Call for Participation: Message Queuing Telemetry Transport (MQTT) TC

Submitted by censign on Mon, 2013-02-04 15:39

Type:
Call for Participation

A new OASIS technical committee is being formed. The Message Queuing Telemetry Transport (MQTT) Technical Committee has been proposed by the members of OASIS listed in the charter below. The TC name, statement of purpose, scope, list of deliverables, audience, IPR mode and language specified in the proposal will constitute the TC's official charter. Submissions of technology for consideration by the TC, and the beginning of technical discussions, may occur no sooner than the TC's first meeting.

The eligibility requirements for becoming a participant in the TC at the first meeting are:

(a) you must be an employee or designee of an OASIS member organization or an individual member of OASIS, and?

(b) you must join the Technical Committee, which members may do by using the Roster "join group: link on the TC's web page at [a].

To be considered a voting member at the first meeting:

(a) you must join the Technical Committee at least 7 days prior to the first meeting (on or before 18 March 2013); and?

(b) you must attend the first meeting of the TC, at the time and date fixed below (25 March 2013).

Participants also may join the TC at a later time. OASIS and the TC welcomes all interested parties.

Non-OASIS members who wish to participate may contact us about joining OASIS [b]. In addition, the public may access the information resources maintained for each TC: a mail list archive, document repository and public comments facility, which will be linked from the TC's public home page at [c].

Please feel free to forward this announcement to any other appropriate lists. OASIS is an open standards organization; we encourage your participation.

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[b] See http://www.oasis-open.org/join/?
--- CALL FOR PARTICIPATION?

The charter for this TC is as follows.

(1)(a) Name of Technical Committee:

OASIS Message Queuing Telemetry Transport (MQTT) Technical Committee

(1)(b) Statement of purpose.

The purpose of the Message Queuing Telemetry Transport (MQTT) Technical Committee is to define an open publish/subscribe protocol for telemetry messaging designed to be open, simple, lightweight, and suited for use in constrained networks and multi-platform environments. The TC will accomplish this purpose through the refinement of an input specification.

> Background and Opportunity:

Many industries are seeing rapid demand for products and solutions which map physical world events into digital events for enterprise and Web applications, bringing an inherent need to integrate sensors, actuators and other types of devices with a wide range of application middleware and Web programming models. These applications need to connect and communicate with devices ranging from simple sensors, actuators and complex embedded edge-of-network controllers, to mobile devices, often over wireless networks.

> Needs and Requirements

A simple, predictable, and easy to implement message protocol is needed for connecting embedded and mobile devices such as, physical sensors, controllers, and smart phones with servers used in Web, enterprise, and other applications where a lightweight messaging protocol is desired. The protocol must be able to cope with runtime platform constraints, network constraints and various combinations of both. It must support implementations that run on embedded devices with limited power, processor or memory resources, connecting to a range of web services and enterprise middleware in constrained environments where networks may have any combination of low bandwidth, intermittent connectivity, unpredictable reliability, or high data cost.

Experience with physical world messages and events across many industry domains, has identified key requirements for such a message protocol:

- Bi-directional messaging to uniformly handle both signals and commands.

- Determinable delivery of messages to and from sensors and actuators, and other resource constrained devices connected over intermittent, limited bandwidth networks. Basic Quality of Service (QoS) levels are needed to reflect tradeoffs between bandwidth, availability, and delivery guarantees. Always-connected and sometimes-connected models both need to be supported. A message subscriber must be able to set up a quality of service needed that reflects the constraints and characteristics of message source?s network connection.

- Connectivity Awareness. To support intermittently-connected networks and devices, the publish-subscribe infrastructure needs to provide message subscribers, if necessary, a means to determine the likely connected, disconnected or error state of the end devices in the network.

- Loose coupling to support dynamic system environments where high volumes of physical world messages and
events need to be made available to enterprise servers and other consumers in ways that may not have been originally anticipated. Time, space and synchronization decoupling are needed.

- Constrained operations: Instrumentation of the physical world must be supported in a proliferation of platforms, technologies and networks that are driven by very diverse equations of cost, technology and physical constraints.

- Scalability suitable to supporting environments where large numbers of devices need to be connected to a server infrastructure.

> Value of Standardization:

Although connectivity solutions currently exist to integrate these types of systems, the lack of a standardized messaging protocol designed explicitly to address the needs and requirements listed above has become an inhibitor in growing markets. Standardization of an open protocol that addresses the technical and market requirements can overcome these inhibitors through:

- Choices. With a standard protocol, initial choices in devices, networks and suppliers will not limit choices and adaptability in the future. A standard protocol that supports current and future device payload formats will support deployment, connectivity, and reconfiguration over a wide range of network and server characteristics.

- Flexible Integration. Even if highly effective, decoupling techniques between internal device infrastructure and external systems will not see widespread adoption without standardization. With devices and device controllers utilizing a standardized message protocol, a basic publish-subscribe model can support integration with a wide range of established messaging and event processing systems, allowing subscribers to effectively decouple from device and network APIs.

- Time to Market. Porting and supporting multiple protocols on multiple platforms tends to inhibit adoption in control and instrumentation systems, which are built using many variations of hardware and software platforms, device types, and networks. Providing an open protocol that scales well from critical embedded systems up to high volume enterprise transaction processing, and one that is data, platform and language independent, will shorten time to market and support new levels of integration.

- Skills. A standard based on protocol and programming models familiar to both embedded and IT programming communities will accelerate markets by building on skilled resources that already understand these types of solutions.

(1)(c) Scope of Work of the TC:

The TC will accept, as its input document, Version 3.1 of the MQTT specification as published by Eurotech and IBM, and publically available under royalty free terms at [http://mqtt.org/documentation](http://mqtt.org/documentation) [3]. The TC will also accept as input a list of issues and recommended changes from the TC Members. Changes to the input document, other than editorial changes and other points of clarification, will be limited to the Connect command, and should be backward compatible with implementations of previous versions of the specification such that a client coded to speak an older version of the protocol will be able to connect to, and successfully use, a server that implements a newer version of the protocol. Mobile and other field equipment is often expensive or otherwise impractical to upgrade immediately in response to server and other IT version changes. A goal of the TC is to minimize disruption to existing implementations, making it straightforward to support both the Version 3.1 of the MQTT specification and the OASIS standard.

Changes to the input document or other contributions will be accepted for consideration without any prejudice
or restrictions and evaluated based on technical merit in so far as they conform to this charter.

The scope of the TC’s first set of deliverables includes further refinement of the input document, addressing specification issues raised by authoring companies, incorporating appropriate additional contributions to the TC, and addressing issues raised in the TC itself.

In Scope

The scope of the TC’s work is to refine and finalize the input MQTT specification document, and to address specification issues raised in the TC in order to produce a standard version of the specification covering the following concepts and capabilities:

a - Use of a publish-subscribe message pattern to provide one-to-many message distribution and decoupling of applications

b - A messaging transport that is agnostic to the content of the payload

c - Use of TCP/IP to provide basic network connectivity

d - QoS specifications for message delivery:
  > At Most Once: where messages are delivered according to the best efforts of the underlying TCP/IP network. Message loss can occur here. This level could be used, for example, with ambient sensor data where it does not matter if an individual reading is lost as the next one will be published soon after.
  > At Least Once: where messages are assured to arrive but duplicates may occur.
  > Exactly Once: where messages are assured to arrive exactly once. This level could be used, for example, in control systems where duplicate triggers or lost messages could lead to incorrect commands being sent, or invalid business logic being triggered.

e - Maintaining a very low transport overhead (fixed-length header of 2 bytes), and minimizing protocol exchanges to reduce network traffic.

f - A mechanism to notify interested parties to an abnormal disconnection of a client using a keep-alive message and a last-will-and-testament mechanism.

This TC may produce the following non-normative Committee Notes for the MQTT specification:

a - A requirements and recommendations document for enhancements which break backward compatibility or are otherwise deemed out of scope. These will be collected for consideration in a future major revision or re-charter of the TC.

b - A requirements and recommendations document for enhancements or issues deemed within in scope but which cannot otherwise be contained in the first version of the standard. These will be collected for consideration in a future major or minor revision of the standardized specification.

c - A primer or white paper describing usage examples, scenarios and/or best practices, including examples of integration with message servers.

d - A primer or white paper describing examples and usage of MQTT topics with commonly available registry and discovery mechanisms.

e - Test scenario descriptions.
Out of Scope

A non-exhaustive list is provided below for the sake of clarity. If some function, mechanism or feature is not mentioned here as Out of Scope, and it is not listed as In Scope in the Scope of Work section, then it will also be considered as Out of Scope.

* The TC will not specify mappings of MQTT functions described in the specifications, to any programming language or particular messaging middleware.
* The TC will not produce reference implementations of the protocol
* Except for the values and fields directly related to the MQTT protocol, the TC will not prescribe the payload format of messages that are published according to the specifications.
* The TC will not identify MQTT topics nor prescribe any mechanism or convention for classification of MQTT topics or topic spaces.
* Transport level security will be assumed and no security features will be added.

Maintenance

Once the TC has completed work on the deliverable and it has become an OASIS Standard, the TC will enter "maintenance mode" for the deliverable.

The purpose of maintenance mode is to provide minor revisions to previously adopted deliverables to clarify ambiguities, inconsistencies and obvious errors. The maintenance mode will not functionally enhance a previously adopted deliverable or extend its functionality.

The TC will collect issues raised against the deliverables and periodically process those issues. Issues that request or require new or enhanced functionality shall be marked as enhancement requests and set aside. Issues that result in the clarification or non-substantive correction of the deliverables shall be processed. The TC shall maintain a list of these adopted clarifications and may periodically create a new minor revision of the deliverables including these updates.

(1)(d) Deliverables

The TC shall produce the OASIS standard version of the MQTT protocol specification which will be targeted for completion within 12 months of the TC's first meeting. Follow-on versions of the standard to address additional in scope capabilities may be developed by the TC on a schedule to be defined by the TC.

(1)(e) IPR Mode

The TC shall operate under Non Assertion Terms.

(1)(f) Anticipated Audience

- Developers of products and solutions in constrained environments for which the MQTT specification is designed, such as devices, edge-of-network servers/controllers, monitoring servers, embedded and control systems, embedded platforms, mobile and web applications, middleware and enterprise applications as well as network providers.

- System integrators at multiple levels will apply this specification, including integration with products and solutions from various wireless network providers and middleware suppliers.

- Cellular providers and other communications companies participating in M2M based service offerings will
apply this specification for service level offerings.

(1)(g) Language

The TC will use English as the language for conducting its operations.

(2) Non-normative information regarding the startup of the TC:

(2)(a) Identification of similar or applicable work that is being done in other OASIS TCs or by other organizations:

The CoAP work at IETF includes shares some protocol characteristics in common with MQTT that should be complementary in sensor network configurations.

The Eclipse M2M Industry Working Group supports open source implementations of this protocol and may be interested in supporting standardized versions.

The OASIS AMQP Technical Committee has released a specification that provides for transaction and publish & subscribe messaging between autonomous businesses, departments and applications using an open protocol for enterprise middleware. This MQTT TC complements the AMQP TC by providing a means by which sensors, control systems, embedded systems and mobile devices can publish and subscribe low-level, technically-orientated data. There is natural affinity to bridge MQTT with AMQP, so as to connect telemetry with enterprise applications.

(2)(b) Date, Time and Location of First Meeting

The first meeting will be held in person on Monday, 25 March 2013, at 9:00 AM Eastern Standard Time. It will be hosted by IBM at a location in Boston. Conference calling facilities will be provided for those who cannot attend in person.

The details of the first TC meeting will be determined and confirmed prior the close of the member review period.

(2)(c) Ongoing Meeting Plans and Sponsors

The MQTT TC will meet by telephone every other week at a time to be determined. The time, date and recurrence of the periodic phone call will be confirmed at the MQTT TC will also hold face-to-face meetings periodically. The date, time and place of the face-to-face meetings will be determined by the MQTT TC.

(2)(d) Names, electronic mail addresses, and membership affiliations of at least Minimum Membership who support this proposal and are committed to the Charter and projected meeting schedule:
(2)(e) For each OASIS Organizational Member listed in (2)(d), the name, electronic mail address, membership affiliation, and statement of support for the proposed Charter from the Primary Representative:

Marco Carrer, marco.carrer@eurotech.com  
Eurotech  
As Eurotech's primary OASIS rep, I approve the MQTT TC Charter, and endorse our proposers (listed above) as named co-proposers.

Dave Ings, ings@ca.ibm.com  
IBM  
As IBM's primary OASIS rep, I approve the MQTT TC Charter, and endorse our proposers (listed above) as named co-proposers.

Prasad Yendluri, Prasad.Yendluri@softwareag.com  
Software AG  
As Software AG's primary OASIS rep, I approve the MQTT TC Charter, and endorse our proposers (listed above) as named co-proposers.

Paul Fremantle, paul@wso2.com  
WSO2  
As WSO2's primary OASIS rep, I approve the MQTT TC Charter, and endorse our proposers (listed above) as named co-proposers.

(2)(f) Convener  
Scott de Deugd, IBM

(2)(h) Contributions of existing technical work:

The Version 3.1 of the MQTT Specification will be used as an input document by the TC, and can be found at


Associated TC:  
Message Queuing Telemetry Transport (MQTT)

Deadline:  
Mon, 2013-02-04

Links: