VISION-LIS

1 Introduction

Vision LI is the protocol used by Vision software to communication with a centralized LIS (Laboratory Information System).

Vision LIS has two ways:

Method One：**TCP/IP Protocol**

Method Two：**Xml File**

2 TCP/IP Protocol

The protocol is built on top of TCP/IP and uses stream sockets to transfer data between Vision software and the LIS. The entire protocol is text-based, which makes it very easy to implement on any kind of platform. No proprietary frameworks, tools or data formats are required to implement this protocol.

The TCP/IP port Vision software connects to is 809, unless it is otherwise configured.

The protocol works both ways: some requests are sent from Vision software while others are sent from the LIS.

Each request or reply is followed by a new-line character (ASCII value: 10).

All requests are encoded using UTF-8 transformation format. This allows the protocol to represent every character in the Unicode set.

Multiple tokens in a single request (i.e. type, parameters ...) are separated by a tab character (ASCII value: 9).

Request types (CLOSE, CONNECT ...) are not case sensitive.

Booleans are represented with text strings (True and False).

Floating-point numbers are represented using a dot character (ASCII value: 46) as decimal separator.

Dates are represented using ISO 8601 standard (e.g.2001-10-20T10:30:00Z).

1.1Request Format

Request ID	A non-negative increasing integer that identifies this request. This is unique within the context of the same connection. All requests except CLOSE will be acknowledged with an ACK (described below) containing the same Request ID.
Request Type	A text string specifying the type of request. The following chapters will list in detail all requests sent by Vision software (CLOSE,

	CONNECT, RESULT, RESULTS) and the LIS(GET, LIST).
Parameter 1	Most requests require the transmission of further information through a number of parameters. These can be any kind of data types, depending on the request, but they are always represented as text strings and they never contain a tab character (ASCII value: 9).
…	
Parameter N	

1.2 ACK Format

Request ID	A non-negative integer identical to the ID of the request acknowledged by this ACK.
Request Type	The text string ACK.

1.3 Vision Software Requests

The CLOSE request is sent when Vision software does not need to send any more requests, just before closing the connection. This request has no parameters and expects no ACK. It can be safely ignored in case the LIS does not need to be notified before the underlying stream is shut down.

The CONNECT request is sent by Vision software immediately after the socket stream has been success fully open. It has 3 parameters and must be acknowledged.

1. Protocol version. There is only one version of the protocol and this parameter is always 1.
2. Client version. This parameter contains Vision software version (i.e. the 4-digit version information embedded in Windows executable file).
3. Client ID. This parameter uniquely identifies one installation of Vision software. It is a GUID(globally unique identifier) that never changes, even when the software is updated, and can be used by the LIS to associate results to the specific installation where they are stored. This is useful to keep track of result transmission history and prevent reception of duplicate results from Vision

The RESULT request is used to transmit a single result to the LIS. This request is sent in response to a GET request from the LIS, and contains all the data associated with a sample processed on the Vision. It has 12 parameters and must be acknowledged.

1. Index. A 0-based result index that uniquely identifies the result on this specific installation of Vision software. This information, together with the client ID received with the CONNECT request, uniquely identifies the sample result even when multiple installations are connected to the same LIS.
2. Instrument serial number. A text string containing the serial number of the instrument on which the sample was analyzed.
3. Time. ISO 8601 representation of the date and time the analysis was completed. If multiple samples are analyzed in the same batch, they will all report the same value in this field.

4. Position. An integer number between 1 and 32, representing the physical position of the sample tube inside the instrument at the time of analysis.
5. Sample code. The sample code, either scanned with an external barcode scanner or manually entered by the user.
6. Blood level. A floating-point number with the initial blood level (measured in mm) detected by the instrument, which is the actual height of the blood column inside the tube. This information can be useful to flag abnormal results, because even if the user is allowed to run any samples on the instrument, blood levels below 20 mm are not recommended.
7. ESR. A floating-point number between 2 and 120 with the estimated ESR value (measured in mm/h).
8. Corrected ESR. A floating-point number between 2 and 120 with the ESR value (measured in mm/h) corrected using Manley's nomogram depending on the average temperature measured during the analysis.
9. Minimum temperature. A floating-point number with the minimum temperature (measured in degree Celsius) measured during the analysis.
10. Maximum temperature. A floating-point number with the maximum temperature (measured in degree Celsius) measured during the analysis.
11. RANDOM flag. A boolean value indicating wether or not the sample was run in RANDOM mode (this flag is True in this case), which is a special way of operating the instrument allowing random access to the sample tray and continuous sample loading.
12. Unfinished flag. Samples run in RANDOM mode can be stopped before the analysis is complete if the result is already stable. This flag is True if the result comes from a sample stopped in this way.

The RESULTS request is used to tell the LIS how many results are available. This request is sent in response to a LIST request from the LIS, or each time a new analysis is completed. It has 1 parameter and must be acknowledged.

1. Count. An integer representing how many results are stored on this installation. The LIS can use this information to check wether or not all results are already stored in its database and eventually send a GET request to retrieve new results.
2. Sample Count. An integer representing how many samples are tested on this cycle.

1.4 LIS Requests

The GET request is sent by the LIS to retrieve all specified results. After the ACK, Vision software will send 1 or more RESULT requests, according to the specified range. It has 2 parameters.

1. Start index. An integer representing the low end (inclusive) of the result range the LIS wants to retrieve.
2. End index. An integer representing the high end (inclusive) of the result range the LIS wants to retrieve.

The CODE request is sent by LIS to retrieve all specified sample code results. After the ACK, Vision software will send 1 or more RESULT requests, according to the specified range. It has one parameters.：

1. Sample Code. A text string representing code of sample.

The DATE request is sent by LIS to retrieve all results in date range. After the ACK, Vision software will send 1 or more RESULT requests, according to the specified range. It has two parameters.

1. Date From. A text string representing the selecting of starting date. The date format is “yyyy-MM-dd HH:mm:ss”，Time is 24 hour Clock.
   e.g :“2015-08-01 13:20:59
2. Date To. A text string representing the selecting of ending date. The date format is “yyyy-MM-dd HH:mm:ss”，Time is 24 hour Clock.
   e.g :“2015-08-01 14:20:59.

The CODEDATE request is sent by LIS to retrieve all results in date range with the specified sample code. After the ACK, Vision software will send 1 or more RESULT requests, according to the specified range. It has three parameters.：

1. Sample Code. A text string representing code of sample。
   Date From. A text string representing the selecting of starting date. The date format is “yyyy-MM-dd HH:mm:ss”，Time is 24 hour Clock.
   e.g“2015-08-01 13:20:59
2. Date To. A text string representing the selecting of ending date. The date format is “yyyy-MM-dd HH:mm:ss”，Time is 24 hour Clock.
   e.g“2015-08-01 14:20:59.

The LIST request is sent by the LIS to retrieve the result count. After the ACK, Vision software will send a RESULTS request with the quantity of sample results stored in its database. It has no parameters.

3 XML File

3.1 Xml Generator Regular

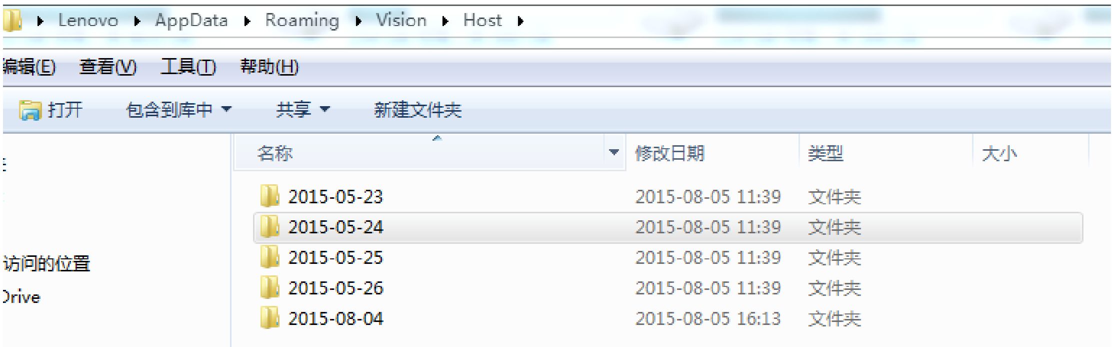
（1） XML File：C:\Users\Lenovo\AppData\Roaming\Vision\Host。
Attention：Lenovo：this is the log name and is verified for different PC.

（2） One Xml File only contains one sample result.

（3） The Xml File will be generated automatically after finishing the cycle.

3.2 Xml File Path【Host folder】and regular of xml file name

（1） Host folder: folder named by result time and all the result xml files are stored in same folder with same date.


Lenovo ▸ AppData ▸ Roaming ▸ Vision ▸ Host ▸
编辑(E) 查看(V) 工具(T) 帮助(H)
打开 包含到库中 ▾ 共享 ▾ 新建文件夹
访问的位置
Drive

名称	修改日期	类型	大小
2015-05-23	2015-08-05 11:39	文件夹	
2015-05-24	2015-08-05 11:39	文件夹	
2015-05-25	2015-08-05 11:39	文件夹	
2015-05-26	2015-08-05 11:39	文件夹	
2015-08-04	2015-08-05 16:13	文件夹	

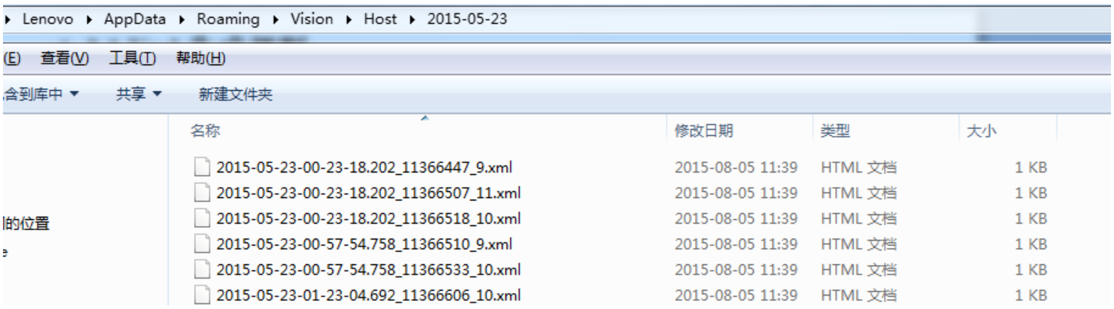
（2）Regular of xml file name：Date + Sample code + Position

1、 Date，Sample code, Position are distinguished by ‘_’.

2、 Date format：“yyyy-MM-dd-HH-mm-ss.ff”
Attention：date accuracy is millisecond.

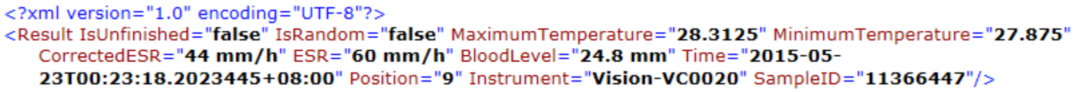
3、 Sample Code：The special character will be replaced by ‘S’ if sample code contains the special character which the windows content of path is not allowed.

4、 Position：Sample test position on Vision instrument.


Lenovo ▸ AppData ▸ Roaming ▸ Vision ▸ Host ▸ 2015-05-23
(E) 查看(V) 工具(T) 帮助(H)
含到库中 ▾ 共享 ▾ 新建文件夹
的位置

名称	修改日期	类型	大小
2015-05-23-00-23-18.202_11366447_9.xml	2015-08-05 11:39	HTML 文档	1 KB
2015-05-23-00-23-18.202_11366507_11.xml	2015-08-05 11:39	HTML 文档	1 KB
2015-05-23-00-23-18.202_11366518_10.xml	2015-08-05 11:39	HTML 文档	1 KB
2015-05-23-00-57-54.758_11366510_9.xml	2015-08-05 11:39	HTML 文档	1 KB
2015-05-23-00-57-54.758_11366533_10.xml	2015-08-05 11:39	HTML 文档	1 KB
2015-05-23-01-23-04.692_11366606_10.xml	2015-08-05 11:39	HTML 文档	1 KB

3.3 Xml File



```
<?xml version="1.0" encoding="UTF-8"?>
<Result IsUnfinished="false" IsRandom="false" MaximumTemperature="28.3125" MinimumTemperature="27.875"
    CorrectedESR="44 mm/h" ESR="60 mm/h" BloodLevel="24.8 mm" Time="2015-05-
    23T00:23:18.2023445+08:00" Position="9" Instrument="Vision-VC0020" SampleID="11366447"/>
```

1. Instrument. A text string containing the serial number of the instrument on which the sample was analyzed.
2. Time. Result time of the analysis was completed. If multiple samples are analyzed in the same batch, they will all report the same value in this field.
3. Position. An integer number between 1 and 32, representing the physical position of the sample tube inside the instrument at the time of analysis.
4. SampleID. The sample code, either scanned with an external barcode scanner or manually entered by the user.
5. Blood level. A floating-point number with the initial blood level (measured in mm) detected by the instrument, which is the actual height of the blood column inside the tube. This information can be useful to flag abnormal results, because even if the user is allowed to run any samples on the instrument, blood levels below 20 mm are not recommended.
6. ESR. A floating-point number between 2 and 120 with the estimated ESR value (measured in mm/h).
7. Corrected ESR. A floating-point number between 2 and 120 with the ESR value (measured in mm/h) corrected using Manley's nomogram depending on the average temperature measured during the analysis.
8. Minimum temperature. A floating-point number with the minimum temperature (measured in degree Celsius) measured during the analysis.
9. Maximum temperature. A floating-point number with the maximum temperature(measured in degree Celsius) measured during the analysis.
10. RANDOM flag. A boolean value indicating wether or not the sample was run in RANDOM mode (this flag is True in this case), which is a special way of operating the instrument allowing random access to the sample tray and continuous sample loading.
11. Unfinished flag. Samples run in RANDOM mode can be stopped before the analysis is complete if the result is already stable. This flag is True if the result comes from a sample stopped in this way.

3.4 Xml file re-produce

The file must be exported by hand if the file is disappeared by some abnormal operation.