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Postal services — Open interface — Sortplan

National foreword

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Management Centre: Avenue Marnix 17, B-1000 Brussels

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Foreword

This document (CEN/TS 16316:2012) has been prepared by Technical Committee CEN/TC 331 “Postal Services”, the secretariat of which is held by NEN.

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Introduction

In a very generic postal system architecture, an Information System manages the creation, production and life cycle of sort plans. This Information System is also responsible for distributing sort plans to Sorting Machines. Sorting machines use several configuration files. A sort plan is a kind of configuration file dedicated to the description of sorting operations executed by a sorting machine. Sorting operations are mainly the assignment of mail items to physical outlets, the display text and the tray labels. As both, the Information System and the several types of Sorting Machines, have to interpret this sort plan file. This file format therefore is the interface between them.

In order to optimise performance, there is a growing demand of the postal operators to combine parts of their sorting automation equipment from different suppliers. In the past this has led to project-specific interfaces being negotiated between one postal operator and one or multiple suppliers. These project-specific interfaces were developed by the suppliers and maintained for an agreed period of time. However, this approach has several disadvantages:

— the interface is derived from an interface that was not intended to be open;

— the interface is developed for a single project and works only in the context of that project (extra costs);

— each participating supplier has to implement the interface (multiple efforts);

— experience shows that integration of components with project-specific interfaces is complex and expensive;

— project-specific interfaces are not integrated into the product line and once the initially agreed maintenance period is over it may be difficult and expensive to maintain and/or may hinder the adoption of equipment upgrades.

This has led to “open interfaces” defined by one supplier. Yet these still have the disadvantage of being in product use only by one supplier.

Within a group of postal operators and suppliers, it was decided to develop a set of “open standard interfaces” which will be developed by the suppliers and referred to by the postal operators. It was explained that the benefits of these interfaces will be that they:

— are fixed in an international standard (with change control);

— are agreed and implemented by major suppliers;

— are agreed by customers and therefore used in calls for tenders;

— will result in net savings, higher initial development effort and consequent higher basic equipment prices being more than offset by reduced project development, integration and maintenance costs;

— will minimize the need for project integration effort by reducing implementation timescales;

— will increase competition between suppliers by stimulating product improvements.

This technical specification is based on the "Common Sortplan Format" which was used in projects before this standard was developed.

1 Scope

This Technical Specification specifies the sort plan file content and structure. It does not deal with other configuration files in sorting machines nor is it applicable to the transport mechanism.

The content of a sort plan allows the specification of the following capabilities:

— sorting by address and non-address attributes;

— sorting of code ranges;

— sorting of rejects;

— support of display and label texts;

— dynamic outlet groups;

— sorting to more than one outlet;

— overflow handling;

— support of cut off time before dispatch;

— sequence sorting;

— provide volume information (option);

— support of Cards;

— possibility to add simple manufacturer specific information;

— support of various sort code formats and non-address attributes;

— support of various display and label formats;

— check against characteristics of the sorting machine.

2 Normative references

There are no normative references for this document.

3 Terms and definitions

3.1
configuration file
one of the different files specifying actions to be processed by a sorting machine during operation time

3.2
configuration file set
complete set of configuration files needed by a machine to operate at a given time

3.3
cut off time
time to empty a certain outlet of a machine for dispatch

3.4
dispatch time
time when the transport leaves the sorting centre

3.5
dynamic outlet groups
outlets automatically assigned by the Machine Control during processing operation according to a defined set of rules

3.6
outlet
output bin or stacker of a sorting machine

3.7
separation
characterization of a part of the mail flow processed by a machine

3.8
sort plan
configuration file specifying sort operations, that is, the assignment of mail items to outlets

4 Format

The sort plans are exchanged as Unicode text files, and are therefore printable: Unicode 16 bits is used. As a deviation, the Unicode 32 bits could be used if necessary. The encoding used is the UTF 8 standard.

The XML language is used to describe the content of a sort plan. As such, a sort plan can be validated against a formal specification, which can be found in A.1.

5 Definition of sort plan concepts

5.1 Sort plan concepts general

This Clause defines the main concepts of the sort plan; the structural details are given in Clause 6.

The sort plan consists mainly of defining the sorting products (what is sorted), the cards and the actions performed on these sorting products.

5.2 Definition of Sorting Products

5.2.1 Item related

Item related conditions are attached to and travel with the mail item (i.e. they are intrinsic to the mail item). The format supports classifying mail by the following item related attributes:

a) destination;

NOTE Destination is expressed by a sortcode.

b) other item attributes.

EXAMPLE *Priority* or *MailFormat*.

5.2.2 Machine related

Machine related conditions describe events that occur on a machine, but will often not travel with the mail item. These are referred to as special sorts.

EXAMPLE Mechanical reject or overflow.

The format supports building reasonably complex classifications. Please note that in reality classifications are typically built from either item-related or machine-related conditions but not from both.

5.3 Definition of Cards

Cards are typically used to separate the mail in the outlet during sequence sorting. The sort plan supports the following information:

a) definition of a Card;

b) request for a Card at a specific position in the sequence of mail.

5.4 Definition of Actions

5.4.1 Sort to outlets

The most important action is to sort a mail item to a given outlet or a group of outlets. Specifying the destination on the machine comes in two options:

— **Static outlet allocation.** The specified outlet points to a physical outlet on the machine. If more than one outlet is specified, these should all be used for the same classification and effectively just form a “bigger outlet”. The machine can decide if it wants to fill up the outlets of a group one after the other or all at the same time.

— **Dynamic outlet allocation.** This only makes sense when more than one outlet is specified. The machine chooses an outlet for the first mail item of each classification and sorts subsequent mail items of the same classification to the same outlet until the outlet is emptied. In theory, the number of SortingProducts can exceed the number of outlets as long as not all products “occur” at the same time.

A group of outlets may be defined either by enumerating the names of the outlets or by indicating the number of outlets needed in this group.

5.4.2 Sequence mail

Mail can be sequenced using two or more passes. Either a separate sort plan for each pass or a single sort plan that contains enough information so the machine knows what to do in each pass can be used. The latter is the more elegant solution because the machine can make better use of volume information gathered in the first pass.

In order to sequence mail, the sort plan includes the following information:

— the walk position of each destination within its respective postman walk;

— the fact that this mail shall be sequenced (in case not all mail that is fed to this sort plan shall be sequenced);

— optionally volume information, so the machine can allocate enough outlets.

5.4.3 Print on label

Mail bundles are often shipped with a label that is printed on-demand by a label printer. The labels contain Text and often a Barcode.

— **Label layouts.** Sometimes different label layouts requiring different fields are in use. The format allows for the use of different label layouts.

— **Literal content.** Most label fields will contain literal text, i.e. text that shall be printed verbatim or printed as a barcode.

— **Variable content.** Some fields may be populated with keywords that will be evaluated at runtime. A typical example is the current date. This specification does not prescribe the list nor describes the format of such keywords.

5.4.4 Show on display

Displays are treated in basically the same manner as labels except Displays are usually much simpler than Labels. A regular two lines Display will typically accept only a single Format consisting of two lines of text.

5.4.5 Print on mail item

This format has no special support for controlling the printing of barcodes or cancellation bitmaps on mail items. This should be done in separate configuration files.

5.4.6 Sweep

Sometimes outlets need to be emptied at a certain point in time or when other conditions become true. This is referred to either as

— clearance times (sweep at a certain point in time), or

— sweep groups (sweep together with other Sorting Products).

The machine can use this information to either sweep some outlets with a robot or to signal a human operator what outlets to sweep.

6 Structure of the sort plan file

6.1 Sort plan

6.1.1 General

The entire file is a single sort plan. In this clause, the file structure is described in a formal way. Practical examples are given in A.2 (Destination Sort Plan) and A.3 (Sequence Sort Plan).

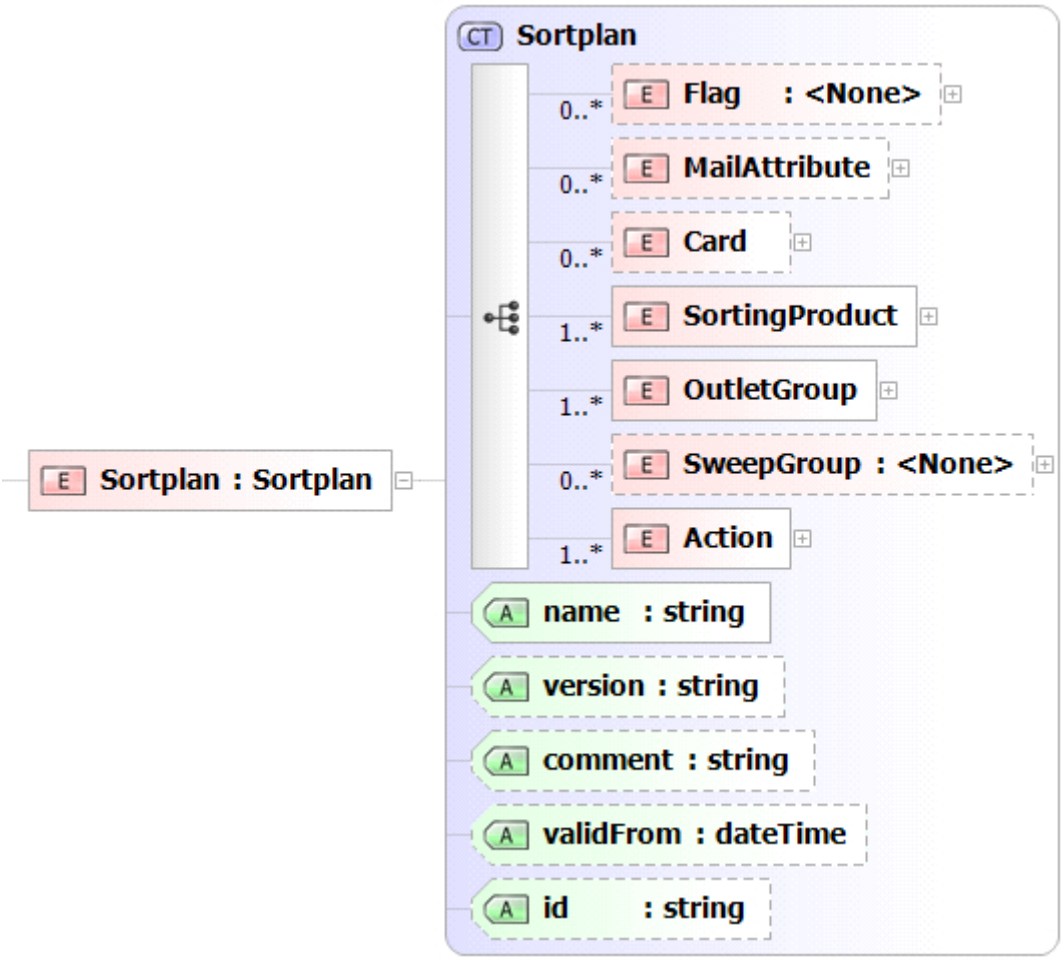

Figure 1 — SortPlan

The attributes of the sort plan are:

— Name (required): the name of the sort plan;

— Version (optional): an identification of the version of the sort plan;

— Comment (optional): a free text field for comment;

— Valid From (optional): date from which the sort plan may be used by the sorting machine. If this field is not used the sort plan may be used by the machine as soon as it receives it;

— Id (optional): a unique identifier as handle for external information system.

6.1.2 Flag

Arbitrary name-value pairs can be attached to a sort plan (see Figure 2). This is used to express machine-specific extensions.

Figure 2 — Flag

6.1.3 MailAttribute

A MailAttribute is a list of non-address attributes such as mail format, weight, priority, etc (see Figure 3).

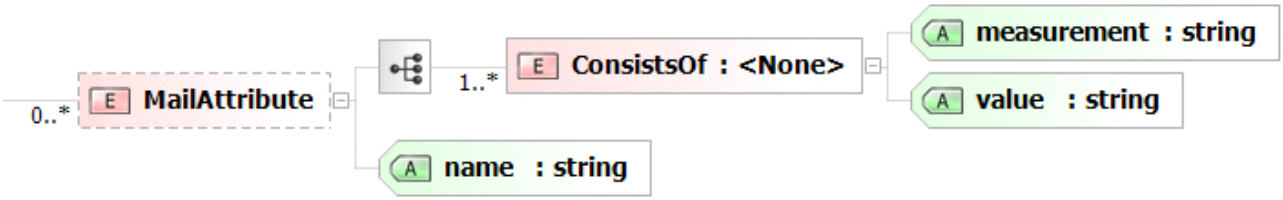

Figure 3 — Mail Attribute

A MailAttribute is identified by its name: a unique key inside the sort plan is used to identify this occurrence of Mail Attribute. This name is mainly used by the sort plan management system.

A MailAttribute is described by a list of couple measurement – value:

— measurement: The name of the measurement performed by the machine on mail items. This string should be recognised as a keyword by the target machine software.

EXAMPLE 1 measurement ="length"

— value: The description of the set of value for this category. The target machine software should know how to interpret the format of this string.

EXAMPLE 2 measurement ="length" value="[10mm, 100mm]"

Inside a MailAttribute, the pairs of measurement - value are combined together with a logical AND.

It is essential that the MailAttributes used within a single sort plan do not overlap.

6.1.4 Card

Cards are used as separators, mostly within sequencing sort plans (see Figure 4).

Figure 4 — Card

The Card section maps card codes to card types ("colors"). Typically, there are several codes that are mapped to the same type.

6.1.5 SortingProduct

The SortingProduct describes "what the machine produces". This is typically the content of an Outlet (see Figure 5).

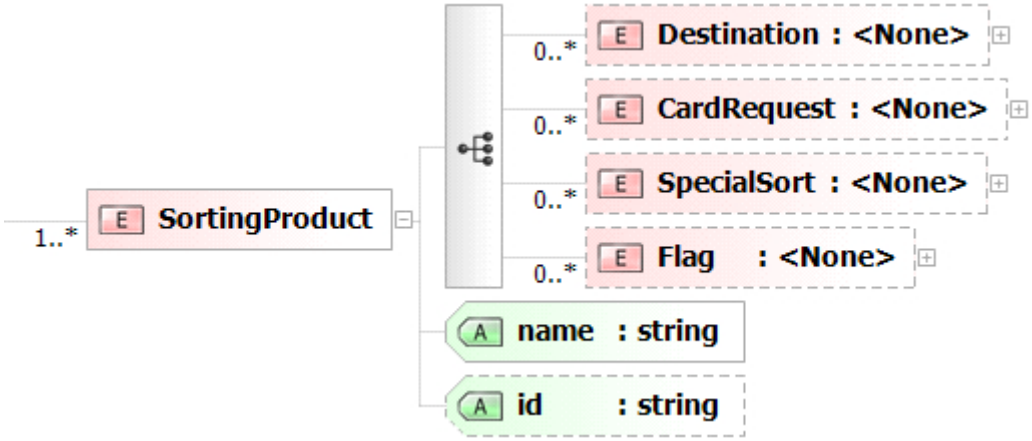

Figure 5 — SortingProduct

6.1.6 Destination

The Destination describes a set of Addresses possibly combined with MailAttributes. Addresses are represented by Sortcode Ranges (see Figure 6).

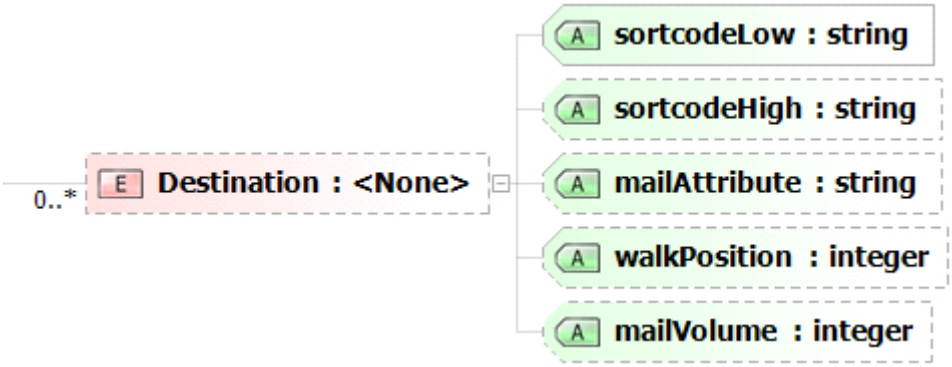

Figure 6 — Destination

Foreign destinations are also represented by Sortcodes which may live in a per-country address space. This can be achieved by prefixing the Sortcodes of foreign destinations with a country prefix.

Sortcode ranges are defined by a SortcodeLow and a SortcodeHigh which shall have the same length and format. The set of Sortcodes that fall into a range is defined as all Sortcodes, S, such that SortcodeLow <= S <= SortcodeHigh. The less-or-equal operator (<=) has an obvious meaning for numeric codes but may require clarification for alphanumeric codes.

In sequencing sort plans, each sortcode range should have a walkPosition, which describes the relative position of an address within a postman's walk. Additionally, a mailVolume attribute can be used to indicate

the expected number of mail items for this address. This can be used by the machine to allocate outlets in an optimal way, or to refuse to load the sort plan in cases where mail volume is too large.

6.1.7 CardRequest

The CardRequest causes a Card to be sorted in front of a specific walkPosition within a postman's walk (see Figure 7).

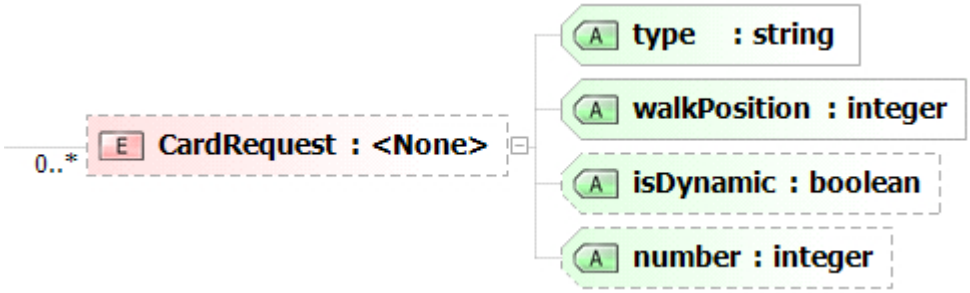

Figure 7 — CardRequest

Dynamic Cards (with isDynamic=true) will only be requested if there is a corresponding mail item at the given walkPosition. Consequently, there must be at least one Destination with the same walkPosition. Static Cards will be requested unconditionally and they can have a unique or an already-used walkPosition. More than one card may be requested by setting the attribute numberOf to an integer larger than one.

6.1.8 SpecialSort

A SpecialSort is an event that may occur while the mail item is being processed (see Figure 8).

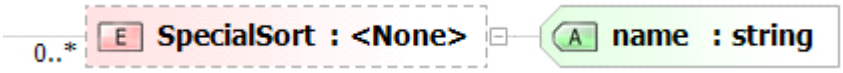

Figure 8 — SpecialSort

Typical examples are “REJECT” or “OVERFLOW”. The set of available special sorts is usually very machine-specific.

6.2 OutletGroup

An OutletGroup is a group of physical outlets (see Figure 9).

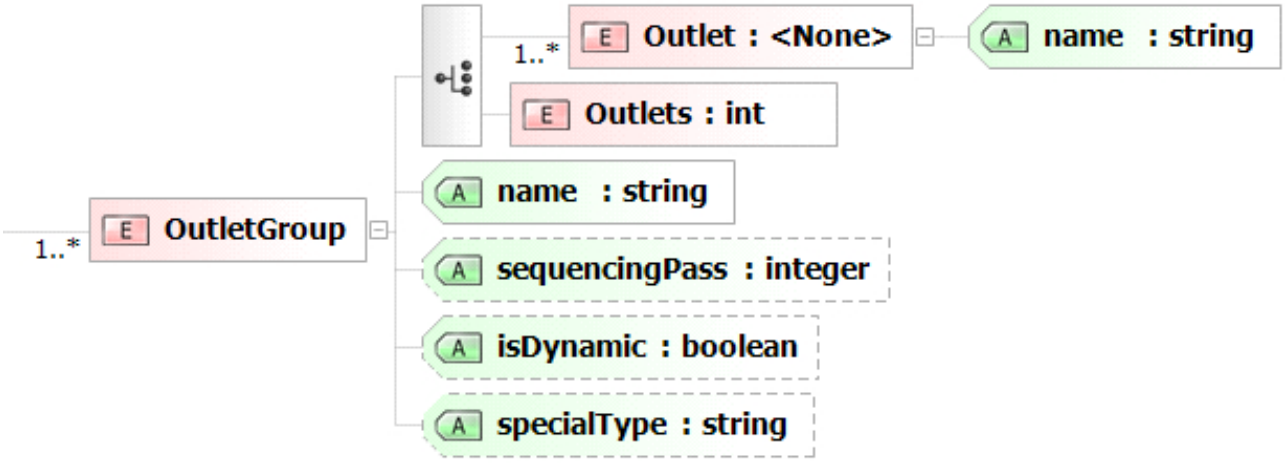

Figure 9 — OutletGroup

An OutletGroup can be static or dynamic. A static OutletGroup can only accept a single SortingProduct even if the OutletGroup contains more than one outlet. A dynamic OutletGroup can accept several SortingProducts; the machine makes sure they are properly separated.

The sequencing pass indicates for which pass an OutletGroup is defined. The idea is to split up the available outlets into several groups. This splitting can be done for each sequencing pass separately.

OutletGroups can be specified either by a machine enumerating all its outlets or by specifying only the number of outlets in that group. In the latter case the machine is free to allocate those outlets where needed.

Especially in sequencing a sort plan, it is often the case that it is preferable to divide the sorting machine into several sections like "sequencing", "direct outlet assignments" and "special sorts". These kinds of OutletGroups shall carry a "specialType" attribute whose values shall be negotiated with the machine manufacturer. It is good practice to name an OutletGroup so it reflects the sequencing pass (e.g. "Walk3-Pass2").

Regular user-definable outlet groups do not need a specialType attribute and can be given any name.

The following names are suggestions for how to name specialTypes:

— **stdArea** - Area used for direct-stackers assignments (i.e. mail that shall not be sequenced even though the sort plan is a sequencing sort plan);

— **seqArea** - Area used for sequenced mail;

— **rejectArea** - Area for SpecialSort;

— **seqOvfArea -** Area for overflow stackers, typically used in the 1st pass when the mail volume is not yet precisely known. This area consists of all the remaining stackers.

Each area can be defined for every pass and for each pass the sum of all outlets in all areas shall be (less or) equal to the number of outlets in the machine.

6.3 SweepGroup

SortingProducts that belong to the same SweepGroup shall be swept together (see Figure 10). The machine may either signal to a human operator that some outlets need sweeping or it may have a robot that carries out this function.

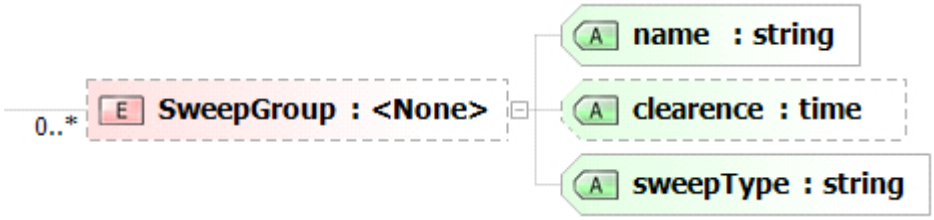

Figure 10 — SweepGroup

The SweepType shall be set to a value that has been negotiated with the machine manufacturer and describes the event that triggers a sweep, e.g. "clearance".

6.4 Action

6.4.1 General considerations

Actions describe what the machine shall do with a mail item that falls into a specified SortingProduct (see Figure 11).

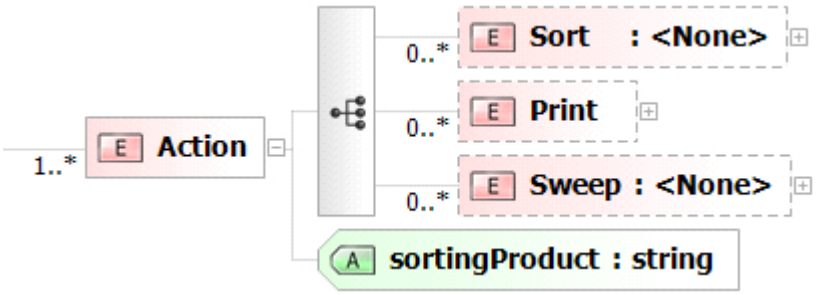

Figure 11 — Action

6.4.2 Sort

A Sort action is specified by a SortingProduct and the OutletGroup where it shall be sorted to (see Figure 12). Additionally, it is possible to specify a position within that OutletGroup (only meaningful for dynamic OutletGroups in sequencing) and to specify if mail shall be sequenced or not.

In sequencing, the position indicates the order of the SortingProduct in the dynamic OutletGroup (both are linked by an action): in this way, the walks can be ordered in the last pass.

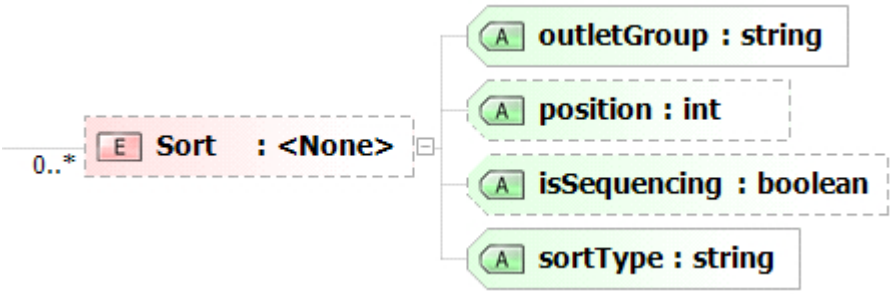

Figure 12 — Sort

This allows any combinations of direct outlet assignments and sequencing over any number of passes. A real sorting machine will most likely restrict the possibilities quite a bit.

The sorting machine can use the sortType indicator to increment different counters.

EXAMPLE *Outward, Delivery Office, Walk* or *Sequenced Walk*

Note that there is no well-defined meaning for the attempt to sort a product more than once. Thus, for any Product there should only be a single Sort action.

6.4.3 Print

The Print action describes what shall be printed on a label or a display for mail items that fall into a given Product (see Figure 13).

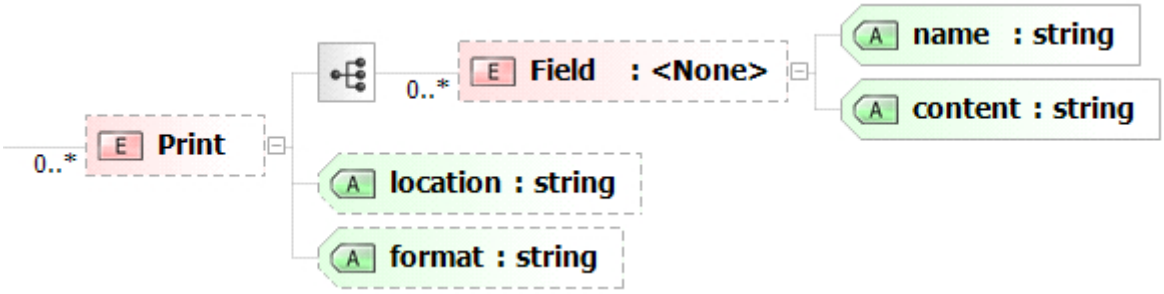

Figure 13 — Print

In addition to a format string and a list of Field elements, the print location (i.e. where action is performed) needs to be specified. Typical locations are Label-Printer or Display. In sequencing, the Print action only applies to the last pass.

6.4.4 Sweep

The sweep action associates a SortingProduct to a sweepGroup (see Figure 14).

Figure 14 — Sweep

A SortingProduct can be a member of several sweep groups. This expresses the fact that there are multiple clearance times (like an hourly train) for the same product. In such cases, the sweepGroups would be named "10:35 train", "11:35 train", etc.

7 Precedence rules

7.1 General considerations

In theory, a given mail item can match more than one SortingProduct; and even for a single SortingProduct several mutually exclusive actions can be specified. To resolve these ambiguities a set of precedence rules apply.

7.2 Sorting Product

If a mail item matches more than one SortingProduct, the first matching SortingProduct (in the order of the sort plan file) shall be used. This means that for any given mail item, a single SortingProduct will be selected for reasons of simplicity. It is however advisable to define SortingProducts in such a way that they do not overlap at all.

7.3 Action

If a SortingProduct matches more than one Action, the first matching Action (order in the sort plan file) shall be used. This means that for any given SortingProduct, a single Action will be selected. It is however advisable to define only a single Action for each SortingProduct.

8 Implementation chart

This paragraph attempts to provide a list of elements to be shared between the sort plan generation system and the sorting machine. These elements need to be agreed upon between the vendors.

— Flag (6.1.2): list of flag names and their possible values;

— MailAttribute (6.1.3): list of measurements and their possible values;

— Sortcode (6.1.6): representation and order;

— SpecialSort (6.1.8): lists the special sort managed by the sorting machine;

— Outlet (6.2): lists of outlet names used by the sorting machine;

— SweepType (6.3): lists the types of sweep that are supported by the sorting machine;

— SortType (6.4.2): lists the type of sort that are supported by the sorting machine;

— Print (6.4.3): lists the fields with their names and possible values (length, character set, etc).

This list is not exhaustive: other information may need to be shared and agreed upon between the vendors.

Annex A
(informative)
XML data

A.1 XML data structure

```
<?xml version="1.0" encoding="utf-8" ?>
<!--Created with Liquid XML Studio - FREE Community Edition 7.0.5.906 (http://www.liquid-technologies.com)-->
<xsd:schema xmlns:xsd="http://www.w3.org/2001/XMLSchema">
  <xsd:element name="Sortplan" type="Sortplan">
    <xsd:annotation>
      <xsd:documentation>The entire file is a single sort plan.</xsd:documentation>
    </xsd:annotation>
    <xsd:key name="SOP">
      <xsd:selector xpath="./SortingProduct" />
      <xsd:field xpath="@name" />
    </xsd:key>
    <xsd:keyref name="SOPrefAction" refer="SOP">
      <xsd:selector xpath="./Action" />
      <xsd:field xpath="@sortingProduct" />
    </xsd:keyref>
    <xsd:key name="CARD">
      <xsd:selector xpath="./Card" />
      <xsd:field xpath="@type" />
    </xsd:key>
    <xsd:keyref name="CARDref" refer="CARD">
      <xsd:selector xpath="./SortingProduct/ItemProduct/CardRequest" />
      <xsd:field xpath="@type" />
    </xsd:keyref>
    <xsd:key name="MA">
      <xsd:selector xpath="./MailAttribute" />
      <xsd:field xpath="@name" />
    </xsd:key>
    <xsd:keyref name="MArefDest" refer="MA">
      <xsd:selector xpath="./SortingProduct/ItemProduct/Destination" />
      <xsd:field xpath="@MailAttribute" />
    </xsd:keyref>
```

```
    <xsd:key name="SGR">
      <xsd:selector xpath="./SweepGroup" />
      <xsd:field xpath="@name" />
    </xsd:key>
    <xsd:keyref name="SGRref" refer="SGR">
      <xsd:selector xpath="./Action/Sweep" />
      <xsd:field xpath="@sweepGroup" />
    </xsd:keyref>
    <xsd:key name="OGR">
      <xsd:selector xpath="./OutletGroup" />
      <xsd:field xpath="@name" />
    </xsd:key>
    <xsd:keyref name="OGRref" refer="OGR">
      <xsd:selector xpath="./Action/Sort" />
      <xsd:field xpath="@outletGroup" />
    </xsd:keyref>
  </xsd:element>
  <xsd:complexType name="Sortplan">
    <xsd:annotation>
      <xsd:documentation />
    </xsd:annotation>
    <xsd:sequence>
      <xsd:element minOccurs="0" maxOccurs="unbounded" name="Flag">
        <xsd:annotation>
          <xsd:documentation>This is used to express machine-specific extensions</xsd:documentation>
        </xsd:annotation>
        <xsd:complexType>
          <xsd:attribute name="name" type="xsd:string" use="required">
            <xsd:annotation>
              <xsd:documentation>The name of the flag</xsd:documentation>
            </xsd:annotation>
          </xsd:attribute>
          <xsd:attribute name="value" type="xsd:string" use="required">
            <xsd:annotation>
              <xsd:documentation>The value of the flag</xsd:documentation>
            </xsd:annotation>
          </xsd:attribute>
        </xsd:complexType>
      </xsd:element>
```

```
<xsd:element minOccurs="0" maxOccurs="unbounded" name="MailAttribute">
 <xsd:annotation>
  <xsd:documentation>A MailAttribute is a list of non-address attributes such as mail format, weight, priority …</xsd:documentation>
 </xsd:annotation>
 <xsd:complexType>
  <xsd:sequence>
   <xsd:element maxOccurs="unbounded" name="ConsistsOf">
    <xsd:annotation>
     <xsd:documentation>First OR attributes within same categories, then AND across categories</xsd:documentation>
    </xsd:annotation>
    <xsd:complexType>
     <xsd:attribute name="measurement" type="xsd:string" use="required">
      <xsd:annotation>
       <xsd:documentation>The name of the measurement performed by the machine on mail items. This string should be recognised as a keyword by the target machine software. Example: measurement ="length"</xsd:documentation>
      </xsd:annotation>
     </xsd:attribute>
     <xsd:attribute name="value" type="xsd:string" use="required">
      <xsd:annotation>
       <xsd:documentation>The description of the set of value for this category. The target machine software should know how to interpret the format of this string.
Example: measurement ="length" value="[10mm, 100mm["</xsd:documentation>
      </xsd:annotation>
     </xsd:attribute>
    </xsd:complexType>
   </xsd:element>
  </xsd:sequence>
  <xsd:attribute name="name" type="xsd:string" use="required">
   <xsd:annotation>
    <xsd:documentation>A unique key inside the sort plan to identify this occurrence of MailAttribute. This name is mainly used by the sort plan management system.  </xsd:documentation>
   </xsd:annotation>
  </xsd:attribute>
 </xsd:complexType>
</xsd:element>
<xsd:element minOccurs="0" maxOccurs="unbounded" name="Card">
 <xsd:annotation>
```

```
        <xsd:documentation>Cards are used as separators, mostly within sequencing sort plans. The Card
section maps card codes to card types ("colors"). Typically there are several codes that are mapped to the
same type.</xsd:documentation>
      </xsd:annotation>
      <xsd:complexType>
        <xsd:sequence>
          <xsd:element maxOccurs="unbounded" name="CodeRange">
            <xsd:annotation>
              <xsd:documentation>List of ranges of codes for this card type when the codeHigh is indicated. If the
codeHigh is omitted the range is reduced to a single code.</xsd:documentation>
            </xsd:annotation>
            <xsd:complexType>
              <xsd:attribute name="codeLow" type="xsd:string" use="required">
                <xsd:annotation>
                  <xsd:documentation>Start of the range or single code</xsd:documentation>
                </xsd:annotation>
              </xsd:attribute>
              <xsd:attribute name="codeHigh" type="xsd:string" use="optional">
                <xsd:annotation>
                  <xsd:documentation>End of the range</xsd:documentation>
                </xsd:annotation>
              </xsd:attribute>
            </xsd:complexType>
          </xsd:element>
        </xsd:sequence>
        <xsd:attribute name="type" type="xsd:string" use="required">
          <xsd:annotation>
            <xsd:documentation>A unique key inside the sort plan to identify this occurrence of Card. This type is
mainly used by the sort plan management system.  </xsd:documentation>
          </xsd:annotation>
        </xsd:attribute>
      </xsd:complexType>
    </xsd:element>
    <xsd:element maxOccurs="unbounded" name="SortingProduct">
      <xsd:annotation>
        <xsd:documentation>Sorting product describes "what the machine produces". This is typically the
content of an Outlet.</xsd:documentation>
      </xsd:annotation>
      <xsd:complexType>
        <xsd:sequence minOccurs="1" maxOccurs="1">
          <xsd:element minOccurs="0" maxOccurs="unbounded" name="Destination">
```

```
<xsd:annotation>
<xsd:documentation>The Destination describes a set of Addresses possibly combined with MailAttributes. Addresses are represented by Sortcode Ranges. </xsd:documentation>
</xsd:annotation>
<xsd:complexType>
<xsd:attribute name="sortcodeLow" type="xsd:string" use="required">
<xsd:annotation>
<xsd:documentation>Start of range or single code</xsd:documentation>
</xsd:annotation>
</xsd:attribute>
<xsd:attribute name="sortcodeHigh" type="xsd:string" use="optional">
<xsd:annotation>
<xsd:documentation>End of the range
</xsd:documentation>
</xsd:annotation>
</xsd:attribute>
<xsd:attribute name="mailAttribute" type="xsd:string" use="optional">
<xsd:annotation>
<xsd:documentation>The name of a previously defined MailAttribute.</xsd:documentation>
</xsd:annotation>
</xsd:attribute>
<xsd:attribute name="walkPosition" type="xsd:integer" use="optional">
<xsd:annotation>
<xsd:documentation>In sequencing sort plans, each sortcode range should have a walkPosition, which describes the relative position of an address within a postman's walk.</xsd:documentation>
</xsd:annotation>
</xsd:attribute>
<xsd:attribute name="mailVolume" type="xsd:integer" use="optional">
<xsd:annotation>
<xsd:documentation>mailVolume attribute can be used to indicate the expected number of mail items for this address.</xsd:documentation>
</xsd:annotation>
</xsd:attribute>
</xsd:complexType>
</xsd:element>
<xsd:element minOccurs="0" maxOccurs="unbounded" name="CardRequest">
<xsd:annotation>
<xsd:documentation>The CardRequest causes a separator card to be sorted in front of a specific WalkPosition within a postman's walk. </xsd:documentation>
</xsd:annotation>
<xsd:complexType>
```

```
            <xsd:attribute name="type" type="xsd:string" use="required">
              <xsd:annotation>
                <xsd:documentation>The type of a previously defined Card.</xsd:documentation>
              </xsd:annotation>
            </xsd:attribute>
            <xsd:attribute name="walkPosition" type="xsd:integer" use="required">
              <xsd:annotation>
                <xsd:documentation>The relative position of the card within the postman's
walk.</xsd:documentation>
              </xsd:annotation>
            </xsd:attribute>
            <xsd:attribute default="false" name="isDynamic" type="xsd:boolean" use="optional">
              <xsd:annotation>
                <xsd:documentation>Dynamic separator cards (with isDynamic=true) will only be requested if
there is a corresponding mail item at the given walk position. </xsd:documentation>
              </xsd:annotation>
            </xsd:attribute>
            <xsd:attribute name="number" type="xsd:integer" use="optional">
              <xsd:annotation>
                <xsd:documentation>The number of cards to be added in the given
position</xsd:documentation>
              </xsd:annotation>
            </xsd:attribute>
          </xsd:complexType>
        </xsd:element>
        <xsd:element minOccurs="0" maxOccurs="unbounded" name="SpecialSort">
          <xsd:annotation>
            <xsd:documentation>Typical examples are “REJECT” or “OVERFLOW”</xsd:documentation>
          </xsd:annotation>
          <xsd:complexType>
            <xsd:attribute name="name" type="xsd:string" use="required">
              <xsd:annotation>
                <xsd:documentation>The name of the special sort e.g. “OVERFLOW”</xsd:documentation>
              </xsd:annotation>
            </xsd:attribute>
          </xsd:complexType>
        </xsd:element>
        <xsd:element minOccurs="0" maxOccurs="unbounded" name="Flag">
          <xsd:annotation>
            <xsd:documentation>This is used to express machine-specific extensions</xsd:documentation>
```

```
            </xsd:annotation>
            <xsd:complexType>
              <xsd:attribute name="name" type="xsd:string" use="required">
                <xsd:annotation>
                  <xsd:documentation>The name of the flag</xsd:documentation>
                </xsd:annotation>
              </xsd:attribute>
              <xsd:attribute name="value" type="xsd:string" use="required">
                <xsd:annotation>
                  <xsd:documentation>The value of the flag</xsd:documentation>
                </xsd:annotation>
              </xsd:attribute>
            </xsd:complexType>
          </xsd:element>
        </xsd:sequence>
        <xsd:attribute name="name" type="xsd:string" use="required">
          <xsd:annotation>
            <xsd:documentation>A unique key inside the sort plan to identify this occurrence of
SortingProduct</xsd:documentation>
          </xsd:annotation>
        </xsd:attribute>
        <xsd:attribute name="id" type="xsd:string" use="optional">
          <xsd:annotation>
            <xsd:documentation>External identifier for cross reference.</xsd:documentation>
          </xsd:annotation>
        </xsd:attribute>
      </xsd:complexType>
    </xsd:element>
    <xsd:element minOccurs="1" maxOccurs="unbounded" name="OutletGroup">
      <xsd:annotation>
        <xsd:documentation>Groupings of physical outlets for each sequencing pass</xsd:documentation>
      </xsd:annotation>
      <xsd:complexType>
        <xsd:choice minOccurs="1" maxOccurs="1">
          <xsd:element minOccurs="1" maxOccurs="unbounded" name="Outlet">
            <xsd:annotation>
              <xsd:documentation>The list of physical outlets to be used.</xsd:documentation>
            </xsd:annotation>
            <xsd:complexType>
              <xsd:attribute name="name" type="xsd:string" use="required">
```

```
            <xsd:annotation>
              <xsd:documentation>The name of the outlets</xsd:documentation>
            </xsd:annotation>
          </xsd:attribute>
        </xsd:complexType>
      </xsd:element>
      <xsd:element minOccurs="1" maxOccurs="1" name="Outlets" type="xsd:int">
        <xsd:annotation>
          <xsd:documentation>The number of outlets used in case of dynamic allocation of
outputs.</xsd:documentation>
        </xsd:annotation>
      </xsd:element>
    </xsd:choice>
    <xsd:attribute name="name" type="xsd:string" use="required">
      <xsd:annotation>
        <xsd:documentation>A unique key inside the sort plan to identify this occurrence of
OutletGroup</xsd:documentation>
      </xsd:annotation>
    </xsd:attribute>
    <xsd:attribute name="sequencingPass" type="xsd:integer" use="optional">
      <xsd:annotation>
        <xsd:documentation>Indication of the sequencing pass</xsd:documentation>
      </xsd:annotation>
    </xsd:attribute>
    <xsd:attribute name="isDynamic" type="xsd:boolean" use="optional">
      <xsd:annotation>
        <xsd:documentation>Specifies if the outlet allocation is dynamic or static for this
group.</xsd:documentation>
      </xsd:annotation>
    </xsd:attribute>
    <xsd:attribute name="specialType" type="xsd:string" use="optional">
      <xsd:annotation>
        <xsd:documentation>Defines the usage made of the outlet group</xsd:documentation>
      </xsd:annotation>
    </xsd:attribute>
  </xsd:complexType>
</xsd:element>
<xsd:element minOccurs="0" maxOccurs="unbounded" name="SweepGroup">
  <xsd:annotation>
    <xsd:documentation>Enables to sweep together products.</xsd:documentation>
```

```
      </xsd:annotation>
      <xsd:complexType>
       <xsd:attribute name="name" type="xsd:string" use="required">
        <xsd:annotation>
         <xsd:documentation>A unique key inside the sort plan to identify this occurrence of
SweepGroup</xsd:documentation>
        </xsd:annotation>
       </xsd:attribute>
       <xsd:attribute name="clearence" type="xsd:time" use="optional">
        <xsd:annotation>
         <xsd:documentation>The time to sweep the products.</xsd:documentation>
        </xsd:annotation>
       </xsd:attribute>
       <xsd:attribute name="sweepType" type="xsd:string" use="required">
        <xsd:annotation>
         <xsd:documentation>The SweepType must be set to a value that has been negotiated with the
machine manufacturer and describes the event that triggers a sweep e.g. "Clearance".</xsd:documentation>
        </xsd:annotation>
       </xsd:attribute>
      </xsd:complexType>
     </xsd:element>
     <xsd:element maxOccurs="unbounded" name="Action">
      <xsd:annotation>
       <xsd:documentation>Maps a product to an action</xsd:documentation>
      </xsd:annotation>
      <xsd:complexType>
       <xsd:sequence minOccurs="1" maxOccurs="1">
        <xsd:element minOccurs="0" maxOccurs="unbounded" name="Sort">
         <xsd:annotation>
          <xsd:documentation>Sort/sequence this product to an OutletGroup. For dynamic outletGroups
specify the relative position withing Group</xsd:documentation>
         </xsd:annotation>
         <xsd:complexType>
          <xsd:attribute name="outletGroup" type="xsd:string" use="required">
           <xsd:annotation>
            <xsd:documentation>A reference on the name of the outlet group</xsd:documentation>
           </xsd:annotation>
          </xsd:attribute>
          <xsd:attribute name="position" type="xsd:int" />
          <xsd:attribute default="false" name="isSequencing" type="xsd:boolean" use="optional">
```

```
            <xsd:annotation>
              <xsd:documentation>Indicates if a sequence sort has to be performed or
not</xsd:documentation>
            </xsd:annotation>
          </xsd:attribute>
          <xsd:attribute name="sortType" type="xsd:string" use="required">
            <xsd:annotation>
              <xsd:documentation>Indication of the nature of the sort for the machine </xsd:documentation>
            </xsd:annotation>
          </xsd:attribute>
        </xsd:complexType>
      </xsd:element>
      <xsd:element minOccurs="0" maxOccurs="unbounded" name="Print">
        <xsd:annotation>
          <xsd:documentation>The Print action describes what shall be printed on a label or a display for mail
items that fall into a given Product.</xsd:documentation>
        </xsd:annotation>
        <xsd:complexType>
          <xsd:sequence minOccurs="1" maxOccurs="1">
            <xsd:element minOccurs="0" maxOccurs="unbounded" name="Field">
              <xsd:annotation>
                <xsd:documentation>List of fields included in the format string</xsd:documentation>
              </xsd:annotation>
              <xsd:complexType>
                <xsd:attribute name="name" type="xsd:string" use="required">
                  <xsd:annotation>
                    <xsd:documentation>Name of the field</xsd:documentation>
                  </xsd:annotation>
                </xsd:attribute>
                <xsd:attribute name="content" type="xsd:string" use="required">
                  <xsd:annotation>
                    <xsd:documentation>Content of the field</xsd:documentation>
                  </xsd:annotation>
                </xsd:attribute>
              </xsd:complexType>
            </xsd:element>
          </xsd:sequence>
          <xsd:attribute name="location" type="xsd:string">
            <xsd:annotation>
```

```
                <xsd:documentation>Specifies the print Location i.e. where action is performed. Typical locations
are Label-Printer or Display.</xsd:documentation>
              </xsd:annotation>
            </xsd:attribute>
            <xsd:attribute name="format" type="xsd:string">
              <xsd:annotation>
                <xsd:documentation>Format string to be printed. It may reference fields defined the Field
sequence.</xsd:documentation>
              </xsd:annotation>
            </xsd:attribute>
          </xsd:complexType>
        </xsd:element>
        <xsd:element minOccurs="0" maxOccurs="unbounded" name="Sweep">
          <xsd:annotation>
            <xsd:documentation>The sweep action associates a SortingProduct with a
SweepGroup.</xsd:documentation>
          </xsd:annotation>
          <xsd:complexType>
            <xsd:attribute name="sweepGroup" type="xsd:string" use="required">
              <xsd:annotation>
                <xsd:documentation>A reference on the name of the sweepGroup.</xsd:documentation>
              </xsd:annotation>
            </xsd:attribute>
          </xsd:complexType>
        </xsd:element>
      </xsd:sequence>
      <xsd:attribute name="sortingProduct" type="xsd:string" use="required">
        <xsd:annotation>
          <xsd:documentation>A reference on the name of a sortingProduct</xsd:documentation>
        </xsd:annotation>
      </xsd:attribute>
    </xsd:complexType>
  </xsd:element>
</xsd:sequence>
<xsd:attribute name="name" type="xsd:string" use="required">
  <xsd:annotation>
    <xsd:documentation>The name of the sort plan</xsd:documentation>
  </xsd:annotation>
</xsd:attribute>
<xsd:attribute name="version" type="xsd:string" use="optional">
```

```
      <xsd:annotation>
        <xsd:documentation>an identification of the version of the sort plan</xsd:documentation>
      </xsd:annotation>
    </xsd:attribute>
    <xsd:attribute name="comment" type="xsd:string" use="optional">
      <xsd:annotation>
        <xsd:documentation>a free text field for comment</xsd:documentation>
      </xsd:annotation>
    </xsd:attribute>
    <xsd:attribute name="validFrom" type="xsd:dateTime" use="optional">
      <xsd:annotation>
        <xsd:documentation>the date from which the sort plan may be used by the sorting machine. If this field is
not used the sort plan may be used by machine as soon as it receives it.</xsd:documentation>
      </xsd:annotation>
    </xsd:attribute>
    <xsd:attribute name="id" type="xsd:string" use="optional">
      <xsd:annotation>
        <xsd:documentation>a unique identifier as handle for external information system.</xsd:documentation>
      </xsd:annotation>
    </xsd:attribute>
  </xsd:complexType>
</xsd:schema>
```

A.2 Example of Destination Sort Plan

```
<?xml version="1.0" encoding="utf-8"?>
<Sortplan xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
xsi:noNamespaceSchemaLocation="CEN-SortPlan.xsd" name="string" id="string">
  <SortingProduct name="Paris" id="75000">
    <Destination sortcodeLow="75000" sortcodeHigh="75099"/>
  </SortingProduct>
  <SortingProduct name="PdD" id="63000">
    <Destination sortcodeLow="63000" sortcodeHigh="63999"/>
  </SortingProduct>
  <SortingProduct name="Rejects" id="1">
    <SpecialSort name="NO-BARCODE" />
  </SortingProduct>
  <OutletGroup name="Paris">
    <Outlet name="UF02" />
    <Outlet name="UF03" />
  </OutletGroup>
  <OutletGroup name="PdD" >
    <Outlet name="UF05" />
  </OutletGroup>
  <OutletGroup name="Rejects" >
    <Outlets>3</Outlets>
  </OutletGroup>
  <SweepGroup name="Wave1" clearence="19:30:00" sweepType="Clearence" />
  <Action sortingProduct="Paris">
    <Sort outletGroup="Paris" sortType="normal" />
    <Print location="Display" format="75 PARIS"/>
    <Sweep sweepGroup="Wave1" />
  </Action>
  <Action sortingProduct="PdD">
    <Sort outletGroup="PdD" sortType="normal" />
    <Print location="Display" format="63 CLERMONT-FERRAND"/>
    <Sweep sweepGroup="Wave1" />
  </Action>
  <Action sortingProduct="Rejects">
    <Sort outletGroup="Rejects" sortType="REJECT" />
    <Print location="Display" format="Rejects"/>
  </Action>
</Sortplan>
```

A.3 Example of Sequence Sort Plan

```
<?xml version="1.0" encoding="utf-8"?>
<Sortplan xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
xsi:noNamespaceSchemaLocation="CEN-SortPlan.xsd" name="string" version="string">
  <Card type="BewareTheDog">
    <CodeRange codeLow="666" />
  </Card>
  <Card type="RoundSeparator">
    <CodeRange codeLow="001" codeHigh="100" />
  </Card>
  <Card type="NotSequenced">
    <CodeRange codeLow="101" codeHigh="200" />
  </Card>
  <SortingProduct name="Round1" id="1">
    <Destination sortcodeLow="75000001001" walkPosition="1" />
       <Destination sortcodeLow="75000001002" walkPosition="2" />
    <Destination sortcodeLow="75000001003" walkPosition="3" />
    <Destination sortcodeLow="75000001004" walkPosition="4" />
    <Destination sortcodeLow="75000001005" walkPosition="6" />
    <Destination sortcodeLow="75000001006" walkPosition="7" />
    <Destination sortcodeLow="75000001007" walkPosition="8" />
       <Destination sortcodeLow="75000001008" walkPosition="9" />
    <Destination sortcodeLow="75000001" walkPosition="11" />
    <CardRequest type="BewareTheDog" walkPosition="5"/>
    <CardRequest type="NotSequenced" walkPosition="10"/>
    <CardRequest type="RoundSeparator" walkPosition="12"/>
  </SortingProduct>
  <OutletGroup name="SequencingP1" sequencingPass="1">
        <Outlets>5</Outlets>
  </OutletGroup>
   <Action sortingProduct="Round1">
    <Sort outletGroup="SequencingP1"  isSequencing="true" sortType="SEQ" />
    <Print location="Display" format="Round1"/>
   </Action>
</Sortplan>
```

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