



WWKS 2 Enhancement Proposal

Channel system support

DRAFT!

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1 Introduction

1.1 Scope

CDAPI defines an extension of WWKS2 that allows a picking robot to collect different dispensing orders and process them as one when it receives a final order with CIP 99999999 or GTIN 99999999999999.

This allows robots working with channels to dispensing all items at once while picking head based robots may start working on the order as soon as the first order line is received.

The IT system may forward each order line immediately to the robot without the need to know, if the robot is working with channels or picking heads. Both types of robots are able deliver the order to the customer in the fastest possible way.

WWKS2 currently does not support this extension. The IT system may either send each line as single order or may send all lines as one order. When sending the order line by line, a channel based robot does not know when the order is complete. When sending all lines of the order at once, a picking head based robot will start later with the processing of order causing longer waiting times for the customer.

This document proposes an extension of WWKS2 to support line-by-line sending of dispensing orders. The extension is designed in a way that picking head based robots do not have to change existing implementations of WWKS2 (by using the rule that any implementation of WWKS2 has to ignore unknown elements).

The extension uses an additional attribute *CollectId* in the *OutputRequest* with that a pharmacy IT system may indicate that this request is part of a bigger order. When all lines of the order have been sent, the pharmacy IT system sends another request with that *CollectId* but no order lines (“empty order”) instead of sending a special 99999999 CIP.

To enable the extension, both pharmacy IT system and channel based robot vendors have to implement it.

1.2 Notation

Changes to the original specification are marked with **orange text color**.

2 Stock Output

Lead elements

OutputRequest

OutputResponse

OutputMessage

Usage

When the pharmacy IT system wants packs withdrawn from stock, it sends the *OutputRequest* to the automated storage and retrieval system. The automated storage and retrieval system responds in the *OutputResponse* indicating whether it is able to execute the output or not. The automated storage and retrieval system may refuse an output request if, for example, the system is not ready due to maintenance procedures or because the query contains invalid data. If the automated storage and retrieval system accepts the output request, the output is executed as quickly as possible. After output (but also if the output fails) the automated storage and retrieval system sends the *OutputMessage*.

The pharmacy IT system can send multiple output requests in sequence. The automated storage and retrieval system will process them in the order in which they are received or according to priority, as appropriate.

The pharmacy IT system may indicate that several output requests are part of one bigger order by sending the number of the bigger order in the *CollectId* attribute. The automated storage and retrieval system may collect all orders with the same *CollectId* until receives an empty *OutputRequest*, that does not contain any order line. It then sends just one *OutputMessage* for all *OutputRequests* with that *CollectId* that contains the combined result for all requests. In case the automated storage and retrieval system does not support the *CollectId* attribute, it will handle each request separately and send an *OutputMessage* for each request.

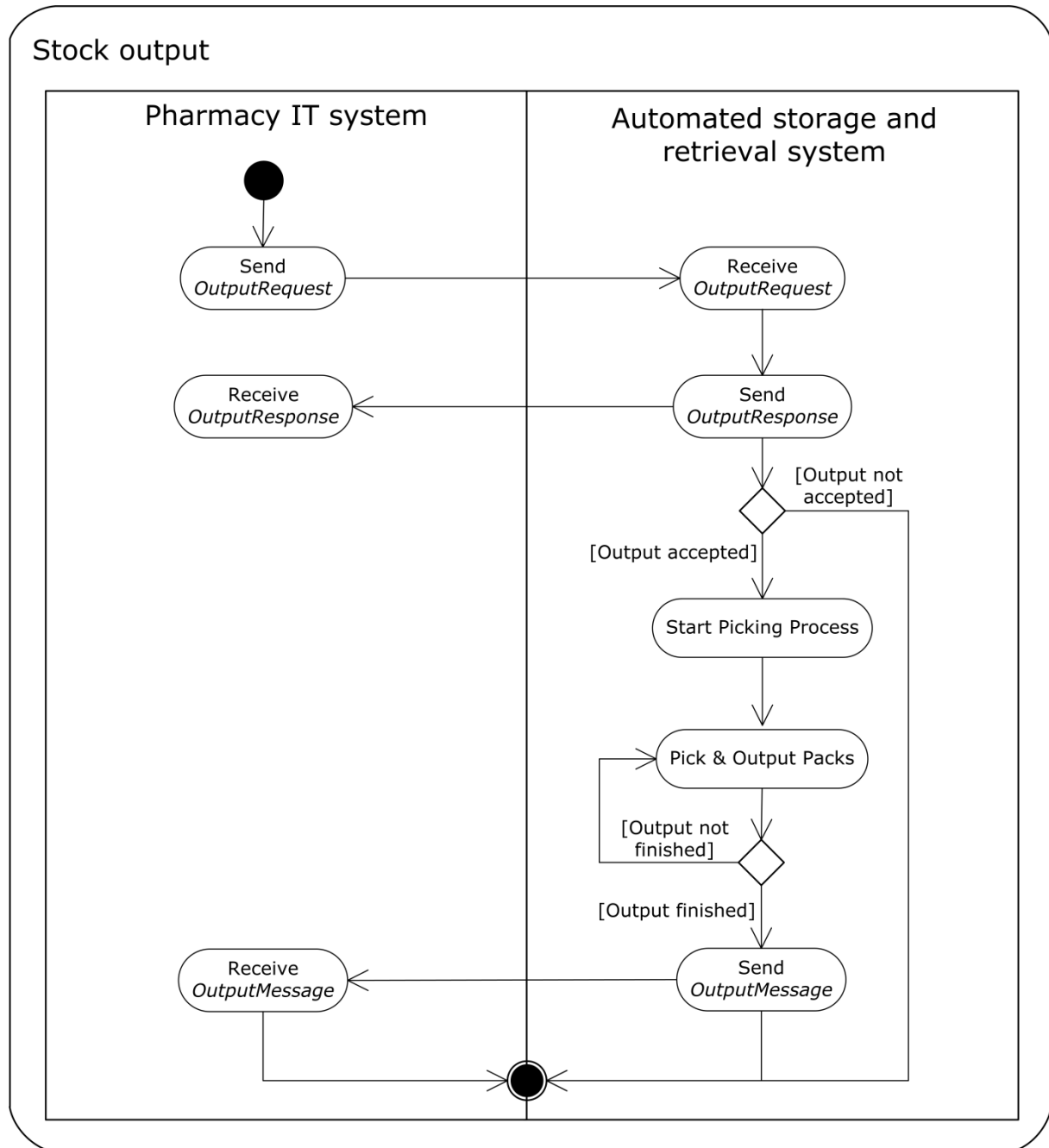
Some automated storage and retrieval systems offer the facility to request packs directly on the automated storage and retrieval system without going through the pharmacy IT system. This is done by an operative on the automated storage and retrieval system's user interface. This procedure requires a returned *OutputMessage* from the automated storage and retrieval system to the pharmacy IT system. You will find an example of this so-called manual output at the end of this section.

Some automated storage and retrieval systems support labeling of packs during the stock output process. A special printer is connected to the automated storage and retrieval system for the purpose. The pharmacy IT system can define the content of the printed label in the *OutputRequest*. The label print is configured in detail both by the pharmacy IT system and on the label printer. Templates are used to specify how the data is presented. The data sent to the label printer may be in a variety of formats, such as XML, HTML or SVG, depending on what the printer is able to process. The label content is therefore embedded in the *OutputRequest* and *OutputResponse* as a CDATA element.

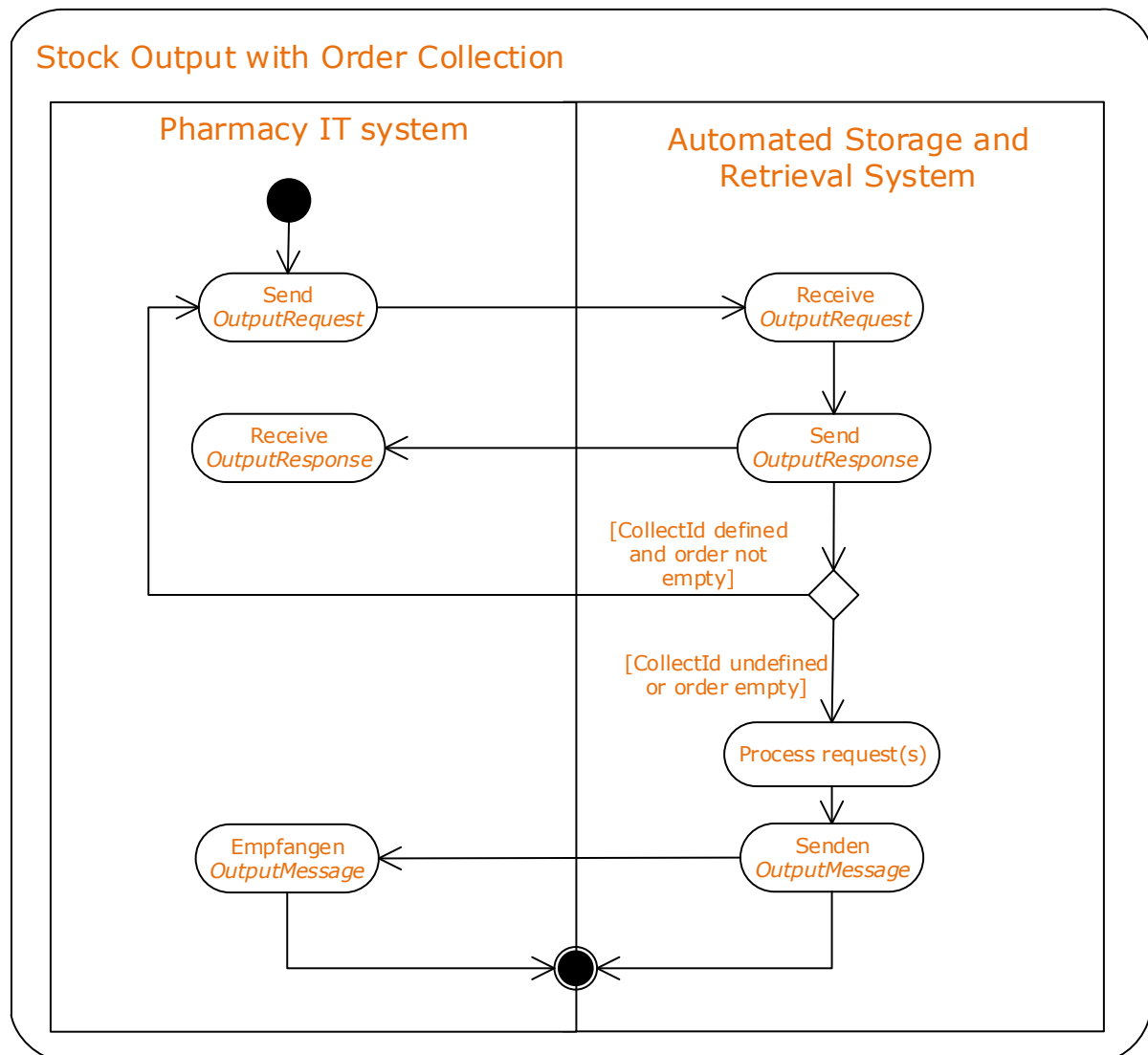
In combination with automated container filling systems, it is possible that the automated storage and retrieval system sends a so-called empty-order to the pharmacy IT system. An empty-order does

not contain any *Criteria* elements and does not therefore prompt a pack output. Consequently the affected container is forwarded by the automated storage and retrieval system as soon as it reaches the container filling point of the automated storage and retrieval system. If no container number is specified in an empty-order, the next container reaching the container filling point of the automated storage and retrieval system is forwarded and the corresponding container number is returned to the pharmacy IT system in an *OutputMessage*.

Sequence



Sequence with order collection



2.1 OutputRequest

Structure

```
<WWKS>
  <OutputRequest>
    <Details/>
    <Criteria>
      <Label>
        <Content>
        </Content>
      </Label>
    </Criteria>
  </OutputRequest>
</WWKS>
```

Elements

Element	M/O	Data type	Description
OutputRequest	M	Tag	Message type
Attributes	M/O	Data type	Description and Values
Id	M	String	ID of the stock output process. This ID is returned in the <i>OutputResponse</i> and is also used in the associated <i>OutputMessage</i> .
Source	M	Integer 32-bit >0	ID of the system sending the output order
Destination	M	Integer 32-bit >0	ID of the system receiving the output order
BoxNumber	O	String	Number of the box to be used for this task. The data is only required if an automatic box filler is being used and the pharmacy IT system predefines the box numbers for an output order.
CollectId	O	String	Id that indicates that picking robot may collect all orders with this Id until it receives an empty order with this Id to process all collected orders at once.

Element	M/O	Data type	Description
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Details	M	Tag	Output details follow.
Attributes	M/O	Data type	Description and Values
Priority	O	String	Priority of the stock output. Possible values: "Low" "Normal" "High" The default value is "Normal".
OutputDestination	M	Integer 32-bit	Number of the output location to which the packs are to be sent
OutputPoint	O	Integer 32-bit	Detailed information on the requested output location (e.g. belt number).

Element	M/O	Data type	Description
Criteria	O	Tag	Output filters follow. This element can be used multiple times.
Attributes	M/O	Data type	Description and Values
ArticleId	O	String	The article ID serving as a filter for the packs. The ID must exactly match the one in the <i>StockInputResponse</i> .
Quantity	M	Integer 32-bit >=0	Number of full packs to be outputted
SubItemQuantity	O	Integer 32-bit >=0	Number of units (e.g. tablets, ampules) to be outputted. The automated storage and retrieval system calculates the resultant number of packs and outputs them. If this attribute is used, the <i>Quantity</i> attribute is ignored. It should nevertheless be set to "0".
MinimumExpiryDate	O	String	Filter for packs having the specified expiration date as a minimum. Format YYYY-MM-DD.
BatchNumber	O	String	Filter for packs having the specified batch number

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SingleBatchNumber	O	Boolean	Alternative to BatchNumber. Defines that all requested packs should have the same BatchNumber. The default value is False.
ExternalId	O	String	Filter for packs having the specified external ID
PackId	O	Integer 64-bit >0	Filter for packs having the specified automated storage and retrieval system internal pack ID. This filter can be used to output a specific pack.
StockLocationId	O	String	Filter for packs having the specified ID of the stock location in the automated storage and retrieval system. Is only used when an automated storage and retrieval system is divided into several virtual stock locations.
MachineLocation	O	String	Filter for packs having the specified identification of the machine used for storing the pack. Only relevant if the automated storage and retrieval system consists of several physical stand-alone machines.
Element	M/O	Data type	Description
Label	O	Tag	Label information follows. This element can be used multiple times.
Attributes	M/O	Data type	Description and Values
TemplateId	M	String	ID of the label template to be used by the label printer for correct output of the label content

Element	M/O	Data type	Description
Content	M	Tag	Label content to be printed. This data is embedded in the message as a CDATA XML block.

2.2 OutputResponse

Structure

```
<WWKS>
  <OutputResponse>
    <Details/>
    <Criteria>
      <Label>
        <Content>
        </Content>
      </Label>
    </Criteria>
  </OutputResponse>
</WWKS>
```

Elements

Element	M/O	Data type	Description
OutputResponse	M	Tag	Message type
Attributes	M/O	Data type	Description and Values
Id	M	String	ID of the stock output process. This ID was sent in the <i>OutputRequest</i> .
Source	M	Integer 32-bit >0	ID of the system sending the <i>OutputResponse</i>
Destination	M	Integer 32-bit >0	ID of the system receiving the <i>OutputResponse</i>
BoxNumber	O	String	Number of the box specified in the <i>OutputRequest</i> . The data is required if an automatic box filler is being used.
CollectId	O	String	Id that indicates that picking robot may collect all orders with this Id until it receives an empty order with this Id to process all collected orders at once. This ID was sent in the <i>OutputRequest</i> .

Element	M/O	Data type	Description
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Details	M	Tag	Output details follow.
Attributes	M/O	Data type	Description and Values
Priority	O	String	Priority of this stock output process. Here the same value is to be seen as in the <i>OutputRequest</i> .
OutputDestination	M	Integer 32-bit	Number of the output location to which the packs are sent. Here the same value is to be seen as in the <i>OutputRequest</i> .
OutputPoint	O	Integer 32-bit	Detailed information on the requested output location (e.g. belt number). Here the same value is to be seen as in the <i>OutputRequest</i> .
Status	M	String	Status of the stock output process. Possible values: "Queued" if the output is pending "Rejected" if the output is rejected

Element	M/O	Data type	Description
Criteria	O	Tag	Output filters follow. This element may occur multiply. The attributes and values correspond to those in the <i>OutputRequest</i> .
Attributes	M/O	Data type	Description and Values
ArticleId	O	String	The article ID serving as a filter for the packs. The ID must exactly match the one in the <i>StockInputResponse</i> .
Quantity	M	Integer 32-bit >=0	Number of full packs to output. Here the same value is to be seen as in the <i>OutputRequest</i> .
SubItemQuantity	O	String	Number of units (e.g. tablets, ampules) to be outputted. If this attribute is used, the <i>Quantity</i> attribute is ignored. It should nevertheless be set to "0". Here the same value is to be seen as in the <i>OutputRequest</i> .
MinimumExpiryDate	O	Integer 32-bit >=0	Filter for packs having the specified expiration date as a minimum. Format YYYY-MM-DD. Here the same value is to be seen as in the <i>OutputRequest</i> .

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BatchNumber	O	String	Filter for packs having the specified batch number. Here the same value is to be seen as in the <i>OutputRequest</i> .
SingleBatchNumber	O	Boolean	Alternative to BatchNumber. Defines that all requested packs should have the same BatchNumber. The default value is False. Here the same value is to be seen as in the <i>OutputRequest</i> .
ExternalId	O	String	Filter for packs having the specified external ID. Here the same value is to be seen as in the <i>OutputRequest</i> .
PackId	O	Integer 64-bit >0	Filter for packs having the specified automated storage and retrieval system internal pack ID. This filter can be used to output a specific pack. Here the same value is to be seen as in the <i>OutputRequest</i> .
StockLocationId	O	String	Filter for packs having the specified ID of the stock location in the automated storage and retrieval system. Is only used when an automated storage and retrieval system is divided into several virtual stock locations. Here the same value is to be seen as in the <i>OutputRequest</i> .
MachineLocation	O	String	Filter for packs having the specified identification of the machine used for storing the pack. Only relevant if the automated storage and retrieval system consists of several physical stand-alone machines. Here the same value is to be seen as in the <i>OutputRequest</i> .

Element	M/O	Data type	Description
Label	O		Label information follows. This element may occur multiply. The data corresponds to that in the <i>OutputRequest</i> .
Attributes	M/O	Data type	Description and Values
TemplateId	M		ID of the label template to be used by the label printer for correct output of the label content. The data corresponds to that in the <i>OutputRequest</i> .

Element	M/O	Data type	Description
Content	M		Label content to be printed. This data is embedded in the message as a CDATA XML block. The data corresponds to that in the <i>OutputRequest</i> .

2.3 OutputMessage

Structure

```

<WWKS>
  <OutputMessage>
    <Details/>
    <Article>
      <Pack/>
    </Article>
    <Box/>
  </OutputMessage>
</WWKS>

```

Elements

Element	M/O	Data type	Description
OutputMessage	M	Tag	Message type
Attributes	M/O	Data type	Description and Values
Id	M	String	ID of the stock output process. This ID was sent in the <i>OutputRequest</i> .
Source	M	Integer 32-bit >0	ID of the system sending the <i>OutputMessage</i>
Destination	M	Integer 32-bit >0	ID of the system receiving the <i>OutputMessage</i>
CollectId	O	String	Id that indicates that picking robot may collect all orders with this Id until it receives an empty order with this Id to process all collected orders at once. This ID was sent in all <i>OutputRequests</i> related to this order.

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Element	M/O	Data type	Description
Details	M	Tag	Output details follow.
Attributes	M/O	Data type	Description and Values
Priority	O	String	Priority of this stock output process. Here the same value is to be seen as in the <i>OutputRequest</i> .
OutputDestination	M	Integer 32-bit	Number of the output location to which the packs were sent. Here the same value is to be seen as in the <i>OutputRequest</i> .
OutputPoint	O	Integer 32-bit	Detailed information on the requested output location (e.g. belt number). Here the same value is to be seen as in the <i>OutputRequest</i> .
Status	M	String	Status of the stock output process. Possible values: "Completed" if the output was completed successfully "Incomplete" if the output was not completed fully "Aborted" if the output was aborted "BoxReleased" if a box was successfully released

Element	M/O	Data type	Description
Article	O	Tag	Article information follows. This element may occur multiply.
Attributes	M/O	Data type	Description and Values
Id	O	String	Article ID of the outputted pack

Element	M/O	Data type	Description
Pack	O	Tag	Pack information follows. This element may occur multiply.
Attributes	M/O	Data type	Description and Values

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Id	M	Integer 64-bit >0	Picking system internal ID of the outputted pack
DeliveryNumber	O	String	Stock delivery number of the outputted pack
BatchNumber	O	String	Batch number of the outputted pack
ExternalId	O	String	External ID of the outputted pack
ExpiryDate	O	String	Expiration date of the outputted pack in format YYYY-MM-DD.
StockInDate	O	String	Input date of the output pack in format YYYY-MM-DD
ScanCode	O	String	Barcode of the output pack
SubItemQuantity	O	Integer 32-bit >=0	Number of units (e.g. tablets or ampules) in the outputted pack. The value "0" means that the pack is full.
Depth	O	Integer 32-bit >=0	Depth of the pack in mm
Width	O	Integer 32-bit >=0	Width of the pack in mm
Height	O	Integer 32-bit >=0	Height of the pack in mm
Shape	O	String	Form factor of the pack. Possible values: "Cuboid" "Cylinder" The default value is "Cuboid".
IsInFridge	O	Boolean	Flag indicating whether the pack has been stored refrigerated. The default value is "False".
BoxNumber	O	String	Number of the box to which the pack was outputted. The data is only required if an automatic box filler is being used.

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OutputDestination	M	Integer 32-bit	Number of the output location to which the pack was sent. A possible error case is output to a point other than the one requested, for example because the requested output point was not operational.
OutputPoint	O	Integer 32-bit	Detailed information on the output location (e.g. belt number) used for pack output.
LabelStatus	O	String	Status of the labeling of the outputted pack. This is only relevant in conjunction with labeling. Possible values: "Labelled" if the pack was labeled correctly with the data predefined by the pharmacy IT system "NotLabelled" if the pack was not labeled (e.g. because no printer was available) "LabelError" if an error occurred during labeling
StockLocationId	O	String	ID of the stock location in the automated storage and retrieval system. Is only used when an automated storage and retrieval system is divided into several virtual stock locations.
MachineLocation	O	String	Identification of the machine that was used to store packs of this article. Only relevant if the automated storage and retrieval system consists of several physical stand-alone machines.

Element	M/O	Data type	Description
Box	O	Tag	Detailed information on the containers used follows. This element may occur multiply.
Attributes	M/O	Data type	Description and Values
Number	M	String	Number of the container either defined in the <i>OutputRequest</i> or automatically determined during filling.

3 Example

Example of multiple output requests for an order with two order lines.

3.2 Automated Storage System supporting CollectId

1. Order line

Pharmacy IT System to Automated storage and retrieval system:

```
<WWKS Version="2.0" TimeStamp="2013-04-16T11:14:00Z">
  <OutputRequest Id="1004" Source="100" Destination="999"
    CollectId="4711">
    <Details Priority="Normal" OutputDestination="3"/>
    <Criteria ArticleId="01234567" Quantity="1"/>
  </OutputRequest>
</WWKS>
```

Automated storage and retrieval system to Pharmacy IT System:

```
<WWKS Version="2.0" TimeStamp="2013-04-16T11:14:00Z">
  <OutputResponse Id="1004" Source="999" Destination="100"
    CollectId="4711">
    <Details Priority="Normal" OutputDestination="3"
      Status="Queued"/>
    <Criteria ArticleId="01234567" Quantity="1"/>
  </OutputResponse>
</WWKS>
```

2. Order line

Pharmacy IT System to Automated storage and retrieval system:

```
<WWKS Version="2.0" TimeStamp="2013-04-16T11:14:00Z">
  <OutputRequest Id="1005" Source="100" Destination="999"
    CollectId="4711">
    <Details Priority="Normal" OutputDestination="3"/>
    <Criteria ArticleId="02588741" Quantity="1"/>
  </OutputRequest>
</WWKS>
```

Automated storage and retrieval system to Pharmacy IT System:

```
<WWKS Version="2.0" TimeStamp="2013-04-16T11:14:00Z">
  <OutputResponse Id="1005" Source="999" Destination="100"
    CollectId="4711">
    <Details Priority="Normal" OutputDestination="3"
      Status="Queued"/>
    <Criteria ArticleId="02588741" Quantity="1"/>
  </OutputResponse>
</WWKS>
```

Final empty request

Pharmacy IT System to Automated storage and retrieval system:

```
<WWKS Version="2.0" TimeStamp="2013-04-16T11:14:00Z">
  <OutputRequest Id="1006" Source="100" Destination="999"
    CollectId="4711">
    <Details Priority="Normal" OutputDestination="3"/>
  </OutputRequest>
</WWKS>
```

Automated storage and retrieval system to Pharmacy IT System:

```
<WWKS Version="2.0" TimeStamp="2013-04-16T11:14:00Z">
  <OutputResponse Id="1006" Source="999" Destination="100"
    CollectId="4711">
    <Details Priority="Normal" OutputDestination="3"
      Status="Queued"/>
  </OutputResponse>
</WWKS>

<WWKS Version="2.0" TimeStamp="2013-04-16T11:14:00Z">
  <OutputMessage Id="1006" Source="999" Destination="100"
    CollectId="4711">
    <Details Priority="Normal" OutputDestination="3"
      Status="Completed"/>
    <Article Id="01234567">
      <Pack Id="5637" BatchNumber="ABC1234"
        ExternalId="PalH09051200001" ExpiryDate="2019-11-30"
        Depth="50" Width="50" Height="50"
        Shape="Cuboid" OutputDestination="3"
        LabelStatus="Labelled"/>
    </Article>
    <Article Id="02588741">
      <Pack Id="8563" BatchNumber="EGFDHD23"
        ExternalId="89345838434" ExpiryDate="2020-12-31"
        Depth="70" Width="70" Height="70"
        Shape="Cuboid" IsInFridge="True" OutputDestination="3"
        LabelStatus="Labelled"/>
    </Article>
  </OutputMessage>
</WWKS>
```

3.3 Automated Storage System not supporting CollectId

1. Order line

Pharmacy IT System to Automated storage and retrieval system:

```
<WWKS Version="2.0" TimeStamp="2013-04-16T11:14:00Z">
  <OutputRequest Id="1004" Source="100" Destination="999"
    CollectId="4711">
    <Details Priority="Normal" OutputDestination="3"/>
    <Criteria ArticleId="01234567" Quantity="1"/>
  </OutputRequest>
</WWKS>
```

Automated storage and retrieval system to Pharmacy IT System:

```
<WWKS Version="2.0" TimeStamp="2013-04-16T11:14:00Z">
  <OutputResponse Id="1004" Source="999" Destination="100">
    <Details Priority="Normal" OutputDestination="3"
      Status="Queued"/>
    <Criteria ArticleId="01234567" Quantity="1"/>
  </OutputResponse>
</WWKS>

<WWKS Version="2.0" TimeStamp="2013-04-16T11:14:00Z">
  <OutputMessage Id="1004" Source="999" Destination="100">
    <Details Priority="Normal" OutputDestination="3"
      Status="Completed"/>
    <Article Id="01234567">
      <Pack Id="5637" BatchNumber="ABC1234"
        ExternalId="PalH09051200001" ExpiryDate="2019-11-30"
        Depth="50" Width="50" Height="50"
        Shape="Cuboid" OutputDestination="3"
        LabelStatus="Labelled"/>
    </Article>
  </OutputMessage>
</WWKS>
```

2. Order line

Pharmacy IT System to Automated storage and retrieval system:

```
<WWKS Version="2.0" TimeStamp="2013-04-16T11:14:00Z">
  <OutputRequest Id="1005" Source="100" Destination="999"
    CollectId="4711">
    <Details Priority="Normal" OutputDestination="3"/>
    <Criteria ArticleId="02588741" Quantity="1"/>
  </OutputRequest>
</WWKS>
```

Automated storage and retrieval system to Pharmacy IT System:

```
<WWKS Version="2.0" TimeStamp="2013-04-16T11:14:00Z">
  <OutputResponse Id="1005" Source="999" Destination="100"
    CollectId="4711">
    <Details Priority="Normal" OutputDestination="3"
      Status="Queued"/>
    <Criteria ArticleId="02588741" Quantity="1"/>
  </OutputResponse>
</WWKS>
```

```
</OutputResponse>
</WWKS>

<WWKS Version="2.0" TimeStamp="2013-04-16T11:14:00Z">
  <OutputMessage Id="1005" Source="999" Destination="100">
    <Details Priority="Normal" OutputDestination="3"
      Status="Completed"/>
    <Article Id="02588741">
      <Pack Id="8563" BatchNumber="EGFDHD23"
        ExternalId="89345838434" ExpiryDate="2020-12-31"
        Depth="70" Width="70" Height="70"
        Shape="Cuboid" IsInFridge="True" OutputDestination="3"
        LabelStatus="Labelled"/>
    </Article>
  </OutputMessage>
</WWKS>
```

Final empty request

Pharmacy IT System to Automated storage and retrieval system:

```
<WWKS Version="2.0" TimeStamp="2013-04-16T11:14:00Z">
  <OutputRequest Id="1006" Source="100" Destination="999"
    CollectId="4711">
    <Details Priority="Normal" OutputDestination="3"/>
  </OutputRequest>
</WWKS>
```

Automated storage and retrieval system to Pharmacy IT System:

```
<WWKS Version="2.0" TimeStamp="2013-04-16T11:14:00Z">
  <OutputResponse Id="1006" Source="999" Destination="100">
    <Details Priority="Normal" OutputDestination="3"
      Status="Queued"/>
  </OutputResponse>
</WWKS>

<WWKS Version="2.0" TimeStamp="2013-04-16T11:14:00Z">
  <OutputMessage Id="1006" Source="999" Destination="100">
    <Details Priority="Normal" OutputDestination="3"
      Status="Completed"/>
  </OutputMessage>
</WWKS>
```