)
- None (N)
- Partial (P)
- Complete (C)

Availability (A)
- None (N)
- Partial (P)
- Complete (C)

CVSS v2.0 Base Vector

Vector Format:

AV:[L,A,N]/AC:[H,M,L]/Au:[M,S,N]
/C:[N,P,C]/I:[N,P,C]/A:[N,P,C]

Example:

AV:N/AC:L/Au:S/C:N/I:N/A:P

CVSS v2.0 Temporal Metric

Exploitability (E)	Remediation Level (RL)	Report Confidence (RC)
• Unproven (U) • Functional (F) • High (H) • Not Defined (ND)	• Official Fix (OF) • Temporary Fix (TF) • Workaround (W) • Unavailable (U) • Not Defined (ND)	• Unconfirmed (UC) • Uncorroborated (UR) • Confirmed (C) • Not Defined (ND)

CVSS v2.0 Environmental Metrics

Collateral Damage Potential (CDP)

- None (N)
- Low (L)
- Low-Medium (LM)
- Medium-High (MH)
- High (H)
- Not Defined (ND)

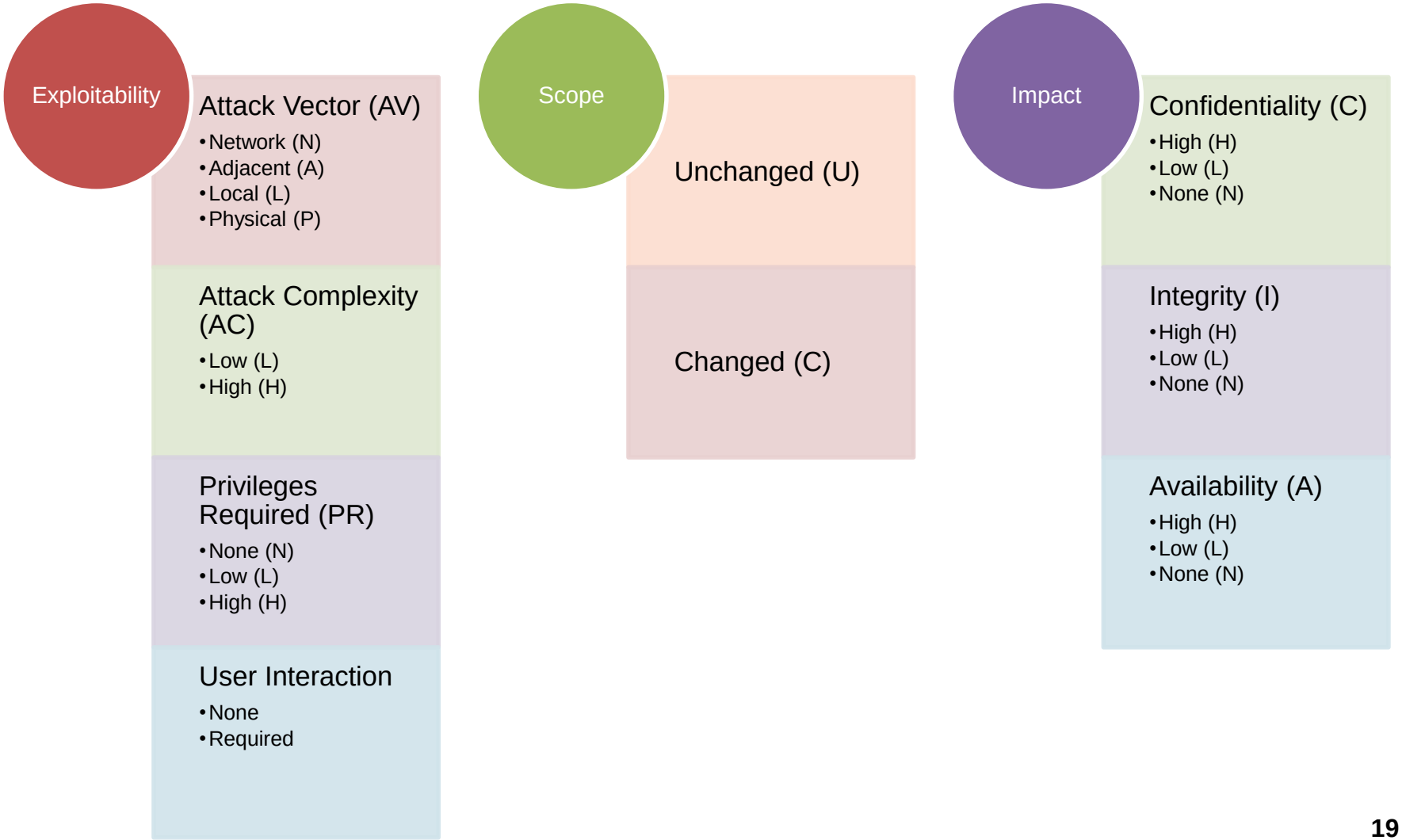
Target Distribution (TD)

- None (N)
- Low (L)
- Medium (M)
- High (H)
- Not Defined (ND)

Security Requirements

- **Confidentiality Requirement (CR)**
- **Integrity Requirement (IR)**
- **Availability Requirement (AR)**
- Low (L)
- Medium (M)
- High (H)
- Not Defined (ND)

CVSS v3.0 Base Metrics



CVSS v3.0 Base Vector

Vector Format:

CVSS:3.0/AV:[N,A,L,P]/AC:[L,H]
/PR:[N,L,H]/UI:[N,R]/S:[U,C]
/C:[H,L,N]/I:[H,L,N]/A:[H,L,N]

Example:

CVSS:3.0/AV:N/AC:L/PR:H/UI:R/S:C/C:L
/I:L/A:N

CVSS v3.0 Temporal Metric

Exploit Code Maturity (E)	Remediation Level (RL)	Report Confidence (RC)
• Not Defined (X) • High (H) • Functional (F) • Proof-of-Concept (P) • Unproven (U)	• Not Defined (X) • Unavailable (U) • Workaround (W) • Temporary Fix (TF) • Official Fix (OF)	• Not Defined (X) • Confirmed (C) • Reasonable (R) • Unknown (U)

CVSS v3.0 Environmental Metrics

Security Requirements

- **Confidentiality Requirement (CR)**
- **Integrity Requirement (IR)**
- **Availability Requirement (AR)**
  - Not Defined (X)
  - High (H)
  - Medium (M)
  - Low (L)

Modified Based Metrics

- **Modified Attack Vector (MAV)**
- **Modified Attack Complexity (MAC)**
- **Modified Privileges Required (MPR)**
- **Modified User Interaction (MUI)**
- **Modified Scope (MS)**
- **Modified Confidentiality (MC)**
- **Modified Integrity (MI)**
- **Modified Availability (MA)**
  - Not Defined (X)
  - Same as equivalent Base Metric

Vulnerability Taxonomy

- Evaluate vulnerabilities only once
  - Generate CVSS v2.0 & v3.0 scores
- Common vocabulary
- Improve Automation
- Support sharing across regional and linguistic boundaries
- Currently in Research and Development phase

Questions

- What information is valuable to your organization when evaluating vulnerabilities?
- What is the desired level of automation?

Future of NVD

Resources and Websites

- **NVD Homepage**
  - http://nvd.nist.gov
- **National Checklist Program**
  - http://checklists.nist.gov
- **SCAP Homepage**
  - http://scap.nist.gov
- **SCAP Validated Products**
  - http://nvd.nist.gov/scapproducts.cfm
- **NIST Computer Security Resource Center (CRSC) Documents**
  - http://csrc.nist.gov/publications/PubsSPs.html
  - http://csrc.nist.gov/publications/PubsNISTIRs.html