



ISSN: 0975-766X
CODEN: IJPTFI
Research Article

Available Online through
www.ijptonline.com

THREATS, VULNERABILITIES AND COUNTERMEASURES OF SECURE NET SERVICES

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Received on: 15.10.2016

Accepted on: 22.11.2016

Abstract

An internet service could be a technique of communication between 2 electronic devices. net services square measure application elements. These square measure self-contained and self-describing. It can even be utilized by different applications. net services square measure utilized by Associate in Nursing increasing range of corporations as they expose merchandise and services to customers and business partners through the net and company extranets. the protection needs for these service suppliers square measure of preponderating importance. the most objectives of the paper "Threats, Vulnerabilities And Countermeasures of Secure net Services" to provide ASP .NET Web services, Web API, and the comparison study of high threats ,Vulnerabilities and Countermeasures of net Services, Secure distributed computing surroundings, SSL limitations and XML-based security schemes. The ASP .NET web services allows you to make custom net services or to use constitutional application services, and to decision these services from any consumer application. The net API could be a development in net services wherever stress has been moving aloof from SOAP (Simple Object Access Protocol) based mostly} services towards depictive State Transfer (REST) based communications.

Keywords: Easy Object Access Protocol(SOAP), Universal Description, Discovery and Integration(UDDI), net Services Description Language(WSDL), extensible nomenclature (XML) , JavaScript Object Notation (JSON).

1. Introduction

An internet service could be a technique of communication between 2 electronic devices. Net services square measure application elements. These square measure self-contained and self-describing. It may be utilized by different applications. It may be discovered exploitation UDDI (Universal Description, Discovery and Integration). XML is that the basis for net services. The W3C defines a "web service" as "a code designed to support practical

machine-to-machine interaction over a network. it's Associate in Nursing interface delineated in a very machine – processable format (specifically net Services Description Language WSDL). Different systems move with the online service in a very manner prescribed by its description exploitation SOAP messages, usually sent exploitation communications protocol with Associate in Nursing XML publishing in conjunction with different Web-related standards[1]. The fundamental net services platform is XML + communications protocol. XML provides a language which might be used between completely different platforms and programming languages and still specific advanced messages and functions. The communications protocol protocol is that the most used net protocol.

Web services platform elements:

- SOAP (Simple Object Access Protocol)
- UDDI (Universal Description, Discovery and Integration)
- WSDL (Web Services Description Language)

1.1. ASP.NET net Services

Net services square measure elements on an internet server that a consumer application will decision by creating communications protocol requests across the online. ASP.NET allows you to make custom net services or to use constitutional application services, and to decision these services from any consumer application.

- Introduction to Programming net Services in Managed Code:-Describes the XML net services programming model in managed code.
- XML net Services exploitation ASP.NET:-Provides links to info concerning the way to produce XML net services in ASP.NET, and concerning however they work.
- Creating WCF Services for ASP.NET AJAX:-Describes Windows Communication Foundation (WCF) services that square measure hosted as ASP.NET compatible services.
- net References in Visual Studio :-Provides info concerning the way to reference Web services in Visual Studio comes and concerning the proxy categories that represent an internet service.

1.2. Web API

Net API could be a development in net services wherever stress has been moving aloof from SOAP based mostly services towards depictive State Transfer(REST) based communications[3]. REST services don't need XML, SOAP, or WSDL service-API definitions[5]. Net Apis enable the mix of multiple net services into new applications referred to as mashups[4] .When utilized in the context of net development. net API is usually an outlined set of machine-

readable text Transfer Protocol (HTTP) request messages together with a definition of the structure of response messages, sometimes expressed in Associate in Nursing extensible nomenclature (XML) or JavaScript Object Notation (JSON) format.

Once running composite net services, every sub service may be thought-about autonomous. The user has no management over these services. conjointly the online services themselves aren't reliable; the service supplier could take away, modification or update their services while not giving notice to users. The responsibility and fault tolerance isn't well supported; faults could happen throughout the execution. Exception handling within the context of net services remains Associate in Nursing open analysis issue. Still it may be handled by responding with a blunder object to the consumer. net services square measure a collection of tools that may be utilized in variety of how. The 3 commonest types of use square measure

- **RPC(REMOTE PROCEDURE CALL):-** RPC net services gift a distributed operate (or method) decision interface that's acquainted to several developers. Typically, the fundamental unit of RPC net services is that the WSDL operation. different approaches with nearly a similar practicality as RPC square measure Object Management Group's (OMG) Common Object Request Broker design (CORBA), Microsoft's Distributed part Object Model (DCOM) or Sun Microsystems's Java/Remote technique Invocation (RMI)[8].
- **SOA (Service-oriented design):-** net services can even be wont to implement Associate in Nursing design in line with service-oriented architecture (SOA) ideas, wherever the fundamental unit of communication could be a message, instead of Associate in Nursing operation. this is {often|this can be} often remarked as "message-oriented" services.SOA net services square measure supported by most major software package vendors and trade analysts.

Service-oriented design

- **REST. (depictive State Transfer):-**REST tries to explain architectures that use communications protocol or similar protocols by restrictive the interface to a collection of well-known, normal operations (like GET, POST, PUT, DELETE for HTTP). Here, the main target is on interacting with stateful resources, instead of messages or operations[2].

Threats and Countermeasures

To build secure net services, understand the associated threats. the highest threats directed at net services square measure the highest threats and attacks directed at net services. The Table-1 shows the comparison study of threats

and vulnerabilities of web services. The Table-2 shows the comparison study of threats and countermeasures of web services.

1. Unauthorized access

Net services that offer sensitive or restricted info ought to demonstrate and authorize their callers. Weak authentication and authorization may be exploited to achieve unauthorized access to sensitive info and operations.

- No authentication used.
- Passwords passed in plaintext in SOAP headers.
- Basic authentication used over Associate in Nursing unencrypted communication channel.

2. Parameter manipulation

Parameter manipulation refers to the unauthorized modification of knowledge sent between the online service shopper and also the net service. as an example, Associate in Nursing aggressor will intercept an internet service message, maybe because it passes through Associate in Nursing intermediate node on the way to its destination; and might then modify it before causing it on to its supposed terminus.

Vulnerabilities that may build parameter manipulation potential include:

- Messages that aren't digitally signed to produce tamper-proofing.
- Messages that aren't encrypted to produce privacy and tamper-proofing.

2. Network eavesdropping

With network eavesdropping, Associate in Nursing aggressor is in a position to look at net service messages as they flow across the network. as an example, Associate in Nursing aggressor will use network observation software package to retrieve sensitive information contained in a very SOAP message. This would possibly embrace sensitive application level information or written document information vulnerabilities that may change no-hit network eavesdropping include:

- Credentials passed in plaintext in SOAP headers
- No message level secret writing used
- No transport level secret writing used

4. Revelation of configuration information

There square measure 2 main ways that within which an internet service will disclose configuration data. First, the online service could support the dynamic generation of net Service Description Language (WSDL) or it's going to

offer WSDL info in downloadable files that square measure on the market on the online server. This might not be fascinating fascinating looking on your state of affairs.

Vulnerabilities that may result in the revelation of configuration information include:

- Unrestricted WSDL files on the market for transfer from the online server
- A restricted net service supports the dynamic generation of WSDL and permits unauthorized shoppers to get net service characteristics
- Weak exception handling

5. Message replay

Net service messages will probably travel through multiple intermediate servers. With a message replay attack, Associate in Nursing aggressor captures and copies a message and replays it to the online service impersonating the consumer. The message could or might not be changed. Security is vital for any distributed computing surroundings.

But, security is changing into even additional vital for net services as a result of the subsequent reasons:

1. The boundary of interaction between communication partners is anticipated to expand from intranets to the net.
2. Communication partners square measure additional possible to move with one another while not establishing a business or relationship initial. this suggests that every one security needs like authentication, access management, nonrepudiation, information integrity, and privacy should be addressed by the underlying security technology.
3. Additional and additional interactions square measure expected to occur from programs to programs instead of from humans to programs. Therefore, the interaction between communication partners exploitation net services is anticipated to be additional dynamic and fast.
4. Finally, as additional and additional business functions square measure exposed as net services, the sheer range of participants in a very net services surroundings are larger than what we've seen in different environments.
5. Currently, the foremost common security theme on the market for today's net services is SSL (Secure Socket Layer), that is usually used with communications protocol. Despite its quality, SSL has some limitations once it involves net services. Thus, varied XML-based security initiatives square measure within the works to handle net services' distinctive wants.

SSL limitations

- SSL is meant to produce point-to-point security, that falls short for net services as a result of we want end-to-end security, wherever multiple negotiator nodes might exist between the 2 endpoints.

- SSL secures communication at transport level instead of at message level. As a result, messages square measure protected solely whereas in transit on the wire.
- HTTPS in its current kind doesn't support nonrepudiation well. Nonrepudiation is essential for business net services and, for that matter, any business group action.
- SSL doesn't offer element-wise language and secret writing.

XML-based security schemes to produce comprehensive and unified security schemes for net services. These schemes include:

- XML digital signature:- XML digital signature, like all different digital language technology, provides authentication, information integrity (tamper-proofing), and nonrepudiation
- XML secret writing:- The W3C is additionally coordinating XML Encryption. Its goal is to develop XML syntax for representing encrypted information and to ascertain procedures for encrypting and decrypting such information
- XKMS (XML Key Management Specification):- XKMS stands for the XML Key Management Specification and consists of 2 parts: XKISS (XML Key info Service Specification) and XKRSS (XML Key Registration Service Specification). XKISS defines a protocol for breakdown or corroboratory public keys contained in signed and encrypted XML documents, whereas XKRSS defines a protocol for public key registration, revocation, and recovery.
- XACML (Extensible Access management nomenclature):- XACML stands for extensile Access management Markup Language, and its primary goal is to standardize access management language in XML syntax. a customary access management language ends up in lower prices as a result of there's no got to develop Associate in Nursing application-specific access management language or write the access management policy in multiple languages.
- SAML (Secure Assertion nomenclature):- the protection Assertions Markup Language effort, or SAML, that is being outlined by the OASIS (Organization for the Advancement of Structured Information) security services technical committee. The committee aims to stipulate a customary XML framework for exchanging authentication and authorization info.
- WS-Security (Web Services Security):- WS-Security is that the rising security normal designed to address these problems.

Microsoft has free net Services Enhancements (WSE) a pair of.0 for Microsoft .NET 1.1 and WSE three.0 for .NET 2.0, that supports WS-Security and a connected family of rising standards. WSE permits you to implement message level security solutions together with authentication, secret writing and digital signatures.

6. Conclusions

The Threats, Vulnerabilities and Countermeasures of Secure net Services to provide the ASP. NET web services that allows you to make custom net services or to use constitutional application services, and to decision these services from any consumer application. The net API could be a development in net services wherever stress has been moving aloof from SOAP (Simple Object Access Protocol) based mostly} services towards depictive State Transfer(REST) based communications. Finally high threats, Vulnerabilities and Countermeasures of net Services square measure compared. It may be extended to prove the important time applications.

References

1. "Web Services Glossary". <http://www.w3.org/TR/ws-gloss/>.
2. "Relationship to the planet Wide net and REST Architectures". <http://www.w3.org/TR/ws-arch/#relwwwrest>.
3. Benslimane, Djamel; SchahramDustdar, and AmitSheth (2008). "Services Mashups: The New Generation of net Applications". IEEE net Computing, vol. 12, no. 5. Institute of Electrical andphysics Engineers.pp.13–15. http://dsonline.computer.org/portal/site/dsonline/menuitem.9ed3d9924aeb0dcd82ccc6716bbe36ec/index.jsp?&am;pname=dso_level1&path=dsonline/2008/09&file=w5gei.xml&xsl=article.xsl.
4. "Mashup Dashboard". ProgrammableWeb.com. 2009. <http://www.programmableweb.com/mashups>.
5. "Web Services Description Language (WSDL) Version a pair of.0 half 2: Adjuncts". http://www.w3.org/TR/2007/REC-wsdl20-juncts0070626/#_http_binding_default_rulemethod.
7. Rethinking the Java SOAP Stack.
8. Gray, N. A. B. (2005). "Performance of Java Middleware - Java RMI, JAXRPC, and CORBA". University of Wollongong. pp. 31–39. <http://ro.uow.edu.au/infopapers/676/>.