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SERVICE INTERFACE PROFILE FOR MESSAGING

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0   PRELIMINARY INFORMATION

0.1   References

A.   NCIA/GM/2012/235; Directive 1 Revision 1; dated 3 May 2013
B.   NCIARECCEN-4-22852 DIRECTIVE 01.01, Agency Policy on Management and Control of Directives, Notices, Processes, Procedures and Instructions, dated 20 May 2014
C.   NCIARECCEN-4-23297, Directive 06.00.01, Management and Control of Directives, Processes, Procedures and Instructions on Service Management, dated 03 June 2014

0.2   Purpose

This Technical Instruction (TI) provides detailed information, guidance, instructions, standards and criteria to be used when planning, programming, and designing Agency products and services. In this specific case the TI defines a Service Interface Profile (SIP) for one of NATO's Core Enterprise Services.

TIs are living documents and will be periodically reviewed, updated, and made available to Agency staff as part of the Service Strategy responsibility as Design Authority. Technical content of these instructions is the shared responsibility of SStrat/Service Engineering and Architecture Branch and the Service Line of the discipline involved.

TIs are primarily disseminated electronically[1], and will be announced through Agency Routine Orders. Hard copies or local electronic copies should be checked against the current electronic version prior to use to assure that the latest instructions are used.

0.3   Applicability

This TI applies to all elements of the Agency, in particular to all NCI Agency staff involved in development of IT services or software products. It is the responsibility of all NCI Agency Programme, Service, Product and Project Managers to ensure the implementation of this technical instruction and to incorporate its content into relevant contractual documentation for external suppliers.

1   SIP INTRODUCTION

In order to ensure compatibility between services, both within NATO and between NATO and its partners, there is a need to ensure that a standard (and standards-based) profile can be defined which will be mandatory for all service operations in the NATO Network Enabled Capability (NNEC) messaging environment.

This specification provides the interface control for simple object access protocol (SOAP) web services that are deployed within the NNEC web service infrastructure. This covers only the call from a web service consumer to a web service provider using SOAP, and the response from the service provider. This includes how the message must be structured and the elements that must be contained within the call.

It is recognized that NATO information systems operate in a heterogeneous environment, with service providers and consumers operating under multiple different framework and application contexts. Therefore, this service interface profile (SIP) has been designed to accommodate these

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[1] https://servicestrategy.nr.ncia/SitePages/Agency%20Directives%20(Technical).aspx

differences, and offer the widest possible support for a messaging infrastructure. This includes support for both [W3C SOAP 1.1, 2000] and [W3C SOAP 1.2, 2007].

This profile has evolved in response to the available technologies and mechanisms that can be used to apply messaging within a service-oriented environment. Furthermore, it has been tested against the service implementations of NATO and coalition member nations.

1.1 Audience

The target audience for this specification is the broad community of NNEC stakeholders, who are delivering capability in an NNEC environment, or anticipate that their services may be used in this environment. These may include (but are not limited to):

- Project Managers procuring (Bi-Strategic Commands) Bi-SC or NNEC related systems
- The architects and developers of service consumers and providers
- Coalition partners whose services may need to interact with NNEC services
- Systems integrators delivering systems into the NATO environment.

1.2 Notational Conventions

The following notational conventions apply to this document:

- The keywords "MUST", "MUST NOT", "REQUIRED", "SHALL", "SHALL NOT", "SHOULD", "SHOULD NOT", "RECOMMENDED", "MAY", and "OPTIONAL" in this document are to be interpreted as described in [IETF RFC 2119, 1997].
- Words in italics indicate terms referenced in Section 1.3.
- Courier font indicates syntax derived from the different open standards [W3C WS-Addressing, 2006], [W3C SOAP 1.1, 2000], [W3C SOAP 1.2, 2007], [WS-I Basic Profile 1.2, 2010] and [WS-I Basic Profile 2.0, 2010].

1.3 Terminology

The following terminology is used in this SIP:

Data Provider	A service that produces data for other services.
Data Consumer	A service or application that calls other services in order to retrieve data.
Message	The structure used for exchanging data between the data provider and data consumer.
Header	The part of the message that contains additional information about the message beyond the data that is being exchanged.
Secured Messages	Messages that contain security information for establishing authentication or authorization, including identity information about the consumer of the service. This also covers messages that are signed or encrypted to provide data integrity or confidentiality.
Unsecured Messages	Messages that do not contain any security information for establishing authentication or authorization.

1.4 Namespaces

The following namespaces are used in this document:

Abbreviation	Namespace	Version
soap	http://schemas.xmlsoap.org/soap/envelope/ *or* http://www.w3.org/2003/05/soap-envelope	1.1 *or* 1.2
soap11	http://schemas.xmlsoap.org/soap/envelope/	1.1
soap12	http://www.w3.org/2003/05/soap-envelope	1.2
wsa	http://www.w3.org/2005/08/addressing	1.0

1.5 Goals

The following are the goals of this SIP:

- Define the structure of messaging formats for SOAP-based web service exchanges using the request/response message exchange pattern (MEP).
- Support the use of heterogeneous operating environments, using both [W3C SOAP 1.1, 2000] and [W3C SOAP 1.2, 2007].
- Support messaging patterns that will allow the broadest possible range of interoperability between systems.

1.6 Non-Goals

The following topics are outside the scope of this profile:

- Specification of the transport for web service exchanges
- Definitions of message structures for other MEPs (such as publish/subscribe)
- Modifications of the specifications and related behaviours
- Definition of how security may be applied to messages.

1.7 Relationships to Other Profiles and Specifications

1.7.1 Normative References

The following documents have fed into this specification, and are incorporated as normative references. Where more than one version of the same standard or profile is listed, then support for requirements from both versions are covered, though a single service needs not implement both versions.

1.7.1.1 SOAP Version 1.2 Part 1: Messaging Framework (Second Edition) (W3C)

http://www.w3.org/TR/soap12-part1/.

1.7.1.2 Simple Object Access Protocol (SOAP) 1.1 (W3C)

http://www.w3.org/TR/2000/NOTE-SOAP-20000508.

1.7.1.3 WS-Addressing 1.0 (W3C)

http://www.w3.org/TR/ws-addr-core.

1.7.1.4   WS-I Basic Profile 2.0 (WS-I)

http://www.ws-i.org/Profiles/BasicProfile-2.0-2010-11-09.html.

1.7.1.5   WS-I Basic Profile 1.2 (WS-I)

http://www.ws-i.org/Profiles/BasicProfile-1.2-2010-11-09.html.

2   SIP DEFINITION

2.1   Subject

Service consumers and providers that communicate within the NNEC service environment MUST use the SOAP messaging framework. Service consumers and service providers MUST use either [W3C SOAP 1.1, 2000] or [W3C SOAP 1.2, 2007] or both, although it is RECOMMENDED that [W3C SOAP 1.2, 2007] is used. Where a service consumer makes a call to a service provider in a particular version of the SOAP, then the service provider MUST respond with the same version. A service provider MAY reject a message if an unexpected version of SOAP is used. If a message is rejected due to the version of SOAP, then a `soap:VersionMismatch` fault MUST be returned (as described in Section 4.4 of [W3C SOAP 1.1, 2000] or Section 5.4 of [W3C SOAP 1.2, 2007]).

The version of the WS-I Basic Profile will depend on the version of SOAP that is used:

- If [W3C SOAP 1.1, 2000] is being used, all requirements defined in the [WS-I Basic Profile 1.2, 2010] MUST be complied with.
- If [W3C SOAP 1.2, 2007] is being used, all requirements defined in the [WS-I Basic Profile 2.0, 2010] MUST be complied with.

The extensible markup language (XML) elements that are used in the message exchanges between a service consumer and service client will depend on the environment in which the message exchange is occurring. Two types of messages are described by this SIP:

- Unsecured messages
- Secured messages.

The elements that are OPTIONAL, RECOMMENDED or REQUIRED will depend on whether the service is secured or unsecured. The values used under these headings in the tables below reflect the levels of requirement for the type of message.

2.2   Service Interface

The Basic Profiles both state that "*either an INSTANCE's WSDL 1.1 description, its UDDI binding template, or both MUST be available to an authorized consumer upon request.(R0001)*". However, this does not need to be available at run-time in order to be considered conformant. Therefore, this SIP makes no recommendation about the distribution of a web service description language (WSDL) or universal description, discovery and integration (UDDI) binding template. It is up to the service publisher to decide how best to distribute the WSDL.

2.3   Transport

Although the transport mechanism for SOAP messages is an explicit non-goal of this SIP, it is expected that most message exchange will occur over hypertext transfer protocol (HTTP). The Basic Profiles distinguish between CORE and HTTP-Transport requirements to cover these different scenarios.

2.4   Message Structure

2.4.1   Input

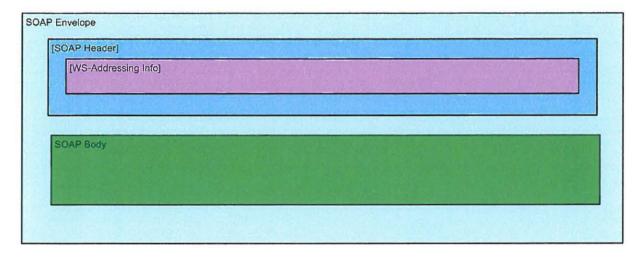Messages sent to services covered by the NNEC Core Enterprise Services (CES) MUST have the following structure.

Figure 1 NNEC services request message structure

2.4.1.1 SOAP envelope

2.4.1.1.1 Element(s)

Element	Notes
/soap:Envelope	This is the wrapper for the SOAP *Message*, and so is REQUIRED.

2.4.1.2 SOAP Header

2.4.1.2.1 Element(s)

Element	Notes
/soap:Envelope/soap:Header	This MAY contain additional application-specific information if it does not interfere with the security addressing information described here. RECOMMENDED for unsecured messages. REQUIRED for secured messages.

2.4.1.3 WS-Addressing Info

[W3C WS-Addressing, 2006] contains metadata about the message.

2.4.1.3.1   Element(s)

Element	Notes
/soap:Envelope/soap:Header/ wsa:Action	The URI of the wsa:Action element MUST match the SOAPAction HTTP header (as per [WS-I Basic Profile 1.2, 2010], and Section 3.7 of [WS-I Basic Profile 2.0, 2010]). The SOAPAction HTTP header MUST NOT have an empty value (even though permitted by [WS-I Basic Profile 1.2, 2010], and Section 3.7 of [WS-I Basic Profile 2.0, 2010]). RECOMMENDED for unsecured messages. REQUIRED for secured messages.
/soap:Envelope/soap:Header/ wsa:MessageID	This MUST be unique for each call to the service. RECOMMENDED for unsecured messages. REQUIRED for secured messages.
/soap:Envelope/soap:Header/ wsa:ReplyTo	This specifies where the result of the call should be returned to. A caller MAY use the anonymous value, "http://www.w3.org/2005/08/addressing/anonymous". OPTIONAL for unsecured messages. OPTIONAL for secured messages.
/soap:Envelope/soap:Header/ wsa:To	This is the end-point of the service. RECOMMENDED for unsecured messages. REQUIRED for secured messages.

2.4.1.4   **SOAP body**

2.4.1.4.1   Element(s)

Element	Notes
/soap:Envelope/soap:Body	This contains the actual data of the message, and is thus REQUIRED.

2.4.2   **Outputs**

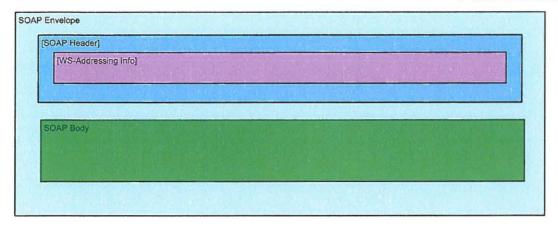Messages response MUST have the following structure.

Figure 2   NNEC services response message structure

2.4.2.1   SOAP envelope

2.4.2.1.1   Element(s)

Element	Notes
/soap:Envelope	This is the wrapper for the SOAP message, and so is REQUIRED.

2.4.2.2   SOAP Header

2.4.2.2.1   Element(s)

Element	Notes
/soap:Envelope/soap:Header	This contains the security and addressing information for the SOAP message. RECOMMENDED for unsecured messages. REQUIRED for secured messages.

2.4.2.3   WS-Addressing info

[W3C WS-Addressing, 2006] contains metadata about the message.

2.4.2.3.1 Element(s)

Element	Notes
/soap:Envelope/soap:Header/ wsa:Action	This specifies what action the message is in response to. If contained in the request and soap:mustUnderstand="1", then it is REQUIRED.
/soap:Envelope/soap:Header/ wsa:RelatesTo	This MUST relate to the corresponding MessageID in the request message (if present), when it becomes REQUIRED.

2.4.2.4 SOAP body

2.4.2.4.1 Element(s)

Element	Notes
/soap:Envelope/soap:Body	This contains the actual data of the message, and so is REQUIRED.

2.4.3 Errors

When errors occur during the receipt and processing of the SOAP elements of a message, then the service provider MUST return a SOAP fault indicating what caused the error.

When errors occur during the processing of the remaining elements of the message, then the service provider SHOULD return a fault, though the message MAY be dropped.

The structure of the fault MUST follow the relevant section of the applicable SOAP specification, i.e. Section 4.4 of ([W3C SOAP 1.1, 2000] or Section 5.4 of [W3C SOAP 1.2, 2007]).

3 REFERENCES

[IETF RFC 2119, 1997]:
Internet Engineering Task Force Request for Comments 2119, "Key words for use in RFCs to Indicate Requirement Levels", S. Bradner, IETF, Sterling, Virginia, US, March 1997.

[W3C WS-Addressing, 2006]:
World Wide Consortium (on-line), http://www.w3.org, "Web Services Addressing 1.0 – Core" at http://www.w3.org/TR/2006/REC-ws-addr-core-20060509/, 9 May 2006, viewed 30 March 2011.

[W3C SOAP 1.1, 2000]:
World Wide Consortium (on-line), http://www.w3.org, "Simple Object Access Protocol (SOAP) 1.1" at http://www.w3.org/TR/2000/NOTE-SOAP-20000508, 8 May 2000, viewed 31 March 2011.

[W3C SOAP 1.2, 2007]:
World Wide Consortium (on-line), http://www.w3.org, "SOAP Version 1.2 Part 1: Messaging Framework (Second Edition)" at http://www.w3.org/TR/soap12-part1/, 27 April 2007, viewed 31 March 2011.

[WS-I Basic Profile 1.2, 2010]:
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[WS-I Basic Profile 2.0, 2010]:
Web Services Interoperability Organization (on-line), http://www.ws-i.org, "Basic Profile Version 2.0", at http://www.ws-i.org/Profiles/BasicProfile-2.0-2010-11-09.html, 9 November 2010, viewed 31 March 2011.

4   ABBREVIATIONS

BiSC   Bi-Strategic Commands

HTTP   Hypertext transfer protocol

MEP   Message exchange pattern

NNEC   NATO Network Enabled Capability

SIP   Service interface profile

SOAP   Simple object access protocol

UDDI   Universal description, discovery and integration

WSDL   Web service description language

XML   Extensible markup language