NMI 3-D Secure Merchant Plugin (3DS1)

Technical Documentation

Document Version: 2.10
Date: 2021-07-19

nmi

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Document History

Version	Date Released (DD/MM/YYYY)	Author	Pages Affected	Remarks
Draft A	31/05/2007	Nigel Jewell		Draft
1.1	18/01/2008	Nigel Jewell	4	URL
1.2	18/04/2008	Nigel Jewell	3, 4	Constraints
1.3	13/08/2008	Nigel Jewell	5, 6	CardEaseXML
2.0	24/08/2008	Nigel Jewell	All	XML Protocol
2.1	31/10/2008	Nigel Jewell	10	Acquirer BINs
2.2	30/12/2008	Nigel Jewell	9	Error Handling
2.3	14/09/2009	Nigel Jewell	4, 7	Merchant IDs
2.4	10/02/2010	Nigel Jewell	10, 11	ACS Warning
2.5	03/03/2010	Nigel Jewell	10	Barclays BINs
2.6	14/07/2011	Nigel Jewell	4, 7, 10	Merchant IDs
2.7	14/12/2012	Nigel Jewell	4, 5	Schemes
2.8	28/05/2014	Nigel Jewell	10	Acquirer BINs
2.9	11/11/2014	Nigel Jewell	10	Test Cards
2.10	19/07/2021	Jarrett Chamberlin	All	NMI Branding, Removed HTTP Post from Doc, Removed logo section, Updated AIB Acquirer BINs, Added tokenisation fields

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Introduction

NMI 3-D Secure Merchant Plugin (3DS1) is a hosted 3-D Secure Merchant Plug-In that allows E-Commerce sites to accept and process Verified by Visa and MasterCard SecureCode authentications. The result of these authentications can then be used during the payment authorisation process providing conformance with card scheme rules and greater liability shift for the merchant.

For ease of integration and compatibility with existing web technologies, NMI 3-D Secure Merchant Plugin (3DS1) makes extensive use of the HTTP protocol, and specifically POST requests. The Merchant Plug-In accepts data in the format of XML POST.

The XML POST method requires some care when integration due to the necessity of constructing and parsing XML data, whilst allowing the merchant website fine control over the redirections required of the card holder's web browser and allows complete control over any error conditions.

Detailed below are the specifics of using the NMI 3-D Secure Merchant Plugin (3DS1) via XML POST MPI requests.

If it is required Network Merchants Limited can make available PHP examples. These examples are constructed in such a way that they should allow a web developer to understand the 3-D Secure solution without a need to be a PHP developer.

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NMI 3-D Secure Merchant Plugin (3DS1) XML Post

For integration with NMI 3-D Secure Merchant Plugin (3DS1) using XML POST the merchant's website must POST a well formed XML string to the MPI. It is important that the XML string is encoded using UTF-8 and that the Content-Type header (also known as HTTP MIME type) is set to "application/xml". The XML will be validated against an appropriate schema.

The XML POST method accepts two different messages; one to determine the enrolment status of a particular transaction, another to determine the result of the cardholder authentication.

If the specification of the XML data is correct and an enrolment request is received, the card number is checked for enrolment in the 3-D Secure scheme to which it relates. The result of this enrolment is returned to the merchant's website. If the card holder is either partially or fully enrolled the resultant XML will contain the address to which the card holder browser must be redirected in order to perform card holder authentication or full enrolment.

The redirection to the card issuer's Access Control Server must be performed using HTTP POST and three POST parameters should be supplied:

1. PaReq: The Payer Authentication Request as returned from the MPI in the response to the enrolment request.
2. MD: The Merchant Data identifier generated by the merchant's website. This can be empty, or alternatively it can be used to associate a particular authentication request with a particular session on the merchant web server. MD can contain the ASCII characters 0x20 to 0x7E. If other data is required the field should be Base64 encoded. The field has a maximum length of 1024 characters.
3. TermUrl: The URL on the merchant's web site to which the card holder's browser should send the POST data on completion. This POST data will include the PaRes value that is required for the MPI authentication process.

The result of the card holder authentication is returned from the card holder's web browser as HTTP POST data. This POST data includes PaRes and MD fields. It is recommended that the MD field is verified against the web server to validate the source of the message. The PaRes field must then be sent to the MPI as well formed XML. Again, it is important that the XML string is encoded as UTF-8 and that the Content-Type header (also known as HTTP MIME type) is set to "application/xml". The XML will be validated against the appropriate schema.

If the specification of the XML data is correct the MPI checks the result of the authentication and returns it to the merchant's website. The result can then be used in the authorisation process to provide 3-D Secure information.

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The request and response XML structures are described in detail below as well as an overview of how to interpret the responses for the authorisation process.

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Request

In order to initiate a NMI 3-D Secure Merchant Plugin (3DS1)I XML POST request an XML string must be posted to the NMI 3-D Secure Merchant Plugin (3DS1) URL.

For test transactions the following address should be used.

https://testmpi.cardeasexml.com

For live transactions the following address should be used.

https://mpi.cardeasexml.com

Please note that live transactions cannot be performed until Network Merchants have registered the merchant account with the MPI. Even then, it can take up to two weeks for the registration process to be completed with MasterCard and Visa meaning that the MPI may not return fully authenticated results initially.

The XML structure for an enrolment request is:

```
<?xml version="1.0" encoding="UTF-8"?>
<Request>
      <Enrollment>
            <AcquirerBIN></AcquirerBIN>
            <Amount></Amount>
            <CurrencyCode></CurrencyCode>
            <ExpiryDateMonth></ExpiryDateMonth>
            <ExpiryDateYear></ExpiryDateYear>
            <MerchantID></MerchantID>
            <PAN></PAN>
            <Password></Password>
            <TransactionNarrative></TransactionNarrative>
            <XID></XID>
      </Enrollment>
</Request>
```

The fields used in the XML are:

Field	Description
AcquirerBIN	The Bank Identification Number (BIN)/Issuer Identification Number (IIN) of the acquiring institution. This should be specified as a 1 to 11 digit number. For the test platform this should be specified as 123456. Please note that for live integrations two BINs will be used, one for MasterCard and one for Visa cards (a list of these can be found at the end of this document). Card schemes can be recognised by looking at the first few digits of the card number. Reliable references for these numbers can be found on the internet or can be suggested

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	by Network Merchants as required
Amount	The amount that will be charged to the credit card. This should be specified in the major format for the currency and should not contain any currency identifier. For example, if the credit card is to be charged £1.23, the amount should be specified as 1.23. It can be specified without the major or minor part if required. For example: 12.34, 12 and .34. The maximum major length is 10 digits
CardGuid	The CardEase assigned Card GUID. This is one of the parts of the CardEase token, and should be specified as a GUID, with a length of 36 characters. This field can be used, in tandem with CardHash, in place of the PAN field to allow the Cardholder to authenticate themselves when performing a tokenised authorisation.
CardHash	The CardEase assigned Card Hash. This is one of the parts of the CardEase token, and should be specified as a string with a length of 28 characters. This field can be used, in tandem with CardGUID, in place of the PAN field to allow the Cardholder to authenticate themselves when performing a tokenised authorisation.
CurrencyCode	The 3-digit ISO4217 code for the currency in which the authorisation will take place. For example, if the credit card is to be charged in pound sterling, the currency code should be specified as 826.
ExpiryDateMonth	The month in which the credit card is due to expire. This should be specified as a 2-digit number in the range 01 to 12.
ExpiryDateYear	The year in which the credit card is due to expire. This should be specified as a 4-digit number.
MerchantID	The Merchant ID assigned by the acquiring institution. This should be specified as a 1 to 24 digit number. For the test platform this should be specified as 123456789012345. Please note that for live transactions two Merchant IDs may be used, one for MasterCard and one for Visa cards. The Merchant ID should be zero padded to a specific length (a list of these can be found at the end of this document). For example an AIB Merchant ID of 1234567 would become 12345670000. Card schemes can be recognised by looking at the first few digits of the card number. Reliable references for these numbers can be found on the internet or can be suggested by Network Merchants as required.
PAN	The credit card number from which the payment will be made. This should not contain any spaces or formatting characters. This should be specified as a 13 to 19 digit number.

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	Note: This field isn't required if the CardGUID and CardHash fields have been provided.
Password	The NMI 3-D Secure Merchant Plugin (3DS1) password that has been supplied by Network Merchants. For the test platform this should be specified as P@ssw0rd.
TransactionNarrative	An optional description of the purchase. This should be specified as a 0 to 125 character string.
XID	A 20-character alphanumeric transaction number that is statistically unique. This can either be created randomly, or assigned on a sequential basis.

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The XML structure for an authentication request is:

```
<?xml version="1.0" encoding="UTF-8"?>
<Request>
      <Authentication>
            <Password></Password>
            <PayerAuthenticationResponse></PayerAuthenticationResponse>
      </Authentication>
</Request>
```

The fields used in the XML are:

Field	Description
Password	The NMI 3-D Secure Merchant Plugin (3DS1) password that has been supplied by Network Merchants. For the test platform this should be specified as P@ssw0rd.
PayerAuthenticationResponse	The response returned from the card issuer's website.

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Response

The information returned by the NMI 3-D Secure Merchant Plugin (3DS1) contains a number of fields that determine how the result of the 3-D Secure transaction should be interpreted. These are:

The XML structure for an enrolment response can contain an Enrollment tag and/or an Error tag:

```
<?xml version="1.0" encoding="UTF-8"?>
<Response>
      <Enrollment>
            <AccessControlServerURL></AccessControlServerURL>
            <CardHolderEnrolled></CardHolderEnrolled>
            <PayerAuthenticationRequest></PayerAuthenticationRequest>
      </Enrollment>
      <Error>
            <Code></Code>
            <Detail></Detail>
            <Message></Message>
      </Error>
</Response>
```

The fields used in the XML are:

Field	Description
AccessControlServerURL	The URL of the card issuer's Access Control Server that is to be used for authentication or enrollment purposes.
CardHolderEnrolled	Whether the card holder is enrolled in the 3-D Secure scheme. Can be one of Y, N, U or an empty value.
Error Code	The code of any error encountered during the authentication process
Error Detail	The detailed message of any error encountered during the authentication process.
Error Message	The short message of any error encountered during the authentication process
PayerAuthenticationRequest	The PaReq data to be sent to the card issuer's Access Control Server as HTTP POST data. This should be accompanied by the MD and TermUrl parameters.

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The XML structure for an authentication response can contain an Authentication tag and/or an Error tag:

```
<?xml version="1.0" encoding="UTF-8"?>
<Response>
      <Authentication>
            <ECI></ECI>
            <IAV></IAV>
            <IAVAlgorithm></IAVAlgorithm>
            <TransactionStatus></TransactionStatus>
      </Authentication>
      <Error>
            <Code></Code>
            <Detail></Detail>
            <Message></Message>
      </Error>
</Response>
```

Field	Description
ECI	The E-Commerce indicator returned when a 3-D Secure authentication is attempted.
Error Code	The code of any error encountered during the authentication process.
Error Detail	The detailed message of any error encountered during the authentication process.
Error Message	The short message of any error encountered during the authentication process.
IAV	The Cardholder Authentication Verification Value (CAVV) / Accountholder Authentication Value (AAV) returned when a 3-D Secure authentication is attempted.
IAVAlgorithm	The algorithm used for the IAV. Returned when a 3-D Secure authentication is attempted.
TransactionStatus	Whether the authentication of the card holder succeeded. Can be one of Y, N, A, U or an empty value.

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Response Interpretation

The action that should be performed by the E-Commerce site upon receiving the response from the XML POST process is dependent upon the value that is held in the CardHolderEnrolled and TransactionStatus fields.

Cardholder Enrolled	Transaction Status	Action
Y	Y	The card holder was enrolled and authentication was successful. Perform an authorisation sending all of the 3-D Secure data to CardEaseXML as part of the Request object (CardHolderEnrolled, TransactionStatus, ECI, IAV, IAV Algorithm and XID).
Y	N	The card holder was enrolled and authentication failed. **Do not perform an authorisation.**
Y	U	The card holder was enrolled and authentication could not be completed due to a technical problem. Perform an authorisation sending all of the 3-D Secure data to CardEaseXML as part of the Request object (CardHolderEnrolled, TransactionStatus, ECI, IAV, IAV Algorithm and XID)
Y	A	The card holder was not fully enrolled and they chose to decline full enrollment. Perform an authorisation sending all of the 3-D Secure data to CardEaseXML as part of the Request object (CardHolderEnrolled, TransactionStatus, ECI, IAV, IAV Algorithm and XID).
Y		The card holder was enrolled however no valid response was obtained from the Access Control Server and therefore authentication could not be determined. Optionally perform an authorisation sending all of the 3-D Secure data to CardEaseXML as part of the Request object (CardHolderEnrolled, TransactionStatus, ECI, IAV, IAV Algorithm and XID)
N		The card holder was not enrolled. Perform an authorisation sending the 3-D Secure result fields

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		(CardHolderEnrolled and TransactionStatus) to CardEaseXML as part of the Request object.
U		It was not possible to determine enrollment due to a technical problem with the Directory Server. Perform an authorisation sending the 3-D Secure result fields (CardHolderEnrolled and TransactionStatus) to CardEaseXML as part of the Request object.
		No valid response was obtained from the Directory Server and therefore enrolment could not be determined. Perform an authorisation sending the 3-D Secure result fields (CardHolderEnrolled and TransactionStatus) to CardEaseXML as part of the Request object.

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Error Codes

Once integration is complete many of the error conditions should never occur (such as 1015:Invalid Expiry Date or 1004:Missing Parameter). In these cases when an error condition is returned it often relates to an issue outside of the merchants control (such as a MasterCard or Visa directory server that is unreachable).

Therefore, it is recommended that CardHolderEnrolled and TransactionStatus fields are processed as described above, and error codes, detail and messages are logged for information.

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CardEaseXML Mapping

When used with Network Merchants' CardEaseXML the NMI 3-D Secure Merchant Plugin (3DS1) responses should be mapped as:

Cardholder Enrolled

NMI 3-D Secure Merchant Plugin (3DS1)	CardEaseXML
Y	Yes
N	No
U	Unknown
	None

Transaction Status

NMI 3-D Secure Merchant Plugin (3DS1)	CardEaseXML
Y	Successful
N	Failed **(do not perform an authorisation)**
U	Unknown
A	Attempted
	None

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Test Cards

The following test cards can be used to perform test transactions on the test platform:

Scheme	Card Number	Password	CSC	Address	Postcode
Amex	376100000000004	N/A	3761	4 Amex Street, Southampton	SO31 6XY
JCB	3561000000000005	N/A	356	5 JCB Street, Hereford	HR3 5TR
Maestro	6761000000000006	123456	676	6 Maestro Street, Exeter	EX16 7EF
Mastercard	5761000000000008	123456	576	8 Mastercard Street, Highbridge	TA6 4GA
Visa	4761000000000001	123456	476	1 Visa Street, Crewe	CW4 7NT

For specific MPI responses, the following test cards can be used on the test platform:

Scheme	Card Number	Cardholder Enrolled	Transaction Status
Maestro	6761000000000006	Y	Y
Mastercard	5761000000000008	Y	Y
Visa	4761000000000001	Y	Y
Maestro	6761000001000005	Y	N
Mastercard	5761000001000007	Y	N
Visa	4761000001000000	Y	N
Maestro	6761000005000001	Y	U

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Mastercard	5761000005000003	Y	U
Visa	4761000005000006	Y	U
Maestro	6761000002000004	Y	A
Mastercard	5761000002000006	Y	A
Visa	4761000002000009	Y	A
Maestro	6761000003000003	N	
Mastercard	5761000003000005	N	
Visa	4761000003000008	N	
Maestro	6761000004000002	U	
Mastercard	5761000004000004	U	
Visa	4761000004000007	U	

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Acquirer BINs and Merchant ID Lengths

The following table lists the Acquirer BINs and Merchant ID Length for the major acquiring banks:

Acquiring Bank	Mastercard Acquirer BIN	Mastercard Merchant ID Length	Visa Acquirer BIN	Visa Merchant ID Length
Allied Irish Bank (Irish Merchants / Domestic)	531615	11	465733	11
Allied Irish Bank (UK Merchants / International)	512262	11	465737	11
Allied Irish Bank (Multi-currency)	542595	11	465736	11
Barclaycard UK	523065	7	492900	15
Elavon Financial Services UK	518422	15	446365	15
First Data Merchant Servers UK	520334	15	405657	15
Global Payments UK	550443	15	483050	15
Lloyds TSB Cardnet UK	540436	15	408532	15
Worldpay UK	542515	15	491677	15

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