



SPARROW

Transact, Grow, SPARROW.

Merchant Public Services

Transaction Query API

Version 1.2

Released February 2017

Revision History

Date	Revision	Comments	Author
2016-03-10	1.0	Initial document created	Vlad Volosuk
2016-03-23	1.1	Action route URL is corrected	Vlad Volosuk
2017-01-19	1.2	Streamline Authentication is added	Sergey Belov
2017-03-01	1.3	Review document	Ilya Tretyakov

Table of Contents

Revision History 2

Overview 4

Architectural Overview 4

 Action Route 4

 Action Request 5

 Action Response 6

 JSON Objects 7

 XML Objects 7

 Authentication 7

 Streamline Authentication 7

 Explicit Authentication 8

Account Service 8

 Authenticate Action 8

Transactions Service 8

 Get Transaction Details Action 9

 Query Transactions Action 11

Appendix: OData Protocol 12

 OData Request 13

 OData Logical Operations 13

 OData String Functions 14

 OData Date/Time Functions 16

 OData Constants 17

 OData Response 17

Overview

The Sparrow Gateway provides a set of services which can be used for integrating the gateway with merchant's IT systems. Merchant Public API provides the following RESTfull services:

- **Account** service – it is auxiliary service to obtain the authentication token required for invoking other Merchant Public API services
- **Transaction** service - this service allows querying transactions processed by the merchant in the Sparrow Gateway
- **Terminal** service – this service provides control functions over transaction processing

This document provides architectural overview of Merchant Public API and describes the services included into this API.

Architectural Overview

Merchant Public API consists of a number of *Actions* which are logically grouped into services. This section describes the structure of HTTP requests which are used for invoking *Actions*.

The legend:

- **<TERM>** indicates a parameter that will be described below of the snippet
- **[any-text]** indicates an optional part that can be not provided in requests for some *Actions* (see the specification of the particular *Action*)

Action Route

A route to an *Action* is a URL-based path that uniquely identifies the *Action* for invocation and invocation parameters:

```
<URL>/api/public/merchant/<SERVICE>/<ACTION> [ /<PATH-PARAMETERS> ] [ ?<QUERY-PARAMETERS> ]
```

Term	Description
<URL>	The address of the Sparrow Gateway server where the service is hosted. Merchants have to use the following URL for the production (life) integrations: https://secure.sparrowone.com
<SERVICE>	The name of the service where the <i>Action</i> is located. Examples: account , transactions , terminal . See documentation of services below in this document.
<ACTION>	The name of the <i>Action</i> . See documentation of services below in this document. Note: normally the name of the action must be always presented in <i>Action Route</i> . However, the service can have a default Action. In this case, this action is invoked without the name in the <i>Action Route</i> . Example: authenticate action in the account service.

<PATH-PARAMETERS>	Path parameters are used to clarify an entity for which the action has to be invoked
<QUERY-PARAMETERS>	Additional parameters provided in the form of HTTP query string

Action Request

An *Action* can be invoked by a HTTP request:

```
<HTTP-VERB> <ACTION-ROUTE> HTTP/1.1
Content-Type: <REQUEST-CONTENT-TYPE>
Accept: <RESPONSE-CONTENT-TYPE>
Authorization: <REQUEST-AUTH-PARAMS>
[other HTTP headers]

<REQUEST-DATA>
```

Term	Description
<HTTP-VERB>	<p>HTTP verb for invoking the service <i>Action</i>. Possible values are:</p> <ul style="list-style-type: none"> ▪ GET ▪ POST ▪ PUT ▪ DELETE <p>It is not mandatory for <i>Actions</i> to support all 4 verbs (but at least one verb must be supported). The verb can be interrupted as a sub-action supported by the <i>Action</i>. See the service documentation to select the proper verb for the <i>Action</i>.</p>
<ACTION-ROUTE>	An URL-based path that uniquely identifies the <i>Action</i> for invocation and invocation parameters. See the section above for details.
<REQUEST-CONTENT-TYPE>	<p>The content type of the <REQUEST-DATA>. Possible values are:</p> <ul style="list-style-type: none"> ▪ <i>application/xml</i> ▪ <i>application/json</i> <p>See <i>JSON Objects</i> and <i>XML Objects</i> sections below for object format details.</p>
<RESPONSE-CONTENT-TYPE>	<p>The expected content type for the response. Possible values are:</p> <ul style="list-style-type: none"> ▪ <i>application/xml</i> ▪ <i>application/json</i> <p>If <i>Accept</i> HTTP header is not provided in the request, then the response will be returned in JSON format.</p> <p>See <i>JSON Objects</i> and <i>XML Objects</i> sections below for object format details.</p>
<REQUEST-AUTH-PARAMS>	The authorization parameters. See <i>Authentication</i> section.
<REQUEST-DATA>	Request data object formatted according <REQUEST-CONTENT-TYPE>. Names of request parameters are case-sensitive.

	See the <i>Action</i> documentation for parameters supported by the <i>Action</i> in <REQUEST-DATA> .
--	--

Action Response

Here is a format of *Action* responses:

```
HTTP/1.1 <HTTP-CODE> <HTTP-CODE-DESCRIPTION>
Content-Type: <RESPONSE-CONTENT-TYPE>
WWW-Authenticate: <RESPONSE-AUTH-TOKEN>
[other HTTP headers]

<RESPONSE-DATA>
```

Term	Description
<HTTP-CODE>	<p>A standard HTTP response code. Here are codes (with HTTP descriptions) commonly used in Merchant Public API:</p> <ul style="list-style-type: none"> ▪ 200 OK The action was executed successfully ▪ 403 Forbidden The current user is not allowed to execute this <i>Action</i> ▪ 404 Not Found The Action was requested for the entity that is not found on the system ▪ 400 Bad Request The Action was executed with an error. More information about the error is returned in <RESPONSE-DATA>. ▪ 500 Internal Server Error It is unwanted, but possible response that indicates about internal (unexpected) error during processing the <i>Action</i>. <p>Particular <i>Actions</i> may support other HTTP response codes, see the <i>Action</i> documentation for details.</p>
<HTTP-CODE-DESCRIPTION>	A general message that clarifies the <HTTP-CODE> . See above for examples.
<RESPONSE-CONTENT-TYPE>	<p>The content type of <RESPONSE-DATA>. Possible values are:</p> <ul style="list-style-type: none"> ▪ <i>application/xml</i> (see <i>XML Objects</i> section for details) ▪ <i>application/json</i> (see <i>JSON Objects</i> section for details) <p>See <i>JSON Objects</i> and <i>XML Objects</i> sections below for object format details.</p>
<RESPONSE-AUTH-TOKEN>	The authentication token. The response contains WWW-Authenticate HTTP header only when the request contains valid authentication parameters: credentials or API Key. See <i>Authentication</i> section.
<RESPONSE-DATA>	<p>Response parameters formatted according <REQUEST-CONTENT-TYPE>.</p> <p>Names of response parameters are case-sensitive.</p>

See the *Action* documentation for parameters supported by the *Action* in **<REQUEST-DATA>**.

JSON Objects

Action requests and responses can be formatted as JSON objects:

```
{
  "Username": "JoeDoe",
  "Password": "pwd"
}
```

See *Action* documentation for supported request/response parameters.

XML Objects

Action requests and responses can be formatted as XML objects:

```
<LoginResponse>
  <AuthToken>TIUPQV+R1R5RGORA4IZVUIXIYEP+OFNB</AuthToken>
</LoginResponse>
```

See *Action* documentation for supported request/response parameters.

The name of the root element is composed as shown below:

- The root element for *Action* requests is named **<ActionName>Request** (e.g. LoginRequest)
- The root element for *Action* responses is named **<ActionName>Response** (e.g. LoginResponse)

where **<ActionName>** is the name of the current *Action*, the first letter is the upper case, others – in the low case.

Authentication

Only authenticated users are allowed to invoke service *Actions*. Merchant Public API supports two action invocation workflows which differ in a way how authentication information is obtained and specified in API calls: explicit authentication and streamline authentication.

Streamline Authentication

Streamline authentication is a preferable way to work with Merchant Public API: authentication information is specified with the every API call in HTTP headers as Authorization parameter (see **Action Request** section above). The following forms are supported for this parameter:

- **Authorization: credentials=<credentials-string>**
where <credentials-string> is <username>:<password> encoded by BASE64

This form is used for the first API call if the user-based authentication scheme is used. Please note, the username cannot contain “:” symbol, otherwise the expression cannot be parsed correctly (the gateway’s policy does not allow using “:” in user names as well).

- **Authorization: apikey=<api-string>**
This form is used for the first API call if the API-based authentication scheme is used.

- **Authorization: token=<auth-token>**
Authorization: <auth-token>

These two forms are equal. They are recommended for using with second and forth API calls. <auth-token> is provided as WWW-Authenticate HTTP header in the response for the first API call: **WWW-Authenticate: <auth-token>** (see **Action Response** section above).

Explicit Authentication

Explicit authentication can be used if an integration does not have ability to specify/fetch HTTP header parameters. This workflow assumes that a special API call is made just to obtain an auth token.

- The app invoke **Authenticate** action (see **Account Service** section below). If the action is successful, then <auth-token> is returned in the response.
- The app makes the first API call with providing **token=<auth-token>** in the request’s query string
- The second and forth API calls are performed in the same way: by providing **token=<auth-token>** in the request’s query string

Account Service

The **Account** service is auxiliary service that allows retrieving the authentication token required for invoking other *Actions*.

Authenticate Action

This action is used to obtain the authentication token for the specified user.

Name	Value
Service	Account
Action Name	(default)
Method	POST
Path Parameters	No
Query Parameters	No
Request	The following items must be provided in <REQUEST-DATA> : <ul style="list-style-type: none"> ▪ Username ▪ Password
Response	The action returns the following items in <RESPONSE-DATA> : <ul style="list-style-type: none"> ▪ AuthToken – an authentication token for subsequent service actions calls

Transactions Service

The **Transactions** service provides a set of *Actions* to query transactions executed by the merchant.

Get Transaction Details Action

This action is used to retrieve details about the particular transaction.

Name	Value/Description
Service	Transactions
Action Name	Detail
Method	GET
Path Parameters	<p>/<TRANSACTION-ID></p> <p><TRANSACTION-ID> - is the identifier of the transaction (transid) which details are requested</p>
Query Parameters	<p>The following items can be provided in <QUERY-PARAMETERS>:</p> <ul style="list-style-type: none"> token – the authentication token (required for explicit authentication scheme)
Request	No
Response	<p>The details of the requested transaction (see below).</p> <p>For XML formatter – the root element of the response is <TransactionResponse>.</p>

The table below enumerates transaction parameters which are returned by this action:

Name	Data Type	Description
TransactionId	Integer	Payment transaction ID
MerchantAccountName	String	Merchant account name
CreationTime	Date/time	Payment operation date/time
ExternalId	String	External ID
Status	String	Operation status
CustomerCurrency	String	Currency
Message	String	Message
Amount	Money	Amount
FormattedAmount	String	Formatted amount
PaymentTypeName	String	Payment type name
AuthCode	String	Auth-code
AvsStatus	String	AVS status
CvvStatus	String	CVV status
CardLevelResultsText	String	Card level results
CommercialCardIndicatorText	String	Commercial card indicator
ProcessorName	String	Payment processor's name
TransactionType	String	Payment transaction's type
IsApproved	Boolean	Indicator whether the payment transaction was approved
Billing		This element contains billing information
Billing/FullName	String	Full name
Billing/Company	String	Company name
Billing/Address1	String	Address (first line)
Billing/Address2	String	Address (second line)

Billing/Country	String	Country
Billing/Phone	String	Phone number
Billing/Fax	String	Fax number
Billing/Email	String	E-mail
Billing/State	String	State
Billing/City	String	City
Billing/Zip	String	Zip
Billing/PostalCode	String	Postal code
Customer		This element that contains customer information
Customer/BirthDate	String	Birth date
Customer/CourtesyCardId	String	Courtesy Card ID
Customer/DriverLicenseNumber	String	Driver's license number
Customer/DriverLicenseCountry	String	Driver's license country
Customer/DriverLicenseState	String	Driver's license state
Shipping		This element contains shipping information
Shipping/FullName	String	Full name
Shipping/Company	String	Company name
Shipping/Address1	String	Address (first line)
Shipping/Address2	String	Address (second line)
Shipping/Country	String	Country
Shipping/Phone	String	Phone number
Shipping/Fax	String	Fax number
Shipping/Email	String	E-mail
Shipping/State	String	State
Shipping/City	String	City
Shipping/Zip	String	Zip
Shipping/PostalCode	String	Postal code
Order		This element contains order information
Order/OrderId	String	Order ID
Order/Description	String	Order description
Order/PurchaseNumber	String	Purchase number
Order/ShippingAmount	String	Shipping amount
Order/TaxAmount	String	Tax amount
Payment		This element contains payment information
Payment/MaskedAccountNumber	String	Masked account number
Payment/BankName	String	Bank name (for ACH and Checks)
Payment/RoutingNumber	String	Routing number (for ACH and Checks)
Payment/AccountType	String	Account type (for ACH and Checks)
Payment/AccountSubType	String	Account sub-type (for Checks)
Payment/CheckNumber	String	Check number (for Checks)
Payment/CardType	String	Card type (for Credit and Star cards)
Payment/ExpirationDate	String	Expiration date in MMY format (for Credit cards)
CustomFields		This element contains the array of custom fields included into the transaction
CustomFields/CustomField/Name	String	The name of the custom field
CustomFields/CustomField/Value	String	The value of the custom field
Items		This element contains the array of purchase items
Items/Item/Id	Integer	Item ID
Items/Item/SkuNumber	String	SKU number
Items/Item/Description	String	Description

Items/Item/Quantity	Number	Quantity
Items/Item/Amount	Money	Amount
Items/Item/TotalAmount	Money	Total amount
Operations		This element contains the array of operations made in the scope of this transaction
Operations/Operations/Id	Integer	Payment operation ID
Operations/Operations/OperationId	Integer	Operation ID
Operations/Operations/Type	String	Operation type
Operations/Operations/Status	String	Operation status
Operations/Operations/Message	String	Message
Operations/Operations/ModuleName	String	Module name
Operations/Operations/ProcessorResponse	String	Payment processor response
Operations/Operations/CreationTime	Date/time	Operation date/time
Operations/Operations/Username	String	Username
Operations/Operations/SettlementStatus	String	Settlement status
Operations/Operations/Amount	Money	Operation amount
Operations/Operations/SettlementAmount	Money	Settlement amount
Operations/Operations/SettlementId	Integer	Settlement operation ID

Query Transactions Action

This action is used to retrieve a list of transaction.

Name	Value/Description
Service	Transactions
Action Name	(default)
Method	GET
Path Parameters	No
Query Parameters	<p>The following items can be provided in <QUERY-PARAMETERS>:</p> <ul style="list-style-type: none"> ▪ token – the authentication token (required for explicit authentication scheme) ▪ \$filter – filter expression (see OData section below) ▪ \$orderby – field list (see OData section below) ▪ \$skip – number of the items to skip (see OData section below) ▪ \$top – number of the items in the result (see OData section below)
Request	None
Response	<p>OData response (see OData section below). The structure of OData item is described below.</p> <p>For XML formatter – the root element of the response is <PageResponseOfTransactionReportItem></p>

Here is the structure of OData item returned in the response:

Name	Data Type	Description
PaymentOperationId	Integer	Payment operation ID
TransactionId	Integer	Payment transaction ID

TypeName	String	Operation type
OperationStatusName	String	Operation status
MerchantAccountName	String	Merchant account name
CustomerName	String	Customer name
OperationTime	Date/time	Operation time
OperationAmount	String	Formatted amount of the payment operation
Currency	String	Currency of the payment transaction
CompanyName	String	Customer's company name
PaymentTypeName	String	Payment type
Username	String	Username
ResponseCodeDescription	String	Response code description provided by the payment processor
Message	String	Message
AuthCode	String	Auth-code provided by the payment processor
Phone	String	Customer's phone number
OrderDescription	String	Order description
Address1	String	Customer's address (first line)
City	String	Customer's city
PostalCode	String	Customer's zip
Email	String	Customer's e-mail
IpAddress	String	IP address
OrderId	String	Order ID
ClientExternalId	String	Id of the Data Vault customer
ExternalId	String	Id of the payment transaction on the payment processor's side
CreditCardIssuerName	String	Credit card's issuer
MerchantCompany	String	Merchant company name
BatchId	String	Batch ID
UserDepartment	String	User department
TransactionStatus	String	Status of the payment transaction
ModuleName	String	Module name
Address2	String	Customer's address (second line)
CountryName	String	Customer's country
StateName	String	Customer's state
SourceType	String	Source type
ShippingFirstName	String	Shipping first name
ShippingLastName	String	Shipping last name
ShippingAddress1	String	Shipping address (first line)
ShippingAddress2	String	Shipping address (second line)
ShippingCity	String	Shipping city
ShippingEmail	String	Shipping e-mail
ShippingCountryName	String	Shipping country
ShippingStateName	String	Shipping state
ShippingPhone	String	Shipping phone number
ShippingPostalCode	String	Shipping zip

Appendix: OData Protocol

The Open Data Protocol (OData) is a data access protocol built over HTTP and it provides a way to query data over web in the RESTful manner.

This section describes OData protocol features supported by SPARROW Merchant Public API.

OData Request

OData request is a pure HTTP GET request. The source of data for querying is represented by the request's URL. The query parameters are passed in the HTTP query string.

SPARROW Merchant Public API supports the following parameters to be passed into OData services:

Name	Data Type	Description
\$skip	Integer	Indicates how many items in the query result should be skipped before putting them into the response. This parameter is used to organize paging in OData responses.
\$top	Integer	Indicates how many items should be put into the response. This parameter is used to organize paging in OData responses. By default: \$top=1000
\$filter	String	Actually contains a query expression. OData service returns only items which meet this filter condition. Example: <i>TransactionId eq 12345 and OperationTime gt 2016-03-04T12</i>
\$orderby	String	Allows specifying item ordering. Example: <i>TransactionId asc,CreationTime desc</i>

OData Logical Operations

It is possible to use the following logical operations for composing OData query (see \$filter parameter):

Operation Name	Operator	Description
Equals	eq	The eq operator returns true if the left operand is equal to the right operand, otherwise it returns false. The null value is equal to itself, and only to itself. Example: <i>Message eq 'APPROVE'</i>
Not Equals	ne	The ne operator returns true if the left operand is not equal to the right operand, otherwise it returns false. The null value is not equal to any value but itself. Example: <i>Message ne 'APPROVE'</i>
Greater Than	gt	The gt operator returns true if the left operand is greater than the right operand, otherwise it returns false. If any operand is null, the operator returns false. For Boolean values true is greater than false. Example: <i>Amount gt 2.33</i>
Greater Than Or Equal	ge	The ge operator returns true if the left operand is greater than or equal to the right operand, otherwise it returns false.

		<p>If only operand is null, the operator returns false. If both operands are null, it returns true because null is equals to itself. Example: Amount ge 2.33</p>
Less Than	lt	<p>The lt operator returns true if the left operand is less than the right operand, otherwise it returns false. If any operand is null, the operator returns false. Example: Amount lt 2.33</p>
Less Than or Equal	le	<p>The le operator returns true if the left operand is less than or equal to the right operand, otherwise it returns false. If only one operand is null, the operator returns false. If both operands are null, it returns true because null is equal to itself. Example: Amount le 2.33</p>
And	and	<p>The and operator returns true if both the left and right operands evaluate to true, otherwise it returns false. The null value is treated as unknown, so if one operand evaluates to null and the other operand to false, the and operator returns false. All other combinations with null return null. Example: Message eq 'APPROVE' and Amount gt 2.33</p>
Or	or	<p>The or operator returns false if both the left and right operands both evaluate to false, otherwise it returns true. The null value is treated as unknown, so if one operand evaluates to null and the other operand to true, the or operator return true. All other combinations with null return null. Example: Message eq 'APPROVE' or Message eq 'Success'</p>
Not	not	<p>The not operator returns true if the left operand returns false, otherwise it returns false. The null value is treated as unknown, so not null returns null. Example: not contains(Message, 'rejected')</p>

OData String Functions

It is possible to use the following string functions for composing OData query (see \$filter parameter):

Function	Description
contains	<p>The contains function returns true if the second parameter string value is a substring of the first parameter string value, otherwise it returns false.</p> <p>Example: contains(Message, 'rejected')</p>
endswith	<p>The endswith function returns true if the first parameter string value ends with the second parameter string value, otherwise it returns false.</p> <p>Example: endswith(ModuleName, 'ACH')</p>
startswith	<p>The startswith function returns true if the first parameter string value starts with the second parameter string value, otherwise it returns false.</p> <p>Example: startswith(ModuleName, 'MIMS')</p>
length	<p>The length function returns the number of characters in the parameter value.</p> <p>Example: length(Message) eg 0</p>
indexof	<p>The indexof function returns the zero-based character position of the first occurrence of the second parameter value in the first parameter value.</p> <p>Example: indexof(Message, 'ACH') gt 0</p>
substring	<p>The two argument substring function returns a substring of the first parameter string value, starting at the Nth character and finishing at the last character (where N is the second parameter integer value). The three argument substring function returns a substring of the first parameter string value identified by selecting M characters starting at the Nth character (where N is the second parameter integer value and M is the third parameter integer value).</p>
tolower	<p>The tolower function returns the input string value with all uppercase characters converted to lowercase according to Unicode rules.</p>
toupper	<p>The toupper function returns the input parameter string value with all lowercase characters converted to uppercase according to Unicode rules.</p>
trim	<p>The trim function returns the input parameter string value with all leading and trailing whitespace characters, according to Unicode rules, removed.</p>

	Example: trim(CompanyName) eq CompanyName
concat	The concat function returns a string that appends the second parameter string to the first. Example: concat(concat(Country, ' '), State)

OData Date/Time Functions

It is possible to use the following date/time functions for composing OData query (see \$filter parameter):

Function	Description
year	The year function returns the year component of the date parameter value. Example: year(OperationTime) eq 2015
month	The month function returns the month component of the date parameter value. Example: month(OperationTime) eq 2
day	The day function returns the day component of the date parameter value. Example: day(OperationTime) eq 25
hour	The hour function returns the hour component of the date parameter value. Example: hour(OperationTime) eq 12
minute	The minute function returns the minute component of the date or time parameter value. Example: minute(OperationTime) eq 20
second	The second function returns the second component of the date or time parameter value. Example: second(OperationTime) eq 0
date	The date function returns the date part of the date parameter value. Example: date(OperationTime) eq 2015-02-25
time	The time function returns the time part of the date parameter value. Example: time(OperationTime) gt 10:20:00
now	The now function returns the current point in time (date and time with time zone) as a date/time value.

	Example: custom_field gt now()
--	--------------------------------

OData Constants

It is possible to use constants for composing OData query (see \$filter parameter). Here are formats for constants of different data types:

Constant Type	Description
Null	null
Boolean	true/false
Integer	-256 or 0.12e1
Decimal	2.33
Date	2015-02-25
Date/time	2015-02-25T02:10:15Z
Time	02:20:25.898
String	'some text' (single-quoted text)
GUID	01234567-89ab-cdef-0123-456789abcdef

OData Response

Here is the structure of the OData response:

Name	Data Type	Description
Items		<p>This element contains an array of items which are returned by this query. Every item in the response have the same structure. This structure is dictated by the particular OData service that returns this response. See the service documentation for details about OData item structure.</p> <p>For XML formatter: the XML element that wraps OData item is dictated by the particular OData service as well. See the service documentation.</p>
TotalCount	Integer	<p>The number of items returned by this query. Note, OData response can be paged and only one page is returned in a single response. TotalCount – is a number of items at all, not just in the current page.</p> <p>SPARROW Merchant Public API services restrict the page size to 1000 items by the default.</p>
NextLink	String	<p>If the current page is not the last one, this parameter contains URL that can be used to retrieve the next page.</p>