WebLogic Vulnerabilities

Oracle E-Business Suite Impact

(CVE-2020-14882, CVE-2020-14883, CVE-2020-14750)

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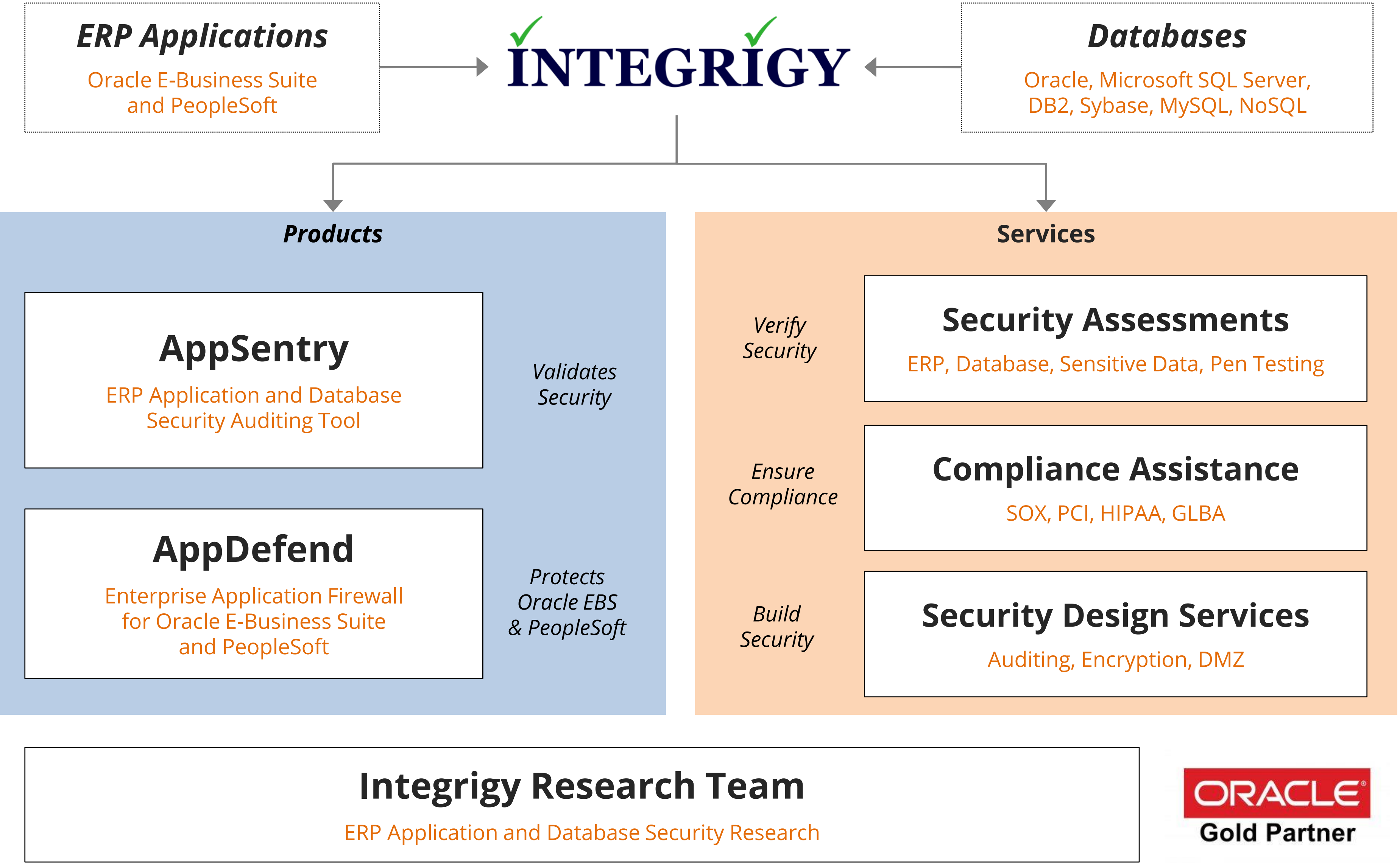
About Integrigy



ERP Applications

Oracle E-Business Suite and PeopleSoft

INTEGRIGY

Databases

Oracle, Microsoft SQL Server, DB2, Sybase, MySQL, NoSQL

Products

AppSentry

ERP Application and Database Security Auditing Tool

Validates Security

AppDefend

Enterprise Application Firewall for Oracle E-Business Suite and PeopleSoft

Protects Oracle EBS & PeopleSoft

Services

Verify Security

Security Assessments

ERP, Database, Sensitive Data, Pen Testing

Ensure Compliance

Compliance Assistance

SOX, PCI, HIPAA, GLBA

Build Security

Security Design Services

Auditing, Encryption, DMZ

Integrigy Research Team

ERP Application and Database Security Research

ORACLE Gold Partner

WebLogic Vulnerabilities 2020

						CVSS Version 3.1 Risk									
	A CVE#	Product	B Component	Protocol	C Remote Exploit Without Auth.?	D Base Score	Attack Vector	Attack Complex	Privs Req'd	User Interact	Scope	Confid	E Integrity	Avail	F Supported Versions Affected
Oracle Critical Patch Update (CPU) October 2020															
1	CVE-2020-14882	Oracle WebLogic Server	Console	HTTP	Yes	9.8	Network	Low	None	None	Unchanged	High	High	High	10.3.6.0.0, 12.1.3.0.0, 12.2.1.3.0, 12.2.1.4.0, 14.1.1.0.0
2	CVE-2020-14883	Oracle WebLogic Server	Console	HTTP	No	7.2	Network	Low	High	None	Unchanged	High	High	High	10.3.6.0.0, 12.1.3.0.0, 12.2.1.3.0, 12.2.1.4.0, 14.1.1.0.0
Oracle Security Alert (one-off) November 1, 2020															
3	CVE-2020-14750	Oracle WebLogic Server	Console	HTTP	Yes	9.8	Network	Low	None	None	Unchanged	High	High	High	10.3.6.0.0, 12.1.3.0.0, 12.2.1.3.0, 12.2.1.4.0, 14.1.1.0.0

A CVE (Common Vulnerability Enumeration) is a **standard numbering** of security vulnerabilities – search using Google or Twitter

B These vulnerabilities are limited to the WebLogic **Console** component

C If the vulnerability is remotely exploitable **without authentication**

D CVE Base Score is a scale of 1 to 10 with 10 meaning **entire server** can be compromised

E Attacker can **read and write to the server** and impact availability of the server

F Lists only **supported** versions of WebLogic which are vulnerable – all versions > 10.3.0 are vulnerable

WebLogic Vulnerabilities 2020

CVE-2020-14882	▪ Authorization bypass in WebLogic Console ▪ Classic **path traversal** vulnerability ▪ Full access to WebLogic Console with **no authentication**
CVE-2020-14883	▪ **Remote code execution** (RCE) vulnerability in WebLogic Console ▪ Allows execution of operating system commands by calling specific Java classes ▪ Requires authorization but can be used in combination with CVE-2020-14882
CVE-2020-14750	▪ Fix for CVE-2020-14882 which could be bypassed

CVE-2020-14882 Authorization Bypass URLs

- **WebLogic console URLs are –**
  - **/console/login/LoginForm.jsp** for login page
  - **/console/console.portal** for console once logged in

- **For Oracle E-Business Suite, the WebLogic console is running on a port such as 7001 and the URL would be something like –**
  - http://ebs.example.com:7001/console/login/LoginForm.jsp for the login page
  - http://ebs.example.com:7001/console/console.portal for the running logged in console

- **WebLogic authorization (login) can be bypassed by changing the URL and perform a path traversal using double encoding –**
  - /console/images/%252E%252E%252Fconsole.portal
  - /console/css/%252E%252E%252Fconsole.portal
  - /console/bea-helpsets/%252E%252E%252Fconsole.portal

- **WebLogic will decode the as follows –**
  - %252E%252E%252F → %2E%2E%2F → ../

Reference: https://owasp.org/www-community/Double_Encoding

CVE-2020-14883 OS Shell Execution

- The security bug is that a page in the WebLogic Console accepts a Java classname as input and executes this class
- Need to simply find a “helper” function that will do something you want, such as execute operating system commands
- There are is at least one very useful “helper” function in WebLogic Console but many others are possible –
  - `com.tangosol.coherence.mvel2.sh.ShellSession`

Example if running WebLogic on Windows –

```
handle=com.tangosol.coherence.mvel2.sh.ShellSession("java.lang.Runtime.
getRuntime().exec('calc.exe');");
```

CVE-2020-14882 Issue and CVE-2020-14750 Fix

The first fix (CVE-2020-14882) is to check for –

/%252E%252E%252F

The issue is that lowercase works too –

/%252e%252e%252f

The second fix (CVE-2020-14750) is to check for –

/%252E%252E%252F

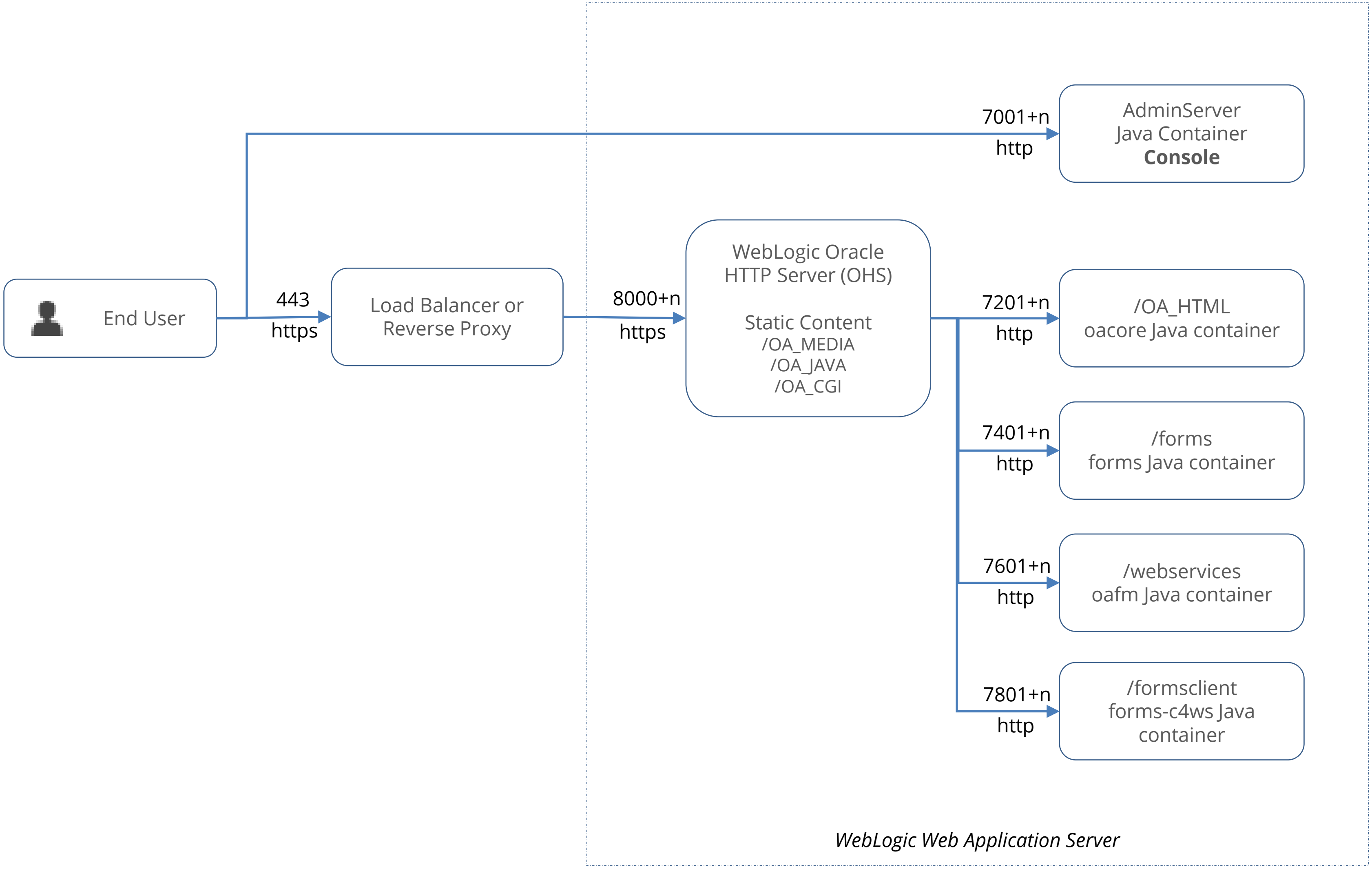
/%252e%252e%252f

WebLogic Vulnerability Demo

Oracle E-Business Suite and WebLogic

EBS Version	**Internal**	**External** (iSupplier, iStore, …)
11.5.10.x	Not Vulnerable (no WebLogic)	Not Vulnerable (no WebLogic)
12.1.x	Not Vulnerable (no WebLogic)	Not Vulnerable (no WebLogic)
12.2.x	**Vulnerable** **WebLogic 10.3.6.0 Console running on 70xx**	**Should not be Vulnerable** **WebLogic 10.3.6.0 Console running on 70xx should be blocked**

WebLogic and Oracle E-Business Suite 12.2



Note: port + n is the EBS Rapid Install default port plus port pool choice (0 to 99)

WebLogic Vulnerabilities 2020 Security Patches

Step 1 **CVE-2020-14882** **CVE-2020-14883**	Patch 31641257: WLS PATCH SET UPDATE 10.3.6.0.201020 See MOS Note ID 2707309.1 *Oracle E-Business Suite Release 12 Critical Patch Update Knowledge Document (October 2020)*
Step 2 **CVE-2020-14750**	Patch 32097188: WLS OVERLAY PATCH FOR 10.3.6.0.0 OCT 2020 PSU See MOS Note ID 2724951.1*Security Alert CVE-2020-14750 Patch Availability Document for Oracle WebLogic Server*

CVE-2020-14882 and CVE-2020-14750 Patch Tests

- To verify the patches are properly applied, attempt to access the Console using the following URLs –
  - /console/images/%252E%252E%252Fconsole.portal (CVE-2020-14882 test)
  - /console/images/%252e%252e%252fconsole.portal (CVE-2020-14750 test)
- If 404 is returned, then patches are applied
- If the console is displayed (missing images), then patches not applied
- If the first URL returns 404 and the second URL returns the console page, then patch for CVE-2020-14750 is missing

Oracle E-Business Suite and WebLogic Console

- **For Oracle E-Business Suite, AdminServer with WebLogic console is running on port 70xx**
  - AdminServer supports http, t3, and IIOP protocols
  - Multiple security vulnerabilities in t3 and IIOP
- **As part of the April 2019 Critical Patch Update (CPU), restrictions on the AdminServer were enabled by default**
  - Verify what connections are allowed – DO NOT ALLOW unrestricted access
  - AutoConfig variable s_wls_admin_console_access_nodes controls access to the AdminServer
  - R12.TXK.C.Delta.11 allows for using CIDR (e.g., 192.168.2.1/24)
  - See MOS Note ID 2542826.1 *Alternative Methods to Allow Access to Oracle WebLogic Server Administration Console from Trusted Hosts for Oracle E-Business Suite Release 12.2*
- **If April 2019 CPU is not applied, then manually apply security filters –**
  - WebLogic console → Domain → Security → Filter → Connection Filter
  - See MOS Note ID 2542826.1 *Alternative Methods to Allow Access to Oracle WebLogic Server Administration Console from Trusted Hosts for Oracle E-Business Suite Release 12.2*

Finding WebLogic Servers

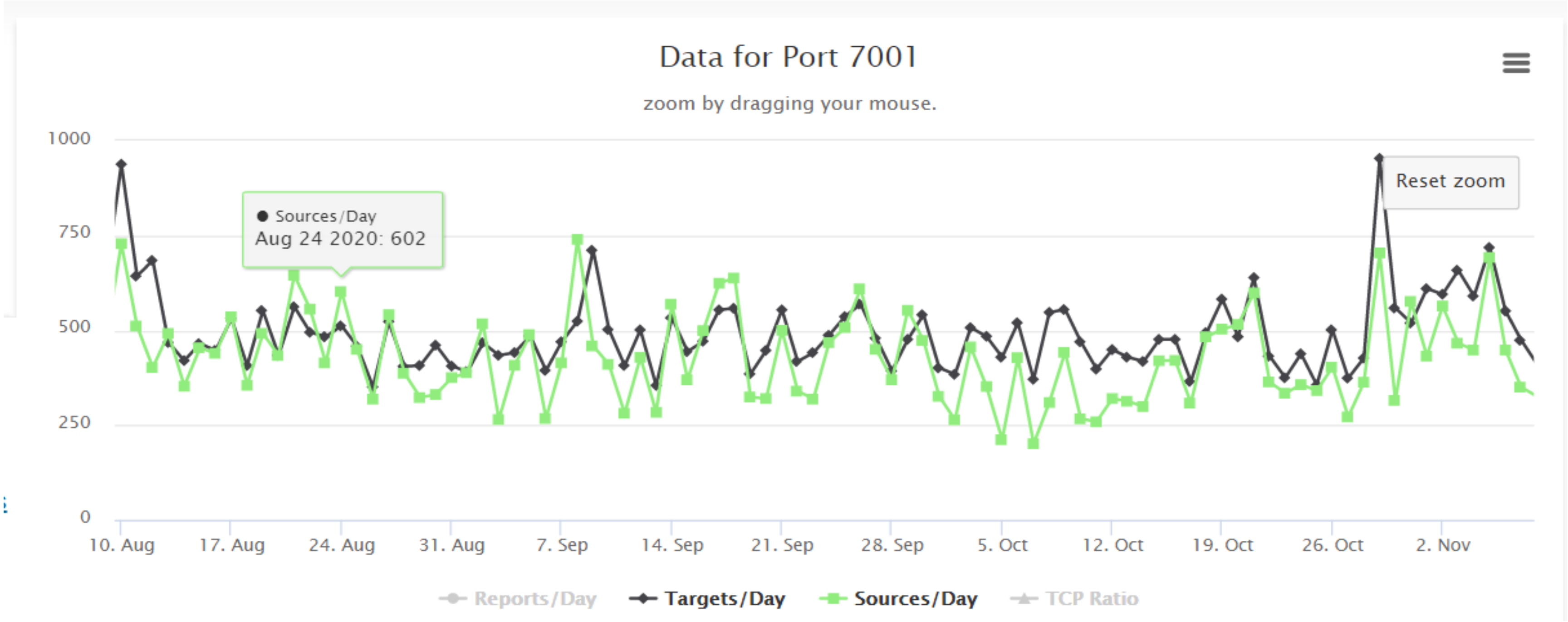
- **Attackers actively search for vulnerable servers on the Internet**
  - Use security search engines
  - Crawl the Internet (IP address by IP address)

- **Security search engines allow for searches by server type (WebLogic) and port number (7001)**
  - Shodan – https://www.shodan.io/
  - Censys – https://censys.io/
  - Spyse – https://spyse.com

- **New versions of Oracle E-Business Suite and PeopleSoft do not show WebLogic as the server type and should not appear in results**
  - Server string is set to empty since Oracle EBS 12.1.1

WebLogic Attacks and Port 7001

- Internet Storm Center (ISC) tracks through sensors on the Internet scanning for ports and attacks against servers
- There is active scanning for port 7001 and active attacks against using these WebLogic vulnerabilities



Source: https://isc.sans.edu/port.html?port=7001
Reference: https://isc.sans.edu/forums/diary/Cryptojacking+Targeting+WebLogic+TCP7001/26768/
Reference: https://isc.sans.edu/forums/diary/Attackers+Exploiting+WebLogic+Servers+via+CVE202014882+to+install+Cobalt+Strike/26752/

Oracle E-Business Suite Infrastructure Products

The following Oracle Fusion Middleware products use Oracle WebLogic –

- Oracle Business Intelligence (OBIEE)
- Oracle Coherence
- Oracle SOA Suite
- Oracle Identity Management
  - Oracle Internet Directory
  - Oracle Access Manager
  - Oracle Unified Directory

WebLogic Vulnerabilities in the Future

- **21 security researchers credited with finding these bugs**
  - They will not stop at this bug
  - Actively working to find the next “hot” WebLogic vulnerability
  - Able to sell such vulnerabilities to services or monetize through bug bounties ($$$)

- **Integrigy anticipates that a number of high-risk WebLogic vulnerabilities will be found and patched in future Oracle Critical Patch Updates**
  - Security bugs most likely will be in core WebLogic components such as Console
  - Core components are in all WebLogic implementations including Oracle EBS, PeopleSoft, OBIEE, SOA, Identity Management, etc.

- **WebLogic must be proactively hardened and protected**
  - Block access to everything except what you absolutely need
  - Use native WebLogic security features
  - Use web application firewalls (WAF)
  - Use load balancer/reverse proxy

Integrigy AppDefend

AppDefend is an **enterprise application firewall** designed and optimized for the Oracle E-Business Suite.

- **Prevents Web Attacks**
  Detects and reacts to SQL Injection, XSS, and known Oracle EBS vulnerabilities

- **Application Logging**
  Enhanced application logging for compliance requirements like SOX, GDPR, PCI-DSS 10.2

- **Two-factor Authentication (2FA)**
  Enables two-factor authentication for login, user, responsibility, or function

- **Limits EBS Modules**
  More flexibility and capabilities than URL firewall to identify EBS modules

- **Protects Web Services**
  Detects and reacts to attacks against native Oracle EBS web services (SOA, SOAP, REST)

- **Protects Mobile Applications**
  Detects and reacts to attacks against Oracle EBS mobile applications

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