Change Document for SyncML Representation Protocol

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1 Formatting Conventions

The key words "MUST", "MUST NOT", "REQUIRED", "SHALL", "SHALL NOT", "SHOULD", "SHOULD NOT", "RECOMMENDED", "NOT RECOMMENDED", "MAY" and "OPTIONAL" in this document are to be interpreted as described in [RFC 2119].

1.1 Errata Type Classifications

The errata types are classified according to the following scheme:

CLARIFICATION: Textual enhancement that provides a clearer explanation of a specification item without changing any behavior.

CORRECTION: A modification that obsoletes some items in the current published specification.

PROBLEM: A known problem for which an erratum has yet to be proposed.

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2 Errata

2.1 MsgRef in Status

2.1.1 Problem

On page 50 in chapter 5.4.1. the spec is talking about the case that MsgRef is not present in Status. According to the DTD, MsgRef is a MUST in Status.

2.1.2 Solution

Delete the following sentence on page 50 :

"If the MsgRef is not present in a Status element type, then the MsgRef value of "1" MUST be assumed."

2.1.3 Other specifications/erratas affected

None.

2.2 Sync Command

2.2.1 Problem

The Sync Command documentation has the following sentence: "One or more Add, Replace, Delete, Copy, Atomic, or Sequence element types MUST be specified." This is different from the DTD, which indicates ZERO or more.

2.2.2 Solution

In Section 5.5.15, change the above sentence to read: "Zero or more Add, Replace, Delete, Copy, Atomic, or Sequence element types MUST be specified."

2.2.3 Other specifications/erratas affected

None.

2.3 Status for Results

2.3.1 Problem

The Results Command documentation has the following sentence: "Exception conditions are not created for this command and there is no requirement to return any request status." This is different from how version 1.0 implementations were tested. At the Dallas meeting, it was agreed that ALL commands would generate a Status response.

2.3.2 Solution

In Section 5.5.12, remove the above sentence.

2.3.3 Other specifications/erratas affected

None.

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2.4 Archive

2.4.1 Problem

Error response descriptions for Archive are conflicting. It is also unclear why Archive is a MUST for server to receive.

2.4.2 Solution

In section 4.9 Archiving Data, change the last sentence from "In which case, the Archive would generate an error condition (i.e., (406) Optional feature not supported.)." to "In which case, the Archive would generate an error condition (i.e., (210) Delete without Archive.)."

In section 5.1.1 Archive, change the last paragraph from "If the recipient does not support this function then the response status code 501 (Not Implemented) MUST be returned." to "If the recipient does not support this function then the response status code 210 (Delete without Archive) MUST be returned if the delete was successful. See Delete for the other possible error codes."

In section 5.5.5 Delete, change a sentence that reads "If specified, the optional Archive element type indicates that the recipient SHOULD preserve a copy of the data prior to deleting it from the database." to "If specified and supported, the optional Archive element type indicates that the recipient MUST preserve a copy of the data prior to deleting it from the database."

In section 9.1 Common Use Elements, change the SCR to read MAY, MAY, MAY, MAY. Currently Server Receiving is MUST.

2.4.3 Other specifications/erratas affected

None.

2.5 Missing Colon in MD5 String

2.5.1 Problem

In section 4.13 paragraph 4 of the SyncML Representation specification the description of how to create the MD5 digest input string omits the colon separator between the password and the nonce.

2.5.2 Solution

Change the following sentence (Section 4.13, 4th paragraph, 2nd sentence):

“This authentication scheme is a MD5 digest form of the concatenation of the an authentication identifier such as the originator's userid, followed by the COLON (i.e., ":") separator character, followed by some secret known by the originator and recipient such as the originator's password for the corresponding userid, followed by a recipient specified nonce string.”

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To this (even longer) sentence:

“This authentication scheme is a MD5 digest form of the concatenation of the an authentication identifier such as the originator's userid, followed by the COLON (i.e., ":") separator character, followed by some secret known by the originator and recipient such as the originator's password for the corresponding userid, followed by the COLON (i.e., ":") separator character, followed by a recipient specified nonce string.”

2.5.3 Other specifications/erratas affected

None.

2.6 Duplicate Paragraph in NoResp

2.6.1 Problem

In Section 5.2.2, under “Restrictions” there are duplicate paragraphs describing the “NoResp” behavior.

2.6.2 Solution

One of the paragraphs should be eliminated. They are worded slightly different but convey the same meaning. I prefer the first paragraph, after capitalizing the word “NOT” in “MUST NOT”.

2.6.3 Other specifications/erratas affected

None.

2.7 Content Model in Search

2.7.1 Problem

Inconsistencies in the Content Model for the Search element.

2.7.2 Solution

Remove the “?” from element “Meta” in the Content Model of section 5.5.13 “Search”.

Chapter 5.3.3, Meta

Change the text "When specified in the Search, the element type specifies the search grammar to be used" to "When specified in the Search, the element type specifies the Meta information, e.g. the type of search grammar."

2.7.3 Other specifications/erratas affected

None.

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2.8 CmdRef is not optional in Results

2.8.1 Problem

The DTD indicates that the CmdRef is required in “Results”, but the text states that it is optional. Also, in section 5.1.5 “CmdRef” under “Parent Elements”, “Results” is missing from the list.

2.8.2 Solution

Section 5.5.12 “Results”, the 3rd paragraph in the Restrictions section should remove the word optional in the first sentence, and remove the second sentence altogether. Also, add “Results” to the list of parent elements in section 5.1.5.

2.8.3 Other specifications/erratas affected

None.

2.9 NoResults in Get cmd

2.9.1 Problem

In 5.1.14 “NoResults” section “Parent Elements” both Get and Search are listed as parents. However, NoResults is not discussed in the section for Get, nor is it listed in the DTD. I believe that NoResults does not belong in Get.

2.9.2 Solution

Remove the parent element “Get” from the list in 5.1.14.

2.9.3 Other specifications/erratas affected

None.

2.10 Final element example incorrect

2.10.1 Problem

Section 5.1.7 Final example is incorrect.

2.10.2 Solution

Change the first </SyncBody> to <SyncBody>

Change the </Final> to <Final/>

Change the </SyncML to </SyncML>

2.10.3 Other specifications/erratas affected

None.

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2.11 Data parents in Search

2.11.1 Problem

The “Search” command is missing from the “Parent Elements” of “Data” in section 5.3.1.

2.11.2 Solution

Add “Search” to the list of “Parent Elements” in section 5.3.1. And add the following sentence to end of the “Restrictions” section.

“When specified in a Search, the element type specifies the search grammar for the command.”

2.11.3 Other specifications/erratas affected

None.

2.12 Put missing in parents of Meta

2.12.1 Problem

In section 5.3.3, under “Parent Elements” the “Put” command is missing.

2.12.2 Solution

Add “Put” to the list of “Parent Elements” in section 5.3.3.

2.12.3 Other specifications/erratas affected

None.

2.13 Basic authentication

2.13.1 Problem

Currently it is unclear that the Format element must not be specified when using basic authentication scheme. Since the basic authentication scheme is already base64 encoding the username:password combination, having the b64 indicator specified within the Format element would actually define that the base64 encoded credentials are base64 encoded twice (i.e. first the username:password combination is base64 encoded, and then the output is base64 encoded again before inserting the string into the Cred element).

After all, the output from basic authentication is base64 encoded string, while the MD5 credential is a 128-bit binary digest value which is then be base64 encoded before inserting it into the Cred element.

2.13.2 Solution

Change the "Restrictions" paragraph in chapter 5.1.6 (Cred) to:

The Meta element type specifies any meta-information about the credentials. The Type and Format element types within the Meta element type specify the credential scheme type and format, respectively. The default type is syncml:auth-basic for the "Basic" form of authentication. The type value syncml:auth-md5 MUST be explicitly specified to indicate the

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SyncML "MD5 Digest" authentication scheme. The format MUST be b64, when using the clear-text, XML representation. However, when using "Basic" form of authentication, the b64 format does not indicate that the credentials are base64 encoded twice. The Data element type specifies the credential value. The types for these SyncML authentication schemes are specified in Section 4.13, "Security", of this specification.

2.13.3 Other specifications/erratas affected

None.

2.14 Status on Delete

2.14.1 Problem

Currently it is specified in Delete chapter (5.5.5) that:

"If the recipient determines that the data item doesn't exists on the recipient's database, then the (404) Not found exception condition is created by the command."

However SyncML has another status code for indicating that the item was not deleted, since it may have already been deleted (211 - Item not deleted). Since the result of not performing the Delete operation is that the item was not deleted, it would make more sense to return the 211 status, if the item does not exist in the recipient's database. Description for status code 404 also specifies that "No indication is given as to whether this is a temporary or permanent condition", thus using 404 in this case is not the very clear.

2.14.2 Solution

Change the paragraph in chapter 5.5.5 to:

"If the recipient determines that the data item doesn't exist on the recipient's database, then the (211) Item not deleted exception condition is created by the command.".

2.14.3 Other specifications/erratas affected

None.

2.15 Definition of MUST, SHOULD, MAY (RFC 2119)

2.15.1 Problem

The current definition is unclear about how to interpret a receiving element when the “Static Conformance Requirements” column defines an element as MAY.

In almost every document we have a reference to `www.ietf.org` and in chapter “Static Conformance Requirements” we have:

In these tables, optional features are specified by a "MAY", mandatory features are specified by a "MUST" and recommended features are specified by a "SHOULD".

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2.15.2 Solution

Change the reference to RFC2119 and include the MAY definition from the RFC under the chapter “Static Conformance Requirements”:

An implementation which does not include a particular option MUST be prepared to interoperate with another implementation which does include the option, though perhaps with reduced functionality.

2.15.3 Other specifications/erratas affected

None.

2.16 Status codes for Cancel

2.16.1 Problem

Currently there is no way to specify if the synchronization has been cancelled. The device (either a client or a server) just simply interrupts the synchronization, and this is not a very clean way.

2.16.2 Solution

Chapters 5.4.1 and 12:
Add two new status codes for indicating that an operation has been cancelled.

214 Operation cancelled. The SyncML command completed successfully, but no more commands will be processed within the session.

514 Operation cancelled. The SyncML command was not completed successfully, since the operation was already cancelled before processing the command. The originator should repeat the command in the next session.

2.16.3 Other specifications/erratas affected

None.

2.17 Chal example incorrect

2.17.1 Problem

Section 5.1.2 Chal example is incorrect

2.17.2 Solution

Change the first “Status>” to “<Status>”

2.17.3 Other specifications/erratas affected

None.

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2.18 Target Address Filtering

2.18.1 Problem

A few corrections and clarifications must be made before Target Address Filtering (TAF) can be successfully implemented with reliable interoperability. These changes should be incorporated into the SyncML protocol version 1.1, so that conformant products will be able to implement filtering in the near-term (e.g. before SyncML 2.0.)

1) It is not stated that the presence of a TAF does not affect the set of data items which are synchronized (e.g. items previously synchronized in prior sessions but not included in the TAF selection remain in the set of data items kept in sync.) TAF acts only as a restriction filter on which synchronization changes are desired. Differing interpretations will lead to interoperability problems.

2) When TAF is used, it is not stated whether the TAF CGI parameter must be sent with every Sync command in the session or only the first. Differing interpretations will lead to interoperability problems.

3) The first table in the representation protocol section 4.17, indicates that TAF is allowed in the Target LocURI for the SyncHdr and Search elements. Neither is useful or correct. The Target LocURI element for SyncHdr elements is the “target routing information for the network device that is receiving the SyncML message.” As for Search commands, Search is both functionally redundant and explicitly disallowed in conjunction with Target Address Filtering in section 4.18.

4) In the same table (section 4.17), for the section relating to the Sync command, language implies that the TAF CGI parameter is server only.

2.18.2 Solution

1) Clarify that items previously synchronized are completely unaffected by the presence of a TAF Sync by inserting the following after sentence 1 of paragraph 1 of section 4.18: “Target address filtering imposes a temporary constraint on the set of data items returned by its parent command. The filter itself has no effect on the set of data items which is synchronized (i.e. previously synchronized items which are not included in the filter result set remain in the set of synchronized data.)”

2) Clarify by appending the following to paragraph 3 of section 4.18: “When the package containing a Sync command using target address filtering for a given database requires multiple messages, the CGI parameter MUST be included every time the Sync command for that database appears in a message in order to maintain the filtering restriction.”

3) Correct the specification by removing the sentence: "For an absolute LocURI value, CGI script parameters can be appended to the URI to perform selection filtering on the server target." from the table for the SyncHdr and Search elements.

4) Change the following sentence from: ”For a LocURI value, CGI script parameters can be appended to the URI to perform selection filtering on the server target.”

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To: ”For a LocURI value, CGI script parameters MAY be appended to the URI to perform selection filtering on client or server targets.”

2.18.3 Other specifications/erratas affected

None.

2.19 MD-5 Digest Authentication

2.19.1 Problem

The current definition requires the MD5 hash value to be computed:

“on the concatenation of the an authentication identifier such as the originator's userid, followed by the COLON (i.e., ":") separator character, followed by some secret known by the originator and recipient such as the originator's password for the corresponding userid, followed by a recipient specified nonce string.”

The problem with this approach is that it requires the SyncML authenticator to retrieve the known secret (originator’s password) to compute the MD5 digest. In fact, the SyncML authenticator must build a new “username:password:nonce” string every time the nonce changes. Notice that the password does not come as part of the Cred element. It has to be retrieved from an external source or authenticating agent.

Some authenticating agents do not store user passwords, as this is universally perceived as a security risk. They store, instead, a digest. The digest is generally computed on data that includes user id and password. Other authenticating agents store but do not allow retrieval of user passwords. These limitations make SyncML MD5 authentication impossible in some environments.

It is worth noticing that the SyncML definition diverges significantly from HTTP authentication, described in RFC2617, regarding this issue. In particular RFC2617 makes a point of not requiring the HTTP server to know the user password in case of Digest Authentication.

2.19.2 Solution

Change the current definition to a two steps approach:

Let A1 be the concatenation of “userid”, COLON and “secret” in accordance to the definition in RFC2617 (section 3.2.2.2).

For example:

A1 = username:password

Let H() represent the MD5 hashing function. The result of H() is base64 encoded.

The final MD5 value is then computed on the concatenation of H(A1), COLON followed by the nonce string. The result is also base64 encoded.

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MD5 final value = H(H(A1):nonce)

Finally it is important to notice that the changing the digest rule as suggested breaks compatibility with the current definition.

2.19.3 Other specifications/erratas affected

None

2.20 MD5 examples incorrect

2.20.1 Problem

The MD5 example in Section 4.13 and Chapter 5 are incorrect

2.20.2 Solution

Replace the example in 4.13 with:

```
<Data>Zz6EivR3yeaaENcRN6lpAQ==</Data>

<!– Base64 coded MD5 digest, for user “Bruce2”, password “OhBehave”, nonce “Nonce” " -->
```

In all the examples in Chapter 5, the line(s):

```
<Data>OGNkNDI1ZTZjNjgwMTNiYWZkOWEyN2JjMjNlZDM4YzENCg==</Data>
```

Should be replaced with:

```
<Data>Zz6EivR3yeaaENcRN6lpAQ==</Data>
```

2.20.3 Other specifications/erratas affected

None

2.21 SyncBody used in Device Management

2.21.1 Problem

SyncBody content model needs to be changed to allow use by the device management protocol.

2.21.2 Solution

Change the content model to:

```
((Alert | Atomic | Copy | Exec | Get | Map | Put | Results | Search |

Sequence | Status | Sync | Add | Replace | Delete)+, Final?)
```

2.21.3 Other specifications/erratas affected

None

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2.22 Parent elements of Add, Replace, Delete

2.22.1 Problem

Parent elements of the following commands needs to be changed to allow device management usage:

Add

Replace

Delete

2.22.2 Solution

Change the SyncML representation specification to allow Add, Replace and Delete commands inside the SyncBody

Eg

Add

Parent Elements: **SyncBody**, Sync, Sequence, Atomic

Delete

Parent Elements: **SyncBody**, Sync, Sequence, Atomic

Replace

Parent Elements: **SyncBody**, Sync, Sequence, Atomic

2.22.3 Other specifications/erratas affected

None

2.23 New status codes for Device Management

2.23.1 Problem

The device management protocol requires some new status response codes to be defined.

2.23.2 Solution

Add the following status codes and definitions

Status code	**Meaning**
215 Not executed	A command was not executed, as a result of user interaction and user chose not to accept the choice.
216 Atomic roll back OK	A command was inside Atomic element and Atomic failed. This command was rolled back successfully.
516 Atomic roll	Command was inside Atomic element and Atomic failed.

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back failed	This command was not rolled back successfully. Server should take action to try to recover client back into original state.

2.23.3 Other specifications/erratas affected

None

2.24 Parent element of Get

2.24.1 Problem

Get command Parent element requires to be changed for use by the device management protocol.

2.24.2 Solution

Get

Parent Elements: SyncBody, **Sequence, Atomic**

2.24.3 Other specifications/erratas affected

None

2.25 Exec

2.25.1 Problem

Parent elements and content model of Exec command requires changes to allow use by device management protocol.

2.25.2 Solution

Exec:

Parent Elements: SyncBody, **Atomic, Sequence**

Content Model

`(CmdID, NoResp?, Cred?, **Meta?,** Item**+**)`

2.25.3 Other specifications/erratas affected

None

2.26 Copy

2.26.1 Problem

Parent element of Copy command needs to be changed to allow command use for the device management protocol. Copy needs to be allowed in a Sequence.

Note: Sequence already has Copy in its content model!

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2.26.2 Solution

Change Parent element of Copy to include Sequence

Eg

Copy

Parent Elements: Atomic, Sync, SyncBody, **Sequence**

2.26.3 Other specifications/erratas affected

None

2.27 Atomic

2.27.1 Problem

Get, Exec and Alert commands need to be allowed in an atomic command for the device management protocol.

2.27.2 Solution

Change Atomic content model to:

(CmdID, NoResp?, Meta?, (Add | Delete | Copy | Atomic | Map | Replace | Sequence | Sync | Get | Exec | Alert)+)

2.27.3 Other specifications/erratas affected

None

2.28 Alert

2.28.1 Problem

Alert does not always need an item. The content model specifies one or more items MUST be included. In the device management protocol, the first Alert sent from the client telling whether the client or server initiated the session, there is no Item required.

Alert is also required to be inside a sequence and Atomic commands, not just inside the SyncBody.

2.28.2 Solution

Change the Parent elements

From:

SyncBody

To:

SyncBody, **Sequence, Atomic**

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Change the content model to allow zero or more items in an Alert command.

From:

```
(CmdID, NoResp?, Cred?, Data?, Item+)
```

To:

```
(CmdID, NoResp?, Cred?, Data?, Item*)
```

2.28.3 Other specifications/erratas affected

None

2.29 Sequence

2.29.1 Problem

Sequence command parent elements and content model requires changes to allow command to be used in device management protocol.

2.29.2 Solution

Sequence

Parent Elements: Atomic, Sync, SyncBody

Content Model

```
(CmdID, NoResp?, Meta?, (Add | Replace | Delete | Copy | Atomic |
Map |Sync | Get | Alert | Exec)+)
```

2.29.3 Other specifications/erratas affected

None

2.30 Nonce: Clarification

2.30.1 Problem

2.30.2 Some of the wording regarding Nonce is unclear. In the Protocol document it is clear that the Nonce can persist between sections (section 3.1 - …", the next nonce in Chal MUST used for the digest when the next sync session is started"). In the representation document, it is not as clear.

2.30.3 Solution

Revise from:

Underlining below is for clarity only.

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Section 4.13, change from:

The MD5 Digest scheme is identified by the URI `syncml:auth-md5`. This authentication scheme is a MD5 digest form of the concatenation of the an authentication identifier such as the originator's userid, followed by the COLON (i.e., ":") separator character, followed by some secret known by the originator and recipient such as the originator's password for the corresponding userid, followed by the COLON (i.e., ":") separator character, followed by a recipient specified nonce string. The maximum duration that the nonce string can be used by the originator is the current SyncML session. More frequent changes to the nonce string can be specified with the `NextNonce` element type within the `Meta` element type of the `Chal` element type. The MD5 digest algorithm and a publicly available source code for generating MD5 digest strings is specified by [3]. The MD5 credential, a 128-bit binary digest value, MUST be Base64 character encoded when transferred as clear-text XML. For WBXML representation, the additional Base64 character encoding is not necessary.

`To:`

The MD5 Digest scheme is identified by the URI `syncml:auth-md5`. This authentication scheme is a MD5 digest form of the concatenation of the an authentication identifier such as the originator's userid, followed by the COLON (i.e., ":") separator character, followed by some secret known by the originator and recipient such as the originator's password for the corresponding userid, followed by the COLON (i.e., ":") separator character, followed by a recipient specified nonce string. The maximum duration that the nonce string can be used by the originator is the current SyncML session. Note that issuing a Nonce does not constitute use – a Nonce may be issued for use in the next session. More frequent changes to the nonce string can be specified with the `NextNonce` element type within the `Meta` element type of the `Chal` element type. The MD5 digest algorithm and a publicly available source code for generating MD5 digest strings is specified by [3]. The MD5 credential, a 128-bit binary digest value, MUST be Base64 character encoded when transferred as clear-text XML. For WBXML representation, the additional Base64 character encoding is not necessary.

2.30.4 Other specifications/erratas affected

None

3 Enhancements

3.1 Progress Information

3.1.1 Introduction

While sending a large number of objects, or to be more precise while sending a large number of modification command (`<Add>`, `<Delete>` and `<Update>`) from one entity to another, the recipient has no idea how long the whole process will take as it has no idea of how many modifications there are to come. This document proposes a solution that enables one entity to send this information to the other so that a progress bar, for example, can be displayed to show the current state of the sync more accurately.

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3.1.2 Representation

A new <NumberOfChanges> element is introduced so that one entity can provide the other with information of the number of modification commands (<Add>, <Delete> and <Replace>) it will send. If syncs are carried out on more than one database (e.g. Contacts & Calendar) then <NumberOfChanges> should be specified for each database. The <NumberOfChanges> element must be specified in the <Sync> command.

Support for receiving/processing <NumberOfChanges> information is indicated by the inclusion of the <SupportNumberOfChanges> element in dev info.

3.1.3 Added wording to Representation Protocol

3.1.3.1 Number Of Changes

Usage: Indicates the total number of changes (the number of <Add>, <Replace> and <Delete> commands) that are going to be sent from sender to recipient during a synchronisation session so that the recipient may use this information to calculate progress information.

Parent Elements: Sync

Restrictions: The element type SHOULD be specified by the server, but only if the Client has indicated that it supports NumberOfChanges. It MAY be specified by the client.

Content Model:

```
(#PCDATA)
```

Attributes: None.

3.1.3.2 DTD Changes

One new element is added to the DTD for NumberOfChanges.

```
<!ELEMENT NumberOfChanges (#PCDATA)>
```

3.1.3.3 WBXML Token Definition

NumberOfChanges	33

3.1.3.4 Static Conformance Requirements

NumberOfChanges	MAY	MUST	MAY	MAY

3.2 Large Object Handling

3.2.1 Introduction

A single SyncML message is limited in size by the underlying PDU of the transport it uses. SyncML provides no mechanism to split data payload across multiple messages. When working over a wireless link using a transport such as WSP this imposes a limitation that is

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likely to have real world impact on the size of objects that can be synchronised. This document proposes a solution that enables objects to be segmented and transmitted across multiple SyncML messages.

3.2.2 Representation

A new <MoreData/> Element is introduced to provide a mechanism signal to the recipient that the data item is incomplete and has further chunks to come. Data objects that fit within a single message MUST NOT be followed by the <MoreData/> element. Data objects that span multiple messages MUST have the <MoreData/> element after all chunks except the last chunk.

Meta and Item information would be repeated on each subsequent message containing chunks of the same data object. Authentication details related to the data object may vary between messages bearing chunks of the same data object as defined in the section 3 of the Sync Protocol [2].

If an item is chunked across multiple messages, the <Size> element of the Meta information MUST be used to signal to the recipient the overall size of the data object.

3.2.3 Added wording to Representation Protocol

3.2.3.1 MoreData

Usage: Indicator that a SyncML data element is incomplete and there will be one or more subsequent chunks.

Parent Elements: `Item`

Restrictions: The element type MUST be specified on all but the last chunk of data of an item. If not present, then the item is either contained within a single message or is the closing chunk of the data item.

Content Model:

```
(EMPTY)
```

Attributes: None.

3.2.3.2 DTD Changes

One new element is added to the DTD.

```
<!ELEMENT MoreData EMPTY>
```

3.2.3.3 WBXML Token Definition

MoreData	34

3.2.3.4 Static Conformance Requirements

MoreData	MAY	MUST	MAY	MAY

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