**ISO 20022**

Approved by the Cards and Related Retail Financial Services SEG on 1 February 2022

**Message Definition Report - Part 1**

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**Table of contents**

[1. Introduction 4](#_Toc531954102)

[1.1 Terms and definitions 4](#_Toc531954103)

[1.2 Glossary 4](#_Toc531954104)

[1.3 Document Scope and Objectives 5](#_Toc531954105)

[1.4 References 5](#_Toc531954106)

[2. Scope and Functionality 6](#_Toc531954107)

[2.1 Background 6](#_Toc531954108)

[2.2 Scope 6](#_Toc531954109)

[2.3 Groups of Message Definitions and Functionality 6](#_Toc531954110)

[3. BusinessRoles and Participants 8](#_Toc531954111)

[4. BusinessProcess Description 11](#_Toc531954112)

[4.1 BusinessProcess 11](#_Toc531954113)

[4.1.1 BusinessProcess Diagram: Financial Services 12](#_Toc531954114)

[4.1.2 BusinessProcess Diagram: Administrative Services 13](#_Toc531954115)

[4.1.3 BusinessProcess Diagram: System Services 14](#_Toc531954116)

[4.1.4 BusinessProcess Diagram: Device Management 15](#_Toc531954117)

[4.2 BusinessProcess Process Flows 16](#_Toc531954118)

[4.2.1 BusinessProcess Process Flow: Financial Services 16](#_Toc531954120)

[4.2.2 BusinessProcess Process Flow: Administrative Services 17](#_Toc531954121)

[4.2.3 BusinessProcess Process Flow: System Services 18](#_Toc531954122)

[4.2.4 BusinessProcess Process Flow: Device Management 19](#_Toc531954123)

[5. Description of BusinessActivities 20](#_Toc531954124)

[5.1 BusinessProcess – Financial Services – Generic Card Payment Process 21](#_Toc531954125)

[5.2 BusinessProcess – Administrative Services 22](#_Toc531954126)

[5.3 BusinessProcess – System Services 24](#_Toc531954127)

[5.4 BusinessProcess – Device Management 25](#_Toc531954128)

[6. BusinessTransactions 26](#_Toc531954129)

[6.1 BusinessTransactions: Financial Services 27](#_Toc531954130)

[6.2 BusinessTransactions: Administrative Services 28](#_Toc531954131)

[6.3 BusinessTransactions: System Services 29](#_Toc531954132)

[6.4 BusinessTransactions: Device Management Transactions 32](#_Toc531954138)

[7. Examples 33](#_Toc531954139)

[8. Revision Record 34](#_Toc531954140)

**Table of figures**

[Figure 1: Business Roles and Participants - Sale System and POI System 7](#_Toc6222655)

[Figure 2: BusinessRoles and Participants - Cardholder and Acceptor 8](#_Toc6222656)

[Figure 3: BusinessProcess Diagram - Financial Services 11](file:///I:\Prof\Prof-ISTIUM\ISTIUM\01-Commerce\1-Tiers\0079-C-NEXO-STD\04-Missions\201711_NEXO_ISO20022Retail\3-Prestas\3-2-MDR-Part1\NEXO_20190415_ISO20022_CAPE_casp_Retailer_MDR-Part1_v1-2.docx#_Toc6222657)

[Figure 4: BusinessProcess Diagram - Administrative Services 12](#_Toc6222658)

[Figure 5: BusinessProcess Diagram – System Services 13](#_Toc6222659)

[Figure 6: BusinessProcess Diagram - Device Management 14](#_Toc6222660)

[Figure 7: BusinessProcess Flow - Financial Services 15](#_Toc6222661)

[Figure 8: BusinessProcess Flow – Administrative Services 16](#_Toc6222662)

[Figure 9: BusinessProcess Flow – System Services 17](#_Toc6222663)

[Figure 10: BusinessProcess Flow – Device Management 18](#_Toc6222664)

[Figure 11: BusinessProcess – Generic Card Payment Process 20](#_Toc6222665)

[Figure 12: BusinessProcess – Session opening process 21](#_Toc6222666)

[Figure 13: BusinessProcess – Session closing process 22](#_Toc6222667)

[Figure 14: BusinessProcess – Session abort 23](#_Toc6222668)

[Figure 15: BusinessProcess – Device Management 24](#_Toc6222669)

[Figure 16: BusinessTransactions - Standard Payment Exchange 26](#_Toc6222670)

[Figure 17: BusinessTransactions - Session Management 27](#_Toc6222671)

[Figure 18: BusinessTransactions - Abort 28](#_Toc6222672)

[Figure 19: BusinessTransactions – Event Notification 29](#_Toc6222673)

[Figure 20: BusinessTransactions – Message Rejection 30](#_Toc6222674)

[Figure 21: BusinessTransactions – Message Rejection 30](#_Toc6222675)

[Figure 22: BusinessTransactions - Device Request and Device Response 31](#_Toc6222676)

**Preliminary note:**

The Message Definition Report (MDR) is made of three parts:

* **MDR - Part 1** describes the contextual background required to understand the functionality of the proposed message set. Part 1 is produced by the submitting organisation that developed or maintained the message set in line with a MDR Part1 template provided by the ISO 20022 Registration Authority (RA) on [www.iso20022.org](http://www.iso20022.org)
* **MDR – Part 2** is the detailed description of each message definition of the message set. Part 2 is produced by the RA using the model developed by the submitting organisation.
* **MDR – Part 3** is an extract of the ISO 20022 Business Model describing the business concepts used in the message set. Part 3 is an Excel document produced by the RA.

# Introduction

## Terms and definitions

The following terms are reserved words defined in ISO 20022 – Part1. When used in this document, they will follow the UpperCamelCase notation.

|  |  |
| --- | --- |
| Term | Definition |
| BusinessRole | Functional role played by a business actor in a particular BusinessProcess or BusinessTransaction |
| Participant | Involvement of a BusinessRole in a BusinessTransaction |
| BusinessProcess | Unrealized definition of the business activities undertaken by BusinessRoles within a BusinessArea whereby each BusinessProcess fulfils one type of business activity and whereby a BusinessProcess may include and extend other BusinessProcesses |
| BusinessTransaction | Particular solution that meets the communication requirements and the interaction requirements of a particular BusinessProcess and BusinessArea |
| MessageDefinition | Formal description of the structure of a MessageInstance |

## Glossary

**Acronyms:**

|  |  |
| --- | --- |
| Acronym | Definition |
| CAPE | Card Payment Exchanges |
| casp | Card Sale to POI |
| ISO | International Organization for Standardization |
| MDR | Message Definition Report |
| MUG | Message User Guide |
| PIN | Personal Identification Number |
| PIN Pad | Keypad used by the Cardholder to type his/her PIN |
| POI | Point of Interaction. Place where customer completes his/her payment. |
| POI System | The POI system refers to the Payment terminal, either physical or virtual |
| SEG | Standards Evaluation Group |

## Document Scope and Objectives

This document is the first part of the ISO 20022 Message Definition Report (MDR) that describes the BusinessTransactions and underlying message set. For the sake of completeness, the document may also describe BusinessActivities that are not in the scope of the project.

This document sets:

* The BusinessProcess scope (business processes addressed or impacted by the project)
* The BusinessRoles involved in these BusinessProcesses

The main objectives of this document are:

* To explain what BusinessProcesses and BusinessActivities these MessageDefinitions have addressed
* To give a high-level description of BusinessProcesses and the associated BusinessRoles
* To document the BusinessTransactions and their Participants (sequence diagrams)
* To list the MessageDefinitions

## References

| Document | Version | Date | Author |
| --- | --- | --- | --- |
| ISO20022 Retail protocol: Message Definition Report part 2 | 3.0 |  | nexo |
| ISO20022 Retail protocol: Message Definition Report part 3 | 3.0 |  | nexo |
| Card Payment Protocols Security | 3.0[[1]](#footnote-1) |  | nexo |
| Sale to POI protocol Message Usage Guide | 6.0[[2]](#footnote-2) |  | nexo |

# Scope and Functionality

## Background

This Message Definition Report covers a set of 17 ISO 20022 Message Definitions developed by NEXO STANDARDS in close collaboration with the card payment industry and submitted to the approval of the Card and Related Retail Financial Service Standards Evaluation Group (SEG).

These messages are specifically designed to support message exchanges between a Sale System and a POI System (physical or virtual payment terminal at point of interaction).

## Scope

These messages are specifically designed to support message exchanges between a Sale System and a POI System.

## Groups of Message Definitions and Functionality

Card payment services are the basic business services allowing a cardholder to pay for the purchase of goods and services from a card acceptor using his card or to use other services like loyalty using his card. Other services are provided in addition to the basic card payment business services.

These services are supported by the following exchanges of messages:

* Financial services
  + *Service Request* (casp.001): to request a financial service by the Sale system, like purchase, a loyalty transaction or other supported services on the POI system,
  + *Service Response* (casp.002): to give an answer to the Service request,
  + *Reconciliation Request* (casp.003): to request by the Sale system, a reconciliation process with an Acquiring system or to retrieve information on a completed reconciliation process,
  + *Reconciliation Response* (casp.004): to give an answer to the Reconciliation request,
* Administrative services
  + *Session Management Request* (casp.005): to request a session functions like login, logoff or diagnosis, initiated by the Sale system,
  + *Session Management Response* (casp.006): to give an answer to the Session Management request,
  + *Admin Request* (casp.007): to select and start customised administrative services provided by the POI, using a "menu" for an interactive or software interface, initiated by the Sale system,
  + *Admin Response* (casp.008): to give an answer to the Admin request,
  + *Report Request* (casp.009): to request a transaction report to the POI system,
  + *Report Response* (casp.010): to give an answer to the Report request,
* System services
  + *Abort* (casp.011): to request by the Sale system, an abort of process on the POI system after timeout or another detected error,
  + *Event Notification* (casp.012): to send an event by the POI System to the Sale system, when an event occurs which could disturb the POI availability,
  + *Message Rejection* (casp.013): to reject a received message; Message Rejection is sent by the recipient when it cannot interpret or process the incoming message,
  + *Message Status Request* (casp.014): to request the status of a transaction,
  + *Message Status Response* (casp.015): to provide an answer to Message Status Request,
* Device management messages
  + *Device Request* (casp.016): to request one or several functions from user Interface or payment peripherals on the POI system or on the Sale system,
  + *Device Response* (casp.017): to give an answer to the Device request.

# BusinessRoles and Participants

A BusinessRole represents an entity (or a class of entities) of the real world, physical or legal, a person, a group of persons, a corporation. Examples of BusinessRoles: “Financial Institution”, “ACH”, “CSD”.

A Participant is a functional role performed by a BusinessRole in a particular BusinessProcess or BusinessTransaction: for example, the “user” of a system, “debtor”, “creditor”, “investor” etc.

The relationship between BusinessRoles and Participants is many-to-many. One BusinessRole (that is, a person) can be involved as different Participants at different moments in time or at the same time: "user", "debtor”, "creditor", "investor", etc. Different BusinessRoles can be involved as the same Participant.

Here are the main BusinessRoles and Participants:

 

Figure 1: Business Roles and Participants - Sale System and POI System

 

Figure 2: BusinessRoles and Participants - Cardholder and Acceptor

| **Participants and BusinessRoles definitions** | |
| --- | --- |
| **Description** | **Definition** |
| Participants | |
| Sale system | Merchant system allowing to complete sales, like a cash register or web site basket for instance. |
| POI System | A system performing card transaction at the merchant site. Also known as a Payment terminal or EFTPOS (Electronic Funds Transfer Point of Sales Terminal), it can be physical or virtual for e-commerce. |
| Cardholder | A Cardholder refers to a customer using a Card to consume services like payment or other related card services. The services are performed via electronic transactions. |
| Acceptor | A Card Acceptor or an Acceptor is a Participant accepting payment by Cards. |
|  |  |
| BusinessRoles | |
| Cash Register | An electronic device for registering and calculating transactions at a point of sale. |
| Vending Machine | An electronic device able to complete transactions without the presence of a Cashier. |
| Sale Server | A server used to manage several Cash Registers, Vending Machines or other sales-dedicated devices or processes. |
| POI Terminal | A physical device or a software process able to receive card payments. |
| POI Terminal and server | A POI configuration mode of a server managing one or several POI terminals |
| Customer | A party purchasing goods or services at a merchant site face-to-face or remotely. It can be an individual or a company. |
| Merchant | An entity which provides goods and/or services at one or several sites (physical or virtual). |
| Merchant agent | An entity that can act on behalf of one or several Acceptors. It could be a sub-contractor or processor delivering services to Merchants. |
| Cashier | A Cashier refers to the attendant of the Merchant who performs electronic transactions using the Sale System. |
| Supervisor | Attendant of the Merchant who is allowed to perform sensitive operations like refunds or to adjust settings of a Sale System or POI System. |
|  |  |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **BusinessRoles/Participants Matrix Table** | | | | |
| Participants  BusinessRoles | Sale System | POI System | Cardholder | Acceptor |
| Cash Register | X |  |  |  |
| Vending Machine | X |  |  |  |
| Sale Server | X |  |  |  |
| POI Terminal |  | X |  |  |
| POI Terminal and server |  | X |  |  |
| Customer |  |  | X |  |
| Merchant |  |  |  | X |
| Merchant agent |  |  |  | X |
| Cashier |  |  |  | X |
| Supervisor |  |  |  | X |

# BusinessProcess Description

## BusinessProcess

BusinessProcesses are grouped according to:

* Financial Services, allowing the customer to complete financial transactions (payment, loyalty, ...) on the POI System,
* Administrative Services, allowing the Merchant or the Cashier to execute administrative tasks.
* System Services, allowing any party to reject or abort previously sent orders, to require and obtain message status, or to deal with events,
* Device Management, covering the interaction between Sale System and POI System peripherals.

### BusinessProcess Diagram: Financial Services

Financial services include the following processes:



Figure 3: BusinessProcess Diagram - Financial Services

Financial Services:

* *Definition*: Services to the Cardholder delivered through the POI System and/or the Sale System.
* *Trigger*: The process is triggered by the Cashier or other Business Roles relating to the Sale System.
* *Pre-conditions*: Connection is established between the Sale System and the POI System.
* *Post-conditions*: Information is returned to the Sale System.
* *Business Roles:* Cash Register, Vending Machine, Sale Server, POI Terminal, POI Terminal and Server, Customer, Merchant, Merchant Agent, Cashier, Supervisor
* *Participants:* Sale System, POI System, Cardholder, Acceptor

### BusinessProcess Diagram: Administrative Services



Figure 4: BusinessProcess Diagram - Administrative Services

Administrative Services:

* *Definition*: The process allows non-payment interactions between the Sale System and the POI.
* *Trigger*: Action coming from the Sale System or the POI System. This action can be triggered by the Cashier, or other Business Roles, or an operator or automatically.
* *Pre-conditions*: The process is needed at system boot and shut down. In addition, Administrative services may be required at any time.
* *Post-conditions*: Administrative services send back a status to the entity that triggered them.
* *Business Roles:* Cash Register, Vending Machine, Sale Server, POI Terminal, POI Terminal and Server, Merchant, merchant Agent, Cashier, Supervisor
* *Participants*: Sale System, POI System, Acceptor

### BusinessProcess Diagram: System Services



Figure 5: BusinessProcess Diagram – System Services

System Services:

* *Definition*: System Services allow each party to reject or abort an action that had been launched previously, to obtain message status and to deal with events.
* *Trigger*: Another process (financial, administrative or device management) may be running on the Sale System or the POI System. This action can be triggered by the Cashier, or other Business Roles, or an operator or automatically.
* *Pre-conditions*: The Sale System and the POI System need to be up and operative.
* *Post-conditions*: None.
* *Business Roles:* Cash Register,Vending Machine, Sale Server, POI Terminal, POI Terminal and Server
* *Participants:* POI System, Sale System

### BusinessProcess Diagram: Device Management



Figure 6: BusinessProcess Diagram - Device Management

Device Management:

* *Definition*: POI and Device management allow the Sale System to drive the card interface of the POI (Read Card, Secure Input), to transmit message (Transmit Message) and to drive the user interface on both the POI and the Sale System (Display, Input, Input Update, Print, Play Sound).
* *Trigger*: Another process (financial, administrative or system) running on the Sale System or the POI System.
* *Pre-conditions*: The Sale System and the POI System need to be up and operative.
* *Post-conditions*: None.
* *Business Roles:* Cash Register,Vending Machine, Sale Server, POI Terminal, POI Terminal and Server
* *Participants:* POI System, Sale System

## BusinessProcess Process Flows

### BusinessProcess Process Flow: Financial Services

The process flows below describe a possible high-level sequence of the Payment BusinessProcess defined in the previous chapter.



Figure 7: BusinessProcess Flow - Financial Services

### BusinessProcess Process Flow: Administrative Services

The process flows below describe a possible high-level sequence of the Administrative services BusinessProcess defined in the previous chapter.



Figure 8: BusinessProcess Flow – Administrative Services

### BusinessProcess Process Flow: System Services

The process flows below describe a possible use of the Message Status and Abort message as defined in the previous chapter.



Figure 9: BusinessProcess Flow – System Services

### BusinessProcess Process Flow: Device Management

The process flows describe a possible high-level sequence of Device Management BusinessProcess defined in the previous chapter.



Figure 10: BusinessProcess Flow – Device Management

# Description of BusinessActivities

This section presents the different BusinessActivities within each BusinessProcess. BusinessActivities of a process are described in swim lane diagrams and are referred in this document as activity diagrams.

The development of an activity diagram is part of the ISO 20022 modelling process and allows capturing the requirements.

The activity diagram provides a zoom-in on the BusinessActivities taking place during each of the BusinessProcesses described in Section 4. It also shows the BusinessActivities that are triggered when another BusinessActivity has a negative result.

What is the activity diagram about?

* It is a diagram representing the ‘common lifecycle’ of a BusinessProcess
* A start point ⚫ shows where the lifecycle of the BusinessProcess commences and the end points show End point where the lifecycle may possibly end
* A lozenge means that a choice between several actions can be made
* A bar means that several actions are initiated in parallel
* The flow of activities between the involved Participants (parties)
* BusinessActivities may result in different actions, that is, information is conveyed from one party to another party.

Both in-scope and out-of-scope activities are included, with a different level of details. There are no information requirements for out-of-scope activities, except that they should be clearly identified in the diagram.

Activity diagrams are always accompanied with a text describing the BusinessActivities and their interactions.

## BusinessProcess – Financial Services – Generic Card Payment Process

Example of a face-to-face payment, with local cardholder authentication:



Figure 11: BusinessProcess – Generic Card Payment Process

| **Description of the *BusinessActivities*** | |
| --- | --- |
|  | **Initiator** |
| **Complete Sale:** The Sale System completes the sale and requires the payment | **Sale System** |
| **Receive Payment Data:** The POI System receives all the data to perform the payment, including the Transaction amount | **POI system** |
| **Payment Card Presentation:** The Cardholder presents his/her card to the POI System | **Cardholder** |
| **Payment processing:** The POI System processes the transaction by interacting with the Cardholder, and potentially the Acquirer. | **POI System** |
| **Payment finalized:** The POI system has completed the payment and, if needed, received authorization from the Acquirer. | **POI System** |

## BusinessProcess – Administrative Services

Example of session opening process:



Figure 12: BusinessProcess – Session opening process

| **Description of the *BusinessActivities*** | |
| --- | --- |
|  | **Initiator** |
| **Session Initialization:** The Sale System starts the connection to the POI System | **Sale System** |
| **Session Login:** The POI System executes the Login request from the Sale System | **POI system** |

Example of session closing process:



Figure 13: BusinessProcess – Session closing process

| **Description of the *BusinessActivities*** | |
| --- | --- |
|  | **Initiator** |
| **Session Termination:** The Sale System ends the connection to the POI System | **Sale System** |
| **Session Logout:** The POI System executes the Logout request from the Sale System | **POI system** |

## BusinessProcess – System Services

Example of PaymentRequest Abort process:



Figure 14: BusinessProcess – Session abort

| **Description of the *BusinessActivities*** | |
| --- | --- |
|  | **Initiator** |
| **Complete Sale:** The Sale System completes the sale and requires the payment | **Sale System** |
| **Receive Payment Data:** The POI System receives all the data to perform the payment, including the Transaction amount | **POI system** |
| **Payment Abort:** The POI System stops ongoing process execution when it receives the Abort message | **POI system** |

## BusinessProcess – Device Management

Example of Device Management process:



Figure 15: BusinessProcess – Device Management

| **Description of the *BusinessActivities*** | |
| --- | --- |
|  | **Initiator** |
| **Send text for display:** The Sale System sends text to be displayed to the POI System | **Sale System** |
| **Receive display data:** The POI System receives text to be displayed | **POI system** |
| **Displays the required text:** The POI System displays the text | **POI system** |
| **Send text for printing:** The Sale System sends text to be printed to the POI System | **Sale System** |
| **Receive print data:** The POI System receives text to be printed | **POI system** |
| **Prints the required text:** The POI System prints the text | **POI system** |

# BusinessTransactions

The BusinessTransactions are arranged according to BusinessProcesses:

Financial Services

* Service Request
* Service Response
* Reconciliation Request
* Reconciliation Response

Administrative Services

* Session Management Request
* Session Management Response
* Admin Request
* Admin Response
* Report Request
* Report Response

System Services

* Abort
* Event Notification
* Message rejection
* Message Status Request
* Message Status Response

Device Management Services

* Device Request
* Device Response

## BusinessTransactions: Financial Services

Financial Services messages are used to complete or reverse payments, or to execute a reconciliation.

Payment is performed by the POI System to pay the purchase of services or goods made by the customer using a payment card. This section presents the processing of the standard Payment message pair by using Service Request and Device Request messages.

Device Requests are optional and depend on the payment type and parameters.



Figure 16: BusinessTransactions - Standard Payment Exchange

## BusinessTransactions: Administrative Services

Administrative Services messages allow to deal with session management, admin services and report services.

Session Management Request and Session Management Response allow to start and to end the session between the Sale System and the POI System.

Login and Logout are optional and may not be present in the case of simple protocols.



Figure 17: BusinessTransactions - Session Management

## BusinessTransactions: System Services

System Services messages allow to reject or abort processes, and deal with notification of events.

Abort allows the Sale System to Abort a command it has just sent.



Figure 18: BusinessTransactions - Abort

Event Notification allows one of the parties to inform the other about the happening of an event.



Figure 19: BusinessTransactions – Event Notification

Message Rejection allows one of the parties to reject a message sent by the other party if it detects a technical or functional error.



Figure 20: BusinessTransactions – Message Rejection



Figure 21: BusinessTransactions – Message Rejection

## BusinessTransactions: Device Management Transactions

Device Management Transactions allow each party (Sale System and POI System) to address and use the peripherals of the other party. These Device Management Transactions include Device Request and Device Response.

These peripherals include:

* Keyboard,
* Display,
* Printer,
* Card reader, to address the smartcard reader which is part of the POI System,
* PINPad, used to enter the Cardholder’s PIN, a cardholder loyalty code or an odometer value,
* Buzzer,
* Modem or other communication means.

Device Management Transactions include:

* Device Request, from the Sale System to the POI System, or vice versa,
* Device Response, from the POI System to the Sale System, or vice versa.

Example of use of Device Request and Device Response:



Figure 22: BusinessTransactions - Device Request and Device Response

# Examples

All examples of the various MessageDefinitions and their actual MessageInstances are described in the “Message Usage Guide Part 4”.

# Revision Record

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Revision** | **Date** | **Author** | **Description** | **Sections affected** |
| V1.0 | 2021/01/13 | NEXO | Initial document | All |
|  |  |  |  |  |
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1. Available on www.nexo-standards.org [↑](#footnote-ref-1)
2. Available on www.nexo-standards.org [↑](#footnote-ref-2)