Transmission of results in HL7 format (INST002)

Rev 19 - December 2022

387 Avenue Jean Kuntsmann, 38330 Montbonnot, France

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Introduction

Transmission of results in HL7 format

This installation guide describes how to install and configure the Technidata LIS to send results in HL7 format.

ASTM result messages produced by the Technidata LIS are converted into one or more HL7 result messages depending on whether the Hospital Information System (HIS) manages orders containing multiple tests in a single message or manages one test per message.

The following functions are supported:

- The Placer Order Number (PON) and Filler Order Number (FON) are added in the result message.
- Host codes sent in the ASTM 1238 message are replaced by LIS Test codes.

  Configure the device property of the device "IN ORU ASTM" as follows: **Enable communication with the database** = **Yes**. This property enables transcoding between the host and test code, which is then processed by the OUT HL7 ORU/OUL device.

NOTE: The OUL result message format is supported only for TDNexLabs from V01.31.

- Alternate tables are applied to the result message if defined in the device.
- Patient Identifier prefixes are removed in the result message if defined in the device.
- Function supported only from version V12.01.A of TD-Synergy (also available in version V11.83 of TD-Synergy) and from version V01.11 of TDNexLabs): Transmission of a report file together with the ASTM result file. This report file is a PCL file, whose name is the same as the ASTM file.
  This function is used when a PDF report must be attached to the HL7 message.
- Add doctors in copy (supported only from version V01.31 of TDNexLabs and from V12.31 of TD-Synergy).
  Doctors in copy are managed in the OBR-28 field.
- Supported for TDNexLabs from V01.52 (also in V01.31.B) and TD-Synergy from V12.21.B
  The LISTESTID information (unique test identifier) can be transmitted in the OBR and OBX segments to have a non-ambiguous access to test when the same test code is present more than once in the request.
- Supported for TDNexLabs from V02.00 (this feature is limited to the French market)
  The *Identifiant National de Santé* (INS) can be transmitted in the PID segment. Configure the device property of the OUT_ORUHL7 as follows: **Manage INS identifier** = **Yes**. This property enables following information to be transmitted: INS in PID.3, Birth place code in PID.11 and Identity Reliability code in PID.32 with the value VALI.

  This property is taken into account if the property **Patient identification with French INS number (0=No, 1=Yes in AltPat#, 2=Yes in INS data)** is set to **1** or **2** in the **Configuration** (USE) window > **General** section.

Communications described in this document

This document describes three types of data flow corresponding to the three devices to be defined in the **Devices** dictionary:

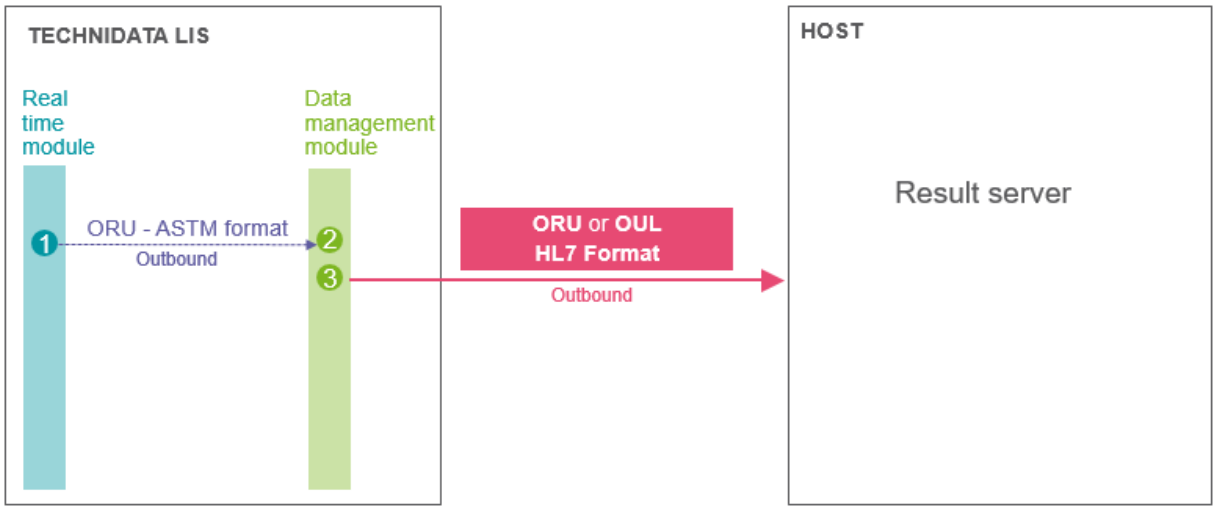
- Reception of results messages (ORU) in ASTM format (internal communication). A task is created to transmit data to the Host.
- Transmission of HL7 ORU or OUL messages to the Host. The data received in ASTM format is converted and transmitted to the Host in HL7 format. This communication can manage PONs (see **Management of Placer Order Number** property, in the **Devices** dictionary, "Result

transmission" data stream). If the PON management is enabled, the results are sent when all PON information is available, otherwise the task is set to the "error" status.

- Reception of HL7 ORM messages from the Host. ORM messages in HL7 format are received from the Host, providing the PON required for the task. This communication is used only to receive the missing PON from the Host. When a PON is received, the communication checks the task in "error" status and moves the task to the "ready" status, if all PON information is available for this task.

These communications are shown in the following diagram.

Communication Diagram



(1) Results are transmitted to the Communication engine device (2) using ASTM 1238 protocol (ORU messages).

(2) A dedicated device (*Inbound ORU ASTM* in our example) is defined in the Communication engine.

- It receives results from the device (1) via ASTM 1238 protocol.
- It generates tasks for device (3) defined as *Outbound ORU/OUL HL7*.
- If the device property **Enable communication with the database** is set to **Yes** for the *Inbound ORU ASTM* device, the host code is transformed to test code for device (3).
- If necessary, it adds in the task, pieces of information that are present in the LIS database (for example, the Placer Order number (PON) of each test).

(3) The *Outbound ORU/OUL HL7* device fetches tasks generated by the device (2) *Inbound ORU ASTM* and transmits HL7 result messages (ORU^R01 or OUL^R24) to the Host.

Other possibility: For TDNexLabs from V01.41 (also in V01.22)
Note that in some cases, it is possible to transmit results containing sample information to an external laboratory using the OUL^R22 result message format. In this case Mirth Connect is used to convert ORU^R01 messages (HL7 v2.3) to OUL^R22 messages (HL7 v2.5). This communication is described in the INST081 document - *Lab-to-lab exchange of orders and results with sample data*.

It is also possible to report results (`.rpw` files) through HL7 2.5 OUL^R22 format. The Host order number (HON) sent in result messages (in the ORC-4 field) and present on result reports can be managed on a maximum of 22 characters.

NOTE: For the Histology/Cytology module, tasks are generated directly by the Histology/Cytology application.

Change history

Confidentiality Notice

This interface specification is confidential and is strictly reserved for communication with a Hospital Information System. An End User Agreement containing the text provided here must be agreed by the Customer (End User).

This interface specification is for the exclusive use of sites covered by an End User Agreement. Use of this interface specification implies full acceptance of the terms and conditions of the End User Agreement.

Document change history

This document is applicable to TDNexLabs and TD-Synergy Technidata products.

For earlier versions of the TD-Synergy history, refer to previous revisions of this document.

Product Version	Document Revision, Date	Short description of the modifications	Internal code
TDNexLabs from V02.01	Revision 19 *November 2022*	Addition of following details for segment PV1-20 Financial class: Hospitalization financial class (sub-field 1) Date when the financial class is taken into account (sub-field 2).	RADOC 144409
TDNexLabs from V02.01	Revision 19 *July 2022*	Addition of sections Transmission of CDA documents: Technical information and CDA R2 Level 3 documents: Structure description to help you understand how CDA documents are used.	CDAN1
TDNexLabs from V02.01	Revision 19 *June 2022*	Information added to Segment descriptions > ORC - Common order segment > ORC-2 Placer Order Number (PON) to include information about storage of the PON within TESTS.ORDERPLACENUMBER.	RADOC 127670
TDNexLabs from V02.01	Revision 19 *June 2022*	First names and Alternate first names are transmitted. Refer to notes in Segment Descriptions > PID-5	NIRIN2
TDNexLabs from V02.01	Revision 19 *May 2022*	Addition of the section Transmission of CDA documents with message examples. Modifications to device properties OUT_ORUHL7, Transmission of Result messages to the Host system for CDA document transmission.	HL7CDA
TDNexLabs from V02.00	Revision 18 *May 2022*	The HL7 ORU result message now supports the *Identifiant National de Santé* (INS). Addition of the device property **Manage INS identifier** in HL7 Transmission of Result messages to host. When this property is set to **Yes**, the following information is supported in PID segment: INS (PID.3), Birth place code in PID.11, Identity Reliability Code in PID.32 valued with VALI. This feature is limited to the French market	NIRINS

TDNexLabs from V01.52.	Revision 18	Result date and time can be sent for sub-combined when the property S**ub-combined tests (Y,N,L,1-6,R)** is set to **P** in the **Connections** (DCX) dictionary on the Real time module. In this case, when transmitting results in HL7 format, the ASTM OBX-14 is completed with the result date and time (YYYYMMDDHHMM format) and the HL7 ORU OBX-19 is filled with the result date and time. See also **Connections** dictionary (DCX) and *Data exchange in ASTM format* installation guide (CNXL003).	RADOC 140604
TDNexLabs from V01.52.B	Revision 18	In "HL7 Transmission of Result messages to host" > Type of stream: Result transmission, the information related to device property **Transmit without external identifiers** has been updated.	RADOC 130619 (DR 44069)
TDNexLabs from V01.53	Revision 17 *February 2021*	Information added to Segment descriptions to include TESTORDER in the OBR and OBX segments.	ATO7RM
TDNexLabs from V01.52.B	Revision 17 *December 2020*	More information about "keepalive" mechanism (Note B) has been provided for the property **Idle time before keepalive transmission (in minutes)** placed in the type of stream "All" of the following pages: "HL7 Transmission of Result messages to host" and "HL7 Reception of Order messages from Host".	RADOC 129943
TDNexLabs from V01.51.B	Revision 17 *December 2020*	Additional information about communication behavior when transmitting a message that use the **National Code** but contains DEFLOC/DEFDOC without National code assigned. New information is found in segments PV1-3,7,8,9,17, ORC-12,13 and OBR-16.	RADOC 129408
TDNexLabs from V01.21.B	Revision 17 *December 2020*	Addition of the topic Updating the VMD script in the Technical information section.	RADOC 101060
TDNexLabs from V01.52	Revision 16 *October 2020*	- The HL7 OUL result message now supports additional information in OBX segment. The following three fields are now supported: OBX-15, OBX-17, OBX-19. - Updated examples of ORU^R01 and OUL^R24 for sample messages containing the new supported information.	TAVRI
TDNexLabs from V01.52	Revision 16 *October 2020*	It is now possible to transmit both local codes and mapped external codes (as for example LOINC codification) in HL7 result messages (in OBR-4 and OBX-3 segment fields). New device property: **Send both local and mapped codes (Yes/No)** in Result transmission stream. Addition of the Activating inclusion of local and mapped codification in HL7 result message topic.	LOIHL7
TDNexLabs from V0152 also in V01.51.B, V01.41.B, V01.31.B TD-Synergy from V12.21.B	Revision 16 *October 2020*	The LISTESTID information (unique test identifier) can be transmitted in the OBR and OBX segments to have a non-ambiguous access to test when same test code is present more than once in the request. Addition of an example of ORU Sample result message with LISTESTID.	MRMSTC

For TD-Synergy only	Revision 16	MSH-4: Addition of a comment about the case of a test request suppression.	RADOC 127481
TDNexLabs from V01.51 also in V01.32	Revision 15 *July 2019*	An increased number of spy files can be saved on disk by configuring the new device property: **Maximum number of old spy file** displayed in the **Devices** dictionary > **Type of stream: All** > **General**.	ENTSK3
TDNexLabs from V01.31.B	Revision 15 *July 2019*	In OBR-14 field: the information related to the "Specimen received date and time" has been updated respect to the value that will be used depending on the configuration.	RADOC 115168
For TDNexLabs and for TD-Synergy from V11.81	Revision 15 *July 2019*	ORC-4 field (Placer Group Number) - Updated information in the NOTE: The FON is now automatically generated by TD-Com using the Access number and test code if not available yet in the message to be transmitted	RADOC 114575
TDNexLabs from V01.51 also in V01.32	Revision 14 *March 2019*	With the reinforced security of Technidata's products, all file-transfer based communications currently using the ftp protocol can now use the sftp protocol. The SFTP low level protocol can now be used for internal ASTM connections and it is defined in the new **Service** property of the Connections dictionary (DCX).	SFTP
TDNexLabs	Revision 14	In DCX > **Low level protocol** folder: The **Identific.** value should be the Windows Server name where TDCnx is installed.	RADOC 111277
TDNexLabs	Revision 14	In OBX-5 segment: precision about SN type result: the result is managed in two subfields.	RADOC 101504
TDNexLabs	Revision 14	When **Enable communication with the database** device property is set to **No**, the DCX settings for HOSPITNUMBER and BENNUMBER must be changed.	RADOC 104356
TDNexLabs	Revision 14	In the device 'Internal ASTM communication for result reception' > Type of stream Result reception, addition of a warning for "Update local database" property.	RADOC 103195
All	Revision 14	**OBR-24.1**: the Service ID has been replaced by Producer ID.	RADOC 98264
TDNexLabs	Revision 14	In "Settings for internal ASTM communication" topic > DCX settings > Data flow folder: Addition of a NOTE relating to Location/doctor1 and Doctor2 settings.	RADOC 94538
All	Revision 14	Addition of the Management of HL7 ORC-5 and OBR-25 result status page (Technical information).	RADOC 73196

TDNexLabs from V01.41 also in V01.22	Revision 13, March 2018	To transmit result messages with Sample information, the communication requires the HL7 2.5 OUL^R22 message format. The Mirth Connect communication ORU2OUL must be used to convert ORU^R01 messages into OUL^R22 messages. To implement it refer to INST081 (*Lab-to-lab exchange of orders and results with sample data*). The Host order number (HON) sent in the result messages (in the ORC-4 field) can now be managed on a maximum of 22 characters.	L2LH75
TDNexLabs from V01.31 TD-Synergy from V12.31	Revision 13, March 2018	To improve communication performance: • The Doctors in copy functionality, so far managed by Mirth (INST060) is now supported by the Communication Engine module which generates HL7 ORU messages (INST002). To enable this feature, the OBR.28 field is now supported and is populated with the doctors in copy. • Optimization of the PON/HON query management.	MDIC7
TDNexLabs from V01.31	Revision 13, March 2018	The new **Result message format to transmit** device property has been added to the "Result transmission stream" of the "HL7 Transmission of results" device, allowing either the ORU^R01 or OUL^R24 message format to be selected. The structure of the OUL^R24 message has been added. The TQ1 segment description has been added as it is managed by the OUL^R24 format.	HL7RBL
All	Revision 13	The supported length for Telephone Numbers (contained in PID-13) is limited to 15 characters.	RADOC 88279
TDNexLabs from V01.21.B	Revision 13	A new topic: Manual VMD modification to support XCHR parameters has been added.	RADOC 84090
All	Revision 13, March 2018	In the description of ORM messages, PV1 segment, a NOTE is added to precisely indicate the code length supported for Doctors and Locations.	RADOC 82738
TDNexLabs from V01.11 TD-Synergy from V12.01 also in V11.83	Revision 13, March 2018	In: Technical Information > Transmission of an additional result report file > Incidents The limit of the PDF report file attachment of transmitted results has been increased to 2MB.	RADOC 81535
All	Revision 13, March 2018	PID-3 Patient identifier list field: the inbound script has been updated, the Outbound script is documented.	RADOC 7981
TDNexLabs from V01.21 TD-Synergy from V12.21	Revision 12, October 2016	Transmission of the sample **Collection date** in HL7 result messages (ORU) when the new **Transmit Sample Collection date** device property is set to Yes in the *Result transmission* data flow. This information is managed in the OBR-7 field.	CDTT7

TDNexLabs from V01.21 TD-Synergy from V12.21, also in V11.83	Revision 12, October 2016	The **TCP/IP socket transport** layer has been updated to improve robustness. In the **Device** dictionary, the properties corresponding to the updated **Transport** section ("Type of stream = All") have been documented.	NSMTC
TDNexLabs from V01.11.A TD-Synergy from V12.21, also in: V12.01.B V11.83	Revision 11, February 2016	Enhanced traceability of result messages using a unique identifier in all the communication steps (listed below) : 1. Creation of ASTM file 2. Transmission of ASTM file via FTP 3. Processing by the Communication engine device ASTM (IN) 4. Processing by the Communication engine device HL7 (OUT) This traceability feature is enabled by a new property in the internal properties (ZP) for the ASTM communication. See: Settings for internal ASTM communication > Properties zone (ZP)	TORCC
	Revision 10, September 2015	**This document is applicable to TDNexLabs.**	NTTNL
TDNexLabs from V01.11	Revision 10, September 2015	Now, when you define the properties related to VMD and SPY files in the **Devices** dictionary, you just have to enter the filename, without the path.	MSSN
All	Revision 10	The HL7 separators described in the Message Header Segment MSH 1-2 have been corrected.	RADOC 59495
All	Revision 10	Updated information in: PV1-44, PV1-45, ORC-7 and OBR-11	RADOC 56930
From V11.61	Revision 10, February 2015	Addition of Note 6 to HL7 Transmission of Result messages to host: Result transmission.	RADOC 53479
All	Revision 10, January 2015	Updated information in the ORC segment for ORC-7.6 field, and OBR segment for OBR-27.6 field.	RADOC 52695
From V11.83	Revision 10, January 2015	Modification of test code for the PDF result report (OBX-3 and OBX-4.1) in Segment descriptions.	RADOC 52205
In V11.83, From V12.01	Revision 10, December 2014	Modification of Message Header Segment MSH-4.1, MSH-4.2 and MSH-4.3 in HL7 ORU transmission Added section Manual VMD modification to transmit Sender information (MSH-4) from ASTM (7.5) in HL7 ORU messages	RADOC 52402

In V11.83, From V12.01	Revision 10, December 2014	Modification of MSH - Message Header Segment: Result transmission of source laboratory code.	H7OCI

In V11.83, From V12.01	Revision 10, November 2014	The GPDF feature is no longer required to attach a PDF report file to the HL7 result message. The report file generation is now synchronized with that of the ASTM result message. The report file (PCL file) is produced and transmitted together with the ASTM result message to the ASTM reception device. The PCL file is converted into PDF by the HL7 transmission device. One single printing block is defined in the **Doctors & Locations** (DCR) dictionary and the **Elec.format C.1** field contains the code of the format used for the report file. A printer must be defined in the **Connections** dictionary. The new **Auxiliary file extension** property must be set to `pcl` in the **File location** section when completing the ASTM reception device properties to enable the device to process the PCL file. The **Directory and name of the PCL to PDF conversion tool** and **Command options of the PCL to PDF conversion tool** properties in the **Archiving of reports** section must be completed in the HL7 transmission device properties.	SPDFH
All	Revision 10, October 2014	Updated the Segment description for the PID - 3 field.	RADOC 48544

Installation

Prerequisites

- The communications must be set up on a computer connected to the network 24 hours/day, 7 days/week and on which the connection service is installed.
- The computer must comply with the recommendations specified in the *Description of System Components*, available on the TECHNIDATA website (www.technidata-web.com).
- For the TCP/IP connection:
  - The listening and outgoing communication ports must be known.
  - The administrative port used by the connection service (needed for internal purposes), is automatically set by the service but can be defined manually if needed. For more information, refer to Administrative port definition.
  - The type of TCP/IP lower layer protocol used (hybrid or minimal) must be defined. For more information, refer to Data block structure.
- Chameleon software:
  On all computers used for communications requiring Chameleon software, it is necessary to register the new version of Chameleon software with Interfaceware before you can use it. To do so, **you must call the TECHNIDATA Support team** in order to obtain a registration code. For more information, refer to Chameleon files (VMD files).

From TDNexLabs V01.51 and also for V01.32:

With the reinforced security of Technidata's products, all file-transfer based communications that were using the **ftp** protocol can now use the **sftp** protocol. Technidata recommends the use of **sftp** instead of **ftp** for security reasons (the login and password used for such communications need to be crypted).

- (Recommended) An SFTP Windows server must be installed on the Windows server. Depending on the version of your Windows Server, refer to:
  - **TIB #202** - Settings for Windows Server 2016, Chapter "*Implement SFTP windows server*", or
  - **TIB #191** - Settings for Windows Server 2012 and Windows 8.1, Chapter "*Implement SFTP windows server*"

  For earlier Windows Server versions, the installation of an SFTP Windows server is possible, in this case refer to TIB 202, Chapter 7. Implement SFTP windows server.

  These documents are available on the website (www.technidata-web.com) > TECHNICAL SUPPORT > Technical bulletins.
- (Optional) Although SFTP server is highly recommended, an FTP server can be installed on the Windows server. For more details please refer to the document **TIB #150** - *Installation of FTP Server on Windows*. This document is available on the website (www.technidata-web.com) > TECHNICAL SUPPORT > Technical bulletins.

To start installation, go to Installation procedure

Installation procedure

This Installation Guide INST002 explains how to transmit results to a Host system in HL7 format.

IMPORTANT: If you are updating your Technidata LIS, the new Chameleon files (VMD files) can be delivered and copied to your disk.
These new VMD files do not overwrite the old files, but are copied to a reference directory.
The old VMD files can contain modifications.

- Before the update, they are stored in the client installation directory:
  `C:\Technidata\TD-<Product> Client_InstanceName`
- At the installation time or during the latest update, they are stored in:
  `C:\Technidata\TD-<Product> Client_InstanceName\Reference`

After an update, it is therefore imperative that the Installation engineer copies the new VMD files from the Reference directory to the directory containing the old VMD files, but before doing this, the Installation engineer must copy the modifications manually, if any.

Install the communication by performing the following steps in the order listed:

1. Select features

   For TDNexLabs and from version V11.91.A of TD-Synergy, this step (selecting features) is no longer needed. The Chameleon software and all the files required to implement the communications are always automatically installed on the computer when you run the Client setup.

   However, if your software version is lower than V11.91.A, this step is necessary to install the communications. In this case, see Selecting features on the Client instance.

   NOTE: When PDF reports must be attached to the HL7 messages, define as many connection services (tdcnx services) as they are devices used to send HL7 ORU messages. Each of these devices must be assigned a dedicated TDCnx service.

2. Start the Connection Service
   - Use the Windows Service Manager to start the **TDConnection** service.
   - The connection service appears under the name **TDCnx_InstanceName**.
   - Start this service before defining devices in the **Device** dictionary.
3. Define the TDNT counters
   Define the TDNT counters that will be used by this communication on the **TDNT Server Control Panel**.

   It is important to define the counters before you define the communication devices because you will be asked later to enter the counter number in the **Device** dictionary. We recommend to note this number as soon as it is created, not to forget it.
   Three counters are needed by the communication devices defined in steps 5, 6, and 7.
4. Define settings for internal ASTM communication
   See Settings for internal ASTM communication
5. Define settings in the **Configuration** window
   See Settings in the Configuration window
6. Define a device to receive ASTM results messages (ORU) (internal communication)
   See Internal ASTM communication for result reception
7. Define a device to transmit HL7 Results messages (ORU or OUL) to the Host system
   See Transmission of HL7 Results messages to Host.
8. Define a device to receive order messages (ORM) from the Host system
   This step is used by this communication only to receive the missing PON from the Host.
   See HL7 Reception of Order messages from Host.
9. Test the connection
   Use the Chameleon simulator to test the connection.

Selecting features

This topic only applies to TD-Synergy versions lower than V11.91.A. On higher versions, the Chameleon software and all the files required to implement the communications are always automatically installed on the computer when you run the client setup.

The Communication Engine must be installed with a Client instance.

For more details about this action, refer to the *Technical Guide*: Installation > Core System > Technical installation > Running the Client Setup on the Server PC.

To select the features at the same time as installing TD-Synergy

During installation of the Client instance, when the **Feature Selection** screen is displayed:

1. Select by left-clicking on the corresponding line:
   - **ASTM: Reception of results** (required)
   - **HL7: Transmission of results** (required)
   - **HL7: Order Reception** (required)
2. Choose the option **This feature will be installed on local hard drive**.

To select the features later

It is also possible to select these features at a later date, using the Windows **Programs and Features** utility. To do this:

1. From the Windows Control Panel, select **Programs and Features.**
2. Select **TD-Synergy Client_*<InstanceName>.***
3. Click **Change.**
4. In the InstallShield Wizard, select **Modify.**
5. Select the features you need (listed above).
6. Follow the on-screen instructions to complete the installation.

Next step

- Defining the TDNT counters

Defining the TDNT counters

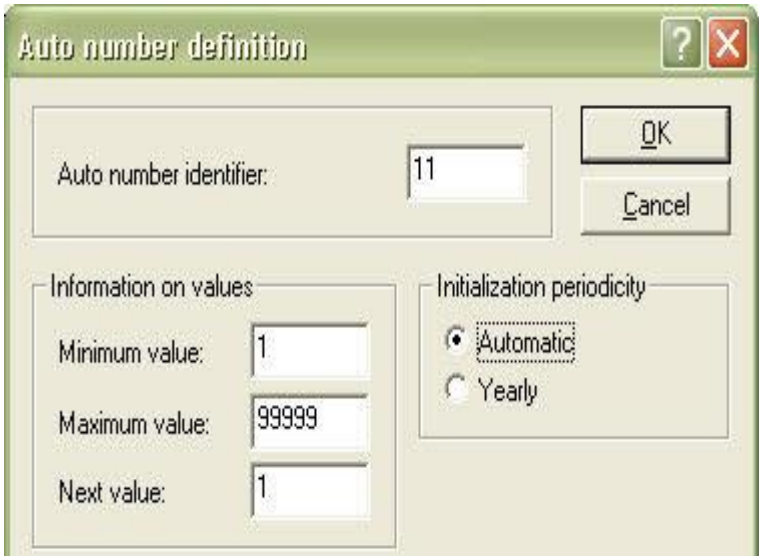
The TDNT counters that will be used by this communication must be defined beforehand in the **TDNT Server Control Panel**.

- Three counters are needed for the following communication devices:
  - Internal ASTM communication for result reception
  - HL7 Transmission of Result messages to host
  - HL7 Reception of Order messages from Host

NOTE: It is important to define the counters before you define the communication devices because you will be asked, later in the installation process, to enter the created counter number in the **Device** dictionary > Data stream: All > **Message control ID** or **Internal counter** property.

To define the TDNT counters

1. From the **Control Panel**, open the **TDNT Server Control Panel** by selecting: **System Management** > **Advanced System Setup** > **TDNT Server Control Panel**.
2. In the **Tools** menu, select **Auto numbers**. The **Auto numbers** window opens. Click **Add** to create a new counter in the **Auto number definition** window. You can set the same values as in the example below.



The **Auto number identifier** field (or **Counter ID**) is filled automatically by the system with the next available Counter ID.

TIP: It is advisable to note this number as soon as it is created, so that you can select it later, when you will be asked for it, in the Device dictionary.

For more information about this feature, refer to the *User online help*, **System Management** > **TDNT Server Control Panel**.

Next step: Settings for internal ASTM communication

Settings for internal ASTM communication

This section explains how to perform the settings required for the internal ASTM communication: Transmission of results in ASTM format. The following files/windows are concerned with the settings:

- peri.par file
- Printer `spool.sh`
- Internal properties (ZP)
- Doctors & Locations dictionary (DCR)
- Connections dictionary (DCX)

Settings in the peri.par file

Define the connection in the `peri.par` file, located in the `/usr/cibleN/files/par` directory.

To connect ASTM (high level protocol) via FTP (low level protocol), you have to define the following line:

```
# Ex astm emission with COR XASER
.:D:61 :ixast :ASTM-EmRes : :N:8:1:0:ast061: :FTP:AST:
```

Settings in the printer `spool.sh`

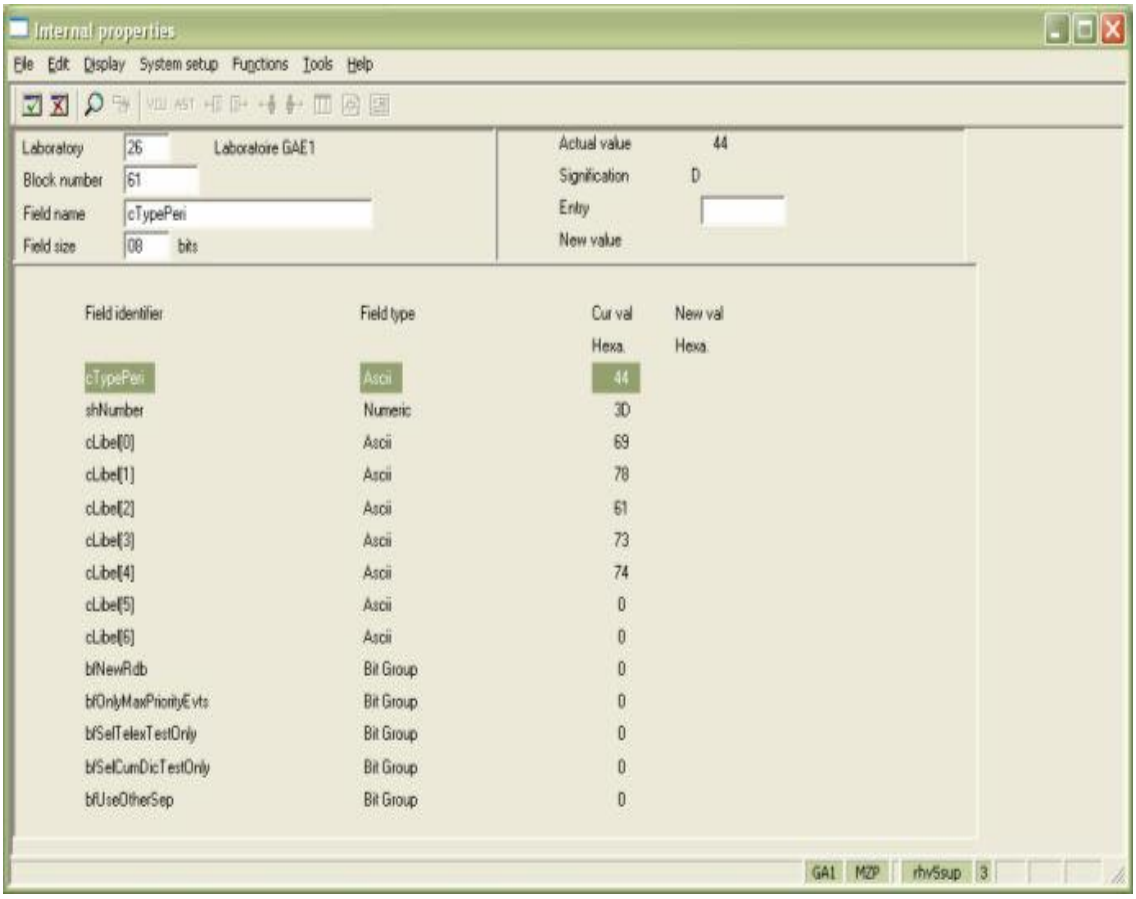
By default, the `spool.sh` is configured to generate paper copies of result reports and archive report files. You must modify it to disable paper copies and archive report files.

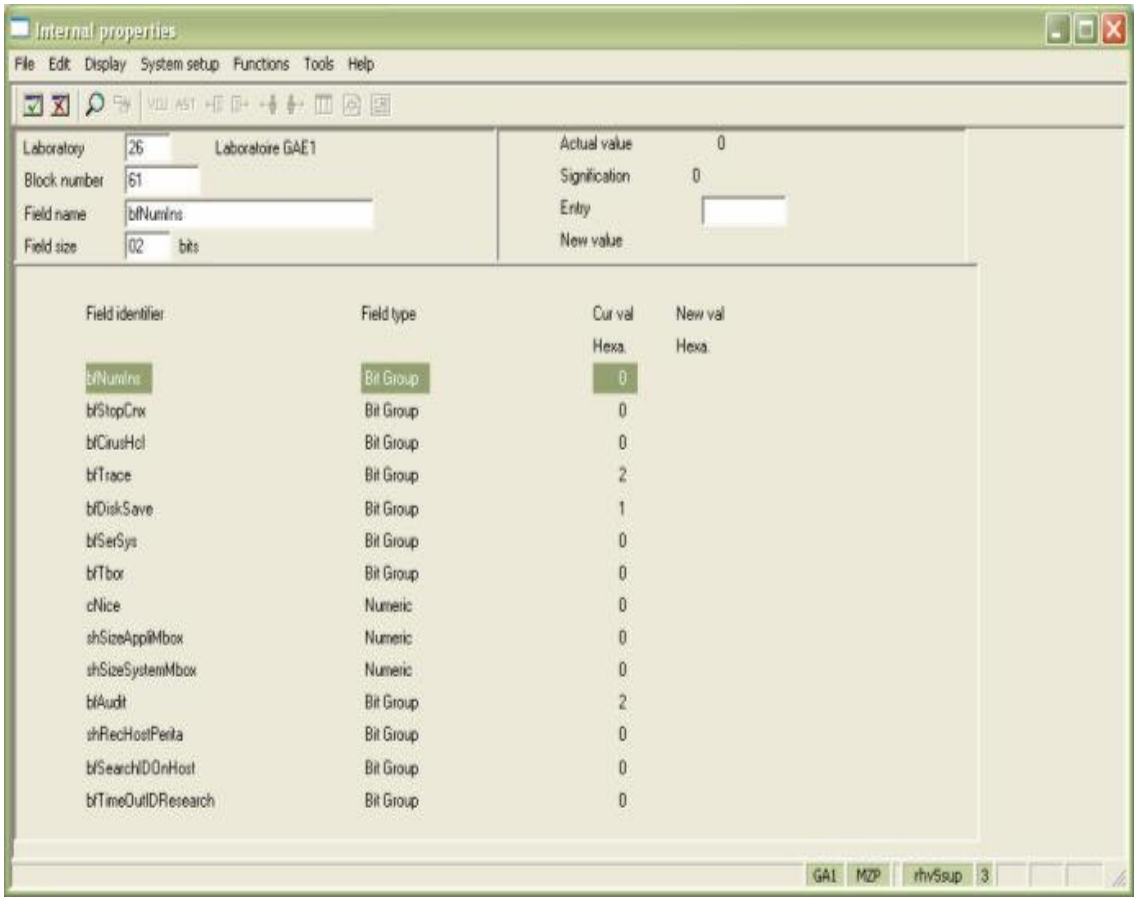
1. Copy `spool.sh` to the shell scripts defined in the `/usr/cibleN/files/par` directory for the printers used for the connection and rename it to spooxxx.sh (where XXX is the printer number)..
2. Open the `spoxxx.sh` and set the **`dontprint`** and **`toarchive`** parameters as indicated to disable paper copies and archive report files (no PCL files for `TDArchiveReport`):

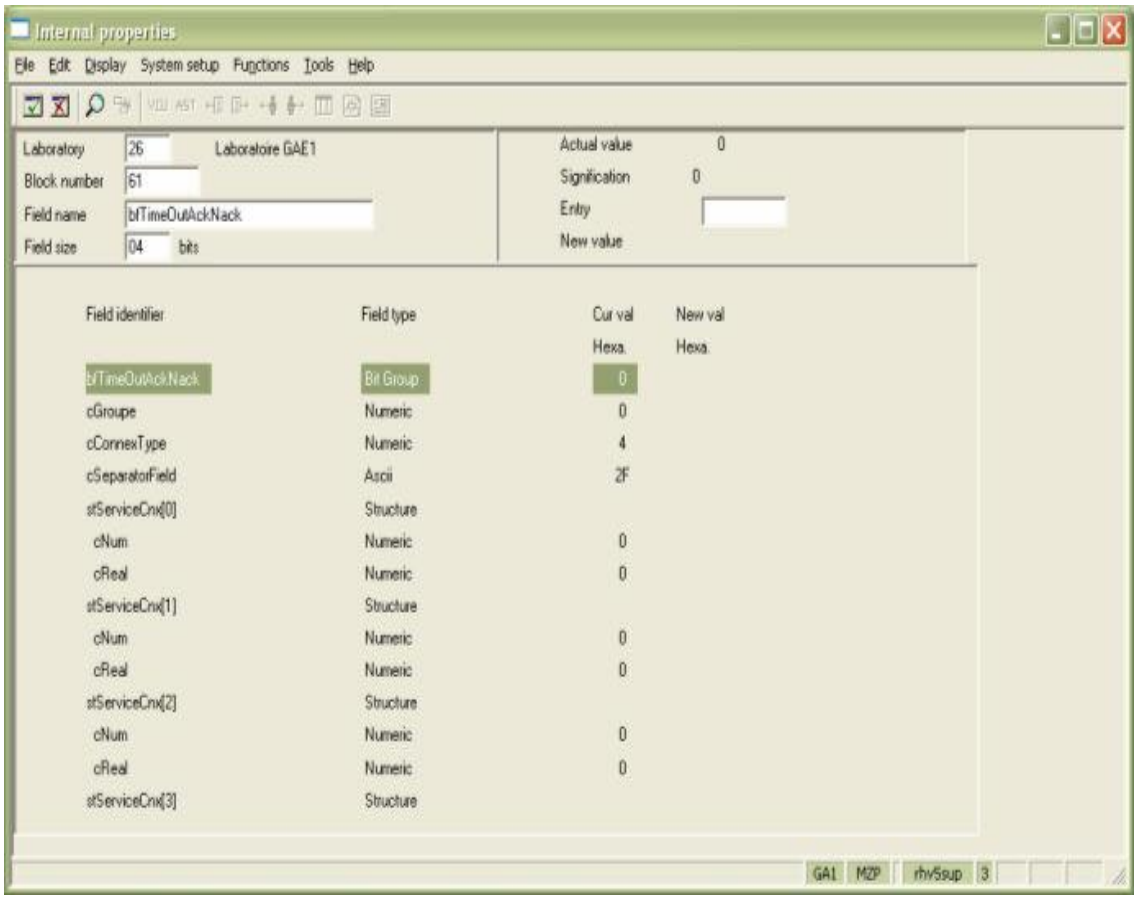
```
dontprint=1
toarchive=0
#=================================================================
==========
#                     SPECIAL SETTINGS FOR THIS SPOOL
#=================================================================
==========
#-------------------------------------
# Report to 'print'
#-------------------------------------

# If report doesn't need to be printed
# uncomment next line
# dontprint=1
#-------------------------------------

# PDF to archive
#-------------------------------------

# If report doesn't need to be archived
# uncomment next line
# toarchive=0
```

Properties zone (ZP)

1. In the **Control Panel**, select **System Management** > **Advanced System Setup** then **Internal Properties**.
2. In the **Block number** field, type the perita number defined in the `peri.par` file (61 in the example). Press [F5] key to enter the decimal or characters.




Internal properties
File Edit Display System setup Functions Tools Help
Laboratory 26 Laboratoire GAE1
Block number 61
Field name bfNumIns
Field size 02 bits
Actual value 0
Signification 0
Entry
New value
Field identifier
Field type
Cur val Hexa.
New val Hexa.
bfNumIns Bit Group 0
bfStopCnx Bit Group 0
bfCirusHcl Bit Group 0
bfTrace Bit Group 2
bfDiskSave Bit Group 1
bfSerSys Bit Group 0
bfTbox Bit Group 0
cNice Numeric 0
shSizeAppliMbox Numeric 0
shSizeSystemMbox Numeric 0
bfAudit Bit Group 2
shRecHostPerita Bit Group 0
bfSearchIDOnHost Bit Group 0
bfTimeOutIDResearch Bit Group 0
GA1 MZP rhvSsup 3


Internal properties
File Edit Display System setup Functions Tools Help
Laboratory 26 Laboratoire GAE1
Block number 61
Field name bfTimeOutAckNack
Field size 04 bits
Actual value 0
Signification 0
Entry
New value
Field identifier
Field type
Cur val Hexa.
New val Hexa.
bfTimeOutAckNack Bit Group 0
cGroupe Numeric 0
cConnexType Numeric 4
cSeparatorField Ascii 2F
stServiceCnx[0] Structure
cNum Numeric 0
cReal Numeric 0
stServiceCnx[1] Structure
cNum Numeric 0
cReal Numeric 0
stServiceCnx[2] Structure
cNum Numeric 0
cReal Numeric 0
stServiceCnx[3] Structure
GA1 MZP rhvSsup 3

Traceability of result messages using a unique identifier

For TDNexLabs from V01.11.A and for TD-Synergy from V12.21 (also in V12.01.B, V11.83)

The traceability of result messages which use a unique identifier in all the communication steps can be enabled or disabled by setting the following property, accessible in the **Properties zone** > PERITA (type D) for ASTM connection.

bfAdditionalInfoCx

0= (default value) the traceability feature is disabled.

1= The traceability feature is enabled. When enabled, the unique identifier used for traceability is transmitted in the fields 7.5.4 and 7.5.5. of the H segment. The field 7.5.4 contains the Full access number and the field 7.5.5 contains the Date and time of the initial step and the Perita number. See example below.

Example:
bfAdditionalInfoCx = **1**
`H|^~\&|||LBIO25^Biochemistry specialiites`
`CHUL^clx55792.pcl`**`^5100000175^20151006094852_61`**`||ORU|||38-1^LIS||P|A.2.|20151006094852|`
where:
7.5.4 = Full access number
7.5.5 = Unique identifier: YYYYMMDDHHMMSS_PeritaCxAstm (Date and time of the initial step_perita number)

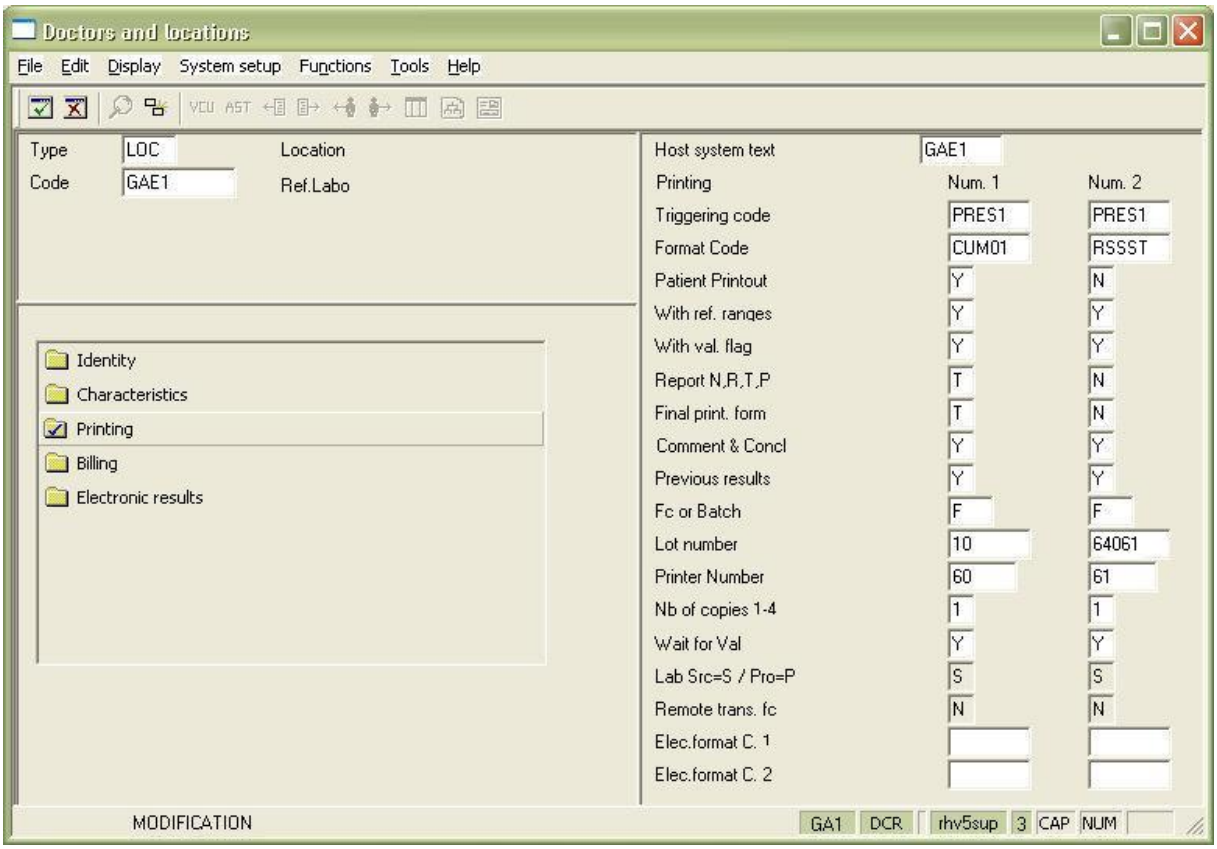
Note that this property only applies to the ASTM protocol, when:

- the ASTM connection is of ORU type
- in DCX, the **Printer#** is associated with a PDF report
- in DCX, the property **Max. nb of msgs per file** is set to **1**

When the traceability feature is enabled, the unique identifier in 7.5.5 in the ASTM message can be seen and tracked in the job parameters of both the ASTM result reception and HL7 transmission devices (`JOBPARAMNAME` = `'ORU Message Unique Identifier'`).

Doctors and Locations dictionary (DCR)

In the **Doctors & Locations** dictionary, accessible from the **Control Panel** > **System Management** > **System Setup (Dictionaries)**, set the following values.



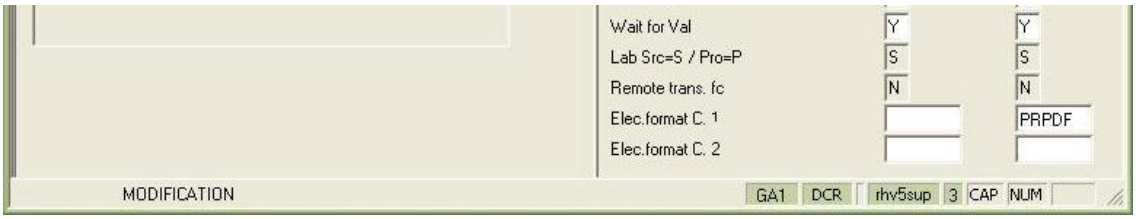
Important settings:

- **Report N,R,T,P**:
  - If format report = T, then all the tests are transmitted and the value contained in the ORC-5 field is correct.
  - If format report = R, then only the tests with results are transmitted (shorter message), but the value of the ORC-5 field can be equal to CM that means order is completed (all the OBX segments = F) whereas the order is not completed (some tests are still waiting for a result).
- **Lot number**: It is a unique number. The value entered must be greater than 60000 (values usually reserved for the ASTM Reception of Results messages (ORU)). The value specified here is also the value entered in the **Connections** dictionary (DCX), in the **Dataflow control** section, **Lot #** field.
- **Printer number** / **Num. 2**: the value entered here is the value used to define the connection in the `peri.par` file (61 in our example).

From version V12.01 of TD-Synergy (also included in V11.83 of TD-Synergy) or for TDNexLabs:

This setting is used when a PDF report file is transmitted together with the ASTM result message.

- **Report N,R,T,P** or **Final report type** must be set to **N** (only new results), to **R** (only the tests with known results) or to **T** (all tests)
- **Elec.format C.1 / Num. 2**: Code of the report format used for the report file transmitted with the ASTM result file. This value is required when a PDF report file must be attached with the HL7 message. For example, PRPDF or PDFxx when result reports are customized per laboratory (either source or production) or per department. Refer to the online User guide > General Laboratory > System setup > Dictionaries > Texts > Text types > **Documents for result reports (RES)**.b .



NOTE: A printer number must also be defined in the **Connections** dictionary (DCX), Global parmater settings. If one of these properties is missing, the PDF transmission does not work.

Connections dictionary (DCX)

1. Opens the **Connections** session from the **Control Panel** > **System Management** > **Advanced System Setup** then **Connections**.
2. Complete the mandatory fields to display the related properties:
   - **Type**: ASTFTP
   - **File**: enter the value defined in the `peri.par` file (`ast061` in our example)
   - **Dest**: enter the location associated with this connection (`XASER` in our example)
3. Set the following values:

Connections	
Type ASTFTP ASTM FTP File ast061 Dest XASER Dummy Loc. used for AST	Correspondence type msg alpha/num ADT 82 ORM 83 ORU 84
Global parameter setting Patient/Request Identif Transcoding ref. tables High level protocol Low level protocol File Localisation Threshold/range definit Dataflow Control	Ligne modem no 1 Ligne modem no 2 Local approval No Printer # Category to assign to the request 1 2 3 4 5 6 7 8

The **Global parameter setting** folder is used to define the type of messages exchanged or the devices used.

IMPORTANT: The entered values, for example, ADT and ORM, must be entered in upper case and the numerical values must not be modified.

From version V12.01 of TD-Synergy (also included in V11.83 of TD-Synergy) or for TDNexLabs:

Important settings:

This setting is used when a PDF report file is transmitted together with the ASTM result message.

- **Printer #**: Printer associated with the PDF report.

NOTE: The code of a report format must also be defined in the **Elec.format C.1 / Num. 2**: field in the **Doctors and Locations** dictionary (DCR). If one of these properties is missing, the PDF transmission does not work.

Connections		
Type ASTFTP ASTM FTP File ast061 Dest XASER Dummy Loc. used for AST	Repeat request (Y/N) Value added to Access # Labor. Ident. in Pat. # Ident. Position Pat# transmit.to WST (Y/N) Ident. per File # (Y/N)	N N
Global parameter setting **Patient/Request Identif** Transcoding ref. tables High level protocol Low level protocol File Localisation Threshold/range definit Dataflow Control	ASTM-8.3 (transmission) ASTM-8.3 (reception) ASTM-8.4 2nd s-field(tran) ASTM-8.4 2nd s-field(recep) ASTM-8.5 (transmisison) ASTM-8.5 (reception) Pat;Hos;Ben returned lgth Result sent with option Reviewer's initials (Y/N)	Pat# Pat# Alt# Alt# Hosp# Hosp# N Y

- Default values (recommended):
  - **ASTM-8.3** = Patient number (Pat#)
  - **ASTM-8.4.2** = Alternate patient Number (Alt#)
  - **ASTM-8.5** = Hospitalization number (Hosp#)

The mapping values entered in these fields should correspond to the identification numbers used on site.

IMPORTANT: if **Enable communication with the database** device property is set to **No**, then it is mandatory to change the DCX field mapping as follows:

- **ASTM-8.3** = Patient number (Pat#)
- **ASTM-8.4.2** = Hospitalization number (Hosp#)
- **ASTM-8.5** = Alternate patient Number (Alt#)

Once defined these values must not be modified.

From version V12.01 of TD-Synergy (also included in V11.83 of TD-Synergy) or for TDNexLabs:

- Important settings:
  This setting is used when a PDF report file is attached to the HL7 message to be transmitted to the Host.
- **Result sent with option** must be set to **N**.

In **Transcoding ref. tables** folder: no setting is required.

Connections		
Type ASTFTP ASTM FTP File ast061 Dest XASER Dummy COR used for AST	Approv# of remote station Name of remote addressee Transmit version Reception version Idf SGL (Sender) LA addressee name Receiver Field delimiter Sub-field delimiter Repeat sub-field separat. ESCAPE sequence Sub-field separator Auto. add message No	 | ^ ~ \ &
Global parameter setting Patient/Request Identif Transcoding ref. tables **High level protocol** Low level protocol File Localisation Threshold/range definit Dataflow Control		

Connections		
Type ASTFTP ASTM FTP File ast061 Dest XASER Dummy Loc. used for AST	PGP Concentrator Nb Parameter of remote Station Identific. WinServer	
Global parameter setting Patient/Request Identif Transcoding ref. tables High level protocol **Low level protocol** File Localisation Threshold/range definit Dataflow Control	Service Login FTP FTP password Waking mechanism: Local Station Waking mechanism Sent/received file extension Name begin. of sent files Name begin. of receiv. files Num. suffix Lg of sent files Check if file to resend (Y/N) End OfFile common with perita#	ftp tdserver1 5 0 ast res 5 Y 0

- From TDNexLabs V01.51, also in V01.32:
  Service: property used to specify which low level protocol is used: **ftp** (default value) or **sftp**. This property is accessible only for the following connection types: MTDFTP, HPRFTP, ASTFTP, CUSFTP, BDRFTP
  Refer to your Technical guide for more information.
- The **Identific.** value should be the Windows Server name where TDCnx is installed.
- The **Login FTP** value should correspond to the FTP server used on site. For example, tdserver1.

- **Local Station Waking mechanism** must be set to 0 (zero). Do not modify.
- The values set in **Sent/received file extension** and **Name begin. of sent files** must correspond to the values set in the **Devices** dictionary to define the device that receives ORU messages within the Technidata LIS database (named IN_ORUASTM device in this document).

Connections	
Type ASTFTP ASTM FTP File ast061 Dest XASER Dummy Loc. used for AST	Access path FTP remote machine ./ResultEmission Access path FTP local machine . Access path Ack remote machine ./ResultEmission Access path Ack local machine .
Global parameter setting Patient/Request Identif Transcoding ref. tables High level protocol Low level protocol **File Localisation** Threshold/range definit Dataflow Control	

Connections		
Type ASTFTP ASTM FTP File ast061 Dest XASER Dummy Loc. used for AST	Addressee call number Modem command line Addressee call capacity Timeout/Nb of toggle Call on threshold /time /both Threshold value Stat hour End hour Frequency Max. nb of msgs per file Interval before resending Time limit for threshold	 S S 1 Tempo 1 2 1
Global parameter setting Patient/Request Identif Transcoding ref. tables High level protocol Low level protocol File Localisation **Threshold/range definit** Dataflow Control		

Max. nb of msgs per file must be set to 1. Do not modify.
This setting must also be used on sites where NTE segments are duplicated after each segment sent for the same request.

- **Interval before resending**: the value is expressed in seconds.
- **Time limit for threshold**: the value is expressed in tenth of minutes. Set 1. Do not modify.

Connections		
Type ASTFTP ASTM FTP File ast061 Dest XASER Dummy Loc. used for AST	Station # _____ ____ |_____| Lot # 64061 Rerun Management (Y/N)	 N
Global parameter setting Patient/Request Identif Transcoding ref. tables High level protocol Low level protocol File Localisation Threshold/range definit **Dataflow Control**	Result printout format Systematic insertion (Y/N) Send sub-combined tests (Y,N,L) Prescriber for category 1: _____ 2: _____ 3: _____ 4: _____ 5: _____ 6: _____ 7: _____ 8: _____ Deletion of Doc/Loc printout (Y/N) Deletion of D1 printout (Y/N) Requests processed per tube (Y/N) "To collect" Requests (Y/N) Dispatch label printout (Y/N) Collection label printout (Y/N)	|__| Y N N N N N N N 1/4

- **Lot #**: It is a unique number. The value entered must be greater than 60000 (values usually reserved for the ASTM Reception of Results messages (ORU)). The value specified here must be the same as the value entered in the **Doctors** dictionary (DCR), in the **Printing** section, **Lot number** field.

Connections		
Type ASTFTP ASTM FTP File ast061 Dest XASER Dummy Loc. used for AST	Process result/comment. TEC (Y/N) Group requests without id. (Y/N) Ind. management transmission (Y/N)	|__| |__| |__|
Global parameter setting Patient/Request Identif Transcoding ref. tables High level protocol Low level protocol File Localisation Threshold/range definit **Dataflow Control**	Previous result management (Y/N) Ref. hospital.# management (Y/N) Collect. condition mgt (Y/N) Remind. of ref info in recep(Y/N) Send unknown ASTM results (Y/N) Sending detailed billing (Y/N) Modifying known result (Y/N) Ind. managem. res. to phone (Y/N) Management of tube number (Y/N) Controle id.locale id.GILDA (O/N) Request with Temporary Pat# (Y/N)	|__| |__| |__| |__| |__| |__| |__| |__| |__| |__| |__| 2/4

Connections		
Type ASTFTP ASTM FTP File ast061 Dest XASER Dummy Loc. used for AST	Regroup. sample by time (Y/N) Regrouping time (in minutes) Location mnemonic code (Y/N/L)	|__| |____| N
Global parameter setting Patient/Request Identif Transcoding ref. tables High level protocol Low level protocol File Localisation Threshold/range definit **Dataflow Control**	Doctor1 mnemonic (Y/N) Doctor2 mnemonic (Y/N) Use City and Post code (Y/N) Sub-field number for city Managt. of the SPN# (Emi./Rec.) No patient modification ORM Processing of addition. pat. data Check consistency patient/request Search patient/ASTM 8.12 Manag. of OBX 10.5 and 10.16 Em. BBS/TDHC corrres dict. mnemo Addition of RDB compl. data	N N |__| |__| |__| 3/4

NOTE: **Location Mnemonic code** / **Doctor1 mnemonic** / **Doctor2 mnemonic** must always be set to **N** (Host codes used) as the Communication engine always performs the search in the database using the Host Code and not the Mnemonic code.

- **Doctor1-2 mnemonic (Y/N)** must be set to **Y** when the Doctors on copy functionality is used. As (Primary Sample Reception) PSR devices always transmit mnemonic codes, the settings of the Connection dictionary (DCX) for ftp connection linked with PSR must always be set to Yes. This ensures that the doctors copied are processed correctly.
- From TDNexLabs V01.52 (also in V01.51.B, V01.41.B, V01.31.B) and TD-Synergy from V12.21.B
  Addition of RDB compl. data: this property must be set to **5** to enable the use of the unique test identifier (managed to have non-ambiguous access to a test when the same test code is present more than once in the request). When the value of this property is set to **5**, the unique test identifier (LISTESTID) is added in OBR-9.5.6 and OBX-10.4.9 subfields of ASTM messages (ORU and ORM).

Connections		
Type ASTFTP ASTM FTP File ast062 Dest XASRA Dummy Loc. used for AST	Manage canceled result in 10.12 Device type Request Hosp.# mandatory Deleted tests in 9.26 Send patient/ASTM 8.12 Manag. mode of OBX 10.14.6 Print logical sequence Management of ORA messages Laboratory Same reason modif. res. (Y/N/Z) Multi-laboratory processing (Y/N)	 5 0 Y
Global parameter setting Patient/Request Identif Transcoding ref. tables High level protocol Low level protocol File Localisation Threshold/range definit **Dataflow Control**		4/4

- **Device type**: on sites where NTE segment is duplicated after each OBR segment sent for the same request, **Device type** must be set to **5**. This setting must also be used on sites where NTE segments are duplicated after each segment sent for the same request.
- **Deleted tests in 9.26** must be set to 0 (zero)
- **Multi-laboratory processing (Y/N)** must be set to **Y** for multi-laboratory organizations.

Next steps

- Settings in the Configuration window (when a report PDF file must be attached with the HL7 message)
- Install Internal ASTM communication for reception of Result messages

Settings in the Configuration window

WARNING: This feature is available only in TD-Synergy V11.83 and from TD-Synergy V12.01 or for TDNexLabs

The following setting in the **Configuration** window is required to enable the conversion of the result report file received with the ASTM results message (ORU) generated by the internal communication.

This report file is received in PCL format and must be converted to PDF to be transmitted to the Host, when a PDF file report must be attached with the HL7 message.

1. Open the **Configuration** window from the **Control panel**, select **Advanced System Setup**, then **Properties and users** (USE) session.
2. Click the **Properties** item.
3. Go to the **Archiving of reports** section.
4. Define the following properties:
   - **Directory and name of the PCL to PDF conversion tool**: Name of the tool used by the **TDArchiveReport** process to convert PCL files to PDF format. The default delivered tool is `pcl6.exe` stored, for example, in `C:\technidata\TD-Product Server_118x\pcl6.exe`.
   - **Command options of the PCL to PDF conversion tool**: Arguments used to run the conversion tool. For example, `-dNOPAUSE -sDEVICE=pdfwrite -sPAPERSIZE=a4 -sOutputFile=OUTPUTFILENAME INPUTFILENAME`

Internal ASTM communication for result reception

This section explains how to:

- Create a new device to receive result messages (ORU) in ASTM format, and from version V12.01 of TD-Synergy -also included in V11.83 of TD-Synergy- or for TDNexLabs, to retrieve the result report file (PCL file) to be converted to HL7, when the PDF report is attached with the HL7 message to be transmitted to the Host.

  From TDNexLabs V01.52 (also in V01.51.B, V01.41.B, V01.31.B) and TD-Synergy from V12.21.B
  The LISTESTID information (unique test identifier) can be transmitted in the OBR and OBX segments to have a non-ambiguous access to test when the same test code is present more than once in the request. To enable the transmission of LISTESTID in the HL7 message, the **Addition of RDB compl. data** property in the **DCX** dictionary must be set to **5** to have LISTESTID in ASTM message.

- Set the properties on the device you have just created.

Creating a new device in the Devices dictionary

Create a new device (for example, IN_ORUASTM). To do this:

- In the **Control Panel**, select **System Management** > **System Setup (Dictionaries) > General dictionaries**
- Double-click on **Device** in the left pane.
- In the menu bar, click the **+** button
- Complete the values of the fields which define the device. The following definition of the communication device in the **Device** dictionary is given as an example:

TIP: Specific and mandatory properties used by the communication device are indicated in **bold**.

Add /Update		
Name	Value	Comment
Code	IN_ORUASTM	This is an example for inbound ASTM Result messages (10 characters max)
Device type	Connection	Must be set to **Connection**
Service	TDCnx_InstanceName_Computername	Name of the computer where the service is installed
Name	ASTM ORU inbound	Enter an intuitive text
Abbreviated text	ASTM ORU inbound	Enter an intuitive short text
Full text	ASTM ORU inbound internal communication	-
Protocol	File Transfer	You must select **File Transfer**
Format	ASTM 1238 High level protocol	You must select **ASTM 1238 High level protocol**
Transport	File I/O	You must select **File I/O**
Application	Patients/Orders/Results processing	You must select **Patients/Orders/Results processing**
Properties	More	-

The Protocol, Transport, Format and Application parameters give the user-friendly names of the various DLLs used for the communication. These DLLs are automatically installed by the software setup program. If the filename of the DLL is displayed instead of the user-friendly name, stop installation and go to Naming of DLLs to resolve the problem.

Once you reach this step, you must click the **OK** button so that the **Properties** displayed will correspond to the device you have just created. This will close the current window.

Setting the Properties of the device

The **Properties** item is used to define the properties specific to a type of stream. The data streams used by this device are:

- **All** (displayed by default).
- **Result reception**. This data steam is dependent on the type of communication

To start setting the properties, in the **Devices** dictionary double-click the device you have just created. Set the properties as indicated in the following examples:

> **Possible differences between documentation and user screen**
> The properties defined in the **Devices** dictionary are regularly updated, in line with new software and documentation enhancements. Consequently, for some properties, the text displayed on your screen may differ from the text indicated in the documentation. You could also find new properties described in the documentation that are not present on your screen. To help you find your way, these properties are clearly identified in the documentation with the corresponding version when they were introduced. New properties are also announced in the *Change history* table.

Type of stream: All

Device properties IN_ORUASTM		
Name	Value	Comment
General	-	-
Interval before task purging (days)	5	If this property is not defined here, the same property defined in the Configuration window is applied
Logical acknowledgement management	No	Do not modify
Maximum number of old spy files	10	Available for TDNexLabs from V01.51 also in V01.32 Maximum number of old spy files that can be generated. If maximum number is reached and another old spy file needs to be created, the oldest old spy file will be deleted. Default value = 10 Minimum value = 1 Maximum value = 100 Spy files have the following format: <spy name>_<date>_<time>.old
Maximum size of spy file (KB)	10000	To be customized on site.
Message control ID	5	Select the TDNTServer counter number, used to generate the message ID in the MSH-10 field. This counter must have been previously defined in the **TDNTServer Control Panel** window.
Number of insertion retries in the database	5	From 3 to 10

Path of spy file	<DeviceName>.spy	Enter the filename, without path. For example, `IN_ORUASTM.spy`. The location directory is applied as follows: 1. Location directory defined for SPY files in the **SPY** property (accessible from the **Properties and Users** (USE) > Properties > All computers level > **General** section). 2. If the **SPY** property is empty, default location directory for SPY files. For more information, see the property description in the Technical guide. For TD-Synergy versions, enter the absolute path and filename (e.g. C:\technidata\TD-*Product* Client_<*InstanceName*>\IN_ORUASTM-.spy It advisable to give an intuitive file name (for example the name of the device) and .spy for the extension.
Spy traces enabled	Yes	Once the installation is finished and you have checked it is running correctly, set it to **No**.
Trace level of spy file	Maximum	Three trace levels are available (maximum, regular, minimum)
Web service port	-	Specify a valid port to start the Web service. See Note 1.
Format	-	-
ASTM message version	A.2	Change from default value (**None**) to **A.2**
Enable communication with the database	Yes	Set it to **Yes** in the case of a communication with the LIS database (default value) (see Note 2). Set it to **No** in the case of an ASTM communication with a Host system (see Note 3).
Message recipient ID	TDR	Recipient identifier corresponding to the 7.10 field of the ASTM Header segment. Concatenated with the "Recipient name" by the ^ separator (first subfield). To be customized on site. "None" is the default value.
Message recipient name	None	Recipient identifier corresponding to the 7.10 field of the ASTM Header segment. Concatenated with the Recipient ID by the ^ separator (second subfield). To be customized on site. "None" is the default value.

Message sender ID	LIS	Sender identifier corresponding to the 7.5 field of the ASTM Header segment. Concatenated with the "Sender name" by the ^ separator (first subfield). To be customized on site. "None" is the default value.
Message sender name	None	Sender identifier corresponding to the 7.5 field of the ASTM Header segment. Concatenated with the "Sender ID" by the ^ separator (second subfield). To be customized on site. "None" is the default value.
Message type	ORU	Change from default value (None) to ORU
Unicode messaging	No	Do not modify

Note 1 : By default there is no port assigned to the Web service, which causes the web service not to be started. If the Web service fails to start due to invalid port, the event log will be updated.
Note 2: If the codes are different between the Technidata LIS database and the Host system, the device property **Enable communication with the database** must be set to **Yes**. This parameter setting automatically executes the transcoding between the host code and the mnemonic code before being processed by the HL7 OUT ORU device. Then, map the HL7 OUT ORU Device to create links between the values of the codes on the Technidata LIS and on Host systems.
Note 3: When **Enable communication with the database** is set to **No**, the properties related to the “mapping” are available, in order to create correspondences between the values of the codes on the Technidata LIS and on Host systems.
IMPORTANT: if **Enable communication with the database** is set to **No**, it is mandatory to change the DCX field mapping as follows:
- ASTM-8.3 = Patient number (Pat#)
- ASTM-8.4.2 = Hospitalization number (Hosp#)
- ASTM-8.5 = Alternate patient Number (Alt#)

Name	Value	Comment
Transport		
Rename sent attached files	No	Do not modify
Semaphore file management	Yes	Do not modify
Transfer Mode	Reception	Do not modify
File location		
Auxiliary file extension	pcl	**Available from version V12.01 of TD-Synergy (also included in V11.83) and from version V01.11 of TDNexLabs.** File extension of the result report file transmitted with the ASTM result file. Change to blank when no result report is transmitted.

NOTE: When the connection service used by the device that converts PCL files into PDF is not installed on the same computer as the server, do as follows:
1. On the client computer, create the tree as defined in **Properties and users** session (USE) > **Properties** > **Configuration** level > **Archiving of reports** level > **Directory and name of the PCL to PDF conversion tool** property. For example, `C:\technidata\<TD-Product> Server_<InstanceName>`.
2. Copy the `PCLFONT` folder and the `pcl6.exe` program in this tree (for example, `C:\polices\urwfonts`).
3. In the system environment variables, create a PCLFONTSOURCE entry that links to the folder where the PCLM fonts are stored. Take care to respect the following syntax:
• Use slash characters (/)
• Add a final slash character (/) to the folder path
In our example, `C:/polices/urwfonts/`.

Folder for processed input files	C:\Inetpub\ftproot\export\done	Directory where the files currently being processed are moved. If empty, no file is moved.
Generated file extension	-	Not used
Generated file prefix	-	Not used
Input error file folder	C:\Inetpub\ftproot\export\error	Directory to which the files that generated an error should be moved.
Input file extension	er7	Change it to the extension of the data files transmitted by the Host
Input file folder	C:\Inetpub\ftproot\export	Directory where data files (ASTM) are received
Input files "in process" folder	C:\Inetpub\ftproot\export\proc	Directory where the processed files are to be moved. If empty; the files are deleted after successful processing.
Input semaphore file extension	ok	Change it to the extension of the semaphore files transmitted by the Host
Input semaphore file folder	C:\Inetpub\ftproot\export	Directory where semaphore files are stored
Output file folder	-	Not used
Output file name	-	Not used
Output semaphore file name	-	Not used
Semaphore file extension for transmitted files	-	Not used
Transmitted file counter	-	Not used
VMD file path	ASTM1238.vmd	Enter the filename without path. For example, `ASTM1238.vmd`. The location directory is applied as follows: 1. Location directory defined for VMD files in the **VMD** property (accessible from the **Properties and Users** (USE) > Properties > All computers level > **General** section). 2. If the **VMD** property is empty, default location directory for VMD files. For more information, see the property description in the Technical guide. For TD-Synergy versions, enter the absolute path and filename of the Chameleon file (e.g. C:\technidata\TD-*Product* Client_<*InstanceName*>\ASTM1238.vmd See Chameleon files (VMDs)

NOTE: It is necessary to create an FTP directory (in `c:\inetpub\ftproot`) for each device which uses FTP, otherwise some corruption could occur between devices.

Type of stream: Result reception

Device properties IN_ORUASTM		
Name	Value	Comment
General		
Enable data stream	Yes	Change default value (**No**) to **Yes**
Automatic number for requests	None	See **NOTE**
Output devices	OUT_ORUHL7	Select the device to be used for HL7: Transmission of Results. Open output device list creation window by clicking on the field and select "Used for Result transmission".
Received chapter and printing order	No	To be customized on site. Yes = received in the message No = defined in the dictionary
Update local database	**No**	**No** indicates that the LIS database is not updated with test order data. Warning: The **Update local database** option MUST BE SET TO NO because it may create duplicates in the TESTS table.

NOTE: This property must be completed if the request number cannot be transmitted to our application (number > 10 characters). In this case, this number will be stored as an external number and the access number will be computed by our application for internal use. The values proposed correspond to the autonumbers defined in the TDNT Server control panel (TCP session in the Control panel).

Name	**Value**	**Comment**
Mapping		From V11.31 See **NOTE 1**
Coded texts	None	Create/select the code of a coding system used to map coded text codes. (1)
Doctors	None	Create/select the code of a coding system used to map doctor codes. (1) Mapping is ignored if **Use National Code for doctor identification** property is enabled.
Locations	None	Create/select the code of a coding system used to map location codes. (1) Mapping is ignored if **Use National Code for location identification** property is enabled.
Tests	None	Create/select the code of a coding system used to map test codes. (1)
Titles	None	Create/select the code of a coding system used to map title codes. (1)

NOTE: The properties in the **Mapping** section are accessible only if the property **Enable communication with the database** defined previously in the **ALL** stream is set to **No**.

(1) Mapping is used to associate code values (local codes and alternate codes) on the Technidata LIS database and Host systems. You can find the description of *Mapping alternate codes* in the *Technical Guide* (in the *Installation* book).

NOTE:
- In reception streams, multiple alternate codes can be mapped to the same LIS mnemonic code for each mapping.
- In transmission streams, multiple LIS mnemonic codes can be mapped to the same alternate code for each mapping.
See example below to get a better understanding.
When defining the device, a message asks whether or not you want to confirm the code duplication, which will result in:
- For reception streams, the related task is set to "error" when multiple LIS codes are mapped to the same alternate code.
- For transmission streams, the related task is set to "error" when multiple alternate codes are mapped to the same LIS code.

EXAMPLE: For reception streams

This mapping is correct	This mapping is not correct
LIS 1 -->	ALT 1 ALT 2

For transmission streams:

This mapping is correct	This mapping is not correct
LIS 1 --> ALT 1	LIS 1 --> ALT 1
LIS 2	ALT 2

Restarting the Connection service

The service associated with the device must be restarted after each modification of the Device dictionary.

Next step:

- Install HL7 Transmission of Result messages to host.

HL7 Transmission of Result messages to the Host system

This section describes how to:

- Create a new device to transmit results to the Host system by HL7
- Set the properties on the device you have just created

Creating a new device in the Devices dictionary

Create a new device (for example, OUT_ORUHL7). To do this:

- In the **Control Panel**, select **System Management** > **System Setup (Dictionaries) > General dictionaries**
- Double-click on **Devices** in the left pane.
- In the menu bar, click the **+** button
- Complete the values of the fields which define the device. The following definition of the communication device in the **Device** dictionary is given as an example:

TIP: Specific and mandatory properties used by the communication device appear in bold.

Add / Update		
Name	Value	Comment
Code	OUT_ORUHL7	This is an example for outbound HL7 Result messages (10 characters max)
Device type	Connection	Must be set to **Connection**
Service	TDCnx_InstanceName_Computername	Name of the computer where the service is installed
Name	HL7 ORU outbound	Enter an intuitive text
Abbreviated text	HL7 ORU out	Enter an intuitive short text
Full text	HL7 ORU outbound to Host	-
Protocol	HL7 Low Layer Protocol	You must select **HL7 Low Layer Protocol**
Format	HL7 format Patients/Orders/Results	You must select **HL7 format Patients/Orders/Results**
Transport	**TCP/IP socket transport 2**	For TDNexLabs from V01.21, TD-Synergy from V12.21, and for TD-Synergy V11.83, You must select **TCP/IP socket transport 2**
Application	Orders/Results transmission	You must select **Orders/Results transmission**
Properties	More	-

The Protocol, Transport, Format and Application properties give the user-friendly names of the various DLLs used for the communication. These DLLs are automatically installed by the software setup program. If the filename of the DLL is displayed instead of the user-friendly name, stop installation and go to Naming of DLLs to resolve the problem.

NOTE A: Note that for existing devices, it is recommended to re-check the device properties when changing any of the Protocol, Format, Transport, or Application properties, as this will result in resetting the related device properties to their default values and they might be different.

Once you reach this step, you must click the **OK** button to display the **Properties** that correspond to the device you have just created. This will close the current window.

Setting the properties of the device

The **Properties** item is used to define the properties specific to a type of stream. The data streams used by this device are:

- **All** (displayed by default)
- **Result transmission**

To start setting the properties from the **Devices** dictionary, double-click on the device you have just created and set the properties as indicated in the following examples:

Possible differences between documentation and user screen
The properties defined in the **Devices** dictionary are regularly updated, in line with new software and documentation enhancements. Consequently, for some properties, the text displayed on your screen may differ from the text indicated in the documentation. You could also find new properties described in the documentation that are not present on your screen. To help you find your way, these properties are clearly identified in the documentation with the corresponding version when they were introduced. New properties are also announced in the *Change history* table.

Type of stream: All

Device properties OUT_ORUHL7		
Name	Value	Comment
General		
Interval before task purging (days)	-	If this property is not defined here, the same property defined in the laboratory Configuration window is applied
Logical acknowledgement management	Yes	-
Maximum number of old spy files	10	Available for TDNexLabs from V01.51 also in V01.32 Maximum number of old spy files that can be generated. If maximum number is reached and another old spy file needs to be created, the oldest old spy file will be deleted. Default value = 10 Minimum value = 1 Maximum value = 100 Spy files have the following format: <spy name>_<date>_<time>.old
Max size of spy file (KB)	10000	To customize on site.
Message control ID	3	Select the TDNTServer counter number, used to generate the message ID in the MSH-10 field. This counter must have been previously defined in the **TDNTServer Control Panel** window.

Number of retries	5	Used in different mechanisms: ● Represents the number of retransmissions of an HL7 message (the inital transmission is deduced), when no HL7 acknowledgement is received from Host. For example, if this parameter is set to 2, the total number of attempts will not exceed 2. ● Represents the number of new runs of the query that is intended to return the Order Number (after the initial query run). For example, if this parameter is set to 2 the total number of attempts will not exceed 3.
Path of spy file	<DeviceName>.spy	Enter the filename, without path. For example, `OUT_ORUHL7.spy`. The location directory is applied as follows: 1. Location directory defined for SPY files in the **SPY** property (accessible from the **Properties and Users** (USE) > Properties > All computers level > **General** section). 2. If the **SPY** property is empty, default location directory for SPY files is used. For more information, see the property description in the Technical guide. For TD-Synergy versions, enter the absolute path and filename (e.g. C:\technidata\TD-*Product* Client_<*InstanceName*>\`OUT_ORUHL7.spy` It advisable to give an intuitive file name (for example the name of the device) and .spy for the extension.
Prefix of alternate patient number on the host	-	Prefix applied to the alternate patient identification, e.g. BEN
Prefix of hospitalization number on the host	-	Prefix applied to the hospitalization identification, e.g. HOS
Retry interval (500 ms minimum)	500	Interval between Order number retrieval retries. Default value is 500 ms. If the input value is less than 500 ms, the value reverts to the previous value when the focus on the grid is changed.
Spy traces enabled	Yes	Once the installation is finished and you have checked it runs well, set it to **No**.
Trace level of spy file	Maximum	Three trace levels are available: minimum, regular, maximum
Use national code for doctor identification	No	Change to **Yes** if you want to use the national code instead of the mnemonic code as external identification

Use national code for location identification	No	Change to **Yes** if you want to use the national code instead of the mnemonic code as external identification
Format		
HL7 version	2.3	Default value The protocol version supported by this communication is HL7 V2.3.
Message recipient code	HOST	Value contained in MSH-5. To customize on site.
Message sender code	TDR	Value contained in MSH-3. To customize on site.
Unicode messaging	No	Do not modify
Transport Properties available for TDNexLabs from V01.21, and TD-Synergy from V12.21, also in V11.83		
Checksum type	Checksum for HL7 low layer protocol	-
End of block character	1C	Do not modify
Idle time before keepalive transmission (in minutes)		Blank means disabled. A value greater than 0 is interpreted as the amount of time of inactivity before the socket starts sending keepalive packets. Note that the Windows default setting for this property is 2 hours. See **Note B**
Keepalive interval (in seconds)	1	Determines the interval between two TCP keepalive retransmissions until a response is received.
Listening address		This property contains the value of the IP address of the network interface where this transport layer listens to incoming connections. This is useful if the computer has multiple network interfaces. For example, one for wireless and another one for wired. When the value for this property is empty, the socket server will listen to all available interfaces. For versions earlier than TDNexLabs V01.21 and TD-Synergy V12.21 (not in V11.83): This property is named **Sender network address** and contains the IP address or logical name of the sender.
Listening port	-	Make sure that the port you enter is not already used by another application.
Message timeout	30	Time that Communication engine waits to receive the acknowledgment. If no acknowledgment is received before the timeout, it is assumed that the Host did not receive the message. The message might be resent, depending on the 'Number of retries' parameter.

Outgoing port	8101	Server port defined on host system
Protocol version	24	-
Recipient network address	localhost	IP address or logical name of the receiver. This property must be used only when **Transmission mode** is set to **Client transmission mode**. This property contains the value of the remote address this transport layer will connect to.
Start of block character	0B	Do not modify
TCP/IP Lower Layer Protocol	Minimal	Do not modify Refer to Data block structure
Transmission mode	Client transmission mode	Do not modify
File location		
Folder for processed input files	-	Not used
VMD file path	hl7.vmd	Enter the filename without path. For example, `hl7.vmd`. The location directory is applied as follows: 1. Location directory defined for VMD files in the **VMD** property (accessible from the **Properties and Users** (USE) > Properties > All computers level > **General** section). 2. If the **VMD** property is empty, default location directory for VMD files is used. For more information, see the property description in the Technical guide. For TD-Synergy versions, enter the absolute path and filename of the Chameleon file (e.g. C:\technidata\TD-*Product* Client_<*InstanceName*>\`hl7.vmd` See Chameleon files (VMDs)
Patient identification		
Prefix of patient number on the host	-	Not used

NOTE B: More details about "keep alive" mechanism...
A TCP / IP server can close the connection after a period of inactivity. This may cause the connection to malfunction afterwards. By default, in Windows Server, this disconnection time is set to 2 hours, but it can be changed via the registry key `HKLM\SYSTEM\CurrentControlSet\Services\Tcpip\Parameters` (see https://docs.microsoft.com/en-us/previous-versions/windows/it-pro/windows-2000-server/cc957549(v=technet.10)?redirectedfrom=MSDN).
To avoid a disconnection, it is possible to send "keep alive" messages to indicate that the connection must remain active. The **Idle time before keep alive transmission (in minutes)** property is used to indicate how often a "keep alive" message should be sent. This frequency must be less than the disconnection time. For example, if the disconnection occurs after 2 hours, a frequency of 60 minutes to send a “keep alive” message is sufficient.

Type of stream: Result transmission

Device properties OUT_ORUHL7		**-**
Name	Value	Comment
General		
Enable data stream	Yes	Do not modify
Content for Histology/Cytology	None	NOT USED by this communication
Manage INS identifier	No	Available for TDNexLabs from V02.00 Only used on the French market. **No** = Default value Enter **Yes** to enable the *Identifiant national de Santé* (INS) stored in PID-3 to be sent together with results. See **NOTE 8**
Management of Placer Order Number	Yes	See **NOTE 2** If this device will send CDA documents, see **NOTE 9**.
Result message format to transmit	ORU^R01 or OUL^R24	For TDNexLabs from V01.31 Determines the type of message to transmit. If this device will transmit CDA documents, this must be set to **ORU^R01**
Send both local and mapped codes (Yes/No)	No	For TDNexLabs from V01.52 **Yes** = both local and mapped codes are included in HL7 result messages (in OBR and OBX segments). **No** = only local or mapped code is transmitted depending if mapped code is found in the dictionary (default value). Mapped codes can be LOINC codes. See **NOTE 7**
Send only one item per message	Yes	Selecting **Yes** will allow you to send one ORC/OBR per message. see **NOTE 6** If this device will send CDA documents, see **NOTE 9**.
Send original format of hospitalization number	No	see **NOTE 3** **No** = The padded format for hospitalization number is used. **Yes** = The original format for the hospitalization number is used.

Transmit multiple alternate patient identifiers	Filtered	see **NOTE 5** (below) Must be set to **Filtered**.
Transmit Sample Collection date	Yes	Available for TDNexLabs from V01.21 and TD-Synergy from V12.21 **Yes** = the sample collection date is transmitted in the OBR-7 field. **No** = the request date is transmitted in the OBR-7 field (default setting).
Transmit without external identifiers	No	**Yes** = the external identifiers such as PON and HON are not transmitted. The FON will not be retrieved from the database but will be generated with the access number and the test code. **No** = the external identifiers especially the FON will be retrieved from the database and will use the existing algorithm to get the PON and the HON before sending the HL7 result message. For TDNexLabs from V01.52.B To be customized on site. **Yes** = result is sent even if not found in database **No** = result is **not** sent when record is not found in the database (except for test deletion case - OBR-25 Result status=X) For both cases: Result message is updated with PON, HON, FON values from the database (if available in the database). **If FON is not available in the database**, FON is generated using access number and test code. Refer to Management of PON by the Technidata LIS in HL7 Result Transmission communication for additional details. If this device will send CDA documents, see **NOTE 9**.
Use ORC-5 as overall request status	No	See **NOTE 4**

File location		
VMD file path	HL7Result Transmission.vmd	Enter the filename without path. For example, `HL7Result Transmission.vmd`. The location directory is applied as follows: 1. Location directory defined for VMD files in the **VMD** property (accessible from the **Properties and Users** (USE) > Properties > All computers level > **General** section). 2. If the **VMD** property is empty, the default location directory for VMD files is used. For more information, see the property description in the Technical guide. For TD-Synergy versions, enter the absolute path and filename of the Chameleon file (e.g. C:\technidata\TD-*Product* Client_<*InstanceName*>\`HL7Result Transmission.vmd` See Chameleon files (VMDs)
Mapping (1)	-	see **NOTE 1**
Coded texts	None	Create/select the code of a coding system used to map coded text codes.
Doctors	None	Create/select the code of a coding system used to map doctor codes. Mapping is ignored if **Use National Code for doctor identification** property is enabled (set to Yes).
Locations	None	Create/select the code of a coding system used to map location codes. Mapping is ignored if **Use National Code for location identification** property is enabled (set to Yes).
Tests	None	Create/select the code of a coding system (mnemonic code) used to map test codes.

(1) Mapping is used to associate code values (local codes and alternate codes) on the Technidata LIS database and Host systems. You can find the description of *Mapping alternate codes* in the *Technical Guide* (in the *Installation* book).

NOTE:
- In reception streams, multiple alternate codes can be mapped to the same LIS mnemonic code for each mapping.
- In transmission streams, multiple LIS mnemonic codes can be mapped to the same alternate code for each mapping.
See example below to get a better understanding.
When defining the device, a message asks whether or not you want to confirm the code duplication, which will result in:
- For reception streams, the related task is set to "error" when multiple LIS codes are mapped to the same alternate code.
- For transmission streams, the related task is set to "error" when multiple alternate codes are mapped to the same LIS code.

EXAMPLE: For reception streams

This mapping is correct This mapping is not correct

LIS 1 --> ALT 1
ALT 2

For transmission streams:

This mapping is correct This mapping is not correct

LIS 1 --> ALT 1 LIS 1 --> ALT 1

LIS 2 ALT 2

NOTE 2: When the **Management of PON** property is set to YES and the PON is not found on the database, the result message will not be transmitted, the task is set to "error".
For more details on the management of the PON by the Technidata LIS in HL7 result transmission, refer to:
- Technical information > Advance use > ORC segment description
- Management of PON by the Technidata LIS in HL7 Result Transmission communication

NOTE 3: Management of the Hospitalization number
The Technidata LIS Hospitalization number length is padded with leading zeros when shorter.
The Hospitalization number received from a Host (in ADT/Order messages) is stored in its original format in a specific field in the database (EXTERNALHOSNUM field stored in the HOSPITALIZATIONS table).
- When the **Send original format of hospitalization number** property is set to **No**, the Hospitalization number with leading zeros is transmitted to the Host.
- When the **Send original format of hospitalization number** property is set to **Yes**, the Hospitalization number in its original format is transmitted to the Host.
Caution:
If the property is enabled (set to **Yes**) and the Hospitalization number with original formatting (stored in EXTERNALHOSNUM field) is empty (due to a Host communication failure), the task for the transmission of results via HL7 is not processed and is placed in the “Standby” queue. In this case, the user will have to set the task manually to “Ready” to be processed.
If the EXTERNALHOSNUM field is still empty, the task will automatically return to the “Standby” queue and the user will have to repeat the operation later, that is, set the task to "Ready" once again until the original formatting is stored successfully by the communication.

NOTE 4: The answer to **Use ORC-5 as overall request status** property depends on the information to be transmitted in the ORC-5 segment field.
a) If you answer **No** (default answer), the ORC-5 field specifies the status of each procedure (one test per request)
Possible values:
A = some, but not all, results available
CA = order is cancelled
CM = order is completed
HD = order is on hold
IP = In process
b) If you answer **Yes**, the ORC-5 field specifies the overall status of the request (several tests per request).
Possible values:
CM = all the results of the test request are known and clinically reviewed
SC = all the results of the test request are known but some of them are to be reviewed
A = some results of the test request are unknown (not available)
IP = in process

NOTE 5: Management of the multiple alternate patient identifiers. The three possible values are:
None = no transmission of multiple alternate patient identifiers.
All = all alternate identifiers linked to the patient are transmitted.
Filtered = Default value. According to the case, the following alternate identifiers linked to the patient are transmitted:
1) Alternate identifiers not associated with a LOCATION or SITE
2) Alternate identifiers associated with the SITE of the source laboratory of the request
3) Alternate identifiers associated with the LOCATION of the request

NOTE 6:
The data to be sent originates from the ASTM message that is generated by the Production server. If the ASTM message contains an order comment, even if there are many OBR segments in the ASTM message, the order comment is only attached to the first OBR segment in the ASTM message.
When the **Send only one item per message** property is set to **Yes,** and an order comment is present, it is included in every HL7 result message sent.

NOTE 7: Available for TDNexLabs from V01.52
It is possible to manage both local and LOINC codification in HL7 result message, as illustrated in the example below:

```
OBX|1|NM|WBC^White Blood Cell^KTPHL^33256-9^WBC corrected for nucl
RBC Auto^LOINC||15.39|x10^9/L|3.37 - 8.38|H|||F|||||||||
```

Where "WBC" is the local code and "33256-9" the mapped one. Note that the associated text is also different (local text and text from mapping).
KTPHL and LOINC (in the above example) are the name of assigning authorities that are defined in the VMD file used by the communication. The VMD file can be updated on site if required, refer to Activating inclusion of local and mapped codification in HL7 result message.

NOTE 8: Available for TDNexLabs from V02.00
This feature is limited to the French market
The **Manage INS identifier** property is taken into account only if the property **Patient identification with French INS number (0=No, 1=Yes in AltPat#, 2=Yes in INS data)** is set to **1** or **2** in the **Configuration** (USE) window > **General** section.

The *Identifiant National de Santé (INS)* , stored in PID-3, is retrieved from the database view PATIENTS_INS_QUALIFIED.
The INS can also be stored into either the BENNUMBER or the ALTERNATE_IDENTIFIERS during ADT reception. If the BENNUMBER or the ALTERNATE_IDENTIFIERS matches the INS Identifier Number, then the BENNUMBER or the ALTERNATE_IDENTIFIERS will be suppressed from the transmission.
Example of PID:

```
PID|1||000000012345^^^^PATNUMBER~BEN210804^^^AUTH01^ALTPAT2~2600588
15400201^^^ASIP-SANTE-INS-NIR&1.2.250.1.213.1.4.8&ISO^INS-
NIR^^^||SMITH^Kate^^Mrs^^^L~BROWN^^^^^^M||19731213|F|||Military
road^^GUNCITY^^12345^^~^^^^^FRA^BDL^^58011||||||||||||||||||||VALI
|
```

Where:
PID.3.1 - 260058815400201 is the INS
PID.3.4.2 - 1.2.250.1.213.1.4.8 is the Assigning Authority (OID)
PID.3.4.3 is always **ISO** if the Identifier type code is valid
PID.3.5 - **INS-NIR** is the Identifier type code
PID.11 - ^^^^^**FRA^BDL^^58011** is the birth place code (58011 in France = code INSEE)).
PID. 11.7 - Address type is set to **BDL** when the birth place is available
PID.11.9 - Code of birth place. **58001** in France (= code INSEE). For people who are not born in France, the code will correspond to the country birth place.
PID.32 - **VALI** is the identity reliability code. The value **VALI** means that the identity status is qualified / *qualifée*. Patient identity and the INS are transmitted with the results only when the identity status is qualiifed / *qualifée*.
If the INS type of identifier is INS-TEST (PATIENTS_INS.ISNTTYPE = 3) or INS-DEMO (PATIENTS_INS.INSTYPE = 4), the Identifier type code transmitted In PID-3.5 is INS-NIR However, the INS_TYPE will still remain the same in the database.

NOTE 9: Available for TDNexLabs from V02.01
If CDA documents will be transmitted in this device, **Management of Placer Order Number** must be set to **No** while **Transmit without external identifiers** must be set to **Yes**. This is done so that the device will avoid checking the test codes in the OBX segments if they exist in the dictionary. Otherwise, errors will be raised by the device because the HL7 message containing the CDA documents will also contain test codes that do not exist in the dictionary. For more information, see **Transmission of CDA documents**.
If a CDA document is found in the task being processed, the **Send only one item per message** device property will be ignored. This is because it may conflict with the USE property **Send CDA documents in separate messages**.

Restarting the Connection service

The service associated with the device must be restarted after each modification of the Device dictionary.

Next step:

- Install HL7 Reception of Order messages from Host.

Reception of HL7 Order messages from the Host system

This section explains how to:

- Set the properties in the **Configuration** window
- Create a new device to receive order messages (ORM^O01/OML^O21) containing the Placer Order Number (PON) from the Host system by means of the HL7 protocol
- Set the properties on the device you have just created

Setting properties in the Configuration window

1. In the **Configuration** window (USE session) > **General** section:
   You must verify some properties before starting the implementation. Make sure that the lengths of the following fields are the same as defined in the **Properties** zone (**GST** block).

   These properties are:

   - Patient number length
   - Alternate patient number length
   - Hospitalization number length
   - Reduced access number length
   - Database name (see **NOTE**)

   NOTE: The database name is the logical name of the database. It is used both by the Web module and this communication protocol. It must be the same for both. Refer to the Web module properties to verify it (**Administration** tool > **File** menu > **Databases** > **Name** field).

2. In the **Configuration** window (USE session) > **Sample management** section:

   Check the property **Volume calculation applied to all locations** to enable the volume calculation either per location or for all the locations when orders are created/modified in OEN/OMN sessions or created/modified by communication.

   - If it is set to **1**, the volume calculation is performed for all the locations (default value).
   - If it is set to **0**, the volume calculation depends on the property set in the **Locations** dictionary.
     - If the property **Volume calculation** is set to **Yes** in the **Locations** dictionary, the volume calculation (Filling rate) is enabled and applies to the location of the request.
     - If the property **Volume calculation** is set to **No** in the **Locations** dictionary, the volume calculation (Filling rate) is disabled.

   Note that the calculation volume (filling rate) is performed, if a location exists in the SP_REQUESTS table.

Settings required to create temporary patients

See Management of temporary patients.

Creating a new device in the Devices dictionary

Create a new device (for example, IN_ORMHL7). To do this:

- In the **Control Panel**, select **System Management** > **System Setup (Dictionaries) > General dictionaries**
- Double-click on **Devices** in the left pane
- In the menu bar, click the **+** button

- Complete the values of the fields which define the device. The following definition of the communication device in the **Devices** dictionary is given as an example:

TIP: Specific and mandatory properties used by the communication device are indicated in **bold**.

Add / Update		
Name	Value	Comment
Code	IN_ORMHL7	This is an example for inbound HL7 order messages (ORM). 10 characters max
Device type	Connection	Must be set to **Connection**
Service	TDCnx_InstanceName_Computername	Name of the computer where the service is installed
Name	HL7 ORM inbound	Enter an intuitive text
Abbreviated text	HL7 ORM inbound	Enter an intuitive short text
Full text	HL7 ORM inbound from HIS	-
Protocol	HL7 Low Layer Protocol	You must select **HL7 Low Layer Protocol**
Format	HL7 Format Patients/Orders/Results	You must select **HL7 Format Patients/Orders/Results**
Transport	TCP/IP socket transport 2	For TDNexLabs from V01.21, TD-Synergy from V12.21, and for TD-Synergy V11.83, You must select **TCP/IP socket transport 2**
Application	Patients/Orders/Results processing	You must select **Patients/Orders/Results processing**
Properties	More	-

The Protocol, Transport, Format and Application properties give the user-friendly names of the various DLLs used for the communication. These DLLs are automatically installed by the software setup program. If the filename of the DLL is displayed instead of the user-friendly name, stop installation and go to Naming of DLLs to resolve the problem.

NOTE A: Note that for existing devices, it is recommended to re-check the properties of the device when changing any of the Protocol, Format, Transport, or Application properties. Changing any of these will reset the related device properties to their default values and they might be different.

Before setting the properties, you must click the **OK** button so that the **Properties** displayed will correspond to the device you have just created. This will close the current window.

Setting the Properties of the device

The **Properties** item is used to define the properties specific to a type of stream. The data streams used by this device are:

- **All** (displayed by default).
- **Order reception**. This data steam is dependent on the type of communication.
- **Sample reception**. This data stream is dependent on the type of communication.
- **Patient information reception**. This data stream must be completed if you use the "creation of temporary patients" feature.

To start setting the properties, in the **Devices** dictionary double-click the device you have just created. Set the properties as indicated in the following examples:

Possible differences between documentation and user screen
The properties defined in the **Devices** dictionary are regularly updated, in line with new software and documentation enhancements. Consequently, for some properties, the text displayed on your screen may differ from the text indicated in the documentation. You could also find new properties described in the documentation that are not present on your screen. To help you find your way, these properties are clearly identified in the documentation with the corresponding version when they were introduced. New properties are also announced in the *Change history* table.

Type of stream: All

Device properties IN_ORMHL7		
Name	Value	Comment
General		
Interval before task purging (days)	5	If this property is not defined here, the same property defined in the laboratory Configuration window is applied
Logical acknowledgement management	Yes	-
Maximum number of old spy files	10	Available for TDNexLabs from V01.51 also in V01.32 Maximum number of old spy files that can be generated. If maximum number is reached and another old spy file needs to be created, the oldest old spy file will be deleted. Default value = 10 Minimum value = 1 Maximum value = 100 Spy files have the following format: <spy name>_<date>_<time>.old
Maximum size of spy file (KB)	10000	To be customized on site.
Message control ID	12	Select the TDNTServer counter number, used to generate the message ID in the MSH-10 field. This counter must have been previously defined in the **TDNTServer Control Panel** window.
Number of insertion retries in the database	5	From 3 to 10
Path of spy file	<DeviceName>.spy	Enter the filename, without path. For example, `in_ormhl7.spy`. The location directory is applied as follows: 1. Location directory defined for SPY files in the **SPY** property (accessible from the **Properties and Users** (USE) > Properties > All computers level > **General** section). 2. If the **SPY** property is empty, default location directory for SPY files. For more information, see the property description in the Technical guide.

		For TD-Synergy versions, enter the absolute path and filename (e.g. C:\technidata\TD-*Product* Client_<*InstanceName*>\`in_ormhl7.spy` It advisable to give an intuitive file name (for example the name of the device) and .spy for the extension.
Spy traces enabled	Yes	Once the installation is finished and you have checked it is running correctly, set it to **No**.
Trace level of spy file	Regular	Three trace levels are available (maximum, regular, minimum)
Use national code for doctor identification	No	Change to **Yes** if you want to use the national code instead of the mnemonic code as the external identification.
Use national code for location identification	No	Change to **Yes** if you want to use the national code instead of the mnemonic code as the external identification.
Web service port		Specify a valid port to start the Web service. See **Note 1** and **2**. Only applicable when the Web module is connected to GP software and is used only for Patient update/create.
Format		
HL7 version	2.4	-
Message recipient code	TDR	-
Message sender code	HOST	-
Unicode messaging	No	Do not modify
Transport Properties available for TDNexLabs from V01.21, and TD-Synergy from V12.21, also in V11.83		
Checksum type	Checksum for HL7 Low Layer Protocol	Must be set to this value.
End of block character	1C	Do not modify
Idle time before keepalive transmission (in minutes)		Blank means disabled. A value greater than 0 is interpreted as the amount of time of inactivity before the socket starts sending keepalive packets. Note that the Windows default setting for this property is 2 hours. See **Note B**
Keepalive interval (in seconds)	1	Determines the interval between two TCP keepalive retransmissions until a response is received.
Listening address		This property is used only when **Transmission mode** is set to Mono client server transmission mode. This property contains the value of the IP address of the network interface where this transport layer listens to incoming connections. This is useful if the computer has multiple network interfaces. For example, one for

		wireless and another one for wired. When the value for this property is empty, the socket server will listen to all available interfaces. For versions earlier than TDNexLabs V01.21 and TD-Synergy V12.21 (not in V11.83): This property is named **Sender network address** and contains the IP address or logical name of the sender.
Listening port	9107	Input port. This is an example. Make sure that the port you enter is not already used by another application.
Message timeout	30	Period of time (in seconds) during which data is expected on the socket. After this time, the server considers the link broken.
Outgoing port		Output port. Make sure that the port you enter is not already used by another application.
Protocol version	23	For ORM^O01 the protocol version supported is HL7 2.3 For OML^O21 the protocol version supported is HL7 2.5
Recipient network address	localhost	IP address or logical name of the receiver.
Start of block character	0B	**Do not modify**. Corresponds to the first character of the socket (**<0B>** in the definition of the socket frame).
TCP/IP Lower Layer Protocol	Minimal	Refer to Data block structure.
Transmission mode	Mono client server transmission mode	**Do not modify**. Defines the mode used by the socket connection.
File location		
Folder for processed input files	C:\technidata\<*TD-Product*> Client_<*InstanceName*>\Processed	Directory where the processed files are to be moved. If not completed, the files are deleted after successful processing.
VMD file path	hl7.vmd	Enter the filename without path. For example, `hl7.vmd`. The location directory is applied as follows: 1. Location directory defined for VMD files in the **VMD** property (accessible from the **Properties and Users** (USE) > Properties > All computers level > **General** section). 2. If the **VMD** property is empty, default location directory for VMD files. For more information, see the property description in the Technical guide. For TD-Synergy versions, enter the absolute path and filename of the Chameleon file (e.g. C:\technidata\TD-*Product* Client_<*InstanceName*>\`hl7.vmd` See Chameleon files (VMDs)

NOTE B: More details about "keep alive" mechanism:
A TCP / IP server can close the connection after a period of inactivity. This may cause the connection to malfunction afterwards. By default, in Windows Server, this disconnection time is set to 2 hours, but it can be changed via the registry key `HKLM\SYSTEM\CurrentControlSet\Services\Tcpip\Parameters` (see https://docs.microsoft.com/en-us/previous-versions/windows/it-pro/windows-2000-server/cc957549(v=technet.10)?redirectedfrom=MSDN).
To avoid a disconnection, it is possible to send "keep alive" messages to indicate that the connection must remain active. The **Idle time before keep alive transmission (in minutes)** property is used to indicate how often a "keep alive" message should be sent. This frequency must be less than the disconnection time. For example, if the disconnection occurs after 2 hours, a frequency of 60 minutes to send a “keep alive” message is sufficient.

NOTE 1 : When selecting a port (either listening, outgoing or Web service), make sure that the port is not already used by another application.
NOTE 2: By default there is no port assigned to the Web service, which causes the web service not to be started. If the Web service fails to start due to invalid port, the event log will be updated.

Type of stream: Order reception

Device properties IN_ORMHL7		
Name	Value	Comment
General		
Enable data stream	**Yes**	Do not modify
Accept assigned message number (NA)	**Yes**	This property must be set to **Yes** to receive the Placer Order Number (PON). NA=Number assigned
Acknowledgement mode for unknown tests	Negative Acknowledgement	Possible values: Positive Acknowledgement or Negative Acknowledgement (default setting). See **NOTE 1**
Allow instruction length greater than 250 characters		For TDNexLabs from V01.32 or V01.41 Used to enable (answer **Yes**) or disable (answer **No**) the transmission of a text greater than 250 characters for collection and transport instructions in the OBX segment. Default value is **No** = Text is limited to 250 characters (defined in HL7 standard) **Yes** = More than 250 characters can be sent for collection and transport instructions. See **NOTE 6**..
Automatic activation for immediate orders	**No**	See **NOTE 2**
Automatic activation for routine orders	**No**	See **NOTE 2**
Automatic activation for urgent orders	**No**	See **NOTE 2**

Automatic number for orders	1	Select the TDNTServer counter number, used to generate the Access number. This counter must have been previously defined in the TDNTServer Control Panel window. If you want to generate contiguous numbers, make sure that this number is not used by another connection.
Delete requested test if contained in another requested test		Used to enable (answer **Yes**) or disable (answer **No**) the deletion of duplicate tests (redundant tests) when they are included in another test which is also requested. See **NOTE 3**.
Exam grouping	Yes	Select **Yes** to enable grouping of several tests into a single order. See **NOTE 4**.
Exam grouping timeframe (minutes)	30	See **NOTE 4**.
Flag the collection date as being temporary	No	Updates the Collection date status of the request. Select **Yes** to set the Collection date status as temporary. **No** = nothing is set (default value). Temporary Collection date status is updated with the user generated date and time once Collection date is received from SPM-17.
Order update allowed for already received samples	No	NOT USED by TDNexLabs and TDHisto/Cyto products. **No** is the default value. Do not modify.
Output devices	OUT_ORMHL7	This is an example. Click [**...**] to select the Device and the data flow it is used for. 1- Specify an output device corresponding to the communication **Transmission of Orders**. 2- Select the flow **Order sending** in the field **used for** of the output device selection window (drop-down list). Orders transmitted are always in ORM^O01 format. Transmission of orders in OML format is not currently supported.
Process order cancelation or duplicate order message	Yes	Used to enable (answer **Yes**) or disable (answer **No**) the processing of order cancelation or duplicate order messages. When this property is enabled, a message is sent to the Host to notify the deletion. See **NOTE 3**
Processing type	Test orders	Do not modify.
Sample reception DLL file path		See **NOTE 2**

Send collection and transport instructions		TDNexLabs from V01.32 or V01.41 Used to enable (answer **Yes**) or disable (answer **No**) the transmission of collection and transport instructions in an OBX segment associated with the SPM segment. See **NOTE 6**.
Send positive ACK for collected specimen	Yes	From V11.91 Select **Yes** to send positive acknowledgement for orders with already collected specimen. Select **No** to send negative acknowledgement for orders with already collected specimen.
Site		TDNexLabs from V01.52.B Mandatory device property. Code of the default Site used to calculate the workstation code during order reception. For more details see Management of Workstation code in order messages.
Time allowed for test addition (minutes)	0	Indicate the period of time (in minutes) during which an order can be modified (addition of test) following the order entry. 0 = no modifications allowed (default value). Maximum time = 50000 minutes. ***for OML messages only addition of test with new sample is allowed. See Modification of OML orders in Order Reception flow with PSR See Modification of ORM orders in Order Reception flow
Time allowed for test deletion (minutes)	0	Indicate the period of time (in minutes) during which an order can be modified (deletion of test) following the order entry. 0 = no modifications allowed (default value). Maximum time = 50000 minutes. ***for OML messages only deletion of test with uncollected sample is allowed. See Modification of OML orders in Order Reception flow with PSR See Modification of ORM orders in Order Reception flow
Update local database	Yes	The default value is **No**. You must change this to **Yes** so that the LIS database is updated.

Use ref. Hospitalization # (if no Hosp. number)	Yes	Available for TDNexLabs from V01.51 If an Hospitalization number from PV1 exists, it will be linked to the request in ERM session. This setting is applicable only if no Hospitalization number from PV1 was set as link to the request in ERM session. Select **Yes**, so that when a received order has no hospitalization number (no PV1 or PV1 without number) but the patient has a reference hospitalization number, then the reference hospitalization number will be linked to the request in ERM session. Select **No** so that when a received order has no hospitalization number; the reference hospitalization number will not be linked to the request in ERM session. The default value is **No**.
Format		
Collection source parameter code	COLSO	Code of the complementary parameter used with results received in OBR-15.1 To be defined if needed by the HIS. See **NOTE 5**
Topography parameter code		Code of the complementary parameter used with results received in OBR-15.4 To be defined if needed by the HIS. See **NOTE 5**
File location		
VMD file path	hl7OrderReception.vmd	Name of the directory where the `hl7OrderReception.vmd` Chameleon file is stored. Note that when an upgrade is performed, new VMDs are located in the Reference folder. The Installation engineer **must** check the new fields managed in the new VMDs against the VMDs from the previous version. For TDHistoCyto from V13.31 Enter `HL7OrderReceptionHC.vmd` as filename.

NOTE 1:
Positive Acknowledgement
The test order message is partially integrated in the LIS database and a positive logical acknowledgement is sent to the Host. The task is set to *completed* status and the request is created but a warning message is generated in the spy file and event viewer.
Negative acknowledgement
- The test order message is partially integrated in the LIS database and a negative logical acknowledgement is sent to the Host.
- In the negative logical acknowledgement sent, the MSA-1 field Acknowledgement code is set to AR (application acknowledgement Reject) and the ERR-1 field, subfield 4, "Error code" and "ERR-1" fields are set to the error code 207.
- 207: Application internal error: *A catchall for internal errors not explicitly covered by other codes*.
The error message in case of NAK is no longer located in MSA-3 but in ERR-1.

NOTE 2:
- These properties are used for triggering auto-rectube for ORM^O01
- Auto-rectube is not recommended to be used from version V11.81 and higher
- These properties are not applicable to OML^O21
- Auto-PSR is used instead of Rectube ONLY for OML^O21 (starting from V12.21)

NOTE 3: Some laboratories prefer not to cancel duplicate tests when a single test, requested separately (for example, Total protein) is also requested in a combined test (for example, Electrophoresis). It is possible to disable the deletion of duplicate tests when they are included in a combined test that has also been requested.
When the **Process order cancelation or duplicate order message** property is set to **No** and the **Delete requested test if contained in another requested test** property is set to **Yes**, duplicate tests are deleted but the Host is not notified that the test has been deleted.
See Management of order cancelation or duplicate order messages for more information.

NOTE 4: An algorithm is used to group together several tests into the same order. This grouping algorithm respects the following rules:
- Same patient and same hospital stay for the test order.
- The location of the new test must be the same as for the other tests.
- The reference collection date/time corresponds to the scheduled collection date/time of the first received test (with +/- 'n' minutes) definable in the **Exam grouping timeframe** property.
- No tube reception procedure has been carried out on the tube associated with the test to be added.
- If the properties **Time allowed for test addition/deletion** are populated and enabled at the same time as **Exam grouping** property:
  > The time set for **Time allowed for test addition/deletion** will be used to verify if the test addition/deletion is allowed.
  > If the tube reception procedure has been carried out for one of the tubes of the order, addition of test will be allowed only on tubes not yet collected.

NOTE 5: Both data elements will be stored as coded text type results and are associated with two complementary parameters. These complementary parameters are used to store the corresponding information.
Example:
```
OBR||||31152|||||||A||||52^^^KNEE|Dr1||||||||||||^^^^^R
```
Collection source parameter code = PARA3
Topography parameter code= TOPO
Will be equivalent to:
```
OBR||||31152|||||||A|||||Dr1||||||||||||^^^^^R
OBX||CE|PARA3||52
OBX||CE|TOPO||KNEE
```

NOTE 6: When the **Send collection and transport instructions** property is set to **Yes**, collection and transport instructions are added to the HL7 message, in an OBX segment associated with the SPM segment. By default, collection and transport instructions are not added.
There is one SPM segment per sample (one per tube). The collection and transport instructions (full text) of each test associated with the sample are created as OBX segments attached to the related SPM segment. One OBX segment per instruction is created. Instructions are read from the **Collection instructions** and **Transport instructions**.
The tube full text is sent in the SPM-7 segment (as usual).
Collection and transport instructions must have been previously entered in the **Collection instructions** and **Transport instructions** dictionaries. They must be assigned to tests in the **Single tests** and **Combined tests** dictionaries.

Example:

```
ORC|OK|6438|6102198001|AXID001|||^^^20161021000925|||||TD^Dr
TEST^Technidata|UFTEST
OBR||6438|6438|TRANS^TRANSAMINASES||20161021000925||||||||||||||||||||^^^2
0161021000925^^R
SPM||00298001||002^PlamaHEP^L|||VERT|||||||||20161021000925||||||||1|002^
BIOCHIMIE^L^^""^99ALT|1
OBX|1|TX|COLL|1|Invert tubes to ensure proper mixing
OBX|2|TX|TRAN|1|No freezing for transport|
```

OBX-3 = "COLL" or "TRAN" (hard-coded segment type value and not the instruction code)
When the instruction full text is empty, OBX-5 is populated with the instruction code
In case of deletion (ORC-1 = CA), the instruction OBX segment is not generated.

Name	Value	Comment
Mapping	-	From V11.31, see (1)
Coded texts	None	Code of the coding system used to map coded text codes. Create/select the code of a coding system. **(1)**
Doctors	Doctors	Code of the coding system used to map doctor codes. Create/select the code of a coding system. **(1)** Mapping is ignored if **Use National Code for doctor identification** property is enabled.
Laboratories	None	Code of the coding system used to map laboratory codes. Create/select the code of a coding system **(1)** AutoCreate is not supported.
Locations	None	Code of the coding system used to map location codes. Create/select the code of a coding system. **(1)** Mapping is ignored if the **Use National Code for location identification** property is enabled.
Patient identifiers	None	Code of the coding system used to map multiple patient identifiers. Create/select the code of a coding system. **(2)**
Tests	None	Code of the coding system used to map test codes. Create/select the code of a coding system. **(1)**

Titles	None	Code of the coding system used to map title codes. Create/select the code of a coding system. **(1)**
Tube type		Code of the coding system used to map the tube type. Supported in outbound mode only (e.g.: ORL transmission)

(1) Mapping is used to associate code values (local codes and alternate codes) on the Technidata LIS database with Host systems. You can find the description of *Mapping alternate codes* in the *Technical Guide* (in the *Installation* book).

(2) TD-Synergy has no inbound mapping for tube type for OML^O21 (SPM-27)
(For sites that use OML^O33 please refer to the documentation described in INST059.chm - *Transmission of collection information to a Care plan*).

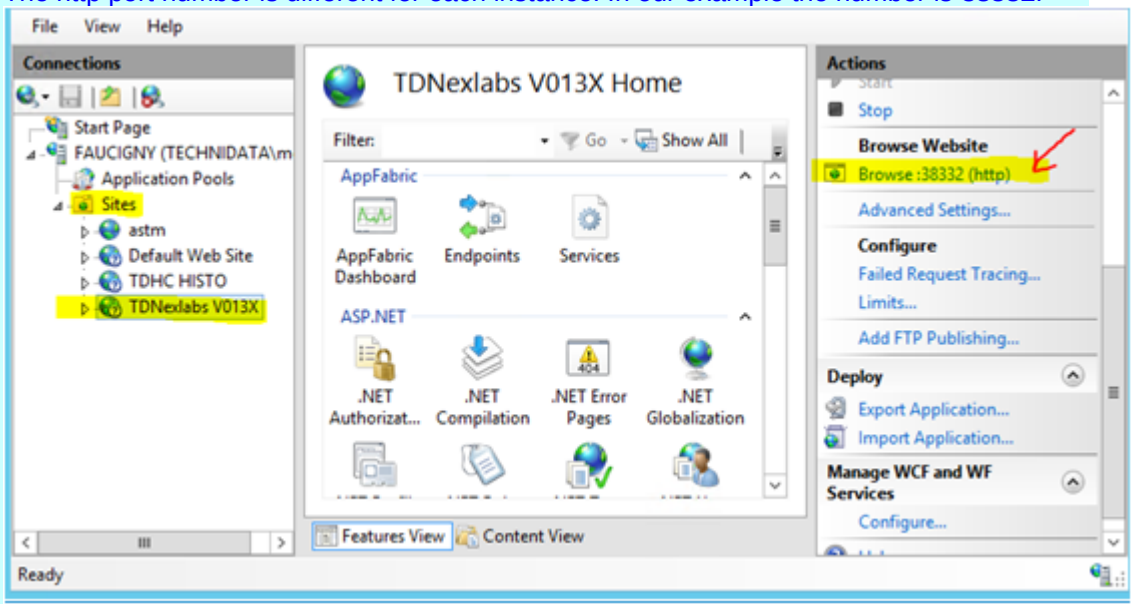
Type of stream: Sample reception

Available for TDNexLabs from V01.21 and for TD-Synergy from V12.21

Device properties IN_ORMHL7		
Name	Value	Comment
General		
Enable data stream	**Yes**	Must be set to **Yes**
Host name of web service for sample reception	**localhost**	From TDNexLabs V01.41: This property is no longer used and then no longer visible. For lower versions: Host name or IP address of the server where the auto Primary Sample Reception web service is running. **localhost** is the default value. See **NOTE 6**
Laboratory	Lab1	You must select a laboratory. The definition of a laboratory is required for the auto PSR process. Sample reception uses the laboratory retrieved from ORC-21 of the received HL7 message. If no value is received from the Host, the laboratory defined in device parameter is used. If no laboratory is defined (the field is left empty), the task is interrupted. As many sample reception devices as laboratories concerned must be defined.
Output devices	**None**	Auto-PSR has its own device that forwards requests to the real time module. (see Technical Guide for details)

For TDNexLabs from V01.31 Sample reception Web service URL OR For lower versions: Web service port for sample reception		From TDNexLabs V01.41: This property is no longer used and then no longer visible. For TDNexLabs lower than V01.31and for TD-Synergy from V12.01 and V12.21 Port number used for the auto Primary Sample Reception web service. See **NOTE 6**

NOTE 6: Sample Reception tool
For TDNexLabs from V01.51 and higher:
Tube status is set to collected when received HL7 2.5 message has collection date in SPM-17. When sample reception stream is enabled and valid laboratory code is set, automatic sample reception (autoPSR) is performed by order connection device for tube associated with the request.
- AutoPSR is called only for tubes with tube status not received at lab yet.
- In case of order modification, autoPSR is not called when tube status is received at lab already.
For TDNexLabs from V01.41: the two device properties "**Host name of web service for sample reception"** and "**Web service port for sample reception** " are no longer needed. They are no longer displayed.
For TDNexLabs from V01.31
The **Web service port for sample reception** device property is renamed into **Sample reception Web service URL**.
In this field you must enter the following URL:
http://serverName:MyHttpPort/TDNexLabsInstanceName/SampleSpecimenManagement/AutoPrimarySampleReceptionService.svc
where:
`serverName` = Server where the service is started.
`MyHttpPort` = http port number of the instance defined during the setup. See Getting HTTP and Net.tcp port numbers in IIS to retrieve the port number.
`TDNexLabsInstanceName` = Instance name (always in this format) without spaces. It is not case sensitive.
Refer to the Technical Guide > *Basics on service management* topic > *Services managed in the IIS window: application pool (SOA) services and Web Services (WS)* paragraph.
The default values must be modified to correspond to the **http port defined in the IIS manager**.
Launch the IIS manager, select your InstanceName, then look at the browse (http port), as illustrated in our example below.
The http port number is different for each instance. In our example the number is **38332**.



For TDNexLabs lower than or equal to V01.21
For sample reception, the auto Primary Sample Reception functionality is used by this communication instead of auto rectube (TD-Web Tube Reception tool).
The default value for the sample reception host name is blank. If the web service is running on the same machine, the host name can be **localhost**. The default value for the sample reception port is **9090**. The default values can be modified but must correspond to those defined in the configuration file `BaseServiceEndPointAddress.properties`, stored in the `DotNet\ConfigService` folder on the server. The value is displayed in the following line: `BaseServiceEndPointAddressHttp=http://localhost:9090`
Refer to the Technical guide > *Setting properties for DotNet configuration files* topic.

Comparison between OML and ORM

- ORM^O01 and OML^O21 share the same order reception device. If the site wants to have different device settings for ORM and OML, separate order reception devices must be created.
- OML^O21 with no sample information behaves in the same manner as ORM^O01.
- Important differences between ORM and OML:
  - ORM supports HTC (order modification after auto-rectube).
  - OML supports order modification after sample reception (PSR) only if the tube linked to the test is not yet received. Order modification is allowed only if the addition of a new test uses a new sample and for the deletion of a test where the associated sample has not yet been collected.

NOTE:
- In reception streams, multiple alternate codes can be mapped to the same LIS mnemonic code for each mapping.
- In transmission streams, multiple LIS mnemonic codes can be mapped to the same alternate code for each mapping.
See example below to get a better understanding.
When defining the device, a message asks whether or not you want to confirm the code duplication, which will result in:
- For reception streams, the related task is set to "error" when multiple LIS codes are mapped to the same alternate code.
- For transmission streams, the related task is set to "error" when multiple alternate codes are mapped to the same LIS code.

EXAMPLE: For reception streams

This mapping is correct This mapping is not correct

LIS 1 --> ALT 1
ALT 2

For transmission streams:

This mapping is correct This mapping is not correct

LIS 1 --> ALT 1 LIS 1 --> ALT 1

LIS 2 ALT 2

Type of stream: Patient information reception

This data steam must be completed if you use the "creation of temporary patients" feature.

Device properties IN_ORMHL7		
Name	Value	Comment
General		
Enable data stream	Yes or No	The default value is **No**. Set it to **Yes** if you use the "creation of temporary patients" feature.
Allow patient update	Yes or No	Available for TDNexLabs from V01.21 and for TD-Synergy from V12.21 **Yes** (default value): when the patient already exists, the patient is updated, provided that the **Update local database** property is also set to Yes and the ORC-7.4 Collection Date and Time field in the received HL7 message is later than the request Collection date stored in the database. **No**: when the patient already exists, the patient is NOT updated. See **NOTE 5**
Hospitalization creation and update	No	-
Management of billing information	No	-
Merge and modifications on existing patients only	No (default value)	Available for TDNexLabs from V01.22 NOT USED by this communication.
Output devices	None	-
Patient merge	No	-
Prefix of alternate patient number on the Host		-
Prefix of hospitalization number on the Host		-
Prefix of patient number on the host		-
Scoring properties to compare the source and the target patients		-
Threshold for patient merge	0	-
Update local database	Yes	The default value is **No**. Change this to **Yes** if you want the LIS database to be updated with the patient demographic data.
Format		
Patient differences	4 differences	This is the default value. To be customized on site, if needed. See **NOTE 6**
Update Patient reference (Doc/Loc)	No	-

NOTE 5: This property is available for TDNexLabs from V01.21 and for TD-Synergy from V12.21.
Note that when the patient does not exist in the LIS database, the patient is created, whatever the value set in this property.
For v11.83.S10, this device property is "hidden" and must be set manually in the database. A parameter "TDI_Allow_patient_update" is added to the PARAM_VALUES table with a default value of 1 (Yes). To modify the behavior, the PARAMVALUE must be updated to have a value of 0 for NO or 1 for YES.

NOTE 6: If the patient data must be set in the Technidata LIS database, checks are performed on the patient's demographic fields before the LIS database can be updated with the new received data.
This checking consists in comparing the differences in demographic information against the maximum number of differences that are authorized to update the database (**Patient differences**). Five fields are checked on reception of a patient demography message: Patient's last name, Patient's first name, Patient's maiden name, Patient's date of birth and Patient sex. The contents of these fields are compared with the contents of the same fields in the database.
The number of authorized differences between the data on the LIS database and the data in the HL7 ADT message is set in **Patient differences**.
The patient record in the database is updated with the data of the HL7 ADT message only if the number of differences is less than or equal to the maximum number of authorized differences.
If the number of fields modified exceeds the authorized number of changes, the HL7 ADT message is not processed (the creation of the request is rejected).

Restarting the Connection service

The service associated with the device must be restarted after each modification of the **Device** dictionary.

Technical information

Activating Access Number as Filler Order Number in HL7 Result Transmission

Overview

This topic describes how to set Access numbers as Filler Order number value in HL7 result transmission.

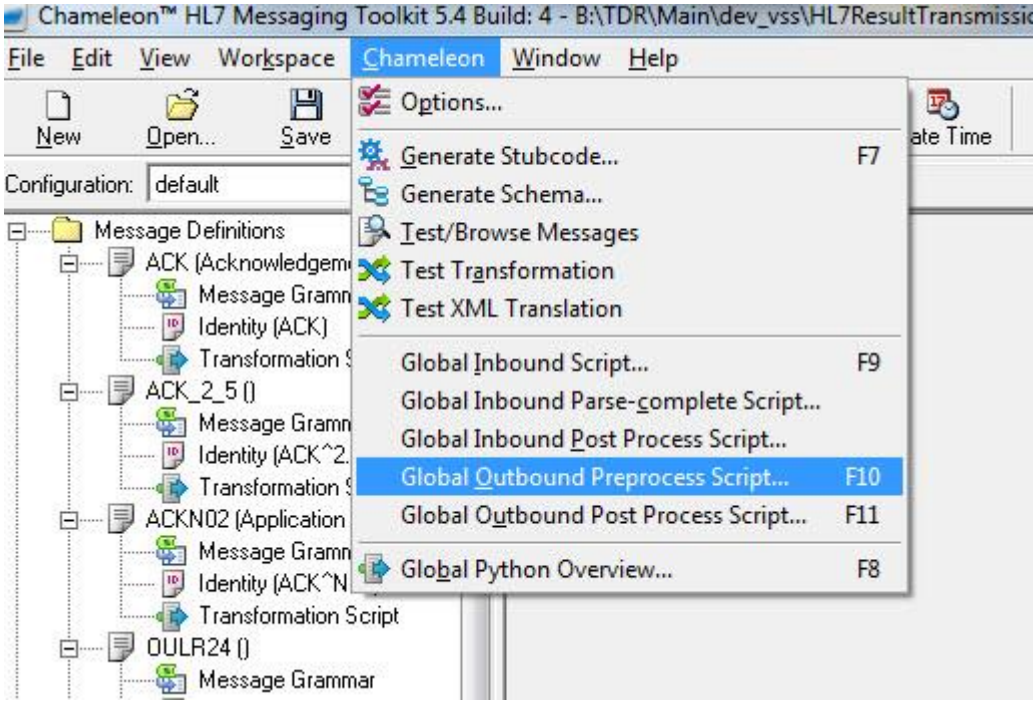
This script is only available to TD-Synergy starting from Version 13.11.

A site using Version 13.11 or higher can activate this script by enabling the VMD parameter that is discussed in Procedure 1 below.

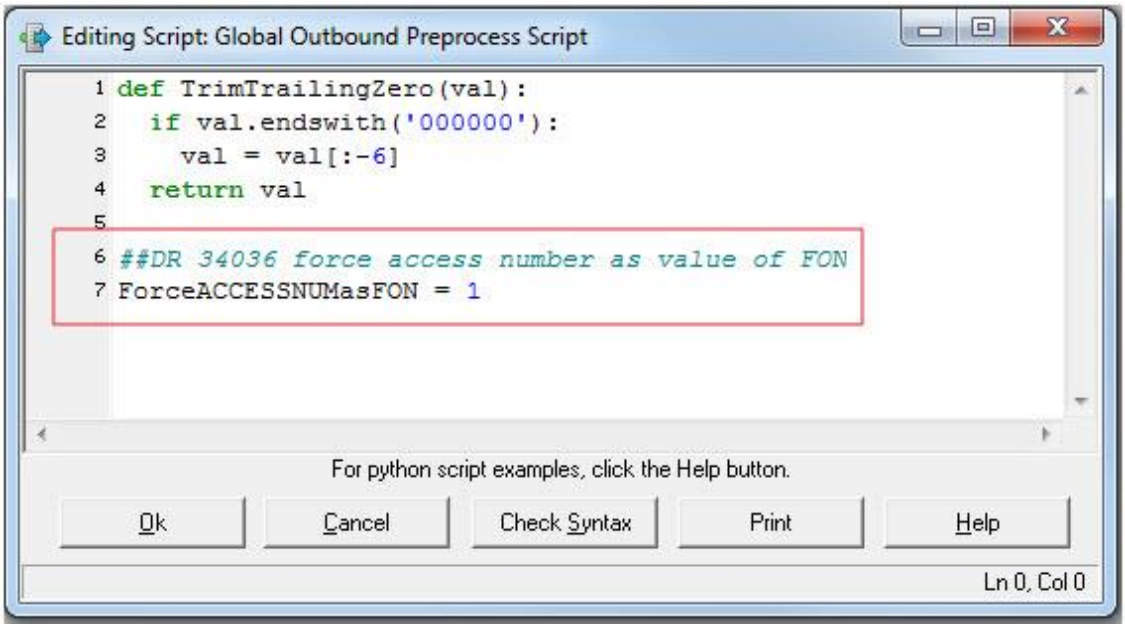
Sites using TD-Synergy Versions lower than version 13.11, that do not manage FON and require VMD customization, must follow Procedure 2 below.

Procedure 1: Applicable to sites with TD-Synergy Version 13.11 and higher.

1. Open `HL7ResultTransmission.vmd`
2. Go to the **Chameleon tab-> Global Outbound Preprocess Script** located at the top of the browser.



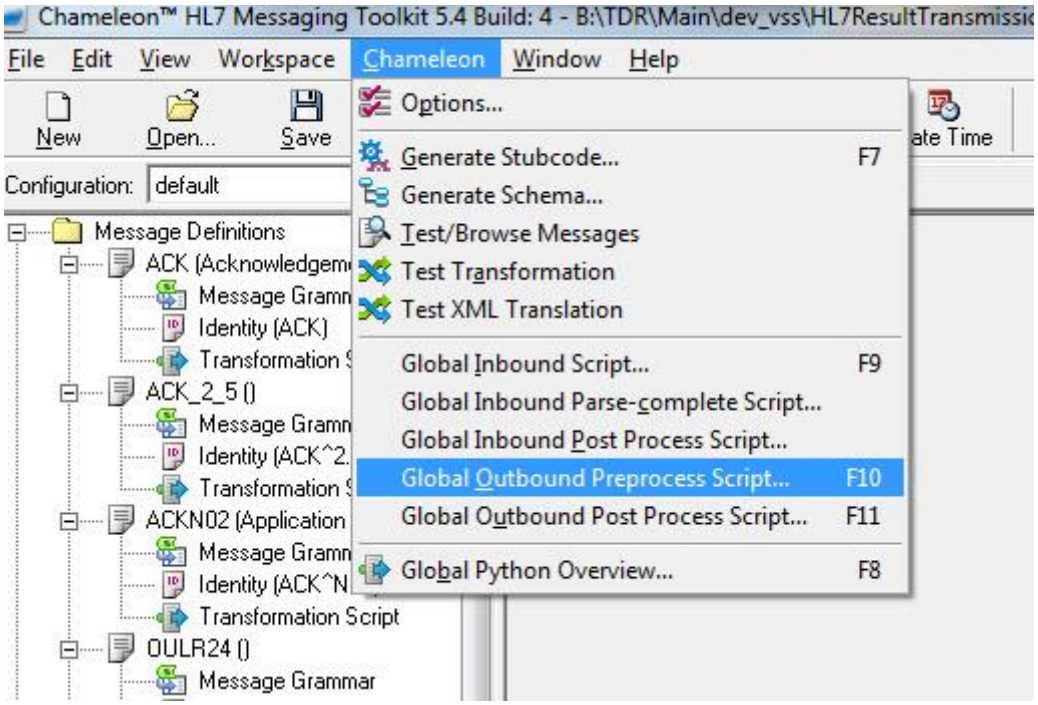
3. Adjust the value of the '*ForceACCESSNUMasFON*' variable to 1.



4. Click the Save icon in the menu bar.
5. Restart the connection service.

Procedure 2: Applicable to sites with TD-Synergy Versions lower than 13.11.

1. Open `HL7ResultTransmission.vmd`
2. Go to the **Chameleon tab-> Global Outbound Preprocess Script** located at the top of the browser.

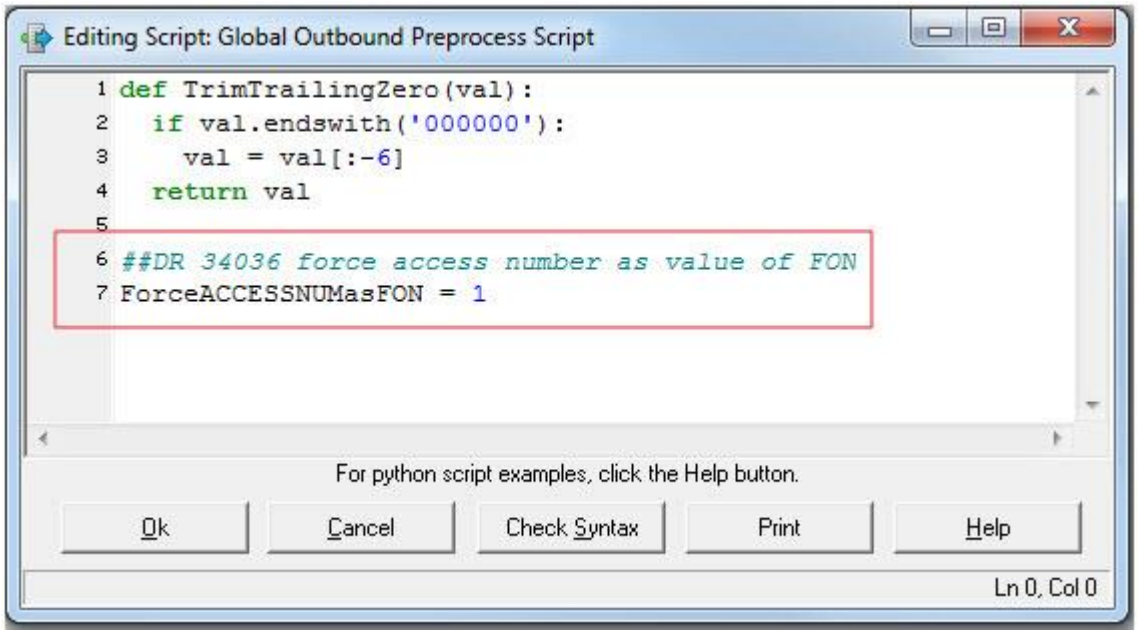


3. Paste the following statement in Global Outbound Preprocess Script

   Paste the following statement in Global Outbound Preprocess Script

   ##DR 34036 force the access number as the FON

   'ForceACCESSNUMasFON = 1'



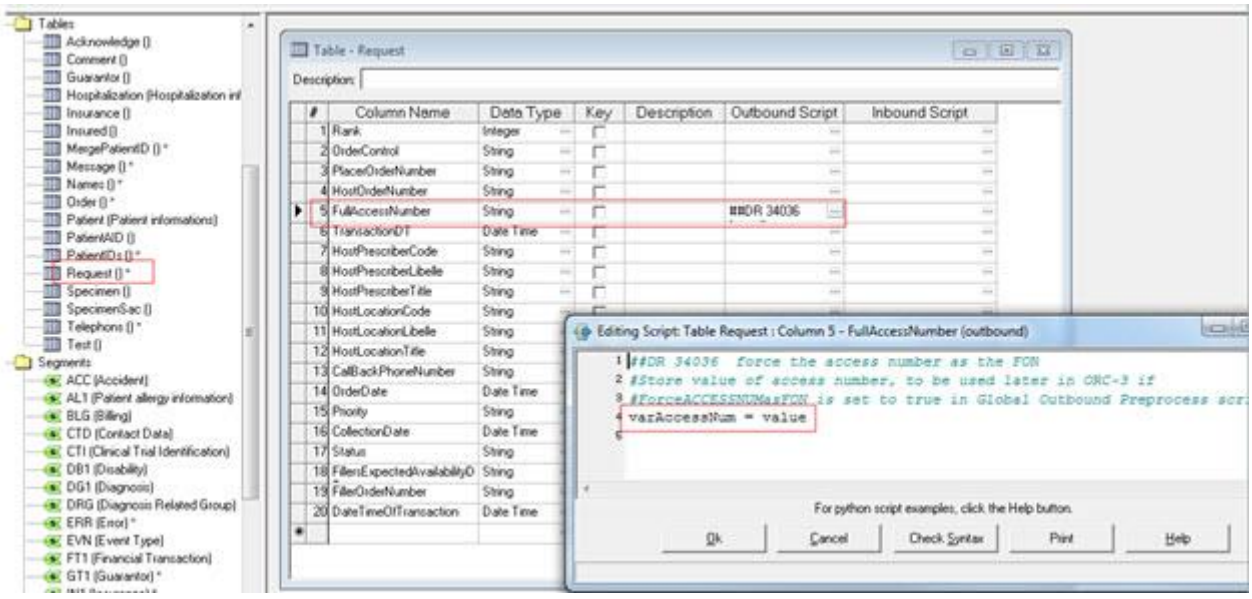
4. Expand the Tables folder on the left-hand side of the Browser window. Double click Request table to open it, and click the ... icon in the Outbound Script of FullAccessNumber. Modify and paste the following into the Outbound script window under Tables 'Request': Column number 5-FullAccessNumber:

   ##DR 34036 force the access number as the FON

   #Store value of access number, to be used later in ORC-3 and OBR-3 if

   #ForceACCESSNUMasFON variable is set to true in Global Outbound Preprocess script

   varAccessNum = value



5. Expand the **Segments file** on the left-hand side of the Browser window and double click on **ORC** segment. Click the ... icon in the Outbound Script of Filler Order Number. Modify and paste the following into the Outbound script of the ORC Segment: Field 3 - Filler Order Number

   #DR 34036 force the access number as the FON

   if ForceACCESSNUMasFON==1:

   value = varAccessNum

6. Click the 'Save' icon in the menu bar.
7. Restart the connection service.

Activating inclusion of local and mapped codification in HL7 result messages

Available only for TDNexLabs from V02.10, also in V01.52

Overview

This topic describes how to include local and mapped codification in HL7 result messages. For example, mapped codes can be LOINC codes.

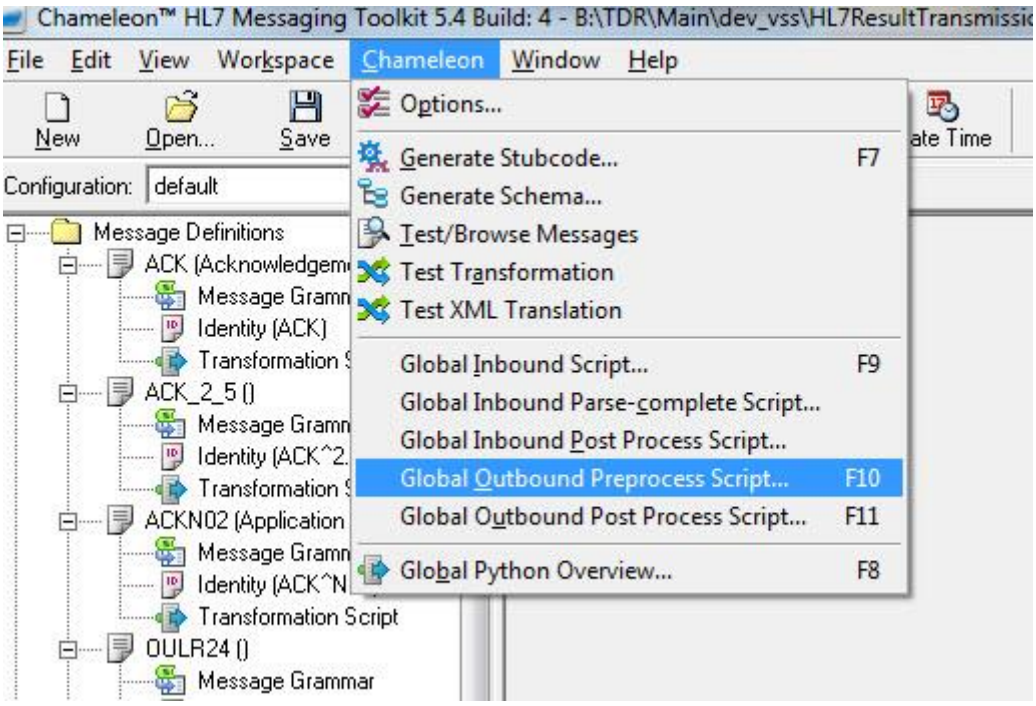
This mechanism is available for both ORU (2.3) and OUL (2.5) HL7 result messages.

To make this mechanism work properly, the following conditions are required:

- The **Send both local and mapped codes (Yes/No)** device property must be set to **Yes**.
- The VMD script must be activated by modifying the VMD file as described in the procedure below.

Procedure to update the VMD file

1. Open the `HL7ResultTransmission.vmd` file.
2. Go to the **Chameleon** tab-> **Global Outbound Preprocess Script** located at the top of the browser.



Then,

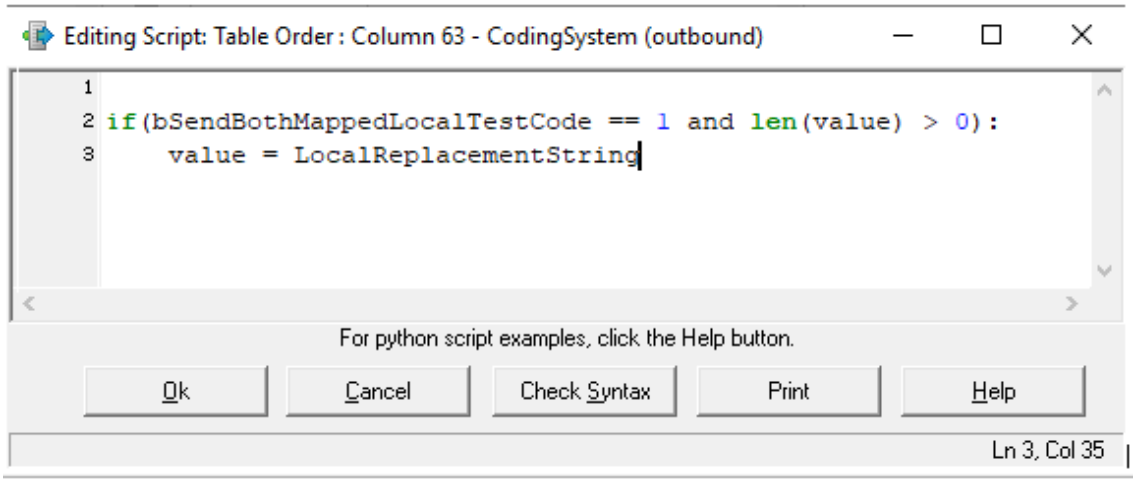
a. Adjust the value of the `bSendBothMappedLocalTestCode` variable to 1

b. Adjust the value of the `LocalReplacementString` variable to the local code value

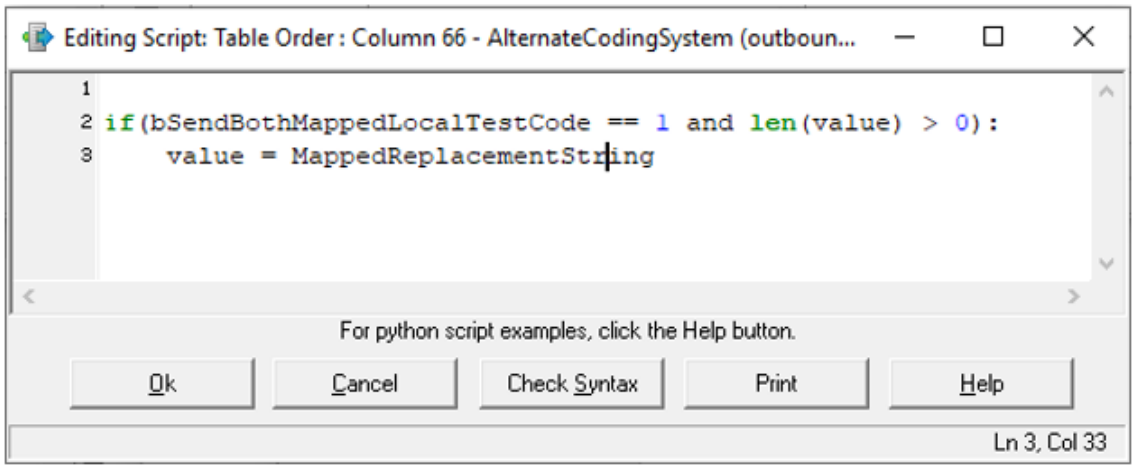
c. Adjust the value of the `MappedReplacementString` variable to the value of LOINC code

```
def TrimTrailingZero(val):
  if val.endswith('000000'):
    val = val[:-6]
  return val

##DR 34036 force access number as value of FON
ForceACCESSNUMasFON = 0

# DR 38913 - customization of line breaks for FT/TX result types
#   and in comments in NTE segments. #FTSEPARATOR# in XCHR
FTNTELineSeparator = '\\.br\\'

bSendBothMappedLocalTestCode = 0   #if property "Set both mnemonic and mapped code(Yes/No)"= yes, set this to one
LocalReplacementString = "KTPHL"   #this can be customized on site
MappedReplacementString = "LOINL7" #this can be customized on site
```

3. Double click on **Order** item under **Tables** and adjust the outbound script of **Coding System** as illustrated below.



4. Double click on **Test** item under **Tables** and adjust the outbound script of **Alternate Coding System** as illustrated below.



Management of Placer Order Number (PON)

The transmission of orders from a Laboratory Information System (LIS) to a Host Information System (HIS) can be used, for example, to send a Placer Order Number query from a Laboratory Information System to a Host Information System.

To understand how it works, it is necessary to first define the context in which it is used and describe all the different steps necessary to its functioning.

For all orders initiated by the laboratory (Tests requests entered at the laboratory and tests added by the laboratory), the Laboratory Information System will transmit a message to the Host Information System in order to obtain a Placer Order Number (PON) for each new requested test.

1. Placer Order Number query

> **NOTE**: Since the Placer Order Number (PON) can only be managed at the Battery level (OBR) and it is a mandatory field in the ORC and OBR segments, all "level 0" tests in the Laboratory Information System must be associated with a Placer Order Number, and it must not be possible to manage a Placer Order Number for a test that is inserted in a combined test.

When an order is directly entered on the LIS or a test is added (manually or by rule based) in an existing request, a task is triggered to request a Placer Order Number from the HIS.

2. Triggering of the Placer Order Number query

The task processing consists in transmitting order messages -where the Order Control field (ORC-1) is completed with SN (for Send Order Service Number)- to the HIS via a dedicated TCP/IP socket.

The LIS generates a message for each laboratory request. Each message can then contain several ORC/OBR segments for a given patient if several tests of the same request have no Placer Order Number.

Upon reception of this message, the HIS allocates a Placer Order Number to each test and returns this number in an order message where the Order Control field (ORC-1) is filled with "NA" (Number Assigned).

Upon reception of this "NA" order message, the LIS stores the Placer Order Number together with the requested test.

3. Reception of the Placer Order Number

Refer to the definition of the device related to the following communication: HL7 Reception of Order messages from Host.

4. Management of PON / FON by the Technidata LIS in HL7 Result Transmission communication

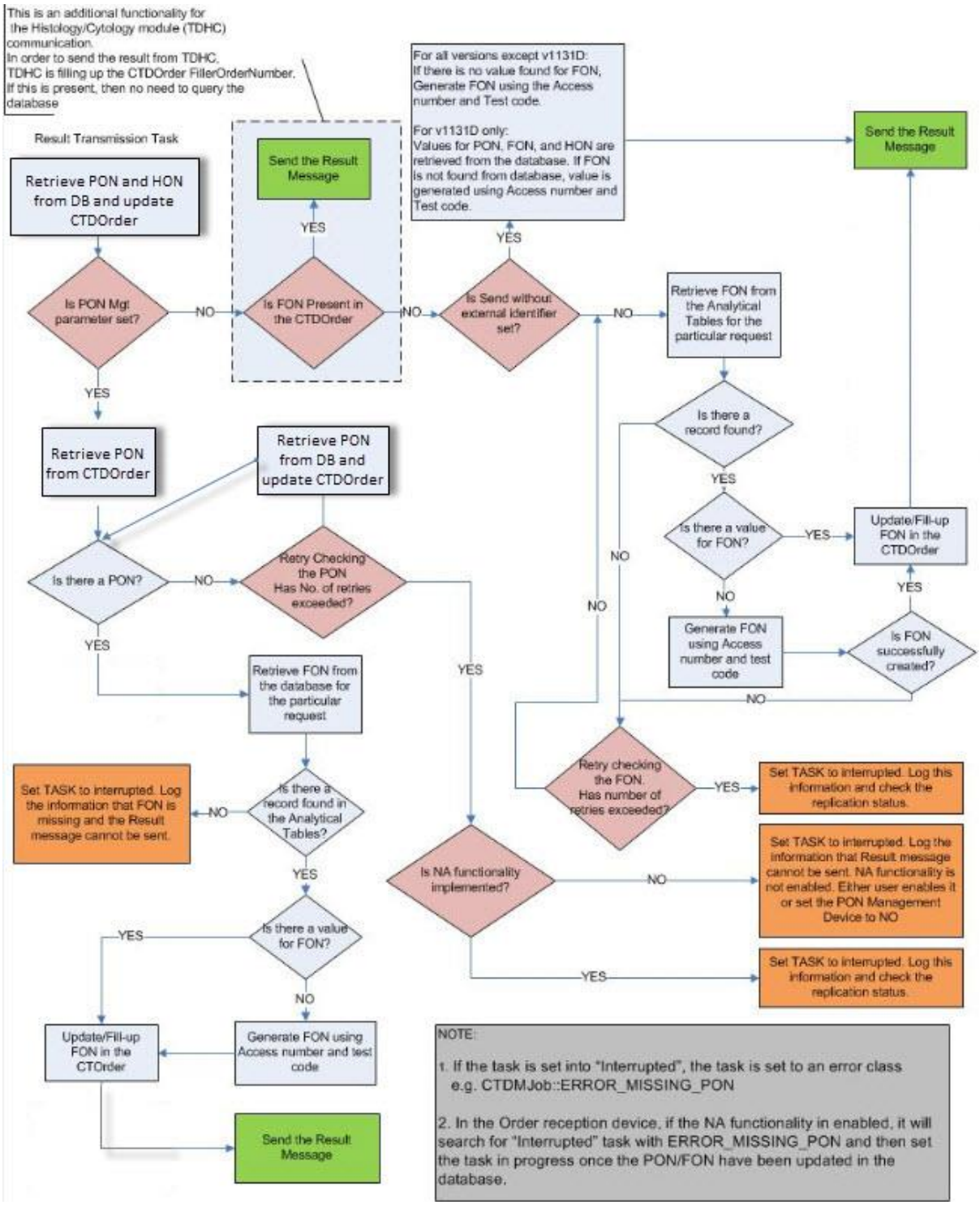
From TDNexLabs V01.31 and TD-Synergy V12.31

For HL7 Result Transmission, the following diagram illustrates the algorithm used for the PON/FON management.

From TDNexLabs V01.52.B

PON/FON retry management is not performed for deleted tests.

For deleted test, result is sent regardless of PON/FON device parameter settings.


This is an additional functionality for the Histology/Cytology module (TDHC) communication.
In order to send the result from TDHC, TDHC is filling up the CTDOrder FillerOrderNumber. If this is present, then no need to query the database
Result Transmission Task
Retrieve PON and HON from DB and update CTDOrder
Is PON Mgt parameter set?
NO
YES
Send the Result Message
YES
Is FON Present in the CTDOrder
NO
For all versions except v1131D:
If there is no value found for FON, Generate FON using the Access number and Test code.
For v1131D only:
Values for PON, FON, and HON are retrieved from the database. If FON is not found from database, value is generated using Access number and Test code.
YES
Is Send without external identifier set?
NO
Retrieve FON from the Analytical Tables for the particular request
Send the Result Message
Is there a record found?
YES
Is there a value for FON?
YES
Update/Fill-up FON in the CTDOrder
YES
NO
Generate FON using Access number and test code
Is FON successfully created?
NO
NO
NO
Retrieve PON from CTDOrder
Retrieve PON from DB and update CTDOrder
Is there a PON?
NO
Retry Checking the PON Has No. of retries exceeded?
YES
YES
Retrieve FON from the database for the particular request
Is there a record found in the Analytical Tables?
NO
Set TASK to interrupted. Log the information that FON is missing and the Result message cannot be sent.
YES
Is there a value for FON?
YES
NO
Update/Fill-up FON in the CTOrder
Generate FON using Access number and test code
Send the Result Message
Retry checking the FON. Has number of retries exceeded?
YES
Set TASK to interrupted. Log this information and check the replication status.
Is NA functionality implemented?
NO
Set TASK to interrupted. Log the information that Result message cannot be sent. NA functionality is not enabled. Either user enables it or set the PON Management Device to NO
YES
Set TASK to interrupted. Log this information and check the replication status.
NOTE:
1. If the task is set into "Interrupted", the task is set to an error class e.g. CTDMJob::ERROR_MISSING_PON
2. In the Order reception device, if the NA functionality in enabled, it will search for "Interrupted" task with ERROR_MISSING_PON and then set the task in progress once the PON/FON have been updated in the database.

Transmission of an additional result report file

WARNING: This feature is only available from version V12.01.A of TD-Synergy (also available in version V11.83 of TD-Synergy) and from version V01.11 of TDNexLabs

This page gives you further information to better understand the management of additional result report files. An additional result report file is managed when a PDF report, which contains result reports, must be transmitted as attached file to the host, with the HL7 result message.

Principle

A report file (PCL file) together with the ASTM result message is transmitted via the internal ASTM communication. The result report file name is stored in the Header segment of the ASTM result message in the field 7.5.3.

Example:
```
H|^~\&|||32^Biochimie gaz CHRTR^asr01709.pcl  ||ORU|||38-
22^LIS||P|A.2.|20141015164009|
```
Where the result report file name is `asr01709.pcl`.

On the ASTM result reception device

When a result report file (PCL file) is sent with the ASTM message, the **Auxiliary file extension** property must be set to `pcl` in the **File location** section when completing the device properties.

On reception of the ASTM message, if the property is completed with the correct extension, the device checks for the PCL file name. As soon as it is found, the device retrieves the file and forwards it to the HL7 result transmission device.

The internal task is set to *interrupted* and no tasks are created for the HL7 result transmission device in the following cases. The ASTM result file, the semaphore file, and the `.pcl` file if present are moved to the **Input error file folder** defined in the device properties.

1. An error occurred while parsing the contents of the ASTM result message (for example, broken ASTM format).
2. Filename of the report file in the 7.5.3 field of the ASTM message header is *NOPCL*.
3. The report file cannot be found.
4. The report file has been found but is empty (size of the file is 0 bytes).
5. The report file extension is different from that defined in the **Auxiliary file extension** property.

When the processing is successful, the input files (ASTM result file, semaphore file, and `.pcl` file, if present) are moved to the **Folder for processed input files** if it is defined in the device property. If it is not defined, the input files are deleted.

On the HL7 result transmission device

The HL7 result transmission device converts the result report file from PCL to PDF format. After the report file has been converted and encoded in Base64, it is transmitted with the HL7 result message, as an OBX segment with the **ED** result type and the **REPORTPDF** test code.

Example of message:
```
MSH|^~\&|LIS|^Biochimie gaz
CHRTR|HOST||20141015164009||ORU^R01^ORU_R01|TD0000008352|P|2.3|||AL|NE|||||
PID|1||0000000444^^^^PATNUMBER||||||id^|||||||id^|||||||||||||||
PV1|1||PDF8|||||||||||||||VACJ57100315|||||||||||||||||||||||20140702|
ORC|RE||4102116583CBC||A||^^^^^R||20141021174700|||DEFDOC|||20141021174700
OBR|1||4102116583CBC|CBC^CBC||20141021174700||||||||||DEFDOC|||||||||P||^^^^^R|||||||||
OBX|1|NM|HCT^Hematocrit|1|40.55||10.00-50.00||||F|||||||||
OBX|2|ED|REPORTPDF|1|asr01709.pdf^application^pdf^Base64^JVBERi0xLcfsaYUmF...JglTOUAlM
KTCk==||||||F|||||||||
```

NOTE: The PDF result report encoded in Base64 is not entirely shown.

Tool and settings used to convert the PCL report file into a PDF report file

- The *Archiving of result reports in PDF format files* option (`TDArchive_Report`) must be specified in the Configuration file (`.xml`).
- Settings required in the **Archiving of reports** section in the **Configuration** window. The **Directory and name of the PCL to PDF conversion tool** and **Command options of the PCL to PDF conversion tool** properties must be completed. See Settings in the Configuration window

Incidents

The HL7 task is set to *interrupted* in the following cases:

1. The converter tool is not initialized correctly due to the following reasons.
   - Incorrect settings in the Configuration window (USE session) - conversion tool not found or invalid command line options
   - The *Archiving of result reports in PDF format files* option (`TDArchive_Report`) is not present in the Configuration file (`.xml`).
   - Failure to create a folder named `CnvTemp` in the installation directory of the TD-Product client. This folder is used in the creation of temporary files during the conversion of PCL to PDF. The temporary files are deleted after the conversion process.
2. The conversion from PCL to PDF failed.
3. The generated PDF file is greater than 2MB (2097152 bytes).
4. Error during formatting of the HL7 result message to be transmitted.

Transmission of CDA documents

Available only for TDNexLabs from V02.01.

Description

CDA stands for **Clinical Document Architecture**. CDA documents are XML files that contain the test results of the patient. When the Real time module produces an ASTM file and PCL file, the files are parsed by the ResultReporting Service from IIS. The PCL file will be converted to PDF format.

This information is then used by the ResultReporting Service to generate two CDA documents: CDA-R2 L1 and CDA-R2 L3, where “R” stands for Release and “L” stands for Niveau or Level. The Result Reporting Service will create a task in the TDCOM device defined in the USE property “Device code used for transmitting HL7 messages to the DMP/MSSanté”. The task will contain the two CDA documents, the converted PDF document, and complementary tests containing metadata. The TDCOM device will convert the CDA and PDF documents to Base64 format and transmit an HL7 ORU^R01 message.

Properties

These properties are found in the **Configuration** window, root level, section **DMP/MSSanté**.

- **Device code used to send HL7 messages to the DMP/MSSanté**
- **Send CDA documents in separate messages (0=No, 1=Yes)**

Example of an HL7 message with CDA documents

Example of message with CDA-R2 L1, CDA-R2 L3 and PDF documents attached::

```
MSH|^~\&|TDR|^^LABO|HOST||20220408100349||ORU^R01^ORU_R01|TD0000031550|P|2.3|||AL|NE|||||
PID|1||ID00000016^^^^PATNUMBER~266087743111555^^^^ALTNUMBER~266087743111555^^^&1.2.250.1.213.1.4.8&ISO^INS-NIR~266087743111555||SMITH^Jane^Marie^^^^L~DUBOLE^Jane^^^^^D||19720821|F||id^|987 Grand Rue^GRENOBLE^^^38000~^^^^^^BDL^^38700|||||id^|||||||||||||||||
ORC|||2040151218||A||^^^20220405091600^^R||20220408100349|||MCE^Médecin ESSAI 1^^^^^^^^^^^^^^^^^^10101198595|LABO^^^^^^^^CORRES. LABO||20220405091600
OBR|1||2040151218|DMPMSSANTE||20220405091600|||||||||MCE^Médecin ESSAI 1^^^^^^^^^^^^^^^^^^10101198595|||||||||P||^^^20220405091600^^R|SEGUR^Pierre SEGUR^^^^^^^^^^^^^^^^^^10000326669|||||||
OBX|1|CE|MASQUE_PS^Masqué aux professionnels de Santé|1|N||||||||||||||
OBX|2|CE|INVISIBLE_PATIENT^Document Non Visible par le patient|1|N||||||||||||||
OBX|3|CE|INVISIBLE_REPRENSANTS_LEGAUX^Non visible par les représentants Légaux du patient|1|N||||||||||||||
OBX|4|CE|CONNEXION_SECRETE^Connexion Secrete|1|N||||||||||||||
OBX|5|CE|MODIF_CONFIDENTIALITYCODE^Modification Confidentiality Code|1|N||||||||||||||
OBX|6|CE|DESTDMP^Destinataire DMP|1|Y||||||||||||||
OBX|7|CE|DESTMSSANTEPS^Destinataire Professionnel de Santé|1|Y||||||||||||||
OBX|8|CE|DESTMSSANTEPAT^Destinataire Patient|1|Y||||||||||||||
OBX|9|ED|11502-2^CR d'examens biologiques|1|^Text^XML^Base64
CDAR2N3^PD94bWwgdmVyc2lvb...ZXNoZWV0Pg==||||||F|||||||
OBX|10|ED|11502-2^CR d'examens biologiques|1|^Text^XML^Base64
CDAR2N1^PENsaW5pY2FsRG9jdW1...W50Pg==||||||F|||||||
OBX|11|ED|REPORTPDF|1|20220405_CR d’examens biologiques_SMITH_Jane_2040151218.pdf^application^pdf^Base64^JVBERi0xLjQKJcfsj6IKJSVJb...JUVPRgo=||||||F|||||||
```

The **DMPMSSANTE** test code in the **OBR segment** of this message does not exist in the dictionary. It is hardcoded and only serves as a container for the tests in the OBX segments that follow.

The test codes of the first eight OBX segments of this message do not exist in the dictionary. They represent metadata that describe how the patient information should be shared. These tests are hardcoded and their values are based on the complementary tests defined in the USE properties.

Please refer to the table below for the possible test code values:

OBX value	**Test code**	**Value**
	MASQUE_PS	**Y** if the test in **Complementary parameter code for masking documents to health professionals** is set to the value in **Result for complementary parameter** to indicate document masking to health professionals
	INVISIBLE_PATIENT	INVISIBLE_PATIENT **Y** if at least one OBX segment in the ASTM file from the Real time module has OBX-14.13 = 1 Otherwise, it is **N**
OBX-3	INVISIBLE_REPRENSANTS_LEGAUX	
	CONNEXION_SECRETE	Always **N**
	MODIF_CONFIDENTIALITYCODE	Always **N**
	DESTDMP	‘N’ if the test in “Complementary parameter code for "DMP refusal"” is set to the value in “Result for the complementary parameter to indicate the "DMP refusal"” Otherwise, it is ‘Y’
	DESTMSSANTEPS	DESTMSSANTEPS ‘N’ if the test in “Complementary parameter code for "MSSanté health professional refusal"” is set to the value in “Result for complementary parameter to indicate the "MSSanté health professional refusal"” Otherwise, it is ‘Y’
	DESTMSSANTEPAT	‘N’ if the test in “Complementary parameter code for "MSSanté patient refusal"” is set to the value in “Result for the complementary parameter to indicate the "MSSanté patient refusal"” Otherwise, it is ‘Y’
OBX-9	11502-2^CR d'examens	Contains the CDA-R2 L3 encoded base 64. Note that type of document is **CDAR2L3** document.
OBX-10	11502-2^CR d'examens biologiques	Contains the CDA-R2 L1 encoded base 64. Note that type of document is **CDAR2L1** document.
OBX-11	REPORTPDF	Contains the PDF A/1 encoded base 64.

NOTE: No task is generated in the device:
*If DESTDMP, DESTMSSANTEPS and DESTMSSANTEPAT are all set to **N**; or
*If the PCL file is not generated by the Real time module.

The ninth and tenth OBX segments contain the CDA-R2 L3 and CDA-R2 L1 documents, respectively. The test code and text **11502-2^CR d'examens biologiques** are hardcoded and do not exist in the test dictionary. The encoding and type of the document is placed in OBX-5.4 separated by a space (for example, Base64 CDAR2N3). The documents are encoded to Base64 format and are placed in OBX-5.5.

The eleventh OBX segment contains the PDF result report converted from a PCL document. The test code **REPORTPDF** is hard coded and does not exist in the test dictionary. The document is encoded to Base64 format.

Transmit CDA documents separately

If the USE property (found in the **Configuration** window, root level, section **DMP/MSSanté**) **Send CDA documents in separate messages** is set to:

- **0** the CDA documents and the result report PDF will all be transmitted in one HL7 message.
- **1** the CDA documents will each be transmitted through separate HL7 messages. The result report PDF will not be included in any of the messages.

  The contents of the patient data, request data and metadata will be the same; only the CDA documents will differ. Currently there are only two CDA documents supported: **CDAR2L3** and **CDAR2L1**.

Examples of the CDA documents transmitted separately:

Example of message:

```
MSH|^~\&|TDR|^^A|HOST||20220422154244||ORU^R01^ORU_R01|TD0000000167|P|2.3|||AL|NE|||||
PID|1||ID00000016^^^^PATNUMBER~266087743111555^^^^ALTNUMBER~266087743111555^^^&
1.2.250.1.213.1.4.8&ISO^INS-
NIR~266087743111555||SMITH^Jane^Marie^^^^L~DUBOLE^Jane^^^^^D||19720821|F||id^|987
Grand Rue^GRENOBLE^^^38000~^^^^^^BDL^^38700||||||id^|||||||||||||||||
ORC|||2040151218||A||^^^20220405091600^^R||20220408100349|||MCE^Médecin ESSAI
1^^^^^^^^^^^^^^^^^^10101198595|LABO^^^^^^^^CORRES. LABO||20220405091600
OBR|1||2040151218|DMPMSSANTE||20220405091600|||||||||MCE^Médecin ESSAI
1^^^^^^^^^^^^^^^^^^10101198595|||||||||P||^^^20220405091600^^R|SEGUR^Pierre
SEGUR^^^^^^^^^^^^^^^^^^10000326669||||||||
OBX|1|CE|MASQUE_PS^Masqué aux professionnels de Santé|1|Y||||||||||||||
OBX|2|CE|INVISIBLE_PATIENT^Document Non Visible par le patient|1|Y||||||||||||||
OBX|3|CE|INVISIBLE_REPRENSANTS_LEGAUX^Non visible par les représentants Légaux du
patient|1|Y||||||||||||||
OBX|4|CE|CONNEXION_SECRETE^Connexion Secrete|1|N||||||||||||||
OBX|5|CE|MODIF_CONFIDENTIALITYCODE^Modification Confidentiality Code|1|N||||||||||||||
OBX|6|CE|DESTDMP^Destinataire DMP|1|Y||||||||||||||
OBX|7|CE|DESTMSSANTEPS^Destinataire Professionnel de Santé|1|Y||||||||||||||
OBX|8|CE|DESTMSSANTEPAT^Destinataire Patient|1|Y||||||||||||||
OBX|9|ED|11502-2^CR d'examens biologiques|1|^Text^XML^Base64
CDAR2N3^PD94bWwgdmVyc2...xEb2N1bWVudD4=||||||F|||||||||
```

Example of message:

```
MSH|^~\&|TDR|^^A|HOST||20220422154244||ORU^R01^ORU_R01|TD0000000168|P|2.3|||AL|NE|||||
PID|1||ID00000016^^^^PATNUMBER~266087743111555^^^^ALTNUMBER~266087743111555^^^&
1.2.250.1.213.1.4.8&ISO^INS-
NIR~266087743111555||SMITH^Jane^Marie^^^^L~DUBOLE^Jane^^^^^D||19720821|F||id^|987
Grand Rue^GRENOBLE^^^38000~^^^^^^BDL^^38700|||||id^|||||||||||||||
ORC|||2040151218||A||^^^20220405091600^^R||20220408100349|||MCE^Médecin ESSAI
1^^^^^^^^^^^^^^^^^^^10101198595|LABO^^^^^^^^CORRES. LABO||20220405091600
OBR|1||2040151218|DMPMSSANTE||20220405091600|||||||||MCE^Médecin ESSAI
1^^^^^^^^^^^^^^^^^^^10101198595|||||||||P||^^^20220405091600^^R|SEGUR^Pierre
SEGUR^^^^^^^^^^^^^^^^^^^10000326669|||||||
OBX|1|CE|MASQUE_PS^Masqué aux professionnels de Santé|1|Y||||||||||||||
OBX|2|CE|INVISIBLE_PATIENT^Document Non Visible par le patient|1|Y||||||||||||||
OBX|3|CE|INVISIBLE_REPRENSANTS_LEGAUX^Non visible par les représentants Légaux du
patient|1|Y||||||||||||||
OBX|4|CE|CONNEXION_SECRETE^Connexion Secrete|1|N||||||||||||||
OBX|5|CE|MODIF_CONFIDENTIALITYCODE^Modification Confidentiality Code|1|N||||||||||||||
OBX|6|CE|DESTDMP^Destinataire DMP|1|Y||||||||||||||
OBX|7|CE|DESTMSSANTEPS^Destinataire Professionnel de Santé|1|Y||||||||||||||
OBX|8|CE|DESTMSSANTEPAT^Destinataire Patient|1|Y||||||||||||||
OBX|9|ED|11502-2^CR d'examens biologiques|1|^Text^XML^Base64
CDAR2N1^PD94bWwgdmVyc2lvbj...2FsRG9jdW1lbnQ+||||||F||||||||
```

NOTE: Only one task will be generated in the device, regardless of the value of the USE property. This means that if **Send CDA documents in separate messages** is set to **1**, the generated task will always produce two HL7 messages (one containing **CDAR2L3** and another containing **CDAR2L1**). If the task processing fails after the first message was successfully transmitted, and the task is run again, the first message will be transmitted again along with the second message.

CDA documents: Technical description

Transmission of CDA documents: Technical information

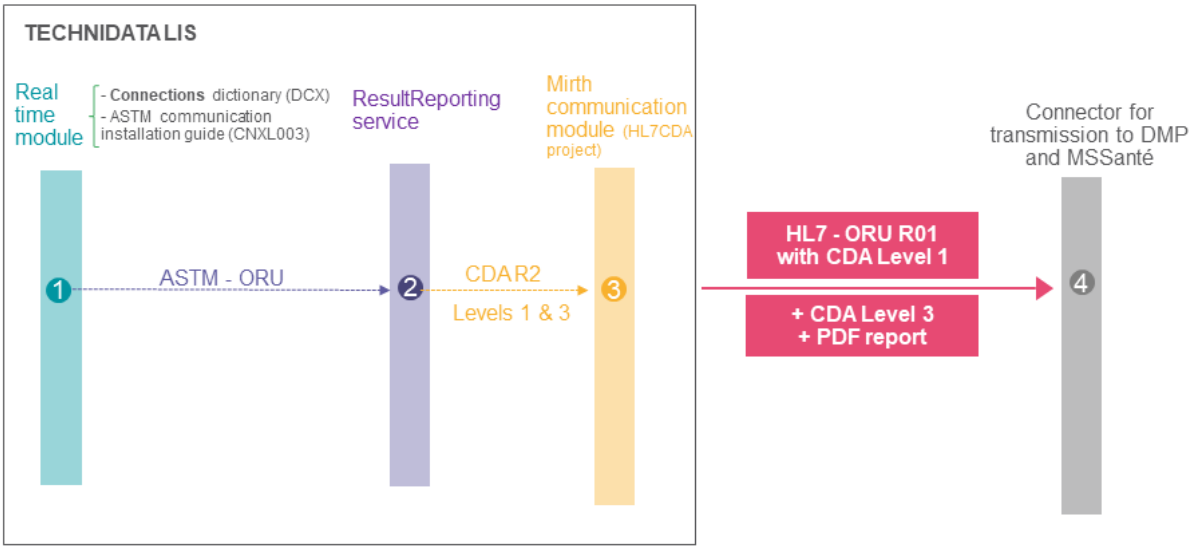
Available only for TDNexLabs from V02.01.

The aim of this topic is to explain how CDA documents and CDA format work to help you run tests or implement this feature, particularly if you need to adapt the style sheet of CDA reports.

This topic mainly covers the CDA documents to be produced to populate the French *Dossier Médical Partagé* (DMP) and to be exchanged via MSSanté.

Diagram

Transmission of CDA documents is triggered by the ASTM communication.

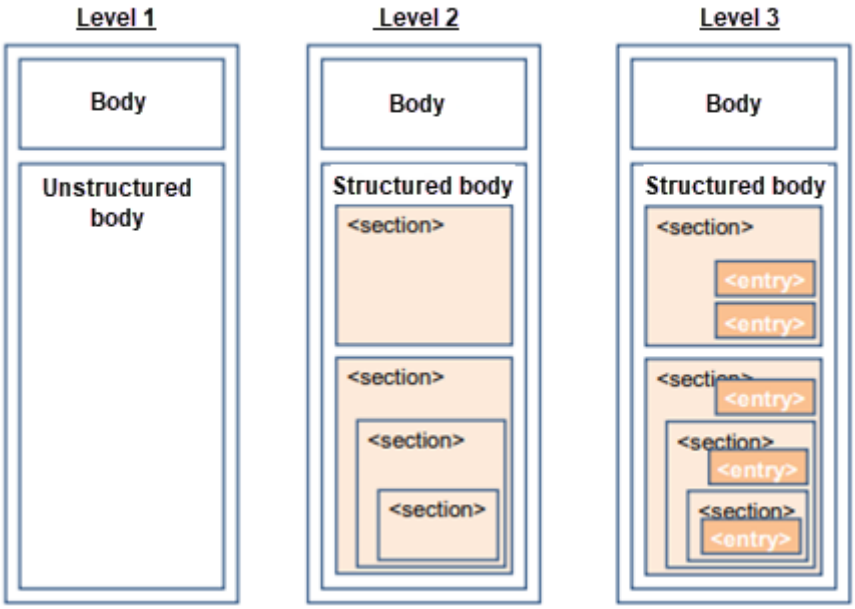


HL7 CDA R2 description

A CDA document (Clinical Document Architecture) is defined as a complete and autonomous documentary entity (usable independently of any other message). It is an XML flow, always composed of a header and a body.

CDA R2 documents are built on HL7 V3 RIM (Reference Information Model) V2.07 of September 12, 2004. Clinical Document Architecture, Release Two (CDA R2), that became an ANSI-approved HL7 Standard in May 2005 ; it is a *de jure* standard (in French: *une norme*).

Different levels of CDA documents exist. Only levels 1 and 3 are used in the current communication for transmission of CDA documents.



CDA R2 Level 1

CDA R2 Level 1 documents have an unstructured body, that is a non-XML body. Usually, the body is a PDF document encoded in Base64.

```
<ClinicalDocument xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
xmlns="urn:hl7-org:v3">
  ... CDA header ... containing information about author, patient, etc.
  <component>
    <nonXMLBody>
      <text mediaType="text/plain" representation="B64">dGVzdCBkb2M</text>
    </nonXMLBody>
  </component>
</ClinicalDocument>
```

CDA R2 Level 3

CDA R2 Level 3 documents have a structured body, that is a structured XML body. The body has several nested section tags, that contain a narrative block in a text tag.

The narrative block is a part of the document that is written with XML tags that are very similar to HTML tags. The narrative block can be interpreted directly by the user using an XSLT stylesheet in a web browser. Indeed the XSLT stylesheet will transform XML tags into HTML tags.

As an example, the narrative block of a subchapter (FR-*CR-BIO-Sous-Chapitre*) usually contains tables showing the results of the ordered tests.

```
<ClinicalDocument xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
xmlns="urn:hl7-org:v3">
  ... CDA header ... containing information about author, patient, etc.
  <component>
    <structuredBody>
      <component>
        <section>
```

```
            <!-- FR-CR-BIO-Chapitre -->
            <code code="18725-2" displayName="Microbiologie [Autre]"
             codeSystem="2.16.840.1.113883.6.1" codeSystemName="LOINC"/>
            <title>Bactériologie</title>
            <component>
              <section>
                <!-- FR-CR-BIO-Sous-Chapitre -->
                <code code="88848-7" displayName="Examen cytobactériologique
des urines"
                 codeSystem="2.16.840.1.113883.6.1" codeSystemName="LOINC" />
                <title>Groupement envoi urines à TDMicro</title>
                <text>a.k.a. "Narrative block"</text>
                <entry typeCode="DRIV">
                  <!-- FR-Resultats-examens-de-biologie-medicale -->
                  <act classCode="ACT" moodCode="EVN">
                    <code code="88848-7" displayName="Examen
cytobactériologique des urines"
                     codeSystem="2.16.840.1.113883.6.1"
codeSystemName="LOINC" />
                    <entryRelationship typeCode="COMP">
                      <organizer classCode="BATTERY" moodCode="EVN">
                        <!-- FR-Batterie-examens-de-biologie-medicale -->
                        <code>
                          <translation code="XASP" displayName="Aspect
visuel"
                           codeSystem="1.2.250.1.999"
codeSystemName="LOCAL"/>
                        </code>
                        <component typeCode="COMP">
                          <observation moodCode="EVN" classCode="OBS">
                            <!-- FR-Resultat-examens-de-biologie-element-
clinique-pertinent -->
                            <code code="5767-9" displayName="Aspect [Aspect]
Urine ; Résultat nominal"
                             codeSystem="2.16.840.1.113883.6.1"
codeSystemName="LOINC" />
                            <value xsi:type="CE">
                              <translation code="TROUB" displayName="Trouble"
                               codeSystem="1.2.250.1.999"
codeSystemName="LOCAL"/>
                            </value>
                          </observation>
                        </component>
```

OID

HL7 CDA R2 widely use OID (Object Identifier). It is an universally unambiguous persistent identifier.

Each enterprise that needs an OID must order it to a standardization agency (such as AFNOR in France).

Then the enterprise can decline the OID by adding arcs, basically a number between two dots.

Let's say an enterprise ordered an OID to an agency. The agency has the responsibility of the OID 1.2.3, it sells the OID 1.2.3.4 to the enterprise.

Now it is up to the enterprise to assign OID in its OID root. If the enterprise wants to assign OID to its different software instance, it must decline its root OID by adding arcs and to register those used OID.

Message description

HL7 CDA R2 is so exhaustive that templates have been defined, to delimit usage of elements.

Templates have been defined by HL7 but also other instance such as IHE (International), IHE France, etc.

Each template has a name and is identified by an OID.

Example

For attached documents, for example, there is a French template FR-*Type-document-attache* :

Template "FR-Type-document-attache" – 1.2.250.1.213.1.1.3.48.18 – defined by French ANS (Agence du Numérique en Santé):

https://o3sis.esante.gouv.fr/art-decor/decor-templates--BBR-?id=1.2.250.1.213.1.1.3.48.18 [**ANS**-Modèles de contenus CDA (BBR) – Templates]

Which is a specialization of the template "FR-Simple-Observation" – 1.2.250.1.213.1.1.3.48 – defined by French ANS (Agence du Numérique en Santé):

https://o3sis.esante.gouv.fr/art-decor/decor-templates--BBR-?id=1.2.250.1.213.1.1.3.48 [**ANS**-Modèles de contenus CDA (BBR) – Templates]

Which itself is an adaptation of the template "IHESimpleObservation" – 1.3.6.1.4.1.19376.1.5.3.1.4.13 – defined by IHE:

https://art-decor.ihe-europe.net/art-decor/decor-templates--IHE-PCC-?id=1.3.6.1.4.1.19376.1.5.3.1.4.13 [**IHE** PCC Sections and Entries – Templates]

which is a specialization of the template "CDAObservation" – 2.16.840.1.113883.10.12.303 – defined by HL7

https://art-decor.org/art-decor/decor-templates--ad1bbr-?id=2.16.840.1.113883.10.12.303 [**CDA R2 Standard** – Templates]

> **NOTE:** The above links refers to an Open Source tool names ART-DECOR.
> ART= Advanced Requirement Tooling
> DECOR= Data Elements, Codes, OIDs and Rules
> ART-DECOR is an open-source tool suite that supports the creation and maintenance of HL7 templates, value sets, scenarios and data sets.
> More information about ART-DECOR at these links:
> https://art-decor.org/mediawiki/index.php/Main_Page
> https://art-decor.org/art-decor/about-art-decor

Structure of Technidata French CDA

To have an idea of the structure of Technidata French CDA R2 Level 3, see CDA R2 Level 3 documents: Structure descripton.

To have the exact specification of the French CDA reports, see the French specifications available here:

https://esante.gouv.fr/offres-services/ci-sis/espace-publication

Particularly the following ones:

- For the format:

  https://esante.gouv.fr/volet-structuration-minimale-de-documents-de-sante

  https://esante.gouv.fr/volet-de-reference-modeles-de-contenus-cda

  https://esante.gouv.fr/volet-cr-bio-compte-rendu-deiologie-medicale

- For the transport:

  https://esante.gouv.fr/volet-transport-dun-document-cda-r2-en-hl7-oru-oul-mdm

Otherwise, you may rely on the above ART-DECOR links (in English).

Structure of tests

Different structures of tests exist, depending on whether the requested test has intermediary combined test (i.e. result has a depth of 2 or more).

We have the following templates for the tests:

- Requested test corresponding to FR-Resultats-examens-de-biologie-medicale
- Executed test corresponding to FR-Resultat-examens-de-biologie-element-clinique-pertinent
- Intermediary group corresponds to FR-Batterie-examens-de-biologie-medicale

Basically we have the following relationships between these tests

Requested test can contain (among other elements):

- [0 to N] Executed tests
- [0 to N] Intermediary grouwhich itself can contain (among other elements):
  - [0 to N] Executed tests

Features with specific points

Microbiology

Highlighted properties are used by the CDA generator.

Microbiology result consolidation	
Use the medium tests group root (0=No, ...	0
Send print flag for MID results (No = N, Y...	Y
Send print flag for MIC results (No = N, Y...	Y
Combined test where detection tests are i...	2
Reason for setting to review	0
Device code for result consolidation	RRT
Regular cytology result	XNORC
Completed culture result	
In progress culture result	
Canceling coded text	XCANR
Conclusion test	XSAMC
Sensitivity tests group root	XAST
Organism test root	XORG
Regular cytology test	XCYTN
In progress culture test	
Completed observation result	XCC
Completed observation test	XEOD
Stop observation test	XSTOP
Pathogenic observation result	XP
Pathogenic observation test	XPAT
Negative observation result	XN
Negative observation test	XMBN

In the CDA:

- Conclusion test is not processed as a result but as a comment at the end of the requested test.
- Test starting with the prefix “Sensitivity tests group root” is used to detect the test that relates to the isolate (FR-Isolat-microbiologique).
- Test starting with the prefix “Organism test root” is processed as as organism (FR: *Germe*) of the related isolate.
- Antibiotics are recognized by comparing with the codes in the **Antibiotics** dictionary.

Example of structure for a microbiology test:

- Requested test: **Cytobacteriological urine exam**
  - **Intermediary group**: **Mascroscopy**
    - Executed test: Color
    - Executed test: Appearance
  - **Intermediary group**: **Microscopy**
    - Executed test: Leucocytes
    - Executed test: Erythrocytes
    - Executed test: Epithelial cells
    - Executed test: Gram staining
- **Isolate**: **Escherichia Col**
  - Organism
  - Executed test: Enumeration
  - Executed test: Amoxicillin
  - Executed test: Ampicillin
  - Executed test: Gentamicin

- **Isolate**: **Streptococcus D**
  - Organism
  - Executed test: Enumeration
  - Executed test: Amoxicillin
  - Executed test: Ampicillin
  - Executed test: Gentamicin
- **Comment** (FR-*Commentaire-ER*) : **Comment on requested test**

Note that ANS recommends an intermediary group to group the antibiotic tests (for example, an intermediary group “Antibiogram” to group Amoxicillin, Ampicillin and Gentamicin) but it is not mandatory.

Previous results

If a test has previous results, then the last previous result is included in the CDA.

	Résultat 27/06/2022 11:48	Unité	Interprétation	Intervalle de référence	Résultats antérieurs 24/03/2022 17:59	28/03/2022 10:32
Sodium (-)	130.00	mmol/L	Anormalement bas	135.00 - 145.00		132.60
Potassium (-)	4.00	mmol/L	Normal	3.50 - 5.00	5.62	
Chlore (-)	90	mmol/L	Anormalement bas	96 - 108		95
Phosphate alcaline (-)	25	[IU]/L	Normal	23 - 29		
Protides (-)	70.0	g/L	Normal	60.0 - 80.0		
Balance ionique (-)	-2	mmol/L	Normal			

NOTE: No previous results are managed for antibiotic sensitivity tests.

Attached documents

Illustrative images

Attached documents are transmitted in CDA only if the following conditions are met:

- The document is attached to a test (not to a request)
- The document is an image: its MIME type must be image/jpeg (image/jpg is automatically corrected into image/jpeg), image/gif, image/png or image/bmp.

Such documents are displayed among the results, as an illustrative image (for example, Electrophoresis curve).

Results from subcontracting laboratory

Documents that correspond to results produced by subcontractors are transmitted in CDA reports if the test to which they are attached is marked as subcontracted. Their MIME type is application/pdf.

Comments

Comments are managed at different levels:

- Comments on request
- Comments on requested test
- Comments on intermediary group (group under a requested test)
- Comments on the result of an executed test

Such comments follow the *FR-Commentaire-ER* CDA template.

Comments at report beginning and end

It is possible to define comments at the beginning or end of reports. Such comments follow the *FR-Commentaire-non-code* CDA template.

To do that, you must:

1. Reserve chapters CH01 and CH064 for this purpose.
2. Define the LOINC transcoding for CH01 and CH064 as follows: Code=8251-1, Texte="Unit comment [Interpretation] Various media ; Score result"
3. Create a test requestable separately of the type Text intended to receive the beginning of the comment.
   - Associate this test with the chapter CH01.
   - Define the LOINC transcoding for this test as follows: Code=55112-7, Text="Document summary [Search] Patient ; Document"
4. Create a test requestable separately of the type Text intended to receive the end of the comment.
   - Associate this test with the chapter CH64.
   - Define the LOINC transcoding for this test as follows: Code=55112-7, Text="Document summary [Search] Patient ; Document"

Troubleshooting

Conditions for DMP

Conditions for the report to be transmitted to DMP:

1. The patient has a *qualified* INS.
2. The patient did not report any refusal (as regards to transmission of reports to the DMP, to health professionals, etc.)
3. The location is not configured as "Not concerned by Not concerned by the DMP/MSSanté".

Note that the DMP rejects a document if it relates to a preceding version that has not been transferred to the DMP.

Testing the CDA L3 messages

At the following link:

https://esante.gouv.fr/offres-services/ci-sis/espace-publication

1. Click on ***Outil de vérification des documents CDA***.
2. You should be redirected to https://github.com/ansforge/TestContenuCDA.
3. Install the tool `testContenuCDA`. This tool helps checking the conformity of a HL7 CDA R2 level 3 document.

Both tools are complementary:

- Schematron files in the test environment are created from the specification tool (Art-decor). The latter contains numerous rules and are thus used in the SEGUR context.
- These schematron files are very large volume files and are hard to use.
- In "testContenuCda", lighter and more easy to use schematrons have been developped, in order to enable editors to run checks (before transmission to MSSanté or DMP).

CDA R2 Level 3 documents: Structure description

Available for TDNexLabs from V02.01.

This page describes the main tags only for CDA R2 **Level 3** documents.

Level	Tag name	Comment	Cardinality
0	Stylesheet		
1	Content		
2	**CDADocument**		
	Patient		
3	recordTarget		
4	patientRole		
	Document author		
3	Author		
	Organization that keeps the document and guarantees its life cycle		
3	custodian		
	Addressee on copy for result reports		
3	informationRecipient		
	Legal document signatory		
3	legalAuthenticator		
	Health professional certifying the document validity		
3	authenticator		N
	Prescribers **FR-*Prescripteurs***		
2	Participant	@typeCode=REF	
	Request **FR-*Prescription d'examens de biologie medicale***		
2	inFulfillmentOf		
3	Order		
2	documentationOf		
3	serviceEvent		
	Production laboratory **FR-*Laboratoire executant***		

4	performer	@typeCode=PRF	
	Hospitalization/Visit **FR: *Contexte de la prise en charge***		
2	componentOf		
3	encompassingEncounter		
2	component		N
3	structuredBody		
4	componetn		N
	Chapter **FR-*CR-BIO-Chapitre***		
5	**section**		
6	code		
6	component		N
	Sub chapter **FR-*CR-BIO-Sous-Chapitre***		
7	section		
8	code		
8	**text**	**Narrative block**	
	Test results (Requested test level) **FR-*Resultats-examens-de-biologie-medicale***		
8	**entry**	**@typeCode=DRIV**	**N**
	Refer to "Order results – Case A" and/ or "Order results – Case B"		
	Results from subcontracting laboratory **FR-*Resultats-de-laboratoire-de-biologie-de-seconde-intention***		
5	**section**		
	… Refer to Results from subcontracting laboratory		

Order results – Case A

N executed tests in an order

Level	Tag name	Comment	Cardinality
	Test results (Requested test level) **FR-*Resultats-examens-de-biologie-medicale***		
8	**entry**	**@typeCode=DRIV**	**N**
9	act		
10	code		
10	entryRelationship	@typeCode=COMP	1
	Test result (Executed test level) **FR-*Resultat-examens-de-biologie-element-clinique-pertinent***		
11	observation	@moodCode=EVN @classCode=OBS	1
12	value		
12	interpretationCode		
	Performing laboratory (Production laboratory) **FR-L*aboratoire-executant***		
12	performer	@typeCode=PRF	
	Clinical reviewer **FR-*Valideur de ces résultats***		
12	participant	@typeCode=AUTHEN	
12	entryRelationship	@typeCode=COMP	N
	Sample **FR-*Prelevement***		
13	procedure		
	Reference ranges **FR-*Intervalle de valeurs de référence***		
12	observationRange		
4	component		

Order results – Case B

N executed tests in M combined tests in an order

Level	Tag name	Comment	Cardinality
	Test results **FR-*Resultats-examens-de-biologie-medicale***		
8	**entry**	**@typeCode=DRIV**	**N**
9	act		
10	code		
10	entryRelationship	@typeCode=COMP	N
	Battery results **FR-*Batterie-examens-de-biologie-medicale***		
11	organizer	@classCode=BATTERY @moodCode=EVN	
12	component	@typeCode=COMP	N
	Test result (Executed test level) **FR-*Resultat-examens-de-biologie-element-clinique-pertinent***		
13	observation	@moodCode=EVN @classCode=OBS	1
14	code		
15	value	@xsi:type: • REAL: Real result (with no unit) • PQ: Physical quantity (with unit) • TS: Date time result • ST: String result • CE: Coded Entry result	
10	entryRelationship	@typeCode=COMP	N
	Microbiology isolat **FR-*Isolat-microbiologique***		
11	organizer	@classCode=CLUSTER @moodCode=EVN	

12	code		
	Identified organism **FR-*Germe identifié***		
12	specimen	@classCode=SPEC	
13	specimenPlayingEntity		
14	code	Vocabulary not restricted	
14	component	@typeCode=COMP	
	Battery **FR-*Batterie-examens-de-biologie-medicale***		
15	organizer	@classCode=BATTERY @moodCode=EVN	
16	component	@typeCode=COMP	N
	Test result (Executed test level) **FR-*Resultat-examens-de-biologie-element-clinique-pertinent***		
17	observation	@moodCode=EVN @classCode=OBS	1

Results from subcontracting laboratory

Level	Tag name	Comment	Cardinality
	Results from subcontracting laboratory **FR-*Resultats-de-laboratoire-de-biologie-de-seconde-intention***		
5	**section**		
5	entry		
6	organizer	@classCode=CLUSTER @moodCode=EVN	
7	ID		
7	component	@typeCode=COMP	
	Attached document type **FR-*Type-document-attache***		
8	observations	@moodCode=EVN @classCode=OBS	

7	component	No attribute	
8	observationMedia	@classCode=OBS @moodCode=EVN @ID=CrBio1	
9	value	@mediaType=application/pdf @representation=B64 Text= PDF document encoded in Base64	

Message description

Message structure

For a detailed description of a segment, and for details of the fields supported, see Segment descriptions.

Structure of ORU^R01 message

ORU^R01	Observational Results (Unsolicited)
MSH	Message Header
{	-
[	-
PID	Patient Identification
[{NTE}]	Notes and Comments
[PV1]	Patient Visit
]	-
{	-
[ORC] OBR	-
{[NTE]}	-
{	-
[OBX]	-
{[NTE]}	-
}	-
}	-
}	-

ACK^R01	Acknowledgment
MSH	Message header
MSA	Message acknowledgment

Each HL7 file contains only one MSH segment

Structure of OUL^R24 message

Segment		R/O	Description
MSH	1..1	R	Message Header
[			-
PID	1..1	R	Patient Identification
[{NTE}]	0..n	O	Notes and Comments for Patient ID
]			-
[PV1]	0..1	O	Patient Visit
{			-
OBR [ORC]	1..n 0..1	R O	Observation Request Segment Common Order Segment
{[NTE]}	0..n	O	-
[TQ1]	0..1	O	
[			
{			
OBX	0..n	O	Observation/result
{[NTE]}	0..n	O	-
}			-
]			-
}			-

Note: R = Required, O = Optional and C = Conditional

Segment descriptions for Outbound Result Messages (ORU/OUL)

This topic is intended for use by experienced installation and support engineers only. It lists the segments and fields supported in the exchange of messages.

- MSH - Message Header Segment: Defines the type, the event of the message and indicates other information such as sender, receiver.
- PID - Patient identification segment: Contains patient identification information exchanged between the sender and the receiver.
- PV1 - Patient visit information segment: Contains hospitalization visit information exchanged between the sender and the receiver.
- ORC - Common Order Segment: Identifies the order control.
- OBR - Observation request segment: Contains data related to the test request such as: Access number, Prescriber code.
- OBX - Observation / result: Contains data related to results.

The message can also contain:

- NTE - Notes and Comments: Contains comment data related to the preceding segment.
- TQ1 - Timing/Quantity segment

NOTE: **TD** in the column header below stands for Technidata LIS.
If the Technidata LIS codes are different from the HIS codes, then MAPPING TABLES are available for: Doctor codes, Location codes, Test codes, and Coded text codes.

MSH - Message Header Segment

Seq	HL7 field length	DT	HL7 field name	TD field name (if applicable)	TD supported length	Comments
1	1	ST	Field Separator	Used to parse the HL7 message	1	See related information below
2	4	ST	Encoding Characters	Used to parse the HL7 message	4	See related information below
3	180	HD	Sending Application	Used for message acknowledgment	180	Determines the Host connected. The content of this field is returned in MSH-5 for acknowledgment message.
4	180	HD	Sending Facility		- MSH-4.1: 10 char. - MSH-4.2: 29 char. - MSH-4.3: 10 char.	Used to transmit the following data: MSH-4.1 - Laboratory Service ID code MSH-4.2 – Requesting department or laboratory name. Laboratory full text (or short text if empty) MSH-4.3 – Requesting laboratory source code

						(corresponding to REQUESTS.LABOID) For TD-Synergy*: Transmission of sending facility in MSH-4.1 and MSH-4.3 is supported only in the versions listed below: - V11.83.S10 - V11.83 - From V12.01 Transmission of sending facility in MSH-4.2 is supported starting from V11.81 * See information in the MSH-4 note below:
5	180	HD	Receiving Application	Used for message acknowledgment	180	Determines the receiving application.
6	180	HD	Receiving Facility	Not supported	-	-
7	26	TS	Date/Time Of Message	Date and time	-	Date and time when the sending system created the message. The date and time from ASTM ORU H 7.14 field.
8	40	ST	Security	Not supported	-	-
9	13	CM	Message Type	Used to determine the message type	13	Determines the message type (Message type code + event code). E.g.: OUL^R24^OUL_R24
10	20	ST	Message Control ID	Used to identify the rejected message in case of error (task information)	20	Value of the counter corresponding to the property **Message control ID** (Devices dictionary). The value is formatted on 10 digits with the prefix TD. E.g., TD0000000001. For this property, it is necessary to define a counter on TDNTServer (Tools/Autonumbers) with the following options : -Minimum value : 1

						-Maximum value : 9999999999 -Initialization periodicity : Automatic
11	3	PT	Processing ID	P	-	P corresponds to a production message.
12	60	VID	Version ID	HL7 version	-	This field contains the value set in the **HL7 version** property (**Devices** dictionary). The protocol version supported by this communication is HL7 V2.3. See related information below
13	15	NM	Sequence Number	Not supported	-	-
14	180	ST	Continuation Pointer	Not supported	-	-
15	2	ID	Accept Acknowledgment Type	Yes	-	Accept Acknowledgement type is set to **AL** by default. If a site needs a different value, a VMD update can address this need.
16	2	ID	Application Acknowledgment Type	Yes	-	Application acknowledgment type is set to **NE**. If a site needs a different value, a VMD update can address this need.
17	3	ID	Country Code	Not supported	-	-
18	16	ID	Character Set	Not supported	-	-
19	250	CE	Principal Language Of Message	Not supported	-	-
20	20	ID	Alternate Character Set Handling Scheme	Not supported	-	-
21	10	ID	Conformance Statement ID	Not supported	-	-

Example: `MSH|^~\&|TD||HOST||200305081258||ORU^O01|TD0000000001|P|2.3`

MSH-1 / MSH-2 Field Separator / Encoding Characters

Defines the message delimiters (reserved characters).

The first five-character set following the H character: **|^~\&** defines which field separators are used. The following ones are preferred:

- | = Field delimiter
- ^ = Component (i.e. subfield) delimiter
- ~ = Repeater delimiter. Separates occurrences of a field
- \ = Escape character
- & = Subcomponent delimiter

MSH-4 Sending Facility

Specific case:
When a test request is suppressed, an ORU message is produced with segment field ORC-5 = **CA** (order cancelled) to indicate that a test request has been suppressed.
In this case:
MSH-4.1 and MSH-4.2 are filled with the laboratory code / name
MSH-4.3 is empty.The requesting Department is omitted.

Only for TD-Synergy:

Values for MSH-4.1 and MSH-4.2 are retrieved from ASTM 7.5.1 and ASTM 7.5.2, which contain the Sender name ID (ASTM 7.5). The Sender name ID is divided into two sub-fields:

7.5.1 = Sender identification (10 alpha-numeric characters maximum).

7.5.2 = Sender name (29 alpha-numeric characters maximum).

The information transmitted as Sender identification and Sender name depends on the Multi-laboratory processing value in the **Connections dictionary** (DCX)

Depending on the report type defined for the doctor or location (**Lab Src=S / Pro=P / Dep=D** field in the **Doctors & Locations** dictionary), a new ASTM file is sent to each different laboratory (source or production laboratory) or, to different departments.

- When **Multi-laboratory processing** is set to **Yes**, the Sender identification corresponds to the Service ID (if defined in the Laboratories or Departments dictionary). The Service ID belongs to the:
  - Source laboratory of the request when reporting is managed by a source laboratory
  - Production laboratory when reporting is managed by a production laboratory
  - Department of the production laboratory when reporting is managed by a department of a production laboratory

  If the Service ID does not exist, the agreement number defined on the system (on the LIS in the **Properties** section: **stAgrNumber** property) is transmitted as the Sender identification.
- The Sender name corresponds to the full text defined in the **Laboratories** or **Departments** dictionary. The Sender name corresponds to the full text of the:
  - Source laboratory of the request when reporting is managed by a source laboratory
  - Production laboratory (when reporting is managed by a production laboratory)
  - Department of the production laboratory when reporting is managed by a department of a production laboratory

  If the full text does not exist, the laboratory name defined on the system (on the LIS in the **Properties** section: **stNameDisp** property) is transmitted as the Sender name.
- When **Multi-laboratory processing** is set to **No**, the information defined in the **stAgrNumber** and **stNameDisp** properties (on the LIS block in the Properties section) is transmitted.

MSH-12 Version ID

The high level protocol supports ORU messages since HL7 Version 2.1. This message type is supported in all subsequent versions for ascending compatibility. The HL7 version transmitted in the MSH segment is the one defined in the LIS **Devices** dictionary for this communication.

PID - Patient identification segment

The PID segment contains patient information exchanged between the sender and the receiver.

Seg	HL7 field length	DT	HL7 field name	TD field name (if applicable)	TD supported length	Comments
1	4	SI	Message counter	Not supported	-	-
2	20	CX	Patient ID	Not supported	-	-
3	250	CX	Patient Identifier List	Patient Number	Max 20	Both Patient Number and Alternate Patient number can be received in this field. See related information below.
				and/or Alternate Patient Number	Max 20	
4	20	CX	Alternate Patient ID - PID	Not supported	-	-
5	250	XPN	Patient Name	First name	Max 80	This field contains all patient names. It is repeatable and each element contains one name. The database can hold entries up to 80 characters - longer entries are truncated. See related information below.
				Surname	Max 80	
				Maiden name	Max 80	
6	250	XPN	Mother's Maiden Name	Not supported	-	-
7	26	TS	Date/Time of Birth	Patient birth date	-	-
8	1	IS	Administrative Sex	Patient sex	1	This field is used for the patient sex. The only supported values are: F = Female M = Male O = Other U = Unknown
9	250	XPN	Patient Alias	Not supported	-	-
10	250	CE	Race	Patient ethnic origin	40	
11	250	XAD	Patient Address	1st repetition (primary address): 1st Address 1st line	Max 65	Technidata LIS supports only one address per patient. Available for TDNexLabs from V02.00 1st address repetition contains the primary address.
				2nd: Address 2nd line	Max 65	

				3rd: City	Max 50	2nd address repetition contains the Birth place. Only used on the French market See **Note 2**.
				4th: State Province	Max 50	
				5th: Postal code	Max 20	
				6th: Country	Max 50	
				2nd repetition: 7th: Address type 9th: Birth place	Max 15	
12	4	IS	County Code	Not supported	-	-
13	250	XTN	Phone Number - Home	Telephone 1	Max 15	This field contains all patient's phone numbers. This field is repeatable and each element contains one phone number. Each phone number is identified by a phone type code : Telephone 1, Telephone 2 and Fax. See related information below.
				Telephone 2	Max 15	
				Fax	Max 15	
				Email	Max 255	
14	250	XTN	Phone Number - Business	Not supported	-	-
15	250	CE	Primary Language	Not supported	-	-
16	250	CE	Marital Status	Not supported	-	-
17	250	CE	Religion	Religion	40 (for the evaluated <Religion Text>)	See related information below
18	250	CX	Patient Account Number	Hospitalization Number	15 or 20 (see comments)	This field is managed as the Hospitalization number by the communication. The field is defined in the **Configuration** window > **Properties** dialog, by the following property: **Duplicate stay numbers are allowed (0=No 1=Yes).** If Hospitalization numbers are not unique, this property must be set to 1. The default value is 0. The original Hospitalization number is stored in the EXTERNALHOSNUM field in the Hospitalization table. The maximum TD field length is: ● 15 for Hospitalization number ● 20 for ExternaLHosNum For Result Transmission: PID-18 is equal to the hospitalization number linked to the request.

19	16	ST	SSN Number - Patient	Not supported	-	-
20	25	DLN	Driver's License Number - Patient	Not supported	-	-
21	250	CX	Mother's Identifier	Not supported	-	-
22	250	CE	Ethnic Group	Not supported	-	-
23	250	ST	Birth Place	Not supported		
24	1	ID	Multiple Birth Indicator	Not supported	-	-
25	2	NM	Birth Order	Not supported	-	-
26	250	CE	Citizenship	Not supported	-	-
27	250	CE	Veterans Military Status	Not supported	-	-
28	250	CE	Nationality	Not supported	-	-
29	26	TS	Patient Death Date and Time	Not supported	-	-
30	1	ID	Patient Death Indicator	Not supported	-	-
31	1	ID	Identity Unknown indicator	Not supported	-	
32	20	IS	Identity reliability Code	Identity reliability Code	-	Available for TDNexLabs from V02.00 Only used on the French market If the property **Manage INS identifier** is set to **Yes** in the **Devices** dictionary (HL7 Transmission of Result messages to the Host system > **Result transmission** stream) and the INS identity status is qualified / *Qualifiée* (PATIENTS_INS.INS_STATUS=3) , the field is set to **VALI**.

PID-3 Patient identifier list field

For each component, the Assigning Facility should be transmitted.

Example: 403O^^^N^FACILITY1~261055502^^^060^FACILITY2
FACILITY1and FACILITY2 identify each identification type.
403O, 261055502 are the identification ID for each identification.

The Patient identifier list field contains all patient identifications.

The inbound script for PID-3 must be updated if the site uses different identifier for PATNUMBER and ALTNUMBER

For example, assume the following representation:

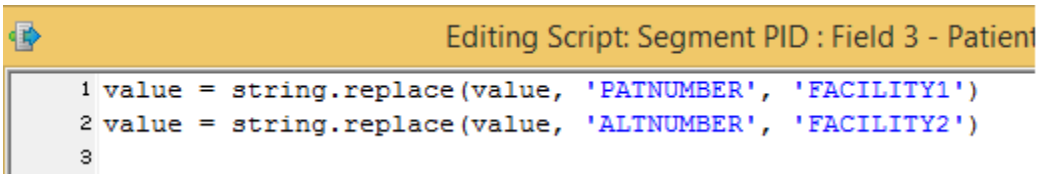
FACILITY1 = PATNUMBER

FACILITY2 = ALTNUMBER

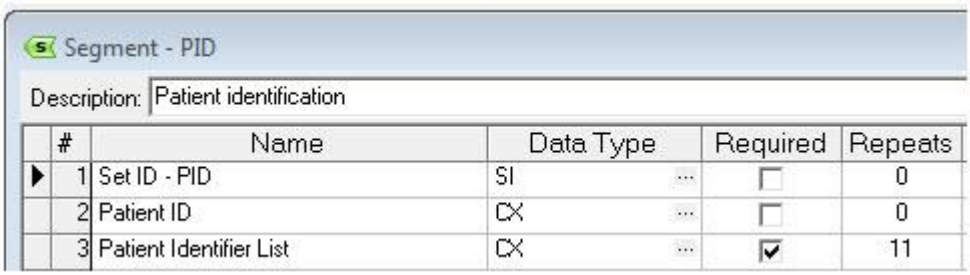
Inbound Script must be updated as follows:

```
varPATNUMBER_IdentifierCode = 'FACILITY1'
varALTNUMBER_IdentifierCode = 'FACILITY2'

for LineIndex in range(0, field.count_of_repeat()):
    if field.repeat_field(LineIndex).subfield(4).value == varPATNUMBER_IdentifierCode:
        field.repeat_field(LineIndex).subfield(4).value = 'PATNUMBER'
    elif field.repeat_field(LineIndex).subfield(4).value == varALTNUMBER_IdentifierCode:
        field.repeat_field(LineIndex).subfield(4).value = 'ALTNUMBER'
    log(field.repeat_field(LineIndex).subfield(4).value)
```

Outbound Script must be updated as follows:



The list is repeatable and each element contains one identification. By default, the maximum number of repeats is ten. However, more repeats can be accommodated by adjusting the value of the repeats for the PID segment in the VMD file as shown in the figure:



PID-5 Patient Name

Components:

<family name (FN)> ^ <given name (ST)> ^ <second and further given names or initials thereof (ST)> ^ <suffix (e.g., JR or III) (ST)> ^ <prefix (e.g., DR) (ST)> ^ <degree (e.g., MD) (IS)> ^ <name type code (ID) > ^ <name representation code (ID)> ^ <name context (CE)> ^ <name validity range (DR)> ^ <name assembly order (ID)>

Subcomponents of family name: <family name (ST)> & <own family name prefix (ST)> & <own family name (ST)> & <family name prefix from partner/spouse (ST)> & <family name from partner/spouse (ST)>

This field contains all patient names. It is repeatable (~) and each element contains one name.

Each name is identified by a Name Type Code.

From TDNexLabs V02.01: First names and Alternate first names are transmitted. The names mapped are dependent on the property *Always use birth name as legal name.*

1. When the property *Always use birth name as legal name i*s set to: ***false***

NOTE: For Cases 1 and 3 - Legal names are country-specific and dependent on different legal system requirements.

Case 1:

When Legal name is used:

L is mapped to NAME, M is mapped to MAIDENNAME

The name field contains the Legal name.

|SMITH^Kate^Kate Kat^^MRS^^**L**~WALTER^^^^MRS^^**M**|

Name = SMITH

Maiden name= WALTER

First name= Kate

Alternate First Name = Field empty

Given names = Kate Kat

NOTE: When married name is considered as legal name, set *Use birth name as legal name* to **false**.

Case 2:

This case represents the most common configuration in France.

When Alternate Name is provided it is mapped. Alternatively, the Legal name is used.

L is mapped to either ALTERNATENAME***** (if provided), or Legal name & D is mapped to NAME

Example: |WALTER^Kate^Kate Kat^^MRS^^**L**~SMITH^Kat^^^MRS^^**D**|

Name = SMITH

Maiden name= WALTER

First name= Kate

Alternate first name = Kat

Given names = Kate Kat

*****MAIDENNAME

2. When the property *Always use birth name as legal name i*s set to: **true**

Case 3:

If the Maiden Name is provided, it is mapped to Name. Alternatively, the Legal name used.

L is mapped to Alternate name (if provided) or Birth name, M is mapped to Legal name if the Alternate Name exists. Alternatively, the field is empty.

| WALTER^Kate^Kate Kat^^MRS^^**L**~SMITH^^^^MRS^^**M**|

Name = SMITH

Alternate name= WALTER

First name= Kate

Alternate first name= <empty>

Given names = Kate Kat

Case 4:

This case reflects target configuration in France.

Name is mapped to Legal name and Alternate name is mapped to a Alternate name.

Example: |SMITH^Kate^Kate Kat^^MRS^^**L**~WALTER^Kat^^^MRS^^**D**|

Name = SMITH

First name= Kate

Alternate name = WALTER

Alternate first name = Kat

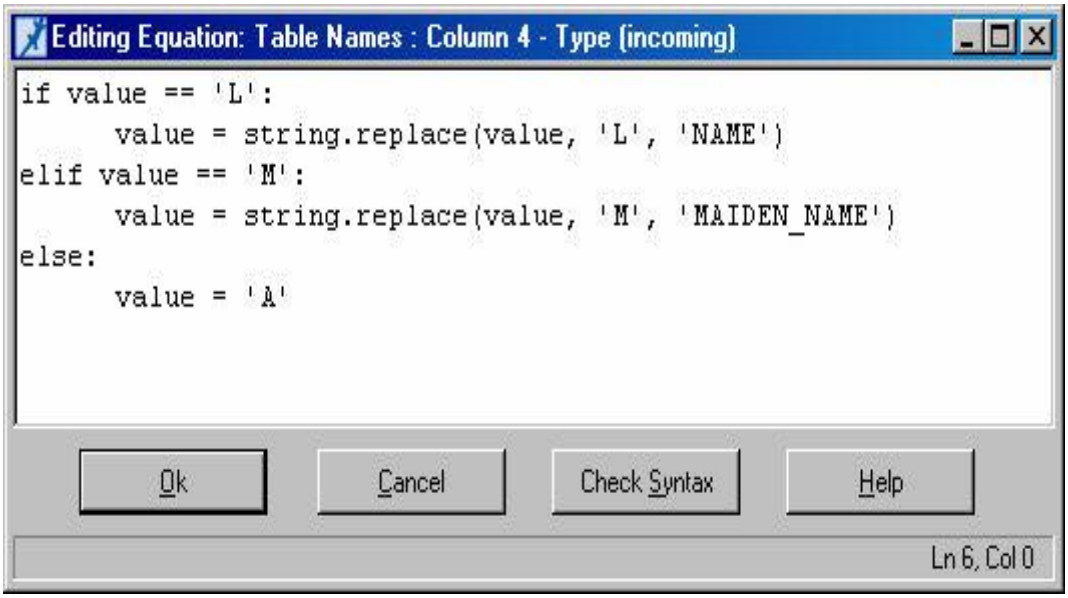
Given names = Kate Kat

Equivalent French/English terminology:

English	French
Birth name	Nom de naissance
Alternate surname	Nom d'usage
First name	Premier prénom de naissance
Given names	Prénoms de naissance
Alternate first name	Prénom utilisé

Different levels of names are available: the Patient Name and the Maiden name.

On Chameleon, there is an association between the Host patient name type codes and the two patient names. This association can be changed by the Field Service Engineer during the communication installation using python scripting in the chameleon Names table:



PID-11 Patient address

NOTE: If the property **Manage INS identifier** is set to **Yes** in the **Devices** dictionary (HL7 Transmission of order messages to the Host system > **Order transmission** stream), PID. 11 contains the birth place:
PID. 11.7 - Address type is set to BDL when the birth place is available
PID.11.9 - Code of birth place. 58001 in France (= code INSEE). For people who are not born in France, the code will correspond to the country birth place.
In order that the INS number is processed, the property **Patient identification with French INS number (0=No, 1=Yes in AltPat#, 2=Yes in INS data)** must be set to **1** or **2** in the **Configuration** (USE) window > **General** section.

PID-13 Patient phone numbers (Home)

Components:

[NNN] [(999)]999-9999 [X99999] [B99999] [C any text] ^ <telecommunication use code (ID)> ^ <telecommunication equipment type (ID)> ^ <e-mail address (ST)> ^ <country code (NM)> ^ <area/city code (NM)> ^ <phone number (NM)> ^ <extension (NM)> ^ <any text (ST)>

This field contains all patient's phone numbers. This field is repeatable and each element contains one phone number. Each phone number is identified by a phone type code : Telephone 1, Telephone 2 and Fax.

In Chameleon, there is an association between the Host phone type codes and the phones on the Technidata LIS database. This association can be changed by the FSE during the communication installation using python scripting in the chameleon Telephone table.

Data	Telecommunication equipment type (ID)
Telephone	PH (Telephone)
Telephone 2	CP (Cellular phone)
Fax	FX (Fax)
Email address	Internet (Internet address)

PV1 - Patient visit information

Seq	HL7 field length	DT	HL7 field name	TD field name (if applicable)	TD supported length	Comments
1	4	SI	Message counter	Not supported	-	-
2	1	IS	Patient Class	Visit patient class	1	This field is managed as the Visit patient class (Inpatient, Outpatient, …) by the communication.
3	80	PL	Assigned Patient Location	Reference location	See **Note** below	This field contains the location where the patient is currently staying. This field can contain the **National code** of the location (if enabled in the **Devices** dictionary, **Use National Code for location identification** property=Yes). Otherwise, this field contains the mnemonic code of the location. If the **Use National Code for location identification** property = **Yes**, and the location is DEFLOC without assigned **National Code**, DEFLOC will always be sent.
				Room number	Max 6, but 20 in database	
4	2	IS	Admission Type	Not supported	-	-
5	250	CX	Preadmit Number	Not supported	-	-
6	80	PL	Prior Patient Location	Not supported	-	-
7	250	XCN	Attending Doctor	Attending doctor	See **Note** below	This field is managed as the attending doctor by the communication. This field can contain the **National code** of the doctor (if enabled on the **Devices** dictionary, **Use National Code**

						for doctor identification property=Yes). Otherwise, this field contains the mnemonic code of the doctor. If the **Use National Code for doctor identification** property = **Yes**, and the doctor is DEFDOC without assigned National Code, DEFDOC will always be sent.
8	250	XCN	Referring Doctor	Reference doctor	See **Note** below	This field is managed as the Patient reference doctor (Family Doctor) by the communication. This field can contain the **National code** of the doctor (if enabled on the **Devices** dictionary, **Use National Code for doctor identification** property=Yes). Otherwise, this field contains the mnemonic code of the doctor. If the **Use National Code for doctor identification** property = **Yes**, and the doctor is DEFDOC without assigned National Code, DEFDOC will always be sent.
9	250	XCN	Consulting Doctor	Consulting doctor	See **Note** below	This field can contain the **National code** of the doctor (if enabled on the **Devices** dictionary, **Use National Code for doctor identification** property=Yes). Otherwise, this field contains the mnemonic code of the doctor. If the **Use National Code for doctor identification** property = **Yes**, and the doctor is DEFDOC without assigned National Code, DEFDOC will always be sent.
10	3	IS	Hospital Service	Hospital service	3	This field is managed as the Visit hospital service (Medical discipline, e.g.: Cardiology) by the communication.
11	80	PL	Temporary Location	Not supported	-	-
12	2	IS	Preadmit Test Indicator	Not supported	-	-
13	2	IS	Re-admission Indicator	Not supported	-	-
14	6	IS	Admit Source	Not supported	-	-

15	2	IS	Ambulatory Status	Not supported	-	-
16	2	IS	VIP Indicator	Not supported	-	-
17	250	XCN	Admitting Doctor	Admitting doctor	See **Note** below	This field is managed as the Visit admitting doctor by the communication. This field can contain the **National code** of the doctor (if enabled on the **Devices** dictionary, **Use National Code for doctor identification** property=Yes). Otherwise, this field contains the mnemonic code of the doctor. If the **Use National Code for doctor identification** property = **Yes**, and the doctor is DEFDOC without assigned National Code, DEFDOC will always be sent.
18	2	IS	Patient Type	Not supported	-	-
19	250	CX	Visit Number	Hospitalization Number	15 or 20 (see comment)	This field is managed as the Hospitalization number by the communication. It is defined in the **Configuration** window > **Properties** dialog, by the following property: **Duplicate stay numbers are allowed (0=No 1=Yes)**. This property must be set to 1 if Hospitalization numbers are not unique. The default value is 0. The original Hospitalization number is stored in the EXTERNALHOSNUM field in the Hospitalization table. The maximum TD field length is: -15 for HOSPITNUMBER, and -20 for EXTERNALHOSNUM. For Result Transmission, PV1-19 is equal to the hospitalization number linked to the request.
20	50	FC	Financial Class	Hospitalization financial class (sub-field 1) Date when the financial class is taken into	-	-

				account (sub-field 2)		
21	2	IS	Charge Price Indicator	Not supported	-	-
22	2	IS	Courtesy Code	Not supported	-	-
23	2	IS	Credit Rating	Not supported	-	-
24	2	IS	Contract Code	Not supported	-	-
25	8	DT	Contract Effective Date	Not supported	-	-
26	12	NM	Contract Amount	Not supported	-	-
27	3	NM	Contract Period	Not supported	-	-
28	2	IS	Interest Code	Not supported	-	-
29	1	IS	Transfer to Bad Debt Code	Not supported	-	-
30	8	DT	Transfer to Bad Debt Date	Not supported	-	-
31	10	IS	Bad Debt Agency Code	Not supported	-	-
32	12	NM	Bad Debt Transfer Amount	Not supported	-	-
33	12	NM	Bad Debt Recovery Amount	Not supported	-	-
34	1	IS	Delete Account Indicator	Not supported	-	-
35	8	DT	Delete Account Date	Not supported	-	-
36	3	IS	Discharge Disposition	Not supported	-	-
37	25	CM	Discharged to Location	Not supported	-	-
38	250	CE	Diet Type	Not supported	-	-
39	2	IS	Servicing Facility	Not supported	-	-
40	1	IS	Bed Status	Not supported	-	-
41	2	IS	Account Status	Not supported	-	-
42	80	PL	Pending Location	Not supported	-	-
43	80	PL	Prior Temporary Location	Not supported	-	-
44	26	TS	Admit Date/Time	Admission Date Time	-	-
45	26	TS	Discharge Date/Time	Discharge Date Time	-	-

46	12	NM	Current Patient Balance	Not supported	-	-
47	12	NM	Total Charges	Not supported	-	-
48	12	NM	Total Adjustments	Not supported	-	-
49	12	NM	Total Payments	Not supported	-	-
50	250	CX	Alternate Visit ID	Not supported	-	-
51	1	IS	Visit Indicator	Not supported	-	-
52	250	XCN	Other Healthcare Provider	Not supported	-	-

NOTE B: Code length supported for Doctors and Locations:
- Mnemonic code = 6 (10 in database)
- Host code = 5 (6 in database)
- National code = 11 (20 in database)

PV1-3 Assigned Patient Location

Example: `|SURG^3001^^^^^^^SURG location|`
where
`SURG` = sub-field 1. Mnemonic code of the location.
`3001` = sub-field 2. Room number.
`SURG location` = sub-field 3. Description of the location if a mapping table is used.

ORC - Common order segment

Seq	HL7 field length	DT	HL7 field name	TD field name (if applicable)	TD supported length	Comments
1	2	ID	Order Control	RE (for Resulted)	Max 2	-
2	22	EI	Placer Order Number	PON (if managed by the Order Placer system)	Max 20	See related information, below
3	22	EI	Filler Order Number	FON	Max 20	See related information, below
4	22	EI	Placer Group Number	Host order number	Max 11 See **Note A**	For TDNexLabs from V01.41 (also in V01.22): The Host order number (HON) sent in this field can be managed on 22 characters maximum (instead of 11). To be customized according to the HON size used on site. See **Note A** See also related information, below (**NOTE**)
5	2	ID	Order Status	Status	-	See related information, below
6	1	ID	Response Flag	Not supported	-	-
7	200	TQ	Quantity/Timing	Priority Only sub-fields 4	-	This field (ORC-7.6) always contains the following value:

				and 6 are used: ^^^COLLECTIONDATE^^PRIORITY		R = Routine Note that the priority indicator is sent in the OBR-27 field.
8	200	CM	Parent	Not supported	-	-
9	26	TS	Date/Time of Transaction	Date/Time of Transaction	-	-
10	250	XCN	Entered By	Not supported	-	-
11	250	XCN	Verified By	Not supported	-	-
12	250	XCN	Ordering Provider	Ordering Doctor	See **Note B** below	The first subfield contains the doctor code of the Prescriber (**Dr1**). The second subfield contains the Family name of the Prescriber. 28th subfield contains the National code of the Prescriber. This field can contain the **National code** (013811815^MARTIN,\T\MD CHRIS W^^^^^^^^^^^^^^^^^^013811815 for example) of the doctor (if enabled on the LIS **Devices** dictionary, **Use National Code for doctor identification** property=Yes). Otherwise, it contains the mnemonic code of the doctor. If the **Use National Code for doctor identification** property = **Yes**, and the doctor is DEFDOC without assigned National Code, DEFDOC will always be sent. Information in ORC-12 is identical to OBR-16.
13	80	PL	Enterer's Location	Requesting Location	See **Note B** below	The first subfield contains the location code of the requesting Location (CR in LIS database). This field can contain the **National code** of the location (if enabled on the LIS **Devices** dictionary, **Use National Code for location identification** property=Yes). Otherwise, it contains the mnemonic code of the location. If the **Use National Code for location identification** property = **Yes**, and the location is DEFLOC without

						assigned **National Code**, DEFLOC will always be sent.
14	250	XTN	Call Back Phone Number	Not supported	-	-
15	26	TS	Order Effective Date/Time	Collection date and time	-	Contains the collection date and time of the request.
16	250	CE	Order Control Code Reason	Not supported	-	-
17	250	CE	Entering Organization	Not supported	-	-
18	250	CE	Entering Device	Not supported	-	-
19	250	XCN	Action By	Not supported	-	-
20	250	CE	Advanced Beneficiary Notice Code	Not supported	-	-
21	250	XON	Ordering Facility Name	Not supported	-	-
22	250	XAD	Ordering Facility Address	Not supported	-	-
23	250	XTN	Ordering Facility Phone Number	Not supported	-	-
24	250	XAD	Ordering Provider Address	Not supported	-	-

NOTE A: ORC-4 - For TDNexLabs from V01.41 (also in V01.22)
For sites already using the HON with its previous size limitation, they can continue printing the HON from the Real-time reports without any change.
Print keywords @HOSTORDNUM, @HOSTID, @CNXTUB are updated to manage the HON with size up to 22 characters.
Delivery reports on unix (e.g., `COM11.rpw`) are not modified and length is still up to 11 to not erase data present after keyword. To manage the HON up to 22 characters, a keyword alias must be created in the `.rpw` file.
Example for CNXTUB keyword to manage a HON on 15 characters:

```
  @CNXTUB = @CNXTUB ( 15, 1, ' ' )
@HOSTORDNUM = @HOSTORDNUM ( 15, 1, ' ' )
@HOSTID = @HOSTID ( 15, 1, ' ' )
```

NOTE B: Code length supported for Doctors and Locations:
- Mnemonic code = 6 (10 in database)
- Host code = 5 (6 in database)
- National code = 11 (20 in database)

ORC-2 Placer Order Number
ORC-3 Filler Order Number
ORC-4 Placer Group Number

Precisions about the management of the PON by the Technidata LIS in HL7 result transmission. It is defined in the **Devices** dictionary by the **Management of PON** property (Yes=enabled, No=disabled).

Management of PON	Only one item per message	ORC2 (Placer Order Number)	ORC3 (Filler Order Number)	ORC4 (Placer order group number)
YES	YES	PON (see Note)	FON	HON (Host Order Number) if any
YES	NO	PON (see Note)	FON	HON (Host Order Number) if any
NO	YES	PON if present on database, Empty if not found (no error generated).	FON	HON (Host Order Number)if any
NO	NO	PON if present on database, Empty if not found (no error generated).	FON	HON (Host Order Number) if any

NOTE:
- When the **Management of PON** property is set to YES and the PON is not found on the database, the task is set to “error” status and the result message is not transmitted.
The storage of the PON within TESTS.ORDERPLACENUMBER field depends on settings recorded in `deviceslist.ini` file. When message HL7 OUT OUL is sent, ORC-2 is recovered from TESTS.ORDERPLACERNUMBER. If not found, program searches for it in SP_TESTS.ORDERPLACERNUMBER table.
- When the **Management of PON** property is set to NO and all the records are not found on the database, the task is set to “interrupted”. Otherwise, if at least one record is found in the database, the FON is auto-generated using the Access number and test code if it is not available yet in the message to be transmitted.
See the diagram illustrating the algorithm used for the PON/FON management.
To ensure that the Host Order Number received in ORC-4 is transmitted to the database via ASTM, the Web module "rectube" process must be installed. The following properties in the **Connections** dictionary (DCX), **Data flow control** folder must be set as indicated:
-Requests processed by tube = **No**
-Management of Tube number = **Yes**
See also *ASTM: Order reception (ORM message)* interface specification (CNXR021) and *ASTM protocol applied to the Web module* interface specification (CNXL040).

ORC-5 Order Status

The information transmitted in this field depends on a property: **Use ORC-5 as overall request status**, defined in the **Devices** dictionary.

- If you answer **No** (default answer), the ORC-5 field specifies the status of each procedure (one test per request). Possible values:
  - A = some, but not all, results available
  - CA = order is cancelled
  - CM = order is completed

- HD = order is on hold
- IP = In process

- If you answer **Yes**, the ORC-5 field specifies the overall status of the request (several tests per request). Possible values:
  - CM = all the results of the test request are known and clinically reviewed
  - SC = all the results of the test request are known but some of them are to be reviewed
  - A = some results of the test request are unknown (not available)
  - IP = in process

See also Management of HL7 ORC-5 (Order status) and OBR-25 (Result status)

OBR - Observation request segment

NOTE: The value contained in the fields marked with the **+** sign, is filled in by the transmitter of the message.

Seq	HL7 field length	DT	HL7 field name	TD field name (if applicable)	TD supported length	Comments
1	4	SI	Message counter	Not supported	-	-
2	22	EI	Placer Order Number	PON (if managed by the Order Placer system)	Max 20	-
3	22	EI	Filler Order Number	FON	Max 20	-
4	250	CE	Universal Service Identifier	Test Code^Test Abbreviated text^L From TDNexLabs V01.61 and also in V01.52 Test Code^Test Abbreviated text^Local Code^Alternate Test Code^Alternate Abbreviated text^Mapped code	Test Code - Max 10 Test Abbreviated text - Max 20	The first subfield contains the test code and the second subfield contains the abbreviated text of the test. From TDNexLabs V01.52 Local code, Alternate test code, Alternate text and Mapped code subfields are included in OBR-4 provided that: 1- The **Send both local and mapped codes (Yes/No)** device property is set to **Yes**. This property is for local and mapped codes. Mapped codes can be LOINC codes for example. 2- The VMD script is activated. Refer to Activating inclusion of local and mapped codification in HL7 result message topic.
5	2	ID	Priority - OBR	Not supported	-	-
6	26	TS	Requested Date/Time	Request Creation date and time	-	-

7	26	TS	Observation Date/Time #	Request Collection date and time	-	For TDNexLabs from V01.21 and TD-Synergy from V12.21 • Contains the Sample collection date if the device property **Transmit Sample Collection date** is set to **Yes**. When a combined test is linked to multiple samples, the collection date of the first sample is sent in this field. Note that when a combined test is updated with tests inserted for example by rules (defined in the Tests dictionary - DAN), the collection date of these added tests are not considered in getting the minimum/first sample received. • Contains the request date if the device property **Transmit Sample Collection date** is set to **No**.

8	26	TS	Observation End Date/Time #	Not supported	-	-
9	20	CQ	Collection Volume	Not supported	-	-
10	250	XCN	Collector Identifier	Not supported	-	-
11	1	ID	Specimen Action Code	Not supported	-	-
12	250	CE	Danger Code	Not supported	-	-
13	250	ST	Relevant Clinical Information	Not supported	-	-
14	300	TS	Specimen Received Date/Time	Specimen received date and time	-	Date and time of the specimen reception in the laboratory (SAMPLES.LABRECEPTIONDATE). When a request is created using TDWeb, OEN, or TDCOM Connection (ORM), this field contains the laboratory reception date. When the test is a combined test, the OBR segment contains the combined test. Therefore, in this case the OBR contains the laboratory reception date of the sample corresponding to the combined test. When the test is linked to a secondary sample, the laboratory reception date of the primary sample is transmitted. (When PSR receives a tube, it updates the laboratory reception date of both the secondary and primary sample using the same date.) When a request is created via ENR, depending on the configuration, if the sample has a

						laboratory reception date value (LABRECEPTIODATE), this field contains SAMPLES.LABRECEPTIODATE value, otherwise the field is populated with REQUESTS.RECEIVEDDATE. Same behavior applies when the test does not have any sample, this field contains the REQUESTS.RECEIVEDDATE value.
15	26	CM	Specimen Source	Not supported	-	-
16	300	XCN	Ordering Provider	Prescriber code	See **Note** below	The first subfield contains doctor code of the Prescriber (Dr1 in LIS database). The second subfield contains the Family name of the Prescriber. The 28th subfield contains the National code of the Prescriber. This field can contain the National code of the doctor (if enabled on the LIS Devices dictionary, **Use National Code for doctor identification** property=Yes). Otherwise, it contains the mnemonic code of the doctor. When the **Use National Code for doctor identification** property is set to Yes, OBR-16.1 and OBR-16.21 have the same value equal to National code.

						If the **Use National Code for doctor identification** property = **Yes**, but the doctor is DEFDOC without assigned National Code, DEFDOC will always be sent. Information in OBR-16 is identical to ORC-12.
17	250	XTN	Order Callback Phone Number	Not supported	-	-
18	60	ST	Placer Field 1	User Field #1	-	Contains the **User Field 1** value (25 characters long) transmitted back to the HIS.
19	60	ST	Placer Field 2	User Field #2	-	Contains the **User Field 2** value (25 characters long) transmitted back to the HIS.
20	60	ST	Filler Field 1 +	Subfield 1: Contains Unique test identifier (LISTESTID) Subfield 2: Contains test order (TESTORDER)		From TDNexLabs V01.52 (also in V01.51.B, V01.41.B, V01.31.B) and TD-Synergy from V12.21.B This field is populated only when the **Addition of RDB compl. data** DCX property is set to **5**. The value is retrieved from ASTM OBR-9.5.6 field.
21	60	ST	Filler Field 2 +	Not supported	-	-
22	26	TS	Results Rpt/Status Chng - Date/Time +	Not supported	-	-
23	40	CM	Charge to Practice +	Not supported	-	-

24	10	ID	Diagnostic Serv Sect ID	Specialty code or Producer ID (subfield 1) Group of chapters (subfield 2) Chapter number (subfield 3) Test printing rank number (subfield 4)	Max 20	See related information below.
25	1	ID	Result Status +	Status	-	Possible values: C = At least one test is corrected I = Incomplete P = Result not validated F = Final status X = Order is canceled See also Management of HL7 ORC-5 and OBR-25 result status
26	400	CM	Parent Result +	Not supported	-	-
27	200	TQ	Quantity/Timing	Only sub-fields 4 and 6 are used: ^^^COLLECTIONDATE^^ PRIORITY	Priority - Max 1	In the 4th subfield, the request collection date value is used. In the 6th subfield (priority). The transmitted values can be: **S** (Stat) **A** (ASAP) **R** (Routine) Deprecated by TQ1 segment as of HL7 v2.5
28	250	XCN	Result Copies To	Doctor in copy		From TDNexLabs V01.31 and TD-Synergy V12.31: contains the Doctor(s) in copy See related information below
29	200	CM	Parent	Not supported	-	-
30	20	ID	Transportation Mode	Not supported	-	-

31	250	CE	Reason for Study	Not supported	-	-
32	200	CM	Principal Result Interpreter +	Clinical Reviewer	Max 8	Contains the clinical reviewer's initials in subfield 1. Contains the clinical reviewer's name in subfield 2.
33	200	CM	Assistant Result Interpreter +	Not supported	-	-
34	200	CM	Technician +	Technical reviewer	Max 8	Contains the technical reviewer's initials in subfield 1 and the technical reviewer's name in subfield 2.
35	200	CM	Transcriptionist +	Not supported	-	-
36	26	TS	Scheduled Date/Time +	Not supported	-	-
37	4	NM	Number of Sample Containers +	Not supported	-	-
38	250	CE	Transport Logistics of Collected Sample	Not supported	-	-
39	250	CE	Collector's Comment	Not supported	-	-
40	250	CE	Transport Arrangement Responsibility	Not supported	-	-
41	30	ID	Transport Arranged	Not supported	-	-
42	1	ID	Escort Required	Not supported	-	-
43	250	CE	Planned Patient Transport Comment	Not supported	-	-
44	250	CE	Procedure Code	Not supported	-	-
45	250	CE	Procedure Code Modifier	Not supported	-	-

NOTE: The value contained in the fields marked with the **+** sign, is filled in by the transmitter of the message.

OBR-24 Field Diagnostic Serv Sect ID

For Histology/Cytology result transmission, this field contains the **specialty code**.

Otherwise:

- **For all versions:**
  - **OBR-24.1** contains the ASTM OBR-25.1 **Producer ID** as is. Refer to CNXL003.chm document for more details.
- **From V11.82:**
  - **OBR-24.2** contains the **group of chapters** using two characters.
  - **OBR-24.3** contains the **chapter number** using two characters.
  - **OBR-24.4** contains the **test printing rank number** using three characters.

OBR-28 Result Copies To

NOTE B: Code length supported for Doctors and Locations:
- Mnemonic code = 6 (10 in database)
- Host code = 5 (6 in database)
- National code = 11 (20 in database)

Field supported from TDNexLabs V01.31 and TD-Synergy V12.31: (not supported in earlier versions)

Doctors in copy are stored in the OBR-28 field as a repeatable field. For each doctor in copy, the code, name and national code are reported in the following field:

- OBR-28.1 for the code of the doctor in copy
- OBR-28.2 for the family name of the doctor in copy
- OBR-28.21 for the National code of the doctor in copy

When the **Use National Code for doctor identification** property is set to **Yes** in the Devices dictionary, the prescriber reported in the OBR-16 and ORC-12 fields is retrieved and the **National code** of the doctor will be sent in the OBR-16.21 and ORC-12.21 sub-fields.
Also note that when the **Use National Code for doctor identification** property = **Yes**, and the doctor is DEFDOC without a **National Code** assigned, DEFDOC will always be sent instead of the National code.

Example of OBR segment (National codes are highlighted in yellow):

```
OBR|1||3030211918NA|NA^SODIUM N||20130313100400|20130313100400||||||
|20130313100400||PRESC^Prescriber name^^^^^^^^^^^^^^^^^^^National
Code||||||||61^01^01^045|F|
|^^^20130313100400^^R|DOC01^Doctor 1^^^^^^^^^^^^^^^^^^^National Code
1~DOC02^Doctor 2^^^^^^^^^^^^^^^^^^^National Code 2||||||LIS2||
```

Note that:

- As PSR device always transmits mnemonic codes, the settings in the Connection dictionary (DCX) for ftp connection linked with PSR must always set the property **Doctor mnemonic = Y** (DCX > *Dataflow Control*). This is to ensure that the copy doctors will be processed correctly.
- For a request with multiple tests, doctors are treated at request level. Thus setting a different copy doctor for another test has no impact. Prescriber and copy doctors will be the same for all the tests in the HL7 ORU message.

OBX - Observation / result

Seq	HL7 field length	DT	HL7 field name	TD field name (if applicable)	TD supported length	Comments
1	4	SI	Message counter	Not supported	-	-
2	2	ID	Value Type	Result type	-	The codification to be used is : **CE** for Coded text **DT** for Result expressed in date format, Hours/Minutes or Minutes/Seconds **ED** for encapsulated data **NM** for Numeric result **SN** for Structured Numeric **ST** for Alphanumerical result **TX** for Free text. See detailed information below
3	250	CE	Observation Identifier	Test Code^Test Abbreviated text^L From TDNexLabs V01.61 and also in V01.52 Test Code^Test Abbreviated text^Local Code^Alternate Test Code^Alternate Abbreviated text^Mapped code	Test Code - Max 10 Test Abbreviated text - Max 20	From version V12.01 of TD-Synergy (also included in V11.83) and from version V01.11 of TDNexLabs: This field contains *REPORTPDF* when result reports are transmitted via internal communication(to be converted in PDF format). From TDNexLabs V01.52 Local code, Alternate test code, Alternate text and Mapped code subfields are included in OBX-3 provided that: 1- The **Send both local and mapped codes (Yes/No)** device property is set to **Yes**. This property is for local and mapped codes. Mapped codes can be LOINC codes for example. 2- The VMD script is activated. Refer to Activating inclusion of local and mapped codification in HL7 result message topic.

4	20	ST	Observation Sub-ID	Sub-field 2: LISTESTID Sub-field 3: TESTORDER Sub-field 4: DEPTH	-	Used in the case of long result. The result value is limited by HL7 to 65535 char. If the text result is too long, another OBX segment is generated to complete the result. The first segment OBX have OBX-4 =1 the second have OBX-4 =2. From version V12.01 of TD-Synergy (also included in V11.83) and from version V01.11 of TDNexLabs: In result transmission, if OBX-2 = ED and if OBX-3 = REPORTPDF, when the result report in OBX-5 exceeds the HL7 field limit of 65535 characters, no other OBX segment is generated and this sub-field is not incremented. Instead, the whole result report is sent in one OBX segment. From TDNexLabs V01.52 (also V01.51.B, V01.41.B, V01.31.B) and TD-Synergy from V12.21.B **OBX-4.2** : The second sub-field contains the LISTESTID (unique test identifier) used to have non-ambiguous access to test when same test code is present more than once in the request. Value is retrieved from ASTM OBX-10.4.9. When OBX-4.2 is available, OBX-4.3 and OBX-4.4 fields are populated with TESTORDER and DEPTH information from the database.
5	26	TS	Observation Value	Result Value	Max 26	In result emission, if the result is of "Coded Text" (CE) type, the information transmitted may be the mnemonic code or the full text of the coded text. It depends on which processing of

						results/comments is defined in the LIS (Connection Dictionary (DCX)). From version V12.01 of TD-Synergy (also included in V11.83) and from version V01.11 of TDNexLabs: In result transmission, if the result is of the "Encapsulated Data" (ED) type, this field contains the encoded result report document sent by internal communication. See detailed information below. Starting from V01.31: In result transmission, if the result type is Structured Numeric (**SN**), this field contains the following information: OBX-5.1 = limit symbol in the result (e.g. < or >) OBX-5.2 = actual result value (without the limit symbol)
6	250	CE	Units	Units	Max 20	-
7	60	ST	Reference Range	Range	-	Reference ranges are only supported for Numeric results.
8	5	IS	Abnormal Flags	Abnormal Flags	-	Abnormal flags are only supported for Numeric results.
9	5	NM	Probability	Not supported	-	-
10	2	ID	Nature of Abnormal Test	Not supported	-	-
11	1	ID	Observation Result Status	Status	-	The existing status values are defined as follows: I = Incomplete P = Result not validated F = Final status X = Order is canceled C = Result Corrected (after being transmitted with a F status)
12	26	TS	Date Last Observation Normal Value	Not supported	-	-
13	20	ST	User Defined Access Checks	Not supported	-	-
14	26	TS	Date/Time of the Observation	Not supported	-	-

15	250	CE	Producer's ID	TDNexLabs from V01.51 Site alternate code^abbreviated text	-	TDNexLabs from V01.51 Alternate code of production site associated with the result.
16	250	XCN	Responsible Observer	Yes	Max 8	Contains the technical reviewer's initials in subfield 1 and the technical reviewer's name in subfield 2.
17	250	CE	Observation Method	TDNexLabs from V01.51 Analytical method code^abbreviated text	-	TDNexLabs from V01.51 Analytical method code and Abbreviated text - The analytical method code is not sent if the result status is I (Incomplete). - The analytical method is not sent for sub-combined tests.
18	22	EI	Equipment Instance Identifier	Not supported	-	-
19	26	TS	Date/Time of the Analysis	TDNexLabs from V01.51 Analysis DateTime	-	TDNexLabs from V01.51 Date and time of the test result Format: YYYYMMDDHHMM - The date and time of the result is not sent for sub combined tests.. - The date and time is empty for complementary parameters entered at request creation. TDNexLabs from V01.52 Result date and time can be sent for sub-combined when the property **Sub-combined tests (Y,N,L,1-6,R)** is set to **P** in the **Connections** (DCX) dictionary. See detailed information below.

OBX-2 Value type

The codification to be used is:

- **CE** for Coded text. Corresponds to the coded text mnemonic as defined on the Technidata LIS.
- **DT** for Result expressed in date format, Hours/Minutes or Minutes/Seconds.

- **ED** for Encapsulated data (Available from version V12.01 of TD-Synergy (also included in V11.83) and from version V01.11 of TDNexLabs)

  If the result type used to send result reports is PDF format:

  For this result type, the result value in OBX-5 is composed as follows:

  OBX 5.1 - Identifier: Contains the file name of the result report file
  OBX 5.2 - Type of Data: Always set to "application"
  OBX 5.3 - Data Subtype: Always set to "pdf"
  OBX 5.4 - Encoding: Always set to "Base64"
  OBX 5.5 - Data: Contains the PDF file encoded in Base64 format

  Example:
  `asr01709.pdf^application^pdf^Base64^JVBERi0xLjQKJcfsj6IKNSAwIG9iago...lCMSUAlMKTCk`

  If the result type used to send result reports is CDA format:

  For this result type, the result value in OBX-9 or OBX-10 is composed as follows:

  OBX 9.1 - Identifier: Empty
  OBX 9.2 - Type of Data: Always set to "text"
  OBX 9.3 - Data Subtype: Always set to "XML"
  OBX 9.4 - Encoding: Set to "Base64<document type>" where document type can be CDAR2N3 or CDAR2N1
  OBX 9.5 - Data: Contains the PDF file encoded in Base64 format

  Example:^
  Text^XML^Base64 CDAR2N3^PD94bWwgdmVyc2lvb...ZXNoZWV0Pg==

- **NOTE:** The PDF and CDA result report encoded in Base64 are not entirely shown.

- **NM** for Numeric result. The decimal separator is "." and not the comma.
- **SN** for Structured Numeric. The structured numeric (SN) data type, new to HL7 version 2.3, provides for reporting ranges (e.g., 3-5 or 10-20), titres (e.g., 1:10), and out-of-range indicators (e.g., >50) in a structured and computer interpretable way. ONLY the out-of-range indicators (e.g. >50, <10) are supported by the Technidata LIS, for the conversion of ST to SN types.
- **ST** for Alphanumerical result (String data). Result expressed in limit, dilution (e.g. ">300"). This result format is used for all other Laboratory Information System result types (alphanumeric, dilution type result, limits type result, known result ...). **However, this usage of the ST type should be discouraged since the SN (structured numeric) data type now accommodates such reporting.**
- **TX** for Free text.

ASTM-to-HL7 result conversion

As the ASTM 1238 does not support SN data type, it uses the ST type to represent these kinds of result types. When ST types -containing values such as out-of-range indicators, with > or < as first character- are converted to HL7, the SN type is used instead of ST, in order to conform to the current standard.

Below is a sample ASTM message converted to HL7 with the SN result type:

Currently, ONLY the out-of-range indicators (e.g. >50, < 10) are supported by the Technidata LIS for the conversion of ST to SN types.

```
========================= SAMPLE ASTM ORU MESSAGE
============================
H|^~\&|||38-1^LIS||ORU|||0001^CHUxxx||P|A2.2|20100129145951|
P|0001|0000136034|00001717042^00001717042||AWI^Haleri
O^||19420218|M||302
DOORE MLEPE^^QI^||(202)136-0034||||||||||20071205~20071205|
OBR|0001|^0010109154|^0010109154|NA^SODIUM art
deloc^L^|R|201001291458|201001291459|||||||201001291500||||LAGE1||C
at5||||DEPT
1 L3^01^04^023|I|
OBX|1|ST|NA^SODIUM^L^||< 100|mmol/l|135 - 145|N|||F|
L|||1|5||
========================= CORRESPONDING HL7 ORU MESSAGE
=======================
MSH|^~\&|LIS||HOST||20100311101618||ORU^R01^ORU_R01|
TD0000000079|P|2.3|||AL|NE|||||PID|1||0000000000000
0136034^^^^PATNUMBER||AWI^Haleri O||19420218|M|||302
DOORE MLEPE^^QI||(202)136-0034^^PH|||||0000171704
2|||||||||||||||PV1|1|||||||||||||||||0000171704
2|||||||||||||||||||||||20071205|20071205|
ORC|RE|116660061|116660061|116660061|IP||^^^2010012
9145900^^R||20100311101618||||LAGE 1||20100129145800|
OBR|1|116660061|116660061|NA^SODIUM artd\XE9\loc||201
00129145800|20100129145900|||||||20100129150000||||||||||DEPT
1 L3|F||^^^20100129145900^^R|||||||||
OBX|1|SN|NA^SODIUM|1|<^100|mmol/l|135 - 145|N|||F|||||||||
```

OBX-19 Value type

Result date and time can be sent for sub-combined when the property **Sub-combined tests (Y,N,L,1-6,R)** is set to **P** in the **Connections** (DCX) dictionary on the Real Time module. In this case, when transmitting results in HL7 format, the ASTM OBX-14.11 is completed with the result date and time (YYYYMMDDHHMM format) and the HL7 ORU OBX-19 is filled with the result date and time. See also **Connections** dictionary (DCX) and *Data exchange in ASTM format* installation guide (CNXL003).

Example when **Sub-combined tests (Y,N,L,1-6,R)** is set to **P**:

```
MSH|^~\&|TDR|L^Hospital
LAS^LLABO|HOST||20210920092154||ORU^R01^ORU_R01|TD0000000321|P|2.3|||AL|NE|
||||
PID|1||||TEST^17years F^^^^^L||20040327|F||id^|||||||id^|||||||||||||||
PV1|1|||||||||||||||||||||||||||||||||||||||||||20210627|
ORC|RE||10900085441HCG2||CM||^^^20210917151200^^R||20210920092144|||BODUN^D
OCTOR, Bidon|^^^^^^^^BODUN LAS||20210917151300
OBR|1||10900085441HCG2|1HCG2^dilution
HCG||20210917151300|20210917151200|||||||20210917151300||BODUN^DOCTOR,
Bodun|||||||CH^03^39^162|C||^^^20210917151200^^R|||||ADM&Administrator||AD
M||
OBX|1|NM|1HCG2^dilution
HCG|1|1500|U/L|||||C||||L|ADM^Administrator|||20210917160800
NTE|1||REFERENCE VALUES \.br\Non-pregnant patient : <0,6 - 2,90
U/L\.br\Male
```

NTE - Notes and Comments

Seq	HL7 field length	DT	HL7 field name	TD field name (if applicable)	TD supported length	Comments
1	2	ID	Message counter	Processed / Not processed	-	-
2	22	EI	Source of Comment	Not processed	-	-
3	22	EI	Comment	Comment	Max 4000	No value is served if the comment exceeds the maximum number of characters.
4	22	EI	Comment Type	Not processed	-	-

The HL7 protocol does not support NTE segments at the PV1 level, and the NTE segment must be placed underneath the following segments:

- PID segment for Patient notes and comments
- OBR segment for Request notes and comments
- OBX segment for Result notes and comments+--dd

TQ1 - Timing/Quantity segment

Only TQ1-7 and TQ1-9 are supported.

Seq	Data type	Field name	Comments
01		Seq number	
07		Start Date/Time	Request collection date
09	ID CWE Table 0485	Priority	Contains the priority for this order. • S (Stat) • A (ASAP) • R (Routine) Same as OBR-27

Management of HL7 ORC-5 and OBR-25 result status

This page gives you further information to better understand the management of HL7 ORC-5 (Order status) and OBR-25 (Result status) when transmitting results from the Real time module.

The table below describes how the values for ORC-5 and OBR-25 are determined:

Conditions based on values found in the ASTM ORU received from Real time module: OBR 9.26 (Order result status code), OBX 10.6 (Observation value), and OBX 10.12 (Observation result status)	Transmitted in HL7 message	
	ORC-5	OBR-25
All tests have result values (all OBX 10.6 are not empty)	CM	F
Having only complementary tests and all have result values	CM	F
Some but not all tests have result values	A	P
Having at least one test with partial result status (OBX 10.12 = P)	HD	P
Having at least one test with corrected result status (OBX 10.12 = C) and other tests have no result values	A	C
Having at least one test with corrected result status (OBX 10.12 = C) and all tests have result values	CM	C
No result found (all OBX 10.6 are empty) or no OBX at all	IP	I
Having only complementary tests and there is a test with no result	IP	I
Test is deleted (ASTM OBR 9.26 = X)	CA	X

NOTE: Only the OBX segments of ELE, PAR, and CAL type tests are checked. The OBX of GRP type tests are ignored.

When the **Use ORC-5 as overall request status** device property is set to **Yes**, the value for HL7 ORC-5 is based directly on the value of ASTM 9.26 instead of the computation in the table above.

ASTM OBR 9.26 Order result status code	Transmitted HL7 ORC-5
F	CM
P	SC
M	A
I	IP
X	CA

Starting from V12.01.B, a hidden parameter 'TDI_Retain_ASTM_OBR_Res_Status_in_HL7_<DEVICE_CODE>' (where <DEVICE_CODE> is the TD-Com device code), when set to 1, retains the value of ASTM OBR 9.26 as the HL7 OBR-25.

ASTM OBR 9.26 Order result status code	Transmitted HL7 ORC-5
F	F
P	P
M	A
I	I
X	X

This hidden parameter is useful when there is a need to transmit the actual result status code from the ASTM ORU file instead of computing the HL7 OBR-25 value as described in the table above.

The TD-Com device needs to be run at least once for the hidden parameter to be created in the database (with default value of 0).

Example of query to update the parameter to 1 for TD-Com device OUT_ORUHL7

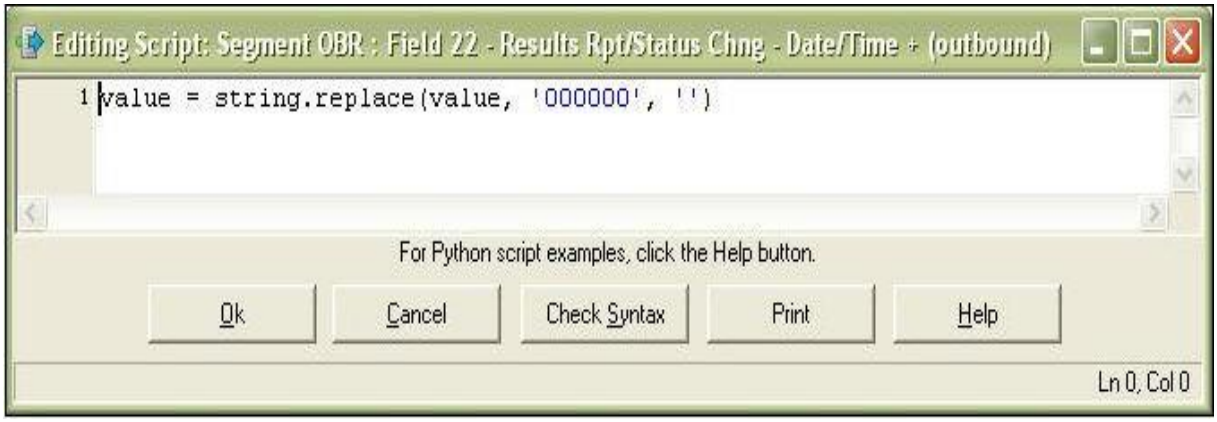
```
update PARAM_VALUES set PARAMVALUE=1 /* 0 = disable, 1 = enable */
where PARAMID = 'TDI_Retain_ASTM_OBR_Res_Status_in_HL7_OUT_ORUHL7'
```

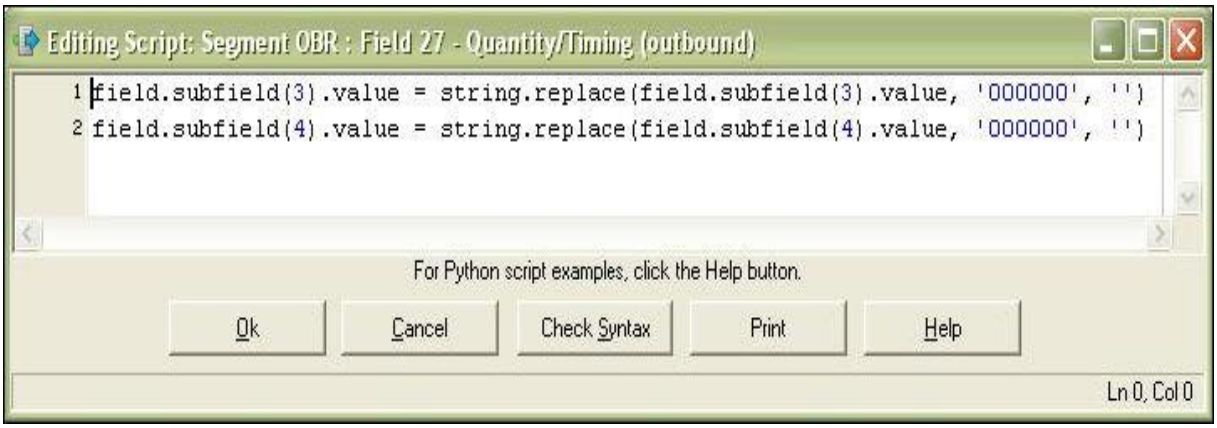
Management of fields in TS (TimeStamp) format

Fields in TS (TimeStamp) format included in most segments (MSH, PID, OBR, OBX, ORC, etc.), are received with zeros.

EXAMPLE: Date/Time field
20081022000000 (YYYYMMDDHHMMSS)
20081022000000 must be formatted as 20081022 in the outbound HL7 messages.

The zeros in the Timestamp, which either mean that it has no time part or it is midnight time 000000, are removed by default with the use of the following python scripts:





Examples of ORU and OUL messages

ORU^R01 sample message

A. Classical sample result message with no LISTESTID for GRP test BLDCS

```
MSH|^~\&|TDR|123^UP
MRL^LABO|HOST||20160908143916||ORU^R01^ORU_R01|TD0000010708|P|2.3|||AL|NE||
|||

PID|1||0000000444^^^^PATNUMBER~000000A444^^^^ALTNUMBER||HL7RBL^Oultrans^^^M
R^^L||20130804|M||id^|Add1^Add2^^^^PH||55462^^PH^email@yahoo.com~532-
2527^^CP~532-
2528^^FX~email@yahoo.com^^Internet||||id^|0000000447|||||||||||||||

PV1|1||DEFLOC^47^^^^^^^MEDICINA|||||||||||||||0000000447|^19991130000000||
|||||||||||||||||||||20160823|

ORC|RE||6090806093BLDCS||IP||^^^20160908141700^^R||20160908143917|||DEFDOC^
DOC
Test^^^^^^^^^^^^^^^^^^DEFNATCODE|DEFLOC^^^^^^^^MEDICINA||20160908141704

OBR|1||6090806093BLDCS|BLDCS^Blood Culture \T\
Sens||20160908141704|20160908141700|||||||20160908141716||DEFDOC^DOC
Test^^^^^^^^^^^^^^^^^^DEFNATCODE|||||||123^32^60^001|I||^^^20160908141700
^^R|MADO^MADO^^^^^^^^^^^^^^^^^^MADNAT|||||||||

OBX|1|TX|XEOD^Request status|1|||||||I|||||||||

OBX|2|CE|XCOLM^Collection Material|1|MBLOO^Blood|||||F|||||||||
```

B. Classical sample result message with no LISTESTID for ELE test NA

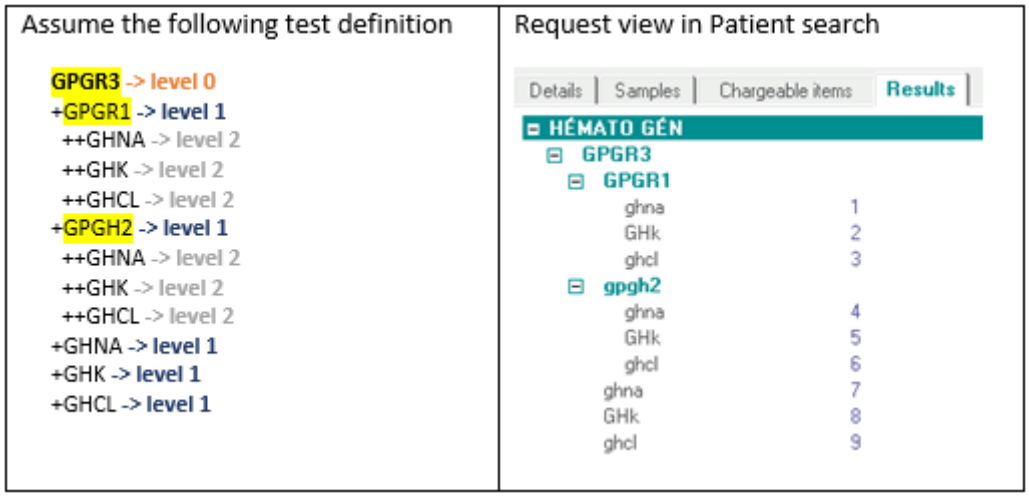
```
MSH|^~\&|TDR||HOST||20150106162700||ORU^R01|TD0000130301|P|2.3|||||||||
PID|||222^^^^PATNUMBER
ORC|RE|01|8030224850|8030224850|||||201411281202||||||20150106162700||||||^^
^^^^^^^LAB
OBR|1|8030224850||NA|||20150106162700||||A|||20150106162700||DEFDOC|||||||||
|||^^^20150106162700^^R|||||||||
OBX|NM|L|NA||101.0|g/dl|100.0 - 200.0|N|||F|||||||||
```

C. Sample result message with LISTESTID

For TDNexLabs from V01.61 (also in V01.52, V01.51.B, V01.41.B, V01.31.B) and TD-Synergy from V12.21.B

The LISTESTID (unique test identifier) is implemented in reception connection to have a non-ambiguous access to tests when same test code is present more than once in the request.

The following example is a sample result message for the following GRP test containing duplicate test codes.



NOTE: To have the LISTESTID transmitted in this HL7 message, the **Addition of RDB compl. data** property in the **DCX** dictionary must be set to **5** to have the LISTESTID in ASTM messages.

```
MSH|^~\&|TDR|HEJ^HEJ^LABO|HOST||20190717135214||ORU^R01^ORU_R01|TD000001078
8|P|2.3|||AL|NE|||||
PID|1||0000000000222^^^^PATNUMBER~00000000BEN222^^^^ALTNUMBER||LAVILLA^Nest
or^^^^^L~CAMU^^^^^^M||20101022|
NTE|1||This is a test patient
PV1|1||DEFLOC||||||||||||||||||||||||||||||||||||||||
ORC|RE||9070008569GPGR3||CM||^^^20190717124900^^R||20210219170409|||DEFDOC^
DR,  PARDEFAUT|DEFLOC^^^^^^^^CO
OBR|1||9070008569GPGR3|GPGR3^GPGR3||20190717124800|20190717124900|||||||201
90723190303||DEFDOC^DR,  PARDEF AUT||||1^1|..
OBX|1|TX|GPGR1^GPGR1|1^2^2^1| ||||||||||||||
OBX|2|NM|GHNA^ghna|1^3^3^2|1||||||F|||||LIS^LISFSE|||
OBX|3|NM|GHK^GHk|1^4^4^2|2||||||F|||||LIS^LISFSE|||
OBX|4|NM|GHCL^ghcl|1^5^5^2|3||||||F|||||LIS^LISFSE|||
OBX|5|TX|GPGH2^gpgh2|1^6^6^1| ||||||||||||||
OBX|6|NM|GHNA^ghna|1^7^7^2|4||||||F|||||LIS^LISFSE|||
OBX|7|NM|GHK^GHk|1^8^8^2|5||||||F|||||LIS^LISFSE|||
OBX|8|NM|GHCL^ghcl|1^9^9^2|6||||||F|||||LIS^LISFSE|||
OBX|9|NM|GHNA^ghna|1^10^10^1|7||||||F|||||LIS^LISFSE|||
OBX|10|NM|GHK^GHk|1^11^11^1|8||||||F|||||LIS^LISFSE|||
OBX|11|NM|GHCL^ghcl|1^12^12^1|9||||||F|||||LIS^LISFSE|||
ORC|||9070008569ES||CM||^^^20190717124900^^R||20210219170409|||DEFDOC^DR,
PARDEFAUT|DEFLOC^^^^^^^^COR Par
OBR|1||9070008569ES|ES^ES||20190717124800|20190717124900|||||||201907231616
17||DEFDOC^DR,  PARDEFAUT||||13^13|||||F|
OBX|1|TX|ES^ES|1^13^13^1|esresult||||||F|||||LIS^LISFSE|||
OBX|2|ED|REPORTPDF|1|9070008569_wLisTestID.pdf^application^pdf^Base64^JVBER
i0xLjQKJcfsj6IKNSAwIG9iago8PC9M…
```

NOTES:
The LISTESTID is found in OBR-20.1; OBX-4.2; the TESTORDER in OBR-20.2; OBX-4.3; and the DEPTH in OBX-4.4
Test with OBR is by default level 0 (not added in the message).

D. Sample result message with Alternate code, Analytical method code and Date/Time of test result

```
MSH|^~\&|TDR|123^UP
MRL^LABO|HOST||20160908143916||ORU^R01^ORU_R01|TD0000010708|P|2.3|||AL|NE||
|||
PID|1||0000000444^^^^PATNUMBER~000000A444^^^^ALTNUMBER||HL7RBL^Oultrans^^^M
R^^L||20130804|M||id^|Add1^Add2^^^^PH||55462^^PH^email@yahoo.com~532-
2527^^CP~532-
2528^^FX~email@yahoo.com^^Internet||||id^|0000000447|||||||||||||
PV1|1||DEFLOC^47^^^^^^^MEDICINA|||||||||||||||0000000447|^19991130000000||
|||||||||||||||||||||20160823|
ORC|RE||6090806093BLDCS||IP||^^^20160908141700^^R||20160908143917|||DEFDOC^
DOC
Test^^^^^^^^^^^^^^^^^^^DEFNATCODE|DEFLOC^^^^^^^^MEDICINA||20160908141704
OBR|1||6090806093BLDCS|BLDCS^Blood Culture \T\
Sens||20160908141704|20160908141700|||||||20160908141716||DEFDOC^DOC
Test^^^^^^^^^^^^^^^^^^^DEFNATCODE|||||||123^32^60^001|I||^^^20160908141700
^^R|MADO^MADO^^^^^^^^^^^^^^^^^^MADNAT|||||||
OBX|1|TX|XEOD^Request status|1|||||||I|||||||
OBX|2|CE|XCOLM^Collection Material|1|MBLOO^Blood|||||F|||||||
OBX|3|NM|XORGC^Organism Count|1|14.9|||||F||||AA^SFA|a|OBS1^Obs Test
1||20170312140800
```

OUL^R24 sample message

NOTE: The OUL^R24 result message format is supported only for TDNexLabs from V01.31.

Sample below is an OUL^R24 message generated after clinical review

```
MSH|^~\&|TDR|123^UP
MRL^LABO|HOST||20160929114825||OUL^R24^OUL_R24|TD0000194643|P|2.3|||AL|NE||
|||
PID|1||0000000444^^^^PATNUMBER~000000A444^^^^ALTNUMBER||HL7RBL^Oultrans^^^M
R^^L||20130804|M||id^|Add1^Add2^^^^PH||55462^^PH^email@yahoo.com~532-
2527^^CP~532-
2528^^FX~email@yahoo.com^^Internet||||id^|0000000447|||||||||||||
NTE|1||low blood
PV1|1||DEFLOC^47^^^^^^^MEDICINA|||||||||||||||0000000447|^19991130000000||
|||||||||||||||||||||20160823|
OBR|1||6090806093BLDCS|BLDCS^Blood Culture \T\
Sens||20160908141704|20160908141700|||||||20160908141716||DEFDOC^DOC
Test^^^^^^^^^^^^^^^^^^^DEFNATCODE|||||||123^32^60^001|I||^^^20160908141700
^^R|MADO^MADO^^^^^^^^^^^^^^^^^^MADNAT|||||||
ORC|RE||6090806093BLDCS||IP||^^^20160908141700^^R||20160908143917|||DEFDOC^
DOC
Test^^^^^^^^^^^^^^^^^^^DEFNATCODE|DEFLOC^^^^^^^^MEDICINA||20160908141704
NTE|1||req comm
TQ1|||||||20160929223200||S
OBX|1|TX|XEOD^Request status|1|||||||I|||||||
OBX|2|CE|XCOLM^Collection Material|1|MBLOO^Blood|||||F|||||||
OBX|3|TX|XASP^Visual aspect /TDM|1| ||||||||||||||
OBX|4|NM|XORGC^Organism Count|1|14.9|||||F||||AA^SFA|a|OBS1^Obs Test
1||20170312140800
OBX|5|TX|MTRAN^Transperancy|1|CLEAR|ml|||||F|||||||
OBX|6|CE|XMBN^MicroBio Obsersation|1|XN^MB Neg||||||F|||||||
```

Where
OBX-15 = Alternate code of production site
OBX-17 = Analytical method code^abbreviated text
OBX-19 = Date and time of the test result

Updating the VMD script

Updating the VMD script to replace message collection date with value from database

From TDNexLabs V01.21.B / TD-Synergy V12.21

This page describes how to modify the VMD file to perform a database query to retrieve the collection date.

Overview

There is a case when the collection date value sent in ORC-7.4 of the result message is incremented by 1 minute. This happens when the host sends two HL7 order messages for the same patient with the same collection date.

Unix side has a limitation for the case when sample is received via auto-rectube at the same time, the second collection date is modified and 1 minute is added. During transmission of result, 1 minute is added in the collection date transmitted. This can create a new sample in Host side due to different collection date and time.

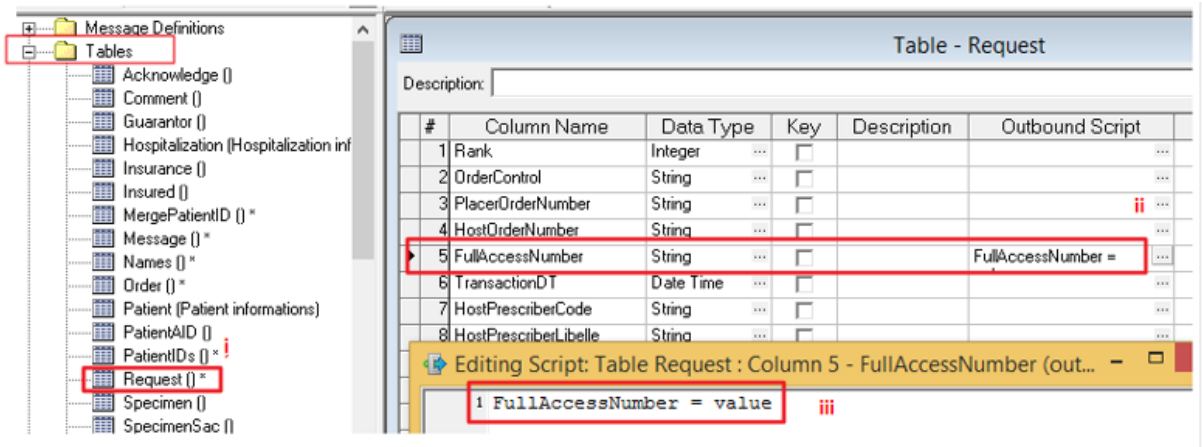
NOTE: Incrementation issue in collection date happens when auto-rectube is used to receive samples.

Updating the VMD script

To solve the issue of incremented collection date, an SQL query can be added in VMD to read the collection date from pre-analytic tables and replace the collection date in ORC-7.4 of the message.

Proceed as follows:

1. Open the `HL7ResultTransmission.vmd` file.
2. Expand the **Tables** node at the left side of the Chameleon browser:
   a. Double-click **Request table**
   b. Modify Outbound script of **FullAccessNumber** column (click **…** at the right side of the Outbound Script)
   c. Save the **FullAccessNumber** value by copying the script below (*FullAccessNumber* = *value*)

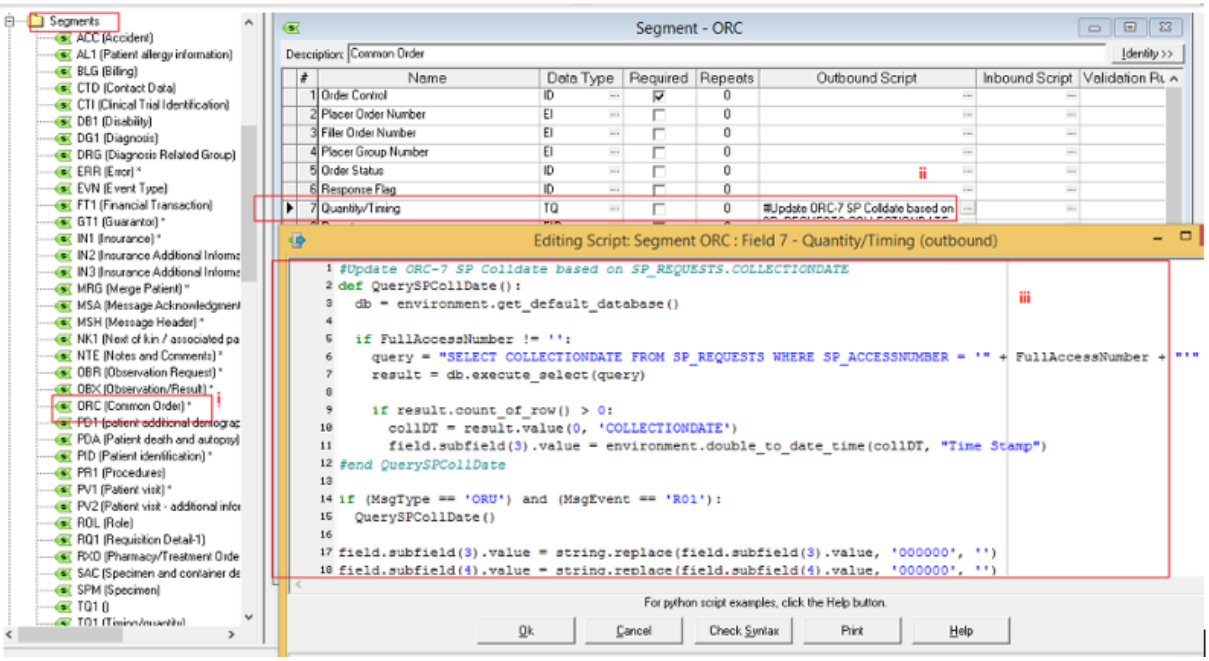


3. Expand the **Segments** node at the left side of the Chameleon browser:
   a. Double click **ORC** segment

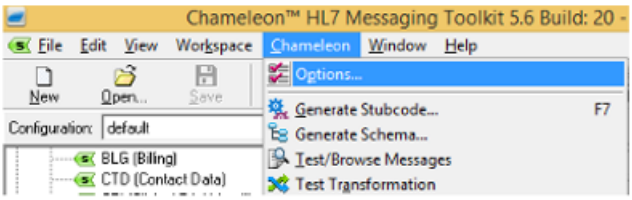
b. Modify Outbound script of **Quantity/Timing** column (click **…** at the right side of the Outbound Script)

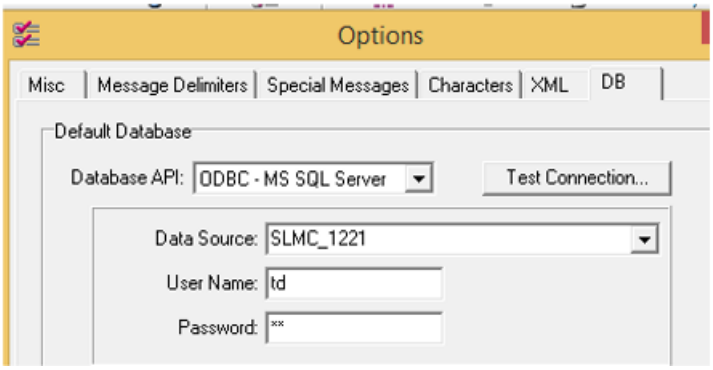
c. Save the script below:

```
#Update ORC-7 SP Colldate based on SP_REQUESTS.COLLECTIONDATE
def QuerySPCollDate():
 db = environment.get_default_database()

  if FullAccessNumber != '':
   query = "SELECT COLLECTIONDATE FROM SP_REQUESTS WHERE
SP_ACCESSNUMBER = '" + FullAccessNumber + "'"
   result = db.execute_select(query)

    if result.count_of_row() > 0:
     collDT = result.value(0, 'COLLECTIONDATE')
     field.subfield(3).value =
environment.double_to_date_time(collDT, "Time Stamp")
#end QuerySPCollDate

if (MsgType == 'ORU') and (MsgEvent == 'R01'):
 QuerySPCollDate()

field.subfield(3).value = string.replace(field.subfield(3).value,
'000000', '')
field.subfield(4).value = string.replace(field.subfield(4).value,
'000000', '')
```



4. Configure database settings under **Chameleon** -> **Options** -> **DB**





IMPORTANT: Database query in VMDs may introduce memory leaks.
The sites that will implement the above procedure must enable automatic restart of **TDCnx** service when the service exceeds the value specified in the SC config command.

See also

See your Technical Guide for setup instructions: Management data > TROUBLESHOOTING > Memory leaks > Restarting TDSpool device when memory usage increases excessively.

Chameleon

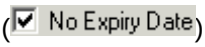
About Chameleon files (VMD files)

Registration

During the customer setup, the previous version of Chameleon (if any) is removed and the new version is installed.

On all computers used for communications requiring Chameleon software, it is now necessary to register the new version of Chameleon software with Interfaceware before you can use it. To do so, you must call the TECHNIDATA Support team in order to obtain a registration code.

Proceed as follows:

- After upgrading the Technidata LIS Client software, open a `.vmd` file, for example `HL7.vmd`. A window is displayed inviting you to obtain a free registration code from Interfaceware. DO NOT USE the 'Get Free Member's Account via Internet' button.
- Call the TECHNIDATA Support team.
  - The TECHNIDATA Support team will ask you to give them the **Machine ID** information, displayed at the bottom of the window on your PC.
  - Then, in return, the TECHNIDATA Support team will give you a registration code. Enter this code in the **Registration Code** field. This code is specific to the computer: a registration code obtained on one computer is not valid on another computer.
  - *IMPORTANT*: Select **No expiry date** option (

), and click the **Ok** button.

Upgrade

WARNING: If you are upgrading your software, new Chameleon files (VMD files) can be delivered and copied to your disk. These new VMD files do not overwrite the old files, but are copied to a `reference` directory, because the old VMD files can contain modifications.

- Before the upgrade, the VMD files currently used are stored in the client installation directory:
  `C:\Technidata\<TD-Product> Client_InstanceName`
- At the installation time or during the latest upgrade, they are stored in:
  `C:\Technidata\<Product> Client_InstanceName\Reference`
- After an upgrade, it is therefore imperative that the Installation engineer copies the new VMD files from the `Reference` directory to the `<TD-Product> Client_InstanceName` directory. But before doing this, the Installation engineer must copy the modifications manually if any, in the new VMD files, (See NOTE below).

NOTE: You should not modify the delivered vmd file. If you cannot avoid modifying it, it is recommended to make a note of all modifications (for example, keep a file containing details of all macros added and the fields where they have been added).
For later upgrades, if you want to find the modifications easily, you can, for example, create a dedicated file named "HL7_modifications.doc" or create a "VMD modifications" directory under the client installation directory.

Using the Chameleon simulator

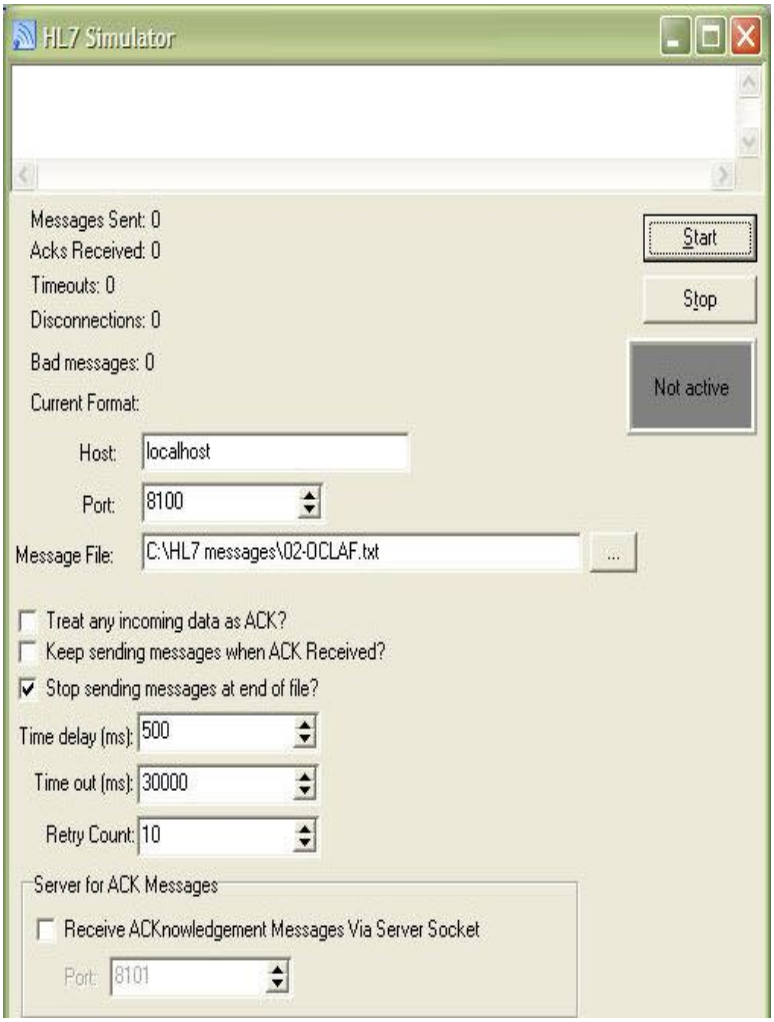
The Chameleon "Simulator" and "Listener" tools are used to simulate a Host, in order to test whether the communication you have installed is running well.

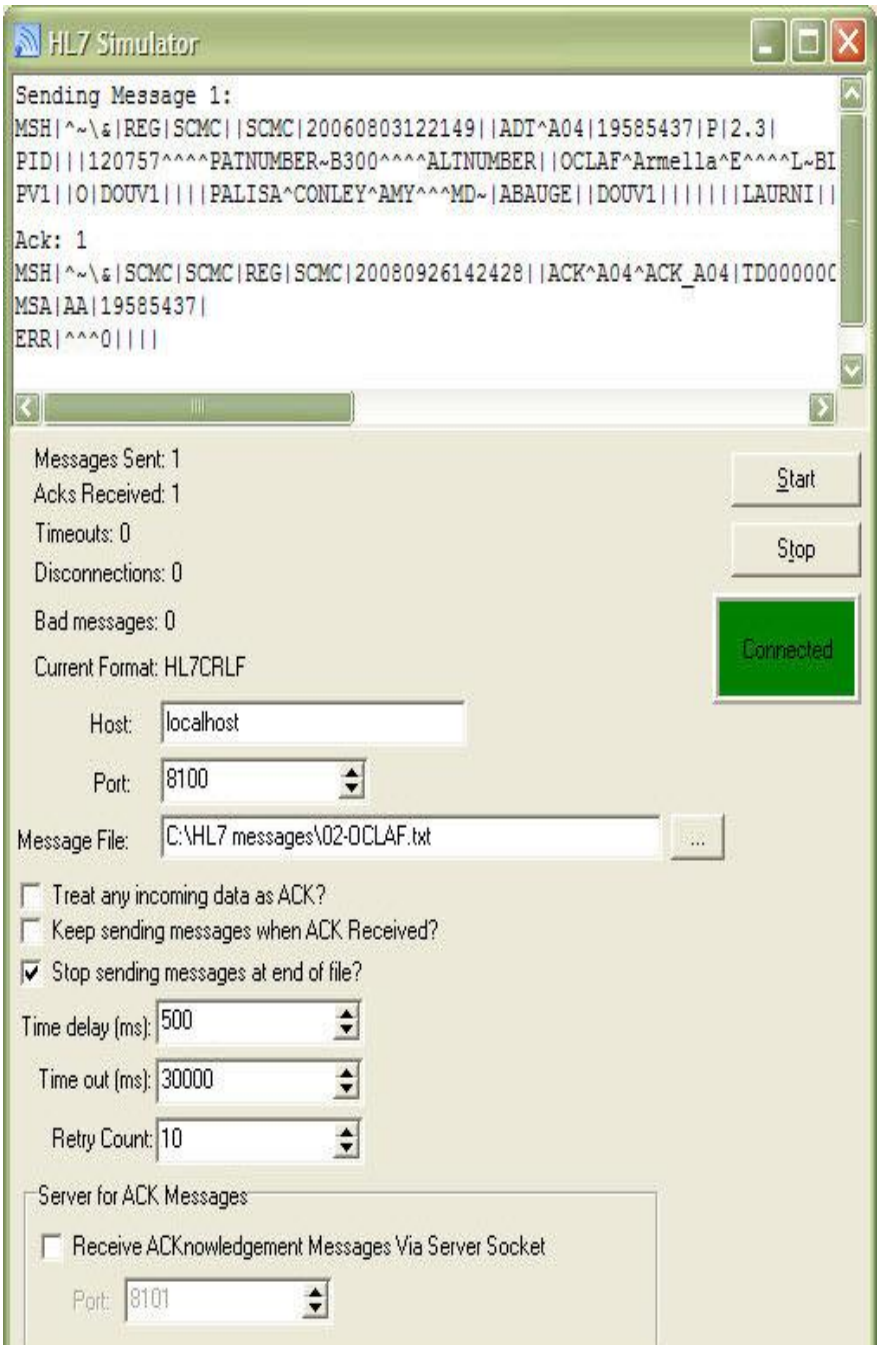
- The *simulator* is used to transmit HL7 messages to the Communication engine via TCP/IP socket.
- The *listener* is used to receive HL7 messages from the Communication engine via TCP/IP socket.

You can use either, depending on whether you are acting as a transmitter or receiver.

Using the Simulator

To start the HL7 simulator, run the `Simulator.exe` file, stored in `C:\Program Files\iNTERFACEWARE\Chameleon\Simulator.exe`

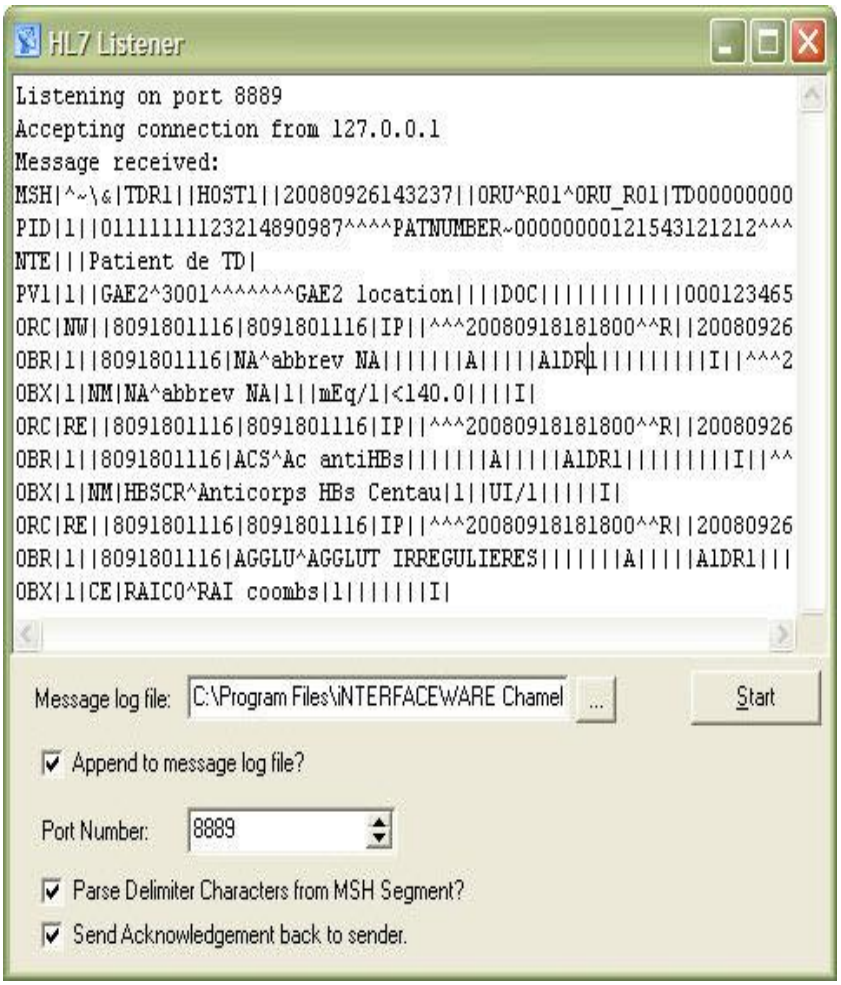




Using the Listener

To start the HL7 Listener, run the `Listener.exe` file, stored in: `C:\Program Files\iNTERFACEWARE\Chameleon\Listener.exe`


HL7 Listener
Listening on port 8887
Message log file:
C:\Program Files\INTERFACE
...
Stop
Append to message log file?
Port Number:
8887
Parse Delimiter Characters from MSH Segment?
Send Acknowledgement back to sender.


HL7 Listener
Listening on port 8889
Accepting connection from 127.0.0.1
Message received:
MSH|^~\&|TDR1||HOST1||20080926143237||ORU^R01^ORU_R01|TD00000000
PID|1||011111111123214890987^^^^PATNUMBER~00000000121543121212^^^
NTE|||Patient de TD|
PV1|1||GAE2^3001^^^^^^^GAE2 location||||DOC||||||||||||000123465
ORC|NW||8091801116|8091801116|IP||^^^20080918181800^^R||20080926
OBR|1||8091801116|NA^abbrev NA|||||||A|||||A1DR1|||||||||I||^^^2
OBX|1|NM|NA^abbrev NA|1||mEq/l|<140.0||||I|
ORC|RE||8091801116|8091801116|IP||^^^20080918181800^^R||20080926
OBR|1||8091801116|ACS^Ac antiHBs|||||||A|||||A1DR1|||||||||I||^^
OBX|1|NM|HBSCR^Anticorps HBs Centau|1||UI/l|||||I|
ORC|RE||8091801116|8091801116|IP||^^^20080918181800^^R||20080926
OBR|1||8091801116|AGGLU^AGGLUT IRREGULIERES|||||||A|||||A1DR1|||
OBX|1|CE|RAICO^RAI coombs|1|||||||I|
Message log file:
C:\Program Files\INTERFACEWARE Chamel
...
Start
Append to message log file?
Port Number:
8889
Parse Delimiter Characters from MSH Segment?
Send Acknowledgement back to sender.

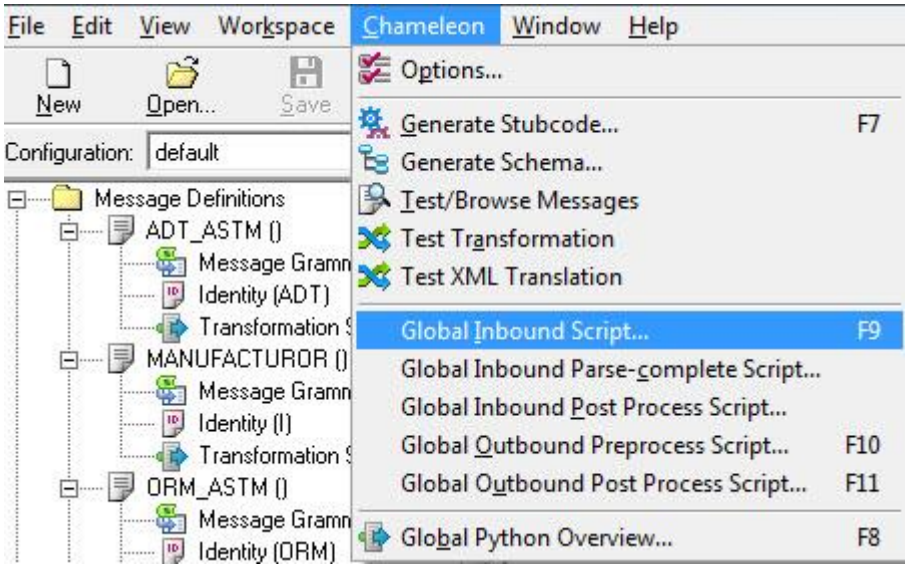
VMD script to suppress OBR segments not associated with OBX segments in ASTM result messages

OBR segments exist in two different forms. They can either be associated with OBX segments, or exist on their own without being associated to OBX segments. This topic provides information on how to suppress OBR segments that are not associated with OBX segments in ASTM Result (ORU) Messages.

This script is not available by default in TD-Synergy. The script must be added manually in ASTM1238.vmd if it is to be installed on site.

Procedure

1. Open the ASTM1238.vmd script.
2. From the Chameleon browser, go to the Chameleon tab-> Global Inbound Script.



3. Insert the script in Modification for VMD script on top of the scripts available in the Editing Script window
4. Click the Save icon in the menu bar.
5. Restart the connection service.

Modification for VMD script

Use the following script to delete OBR segments that are not associated to OBX segments from ASTM result (ORU) messages:

```
    #Begin Incident 169602, 171986
    #$2=========================================================
    #$2 Purpose: incident 169602, 171986 OBR without OBX within ORU
message
    #$2          In ORU message, remove OBR without OBX
    #$2=========================================================

    #Begin checkIfHasOBX function
    def checkIfHasOBX(SegmentSlices,index):
        segLen = len(SegmentSlices)-1
        i=index

        #C (Comment) segments are ignored
        while (i < segLen) :
```

```
            if (SegmentSlices[i].startswith( 'OBR' )) :
                return i
            if (SegmentSlices[i].startswith( 'L' )) :
                return i
            if (SegmentSlices[i].startswith( 'OBX' )) :
                return 0
            i = i + 1
        #end of while
    #End checkIfHasOBX function


    #BEGIN::RemoveObrWithoutObx function
    def RemoveObrWithoutObx (SegmentSlices, separator):
        print '-------- RemoveObrWithoutObx - Start function'
        nSegmentCount = len(SegmentSlices)
        print 'nSegmentCount is', nSegmentCount-1
        print '--------'

        i = 0
        while (i < nSegmentCount-1):
              print 'Current segment index:', i
              print 'Current segment:', SegmentSlices[i]
              bDelete = 1
              if (SegmentSlices[i].startswith( 'OBR' )) :
                   print 'Next segment:', SegmentSlices[i+1]

                   #check if there is corresponding OBX segment
                   NextSegIndex = 0
                   if ((i + 1) < (nSegmentCount-1)) :
                         NextSegIndex =
checkIfHasOBX(SegmentSlices, i + 1)
                         if (NextSegIndex == 0) :
                              bDelete = 0

                   print 'To delete current segment: ', bDelete

                   if (bDelete == 1) :
                         if (NextSegIndex == 0) : #last line has no
lf terminator
                             del SegmentSlices[i]
                         elif (NextSegIndex != 0) :
                             NextSegDist = NextSegIndex - i
                             while (NextSegDist > 0) :
                                 del SegmentSlices[i]
                                 NextSegDist = NextSegDist - 1
                         nSegmentCount = len(SegmentSlices)
                         i -= 1 #to bring back the index to the
current after this iteration
                         print 'New nSegmentCount is',
nSegmentCount-1
                         print ' '
                         TmpMsg = separator.join(SegmentSlices)
                         print 'New Msg:', TmpMsg

              else :
                   print 'Not an OBR segment'

              print ' '
              print '--------'
              i += 1
```

```
        NewMsg = separator.join(SegmentSlices)
        print 'New Msg:', NewMsg

        print '-------- RemoveObrWithoutObx - End function'
        print ' '
        return NewMsg
  #END::RemoveObrWithoutObx Macro

  #check if MSG is ORU
  TempMsg = value

  SegmentSlices = TempMsg.split( '\r\n' )
  separator = '\r\n'

  if len(SegmentSlices) <= 1:
     SegmentSlices = TempMsg.split( '\n' )
     separator = '\n'
     if len(SegmentSlices) <= 1:
        SegmentSlices = TempMsg.split( '\r' )
        separator = '\r'
  Hsegment = SegmentSlices[0]
  Hfields = Hsegment.split( '|' )
  HMsgType = Hfields[6]
  HMsgTypeFields = HMsgType.split( '^' )
  #transform message if it's of type ORU
  if(HMsgTypeFields[0] == 'ORU'):
     value = RemoveObrWithoutObx(SegmentSlices, separator)

  #End Incident 169602, 171986
```

Verification

This verification concerns OBR segments that are not associated with OBX segments.

1. Start the ASTM Result Reception device.
2. Enter the ASTM ORU message containing the OBR segment in the Input folder that is read by the ASTM result reception device. Sample ASTM ORU message:

```
H|^~\&|||LIS^LIS||ORU|||38-2^LIS||P|A.2.|20131106160437|
P|0001|0000005656|0000004545HOSPI^0000004545HOSPI|0000656590|ESPIRITU^
Onad^^^^||19911111|M||^^"" "" "" ""
""^||||||||||||||20120915~20131106||^^^|
OBR|0001|^3000233841|^3000233841|K^POTASSIUM^L^|R|201310291323|2013102
91326||||R|||201311061606||DEFDOC||DEFLOC||Cat1||||5^01^09^132|F||||||
|LIS^LISFSE||LIS^LISFSE|
C|Comment1
OBR|0002|^3000233841|^3000233841|NA^SODIUM
Na^L^|R|201310291323|201310291326||||R|||201311061606||DEFDOC||DEFLOC|
|Cat1||||5^01^09^129|F|||||||LIS^LISFSE||LIS^LISFSE|
OBX|1|NM|NA^SODIUM Na^L^||140.0|mEq/l|135.0 -
145.0|N|||F||^ELE^^^CV^|||LIS^LISFSE|
```

   Note that the first OBR has no corresponding OBX segment

3. Check the spy/logs.

   The above message should have the following result (look for the final `New Msg`: string before `-------- RemoveObrWithoutObx - End function` from the logs/spy)

```
H|^~\&|||LIS^LIS||ORU|||38-2^LIS||P|A.2.|20131106160437|
P|0001|0000005656|0000004545HOSPI^0000004545HOSPI|0000656590|ESPIRITU^
Onad^^^^||19911111|M||^^"" "" "" ""
""^||||||||||||||20120915~20131106||^^^|
```

```
OBR|0002|^3000233841|^3000233841|NA^SODIUM
Na^L^|R|201310291323|201310291326||||R|||201311061606||DEFDOC||DEFLOC|
|Cat1||||5^01^09^129|F|||||||LIS^LISFSE||LIS^LISFSE|
OBX|1|NM|NA^SODIUM Na^L^||140.0|mEq/l|135.0 -
145.0|N|||F||^ELE^^^CV^|||LIS^LISFSE|
L|||1|7||
```

The following OBR segment and its corresponding C (comment) in the original message in item #2 above have been removed:

```
OBR|0001|^3000233841|^3000233841|K^POTASSIUM^L^|R|201310291323|2013102
91326||||R|||201311061606||DEFDOC||DEFLOC||Cat1||||5^01^09^132|F||||||
|LIS^LISFSE||LIS^LISFSE|
C|Comment1
```

Manual VMD modification to transmit Sender information (MSH-4) from ASTM (7.5) in HL7 ORU messages

It is possible to recover the Sender information related to a request by manual VMD modification for the following TD-Synergy versions:

- TD-Synergy V11.83.S10
- TD-Synergy V11.83
- TD-Synergy from V12.01

Note 1: This is the default VMD setting that comes with the above versions. No modification is needed if the site uses the default HL7ResultTransmission.vmd. The modification that will be discussed below is only required if the site has an existing customized VMD and would like to include the Sender information from ASTM 7.5 fields in MSH-4 fields.

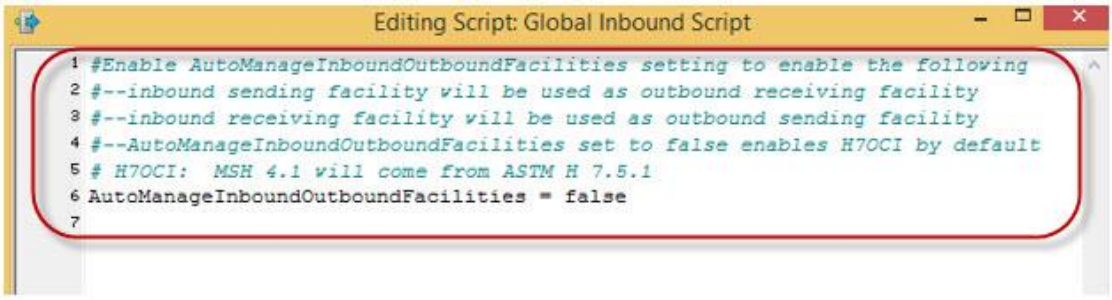
Note 2: Applying the modification discussed below modifies the following: The values of the Sending Facility (MSH-4) are automatically switched with those of the Receiving Facility (MSH-6). This is applicable to host inbound reception -> host outbound transmission. Sites that choose the default VMD can opt to use the previous behavior (Sending Facility (MSH-4) which is automatically retrieved from Receiving Facility (MSH-6)) by setting the variable AutoManageInboundOutboundFacilities = true in Global Inbound Script.

Modification of HL7ResultTransmission.vmd to transmit Sender information

The Message Header Segment MSH-4.1 can receive data from ASTM 7.5.1 when the HL7ResultTransmission.vmd is modified. This can be achieved by following these steps:

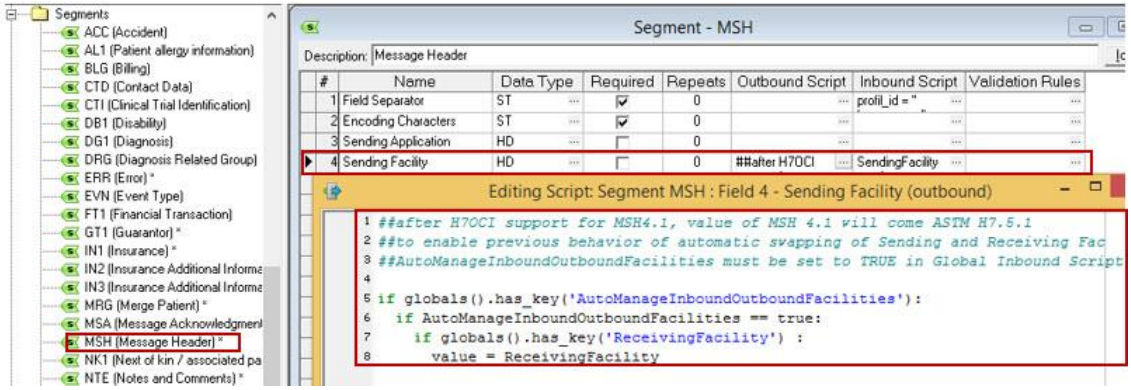
1. Edit Global Inbound script

   Go to **Chameleon** -> **Global Inbound Script** (keyboard shortcut: F9), and edit the **Global Inbound Script** to set the Inbound facilities.



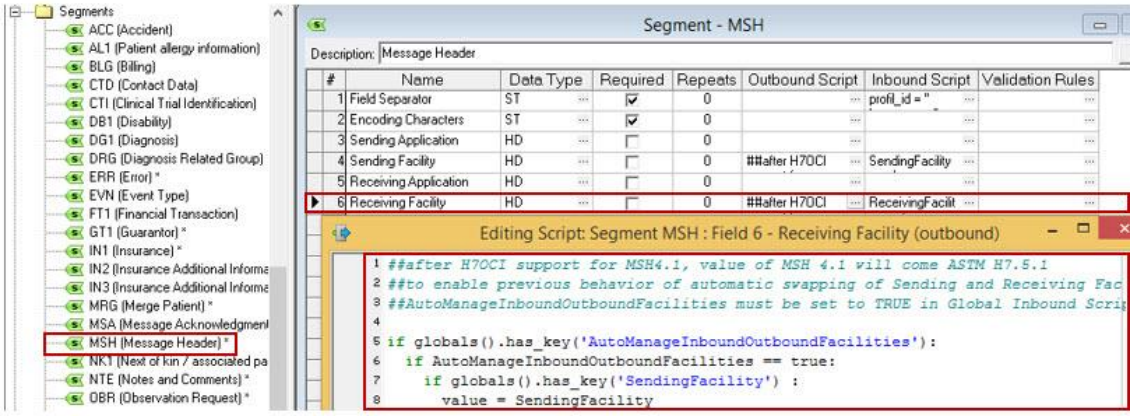
2. Edit Sending Facility Outbound script

   Go to **Segments** -> **MSH** -> **Sending Facility** -> **Outbound Script**, and edit the **MSH-4 Sending Facility Outbound** script in the following manner:



3. Edit Receiving Facility Outbound script

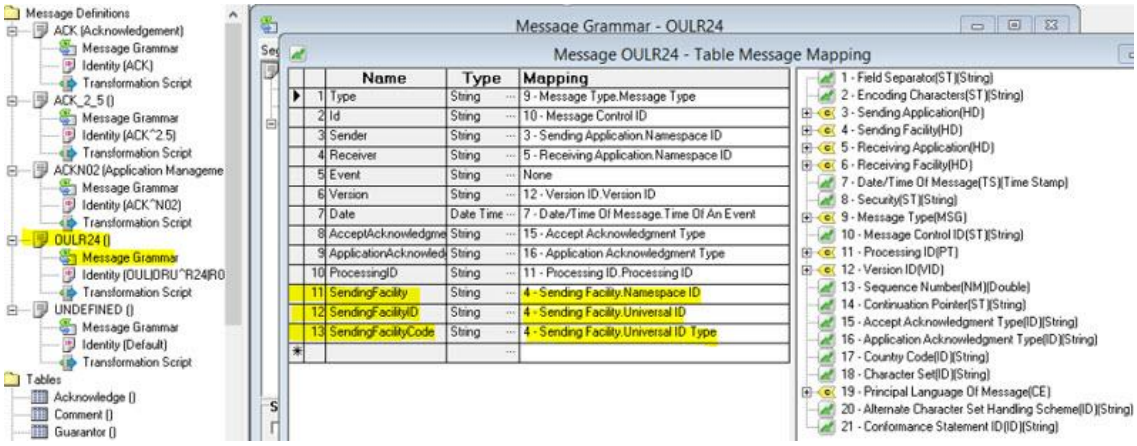
   Go to **Segments** -> **MSH** -> **Receiving Facility** -> **Outbound Script** and edit the **MSH-6 Receiving Facility Outbound script** in the following manner:



Mapping MSH-4.1, MSH-4.2 and MSH-4.3

1. MSH-4.1, MSH-4.2 and MSH-4.3 should mapped to the SendingFacility, SendingFacilityID, and SendingFacilityCode Mapping as shown:

   Go to **Message Definitions** -> **OULR24** -> **Message Grammar** -> double click **Message** Table under **Table Grammar**



2. Based on the following example of a sample ASTM Message, a sample HL7 Message is generated using the ASTM input message.

   - Sample ASTM Message:

```
H|^~\&|||LIS41^LIS42||ORU|||38-2^LIS||P|A.2.|20141218170351|
P|0001|0000001986|^BENIRONMAN||IRONMAN^Tony^^^Mr^||19860101|M|||||||||||||
||^^^|
OBR|0001|^4120224457|^4120224457|NAKG^NAKG^L^|R|201412181703|201412181703||||
R|||201412181703||||||Cat1||||5^01^16^011|F|||||||LIS^LISFSE||LIS^LISFSE|
OBX|1|NM|KHOST^POTASSIUM^L^||4.00|mE|3.50 -
5.00|N|||F||^ELE^1SG^^CV^|||LIS^LISFSE|
L|||1|5||
```

   - Sample HL7 Message generated from the above ASTM input message. In this example, the sample HL7 Message assumes the request laboratory name LABO2.

```
MSH|^~\&|TDR|LIS41^LIS42^LABO2|HOST||20141223165512||ORU^R01^ORU_R01|TD000000
0161|P|2.3|||AL|NE|||||
PID|1||0000000000001986^^^^PATNUMBER~BENIRONMAN^^^^ALTNUMBER||IRONMAN^To
ny^^^Mr^^L||19860101|M||id^|||||||id^|||||||||||||||
PV1|1|||||||||||||||||||||||||||||||||||||||||||||
ORC|RE||4120224458NAKG||CM||^^^20141223165400^^R||20141223195725||||||2014122
3165400
OBR|1||4120224458NAKG|NAKG^NAKG||20141223165400|20141223165400|||||||2014122
3165400|||||||||5^01^16^011|F||^^^20141223165400^^R|||||LIS&LISFSE||LIS&LISFSE||
OBX|1|NM|KHOST^POTASSIUM|1|4.00|mE|3.50 - 5.00|N|||F|||||LIS^LISFSE|||
```

Manual VMD modification to support XCHR parameters

For TDNexLabs from V01.21.B

This page describes the modifications to perform manually in the Chameleon VMD file to support the following XCHR parameters: **#DUMMYTEST#** and **#FTSEPARATOR#**,

1. **#DUMMYTEST#**

   This parameter is used to provide a dummy result value, if defined, as a result value when OBX-5 (Observation Value) and OBX-11 (Observation Result Status) are both empty.
   By default, the dummy result value is empty, thus no processing is performed.

   To define a dummy result value:

   a. Open the `HL7ResultTransmission.vmd` file.

   b. Edit the **Global Outbound Post Process Script**.

   Go to **Chameleon** -> **Global Outbound Post Process Script** (keyboard shortcut: F11), and edit the **Global Outbound Post Process Script** to set the dummy test.

   Editing Script: Global Outbound Post Process Script

```
1 # DR 38913 - support for XCHR specific values
2 # Define value for #DUMMYTEST# if needed
3 DUMMYTEST = ''
4 DUMMYTESTSTATUS = 'F'
5
```

   For example, defining '****DUMMY' as a dummy result value

```
2 # Define value for #DUMMYTEST# if needed
3 DUMMYTEST = '****DUMMY'
4 DUMMYTESTSTATUS = 'F'
```

   – ASTM message

```
H|^~\&|||001^000||ORU|||0010^HCP000||P|A.2.|20170221061926|
P|0001|1556542216|000044556889960^000044556889960||RAM^Ki^|Jinn|19210418|F|
||||||||||||||||0230^5211^^|
OBR|0001|^8027106574|^8027106574|RNP2^Renal Panel
2^L^|R|201702210552|201702210552||||R|||201702210635||4377||0590||||||^16^1
6^032|F|
C|1|L|00543417~02009659|
OBX|1|NM|BUN^Blood Urea Nitrogen^L^||51|mg/dL|7 - 18|H|||F|||||MLR|
OBX|2|TX|NAKG^Na   K Group^L^|
OBX|3|NM|NA^Sodium^L^||128|mmol/L|136 - 145|L|||F|||||MLR|
OBX|4|TX|REM^Remarks^CGHL||Result/s double-checked by manual
method.~Specimen from unit.||||||F|||||MLR|
L|||1|9||
```

– Generated HL7 message with dummy result value

```
MSH|^~\&|LIS|001^000|HOST||20170221061926||ORU^R01^ORU_R01|TD0000010516|P|2
.3|||AL|NE|||||
PID|1||1556542216^^^^PATNUMBER~4556889960^^^^ALTNUMBER||RAM^Ki^^^^^L~Jinn^^
^^^^M||19210418|F||id^|||||||id^|||||||||||||||||
PV1|1||0230^5211|||||||||||||||||||||||||||||||||||||
ORC|RE||8027106574RNP2||A||^^^20170221055200^^R||20170228173608|||4377|0590
||20170221055200
OBR|1||8027106574RNP2|RNP2^Renal Panel
2||20170221055200|20170221055200||||||20170221063500||4377|||||||^16^16^0
32|P||^^^20170221055200^^R|||||||| NTE|1||00543417\.br\02009659
OBX|1|NM|BUN^Blood Urine Nitrogen|1|51|mg/dL|7 - 18|H|||F|||||MLR|||
OBX|2|TX|NAKG^NAKG|1|****DUMMY||||||F|||||||
OBX|3|NM|NA^Sodium Na SPTL|1|128|mmol/L|136 - 145|L|||F|||||MLR|||
OBX|4|TX|REM^Remarks|1|Result/s double-checked by manual
method.\.br\Specimen from unit.||||||F|||||MLR|||
```

OBX-11 (Observation result status) of a dummy result value is set by using the value defined in DUMMYTESTSTATUS which is 'F' by default.

2. **#FTSEPARATOR#** -

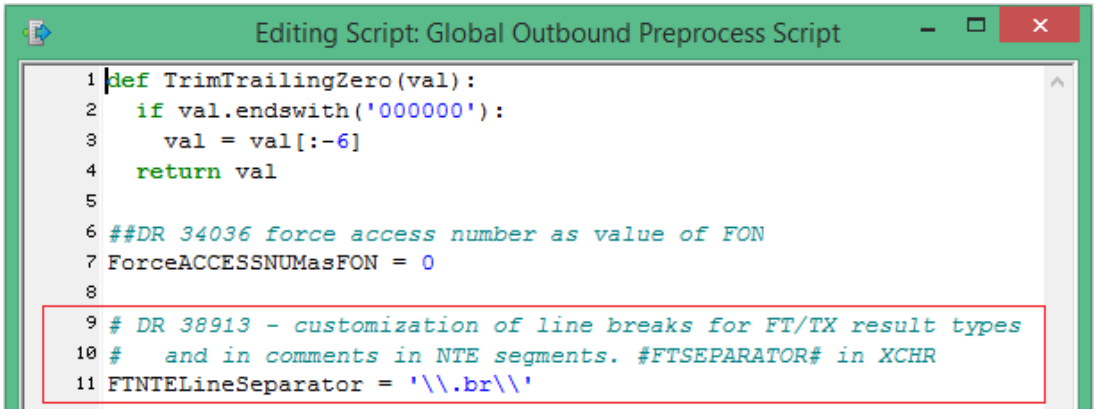
This parameter is used to customize the line breaks in FT/TX result values and in NTE segment comments. By default, line breaks are defined as '\.br\'.

To use a different value for line breaks:

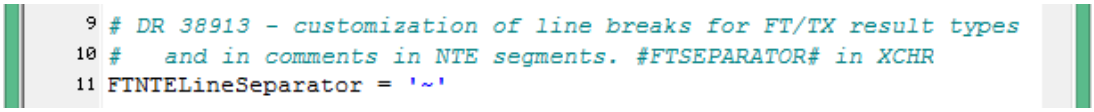
a. Open the `HL7ResultTransmission.vmd` file.

b. Edit the **Global Outbound Preprocess Script**.

Go to **Chameleon** -> **Global Outbound Preprocess Script** (keyboard shortcut: F10), and edit the **Global Outbound Preprocess Script** to set the line separator value.



Example: Defining '~' as line breaks



– Example output with '~' character as line breaks (using the same ASTM message as above)

```
MSH|^~\&|LIS|001^000|HOST||20170221061926||ORU^R01^ORU_R01|TD0000010519|P|2
.3|||AL|NE|||||
PID|1||1556542216^^^^PATNUMBER~4556889960^^^^ALTNUMBER||RAM^Ki^^^^^L~Jinn^^
^^^^M||19210418|F||id^|||||||id^|||||||||||||||||
PV1|1||0230^5211|||||||||||||||||||||||||||||||||||||||
ORC|RE||8027106574RNP2||A||^^^20170221055200^^R||20170228174859|||4377|0590
||20170221055200 OBR|1||8027106574RNP2|RNP2^Renal Panel
2||20170221055200|20170221055200|||||||20170221063500||4377|||||||||^16^16^0
32|P||^^^20170221055200^^R|||||||||
NTE|1||00543417~02009659
OBX|1|NM|BUN^Blood Urine Nitrogen|1|51|mg/dL|7 - 18|H|||F|||||MLR|||
OBX|2|TX|NAKG^NAKG|1|****DUMMY||||||F|||||||||
OBX|3|NM|NA^Sodium Na SPTL|1|128|mmol/L|136 - 145|L|||F|||||MLR|||
OBX|4|TX|REM^Remarks|1|Result/s double-checked by manual method.~Specimen
from unit.||||||F|||||MLR|||
```

TCP/ IP transport layer

Description of TCP/IP information exchange

TCP/IP socket low-level protocol is the transport layer used for exchanging data through devices located on the same network. The purpose of this section is to describe the mechanisms for data exchange between a Host and the Communication engine when TCP/IP socket is implemented as low-level protocol.

Overview

Data is exchanged between the Host and Communication engine by transmission of data blocks through a socket.

To enable data exchange, a socket (connection) must first be established. One part is the *server*, the other part the *client*. The client asks the server permission to connect to a specific port. The server on its side must be listening to this port.

The operations must be performed in the following order:

1. The server must be created and must be listening to a specific port.
2. The client asks the server permission to connect to this port.
3. If permission is granted, a socket is established between the client and the server.
4. Data can be sent back and forth through the previously established socket.

When finished, the client disconnects.

The Communication engine can act either as a client or as a server.

See also:

- Transmission diagram
- Data block structure
- Administrative port definition
- Incident management on the TCP/IP socket

TCP/IP transmission diagram

After the communication has been established between the client and the server, data is sent to the server by the client.

The TCP/IP client establishes the connection and transmits data to the server.

The following diagrams show how the transmission proceeds, depending on the result of the physical integrity check.

Connection phase between the client and the server

This phase includes socket creation, establishment of the connection etc (see Description of TCP/IP information exchange).

Successful information exchange with acknowledgement

Client		Server
<SB>tvv<CR>ddddccccccxxx<EB><CR>		Data block sent by the client with an HL7 message embedded in it. After checking for correct data transfer (physical integrity), the HL7 message is parsed and managed. An HL7 ACK message is then sent, with or without an error code depending on the result of this processing.
Data block sent by the server with a HL7 ACK message embedded in it		<SB>tvv<CR>ddddccccccxxx<EB><CR> "dddd" contains the various HL7 messages composing the logical acknowledgement (MSH,MSA and ERR segments)

The Client is responsible for closing the connection upon receipt of the Acknowledgement.

Exchange with a transmission error

Client		Server
<SB>tvv<CR>ddddccccccxxx<EB><CR>		Data block sent by the client with an HL7 message embedded in it. During the physical integrity check, an incorrect block format has been detected. A special data block is sent (NAK block).
Data block sent by the server with a physical NAK message embedded into it (character 'C')		<SB>Nvv<CR>C/000EBxxx<EB><CR> Negative physical acknowledgement sent by the connection if something is wrong with the physical transmission (incorrect checksum, incorrect count of characters)
The Client is responsible for sending the data block back or simply discarding it and executing its own error handling routine.		
<SB>tvv<CR>ddddccccccxxx<EB><CR>		Data block sent by the client with an HL7 message embedded in it. After checking for correct data transfer (physical integrity), the HL7 message is parsed and managed. An HL7 ACK message is then sent, with or without an error code depending on the result of this processing.
Data block sent by the server with a HL7 ACK message embedded into it		<SB>tvv<CR>ddddccccccxxx<EB><CR>

		"dddd" contains the various HL7 messages composing the logical acknowledgement (MSH,MSA and ERR segments).

The Client is responsible for closing the connection upon reception of the Acknowledgement.

For more information on data blocks, see Data block structure.

See also:

- Troubleshooting TCP/IP communications

Data block structure

Depending upon the TCP/IP Lower Layer Protocol property in the **Devices** Dictionary, two Data Block structures are possible: Hybrid and Minimal.

Hybrid HL7 Low Layer Protocol

There are two types of block: data blocks and NAK blocks.

HL7 messages are transmitted in single data blocks.

NAK blocks are used to signal physical transmission errors.

Both block types have the same format: <SB>tvv<CR>ddddccccxxx<EB><CR>

Blocks consist of the following fields.

Field	Description
<SB> =	Start Block character (1 byte). Configurable on a site specific basis. Unless there is a conflict, the value should be ASCII <VT>, i.e. <0x0B>. This should not be confused with the SOH or STX ASCII characters. **This character must be the same as that configured as "Start of block character" in the Devices dictionary.**
t =	Block Type (1 byte). "D" = Data block "N" = NAK block
vv =	Protocol ID (2 bytes). Characters "2" "4" for this version.
<CR> =	Carriage Return (1 byte). The ASCII carriage return character, i.e. <0x0D>.
dddd =	Data (variable number of bytes). In a data block, it corresponds to the data content of the block. The data can contain any displayable ASCII characters and the carriage return character, <CR>. Carriage returns that are not part of the HL7 message may be inserted as described in "Carriage Return Stuffing." In a NAK block, this field contains a 1-byte reason code as follows: 'C' - character count wrong in previous data block received 'X' - checksum wrong in previous data block received 'B' - data too long for input buffer in previous block received 'G' - Error not covered elsewhere.
ccccc =	Block Size (5 bytes). Character count of all characters so far in the data block up to and including the last data character. For this protocol version, it corresponds to 5 + the size of the "dddd" field. **Note:** HL7 message ends with a <CR> character. This character is considered as part of the data.
xxx =	Checksum (3 bytes). Exclusive-OR checksum of all characters in the block up to and including the last data character. The checksum is expressed as a decimal number in three ASCII digits. If the value of this field is 999, the checksum should not be computed. Processing will proceed as if it were correct. This feature is used for applications where the messages will be translated from one character set to another during transmission. **The "Checksum type" property in the Devices dictionary must be set to "Checksum for HL7 low layer protocol".**
<EB> =	End Block character (1 byte). Configurable on a site specific basis. Unless there is a conflict, the value should be ASCII <FS>, i.e. <0x1C>. This should not be confused with the ETX or EOT ASCII characters.

	This character must be the same as that configured as "End of block character" in the Devices dictionary.
<CR> =	Carriage Return (1 byte). The ASCII carriage return character, i.e., <0x0D>.

Minimal HL7 Low Layer Protocol

HL7 messages are enclosed by special characters to form a block. The format is as follows:

Field	Description
-	<SB>dddd<EB><CR>
<SB> =	Start Block character (1 byte) ASCII <VT>, i.e., <0x0B>. This should not be confused with the ASCII characters SOH or STX. **This character must be the same as that configured as "Start of block character" in the Devices dictionary.**
dddd =	Data (variable number of bytes) This is the HL7 data content of the block. The data can contain any displayable ASCII characters and the carriage return character, <CR>.
<EB> =	End Block character (1 byte) ASCII <FS>, i.e., <0x1C>. This should not be confused with the ASCII characters ETX or EOT.
<CR> =	Carriage Return (1 byte) The ASCII carriage return character, i.e., <0x0D>. **This character must be the same as that configured as "End of block character" in the Devices dictionary.**

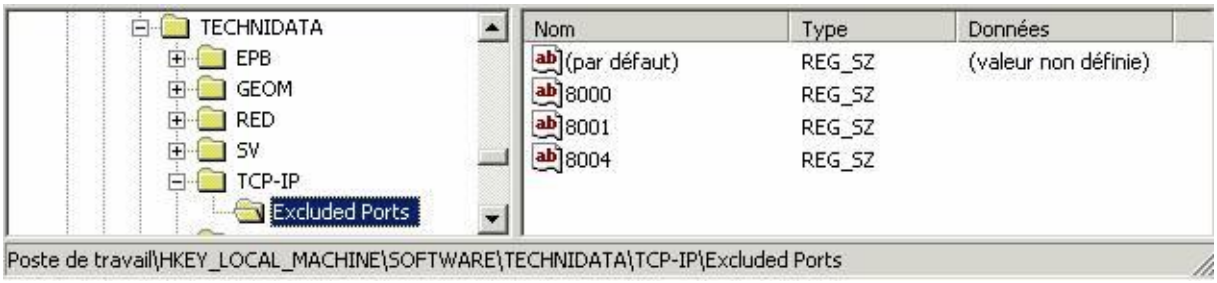
Administrative port definition

The TCP/IP address of the communication port (needed for internal use) is allocated dynamically when the Connection service is started (search for an available address on the concerned computer). It uses the first port available, starting at 8000.

NOTE: The port indicated in this section is used by the TDCnx service. It must not be confused with the ports defined in the **Device** properties (listening port or outgoing port).

Excluding ports

A list of excluded ports by computer can be specified. It must be set up in the registry as in the following example:



Specifying the port for a service

You can also specify the port to be used by the service:

1. In regedit, go to: `HKLM\SYSTEM\CurrentControlSet\Services\<Service name>-<instance name>`
2. Modify the value of **Image path**, adding the port number at the end of the line.

EXAMPLE: `c:\technidata\ProductClient-Appli1\servcnx.exe TDCnx1 8011`

FTP transport layer

Description of FTP/SFTP information exchange

ASTM files can be transferred by the File Transfer Protocol (FTP) or Secure File Transfer Protocol (SFTP).

File Transfer Protocol (FTP)

The FTP low-level protocol is a transport layer used for exchanging data via the network. FTP low-level protocol appears as a standard tool for the network. The purpose of this section is to describe data exchange between the Communication engine and a receiver (Host system, database or other applications) when the FTP low-level protocol is implemented.

Data is exchanged between the Communication engine and the receiver by exchanging files. One file can be transferred at a time and it must be identified. The file is transferred from the Communication engine to the receiver, and stored in the final directory.

There is no flow control between Communication engine and the receiver: the files are sent as soon as the FTP connection is established and as long as there is enough space on the reception disk to store the files.

Secure File Transfer Protocol (SFTP) (available from TDNexLabs V01.41 also in V01.32)

SFTP transport is the transport layer used when exchanging files in a secure connection.

It is used on communications where the Secure File Transfer Protocol (SFTP) is supported or implemented.

In SFTP transfer, the data transferred to and from the server is encrypted - no user login credentials or file data are transferred in plain text.

File identification

When FTP or SFTP low-level protocol is implemented, all file identification must follow the same rule: Sender and receiver must be identified so that a file name is given only once.

The length of the file name must be defined as n characters (where n is defined by the **Counter length for files to handle** device property in the **Devices** dictionary), with an additional 3-character extension (`.XXX`). This extension is defined by the **Generated file extension** property in the **Devices** dictionary.

The characters identifying the file name can be alphanumeric (A to Z, and 0 to 9).

The file name is composed of:

- The sender/receiver identifier, defined by the **Generated file prefix** property in the **Devices** dictionary
- A sequential number
- Extension

EXAMPLE: TDR00123.AST
where:
TDR = sender
00123 = sequential number
AST = extension

The sequential number is managed by the counter defined in the **Internal Counter** property in the **Devices** dictionary. If this counter is not defined or cannot be used, the job requesting the transmission is set to the "INTERRUPTED" error status and the following incident is generated:

"Could not get a proper value from counter %s : GetAutoCounter() returned %d"

The size of this counter is defined by the **Counter length for files to handle** property in the **Devices** dictionary (this property is set to 5 by default).

The result files are sent to the Host in the directory defined by the **FTP remote host** and **FTP remote output directory** properties in the **Devices** dictionary.

At first, the Communication engine produces and sends a `TDRxxxxx.AST` file and then an associated `TDRxxxxx.ok` file meaning that the `TDRxxxxx.AST` file is available. The Host tries to find the oldest `TDRxxxxx.ok` file. If this file exists, the Host reads and processes the associated request file, that is, the `TDRxxxxx.AST` file. After processing the result file, the Host must delete both files (that is, `TDRxxxxx.AST` and `TDRxxxxx.ok` files).

Each ASTM 1238 file contains the data of one patient.

See also:

- FTP transmission diagram
- Troubleshooting FTP communications

FTP transmission diagram

Transmission diagram

The following diagram shows the data flow:

Sender (Communication engine)	-	Receiver
TDR00001.AST		-
TDR00001.ok		-

-

Sender (Communication engine)	-	Receiver
TDR00002.AST		-
TDR00002.ok		-

-

Sender (Communication engine)	-	Receiver
TDR00003.AST		-
TDR00003.ok		-

See also:

- Troubleshooting FTP communications

Troubleshooting

TD-Com diagnostic tools

Tracking incidents

To get useful information about communication incident management, refer to the following topic available in the **Technical guide**:

Troubleshooting > Communication engine diagnostic tools > **Tracking incidents**

In that page, the following information is provided to assist in troubleshooting incidents:

- Spy files for devices
- Spy file for TDCnx service
- Starting the service in debug mode
- Event Viewer

Database information

Use the database possibilities when the Task Manager is not sufficient.

In the **Task Manager** window, when the tasks are in the "Ready" status (), they cannot be changed. You must use an SQL query. Use for example:

- `Select * from DICT_DEVICES.` This query gives all the devices of the dictionary
- `Select * from JOBS where deviceid = <deviceid of DICT_DEVICES>.` This query gives all the tasks associated with a device of the dictionary

Statuses

- 1 = ready
- 2 = in progress 
- 3 = stand by
- 4 = completed
- 5 = interrupted

To run the tasks again, set them to status 2. Device status:

- 0 Undefined
- 1 Ready
- 2 Pause
- 3 Error

Troubleshooting TCP/IP communications

The following information is provided to assist in troubleshooting incidents.

Message	Description of incident
More than one connection has been opened on the server!	This incident is generated if the server tries to accept a client connection while already having a client connected to it.
Invalid client socket retrieved!	This incident is generated if the server could not instantiate a client socket upon creation.
Couldn't accept connection!	This incident is generated if the server cannot accept a client connection.
Couldn't receive data through socket!	This incident is generated if an exception occurs while reading from the socket.
Connection couldn't create socket server. Connection Couldn't be successfully opened!	This incident is generated when the port defined in the Device properties (for example, listening or outgoing port) is already used.

Troubleshooting FTP / SFTP communications

The following information is provided to assist in troubleshooting incidents:

Message	Description of incident
Could not get a proper value from counter %s : GetAutoCounter() returned %d	The sequential counter used for the names of the files is not defined or cannot be used. When this incident occurs, the device communication is stopped.
Could not create file (%s)	The data file cannot be created on the local disk before its transmission via FTP.
Could not create file (%s)	The associated file (*.ok file) cannot be created on the local disk before its transmission via FTP.
User %s couldn't be logged onto host %s	The user cannot connect to the FTP Server.
The target directory couldn't be changed to %s	The target directory does not exist or is protected.
Could not create file %s on remote host	The user is not allowed to write in the target directory.
Unable to retrieve any PatientRecord from CTDOrder for Device %s	The Patient information is not available by the communication.
Invalid message type configured in the dictionary	The **Message Type** property is not defined in the **Device** dictionary. When this incident occurs, the device corresponding to the communication is set to Error status.

Each time one of the above incidents occurs, the task requesting the transmission is set to the "Interrupted" status (JOBSTATUS_INTERRUPTED).

Error messages when using SFTP transport (from TDNexLabs V01.41 also in V13.32)

- If the server does not support SSH/SFTP connections or an incorrect port number is used, the following error is encountered:
  User <user id> couldn't be logged onto host: <remote host>. Connection failed! RetCode:(-1) - Timeout connecting to <remote host>.
- If the server is invalid, the following error is encountered:
  User <user id> couldn't be logged onto host: <remote host>. Connection failed! RetCode:(-1) - Failed to resolve hostname <remote host> (No such host is known.)
- If the SFTP user ID and password is incorrect, the following error is encountered:
  User <user id> couldn't be logged onto host: <remote host>. User authentication error! RetCode:(1) - Access denied. Authentication that can continue: publickey,gssapi-keyex,gssapi-with-mic,password.
- If the local temporary folder is invalid and application is unable to create the temporary file, the following error is encountered:
  Could not create file : <local temporary folder><filename>. Could not send file to remote host.
- If the remote output path does not exist, the following error is encountered:
  Could not send file to remote host. Can't create file '<output file>' for writing: SFTP server: No such file

- If the remote output path is write protected, the following error is encountered:
  Could not create file on remote host. Can't create file '<output file>' for writing: SFTP server: Permission denied
- If the remote input directory is invalid or the SFTP user has no rights to browse the directory, the following error is encountered:
  Could not look for files on remote host. Failed to open directory '<directory>'!
- If the removal of file in the remote directory failed, the following error is encountered:
  Could not remove the data file from the remote host. Deletion of '<filename> failed!
- If the renaming of file in the remote directory failed, the following error is encountered:
  Could not retrieve file from remote host. Rename of '<old filename>' to '<new filename>' failed.
- If a file cannot be transmitted completely, the incomplete file is deleted on the remote host and the following error is encountered:
  Could not send file to remote host. Failed to completely transmit file '<filename>' (<bytes sent>/<total number of bytes>). Removing file '<filename>'...

Each time one of the above incidents occurs, the task requesting the transmission is set to the "Interrupted" status (JOBSTATUS_INTERRUPTED).

Incident related to the device property "FTP remote output directory" that is misinterpreted (from TDNexLabs V01.51.B)

A hidden device parameter is available to change the directory path format using absolute path instead of relative path.

To implement this mechanism, relative had to be converted to absolute path using the FTP current directory which is in absolute path format based on local testing.
For example, if FTP current directory is "`/cible/files`" and FTP remote output directory is "`../`" then converted absolute path for output directory will be "`/cible/`".

The use of absolute path for output directory is applicable only if the current directory is in absolute path format.

This feature is disabled by default. To enable this feature, the hidden device parameter PARAMVALUE must be updated to **1**, as described below:

UPDATE PARAM_VALUES SET PARAMVALUE = 1 WHERE PARAMID = 'TDI_Convert_relative_path_to_absolute_parameter'

To disable the feature set PARAMVALUE to **0**.

Naming of DLLs used in transmission of results in HL7 format

Transmission of results (ORU) messages requires several different communications to be installed. Each communication needs four different DLLs, for the Application, Protocol, Format and Transport layers.

If your software version is lower than V11.91.A

These DLLs are installed automatically when you install the Client and select the corresponding communication.

When you create the connection device in the **Device** dictionary, the user-friendly names of the DLLs should be displayed. If the filename of the DLL is displayed instead of the user-friendly name, use the Windows **Programs and Features** utility to reinstall the DLL before proceeding with installation. To do this:

1. From the Windows Control Panel, select **Programs and Features**.
2. Select **TD-Synergy Client_*<InstanceName>.***
3. Click **Change.**
4. In the InstallShield Wizard, select **Modify.**
5. Select the feature you need to reinstall by choosing the correct user-friendly name.
6. Follow the on-screen instructions to complete the installation.
7. Return to the creation of the device in the **Device** dictionary: you will see that the user-friendly name of the DLL is now displayed. You can now continue with your installation.

For TD-Synergy from version V11.91.A and for TDNexLabs, these DLLs are always installed automatically when you install the Client.

For reference purposes, the tables which follow list the filenames of the DLLs and their user-friendly names:

Internal ASTM communication for result reception

This device receives ASTM result messages (ORU) (internal communication) and creates a task to transmit it to the Host.

When you install the Client, and select this communication, the following four DLLs required for the communication are installed automatically:

Layer	DLL	User-friendly name
Application	TDCnxAppWRH.dll	Patients/Orders/Results processing
Protocol	TDCnxProtoFolder.dll	File transfer
Format	TDCnxFormASTM1238.dll	ASTM 1238 High Level Protocol
Transport	TDCnxTransFile.dll	File I/O

Transmission of HL7 ORU messages to the Host

This device processes the result messages received in ASTM format and transmits them to the Host in HL7 format when all Placer Order Number (PON) information is available

When you install the Client, and select this communication, the following four DLLs required for the communication are installed automatically:

Layer	DLL	User-friendly name

Application	TDCnxAppResult.dll	Order/Results transmission
Protocol	TDCnxProtoHISADT.dll	HL7 Low Layer Protocol
Format	TDCnxFormHL7.dll	HL7 format Patients/Orders/Results
Transport	TDCnxTransTCPIPSocket.dll	For TDNexLabs from V01.21, TD-Synergy from V12.21, and for TD-Synergy V11.83, TCP/IP socket transport 2

Reception of HL7 ORM messages from the Host

This device receives ORM messages in HL7 format from the Host, providing the PON required for the task.

When you install the Client, and select this communication, the following four DLLs required for the communication are installed automatically:

Layer	DLL	User-friendly name
Application	TDCnxAppWRH.dll	Patients/Order/Results processing
Protocol	TDCnxProtoHISADT.dll	HL7 Low Layer Protocol
Format	TDCnxFormHL7.dll	HL7 format Patients/Orders/Results
Transport	TDCnxTransTCPIPSocket.dll	For TDNexLabs from V01.21, TD-Synergy from V12.21, and for TD-Synergy V11.83, TCP/IP socket transport 2

Accept Acknowledgment code CA

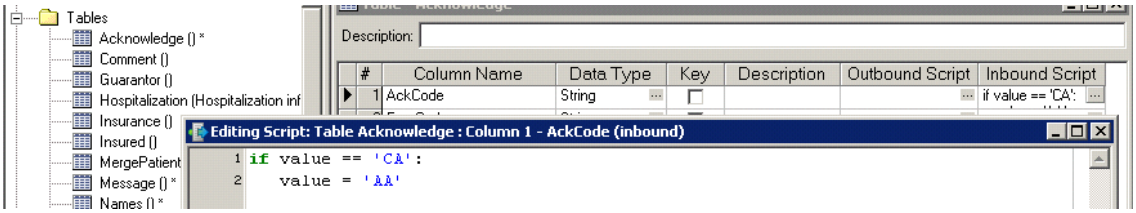
HL7 has the following sets of acknowledgment codes:

- The first and most common set (used by the Communication engine) is for both original mode and enhanced acknowledgment mode. This set contains the following codes:
  - AA - Application Accept
  - AE - Application Error
  - AR - Application Reject.
- The second code should normally be used only for enhanced acknowledgment mode. It represents physical acknowledgments, where the message has been stored but the application can refuse to perform the action for some reason. This set contains the following codes:
  - CA - Commit Accept
  - CE - Commit Error
  - CR - Commit Reject.

By default, the Communication engine considers as positive acknowledgments only acknowledgments that have MSA-1=AA (Application Accept). However, if the host uses the code CA - Commit Accept, it is possible to interpret CA as AA by modifying the Chameleon file.

Modifying the Chameleon file

1. Open the Chameleon file that is associated to the result transmission flow (delivered under the name HL7ResultTransmission.vmd)
2. Open the table Acknowledge
3. Open the Inbound Script of the field AckCode
4. Add the following script:



5. Pause and unpause the device so that it takes into account the modification.

Appendix

End User Agreement

The interface specification described in the attached Communication Installation Guide is confidential and is strictly reserved for communication with a Hospital Information System. An End User Agreement containing the text hereunder must be agreed by the Customer (End User). This interface specification is for the exclusive use of sites covered by an End User Agreement. Use of this interface specification implies full acceptance of the terms and conditions of the End User Agreement hereunder.

End User Agreement for Communication Installation Guide # INST002

PLEASE READ THIS AGREEMENT CAREFULLY.
THE USE OF THE INTERFACE SPECIFICATION SHALL IMPLY ACCEPTANCE OF THIS AGREEMENT.
IF YOU DO NOT AGREE, YOU MUST NOT USE THE INTERFACE SPECIFICATION.

Ownership

TECHNIDATA shall retain all titles and intellectual property rights of the attached interface specification. The interface specification is protected under international laws related to intellectual property rights.

The Customer agrees that it does not have any title or ownership on the attached interface specification.

Use

The Customer may use the Interface Specification, provided that the product license has been properly acquired.

The Customer shall only use the Interface Specification for his own needs.

The Customer shall only use the Interface Specification for the purpose of communication with a Hospital Information System. Consequently, Customer is not authorized, in any way, to use the Interface Specification for any other type of communication or for any other purpose.

The Customer shall not use any portion of the said Interface Specification for the purpose of interfacing or creating new software programs to be made available to any third party, either free of charge or for pecuniary benefit.

The Customer shall not disclose, communicate or use for the benefit of any third party any portion of the said Interface Specification

The Customer must be aware that the Interface Specification is likely to evolve. The Customer therefore agrees that any software that relies on this Interface Specification may require to be updated to maintain existing functionality.

Upon termination of this Agreement, the Customer shall return all materials which contain information related to the Interface Specification, including written notes, photographs, memoranda or notes taken.