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OGC Publish-Subscribe White Paper

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Table of Contents

i. Abstract

<Insert Abstract Text here>

ii. Keywords

The following are keywords to be used by search engines and document catalogues.

ogcdoc, OGC document, <tags separated by commas>

iii. Preface

NOTE

Insert Preface Text here. Give OGC specific commentary: describe the technical content, reason for document, history of the document and precursors, and plans for future work. > Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. The Open Geospatial Consortium shall not be held responsible for identifying any or all such patent rights.

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iv. Submitting organizations

The following organizations submitted this Document to the Open Geospatial Consortium (OGC):

Organization name(s)

v. Submitters

All questions regarding this submission should be directed to the editor or the submitters:

Name Affiliation

Chapter 1. Overview

Chapter 2. Asynchonous Operations

An asynchronous operation is any interaction between two software entities where the conclusing action does not immediately follow the initiating action. There are a number of different models for Asynchronous Operations. This section attempts to describe someof the more common ones. An understanding of the scope of this space will help discuss and compare the alternatives OGC faces in asynchonous services.

Asynchronous operatations have three variables:

1. The overall pattern of behavior
2. How the two entities rendezvous
3. The criteria for selecting response messages

2.1. Behavior Models

2.1.1. Request-Response

Request-Response is a synchronous behavior model. A request is issued by one entity and a response is provided in return. Asynchonous behaviors can best be understood in contrast to this model.

2.1.2. Delayed Response

This model differs from Reqest-Response in that the immediate response is not the final response. Rather it acknowedges successful receipt of the request. The final response is to be delivered latter.

2.1.3. Standing Request

A Standing Request is a variation of the Delayed Response pattern. While a Delayed Response performs a single operation, a Standing Request is active until instructed to stop.

2.1.4. Synchronization

The Synchronization pattern supports a scenario where communication between the message producer and consumer is intermittent. When communication is possible, they perform whatever transactions are needed to synchronize their states, then establish a checkpoint for that state. Both parties can then continue to operate independently until the next synchronization opportunity arrives.

2.1.5. Publish-Subscribe

The Publish-Subscribe model completely separates message producers and consumers. Potential consumers of messages create filtering criteria which describe the types of messages they wish to receive. They then "subscribe" to a Pub-Sub service with this filtering criteria. Producers of messages "publish" those messages to the Pub-Sub service along with a set of tags which describe each message. The Pub-Sub service evaluates the tags against the filtering criteria of all subscribers.

The message is forwarded to all subscribers who's criteria are met.

The "publish" operation follows the Request-Response pattern. The "subscribe" operation follows the Standing Request pattern.

2.1.6. Broadcast

Broadcast is the simplest asynchronous pattern. The message producer simply sends the message to everyone. It is left up to the recipients to decide what to do with it.

2.2. Notification and Alert

An inherent property of Asynchronus operations is that there is no persistent connection between the message producer and message receiver. Therefore, there must be a way for the message producer to re-establish a connection with the receiver in order to complete the transaction. There are a number of ways this is done.

2.2.1. Callback

Callbacks can be viewed as mini-services who's sole purpose is to receive an asychronous response. Information on how to access the callback is provided with the initial request. Message producers (or their agents) use this information deliver responses, typically using the Request-Response pattern.

2.2.2. Polling

In polling the requesting entity checks on the status of their request on a recurring basis. Upon completion of the request, the requestor retrieves the result to complete the transaction.

2.2.3. Stored response queue

A stored response queue is a service which holds responses to asynchoronous requests. The message producer simply leaves the response in the queue, and it's up to the requestor to retrieve it.

2.2.4. Man in the Loop

If all else fails, let the human do it. Many alternatives are available including instand messaging, e-mail, phone calls, even the Postal Service.

2.3. Filtering

Filtering allows a message producer to identify the intended recipients of a message.

2.3.1. Event (RSS, SNMP)

Event filtering specifies that a notification will be sent if certain conditions occure. For example, if the free space in a mail box drops below 10%.

2.3.2. Tags (JMS)

Publish-Subscribe implementations typically define a set of topics (terms) which can be used to select messages for delivery. In the most basic case a recipient can only subscribe to topics. More capable systems may provide a simple query language to go with the topic vocabulary,

2.3.3. Query expression (Standing Query)

More capable systems support a full query language for filtering messages. For example, an asynchronous WFS would accept asynchronous requests using the same Filter Encoding language as any other WFS. But the results would be returned asynchronously.

2.3.4. Check Point

A check point is a store snapshot of the state of the system as a specific date and time. All changes made after a check point are can

Chapter 3. OGC’s PubSub implementation Standard

Description of the standard and recommendations for OGC PubSub

Chapter 4. PubSub in OGC SensorThings

Description of the standard and recommendations for OGC PubSub.

Presentation from Stuttgart would be good to draw from.

Chapter 5. W3C Pub Sub Recommendation

Description of the standard and recommendationsfor OGC PubSub.

Presentation from Stuttgart would be good to draw from.

Chapter 6. Asynchronous Messaging for Aviation from OGC testing

Asynchronous Messaging for Aviation from OGC testing

Chapter 7. WMO OpenWIS use of AMQP

Description of the standard and recommendations for OGC PubSub

Chapter 8. AsyncAPI description

Description of the AsyncAPI spec in general.

The role of AsyncAPI is to provide a language for designing the API.

Chapter 9. Ideas for AsyncAPI in OGC

Application of Async in the context of OGC API work

Chapter 10. Ideas for an OGC Abstract Spec for PubSub

Concepts to be included in an OGC AS for PubSub - draw from the previous sections

Annex A: Title

NOTE	Place other Annex material in sequential annexes beginning with "A" and leave final two annexes for the Revision History and Bibliography <<<

Annex B: Revision History

Date	Release	Editor	Primary clauses modified	Description
2016-04-28	0.1	G. Editor	all	initial version

Annex C: Bibliography

NOTE

Example Bibliography (Delete this note).

The TC has approved Springer LNCS as the official document citation type.

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[1] OGC: OGC Testbed 12 Annex B: Architecture. (2015).