



Draft Standard

MEF 134 Draft (R1)

Invoice Business Requirements and Use Cases

Release 1

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1 List of Contributing Members

The following members of the MEF participated in the development of this document and have requested to be included in this list.

Editor Note 1: This list will be finalized before Letter Ballot. Any member that comments in at least one CfC is eligible to be included by opting in before the Letter Ballot is initiated. Note it is the MEF member that is listed here (typically a company or organization), not their individual representatives.

- ABC Networks
- XYZ Communications

2 Abstract

This document contains the Business Requirements and Use Cases for Invoicing between a Seller and a Buyer at the Sonata Interface Reference Point.

3 Release Notes

This document currently has an open Letter Ballot. Changes are not expected to be made to the document.

4 Terminology and Abbreviations

This section defines the terms used in this document. In many cases, the normative definitions to terms are found in other documents. In these cases, the third column is used to provide the reference that is controlling, in other MEF or external documents.

In addition, terms defined in [MEF 55.1 \[3\]](#) are included in this document by reference and are not repeated in the table below.

Term	Definition	Reference
Invoice	A legal document generated by the Seller to the Buyer relating to charges associated to Products provided by the Seller to the Buyer.	This document

Table 1 – Terminology and Abbreviations

5 Compliance Levels

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 BCP 14 (RFC 2119 [1], RFC 8174 [2]) when, and only when, they appear in all capitals, as shown here. All key words must be in bold text.

Items that are **REQUIRED** (contain the words **MUST** or **MUST NOT**) are labeled as [Rx] for required. Items that are **RECOMMENDED** (contain the words **SHOULD** or **SHOULD NOT**) are labeled as [Dx] for desirable. Items that are **OPTIONAL** (contain the words **MAY** or **OPTIONAL**) are labeled as [Ox] for optional.

Editor Note 2: The following paragraph will be deleted if no conditional requirements are used in the document.

A paragraph preceded by [CRa]< specifies a conditional mandatory requirement that **MUST** be followed if the condition(s) following the "<" have been met. For example, "[CR1]<[D38]" indicates that Conditional Mandatory Requirement 1 must be followed if Desirable Requirement 38 has been met. A paragraph preceded by [CDb]< specifies a Conditional Desirable Requirement that **SHOULD** be followed if the condition(s) following the "<" have been met. A paragraph preceded by [COc]< specifies a Conditional Optional Requirement that **MAY** be followed if the condition(s) following the "<" have been met.

6 Numerical Prefix Conventions

Editor Note 3: This section will be deleted if no numerical prefixes are used in the document.

This document uses the prefix notation to indicate multiplier values as shown in Table 2.

Decimal		Binary	
Symbol	Value	Symbol	Value
k	10 ³	Ki	2 ¹⁰
M	10 ⁶	Mi	2 ²⁰
G	10 ⁹	Gi	2 ³⁰
T	10 ¹²	Ti	2 ⁴⁰
P	10 ¹⁵	Pi	2 ⁵⁰
E	10 ¹⁸	Ei	2 ⁶⁰
Z	10 ²¹	Zi	2 ⁷⁰
Y	10 ²⁴	Yi	2 ⁸⁰

Table 2 – Numerical Prefix Conventions

7 Introduction

This document defines the Business Requirements and Use Cases for Invoicing at the Sonata Interface Reference Point (IRP). The focus of this document is on the ability of a Seller to notify a Buyer that an Invoice for their products is available and for the Buyer to retrieve an Invoice. The Buyer then either accepts the Invoice or disputes one or more charges associated with the Invoice. Disputed charges are resolved by the Buyer and Seller.

The document does not address how payment of an Invoice is made by the Buyer. This is beyond the scope of the project.

8 Use Cases

Based on the Epics and User Stories defined previously, the following Use Cases have been developed, An overview of the Use Cases contained in this document are shown in Table 3.

Use Case Name	Use Case Description	Reference Section
Register for Notification	Buyer is able to register for Invoice Notifications	
Send Notification	Seller sends an Invoice Notification to a Buyer	
Retrieve Invoice List	The Buyer is able to retrieve a list of Invoices.	
Retrieve Invoice by Identifier	The Buyer is able to retrieve a specific Invoice based on the Invoice Identifier of the Invoice	
Dispute Invoice or Line Item	The Buyer informs the Seller that they are disputing one or more Line Items in an Invoice.	

Table 3 – Use Case Overview

8.1 Notification Use Cases

The Use Cases that support Sonata Invoicing are defined in this section.

8.1.1 Register for Invoice Notifications

A request initiated by the Buyer to instruct the Seller to send notifications of Invoice state changes to the Buyer. Pre-Conditions

The Buyer has a commercial relationship with the Seller. The Buyer is the responsible party for payment for products that have been delivered to the Buyer by the Seller.

8.1.1.1 Process Steps

1. The Buyer sends the Register for Invoice Notification request to the Seller.

[R1] The Buyer request **MUST** contain the following:

Attribute	Value	Definition
Notification Action	Stop	
	Start	
Notification Type	Invoice Ready State Change	

Attribute	Value	Definition
Recipient Information		

Table 4 – Register for Invoice Notification Buyer Request Attributes

- The Seller responds to the Buyer’s request with an acknowledgment.
- The Seller is now aware of where to send Invoice Notifications and generates Invoice Notifications to the Buyer for any Invoice State Changes going forward.

The Seller returns an error message if they do not support notifications.

[R2] If the Seller does not support notifications, they **MUST** return an error message to a Buyer’s request to register for notifications that indicates that notifications are not supported.

8.1.2 Generate Invoice Notifications

The Seller sends Invoice notifications to a Buyer target address when the Buyer has registered for Invoice notifications.

8.1.2.1 Process Steps

- The Seller sends an Invoice Notification to the Buyer.
 - [R3]** The Invoice notification **MUST** contain the following:
 - Notification Type (Invoice Ready, State Change)
 - Invoice Identifier
 - [R4]** The Invoice Ready notification **MUST** be sent when an Invoice is in the Generated state.
- The Buyer acknowledges the Notification received from the Seller.
 - [O1]** If the Seller fails to receive an acknowledgement from the Buyer repeatedly, they Seller **MAY** make the target address as bad and stop sending notifications.

8.2 Retrieve Invoice Use Cases

The Use Cases for the Retrieve Invoice Epic are defined in this section of the document.

8.2.1 Retrieve Invoice List

A request initiated by a Buyer, who is authorized to purchase products from the Seller, to retrieve a list of Invoices that meet a set of filter criteria.

8.2.1.1 Process Steps

- The Buyer sends a Retrieve Invoice List request to the Seller.

[R5] The Buyer request **MUST** contain the following:

- Invoice Account ID
- Start Date
- End Date
- Invoice Category
- Invoice State

2. The Seller receives this request and returns a response.

[R6] The Seller response **MUST** include the following for each entry in the list:

- Invoice Identifier – an identifier for the Buyer’s Invoicing Account that is unique within the Seller and that is assigned by the Seller.
- Invoice Number – a number assigned to the Invoice by the Seller that is unique within the Invoicing Account.
- Invoice Category
 - Normal – an Invoice for the Invoicing Cycle
 - Duplicate – a copy of an Invoice that has been provided.
 - Interim – an Invoice that is provided instead of a Normal Invoice.
 - Last – the last Invoice for a Product that has been disconnected.
 - Trial Customer – a Invoice for a customer during a trial period
 - Credit Note for Example – an example of a credit note that may be included within an Invoice.
- Invoice State
 - New – an Invoice that has been created based on the completion of an Invoicing Cycle.
 - On_hold – an Invoice that is On_hold due to issues raised by the Buyer.
 - Validated – an Invoice where all items have been validated.
 - Sent – an Invoice for which an Invoice Notification has been sent to the Buyer.
 - Partial_Payment – an Invoice for which a partial payment has been received.
 - Settled – an Invoice for which all payment due has been received

[R7] If no Invoices match the criteria provided by the Buyer, the Seller **MUST** return a positive response with an empty list.

8.2.2 Retrieve Invoice by Invoice Identifier

A request initiated by the Buyer, who has been authorized to purchase products from the Seller, to retrieve a specific Invoice using the Invoice Identifier to identify the Invoice.

8.2.2.1 Process Steps

1. The Buyer sends a Retrieve Invoice by Invoice Identifier request to the Seller.

[R8] The Buyer request **MUST** contain the following:

- Invoice Identifier – an identifier for the Buyer’s Invoice that is unique within the Seller and that is assigned by the Seller.

2. The Seller receives this request and returns a response.

[R9] The Seller response **MUST** include the attributes in Table 5 and Table 6 for the Invoice Identifier.

Attribute		Description
Invoice Number		A number assigned to the Invoice by the Seller
Run Type	Sub-Attribute	The Invoicing cycle as set by the Seller
	On_Cycle	Invoice created as a result of the normal Invoicing Cycle
	Off_Cycle	Invoice created outside the normal Invoicing Cycle. This may be based on a Buyer request or for other reasons.
Invoice Category	Values	The type of Invoice
	Normal	An Invoice for the Invoicing Cycle
	Duplicate	A copy of an Invoice that has been provided
	Trial	An Invoice that is sent by the Seller to the Buyer for test Invoicing purposes to assist in assuring that their Invoicing implementations are compatible. The Trial Invoice is not paid.
Invoice State	Values	The state of the Invoice
	Credit	The Seller has agreed with the Buyer that disputed charges are in error and has provided a credit for the disputed charges in error.
	Generated	An Invoice that has been created based on the completion of an Invoicing Cycle and an Invoice Notification has been sent to the Buyer.
	In Dispute	A Buyer has disputed charges included in an Invoice and those charges are in the Seller’s Dispute Process.
	Fully Settled	An Invoice for which all payment due has been received.
	Partially Settled	An Invoice for which a partial payment has been received.

Attribute		Description		
	Withdrawn	A Seller has agreed with the Buyer that disputed charges are in error and has withdrawn the Invoice.		
Last Update Date		The date when the Invoice was last modified.		
Invoice Date		Date the Invoice was issued.		
Invoicing Period	Sub-Attribute		The Start and Stop Dates of the Invoicing Period.	
	Start Date		The date the Invoicing Period started.	
	Stop Date		The date the Invoicing Period ended.	
Invoicing Cycle Identifier		The identifier of the Invoicing Cycle iteration.		
Amount Due		The total amount of money (unit, value) with all taxes, fees, and credits applied that is due.		
Payment Due Date		The date by which a payment of the Amount Due must be received by the Seller		
Remaining Amount		An amount of money (unit, value) that still requires payment.		
Tax Excluded Amount		The amount of money (unit, value) due without taxes being calculated for the current Invoicing Cycle.		
Tax Included Amount		The amount of money (unit, value) due with taxes being calculated for the current Invoicing Cycle.		
Discounts				
Fees				
Credits				
Applied Payment	Sub-Attribute		A list details of a payment that has been received from the Buyer	
	Applied Amount		The amount of money (unit, value) that was received from the Buyer and applied to the Invoice as payment.	
	Payment	Sub-Sub-Attribute		A payment that has been received.
		Payment Identifier		An identifier for the payment that is unique within the Buyer Invoicing Account and is assigned by the Seller.
		Payment Date		The Date the payment was received.
		Amount		The amount of money (unit, value) received.
		Payment Method		The specific means of payment.
	Sub-Attribute		The Buyer Invoicing Account.	

Attribute		Description
Invoicing Account	Invoicing Account Identifier	An identifier for the Invoicing Account that is unique within the Seller and is assigned by the Seller.
Tax Items	Sub-Attribute	
	Tax Category	The Tax Category for this tax item.
	Tax Rate	The Tax Rate for this Tax Item.
	Tax Amount	The amount of money (unit, value) calculated for this Tax Item.
Related Parties	Sub-Attribute	A party related to this Invoice.
	Identifier	An identifier for the Related Party that is unique within the Seller and is assigned by the Seller.
	Name	The name of the Related Party.
	Role	The role of the Related Party.
	Type	The type of Related Party.
Financial Account	Sub-Attribute	A Financial Account within the Seller.
	Identifier	An identifier for the Financial Account that is unique within the Seller and is assigned by the Seller.
	Name	The name of the Financial Account.
	Type	The type of the Financial Account.

Table 5 – Invoice Attributes

Attribute	Description
Item Identifier	The Invoice Line-Item identifier.
Product Identifier	The identifier of the Product that is the subject of the Line Item. A Product Identifier is provided unless no Product Identifier exists. In that case, the Product Order Identifier is used instead of the Product Identifier.
Product Order Identifier	The identifier for a Product Order that did not result in an installed Product.
Product Name	The name of the Product that is the subject of the Line Item.
Invoicing Start Date	The start date of Invoicing for the Line Item
Invoicing End Date	The end date of Invoicing for the Line Item.
Charge Description	A text description of the charge.
Unit Rate	The rate per unit for the Invoice determined during or after the Invoicing Process.

Attribute		Description
Unit Quantity		The number of units.
Charge Type		The type of charge related to the Line Item. The type is one of: <ul style="list-style-type: none"> • Recurring • Non-recurring • Usage-based
Duty Free Amount		The amount of money (unit, value) of the charge before taxes and fees are calculated and applied.
List of Taxes	Sub-Attribute	Taxes and fees associated with the Line Item
	Tax Category	The category of the Tax.
	Tax Description	A description of the type of Tax
	Tax Rate	The rate at which the Tax is calculated.
	Tax Amount	The amount of money (unit, value) of the Tax.
List of Fees		

Table 6 – Invoice Line-Item Attributes

8.2.3 Retrieve Printable Invoice

A request initiated by the Buyer, who has been authorized to purchase products from the Seller, to retrieve a specific Invoice using the Invoice Identifier to identify the Invoice in a printable format.

8.2.3.1 Process Steps

1. The Buyer sends a Retrieve Printable Invoice by Invoice Identifier request to the Seller.

[R10] The Buyer request **MUST** contain the following:

- Invoice Identifier – an identifier for the Buyer’s Invoice that is unique within the Seller and that is assigned by the Seller.

2. The Seller receives this request and returns a response that includes a file that is printable by the Buyer. The format of the printable invoice is agreed to by the Buyer and Seller during on-boarding.

[R11] The Seller response **MUST** include the attributes in Table 5 and Table 6 for the Invoice Identifier in the printable file.

8.3 Dispute Charges

The Buyer can dispute an Invoice or a Line Item within an Invoice.

8.3.1 Dispute Invoice

The Buyer can dispute an entire Invoice.

8.3.1.1 Process Steps

1. The Buyer sends a Dispute Invoice request to the Seller.
 - [R12] The Dispute Invoice request **MUST** contain the disputed Invoice Identifier and the Dispute Reason.
2. The Seller moves the Invoice to the InDispute state and begins the Seller's dispute process.
 - [R13] The Seller **MUST** move an Invoice for which a Dispute Invoice request has been received to the In Dispute state and begin any applicable process to resolve the dispute.
3. The Seller concludes the dispute process and updates the state of the dispute to either Accepted or Declined.
 - [R14] The Seller **MUST** update the state of the dispute to Accepted if the dispute process accepted the dispute.
 - [R15] If the dispute is accepted, the Seller **MUST** update the Invoice accordingly and notify the Buyer that the revised Invoice is available if applicable.
 - [R16] The Seller **MUST** update the state of the dispute to Declined if the dispute process declined the dispute.

8.3.2 Dispute Line Item

The Buyer can dispute one or more Line Items within an Invoice.

8.3.2.1 Process Steps

1. The Buyer sends a Dispute Invoice Line-Item request to the Seller.
 - [R17] The Dispute Invoice request **MUST** contain the disputed Invoice Identifier, one or more Line-Item Identifiers, and the Dispute Reason for each Line Item.
2. The Seller moves the Invoice to the In Dispute state and begins the Seller's dispute process.
 - [R18] The Seller **MUST** move an Invoice for which a Dispute Invoice Line-Item request has been received to the In Dispute state and begin any applicable process to resolve the dispute.
3. The Seller concludes the dispute process and updates the state of the dispute to either Accepted or Declined.

- [R19] The Seller **MUST** update the state of the dispute to Accepted if the dispute process accepted the dispute.
- [R20] If the dispute is accepted, the Seller **MUST** update the Invoice and Line Item(s) accordingly and notify the Buyer that the revised Invoice is available if applicable.
- [R21] The Seller **MUST** update the state of the dispute to Declined if the dispute process declined the dispute.

9 Process Flows

9.1 Invoice Process Flow

The process flow for Invoicing is shown in Figure 1.

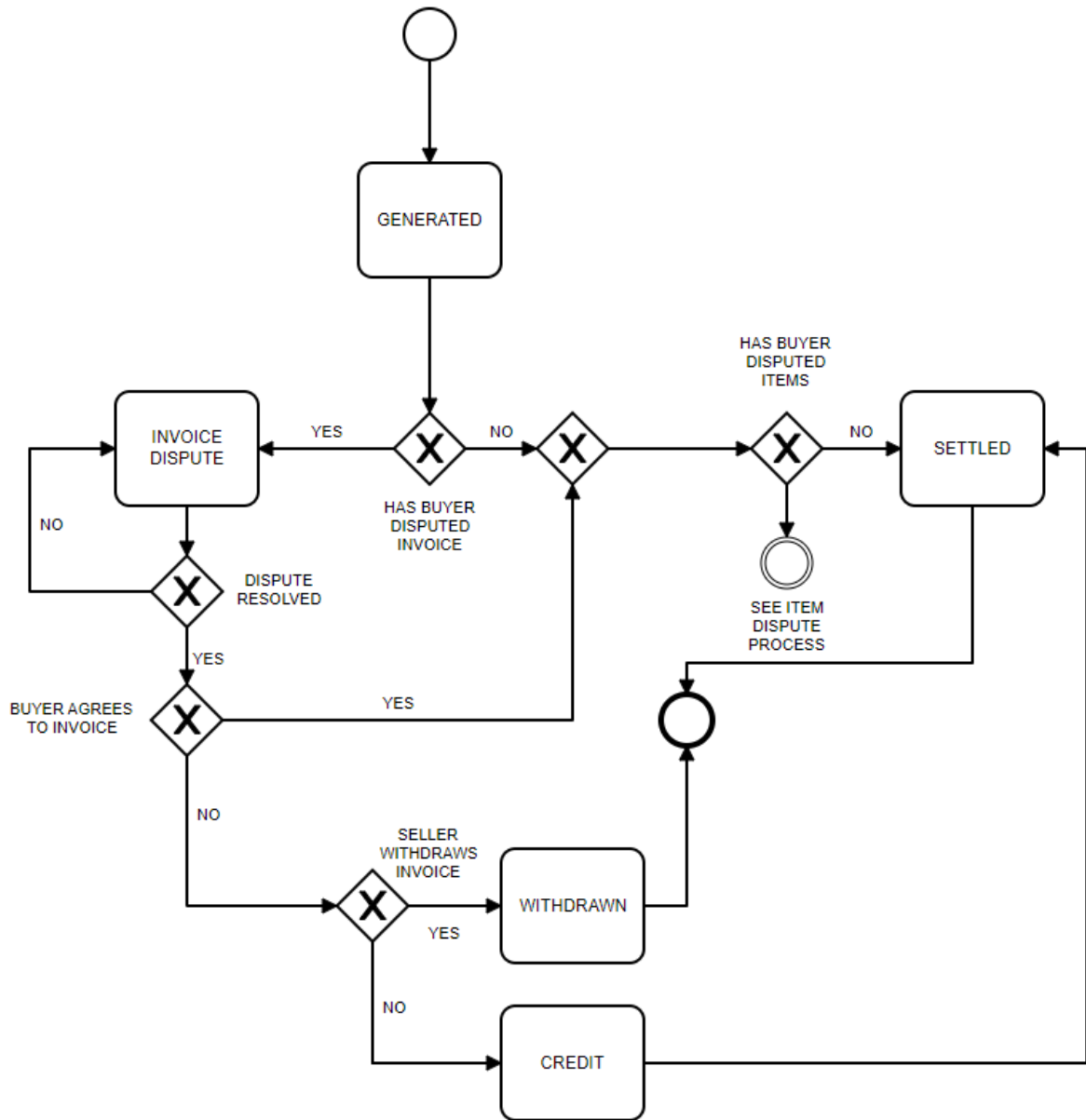


Figure 1 – Invoice Process Flow

The states within the Invoice Process Flow are described in Table 7.

State	Definition	Comments
CREDIT	The Seller has agreed with the Buyer that disputed	How a Seller determines whether to offer a credit or

	charges are in error and has provided a credit for the amount in error.	withdraw the Invoice is beyond the scope of this document.
DISPUTE	A Buyer has disputed charges included in an Invoice and those charges are in the Seller's Dispute Process. Disputes cannot exit the dispute process until the Dispute is resolved.	The method of disputing charges on an Invoice is beyond the scope of this document.
GENERATED	An Invoice that has been created based on the completion of an Invoicing Cycle and an Invoice Notification has been sent to the Buyer.	
SETTLED	An Invoice for which all payment due has been received.	
WITHDRAWN	A Seller has agreed with the Buyer that disputed charges are in error and has withdrawn the Invoice.	How a Seller determines whether to offer a credit or withdraw the Invoice is beyond the scope of this document.

Table 7 – Invoice Process Flow States

[R23] An Invoice API **MUST** support the states and transitions shown in Figure 1 and Table 7.

9.2 Invoice Line Item Flow

The process flow for line item in Invoicing is shown in

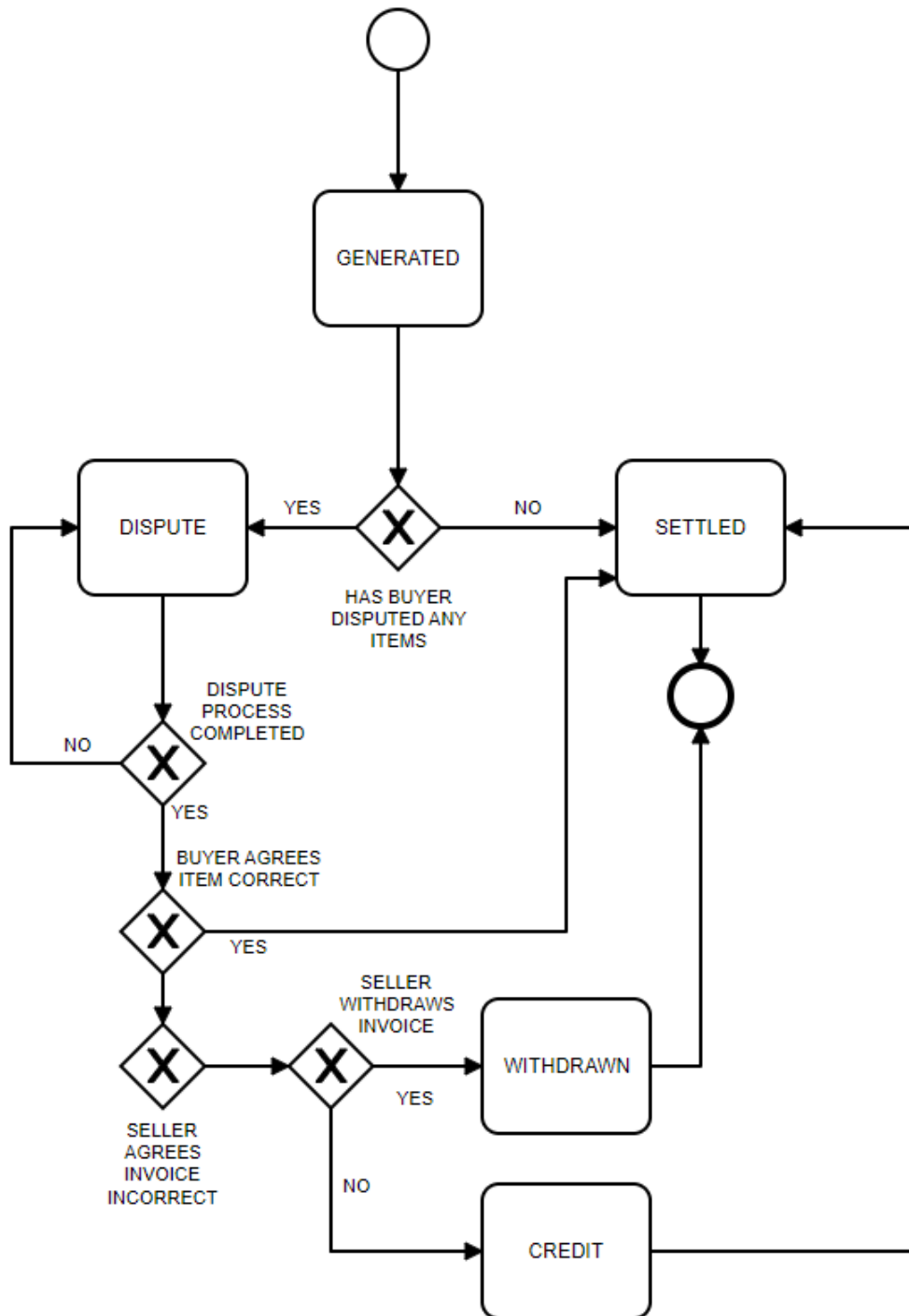


Figure 2 – Invoice Line Item Flow

State	Definition	Comments
CREDIT	The Seller has agreed with the Buyer that disputed charges are in error and has	How a Seller determines whether to offer a credit or withdraw the Invoice is

	provided a credit for the amount in error.	beyond the scope of this document.
DISPUTE	A Buyer has disputed charges included in an Invoice and those charges are in the Seller's Dispute Process. Disputes cannot exit the dispute process until the Dispute is resolved.	The method of disputing charges on an Invoice is beyond the scope of this document.
GENERATED	An Invoice that has been created based on the completion of an Invoicing Cycle and an Invoice Notification has been sent to the Buyer.	
SETTLED	An Invoice for which all payment due has been received.	
WITHDRAWN	A Seller has agreed with the Buyer that disputed charges are in error and has withdrawn the Invoice.	How a Seller determines whether to offer a credit or withdraw the Invoice is beyond the scope of this document.

Table 8 – Invoice Line Item Process Flow States

[R24] An Invoice API **MUST** support the states and transitions shown in Figure 2 and Table 8.

9.3 Payment Process Flow

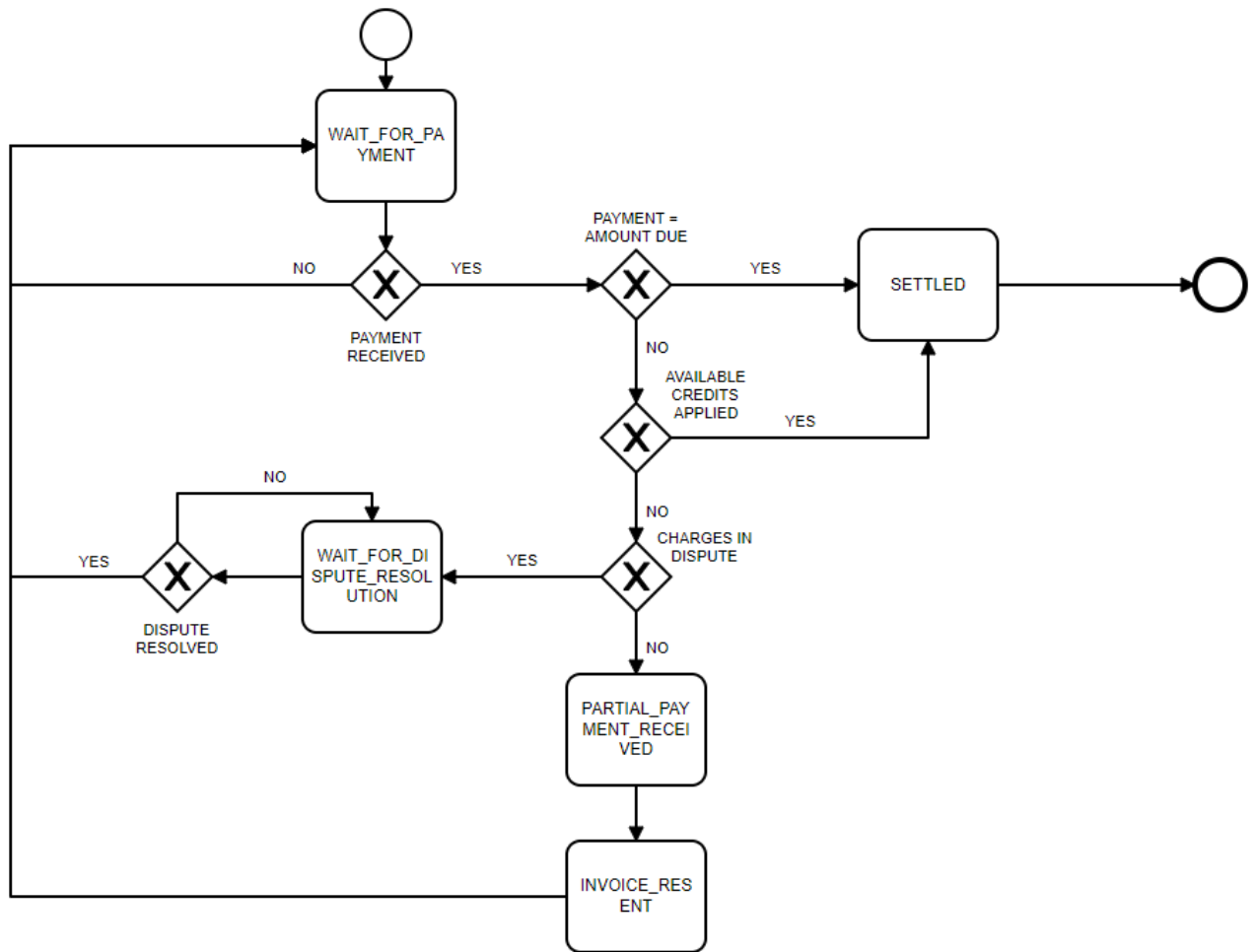


Figure 3 – Payment Process Flow

The states within the Payment Process Flow are described in Table 9.

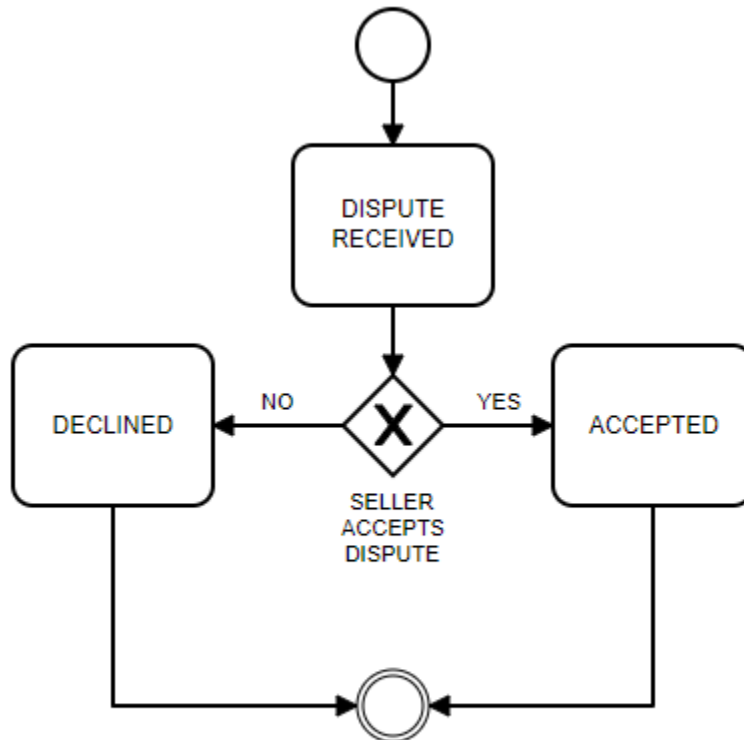
State	Definition	Comments
INVOICE_RESENT	A partial payment on an Invoice has been received and the Seller has sent an Invoice Notification indicating that the Invoice is not Settled.	
PARTIAL_PAYMENT_RECEIVED	A partial payment on an Invoice has been received from the Buyer.	

SETTLED	An Invoice for which all payment due has been received.	
WAIT_FOR_DISPUTE_RESOLUTION	The Buyer has disputed charges on the Invoice and the Dispute Resolution process is in progress.	
WAIT_FOR_PAYMENT	An Invoice Notification has been sent and the Seller is awaiting payment from the Buyer.	

Table 9 – Payment Process States

[R25] An Invoice API **MUST** support the states and transitions shown in Figure 3 and Table 9.

9.4 Dispute Process Flow


Figure 4 – Dispute Process Flow

The states within the Dispute process are shown in Table 10.

State	Definition	Comments
ACCEPTED	A dispute received from the Buyer has been accepted by the Seller.	
DECLINED	A dispute received from the Seller has been declined by the Seller.	
DISPUTE RECEIVED	A dispute has been received from the Buyer	

Table 10 – Dispute Process States

- [R26]** An Invoice API **MUST** support the states and transitions shown in Figure 4 and Table 10.

10 References

- [1] IETF RFC 2119, *Key words for use in RFCs to Indicate Requirement Levels*, by S. Bradner, March 1997
- [2] IETF RFC 8174, *Ambiguity of Uppercase vs Lowercase in RFC 2119 Key Words*, by B. Leiba, May 2017, Copyright (c) 2017 IETF Trust and the persons identified as the document authors. All rights reserved.
- [3] MEF 50.1, MEF Forum, *MEF Services Lifecycle Process Flows, MEF 50.1*, August 2017.
- [4] TMF678, *Customer Bill Management API Rest Specification R17.5.1*, May 2018