CATENA-X

STANDARD

CX - 0022 Notification Process

BUSINESS DOMAIN: PLM & QUALITY

USE CASE: TRACEABILITY

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Note: Please specify the platform capability in the email subject line.

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ABOUT THIS DOCUMENT AND MOTIVATION

Catena-X is the first open and collaborative data ecosystem. The goal is to provide an environment for the creation, operation, and joint use of end-to-end data chains along the entire automotive value chain. All partners are on an equal ground, have sovereign control over their data and no lock-in effects occur. This situation provides a sustainable solution for the digitalization of supply chains, especially for medium-sized and small companies, and supports the cooperation and collaboration of market participants and competitors.

The ever-growing Catena-X ecosystem will enable enormous amounts of data to be integrated and collaboratively harnessed. To ensure that these complex data volumes can be sent, received, and processed smoothly across all stages of the value chain, one language for all players: common standards.

The standards of the Catena-X data ecosystem define how the exchange of data and information in our network works. They are the basis for ensuring that the technologies, components, and processes used are developed and operated according to uniform rules.

Common standards create added value for all partners: Within our network, data flows more smoothly through interfaces. In addition, we avoid cumbersome individual IT solutions for sharing data with other partners. In the field of international standardization, Catena-X follows the proven international standardization institutions: ISO/IEC/ITU and CEN-CENELC/ETSI.

For users and data providers, implementation of standards will reduce the costs that would arise from adapting different systems. In addition, no important data is lost. On the contrary, it even becomes easier to collect data across companies. For operators and developers, standards will create a framework that provides reliable orientation and planning security.

The following document describes one of the reference implementations used in the Catena-X ecosystem and the requirements needed to implement it. Here, it serves as the main resource to illustrate the following process. It contains information on the actors, the activities, and the objective of the process. Defining the data model as a reference implementation enables a coordinated and smooth operation throughout the Catena-X ecosystem.

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MANAGEMENT SUMMARY

This document describes the minimal requirements of the notification process a traceability application or application stack needs to fulfil for being interoperable within the Catena-X platform. It also illustrates common practices for identifying the correct receiving endpoint when sending a notification. In that sense, the below specification should in no way be regarded as a general solution pattern for notifications across various use cases. The current process does not go beyond the sending and receiving of quality notifications.

1 INTRODUCTION

This document describes the minimal process to be covered by a traceability application or application stack in order to exchange notifications within Catena-X with other applications in an interoperable manner.

The data formats and/or API to be built on top of the application to support receiving notifications is described in a separate standard.

2 PURPOSE OF THE DOCUMENT

The purpose of the document is to illustrate the minimal requirements towards handling of notifications in traceability applications or application stacks. The minimal process of a notification is explained in detail.

3 SCOPE OF THE IMPLEMENTATION

This chapter serves to situate the given reference implementation, to outline its prerequisites and to point out its limitations.

3.1 PRECONDITIONS AND DEPENDENCIES

The Traceability Notification API as described in a separate standard, has to be used and implemented by all applications in order to be interoperable.

The whole data transfer within Catena-X leverages the IDSA protocol, which is another standard within Catena-X.

The IDSA protocol is currently being introduced by leveraging the reference implementation of an IDSA compliant connector named Eclipse Dataspace Connector, which is a separate standard.

3.2 CONSTRAINTS AND LIMITATIONS

There are no known constraints and limitations to this reference implementation document.

4 PROCESS

In the following the traceability quality notification process at Catena-X will be presented, so it can be used in future implementations.

4.1 CONTEXTUAL DESCRIPTION

The process takes place in between traceability applications or application stacks, and the focus is on minimal interaction, which is required to be supported by all applications.

Application internals like user journeys, process steps or workflows in an application are not standardized within Catena-X, and therefore omitted.

4.2 FRAMEWORK

No specific framework is being used within Catena-X for BPM, but mainly UML diagrams will be shown.

4.3 ACTORS AND ROLES

Catena-X does not standardize user-roles at the moment. The actors are traceability applications of the companies in a supply chain.

4.4 PROCESS REPRESENTATION

The exchange of notifications follows the IDSA protocol. On top, a notification state model has been described.

4.4.1 Notification State Model

The notification itself has various states. The states and their cycle are described in the following picture (Figure 1):

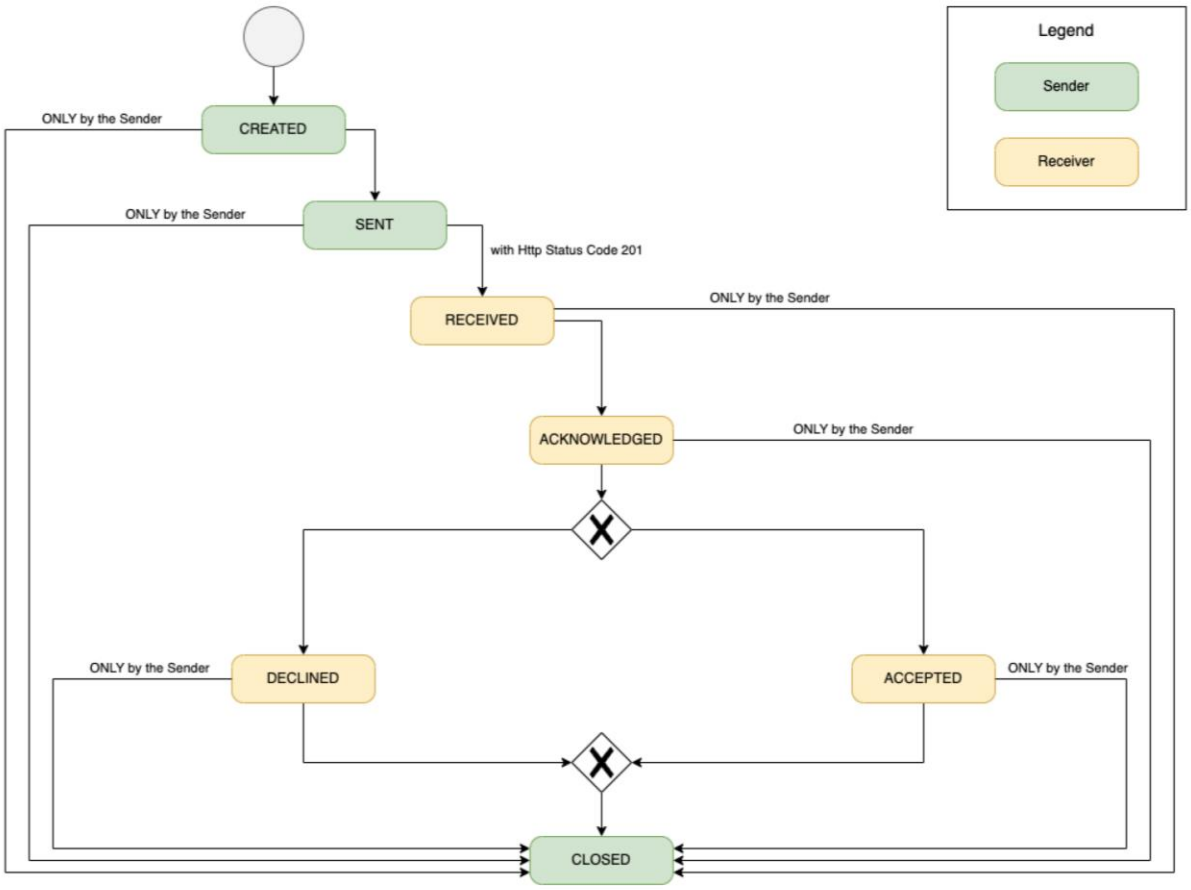

Figure 1: Description of Process

The state of a notification can be exchanged using the traceability notification API.

4.4.2 Processes for Sending, Updating and Resolving Notifications

Below the sequence for sending, updating, and resolving of notifications between (traceability) applications is shown in UML sequence diagrams. In all cases, HTTP POST requests are used. The HTTP endpoints are described in the Traceability Notification API specification.

To read the UML sequence diagrams correctly, some remarks below:

- The shown Notification EDC Adapter is not mandatory. It is just one option to send a notification via the EDC control and data plane. It is important, that a similar functionality must be provided/implemented by the (traceability) application vendor. The Notification EDC Adapter or a similar component / functionality will not be provided as a central service from Catena-X.
- To discover where a notification must be sent to, the (traceability) application must resolve the BPN of the receiver. This can either happen through the (traceability) application holding this information in its data model, or it could - alternatively - also be resolved e.g. via a lookup of the digital twin in the central asset administration shell (AAS) registry or by using services from the BPDM use case.
- The resolution of the EDC URL for a given BPN is done via the EDC Discovery Service API. The entry for each EDC into this Discovery Service is done via the Catena-X Portal.
- In each UML sequence diagram the step [01] describes the publishing of the notification endpoints as described in the above sections.

4.4.2.1 Sending and receiving of a quality investigation

Below, the UML sequence diagram to send and receive a quality investigation is depicted.

In addition to the above-mentioned general remarks, the following remark has to be mentioned:

- The status transition from SENT to RECEIVED has to be done by the sender once it received the Http status code 201 from the receiver

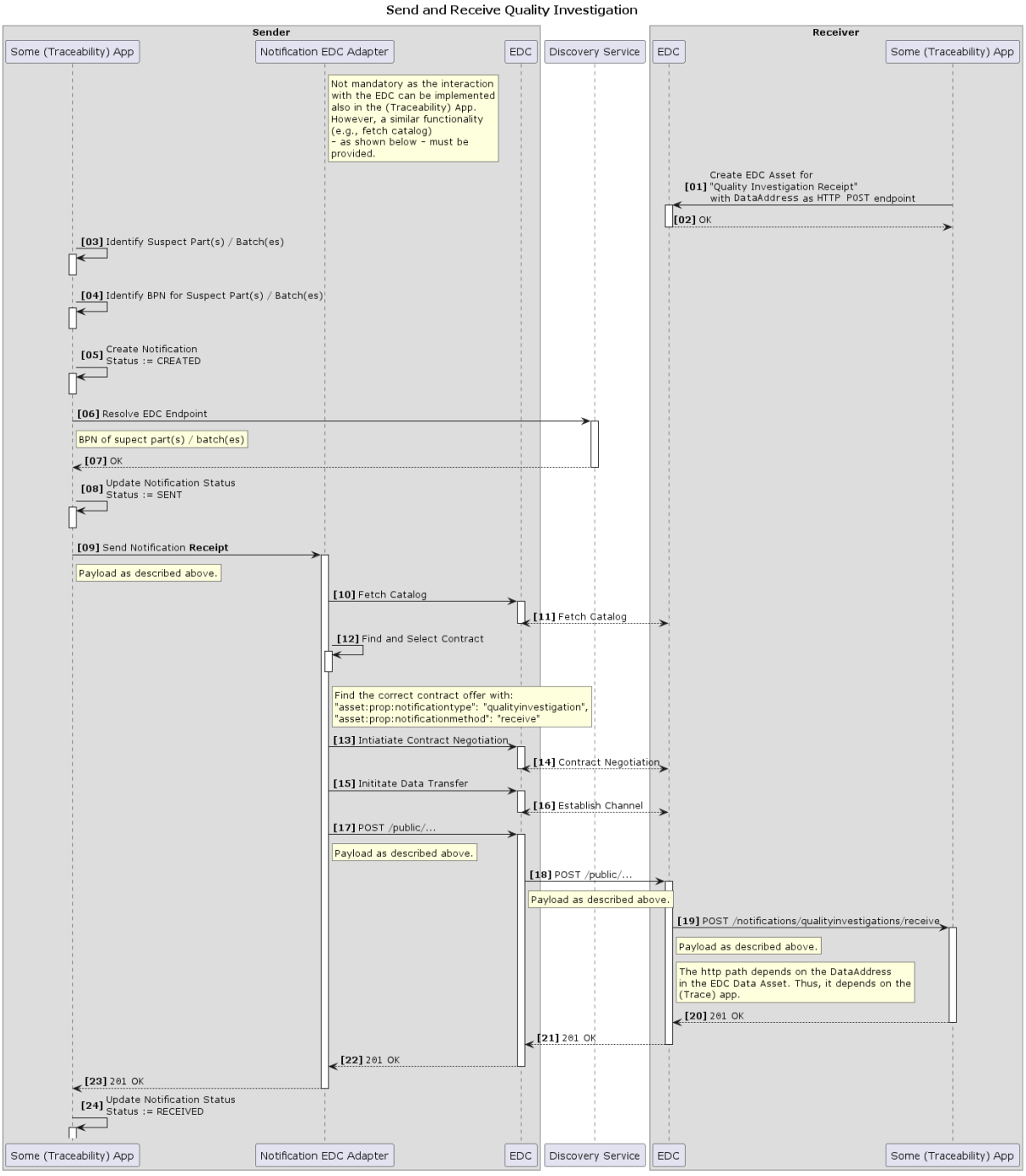

Figure 2: Send and Receive Quality Investigation

4.4.2.2 Sending and receiving of a quality alert (optional)

Below, the UML sequence diagram to send and receive a quality alert is depicted.

In addition to the above-mentioned general remarks, the following remark has to be mentioned:

- The status transition from SENT to RECEIVED has to be done by the sender once it received the Http status code 201 from the receiver

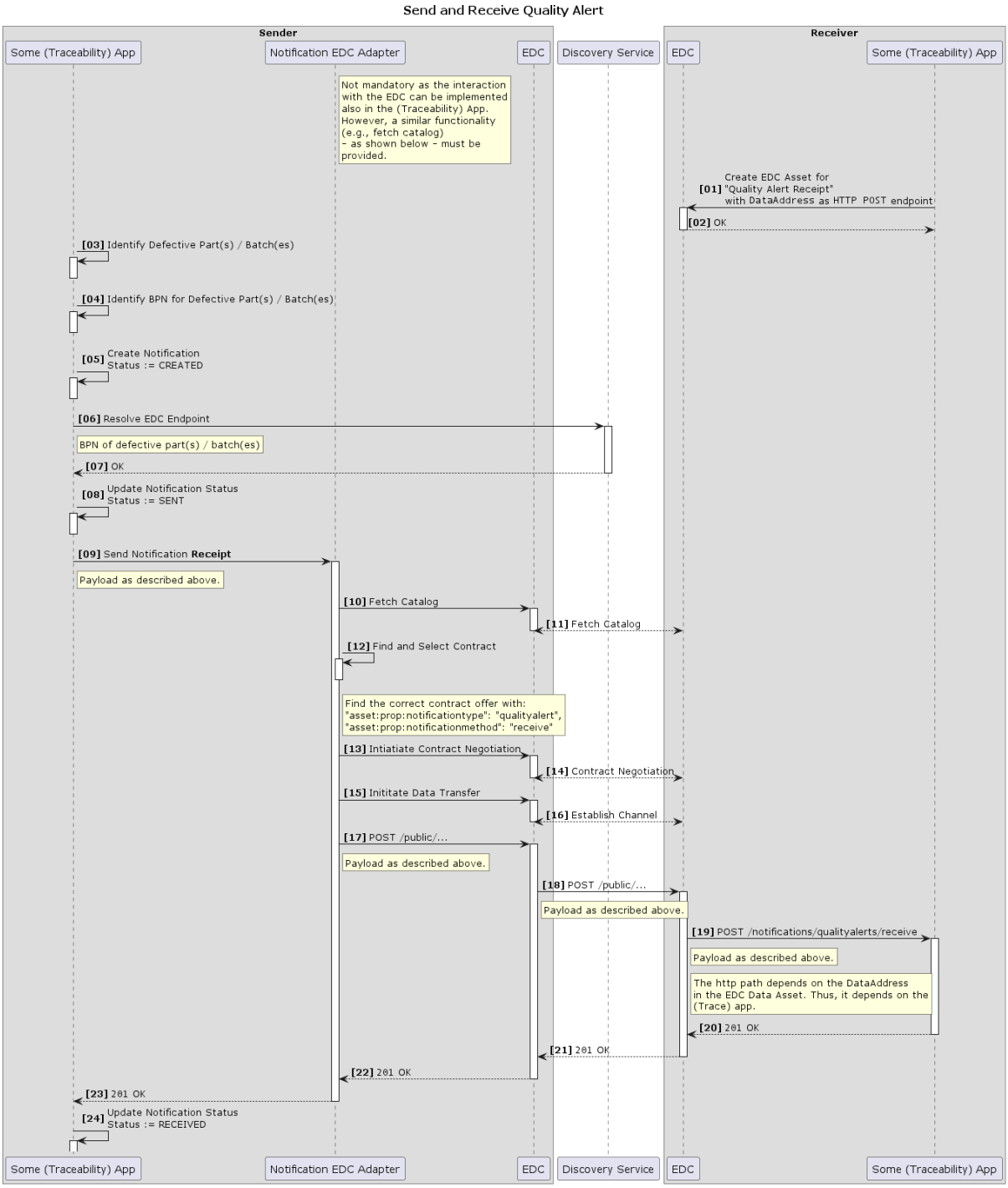

Figure 3: Send and Receive Quality Alert

4.4.2.3 Update of a quality investigation

Below, the UML sequence diagram to update a quality investigation is depicted.

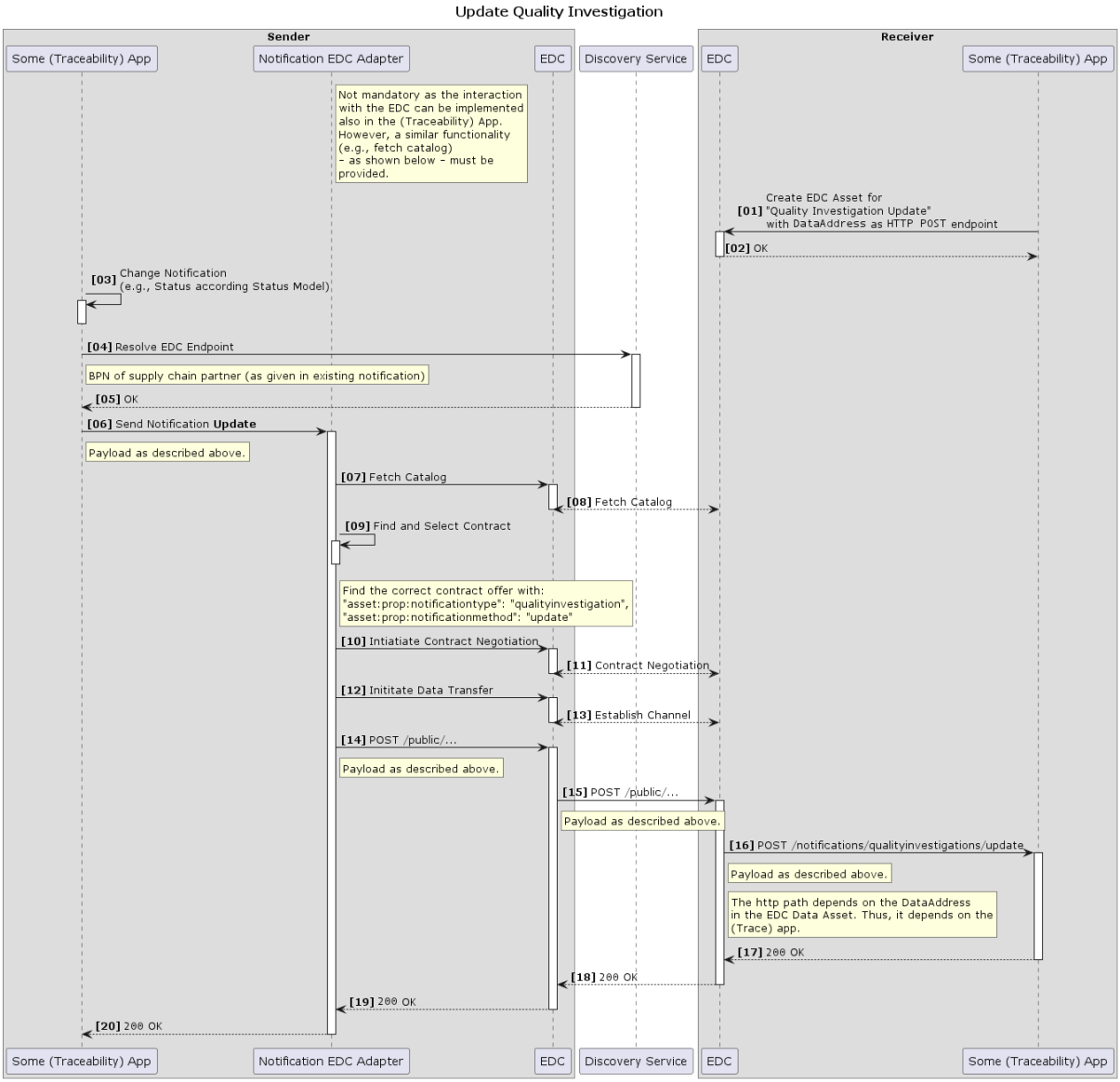

Figure 4: Update Quality Investigation

4.4.2.4 Update of a quality alert

Below, the UML sequence diagram to update a quality alert is depicted.

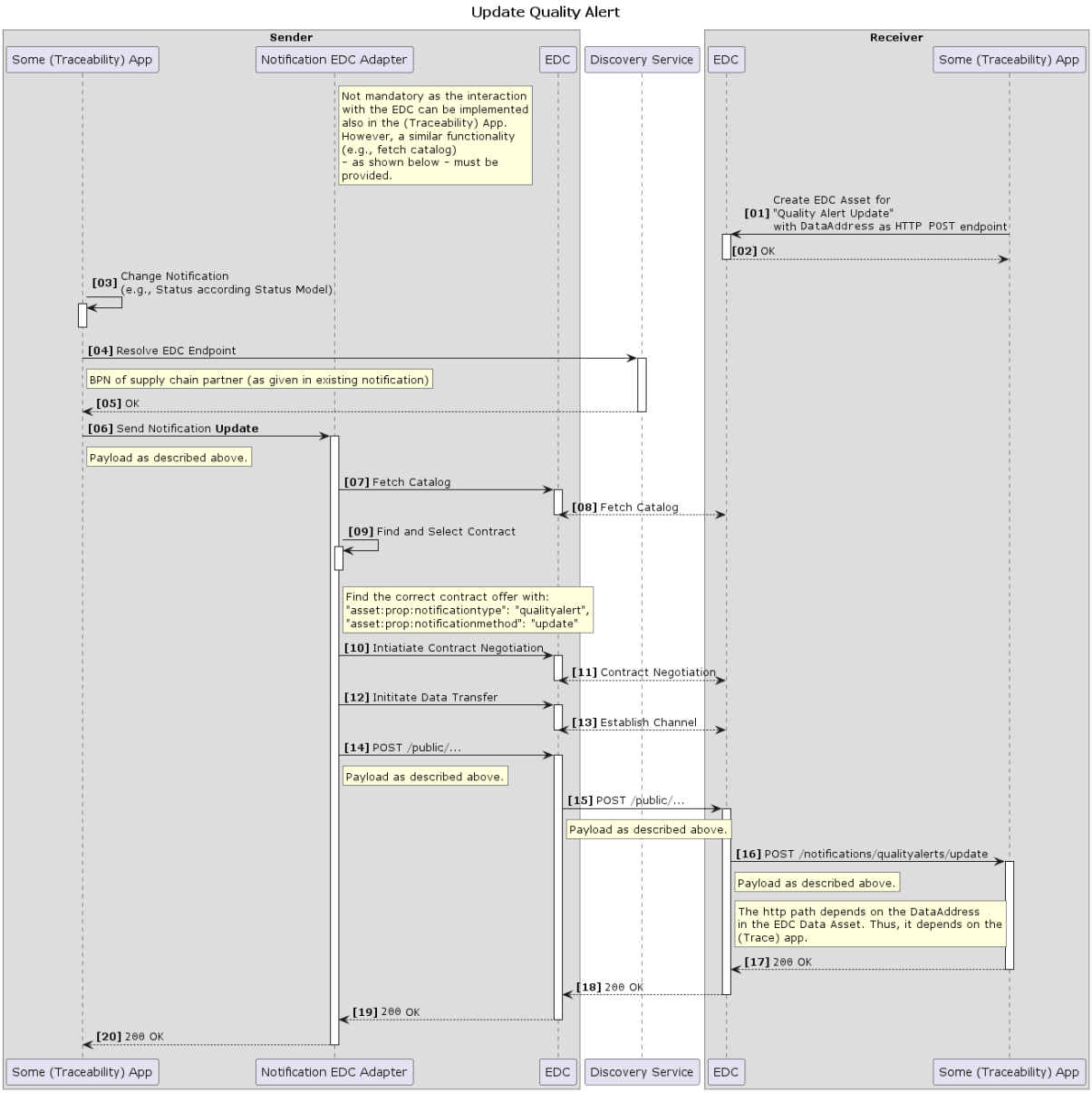

Figure 5: Update Quality Alert

4.4.2.5 Resolve of a quality investigation (optional)

Below, the UML sequence diagram to resolve a quality investigation is depicted.

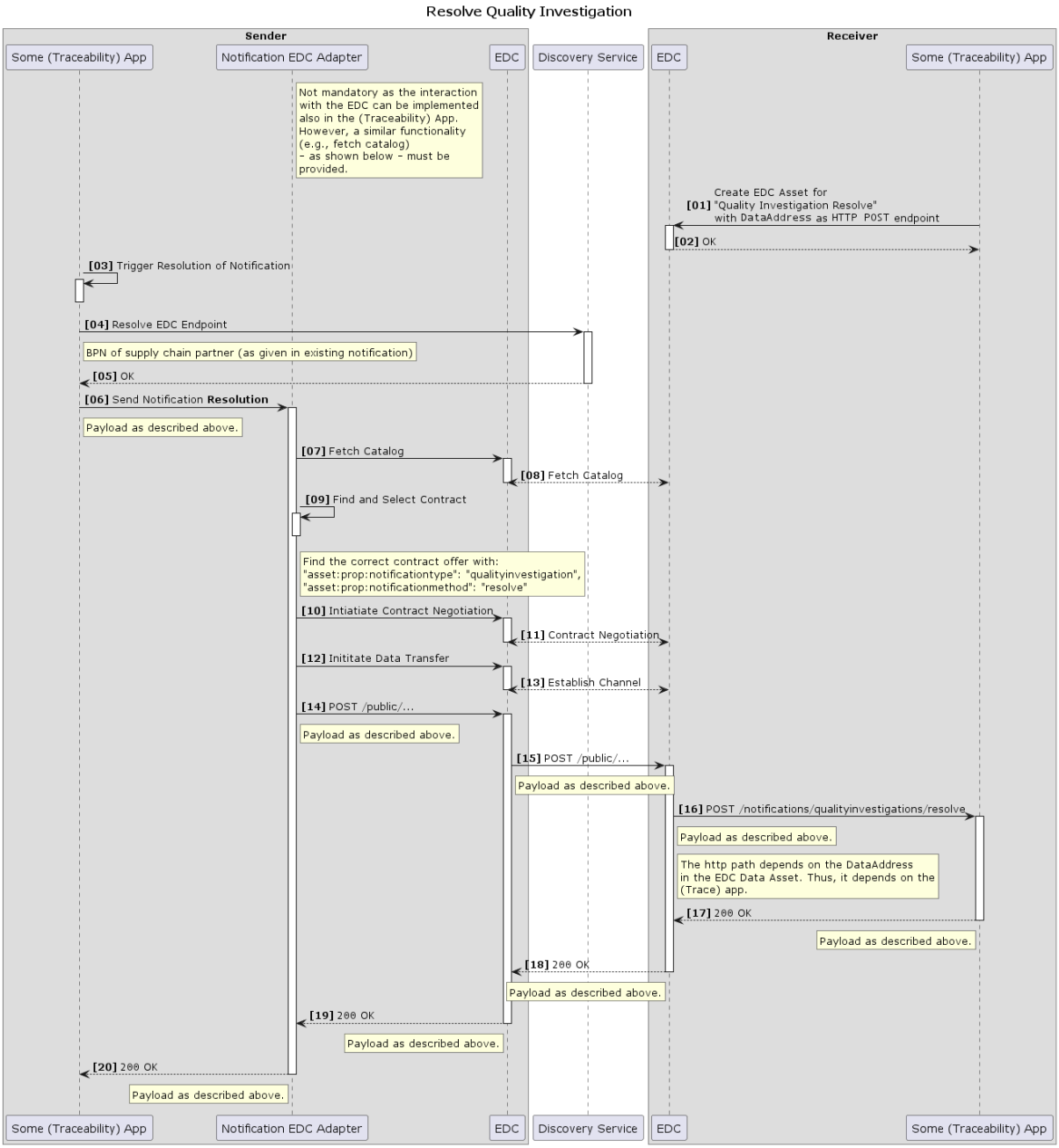

Figure 6: Receive Quality Investigation

4.4.2.6 Resolve of a quality alert (optional)

Below, the UML sequence diagram to resolve a quality alert is depicted.

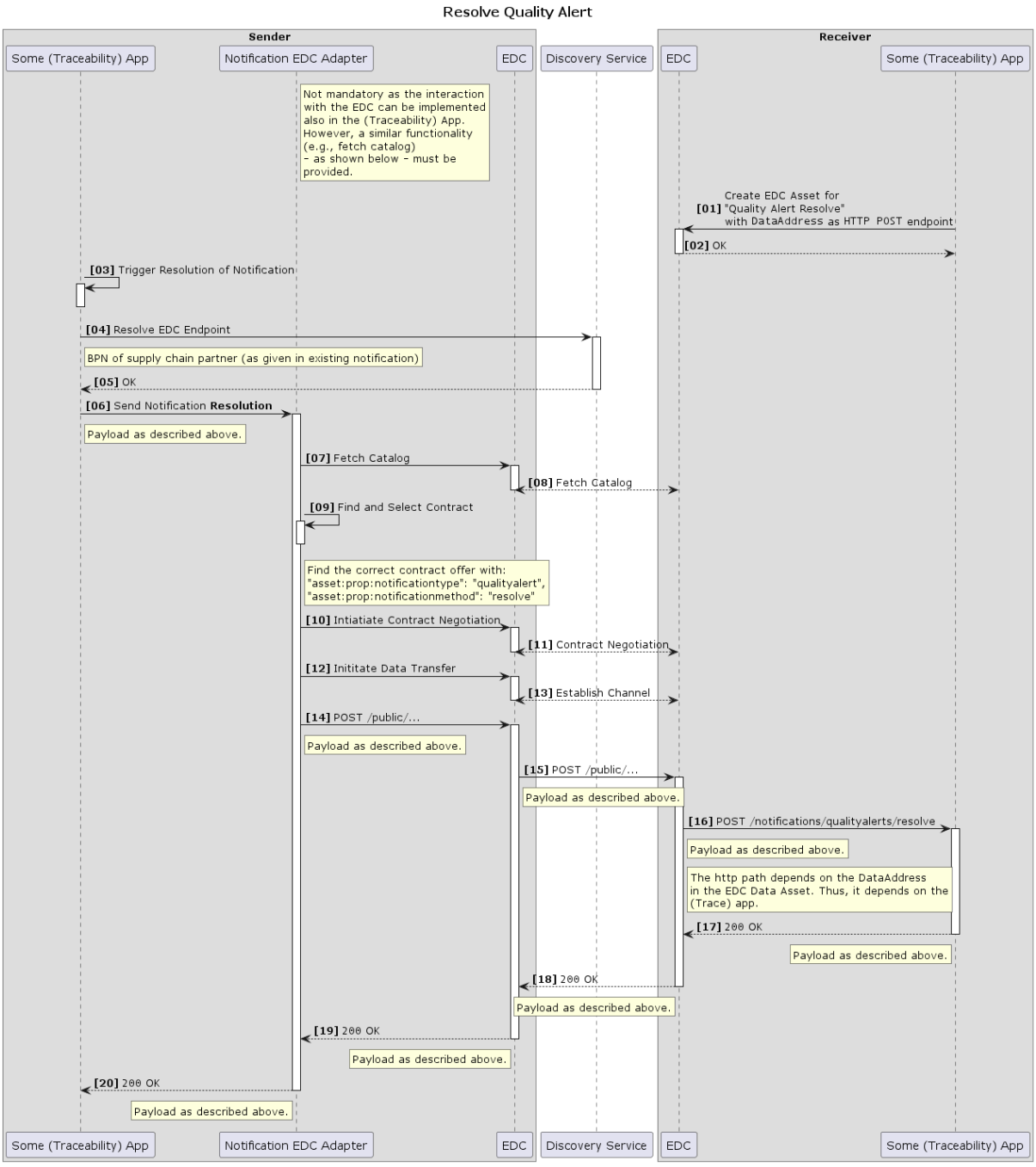

Figure 7: Resolve Quality Alert

5 NORMATIVE REFERENCES

The following references refer to the related Catena-X reference implementations and external standards. This is intended to place the present reference implementation in the context of existing references.

5.1 CATENA-X- REFERENCE IMPLEMENTATIONS

CATENA-X Reference Implementation	
CX - 0023	Notification API
SC-002	Eclipse Data Connector (EDC)
CX - 0013	Identity of Member Companies
CX - 0001	EDC Discovery Service API
CX - 0010	Business Partner Number
CX - 0002	Digital Twins in Catena-X

GLOSSARY

ABBREVIATIONS

Abbreviations	Description
EDC	Eclipse Dataspace Connector
DAPS	Dynamic Attribute Provisioning Service
IDSA	International Data Space Association
HTTP	Hypertext Transfer Protocol
API	Application Programming Interface
EDC	Eclipse Dataspace Connector

ADDENDUM FOR CONFORMITY ASSESSMENT

DISCLAIMER

The following pages are not part of the standard documentation.

CATENA-X

ADDENDUM FOR CONFORMITY ASSESSMENT

CX – 0022 NOTIFICATION PROCESS

BUSINESS DOMAIN: TRACEABILITY

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ABOUT THIS DOCUMENT & MOTIVATION

The **standards of the Catena-X data ecosystem** define how the exchange of data and information in our network works. They are the basis for ensuring that the technologies, components, and processes used are developed and operated according to uniform rules.

The addendum for conformity assessment clarifies the requirements and scope for each standard. It contains conformity assessment criteria (CAC) that specify how a participant can receive a certificate for the correct application of the standard.

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ABSTRACT

This document describes the minimal requirements of the notification process a traceability application or application stack needs to fulfil for being interoperable within the Catena-X platform. It also illustrates common practices for identifying the correct receiving endpoint when sending a notification. In that sense, the below specification should in no way be regarded as a general solution pattern for notifications across various use cases. The current process does not go beyond the sending and receiving of quality notifications and quality investigation requests.

1 INTRODUCTION

This document describes the minimal process to be covered by a traceability application or application stack in order to exchange notifications within Catena-X with other applications in an interoperable manner.

The data formats and/or API to be built on top of the application to support receiving notifications is described in a separate standard.

1.1 AUDIENCE & SCOPE

This section is non-normative

This standard applies to the following roles:

- Data Provider / Consumer
- Business Application Provider

This standard applies to Traceability Applications or Application stacks and participants that want to exchange quality notifications and quality investigation data leveraging Traceability solutions.
The process described is built upon the Notification API described in CX-0023. This standard rather describes the protocol for exchanging updates of status for notifications exchanged via CX-0023.

1.2 CONTEXT

This section is non-normative

The Traceability Notification API as described in a separate standard, has to be used and implemented by all applications in order to be interoperable.
The whole data transfer within Catena-X leverages the IDSA protocol, which is another standard within Catena-X.
The IDSA protocol is currently being introduced by leveraging the reference implementation of an IDSA compliant connector named Eclipse Dataspace Connector, which is a separate standard.

1.3 ARCHITECTURE OVERVIEW

This section is non-normative

This standard does not describe an architecture. It rather describes a protocol.
The is exchanged in between Traceability applications or application stacks leveraging EDC or any other IDS compliant connector on both ends.

1.4 CONFORMANCE

As well as sections marked as non-normative, all authoring guidelines, diagrams, examples, and notes in this specification are non-normative. Everything else in this specification is normative.

The key words MAY, MUST, MUST NOT, OPTIONAL, RECOMMENDED, REQUIRED, SHOULD and SHOULD NOT in this document are to be interpreted as described in BCP 14 [RFC2119] [RFC8174] when, and only when, they appear in all capitals, as shown here.

1.5 PROOF OF CONFORMITY

This section is non-normative

All participants and their solutions will need to prove they conform with the Catena-X standards. To validate that the standards are applied correctly, Catena-X employs Conformity Assessment Bodies (CABs).

Due to the lack of a testbed, which could be interacting with the application or data provider/consumer to be certified, a self-assessment is deemed sufficient at this point.

1.6 EXAMPLES

This section is non-normative

Payload examples are given in the CX-0023 description.

1.7 TERMINOLOGY

This section is non-normative

Business Partner Number (BPN)
A BPN is the unique identifier of a partner within Catena-x.

IDSA/IDSA Protocol

Protocol being used for data exchange in an International Dataspace. This includes contract negotiation.

Eclipse Dataspace Connector (EDC)
IDS conformant Connector

Asset Administration Shell (AAS)
The Asset Administration Shell is a digital representation of an asset. It is a form of a digital twin.

2 NOTIFICATION PROCESS

The process takes place in between traceability applications or application stacks, and the focus is on minimal interaction, which MUST be supported by all applications participating in a quality notification or quality investigation scenario.

Application internals like user journeys, process steps or workflows in an application are not standardized within Catena-X, and therefore omitted.

2.1 ACTORS AND ROLES

Catena-X does not standardize user-roles at the moment. The actors are traceability applications of the companies in a supply chain.

2.2 PROCESS REPRESENTATION

The exchange of notifications follows the IDSA protocol.
On top, a notification state model has been described.

2.2.1 Notification State Model

The notification itself has various states. The states and their cycle are described in the following picture (Figure 1):

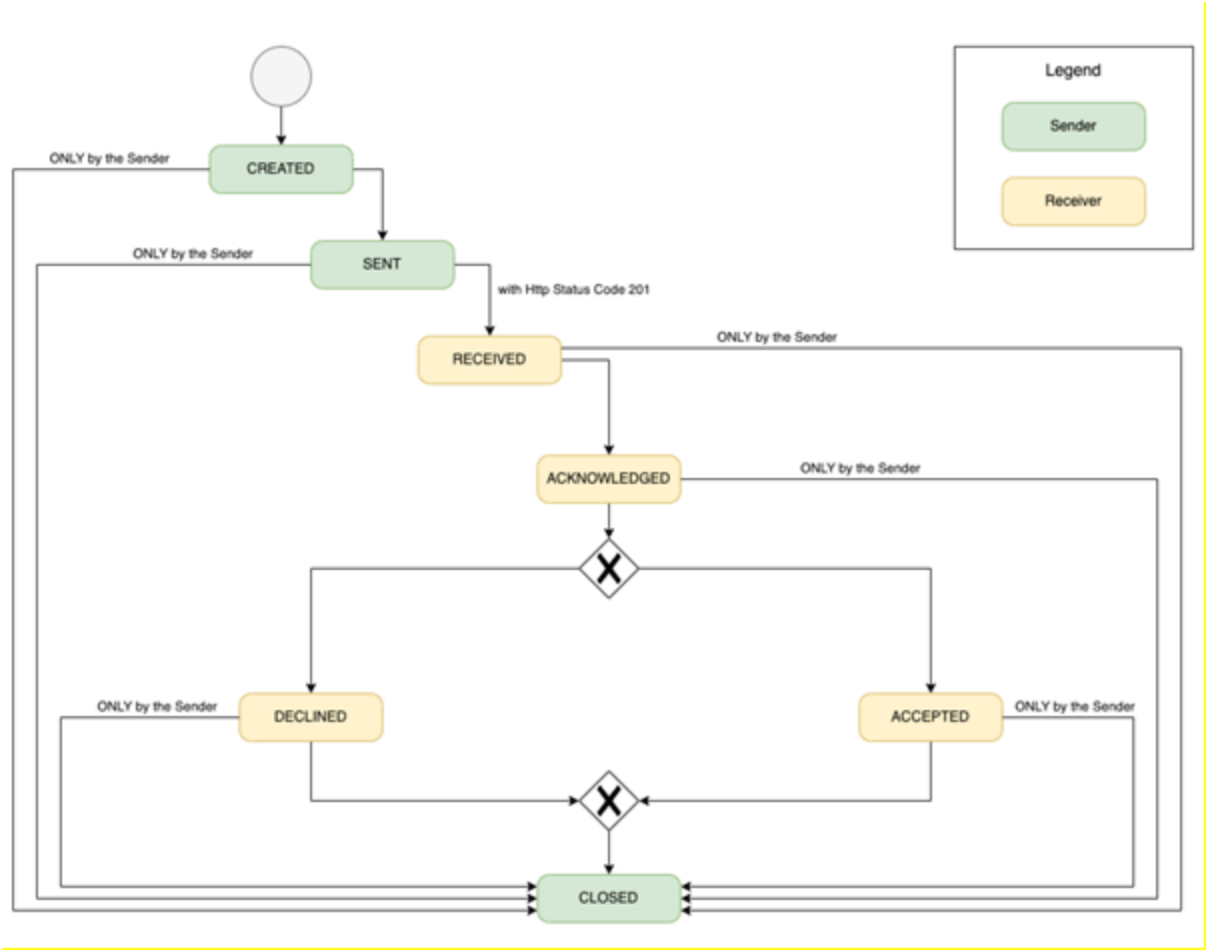

Figure 1: Description of Process

The state of a notification MUST be exchanged via the notification API [CX-0023].

2.2.2 Processes for Sending, Updating and Resolving Notifications

Below the sequence for sending, updating, and resolving of notifications between (traceability) applications is shown in UML sequence diagrams. In all cases, HTTP POST requests MUST be used. The corresponding HTTP endpoints are described in the Traceability Notification API specification.

To read the UML sequence diagrams correctly, some remarks below:

- The shown Notification EDC Adapter is not mandatory. It is just one option to send a notification via the EDC control and data plane. It is important, that a similar functionality must be provided/implemented by the (traceability) application vendor. The Notification EDC Adapter or a similar component / functionality will not be provided as a central service from Catena-X.
- To discover where a notification MUST be sent to, the (traceability) application MUST resolve the BPN of the receiver. This can either happen

through the (traceability) application holding this information in its data model, or it could - alternatively - also be resolved e.g. via a lookup of the digital twin in the central asset administration shell (AAS) registry or by using services from the BPDM use case.

- The resolution of the EDC URL for a given BPN SHOULD be done via the EDC Discovery Service API [CX-0001]. The entry for each EDC into this Discovery Service is done via the Catena-X Portal.
- In each UML sequence diagram the step [01] describes the publishing of the notification endpoints as described in the above sections.

1. Sending and receiving of a quality investigation

Below, the UML sequence diagram to send and receive a quality investigation is depicted.
In addition to the above-mentioned general remarks, the following remark has to be mentioned:

- The status transition from SENT to RECEIVED MUST be done by the sender once it received the Http status code 201 from the receiver

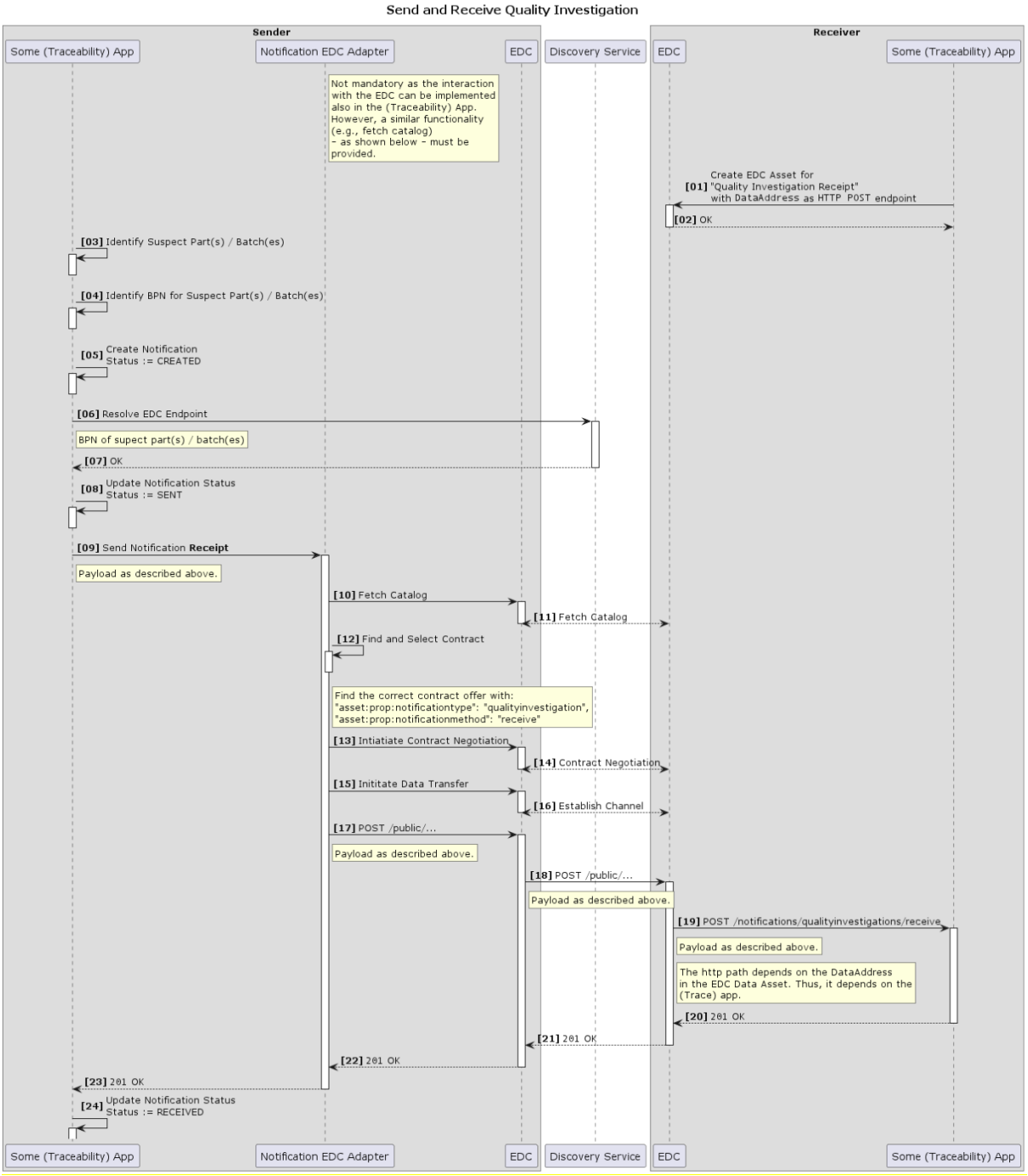

Figure 2: Send and Receive Quality Investigation

2.2.3 Sending and receiving of a quality alert (optional)

Below, the UML sequence diagram to send and receive a quality alert is depicted. In addition to the above-mentioned general remarks, the following remark has to be mentioned:

- The status transition from SENT to RECEIVED MUST be done by the sender once it received the Http status code 201 from the receiver

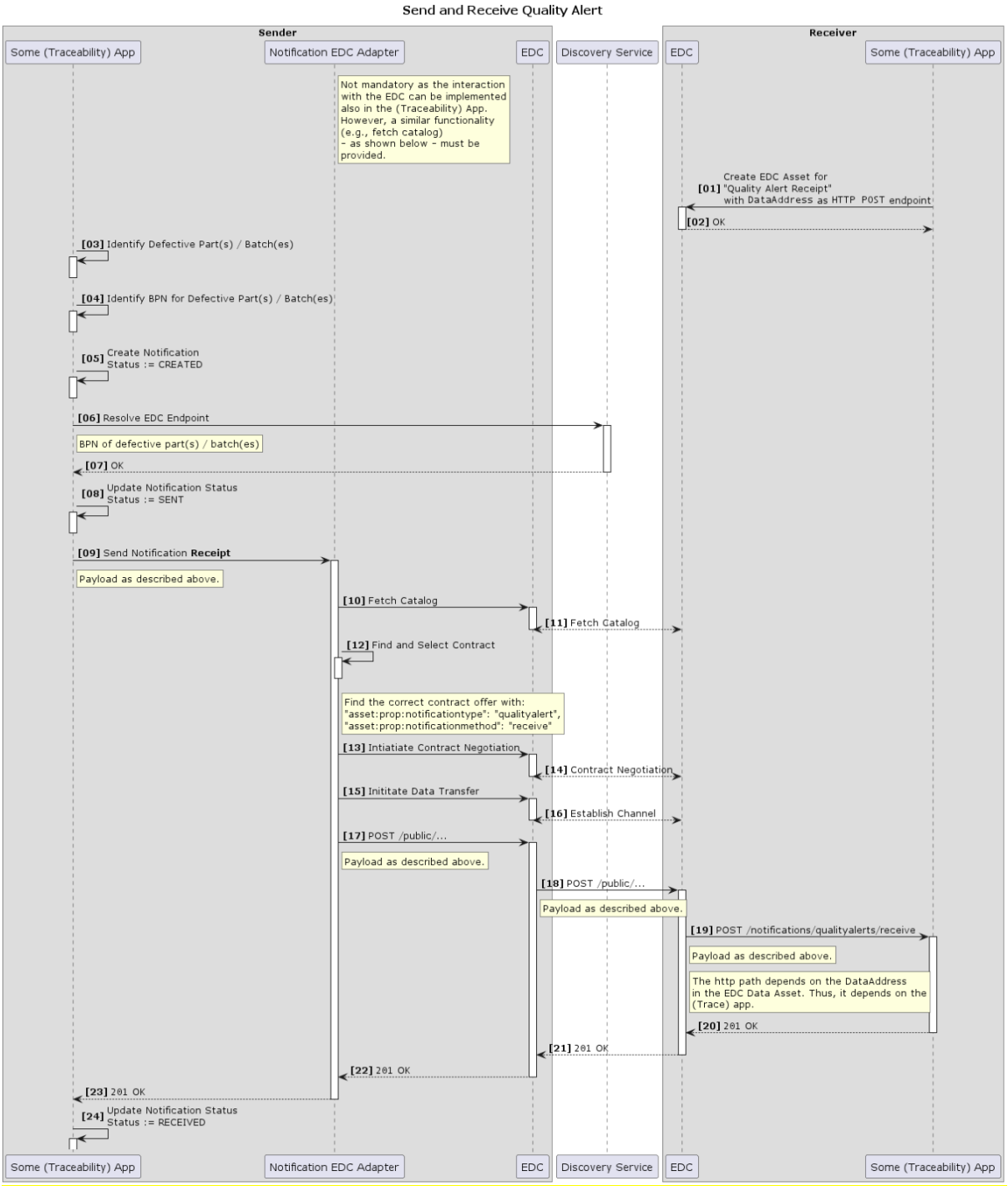

Figure 3: Send and Receive Quality Alert

2.2.4 Update of a quality investigation

Below, the UML sequence diagram to update a quality investigation is depicted.

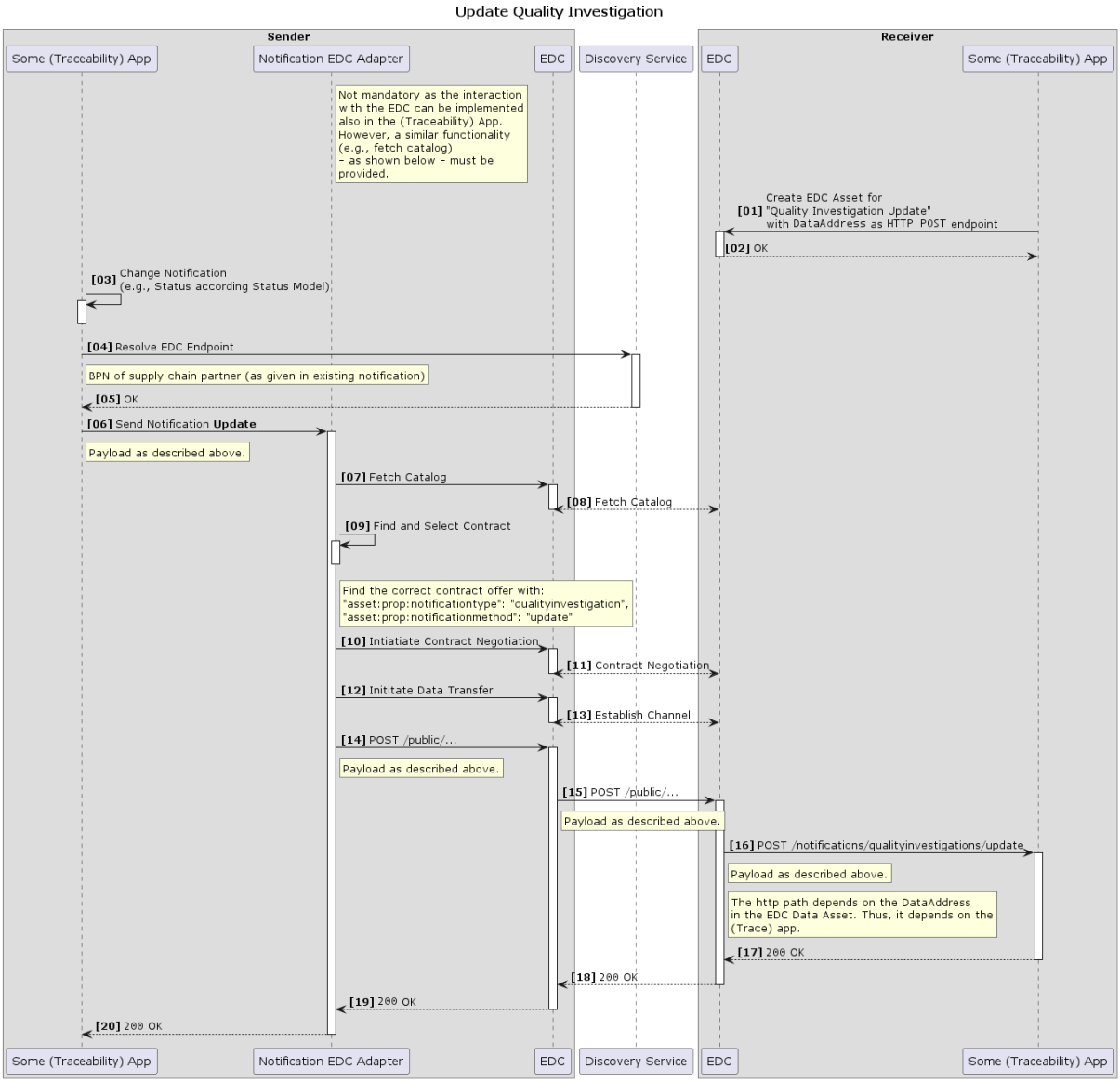

Figure 4: Update Quality Investigation

2.2.5 Update of a quality alert

Below, the UML sequence diagram to update a quality alert is depicted.

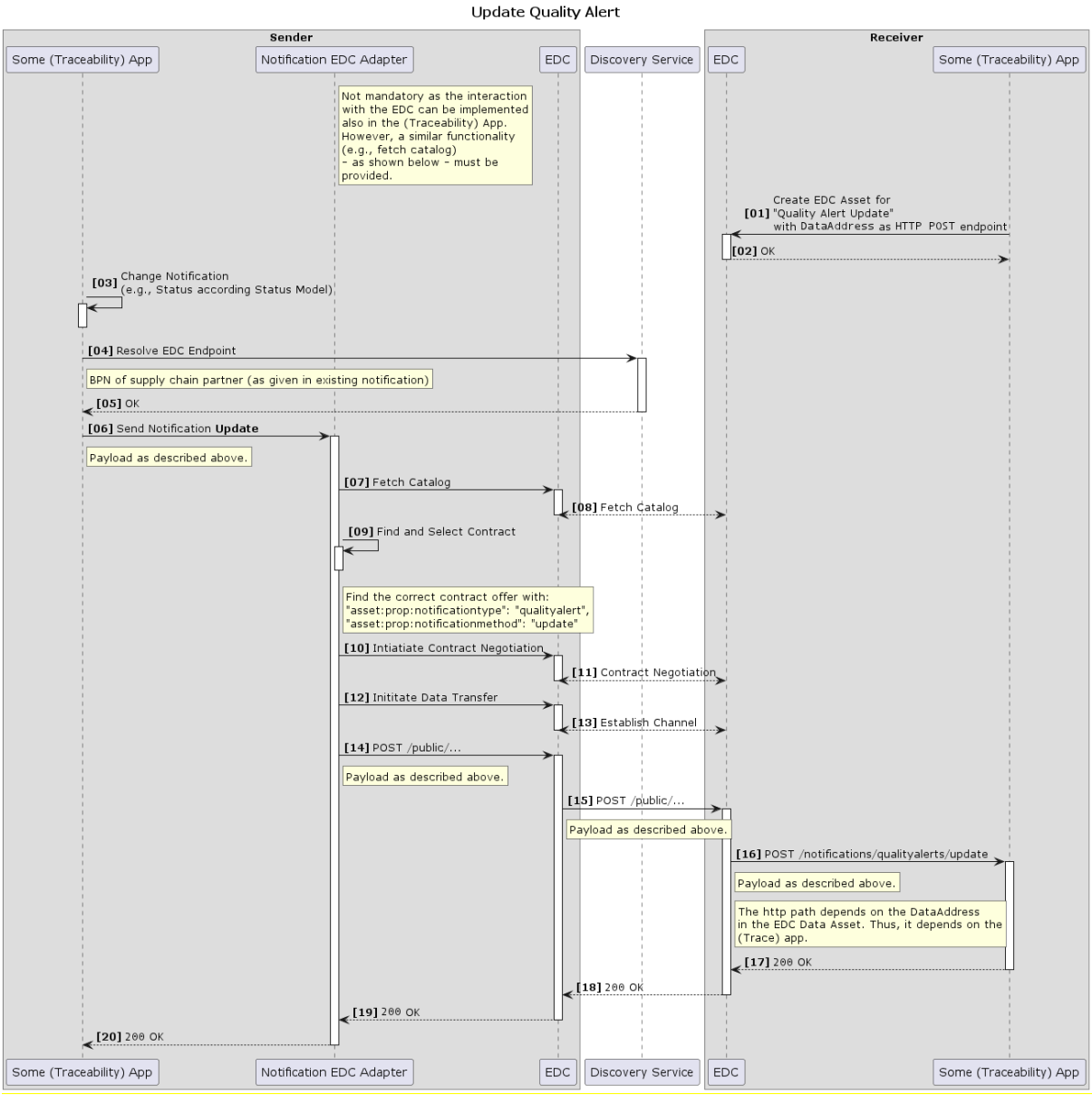

Figure 5: Update Quality Alert

2.2.6 Resolve of a quality investigation (optional)

Below, the UML sequence diagram to resolve a quality investigation is depicted.

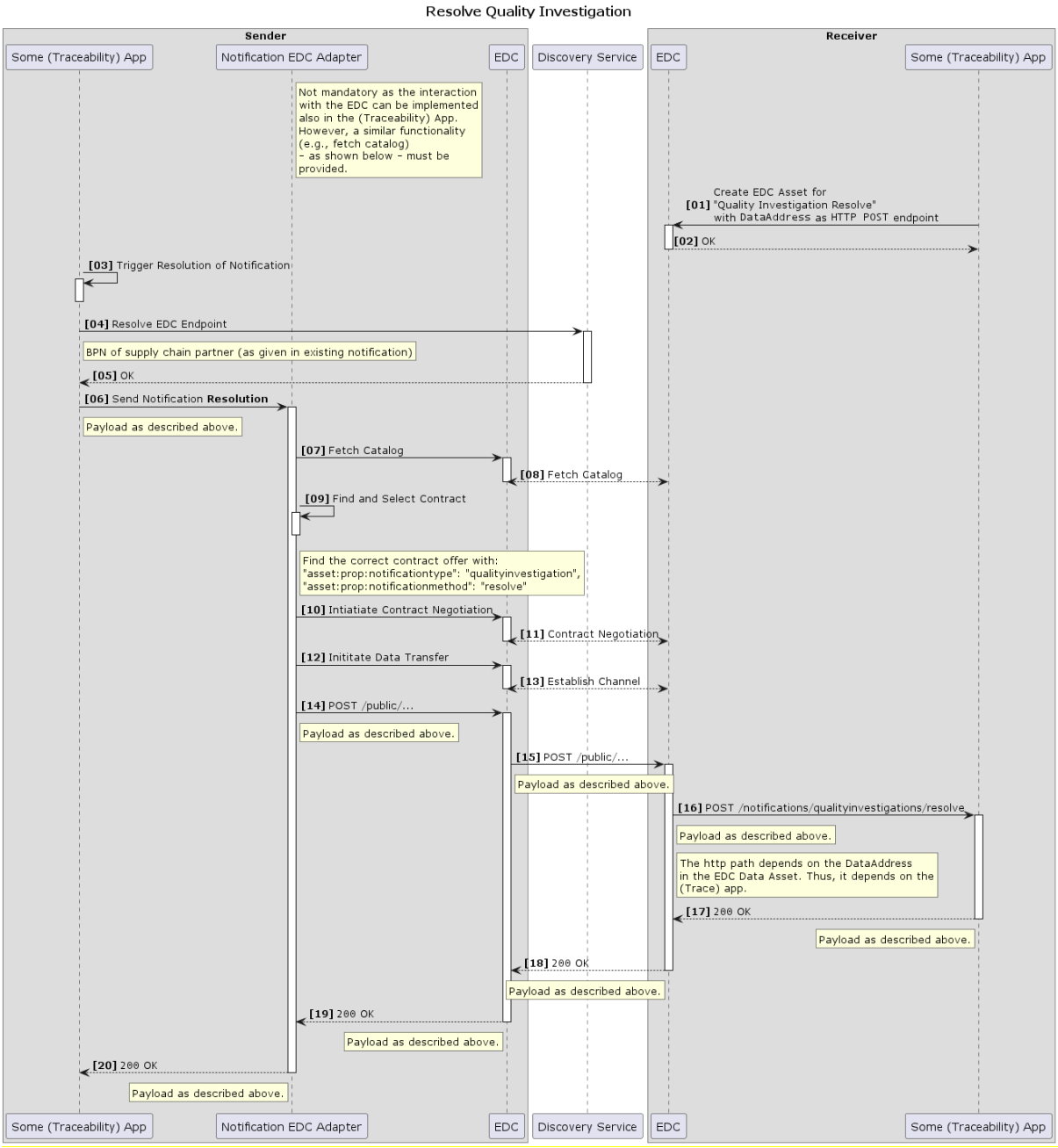

Figure 6: Receive Quality Investigation

2.2.7 Resolve of a quality alert (optional)

Below, the UML sequence diagram to resolve a quality alert is depicted.

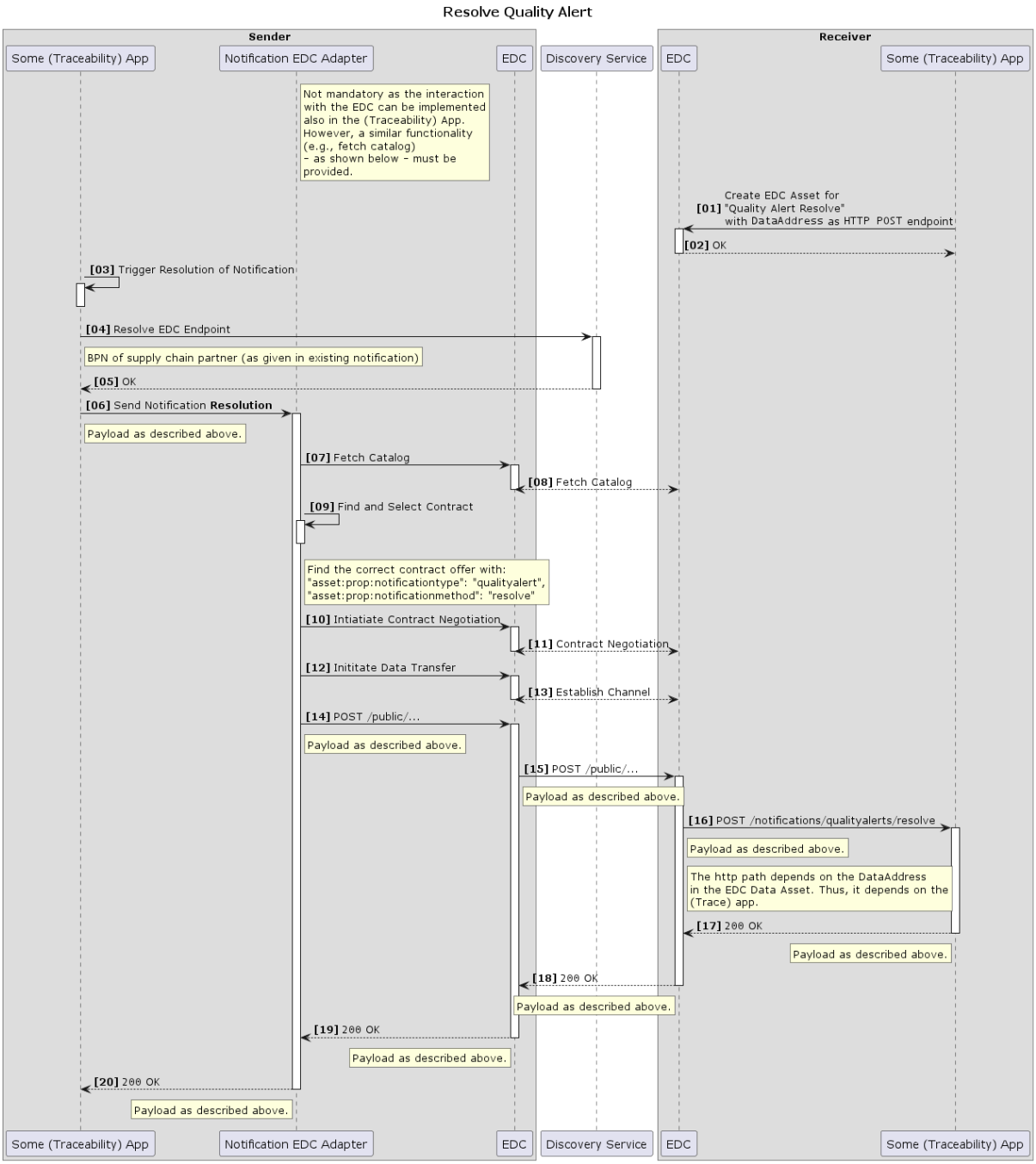

Figure 7: Resolve Quality Alert

3 REFERENCES

3.1 NORMATIVE REFERENCES

- CX – 0023 NOTIFICATION API
- CX – 0013 IDETITY OF MEMBER COMPANIES
- CX – 0001 EDC DISCOVERY SERVICE API
- CX – 0010 BUSINESS PARTNER NUMBER
- CX – 0002 DIGITAL TWINS IN CATENA-X
- CX – 0018 ECLIPSE DATA SPACE CONNECTOR (EDC)