

## MULTILATERAL INTEROPERABILITY PROGRAMME (MIP)



### MIP4 Information Exchange Specification (MIP4-IES)

#### Publish/Subscribe Exchange Pattern

**09 October 2020**

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### Version History

Version	Author	Date	Reason for Change
1.5.2	IPT4 CM	12 Sep 2017	MIP4.0 official release [ref MSG-DL-26 at MSG20; July 2017]. Details of internal versions removed from Version History.
1.8.0	IPT4 EMT	19 Apr 2018	MIP4.1 official release. Details of internal versions removed from Version History.
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## 1 Overview

This document defines the expected usage of the WSMP (Web Service Messaging Profile) Publish/Subscribe exchange pattern, according to use cases described in the MIP4-IES Exchange Mechanism Overview [REF-MIP-02]. It has been based heavily on the generic WSMP specification, and tailored to meet the information exchange needs of the MIP4 Community of Interest (CoI).

## 2 Scope

The scope of this document includes a technical specification of the MIP4-IES Publish/Subscribe exchange pattern, design constraints and implementation details. It is intended for technical users that are developing, consuming or providing such web services. The contents of this document focus solely on the service and not on the information content. The specification of the information content is provided in the *MIP4-IES Information Definition Overview* [REF-MIP-07].

### 2.1 Note on non-normative examples

The examples in this document are non-normative and they are intended to illustrate the purpose of the concept or the functionality being described. The normative technical details in the document will take precedence over these non-normative examples. The actual implementation shall be based on the normative technical details and technical artifacts.

### 3 References

For any references in this document to a MIP4-IES source (REF-MIP-##), refer to section 2.3 in the ‘MIP4-IES Overview’ [REF-MIP-01].

For any references in this document to a MIP4-IES Exchange Mechanism external source (REF-EM-##), refer to section 3.1 in the ‘MIP4-IES Exchange Mechanism Overview’ [REF-MIP-02].

For any references in this document to a MIP4-IES Exchange Mechanism XML artifact (ART-EM-##), refer to section 3.3 in the ‘MIP4-IES Exchange Mechanism Overview’ [REF-MIP-02].

## 4 Technical Artifacts

The following artifacts are required to implement the MIP4-IES Publish/Subscribe exchange pattern:

Artifact Reference	Artifact Name
ART-EM-03	Filter.xsd
ART-EM-07	Base.xsd
ART-EM-10	WSMP-ResourceMessages.xsd



## 5 Publish/Subscribe Exchange Pattern

In the Publish/Subscribe Exchange Pattern the Consumer subscribes to the content available from the Producer. The Producer then provides the content to the Consumer on an asynchronous basis as updates become available. The subscription generally holds until it is terminated by the Consumer or expires under the specific implementation rules. Typically a notification occurs when an information object is created or changed.

In MIP4-IES, the Publish/Subscribe Exchange Pattern is applied to information sharing between Command and Control (C2) and partner systems. Specifically this pattern gives a Consumer the ability to receive information from a Producer asynchronously as required by the operational context.

The following design constraints for the MIP4-IES Publish/Subscribe Web Service have been identified:

- a) The web service implementation SHALL be payload agnostic and allow a COI to expand and contract the information to be exchanged without having to redefine the service interface and implementations.
- b) The Producer SHOULD be able to filter subscriptions based on a geographic area (Area Filter).
- c) The Producer SHOULD be able to filter subscriptions based on Topics of interest from the Consumer.
- d) The Producer SHOULD be able to filter subscriptions based on the content of the messages.

Each actor of the Publish/Subscribe pattern MUST be compliant to the *TIDE Transformational Baseline* profile [REF-EM-03]

## 6 Web Service Implementation

### 6.1 Namespaces

The following namespaces are used in this document:

Prefix	Namespace	Source
mip4-f	<a href="https://mip-interop.org/exchange/v4.3//Filter">https://mip-interop.org/exchange/v4.3//Filter</a>	MIP4-IES Filtering Profile
wsmp	urn:nato:stanag:5644:wsmp:1:3	Web Service Messaging Profile
wsmp-r	urn:nato:stanag:5644:wsmp:1:3:resources	Web Services Messaging Profile Resources
soap12	<a href="http://www.w3.org/2003/05/soap-envelope">http://www.w3.org/2003/05/soap-envelope</a>	Simple Object Access Protocol
wsa	<a href="http://www.w3.org/2005/08/addressing">http://www.w3.org/2005/08/addressing</a>	Web Services Addressing
wsam	<a href="http://www.w3.org/2007/05/addressing/metadata">http://www.w3.org/2007/05/addressing/metadata</a>	Web Services Addressing Metadata
wsaw	<a href="http://www.w3.org/2006/05/addressing/wsdl">http://www.w3.org/2006/05/addressing/wsdl</a>	Web Services Addressing WSDL 1.1 binding
wsn-b	<a href="http://docs.oasis-open.org/wsn/b-2">http://docs.oasis-open.org/wsn/b-2</a>	Web Services Base Notification
wsn-bw	<a href="http://docs.oasis-open.org/wsn/bw-2">http://docs.oasis-open.org/wsn/bw-2</a>	Web Services Base Notification
wsrf-bf	<a href="http://docs.oasis-open.org/wsrf/bf-2">http://docs.oasis-open.org/wsrf/bf-2</a>	Web Services Resource Framework
wsrf-r	<a href="http://docs.oasis-open.org/wsrf/r-2">http://docs.oasis-open.org/wsrf/r-2</a>	Web Services Resource Framework

wsrf-rp	<a href="http://docs.oasis-open.org/wsrf/rp-2">http://docs.oasis-open.org/wsrf/rp-2</a>	Web Services Resource Framework
wsrf-rpw	<a href="http://docs.oasis-open.org/wsrf/rpw-2">http://docs.oasis-open.org/wsrf/rpw-2</a>	Web Services Resource Framework
wstop	<a href="http://docs.oasis-open.org/wsn/t-1">http://docs.oasis-open.org/wsn/t-1</a>	Web Services Topics

## 6.2 Service Metadata

Refer to section ‘Cross-pattern Requirements’ in *MIP4-IES Exchange Mechanism Overview* [REF-MIP-02].

## 6.3 Service Rules

Some service rules are common for the both the Publish/Subscribe and Request/Response patterns. Refer to section ‘WS-I Profiles and Bindings’ in the *MIP4-IES Exchange Mechanism Overview* [REF-MIP-02].

The services should be defined by these port types:

### 6.3.1 Producer Port Types

- a) wsrf-rpw:*GetResourceProperty*
- b) wsn-bw:*NotificationProducer*
- c) wsn-bw:*SubscriptionManager*

### 6.3.2 Consumer Port Types

- a) wsn-bw:*NotificationConsumer*

For more details about the definition and usage of these ports, refer to the *WSMP Core Specification* [REF-EM-11].

## 6.4 Message Container

Refer to section ‘Cross-pattern Requirements’ in the *MIP4-IES Exchange Mechanism Overview* [REF-MIP-02].

## 6.5 Filtering Data

Refer to section ‘Cross-pattern Requirements’ in the *MIP4-IES Exchange Mechanism Overview* [REF-MIP-02].

## 6.6 Reliability

The Web Services Base Notification specification [REF-EM-02] does not guarantee reliable notification delivery. Instead of extending the payload to improve error detection and reliability, we depend on the underlying infrastructure (HTTP/TCP) to ensure reliable delivery. Implementation of an MIP4-IES Publish/Subscribe Web Service should ensure selection of the appropriate infrastructure to deliver the necessary level of reliability.

## 6.7 Roles

A summary of the Producer and Consumer responsibilities are as follows:

The Producer SHALL:

- a) Be compliant with all the requirements from the TIDE Transformational Baseline v4.0 [REF-EM-06] corresponding to the Producer domain.
- b) Expose a Service with the following mandatory Ports:
  - i) wsrf-rpw:*GetResourceProperty*
  - ii) wsn-bw:*NotificationProducer*
  - iii) wsn-bw:*SubscriptionManager*
- c) Share service endpoint metadata.
- d) Advertise one or more Topics through the usage of Resource Properties.
- e) Allow WS-Notification style subscriptions with a filter (wsn-b:Filter).
- f) Provide the Consumer with the following information related to the subscription:
  - i) wsn-b:*SubscriptionReference*
  - ii) wsn-b:*TerminationTime*
- g) Provide notifications to the Consumer that match the subscription filter(s).
- h) Allow the Consumer to renew a subscription.
- i) Allow the Consumer to terminate a subscription.

The Consumer SHALL:

- a) Be compliant with all the requirements from the *TIDE Transformational Baseline 4.0* [REF-EM-06] corresponding to the Consumer domain.
- b) Expose a Service with the following mandatory Port:
  - i) wsn-bw:*NotificationConsumer*
- c) Process the Producer services endpoint metadata.
- d) Request the available wstop:*TopicSet* from the Producer using the WS-Resource Framework.
- e) Provide wsn-b:*ConsumerReference* identifying the Consumer service which will receive the notifications

- f) Request a Subscription from a Producer on one or more topics by providing a proper *wsn-b:Filter*.
- g) Renew a subscription with the Producer, as required, prior to the subscription's expiration (*wsn-b:TerminationTime*).
- h) Request the Producer to terminate a subscription.

The Consumer SHALL formulate a subscription filter based on miscellaneous parameters:

- a) Desired Topics (*wsn-b:TopicExpression*) (**mandatory**)
- b) MIP4 Filter (*mip4-f:MIP4Filter* using the MIP4 Filter Dialect) in the *wsn-b:Filter* (see §9.1 MIP4-IES Profile for more details)

## 6.8 Port Types

The MIP4-IES Publish/Subscribe Web Service specification is directly based on the *WSMP Core Specification* [REF-EM-11], which consists of a set of required and optional Port Types. It is expected that implementers will import the supporting WSDLs into their own WSDL and derive services which implement the specified Port Types by applying the rules reported in section 6.2 (Service Rules).

As stated in section 6.3, four Port Types are considered mandatory for the MIP4-IES Publish/Subscribe Web Service exchange. Three Port Types are to be implemented by the Producer and one by the Consumer. These Port Types define the minimum implementation requirements to realize the MIP4-IES Publish/Subscribe Web Service exchange.

The *WS-Notification specification* [REF-EM-02] provides additional Port Types that may be useful in conjunction with the above mandatory Port Types.

The following descriptions of Port Types and operations will focus on MIP4 specific constraints and variances from the *WS-Notification specification* [REF-EM-02] and the *TIDE Transformational Baseline* [REF-EM-03].

If a concept (e.g. faults) is introduced but not explained, please refer to the *WS-Notification specification* [REF-EM-02], the *TIDE Transformational Baseline* [REF-EM-03] or any supporting specification for further clarification.

If the following descriptions differ from those provided in *MIP4-IES Exchange Mechanism XML Artifacts* [REF-MIP-06] or *MIP4-IES XML Schema* [REF-MIP-08], the authoritative documents ([REF-MIP-06] and [REF-MIP-08]) shall take precedence.

### 6.8.1 Port Type *wsrf-rpw:GetResourceProperty*

The *wsrf-rpw:GetResourceProperty* Port Type is implemented by a Producer to allow a Consumer to retrieve specific run-time resources made available by the Producer. MIP4-IES

Publish/Subscribe Producers SHALL make available at least the resources defined in section 6.9 Publish Subscribe Resource Property Messages from WSMP Core Specification [REF-EM-11].

No specific faults are added by the MIP4-IES, other than those defined in the WSMP Core Specification [REF-EM-11].

**Note:** Although the port type *wsrf-rpw:GetResourceProperty* is the same in both the Request/Response and Publish/Subscribe exchange patterns, the meaning and available properties are different. For the Request/Response exchange pattern, the corresponding documentation also states the supported properties.

**Note:** In the case of *wsmp-r:WSMPPProfiles* a Producer must at least respond with the following values:

- MessageTransmissionProfile: *urn:nato:stanag:5644:wsmp:1:3:profiles:mtp:SOAP1.2:1:0*
- COIProfile: *https://mip-interop.org/data/v4.3/*

For more details about the usage of the *wsmp-r:WSMPPProfiles*, please refer to the WSMP Core Specification [REF-EM-11].

#### 6.8.1.1 Operation *wsrf-rpw:GetResourceProperty*.*GetResourceProperty*

The *wsrf-rpw:GetResourceProperty*.*GetResourceProperty* operation allows the Consumer to retrieve a typed resource from a Producer. The resource type is identified by a QName. The Producer will return zero or more instances of the type in accordance with its cardinality specified above.

All the details about this operation are described in the corresponding specification *WS-ResourceProperties* [REF-EM-08]. Additional constraints applicable to this operation are provided in the *TIDE Transformational Baseline* [REF-EM-03].

The following are non-normative examples of a [GetResourceProperty] [request|response] message using SOAP.

Sample	Retrieve the wsn-b:TopicExpression resource from the Producer.
Request	<pre> &lt;s:Envelope xmlns:s="http://www.w3.org/2003/05/soap-envelope" xmlns:a="http://www.w3.org/2005/08/addressing"&gt;   &lt;s:Header&gt;     &lt;a:Action s:mustUnderstand="1"&gt;http://docs.oasis-open.org/wsrf/rpw-2/GetResource Property/GetResourcePropertyRequest&lt;/a:Action&gt;      &lt;a:MessageID&gt;urn:uuid:31547732-58ef-4539-b470-c25350bc8e30&lt;/a:MessageID&gt;   &lt;/s:Header&gt;   &lt;s:Body&gt;     &lt;wsn-b:TopicExpression&gt;       &lt;wsp:wsmp-r:WSMPPProfiles&gt;         &lt;wsp:MessageTransmissionProfile&gt;urn:nato:stanag:5644:wsmp:1:3:profiles:mtp:SOAP1.2:1:0&lt;/wsp:MessageTransmissionProfile&gt;         &lt;wsp:COIProfile&gt;https://mip-interop.org/data/v4.3/&lt;/wsp:COIProfile&gt;       &lt;/wsp:wsmp-r:WSMPPProfiles&gt;     &lt;/wsn-b:TopicExpression&gt;   &lt;/s:Body&gt; &lt;/s:Envelope&gt; </pre>

	<pre> &lt;a:ReplyTo&gt;  &lt;a:Address&gt;http://www.w3.org/2005/08/addressing/anonymous&lt;/a:Address&gt; &lt;/a:ReplyTo&gt;   &lt;a:To s:mustUnderstand="1"&gt;http://10.0.99.4:8236/resource&lt;/a:To&gt; &lt;/s:Header&gt;   &lt;s:Body xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance" xmlns:xsd="http://www.w3.org/2001/XMLSchema"&gt;     &lt;GetResourceProperty xmlns="http://docs.oasis-open.org/wsrf/rp-2" xmlns:q1="http://docs.oasis-open.org/wsn/b-2"&gt;q1:TopicExpression&lt;/GetR esourceProperty&gt;   &lt;/s:Body&gt; &lt;/s:Envelope&gt; </pre>
Response	<pre> &lt;s:Envelope xmlns:a="http://www.w3.org/2005/08/addressing" xmlns:s="http://www.w3.org/2003/05/soap-envelope"&gt;   &lt;s:Header&gt;     &lt;a:Action s:mustUnderstand="1"&gt;http://docs.oasis-open.org/wsrf/rpw-2/GetResource Property/GetResourcePropertyResponse&lt;/a:Action&gt;      &lt;a:RelatesTo&gt;urn:uuid:7d698125-a193-4cfb-b425-a98049e5d6c0&lt;/a:RelatesT o&gt;   &lt;/s:Header&gt;   &lt;s:Body xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance" xmlns:xsd="http://www.w3.org/2001/XMLSchema"&gt;     &lt;GetResourcePropertyResponse xmlns="http://docs.oasis-open.org/wsrf/rp-2"&gt;       &lt;texpr:TopicExpression xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance" xmlns:wsnt="http://docs.oasis-open.org/wsn/t-1" xmlns:texpr="http://docs.oasis-open.org/wsn/b-2" xmlns:tns="http://mip-interop.org/TopicNamespace" Dialect="http://docs.oasis-open.org/wsn/t-1/TopicExpression/Simple"&gt;tn s:LandPicture&lt;/texpr:TopicExpression&gt;       &lt;texpr:TopicExpression </pre>

```

xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
xmlns:wsnt="http://docs.oasis-open.org/wsn/t-1"
xmlns:texpr="http://docs.oasis-open.org/wsn/b-2"
xmlns:tns="http://mip-interop.org/TopicNamespace"
Dialect="http://docs.oasis-open.org/wsn/t-1/TopicExpression/Concrete">
tns:LandPicture/tns:Forces</texpr:TopicExpression>
<texpr:TopicExpression
xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
xmlns:wsnt="http://docs.oasis-open.org/wsn/t-1"
xmlns:texpr="http://docs.oasis-open.org/wsn/b-2"
xmlns:tns="http://mip-interop.org/TopicNamespace"
Dialect="http://docs.oasis-open.org/wsn/t-1/TopicExpression/Concrete">
tns:LandPicture/tns:BattlespaceGeometry</texpr:TopicExpression>
<texpr:TopicExpression
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xmlns:wsnt="http://docs.oasis-open.org/wsn/t-1"
xmlns:texpr="http://docs.oasis-open.org/wsn/b-2"
xmlns:tns="http://mip-interop.org/TopicNamespace"
Dialect="http://docs.oasis-open.org/wsn/t-1/TopicExpression/Concrete">
tns:LandPicture/tns:LogisticsCSS</texpr:TopicExpression>
<texpr:TopicExpression
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xmlns:texpr="http://docs.oasis-open.org/wsn/b-2"
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xmlns:texpr="http://docs.oasis-open.org/wsn/b-2"
xmlns:tns="http://mip-interop.org/TopicNamespace"
Dialect="http://docs.oasis-open.org/wsn/t-1/TopicExpression/Concrete">
tns:LandPicture/tns:ElectronicWarfare</texpr:TopicExpression>
<texpr:TopicExpression
xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"

```



```
xmlns:wsnt="http://docs.oasis-open.org/wsn/t-1"
xmlns:texpr="http://docs.oasis-open.org/wsn/b-2"
xmlns:tns="http://mip-interop.org/TopicNamespace"
Dialect="http://docs.oasis-open.org/wsn/t-1/TopicExpression/Concrete">
tns:LandPicture/tns:CIS</texpr:TopicExpression>
<texpr:TopicExpression
xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
xmlns:wsnt="http://docs.oasis-open.org/wsn/t-1"
xmlns:texpr="http://docs.oasis-open.org/wsn/b-2"
xmlns:tns="http://mip-interop.org/TopicNamespace"
Dialect="http://docs.oasis-open.org/wsn/t-1/TopicExpression/Concrete">
tns:LandPicture/tns:FireSupport</texpr:TopicExpression>
<texpr:TopicExpression
xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
xmlns:wsnt="http://docs.oasis-open.org/wsn/t-1"
xmlns:texpr="http://docs.oasis-open.org/wsn/b-2"
xmlns:tns="http://mip-interop.org/TopicNamespace"
Dialect="http://docs.oasis-open.org/wsn/t-1/TopicExpression/Concrete">
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xmlns:wsnt="http://docs.oasis-open.org/wsn/t-1"
xmlns:texpr="http://docs.oasis-open.org/wsn/b-2"
xmlns:tns="http://mip-interop.org/TopicNamespace"
Dialect="http://docs.oasis-open.org/wsn/t-1/TopicExpression/Concrete">
tns:LandPicture/tns:MobilityCounterMobility</texpr:TopicExpression>
<texpr:TopicExpression
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xmlns:wsnt="http://docs.oasis-open.org/wsn/t-1"
xmlns:texpr="http://docs.oasis-open.org/wsn/b-2"
xmlns:tns="http://mip-interop.org/TopicNamespace"
Dialect="http://docs.oasis-open.org/wsn/t-1/TopicExpression/Concrete">
tns:LandPicture/tns:Medical</texpr:TopicExpression>
<texpr:TopicExpression
xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
xmlns:wsnt="http://docs.oasis-open.org/wsn/t-1"
```

```
xmlns:texpr="http://docs.oasis-open.org/wsn/b-2"
xmlns:tns="http://mip-interop.org/TopicNamespace"
Dialect="http://docs.oasis-open.org/wsn/t-1/TopicExpression/Concrete">
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n>
<texpr:TopicExpression
xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
xmlns:wsnt="http://docs.oasis-open.org/wsn/t-1"
xmlns:texpr="http://docs.oasis-open.org/wsn/b-2"
xmlns:tns="http://mip-interop.org/TopicNamespace"
Dialect="http://docs.oasis-open.org/wsn/t-1/TopicExpression/Concrete">
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<texpr:TopicExpression
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xmlns:wsnt="http://docs.oasis-open.org/wsn/t-1"
xmlns:texpr="http://docs.oasis-open.org/wsn/b-2"
xmlns:tns="http://mip-interop.org/TopicNamespace"
Dialect="http://docs.oasis-open.org/wsn/t-1/TopicExpression/Concrete">
tns:LandPicture/tns:SignificantActivityIncidents</texpr:TopicExpressio
n>
<texpr:TopicExpression
xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
xmlns:wsnt="http://docs.oasis-open.org/wsn/t-1"
xmlns:texpr="http://docs.oasis-open.org/wsn/b-2"
xmlns:tns="http://mip-interop.org/TopicNamespace"
Dialect="http://docs.oasis-open.org/wsn/t-1/TopicExpression/Simple">tn
s:MaritimePicture</texpr:TopicExpression>
<texpr:TopicExpression
xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
xmlns:wsnt="http://docs.oasis-open.org/wsn/t-1"
xmlns:texpr="http://docs.oasis-open.org/wsn/b-2"
xmlns:tns="http://mip-interop.org/TopicNamespace"
Dialect="http://docs.oasis-open.org/wsn/t-1/TopicExpression/Simple">tn
s:AirPicture</texpr:TopicExpression>
</GetResourcePropertyResponse>
```

	<pre> &lt;/s:Body&gt; &lt;/s:Envelope&gt; </pre>
--	--

Sample	Retrieve the wstop:TopicSet resource from the Producer
Request	<pre> &lt;s:Envelope      xmlns:s="http://www.w3.org/2003/05/soap-envelope" xmlns:a="http://www.w3.org/2005/08/addressing"&gt;   &lt;s:Header&gt;     &lt;a:Action s:mustUnderstand="1"&gt;http://docs.oasis-open.org/wsrf/rpw-2/GetResource Property/GetResourcePropertyRequest&lt;/a:Action&gt;      &lt;a:MessageID&gt;urn:uuid:ee479b9d-112b-41d4-80cb-ef788bd525fc&lt;/a:MessageI D&gt;     &lt;a:ReplyTo&gt;    &lt;a:Address&gt;http://www.w3.org/2005/08/addressing/anonymous&lt;/a:Address&gt;   &lt;/a:ReplyTo&gt;    &lt;a:To s:mustUnderstand="1"&gt;http://10.0.99.4:8234/rr-resource&lt;/a:To&gt;   &lt;/s:Header&gt;   &lt;s:Body      xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance" xmlns:xsd="http://www.w3.org/2001/XMLSchema"&gt;     &lt;GetResourceProperty xmlns="http://docs.oasis-open.org/wsrf/rp-2" xmlns:q1="http://docs.oasis-open.org/wsn/t-1"&gt;q1:TopicSet&lt;/GetResource Property&gt;   &lt;/s:Body&gt; &lt;/s:Envelope&gt; &gt; </pre>
Response	<pre> &lt;s:Envelope      xmlns:a="http://www.w3.org/2005/08/addressing" xmlns:s="http://www.w3.org/2003/05/soap-envelope"&gt;   &lt;s:Header&gt;     &lt;a:Action </pre>

```
s:mustUnderstand="1">http://docs.oasis-open.org/wsrp/rpw-2/GetResource
Property/GetResourcePropertyResponse</a:Action>

<a:RelatesTo>urn:uuid:66d96ecb-fcf7-4d40-89b4-d4768aca580e</a:RelatesT
o>
</s:Header>
<s:Body xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
xmlns:xsd="http://www.w3.org/2001/XMLSchema">
<GetResourcePropertyResponse
xmlns="http://docs.oasis-open.org/wsrp/rp-2">
<wsnt:TopicSet xmlns:tns="http://mip-interop.org/TopicNamespace"
xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
xmlns:wsnt="http://docs.oasis-open.org/wsn/t-1">
<tns:LandPicture wsnt:topic="true">
<Forces xmlns="http://mip-interop.org/TopicNamespace"
wsnt:Topic="true"/>
<BattlespaceGeometry
xmlns="http://mip-interop.org/TopicNamespace" wsnt:Topic="true"/>
<LogisticsCSS xmlns="http://mip-interop.org/TopicNamespace"
wsnt:Topic="true"/>
<CBRN xmlns="http://mip-interop.org/TopicNamespace"
wsnt:Topic="true"/>
<ElectronicWarfare
xmlns="http://mip-interop.org/TopicNamespace" wsnt:Topic="true"/>
<CIS xmlns="http://mip-interop.org/TopicNamespace"
wsnt:Topic="true"/>
<FireSupport xmlns="http://mip-interop.org/TopicNamespace"
wsnt:Topic="true"/>
<AirDefence xmlns="http://mip-interop.org/TopicNamespace"
wsnt:Topic="true"/>
<MobilityCounterMobility
xmlns="http://mip-interop.org/TopicNamespace" wsnt:Topic="true"/>
<Medical xmlns="http://mip-interop.org/TopicNamespace"
wsnt:Topic="true"/>
<InfrastructureAndEnvironment
xmlns="http://mip-interop.org/TopicNamespace" wsnt:Topic="true"/>
```

	<pre> &lt;IntelligenceAssessment xmlns="http://mip-interop.org/TopicNamespace" wsnt:Topic="true"/&gt; &lt;SignificantActivityIncidents xmlns="http://mip-interop.org/TopicNamespace" wsnt:Topic="true"/&gt; &lt;/tns:LandPicture&gt; &lt;tns:MaritimePicture wsnt:topic="true"/&gt; &lt;tns:AirPicture wsnt:topic="true"/&gt; &lt;/wsnt:TopicSet&gt; &lt;/GetResourcePropertyResponse&gt; &lt;/s:Body&gt; &lt;/s:Envelope&gt; </pre>
--	--

Sample	Retrieve the wsn-b:TopicExpressionDialect resource from the Producer
Request	<pre> &lt;s:Envelope xmlns:s="http://www.w3.org/2003/05/soap-envelope" xmlns:a="http://www.w3.org/2005/08/addressing"&gt;   &lt;s:Header&gt;     &lt;a:Action s:mustUnderstand="1"&gt; http://docs.oasis-open.org/wsrp/rpw-2/GetResourceProperty/GetResourceP ropertyRequest     &lt;/a:Action&gt;     &lt;a:To s:mustUnderstand="1"&gt;http://10.0.99.4:8234/rr-resource&lt;/a:To&gt;   &lt;/s:Header&gt;   &lt;s:Body xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance" xmlns:xsd="http://www.w3.org/2001/XMLSchema"&gt;     &lt;GetResourceProperty xmlns="http://docs.oasis-open.org/wsrp/rp-2" xmlns:wsn-b="http://docs.oasis-open.org/wsn/b-2"&gt;       wsn-b:TopicExpressionDialect     &lt;/GetResourceProperty&gt;   &lt;/s:Body&gt; &lt;/s:Envelope&gt; </pre>
Response	<pre> &lt;s:Envelope xmlns:a="http://www.w3.org/2005/08/addressing" xmlns:s="http://www.w3.org/2003/05/soap-envelope"&gt;   &lt;s:Header&gt;     &lt;a:Action s:mustUnderstand="1"&gt; http://docs.oasis-open.org/wsrp/rpw-2/GetResourceProperty/GetResourceP ropertyResponse     &lt;/a:Action&gt;   &lt;/s:Header&gt; </pre>

	<pre> &lt;s:Body xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"   xmlns:xsd="http://www.w3.org/2001/XMLSchema"&gt;   &lt;GetResourcePropertyResponse xmlns="http://docs.oasis-open.org/wsrp/rp-2"&gt;     &lt;TopicExpressionDialect xmlns="http://docs.oasis-open.org/wsn/b-2"&gt;         http://docs.oasis-open.org/wsn/t-1/TopicExpression/Simple     &lt;/TopicExpressionDialect&gt;     &lt;TopicExpressionDialect xmlns="http://docs.oasis-open.org/wsn/b-2"&gt;         http://docs.oasis-open.org/wsn/t-1/TopicExpression/Concrete     &lt;/TopicExpressionDialect&gt;     &lt;TopicExpressionDialect xmlns="http://docs.oasis-open.org/wsn/b-2"&gt;         http://docs.oasis-open.org/wsn/t-1/TopicExpression/Full     &lt;/TopicExpressionDialect&gt;   &lt;/GetResourcePropertyResponse&gt; &lt;/s:Body&gt; &lt;/s:Envelope&gt; </pre>
--	--

Sample	Retrieve the wsmpr:WSMPPProfiles resource from the Producer
Request	<pre> &lt;s:Envelope xmlns:s="http://www.w3.org/2003/05/soap-envelope"   xmlns:a="http://www.w3.org/2005/08/addressing"&gt;   &lt;s:Header&gt;     &lt;a:Action s:mustUnderstand="1"&gt;http://docs.oasis-open.org/wsrp/rpw-2/GetResource Property/GetResourcePropertyRequest&lt;/a:Action&gt;      &lt;a:MessageID&gt;urn:uuid:44b8346f-0f87-456e-8cb1-0d450c8ae65a&lt;/a:MessageI D&gt;     &lt;a:ReplyTo&gt;      &lt;a:Address&gt;http://www.w3.org/2005/08/addressing/anonymous&lt;/a:Address&gt;     &lt;/a:ReplyTo&gt;      &lt;VsDebuggerCausalityData xmlns="http://schemas.microsoft.com/vstudio/diagnostics/servicemodelsi nk"&gt;uIDPozAVbuj9xSRLgZdoNvSA4aUBAAATpQT5iloSUSW3S8b+1ZAzZtt2LFKuFVMn1 fZX7tDUvUACQAA&lt;/VsDebuggerCausalityData&gt;      &lt;a:To&gt; </pre>

	<pre> s:mustUnderstand="1"&gt;http://10.0.99.4:8234/rr-resource&lt;/a:To&gt; &lt;/s:Header&gt; &lt;s:Body xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance" xmlns:xsd="http://www.w3.org/2001/XMLSchema"&gt; &lt;GetResourceProperty xmlns="http://docs.oasis-open.org/wsrp/rp-2" xmlns:q1="urn:nato:stanag:5644:wsmpp:1:3:resources"&gt;q1:WSMPPProfiles&lt;/Ge tResourceProperty&gt; &lt;/s:Body&gt; &lt;/s:Envelope&gt; </pre>
Response	<pre> &lt;s:Envelope xmlns:a="http://www.w3.org/2005/08/addressing" xmlns:s="http://www.w3.org/2003/05/soap-envelope"&gt; &lt;s:Header&gt; &lt;a:Action s:mustUnderstand="1"&gt;http://docs.oasis-open.org/wsrp/rpw-2/GetResource Property/GetResourcePropertyResponse&lt;/a:Action&gt; &lt;a:RelatesTo&gt;urn:uuid:04dc3c57-fd20-4967-bda4-83ed8e40daea&lt;/a:RelatesT o&gt; &lt;/s:Header&gt; &lt;s:Body xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance" xmlns:xsd="http://www.w3.org/2001/XMLSchema"&gt; &lt;GetResourcePropertyResponse xmlns="http://docs.oasis-open.org/wsrp/rp-2"&gt; &lt;WSMPPProfiles xmlns:obj="https://mip-interop.org/data/v4.3//IESObjects" xmlns:base="https://mip-interop.org/data/v4.3//Base" xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance" xmlns:gen="https://mip-interop.org/data/v4.3//IESGenerics" xmlns:core="https://mip-interop.org/data/v4.3//IESCore" xmlns:ext="https://mip-interop.org/data/v4.3//Extension" xmlns:met="https://mip-interop.org/data/v4.3//IESMetadata" xmlns:prim="https://mip-interop.org/data/v4.3//Primitives" xmlns:wsmpp="urn:nato:stanag:5644:wsmpp:1:3" </pre>

	<pre> xmlns:style="https://mip-interop.org/data/v4.3//Style" xmlns="urn:nato:stanag:5644:wsmp:1:3:resources"&gt;  &lt;MessageTransmissionProfile&gt;urn:nato:stanag:5644:wsmp:1:3:profiles:mtp :SOAP1.2:1:0&lt;/MessageTransmissionProfile&gt;      &lt;COIProfile&gt;https://mip-interop.org/data/v4.3/&lt;/COIProfile&gt;      &lt;/WSMPPProfiles&gt;      &lt;/GetResourcePropertyResponse&gt;  &lt;/s:Body&gt; &lt;/s:Envelope&gt; </pre>
--	---

### 6.8.2 Port Type *wsrf-rpw:GetResourcePropertyDocument*

The *wsrf-rpw:GetResourcePropertyDocument* Port Type is implemented by a Producer to allow a Consumer to retrieve all run-time resources made available by the Producer. No input parameter is required. The producer shall return a message including the resources. (Please refer to WSMP Core Specification for detailed information [REF-EM-11]).

The following is a non-normative example of a [GetResourcePropertyDocument] [request|response] message using SOAP.

Sample	Retrieve supported resources from the Producer
--------	--



Request	<pre>&lt;s:Envelope xmlns:a="http://www.w3.org/2005/08/addressing" xmlns:s="http://www.w3.org/2003/05/soap-envelope"&gt;   &lt;s:Header&gt;     &lt;a:Action s:mustUnderstand="1"&gt;http://docs.oasis-open.org/wsrp/rpw-2/GetResourcePr opertyDocument/GetResourcePropertyDocumentRequest&lt;/a:Action&gt;      &lt;a:MessageID&gt;urn:uuid:27b065fe-15d8-4e79-934b-b3a4ae7f4020&lt;/a:MessageID&gt;     &lt;a:ReplyTo&gt;      &lt;a:Address&gt;http://www.w3.org/2005/08/addressing/anonymous&lt;/a:Address&gt;     &lt;/a:ReplyTo&gt;   &lt;/s:Header&gt;   &lt;s:Body&gt;     &lt;GetResourcePropertyDocument xmlns="http://docs.oasis-open.org/wsrp/rp-2"/&gt;   &lt;/s:Body&gt; &lt;/s:Envelope&gt;</pre>
---------	--

Response	<pre> &lt;s:Envelope xmlns:s="http://www.w3.org/2003/05/soap-envelope" xmlns:a="http://www.w3.org/2005/08/addressing"&gt;   &lt;s:Header&gt;     &lt;a:Action s:mustUnderstand="1"&gt;http://docs.oasis-open.org/wsrp-2/GetResourcePr opertyDocument/GetResourcePropertyDocumentResponse&lt;/a:Action&gt;      &lt;a:RelatesTo&gt;urn:uuid:27b065fe-15d8-4e79-934b-b3a4ae7f4020&lt;/a:RelatesTo&gt;   &lt;/s:Header&gt;   &lt;s:Body xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance" xmlns:xsd="http://www.w3.org/2001/XMLSchema"&gt;     &lt;GetResourcePropertyDocumentResponse xmlns="http://docs.oasis-open.org/wsrp-2"&gt;       &lt;WSMPPublishSubscribeRP xmlns="urn:nato:stanag:5644:wsmrp:1:3:resources" xmlns:obj="https://mip-interop.org/data/v4.3//IESObjects" xmlns:base="https://mip-interop.org/data/v4.3//Base" xmlns:gen="https://mip-interop.org/data/v4.3//IESGenerics" xmlns:core="https://mip-interop.org/data/v4.3//IESCore" xmlns:ext="https://mip-interop.org/data/v4.3//Extension" xmlns:met="https://mip-interop.org/data/v4.3//IESMetadata" xmlns:prim="https://mip-interop.org/data/v4.3//Primitives" xmlns:wsmrp="urn:nato:stanag:5644:wsmrp:1:3" xmlns:style="https://mip-interop.org/data/v4.3//Style"&gt;         &lt;TopicExpression Dialect="http://docs.oasis-open.org/wsn/t-1/TopicExpression/Simple" xmlns="http://docs.oasis-open.org/wsn/b-2"&gt;tns:LandPicture&lt;/TopicExpress ion&gt;          &lt;TopicExpression Dialect="http://docs.oasis-open.org/wsn/t-1/TopicExpression/Concrete" xmlns="http://docs.oasis-open.org/wsn/b-2"&gt;tns:LandPicture/tns:Forces&lt;/T opicExpression&gt;          &lt;TopicExpression Dialect="http://docs.oasis-open.org/wsn/t-1/TopicExpression/Concrete" xmlns="http://docs.oasis-open.org/wsn/b-2"&gt;tns:LandPicture/tns:Battlespa ceGeometry&lt;/TopicExpression&gt;          &lt;TopicExpression Dialect="http://docs.oasis-open.org/wsn/t-1/TopicExpression/Concrete" xmlns="http://docs.oasis-open.org/wsn/b-2"&gt;tns:LandPicture/tns:Logistics CSS&lt;/TopicExpression&gt;          &lt;TopicExpression Dialect="http://docs.oasis-open.org/wsn/t-1/TopicExpression/Concrete" xmlns="http://docs.oasis-open.org/wsn/b-2"&gt;tns:LandPicture/tns:CBRN&lt;/Top icExpression&gt;          &lt;TopicExpression Dialect="http://docs.oasis-open.org/wsn/t-1/TopicExpression/Concrete" xmlns="http://docs.oasis-open.org/wsn/b-2"&gt;tns:LandPicture/tns:Electroni </pre>
----------	--

	<pre> cWarfare&lt;/TopicExpression&gt;   &lt;TopicExpression Dialect="http://docs.oasis-open.org/wsn/t-1/TopicExpression/Concrete" xmlns="http://docs.oasis-open.org/wsn/b-2"&gt;tns:LandPicture/tns:CIS&lt;/TopicExpression&gt;   &lt;TopicExpression Dialect="http://docs.oasis-open.org/wsn/t-1/TopicExpression/Concrete" xmlns="http://docs.oasis-open.org/wsn/b-2"&gt;tns:LandPicture/tns:FireSupport&lt;/TopicExpression&gt;   &lt;TopicExpression Dialect="http://docs.oasis-open.org/wsn/t-1/TopicExpression/Concrete" xmlns="http://docs.oasis-open.org/wsn/b-2"&gt;tns:LandPicture/tns:AirDefence&lt;/TopicExpression&gt;   &lt;TopicExpression Dialect="http://docs.oasis-open.org/wsn/t-1/TopicExpression/Concrete" xmlns="http://docs.oasis-open.org/wsn/b-2"&gt;tns:LandPicture/tns:MobilityCounterMobility&lt;/TopicExpression&gt;   &lt;TopicExpression Dialect="http://docs.oasis-open.org/wsn/t-1/TopicExpression/Concrete" xmlns="http://docs.oasis-open.org/wsn/b-2"&gt;tns:LandPicture/tns:Medical&lt;/TopicExpression&gt;   &lt;TopicExpression Dialect="http://docs.oasis-open.org/wsn/t-1/TopicExpression/Concrete" xmlns="http://docs.oasis-open.org/wsn/b-2"&gt;tns:LandPicture/tns:InfrastructureAndEnvironment&lt;/TopicExpression&gt;   &lt;TopicExpression Dialect="http://docs.oasis-open.org/wsn/t-1/TopicExpression/Concrete" xmlns="http://docs.oasis-open.org/wsn/b-2"&gt;tns:LandPicture/tns:IntelligenceAssessment&lt;/TopicExpression&gt;   &lt;TopicExpression Dialect="http://docs.oasis-open.org/wsn/t-1/TopicExpression/Concrete" xmlns="http://docs.oasis-open.org/wsn/b-2"&gt;tns:LandPicture/tns:SignificantActivityIncidents&lt;/TopicExpression&gt;   &lt;TopicExpression Dialect="http://docs.oasis-open.org/wsn/t-1/TopicExpression/Simple" xmlns="http://docs.oasis-open.org/wsn/b-2"&gt;tns:MaritimePicture&lt;/TopicExpression&gt;   &lt;TopicExpression Dialect="http://docs.oasis-open.org/wsn/t-1/TopicExpression/Simple" xmlns="http://docs.oasis-open.org/wsn/b-2"&gt;tns:AirPicture&lt;/TopicExpression&gt;   &lt;FixedTopicSet xmlns="http://docs.oasis-open.org/wsn/b-2"&gt;true&lt;/FixedTopicSet&gt;   &lt;TopicExpressionDialect xmlns="http://docs.oasis-open.org/wsn/b-2"&gt;http://docs.oasis-open.org/wsn/t-1/TopicExpression/Simple&lt;/TopicExpressionDialect&gt;   &lt;TopicExpressionDialect </pre>
--	--

```

xmlns="http://docs.oasis-open.org/wsn/b-2">http://docs.oasis-open.org/ws
n/t-1/TopicExpression/Concrete</TopicExpressionDialect>
    <TopicExpressionDialect
xmlns="http://docs.oasis-open.org/wsn/b-2">http://docs.oasis-open.org/ws
n/t-1/TopicExpression/Full</TopicExpressionDialect>
    <TopicSet xmlns="http://docs.oasis-open.org/wsn/t-1">
    <tns:LandPicture wsnt:topic="true"
xmlns:tns="http://mip-interop.org/TopicNamespace"
xmlns:wsnt="http://docs.oasis-open.org/wsn/t-1">
    <Forces wsnt:Topic="true"
xmlns="http://mip-interop.org/TopicNamespace" />
    < BattlespaceGeometry wsnt:Topic="true"
xmlns="http://mip-interop.org/TopicNamespace" />
    < LogisticsCSS wsnt:Topic="true"
xmlns="http://mip-interop.org/TopicNamespace" />
    < CBRN wsnt:Topic="true"
xmlns="http://mip-interop.org/TopicNamespace" />
    < ElectronicWarfare wsnt:Topic="true"
xmlns="http://mip-interop.org/TopicNamespace" />
    < CIS wsnt:Topic="true"
xmlns="http://mip-interop.org/TopicNamespace" />
    < FireSupport wsnt:Topic="true"
xmlns="http://mip-interop.org/TopicNamespace" />
    < AirDefence wsnt:Topic="true"
xmlns="http://mip-interop.org/TopicNamespace" />
    < MobilityCounterMobility wsnt:Topic="true"
xmlns="http://mip-interop.org/TopicNamespace" />
    < Medical wsnt:Topic="true"
xmlns="http://mip-interop.org/TopicNamespace" />
    < InfrastructureAndEnvironment wsnt:Topic="true"
xmlns="http://mip-interop.org/TopicNamespace" />
    < IntelligenceAssessment wsnt:Topic="true"
xmlns="http://mip-interop.org/TopicNamespace" />
    < SignificantActivityIncidents wsnt:Topic="true"
xmlns="http://mip-interop.org/TopicNamespace" />
    </tns:LandPicture>
    <tns:MaritimePicture wsnt:topic="true"
xmlns:tns="http://mip-interop.org/TopicNamespace"
xmlns:wsnt="http://docs.oasis-open.org/wsn/t-1" />
    <tns:AirPicture wsnt:topic="true"
xmlns:tns="http://mip-interop.org/TopicNamespace"
xmlns:wsnt="http://docs.oasis-open.org/wsn/t-1" />
    </TopicSet>
    <WSMPProfiles>

<MessageTransmissionProfile>urn:nato:stanag:5644:wsmp:1:3:profiles:mtp:S
OAP1.2:1:0</MessageTransmissionProfile>

```

	<pre>         &lt;COIProfile&gt;https://mip-interop.org/data/v4.3/&lt;/COIProfile&gt;       &lt;/WSMPPProfiles&gt;     &lt;/WSMPPublishSubscribeRP&gt;   &lt;/GetResourcePropertyDocumentResponse&gt; &lt;/s:Body&gt; &lt;/s:Envelope&gt; </pre>
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### 6.8.3 Port Type wsn-bw:NotificationProducer

The wsn-bw:NotificationProducer Port Type is implemented by a Producer and provides the operations required to initiate a subscription and, if supported, retrieve the latest notification associated with a specific Topic.

#### 6.8.3.1 Operation wsn-bw:NotificationProducer.Subscribe

This operation allows a Consumer to create a subscription based on the supplied filter and suggested termination time. As a result of creating the subscription the Producer will notify the Consumer of updates to the Situation on the Consumer's wsn-bw:NotificationConsumer.Notify endpoint according to the filtering criteria provided at subscription time. The subscribe request message contains the wsn-b:Filter that is used to provide one or more filters; when wsn-b:Filter contains more than one filter, they are to be evaluated as a logical AND operation. The Consumer MUST provide at least one filter criteria. In particular, the wsn-b:Filter and its child TopicExpression are mandatory in the MIP 4.0 specification.

All the details about this operation is described in the corresponding specification *WS-BaseNotification* [REF-EM-02]. Additional constraints applicable to this operation are provided in the *TIDE Transformational Baseline* [REF-EM-03].

As stated in the specification *WS-BaseNotification* [REF-EM-02], the termination time MAY be specified as an xsd:datetime or an xsd:duration. If specified as an xsd:datetime, the date time format SHALL follow the same restrictions as described in section 7.7 Date, Time and DateTime of the *MIP4-IES Information Definition Overview* [REF-MIP-07].

The MIP4-IES filtering mechanism is described in [REF-MIP-02]..

The following are non-normative examples of a [Subscribe] [request|response] message using SOAP

Sample	Subscribe to a Topic with a Topic filter
Request	<pre> &lt;s:Envelope          xmlns:s="http://www.w3.org/2003/05/soap-envelope"   xmlns:a="http://www.w3.org/2005/08/addressing"&gt;   &lt;s:Header&gt;     &lt;a:Action       s:mustUnderstand="1"&gt;http://docs.oasis-open.org/wsn/bw-2/NotificationP       roducer/SubscribeRequest&lt;/a:Action&gt; </pre>

MIP4-IES - PUBLISH/SUBSCRIBE EXCHANGE PATTERN  
v1.15.1

	<pre> &lt;a:MessageID&gt;urn:uuid:f0ac748c-32fb-445a-a719-10553259d8e8&lt;/a:MessageID&gt;      &lt;a:ReplyTo&gt;  &lt;a:Address&gt;http://www.w3.org/2005/08/addressing/anonymous&lt;/a:Address&gt;     &lt;/a:ReplyTo&gt;                                  &lt;VsDebuggerCausalityData xmlns="http://schemas.microsoft.com/vstudio/diagnostics/servicemodelsink" &gt;uIDPoyM43vOFxoZLhoSGBLhHspwBAAAA1LQnzlpvuk+ewvlnbe7yN12UmNoZFoJGrt pAiYfgr+QACQAA&lt;/VsDebuggerCausalityData&gt;                                  &lt;a:To s:mustUnderstand="1"&gt;http://10.81.0.26:9192/NotificationProducer&lt;/a:To &gt;     &lt;/s:Header&gt;         &lt;s:Body      xmlns:xsd="http://www.w3.org/2001/XMLSchema" xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"&gt;             &lt;Subscribe xmlns="http://docs.oasis-open.org/wsn/b-2"&gt;                 &lt;ConsumerReference&gt;                     &lt;a:Address&gt;http://10.81.0.14:8236/consumer&lt;/a:Address&gt;                 &lt;/ConsumerReference&gt;                 &lt;Filter&gt;                                  &lt;texpr:TopicExpression xmlns:texpr="http://docs.oasis-open.org/wsn/b-2" xmlns:tns="http://mip-interop.org/TopicNamespace" xmlns:wsn-b="http://docs.oasis-open.org/wsn/t-1" Dialect="http://docs.oasis-open.org/wsn/t-1/TopicExpression/Simple"&gt;tns:LandPicture&lt;/texpr:TopicExpression&gt;                 &lt;/Filter&gt;                 &lt;InitialTerminationTime xsi:nil="true" /&gt;             &lt;/Subscribe&gt;         &lt;/s:Body&gt;     &lt;/s:Envelope&gt; </pre>
Response	<pre> &lt;soap:Envelope xmlns:soap="http://www.w3.org/2003/05/soap-envelope"&gt;     &lt;soap:Header&gt;                                  &lt;Action xmlns="http://www.w3.org/2005/08/addressing"&gt;http://docs.oasis-open.org/wsn/bw-2/NotificationProducer/SubscribeResponse&lt;/Action&gt;                                  &lt;MessageID xmlns="http://www.w3.org/2005/08/addressing"&gt;urn:uuid:97992dd5-d5cf-408d-8929-7bb88a8dcb37&lt;/MessageID&gt;                                  &lt;To xmlns="http://www.w3.org/2005/08/addressing"&gt;http://www.w3.org/2005/08/addressing/anonymous&lt;/To&gt;                                  &lt;RelatesTo xmlns="http://www.w3.org/2005/08/addressing"&gt;urn:uuid:f0ac748c-32fb-445a-a719-10553259d8e8&lt;/RelatesTo&gt;     &lt;/soap:Header&gt; </pre>

	<pre> &lt;soap:Body&gt;   &lt;SubscribeResponse xmlns="http://docs.oasis-open.org/wsn/b-2" xmlns:ns2="http://docs.oasis-open.org/wsrf/bf-2" xmlns:ns3="http://www.w3.org/2005/08/addressing" xmlns:ns4="urn:nato:stanag:5644:wsm:1:3:resources" xmlns:ns5="http://docs.oasis-open.org/wsn/t-1" xmlns:ns6="urn:nato:stanag:5644:wsm:1:3:fault" xmlns:ns7="urn:nato:stanag:5644:wsm:1:3" xmlns:ns8="http://docs.oasis-open.org/wsrf/r-2" xmlns:ns9="http://docs.oasis-open.org/wsrf/rp-2"&gt;     &lt;SubscriptionReference&gt;  &lt;ns3:Address&gt;http://14.65.0.10:8236/subscriptionmgr?UUID=80af28d9-4049- 496d-b9d7-145e5f5ae4b7&lt;/ns3:Address&gt;     &lt;/SubscriptionReference&gt;     &lt;CurrentTime&gt;2017-05-29T12:48:38.478Z&lt;/CurrentTime&gt;                                 &lt;TerminationTime xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"    xsi:nil="true" /&gt;     &lt;/SubscribeResponse&gt;   &lt;/soap:Body&gt; &lt;/soap:Envelope&gt; </pre>
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### 6.8.3.2 Operation *wsn-bw:NotificationProducer.GetCurrentMessage*

Implementation of the *wsn-bw:NotificationProducer.GetCurrentMessage* operation is used to retrieve last notification published to a given topic (WS-BaseNotification standard does not prescribe any caching policy).

The *WSMP Core Specification* [REF-EM-11], the *WS-BaseNotification specification* [REF-EM-02] and the *TIDE Transformational Baseline* [REF-EM-03] are references for this operation.

### 6.8.4 Port Type *wsn-bw:SubscriptionManager*

The *wsn-bw:SubscriptionManager* Port Type is implemented by the Producer. The *wsn-bw:SubscriptionManager* Port Type gives Consumers the ability to manage existing subscriptions.

When a Consumer accesses a Producer's *wsn-bw:SubscriptionManager*, it SHALL send its request to the address specified in the *wsn-b:SubscriptionReference* that was provided by the Producer when the subscription was created (in the *wsn-b:SubscribeResponse*).

In the MIP4 environment, a Consumer who wants to renew subscription shall send the reference in the Address fields in the header.

It is the Producer's responsibility to listen on the address specified in the wsn-b:SubscriptionReference. This allows the Producer to uniquely identify the subscription being operated on.

Details about this operation are described in the corresponding specification *WS-BaseNotification* [REF-EM-02]. Additional constraints applicable to this operation are provided in the *TIDE Transformational Baseline* [REF-EM-03].

The following is a non-normative example of a [Renew] [request|response] message using SOAP:

Sample	Renew an existing subscription
Request	<pre>&lt;s:Envelope xmlns:s="http://www.w3.org/2003/05/soap-envelope" xmlns:a="http://www.w3.org/2005/08/addressing"&gt;   &lt;s:Header&gt;     &lt;a:Action s:mustUnderstand="1"&gt;http://docs.oasis-open.org/wsn/bw-2/SubscriptionManager/RenewRequest&lt;/a:Action&gt;     &lt;a:MessageID&gt;urn:uuid:46d13c0b-2550-46eb-ae76-861d4b9a6791&lt;/a:MessageID&gt;     &lt;a:ReplyTo&gt;       &lt;a:Address&gt;http://www.w3.org/2005/08/addressing/anonymous&lt;/a:Address&gt;     &lt;/a:ReplyTo&gt;     &lt;a:To s:mustUnderstand="1"&gt;http://x.x.x.x:xxxx/Mip4Plugin/WSMPSubscriptionManagerService?UUID=1e1bf888-2f1c-445b-ab7c-2c27294a9ebc&lt;/a:To&gt;   &lt;/s:Header&gt;   &lt;s:Body xmlns:xsd="http://www.w3.org/2001/XMLSchema" xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"&gt;     &lt;Renew xmlns="http://docs.oasis-open.org/wsn/b-2"&gt;       &lt;TerminationTime&gt;2020-06-23T08:46:03.120Z&lt;/TerminationTime&gt;     &lt;/Renew&gt;   &lt;/s:Body&gt; &lt;/s:Envelope&gt;</pre>
Response	<pre>&lt;s:Envelope xmlns:s="http://www.w3.org/2003/05/soap-envelope" xmlns:a="http://www.w3.org/2005/08/addressing"&gt;   &lt;s:Header&gt;     &lt;a:Action s:mustUnderstand="1"&gt;http://docs.oasis-open.org/wsn/bw-2/SubscriptionManager/RenewResponse&lt;/a:Action&gt;     &lt;a:RelatesTo&gt;urn:uuid:140ff9ec-7872-4712-b80d-06a1c92a304b&lt;/a:RelatesTo&gt;   &lt;/s:Header&gt;   &lt;s:Body xmlns:xsd="http://www.w3.org/2001/XMLSchema"&gt;</pre>



	<pre> xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"&gt;   &lt;RenewResponse xmlns="http://docs.oasis-open.org/wsn/b-2"&gt;     &lt;TerminationTime xsi:nil="true" /&gt;     &lt;CurrentTime&gt;2017-05-26T13:35:12.6901151Z&lt;/CurrentTime&gt;   &lt;/RenewResponse&gt; &lt;/s:Body&gt; &lt;/s:Envelope&gt; </pre>
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#### 6.8.4.1 Operation *wsn-bw:SubscriptionManager.Unsubscribe*

This operation allows the Consumer to terminate a subscription.

In the MIP4 environment, a Consumer who wants to unsubscribe shall send the reference in the Address fields in the header.

Details about this operation are described in the WS-BaseNotification specification [REF-EM-02]. Additional constraints applicable to this operation are provided in the TIDE Transformational Baseline [REF-EM-03].

The following is a non-normative example of an [Unsubscribe] [request|response] message using SOAP.

Sample	Unsubscribe an existing subscription
Request	<pre> &lt;s:Envelope xmlns:s="http://www.w3.org/2003/05/soap-envelope" xmlns:a="http://www.w3.org/2005/08/addressing"&gt;   &lt;s:Header&gt;     &lt;a:Action       s:mustUnderstand="1"&gt;http://docs.oasis-open.org/wsn/bw-2/SubscriptionManager/UnsubscribeRequest&lt;/a:Action&gt;     &lt;a:MessageID&gt;urn:uuid:46d13c0b-2550-46eb-ae76-861d4b9a6791&lt;/a:MessageID&gt;     &lt;a:ReplyTo&gt;       &lt;a:Address&gt;http://www.w3.org/2005/08/addressing/anonymous&lt;/a:Address&gt;     &lt;/a:ReplyTo&gt;     &lt;a:To       s:mustUnderstand="1"&gt;http://x.x.x.x:xxxx/Mip4Plugin/WSMPSubscriptionManagerService?UUID=1e1bf888-2f1c-445b-ab7c-2c27294a9ebc&lt;/a:To&gt;   &lt;/s:Header&gt;   &lt;s:Body xmlns:xsd="http://www.w3.org/2001/XMLSchema" xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"&gt;     &lt;Unsubscribe xmlns="http://docs.oasis-open.org/wsn/b-2"&gt;     &lt;/Unsubscribe&gt;   &lt;/s:Body&gt; &lt;/s:Envelope&gt; </pre>

Response	<pre> &lt;s:Envelope      xmlns:s="http://www.w3.org/2003/05/soap-envelope" xmlns:a="http://www.w3.org/2005/08/addressing"&gt;   &lt;s:Header&gt;    &lt;a:RelatesTo&gt;urn:uuid:41cb5600-6328-4efe-a9c7-82989c5f1b69&lt;/a:Rela tesTo&gt;     &lt;/s:Header&gt;       &lt;s:Body      xmlns:xsd="http://www.w3.org/2001/XMLSchema" xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"&gt;   &lt;UnsubscribeResponse xmlns="http://docs.oasis-open.org/wsn/b-2" /&gt;         &lt;/s:Body&gt;       &lt;/s:Envelope&gt; </pre>
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### 6.8.5 Port Type wsn-bw:NotificationConsumer

The wsn-bw:NotificationConsumer Port Type is implemented by the Consumer and is used to receive notifications from the Producer matching the current subscriptions.

Details about this operation are described in the *WSMP Core Specification* [REF-EM-11] and the *WS-BaseNotification specification* [REF-EM-02]. Additional constraints applicable to this operation are provided in the *TIDE Transformational Baseline* [REF-EM-03].

When receiving an item through Publish/Subscribe, the Consumer might request an object being referenced using the WSMP.Read operation defined in *MIP4-IES Request / Response Exchange Pattern* [REF-MIP-04].

The following are non-normative examples of a [Notify] [request|response] message using SOAP

Sample	Notify the Consumer of change to the Situation
Request	<pre> &lt;env:Envelope xmlns:env="http://www.w3.org/2003/05/soap-envelope"&gt;   &lt;env:Header xmlns:wsa="http://www.w3.org/2005/08/addressing"&gt;     &lt;wsa:To env:mustUnderstand="true"&gt;http://10.87.0.41:9091/services/Consumer   &lt;/wsa:To&gt;     &lt;wsa:Action&gt; http://docs.oasis-open.org/wsn/bw-2/NotificationConsumer/Notify&lt;/wsa:Actio n&gt;     &lt;wsa:MessageID&gt;urn:uuid:c84b71da-69f5-4ecf-ae1f-dfe215767925&lt;/wsa:MessageI D&gt;   &lt;/env:Header&gt;   &lt;env:Body&gt;     &lt;ns4:Notify xmlns:ns12="https://mip-interop.org/data/v4.3/Base" xmlns:ns14="https://mip-interop.org/data/v4.3/BattlespaceConcept" xmlns:ns15="https://mip-interop.org/data/v4.3/BattlespaceConcept/Location" xmlns:ns17="https://mip-interop.org/data/v4.3/Concept" </pre>

	<pre> xmlns:ns19="https://mip-interop.org/data/v4.3/Concept/Metadata" xmlns:ns24="https://mip-interop.org/data/v4.3/BattlespaceConcept/Object" xmlns:ns28="https://mip-interop.org/data/v4.3/BattlespaceConcept/Object/Actor/Organisation" xmlns:ns3="http://www.w3.org/2005/08/addressing" xmlns:ns38="https://mip-interop.org/data/v4.3/BattlespaceConcept/Affiliation" xmlns:ns4="http://docs.oasis-open.org/wsn/b-2" xmlns:ns52="https://mip-interop.org/data/v4.3/BattlespaceConcept/Object/Actor/Organisation/Unit" xmlns:ns8="urn:nato:stanag:5644:wsmp:1:3"     &lt;ns4:NotificationMessage&gt;         &lt;ns4:SubscriptionReference&gt;             &lt;ns3:Address&gt; http://10.87.0.41:9091/services/Producer?id=subscriptions-192-168-2-120-17490dfbf40-0-0             &lt;/ns3:Address&gt;             &lt;/ns4:SubscriptionReference&gt;             &lt;ns4:Topic&gt; xmlns:xxxx="https://insane.fkie.fraunhofer.de/models/datapool" Dialect="http://docs.oasis-open.org/wsn/t-1/TopicExpression/Simple"&gt;                 xxxx:SAD             &lt;/ns4:Topic&gt;             &lt;ns4:Message&gt;             &lt;ns8:WSMPMsg&gt;                 &lt;ns8:Update&gt;                 &lt;ns8:Data ns8:Dialect="https://mip-interop.org/data/v4.3/Dialect"&gt;                     &lt;ns12:Context&gt;                         &lt;ns12:ContextIdentifier&gt; /Overlay/3a9b275a-07d2-42df-a6c0-92394e46b19b/Content                         &lt;/ns12:ContextIdentifier&gt;                         &lt;ns12:Data xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"                         xsi:type="ns52:InfantryUnitType"&gt;  &lt;ns12:ID&gt;6c8ced0a-359b-4b7d-8263-f8370578712c&lt;/ns12:ID&gt;                             &lt;ns17:ConceptName&gt;Infantry_GER&lt;/ns17:ConceptName&gt;                                 &lt;ns14:BattlespaceConceptGeographicLocation&gt;                                     &lt;ns15:LocationGeometry xsi:type="ns15:AbsolutePointType"&gt;   &lt;ns15:AbsolutePointLatitudeCoordinate&gt;   &lt;ns15:LatitudeCoordinateCoordinate&gt;49.92   &lt;/ns15:LatitudeCoordinateCoordinate&gt;  &lt;/ns15:AbsolutePointLatitudeCoordinate&gt;   &lt;ns15:AbsolutePointLongitudeCoordinate&gt;   &lt;ns15:LongitudeCoordinateCoordinate&gt;8.50 </pre>
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	<pre> &lt;/ns15:LongitudeCoordinateCoordinate&gt; &lt;/ns15:AbsolutePointLongitudeCoordinate&gt; &lt;/ns15:LocationGeometry&gt; &lt;/ns14:BattlespaceConceptGeographicLocation&gt; &lt;ns14:BattlespaceConceptHostilityCode&gt;Hostile     &lt;/ns14:BattlespaceConceptHostilityCode&gt;     &lt;ns14:BattlespaceConceptMetadata&gt;         &lt;ns19:ConceptMetadataCommentText&gt;             This is a Comment         &lt;/ns19:ConceptMetadataCommentText&gt;         &lt;ns19:ConceptMetadataReportingData&gt;             &lt;ns19:ReportingDataCategoryCode&gt;Reported         &lt;/ns19:ReportingDataCategoryCode&gt;         &lt;ns19:ReportingDataObservationDateTime&gt;2020-09-14T08:19:42.941Z         &lt;/ns19:ReportingDataObservationDateTime&gt;         &lt;ns19:ReportingDataReportingDateTime&gt;2020-09-14T08:19:42.941Z         &lt;/ns19:ReportingDataReportingDateTime&gt;         &lt;ns19:ReportingDataReporter&gt;             &lt;ns19:ReporterName&gt;reporter&lt;/ns19:ReporterName&gt;         &lt;/ns19:ReportingDataReporter&gt;     &lt;/ns19:ConceptMetadataReportingData&gt;     &lt;/ns14:BattlespaceConceptMetadata&gt;     &lt;ns14:BattlespaceConceptStaffCommentsText&gt;shortcomment     &lt;/ns14:BattlespaceConceptStaffCommentsText&gt;     &lt;ns24:ObjectAffiliation xsi:type="ns38:GeopoliticalAffiliationType"&gt; &lt;ns38:GeopoliticalAffiliationCode&gt;DEU&lt;/ns38:GeopoliticalAffiliationCode&gt;     &lt;/ns24:ObjectAffiliation&gt; &lt;ns28:OrganisationHasCommandFunctionIndicator&gt;true     &lt;/ns28:OrganisationHasCommandFunctionIndicator&gt; &lt;ns28:MilitaryOrganisationAvailabilityCode&gt;After30Days     &lt;/ns28:MilitaryOrganisationAvailabilityCode&gt; &lt;ns28:MilitaryOrganisationServiceCode&gt;Army     &lt;/ns28:MilitaryOrganisationServiceCode&gt;     &lt;ns24:ArmyEchelonCode&gt;Battalion&lt;/ns24:ArmyEchelonCode&gt;     &lt;/ns52:UnitEchelon&gt; &lt;ns52:UnitTransportationCode&gt;Mechanised&lt;/ns52:UnitTransportationCode&gt;     &lt;/ns12:Data&gt; &lt;ns12:ContextLastModificationDateTime&gt;2020-09-15T08:28:04.094Z     &lt;/ns12:ContextLastModificationDateTime&gt;     &lt;/ns12:Context&gt; &lt;/ns8:Data&gt; &lt;/ns8:Update&gt; &lt;/ns8:WSMPMsg&gt; &lt;/ns4:Message&gt; &lt;/ns4:NotificationMessage&gt; &lt;/ns4:Notify&gt; &lt;/env:Body&gt; </pre>
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	<code>&lt;/env:Envelope&gt;</code>
Response	HTTP/1.1 202 Accepted Server: Apache-Coyote/1.1 Content-Length: 0 Date: Thu, 20 Sep 2012 12:08:57 GMT

## 7 Use Cases

This section describes how the MIP4-IES Publish/Subscribe Web Service is used, in terms of preconditions and interactions between Consumer and Producer, to accomplish Use Cases/Scenarios described in the *MIP4-IES Exchange Mechanism Overview* [REF-MIP-02]. It is anticipated that additional use cases may be identified according to specific needs.

Currently, the only Use Case relevant to the MIP4-IES Publish/Subscribe Web Service Exchange Pattern is ‘Consumption of the Situation’.

### 7.1 Consumption of the Situation

#### 7.1.1 Problem

The Consumer is interested in receiving regular updates of the Situation in an asynchronous way (i.e without polling the Producer for the Situation).

#### 7.1.2 Solution

The system interested in consuming the situation receives updates by using the MIP4-IES Publish/Subscribe Exchange Pattern (playing the Consumer role) and receiving asynchronous notifications from one or more systems (playing the Producer role) capable to provide the Situation as known by them.

For a better understanding, this use case is divided into phases:

- a) Subscribing
- b) Receiving Notifications
- c) Renewing Subscription
- d) Terminating Subscription

##### 7.1.2.1 Subscribing

Before being able to consume notifications, the Consumer needs to subscribe to the Producer in order to advertise its interest in a subset of the data space.

This subset is defined by a succession of filters on Topic and Message Content.

In order to accomplish this Use Case phase, the operations in the following table are required (and used in the order specified).

Required Operations: Subscribing	
Port Type	Operation
wsrf-rpw: <i>GetResourceProperty</i>	wsrf-rpw: <i>GetResourceProperty</i>
wsn-bw: <i>NotificationProducer</i>	wsn-b: <i>Subscribe</i>

Consumer-Producer interactions for this Use Case phase are provided in the following table.

<b>Consumer-Producer Interactions: Subscribing</b>	
<b>Prec.</b>	<b>Description</b>
1	Both Consumer and Producer systems are conformant to MIP4-IES Publish/Subscribe Exchange Pattern Specification.
2	Both Consumer and Producer systems are able to process and exchange information represented according to <i>MIP4-IES Information Schemas</i> [REF-MIP-08].
3	Consumer successfully discovered the target Producer; The system on Consumer side has been properly configured and is ready to interact with Producer system.
<b>Step</b>	<b>Description</b>
1	The Consumer retrieves the topics exposed by the Producer using the <i>wsrf-rpw:GetResourceProperty</i> operation with <i>wsn:TopicExpression</i> , <i>wsn:TopicExpressionDialect</i> and <i>wstop:TopicSet</i> as parameters (refer to <i>WS-BaseNotification</i> [REF-EM-02] for detailed information).
2	<p>The Consumer processes the list of exposed topics, prepares a filter accordingly, and requests a subscription on a given single or set of topics to the Producer using the <i>wsn-b:Subscribe</i> operation.</p> <p>With this operation, the Consumer MAY suggest a Termination time for this subscription. It is up to the Producer to decide whether it accepts it or not: (and in the latter case, the Producer sets its own termination time (refer to <i>WS-BaseNotification</i> [REF-EM-02] for detailed information).</p>
3	The Producer accepts or rejects the subscription request.

### 7.1.2.2 Receiving Notifications

The Producer is responsible for distributing data to Consumers based on active subscriptions. How the Producer knows when new or updated data is available is up to the implementer and is outside the scope of this document.

When the Producer has data to distribute, it SHALL check the subscription filters that were specified in the wsn-b:Subscribe request and determine if the data matches the subscription.

The Producer SHALL send a wsn-b:Notify to the address specified in the wsn-b:ConsumerReference for each matching subscription. According to the WS-Notification specification, if a Consumer has multiple matching subscriptions, the Producer SHALL send a notification to the Consumer for each matching subscription. If this behavior is not desirable for a Consumer, the Consumer should create their subscriptions in such a way that the filters do not overlap.

In order to accomplish this Use Case phase, the operations in the following table are required.

Required Operations: Receiving Notifications	
Port Type	Operation
wsn-bw:NotificationConsumer	wsn-b:Notify

Consumer-Producer interactions for this Use Case phase are provided in the following table.

Consumer-Producer Interactions: Receiving Notifications	
Prec.	Description
1	Both Consumer and Producer systems are conformant to MIP4-IES Publish/Subscribe Exchange Pattern Specification.
2	Both Consumer and Producer systems are able to process and exchange information represented according to MIP4-IES Information schemas.
3	Consumer successfully discovered the target Producer. The system on Consumer side has been properly configured and is ready to interact with Producer system.
4	Consumer has already successfully performed the previous phase of the use case (i.e at least one subscription exists on Producer side for this Consumer)



Step	Description
1	The Producer pushes the data to the Consumer using the wsn-b:Notify operation. No response is expected by the consumer (exception made of the HTTP 202 response)
2	The Consumer processes the data included in the message.

### 7.1.2.3 *Renewing Subscription*

It is the Consumer's responsibility to keep track of their subscriptions if they desire to manage them later. If the Consumer wishes to extend the lifetime of a subscription, they must renew the subscription with the Producer prior to the subscription's termination time (or else the Producer must raise a ResourceUnknownFault according to *WS-BaseNotification* [REF-EM-02])

In order to accomplish this Use Case phase, the operations in the following table are required.

Required Operations: Renewing Subscription	
Port Type	Operation
wsn-bw:SubscriptionManager	wsn-b:Renew

Consumer-Producer interactions for this Use Case phase are provided in the following table.

Consumer-Producer Interactions: Renewing Subscription	
Prec.	Description
1	Both Consumer and Producer systems are conformant to MIP4-IES Publish/Subscribe Exchange Pattern Specification.
2	Both Consumer and Producer systems are able to process and exchange information represented according to MIP4-IES Information Schemas.
3	Consumer successfully discovered the target Producer .The system on Consumer side has been properly configured and is ready to interact with Producer system.

4	Consumer has already successfully performed the subscription phase of the use case (i.e a subscription exists on Producer side for this Consumer). The subscription is not currently terminated.
<b>Step</b>	<b>Description</b>
1	<p>The Consumer requests to renew its subscription, using the <i>wsn-b:Renew</i> operation with the SubscriptionReference (issued from the initial Subscribe response) and a new expected termination time.</p> <p>It is up to the Producer to decide whether it accepts this suggested termination time or not (and in the latter case, the Producer decides its own termination time).</p>
2	The Producer accepts or rejects the request. If the Producer accepts, the accepted termination time is provided in the content of the response.

#### 7.1.2.4 Terminating Subscription

The Producer will continuously send notifications to the Consumer until the Consumer unsubscribes or the subscription expires. If a Consumer becomes unavailable before a subscription expires, the Producer must decide how to efficiently deal with the subscription without removing it (until it does expire).

In the case of a subscription expiration or unreachable Consumer, no operation is required by the Consumer.

In other cases, if the Consumer wishes to terminate the subscription, the operations in the following table are required.

Required Operations: Terminating Subscription	
Port Type	Operation
<i>wsn-bw:SubscriptionManager</i>	<i>wsn-b:Unsubscribe</i>

Consumer-Producer interactions for this Use Case phase are provided in the following table.

Consumer-Producer Interactions: Terminating Subscription
--

<b>Prec.</b>	<b>Description</b>
1	Both Consumer and Producer systems are conformant to MIP4-IES Publish/Subscribe Exchange Pattern Specification.
2	Both Consumer and Producer systems are able to process and exchange information represented according to MIP4-IES Information Schemas.
3	Consumer successfully discovered the target Producer. The system on the Consumer side has been properly configured and is ready to interact with the Producer system.
4	Consumer has already successfully performed the subscription phase of the use case (i.e a subscription exists on Producer side for this Consumer). The subscription is not terminated.
<b>Step</b>	<b>Description</b>
1	The Consumer sends a request to the Producer , using the wsn-b: <i>Unsubscribe</i> operation with the SubscriptionReference (issued from the initial Subscribe response).
2	The Producer SHALL attempt to destroy the corresponding subscription, or fault if it cannot.

## 8 Glossary

Refer to the *MIP4-IES Exchange Mechanism Overview* [REF-MIP-02] for the definition of any acronyms/terms used in this document.

## 9 MIP4-IES Profile

The MIP4-IES defines a COI-specific profile to implement on top of the *WSMP Core Specification* [REF-EM-11]. In the case of the Publish-Subscribe pattern, this profile is structured for one usage:

### a) Filtering

In order to detect that the Filters are defined according to the MIP4-IES profiles, the Consumer **MUST** use the MIP4-IES dialects:

<https://mip-interop.org/data/v4.3/Dialect/Filter>

Also, in order to detect that the payload corresponds to MIP4-IES, the Provider **SHALL** fill the Dialect attribute of the Data element with the following value:

<https://mip-interop.org/data/v4.3/Dialect>

Be aware that the ResourceProperty COIProfile URL is (see 6.8.1):

<https://mip-interop.org/data/v4.3>

### 9.1 Filtering

For the purpose of filtering, the WS-Notification proposes multiple generic filters, among them **wsn-b:TopicExpression**, **wsn-b:ProducerProperties**, and **wsn-b:MessageContent**. The MIP4-IES uses these generic filters (e.g to filter on Topic) using the mechanism of XML Extension of these elements. It also needs specific filtering.

This is achieved by adding a **mip4-f:MIP4Filter** element as a direct child of the **wsn-b:Filter/wsn-b:MessageContent**.

These structures are defined in Filter.xsd [ART-EM-03]

## 9.2 Raw Notification

The subscriber SHALL NOT send a Subscribe request message which requires Raw Notifications.

Nevertheless, a Producer SHALL anticipate receiving this kind of request, and MAY either accept it or trigger a fault in accordance to the *WS-BaseNotification standard* [REF-EM-02]

## 9.3 Operations across notifications

WSMP allows a producer to send Create, Update and Delete operations through notifications, using *wsmp:WSMPMsg*.

In the MIP4-IES context, a Consumer shall support all of the three operations.

In the case of the reception of a Create or an Update, it is up to the Consumer to determine which behavior is to be adopted, depending on its own internal state.

When sending a notification, it is up to the Producer to determine whether the operation is a Creation or an Update.

In a Delete Operation the Provider provides a Context instance with the ContextIdentifier and the ID of the contained data uniquely identifying the Information to be deleted. All other properties, such as the type of the data or its properties shall be ignored by the consumer.

When a Provider locally removes an Identifiable from a Topic, then it will notify the removed Identifiable to all of the served Subscribers of that Topic via a WSMP-Delete operation.

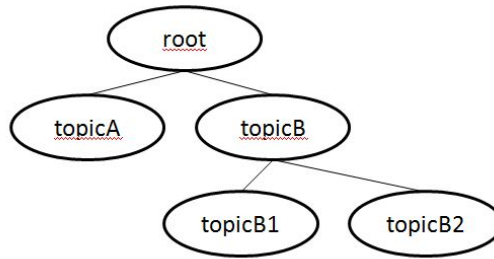
## 9.4 Topic expression usage in notifications

The *WS-BaseNotification* [REF-EM-02] specification defines metadata for the notification message, among which there is a *wsn-b:Topic* (of type *wsn-b:TopicExpressionType*). This element is supposed to describe “exactly one Topic, which MUST be the Topic that is associated with the Notification. This element describes the Topic that matched to a subscription, causing the NotificationProducer to send the Notify message to the NotificationConsumer” [REF-EM-02].

In order to avoid ambiguity when using complex Topic Sets, the MIP4-IES expects a Producer to fill this *wsn-b:Topic* more strictly. The *wsn-b:Topic* must describe only one Topic, which MUST be the lowest in the Topic hierarchy that is associated with the Notification.

Example:

The image below represents a Topic Set, modelled as a tree. “Root” encompasses “topicA” and “topicB”; “topicB” encompasses “topicB1” and “topicB2”.



In the case a BSO is updated in “topicB1”, the wsn-b:Topic element must then be filled with a wsn-b:TopicExpression that defines the topic “topicB1” (and not “topicB” nor “root”). If this BSO is updated in “topicB”, then the wsn-b:Topic must define “topicB” and not “root”.

## 9.5 Avoiding ghost subscriptions

In the case of an unexpected event (for example, a network disconnection or a system crash), it may happen that a subscription is no longer valid, but the Producer or Subscriber may not be aware of this fact. In order to prevent this use case, MIP4-IES provides here some guidances for the implementer.

## 9.6 Process wsn-b:TerminationTime

As already stated in the WS-Notification standard: the Subscriber SHALL examine the content of the subscribe response. If the wsn-b:TerminationTime element is present, then it SHALL be taken into account.

At the end of the subscription lease, the Subscriber MAY renew the subscription in order to continue receiving notifications.

## 9.7 Check subscription status

A Subscriber SHOULD regularly check the status of his subscriptions, in order to detect which have been dropped (for any reasons).

This can be achieved using the wsn-b:Renew operation. If the operation succeeds, then the subscription is valid and renewed. If the operation fails, an exception is raised and the Subscriber is now aware of the *dropped* status of the subscription. The Subscriber should then subscribe again to the Producer.

## 9.8 Detect failures

When a Producer detects a failure while sending a notification (for example, a network error that raises an exception), then it SHOULD drop the corresponding subscription (after any number of retries, as preferred by the Producer implementation).