

Network Working Group	A. Morton	
Internet-Draft	AT&T Labs	
Intended status: Standards Track	July 07, 2008	
Expires: January 8, 2009		

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## **Independent Session Control Feature for TWAMP draft-morton-ippm-twamp-session-cntrl-00**

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### **Abstract**

The IETF is completing its work on TWAMP - the Two-Way Active Measurement Protocol. This memo describes a proposed feature for TWAMP, intended for discussion in the IP Performance Metrics WG. The feature gives the sender the ability to start and stop one or more test sessions using the Session Identifiers.

### **Requirements Language**

The key words "MUST", "MUST NOT", "REQUIRED", "SHALL", "SHALL NOT", "SHOULD", "SHOULD NOT", "RECOMMENDED", "MAY", and "OPTIONAL" in this document are to be interpreted as described in [RFC 2119 \(Bradner, S., "Key words for use in RFCs to Indicate Requirement Levels," March 1997.\)](#) [RFC2119].

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## 1. Introduction

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The IETF is completing its work on TWAMP - the Two-Way Active Measurement Protocol [[I-D.ietf-ippm-twamp](#)] ([Babiarz, J., "A Two-way Active Measurement Protocol \(TWAMP\)," August 2008.](#)), which is an extension to the One-way Active Measurement Protocol, OWAMP [[RFC4656](#)] ([Shalunov, S., Teitelbaum, B., Karp, A., Boote, J., and M. Zekauskas, "A One-way Active Measurement Protocol \(OWAMP\)," September 2006.](#)). This memo describes a new proposed feature for TWAMP, so it can be discussed and interest to take-up the feature assessed. TWAMP (and OWAMP) start all previously requested and accepted test sessions at once. This feature allows the Control-Client to control the test sessions on the basis of their Session Identifier (SID). The feature permits a short duration TWAMP test to start (and stop) during a longer test. For example, this feature permits a specific diagnostic test to begin if intermediate results indicate that the test is warranted. This feature requires a Mode bit position assignment and the assignment of two new TWAMP command numbers (for the augmented Start and Stop commands).

The relationship between this memo and TWAMP is intended to be an update to the TWAMP RFC when published.

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## 2. Purpose and Scope

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The purpose of this memo is to describe an additional function and feature for TWAMP [\[I-D.ietf-ippm-twamp\] \(Babiarz, J., "A Two-way Active Measurement Protocol \(TWAMP\)," August 2008.\)](#). The feature needs a clear description so it can be discussed and (hopefully) adopted in the IP Performance Metrics Charter.

The scope of the memo is currently limited to specifications of the following features:

1. Extension of the modes of operation through assignment of a new value in the Mode field to communicate feature capability and use, the definition of augmented Start Session and Stop Session commands, and the definition of related procedures for TWAMP entities. The motivation for this added feature is the ability to start and stop individual test sessions at will, using a single TWAMP-control connection.

When new features are discussed and reach consensus, they may become chartered work items in IETF IPPM (and may appear in a different memo).

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## 3. TWAMP Control Extensions

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TWAMP-Control protocol is a derivative of the OWAMP-Control protocol, and provides two-way measurement capability. TWAMP [\[I-D.ietf-ippm-twamp\] \(Babiarz, J., "A Two-way Active Measurement Protocol \(TWAMP\)," August 2008.\)](#) uses the Mode field to identify and select specific communication capabilities, and this field is a recognized extension mechanism. The following sections describe one such extension.

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### 3.1. Connection Setup with Individual Session Control

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TWAMP connection establishment follows the procedure defined in section 3.1 of [\[RFC4656\] \(Shalunov, S., Teitelbaum, B., Karp, A., Boote, J., and M. Zekauskas, "A One-way Active Measurement Protocol \(OWAMP\)," September 2006.\)](#). The Individual Session Control mode requires one new bit position (and value) to identify the ability of the Server/Session-

Reflector to start and stop specific sessions (according to their Session Identifier, or SID). This new feature requires an additional TWAMP mode bit assignment as follows:

Value	Description	Reference/Explanation
0	Reserved	
1	Unauthenticated	RFC4656, Section 3.1
2	Authenticated	RFC4656, Section 3.1
4	Encrypted	RFC4656, Section 3.1
8	Unauth. TEST protocol, Auth. CONTROL	draft-...-more-twamp (3)
16	Unauth. TEST protocol, Encrypted CONTROL	draft-...-more-twamp (4)
32	Auth. TEST protocol, Encrypted CONTROL	draft-...-more-twamp (5)
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zzz	Individual Session Control	this memo, bit position (Z)

In the original OWAMP mode field, setting bit positions 0, 1 or 2 indicated the security mode of the Control protocol, and the Test protocol inherited the same mode (see section 4 of [\[RFC4656\] \(Shalunov, S., Teitelbaum, B., Karp, A., Boote, J., and M. Zekauskas, "A One-way Active Measurement Protocol \(OWAMP\)," September 2006.\)](#)). In the [\[I-D.morton-ippm-more-twamp\] \(Morton, A. and K. Hedayat, "More Features for TWAMP," July 2008.\)](#) proposal, bit positions (3, 4 or 5) discontinue the inheritance of the security mode in the Test protocol. The Server sets the new bit position (possibly bit 8) in the Server Greeting message to indicate its capabilities and willingness to control sessions on an individual basis if desired. If the Control-Client intends to control sessions on an individual basis, it MUST set the mode bit corresponding to that mode in the Setup Response message.

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### 3.2. Start-Sessions Command with Session Control

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Having requested one or more test sessions and received affirmative Accept-Session responses, an OWAMP client MAY start the execution of the requested test sessions by sending a Start-Sessions message to the server.

The format of this message is as follows:



Thus, the Server SHALL suspend monitoring control connection activity after receiving any Start-Sessions command, and SHALL resume after receiving a Stop-Sessions command for all corresponding SIDs (and no test sessions are in-progress).

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### 3.5. Additional considerations

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The value of the Modes field sent by the Server (in the Server Greeting message) is the bit-wise OR of the mode values that it is willing to support during this session.

If this feature is adopted, the last seven bits of the Modes 32-bit field are used. The first 25 bits MUST be zero. A client conforming to this version of the specification MUST ignore the values in the first 25 bits of the Modes value. (This way, the bits are available for future protocol extensions.)

Other ways in which TWAMP extends OWAMP are described in

[\[I-D.ietf-ippm-twamp\]](#) (Babiarz, J., "A Two-way Active Measurement Protocol (TWAMP)," August 2008.).

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## 4. TWAMP Test with Individual Session Control

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The TWAMP test protocol is similar to the OWAMP [\[RFC4656\]](#) (Shalunov, S., Teitelbaum, B., Karp, A., Boote, J., and M. Zekauskas, "A One-way Active Measurement Protocol (OWAMP)," September 2006.) test protocol with the exception that the Session-Reflector transmits test packets to the Session-Sender in response to each test packet it receives. TWAMP [\[I-D.ietf-ippm-twamp\]](#) (Babiarz, J., "A Two-way Active Measurement Protocol (TWAMP)," August 2008.) defines two different test packet formats, one for packets transmitted by the Session-Sender and one for packets transmitted by the Session-Reflector. As with OWAMP-Test protocol there are three security modes: unauthenticated, authenticated, and encrypted. Unauthenticated mode has one test packet format, while authenticated and encrypted modes use another (common) format.

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### 4.1. Sender Behavior

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The individual session control feature requires that the sender MUST manage test sessions according to their SID. Otherwise, the sender behavior is as describe in section 4.1 of [\[I-D.ietf-ippm-twamp\]](#) (Babiarz, J., "A Two-way Active Measurement Protocol (TWAMP)," August 2008.).

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## 4.2. Reflector Behavior

The TWAMP Reflector follows the procedures and guidelines in section 4.2 of [\[I-D.ietf-ippm-twamp\] \(Babiarz, J., "A Two-way Active Measurement Protocol \(TWAMP\)," August 2008.\)](#), with the following additional functions required by this feature:

- \*The session reflector MUST manage test sessions according to their SID.
- \*Packets for a specific session/SID not received within the Timeout (following the Stop-Session command) MUST be ignored by the Reflector. The Session-Reflector MUST NOT generate a test packet to the Session-Sender for packets that are ignored.
- \*If the optional REFWAIT timer is implemented, it SHOULD be enforced when any test session is in-progress (started and not stopped).

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## 5. Security Considerations

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These extended modes of operation permit stronger integrity protection on the TWAMP-Control protocol while simultaneously emphasizing accuracy or efficiency on the TWAMP-Test protocol, thus enhancing overall security when compared to the previous options.

The security considerations that apply to any active measurement of live networks are relevant here as well. See the security considerations in [\[RFC4656\] \(Shalunov, S., Teitelbaum, B., Karp, A., Boote, J., and M. Zekauskas, "A One-way Active Measurement Protocol \(OWAMP\)," September 2006.\)](#) and [\[I-D.ietf-ippm-twamp\] \(Babiarz, J., "A Two-way Active Measurement Protocol \(TWAMP\)," August 2008.\)](#).

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## 6. IANA Considerations

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This memo requests assignment of one mode bit position/value to the IANA registry for the TWAMP Mode field, and describes behavior when the new mode is used. This field is a recognized extension mechanism for TWAMP.

This memo also requests assignment of two command numbers in the TWAMP-Control Command Number registry, and describes the use of the new commands. The command number field is a recognized extension mechanism for TWAMP.



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## 6.1. Registry Specification

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IANA has created a TWAMP-Modes registry (as requested in [\[I-D.morton-ippm-more-twamp\]](#) (Morton, A. and K. Hedayat, "More Features for TWAMP," July 2008.)). TWAMP-Modes are specified in TWAMP Server Greeting messages and Set-up Response messages, as described in section 3.1 of [\[I-D.ietf-ippm-twamp\]](#) (Babiarz, J., "A Two-way Active Measurement Protocol (TWAMP)," August 2008.), consistent with section 3.1 of [\[RFC4656\]](#) (Shalunov, S., Teitelbaum, B., Karp, A., Boote, J., and M. Zekauskas, "A One-way Active Measurement Protocol (OWAMP)," September 2006.), and extended by this memo. Modes are indicated by setting bits in the 32-bit Modes field. Thus, this registry can contain a total of 32 possible values.

IANA has also created a TWAMP-Control Command Number registry. TWAMP-Control commands are specified by the first octet in TWAMP-Control messages as specified in section 3.5 of [\[I-D.ietf-ippm-twamp\]](#) (Babiarz, J., "A Two-way Active Measurement Protocol (TWAMP)," August 2008.), and augmented by this memo. This registry may contain sixteen possible values.

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## 6.2. Registry Management

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Because the TWAMP-Control Command Number registry can contain only sixteen values, TWAMP-Modes can only contain thirty-two values, and because TWAMP is an IETF protocol, these registries must be updated only by "IETF Consensus" as specified in [\[RFC2434\]](#) (Narten, T. and H. Alvestrand, "Guidelines for Writing an IANA Considerations Section in RFCs," October 1998.) (an RFC documenting registry use that is approved by the IESG). Management of these registries is described in section 8.2 of [\[I-D.ietf-ippm-twamp\]](#) (Babiarz, J., "A Two-way Active Measurement Protocol (TWAMP)," August 2008.) and [\[I-D.morton-ippm-more-twamp\]](#) (Morton, A. and K. Hedayat, "More Features for TWAMP," July 2008.).

This memo proposes assignment of values 7 and 8.

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## 6.3. Experimental Numbers

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One experimental value has been assigned in the TWAMP-Control Command Number registry.

No additional experimental values are assigned in the TWAMP-Modes registry.

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## 6.4. Registry Contents

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### TWAMP-Control Command Number Registry

Value	Description	Semantics Definition
0	Reserved	
1	Forbidden	
2	Start-Sessions	RFC4656, Section 3.7
3	Stop-Sessions	RFC4656, Section 3.8
4	Reserved	
5	Request-TW-Session	draft-ietf-ippm-twamp, Section 3.5
6	Experimentation	draft-ietf-ippm-twamp, Section 8.3
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7	Start-Sessions with Individ. Session Cntrl.	this memo, Section 3.2
8	Stop-Sessions with Individ. Session Cntrl.	this memo, Section 3.3

### TWAMP-Modes Registry

Value	Description	Reference/Explanation
0	Reserved	
1	Unauthenticated	RFC4656, Section 3.1
2	Authenticated	RFC4656, Section 3.1
4	Encrypted	RFC4656, Section 3.1
8	Unauth. TEST protocol, Auth. CONTROL	draft-...-more-twamp (3)
16	Unauth. TEST protocol, Encrypted CONTROL	draft-...-more-twamp (4)
32	Auth. TEST protocol, Encrypted CONTROL	draft-...-more-twamp (5)
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zzz	Individual Session Control	this memo, Section 3.1 bit position (Z)

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## 7. Acknowledgements

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The author would like to thank Murtaza Chiba for suggesting this feature.

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## 8. References

### 8.1. Normative References

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[I-D.ietf-ippm-twamp]	Babiarz, J., " <a href="#">A Two-way Active Measurement Protocol (TWAMP)</a> ," draft-ietf-ippm-twamp-09 (work in progress), August 2008 ( <a href="#">TXT</a> ).
[I-D.morton-ippm-more-twamp]	Morton, A. and K. Hedayat, " <a href="#">More Features for TWAMP</a> ," draft-morton-ippm-more-twamp-02 (work in progress), July 2008 ( <a href="#">TXT</a> ).
[RFC2119]	Bradner, S., " <a href="#">Key words for use in RFCs to Indicate Requirement Levels</a> ," BCP 14, RFC 2119, March 1997 ( <a href="#">TXT</a> , <a href="#">HTML</a> , <a href="#">XML</a> ).
[RFC2434]	Narten, T. and H. Alvestrand, " <a href="#">Guidelines for Writing an IANA Considerations Section in RFCs</a> ," BCP 26, RFC 2434, October 1998 ( <a href="#">TXT</a> , <a href="#">HTML</a> , <a href="#">XML</a> ).
[RFC4656]	Shalunov, S., Teitelbaum, B., Karp, A., Boote, J., and M. Zekauskas, " <a href="#">A One-way Active Measurement Protocol (OWAMP)</a> ," RFC 4656, September 2006 ( <a href="#">TXT</a> ).

### 8.2. Informative References

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